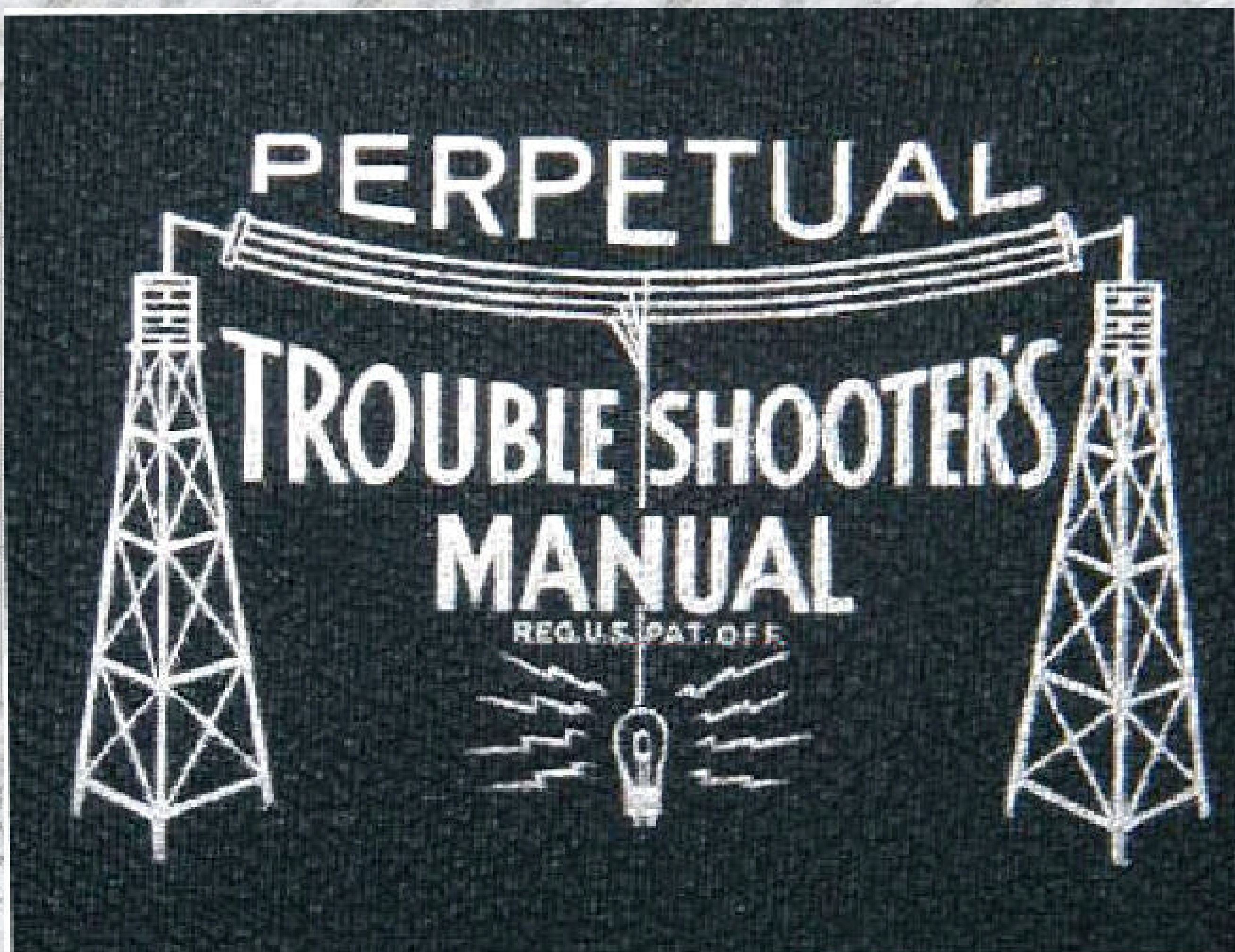
RIDER'S
VOLUME - X



COVERING OCTOBER 1938
THROUGH
AUGUST 1939

MODEL 1075, Series A, B
Alignment

BELMONT RADIO CORP.

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metalic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Pushbutton Indicated Below Pushed "In"	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7 I.F Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I. F.	Adjust to maximum output
BAND BROAD-CAST	1690 Kc.	200 mmf	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C17) (See Fig. 5)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set dial at 1400 Kc.	Trimmer (C7), (C19) (See Fig. 5)	Broadcast antenna and R. F.	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set dial at 600 Kc.	Trimmer (C22) (See Fig. 5)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set dial at 17 MC	Trimmer (C15) (See Fig. 5)	Short wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave	Set dial at 17 MC	Trimmer (C5), (C20) (See Fig. 5)	Short wave antenna and R. F.	Adjust to maximum output
MEDIUM WAVE BAND	5 Mc.	400 ohms	Antenna lead	Med. Wave	Set dial at 5 MC	Trimmer (C16) (See Fig. 5)	Medium wave oscillator	Adjust to maximum output
	5 Mc.	400 ohms	Antenna lead	Med. Wave	Dial set at 5 MC	Trimmer (C6), (C21) (See Fig. 5)	Medium wave antenna and R. F.	Adjust to maximum output

NOTE "A". Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attentuate the signal from the signal generator to prevent the leveling-off action of the AVC.

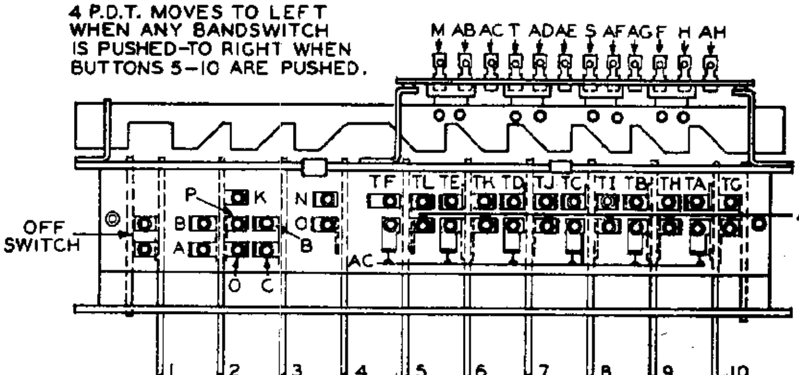
After each range is completed, repeat the procedure as a final check.

BAND	FREQUENCY RANGE
Broadcast	535 to 1690 Kc.
Medium Wave	1.66 to 5.5 MC.
Short Wave	5.5 to 18.0 MC.

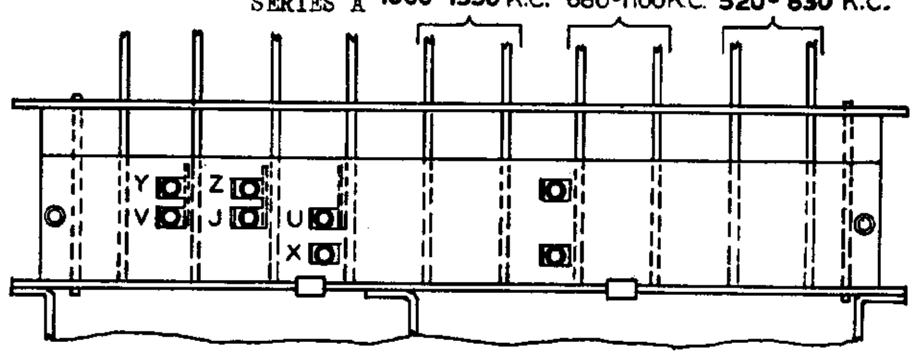
Power Consumption .... 100 Watts (At 115 volts 50-60 cycles)
Power Output .... 5 Watts Undistorted, 7.5 Watts Maximum
Intermediate Frequency .... 465 KC.

TOP VIEW

4 P.D.T. MOVES TO LEFT WHEN ANY BANDSWITCH IS PUSHED—TO RIGHT WHEN BUTTONS 5–10 ARE PUSHED.



SERIES B 890-1570 KC 710-1235 KC 535-930 KC
SERIES A 1000-1550 K.C. 680-1100 K.C. 520-830 K.C.



662

BOTTOM VIEW

BELMONT RADIO CORP.

MODEL 1075, Series A, B
Socket, Trimmers, Voltage
Phono, Notes

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper Scale "BC"	535 to 1690 KC. (Kilocycles)
Medium Wave	Center Scale "MW"	1.66 to 5.5 MC. (Megacycles)
Short Wave	Lower Scale "SW"	5.5 to 18.0 MC (Megacycles)

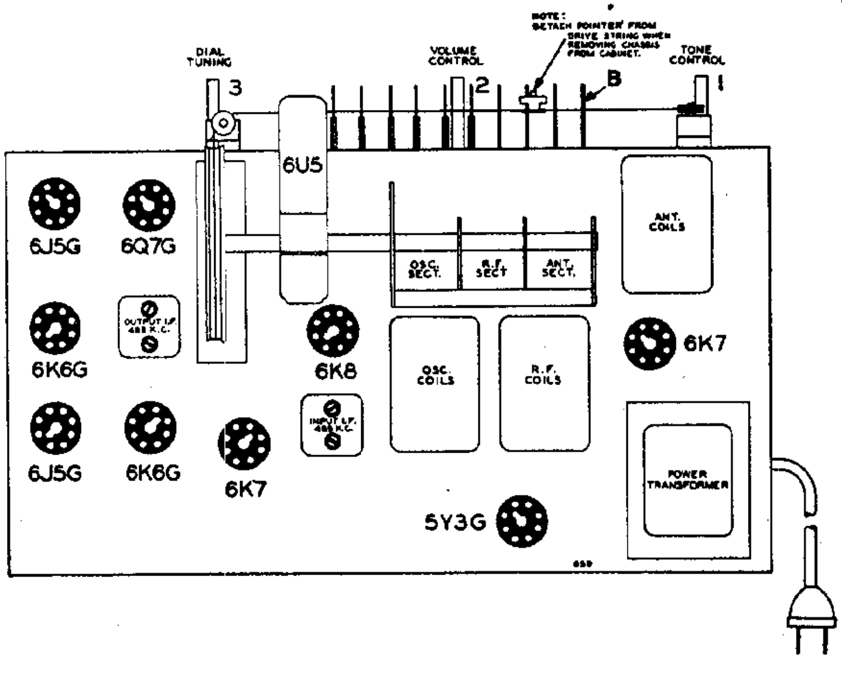


FIG. 2—TOP VIEW

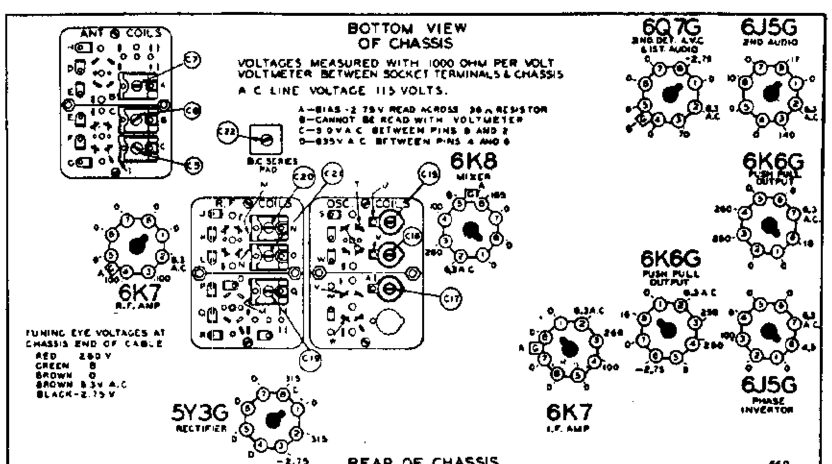


FIG. 5

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 2, top view).

NOTE:—On the back of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

DIAL CALIBRATION:

To correct dial calibration rotate the tuning knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider bar make the pointer self aligning thereby correcting dial calibration.

POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-115 volts, 50-60 cycle A. C. supply only. If you are in doubt as to the voltage and frequency rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes and speaker plug are in their proper sockets.

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 50-60 cycles are so marked. The power consumption of this receiver is 100 watts.

PHONOGRAPH CONNECTIONS:

A phonograph connector and switch are provided on the rear of the chassis. To operate; insert plug on end of phonograph pick-up lead into connector on chassis and move phonograph switch to "Phono" position. Volume and tone may be controlled by using the controls on the front of the radio.

BELMONT RADIO CORP.

PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHBUTTONS:

Important: Allow the radio to "warm up" for about 15 minutes before setting the station adjustment screws for the pushbuttons.

Only a single adjustment for each station is required in setting up your favorite stations for automatic pushbutton operation. These adjustments are located at the front of the chassis shown in Fig. 4 and are accessible through the station call letter tab holes. The only equipment needed is a small screw driver to make the adjustments.

Make a list of your favorite local stations, those which you tune in regularly. Put down the frequency (kilocycle number) of these stations. There may be 2, 3, 5 or any number up to and including six in this list.

If you do not know the broadcasting frequencies, consult your local newspaper or a radio log book. They can also be obtained by pressing the button marked "Broadcast" on the left and tuning in the stations manually, noting the numbers on the dial at which they are received.

The automatic station pushbuttons are grouped to cover specific frequency ranges.

The range of the frequencies covered by each button are given below and are also shown in Fig. 4. Only stations within the frequency ranges given can be obtained on a particular button. Counting the station buttons from left to right, looking at the front of the set, the frequency ranges are as follows:

1. 1550 to 1000 Kilocycles.
2. 1550 to 1000 Kilocycles.
3. 1100 to 680 Kilocycles.
4. 1100 to 680 Kilocycles.
5. 830 to 520 Kilocycles.
6. 830 to 520 Kilocycles.

This means that any station which has a kilocycle number lying between 1550 and 1000 K.C. can be set up on either Button 1 or Button 2. Any station which has a kilocycle number lying between 1100 and 680 K.C. can be set on either Button 3 or Button 4. Any station which has a kilocycle number lying between 830 and 520 K.C. can be set on either Button 5 or Button 6.

After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 4). Adjust screw through station tab opening above button pressed until the same station is heard clearly and tuning indicator indicates that it is correctly tuned.

TRANSFORMERS

104143	T14	50/60 Cycle Power Transformer 105-115 Volt Primary	4.00
104147		25/60 Cycle Power Transformer 105-115 Volt Primary	
104		25/60 Cycle Power Transformer Universal Primary	
104144		40/60 Cycle Power Transformer Universal Primary	
10556B	T12	Output Transformer for Speaker	1.50

SPEAKER

114126	T13	Twelve Inch Dynamic Speaker (600 Ohm Field)	7.00
10556B	T12	Output Transformer for Speaker	1.50

MISCELLANEOUS

101128	R13	Volume Control (1 Megohm)	1.00
101129	R11	Tone Control (250M Ohm)	.75
10280	C	Three Gang Variable Condenser	5.00
10556B	T12	Output Transformer for Speaker	1.50
1075		Line Cord and Plug	.50
11378		Antenna and Ground Terminal Strip	.25
11535		Shield for Ant., R.F., Osc., Coils	.15
115229		Tube Shield	.15
12561	S2	Phono-Radio Switch	.25
13437		Rubber Grommet for Variable Condenser Mounting	.02
13447		Rubber Chassis Mounting Cushions	.05
13244		No. 10—32 x 1¼" Chassis Mounting Bolts	.01

AUTOMATIC PUSHBUTTON ASSEMBLY PARTS

112466		Pushbutton Tuner Assembly Complete with Coils and Switch Mechanism	12.00
12562		Switch Assembly for Pushbutton Tuner (Less Coils)	4.50
11083	T7	Low Frequency Coil	1.25
11083B	T7	Low Frequency Coil	1.25
11082	T8	Medium Frequency Coil (Two Used)	1.25
11081	T9	High Frequency Coil	1.25
11081B	T9	High Frequency Coil	1.25
112492		Moulded Escutcheon for Pushbuttons (10 Hole)	.50
12199		Pushbuttons	.10

Press pushbutton marked "Broadcast" and tune in next station selected. Press button covering frequency range in which station is located. Adjust screw through station tab opening above button pressed until the same station is heard clearly and with maximum volume.

Follow this procedure for each button until you have selected all of your stations. The automatic buttons are now set up for quick tuning and no further adjustment is necessary.

NOTE: In setting up the pushbuttons, station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order or sequence of programs with that on dial tuning.

Punch out the station call letter tabs of the stations you have set up for the automatic buttons from the set of sheets supplied and insert them into the rectangular openings in the escutcheon. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

ANTENNA AND GROUND CONNECTIONS:

Antenna connections are made on the terminal board, with terminals marked "A" and "D" on the rear of chassis. When using a conventional antenna connect the lead-in to terminal "A". The ground lead should be connected to Terminal "G". When using a Doublet Antenna, connect one lead-in of the doublet to "A" and the other lead-in to "D". Connect a ground wire to Terminal "G". (See Fig. 1).

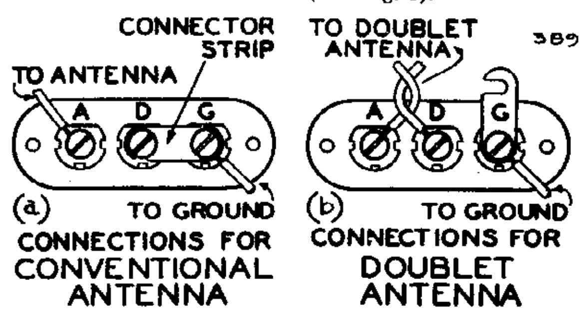


FIG. 1

COILS FOR PUSHBUTTON TUNER ASSEMBLY

11083	T7	Low Frequency Coil	1.25
11083B	T7	Low Frequency Coil	1.25
11082	T8	Medium Frequency Coils (Two Used)	1.25
11081	T9	High Frequency Coil	1.25
11081B	T9	High Frequency Coil	1.25

DIAL PARTS LIST

112509	Dial Scale (Calibrated)	1.00
112495	Moulded Escutcheon for Dial	.75
112446	Set of 2 Sheets Station Call Letters	.15
112336	Clear Pyralin Tabs for Station Call Letters, Doz.	.10
128199	Pushbuttons	.10
112492	Moulded Escutcheon for Pushbuttons (10 Hole)	.50
128195	Bakelite Knobs	.15
112459	Drive Drum Complete with Bushing and Set Screw	.25
112468C	Background Diffuser for Dial Complete with 115208 Slider Bar for Pointer	.50
112436	Carriage for Pointer (Attach Pointer to String Drive)	.03
112431	Pointer	.15
115234	Stop Clamps (Attach to Slider Bar; Limit Travel of the Pointer)	.08
112469	Manual Tuning Control (Shaft)	.50
115235	Bracket Complete with Idler Pulley (for Drive String)	.20
11774	Collar for Manual Tuning Control Shaft	.10
1209	Linen Drive String	.10
120145	Take-Up Spring for Drive String	.05
10794	6-8 Volt Pilot Light Bulb Type 44	.10
107178B	Socket and Bracket for Pilot Light	.15

CATHODE-RAY TUNING INDICATOR PARTS

107112	R9	Cable and Socket Assembly (with 1 Megohm Resistor in Socket)	.75
117211		Bracket for Tuning Indicator	.15
11757B		Clamp for Tuning Indicator	.15
11757C		Wing Bolt	.05

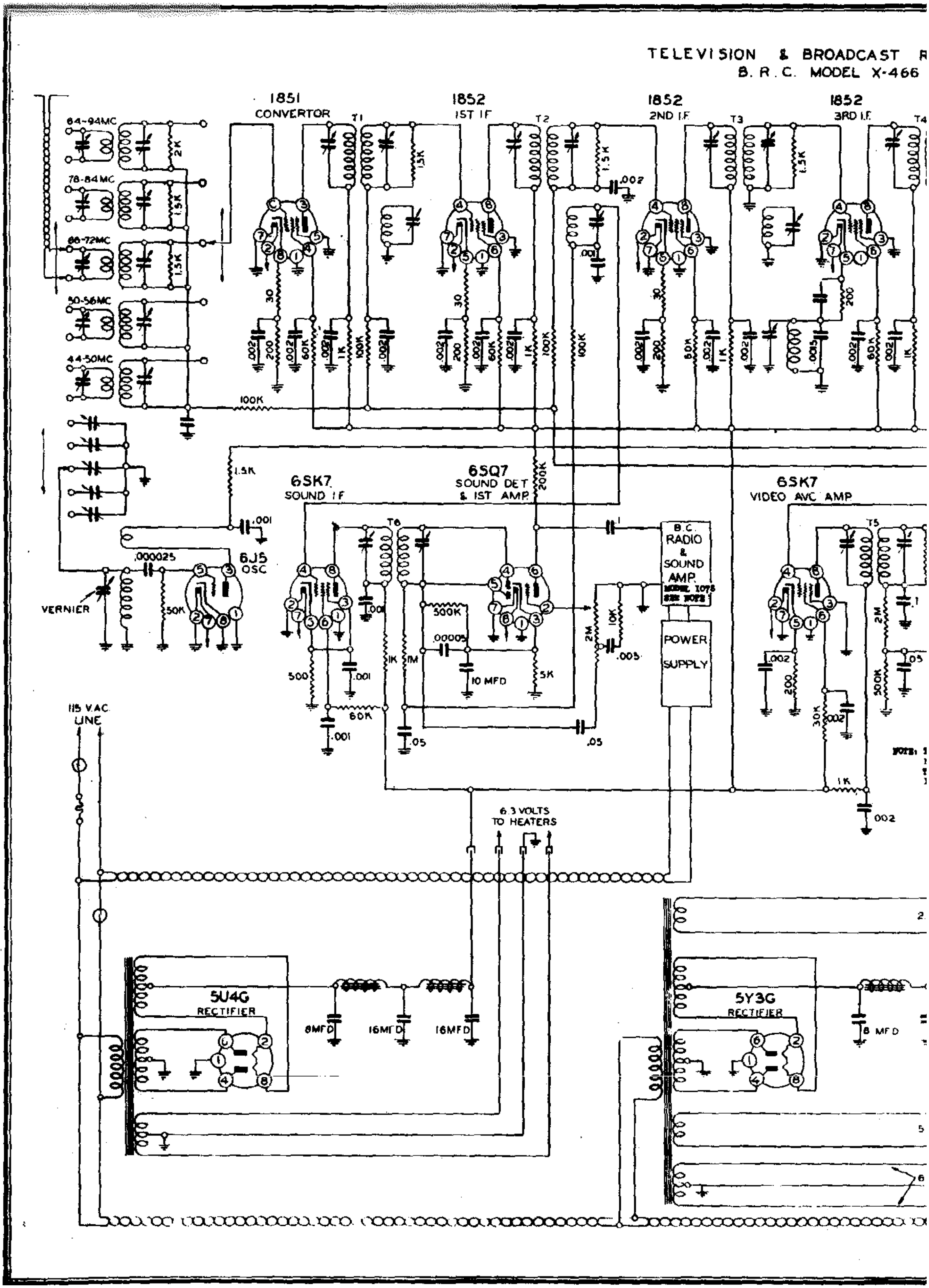
BELMONT RADIO CORP.

TUBE DESCRIPTION	VOLTAGE ON PIN # TO GND. (NO SIGNAL CONDITION) 1	2	3	4	5	6	7	8	CAP
1851 Convertor	0	6.3 AC	290	150	0		0	2	0
1852 - 1st I.F.	0	6.3 AC	0	0	2	150	0	290	
1852 - 2nd I.F.	0	6.3 AC	0	0	2	150	0	290	
1853 - 3rd I.F.	0	0	0	0	2	150	6.3 AC	290	
6H6 Video	0	6.3	0	0	N.C.		0	N.C.	
6SK7 1st video amp.	0	0	0	0	3→10	100 v.	6.3 AC	180	
6K6G 2nd video	0	6.3	150	70-150	0	N.C.	0	0	
6J5 Osc.	0	0	95 v.approx.	N.C.	0	N.C.	6.3 AC	0	
6SK7 Sound I.F. amp.	0	0	4.5 v.	0	4.5	100	6.3 AC	290	
6SQ7 Sound Det.	0	0	1.5	0	0	70	0	6.3 AC	
6SK7 Video AVC Amp	0	6.3 AC	0	0	2	110	0	290	
6H6 Video Det. Sync.	0	0	0	N.C.	N.C.		6.3 AC	0	
6SJ7 Sync.Channel Amp.	0								
5U4G Rectifier	0	Pin 2-8 5 AC		280 AC		280 AC	N.C.	N.C.	
5Y3G Rectifier	0	Pin 2-8 5 AC		280 AC		280 AC	N.C.	N.C.	
6SJ7 Sync.Channel Amp.	0	Pin 2-7 6.3 AC	0	0	0	110		110	
6N7 Hor.Vert. Sync.Amp.	0	Pin 2-7 6.3 AC	195	0	0	205		0	
6N7 Hor.Osc.	0	Pin 2-7 6.3 AC	105	-22	-22	200		0	
6L6 Hor.Output	0	Pin 2-7 6.3 AC	Cannot be Checked	300	0			.24	
5V4 Hor.Damping	0	Pin 2-8 5.0 AC	0	0		0		0-13 v.	
6N7 Vert.Osc.	0	Pin 2-7 6.3 AC	290	-50	-50	20		0	
6J5 Vert.Output	0	Pin 2-7 6.3 AC	300	300	0	6		13 v.approx.	
2V3G *	0	7000 0					Pin 2-7 2.5 v.	6000 AC 0	□

* Great caution should be exercised in checking high voltage circuits. It is best never to attempt to measure heater voltage on the 2V3G. If the tube lights brightly, it is sufficient indication that the heater voltage is correct. To measure high voltage, disconnect power supply and insert 0-5 m.a. meter in ground end of bleeder chain. (With protection fuse) current should read about 1 m.a. when power supply is reconnected. If bleeder current is appreciably off measure individual resistors in chain, to see if difficulty is there. Thus by replacing rectifier tubes an appropriate check of transformer the high voltage circuits can be checked without the use of dangerous probes.

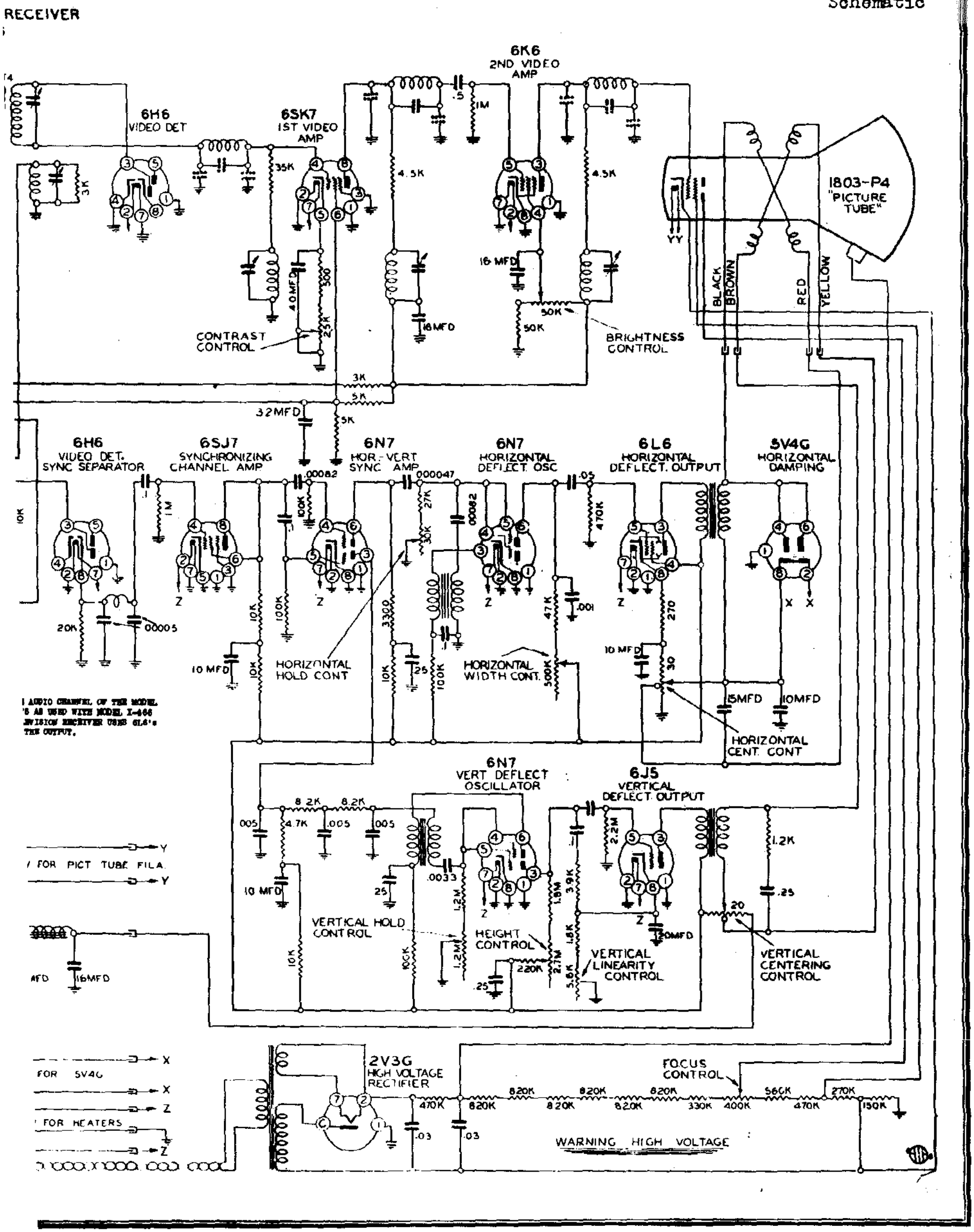
□ Electrostatic voltmeter

0 Special High resistance voltmeter



TELEVISION & BROADCAST R
B. R. C. MODEL X-466
1851
CONVERTOR
1852
1ST I.F.
1852
2ND I.F.
1852
3RD I.F.
64-94MC
78-84MC
66-72MC
50-56MC
44-50MC
6SK7
SOUND I.F.
6SQ7
SOUND DET & 1ST AMP.
6SK7
VIDEO AVC AMP
6J5
OSC
VERNIER
B.C. RADIO & SOUND AMP.
POWER SUPPLY
115 V.AC. LINE
6.3 VOLTS TO HEATERS
5U4G
RECTIFIER
5Y3G
RECTIFIER
8MFD
16MFD
16MFD
8 MFD
10 MFD

MODEL X-466
Schematic



BELMONT RADIO CORP.

TUBE DESCRIPTION	VOLTAGE ON PIN # TO GND. (NO SIGNAL CONDITION) 1	2	3	4	5	6	7	8	CAP
1851 Convertor	0	6.3 AC	290	150	0		0	2	0
1852 - 1st I.F.	0	6.3 AC	0	0	2	150	0	290	
1852 - 2nd I.F.	0	6.3 AC	0	0	2	150	0	290	
1853 - 3rd I.F.	0	0	0	0	2	150	6.3 AC	290	
6H6 Video	0	6.3	0	0	N.C.		0	N.C.	
6SK7 1st video amp.	0	0	0	0	3→10	100 v.	6.3 AC	180	
6K6G 2nd video	0	6.3	150	70-150	0	N.C.	0	0	
6J5 Osc.	0	0	95 v.approx.	N.C.	0	N.C.	6.3 AC	0	
6SK7 Sound I.F. amp.	0	0	4.5 v.	0	4.5	100	6.3 AC	290	
6SQ7 Sound Det.	0	0	1.5	0	0	70	0.	6.3 AC	
6SK7 Video AVC Amp	0	6.3 AC	0	0	2	110	0	290	
6H6 Video Det. Sync.	0	0	0	N.C.	N.C.		6.3 AC	0	
6SJ7 Sync.Channel Amp.	0								
5U4G Rectifier	0	Pin 2-8 5 AC		280 AC		280 AC	N.C.	N.C.	
5Y3G Rectifier	0	Pin 2-8 5 AC		280 AC		280 AC	N.C.	N.C.	
6SJ7 Sync.Channel Amp.	0	Pin 2-7 6.3 AC	0	0	0	110		110	
6N7 Hor.Vert. Sync.Amp.	0	Pin 2-7 6.3 AC	195	0	0	205		0	
6N7 Hor.Osc.	0	Pin 2-7 6.3 AC	105	-22	-22	200		0	
6L6 Hor.Output	0	Pin 2-7 6.3 AC	Cannot be Checked	300	0			24	
5V4 Hor.Damping	0	Pin 2-8 5.0 AC	0	0		0		0-13 v.	
6N7 Vert.Osc.	0	Pin 2-7 6.3 AC	290	-50	-50	20		0	
6J5 Vert.Output	0	Pin 2-7 6.3 AC	300	300	0	6		13 v.approx.	
2V3G *	0	7000 O					Pin 2-7 2.5 v.	O □ 6000AC	

* Great caution should be exercised in checking high voltage circuits. It is best never to attempt to measure heater voltage on the 2V3G. If the tube lights brightly, it is sufficient indication that the heater voltage is correct. To measure high voltage, disconnect power supply and insert 0-5 m.a. meter in ground end of bleeder chain. (With protection fuse) current should read about 1 m.a. when power supply is reconnected. If bleeder current is appreciably off measure individual resistors in chain, to see if difficulty is there. Thus by replacing rectifier tubes an appropriate check of transformer the high voltage circuits can be checked without the use of dangerous probes.

□ Electrostatic voltmeter

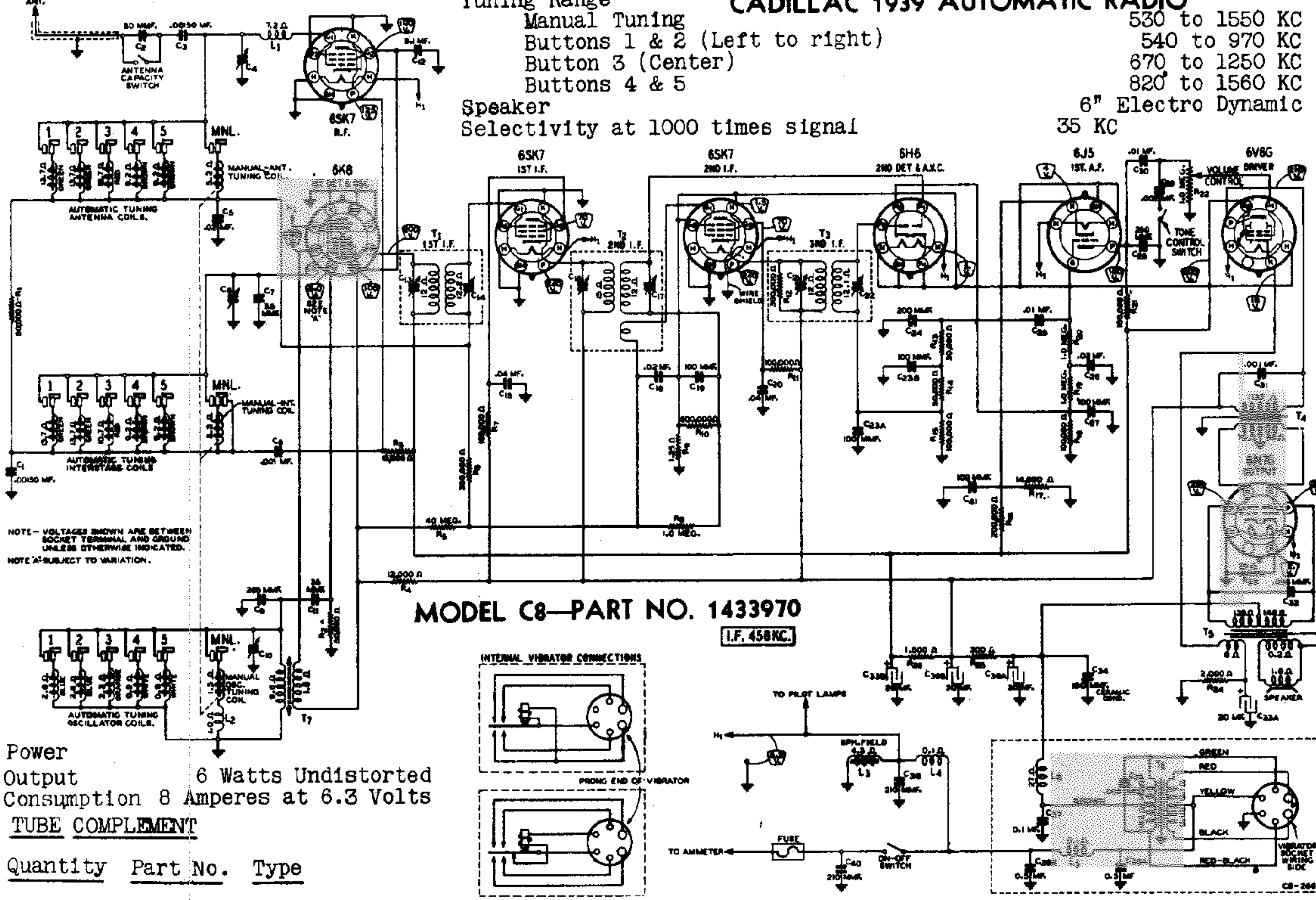
O Special High resistance voltmeter

CADILLAC DIV.—GEN. MOTORS

Sensitivity
Manual Tuning 1 Microvolt at .5 Watt Output
Automatic Tuning 1 Microvolt at .5 Watt Output

CADILLAC 1939 AUTOMATIC RADIO

Tuning Range	
Manual Tuning	530 to 1550 KC
Buttons 1 & 2 (Left to right)	540 to 970 KC
Button 3 (Center)	670 to 1250 KC
Buttons 4 & 5	820 to 1560 KC
Speaker	6" Electro Dynamic
Selectivity at 1000 times signal	35 KC



MODEL C8—PART NO. 1433970

I.F. 456KC.

Power
Output 6 Watts Undistorted
Consumption 8 Amperes at 6.3 Volts

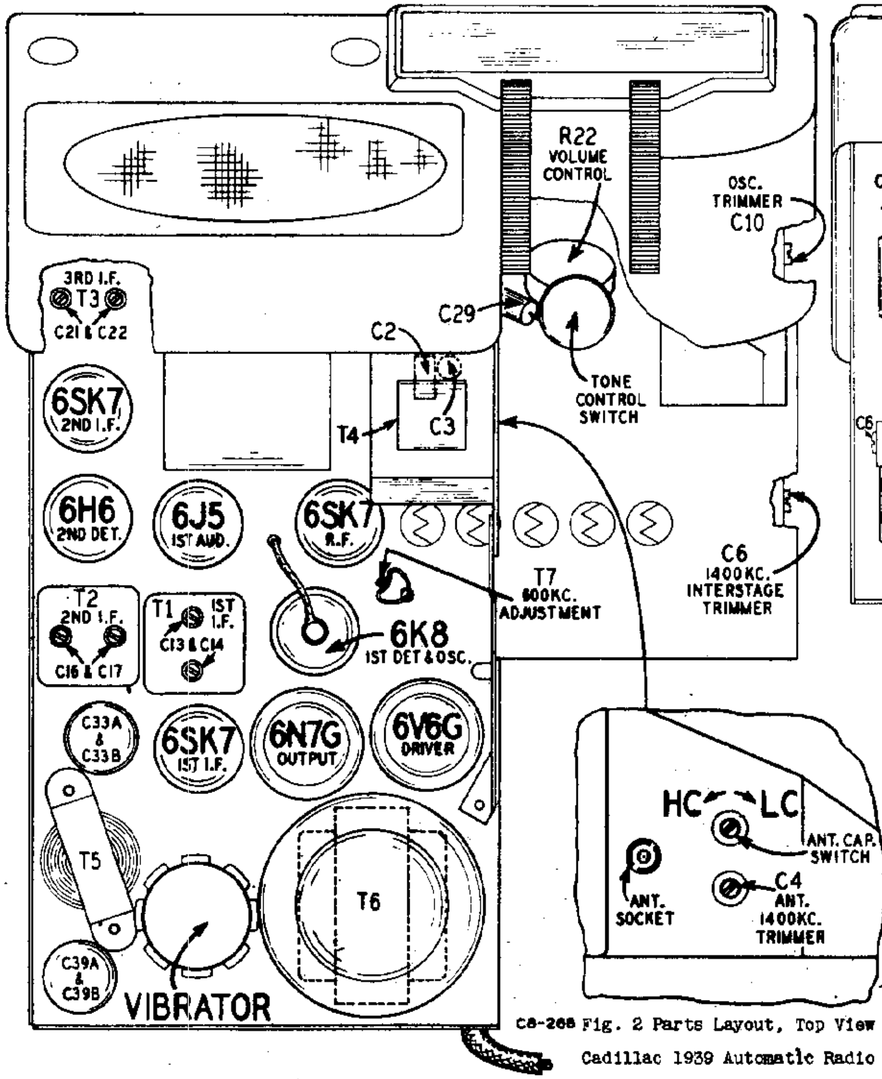
TUBE COMPLEMENT

Quantity	Part No.	Type
3	1213392	6SK7
1	1213393	6K8
1	1213395	6H6
1	1213394	6J5
1	1213396	6V6G
1	7233587	6N7G

Antenna Capacity Screw Settings
Low Capacity Setting - In tight (clockwise) -- 59 mmf. -- Total of antenna and shielded cable.
High Capacity Setting — Out (counter clockwise) -- 193 mmf. -- Total of under car antenna and shielded lead.
Antenna Trimmer Range ±15 mmf. of above antenna capacities

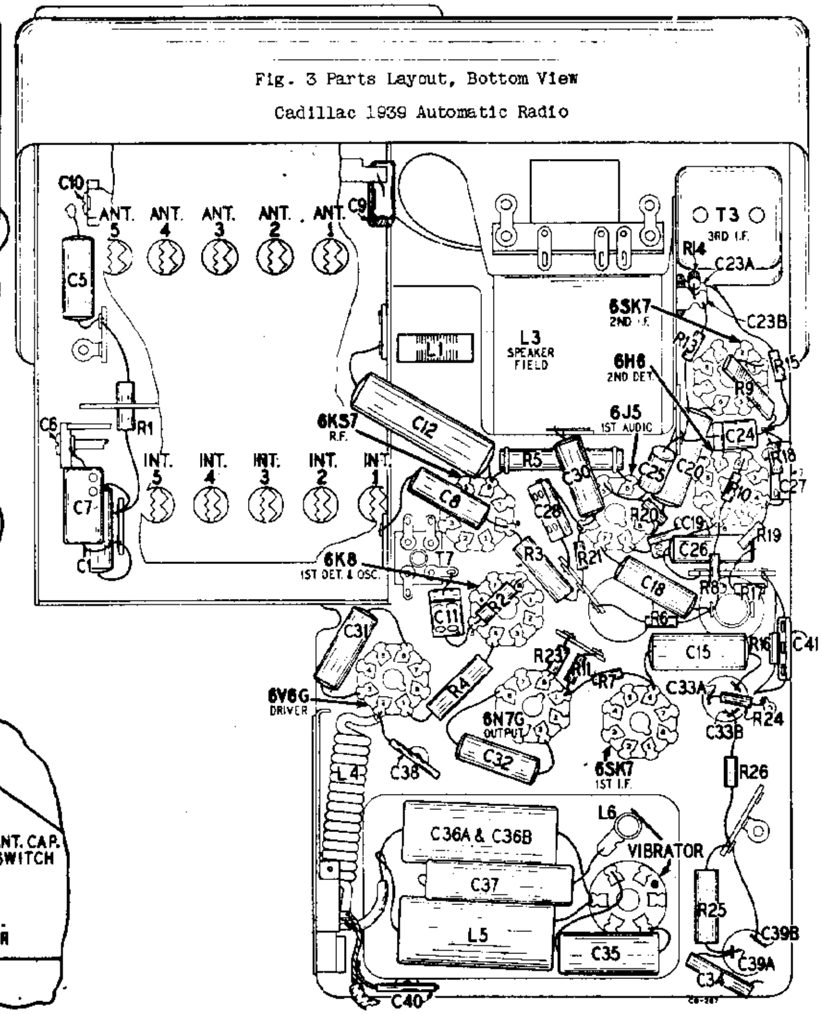
MODEL C-8
Socket, Trimmers
Chassis

CADILLAC DIV.—GEN. MOTORS



C8-268 Fig. 2 Parts Layout, Top View

Cadillac 1939 Automatic Radio



Original Part Number	Replacement Part Number	Quan.	Illus. No.	Description	List Price
				Sockets	
3A267	1428011	8		Tube socket-Octal (8 prong) -	$ .15
3A276	1435462	1		Vibrator socket (6 prong molded) -	.10
26A129	1435453	1		Antenna connection socket and bracket assembly -	.15
				Speaker	
				When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.	
12A319	1434972	1		6" Dynamic Speaker -	$3.85
	1435454	1		Cone & voice coil assembly for above speaker. -	1.75
14x230		1		Wire screen to cover front of speaker -	.35
7x32		1		Cardboard Ring for above wire screen -	.05

MODEL C-8

CADILLAC DIV.—GEN. MOTORS Tuner, Alignment Notes

FEATURES

The 1939 Cadillac Automatic Radio is an 8-tube automobile radio covering the standard wave band incorporating the very latest developments in automobile radio engineering. The outstanding features are:

1. Permeability tuning, providing a dual input circuit to the 1st detector, one for manual tuning and one for automatic push button tuning, is used.
2. A new noise-limiting circuit in the audio system controlled by signal voltage developed by the 2nd detector and the AVC network, providing for the first time effective noise-limiting action without affecting sensitivity.
3. Two stages of Intermediate Frequency, increasing considerably Automatic Volume Control action.
4. A three-circuit Automatic Tuner, providing the same sensitivity on both manual and automatic tuning sections.
5. An OFF-switch incorporated in the push button operating mechanism to provide practically complete automatic operation, making it necessary to push only one button to select a station, tune and turn on the radio.

MANUAL TUNING CIRCUIT

When the manual tuning button is depressed, the manual antenna tuning coil is connected to the grid of the 6SK7 R.F. amplifier tube through a series motor noise filter. The plate of the R.F. tube is fed through a resistor and is capacity coupled to the detector grid of the 6K8 tube through the manual intermediate tuning coil. This grid is also controlled by the AVC system through the manual intermediate tuning coil. The manual oscillater tuning coil is capacity coupled to the oscillator grid of the 6K8 tube in parallel with the fixed oscillator coil T7 which also functions as the low frequency adjustment.

All the automatic tuning coils are open circuited when the manual tuning button is depressed.

Manual tuning is accomplished by varying the inductance of the manual tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core of special design in and out of the coil by rotating the manual station selector drum.

The extreme position of the iron cores within the coils has been precision adjusted at the factory and should not be disturbed.

AUTOMATIC TUNING CIRCUIT

Automatic tuning is accomplished by the use of a new and highly efficient three-circuit push button permeability tuner.

The tuning of the R.F., Interstage and Oscillator semi-fixed tuned circuits, is accomplished by varying the inductance of the coils, by changing the permeability of the intermediate circuit and by moving the iron core in and out of the coil. The iron cores within the coils are rigidly secured to a brass rod. This brass rod moves in and out of the coils as the adjustment screw is turned, changing the inductance of the coils, giving the same result as the variable tuning condenser across the coil except that this method is more precise and stable, and it is not affected by moisture or temperature changes as is the case with a normal tuning condenser.

ALIGNMENT

Alignment between the Oscillator, Antenna and Interstage automatic tuning coils is obtained by changing the Antenna (center) and Interstage (rear) coil positions while the iron cores are held stationary on the shaft. To describe the connections for automatic tuning, let us assume that button No. 1 is depressed

The automatic tuning antenna coil, No. 1, is connected to the grid of the R.F. tube. The plate of the R.F. tube is fed through a resistance and is capacity coupled to the automatic tuning Interstage coil, No. 2, which is connected to the control grid of the 6K8 tube.

The manual Interstage tuning coil is short-circuited.

The automatic tuning Oscillator coil, No. 1, is capacity coupled to the Oscillator grid of the 6K8 tube.

Two stages of I.F. amplification are employed, using 6SK7 tubes. The primary and secondaries of each of the I.F. transformers are tuned by small trimmer condensers. Directly below the secondary of the 2nd I.F. is a third winding which couples the control grid circuit of the 2nd I.F. tube to the 2nd I.F. transformer.

The signal voltage across the secondary of the 2nd I.F. transformer is used to drive the plate of the AVC section of the 6H6 tube. AVC voltage is applied to the control grid circuits of the R.F., 1st detector and 1st and 2nd I.F. tubes. The rectified output of the 2nd detector section of the 6H6 tube is applied to the control grid of the 6J5 tube.

At no signal, the 6J5 tube is biased to cut off by virtue of the current flowing through resistor network R16 and 17. This gives a constant potential across R17, which keeps the tube biased to cut off when no signal is being received. When a station is being received, a positive voltage is applied to the control grid by both sections of the 6H6 tube through resistor networks R13, 14 and 15, and R18, 19 and 20, causing a very rapid reduction in bias so that the noise gate or noise limiter does not affect the sensitivity of the receiver. This is a very outstanding development in automobile radio circuit design and provides unusually quiet operation.

The 6J5 is resistance coupled to the 6V6G driver tube. The 6V6G is transformer coupled to the 6N7G output tube. This tube is a class "B" power amplifier and combines two triodes in one envelope. A 6" electro dynamic reproducer is employed.

Degeneration, or negative feed-back, is used in the audio amplifier. The voltage developed across the separate small secondary of the output transformer is fed back into the cathode circuit of the driver tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

ALIGNMENT AND CALIBRATION PROCEDURE

The following equipment is required for proper alignment:

An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
An Output Indicating Meter.
Non-metallic screwdriver.
Dummy Antennas - .1mf., and 35 mmf.

The Radio Chassis must be removed from the case, but the front cover must remain on the chassis with all screws in place. THIS IS ABSOLUTELY NECESSARY TO ALIGN.

The Volume Control must be at maximum for all adjustments.

The Normal-Quiet Control must be in the Normal position for all adjustments.

The Antenna Capacity Switch (See Fig. 2,) screw should be in the maximum clockwise position for the Low Capacity (Vacuum Type) Antenna. The total capacity of the Low Capacity Antenna and the shielded lead is 59 mmf.

Connect Radio Chassis to Ground Post of Signal Generator with a short heavy lead.

Allow chassis and Signal Generator to "Heat Up" for several minutes.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
Refer to Alignment Charts

MODEL C-8
Tuner,Alignment Data

CADILLAC DIV.—GEN. MOTORS

ALIGNMENT CHART NUMBER ONE

SIGNAL GENERATOR Frequency Setting	Connection at Radio	Dummy Antenna	Button Depressed	Inductive Tuner and Dial Setting	Adjust Trimmers to Maximum
I.F. ADJUSTMENT					
456 KC	Control Grid (prong No. 4) 6SK7 2nd I.F. Tube See Note A	.1 mf.	Manual	1550 KC	3rd I.F. (C21) & (C22) See Fig. 2
456 KC	Control Grid (prong No. 4) 6SK7 1st I.F. Tube	.1 mf.	Manual	1550 KC	2nd I.F. (C16) & (C17) See Fig. 2
456 KC	Control Grid (top cap) 6K8 1st Det. Tube	.1 mf.	Manual	1550 KC	1st I.F. (C15) & (C14) See Fig. 2
OSCILLATOR ADJUSTMENT					
1550 KC	Control Grid (top cap) 6K8 1st Det. Tube	.1 mf.	Manual	1550 KC	Osc. (C10)
1400 KC ADJUSTMENT					
1400 KC	Antenna Cable - See Note B	35 mmf.	Manual	Tune to Maximum Output with station selector drum.	Int. 1400 KC (C5) Ant. 1400 KC (C4) See Fig. 2
600 KC ADJUSTMENT					
600 KC	Antenna Cable	35 mmf.	Manual	Tune to Maximum Output with station selector drum.	600 KC (T7) See Fig. 2 Rocking Adjustment - Note C
1400 KC READJUSTMENT					
1400 KC	Antenna Cable	35 mmf.	Manual	Tune to Maximum Output with station selector drum.	Osc. (C10) See Fig. 2 Rocking Adjustment - Note C

NOTE A - Insert antenna cable at chassis and short circuit open end of cable to cable shield for all I.F. and oscillator adjustments.
NOTE B - Remove antenna cable short circuit and insert 35 mmf. condenser between open end of antenna cable and signal generator.
NOTE C - Rotate station selector drum back and forth and turn the adjusting screw until the peak of greatest intensity is obtained.

ALIGNMENT CHART NUMBER TWO

CAUTION - DO NOT CHANGE SETTING OF ANY TRIMMERS THAT HAVE BEEN ADJUSTED UP TO THIS POINT.

SIGNAL GENERATOR Frequency Setting	Connection at Radio	Dummy Antenna	Button Depressed	Automatic Tuner Setting	Adjust Coil Positions to Maximum Output
AUTOMATIC TUNER ADJUSTMENTS AND ALIGNMENT				WITH BUTTON DEPRESSED, TURN AUTOMATIC TUNER ADJUSTING SCREW TO MAXIMUM OUTPUT.	See Note D
700 KC	Antenna Lead	35 mmf.	No. 1	Ajusting Screw No. 1	Antenna Coil No. 1 Interstage Coil No. 1
700 KC	Antenna Lead	35 mmf.	No. 2	Adjusting Screw No. 2	Antenna Coil No. 2 Interstage Coil No. 2
850 KC	Antenna Lead	35 mmf.	No. 3	Adjusting Screw No. 3	Antenna Coil No. 3 Interstage Coil No. 3
1100 KC	Antenna Lead	35 mmf.	No. 4	Adjusting Screw No. 4	Antenna Coil No. 4 Interstage Coil No. 4
1100 KC	Antenna Lead	35 mmf.	No. 5	Adjusting Screw No. 5	Antenna Coil No. 5 Interstage Coil No. 5

NOTE D - At the top of the automatic tuning unit can be seen ten round openings - See Fig. 3. Through these openings can be seen the ten "W" openings on the other side of the unit. Insert a thin blade screw driver through the round openings and in the "W" opening of the proper button and adjust the position of the coil by twisting the screw driver until maximum output is obtained.

ADJUSTING ANTENNA 1400 KC TRIMMER

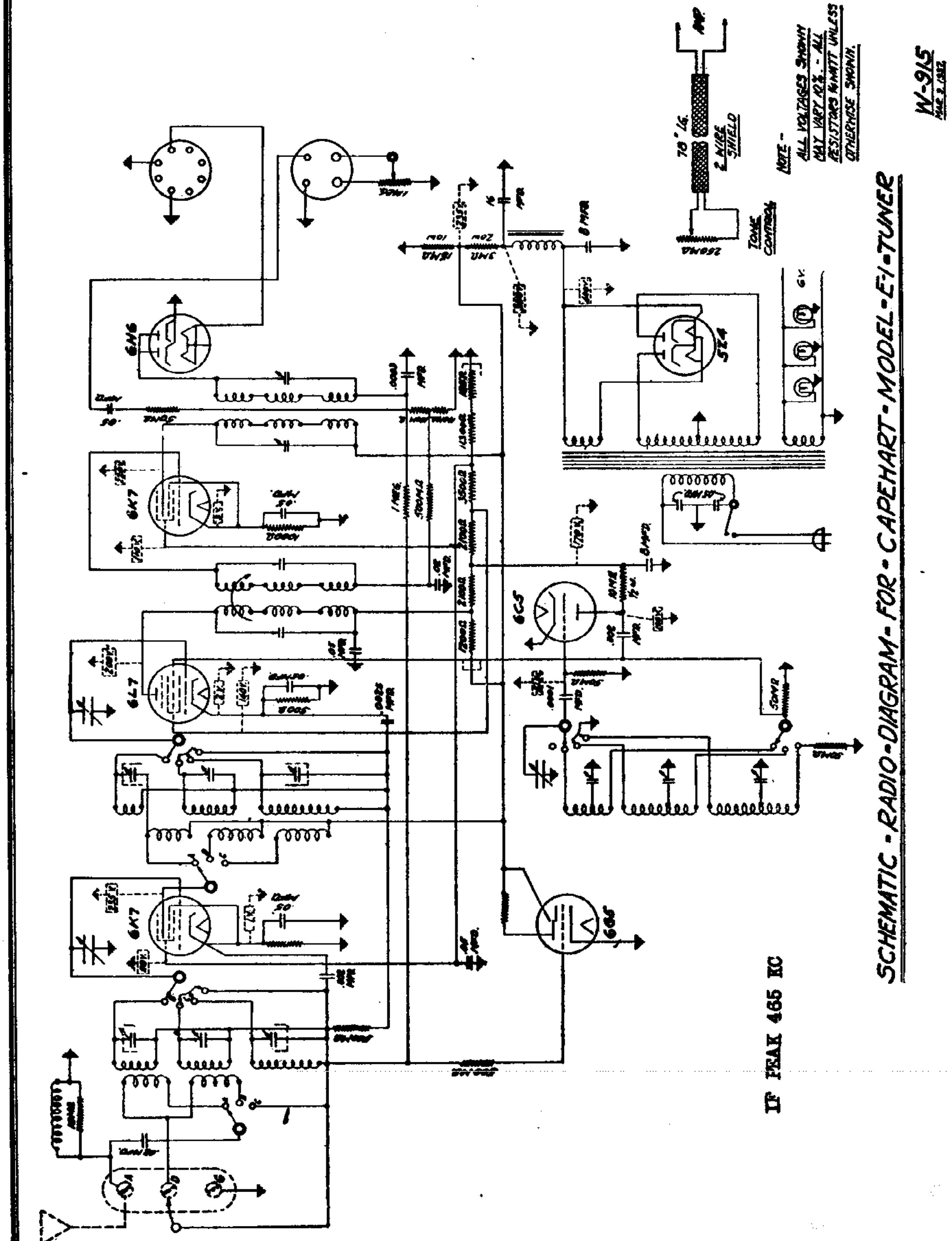
After the radio is installed and the car antenna is connected, it is necessary to readjust the antenna 1400 KC trimmer.

There are two small holes in the chassis case near the antenna connection through which the antenna capacity and antenna trimmer adjustments are to be made. See Fig. 2. With the Cadillac Vacuum Antenna, the screw marked "Capacity" should be set to the extreme clockwise position. With the Cadillac Under Car or Running Board Antenna, the screw marked "Capacity" should be set to the extreme counter clockwise or high capacity position.

To adjust trimmer, tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on, turn the adjusting screw (marked trim) in or out until maximum output is obtained. On Vacuum Antenna this adjustment should be made with antenna fully extended.

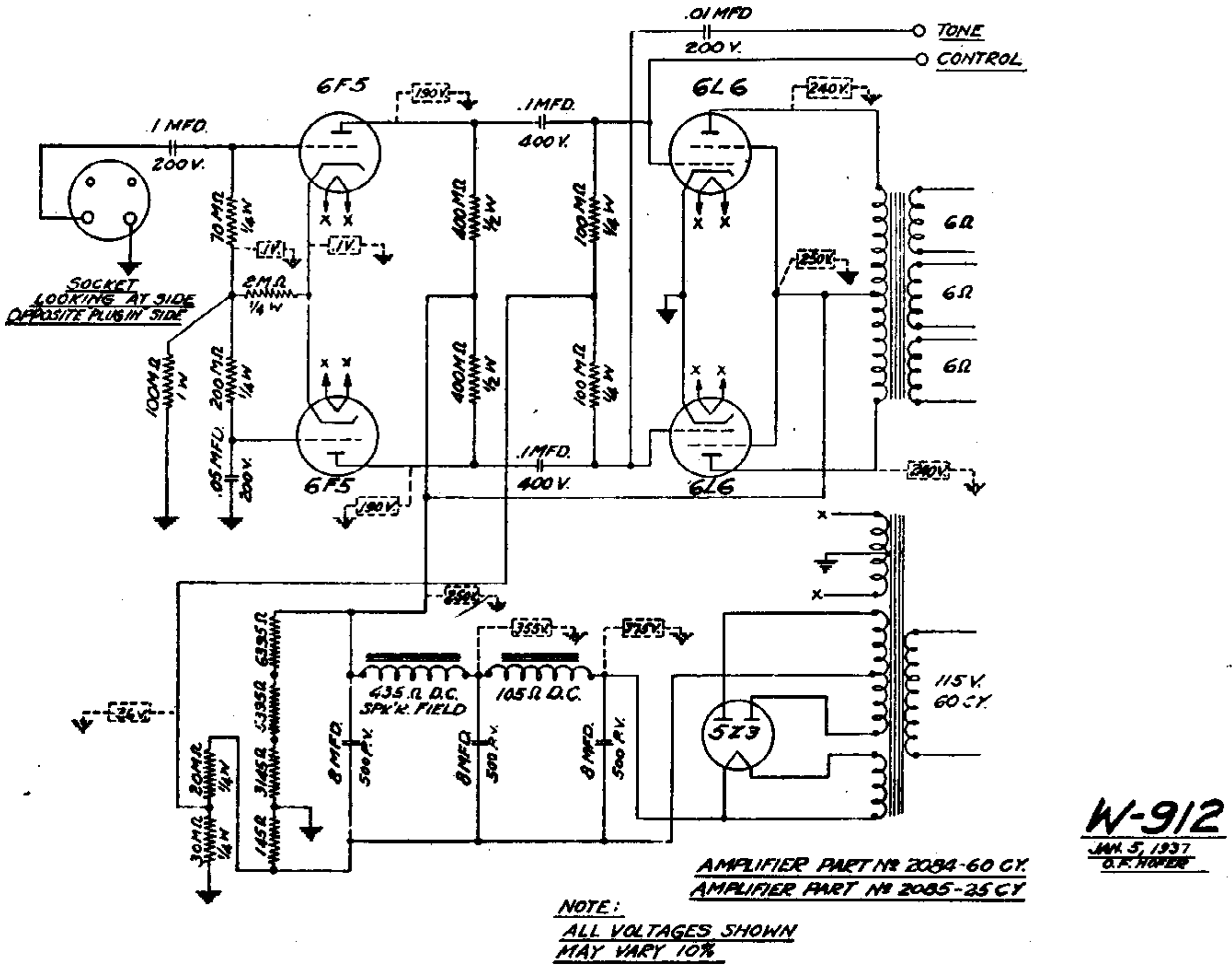
MODEL E-1
Tuner Schematic
Voltage

CAPEHART CORPORATION



MODEL E-1
Amplifier Schematic
Voltage, Alignment

CAPEHART CORPORATION



·SCHEMATIC·CAPEHART·AMPLIFIER·E-1·SERIES

Align the i-f stages at 465 kc after removing the 6C5 oscillator and with the test oscillator connected to the grid of the 6L7 first detector.

R-F Alignment: Replace the 6C5 and connect the test oscillator to the antenna post of the receiver. Start with the oscillator trimmer with the dial set on the high-frequency end of the band at the frequencies listed below:

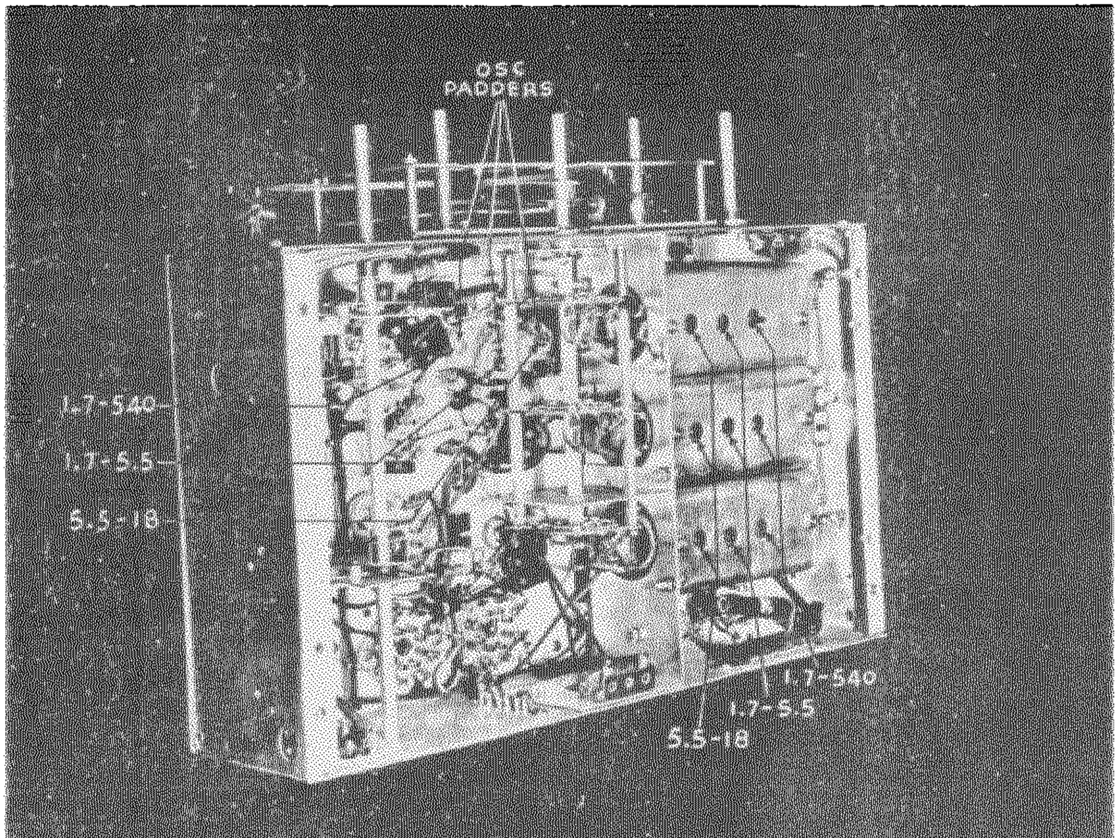
Broadcast Band - 1400 kc 1st H-F Band - 5.0 mc 2nd H-F Band - 17 mc

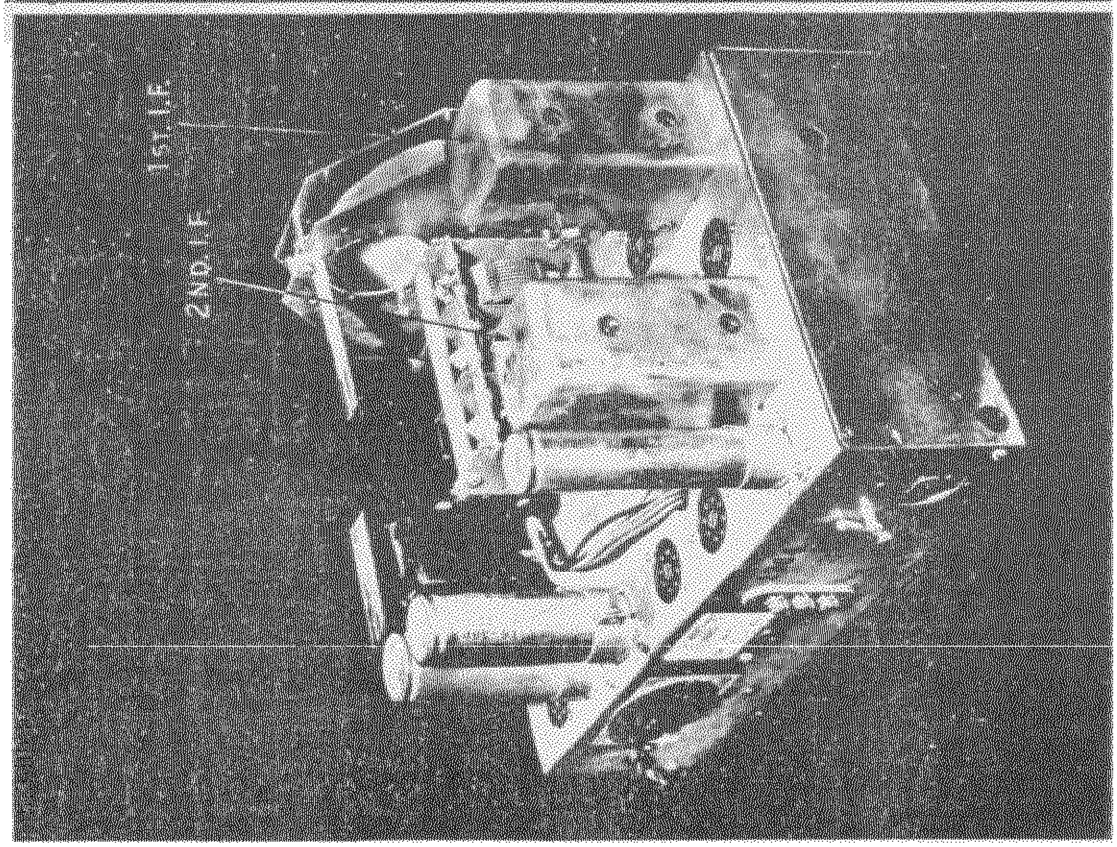
After the oscillator trimmer has been adjusted, align the r-f trimmer of each band. Then set the oscillator padding condensers of the various bands at the following frequencies:

Broadcast Band - 550 kc 1st H-F Band - 2.0 mc 2nd H-F Band - 6.0 mc

MODEL E-1
Trimmers, Chassis

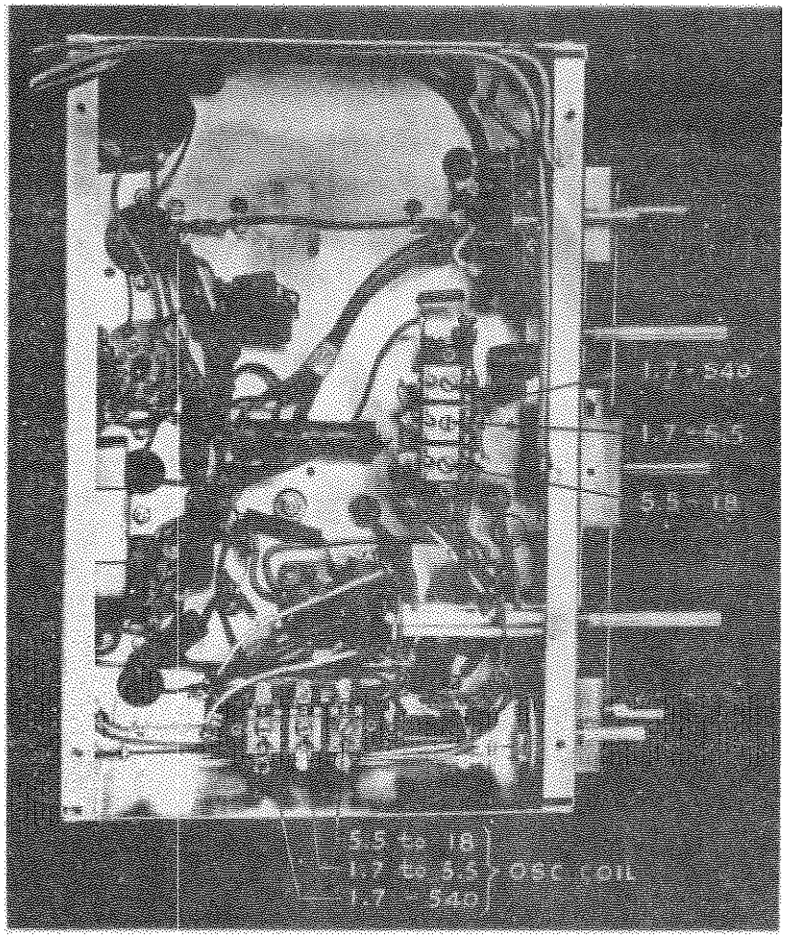
CAPEHART CORPORATION

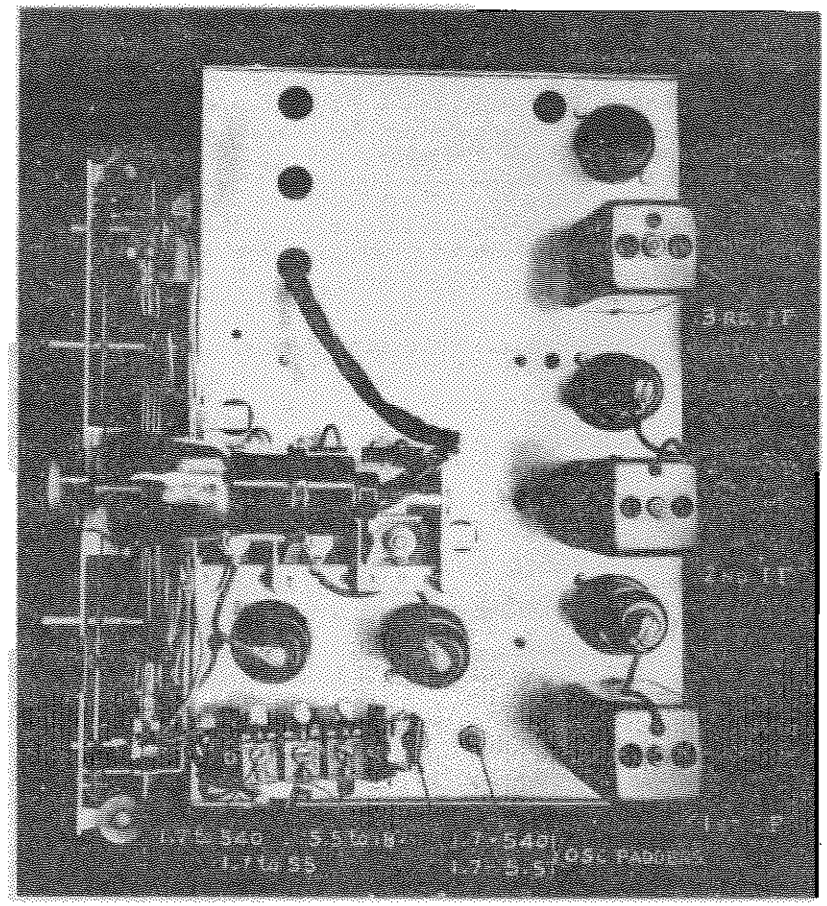




MODEL 110-G, Panamuse
Trimmers, Chassis
Alignment

CAPEHART CORPORATION





ALIGNMENT INSTRUCTIONS

When aligning the i-f stages, short the oscillator section of the tuning condenser to ground. Set test oscillator to 465 kc and connect to the grid of the 6A8 first detector. Set the i-f trimmers for maximum reading of the output meter connected across the voice coil.

When aligning the r-f amplifier, connect the test oscillator to the antenna post, after removing ground from the tuning condenser mentioned above. Regardless of which band is being aligned, start with the oscillator coil trimmer with the dial set on the high-frequency end of the band at the following frequencies:

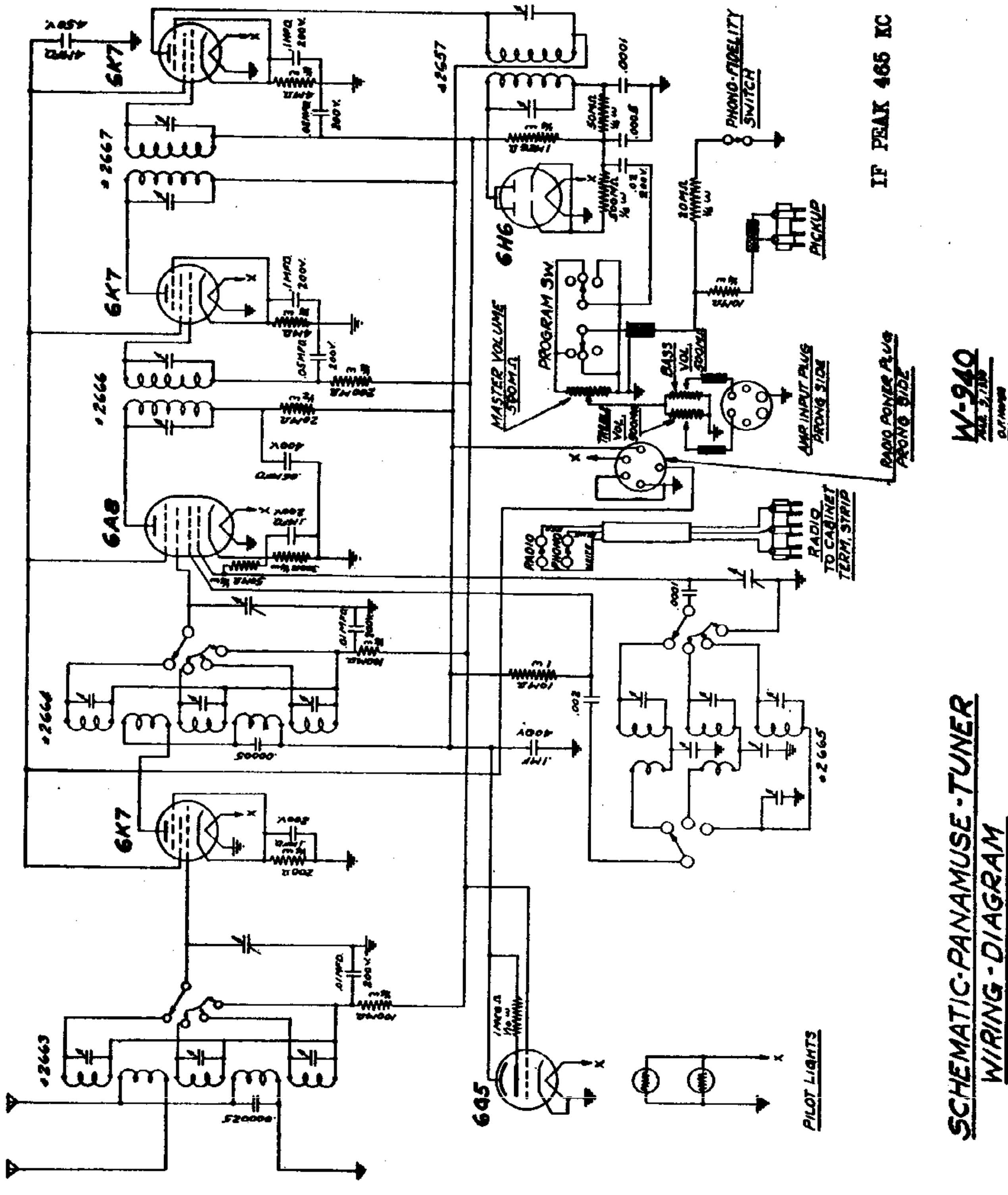
Broadcast band	------ 1400 kc
1st H-F band	------ 5.0 mc
2nd H-F band	------ 17 mc

After the oscillator coil trimmer has been set, align the r-f trimmers. Next set the oscillator padding condensers of the various bands at the following frequencies:

Broadcast band	----- 550 kc
1st H-F band	----- 2.0 mc
2nd H-F band	----- 6.0 mc

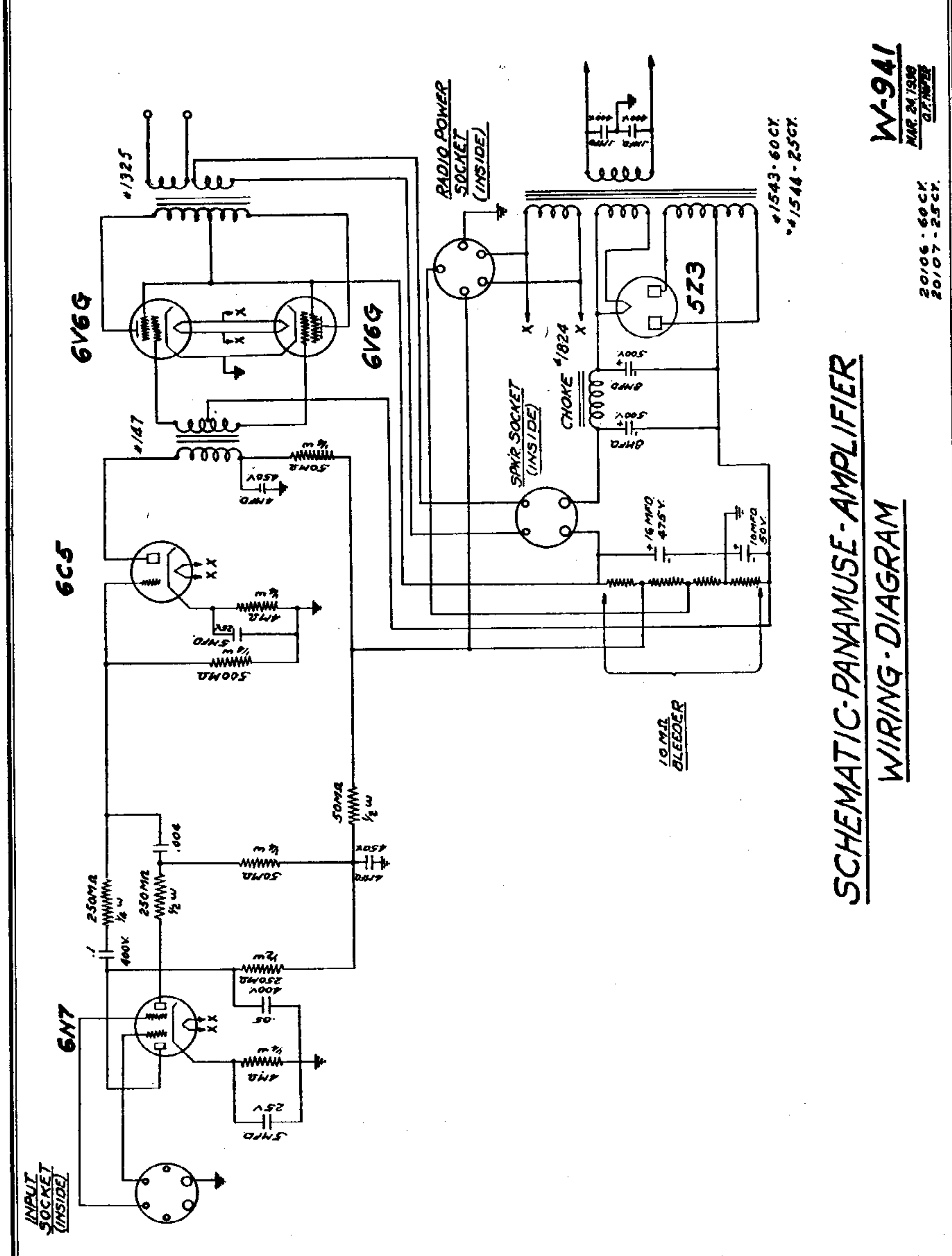
MODEL 110-G, Panamuse
Tuner Schematic

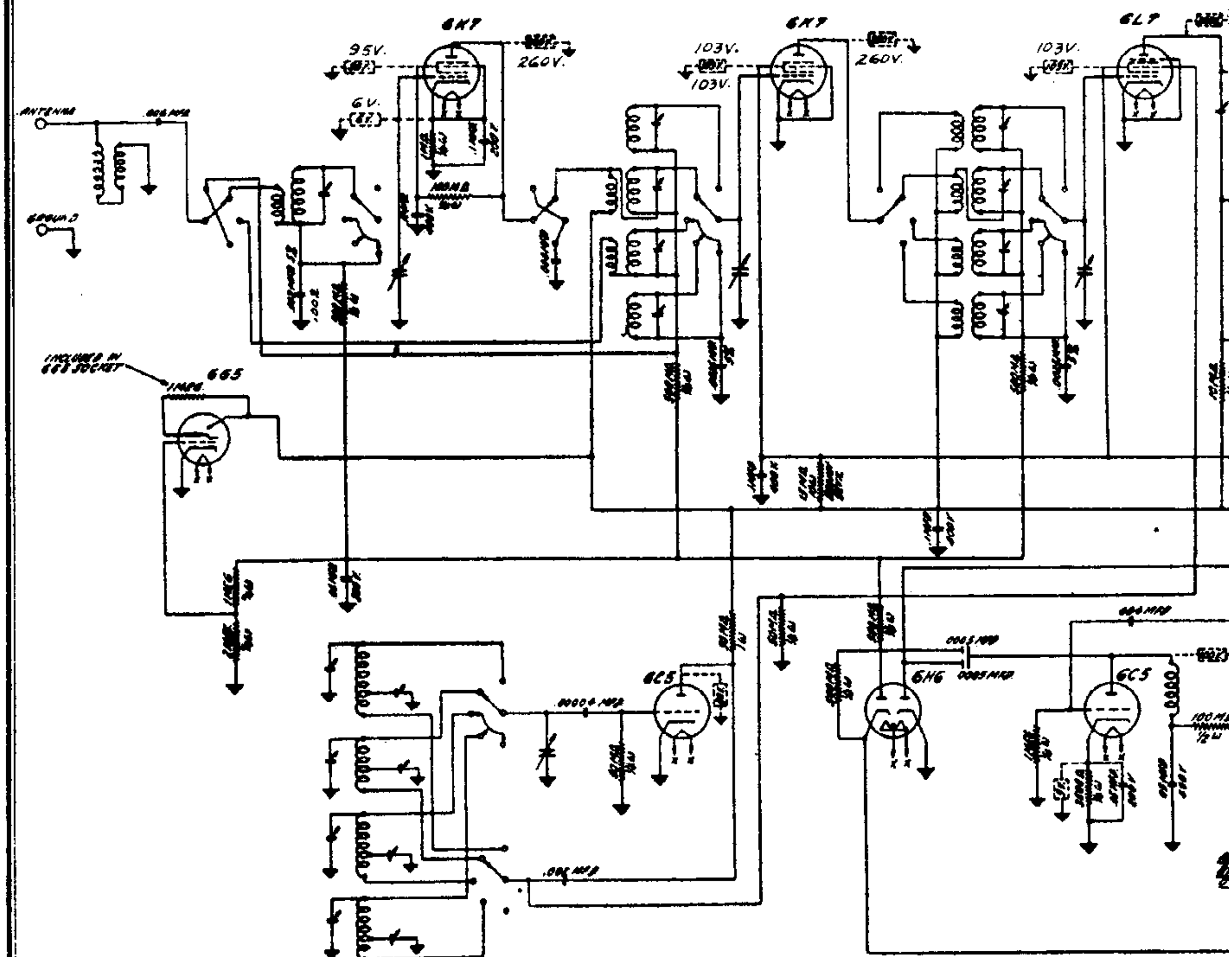
CAPEHART CORPORATION



MODEL 110-G, Panamuse
Amplifier Schematic

CAPEHART CORPORATION





ALIGNMENT PROCEDURE

When aligning the i-f stages at 465 kc, make certain the Selectivity Contro
treme counter-clockwise position, i.e. set to "sharp tuning". Remove the 6
tube and connect the output of the test oscillator to the grid of the 6L7 f
The bias of this tube is fixed, therefore it will be necessary to leave the
the tube and couple the oscillator through a .001 or .002-mf condenser. Ad
mers on the three i-f transformers for maximum readings.

R-F Alignment: Replace the 6C5 oscillator tube. Connect the test oscillator
post with the dial set on the high-frequency end of the band at the followi

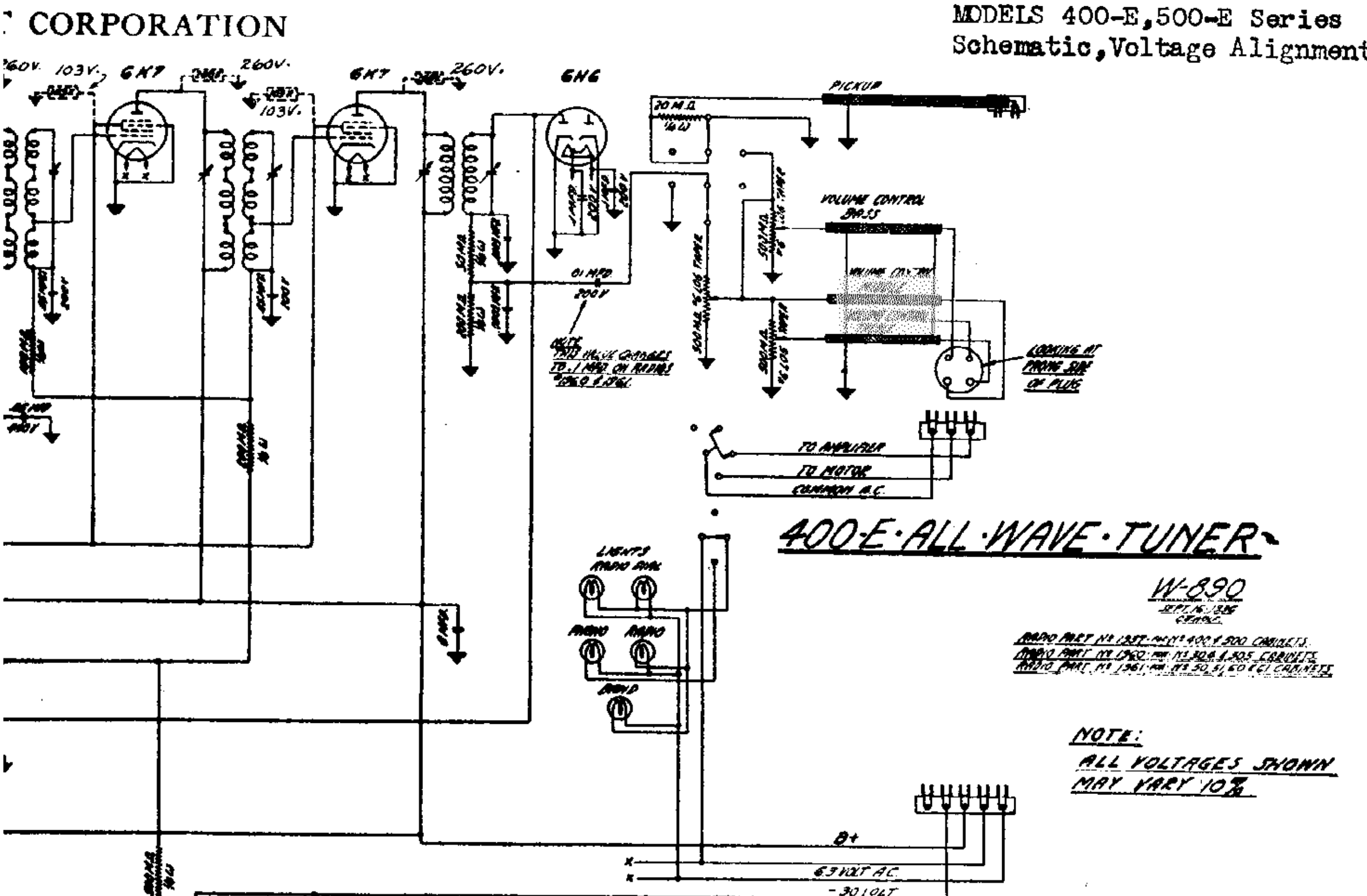
Long-Wave Band ... 400 kc	First H-F Band ... 5.0 mc
Broadcast Band ...1400 kc	Second " " ...17.0 mc

First adjust the oscillator trimmers and then the r-f trimmers. After the
these trimmers, set the oscillator padding condensers of the various bands
frequencies:

Long-Wave Band ... 200 kc	First H-F Band ... 2.0 mc
Broadcast Band ... 550 kc	Second " " ... 6.0 mc

AM

MODELS 400-E,500-E Series
Schematic,Voltage Alignment



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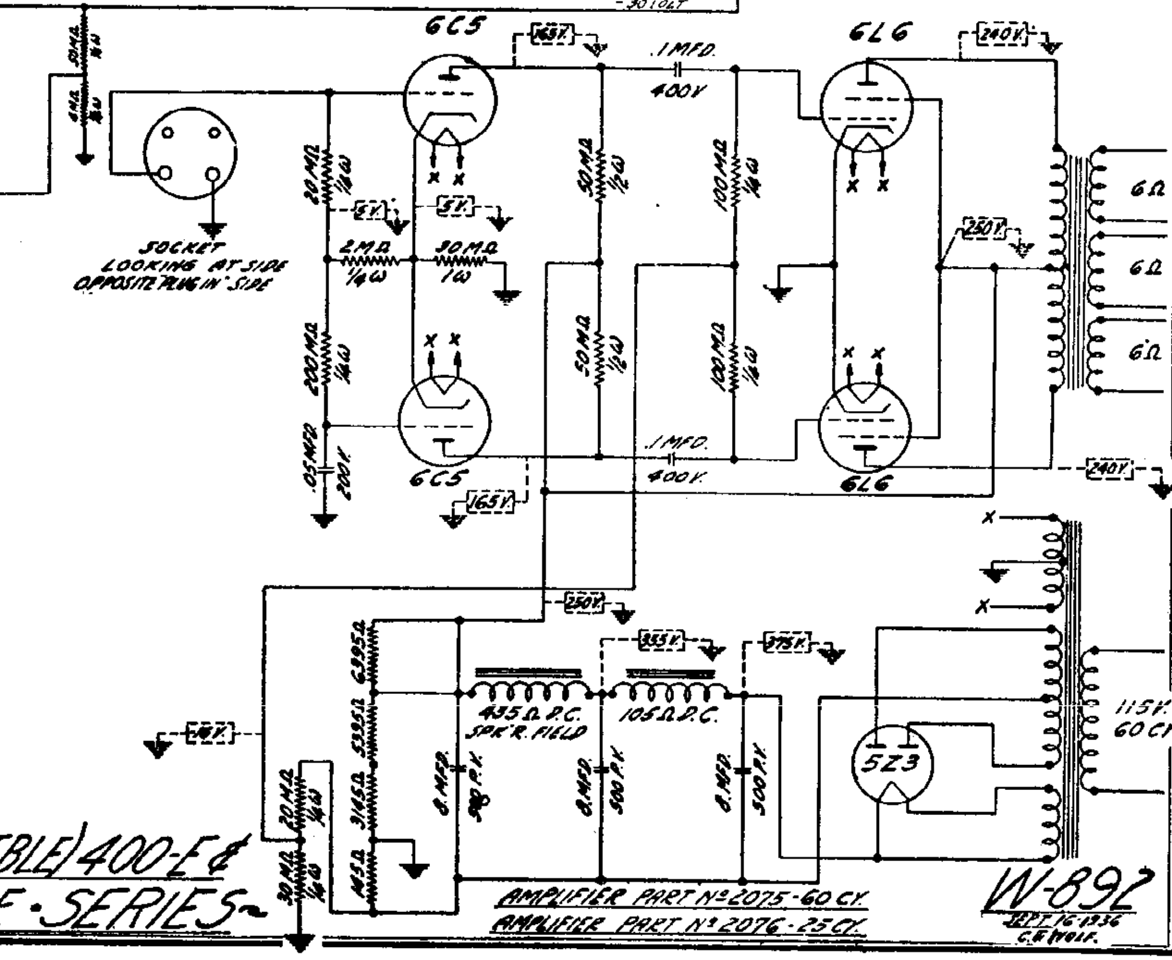
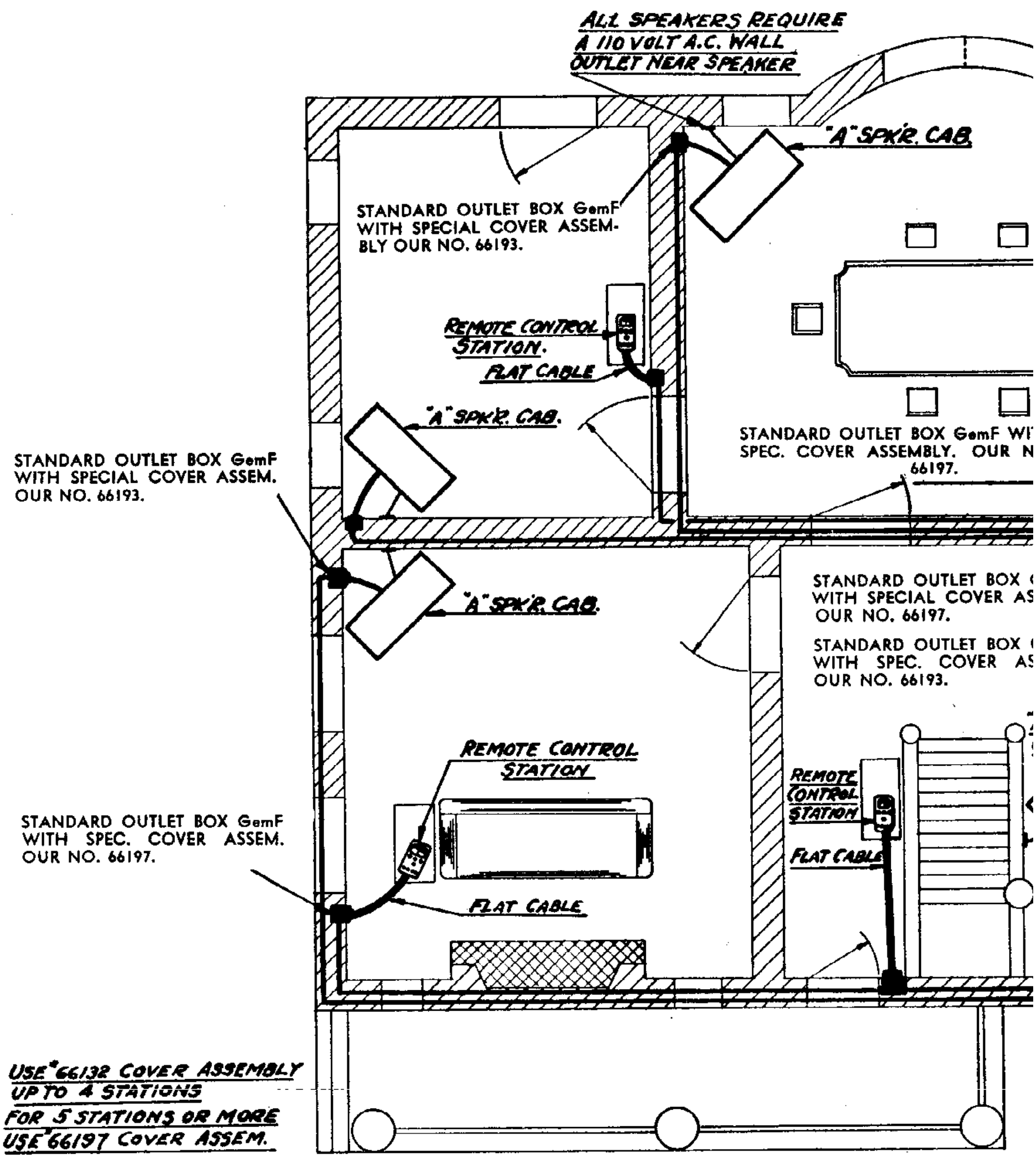


MODELS 400-G,500-G Series
Remote Control Installation

CAPEHAR

THIS DRAWING SHOWS A CAPEHART REMOTE INSTALLATION OF
FOR THESE CONTROL STATIONS HAVE BEEN RUN FROM A SET
REAR OF THE INSTRUMENT THROUGH CONDUIT PIPES TO THE



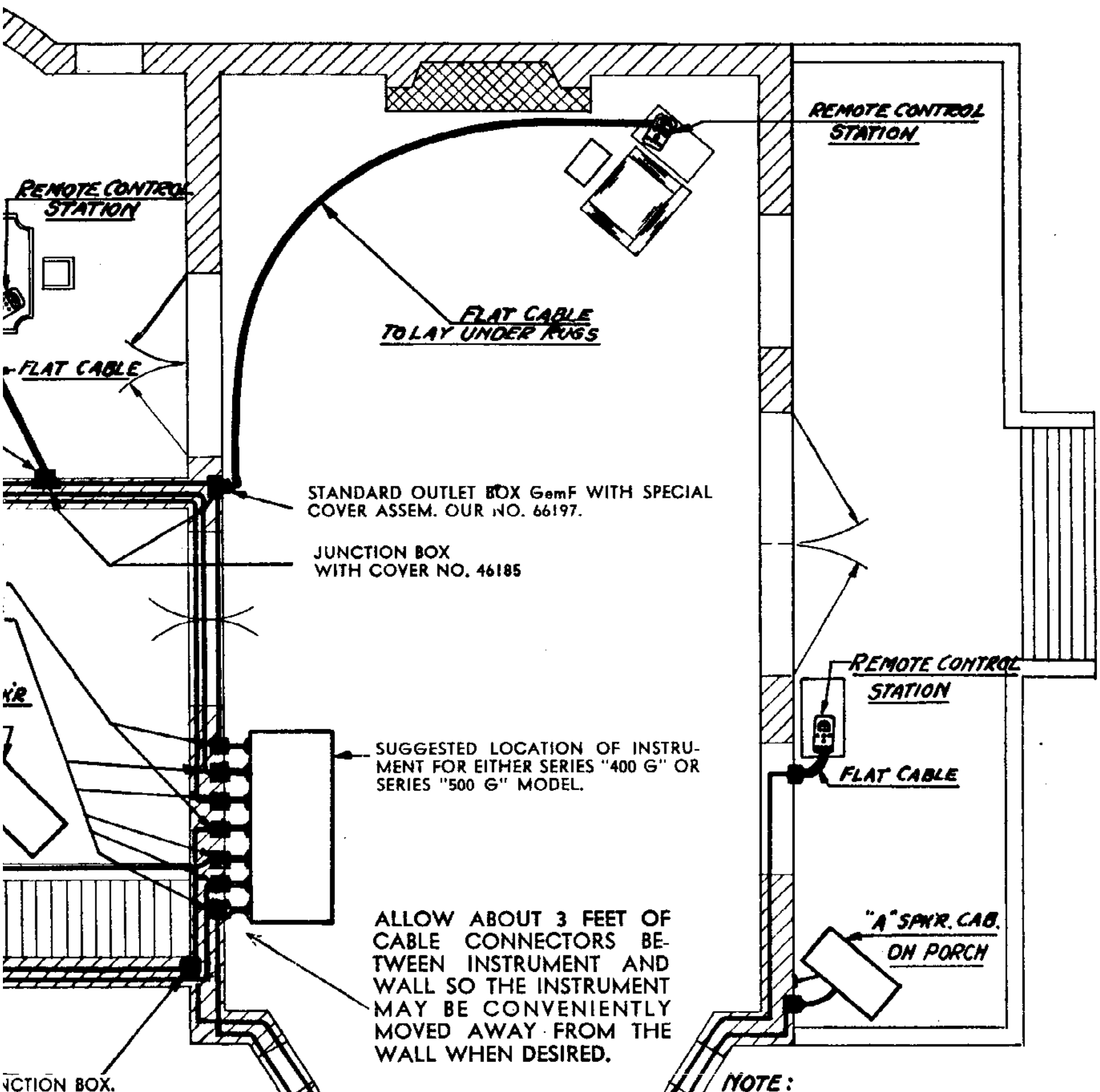
THE CAPEHART, INCORPORATED
Fort Wayne, Ind., U. S. A.

CAPEHART REM

AVAILABLE ON MODELS OF

:ORPORATION

REMOTE SPEAKERS AND 6 REMOTE CONTROL STATIONS. THE WIRES
BASEBOARD OUTLET BOXES MOUNTED IN THE BASEBOARD AT THE
BOARD OUTLET BOXES AT THE REMOTE LOCATIONS.



NOTE:

WIRE SIZES FOR VOICE COIL CONNECTIONS

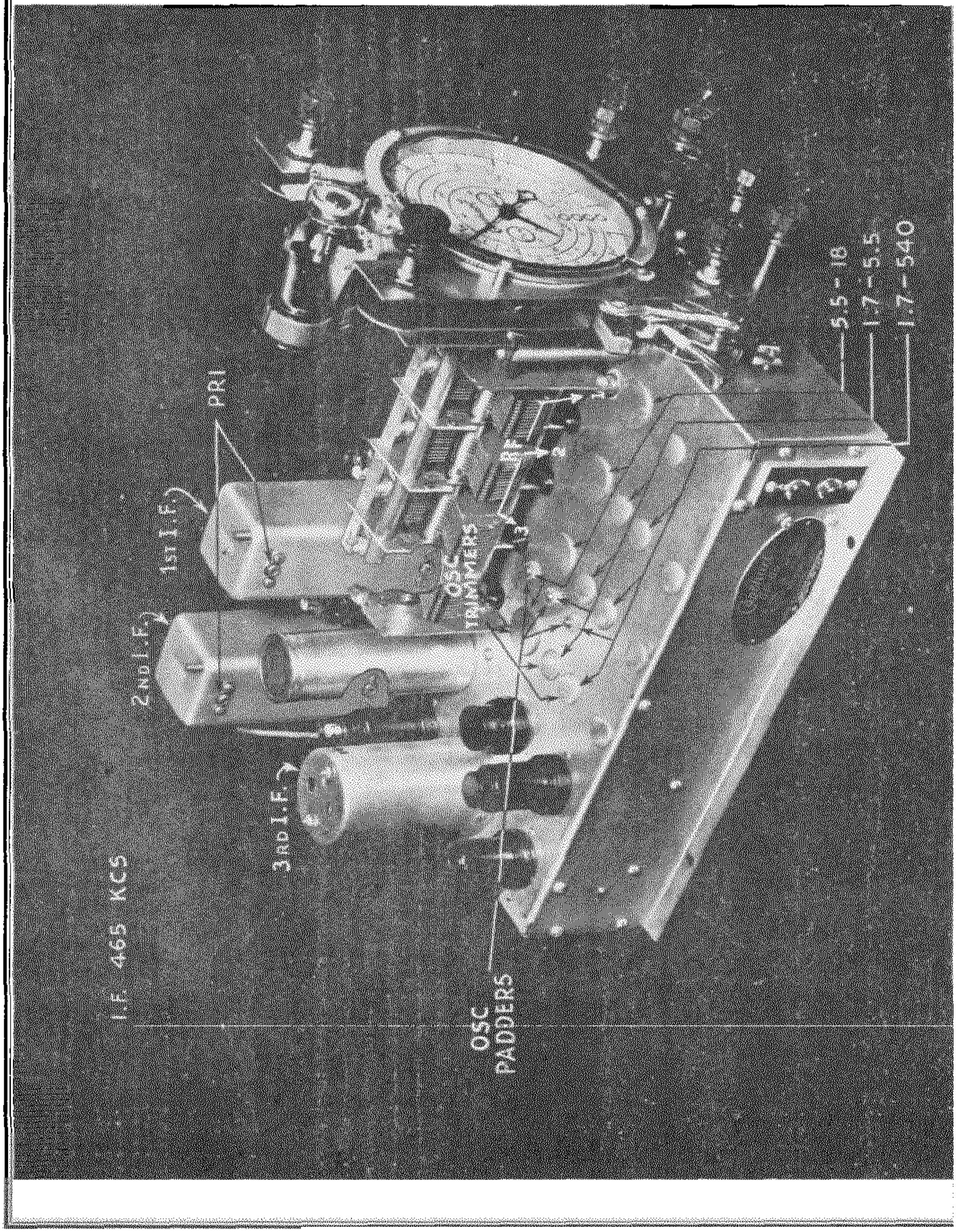
UP TO 100 FEET, NO. 14 WIRE
100 FT. TO 250 FEET, NO. 12 WIRE
250 FT. AND OVER, NO. 10 WIRE

'E CONTROL INSTALLATION

ERIES 400G AND SERIES 500G INSTRUMENTS

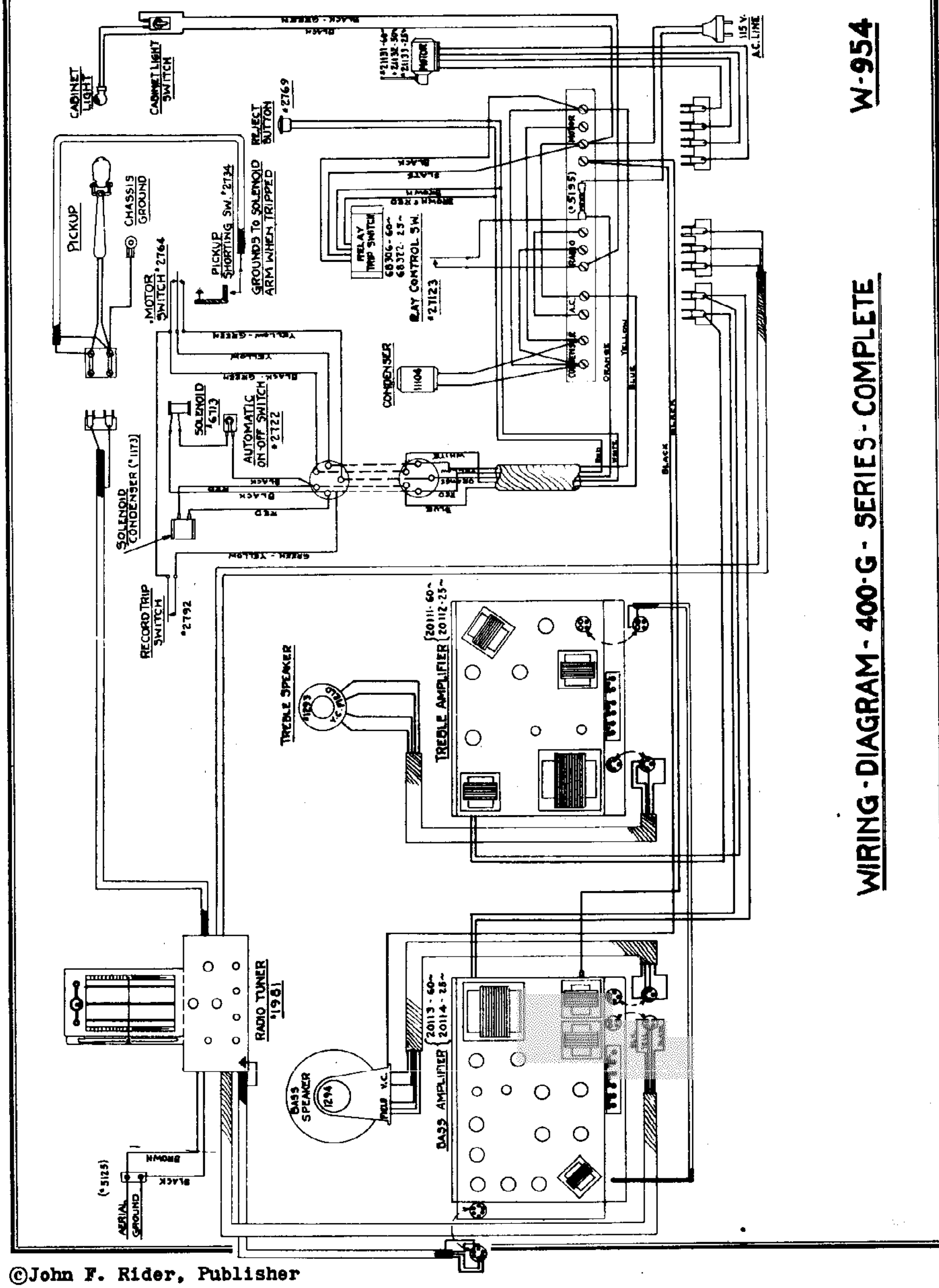
MODELS 400-E,500-E Series
Trimmers,Layout

CAPEHART CORPORATION



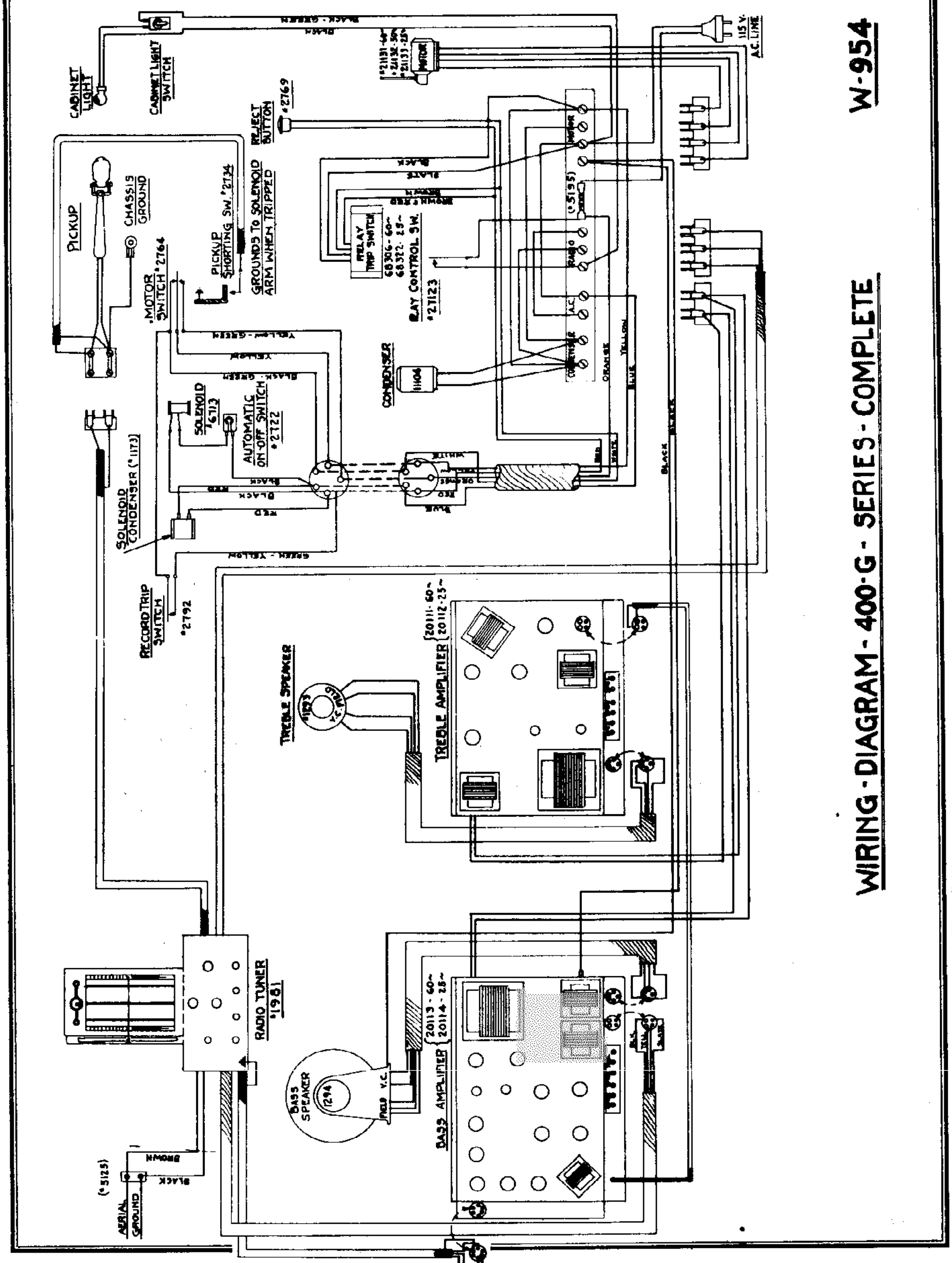
MODEL 400-G
Assembly Wiring

CAPEHART CORPORATION



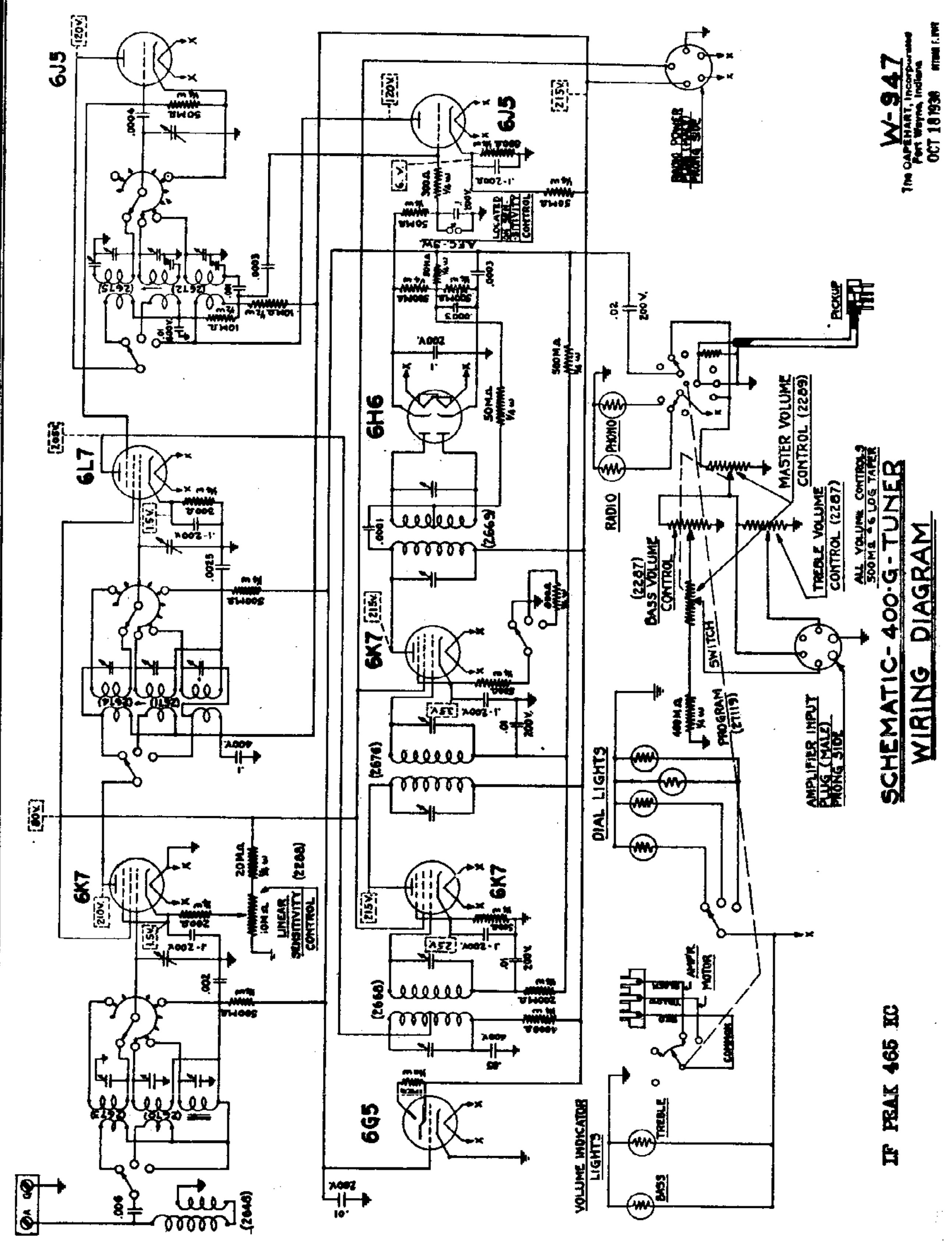
MODEL 400-G
Assembly Wiring

CAPEHART CORPORATION

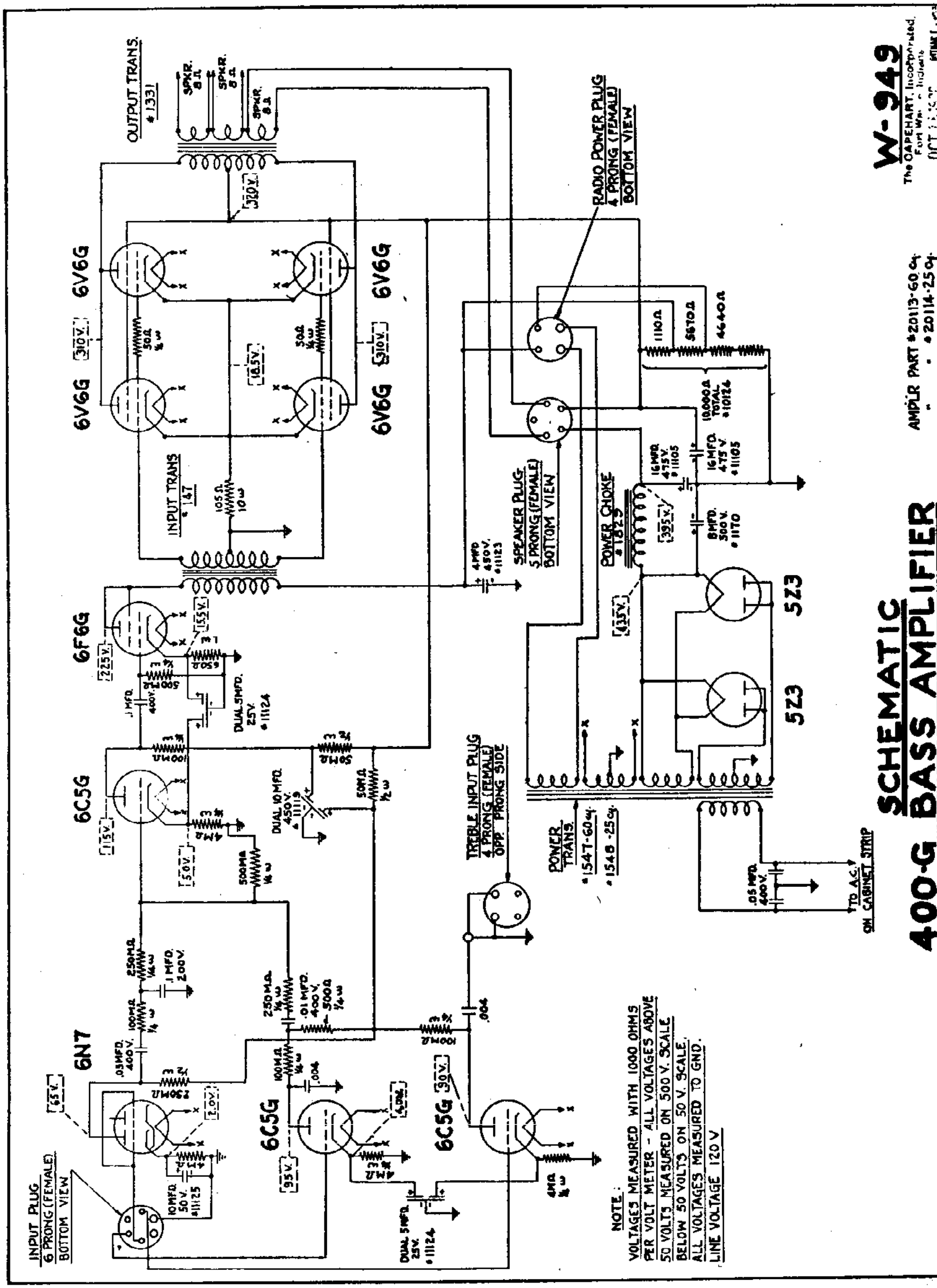


CAPEHART CORPORATION

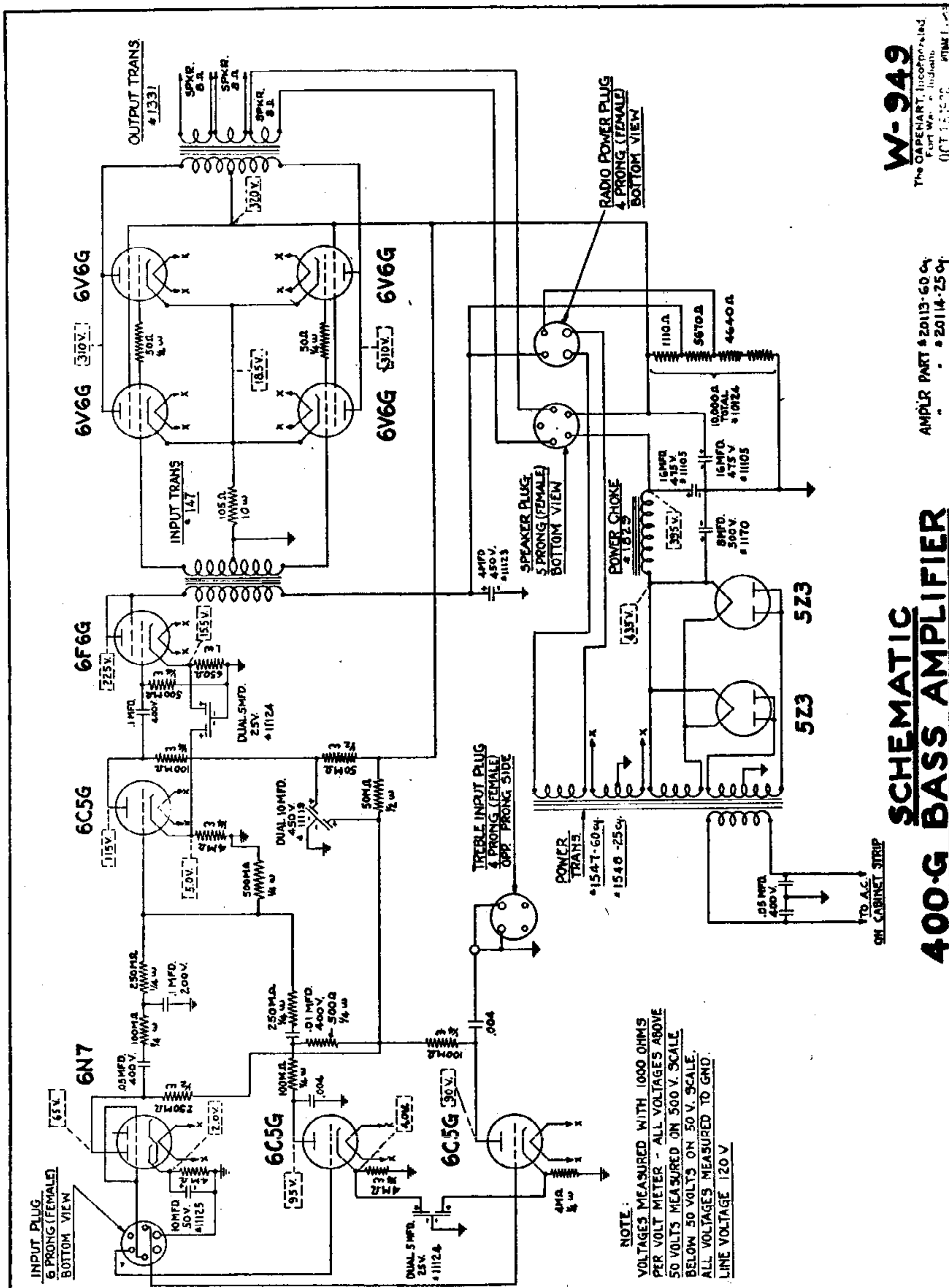
MODEL 400-G
Tuner Schematic
Voltage



MODEL 400-G
Bass Amplifier Schematic CAPEHART CORPORATION
Voltage

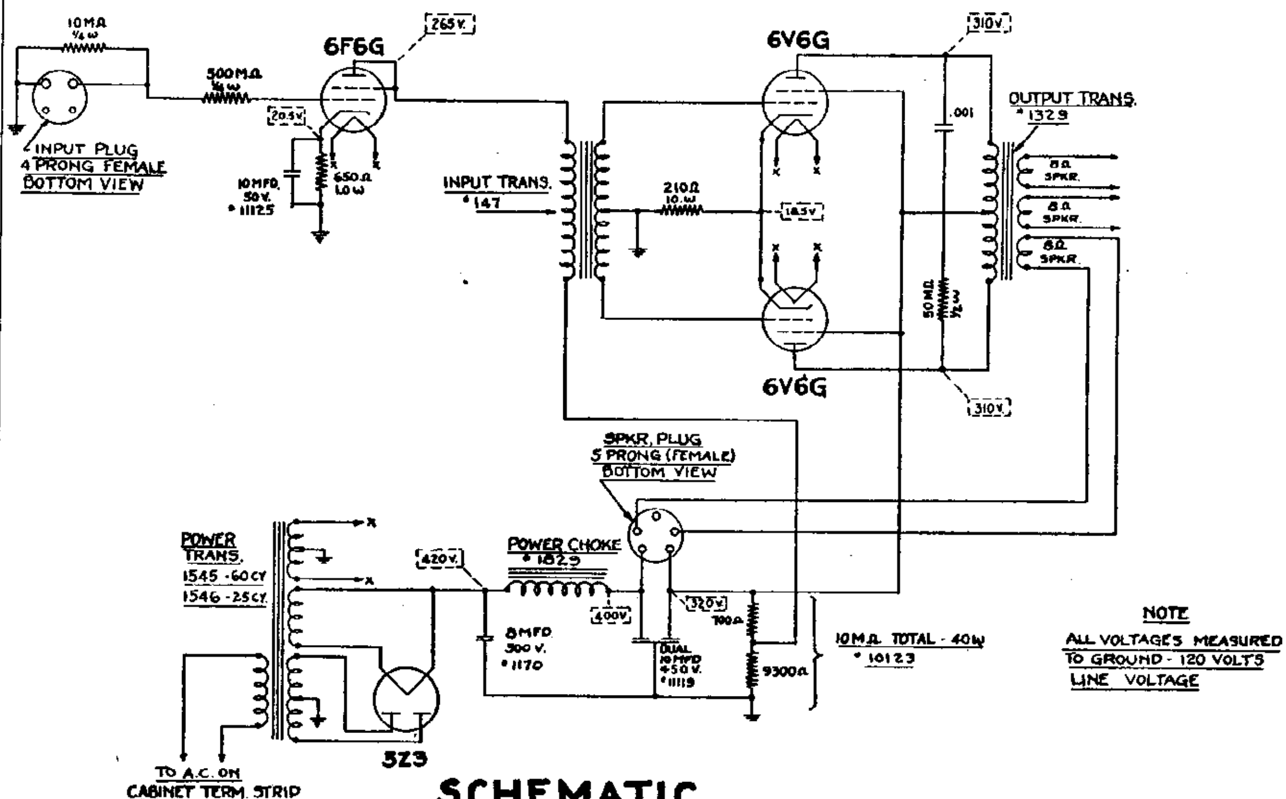


MODEL 400-G
Bass Amplifier Schematic **CAPEHART CORPORATION**
Voltage



CAPEHART CORPORATION

MODEL 400-G
Treble Amplifier
Schematic, Alignment



SCHEMATIC
400-G TREBLE AMPLIFIER

W-948

AMPLR. PART No. 20111-60cy
" " 20112-25cy

Alignment: I-F
The i-f stages are peaked at 465 kc. Remove the 6J5 oscillator tube. Set the test oscillator at 465 kc and connect the output to the grid of the 6L7 first detector. Adjust the trimmers for maximum reading of the output meter.

AFC :
The AFC circuit is aligned when aligning the i-f amplifier at 465 kc. The primary of the discriminator transformer, marked DIODE transformer in the layout, is aligned at 465 kc. The secondary is aligned with the AFC switch closed on a broadcast or oscillator signal, using either the electric eye or output meter for checking resonance. The AFC switch should then be opened and the secondary re-aligned. If alignment has been made correctly, turning the AFC switch off and on should make no difference in the cathode-ray tuning tube.

R-F :
Replace the oscillator tube. Connect oscillator to antenna post. No matter what band is being aligned, start with the oscillator trimmer with the dial set to the high-frequency end of the band at the following frequencies:

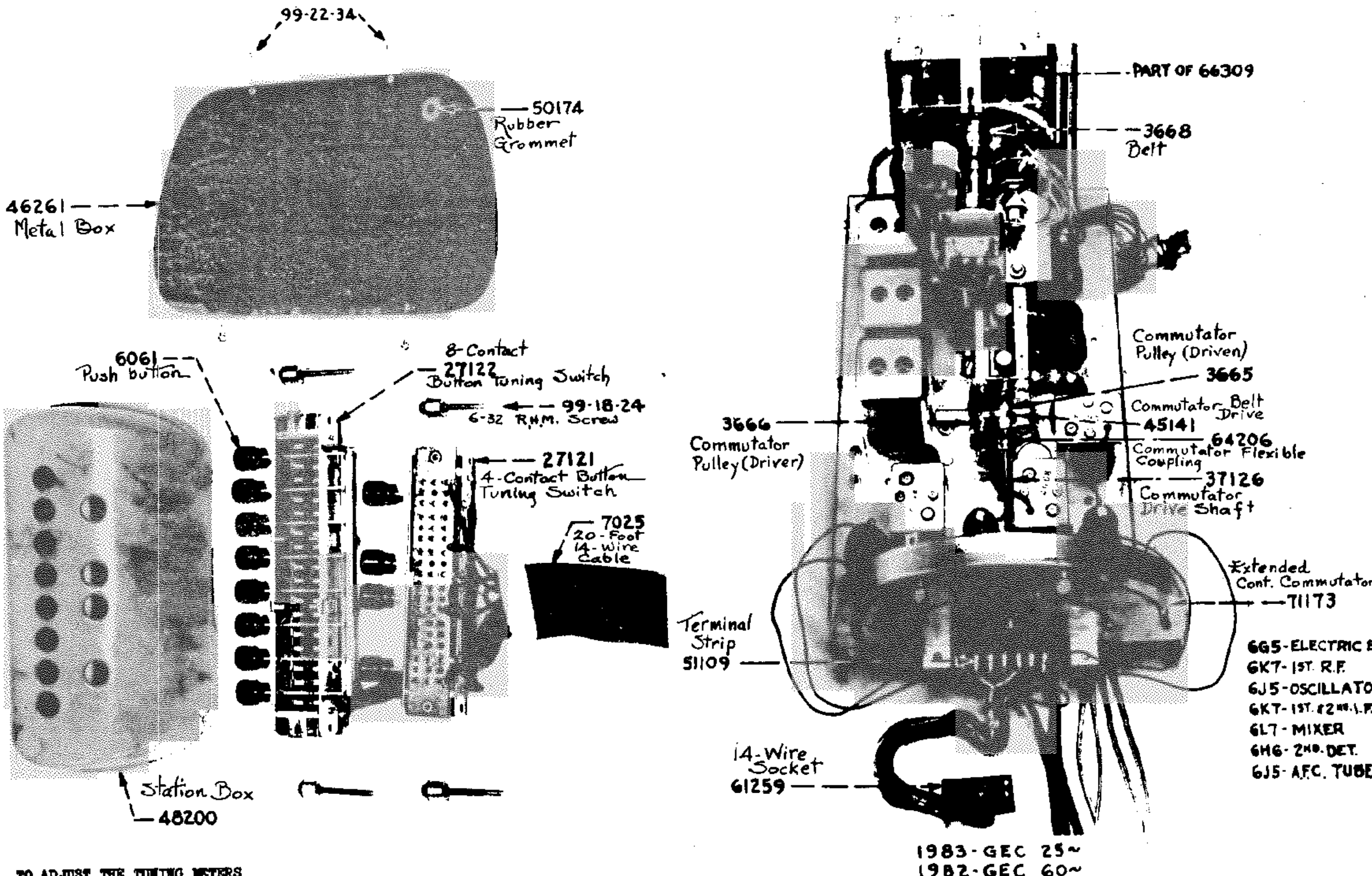
Broadcast Band ... 1400 kc
First H-F Band ... 5.0 mc
Second " " ... 17.0 mc

After the oscillator trimmer has been set for resonance, align the r-f trimmers. After these have been adjusted properly and checked, set the oscillator padding condensers of the bands at the following frequencies:

Broadcast Band ... 550 kc
First H-F Band ... 2.0 mc
Second " " ... 6.0 mc

MODEL 400-G
Tuning Meter Adjustments
Chassis, Assembly

CAPEHART CORPORATION



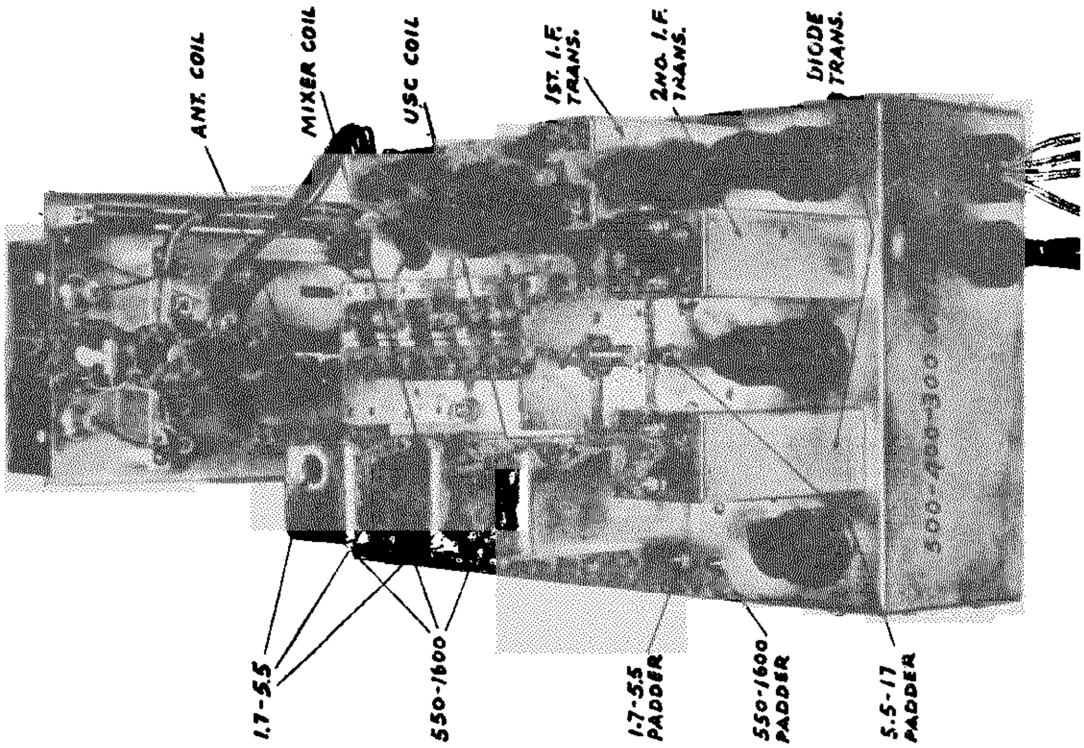
TO ADJUST THE TUNING METERS

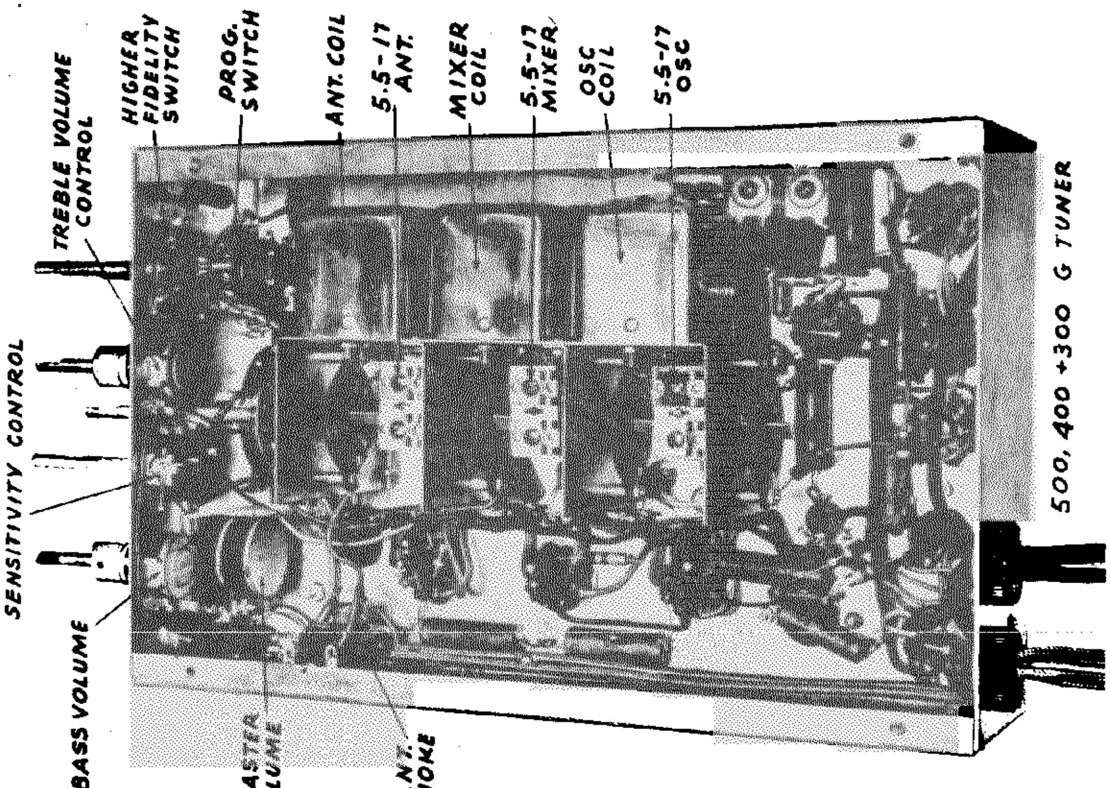
IN ORDER THAT THE CALIBRATION OF THE TUNING METERS, IN THE REMOTE CONTROL STATIONS MAY BE MADE TO AGREE WITH THE TUNING DIAL, A RHEOSTAT IS PROVIDED. THIS RHEOSTAT IS MOUNTED ON THE RADIO CHASSIS, DIRECTLY ABOVE THE ANTENNA GROUND TERMINAL STRIP. THIS RHEOSTAT IS USED TO COMPENSATE FOR THE VARIOUS LENGTHS OF CABLE REQUIRED IN THE DIFFERENT INSTALLATIONS, AND TO COMPENSATE IN THE DROP IN BATTERY VOLTAGE.

TO ADJUST A REMOTE CONTROL STATION, TUNE THE SET BY HAND, TO 550 KILOCYCLES, THEN AT EACH STATION BOX, SET THE METER TO THIS FREQUENCY BY THE ZERO ADJUSTING SCREW ON THE FACE OF THE METER. THEN TUNE THE SET, BY HAND TO 1600 KILOCYCLES, AND ADJUST THE RHEOSTAT UNTIL THE METERS INDICATE THIS FREQUENCY. AGAIN CHECK THE LOW FREQUENCY SETTING, MAKING THE NECESSARY ADJUSTMENTS BY THE ADJUSTING SCREW IN EACH BOX.

CAPEHART CORPORATION

MODEL 400-G,500-G Series
Trimmers,Chassis

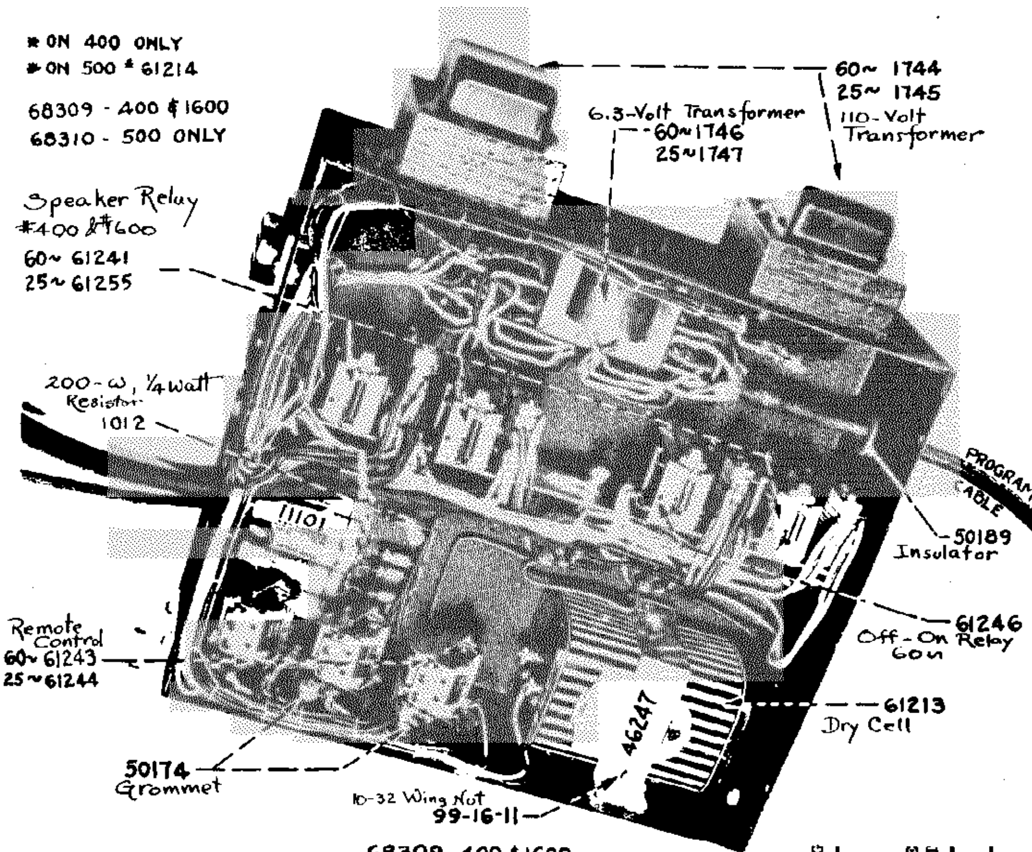


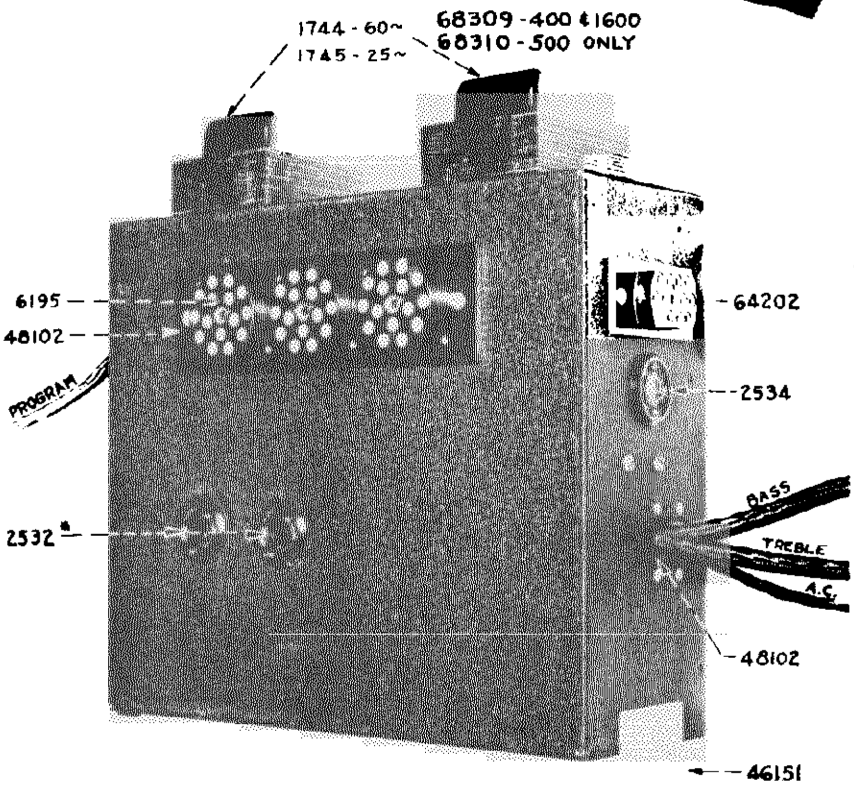


500, 400 +300 G TUNER

MODEL 400-G,500-G Series
Mixing Panel Chassis
Notes

CAPEHART CORPORATION





THE #1744 TRANSFORMERS, #1745 IF 25 CYCLE, ARE FOR THE PURPOSE OF ENERGIZING THE VARIOUS RELAYS NEEDED TO PERFORM THE NECESSARY SWITCHING OPERATIONS WHEN CUTTING IN OR OUT A GROUP OF SPEAKERS, CHANGING FROM RADIO TO PHONOGRAPH, ETC. ONE OF THESE TRANSFORMERS IS ALWAYS ON THE LINE, EXCEPT WHEN THE PLAY CONTROL IS AT ZERO, TO PROVIDE VOLTAGE FOR THE OFF-ON RELAY.

TRANSFORMER #1746, #1747 IF 25 CYCLE, IS EMPLOYED FOR THE PILOT LIGHT IN THE REMOTE CONTROL STATIONS. IF TRANSFORMER #1746 OR #1747 FAILS TO WORK, THE RESULT WILL BE NO PILOT LIGHT IN THE REMOTE STATIONS. THE OUTPUT VOLTAGE OF THESE TRANSFORMERS IS 6.3 VOLTS.

THE DRY CELL, #61213, IS TO SUPPLY A STEADY SOURCE OF DIRECT CURRENT TO OPERATE THE TUNING OR KILOCYCLE METERS IN THE REMOTE STATIONS. IF IT BECOMES IMPOSSIBLE TO BRING THE METERS IN THE REMOTE STATIONS INTO SYNCHRONISM WITH THE TUNING DIAL, BY ADJUSTING THE RHEOSTAT ON THE RADIO CHASSIS, A NEW BATTERY IS INDICATED.

IF THE OFF-ON BUTTON DOES NOT TURN THE INSTRUMENT ON AND OFF, IT MAY BE THAT THE COIL IN RELAY #61246, #61257 IF 25 CYCLE, IS OPEN, HOWEVER, IF THE COIL IS NOT OPEN, THE CONTACTS MAY NEED CLEANING, OR THE SPRINGS ADJUSTED.

MIXING PANEL - G-SERIES

If any speaker button does not switch its associated speaker group on or off, the #61241 relay, #61255 if 25 cycle, #61242 60 cycle or #61256, 25 cycle if a Model-500 instrument, may be open, or the contacts in need of adjustment or cleaning. Low volume from one set of speakers, is probably due to lack of field current, due to defective field supply rectifier tube, or the 110-volt relay not making proper contact.

The 200-Ohm resistors, in series with the 0.1 Mfd. condensers, are across the points of some of the relays as thump filters to reduce the radio interference when the relays open or close.

If either the tuning or volume control knobs are ineffective, the trouble may be located in the #61243, #61244 if 25 cycle relay. In the "G" model remote control, the relays operate from 16-volts, instead of 110-volts, with a large reduction in radio interference.

The covers, for the unused 16-wire sockets of the face of the mixing panel, used to connect the remote cables to the instrument, should be left in place. These covers hold the jumpers in the sockets, which complete the tuning meter circuit. If any cover is removed, see that the tuning meter circuit is completed, as these meters operate in series and if a jumper is removed, all meters will fail to function.

When installing a remote control system, all control stations are wired in parallel, except the tuning meters, these meters are in series. The leads for the meters are coded red for one load, and green for the other. In the event that one, or more station tuning meters read backward, the remedy is, of course, to reverse the polarity of the leads going to the meter.

If extra outlets are provided, it is necessary that some method be provided to close the meter circuit in the unused outlets, otherwise the meters will not function.

TO REPLACE KILOCYCLE METER OR GLASS

Remove the station box rear cover, by removing the six screws from the back, thus exposing the bakelite meter cover. This cover has three solder lugs at the bottom edge, all leads to these lugs should be unsoldered. Extreme care should be used in removing the two leads going into the meter case. After the leads are free, remove the three screws holding the meter cover in the box, lift the meter cover and the pilot light, out. Check the position of the Zero adjuster in the face of the box. This is a bakelite part and its pin, which adjusts the meter hand, should be turned to the large opening, in the slot of the Zero correcting arm. Now remove the two screws holding the meter mounting bracket to the case. Care should be exercised when handling the meter, not to bend the hand or get any foreign bodies, especially steel particles, in its moving parts. The glue used to hold the glass in place, is water soluble, and any broken pieces of glass, remaining in the case, may be removed by soaking.

Linoleum cement may be used to hold the new glass in place. This cement requires a minimum of 36 hours to dry, due to the impervious nature of the box and glass. After the cement has hardened, clean the glass carefully, on the inside before remounting the meter. Also check the Zero adjuster before setting the meter into the box, to see that the pin will enter its slot without striking and bending the correcting arm.

When replacing the pointer, #6062, turn the shaft to the position where the switch is open, then turn the shaft ONE notch or step toward one hundred, at this point, set the indicator on Zero and set up the set screw, checking to see that the pointer does not ride on the dial at any point.

TO SET STATION STOPS ON EXTENDED TUNING CHASSIS

Starting at the high frequency (shortest wave length) end of the broadcast band, with the AFC off, pick the desired station, nearest the end of the dial. Slide station stop #1 on the commutator, meanwhile holding button #1 down, until the station desired comes in best, then lock the station stop, by the thumb screw. The odd numbered stops are in the outer row and the even numbered stops in the inner row, (by having two rows of stops, stations on adjacent channels may be tuned in). Next, adjust stop #2 for the next low frequency station, using button #2 and so on, until all eight stops are adjusted. Always have the AFC switch in circuit when using extended tuning, except during the time the stops are being set. Proper call letter strips should be inserted in the buttons with the celluloid covers over them. These call letter slips and covers are packed in a manila envelope with each extended control instrument.

On the chassis, is a relay #61235, #61245 if 25 cycles, which is used to shift the clutch so that the meter may drive either the gang condenser or the volume control, a set of contacts is mounted on this relay to mute the speakers when the meter is tuned from station to station. If a station button is depressed, this relay should close, muting the speakers and shifting the clutch so as to engage with the condenser drive pulley, in the event of failure of the instrument to tune when a station button is depressed, failure may be traced to an open coil in this relay, if the meter operates properly.

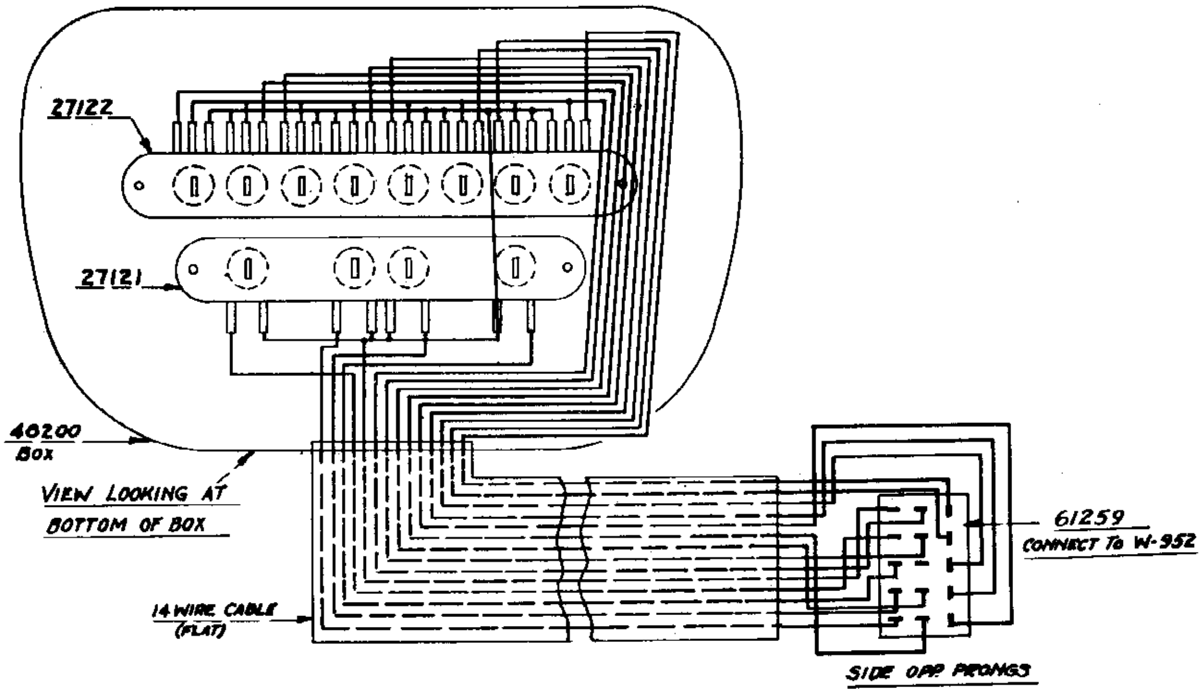
Underneath the chassis is the program relay, #61240, #61258 if 25 cycle. Failure to change from radio to phonograph, or from phonograph to radio, may be due to an open coil or improper contact adjustment here.

In the bottom of the cabinet is the OFF-ON relay, #61246, #61257 if 25 cycle. Failure of the instrument to start or shut off when the corresponding buttons are pushed, may be due to failure of the relay coil or improper adjustment of the contacts.

In case a control button fails to operate from the control box, but the corresponding button on the instrument works, the trouble may be located in the cable.

MODEL 400-G,500-G Series
Extended Control Wiring

CAPEHART CORPORATION



EXTENDED - CONTROL - BOX
WIRING - DIAGRAM

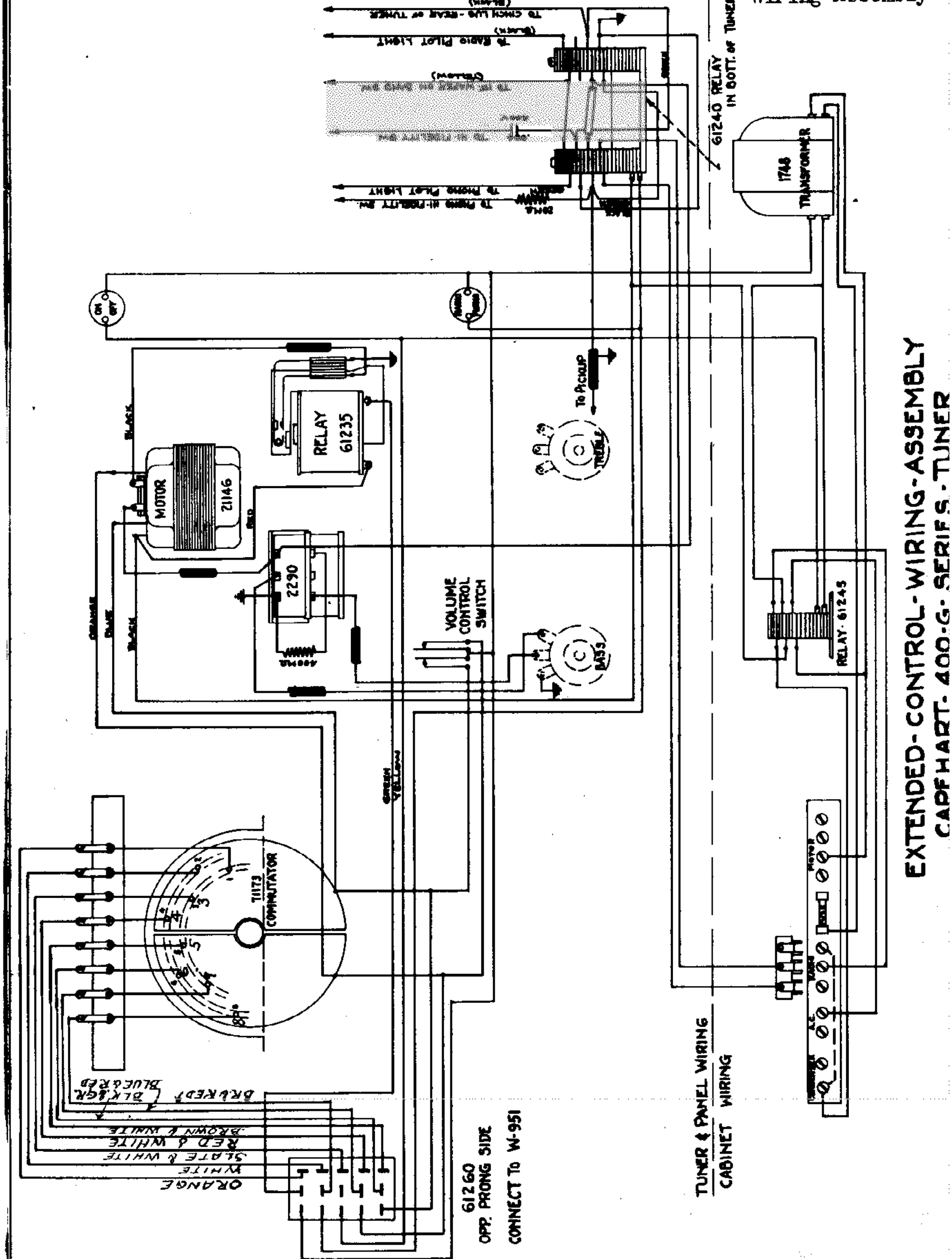
W-951
The CAPEHART, Incorporated
Fort Wayne, Indiana
NOV 2 1939

RATING	NAME	PART NO.	LOCATION	REGULAR #300-400 #500-#1600	EXTENDED CONTROL #300-#400-#500 #1600	REMOTE CONTROL #400-#1600	REMOTE CONTROL #500
110-Volt							
60 Cycle	Cabinet	61228	Cabinet	1	1	1	1
25 Cycle	Cabinet	61229	Cabinet	1	1	1	1
16-Volt							
60 Cycle	Off-On	61246	Cabinet	-	1	-	-
60 Cycle	Off-On	61246	Mixing Panel	-	-	1	1
25 Cycle	Off-On	61257	Cabinet	-	1	-	-
25 Cycle	Off-On	61257	Mixing Panel	-	-	1	1
60 Cycle	Program	61240	Chassis	-	1	1	1
25 Cycle	Program	61258	Chassis	-	1	1	1
60 Cycle	Motor	61235	Chassis	-	1	1	1
25 Cycle	Motor	61245	Chassis	-	1	1	1
60 Cycle	Speaker	61241	Mixing Panel	-	-	*	-
25 Cycle	Speaker	61255	Mixing Panel	-	-	*	-
60 Cycle	Speaker	61242	Mixing Panel	-	-	-	*
25 Cycle	Speaker	61256	Mixing Panel	-	-	-	*
60 Cycle	Remote	61243	Mixing Panel	-	-	3	3
25 Cycle	Remote	61244	Mixing Panel	-	-	3	3
60 Cycle	Off-On	61224	Speaker Cabinet) These relays used				
25 Cycle	Off-On	61226	Speaker Cabinet) at extension speakers only				

*One speaker relay is required for each speaker installation, including the speakers in the instrument, in the case of the #400 and #500 Series.

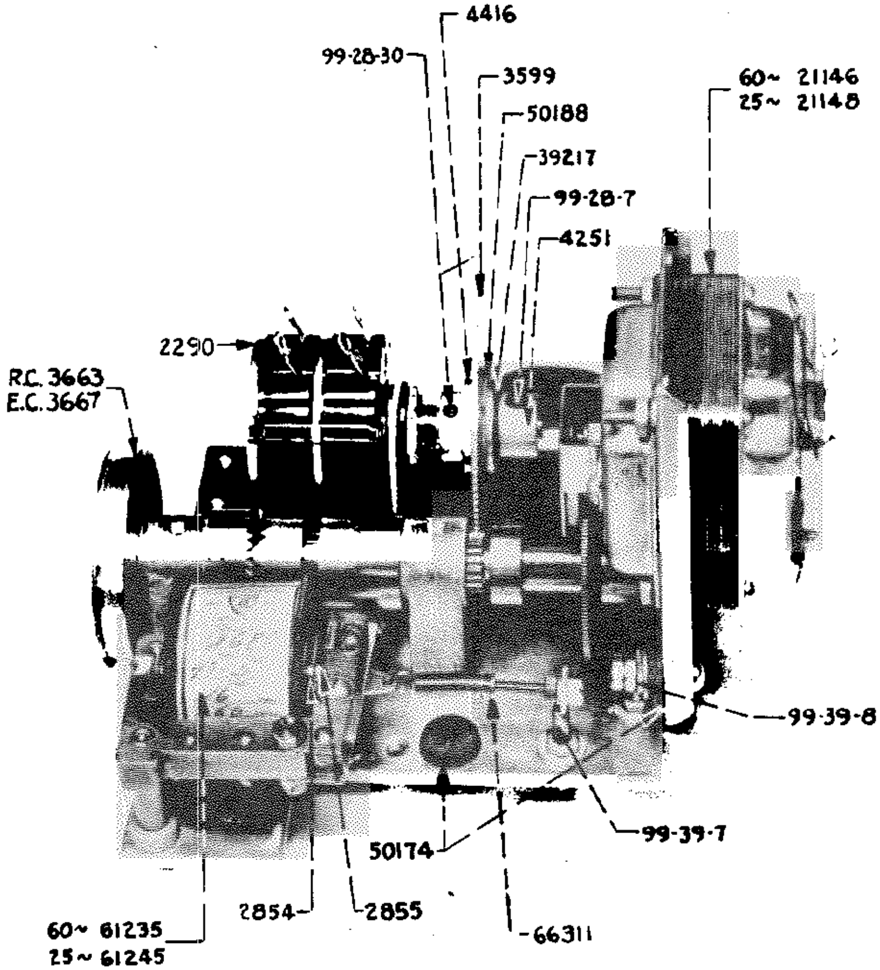
MODEL 400-G, 500-G Series
Extended Control
Wiring Assembly

CAPEHART CORPORATION



MODEL 400-G
Volume Control Schematic
Data, Parts list

CAPEHART CORPORATION



The motor which operates the tuning and volume control mechanism has a thermostat on it. This thermostat will allow the motor to operate continuously for ten minutes before shutting off the motor.

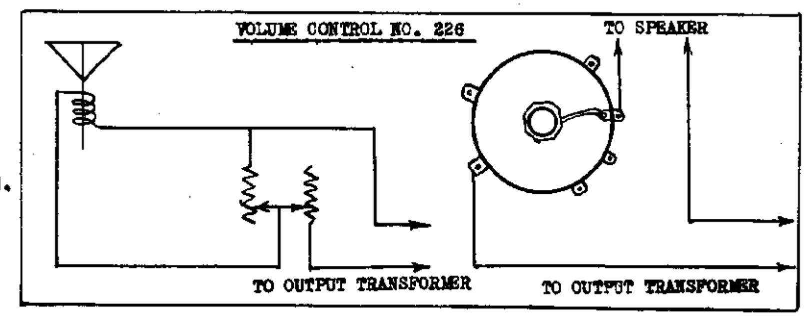
If the motor fails to operate when the proper controls are used, the thermostat has undoubtedly shut off the motor. Allowing the tuning and volume controls to remain unused for three or four minutes, will close the thermostat and the instrument can be used in the regular manner. This thermostat is placed on this motor as a safety device and if the above occurs, it is a normal function of this motor.

Part No.	Description
2290	Master Volume Control
2854	Muting Switch Contact Assembly
2855	" " " "
3599	Volume Control Gear
3662	Clutch (Driver)
3663	Drive Pulley for Remote Control only
3667	" " " Extended " "
4251	Collar
4416	"
21146	Motor, 60 cycles
21148	" 25 "
39217	Spring Washer, Volume Control
50174	Grommet
50188	Friction disc, Volume Control
61235	Relay, 60 cycles
61245	" 25 "
66311	Relay Spring Assembly
99-28-7	10-32 x 3/16" setscrew
99-28-30	6-32 x 1/4" "
99-37-7	6-32 x 7/8" Spade bolt
99-39-8	6-32 x 3/4" " "

VOLUME CONTROL NO. 226 (CONSTANT IMPEDANCE)

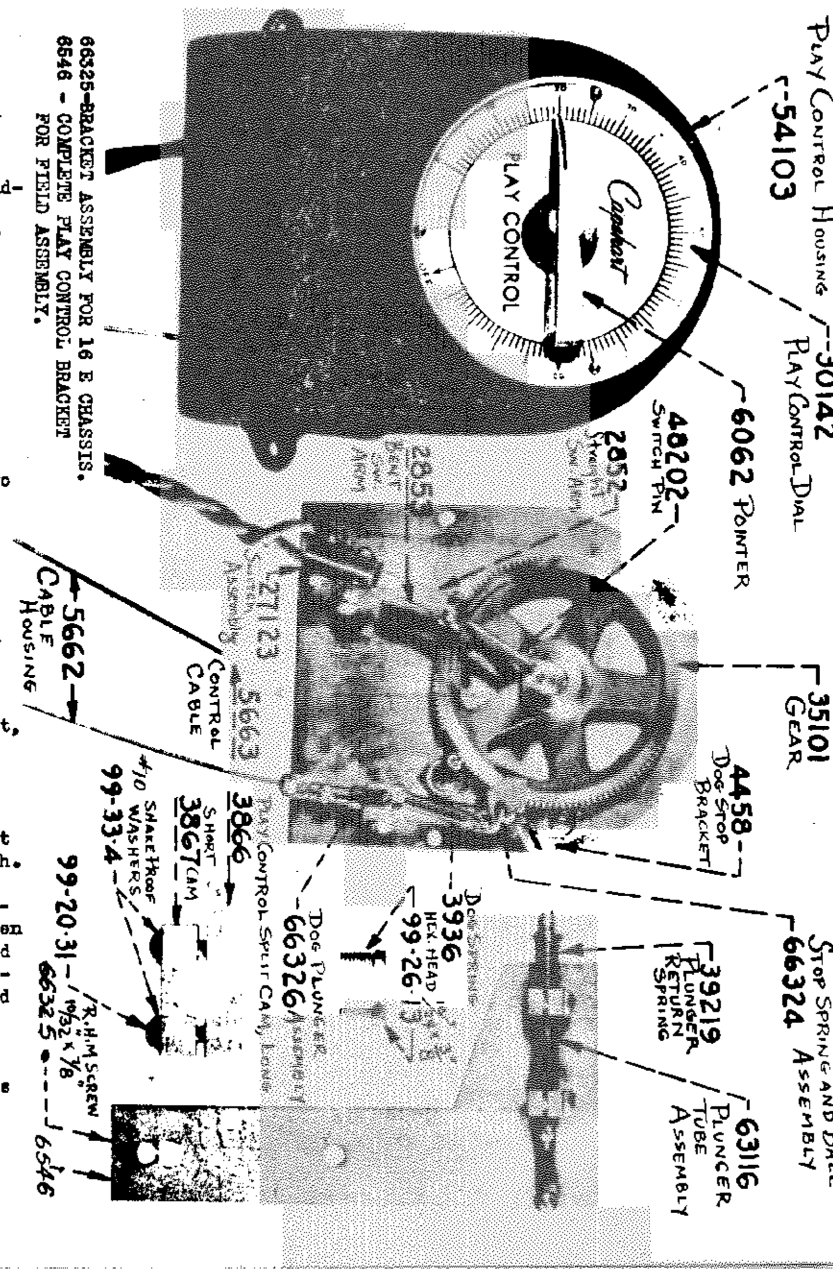
THIS DIAGRAM AND VOLUME CONTROL ARE TO BE USED WHEN IT IS NECESSARY TO HAVE VOLUME CONTROL FOR EACH INDIVIDUAL REMOTE SPEAKER. ONE VOLUME CONTROL IS NEEDED FOR EACH SPEAKER TO BE CONTROLLED, THAT IS, TWO FOR EACH 400-G REMOTE SPEAKER INSTALLATION. AND THREE FOR EACH 500-G REMOTE SPEAKER INSTALLATION. THIS VOLUME CONTROL NO. 226, MAY ONLY BE USED IN LOW IMPEDANCE CIRCUITS, FROM 6 TO 10 OHMS. IT IS NOT SUITABLE FOR USE WITH HIGH IMPEDANCE SPEAKERS OF THE MAGNETIC TYPE, OR ELECTRODYNAMIC SPEAKERS, HAVING HIGH IMPEDANCE TRANSFORMERS.

THE OUTPUT TRANSFORMERS OF THE CAPEHART AMPLIFIERS MATCH TO 8 OHMS, AT 400 CYCLES.



CAPEHART CORPORATION

MODEL 400-G
Play Control
Assembly, Adjustments



66325-BRACKET ASSEMBLY FOR 16 E CHASSIS.
6546 - COMPLETE PLAY CONTROL BRACKET FOR FIELD ASSEMBLY.

THE CAPEHART PLAY CONTROL

The play control allows the operator to set the phonograph to play a predetermined number of selections and have the instrument automatically stop when that number of selections have been played.

When the play control is set at Zero, all remote control and extended control stations are rendered ineffective. An off position is provided on the play control, so an indefinite number of selections may be played without the control operating.

In disconnecting the play control from the record changer, the two set screws on the cable and the cable housing, should be loosened and the cable and cable housing carefully removed. When the cable is removed from the plunger, see that the wire is not broken, and the kink, due to the set screw, should be straightened out before reinstalling the cable.

TO ADJUST THE PLAY CONTROL

When setting up a play control, the counter should be reset at Zero just as the needle touches the record. That is, the play control cam, on the record changer main shaft, should be from 1/4" to 1/2" beyond the plunger after the main clutch has disengaged. The control cable is put in the hole in the plunger and the set screw tightened, then the cable housing should be held in place by the set screw - do not set the screw tight. Turn the pointer back and forth over the play control dial, if the pointer catches or binds, slip the cable housing away from the bracket slightly, until the pointer runs free, then run the changer through a cycle to see that the play control resets properly, then tighten the screw.

When adjusting the play control, which is in the record compartment, after removing the wood screws which mount the control to the shelf, remove the clips holding the 110-volt loads to the switch. Then remove the pointer and the two round head machine screws from the back. The stop spring of the stop spring and ball assembly, #66324, should be tangent to the gear and the ball should be in the space between the last and the next to the last tooth, before the blank space in the gear tooth. With the ball in this position, the set screw in the collar at the rear of the unit should be firmly against the stop pin. To make this adjustment, loosen the set screw, while holding the gear, move the collar, then tighten the set screw. In this position, the switch pin, #48202, should hold the switch open and permit the switch to close when the gear is advanced one tooth. The stop bracket #4450, for the resetting dog, should allow the dog to advance only one tooth at a time, if it picks up more than one tooth, move the step toward the dog until it advances only one tooth at a time.

The resetting dog #3839, should not ride on the gear tooth, as this will prevent turning the pointer toward one hundred. Shift the stud, #4354 until the dog clears the tooth, then check the alignment of the plunger tube and the cable housing stud, for if the cable is bent here, the play control may fail to function.

MODEL 400-G
Remote Control
Cable Notes

CAPEHART CORPORATION

REMOTE CONTROL CABLE BULLETIN

SERIES-G

TO SPEAKERS --

Speaker cable of size according to the charts below, must be run from the instrument to each individual speaker.

The 110-volt AC lead for the speaker fields may be run from any 110-volt AC line nearest, or most convenient to each individual speaker The above is all the wiring necessary for remote speakers.

TO REMOTE STATIONS --

Remote station cable of size according to the chart below, may be run from the instrument to each individual remote station, or extended from one remote station to another in parallel. This one cable is all the wiring required for remote stations.

CABLE SIZES ON #500-GR (REMOTE CONTROL)

No. of Remote Control Stations and Speakers	Speaker Cable Sizes	Remore Control Cable Sizes
4 or less	8-Wire	16-Wire To All Stations
5 to 13	8-Wire	24-Wire To All Stations

CABLE SIZES FOR #400-GR and #1600-GR (REMOTE CONTROL)

No. of Remote Control Stations and Speakers	Speaket Cable Sizes	Remote Control Cable Sizes
4 or less	6-Wire	16-Wire To All S tations
5 to 13	6-Wire	24-Wire To All Stations

Note the Model-1600GR does not include any speakers. All speakers used with this model must be of the AC type, Models G2 or AG2. All remote speakers on the #400-GR Series are AC speakers, Models G2 and AG2. All remote speakers on the #500-GR Series are G3.

Note the Model 1600-GR does not include any speakers; while the Series #400-GR and #500-GR models include one set of DC speakers in the instrument cabinet. No DC speakers are required with the Model-1600GR and all speakers for this model and all remote speakers for the Series #400-GR and #500-GR are of the AC type.

Instruments equipped for four speakers or less (including the speaker in the instrument) contain one set of amplifiers. For five and including eight speakers, two sets of amplifiers are used, and for nine and including twelve speakers, three sets of amplifiers are used. These additional sets of amplifiers are not installed in the instrument cabinet and may be located in a closet or other convenient place, apart from the instrument.

In all models where additional sets of amplifiers are used, all speakers operating from these amplifiers are of the AC type. When ordering equipment calling for additional sets of amplifiers, specify length of cable necessary to connect additional amplifiers to the instrument.

REMOTE CONTROL EQUIPMENT INCLUDES:

- Instrument equipped for remote control operation.
- One remote control station with 20-ft. flat cable.
- Provision for attaching number of additional remote control stations as ordered.
- Provision for attaching number of auxiliary speakers as ordered.

Speaker push buttons will be engraved with any lettering desired as specified, maximum limit two lines of six letters each, or one line of seven letters. Unless otherwise specified, speaker push buttons will be engraved "spkr. 1", "spkr. 2", etc.

Plug #61106 and outlet box cover #66132, are used where the 24-wire remote control station cable enters and leaves the wall.

Plug #6194 and outlet box cover #66132, are used where the 16-wire remote control station enters and leaves the wall.

24-wire flat cable is used between each remote control station and the instrument, or between remote station and wall receptacle on instrument, or between remote station and wall receptacle on instruments having more than four remote stations and speakers.

16-wire flat cable is used between each remote control station and the instrument, or between remote station and wall receptacle on instruments having four or less remote stations and speakers.

Round Cable is used whenever the cable is concealed.

Standard Gem "F" Outlet Box is used with #66197, #66264, #66132, #66131, #66104 and #66193 outlet box covers and is obtainable at any local electrical dealer.

Use standard house wire, approved by the Underwriters' Laboratories for connecting AC speaker fields.

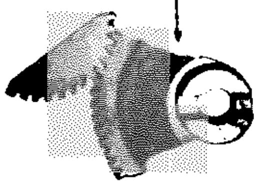
CAPEHART CORPORATION

MECHANICAL INSTRUCTIONS

No. 16-E De Luxe Record Changer

1. **TO LOCATE AND ADJUST THE RECORD TRAY (6687) (Fig. 6).**

In assembling the record tray to the record changer, the first tooth of the driver quadrant (3551) (Fig. 5) should mesh with the second tooth of the driven quadrant of the tray as shown.



With the two gears properly meshed, loosen the Allen set screws which hold pins No. 34133, Fig. 1, in place. This will allow you to move the record tray sidewise, adjust tray sidewise until the turntable spindle is exactly in the center of the 10" record level of the record tray. (The 10" record level is that part of the tray where the felts No. 4913 are indicated in Fig. 6.)

With the control lever in the "one side" position, run the record changer through its cycle until the large hole in the main cam is exactly half way past the upper edge of the record tray cam follower, as shown at No. 5, figure 1. At this position, the points of the ten-inch felts (4913) (Fig. 6) should be level with the top of the turntable felt. If this tray is too low or too high, it may be adjusted to the proper level by loosening the eccentric screw (3237) (Fig. 1) No. 4 and turning this screw until the proper level is obtained. Be sure to tighten the lock nut after adjustment.

If the tray is too high, at this position, the ten-inch records will not be centered over the turntable spindle. If the record tray is too low, the ten-inch records will slide out over the ten-inch tray shoulder and not properly center.

2. **THE ADJUSTMENTS OF THE RECORD MAGAZINE.**

Before attempting to adjust the magazine, be sure that the center of the magazine pivot pins (34132) (Fig. 1) is $8\frac{3}{8}$" above the base plate. This height is very important and we recommend checking the height of the right hand pin, when looking at the magazine, before any adjustments are made.

The record magazine is positioned by moving it sideways on its bearing or pivot pins. The two set screws underneath the pivot pins lock the magazine in position. Loosen these set screws, then see that the left hand side of the record reverse assembly fork (part of 6228, Fig. 6) is between $\frac{1}{32}$" and $\frac{1}{16}$" inside the left hand side of the Reverse crank, when looking at the magazine. That is, the left hand edge of the record reverse fork is about $\frac{1}{32}$" or $\frac{1}{16}$" to the right of the left hand edge of the crank. After moving the magazine, lightly set up the set screws. Then with the selector arm in the "Repeat" position swing the record reverse arm around in front of the magazine, to see whether the record guide strikes either of the record support pins (34138) (Fig. 6). If the guide strikes either of the support pins it will be necessary to bend the pin away from the guide so they can not strike. If it is necessary to bend either pin, set the control lever in the "Repeat" position, then raise the record tray by hand, with a 10" record on it, observing the way the record strikes the support pins, the record should hit both pins about $\frac{1}{16}$" from the end of the pin; if it does not it will again be necessary to adjust the pin until the record hits both pins an equal distance from the ends. If it is necessary to bend the pins, check the clearance between the record guide arms and the pins and between the arm carrying the record guide and the right hand pin. Also if the magazine has been shifted it is necessary to see that the two points, which extend downward from the magazine, have ample clearance in the channels, in the record tray, which are provided for their passage. If there is possibility of the points striking it probably means the magazine has been shifted too much.

If the magazine has been adjusted, it is also necessary to see that the record separator hook (6226) (Fig. 1) does not bind in the slot in the end of the record separator arm (6445) (Fig. 6). If it does the section covering these parts give the adjustment.

3. **MAGAZINE STOP SCREW.**

The magazine stop screw No. 2, Fig. 5, should be adjusted so that the crank pin (part of 6230, Fig. 1) is approximately $\frac{1}{16}$" from the edge of the record reverse arm fork (part of 6228, Fig. 6) which is furthest from the magazine, when the record reverse guide is in front of the magazine, that is, in the reversing position.

4. **MAGAZINE LINK ADJUSTING SCREWS (No. 2) (Fig. 1).**

The record magazine should always come back snugly against the magazine stop screw, No. 2, Fig. 5. If it does not, it is necessary to loosen the two set screws (No. 2, Fig. 1) to a sliding tension and run the record changer through a cycle of change. When the magazine has reached the horizontal position, as shown in Fig. 1, press down on the lower end of the magazine; this will lengthen the link assembly. Then when the magazine returns to its normal position, the magazine link will adjust itself so that the magazine is snugly against the stop screw. Then tighten the magazine link screws.

5. **RECORD REVERSE GUIDE (6444) (Fig. 6).**

With a 12" record in the magazine the record reverse guide assembly (6444) (Fig. 6) should be parallel with the record when in the reversing position, in front of the magazine.

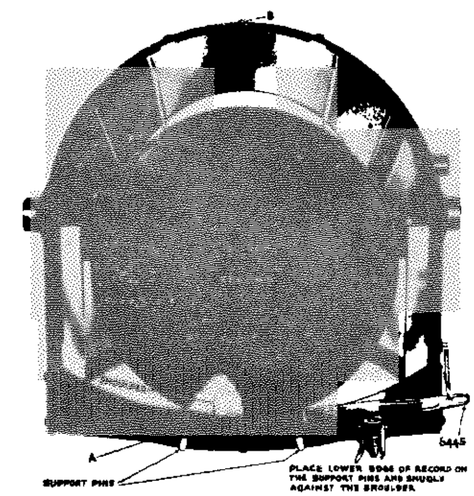
If the record reversing assembly is parallel with a 12" record as above, it should come around and lay against the reverse guide pin tubing (34134) (Fig. 6), if the eccentric cam (3825) (Fig. 8) is properly adjusted. This cam can be adjusted, by loosening the screw through the cam and turning it so that the record reversing assembly returns to the reverse guide pin tubing. Care should be taken when making this adjustment so that the crank pin (part of 6230, Fig. 1) does not hold the reverse guide away from the pin tubing. This cam should be turned so that the reverse guide assembly just touches the pin tubing; if the cam is turned too far it will allow the reverse guide assembly to hit the pin tubing, but in the reversing position the assembly will not be able to assume a position parallel with a 12" record.

6. **REVERSE ASSEMBLY LINK ROD.**

Loosen lock nut No. 9, Fig. 3, while the record changer is in the reversing position, that is, when the reversing assembly (6444) (Fig. 6) is in front of the magazine. Remove the screw (3241) (Fig. 8) holding the reverse segment link (34141) (Fig. 8) to the reverse segment (3550) (Fig. 8) and lengthen or shorten the link, by the link thread until the reversing crank (6230) (Fig. 1) stands with the crank pin just barely touching, but not binding, against the front side of the fork (6228) (Fig. 6). After the adjustment has been made, lock the link in place with the lock nut No. 9, Fig. 3.

7. **RECORD SEPARATOR ADJUSTMENT.**

The separator stop No. 3, Fig. 1, should be adjusted so that a small 10" record will positively clear the knife portion of the separator lever as shown in the following illustration. A standard to use is to make certain that there is approximately $\frac{1}{32}$" clearance between the edge of the small record and the point of the separator lever, as shown at "A" in illustration below. However, it may be necessary to vary one way or the other from this measurement, depending on whether or not the slotted end of the record separator lever goes over the hook (6226) (Fig. 1) without binding.



8. **RECORD SEPARATOR HOOK ADJUSTMENT.**

After adjusting the record separator it will be necessary to check the record separator hook (6226) (Fig. 1) to see that it enters the slot in the record separator without binding. This hook is threaded and by loosen-

MODEL 16-E
Adjustments, Part 2

CAPEHART CORPORATION

ing the locknut the hook can be turned in either direction, to raise or lower it. After the correct adjustment is obtained, tighten the locknut.

It should never be necessary to change these adjustments on record changers unless they have been tampered with by an inexperienced person.

9. SEPARATOR HOOK AND ARM (6226) (Fig. 12).

Be sure set screw No. 10 in Fig. 8 is screwed all the way in.

10. RECORD MAGAZINE BUSHING (4020) (Fig. 1).

If a ringing noise is heard while the instrument is changing records, i. e., such a noise that might be made by a spring, it will be found that the Durex bushing (4020) (Fig. 1) is too tight, in which case it will be necessary to loosen the lock nut of the holding bolt, and back the bolt out, from a quarter to a half turn, then tighten the lock nut.

11. TO ADJUST THE TONE ARM HEIGHT.

To adjust the tone arm height, first place a 12" record on the turntable and adjust the tone arm stop lever (64197) (Fig. 1) so that the record hits the rubber roller (5044) (Fig. 1) in the center. Start the record changer through a cycle and stop it when the tone arm lever hook (5658) (Fig. 1) just touches the stop lever assembly. In this position adjust the tone arm height so that the top of the stop lever is the same height as the center of the hook. This adjustment is made by loosening the two Allen set screws at the rear of the tone arm. These Allen set screws are accessible by raising the tone arm by hand. After making the height adjustment it is necessary to make certain that there is a clearance of approximately $\frac{3}{8}$" between the pickup head and the record tray. This distance may be checked between the bottom of the record tray and the bottom of the pickup when the record tray is approximately parallel with the pickup.

12. TO ADJUST THE PICKUP ELEVATION.

When the tone arm swings in towards the record, the pickup arm lever hook (5658) (Fig. 1) comes to rest against the pickup arm stop lever (64197) (Fig. 1) and when the tone arm lowers the pickup toward the record it pauses momentarily before the pickup arm lever hook goes through the stop lever. If the record changer is stopped during this pause, it will be found that the ball in the end of the pickup arm lift shaft (6457) (Fig. 9) is at the point marked "L" in Fig. 9 on the lift cam (6449) (Fig. 9.) Now if the pickup, with a needle in the proper position, is moved beyond the edge of the record, the point of the needle will extend below the top surface of the record a distance equal to half the thickness of the record. The correct elevation of the pickup is made by the screw in the underside of the tone arm fork against which the pickup cover rests. Loosen the locknut, adjust the screw to bring the needle to the position mentioned above, then lock the locknut.

13. PICKUP FEED IN ADJUSTMENT.

The collar of the pickup arm swing lever and collar assembly (6232) (Fig. 9) should ride on the leather facing of the friction cam (6691) (Fig. 10) until the pickup arm lever hook (5658) (Fig. 1) has engaged the stop lever (64197) (Fig. 7). Then a slight amount of friction should be maintained after the ball at the end of the pickup lift arm (6457) (Fig. 9) has engaged with the lift cam (6449) (Fig. 9). This friction should be maintained until the needle has touched the record, otherwise the pickup arm may move away from the stop lever and the needle miss the record. If the friction be maintained too long the needle may be forced beyond the first playing groove. To adjust this, the pin locking the friction cam to the main cam shaft should be driven out and the Allen set screw loosened to a sliding tension. The cam is rotated forward, in the direction of rotation of the main cam shaft, to maintain the friction a longer time and backward to maintain it for a shorter time.

14. TO ADJUST THE PICKUP.

After removing the pickup cover, it should be noted whether the stylus (5610) (Fig. 10) is centrally located in respect to the pole pieces (569) (Fig. 10). To center the stylus loosen the lock-nuts (99-11-1) (Fig. 10), then loosen the two headless set screws (99-28-3) (Fig. 10). These set screws hold the spool assembly (6711) (Fig. 10). The spool assembly should be shifted until the stylus is centralized with the pole pieces, then tighten the set screws carefully, so as not to crack the spool, then tighten the lock nuts.

If for any reason it is necessary to shift the pole pieces, which are held to the back by two screws, the two set screws holding the spool should be loosened before attempting to move the pole pieces. If any adjustment, of pole pieces, is made carefully check the centering of the stylus before replacing the cover by means of its three screws.

15. TO ADJUST THE STOP LEVER HOOK (5658) (Fig. 1).

Always adjust the tone arm position on a 12" record before adjusting for a 10" record. Adjust the tone arm stop lever hook (5658) (Fig. 1) by moving it in or out. This hook is locked in place by a set screw in the stud whose nut is shown in Fig. 1 as No. 43159. This set screw is at the bottom of this stud. Adjust the hook so that it will pass through the notch in the pickup arm lever (64197) (Fig. 1) without binding against the top or bottom of the notch, when in the playing position. With a 12" record on the turntable, the rubber roller (5044) (Fig. 1) against the edge of the record and the stop lever hook (5658) against the blade of the stop lever (64197) the needle should stop on the record exactly $\frac{3}{32}$" from the edge of the record.

With the record changer in exactly the same position as described above, and with a 10" record on the turntable and the hook (5658) (Fig. 1) against the blade, the stop lever should allow the needle to stop on the record $\frac{3}{32}$" from the edge of the 10" record. A 6-32 screw shown in Fig. 1 is provided for making this adjustment, simply by screwing it in or out. A check should be made for clearance between the roller and the tray, this roller should never bind on the record tray. This can be taken care of by slightly bending the tone arm stop lever (64197) (Fig. 1) up or down. If it is necessary to bend the stop lever it will be necessary to readjust for 12" records.

16. TO ADJUST THE CLUTCH THROWOUT LEVER AND CAM.

The clutch throwout lever cam is shown at 15 in Fig. 2 and is adjusted by loosening the shoulder screw (3317) (Fig. 2) to a sliding tension after the record changer has been stopped in the playing position. The clutch throwout lever cam should just clear the point of the turntable throwout cam (6448) (Fig. 10) with the clutch disengaged. Unless clearance between the turntable throwout cam and the clutch lever throwout cam is maintained the record changer will jam. If too much clearance is allowed the turntable throwout cam will not disengage the clutch and the record changer will continue to change records without playing them.

17. TO ADJUST SOLENOID WEDGE SPRING.

This phosphor bronze spring is located on one of the three spacers used to mount the solenoid plate bracket to the solenoid bracket. It is used to prevent clutch chatter or bounce when the clutch engages. The only adjustment is to bend the spring to a snug fit with a long screw driver so as to increase or decrease its pressure on the solenoid to clutch lever (6455) (Fig. 11).

18. TO ADJUST THE REVERSE CAM SHIFT LEVER (5326) (Fig. 5).

This lever is moved by the record control shaft (3724) (Fig. 12) and is held in position by an Allen set screw. It should be positioned on its shaft so that the record reverse cam (6325) (Fig. 4) is firmly engaged with its pin (34144) (Fig. 8) in the "Both Sides" position. In the "One Side" and "Repeat" positions it should have good clearance with the pin. If any adjustment of this lever is made be sure to check the setting of the Reverse Cam Arm and Roller Assembly (6450) (Fig. 8) as instructed in Section 7 of the instructions on replacing a reverse cam.

19. TO ADJUST THE RECORD REPEAT LOCK LEVER (5334) (Fig. 12).

The purpose of this lever is to prevent accidental shifting of the Selector Arm while the instrument is not in the playing position. In the "Repeat" position this lever is on the side of the Solenoid to Clutch Lever (6455) (Fig. 11) away from the main cam. In the "One Side" and "Both Sides" positions it is on the main cam side of the solenoid to clutch lever. With the tone arm in the playing position (Main Clutch Disengaged) this lock lever should clear the solenoid to clutch lever by approximately $\frac{1}{16}$" when moved under it.

20. TO ADJUST THE REVERSE CAM LOCK LEVER (5339) (Fig. 12).

This lever should be on the main cam side of the solenoid to clutch lever when in the "Both Sides" position. And on the opposite side when in the "One Side" and "Repeat" positions. With the main clutch disengaged the lock lever should clear the solenoid to clutch lever by approximately $\frac{1}{16}$" when moving under it.

21. TO ADJUST REVERSE CAM ARM AND ROLLER ASSEMBLY (6450) (Fig. 4).

See Section 7 under Instructions For Replacing a Reverse Cam.

22. TO ADJUST RECORD REPEAT THROWOUT LEVER (4663) (Fig. 12).

No adjustment of this part is necessary.

23. TO ADJUST RECORD REPEAT CLUTCH LEVER (5332) (Fig. 12).

The adjustment of this lever is made by loosening the Allen set screw to a sliding tension then moving the part along the shaft. The sliding clutch should engage in the "One Side" and "Both Sides" positions, but should be disengaged in the "Repeat" position. The fork of this lever should not bind the sliding clutch in either the "Repeat" or "Both Sides" position.

24. LATERAL LOCATION OF THE MAIN CAM SHAFT.

Both end bearings of the main cam shaft are movable, and are used to locate the cam shaft in its proper lateral position, as well as adjust the amount of end play. The main cam shaft is located laterally so that the

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ball in the end of the tone arm lift rod (6457) (Fig. 9) travels in the exact center of the tone arm lift cam (6449) (Fig. 9). As shown at H in Fig. 9.

25. TO ADJUST THE STOP TRIP SWITCH (2792) (Fig. 7).

This switch is accessible by removing the turntable, which will expose the switch cover. To remove the switch cover it is necessary to remove the trip arm, which goes through the switch cover and the two flat head screws which hold the cover in place. The clearance between the contact points on the fixed and moveable arms of the switch should be $\frac{1}{32}$". After replacing the trip arm (6510) (Fig. 7) in the switch, after the switch cover has been removed, set the turntable on the spindle, push stop trip arm (4533) (Fig. 7) slowly about $\frac{1}{4}$" toward the magazine and then turn the turntable through one complete revolution. This will insure the fibre cam, on the turntable, resetting the trip switch, the clearance between the trip arm and the moveable arm of the switch should be $\frac{1}{32}$". The distance between the trip arm and the switch trip guard finger should also be $\frac{1}{32}$".

To adjust the clearance between the trip arm hook (6510) (Fig. 7) and the moveable switch arm, loosen the screw in the bakelite switch base, at the end nearest the tone arm. Move the switch until $\frac{1}{32}$" clearance is secured between the trip arm hook and the moveable arm of the switch, then tighten the screw holding the switch. In making this adjustment be sure that the stationary arm of the switch is not bent when tightening this screw.

On some models a headless set screw, near the end of the coil spring, is used to lock the switch in position; loosen this screw, adjust the switch, then tighten the set screw.

26. TO ADJUST THE SOLENOID MOTOR SWITCH (2764) (Fig. 3).

After the switch cover has been removed the switch is exposed. The upper switch points should make good electrical contact, while the main clutch is disengaged, in this position the clearance between the bottom points should be approximately $\frac{1}{32}$". While the clutch moves from the disengaged to the engaged position the upper switch points should remain closed until the lower set of points are closed. When the clutch is fully engaged the lower points should make good contact and the clearance between the upper points should be approximately $\frac{1}{32}$".

To adjust the switch loosen the screw through the bakelite switch base at the rear of the switch assembly. After the position is found where proper clearance is secured with the clutch engaged and disengaged, the switch should be locked in position with the screw.

In some machines a headless set screw is used to lock the switch in position. This screw is near the point of the tapered bakelite insulating block. Loosen this screw and adjust switch to get proper clearance then lock the switch in position by the set screw.

The two upper contacts are in series with the auto trip switch and the two lower contacts are shunted across the motor switch. When the clutch is engaged the auto trip switch is out of circuit and the motor switch is shunted by the lower contacts thus insuring the completion of the change cycle even though the instrument is switched to radio or turned off.

27. TO ADJUST THE FRICTION JOINT OF AUTOMATIC TRIP SWITCH.

The amount of friction necessary in the friction joint between the auto stop trip lever—long (6510) (Fig. 7) and the auto stop trip lever—short (4533) (Fig. 7) should be just sufficient to close the automatic stop trip switch (2792) (Fig. 7). The friction is regulated by adjusting the screw which tightens the flat spring (3998) (Fig. 7). If the tension is too great the instrument may trip before finishing a record, if not enough tension is had the instrument will not change records when the needle hits the automatic change groove.

28. RECORD SIZE LIMIT.

The 16-E Series record changer will play any 10" or 12" record of standard size. The minimum size for 12" records is $11\frac{7}{8}$". The minimum size for 10" records is $9\frac{7}{8}$". Records smaller than these limits are very apt to miss centering over the turntable spindle and in most cases are broken.

These record changers will automatically trip on any record having an automatic stop change groove, either spiral or oscillating, where the blank space in the center of the record is not more than $6\frac{1}{2}$" in diameter.

29. RECORDS.

Always inspect the records to see that no rough edges are present. Occasionally you will find a record which has a rough outside edge. This rough edge will greatly interfere with the satisfactory performance of the record changer. A small piece of #00 sandpaper will assist you greatly in removing this rough edge.

30. TO ADJUST THE VERTICAL BUMPER GUIDE (6693) (Fig. 6).

This guide is located back of the magazine cross bar (6685) (Fig. 6). After the records are separated from the magazine they are guided in dropping off the separator so they hit the center of the record bumpers (5081) (Fig. 6). This vertical bumper guide also guides the records when the elevating hook, on the rear of the record tray lifts the record. The vertical bumper should be set back just far enough to allow a 12" record to drop onto the record bumpers freely. The lower part of the vertical bumper, which extends into the record well, should extend toward the center of the well rubber bumpers far enough to make sure that the upper edges of the records fall behind the points of the upper record support (5517) (Fig. 6). This adjustment is not critical. In most cases it will be found that the upper end of the vertical bumper will just clear the elevating hook on the rear of the tray. In cases where it is found that 10" records are chipping about the edges, due to bouncing against the points of the upper record support (5517) (Fig. 6) it will be necessary to bend the vertical bumper (6693) (Fig. 6) back at the top to a point where it just barely clears the elevating hook at the rear of the tray. It should never be bent back far enough to raise the front of the tray.

31. CLUTCH CLEARANCE.

The clearance between the driven (6326) (Fig. 10) and driving (3630) (Fig. 10) members of the clutch should be approximately .020" (Twenty thousandths), and is adjusted by loosening screw No. 16 Fig. 3 to a sliding tension and adjusting the clutch fork (5333) (Fig. 2) and the solenoid to clutch lever and pin assembly until the proper clearance is obtained. After adjustment is made lock the screw No. 16, Fig. 3.

32. MOTOR CONNECTIONS (21131).

The 21131 motor is a synchronous motor and will run equally well in either direction, when properly connected. For this reason, all motors shipped from the factory are equipped with a terminal strip and cable. However, if it should ever be necessary to disconnect the leads from the terminal strip the leads should be replaced in the following order: With the cable extending to the right of the terminal strip and the mounting lugs pointing downward, and the soldering lugs towards you, the leads go on from left to right in the following order—small black, black with yellow tracer, blue and large black. In that order they are ground, one side of 110 volt line, one side of the condenser, and the remaining 110 volt and condenser leads. The motor terminal strip should be mounted to the cabinet terminal strip so that the cable extends to the right, with the soldering lugs towards you.

33. OILING INSTRUCTIONS.

Due to its careful design and precise workmanship, the Capehart 16-E record changer requires a minimum of oiling.

About once each year a light coat of vaseline or petroleum jelly should be applied to all moving surfaces which were coated with graphite at the factory.

A very light coat of vaseline should be applied to the surfaces of the magazine, indicated at "A" in Figure 6. It is best to apply this coating every six months. The vaseline should be applied with, and removed by, the fingers, on the magazine faces. DO NOT USE EXCESSIVE AMOUNTS OF LUBRICANT ANYWHERE ON THE RECORD CHANGER.

A good grade of machine oil, not too light, should be used on the sliding clutches, reverse cam shaft and all eccentric and shoulder screws.

NEVER OIL THE "DUREX" BUSHINGS, AS THIS WILL CAUSE THEM TO DISINTEGRATE.

Once each year the motor oil cups should be oiled with a good grade of motor oil. At the same time the gear box should be inspected, and the grease replaced if it has become hard. A good mixture to use here is 75% vaseline and 25% SAE 40 motor oil.

34. INSTRUCTIONS FOR REPLACING THE RECORD REVERSE CAM AND ITS ADJUSTMENTS.

1. Set record changer in the playing position. Carefully mark the drive gear (3516) (Fig. 10) on the main shaft and the driven gear shown as part of 6223, Fig. 10, by prick punch marks or scriber, so that the same teeth can be engaged after reassembly, thus insuring proper timing.

2. Remove the two bolts, one (3238) (Fig. 4) securing the magazine slide and roller assembly to the magazine slide arm lever, and one (3237) (Fig. 1) securing the record slide arm and stud assembly to the record tray drive crank.

3. Looking in from the rear of the instrument, remove the Durex bushing from the end of the main cam shaft, nearest the motor drive shaft. This is accomplished by loosening the bolt to the right of the main shaft. Care should be taken when replacing this bushing so as not to tighten the bolt enough to crush the bushing; a snug fit only is required.

4. Remove lower half of bearing and Durex bushing from the other end of the main cam shaft and work the cam shaft out of the record changer. The same precaution against crushing this bushing should be taken with this one as with the one in the preceding section.

5. Remove taper pin from gear and loosen set screw in the collar, both shown as 6233 in Fig. 8, of the reverse cam shaft assembly, as well as the pin (34144) (Fig. 10) over which the reverse cam forks, when in

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the reversing position. After removing the collar and sliding the gear to one side, file all burs from the edges of the holes in the reverse cam shaft. Slide the shaft through its Durex bushing toward the rear of the instrument far enough to allow the removal and replacement of the reverse cam (6325) (Fig. 10).

6. Reassemble the reverse cam shaft assembly, making certain that the taper pin holes in the shaft and gear are correctly aligned to permit the taper pins being properly inserted. The set screw in the collar at the end of the shaft should be properly tightened.

7. Remove the reverse cam arm and roller assembly (6450) (Fig. 2) and make sure that the roller pin and arm are not bent, if either of these items are found bent we suggest that you replace the reverse arm and roller assembly.

8. In reassembling the reverse cam arm and roller assembly (6450) (Fig. 2) in its proper position for alignment with the reverse cam, be sure the roller is about $\frac{1}{32}$" inside the ridge on the reverse cam, when the cam is in the reversing position.

9. Remove the taper pin from the gear (3516) (Fig. 10) on the main shaft, which drives the gear on the reverse cam shaft assembly (6233) (Fig. 10) and remount the main shaft to the record changer chassis, pushing the above gear, from which the pin was removed, to one side so that it will not mesh with its driven gear.

10. Locate the main shaft so that the lower end of the pickup arm lift shaft travels in the center of the pickup arm lift cam, as shown at "H" in Fig. 9. With the main shaft in this position, adjust the main shaft Durex bushings so that there is no end play in the main cam shaft assembly.

11. Rotate the main cam shaft to the playing position so that the pickup arm is lowered over the turntable.

12. Set the reverse cam in its lowest position, with the control lever in the "Both Sides" position, so that the fork of the reverse cam is meshed with the driving pin.

13. Mesh the reverse cam assembly driver gear (3516) (Fig. 10) with the reverse cam assembly driven gear so that the identifying punch marks correspond to the original position. The taper pin for the driver gear should be inserted next. If the assembly has been properly made there should be approximately $\frac{1}{32}$" clearance between the roller or the reverse cam arm and the reverse cam. See "A", Fig. 9.

14. Throw the control lever to the "One Side" position and rotate the reverse cam with the fingers until it is in the reversing position. Again throw the control lever to the "Both Sides" position. Now there should be approximately $\frac{1}{32}$" clearance between the reverse cam and the roller. See "B", Fig. 9. If the clearance is not approximately $\frac{1}{32}$" for both positions of the reverse cam it indicates either the gears are not properly meshed or the reverse segment link rod may be bent. A careful check of the latter while the main shaft is out will save time and trouble later.

35. INSTRUCTIONS FOR REMOVING THE 16-E RECORD CHANGER.

There is a great possibility, when removing the chassis from the cabinet, to mar or scratch the cabinet. If you will place a piece of cardboard around the record changer it will eliminate, to a great extent, the possibility of marring the finish. A rubber auto mat, with a hole for the record changer, the same size as the one in the cabinet, makes an excellent pad. This pad can be split and is easily put in position and removed.

Remove the backs from the record changer, radio and amplifier compartments.

Remove the screws from the partition between the radio and record-changer compartments, so it can be moved back out of the way.

Remove the wood screw, under the turntable, also the three bolts which hold the record changer down.

Remove the two wood screws that mount the play control.

Remove the female chassis plug, from the male chassis plug (6178) (Fig. 1), the pickup lead, which runs from the radio chassis to the terminal block, then dismount the terminal block by removing the wood screw in its center, the straps holding the shielded lead, which runs from the shorting switch, and the 110 volt leads to the Play Control.

Release the play control cable and cable housing from the bracket on the record changer chassis, by loosening the two set screws. Care should be taken to prevent breaking the control cable when removing it. The end which has been kinked by the set screw should be straightened before attempting to reinstall it.

Loosen the two Allen set screws in the flexible coupling and allow it to slide down the motor shaft, so as to clear the record changer shaft.

Move the play control as far into the radio compartment as possible.

Remove the screw marked "B" in the illustration on page 8. This is the middle one of the screws holding the upper record support.

Remove the magazine link shoulder screw (3239) (Fig. 6). This will allow the magazine to be swung out of the way. As soon as the record reverse arm and fork assembly have cleared the reverse crank and pin (6230) (Fig. 1) it should be swung over the magazine and locked with the record reverse arm lock (4659) (Fig. 6), to keep it out of the way.

Lift the record changer up, until the tone-arm just touches the top of the cabinet, carry it forward through the doors, tilting it to keep the main cam clear of the shelf.

All parts of the cabinet liable to damage should be protected by soft cloths while removing or installing the record changer.

It is not necessary that the above operations be carried out in the above sequence.

36. ALIGNMENT OF TRUE-TANGENT PICKUP.

When adjusting the TRUE-TANGENT pickup, the pickup head and tone arm should form a straight line, when the needle is exactly one and one half inches from the point of the turn table drive shaft cap (4320) (Fig. 6). To adjust the pickup angle, loosen the nut at the rear of the steering arm assembly (66254) (Fig. 1), turn the steering arm either right or left until the correct position for the pickup is found, then set the lock nut up tight. Then see that there still is $\frac{5}{8}$" clearance between the pickup and the record tray per Section 11.

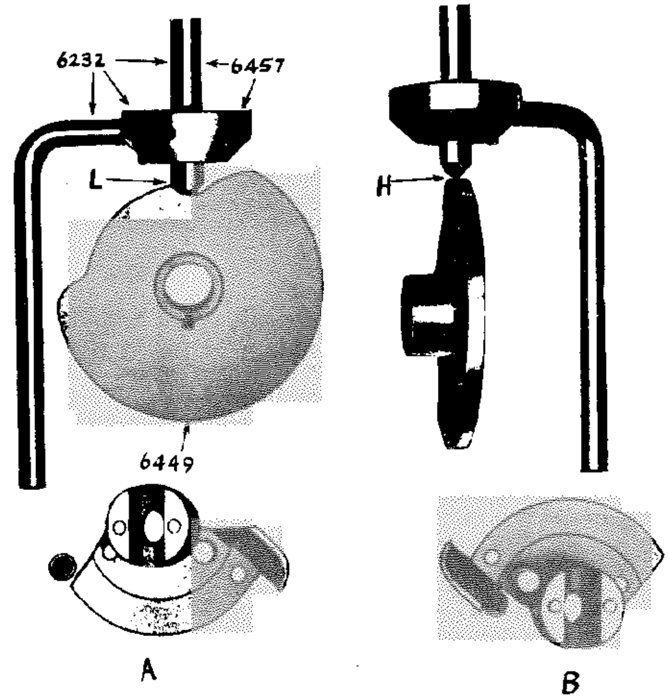

Fig. 9

6232 Pickup Swing Lever and Collar Assembly
6325 Reverse Cam
6449 Pickup Arm Lift Cam
6457 Pickup Arm Lift Shaft

MODEL 16-E
Complete Assembly

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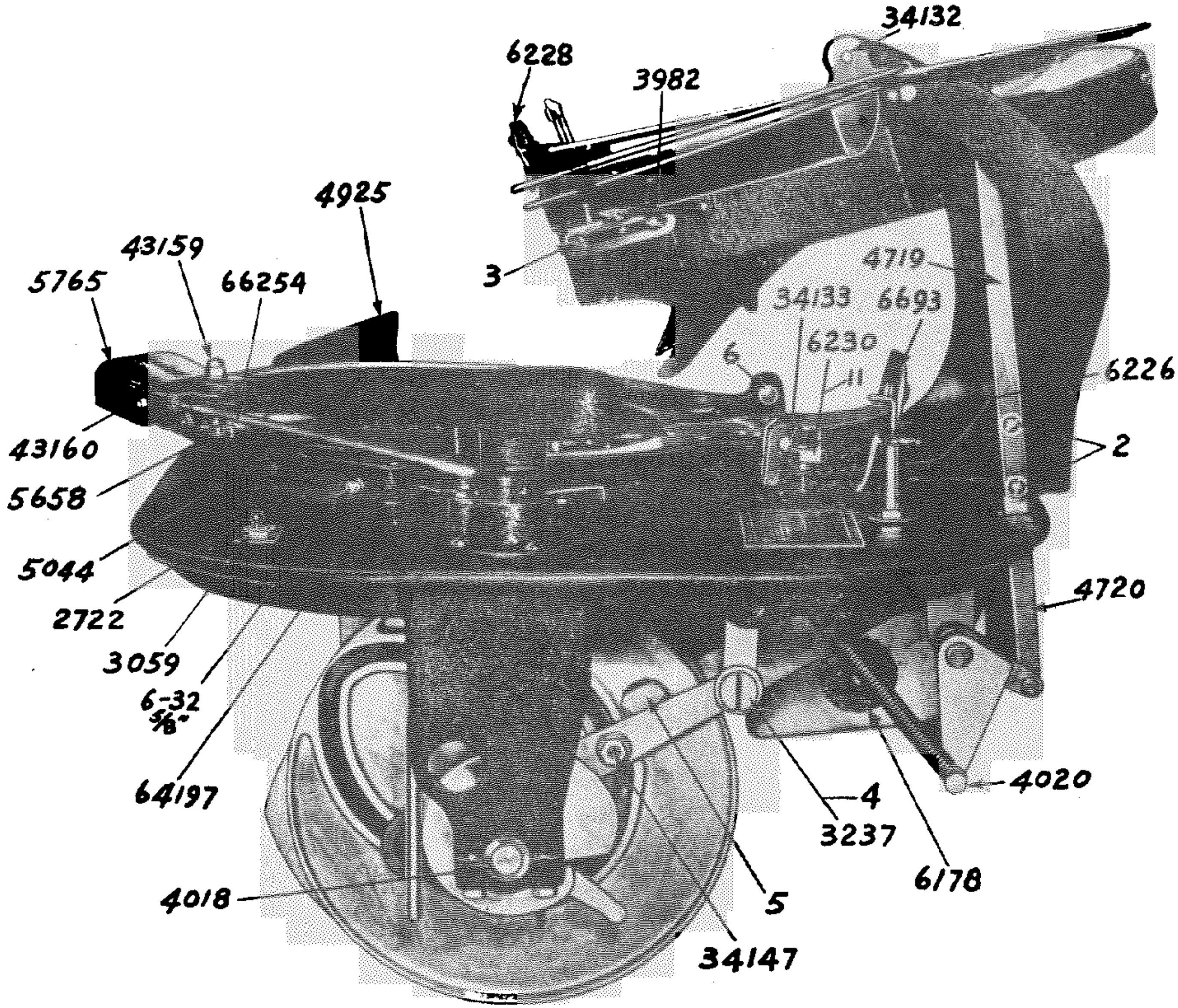
Fig. 1



2722 Switch AC Line
3059 Escutcheon Plate Off-On
3237 Shoulder Screw — Record Tray Slide
3982 Spring—Separator
4018 Main Shaft Bushing
4020 Record Magazine Bushing
4719 Magazine Link Upper
4720 Magazine Link Lower
4925 Record Tray Shield Felt—Outer
5044 Stop Lever Roller Tubing
5658 Pickup Arm Lever Hook
5765 Pickup Cover
6178 Chassis Plug
6226 Separator Hook and Arm Assembly
6228 Record Reverse Arm and Fork Assembly
6230 Reverse Pinion and Crank Assembly
6693 Record Bumper Guide and Felt Assembly
34132 Pin—Magazine Pivot
34133 Pin—Record Tray Pivot
34147 Pin—Record Tray Slide
43159 1/4"—28 Hex. Cap Nut
43160 Lock Nut for Pivot Screw
64197 Pickup Arm Stop Lever Assembly (Specify color).
66254 Steering Arm Assb'y.
6—32x5/8" Pickup Stop Lever Screw

NOTE: In ordering any part that is painted, please specify color wanted.

MODEL 16-E
Chassis Views

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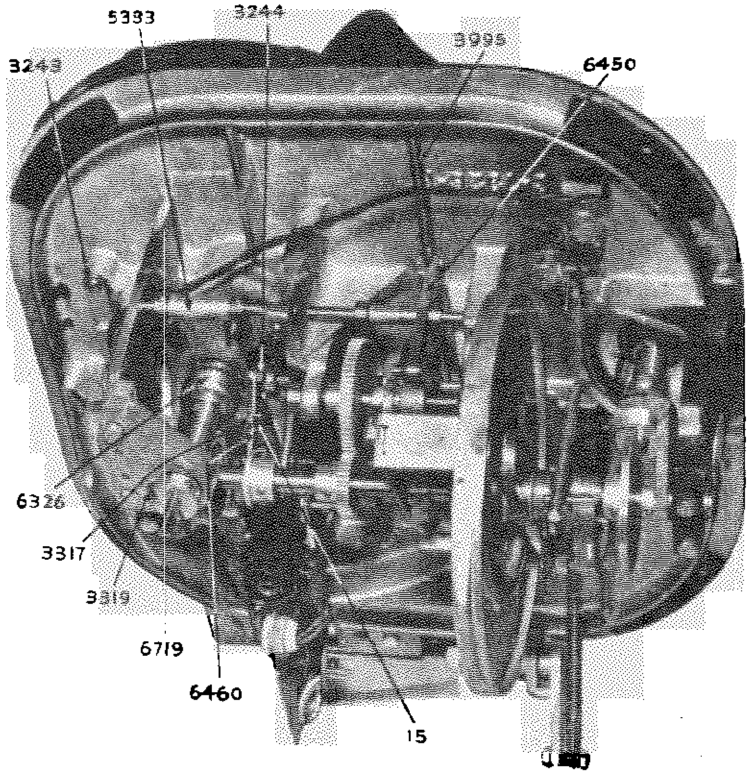

Fig. 2

3243 Shoulder Screw—Repeat Lever
3244 Shoulder Screw—Clutch Throwout Lever
3317 Screw—Clutch Throwout Cam
3319 Screw—Turntable Shaft Collar
3995 Spring—Reverse Arm
5333 Main Clutch Fork Lever
6326 Worm and Bushing Assembly
6450 Reverse Cam Arm and Roller Assembly
6460 Clutch Throwout Lever and Spring Assembly
6719 Turntable Drive Shaft Assembly

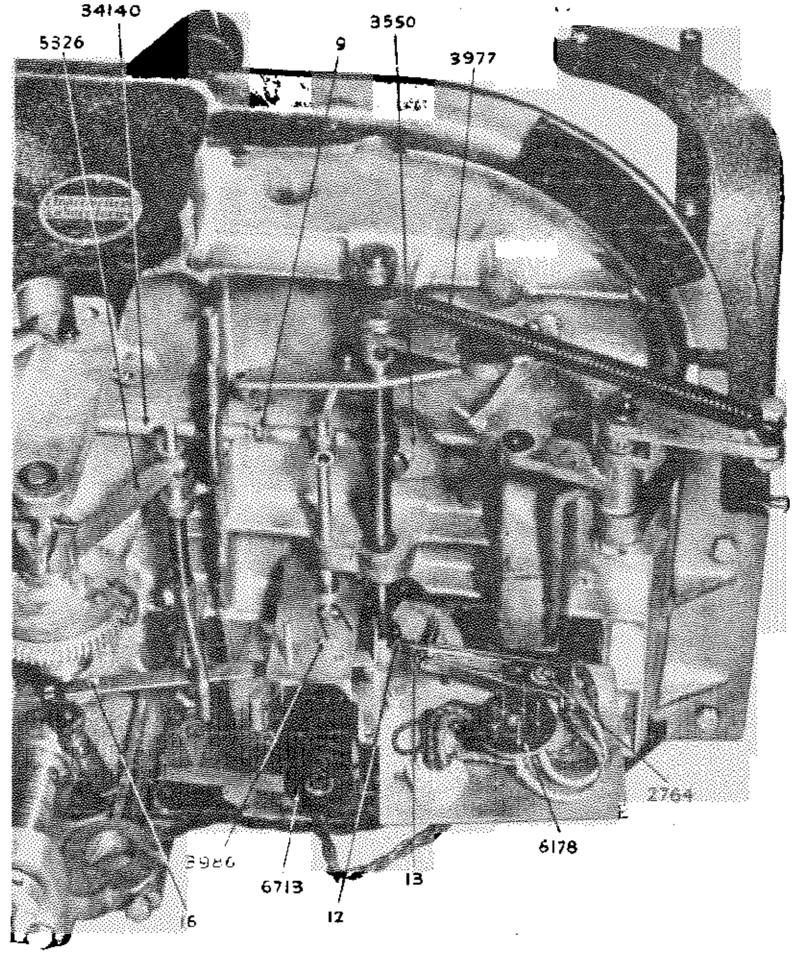

Fig. 3

2764 Switch Assembly—Solenoid and Motor
3550 Record Reverse Pinion Segment
3977 Spring—Magazine Slide Arm
3986 Spring—Solenoid Lever Torsion
5326 Record Reverse Cam Shaft Lever
6178 Chassis Plug 5 Prong
6713 Solenoid Assembly
34140 Pin—Long, Reverse Segment

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MODEL 16-E
Chassis Views

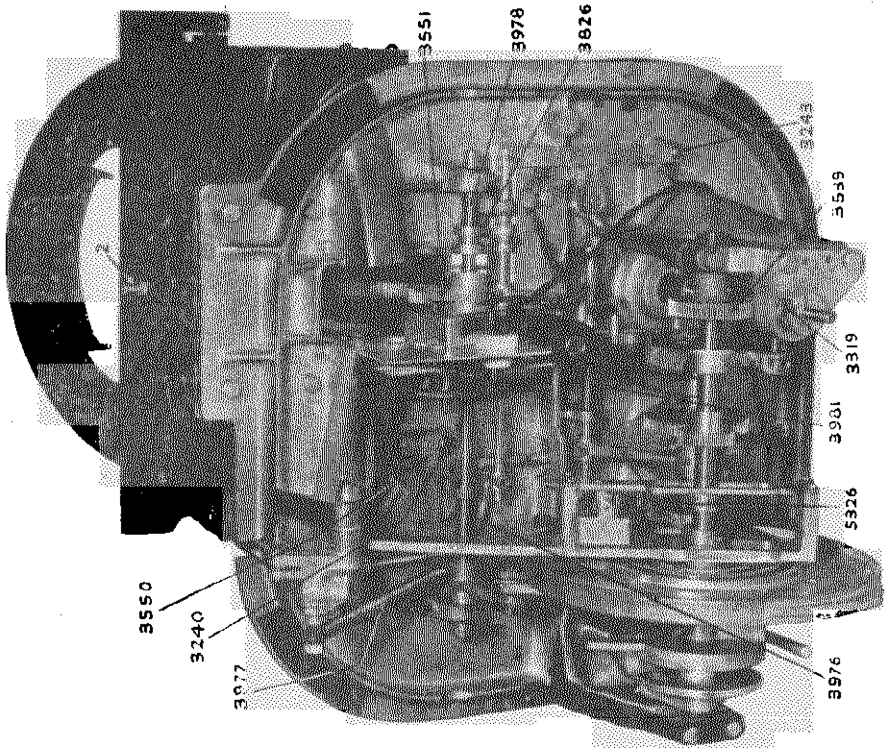

Fig. 5

3240 Shoulder Screw—Reverse Segment
3243 Shoulder Screw—Repeat Lever
3319 Screw—Turntable Shaft Collar
3539 Worm Gear—Main Drive
3550 Record Reverse Pinion Segment
3551 Record Tray Gear—Driver

3826 Record Repeat Sliding Clutch Cam
3976 Spring—Record Separator Hook Lever
3977 Spring—Magazine Slide Arm
3978 Spring—Record Repeat Clutch
3981 Spring—Record Reverse Cam Control
5326 Record Reverse Cam Shift Lever

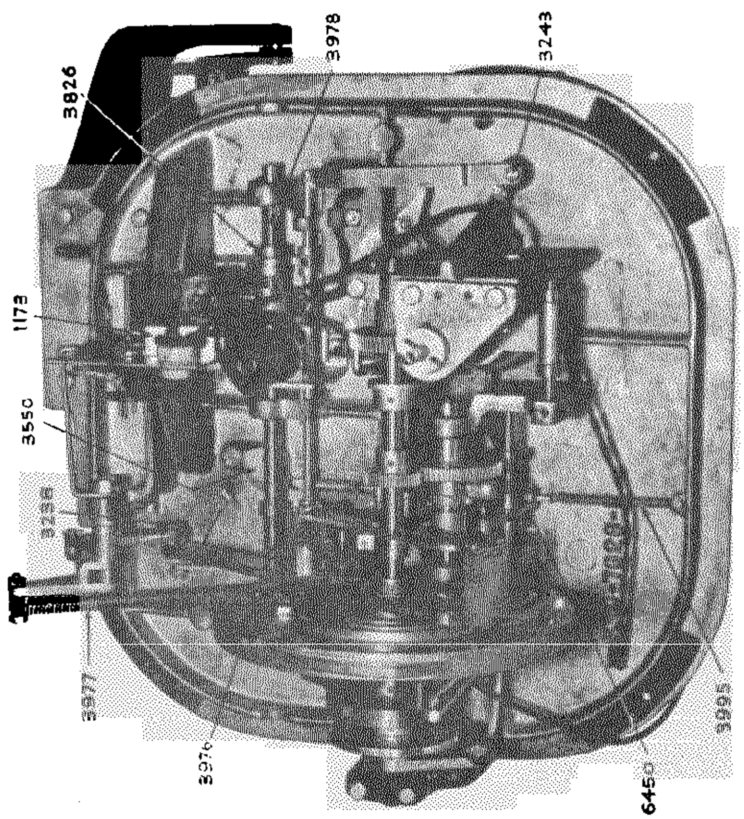

Fig. 4

1173 Condenser—0.1 Mfd. 400-Volt (in can)
3238 Shoulder Screw—Magazine Slide Arm
3243 Shoulder Screw—Repeat Lever
3550 Record Reverse Pinion Segment
3826 Record Repeat Sliding Clutch Cam
3976 Spring—Record Separator Hook Lever
3977 Spring—Magazine Slide Arm
3978 Spring—Record Repeat Clutch
3995 Spring—Reverse Arm
6450 Reverse Cam Arm and Roller Assembly

MODEL 16-E
Chassis Views

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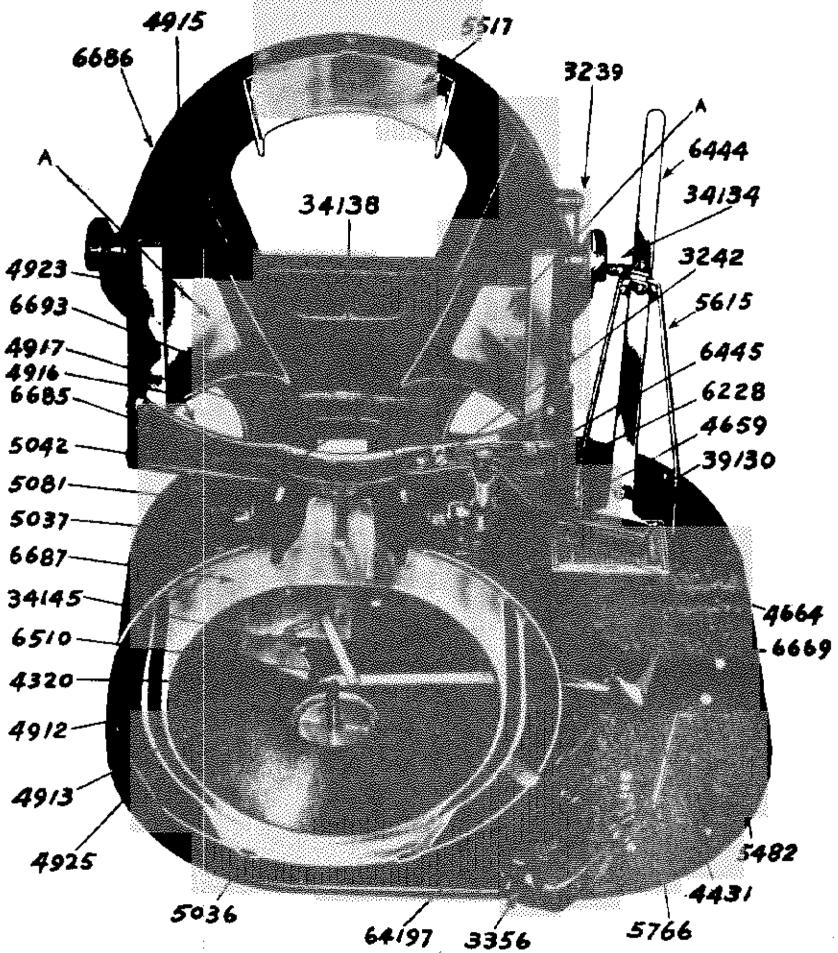

Fig. 6

3239 Shoulder-Screw-Magazine Link
3242 Shoulder Screw—Separator
3356 Pickup Needle Screw (Magnetic)
4320 Turntable Drive Shaft Cap
4431 Automatic Stop Trip Quadrant Bracket
4659 Record Reversing Arm Lock
4664 Record Reverse Arm Lock Stop
4912 Record Tray Felt—Large
4913 Record Tray Felt—Small
4915 Record Magazine Felt
4916 Lower Record Support Felt
4917 Record Bumper Guide Felt
4925 Magazine Side Felt
4925 Record Way Shield Felt Outer
5036 Record Tray Bumper—Front
5037 Record Tray Bumper—Rear
5042 Reverse Arm Bumper
5081 Record Bumper
5482 Pickup Arm Base
5517 Record Support—Upper
5615 Record Reverse Guide
5766 Pickup Arm
6228 Record Reverse Arm and Fork Assembly (Specify color)
6444 Record Reverse Guide Assembly
6445 Record Separator and Hub Assembly
6510 Automatic Stop Trip Lever Assembly
6669 Pickup Arm Assembly complete
6685 Lower Record Support Assembly
6686 Record Magazine Assembly
6687 Record Tray Assembly
6693 Record Bumper Guide and Felt Assem
34134 Pin—Reverse Guide Stop
34138 Pin—Record Support
34145 Pin—Record Control Rod
39130 Record Reverse Guide Spring
64197 Pickup Arm Stop Lever Assembly (specify color)

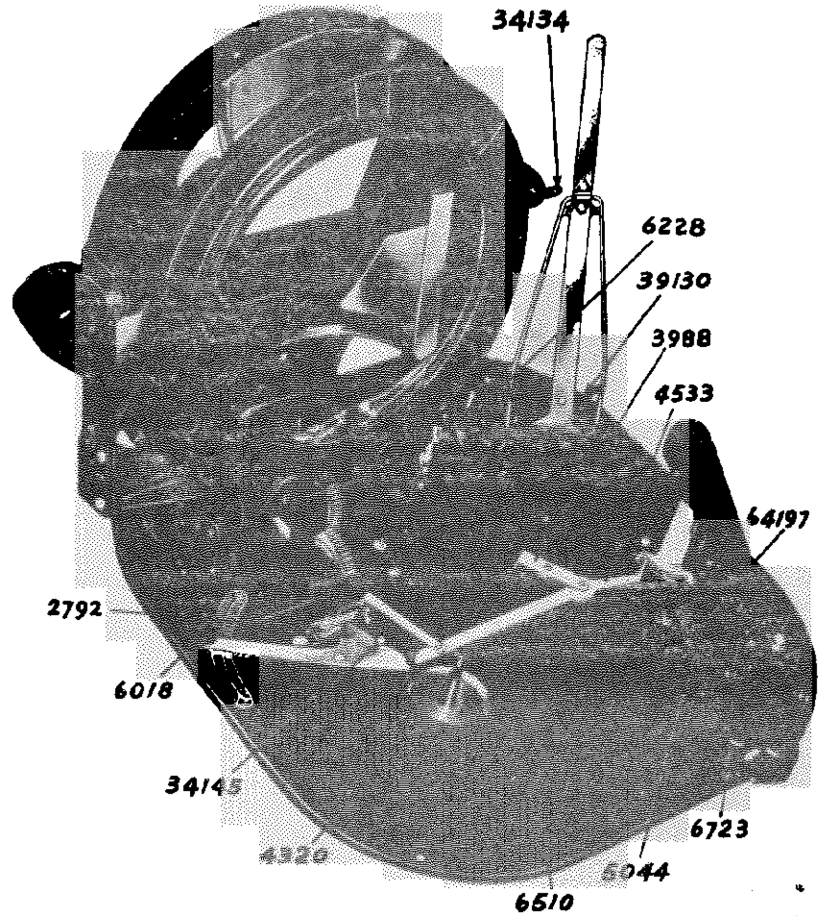

Fig. 7

2792 Record Trip Switch Assembly—complete
3988 Spring—Automatic Trip Lever Pin
4320 Turntable Drive Shaft Cap
4533 Automatic Stop Trip Lever—Short
5044 Stop Lever Roller Tubing
6018 Selector Knob
6228 Record Reverse Arm and Fork Assembly (specify color)
6510 Automatic Stop Trip Lever Assembly
6723 Pickup Brush Assembly
34134 Pin—Reverse Guide Stop
34145 Pin—Record Control Rod
39130 Record Reverse Guide Spring
64197 Pickup Arm Stop Lever Assembly (specify color)

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MODEL 16-E
Chassis View, Parts

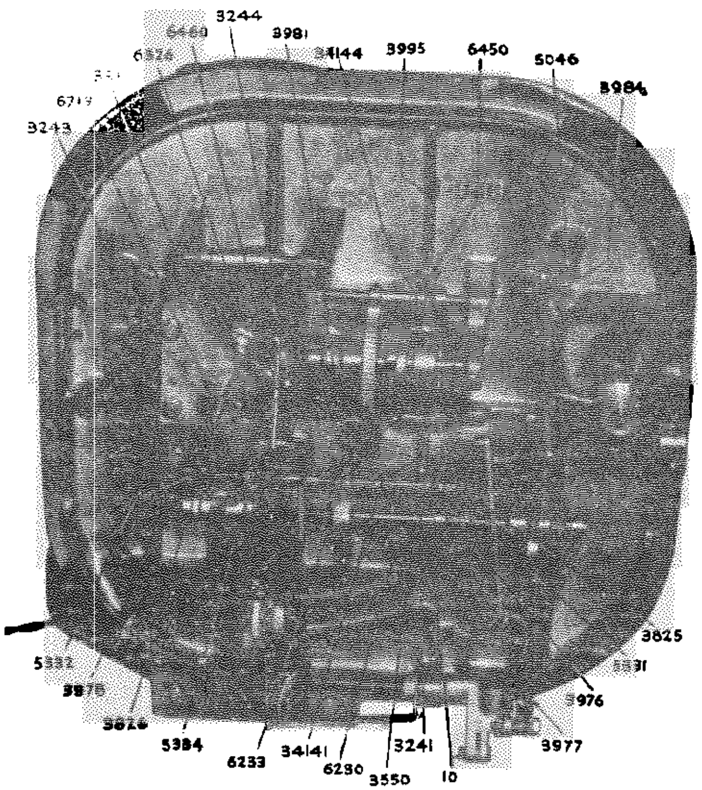

Fig. 8

3241 Shoulder Screw—Reverse Segment Link
3243 Shoulder Screw—Repeat Lever
3244 Shoulder Screw—Clutch Throwout Lever
3317 Screw—Clutch Throwout Cam
3550 Record Reverse Pinion Segment
3825 Reverse Segment Stop Cam
3826 Record Repeat Sliding Clutch Cam
3976 Spring—Record Separator Hook Lever
3977 Spring—Magazine Slide Arm
3978 Spring—Record Repeat Clutch
3981 Spring—Record Reverse Cam Control
3984 Spring—Tone Arm Lever
3995 Spring—Reverse Arm

5046 Stop Lever Collar Pin Tubing
5331 Record Repeat Throwout Hook Lever
5332 Record Repeat Clutch Fork Lever
5334 Record Repeat Lock Lever
6230 Reverse Pinion and Crank Assembly
6233 Record Reverse Cam Shaft Assembly
6326 Worm and Bushing Assembly
6450 Reverse Cam Arm and Roller Assembly
6460 Clutch Throwout Lever and Spring Assembly
6719 Turntable Drive Shaft Assembly
34141 Pin—Short—Reverse Segment
34144 Pin—Reverse Cam Shaft

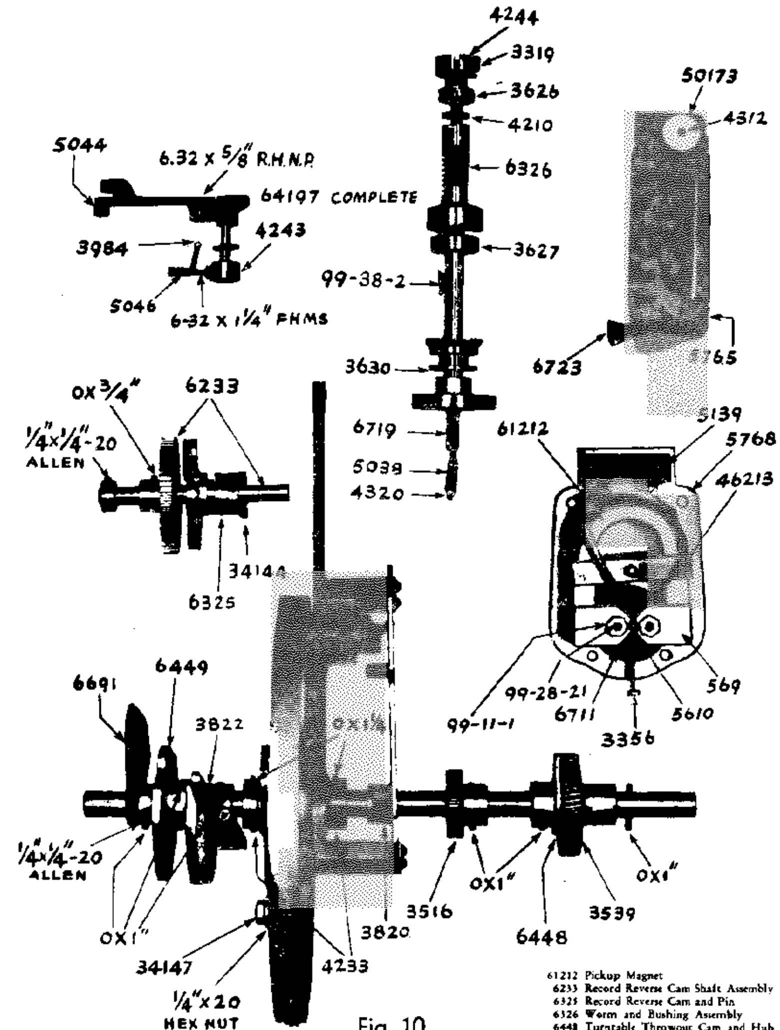

Fig. 10

3319 Screw—Turntable Shaft Collar
3356 Pickup Needle Screw
3516 Gear—Reverse Cam Shaft Driver
3539 Worm Gear
3626 Ball Bearing
3627 Ball Bearing
3630 Turntable Shaft Clutch
3820 Magazine Slide Arm Cam
3822 Pickup Arm Swing Cam
3984 Spring—Tone Arm Stop Lever
4210 Thrust Washer—Worm Shaft
4233 Main Cam Collar
4243 Pickup Arm Stop Lever Collar

4244 Turntable Shaft Collar
4312 Pivot Bushing
4320 Turntable Driveshaft Cap
46213 Magnet Holder
5039 Turntable Driveshaft Cap Tubing
5044 Stop Lever Roller Tubing
5046 Stop Lever Collar Pin Tubing
50173 Tone Arm Insulating Bushing
5139 Terminal Block
569 Pole Piece
5610 Stylus
5765 Pickup Cover
5768 Pickup Back

61212 Pickup Magnet
6233 Record Reverse Cam Shaft Assembly
6325 Record Reverse Cam and Pin
6326 Worm and Bushing Assembly
6448 Turntable Throwout Cam and Hub Assembly
6449 Pickup Lift Cam and Hub Assembly
64197 Pickup Arm Stop Lever Assembly
6691 Pickup Arm Friction Cam Assembly
6711 Spool Assembly
6719 Turntable Shaft Assembly
6723 Brush Assembly
34144 Pin—Reverse Cam Shaft
34147 Pin—Record Tray Slide
99-11-1 6-32 Hex Nut
99-18-21 6-32x5/8" RHMS
99-28-3 6-32x1/4" Headless Set Screw
99-28-21 6-32x1/8" Headless Set Screw
99-38-2 No. 2 Woodruff Key

MODEL 16-E
Chassis Views

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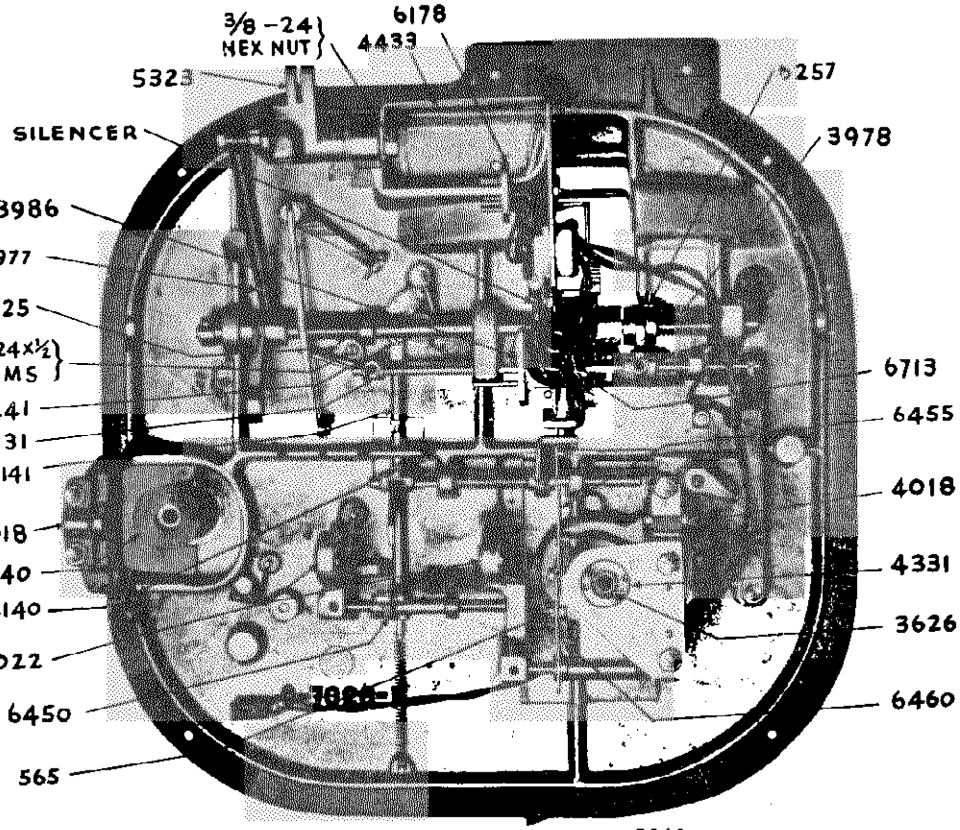


Fig. 11

565 Clutch Throwout Cam
3241 Reverse Segment Link Shoulder Screw
3626 Ball Bearing
3825 Reverse Segment Stop Cam
3977 Magazine Slide Arm Spring
3978 Record Repeat Clutch Spring
3986 Solenoid Lever Torsion Spring
4018 Main Shaft Bushing
4022 Record Tray Shaft Bushing
4331 Bearing Retainer Plug
4433 Solenoid Plate Bracket
5040 Pickup Arm Brake Facing
5323 Magazine Slide Arm Lever
5331 Record Repeat Throwout Hook Lever
6178 Chassis Plug
6257 Record Tray Gear and Sliding Cam Assembly
6450 Reverse Cam Arm and Roller Assembly
6455 Solenoid to Clutch Lever and Pin Assembly
6460 Clutch Throwout Lever and Spring Assembly
6713 Solenoid Assembly
34140 Reverse Segment Pin, Long
34141 Reverse Segment Pin, Short

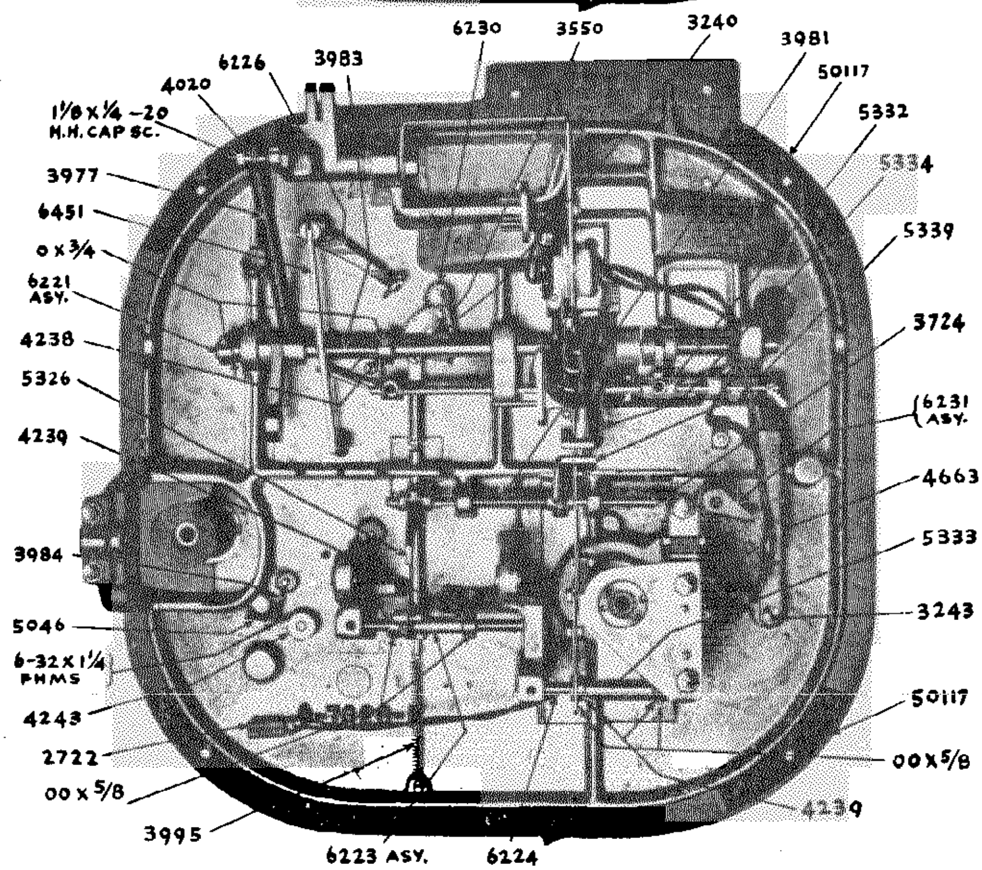


Fig. 12

2722 AC Line Toggle Switch
3240 Reverse Segment Shoulder Screw
3243 Repeat Lever Shoulder Screw
3550 Record Reverse Pinion Segment
3724 Record Control Shaft
3977 Magazine Slide Arm Spring
3981 Record Reverse Cam Control Spring
3983 Separator Hook Spring
3984 Tone Arm Stop Lever Spring
3991 Reverse Arm Spring
4020 Record Magazine Bushing
4238 7/16". Collar
4239 5/16" Collar
4243 Pickup Arm Stop Lever Collar
4663 Record Repeat Throwout Lever
5046 Stop Lever Collar Pin Tubing
5326 Record Reverse Cam Shaft Lever
5332 Record Repeat Clutch Fork Lever
5333 Main Clutch Fork Lever
5334 Record Repeat Lock Lever
5339 Reverse Cam Lock Lever
6221 Record Tray Drive Shaft Assembly
6223 Record Reverse Arm Shaft Assem.
6224 Solenoid Lever Shaft Assem.
6226 Separator Hook and Arm Assembly
6230 Reverse Pinion and Crank Assembly
6231 Record Control Lever and Stud Assembly
6451 Separator Hook Lever and Roller Assembly
50117 Main Frame Pad
00x⅝ Taper Pin
0x¾ Taper Pin

CASE ELECTRIC CORP.

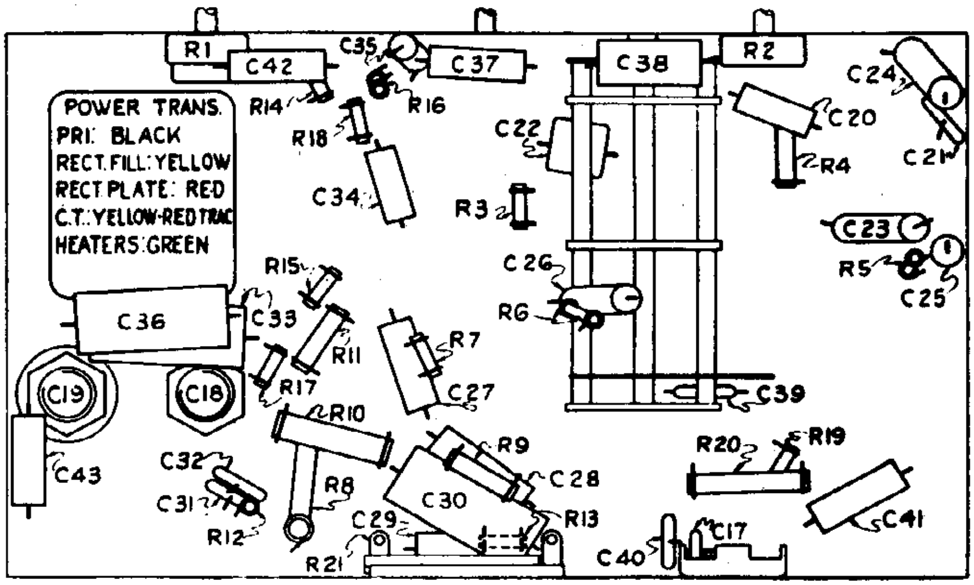
MODELS 710,713,714
715,716,718,719
Chassis 17
Voltage,Chassis,Parts

VOLTAGE CHART

115 VOLT LINE

Measurements taken from elements to chassis--1000 ohm per volt meter.
*Across Candohm (R-21)
Total "B" current drain 72 Ma.--speaker field drop--92 volts.

POSITION	TUBE	E_f	E_k	E_g Screen	E_g Suppressor	E_p Triode	E_p Pentode
RF Amplifier	6K7	6.0	3.0	110.0	3.0		250.0
Mixer	6L7	6.0	2.0	125.0	0.0		250.0
IF Amplifier	6D6	6.0	3.0	120.0	3.0		250.0
AVC Detector	6B7	6.0	0.0	20.0	0.0		18.0
Oscillator	76	6.0	0.0			125.0	
Audio Output	42	6.0	*20.0	250.0			240.0
Rectifier	80	6.0					

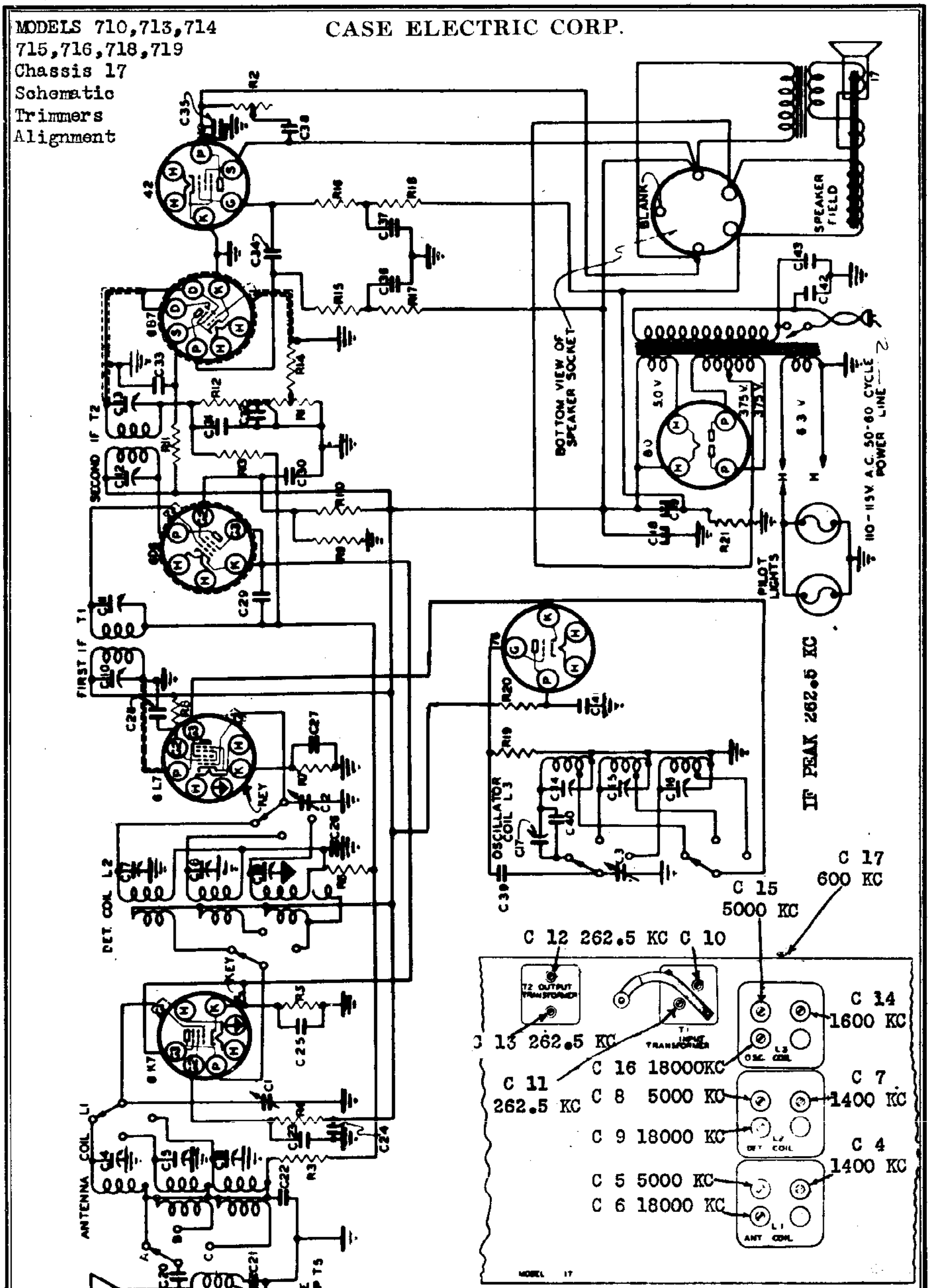


PARTS CHASSIS 17, PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

	A15016	Belt Drive	.21
	B15045	Bezel	.94
	15225	Book Instruction	.27
	15070	Clip Grid (Glass Tube)	.01
	15071	Clip Grid (Metal Tube)	.01
	15330	Clutch Assembly	.25
C4 C5 C6 L1	15127	Coil Antenna in Shield Sold in sets of 3	3.36
C7 C8 C9 L2	15128	Coil Detector in Shield	4.72
C14 C15 C16 L3	15126	Coil Oscillator in Shield	3.22
	A15069	Cord Attachment	.35
C1 C2 C3	D15076	Cond. Variable	5.21
C19	15078	Cond. Electrolytic 16 Mfd 475V	1.16
C18	15079	Cond. Electrolytic 16 Mfd 300V	.92
C31 C32	15900	Cond. Mica 50 Mmfd	.11
C21	15904	Cond. Mica 2000 Mmfd	.25
C22	15911	Cond. Mica 4500 Mmfd	.37
C39	15918	Cond. Mica 35 Mmfd	.11
C40	15908	Cond. Mica 550 Mmfd	.19
C33 C36 C30	15750	Cond. Tubular .25 Mfd 400V	.19
C27 C26	15752	Cond. Tubular .05 Mfd 200V	.12
C35	15753	Cond. Tubular .002 Mfd 600V	.11
[redacted] C20, C34	15754	Cond. Tubular .01 Mfd 400V	.11
C38	15755	Cond. Tubular .05 Mfd 600V	.14
C28 C23	15756	Cond. Tubular .05 Mfd 400V	.12
C41 C24	15757	Cond. Tubular .1 Mfd 400V	.14
C42 C43 C29 C25	15761	Cond. Tubular .1 Mfd 200V	.12
C37	15764	Cond. Tubular .03 Mfd 400V	.12
R2	A15116	Control Tone	.70
R1	A15113	Control Volume	.89
	15301	Dial & Paper Strip Assembly	1.96
	B15044	Glass Convex	.25
A15037	[redacted]	Knob Drive	.14 [redacted]
	A15098	Knob Switch	.23
A15035	[redacted]	Knob Volume & Tone	.15 [redacted]
	15089	Lamp Dial 6.3 V. Bayonet Type	.19
	15129	Lamp Dial Assembly	.68
	A15082	Lug Ground Electrolytic	.01
	A15032	Mounting Chassis Rubbers	.03
	B15168	Paper Dial Backing	.02
	A15023	Pointer (Minute)	.04
	A15024	Pointer (Tuning)	.04
	A15006	Pulley Idler Assembly	.10
	A15072	Planetary Assembly	.46
R21	A15159	Resistor Candohm 235 Ohm	.23
R13	15500	Resistor Carbon 2 Meg. .25W	.08
R20 R8	15501	Resistor Carbon 25M Ohm 1W	.11
C17	A15159	Var. Padder Cond.	.34
R10	15502	Resistor Carbon 15M Ohm 2W	.16
R18	15504	Resistor Carbon 150M Ohm .25W	.08
R4	15505	Resistor Carbon 60M Ohm .5W	.10
R11	15507	Resistor Carbon 300M Ohm .5W	.10
R5	15508	Resistor Carbon 150 Ohm .25W	.10
R15	15509	Resistor Carbon 50M Ohm .25W	.08
R17	15510	Resistor Carbon 20M Ohm .25W	.08
R12 R19	15511	Resistor Carbon 60M Ohm .25W	.08
R3 R6	15512	Resistor Carbon 250M Ohm .25W	.08
R9	15513	Resistor Carbon 20M Ohm .5W	.10
R14	15515	Resistor Carbon 100M Ohm .25W	.08
R16	15518	Resistor Carbon 180M Ohm .25W	.08
R7	15527	Resistor Carbon 500 Ohm .25W	.10
	B15041	Retaining Spring for Bezel	.18
	B15043	Retaining Ring for Glass	.16
	A15020	Shaft Drive	.15
	15095	Shield Coat (Long)	.12
	15094	Shield Coat (Short)	.11
	15118	Shielded Grid Lead	.26
	15195	Shielded Plate Lead	.24
	15196	Shielded Vol. Control Lead	.25
	A15053	Socket Dial Lamp (Left Hand)	.11
	A15054	Socket Dial Lamp (Right Hand)	.11
	15062	Socket Speaker	.10
	B15063	Socket 80	.09
	B15064	Socket 42	.11
	B15065	Socket 76	.10
	B15067	Socket 6B7	.11
	B15068	Socket 6D6	.11
	B15067	Socket 6L7	.14
	B15066	Socket 6K7	.14
	A15033	Spacer (For Chassis Rubbers)	.02
B15170	[redacted]	~~Speaker 8"~~	5.34 [redacted]
	C15172	Speaker 10"	6.94
	A15017	Spring Tension	.02
	C15256	Switch Range	2.14
	15123	Switch Range Pulley & String	.65
C10 C11 T1	B15208-4	Transformer Input IF	1.42
C12 C13 T2	B15209-4	Transformer Output IF	1.63
	B15060	Transformer Power 60 cycles 110V	4.29
	15242	Trap Wave	1.26
	1950	Washer Felt (Small Knob)	.01
	1951	Washer Felt (Switch Knob)	.01
	A2111	Washer Extruding Fibre	.02
	A2105	Washer Plain Fibre	.01
	A2300	Washer Rubber RF Panel	.02

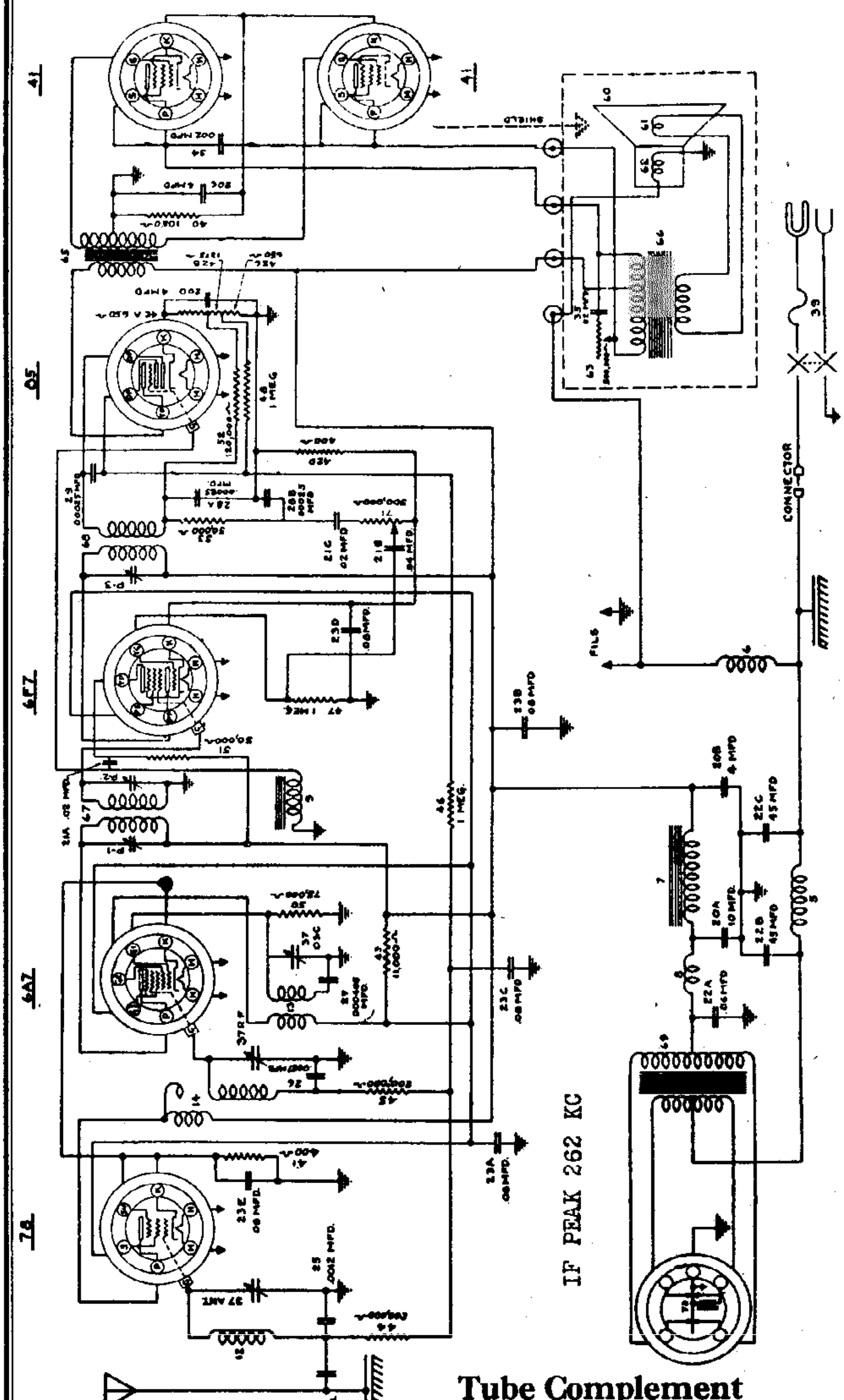
MODELS 710,713,714
715,716,718,719
Chassis 17
Schematic
Trimmers
Alignment

CASE ELECTRIC CORP.



MODEL 601525
Schematic
Voltage

CHEVROLET DIV.—GEN. MOTORS



601525 CIRCUIT DIAGRAM

Part No. 601525
Date 6-1-37

The voltages shown below are average readings taken from the tube socket contacts to the chassis frame, and will vary **10%** when the set is tested on a 6 volt battery due to differences in characteristics of vibrators and tubes.

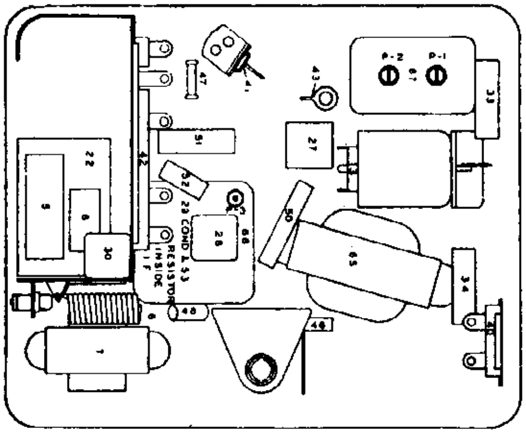
Type	Function	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
78	R. F.	6	240	130	—	—	0	—	—	—	8.0
6A7	Det. Osc.	6	240	130	—	—	0	0	130	130	8.0
6F7	I. F.—AF	6	240	130	115	0	0	—	—	—	4.5
85	Det.—2nd AF	6	—	—	235	0	0	—	—	—	16.5
41	Output	6	240	240	—	—	—	—	—	—	23.0
41	Output	6	240	240	—	—	—	—	—	—	23.0

Tube Complement

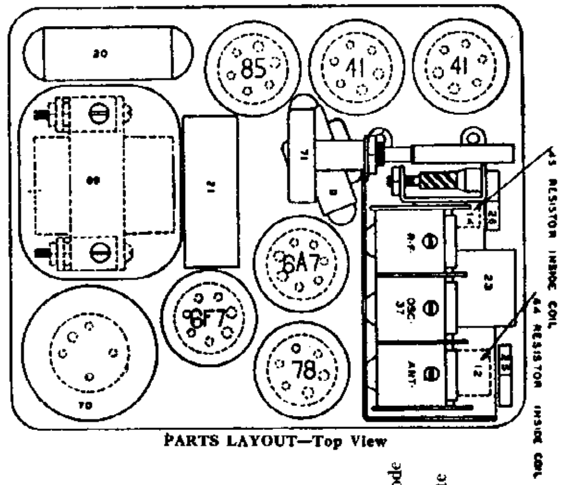
Type	Function	Type	Function
78	1st R. F. Amplifier	85	2nd Detector—A. V. C.—2nd Audio
6A7	1st Detector—Oscillator	41	Power Output (Class "A Prime")
6F7	I. F.—1st Audio Amplifier	41	Power Output (Class "A Prime")

MODEL 601525
Socket, Trimmers
Chassis, Changes
Alignment

CHEVROLET DIV.—GEN. MOTORS



PARTS LAYOUT—Bottom View



PARTS LAYOUT—Top View

Peaking I. F. Stages at 262 K. C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube leaving the tube's grid clip in place. The 1 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I. F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I. F. trimmer P-3 located on the 2nd I. F. coil shown on Figure 2.

(e) Then peak trimmers P-2 and P-1 located on the first I. F. Coil also shown on Figure 2.

(f) In order to insure accurate settings of the I. F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable deflection of the output meter pointer. Make all adjustments for maximum output.

Part No. 601525
Date 11-1-35

GENERAL: This auto radio is a six tube, two unit (dash speaker) superheterodyne receiver. It is equipped with a remote control and a plug-in vibrator of the full wave self-rectifying type.

Circuit Changes

A number of the early receivers have ¼ mfd. tubular condenser mounted above the candohm resistor, illustration #42 of Figure 2 and connected in parallel with the 85 tube cathode by-pass section 20D of the #1209144 electrolytic condenser block. The use of the tubular condenser was necessary in production to reduce the R. F. resistance of the 85 cathode by-pass. A change has been made in the design of the condenser block, making the use of the tubular condenser unnecessary. All of the service parts replacement stock of #1209144 electrolytics are of the new design and it is immaterial whether or not the tubular condenser is left in the receiver when replacing the electrolytic condenser block.

It may be noted on some of the earlier receivers that there is a small condenser in a metal case mounted below the candohm resistor, Illus. #42, Figure 2, with two terminals that are not connected. This condenser was originally placed in the set to filter vibrator interference, but it was found after production started that two small condensers mounted in the vibrator unit were more effective and the external condenser was simply disconnected.

Peaking Instructions

Peaking Gang Condenser at 1530 and 1400 K. C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I. F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the trimmer condenser for the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R. F." and "ANT" sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K. C. signal from the test oscillator is turned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K. C. on this set.)

(g) Readjust the parallel trimmers for the "R. F." and "ANT" section of the gang condenser for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K. C. only and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

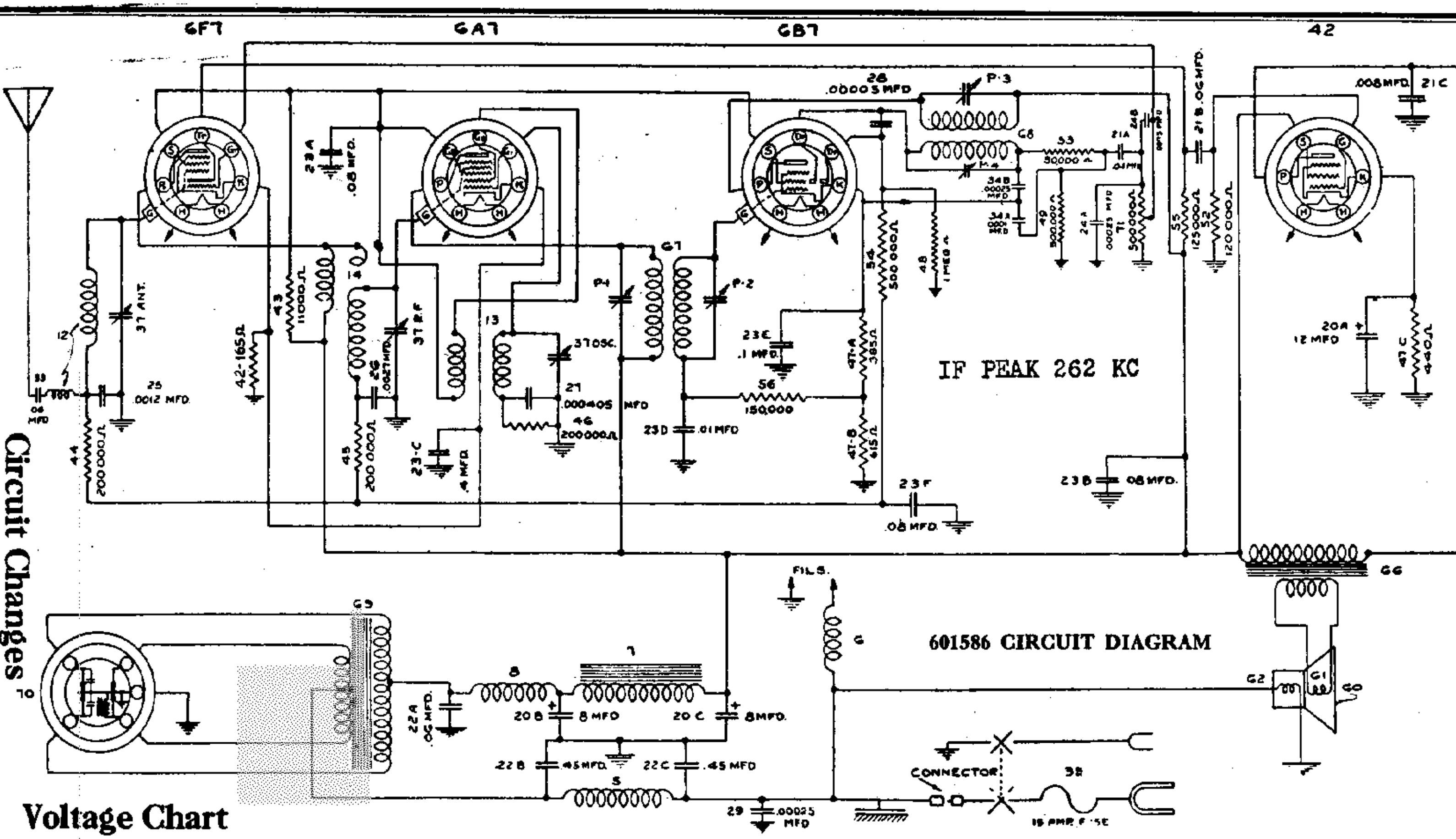
CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer in order to prevent the A. V. C. from leveling out the output as the adjustments are made.

CODE FOR SYMBOLS

Gt—Grid-triode	H—Heater
G—Control grid	Pp—Plate-pentode
G1—Osc. Grid	S—Screen
G2—Osc. plate	Tp—Triode-plate
G3,5—Osc. Screen	
K—Cathode	

MODEL 601586
Schematic, Voltage
Changes

CHEVROLET DIV.—GEN. MOTORS



Code for Symbols

H—Heater
Pp—Plate-pentode
S—Screen
Tp—Triode-plate
Gt—Grid-triode
G—Control grid
G1—Osc. grid
G2—Osc. plate
G3,5—Osc. screen
K—Cathode

Voltage Chart

The voltages shown below are average readings taken from the tube socket contacts to the chassis frame, and will vary 10% when the set is tested on a 6 volt battery due to differences in characteristics of vibrators and tubes. All readings were taken with a 1000 ohm per volt meter.

Type	Function	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
6F7	R. F.	6	250	135	80	0	0	—	—	—	6.2
6A7	Det.-Osc.	6	250	—	—	—	0	0	120	135	6.2
6B7	2nd Det. AVC	6	250	135	—	—	0	—	—	—	8.5
42	Output	6'	240	250	—	—	0	—	—	—	16.0

NOTE: Ampere drain of set at 6 volts is 6.2 amperes.
Milliampere drain from "B" supply is approximately 55 M. A.

Part No. 601586
Date 11-1-35

Circuit Changes

A number of .05 mfd. tubular condensers were used at the factory in place of the .06 mfd. condenser part #1209213 condenser shown on Fig. 2 as Illus. #33. For Service Replacement purposes of any defective .05 mfd. condensers—use part #1209213 condenser.

MODEL 601586
Socket, Trimmers
Chassis, Alignment
Parts

CHEVROLET DIV.—GEN. MOTORS

GENERAL: **This auto radio is a four tube, single unit superheterodyne radio. It was designed for the 1935 Standard Model Chevrolets. A tuning control of the type that mounts on the bottom flange of the instrument is used.**

Peaking Instructions

Peaking I. F. Stages at 262 K. C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I. F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I. F. trimmer P-3 for the 2nd I. F. coil shown on Fig. 3.

(e) Then peak trimmers P-2 and P-1 of the first I. F. coil also shown on Fig. 3.

(f) In order to insure accurate settings of the I. F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 and 1400 K. C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the .5 mfd. condenser that was required in aligning the I. F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R. F." and "ANT" sections of the gang condenser.

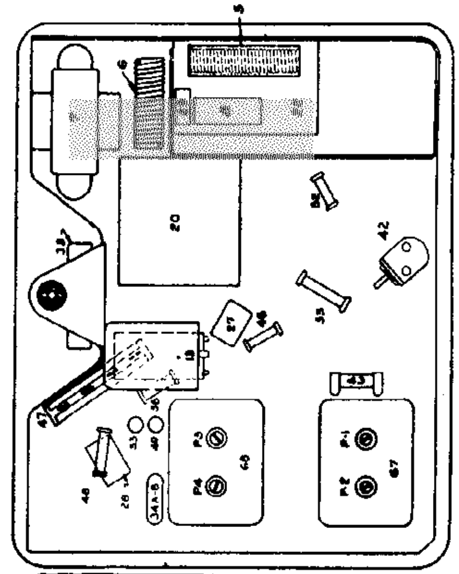
(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K. C. signal from the test oscillator is tuned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K. C. on this set.)

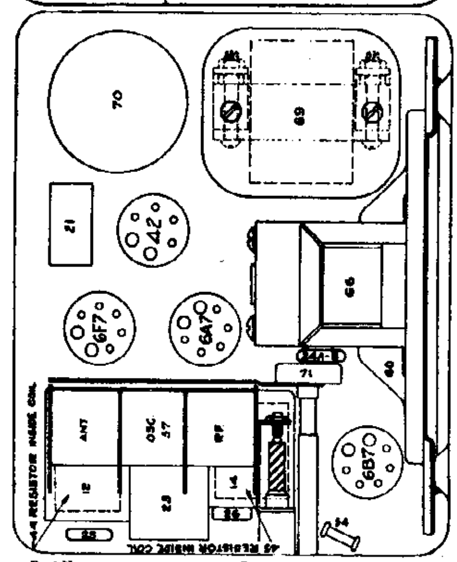
(g) Readjust the parallel trimmers for the "R. F." and "ANT" sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K. C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

(h) The capacity of the output circuit of the test oscillator may be slightly different than that of the under car antenna the receiver is to be used on. Therefore, it is advisable to readjust the "ANT" trimmer to the car antenna when reinstalling the receiver. This may be done by tuning the receiver to a broadcast station around 1400 K. C. and adjusting for maximum volume.

CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer, in order to prevent the A. V. C. from leveling out the output as the adjustments are made.



PARTS LAYOUT—Bottom View



PARTS LAYOUT—Top View

PARTS

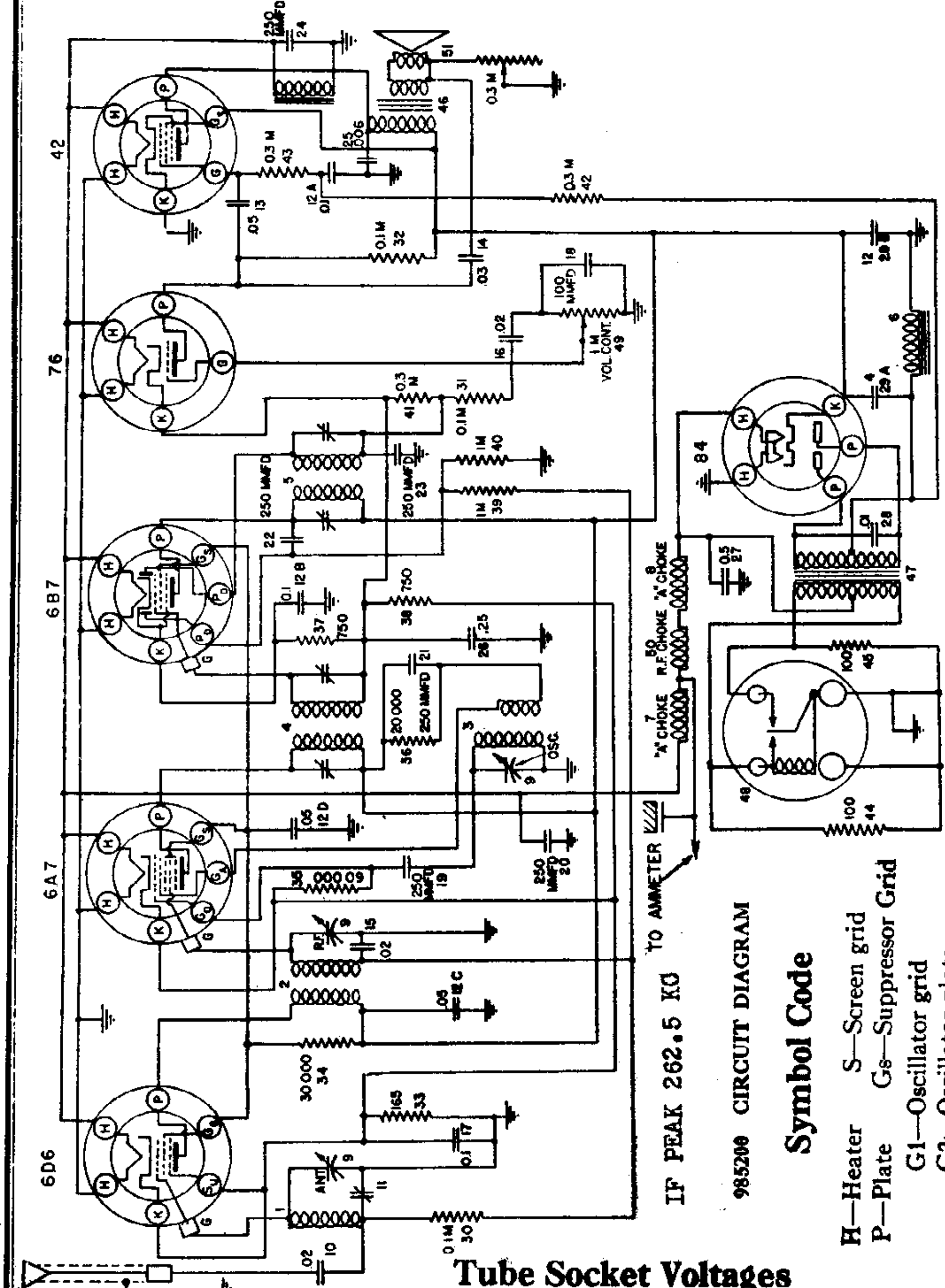
Part No. 601586
Date 11-1-35

Part No.	Part Name	Description	Illus. No.
1209079	Case	Chassis	
1207683	Clip	Tube grid connector	
1209039	Coil	Vibrator "A" choke	5
1209209	Condenser	By-pass block	23
	Sec. A	.08 Mfd., 400 v.	
	Sec. B	.08 Mfd., 400 v.	
	Sec. C	.4 Mfd., 100 v.	
	Sec. D	.01 Mfd., 100 v.	
	Sec. E	.1 Mfd., 100 v.	
	Sec. F	.08 Mfd., 100 v.	
1209051	Condenser	Molded .0012 Mfd.	25
1209052	Condenser	Molded .00027 Mfd.	26
1209053	Condenser	Molded .000405 Mfd.	27
1209878	Condenser	Molded .00005 Mfd.	28
1209055	Condenser	Molded .00025 Mfd.	29
*1209534	Condenser	Tubular .06 Mfd., 200 v.	53
1209950	Condenser	3 gang tuning—incl. coupling	35
	**Connector Assembly	"A" power on chassis	
1836869	Cap	Ferrule holder	
1838476	Ferrule	Contact	
	*Connector Assembly	Antenna on chassis	
1836878	Body	Antenna connector	
1838476	Ferrule	Contact	
1836876	Spring	Ferrule tension	
1843713	Washer	Antenna connector	
1209059	Coupling	Condenser drive	
1209083	Cover	Chassis top	
1209084	Cover	Tube lid	
1209210	Resistor	Candohm 165 ohms	42
1209063	Resistor	Ohmite 11,000 ohms—1½ watt	43
1210119	Resistor	Insulated 200,000 ohms—½ watt	44, 45, 46
1209211	Resistor	Candohm strip	47
	Sec. A	385 ohms	
	Sec. B	615 ohms	
	Sec. C	440 ohms	

Part No.	Part Name	Description	Illus. No.
1210470	Resistor	Insulated 500,000 ohms—½ watt	54
1211157	Resistor	Insulated 120,000 ohms—½ watt	55
1211163	Resistor	Insulated 150,000 ohms—½ watt	56
1208018	Shield	Tube (without grid shield)	
1207594	Sleeve	Volume control shaft	
1210759	Socket	6 prong tube (42)	
1209065	Socket	Vibrator	
1209071	Speaker Assembly	Complete (6-½")	60
1209074	Transformer	1st I. F. assembly	67
1209367	Transformer	2nd I. F. assembly	68
1209076	Transformer	Vibrator	69
5039661	Vibrator	Plug-in synchronous	70
1209368	Volume control	Res. 500,000 ohms	71
1209130	Bracket	Dial support	
1208197	Clip	Ammeter lead	
1209099	Dial	Chart	
119496	Dial Light	6-8 volt	
1209098	Drive Head	Less flex. shaft assembly	
361656	Fuse	15 ampere	
1209132	Gear	Pointer drive	
1209100	Knob	Tuning or volume	
1209204	Lead Assembly	Ammeter	
1209885	Resistor	Insulated 1 megohm—½ watt	48
1210470	Resistor	Insulated 500,000—½ watt	49
1211157	Resistor	Insulated 120,000 ohms—½ watt	52
1210116	Resistor	Insulated 50,000 ohms—½ watt	53

*See "CIRCUIT CHANGES."
**Complete assembly not available as a service part.

CHEVROLET DIV.—GEN. MOTORS



IF PEAK 262.5 KC

985200 CIRCUIT DIAGRAM

Symbol Code

H—Heater
P—Plate
S—Screen grid
Gs—Suppressor Grid
G1—Oscillator grid
G2—Oscillator plate
K—Cathode

Circuit Description

The circuit used is of the conventional superheterodyne type and does not employ regeneration which might affect its stability. A high gain antenna circuit especially designed for use with an under car antenna is used. An antenna compensating condenser is provided in this circuit which can be adjusted so as to bring the antenna circuit of the receiver into resonance with the car antenna.

Part No. 985200
Date 11-1-35

Tube Socket Voltages

Type	Function	H	P	S	Gs	G1	G2	K
6D6	R. F. Amplifier	6	240	100	—	—	—	3.6
6A7	1st Det.-Osc.	6	140	100	—	—	160	3.6
6B7	IF Amp.-2nd Det.	6	130	100	—	—	—	3.6
76	1st A. F.	6	130	—	—	—	—	8.0
42	Output	6	220	240	—	—	—	0
84	Rectifier	6	*	—	—	—	—	240

*A. C.

Note: Above readings taken from tube socket contacts to ground with a D. C. voltmeter having a resistance of 1000 ohms per volt.

MODEL 985200
Socket, Trimmers
Alignment, Chassis
Parts

CHEVROLET DIV.—GEN. MOTORS

Peaking Procedure

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 42 output tube.
BE SURE the meter is protected from D. C. by connecting a condenser (.1 Mfd. or arger—not electrolytic) in series with one of the leads.

'eaking I. F. Stages at 262.5 K. C.

(a) Connect the ground lead of the signal generator to the chassis frame. Connect a .5 Mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place.

(b) Set the signal generator to 262.5 kilocycles.

(c) Turn the volume control of the receiver on full and turn the tone control to the treble position.

(d) Rotate the station selector until the tuning condenser plates are completely in mesh.

(e) Adjust the trimmer condensers located on top of the 2nd I-F coil (Fig. 00) for maximum reading on the output meter.

(f) Adjust the trimmer condensers located on top of the 1st I-F coil for maximum output.

NOTE: In order to insure accurate settings of the I-F trimmer condensers the above adjustments should be repeated using the lowest signal generator output that will give a reasonable scale deflection on the output meter. Make all adjustments for maximum output.

eaking R. F. Stages

(a) Remove the .5 Mfd. condenser from the output lead of the signal generator and connect a .00025 Mfd. condenser in its place. Then, connect this lead to the antenna connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Rotate the station selector until the pointer points to 140 on the dial.

NOTE: Special care should be exercised in making the adjustments at this frequency as the correct logging of stations on the dial is dependent upon these adjustments.

(d) Adjust the "Osc" trimmer of the tuning condenser (Fig. 2) for maximum output.

(e) Adjust the "R-F" trimmer for maximum output.

(f) Adjust the "ANT" trimmer for maximum output.

(g) Repeat operations (e) and (f) using the lowest signal generator output that will give a reasonable scale deflection on the output meter.

NOTE: The "Osc," "R-F," and "ANT" trimmers should not be adjusted at any frequency other than 1400 kilocycles.

(h) Set the signal generator to 600 kilocycles.

(i) Tune in the 600 kilocycles from the signal generator with the station selector for maximum output.

(j) Peak the antenna compensating condenser (Fig. 3) for maximum output.

(k) Repeat operation (j) and (k) alternately until no further improvement in output can be obtained.

(l) Set the signal generator to 1400 kilocycles again.

(m) Tune in the 1400 kilocycle with the station selector for maximum output.

(n) Readjust the "ANT" trimmer of the tuning condenser for maximum output.

Part No.	Part Name	Description	Illus. No.
1210652	Coil	Antenna	1
1210653	Coil	R. F.	2
7231040	Coil	Oscillator	3
1210654	Coil Assembly	1st I. F.	4
1210655	Coil Assembly	2nd I. F.	5
1209803	Coil	"B" filter choke	6
1210656	Coil	"A" filter choke	7
1210656	Coil	"A" filter choke	8
1210657	Condenser	3 gang variable	9
1210658	Condenser	Ant. blocking .02 Mfd.,	10
1210659	Condenser	Antenna trimmer	11
1210660	Condenser	By-pass block	12
	Sec. A	.1 Mfd., 200 volt	
	Sec. B	.1 Mfd., 200 volt	
	Sec. C	.05 Mfd., 400 volt	
	Sec. D	.05 Mfd., 400 volt	
7230592	Condenser	Tubular .05 Mfd.,	13
1209625	Condenser	Tubular .03 Mfd.,	14
1212099	Condenser	Tubular .02 Mfd.,	15
1212099	Condenser	Tubular .02 Mfd.,	16
1207908	Condenser	Tubular .1 Mfd.,	17
1210275	Condenser	Molded .0001 Mfd.	18
1209055	Condenser	Molded .00025 Mfd.	19
1209055	Condenser	Molded .00025 Mfd.	20
1209055	Condenser	Molded .00025 Mfd.	21
1209055	Condenser	Molded .00025 Mfd.	22
1209055	Condenser	Molded .00025 Mfd.	23
1209055	Condenser	Molded .00025 Mfd.	24
7230593	Condenser	Tubular .006 Mfd.,	25
7231594	Condenser	Tubular .25 Mfd.,	26
1212100	Condenser	Tubular .5 Mfd.,	27
1209805	Condenser	Oil type .01 Mfd.,	28
1210662	Condenser	Electrolytic block	29
	Sec. A	4. Mfd., 350 volt	
	Sec. B	12. Mfd., 350 volt	
1209883	Resistor	Insulated 100,000 ohms—½ watt	30
1209883	Resistor	Insulated 100,000 ohms—½ watt	31
1209883	Resistor	Insulated 100,000 ohms—½ watt	32
1208140	Resistor	Flexible 165 ohm—½ watt	33
1211102	Resistor	Insulated 30,000 ohm—1 watt	34
1210881	Resistor	Insulated 60,000 ohm—½ watt	35
1210882	Resistor	Insulated 20,000 ohm—½ watt	36
1208800	Resistor	Flexible 750 ohm—½ watt	37
1208800	Resistor	Flexible 750 ohm—½ watt	38
1209885	Resistor	Insulated 1 Megohm—½ watt	39
1209885	Resistor	Insulated 1 Megohm—½ watt	40
1209884	Resistor	Insulated 300,000 ohm—½ watt	41
1208984	Resistor	Insulated 300,000 ohm—½ watt	42
1209884	Resistor	Insulated 300,000 ohm—½ watt	43
1209015	Resistor	Flexible 100 ohm—½ watt	44
1209015	Resistor	Flexible 100 ohm—½ watt	45
1209629	Transformer	Output	46
1210663	Transformer	Power	47
5040000	Vibrator	Plug-in type	48
1210664	Volume Control	1 megohm	49
1210665	Coil	Motor noise choke	50

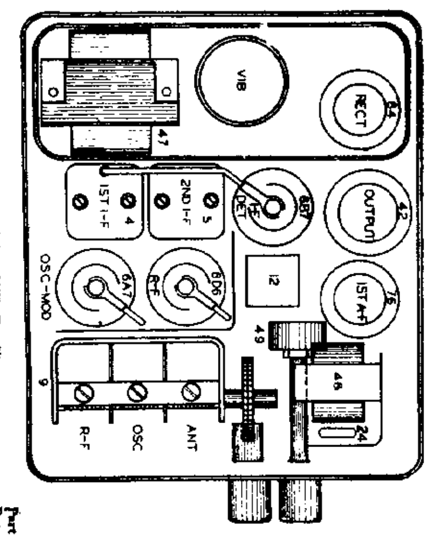


Fig. 3 PARTS LAYOUT—Top View

Part No. 985200
Date 11-1-35

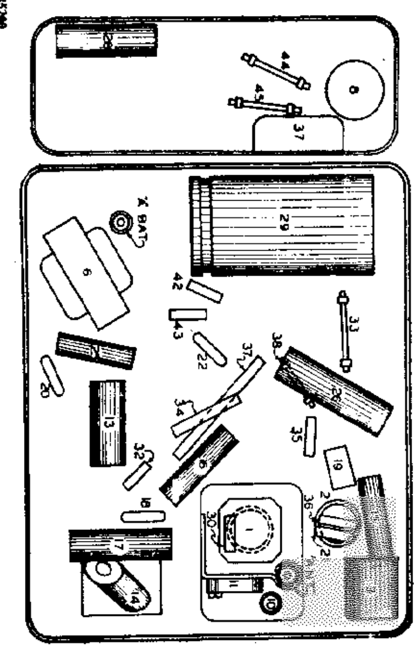
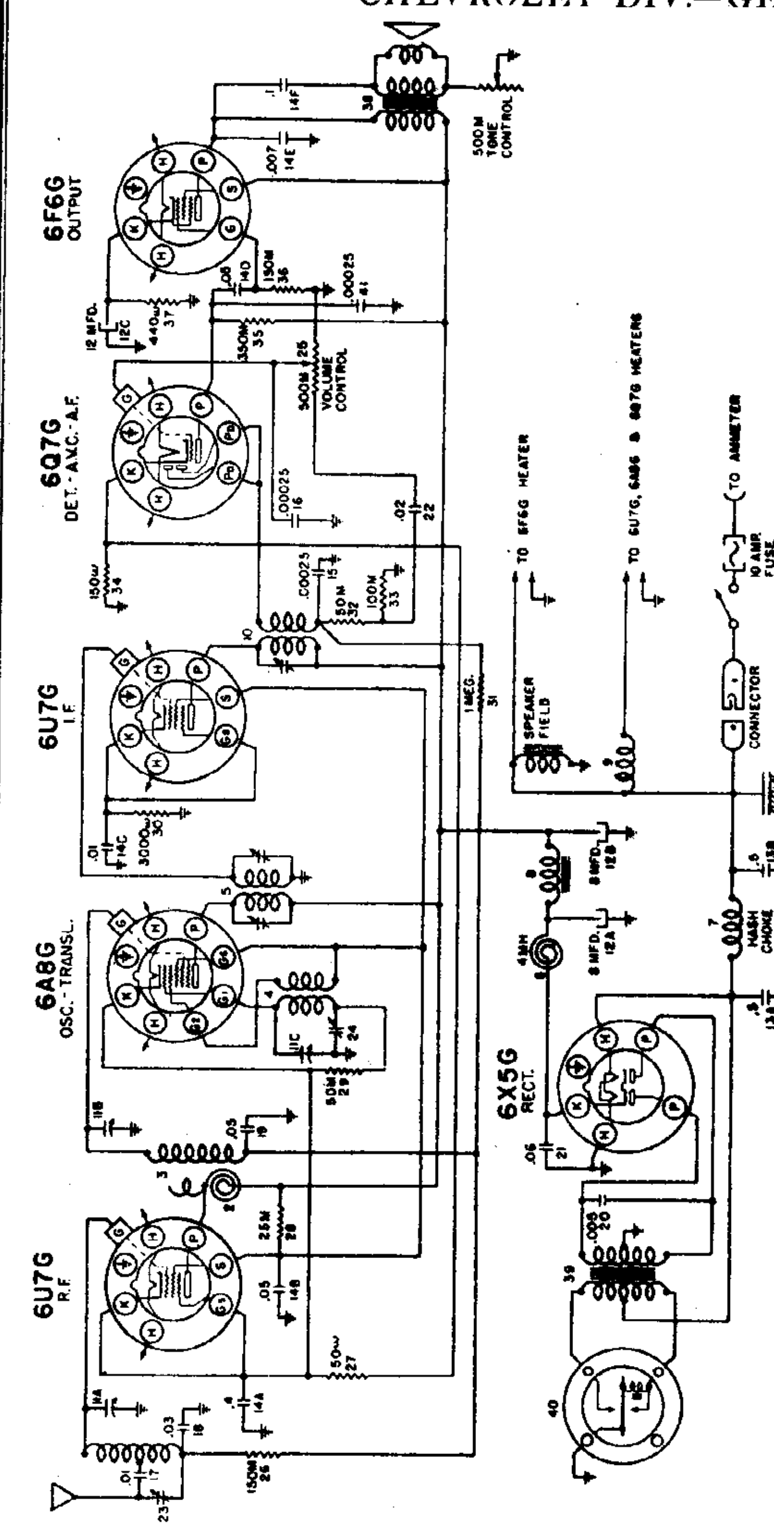


Fig. 2 PARTS LAYOUT—Bottom View

CHEVROLET DIV.—GEN. MOTORS

MODEL 985254
Schematic, Volta



985254 CIRCUIT DIAGRAM

IF PEAK 262 KC

Part No. 985254
Date 11-1-36

Tube Socket Voltage

Model 985254

Type	Function	H	P	S	GS	G1	G2	K
6U7G	R.F. Amplifier	5.75	230	60	2.5			2.5
6A8G	Translator	5.75	230		6.0			2.5
	Oscillator					3.0	60	
6U7G	I.F. Amplifier	5.75	230	60	5.0			5.0
6Q7G	Det-1st I.F.	5.75	80					1.2
6F6G	Output	5.8	220	230				14.0
6X5G	Rectifier	5.75	*					240

*AC.

NOTE: Above readings taken from tube socket contacts to ground with a D.C. voltmeter having a resistance of 1000 ohms per volt; "A" Batt 6 volts.

Symbol Code

H. Heater
P Plate
S Screen Grid
GS Supressor Grid
G1 Oscillator Grid
g2 Oscillator Plate
K Cathode

ANTENNA CIRCUIT: The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some Chevrolet Models. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the dial (1400 K.C.) instead of at the low frequency end as with the capacity coupled sets.

POWER SUPPLY: The power supply in this receiver differs from previous Chevrolet Models in that a rectifier tube (type 6X5G) is used in conjunction with a full wave, plug-in vibrator. The vibrator circuit is permanently connected for operation on negative battery ground as is the case on all Chevrolets.

MODEL 985254
Socket, Trimmers
Chassis, Alignment
Parts

CHEVROLET DIV.—GEN. MOTORS

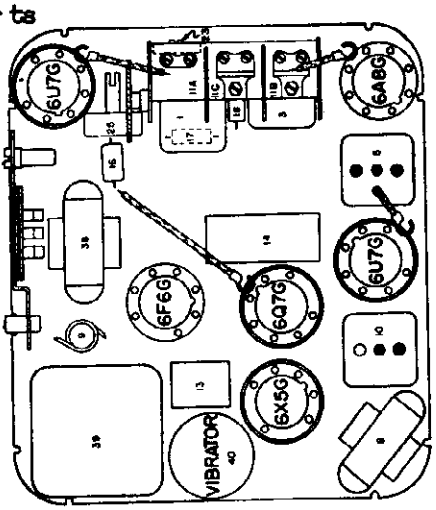


Fig. 2

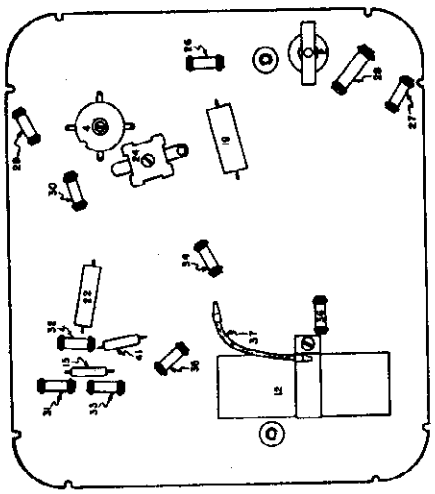


Fig. 1

Part No.	Illustration No.	Part Name	Function
1211585	1	Coil	Antenna Assy. (includes 17)
1210690	2	Coil	Choke (R. F. Primary)
1210501	3	Coil	R. F.
1211583	4	Coil	Oscillator
1211587	5	Coil	1st I. F. Assy.
1210547	8	Choke	Hum Filter
1211586	10	Coil	2nd I. F. Assy.
1211591	11	Condenser	Variable 3-gang tuning
1211580	12	Condenser	Electrolytic
			Sec. A "B" Voltage Filter
			Sec. B "B" Voltage Filter
			Sec. C 6F6G Bias Resistor By-Pass
1211581	13	Condenser	Filter Block
		Sec. A. .5 mfd. 160 V. Hash Filter	
		Sec. B. .5 mfd. 160 V. Hash Filter	
1211584	14	Condenser	By-pass Block
		Sec. A. .4 mfd. 160 V-R. F. and translator bias resistor By-Pass	
		Sec. B. .05 mfd. 400 V-Screen By-Pass	
		Sec. C. .01 mfd. 160 V-I. F. Bias Resistor By-Pass	
		Sec. D. .05 mfd. 400 V. Audio Coupling	
		Sec. E. .007 mfd. 400 V. 6F6G Plate By-Pass	
		Sec. F. .1 mfd. 400 V. Tone Control	
1209055	15	Condenser (.00025 mfd.) molded Diode Return	
1209055	16	Condenser (.00025 mfd.) molded R. F. By-Pass	
1208600	17	Condenser .01 mfd. Antenna Coupling	
1209625	18	Condenser .03 mfd. 6U7G Grid Return (Tubular)	
7230592	19	Condenser .05 mfd. 6A8G Grid Return (Tubular)	
7230912	20	Condenser .005 mfd. Buffer	
1209534	21	Condenser .05 mfd. Hash Filter (Tubular)	
1212099	22	Condenser .02 mfd. Audio Coupling (Tubular)	
1210543	23	Condenser (Ant. Padder) (7.5 mfd. to 75 mfd)	
1211592	24	Condenser (Oscillator Padder)	
1210512	25	Control 500,000 ohms Volume	
1210545	25	Control 500,000 ohms (tapped) Volume	
1211163	26	Resistor 150,000 ohms ½ Watt Grid Filter	
1211661	27	50 ohm Resistor 6U7G and 6A8G Bias Resistor	
1211663	28	Resistor 25,000 ohms 2 Watt Screen Voltage	
1210116	29	Resistor 50,000 ohm ½ watt Oscillator Grid Leak	
1211225	30	Resistor 3,000 ohm ½ Watt 6U7G I. F. Grid Bias	
1209885	31	Resistor 1 meg. ½ Watt Isolation AVC Filter	
1210116	32	Resistor 50,000 ohms ½ Watt AVC	
1209883	33	Resistor 100,000 ohms ½ Watt Diode Load	
1211003	34	Resistor 150 ohm ½ watt	6Q7G Bias
1211627	35	Resistor 350,000 ohm ½ watt	6Q7G Plate Load
1211163	36	Resistor 150,000 ohm ½ watt	6F6G Grid
1211622	37	Resistor WW 440 ohms 1 watt	6F6G Bias Resistor
1211588	38	Transformer	Output
1211589	39	Transformer	Power
5050673	40	Vibrator	Plug-In
1209055	41	Condenser (.00025 mfd molded)	R. F. By-Pass
1211220	42	Resistor 300 ohm ½ watt	
1210116	43	Resistor 50,000 ohm ½ watt	

Circuit Alignment

IMPORTANT: Do not make any adjustments to this receiver with the chassis case removed from the receiver chassis or without the proper equipment. If maximum sensitivity is to be obtained from this receiver after realignment, it is very important that the following procedure be closely observed:

1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Connect output meter in plate circuit of 6F6G output tube or across the voice coil of the speaker.

(d) Set the test oscillator to exactly 262 K.C.

(e) Adjust the trimmers on the I-F coils (Illus. 5 and 10) carefully for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining readable indication on the output meter.

2. Aligning at 1530 Kilocycles

(a) Leave the test oscillator leads connected the same as for aligning the I-F circuits.

(b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

(c) Set the test oscillator to 1530 kilocycles.

(d) Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 11C, Fig. 2) for maximum output. It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles

(a) Leave the test oscillator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the test oscillator to 540 K.C.

(d) Adjust the oscillator tracking condenser (Illus. 24, Fig. 3) located on the underside of the receiver sub-panel to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

(a) Remove the signal lead of the test oscillator from the grid of the 6A8G tube and connect to the antenna terminal of the receiver through a .002 mica condenser connected in place of the .1 mfd. condenser previously used.

(b) Set the test oscillator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency is tuned in with maximum output.

(d) Adjust the R-F parallel trimmer on the condenser gang (Illus. 11B, Fig. 2) located on the side of the receiver case for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C.; however, it is necessary, in most cases, to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator on 600 K.C.

(b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. 24, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.

Part No. 985254
Date 11-1-36

Visual Alignment

If the visual method of alignment is preferred to the method outlined above, the vertical input terminals of the cathode ray oscillograph should be connected to the second detector output with the high side connected between the junction of the 50,000 ohm resistor (Illus. 32, Fig. 1) and the secondary of the second I.F. transformer (Illus. 10, Fig. 1).

CHEVROLET DIV.—GEN. MOTORS

SUBJECT: Service Hints On Tuning Unit For 985283 Radio

FOR OTHER DATA, SEE VOL. IX

1. Motor does not run

(a) Press button down and check motor terminals for voltage. The voltage on the motor must be measured across the terminals because a voltage reading will show at all times from any one of the four motor terminals to ground or chassis. The voltage across the motor terminal should read 5.5 volts with 6 volts on the radio set, and will only show a reading when a button is pressed down and the relay is operating.

(b) If no voltage reading is obtained at the motor terminals to ground, check high "A" wiring from spark plate to motor terminals for open circuit. This check is made with no buttons down.

(c) When there is a voltage reading on some of the motor terminals to ground with no buttons down and not on other terminals, check motor fields and armature for open circuit. This is done with the regular continuity test.

(d) Check all motor terminals for ground with high "A" disconnected from the motor.

(e) Check the brushes on motor to make sure that they are seating properly on the commutator.

(f) Polish commutator with very fine emery paper, then wipe with a clean rag. Be sure that no abrasive is left on the commutator.

2. Motor stalls or does not pull condenser gang, but still motor checks okeh under No. 1

(a) Rotate armature of motor with finger to see if motor bearings are not frozen up. If the armature has a slight drag, it may be caused by the following:

1. Tight motor bearings.
2. Improper adjustment of motor worm with respect to the motor worm gear.

(b) Rotate condenser gang coupling if chassis is out of case and make sure that all moving parts rotate freely. Check remote control and be sure that all moving parts rotate freely.

(c) Hold clutch armature from engaging clutch and run motor by pressing button. Motor should run at very high speed with no load on it. This will check the motor and motor worm gear for freeness.

(d) Check remote control for binding either in the control head or in drive cables. Make sure that there are no sharp bends in control cables when installed in the car.

(e) Check motor armature for proper end play.

(f) If any bearings or gears appear to be running tight, oil only with 3 in 1 oil or its equivalent. This is very important, and only a very light grade of oil should be used, otherwise motor unit will not operate properly under low temperature conditions.
Caution: Do not oil motor bearings excessively because the motor used on this unit has oil-less bearings and should require very little oil. If an excessive amount of oil is used on the bearings it may get on the commutator or windings and cause damage to the motor. Do not oil the commutator under any circumstances.

3. If motor unit runs slow in both directions

(a) The same checks as outlined in Nos. 1 and 2 will apply to a slow running motor.

4. Motor unit runs slow in one direction

(a) Check motor brushes for proper fit to commutator.

(b) Check motor worm for proper adjustment. Motor worm should be exactly on a center with motor worm gear, with about .002 inch of backlash to worm gear when motor armature is held rigid.

(c) Check remote control and gang condenser assembly for binding in one direction or both.

SUBJECT: Service Hints On Tuning Unit For 985283 Radio—Cont'd

5. Noisy motor unit mechanically

(a) Check remote control for grinding or squeaking by spinning remote control knob.

(b) Check all gear adjustments for proper backlash and alignment.

(c) Check gears for proper lubrication. Use a light grade of vaseline on gears.

(d) Check gears and bearings for worn parts or poor bearing fits and lack of lubrication. Refer to No. 2 for oiling.

(e) Check motor brushes for noise.

6. Set noisy when jarred. This deals only with troubles in the motor unit that may cause the above trouble

(a) Relay armature bouncing on relay contacts. To remedy this condition adjust relay spring if weak and relay spring contacts for a wider gap.

(b) Push button cable plug not pushed in socket far enough.

(c) Weak push button springs in push button box. This will be noticeable only when the button box itself is jarred.

7. Motor runs but condenser gang and dial pointer do not move

(a) Check the set screw in rear of gang condenser worm gear that locks the drive shaft to the gang condenser worm. The drive shaft may be turning free and not driving the gang. The drive shaft is adjustable endwise for the clutch armature adjustment only, and not for the motor worm gear. If this set screw has come loose the drive shaft will be out of adjustment and the clutch and motor worm will have to be adjusted in the order named.

(b) Clutch armature not operating. Check voltage across the clutch coil and also check the clutch coil for continuity.

(c) If the clutch armature is operating, the clutch arm on the drive shaft may not be engaging the pin and roller on the motor worm gear. Adjustment can be made by moving the drive shaft endwise, but be sure to adjust motor after moving the drive shaft.

8. Motor unit operates and gang condenser oscillates but remote control does not operate

(a) This condition will be caused by the bakelite gang condenser coupling slipping in the gang condenser worm. This coupling is a friction drive and is pushed inside the gang condenser worm with spring pressure exerted outwards on the worm. Do not oil this friction drive. To tighten this friction drive, pull coupling out and spread the split shaft with a small screwdriver. A very small spread is all that is required. Be sure to clean off all grease on split shaft and inside of hole in gang condenser worm gear, then replace the coupling.

(b) Check remote control for any faults.

9. Push buttons do not release when one button is pressed at a time

(a) Buttons may be binding on control panel plate. Loosen the nuts holding push button box and adjust box so that buttons are free to move in and out.

(b) Buttons may be binding on top plate of button box. Adjust box plate so that buttons are free

(c) Rubber bands around buttons may be causing the buttons to bind.

(d) Push button box may be defective. Try a new box. Do not repair push button box internally.
Caution: Remember, the push buttons will not release until the proper station is tuned in and the motor unit has ceased to run.

MODEL 985283
Tuning Unit Notes
Part 2

CHEVROLET DIV.—GEN. MOTORS

SUBJECT: Service Hints On Tuning Unit For 985283 Radio—Cont'd

10. Push buttons do not release when two or more buttons are pressed at the same time. This is a fault that should seldom be complained about because it is not the correct way to operate the tuning unit, but provision has been made in the design to eliminate continuous oscillation of the tuning unit when two or more buttons are pressed at the same time. Three or four oscillations are permissible before buttons release. If the buttons do not release, proceed as follows:

(a) Try a new push button box.
(b) Check adjustment of relay spring contacts for proper gap.
(c) Check relay control arm for free operation and also for proper spring tension. Make sure that relay control arm is returning to normal position after relay operates.
(d) Check instrument panel plate and button box as outlined in No. 9.

11. Dial pointer slides past the proper station or setting and then returns to station when the corresponding button is pressed the second time

(a) This is a fault of the clutch which is not releasing fast enough or is not releasing at all. If the clutch does not release, the momentum of the locating motor will carry the gang condenser past the required setting. Check the clutch armature for free operation.
(b) Check the clutch arm on drive shaft for free operation.
(c) Check the clutch arm spring on drive shaft for proper tension.
(d) Check the small roller on motor worm gear for free operation on its retaining pin.
(e) Check the motor worm gear for free rotation on drive shaft when clutch arm is disengaged from the clutch pin.
(f) Check the clutch magnet gap clip for proper tension.
(g) Check the clutch arm spring for proper tension.
(h) Check the clutch arm for proper alignment with control shaft.

12. Stations do not log properly when dial pointer comes towards the station from the high frequency end—in other words, rotating in a counter clockwise direction

(a) Bakelite control disc for that particular station has not been set accurately. Adjust as per instructions.
(b) This condition may also be caused by fault No. 11. Check as per instructions in No. 11.

13. Stations do not log properly when dial pointer comes towards station from the low frequency end of dial—in other words, rotating in a clockwise direction. Under this fault, it is assumed that fault No. 12 has been checked

(a) The contact spring on control switch corresponding to the particular button under question may not be adjusted properly. If dial is over-riding on station it means that the contact spring is too close to the contact arm. To correct this condition it is necessary to loosen the screw on the discriminator switch to give contact spring a wider gap. If dial is under-shooting the station, that is, not dialing entirely to the station, it means that the contact spring is too far from the contact arm. To correct this condition, it is necessary to tighten the adjusting screw on the discriminator switch. Be sure that none of the other adjusting screws are disturbed.

SUBJECT: Service Hints On Tuning Unit For 985283 Radio—Cont'd

(b) Check idler gear between control disc shaft and gang condenser worm gear for proper adjustment and also for being loose.

Caution: If the idler gear is moved from its original position for any reason or for any cause, it will be necessary to readjust all eight contact springs on control switch, and also to reset all eight bakelite control discs. Under no condition make any adjustment to any of the spring adjusting screws or to the idler gear unless all other remedies have been tried.

14. Set very noisy when motor unit is running. This would be electrical noise from the speaker

(a) Improper adjustment of the silencing contact on the relay. This silencing contact is the back contact, or the one nearest the condenser gang. The lead running from this contact is connected to the tab of the push-pull input choke and hence when the relay is operated to either side, the input choke tab is then grounded, silencing the audio of the set. Check wiring, soldered joints and contact resistance of silencing contact on relay. Polish relay contacts with very fine emery paper to remove dirt and grease. This will assure a good contact.

15. Set noisy immediately after motor unit has ceased to operate dial pointer

(a) This noise will only last for one or two seconds after the unit has stopped running and is caused by a voltage being generated in the motor and hence the "A" circuit by the rotation of the armature in a small residual field of the pole pieces. Check motor brushes and commutator for high resistance. Polish commutator as previously outlined.
(b) Check the .01 mfd. condenser across motor terminals for open.

16. Push buttons do not hold down when pressed

(a) Check the voltage between the black and yellow leads on push button cable socket.
(b) Make sure that push button cable plug is making good contact to the socket.
(c) Try a new push button box.

17. Calibrating light inside of case lights when calibrating switch is closed and push button is pressed. Motor will not run when this happens

(a) This condition is due to a faulty calibrating switch. Bend the switch arm down slightly so that a good contact is assured. This light is in series with relay coils and when light is not shorted out with calibrating switch the relay will not operate.

18. Calibrating light inside of case does not light when calibrating switch is open and push button is pressed

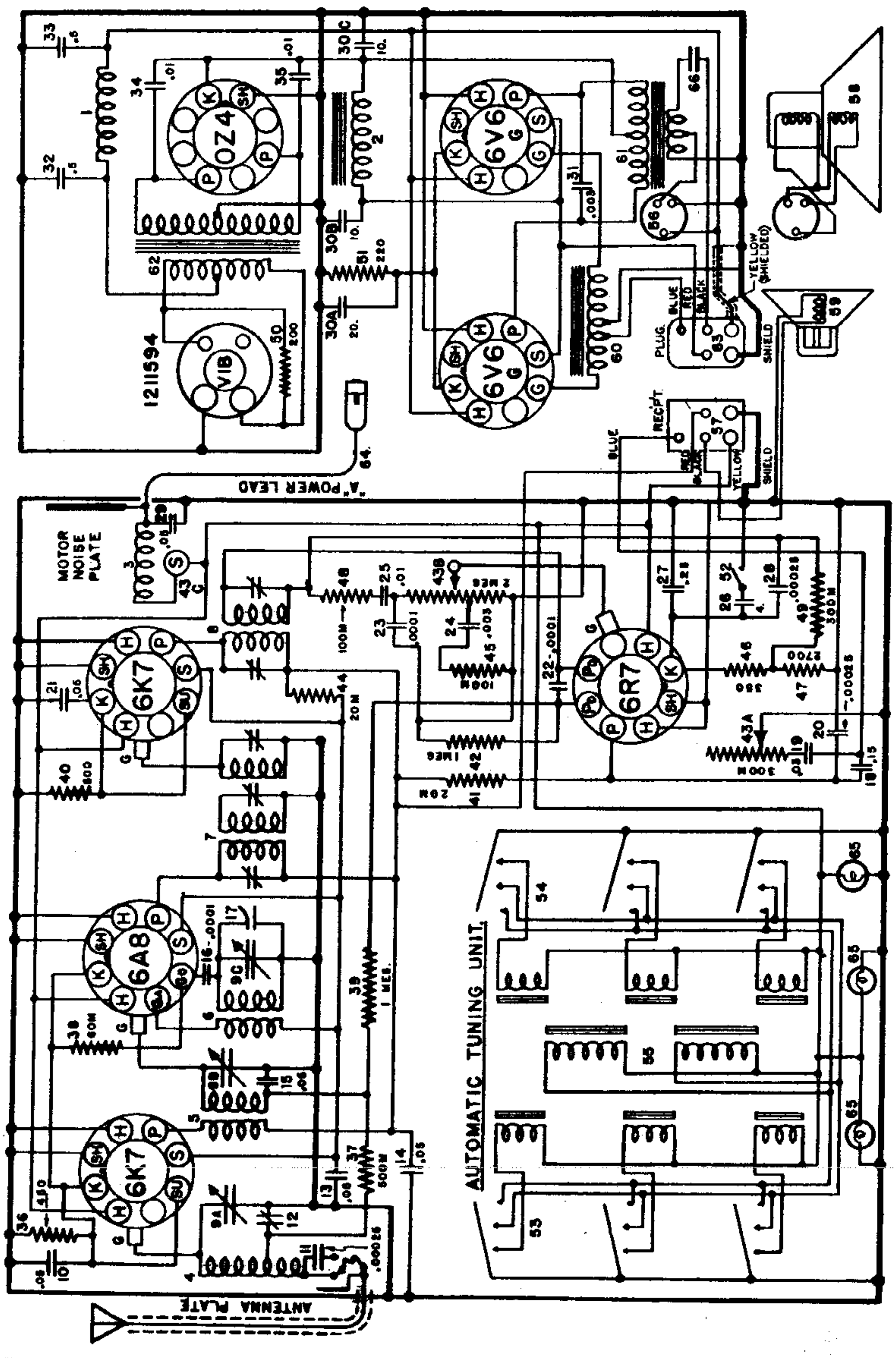
(a) Be sure calibrating light is not burned out.
(b) Check the voltage on relay coils.
(c) Check the relay coils for continuity.
(d) Check the calibrating switch contact for grounded connection.

19. Shift in station logging

(a) Check bakelite control discs for being loose on shaft. Discs are not supposed to slip when unit operates. This is a friction fit on the control shaft and should never be oiled.
(b) Check the oscillator circuit for shift.

CHEVROLET DIV.—GEN. MOTORS

MODEL 985424
Schematic



IF PEAK 262.5 KC

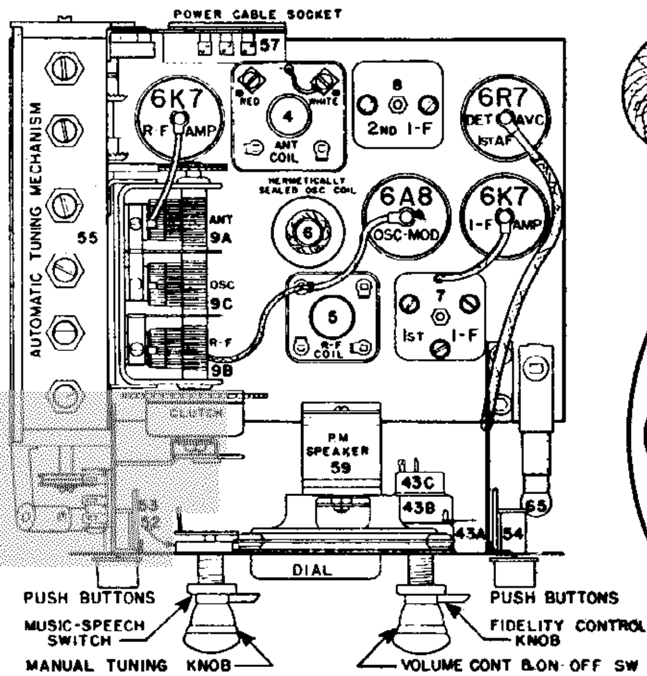
985424 CIRCUIT DIAGRAM

MODEL 985424
Socket,Trimmers
Chassis Views

CHEVROLET DIV.—GEN. MOTORS

Tube Complement

Type	Function	Type	Function
6K7	R. F. Amplifier	6R7	2nd Det.—A. V. C.—1st A. F. Amplifier
6A8	Oscillator-Modulator	6V6G	Output
6K7	I. F. Amplifier	0Z4	Rectifier



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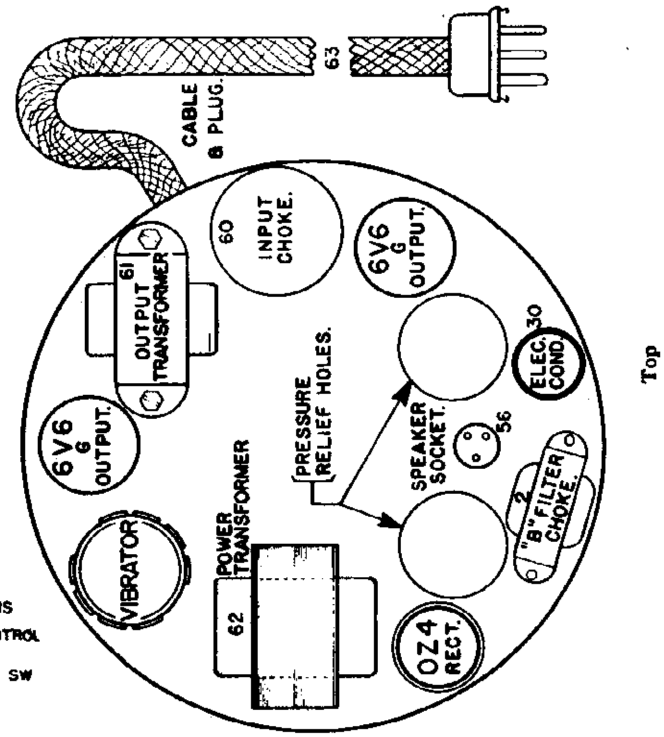

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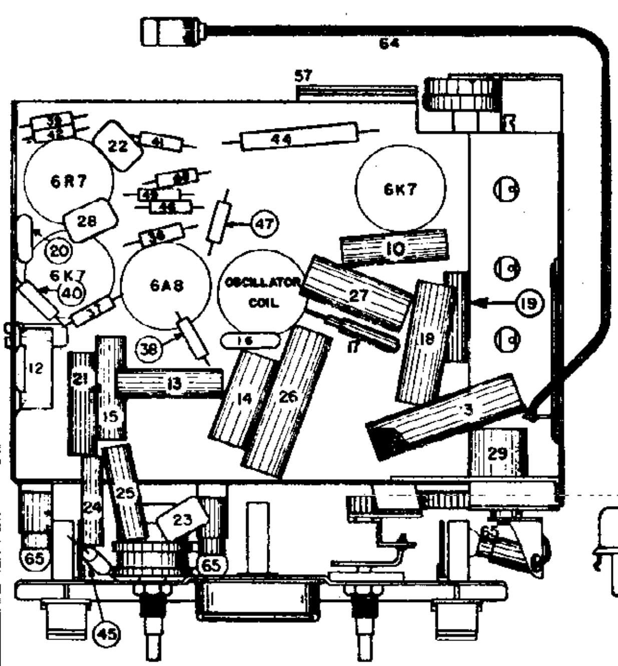
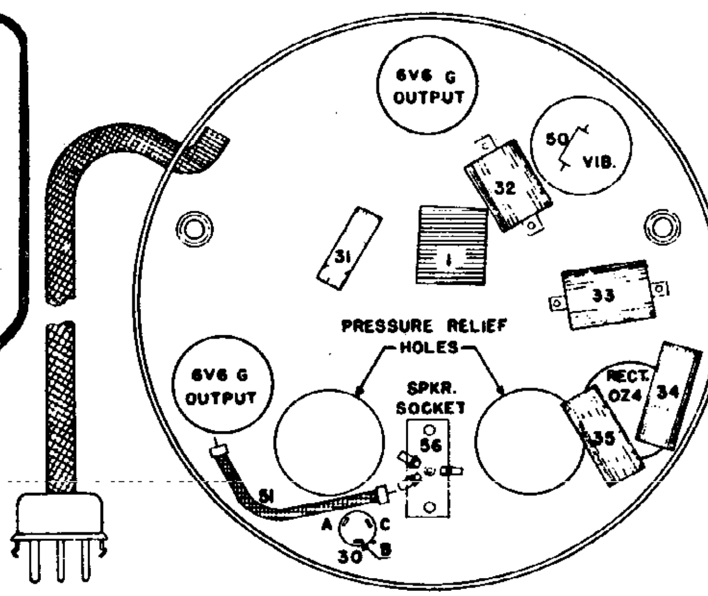


Bottom

985424 PARTS LOCATING DIAGRAM



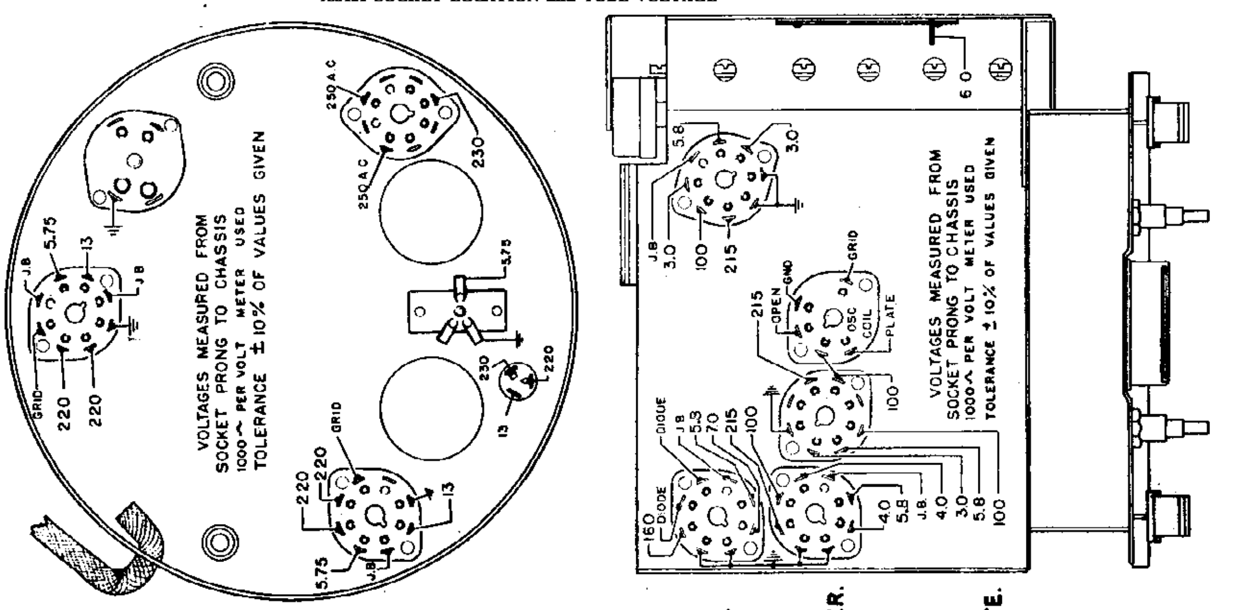
Bottom

985424 PARTS LOCATING DIAGRAMS

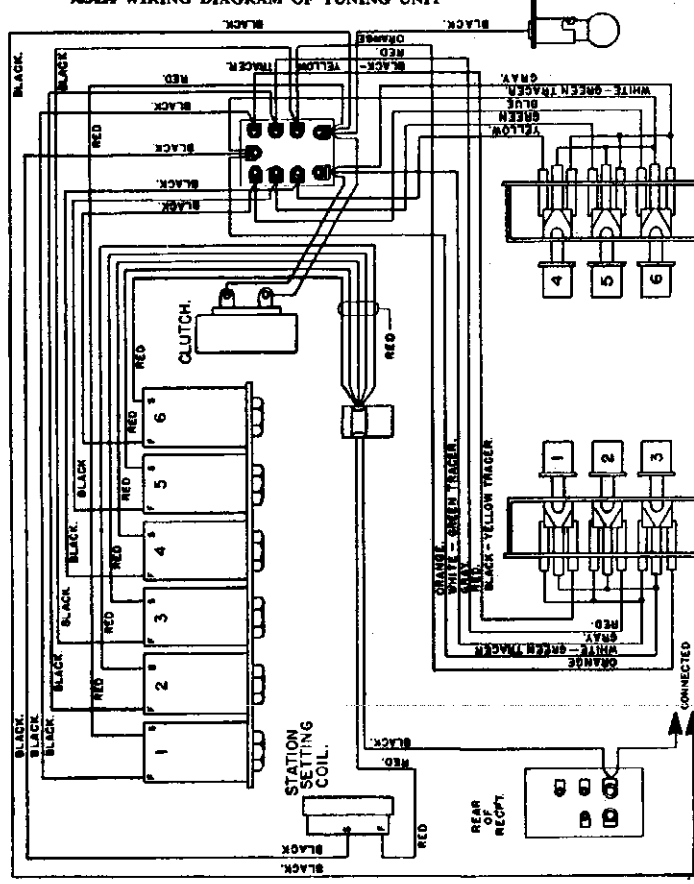
MODEL 985424
Tuning Unit Wiring
Condenser Assembly
Voltage

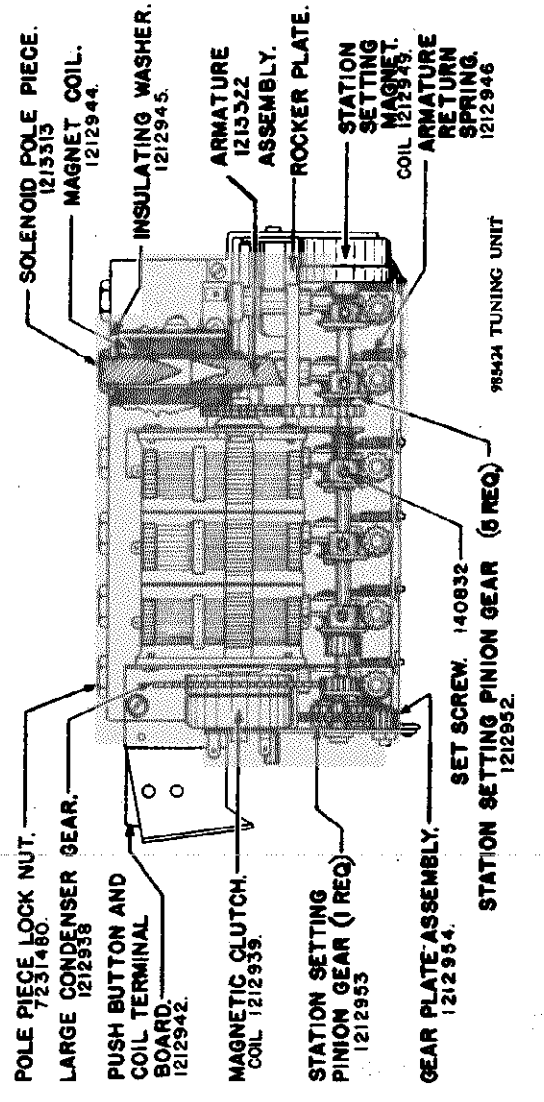
CHEVROLET DIV.—GEN. MOTORS

985424 SOCKET LOCATION and TUBE VOLTAGE



985424 WIRING DIAGRAM OF TUNING UNIT





985424 TUNING UNIT

MODEL 985424
Alignment

CHEVROLET DIV.—GEN. MOTORS

Circuit Alignment

If alignment is found necessary the circuits can be adjusted only with the use of a calibrated test oscillator or signal generator and an output meter. The signal generator output should be adjusted to give a reasonable scale deflection on the output meter. Before turning the receiver on or making any adjustments, a speaker similar to the one used with the receiver or a universal test speaker, should be connected to the chassis. It is also possible to use an 8000 ohm load connected across the primary of the output transformer.

1. Aligning I. F. Stages at 262.5 Kilocycles

The I. F. amplifier may best be aligned by first using a modulated signal generator and an output meter in the conventional manner, and then making the final adjustment with a radio frequency modulator signal generator and oscillograph. The accuracy of the push-button tuning system partially depends upon the symmetry of the I. F. wave form. In most cases the symmetry is only approximate without the aid of the oscillograph equipment.

(a) Connect one terminal of the output meter to the plate of one of the 6V6G output tubes and connect the other terminal through a .1 mfd. condenser (not electrolytic) to the plate of the other 6V6G output tube.

(b) Connect the output of the signal generator through a .02 mfd. condenser to the grid of the 6K7 I. F. amplifier tube leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the frame of the receiver chassis.

(c) Turn the volume control on full. Adjust station selector so that the rotor plates of the condenser gang are completely in mesh and turn the audio fidelity control to the treble position. The music-speech control should be in the "music" position.

(d) Adjust the signal generator to 262.5 kilocycles.

(e) Adjust both transformers located on the 2nd I. F. transformer to maximum reading on the output meter.

Note: Always use the lowest signal generator output that will give a reasonable reading on the output meter.

(f) Connect the output of the signal generator to the grid of the 6A8 tube leaving the tube's grid clip in place.

(g) Open the middle trimmer on the 1st I. F. transformer two or three turns of the adjustment screw. Care should be taken that the adjustment screw does not become dislodged from the nut.

(h) Adjust the other two trimmers on the 1st I. F. transformer for maximum reading on the output meter.

(i) Adjust the middle trimmer on the I. F. transformers for maximum reading on the output meter.

Caution: Do not readjust the trimmers on the 2nd I. F. transformer.

2. Oscillograph Alignment

For more accurate adjustment of the I. F. amplifier a cathode ray oscillograph in conjunction with a radio frequency modulated signal generator may be used to obtain a visual alignment. It will allow adjusting for a more symmetrical wave form.

(a) Disconnect the conventional signal generator from the receiver.

(b) Connect the vertical plates of the oscillograph to the receiver connecting the (HI) terminal through a .02 mfd. condenser to the grid cap of the 6R7 tube leaving the tubes grid clip in place. (Condenser is built into most oscillographs.) Connect the ground terminal to the frame of the receiver chassis.

(c) Connect the output of the R. F. modulated signal generator also through a .02 mfd. condenser to the grid cap of the 6A8 tube leaving the tube's grid clip in place. Connect the ground lead to the frame of the receiver chassis.

(d) Adjust the signal generator to 262.5 kilocycles.

(e) With the modulator switch of the signal generator turned off, a horizontal line will appear on the window of the oscillograph by means of the amplitude control on the oscillograph. Adjust the length of this line so that it is equal to the width of the celluloid scale supplied with the oscillograph.

(f) Turn the frequency modulator switch of the signal generator on.

(g) Adjust the vertical control of the oscillograph so that the image is just within the top and bottom lines of the oscillograph scale.

Note: Use the lowest signal generator output that will give a stable image on the oscillograph window. If too much signal input is used; the humps desired on the wave form will not be visible even at perfect alignment.

(h) Readjust the middle trimmer on the 1st I. F. transformer for maximum symmetry above the vertical resonance line in the center of the celluloid scale. The hump or shoulder appearing on each side of the wave form will be equal distance from the nose of the curve when maximum symmetry is reached.

3. Aligning the R. F. Amplifier

(a) Connect the output of the signal generator through a .00016 mfd. condenser and Chevrolet shielded antenna lead-in to the antenna connection of the receiver. Connect the ground lead to the frame of the receiver chassis.

(b) Adjust the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial logging the dial from the low frequency end.

(d) Adjust the trimmer on the oscillator section of the condenser gang for maximum reading on the output meter.

(e) Adjust the trimmer on the R. F. trimmer gang for maximum reading on the output meter.

(f) Adjust the trimmer on the antenna gang for maximum reading on the output meter.

(g) Readjust the station selector for maximum reading on the output meter.

Note: Do not readjust the ocillator trimmer.

(h) Repeat operations (e) and (f) for more accurate adjustments.

4. Adjusting Antenna Compensating Condenser

(a) Adjust the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum reading on the output meter.

(c) Adjust the antenna compensating condenser for maximum reading on the output meter.

(d) Repeat operations (b) and (c) alternately until no further improvement in output can be obtained.

(e) Readjust the signal generator to 1400 kilocycles.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the antenna section of the condenser gang for maximum reading on the output meter.

5. Adjusting the Antenna Compensating Condenser When Set Is Installed on Car

(a) After installation is complete, tune-in a weak station between 55 and 65 on the dial that is just audible with volume control on full.

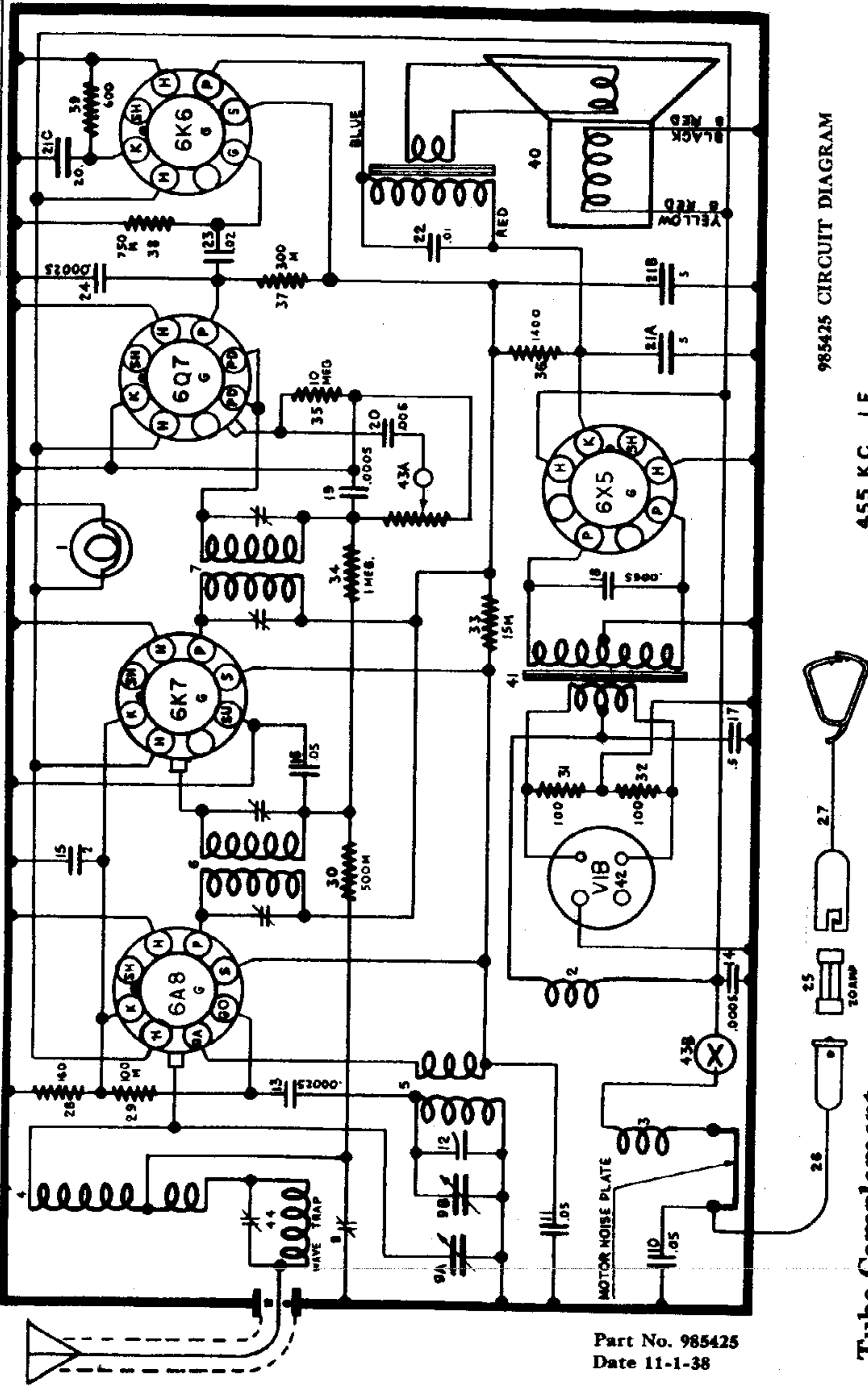
(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

6. Setting the Push-Buttons

The order in which the stations are set-up on the push-buttons will in no way affect the operation of the tuning unit. To set the push-buttons no tools are required, but an understanding of the operation of the push-button switch is essential. There are two definite pressures and movements required to actuate the switch. First, a slight touch and a movement of less than one-eighth of an inch is all that is required to tune the receiver with a push-button after the button has been adjusted. Second, a heavier pressure and a movement of about one-quarter of an inch is required when the push-button is to be set to the station selected. To adjust the button, push the button all the way down (a slight snap will be felt when going past first stop position), and hold it in that position while you tune-in as accurately as possible with the manual tuning knob, the station selected. Release button, the station is set. Follow the same procedure in setting the remaining buttons.

Note: The accuracy of the push-buttons depends upon how accurate you tune-in the station while setting them.

CHEVROLET DIV.—GEN. MOTORS



Part No. 985425
Date 11-1-38

Adjusting Antenna Compensating Condenser After Radio Is Installed

(a) After installation, tune-in a weak station between 55 and 65 on the dial that is just audible with the volume control on full.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

ANTENNA SYSTEM: There are three antenna systems available for use with this receiver: The under-car; the turret top, or the telescopic cowl antenna. Any one of these antennas will operate very efficiently with this receiver.

Tube Complement

Type	Function
6A8G	Oscillator-Modulator
6K7	I. F. Amplifier
6Q7G	2nd Det. A. V. C. —1st A. F. Amplifier
6K6G	Power Output
6X5G	Rectifier

A highly efficient superheterodyne circuit is used. Bias for the 6A8G and 6K7 tubes is obtained across the 160 ohm resistor, item No. 28. Bias for the 6K6G tube is obtained across a 600 ohm resistor, item No. 39.

MODEL 985425
Socket, Trimmers
Voltage, Chassis
Alignment, Tuner

CHEVROLET DIV.—GEN. MOTORS

Circuit Alignment

1. Aligning the I. F. Stage at 455 Kilocycles

(a) Connect the output meter to the plate and screen of the 6K6G output tube. Be sure the meter is protected from D. C. by connecting a .1 mfd. condenser (not electrolytic) in series with one of the leads.

(b) Connect the output of the signal generator through a .02 mfd. condenser to the grid of the 6K7 I. F. tube leaving the tubes grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame.

Note: Keep the generator leads as far as possible from the grid leads of the other screen grid tubes.

(c) Adjust the station selector so that the rotor plates of the tuning condenser are completely disengaged and turn the volume control to the maximum position.

(d) Adjust the signal generator to 455 kilocycles.

(e) Adjust both 2nd I. F. trimmer condensers for maximum output.

(f) Transfer generator lead to the grid of the 6A8G tube leaving the tube's grid clip in place.

(g) Adjust both trimmers located on the 1st I. F. transformer for maximum output.

(h) Repeat operations (e) and (g) for more accurate adjustments.
Note: In order to prevent A. V. C. action always use the lowest signal generator output that will give a reasonable output meter reading.

2. Aligning the R. F. Amplifier

To obtain the greatest gain from the antenna system, the capacity of the dummy antenna should be accurate to the capacity of the antenna with which the receiver is to be used. The capacities of auto radio antennas range from 65 mmf. to 250 mmf., depending upon the size and type. If the receiver is adjusted for maximum efficiency when used with an antenna having a high capacity, it will not operate at its maximum efficiency on an antenna having a much lower capacity or vice versa.

(a) If the receiver is to be used with a turret-top antenna or a telescopic cowl antenna, the output lead from the signal generator should be connected through a .00005 mfd. condenser, and shielded lead, to the antenna connection of the receiver. If a large antenna such as the running board type is used, a .00016 mfd. condenser should be used and a long shielded lead in place of the .00005 mfd. condenser and short shielded lead.

(b) Adjust the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the oscillator section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the antenna section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output.

Note: Do not readjust the oscillator trimmer.

(g) Repeat operation (e) for more accurate adjustment.

Adjusting Antenna Compensating Condenser

(a) Set the signal generator to 600 kilocycles.

(b) Tune-in the 600 kilocycle signal with the station selector for maximum output.

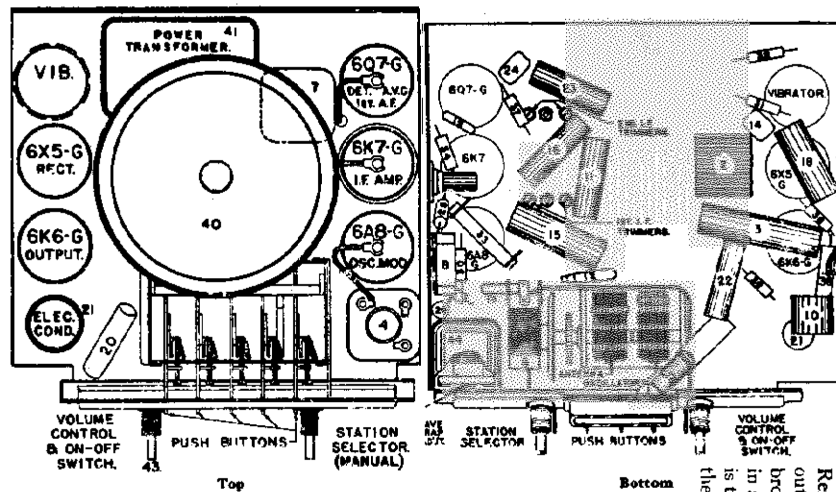
(c) Adjust the antenna compensating condenser for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles.

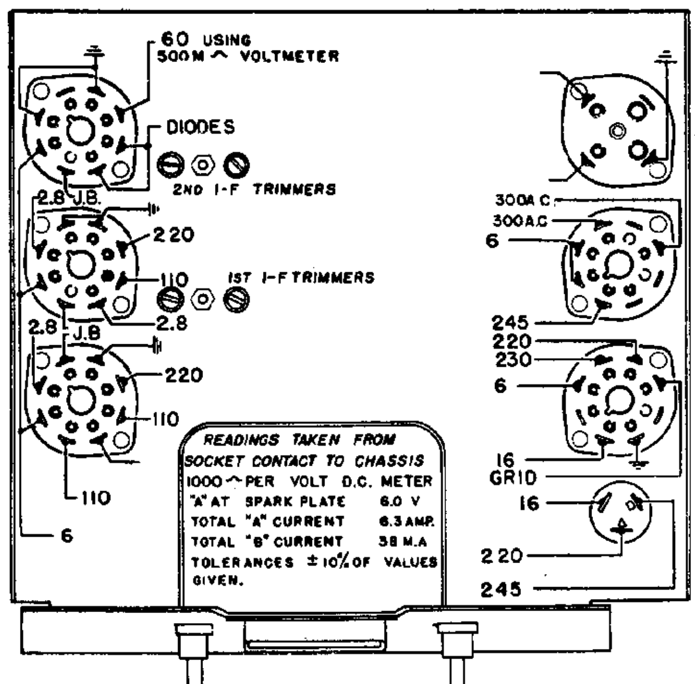
(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the antenna section of the tuning condenser for maximum output.



Setting the Push-Buttons

The push-button can be quickly and accurately set from the front of the receiver. Remove the push-button to be set (clasp between forefinger and thumb and pull straight out) and loosen the set screws that are concealed by the buttons. Determine the five broadcasting stations that are to be set up. By means of a manual tuning knob, tune in as accurately as possible, the station desired. Push the button on which that station is to be set up on and hold in that position, then securely tighten the set screw. Replace the button on that key and adjust the remaining buttons in the same manner.



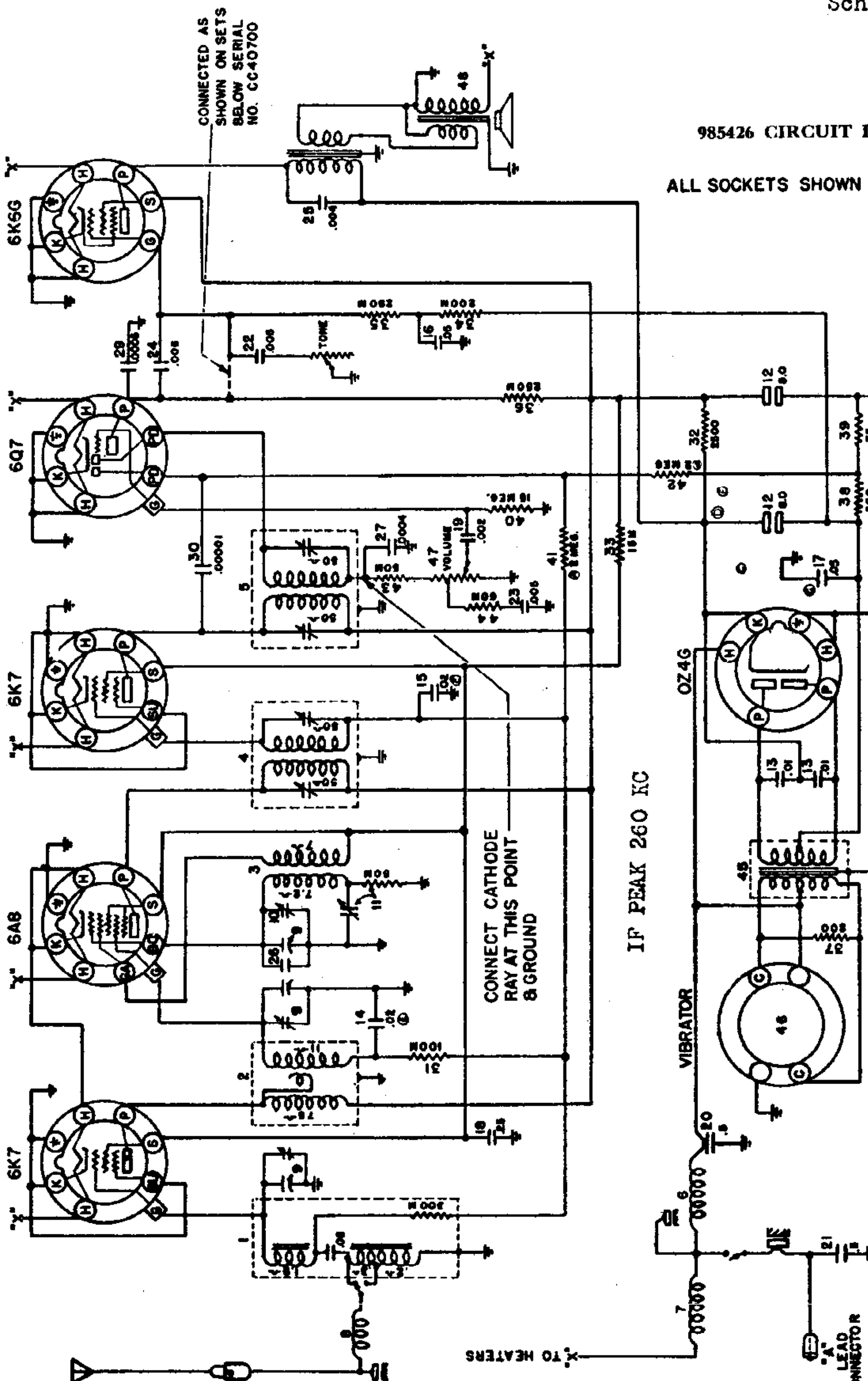
985425 TUBE SOCKET LAYOUT and VOLTAGES

CHEVROLET DIV.—GEN. MOTORS

MODEL 985426
Schematic, Alignment

985426 CIRCUIT DIAGRAM

ALL SOCKETS SHOWN BOTTOM VIEW



2. Aligning at 1560 Kilocycles

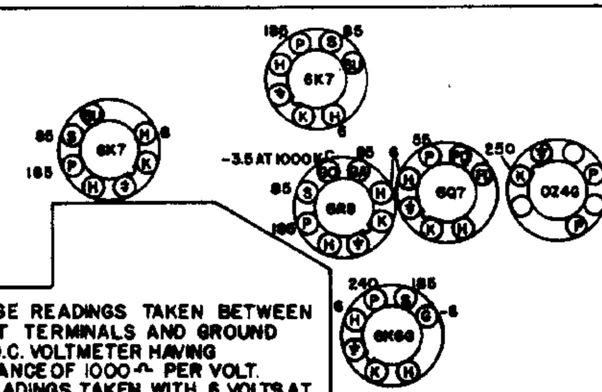
(a) Remove the signal lead of the signal generator from the grid of the 6A8 tube and connect to the antenna terminal of the receiver through a .000186 mica condenser connected in place of the .1 mfd. condenser previously used. (It is very important that a .000186 mica condenser be used when aligning the antenna stage of these receivers, and that the antenna coil tap is in the running board position "HC" in order that this circuit can be made to track properly.)

Part No. 985426
Date 11-1-38

Circuit Alignment When adjustments are being made, the chassis must be in its case to provide proper shielding, and the volume control should be turned full on to the maximum position. The signal generator output should be adjusted to give a reasonable scale deflection on the output meter.

MODEL 985426
Voltage, Socket
Trimmers, Alignment
Chassis

CHEVROLET DIV.—GEN. MOTORS



VOLTAGE READINGS TAKEN BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 Ω PER VOLT. ALL READINGS TAKEN WITH 6 VOLTS AT SPARK PLATE.

CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 7.3 AMPS.

"B" SUPPLY DRAIN APPROX. 42 M.A.

TOLERANCES ON TUBE VOLTAGES ±10%

985426 TUBE SOCKETS LAYOUT and VOLTAGES

FOR CONVENTIONAL ALIGNMENT PROCEDURE, SEE SPECIAL SECTION VOL. VIII.

ALIGNMENT:

1. IF 260kc. Connect output meter through .25 mfd. condenser to screen grid prongs of 6K6G tube. Signal generator through .1 mfd condenser to grid cap of 6A8 tube. Generator ground lead to chassis. Variable out of mesh. Adjust trimmers A, B, C, D for maximum output. Check IF band spread with oscillograph.

2. At 1560 kc, see "ALIGNING AT 1560 KILOCYCLES" with schematic.

3. With connections as in 2. Generator and variable tuned to 1400 kc Adjust parallel trimmers on top and bottom sections of variable for maximum output.

4. At 600 kc. Tune variable to 600 kc Adjust oscillator padder (f) to maximum output while rocking variable.

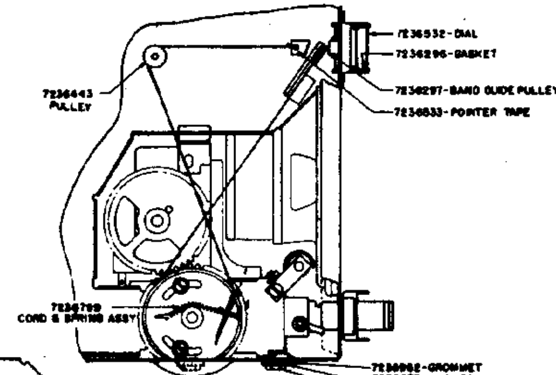
5. Adjustment of the Receiver to the Car Antenna

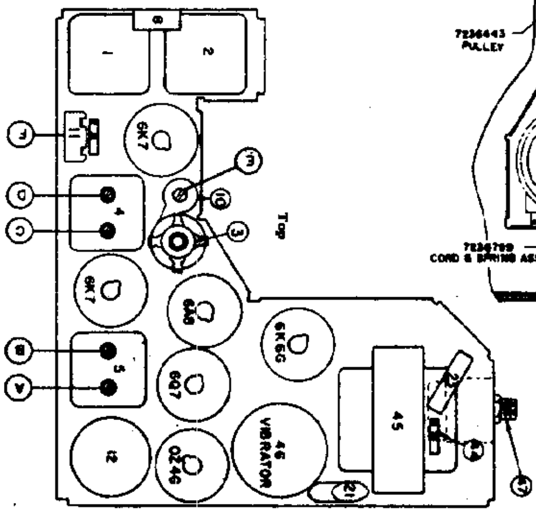
When the receiver leaves the factory the antenna circuit is properly aligned to match the under running board type of antenna. Therefore when the receiver is installed in a car and connected to the standard Chevrolet running board antenna, only a slight adjustment of the antenna circuit is required. If the receiver is connected to a turret top antenna or a telescopic cowl antenna, proceed as follows to properly adjust the receiver:

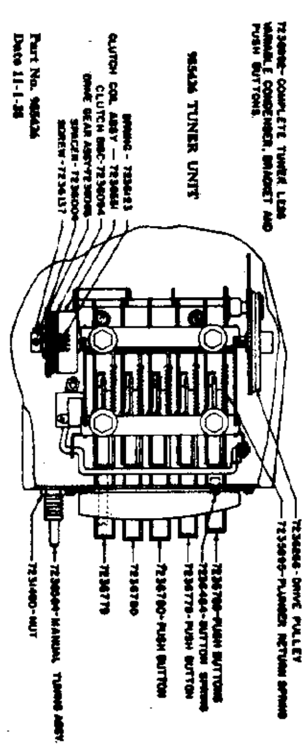
(a) Tune in a weak station about 1400 kilocycles, which is barely audible, with the volume control full on.

(b) If the turret-top antenna or the telescopic cowl antenna is used, remove the bottom tube cover and change the position of the antenna plug from the hole marked "HC" to the hole marked "LC," and replace the cover.

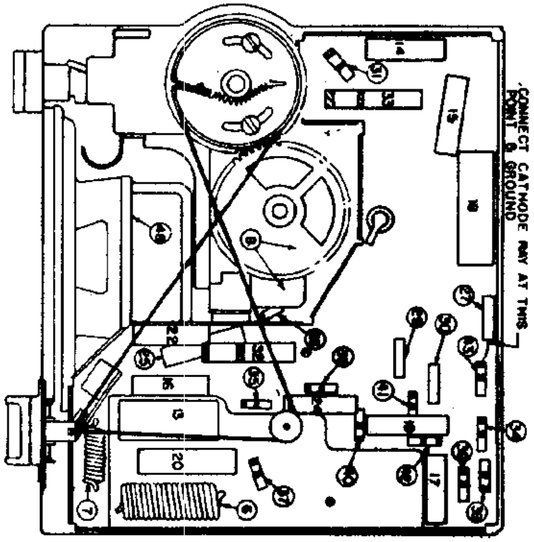
(c) Adjust the antenna trimmer condenser for maximum volume.







Part No. 985426
Date 11-1-38



CHEVROLET DIV.—GEN. MOTORS

Part No. 985400
Date 1-1-36

Peaking I-F Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect the output of the test oscillator through an .02 mfd. condenser to the grid cap of the 6A7 tube (1st detector-oscillator) leaving the tube's grid clip in place. Keep the leads of the test oscillator as far as possible from the grid wires of the other screen grid tubes.

(b) Set the test oscillator to 262 kilocycles.

(c) Adjust the station selector so that the plates of the tuning condenser are completely in mesh.

(d) Turn the volume control on full and turn the tone control to the treble position.

(e) Adjust both trimmer condensers located on top of the second I. F. coil. Illustration No. 10—Fig. 1, for maximum output.

(f) Adjust both trimmer condensers located on top of the first I. F. coil. Illustration No. 9—Fig. 1, for maximum output.

(g) Repeat operations (c) and (f) for more accurate adjustments.

Always use the lowest signal generator output that will give a reasonable output meter reading.

Peaking R. F. Stages

(a) Remove the .02 mfd. condenser from the output lead of the test oscillator and connect a .00025 mfd. condenser in its place. Then, connect this lead to the antenna connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "Osc" section of the tuning condenser for maximum output. (Fig. 1.)

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output. (Fig. 1.)

(f) Adjust the trimmer on the "ant" section of the tuning condenser for maximum output. (Fig. 1.)

(g) Readjust the station selector for maximum output. Do not readjust the "Osc" trimmer.

(h) Repeat operations (e) and (f) for more accurate adjustments.

Adjusting Antenna Compensating Condenser

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector, for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 11, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement in output can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

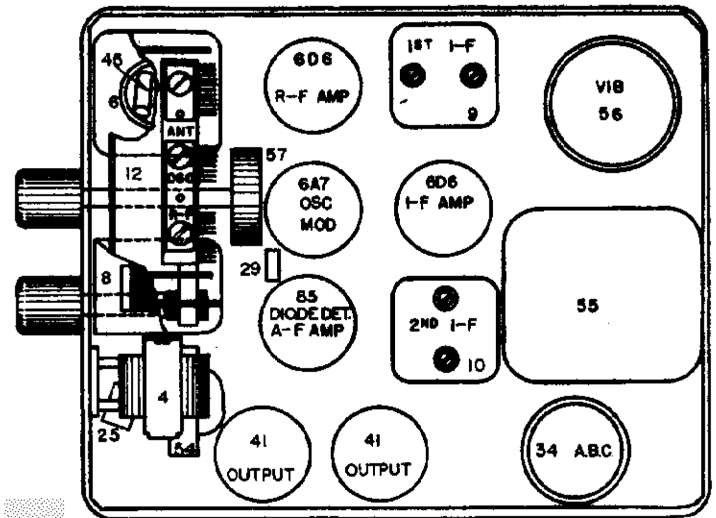
(f) Tune in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ant" section of the tuning condenser, for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune in a weak station between 55 and 65 on the dial.

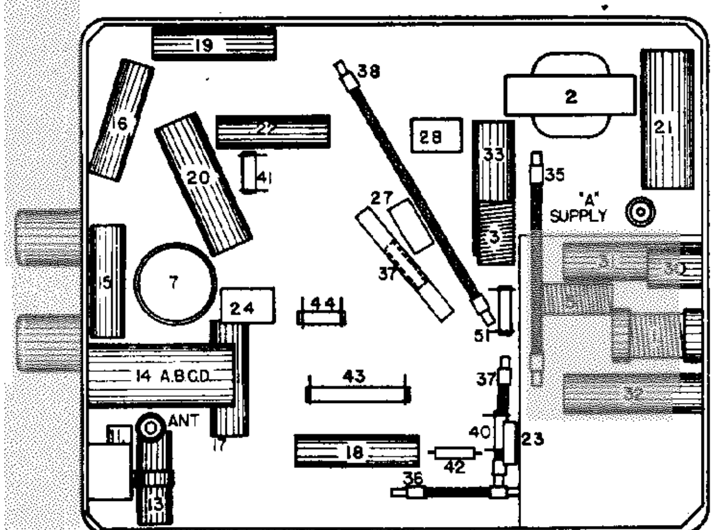
(b) Adjust the antenna compensating condenser for maximum volume in the speaker.



PARTS LAYOUT—Top View (Fig. 1)

Chevrolet Model 985400

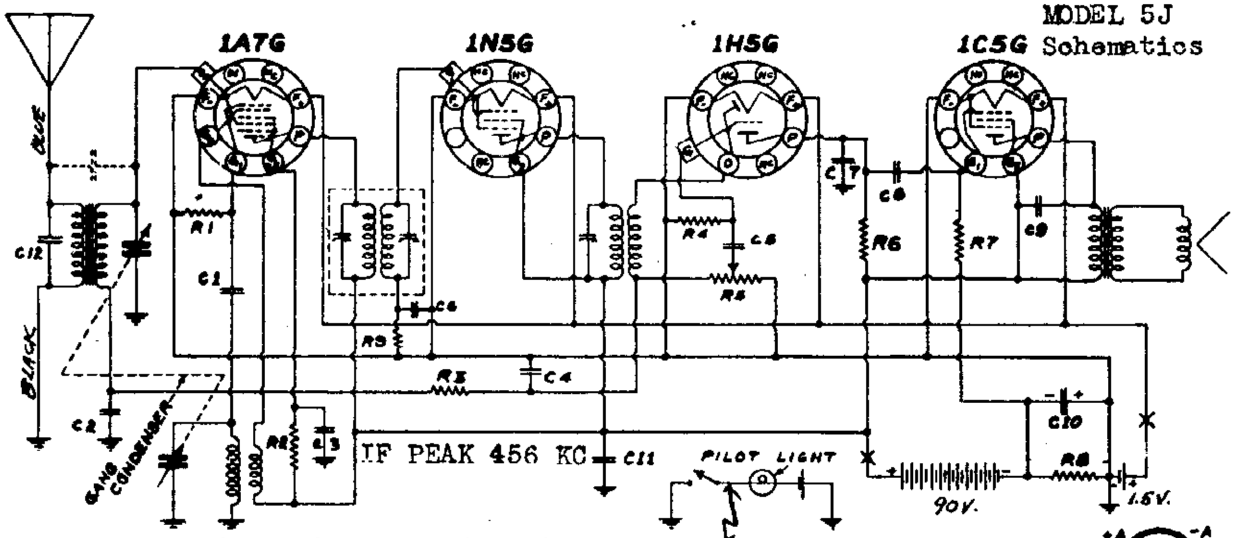
FOR OTHER DATA, SEE VOL. VIII



PARTS LAYOUT—Bottom View (Fig. 2)

CONTINENTAL RADIO & TELEV. CO.

MODELS 4A,4B,Early, Late,4C
MODEL 5J
Schematics



MODELS 4A,4B (Early), 4A,4B (Late) and 4C.

CAPACITORS

Nº	CAP.-MFDS	TYPE	Nº	CAP.-MFDS	TYPE
C1	.00025	MICA	C7	.00025	MICA
C2	.05	200V.	C8	.01	400V.
C3	.1	200V.	C9	.006	400V.
C4	.00025	MICA	C10	20. (ELECT)	25V.
C5	.01	400V.	C11	.1	200V.
C6	.002	400V.	C12	.00005	MICA

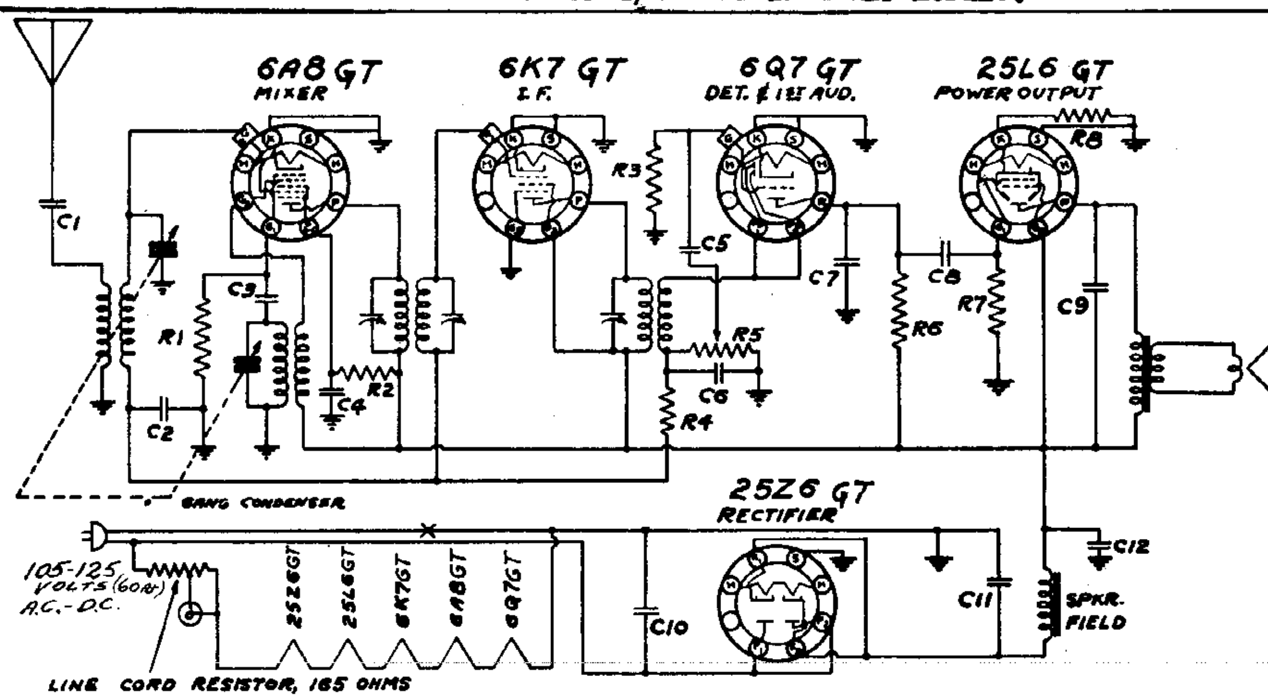
RESISTORS

Nº	OHMS	WATTS	Nº	OHMS	WATTS
R1	200,000	1/4	R6	250,000	1/4
R2	70,000	1/4	R7	500,000	1/4
R3	1 MEG.	1/4	R8	600	1/4
R4	2 MEG.	1/4	R9	2 MEG.	1/4
R5	500,000	VOL. CONTROL			

FOR ALIGNMENT AND LAYOUT SEE INDEX

CHANGES:- LATE MODELS 4A AND 4B DIFFER FROM THE ABOVE DIAGRAM AS FOLLOWS; 1Q5G REPLACES 1C5G OUTPUT TUBE; CONDENSER C1 IS .00005 MICA, INSTEAD OF .00025 MICA AND RESISTOR R8 IS 440 OHMS 1/4 WATT INSTEAD OF THE 600 OHM 1/4 WATT IN EARLY MODELS.

RANGE 535 - 1730 KILOCYCLES



RESISTORS

Nº	OHMS	WATTS	
R1	50,000	1/2	
R2	40,000	1/2	
R3	5 MEG	1/2	
R4	2 MEG	1/2	
R5	500,000		VOL. CONT.
R6	250,000	1/2	
R7	500,000	1/2	
R8	150	1/2	±10%

CONDENSERS

Nº	MFD.	TYPE
C1	.00025	600V.
C2	.02	400V.
C3	.00005	MICA
C4	.01	400V.
C5	.01	400V.
C6	.0002	MICA
C7	.00025	MICA
C8	.01	300V.
C9	.005	600V.
C10	.05	400V.
C11	25. ELECT.	150V.
C12	10. ELECT.	150V.

I.F. 456 K.C.

FOR ALIGNMENT AND LAYOUT SEE INDEX

MODEL 5J

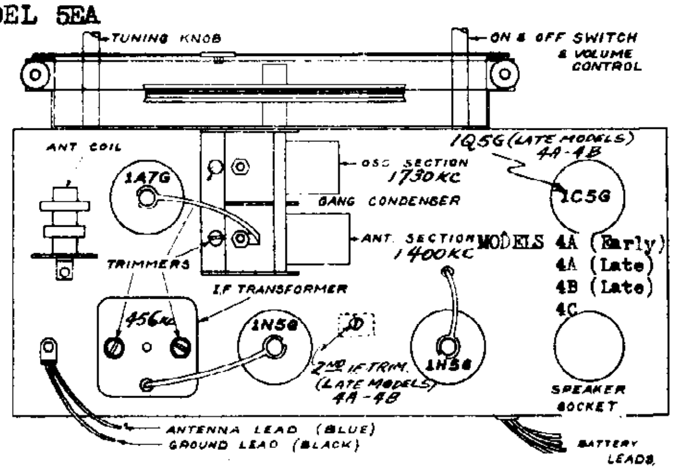
A.C.-D.C.

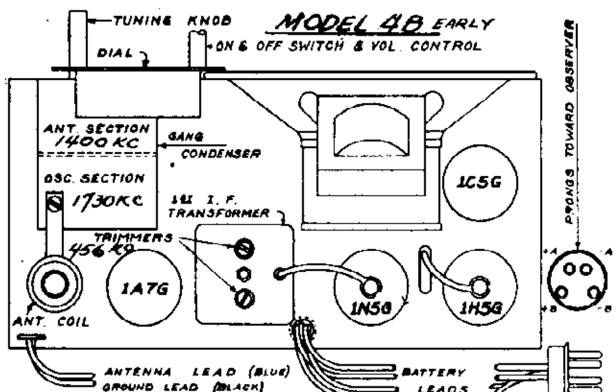
RANGE 535 - 1730 KILOCYCLES

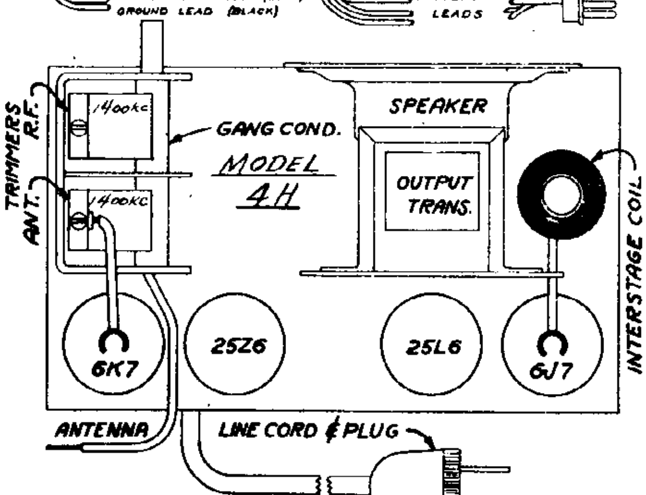
MODELS 4A, 4B Early, Late
MODEL 4C
MODEL 4D, Early, Late, 4D-PH
MODEL 4H
MODELS 5D, 5DL
MODEL 5EA

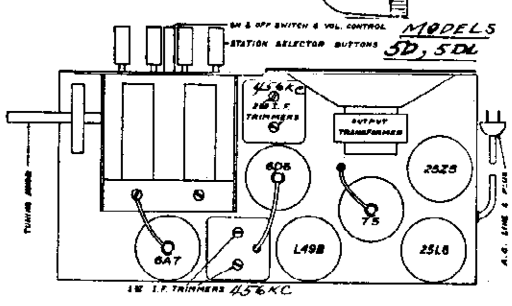
CONTINENTAL RADIO & TELEV. CO.

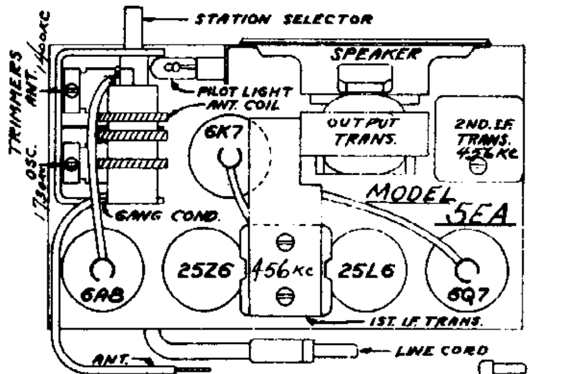
MODEL 5J
MODELS 5L, 5LL
Alignment, Socket
Trimmers

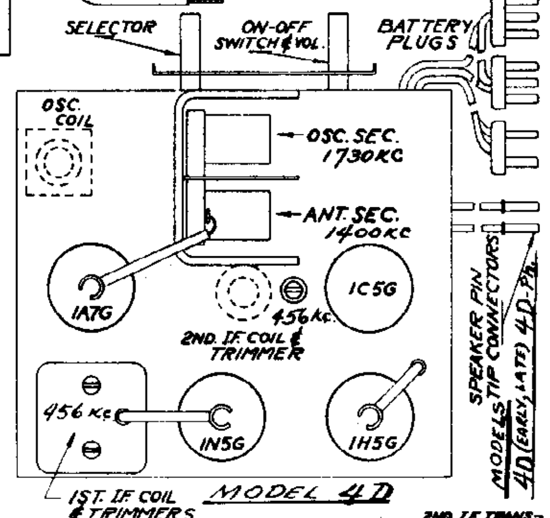


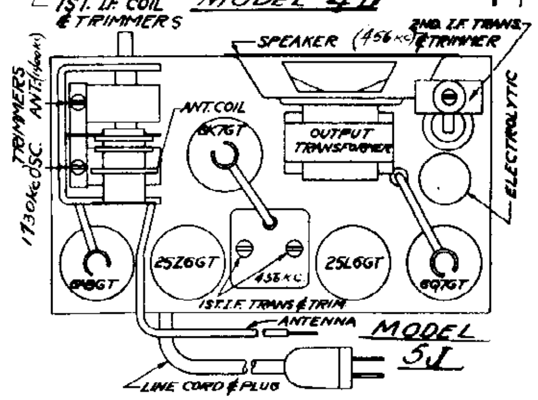


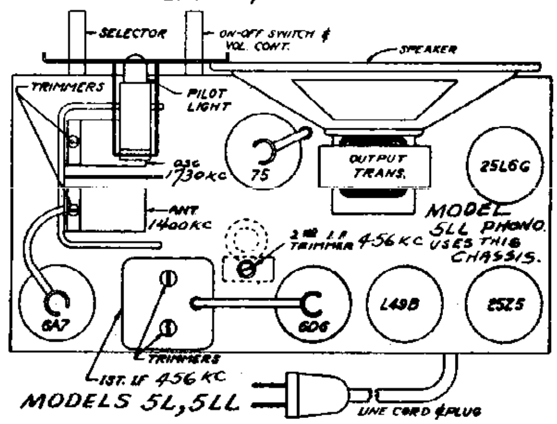










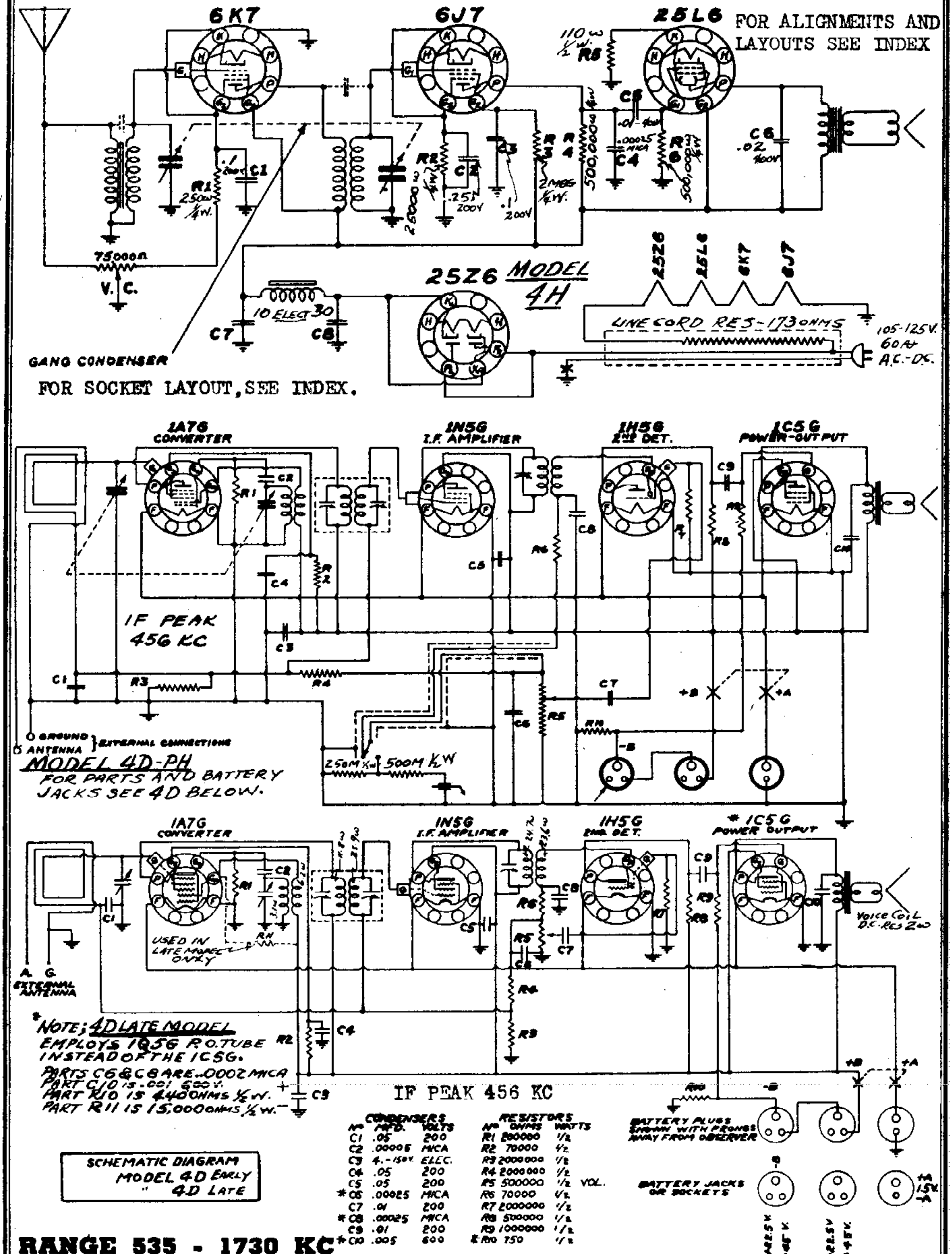


MODEL 4H
Schematics

CONTINENTAL RADIO & TELEV CO

MODELS 4D, Early, Late
MODEL 4D-PH

FOR ALIGNMENTS AND LAYOUTS SEE INDEX



CONDENSERS

Nº	MFD.	VOLTS
C1	.05	200
C2	.00005	MICA
C3	4.-150V.	ELEC.
C4	.05	200
C5	.05	200
*C6	.00025	MICA
C7	.01	200
*C8	.00025	MICA
C9	.01	200
*C10	.005	600

RESISTORS

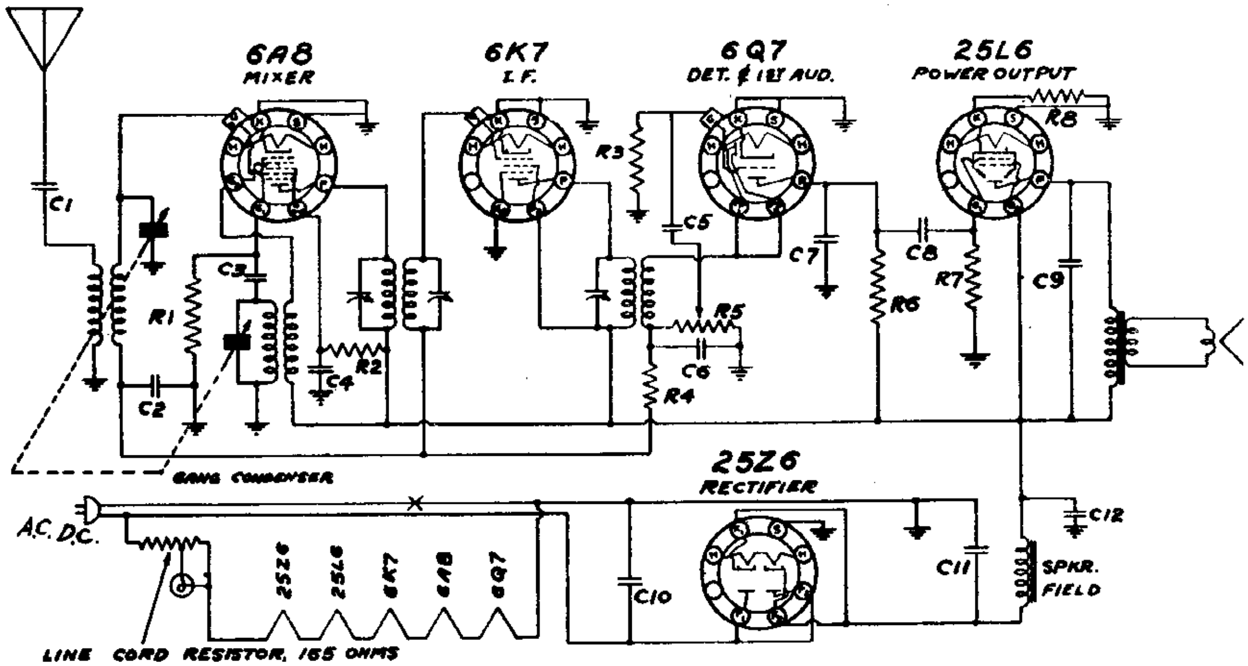
Nº	OHMS	WATTS	
R1	250000	1/2	
R2	70000	1/2	
R3	2000000	1/2	
R4	2000000	1/2	
R5	500000	1/2	VOL.
R6	70000	1/2	
R7	2000000	1/2	
R8	500000	1/2	
R9	1000000	1/2	
*R10	750	1/2	

RANGE 535 - 1730 KC

MODELS 5D, 5DL
MODEL 5EA

CONTINENTAL RADIO & TELEV. CO.

Schematics



RESISTORS

No.	OHMS	WATTS	
R1	50,000	1/4	
R2	40,000	1/4	
R3	15 MEG	1/4	
R4	2 MEG	1/4	
R5	500,000		VOL. CONT.
R6	250,000	1/4	
R7	500,000	1/4	
R8	110	1/4	±10%

CONDENSERS

No.	MFD.	TYPE
C1	.005	600V.
C2	.02	400V.
C3	.00025	MICA
C4	.01	400V.
C5	.01	400V.
C6	.00025	MICA
C7	.00025	MICA
C8	.01	400V.
C9	.005	600V.
C10	.05	400V.
C11	25. ELECT.	150V.
C12	10. ELECT.	150V.

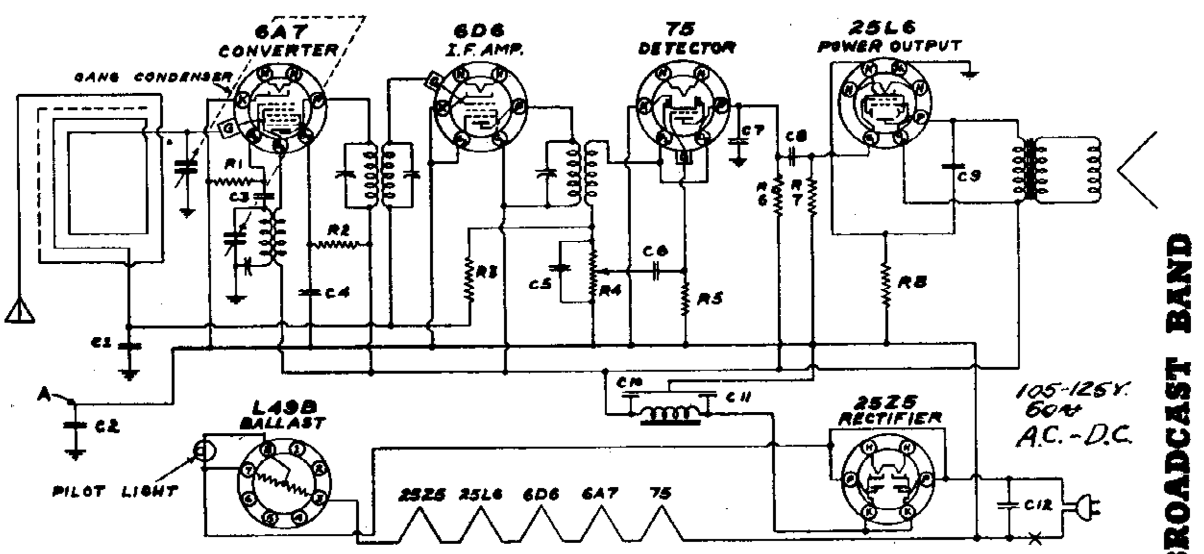
IF PEAK 456 KC

MODEL 5EA

FOR ALIGNMENT AND LAYOUTS SEE INDEX

A.C.-D.C.

RANGE 535 - 1730 KILOCYCLES



BROADCAST BAND

A.C.-D.C.

RESISTORS

No.	OHMS	WATTS
R1	50,000	1/2
R2	30,000	1/2
R3	2,000,000	1/2
R4	500,000	VOL. CONT.
R5	5,000,000	1/2
R6	250,000	1/2
R7	500,000	1/2
R8	150 ± 10%	1/2

CONDENSERS

No.	MFDS.	VOLTS
C1	.02	400
C2	.25	200
C3	.00005	MICA
C4	.05	400
C5	.00025	MICA
C6	.01	400
C7	.00025	MICA
C8	.01	400
C9	.005	600
C10	20.	150
C11	20.	150
C12	0.05	400

NOTE:- C2 USED ON MODEL 5DL ONLY. ON MODEL 5D POINT "A" IS CONNECTED TO CHASSIS

IF PEAK 456 KC

⏚ INDICATES CHASSIS GROUND

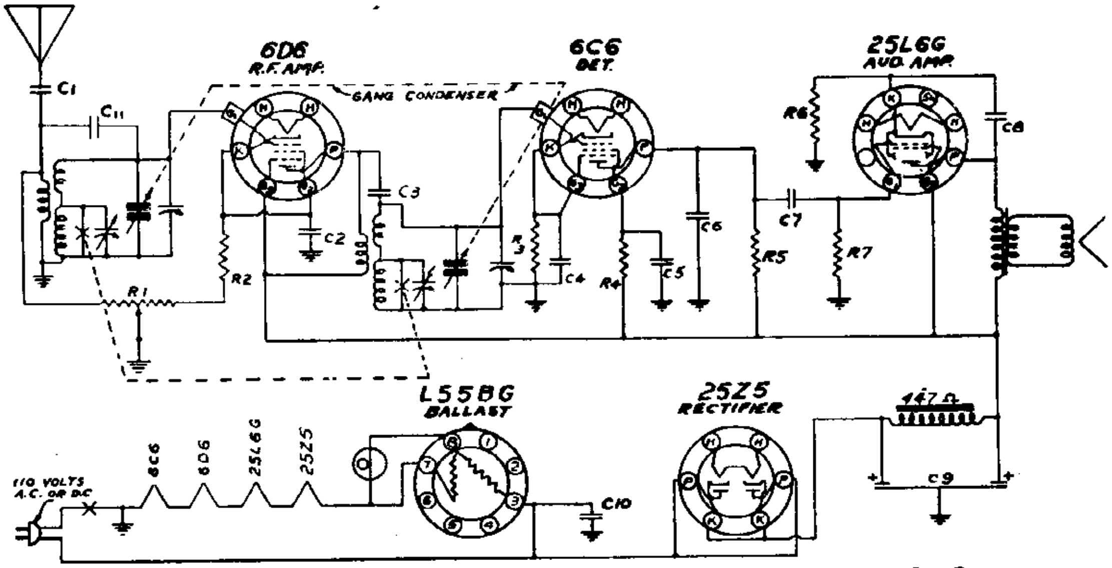
FOR SOCKET LAYOUT SEE INDEX

SCHEMATIC DIAGRAM
MODEL 5DL
MODEL 5D

RANGE 545 - 1630 KILOCYCLES

MODEL 5B
MODEL 5CU
Schematics

CONTINENTAL RADIO & TELEV. CO.



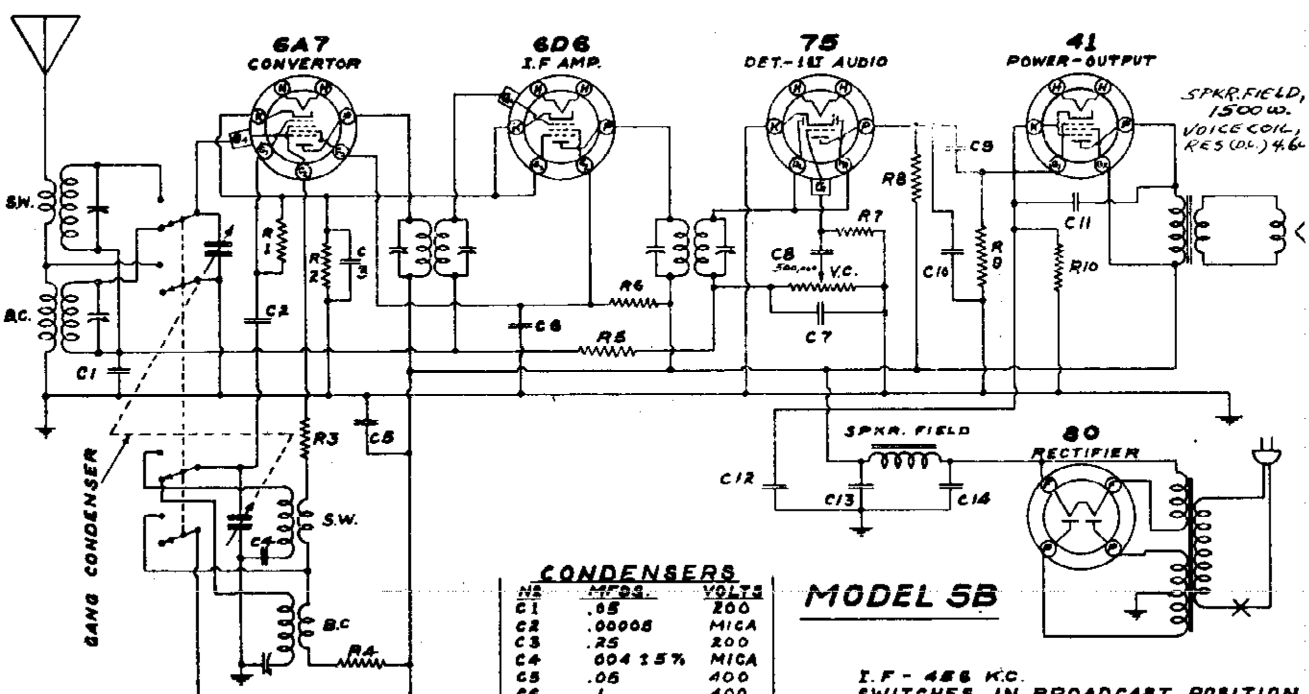
RANGES:-
535-1730 KC
350-135 KC

CONDENSERS		
No.	CAPACITY	TYPE
C1	.002 MFD.	400 V.
C2	.1 "	200 V.
C3	5. μμf.	GIMMIK
C4	.25 Mfd.	200 V.
C5	.1 "	200 V.
C6	.0002 "	600 V.
C7	.01 "	400 V.
C8	.02 "	400 V.
C9	16.0-16.0"	150 V. ELECT.

RESISTORS			
No.	OHMS R.	WATTS	
R1	75,000		VOL. CONT.
R2	250	1/4	
R3	25,000	1/4	
R4	2,000,000	1/4	
R5	500.000	1/4	
R6	110	1/2	WIRE WOUND
R7	500,000	1/4	

C10 .1 Mfd. 400 V.
C11 2.5 μμf. GIMMIK

SCHEMATIC DIAGRAM MODEL 5CU



MODEL 5B

I.F. - 456 K.C.
SWITCHES IN BROADCAST POSITION
V.C. - VOLUME CONTROL

CONDENSERS		
No.	MFDS.	VOLTS
C1	.05	200
C2	.00005	MICA
C3	.25	200
C4	.004 ± 5%	MICA
C5	.05	400
C6	.1	400
C7	.00025	MICA
C8	.01	400
C9	.01	400
C10	.0005	MICA
C11	.005	600
C12	20. ELECT	25
C13	10 ELECT	350
C14	10 ELECT	350

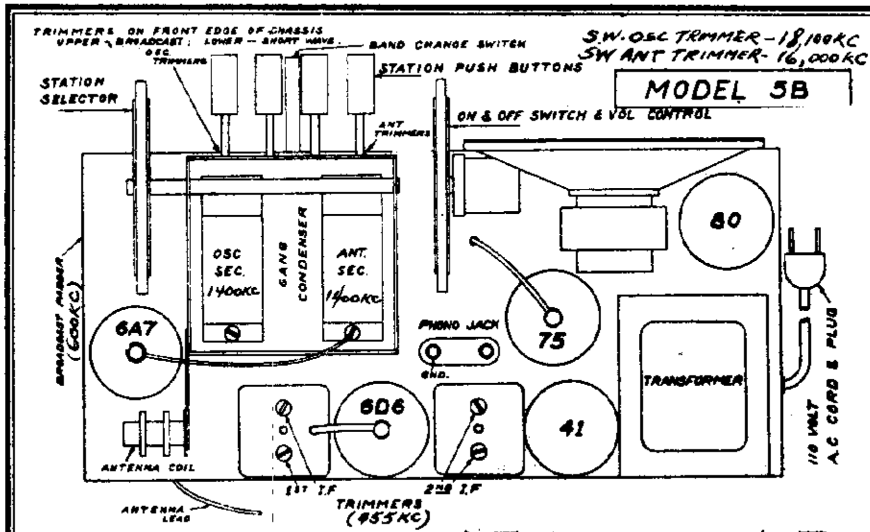
RESISTORS					
No.	OHMS	WATTS	No.	OHMS	WATTS
R1	50,000	1/2	R6	30,000 ± 10%	1/3
R2	170 ± 10%	1/2	R7	5 MEG.	1/3
R3	30	1/2	R8	250,000	1/3
R4	1000	1/3	R9	500,000	1/3
R5	1 MEG.	1/2	R10	750 ± 10%	1/3

535-1730 KILOCYCLES
16.57-52.63 METERS

MODEL 5CU
Socket, Trimmers
Alignment

CONTINENTAL RADIO & TELEV. CO.

MODEL 5B
Socket, Trimmers
Alignment, Tuner
Voltage Phono



PROCEDURE FOR SETTING UP PUSH BUTTONS

MODEL 5B

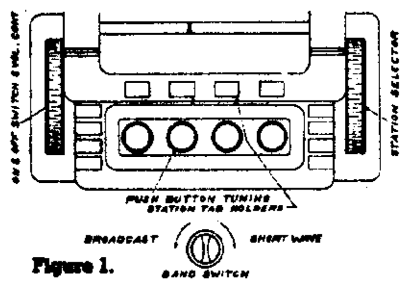


Figure 1.

There are four push buttons by means of which four stations may be selected (see Fig. 1). Make a list of four stations tuned in regularly. Loosen any of the push buttons by turning the push botton proper, counter clockwise a few turns. Holding it in, tune in any one of your favorite stations by means of the station selector. Turn the selector very slowly back and forth until the signal is clearest. Now tighten the push button knob by turning clockwise.

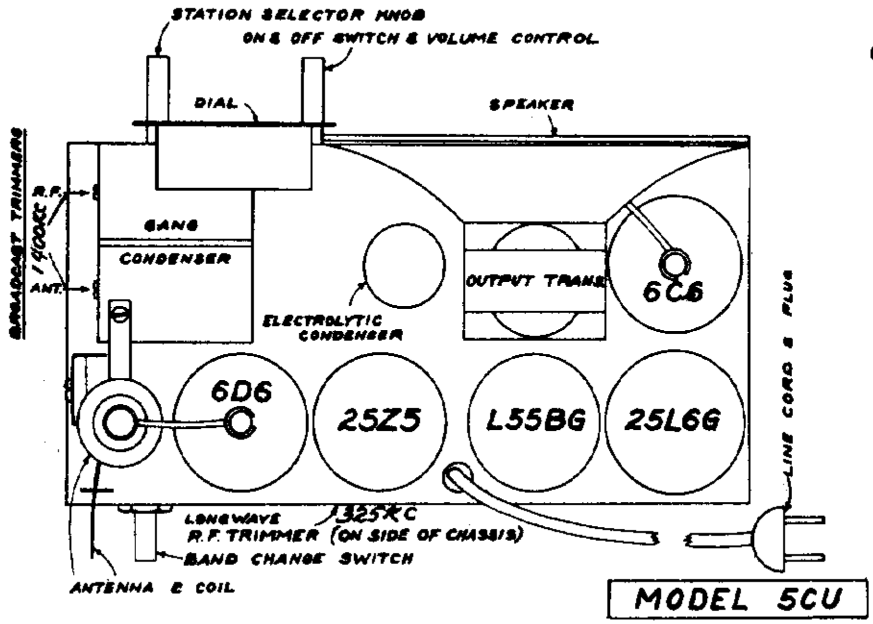
Release the push button and loosen another push button. Holding it in, tune in another favorite station using the station selector. Turn the selector wheel very slowly back and forth until the signal is clearest. Now tighten the push button by turning it clockwise.

Repeat this operation for the remaining two buttons, tightening each button securely as it is set.

If it is desired to change a station, simply loosen the push button and re-set.

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the windows above the push buttons.

The dial is now set up for quick tuning.



PHONOGRAPH CONNECTIONS MODEL 5B This receiver is provided with a phono jack (see chassis layout) and connection may be made from the phonograph to this jack by means of phone tips. It is necessary that the phonograph be equipped with a volume control and a switch to break connection between the phonograph and the set as the radio will not operate properly if a permanent connection is made. When the phonograph is in use the volume control of the set will act to some extent as a tone control. Best results will be obtained with the volume control of the set near maximum and no station tuned in.

MODEL 5B VOLTAGE READINGS—LINE VOLTAGE 115

Volume control minimum, antenna shorted to ground and band switch in broadcast position. Meter 1,000 ohms per volt.

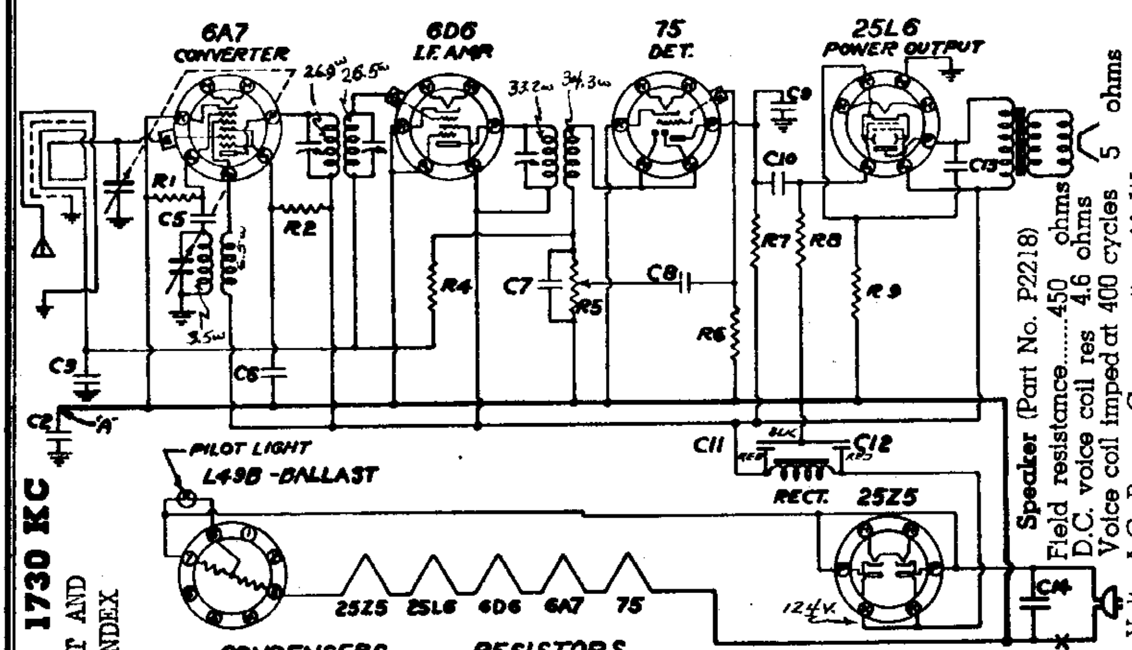
Filament of 80 tube to ground	253 Volts
Screen of 41 tube to ground	196 Volts
Screens of 6A7 and 6D6 tubes to ground	87 Volts
Cathode of 41 tube to ground	13 Volts
Cathode of 6A7 tube to ground	2.75 Volts

MODEL 5L, 5LL
MODEL 5LL Phono.
Schematics

CONTINENTAL RADIO & TELEV. CO.

RANGE 535 - 1730 KC

FOR ALIGNMENT AND LAYOUT SEE INDEX



Speaker (Part No. P2218)
Field resistance......450 ohms
D.C. voice coil res 4.6 ohms
Voice coil imped at 400 cycles 5 ohms

Voltages—Line 115 Volts A.C. Power Consumption 44 Watts.
Volume Control minimum. Antenna shorted to ground. Meter 1,000 ohms per volt.

Cathode of 25Z5 tube to Ground	124	volts
Screen of 25L6 tube to Ground	95	volts
Screen of 6A7 tube to Ground	44	volts
Cathode of 25L6 tube to Ground	5.7	volts

MODELS 5L, 5LL, 5LL-PHONO.

CONDENSERS

Nº	MFD.	VOLTS
C2	.25	200
C3	.02	400
C5	.00005	MICA
C6	.05	400
C7	.00025	MICA
C8	.01	400
C9	.00025	MICA
C10	.01	400
C11	20.	150
C12	20.	150
C13	.005	600
C14	.05	400

RESISTORS

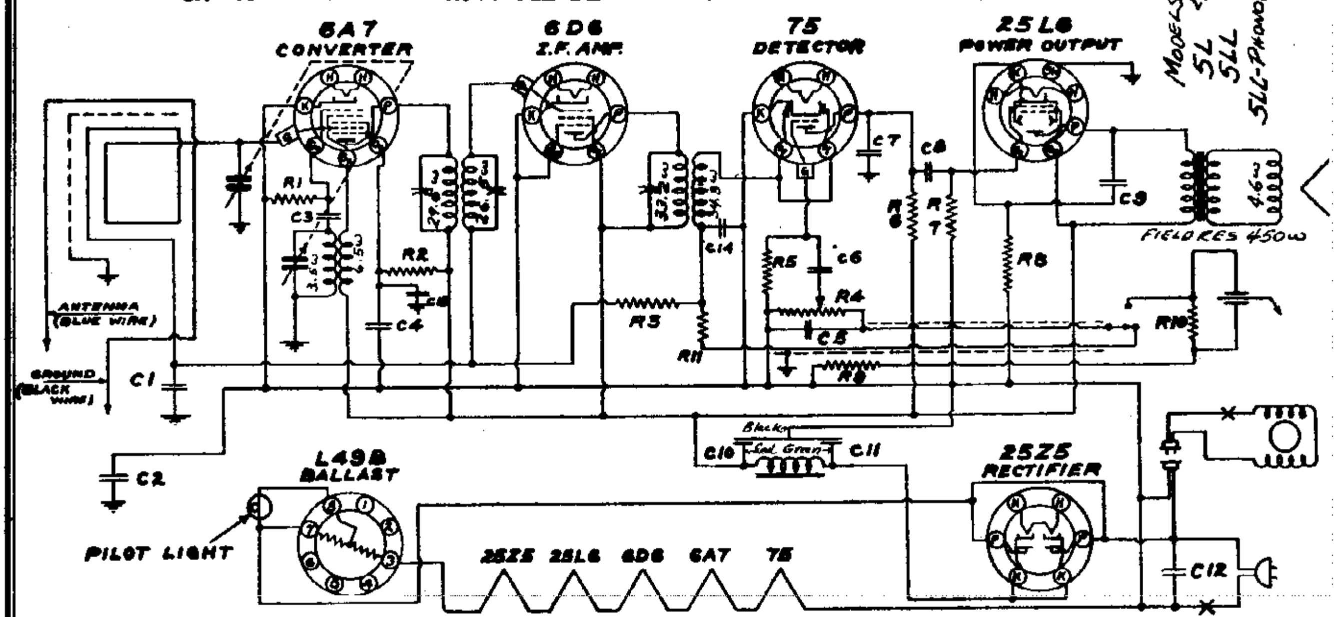
Nº	OHMS	WATTS
R1	50000	½
R2	30000	½
R4	2,000,000	½
R5	500,000	VOL CONT
R6	5000000	½
R7	250,000	½
R8	500000	½
R9	150	½ ± 10%

↓ IND. CHASSIS GND.

SCHEMATIC DIAGRAM
MODEL 5LL
MODEL 5L

IF PEAK 456 KC

NOTE: C2 USED ON MODEL 5LL ONLY.
ON MODEL 5L POINT "A" IS CONNECTED TO CHASSIS



RESISTORS

Nº	OHMS	WATTS
R1	50,000	½
R2	30,000	½
R3	2,000,000	½
R4	500,000	VOL. CONT.
R5	5,000,000	½
R6	250,000	½
R7	500,000	½
R8	150 ± 10%	½
R9	500,000	½
R10	500,000	½
R11	50,000	½

CONDENSERS

Nº	MFDS.	VOLTS
C1	.02	400
C2	.1	200
C3	.00005	MICA
C4	.05	400
C5	.00025	MICA
C6	.01	400
C7	.00025	MICA
C8	.01	400
C9	.005	600
C10	20.	150
C11	20.	150
C12	0.05	400
C13	.05	400
C14	.0001	MICA

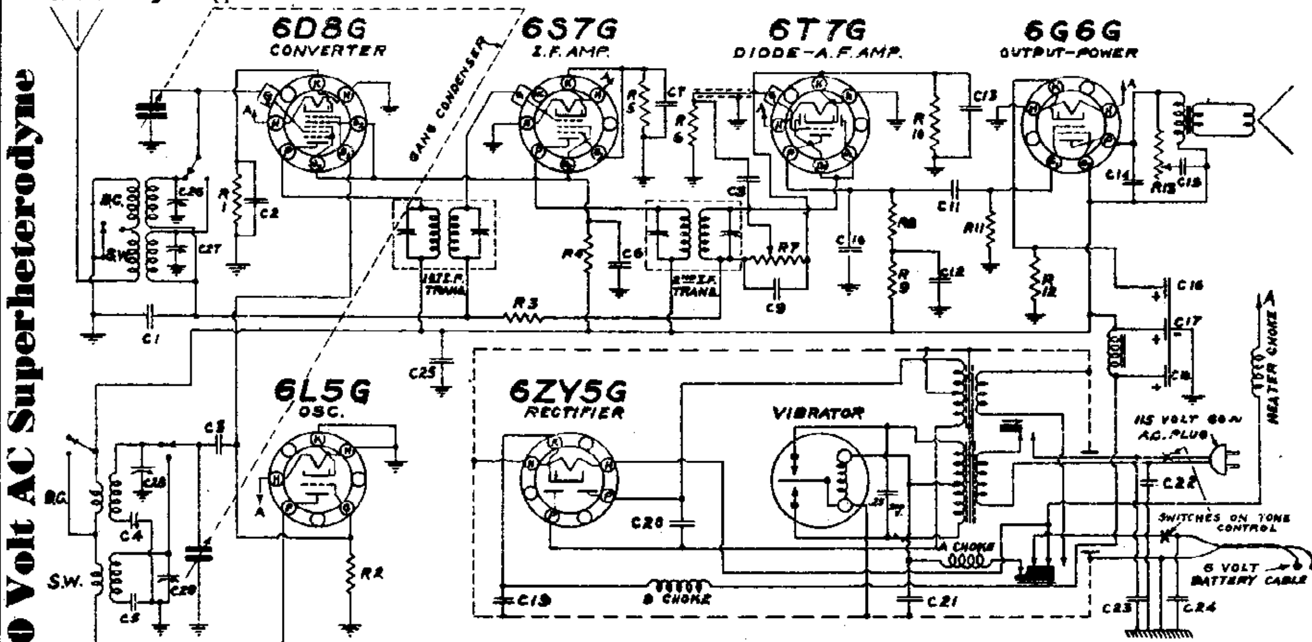
I.F. 465 K.C.
INDICATES CHASSIS GROUND

SCHEMATIC DIAGRAM MODEL 5LL PHONO

MODEL 6A
Schematic, Socket
Trimmers, Alignment

CONTINENTAL RADIO & TELEV. CO.

Six Tube 6 Volt Battery 110-120 Volt AC Superheterodyne



IF PEAK 456 KC

CONDENSERS

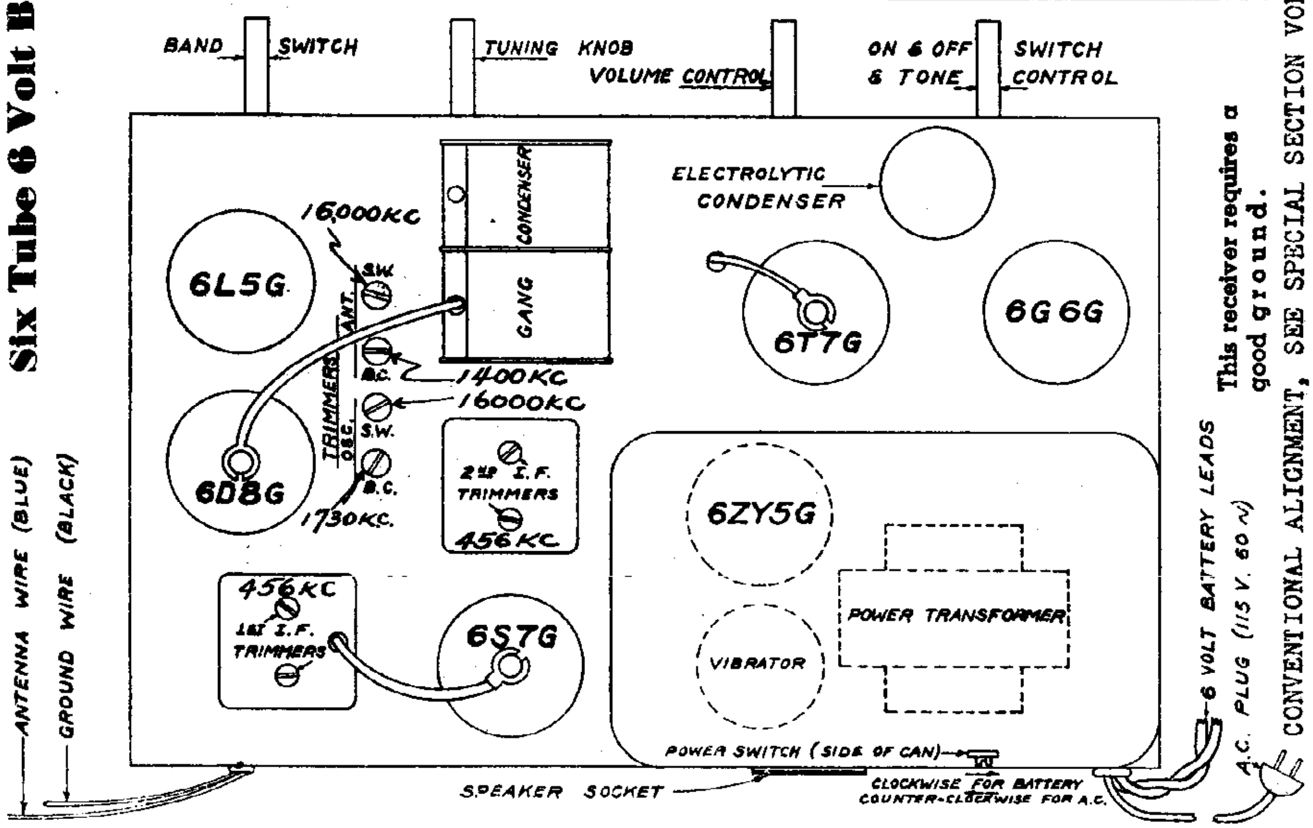
No	Capacity	Type	No	Capacity	Type
1	.05 Mfd.	200 V.	13	.5 Mfd.	200 V.
2	.05 Mfd.	200 V.	14	.005 "	600 V.
3	100 mmf.	MICA	15	.05 "	400 V.
4	300-800 mmf.	"	16	8. "	25 V.
5	4000 mmf.	M. ±5%	17	8. "	200 V.
6	.1 Mfd.	200 V.	18	8. "	200 V.
7	.05 "	200 V.	19	.01 "	600 V.
8	.01 "	400 V.	20	.015 "	1600 V. OIL TYPE
9	250 mmf.	MICA	21	.5 "	10 V.
10	250 "	"	22	.05 "	300 V.
11	.01 Mfd.	400 V.	23	.01 "	600 V.
12	.1 "	200 V.	24	.5 "	10 V.
			25	.1 "	200 V.

RESISTORS

No	Ohms	Watts	Spl. Tol.
1	1500	1/4	± 10%
2	50,000	1/4	
3	1,000,000	1/4	
4	38,000	1/4	
5	1,000	1/4	± 10%
6	1,000,000	1/4	
7	500,000	1/4	(VOL. CONT)
8	500,000	1/4	
9	200,000	1/4	
10	10,000	1/4	± 10%
11	500,000	1/4	
12	450	1/4	± 10%
13	100,000	1/4	(TONE CONT.)

BAND SWITCH IN BROADCAST POSITION.
POWER SWITCH IN BATTERY POSITION.
I.F. — 456 K.C.
C26 TO C29 — 2 TO 20 mmf. TRIMMERS

SCHEMATIC DIAGRAM
MODEL 6A

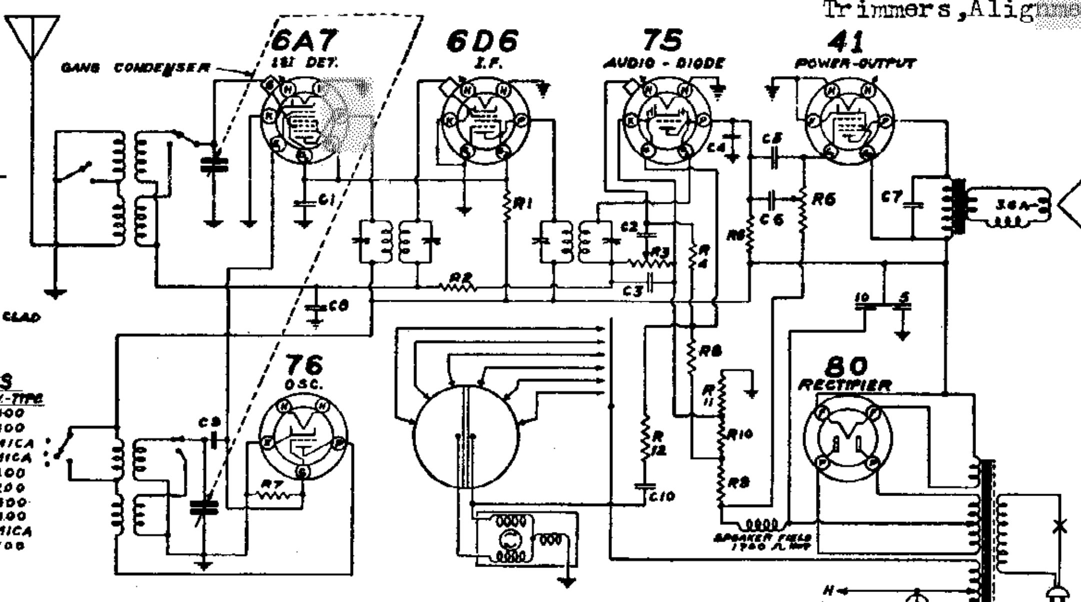


This receiver requires a good ground.

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

CONTINENTAL RADIO & TELEV. CO.

MODEL 6B
Schematic, Socket
Trimmers, Alignment



RESISTORS

NR	OHMS	WATTS
1	10,000	½
2	1 MEG.	¼
3	500,000	V.C.
4	2 MEG.	½
5	200,000	¼
6	500,000	T.C.
7	50,000	¼
8	1 MEG.	¼
9	200	METAL CLAD
10	33	METAL CLAD
11	100	METAL CLAD
12	1 MEG.	¼

CONDENSERS

NR	CAP.-MFD.	WV.-TYPE
1	.05	400
2	.01	400
3	.00025	MICA
4	.00025	MICA
5	.01	400
6	.05	200
7	.005	600
8	.05	400
8	.0001	MICA
10	.002	400

This receiver is designed to operate from a power supply main of 110-120 volt, 60 cycle alternating current AC). **Never plug into a DC outlet.**

GROUND Where ever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the "Black" lead.

ANTENNA Use a standard outside antenna of at least 50 feet including lead-in. Connect the antenna to the "Blue" lead.

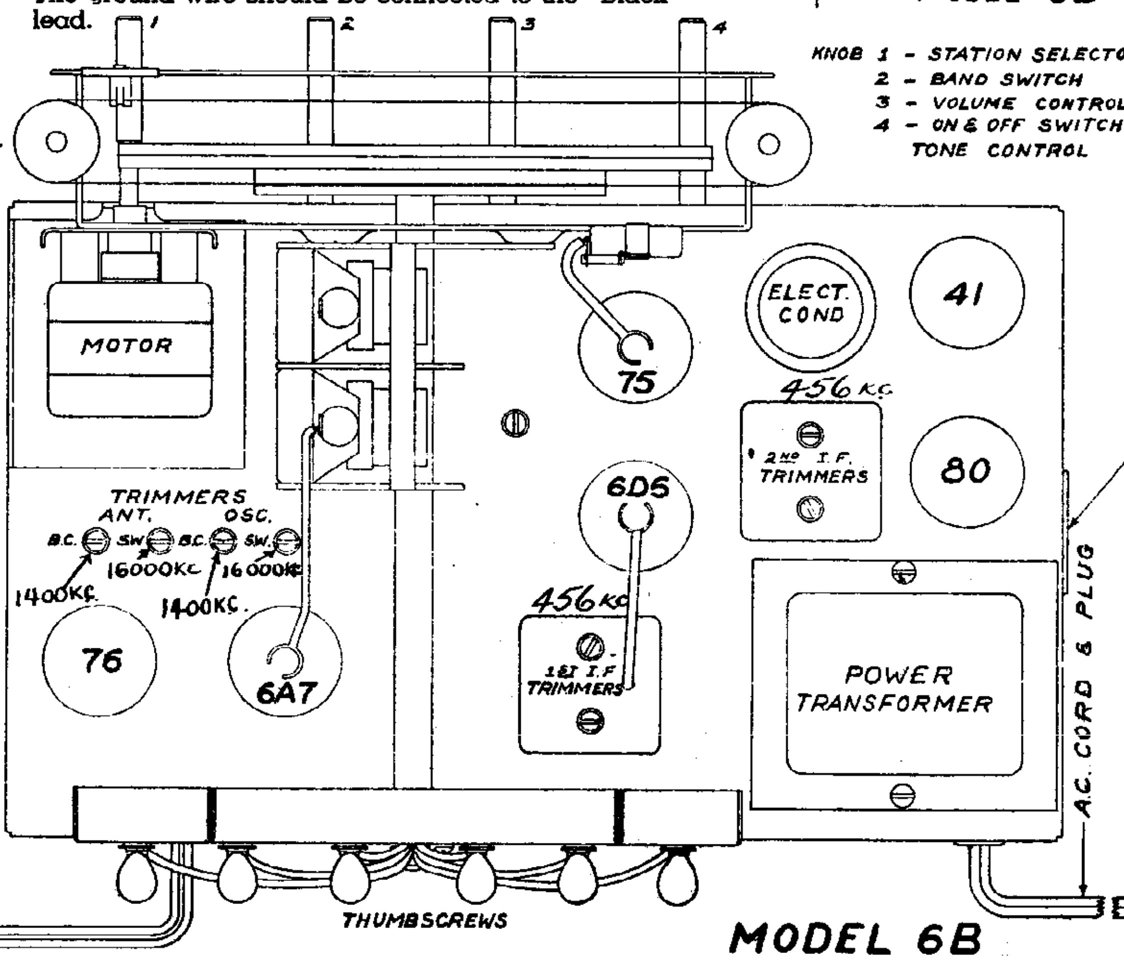
IF PEAK 456 KC

BAND SWITCH IN BROADCAST POSITION
I.F. = 456 K.C.
V.C. = VOLUME CONTROL
T.C. = TONE CONTROL

SCHEMATIC DIAGRAM MODEL 6B

KNOB 1 - STATION SELECTOR
2 - BAND SWITCH
3 - VOLUME CONTROL
4 - ON & OFF SWITCH & TONE CONTROL

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII



ANT. WIRE - BLUE
GND. WIRE - BLACK

SPEAKER SOCKET
A.C. CORD & PLUG

535 to 1730 Kilocycles
5650 to 18,100 Kilocycles

MODEL 6B

MODEL 6B
MODEL 6C
MODEL 6G
Tuner Data

CONTINENTAL RADIO & TELEV. CO.

MODEL 6B

ELECTRIC MOTOR The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch and a silent gear train. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

SETTING UP SELECTOR MECHANISM List six (6) strong local stations which are free from excess fading. The station on your list that comes in nearest the left hand end of the dial should be called station No. 1 and should be set up on button No. 1. (See Figure 1.) Located on the back of the receiver is the thumb screw bracket and six (6) thumb screws whose positioning determines the points at which the pointer will stop when the buttons are being used. Figure 2 shows a detail of the thumb screws numbered for reference to the push buttons.

Located on the rotating selector plate is a fibre dead spot which locates the position at which station selector contacts should be set in order to have the selector plate stop for a certain station. Follow closely the steps listed below:

1. Using the manual selector knob, tune in station No. 1, the station near the left hand end of the dial—the 170 K.C. end. Make certain that the station is properly tuned in.

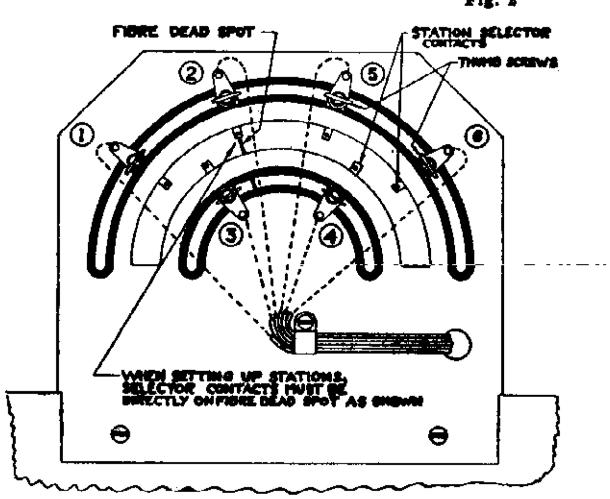
2. From the back of the receiver loosen thumb screw No. 1 (See Figure 2) just enough to allow it to slide freely in the groove.

3. Now adjust the thumb screw until the contact is resting directly on the fibre dead spot.

4. Tighten thumb screw securely, making sure that in tightening you do not move the contact off the fibre dead spot.

5. Check the above operation by pressing button No. 1 and note if there is any pointer movement. If there is no pointer movement, the contact is properly set. If the pointer moves, the contact was not set directly on fibre dead spot. In this case, the station should be re-tuned manually, and procedure No. 3 should be repeated.

Fig. 2



6. Using the same procedure, set up the remaining five stations, in each case using the station of the next highest frequency and the thumb screw having the same number as the corresponding button. Never skip buttons, always set up in numerical order from button 1 to 6 from left to right.

7. After all the stations have been set up, insert the proper station call tabs (found with the instructions) into the recesses of their respective buttons.

8. To receive any of the six stations set up as described above turn receiver "ON" by rotating the left hand knob to the right until the switch clicks. Allow the tubes to heat up, press the buttons designated by the call letter of the station desired and hold the button in until the pointer stops moving and the station comes in. Adjust tone and volume. IMPORTANT: Be sure the band switch is in the position for Standard Broadcast Reception.

AUTOMATIC PUSH BUTTONS

MODELS 6C and 6G

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these push buttons. Fig. 1 also shows the tuning range or frequencies covered by each button.

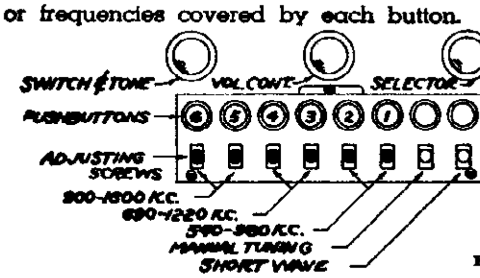


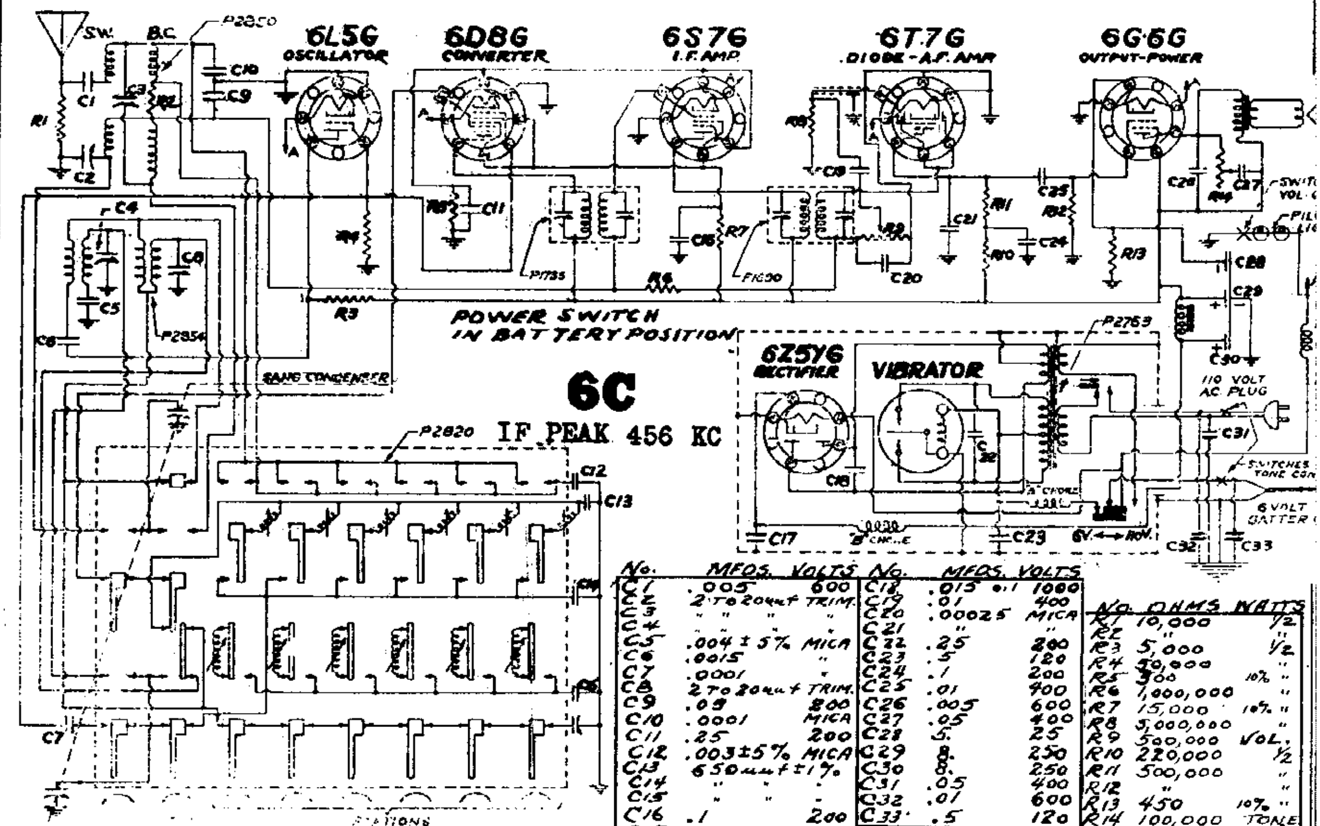
Fig. 1

The remaining two (2) push buttons located at the extreme right hand end of the push button plate are for short wave and manual tuning. See Fig. 1. Short wave tuning is accomplished by pressing "short wave" button and tuning with the selector knob. By pressing "manual tuning" button, the automatic disconnects and the selector knob becomes active for the broadcast band.

1. Choose a station havng a frequency within the range of button No. 1 (540 to 980 kc).
2. Press "Manual Tuning" button and tune this station conventionally by using the selector knob.
3. Now press button No. 1 and turn adjusting screw in either direction until the previously selected station is heard. Adjust the screw until the station is received with maximum volume.
4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw.
5. Repeat the above procedure for the remaining five (5) stations.

MODEL 6C

CONTINENTAL RADIO & TELEV. CO. Schematic, Socket Trimmers, Alignment



No.	MFDS.	VOLTS
C1	.005	600
C2	2 TO 20 μμf	TRIM.
C3	" "	"
C4	" "	"
C5	.004 ± 5%	MICA
C6	.0015	"
C7	.0001	"
C8	2 TO 20 μμf	TRIM.
C9	.05	200
C10	.0001	MICA
C11	.25	200
C12	.003±5%	MICA
C13	650 μμf ±1%	
C14	" "	"
C15	" "	"
C16	.1	200
C17	.01	600

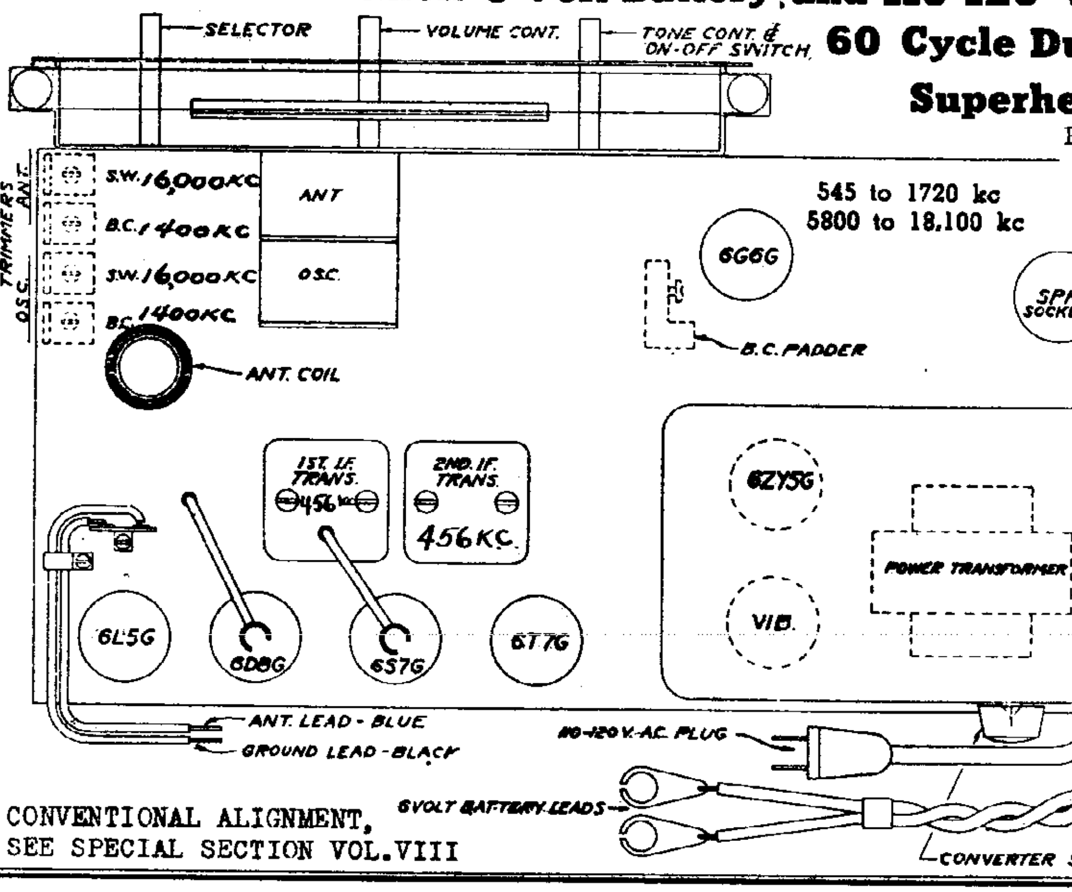
No.	MFDS.	VOLTS
C18	.015 ±.1	1000
C19	.01	400
C20	.00025	MICA
C21	"	"
C22	.25	200
C23	.5	120
C24	.1	200
C25	.01	400
C26	.005	600
C27	.05	400
C28	5.	25
C29	8.	250
C30	8.	250
C31	.05	400
C32	.01	600
C33	.5	120

No.	OHMS		WATTS
R1	10,000		½
R2	"		"
R3	5,000		½
R4	50,000		"
R5	300	10%	"
R6	1,000,000		"
R7	15,000	10%	"
R8	5,000,000		"
R9	500,000	VOL.	
R10	220,000		½
R11	500,000		"
R12	"		"
R13	450	10%	"
R14	100,000	TONE	

Six Tube Combination 6 Volt Battery, and 110-120 Volt AC 60 Cycle Dual Wave Superheterodyne

FOR TUNER DATA SEE INDEX

545 to 1720 kc
5800 to 18,100 kc



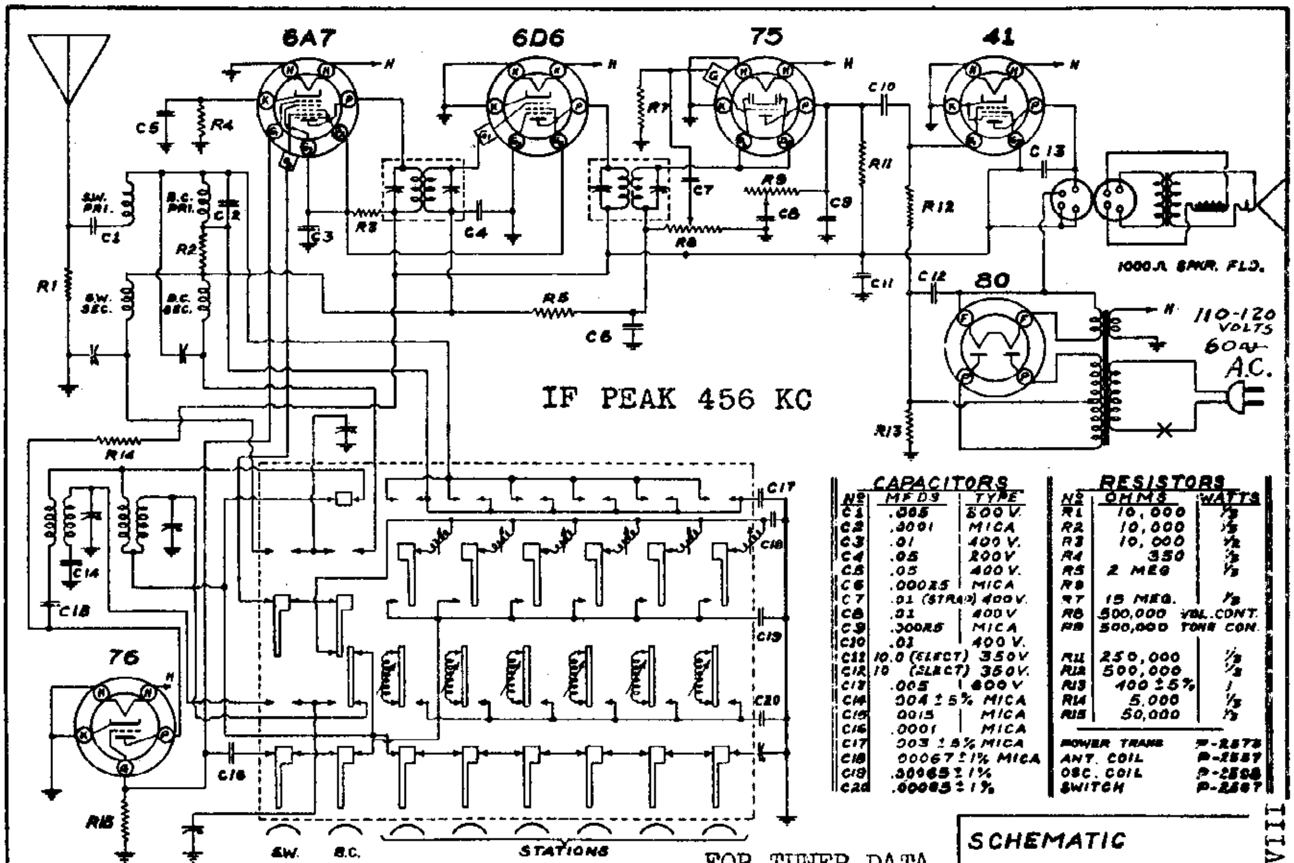
POWER SUPPLY
Never plug into a D.C. outlet. In order to adapt the receiver to either type of current (6 volt or 110-120 volt—A.C.) simply insert a screw driver into the slot in the hole located on the back of the can, which is mounted on the chassis, and turn to the left or counterclockwise for 110-120 volt A.C. 60 cycle current; turn to the right or clockwise for 6 volt battery operation.

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL.VIII

MODEL 6G
Schematic, Socket
Trimmers, Alignment

CONTINENTAL RADIO & TELEV. CO.

This receiver is designed to operate over two tuning ranges: the broadcast range which extends from 545 to 1720 kc (174.4 to 550.4 meters) and the international short wave band which extends from 5800 to 18,100 kc (16.5 to 51.7 meters). This latter range is the one which includes the 5 internationally assigned bands—the 16, 19, 25, 31 and 49 meter bands.



CAPACITORS

Nº	MFDS	TYPE
C1	.005	600 V.
C2	.0001	MICA
C3	.01	400 V.
C4	.05	200 V
C5	.05	400 V.
C6	.00025	MICA
C7	.01 (STRAP)	400 V.
C8	.01	400 V
C9	.00025	MICA
C10	.01	400 V.
C11	10.0 (ELECT)	350 V
C12	10 (ELECT)	350 V.
C13	.005	600 V
C14	.004 ± 5%	MICA
C15	.0015	MICA
C16	.0001	MICA
C17	.003 ± 5%	MICA
C18	.00067 ± 1%	MICA
C19	.00065 ± 1%	
C20	.00065 ± 1%	

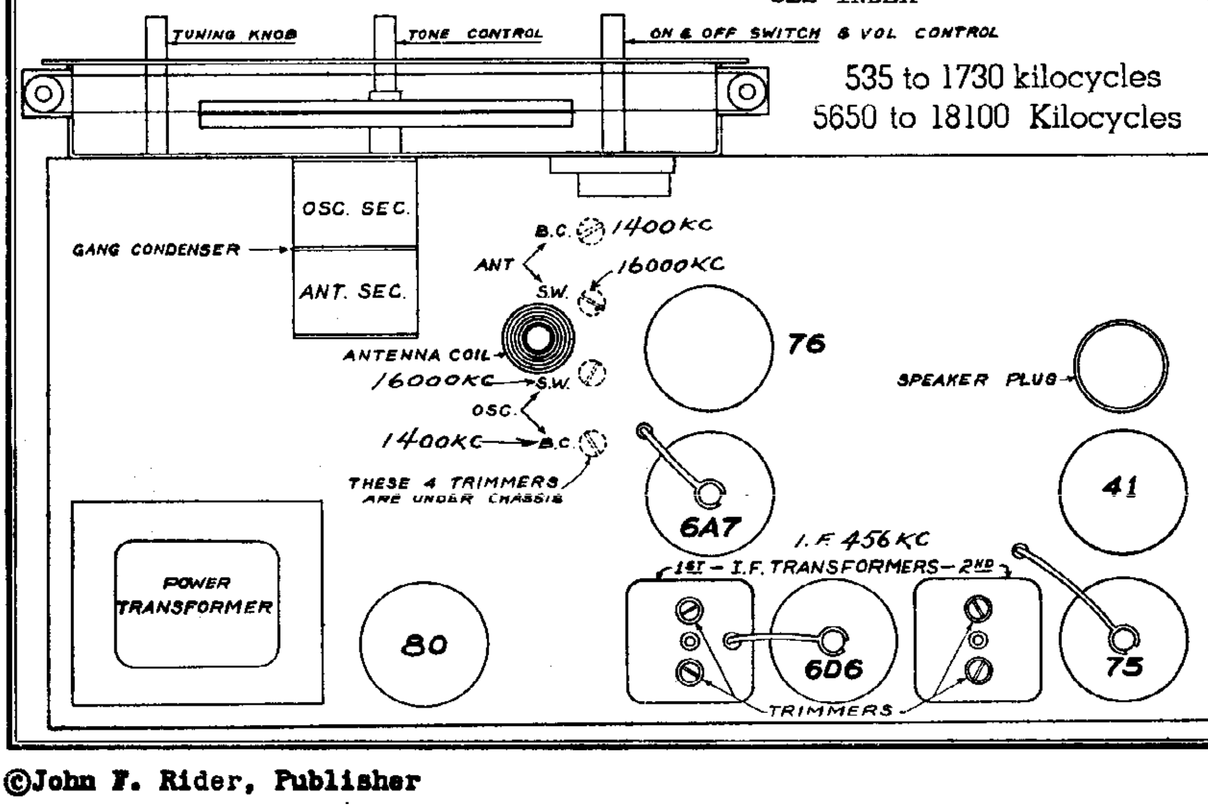
RESISTORS

Nº	OHMS	WATTS
R1	10,000	1/3
R2	10,000	1/3
R3	10,000	1/2
R4	350	1/3
R5	2 MEG	1/3
R6		
R7	15 MEG.	1/3
R8	500,000	VOL. CONT.
R9	500,000	TONE CON.
R11	250,000	1/3
R12	500,000	1/3
R13	400 ± 5%	1
R14	5,000	1/3
R15	50,000	1/3

POWER TRANS	P-2575
ANT. COIL	P-2557
OSC. COIL	P-2558
SWITCH	P-2567

SCHEMATIC
Model 6G

FOR TUNER DATA SEE INDEX



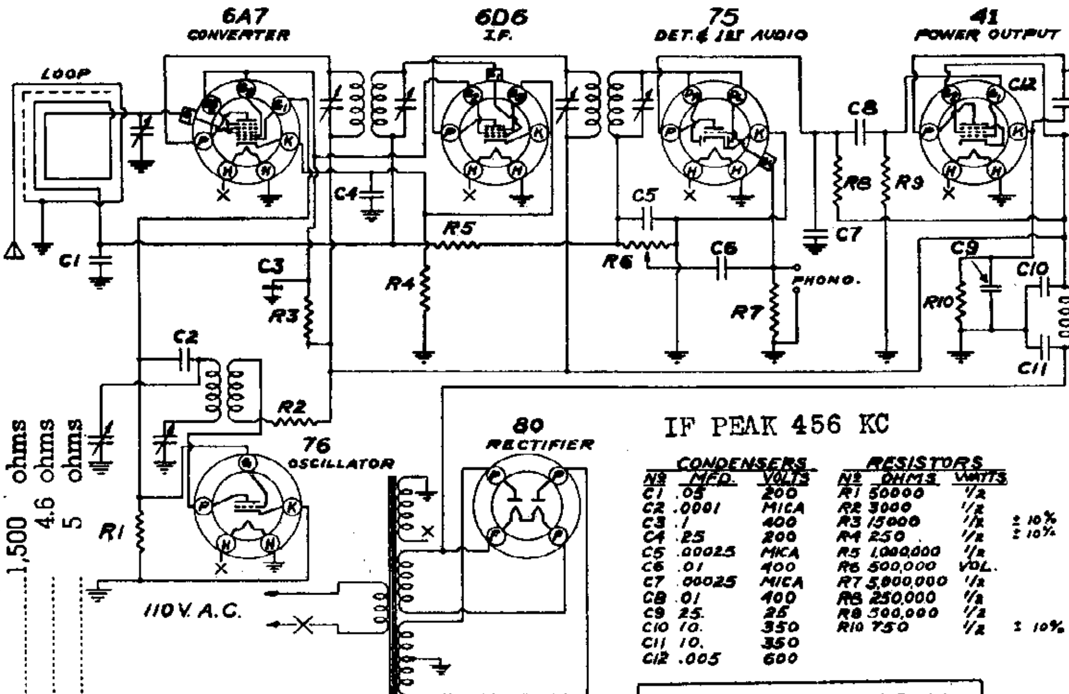
Six Tube AC Automatic Tuning

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

MODEL 6K
Schematic, Socket
Trimmers, Voltage
Alignment

CONTINENTAL RADIO & TELEV. CO.

6 TUBE AC SUPERHETERODYNE BROADCAST BAND

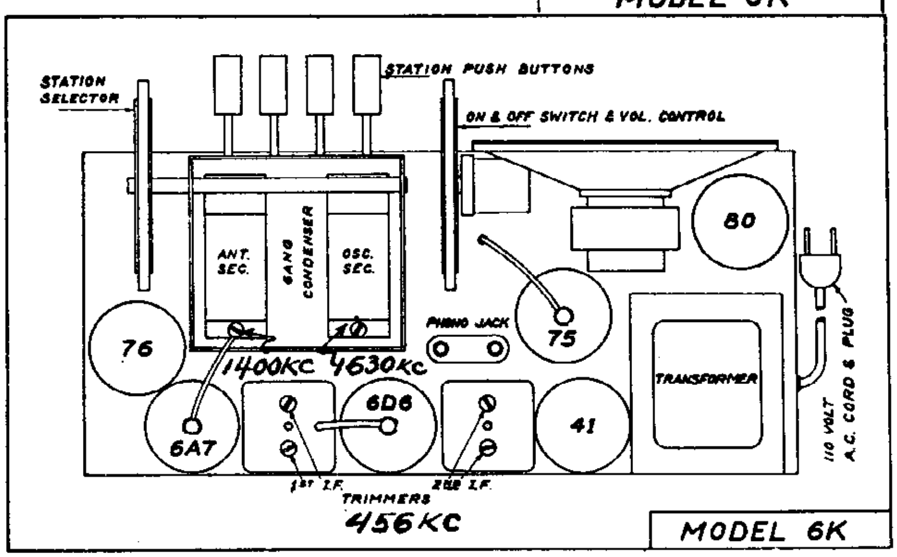


IF PEAK 456 KC

CONDENSERS No.	MFD.	VOLTS
C1	.05	200
C2	.0001	MICA
C3	.1	400
C4	.25	200
C5	.00025	MICA
C6	.01	400
C7	.00025	MICA
C8	.01	400
C9	25.	25
C10	10.	350
C11	10.	350
C12	.005	600

RESISTORS No.	OHMS	WATTS	
R1	50000	1/2	
R2	3000	1/2	
R3	15000	1/2	± 10%
R4	250	1/2	± 10%
R5	1,000,000	1/2	
R6	500,000	VOL.	
R7	5,000,000	1/2	
R8	250,000	1/2	
R9	500,000	1/2	
R10	750	1/2	± 10%

SCHEMATIC DIAGRAM
MODEL 6K



MODEL 6K

Speaker (Part No. P3087)
Field resistance........................1,500 ohms
DC voice coil resistance.....................4.6 ohms
Voice coil impedance at 400 cycles..............5 ohms

Voltages—Line 115 Volts AC. Volume control minimum. Antenna shorted to ground. Meter 1,000 ohms per volt.

Filament of 80 tube to ground........................250 volts
Screen of 41 tube to ground........................187 volts
Screens of 6A7 and 6D6 tubes to ground..............84 volts
Cathode of 41 tube to ground........................13.2 volts
Cathode of 6A7 tube to ground........................3.1 volts

6K PARTS LIST

PAPER CONDENSERS

P148 .05 mfd. 200 volt
P141 .25 mfd. 200 volt
P276 .10 mfd. 400 volt
P1322 .005 mfd. 600 volt
P164 .01 mfd. 400 volt
P1313 .01 mfd. 400 volt with strap

RESISTORS

P137A 500,000 ohm ½ watt
P2344 250,000 ohm ½ watt
P162A 1,000,000 ohm ½ watt
P1729 750 ohm ½ watt 10%
P2578 15,000 ohm ½ watt 10%
P1942 250 ohm ½ watt 10%
P1952 50,000 ohm ½ watt
P2735 5,000,000 ohm ½ watt
P481 3,000 ohm ½ watt

MICA CONDENSERS

P817 .00025 mfd.
P480 .0001 mfd.

ELECTROLYTIC CONDENSERS

P3086 {10 mfd. 350 w. v.
10 mfd. 350 w. v.
20 mfd. 25 w. v.}

ADJUSTABLE CONDENSERS

P3072 Gang Condenser and Tuner
P2560 Padding Condenser

TRANSFORMERS AND COILS

P3083 1st I.F. Transformer
P2606 2nd I.F. Transformer
P3084 Oscillator Coil

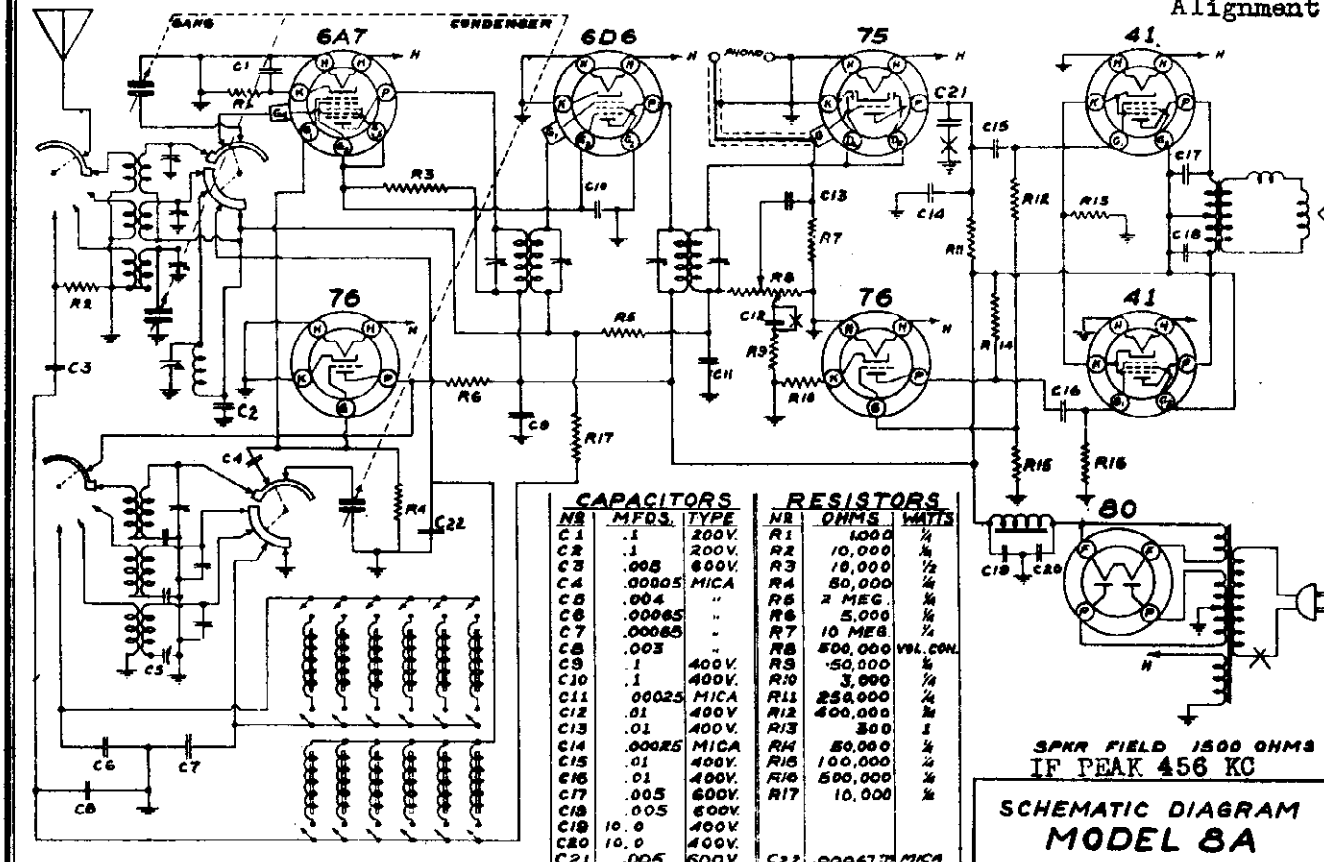
MISCELLANEOUS

P3082 Volume Control and Switch
P3074 4 Prong Socket
P3075 5 Prong Socket
P3076 6 Prong Socket
P3077 7 Prong Socket
P533 Tube Shield Base
P530 Tube Shield
P531 Tube Shield Cap
P1504 Pilot Light Bulb
P3085 Pilot Light, Socket and Bracket
G5891 Antenna Loop Assembly
G5892 Static Shield Assembly
P929 Line Cord
P3087 6" Dynamic Speaker and Output Transformer
P3139 Pressed Paper Back
P3096 Call Letter Sheet
P2965 Pointer
P3068 Dial Scale—Order by Name and Model Number
P3073 Push Button
P2867 Bakelite Thumb Wheels

MODEL 8A
Schematic, Alignment

CONTINENTAL RADIO & TELEV. CO.

MODEL 8AU
MODEL 11A
Alignment



CAPACITORS NO	MFDS.	TYPE
C1	.1	200V.
C2	.1	200V.
C3	.005	600V.
C4	.00005	MICA
C5	.004	"
C6	.00065	"
C7	.00065	"
C8	.003	"
C9	.1	400V.
C10	.1	400V.
C11	00025	MICA
C12	.01	400V
C13	.01	400V.
C14	.00025	MICA
C15	.01	400V.
C16	.01	400V.
C17	.005	600V.
C18	.005	600V.
C19	10.0	400V.
C20	10.0	400V.
C21	.005	600V.

RESISTORS NO	OHMS	WATTS
R1	1,000	1/4
R2	10,000	1/4
R3	10,000	1/2
R4	50,000	1/4
R5	2 MEG.	1/4
R6	5,000	1/4
R7	10 MEG.	1/4
R8	500,000	VOL. CON.
R9	50,000	1/4
R10	3,000	1/4
R11	250,000	1/4
R12	400,000	1/4
R13	300	1
R14	50,000	1/4
R15	100,000	1/4
R16	500,000	1/4
R17	10,000	1/4
C22	.00067	MICA

IF PEAK 456 KC

SCHEMATIC DIAGRAM
MODEL 8A

POWER SUPPLY This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycles alternating current (AC). Never plug into a DC outlet.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure, after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground if the test oscillator is not grounded to one side of the power line. In case one side is connected to ground, connect a large condenser from ground on the test oscillator to ground of the chassis. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through at .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and the oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

CONTINENTAL RADIO & TELEV. CO.

MODEL 8A
MODEL 8AU
Parts Socket
Trimmers, Tuner,

8A Eight Tube AC Automatic Tuning 8AU

This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 535 to 1730 K.C. (173 to 560 meters), police and aviation band which extends from 1700 to 5600 K.C. (53 to 176 meters) and the international short wave band which extends from 5600 to 18,100 K.C. (16.5 to 53 meters). This latter range is the one which includes the five internationally assigned bands — the 16, 19, 25, 31, and 49 meter bands.

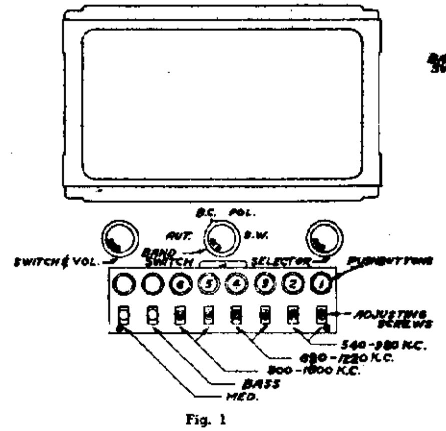


Fig. 1

PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these.

Fig. 1 also shows the tuning range or frequencies covered by each button.

The remaining two (2) push buttons, located at the extreme left hand end of the push button plate are for tone control.

1. Choose a station having a frequency within the range of button No. 1 (540 K.C. to 930 K.C.)

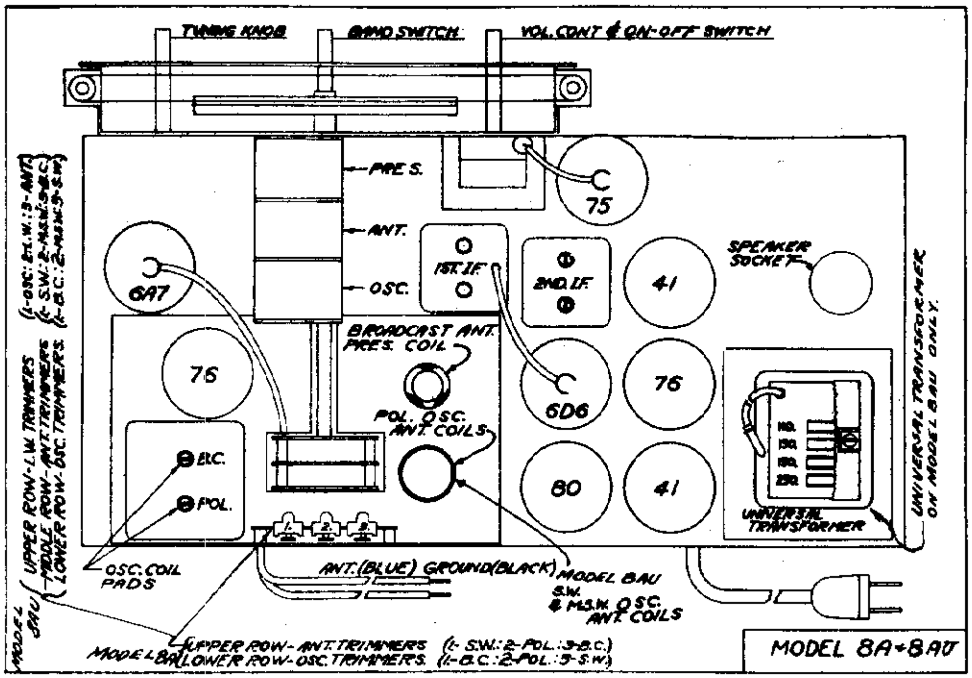
2. With the middle knob in the "broadcast" position, tune this station conventionally by using the selector knob.

3. Now turn the middle knob to the "automatic" position and press button No. 1 and turn the adjusting screw in either direction until the previously selected station is heard. Adjust the screw for maximum volume and sensitivity.

4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw. Insert "Med" and "Bass" tabs in windows as shown in Fig. 1.

5. Repeat the above procedure for the remaining five (5) stations.

NOTE: It is advisable to retain the call letter sheet in case of station change later on.



REPLACEMENT PARTS LIST
MODEL 8A

RESISTORS—CARBON

P417	50,000 Ohm ¼ Watt
P167	10,000 Ohm ¼ Watt
P139	250,000 Ohm ¼ Watt
P297	15,000 Ohm ⅓ Watt
P481	3,000 Ohm ¼ Watt
P2684	400,000 Ohm ¼ Watt 10%
P137	500,000 Ohm ¼ Watt
P2685	300 Ohm 1 Watt 10%
P278	1,000 Ohm ¼ Watt 20%
P2664	10,000,000 Ohm ¼ Watt
P2685	100,000 Ohm ¼ Watt 10%

CONDENSERS—PAPER

P164	.01 Mfd. 400 Volt
P1322	.005 Mfd. 600 Volt
P276	.16 Mfd. 400 Volt
P334	.05 Mfd. 400 Volt
P1313	.01 Mfd. 400 Volt with Strap
P142	.10 Mfd. 200 Volt

MICA CONDENSERS

P817	.00025 Mfd.
P1683	.004 Mfd.
P1382	.00005 Mfd.
P338	.0005
P480	.0001 Mfd.
P336	.0005 Mfd.

ELECTROLYTIC CONDENSERS

P2631	Dual 10 Mfd., 400 W.V.

ADJUSTABLE CONDENSERS

P2623	Gang Condenser
P2656	Trimmer Strip
P2657	Trimmer Strip

TRANSFORMERS AND COILS

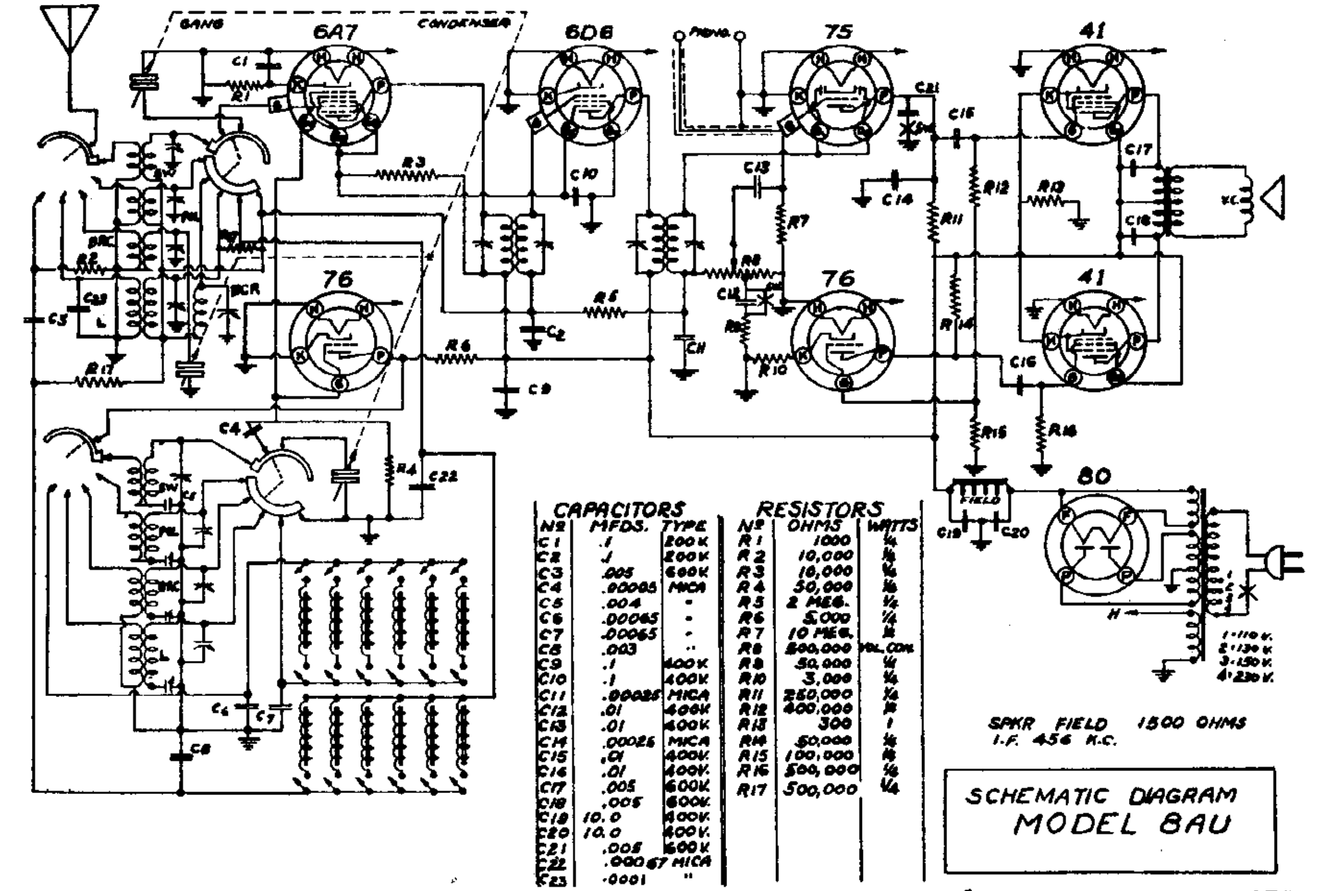
P2629	Power Transformer
P2630	230 Volt Power Transformer
P2633	1st I.F. Transformer Coil
P1756	2nd I.F. Transformer Coil
P1751	Broadcast Antenna Coil
G5310	Police and Short Wave Antenna Coil
G5307	Oscillator Coil, Trimmer and Shield Assembly

MISCELLANEOUS

P492	80 Tube Socket
P1277	41 Tube Socket
P537	76 Tube Socket
P536	6D6 Tube Socket
P506	6A7 Tube Socket
P521	75 Tube Socket
P945	Speaker Socket
P2637	8" Dynamic Speaker (Mantel)
P2638	10" Dynamic Speaker (Console and Phono.)
P2659	Volume Control and Switch
P929	A.C. Line Cord and Plug
P1455	Tube Shield
P1456	Tube Shield Base
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P2636	Band Switch
P697	Phono. Socket
P2632	Dial Scale (Specify Name)
P2585	Walnut Push Buttons
P2586	Ivory Push Buttons
G5762	Permeability Tuner Assembly
P2533	Automatic Record Changer

MODEL 8AU
Schematic,
Alignment

CONTINENTAL RADIO & TELEV. CO.



CAPACITORS Nº	MFDS.	TYPE
C1	.1	200 V.
C2	.1	200 V.
C3	.005	600 V.
C4	.00005	MICA
C5	.004	"
C6	.00065	"
C7	.00065	"
C8	.003	"
C9	.1	400 V.
C10	.1	400 V.
C11	.00025	MICA
C12	.01	400 V.
C13	.01	400 V.
C14	.00025	MICA
C15	.01	400 V.
C16	.01	400 V.
C17	.005	600 V.
C18	.005	600 V.
C19	10.0	400 V.
C20	10.0	400 V.
C21	.005	600 V.
C22	.00067	MICA
C23	.0001	"

RESISTORS Nº	OHMS	WATTS
R1	1000	¼
R2	10,000	½
R3	10,000	¼
R4	50,000	½
R5	2 MEG.	¼
R6	5,000	¼
R7	10 MEG.	½
R8	500,000	VOL. CON.
R9	50,000	¼
R10	3,000	¼
R11	250,000	¼
R12	400,000	½
R13	300	1
R14	50,000	½
R15	100,000	½
R16	500,000	½
R17	500,000	¼

This receiver is designed to operate over four tuning ranges; **long wave** 150 to 350 K.C. (2000 to 857 meters); **broadcast** 535 to 1730 K.C. (173 to 561 meters); **medium short wave band** 2350 to 7100 K.C. (127.6 to 42 meters); **international short wave** 7000 to 22,000 K.C. (13.6 to 42.8 meters), which includes five—5 internationally assigned bands—16, 19, 25, 31 and 49 meter bands.

PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS See Model 8A.

ALIGNMENT

Align I F and Broadcast Bands using the procedure for Model 8A. Using this procedure align Med. S.W. and S.W. Band likewise, using the following frequencies; Med. S.W., 7000 KC Osc. Trimmer, 6000Kc Ant. Trimmer, 2500 Kc "pad". S.W., 22000 KC S.W. Osc Trimmer, 18000 KC S.W. Ant Trimmer, 8000 KC "pad". Align L.W. Band as below;

LONG WAVE BAND ALIGNMENT The long wave band is adjusted by connecting the output of the signal generator through a .0002 Mfd. mica condenser to the blue antenna lead. Then set the gang to minimum and the generator to 360 KC and adjust the long wave oscillator trimmer to receive this signal. Then set the generator to 325 KC and adjust the long wave antenna trimmer to give maximum output. Next set generator to 160 KC and pad the circuits to maximum output. Owing to the nature of the long wave band, the trimmer and padding condensers react upon each other to quite a degree; consequently, several re-adjustments at the trimming and padding positions are required before the circuits are adjusted properly.

For parts not listed below see Parts List Model 8A.

PARTS LIST MODEL 8AU

P2727 6" Dynamic Speaker (Mantel)

TRANSFORMERS AND COILS

P2663 Universal Transformer

MISCELLANEOUS

P2661 Band Switch
P2660 Dial Scale
G5775 Medium Short Wave and Short Wave Antenna Coil
G5774 Oscillator Coil, Trimmer and Shield Assembly
G5777 Long Wave Antenna Coil Assembly

RESISTORS—CARBON

P1114 2,000,000 Ohm ¼ Watt
P2735 5,000,000 Ohm ¼ Watt

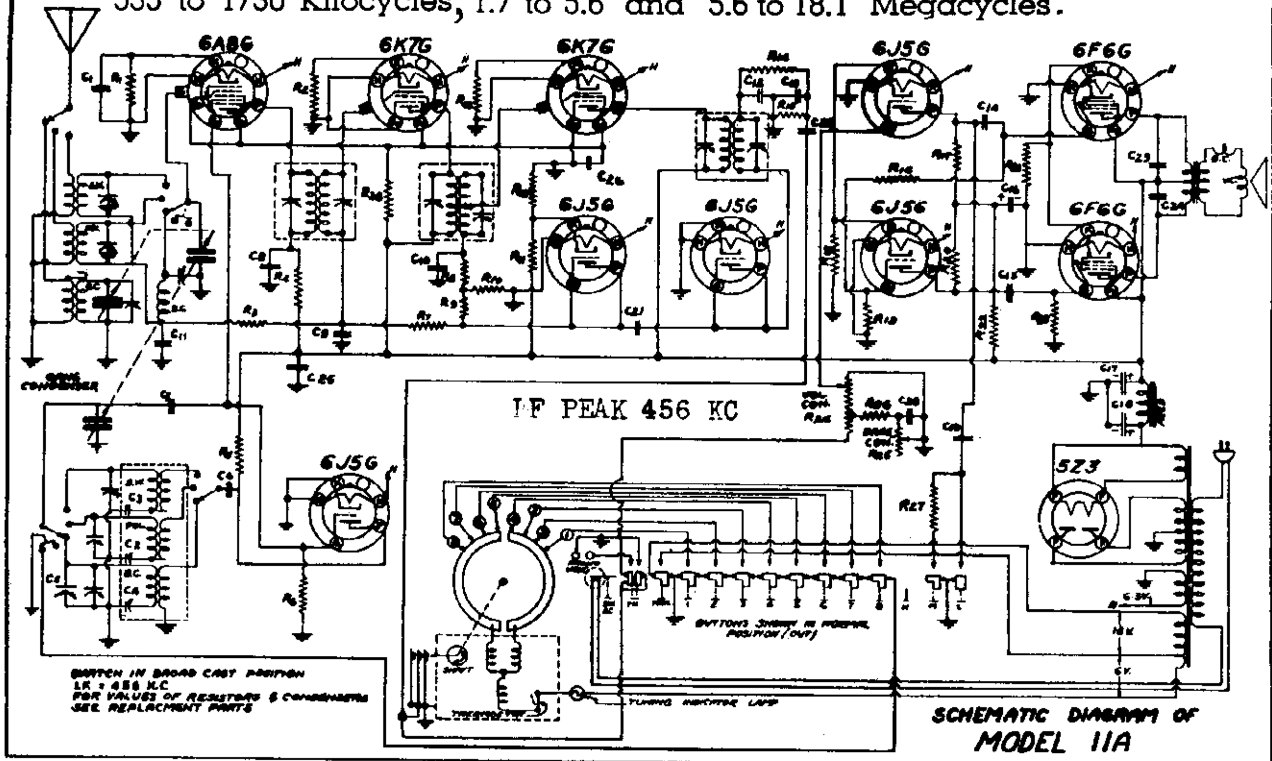
MICA CONDENSERS

2701 .005 5%
2702 .0018 3%

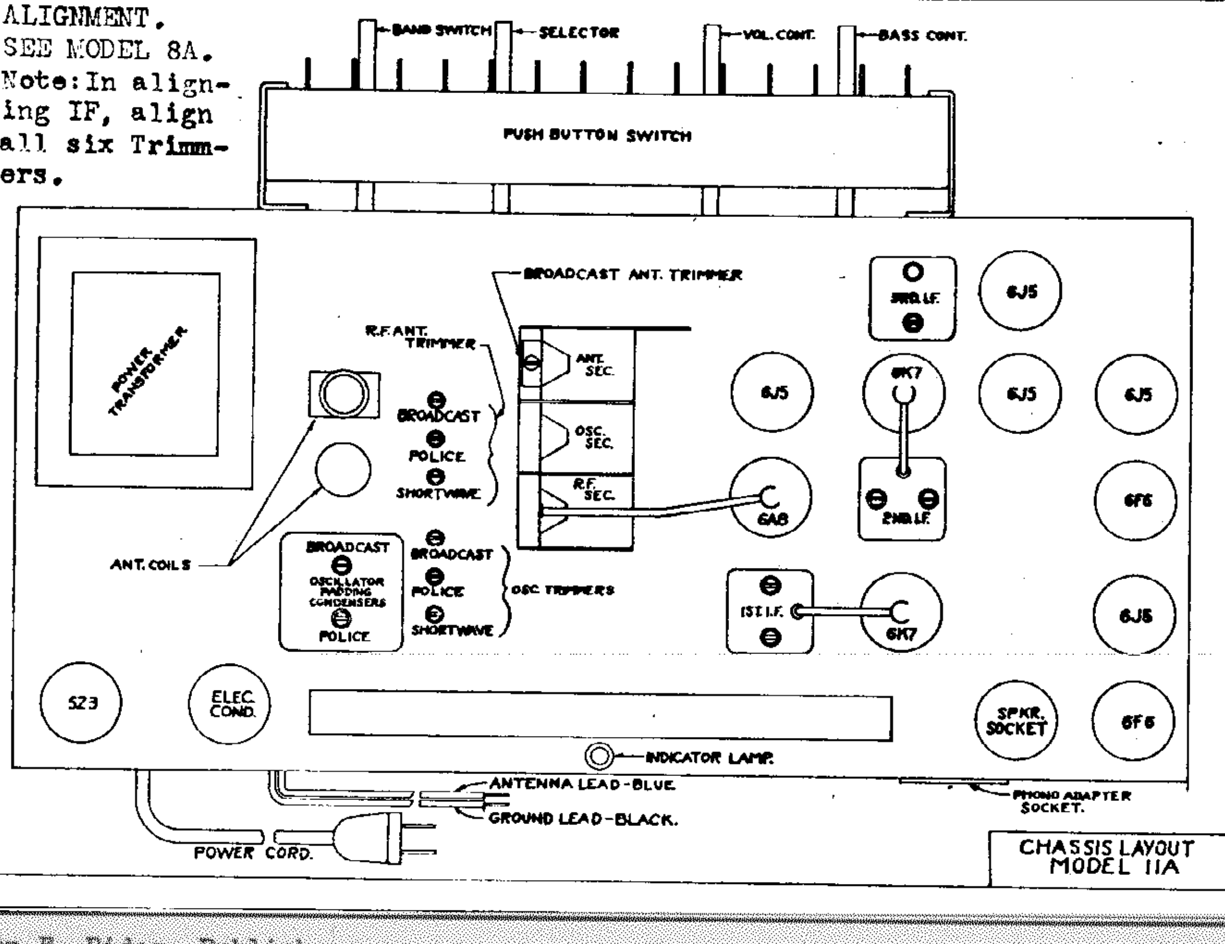
MODEL 11A
Schematic, Socket
Trimmers
Alignment

CONTINENTAL RADIO & TELEV. CO.

This receiver is designed to operate over three tuning ranges; 535 to 1730 Kilocycles, 1.7 to 5.6 and 5.6 to 18.1 Megacycles.



ALIGNMENT.
SEE MODEL 8A.
Note: In aligning IF, align all six Trimmers.



CHASSIS LAYOUT
MODEL 11A

MODEL 11A
MODEL 16S
Tuner Data
Parts

CONTINENTAL RADIO & TELEV. CO.

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner.
The electric tuner is made up of three integral units:

PUSH BUTTON SWITCH: The push button switch consists of eight (8) brown push buttons flanked on either side by three (3) white push buttons.

SELECTOR MECHANISM: The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

ELECTRIC MOTOR: The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

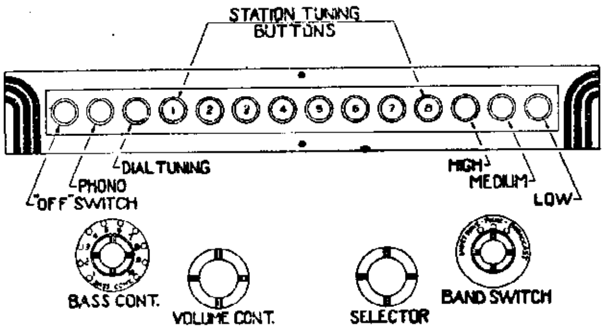


Fig. 1

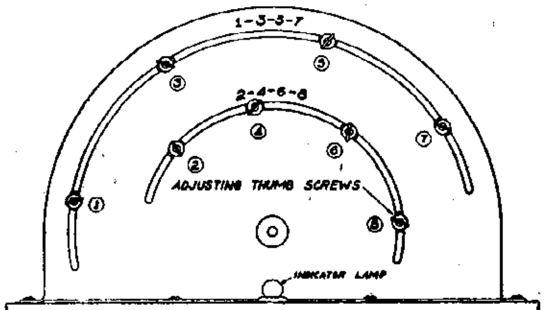


Fig. 2

SETTING UP STATIONS The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the dial tuning button; tune in the station of the **lowest frequency**, using the station selector knob. Now hold the dial tuning button in and press in button number one (1). (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call disc and insert into the recess of button number one. Push one of the clear celluloid discs into the recess also, over the station call disc. Now release button number one by pressing the dial tuning button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call disc and celluloid disc into the window of button number two.

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button, insert the word "OFF" found in the call letter sheet.

NOTE: In the recesses of the white push buttons insert the words found in the call letter sheet as shown in Figure 1.

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the dial tuning button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above.

To change from electric tuning to manual selecting, simply press in the dial tuning button. When the dial tuning button is in, the set may be tuned as a conventional receiver.

RESISTORS

R 1—P140	500 Ohm	¼ Watt
R 2—P1950	350 Ohm	¼ Watt 10%
R 3—P139	250,000 Ohm	¼ Watt
R 4—P481	3,000 Ohm	¼ Watt
R 5—P673	10,000 Ohm	½ Watt
R 6—P417	50,000 Ohm	¼ Watt
R 7—P137	500,000 Ohm	¼ Watt
R 9—P137	1,000,000 Ohm	¼ Watt
R11—P2731	25,000 Ohm	1 Watt
R12—P278	600 Ohm	¼ Watt
R13—P1950	350 Ohm	¼ Watt
R14—P417	50,000 Ohm	¼ Watt
R15—P139	250,000 Ohm	¼ Watt
R16—P1220	200,000 Ohm	¼ Watt
R17—P166	25,000 Ohm	¼ Watt
R18—P376	750 Ohm	¼ Watt
R19—P258	15,000 Ohm	¼ Watt
R20—P166	25,000 Ohm	¼ Watt
R21—P2732	220 Ohm	2 Watt
R22—P167	10,000 Ohm	¼ Watt
R23—P139	250,000 Ohm	¼ Watt
R24	Volume Control—2,000,000 Ohms	
R25	Bass Control—1,000,000 Ohms	
R26—P1217	60,000 Ohm	¼ Watt
R27—P167	10,000 Ohm	¼ Watt
R28—P165	25,000 Ohm	¼ Watt
R29	Speaker Field—600 Ohm	

TRANSFORMERS AND COILS

P2710	Power Transformer
P1930	1st I.F. Transformer
P2704	2nd I.F. Transformer
P2711	3rd I.F. Transformer
G5794	Oscillator Coil Assembly
G5310	Police and Short Wave Antenna Coil
G5347	Broadcast Antenna Coil

PAPER CONDENSERS

C 1—P148	.05 Mfd. 200 V.
C 2	Police Band Padder—(.0008—.0016 Mfd.)
C 4	Broadcast Band Padder—(.003—.0006 Mfd.)
C 6—P1322	.005 Mfd. 600 V.
C 8—P276	.1 Mfd. 400 V.
C 9—P148	.05 Mfd. 200 V.
C11—P142	.1 Mfd. 200 V.
C14—P334	.05 Mfd. 400 V.
C15—P334	.05 Mfd. 400 V.
C19—P334	.05 Mfd. 400 V.
C20—P1322	.005 Mfd. 600 V.
C22—P148	.05 Mfd. 200 V.
C23—P1322	.005 Mfd. 600 V.
C24—P1322	.005 Mfd. 600 V.
C25—P276	.1 Mfd. 400 V.
C26—P276	.1 Mfd. 400 V.
C28—P148	.05 Mfd. 200 V.

MISCELLANEOUS

P1928	Tube Socket
P1153	5Z3 Socket
P945	Speaker Socket
P2705	Volume Control
P2706	Bass Control
G5788	Band Switch and Lead Assembly
P929	A.C. Line Cord
P1455	Tube Shield
P1456	Tube Shield Base
P2716	12" Dynamic Speaker

MICA CONDENSERS

C 3—P1683	.004 Mfd.
C 7—P480	.0001 Mfd.
C12—P480	.0001 Mfd.
C13—P480	.0001 Mfd.
C21—P1382	.00025 Mfd.
C27—P480	.0001 Mfd.

ELECTROLYTIC CONDENSERS

C16 } C17 }	P1939 Dual Electrolytic
C18—P1937	Electrolytic

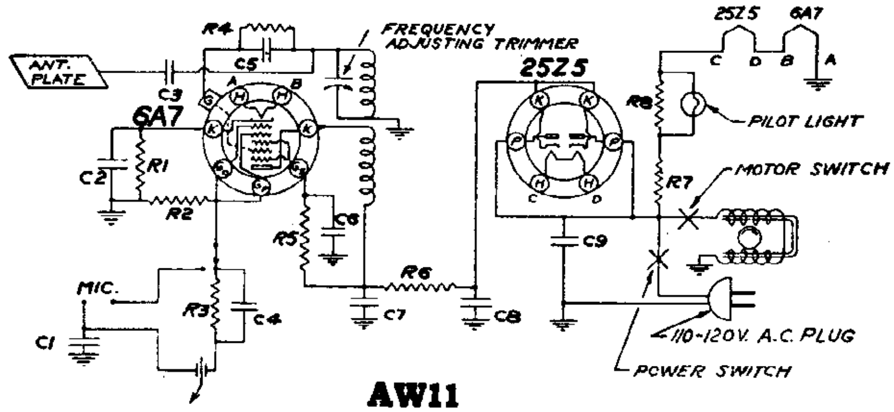
ADJUSTABLE CONDENSERS

P1918A	Variable Condenser
P2743	Gang Trimmer Strip
P1682	Oscillator Padder Condensers
P2694	Push Button Switch
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P2690	Electric Motor
P2689	Rubber Drive Belt
P2688	Dial Scale
P2644	Dial Pointer
G5462	Lower Segment Adjustment Bracket and Contact
G5463	Upper Segment Adjustment Bracket and Contact

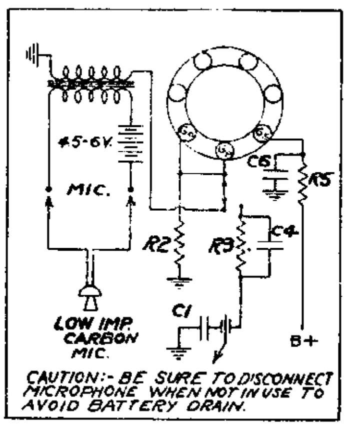
Schematic, Layout Notes

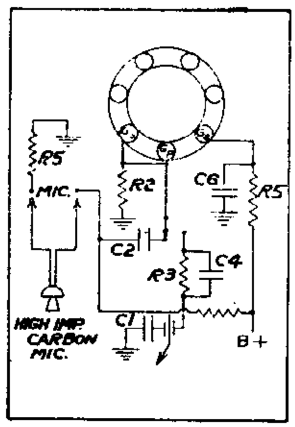
CONTINENTAL RADIO & TELEV. CO.

MODEL AW11 Wireless Record Player



AW11





CONDENSERS

No.	MFD.	VOLTS
C1	.05	200
C2	.05	200
C3	.00005	MICA
C4	.0006	MICA
C5	.0001	MICA
C6	.05	200
C7	20.	110
C8	20.	150
C9	.1	400

RESISTORS

No.	OHMS	WATTS
R1	700	1/4
R2	250,000	1/4
R3	250,000	1/4
R4	50,000	1/4
R5	10,000	1/4
R6	5000	1/4
R7	40. COLD	METAL CLAD
R8	250.	

RESISTORS

P1952	50,000 Ohm ½ Watt Ins.	
P2344	250,000 Ohm ½ Watt Ins.	
P1381	1,000 Ohm ½ Watt Ins.	
P673	10,000 Ohm ½ Watt Ins.	
P1304	5,000 Ohm ½ Watt Ins.	
P2833	Candohm Resistor	

CONDENSERS

P276	.10 Mfd. 400 V. Paper
P148	.05 Mfd. 200 V. Paper
P2821	Electrolytic Condenser
P480	.0001 Moulded Mica
P1382	.00005 Moulded Mica
P336	.0005 Moulded Mica
P2826	Trimmer Condenser

MISCELLANEOUS

P506	6A7 Tube Socket
P559	25Z5 Tube Socket
P2827	Oscillator Coil
P2798	Motor and Turntable
P2828	Pickup Arm
P2800	Automatic Stop Switch
P2615	Needle Cup
P897	Phono Jack
P2829	Slide Switch
P2825	Power Switch
P2831	Power Switch Knob
P2215	Line Cord
P1923	Pilot Light Socket
P1504	Pilot Light Bulb
P2844	Pickup Rest

MICROPHONE

It will be noticed that the unit is provided with a sliding switch to change from phono pickup to microphone. Before attempting to use the **Mic** the switch should be set in the proper position.

The wireless record player unit is shipped from the factory, connected for use with a **Brush** type SM-37 crystal microphone, and **Quam Permanic** microphone. Insert pin tip connectors into microphone jacks. For use with other types of microphones, schematic diagrams are enclosed wherein the necessary wiring changes are shown.

The high impedance carbon microphone is the type usually recommended for home use and is connected in the plate circuit of the audio tube. Such microphones as the Philmore, I.R.C. and others fall into this group.

The low impedance microphones include the single and double button types and are as a rule the most satisfactory for use with the wireless unit. These are usually of a higher grade and are recommended for use when maximum output and tone quality is required. With such a microphone and a receiver having sufficient power output, a very simply installed and effective P.A. system may be had.

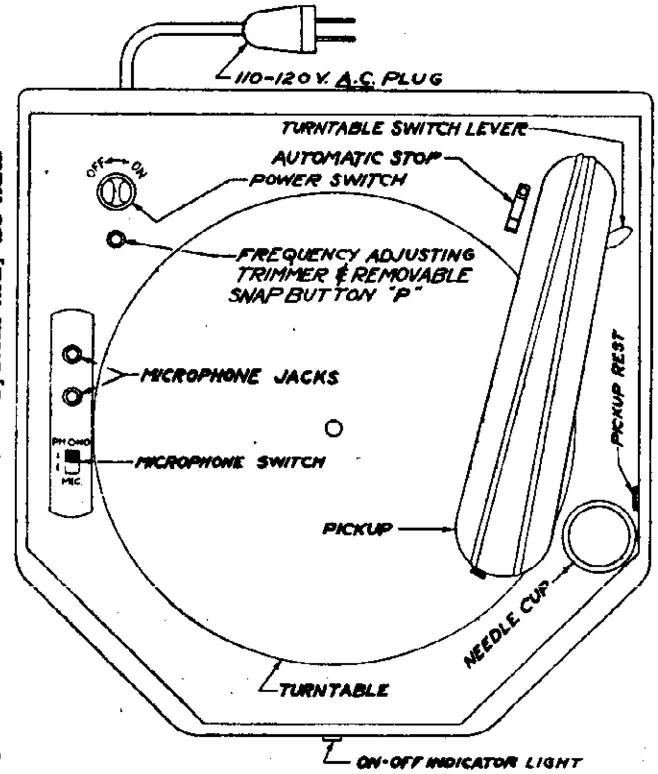
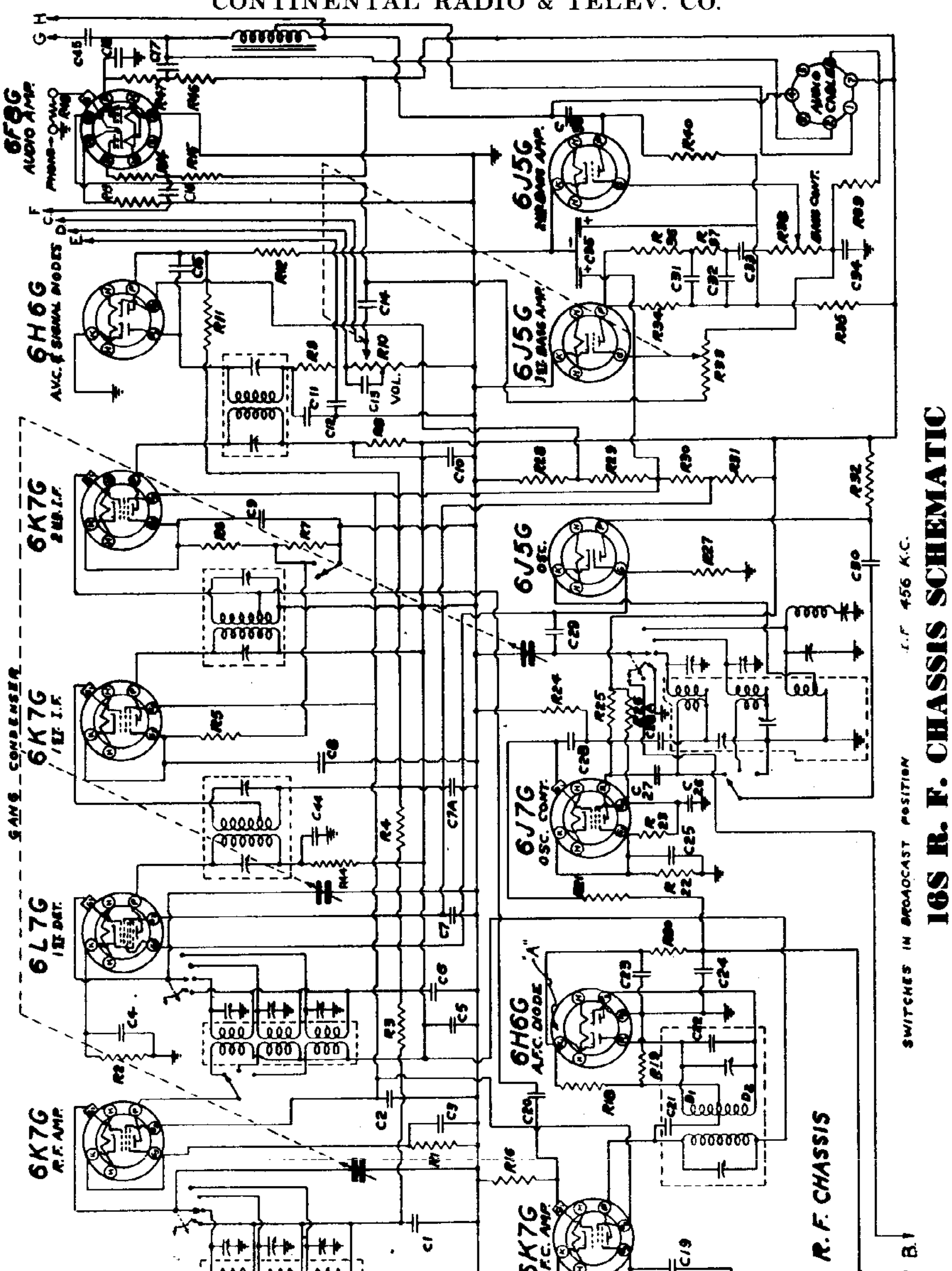


Fig. 1

MODEL 16S

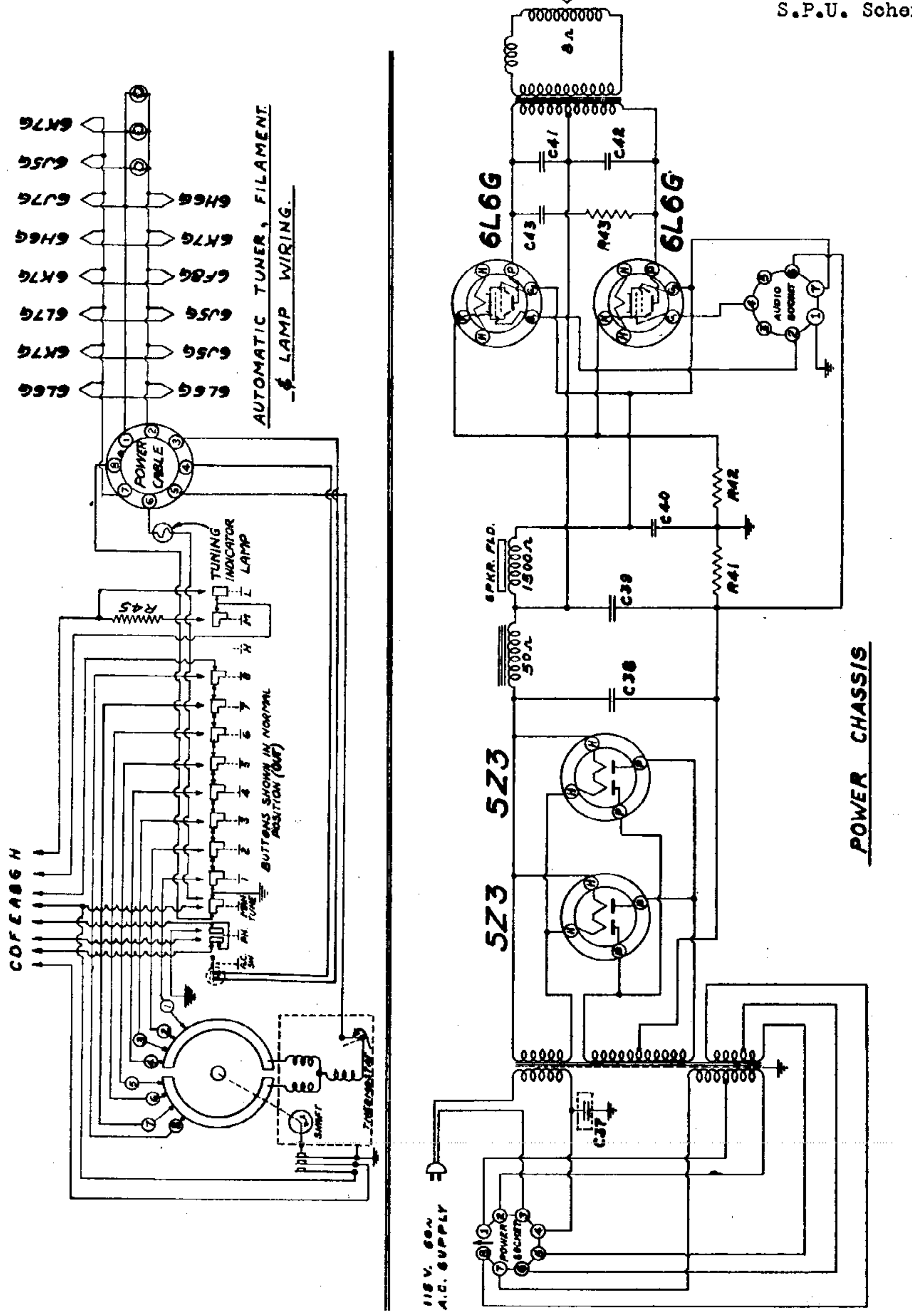
CONTINENTAL RADIO & TELEV. CO.

R-F Schematic



MODEL 16S
Tuner, A-F and
S.P.U. Schemati

CONTINENTAL RADIO & TELEV. CO.

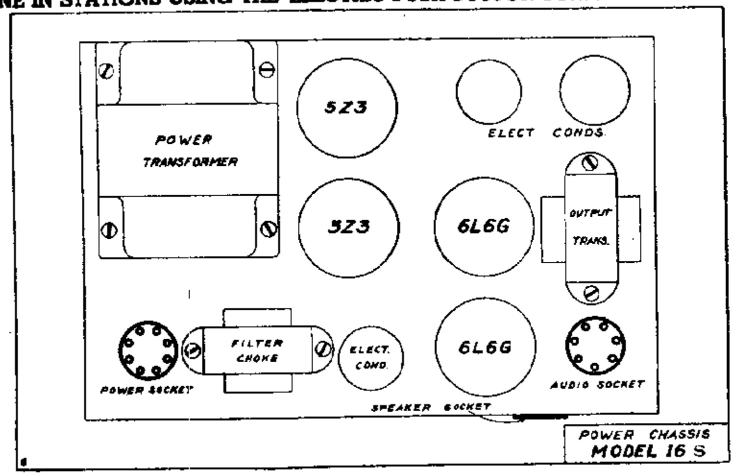


16S COMBINED TUNER and A. F. SCHEMATIC

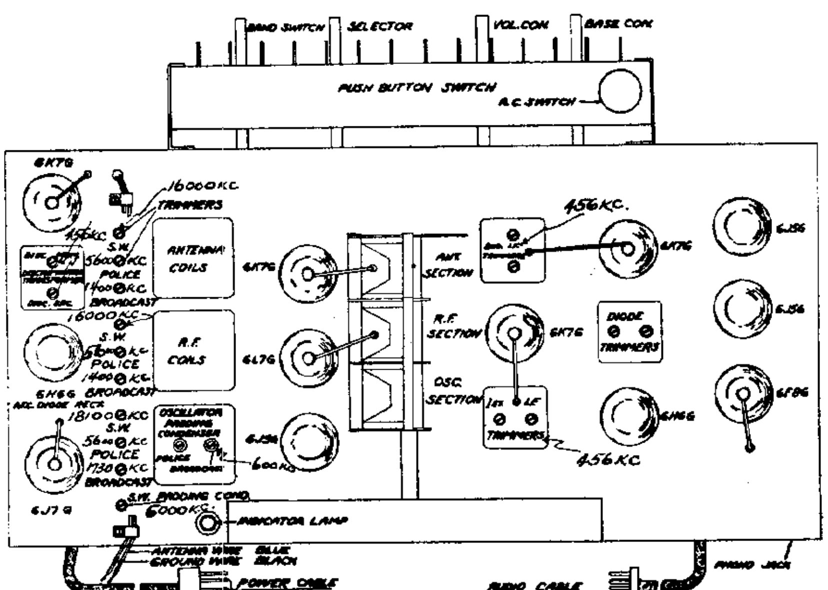
MODEL 16S.
Socket, Trimmers
Alignment, Notes
Parts

CONTINENTAL RADIO & TELEV. CO.

FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER AND HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER SEE MODEL 11A.



16S CHASSIS LAYOUT DIAGRAMS



This receiver is designed to operate over three tuning ranges with a Horizontal Pointer movement; the broadcast band which extends from 535 to 1730 Kilocycles (KC) (173 to 560 Meters), Police and Aviation Band which extends from 1.7 to 5.6 Megacycles (MC) (53 to 176 Meters) and the International Short Wave Band which extends from 5.6 to 18.1 Megacycles (MC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). **Never plug into a DC outlet.**

FLOATING CHASSIS (IMPORTANT) **Loosen the four (4) mounting screws) and two (2) hook bolts that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws. NOTE: Save the mounting screws and wooden strips to use in case the set is reshipped or moved, otherwise damage may be done to the in-**

strument cabinet or tubes.

GROUND Wherever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the ground lead (Black).

Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent bed can be prepared by digging a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a moist condition throughout the year.

REPLACEMENT PARTS LIST 16S

CARBON RESISTORS

R 1-P1729	750 Ohm ¼ Watt 10%
R 2-P2020	700 Ohm ¼ Watt 10%
R 3-P280	100,000 Ohm ¼ Watt
R 4-P280	100,000 Ohm ¼ Watt
R 5-P376	750 Ohm ¼ Watt
R 6-P1729	750 Ohm ¼ Watt 10%
R 7-P2019	600 Ohm ¼ Watt 10%
R 8-P1216	5,000 Ohm ¼ Watt
R 9-P419	20,000 Ohm ¼ Watt
R10-P1989	250,000 Ohm Volume Control
R11-P137	500,000 Ohm ¼ Watt
R12-P137	500,000 Ohm ¼ Watt
R13-P756	2,000 Ohm ½ Watt
R14-P167	10,000 Ohm ¼ Watt
R15-P419	20,000 Ohm ¼ Watt
R16-P1114	2,000,000 Ohm ¼ Watt
R17-P1729	750 Ohm ¼ Watt 10%
R18-P137	500,000 Ohm ¼ Watt
R19-P137	500,000 Ohm ¼ Watt
R20-P1114	2,000,000 Ohm ¼ Watt
R21-P137	500,000 Ohm ¼ Watt
R22-P2024	1,100 Ohm ¼ Watt 5%
R23-P2021	25,000 Ohm ½ Watt 10%
R24-P1950	350 Ohm ¼ Watt 10%
R25-P166	25,000 Ohm ¼ Watt
R26-P1215	35,000 Ohm 1 Watt
R27-P417	50,000 Ohm ¼ Watt
R28-P2022	450 Ohm ¼ Watt 10%
R32-P165	25,000 Ohm 1 Watt
R33-P1989	500,000 Ohm Base Boost on Volume Control
R34-P166	25,000 Ohm ¼ Watt
R35-P673	10,000 Ohm ½ Watt
R36-P167	10,000 Ohm ¼ Watt
R37-P419	20,000 Ohm ¼ Watt
R38-P1991	500,000 Ohm Base Control
R39-P137	500,000 Ohm ¼ Watt
R40-P166	25,000 Ohm ¼ Watt
R43-P1944	15,000 Ohm 2 Watt
R44-P278	1,000 Ohm ¼ Watt
R45-P167	10,000 Ohm ¼ Watt
R46-P166	25,000 Ohm ¼ Watt
R47-P2018	7,000 Ohm ¼ Watt 10%
R48-P137	500,000 Ohm ¼ Watt

PAPER CONDENSERS

C 1-P334	.05	Mfd.	400 V.
C 2-P141	.25	Mfd.	200 V.
C 3-P142	.1	Mfd.	200 V.
C 4-P142	.1	Mfd.	200 V.
C 5-P1789	.25	Mfd.	400 V.
C 6-P334	.05	Mfd.	400 V.
C 7-P142	.1	Mfd.	200 V.
C7A-P334	.05	Mfd.	400 V.
C 8-P142	.1	Mfd.	200 V.
C 9-P142	.1	Mfd.	200 V.
C10-P334	.05	Mfd.	400 V.
C14-P334	.05	Mfd.	400 V.
C16-P334	.05	Mfd.	400 V.
C17-P1789	.25	Mfd.	400 V.
C19-P142	.1	Mfd.	200 V.
C23-P142	.1	Mfd.	200 V.
C24-P142	.1	Mfd.	200 V.
C25-P142	.1	Mfd.	200 V.
C26-P276	.1	Mfd.	400 V.
C27-P904	.002	Mfd.	600 V.
C31-P334	.05	Mfd.	400 V.
C32-P276	.1	Mfd.	400 V.
C33-P276	.1	Mfd.	400 V.
C34-P141	.25	Mfd.	200 V.
C36-P1789	.25	Mfd.	400 V.
C37-P2030	.02	Mfd.	600 V. Metal Clad
C41-P904	.002	Mfd.	600 V.
C42-P904	.002	Mfd.	600 V.
C43-P1079	.01	Mfd.	1000 V.
C44-P334	.05	Mfd.	400 V.
C45-P334	.05	Mfd.	400 V.

MICA CONDENSERS

C11-P480	.0001	Mfd.
C12-P480	.0001	Mfd.
C13-P817	.00025	Mfd.
C15-P1382	.00005	Mfd.
C19-P336	.0005	Mfd.
C20-P672	.001	Mfd.
C21-P480	.0001	Mfd.
C28-P672	.001	Mfd.
C28A-P1044	.0002	Mfd.
C29-P480	.0001	Mfd.
C30-P818	.002	Mfd.

CANDOHM RESISTORS

R29	P2013	2400 Ohms
R30	P2013	2250 Ohms
R31	P2013	2260 Ohms
R41	P2010	150 Ohms
R42	P2010	31 Ohms

ELECTROLYTIC CONDENSERS

C35	4	100 W. V.	Dry
C35	4	250 W. V.	Dry
C38	25	450 W. V.	Wet
C39	12	450 W. V.	Wet
C40	25	300 W. V.	Wet

ADJUSTABLE CONDENSERS

P1980A	Variable Condensers
P1682	Trimmer Condenser (Osc.)
P2009	4 Gang Trimmer Strip
P2008	3 Gang Trimmer Strip

TRANSFORMERS AND COILS

P2000	Power Transformer
P2001	1st I.F. Transformer
P2002	2nd I.F. Transformer
P2003	3rd I.F. Transformer
P1943	Discriminator Coil
G5494	Oscillator Coil Assembly
G5497	R.F. Coil Assembly
G5499	Antenna Coil Assembly
P2005	Iron Core Filter Choke
P2006	Iron Core Audio Choke
P2007	Output Transformer
G5501	Tracking Coil

MISCELLANEOUS

P1928	Tube Socket
P1153	5Z3 Tube Socket
P945	Speaker Socket
P2014	Cable Socket
P929	A.C. Line Cord
P1988	Power Cable
P1987	Audio Cable
P1989	Volume Control
P1991	Base Control
P1986	Band Change Switch
G5793	Electric Tuner Cable
P2017	12" Dynamic Speaker
P1504	Pilot Light Bulb
P1503	Pilot Light Socket
P1455	Tube Shield
P1456	Tube Shield Base
P2694	Push Button Switch
P2689	Rubber Drive Belt
P2688	Dial Scale
P2644	Dial Pointer
P2532	Tilt Escutcheon
P2619	Push Button Escutcheon
P2698	Base Control Escutcheon
P2699	Band Switch Escutcheon
G5462	Lower Segment Adjustment Bracket and Contact
G5463	Upper Segment Adjustment Bracket and Contact
P2690	Electric Motor
P2677	Ivory Push Button Knob
P2678	Walnut Push Button Knob
P2720	Band Switch Knob and Base Control Knob
P2721	Selector Knob
P2722	Volume Control Knob

CROSLEY CORP.

MODEL 438,438M,486 Phono.
Chassis,Voltage,Alignment
Drive Data,Phono.Data,Tuner

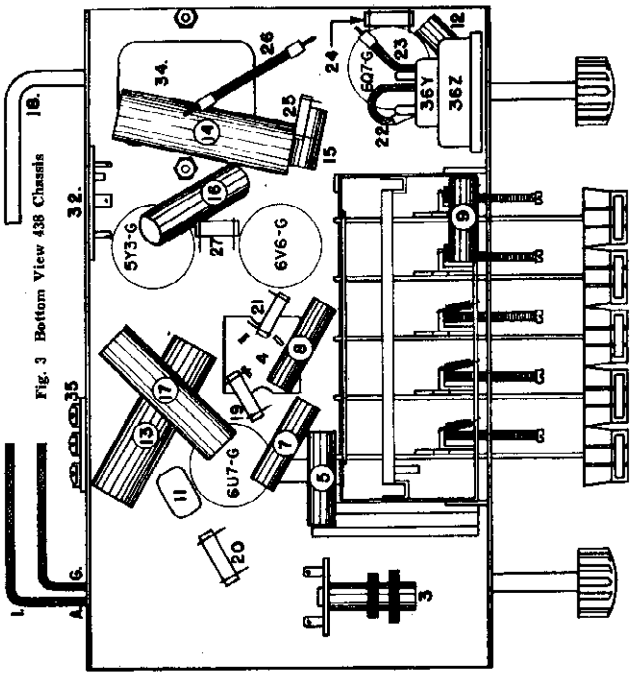


Fig. 3 Bottom View 438 Chassis

Item No.		
10	Deleted	Was Capacity Coupling (Twisted Leads)

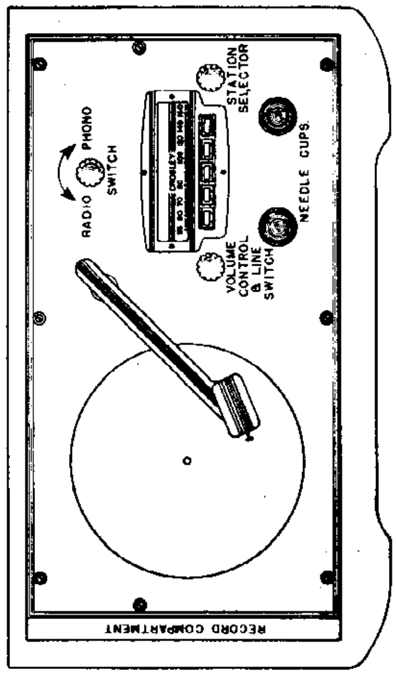


Fig. 4 Top View — Combination

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Su
6U7G	Amplifier	6.7	175	100	—	–3	—
6Q7G	Det., A. V. C., 1st. A-F	6.7	78	—	–3	–1.5	—
6V6G	Output	6.7	172	178	—	–10.	—
5Y3G	Rectifier	4.1	negative end of spk. field to No. 8 pin 225 volts				

Voltage drop across speaker field 40 volts.
Maximum power output approximately 3. Watts
Power consumption at 117.5 line approx. 36 watts. Phono—15 watts additional.

MODEL 438-M
Chassis 438 — Phono Assy. 486

FOR SCHEMATIC SEE INDEX

OCTOBER, 1938

SPECIFICATIONS

This model combination consists of a four-tube T. R. F. radio receiver and Record Player in a console cabinet, designed for operation on electric circuits as specified on the Model and License Notice Label.

Incorporated in the receiver design is, a mechanical Push Button tuning system, an iron cored antenna coil with antenna to match, A.V.C., beam power output and dynamic speaker.

The frequency range of the receiver is from 1725 to 540 kilocycles. The tubes used and their function are as follows: one 6U7G as R-F amplifier, one 6Q7G as detector, A.V.C. and 1st audio amplifier, one 6V6G as beam power and one 5Y3G as rectifier.

The bias for the 6U7G is obtained from the voltage drop across a 60 ohm resistor (item 22) and is measured from the chassis to the Cathode of the 6Q7G. The bias for the 6Q7G is obtained from the drop across a 32 ohm resistor (item 23) and is measured from the cathode of the 6Q7G to the junction of items 23 (32 ohm)—24 (3 meg) and 26 (140 ohm). The 6V6G bias is obtained from the total drop across items 22 (60 ohm., 23 (32 ohm) and 26 (140 ohm) resistors which are in series with the speaker field that is in the negative leg of the power supply. The bias is measured from chassis to the junction of items 26, 27 and speaker field.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 6V6G output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd., or larger—not electrolytic) in series with one of the leads.

ALIGNMENT PROCEDURE

The signal generator high side should be connected to the antenna through a .0001 Mf. condenser, after the antenna has been completely uncoiled. The low side of the signal generator is connected to chassis.

(a) First check to see that the pointer makes a complete trip both ways.

(b) Set the signal generator to 1400 kilocycles.

(c) Set the pointer of receiver to 140 on the dial.

(d) Adjust trimmer condensers on the gang for maximum output.

(e) Check to see that set will tune to 1725 kilocycles, it does not have to tune through a peak at this frequency.

Any large discrepency in tracking may be compensated for by slight adjustments of the split end plates of the condenser gang.

Check Push Buttons to see if they need resetting.

SETTING THE PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. Insert a small screw driver in the whole in the front of each push button to be set and loosen (DO NOT REMOVE) the set screw at the bottom of the hole.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency (kilocycles), that is the one nearest the 150 marking on the knob. Completely depress and hold the right hand push button in that position, while you SECURELY TIGHTEN THE SET SCREW.

The push button system is now set for the first station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles.)

Cut the call letters of the stations selected, from the list supplied with your receiver and press them into the openings in the front of the push buttons. Four pieces of clear celluloid are supplied in a small envelope and should be snapped into place over the call letters to protect and hold them in place.

REPLACING DRIVE CORD

1.—Remove the chassis from the cabinet.

2.—Remove the broken drive cord, first from the pointer then from the pulleys. Remove the cord tension spring.

3.—Remove the dial (glass and mask) and the manual tuning shaft bracket.

4.—Cut a piece of drive cord 44 inches in length (G2-41582).

5.—Tie the cord tension spring approximately 1½ inches from the one end of the cord. Open gang condenser, this should place the eyelet in the pulley up. Insert the end of the cord through eyelet, from the inside of pulley. Hook end of the tension spring on the catch in pulley, opposite the eyelet.

6.—Bring the cord forward and down, then around lower idler pulley, (on gang bracket) on the underside, continue over to the left hand idler pulley. Bring around and over in a clockwise direction. Continue on over to top of right hand idler pulley, then straight down to and around pulley on drive shaft. Make two complete turns around drive shaft pulley in a clockwise direction. Then bring cord up and over top idler pulley on gang bracket, making ½ turn in a counter clockwise direction. Continue cord straight down then back and around large pulley on the gang, in a counter clockwise direction to eyelet. Insert end of cord through eyelet (top down). Pull cord until tension spring is stretched to about ¾ inches in length. Loop cord in tension spring and tie in knot. Clamp cords together with cord clamp (W-46290) approximately ⅛ inch from inside rim of large pulley.

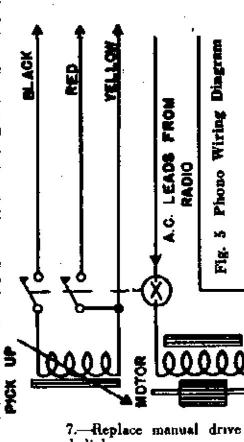


Fig. 5 Phono Wiring Diagram

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

7.—Replace manual drive shaft bracket, dial mask and dial.

8.—Close condenser gang, place pointer at 540 on dial and then insert drive cord in pointer. Check pointer travel before cementing the cord to pointer.

PHONO

The motor is mounted in such a manner that it will swing up and down a short distance. The reason for this is, that when the turntable is in operating position the weight of the motor is applied to the friction drive and against the inside surface of the turn-table rim. The amount of friction obtained is just right for proper operation. When placing the turn-table in position, first hook the rim over the friction drive on the motor shaft then carefully place the center hole in the turn-table on the record guide (spindle). During this operation you should be very careful to see that the friction drive is completely under the rim and that the turn-table is all the way down on the record guide (spindle).

The Radio-Phono Switch (Fig. 4) when turned to the left is for radio broadcast reception and when turned to the right cuts off the radio signals and starts the phonograph motor.

The Volume Control and Line Switch of the receiver must be turned on before the motor will operate. This volume control also controls the output level of the phonograph.

MODEL 448 Combination
Socket, Trimmers, Voltage
Alignment, Phono. Data, Tuner

CROSLEY CORP.

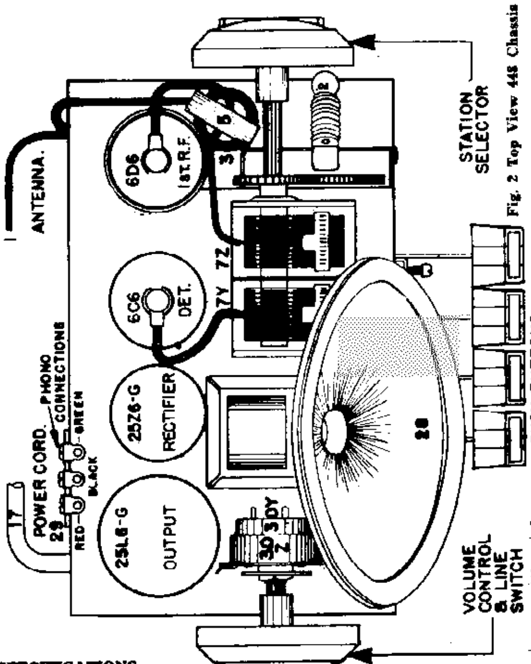


Fig. 2 Top View 448 Chassis

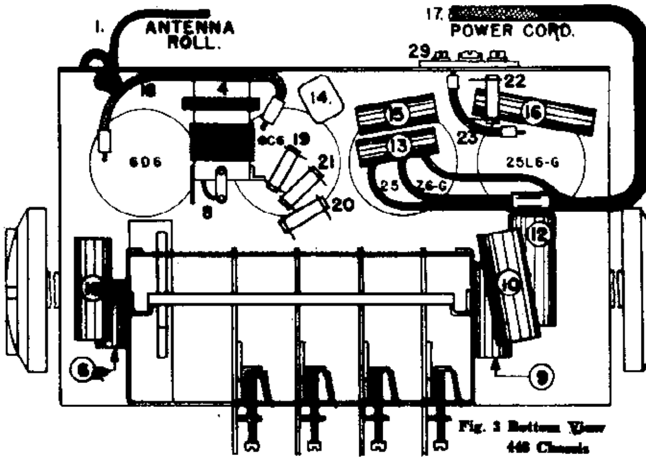


Fig. 3 Bottom View 448 Chassis

TUBE SOCKET VOLTAGE READINGS

Tube	Function	F	P	S	K	Su.	G
6D6	R-F Amplifier	6.3	97	98	2.5-25	2.5-25	—
6C6	Detector	6.3	20	10	7	—	—
25L6-G	Output	25	85	98	6	—	—
25Z6-G	Rectifier	25	—	—	126	—	—

Power output approximately 2 watts.
Power consumption at 117.5 volts line 45 watts. Phono. Motor 15 watts additional.
Drop across field 28 volts.

SPECIFICATIONS

The receiver is a four-tube Tuned Radio Frequency receiver designed for operation on A. C. circuits as specified on Model Sticker. Push Button tuning, Beam power output, Dynamic Speaker are a few of the features incorporated in this receiver. The frequency range is from 1725 to 540 Kc. The tubes used and their functions are as follows: one 6D6 as R-F amplifier, one 6C6 as biased detector, one 25L6G as beam power output and one 25Z6G as rectifier. The volume control varies the bias on the 6D6 and at the same time the amount of signal fed to the antenna coil primary. The bias for the 6C6 is obtained from the voltage drop across item 19 (25000 ohm resistor) and for the 25L6G from the drop across item 23 (110 ohm resistor).

This receiver incorporates a certain amount of fixed regeneration to improve selectivity and sensitivity. With a normal antenna the receiver is stable and the performance approaches that of a three gang T. R. F. receiver in spite of the fact that only a two gang condenser is used. However with no antenna or a very small antenna the receiver will oscillate but this oscillation can readily be controlled by the volume control.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

NOTE: The RED and BLACK terminals on the phono terminal board supply the current for the phono motor, therefore HAVE 110 VOLTS ACROSS THEM WHEN THE RECEIVER IS IN OPERATING POSITION. BE CAREFUL NOT TO TOUCH OR SHORT CIRCUIT THEM WHILE WORKING ON THE CHASSIS.

CONNECTING OUTPUT METER

Connect the one terminal of the output meter to the plate and the other terminal to the screen of the 25L6G Output tube. Be sure the output meter is protected from D. C. by connecting a condenser (.1 mfd. or larger —NOT electrolytic) in series with one of the leads.

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power line, therefore when using an A. C. operated signal generator for alignment the following precaution should be taken.

(a) Connect the output lead of the signal generator through a .0001 Mf. condenser to the antenna lead on the receiver (after the antenna has been completely unrolled. The ground lead of the generator should be connected through a .001 Mf. condenser to the chassis.

(b) Open the gang condenser all the way.

(c) Set the generator to 1725 Kilocycles.

(d) Adjust the trimmer condensers on the gang until the 1725 Kc signal is heard. The gang does not have to tune through this signal.

(e) Set the generator to 1400 Kc.

(f) Tune the set to the 1400 Kc. signal, then alternately adjust the trimmers on the gang until no further improvement can be noticed on the output meter.

NOTE: Always use the lowest signal generator output that will give a reasonable indication on the output meter.

Keep the two grid leads as far as possible from each other.

If the receiver has been re-aligned it may be necessary to readjust the setting of the push buttons.

SETTING THE PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. Insert a small screw driver in the hole in the front of each push button to be set and loosen (DO NOT REMOVE) the set screw at the bottom of the hole.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency (kilocycles), that is the one nearest the 150 marking on the knob. Completely depress and hold the right hand push button in that position, while you SECURELY TIGHTEN THE SET SCREW.

The push button system is now set for the first station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles).

Cut the call letters of the stations selected, from the list supplied with your receiver and press them into the openings in the front of the push buttons. Four pieces of clear celluloid are supplied in a small envelope and should be snapped into place over the call letters to protect and hold them in place.

RECORD PLAYER ASSEMBLY

The record player assembly consists of a small self-starting motor, Phono-Radio switch, magnetic pickup and a separate volume control mounted on a metal base plate.

Connections—

A three lead cable is used for connecting the Phono Unit to the Radio receiver. The green lead is the high side of the magnetic pickup and is connected to the 6C6 cathode through a .25 Mf. 160 V. condenser. The red lead is the high side of the 110 volt circuit for the motor. The black lead is connected to the receiver chassis and is the low side of the pickup and motor.

Operation—

Place turn table in position by hooking the rim over the rubber friction drive on the motor shaft, then carefully placing center hole over record guide spindle. Be sure that the table is all the way down on the spindle and that the friction drive is riding full on the inside surface of the rim.

FOR SCHEMATIC SEE INDEX

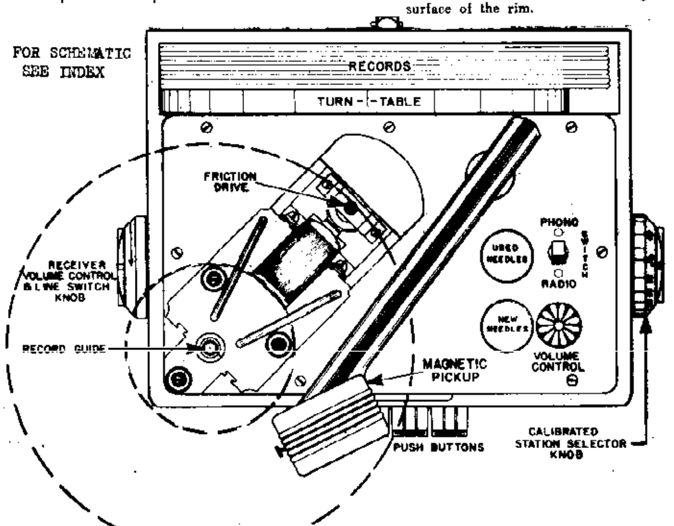


Fig. 4—Top View Phono Assembly

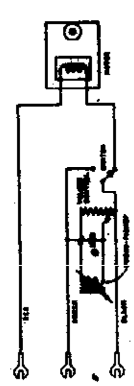


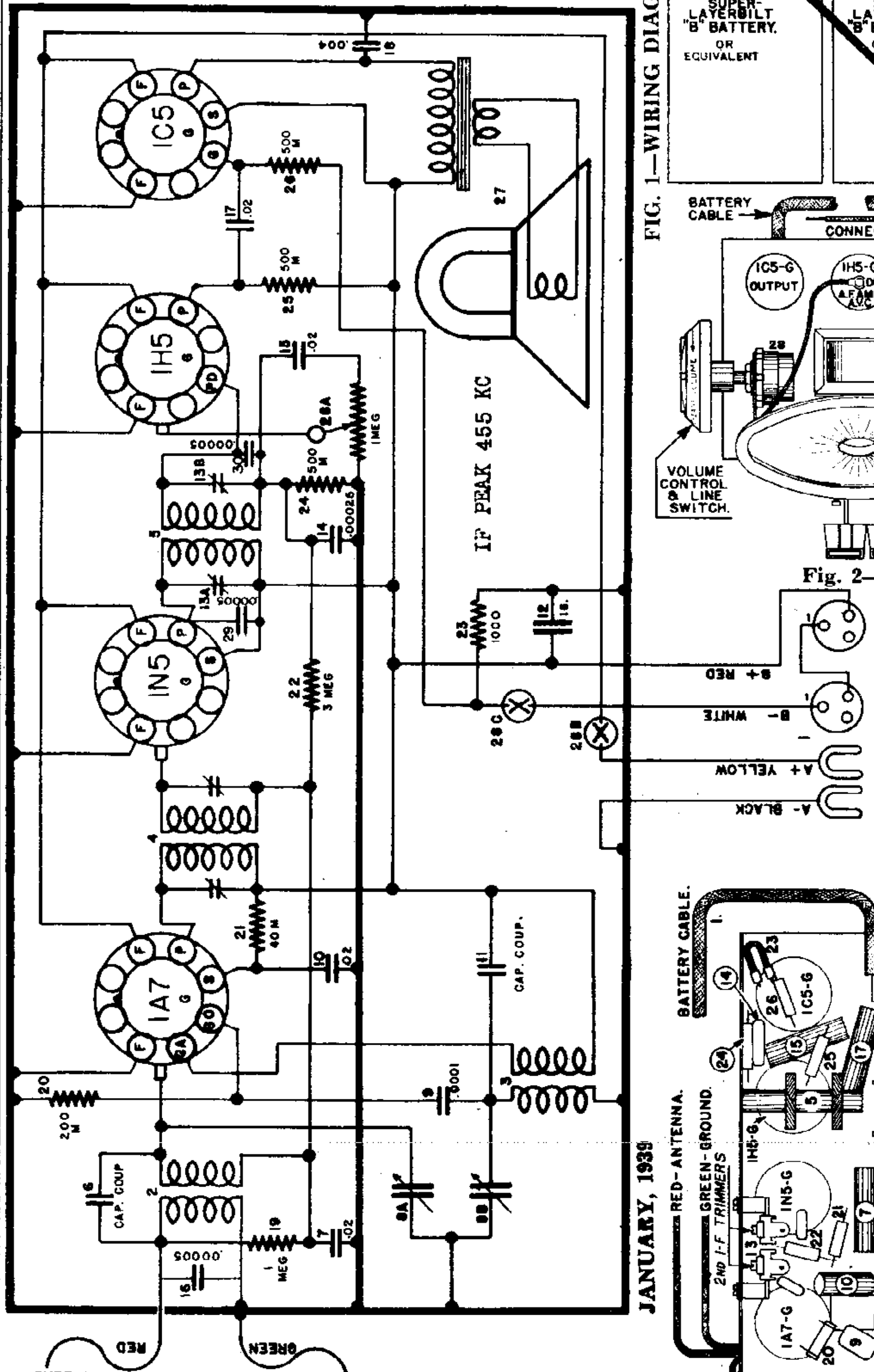
Fig. 5—Phono Wiring Diagram

MODEL 458, Battery Vanity
Schematic, Socket, Trimmers
Voltage, Chassis

CROSLEY CORP.

Tube	Function	H	P	S	G	Ga	Go
1A7-G	Oscillator-Modulator	1.5	82	43	0	82	-6
1N5-G	I-F Amplifier	1.5	82	82	0	—	—
1H5-G	Detector & 1st A-F Amp.	1.5	17	—	0	—	—
1C5-G	Output	1.5	78	82	8*	—	—

Power Output approximately .5 Watt.
"A" Battery Drain approximately .25 Ampere at 1.5 Volts.
"B" Battery Drain approximately 9 Milliamperes at 90 Volts.
*Measured at No. 8 Socket Lug and Chassis.



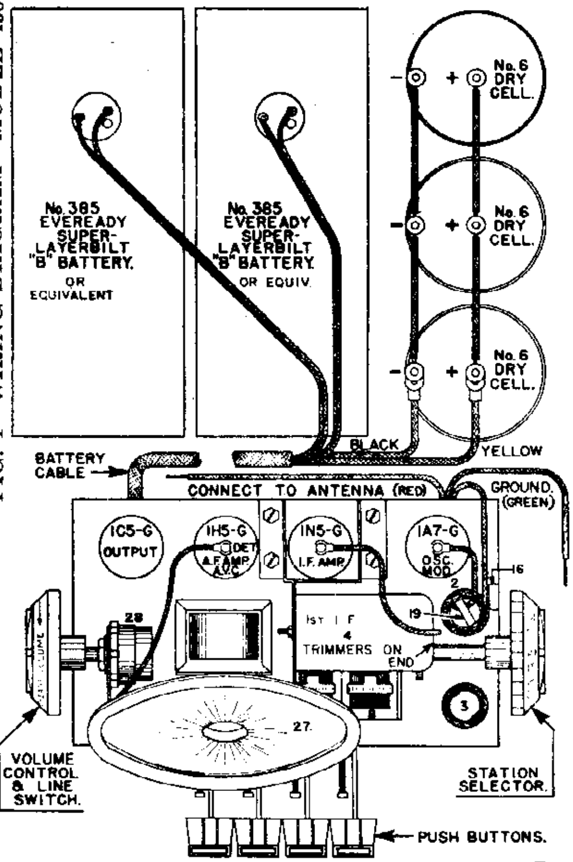
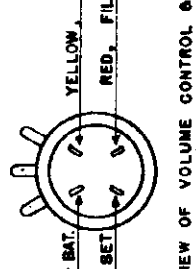


FIG. 1—WIRING DIAGRAM—MODEL 458

Fig. 2—Top View 458

MODEL 458



BACK VIEW OF VOLUME CONTROL & SWITCH

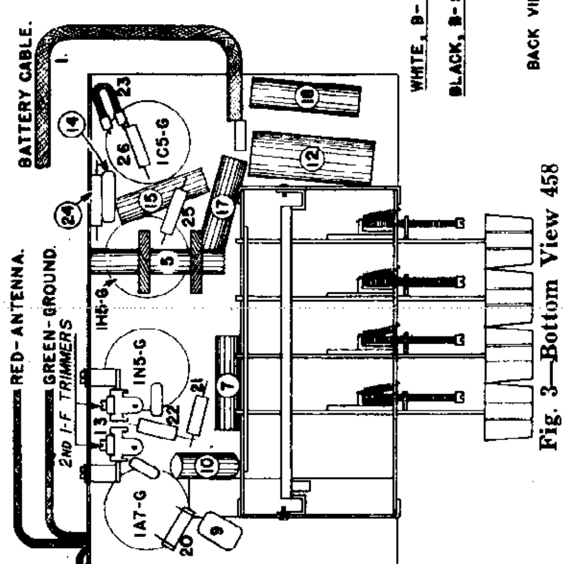


Fig. 3—Bottom View 458

MODEL 458, Battery Vanity
Alignment, Tuner, Notes
Parts

CROSLEY CORP.

MODEL 458 (Battery Vanity)

SPECIFICATIONS

The Crosley Model 458 radio is a four-tube superheterodyne receiver designed for operation from batteries. The method of connecting the battery cable to the batteries is shown on the Wiring Diagram. The batteries required are: one 1.5 volt "A" (EVEREADY NO. 740 or equivalent) or 3 or 4 No. 6 DRY CELLS in parallel, and two plug-in type 45 volt "B" batteries.

TUBES AND VOLTAGE LIMITS

The table gives the function of the tubes used, together with the voltage readings between the tube socket contacts and the negative side of the "A" battery circuit. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and the volume control full on and no signal input. The filament voltages should be measured with an accurate low range DC voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary, the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter across the "P" and "S" terminals of the 1C5G output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 1A7G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely in mesh and turn the volume control knob to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both 2nd I-F trimmers (located through rear of chassis flange) for maximum reading on the output meter. (Fig. 3).

(e) Adjust both trimmers located on the 1st I-F transformer (right end) for maximum output. (Fig. 2).

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator should be connected through a .0002 mfd. condenser to the "ANT" terminal of the receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) Open the condenser gang all the way.

(c) Adjust the "OSC" trimmer condenser on gang for maximum output.

(d) Set the signal generator to 1400 kilocycles.

(e) Tune the receiver to the generator signal for maximum output (approximately 140 on the dial).

(f) Adjust the "ANT" trimmer condenser on gang for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(g) Repeat operations (e) and (f) alternately until no further improvement in output can be obtained.

If any of the circuits have been re-adjusted it may be necessary to reset the push buttons.

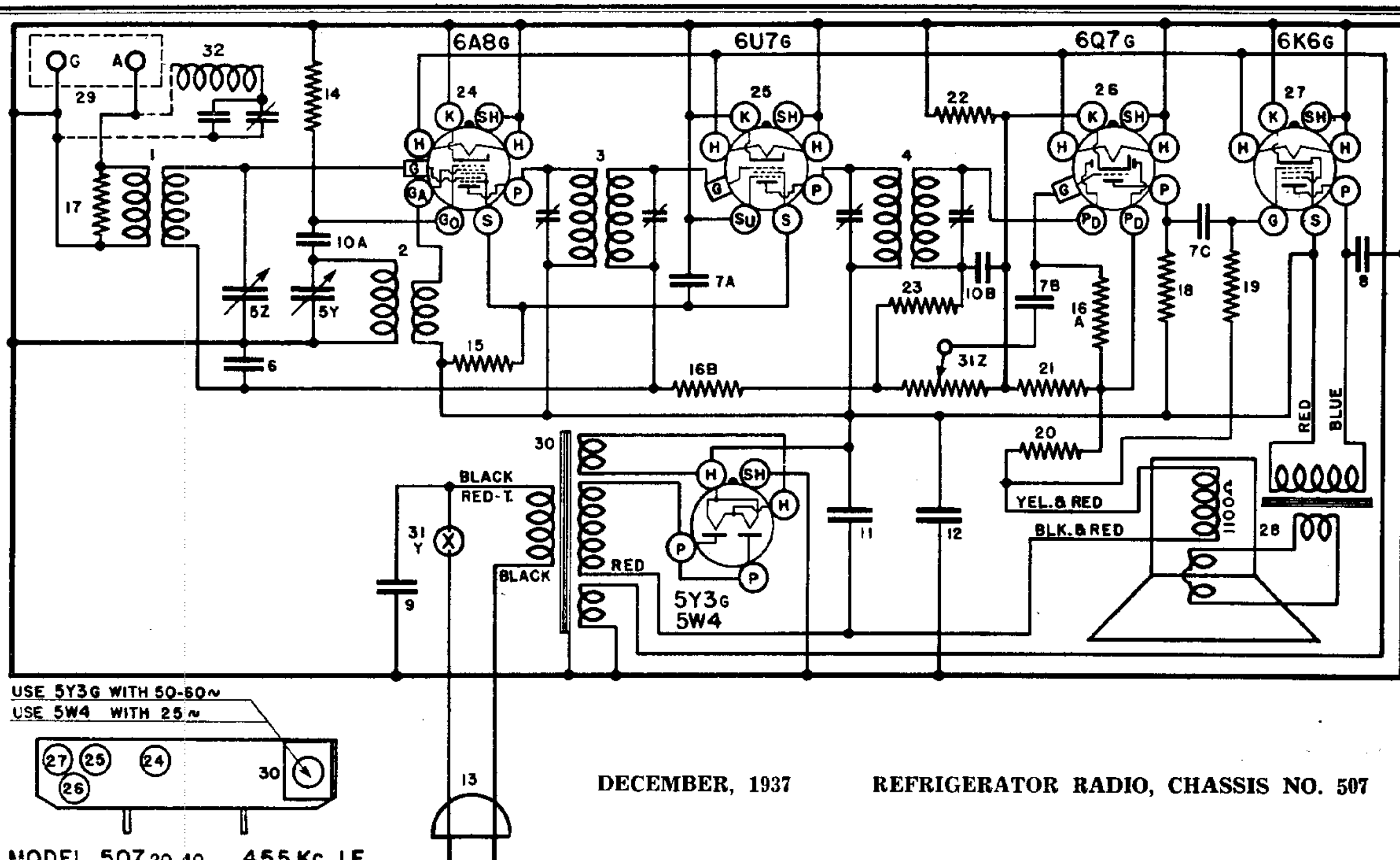
SETTING THE PUSH BUTTONS

With a small screw driver or pen knife remove celluloid cover and the call letters. Insert screw driver in the hole in the front of the button and loosen the set screw a turn or two. With the manual tuning knob tune-in as ACCURATELY AS POSSIBLE the station for which the button is to be set. Then push the button all the way down and while you hold it in that position SECURELY TIGHTEN the set screw. Replace the call letter and call letter cover. Use same procedure in resetting or adjusting the rest of the push buttons.

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	C —46433A	Battery Cable
2	G176—32000	Antenna Coil
3	G177 32002	Oscillator Coil
4	G194—32004	1st I.F. Transformer
5	G204—32004	2nd I.F. Transformer
6	G6 —50640	Condenser Capacity Coupling
7	W —28621	Condenser, .02 Mf. 200 V. Paper
8A	G65 —33001	Var. Condenser, Antenna Section
8B		Var. Condenser, Oscillator Section
9	G2 —34002	Condenser, .0001 Mf. Molded
10	W —28621	Condenser, .02 Mf. 200 V. Paper
11	G3 —50640	Capacity Condenser Coupling
12	W —45783	Condenser, 16 Mf. 125 V. Elect.
13A	W 44882	Trimmer Condenser
13B		Trimmer Condenser
14	G1 34002	Condenser, .00025 Mf. Molded
15	W 28621	Condenser, .02 Mf. 200 V. Paper
16	G5 34002	Condenser, .00005 Mf. Molded
17	W 28621	Condenser, .02 Mf. 200 V. Paper
18	W 28904	Condenser, .001 Mf. 200 V. Paper
19	21454	Resistor, 1 Megohm 1/3 W. Carbon
20	—34018	Resistor, 200,000 Ohm 1/3 W. Carbon
21	36761	Resistor, 40,000 Ohm 1/3 W. Carbon
22	36688	Resistor, 3 Megohm 1/4 W. Carbon
23	W 35581	Resistor, 1,000 Ohm 3/4 W. Flexible
24	36322	Resistor, 500,000 Ohm 1/4 W. Carbon
25	36322	Resistor, 500,000 Ohm 1/4 W. Carbon
26	—36322	Resistor, 500,000 Ohm 1/4 W. Carbon
27	274-PL-5-"B"	Speaker, Spec. 55PWS1 (P. M.)
	—47083	Cone and V. C. Assy.
	—47084	Output Transformer
	—46685	Cardboard Ring
28A	—46435	Volume Control, 1 Megohm
28B		"A" Supply Switch
28C		"B" Supply Switch
	—46259	Cabinet 8BB
	—45825A	Knob, Volume Control
	—45822	Knob, Dial
	W —45931A	Rubber Foot and Screw
	—45553B	Push Button
	W —45852A	Baffle Board
	W —45852	Grille Cloth
	—50841	Call Letter Sheet
	W —50551A	Call Letter Cover
	W —45930C	Rubber Foot
	—46450	Instructions
	G26 —45683	Riveted Key Assy.
	G27 —45683	Rocker Plate Assy.
	W —50542C	Key Clip (Lock Clamp)
	W 50561	No. 6 x 40 x 1/8" Fil. Hd. Screw, Rocker Plate Bearing
	W —50547	Key Plate
	W —50607C	Push Button Spring
	—45717	No. 6 x 32 x 1 1/16" Fil. Hd. Screw, Clamp Adjusting
	—31388	No. 8 x 32 x 3/16" H. H. Mach. Screw, Key Plate Mounting Screw
	—2046	No. 8 Shakeproof Washer, Key Plate Screw

CROSLEY CORP.



MODEL_507-20-40 455 Kc. I.F.

DECEMBER, 1937 REFRIGERATOR RADIO, CHASSIS NO. 507

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Ga
6A8G	Oscillator-Modulator	6.3	160	115	0	-1.2	160
6U7G	I-F Amplifier	6.3	160	115	0	-1.2	—
6Q7G	Diode Det & A-F Amplifier	6.3	80	—	2.5	-2.5	—
6K6G	Output	6.3	160	160	0	-5.0	—
5Y3	Rectifier	5.0	—	—	225	—	—

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 36 volts.

MODEL 507
Trimmers, Chassis
Alignment, Parts

CROSLEY CORP.

SPECIFICATIONS

This model Crosley radio chassis is especially designed for installation in Crosley Shelvador electric refrigerators. It should be operated only from an ALTERNATING CURRENT power supply as specified on the rear of the receiver.

The tuning range of the receiver is from 540 to 1725 kilocycles or 555 to 173 metres.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Voltage limits may vary plus or minus 10% of values given.

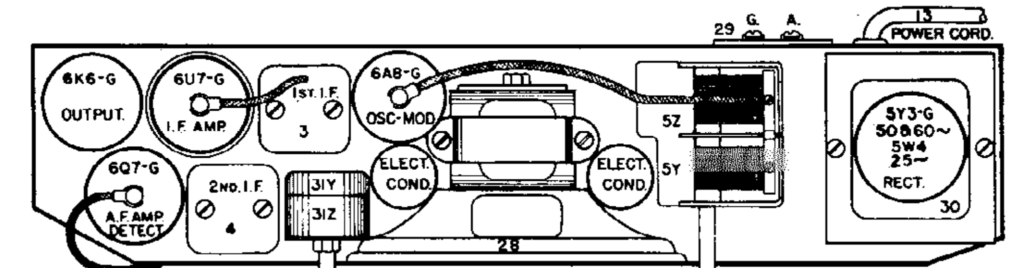


Fig 2. Top View 507

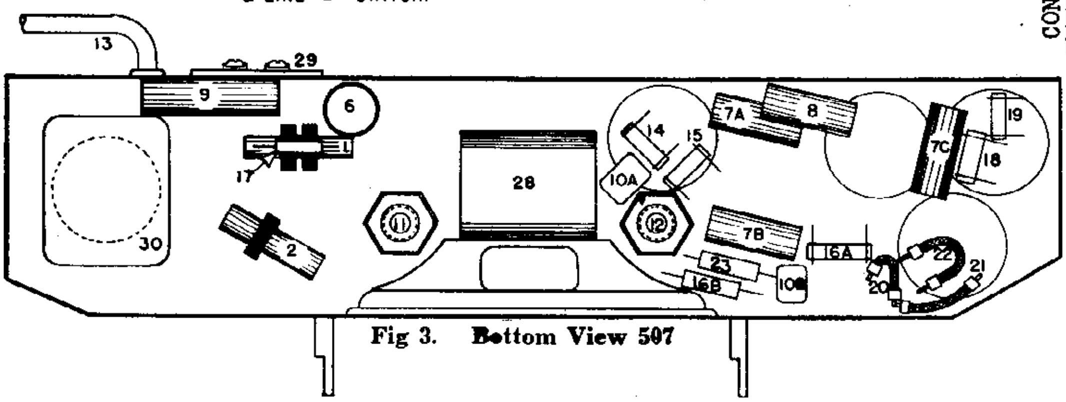


Fig 3. Bottom View 507

CONVENTIONAL ALIGNMENT

SEE SPECIAL SECTION VOL. VIII.

Connect output meter across "P" and "S" of 6K6G tube.
IF Generator 455 kc through .02 cond. to 6A8G grid cap. Gen. gnd. to receiver gnd. Variable out of mesh. Vol. control (ON).
Adjust 2nd and 1st IF trimmers to maximum output.
RF Gen. at 1725 kc through .0002 cond to Ant. terminal. Variable out of mesh. Adjust osc trimmer (35Y) for max. out.
Gen. 1400 kc. Dial 1400 kc. Adjust ant trimmer(33Z) max. out.

PARTS LIST—MODEL 507

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G132—32000	Ant. Coil	20	W —25937	Resistor, 275 Ohm ½W. Flex.
2	G132—32002	Osc. Coil	21	W —23012A	Resistor, 40 Ohm ¾W. Flex.
3	G177—32004	1st I-F.	22	W —24357	Resistor, 75 Ohm ¾W. Flex.
4	G178—32004	2nd I-F.	23	—36761	Resistor, 40,000 Ohm ¼W. Insu.
5	G48 —33001	2 Section Gang Cond.	24	G156—36400	Socket, Type 6A8
	W —45368B	Pointer Shaft	25	G171—36400	Socket, Type 6U7
	W —45367	Pointer Shaft Bracket	26	G160—36400	Socket, Type 6Q7
	—41582	Drive Cord (9-inch)	27	G172—36400	Socket, Type 6K6
	W —44635	Tension Spring		W —40911	Tube Shield (6U7-G)
	W —45155B	Pointer	28	275BL7"B"	Speaker
6	W —36541	Condenser, .02 Mf. 160 V.		—45467	V. C. and Cone Assy.
7A	W —28621	Condenser, .02 Mf. 200 V.	29	G1 —26719	Ant. and Gnd. Terminal Assy.
7B	W —28621	Condenser, .02 Mf. 200 V.	30	—45149	Power Trans., 50-60 Cy.—110 V.
7C	W —28621	Condenser, .02 Mf. 200 V.		—45148	Power Trans., 25 Cy.—110 V.
8	W —34647	Condenser, .006 Mf. 400 V.	31	—45162	Vol. Cont. (1 Meg.) and Line Switch
9	W —30805	Condenser, .01 Mf. 400 V.	32	G165—32004	Wave Trap
10A	G1 —34002	Condenser, .00025 Mf. Molded		W —45198A	Speaker Screen
10B	G1 —34002	Condenser, .00025 Mf. Molded		C —45173A	Escutcheon
11	W —44012	Condenser, 16 Mf. 250 V.		W —45380	Knob (2 Req.)
12	W —43450	Condenser, 16 Mf. 200 V.		W —45157	Chassis Mtg. Brkt.
13	B —44867	Power Cord and Plug		C —45158B	Chassis Bottom Cover
14	—21237A	Resistor, 60,000 Ohm ⅛W. Carb.		W —45401	Support Angle—to Brkt. on Spkr.
15	—24990	Resistor, 25,000 Ohm ⅛W. Carb.		W —45402B	Support Brkt.—to Spkr. Stud
16A	—26577	Resistor, 3 Megohm ⅛W. Carb.		W —23880	Thumb Screw—Sup. Angle Mtg.
16B	—26577	Resistor, 3 Megohm ⅛W. Carb.			
17	—22196	Resistor, 20,000 Ohm ⅛W. Carb.			
18	—35601	Resistor, 300,000 Ohm ¼W. Insu.			
19	—23786	Resistor, 500,000 Ohm ⅓W. Carb.			

CROSLEY CORP.

MODEL 568, Trouper
Schematic, Voltage, Chassis
Socket, Trimmers

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	Su	G
6K7GT	R-F Amplifier	6.3	97	98	2.5–25	2.5–25	—
6 J7GT	Detector	6.3	20	10	7	—	—
25 L6GT	Output	25	85	98	6	—	—
25 Z6GT	Rectifier	25	—	—	126	—	—
W-46416	Ballast	55 Volts A. C.					

Power output approximately 2 watts.
Power consumption at 117.5 volts line 45 watts (A.C.).
All readings except filaments will be approximately 10% lower on 117.5 D. C.

Drop across field 28 volts.

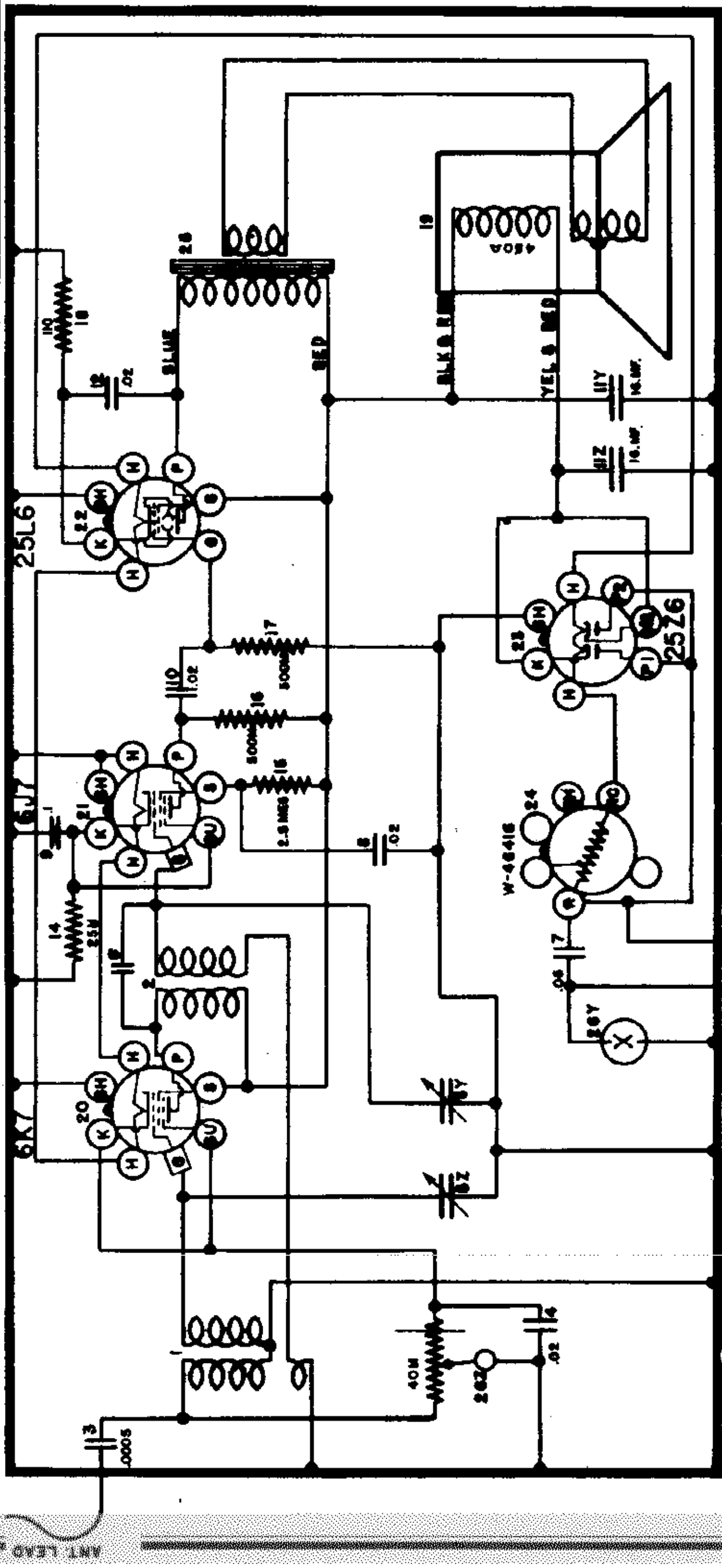


FIG. 1—WIRING DIAGRAM—MODEL 568

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

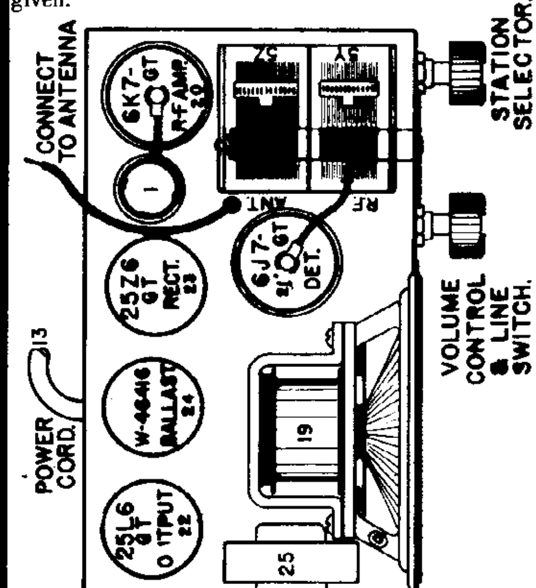


Fig. 2 Top View No. 568

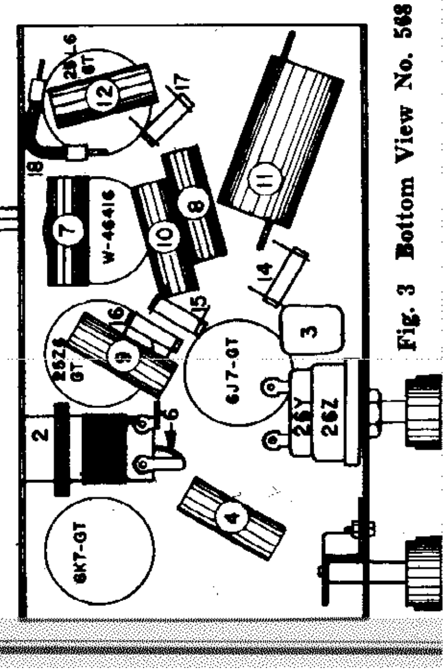


Fig. 3 Bottom View No. 568

MODEL 568, Trouper
Alignment, Notes
Parts

CROSLEY CORP.

CHASSIS NO. 568 (TROUPER)

SPECIFICATIONS

This model Crosley employs four tubes in a highly efficient T. R. F. circuit and on Ballast tube for dropping the line voltage instead of resistance in the power cord.

The frequency range is from 1725 to 540 kilocycles.

The tubes used are of the new Bantam type. Their functions are as follows, one 6K7-GT as R-F amplifier, one 6J7-GT as detector, one 25L6-GT as beam power output, one 25Z6-GT as rectifier. The all metal ballast tube has approximately 200 ohms resistance when cold.

The volume control varies the bias on the 6K7-GT and at the same time the amount of signal fed to the primary of the antenna coil. The bias for the 6J7-GT is obtained from the drop across item 14, a 25,000 ohm resistance and for the 25L6-GT, the drop across item 18, a 110 ohm resistance. The speaker field (450 ohms), is used for filtering in the high side of the "B" supply.

This receiver incorporates a certain amount of fixed regeneration to improve selectivity and sensitivity. With a normmal antenna the receiver is stable and the performance approaches that of a three gang T. R. F. receiver in spite of the fact that only a two gang condenser is used. However with no antenna or a very small antenna the receiver will oscillate but this oscillation can readily be controlled by the volume control.

CONNECTING OUTPUT METER

Connect the one terminal of the output meter to the plate and the other terminal to the screen of the 25L6-G Output tube. Be sure the output meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—NOT electrolytic) in series with one of the leads.

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power line, therefore when using an A. C. operated signal generator for alignment the following precaution should be taken.

(a) Connect the output lead of the signal generator through a .0001 Mf. condenser to the antenna lead on the receiver. The ground lead of the generator should be connected through a .001 Mf. condenser to the chassis.

(b) Open the gang condenser all the way.

(c) Set the generator to 1725 Kilocycles.

(d) Adjust the trimmer condensers on the gang until the 1725 Kc signal is heard. The gang does not have to tune through this signal.

(e) Set the generator to 1400 Kc.

(f) Tune the set to the 1400 Kc. signal, then alternately adjust the trimmers on the gang until no further improvement can be noticed on the output meter.

NOTE: Always use the lowest signal generator output that will give a reasonable indication on the output meter.

Keep the two grid leads as far as possible from each other.

PARTS LIST — MODEL 568

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G182—32000	Antenna Coil	19	284-BL-4"B"	Speaker—Spec. No. 40WA3
2	G102—32001	R-F. Coil		—46691	Field Coil—450 Ohm 60 M. A.
3	G3 —34002	Condenser, .0005 Mf. Molded		284-BL-4"H"	Speaker—Spec. No. S5330M4
4	W —45708B	Condenser, .02 Mf. 160 V.		—46901	Field Coil—450 Ohm 60 M. A.
5	G60 —33001	2 Section Gang Condenser	20 to 24	G178—36400	Socket—8 Prong Octal
	D —46418	Dial Face		W —46477	Tube Shield
	W —46425	Pointer	25	G25 —29535	Output Transformer
	—41587	Pointer Mtg. Screw	26Z	—46411	Volume Control—
	W —44809C	Drive Shaft	26Y		Line Switch—
	W —44808B	Bracket—Shaft Mtg.		W —46416	Ballast Tube
	W —43549	"C" Washer—Shaft Mtg.		B —46880	Power Cable for 220 V. (Resistor)
	G10 —41582	Drive Cord—8¼ Inches		8FC	Cabinet—Mottled Brown
	W —44989	Spring—Cord Tension		—45242	Knob—2 Req.
	W —46854A	Dial Support Brkt.		—45505A	Cabinet Back
6	G3 —50640	Twisted Lead—Cap. Coupling Assy.		8FD	Cabinet—Ivory
7	W —45782B	Condenser, .05 Mf. 120 V.		W —45324	Knob—2 Req.
8	W —45780B	Condenser, .02 Mf. 160 V.		—45506A	Cabinet Back
9	W —50105	Condenser, .1 Mf. 160 V.		G3 —45281	Baffle and Grille Cloth Assy.
10	W —45708B	Condenser, .02 Mf. 160 V.		W —46421	Celluloid Dial Lens
11Z	W —46398	Condenser, 16 Mf. 125 V.		—46437	Instruction Booklet
11Y		Condenser, 16 Mf. 125 V.		W —46454	Cabinet Assy.—8FC—Mottled Brown
12	W —45780B	Condenser, .02 Mf. 160 V.		W —46866	Cabinet Assy. 8FD—Ivory
13	B —45784	Power Cord and Plug		—44763	Single Shipping Carton
14	—24990	Resistor, 25,000 Ohm 3/8W.			
15	—37583	Resistor, 2.5 Megohm 3/8W.			
16	—23785	Resistor, 500,000 Ohm 3/8W.			
17	—23785	Resistor, 500,000 Ohm 3/8W.			
18	W —45965	Resistor, 110 Ohm 1/2W.			

MODELS 587,5587
Schematic,Voltage
Socket,Parts

CROSLEY CORP.

NOVEMBER, 1937

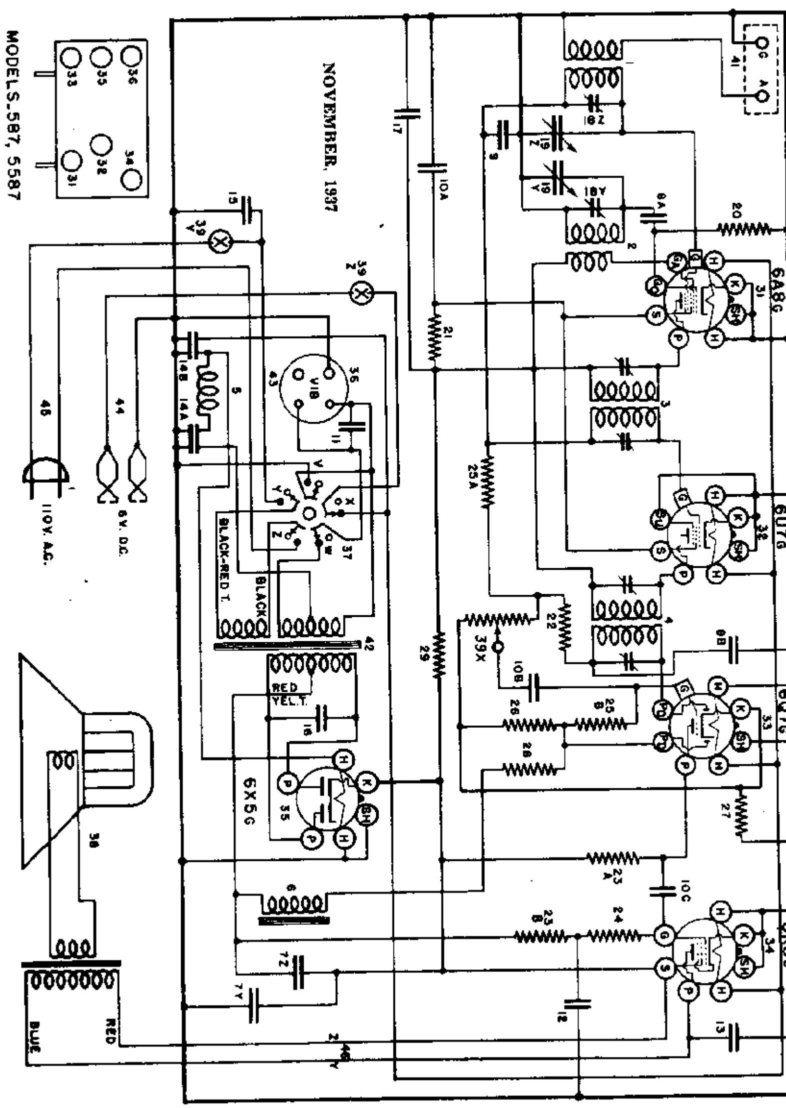


FIG. 1—WIRING DIAGRAM—MODELS 587 and 5587

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	G154-32000	Ant. Coil, 1725–540 Kc.
2	G156-32002	Osc. Coil, 1725–540 Kc.
3	G173-32004	1st I-F., 455 Kc.
4	G171-32004	2nd I-F., 455 Kc.
5	G26—28067	"A" Filter Choke
6	G23—29535	"B" Filter Choke
7	W—41769A	Condenser, Dual 6 Mf. 250 V. (587 only)
7	W—44868A	Condenser, Dual 8 Mf. 250 V. (5587 only)
8A	G1—31002	Condenser, .00025 Mf. Molded
8B	G1—31002	Condenser, .00025 Mf. Molded
9	W—36541	Condenser, .02 Mf. 160 V.
10A	W—28621	Condenser, .02 Mf. 200 V.
10B	W—28621	Condenser, .02 Mf. 200 V.
10C	W—28621	Condenser, .02 Mf. 200 V.
11	W—35936	Condenser, .05 Mf. 200 V.
12	W—21049C	Condenser, .1 Mf. 200 V.
13	W—35758	Condenser, .008 Mf. 400 V.
14A	W—50161	Condenser, .5 Mf. 120 V.
14B	W—50161	Condenser, .5 Mf. 120 V.
15	W—30805	Condenser, .01 Mf. 400 V.
16	W—50170	Condenser, .01 Mf. 1,000 V.
17	W—37173	Condenser, .25 Mf. 300 V.
18	W—37986A	2 Section Shunt Trimmer Cond. Assy.
19	G46—33001	2 Section Var. Tuning Condenser (587 only)
	B—44981A	[illegible]e (587 only)
	—44285	[illegible]ask, Paper (587 only)
	W—44001A	[illegible]Dial Support (587 only)
	—44267	[illegible]ask (587 only)
	B—45033	[illegible]Dial Face (587 only)
	W—43550A	[illegible] (587 only)
	W—40486	[illegible]and Mtg.
	W—44989	[illegible]ord Tension (587 only)
	—41582	[illegible]d
	W—45030	[illegible]—Drive Shaft Mtg.
	W—45031	[illegible]haft (587 only)
	W—43549	[illegible]Shaft Retaining
19	G47—33001	[illegible]on Var. Tuning Condenser ([illegible] only)
	B—44994A	Dial Face (5587 only)
	W—44085B	Dial Mask (5587 only)
	W—44084	Ring—Dial Support (5587 only)
	C—44082E	Support Bracket—Dial (5587 only)
	W—44299	Dial Hand (5587 only)
	G1—43564	Pulley and Hub Assy. (5587 only)
	W—43542B	Bracket—Drive Shaft (5587 only)
	W—44134A	Drive Shaft (5587 only)
	W—43561	Spring—Cord Tension (5587 only)
20	—35928	Resistor, 60,000 Ohm ¼W. Ins.
21	—24990	Resistor, 25,000 Ohm ⅓W. Carb.
22	—35600	Resistor, 100,000 Ohm ¼W. Ins.
23A	—35601	Resistor, 300,000 Ohm ¼W. Ins.
23B	—35601	Resistor, 300,000 Ohm ¼W. Ins.
24	—36322	Resistor, 500,000 Ohm ¼W. Ins.
25A	—36688	Resistor, 3 Megohm ¼W. Ins.
25B	—36688	Resistor, 3 Megohm ¼W. Ins.
26	W—23012A	Resistor, 40 Ohm ¾W. Flex.
27	W—25357	Resistor, 75 Ohm ¾W. Flex.
28	W—27504	Resistor, 100 Ohm ½W. Flex.
29	W—23907	Resistor, 750 Ohm 1½W. Flex.
31	G156—36400	Socket, 6A8 Type
32	G171—36400	Socket, 6U7 Type
33	G160—36400	Socket, 6Q7 Type
34	G172—36400	Socket, 6K6 Type
35	G168—36400	Socket, 6X5 Type
36	G105—28807	Socket, Vibrator
	W—40911	Tube Shield
37	W—45028	A. C.–D. C. Switch (Change Over)
38	274-PL-18"U"	Speaker, Spec. 5-PA-4 (587 only)
	—44537	V. C. and Cone Assy. (274–PL–18"U")
	—45295	Output Transformer (274–PL–18"U")
38	474-PJ-2"M"	Speaker, Spec. 1-D-1282
	—45551	Cone Assembly (474–PJ–2"M")
	—45552	Output Trans. (474–PJ–2"M")
	—43676	Ring, Cone Mtg. (474–PJ–2"M")
39Z	—43854A	6 V. D. C. Switch (On-Off)
39Y		110 V. A. C. Switch (On-Off)
39X		Volume Control
41	G1—26719	Ant. and Gnd. Terminal Assy.
42	G19—32769	Power Transformer
	W—50130	Trans. Shield
43	W—45110	Vibrator, 6 Volt
44	G3—44948	Battery Cable Assy.
	—34903	Battery Clip (Pos.)
	—34904	Battery Clip (Neg.)
45	B—44001	Power Cord and Plug (A. C.)
46Z	G1—45078	Red Speaker Lead (5587 only)
46Y	G2—45078	Blue Speaker Lead (5587 only)
47		
	G20—45022	Vib. Shield Assy.
	G19—45022	Switch Shield Assy.
	7MD	Cabinet (5587 only)
	7AF	Cabinet (587 only)
	W—44432	Knob (1)
	W—44381B	Knob (2)
	—44268A	Escutcheon (587 only)
	B—44226B	Escutcheon (5587 only)
	W—45056	Rubber Mtg. Foot (5587 only)
	W—43553	Rubber Mtg. Foot (587 only)
	B—45231	Bottom Mtg. Plate (5587 only)

SOCKET VOLTAGE READINGS TAKEN ON 117.5 VOLT A. C. POWER SUPPLY

Tube	Function	H	P	S	Su	K	G	Ga
6A8G	Oscillator-Modulator	6.3	192	94	–	0	–	192
6U7G	I.-F. Amplifier	6.3	192	94	0	0	–	–
6Q7G	Det., AVC, 1st A. F	6.3	72	–		2.5	-1.0*	–
6K6G	Output	6.3	195	205		0	20.**	–
6X5G	Rectifier	6.3				205		

SOCKET VOLTAGE READINGS TAKEN ON 6 VOLT STORAGE BATTERY

Tube	Function	H	P	S	Su	K	G	Ga
6A8G	Oscillator-Modulator	6.0	131	62	–	0	–	131
6U7G	I.-F. Amplifier	6.0	131	62	0	0	–	–
6Q7G	Det., AVC, 1st A. F.	6.0	47	–		1.9	-2.7*	–
6K6G	Output	6.0	132	139		0	-12.**	
6X5G	Rectifier	6.0				131		

* Measured across item 26.
** Measured from junction of items 6 and 23B to chassis.

Power output approximately 2.5 watts on 117.5 volts A. C. and 1.1 watts on 6 volt storage battery.
Power consumption approximately 28 watts on 117.5 volts A. C. and 2.9 amperes on 6 volt storage battery.

MODELS 587,5587
Socket,Trimmers
Chassis,Alignment,Notes

CROSLEY CORP.

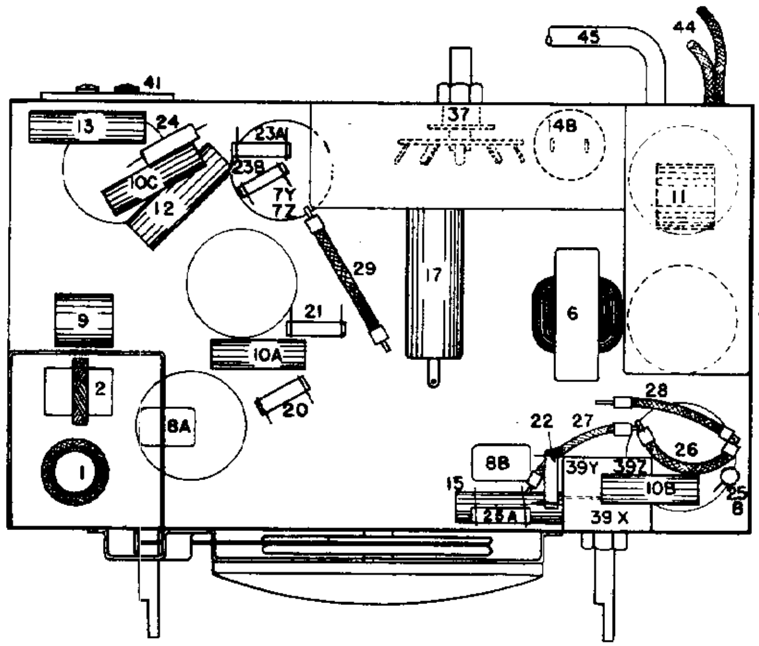


Fig. 3—Bottom View Models 587 and 5587

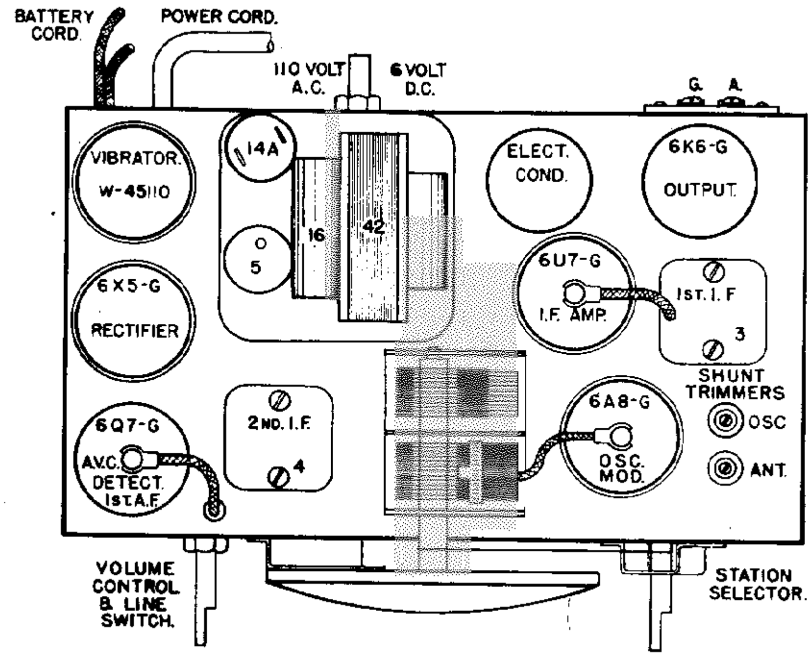


Fig. 2—Top View Models 587 and 5587

ALIGNMENT PROCEDURE

All the circuits in this receiver were very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 6K6G output tube. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning The I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the ground terminal of the receiver. (KEEP THE SIGNAL GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES).

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the trimmer condensers located on the 2nd I. F. transformer, item 4—fig. 2, for maximum reading on the output meter.

(e) Adjust the trimmer condensers located on the 1st I. F. transformer, item 3—fig. 2, for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

(a) Connect the output of the signal generator through a .00025 mfd. condenser to the antenna terminal of the receiver.

(b) Set the signal generator to 1725 kilocycles.

(c) With the condenser gang rotated to the minimum capacity position, adjust the "OSC" SHUNT TRIMMER so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(d) Set the signal generator to 1400 kilocycles.

(e) Tune-in the 1400 kilocycle signal, in the region of 140 on the dial, for maximum output.

(f) Adjust the "ANT" SHUNT TRIMMER for maximum output. NOTE: Do not readjust the "OSC" SHUNT TRIMMER.

(g) Repeat operations (e) and (f) for more accurate adjustments.

SPECIFICATIONS

These model Crosley radios are designed for operation on 110-volt, 60 cycle A. C. power lines or on a six-volt storage battery. No "B" or "C" batteries are required. The tuning range is from 535 to 1725 kilocycles (560 to 173 Metres). Model 5587 is identical with Model 587 except that it has a larger dial assembly, an 8" speaker, larger electrolytic condenser, and is mounted in a console cabinet.

CIRCUIT DESCRIPTION

Five octal base glass tubes are employed in a superheterodyne circuit which consists of an oscillator-modulator tube, 455 kilocycle I. F. amplifier, composite detector—AVC and A. F. amplifier tube, pentode output and power supply. An AC-DC switch is located on the rear of the chassis and must be set according to the power supply the receiver is to be used on. The 6Q7G tube supplies AVC voltage to the grids of the 6A8G and 6U7G tubes through items 22 and 25A. The initial bias for the 6A8G and 6U7G tubes is developed across a 75 ohm resistor, item 27. The bias for the 6Q7G tube is developed across a 40 ohm resistor, item 26. The bias for the output tube is obtained by the combined voltage drop across items 6 ("B" filter choke), 26 (40 ohms), 27 (75 ohms) and 28 (100 ohms). The speaker is a permanent magnet type dynamic.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

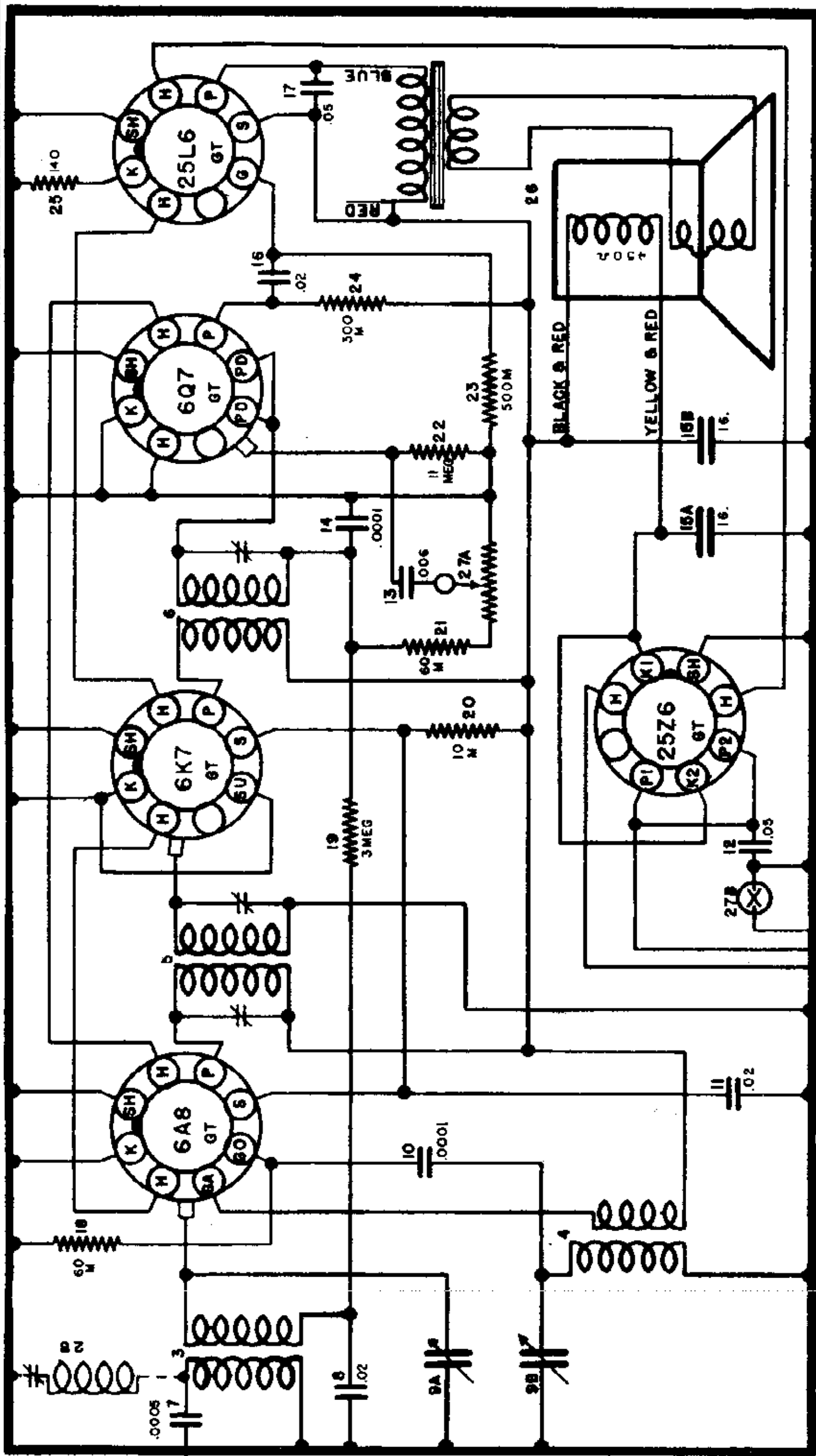
MODEL 588,Super Vanity Fiver
588BC,588BD,588BE
Schematic,Socket,Trimmers
Alignment,Voltage,Chassis

CROSLEY CORP.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Co	Ga
6A8-GT	Oscillator-Modulator	6.3	105	65	—	—	-10	105
6K7-GT	I-F Amplifier	6.3	105	65	—	—	—	—
6Q7-GT	Det, AVC, A-F Amplifier	6.3	42	—	—	...	—	—
25L6-GT	Output	25.1	95	105	—	—	—	—
25Z6-GT	Rectifier	25.1	117.5 A.C.	—	—	132	—	—

Power output approximately 2 watts. Power consumption approximately 47 watts. Voltage drop across speaker field 27 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.



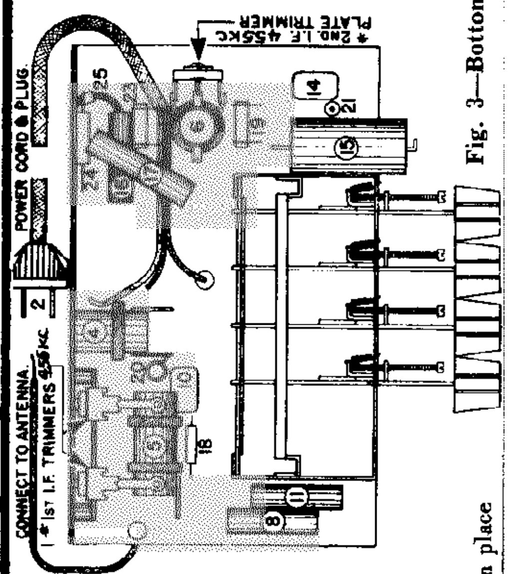


Fig. 3—Bottom View

MODEL . . 588
456 K.C. I.F.

CHASSIS NO. 588
(Super Vanity Fiver)
JANUARY, 1939

*Leave grid cap of 6A8GT in place

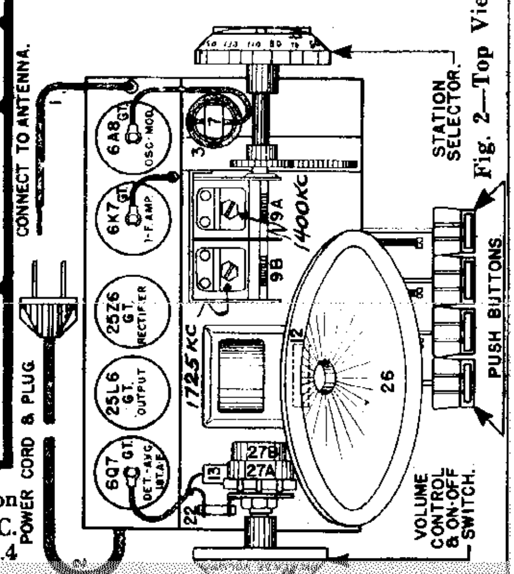


Fig. 2—Top View

SPECIFICATIONS This model Crosley radio is designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 540 to 1725 kilocycles (555.4 to 173 metres).

MODEL 598, Vanity, 598BB, 598BD
Schematic, Socket, Trimmers
Alignment, Voltage, Chassis

CROSLEY CORP.

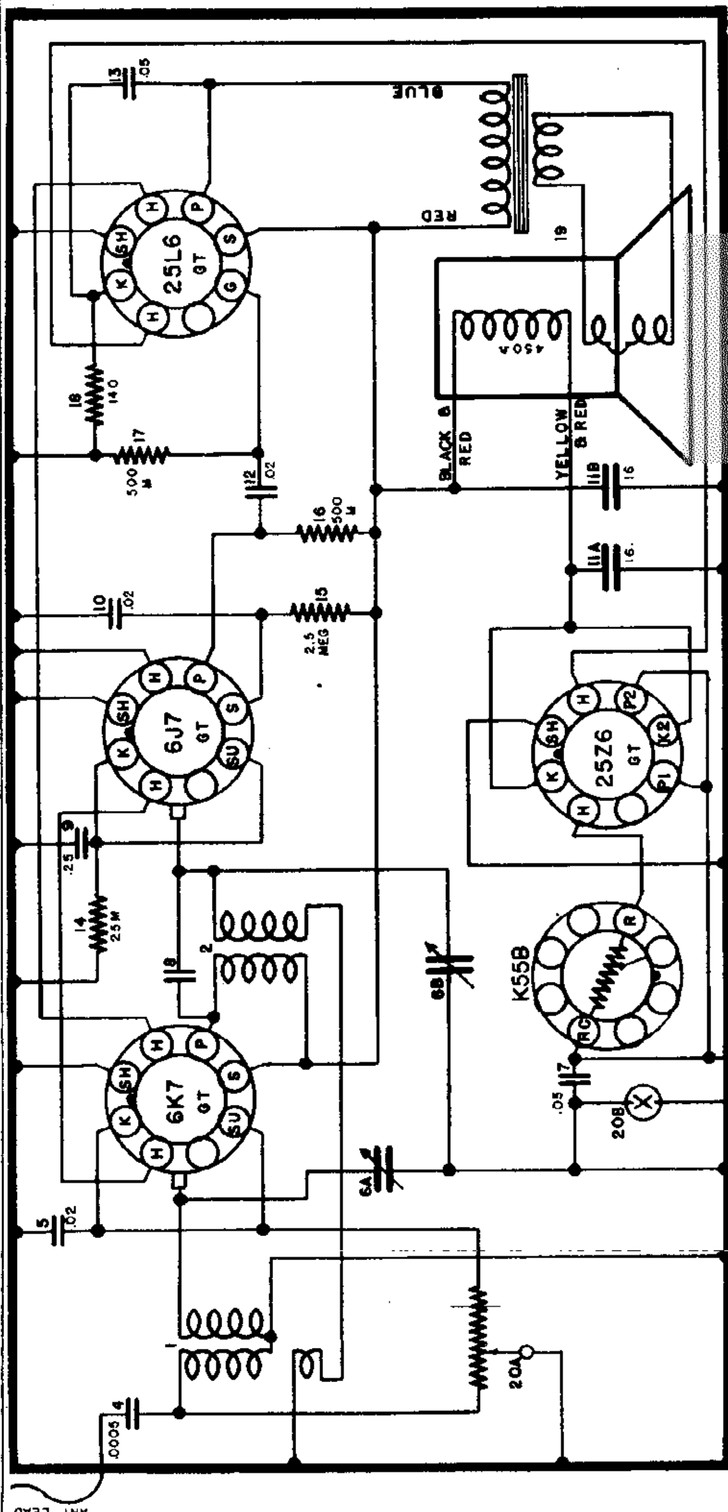
TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	Su	G
6K7-GT	R-F Amplifier	6.3	110	110	2.5–25	2.5–25	—
6 J7-GT	Detector	6.3	20	7	6	—	—
25 L6-GT	Output	25.1	98	110	6	—	—
25 Z6-GT	Rectifier	25.1	117 A.C.	—	135	—	—
W–46416	Ballast	Approx. 54.7 Drop A.C.					

Power output approximately 2 watts.
Power consumption at 117.5 volts line 47 watts (A.C.).
All readings except filaments will be approximately 15% lower on 117.5 D. C.

Drop across field 25 volts.

FIG. 1—WIRING DIAGRAM



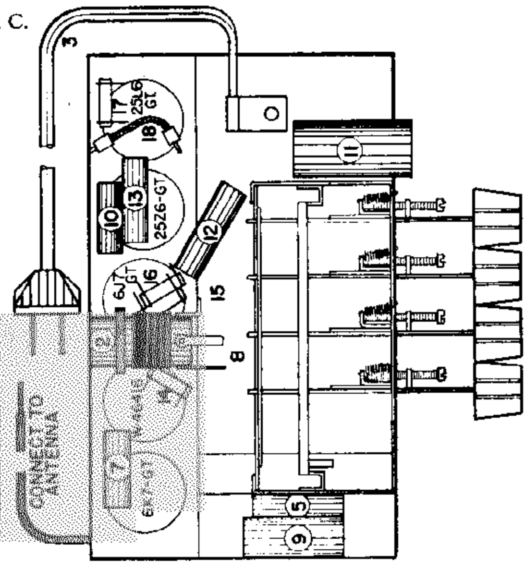


Fig. 3—Bottom View 598

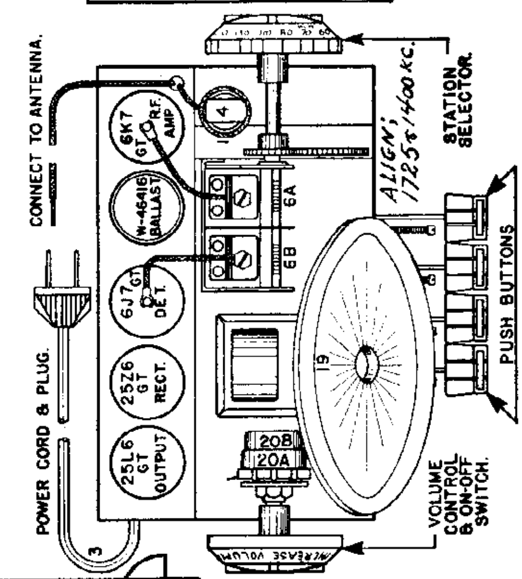


Fig. 2—Top View 598

MODEL--598

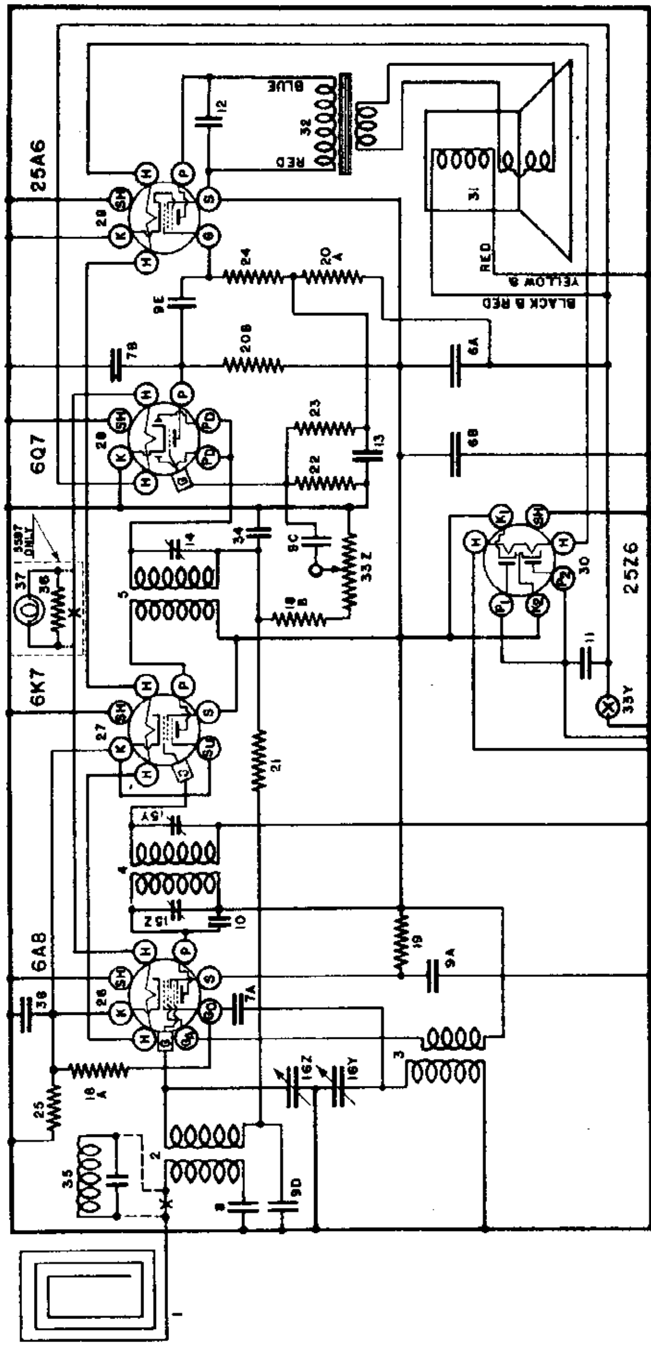
MODEL 598 VANITY

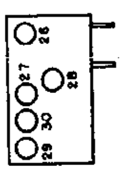
JANUARY, 1939

TUBES AND VOLTAGE LIMITS

The table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

CROSLEY CORP.





NOVEMBER, 1937

MODEL 597-5597
455 Kc. I.F.

FIG. 1—WIRING DIAGRAM—MODEL 597 and 5597

Figures in first column refer to parts in Diagrams.

Item	Part No.	Description
1	W —31765C	Ant. Roll
2	G163—32000	Ant. Coil
3	G155—32002	Osc. Coil
4	G168—32004	1st I-F
5	G167—32004	2nd I-F
6A	W —44935	Condenser, 30 Mf. 125 V.
6B	W —44935	Condenser, 30 Mf. 125 V.
7A	G 2—34002	Condenser, .0001 Mf. Molded
7B	G 2—34002	Condenser, .0001 Mf. Molded
8	W —26571	Condenser, .0005 Mf. 200 V.
9A	W —28621	Condenser, .02 Mf. 200 V.
9C	W —28621	Condenser, .02 Mf. 200 V.
9D	W —28621	Condenser, .02 Mf. 200 V.
9E	W —28621	Condenser, .02 Mf. 200 V.
10	G 5—34002	Condenser, .00005 Mf. Molded
11	W —23615	Condenser, .05 Mf. 400 V.
12	W —28619	Condenser, 006 Mf. 200 V.
13	W —24049C	Condenser, .1 Mf. 200 V.
14	W —44142	Condenser, 2nd I-F Plate Trimmer.
15	W —44882	Condenser, 1st I-F Trimmer Assy.
16	G 45—33001	2 Sect. Var. Tuning Cond.
	B —44801A	Dial Face (Glass)
	W —50173A	Pointer
	W — 2045	Washer (Pointer Lock)
	W —40486	Screw (Pointer Mtg.)
	W —44810C	Dial Support
	W —44811	Ring (Dial Glass Support) 597
	W —45342	Ring (Dial Glass Support) 5597
	W —44809C	Drive Shaft
	W —44808A	Bracket Drive Shaft
	—41582	Drive Cord
	W —43561	Spring—Cord Tension
	W —43549	Ring—Drive Shaft Retaining
17	B —44917B	Power Cord & Plug (160 Ohm) 597 Only
	B —45491B	Power Cord & Plug (140 Ohm) 5597 Only
18A	—35928	Resistor, 60,000 Ohm ¼ W. Ins.
18B	—35928	Resistor, 60,000 Ohm ¼ W. Ins.
19	—22831	Resistor, 15,000 Ohm 1/3 W. Ins.

Item	Part No.	Description
20A	—21455	Resistor, 300,000 Ohm 1/3 W. Carb.
20B		See Item 39
21	—26577	Resistor, 3. Megohm 1/3 W. Carb.
22	—21454	Resistor, 1. Megohm 1/3 W. Carb.
23	—37584	Resistor, 11. Megohm 1/3 W. Carb.
24	—34020	Resistor, 250,000 Ohm 1/3 W. Carb.
25	W —25357	Resistor, 75 Ohm ¾ W. Flex.
26	G156—36400	Socket Type 6A8
27	G151—36400	Socket Type 6K7
28	G160 36400	Socket Type 6Q7
29	G161—36400	Socket Type 25A6
30	G162—36400	Socket Type 25Z6
31	—270BL6"O"	Speaker Spec. No. 3-101
	—45174	Cone & V.C. Assy. } For Above
	—45175	Ring (Cone Mtg.) } Speaker
32	G 21—29535	Output Transformer
33	—44920A	Vol. Cont. (1 Meg.) & Line Switch
34	G 1—34002	Condenser .00025 Mf. Molded
35	G182—32004	Wave Trap
36	W —44396	Resistor 40 Ohm 3½ W. Flex 5597
37	W 44337	Bulb 6-8 V. Dial Light 5597
	G 6—27134	Dial Light Socket Assy. 5597
	W —45313	D. L. Socket Mtg. Brkt. 5597
38	W —27216	Condenser .05 Mf. 200 V.
	7F	Cabinet (Black) 597
	W —44934	Knob—Black 597
	G 1—45281	Grille & Baffle Assy. 597
	—7FB	Cabinet (Brown) 597
	W 45242	Knob—Brown 597
	G 1—45281	Grille & Baffle Assy. 597
	—7FA	Cabinet (Ivory) 5597
	W —45324	Knob 5597
	G 1 45281	Grille & Baffle Assy. 5597
	W —45282	Shield—Heat Reflector
	B —45505	Back—7FB Cab.
	B —44885A	Back—7F Cab.
	B —45506	Back 7FA Cab.
39	—23403	Resistor, 150,000 Ohm 1/3 W. Carb.

MODELS 597,5597
Socket,Trimmers,Chassis
Alignment,Voltage,Data

CROSLEY CORP.

CHASSIS NO. 597—5597

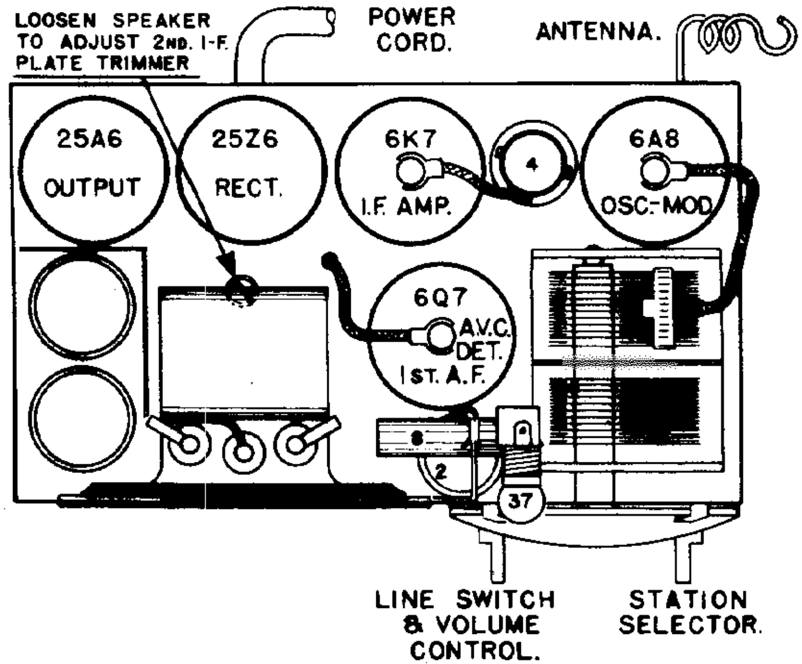


Fig. 2—Top View Model 597 and 5597

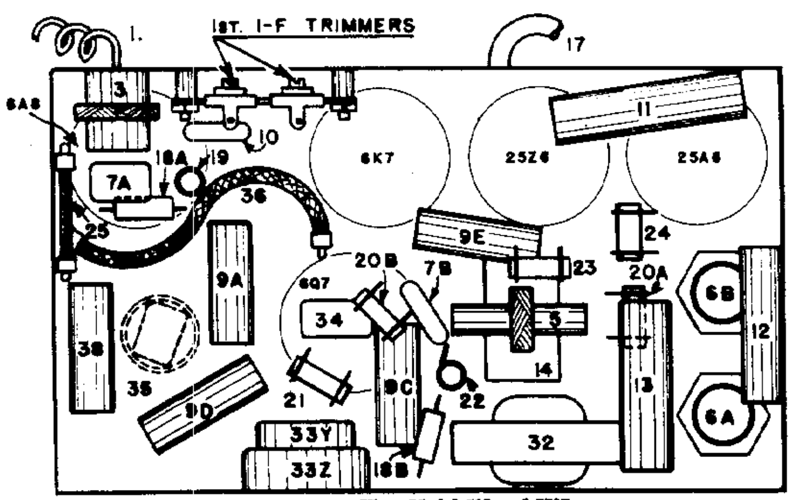


Fig. 3—Bottom View Model 597 and 5597

SPECIFICATIONS

These model Crosley radios are designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 535 to 1725 kilocycles (550 to 173 metres). Model 5597 is identical with Model 597 except that it has an illuminated dial and a different cabinet.

CIRCUIT DESCRIPTION

Five metal tubes are employed in a superheterodyne circuit which consists of a combination oscillator-modulator tube, 455 kilocycle I-F amplifier, pentode output and power supply. The 6Q7 tube serves as the detector and 1st A-F amplifier and supplies AVC voltage to the grid of the 6A8 tube. The bias voltage for the 6A8 and 6K7 tubes is obtained across a 75 ohm resistor, item 25. The bias for the 6Q7 and 25A6 tubes is obtained across the speaker field. A resistance type power supply cord is used to provide the proper heater voltage to the tubes. The filaments of the tubes are wired in series. A .05 mfd. condenser, item 11, is connected across the power supply leads to reduce electrical interference from that source.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range voltmeter. When measured on a 117.5 volt AC line voltage limits may vary plus or minus 10% of the values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Gc	Gs
6A8	Oscillator-Modulator	6.3	105	46	—	3	-10	105
6K7	I-F Amplifier	6.3	105	105	0	3	—	—
6Q7	Det, AVC, A-F Amplifier	6.3	50	—	—	0	—	—
25A6	Output	26.1	100	106	—	0	—	—
25Z6	Rectifier	26.1	117.5	—	—	110	—	—

Power output approximately 1 watt.
Power consumption approximately 35 watts.
Voltage drop across speaker field 18 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning The I-F Amplifier To 455 Kilocycles.

(a) Disconnect the antenna roll from the receiver and connect the output of the signal generator through a 50 mmf. condenser to the antenna connection on the receiver. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condenser, Item 14, located beneath the edge of speaker field, for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers, located on back flange of the chassis, for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

(a) Set the signal generator to 1725 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser on the "OSC" section of the gang so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(c) Set the signal generator to 1400 kilocycles.

(d) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condenser located on the "ANT" section of the gang for maximum output.

Note: Do not readjust the "OSC" trimmer.

(f) Repeat operations (d) and (e) for more accurate adjustments.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil and a fixed condenser as illustrated by dotted lines in the Wiring Diagram.

MODEL 648, Super Sextette
Schematic, Voltage, Data

CROSLEY CORP.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Go	Ga
6A8G	Oscillator-Modulator	6.3	105	70	—	—	-10	105
6U7G	I-F Amplifier	6.3	105	70	—	—	—	—
6Q7G	Det, AVC, A-F Amplifier	6.3	35	—	—	—	—	—
25A6G	Output	25.1	100	105	—	6	—	—
25Z6G	Rectifier	25.1	117.5 A.C.	—	—	132	—	—
W-46773	Ballast Tube	Approx. 48.4 A.C. Drop						

Power output approximately 2 watts.
Power consumption approximately 48 watts.
Voltage drop across speaker field 27 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.

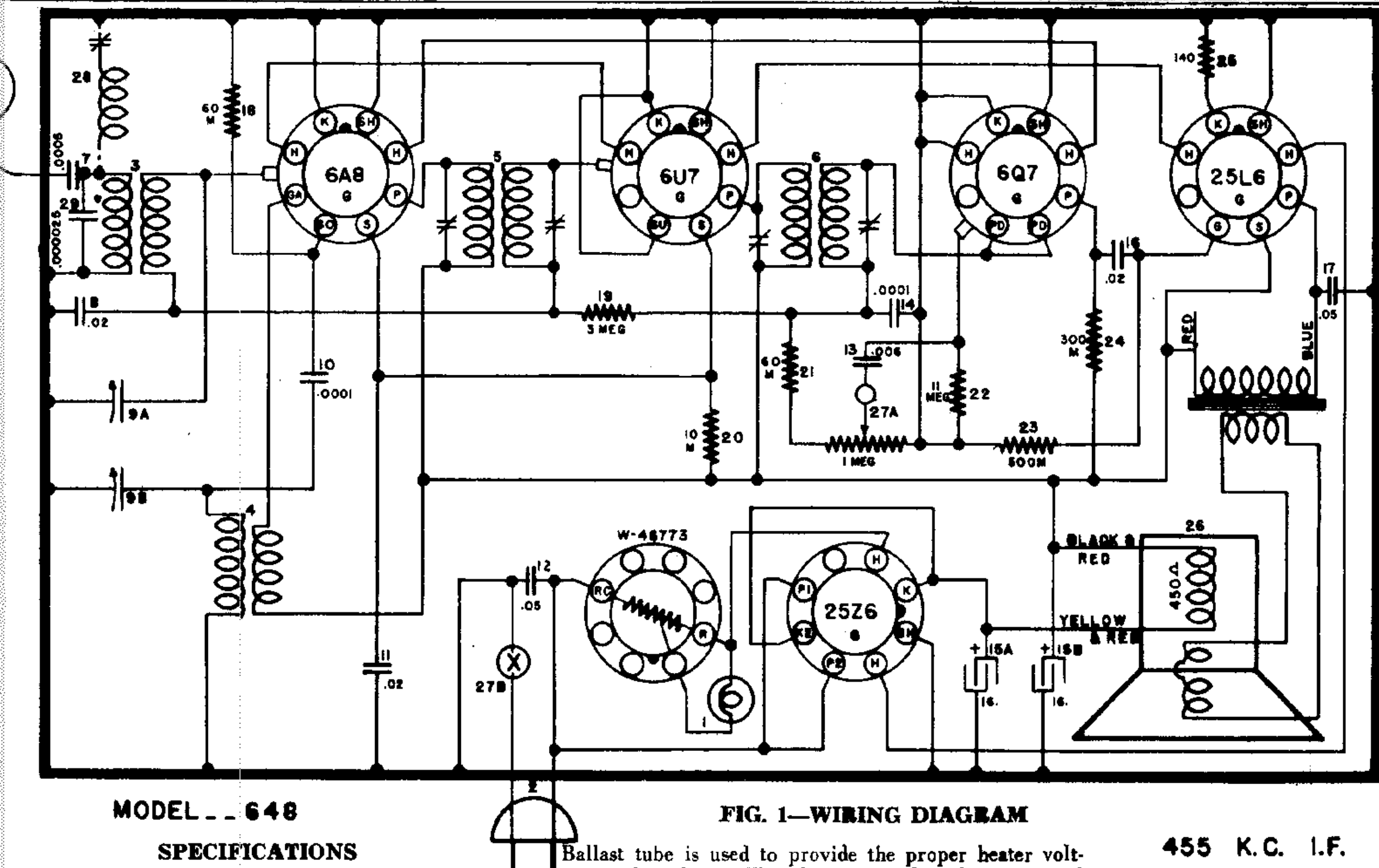


FIG. 1—WIRING DIAGRAM

455 K.C. I.F.

CHASSIS NO. 648
(Super Sextette)

JANUARY, 1939

MODEL — 648

SPECIFICATIONS

This model Crosley radio is designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 540 to 1725 kilocycles (555 to 173 metres).

CIRCUIT DESCRIPTION

Five Octal Glass tubes and one metal Ballast tube are employed in a superheterodyne circuit which consists of a combination oscillator-modulator tube, 455 kilocycle I-F amplifier, Beam Power output and power supply. The 6Q7 tube serves as the detector and 1st A-F amplifier and supplies AVC voltage to the grid of the 6A8-G and 6U7-G tubes. The bias for the 25L6-G tube is obtained from item 25 a 140 ohm resistor. A Ballast tube is used to provide the proper heater voltage to the tubes. The filaments of the tubes are wired in series. A .05 mfd. condenser, item 12, is connected across the power supply leads to reduce electrical interference from that source.

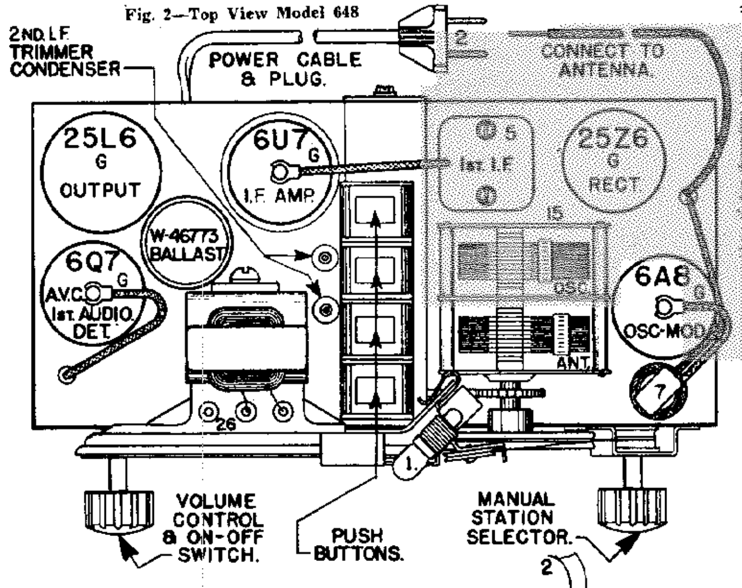
TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range voltmeter. When measured on a 117.5 volt AC line voltage limits may vary plus or minus 10% of the values given.

MODEL 648, Super Sexette
Socket, Trimmers, Chassis
Alignment, Notes, Parts

CROSLEY CORP.

Fig. 2—Top View Model 648



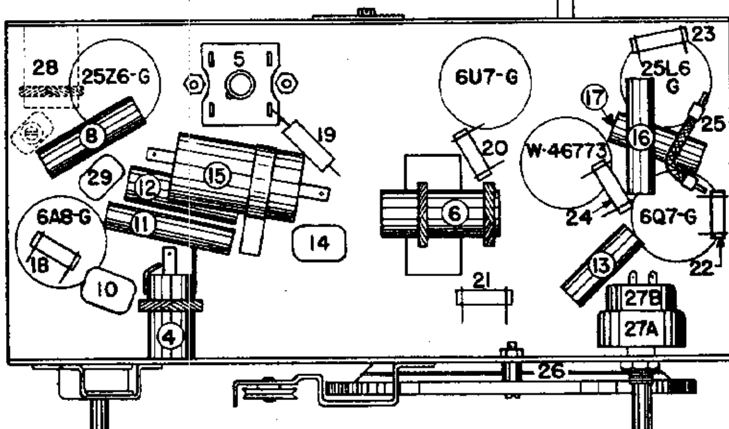


Fig. 3—Bottom View Model 648

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25L6G output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning The I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mf. condenser to the grid cap of 6A8-G, leaving grid cap in place. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condensers, Fig. 2, located between Push Button Assembly and speaker field, for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

Connect output of signal generator through a .0001 condenser to the antenna lead of receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser on the "OSC" section of the gang so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(c) Set the generator to 1400 kilocycles.

(d) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condenser located on the "ANT" section of the gang for maximum output.

NOTE: Do not readjust the "OSC" trimmer.

(f) Repeat operations (d) and (e) for more accurate adjustments.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil and a fixed condenser as illustrated by dotted lines in the Wiring Diagram.

If any of the circuits have been re-aligned, check push buttons to see if they need resetting.

SETTING THE PUSH BUTTONS

The push buttons are easily and accurately set from the top of the receiver. It is not necessary that all the buttons be set at the same time. Remove the push buttons to be set by grasping the button between the forefinger and thumb and pulling straight up. Loosen the set screws on the keys but do not remove them.

Determine the favorite broadcasting stations whose call letters are to be placed in the buttons. By means of the manual tuning knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is the station that is tuned-in nearest the 1500 Kc. end of the dial. Then push the front key all the way down, and while you hold it in that position SECURELY TIGHTEN THE SET-SCREW. Replace push button on key.

The push button tuning system is now correctly set for the 1st station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles). Detach the call letters of the favorite stations from the list supplied with your receiver and press them into the openings in the front of the push buttons. Thin pieces of clear celluloid are supplied in a small envelope and should be snapped in place over the call letters to protect and hold them in place.

PUSH BUTTON PARTS

C33	45683	Push Button Unit Complete
G26	45683	Key Assembly
W	—50542C	Key Clip (Lock Clamp)
W	—45646B	Adjusting Clip (3 Req.)
W	—50547	Key Plate
W	[illegible]	Adjusting Clip (1 Req.)
W	—50607C	Spring (Key Return)
W	—50561	No. 6—40 x ½" Bearing Screw (Rocker Plate)
	—2046	No. 8 Shakeproof Washer
G62	45683	Rocker Plate Assembly
	—46841A	Push Button (8AK) (Brown)
	—46879A	Push Button (8AH and 8AG) (Black)
W	—46887	Call Letter Sheet (8AH and 8AG)
	—50841	Call Letter Sheet (8AK)
	—50551	Call Letter Cover (5 in Envelope)
	—46840A	Instructions
	—46953	Knob (8AK) (Brown)
	—44552	Knob (8AH and 8AG) (Black)

PARTS LIST — MODEL 648

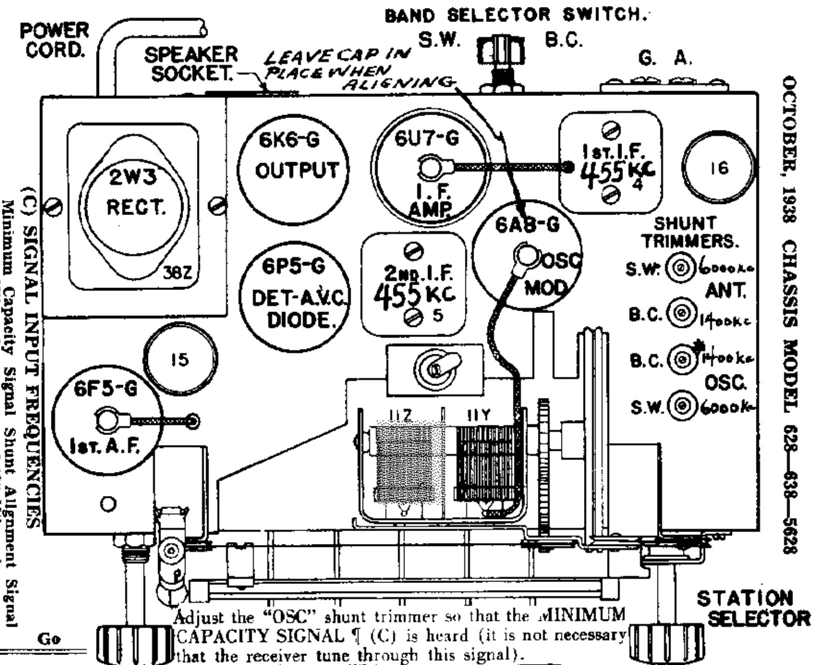
Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —4099B	Dial Light, 6-8 Volt
	G6 —27134	Dial Light Bracket Assembly
2	B —45784	Power Cable and Plug
3	G185—32000	Antenna Coil
4	G182—32002	Oscillator Coil
5	G208—32004	1st I.F. Transformer
6	G209—32004	2nd I.F. Transformer
7	G3 —34002	Condenser, .0005 Mf. Molded
8	W —45780B	Condenser, .02 Mf. 160 V. Paper
9A	G66 —33001	2 Section Gang Antenna Section
9B		2 Section Gang Oscillator Section
	W —46753	Var. Con. Mtg. Plate
	—6416	No. 8—32 x 5/16" W. H. M. Screw
	C —46815A	Dial Glass
	W —46921	Speed Nut (2 Req.)
	MG12—46750	Dial Back Plate Assembly
	W —46831A	Dial Pointer
	G13 —41582	Drive Cord (30 Inches)
	G4 —41582	Guide Cord (9 Inches)
	W —46848	Guide Cord Spring
	W —46087	Drive Cord Spring
	G15 —43564	Pulley and Hub Assembly
	W —23877	Set Screw for Drive Pulley (2 Req.)
	W —46290	Cord Clamp
	W —43542B	Drive Shaft Bracket
	—45746	Drive Shaft
	—45808	P. K. Screw for Bracket (2 Req.)
	O-8	Flat Washer
10	G2 —[illegible]	Condenser, .0001 Mf. Molded
11	W —[illegible]	Condenser, .02 Mf. 160 V. Paper
12	W —[illegible]	Condenser, .05 Mf. 120 V. Paper
13	W —[illegible]	Condenser, .006 Mf. 160 V. Paper
14	G2 [illegible]	Condenser, .0001 Mf. Molded
15A	W —[illegible]	Condenser, 16 Mf. 125 V. Elect.
15B		Condenser, 16 Mf. 125 V. Elect.
16	W —[illegible]	Condenser, .02 Mf. 160 V. Paper
17	W —[illegible]	Condenser, .05 Mf. 160 V. Paper
18	—[illegible]	Resistor, 60,000 Ohm ⅓W. Carbon
19	—[illegible]	Resistor, 3 Megohm ⅓W. Carbon
20	—[illegible]	Resistor, 10,000 Ohm ⅓W. Carbon
21	—[illegible]	Resistor, 60,000 Ohm ⅓W. Carbon
22	—[illegible]	Resistor, 11 Megohm ⅓W. Carbon
23	—23765	Resistor, 500,000 Ohm ⅓W. Carbon
24	—21455	Resistor, 300,000 Ohm ⅓W. Carbon
25	W —41759	Resistor, 140 Ohm ½W. Flex.
26	281-BL-7-"B"	Speaker, Spec. 55WA43 (450 Ohm)
	—47290	Speaker Cone and V. C. Assembly
	—46686	Field Coil (450 Ohm 60 M. A.)
	—46687	Output Transformer
	—46685	Cardboard Ring, Cone Mtg.
	W —46967A	Speaker Support Bracket
	—6876	No. 6—32 x ¼" Washer H. M. Screw
	N —5062	No. 6—32 H. H. Nut
	W —20800	No. 6 Shakeproof Washer
	L —10	Lock Washer
	R —181	No. 10—32 x 1/16" Ro. H. M. Screw
	W —4318B	Spacer
27A	—46847	Volume Control (1 Meg.)
27B		Power Switch
	W —46668	⅜" Palnut
	G178—36400	8 Prong Socket (No Marking)
	W —46773	Ballast Tube
	W —40911	Tube Shield
28	G184—32004	Wave Trap
29	G6 —34002	Condenser, .000025 Mf. 200 V. Molded
	—46894	8AK Cabinet (Brown)
	—46909	8AH Cabinet (Ivory)
	—47081	8AG Cabinet (Red)
	—46842A	8AK Cabinet Back
	—46876A	8AH Cabinet Back
	—46990A	8AG Cabinet Back
	B —128	Screws for Mounting Back (4 Req.)
	—46816	Rubber Bottom Mtg. Screw (4 Req.)

CROSLEY CORP.

MODELS 628, 638 (Late)
5628
Socket, Trimmers, Chassis
Alignment, Data, Late Parts

OCTOBER, 1938 CHASSIS MODEL 628—638—5628



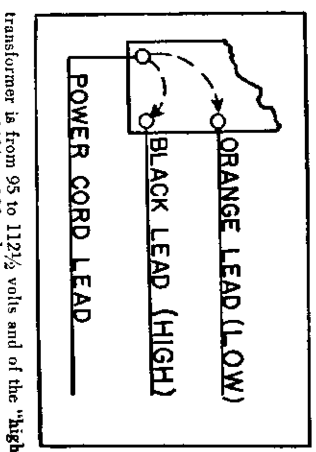
Adjust the "OSC" shunt trimmer so that the MINIMUM CAPACITY SIGNAL ¶ (C) is heard (it is not necessary that the receiver tune through this signal).

Fig. 2 Top View—Model 628—638—5628

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt

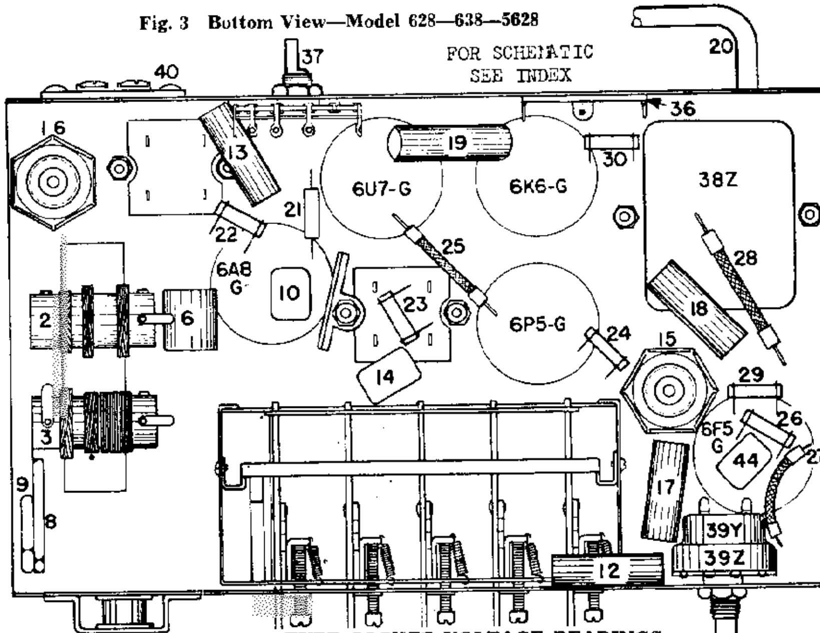


transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

Fig. 3 Bottom View—Model 628—638—5628



(C) SIGNAL INPUT FREQUENCIES

	Minimum Capacity Signal	Shunt Alignment Signal
American Broadcast Band	1,725 Kilocycles	1,400 Kilocycles
Short-Wave Band	7,000 Kilocycles	6,000 Kilocycles

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Ga	Go
6A8G	Oscillator-Modulator	6.3	175	80	—	—	175	—
6U7G	I-F Amplifier	6.3	175	80	—	—	—	—
6P5G	Detector—A. V. C.	6.3	—	—	—	—	—	—
6F5G	1st. A-F Amplifier	6.3	105	—	—	—	—	—
6K5G	Power Output	6.3	160	170	—	-14.5	—	—
2W3	Rectifier	2.2	—	—	230			

Voltage drop across speaker field 45 volts.
Maximum power output approximately 2 watts.
Power consumption at 117.5 volts approx. 37 watts.

(LATE) PARTS LIST—MODEL 628, 638—5628 (FOR OTHER PARTS SEE SCHEMATIC DIAGRAM)

Item No.		Part No.	Description
		—45940	Power Trans., 50 Cycle, 220 V.
39Z, 39Y		—45864	Vol. Cont., 1 Meg. (628-5628) Line Switch
39Z, 39Y		—46314	Vol. Cont., 1 Meg. (638) Line Switch
17	W	—28619	Condenser, .006 Mf., 200 V.
22		—33390	Resistor, 30,000 Ohm, 1/3 W.
26		—37584	Resistor, 11 Megohm, 1/3 W.
28	W	—21965	Resistor, 375 Ohm, 1 W (was 275 Ohm)
			Model 628
		—8AA	Cabinet (Brown)
	W	—43552	Clamp, Speaker Plug
		—45957	Knob, Band Switch
		—45771	Knob, V. C. & Tuning
		—50841	Station Call List
		—45553B	Push Button
	W	—50551A	Celluloid Call Letter Cover
			Model 5628
		—8AB	Cabinet (Red)
		—8AC	Cabinet (Ivory)
		—44552	Knob, V. C. & Tuning
		—44934	Knob, Band Switch
		—46887	Station Call List
	W	—50551A	Call Letter Cover
		—50617	Push Button
		—45910	Instructions (628)
		—46326	Instructions (638)
		—46897	Instructions (5628)
			Model 638
		—8G	Cabinet (Wood Has Inlays)
		—8K	Cabinet (Wood)
		—46399C	Escutcheon
	D	—30	Screws, Escutcheon Mtg.
		—46407	Knob, Band Switch
		—46408	Knob, V. C. & Tuning
		—50841	Station Call List
	W	—50551A	Celluloid Cover
		—46417	Push Button

MODEL 667
Socket, Trimmers, Chassis
Voltage

CROSLEY CORP.

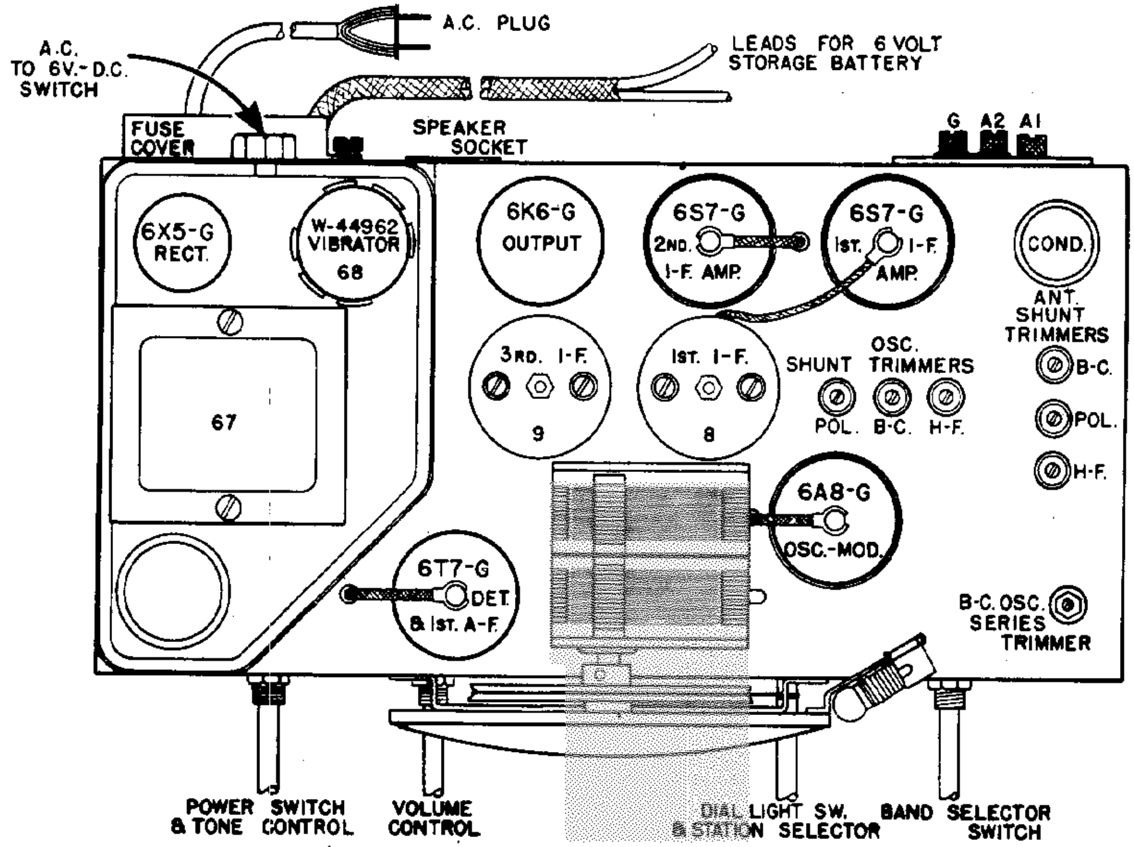


Fig. 2—Top View Model 667

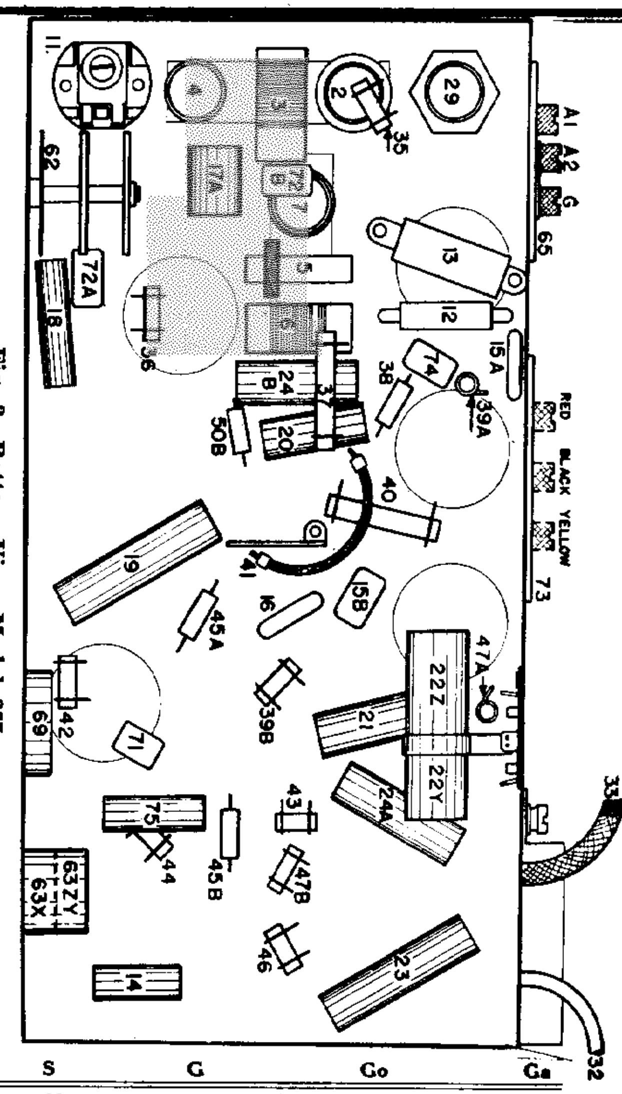


Fig. 3—Bottom View Model 667

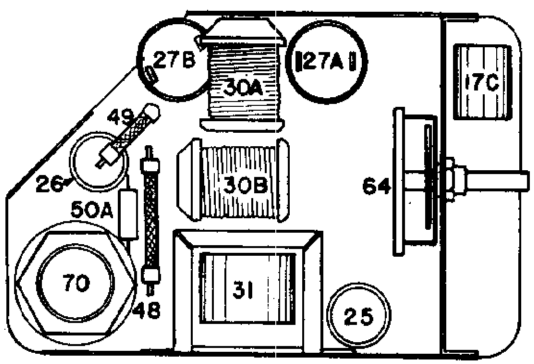


Fig. 4—Power Unit—Model 667

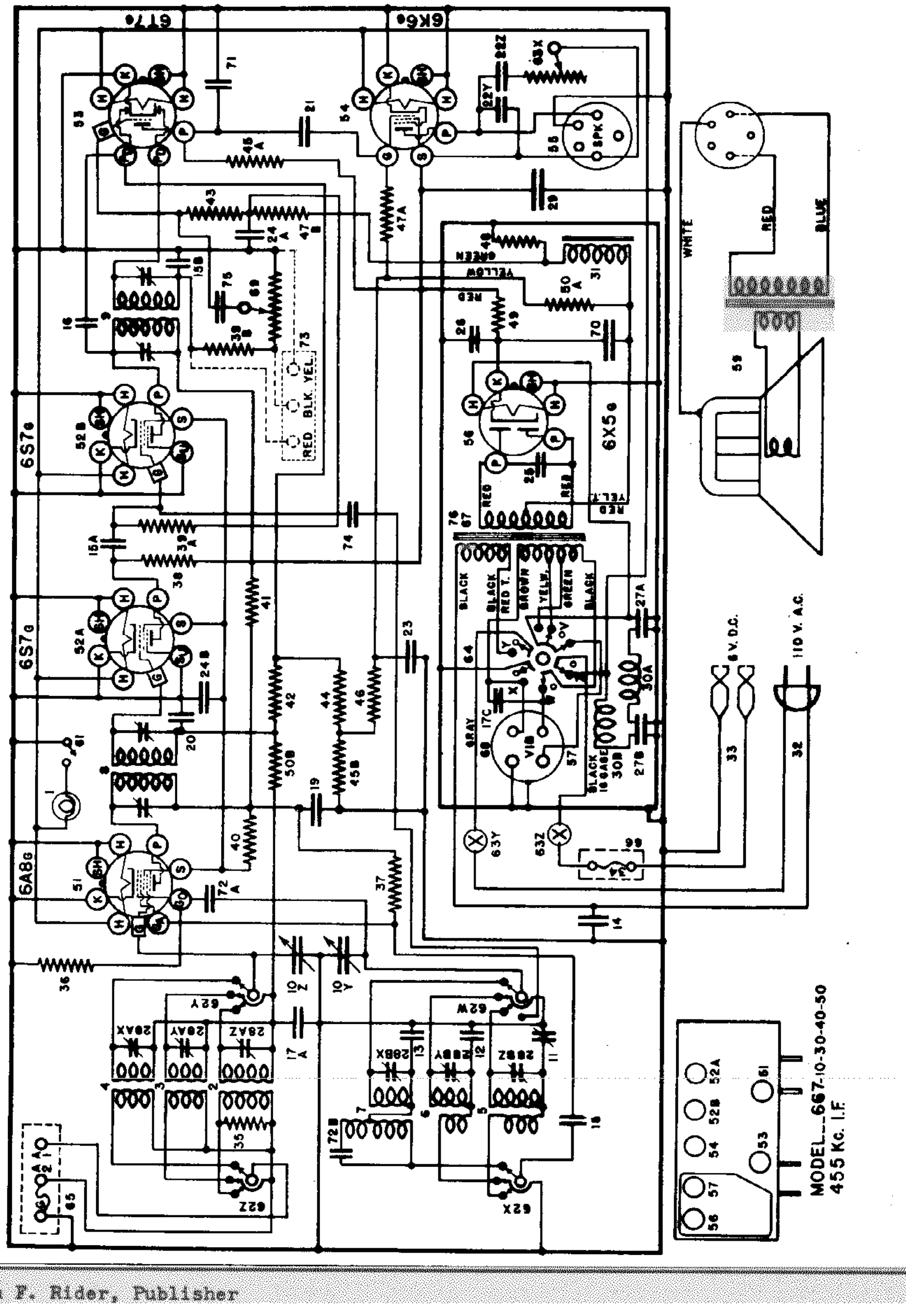
TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	Go	Ga
6A8G	Oscillator-Modulator	6.2	170	92	-3*	-6 to -9**	125
6S7G	1st I-F. Amplifier	6.2	150	92	-3*	—	—
6S7G	2nd I-F. Amplifier	6.2	198	92	-2	—	—
6T7G	Det. AVC & 1st A. F.	6.2	100	—	-2	—	—
6K6G	Output	6.2	193	198	-18.5*	—	—
6X5G							

Power consumption approximately 25 watts at 117.5 volts or 5 amperes at 6 volts.
Power output approximately 3 watts at 117.5 volts or 2.5 watts at 6 volts D. C.
When using a 6 volt storage battery, all voltages will be approximately as given except "H" which will be 6 volts.
*See CIRCUIT DESCRIPTION.
**100 to 150 microamperes measured between 60,000 ohm grid lead (item 36) and chassis.

MODEL 667
Schematic

CROSLEY CORP.



MODEL 667
Alignment, Parts
Data

CROSLEY CORP.

DECEMBER, 1937 — CHASSIS NO. 667

CIRCUIT DESCRIPTION

Six octal base glass tubes are employed in a superheterodyne circuit which consists of an oscillator-modulator tube, two-stage 455 kilocycle I-F amplifier, composite detector, AVC and 1st A-F amplifier tube, pentode output and power supply. Items 45B, 46 and 50 serve as a voltage divider. The initial bias for the 6A8G and 6S7G 1st I-F tubes is obtained by the voltage drop across item 45B, measured with a vacuum tube voltmeter or 20,000 ohms per volt voltmeter. The bias for the 6S7G 2nd I-F and 6T7G tubes is developed across item 48. The bias for the output tube is obtained by the voltage drop across items 45B and 46, also measured with a vacuum tube voltmeter or 20,000 ohms per volt voltmeter.

When the AC-DC change-over switch is turned to the "6 volt" position as shown in the wiring diagram, the BROWN to BLACK winding of the power transformer serves as the primary and the filament voltage is taken direct from the storage battery. When the switch is thrown to the "AC" position, the BLACK to BLACK with RED tracer winding serves as the primary and the filament voltage is obtained across the GREEN and BROWN leads.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube prongs to the chassis with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with the receiver in operating condition and the volume control full on but with no signal input. The filament voltages should be measured with a low range voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plate and screen of the 6K6G output tube. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning the I-F Amplifier to 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal (G) of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right, (ON).

(c) Turn the band selector switch to the Standard Broadcast Band.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 3rd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning the R-F Amplifier.

When aligning the R-F amplifier, the output lead from the signal generator is connected to the antenna (A1) terminal of the receiver. For the Broadcast Band, a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the Police and Short Wave Bands, a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated for each adjustment, paragraph (D) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer so that the MINIMUM CAPACITY SIGNAL (D) is heard. (It is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then, adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and Short Wave bands, care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the station selector maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(D) SIGNAL INPUT FREQUENCIES

	Min. Cap. Signal	Shunt Align.	Series Align.
Standard Broadcast Band	1725 Kilocycles	1400 Kilocycles	600 Kilocycles
Police Band	6.6 Megacycles	6.0 Megacycles	
Short Wave Band	22.5 Megacycles	18 Megacycles	

SPECIFICATIONS

This model Crosley radio is a six-tube superheterodyne receiver designed for operation either from a 6-volt storage battery or commercial A. C. power supply. No "B" or "C" batteries are required when the receiver is operated from a storage battery. The tuning range is divided into three bands as follows:

535-1725 Kilocycles or 550-173 Metres (Standard Broadcast)
1.9- 6.6 Megacycles or 158-45.5 Metres (Police and Amateurs)
6.4- 22 Megacycles or 47-13.5 Metres (Short Wave).

PARTS LIST—MODEL 667

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —44337	Dial Light Bulb, 6-8 V.
	G6 —27134	Dial Light Socket Assy.
2	G157—32000	Ant. Coil, B-C.
3	G158—32000	Ant. Coil, Pol.
4	G153—32000	Ant. Coil, H-F.
5	G159—32002	Osc. Coil, B-C.
6	G157—32002	Osc. Coil, Pol.
7	G162—32002	Osc. Coil, H-F.
8	G153 —32004	1st I-F.—455 Kc.
9	G179 —32004	3rd I-F.—455 Kc.
10	G41 —33001	2 Section Gang Condenser
	B —45009A	Dial Face (6 V.-110 V.)
	B —45009	Dial Face (Export Only)
	C —44964A	Support Brkt —Dial Glass
	W —44085B	Metal Mask —Dial
	W —44084B	Ring—Glass Support
	W —44299	Pointer
	W —40486	Screw —Pointer Mtg.
	W —43622	Felt Washer
	G1 —43564	Pulley and Hub Assy.
	—41582	Drive Cord (18 in.)
	W —43561	Drive Spring (Tension)
	W —44130A	Drive Shaft
	W —43549	Ring—Shaft Retaining
11	—40769	B-C. Osc. Series Trimmer (Variable)
12	G23 —34000	Pol. Osc. Series Trimmer (Fixed 1,560 Mmf.)
13	G20 —34000	H-F. Osc. Series Trimmer (Fixed 4,910 Mmf.)
14	W —30805	Condenser, .01 Mf. 400 V.
15A	G2 —34002	Condenser, .0001 Mf. Molded
15B	G2 —34002	Condenser, .0001 Mf. Molded
16	G3 —34002	Condenser, .0005 Mf. Molded
17A	W —35936	Condenser, .05 Mf. 200 V.
17C	W —35936	Condenser, .05 Mf. 200 V.
18	W —35139	Condenser, .004 Mf. 400 V.
19	W —22688	Condenser, .1 Mf. 400 V.
20	W —28621	Condenser, .02 Mf. 200 V.
21	W —30488	Condenser, .02 Mf. 400 V.
22Z	W —31052	Condenser, .05 Mf. 400 V.
22Y		Condenser, .004 Mf. 400 V.
23	W —34712	Condenser, .25 Mf. 160 V.
24A	W —24049C	Condenser, .1 Mf. 200 V.
24B	W —24049C	Condenser, .1 Mf. 200 V.
25	W —50068A	Condenser, .006 Mf. 1,000 V. (60 Cy.)
25	W —45473	Condenser, .003 Mf. 1,000 V. (25 Cy.)
26	W —37173	Condenser, .25 Mf. 300 V.
27A	W —50161	Condenser, .5 Mf. 120 V.
27B	W —50161	Condenser, .5 Mf. 120 V.
28	W —35951A	3 Section Shunt Trimmer Assy.
29	W —44012	Condenser, 16 Mf. 250 V.
30A	G25 —28067	Choke "A" Filter
30B	G25 —28067	Choke "A" Filter
31	G22 —29535	Choke "B" Filter
32	B —44004	A-C Power Cord and Plug
33	G2 —44948	Battery Cable and Clips
	—34903	Battery Clip (Pos.)
	—34904	Battery Clip (Neg.)
34	W —31103	Fuse, 10 Amp.
35	—22196	Resistor, 20,000 Ohm ⅓W. Carb.
36	—21237A	Resistor, 60,000 Ohm ⅓W. Carb.
37	—4921C	Resistor, 10,000 Ohm 1W. Carb.
38	—36316	Resistor, 2,700 Ohm ¼W. Ins.
39A	—21875	Resistor, 100,000 Ohm ⅓W. Carb.
39B	—21875	Resistor, 100,000 Ohm ⅓W. Carb.
40	—23616	Resistor, 15,000 Ohm 1W. Carb.

Item No.	Part No.	Description
41	W —23013	Resistor, 2,000 Ohm 1¼W. Flex.
42	—34883	Resistor, 2 Megohm ⅓W. Carb.
43	—26577	Resistor, 3 Megohm ⅓W. Carb.
44	—37590	Resistor, 750,000 Ohm ⅓W. Carb.
45A	—35601	Resistor, 300,000 Ohm ¼W. Ins.
45B	—35601	Resistor, 300,000 Ohm ¼W. Ins.
46	—37245	Resistor, 1.5 Megohm ⅓W. Carb.
47A	—23785	Resistor, 500,000 Ohm ⅓W. Carb.
47B	—23785	Resistor, 500,000 Ohm ⅓W. Carb.
48	W —23012A	Resistor, 40 Ohm ¾W. Flex.
49	W —27504	Resistor, 100 Ohm ½W. Flex.
50A	—35600	Resistor, 100,000 Ohm ¼W. Ins.
50B	—35600	Resistor, 100,000 Ohm ¼W. Ins.
51	G155 —36400	Socket, Type 6A8
52	G182 —36400	Socket, Type 6S7
53	G183 —36400	Socket, Type 6T7
54	G172 —36400	Socket, Type 6K6
55	G103 —28807	Socket Spkr.
56	G168 —36400	Socket, Type 6X5
57	G105 —28807	Socket Vib.
	W —40911	Tube Shield
59	51PP18"B"	Speaker, Spec. No. 100-PG-4 (Console)
59	31PP18"A"	Speaker, Spec. No. R-6000, M-16 (Table Model)
	—44218	V. C. and Cone Assy. (31PP18"A" only)
	—44220	Cone Mtg. Ring (Cardboard) (31PP18"A" only)
	—45071	Output Transformer (31PP18"A" only)
60		
61	G1 —44950	Switch—Dial Light
62	—44049A	Band Switch
63	—44946	Switch—On-Off and Tone Control (100,000 Ohm)
64	W —44951	Switch—A. C.-D. C.
65	G27 —26719	Ant. and Gnd. Terminal Assy.
66	G2 —33339	Fuse Panel
	W —33310A	Fuse Cover
	W —34223	Insulator—Fuse Cover
	W —4072	Thumb Screw—Fuse Cover
67	—44961	Power Trans., 50-60 Cy.—110 V.
68	W —44962A	Vibrator (6 V.)
69	—44081	Volume Control (1 Megohm)
70	W —44990	Condenser, 30 Mf. 250 V.
71	G1 —34002	Condenser, .00025 Mf. Molded
72A	G5 —34002	Condenser, .00005 Mf. Molded
72B	G5 —34002	Condenser, .00005 Mf. Molded
73	G37 —26719	Phono. Terminal Assy.
74	G13 —34002	Condenser, .000035 Mf. Molded
75	W —41461	Condenser, .0014 Mf. 200 V.
76	—45454	Power Trans., 25 Cy.—125 V.
	—45497	Power Trans., 25 Cy.—220 V.
	—45498	Power Trans., 50 Cy.—220 V.
	7G	Cabinet—Table
	7WD	Cabinet—Console
	B —44225B	Escutcheon
	W —43553	Rubber Mtg. Foot
	W —41221	Knob—Station Selector
	W —41222	Knob—Dial Light
	W —41605	Knob—Vol. Cont.
	W —41224	Knob—Tone Cont.
	W —45037	Knob—Band Sw.
	W —28601	Knob—A. C.-D. C. Sw.

MODEL 718
Socket, Trimmers, Voltage
Chassis, Data

CROSLEY CORP.

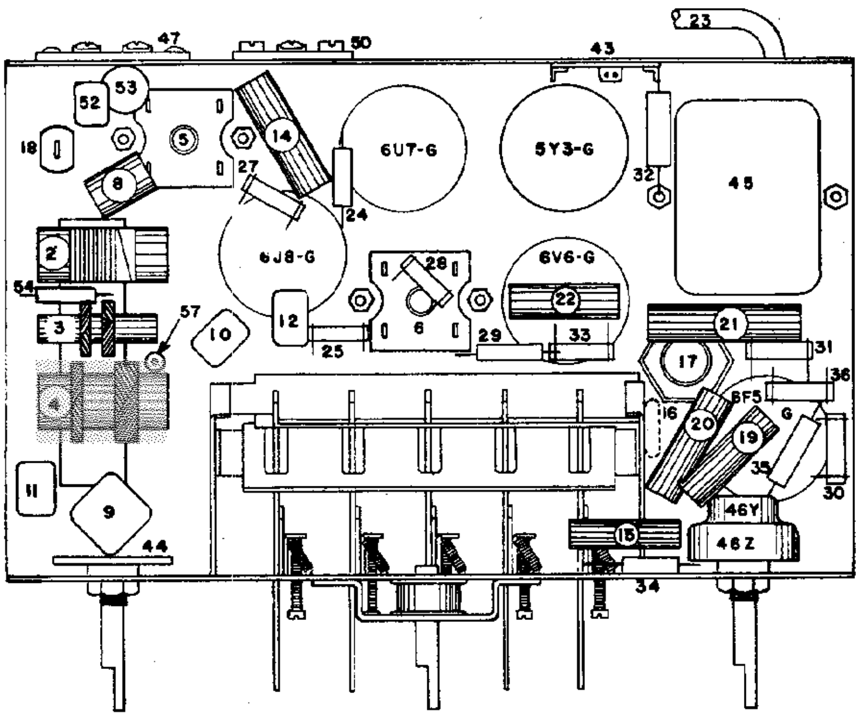


Fig. 3 Bottom View Model 718

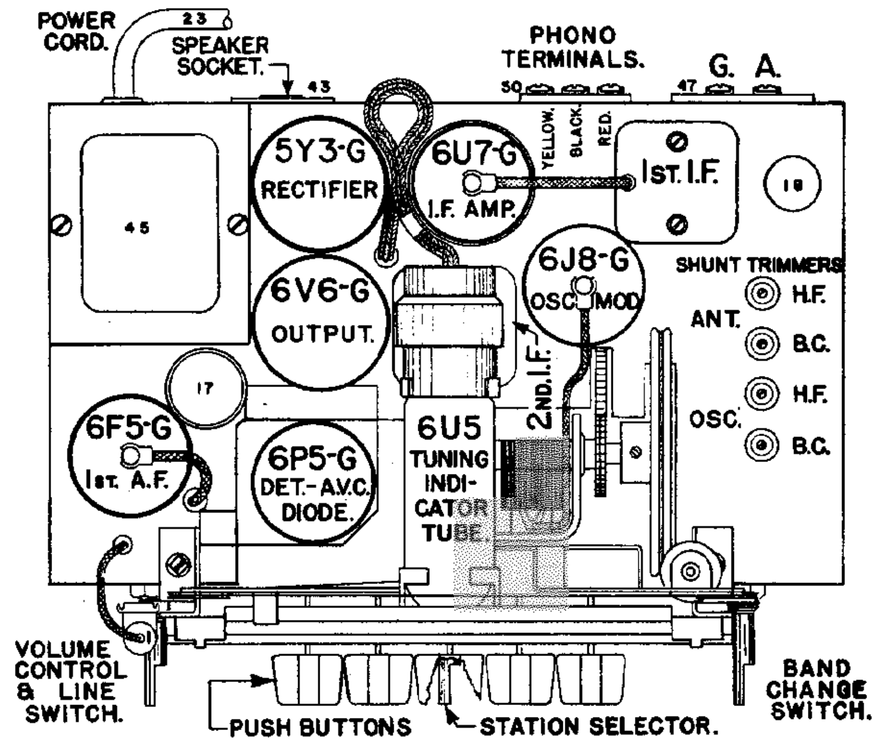


FIG. 2 Top View Model 718

SPECIFICATIONS

This model Crosley is a compact seven-tube superheterodyne receiver designed for operation on ALTERNATING CURRENT as specified on the Model and License sticker.

The features included in its design consist of a Mechanical Push Button Tuning System, Beam Power Output Tube, Radio-Log Dial, Tuning Indicator Tube, Bass Compensation and a moving coil dynamic speaker.

The Tuning Range is divided into two bands as follows:

540-1725 Kilocycles or 555-173 Meters (American and some Police)
5.7-18.3 Megacycles or 52.6-16.4 Meters (Foreign)

The tubes used and their functions are as follows: one 6J8G as Oscillator-Modulator, one 6U7G as I-F amplifier, one 6P5G as Detector, A. V. C. diode, one 6F5G as first Audio amplifier, one 6V6G as Beam Power output, one 5Y3G as Rectifier and one 6U5 as eye Tuning Indicator.

The initial bias for the 6J8G and 6U7G (drop across item 34 a 60 ohm resistor) is measured from chassis to the low end of the volume control. For the 6F5G, (drop across item 35 a 32 ohm resistor) is measured from the low end of the 10 megohm resistor to the cathode of the 6F5G. The bias for the 6V6G is obtained from the drop across items 34, 35, 32, 60 ohms, 32 ohms, 100 ohms respectively, measured from the junction of item 32 and speaker field to chassis. The speaker field is in the negative leg of the power supply. Item 51Y is a 1 megohm resistor assembled in the socket of the 6U5.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1,000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	Ga	K
6J8G	Oscillator-Modulator	6.3	172	88	-3	120	0
6U7G	I-F Amplifier	6.3	172	88	-3	0	0
6P5G	Detector A.V.C. Diode	6.3	0	0	0	0	-3
6F5G	1st A-F Amplifier	6.3	100	0	-2	0	-3
6V6G	Output	6.3	160	172	-10	0	0
5Y3G	Rectifier	3.9	A.C.				217
6U5	Tuning Indicator	6.3	170				

Maximum power output approximately 5 watts.
Voltage across speaker field 37 volts.
Power consumption approximately 52 watts at 117.5 line.

OCTOBER, 1938

FOR SCHEMATIC SEE INDEX

CHASSIS MODEL 718

MODEL 718
Alignment, Drive Data

CROSLEY CORP.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

SETTING THE PUSH BUTTONS

Should it become necessary to realign the various circuits of this receiver, it may be necessary to reset the Push Button Tuning System.

The buttons are set by means of a set screw that is accessible through the front of the push button.

Loosen set screw, tune-in with the manual tuning knob the station whose call letters are to be placed in that button.

PUSH THAT BUTTON ALL THE WAY DOWN, AND WHILE YOU HOLD IT IN THAT POSITION, SECURELY TIGHTEN THE SET SCREW.

The first button is now set, follow the same procedure with the rest of the push buttons.

The accuracy of the buttons depends on how accurate the station is tuned-in while setting them.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6V6G Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6J8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh and turn the volume control to the right (ON).

(c) Turn the band selector switch to the left (American Broadcast Band).

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F amplifier the output of the modulated signal generator should be fed through a dummy antenna and connected to the "ANT" terminal of the receiver.

For the "Foreign" band use a 250 ohm carbon resistor for dummy and for the "American" band use a .0002 Mf. condenser.

Align the "Foreign" band first.

(a) Set Band selector to "Foreign" band, right.
(b) Set signal generator to 18.3 Megacycles.
(c) Open gang all the way. Minimum capacity.
(d) Tune-in with H-F Osc. shunt trimmer 18.3 signal. This signal will be heard at two settings of this trimmer always choose the setting furthest open.
(e) Set signal generator to 18.0 Megacycles.
(f) Tune-in 18.0 Mc. signal with station selector, then align the H-F ANT. trimmer condenser for maximum output. DO NOT ADJUST OSC. TRIMMER AT THIS FREQUENCY.
(g) Repeat operations (d), (e) and (f) until no further improvement can be obtained.
(h) Set the band selector to the American Broadcast band.
(i) Set the signal generator to 1725 Kilocycles.
(j) Open the gang all the way. Minimum capacity.
(k) Adjust B-C OSC. trimmer for maximum output.
(l) Set signal generator to 1400 Kc.
(m) Tune receiver for maximum general signal (approx. 140 on the dial).
(n) Adjust B-C ANT. trimmmer for maximum output. DO NOT RE-ADJUST OSC. TRIMMER AT 1400 Kc.
(o) REPEAT operations (m) and (n) alternately until no further improvement in output can be obtained.

NOTE: If at any time the H-F coils in this receiver are replaced, it may be necessary to vary the inductance of the "OSC" coil by moving the cross-over turn of wire at the gap to make the set track at the 6 megacycle end. Moving the turn toward the short end of the coil will decrease the inductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 megacycles, a similar slight change in the inductance at the "ANT" coil should bring up the signal strength. THIS IS A CRITICAL OPERATION AND SHOULD NOT BE DONE ON ANY SET UNLESS CHANGING COILS MAKES IT NECESSARY.

NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 Kc. This assembly is located on the underneath side of the chassis and consists of a coil and a trimmer condenser as indicated by item 48 in the wiring diagram.

The wave trap should not be adjusted until all other adjustments have been made. To adjust, feed a 455 Kc. signal through a .0002 Mf. condenser to the antenna terminal of the receiver. With the band selector turned to the broadcast band and the condenser gang closed and the volume control on full, adjust the trimmer condenser on the wave-trap for MINIMUM SIGNAL.

Should the interfering station be operating on a frequency of slightly more or less than 455 Kc., the exact frequency should be determined with the aid of a signal general by the beat note method. Then instead of feeding a 455 Kc. signal through, the exact frequency of the interfering station should be used. If it is not possible to determine the exact frequency of the interfering signal, the antenna may be attached to the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave-trap for minimum interference.

REPLACING DIAL DRIVE CORD

To replace a broken drive cord proceed as follows:

1—Remove broken cord from dial pointer and the cord tension spring from the large pulley on the condenser gang.

2—Remove complete dial assembly, fastened with two P. K. screws to top of chassis.

3—Remove screw and washer that fastens felt key mask to chassis and fold felt to one side.

4—Remove manual drive shaft bracket, fastened with two P. K. screws.

5—Place ends of replacement drive cord (G3-41582) together and tie a knot about 1¼ inches from the end. Slip tension spring through knot. Fasten the other end of spring on hook in large pulley on gang.

6—Close the gang then thread loop through the eyelet in pulley rim.

7—Bring one side of drive cord loop forward over pulley and around (¼ turn) horizontal idler pulley, then under and over the righ hand idler pulley (counter-clockwise).

8—Loop the other side of drive cord over large pulley on gang in a clockwise direction, continue around and up and over the small idler pulley.

9—Then remove drive shaft from chassis, wrap two complete turns around pulley on the shaft, taking the cord coming over the small idler pulley and wrapping in a clockwise direction while holding shaft in right hand.

10—Replace drive shaft in position, taking care that the drive cord coming down to the pulley goes between the 4th and 5th keys and the cord going up from the pulley goes between the 1st and 2nd keys.

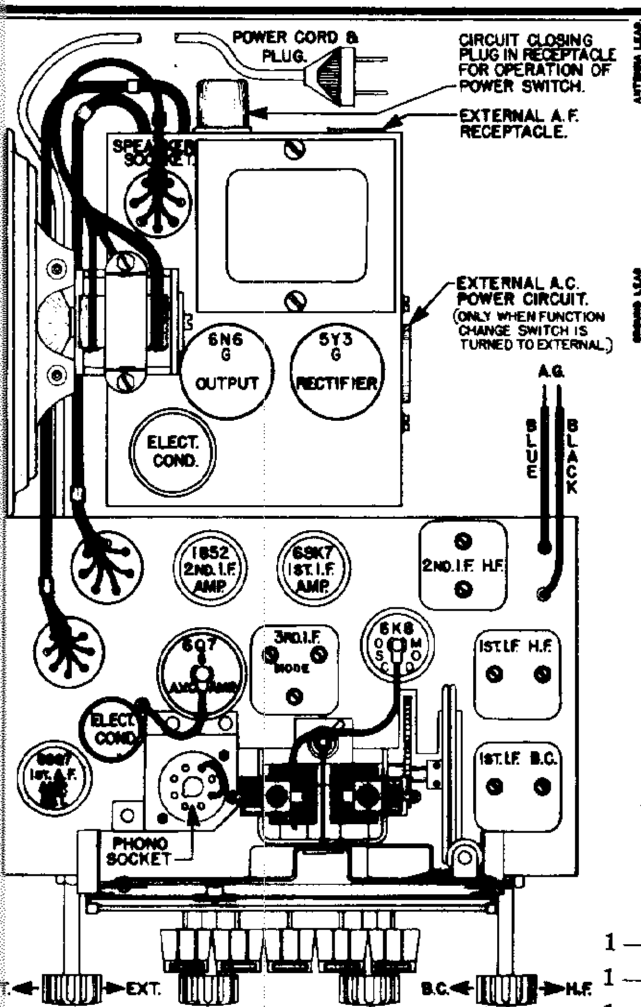
11—Hook drive cord over left hand idler pulley. Mount drive shaft bracket in position. Check to see that cord is running on all pulleys, and tension spring is stretched to approx. one inch in length.

12—Place drive cord clamp (W-46290) on drive cord approx. ⅛ inch from inside edge of large pulley rim.

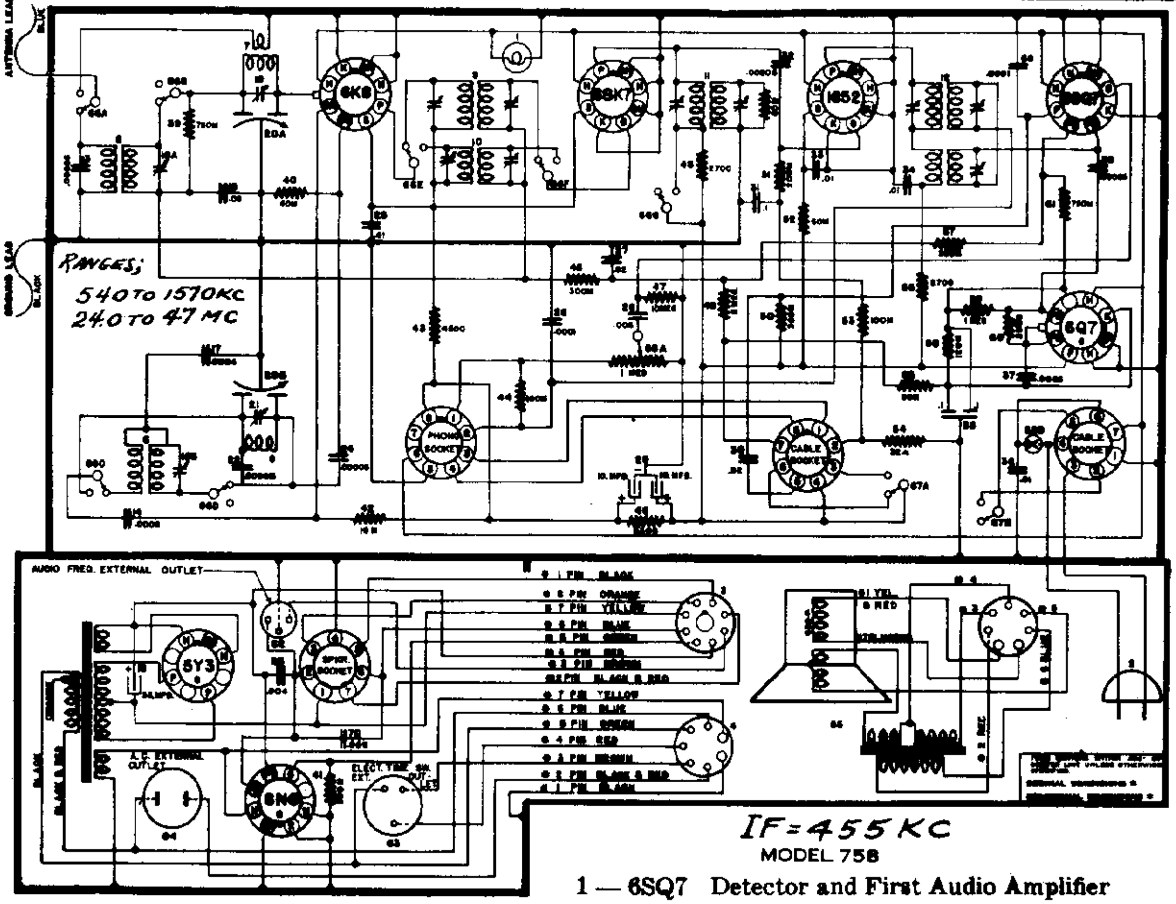
13—Replace key felt, rubber bands and dial assembly.

14—Close gang, set the pointer at 540 Kc., place cord in pointer, check pointer travel from end to end before gluing cord to pointer.

MODEL 758
Schematic, Socket, Trimmers
Chassis



CROSLEY CORP.



IF=455KC
MODEL 758

1 — 6K8 Oscillator and Mixer or Modulator
1 — 6SK7 1st Intermediate Frequency Amplifier
1 — 1852 2nd Intermediate Frequency Amplifier
1 — 6SQ7 Detector and First Audio Amplifier
1 — 6Q7-G Automatic Volume Control Amplifier
1 — 6N6-G Triple Twin Output
1 — 5Y3-G Rectifier

1	W-37922	Bulb, Dial Light 5-8V
2	B-45769-A	Cable & Plug A.C.
3	B-47154	Cable & Plug 8-Lead
4	B-47153	Cable & Plug 7-Lead
5	G192-32000	Coil B.C. Ant.
6	G190-32002	Coil B.C. Osc.
7	G191-32000	Coil Ultra H.F. Ant.
8	G189-32002	Coil Ultra H.F. Osc.
9	G214-32004	1st I.F. Trans. B.C.
10	G213-32004	1st I.F. Trans. H.F.
11	G215-32004	2nd I.F. Trans.
12	G212-32004	Dual I.F. Trans.
13	G5-34002	Cond. 50 MMF Mica
14	G3-34002	Cond. 500 MMF Mica
15	W-36055-B	Cond. 35 MF 400V (Elec.)
16A	W-47147	Trimmer Cond. (B.C. Ant.)
16B		Trimmer Cond. (B.C. Osc.)
17	G18-34002	Cond. 400 MMF Mica
18	W-35936	Cond. .05 MF 200V Paper
19	W-45979	Trimmer Cond. (U.H.F. Ant.)
20A	G70-33001	Var. Cond. (Ant. Sect.)
20B		Var. Cond. (Osc. Sect.)
21	W-47126	Trimmer Cond. (U.H.F. Osc.)
22	G1-34009	Cond. 15 MMF Temp. Comp.
23	W-35139	Cond. .004 MF 400V Paper
24	G2-34009	Cond. 50 MMF Temp. Comp.
25	W-23191-A	Cond. .01 MF 400V Paper
26	G2-34002	Cond. 100 MMF Mica
27	W-28621	Cond. .02 MF 200V Paper
28	W-34713	Cond. .006 MF 160V Paper
29	W-47256	Cond. 10-10 MF 300V (Elec)
30	W-30488	Cond. .02 MF 400V Paper
31	W-24049-C	Cond. .1 MF 200V Paper
32	G5-34002	Cond. 50 MMF Mica
33	W-23191-A	Cond. .01 MF 400V Paper
34	W-23191-A	Cond. .01 MF 400V Paper
35	W-28622	Cond. .1-.1 MF 200V "
36	W-30805	Cond. .01 MF 400V Paper
37	G3-34002	Cond. 500 MMF Mica
38	G5-34002	Cond. 50 MMF Mica
39	38623	Res. 750,000 Ohm ¼ W. Ins.
40	36928	Res. 60,000 Ohm ¼ W. Ins.
41	36322	Res. 500,000 Ohm ¼ W. Ins.
42	36317	Res. 10,000 Ohm ¼ W. Ins.
43	31094	Res. 4500 Ohm 1/3 W. Carb.
44	35600	Res. 100,000 Ohm ¼ W. Ins.
45	35601	Res. 300,000 Ohm ¼ W. Ins.
46	47101	Res. 6500 Ohm 2½ W. Ins. Wire Wd.
47	50956	Res. 10 Meg. ¼ W Ins.
48	36316	Res. 2700 Ohm ¼ W Ins.
49	47131	Res. 5 Meg. ¼ W Ins.
50	35601	Res. 300,000 Ohm ¼ W Ins.
51	35930	Res. 200,000 Ohm ¼ W Ins.
52	35928	Res. 60,000 Ohm ¼ W Ins.
53	35600	Res. 100,000 Ohm ¼ W Ins.
54	45981	Res. 32 Ohm ½ W. Ins. Wire Wd
55	35928	Res. 60,000 ¼ W Ins.
56	36316	Res. 2700 Ohm ¼ W. Ins.
57	35601	Res. 300,000 Ohm ¼ W Ins.
58	36320	Res. 120,000 Ohm ¼ W. Ins.
59	35602	Res. 1 Meg ¼ W. Ins.
60	47131	Res. 5 Meg ¼ W. Ins.
61	38623	Res. 750,000 Ohm ¼ W Ins.
62	W-47133	Socket A.F. Ext. Outlet
63	W-50243	Socket Elec. Time S.W.
64	W-47163	Socket A.C. Ext. Outlet
65	B-47073	Spkr. 388 B.P. 6
66A	B-47157	Switch-Band Chg.
66B		Switch-Band Chg.
66C		Switch-Band Chg.
66D		Switch-Band Chg.
66E	B-47157	Switch-Band Chg.
66F		Switch-Band Chg.
66G		Switch-Band Chg.
67A	47155-A	Switch-Function Chg.
67B		Switch-Function Chg.
68A	47138-A	Volume Control
69	G2-34002	Cond. 100 MMF Mica
70	W-35768	Cond. .008 MF 400V. Paper

MISCELLANEOUS

8GE	Cabinet
46408	Knob (4)
46417	Push Button
47190	Instructions

MODEL 818
Socket, Trimmers, Chassis
Voltage, Phono.

CROSLEY CORP.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	K	Go	Ga
6A8G	Modulator	6.3	240	85	Neg	0	Neg	85
6K6G	Oscillator	6.3	145	145	Neg	0	—	—
6U7G	1st I-F Amp	6.3	240	85	Neg	0	—	—
6U7G	2nd I-F Amp	6.3	210	85	Neg	0	—	—
6Q7G	Det., AVC & 1st A-F Amp	6.3	120	—	Neg	0	—	—
6K6G	Output	6.3	235	230	0	18.5	—	—
6K6G	Output	6.3	235	230	0	18.5	—	—
5Y3G	Rectifier	5.0	—	—	—	240	—	—

Power output approximately 5.5 watts.

Power consumption approximately 70 watts at 117.5 volts.
Voltage drop across speaker field 80 volts.

Fig. 2. Top View Model 818

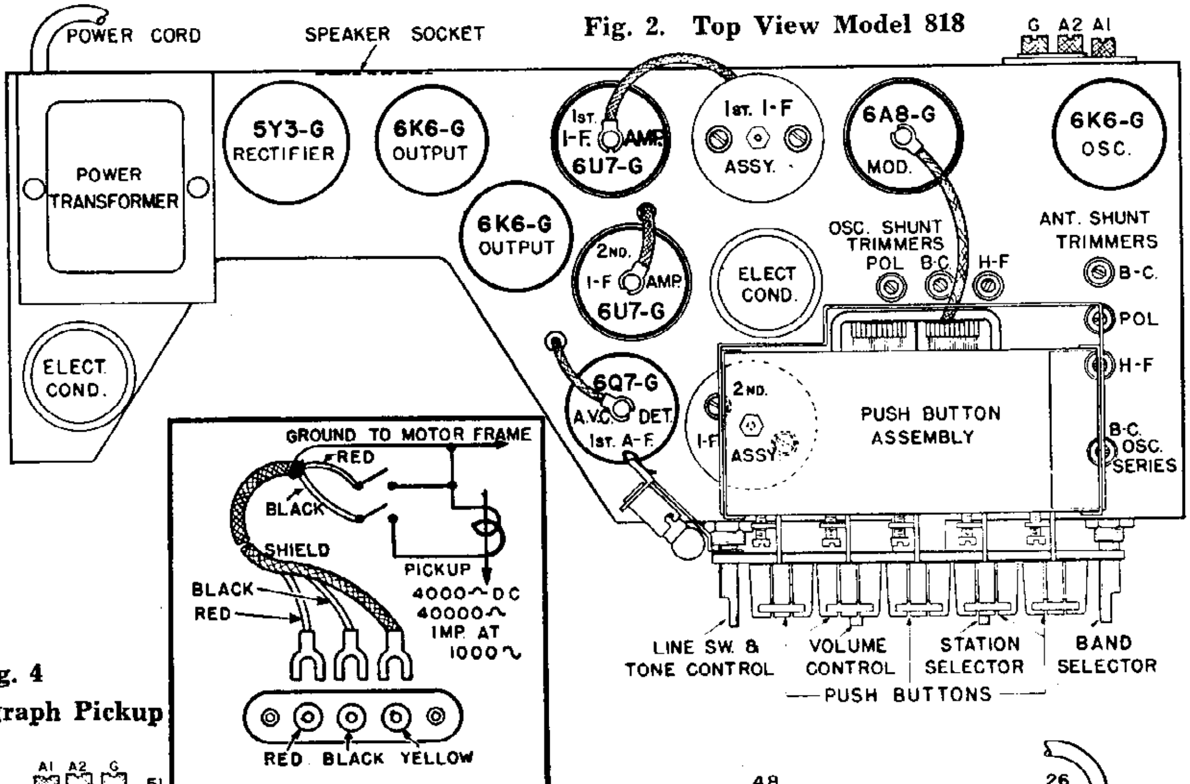


Fig. 4
Phonograph Pickup

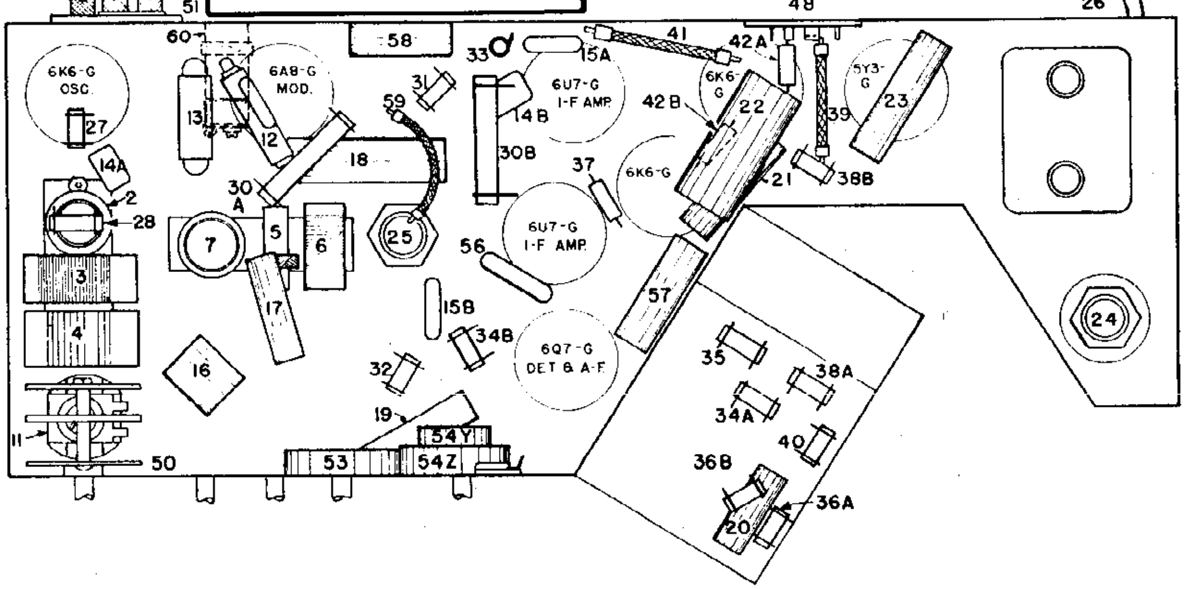
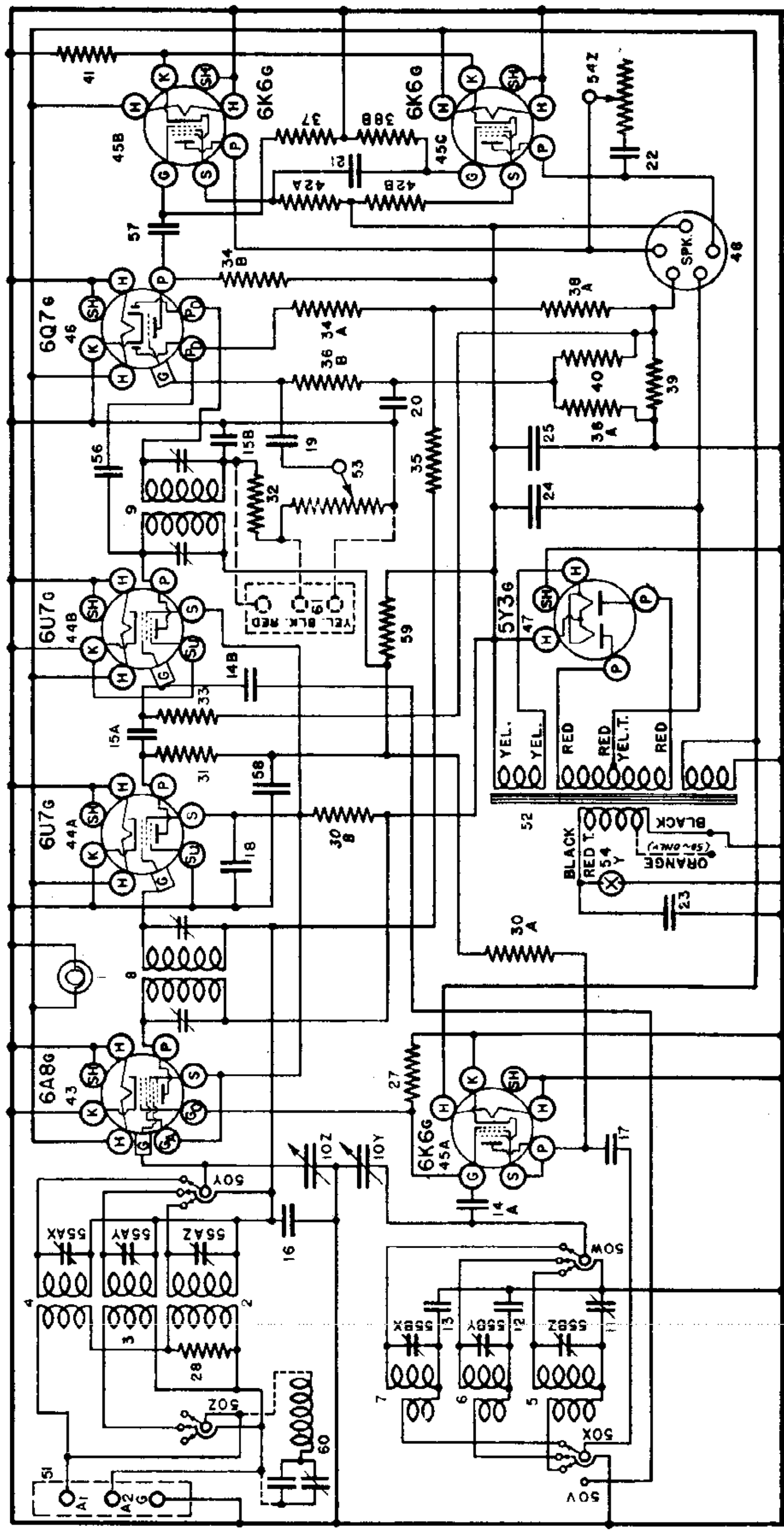
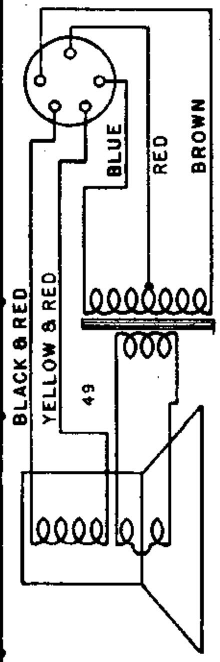


Fig. 3. Bottom View Model 818

MODEL 818
Schematic

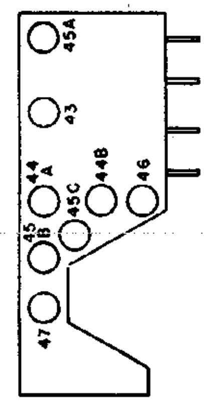
CROSLEY CORP.





540-1850 Kilocycles or 555-162 Metres (American Broadcast Band)
1.9- 6.6 Megacycles or 158-45.5 Metres (Police & Amateur Band)
6.4- 22 Megacycles or 47-13.5 Metres (High Frequency or Foreign Band)

IF PEAK 455 KC



MARCH, 1938

MODEL 818
Alignment, Notes, Parts

CROSLEY CORP.

ALIGNMENT PROCEDURE

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G

for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

tube, leaving the tube's grid lead in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F assm. for maximum output. (Item 9, Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F assm. for maximum output. (Item 8, Fig. 2).

(g) Check operations (e) and (f) for more accurate adjustment.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast and Police Bands a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated for each adjustment, ¶ (C) below.

(a) Adjust the "OSC" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustment of the "ANT" trimmer. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this increase the output of the signal generator ten times, or more, to try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(b) To align the B. C. OSC. series trimmer (Fig 2), set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(C) SIGNAL INPUT FREQUENCIES

	Shunt Align.	Series Align.
American Broadcast Band	1700 Kilocycles	600 Kilocycles
Police & Amateur Band	6000 Kilocycles	
Foreign Band	18 Megacycles	

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram (item 60).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver turned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

SETTING PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. It is not necessary that all the push buttons be set at the same time. Insert a small screw driver in the hole in the front of each push button and loosen (DO NOT REMOVE) the screw that is located in the bottom of each hole.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the conventional tuning knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, the station nearest the 1500 kilocycle end of the dial. COMPLETELY DEPRESS AND HOLD No. 1 push button and SECURELY TIGHTEN THE SET SCREW. No. 1 push button is the one toward the high frequency end of the dial.

The push button system is now set for the first station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles).

If the receiver has been re-aligned it may be necessary to reset the push button system.

REPLACING DIAL DRIVE CORD

To replace the dial drive cord, the following procedure should be carefully followed.

(1) Remove the chassis from the cabinet.

(2) Remove the dial glass, pointer and dial mounting bracket.

(3) Remove the broken cord and the tension spring.

(4) Double a 48" length of drive cord. Insert the doubled end through the eyelet (from the outside) in the pulley on the end of the tuning condenser gang. Tie a knot in the cord so as to form a loop about ¾" long. Close the gang so that the eyelet in the pulley will be "down." Hook the looped cord over the catch provided in the pulley opposite the eyelet.

(5) Bring one end of the cord forward and over the top idler pulley. Continue the cord under and around to the top of the pulley on the pointed shaft (¾ turn). With the pointer shaft pulley set so that its eyelet is in the "up" position, thread the cord through the eyelet.

(6) Bring the other end of the cord back and over the condenser gang pulley. Continue it down and over the lower idler pulley to the left-hand side of the rubber grommet and then over the top of the pointer shaft pulley. This lead should cross behind the down lead to the rubber grommet. Make one complete loop around the pointer shaft pulley and back to the eyelet. Thread the lead through the eyelet and tie a knot in the two ends of the cord so that it will be about ½" from the eyelet when the cord is drawn taught. Hook one end of the tension spring over the knot and hook the other end to the catch provided opposite the eyelet. Cut off the excess cord and if bees' wax is available, apply a small amount to the knot as an added protection against slipping.

PARTS LIST—MODEL 818

Figures in first column refer to parts in Diagrams.

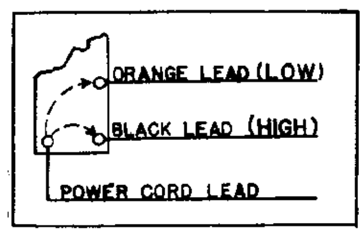
Item No.	Part No.	Description	Item No.	Part No.	Description
1	W —43567	Bulb, Dial Light, 6-8 V.	44AB	G171—36400	Socket, Type 6U7
	G4 —45398	Bracket, for Dial Light	45ABC	G172—36400	Socket, Type 6K6
2	G138—32000	Ant. Coil, 535-1860 Kc.	46	G160—36400	Socket, Type 6Q7
3	G139—32000	Ant. Coil, 1900-6600 Kc.	47	G173—36400	Socket, Type 5Y3
4	G140—32000	Ant. Coil, 6.5-22 Mc.	48	G103—28807	Socket, Type Speaker
5	G139—32002	Osc. Coil, 535-1860 Kc.		W —40911	Tube Shield
6	G171—32002	Osc. Coil, 1900-6600 Kc.		W —27981A	Base, Tube Shield
7	G172—32002	Osc. Coil, 6.5-22 Mc.	49	465BP—12"M"	Speaker Spec., 1-D-1049 "M"
8	G153—32004	1st I-F. Assy.		—44272	V. C. and Cone Assy. for 465BP12"M" Spkr.
9	G154—32004	2nd I-F. Assy.		—44273	Field Coil for 465BP12"M" Spkr.
10ZY	G41 —33001	2 Section Gang Cond.		—44274	Output Trans. for 465BP12"M" Spkr.
	D —44080C	Glass Dial Face		W —43552	Spk. Plug Clamp
	W —44085B	Dial Mask (Paper)	50	—44049	Band Selector Switch
	W —44084A	Dial Support Ring	51	G27 —28719	A1-A2-G. Terminal Assy.
	C —44082E	Support Brkt., Dial Glass	52	—44057	Power Trans., 100 V. 60 Cy.
	C10 —43564	Pulley and Hub Assy. (Pointer Shaft)		—44058	Power Trans., 110 V. 50 Cy.
	C11 —43564	Pulley and Hub Assy. (Cond. Gang)		—44059	Power Trans., 220 V. 50 Cy.
	—41582	Drive Cord		—44060	Power Trans., 110 V. 25 Cy.
	MG29—45807	Drive Mtg. Bracket and Pulley Assy.		—44061	Power Trans., 220 V. 25 Cy.
	W —45644	Pointer Shaft	53	—44081	Volume Control, 1 Meg.
	W —50825A	Retaining Ring (Pointer Shaft)	54Z	—44024B	Tone Control, 100,000 Ohm
	W —44299	Dial Pointer	54Y		Line Switch
	W —40486	Screw (Pointer Mtg.)	55	W —35951A	3 Sect. Ant. Shunt Trimmer Assy.
	W —43561	Cord Tension Spring		W —45714	3 Sect. Osc. Shunt Trimmer Assy.
	W —45716	Drive Shaft (Manual)	56	W —32741	Condenser, 500 Mmf.
	W —43549	Retaining Ring (Drive Shaft)	57	W —34647	Condenser, .006 Mf. 400 V.
	W —43542B	Drive Shaft Mtg. Bracket	58	W —32378	Condenser, .01 Mf. 400 V.
	W —44701C	Grommet for Drive Shaft	59	W —23013	Resistor, 2,000 Ohm 1¼W. Flex.
11	—40769	B.C. Osc. Series Trimmer			**PUSH BUTTON PARTS**
12	G23 —34000	Condenser, 1560 Mmf.		G4 —45683	Push Button Unit Assy. Complete
13	G20 —34000	Condenser, 4910 Mmf.		G30 —45683	Key and Toggle Assy.
14AB	G13 —34002	Condenser, 35 Mmf.		W —50542A	Key Clip (Lock Clamp)
15AB	G2 —34002	Condenser, 100 Mmf.		—45718	Adjusting Screw
16	W —35936	Condenser, .05 Mf. 200 V.		G31 —45683	Rocker Plate Assy.
17	W —35139	Condenser, .004 Mf. 400 V.		W —50561	⅛"-6 x 40 Screw (Rocker Plate Bearing)
18	W —22688	Condenser, .1 Mf. 400 V.		W —50547	Key Plate (Rear Guide)
19	W —27652	Condenser, .00[illegible] V.		W —45646A	Adjust. Clip (Hooked Tear Drop)
20	W —28621	Condenser, .02 [illegible] V.		W —50588	Adjust. Clip (Plain Tear Drop)
21	W —30488	Condenser, .02 [illegible] V.		—43882	¼" No. 8 P. K. Screw (Clip Mtg.)
22	W —23615	Condenser, .0[illegible] V.		W —50607	Spring (Key Return)
23	W —30805	Condenser, .01 [illegible] V.		W —45711	Felt
24	W —44054	Condenser, 30 [illegible] V.		W —45658	Push Button
25	W —36057	Condenser, [illegible] V.		W —45668	P. B. Support Bracket
26	B —33906A	Power Cord [illegible]		S —132	Screw (P. B. Brkt. Mtg.)
27	—21237A	Resistor, [illegible] ¼W.		W —44088	Knob, Vol. and Tuning
28	—22196	Resistor, [illegible] ¼W.		W —50164A	Knob, Tone and Band Change
30A	—23616	Resistor, [illegible] W.		W —43553	Rubber Mtg. Foot
30B	—23616	Resistor, [illegible] W.		W —44225	Grille Bar (2)
31	—24814	Resistor, [illegible] ¼W.		—44092	Grille Cloth
32	—35600	Resistor, [illegible] Ohm ¼W.		—7CA	Cabinet
33	—21875	Resistor, [illegible] Ohm ¼W.		B —44226B	Escutcheon
34AB	—21455C	Resistor, [illegible] Ohm ¼W.		B —45626A	Push Button Escutcheon
35	—21454	Resistor, [illegible] ¼W.		—50549	Call Letter Sheet
36AB	—26577	Resistor, [illegible] ¼W.		W —50551A	Celluloid Cover
37	—36322C	Resistor, [illegible] ¼W.	60	G165—32004	Wave Trap
38AB	—23785	Resistor, [illegible] ¼W.			
39	W —23012A	Resistor, [illegible]. Flex.			
40	—34883	Resistor, [illegible] ¼W.			
41	W. —21965	Resistor, [illegible] Ohm 1W. Flex			
42AB	—44009	Resistor, [illegible] Ohm ¼W.			
43	G156—36400	Socket, T[illegible]8			

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal stripe near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections



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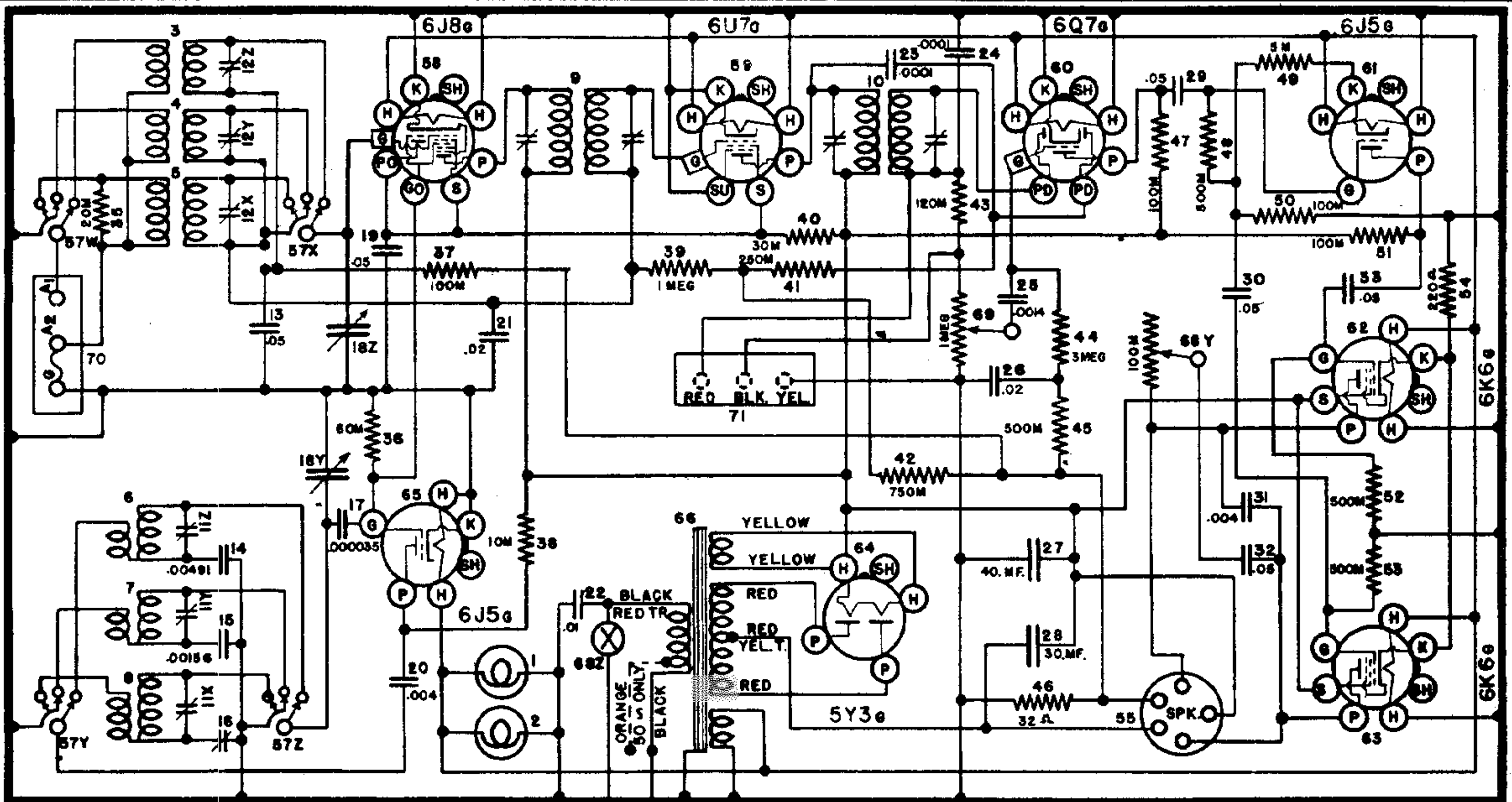
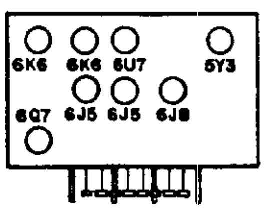


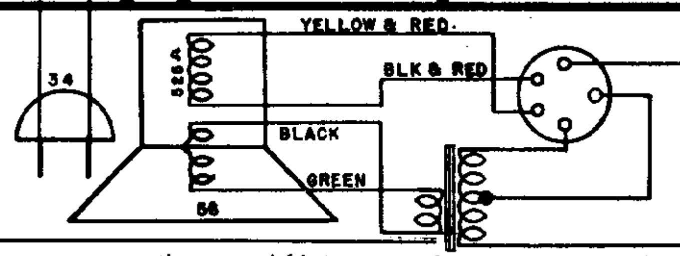


MODEL _ _ 828

455 K.C. I.F.

FIG. 1

DECEMBER, 1938



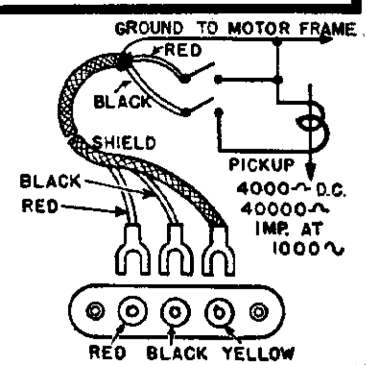


Fig. 4 Phonograph Pickup

This model Crosley is an eight-tube receiver designed for operation on A.C. circuits as specified on the model and license label.

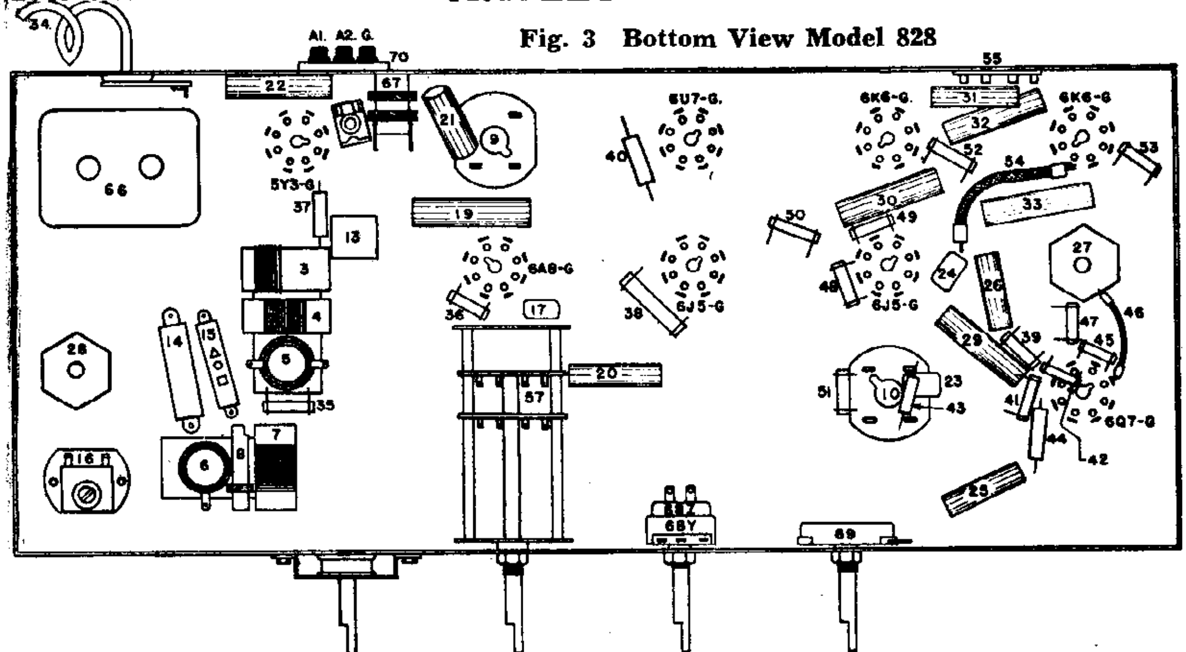
Features include; large sloping rectangular dial, three tuning ranges, continuous variable tone control, separate oscillator, bass compensation, push pull pentode output, phase inversion and the famous CROSLEY mechanical push button tuning system.

The tuning range is from 540 kilocycles to 20 megacycles and divided into three bands as follows:

540-1725 Kilocycles or 555-173 Meters (American Broadcast Band)
1.9- 6.4 Megacycles or 158-46.8 Meters (Police and Amateurs)
6.2- 20 Megacycles or 48.4-15 Meters (Foreign or High Frequency Band)

CROSLEY CORP.

Fig. 3 Bottom View Model 828



PARTS LIST — MODEL 828

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —37922	Dial Light—6-8 Volt
2	W —37922	Dial Light—6-8 Volt
	G16 —45398	Socket and Brkt. Assy., Dial Light
3	G170—32000	Antenna Coil—H-F.
4	G168—32000	Antenna Coil—Pol.
5	G169—32000	Antenna Coil—B-C.
6	G170—32002	Oscillator Coil—H-F.
7	G168—32002	Oscillator Coil—Pol.
8	G169—32002	Oscillator Coil—B-C.
9	G175—32004	1st I-F. Assy., 455 Kc.
10	G176—32004	2nd I-F. Assy., 455 Kc.
11	W —45713	3 Section Trimmer (Osc. Shunt)
12	W —35951A	3 Section Trimmer (Ant. Shunt)
13	W —35936	Condenser, .05 Mf. 200 V.
14	G20 —34000	Condenser, .004910 Mf. Mica
15	G23 —34000	Condenser, .001560 Mf. Mica
16	—40769	B-C. Osc. Series Trimmer
17	G13 —34002	Condenser, .000035 Mf. Molded
18	G59 —33001	2 Section Gang Condenser
	D —46317	Calibrated Dial Glass—Domestic
	D —46749	Calibrated Dial Glass—International
	C —46275B	Dial Support—Flocked Mask
	W —46941	Rubber Cushion—Dial Glass
	W —46099	Dial Class Clip—(2 Req.) Mtg.
	W —46096	Dial Class Clip—(R. H.) Mtg.
	W —46095	Dial Class Clip—(L. H.) Mtg.
	—46203	Dial Pointer
	W —46097	Guide—Pointer
	G13 —43564	Pulley and Hub Assy. on Gang
	MG17—46287	Small Brass Idler Pulley and Brkt. Assy.
	MG20—46287	Idler Pulley Assy. (2 Pulleys)
	—45877B	Drive Shaft and Pulley (Manual)
	W —45878	Bracket—Drive Shaft Mounting
	—46087	Tension Spring—Drive Cord
	G9 —41582	Drive Cord (61 Inches)
	W —46290	Clamp—Drive Cord
19	W —23615	Condenser, .05 Mf. 400 V.
20	W —35139	Condenser, .004 Mf. 400 V.
21	W —28621	Condenser, .02 Mf. 200 V.
22	W —30805	Condenser, .01 Mf. 400 V.
23	G2 —34002	Condenser, .0001 Mf. Molded
24	G2 —34002	Condenser, .0001 Mf. Molded
25	W —41461	Condenser, .0014 Mf. 200 V.
26	W —28621	Condenser, .02 Mf. 200 V.
27	W —36057B	Condenser, 40 Mf. 300 V.
28	W —44054	Condenser, 30 Mf. 350 V.
29	W —23615	Condenser, .05 Mf. 400 V.
30	W —23615	Condenser, .05 Mf. 400 V.
31	W —35139	Condenser, .004 Mf. 400 V.
32	W —23615	Condenser, .05 Mf. 400 V.
33	W —23615	Condenser, .05 Mf. 400 V.
34	B —33906A	Power Cord and Plug
35	—22196	Resistor, 20,000 Ohm 1/3 W.
36	—21237A	Resistor, 60,000 Ohm 1/3 W.
37	—35600	Resistor, 100,000 Ohm 1/4 W.
38	—4921C	Resistor, 10,000 Ohm 1W.
39	—21454	Resistor, 1 Megohm 1/3 W.
40	—36952	Resistor, 30,000 Ohm 1W.
41	—34020	Resistor, 250,000 Ohm 1/3 W.
42	—37590	Resistor, 750,000 Ohm 1/3 W.
43	—36320	Resistor, 120,000 Ohm 1/4 W.
44	—36688	Resistor, 3 Megohm 1/4 W.
45	—23785	Resistor, 500,000 Ohm 1/3 W.
46	W —37631	Resistor, 32 Ohm 1/2 W.
47	—21875	Resistor, 100,000 Ohm 1/3 W.

Item No.	Part No.	Description
48	—23785	Resistor, 500,000 Ohm 1/3 W.
49	—27121	Resistor, 5,000 Ohm 1/2 W.
50	—21875	Resistor, 100,000 Ohm 1/3 W.
51	—21875	Resistor, 100,000 Ohm 1/3 W.
52	—23785	Resistor, 500,000 Ohm 1/3 W.
53	—23785	Resistor, 500,000 Ohm 1/3 W.
54	W —22873	Resistor, 220 Ohm 2 1/2 W.
55	G103—28807	Socket—(5 Prong Spkr.)
	W —43552	Spkr. Plug Clamp
56	583-CP-18"K"	Speaker, Spec. No.
		V. C. and Cone Assy.
		Field Coil—(525 Ohm)
		Output Transformer
		Cardboard Ring
	583-CP-18"H"	Speaker, Spec. No. S-4893N3
	—46786	V. C. and Cone Assy.
	—46787	Field Coil (525 Ohm)
	—46788	Output Transformer
	—46789	Cardboard Ring
	583-CP-18"Z"	Speaker, Spec. No. E10K326
	—46758	V. C. and Cone Assy.
	—46759	Field Coil (525 Ohm)
	—46760	Output Transformer
	—46761	Cardboard Ring
57	B —46276	Band Selector Switch
58 to 65	G178—36400	8 Prong Socket
66	—46318	Power Transformer, 60 Cy.—110 V.
	—46307	Power Transformer, 50 Cy.—110 V.
	—46308	Power Transformer, 50 Cy.—220 V.
	—46309	Power Transformer, 25 Cy.—110 V.
	—46310	Power Transformer, 25 Cy.—220 V.
	—46311	Power Transformer, 40-100 Cy.—95-267 V
67	MG41—46287	Wave Trap—455 Kc.
	G188—32000	Coil—Only—Wave Trap
68Y	—44024B	Tone Control
68Z		Line Switch
69	—44773	Volume Control
70	G27 —26719	Ant. and Gnd. Terminal Assy.
71	G41 —26719	Phono Terminal Assy.
	G10 —45683	Push Button Unit Assy.
	G29 —45683	Key and Toggle Assy.
	—45717	Screw—Key Adjusting
	W —50607C	Spring—Key Return
	W —50542C	Clamp—Toggle Lock
	W —50588B	Adjusting Clip—(Heart Shaped)
	W —45646B	Adjusting Clip—(Hooked)
	W —46278	Guide Plate—Key
	G18 —45683	Rocker Plate and Gear Sector Assy.
	W —50561	Screw—Rocker Plate Bearing
	W —45976	Bronze Spring—Bearing Thrust
	W —50273	Rubber Band—Used on Keys
	8R	Cabinet
	—46360A	Knob—4 Req.
	8T	Cabinet (Lowboy Style)
	—46360A	Knob—Tuning—Volume
	—46784A	Knob—Tone Control—Band Sw.
	C —46228C	Escutcheon
	—46417	Push Button
	—50841	Station Call List
	W —50551A	Celluloid Call Letter Cover
	—46329	Instruction Booklet
	—46306	Carton for 8R Cabinet
	—46640	Carton for 8T Cabinet

CROSLEY CORP.

MODEL 828
Socket, Trimmers, Voltage
Alignment, Drive Data

CHASSIS MODEL 828

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	K	Co	Po
6J5G	Oscillator	6.3	145	—	—	0	—	—
6A8G	Modulator	6.3	265	82	-3	0	—	82
6U7G	I-F Amplifier	6.3	265	82	-3	0	—	—
6Q7G	Detector A.V.C. 1st A-F	6.3	200	—	-3	0	—	—
6J5G	Phase Inverter	6.3	165	—	-4	78	—	—
6K6G(2)	Output	6.3	260	265	—	17	—	—
5Y3G	Rectifier	5.0	A. C.					

Max. power output approx. 10 watts.
Power consumption at 117.5 line 85 watts.
Voltage across speaker field 62 volts.

CIRCUIT DESCRIPTION

The tubes used and their functions are as follows; one 6J5 G as oscillator, one 6A8 G (early models have a 6J8 G) as modulator, one 6U7 G as I-F amplifier, one 6Q7 G as diode detector, A.V.C. and first A-F amplifier, one 6J5 G as phase inverter, two 6K6 G's as push pull pentode output and one 5Y3 G as rectifier.

The fixed bias for the 6A8 G, 6U7 G and 6Q7 G is obtained from the drop across item No. 46 a 32 ohm resistor. The voltage is measured from the chassis to the low side of the speaker field. Bias for the 6J5 G phase inverter is measured across item No. 49 a 5,000 ohm resistor. The bias for the output tubes is measured across item No. 54 a 220 ohm resistor.

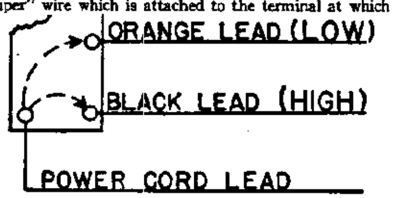
The speaker field (525 ohm) is in the negative leg of the power supply.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one



side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plates of the two 6K6G Output tubes. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier to 455 Kilocycles.

(a) Connected the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid lead in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the Broadcast Band. Right.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F assm. for maximum output. (Item 10, Fig. 2)

(f) Adjust both trimmers located on top of the 1st I-F assm. for maximum output. (Item 9, Fig. 2)

(g) Check operations (e) and (f) for more accurate adjustment.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast and Police Bands a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency band a 250 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated for each adjustment, paragraph (c) below.

(a) Adjust the "OSC" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustment of the "ANT" trimmer. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, to try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(b) To align the B. C. OSC. series trimmer (Fig. 2), set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(C) SIGNAL INPUT FREQUENCIES

	Shunt Alignment	Series Align.
American Broadcast Band	1400 Kilocycles	600 Kilocycles
Police and Amateur Band	6000 "	———
Foreign Band	18 Megacycles	———

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram (item 60).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

REPLACING THE DIAL DRIVE CORD

1—Remove the chassis from the cabinet.

2—Remove the broken drive cord, first from the pointer then from the pulleys. Remove the cord tension spring and cable clamp.

3—Remove the dial (glass and mask) and the manual tuning shaft bracket.

4—Cut a piece of dial cord 58 inches in length (G9-41582)

5—Tie the cord tension spring approximately 1½ inches from one end of the cord. Open the gang condenser, this should place the eyelet in the pulley up. Insert the cord through the eyelet, from the inside of pulley. Hook end of tension spring on the catch in the pulley opposite eyelet.

6—Bring the cord forward and down, over small brass idler pulley to the manual shaft pulley, wrap two turns around the manual shaft pulley in a counter clockwise direction. Continue cord up and over small brass idler pulley to the top idler pulley (bracket mounted on the gang) then over to the left hand idler, around idler and over to lower right hand idler pulley, over pulley and down and around (counter clockwise) the large pulley on the gang. Insert end of cord through eyelet. Stretch tension spring until it is approximately one inch in length, tie ends of cord securely. Place cable clamp (W-46290) on the cable approximately ⅛ inch from the inside of the pulley rim.

7—Replace manual drive shaft bracket, dial mask and dial.

8—Close the gang condenser, place pointer at 540 on dial then insert drive cord in pointer. Check pointer travel before cementing cord to pointer.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1,000 ohm per volt, 500-volt D. C. voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

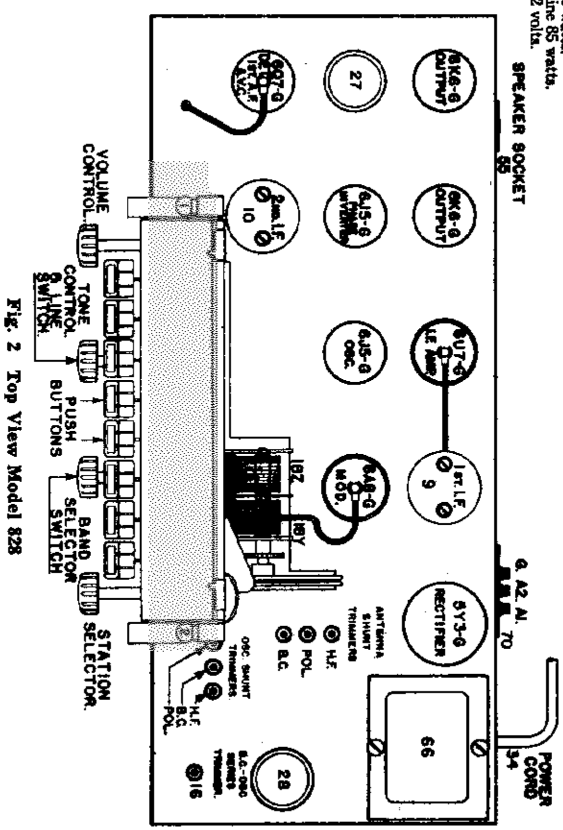


Fig. 2 Top View Model 828

MODEL 1018
Voltage, Alignment
Drive Data, Notes, Tuner

CROSLEY CORP.

Circuit Description

The circuit consists of separate oscillator and modulator tubes, two stages of I-F amplification—the second of which is resistance coupled, separate AVC and detector diodes, two stages of audio amplification and power supply. The speaker field is located in the negative leg of the power supply. The bias for all tubes except the output is developed across a 22 ohm resistor, item 40, located between the speaker field and ground. Phase inversion is obtained in the output circuit by the voltage developed across a 3000 ohm resistor, item 27A, located in the screen circuit of one of the output tubes, item 42B.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The volume control should be turned full on, the tone control should be turned to the TREBLE position (counter-clockwise) and the tuning condenser should be turned to the minimum capacity position. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	K	Gc	Ga
6K8G	Oscillator	6.3	147	147	-36	0	—	—
6A8G	Modulator	6.3	224	110	—	0	-36	110
6U7G	1st I-F Amplifier	6.3	174	110	—	0	—	—
6U7G	2nd I-F Amplifier	6.3	270	110	—	0	—	—
6C5G	Diode Detector	6.3	0	—	—	0	—	—
6C5G	AVC Diode	6.3	0	—	—	0	—	—
6K5G	1st A-F Amplifier	6.3	190	—	—	0	—	—
6K6G	Output	6.3	263	250	0	22	—	—
6K6G	Output	6.3	263	270	0	22	—	—
5Y3G	Rectifier	5.0	—	—	—	270	—	—

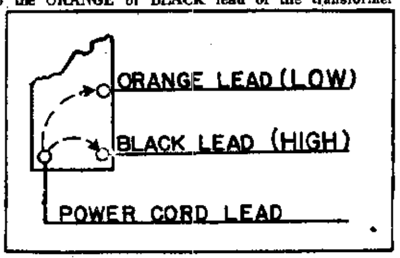
Power consumption approximately 85 watts at 117.5 volts.
Power output approximately 10 watts.
Voltage drop across speaker field 60 volts.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer



primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plates of the two 6K6G output tubes. Be certain that the meter is protected from D. C. by a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustment.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R. F. Amplifier

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (d) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (d) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (d) is tuned-in with maximum output. Then adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (d) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 2500 kilocycles in the Police Band and a 6000 kilocycles in the High Frequency Band may be compensated for by slight repositioning of the grid lead of the antenna coil in the Band affected.

If the various circuits of this receiver have to be adjusted it may be necessary to reset the push button tuning system, after the adjustments have been made.

The push buttons are set from the front of the receiver. To reset a push button remove the call letter and celluloid protector from the front of the button.

Loosen the set screw at the bottom of the hole.

Tune-in with the manual tuning knob AS ACCURATELY AS POSSIBLE the station whose call letters were in that button.

Push the button all the way down and while you hold it in that position securely tighten the set screw.

Replace station call letter and celluloid protector in button.

Repeat the above procedure for the rest of the push buttons that have to be set.

Remember—The accuracy of the push buttons depend entirely upon HOW ACCURATE YOU TUNE-IN THE STATION WHILE SETTING THEM.

(D) SIGNAL INPUT FREQUENCIES

	Min. Cap. Signal	Shunt Align.	Series Align.
American Broadcast Band	1725 Kilocycles	1400 Kilocycles	600 Kilocycles
Police & Amateur Band	6400 "	6000 "	
High Frequency Band	20 Megacycles	18 Megacycles	

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram. Item 63, Fig. 1.

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

REPLACING DIAL DRIVE CORD

To replace the dial drive cord the following procedure should be carefully followed:

1—Remove the chassis from the cabinet.

2—Remove the dial glass, the pointer, then the dial mounting bracket.

3—Remove the broken cord and the tension spring.

4—Double a 48" length of drive cord. Tie a knot in the cord to form a loop about ¾" long. Insert the two ends through the eyelet in the pulley on the gang from the inside. Hook the small loop over the catch in the pulley opposite the eyelet, then close the gang.

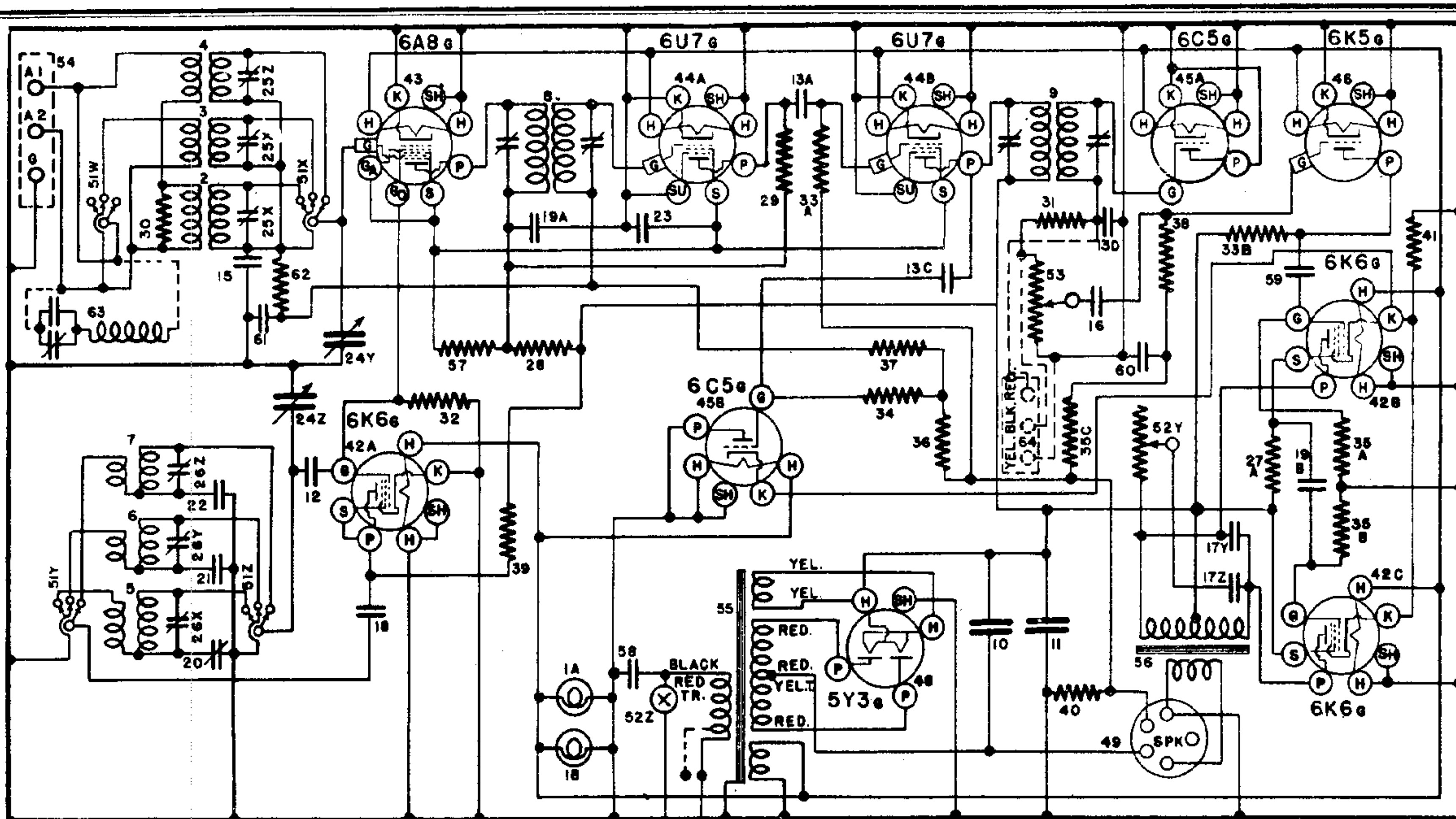
5—Bring one end of the cord forward and down over the top of the lower idler pulley. Continue the cord on down to the left of the manual drive shaft then under and around to the top of the pointer shaft pulley, crossing in front of cord to manual drive shaft. Make one and one half turns around pulley in a counter-clockwise direction. Insert end of cord through eyelet in pulley rim, eyelet should be to the left and in line with the pointer shaft.

6—Bring the other end of drive cord back and under pulley on the gang, then up and over the top idler pulley. Continue down and under pointer drive pulley for ½ turn, insert end through eyelet. Tie ends in a secure knot, then hook one end of tension spring through knot and hook the other end on catch in pulley. The tension spring should be stretched to approximately ¾" length. Retie knot if necessary to give proper tension on drive cord.

Cut off excess cord and if any bees wax is available apply a small amount to the knot as an added precaution against slipping.

MODEL 1018

CROSLEY CORP.



MODEL __1018

455 K.C. I.F.

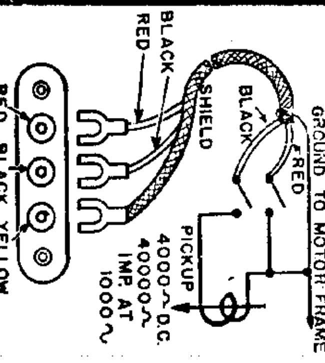


Fig. 4 Phonograph Pickup

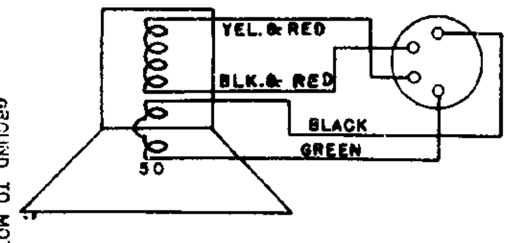


FIG. 1—WIRING DIAGRAM

OCTOBER, 1938

SPECIFICATIONS

This model Crosley is a ten-tube superheterodyne receiver featuring Push Button Tuning, temperature compensated B-C oscillator, (to prevent station drift) push pull output and many of the latest improvements in circuit design. It is designed for operation on A. C. circuits as specified on the model label.

The tuning range is from 535 to 20,000 kilocycles and is divided into three bands as follows:

535-1725 Kilocycles or 560-174 Meters (American Broadcast Band)
1900-6400 Kilocycles or 158-46.8 Meters (Police & Amateur Band)
[illegible] Meters (Foreign Band)

MODEL 1018
Socket, Trimmers, Parts

CROSLEY CORP.

Item No.	Part No.	Description
1AB	W —43567	Dial Light Bulb
	G6 —45398	Dial Light Socket Assy.
2	G169—32000	Ant. Coil—535—1850 Kc.
3	G168—32000	Ant. Coil—1850—6600 Kc.
4	G170—32000	Ant. Coil—6.2—22 Mc.
5	G169—32002	Osc. Coil—535—1850 Kc.
6	G168—32002	Osc. Coil—1850—6600 Kc.
7	G170—32002	Osc. Coil—6.2—22 Mc.
8	G162—32004	1st I-F Assembly—455 Kc.
9	G155—32004	2nd I-F Assembly—455 Kc.
10	W —44054	Condenser, 30 Mf. 350 V.
11	W —36057B	Condenser, 40 Mf. 300 V.
12	G13 —34002	Condenser, .000035 Mf. Molded
13ACD	G2 —34002	Condenser, .0001 Mf. Molded
14		NONE
15	W —35936	Condenser, .05 Mf. 200 V.
16	W —41461	Condenser, .0014 Mf. 200 V.
17Z	W —31052	Condenser, .05 Mf. 400 V.
17Y		Condenser, .004 Mf. 400 V.
18	W —35139	Condenser, .004 Mf. 400 V.
19AB	W —23615	Condenser, .05 Mf. 400 V.
20	—40769	B-C. Osc. Series Trimmer (520 Mmf.)
21	G23 —34000	Pol. Osc. Series Cond. (1560 Mmf.)
22	G20 —34000	H-F. Osc. Series Cond. (4910 Mmf.)
23	W —22688	Condenser, .1 Mf. 400 V.
24	G51 —33001	2 Sect. Gang Cond.
	—45593A	Dial Face (Glass)
	W —44262	Ring—Dial Support (Cardboard)
	W —44263	Arc—Dial Support (Cardboard)
	W —45587A	Mask—Dial (Metal)
	C —44110C	Dial Mtg. Bracket
	W —44127	Pointer (Dial Hand)
	— 2045	Shake Proof Washer (Pointer)
	W —40486	Screw—Pointer Mtg.
	W —45630	Shaft—Pointer
	W —50325A	Retaining Ring (Pointer Shaft)
	G10 —43564	Pulley and Hub Assy. (Pointer Shaft)
	G11 —43564	Pulley, Gear and Hub Assy.

Item No.	Part No.	Description
	W —45632	Gear—Take-up Spring
	W —44500A	Bearing Plate (Drive Shaft)
	W —43542B	Bracket—Drive Shaft
	W —45716	Drive Shaft
	W —43549	Retaining Ring (Drive Shaft)
	W —44701C	Rubber Grommet
	G16 —41582	Drive Cord (38 Inches)
	W —50573A	Tension Spring (D. Cord)
	MG34—45584	Bracket and Pulley Assy. (Cond. Mtg.)
	W —46290	Cord Clamp
25	W —35951A	3 Sect. Ant. Shunt Trimmer Assy.
26Z	W —45713	H-F. Osc. Shunt Trimmer
26Y		Pol. Osc. Shunt Trimmer
26X		B-C Osc. Shunt Trimmer (Temp. Compensated)
27A	—44009	Resistor, 3,000 Ohm ¼W. Carb.
28	W —23013	Resistor, 2,000 Ohm 1¼W. Flex.
29	—44165	Resistor, 5,000 Ohm ½W. Carb.
30	—22196	Resistor, 20,000 Ohm ¼W. Carb.
31	—36320	Resistor, 120,000 Ohm ¼W. Carb.
32	—21237A	Resistor, 60,000 Ohm ¼W. Carb.
33AB	—21875	Resistor, 100,000 Ohm ¼W. Carb.
34	—34020	Resistor, 250,000 Ohm ¼W. Carb.
35ABC	—23785	Resistor, 500,000 Ohm ¼W. Carb.
36	—37590	Resistor, 750,000 Ohm ¼W. Carb.
37	—21454	Resistor, 1 Megohm ¼W. Carb.
38	—26577	Resistor, 3 Megohm ¼W. Carb.
39	—44008	Resistor, 10,000 Ohm 2W. Carb.
40	W —37631	Resistor, 32 Ohm ¼W. Flex.
41	W —22873	Resistor, 220 Ohm 2½W. Flex.
42ABC	G172—36400	Socket, Type 6K6
43	G156—36400	Socket, Type 6A8
44AB	G171—36400	Socket, Type 6U7
45AB	G152—36400	Socket, Type 6C5
46	G9 —43900	Socket, Type 6K5
47		NONE
48	G173—36400	Socket, Type 5Y3
49	G103—28807	Socket for Speaker
	W —27981A	Tube Shield Base
	W —40911	Tube Shield

Item No.	Part No.	Description
50	566BP18 "M"	Speaker, Spec. No. 1-D-1052
	—44275	V. C. and Cone Assy. for 566BP18 "M" Spkr.
	—44276	FieldCoil Assy. for 566BP18 "M" Spkr.
51	—44049A	Band Selector Switch
52Z	—44024B	Line Switch
52Y		Tone Control (100,000 Ohm)
53	—44081	Volume Control—1 Meg.
54	G27 —26719	Ant. and Gnd. Term. Assy.
55	—44101	Power Trans., 110 V. 60 Cy.
	—44104	Power Trans., 110 V. 50 Cy.
	—44105	Power Trans., 220 V. 50 Cy.
	—44102	Power Trans., 110 V. 25 Cy.
	—44103	Power Trans., 220 V. 25 Cy.
56	G77 —24628	Output Transformer
57	—4921C	Resistor, 10,000 Ohm 1W.
58	W —30805	Condenser, .01 Mf. 400 V.
59	W —30488	Condenser, .02 Mf. 400 V.
60	W —34712	Condenser, .25 Mf. 160 V.
61	W —28521	Condenser, .02 Mf. 200 V.
62	—35600	Resistor, 100,000 Ohm ¼W.
63	G164—32004	Wave Trap
		PUSH BUTTON PARTS
	G1 —45683	Push Button Unit Assy.
	G32 —45683	Key and Toggle Assy.
	W —50542A	Key Clip (Lock Clamp)
	W —50607	Spring (Key Return)
	—45717	Adj. Screw (Lock Clamp)
	W —50547	Key Plate (Rear Guide)
	W —45646A	Clip (Front Guide) 1 Req.
	G31 —45683	Rocker Plate Assy.
	W —50561	⅛"—6-40 Screw (R. Plate Bearing)
	W —45711	Felt Strip (Unit Front)
	W —45589A	Push Button
	W —45763	Celluloid Covers
	—43882	Screw P.K. (Adj. Clip Mtg.)
	W —50588	Clip (Front Guide) 4 Req.
	—50841	Station Call List
	—45605	Instructions (60 Cycle)
	W —43553	Rubber Mtg. Foot
	W —44380B	Knob (2)
	W —44426A	Knob (2) (Pointer)
	W —43552	Spkr. Plug Clamp
	B —44207B	Escutcheon—Dial
	—7WB	Cabinet
	B —45626C	Push Button Escutcheon
	W —45623A	P. B. Support Brkt.
	W —45580	Grommet (P. B. Sup. Brkt.)
	—45620	Headed Bushing (P. B. Sup. Brkt.)
	W —23880A	Thumb Screw

PARTS LIST — MODEL 1018

Figures in first column refer to parts in Diagrams.

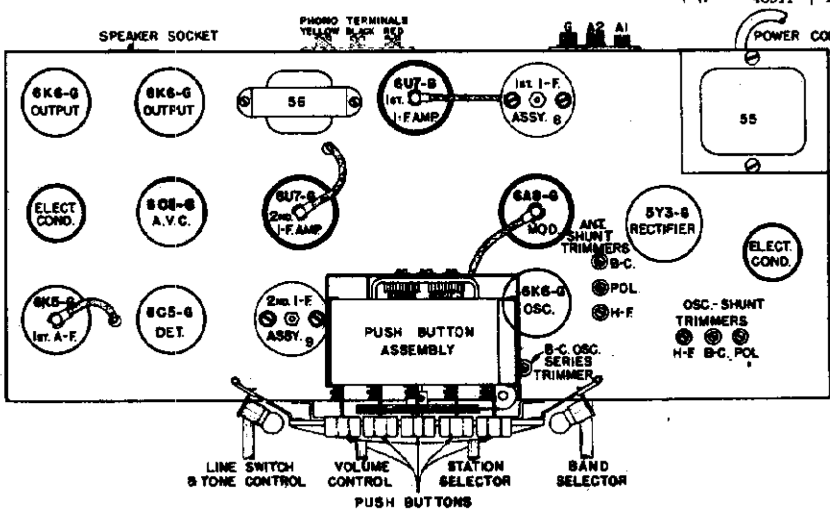


Fig. 2 Top View Model 1018

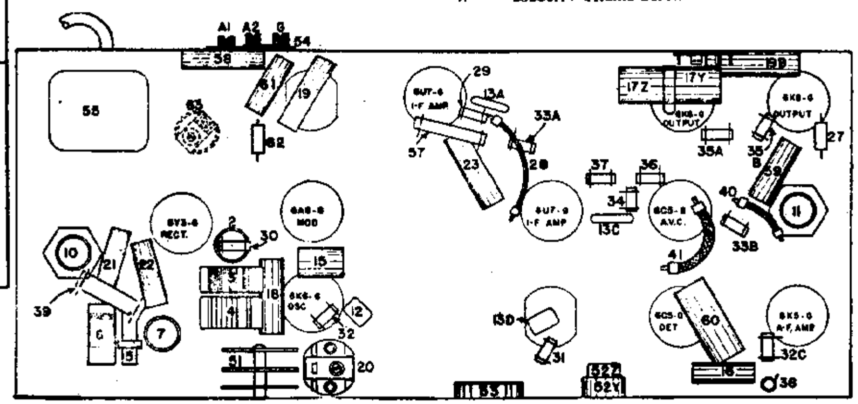


Fig. 3 Bottom View Model 1018

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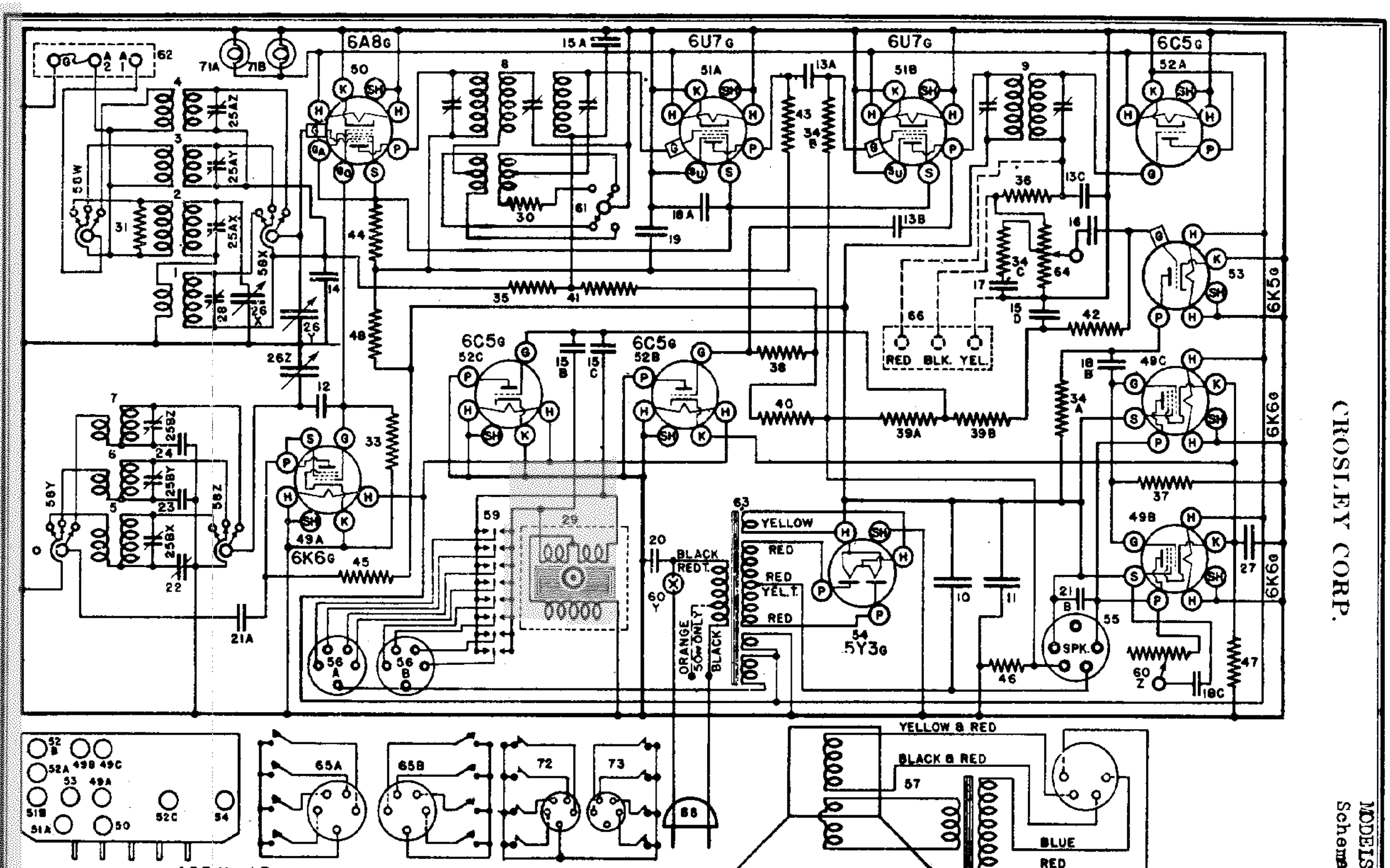


NOVEMBER, 1938

CHASSIS MODEL
1118 AND 1128

SPECIFICATIONS

This model Crosley radio is an 11-tube AC receiver designed for American and Foreign broadcast reception. It incorporates such features as push-button electric tuning, automatic volume control Local-Distance switch and parallel pentode output. The tuning range is from 540 kilocycles to 22 megacycles and is divided into three bands as follows:

540-1850 Kilocycles or 555-162 Metres
1.9- 6.6 Megacycles or 158-45.5 Metres
6.4- 22 Megacycles or 47-13.5 Metres

MODELS 1118, 1128
Parts List

CROSLEY CORP.

PARTS LIST — MODEL 1118

Figures in first column refer to parts in Diagrams.

Item	Part No.	Description
1	G97 —32001	Pre-Selector Coil, B.C.
2	G138—32000	Antenna Coil, B.C.
3	G151—32000	Antenna Coil, Police
4	G150—32000	Antenna Coil, H.F.
5	G139—32002	Oscillator Coil, B.C.
6	G154—32002	Oscillator Coil, Police
7	G153—32002	Oscillator Coil, H.F.
8	G161 -32004	1st I-F., 455 Kc. Assy.
9	G154—32004	2nd I-F., 455 Kc. Assy.
10	W —44054	Condenser, 30 Mf. 350 V.
11	W —36057B	Condenser, 40 Mf. 300 V.
12	G1 —44886	Condenser, Bimetal Temp. Control
13A	G2 —34002	Condenser, .0001 Mf. Molded
13B	G2 —34002	Condenser, .0001 Mf. Molded
13C	G2 —34002	Condenser, .0001 Mf. Molded
14	W —35936	Condenser, .05 Mf. 200 V.
15A	W - 28621	Condenser, .02 Mf. 200 V.
15B	W —28621	Condenser, .02 Mf. 200 V.
15C	W —28621	Condenser, .02 Mf. 200 V.
15D	W —28621	Condenser, .02 Mf. 200 V.
16	W —41461	Condenser, .0014 Mf. 200 V.
17	W - 28619	Condenser, .006 Mf. 200 V.
18A	W —22688	Condenser, .1 Mf. 400 V.
18B	W —22688	Condenser, .1 Mf. 400 V.
18C	W —22688	Condenser, .1 Mf. 400 V.
19	W —23615	Condenser, .05 Mf. 400 V.
20	W —30805	Condenser, .01 Mf. 400 V.
21A	W —35139	Condenser, .004 Mf. 400 V.
21B	W —35139	Condenser, .004 Mf. 400 V.
22	—40769	Condenser, B.C. Osc. Series Trimmer
23	G23 —34000	Condenser, .001560 Mf. Pol. Osc. Fixed Trimmer
24	G20 —34000	Condenser
25	W —35951A	3 Section Shunt Trimmer Assy.
26	G60 —33002	3 Section Var. Tuning Cond. (1118)
26	G62 —33002	3 Section Var. Tuning Cond. (1128)
	—44891B	Dial Face (Glass) (1118)
	W —45587A	Mask (Polished Metal) (1118)
	C —44110C	Support Bracket (Dial Glass) (1118)
	W —44262	Ring (Glass Support) (1118)
	W —44263	Arc (Glass Support) (1118)
	W —44127	Pointer (1118)
	W —40486	Screw—Pointer Mtg. (1118)
	G5 —43564	Pulley and Hub Assy. (1118)
	—41582	Drive Cord (1118)
	W —45448	Drive Belt (1118)
	W —44907A	Idler Pulley (1118)
	W —44908	Idler Mtg. Stud (1118)
	D —46239	Dial Face (Glass) (1128)
	C —46094	Dial Glass Support (1128)
	W —46099	Dial Glass Clip (2) (1128)
	W —46096	Dial Glass Clip, R.H. (1128)
	W —46095	Dial Glass Clip, L.H. (1128)
	—46203	Dial Pointer (1128)
	W —46097	Dial Pointer Guide (1128)
	G —41582	Drive Cord (50-Inch) (1128)
	W —46941	Dial Glass Cushion (1128)
	G13 —43564	Pulley and Hub Assy. (1128)
	MG44—46080	Idler Pulley and Brkt. Assy. (1128)
	W —44989	Cord Tension Spring (1128)
	W —46477	Tubing—Drive Shaft (1128)
	W —45448	Drive Belt (1128)
	W —44907B	Idler Pulley (Dual) (1128)
	W —44908	Idler Stud (1128)
	D —46949	Dial Glass (Foreign Only) (1128)
	W —46290	Drive Cord Clamp (1128)
27	W —41598	Condenser, 50 Mf. 25 V.
28	—44516	Condenser, Pre-Select Shunt
29	MG105—44879	Motor Assembly (50-60 Cycle)
	—45168	Motor
	W —45165	Motor Foot
	W —45164	Motor Mounting Bracket
	W —20800	Shakeproof Washer
	—6875	W. H. Machine Screw, 3/16" Long
	—6876	W. H. Machine Screw, 1/4" Long
	—44497	Headed Bushing—Brkt. Mtg.
	W —36180	Rubber Sleeve—Brkt. Mtg.
30	—42401A	Resistor, 99 Ohm 1/4W. Ins.
31	—22196	Resistor, 20,000 Ohm 1/3W. Carb.
33	—21237A	Resistor, 60,000 Ohm 1/3W. Carb.
34A	—21875	Resistor, 100,000 Ohm 1/3W. Carb.
34B	—21875	Resistor, 100,000 Ohm 1/3W. Carb.
34C	—21875	Resistor, 100,000 Ohm 1/3W. Carb.

Item	Part No.	Description
35	—35600	Resistor, 100,000 Ohm 1/4W. Carb.
36	—36320	Resistor, 120,000 Ohm 1/4W. Carb.
37	—34018	Resistor, 200,000 Ohm 1/3W. Carb.
38	—34020	Resistor, 250,000 Ohm 1/3W. Carb.
39A	—23785	Resistor, 500,000 Ohm 1/3W. Carb.
39B	—23785	Resistor, 500,000 Ohm 1/3W. Carb.
40	—37590	Resistor, 750,000 Ohm 1/3W. Carb.
41	—21454	Resistor, 1 Megohm 1/3W. Carb.
42	—26577	Resistor, 3 Megohm 1/3W. Carb.
43	—44165	Resistor, 5,000 Ohm 1/2W. Carb.
44	—4921C	Resistor, 10,000 Ohm 1W. Carb.
45	-44008	Resistor, 10,000 Ohm 2W. Carb.
46	W —37631	Resistor, 32 Ohm 1/2W. Flex.
47	W —45381	Resistor, 300 Ohm 2W. Flex.
48	W —23013	Resistor, 2,000 Ohm 1 1/4W. Flex.
49 to 54	G178—36400	Socket, 8 Prong Octal.
55	G103—28807	Socket, Speaker
56	G16 —28807	Socket, Push Button Cable
	W —41007	Cable Clamp, P. B. Cable
	W —40911	Tube Shield
57	671BP-18-"M"	Speaker, Spec. No. 1-D-1180
	—45184	V. C. and Cone Assembly
	—45185	Field Coil (515 Ohm)
	—44678	Output Transformer
	—43680	Cone Mounting Ring
	W —24715	Elastic Mounting Nuts
	W —22985	Rubber Washer
	W —46804	Spacer
	W —24865	Steel Washer
58	—44049	Band Selector Switch
59	G1 —44628	Switch, Discriminator, Assy. Complete
	G2 —44628	Flexible Coupling
60	—44024B	Tone Control (300,000 Ohm) and Line Switch
61	—46086	Switch, Local Distance (1128)
61	—44665A	Switch, Local Distance (1118)
62	G27 —26719	Ant. and Gnd. Terminal Assy.
63	—44910	Power Transformer, 110 V. 60 Cycle
	—44915	Power Transformer, 110 V. 50 Cycle
	—44916	Power Transformer, 220 V. 50 Cycle
	—45527	Power Transformer, Universal
64	—44702	Volume Control, 1 Megohm Tapped
65A	G8 —45228	Push Button—Cable and Plug Assy. (R.H.) (1118)
65B	G9 —45228	Push Button—Cable and Plug Assy. (L.H.) (1118)
	W —45478	Trip Bar and Connecting Link (P. B. Switch) (1118)
66	G37 —26719	Phono Terminal Assy.
68	B —33960A	Line Cord and Plug
71	W —43567	Dial Light Bulb, 6-8 Volt (1118)
71	W —37922	Dial Light Bulb, 6-8 Volt (1128)
	G9 —44363	Dial Light Socket Assy.
72	MG45—46081	Push Button—Cable and Plug Assy. (1128)
73	7P	Cabinet (1118)
	B —45652A	Escutcheon (Dial) (1118)
	—45667	Escutcheon (Push Button) L.H. (1118)
	—45666	Escutcheon (Push Button) R.H. (1118)
	W —44380B	Knob, Vol. Cont. and Tuning (2) (1118)
	W —44426A	Knob, T. C.—L. D. Sw. and B. C. Sw. (3) (1118)
	W —44871A	Push Button (Bakelite) (1118)
	B —44876A	Switch (Push Button) Only (1118)
	8Q	Cabinet (1128)
	8QA	Cabinet (1128)
	C —46228C	Escutcheon (1128)
	—46360A	Knob, Vol. Cont. and Tuning (2) (1128)
	—46362A	Knob, T. C.—L. D. Sw. and B. C. Sw. (3) (1128)
	W —45171	Push Button (Bakelite) (1128)
	B —46221	Switch (Push Button) Only (1128)
	W —44876A	Celluloid Cover (Button)
	—44902	Call Letter Sheet
	W —43553	Rubber Mounting Foot
	W —43552	Clamp (Speaker Plug)
	—45604	Instructions (1118)
	—43093	Instructions (1128)

CROSLEY CORP.

MODEL 1118 AND 1128

CIRCUIT DESCRIPTION

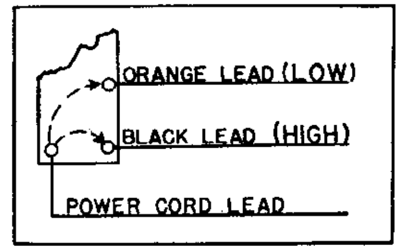
Eleven tubes are employed in a superheterodyne circuit which consists of separate oscillator and modulator tubes, 455 kilocycle I-F amplifier—one stage of which is resistance coupled, separate AVC and detector diodes, two stages of audio amplification and power supply. The 1st I-F transformer is a triple-tuned unit, which in conjunction with the Local-Distance switch, controls the selectivity of the receiver. Inter-station noise suppression is accomplished while tuning by means of the push buttons due to the action of the 6C5-G "squelch" tube. When a push button is depressed, this tube supplies sufficient voltage to the cathodes of the output tubes to bias them beyond "cut-off." It also supplies voltage to the AVC circuit through a 250,000 ohm resistor, item 38. The speaker field is located in the negative leg of the power supply. The bias for all tubes except the three type 6C5-G and the two output tubes is developed across a 32 ohm resistor, item 46, located between the speaker field and ground. The bias for the output tubes is developed across a 220 ohm resistor, item 47.

SPECIAL POWER TRANSFORMER ADJUSTMENT

In localities where the voltage variation on 50 or 60 cycle power supply lines is greater than customary commercial limits, special 50-60 cycle power transformers are available. These transformers have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the



terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

Connecting Output Meter

Connect the output meter to the plate and screen of one of the 6K6C output tubes. Be certain that the meter is protected from D.C. by a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning The I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6U7G 1st I-F Amp. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band.

(d) Turn the Local-Distance Switch to the "Distance" position.

(e) Set the signal generator to 455 kilocycles.

(f) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum output. DO NOT ADJUST THE TRIMMER CONDENSERS LOCATED ON THE 2ND I-F TRANSFORMER WITH THE SIGNAL GENERATOR LEAD CONNECTED TO THE 6A8G TUBE.

(g) Transfer the signal generator lead to the top cap of the 6A8G tube, leaving the tube's grid clip in place.

(h) Close the middle trimmer of the 1st I-F transformer. (Do not force adjustment screw).

(i) Adjust the top and then the bottom trimmers of the 1st I-F transformer for maximum output.

(j) Adjust the middle trimmer of the 1st I-F transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning The R-F Amplifier

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in placed of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (D) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (D) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then adjust the "R-F" and "ANT" shunt trimmers for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "R-F" and "ANT" trimmers. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 2500 kilocycles in the Police Band and at 7000 kilocycles in the High Frequency Band may be compensated for by slight reposition of the grid lead of the antenna coil in the Band affected.

PUSH BUTTON TUNING SYSTEM

The push button electric tuning system employed in this receiver incorporates eight push buttons on the Model 1118 and nine on the Model 1128, a selector switch and a motor. The discriminator switch, item 59—also Figs. 5 and 6, incorporates eight metallic discs, each of which operates in conjunction with a different push button to tune-in some favorite station. That is, the 1st push button on the left as you face the front of the cabinet works with No. 1 disc, and the 2nd push button works with No. 2 disc, etc.

SETTING PUSH BUTTONS

To set the electric tuning system, turn the receiver "ON" and depress No. 1 push button. When the dial pointer stops rotating, the key slot in No. 1 disc on the selector switch will be in the "UP" position. Remove the key from its mounting and place it (knob up) through No. 1 hole in the disc identification bracket. If it does not drop into the slot in the disc, push it in with the fingers.

Turn the Local-Distance switch to the "Distance" position. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE, the station whose call letters have been placed in No. 1 push button. Then remove the key.

NOTE: On Model 1128 the push button on the extreme right (manual) serves as a release for all other push buttons and should be depressed before operating the manual tuning control.

NOTE: On Model 1118 the push button which will ordinarily be used for Police calls does not lock in the depressed position. It serves as a release for all other buttons and should be depressed before operating the manual tuning control.

By means of the manual tuning knob, turn the dial pointer to some other position. Then check the setting by pressing the button which has been set. If the pointer stops too soon or goes too far, a second setting will be necessary.

To make the second setting, observe how far the pointer stops from the correct position for that station. Replace the key in the disc and tune far enough to one side of the correct position to make allowance for the difference noted in the first setting.

The electric tuning system is now correctly set for the 1st station. Follow through with this same procedure until the proper adjustments have been made for all eight of the favorite stations. When tuning the receiver by means of the push buttons, the Local-Distance switch should be turned to the "Local" position.

Selector Switch

Should the selector switch become inoperative in the field, it should not be dissembled for repair, but should be returned to the factory via an authorized Crosley Distributor.

REPLACING DRIVE CORD ON THE 1128

To replace the dial drive cord, the following procedure should be carefully followed.

1.—Remove the knobs, plugs, and hold down screws from the chassis then remove the chassis from the cabinet.

2.—Remove the drive cord from the pointer, the dial light sockets from the dial bracket, then the complete dial assembly.

3.—Remove the broken cord and tension spring.

4.—Cut a piece of drive cord exactly 50 inches in length. Fold double then tie the tension spring approximately one inch from the end, this gives you a loop 24 inches long.

5.—Close the condenser gang, this should place the eyelet in the pulley on top.

6.—Insert the cord through the eyelet in the large pulley from the inside. Hook the loose end of tension spring on catch in pulley.

7.—Remove double brass pulley from front of chassis.

8.—Take one side of drive cord and make one half turn in a counter-clockwise direction around large pulley.

9.—Hold brass pulley in left hand and make two complete turns in a clockwise direction around small end. While keeping tension on cord mount pulley to chassis. Then continue cord up and over the right hand idler pulley in a counter clockwise direction (¼ turn). Continue across to left hand idler pulley and on around and down to bottom of large pulley. Stretch tension spring and snap cord over pulley rim. Place cord clamp (W-46290) on drive cord approximately ⅛ inch from inside edge of pulley rim.

10.—Replace drive belt, dial assembly and dial lights.

11.—Place pointer at extreme left end of dial, close condenser gang. Hook drive cord in pointer, check pointer travel before cementing cord to pointer.

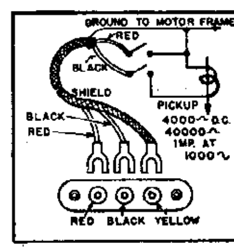


Fig. 4 Phonograph Pickup

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The volume control should be turned full "ON," the tone control should be turned to the "TREBLE" position (counter-clockwise), the Local-Distance switch should be turned to the "Distance" position and the condenser gang should be rotated to the minimum capacity position. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

1938

MODELS 1118, 1128
Voltage, Socket, Trimmers
Chassis, Drive Data

CROSLEY CORP.

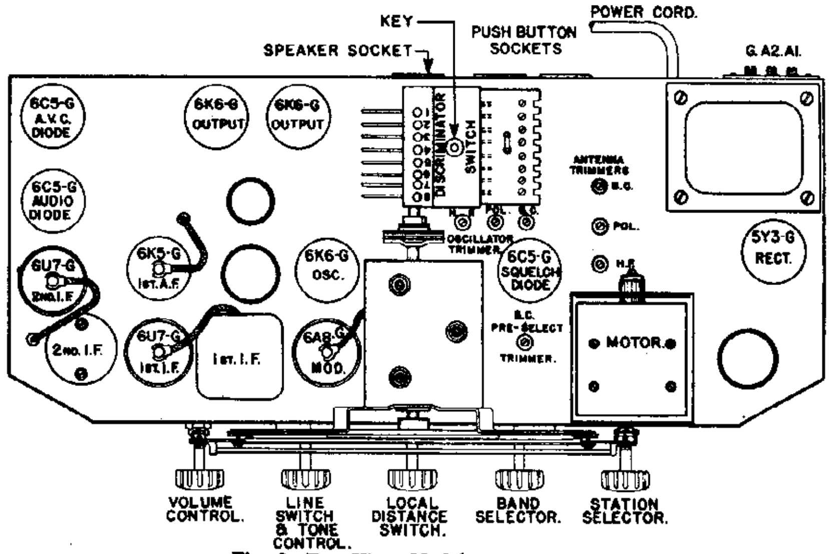


Fig. 2 Top View Model 1118 and 1128

(D) SIGNAL INPUT FREQUENCIES

	Min. Cap. Signal	Shunt Align.	Series Align.
American Broadcast Band	1850 Kilocycles	1700 Kilocycles	600 Kilocycles
Police & Amateur Band	6600 Kilocycles	6000 Kilocycles	
High Frequency Band	22 Megacycles	18 Megacycles	

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	K	Go	Ga
6K6G	Oscillator	6.3	147	147	-36	0	-36	110
6A8G	Modulator	6.3	224	110	—	0	—	—
6U7G	1st I-F Amplifier	6.3	174	110	—	0	—	—
6U7G	2nd I-F Amplifier	6.3	270	110	—	0	—	—
6C5G	Diode Detector	6.3	0	—	—	0	—	—
6C5G	AVC Diode	6.3	0	—	—	0	—	—
6K5G	1st A-F Amplifier	6.3	190	—	—	0	—	—
6K6G	Output	6.3	263	270	0	22	—	—
6K6G	Output	6.3	263	270	0	22	—	—
6C5G	"Squelch"	6.3	0	—	—	0	—	—
5Y3G	Rectifier	5.0	—	—	—	270	—	—

Power consumption approximately 90 watts at 117.5 volts.
Power output approximately 10 watts.
Voltage drop across speaker field 60 volts.

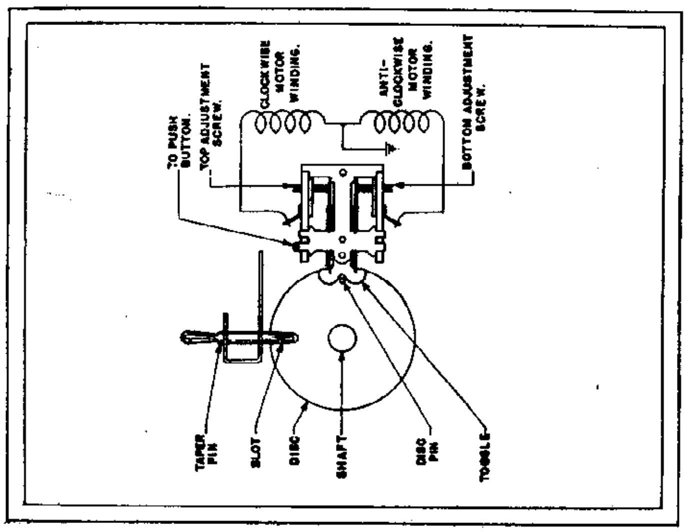


Fig. 5

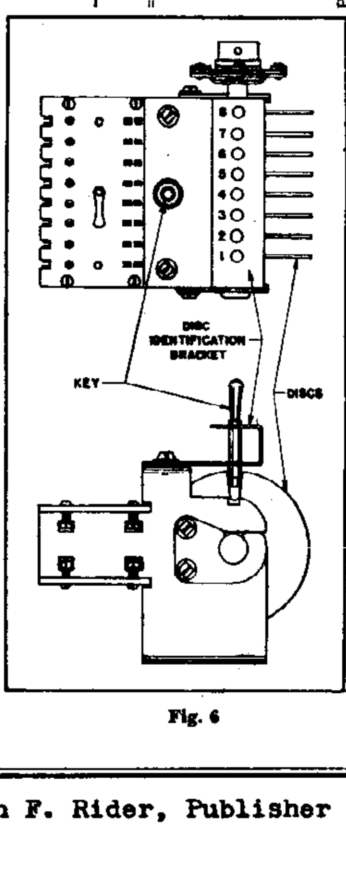


Fig. 6

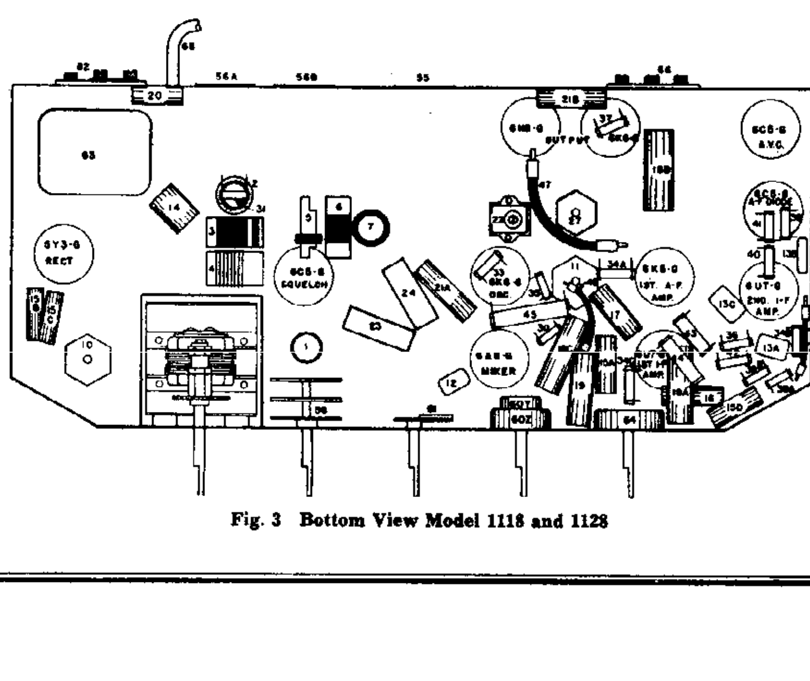


Fig. 3 Bottom View Model 1118 and 1128

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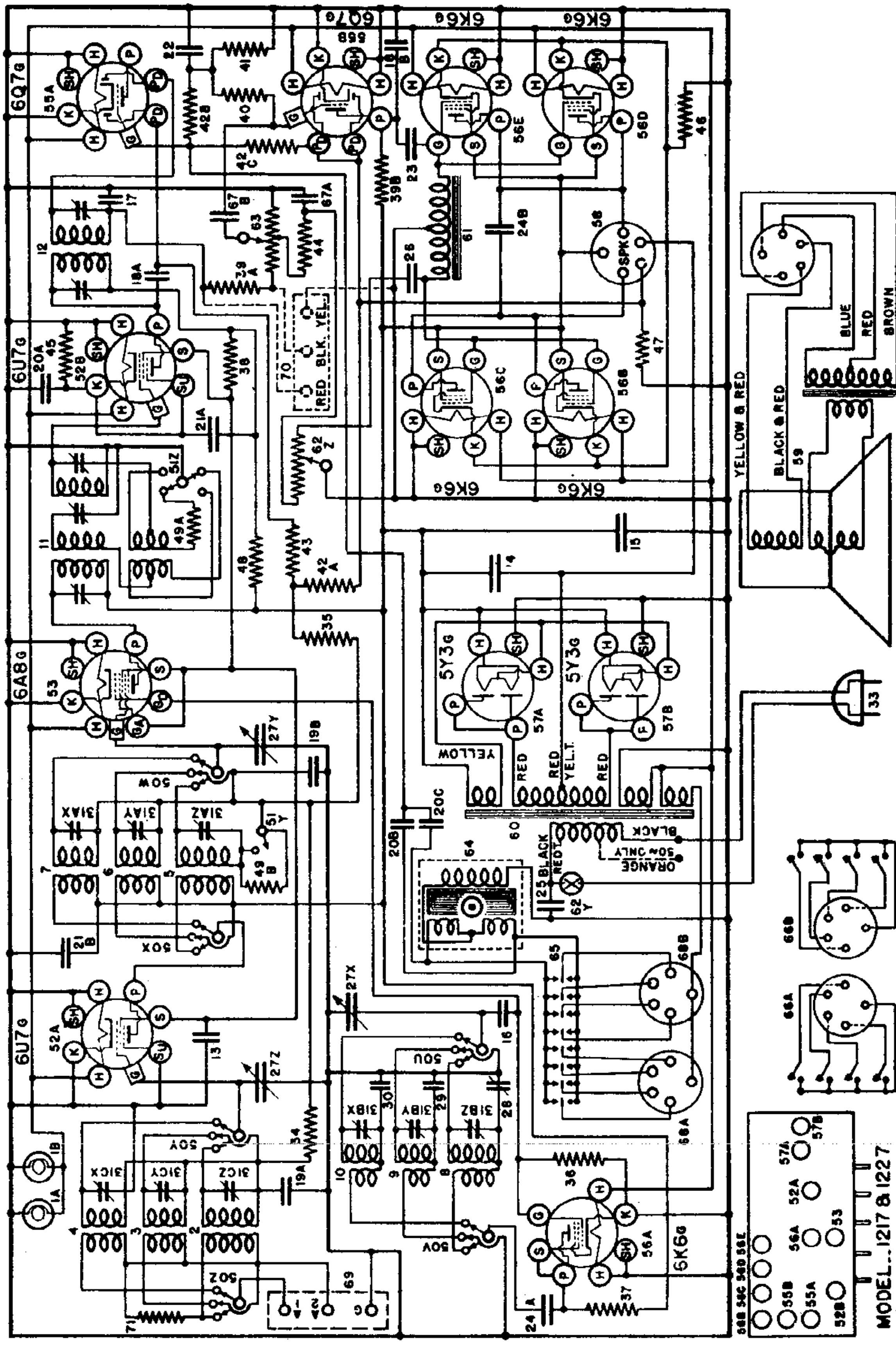

MODELS 1217,1227
Tuner,Parts List

CROSLEY CORP.

INTERLOCKING PUSH BUTTONS

	Part No.	Description
G4	45228	R. H. Push Button Assy. (1) (1217)
B	45177	Push Button Escutcheon R. H.
G5	—45228	L. H. Push Button Assy. (1) (1217)
W	—44873B	Push Button Escutcheon L. H.
W	45478	Trip Bar Connecting Link (1)(1217, 1227)
R	-77	Screw—Trip Bar Mtg. (1217 and 1227)
W	—44877A	P. B. Cable and Plug (1217 and 1227)
B	—45475	R.H. Push Button Switch only (1217, 1227)
B	—45476	L.H. Push Button Switch only (1217, 1227)
W	45171A	Push Button only (8) (1217)
G6	—45228	R. H. Push Button Assy. (1) (1227)
G7	—45228	L. H. Push Button Assy. (1) (1227)
W	—44871A	Push Button only (8) (1227)
W	—44875	Celluloid Covers (8) (1217 and 1227)
W	—45483	Shock Pad—P. B. Sw. (8) (1217 and 1227)

PUSH BUTTON TUNING SYSTEM

The push button electric tuning system employed in this receiver incorporates eight push buttons, a selector switch and an electric motor. The discriminator switch, item 65 — also Fig. 5, incorporates eight metallic discs, each of which operates in conjunction with a different push button to tune-in some favorite station. That is, the 1st push button on the left as you face the front of the cabinet work with No. 1 disc, and the 2nd push button works with No. 2 disc, etc.

SETTING PUSH BUTTONS

To set the electric tuning system, turn the receiver "ON" and depress No. 1 push button. When the dial pointer stops rotating, the key slot in No. 1 disc on the selector switch will be in the "UP" position. Remove the key from its mounting and place it (knob up) through No. 1 hole in the disc identification bracket. If it does not drop into the slot in the disc, push it in with the fingers.

Turn the Local-Distance switch to the "Distance" position. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE, the station whose call-letters have been placed in No. 1 push button. Then remove the key.

NOTE: The push button which will ordinarily be used for POLICE calls does not lock in the depressed position. It serves as a release for all other push buttons and should be depressed before operating the manual tuning control. (The first sets of this model were built with non-lock type push buttons).

By means of the manual tuning knob, turn the dial pointer to some other position. Then check the setting by pressing the button which has been set. If the pointer stops too soon or goes too far, a second setting will be necessary.

To make the second setting, observe how far the pointer stops from the second position for that station. Replace the key in the disc and tune far enough to one side of the correct position to make allowance for the difference noted in the first setting.

The electric tuning system is now correctly set for the 1st station. Follow through with this same procedure until the proper adjustments have been made for all eight of the favorite stations. When tuning the receiver by means of the push buttons, the Local-Distance switch should be turned to the "Local" position.

Tuning Motor

Should the clutch on the tuning motor fail to operate satisfactorily, either by not engaging or not releasing when it should, the two tension springs located on the back of the motor should be readjusted.

With the receiver sitting in its normal operating position, bend both tension springs until the clutch will not engage. Slowly decrease the tension on both springs until the clutch engages and releases satisfactorily. Check the operation of the motor several times to be certain that the tension is correct.

Selector Switch

Should the selector switch become inoperative in the field, it should not be dissembled for repair, but should be returned to the factory via an authorized Crosley distributor.

PARTS LIST—MODELS 1217 and 1227

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1AB	W —43567	Dial Light Bulb
	G8 —45398	Dial Light Socket Assy.
2	G145—32000	Ant. Coil, B-C.
3	G146—32000	Ant. Coil, Pol.
4	G147—32000	Ant. Coil, H-F.
5	G94 —32001	R-F. Coil, B-C.
6	G95 —32001	R-F. Coil, Pol.
7	G96 —32001	R-F. Coil, H-F.
8	G148—32002	Osc. Coil, B-C.
9	G149—32002	Osc. Coil, Pol.
10	G150—32002	Osc. Coil, H-F.
11	G161—32004	1st I-F. Assy.
12	G166—32004	2nd I-F. Assy.
13	W —44672	Condenser, 40 Mf. 125 V.
14	W —44054	Condenser, 30 Mf. 350 V.
15	W —36057B	Condenser, 40 Mf. 300 V. (1217 only)
15	W —44438A	Condenser, 40 Mf. 300 V. (1227 only)
16	G1 —44886	Condenser, Temp. Compensating
17	G5 —34002	Condenser, .00005 Mf. Molded
18A	G1 —34002	Condenser, .00025 Mf. Molded
18B	G1 —34002	Condenser, .00025 Mf. Molded
19A	W —35936	Condenser, .05 Mf. 200 V.
19B	W —35936	Condenser, .05 Mf. 200 V.
20A	W —28621	Condenser, .02 Mf. 200 V.
20B	W —28621	Condenser, .02 Mf. 200 V.
20C	W —28621	Condenser, .02 Mf. 200 V.
21A	W —32378	Condenser, .01 Mf. 400 V.
21B	W —32378	Condenser, .01 Mf. 400 V.
22	W —29910A	Condenser, .25 Mf. 200 V.
23	W —24049C	Condenser, .1 Mf. 200 V.
24A	W —35139	Condenser, .004 Mf. 400 V.
24B	W —35139	Condenser, .004 Mf. 400 V.
25	W —30805	Condenser, .01 Mf. 400 V.
26	W —37988	Condenser, .017 Mf. 400 V.
27	G58 —33002	3 Section Var. Tun. Condenser
	B —44815B	Dial Face (Glass)
	W —44146B	Dial Mask (Metal)
	C —44814A	Dial Support Bracket
	W —45417	Ring—Dial Glass Support
	W —44127	Dial Hand (Pointer)
	W —40486	Screw (Hand Mtg.)
	G1 —43564	Pulley and Hub Assy. (Drive Cord)
	—41582	Drive Cord (23 in.)
	W —44908	Idler Stud
	W —44989	Spring—Drive Cord Tension
	W —44907A	Idler Pulley
	W —45448	Drive Belt
	—45449	Friction Tubing—Motor Shaft
28	—40769	B-C Osc. Series Trimmer (.00052 Mf.) Variable
29	G23 —34000	Pol. Osc. Fixed Series Condenser (.00156 Mf.)
30	G24 —34000	H-F. Osc. Fixed Series Condenser (.005525 Mf.)
31	W -35951A	3 Section Shunt Trimmer Assy.
32		
33	B —33906A	Power Cord and Plug
34	—35930	Resistor, 200,000 Ohm ¼W. Ins.
35	—34883	Resistor, 2 Megohm ½W. Carb.
36	—21237A	Resistor, 60,000 Ohm ¼W. Carb.
37	—44008	Resistor, 10,000 Ohm 2W. Carb.
38	—23616	Resistor, 15,000 Ohm 1W. Carb.
39A	—35600	Resistor, 100,000 Ohm ¼W. Ins.
39B	—35600	Resistor, 100,000 Ohm ¼W. Ins.
40	-37583	Resistor, 2.5 Megohm ⅓W. Carb.
41	-37245	Resistor, 1.5 Megohm ⅓W. Carb.
42A	—23785	Resistor, 500,000 Ohm ⅓W. Carb.
42B	—23785	Resistor, 500,000 Ohm ⅓W. Carb.
42C	—23785	Resistor, 500,000 Ohm ⅓W. Carb.
43	—21455	Resistor, 300,000 Ohm ⅓W. Carb.
44	-37472	Resistor, 50,000 Ohm ⅓W. Carb.
45	W —28589	Resistor, 350 Ohm ½W. Flex.
46	W —44456	Resistor, 250 Ohm 3W. Flex.
47	W —37630	Resistor, 21 Ohm ½W. Flex.
48	W —23013	Resistor, 2,000 Ohm 1¼W. Flex.
49A	—42401B	Resistor, 99 Ohm ¼W. W. W. Ins.
49B	—42401B	Resistor, 99 Ohm ¼W. W. W. Ins.
50	—44532A	Band Selector Switch
51	—44771	Local-Distance Switch
52AB	G171—36400	Socket, Type 6U7
53	G156—36400	Socket, Type 6AB
55AB	G160—36400	Socket, Type 6Q7
56A BCDE	G172—36400	Socket, Type 6K6
57AB	G173—36400	Socket, Type 5Y3
58	G103—28807	Socket Speaker
	W —40911	Tube Shield
59	668BP18"M"	Speaker, Mfg. Spec. 1-D-1134
	—45180	V. C. and Cone Assy.
	—45181	Field Coil (450 Ohms—125 M. A.)
	—45182	Output Trans.
	—44682	Speaker Plug
	—43680	Cardboard Ring—Cone Mtg.
60	—44705	Power Trans., 110 V. 60 Cy.
	—44793	Power Trans., 110 V. 50 Cy.
	—44791	Power Trans., 110 V. 25 Cy.
	—44794	Power Trans., 220 V. 50 Cy.
	—44792	Power Trans., 220 V. 25 Cy.
61	G20 —29535	Audio Input Choke
62	—44704A	Tone Control (1 Meg.) and Line Switch
63	—44773	Volume C't'l (1 Meg. Tap-275,000 Ohm)
64	—45168	Motor—1217 only (50-60 Cy.)
	—45169	Motor—1227 only (50-60 Cy.)
	W —45165	Mtg. Foot—Motor
	W —45164	Bracket—Motor Mtg.
65	G1 —44628	Discriminator Switch Assy.
	W —44898	Pin. Switch Adjust.
66AB	W —44877	Cable and Plug—Push Button
67A	W —28619	Condenser, .006 Mf. 200 V.
67B	W —28619	Condenser, .006 Mf. 200 V.
68AB	G16 —28807	Socket—Push Button Plug
69	G27 —26719	Ant. and Gnd. Terminal Assy.
70	G37 —26719	Phono Terminal Assy.
71	—22196	Resistor, 20,000 Ohm ¼W. Carb.
	7R	Cabinet (1227 only)
	7PF	Cabinet (1217 only)
	W —43552	Spk. Plug Clamp
	W —43553	Rubber Mtg. Foot (5-1217) (2-1227)
	B —44207B	Escutcheon (Dial)
	W —44724	Extruded Rub. Spacer—Brkt. Mtg. 1227
	B —45477	Escutcheon (2 Req.) Push Button
	B —44876A	Push Button Switch only
	W —44877A	Push Button Cable
	W —44871A	Push Button (1227)
	W —45171	Push Button (1217)
	W —44380B	Knob—V. Cont.—Tuning (1227)
	W —44426A	Knob—T. Cont.—Loc. Dist. (1227)
	W —44751A	Knob—Band Sel. (1227)
	W —45105	Knob—V. Cont.—Tuning (1217)
	W —45104	Knob—T. Cont.—Loc. Dist. (1217)
	W —45103A	Knob—Band Sel. (1217)
	W —44875	Celluloid Cover
	—44902	Station Call Letter Sheet
	C —44404	Chassis Mtg. Bracket (1227)
	• — 7662	Screws—Brkt. Mtg. (1227)

NON-INTERLOCKING PUSH BUTTONS

	Part No.	Description
G2	—45228	Push Button Assy. Complete (2) (1217)
B	—44876A	Push Button Switch only (1217)
W	—44877A	Push Button Cable and Plug only (1217)
W	—45171	Push Button only (1217)
G1	—45228	Push Button Assy. Complete (1227)
B	—44876H	Push Button Switch only (1227)
W	—44877A	Push Button Cable and Plug only (1227)
W	—44871A	Push Button only (1227)
W	—44873B	Push Button Escutcheon (2) (1217 and 1227)

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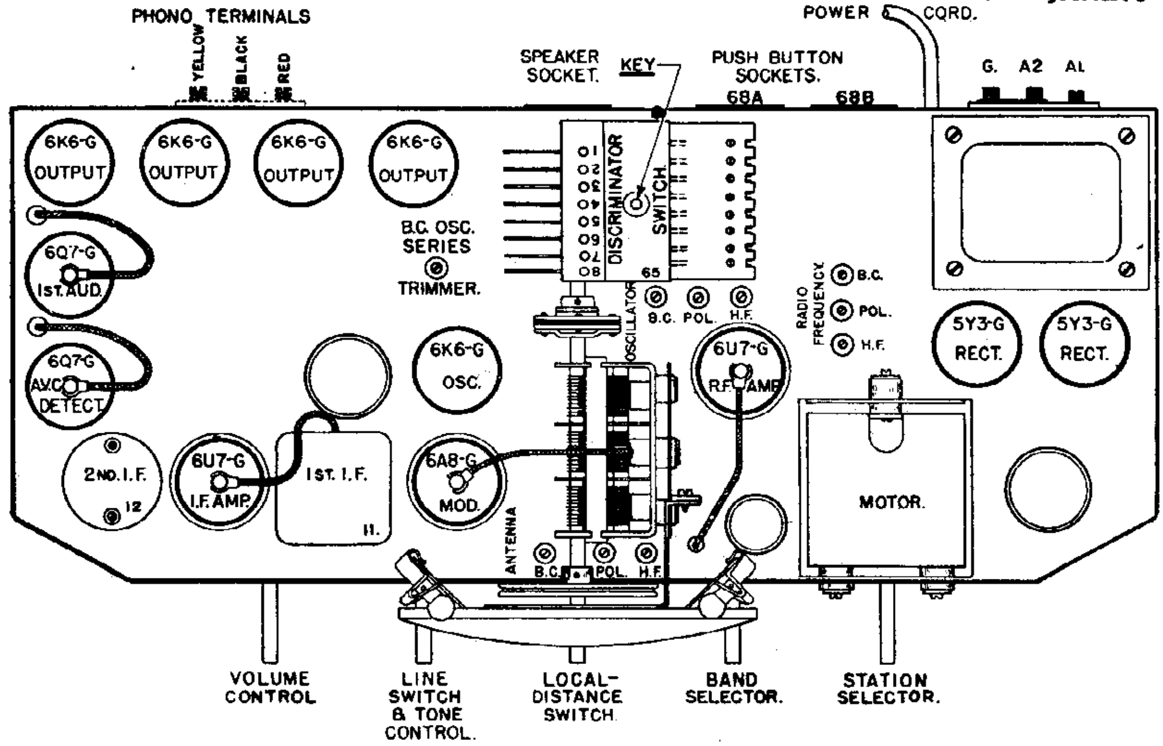


Fig. 2. Top View Models 1217 and 1227

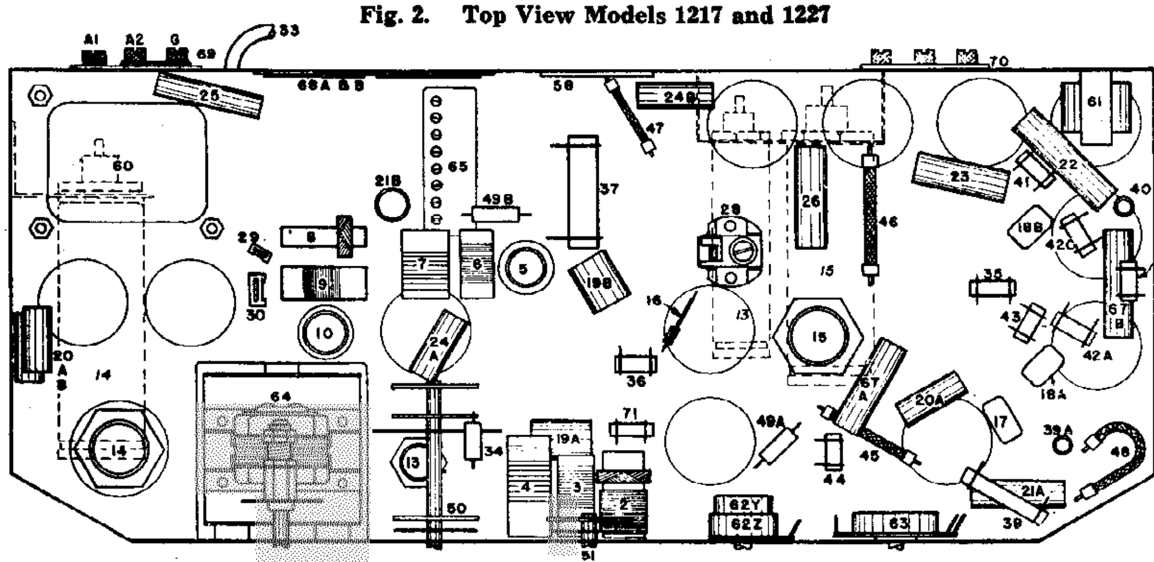


Fig. 3. Bottom View Models 1217 and 1227

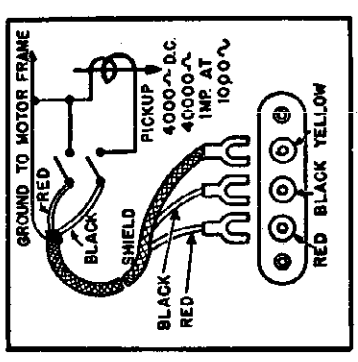


Fig. 4. Phonograph Pickup

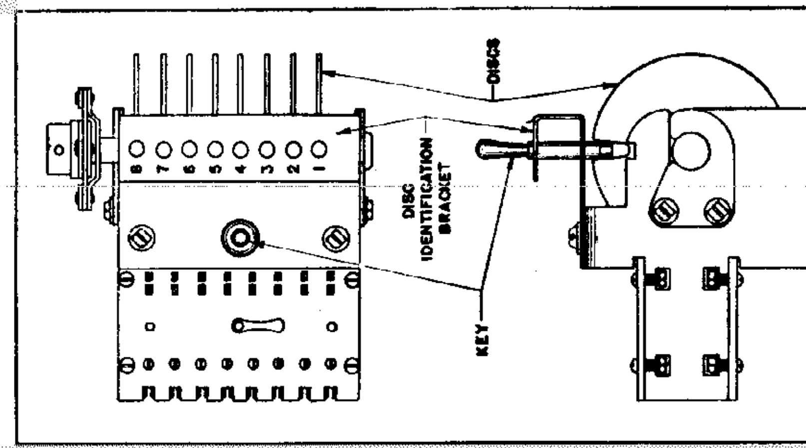


Fig. 5

MODELS 1217,1227
Voltage,Alignment
Notes

CROSLEY CORP.

These model Crosley radios are 12-tube AC receivers designed for Standard Broadcast and Short Wave reception. They incorporate such features as push button electric tuning, automatic volume control, Local-Distance switch and push pull parallel output. The tuning range is divided into three bands as follows:

535-1725 Kilocycles or 565-173 Metres (American Broadcast Band)
2.0- 6.8 Megacycles or 150-44.5 Metres (Police & Amateur Band)
6.6- 22 Megacycles or 45.5-13.6 Metres (High Frequency or Foreign Band)

CIRCUIT DESCRIPTION

Twelve tubes are employed in a superheterodyne circuit which consists of an R. F. amplifier, separate oscillator and modulator tubes, 455 kilocycle I. F. amplifier, a composite detector, AVC and quiet or "squelch" tube, two stage audio amplifier—the output of which uses four pentode tubes in push pull parallel and power supply.

The 1st I. F. transformer is a triple-tuned unit, which in conjunction with the Local-Distance switch, controls the selectivity of the receiver. Quiet tuning is accomplished while tuning by means of the push buttons due to the action of the 6Q7G tube, item 55A, on the audio amplifier. When any push button is depressed, A. C. voltage is impressed upon the control grid of this tube through one or the other of condensers 20B or 20C. A portion of this voltage is rectified and passed on to the control grid of the 6Q7G A. F. tube through resistors 42B and 40, the effect being to bias the tube beyond cutoff.

The diode plates of the 6Q7G A. F. tube have no effect upon the circuit and the socket terminals for these two elements are only used for junction blocks. The 450 ohm field of the speaker is located in the negative leg of the power supply.

The bias voltage for the 6U7G I. F. amplifier tube is obtained across a 250 ohm resistor, item 47, located between the speaker field and ground.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The volume control should be turned full "ON," the tone control should be turned to the "TREBLE" position (counter-clockwise), the Local-Distance switch should be turned to the "Distance" position and the condenser gang should be rotated to the minimum capacity position. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Go	Ga
6U7G	R. F. Amplifier	6.3	255	95	0	0.	—	—
6A8G	Modulator	6.3	255	95	—	0	95	95
6K6G	Oscillator	6.3	125	125	—	0	—	—
6U7G	I. F. Amplifier	6.3	255	95	3	3	—	—
6Q7G	Det., AVC & "Squelch"	6.3	0	—	—	0	—	—
6Q7G	1st A. F. Amplifier	6.3	165	—	—	0	—	—
6K6G	(4) Output	6.3	245	255	—	22	—	—
5Y3G	(2) Rectifier	5.0	—	—	—	295	—	—

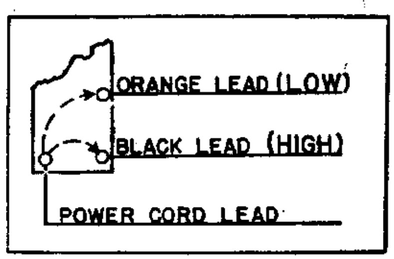
Power consumption approximately 180 watts at 117.5 volts.
Power output approximately 12 watts.
Voltage drop across speaker field 72 volts.

SPECIAL POWER TRANSFORMER ADJUSTMENT

In localities where the voltage variation on 50 or 60 cycle power supply lines is greater than customary commercial limits, special 50-60 cycle power transformers are available. These transformers have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.



NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

Connecting Output Meter.

Connect the output meter to the plates of the two 6K6G output tubes. Be certain that the meter is protected from D. C. by a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning The I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6U7G 1st I-F Amp. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band.

(d) Turn the Local-Distance Switch to the "Distance" position (Right).

(e) Set the signal generator to 455 kilocycles.

(f) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum output.

(g) Transfer the signal generator lead to the top cap of the 6A8G tube, leaving the tube's grid clip in place.

(h) Close the middle trimmer of the 1st I-F transformer. (Do not force adjustment screw).

(i) Adjust the top and then the bottom trimmers of the 1st I-F transformer for maximum output.

(j) Adjust the middle trimmer of the 1st I-F transformer for maximum output.

DO NOT ADJUST THE TRIMMER CONDENSERS LOCATED ON THE 2ND I-F TRANSFORMER WITH THE SIGNAL GENERATOR LEAD CONNECTED TO THE 6A8G TUBE.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (D) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (D) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then adjust the "R-F" and "ANT" shunt trimmers for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "R-F" and "ANT" trimmers. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

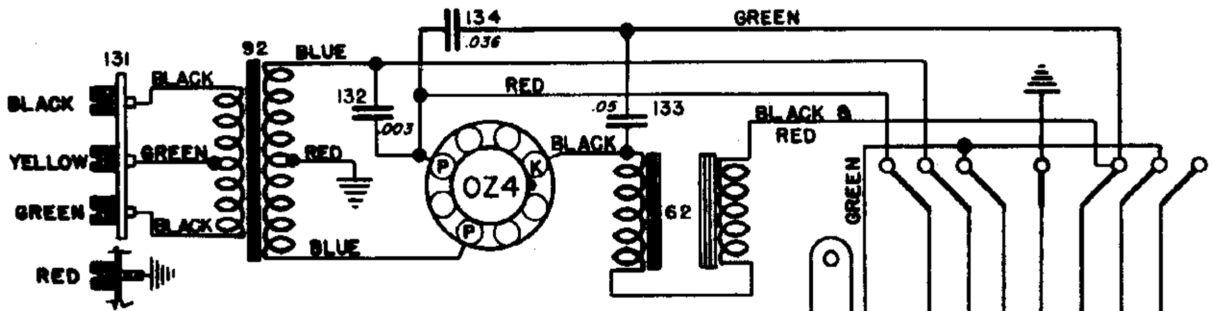
(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 2500 kilocycles in the Police Band and at 7000 kilocycles in the High Frequency Band may be compensated for by slight repositioning of the grid lead of the antenna coil in the Band affected.

(D) SIGNAL INPUT FREQUENCIES

	Min. Cap. Signal	Shunt Align.	Series Align.
American Broadcast Band	1650 Kilocycles	1700 Kilocycles	600 Kilocycles
Police & Amateur Band	6600 Kilocycles	6000 Kilocycles	
High Frequency Band	22 Megacycles	18 Megacycles	

CROSLEY CORP.

MODELS 118,119
Reado Printers
Schematic, Connections
Stylus Details



WIRING DIAGRAM FOR MODELS 118&119

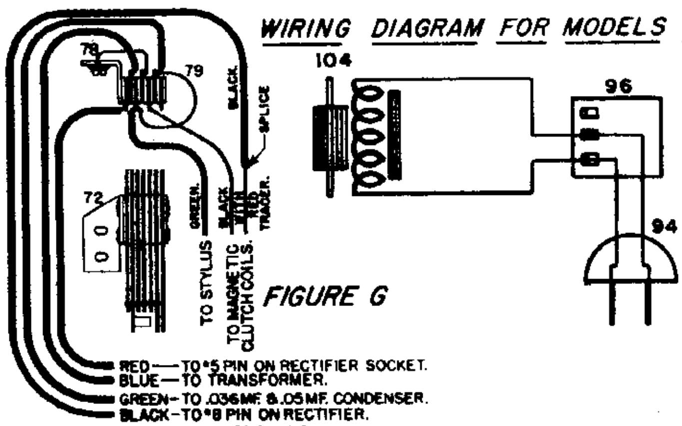


FIGURE G

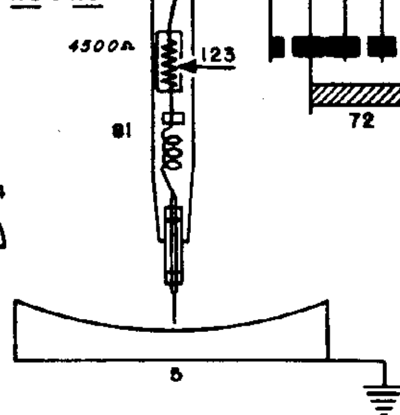
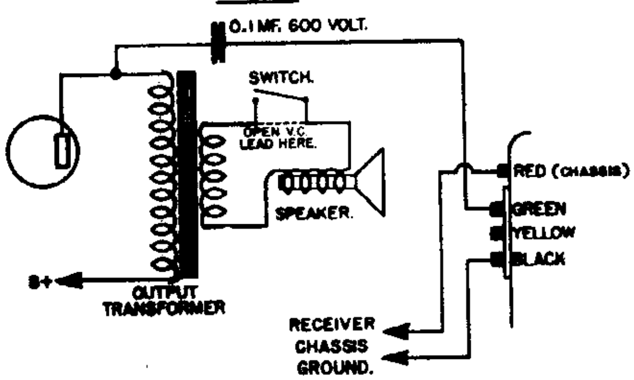


FIG. 1A



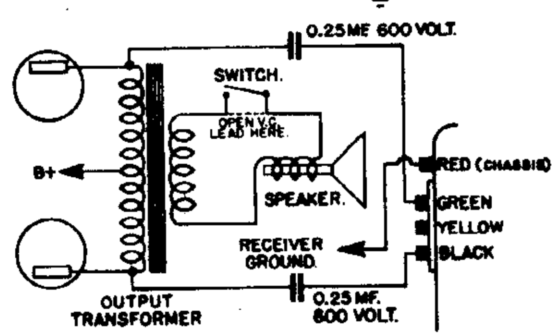


FIG. 2A

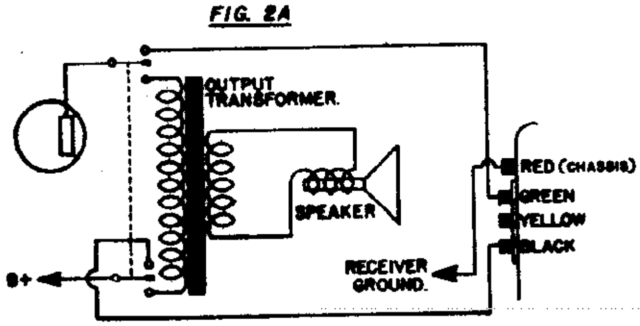
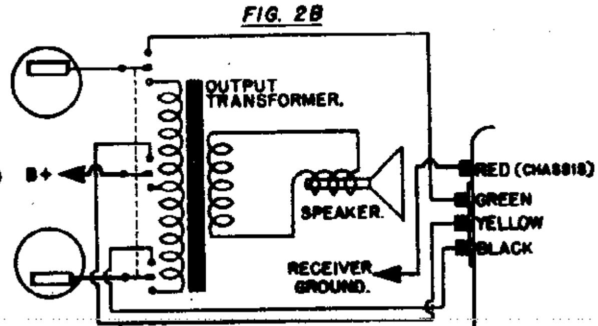
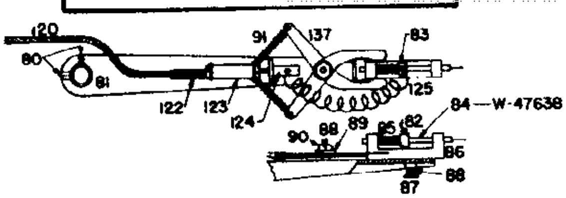


FIG. 2B



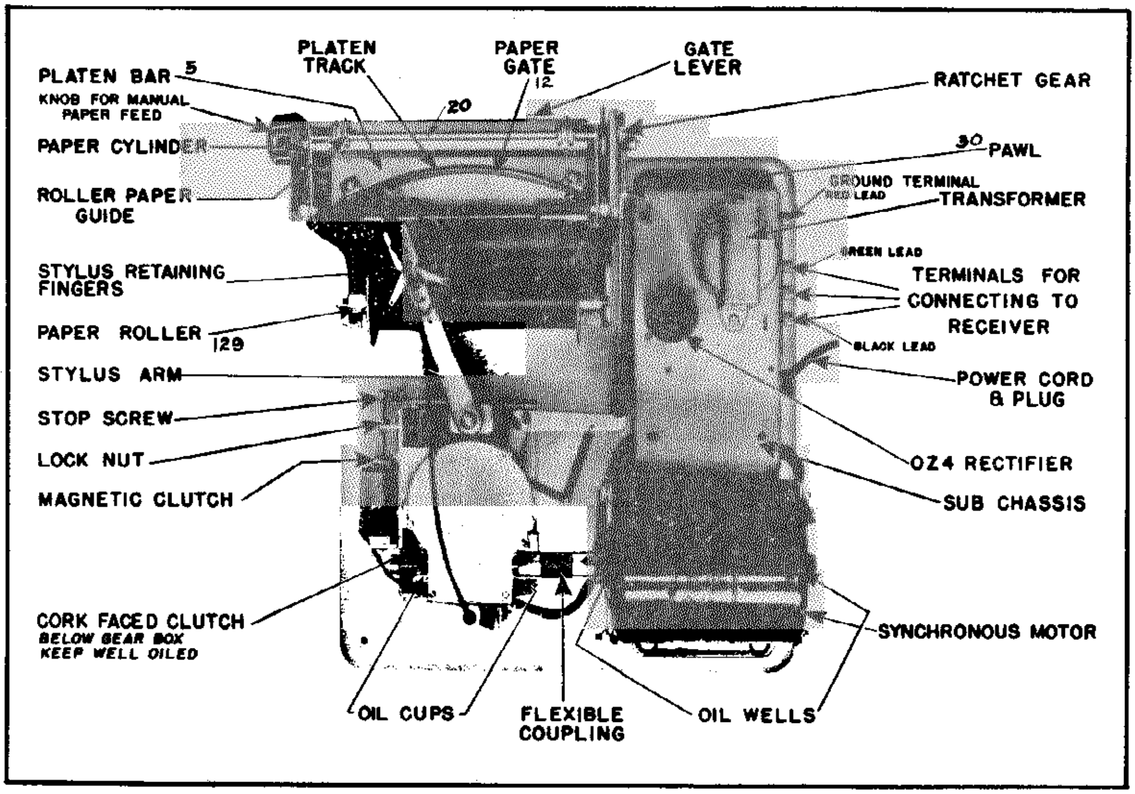


MATCHING

BLACK & YELLOW	APPROX. 5,000 OHMS.
GREEN & YELLOW	APPROX. 5,000 OHMS.
BLACK & GREEN	APPROX. 10,000 OHMS.
BLACK, YELLOW, GREEN	APPROX. 10,000 OHMS, PUSH-PULL.

MODELS 118,119
Reado Printers
Assembly,Chassis Views

CROSLEY CORP.



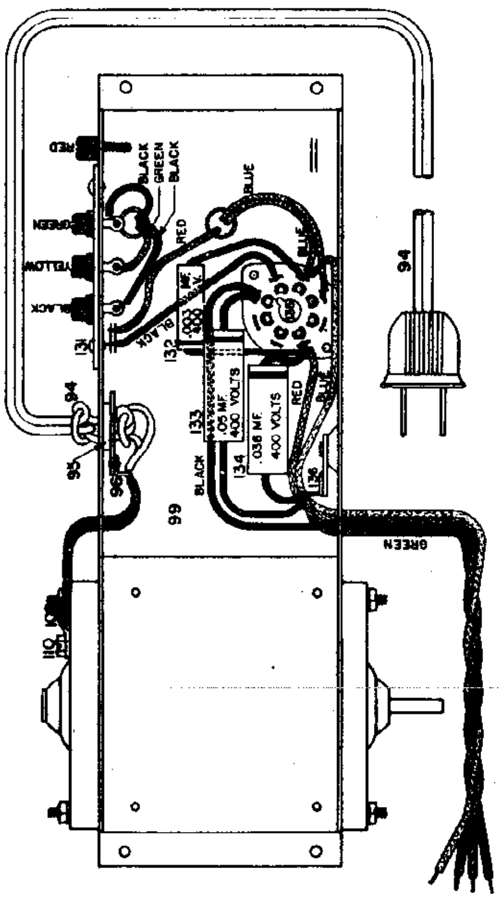


FIGURE J

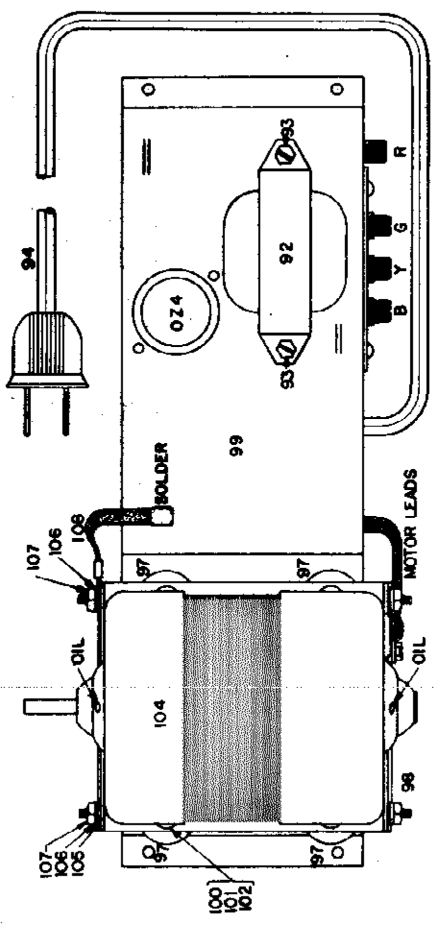


FIGURE K.

CROSLEY CORP.

INSTRUCTIONS FOR ELECTRICALLY CHECKING
MODELS 118 AND 119 CROSLEY READO PRINTERS.

To electrically check the operation of the 118 and 119 printer, it should be connected to a receiver as shown in attached bulletin. Connect a signal generator modulated with any audio frequency less than 500 cycles to the antenna of the receiver and switching the output from the receiver to the printer, with the motor running, turn up the level control on the receiver slowly until sufficient voltage appears across the synchronizing coils on printer to actuate the clutch release. This will release the stylus arm at this same level setting and the modulation should mark lightly on the paper. Increasing the level setting should bring up the blackness of printing to the point just below where the paper begins to smoke which is the desirable printing level. As the level of the receiver is reduced the printing should become lighter and lighter and as the level is further reduced the clutch pawl will hold in and the arm should stop over at the left side of the paper.

Measuring across the relay solenoid with a 1000 ohm per volt D.C. meter synchronization should occur between 45 and 55 volts. In cases where this does not hold true the OZ4 rectifier should be checked as it will be noted from circuit diagram this tube is switched in the circuit only for synchronization, that is, to rectify the 500 cycle pulse for the relay coils If the trouble is not found in the tube, the circuit should be checked for opens or shorts and the switch points inspected and cleaned. If circuit and voltages are found okay and printer still refuses to operate properly, the clutch arm should be adjusted according to instructions.

To measure the printing signal, connect a 1000 ohm per volt A.C. meter across the stylus to ground at the switch and advance the level control of the receiver until the stylus is sweeping back and forth across the paper. When printing at desired level on average paper, the voltage reading should pick up to between 200 and 250 volts. If the paper is in doubt, turn the stylus so that it does not touch the paper and connect 18000 ohms from stylus to ground, turn motor off and rotate shaft by hand until stylus arm is half way across on its way from left to right and measure the voltage across this resistor. The voltage should read between 200 and 250 volts as above.

Wherever possible it is advisable to check the operation with a phonograph and a record containing facsimile copy. Such a record may be obtained from The Crosley Corporation for operation on a 33-1/3 R.P.M. turntable.

TO PREPARE FOR OPERATION

1. INSERTING PAPER

(a) The roll of paper should be placed on the roller (129) so that if you were to pull on the end, it would unroll toward you.

(b) Insert paper between the lower roller and the base (white surface up).

(c) Push lever, on back of platen bar (5), to the left. (Platen is the center bar that supports paper for the stylus.) This springs open the paper gate (12) Pull paper up between gate and platen.

(d) Lift bar (20) with the roller paper guides.

(e) Place paper over paper cylinder. Be sure the paper is lined up and fits over pins in cylinder.

(f) Release catch holding lever on platen bar, then push roller guides down on the paper.

(g) Place cleaning brush so that the bristles just bear lightly on the paper, with the bristles toward the stylus.

2. STYLUS

VERY CAREFULLY, spread metal fingers (137) and turn the stylus assembly (86) so that the point is toward the paper (BE SURE NOT TO BEND POINT) then release fingers (137). The metal fingers should hold the stylus assembly in line with the stylus arm.

(a) Turn the motor over by hand. To do this, turn the rubber coupling away from you (clockwise direction) until stylus comes to rest at the left hand side of the paper.

(b) While turning the motor by hand, depress the magnetic clutch. The stylus will move across the paper. Check the stylus pressure against paper by listening for a slight rub as stylus crosses paper. The correct pressure is indicated by a slight rub but not sufficient to leave a mark on the paper.

3. RATCHET AND PAWL

By turning the motor over by hand the operation of the ratchet and pawl (which moves the paper cylinder) can be checked.

(a) While turning motor by hand and depressing the magnetic clutch as before; turn motor until the stylus arm is at the right hand side of the paper. While the arm is traveling back to the left side of paper, the ratchet moves up ONE tooth and is locked by the pawl (30). This movement of one tooth acts through the gear train and turns the paper cylinder, so that the paper moves up 1/100 of an inch.

If everything checks normal up to this point, plug the power cord into a convenient receptacle (110 volts, 60 cycles).

With motor running, listen carefully for any excessive mechanical vibrations. If present they may be minimized by adjusting the four bolts that mount the motor bracket and the four bolts that mount the sub-chassis to the base.

CONNECTING TO RECEIVER

For best results from the READO, (Model 119), the receiver or source of A-F supply should be designed to give the required electrical characteristics that are necessary for the correct operation of the READO, namely:

1. At least 5 watts output (clean audio).

2. A very good A.V.C. circuit.

3. Good sensitivity and selectivity.

4. A well filtered power supply (NO HUM).

Figures 1 A & B and 2 A & B show how to connect 119 Printer to Receiver. The switching arrangement is up to the individual, likewise the connection may be varied as in Figure 1 or 2, use the connection that gives the best results.

CAUTION: NEVER WORK ON PRINTER CONNECTIONS WITH RECEIVER TURNED ON.

We recommend the Crosley Model 758 Receiver as an exceptional radio receiver, in that the circuit incorporates many new developments that are essential for producing the excellent job of printing of which this READO is capable.

OPERATION

If the preceding instructions have been carefully followed, the operation of the READO is practically automatic with the exception of turning ON and OFF

TUNING-IN FACSIMILE SIGNAL

The IMPORTANCE OF ACCURATE tuning of the radio receiver to the station broadcasting Facsimile signal cannot be emphasized enough. Good copy cannot be realized unless the station is tuned-in right on the nose, as the form of printing depends almost entirely on the READO being synchronized with the transmitting equipment.

The procedure for accurate tuning is as follows: Locate desired station on the dial, then tune to each side, then bring pointer back to the exact center of that portion of the dial that the station covers. It will be found much easier to tune-in accurately (Facsimile signals) by tuning to the station that is to broadcast Facsimile signals, WHILE THE STATION IS BROADCASTING A REGULAR RADIO PROGRAM.

ADJUSTING THE DENSITY OF PRINTING (Blackness)

First, the receiver must have sufficient output (5 watts or more). The blackness of the printing is regulated by increasing or decreasing the setting of the volume or level control.

MAINTENANCE

1. Care of the Stylus.
The stylus may tend to bind in the bakelite block after considerable service due to small particles of carbon collecting on shaft. If this occurs, loosen collar and remove shaft and clean. Replace and adjust as stated in paragraph under "Stylus"

2. Care of the Platen Track.
The platen track is a strip of spring steel that is back of paper gate and is between paper and the platen bar. Due to the method of printing this track collects deposits of carbon after quite a few hours of service and will cause the stylus to stick or the printing density to vary in shade for one sweep. To clean, carefully turn stylus assembly at right angles with the stylus arm. This is done so as to prevent possible damage to the stylus point when removing paper gate. Then push lever back on platen bar and carefully remove paper gate. With a VERY fine sand paper using a wiping motion from one side to the other, polish the platen track. Replace paper gate. Replace stylus to printing position.

MOTOR

The motor should be oiled (each bearing) about once in every three hundred hours of service with a high grade of light lubricating oil.
Motor will not run properly on less than 105V.

CLUTCH

It is essential that the clutch plate be thoroughly lubricated at all times, check at least once a week. Use a high grade of machine oil for this purpose.

SERVICE HINTS

Variations in density or blackness of printing may be due to:
(a) Receiver may not have the A.V.C. circuit capable of keeping the output constant over wide variations of incoming signal strength.
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in bakelite bracket.
(d) Stylus may be worn.
(e) Platen track may have small deposits of carbon on it.

WOBBLY PRINTING --
(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Bent or loose stylus point.
Definite vertical light streaks uniformly spaced across the printer matter is an indication of insufficient filtering in the receiver, permitting hum voltage to reach printer.

NOT PRINTING --
(a) Power off.
(b) Loose or open connection between receiver and printer.
(c) Stylus stuck.

STYLUS ARM KEEPS MOVING --
The stylus arm should come to rest at the left hand side of paper when the volume or level control is reduced appreciably. If it keeps moving back and forth, the end of the magnetic clutch arm that engages the dog on the clutch plate may be slightly worn. If this is the case it may be compensated for by a slight adjustment of the magnetic clutch stop screw. (See illustration) Loosen the stop screw lock nut, then turn screw to the left (counter-clockwise) about a quarter turn or just enough to cause the magnetic clutch arm to engage dog on clutch plate.

MODELS 118,119
Reado Printers
Trouble Chart

CROSLEY CORP.

MODEL 118 READO TROUBLE CHART

TROUBLE	CAUSE	REMEDY
A. Uneven density of print. Light streaks through copy, particularly noticeable on solid black areas.	A1. Gate not holding paper against platen properly.	A1.(a) Check gate latch making sure gate is closed. A1(b) Check gate hold-down lugs on left and right side of platen holder which should prevent gate from crawling up as paper goes through machine. A1(c) Gate should not be kinked or twisted.
	A2. Stylus pressure too light.	A2.Adjust collar on stylus holder.
	A3. Platen carbonized.	A3. Clean with light emery paper. To prevent carbonizing do not print too black.
	A4.Stylus does not move freely in holder.	A4. Burnish stylus lengthwise with fine emery paper.
	A5.Paper	A5.Try new paper.
B. Fuzzy printing. Characters lined up straight and of correct height, but with staggered outline.	B1. Carbonized stylus.	B1. Clean stylus; lighten pressure, adjust blackness.
	B2. Platen carbonized.	B2. See A3.
	B3.Not synchronizing cleanly.	B3(a) Adjust clutch arm and air gap. B3(b)Check clutch arm point for squareness.
	B4. See A4.	B4. See A4.
C. Height of characters varies from line to line.	C1.Paper not feeding through gate and platen properly.	C1.See A1(a) and A1(b)
	C2.Ratchet not working properly.	C2(a) Check ratchet assembly for binding. C2(b) Adjust ratchet push rod so that pawl has from 1 to 1 1/2 tooth movement each stroke.
D. Stylus sticks in holes in side of paper.	D1.Stylus arm not centered.	D1.Re-center stylus arm by adjusting arm on shaft by two set screws.
E.Light or no printing with horizontal lines or streaks, usually accompanied by a black vertical line on one or both sides.	E1.Weak signal or interference from local sources or other stations.	E1.Use better antenna remove local interference.
F.Wavy characters; some leaning to the right, others to the left.	F1. Poor synchronizing.	F1.Adjust clutch arm and air gap.Tighten clutch.
	F2.Weak 0Z4 tube.	F2. Replace tube.
G.Short dash lines of increasing and then decreasing length appear across paper accompanied by stylus arm not stopping when volume control is turned down.	G1.Clutch arm not stopping stylus.	G1.Adjust clutch arm and air gap.
H.Paper tears.	H1.Paper not set up properly.	H1.Reset paper.
	H2.Paper creased or torn at edges.	H2.Remove creased or torn portion.
	H3.Too much pressure on gate.	H3.See that gate is free to reset lightly but firmly on paper.
I. Paper burns.	I.Printing too black due to volume being too high.	I.Decrease volume control.

MODEL 494 RECORD PLAYER TROUBLE CHART

A.Prints light on records, but O.K. on air.	A1.Needle too soft.	A1.Use new hard needle.
	A2.Record worn out.	A2.Use new record.
	A3.Paper	A3.Change paper.
B.Prints uneven on record,but O.K. on air.	B1.Uneven velocity of turntable.	B1.Lap thrust bearing washer with a rotary motion until all radial marks are erased.Lap thrust bearing on turntable same as thrust washer.
C.Motor will not start.	C.Motor mounted too rigidly.	C.Loosen mounting nuts under turntable one turn.

TO ADJUST CLUTCH AND AIR GAP

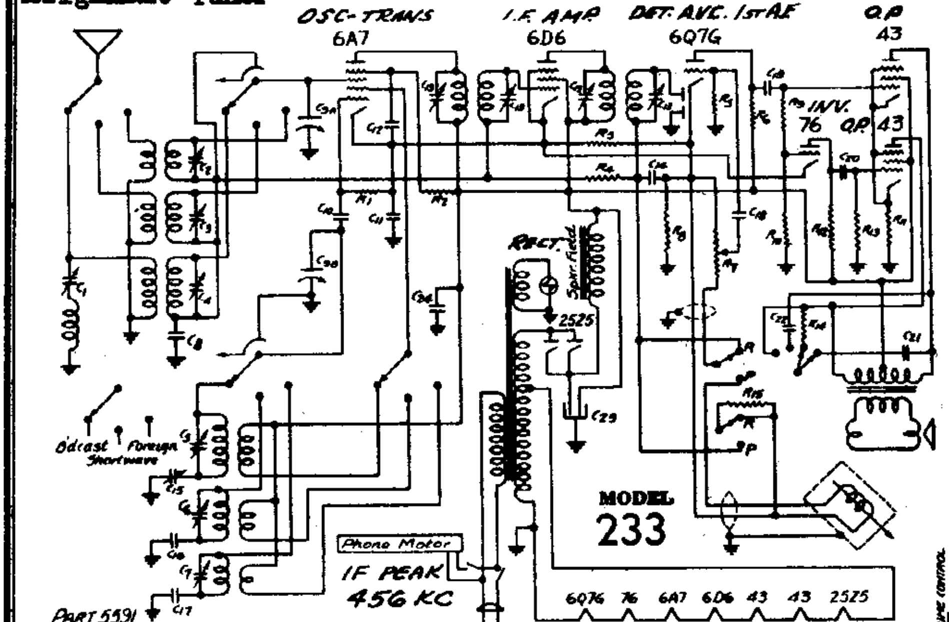
Turn motor coupling by hand in direction of normal rotation while holding clutch arm against magnet pole pieces, until stop on lower clutch plate is just completely under clutch arm. Loosen mounting screws for magnet bracket and slide bracket and coils forward until the pole pieces come within the thickness of a piece of writing paper of touching the magnetic armature on clutch arm,Tighten bracket screws.

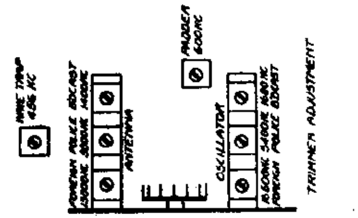
Plug motor in and adjust armature adjustment screw until clutch arm just stops lower clutch plate. Repeat to make sure that clutch arm engages just enough to stop clutch, as more movement of armature than is necessary only requires more power to synchronize. Tighten lock nut, being careful not to change adjustment while so doing.

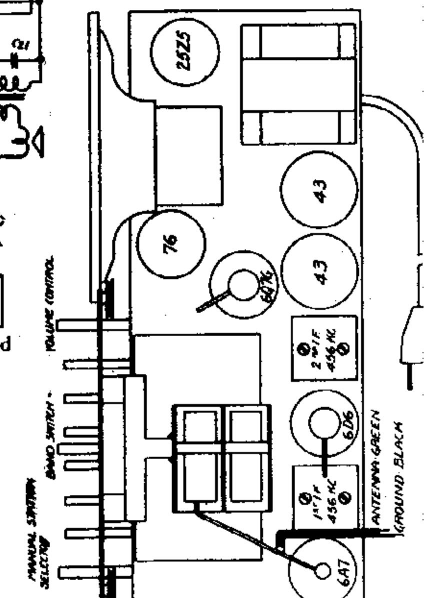
MODELS 251,256
Alignment Tuner

DETROLA CORP.

MODEL 233
Schematic,Socket
Trimmers,Alignme







No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

Symbol	Part No.	Description
C-1	3272	30-140 mmf Trimmer
C-2, 5, 7	1611	3-35 mmf Trimmer
C-3, 4, 6	2597	1-10 mmf Trimmer
C-8, 11	572	.1 200 V.
C-9a, b	5377	Tuning Condenser
C-10	2780	50 mmf Mica
C-12	580	.05 200 V.
C-13		IF Trimmer
C-14	4810	.0005 400 V.
C-15	2560	220-500 mmf Padder
C-16	2741	1330 mmf 5%
C-17	3871	.006 600 V. 5%
C-18	568	.01 400 V.
C-19, 20		.02 400 V.
C-21	581	.005 600 V.
C-22, 23	2600	.02 600 V.
		Electrolytic
C-24	5272	8 MF. 150 V.
		Electrolytic
C-25	5420	8 MF. 150 V.
		Electrolytic
C-26	5419	8/8 MF. 250 V.
		Electrolytic
R-1, 10	631	50M 1/3 W.
R-2	617	20M 1/3 W.
R-3	2605	200 ohm 1/3 W. 10%
R-4, 5	624	1 Meg. 1/3 W.
R-6	598	200M 1/3 W.
R-7	5332	500M Volume Control
R-8	2698	100 ohm 1/3 W. 10%
R-9	2881	400M 1/3 W. 10%
R-11	5395	500 ohm wire wound 10%
R-12, 15	603	100M 1/3 W.
R-13	615	500M 1/3 W.
R-14	4529	10M 1/3 W. 10%
R-15A	5421	30 ohm Wire Wound
B		10 ohm Wire Wound
C		20 ohm Wire Wound
	3463-10	1st IF Transformer
	3463-4	2nd IF Transformer
	5096	Oscillator Coil
	5392	Antenna Coil
	5390	Band Switch
	5394	Tone Control Switch
	5390	Band Switch
	5394	Tone Control Switch
	5422	AC-DC Switch

Part No.	Description
5397	Button escutcheon
5353	Tuning Buttons
5357	Call Letter Sheets
5388	Speaker
3904	Knobs
5234	Phono Pick Up
5233	Turn Table
5240	Radio-Phono Switch
5232	Phono Motor
530	Pilot Light Bulb
5387	Dial Chart
5396	Escutcheon

ALINEMENT PROCEDURE MODELS 233,251,256.

Connect a high impedance AC voltmeter across loud-speaker terminals. Volu control should be set a few degrees back of maximum volume position. Use a we signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplif tube, and aline transformer No. 2. Connect generator to grid of 6A7 tube and al transformer No. 1.

RF. (See above diagram for location of trimmers.)

Using a 200 MMF. condenser in series with the high side of the generator, turn ba selector switch to left hand position and the tuning condenser to about 600 kc. Feed 456 kc. signal to the antenna and adjust wave trap trimmer for minimum response. W the tuning condenser at minimum capacity feed 1660 kc. signal to the antenna and adj broadcast oscillator trimmer for top frequency. Set generator frequency at about 14 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to sig and adjust the padder. The tuning condenser should be rocked back and forth throu the signal while varying the padder in order to assure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center positi set generator to 5400 kc and adjust oscillator trimmer for top frenquency. Set genera to 5000 kc, tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in se with generator, set oscillator top frequency for 16,500 kc—screw trimmer down tig then unscrew to *second* peak. Set generator to 15,000 kc, tune receiver to signal a adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocki the tuning condenser back and forth through the signal while the adjustment is bei made. **Above procedure for alinement at 15,000 kc must be followed exactly to insu proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillat circuits are not set in proper relation to each other.**

Adjustment of Mechanical Automatic Tuning System

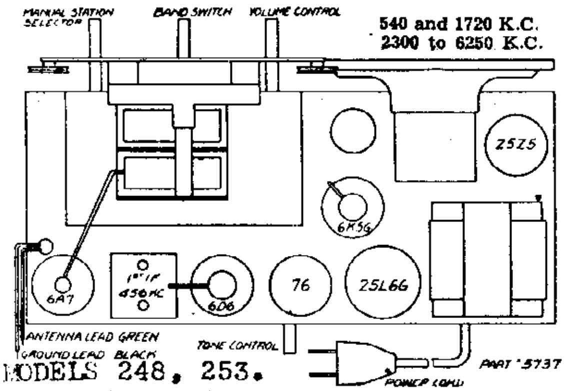
Any of your favorite stations may be set up on any button, but it is recommend that they be set up in the same sequence as they are received on the dial. Loosen one the buttons by turning it to the LEFT. A slot is provided in the button into which coin may be inserted to facilitate turning. After turning the button a few turns to t LEFT, press it in as far as it will go. While holding the button in this position, tu in the station desired very carefully in the usual manner with the manual tuning kno While still holding the button if, fix the adjustment by turning the button to the RIGH until tight. Thereafter the station set up on this button will be received whenever t button is pressed in AS FAR AS IT WILL GO.

MODELS 248,253
MODELS 249,254
MODEL 250 MODEL 257

DETROLA CORP.

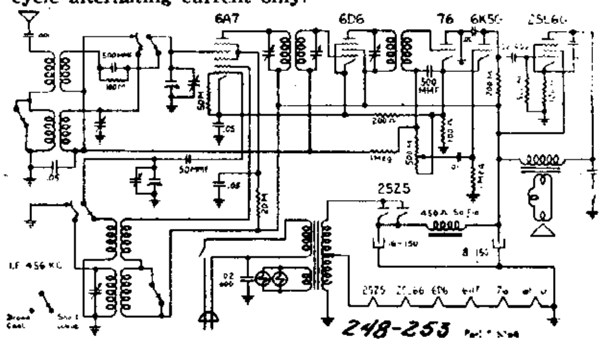
Schematics, Socket
Trimmers

540 and 1720 K.C.
2300 to 6250 K.C.



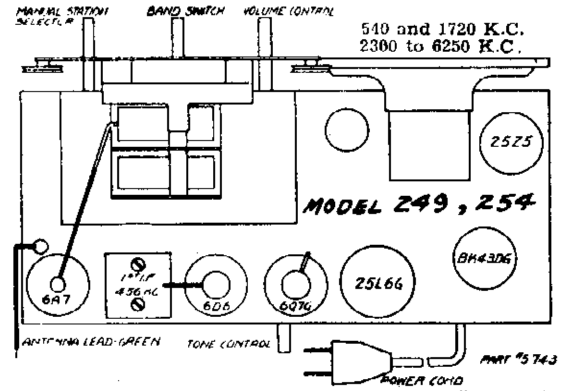
MODELS 248, 253.

This receiver is designed to operate on 105 to 125 volts, 60 cycle alternating current only.

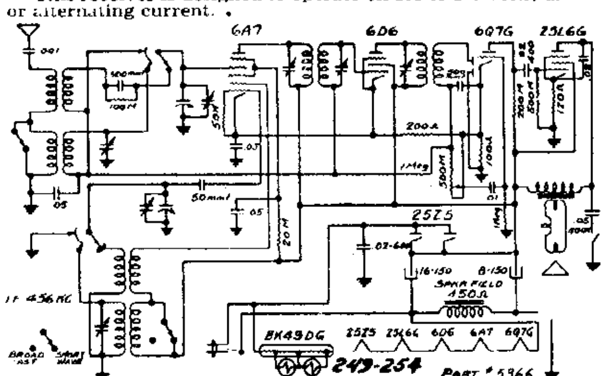


6A7—Oscillator, Translator
6D6—I.F. Amplifier
76—Detector
6K5G—Audio Amplifier
25L6G—Power Output
25Z5—Rectifier

540 and 1720 K.C.
2300 to 6250 K.C.



This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

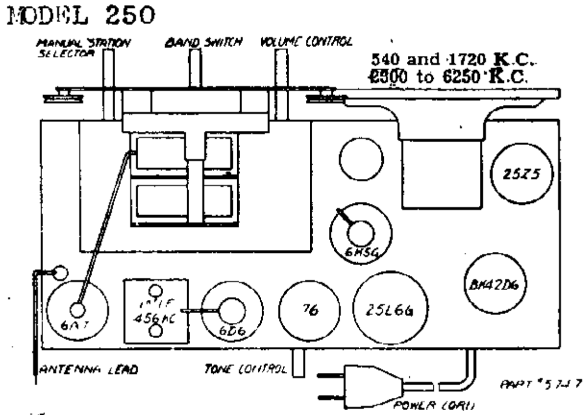


DO NOT CONNECT A GROUND TO THIS RECEIVER.

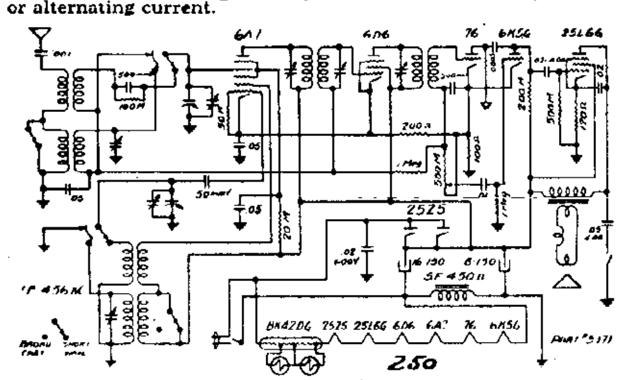
6A7—Oscillator, Translator
6D6—I.F. Amplifier
6Q7G—Detector, Audio Amplifier
25L6G—Power Output
25Z5—Rectifier
BK49DG—Ballast

MODEL 250

540 and 1720 K.C.
2300 to 6250 K.C.



This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

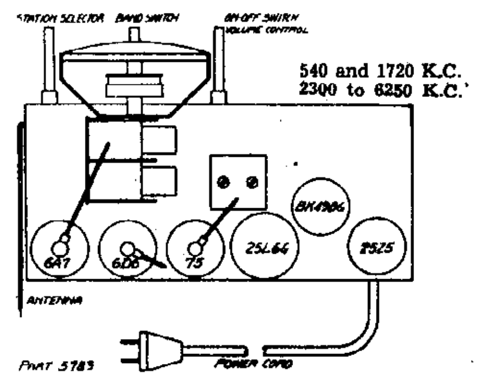


DO NOT CONNECT A GROUND TO THIS RECEIVER.

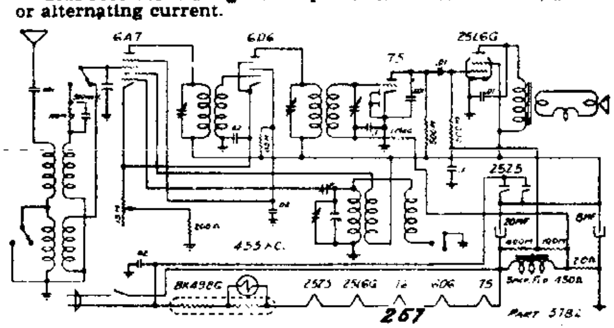
6A7—Oscillator, Translator
6D6—I.F. Amplifier
76—Detector
6K5G—Audio Amplifier
25L6G—Power Output
25Z5—Rectifier
BK42DG—Ballast

MODEL 257.

540 and 1720 K.C.
2300 to 6250 K.C.



This receiver is designed to operate on 105 to 125 volts, direct or alternating current.



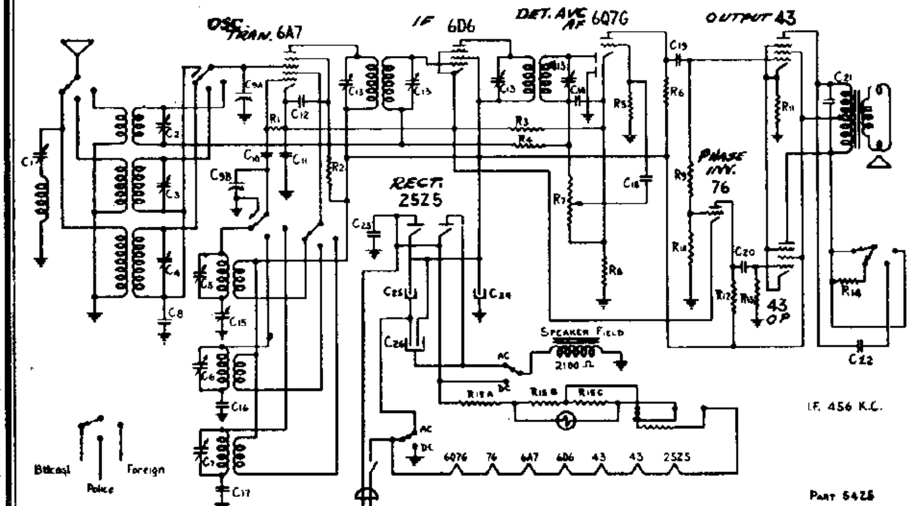
DO NOT CONNECT A GROUND TO THIS RECEIVER.

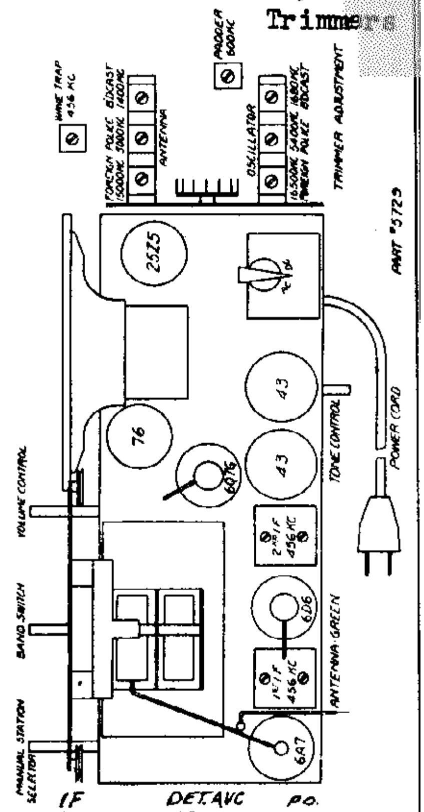
25L6G—Power Output
25Z5—Rectifier
BK49BG—Ballast
6A7—Oscillator Translator
6D6—I.F.
75—Detector

MODEL 262 Schematic, Socket Trimmers, Alignment

DETROLA CORP.

MODELS 251, 256 Schematic, Socket Trimmers





Be sure the AC-DC switch is in the proper position.

This receiver is designed to operate on 105 to 125 volts AC or DC.

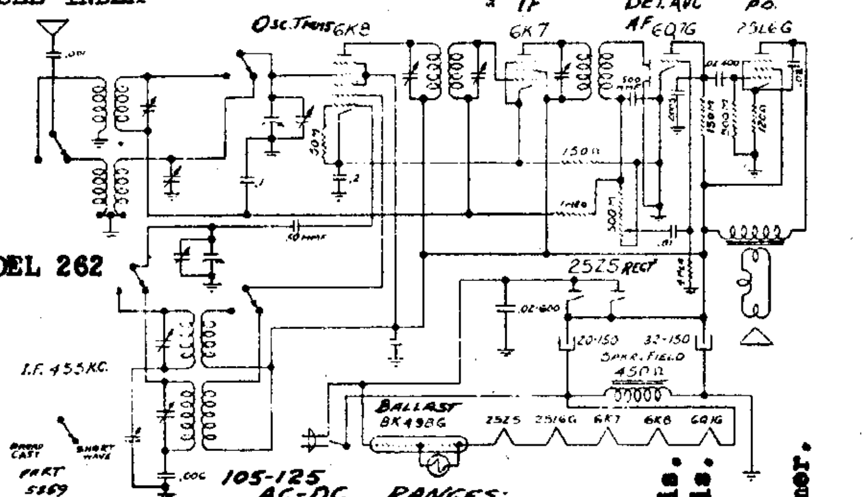
No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

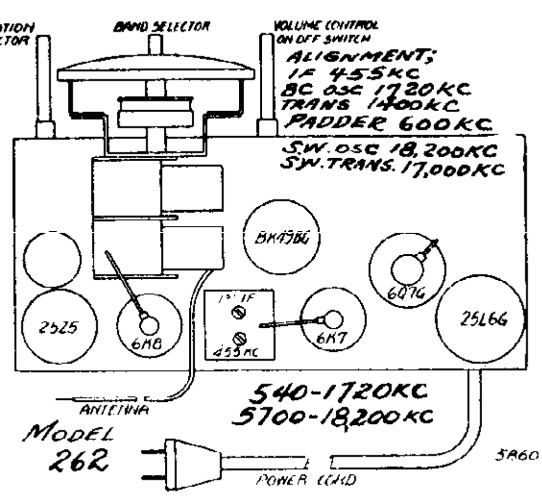
Symbol	Part No.	Description
C-1	3272	30-140 mmf Trimmer
C-2, 5, 7	1611	3-35 mmf Trimmer
C-3, 4, 6	2597	1-10 mmf Trimmer
C-8, 11	572	.1 200 V.
C-9a, b	5724	Tuning Condenser
C-10	2780	50 mmf Mica
C-12	580	.05 200 V.
C-13		IF Trimmer
C-14	4810	.0005 400 V.
C-15	2560	220-500 mmf Padder
C-16	2741	1330 mmf 5%
C-17	3871	.006 600 V. 5%
C-18	568	.01 400 V.
C-19, 20		.02 400 V.
C-21	581	.005 600 V.
C-22, 23	2600	.02 600 V. Electrolytic
C-24	5272	8 MF. 150 V. Electrolytic
C-25	5420	8 MF. 150 V. Electrolytic
C-26	5419	8/8 MF. 250 V. Electrolytic
R-1, 10	631	50M ⅓ W.
R-2	617	20M ⅓ W.
R-3	2605	200 ohm ⅓ W. 10%
R-4, 5	624	1 Meg. ⅓ W.
R-6	598	200M ⅓ W.
R-7	5332	500M Volume Control
R-8	2698	100 ohm ⅓ W. 10%
R-9	2881	400M ⅓ W. 10%
R-11	5395	500 ohm wire wound 10%
R-12	603	100M. ⅓ W.
R-13	615	500M ⅓ W.
R-14	4529	10M ⅓ W. 10%
R-15A, B, C	5421	30 ohm, 10 ohm, 20 ohm Wire Wound
	3463-10	1st IF Transformer
	3463-4	2nd IF Transformer
	5096	Oscillator Coil
	5392	Antenna Coil
	5390	Band Switch
	5394	Tone Control Switch
	5422	AC-DC Switch
	530	Pilot Light Bulb
	5728	Dial Chart
	5739	Escutcheon
	5388	Speaker
	2663	Knobs

FOR ALIGNMENT SEE INDEX

Model 251-256

MODEL 262





540-1720KC
5700-18,200KC

MODEL 262

LOCATION OF TRIMMERS MODEL 262.
2nd. IF Trans. beneath chassis.
BC osc., osc. coil beneath chassis.
BC trans., trans coil top chassis.
BC padder on the chassis.
SW osc, next to BC osc trimmer.
SW trans, next to BC trans trimmer.

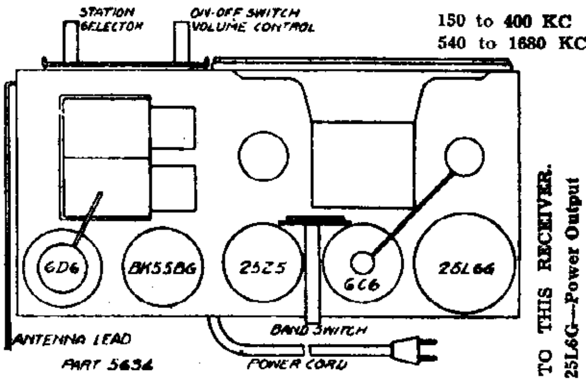
MODEL 260
MODEL 266
MODEL 268
MODEL 272

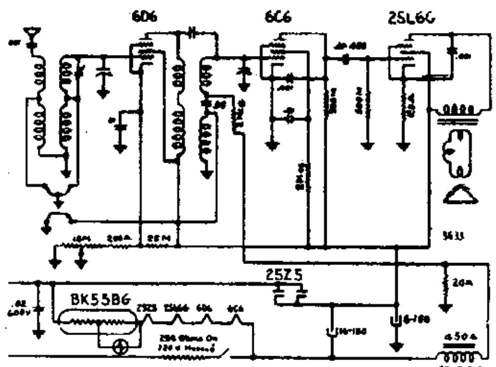
DETROLA CORP.

Schematics, Socket
Trimmers

MODEL 260

150 to 400 KC
540 to 1680 KC



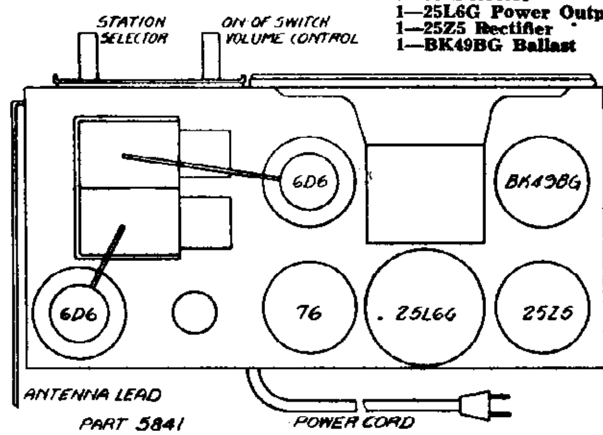


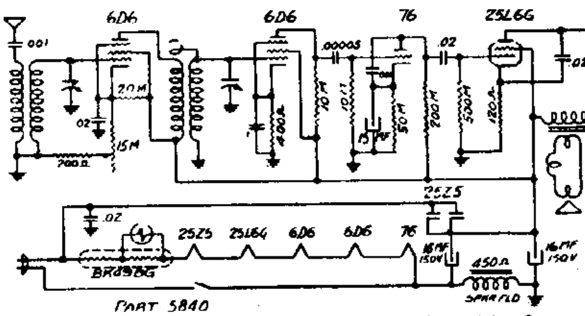
This receiver is designed to operate on 220 volts, direct or alternating current.

DO NOT CONNECT A GROUND TO THIS RECEIVER.
25L6G—Power Output
25Z5—Rectifier
BK55BG—Ballast
6D6—RF Amplifier
6C6—Detector

MODEL 266

2—6D6 R. F. Amplifiers
1—76 Detector
1—25L6G Power Output
1—25Z5 Rectifier
1—BK49BG Ballast



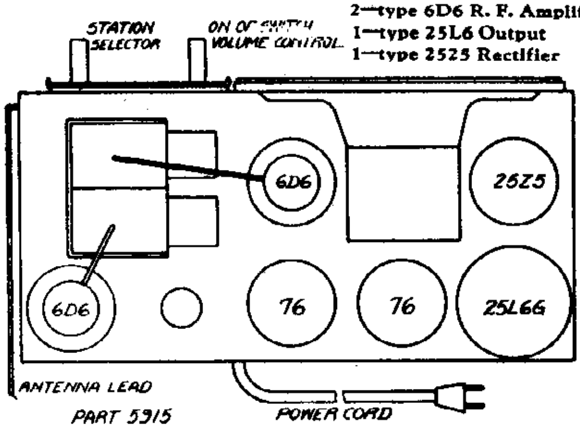


540 K.C. and 1600 K.C.
1600 K.C. and 1712 K.C.

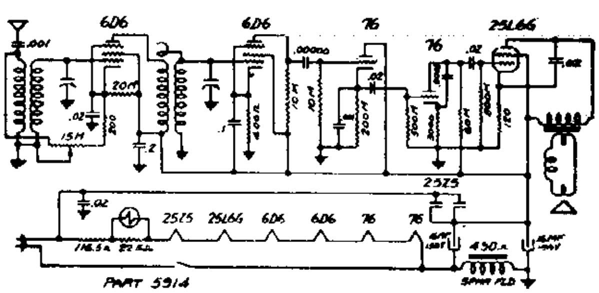
This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

MODEL 268

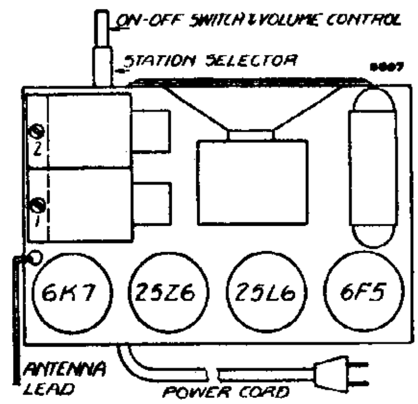
1—type 76 Detector
1—type 76 1st. Audio
2—type 6D6 R. F. Amplifiers
1—type 25L6 Output
1—type 25Z5 Rectifier



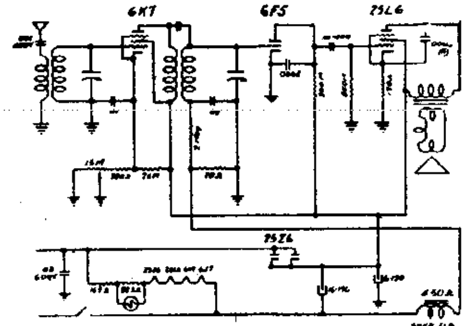
This receiver is designed to operate on 105 to 125 volts, direct or alternating current.



Model 272



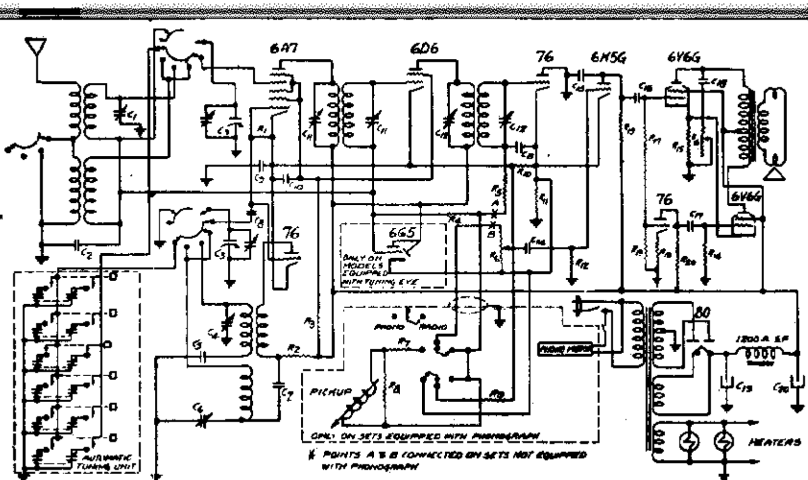
1—25Z6 Rectifier
1—25L6 Output



1—6K7 R. F. Amplifier
1—6F5 Detector

This receiver is designed to operate on 105 to 125 volts direct or alternating current

DETROLA CORP.



Model 259

IF PEAK 456 KC

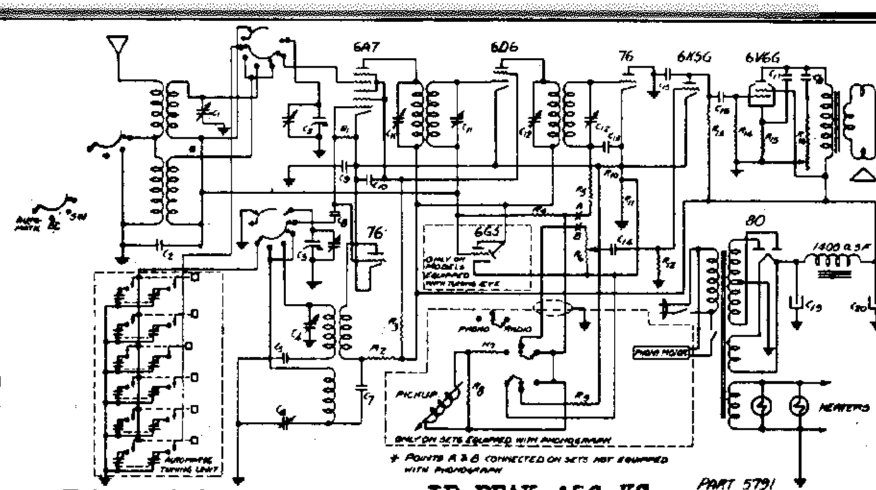
Tubes required are:

1—76 Oscillator
1—6A7 Translator
1—6D6 I.F. Amplifier
1—76 Detector, A.V.C.
1—6K5G Audio Amplifier
1—76 Phase Invertor, driver
2—6V6G Power Output
1—80 Rectifier

No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

Symbol	Part No.	Description	Symbol	Part No.	Description
C-1	1611	5-35 mmf Trimmer	R-15	3353	250 ohm 2W
C-2, 7, 10	580	.05-200V	R-16	5511	100M T. C.
C-3	5654	Tuning Condenser	R-17	2881	400M 10% ⅓W
C-4	2597	1-10 mmf Trimmer	R-18	2880	100M 10% ⅓W
C-5	2741	1330 mmf Mica +5%	R-19	2883	5M 10% ⅓W
C-6	2560	300-500 mmf padder		5802	Power Transformer
C-8	2780	50 mmf mica		5656	Dial Chart
C-9	2792	.2-200V		5447	Pointer
C-11 12		IF Trimmers		5657	1st I.F. Transformer
C-13	4810	.0005-400V		5658	2nd I.F. Transformer
C-14	565	.01-200V		5659	Antenna Coil
C-15	1285	100 mmf mica		5660	Oscillator Coil
C-16, 17	576	.02-400V		5789	Band Switch
C-18	563	.05-400V		5790	Automatic Tuning Unit
C-19	3375	16MF 400V		5240	Radio-Phono Switch
C-20	3113	16MF Reg.		5232	Phono Motor
R-1, 5, 20	631	50M ⅓W		5233	Turn Table 10"
R-2, 3	617	20M ⅓W		5234	Phono Pickup
R-4, 12	624	1 Meg ⅓W		5798	Automatic Tuning Buttons
R-6	5100	5 meg V.C.			
R-7	2106	3 Meg ⅓ W		5672	Dial Escutcheon
R-8	615	5 Meg. ⅓ W		5797	Button Escutcheon
R-9, 11	2689	100 ohm 10% ⅓W		5800	Tuning Eye Escutcheon
R-10	600	10M ⅓W		5799	Call Letter Sheets
R-13	598	200M ⅓W		5912	Speaker.
R-14	615	.5 Meg ⅓W			

Note: R-7, 8, 9 omitted and R-10 changed to 100 ohm 10% ⅓W on sets not equipped with phonograph.



Model 258

IF PEAK 456 KC

Tubes required are:

1—76 Oscillator
1—6A7 Translator
1—6D6 I.F. Amplifier
1—76 Detector, A.V.C.
1—6K5G Audio Amplifier
1—6V6G Power Output
1—80 Rectifier
*1—6G5 Tuning Tube

*Only on those sets equipped with tuning eye.

Do not use tubes of types different from those shown above.

No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

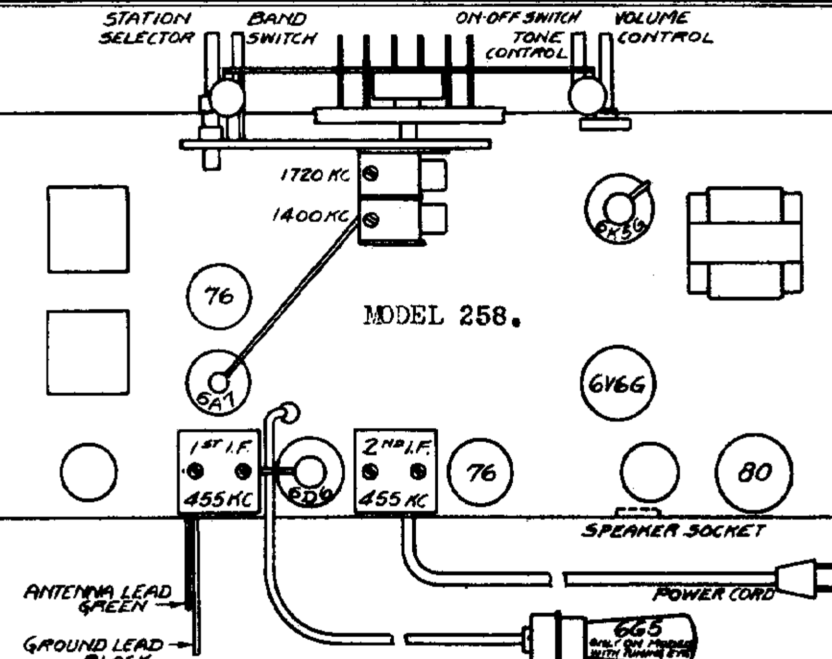
Symbol	Part No.	Description	Symbol	Part No.	Description
C-1	1611	5-35 mmf Trimmer	C-6	2560	300-500 mmf padder
C-2, 7, 10	580	.05-200V	C-8	2780	50 mmf mica
C-3	5654	Tuning Condenser	C-9	2792	.2-200V
C-4	2597	1-10 mmf Trimmer	C-11, 12		IF Trimmers
C-5	2741	1330 mmf Mica +5%	C-13	4810	.0005-400V
	5447	Pointer	C-14	565	.01-200V
	5657	1st I.F. Transformer	C-15	1285	100 mmf mica
	5658	2nd I.F. Transformer	C-16, 17	576	.02-400V
	5659	Antenna Coil	C-18	563	.05-400V
	5660	Oscillator Coil	C-19	3375	16MF 400V
	5789	Band Switch	C-20	3113	16MF Reg.
	5790	Automatic Tuning Unit	R-1, 5	631	50M ⅓W
	5240	Radio-Phono Switch*	R-2, 3	617	20M ⅓W
	5232	Phono Motor	R-4, 12	624	1 Meg ⅓W
	5233	Turn Table 10"	R-6	5100	.5 Meg V.C.
	5234	Phono Pickup	R-7	2106	3 Meg ⅓ W
	5798	Automatic Tuning Buttons	R-8	615	.5 Meg ⅓ W
			R-9, 11	2689	100 ohm 10% ⅓W
	5672	Dial Escutcheon	R-10	600	10M ⅓W
	5797	Button Escutcheon	R-13	598	200M ⅓W
	5800	Tuning Eye Escutcheon	R-14	615	.5 Meg ⅓W
	5799	Call Letter Sheets	R-15	3353	250 ohm 2W
	5668	Speaker	R-16	5511	100M T. C.
				5091	Power Transformer
				5656	Dial Chart

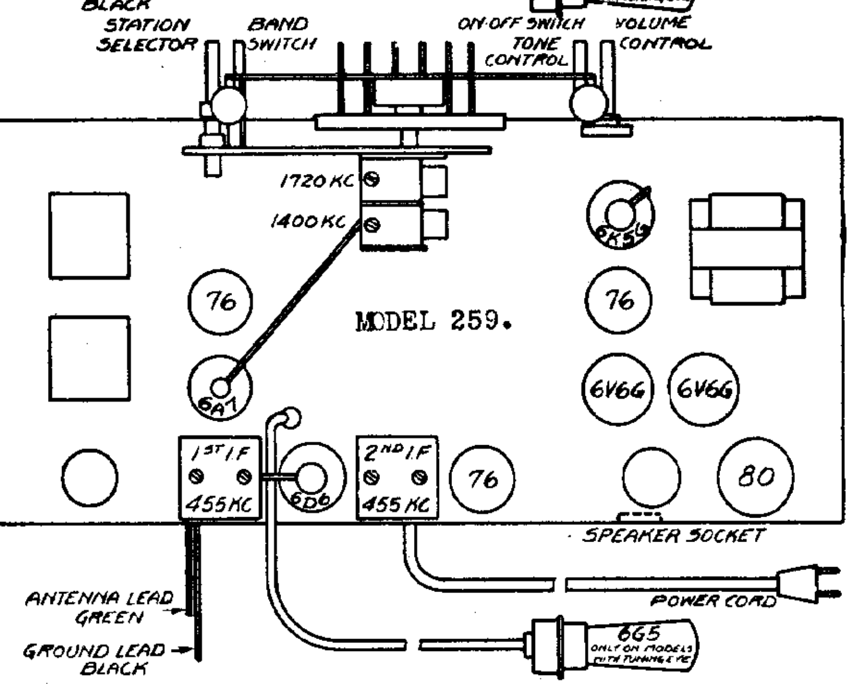
Note: R-7, 8, 9 omitted and R-10 changed to 100 ohm 10% ⅓W on sets not equipped with phonograph.

MODEL 258
MODEL 259
Socket, Trimmers
Alignment, Tuner

DETROLA CORP.

MODEL 270
Alignment, Tuner





MODELS 258,259,270.

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplifier tube, and aline transformer No. 2. Connect generator to grid of 6A7 tube and aline transformer No. 1.

RF. (See above diagram for location of trimmers.)

Using a 200 MMF. condenser in series with the high side of the generator, turn band selector switch to center (B). position and the tuning condenser at minimum capacity feed 1720 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in right hand (F) position, set generator to 6300 kc. and adjust oscillator trimmer for top frequency. Set generator to 5000 kc., tune receiver to signal and adjust antenna trimmer.

Setting Up the Push Button Station Selector

First select six favorite local or strong nearby stations, listing them according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left hand end of the dial (nearest 1600 kc.) the No. 1 station and number the other five stations consecutively as they are tuned in on the dial, tuning from left to right. For example assume your selected stations operate on frequencies of 1500 kc., 1300 kc., 1100 kc., 900 kc., 700 kc., and 600 kc. The 1500 kc. station should be listed as No. 1, the 1300 kc. station would be No. 2, and so on through the list with the 600 kc. station becoming No. 6. In setting up the buttons, the 1500 kc. station should be set up on No. 1 button, or the first button from the left, the 1300 kc. station on the second button from the left, and so on until the 600 kc. station is finally set up on the button farthest to the right.

With the band selector set at "B," or the second position from the left, tune in station No. 1. Observe the program in progress, then turn the band selector knob to the extreme left position (A). Push the No. 1 button in as far as it will go; when the proper operating position is reached the button will lock in. Then insert the screw driver through the opening directly above the No. 1 button and turn the larger headed screw until the same program is heard. ***Do not force this screw. It should turn very easily and if the station is not heard when the screw is turned all the way in one direction, reverse the direction of rotation until the station is found.*** When the station is located, turn the screw back and forth through the station slowly and observe when the station is accurately tuned in, indicated by a minimum of noise or hiss, or by watching the tuning eye on the models so equipped. Inserted in one side of the larger screw head is a smaller screw. This screw is for fine adjustment, and should be turned in and out until position of least hiss is found, or until the tuning eye, on models so equipped, shows the least shadow. It will not be necessary to turn this small screw more than one full turn from the factory adjusted position. As a definite check that the desired station has been tuned in, listen for the station announcement. Set up the remaining buttons in the same manner, and after all stations have been set up, locate the call letters of the stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets and insert them in the escutcheon according to the directions on the envelope.

On Sets Equipped with Phonograph

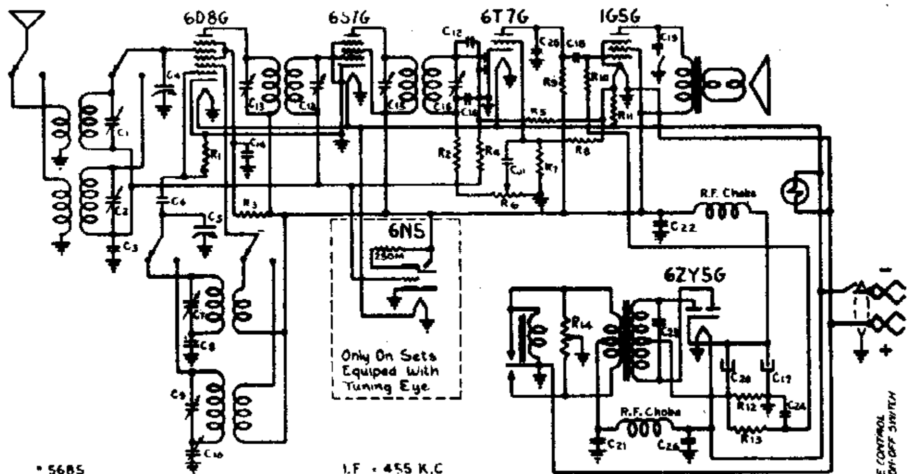
Phono Radio Switch: The ***Left Hand Position is for Radio Only.*** The ***Right Hand Position*** connects the pick-up and turns on the power for the phonograph motor.

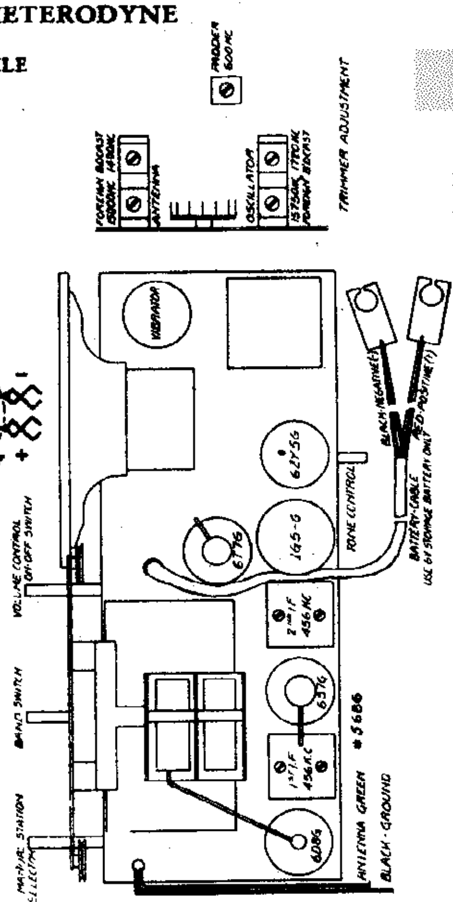
MODEL 267
Schematic, Socket
Trimmers, Alignment

DETROLA CORP.

5-TUBE STORAGE BATTERY POWERED SUPERHETERODYNE

WARNING! DO NOT CONNECT A CHARGER TO THE BATTERY WHILE THE SET IS IN USE. DO NOT GROUND EITHER SIDE OF THE BATTERY.





540 KC and 1725 KC
5.5 to 15.5 megacycles

Symbol	Part No.	Description	Symbol	Part No.	Description
C1	1611	3—35 mmf Trimmer	R3	609	15 M 1/3 W
C2, 7, 9	2597	1—10 mmf Trimmer	R4, 5	624	1 Meg 1/3 W
C3, 14	572	.1—200 v.	R6	5690	500 M Volume
C4, 5	5724	350 mmf Variable		control	and switch
C6	2780	50 mmf Mica	R7, 8	630	2 Meg 1/3 W
C8	2740	3850 mmf padder	R9, 13	603	100 M 1/3 W
C10	2560	350 mmf padder	R10	615	500 M 1/3 W
C11	565	.01—200 v.	R11	4474	35 ohm 1 W
C12	1285	100 mmf Mica	R12	2881	400 ohm .1/3 W
C13, 15		I. F. Trimmers	R14	4475	200 ohm center tapped
C16	4810	.0005—400 v.		3412	No. 1 IF Transformer
C17, 20	5273	16mf 150 v.		4457	No. 2 IF Transformer
C18, 19, 22	576	.02—400 v.		5682	Power transformer
C21	3003	.5—160 v.		5333	Band switch
C23	5684	.03—1000 v.		5679	Antenna Coil
C24	580	.05—200 v.		5678	Oscillator Coil
C25	3190	1000 mmf Mica		5766	Vibrator
C26	4171	.2—160 v.		5680	Battery cable
R1, 2	631	50 M 1/3 W		4463	6″ Speaker

MODEL 267

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

IF. Connect generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer; same for first IF, applying signal to grid of 6D8G. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using 200 mmf condenser in series with generator, feed 1725 kc signal to antenna lead and adjust oscillator top frequency. Set generator at 1400 kc, tune receiver to signal and adjust broadcast antenna trimmer. Set generator to 600 kc, tune receiver and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being adjusted in order to obtain perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in short wave (right) position, feed 15,600 kc signal to antenna and adjust oscillator trimmer—screw trimmer down tight and unscrew to SECOND peak. Set generator to 15,000 kc, tune receiver and adjust antenna trimmer—screw trimmer down tight and unscrew to FIRST peak, rocking the condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A "dead spot" at about 12,000 kc will result if antenna and oscillator are not set in proper relation to each other.**

Tubes

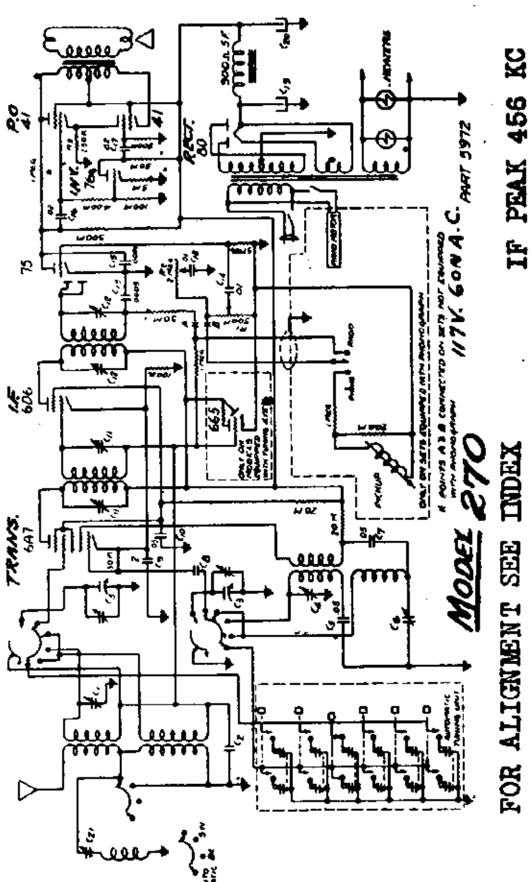
Tubes required are:
1—6D8G Oscillator-Translator.
1—6S7G Intermediate frequency amplifier.
1—6T7G Detector—automatic volume control—first audio amplifier.
1—1G5G Power output
1—6ZY5G Rectifier

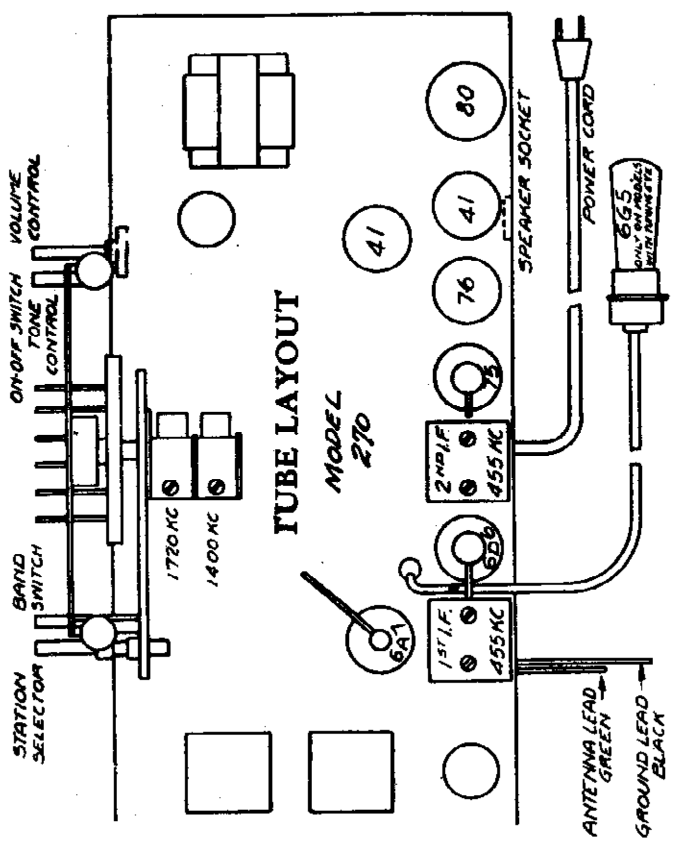
Do not use tubes of types different from those shown above.

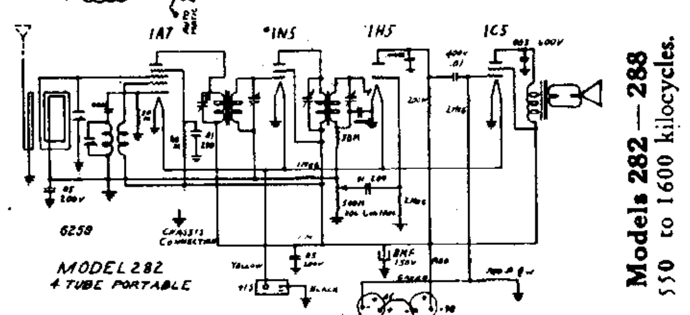
MODEL 270
MODELS 282, 288
MODEL 286

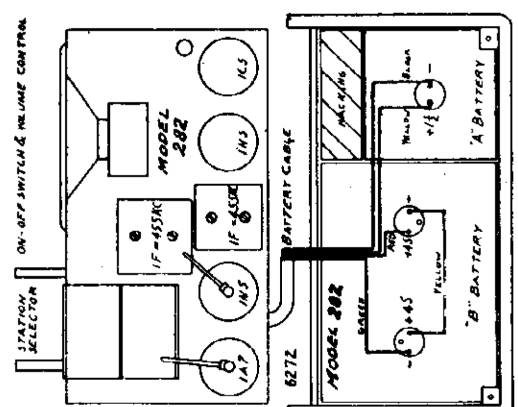
DETROLA CORP.

Schematics, Socket Trimmers, Alignment





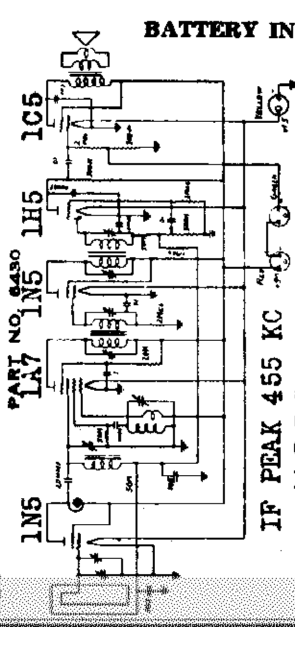


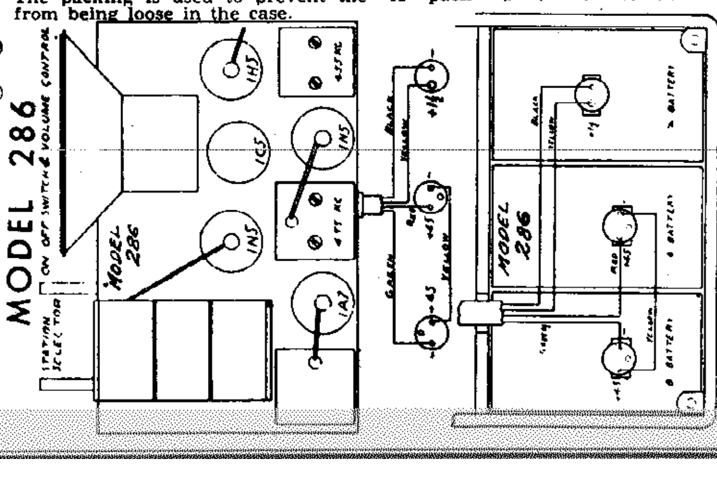


BATTERY INSTALLATION

Remove the batteries from the shipping carton, save the small piece of cardboard packing. Place the "B" pack in the cabinet as shown in the illustration. Then put in the "A" pack. Take the small piece of cardboard packing and fold to a size that will wedge the "A" pack between the shelf and bottom of case. (See illustration.) The packing is used to prevent the "A" pack from being loose in the case.

Connect the "A" and "B" plugs as shown in the illustration. It makes no difference which socket on the "B" pack, the three prong "B" plugs are inserted.





MODELS 282, 286, 288. ALIGNMENT PROCEDURE

I.F. Frequency 455 KC. Set Range 540-1580 KC. Connect the test oscillator, or signal generator, to the set as follows: Connect the "hot" side of the signal generator to the grid of the 1A7 tube, and the ground side to the terminal on the back of the chassis. An output meter should be connected across the voice coil leads of the speaker to indicate resonance. Align the I.F. trimmers at 455 KC for maximum meter reading.

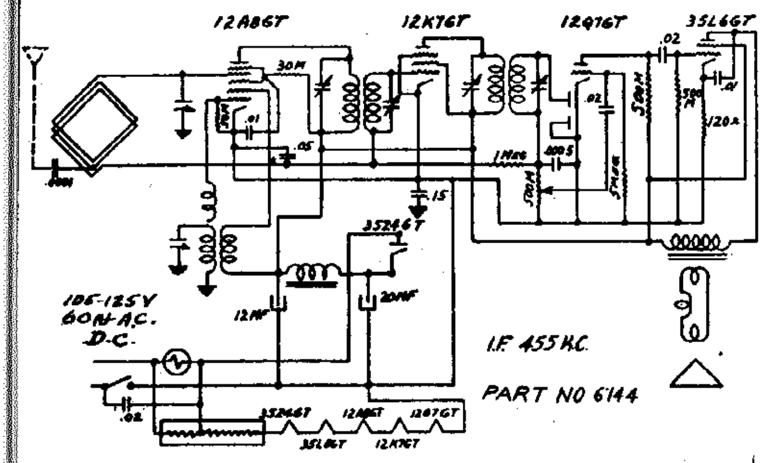
Adjust the trimmer on the back of the variable condenser at or near 1400 KC at full volume on a weak broadcast signal. When aligning the set do not set the receiver on or near a metal work bench or other large metal object, as it will affect the tracking of the receiver.

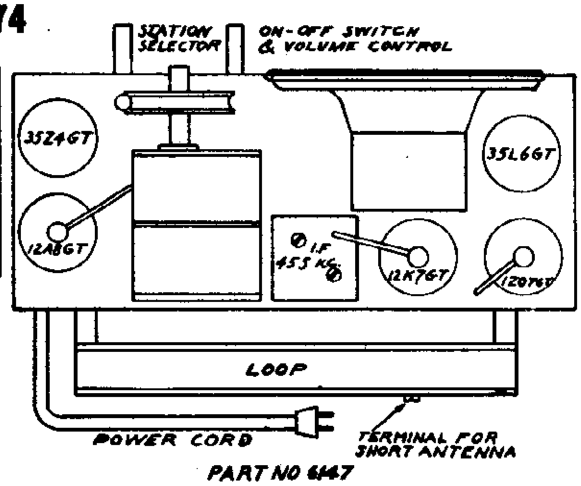
Schematics, Socket Trimmers, Alignment

DETROLA CORP.

MODEL 274
MODEL 276U, Super Pee Wee
MODEL 2742

Model 274

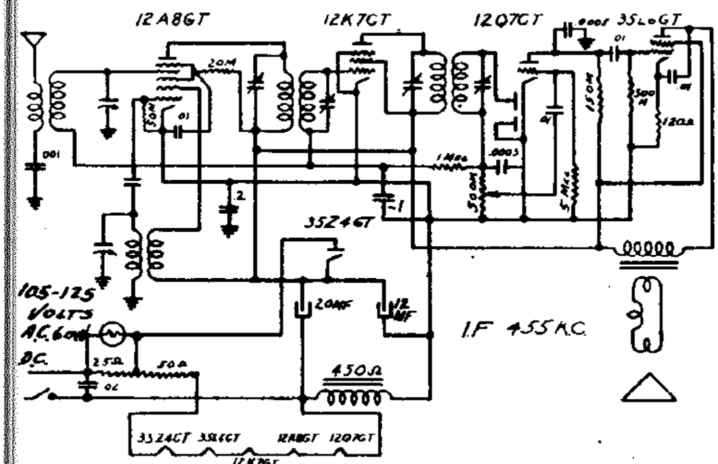


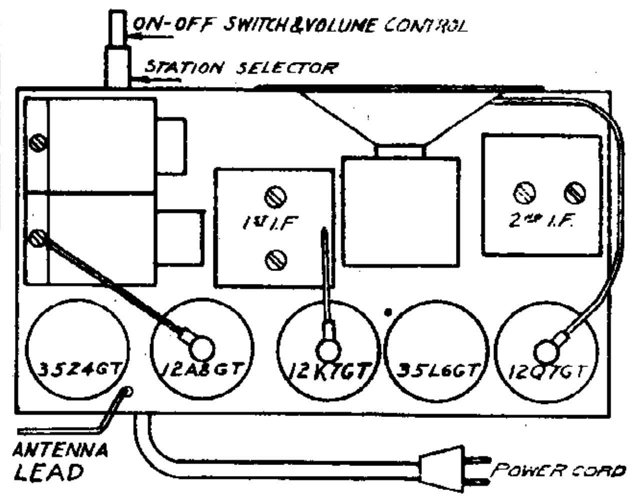


12A8GT Translator
12K7GT IF Amplifier
12Q7GT Detector AVC
35L6GT Output
35Z4GT Rectifier

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME V111

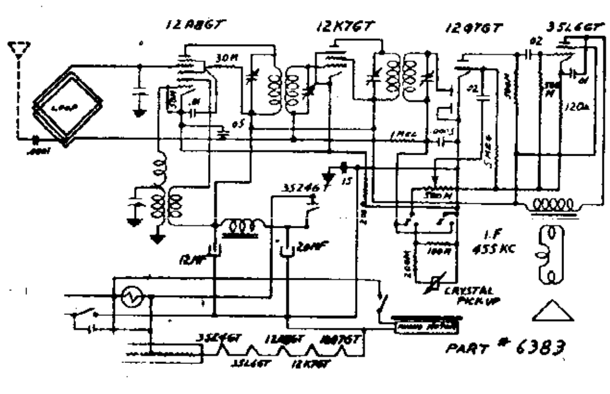
Super Pee-Wee Model 276-U

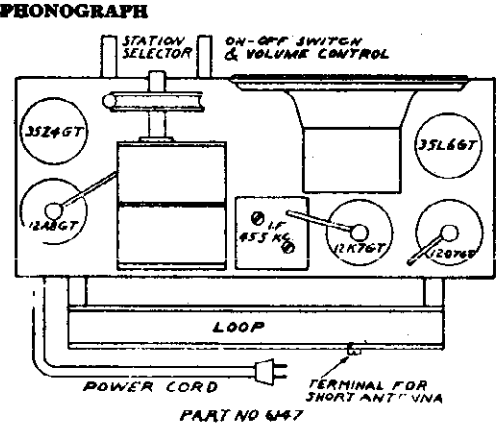




12A8GT Translator
12K7GT IF Amplifier
12Q7GT Detector AVC
35L6GT Output
35Z4GT Rectifier

MODEL 2742—A.C.-D.C.—PHONOGRAPH





This receiver is designed to operate on 105 to 125 volts, 60 cycle, alternating or direct current. Do not connect to any other source.

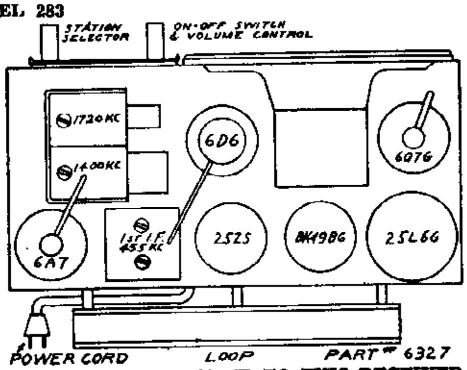
For phonograph operation turn the Radio Phono switch to the Phono position. THE A.C.-D.C. SWITCH MUST BE SET IN THE PROPER POSITION. (This switch is on the phonograph panel.) The radio volume control also serves as the phonograph volume control.

MODEL 280, Jr. PeeWee
MODEL 283
MODEL 284, Super Pee-Wee
MODEL 2741

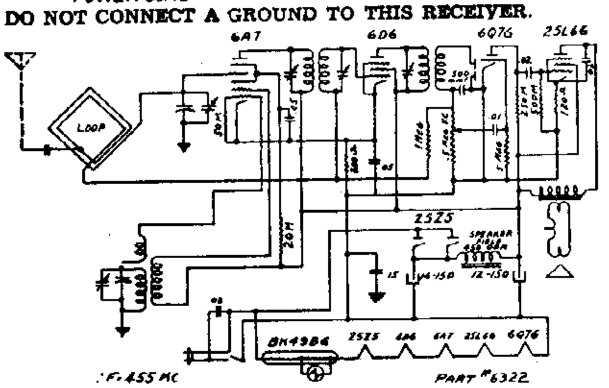
DETROLA CORP.

Schematics, Socket
Trimmers Alignment

MODEL 283

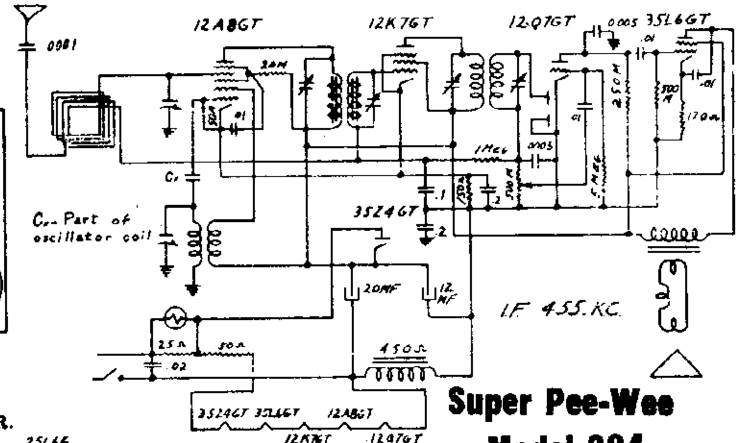


DO NOT CONNECT A GROUND TO THIS RECEIVER.

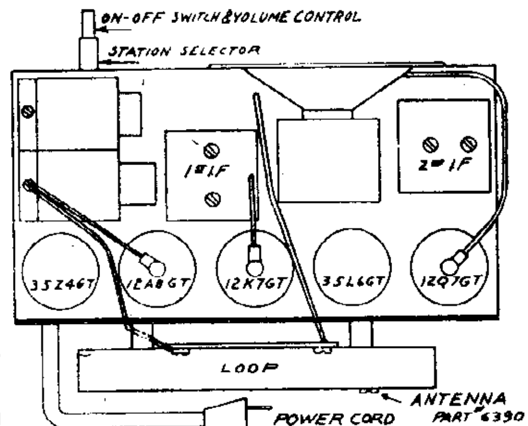


Part No. 6337

This receiver is designed to operate on 105 to 125 volts, direct or alternating current.



Super Pee-Wee
Model 284

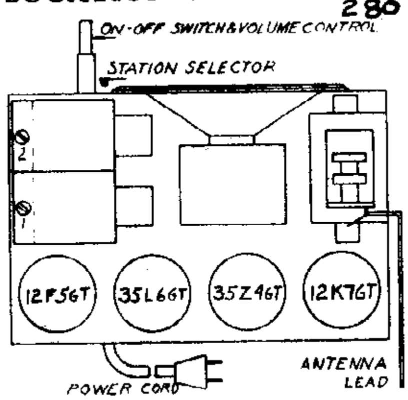


CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. V111

35L6GT Output
35Z4GT Rectifier
12Q7GT Detector AVC
12A8GT Translator
12K7GT IF Amplifier

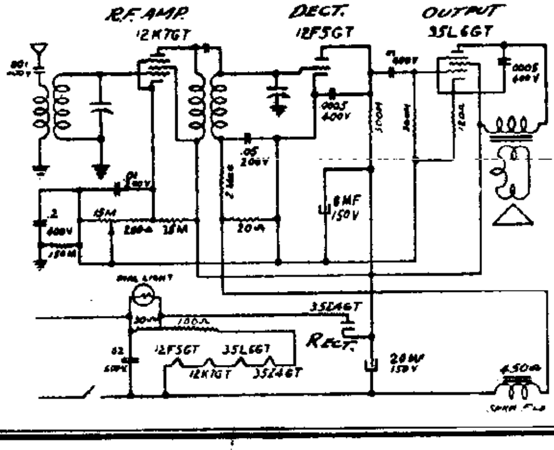
TUBE LOCATION CHART—MODEL 280

DETROLA JR. PEE-WEE

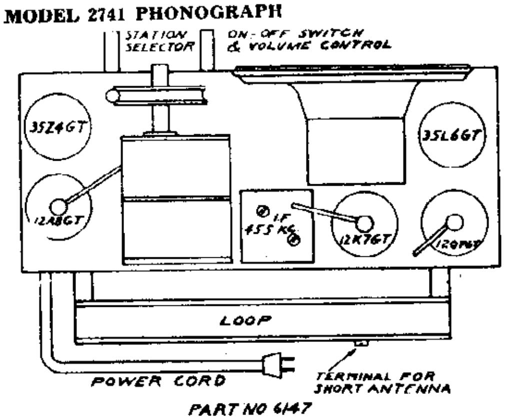


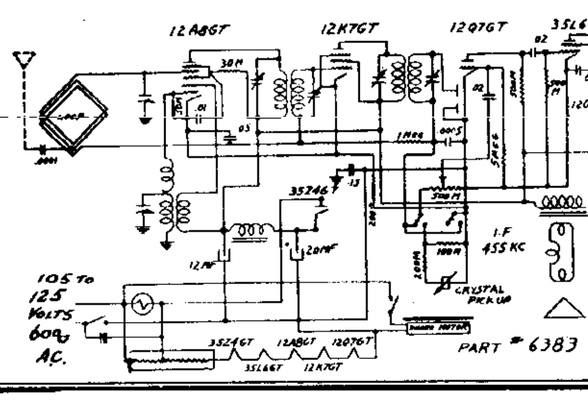
This receiver is designed to operate on 105 to 125 volts, direct or alternating current. Do not connect to any other source.

SCHEMATIC DIAGRAM—MODEL 280



MODEL 2741 PHONOGRAPH

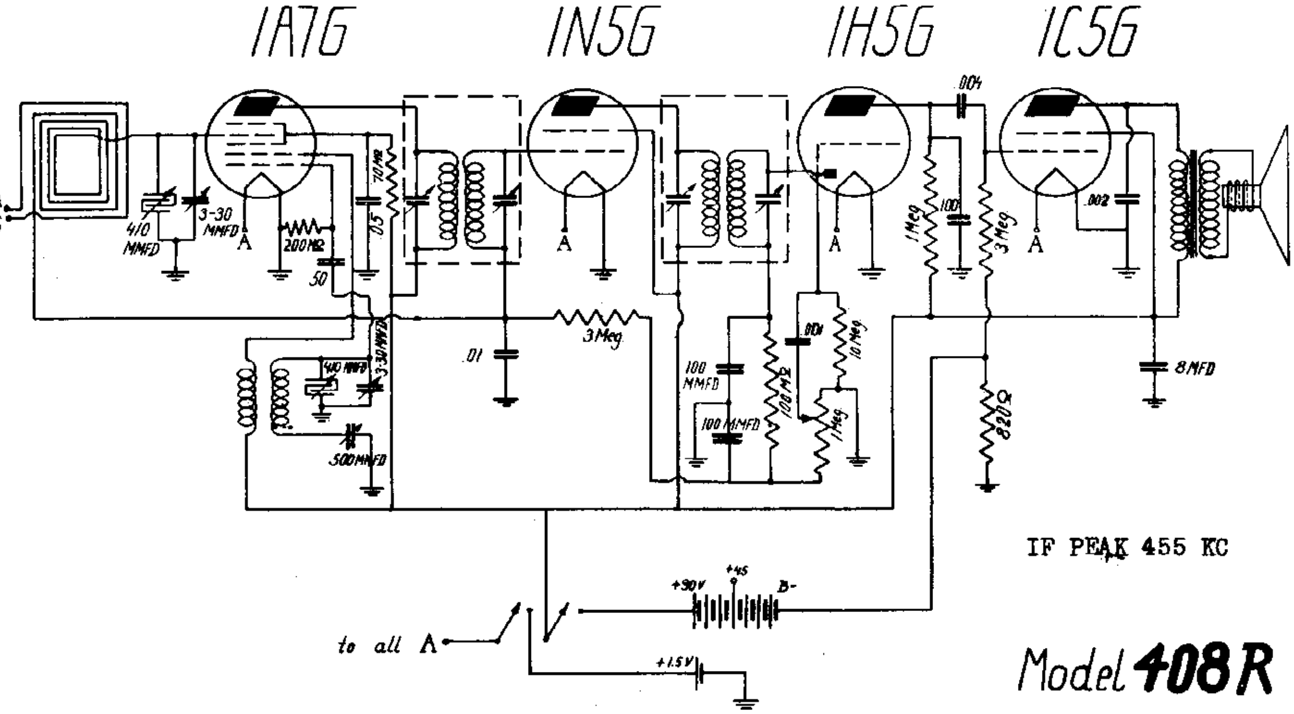




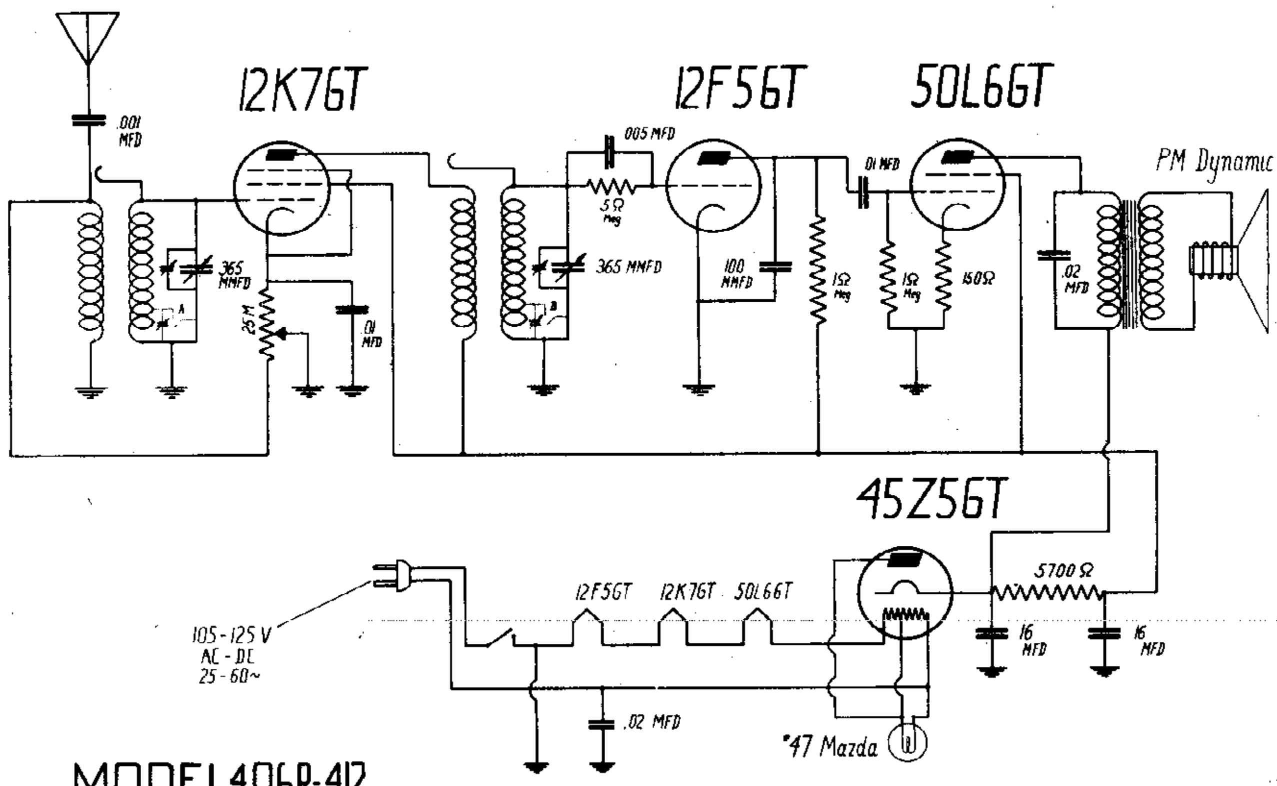
MODELS 406R,412
MODEL 408R
Schematics

DeWALD RADIO MFG. CORP.

This is a battery operated superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. It is designed to function with an "A" supply of 1.5 volts and a "B" supply of 90 volts. The broadcast range coverage is 540-1600 kilocycles.



Model 408R

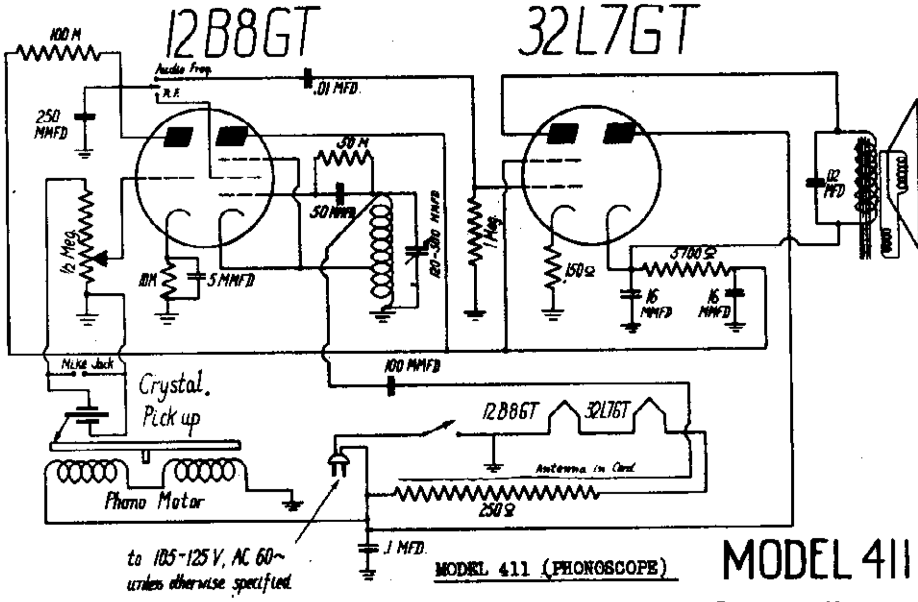


MODEL 406R-412

When used as LW model see "AB"

MODEL A Phono.Converter
MODEL 411 Phonoscope
Schematics, Data

DEWALD RADIO MFG. CORP.



MODEL 411 (PHONOSCOPE)

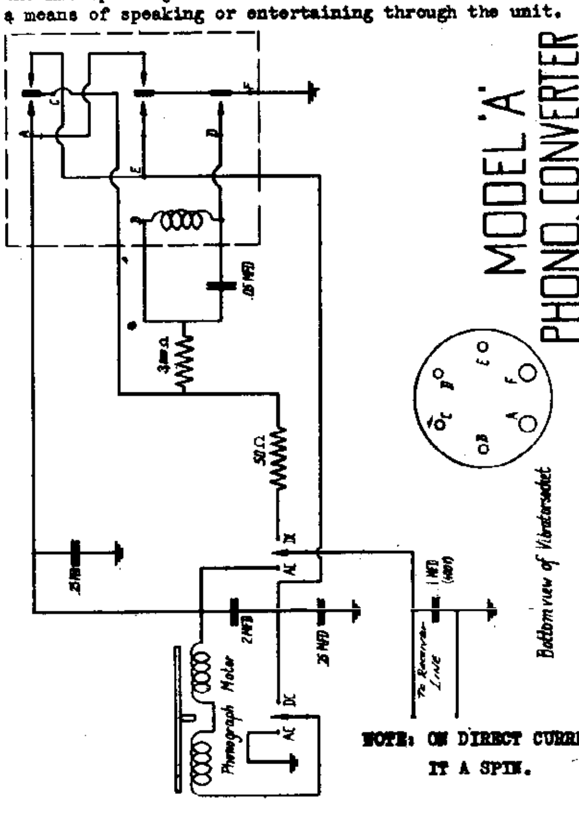
MODEL 411

The "PHONOSCOPE" is a combination audio and wireless playback. Disc recordings may be played directly through this unit, or may be reproduced through a remote radio receiver. A microphone may also be used instead of disc recordings. The unit has been designed to operate on 105-125 volts 60 cycles A.C. unless otherwise specified.

PHONOGRAPH OPERATION — The phonograph motor and unit is turned "on" by rotating the knob on the right in a clockwise direction. Further rotation in this direction increases the volume. Turn the knob on the left side to the clockwise position. Allow about a minute for the tubes to become sufficiently heated. Disc recordings may now be played through the speaker in the PHONOSCOPE.

MICROPHONE OPERATION — A high impedance magnetic or crystal microphone may be used in place of phonograph recordings. The two pin tips should be inserted in the microphone jack in the rear of the cabinet. The microphone may be used as a means of speaking or entertaining through the unit.

WIRELESS REPRODUCTION — Wireless reproduction is a method by which signals from the PHONOSCOPE may be picked up in a remote radio receiver. This is accomplished by rotating the knob on the left in the counterclockwise position. The receiver through which the recordings or microphone reproduction is to be heard must be turned "on". The volume control should be turned to nearly maximum position; and the dial should be adjusted for approximately 550 K. C. The tuning trimmer which is located under the motor board of the cabinet of the PHONOSCOPE should be adjusted until the loudest "swish" or "hiss" noise is heard through the remote radio receiver speaker. After this adjustment has been made any form of reproduction in the PHONOSCOPE will be heard in the remote unit. Once the trimmer has been adjusted it is advisable to tune the remote receiver in order to pick-up the signals being reproduced. This unit when reproducing through the radio receiver will operate at a distance of fifty feet.



MODEL 'A' PHONO. CONVERTER

This converter is used with radio and phonograph combinations. The purpose of the unit is to enable the phonograph motor to operate on direct current. Although the radio receiver will operate A.C or D.C., care must be taken when operating the phonograph, that the converter switch is in the proper position.

ALTERNATING CURRENT Operation

Push the slide button switch to the position marked A.C. The phonograph turn table will spin when the phonograph switch is turned to the phonograph position.

DIRECT CURRENT Operation

Push the slide button switch to the position marked D.C. The phonograph turn table will spin when the phonograph switch is turned to the phonograph position.

NOTE

When operating the receiver on D.C. and no signals are heard after it has been "on" for about a minute, reverse the line plug in the outlet.

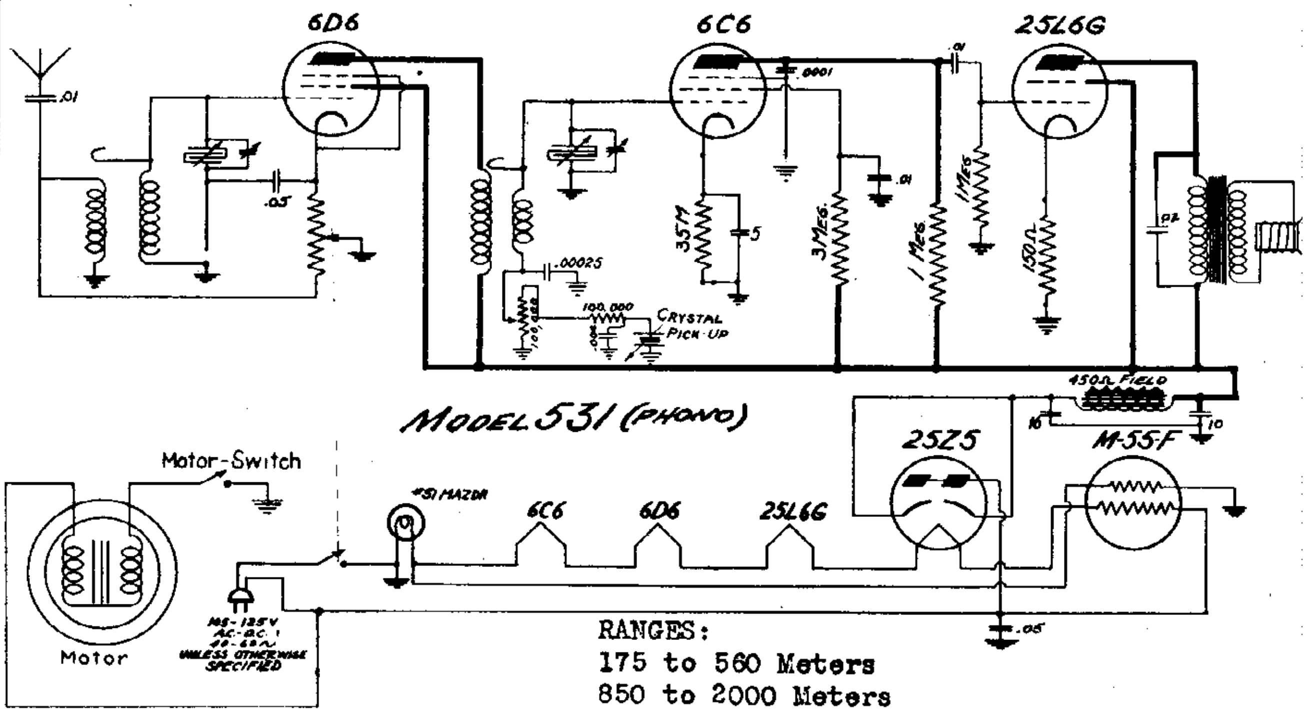
WARNING

ALWAYS BE SURE THAT THE POSITION OF THE CONVERTER SLIDE SWITCH IS IN THE POSITION CORRESPONDING TO THE LINE CURRENT AT THE OUTLET. FOR INSTANCE, IF THE OUTLET IS A.C. THE SLIDE SWITCH MUST BE ON THE A.C. SIDE. FAILURE TO OBSERVE THIS WHILE OPERATING THE PHONOGRAPH MOTOR, MAY RESULT IN DAMAGE TO THE UNIT.

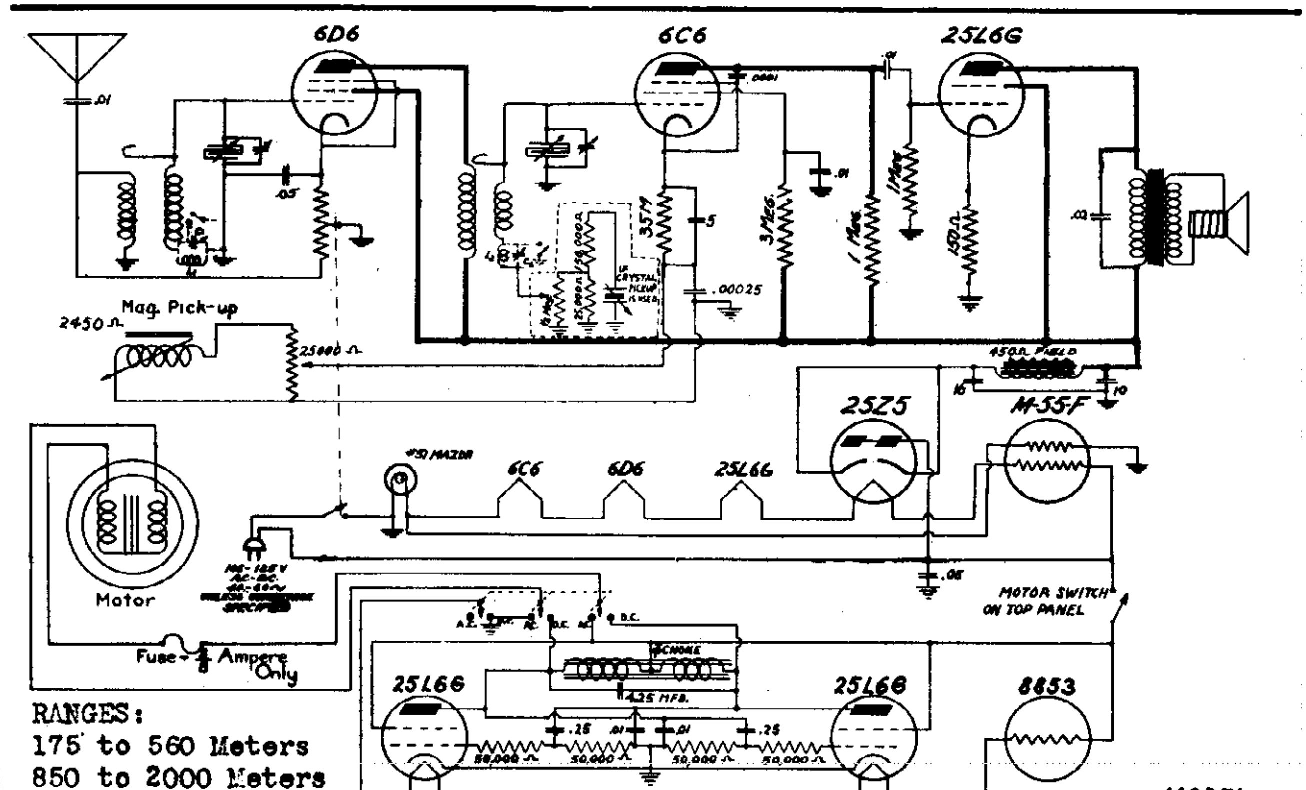
NOTE: ON DIRECT CURRENT IT MAY BE NECESSARY TO START THE MOTOR BY GIVING IT A SPIN.

MODEL 531 Phono
MODELS 532, 532L
Schematics

DeWALD RADIO MFG. CORP.



RANGES:
175 to 560 Meters
850 to 2000 Meters



RANGES:
175 to 560 Meters
850 to 2000 Meters

MODEL 532-532 L.W. LIST PRICES OF REPLACEMENT PARTS

1481	antenna coil	.50	8542	pilot lamp	.15
1482	detector coil	.50	8777	knob	.10
1488	cent. tap choke	1.50	8852	AC-DC switch	.75
2422	2 gang var. cond.	2.00	8854	pointer knob	.15
2423	comb. electrolytic	1.00	9799	drum	.15
2433	4.25 mfd. cond.	2.00	9914	drive shaft	.10
3420	comb. vol. cont.	1.00	9911	pointer	.10
6079	scale-	.10		cabinet	12.50
6080	crystal	.25		phono. vol. cont.	1.00
7233	speaker	3.50		phono. pickup	11.50
				phono. motor	17.50

MODEL 532 - 532 L.W.
RADIO-PHONOGRAPH COMBINATION

In Model 532 L.W.
L1, C1, L2 & C2 are in circuit

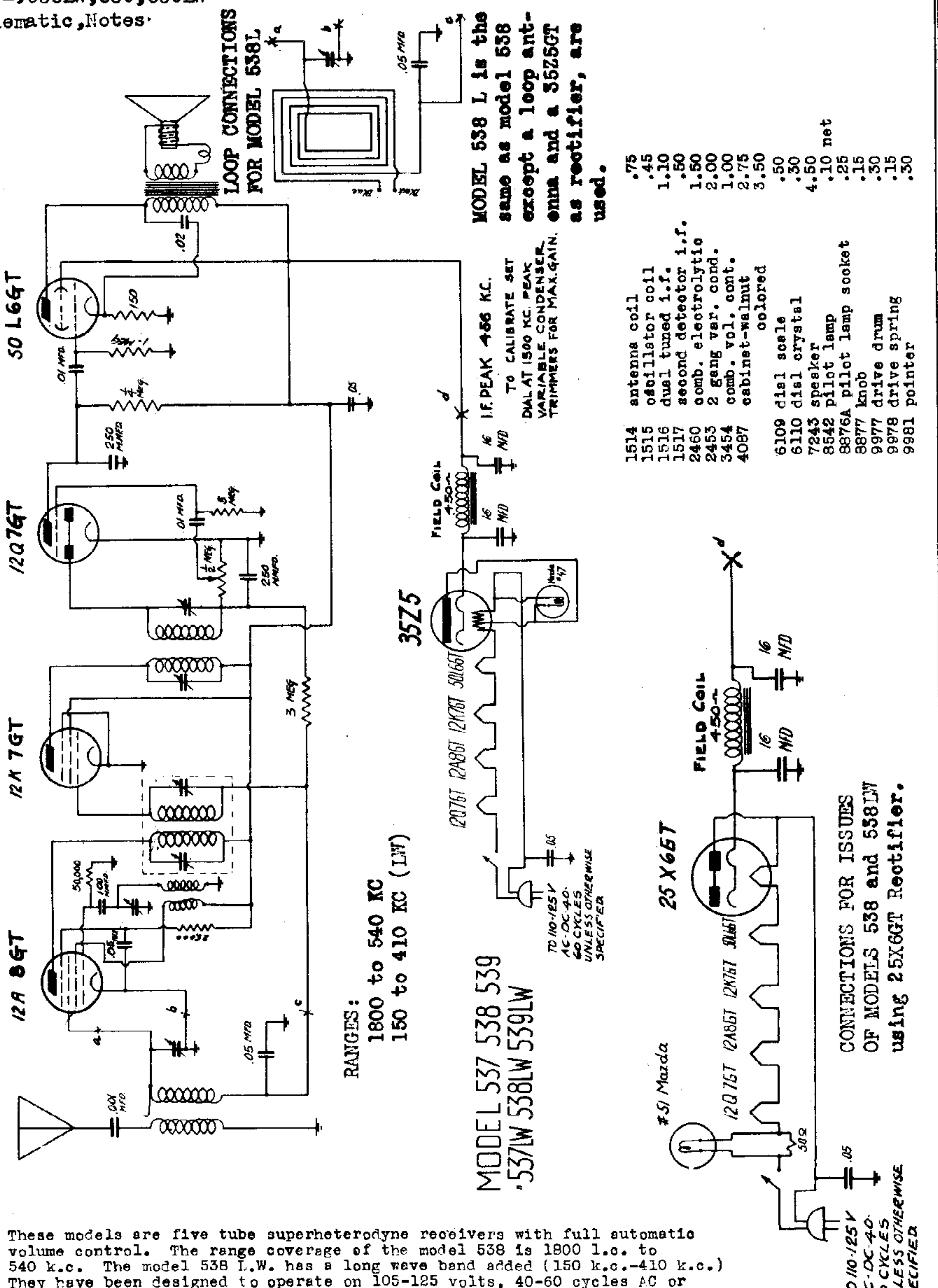
In Model 532
L1, L2, C1, & C2 are omitted

TO CALIBRATE

Connect external Oscillator 's hot lead to reel antenna of receiver. Connect oscillator cold lead in series with a ½ or .1 MFD condenser to receiver chassis. Set oscillator at 1500 KC and peak Variable Condenser trimmers for Maximum signal with condenser set approximately where 1500 comes in on scale.

MODELS 537,537LW,538,
538L,538LW,539,539LW
Schematic,Notes·

DeWALD RADIO MFG. CORP.

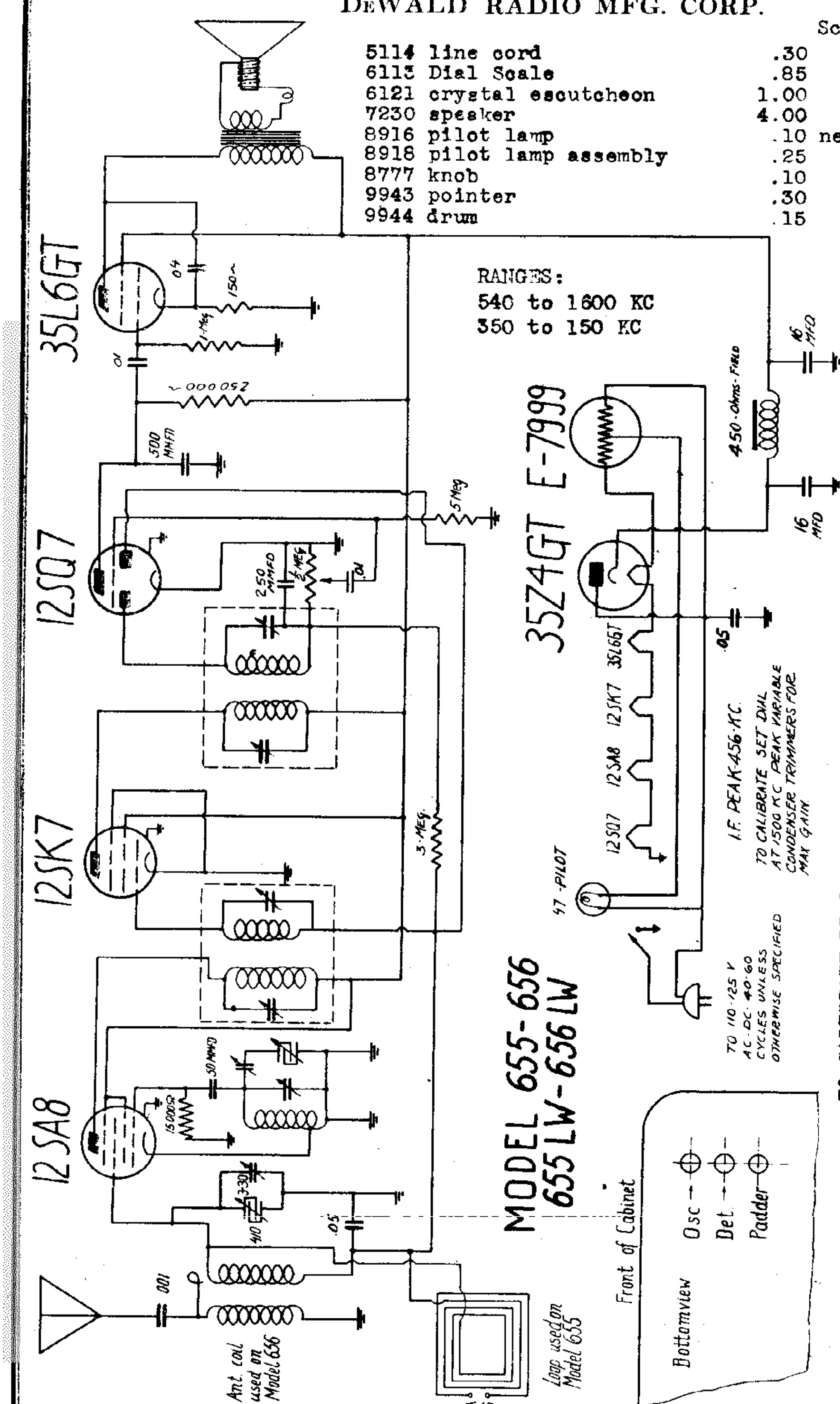


1514	antenna coil	.75
1515	oscillator coil	.45
1516	dual tuned i.f.	1.10
1517	second detector i.f.	.50
2460	comb. electrolytic	1.50
2453	2 gang var. cond.	2.00
3454	comb. vol. cont.	1.00
4087	cabinet-walnut	2.75
	colored	3.50
6109	dial scale	.50
6110	dial crystal	.30
7243	speaker	4.50
8542	pilot lamp	.10 net
8876A	pilot lamp socket	.25
8877	knob	.15
9977	drive drum	.30
9978	drive spring	.15
9981	pointer	.30

These models are five tube superheterodyne receivers with full automatic volume control. The range coverage of the model 538 is 1800 l.c. to 540 k.c. The model 538 L.W. has a long wave band added (150 k.c.-410 k.c.) They have been designed to operate on 105-125 volts, 40-60 cycles AC or DC unless otherwise specified.

DeWALD RADIO MFG. CORP.

5114	line cord	.30
6113	Dial Scale	.85
6121	crystal escutcheon	1.00
7230	speaker	4.00
8916	pilot lamp	.10 net
8918	pilot lamp assembly	.25
8777	knob	.10
9943	pointer	.30
9944	drum	.15
1520	osc. coil	.50
1521	ant. loop	1.50
1531	dual tuned I.F.	1.25
1532	ant. coil	.65
2443A	2 gang var. cond.	2.00
2460	comb. elect	1.50
2466	trimmer assembly	.75
3439	comb. vol cont.	1.00
	cabinet	5.25



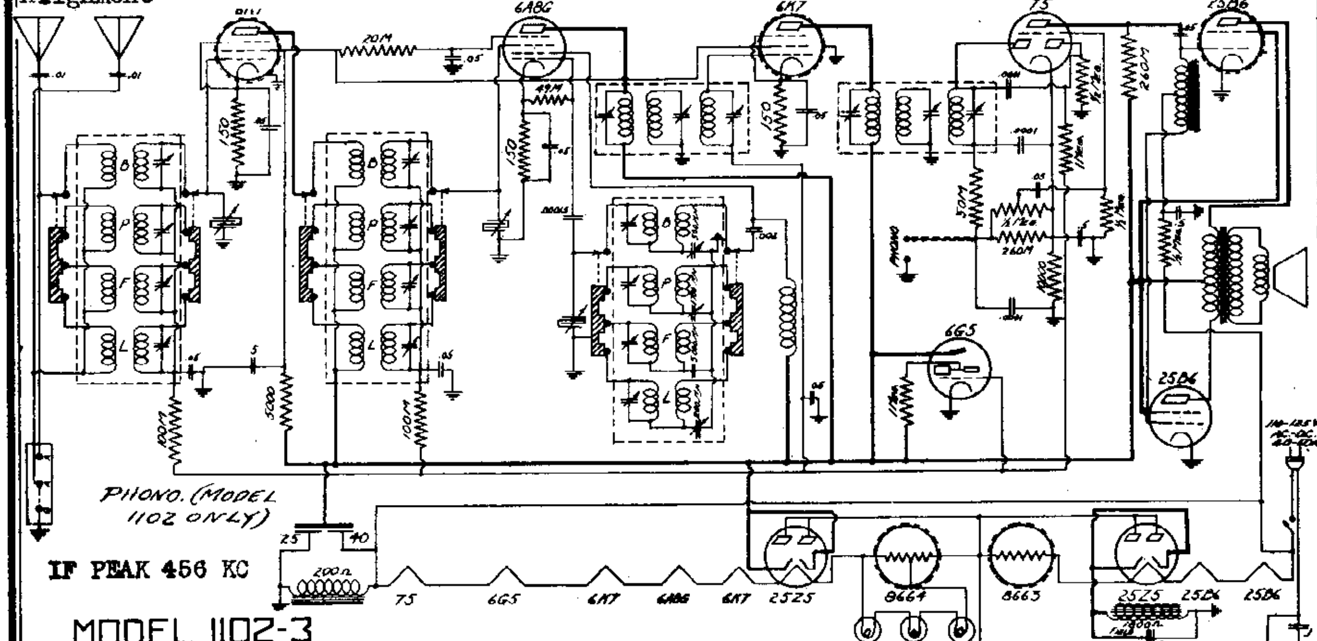
TO CALIBRATE RECEIVER

Adjust the signal generator at 456 K.C. and peak the I.F. trimmers for maximum signal. Connect the "hot" lead from the signal generator to antenna of receiver and ground to ground of receiver. Adjust the generator and receiver to 1500 K.C. and peak the trimmers for maximum signal. Adjust generator and receiver to 600 K.C. and peak the padder for maximum signal. The model 655 should have the back attached to the cabinet when peaking 1500 K.C. and 600 K.C. The trimmers and padder on these models are shown in a sketch on the wiring diagram.

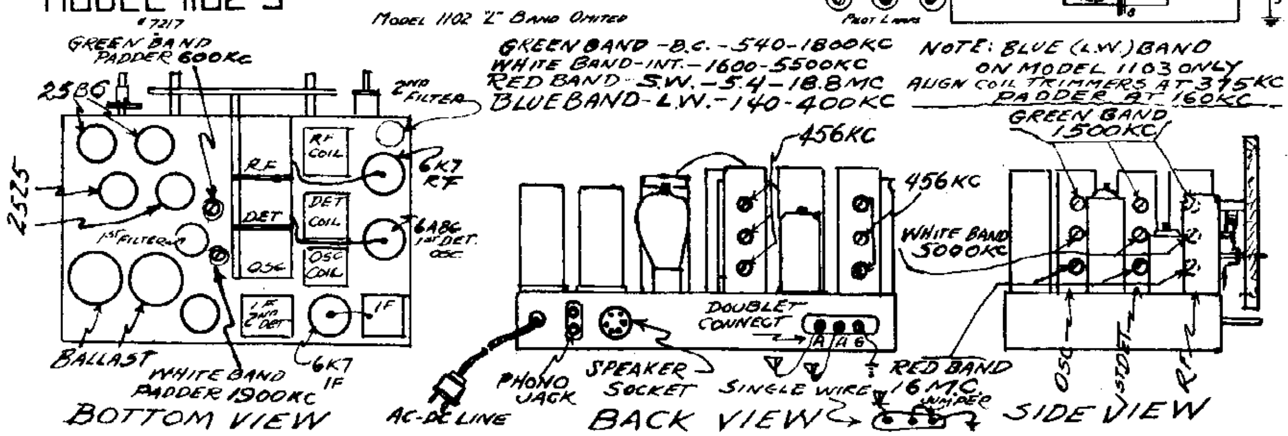
MODEL 1102-3
Schematic, Socket, Trimmers
Alignment

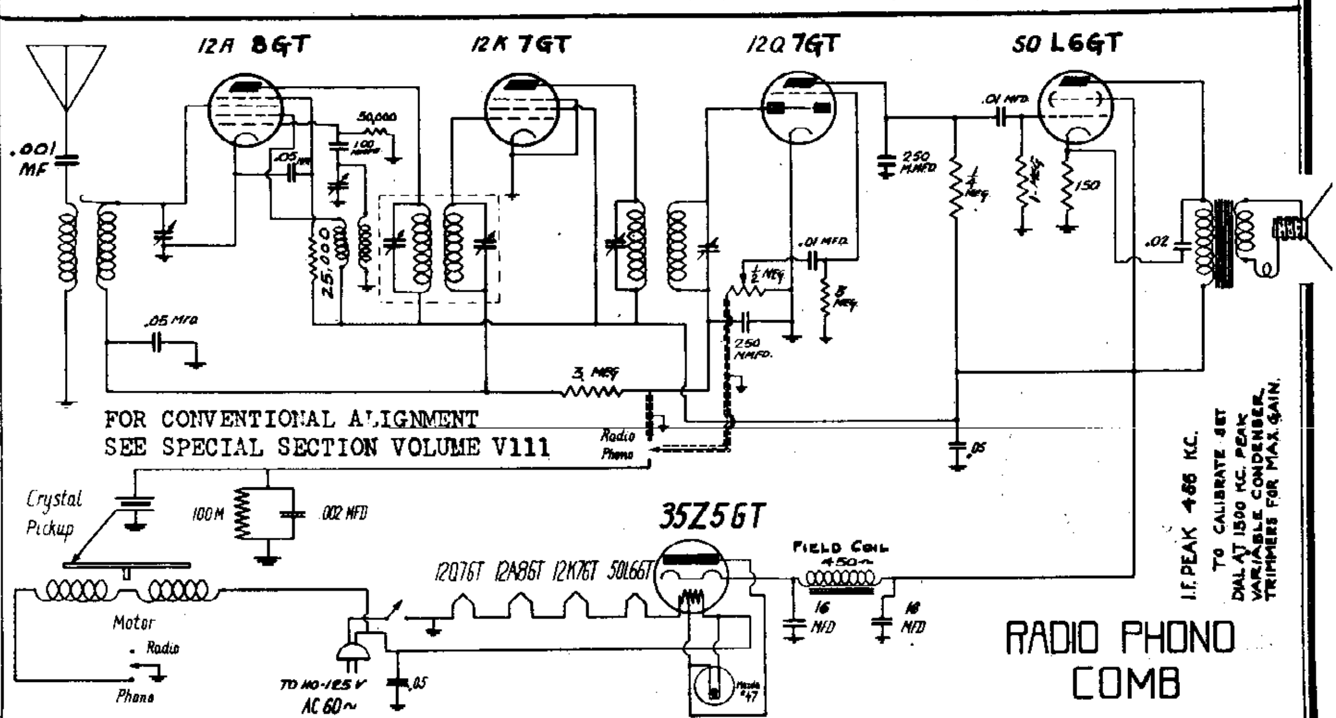
DeWALD RADIO MFG. CORP.

MODEL Radio-Phono. Combin.
Schematic, Alignment



MODEL 1102-3





FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME V111

RADIO PHONO
COMB

ALLEN B. DUMONT LABS., INC. MODELS 180,181,182,18
Circuit Data, Controls
Trouble Chart

GENERAL FEATURES

These receivers are classed as "Electrostatic and Direct Vision." Electrostatic indicates that the entire deflection system is electrostatic and since the picture is viewed direct, without the use of a mirror, lens or other device, it is referred to as Direct Vision. The latter ensures clarity, brilliance and the widest angle of vision. Steady, clear cut, black and white pictures that are large enough for all the family to enjoy at one time are secured by the use of a fourteen inch cathode-ray tube which furnishes a picture eight by ten inches. A separate high fidelity section brings superb reproduction of the sound channel which is associated with the picture. A single control tunes both the sight and the sound channels so the receiver is no more difficult to operate than an ordinary broadcast receiver. To the above features add its compact size, minimum number of controls and simple straight forward layout and you will have an idea of the first commercial television receiver which we believe you will find easy to install and service in spite of the apparent complexity of the subject Television.

CIRCUIT ARRANGEMENT

A simple straight line layout is used in these receivers that should prove extremely helpful to the serviceman. Viewed from the front the video receiver is on the left side of the chassis and the sound receiver is on the right. Fig. No. 1 shows the front controls and the sound receiver while Fig. No. 2 shows the rear adjustments and the video receiver. The top portion of the chassis contains both sweep circuits along with the modulating circuits of the cathode-ray tube. To prevent confusion each side is considered separately, half appearing in Fig. No. 1 and the remainder in Fig. No. 2. The seven auxiliary controls shown in Fig. No. 2 are provided for the use of the installer and serviceman. These controls are necessary to make the final alignment of picture size and positioning when the receiver is installed under the operating conditions imposed by the earth's magnetic field and the power supply line voltages. Once properly set these controls do not need adjustment and since they were not provided for the owner's use we suggest that the dealer or serviceman seal the back of the cabinet as it is not possible to tamper with the controls when the back is in place. The use of the parts and tubes shown in Fig. No. 1 and Fig. No. 2 can be checked by comparing the "V" numbers, etc., with the schematic drawings

Operating Controls of the Receiver (Front)

First, become familiar with the controls on the front of the receiver. Since the receiver has been tested before shipment, probably only a few minor adjustments will be necessary. Therefore before touching the adjustments in the rear attempt to operate the set according to the instruction sheet supplied the purchaser and make only the adjustments required. These instructions are repeated here to cover the possible loss of this sheet. Figure No. 1 shows the front of the receiver with the controls numbered and the use and the purpose of these controls is as follows.

1. Marked CONTRAST, ON and OFF
This is a power switch for starting and stopping a set. It also is the volume control of the picture signal. It should be adjusted in conjunction with the intensity control (No. 4) to produce a picture of pleasing contrast to the user. If the location is such that the signal received is very small, it may be necessary to use the full gain of this control, while in a good location it may have to be retarded considerably. If the picture is not satisfactory the rear controls must be adjusted as covered in a following section.

2. Marked SELECTOR
This control is a four position switch provided for covering four television channels.

3. Marked TUNING
Only one control is necessary to properly tune both the sight and sound channels. Simply adjust this control until the best reception of the sound is secured and at this point the picture signal will be correctly tuned.

4. Marked INTENSITY
The intensity or brightness of the picture is controlled by this knob. It should be adjusted in conjunction with Control No. 1 to get the best picture. Note: It is a good plan to retard (turn to the left) this control when starting the set. If about 15 seconds is allowed to elapse before advancing this control it will prevent a small bright spot from appearing on the screen which might eventually darken the screen.

5. Marked FOCUS
This control is used to sharpen the individual lines of the pattern and once set seldom requires further adjustment.

6. Marked VOLUME
This volume control adjusts the audio volume and has no effect whatever upon the picture.

Rear Controls of the Receiver

As previously stated, the adjustment of these controls is necessary for the final alignment of picture size and positioning, as the earth's magnetic field and power supply line voltages vary with locations. The location of these controls is shown in Figure No. 2 and their use will be covered in numerical order. Proceed as follows: remove the wood screws holding in the back of the cabinet and pull out the back. The safety switch will open, turning the set off and since it is necessary to have the set in operation while making these adjustments the switch can be made temporarily inoperative. (A large battery clip is convenient for this purpose.) Do not reach into the set with the voltages on. (See Cautions and Warning.) There is one adjustment that cannot be made by these controls, that of rotating the Cathode-ray tube to cause the picture to properly line up with the viewing opening. To remedy this, turn the set off, remove the elastic band that grips the rear support and rotate the tube by hand in the correct direction.

The function of the seven rear controls are as follows:

1. Vertical Frequency Control
This controls the frequency of the vertical sweep. If the picture is not steady and slips past at intervals, vertically, this control should be adjusted until a steady picture is secured.

2. Vertical Size Control
If the picture is too narrow and out of proportion vertically this control will remedy the trouble.

3. Vertical Positioning Control
As its name indicates, this control will move the pattern vertically, allowing the picture to be placed directly in the center of the opening.

4. Astigmatic Positioning Control
This is adjusted in conjunction with Control No. 5 to give the best possible focus on the corners of the picture.

5. Horizontal Positioning Control
This control positions the picture horizontally.

6. Horizontal Size Control
The width of the picture is adjusted by this control.

7. Horizontal Frequency Control

If no picture can be secured but modulation (dark and light spaces) can be seen on the screen, the setting of the horizontal frequency control is probably incorrect. Adjust this control until the picture forms.

With the adjustment of these controls the installation should be satisfactory. However, if the signal is weak or if ghosts or noise is present, return to the dipole antenna and make changes as previously suggested until the best position for it is secured.

LOCATION OF TROUBLE

FAULT	POSSIBLE CAUSES
No picture.	1. Power supply trouble in any or all three sources. 2. Too much bias on modulator electrode. 3. Defective cathode-ray tube.
No scanning.	1. Trouble in 1500 volt power source. 2. Poor connections to deflection plates. 3. Defective scanning circuits. 4. Defective cathode-ray tube.
No modulation.	1. Defective or shorted antenna. 2. Defect in video receiver. 3. Too much bias on modulator electrode. 4. Defective cathode-ray tube.
Poor focus.	1. Improper voltages supplied cathode-ray tube. (check entire divider circuit) 2. Defective video receiver. 3. Poor adjustments. 4. Defective cathode-ray tube.
Uneven brilliance.	1. Hum from power source. 2. Defective scanning circuits. 3. Scanning picked up by modulator circuits. 4. Screen burnt or discolored.
Distorted picture.	1. Poor synchronizing (circuit or adjustment). 2. Overloading (contrast control advanced too far) 3. Defective video receiver. 4. A.C. hum. 5. External interference.
Unsteady picture or flickers.	1. Poor synchronizing action. 2. Leakage. 3. Varying voltages to cathode-ray tube or receiver. 4. Unsteady receiver. 5. Antenna loose or shorting.
Double image.	1. Scanning circuits incorrectly adjusted. 2. Ghost images due to reflection of signals.
Cathode-ray tube controls effect the picture and scanning.	1. Cathode-ray tube defective, probably leaking and going soft.
Superimposed pattern on the picture.	1. Oscillation probably in the receiver.
Streaks across picture.	1. Usually local interference such as ignition or diathermy.

MODELS LS 180,181,182,183
Chassis Views

ALLEN B. DUMONT LABS., INC.

CONTROLS

Operating Controls 6
Adjustment Controls 7

Types 181, 182, 183
These receivers have the same operating controls as the type 180 and therefore will not be covered separately.

MECHANICAL SPECIFICATIONS

Cabinet Dimensions
Height .... 24 inches
Width .... 15¾ inches
Depth .... 25 inches

Chassis Dimensions
Height .... 20¾ inches
Width .... 13¼ inches
Depth .... 24¼ inches

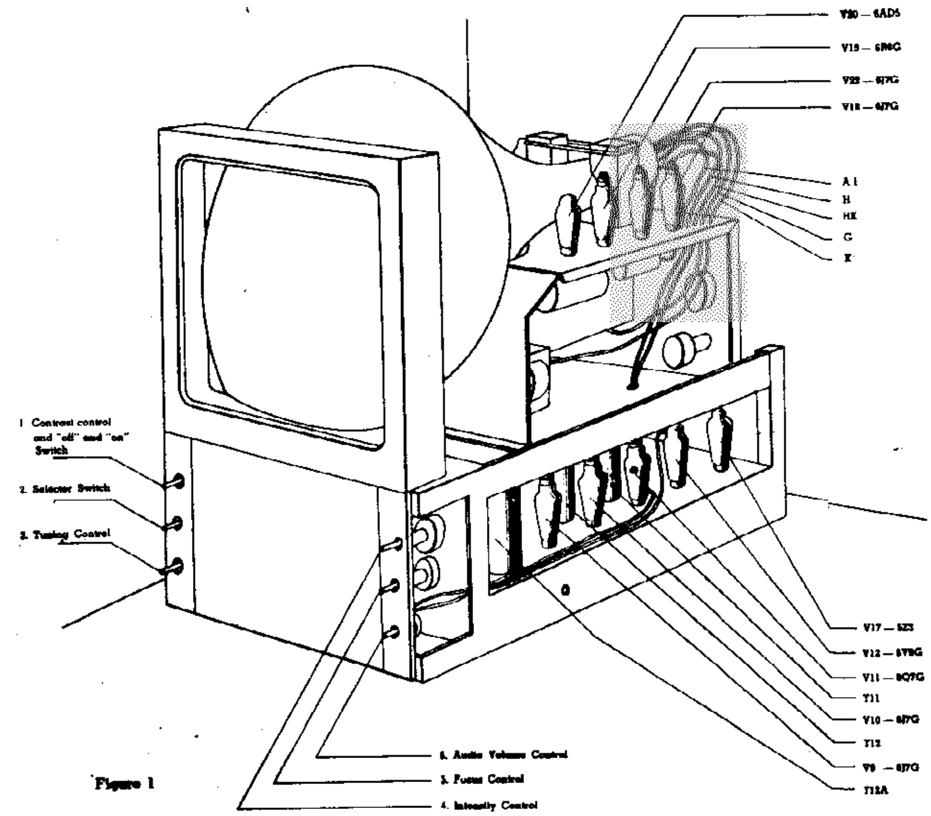


Figure 1

TUBE COMPLEMENT

Type	Purpose
1853	R.F. Amplifier
6J5M	R.F. Oscillator
1852	First Detector
1853	1st Video I.F. Amplifier
1852	2nd Video I.F. Amplifier
6H6M	Video 2nd Detector
1851	1st Video Amplifier
6V6G	Video Power Amplifier
6J7G	1st Sound I.F. Amplifier
6J7G	2nd Sound I.F. Amplifier
6Q7G	Sound 2nd Detector and Amplifier
6V6G	Sound Power Amplifier
6J7G	Horizontal Synch Separator
6AD5G	Horizontal Sweep Oscillator
6R6G	Horizontal Sweep Amplifier
6J7G	Vertical Synch Separator
6AD5G	Vertical Sweep Oscillator
6R6G	Vertical Sweep Amplifier
2Y2	4100 Volt Rectifier
5X3	1600 Volt Rectifier
5Z3	350 Volt Rectifier
114-9-T	Cathode-ray Tube (14")

Frequency Ranges — Four Television Channels provided, present alignment as follows:

STEP	STATION	SIDE BAND	AUDIO CARRIER	VIDEO CARRIER
A	NBC	Single	49.75	45.25
B	CBS	Single	55.75	51.25
C	....	....	....	....
D	NBC	Double	49.75	46.5

Power Ratings

Power supply 110 to 120 volts, 50 to 60 cycles, 250 watts.
Audio output, maximum 4.25 watts.

Twenty-two Tube, AC, Superheterodyne, Television Receiver

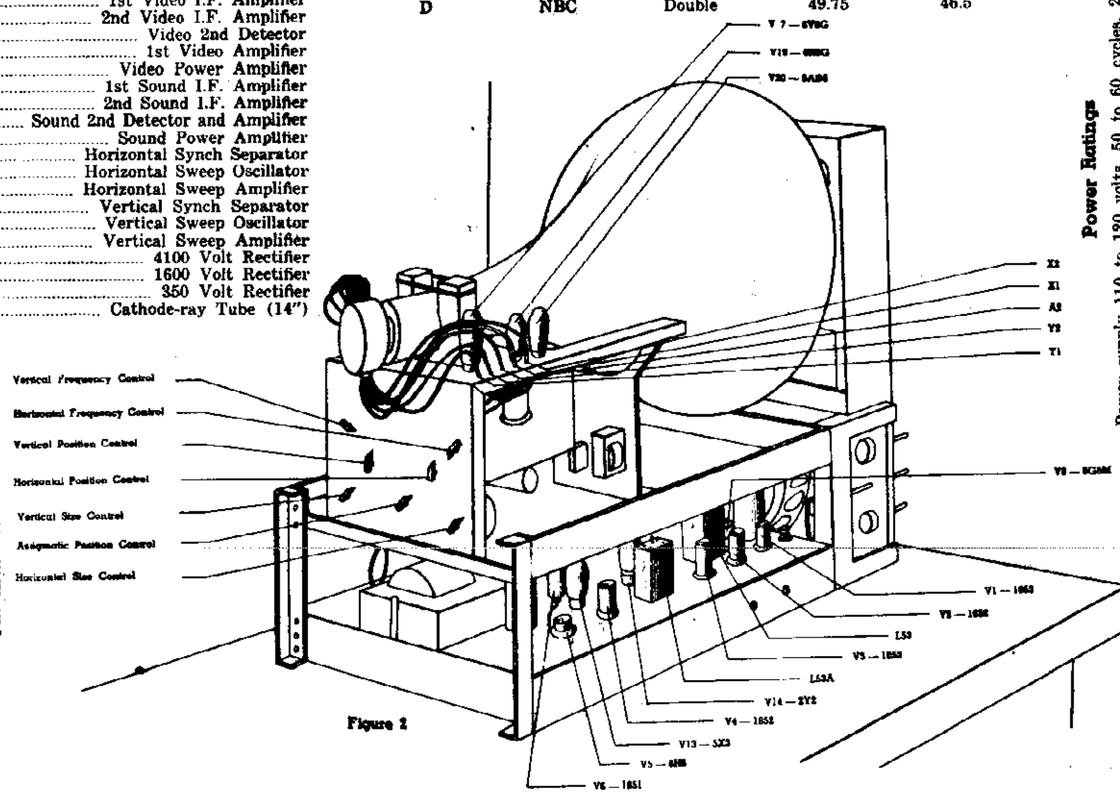
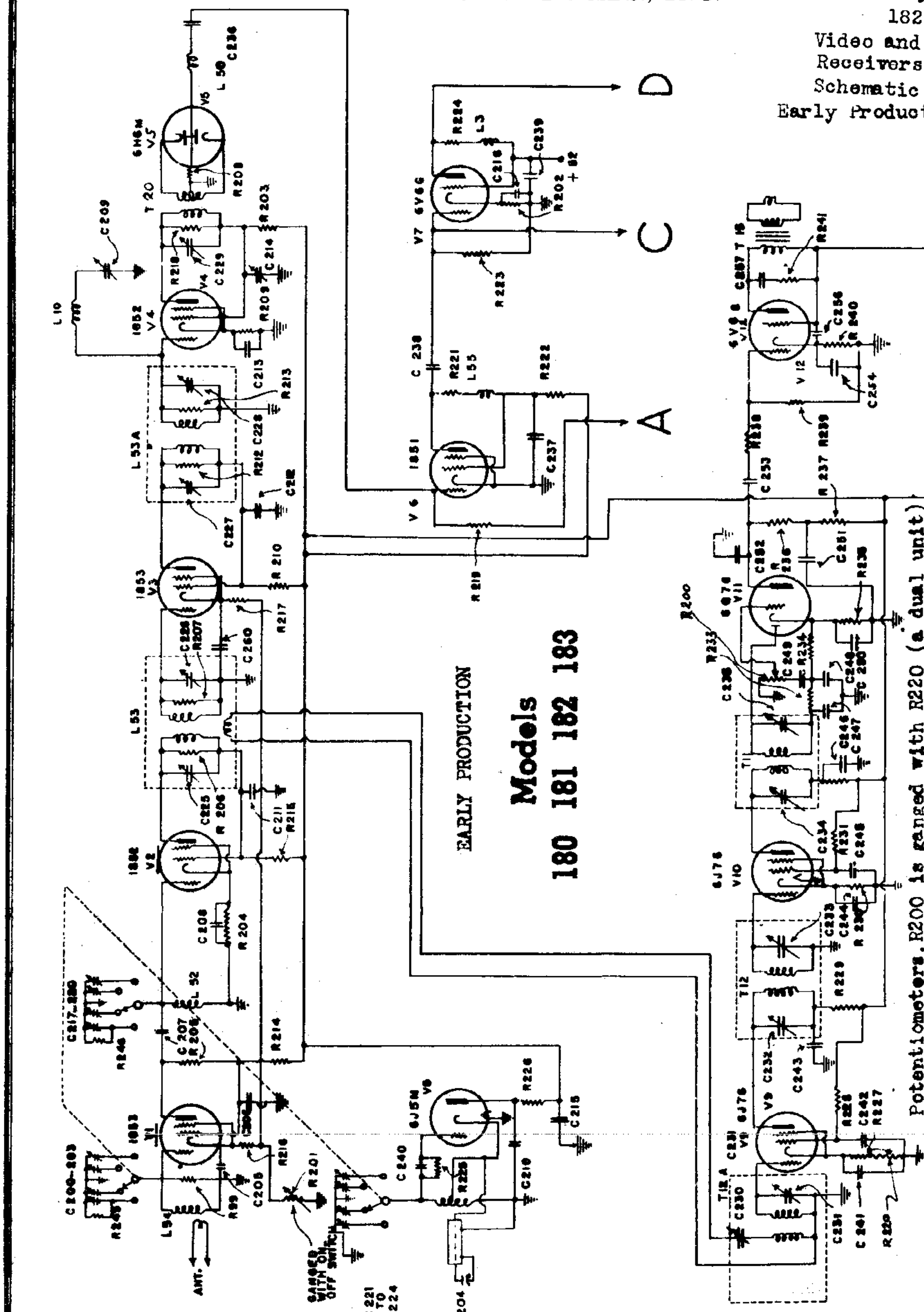


Figure 2

ALLEN B. DUMONT LABS., INC.

MODELS 180,181
182,18
Video and A-
Receivers
Schematic
Early Production



Potentiometers, R200 is ganged with R220 (a dual unit)

Figure 8 — Schematic Diagram — Video and Audio Receivers

MODELS 180,181,182,183
Separator and Sweep
Voltage Divider
Schematics,Notes

ALLEN B. DUMONT LABS., INC.

Early Production

EARLY PRODUCTION **Models** **180 181 182 183**

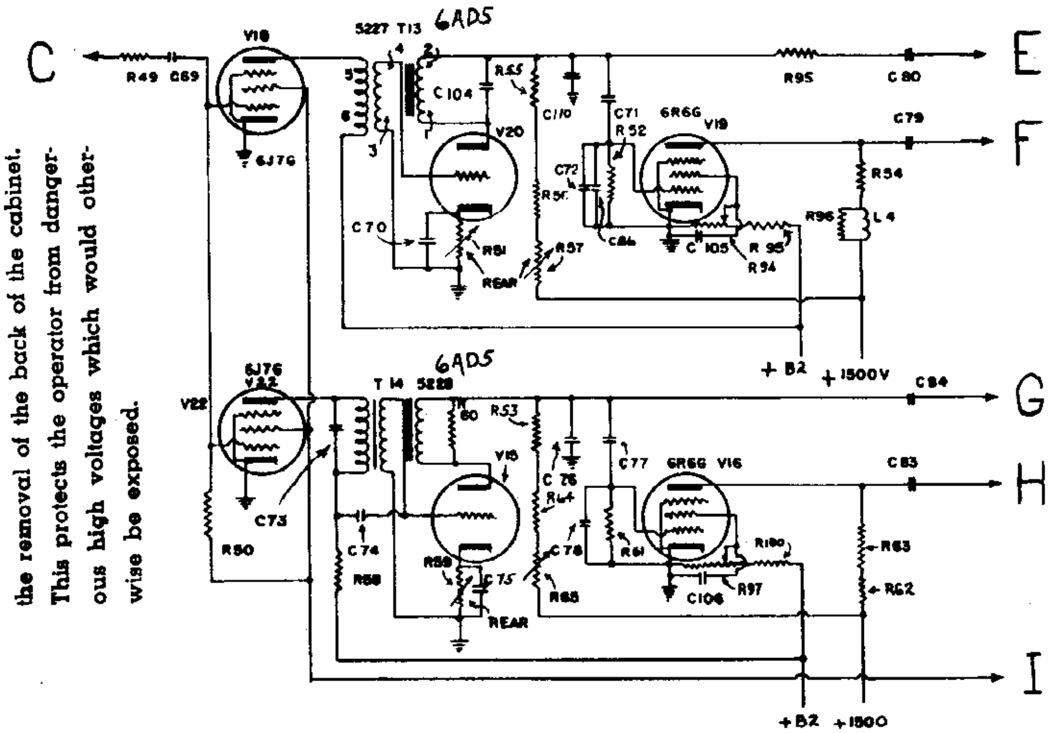


Figure 5 — Schematic Diagram. Separator and Sweep Circuits

It is better to shut the set completely off between adjustments than to suffer a painful or even a dangerous burn. The set is equipped with a safety switch which automatically opens upon the removal of the back of the cabinet. This protects the operator from dangerous high voltages which would otherwise be exposed.

The high voltages that are necessary in this type of equipment are very dangerous and should not be approached in a careless manner.

The serviceman that is engaged in installing or servicing television receivers is urged to take all precautions and run no unnecessary risks.

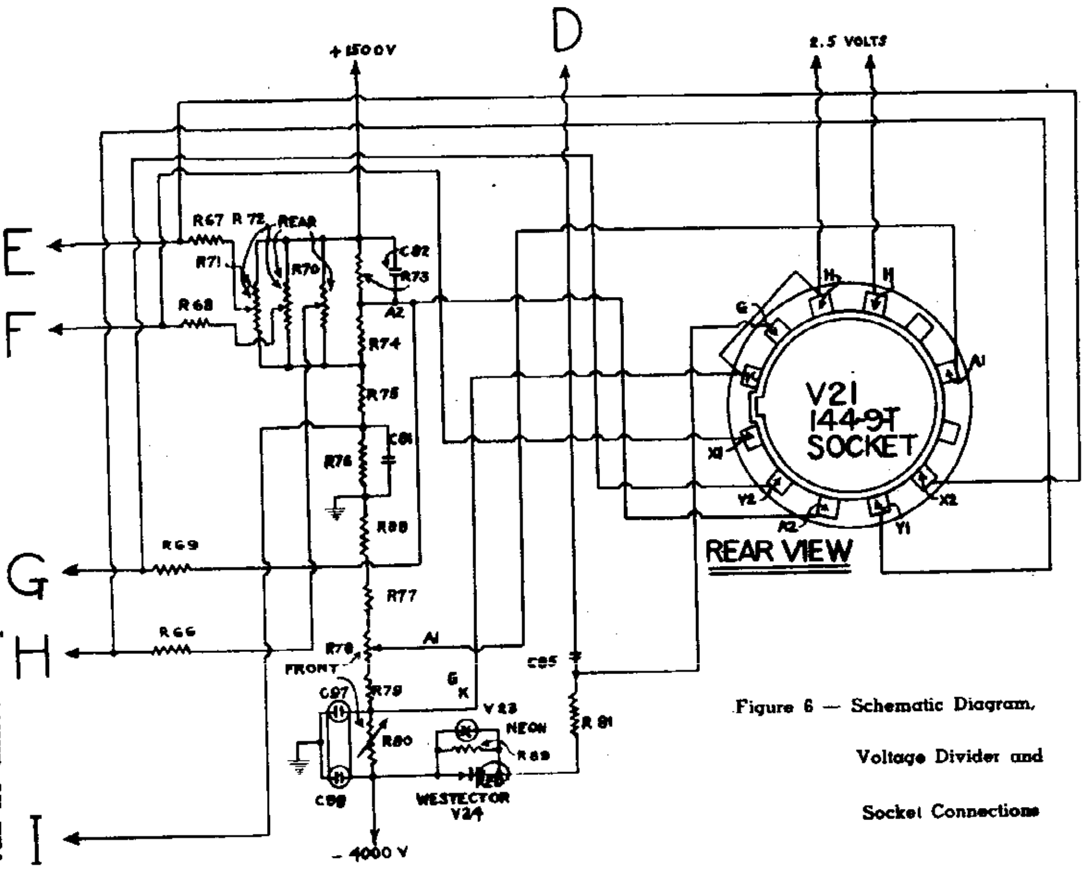


Figure 6 — Schematic Diagram, Voltage Divider and Socket Connections

ALLEN B. DUMONT LABS., INC.

CAUTION AND WARNING

Large cathode-ray tubes operate at high voltages and hence are evacuated to a very high degree of vacuum. Therefore the atmospheric pressure on the glass can run into tons depending on the size of the tube. A collapse therefore is as bad as an explosion and all cathode-ray tubes should be handled with care. The Du Mont Laboratories have gone to great expense to provide a cathode-ray tube that is safe for the home and the structural design results in its ability to stand tests nearly twice as severe as usually employed. The serviceman, however, should observe the following rules as he will probably be the only one to handle the average tube.

1. Be careful in handling the tube.
2. Watch the use of tools near the tube.
3. Don't scratch the surface of the glass.
4. Don't stand the tube on a metal surface or in any other way cause certain parts to be quickly heated or cooled.

TERMINAL VOLTAGES

Using Weston Model 772   20,000 Ohms per Voltmeter
(with Televerter)

Tube	Plate	Screen	Grid (Control)	Notes
V9	240	150	— 4.3	
V10	240	155	— 4.3	
V11	190	......	— 2.2	
V12	275	290	—11.5	Cathode to ground.
V8	115	......	....	
V1	140	190	— 2.	Contrast on full.
V2	190	190	— 3.5	
V3	180	180	— 2.25	
V4	170	170	— 2.25	
V6	170	185	— 2.0	Cannot be measured at the grid of V6. Should read —4 volts at center tap of 5Z3 high voltage winding to ground.
V7	140	225	— 7.5	

V17 5Z3 filament to ground = 310 volts
V13 5X3 filament to ground = 1600 volts
(output after L7 = 1550)
V14 2Y2 output = 3950 to 4200 (ground is positive)
(output after R83 — 3800 to 4100 volts)
The above measurements were taken with respect to ground, the following are point to point.
V21 From cathode to grid —60 to —160
From cathode to first anode +800 to +1600
From cathode to second anode +5000

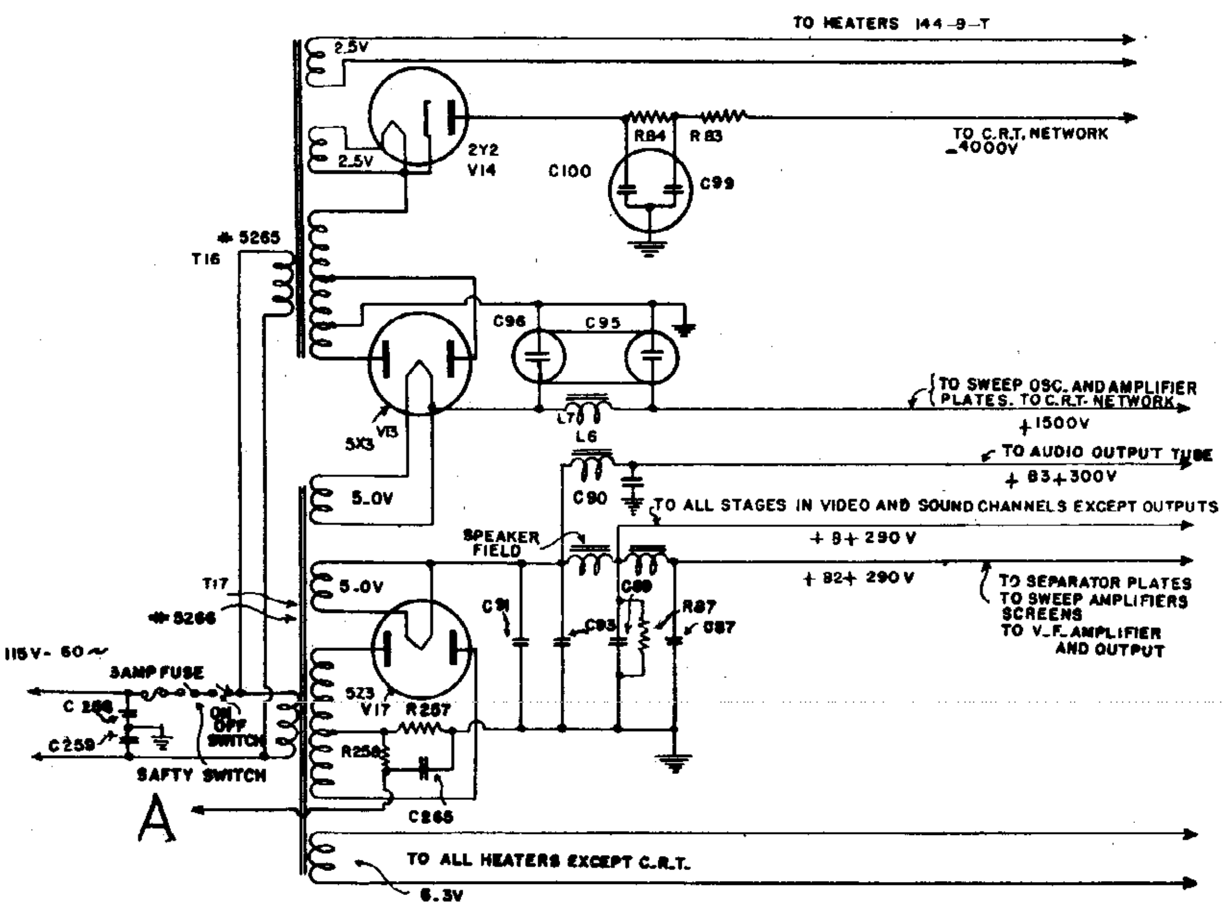


Figure 7 — Schematic Diagram, Power Supplies

MODELS 180,181,182,183
Service Data, Parts

ALLEN B. DUMONT LABS., INC.

RESISTOR VALUES

EARLY PRODUCTION

R — Regular
S — Special
W — Wire

R	Ohms	Watt	Class	R	Ohms	Watt	Class
49	10,000	½	R	200	500,000	pot	S
50	10 meg	½	R	201	2,000	pot	R
51	6,000	pot	W	202	150	½	R
52	1 meg	½	R	203	5,000	1	R
53	200,000	2	S	204	400	½	R
54	80,000	20	W	205	3,000	½	R
55	100,000	2	S	206	3,000	½	R
56	100,000	2	S	207	3,000	½	R
57	500,000	pot	S	208	3,000	½	R
58	15,000	½	R	209	150	½	R
59	6,000	pot	W	210	5,000	1	R
60	50,000	½	R	212	3,000	½	R
61	25 meg	1	R	213	3,000	½	R
62	1.5 meg	1	R	214	5,000	1	R
63	1.5 meg	1	R	215	5,000	1	R
64	200,000	2	S	216	150	½	R
65	1 meg	pot	S	217	150	½	R
66	5 meg	½	R	218	5,000	½	R
67	5 meg	½	R	219	1 meg	½	R
68	5 meg	½	R	220	100,000	pot	S
69	5 meg	½	R	221	1,500	1	R
70	2 meg	pot	R	222	5,000	1	R
71	2 meg	pot	R	223	1 meg	½	R
72	2 meg	pot	R	224	1,000	2	R
73	300,000	½	R	225	25,000	½	R
74	300,000	½	R	226	25,000	½	R
75	750,000	2	R	227	400	½	R
76	15,000	½	R	228	100,000	½	R
77	1 meg	2	S	229	4,000	½	R
78	1 meg	pot	S	230	1,000	½	R
79	750,000	2	R	231	100,000	½	R
80	100,000	pot	R	232	4,000	½	R
81	10,000	½	R	233	50,000	½	R
82	35,000	10	W	234	1.5 meg	½	R
83	100,000	1	R	235	2,000	½	R
84	100,000	1	R	236	50,000	½	R
87	100,000	2	R	237	10,000	½	R
88	1 meg	2	S	238	50,000	½	R
89	1 meg	½	R	239	250,000	½	R
90	50,000	½	R	240	150	1	R
94	250,000	pot	S	241	10,000	1	R
95	40,000	½	R	245	10,000	½	R
96	60,000	½	R	246	10,000	½	R
97	50,000	pot	R	257	20	1	R
98	3,000	½	R	258	500,000	½	R
100	200,000	½	R				

CONDENSER VALUES

C.	Mfd.	Volts	C.	Mfd.	Volts
69	.1	400	214	.01	400
70	.05	400	215	.01	400
71	.000075	1500	216	.001	400
72	.0025	400	217	3-30	trimmer
73	.0025	400	218	3-30	trimmer
74	.005	500	219	3-30	trimmer
75	25.	50	220	3-30	trimmer
76	.04	1600	221	3-30	trimmer
77	.0005	1500	222	3-30	trimmer
78	.25	400	223	3-30	trimmer
79	.01	1200	224	3-30	trimmer
80	.04	1600	225	L53	
81	.1	400	226	L53	
82	.25	600	227	L53A	
83	.1	1000	228	L53A	
84	.1	1000	229	T-20	
85	.05	4500	230	T12A	
86	.0005	400	231	T12A	
87	16.	450	232	T12	
89	8.	450	233	T12	
90	8.	450	234	T11	
91	16.	450	235	T11	
93	16.	450	236	.04	400
95	4.	1500	237	8.	450
96	4.	1500	238	.04	400
97	.2	4000	239	.01	400
98	.2	4000	240	.000050	400
99	.2	4000	241	.02	400
100	.2	4000	242	.10	400
104	.0005	400	243	.25	400
105	.02	400	244	.02	400
106	25.	50	245	.10	400
110	.0002	1500	246	.25	400
200	3-30 mmf.	trimmer	247	.0002	400
201	3-30 mmf.	trimmer	248	.000050	400
202	3-30 mmf.	trimmer	249	.01	400
203	3-30 mmf.	trimmer	250	25.	25
204	3-5	variable	251	4.	450
205	.0006	400	252	.0005	400
206	.0006	400	253	.1	400
207	.0006	400	254	50.	25
208	.01	400	256	.0005	450
209	3-30 mmf.	trimmer	257	.01	400
210	.0006	400	258	.0006	400
211	.01	400	259	.0006	400
212	.01	400	260	.01	400
213	.01	400	265	25.	25

SERVICE

While the technique employed in servicing television receivers is similar to ordinary radio practice, there is a greater need for basic knowledge and the time will be well spent that is used to study the fundamental principles of television before attempting actual service work. For obvious reasons it will be impossible to include fundamental theory in this manual, however, since very little data concerning the form of sweeps used in these receivers is available, the following description may be helpful.

Fig. 5 is a schematic diagram showing synchronising, signal separation and sweep circuits used in this receiver. The two 6J7G tubes (V18 & V22) function as the synchronizing signal separators. The outputs of the two plates are fed their respective synchronizing windings of the horizontal and vertical oscillation transformers. Linear sawtooth deflection is effected using a 6AD5G triode as an oscillator and a 6R6G pentode as an amplifier. Oscillations are generated as follows:

Let us consider first the low frequency vertical circuit. Condenser C76 is charged from the power supply through the resistor consisting of R64 R66 and R65. R65 functions mainly as an amplitude or size control, although it has some effect upon the frequency of operation. Condenser C76 charges to practically full power supply potential. As a result of previous oscillations, a charge on condenser C75 is held on the cathode, which gradually decreases to zero through R59 as C76 is charging. This charge on C75 is high enough to hold the tube at cutoff. The grid of the tube is at D.C. ground potential. As the cathode approaches ground potential due to the discharge of C75 the 6AD5G triode becomes conducting. As plate current flows C76 is discharged producing the return trace of the sawtooth. The surge of plate current through the winding of the oscillation transformer induces a voltage in the grid winding, of proper polarity to drive the grid more positive, thereby reducing the plate circuit impedance and therefore the return trace time. At the same time that C76 is discharging, C75 is charging to its initial value to cut off the flow of plate current. As this action takes place, the plate current surge decreases, thereby applying less positive voltage to the grid and increasing its cutoff action. Ultimately, the tube is completely cut off, the cathode is at its full positive potential, and the charging cycle again begins. Resistance R59 functions as both an amplitude and a frequency control since it determines the breakdown potential and the frequency of recurrence of the oscillations in the plate circuit of the triode. Synchronizing pulses are injected into the grid of the oscillator tube through the winding of the oscillation transformer. These synchronizing pulses are polarized so that they drive the grid in a positive direction with respect to the cathode and therefore hasten the "breaking down" of the oscillator tube and effect synchronization. Since condenser C76 is charged to nearly full power supply voltage, the signal which is taken from the plate circuit of the triode is extremely non-linear. It is applied, however, to one plate of the defecting pair in the cathode-ray tube. At the same time it is divided by a capacity-resistance network and is applied to the grid of the 6R6G pentode. This triode section is so operated that its output is distorted in a manner opposite to that distortion introduced by the non-linear operation of the oscillator triode. The output of the 6R6G is applied to the other deflection plate of the pair and the deflection from this signal is such that the resultant deflection is linear.

Since the high frequency or horizontal sweep operates in the same manner it will be unnecessary to repeat the above description. The horizontal circuit is, however, a little more critical than the vertical and it is absolutely essential to keep the stray circuit capacities of the horizontal oscillator and amplifier at a minimum in order to keep the return trace time at a minimum. Therefore, if repairs are ever necessary on this circuit care must be taken not to increase the capacity of the circuit.

In Fig. 6 the use of a copper oxide rectifier and neon lamp can be explained as follows. The D.C. component necessary for background level, is introduced by the action of the copper oxide (Westector) V24. The neon lamp V23 is provided to protect the rectifier from high voltage surges when the equipment is first turned on.

Assuming that the controls are properly set and handled, the first step will be to determine the location of the trouble and isolate the defective portion. In this you will be aided by the design of the receiver, for, as previously pointed out, the various sections are separately located.

The following brief outline, while by no means complete, will serve to point out possible causes and location.

While no fast rule can be laid down, once the section failing has been decided on it will generally be found that a systematic check correctly interpreted will locate the fault. A voltage check of the suspected circuit along with the checking of the tubes employed will probably be the next step. Then, if the voltages are correct and a cathode-ray oscillograph is available it can be used to trace the source of the trouble.

It is quite probable that the majority of service problems will fall within this range in spite of this limitation, as the correct adjustment of the regular control knobs along with the replacement of tubes and parts will provide the answer to nearly all troubles.

ALLEN B. DUMONT LABS., INC.

RESISTOR VALUES

EARLY PRODUCTION

R — Regular
S — Special
W — Wire

R	Ohms	Watt	Class	R	Ohms	Watt	Class
49	10,000	½	R	200	500,000	pot	S
50	10 meg	½	R	201	2,000	pot	R
51	6,000	pot	W	202	150	½	R
52	1 meg	½	R	203	5,000	1	R
53	200,000	2	S	204	400	½	R
54	30,000	20	W	205	3,000	½	R
55	100,000	2	S	206	3,000	½	R
56	100,000	2	S	207	3,000	½	R
57	500,000	pot	S	208	3,000	½	R
58	15,000	½	R	209	150	½	R
59	6,000	pot	W	210	5,000	1	R
60	50,000	½	R	212	3,000	½	R
61	25 meg	1	R	213	3,000	½	R
62	1.5 meg	1	R	214	5,000	1	R
63	1.5 meg	1	R	215	5,000	1	R
64	200,000	2	S	216	150	½	R
65	1 meg	pot	S	217	150	½	R
66	5 meg	½	R	218	5,000	½	R
67	5 meg	½	R	219	1 meg	½	R
68	5 meg	½	R	220	100,000	pot	S
69	5 meg	½	R	221	1,500	1	R
70	2 meg	pot	R	222	5,000	1	R
71	2 meg	pot	R	223	1 meg	½	R
72	2 meg	pot	R	224	1,000	2	R
73	300,000	½	R	225	25,000	½	R
74	300,000	½	R	226	25,000	½	R
75	750,000	2	R	227	400	½	R
76	15,000	½	R	228	100,000	½	R
77	1 meg	2	S	229	4,000	½	R
78	1 meg	pot	S	230	1,000	½	R
79	750,000	2	R	231	100,000	½	R
80	100,000	pot	R	232	4,000	½	R
81	10,000	½	R	233	50,000	½	R
82	35,000	10	W	234	1.5 meg	½	R
83	100,000	1	R	235	2,000	½	R
84	100,000	1	R	236	50,000	½	R
87	100,000	2	R	237	10,000	½	R
88	1 meg	2	S	238	50,000	½	R
89	1 meg	½	R	239	250,000	½	R
90	50,000	½	R	240	150	1	R
94	250,000	pot	S	241	10,000	1	R
95	40,000	½	R	245	10,000	½	R
96	50,000	½	R	246	10,000	½	R
97	50,000	pot	R	257	20	1	R
98	3,000	½	R	258	500,000	½	R
100	200,000	½	R				

CONDENSER VALUES

C.	Mfd.	Volts	C.	Mfd.	Volts
69	.1	400	214	.01	400
70	.05	400	215	.01	400
71	.000075	1500	216	.001	400
72	.0025	400	217	3-30	trimmer
73	.0025	400	218	3-30	trimmer
74	.005	500	219	3-30	trimmer
75	25.	50	220	3-30	trimmer
76	.04	1600	221	3-30	trimmer
77	.0005	1500	222	3-30	trimmer
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ALLEN B. DUMONT LABS., INC.

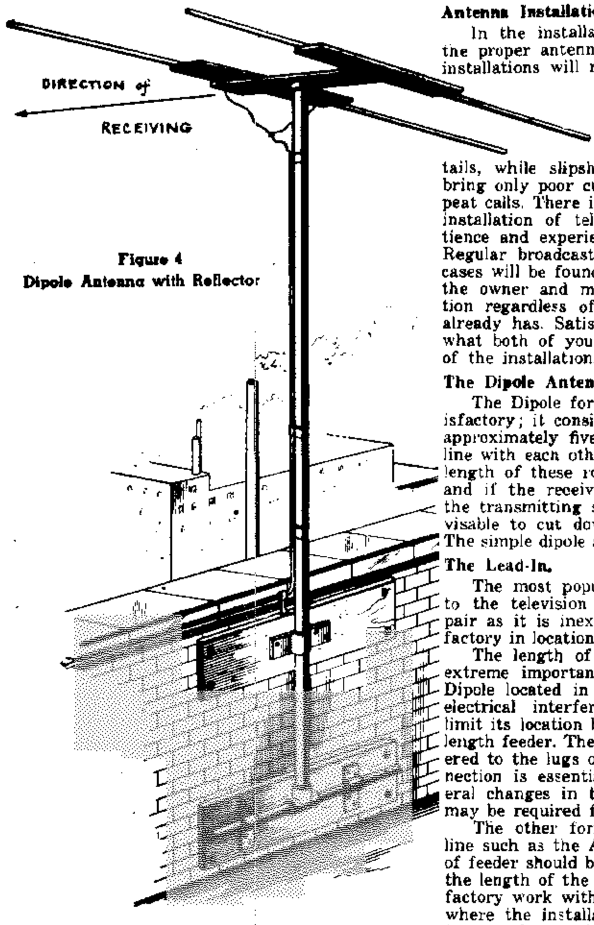
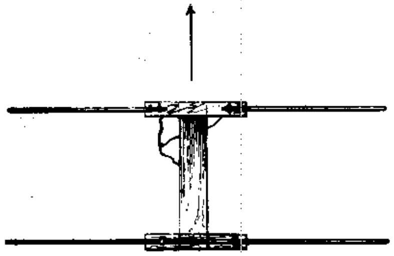


Figure 4
Dipole Antenna with Reflector



TOP PLAN VIEW

Antenna Installation

In the installation of television receivers the proper antenna is a necessity. Successful installations will result from attention to details, while slipshod and careless work will bring only poor customer satisfaction and repeat calls. There is nothing difficult about the installation of television aerials, a little patience and experience is all that is required. Regular broadcast aerials in the majority of cases will be found useless. Impress this upon the owner and make a satisfactory installation regardless of what other equipment he already has. Satisfactory picture reception is what both of you require for the completion of the installation.

The Dipole Antenna

The Dipole form of aerial is generally satisfactory; it consists of two metal rods, each approximately five feet long and placed on a line with each other. Extreme accuracy in the length of these rods is usually not necessary and if the receiver is located very close to the transmitting station it may be found advisable to cut down the length of each rod. The simple dipole aerial is shown in Fig. No. 3.

The Lead-In.

The most popular lead-in from the dipole to the television receiver will be a twisted pair as it is inexpensive and generally satisfactory in locations where the signal is strong.

The length of this lead is usually not of extreme importance. It is better to get the Dipole located in the clear and as far from electrical interference as possible than to limit its location by using a theoretical, exact length feeder. The twisted pair should be soldered to the lugs on the Dipole as a good connection is essential and necessary since several changes in the position of the antenna may be required for best results.

The other form of lead-in is the coaxial line such as the Amphenol No. 72. This form of feeder should be used in installations where the length of the lead-in is too long for satisfactory work with the twisted pair and again where the installation is at an extreme distance and every bit of energy picked up must be delivered to the receiver.

Polarization

If the dipole is mounted horizontally it is said to be horizontally polarized, and if vertical it is vertically polarized. Since the physical location materially affects the aerial no specific form can be advised and we can merely suggest that you start by using horizontal polarization and change if necessary to produce the best results.

Location of the Antenna

Whenever possible the Dipole should be erected so that it is in line of sight with the transmitter. This does not mean that no signals can be secured where a direct view of the transmitter cannot be obtained. Surprising results are often secured on these high frequencies and no concise rules can be assigned to this work. If the location is on a street having heavy traffic there may be considerable noise level due to automobile ignition systems. In this case, locate the Dipole to the rear of the building and away from the source of the noise as far as possible. In the case of electrical machinery over which you have no control, the same method can be employed along with the utilization of the directional effects of the aerial which will be covered later.

Room Illumination

Wherever possible the receiver should be so placed in the home that a direct glare from either natural or artificial light does not fall upon the face of the cathode-ray tube. The received pictures may be viewed under a variety of conditions where it is not always convenient to darken the room completely. Adjustments made to meet these conditions will not cause damage to the receiver. Viewing the pictures in as dark a room as possible is always at an advantage as it permits the setting of the Intensity and Contrast controls in a manner that will give picture tone values more correctly relating to those actually used in the studio from which the picture is transmitted.

Installation Process

It is a good plan to proceed as follows with the installation.

1. Erect the Dipole antenna in the clear. Start by using horizontal polarization (mount the rods horizontally) and turn them until their plane is at right angles with the location of the transmitter.
2. Adjust the receiver to produce a picture.
3. Return to the antenna and make final adjustments for best signal strength and removal of ghosts, etc.

Ghost Effects

Where the picture appears to be duplicated and slightly displaced, the additional picture is referred to as a ghost. This effect is usually due to the reflection of the signals and can be cured by the slanting or rotating of the Dipole or the use of a reflector or reflectors. If, after all possible positions have been tried, the ghost still exists it will be necessary to change the location of the antenna and try again.

Directional Effects

In the simple Dipole, directional effects are not very pronounced, but it does have a rather sharp no-signal radius and it is possible in some instances to materially reduce interference by placing the offending source in this area. If the installation of the receiver is being made at quite a distance from the transmitter or if the signal level is very low due to local conditions, it is well to consider the use of a reflector. This is done by placing a rod, about ten feet long, parallel with the Dipole and about five feet in back of it. The directional effect of the Dipole remains the same, namely at right angles to the plane. Signals coming from the front will be greatly increased. In using reflectors it is well to bear in mind, however, that any signal approaching from the rear (where the reflector is located) will be greatly attenuated. Fig. No. 4 shows the reflector added to the simple Dipole.

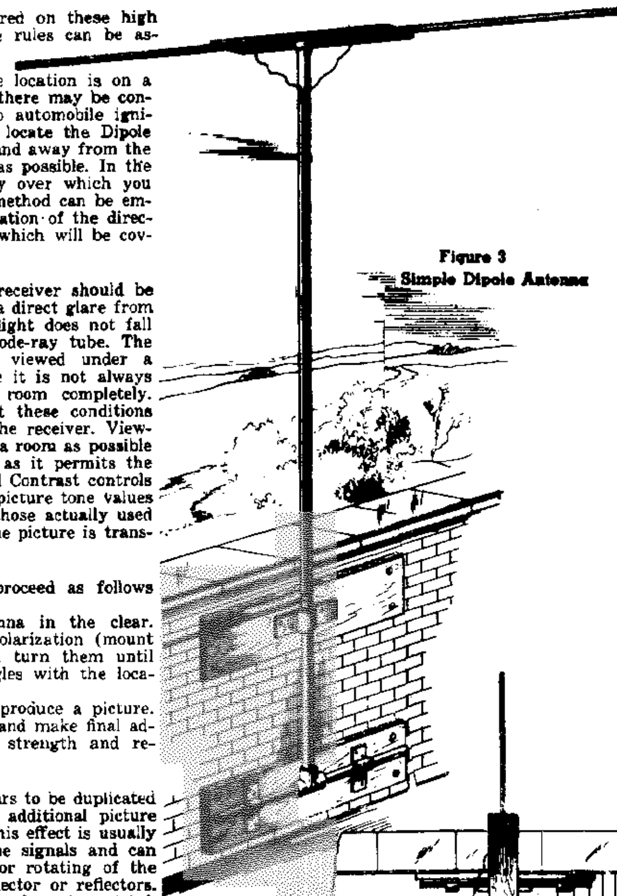
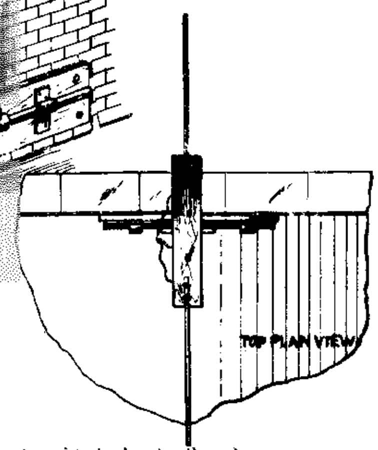


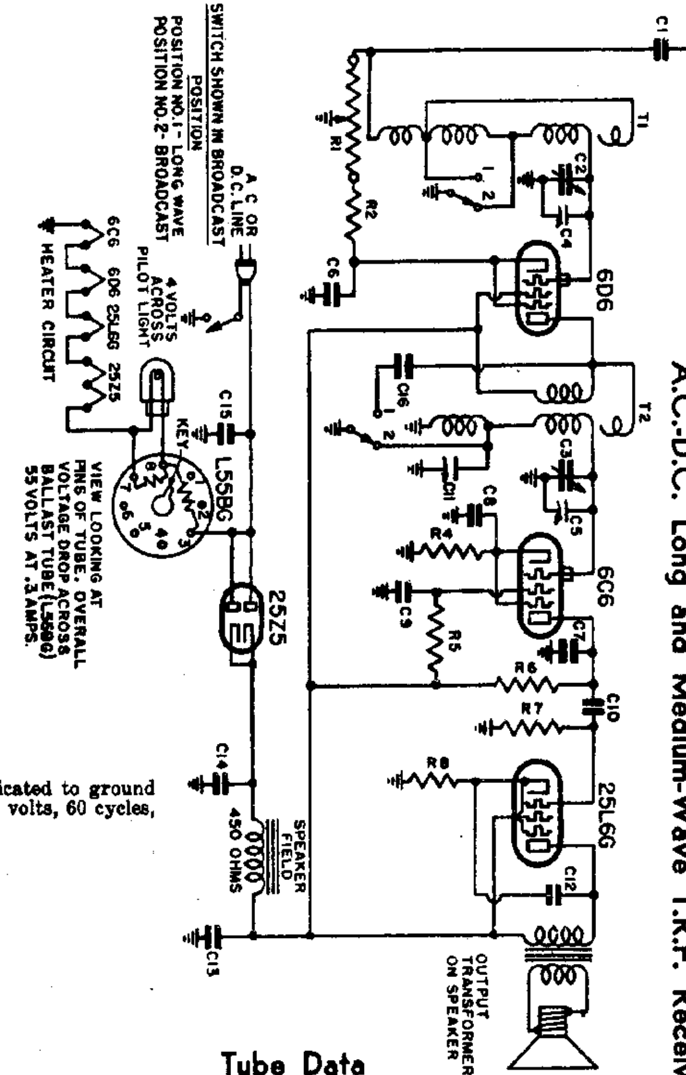
Figure 3
Simple Dipole Antenna



EMERSON RADIO & PHONOGRAPH CORP.

MODELS CD206,CD215
Chassis CD
Schematic,Voltage
Alignment,Parts

A.C.-D.C. Long and Medium-Wave T.R.F. Receiver



Voltage rating ......105 to 125 volts
Power consumption ..45 watts
Frequency range ....535 to 1650 kc
366 to 143 kc

MODEL CD-206
CD-215
CHASSIS MODEL CD

Tube Data

The tube complement is as follows:
1—6D6, r-f amplifier.
1—6C6, biased detector.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.
1—L55BG, ballast tube.
Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

When ordering replacement parts specify part number

*Item number locates the article on the schematic diagram.

List Price as Effective as of Nov. 1st, 1938 (Subject to change without notice.)

*Item	Part No.	DESCRIPTION	PRICE
T1	3TT-409	Two-band antenna coil	$ .65
T2	3TT-410	Two-band detector coil	.65
R1	2VR-219E	Volume control, 75,000 ohms, with line switch	.90
R2	3CR-294	240 ohm, ½ watt wire-wound resistor	.16
	L55-BG	Plug-in ballast tube	.55
R4	KR-63U	15,000 ohm, ¼ watt carbon resistor	.16
R5	HR-42U	2 megohm, ¼ watt carbon resistor	.16
R6, R7	KR-56U	500,000 ohm, ¼ watt carbon resistor	.16
R8	3QR-297	110 ohm, ½ watt wire-wound resistor	.16
C1	KC-58	0.01 mf, 400 volt tubular condenser	.20
C2, C3	5MC-399	Two-gang variable condenser	3.55
C4, C5		Trimmers, part of variable condenser, not supplied separately.	
C6, C9	AC-6	0.1 mf, 200 volt tubular condenser	.20
C7	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C8	5AC-388	0.25 mf, 100 volt tubular condenser	.20
C10	LC-65	0.02 mf, 400 volt tubular condenser	.20
C11	3AC-278	Trimmer for long-wave interstage coil	.15
C12	LC-64	0.05 mf, 400 volt tubular condenser	.20
C13, C14	4DC-345A	Dual 16 mf, 150 volt dry electrolytic condenser	1.20
C15	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C16	NC-70A	0.0002 mf mica condenser	.20
	5BS-333	5" dynamic speaker	3.90
	3TS-223A	Wave-band switch	.55
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	4XM-367	Drive pulley	.10
	5MZ-829	Dial crystal	.10
	5MZ-830	Drive shaft and pulley	.10
	4MZ-588B	Dial pointer	.20
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	6DD-63	Dial face	.15

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

Tube	*Plate*	*Screen*	*Cathode*	*Fil.*
6D6	100	100	2.3	6.3
6C6	20	15	2.1	6.3
25L6G	93	100	6	25.0

Voltage across speaker field—26 volts.

25Z5 cathode to ground—126 volts.

ALIGNMENT PROCEDURE

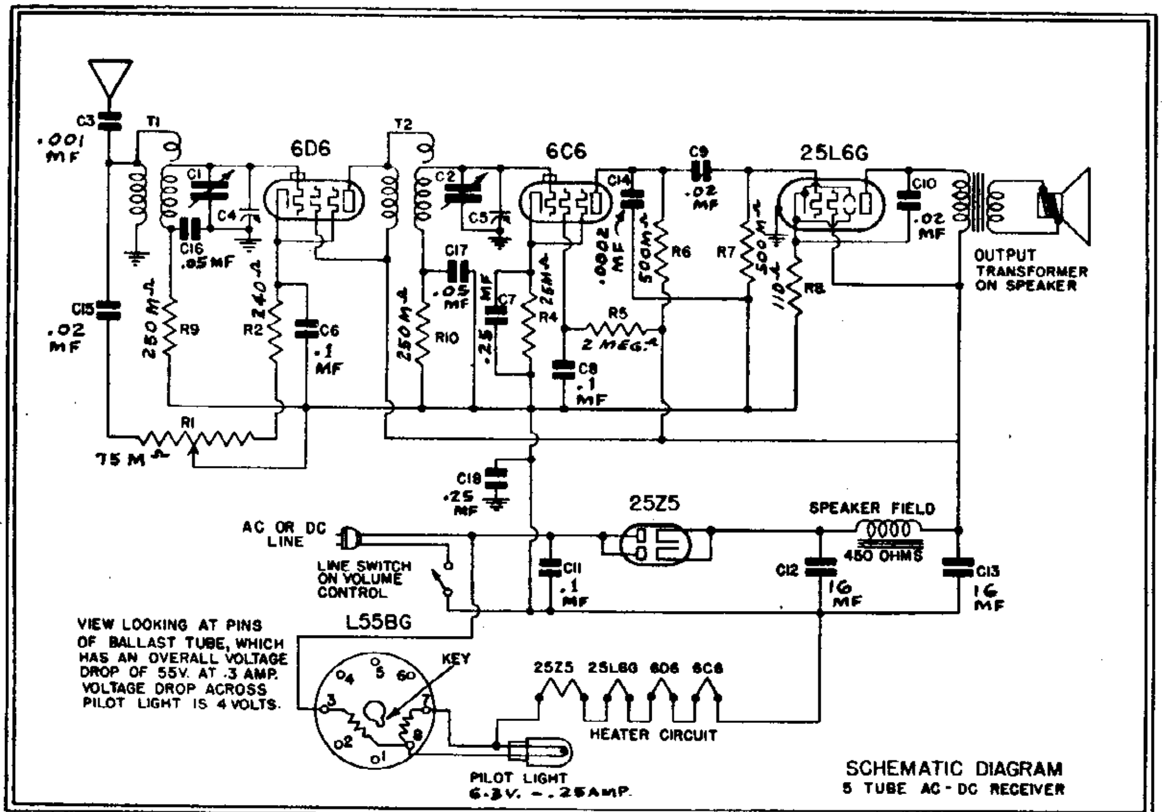
An oscillator with frequencies of 1500 kc and 350 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 550. Rotate band-switch clockwise to broadcast (medium-wave) position. Then rotate the variable condenser until the pointer is at 200 and feed 1500 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

Turn wave-band switch counter-clockwise to long-wave position. Rotate variable condenser until pointer is at 350 and feed 350 kc to antenna. Adjust the long-wave interstage coil trimmer for maximum output. Return to broadcast and repeat entire procedure. The long-wave trimmer is located beneath the chassis and is reached from the right end of the chassis.

EMERSON RADIO & PHONOGRAPH CORP.



SCHEMATIC DIAGRAM FOR MODELS BX-208 and BX-209

PREADJUSTMENT OF STATION BUTTONS

For complete instruction for "Preadjustment of Station Buttons" see MODEL CA-208

TUBE DATA

The tube complement is as follows:

1—6D6, r-f amplifier.
1—6C6, biased detector.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.
1—L55BG, ballast tube.

Voltage rating .... 105 to 125 volts, a.c. or d.c.
Power consumption .... 45 watts.
Frequency range .... 540 to 1730 kc.

Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

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Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

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6C6	20	15	2.1	6.3
25L6G	93	100	6.0	25.0

Voltage across speaker field—26 volts.
25Z5 cathode to ground—126 volts.
Voltage across ballast tube (pins 3, 7)—55 volts.
Voltage across pilot light section (pins 7, 8)—4 volts.

The ballast resistor (L55BG on schematic) is in a special tube at the rear of the chassis. In normal operation this tube will become quite hot. For voltage drop specifications, see "Voltage Analysis" above.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

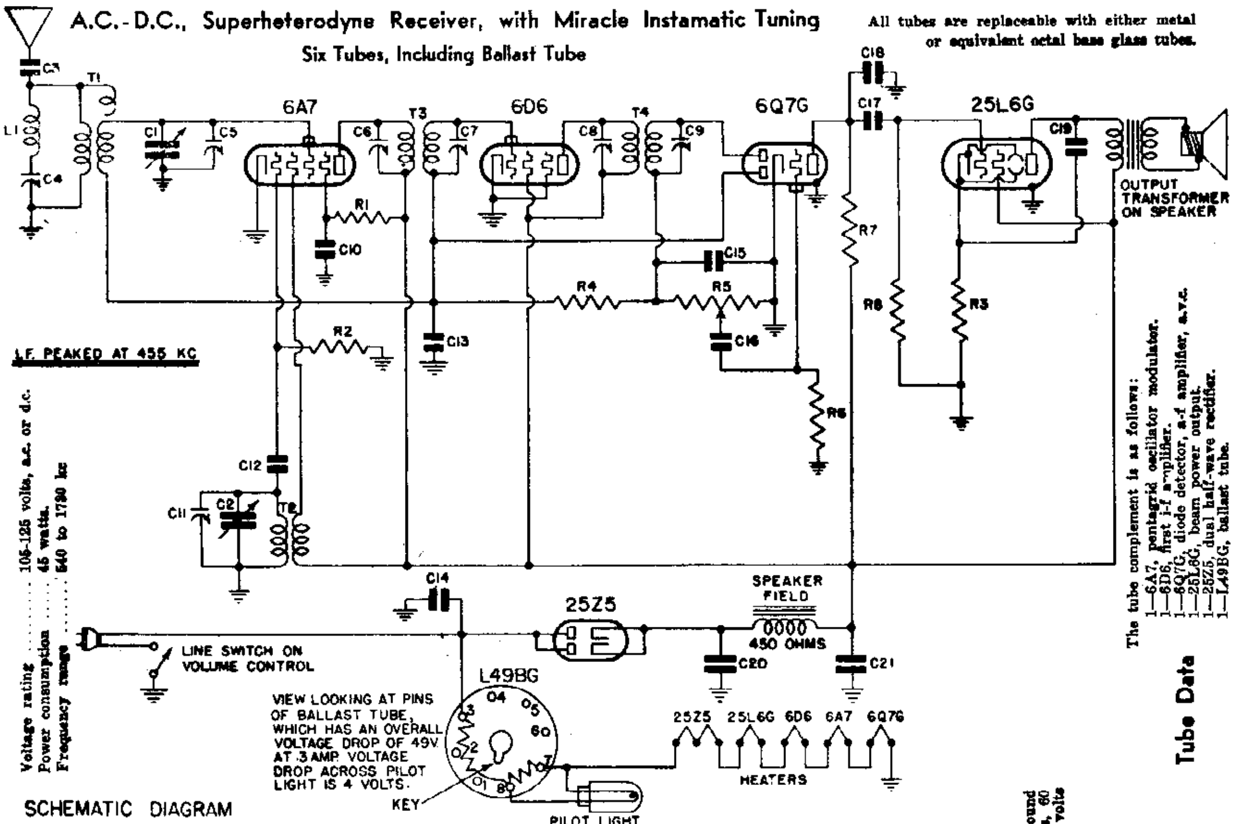
Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

Schematic, Voltage
Alignment, Notes EMERSON RADIO & PHONOGRAPH CORP.

MODELS CA208
CA209, CA234
Chassis CA

A.C.-D.C., Superheterodyne Receiver, with Miracle Instamatic Tuning
Six Tubes, Including Ballast Tube

All tubes are replaceable with either metal or equivalent octal base glass tubes.



Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption .... 45 watts.
Frequency range .... 540 to 1730 kc

SCHEMATIC DIAGRAM

MODELS CA-208, CA-209 and CA-234

CHASSIS MODEL CA

Tube Data

The tube complement is as follows:
1—6A7, pentagrid oscillator modulator.
1—6D6, first i-f amplifier.
1—6Q7G, diode detector, a-f amplifier, a.v.c.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.
1—L49BG, ballast tube.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
4. The color coding of the i-f transformer leads is as follows:
   Grid—green   Plate—blue
   Grid return—black   B plus—red.
5. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
   Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
6. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil on the top of the chassis beside the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the side of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid cap of the 6A7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 6.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathode and heaters were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	55	3	100	6.3
6D6	100	100	3	—	6.3
6Q7G	43	—	0	—	6.3
25L6G	92	100	5.5	—	25.0

Voltage at 25Z5 cathode—128 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube L49BG (pins 3, 7)—49 volts.
Voltage drop across pilot light section of ballast tube (pins 7, 8)—4 volts.

MODELS CA208, CA209
CA234 Chassis CA
Tuner Data, Parts

EMERSON RADIO & PHONOGRAPH CORP.

REPLACEMENT PARTS

List Price ea. Effective as of Sept. 15th. 1938 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
L1, T1	5YT-444	Antenna coil with adjustable 455 kc wave-trap	$ .90
T2	4XT-433	Oscillator coil	.35
T3	3RT-320C	Double-tuned 455 kc first i-f transformer	1.10
T4	3RT-321C	Double-tuned 455 kc second i-f transformer	1.10
R1	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
R4	KR-57	1 megohm 1/4 watt carbon resistor	.16
R5	2NR-214F	Volume control .25 megohm with line switch	.90
R6	4XR-327	15 megohm 1/4 watt carbon resistor	.16
R7	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R8	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
	L49-BG	Ballast resistor tube. (Interchangeable with L-49B)	.55
C1, C2	6AC-407	Two-gang variable condenser	2.35
C3	NNC-199	0.001 mf, 600 volt tubular condenser	.20
†C4		Trimmer, part of wave-trap assembly.	
†C5, C11		Trimmers, part of variable condenser.	
†C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	4XC-393A	0.00006 mf mica condenser	.20
C13	AC-6	0.1 mf, 200 volt tubular condenser	.20
C14	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C15, C18	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C16	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C19	3FC-336	0.025 mf, 400 volt tubular condenser	.20
C20, C21	4HC-348A	Dual 20 mf, 150 volt dry electrolytic condenser	1.00
	5BS-333	5" dynamic speaker	3.90
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	6AD-59	Dial face	.70
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	4MZ-588A	Dial pointer	.20
	3CZ-350B	Escutcheon with crystal	1.25
	6AM-414	Four-button mechanical tuning unit (complete with variable condenser)	6.15
	5BZ-835	Push-buttons	.05
	4VZ-763B	Celluloid push-button caps (set of 4)	.05
	4VZ-725	Station name-tab cards (complete set)	.65

*Item number locates the article on the schematic diagram.

†These condensers cannot be supplied separately.

When ordering replacement parts specify part number

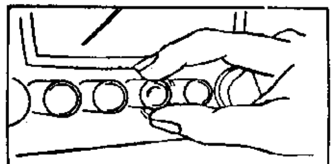


FIG.2 Loosen button by rotating counter-clockwise from 1/4 to 1/2 turn.

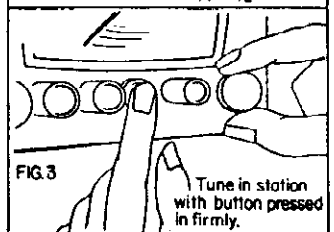


FIG.3 Tune in station with button pressed in firmly.

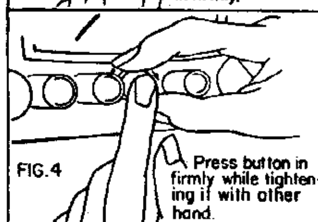


FIG.4 Press button in firmly while tightening it with other hand.

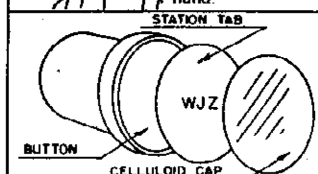


FIG.5 Insert station tab in button with celluloid cap over tab.

PREADJUSTMENT OF STATION BUTTONS

Select four nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Follow the procedure outlined below.

1. Loosen the push-button to be adjusted by rotating it counter-clockwise from 1/4 to 1/2 turn. See Fig. 2.

2. Push the button in as far as it will go and, holding it in firmly, tune in the desired station by means of the selector knob. See Fig. 3.

3. Hold button in with finger of one hand and tighten securely with the other hand. Release the button and tighten it further if possible. See Fig. 4.

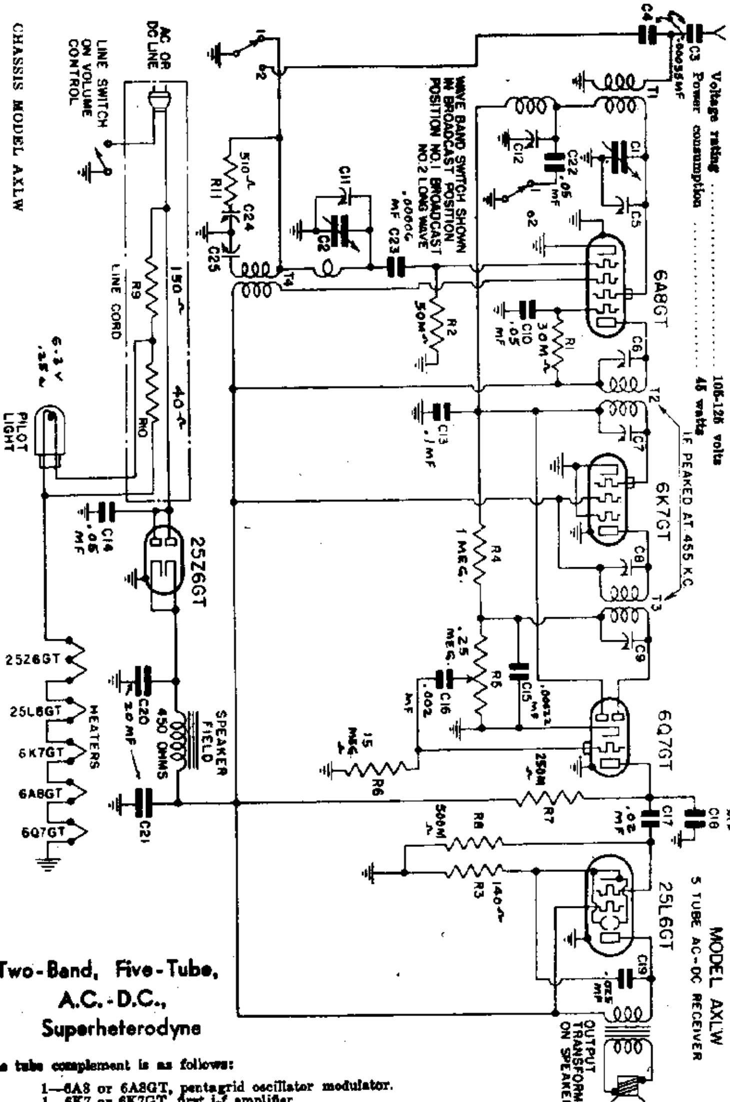
4. Remove the tab bearing the station call letters from one of the cards supplied in a separate envelope with the receiver. Insert the tab in the button, pressing it in firmly. Four celluloid caps are supplied in a separate envelope with the receiver. Snap one of these caps into the button over the station tab.

Check the adjustment of the button by detuning the station by means of the selector knob and then pressing the push-button in as far as it will go. The station should come back in clearly and with maximum volume.

Schematic, Voltage
Alignment, Notes

EMERSON RADIO & PHONOGRAPH CORP

MODELS AXLW2-212, -217, -2-237, -238, -2-257. Chas. AX



CHASSIS MODEL AXLW

Models AXLW-211, AXLW-212, AXLW-217, AXLW-235, AXLW-237, AXLW-238, AXLW-239 and AXLW-257

Frequency range
540 to 1650 kc (555 to 182 meters)
157 to 370 kc (1910 to 810 meters)

Two-Band, Five-Tube, A.C.-D.C., Superheterodyne

The tube complement is as follows:

1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R-9—see schematic is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
4. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red.
6. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-32. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
   Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
7. To remove the 6A8 tube from its socket, push up on its center pin from beneath the chassis.

TUBE DATA

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A8	100	55	0	100	6.3
6K7	100	100	0	—	6.3
6Q7	43	—	0	—	6.3
25L6	92	100	5.5	—	25.0

Voltage at 25Z6 cathode—125 volts.

Voltage across speaker field—28 volts.

ADJUSTMENTS

An oscillator with frequencies of 455, 1500, 350 and 172 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The two-band antenna coil is located directly behind the speaker. The trimmer for the broadcast antenna coil is located on the front section of the variable condenser. The trimmer for the long wave antenna coil is mounted on the top of the antenna coil form. The two-band oscillator coil is located underneath the chassis below the first i-f transformer. The trimmer for the broadcast oscillator coil is located on the rear section of the variable condenser. The trimmer and series padder (condensers C24 and C25 resp.) for the long wave oscillator coil are located beneath the chassis and can be reached from the bottom only. The section toward the rear of the chassis is C24, the shunt trimmer. The section toward the front of the chassis is C25, the series padding condenser.

I-f Alignment

Turn the band switch clockwise to broadcast position and swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Broadcast Alignment

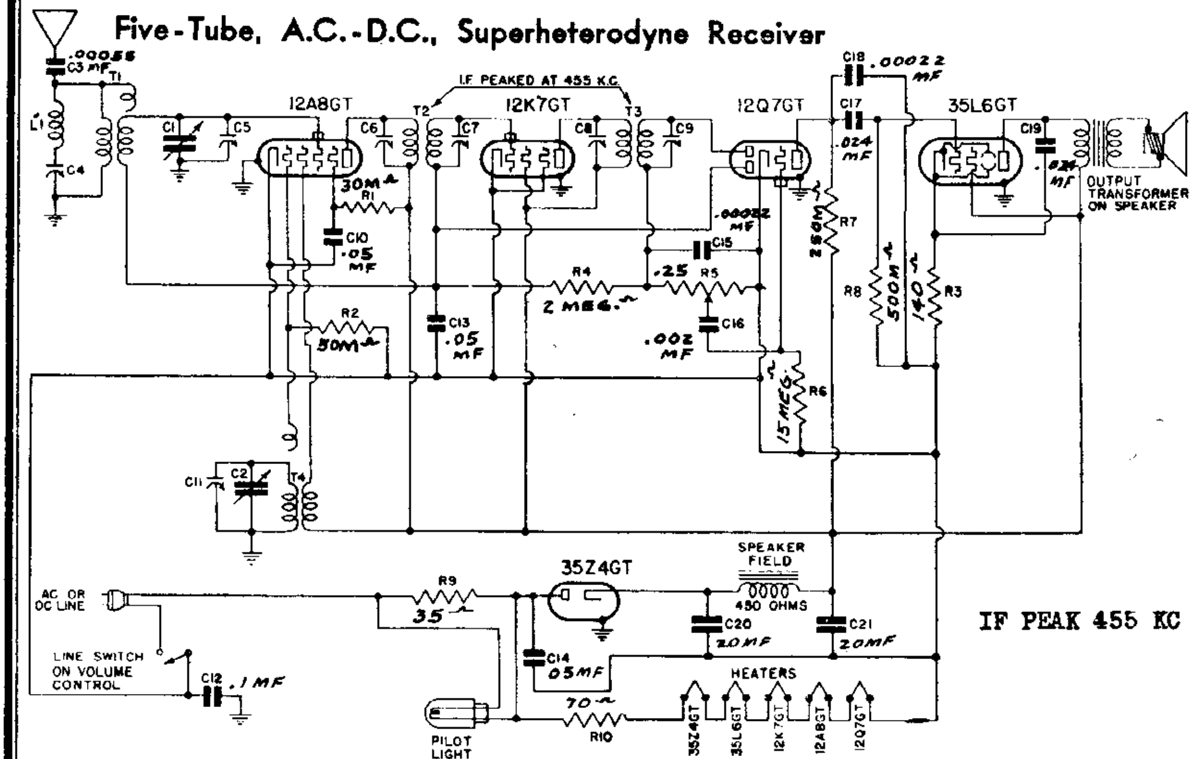
With the band switch in broadcast position set the dial pointer at 200. Feed 1500 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

Long Wave Alignment

Turn the band switch counter-clockwise to the long wave position. With the dial pointer set at 850, feed 350 kc through a .0001 mf condenser to the antenna and adjust first the oscillator trimmer (rear trimmer beneath the chassis), then the antenna trimmer (on antenna coil) for maximum response. Move the pointer to 1750, feed 172 kc, and adjust the series padder (front trimmer beneath the chassis), rocking the variable condenser back and forth while adjusting for maximum response. Return to 350 kc and repeat alignment.

MODELS CJ211, CJ217, CJ235
CJ257 Chassis CJ EMERSON RADIO & PHONOGRAPH CORP. Alignment. Schematic, Voltage

Five-Tube, A.C.-D.C., Superheterodyne Receiver



IF PEAK 455 KC

Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption .... 30 watts
Frequency range .... 540 to 1730 kc.

SCHEMATIC DIAGRAM FOR MODELS CJ-211, CJ-217, CJ-235 AND CJ-257 CHASSIS MODEL CJ

The tube complement is as follows:

1—12A8 or 12A8GT, pentagrid oscillator modulator.
1—12K7 or 12K7GT, first i-f amplifier.
1—12Q7 or 12Q7GT, diode detector, a-f amplifier a.v.c.
1—35L6 or 35L6GT, beam power output.
1—35Z4 or 35Z4GT, half-wave rectifier.

The color coding of the i-f transformer leads is as follows:

Grid—green　　Plate—blue
Grid return—black　　B plus—red.

Location of Coils and Trimmer Adjusfments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
12A8	94	50	0	94	12
12K7	94	94	0	—	12
12Q7	40	—	0	—	12
35L6	87	94	5.2	—	35

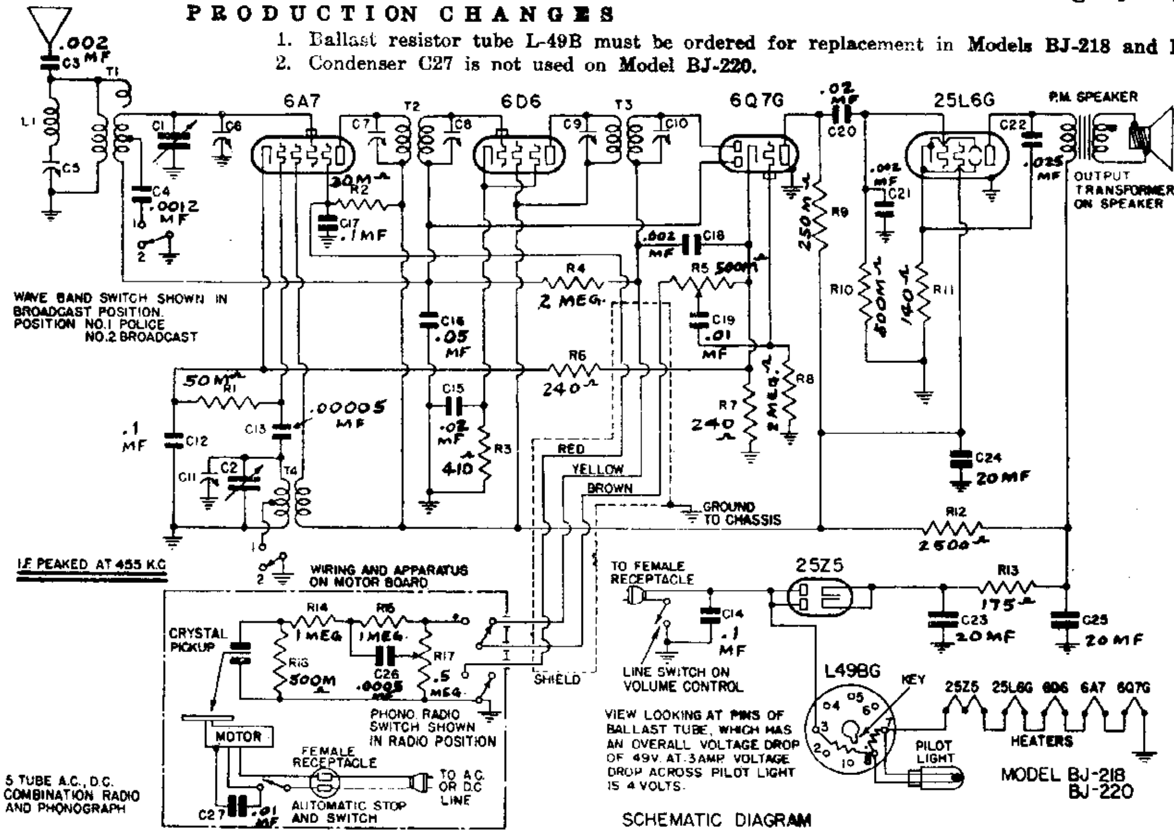
Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

MODELS BJ218,BJ220
Chassis BJ
Schematic,Voltage
Changes,Alignment

EMERSON RADIO & PHONOGRAPH CORP.

PRODUCTION CHANGES

1. Ballast resistor tube L-49B must be ordered for replacement in Models BJ-218 and BJ-220.
2. Condenser C27 is not used on Model BJ-220.



SCHEMATIC DIAGRAM

Voltage rating .... 105 to 125 volts, a.c. or d.c.
Power consumption .... 43 watts for receiver. 30 watts for phonograph motor.
Frequency ranges .... 540 to 1580 kc and 1580 to 4200 kc.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna.

The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B plus—red

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for *minimum* response. (See General Note No. 7.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

The police band is self-tracking and does not require any adjustment.

NOTE: The Model BJ-200 should be aligned with the chassis bottom plate in place.

The tube complement is as follows:
1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7G diode detector, a-f amplifier, a.v.c.
1—25L6G beam power output.
1—25Z5 dual half-wave rectifier.
1—L-49B

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale.

MODELS BJ-218 and 220

Plate	*Screen*	*Cathode*	*Osc. Plate*	*Heaters*	
84	46	2.0	84	6.3	Voltage at 25Z5 cathode—130 volts.
84	84	2.8	—	6.3	Voltage across speaker field (Models BJ-200, 210 and 214)—28 volts.
35	—	1.0	—	6.3	Voltage drop across ballast tube L-49BG (pins nos. 3, 7)—49 volts.
115	84	5.5	—	25	Voltage drop across pilot light section (pins nos. 7, 8)—4 volts.

MODELS BL218, BL220
Chassis BL
Schematic, Voltage

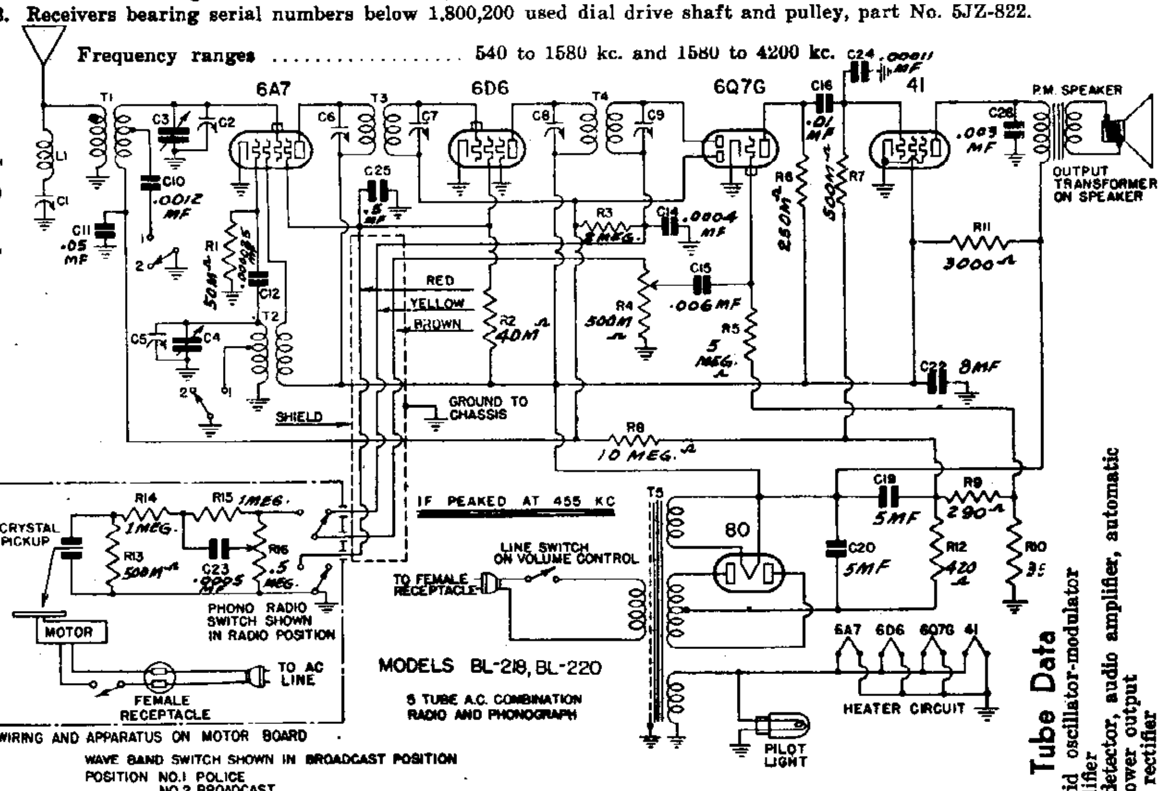
EMERSON RADIO & PHONOGRAPH CORP. Changes, Alignment

PRODUCTION CHANGES

1. In receivers used in phonograph combinations:
R2 is 40,000 ohms 1 watt, part No. 2NR-217
2. Receivers bearing serial numbers below 1,802,875 used a 0.00006 mf mica condenser, part No. 4XC-393A, at C12.
3. Receivers bearing serial numbers below 1,800,200 used dial drive shaft and pulley, part No. 5JZ-822.

Frequency ranges .... 540 to 1580 kc. and 1580 to 4200 kc.

Power consumption
45 watts for receiver,
20 watts for phonograph motor.



Voltage rating
105-125 volts, 60 cycles, a.c.

Tube Data
1—6A7 pentagrid oscillator-modulator
1—6D6 i-f amplifier
1—6Q7G diode detector, audio amplifier, automatic
1—41 pentode power output
1—80 full-wave rectifier

The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. To readjust the speed remove the turn-table and turn the speed adjusting screw (located near the turn-table shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position. The stroboscope method will work only when the neon lamp is connected to a 60 cycle, a.c. supply.

The color coding of the leads of the i-f transformers, is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red

The color coding of the power transformer leads is as follows:

Primary—two black leads	6.3 v. sec.—two heavy green leads
High voltage sec.—two red leads	5 v. sec.—two heavy yellow leads
High voltage sec. center tap—red and yellow lead	

With a few exceptions, the color coding of the general wiring is as follows:

Plate—blue	A.v.c. and cathode—white or yellow
B plus—red	Grid—green
Screen—brown	Filament and ground—black

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna.

The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for *minimum* response. (See General Note No. 1.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

The police band is self-tracking and does not require any adjustment.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters were taken on 250 volt scale.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	182	70	0	182	6.3 a.c.
6D6	182	70	0	—	6.3 a.c.
6Q7	87	—	0	—	6.3 a.c.
41	*165	182	0	—	6.3 a.c.

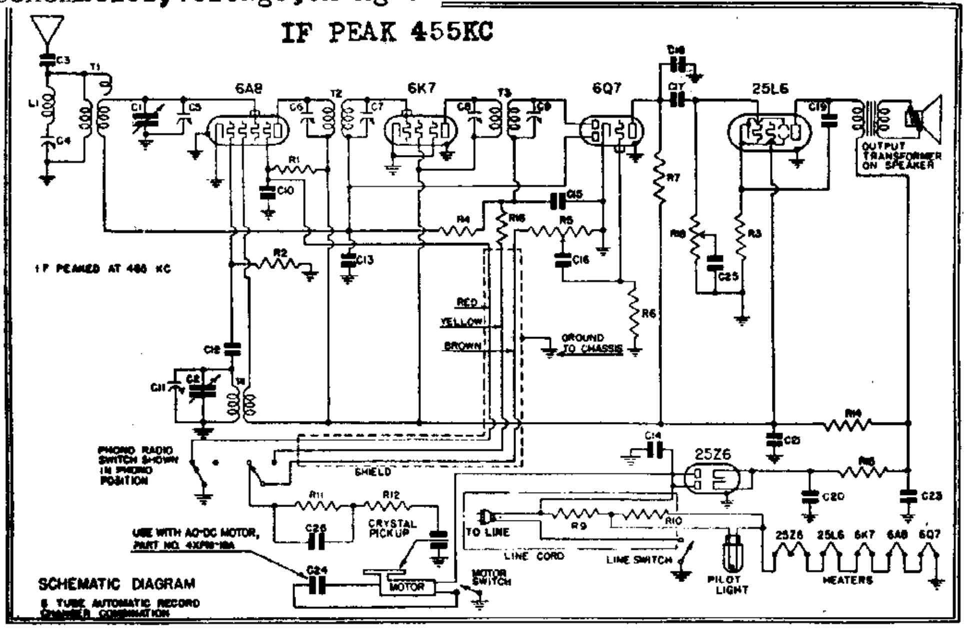
Voltage across speaker field (Models 200, 210 and 214)—70 volts.
Voltage from B minus to chassis (Models 200, 210 and 214)—80 v
Voltage from B minus to chassis (Models 218 and 220)—54 volts.
B plus at 80 tube filament (Models 200, 210 and 214)—182 v
B plus at 80 tube filament (Models 218 and 220)—232 volts.
*Voltage at 41 tube plate in Models 218 and 220 is 220 volts

MODELS AX221 A
AX221 AC-DC
AX222,AX232 AC
AX232 AC-DC

Chassis AX
Schematics, Voltage, Changes

EMERSON RADIO & PHONOGRAPH CORP.

IF PEAK 455KC

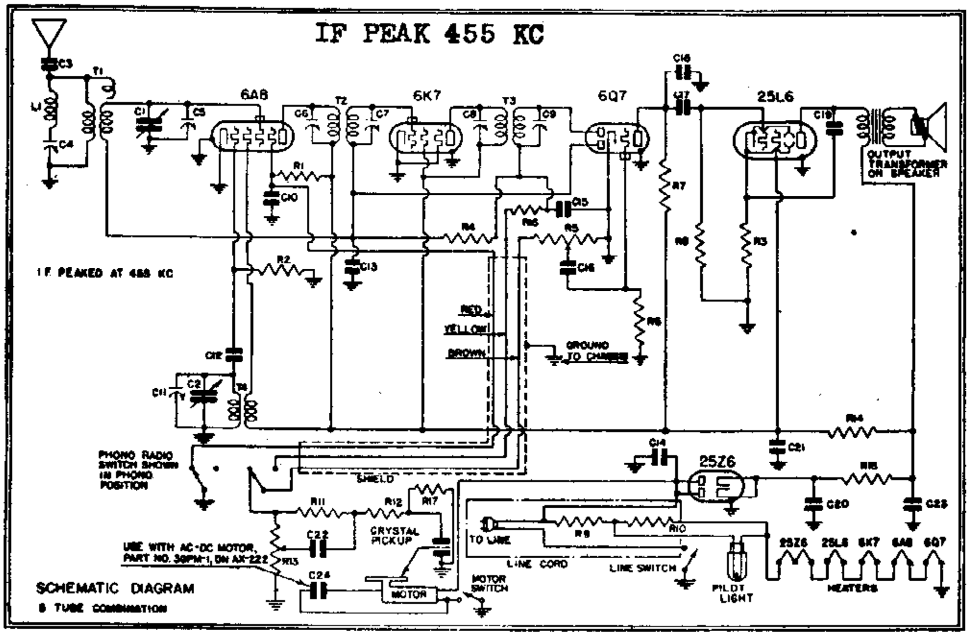


MODELS AX-232 AC and AC-232 AC-DC

CHASSIS MODEL AX

FOR RECORD CHANGER DATA SEE INDEX

IF PEAK 455 KC



MODELS AX-221 AC, AX221 AC-DC and AX-222

CHASSIS MODEL AX

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. Measurements made with 117.5 volts d.c. will be lower than those given below.

Voltage rating	105-125 volts
Power consumption	45 watts for receiver 10 watts for 219 motor 20 watts for 221 a.c. or 232 a.c. motors 30 watts for 221 a.c.-d.c., 222, and 232 a.c.-d.c. motors
Frequency range	540-1730 kc.

MODELS AX-221, AX-222, and AX-232

Plate	Screen	Osc.	Cathode	Heaters
82	44	82	0	6.3
82	82	—	0	6.3
35	—	—	0	6.3
115	82	—	5.5	25

Voltage at 25Z6 cathode—135.

Tube Data

The tube complement is as follows:

1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier, a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

All tubes are replaceable with either metal or equivalent bantam glass tubes.

PRODUCTION CHANGES

AX-221 and AX-222 chasses bearing serial numbers below 1,890,976 do not have R16, 100,000 ohm resistor, connec in series with the yellow lead to phono-radio switch.

AX-221 and AX-222 chasses bearing serial numbers below 1,914,451 do not contain resistor R17.

On model AX-222 a 0.01 mf, 400 volt condenser is connected from B plus to the speaker frame. Another 0.01 condenser is connected from the motor mounting plate to ground.

AX-221 and AX-222 chasses below serial number 1,921,165 have a 210 ohm, ½ watt wire-wound resistor at R15.

MODELS AX221 AC
AX221 AC-DC
AX222, AX232 AC
AX232 AC-DC

EMERSON RADIO & PHONOGRAPH CORP.

Chassis AX
Alignment, Notes
Parts

Combination Phonograph and Five-Tube Superheterodyne

MODEL AX-221AC (For Operation on AC Only)
MODEL AX-221AC-DC (For Operation on Either AC or DC)
MODEL AX-222 (AC-DC Portable)
MODEL AX-232AC (Automatic Record Changer—For AC Only)
MODEL AX-232AC-DC (Automatic Record Changer—For AC or DC)

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†Not supplied separately.

REPLACEMENT PARTS

List Price as Effective as of Aug. 1st, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
L1, T1	4XT-432	Antenna coil with adjustable 455 kc wave-trap	$ .90
T2	4XT-434	Double-tuned 455 kc first i-f transformer	1.10
T3	4XT-435	Double-tuned 455 kc second i-f transformer	.85
T4	4XT-433	Oscillator coil	.85
R1	2CR-193	30,000 ohm ½ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R4, R17	KR-57	1 megohm ¼ watt carbon resistor	.16
R5	4XR-335	Volume control .25 megohm with line switch	.90
R6	4XR-327	15 megohm ¼ watt carbon resistor	.16
R7	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R9, R10	4XW-112	Resistance line cord with pilot light ballast section. R9—150 ohms; R10—40 ohms	.85
R13	4LR-312B	Tone control .5 megohm with motor line switch	1.05
R14	4XR-334	2,500 ohm 1 watt carbon resistor	.16
R15	4ZR-325	175 ohm 1 watt metallized resistor. (See prod. change No. 4.)	.16
R16	KR-54	100,000 ohm ¼ watt carbon resistor. (See prod. change No. 1.)	.16
R18	4XR-342	Tone control .5 megohm	.70
C1, C2	4XC-391A	Two-gang variable condenser (for 219 and 221)	2.40
C1, C2	4XC-412	Two-gang variable condenser (for 222 and 232)	2.75
C3	4XC-401	0.00055 mf mica condenser	.20
†C4		Trimmer, part of wave-trap assembly.	
†C5, C11		Trimmers, part of variable condenser.	
†C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10	BC-12	0.05 mf, 200 volt tubular condenser	.30
C12	4XC-393A	0.00006 mf mica condenser	.30
C13	AC-6	0.1 mf, 200 volt tubular condenser	.20
C14	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C15, C18	4XC-394A	0.00022 mf mica condenser	.20
C16	3HC-274	0.002 mf, 600 volt tubular condenser	.30
C17	LC-65	0.02 mf, 400 volt tubular condenser	.30
C19	3FC-336	0.025 mf, 400 volt tubular condenser	.30
C20, C21	4HC-348B	Dual 20 mf, 150 volt dry electrolytic condenser	.80
C22	IC-47A	0.0005 mf mica condenser	.30
C23	4XC-404	20 mf, 135 volt dry electrolytic condenser	.65
C24	3LC-297A	0.01 mf, 400 volt molded condenser (used only with ac-dc motors)	.30
C25	HC-34	0.006 mf, 600 volt tubular condenser	.30
C26	4VC-371A	0.0003 mf mica condenser	.30
	TTS-111S	Phono-radio switch	.35
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.30
	4YZ-772	Drive cord	.02
	5JZ-824	Drive cord spring	.05
	4XZ-811A	Drive shaft	.05
	4XZ-816	Dial face fasteners	.01
	3LM-253	Needle cup (for 219 and 221)	.30
	3GM-251	Needle cup (for 222)	.75
	4MZ-588B	Dial pointer (for 221, 222 and 232)	.30
	4XE-3	Dial crystal (for 221, 222 and 232)	.30
	4XD-51	Dial face (for 221, 222 and 232)	.55
	4PS-303A	6½" permanent magnet dynamic speaker (used on 221, 222 and 232)	6.70

ADDITIONAL PARTS USED ON AX-219

R11, R12	KR-56	500,000 ohm ¼ watt carbon resistor	.16
	4XPM-15 or	A.C. synchronous motor	12.20
	4XPM-20	A.C. self-starting motor	12.65
	4XZ-850 or	Crystal pick-up (metal tone arm)	9.85
	4XC-411	Crystal pick-up (wooden tone arm)	9.30
	4XS-324A	4" dynamic speaker	3.70
	4XE-1	Dial crystal	.10
	4XZ-810B	Dial face	.20
	4XZ-812B	Dial pointer	.02

ADDITIONAL PARTS USED ON AX-221 and AX-222

R11, R12	KR-57	1 megohm ¼ watt carbon resistor	.16
	3LPM-3	110 volt, a.c. motor (for 221-AC)	21.35
	3GPM-1	AC-DC motor (for 221AC-DC and 222)	48.30
	4RZ-788A	Crystal pick-up	11.35

ADDITIONAL PARTS USED ON MODEL AX-232

R11, R12	KR-56	.5 megohm ¼ watt carbon resistor	.16
	4XPM-19A	117 volt, ac-dc phonograph motor (for AX-232 AC-DC)	66.00
	4XPM-19	117 volt, ac phonograph motor (for AX-232 AC)	42.60
	4XW-130	Record holder block	.60

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R-9—see schematic) is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
4. In operating the a.c.-d.c. combinations on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red.
6. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
   Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
8. The receivers in these combinations are of the a.c.-d.c. type. The motors, however, in models 219, 221AC and 232AC are of the AC ONLY type and will be damaged if the combination is used on direct current.
9. To remove the 6A8 tube from its socket, push up on its center pin from beneath the chassis.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same from as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

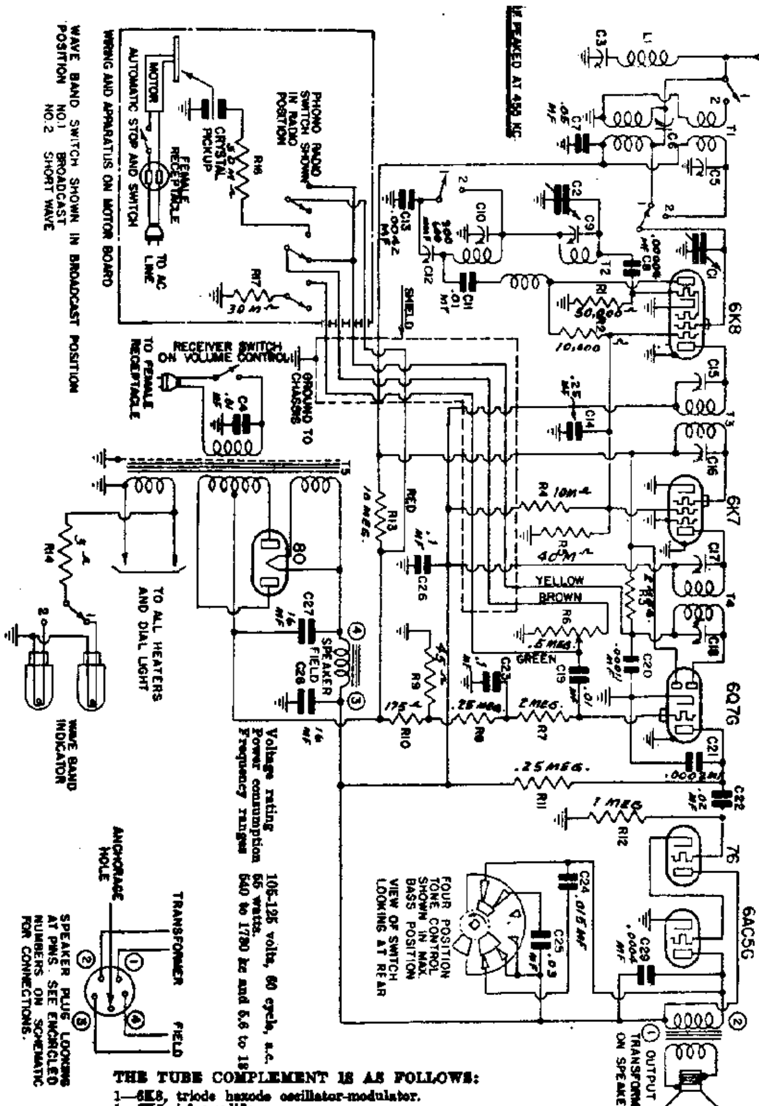
Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for minimum response. (See General Notes, paragraph No. 7.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

EMERSON RADIO & PHONOGRAPH CORP

MODEL BQ223
Chassis BQ
Schematic, Voltage
Changes, Alignment



THE TUBE COMPLEMENT IS AS FOLLOWS:
1—6K8, triode hexode oscillator-modulator.
1—6K7, i-f amplifier.
1—6Q7G, diode detector, audio amplifier and a.v.a.
1—76, audio amplifier.
1—6AC5G, power output.
1—80, full-wave rectifier.

FOR PREADJUSTMENT OF STATION PUSHBUTTONS SEE MODEL BR 224.

PRODUCTION CHANGE

The colors of leads in the cable to the phono-radio switch on chasses bearing serial numbers below 1876210 are as follows:

blue to diode; red to high side of volume control; green to arm of volume control; black to B minus. These changes are easily distinguishable by the presence of a blue lead in the cable.

The color coding of the i-f transformers is as follows:

Grid—green — Grid return—black
B plus—red — Plate—blue.

The color coding of the power transformer is as follows:

Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder, C13 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.

The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. To readjust the speed remove the turntable and turn the speed adjusting screw (located near the turntable shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6K8	215	100	0	75	6.3 a.c.
6K7	215	100	0	—	6.3 a.c.
6Q7G	100	—	0	—	6.3 a.c.
76	215	—	11	—	6.3 a.c.
6AC5G	195	—	0	—	6.3 a.c.

Voltage at 80 filament to B minus (center tap of high voltage winding on power transformer)—300 volts.
Voltage across speaker field—70 volts.
The grid bias for all tubes is developed across resistors R-9 and R-10 (see schematic). The total voltage measured across R-9 and R-10 should be 12 volts.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in front of the 76 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands and the 455 kc wave-trap are wound on one form and mounted underneath the chassis deck near the 76 tube socket. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 455 kc wave-trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and are mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through holes in the rear of the chassis. The trimmer farthest from the end of the chassis is for short-wave and trimmer closest to the end of the chassis is for broadcast.

I-f and Wave-Trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6K8 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a 0.0002 mica condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on right side of the chassis) for *minimum* response. (See General Note No. 6.)

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment.)

Since the dial indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the dial assembly plate and bent over to form a dial pointer when the chassis is removed from the cabinet. Set pointer at extreme low-frequency end of dial with condenser closed.

Use a 400 ohm dummy antenna (a 400 ohm non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coils. Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial exactly at 16 megacycles. Feed 16,000 kc to the antenna and adjust the short-wave oscillator trimmer (farthest from end on rear chassis wall) for maximum response, and then adjust the short-wave antenna trimmer (nearest the front on the right side of the chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment

By adding a cipher to each figure on the broadcast band calibration, this scale can be made to read directly in kilocycles.

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be substituted.) Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial at 60 and feed 600 kc. Adjust the broadcast series padder (in corner near 76 tube) for maximum response. Move the dial to 160 and feed 1600 kc. Adjust the broadcast oscillator trimmer (closest to end on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at right side of chassis). Return dial to 60, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

MODELS BR224
BR224A.Ch.BR
Voltage
Alignment

EMERSON RADIO & PHONOGRAPH CORP.

MODEL BQ223
Chassis BQ
Tuner Data

VOLTAGE ANALYSIS

CHASSIS BR

†Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control full on, band-switch in short-wave position (counter-clockwise) and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings below 250 volts, except heaters and cathodes, were taken on 250 volt scale.

Tube	Plate	Screen	Osc. Plate	Cathode	Fil.
6K7 r-f amplifier	230	‡100	—	5	6.3 a.c.
6K8 oscillator-modulator	225	‡100	100	4.2	6.3 a.c.
6K7 i-f amplifier	215	‡100	—	4.5	6.3 a.c.
6Q7 diode detector, a.v.c. first audio	170	—	—	2.1	6.3 a.c.
6J5 phase inverter	130	—	—	4.2	6.3 a.c.
6J5 first audio driver	280	—	—	9	6.3 a.c.
6J5 inverted audio driver	280	—	—	9	6.3 a.c.
4—6AC5G's output	275	—	—	0	6.3 a.c.

Voltage across speaker field—65 volts.
Voltage at 80 filament—350.

†Model BR chasses using 3XS-237 speaker will have voltages approximately 10 percent lower. Voltage across this speaker field is 80 volts.

‡When band-switch is in broadcast and police positions the screen voltages will read 65 volts. Bias readings on these tubes will be slightly lower.

Location of Coils and Trimmer Adjustments

The i-f transformers are located at the back of the chassis. The first i-f transformer is the one near the electrolytic condenser. The six trimmers for i-f alignment are available through holes in the tops of the cans.

The antenna coils for the three bands are wound on one form located on the front wall of the chassis with the trimmers accessible through holes in the chassis. The right-hand trimmer is for the broadcast band, the left-hand trimmer is for the short-wave band and the central trimmer is for the police band.

The r-f interstage coils are wound on one form and are mounted underneath the chassis to the left of the wave-band switch. The trimmers are available through holes in the top of the chassis. The trimmer closest to the front of the chassis is for the broadcast band. The trimmer farthest from the front is for the short-wave band. The central trimmer is for compensating the short-wave band at 6 mc.

The oscillator coils are wound on one form and mounted underneath the chassis directly behind the wave-band switch. The trimmers are accessible through holes in the top of the chassis. The trimmer closest to the band-switch is for the broadcast band, the trimmer farthest from the band-switch is for the short-wave band and the central trimmer is for the police band.

The oscillator series padder for the broadcast and police bands are mounted underneath the chassis near the interstage coils. The adjusting screws are available through holes in the top of the chassis. The padder nearest the front of chassis is for the police band. The padder for the short-wave band is a fixed mica condenser, C9 on the schematic diagram. If this condenser is to be replaced use a condenser with a value within 2% of that specified.

I-f Alignment

Set the wave-band switch at the broadcast (clockwise) position, and the variable condenser at minimum capacity. Feed 455 kc to the grid of the 6K7 i-f amplifier tube through a .02 mf condenser. (Do not remove the grid clip from the tube.) Examine the trimmer screws and locate the screw which is painted red. Screw this trimmer down as far as it will go. Adjust the other two trimmers for maximum response and then adjust the red trimmer for maximum response. Do not readjust the other two trimmers. Now feed 455 kc to the grid of the 6K8 tube and repeat same procedure on the first i-f transformer. Do not touch the adjustment of the second i-f transformer. Failure to follow this procedure may result in impairment of the fidelity of the receiver.

Broadcast Alignment

Since the indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the dial drive assembly-plate and bent over to form an indicator when the chassis is removed from the cabinet. Set indicator at extreme low frequency end of dial with condenser closed.

Set the wave-band switch at the broadcast (clockwise) position, and the dial at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the dial to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the interstage and antenna coil trimmers for maximum response. Reset the dial at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Police Alignment

Set the wave-band switch at the police-band (central) position and the dial at 1.8. Feed 1800 kc to the antenna (using a .0001 mf dummy antenna) and adjust the police-band series padder for maximum response. Move the dial to 6.0, feed 6000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Note the interstage coil on this band has no trimmer adjustment. Return the dial to 1.8, feed 1800 kc to the antenna and rock the variable condenser while readjusting the series padder for maximum response. Return to 6000 kc and check alignment. If readjustment is necessary return to 1800 kc and repeat entire procedure.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the interstage and antenna coil trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak. Move the dial to 6 mc, feed 6000 kc to the antenna and adjust the r-f interstage trimmer (central trimmer at left of band-switch) for maximum response.

MIRACLE INSTAMATIC TUNING

Preadjustment of Station Push-buttons

FOR CHASSIS BQ

The six push-buttons provide a choice of six favorite broadcast stations for Miracle Instamatic Tuning. Adjustments for any particular station must be made by means of the small cross-slotted button immediately below the chosen push-button. The following procedure must be carefully observed in making these adjustments:

1. Insert the line plug in the electrical outlet. Turn the receiver on by rotating the tone control knob clockwise until the switch is heard to click and then rotate this knob to the extreme clockwise position. Wait about a minute for the tubes to warm up. Turn the wave-band switch to the broadcast position, clockwise. Turn the volume control clockwise to about half of its full rotation.

2. Select six nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Find the station call letters on one of the four cards supplied in an envelope with the receiver. Push out the circular tab bearing the station call letters from the card and press it in the depression in the front face of the push-button. Insert one of the clear celluloid discs, which are supplied in a separate envelope, over the station tab in the push-button. Press this disc in firmly. See Fig. 4.

3. Push in the manual selector knob (second from right). When pushing in the selector knob or one of the push-buttons best results are obtained by using a firm rapid action.

4. With the selector knob depressed tune in the desired station. Rotate the selector knob until the mark on the dial face corresponding approximately to the frequency of the station appears at the black indicator line on the conical escutcheon window. Identify the station and note the approximate position of the dial face.

5. Push in the button to be adjusted for this station. See Fig. 1.

6. Insert a small thin coin in one of the slots of the adjusting button immediately below the push-button. Turn the adjusting button until the mark on the dial face corresponding approximately to the frequency of the station again appears at the black indicator line on the conical escutcheon window. Once the station is heard, tune it in carefully by turning the adjusting button back and forth slowly. From the standpoint of performance it is of paramount importance to tune in the station accurately. See Fig. 2.

7. It is very important, when tuning in a station by means of the adjusting button, that the last turning motion of the adjusting button be in the counter-clockwise direction, as indicated in Fig. 3.

8. Check the results by moving the dial face, using the selector knob, to a different position and then pushing in the button. The station should be received clearly and with maximum volume.

9. Adjust the remaining buttons, one at a time, following the procedure outlined above.

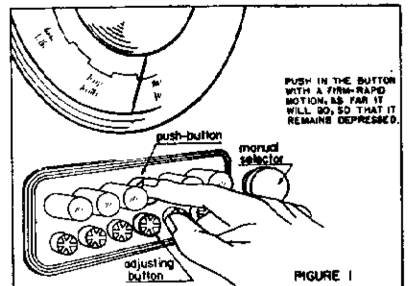


FIGURE 1

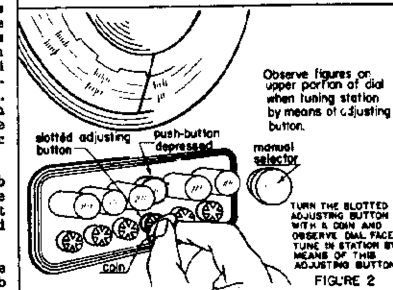


FIGURE 2

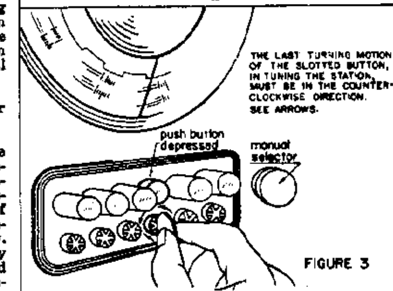


FIGURE 3

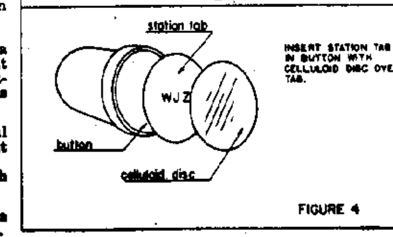
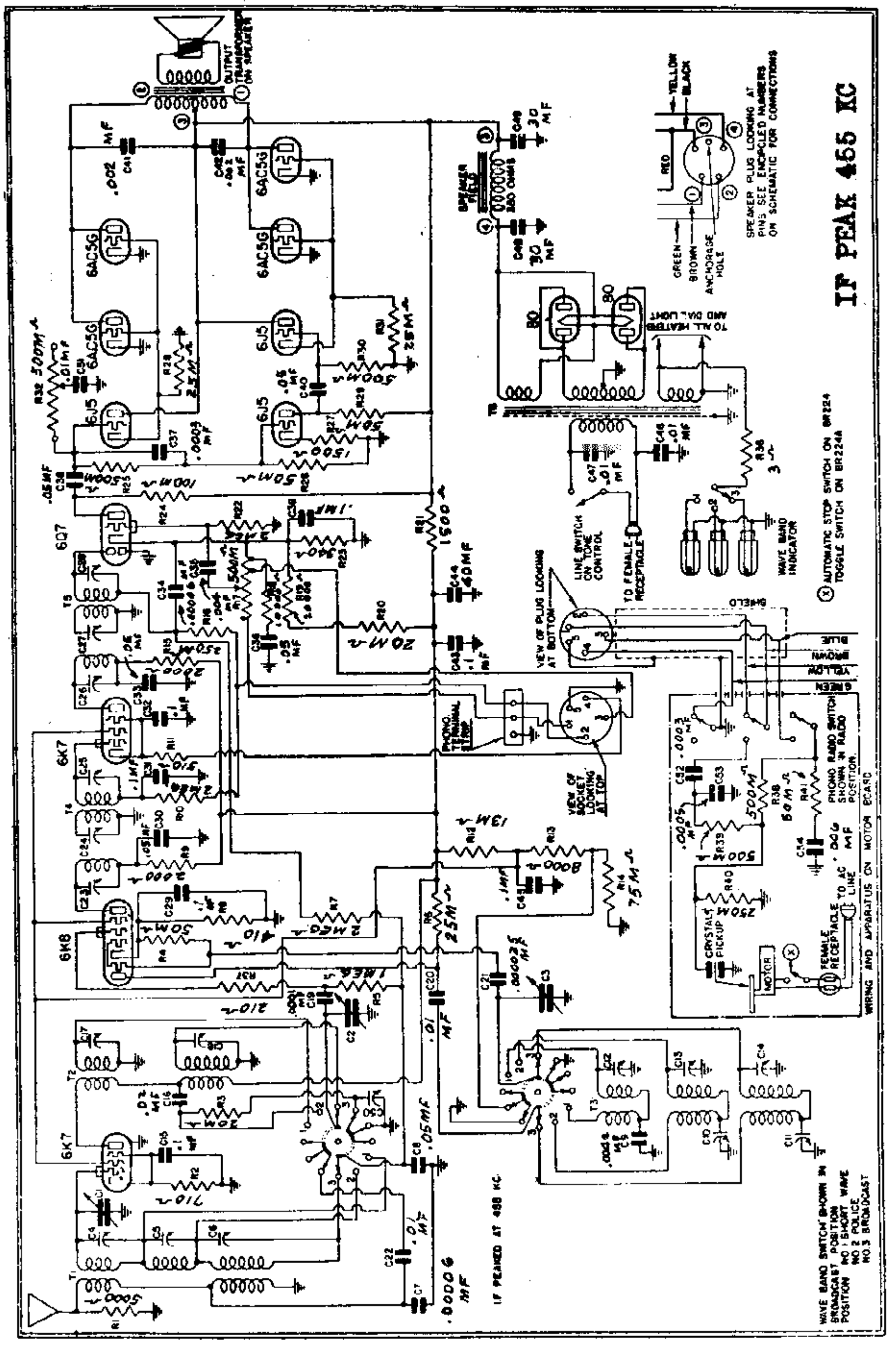


FIGURE 4

EMERSON RADIO & PHONOGRAPH CORP.

MODELS BR224
BR224A
Chassis BR
Schematic, Notes



GENERAL NOTES

1. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
2. The color coding of the power transformer leads is as follows:
   - Primary—two black leads
   - High voltage sec.—two red leads
   - High voltage secondary center tap—red and yellow leead
   - 6.3v sec.—two heavy green leads
   - 5v sec.—two heavy yellow leads
3. The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. The stroboscope method will work only when the neon bulb is lighted from a 60 cycle a.c. supply. To readjust the speed on Model BR-224, remove the turntable and turn the speed adjusting screw (located near the turntable shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.

   To readjust the speed on Model BR-224A, remove the record and set the turntable by turning it slowly to give access to the speed regulator screw through a hole in the turntable. Adjust in same manner as BR-224.

TUBE DATA

Voltage rating	105-125 volts, 60 cycles, a.c.
Power consumption	135 watts at 117.5 volts. 20 watts for phonograph motor.
Frequency ranges	540 to 1800 kc, 1800 to 6,250 kc and 5.8 to 22.0 megacycles.

1—6K7, R-f amplifier (behind right-hand section of variable condenser).
1—6K8, Triode-hexode, oscillator-modulator (behind left-hand section of variable condenser).
1—6K7, I-f amplifier (between the two i-f transformers).
1—6Q7, Diode detector, audio amplifier, a.v.c. (left rear corner of chassis).
1—6J5, Phase inverter (left side of chassis, third from rear).
2—6J5, Second audio amplifiers (left side of chassis, second from rear, and right side of chassis beside electrolytic condensers).
4—6AC5G, Dynamic coupled, power output (two are in front of power transformer; other two are alongsid power transformer near variable condenser).
2—80, Rectifiers (beside power transformer, at rear of chassis).

MODEL BR224A
MODELS AX232 AC, AX232 AC-DC
Record Changer Data

EMERSON RADIO & PHONOGRAPH CORP.

Part No. 4XPM-18A used with

MODEL AX-232, A.C.-D.C.

Five-tube A.C.-D.C. Portable Combination

MODEL AX-232, A.C.

Five-tube A.C. Portable Combination

Part No. 4XPM-18 used with

MODEL BR-224A

Thirteen-tube A.C. Radio-Phonograph Combination

AUTOMATIC OPERATION

1. Turn the receiver "on" in the usual way.
2. Rotate the phono-radio switch knob counter-clockwise to the phonograph position. Wait about a half-minute for the tubes in the receiver to warm up.
3. See that the pick-up is over the needle gauge plate with needle properly in place. If not, complete a *cycle* as follows: Throw the turntable switch "on." The turntable will start to revolve and the cycle of motion on the pick-up arm will follow through. When the pick-up arm comes down (and it can be moved by hand) the cycle is completed. Turn off the turntable switch.
4. The Index and Record Reject Lever are located near the right front corner of the motor board. With this lever at "Manual" position place the records on the record holder shelves. The records should be arranged in the desired order with the desired selection face up and the last selection on top. The first record to be played will rest directly on the shelves. The turntable should be empty.
5. Throw the turntable switch to the "on" position. The turntable should start to revolve.
6. While the turntable is revolving, push the Index and Record Reject Lever to the "Reject" position and let go. When the lever is released, after it has been pushed to "Reject," it will return automatically to the "10" position. If all the records to be played are 12 inch, return the lever to the "12" position. The changer will then begin to go through its cycle and the first record will drop on the turntable. The entire series of records will then be played automatically in sequence.
7. Adjust to the desired volume by means of the regular receiver volume control.
8. Close the cabinet lid to eliminate normal mechanical noises due to needle vibration.

The whole series of records will now play without further attention, and the last record will repeat until the turntable switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pick-up, swing the arm to the right beyond the edge of the record and lower it onto the pick-up rest with pick-up over needle gauge plate. The record player is then ready for reloading, or for manual operation.

MANUAL OPERATION

1. Proceed as in steps 1, 2 and 3 under Automatic Operation.
2. Place record on turntable with desired selection upwards.
3. Set Index and Record Reject Lever to "Manual" position. The lever should be kept in this position when not actually playing records automatically.
4. Throw the turntable switch on and when turntable has attained speed, lift pick-up and gently lower onto the record, so that the needle point enters the outside groove.
5. Proceed as in steps 7 and 8 under Automatic Operation.

SPECIAL PRECAUTIONS

1. This instrument is not recommended for playing 10 inch and 12 inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pick-up will come down in position for a 10 inch record and repeat the playing of the record on a 10 inch diameter unless the turntable switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.
2. Do not handle or move manually the pick-up or any part of the mechanism while it is going through the record-changing operation.
3. Do not use force in handling the mechanism at any time.
4. Warped or thick records should not be used for automatic operation.
5. Do not leave records on record holder posts except when needed for immediate operation, as they will warp and sag if left in this manner for a long period of time. Records can be straightened, however, by placing them on a flat surface and resting heavy flat articles, such as books, over them.
6. During automatic operation, the needle is fed automatically into the starting groove of the next record. If the needle fails to enter the starting groove, this is an indication that the cabinet is not level. Raise the right hand side of the cabinet, by inserting several thin spacers beneath it on that side. If the needle slides over a few grooves, raise the left hand side of the cabinet in a similar manner.
7. Never leave pick-up with needle resting on a record or on the turntable. When finished playing, be sure that the turntable has stopped and the pick-up is in the rest position over needle gauge plate.

Replacements should be made with genuine Emerson parts for best results.

Automatic Record Changer

GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

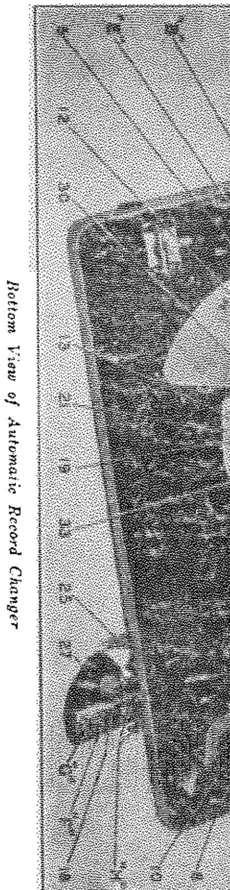
Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

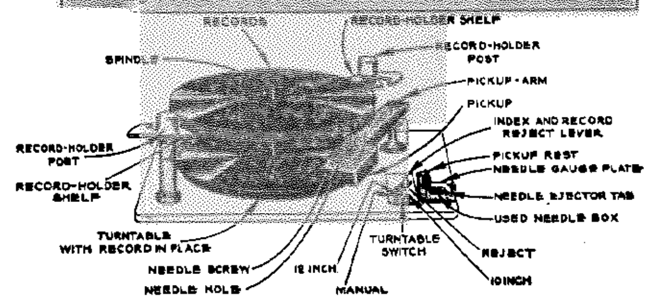
Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F)
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H"
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "30"

MODEL BR224A EMERSON RADIO & PHONOGRAPH CORP.
MODELS AX232 AC,AX232 AC-DC
Record Changer,Diagrams,Notes



Bottom View of Automatic Record Changer



Top View of Automatic Record Changer

AUTOMATIC RECORD CHANGER

GENERAL NOTES

1. The pick-up must be over the needle gauge plate to insert or change needles. To insert a needle initially, loosen the needle screw on the front of the pick-up, place needle in hole at the top so that it drops down against the needle gauge plate and then tighten up the needle screw.
2. The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. (The stroboscope method will only work when neon bulb is lighted from a 60 cycle a.c. supply.) To readjust the speed lift off the record and set the turntable by turning it slowly to give access to the speed regulator screw through one of the three holes in the turntable. Insert a screw-driver through the hole in the turntable into the groove in the speed regulator screw and turn to right (clockwise) to decrease speed, or to the left (counter-clockwise) to increase speed. Replace and replay record and adjust until speed is checked at 78 r.p.m.
3. A few drops of good quality light machine oil should be applied in the oil holes at regular intervals, about once every six months. The three holes in the top of the turntable give access to the oil holes in the motor mechanism beneath. Revolve the turntable slowly until the oil holes can be seen through the turntable, then apply the oil.
4. Model AX-232, AC-DC portable automatic combination carries an a.c.-d.c. switch at the left of the turntable to switch the motor for a.c. or d.c. supply. It is important that this switch be in the proper position for the power-supply available.

CONTROLS AND MOVING MECHANISM

INDEX and RECORD REJECT LEVER.—This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"*Manual*," "12," "10," and "*Reject*." When you desire to change record selections manually, this lever should be set in the "*Manual*" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "*Reject*" position and let go. The pick-up will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "*Manual*" position when not actually playing records automatically.

TURNTABLE SWITCH.—The toggle switch located just in front of the Index and Record Reject Lever controls the current to the turntable motor. To start the turntable, throw the switch to the "ON" position. To stop the turntable throw the switch to the "OFF" position.

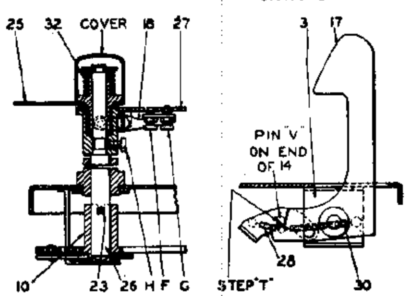
PICK-UP and TOP-LOADING NEEDLE SOCKET.—The pick-up is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pick-up arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pick-up arm in the groove and the pick-up over the needle gauge plate. The pick-up must be in this position to change needles.

To insert a needle initially, loosen the needle screw on the front of the pick-up, place needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw.

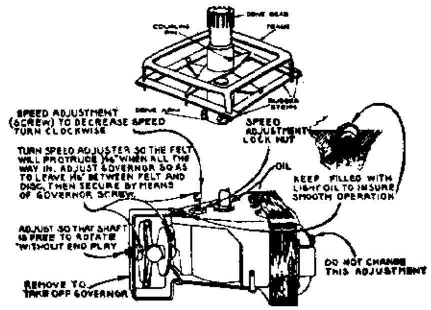
NEEDLE EJECTOR.—The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pick-up in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pick-up as described above.

RECORD HOLDER SHELVES.—To place a record on the turntable or to remove records, raise the record holder shelves, by lifting with the fingers under the shelf, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record holder post. You now have clear access to the turntable. **Before loading the magazine for Automatic Operation swing the record holder shelves back into position.**

Note: Numbers refer to parts—letters refer to adjustments.



Details of Record Shelf Posts, and Locating Lever Assemblies



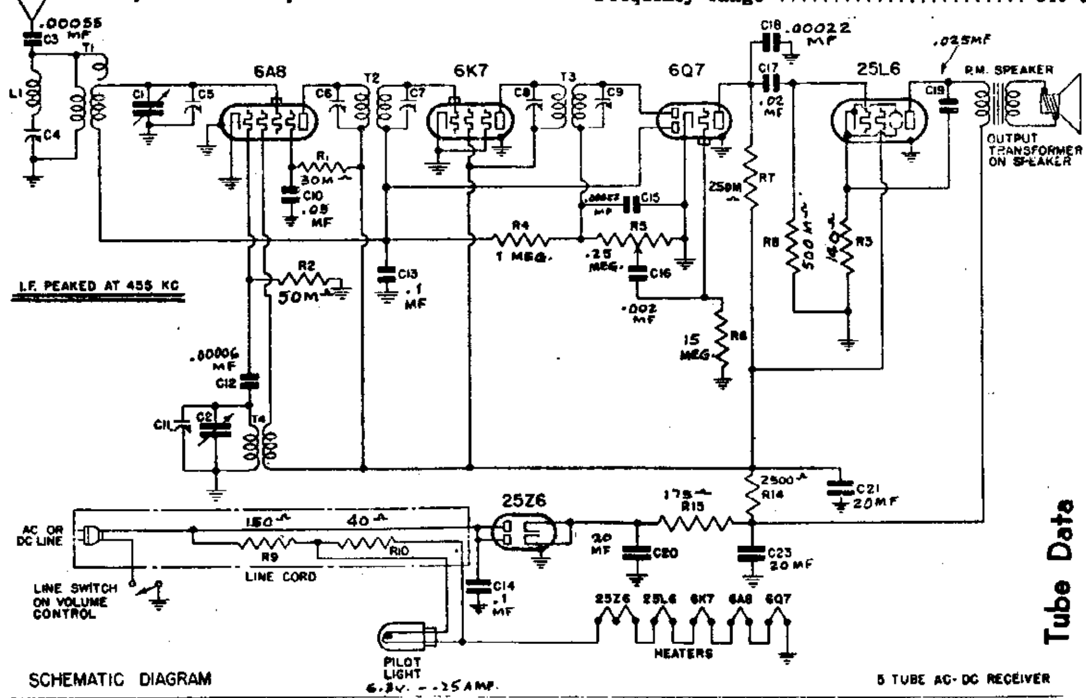
Motor Data and Coupling

MODEL AX240
Chassis AX
Schematic, Voltage
Alignment, Changes

EMERSON RADIO & PHONOGRAPH CORP.

Five-Tube, A.C.-D.C., Superheterodyne Receiver

Voltage rating	105-125 volts
Power consumption	45 watts
Frequency range	540 to 1730 kc.



SCHEMATIC DIAGRAM FOR MODEL AX-240
(*See Production Change, No.* 1)

PRODUCTION CHANGE

1. A resistor 100,000 ohms, part no. KR-54, (not shown in schematic for AX-240) is connected in series with the high side of the volume control.

Tube Data

The tube complement is as follows:
1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier, a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is exactly the same as the metal tube bearing the same number without the "GT."

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8	100	55	0	100	6.3
6K7	100	100	0	—	6.3
6Q7	43	—	0	—	6.3
25L6	92	100	5.5	—	25.0

Voltage at 25Z6 cathode—128 volts.
Voltage across speaker field—28 volts.

The color coding of the i-f transformer leads is as follows:
Grid—green; Plate—blue
Grid return—black; B plus—red.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

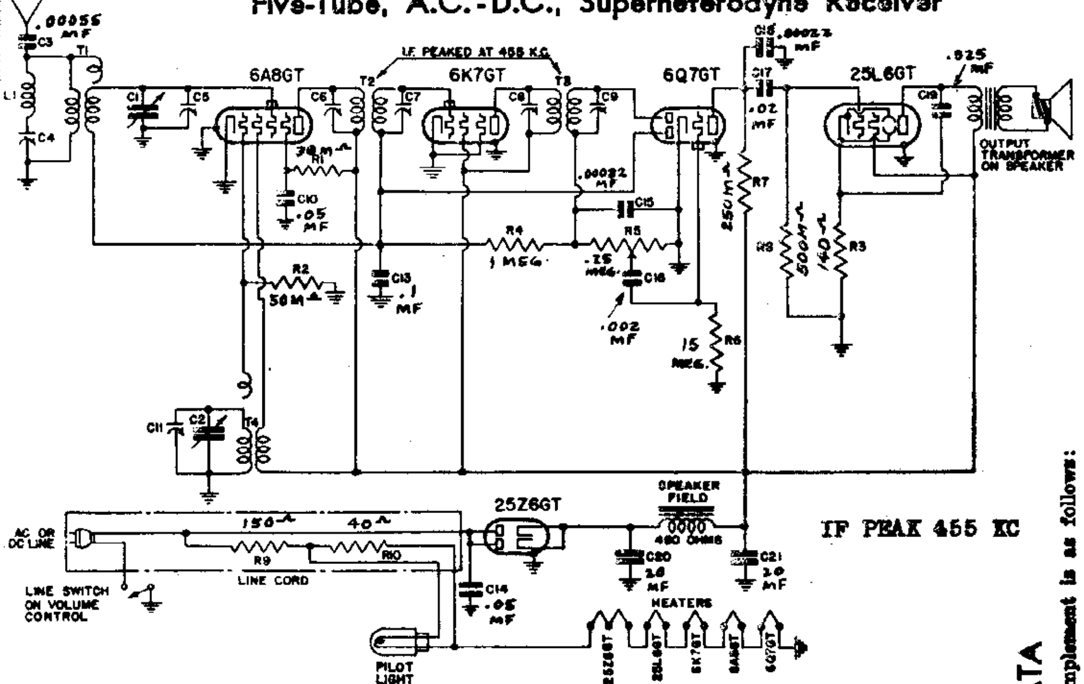
Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 7.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

EMERSON RADIO & PHONOGRAPH CORP.

Five-Tube, A.C.-D.C., Superheterodyne Receiver



MODELS CH-243, CH-246 and CH-256

CHASSIS MODEL CH

Voltage rating	105-125 volts, a.c. or d.c.
Power consumption	45 watts
Frequency range	540 to 1720 kc.

TUBE DATA

The tube complement is as follows:

1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8	100	55	0	100	6.3
6K7	100	100	0	—	6.3
6Q7	43	—	0	—	6.3
25L6	92	100	5.5	—	25.0

Voltage at 25Z6 cathode—125 volts.

Voltage across speaker field—28 volts.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 7.)

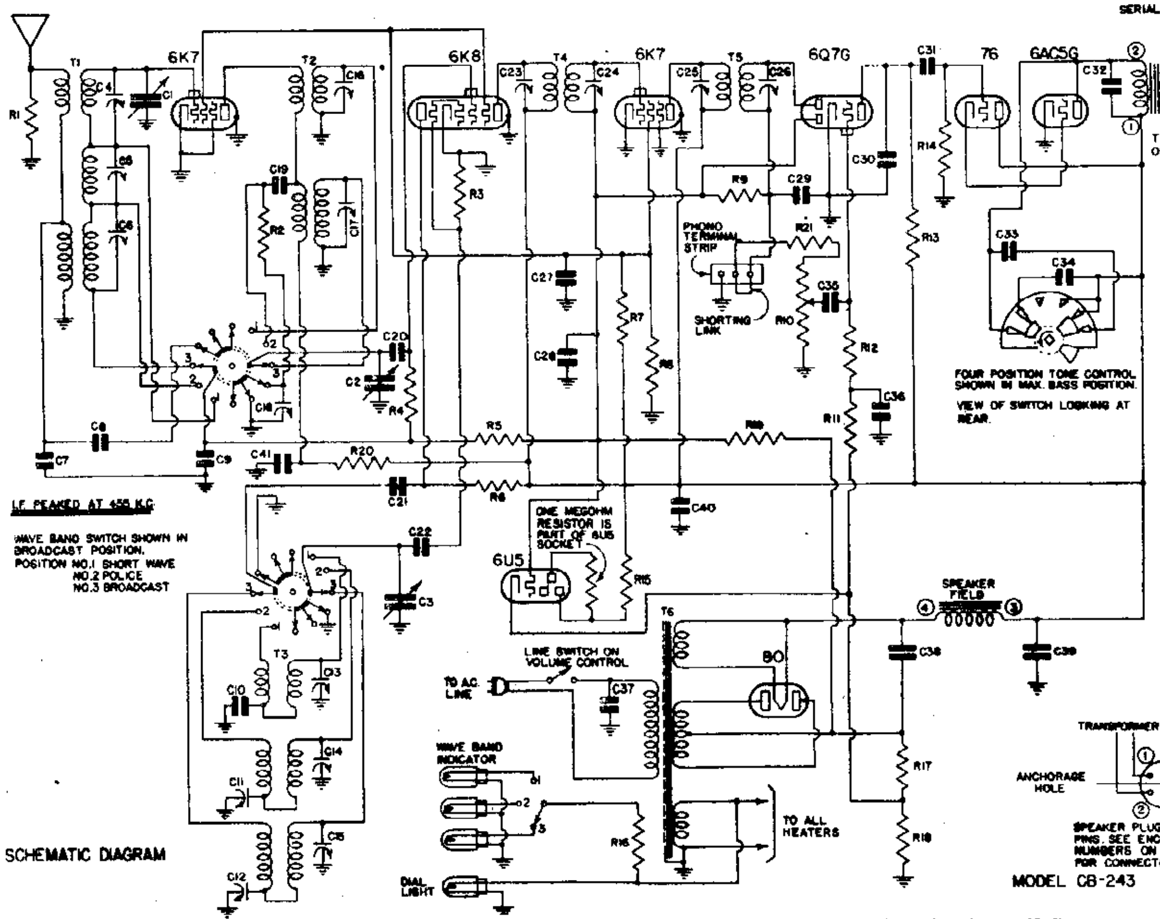
R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

MODEL CB243
Chassis CB
Schematic, Voltage
Notes

EMERSON RADIO & PHONOGRAPH CORP

Eight-Tube, A.C., Three-Band Superheterodyne



Voltage rating	105-125 volts, 60 cycle, a.c. (unless otherwise specified)
Power consumption	60 watts
Frequency ranges	540 to 1800 kc, 1800 to 6250 kc and 5.8 to 22 megacycles

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 6AC5G tube out of their respective sockets, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green Grid return—black
   B plus—red Plate—blue.
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condensers for the broadcast and police bands are mounted on the rear chassis wall with the screw adjustment accessible through holes in the rear of the chassis. The short-wave band has a fixed padder, C10 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 110 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7 (r-f)	170	85	0	—	6.3 a.c.
6K8	206	85	0	77	6.3 a.c.
6K7 (i-f)	206	85	0	—	6.3 a.c.
6Q7G	100	—	0	—	6.3 a.c.
76	206	—	10.3	—	6.3 a.c.
6AC5G	195	—	0	—	6.3 a.c.

Voltage at 80 filament to B minus (center tap on high voltage winding)—300 volts.
Voltage across speaker field—86 volts.
The grid bias for all tubes is developed across resistors R17 and R18. This voltage should measure 10.8 volts.

Tube Data

The tube complement is as follows:

1—6K7, r-f amplifier (to left of variable condenser)
1—6K8, triode-hexode oscillator-modulator
1—6K7, i-f amplifier (behind variable condenser)
1—6Q7G, diode detector, audio amplifier and a.v.c.
1—76, audio amplifier
1—6AC5G, power output
1—6U5, electron-ray tuning indicator
1—80, full-wave rectifier.

Note: The following special voltage transformers are also available:

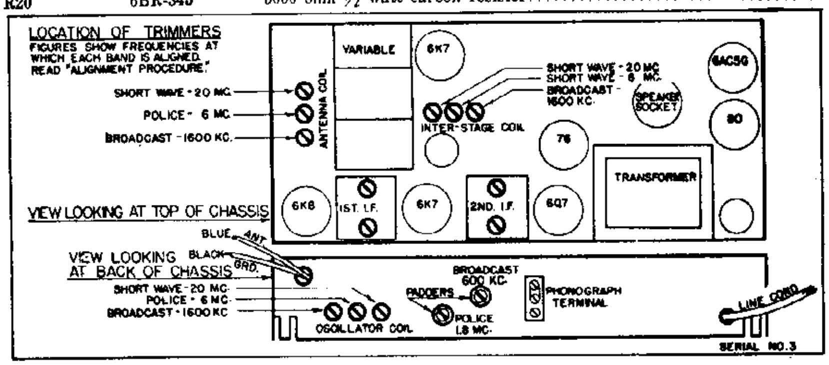
6BT-455 Universal power transformer: 110, 130, 210 and 225 volts, 40-60 cycles.
6BT-456 Power transformer: 110 and 127 volts, 50 cycles.

MODEL CB243
Alignment, Socket
Trimmers, Parts

EMERSON RADIO & PHONOGRAPH CORP.

List Price Ea. Effective as of Oct. 15th, 1938

* Item	Part No.	DESCRIPTION	PRICE
T1	4BT-396	Three-band antenna coil	$2.05
T2	4BT-397	Three-band interstage coil	1.80
T3	5RT-447	Three-band oscillator coil	1.75
T4	4ZT-425A	455 kc first i-f transformer	1.20
T5	3RT-321C	455 kc second i-f transformer	1.10
T6	6RT-461	Power transformer, 117.5 V, 50-60 cycle (See note below)	4.50
R1	LR-64	5000 ohm 1/4 watt carbon resistor	.16
R2	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R3, R5, R21	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R4, R14	KR-57	1 megohm 1/4 watt carbon resistor	.16
R6, R8	3LR-265	40,000 ohm 1/2 watt carbon resistor	.16
R7	3BR-246	10,000 ohm 2 watt carbon resistor	.28
R9, R12	HR-42	2 megohm 1/4 watt carbon resistor	.16
R10	3XR-277	Volume control 500,000 ohm, with line switch	1.00
R11, R13	KR-55	250,000 ohm 1 watt carbon resistor	.16
R15	GR-31	20,000 ohm 1 watt carbon resistor	.16
R16	4ZR-326	3 ohm 1/2 watt wire wound resistor	.16
R17	6BR-344	145 ohm 1 watt metallized resistor	.16
R18	4CR-320	35 ohm 1/2 watt wire wound resistor	.16
R19	3RR-275	10 megohm 1/4 watt carbon resistor	.16
R20	6BR-345	5000 ohm 1/2 watt carbon resistor	.16



REPLACEMENT PARTS LIST

MODEL CB-243

CHASSIS MODEL CB

5WS-352	8" dynamic speaker	7.50
6BS-356	Wave-band switch	1.95
4ZS-317	Tone-control switch	.80
4BL-94	Pilot light 6.3 volt .25 amp Mazda No. 44	.20
6BD-62	Conical dial face	1.70
4YZ-844A	Conical crystal and escutcheon	1.50
5SE-4	Molded escutcheon for electron ray indicator tube	.05
3XZ-684	Electron ray tube socket and cable assembly	.80
4YZ-772	Dial drive cord	.02
5JZ-824	Dial drive cord spring	.05
4XM-367	Dial drive pulley	.10

*Item number locates the article on the schematic diagram.

†These trimmer condensers are part of the coil assemblies and cannot be supplied separately.

ADJUSTMENTS

An oscillator with frequencies of 455, 600, 1600, 1800, 6000 and 20,000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for broadcast band dummy antenna, a .0001 mf condenser for the police band dummy antenna and a 400 ohm non-inductive resistor for the short-wave band dummy antenna.

Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on *all three bands*, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, *not* a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a sure source of noise, drifting, and microphonism.

In aligning antenna trimmers on the high-frequency signals there is always a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep tuning the variable condenser as the trimmers are being adjusted.

I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6K8 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response.

Broadcast Alignment

Since the indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the variable condenser and bent over to form an indicator when the chassis is removed from the cabinet. Set indicator at extreme low frequency end of dial with condenser closed.

Set the wave-band switch at the broadcast (clockwise) position, and the dial at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the dial to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the interstage and antenna coil trimmers for maximum response. Reset the dial at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Police Alignment

Set the wave-band switch at the police-band (central) position and the dial at 1.8. Feed 1800 kc to the antenna (using a .0001 mf dummy antenna) and adjust the police-band series padder for maximum response. Move the dial to 6.0, feed 6000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Note the interstage coil on this band has no trimmer adjustment. Return the dial to 1.8, feed 1800 kc to the antenna and rock the variable condenser while readjusting the series padder for maximum response. Return to 6000 kc and check alignment. If readjustment is necessary return to 1800 kc and repeat entire procedure.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the interstage and antenna coil trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak. Move the dial to 6 mc, feed 6000 kc to the antenna and adjust the r-f interstage trimmer for maximum response.

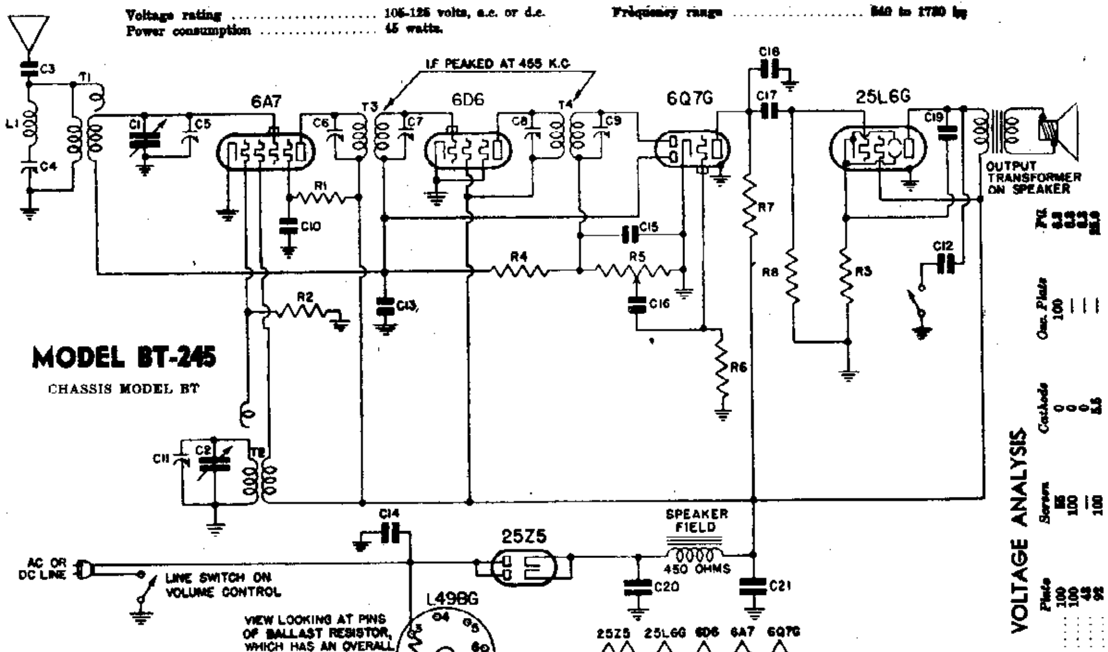
Replacements should be made with genuine Emerson parts for best results.

C1, C2, C3	6BC-418	Three-gang variable condenser	5.55
†C4, C5, C6		Trimmers, part of antenna coil assembly	
C7, C20	4XC-398A	0.00006 mf mica condenser	.20
C8, C21, C35	KC-58	0.01 mf, 400 volt tubular condenser	.20
C9	BC-12	0.05 mf, 200 volt tubular condenser	.20
C10	3EC-267	0.0042 mf mica condenser	.40
C11	2NC-281B	Single adjustable padding condenser, range: 750-1500 mmf	.45
C12	2NC-281A	Single adjustable padding condenser, range: 300-600 mmf	.30
		(If dual padding condenser is used, order 5SC-409)	
	5SC-409	Dual adjustable padding condenser	.95
†C13, C14, C15		Trimmers, part of oscillator coil assembly	
†C16, C17, C18		Trimmers, part of interstage coil assembly	
C19, C31	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	4HC-395A	0.000026 mf mica condenser	.20
†C23, C24		Trimmers, part of first i-f transformer	
†C25, C26		Trimmers, part of second i-f transformer	
C27	BC-13	0.25 mf, 200 volt tubular condenser	.20
C28	FC-29	0.02 mf, 200 volt tubular condenser	.20
C29	5LC-410A	0.00011 mf mica condenser	.20
C30	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C32	3RC-378	0.0004 mf, 600 volt tubular or mica condenser	.20
C33	3XC-331	0.015 mf, 400 volt tubular condenser	.20
C34	EC-23	0.03 mf, 400 volt tubular condenser	.20
C36	AC-6	0.1 mf, 200 volt tubular condenser	.20
C37	3LC-297A	0.01 mf, 400 volt molded condenser	.20
C38	4ZC-879	16 mf, 375 volt wet electrolytic condenser	.95
C39	4ZC-880	16 mf, 285 volt wet (regulating type) electrolytic condenser	.80
C40, C41	EEC-182	0.1 mf, 400 volt tubular condenser	.20

MODEL BT245
Chassis BT
Schematic, Voltage
Alignment, Parts

EMERSON RADIO & PHONOGRAPH CORP

Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption .... 45 watts.
Frequency range .... 540 to 1730 kc



TUBE DATA

The tube complement is as follows:

1—6A7, pentagrid oscillator-modulator.
1—6D6, first i-f amplifier.
1—6Q7G, diode detector, a-f amplifier, a.v.c.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.

All octal-base tubes are replaceable with either metal or equivalent octal-base glass tubes. The letter "G" at the end of the tube number indicates that the tube has a glass envelope. In all other respects it is exactly the same as the metal tube bearing the same number without the "G."

VOLTAGE ANALYSIS

Tube	Plate	Screen	Cathode	Osc. Plate	FG
6A7	100	[illegible]	0	100	[illegible]
6D6	100	100	0	—	[illegible]
6Q7G	42	—	0	—	[illegible]
25L6G	92	100	5.5	—	[illegible]

Voltage at 25Z5 cathode—123 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast resistor L49BG (pins 3, 7)—49 volts.
Voltage drop across pilot light section of ballast resistor (pins 7, 8)—4 volts.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. Measurements made with 117.5 volts d.c. will be lower than those given below.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
4. The color coding of the i-f transformer leads is as follows:
   Grid—green   Plate—blue
   Grid return—black   B plus—red.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first and second i-f transformers are mounted on the left hand inside wall of the chassis. The trimmers for the first i-f transformer are accessible through the lower pair of holes in the side of the chassis. The trimmers for the second i-f transformer are accessible through the upper pair of holes in the chassis.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible through a hole in the right side of the chassis.

I-f and Wave-Trap Alignment

Rotate the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 6A7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap trimmer for minimum response. (See General Notes, paragraph No. 6.)

R-f Alignment

Set the dial pointer at 140, feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator-trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

REPLACEMENT PARTS LIST

List Price as Effective as of Mar. 1st, 1939 (Subject to change without notice)

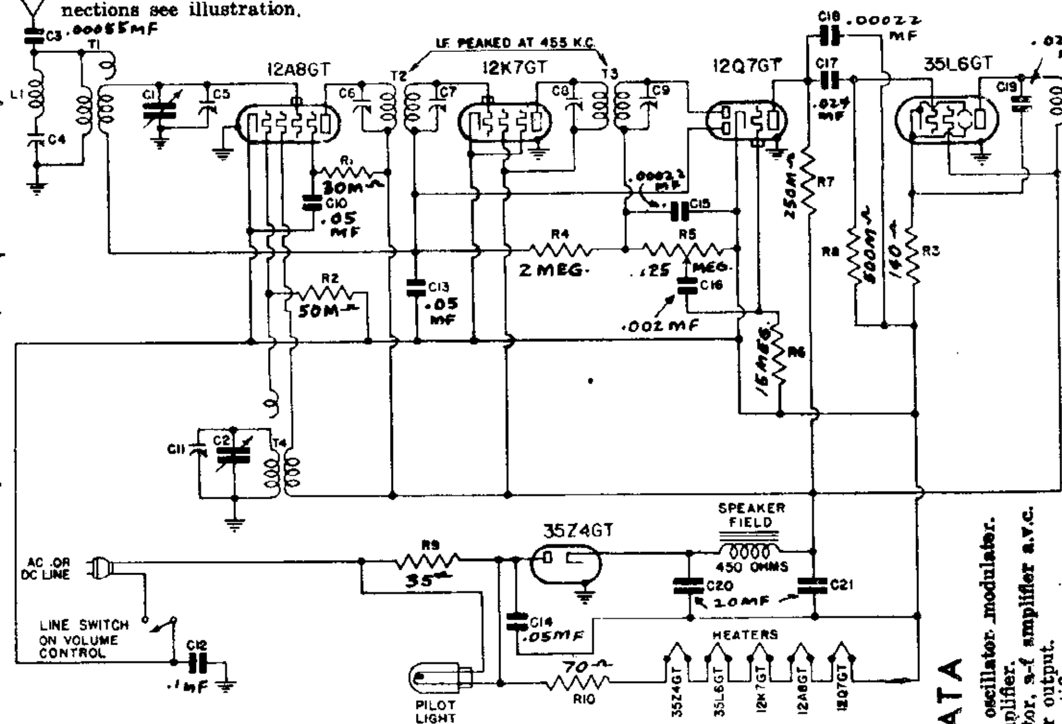
Item	Part No.	DESCRIPTION	Price
L1, T1	5YT-444	Antenna coil with adjustable 455 kc wave-trap	$ .90
T2	4XT-458	Oscillator coil	.85
T3	5TT-463	Double-tuned 455 kc first i-f transformer	.90
T4	4XT-485A	Double-tuned 455 kc second i-f transformer	.80
R1	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R4	KR-57	1 megohm ¼ watt carbon resistor	.16
R5	2NR-214	Volume control .25 megohm with line switch	1.20
R6	4XR-327	15 megohm ¼ watt carbon resistor	.16
R7	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8	KR-56	500,000 ohm ¼ watt carbon resistor	.16
	L-49BG	Plug-in ballast resistor. (Interchangeable with L-49B)	.55
C1, C2	5TC-423	Two-gang variable condenser	2.40
C3	4XC-401	0.00065 mf mica condenser	.20
C4		Trimmer, part of wave-trap assembly.	
C5, C11		Trimmers, part of variable condenser.	
C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10	BC-12	0.05 mf, 200 volt tubular condenser	.20
C13	AC-6	0.1 mf, 200 volt tubular condenser	.30
C12, C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C15, C18	4XC-394A	0.00022 mf mica condenser	.20
C16	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C19	3FC-396	0.025 mf, 400 volt tubular condenser	.20
C20, C21	4HC-348D	Dual 20 mf, 150 volt dry electrolytic condenser	.90
	3QS-257B	5" dynamic speaker	4.45
	4DS-264A	Tone control switch	.35
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	5TD-68	Dial face	.20
	3RZ-484	Drive cord	.03
	3RZ-519	Drive cord spring	.02
	4UZ-700A	Dial pointer	.15
	[illegible]	Dial crystal	.10

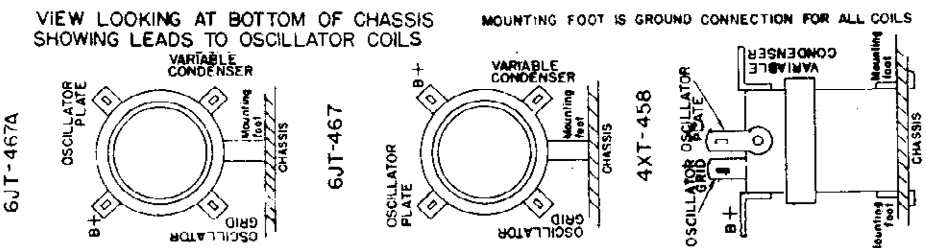
MODELS CL246, CL253
CL256 Chassis CL
Schematic, Voltage
Alignment, Data

PRODUCTION CHANGE

CL chassis which use oscillator coil 6JT-466 or 4XT-458 may use 6JT-466A for replacement. For correct lug connections see illustration.

Five-Tube, A.C.-D.C., Superheterodyne





TUBE DATA

12A8 or 12A8GT, pentagrid oscillator modulator.
12K7 or 12K7GT, first i-f amplifier.
12Q7 or 12Q7GT, diode detector, a-f amplifier a.v.c.
35L6 or 35L6GT, beam power output.
35Z4 or 35Z4GT, half-wave rectifier.

Voltage rating ..... 105-125 volts, a.c. or d.c.
Power consumption 30 watts
Frequency range ... 540 to 1780 kc.

The color coding of the i-f transformer leads is as follows:
Grid—green
Grid return—black
Plate—blue
B plus—red.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 5.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
12A8	94	50	0	94	12
12K7	94	94	0	—	12
12Q7	40	—	0	—	12
35L6	87	94	5.2	—	35

Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

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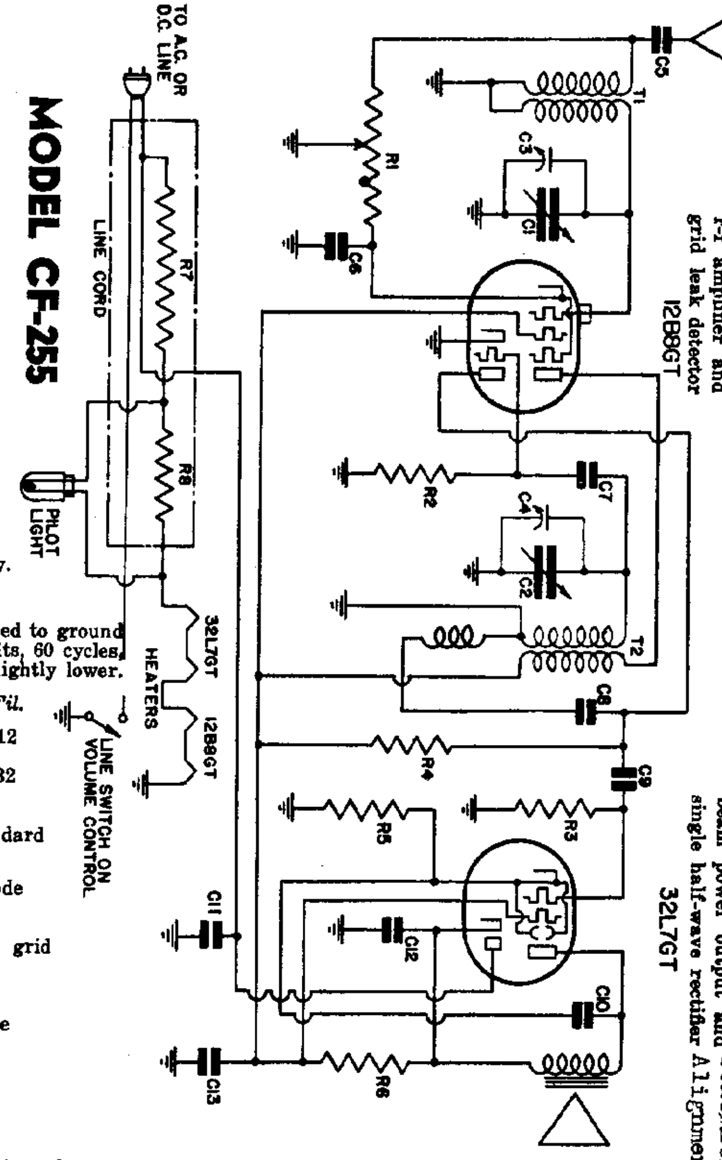


MODEL CF-255

CHASSIS MODEL CF

*Item	Part No.	DESCRIPTION	Effective as of March 1st, 1939 (Subject to change without notice)
T1	6FT-461	Broadcast antenna coil	$ .50
T2	6FT-462	Broadcast detector coil	.50
R1	6FR-346	Volume control 75,000 ohms with 200 ohm bias stop and line switch	.90
R2	3RR-275	10 megohm ¼ watt resistor	.16
R3, R4	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R5	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R6	6FR-348	2,400 ohm ½ watt carbon resistor	.16
R7, R8	6FW-142	Resistance line cord with pilot light section	.80
C1, C2	6FC-422	Two-gang variable condenser	2.30
†C3, C4		Trimmers, part of variable condenser.	
C5	4XC-401	0.00055 mf mica condenser	.20
C6	BC-12	0.05 mf, 200 volt tubular condenser	.20
C7	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C8	4XC-394A	0.00022 mf mica condenser	.20
C9	LC-65	0.02 mf, 400 volt tubular condenser	.20
C10	XXC-207	0.005 mf, 400 volt tubular condenser	.20
C11	LC-64	0.05 mf, 400 volt tubular condenser	.20
C12, C13	4HC-348B	Dual 20 mf, 150 volt dry electrolytic condenser	.90
	6FS-364	4" magnetic speaker	2.80
	6FD-67	Dial pointer	.05
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44	.20
	3RZ-519	Drive cord spring	.02
	4YZ-772	Dial drive cord	.02

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram. †These condensers cannot be supplied separately.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

Tube		*Plate*	*Screen*	*Cathode*	*Fil.*
12B8GT	Pentode	95 (pin no. 3)	95 (pin no. 4)	2.1 (pin no. 1)	12
	Triode	40 (pin no. 5)		0.0 (pin no. 6)	
32L7GT	Output	125 (pin no. 3)	95 (pin no. 4)	4.5 (pin no. 8)	32

Voltage at rectifier cathode—130 (pin no. 1)

The socket connections of the tubes used in the CF chassis are as follows, the numbering following standard designation R.M.A.

Tube 12B8GT: pin 1—r-f amplifier cathode
pin 2—heater
pin 3—r-f amplifier plate
pin 4—r-f amplifier screen grid
pin 5—detector plate
pin 6—detector cathode
pin 7—heater
pin 8—detector grid

Tube 32L7GT: pin 1—rectifier cathode
pin 2—heater
pin 3—output plate
pin 4—output screen grid
pin 5—output grid
pin 6—rectifier plate
pin 7—heater
pin 8—output cathode

R-f amplifier grid connection is made to grid cap.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1600 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

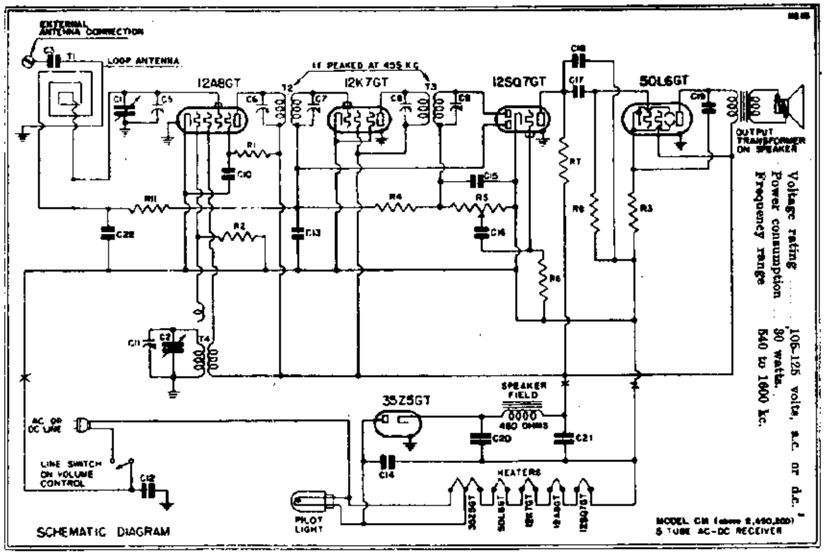
Examine the condenser drive assembly bracket and locate five dots embossed along the front. Rotate the variable condenser to maximum capacity and set the pointer just below the bottom dot. Then rotate the condenser until the pointer is just below the second dot from the top. Feed 1600 kc to the antenna through a .0001 mf condenser and adjust both trimming condensers for maximum response.

A.C.-D.C. T.R.F. Receiver—Two Tubes

Voltage rating . . . 105 to 125 volts, a.c. or d.c.
Power consumption 40 watts.
Frequency range . . . 540 to 1730 kc.

MODELS CM260,CM266
CM267 Early,Late **EMERSON RADIO & PHONOGRAPH CORP.**
Chassis CM.
Above and Below Serial 2690200

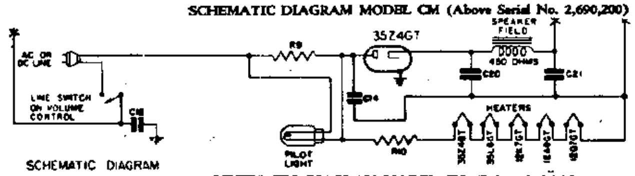
Schematics
Voltage
Alignment,Changes
Parts list



Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption .... 30 watts.
Frequency range .... 540 to 1600 kc.

SCHEMATIC DIAGRAM

SCHEMATIC DIAGRAM MODEL CM (Above Serial No. 2,690,200)



NOTE: A 35L6GT output tube is used for sets of lower serial numbers.

SCHEMATIC DIAGRAM

SCHEMATIC DIAGRAM MODEL CM (Below Serial No. 2,690,200)

THE TUBE COMPLEMENT IS AS FOLLOWS:

For serial numbers below 2,690,200:		*For serial numbers above 2,690,200:*
1—12A8 or 12A8GT	pentagrid oscillator modulator	1—12A8 or 12A8GT
1—12K7 or 12K7GT	first i-f amplifier	1—12K7 or 12K7GT
1—12Q7 or 12Q7GT	diode detector, a-f amplifier, a.v.c.	1—12SQ7 or 12SQ7GT
1—35L6 or 35L6GT	beam power output	1—50L6 or 50L6GT
1—35Z4 or 35Z4GT	half-wave rectifier	1—35Z5 or 35Z5GT

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

For serial numbers below 2,690,200:

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
12A8	94	50	0	94	12
12K7	94	94	0	—	12
12Q7	40	—	0	—	12
35L6	87	94	5.2	—	35

Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

For serial numbers above 2,690,200:

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
12A8	88	45	0	88	12
12K7	88	88	0	—	12
12SQ7	40	—	0	—	12
50L6	82	88	5.7	—	50

Voltage at 35Z5 cathode—115 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light—4.5 volts.

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 2,690,200 use R7—250,000 ohm ¼ watt carbon resistor .... .16
2. Resistor R9—R10, part no. 6JR-353, is not used on chassis bearing serial numbers above 2,690,200.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:
   Grid—green   Plate—blue
   Grid return—black   B plus—red
4. Models CM-260, 266 and 267 have self-contained antennas and do not require additional antenna connections. For permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal screw is provided in the cabinet for antenna connection. It is not necessary to remove the chassis from the cabinet to make this connection. The screw is easily reached through a hole in the bottom of the cabinet.
5. The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. *It is important, therefore, once the station is tuned in, rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.*
6. On some models the bottom of the chassis is covered with a metal bottom plate. To reach the internal chassis parts, this plate must be unsoldered and removed.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis behind the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The oscillator coil is located underneath the chassis, beneath the speaker. The loop antenna acts as the antenna coil.

I-f and Wave-Trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

*Item	Part No.	DESCRIPTION	PRICE (Subject to change without notice)
T1	6MW-155	Loop antenna assembly	$1.45
T4	6JT-467A	Oscillator coil	.35
T2	6JT-466U	Double-tuned 455 kc first i-f transformer	1.10
T3	6MT-472U	Double-tuned 455 kc second i-f transformer	1.05
R1	2CR-193	30,000 ohm ⅓ watt carbon resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R4	HR-42	2 megohm ¼ watt carbon resistor	.16
R5	4XR-335	Volume control .25 megohm with line switch (for CM-266)	.90
R5	4XR-335A	Volume control .25 megohm with line switch (for CM-260 and CM-267)	.85
R6	4XR-327	15 megohm ¼ watt carbon resistor	.16
R7, R8	KR-56	500,000 ohm ¼ watt carbon resistor (see production change no. 1)	.16
R9, R10	6JR-353	Tapped metal-clad wire-wound resistor (see production change no. 2) R9—35 ohms; R10—70 ohms (Each section—2 watts)	.25
R11	KR-54	100,000 ohm ¼ watt carbon resistor	.16
C1, C2	4XC-391C	Two-gang variable condenser	2.40
†C5, C11		Trimmers, part of variable condenser.	
†C6, C7, C8, C9		Trimmers, part of i-f transformers.	
C10, C13, C22	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	AC-6	0.1 mf, 200 volt tubular condenser	.20
C14	LC-64	0.05 mf, 400 volt tubular condenser	.20
C15, C18	4XC-394A	0.00022 mf mica condenser	.20
C16, C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C17, C19	6JC-425	0.024 mf, 400 volt tubular condenser	.20
C20, C21	6JC-426	Dual 20 mf, 150 volt dry electrolytic condenser	.90

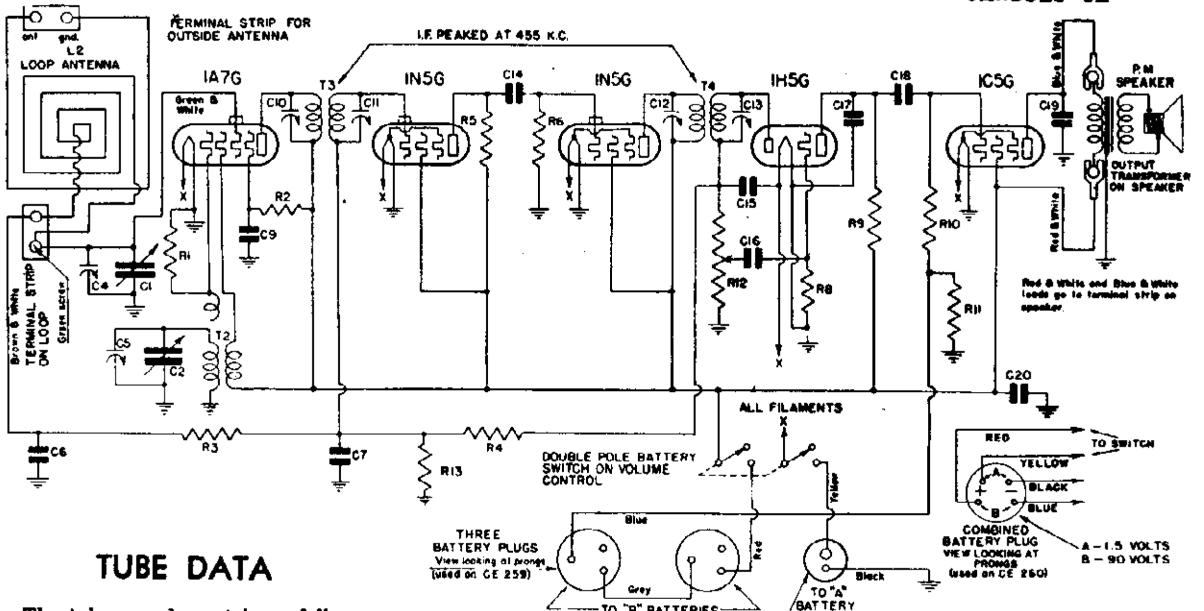
Part No.	Description	Price
6JS-368U	4" dynamic speaker (for CM-266)	5.85
6MS-384	4" dynamic speaker (for CM-267)	4.15
6MS-395	5" dynamic speaker (for CM-260)	4.45
6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47	.20
6ED-73	Dial face (for CM-260 and CM-267)	.25
6MD-75	Dial face (for CM-266)	.20
4YZ-772	Drive cord	.02
5JZ-824	Drive cord spring	.05
6JH-24	Drive shaft (for CM-266)	.05
6JH-24A	Drive shaft (for CM-260 and CM-267)	.05
4XZ-812B	Dial pointer (for CM-266)	.02
4MZ-588B	Dial pointer (for CM-260 and CM-267)	.20
4XZ-815A	Dial crystal (for CM-266)	.10
4XE-3	Dial crystal (for CM-260 and CM-267)	.20
4XM-367	Drive pulley	.10

* Item number locates the article on the schematic diagram.
† Not supplied separately.

Schematic, Voltage
Batt. Wiring, Changes

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CE259, CE260
Chassis CE



TUBE DATA

The tube complement is as follows:

1—1A7G, oscillator-modulator
1—1N5G, 1st i-f amplifier
1—1N5G, 2nd i-f amplifier
1—1H5G, 2nd detector, a.v.c., a-f amplifier
1—1C5G, pentode output

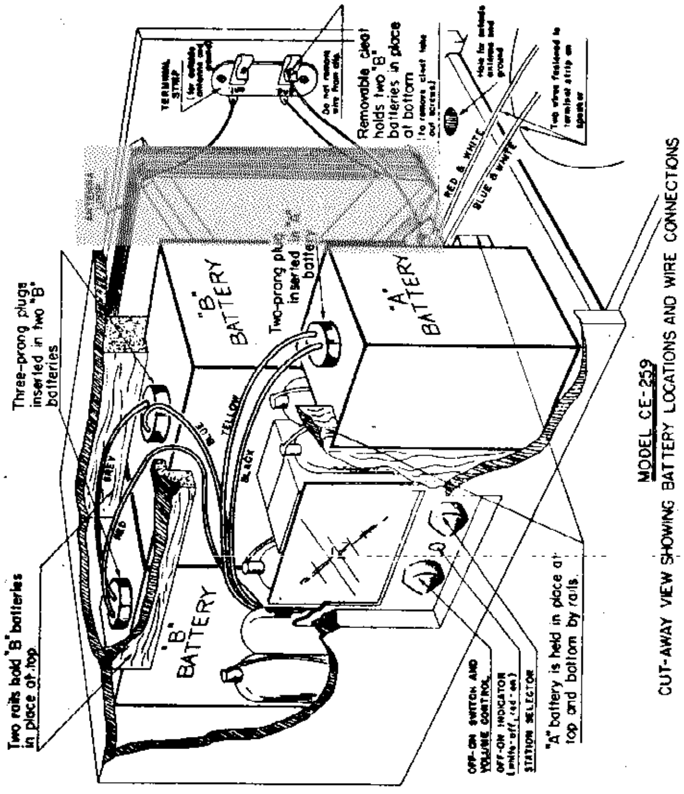
Five-Tube Battery-Operated Superheterodyne

MODELS CE-259 and CE-260

CHASSIS MODEL CE

Current drain .... "A" battery—0.3 amps.
"B" battery—0.010 amps. with no signal

Frequency range 540 to 1730 kc on early Model CE-259
530 to 1600 kc on all Model CE-260
and later Model CE-259



MODEL CE-259
CUT-AWAY VIEW SHOWING BATTERY LOCATIONS AND WIRE CONNECTIONS

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1A7G	82	52	82	1.5
1N5G 1st i-f	70	70	—	1.5
1N5G 2nd i-f	82	82	—	1.5
1H5G	25	—	—	1.5
1C5G	77	82	—	1.5

Bias for the 1C5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.8 volts.

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 2,319,650 use:
   (a) Double-tuned 455 kc first i-f transformer, part no. 4XT-434A 1.00
   (b) Double tuned 455 kc diode i-f transformer, part no. 4XT-435B .... .80
   (c) Oscillator coil, Part No. 4XT-433 .... .35
   (d) The low side of the volume control (R12) is connected to A plus instead of A minus (chassis) as shown in the schematic.
   (e) Condenser C19 is connected from plate to B plus instead of from plate to ground as shown in the schematic.
   (f) Resistor R2 is 50,000 ohms, Part No. KR53, instead of 30,000 ohms.
2. Chassis bearing serial numbers below 2,408,049 use dial face, part no. 4XD-51 .... .55
3. On Model CE-260 the antenna trimming condenser (C4) is mounted on the loop antenna frame instead of on the variable condenser.
4. In chassis bearing serial numbers above 2,319,650 condenser C15 is connected from the high side of the volume control to ground instead of to A plus as shown in the schematic.

MODELS CE259, CE260
Chassis CE
Socket, Trimmers
Alignment, Parts

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CE-259 AND CE-260

GENERAL NOTES

1. **Batteries:** The Models CE-259 and CE-260 are designed to house the complete set of batteries within the cabinet. The battery complement should be as follows:

FOR MODEL CE-259 (Portable)

Type Battery	*No. Req.*	*Eveready Part No.*	*Ray-o-vac Part No.*
1½ volt "A"	1	742 (plug-in type)	P-94A (plug-in type)
45 volt "B"	2	762 (plug-in type)	P-5303 (plug-in type)

FOR MODEL CE-260

Combined "A" and "B" Pack	1	748 (plug-in type)	AB82 (plug-in type)	(Also Burgess No. 17G-D60)

2. The color coding of the i-f transformer leads is as follows:

Grid—green Plate—blue
Grid return—black B plus—red

3. The color coding of the battery cable is as follows:

Red—B plus, 90 volts Yellow—A plus, 1.5 volts
Blue—B minus Black—A minus

4. If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

5. Models CE-259 and CE-260 have self-contained antennas and do not require additional antenna or ground connections. For permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal strip is provided in the cabinet for antenna and ground connections. *(See diagram on next page.)*

6. The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. *It is important, therefore, once the station is tuned in, rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.* This procedure is not necessary for receivers with outside antennas.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

The loop antenna acts as the antenna coil. The trimmer for the loop, when provided, is on the front section of the variable condenser. (See Production Change No. 3)

I-f Alignment

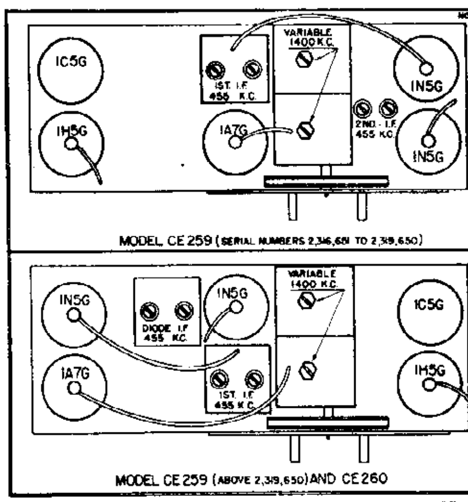
Model CE-259 (below serial number 2,319,650). Swing variable condenser to maximum capacity position.

Model CE-259 (above serial number 2,319,650) and CE-260. Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7G tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.



LOCATION OF TUBES AND TRIMMING CONDENSERS
MODELS CE-259 AND CE-260
(See Production Change No. 3)

Battery Installation for Model CE-259

(See diagram on inside page)

To install and connect the batteries in the portable cabinet observe the following procedure:

1. Open the end side of the cabinet (side with speaker grille) by removing the two wood screws in the top corners of the panel. The panel is hinged at the bottom. Open the panel by pulling the small leather tab at the top edge.
2. A small wood cleat is fastened to the bottom of the cabinet directly below the two large wood rails. Remove this cleat by taking out the small wood screws.
3. The three-prong plugs on the battery cable from the receiver should be plugged into the two "B" batteries.
4. Slide the "B" batteries, one at a time, in an upright position between the two wood rails in the cabinet, as indicated in the diagram.
5. Replace the small wood cleat in front of the second battery and fasten it securely with the wood screws.
6. The small two-prong plug in the battery cable should be plugged into the "A" battery. Place the "A" battery in the front corner of the cabinet, as shown in the diagram.
7. Be sure that all of the cable wires are free and clear of the receiver. Care should be taken also to keep the wires from jamming between the wood rails and the batteries.
8. Close the end panel and replace the wood screws, fastening them securely.

Battery Installation for Model CE-260

The cabinet for this model is designed to house completely the combined "A" and "B" pack. Place the battery pack in the cabinet at the rear of the receiver and insert the four-prong plug of the battery cable into the socket on the top of the battery.

If it is desired to use separate "A" and "B" plug-in type batteries, a special cable harness is available for connecting the batteries together. The receiver battery cable then may be plugged into the socket on the special cable harness.

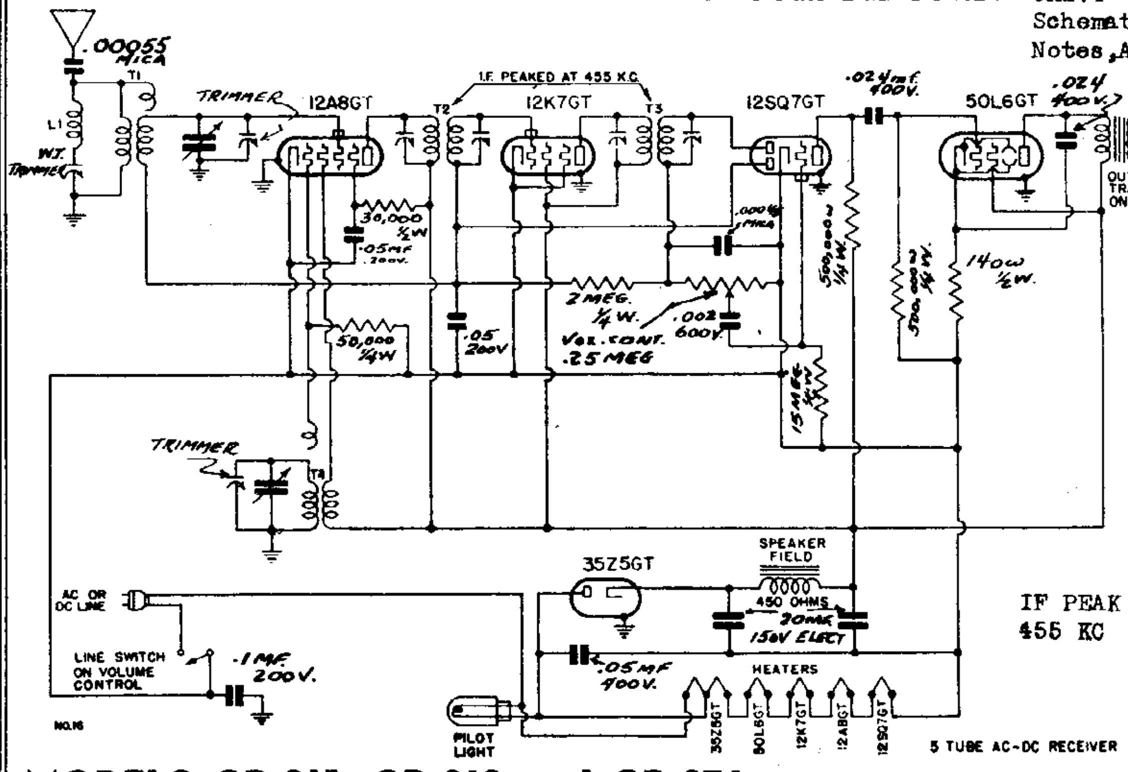
When ordering replacement parts specify part numbers.

*Item	Part No.	DESCRIPTION	List Price Ea. Effective as of Feb. 15th, 1939 (Subject to change without notice)
L2	6EW-146	Loop antenna assembly (for CE-259 only)	$1.45
L2	6EW-152	Loop antenna assembly (for CE-260 only)	1.60
T2	6JT-467A	Oscillator coil (see Production Change No. 1c)	.35
T3	6JT-466B	Double-tuned 455 kc first i-f transformer (see production change no. 1a)	1.10
T4	6ET-470	Double tuned 455 kc diode i-f transformer (see production change no. 1b)	1.10
R1	LR-61	200,000 ohm ¼ watt carbon resistor	.16
R2	ZZR-196	30,000 ohm ¼ watt carbon resistor (see Production Change No. 1f)	.16
R3, R6	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R4, R8, R13	HR-42	2 megohm ¼ watt carbon resistor	.16
R5	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R9, R10	KR-56	.5 megohm ¼ watt carbon resistor	.16
R11	6ER-350	740 ohm ½ watt wire wound resistor	.16
R12	3HR-240B	Volume control 500,000 ohms with double pole line switch (for CE-259)	1.05
R12	3HR-240C	Volume control 500,000 ohms with double pole line switch (for CE-260)	1.05
C1, C2	4XC-391B	Two-gang variable condenser	2.50
†C4, C5		Trimmer, part of variable condenser (see Production Change No. 3)	
C6, C7	BC-12	0.05 mf, 200 volt tubular condenser	.20
C9, C18	LC-65	0.02 mf, 400 volt tubular condenser	.20
†C10, C11, C12, C13		Trimmer, part of i-f transformer	
C14	5AC-384	0.0002 mf, 600 volt tubular or mica condenser	.20
C15, C17	4XC-394A	0.00022 mf mica condenser (see Production Change No. 4)	.20
C16	KC-58	0.01 mf, 400 volt tubular condenser	.20
C19	NNC-199	0.001 mf, 600 volt tubular condenser	.20
C20	6EC-414	8 mf, 100 volt dry electrolytic condenser	.60
	6ES-367	5" permanent magnet dynamic speaker	6.25
	6ED-73	Dial face (see production change no. 2)	.25
	6ED-69	Indicator dial	.10
	4MZ-588B	Dial pointer	.20
	4XE-3	Dial crystal	.20
	5JZ-824	Drive cord spring	.05
	4YZ-772	Dial drive cord	.02
	6EW-135	Battery cable (for CE-259)	.65
	6EW-148	Battery cable (for CE-260)	.75

* Item number locates the article on the schematic diagram.
† Not supplied separately.

MODELS CR261, CR262
CR274 Chassis CR
Schematic, Voltage
Notes, Alignment

EMERSON RADIO & PHONOGRAPH CORP.



The tube complement is as follows:
One 12A8GT—pentagrid oscillator modulator
One 12K7GT—first i-f amplifier
One 12SQ7GT—diode detector, a-f amplifier, a.v.c.
One 50L6GT—beam power output
One 35Z5GT—half-wave rectifier

MODELS CR-261, CR-262 and CR-274

CHASSIS MODEL CR

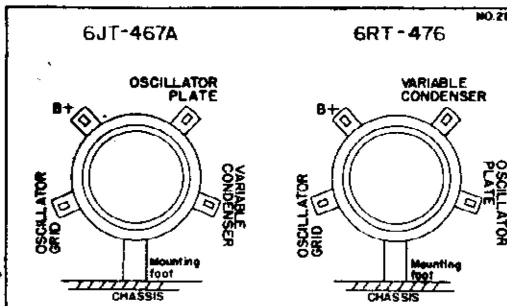
Voltage rating	105-125 volts, a.c. or d.c.
Power consumption	30 watts.
Frequency range	540 to 1730 kc.

ALIGNMENT AND LOCATION OF TRIMMERS

IF. 455kc through .01 mf. cond. to grid of 12A8G 1st IF, top of chassis right of speaker; 2nd IF under chassis beneath variable, holes provided in top of chassis.-Variable max. cap. Adjust trimmers to max. response.

Wave Trap (see GENERAL NOTES) Feed 455kc through .0001 mf. cond. to ant. lead. Adjust for minimum response.

RF. Dial at 140. Feed 1400kc through .0001 mf. cond. to ant. lead. Adjust osc. trimmer (rear section of variable), then ant. trimmer (front section of variable) for maximum response.



MOUNTING FOOT IS GROUND CONNECTION FOR BOTH COILS

CR chassis may use either oscillator coil

VIEW LOOKING AT LUG END OF COILS SHOWING LEADS TO OSCILLATOR COILS

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red
4. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

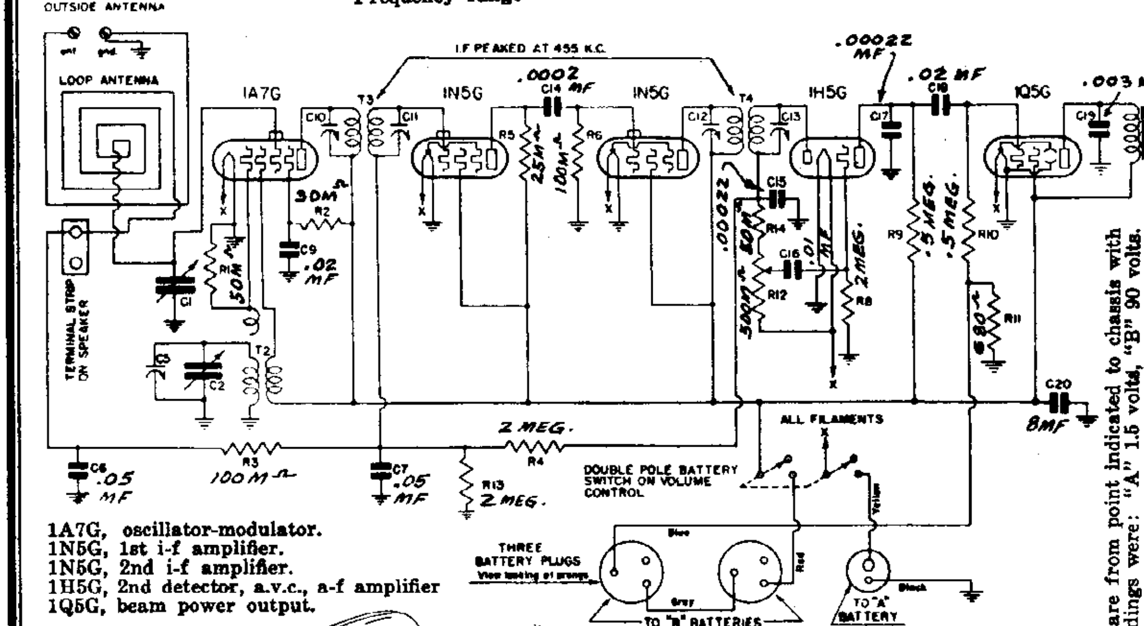
Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
12A8GT	88	45	0	88	12
12K7GT	88	88	0	—	12
12SQ7GT	40	—	0	—	12
50L6GT	82	88	5.7	—	50

Voltage at 35Z5 cathode—115 volts. Voltage across speaker field—27 volts. Voltage across pilot light—4.5 volts.

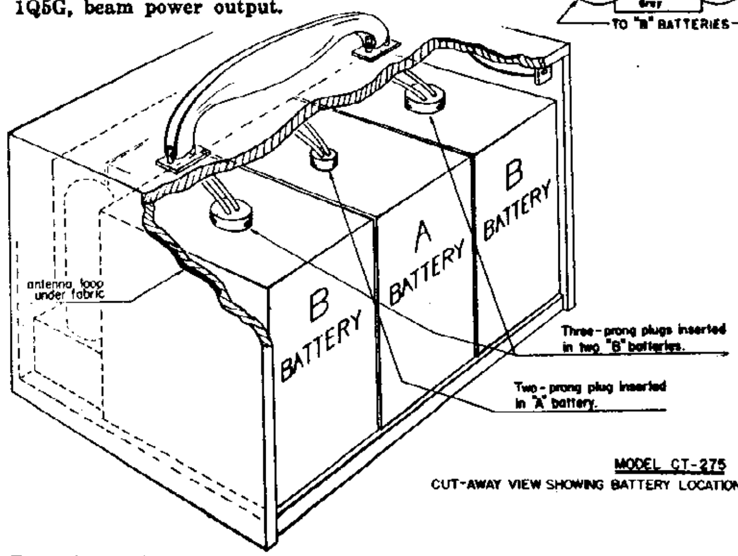
MODEL CT275
Chassis CT
Schematic, Voltage
Alignment

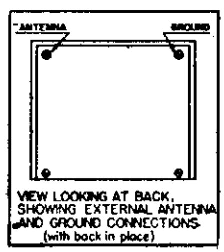
EMERSON RADIO & PHONOGRAPH CORP.

Current drain .... "A" battery—0.3 amps.
"B" battery—0.010 amps. with no signal
Frequency range .. 530 to 1600 kc



1A7G, oscillator-modulator.
1N5G, 1st i-f amplifier.
1N5G, 2nd i-f amplifier.
1H5G, 2nd detector, a.v.c., a-f amplifier
1Q5G, beam power output.





MODEL CT-275
CUT-AWAY VIEW SHOWING BATTERY LOCATIONS AND WIRE CONNECTIONS

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Fil.*
1A7G	82	52	82	1.5
1N5G 1st i-f	48	82	—	1.5
1N5G 2nd i-f	82	82	—	1.5
1H5G	25	—	—	1.5
1Q5G	77	82	—	1.5

Bias for the 1Q5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.0 volts.

Batteries: The Model CT-275 is designed to house the complete set of batteries within the cabinet.

The battery complement should be as follows:

Type Battery	No. Req.	Eveready Part No.	Rayovac Part No.	Burgess Part No.
1½ volt "A"	1	741 (plug-in type)	—	8F (plug-in type)
45 volt "B"	2	762 (plug-in type)	P-5303 (plug-in type)	B30-P1 (plug-in type)

The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B plus—red

The color coding of the battery cable is as follows:

Red—B plus, 90 volts
Blue—B minus
Yellow—A plus, 1.5 volts
Black—A minus

Location of Coils and Trimmer Adjustments

The i-f transformers are located in cans mounted on top of the chassis. The first i-f transformer is the one between the speaker and the variable condenser. The diode i-f transformer is the one behind the speaker. The trimming condensers for both transformers can be reached through holes in the tops of the cans.

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

I-f Alignment

Swing variable condenser to minimum capacity position.

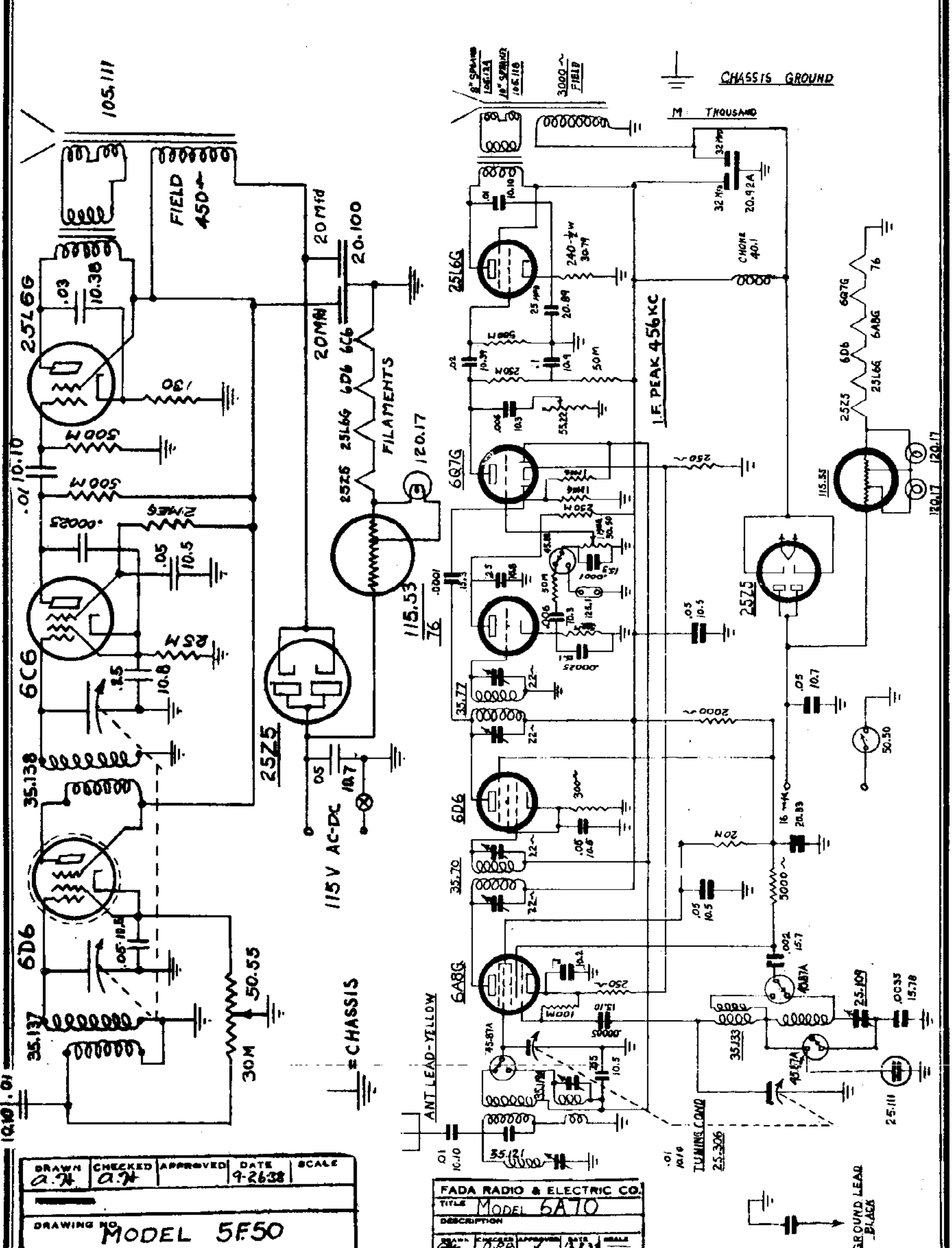
Feed 455 kc to the grid of the 1A7G tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust the oscillator trimmer (on rear section of variable condenser) for maximum response. No alignment necessary on antenna circuit.

FADA RADIO & ELECTRIC CO

MODEL 5F50
MODEL 6A70
Schematics



MODEL 5F60
MODEL 460
MODEL 461

FADA RADIO & ELECTRIC CO

Alignment, Socket
Trimmers, Voltage

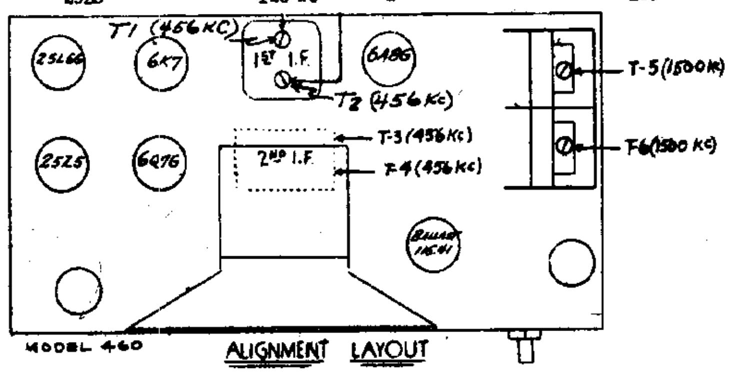
FOR OTHER DATA SEE INDEX

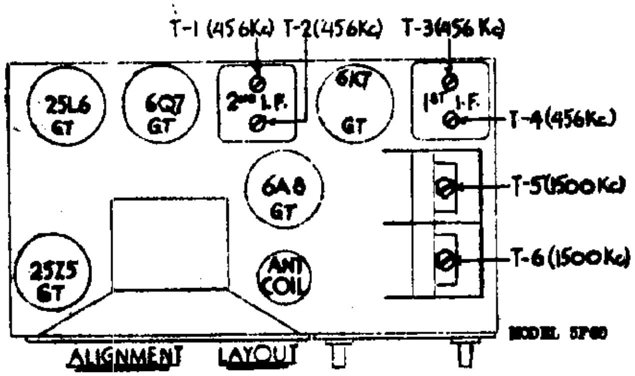
MODEL 5F60 MODEL 460 - 115 VOLTS AC-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne. Tubes required - 6A8G-6K7-6Q7G-25L6G-25Z5-115.41.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked then proceed as follows:---Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A8G tube in series with a.1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

MODEL 460 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode	Anode
6A8G	110	50	2.5	105
6K7	110	110	2.5	-
6Q7G	45	-	1.1	-
25L6G	110	110	7.	-
25Z5	120 AC	-		133

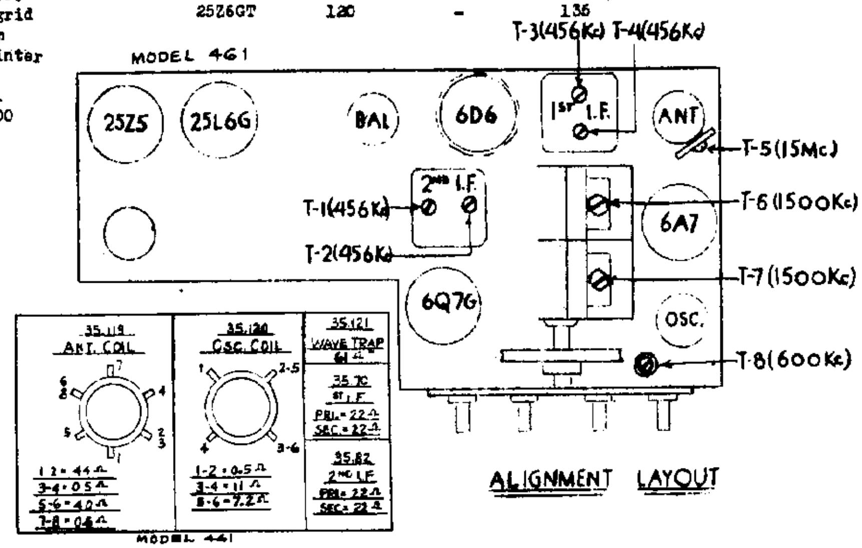




MODEL 5F60

MODEL 5F60 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode	Anode
6A8GT	103	60	0	103
6K7GT	102	104	0	
6Q7GT	45	-	0	
25L6GT	95	104	7	
25Z6GT	120	-	135	



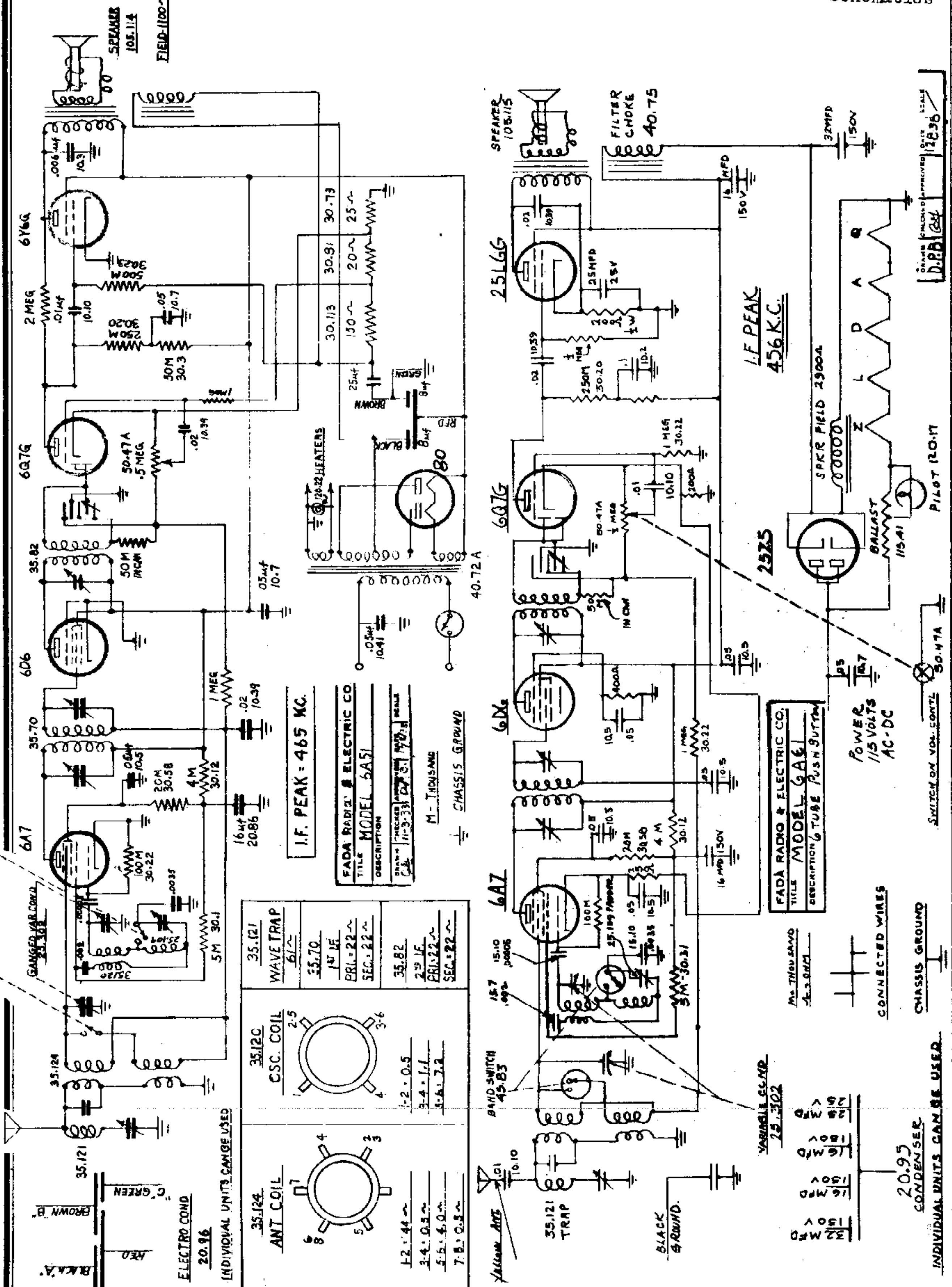
FADA RADIO MODEL 461 - 115 VOLTS - AC-DC - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles-6 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-25L6G-25Z5-115.41. Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condensor as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

MODEL 461 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode	Anode
6A7	104	52	2.1	75
6D6	104	104	3.0	-
6Q7G	45	-	1.1	-
25L6	98	104	6.7	-
25Z5	120 A.C.		133	-

FADA RADIO & ELECTRIC CO

MODEL 6A51
MODEL 6A61
Schematics



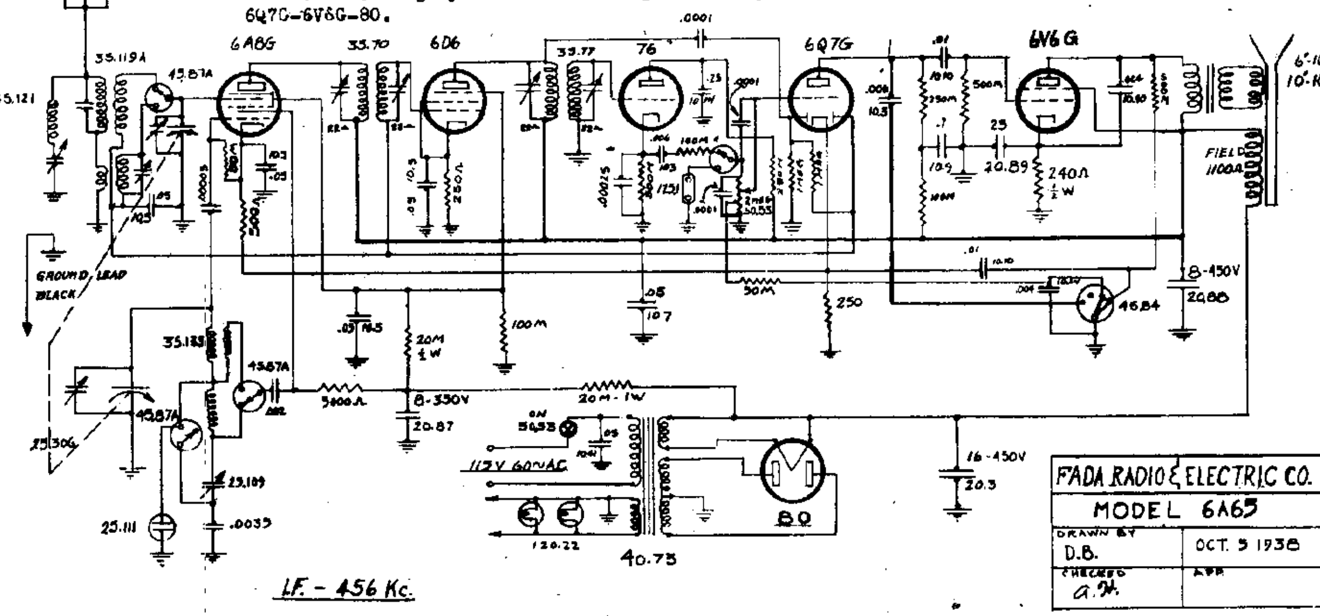
MODEL 6A65
Schematic, Voltage
Alignment, Socket
Trimmers

FADA RADIO & ELECTRIC CO

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A. C.

	Plate	Screen	Cathode	Anode
6A8G	258	70	4.	150
6D6	258	70	2.	
6Q7G	150	-	1.9	
6V6G	250	258	11.4	
80	630 A.C.PLATE TO PLATE-330 D.C.Fil.to Ground			
76	250	-	19.	

FADA RADIO MODEL 6A65 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles - 6 Tube Superheterodyne. Tubes required - 6A8G-6D6-76-6Q7G-6V6G-80.

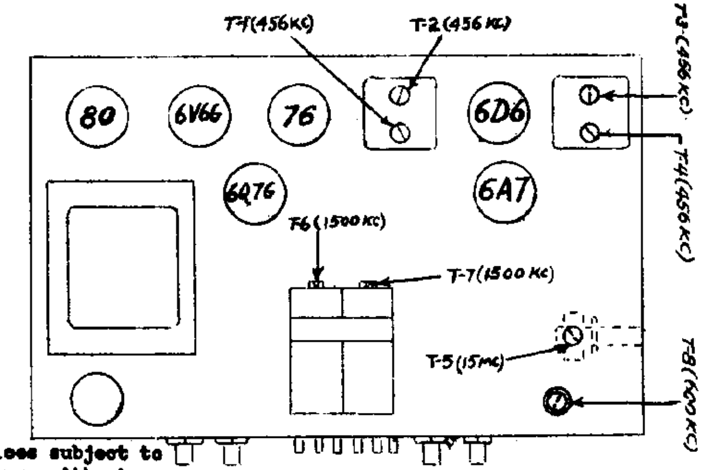


I.F. - 456 Kc.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

		List			List
50.53	Volume Control	.85	35.70	I.F. Input	1.20
45.84	Tone Switch	.65	35.77	I.F. Output	1.20
45.87A	Band Switch	.70	35.121	I.F. Trap	.45
40.73	Power Transformer	3.60	25.306	Variable Cond.	2.50
35.119A	Antenna Coil	1.35	105.123	Speaker (8")	6.30
35.133	Oscillator Coil	.60	105.119	" (10")	7.75

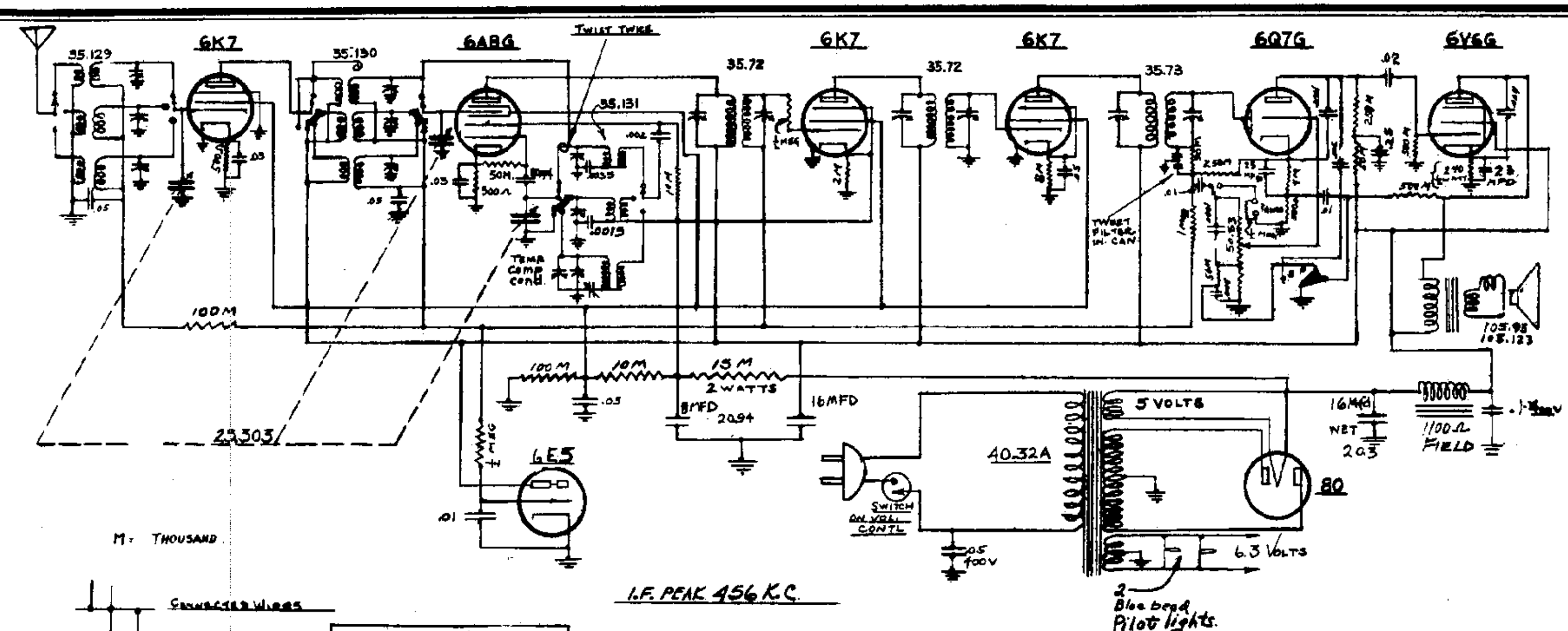
Prices subject to change without notice.



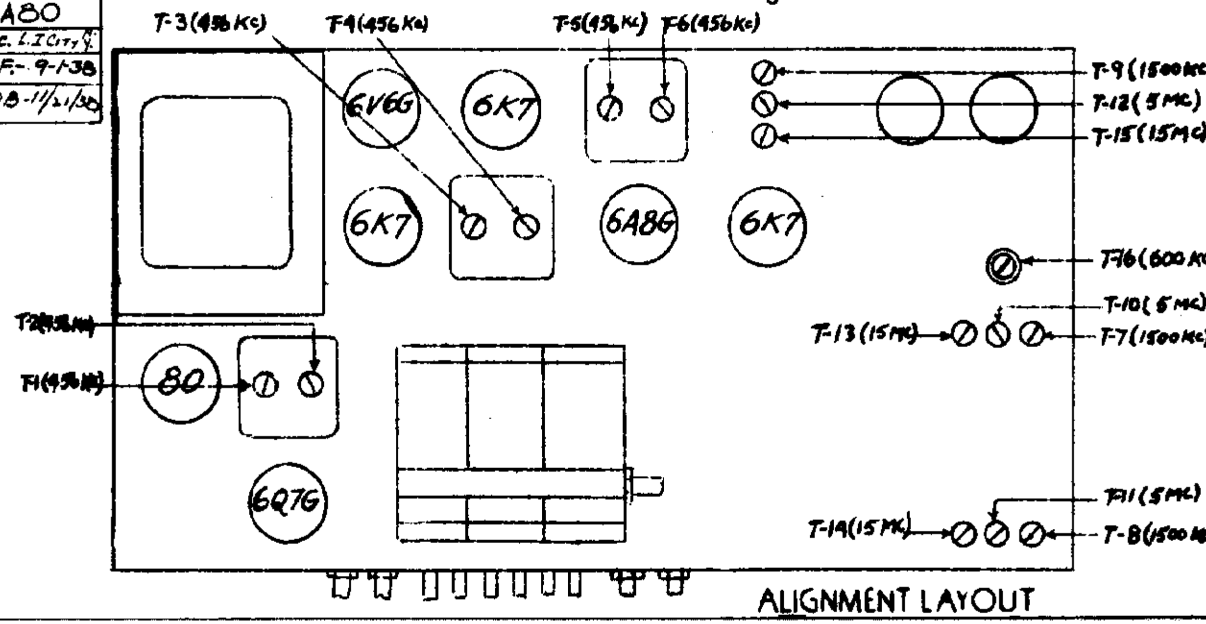
ALIGNMENT LAYOUT

FADA RADIO & ELECTRIC CO

MODEL 6A80
Schematic, Socket, Voltage
Trimmers,



MODEL 6A80
FADA RADIO & ELEC. L.I. City N.Y.
DRAWN BY - H.F. - 9-1-38
CHECKED BY DPB - 11/21/38



	6K7G	6A8G	6K7G	6K7G
Plate	265	265	265	265
Screen	95	95	95	95
Cathode	3.8	5.2	7.2	9
Anode	-	136	-	-

	6Q7	6V6G	80
Plate	83	255	(710AC-plate to plate
Screen	-	265	(356DC Fil. to ground
Cathode	1.9	13	
Anode	-		

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C. 1000 OHM PER VOLT METER.

FADA RADIO & ELECTRIC CO

FADA FLASH-O-MATIC SIX

INTRODUCTION: FADA Flash-o-Matic Six is an electrical type automatic tuning system that, once adjusted, will automatically "tune in" any one of six local broadcast stations operating between 540 and 1500 kilocycles (K. C.). While the Flash-o-Matic is not confined to local reception, it should be adjusted for stations affording the best reception and most frequently "tuned in."

ALIGNING PROCEDURE: It is advisable that the receiver remain in operation for fifteen minutes or more before attempting any adjustments. Now that the receiver has reached constant temperature the following adjustments are to be made to the trimmer condenser set screws located on the Flash-o-Matic tuning panel at the rear of the receiver.

(a) Select six local broadcast stations whose programs are preferred; then, detach the station call letters from the station call letter tab sheets, which are supplied with each receiver.

(b) The six Flash-o-Matic positions are numbered and arranged according to frequency limits.

There are number tabs (1 to 6) in the Flash-o-Matic escutcheon as shipped from the factory. These tabs show the relation between the Flash-o-Matic escutcheon and the Flash-o-Matic tuning panel positions and are to be removed, one at a time (with the aid of a pin) when inserting the station call letters.

The six call letter tabs corresponding to the six broadcast stations which have been chosen, must be arranged in the Flash-o-Matic escutcheon so that the frequency in kilocycles of each station will fall within the frequency limits of the proper group.

If one of the chosen stations has an operating frequency of 550 K.C., it should be placed in the No. 1 (530 to 710 K.C.) group, a station of 600 K.C. should be placed in the No. 2 group, etc.

Each group has considerable overlap to allow for the selection of six stations which may have frequency assignments comparatively close together.

Having inserted the call letter tabs, cover each tab with a celluloid disc furnished with your receiver.

(c) Two trimmer condenser set screws are provided for each one of the six station positions and are accessible at the rear of the receiver. All trimmer condenser set screw adjustments are marked as to their group number and frequency range coverage.

(d) Tune in the station in the usual manner, using manual tuning, and determine the program.

(e) Turn the wave band switch completely to the right (clockwise).

(f) Turn the Flash-o-Matic selector switch to the position that corresponds to the group in which the desired station falls. This can be readily determined, for as the Flash-o-Matic selector switch is turned the various call letters will light up.

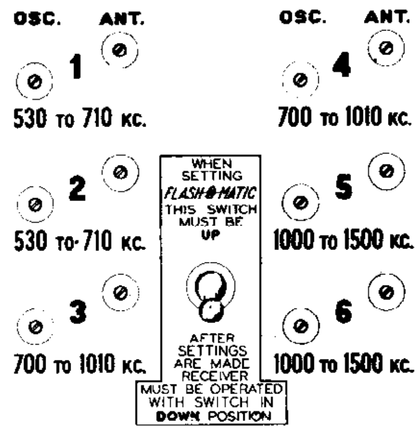
(g) The toggle switch *(SEE ILLUSTRATION)* near the center of the Flash-o-Matic tuning panel should be thrown to the "UP" position during the following adjustments.

(h) With the aid of a screwdriver adjust (by turning clockwise or counter-clockwise) the OSC. trimmer condenser set screw *(SEE ILLUSTRATION)* corresponding to the proper station, until the same station that was tuned in manually is heard. Turn the volume control down so that any variation in sound output can be noted and readjust set screw for maximum sound output. *TAKE PARTICULAR CARE WHILE MAKING THIS ADJUSTMENT THAT THE SAME STATION IS HEARD AND NOT A NETWORK STATION BROADCASTING THE SAME PROGRAM.*

(i) Now adjust the ANT. trimmer condenser set screw *(SEE ILLUSTRATION)* having the same position number, for maximum sound output.

(J) Repeat the same procedure as outlined above for each of the remaining five stations.

(k) To insure accurate adjustment, it may be found advisable to repeat the operations outlined in paragraphs (h), (i) and (J).



(l) Having completed the adjustments for the desired stations throw the toggle switch *(SEE ILLUSTRATION)* to "DOWN" position. The receiver is now ready for Flash-o-Matic operation and any one of the six stations to which the Flash-o-Matic has been adjusted, may be instantly "tuned in" by merely rotating the Flash-o-Matic selector knob to the desired station position.

(m) In order to reset one or more positions of the Flash-o-Matic tuning to other stations, it is merely necessary to follow the instructions outlined above; additional celluloid discs are supplied for this purpose.

OPERATING PROCEDURE: For Flash-o-Matic tuning turn the wave band switch completely to the right (clockwise): this will reduce the illumination of the station selector dial. Then, turn the Flash-o-Matic selector switch until the call letters of the desired station are illuminated. To return to standard or manual tuning simply turn the wave band selector switch toward the left (counter-clockwise) to the desired wave band.

ALIGNMENT MODEL 6A80

Tuning ranges 533-1730 K.C., 1.71-5.7 M.C. and 5.67 and 18.1 M.C. Tubes 3-6K7G-6A8G-6E5-6V6G-80.

Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. Turn volume control to maximum. Tone switch to high end. Band switch to broadcast. Connect modulated oscillator to grid of 6A8G in series with a .1 condenser and adjust trimmers 1-2-3-4-5-6 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 signal adjust trimmers 7-8-9 for maximum output, reducing input signal as required. Turn pointer to 600 K.C. Shift oscillator to 600 K.C. and adjust padder 16 for maximum while rocking gang condenser. Check alignment at 1000 K.C. Turn band switch to position 2- turn pointer to 5 M.C. Use a 400 ohm carbon resistor for dummy antenna. Adjust trimmers 10-11-12 for maximum output. Check output at .8 and 2.4. Make sure 5 M.C. was aligned on fundamental and not image. Turn band switch to position 3 - turn pointer to 15 M.C. Adjust trimmers 13-14-15 for maximum. Check image at 14.1. Check sensitivity at 6 M.C.

Alignment, Voltage
Socket, Trimmers

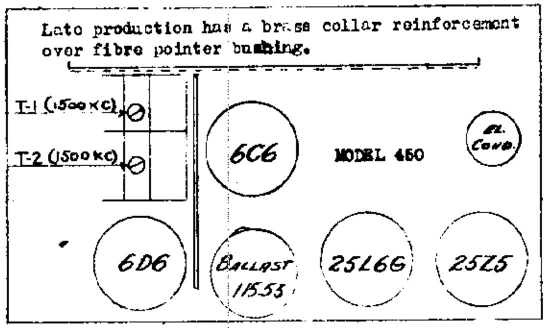
FADA RADIO & ELECTRIC CO

MODELS 20, 20A, 20B, 20T (Late)
MODEL 450
MODEL 451
MODELS 454, 454

FADA RADIO MODEL 450 - 115 AC-DC - Tuning Range 545-1720 K.C. - 5 Tube Tuned Radio Frequency. Tubes required-6D6-6C6-25L6G-25Z5-115.53.

Alignment Instructions: --Turn volume control to maximum position. Connect a modulated oscillator to antenna hank using a .0001 condenser as a dummy antenna. Turn condenser to minimum position. Roughly adjust to 1720 K.C. Set oscillator at 1500 K.C. Turn condenser until signal is loudest, then adjust trimmers 1 & 2 for maximum signal reducing output of oscillator as required. Check alignment at 600 & 1000 K.C. using magic wand. Slight adjustments can be made at 600 K.C. by adjusting rotor plates.

Late production has a brass collar reinforcement over fibre pointer bushing.



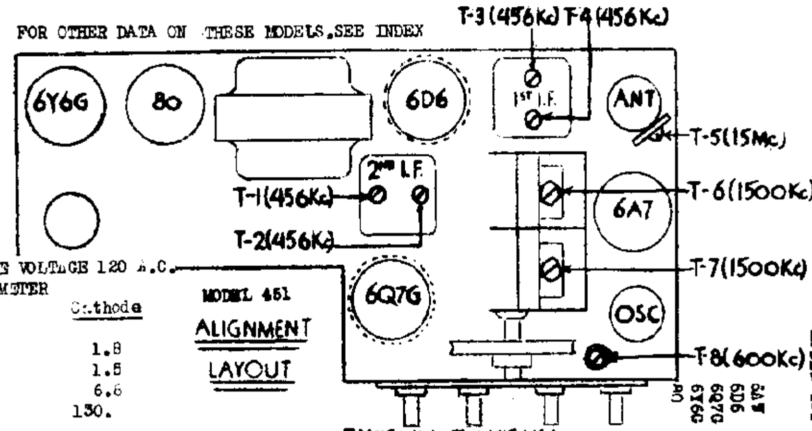
MODEL 450
THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.
1000 OHM PER VOLT METER

	Plate	Screen	Cathode
6D6	103	104	1.8
6C6	15	10	1.5
25L6G	96	104	6.6
25Z5	120 A.C.	-	130.

MODEL 454, 454T. READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

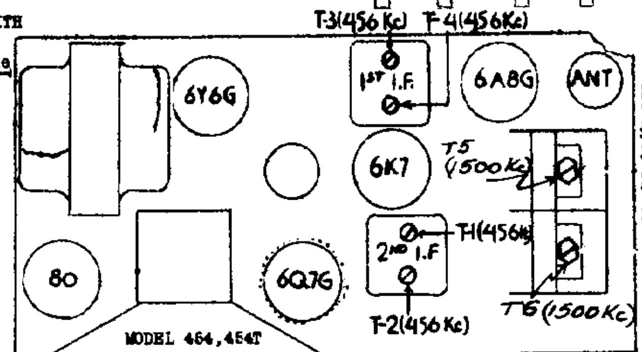
	Plate	Screen	Cathode	Anode
6A8G	112	62	2.7	112
6K7	112	62	2.7	-
6Q7G	50	-	1.1	-
6Y6G	105	112	11.5	-
80	414 AC Plate to Plate			-

FOR OTHER DATA ON THESE MODELS, SEE INDEX



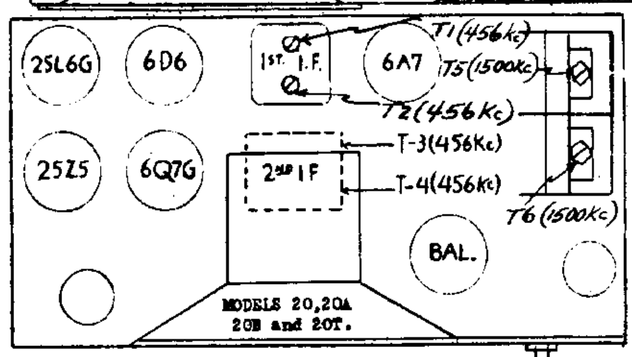
MODEL 451 (TAKEN WITH LINE VOLTAGE 120 A.C.)

	Plate	Screen	Cathode	Anode
6A7	107	52	1.4	78
6D6	107	107	1.4	
6Q7G	55	-	1.2	
6Y6G	100	107	11	
80	414 A.C. Plate to Plate			



MODELS 20, 20A, 20B, 20T. VOLTAGE DATA
THESE READINGS TAKEN WITH LINE VOLTAGE 120 AC

	PLATE	SCREEN	CATHODE	ANODE
6A7	110	50	2.5	105
6D6	110	110	2.5	
6Q7G	45	-	1.1	
25L6G	110	110	7	
25Z5	120 AC	-	133	



NOTE:-MODEL 20T DIFFERS FROM MODEL 20A IN THAT IT HAS A SEPERATE SPEAKER AND A LONGER VOLUME CONTROL SHAFT MODEL 20B DIFFERS IN THAT A 76 TUBE IS SUBSTITUTED FOR THE 6Q7G TO ACCOMMODATE AUTOMATIC VOLUME CONTROL.

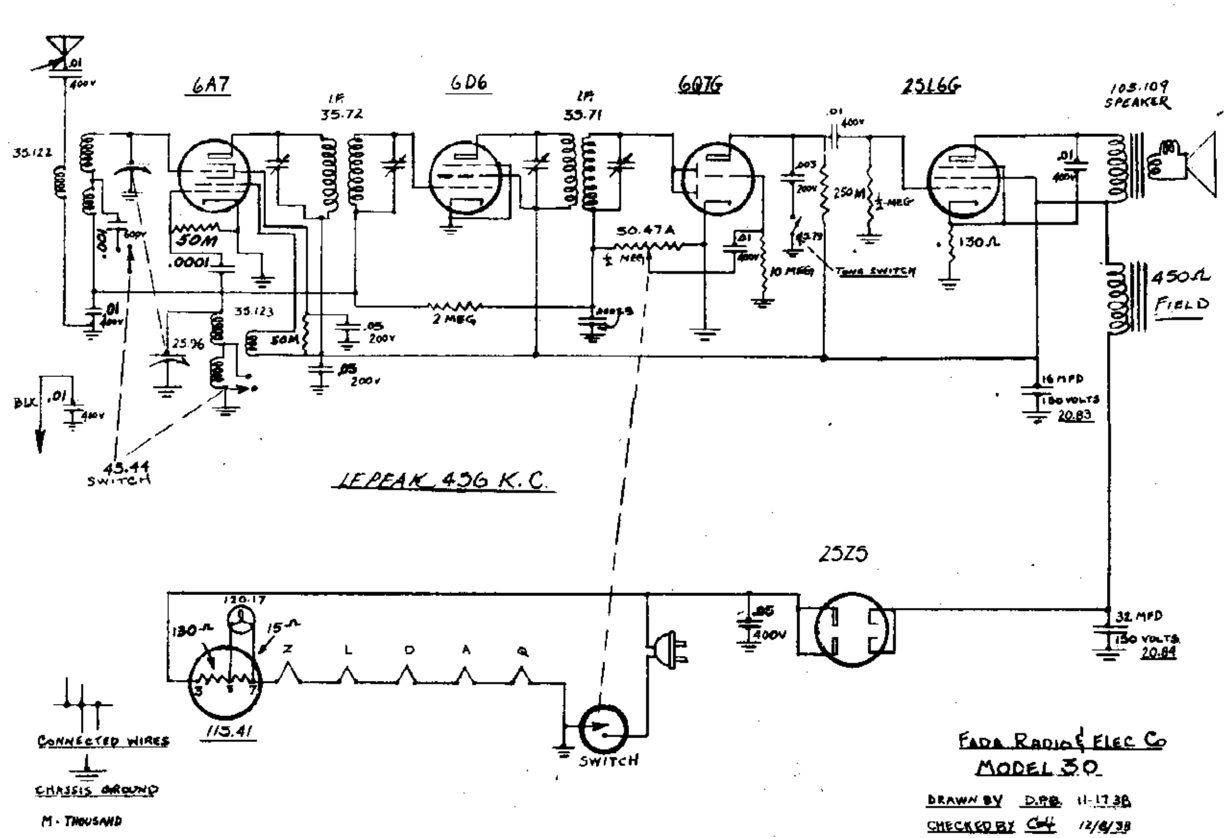
FADA RADIO MODEL 451 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles - 5 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-6Y6G-80. Alignment instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

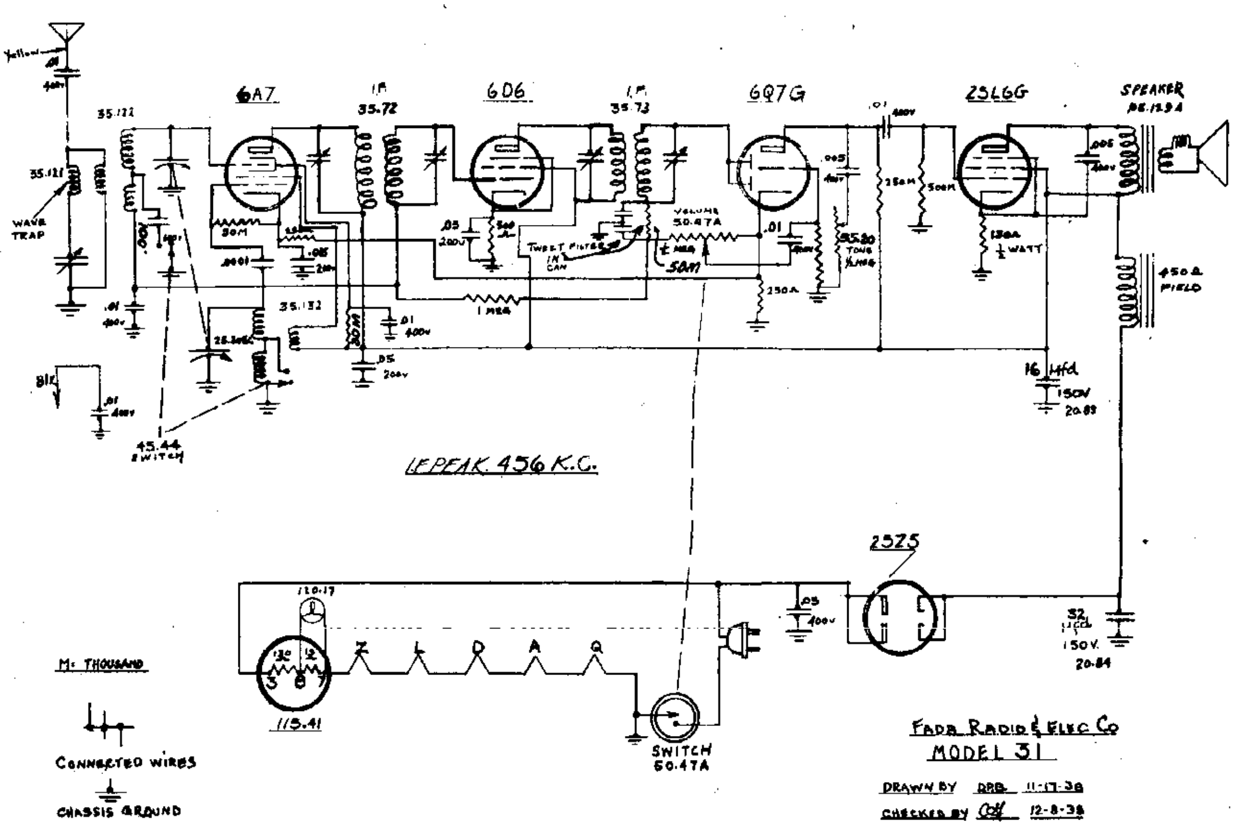
FADA RADIO MODELS 454, 454T

FADA MODELS 20, 20A, 20B, 20T. - 115 VOLTS AD-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne. ---Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

MODEL 30 Late
MODEL 31 Late
Schematics

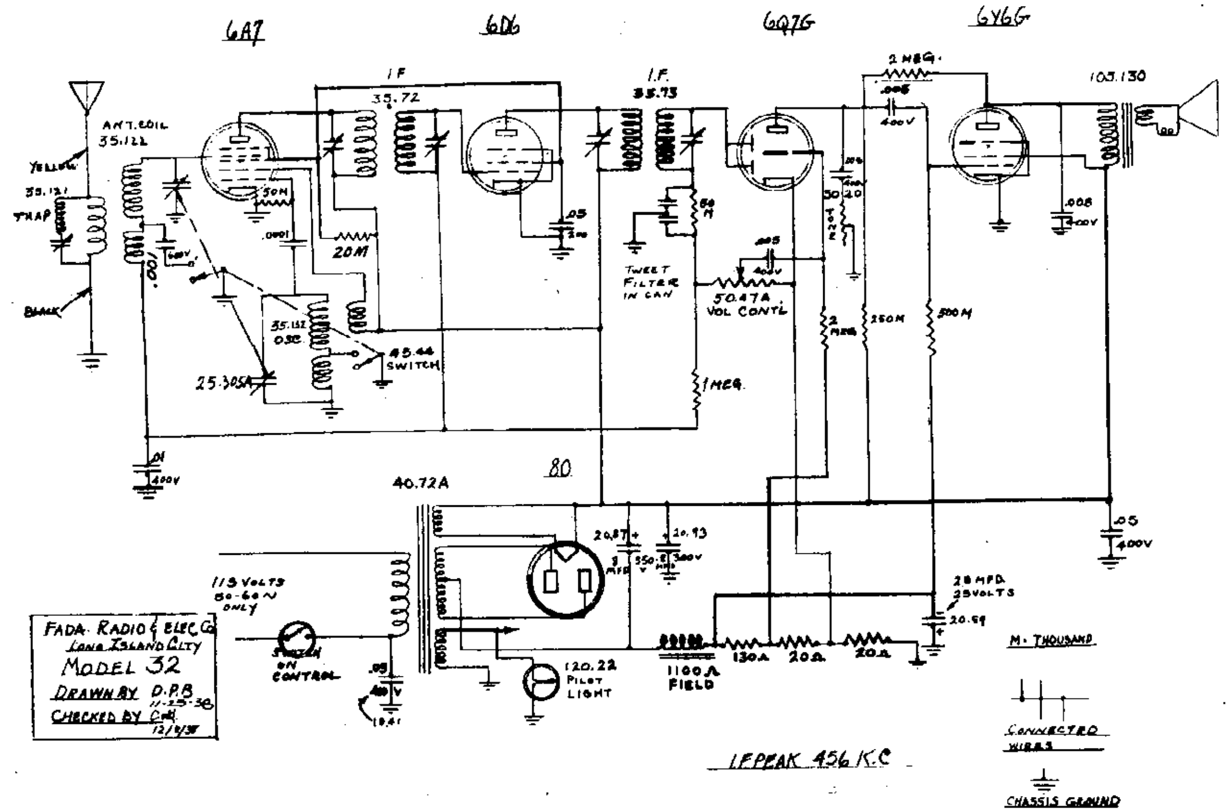
FADA RADIO & ELECTRIC CORP.

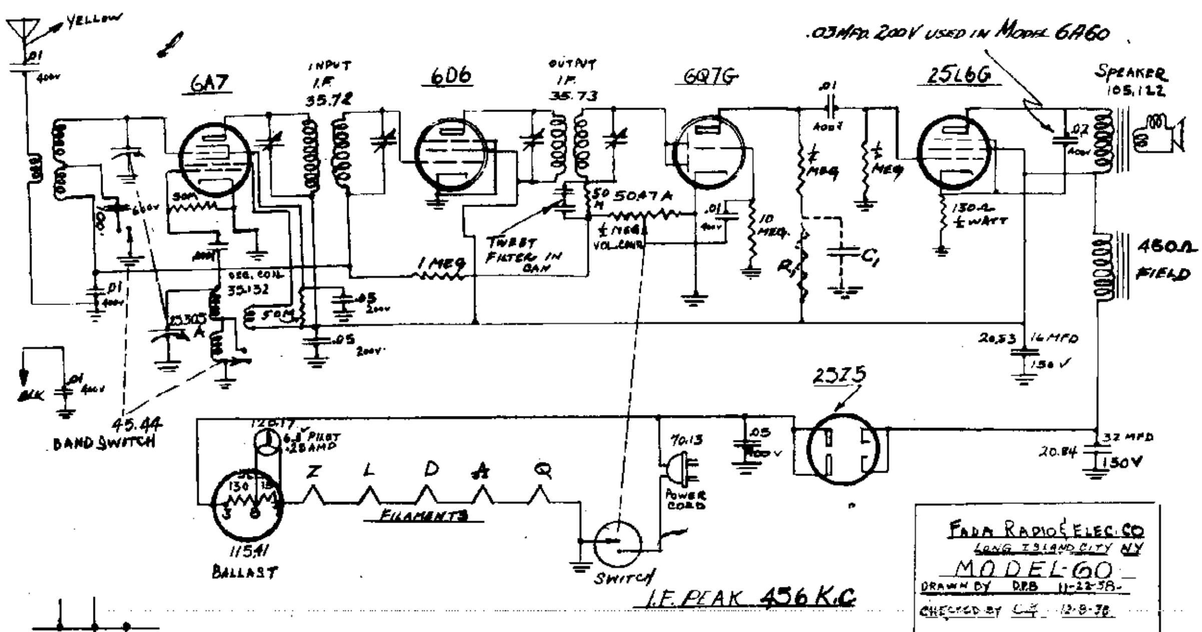




MODEL 32 Lat
MODEL 6A60
MODEL 60
Schematics

FADA RADIO & ELECTRIC CORP.



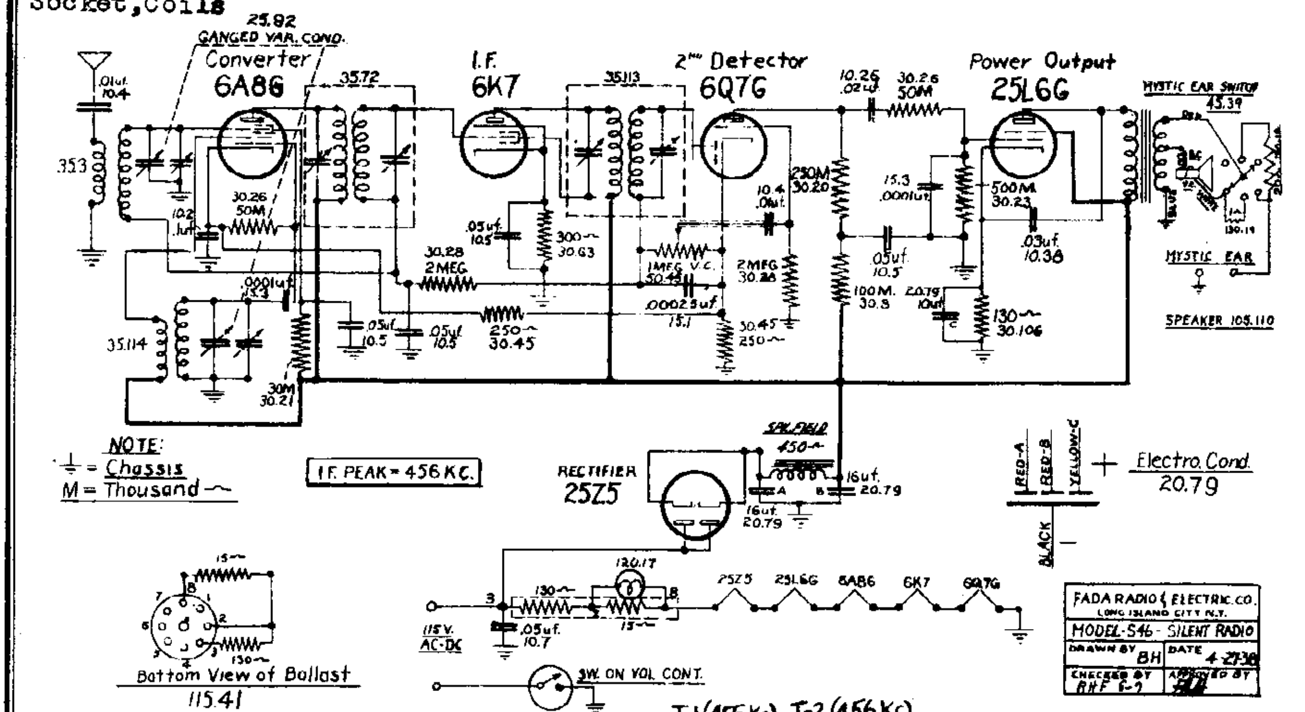


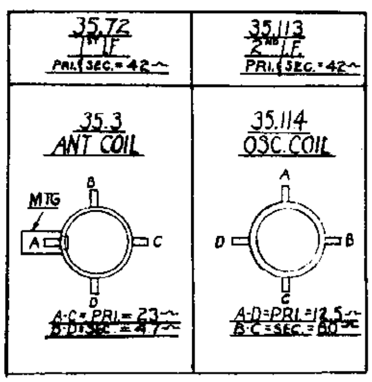
USED ONLY IN MODEL 6A60
R_1 50M.
C_1 .1 MFD 200V.
GANG CONDENSER #25.304 (REPLACES #25.305A SHOWN ABOVE).
BAND SWITCH #45.83 (REPLACES #45.44 SHOWN ABOVE).

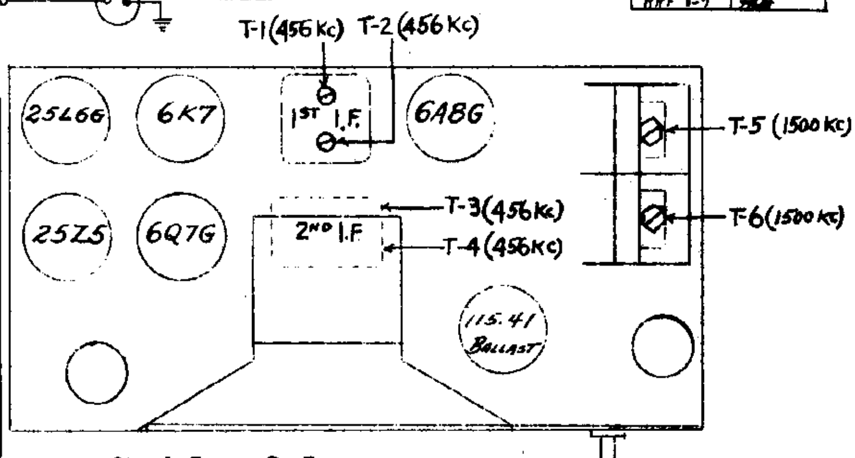
FADA RADIO & ELEC. CO
L.I. CITY N.Y.
MODEL 6A60
DRAWN BY D.P.B. 11-22-38
CHECKED BY C.H. 12-8-38

MODEL S46
Schematic, Voltage
Alignment, Trimmers
Socket, Coils

FADA RADIO & ELECTRIC CO







ALIGNMENT LAYOUT

FADA RADIO MODEL S46 - 115 VOLTS AC-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne. Tubes required - 6A8G-6K7-6Q7G-25L6G-25Z5-115.41.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked then proceed as follows:---Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A8G tube in series with a.1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

*** USE ONLY GENUINE FACTORY REPLACEMENT PARTS ***

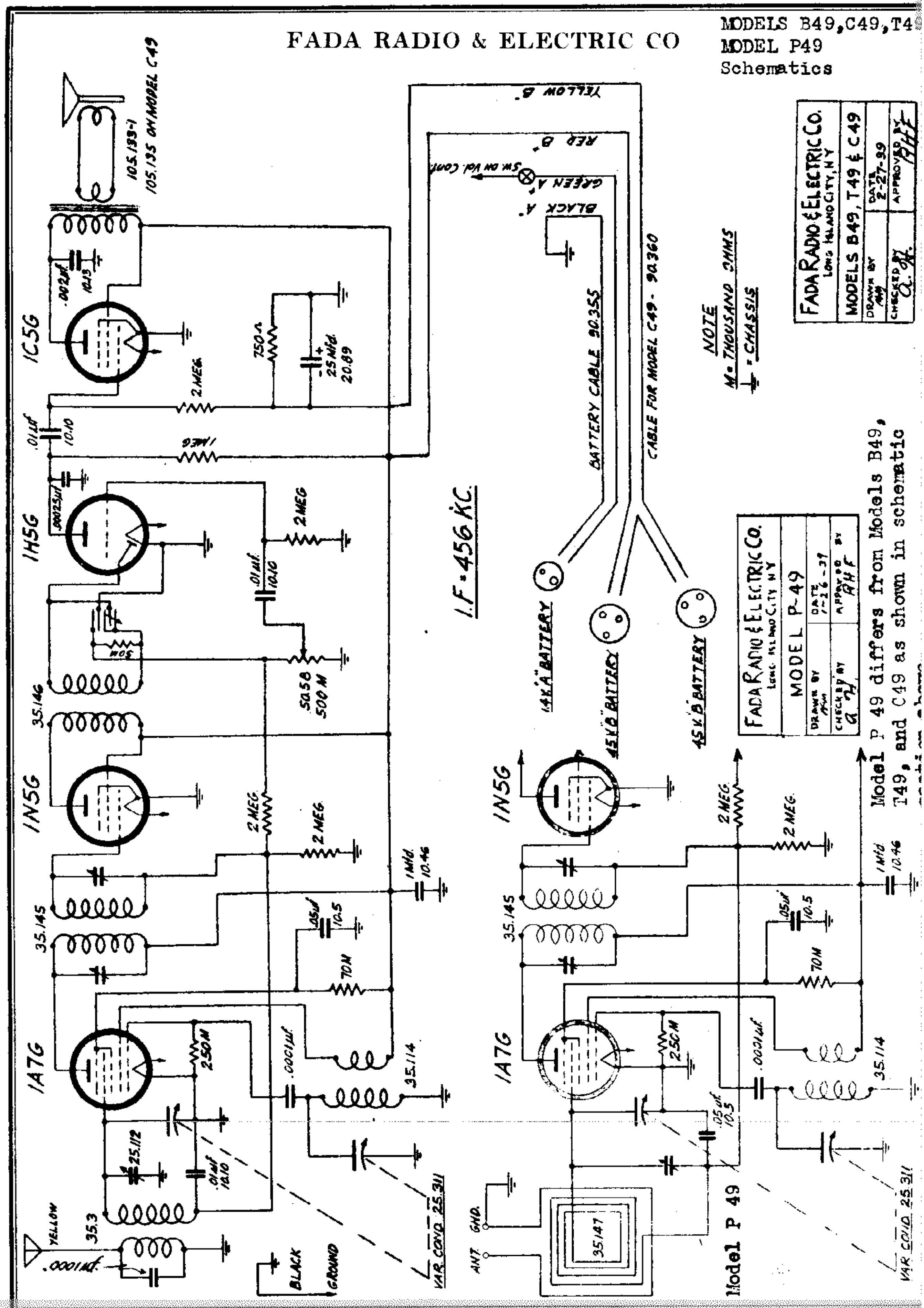
		List			List
75.207	Dial Assembly	1.75	20.79	Electrolytic Condenser	1.25
50.45	Volume Control	.80	105.110	Speaker	3.85
35.3	Antenna Coil	.60	120.27	Pilot Light Socket	.10
35.114	Oscillator Coil	.45	140.37	Knobs (walnut)	.10
35.72	Input I.F.	1.00		(ivory)	.20
35.113	Output I.F.	.90	75.245	Crystal	.25
25.92A	Variable Condenser	2.15			

Prices subject to change without notice.

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

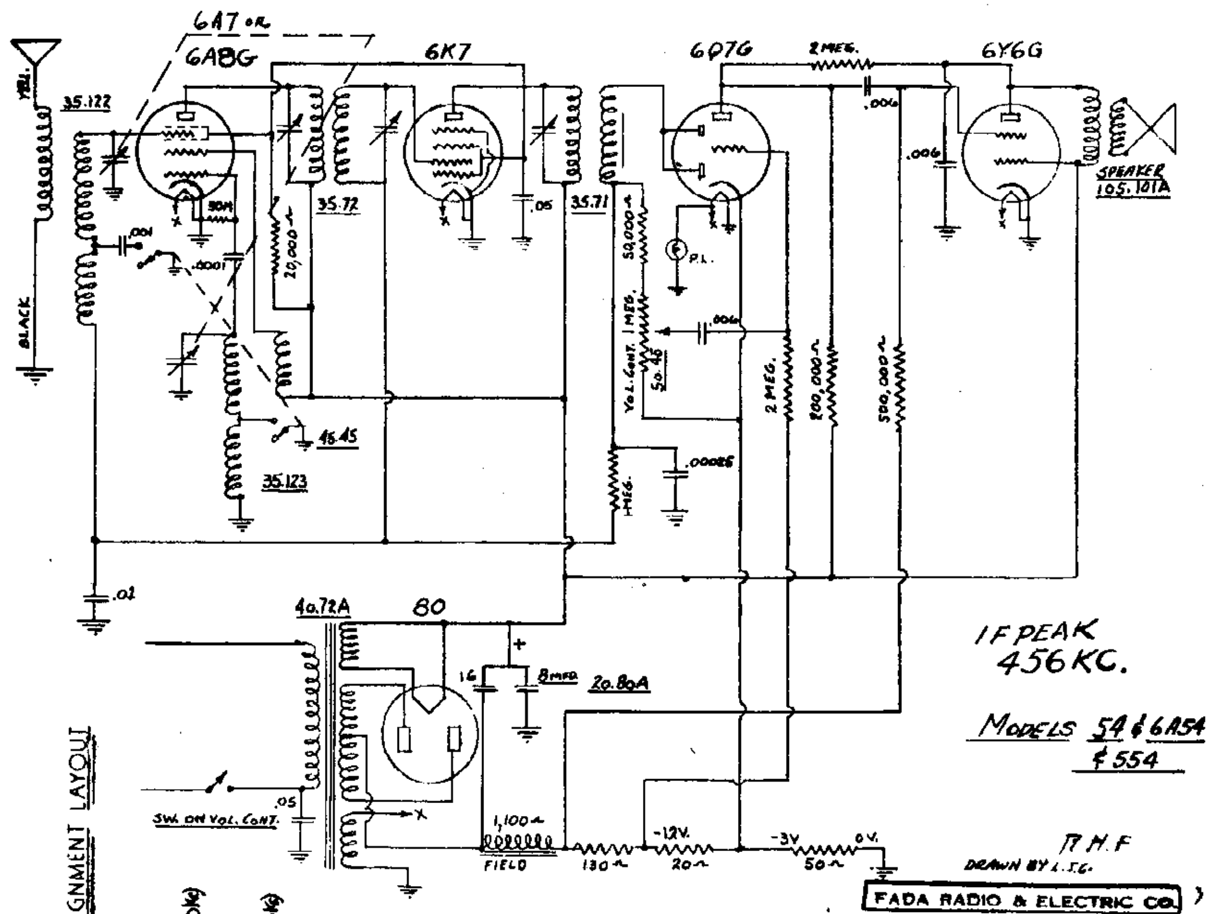
	Plate	Screen	Cathode	Anode
6A8G	110	50	2.5	105
6K7	110	110	2.5	-
6Q7G	45	-	1.1	-
25L6G	110	110	7.	-
25Z5	120 AC	-		133

MODELS B49,C49,T49
MODEL P49
Schematics

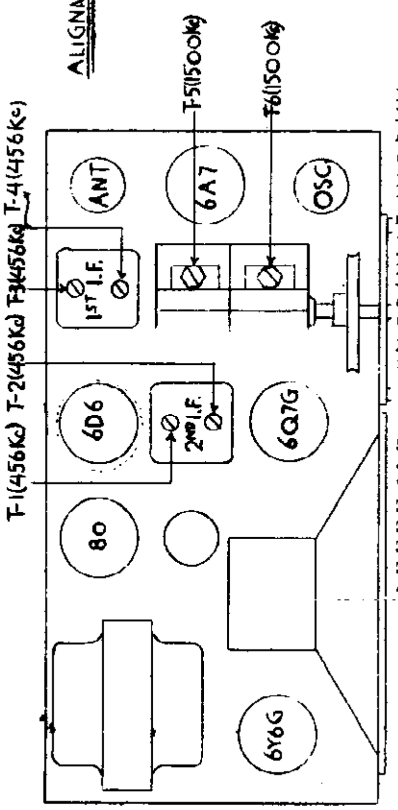


MODELS 54, 6A54, 554
Schematic, Voltage
Alignment, Trimmers
Socket

FADA RADIO & ELECTRIC CO



ALIGNMENT LAYOUT



FADA RADIO MODEL 54 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 540-1720 and 1550-4000 K.C. - 5 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-6Y6G-80. Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Band switch in broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. using magic wand. Set band switch in police band position and check sensitivity at 2800 K.C. Do not disturb trimmers for this operation.

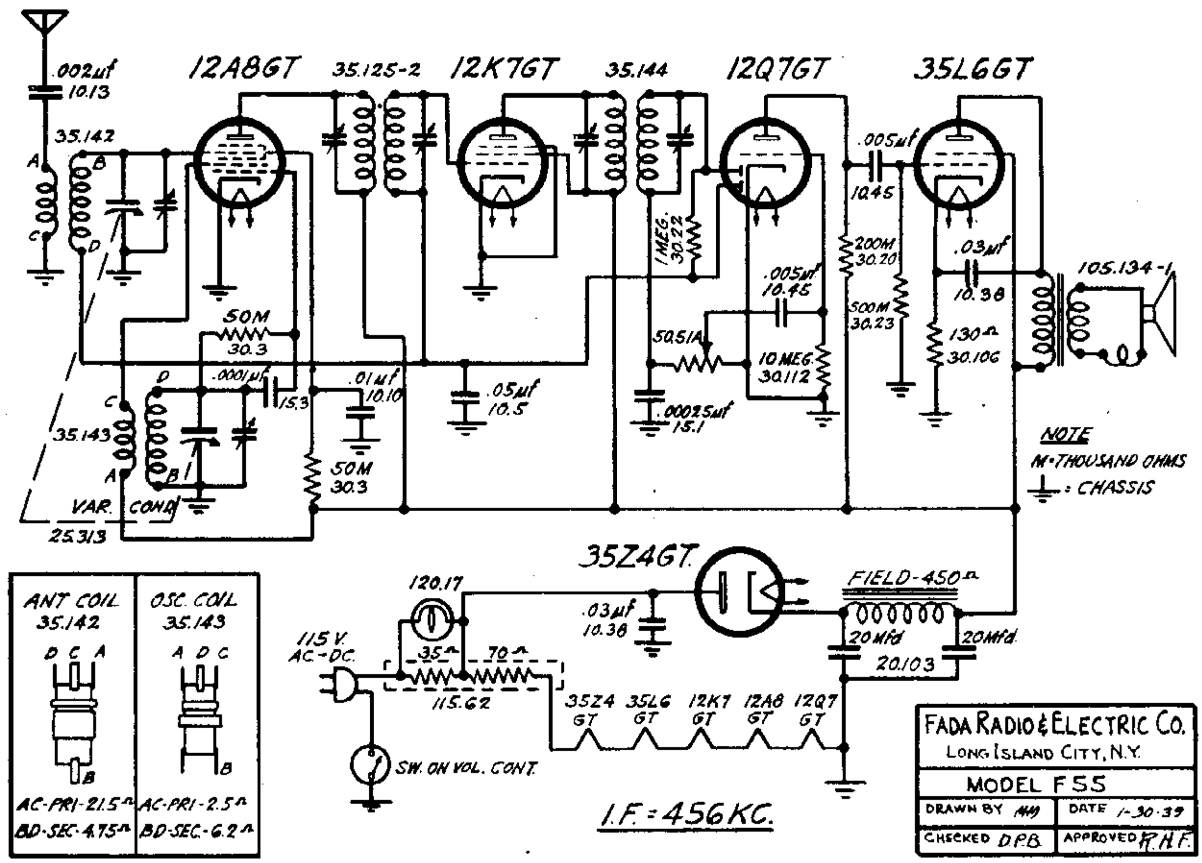
Prices subject to change without notice.

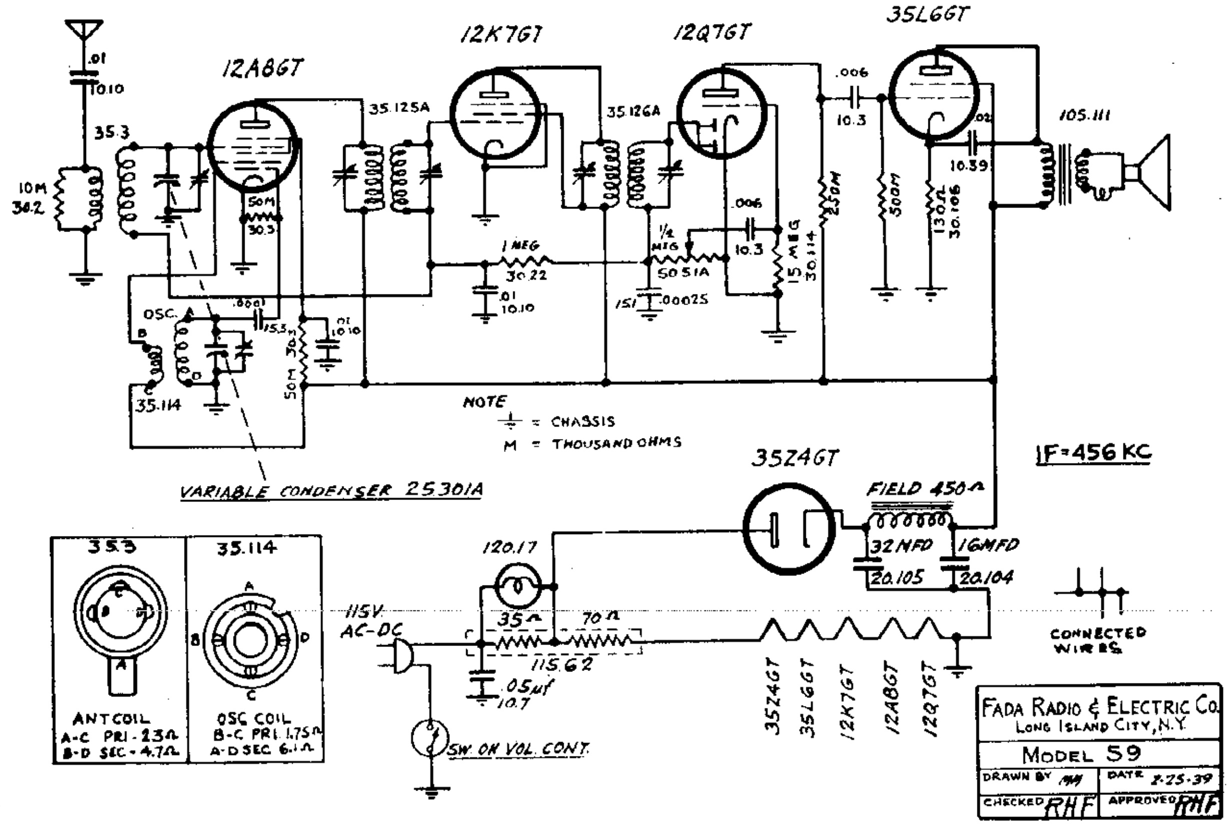
		List			List
50.47A	Volume Control	.85	25.305A	Variable Condenser	2.10
45.44	Band Switch	.50	20.81A	Electrolytic "	1.35
75.229	Vernier Drive	.25	75.267	Pulley	.20
35.122	Antenna Coil	.75	75.290	Dial Plate	.20
35.132	Oscillator Coil	.60	75.223	Dial Pointer	.15
35.72	Input I.F.	1.00	75.291	Dial Scale	.15
35.73	Output I.F.	1.25	105.114	Speaker	4.25
40.72A	Power Transformer	3.25	75.230	Crystal	.40

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode	Anode
6A7	112	62	2.7	112
6D6	112	62	2.7	-
6Q7G	50	-	1.1	-
6Y6G	106	112	11.5	-
80	414 A.C. Plate to Plate			

FADA RADIO & ELECTRIC CO



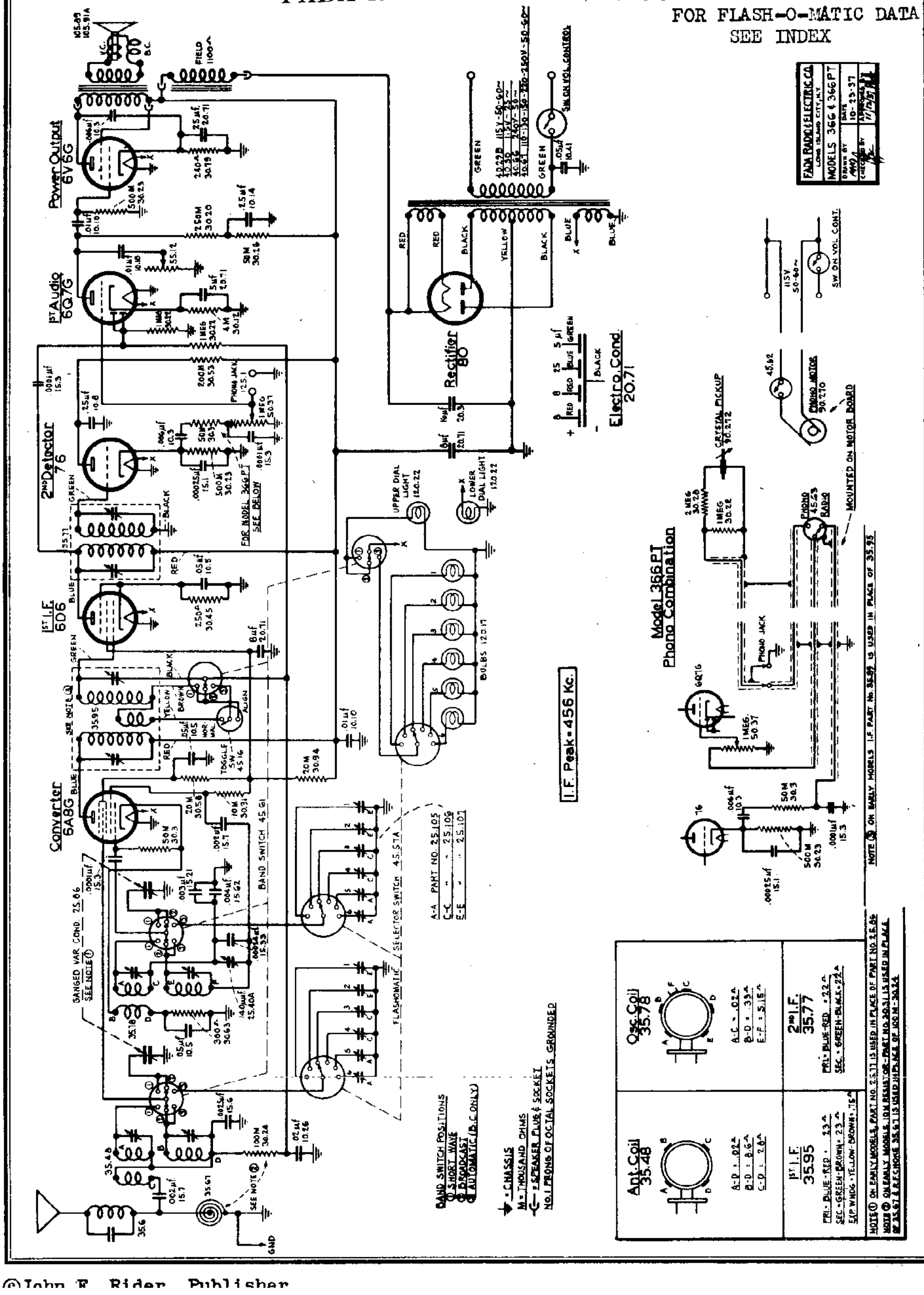


MODELS 366,366PT

FADA RADIO & ELECTRIC CO

Schematic, Coils

FOR FLASH-O-MATIC DATA SEE INDEX



MODEL 365
MODELS 366,366PT
Alignment,Voltag
Socket,Trimmers

ALIGNMENT

1. VOLUME CONTROL .... MAXIMUM.
2. ATTENUATE SIGNAL TO CONTROL SIGNAL OUTPUT.
3. CONNECT PROPER DUMMY ANTENNA, FOR EACH ADJUSTMENT, IN SERIES WITH HIGH POTENTIAL SIDE OF SIGNAL GENERATOR. FOR .001 MFD. CONDENSER, USE PAPER TUBULAR TYPE (400V); FOR 200 MFD., MICA; 400 and 50,000 ohm resistors, CARBON 1/3 WATT.
4. GROUND LOW POTENTIAL SIDE OF SIGNAL GENERATOR.
5. FOR ADJUSTING THE I.F. TRIMMER CONDENSERS, THE CONTROL GRID SHOULD BE REMOVED AND A 50,000 OHM RESISTOR INSERTED IN SERIES WITH SAME. THEN CONNECT THE HIGH POTENTIAL LEAD OG THE SIGNAL GENERATOR THROUGH THE .001 MFD. CONDENSER DIRECTLY TO THE CONTROL GRID CAP OF THE TUBE.
6. REPEAT ALL ADJUSTMENTS.
7. TO DETERMINE THAT THE SHORT WAVE BAND SHUNT TRIMMER HAS NOT BEEN ADJUSTED TO THE IMAGE FREQUENCY, TURN THE DIAL TO THE FREQUENCY LISTED UNDER IMAGE FREQUENCY WHERE A SIGNAL WEAKER THAT THE FUNDEMENTAL SHOULD BE NOTED, HOWEVER, IF NO SIGNAL CAN BE HEARD AT THIS SETTING EVEN WITH GREATER SIGNAL GENERATOR OUTPUT, THE TRIMMER HAS BEEN IMPROPERLY ADJUSTED AND IT WILL BE NECESSARY TO READJUST TO THE PROPER PEAK.

ALIGNMENT TABLE

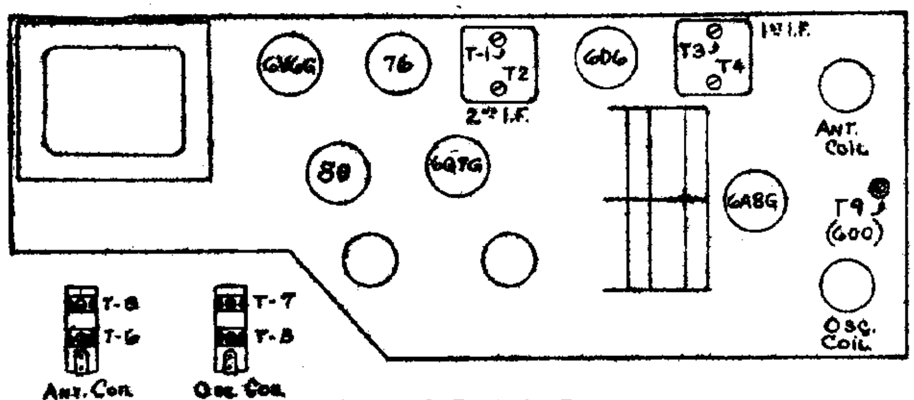
WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	IMAGE FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6D6 tube	T-1,T-2
B.C.	1000 KC	456 KC	---	.001 mfd. 50,000 ohms	Control grid of 6A8G tube	T-3,T-4
S.W.	15.0 MC	15.0 MC	15.9 MC	400 ohm resistor	Yellow antenna lead	T-5,T-6
S.W.	6.0 MC	6.0 MC	---	400 ohm resistor	Yellow antenna lead	Check Tracking
B.C.	1500 KC	1500 KC	---	200 mmfd. condenser	Yellow antenna lead	T-7,T-8
B.C.	600 KC	600 KC	---	200 mmfd. condenser	Yellow antenna lead	T-9*

*To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

VOLTAGE ACROSS ELECTROLYTIC CONDENSERS

1st Section	2nd Section	3rd Section
312	240	105

Voltage across speaker field - 73 volts



ALIGNMENT LAYOUT

CONTINUITY AND VOLTAGE READINGS ON

MODEL 365 & 366 SERIES

SEE INDEX FOR MODEL 365 SCHEMATIC

Line voltage 115 A.C. - Input watts - 58

(No signal input)

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A8G	1st Detector	235	1.9	1.3	65
	Oscillator	86	2.2	---	---
6D6	Int. Freq.	235	9.4	3.0	105
76	2nd Detector	127	.1	13.0	---
6Q7G	A.V.C.	---	---	---	---
	1st Audio	67	.1	1.3	---
6V6G	Pwr. Pentode	220	41.0	10.5	229
80	Rectifier	---	66.0 TOTAL	---	---

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages. Above readings taken with a 105.89 speaker in circuit.

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.89	1,100*	210*	.5**	3.0
105.91A	1,100*	220*	.8**	3.0

* These are cold D.C. resistance values.

**This reading includes resistance of hum bucking coil.

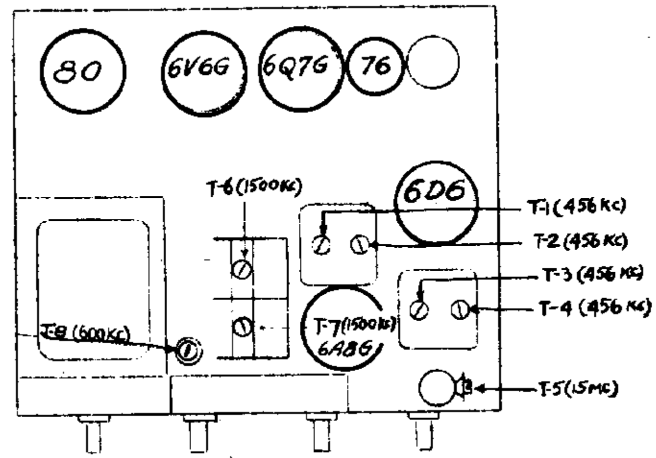
MODEL 465
Schematic, Voltage
Alignment, Trimmers
Socket

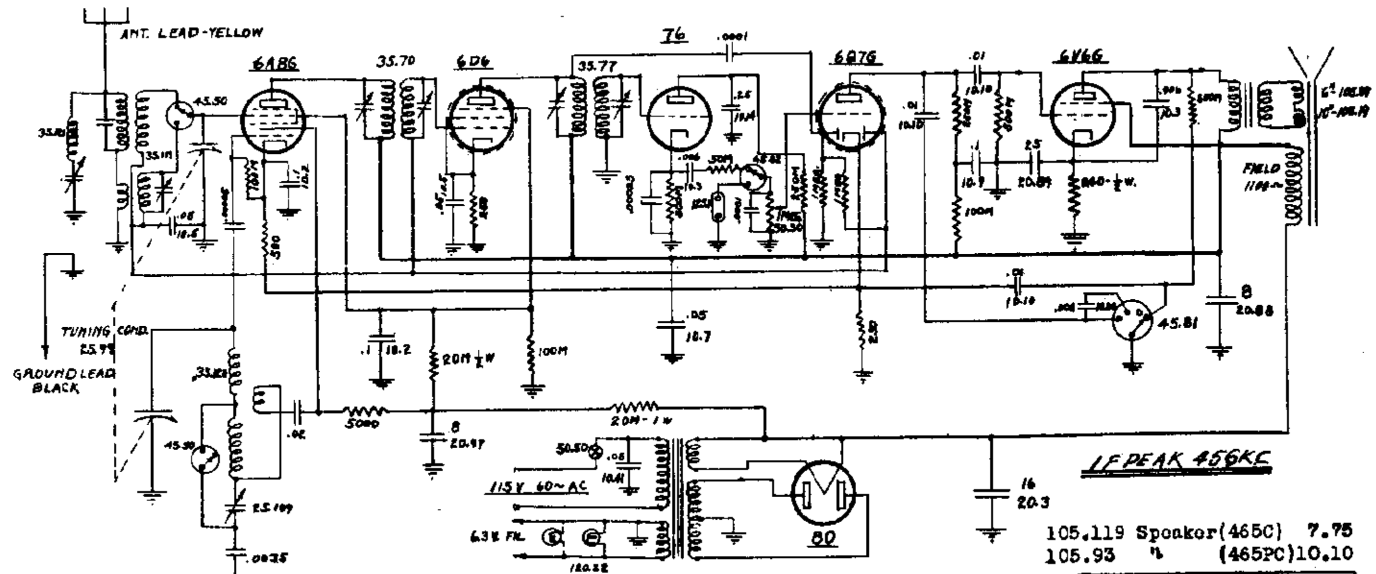
FADA RADIO & ELECTRIC CO

FADA RADIO MODEL 465 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range - 545-1720 K.C. and 5.8-18.4 Megacycles - 6 Tube Superheterodyne. Tubes required-6A8G-6D6-76-6Q7G-6V6G-80.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a.1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condensor fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M. C.

ALIGNMENT LAYOUT





105.119 Speaker(465C) 7.75
105.93 " (465PC) 10.10

FADA RADIO & ELECTRIC Co.
LONG ISLAND CITY NY
MODEL 465
DRAWN BY A.H. SEPT 29, 1938
CHECKED A.H. APP.

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

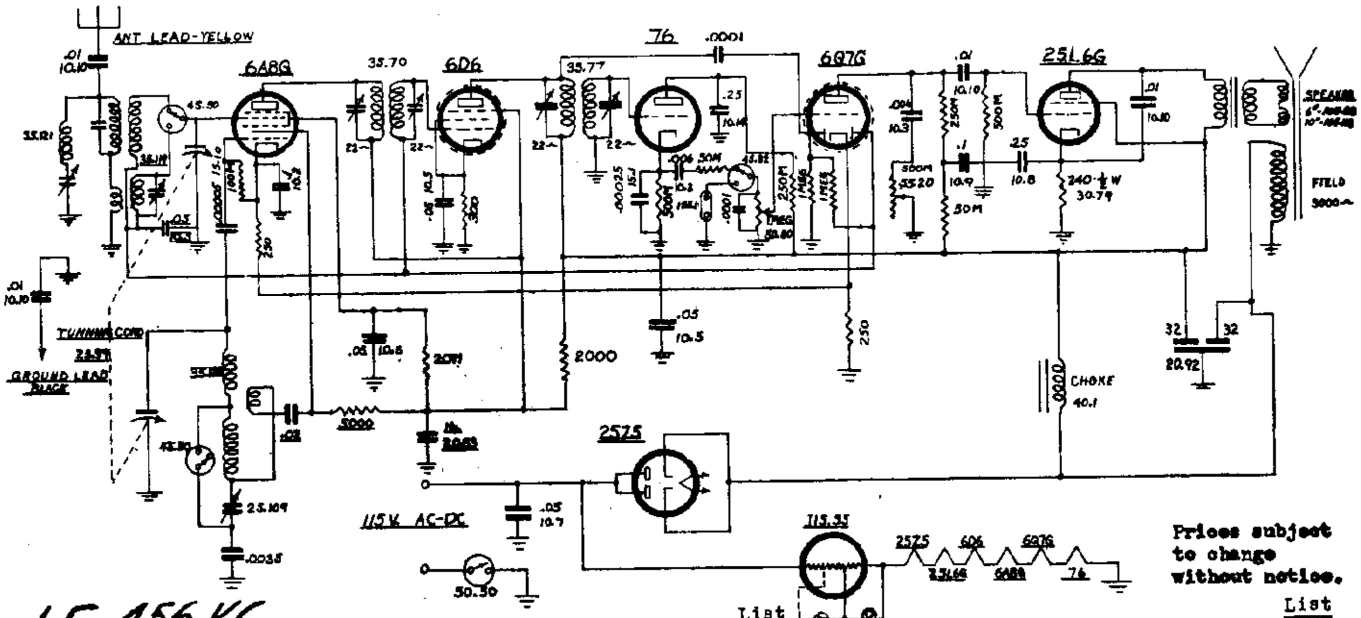
	Plate	Screen	Cathode	Anode
6A8G	258	70	4	150
6D6	258	70	2	
6Q7G	150	-	2	
6V6G	250	258	11.4	
80	630 A.C. Plate to Plate			
76	250	-	19	

		List			List
50.50	Volume Control	.85	35.70	I.F. Input	1.20
45.81	Tone Switch	.65	35.77	I.F. Output	1.20
45.50	Band Switch	.60	35.121	I.F. Trap	.45
40.73	Power Transformer	3.60	25.99	Variable Cond.	2.00
35.119	Antenna Coil	1.35	25.109	Padding Cond.	.25
35.120	Oscillator Coil	.75	105.89	Speaker(465T)	4.25

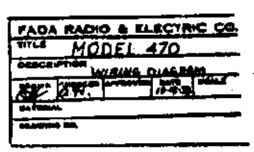
Prices subject to change without notice.

MODEL 470
Schematic, Voltage
Alignment, Trimmers
Socket

FADA RADIO & ELECTRIC CO



I.F.-456 KC.



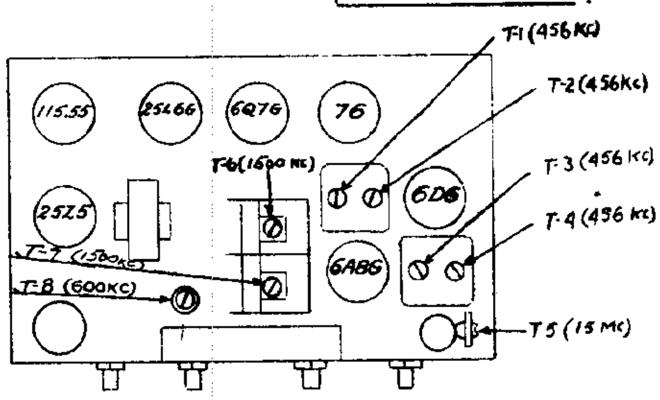
Prices subject to change without notice.

		List
50.50	Volume Control	.85
55.20	Tone Control	.50
45.50	Band Switch	.60
40.1	Filter choke	.75
35.119	Antenna Coil	1.35
35.120	Oscillator Coil	.75

		List
35.70	I.F. Input	1.20
35.77	I.F. Output	1.20
35.121	I.F. Trap	.45
25.99	Variable Condenser	2.00
25.109	Padding "	.25
105.88	Speaker (6½")	4.50

FADA RADIO MODEL 470 - 115 VOLTS A.C.-D.C. - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles - 7 Tube Superheterodyne. Tubes required -6A8G-6D6-76-6Q7G-25L6G-25Z5-115.55.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.



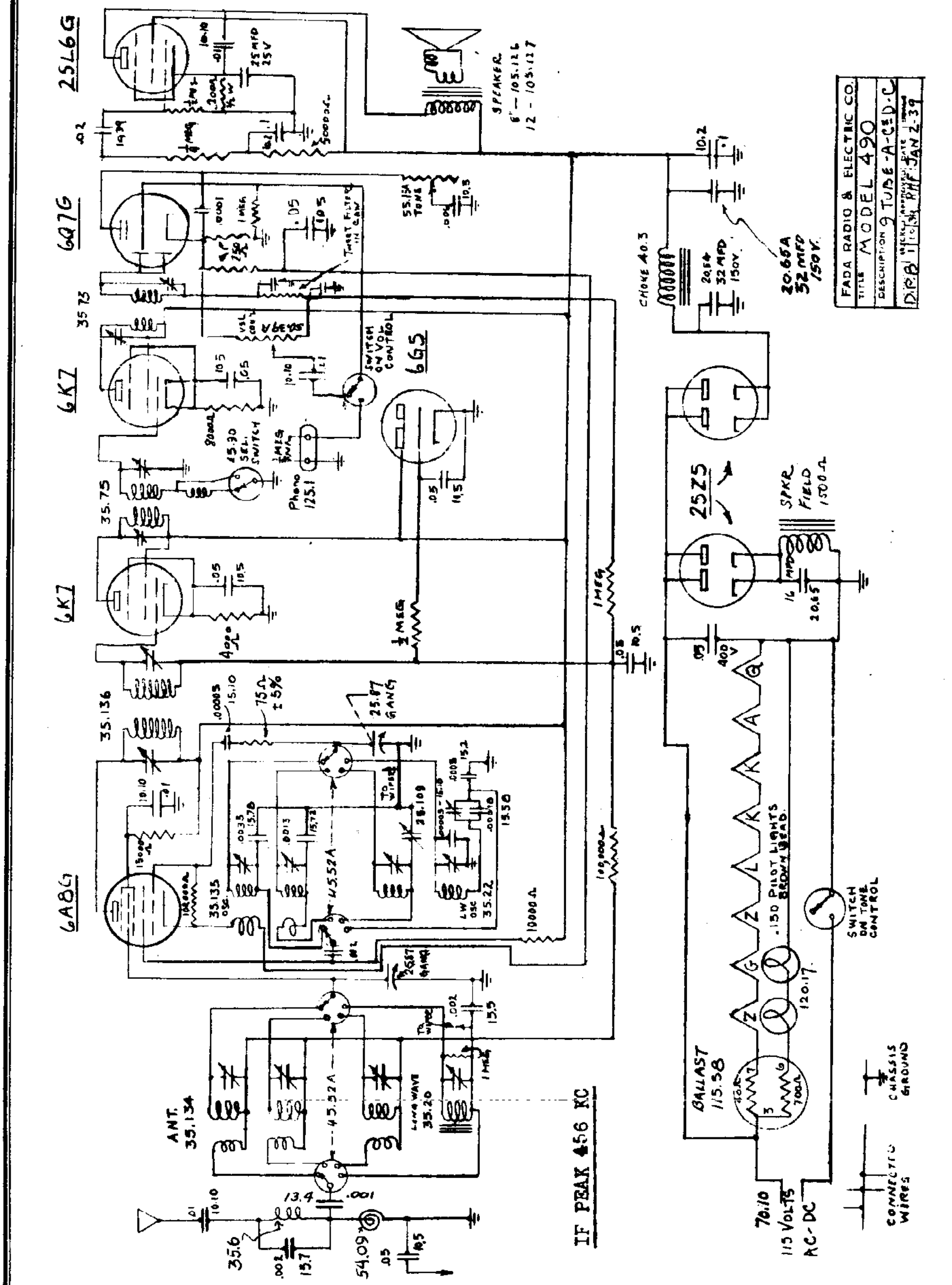
ALIGNMENT LAYOUT

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

	Plate	Screen	Cathode	Anode
6A8G	92	54	2.4	75
6D6	107	96	2.4	
76	101	-	8.6	
6Q7G	75	-	1.2	
25L6G	105	109	8.4	
25Z5	120 A.C.		120 D.C.	

MODEL 490
Schematic

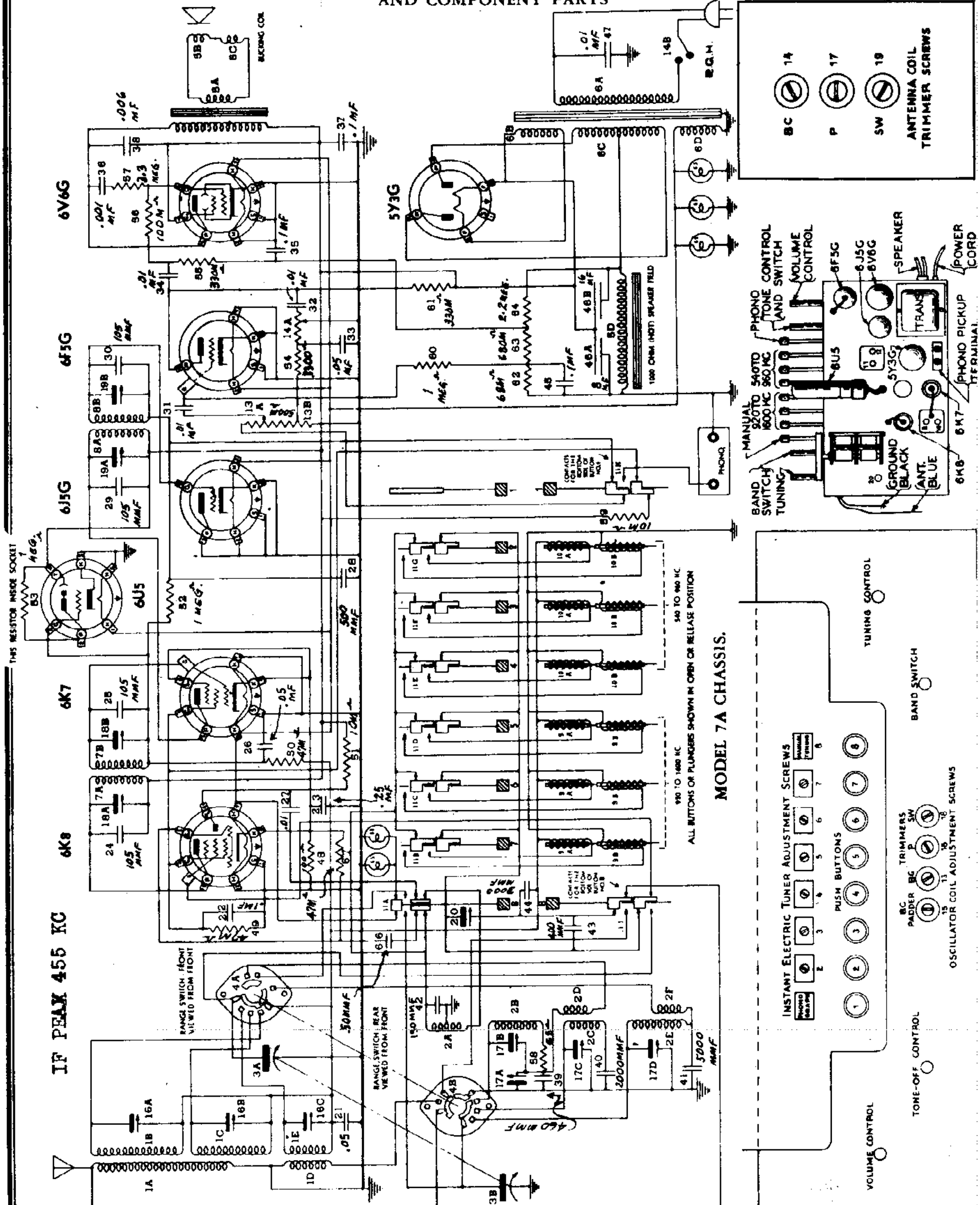
FADA RADIO & ELECTRIC CO



MODEL 7A
Schematic, Socket
Trimmers

FAIRBANKS, MORSE & CO.

SCHEMATIC WIRING DIAGRAM OF THE MODEL 7A CHASSIS.
FRONT, SIDE, AND TOP VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS AND COMPONENT PARTS



MODEL 7A
Alignment, Voltage
Tuner, Phono

FAIRBANKS, MORSE & CO.

The model 7A chassis is an AC operated superheterodyne with automatic volume control, audio inverse feedback, permeability push button tuning and tuning eye. It incorporates three wave bands, broadcast, police-amateur and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 42 on the schematic diagram and has a value of 150 micro-microfarads. The capacitance in the antenna circuit consists of two condensers, number 20 and number 43. Condenser number 20 must be adjusted when the initial alignment is made, but does not have to be touched at the time the buttons are "set" for their individual stations. Its use is covered in the alignment instructions Instructions for "setting-up" the push buttons are covered in detail in the instruction book which accompanies each receiver.

THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 56 and number 57 and condenser number 36. By means of this network a certain amount of the voltage present at the plate of the 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.

The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

PHONO CONNECTIONS

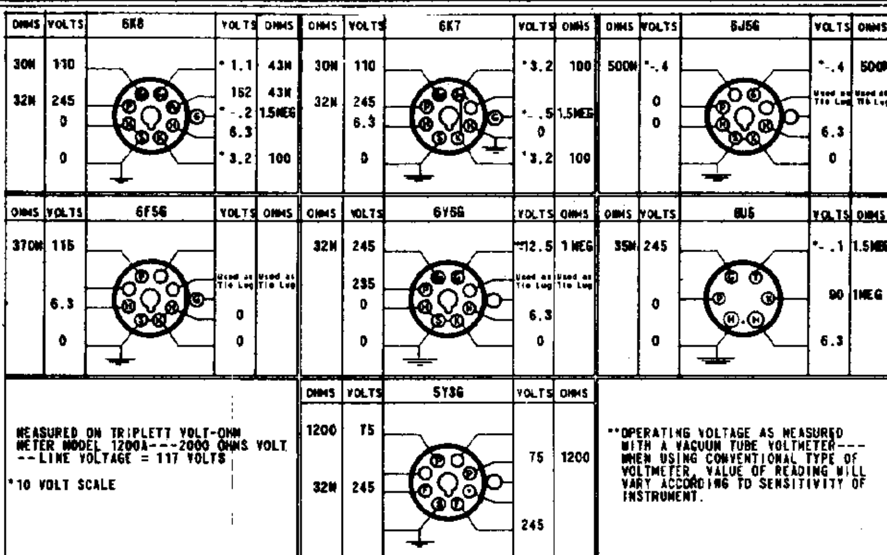
The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the set when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal, so at 20 megacycles the image should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the antenna trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the antenna trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order even to hear the image when you have found the right peak.



VOLTAGE AND RESISTANCE DATA

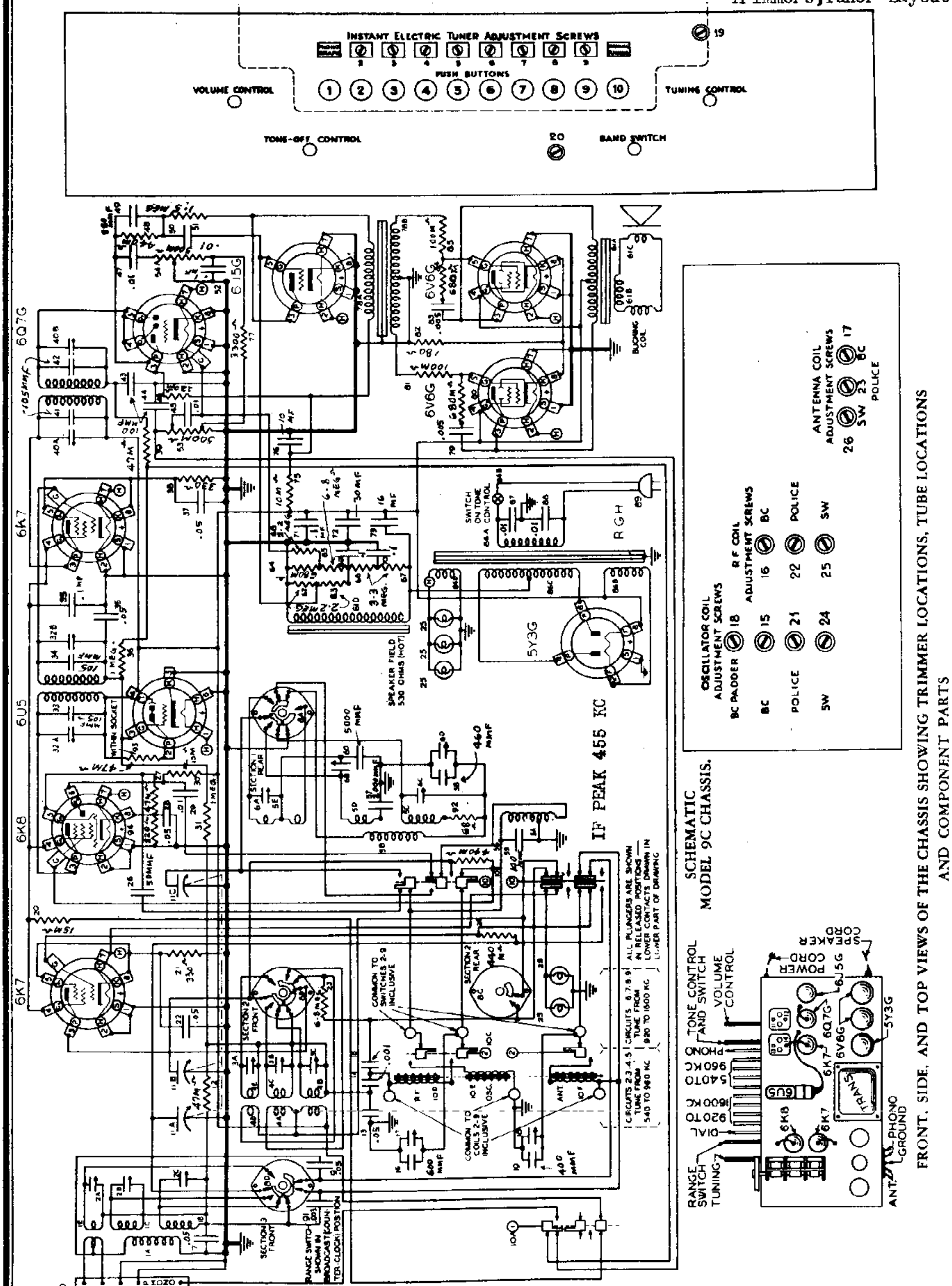
Step No.	Connect Signal Generator To	Signal Generator Frequency	Dummy Antenna	Range Switch Position	Dial Setting	Section	Adjusting Screw No.	Peak For
1	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	9	Maximum
2	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	10	Maximum
3	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	11	Maximum
4	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	12	Maximum
5	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	1500 KC	B.C. Osc.	13	Maximum
6	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	1500 KC	B.C. Det.	14	Maximum
7	Antenna	600 KC	200 Mmfd. Condenser	Broadcast (A)	600 KC	B.C. Padder	15	Max.(1)
8	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	Depress #7 Button	Instant Electric Tuner	7	Maximum
9	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	Depress #7 Button	Instant Electric Tuner	20	Maximum (2)
10	Antenna	6.0 MC	400 Ohm Resistor	Police-Amateur (B)	6.0 MC	Police Oscillator	16	Maximum
11	Antenna	6.0 MC	400 Ohm Resistor	Police-Amateur (B)	6.0 MC	Police Detector	17	Maximum
12	Antenna	2.5 MC	400 Ohm Resistor	Police-Amateur (B)	2.5 MC	Police Padder	(3)	
13	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Oscillator	18	Maximum (4)
14	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Detector	19	Maximum (5)
15	Antenna	8.0 MC	400 Ohm Resistor	Short Wave (C)	8.0 MC	Short Wave Padder	(6)	

(1) While rocking, repeat 13, 14 and 15 until no change is noticed.
(2) The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae, may necessitate a minor change in this adjustment for best results.
(3) Check calibration at 2.5 MC. Padder is fixed.
(4) Check for image at 19.1 MC approximately.
(5) Check for image response.
(6) Check calibration at 8.0 MC. Padder is fixed.

ALIGNMENT PROCEDURE CHART

FAIRBANKS, MORSE & CO.

MODEL 9C
Schematic, Socket
Trimmers, Tuner Layout



SCHEMATIC
MODEL 9C CHASSIS.

FRONT, SIDE, AND TOP VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS AND COMPONENT PARTS

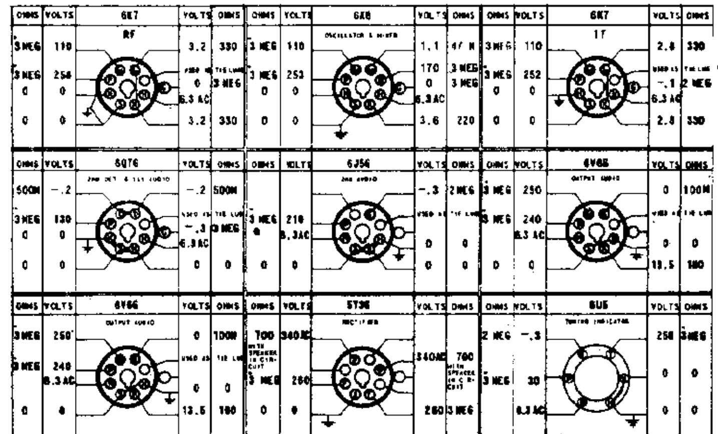
FAIRBANKS, MORSE & CO.

ALIGNMENT PROCEDURE CHART

Step No.	Connect Signal Generator To	Signal Generator Frequency	Dummy Antenna	Range Switch Position	Dial Setting	Section	Adjusting Screw No.	Peak For
1	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	11	Maximum
2	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	12	Maximum
3	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	13	Maximum
4	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	14	Maximum
5	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	1500 KC	B.C. Osc.	15	Maximum
6	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	1500 KC	B.C. RF	16	Maximum
7	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	1500 KC	B.C. Antenna	17	Maximum
8	Antenna	600 KC	200 Mmfd. Condenser	Broadcast (A)	600 KC	B.C. Padder	18	Max. (1)
9	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	Depress #9 Button	Instant Electric Tuner	9	Maximum
10	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	Depress #9 Button	Instant Electric Tuner	19	Maximum (2)
11	Antenna	1500 KC	200 Mmfd. Condenser	Broadcast (A)	Depress #9 Button	Instant Electric Tuner	20	Maximum (2)
12	Antenna	6.0 MC	400 Ohm Resistor	Police-Amateur (B)	6.0 MC	Police Oscillator	21	Maximum
13	Antenna	6.0 MC	400 Ohm Resistor	Police-Amateur (B)	6.0 MC	Police RF	22	Maximum
14	Antenna	6.0 MC	400 Ohm Resistor	Police-Amateur (B)	6.0 MC	Police Antenna	23	Maximum
15	Antenna	2.5 MC	400 Ohm Resistor	Police-Amateur (B)	2.5 MC	Police Padder		(3)
16	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Oscillator	24	Maximum (4)
17	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave RF	25	Maximum (5)
18	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Antenna	26	Maximum (5)
19	Antenna	8.0 MC	400 Ohm Resistor	Short Wave (C)	8.0 MC	Short Wave Padder		(6)

(1) While rocking, Repeat 5, 6, 7 and 8 until no change is noted.
(2) The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae, may necessitate a minor change in this adjustment for best results.
(3) Check calibration at 2.5 MC. Padder is fixed.
(4) Check for image at 19.1 MC on dial approximately.
(5) Check for image response.
(6) Check calibration at 8.0 MC. Padder is fixed.

VOLTAGE AND RESISTANCE DATA



WILL VARY ACCORDING TO CONDENSER LEAKAGE.
ALL READINGS MEASURED ON TRIPLETT VOLT OHM METER MODEL 1200A 2000 OHMS PER VOLT WITH LINE VOLTAGE OF 117 VOLTS ALL READINGS MADE AS NEAR HALF SCALE AS POSSIBLE.
ALL READINGS MEASURED WITH VOLUME CONTROL ADVANCED TO MAXIMUM VOLUME, NO ANTENNA, AND CHASSIS GROUNDED.
ALL RESISTANCE READINGS FROM MEASUREMENT POINT TO GROUND (CHASSIS PAN).

The model 9C chassis is an AC operated superheterodyne with automatic volume control, push-pull output with inverse feedback, permeability push button tuning, and tuning eye. It incorporates three wave bands, broadcast, police-amateur, and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 59 on the schematic diagram and has a value of 140 micro-microfarads. The capacitance in the antenna and RF circuits consists in each case of two condensers, number 18 and 19 for the antenna, and number 16 and 17 for the RF. Condensers 17 and 18 must be adjusted when the initial alignment is made, but do not have to be touched at the time the buttons are "set" for their individual stations. Their use is covered in the alignment instructions. Instructions for setting-up the push buttons are covered in detail in the instruction book which accompanies each receiver.

THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 80 and 84, and condensers 79 and 83. By means of this network a certain amount of the voltage present at the plate of each 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube or tubes. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.
The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

PHONO CONNECTIONS

The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the set when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form
Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal on the dial, so at 20 megacycles the image should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the RF trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order even to hear the image when you have found the right peak.

Repeat this operation for the antenna trimmer.

FAIRBANKS, MORSE & CO.

ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form (see figure 3 and 4). Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal on the dial, so at 20 megacycles the image should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the RF trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order even to hear the image when you have found the right peak.

Repeat this operation for the antenna trimmer.

Step No.	Connect Signal Generator To	Signal Generator Frequency	Dummy Antenna	Range Switch Position	Dial Setting	Section	Adjusting Screw No.	Peak For	Volume Nat-R-L Switch
1	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	3rd IF Trans.	11	Maximum	Off
2	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	3rd IF Trans.	12	Maximum	Off
3	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	13	Maximum	Off
4	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	2nd IF Trans.	14	Maximum	Off
5	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	15	Maximum	Off
6	6K8 Grid	455 KC	.1 Mfd. Condenser	Broadcast (A)	540 KC	1st IF Trans.	16	Maximum	Off
7	Antenna	1500 KC	200 Mmfd.Condenser	Broadcast (A)	1500 KC	B.C. Osc.	17	Maximum	Off
8	Antenna	1500 KC	200 Mmfd.Condenser	Broadcast (A)	1500 KC	B.C. R.F.	18	Maximum	Off
9	Antenna	1500 KC	200 Mmfd.Condenser	Broadcast (A)	1500 KC	B.C. Antenna	19	Maximum	Off
10	Antenna	600 KC	200 Mmfd.Condenser	Broadcast (A)	600 KC	B.C. Padder	20	Maximum (1)	(2)
11	Antenna	1500 KC	200 Mmfd.Condenser	Broadcast (A)	Depress #9 Button	Instant Electric Tuning	9	Maximum	Off
12	Antenna	1500 KC	200 Mmfd.Condenser	Broadcast (A)	Depress #9 Button	Instant Electric Tuning	21	Maximum (3)	Off
13	Antenna	1500 KC	200 Mmfd.Condenser	Broadcast (A)	Depress #9 Button	Instant Electric Tuning	22	Maximum (3)	Off
14	Antenna	6.0 MC	400 Ohm Resistor	Police Amateur (B)	6.0 MC	Police Oscillator	23	Maximum (3)	Off
15	Antenna	6.0 MC	400 Ohm Resistor	Police Amateur (B)	6.0 MC	Police RF	24	Maximum (3)	Off
16	Antenna	6.0 MC	400 Ohm Resistor	Police Amateur (B)	6.0 MC	Police Ant Antenna	25	Maximum	Off
17	Antenna	2.5 MC	400 Ohm Resistor	Police Amateur (B)	2.5 MC	Police Padder		(4)	Off
18	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Oscillator	26	Maximum (5)	Off
19	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave RF	27	Maximum (6)	Off
20	Antenna	20.0 MC	400 Ohm Resistor	Short Wave (C)	20.0 MC	Short Wave Antenna	28	Maximum (6)	Off
21	Antenna	8.0 MC	400 Ohm Resistor	Short Wave (C)	8.0 MC	Short Wave Padder		(7)	Off

(1) While rocking. Repeat 7, 8, 9 and 10 until no change is noted.

(2) To check volume naturalizer operation, turn to "On" or "In" position. If functioning normally, volume level will drop quite noticeably, under normal output volume.

(3) The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae, may necessitate a minor change in this adjustment per best results.

(4) Check calibration at 2.5 MC. Padder is fixed.

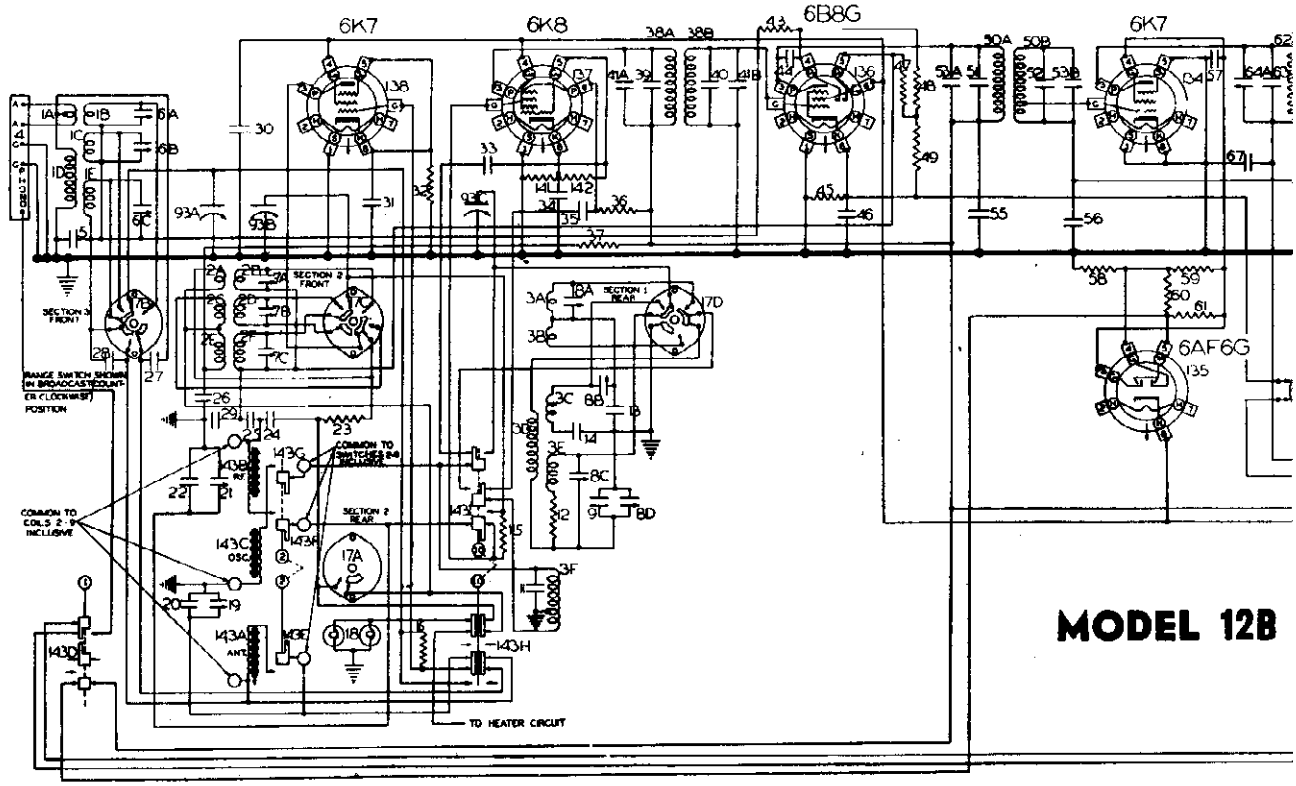
(5) Check for image at 19.1 MC on dial approximately.

(6) Check for image response.

(7) Check calibration at 8.0 M.C. Padder is fixed.

Figure 4

ALIGNMENT PROCEDURE CHART



MODEL 12B

VOLTAGE AND RESISTANCE DATA

Figure 1

OHMS	VOLTS	6K7 RF	VOLTS	OHMS
7M	120		9.0	1200
			USED AS	TIE LUG
11500	250		0	3MEG
0	0		6.3AC	
0	0		9.0	1200

OHMS	VOLTS	6K8 Oscillator & Mixer	VOLTS	OHMS
7M	120		6.0	46M
			170	20M
10M	257		0	3MEG
0	0		6.3AC	
0	0		7.2	500

OHMS	VOLTS	6B8G 1st IF & 1st AVC Diode	VOLTS	OHMS
750M	+.3		+ .1	3MEG
			120	7M
10M	258		0	14.0
0	0		6.3AC	
0	0		5.4	820

OHMS	VOLTS	6K7 2nd IF and tuning eye Control	VOLTS	OHMS
55M	110		0	0
			USED AS	TIE LUG
16500	260		-.3	3MEG
	6.3AC		0	0
0	0		0	0

OHMS	VOLTS	6Q7G 2nd AVC and 2nd diode detector; Volume naturalizer diode and driver	VOLTS	OHMS
1.5 MEG	-.3		-.2	250M
			USED AS	TIE LUG
230	60		-.4	1 MEG
0	0		6.3AC	
0	0		0	0

OHMS	VOLTS	6J5 1st Audio	VOLTS	OHMS
USED AS	TIE LUG		-.5	3MEG
			USED AS	TIE LUG
120M	100			
	6.3AC		0	0
0	0		0	0

OHMS	VOLTS	6J5G 2nd Audio	VOLTS	OHMS
USED AS	TIE LUG		-.4	1.5 MEG
			USED AS	TIE LUG
16500	190			
	6.3AC		0	0
0	0		0	0

OHMS	VOLTS	6V6G Output Audio	VOLTS	OHMS
11300	320		0	90M
			USED AS	TIE LUG
11500	310.			
0	0		6.3AC	
0	0		18	200

OHMS	VOLTS	6V6G Output Audio	VOLTS	OHMS
11300	320		0	90M
			USED AS	TIE LUG
11500	310			
0	0		6.3AC	
0	0		18	200

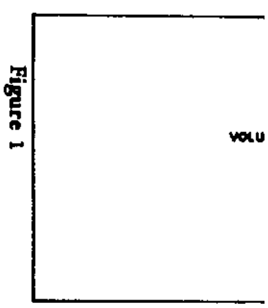
OHMS	VOLTS	5V4G Rectifier	VOLTS	OHMS
440	350AC			
			350AC	440
11500	320			
0	0		320	11500

OHMS	VOLTS	6K7 Volume Naturalizer Feed Back	VOLTS	OHMS
7M	120		0	0
			USED AS	TIE LUG
38M	100		-.5	4MEG
	6.3AC		0	0
0	0		0	0

OHMS	VOLTS	6AF6G Tuning Eye	VOLTS	OHMS
1.5 MEG	48		246	11M
50M	108			
	6.3AC		0	0
			120	7M

ALL READINGS MEASURED ON MODEL 1200A, 2000 OHMS PER VOLT, TRIPLETT VOLT OHMMETER, AS NEAR HALF SCALE AS POSSIBLE AND WITH 117 VOLTS, LINE VOLTAGE.

ALL READINGS FROM SPECIFIED POINT TO GROUND (CHASSIS PAN) WITH VOLUME AND TONE CONTROL ADVANCED TO MAXIMUM, VOLUME NATURALIZER "IN", RANGE SWITCH ON BC POSITION, GANG CONDENSOR IN FULL MESH, NO ANTENNA AND CHASSIS GROUNDED.



OSCILLATOR COIL ADJUSTMENT SCREWS

AD.

BC PADDER	20
BC	17
POLICE	23
SW	26

FRONT, SIDE, AND

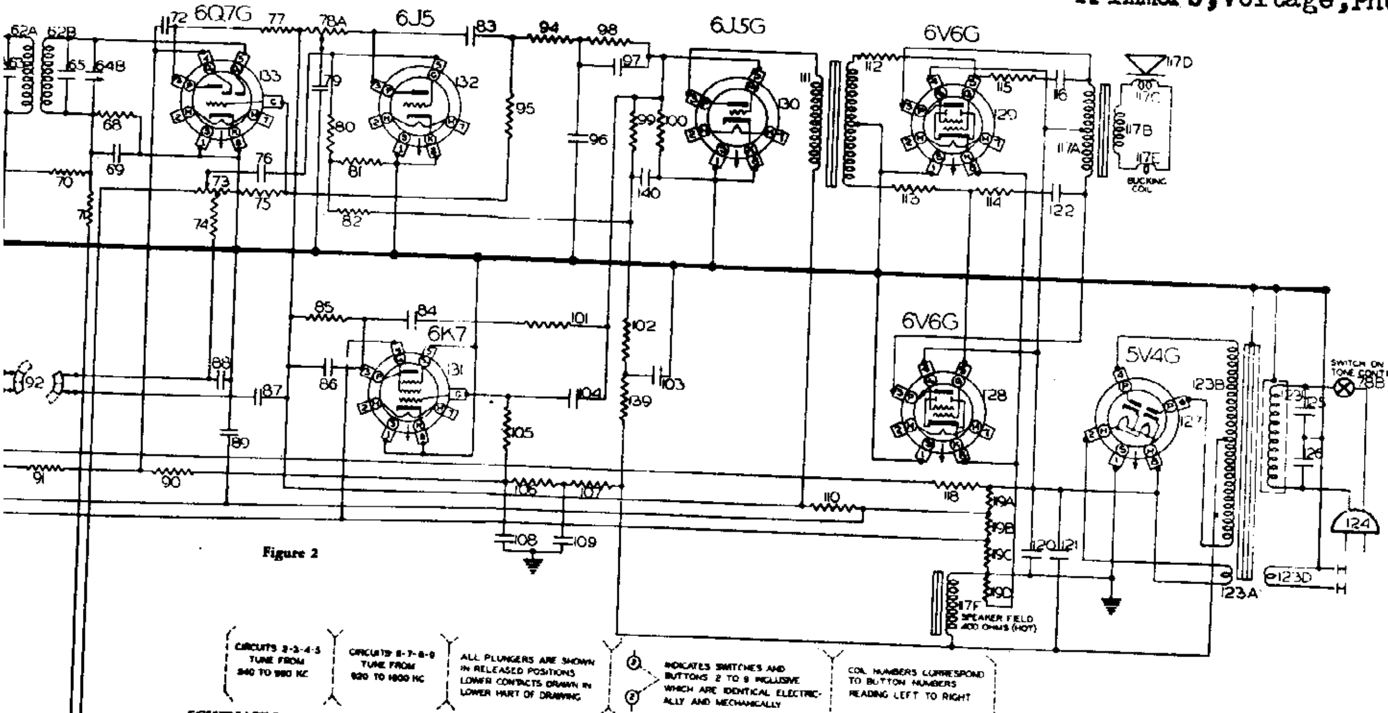


Figure 2

SCHEMATIC WIRING DIAGRAM OF THE MODEL 12B CHASSIS. VALUES OF COMPONENT PARTS MAY BE DETERMINED BY COMPARING THE REFERENCE NUMBERS SHOWN ON THE DIAGRAM WITH THE REFERENCE NUMBERS SHOWN ON THE PARTS LIST.

IF PEAK 455 KC

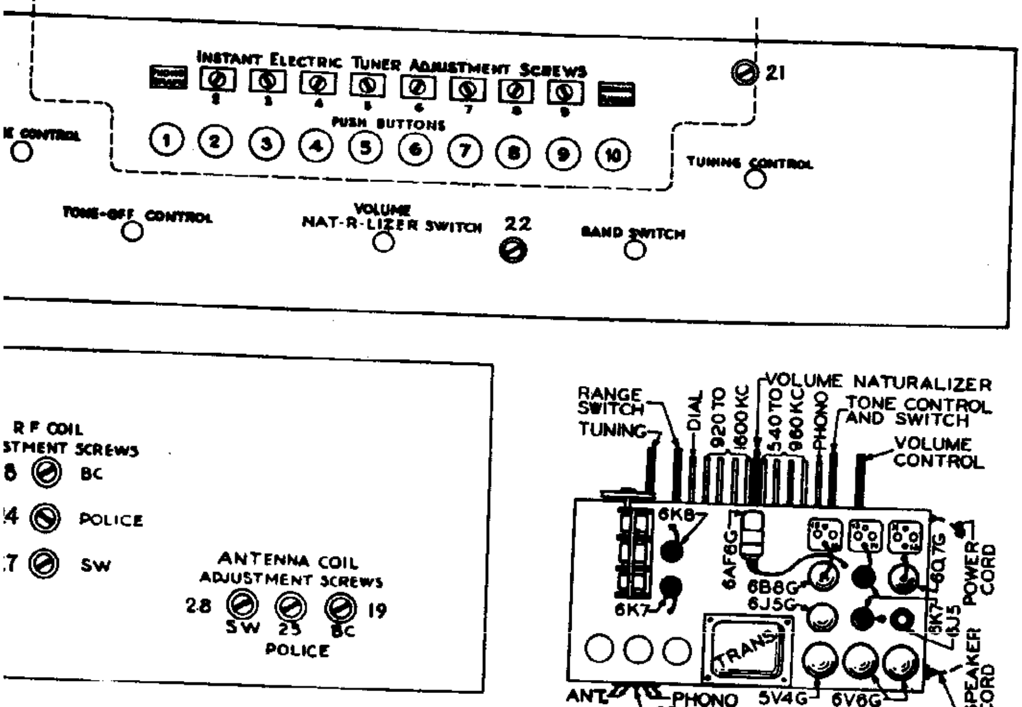


Figure 3

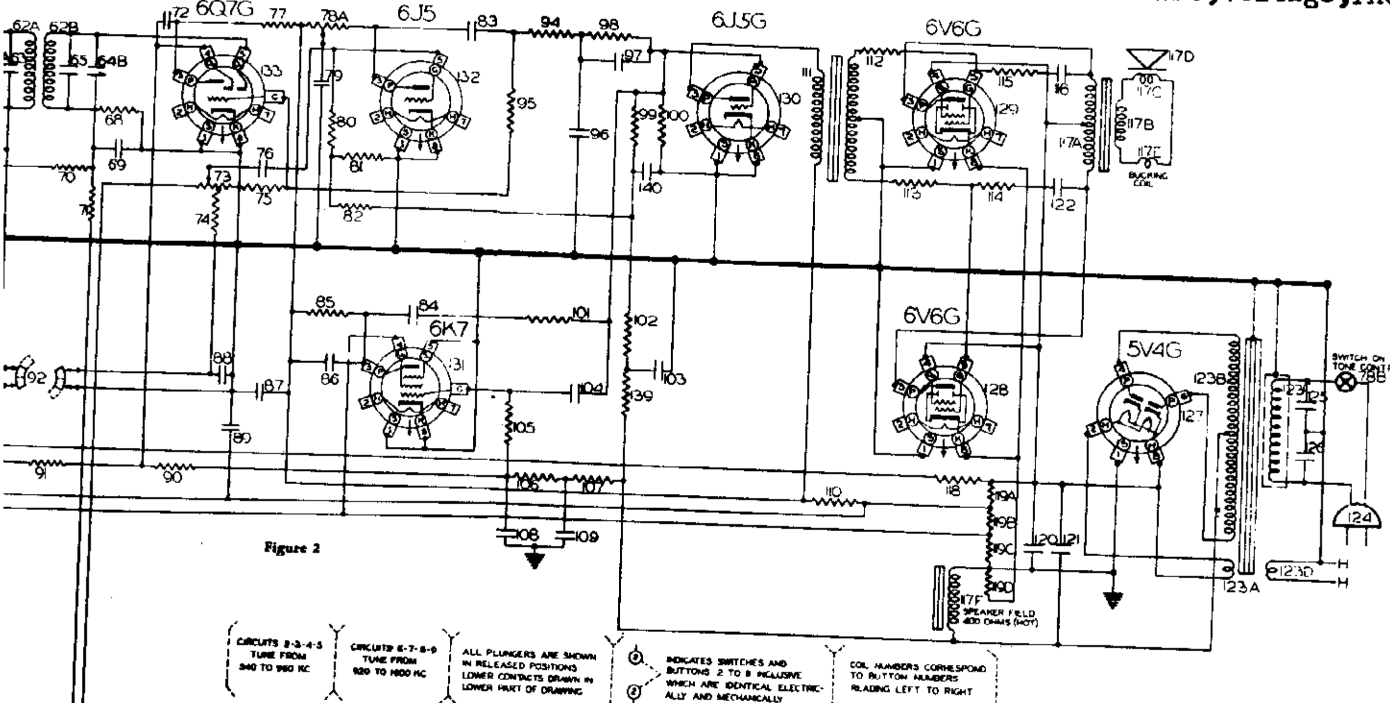
TOP VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS AND COMPONENT PARTS

The model 12B chassis is an AC operated superheterodyne with automatic volume control, push-pull output with inverse feedback, permeability push button tuning, volume naturalizer, and tuning eye. It incorporates threewave bands,broadcast, police-amateur, and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

PHONO CONNECTIONS

The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the set when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

MODEL 12B
Schematic, Socket, Tuner
Trimmers, Voltage, Phono.



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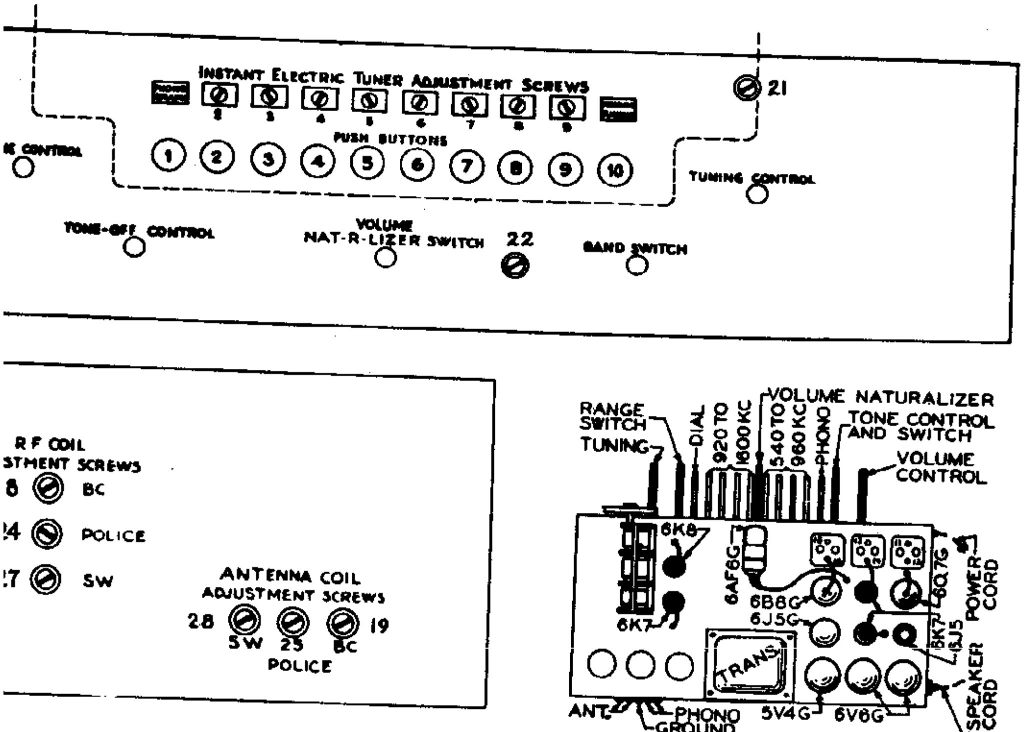
IF PEAK 455 KC



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The model 12B chassis is an AC operated superheterodyne with automatic volume control, push-pull output with inverse feedback, permeability push button tuning, volume naturalizer, and tuning eye. It incorporates three wave bands, broadcast, police-amateur, and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

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MODEL 12B
Tuner Data, Parts
Naturalizer Notes

FAIRBANKS, MORSE & CO.

THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 11 on the schematic diagram and has a value of 140 micro-microfarads. The capacitance in the antenna and RF circuits consists in each case of two condensers, number 19 and 20 for the antenna, and number 21 and 22 for the RF. Condensers 19 and 21 must be adjusted when the initial alignment is made, but do not have to be touched at the time the buttons are "set" for their individual stations. Their use is covered in the alignment instructions in Figure 4. Instructions for setting-up the push buttons are covered in detail in the instruction book which accompanies each receiver.

THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 114 and 115, and condensers 116 and 122. By means of this network a certain amount of the voltage present at the plate of each 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube or tubes. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.

The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

PURPOSE AND OPERATION OF VOLUME NATURALIZER

In most transmitting stations, the operators attempt to keep the modulation percentage high at all times in order to increase the area in which acceptable reception of their programs is possible. In so doing, a considerable portion of the volume range present in the studio program may be lost due to the fact that the lower volume portions of the program are raised to maintain coverage and thus require that the higher volume portions be relatively attenuated to prevent over-modulation of the transmitter.

The volume naturalizer is designed to compensate, in part, for this evil that often exists under present broadcasting conditions but should not be used indiscriminately. In general, its use is not justified on oral programs although occasionally a listener may prefer it. On some popular musical selections, the volume range is so restricted that no appreciable difference will be noticed except as the frequency response is influenced by the naturalizer circuit. Of course the volume control should be reset, each time the naturalizer is switched in and out, to keep the reference volume approximately the same for more accurate comparison. This will not be necessary at relatively high volume, because the volume will not change appreciably as the naturalizer is switched in or out, under these conditions.

On modern phonograph records, its use is not often desirable as the volume range is generally acceptable. On older records, no definite recommendation can be made because great variations will be found, especially between recordings by different manufacturers.

The method by which the volume naturalizer operates, can be simply described as controlled degeneration, whereby a portion of the audio signal from the plate circuit of the 6J5 first audio tube, is used to vary the bias voltage of preceding and interconnected tubes, in such a manner as to increase the volume level on signals that were originally suppressed at the transmitting station, and to decrease the volume level on signals that were increased in intensity at the transmitter, thus restoring in part, the original volume range present, for example, during a symphonic orchestra broadcast.

PARTS AND PRICE LIST MODEL 12B

Part Number	Schematic Reference Number	Description	List Price
8506-40		Booklet - Instruction	
103-15		Bracket - Shipping	.01
103-13		Bracket - Gang Condenser Mtg.-Front	.06
103-14		Bracket - Gang Condenser Mtg.-Rear	.02
103-11		Bracket - Dial Drive Shaft	.04
805-3	18	Bulb - Dial Light - 6.3 V. - Bayonet Base	.15
72-1		Button - Push	.06
7718-1		Button - Cinch Plug	.06
44-3		Cabinet - Console Grand - 63	60.90
991-89		Carton - 63 Cabinet	2.95
108-12		Chassis End Plate Assembly - Left	1.75
108-11		Chassis End Plate Assembly - Right	1.50
501-8	1A,B,C,D,E	Coil Assembly - Antenna - Red Dot Color Code	3.00
502-4	2A,B,C,D,E,F	Coil Assembly - RF - Yellow Dot Color Code	3.00
503-10	3A,B,C,D,E,F	Coil Assembly - Oscillator - Green Dot Color Code	3.00
801-6		Clip - Grid - Octal - Small (Dozen .06)	.01
340-21	78A,B	Control - Tone and Switch	.75
340-20	73	Control - Volume	.60
878-1	124	Cord and Plug - AC Line	.35
203-4	93A,B,C	Condenser - Variable Tuning - 3 Gang	3.06
293-2	6,1A,B,C	Condenser - Variable Trimmer- 3 Gang	.30
294-2	8A,B,C,D	Condenser - Variable Trimmer- 4 Gang	.40
286-7	19,21	Condenser - Variable Trimmer- 1 Gang	.15
272-11	41,53,64 A&B	Condenser - Variable Trimmer- 2 Gang	.25
211-5	121	Condenser - Electrolytic - 16mfd.-500 Volt	.75
214-4	120	Condenser - Electrolytic - 30 mfd.-315 Volt	.75
235-1	87,89	Condenser - Electrolytic - Dual - 20 mfd.-300 Volt	.90
264-1	39,40,51,52, 63,66	Condenser - Moulded Mica - 100 mmfd.-5%	.15
256-3	9	Condenser - Moulded Mica - 460 mmfd.-3%	.25
259-4	11	Condenser - Moulded Mica - 140 mmfd.-3%	.25
260-5	33	Condenser - Moulded Mica - 50 mmfd.	.15
260-7	44,69	Condenser - Moulded Mica - 100 mmfd.	.15
262-2	20	Condenser - Moulded Mica - 400 mmfd.-5%	.15
260-13	96	Condenser - Moulded Mica - 500 mmfd.	.20
262-6	22	Condenser - Moulded Mica - 600 mmfd.-5%	.30
262-4	14	Condenser - Moulded Mica - 2000 mmfd.-5%	.18
262-1	13	Condenser - Moulded Mica - 5000 mmfd.-5%	.35
251-1	125,126	Condenser - Moulded Paper - .01 mfd. - 600 V.	.18
252-4	24,26,97	Condenser - Tubular Paper - .001 mfd. - 600 V.-10%	.18
252-6	84,86,104	Condenser - Tubular Paper - .002 mfd. - 600 V.-10%	.20
250-8	76	Condenser - Tubular Paper - .003 mfd. - [illegible] V.	.18
252-8	28	Condenser - Tubular Paper - .003 mfd. - 600 V.-10%	.20
252-12	116,122	Condenser - Tubular Paper - .01 mfd. - 400 V.-10%	.18
250-12	26,35,57,67, 72	Condenser - Tubular Paper - .01 mfd. - 400 V.	.15
250-14	79	Condenser - Tubular Paper - .02 mfd. - 400 V.	.18
250-39	5,27,29,31, 34,46,56,63	Condenser - Tubular Paper - .05 mf. - 200 V.	.15
250-21	30,103,109, 140	Condenser - Tubular Paper - .1 mfd. - 200 V.	.15
250-22	55	Condenser - Tubular Paper - .1 mfd. - 400 V.	.18
252-27	88,108	Condenser - Tubular Paper - .25 mfd. - 200 V.-10%	.15
64-13		Crystal - Station Tab - Plain - (8 to one sheet)	.06
64-8		Crystal - Station Chain Indicator - Red - (8 to one sheet)	.05
64-9		Crystal - Station Chain Indicator -Green- (8 to one sheet)	.06
64-10		Crystal - Station Chain Indicator -Yellow (8 to one sheet)	.06
64-11		Crystal - Station Chain Indicator -Blue - (8 to one sheet)	.06
152-2		Drive Shaft and Flywheel Assy.	.65
60-2		Escutcheon Assembly	2.00
700-8		Grommet - Rubber-Tuning Condenser Mtg.	.02
70-15		Knob - Tuning	.15
70-16		Knob - Band	.18
70-11		Knob - Tone - "Off"	.18
70-18		Knob - Volume	.15
70-13		Knob - Volume Nat-R-Lizr	.40
7444-3		Nut - HH - 8/32 (Doz. .05)	.01
7444-4		Nut - HH - 6/32 x 1/4" x 3/32" (Doz. .06)	.01
7428-3		Nut - Pal - 6/32 (Doz. .05)	.01
7444-8		Nut - HH - 10/32 (Doz. .06)	.01
7429-1		Nut - Pal - 3/8" x 32 (Doz. .06)	.01
128-3		Pulley - Dial Drive - Assy.	.35
7530-5		Rivet - Tubular - 1/8" x 1/4" (Doz. .06)	.01
7530-1		Rivet - Tubular - 1/8" x 1/8" (Doz. .05)	.01
7530-3		Rivet - Tubular - 1/8" x 3/16" (Doz. .06)	.01
112-3		Ring - Electrolytic Mtg.	.03
330-3	119A to D	Resistor - Candohm - Wirewound	1.00
306-11	12	Resistor - Carbon - 68 ohms - 1/2 watt - 10%	.15
306-21	141	Resistor - Carbon - 470 ohms - 1/2 watt - 10%	.15
306-24	48	Resistor - Carbon - 820 ohms - 1/2 watt - 10%	.15
306-26	32,37	Resistor - Carbon - 1200 ohms - 1/2 watt - 10%	.15
306-29	74	Resistor - Carbon - 2200 ohms - 1/2 watt - 10%	.15
307-34	110,118	Resistor - Carbon - 5600 ohms - 1 watt - 10%	.20
307-37	36	Resistor - Carbon - 10M ohms - 1 watt - 10%	.20
306-41	85,94	Resistor - Carbon - 22M ohms - 1/2 watt - 10%	.15
306-47	61,142	Resistor - Carbon - 47M ohms - 1/2 watt - 10%	.15
306-49	98,101,112, 113	Resistor - Carbon - 100M ohms - 1/2 watt - 10%	.15
306-53	48,77	Resistor - Carbon - 220M ohms - 1/2 watt - 10%	.15
306-56	49,68	Resistor - Carbon - 390M ohms - 1/2 watt - 10%	.15
306-57	71	Resistor - Carbon - 470M ohms - 1/2 watt - 10%	.15
301-29	15,16	Resistor - Carbon - 470M ohms - 1/2 watt - 20%	.15
306-59	114,115	Resistor - Carbon - 680M ohms - 1/2 watt - 10%	.15
306-61	75,105	Resistor - Carbon - 1 Megohm - 1/2 watt - 10%	.15
311-124	91	Resistor - Carbon - 1.3 Megohm - 1/2 watt - 5%	.18
306-63	81,100	Resistor - Carbon - 1.5 Megohm - 1/2 watt - 10%	.15
311-126	90	Resistor - Carbon - 1.6 Megohm - 1/2 watt - 5%	.18
306-65	80	Resistor - Carbon - 2.2 Megohm - 1/2 watt - 10%	.15
306-67	42,47,59,70, 99, 102, 139	Resistor - Carbon - 3.3 Megohm - 1/2 watt - 10%	.15
306-69	68	Resistor - Carbon - 4.7 Megohm - 1/2 watt - 5%	.18
311-141	106,107	Resistor - Carbon - 6.8 Megohm - 1/2 watt - 5%	.18
306-71	23,60,82,95	Resistor - Carbon - 6.8 Megohm - 1/2 watt - 10%	.15
7369-5		Screw - Slab Head - Set - 8/32 x 3/16" (Doz. .25)	.03
7348-1		Screw - S H N - Cup Point - Set (Doz. .20)	.02
7246-37		Screw - S H W H - Tap - 8/32 x 3/4" (Doz. .10)	.02
7123-8		Screw - R H M - 8/32 x 1/4" (Doz. .05)	.01
7123-19		Screw - R H M - 6/32 x 3/4" (Doz. .08)	.01
7123-9		Screw - R H M - 6/32 x 1/4" (Doz. .05)	.01
7123-7		Screw - R H M - 6/32 x 1/2" (Doz. .06)	.01
7113-1		Screw - Fillister Hd. M.-1/4" x 20 x 1/2" (Doz. .30)	.03
7113-8		Screw - Fillister Hd. M.-10/32 x 5/8" (Doz. .06)	.01
7379-2		Screw - Oval C'sunk Hd. - [illegible] x 7/16" (Doz. .06)	.01
7223-1		Screw - Flat Wing Hd. - 8/32 x 1-1/8"	.01
151-4		Shaft - Range/Switch Jack	.20
664-7		Sheets - Station Letter Tabs (2 sheets to set)	.30
664-8		Sheets - Phono and Tuning Tab (1 sheet of 10 tabs)	.30
20-18	117A to F	Speaker - Electro-Dynamic - 12"	11.65
C20-18	117D	Cone and Voice Coil Assy.	4.00
T20-18	117A	Output Transformer	2.25
F20-18	117F	Field Coil	3.00
466-1	128 to 134	Socket - Octal Base - 8 Contact	.10
466-2	127	Socket - Octal Base - 8 Contact	.10
451-3		Socket - Speaker Base - 6 Contact	.10
468-13		Socket - For Dial Light - one lead	.10
110-1		Socket - With Bracket and Mtg. Bracket-Eyetube	.15
111-8		Shield Assy. - for tubes	.10
113-1		Shield Shell-half	.03
113-3		Shield Base Ring	.02
113-4		Shield Ground Clip (Doz. .06)	.01
113-7		Shield Cap Ring	.01
137-2		Shield Assy. for Coils	.20
7349-1		Snap - Condenser Mtg.	.02
470-18	4	Strip - Antenna - Phono Gnd.	.20
470-2		Strip - Terminal - 2 Lug	.03
470-19		Strip - Terminal - 3 Lug	.08
380-8	92	Switch - Volume Nat-R-Lizer	.40
373-3	17A,B,C,D	Switch - Range	1.65
400-23		Transformer - Power - 25 cycle-universal	9.25
400-20	123A to D	Transformer - Power	5.75
410-2	111	Transformer - Audio Coupling	1.60
550-24	38A,B	Transformer - IF Input	2.25
550-25	50A,B	Transformer - IF Intermediate	2.25
550-26	62A,B	Transformer - IF Output	2.50
8625-3		Tube - Eye Cover	.05
220-3		Tube - Paper - For Electrolytic	.05
221-1		Terminal - Cathode - For Electrolytic	.04
525-2	143A to I	Tuner - Push Button Assy. (Complete)	20.06
7491-3		Washer - Lock - #6 - Internal (Doz. 05)	.01
7496-1		Washer - Lock - #8 - External (Doz. 06)	.01
7496-5		Washer - Lock - 1/4 - External (Doz. 05)	.01
7496-2		Washer - Lock - #6 - External (Doz. 05)	.01
7496-4		Washer - Lock - #10 - External (Doz. 06)	.01
7471-2		Washer - Flat - .260 x 11/16" x .051 (Doz. .06)	.01
7471-16		Washer - Flat - 7/32" x 1/2" x .051 (Doz. .06)	.01
7471-7		Washer - Flat - .130" I.D. (Doz. .06)	.01
7477-1		Washer - Felt - (Doz. .06)	.01
8004-9		Washer - Fibre - .140 I.D. (Doz. .05)	.01
7478-1		Washer - Spring (Doz. .05)	.01
7475-3		Washer - "C"-3/16 (Doz. .05)	.01
8545-2		Wrench - Tuner Adjusting Screw	.20
		DIAL PARTS	
400-7		Dial Assembly - Complete	5.50
625-7		Dial Mtg. Plate Assembly	.90
8036-1		Cord - Dial Drive - Specify 100" length	.15
157-1		Crank Lever - Band Indicator	.75
157-2		Crank Assembly - for Shifter Link & Range Sw.	.25
641-3		Disc Assembly - Band Indicator	.50
161-4		Jack Shaft - Range Switch	.20
709-1		Mask - Push Button Arm	.05
602-8		Pointer - Slider	.10
130-3		Pulley - Idler	.05
636-1		Pad - Dial Scale Glass - Fibre	.01
7531-1		Rivet - Special Shoulder - 1/8" x 1/8" (Doz. .05)	.01
7532-1		Rivet - FH - 1/8" x 1/8" (Doz. .05)	.01
601-13		Scale - Dial - Glass	.75
631-3		Slider Bar Assembly	.45
161-2		Shifter Link - To Range Switch	.01
7245-31		Screw - SHMN - Tap - 8/32 x 1/4" (Doz. .10)	.01
173-1		Shifter Linkage-Assy. (2 levers, link, spring)	.45
121-6		Spring - Shifter Linkage	.10
121-1		Spring - Cord Tension	.02
141-1		Strip - Dial Scale Retainer	.01
7452-3		Washer - Spring (Doz. .05)	.01
7475-4		Washer - "C" 1/8" ID (Doz. .06)	.01
616-1		Washer - Dial Eyelet	.01

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

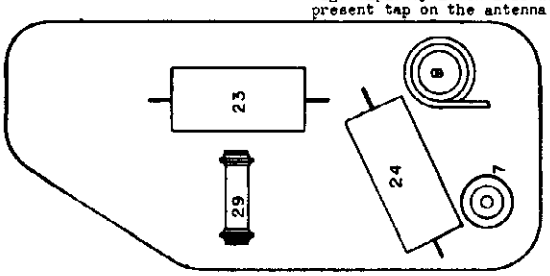
Schematic, Voltage
Socket, Trimmers
Chassis, Alignment

FIRESTONE TIRE & RUBBER CO.

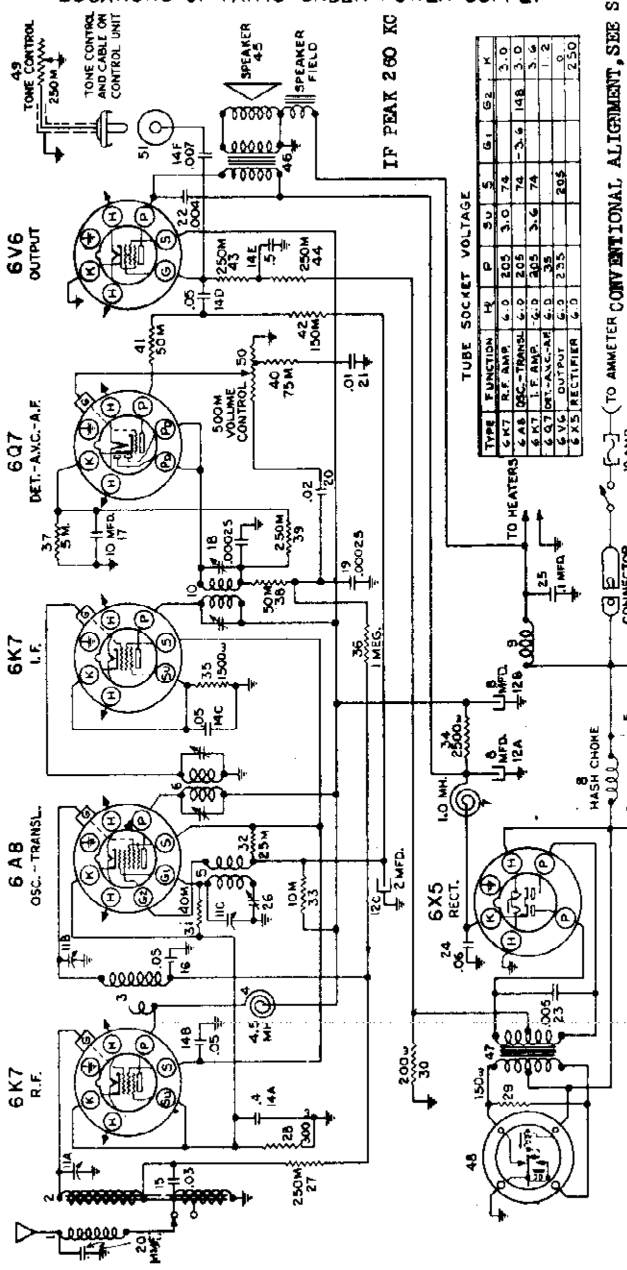
MODEL 7407-3
Chassis 536

NOTE: VOLTAGE READING TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT. "A" BATTERY = 6 VOLTS. CURRENT DRAIN = 7.4 AMPERES

ANTENNA CIRCUIT: The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some previous Firestone auto receivers. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the dial (1400 K.C.) instead of at the low frequency end, as with the capacity coupled sets. There are two taps provided on the antenna coil. One for use with whip or low capacity type antenna, and the other for running board or high capacity type antenna. The antenna coil is set at the low capacity tap at the factory and must be changed (by means of the small tip jack located in the receiver at the antenna coil) if a high capacity antenna is used. This is done by merely removing the small tip jack from its present tap on the antenna coil and inserting the jack in the other receptacle provided.



LOCATIONS OF PARTS UNDER POWER SUPPLY

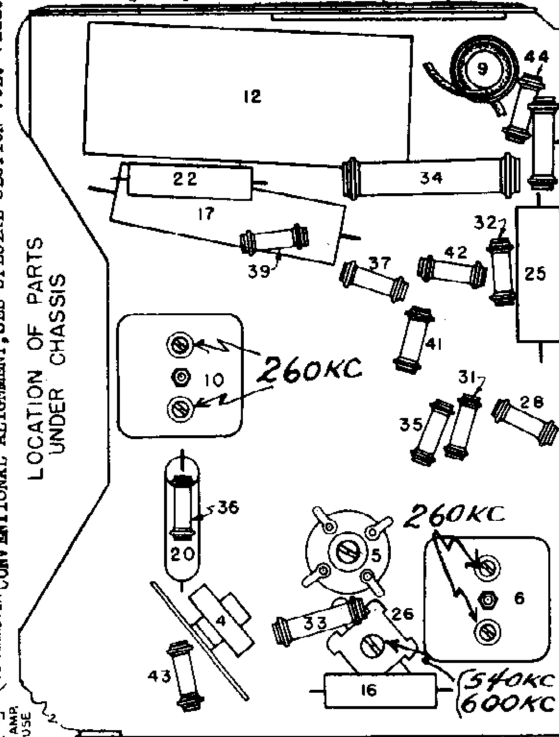


IF PEAK 260 KC

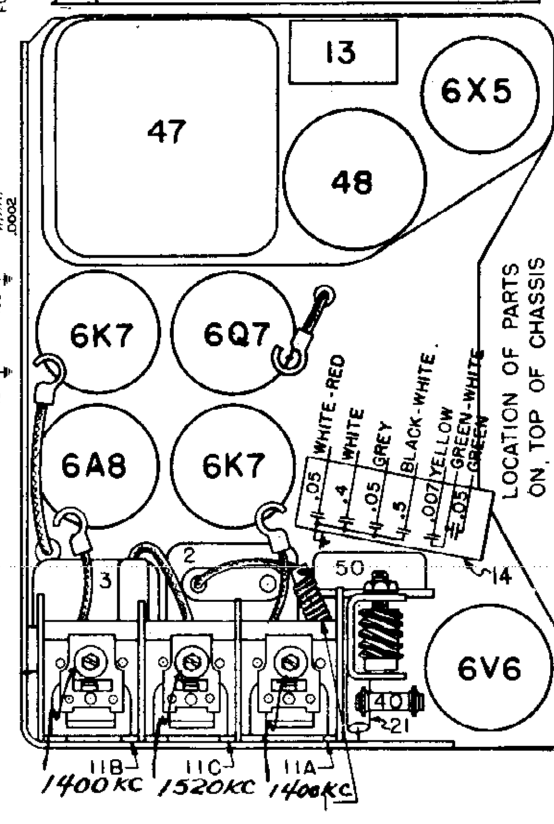
TUBE SOCKET VOLTAGE

TYPE	FUNCTION	H	P	Su	S	G1	G2	K
6K7	R.F. AMP.	6.0	205	3.0	74			3.0
6A8	OSC.-TRANSL.	6.0	205		74	-3.6	148	3.0
6K7	I.F. AMP.	6.0	205	3.6	74			3.6
6Q7	DET.-AVC.-AF.	6.0	35					1.2
6V6	OUTPUT	6.0	235		205			0
6X5	RECTIFIER	6.0						250

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.



LOCATION OF PARTS UNDER CHASSIS

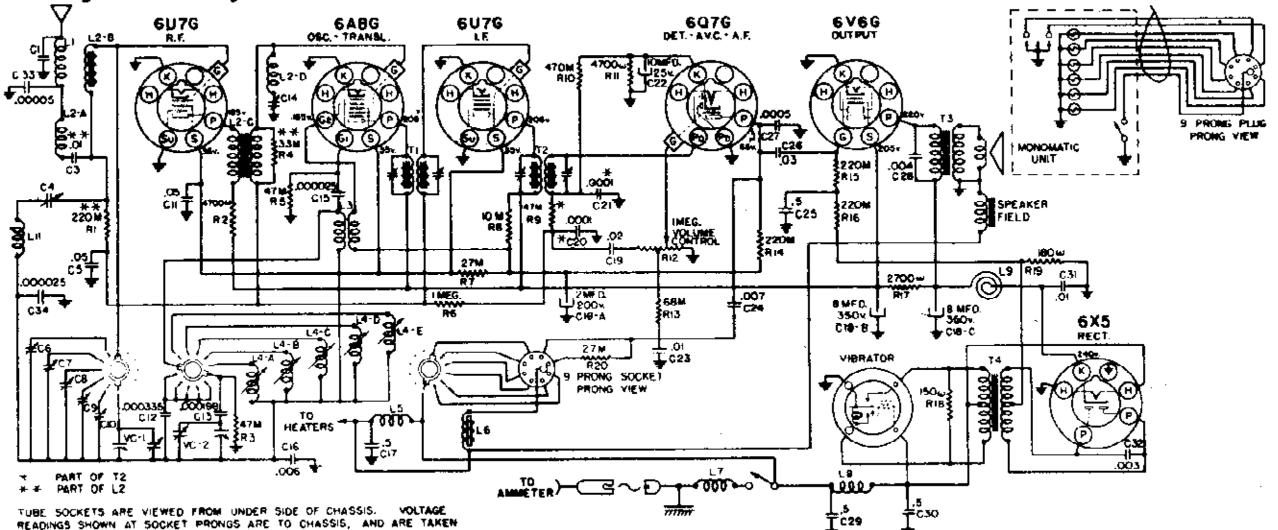


LOCATION OF PARTS ON TOP OF CHASSIS

IMPORTANT: Do not make any adjustments to this receiver with the chassis case removed from the receiver chassis or without the proper equipment.

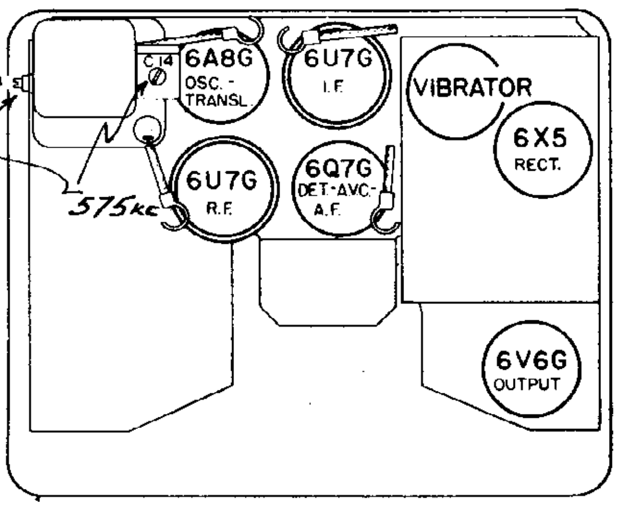
MODEL S7407-5
Schematic, Voltage, Socket, Trimmers, Alignment, Tuner

FIRESTONE TIRE & RUBBER CO.

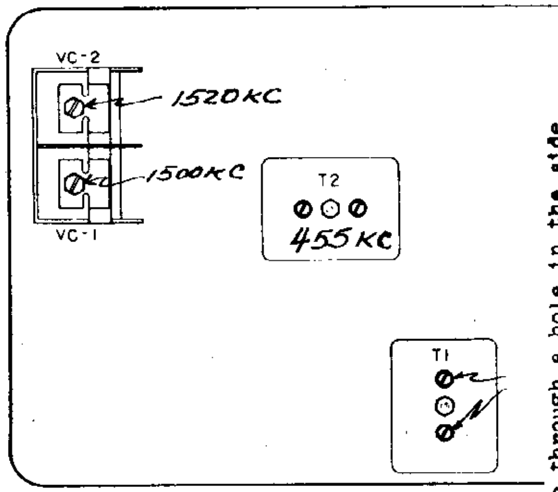


* PART OF T2
** PART OF L2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
"A" BATTERY - 6 VOLTS CURRENT DRAIN - 7.1 AMPERES



LOCATIONS OF TUBES & TRIMMERS - BOTTOM COVER REMOVED



LOCATIONS OF TRIMMERS - TOP COVER REMOVED

SETTING UP THE MONOMATIC TUNING MECHANISM:

Remove the plate that covers the Monomatic tuning adjustments on the receiver case.

Operate the Monomatic button (marked "Push") until the dial becomes illuminated, indicating that the receiver is adjusted for Dial Tuning. Then tune in your #1 station, using the Station Selector knob.

Operate the Monomatic button until the #1 station indicator (furthest left of the five indicators) becomes illuminated.

Turn the #1 station screw marked "OSC" (see Fig. 3) until your #1 station is tuned in. Other stations may be heard during this operation. If in doubt whether you have your desired #1 station, compare it with the original station by operating the Monomatic button until the Dial Tuning position is reached.

After adjusting the "OSC" screw as carefully as possible, adjust the "ANT" screw for maximum volume and best reproduction. After having done so, it is advisable to re-check the adjustment of the "OSC" screw and then the "ANT" one again to insure greatest accuracy.

Tune in your #2 station and operate the Monomatic button until the #2 indicator becomes illuminated. Then proceed to adjust the two screws for this station in the same manner as was just done for the #1 station. Always adjust the "OSC" screw before adjusting the "ANT" one, and then repeat the adjustments for greater accuracy.

Proceed in the same manner for the remaining stations on your list. Then replace the cover in the receiver case. Insert the proper call letters, cut from the sheets supplied, in the indicator button slots.

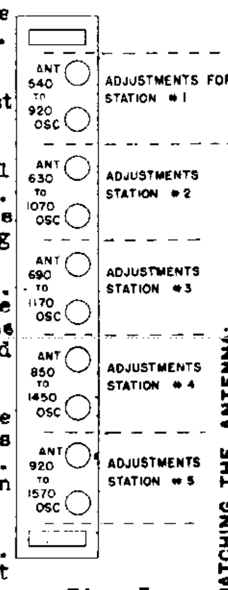
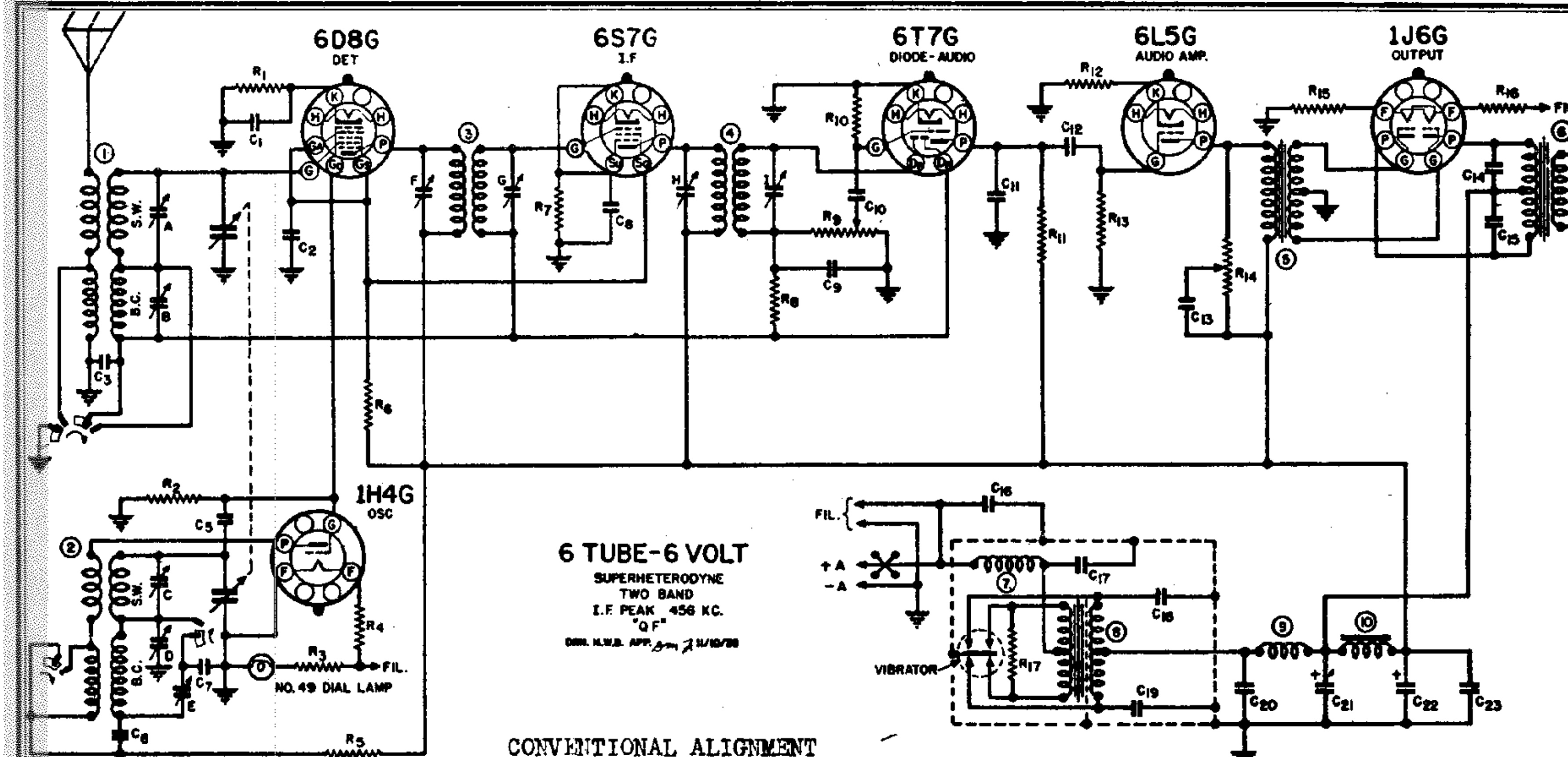


Fig. 3

MATCHING THE ANTENNA: An adjusting screw, accessible to a screw-driver through a hole in the side of the case is provided to match the receiver to the car antenna. Using the Station Selector knob, tune in a very weak station at about 600 kilocycles. Then turn the adjusting screw to the point affording maximum volume.

MODEL S7424-3
Schematic, Socket
Alignment
Trimmers

FIRESTONE TIRE & RUBBER CO.



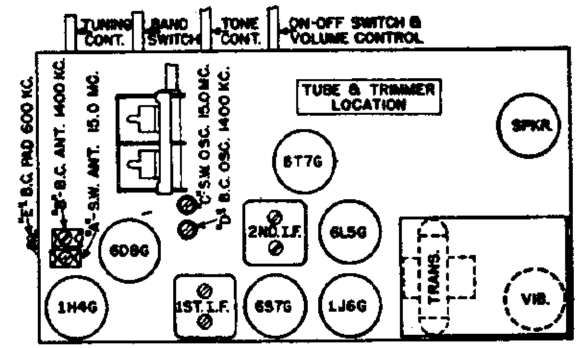
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

DIAG. NO.	PART NO.	DESCRIPTION	
C_1	C-13	.05 MFD.	200 V.
C_2	C-1	.1 MFD.	200 V.
C_3	C-13	.05 MFD.	200 V.
C_5	C-115	50 MMFD.	
C_6	C-4	.01 MFD.	400 V.
C_7	C-109X	4,000 MMFD.	5 %
C_8	C-13	.05 MFD.	200 V.
C_9	C-110	100 MMFD.	
C_{10}	C-27	.006 MFD.	800 V.
C_{11}	C-111	250 MMFD.	
C_{12}	C-4	.01 MFD.	400 V.
C_{13}	C-5	.01 MFD.	600 V.
C_{14}	C-4	.01 MFD.	400 V.
C_{15}	C-4	.01 MFD.	400 V.
C_{16}	C-22	.5 MFD.	50 V.
C_{17}	C-22	.5 MFD.	50 V.
C_{18}	C-71	.01 MFD. (OIL)	1000 V.

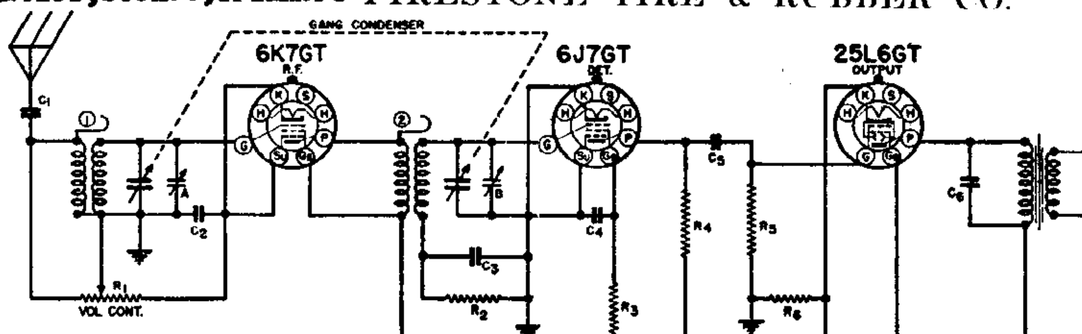
DIAG. NO.	PART NO.	DESCRIPTION	
C_{19}	C-71	.01 MFD. (OIL)	1000 V.
C_{20}	C-5	.01 MFD.	600 V.
C_{21}	C-242	10 MFD.	250 V.
C_{22}	C-242	15 MFD.	250 V.
C_{23}	C-1	.1 MFD.	200 V
R_1	R-12	500 OHM	.5 W.
R_2	R-33	50,000 OHM	.5 W.
R_3	R-511	67.0 OHM	.5 W.
R_4	R-511	67.0 OHM	.5 W.
R_5	R-25	10,000 OHM	.5 W.
R_6	R-26	15,000 OHM	.5 W
R_7	R-10	400 OHM	.5 W.
R_8	R-44	2 MEGOHM	.5 W.

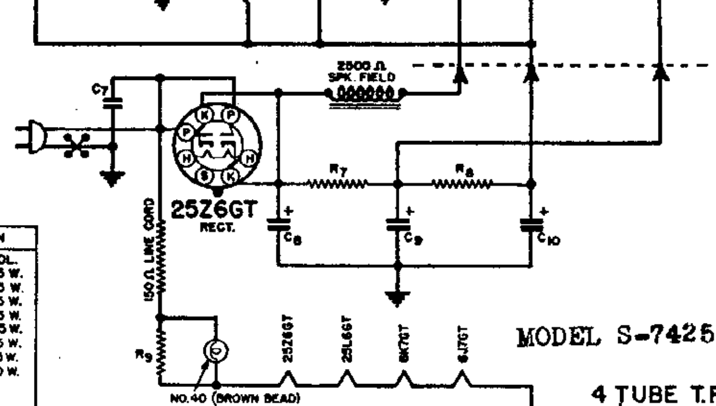
DIAG. NO.	PART NO.	DESCRIPTION	
R_9	V-20	1 MEG. VOLUME CONT.	
R_{10}	R-55	10 MEGOHM	.5 W.
R_{11}	R-41	.25 MEGOHM	.5 W.
R_{12}	R-16	2,000 OHM	.5 W.
R_{13}	R-42	.5 MEGOHM	.5 W.
R_{14}	V-112	75,000 Ω TONE CONT.	
R_{15}	R-510	8.3 OHM 5 %	.5 W.
R_{16}	R-510	8.3 OHM 5 %	.5 W.
R_{17}	R-107	200 OHM	.5 W.
	X-17	BAND SWITCH	
	G-20	GANG CONDENSER	
	F-4	SYN. VIBRATOR	
	W-207	BATTERY CABLE	

DIAG. NO.	PART NO.	DESCRIPTION
1	L-72	ANTENNA COIL
2	L-63	OSCILLATOR COIL
3	I-38	1ST. I.F. TRANS.
4	I-39	2ND. I.F. "
5	T-103	AUDIO "
6	S-26	SPKR. "
7	H-208	"A" CHOKE
8	T-26	POWER TRANS.
9	H-207	R.F. CHOKE
10	H-9	AUDIO CHOKE
A		2-35 MMFD.
B		"
C		"
D		"
E	P-3	300-600 MMFD



MODELS S7425-4, S7425-5, S7426-5 Alignment
Schematics, Socket, Trimmers FIRESTONE TIRE & RUBBER CO.

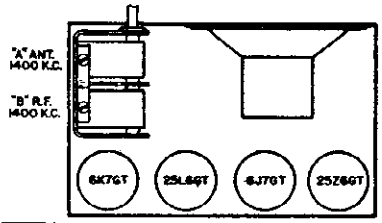




MODEL S-7425-4

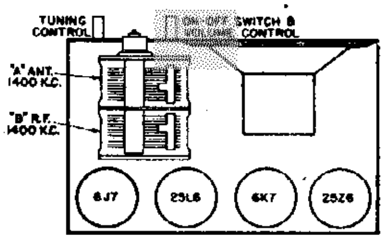
4 TUBE T.R.F.

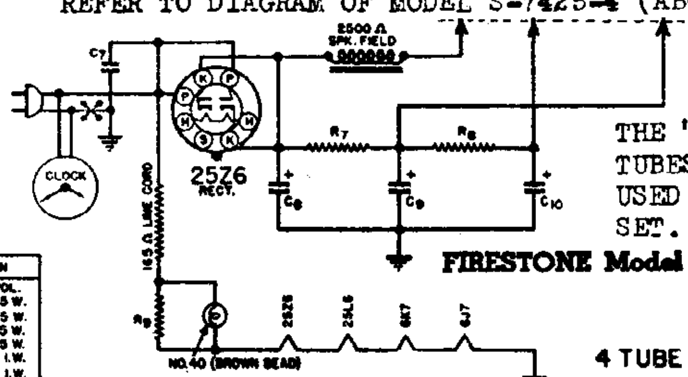
POWER SUPPLY. This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (D.C.) ranging from 110 to 120 volts.



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C_1	C-4	.01 MFD. 400 V.	R_1	V-6	25,000 OHM VOL.
C_2	C-13	.05 MFD. 200 V.	R_2	R-45	3.5 MEG. .25 W.
C_3	C-13	.05 MFD. 200 V.	R_3	R-46	6 MEG. .25 W.
C_4	C-4	.01 MFD. 400 V.	R_4	R-43	1 MEG. .25 W.
C_5	C-4	.01 MFD. 400 V.	R_5	R-42	.5 MEG. .25 W.
C_6	C-4	.01 MFD. 400 V.	R_6	R-105	125 OHM ±10% .5 W.
C_7	C-14	.05 MFD. 400 V.	R_7	R-1	30 OHM .25 W.
C_8	C-233	12 MFD. 150 W.V.	R_8	R-18	3,000 OHM .25 W.
C_9	C-233	8 MFD. 150 W.V.	R_9	R-250	30 OHM 1.0 W.
C_{10}	C-233	6 MFD. 150 W.V.	1	L-110R	ANTENNA COIL
			2	L-111R	R.F. COIL
	G-17	GANG CONDENSER		S-300	SPEAKER

REFER TO DIAGRAM OF MODEL S-7425-4 (ABOVE)





THE "GT" TYPE TUBES ARE NOT USED IN THIS SET.

FIRESTONE Model S-7425-5

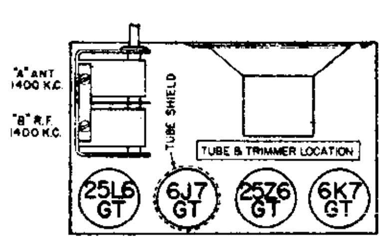
4 TUBE T.R.F.

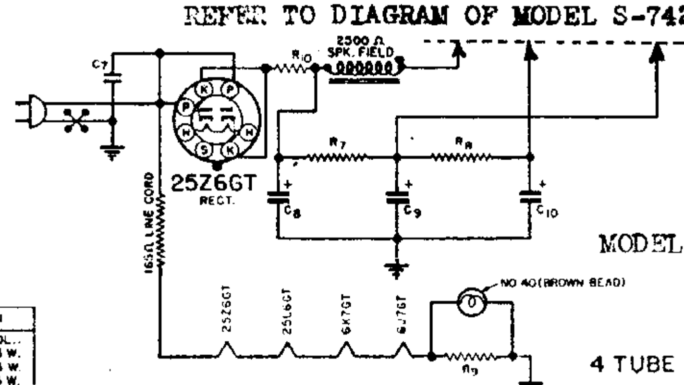
DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C_1	C-4	.01 MFD. 400 V.	R_1	V-24	25,000 OHM VOL.
C_2	C-13	.05 MFD. 200 V.	R_2	R-45	3.5 MEG. .5 W.
C_3	C-13	.05 MFD. 200 V.	R_3	R-46	6 MEG. .5 W.
C_4	C-4	.01 MFD. 400 V.	R_4	R-43	1 MEG. .5 W.
C_5	C-4	.01 MFD. 400 V.	R_5	R-42	.5 MEG. .5 W.
C_6	C-4	.01 MFD. 400 V.	R_6	R-105X	125 OHM ±10% 1.W.
C_7	C-14	.05 MFD. 400 V.	R_7	R-105X	125 OHM ±10% 1.W.
C_8	C-233	16 MFD. 150 W.V.	R_8	R-18X	3,000 OHM ±10% .5 W.
C_9	C-233	8 MFD. 150 W.V.	R_9	R-100	30 OHM 1.W.
C_{10}	C-233	6 MFD. 150 W.V.	1	L-110	ANTENNA COIL
	W-3	POWER CORD	2	L-111	R.F. COIL
	G-26	GANG CONDENSER		S-300A	SPEAKER & TRANS.

The clock will keep correct time only when connected to a 60 cycle, 110 to 120 volt A.C. power supply. **Never plug into a direct current circuit.**

4 Tube AC Tuned Radio Frequency Receiver With Electric Clock

REFER TO DIAGRAM OF MODEL S-7425-4 (ABOVE)





MODEL S-7426-5

4 TUBE T.R.F.

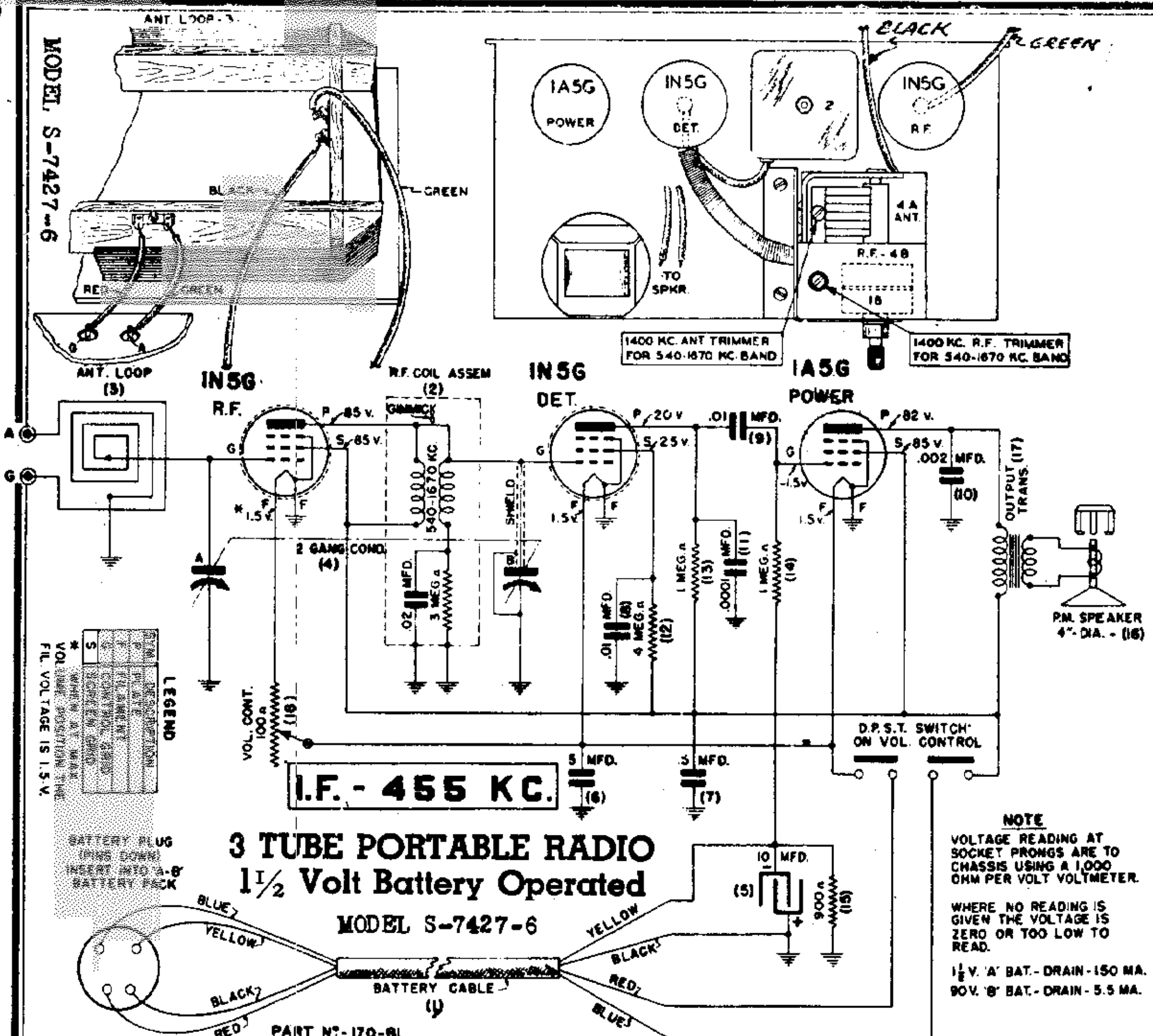
DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C_1	N-1344	.01 MFD. 400 V.	R_1	V-23	25,000 OHM VOL.
C_2	N-1345	.05 MFD. 200 V.	R_2	N-1418	3.5 MEG. .5 W.
C_3	N-1345	.05 MFD 200 V.	R_3	N-1419	6 MEG. .5 W.
C_4	N-1344	.01 MFD. 400 V	R_4	N-1262	1 MEG. .5 W.
C_5	N-1344	.01 MFD 400 V.	R_5	N-1264	.5 MEG. .5 W.
C_6	N-1344	.01 MFD. 400 V	R_6	N-1416	125 OHM ±10% .5 W.
C_7	N-1346	.05 MFD. 400 V.	R_7	N-1420	125 OHM 1 W.
C_8	C-233	16 MFD. 150 W.V.	R_8	N-1417	3,000 OHM .5 W
C_9	C-233	8 MFD 150 W.V.	R_9	N-1415	30 OHM 1.0 W
C_{10}	C-233	6 MFD 150 W.V.	R_{10}	N-1251	25 OHM 1 W
	S-300	SPEAKER	1	L-110	ANTENNA COIL
	G-25	GANG CONDENSER	2	L-111	R.F. COIL

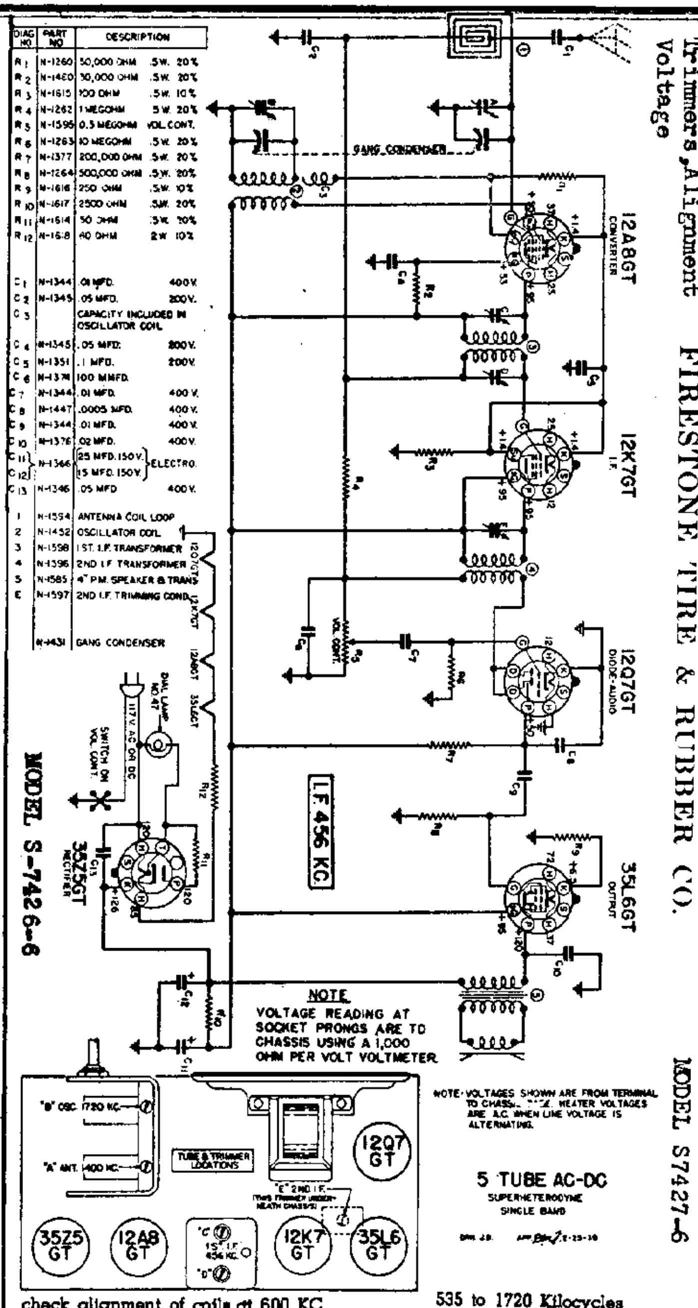
POWER SUPPLY. This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (D.C.) ranging from 110 to 120 volts.

Schematics, Socket Trimmers, Alignment Voltage

FIRESTONE TIRE & RUBBER CO.

MODEL S7426-6
MODEL S7427-6





DIAG NO	PART NO	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%
R2	N-1460	30,000 OHM .5W. 20%
R3	N-1615	100 OHM .5W. 10%
R4	N-1262	1 MEGOHM .5W. 20%
R5	N-1595	0.5 MEGOHM VOL. CONT.
R6	N-1263	10 MEGOHM .5W. 20%
R7	N-1377	200,000 OHM .5W. 20%
R8	N-1264	500,000 OHM .5W. 20%
R9	N-1616	250 OHM .5W. 10%
R10	N-1617	2500 OHM .5W. 20%
R11	N-1614	50 OHM .5W. 20%
R12	N-1618	40 OHM 2W. 10%
C1	N-1344	.01 MFD. 400V.
C2	N-1345	.05 MFD. 200V.
C3		CAPACITY INCLUDED IN OSCILLATOR COIL
C4	N-1345	.05 MFD. 200V.
C5	N-1351	.1 MFD. 200V.
C6	N-1374	100 MMFD.
C7	N-1344	.01 MFD. 400V.
C8	N-1447	.0005 MFD. 400V.
C9	N-1344	.01 MFD. 400V.
C10	N-1376	.02 MFD. 400V.
C11	N-1366	25 MFD. 150V. ELECTRO.
C12		15 MFD. 150V. ELECTRO.
C13	N-1346	.05 MFD 400V.
1	N-1594	ANTENNA COIL LOOP
2	N-1452	OSCILLATOR COIL
3	N-1598	1ST. I.F. TRANSFORMER
4	N-1596	2ND I.F. TRANSFORMER
5	N-1585	4" P.M. SPEAKER & TRANS
E	N-1597	2ND I.F. TRIMMING COND.
	N-1431	GANG CONDENSER

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1400 kilocycle antenna and R. F. trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

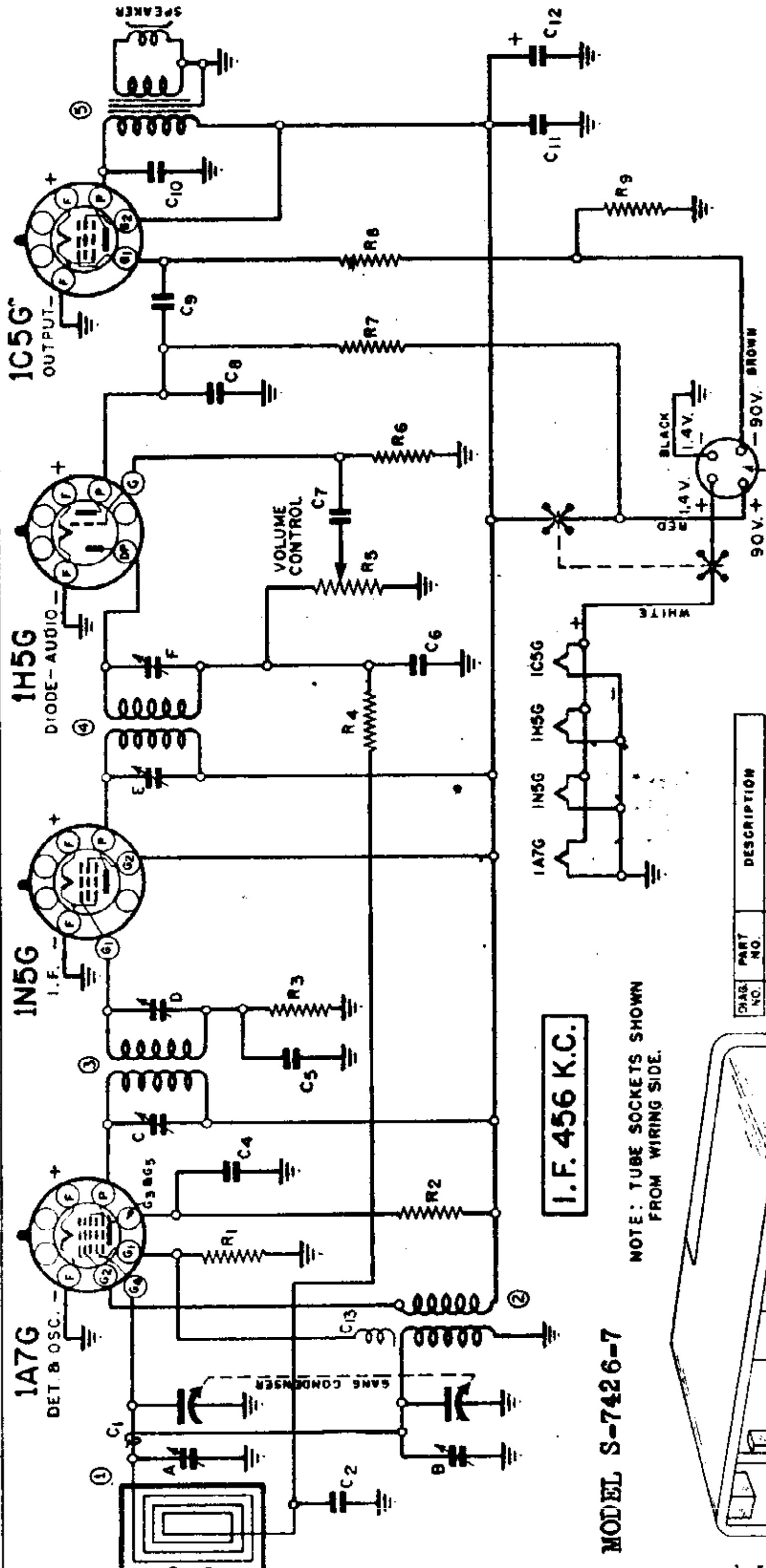
a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

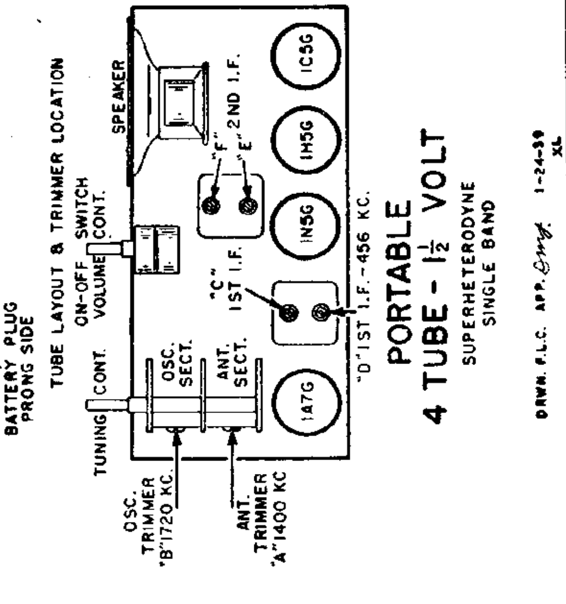
b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

MODEL S7426-7, Roamer
(Jan. 1939)

FIRESTONE TIRE & RUBBER CO.

Schematic, Socket
Alignment
Trimmers

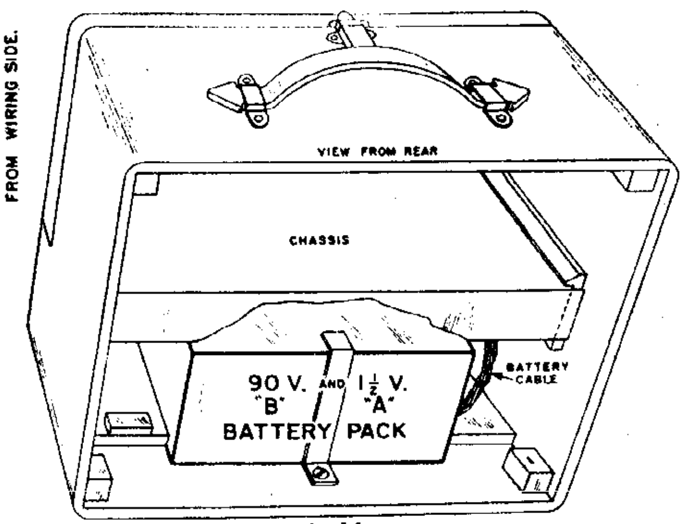




PORTABLE
4 TUBE - $1\frac{1}{2}$ VOLT
SUPERHETERODYNE
SINGLE BAND

DRWN. F.L.C. APP. [signature] 1-24-39 XL

DIAG. NO.	PART NO.	DESCRIPTION
R_1	N-1377	.2 MEGOHM 20% .5W.
R_2	N-1353	50,000 OHM 10% "
R_3	N-1378	2 MEGOHM 20% "
R_4	N-1262	1 MEGOHM " "
R_5	N-1504	.5 MEG. VOLUME CONT.
R_6	N-1378	2 MEGOHM 20% .5W
R_7	N-1262	1 MEGOHM " "
R_8	N- "	" " "
R_9	N-1379	550 OHM 10% "
C_1	——	GIMMIC
C_2	N-1345	.05 MFD 200 V.
C_4	N-1345	.05 MFD. 200 V.
C_5	N-1376	.02 MFD. 400 V.
C_6	N-1343	250 MMFD. 20%
C_7	N-1344	.01 MFD. 400 V.
C_8	N-1374	100 MMFD. 20%
C_9	N-1344	.01 MFD 400 V.
C_{10}	N-1347	.006 MFD. 600 V.
C_{11}	N-1351	.10 MFD. 200 V.
C_{12}	N-1387	6 MFD. ELECTROLYTIC
C_{13}	-	CAPACITY INCLUDED IN OSCILLATOR COIL.
1	N-1508	LOOP ANTENNA
2	N-1532	OSCILLATOR COIL
3	N-1391	1ST I.F. TRANS.
4	N-1509	2ND I.F. TRANS.
5	N-1507	5" P.M. SPKR. & TRANS.
	N-1499	GANG CONDENSER
	N-1510	BATTERY CABLE



SINGLE UNIT "A" & "B" BATTERY

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1A7G) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna terminal to the generator through a 200 MMF dummy and the ground terminal to the generator ground. Set the dial and generator at 1720 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output. Check the sensitivity at 600 to determine if the gang or the coils have been damaged.

Schematics, Socket, Trimmers
Alignment, Voltage

FIRESTONE TIRE & RUBBER CO.

MODEL S7426-7 (Mar. 1939)
MODEL S7428-2

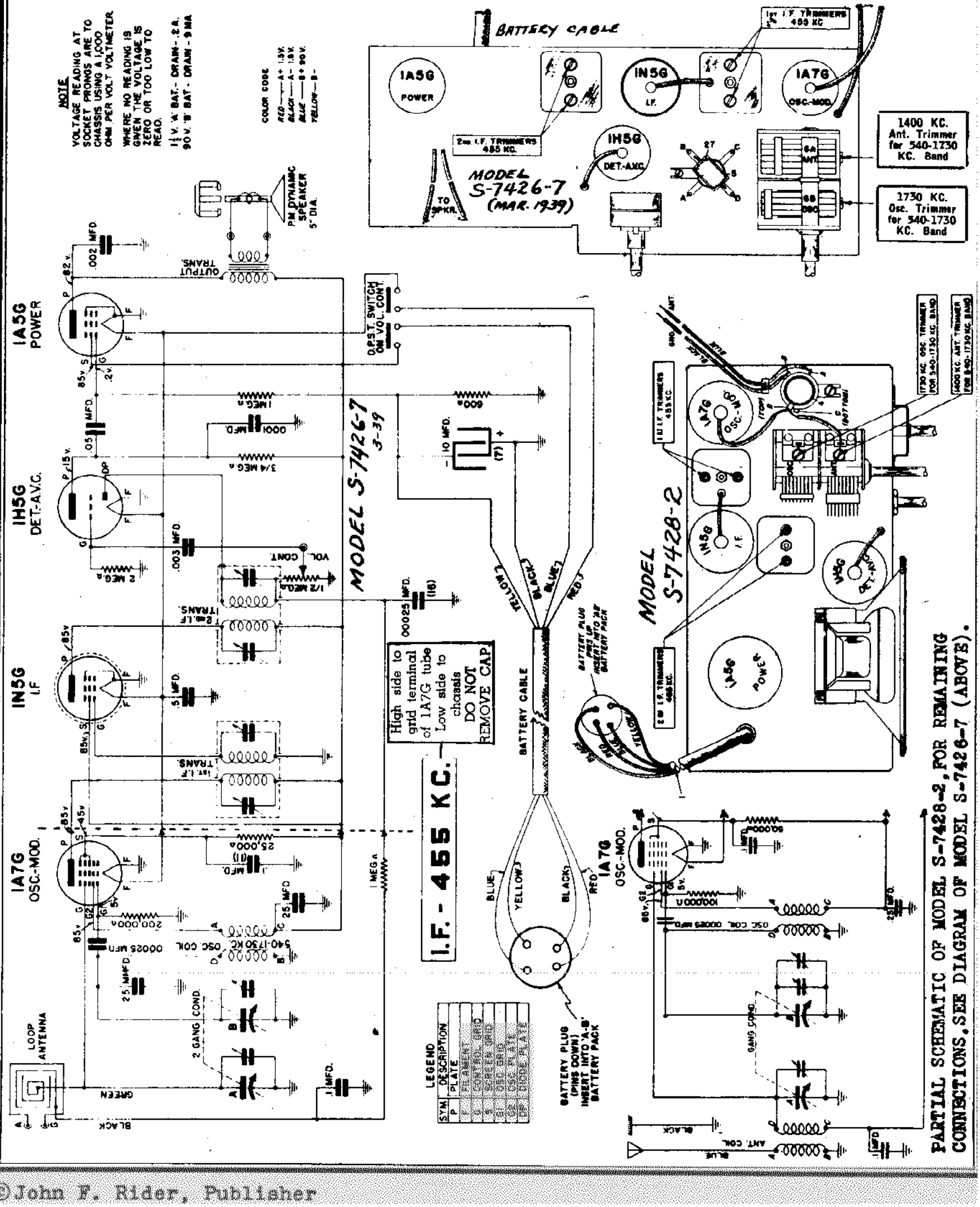
BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

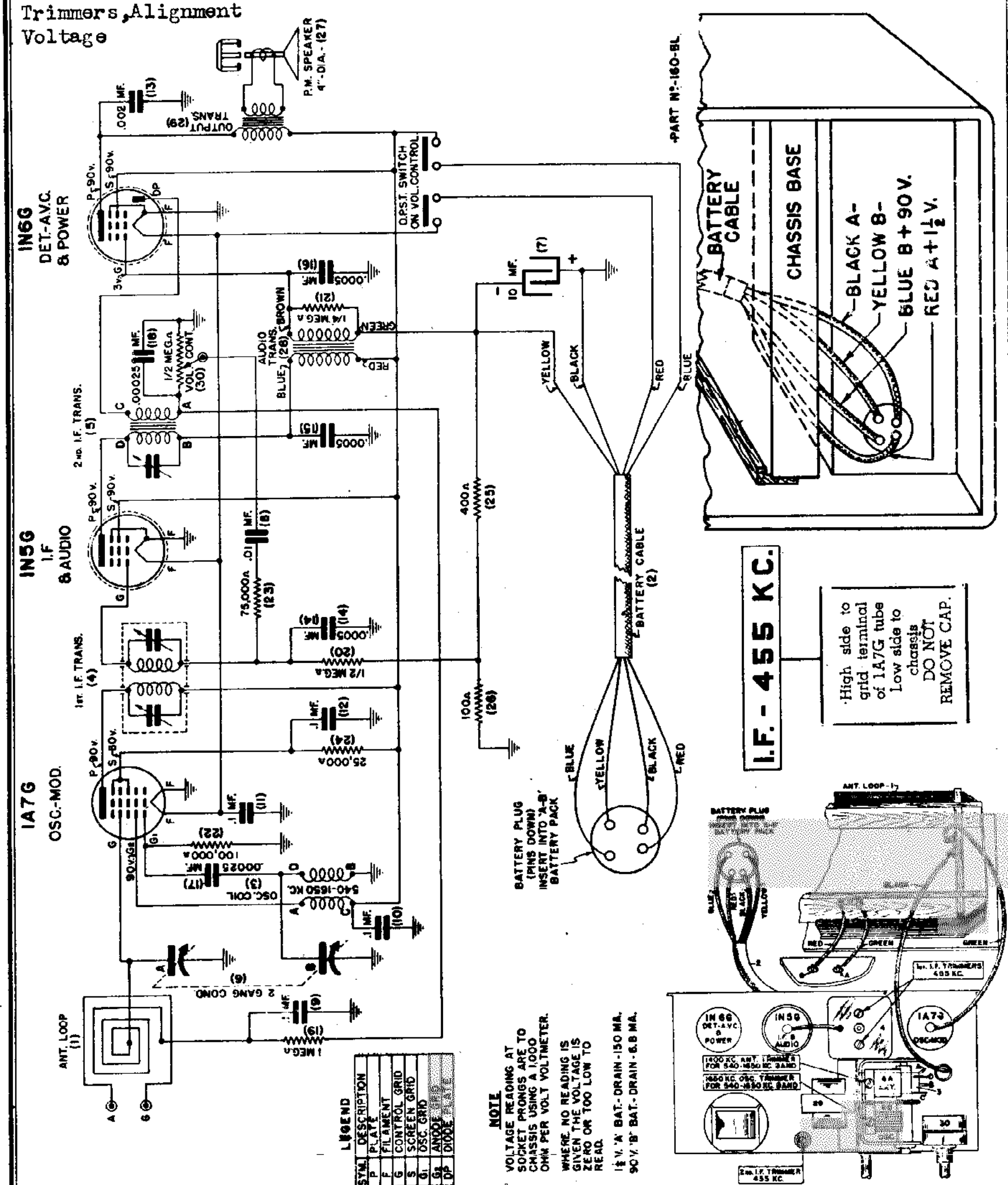
a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.



MODEL S7426-9
Schematic, Socket
Trimmers, Alignment
Voltage

FIRESTONE TIRE & RUBBER CO.



BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERY-PACK IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

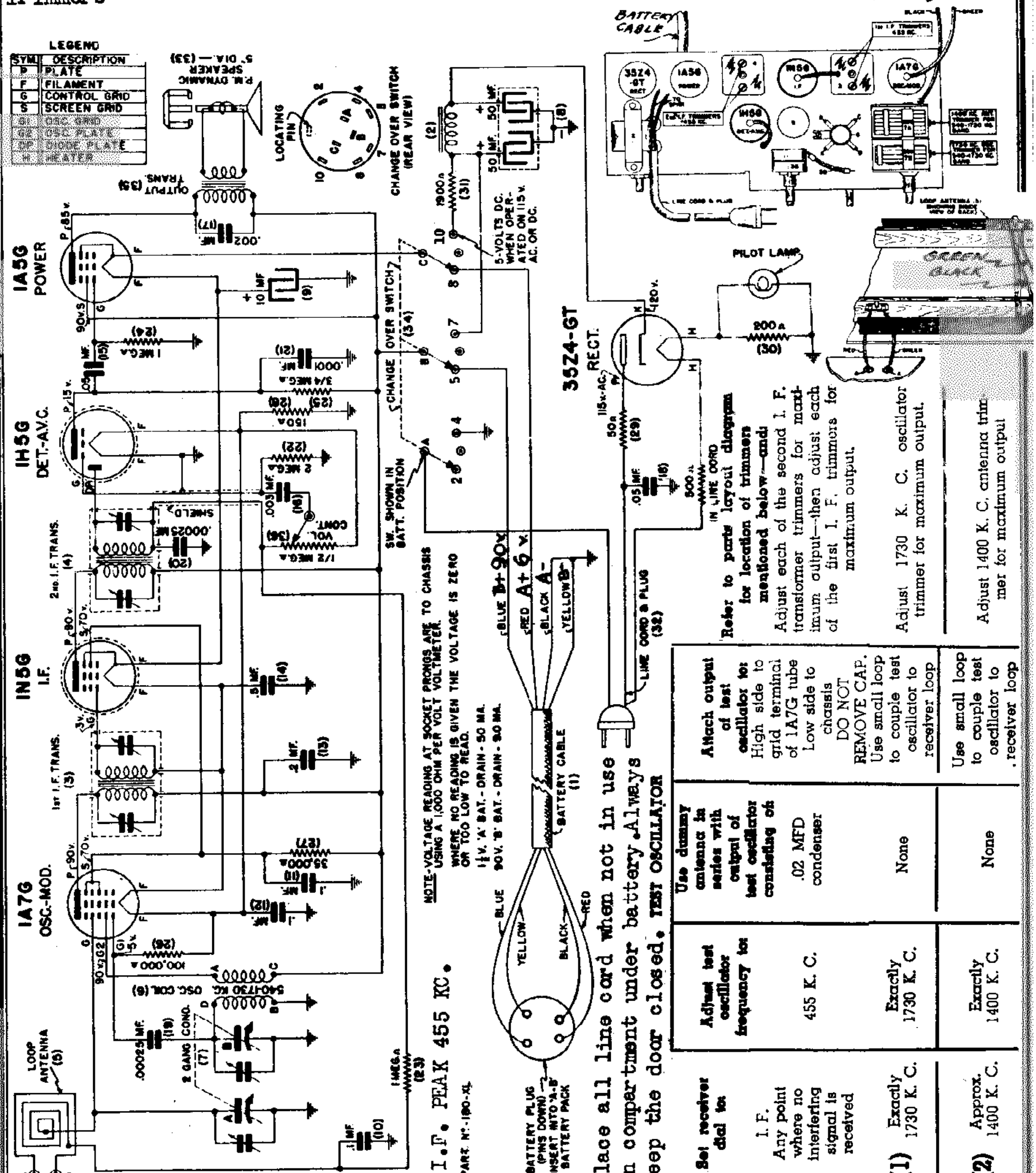
a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Alignment, Voltage Trimmers

FIRESTONE TIRE & RUBBER CO.

MODEL S7427-5 Schematic, Socket



TEST OSCILLATOR

	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below—and:
	I.F. Any point where no interfering signal is received	455 K.C.	.02 MFD condenser	High side to grid terminal of 1A7G tube Low side to chassis DO NOT REMOVE CAP.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. trimmers for maximum output.
(1)	Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use small loop to couple test oscillator to receiver loop	Adjust 1730 K.C. oscillator trimmer for maximum output.
(2)	Approx. 1400 K.C.	Exactly 1400 K.C.	None	Use small loop to couple test oscillator to receiver loop	Adjust 1400 K.C. antenna trimmer for maximum output

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

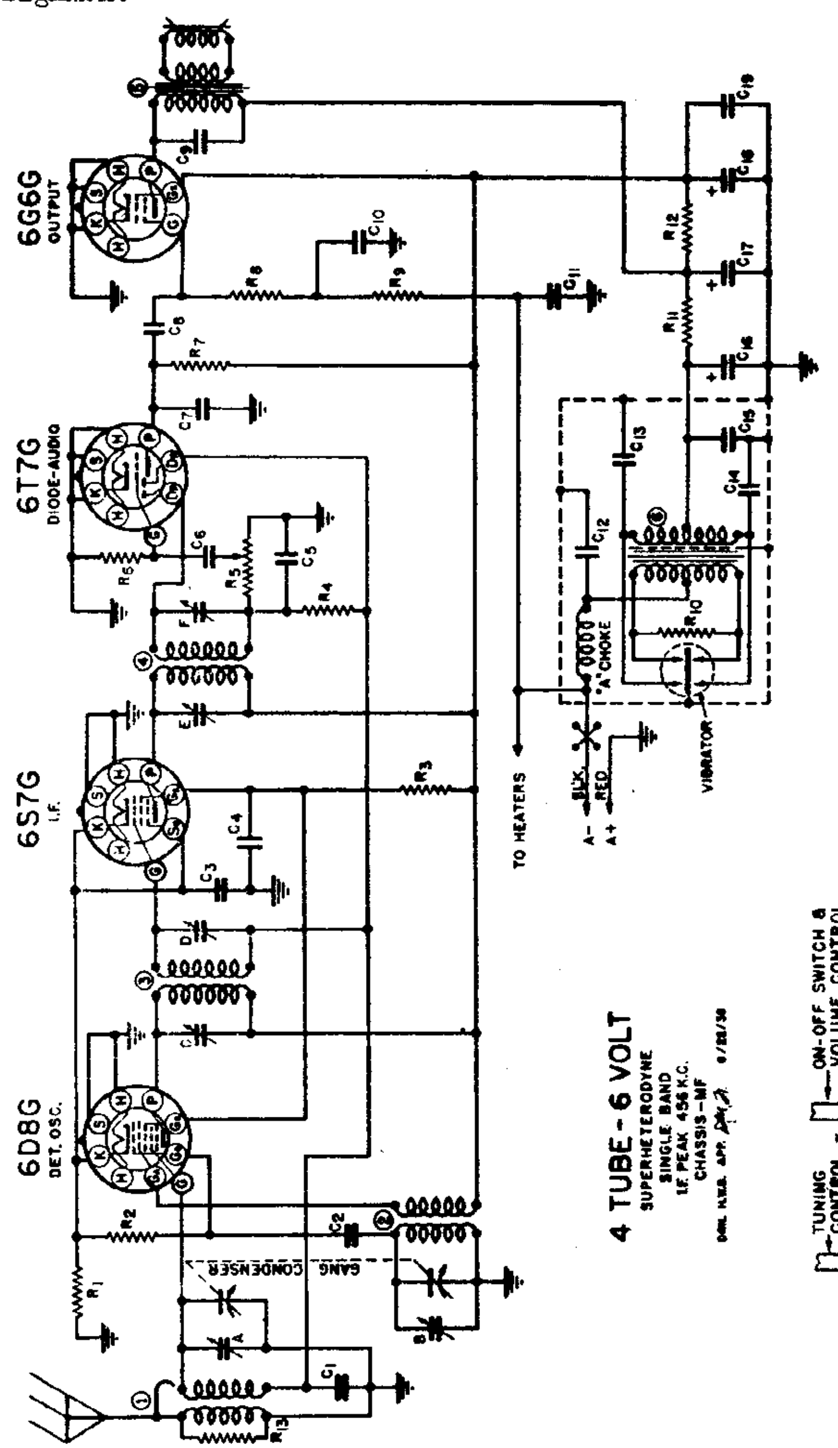
a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

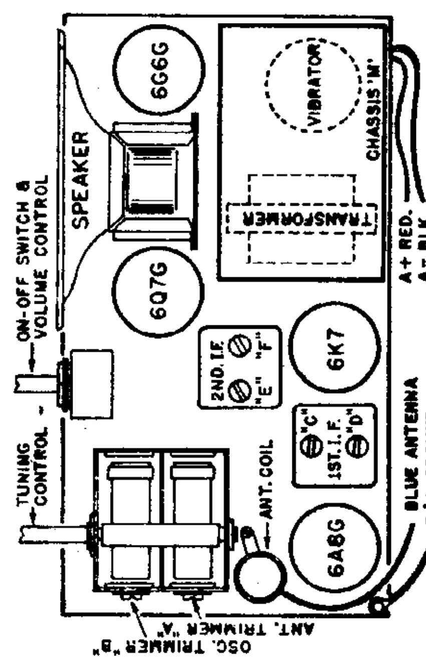
MODEL S7428-1

FIRESTONE TIRE & RUBBER CO.

Schematic, Socket, Trimmers
Alignment



SYM. NO.	PART NO.	DESCRIPTION	SYM. NO.	PART NO.	DESCRIPTION
R_1	R-5	200 OHM .25 W.	C_{11}	C-22	.5 MFD. 50 V.
R_2	R-33	50,000 OHM "	C_{12}	C-22	.5 MFD. 50 V.
R_3	R-36	25,000 OHM "	C_{13}	C7-1	.01 MFD. (OIL) 1000 V.
R_4	R-44	2 MEGOHM "	C_{14}	C7-1	.01 MFD. (OIL) 1000 V.
R_5	V-20	1 MEGOHM VOLUME CONTROL	C_{15}	C-5	.01 MFD. 600 V.
R_6	R-46	5 MEGOHM .25 W.	C_{16}	C-236	10 MFD. 250 V.
R_7	R-41	250,000 OHM "	C_{17}	C-236	20 MFD. 150 V.
R_8	R-42	.5 MEGOHM "	C_{18}	C-236	20 MFD. "
R_9	R-33	50,000 OHM "	C_{19}	C-1	.1 MFD. 200 V.
R_{10}	R-107	200 OHM .5 W.			
R_{11}	R-7	250 OHM .25 W.			
R_{12}	R-8	500 OHM "	1	L-48	ANTENNA COIL
R_{13}	R-26	15,000 OHM "	2	L-49	OSCILLATOR COIL
			3	I-27	1ST. I.F. TRANSFORMER
			4	I-28	2ND. I.F. "
C_1	C-13	.05 MFD. 200 V.	5	S-24	SPEAKER & "
C_2	C-110	100 MMFD. 20%	6	T-22	POWER "
C_3	C-16	.25 MFD. 200 V.			
C_4	C-1	.1 MFD. 200 V.		G-10	2 GANG VARIABLE CONDENSER
C_5	C-110	100 MMFD. 20%		206	"A" CHOKE
C_6	C-27	.006 MFD. 800 V.		F-4	SYNCHRONOUS VIBRATOR
C_7	C-111	250 MMFD. 20%			
C_8	C-4	.01 MFD. 400 V.			
C_9	C-27	.006 MFD. 800 V.			
C_{10}	C-13	.05 MFD. 200 V.			



TUBE AND TRIMMER LOCATIONS

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600 and 1400 KC. and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should be aligned.

I.F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and tune in the signal to check sensitivity at this point to determine if coils or gang condenser have not been damaged.

Elec.Automatic Tuner
Data,Procedure,Assembly

GALVIN MFG. CORP.

MODEL 9-49 (E5T)
MODEL 9-69 (E5T)
MODEL 15-F (E6T)
MODELS 20-P,21-L,24-K
MODELS 22-S,25-N (E6T)

ELECTRIC AUTOMATIC TUNER

Types E5T, E6T and E7T

NOTE: All three tuners are identical in construction, except for the condenser gang.

E5T has a 3-gang condenser and is used in Models 9-49 and 9-69.

E6T has a 2-gang condenser and is used in Models 15-F, 20-P, 21-L, 22-S, 24-K, and 25-N.

E7T has a special high frequency condenser gang and is used in Police Cruiser Model P-69-14.

SERVICE SUGGESTIONS

MOTOR DOES NOT RUN

1. MOTOR CONTACTS IN CONTROL HEAD NOT CLOSING. Open the control head and inspect the motor contacts. If the gap is too great, contact will not be made when the button is pressed. Adjust by bending carefully.
2. POOR CONTACT AT PUSH-BUTTON PLUG. Inspect the contacts between the plug and the receptacle on the chassis.
3. OPEN CIRCUIT IN MOTOR. Check all connections to motor and check motor winding for continuity.
4. MOTOR BRUSHES NOT MAKING CONTACT. Check contact between brushes and commutator. Clean dirty commutator with carbon tetrachloride.
5. LOW BATTERY VOLTAGE. A weak or defective battery in the car would not deliver sufficient voltage to run the motor.
6. FLEXIBLE TUNING SHAFT BINDS. Binding in the flexible tuning shaft places an additional load on the motor. If this load is too great, it will prevent the motor from turning the mechanism.
7. MAGNET FAILS TO RELEASE. If the magnet which has previously been energized, fails to release the latch bar for any reason, the motor cannot turn the mechanism.

MECHANISM RUNS SLUGGISHLY

1. LOW BATTERY VOLTAGE. A weak or defective battery will not deliver sufficient voltage to turn the motor at normal speed.
2. HIGH RESISTANCE CONTACT IN CONTROL HEAD. High resistance at the push-button contacts will cause a voltage drop which will prevent the motor from turning at normal speed.
3. POOR CONTACT BETWEEN PUSH-BUTTON PLUG AND RECEPTACLE. This will also result in voltage drop, and lessened motor power.
4. BINDING IN TUNING SHAFT. Binding in the flexible tuning shaft will place an additional load on the motor which can slow it down considerably. Install tuning shaft with minimum amount of bending and check alignment where the tuning shaft enters the receiver housing.
5. GEARS NOT PROPERLY MESHED. Check all gears in assembly for binding due to improper meshing.
6. DEFECTIVE MOTOR. - Replace.

MOTOR FAILS TO REVERSE

1. REVERSING SWITCH NOT PROPERLY ADJUSTED. See instructions elsewhere in this book.
2. OPEN CIRCUIT IN MOTOR. If one side of motor circuit is open, motor will run in one direction only.
3. OPEN MAGNET WINDING. An open magnet will not pull latch down; consequently will not cause motor switch to reverse.
4. LATCH BAR SPRING TOO TIGHT. If the latch bars operate under too much tension the magnet may not be able to pull the latch down.

FAILS TO RETAIN ORIGINAL SETTING

1. LATCH RINGS NOT LOCKED SECURELY. The locking screw must be pulled down securely, otherwise, the shock of the sudden stopping will tend to slide the rings away from the original setting.
2. ORIGINAL SETTING NOT ACCURATE. Resetting of magnets may be necessary after several days' use, during which time the mechanism goes through a "shaking down" process.
3. ELECTRICAL DRIFT. This is usually the result of a great change in temperature. Automatic compensation is provided in the circuit to take care of the normal operating temperature range. Before making original setting, turn the set on and permit it to play long enough to arrive at a constant operating temperature. In zero weather do not expect the set to tune "on the nose" until after a constant temperature has been reached. In severe cases of electrical drift occurring at normal operating temperature, change the compensating condenser.

IMPOSSIBLE TO SET UP STATIONS

1. TOO MUCH TENSION ON LOCKING LEVERS. When the automatic locking screw is loose, the station rings should move freely. If the levers still hold the station rings partially locked, the screws which hold the levers in position should be loosened one-quarter to one-half turn.
2. LATCH RINGS "OUT OF RANGE". If the loosened latch rings slip on the drum until the notch falls out of reach of the latch bar, they can be brought back to position by following exactly the "setting procedure" outlined elsewhere in this book.

FAILS TO STOP AT STATION

1. OPEN MAGNET WINDING. Check for continuity and replace if necessary.
2. MAGNET CONTACT IN CONTROL HEAD NOT CLOSING. Inspect contacts. Adjust or clean if necessary.
3. LATCH BAR DEFECTIVE. Inspect latch bar to make sure that it has not been damaged. Replace latch bar, if required.
4. POOR CONTACT AT PUSH BUTTON PLUG. A poor contact here means a voltage drop which reduces the pulling power of the magnet.
5. IMPROPER SPACING OF MAGNET. Check the spacing between the latch bar armature and the magnet pole. When the tip of the latch bar is seated all the way down in the notch in the latch ring, the armature should not quite touch the magnet pole. A hair line of light should be visible between them.
6. LATCH RINGS NOT LOCKED SECURELY. If the latch rings are very loose the motor will continue to turn the gang until the plates are completely meshed.

LATCH BAR STICKS IN NOTCH

1. MANUAL TUNING SHAFT BINDS. Binding in the tuning control shaft causes the latch bar to press hard against one side of the notch and may prevent it from releasing as the magnet is de-energized.
2. LATCH BAR SPRING WEAK. Check latch bar tension spring to make sure it is pulling away from the magnet with sufficient force. Spring tension is adjustable.
3. MAGNET CONTACT IN CONTROL HEAD STUCK. Check the magnet switch in the control head to make sure it breaks contact when pressure is released on the bottom. Check for frozen contact points, or for sticking button.
4. ARMATURE RIVET WORN. There is a brass rivet at the tip of the armature, to prevent the armature freezing to the magnet. If this rivet is worn down, permitting the steel armature to actually touch the magnet pole, it may freeze in that position.
5. BURR ON TIP OF LATCH. Latch tip should be smooth and shiny.
6. BINDING IN LATCH BEARINGS. Latch must move freely but not sloppy.
7. LATCH TIPS NOT CENTERED ON LATCH RINGS. Latch tips must not rub bakelite guide rings. The latch bar bearing shaft is adjustable.
8. FRICTION CLUTCH TOO TIGHT. A tension washer between the motor pinion and the brass pinion collar acts as a friction clutch to absorb the shock of stopping the motor quickly when a station is tuned. If the tension is too tight, the torque of the stopped motor will hold the latch bar tip in the notch.
9. MOTOR BRUSHES TOO TIGHT. Too much friction between the motor brushes and the commutator will cause the same thing.

TO SET AUTOMATIC TUNER

NOTE: Before setting any station, let the set warm up for not less than ten minutes. If you wish you can "set" the automatic tuner on the service bench before installing the radio in the car. Use a short aerial and peak the antenna trimmer to it. Then readjust the antenna trimmer after the installation in the car.

IMPORTANT—You will note that the 9-contact plug on the end of the control head cable has one pin that is shorter than the others. For the "setting up" procedure, this plug should be inserted in its receptacle on the receiver only half way. This will cause all of the magnet terminals to be connected, but will not permit the tuning motor to run during the adjustment, since the short pin will not make contact, thereby holding the motor circuit open. The motor should not run at any time during the "setting up" procedure.

1. From the set of call letter tabs provided, detach the proper ones for the six stations. The station tabs should then be inserted in the space provided in the fact of station tuning buttons. Cover the tab with a small rectangular piece of celluloid. Both tabs and celluloids snap into position.

2. Loosen the AUTOMATIC LOCKING SCREW. This screw should be turned counter-clockwise four or five revolutions—far enough to assure plenty of looseness.

3. Turn the dial all the way to the low frequency end (535 K.C.)

4. Press the first button and hold it down. A faint "click" should be heard, indicating that the tuning magnet has attracted the latch bar.

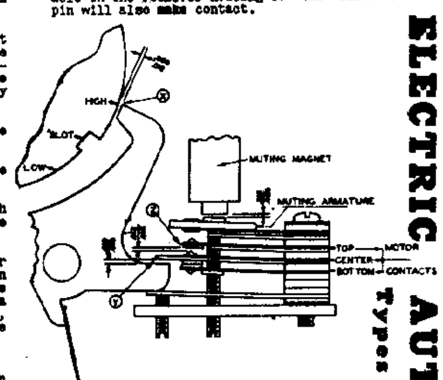
5. Holding the magnet energized, turn the dial manually all the way to the high frequency end (1550 K.C.) and then all the way back to the low frequency end (535 K.C.)

6. Still pressing on the button, tune in the station to be set on that button.

7. Proceed to set the remaining five stations. For each station follow steps 3, 4, 5, and 6, as outlined above. AT NO TIME IN THE SETTING UP PROCEDURE SHOULD THE TUNING MOTOR BE PERMITTED TO RUN.

8. Tighten the automatic locking screw very securely. Do not hold the tuning knob while locking the automatic, but allow the mechanism to turn to its natural stop.

9. Push the plug all the way into the receptacle on the receiver housing so the short motor pin will also make contact.



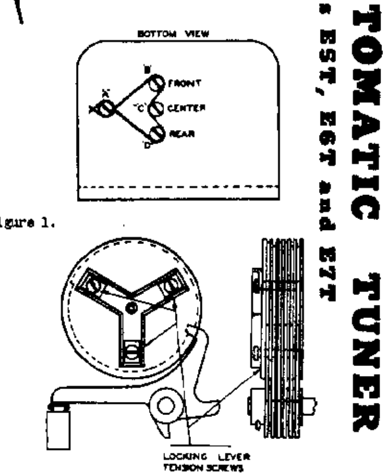


Figure 1.

REVERSING SWITCH AND MUTING RELAY ADJUSTMENT

NOTE: Four adjusting screws extend upward through the switch mounting plate, three of them in line, and one set off by itself. (See Fig. 1).

1. Turn the rotor assembly until the HIGH sides of all latch rings rest opposite the latch tips.

2. Turn screw "A" in until all latch bar tips touch HIGH side of ring and then turn the screw back one half turn. (Spacing between latch tip and high side of ring at point "X" should be 8 to 12 thousandths of an inch.)

MODEL 9-49
MODEL 9-69
MODEL 15-F
MODELS 20P,21L,24K

GALVIN MFG. CORP.

Procedure,Part 2
Schematic of Tuner
Assembly,Parts List

AUTOMATIC SERVICE PROCEDURE--Continued

3. Hold any latch bar tip down on HIGH side of ring and adjust screw "C" (center screw) until the bakelite insulator on the center switch leaf just barely misses touching the heel of the latch bar at point "Y". (Check adjustment by pressing other latch bars. The depressed latch bar must not lift the center contact even slightly.)

4. With latch bar at rest position adjust screw "B" (front screw) until top motor contact is lifted from center contact by 12 to 15 thousandths of an inch at point "Z". (15 thousandths = 1/64").

5. Turn rotor until LOW side of ring rests under latch tip. Press any latch bar down and make sure switch actually reverses. (Bottom contact must break and top contact make sufficiently to lift the top switch leaf slightly from the bakelite spacer.)

6. Turn screw "D" (rear screw) until muting relay armature rests 15 to 20 thousandths of an inch from the magnet pole. (Too close spacing will cause intermittent muting due to vibration.) (15 thousandths = 1/64").

TO REMOVE LATCH BAR ASSEMBLY

1. Back up on front switch adjustment screw (A) until latch tips rest outside the diameter of the bakelite ring separators.

2. Remove comb shaped latch tension spring. (E)

3. Remove the hex-head machine screw which extends through the small angle bracket into the brass latch bar bearing shaft underneath the tuner. (Screw not visible in photo.)

4. Pull out latch and shaft assembly. (F)

NOTE: To re-assemble, reverse the above procedure, and take particular care that:

1. Latch bar tips center on latch rings. They should not rub bakelite ring separators. (Spacing is adjustable through elongated hole in small bracket under tuner.)

2. When readjusting screw (A), turn it all the way in until latch tips touch high side of rings; then back screw up one-half turn (See reversing switch adjustment on Page .)

TO REMOVE LATCH RING ASSEMBLY

1. Back up on switch adjustment screw (A) until latch tips rest outside the diameter of the bakelite ring separators.

2. Remove locking screw. (G)

3. Remove the three locking levers. (H)

4. Lift the locking nut off the end of the rotor shaft.

5. Carefully loosen the three screws (J) which hold the ring assembly to the rotor hub, and remove all rings and separators as a unit, being careful to keep the three screws in position through the assembly.

NOTE: To reassemble, reverse the above procedure. Work carefully - do not let the rings and separators get off the screws.

TO REPLACE DEFECTIVE LATCH RING

1. Remove the entire latch ring assembly from the rotor hub. (See instructions above.)

2. Lay assembly on flat surface with screw heads down.

3. Remove rings, separators and brass spacing collars, one at a time, until the defective ring is exposed.

NOTE: Reassemble parts one at a time, being careful that rings, separators, and spacers are in the correct position.

CAUTION: Be careful to replace rings in original position. Turning the ring over will reverse the position of the notch and will result in faulty tuning.

TO REMOVE DEFECTIVE HUB AND GEAR

1. Remove the entire latch ring assembly from the rotor hub. (See instructions above.)

2. Loosen the four Bristo set screws in the rotor hub.

3. Loosen the one Bristo set screw in the bakelite flexible shaft coupling.

4. Pull the rotor hub off the gang shaft. The manual tuning gear and coupling will have to be removed at the same time. The brass collar on the motor shaft may also need to be removed.

NOTE: When installing a new hub, turn the gang to full mesh and the hub gear against its stop before tightening set screws.

3S7111	Set Screw (8-32x3/16 Bri. Hd.) Blk.	DOZ.	$0.86
3S7114	Set Screw (8-32x1/4 Slab Hd.)	PERC.	1.50
3S7243	Screw (5-40x7/8 Sl. Hdls. MS) CP.	PERC.	1.05
3S7244	Screw (5-40x5/8 Sl. Hdls. MS) CP.	PERC.	1.00
3S7245	Screw (5-40x3/8 Sl. Hdls. MS) CP.	PERC.	1.00
4S7616	Washer (5/16-.171-.016) Brass	DOZ.	.10
8A10306	Tub. Cond. & Strap (.03-100V.)		.15
64A11245	Switch Holding Plate	DOZ.	.25
8K11624	Muting Magnet Assembly (Black)		.45
4X11633	Spring Washer (.562-.190-.008)	DOZ.	.10
9A13298	Plug Receptacle (9 Prong)		.30
62B13302	Rotor Hub		.40
43B13303	Station Ring		.25
32A13310	Spacer Ring (.015)	DOZ.	.70
43A13311	Latch Collar		.10
49A13312	Clamping Screw Disc	DOZ.	.15
1X13313	E5T Tuner Assembly Complete with Gang		18.00
2A13314	Clamping Lever Nut	DOZ.	.75
41A13315	Latch Spring (6 Finger)		.05
45A13318	Clamping Lever	DOZ.	.35
45B13319	Latch Arm (No. 1)		.20
45K13320	Latch Arm (No. 6)		.20
45B13321	Latch Arm (No. 3)		.20
45K13322	Latch Arm (No. 4)		.20
45B13323	Latch Arm (No. 2)		.20
45K13324	Latch Arm (No. 5)		.20
32K13325	Spacer Ring (.031)		.10
4K13328	Idler Gear Assembly		.75
59B13330	Tuner Motor (6-8V.D.C.)		3.90
47A13331	Latch Shaft		.30
47A13332	Idler Shaft		.10
7A13334	Shaft Retainer Bracket		.05
44A13335	Motor Pinion (1/2" PD)		.20
43A13336	Clutch Collar		.10
41A13338	Clamp Tension Spring	DOZ.	.20
7K13341	Idler Shaft Support (.062)		.05
7A13342	Idler Shaft Support (.109)		.10
4A13343	Clutch Washer (.562-.189-.019)	DOZ.	.10
4A13344	Spacer Washer (.312-.169-.090)	DOZ.	.25
19B13348	Variable Condenser (3 Gang) For E5T		4.00
1X13350	Rotor Assembly Complete		3.00
1K13353	Tuner Magnet Assembly (Black)		.45
1X13356	Latch Assembly Complete		1.50
1X13357	Tuner Switch Assembly		.90
7A13362	Relay Bracket		.05
1X13413	E6T Tuner Assembly Complete with Gang		17.50
3A13731	Screw (8-32x7/8 Spec. MS) CP.	DOZ.	.10
3A13732	Screw (8-32x3/4 Spec. MS) CP.	DOZ.	.10
19B14154	Variable Condenser (2 Gang) for E6T		3.50
1X14214	E7T Tuner Assembly Complete with Gang		21.50
19B14653	Variable Condenser (Hi-Frequency) P-69-14		7.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

A. Switch adjustment screw
B. Switch adjustment screw
C. Switch adjustment screw
D. Switch adjustment screw
E. Latch tension spring
F. Latch and shaft assembly
G. Locking Screw
H. Locking lever
J. Latch ring assembly screw
K. Manual tuning gear and coupling
L. Motor pinion
M. Pinion collar
N. Tuning Motor
P. Muting relay coil
R. Reversing switch

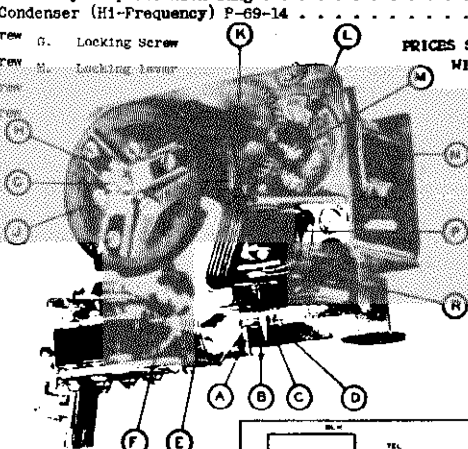


Figure 2.

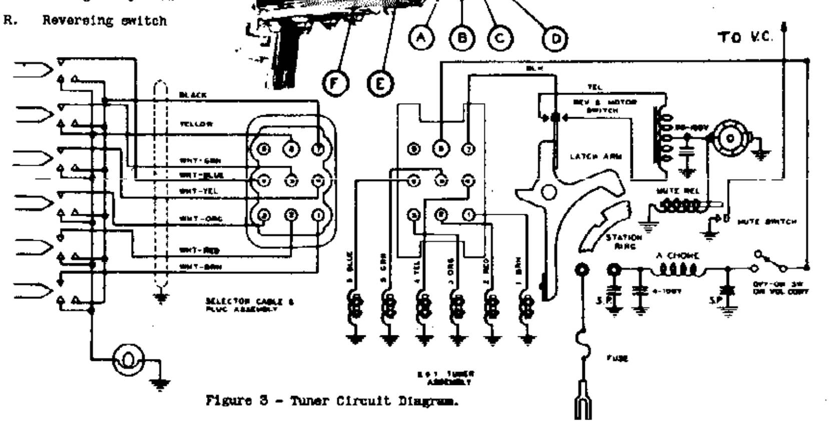
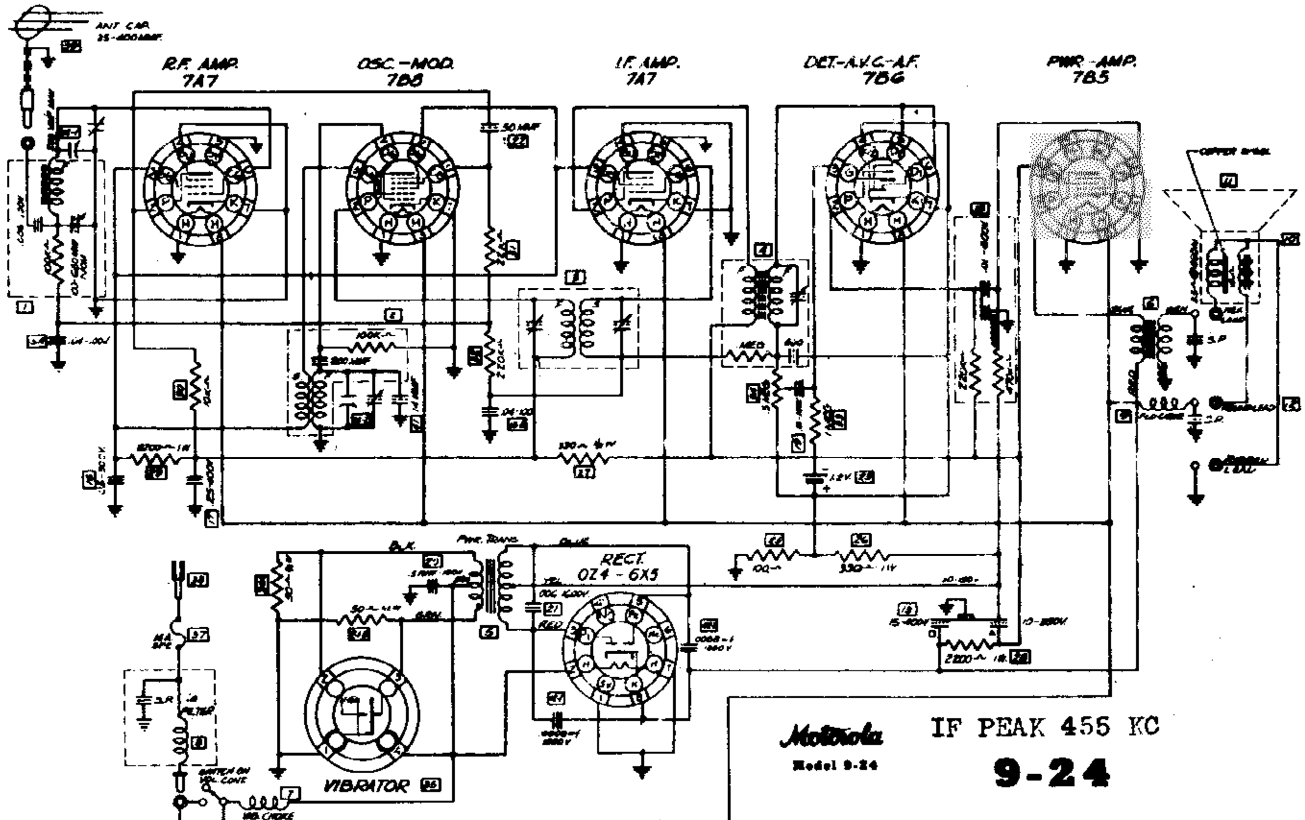


Figure 3 - Tuner Circuit Diagram.

GALVIN MFG. CORP.

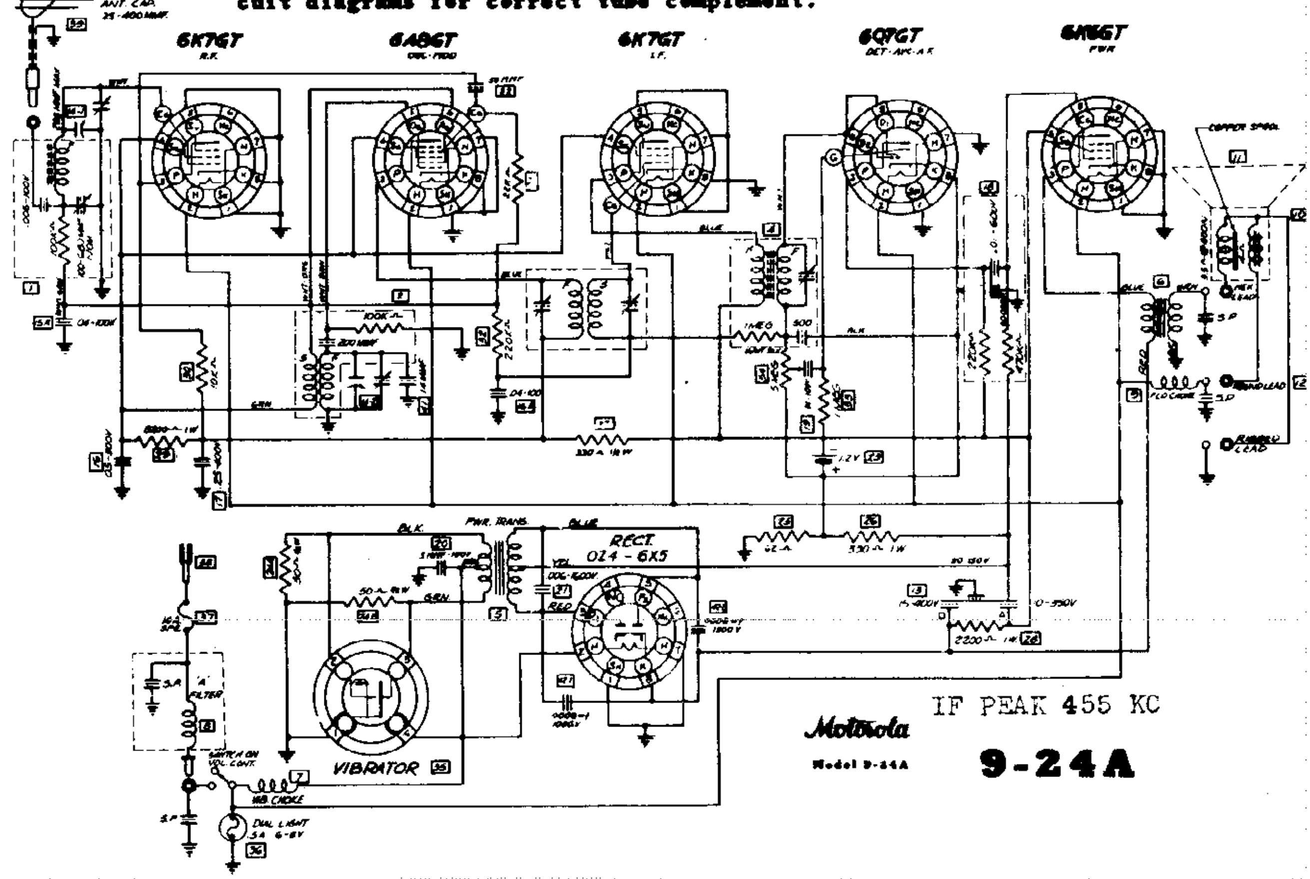


Motorola
Model 9-24

IF PEAK 455 KC

9-24

The only difference between these two is the tube complement. Model 9-24 uses Loktal tubes, whereas Model 9-24A uses Octal Base Bantam tubes. See the circuit diagrams for correct tube complement.



Motorola
Model 9-24A

IF PEAK 455 KC

9-24A

MODEL 9-24
MODEL 9-24A

GALVIN MFG. CORP.

Alignment, Socket, Trimmers
Voltage, Sensitivity, Gain
Dial Cord Data

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

NOTE: The antenna padder is reached through a hole in the bottom of the chassis base, directly under the antenna coil can.)

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
20,000	455 K.C.	IF Grid	.1 MF	.5 Meg	1.87 Volts
200	455 K.C.	Mod. Grid	.1 MF	.5 Meg	1.87 Volts
250	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.87 Volts
125	600 K.C.	RF Grid	.1 MF	.5 Meg	1.87 Volts
10	600 K.C.	Ant. Lead	40 MMF	None	1.87 Volts

* For one watt output.
** Meter connected across voice coil.

V.C. Resistance -3.5 ohms at 400 cycles.
1.87 Volts equals 1 watt output.

VOLTAGE CHART

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
7A7 or 6K7GT	RF	120	95	0	-
7B8 or 6A8GT	Osc.-Mod.	175	95	0	95
7A7 or 6K7GT	IF	175	95	0	-
7B6 or 6Q7GT	Det.Avc.	65	-	-2.5	-
7B5 or 6K6GT	Output	225	180	0	-
OZ4 or 6X5	Rect.	AC	-	230	-

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.

Current Consumption 6.5 Amps.

Battery voltage 6.3 V.

Maximum Power Output 5 Watts.

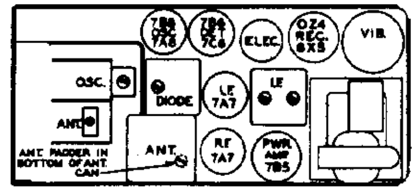


Figure 1 - Trimmer Locations

DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14731

1. Remove broken cord, dial scale and dial pointer.

2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 32 inches long. CONDENSER GANG MUST BE MESHED.

3. Double the cord at a point 11 inches from one end and thread the loop through the hole in the drive raceway. See Fig.

4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord (A) 21 inches long, and cord (B) 11 inches long extending from the raceway as in Fig. 3.

5. Loop cord (A) under and over idler pulley No. 1, as shown in Fig. 4 and holding the end of the cord tight, turn the raceway 2½ turns to the right (clockwise), thereby winding 2½ turns of cord (A) on the raceway.

6. Use a common ordinary paper clip to clip the loose end of cord (A) to the front plate of the chassis, so you can work on cord (B) for a while.

7. Take cord (B) and bring it over the raceway and under idler pulley No.2 as shown in Fig.5.

8. Make one complete turn around drive pulley as shown in Fig. 5 and clip the end of cord (B) to the edge of the chassis with a paper clip.

9. Remove the paper clip holding cord (A) and continue its routing from idler pulley No. 1 over idler pulley No. 3 and 1/2 turn around the drive pulley as shown in Fig. 5.

10. Bring both loose ends of cord through the slot in the drive pulley and tie them together tightly inside the slot.

11. Then tie in one end of the tension spring, Part No. 41A12854 and hook the other end of the spring on the ear stamped out of the washer. Cut off surplus cord.

12. Replace pointer and dial scale.

13. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.

14. Secure pointer to string with a drop of shellac.

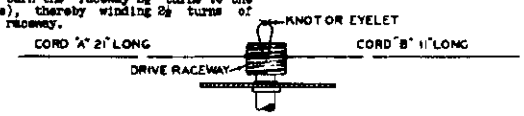


FIG. 3

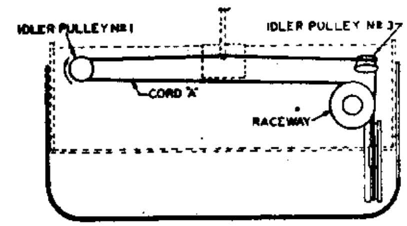


FIG. 4

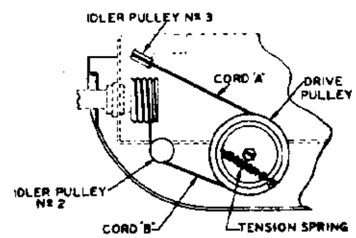


FIG. 5

DIAL CORD INSTRUCTIONS

BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14730

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.

2. Loop long end of cord around set screw (A) in condenser gear and hook around third tooth of gear ahead of set screw.

3. Make one complete turn around condenser rotor shaft.

4. Stretch spring and loop other end around set screw (B) in tuner gear.

NOTE: Spring tension must be sufficient to take up all backlash in gear train. To increase tension, hook cord around fourth tooth in Step 2. To decrease tension, hook around second tooth.

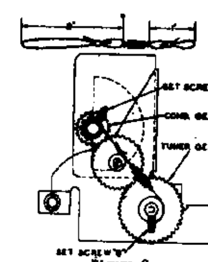


Figure 2.

Alignment Trimmers

GALVIN MFG. CORP.

MODEL 9-29
Schematic, Socket

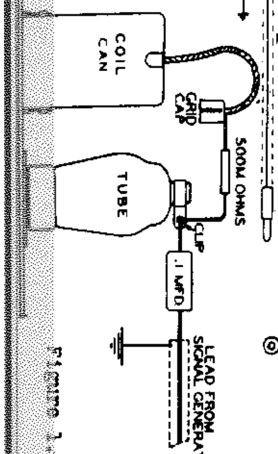
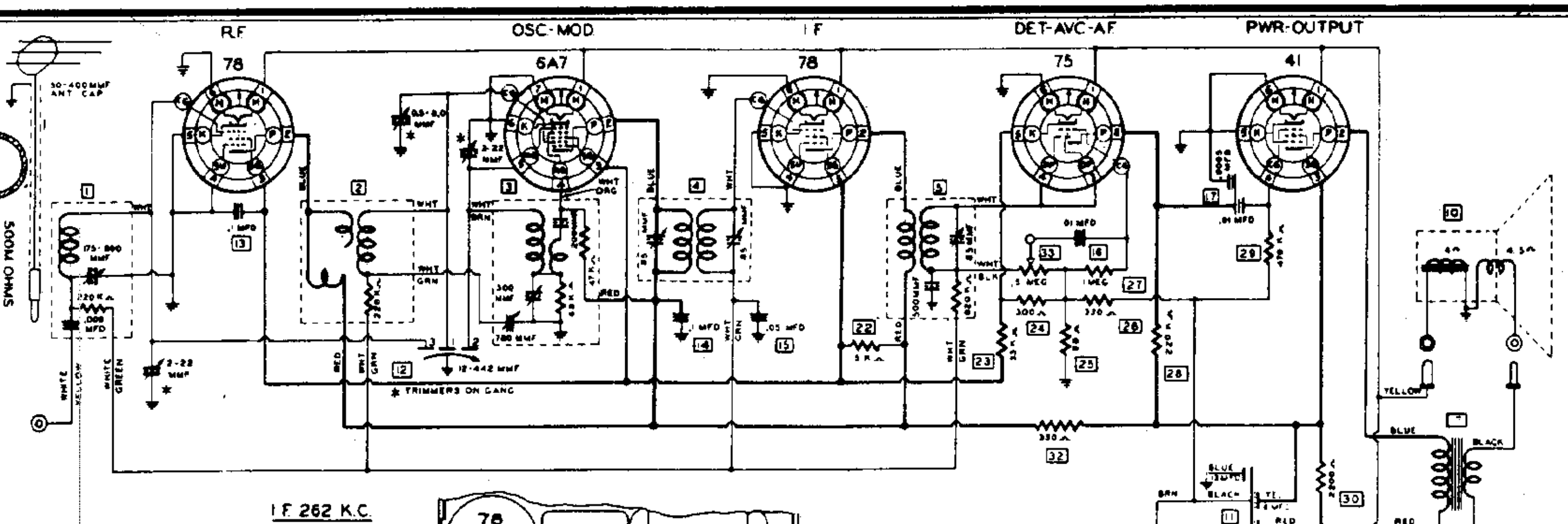
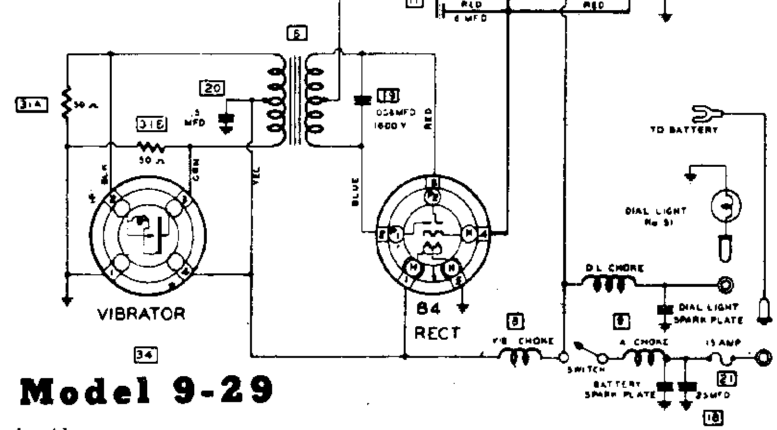


Figure 1.





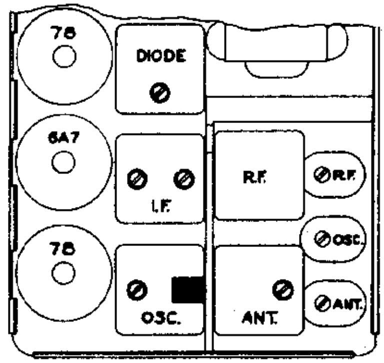


Figure 2. 9-29 TRIMMERS

Model 9-29

ALIGNMENT PROCEDURE

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the oscillator coil can that is covered with Scotch Tape. The original adjustment, made in the factory, should not be tampered with. (Fig. 2 below, shows all trimmer locations.)

I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. (See Fig. 1.) Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to he point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (78) using the same .1 MF condenser and the same 500,000 ohm leak resistance.

2. Set the signal generator at 1560 K.C. and with the condenser gang completely out of mesh adjust the trimmer on the oscillator section of the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. trimmer in the Oscillator coil can for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

R.F. AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MMF condenser and to chassis ground. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna coil can for the maximum output reading.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna section of the condenser gang for maximum output reading.

3. Adjust the trimmer on the R.F. section of the condenser gang for maximum output reading.

4. Recheck steps 1, 2, and 3, for accuracy.

MODEL 9-29
Voltage, Sensitivity, Gain
MODEL 9-49
Alignment, Sensitivity
Socket Trimmers, Gain

GALVIN MFG. CORP.

AUTOMOBILE RECEIVER

Model 9-49

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
.25 Volts	400 cycles	7B6 Grid	.1 MF	.5 Meg	1.74 Volts
25,000	262 K.C.	7A7 Grid(I.F.)	.1 MF	.5 Meg.	1.74 Volts
700	262 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
800	600 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
45	600 K.C.	7A7 Grid(R.F.	.1 MF	.5 Meg	1.74 Volts
2	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

* For one watt output.

** Meter connected across voice coil.

V.C. impedance - 3 ohms at 400 cycles.

1.74 volts equals 1 watt output.

CAUTION

If you use a screw driver to pry out Loktal tubes, be careful that you do not crack the glass bead around the tube pins.

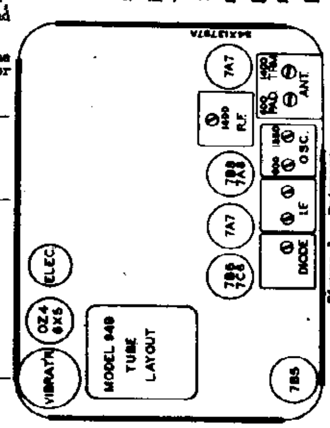


Figure 1 - Trimmers

ALIGNMENT:
For alignment, follow procedure as for Model 9-44.

AUTOMOBILE RECEIVER

Model 9-29

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the top grid terminal of the tube through a .1 MF condenser, with a 500M Ohm resistor connected as a leak resistance between the grid of the tube and the grid cap which has been removed. (See Fig. 1 on Page 1.)

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
.25 Volts	400 Cycles	75 Grid	.1 MF	.5 Meg	2.2 Volts
25,000	262 K.C.	78 Grid (I.F.)	.1 MF	.5 Meg	2.2 Volts
700	262 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
800	600 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
45	600 K.C.	78 Grid (R.F.)	.1 MF	.5 Meg	2.2 Volts
3	600 K.C.	Ant. Lead	40 MMF	None	2.2 Volts

* For one watt output.

** Meter connected across voice coil.

V.C. Resistance - 5 ohms at 400 cycles.

2.2 Volts equals 1 watt output.

VOLTAGE CHART - MODEL 9-29

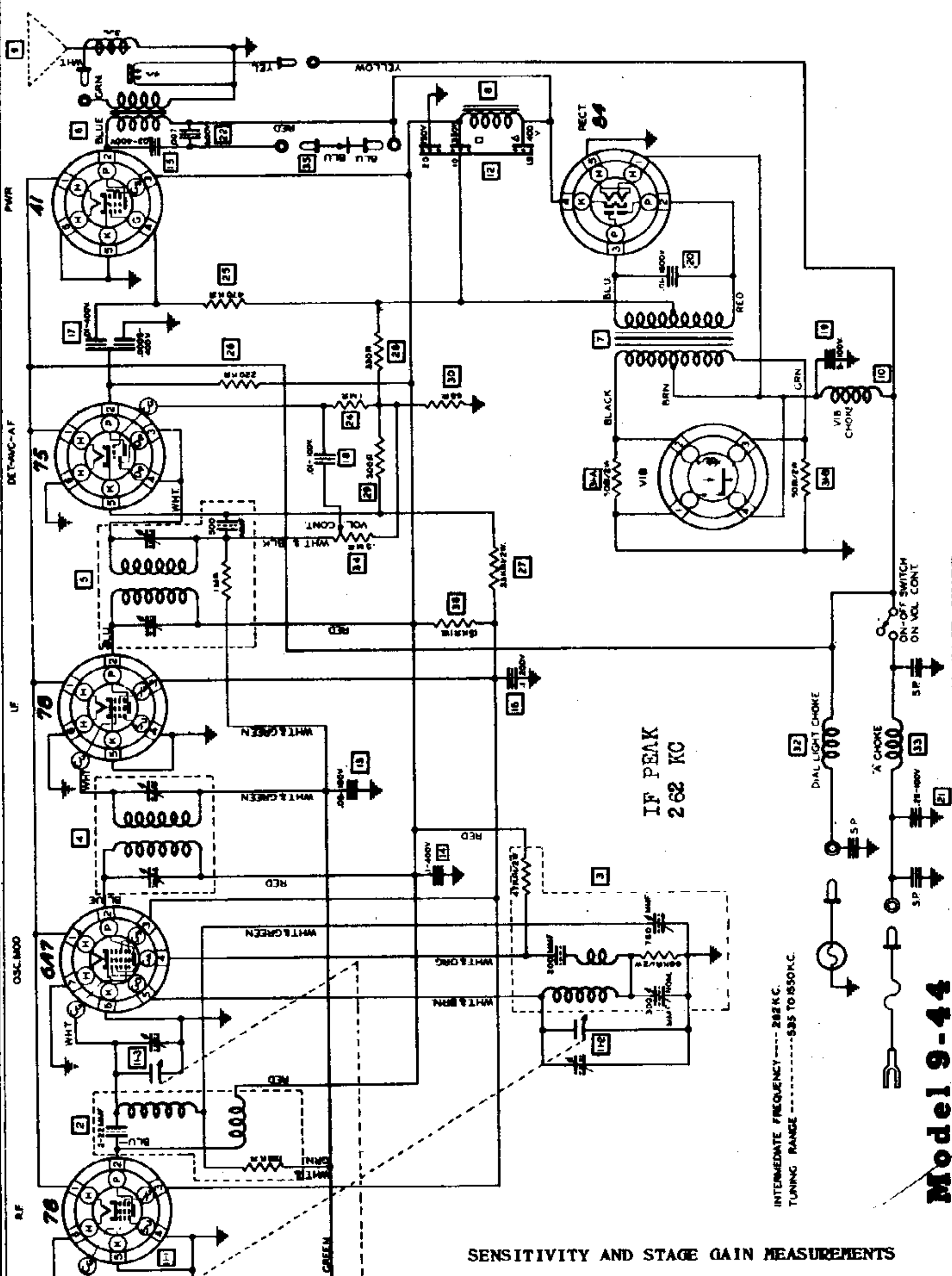
TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
78 *	RF	185	85	-	-
6A7 *	Osc.-Mod.	185	85	-	100
78 *	IF	185	85	-	-
75	Det.-Avc.	150	-	-2	-
41 **	Output	235	200	-	-
84	Rect.	AC	-	250	-

Current - 6.5 Amps. at 6.3 Volts
Maximum power output - 3.5 Watts
All readings from chassis ground with 1000 ohms per volt meter.

* Bias -3 V from B stick
** Bias -17 V from B stick

GALVIN MFG. CORP.

MODEL 9-44
Schematic, Voltage, Gain
Sensitivity



VOLTAGE CHART

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
78 *	RF	195	80	0	-
6A7 *	Osc. - Mod.	195	80	0	95
78	IF	195	80	0	-
75	Det. - Avc	75	-	-2	-
41 **	Output	200	200	0	-
84	Rect.	AC	-	210	-

* Bias -3. V from "B" stick.

** Bias -17.V from "B" stick.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
9000	262.K.C.	78 Grid (I.F.)	.1 MF	.5 Meg	1.74 Volts
900	262 K.C.	6A7 Grid	.1 MF	.5 Meg	1.74 Volts
1000	600 K.C.	6A7 Grid	.1 MF	.5 Meg	1.74 Volts
50	600 K.C.	78 Grid (R.F.)	.1 MF	.5 Meg	1.74 Volts
5 (NOTE)	600 K.C.	Ant. Lead	.40 MMF	None	1.74 Volts

* For 1 Watt output.
** Output meter connected across voice coil.

1.74 Volts equals .1 Watt output.
V.C. resistance - 3 ohms.

(NOTE:) Without Booster

MODEL 9-44
Socket, Trimmers, Drive
Alignment
MODEL 9-49
Alignment

GALVIN MFG. CORP.

MODEL 9-69
Sensitivity, Gain, Socket
Trimmers, Alignment, Voltage

SENSITIVITY AND STAGE GAIN MEASUREMENTS
MODEL 9-69

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the tables.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500 M Ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF.

It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
20,000	262 K.C.	7A7 Grid (IF)	.1 MF	.5 Meg	1.74 Volts
400	262 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
500	600 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
30	600 K.C.	7A7 Grid(RF)	.1 MF	.5 Meg	1.74 Volts
1	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

1.74 Volts equals 1 Watt output.
* For 1 Watt output.

V.C. resistance - 3 ohms.
** Output meter connected across voice coil.

VOLTAGE CHART - MODEL 9-69

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
7A7	RF	240	85	4	-
7B8	Osc.-Mod.	240	85	4	110
7A7	I.F.	240	85	4	-
7A6	Det.Avc.	0	0	0	-
7B6	A.F.	140	-	0	-
7C5	Output	250	250	15	-
7C5	Output	250	250	15	-
0Z4	Rect.	AC	-	260	-

All voltages measured from socket terminal to chassis ground using 1000 Ohms per volt meter.

CAUTION

If you use a screw driver to pry out Loktal tubes, be careful that you do not crack the glass bead around the tube pins.

ALIGNMENT: To align, follow procedure of Model 9-44.

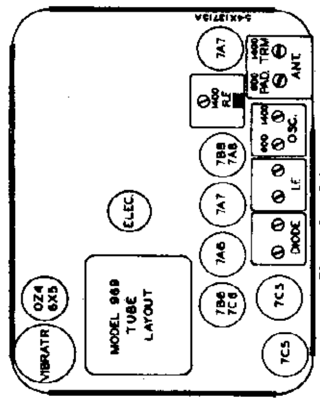
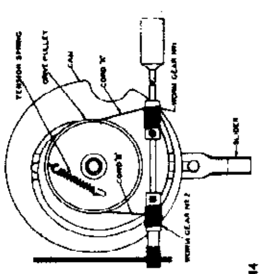


Figure 1 - Trimmers



MODEL-9-44
Figure 2

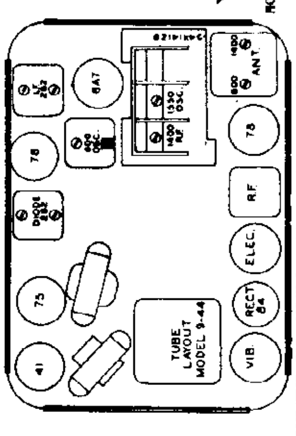


Figure 1 — Trimmers

ALIGNMENT FOR MODELS 9-44, 9-49 & 9-69

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output, if necessary.

NOTE: Do not adjust trimmer in the oscillator coil can that is covered with Scotch Tape. The original adjustment made in the factory should not be tampered with.

Fig. 1 shows all trimmer locations.

I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7). Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the two trimmers in the Diode coil can to the point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustments several times for maximum accuracy.

SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (78), using the same .1 MF condenser.

2. Set the signal generator at 1550 K.C. and with the condenser gang completely out of mesh adjust the oscillator trimmer on the middle section of the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. padder in the oscillator coil can for the highest output reading.

NOTE: Adjustments above set the range so the receiver will track with the calibrations in the control head.

RF AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MMF condenser and to chassis ground. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the 600 K.C. padder in the antenna coil can for maximum output reading, while slightly rocking the condenser gang.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the 1400 K.C. trimmer in the antenna coil can for maximum output reading.

3. Adjust the 1400 K.C. R.F. trimmer on the inside section of the condenser gang for maximum output reading.

4. Recheck steps 1, 2, and 3, for accuracy.

TO RESTRING BOOST-O-MATIC DRIVE
MODEL 9-44

1. Turn the condenser gang to the fully open position.

2. Turn the booster pulley and cam assembly until the forked slider has been drawn all the way in and the hole in the rim of the drive pulley is at the top, lining up with the pulley stud and the slider, as indicated in Fig. 2.

3. If the old string is broken, cut a new piece of 30 pound test silk fish cord, 31" long, and tie knots or eyelets in both ends so the length between the knots is exactly 29½".

4. Double the cord at its exact center and push the loop through the hole in the rim of the drive pulley.

5. Tie the tension spring in the loop thus formed, but do not hook it under the ear stamped out of the pulley. You will now have two equal lengths of string extending from the hole in the pulley which we shall call Cord "A" and Cord "B", as indicated in Fig. 2.

6. Take Cord "A" and wind it clockwise one complete revolution around the drive pulley, continuing downward to worm gear #1.

7. Loosen the set screws in worm gear #1 and hook the knot in Cord "A" in the slot in the end of the worm drive.

8. Turn the worm drive towards you just enough to take up the slack in Cord "A" and tighten the set screws.

9. Hold Cord "B" in your left hand and turn the tuning shaft manually until the condenser gang is closed. This will wind Cord "A" on worm drive #1.

10. Loosen the set screws in worm drive #2 and hook the knot in Cord "B" in the slot in the end of worm drive #2.

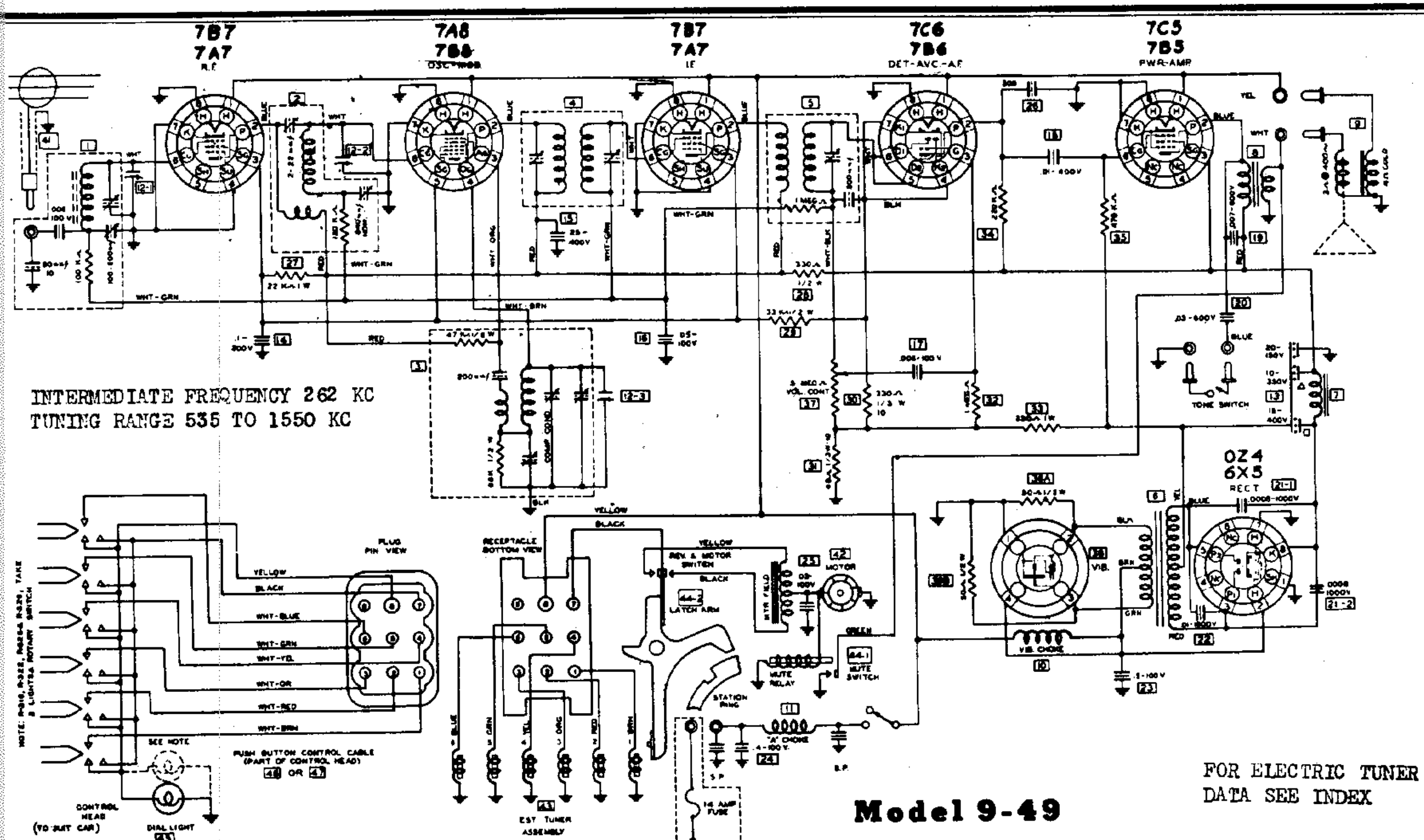
11. Turn worm drive #2 away from you just enough to take up the slack in Cord "B" and tighten the set screws.

12. Hook the end of the cord tension spring under the ear stamped out of the pulley.

NOTE: You can see by studying Fig. 2 how Cord "A" passes over worm drive #1, whereas, Cord "B" passes under worm drive #2.

GALVIN MFG. CORP.

MODEL 9-49
Schematic, Voltag



Model 9-49

VOLTAGE CHART - MODEL 9-49

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
7A7 or 7B7 *	R.F.	200	60	0	-
7B8 or 7A8 *	Osc.-Mod.	200	60	0	95
7A7 or 7B7 *	I.F.	200	60	0	-
7B6 or 7C6 **	Det.-Avc.	70	-	-2	-
7B5 ***	Output	200	205	0	-

Battery Voltage - 6.3 V.

Current consumption - 6.2 Amps.

Maximum power output - 4.5 Watts

* Bias - -3.V Measured from "B" stick.

** Bias - -2.V Measured from "B" stick.

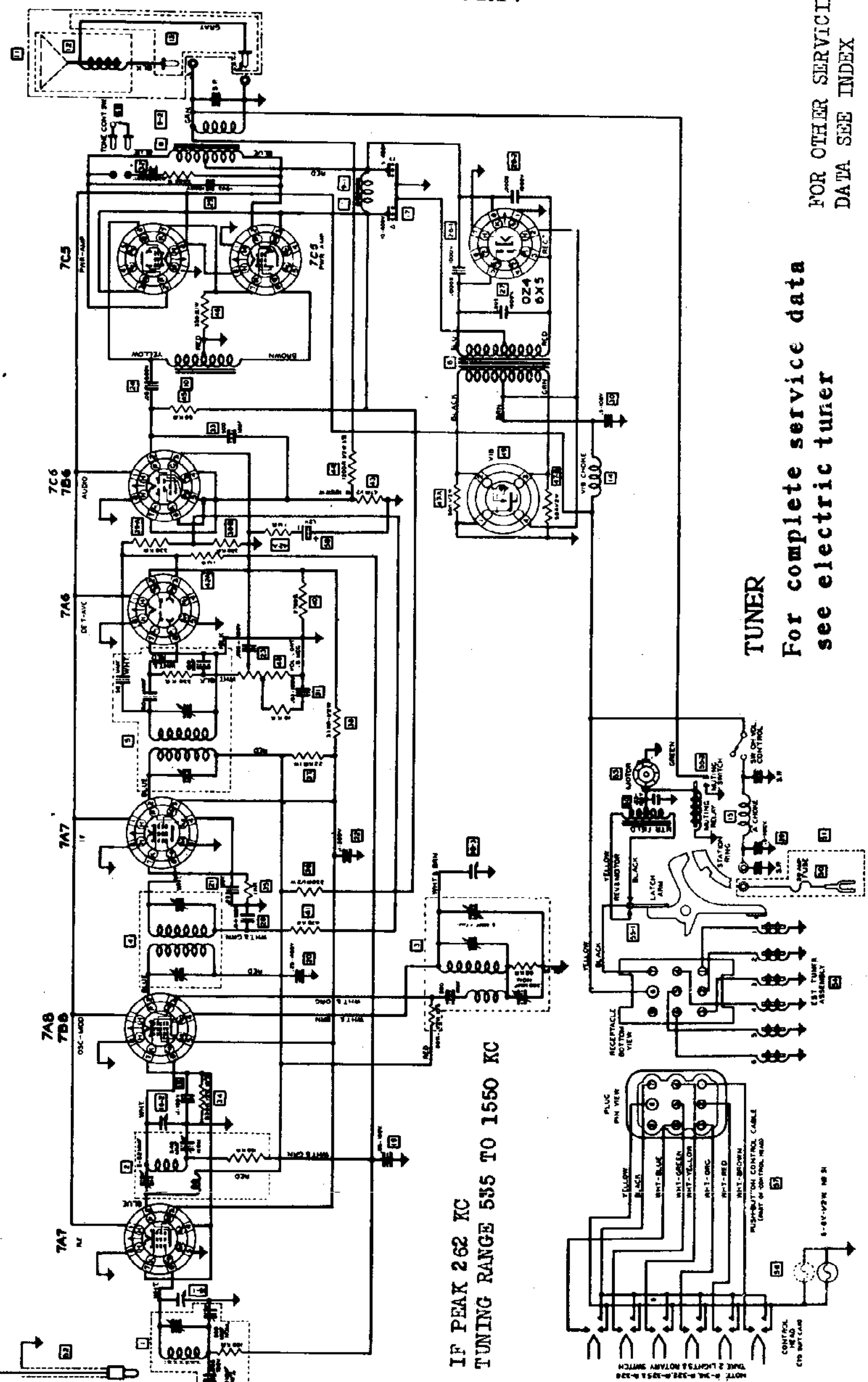
*** Bias - -15.V Measured from "B" stick.

All measurements from socket terminal to

MODEL 9-69
Schematic

GALVIN MFG. CORP.

Model 9-69



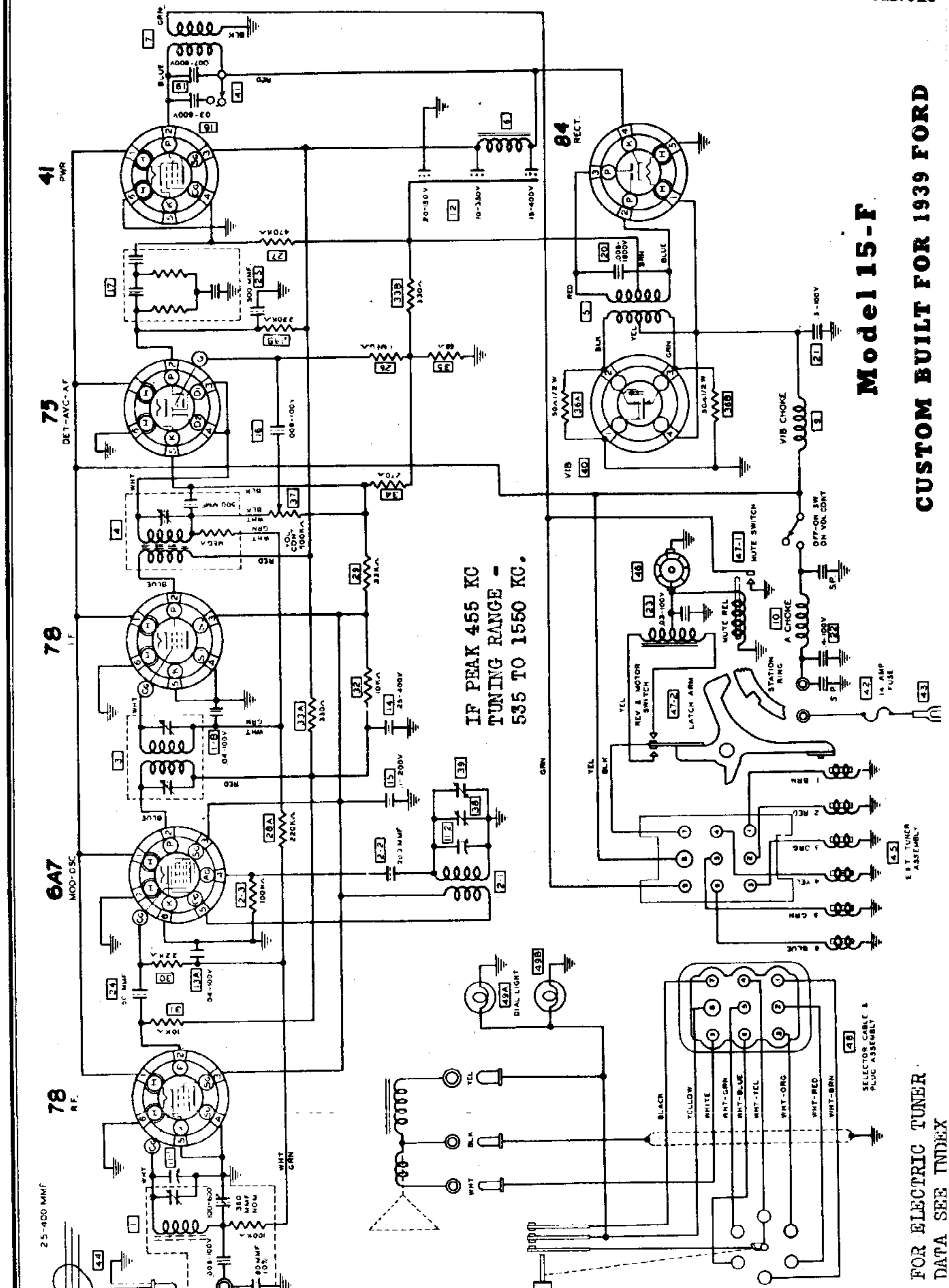
IF PEAK 262 KC
TUNING RANGE 535 TO 1550 KC

TUNER
For complete service data
see electric tuner

FOR OTHER SERVICING
DATA SEE INDEX

GALVIN MFG. CORP.

MODEL 15F
Schematic



MODEL 15F
Sensitivity, Gain, Voltage
Alignment, Socket, Trimmers

GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1560 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

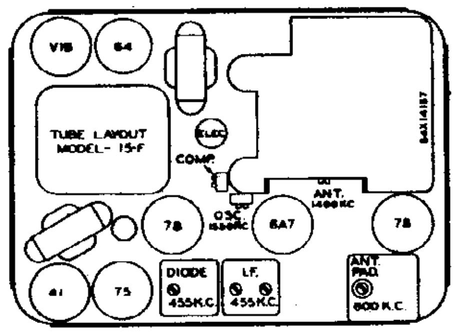


Figure 1 - Trimmers

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
20,000	455 K.C.	IF Grid	.1 MF	.5 Meg	1.74 Volts
200	455 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
250	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
125	600 K.C.	RF Grid	.1 MF	..5 Meg	1.74 Volts
10	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

* For 1 Watt output. 1.74 Volts equals 1 Watt output.

** Output meter connected across voice coil. V.C. resistance - 3 ohms.

VOLTAGE CHART

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
78*	RF	145	85	0	-
6A7	Osc.-Mod.	200	85	0	90
78	IF	205	85	0	-
75**	Det.Avc.	85	-	-2.5	-
41***	Output	200	205	0	-
84	Rect.	AC	-	215	-

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.

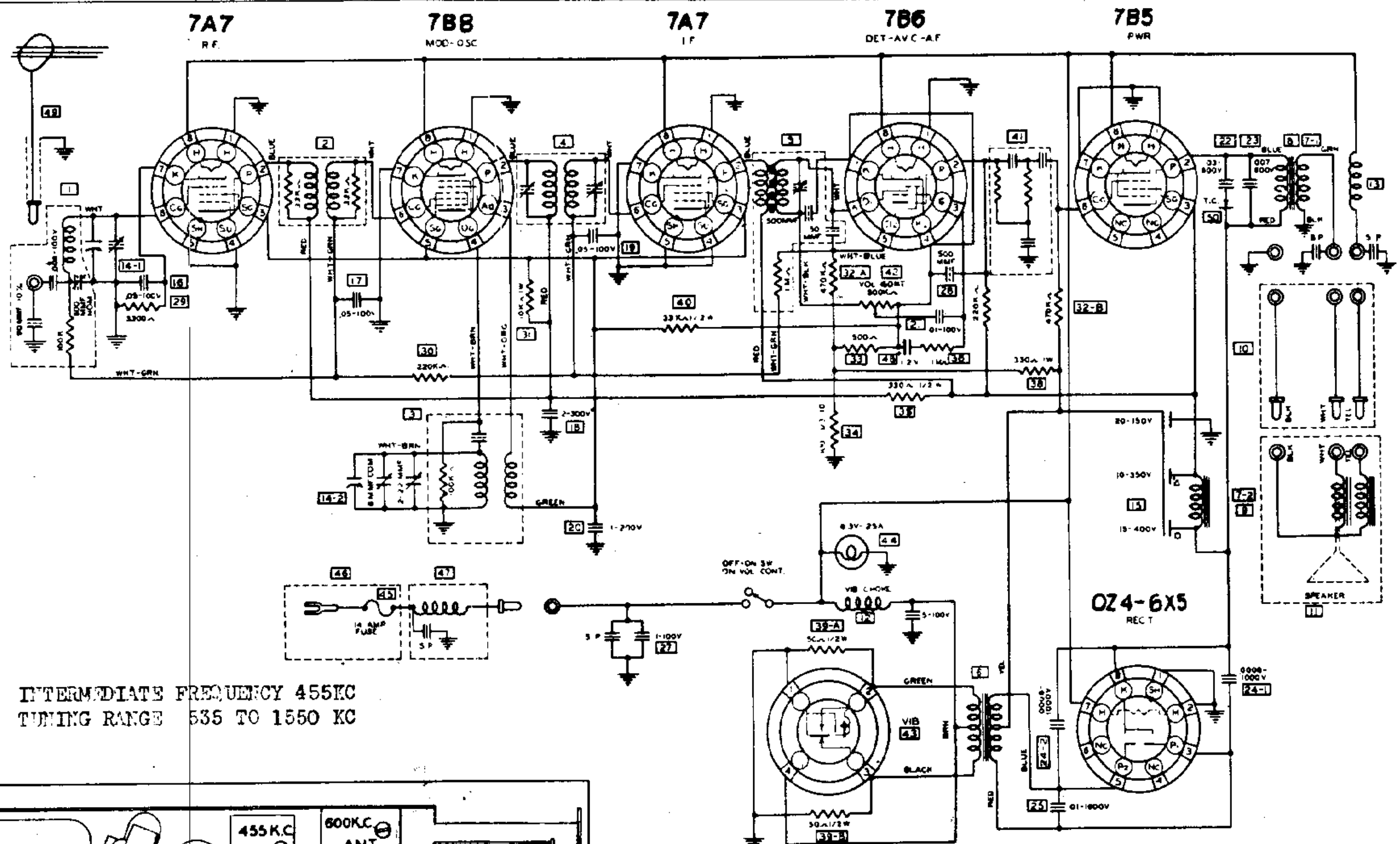
Battery voltage 6.3 V. * Bias- -3.V from "B" Stick.

Current Consumption 6.5 Amps. ** Bias- -2.V from "B" Stick.

Maximum Power Output 5 Watts. *** Bias- -17.V from "B" Stick.

GALVIN MFG. CORP.

MODEL 16C
Schematic, Socket
Trimmers



INTERMEDIATE FREQUENCY 455KC
TUNING RANGE 535 TO 1550 KC

Model 16-C

CUSTOM BUILT FOR 1939 CHEVROLET

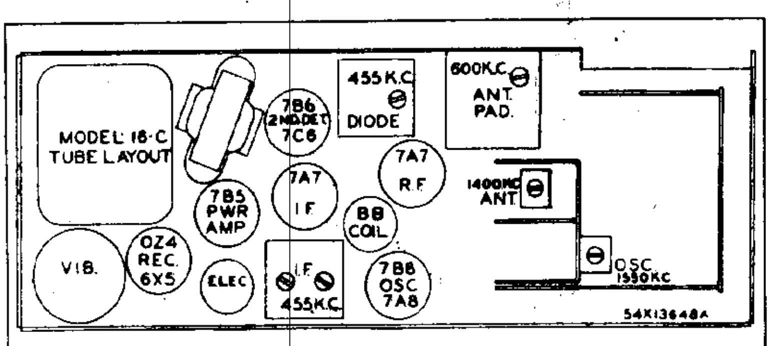


Figure 1 - Trimmers

CAUTION

When removing Loktal tubes from their sockets, do not pry them out with a screw driver unless you take extreme care not to break the glass seal around the pin terminals. To do so will render the tube worthless.

MODEL 16C
Sensitivity, Gain, Voltage
Alignment, Drive Data

GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

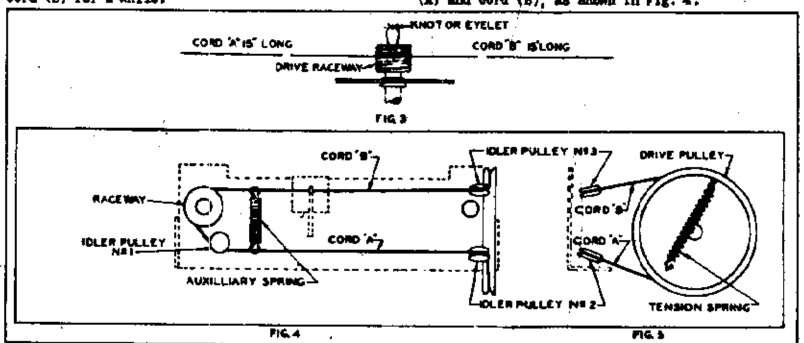
1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

DIAL DRIVE CORD ASSEMBLY

1. Remove broken cord.
2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 30 inches long. CONDENSER GANG MUST BE MESHED.
3. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig. 3.
4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord (A) and cord (B) each 15 inches long extending from the raceway as in Fig. 3.
5. Loop cord (A) under idler pulley No. 1, and across the chassis to idler pulley No. 2.
6. Holding the end of cord (A) tight, turn the raceway two and one half turns to the right (clockwise), thereby winding two and one half turns of cord (A) on the raceway. (Stop when the hole is at the top.)
7. Use a common paper clip to clip the loose end of cord (A) to the chassis, so you can work on cord (B) for a while.
8. Take cord (B) and bring it over to idler pulley No. 3, as shown in Fig. 4.
9. Continue cord (B) around the drove pulley to the hole and thread the end of the cord through the hole, after which it should be clipped to the chassis.
10. Remove the paper clip holding cord (A) and continue its routing around idler pulley No. 2 to the hole in the drive pulley. Thread the end of the cord through the hole.
11. Tie the loose ends of both cords tightly together inside the hole in the pulley. Then tie in the tension spring and hook the other end around the ear stamped out of the pulley. Cut off surplus cord.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
13. Secure pointer to string with a drop of shellac.
14. Add auxiliary tension spring between cord (A) and cord (B), as shown in Fig. 4.



Figures 3, 4 and 5

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
10,000	455 K.C.	IF Grid	.1 MF	.5 Meg	1.74 Volts
150	455 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
200	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
50	600 K.C.	RF Grid	.1 MF	.5 Meg	1.74 Volts
5	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

* For 1 Watt output. 1.74 Volts equals 1 Watt output.

** Output meter connected across voice coil. V.C. resistance - 3 ohms.

VOLTAGE CHART — MODEL 16-C

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
7A7	RF	210	95	0	-
7B8	Osc.-Mod.	200	95	0	95
7A7	IF	210	95	0	-
7B6	Det.-Avc.	100	-	6	-
7B5	Output	210	205	0	-
0Z4 or 6X5	Rect.	AC	-	215	-

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
Battery voltage 6.3 V. Current Consumption 6.8 Amps. Maximum Power Output 5 Watts.

DIAL CORD INSTRUCTIONS

BACKLASH CORD AND SPRING ASSEMBLY

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.
2. Loop short end of cord around set screw (A) in condenser gear.
3. Make one complete turn clockwise around condenser gear hub.
4. Stretch spring and make one complete turn around the tuner gear hub with the long end of the backlash cord.
5. Loop the end of the cord around drive pin "B".

NOTE: Spring tension must be sufficient to take up all backlash in gear train.

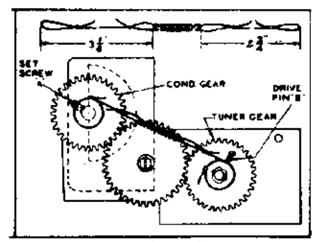
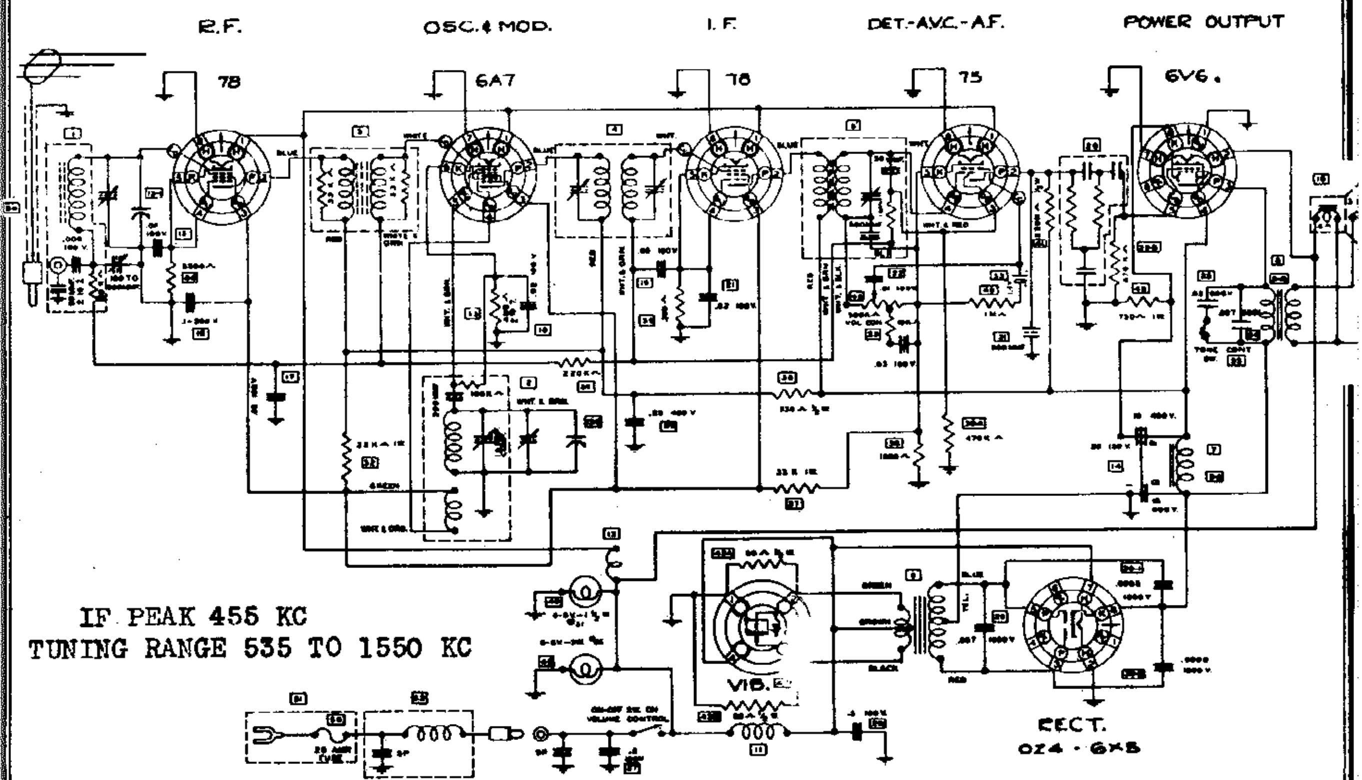


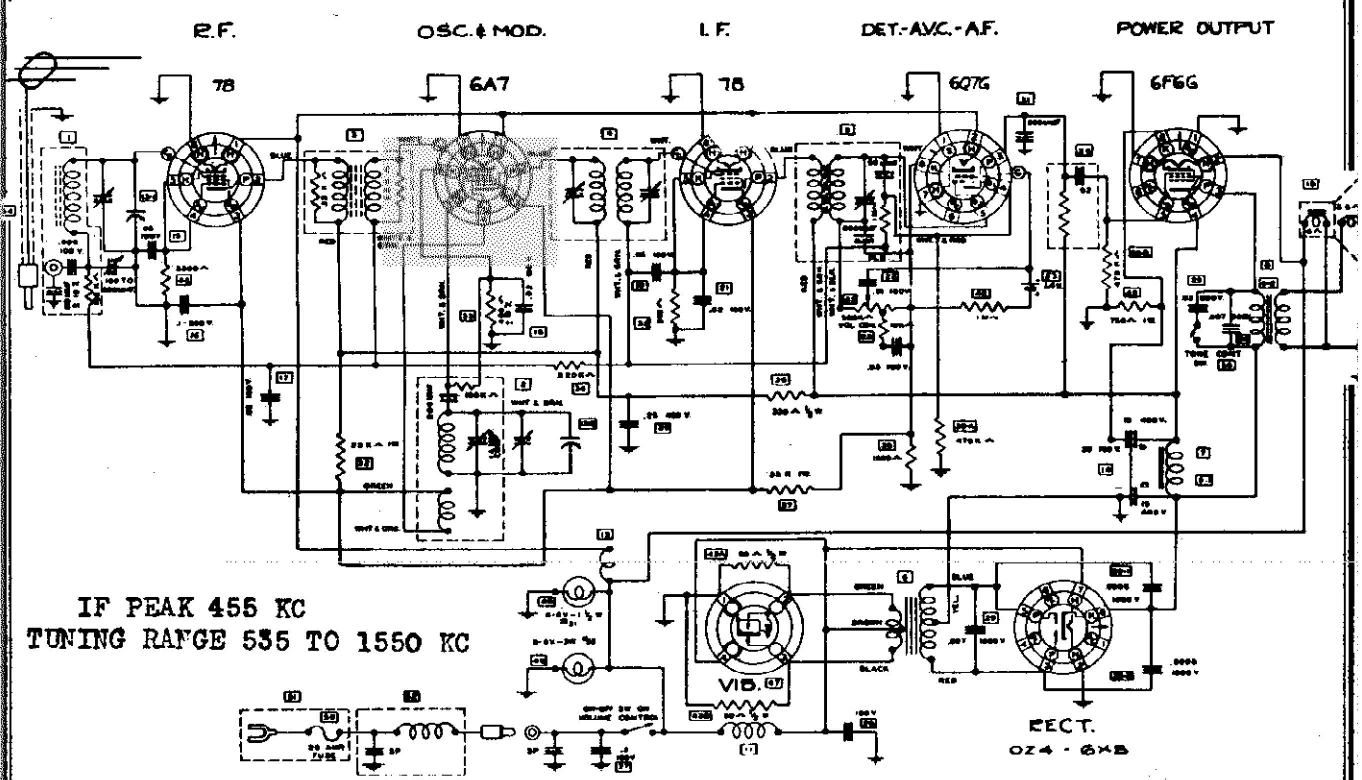
Figure 2

GALVIN MFG. CORP.

MODEL 17-D
MODEL 17-D-A
Schematics



MODEL 17-D



MODEL 17-D-A

MODEL 17-D
MODEL 17-D-A
Alignment, Voltage, Gain

GALVIN MFG. CORP.

Sensitivity, Drive Data
Socket, Trimmers

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

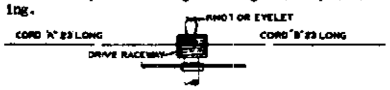


FIG. 3

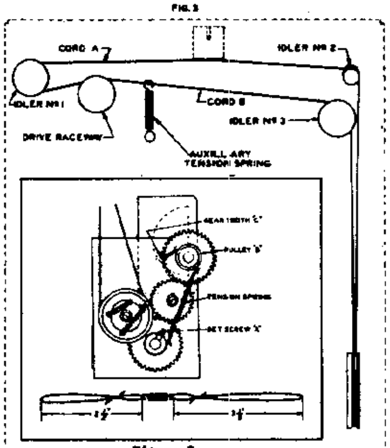


Figure 2

FIG. 4

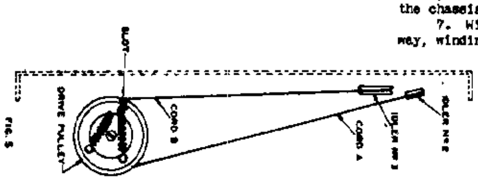


FIG. 5

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

NOTE: The antenna padder is reached through a hole in the side of the chassis base, directly under the antenna coil can.

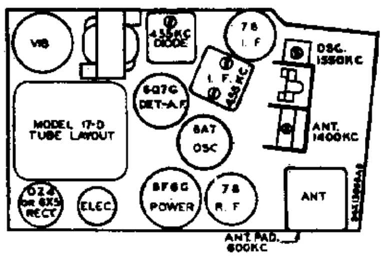


Figure 1 - Trimmers

DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14744

1. Remove broken cord.
2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 46 inches long. CONDENSER GANG MUST BE MESHED.
3. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig.
4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord "A" 23 inches long, and cord "B" 23 inches long extending from the raceway as in Fig. 3.
5. Loop cord "A" under and over idler pulley No. 1 and across the chassis to small idler pulley No. 2. (See Fig. 4).
6. Continue cord "A" around idler pulley No. 2, and use a paper clip to clip the cord to the chassis while you work on cord "B" for a while.
7. Wind three turns of cord "B" on the raceway, winding from the hole to the outside rim.
8. Continue cord "B" to idler pulley No. 3 and down to the drive pulley, making one-half turn around the pulley to the slot.
9. Clip cord "B" to the chassis and continue cord "A" around the drive pulley one complete turn to the slot.
10. Bring cord "A" and cord "B" both inside the slot and tie them together securely.
11. Then tie in the tension spring and hook it on the stud in the drive pulley as shown in Fig. 5.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
13. Secure pointer to string with a drop of shellac.
14. Connect auxilliary tension spring as shown in Fig. 4.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
25,000	455 K.C.	IF Grid	.1 MF	.5 Meg	1.87 Volts
200	455 K.C.	Mod. Grid	.1 MF	.5 Meg	1.87 Volts
250	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.87 Volts
75	600 K.C.	RF Grid	.1 MF	.5 Meg	1.87 Volts
5	600 K.C.	Ant. Lead	40 MMF	None	1.87 Volts

* For one watt output.
** Meter connected across voice coil.
V.C. Resistance -3.5 ohms at 400 cycles.
1.87 Volts equals 1 watt output.

VOLTAGE CHART - MODEL 17-D

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
78	RF	300	100	8.5	-
6A7	Osc.-Mod.	290	100	3	100
78	IF	300	100	3.5	-
75 or 6Q7G	Det.-Avc.	120	-	5	-
6V6 or 6F6G	Output	290	180	18	-
0Z4 or 6X5	Rect.	AC	-	300	-

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
Battery voltage 6.3 V. Current Consumption 7.5 Amps.
Maximum Power Output 8 Watts.

DIAL CORD INSTRUCTIONS - MODEL 17-D
BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14743

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the bottom of Fig. 2.

1. Turn gang to open position.
2. Loop short end of cord around set screw "A" in tuner gear.
3. Make one complete turn counter-clockwise around tuner gear hub.
4. Stretch spring and make one complete turn counter-clockwise around pulley "B"
5. Hook the loop in the end of the cord on gear tooth "C" of condenser gear.

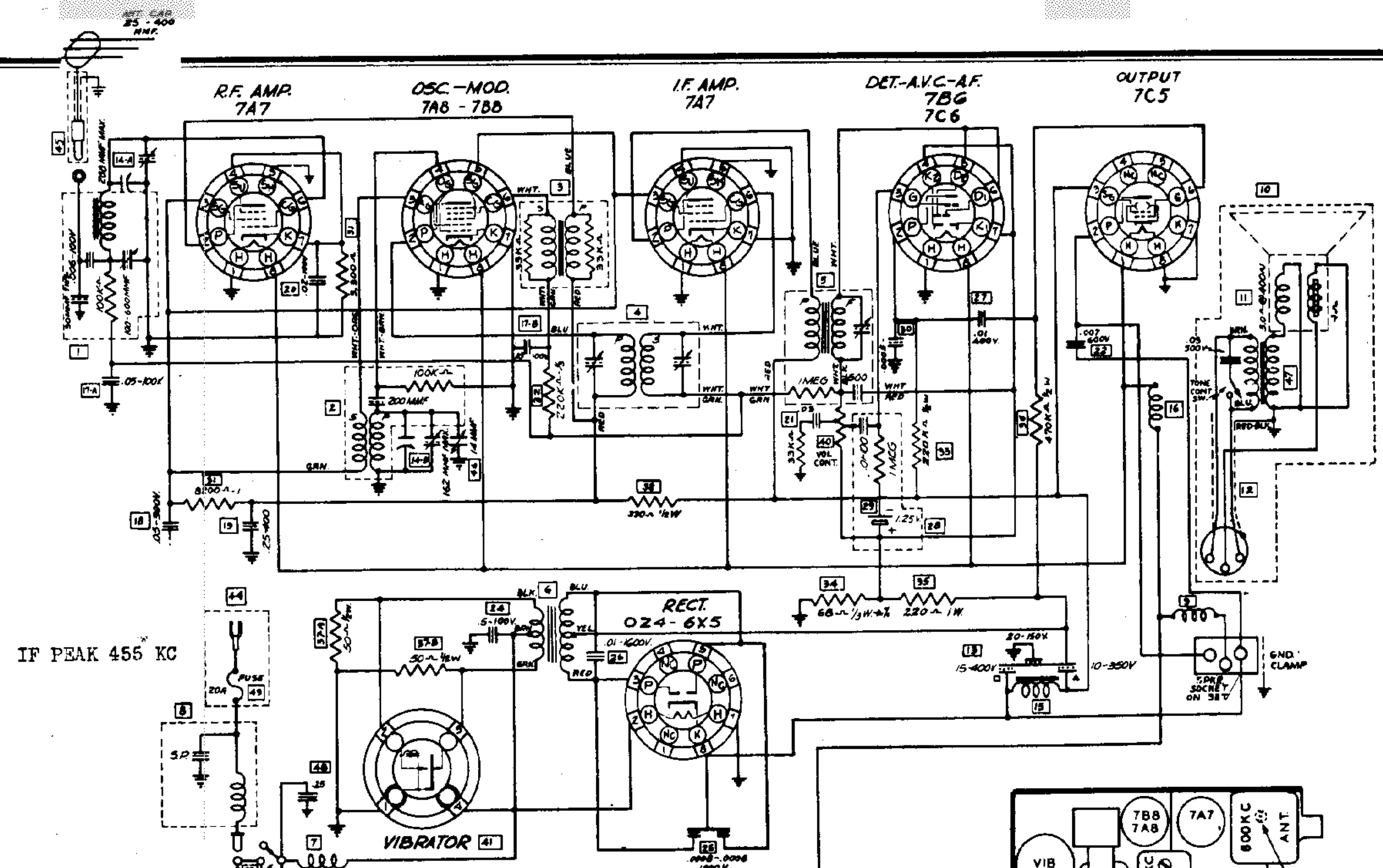
NOTE: Spring tension must be sufficient to take up all backlash in gear train. Regulate tension through selection of gear tooth in Step 5 above.

Model 17-D

CUSTOM BUILT FOR 1938

CHRYSLER DESOTO DODGE PLYMOUTH

GALVIN MFG. CORP.



IF PEAK 455 KC

Model 18-0

CUSTOM BUILT FOR 1939 OLDSMOBILE

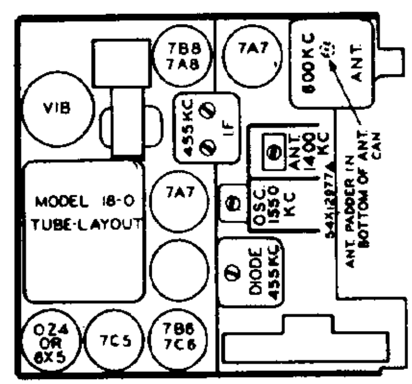


Figure 1 - Trimmers

CAUTION

When removing Loktal tubes from their sockets, do not pry them out with a screw driver unless you take extreme care not to break the glass seal around the pin terminals. To do so will render the tube worthless.

MODEL 18-0
Voltage, Sensitivity, Gain
Alignment, Drive Data

GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

NOTE: The antenna padder is reached through a hole in the bottom of the chassis base, directly under the antenna coil can.)

DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14746

1. While not essential, you will find it easier to work if you remove the front plate from the chassis. This requires removal of the dial light bracket, the broad band coil bracket, the volume control, and the unsoldering of the ground connection of 8X14120 condenser.
2. If the exact Motorola assembly is not available, cut a piece of 30 lb. test silk fish cord 43 inches long.
3. The condenser gang must be open.
4. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig. 3.
5. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole. You will now have cord "A" and cord "B", each approximately 21 inches long, extending from the raceway as in Fig. 3.
6. Loop cord "A" over idler pulley No. 1 and across the chassis to idler pulley No. 2 and holding the end of the cord tight, turn the raceway 2½ turns to the right (clockwise), thereby winding 2½ turns of cord "A" on the raceway.
7. Use a paper clip to clip the loose end of cord "A" to the front plate so you can work on cord "B" for a while.
8. Loop cord "B" over idler pulley No. 3, and across the chassis to idler pulley No. 4.
9. Both cords should now be clipped to the front plate while the plate is reinstalled on the chassis.
10. Continue cord "B" down to the drive pulley and make 1½ turns around the pulley to the slot in the rim.
11. Continue cord "A" down to the slot in the rim of the drive pulley.
12. Bring both loose ends of cord through the slot in the drive pulley and tie them together tightly inside the slot.
13. Then tie in one end of the tension spring and hook the other end over the stud as shown in Fig. 4.
14. To set the pointer to correct frequency, tune in a station of known frequency and adjust the position of the pointer on the string, securing it with a drop of shellac.

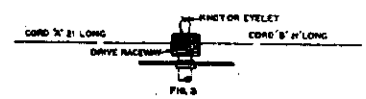


FIG. 3

DIAL CORD INSTRUCTIONS

BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14745

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.

2. Loop long end of cord around set screw (A) in tuner gear.

3. Make one complete turn around tuner gear hub.

4. Stretch spring and loop other end around set screw (B) in condenser gear.

NOTE: Spring tension must be sufficient to take up all backlash in gear train.

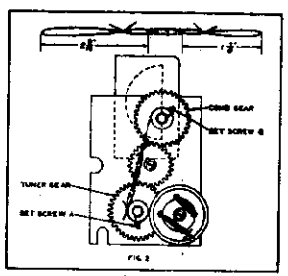


FIG. 2

Figure 2

VOLTAGE CHART — MODEL 18-0

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
7A7 or 7B7*	R.F.	185	100	7.7	-
7B8 or 7A8*	Osc.-Mod.	185	100	0	100
7A7 or 7B7*	I.F.	185	100	0	-
7B6 or 7C6	Det.-Avc.	75	-	0	-
7C5**	Output	195	190	0	-
0Z4 or 6X5	Rect.	AC	-	200	-

* Bias - -2.8 V. Measured from "B" stick. ** Bias - -13.V. Measured from "B" stick.

All measurements from socket terminal to chassis ground, using 1000 ohms per volt meter.

Battery Voltage - 6.3 V. Current Consumption - 6.5 Amps.

Maximum Power Output - 7.5 Watts.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characterisitcs, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
.25 Volts	400 cycles	7B8 Grid	.1 MF	.5 Meg.	1.74 Volts
10,000	455 K.C.	7A7 Grid (I.F.)	.1 MF	.5 Meg.	1.74 Volts
150	455 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
200	600 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
50	600 K.C.	7A7 Grid (R.F.)	.1 MF	.5 Meg	1.74 Volts
4	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

* For one watt output. V.C. impedance - 3 ohms at 400 cycles.

** Meter connected across voice coil. 1.74 volts equals 1 watt output.

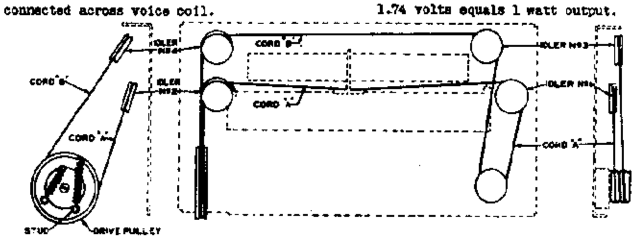
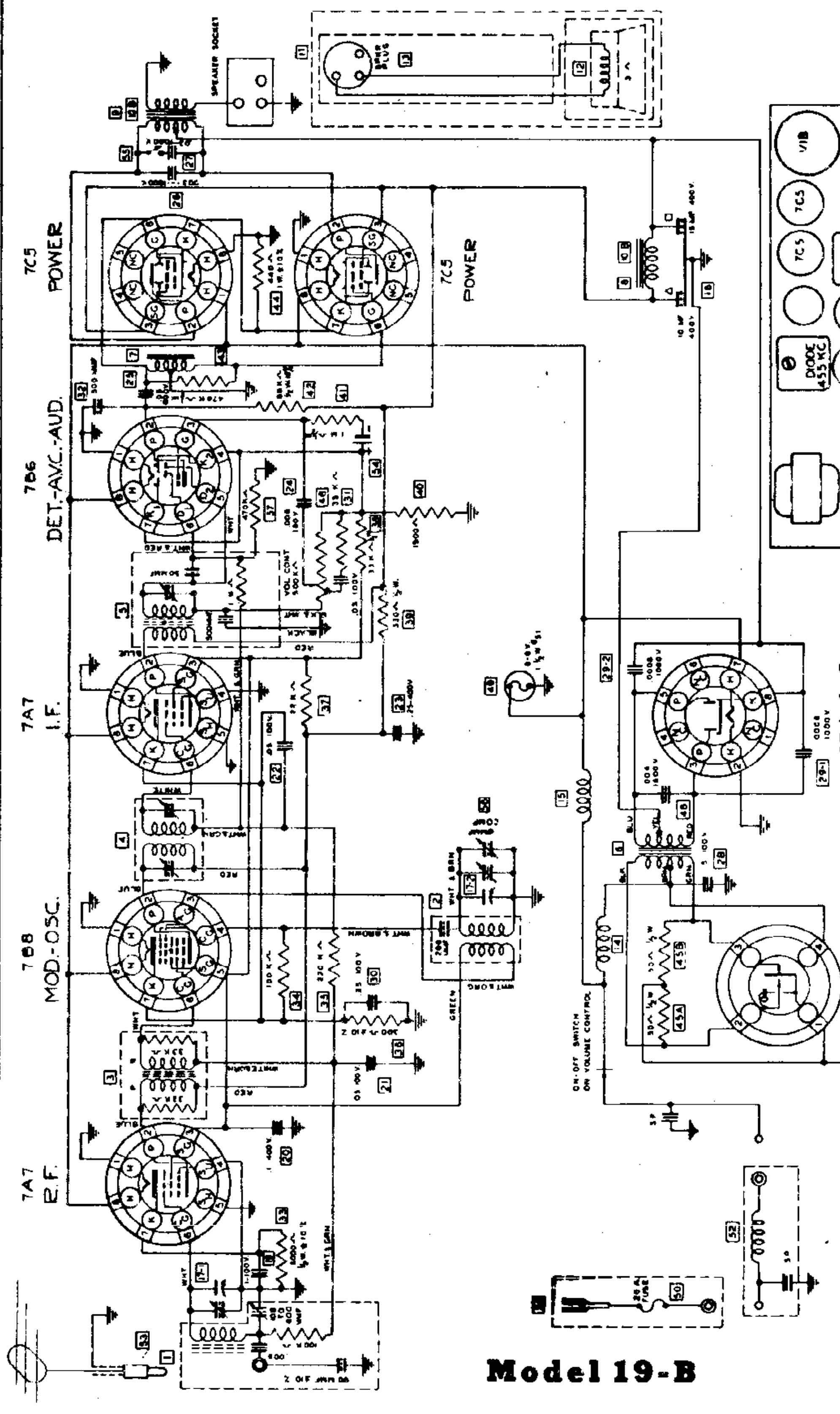


FIG. 4 FIG. 5 FIG. 6

GALVIN MFG. CORP.

MODEL 19B
Schematic, Socket
Trimmers



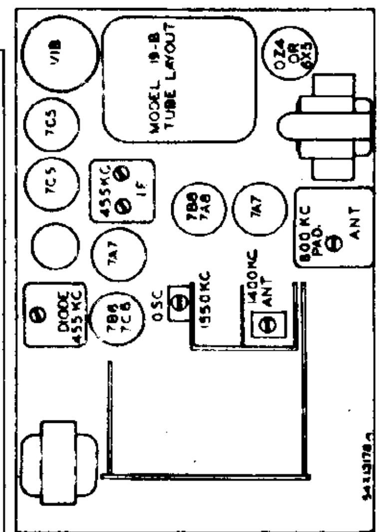


Figure 1 - Trimmers

IF PEAK 455 KC
TUNING RANGE 535 TO 1550 KC

CAUTION

When removing Loktal tubes from their sockets, do not pry them out with a screw driver unless you take extreme care not to break the glass seal around the pin terminals. To do so will render the tube worthless.

Model 19-B

CUSTOM BUILT FOR 1939 BUICK

MODEL 19B
Alignment, Voltage, Gain Sensitivity, Drive Data

GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14731

1. Remove broken cord, and dial pointer.
2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 44 long. CONDENSER GANG MUST BE MESHED.
3. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig.
4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord (A) 22 inches long, and cord (B) 22 inches long, extending from the raceway as in Fig. 3.
5. Loop cord (A) under idler pulley No. 1, as shown in Fig. 5 and holding the end of the cord tight, turn the raceway 2½ turns to the right (clockwise), thereby winding 2½ turns of cord (A) on the raceway.
6. Continue cord (A) across the front of the receiver, around idler pulley No. 2, and fasten the loose end of the cord to the edge of the chassis with a common paper clip, so you can work on cord (B) for a while.
7. Take cord (B) and bring it over the raceway and under idler pulley No. 3, as shown in Fig.
8. Continue cord (B) across the front of the chassis, around idler pulley No. 4, and make one complete turn around the drive pulley, after which the end of the cord should be clipped to the chassis.
9. Remove the paper clip holding cord (A) and continue its routing to the drive pulley, making 1/2 turn around it to the slot.
10. Bring both loose ends of cord through the slot in the drive pulley and tie them together tightly inside the slot.
11. Then tie in one end of the tension spring, Part No. 41A12988 and hook the other end of the spring on the small stud as shown in Fig. 5.
12. Replace dial pointer.
13. To set pointer to correct frequency tune in a station of known frequency and adjust position of pointer on string.
14. Secure pointer to string with a drop of shellac.

FIG. 3

DIAL CORD INSTRUCTIONS

BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14730

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.
2. Loop long end of cord around set screw (A) in tuning unit.
3. Make one complete turn around gear hub.
4. Stretch spring and loop other end around set screw (B) in condenser gear.

NOTE: Spring tension must be sufficient to take up all backlash in gear train.

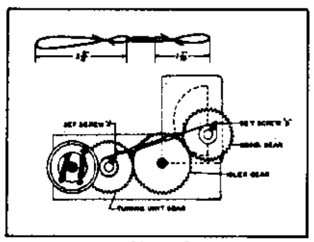


Figure 2.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the tables.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500 M Ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF.

It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
7,000	455 K.C.	7A7 Grid (IF)	.1 MF	.5 Meg	1.74 Volts
100	455 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
150	600 K.C.	7B8 Grid	.1 MF	.5 Meg	1.74 Volts
15	600 K.C.	7A7 Grid (RF)	.1 MF	.5 Meg	1.74 Volts
1	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

* For 1 Watt output. 1.74 Volts equals 1 Watt output.

** Output meter connected across voice coil. V.C. resistance - 3 ohms.

VOLTAGE CHART - MODEL 19-B

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
7A7	RF	250	75	7.5	-
7B8	Osc.-Mod.	250	75	3.5	78
7A7	IF	250	75	3.5	-
7B8	Det.-Ave.	150	-	4.5	-
7C5	Output	250	250	18	-
7C5	Output	250	250	18	-
6Z4	Rect.	AC	-	260	-

All voltages measured from socket terminal to chassis ground using 1000 Ohms per volt meter.

Current - 7.0 Amps. at 6.3 Volts. Maximum power output - 12 Watts.

FIG. 4

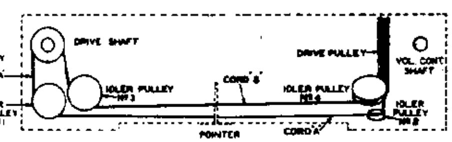
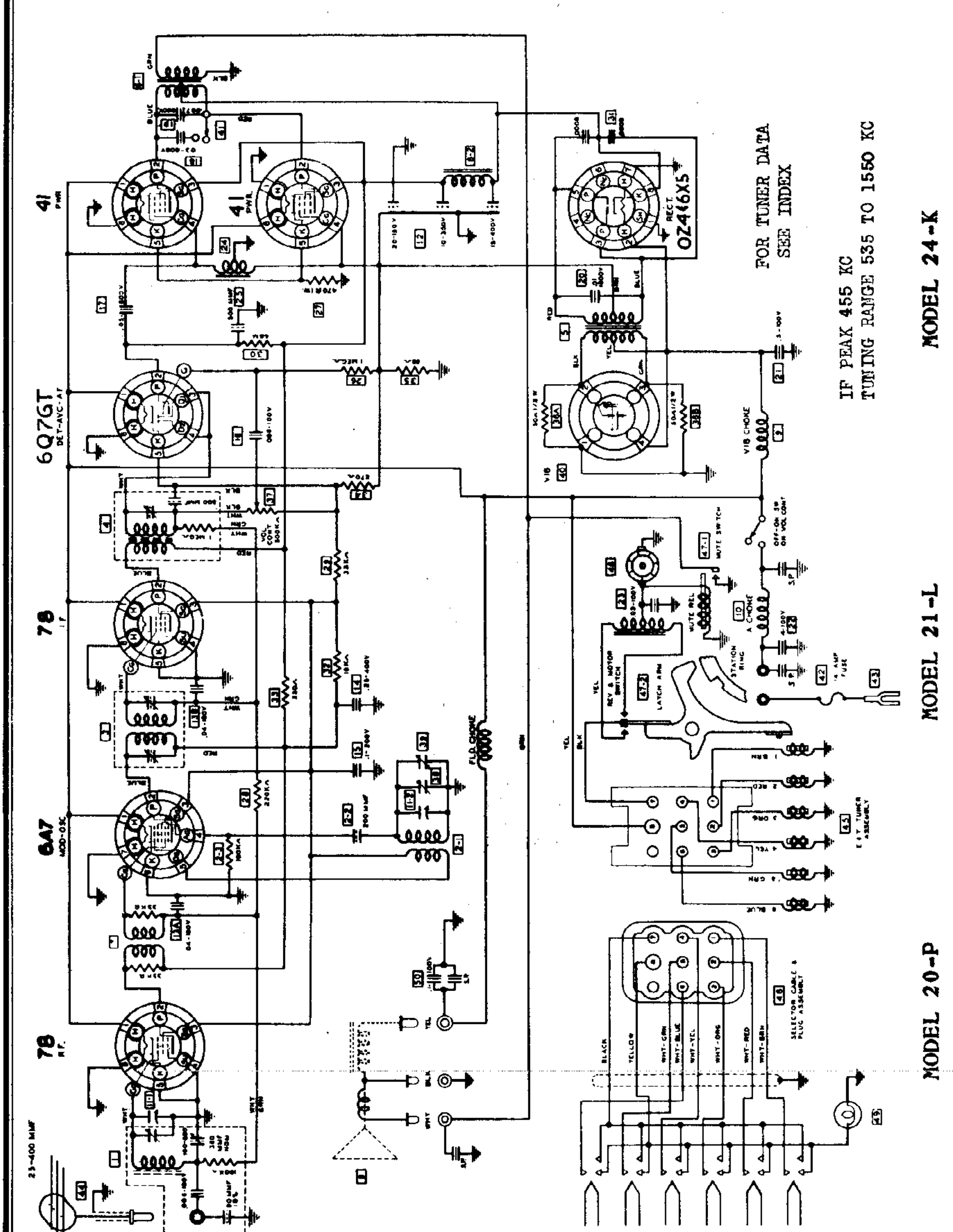


FIG. 5

FIG. 6

GALVIN MFG. CORP.

MODELS 20P,21L,24K
Schematic



MODELS 20P,21L,24K
Alignment,Socket,Trimmers
Gain,Sensitivity

GALVIN MFG CORP.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc. - Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
15,000	455 K.C.	IF Grid	.1 MF	.5 Meg	1.74 Volts
400	455 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
450	600 K.C.	Mod. Grid	.1 MF	.5 Meg	1.74 Volts
25	600 K.C.	RF Grid	.1 MF	.5 Meg	1.74 Volts
2	600 K.C.	Ant. Lead	40 MMF	None	1.74 Volts

* For one watt output.
** Meter connected across voice coil.

V.C. impedance - 3 ohms at 400 cycles.
1.74 volts equal 1 watt output.

VOLTAGE CHART - MODELS 20-P, 21-L, AND 24-K

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
78*	RF	180	80	0	-
6A7*	Osc.-Mod.	180	80	0	80
78 *	IF	180	80	0	-
6Q7GT**	Det.-Avc.	80	-	-2.6	-
41	Output	190	180	15	-
41	Output	190	180	15	-
OZ4	Rect.	AC	-	190	-

* Bias -2.6 V. from B stick
** Bias -3.5 V. from B stick

Current - 6.5 Amps. at 6.3 Volts
Maximum power output 4.5 Watts
All readings from chassis ground with 1000 ohms per volt meter.

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

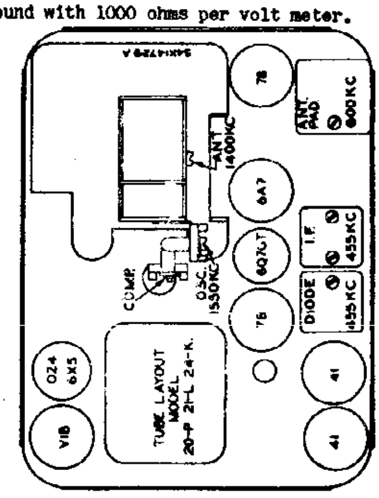


FIGURE 1. TRIMMERS

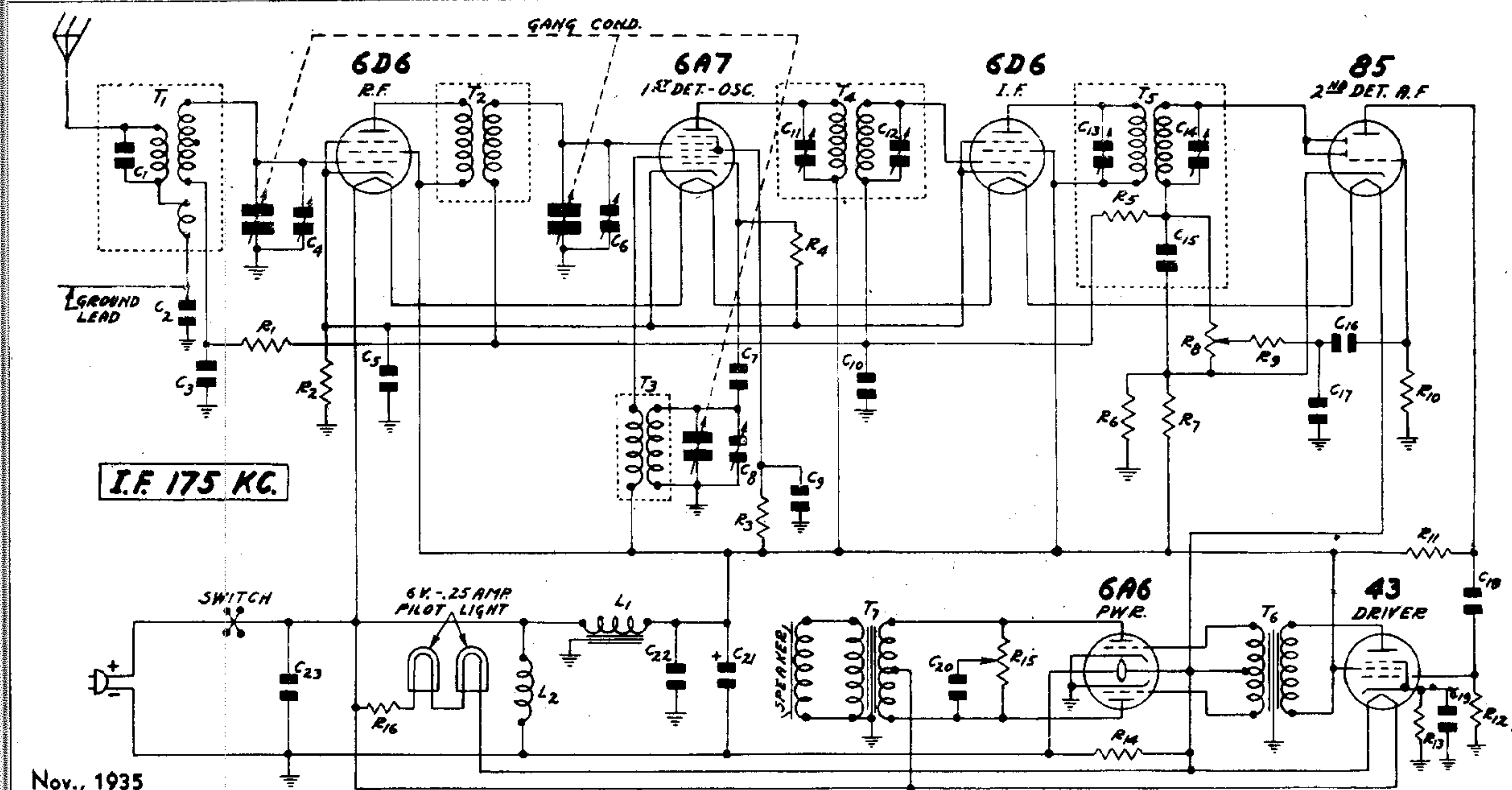
R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

GAMBLE SKOGMO, INC.



Nov., 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C_1 250 MMF MOULDED
C_2 .05 MF 180V.
C_3 .05 MF 180V.
C_4 GANG TRIMMER
C_5 .05 MF 180V.
C_6 GANG TRIMMER
C_7 .35 MMF MOULDED
C_8 GANG TRIMMER
C_9 .05 MF 180V.
C_{10} .05 MF 180V.
C_{11} 40-100 MMF } DUAL
C_{12} 40-100 MMF } P-17A39
C_{13} 40-100 MMF } DUAL
C_{14} 40-100 MMF } P-17A39
C_{15} 100 MMF MOULDED
C_{16} .01 MF 180V.
C_{17} 50 MMF MOULDED
C_{18} .01 MF 180V.
C_{19} 12. MF 25V. DRY ELECTROLYTIC P-45X207
C_{20} .10 MF 180V.
C_{21} 30 MF 50V. WET ELECTROLYTIC P-44X25
C_{22} .25 MF 180V.
C_{23} .25 MF 180V.

R_1 100 000 OHM .2 W.
R_2 450 OHM .2 W.
R_3 30 000 OHM .2 W.
R_4 100 000 OHM .2 W.
R_5 1.0 MEGOHM .2 W.
R_6 350 OHM .2 W.
R_7 6000 OHM .2 W.
R_8 .50 MEGOHM VOL. CONTROL P-36X213
R_9 50 000 OHM .2 W.
R_{10} 2.0 MEGOHM .2 W.
R_{11} 80000 OHM .2 W.
R_{12} 1.0 MEGOHM .2 W.
R_{13} 400 OHM 2 W.
R_{14} 180 OHM 1.0 W.
R_{15} 75000 OHM TONE CONTROL
R_{16} 6.7 OHM 4.0 W ARMORED WIRE WOUND

6 Tube - 32 Volt D. C.

Superheterodyne Receiver

T_1 ANTENNA INTERSTAGE TRANS. P-3A452
T_2 INTERSTAGE R.F TRANS P-9A453
T_3 OSC. INDUCTORS
T_4 1ST I.F. TRANS.
T_5 2ND I.F. TRANS.
T_6 INPUT TRANS.
T_7 OUTPUT TRANS.
L_1 FILTER REACTOR P-52X33
L_2 SPEAKER FIELD 100 OHM.

MODEL 6D
Alignment, Voltage
Trimmers, Voltage

GAMBLE SKOGMO, INC.

Socket
Resistance
Coil Data

SPECIFICATIONS

Power Consumption - 1.2 Amperes at 32 Volts DC
Power Output - - - - - .25 Watts Undistorted
Selectivity - - 29 KC Broad at 1000 times Signal
Sensitivity - - - - - - 10 Microvolts Absolute

Tuning Range - - - - - - - - 530 to 1750 KC
Intermediate Frequency - - - - - - - 175 KC
Speaker - - - - - - - - - - - - 6" Dynamic

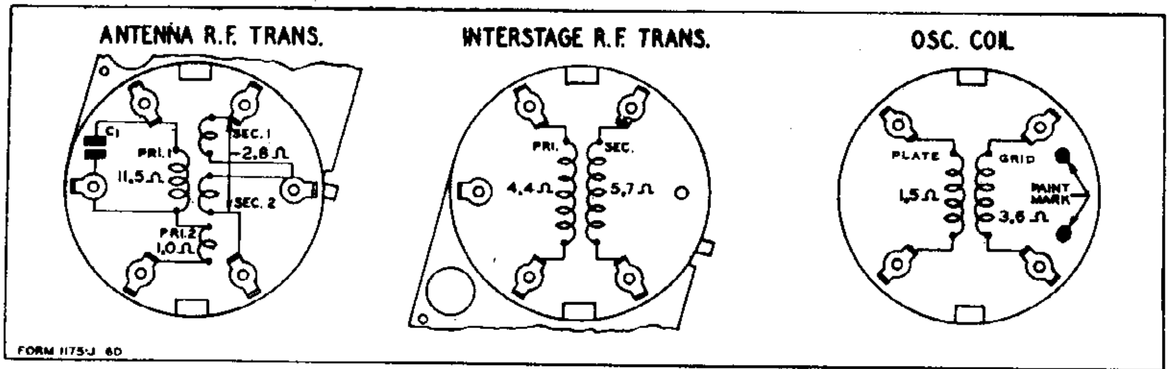


Fig. 3—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

D. C. Resistance of Windings

Refer to Fig. 3

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A452	Antenna R.F. Transformer	T1	
	Primary No. 1		11.5
	Primary No. 2		1.0
	Secondary Windings in Series		2.8
P-9A453	Interstage R.F. Transformer	T2	
	Primary Winding		4.4
	Secondary Winding		5.7
P-9A454	Oscillator Coil	T3	
	Grid Coil		3.6
	Plate Coil		1.5
P-9A455	1st I.F. Transformer	T4	
	Primary Winding		102.0
	Secondary Winding		99.
P-9A456	2nd I.F. Transformer	T5	
	Primary Winding		101.
	Secondary Winding		102.
P-50X22	Audio Input Transformer	T6	
	Primary Winding		380.
	Secondary Winding		
	Center Tap to Inside		85.
	Center Tap to Outside		95.
P-12A219	Dynamic Speaker		
	Speaker Field	L2	100.
	Speaker Voice Coil		3.1
	Audio Output Transformer (51X23)	T7	
	Primary Winding		
	Center Tap to Inside		152.
	Center Tap to Outside		176.
	Secondary Winding		1.4
P-52X33	Filter Choke	L1	50.

VOLTAGES AT SOCKETS
Volume Control at Maximum — Antenna Connected to Ground LEAD

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Normal Plate MA.
6D6	R.F.	6.4	31	31	2	1.5
6A7	1st Det. & Osc.	6.4	31 31(1)	18	2	.2 .65(1)
6D6	I.F.	6.4	31	31	2	1.5
85	2nd Det.	6.4	12.5		1.8	.20
43	1st Audio	25.6	28	31	3.5	7.
6A6	Output	6.4	31		0	11 (per plate)

(1) Anode Grid

I. F. Adjustment 175 KC.

Connect the output lead of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

1750 KC Adjustment

Connect the antenna lead of the signal generator to the antenna lead of the receiver through a 200 mmf. condenser. Adjust the trimmer of the oscillator section

1500 KC Adjustment

Loosen the pointer screw and set the pointer at the 1500 KC mark on the dial scale. Retighten the pointer screw.

Adjust the 1st detector and antenna trimmers for maximum output.

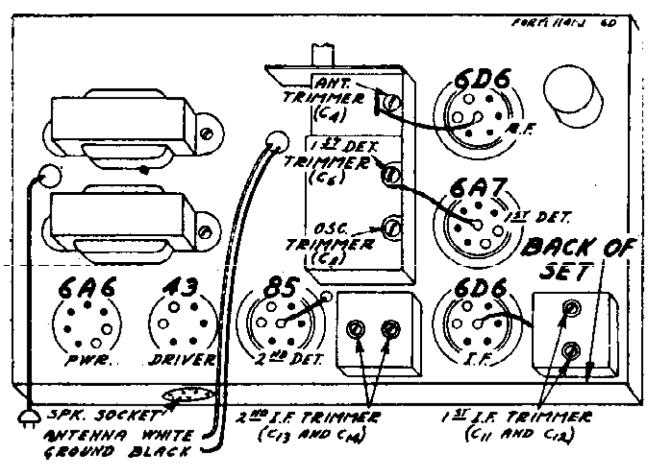


Fig. 4—Tube Arrangement

GAMBLE-SKOGMO, INC.

MODEL 15C6
Schematic
Voltage, Data

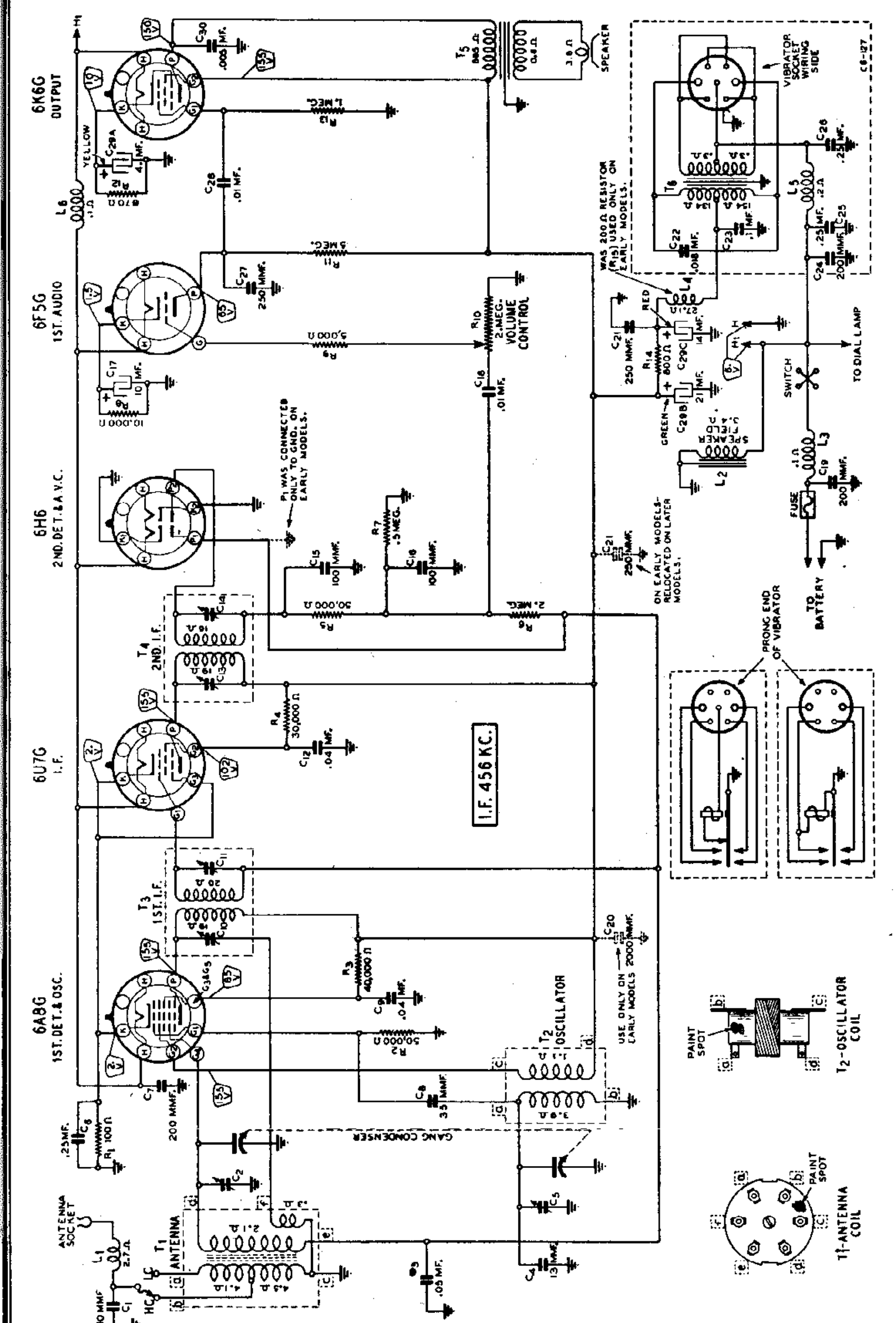


Fig. 1—Schematic Circuit Diagram

Power Consumption - - 5.5 Amperes at 6.3 Volts
Power Output - - - - - .8 Watt Undistorted
Sensitivity - - 10 Microvolts at .5 Watt Output
Selectivity - 42.5 KC Broad at 1000 Times Signal

Tuning Frequency Range - - - 528 to 1550 KC
Intermediate Frequency - - - - - 456 KC
Speaker - - - - - - - - - 6" Dynamic

15 C 6

APRIL, 1938

MODEL 15C6
Alignment, Drive Data
Changes, Notes, Socket

GAMBLE SKOGMO, INC.

Alignment Procedure

Remove the bottom and front chassis covers. Directions for removing the bottom cover are in the instruction book.

To remove the front cover, first pull the knobs and buttons off the shafts. Remove the 2 screws at the top and the 2 screws at the sides of the front cover. Press in the sides of the chassis case to release the lugs at the sides of the front cover. Pull outward on the bottom of the front cover and then push the cover up until the lugs at the top are released.

Do not remove the back of the chassis case. This back can be taken off of the No. 2 and later issue sets.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 1st Detector. Connect the ground lead of the signal generator to the chassis. Set the volume control at maximum. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. These trimmers can be reached through the 4 holes in the back wall of the chassis case. It will be necessary to pull out the fiber insulating sheet a slight amount.

Insert the antenna cable plug in the antenna socket on the chassis.

Rotating Pointer Models—If the antenna is connected at the HC terminal and the entire 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 120 mmf. condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal, the antenna cable has been cut as explained in the instructions. If cut in half (30-inch length), the capacity of the antenna cable is approximately 35 mmf. Connect the antenna wire, in this case, through a 25 mmf. condenser to the antenna post of the signal generator.

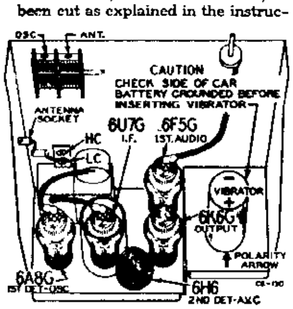


Fig. 4—Location of Tubes

Sliding Pointer Models—If the antenna is connected at the HC terminal and the 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 230 mmf. condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal and the short shielded cable (19 mmf.) is being used, connect the antenna wire, in this case, through a 20 mmf. condenser to the antenna post of the signal generator. If the long cable has been cut to length and is being used, the total capacity of the cable and the series condenser should be 38 to 40 mmf.

Both Models—Set the signal generator for 1550 KC. Turn the rotor of the tuning condenser to the full open position. Adjust the trimmer of the oscillator section of the gang condenser until maximum output is obtained. See Fig. 4 for location of this trimmer.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the trimmer of the antenna section of the gang condenser for maximum output.

Calibration—Rotating Pointer Models—To obtain dial scale calibration, tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

Calibration—Sliding Pointer Models—The pointer assembly is clamped to the drive cord and it is seldom necessary to reset it to obtain proper dial calibration. If re-calibration is required, loosen the clamps with a screw driver, bringing the pointer assembly first down to one end of the dial scale and then down to the other end. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the scale and tighten the clamps with long nose pliers.

Drive Cord Replacement—Rotating Pointer Models

Tie a knot with a small loop at one end of the new drive cord. The free end of the drive cord is tied to the tension spring. The distance between knots should be 23⅙ inches.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2 (Shown with gang condenser half open). Bring the cord up through the slot in the drum rim and wind one-half turn to the rear (from front of chassis) around the drive drum. Pass cord around the pulley B as shown. Wind one turn clockwise (from front of chassis) around pointer disc pulley C. Loop cord through the notches on the outside rim of the pointer disc pulley as shown. Wind 2½ turns clockwise, progressing from a point midway between the bracket arms toward the chassis, on tuning control shaft D. Bring cord to the left under pointer disc pulley C and around pulley E as shown. Pass cord to top of drive drum A and wind one turn to the rear around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum rim. Place free end of spring over the hook on the condenser drive drum.

Setting Pointer Disc—Tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

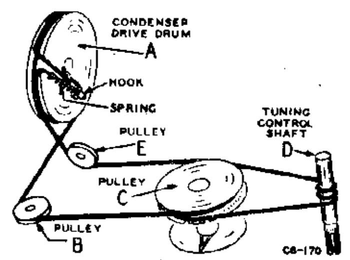


Fig. 2—Replacing Drive Cord—Rotating Pointer Models

Drive Cord Replacement—Sliding Pointer Models

Remove the celluloid dial scale. Open the clamps on the back of the dial pointer in order to remove the old drive cord.

It is not necessary to remove the dial and drive bracket assembly in order to replace the drive cord.

Tie a knot with a small loop at one end of the new drive cord. Slide a ½ inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 28⅝ inches

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 3. Bring the cord up through the slot in the drum rim.

Turn the drive drum to the position shown in Fig. 3.

Wind one turn down and around drive drum A and around pulley B as shown. Wind 3½ turns on tuning control shaft C, progressing from a point midway between the two bracket arms toward the chassis. Bring cord under pulley D and around pulleys E and F as shown. See that the fabric tubing is now between pulleys E and F. Bring the drive cord to the rear around drive drum A and through the slot in the drum rim as shown.

Turn the gang condenser to full open position and place the free end of the tension spring over the hook on drive drum A.

Dial Pointer Adjustment—Mount the celluloid dial scale on the dial bracket. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the dial scale and tighten the clamps with long nose pliers.

Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (−) terminal of the car battery is grounded, line up the − mark on the top of the vibrator with the arrow on the chassis base.

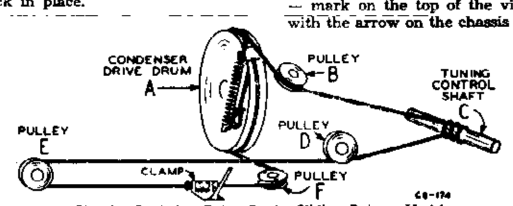


Fig. 3—Replacing Drive Cord—Sliding Pointer Models

Antenna Capacity

Rotating Pointer Models—The antenna coil is designed for car antennas with a capacity of 190 mmf. for the HC connection and 60 mmf. for the LC connection. This capacity is the total capacity of the antenna and the shielded lead.

Complete information regarding car antenna installation will be found in the instruction book packed with the radio.

Sliding Pointer Models—The information for this type of radio is the same as above except that the HC capacity is 300 mmf. and the LC capacity is 38 mmf.

Two Models

One model has a rectangular dial scale with a sliding pointer.

The other model has a circular dial scale with a rotating pointer disc.

The 2 models also differ in the capacities of the antennas which may be used. The values are shown in article "Antenna Capacity."

Issue No. 1

Mechanical Assembly—The 2 front mounting studs are attached to the top of the chassis case.

The I.F. coil cans have a spring clip by means of which they are secured to the chassis.

The back of the chassis case is not removable.

Electrical Assembly—See electrical changes under "Issue No. 2."

Issue No. 2

Mechanical Changes—The chassis case is supplied with a front mounting bracket and this bracket is secured to the instrument panel of the car by means of 2 separate bolts.

The I.F. cans use a threaded spade lug which extends through the chassis base and is secured in place with nuts and lock washers.

The back of the chassis case can be removed.

Electrical Changes—The following changes are all illustrated in the schematic—Fig. 1.

The 6H6 tube plate No. 1, which was connected originally to ground is removed from ground and connected as shown in the schematic.

Condenser C20 is removed.

The position of condenser C21 is changed as shown.

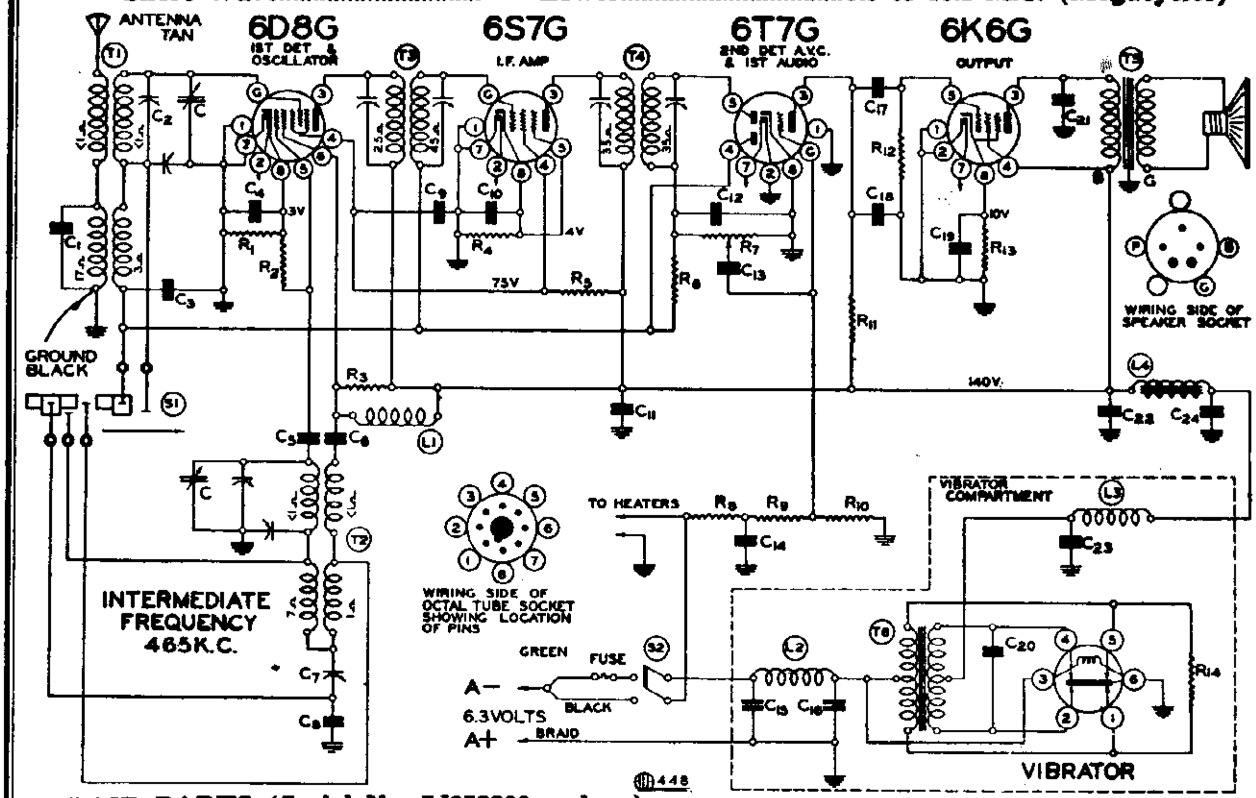
Resistor R15 (200 ohms) is removed and replaced by choke L4.

Trimmers, Voltage

MODEL 489
Schematic, Socket

GAMBLE-SKOGMO, INC.

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper	535 to 1720 K.C. (Kilocycles)
Short Wave	Lower	5.5 to 18.1 M.C. (Megacycles)



2 Band 6-Volt Storage Battery Operated Superheterodyne Receiver

MODEL 489

REPAIR PARTS (Serial No. 7J852300 and up)

No.	Part No.	Description
		RESISTORS
R1	130-54	500 ohm - 1/3 w.
R2	130-12	50M ohm - 1/3 w.
R3	130-12	50M ohm - 1/3 w.
R4	130-26	1000 ohm - 1/3 w.
R5	130-149	15M ohm - 1/3 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-91	1 meg volume control
R8	130-191	1.5 megohm - 1/3 w.
R9	130-4	3 megohm - 1/3 w.
R11	180-9	200M ohm - 1/3 w.
R12	130-3	500M ohm - 1/3 w.
R13	130-153	700 ohm - 1/3 w.
R14	130-84	200 ohm - 1/3 w.
R10	130-191	1.5 meg - 1/3 w.
		CONDENSERS
C	102-43	2 gang variable
C1	129-5	.0001 Mica
C2	124-39B	Adj. Cond. 2-25 mmf.
C3	100-22	.05 x 200
C4	100-20	.1 x 200
C5	129-39	.00005 Mica
C6	100-25	.002 x 600
C7	124-38	Series pad 600 mmf. W. C
C8	129-54	.003 Mica
C9	100-20	.1 x 200
C10	100-20	.1 x 200
C11	100-11	.01 x 400
C12	129-5	.0001 Mica
C13	100-11	.01 x 400
C14	100-11	.01 x 400
C15	100-40	.5 x 200
C16	100-40	.5 x 200
C17	100-26	.02 x 400
C18	129-2	.0005 Mica
C19	119-22	10.0 mfd. 25 v. lytic
C20	100-34	.005 x 1200
C21	100-19	.006 x 600
C22	119-28B	5.0 mfd. lytic
C23	100-20	.1 x 200
C24	119-28B	5.0 mfd. lytic C22 C24 in same unit
		PARTS
T1	111-83	Antenna coil complete
T2	110-66B	Oscillator coil complete
T3	108-105B	Input I.F. complete 465 kc.
T4	108-106B	Output I.F. complete 465 kc.
T5	114-96	6" speaker (P.M.)
T6	104-62E	Power Transformer
L1	123-4	R. F. "B" Choke
L2	105-19	A Choke
L3	123-3	R. F. "B" Choke
L4	105-30E	"B" Filter Choke (400 ohms)
S1	125-39	Wave Band Switch
S2		Switch on volume control

BATTERY CONNECTIONS:

Referring to Fig. 1, connect the battery cable to the storage battery in the following manner:

(a) The storage battery should be located as far from the receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.

(c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.

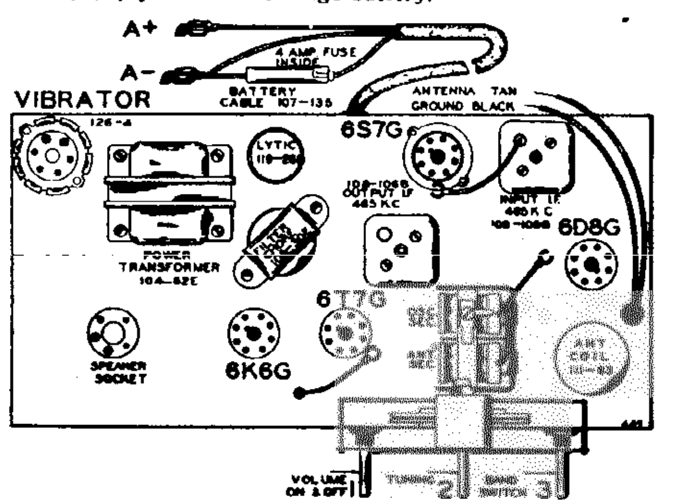
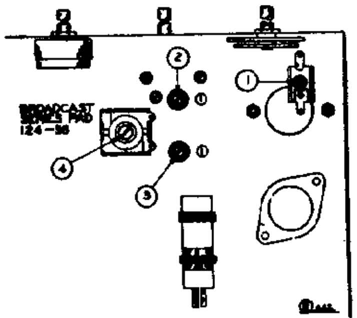


FIG. 1—TOP VIEW

MODEL 489
Alignment, Trimmers
MODEL 761A
Alignment, Tuner

GAMBLE SKOGMO, INC.

MODEL 489



SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or ground antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6K6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-106B Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-106B) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-105B) to resonance.

SHORT WAVE BAND ALIGNMENT:
5.5 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.
   This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).
   (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:
536 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

MODEL 761A

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106E Output I.F. Transformer
Part No. 108-105 Input I.F. Transformer

These I. F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106E) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8 and adjust input I.F. transformer (No. 108-105) to resonance.

BROADCAST BAND ALIGNMENT:
540 to 1750 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1750 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment E'; see top view, Fig. 1).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment A') to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (Adjustment F') to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained.
   (d) Repeat adjustments "a" and "c" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:
5.5 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment G') and short wave antenna (Adjustment C') to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.5 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1730 to 5000 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment D') and middle wave antenna (Adjustment B') to resonance.
   (b) Re-set external oscillator to 1900 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-check broadcast band alignment.

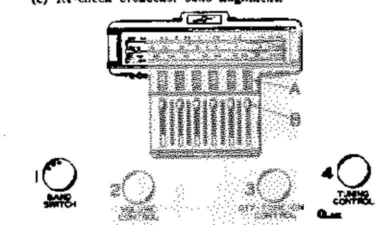


FIG. 2—FRONT VIEW

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

There are six levers on the dial by means of which six stations may be selected, (See "B", Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including 6.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2). Any order of grouping may be used, however, it is recommended that the left hand three automatic levers be used for high frequency stations (1750 to 1000 K.C.) and the right hand three automatic levers for low frequency stations (1000 to 540 K.C.).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 4) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob (No. 4) to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the locking adjustment screw "C". It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

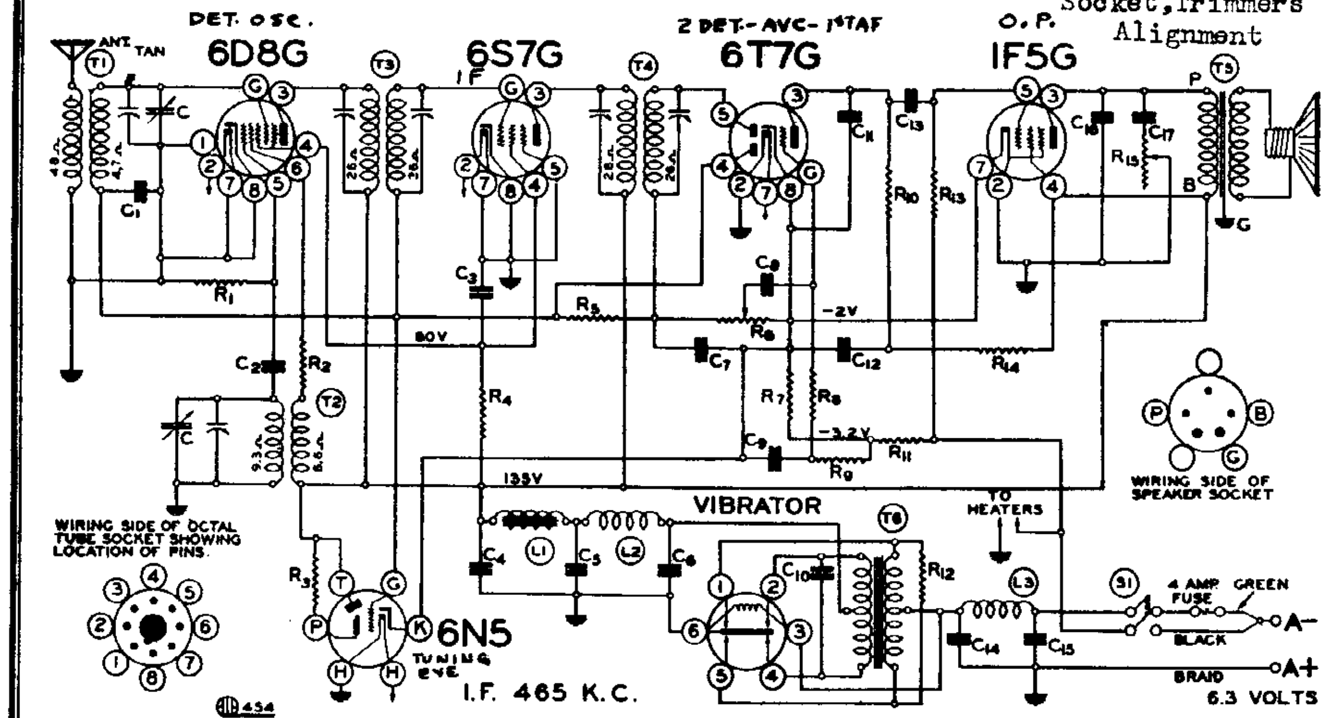
If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN the LOCKING SCREW; otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and—Presto!—your favorite station is selected.

MODEL 504
Schematic, Voltage
Socket, Trimmers
Alignment

GAMBLE SKOGMO, INC.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

Sensitivity Check at
600 KC and 1000 KC

IF ALIGNMENT

ADJ. at 465 KC thru .1 mf cord.

RF ALIGNMENT

THRU 200 mmf cond. :
Adj. osc. trim. at 1720 KC -
Adj. Ant. trim. at 1400 KC -

Frequency Range — 535-1720 Kilocycles

REPAIR PARTS (Serial No. 7J852900 and up)

No.	Part No.	Description
		RESISTORS
R1	130-76	30M ohm - 1/3 w.
R2	130-23	2M ohm - 1/3 w.
R3	130-186	250M ohm - 1/10 w. - in tuning indicator
R4	130-123	15M ohm - 1/2 w.
R5	130-121	3.2 megohm - 1/3 w.
R6	101-56	1 megohm volume control
R7	106-36	10 ohms - resistor strip
R8	130-19	1 megohm - 1/3 w.
R9	130-19	1 megohm - 1/3 w.
R10	130-100	150M ohm - 1/3 w.
R11	106-36	25 ohms - resistor strip
R12	130-84	200 ohms - 1/3 w.
R13	130-19	1 megohm - 1/3 w.
R14	130-20	100M ohm - 1/3 w.
R15	101-72	300M ohm - tone control
		R7 and R11 in same unit
		CONDENSERS
C	102-38	2 gang variable
C1	100-9	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-33	.1 x 200 v.
C4	119-28	5.0 mfd. - 200 w. v. lytic
C5	119-28	5.0 mfd. - 200 w. v. lytic
C6	100-33	.1 x 200 v.
C7	129-5	.0001 Mica
C8	100-11	.01 x 400 v.
C9	100-11	.01 x 400 v.
C10	100-34	.005 x 1200 v.
C11	129-12	.00025 Mica
C12	100-33	.1 x 200 v.
C13	100-11	.01 x 400 v.
C14	100-40	.5 x 200 v.
C15	100-40	.5 x 200 v.
C16	100-37	.003 x 600 v.
C17	100-11	.01 x 400 v.
		C4 and C5 in same unit
		PARTS
T1	111-66	Antenna coil complete
T2	110-45	Oscillator coil complete
T3	108-84	Input I.F. coil complete - 465 kc.
T4	108-85	Output I.F. coil complete - 465 kc.
T5	114-63	P.M. Speaker
T6	104-62	Power Transformer
L1	105-30	Filter Choke
L2	123-3	R. F. "B" Choke
L3	105-19	"A" Choke
S1		Switch on volume control
	126-4	Vibrator

BATTERY CONNECTIONS:

Referring to Fig. 1, connect the battery cable to the storag battery in the following manner:

(a) The storage battery should be located as far from th receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marke A negative (—) to the negative (—) post of th storage battery.

(c) Connect the lead marked A positive (+) to the positiv (+) post of the storage battery.

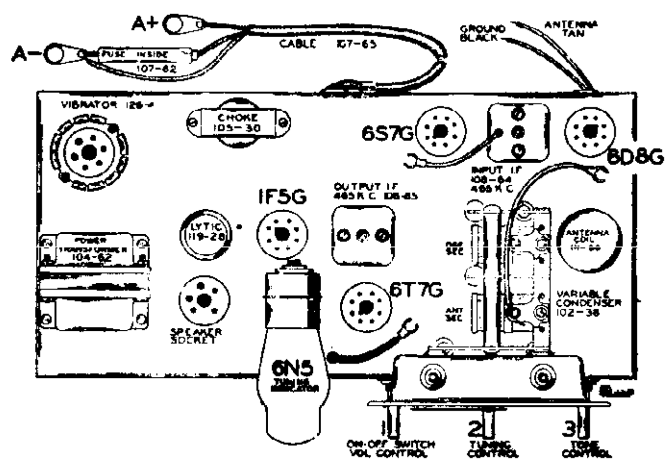
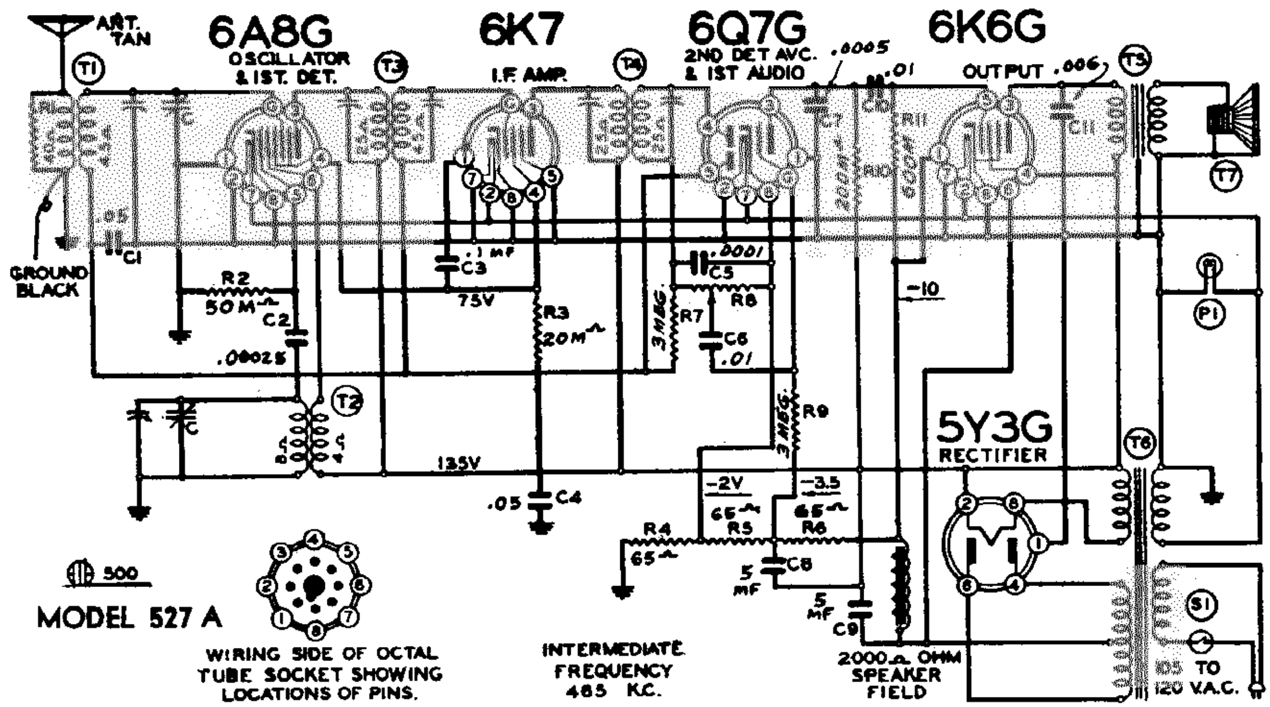


FIG. 1—TOP VIEW

MODEL 527A
Schematic, Voltage, Alignment
Socket, Trimmers,

GAMBLE SKOGMO, INC.



Frequency Range —535 - 1720 Kilocycles

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No.108-95B Output I.F. Transformer
Part No. 108-96 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condensor, to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input I.F. transformer (No. 108-96) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-95B) if necessary.

1. **R.F. ALIGNMENT: (535-1720 K.C.)**

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condensor to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

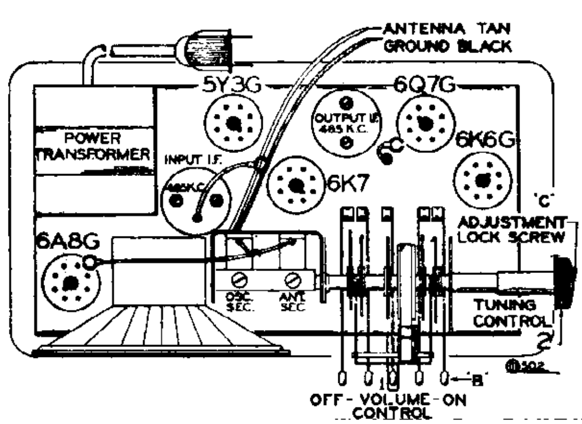


FIG. 1—TOP VIEW

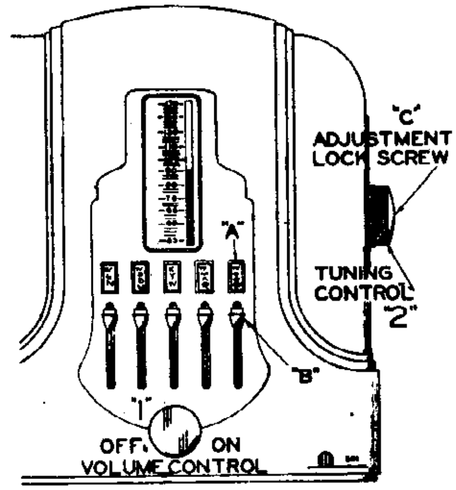


FIG. 2—FRONT VIEW

FOR TUNER PROCEDURE, SEE DATA ON MODEL 677A

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

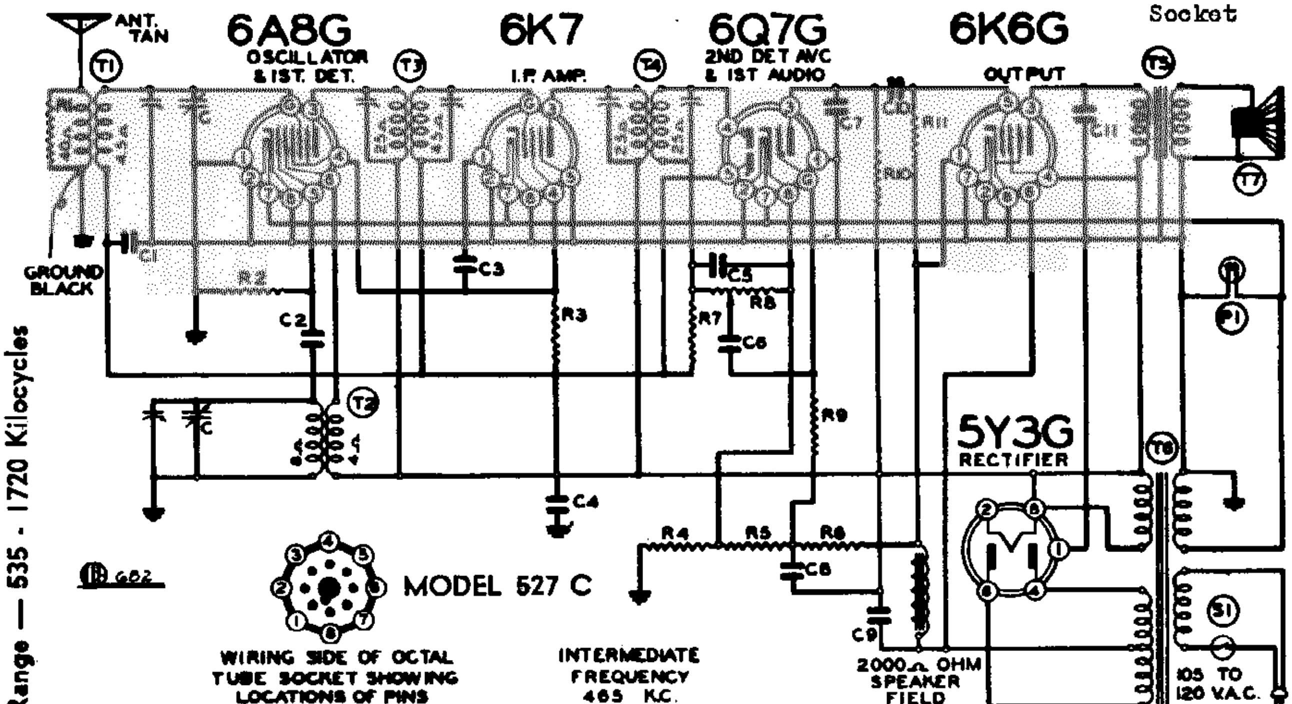
Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

Voltage, Alignment

MODEL 527C
Schematic
Socket

GAMBLE-SKOGMO, INC.

Range — 535 - 1720 Kilocycles



PARTS (Serial No. 307600 and up)

Code No.	Part No.	Description
		RESISTORS
R1	13021	20M ohm—⅓ w.
R2	13012	50M ohm—⅓ w.
R3	13021	20M ohm—⅓ w.
R4	10635	Resistor Strip—65 ohm
R5	10635	45 ohm—resistor strip
R6	10635	220 ohm—resistor strip
R7	130170	3 megohm—⅓ w.
R8	101141	500M ohm volume control
R9	130170	3 megohm—⅓ w.
R10	1309	200M ohm—⅓ w.
R11	130118	600M ohm—⅓ w.
		CONDENSERS
C	10290	2 gang variable condenser
C1	1009	.05 x 200 v.
C2	12912	.00025 Mica
C3	1001	.1 x 400 v.
C4	10013	.05 x 400 v.
C5	1295	.0001 Mica
C6	10011	.01 x 400 v.
C7	1292	.0006 Mica
C8	11947E	5.0 mfd.—250 w. v. lytic
C9	11947E	5.0 mfd.—250 w. v. lytic
C10	10011	.01 x 400 v.
C11	10019	.006 x 600 v.
		PARTS
T1	11192	Antenna coil complete
T2	11073	Oscillator coil complete
T3	10896F	Input I. F.—465 kc. complete
T4	10895E	Output I. F.—465 kc. complete
T5	10555D	Output Transformer
T6	104149	Power Transformer
T7	114113	5" Dynamic Speaker (2000 ohm Field)
S1		Off-on switch on volume control
P1	10794	6-8 v. pilot light

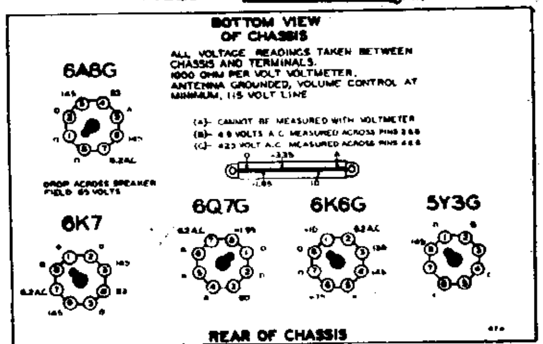


FIG. 3

TUBES:

DESCRIPTION:

The tube complement of this chassis consists of the following octal base glass and metal tubes.

The type and function of each tube is as follows:

1—Type 6A8G Pentagrid Mixer, First Detector-oscillator.
1—Type 6K7 Remote Cut-off Pentode, I.F. Amplifier (465 K.C.)
1—Type 6Q7G Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6K6G Pentode Output Amplifier.
1—Type 5Y3G High Vacuum Rectifier.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

BAND	Signal Generator Frequency Setting	Signal Generator Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6A8G	Rotor full open (Plates out of mesh)	Four trimmers (See Fig. 1)	Input I. F. and Output I. F.	Adjust to maximum output
BROADCAST BAND	1720 Kc.	100 mmf.	Antenna Lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	100 mmf.	Antenna Lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Broadcast Antenna	Adjust to maximum output

FREQUENCY RANGE
535 to 1720 K.C.

Power Consumption .... 50 Watts
Power Output .... 1 Watt Undistorted, 1.7 Watts Maximum
Intermediate Frequency .... 465 K.C.

MODEL 527C
Socket, Trimmers, Tuner
MODEL 587 Series A
Alignment

GAMBLE SKOGMO, INC.

MODEL 587 - Series A

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-76A Output I.F. Transformer
Part No. 108-75A Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-76A) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6A8 and adjust input I.F. transformer (No. 108-75A) to resonance.
   (c) With oscillator still connected to 6A8, readjust output I.F. transformer (108-76A) if necessary.

BROADCAST AND SHORT WAVE BAND ALIGNMENT

Broadcast Band:—535 to 1720 Kilocycles.
Short Wave Band:—2280 to 6600 Kilocycles.

Important:—These adjustments must be made in the following order:

SHORT WAVE OSCILLATOR ADJUSTMENT:

1. With band switch in the short wave band position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with the external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:
   (a) Set external oscillator to 6.6 megacycles and adjust short wave oscillator trimmer to resonance. This adjustment is marked "S.W. Osc." (see top view of chassis, Fig. 1, for location of this adjustment).

NOTE: Make certain that the fundamental 6.6 megacycles signal has been tuned in and not the image frequency, noting that the image appears when the tuning knob is moved to approximately 5.7 megacycles.

BROADCAST BAND OSCILLATOR ADJUSTMENT:

1. With band switch in the broadcast position, extreme left of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. This adjustment is the trimmer mounted on the front section of the variable gang condenser.

BROADCAST BAND ANTENNA ADJUSTMENT:

1. With the band switch still in the broadcast position, move the external oscillator from the grid cap of the 6A8 tube to the tan antenna lead and black ground lead, in series with "Dummy 2" and make the following adjustments:
   (a) Set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer to resonance. This adjustment is marked "B.C. Ant." (See top view of chassis, Fig. 1, for location of this adjustment.)
   (b) Re-set external oscillator to 600 K.C. and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until, by adjusting series pad, maximum output is attained. This adjustment is located on the top of the chassis directly in front of the antenna coil. (See top view of chassis, Fig. 1).
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

SHORT WAVE BAND ANTENNA ADJUSTMENT:

1. With the band switch in the short wave position, and with external oscillator connected in series with "Dummy 3," to the tan antenna lead and black ground lead, make following adjustment:
   (a) Set external oscillator to 6 megacycles and adjust the short-wave antenna trimmer to resonance. This adjustment is the trimmer mounted on the rear section of the variable gang condenser.

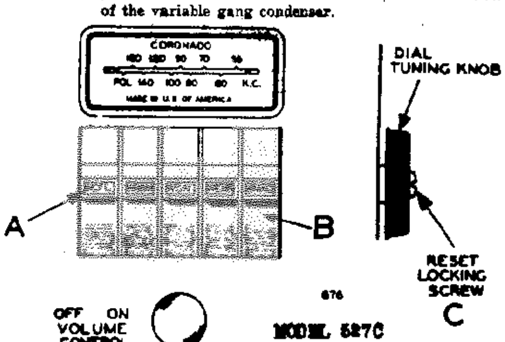


FIG. 2—FRONT VIEW

MODEL 527C

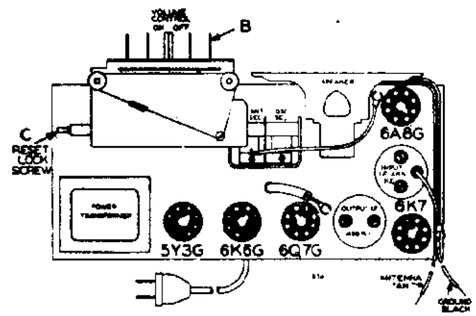


FIG. 1—TOP VIEW

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected, (See "B" Fig. 2)

Make a list of local stations you tune in regularly; any number up to and including five.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner lever buttons. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab on this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever button. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab on this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

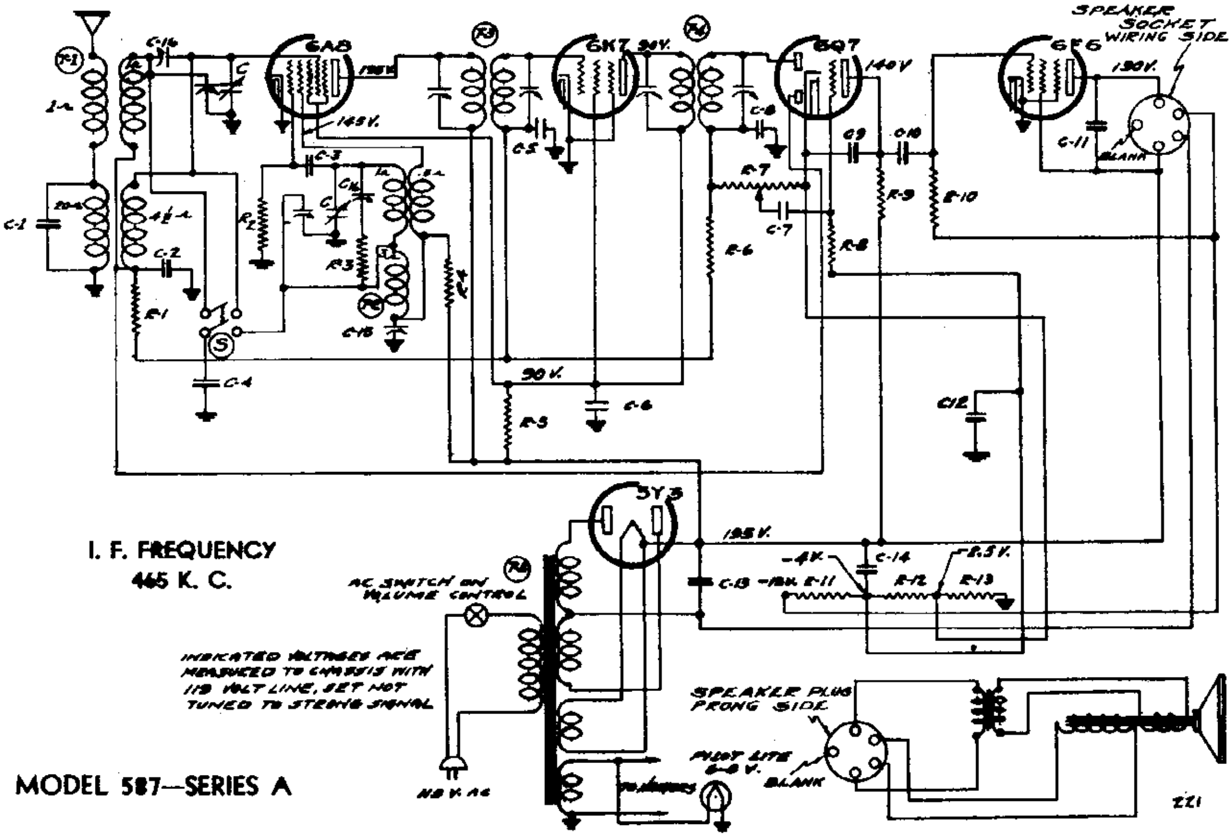
If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and—your favorite station is selected.

MODEL 587 Series A
Schematic, Voltage
Socket, Trimmers

GAMBLE-SKOGMO, INC.

2-Band A. C. Superheterodyne Receiver



I. F. FREQUENCY
465 K. C.

MODEL 587—SERIES A

PARTS (Serial No. 6G310775 and up)

RESISTORS

No.	Part No.		Description
R1	130-111	100M	Ohms 1/10W—20%—50V Carbon
R2	130-12	50M	Ohms 1/3 W—20%—20V Carbon
R3	130-112	100	Ohms 1/10W—20%—10V Carbon
R4	130-22	5M	Ohms 1/3 W—20%—10V Carbon
R5	130-77	10M	Ohms 1 W—20%—100V Carbon
R6	130-110	1 meg	Ohm 1/10W—10%—100V Carbon
R7	101-49	1 meg	Ohm Volume Control
R8	130-113	2 meg	Ohm 1/10W—20%—100V Carbon
R9	130-20	100M	Ohms 1/3W—20%— 50V Carbon
R10	130-100	150M	Ohms 1/3W—20%— 50V Carbon
R11	106-26	220	Ohms
R12	106-26	33	Ohms
R13	106-26	52	Ohms

NOTE: R11, R12, and R13 in one unit—106-26

CONDENSERS

C1	129-63	.0004 Mica—W—10%
C2	100-26	.02 x 400 Volt—25%
C3	129-62	.00003 Mica—0—10%
C4	129-61	.0017 Mica—W—2½%
C5	100-9	.05 x 200 Volt—25%
C6	100-6	.25 x 200 Volt—25%
C7	100-11	.01 x 400 Volt—25%
C8	129-12	.00025 Mica—0—20%
C9	129-12	.00025 Mica—0—20%
C10	100-11	.01 x 400 Volt—25%
C11	100-19	.006 x 600 Volt—25%
C12	100-6	.25 x 200 Volt—25%
C13	103-6	8 mfd. x 350 Volt Electrolytic
C14	103-7	8 mfd. x 300 Volt Electrolytic
C15	124-29	Adjustable condenser 390 mmf. working capacity
C16	124-30	Adjustable Dual Condenser

TUNING RANGE—
Standard Broadcast Band
535-1720 Kilocycles.
Short Wave Band
2300-6000 Kilocycles

MISCELLANEOUS PARTS

T1	111-56A	Antenna Coil
T2	110-44	Oscillator Coil
T3	108-75A	Input I.F. 465 Kc.
T4	108-76A	Output I.F. 465 Kc.
T5	104-56	Power Transformer—60 Cycles
S	125-19	Band Switch
C	102-31	One Section of Two Gang Condenser

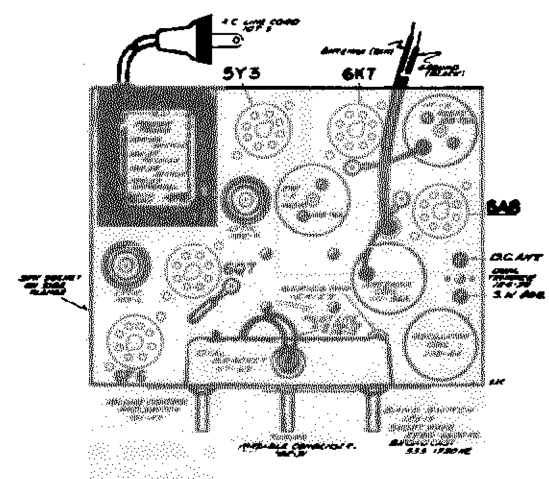


FIG. 1—TOP VIEW

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following tubes.

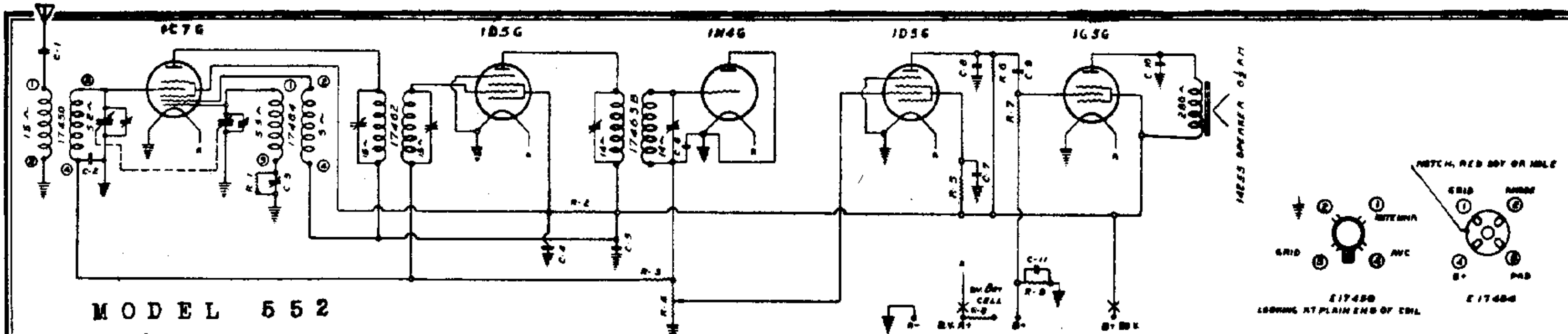
The type and function of each tube is as follows:

1—Type 6A8 Pentagrid Mixer, First Detector-oscillator
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7-G Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6F6-G Pentode Output Amplifier.
1—Type 5Y3 High Vacuum Rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

MODEL 541A
MODEL 552
Schematics, Alignment

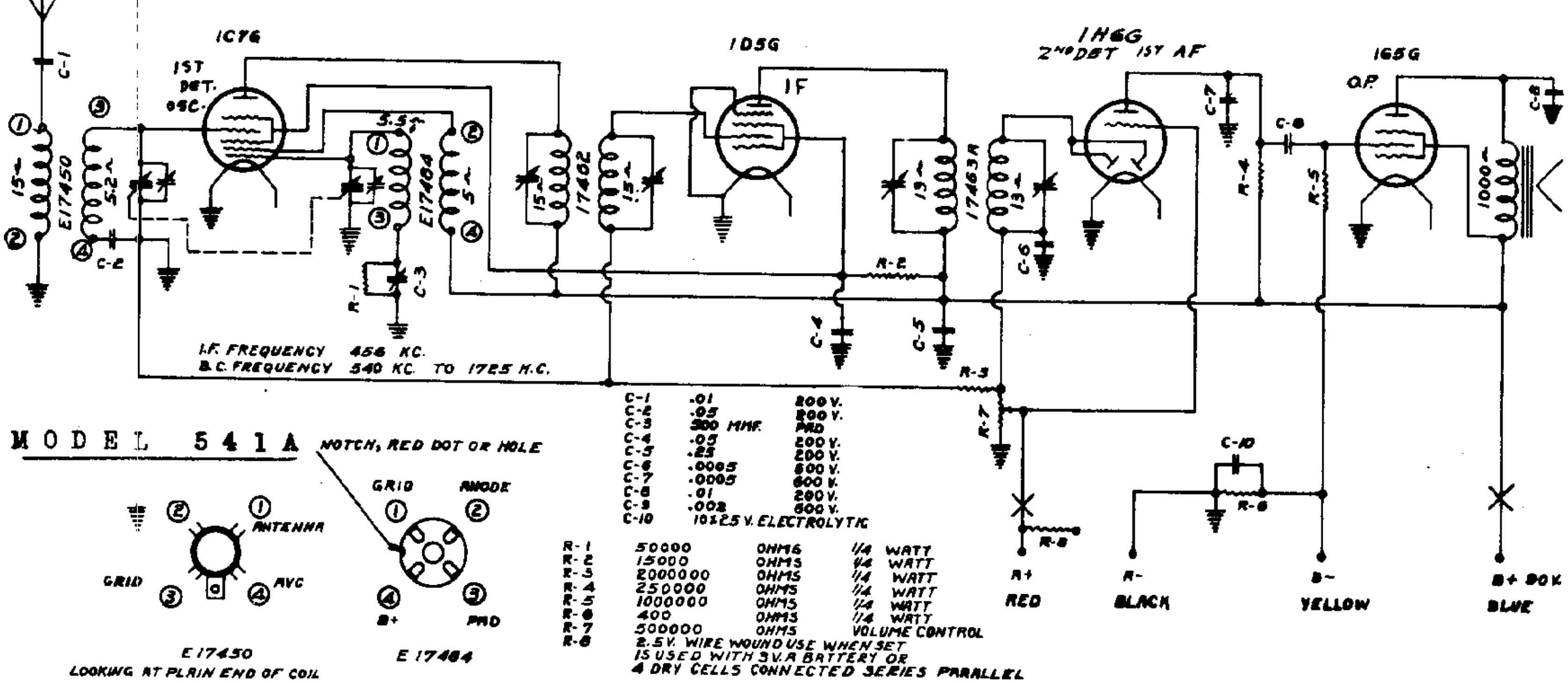
GAMBLE-SKOGMO, INC.



MODEL 552

IF ALIGNMENT 456 K. C. Connect signal generator to grid of 1C7G tube through a .01 MFD condenser, leave grid cap in place and open tuning condenser (turn dial to high frequency end). Peak IF trimmers — use an output meter — use only enough signal to give a readable output, and go over trimmers several times.

OSCILLATOR & ANTENNA ALIGNMENT: With pointer set to end of scale calibration when tuning condenser is closed, trim oscillator (rear section of tuning condenser) for maximum response at 1400 K. C. dial reading with a 1400 K. C. signal into the antenna lead. Next adjust padding condenser at 540 K. C. and recheck at 1400, then resonate antenna trimmer at 1400 K. C.



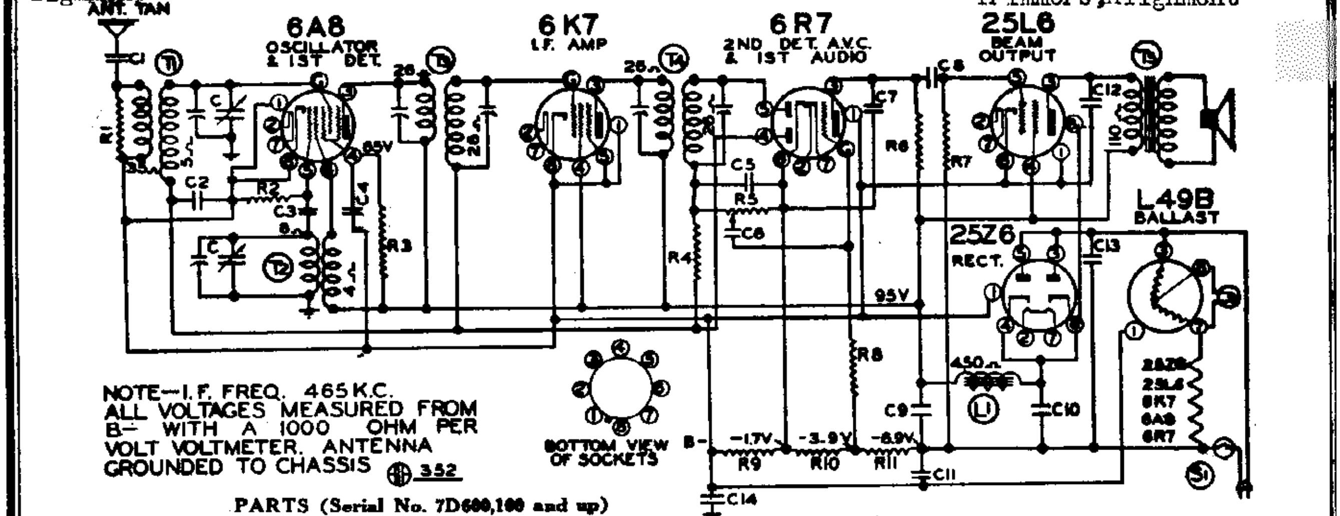
MODEL 541A

MODEL 541A ALIGNMENT the same as Model 552, but connect signal gen. thru a .00025 condenser

MODEL 602B
MODEL 602C
Alignment

GAMBLE SKOGMO, INC.

MODEL 602
Schematic, Voltage, Socket
Trimmers, Alignment



PARTS (Serial No. 7D600,100 and up)

RESISTORS

No.	Part No.	Description	
R1	130-17	10M ohm - 1/3 w.	20%
R2	130-12	50M ohm - 1/3 w.	20%
R3	130-149	15M ohm - 1/3 w.	20%
R4	130-4	3 meg ohm - 1/3 w.	20%
R5	101-77	Volume Control (1 Meg)	
R6	130-12	50M ohm - 1/3 w.	20%
R7	130-20	100M ohm - 1/3 w.	20%
R8	130-19	1 megohm - 1/3 w.	20%
R9	106-38	30 ohm	
R10	106-38	40 ohm	
R11	106-38	55 ohm	

R9, R10, and R11 in one unit

CONDENSERS

No.	Part No.	Description	
C	102-48	2 gang variable	
C1	100-25	.002 x 600	25%
C2	100-9	.05 x 200	25%
C3	129-12	.00025 Mica	20%
C4	100-22	.05 x 200	25%
C5	129-5	.0001 Mica	20%
C6	100-11	.01 x 400	25%
C7	129-2	.0005 Mica	20%
C8	100-22	.05 x 200	25%
C9	119-39	20 mfd. lytic - 100 w.v.	
C10	119-39	15 mfd. lytic - 100 w.v.	
C11	100-20	.1 x 200	25%
C12	100-13	.05 x 400	25%
C13	100-39	.1 x 400	20%
C14	100-53	.25x400	20%

PARTS

No.	Part No.	Description
T1	111-58B	Antenna Coil Complete
T2	110-46	Oscillator Coil Complete
T3	108-82B	Input I. F. Complete
T4	108-83B	Output I. F. Complete
T5	114-71	Dynamic Speaker
L1		450 ohm speaker field
S1		Switch on Volume Control

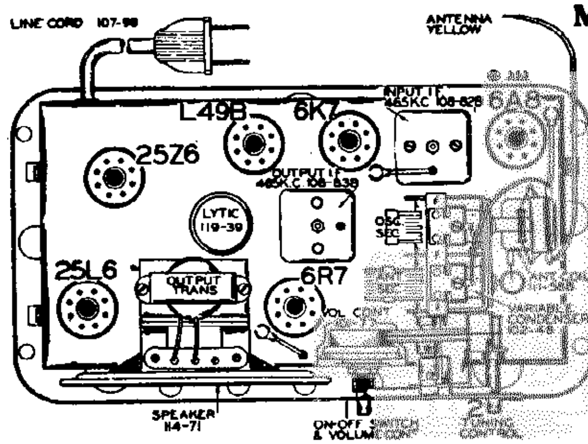


FIG. 1—TOP VIEW

MODEL 602

Range 535-1720 Kilocycles

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 25L6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT - 465 KC - Model 602
I.F. ALIGNMENT -470 KC - Models 602 B & C

Part No. 108-83B Output I.F. Transformer
Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

Models 602, 602B & 602C

R.F. ALIGNMENT: (535-1720 K.C.)

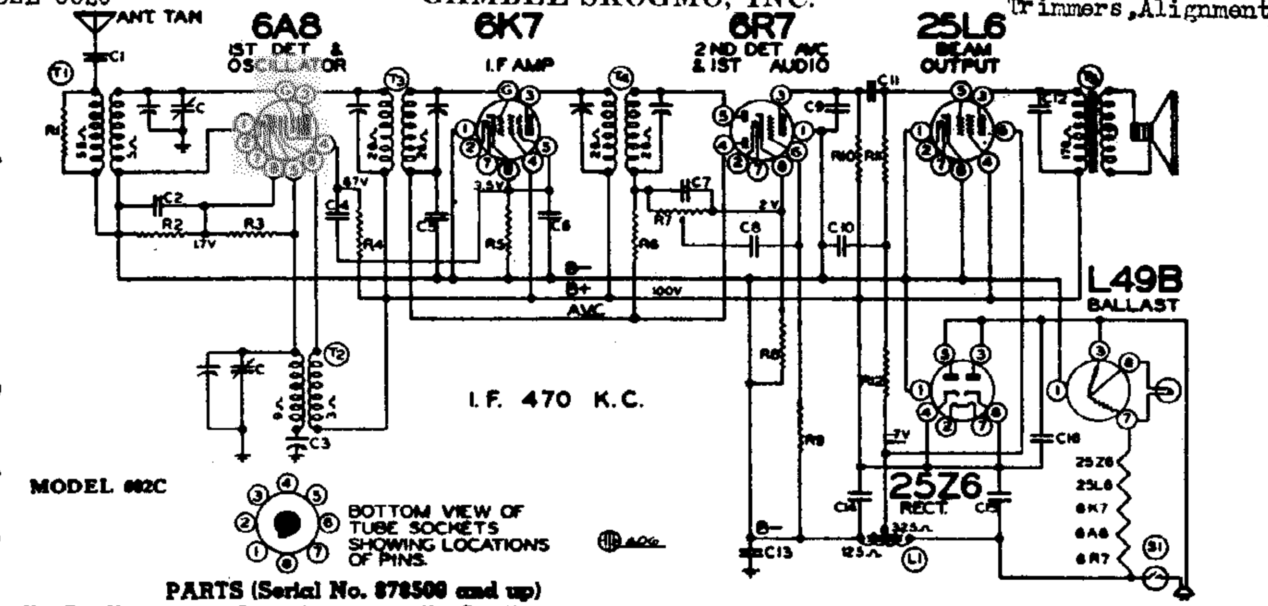
1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

MODEL 602B
MODEL 602C

GAMBLE-SKOGMO, INC.

Schematics, Socket Trimmers, Alignment

Frequency Range 535-1720 Kilocycles



MODEL 602C

PARTS (Serial No. 878500 and up)

No.	Part No.	Description	
		CONDENSERS	
C	102-55	2 Gang Variable Condenser	
C1	100-25	.002 x 600	25%
C2	100-22	.05 x 200	25%
C3	129-75	.0003386 Compression Type Condenser 1%	
C4	100-22	.05 x 200	25%
C5	100-9	.05 x 200	25%
C6	100-20	.1 x 200	25%
C7	129-21	.0002 Mica	20%
C8	100-11	.01 x 400	25%
C9	129-2	.0005 Mica	20%
C10	100-75	.22 x 200	10%
C11	100-10	.05 x 200	10%
C12	100-67	.025 x 400	25%
C13	100-53	.25 x 400	20%
C14	119-42	5. mfd. lytic 100 w. v.	
C15	119-42	20. mfd. lytic 100 w. v.	
C16	100-39	.1 x 400	20%
		RESISTORS	
R1	130-17	10M ohm — 1/3 w.	20%
R2	130-97	200 ohm — 1/3 w.	10%
R3	130-12	50M ohm — 1/3 w.	20%
R4	130-149	15M ohm — 1/3 w.	20%
R5	130-54	500 ohm — 1/3 w.	20%
R6	130-4	3 megohm — 1/3 w.	20%
R7	101-77	Volume Control (1 meg)	
R8	130-193	3M ohm — 1/3 w.	10%
R9	130-19	1 megohm — 1/3 w.	20%
R10	130-94	50M ohm — 1/3 w.	10%
R11	130-103	100M ohm — 1/3 w.	10%
R12	130-194	35M ohm — 1/3 w.	10%
		PARTS	
T1	111-79	Antenna Coil Complete	
T2	110-62	Oscillator Coil Complete	
T3	108-82B	Input I. F. Complete	
T4	108-83B	Output I. F. Complete	
T5	114-88	5" Dynamic Speaker	
L1		Speaker field 450 ohm— total tapped 125 ohm	
S1		Switch on volume control	

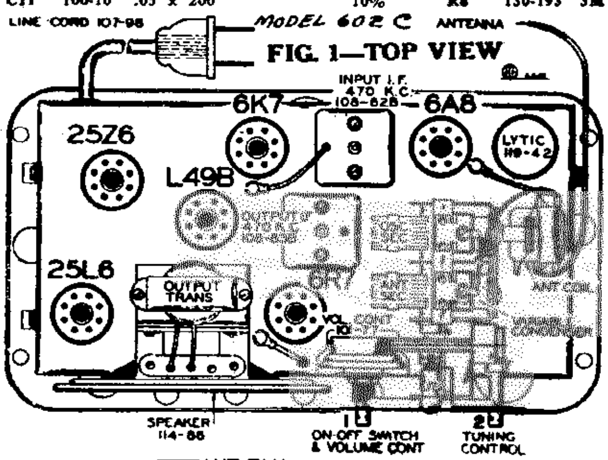


FIG. 1—TOP VIEW

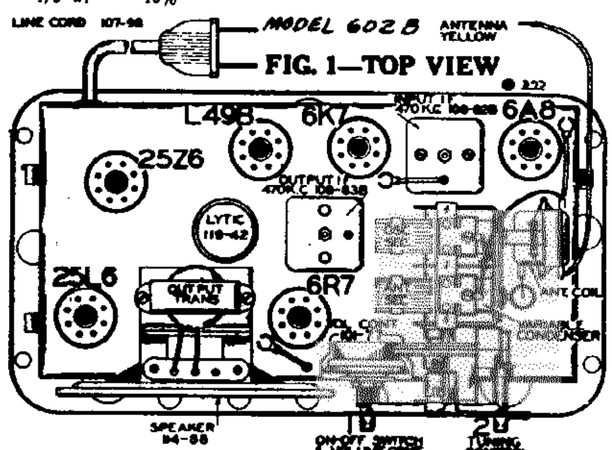
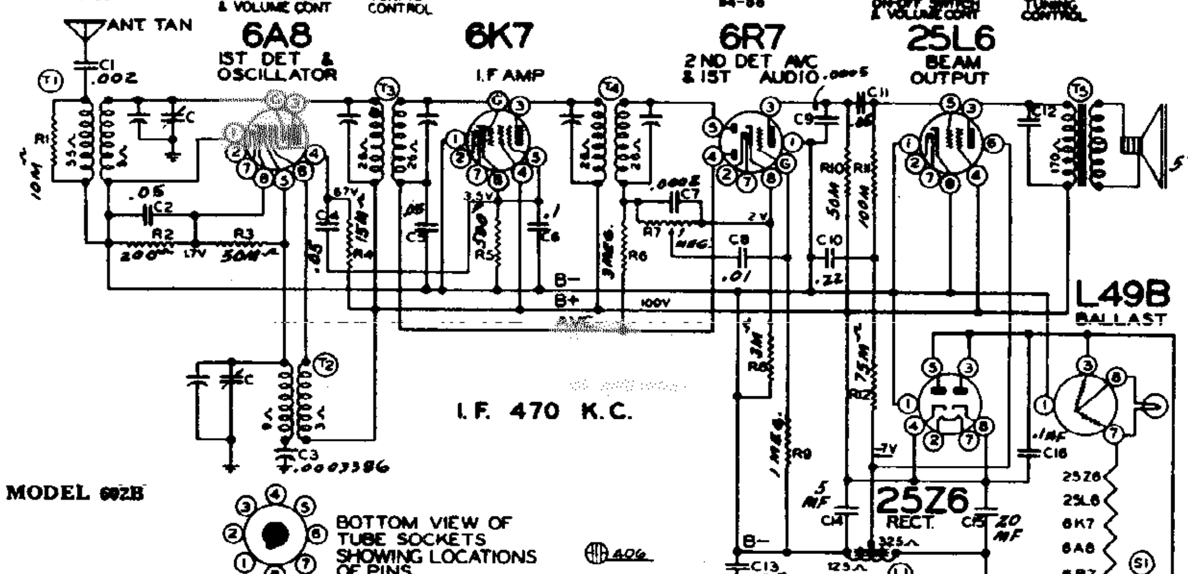


FIG. 1—TOP VIEW

ALIGNMENT FOR MODELS 602B and 602C THE SAME AS MODEL 602, EXCEPT I.F. ADJUSTMENT IS AT 470 KC
Range 535-1720 Kilocycles



MODEL 602B

Socket, Trimmers
Parts, Notes

GAMBLE-SKOGMO, INC.

MODEL 666
Schematic, Voltage

The tube complement consists of the latest "Metal-Glass" tubes which are interchangeable with metal tubes.

NOTE.

C3, C4, C9, C15, in one unit—part No. 116-18.
C5, C8, C10, C11, in one unit—part No. 116-17.
C12, C17, C19, in one unit—part No. 116-16.
C24, C25, in one unit—part No. 119-21.

T6	102-26	Three Gang Variable Condenser
T7	108-72	Output I.F. Coil—465 Kc.
T8	105-27	Output Transformer
T9	104-51	Power Transformer
L1	105-23	Filter Choke
L2	105-19	"A" Choke
L3	105-24	"A" Choke
L4	105-26	"A" Choke
L5	114-34	5¼" Speaker (Field Resistance—4 Ohms)
V	126-1	Vibrator

DESCRIPTION:

Model No. 666 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give *minimum* drift and variation of gain due to climatic changes.

The receiver is so designed that it may be used as either a single or two unit installation. Taps are provided on the output transformer to a pin jack terminal board, a red dot distinguishing dual speaker tap and green dot for single speaker operation.

For complete details see illustration and Header speaker data chart.

Dash kits for the remote control head are available for 1936 cars drilled for dash plates.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

CONDENSERS

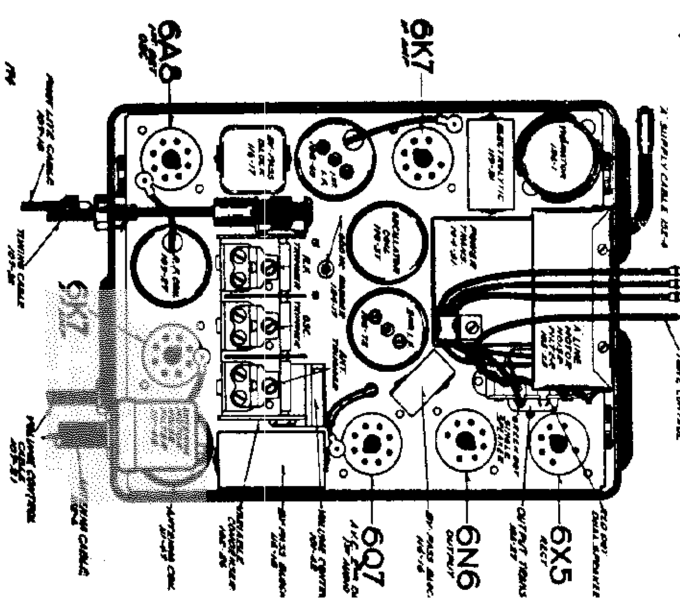
C		Spark Plate
C1	129-3	.00002 Mica - "O" - 20%
C2	129-49	.00009 Mica - "O" - 5%
C3	116-18	.05 x 200 Volt
C4	116-18	.25 x 200 Volt
C5	116-17	.05 x 200 Volt
C6	129-21	.0002 Mica - MT - "O" 20%
C7	124-17	Single Padder J-4-S
C8	116-17	.1 x 400 Volt
C9	116-18	.1 x 400 Volt
C10	116-17	.1 x 200 Volt
C11	116-17	.1 x 200 Volt
C12	116-16	.05 x 200 Volt
C13	129-5	.0001 Mica - MT - "O" - 20%
C14	129-2	.0005 Mica - MT - "O" - 20%
C15	116-18	.02 x 200 Volt
C16	129-5	.0001 Mica - MT - "O" - 20%
C17	116-16	.05 x 400 Volt
C18	100-37	.003 x 600 Volt - 10%
C19	116-16	.01 x 800 Volt
C20	100-35	.5 x 200 Volt - 50% - 10%
C21	100-35	.5 x 200 Volt - 50% - 10%
C22	100-35	.5 x 200 Volt - 50% - 10%
C23	100-36	.01 x 1400 Volt - 10%
C24	119-21	8.0 mfd. Lytic Cond. 350 Working Volts
C25	119-21	4.0 mfd. Lytic Cond. 350 Working Volts
C26		5.0 mmf. Gimmick

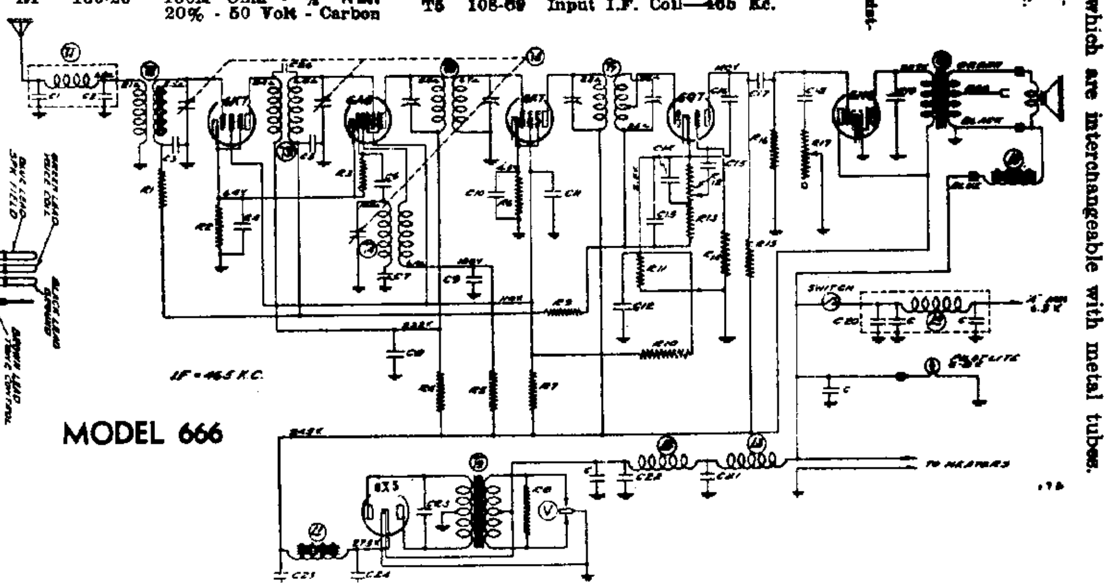
RESISTORS

R1	130-20	100M Ohm - ½ Watt 20% - 50 Volt - Carbon
R2	130-99	300 Ohm - ½ Watt - 20% - 10 Volt - Carbon
R3	130-94	50M Ohm - ¼ Watt - 10% - 10 Volt - Carbon
R4	130-98	1500 Ohm - ½ Watt - 20% - 25 Volt - Carbon
R5	130-42	20M Ohm - ½ Watt - 20% - 100 Volt - Carbon
R6	130-70	500 Ohm - ¼ Watt - 10% - 10 Volt - Carbon
R7	130-95	12M Ohm - 1.2 Watt - 10% - 100 Volt - Carbon
R8	130-97	200 Ohm - ½ Watt - 10% - 10 Volt - Carbon
R9	130-8	500M Ohm - ¼ Watt 20% - 100 Volt - Carbon
R10	130-108	40M Ohm - ½ Watt - 10% - 100 Volt - Carbon
R11	130-107	800 Ohm - ¼ Watt - 10% - 10 Volt - Carbon
R12	101-42	50M Ohm - Volume Control and Switch
R13	130-22	5M Ohm - ¼ Watt - 20% -10 Volt - Carbon
R14	130-68	1 Meg Ohm - ¼ Watt - 10% - 20 Volt - Carbon
R15	130-9	200M Ohm - ½ Watt - 20% - 20 Volt - Carbon
R16	130-3	500M Ohm - ½ Watt - 20% - 100 Volt - Carbon
R17	101-45	1 Meg Ohm - Tone Control

PARTS

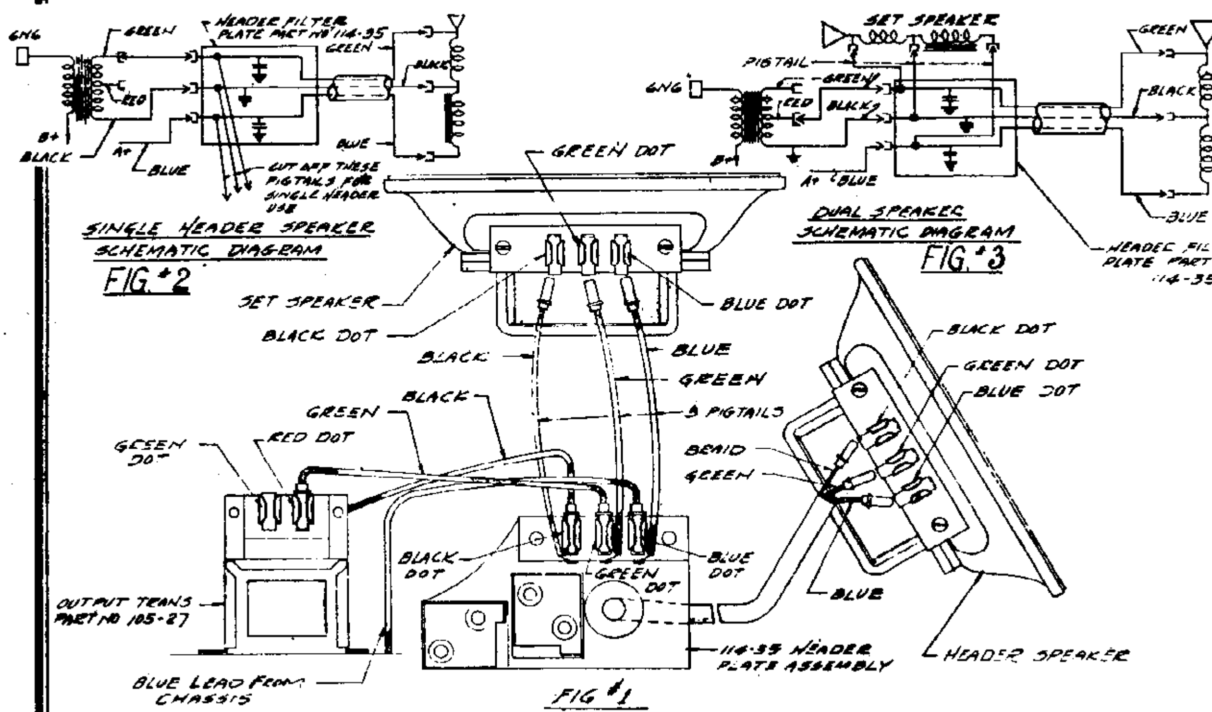
T1	111-46	Antenna Filter Coil Assembly
T2	111-47	Antenna Coil Assembly
T3	109-37	R.F. Coil Assembly
T4	110-37	Oscillator Coil Assembly
T5	108-69	Input I.F. Coil—465 Kc.





MODEL 666

GAMBLE-SKOGMO, INC.



DIAL ADJUSTMENT

Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then remove pilot light assembly from back of remote head and with a screw driver adjust the slotted screw through this opening and in this way adjust the dial pointer to the correct frequency setting.

SINGLE HEADER SPEAKER CONNECTIONS

Consult Fig. No. 1. On this application, all that is required is to remove speaker from receiver case and place in header board of car. Install the special seven foot shielded speaker cable and header filter plate assembly and insert the three leads (which formerly connected the radio to the speaker) to the pin jacks on the header filter plate assembly. Remove the three short pigtail leads from the header filter plate assembly, namely, black, green and blue. These leads are only used when dual (two) speakers are to be used, one in the header and the other in the receiver case.

DUAL SPEAKER CONNECTIONS

Consult Fig. No. 1. On this application, leave speaker in receiver case, install a complete header speaker in the header board of the automobile and assemble header filter plate assembly and seven foot shielded cable to front cover of receiver case.

The speaker leads from the radio are removed from the terminal board of the set speaker and plugged into the pin jacks of the header filter plate assembly, making certain to match the colors of the leads with the color dots on the pin jacks. The three short pigtail leads from the header filter plate assembly are then connected to the set speaker. Shift the green lead which runs to the output transformer (No. 105-27) to the pin jack with red dot for dual speaker operation.

For further explanation, consult Fig. No. 2 Single Header Speaker schematic diagram, and Fig. No. 3, Dual Speaker schematic diagram.

A more technical explanation of the manner of interconnecting the set speaker with the header speaker and header filter plate is that for dual speaker operation the two speakers are connected in parallel and for single header speaker operation, three pigtail leads from the header filter plate terminal assembly are cut off. All leads are color-coded and correspond to color dots on the pin jacks mounted on the speakers and the terminal board of the header filter plate assembly. A tapped output transformer is provided for impedance matching.

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. condenser connected in series with the output lead of the test oscillator.

I.F. ALIGNMENT

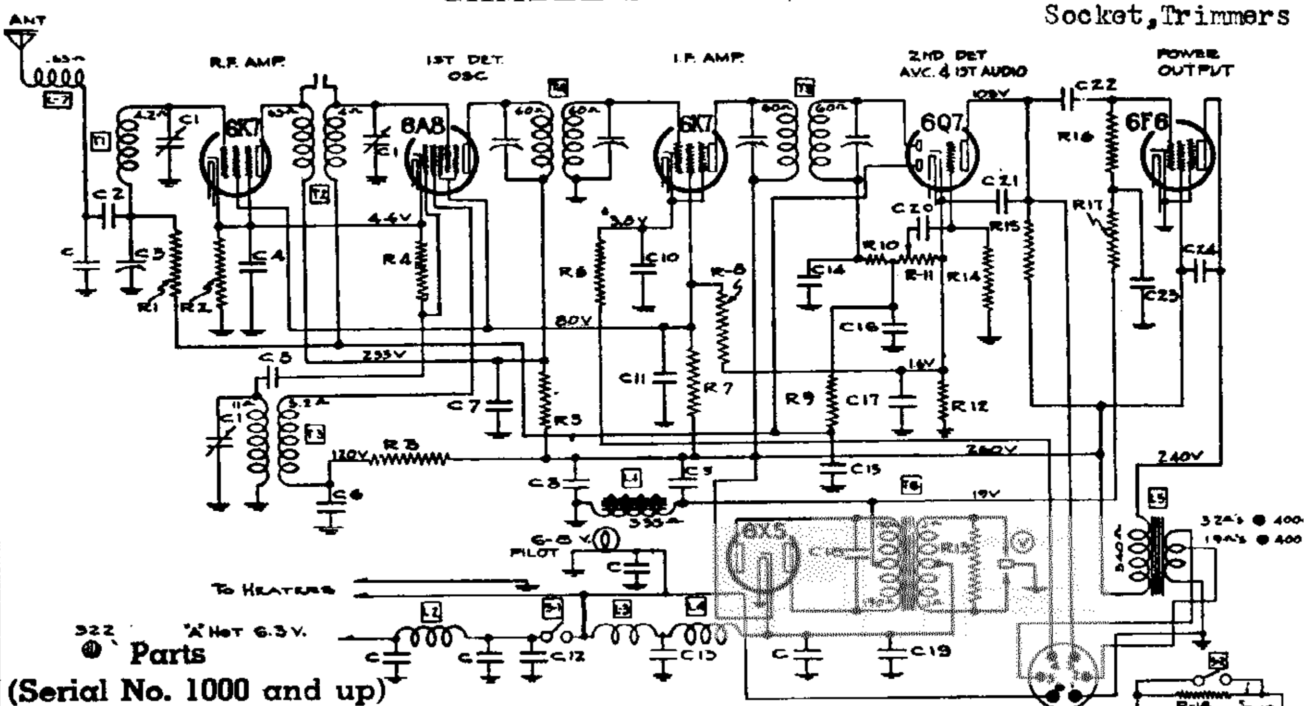
1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-72 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-69 to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view.
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 KC. Adjust series pad rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking

Alignment, Parts

GAMBLE SKOGMO, INC.



NOTE— I.F. FREQ 262.5 KC.
ALL VOLTAGES MEASURED FROM GROUND WITH A 1000 Ω/V VOLTMETER
* CATHODE of IF AMP TO GND 3.8V IN DISTANCE POSITION of LOCAL DISTANCE SWITCH, 7V IN LOCAL POSITION.

Parts
(Serial No. 1000 and up)

CONDENSERS

C		Spark Plate
C1	102-45	3 Gang Condenser
C2	129-73	.002 Mica - MW-W - 10%
C3	124-36	Series Pad
C4	116-20	.1 x 200 v. - 20%
C5	129-12	.00025 Mica - MT - 20%
C6	116-19	.1 x 400 - 20%
C7	116-19	.1 x 400 - 20%
C8	119-34	8. mfd. - 350 W v.
C9	119-34	4 mfd. 350 W v.
C10	116-19	.05 x 200 v. - 20%
C11	116-20	.25 x 200 v. - 20%
C12	100-31	.5 x 120 v. - 10-50% - Braid leads
C13	100-31	.5 x 120 v. - 10-50%
C14	129-5	.0001 Ceramicon - 20%
C15	116-19	.05 x 200 v. - 20%
C16	129-5	.0001 Ceramicon - 20%
C17	116-20	.02 x 200 - 20%
C18	100-36	.01 x 1400 v. - 20% - 10% "A"
C19	100-31	.5 x 120 v. - 10% - 50%
C20	116-20	.02 x 200 - 20%
C21	129-5	.0001 Mica - 20%
C22	100-55	.01 x 400 - 25%
C23	100-48	.25 x 200 - 20%
C24	100-54	.006 x 600 - 25%
C25	100-11	.01 x 400 - 25%

C4, C11, C17, C20 All in Block 116-20
C7, C6, C10, C15 All in Block 116-19

RESISTORS

R1	130-141	250M ohm - 1/3 w. Insulated
R2	130-54	500 ohm - 1/3 w.
R3	130-138	50M ohm - 1/2 w. Insulated
R4	130-52	50M ohm - 1/3 w.
R5	130-31	1500 ohm - 1/3 w.
R6	130-154	1000 ohm - 1/3 w. Insulated
R7	130-143	30M ohm - 1.2 w.
R8	130-139	40M ohm - 1/3 w. Insulated
R9	130-19	1 meg - 1/3 w.
R10	130-162	50M ohm - 1/3 w. Insulated
R11	101-73	250M ohm - Volume Control
R12	130-153	700 ohm - 1/3 w.
R13	130-84	200 ohm - 1/3 w.
R14	130-19	1 meg ohm - 1/3 w.
R15	130-11	250M ohm - 1/3 w.
R16	130-5	300M ohm - 1/3 w.
R17	130-11	250M ohm - 1/3 w.
R18	130-161	4000 ohm - 1/3 w. Insulated
R19	101-45	Tone Control 1 Meg ohm

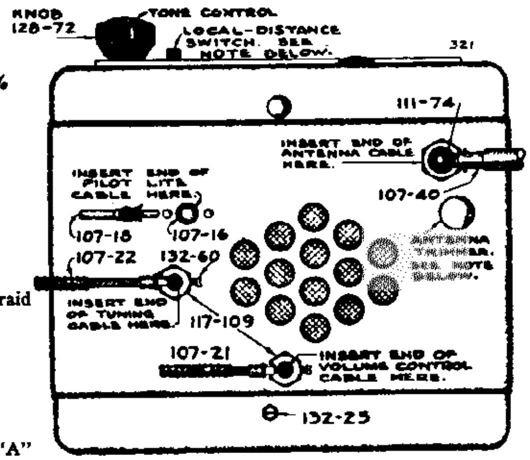


FIG. 1—SIDE VIEW

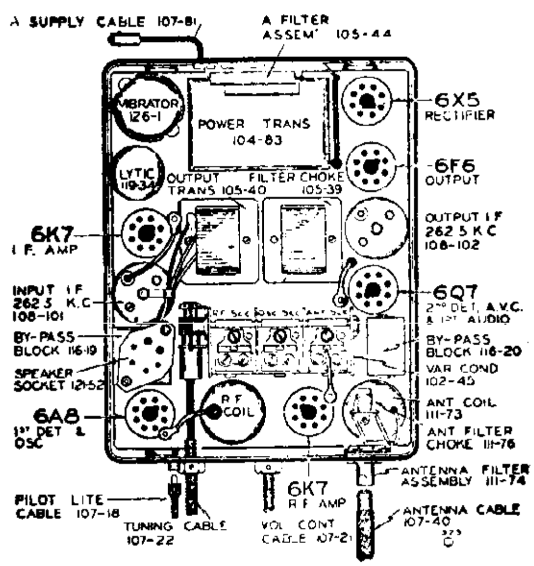


FIG. 2—TOP VIEW

I.F. ALIGNMENT - Adj at 262.5 KC thru .5 mf condenser

B.C. ALIGNMENT - Adj. osc. trim. thru 17 mmf cond. at 1500 KC.

Adj. RF & Ant. trim. at 1400 KC. - Pad at 600 KC.

SENSITIVITY - 1000 KC. CHECK

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME

MODELS 675A, 685B
MODEL 807B
Schematics, Alignment

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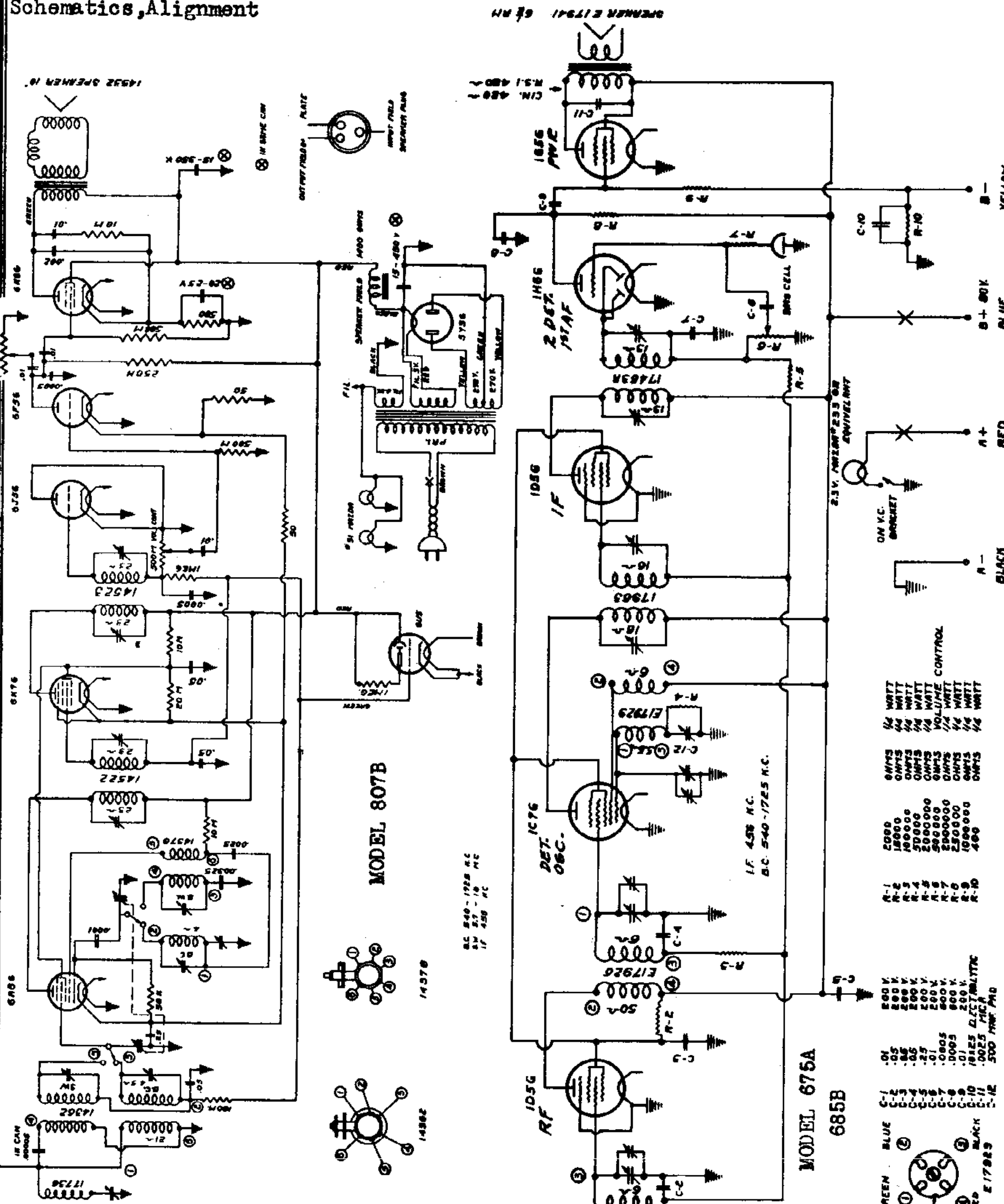


IF ALIGNMENT

ADJ. AT 456 KC thru .01 cond.

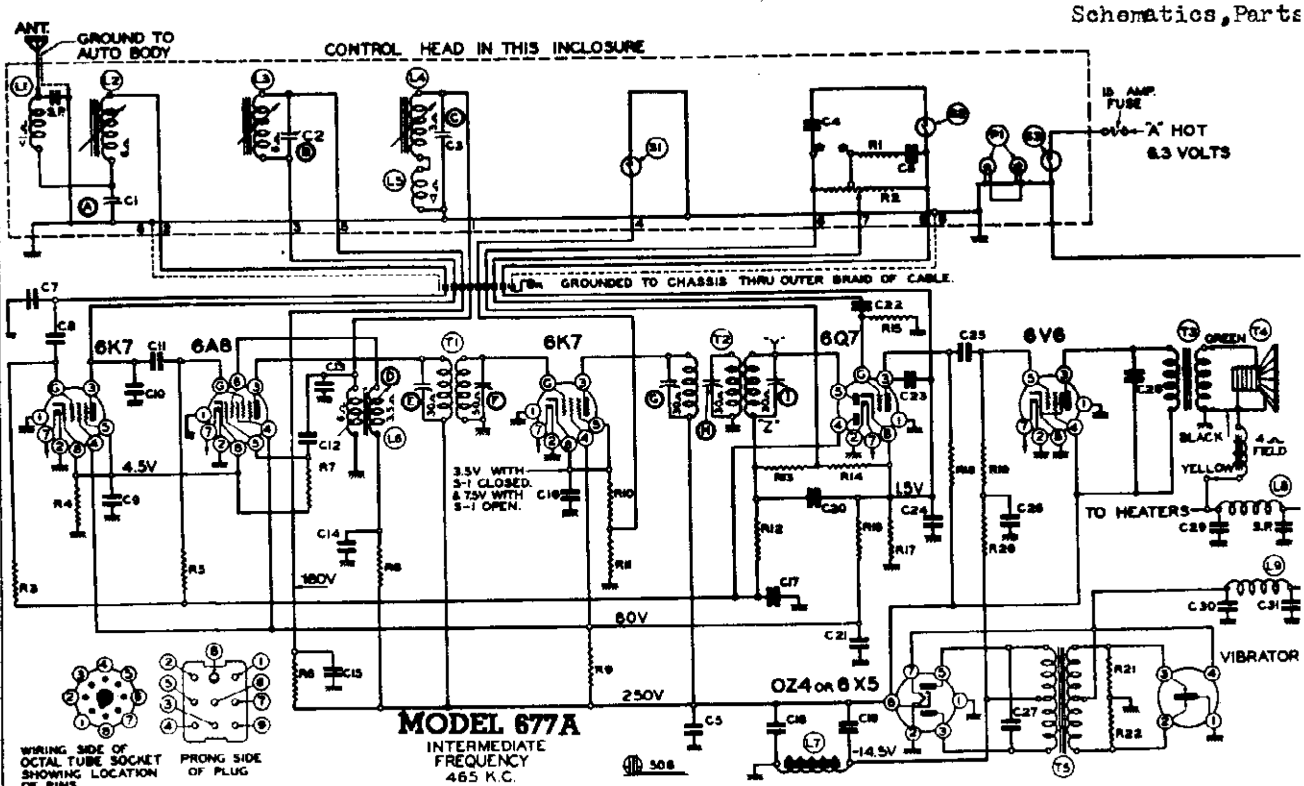
BROADCAST ALIGNMENT

ADJ. OSC. TRIMMER AT 1400 KC
THRU .00025 COND.
PAD AT 540 KC.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

MODEL 677A
MODEL 677B
Schematics, Parts

GAMBLE-SKOGMO, INC.



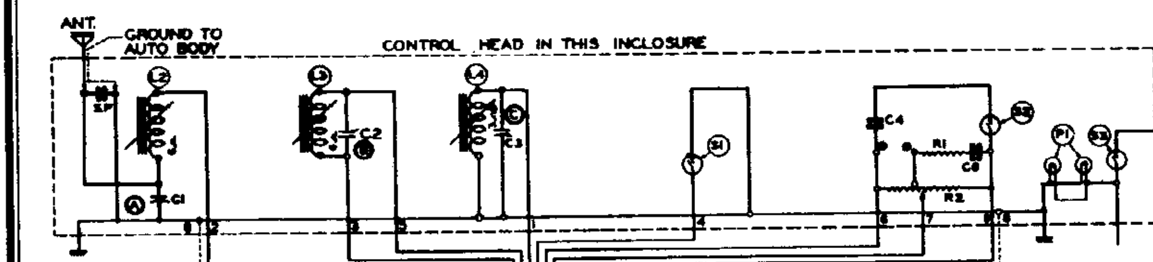
MODEL 677A
INTERMEDIATE FREQUENCY 465 K.C.

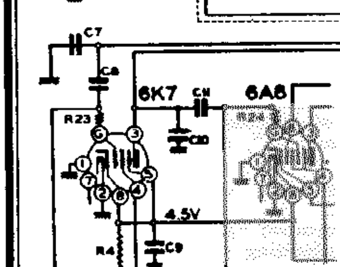
PARTS (Serial No. 30,001 and up)

Code	Part No.	Description
		CONDENSERS
C1	124-45	Antenna trimmer 50 - 450 w. c. 350 mmf.
C2	127-82	R. F. Trimmer - 5-30 mmf.
C3	127-84	Oscillator Trimmer 5 - 30 mmf.
C4	100-25	.002 x 600 v. - 25%
C5	100-74	.1 x 400 v. 50 - 10%
C6	100-19	.006 x 600 v. - 25%
C7	129-95	.00015 Mica 2½%
C8	129-39	.00005 Mica 20%
C9	100-22	.05 x 200 v. 25%
C10	129-96	.000035 Mica 5%
C11	129-2	.0005 Mica 20%
C12	129-12	.00025 Mica 20%
C13	129-97	.00005 Mica 5%
C14	100-13	.05 x 400 v. 25%
C15	116-24	By pass block .25 x 400 v. 20-10%
C16	100-9	.05 x 200 v. 25%
C17	100-22	.05 x 200 v. 25%
C18	119-51	8.0 mfd. 350 w.v. lytic
C19	119-51	8.0 mfd. 350 w.v. lytic
C20	129-5	.0001 Mica 20%
C22	100-11	.01 x 400 v. 25%
C21	116-24	.25 x 400 v. 20-10% By pass block
C23	129-5	.0001 Mica 20%
C24	100-26	.02 x 400 v. 25%
C25	100-11	.01 x 400 v. 25%
C26	116-24	.25 x 200 v. 20-10%
C27	100-23	.01 x 1400 v. 20-10%
C28	100-38	.01 x 800 v. 10%
C29	129-6	.002 Mica 20%
C30	100-31	.5 x 120 v. 50-10%
C31	100-31	.5 x 120 v. 50-10%
SP		Spark Plates (2)

C15, C21 and C26 in same unit
C18 and C19 in same unit

Code	Part No.	Description
		RESISTORS
R1	130-214	30M - ½ w. 20%
R2	101-109	1.2 meg. volume control
R3	130-19	1 megohm - ⅓ w. 20%
R4	130-79	400 ohm - ⅓ w. 10%
R5	130-19	1 megohm - ⅓ w. 20%
R6	130-21	20M ohm - ⅓ w. 20%
R7	130-12	50M ohm - ⅓ w. 20%
R8	130-12	50M ohm - ⅓ w. 20%
R9	130-65	30M ohm - 1 watt 20%
R10	130-39	700 ohm - ⅓ w. 20%
R11	130-85	3M ohm - ⅓ w. 20%
R12	130-19	1 megohm - ⅓ w. 20%
R13	130-20	100M ohm - ⅓ w. 20%
R14	130-118	600M ohm - ⅓ w. 20%
R15	130-19	1 megohm - ⅓ w. 20%
R16	130-208	40M ohm - ⅓ w. 20%
R17	130-101	600 ohm - ⅓ w. 10%
R18	130-11	250M ohm - ⅓ w. 20%
R19	130-5	300M ohm - ⅓ w. 20%
R20	130-11	250M ohm - ⅓ w. 20%
R21	130-56	100 ohm - ⅓ w. 20%
R22	130-56	100 ohm - ⅓ w. 20%
		PARTS
L1	111-96	Antenna Choke (No. 111-97)
L2	111-96	Antenna permeability coil complete
L3	109-40	R. F. Permeability coil complete
L4	110-77	Oscillator permeability coil complete
L5	110-77	Oscillator series coil (No. 110-79)
L6	110-75	Oscillator shunt coil Adj.
L7	105-62	Filter Choke - 250 ohms
L8	105-66	"A" Choke
L9	105-65	"A" Choke
T1	108-96C	Input I. F. Complete - 465 kc.
T2	108-115	Output I. F. Complete - 465 kc.
T3	105-61	Output Transformer
T4	114-113	8" Dynamic speaker
T5	104-132	Power Transformer
S1	125-47	Sensitivity switch
S2	125-47	Tone control switch
S3		Off-on switch on volume control
P1	107-97	6-8 v. pilot light (2)





PARTIAL SCHEMATIC SHOWING DIFFERENCES BETWEEN MODELS 677 A and 677B. (For balance of schematic refer to diagram Model 677A above).

MODEL 677 B

PARTS (Serial No. 42,000 and up)

Code	Part No.	Description
		CONDENSERS
C5	100-88	.1 x 400 v. 50 - 10%
C13	129-181	.00007 Mica 5%
C27	100-36	.01 x 1400 v. 20-10%
C28	100-89	.008 x 800 v. 10%
		RESISTORS
R23	130-54	500 ohm - ⅓ w. 20%
R24	130-54	500 ohm - ⅓ w. 20%
		PARTS
L2	111-100	Antenna permeability coil complete
L3	109-40	R. F. Permeability coil complete
L4	110-84	Oscillator permeability coil complete
L6	110-75	Oscillator shunt coil Adj.

For parts not listed, see parts, Model 677A (above).

MODEL 677A
MODEL 677B
Alignment, Socket, Trimmers
Automatic Tuner Procedure

MODEL 527A
Tuner Procedure

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected. (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now Rotate the turning knob (No. 2) to the left (counter clockwise) as far as it will turn, and tighten the special reset lock screw ("C") located on left side of remote turner unit. (See Fig. 2).

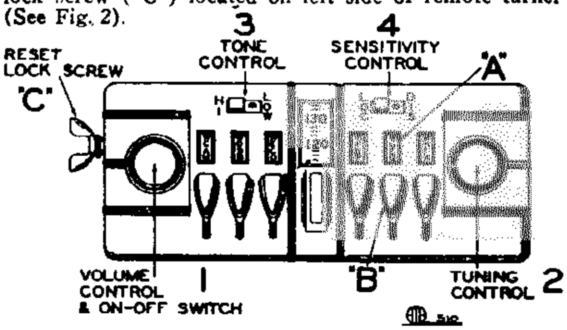


Fig. 2—Front View of Remote Tuner Unit

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Reset lock screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" one or two turns; select the new station as explained. **Be sure to retighten the locking screw,** otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and Presto!—your favorite station is selected.

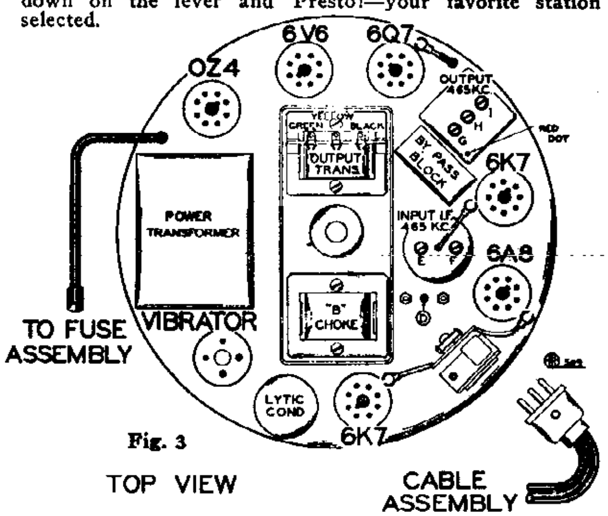


Fig. 3

I.F. ALIGNMENT: (465 K.C.)

IMPORTANT:
To align the output I.F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the tertiary coil of this unit.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The white lead with green tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point. Proceed as follows:

1. With the dial of the Remote Tuner Unit set at 1400 K.C. and with volume control full on, connect test oscillator

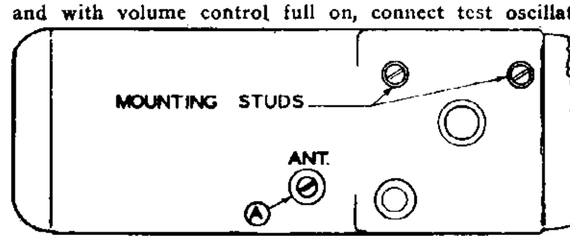
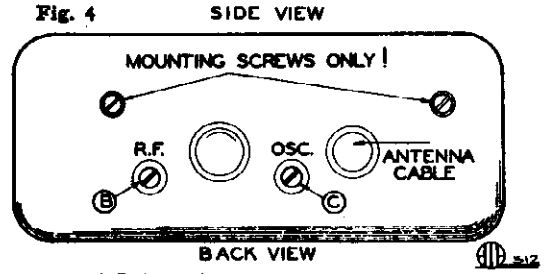


Fig. 4 SIDE VIEW



BACK VIEW

set at 465 K.C. in series with I.F. dummy to grid of 6K7 I.F. tube. (.5 MF COND.)

2. Adjust trimmers "G" and "H" of output I.F. transformer for maximum gain, (See Fig. 3, top view).
3. Disconnect the 10M ohm resistor which has been shunted across the tertiary winding and adjust trimmer "I" for maximum gain.
   - (a) This transformer is now correctly tuned. Under no circumstances re-adjust trimmers "G" and "H" after the 10M ohm resistor has been removed.
   - (b) For alignment of the output I.F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used and the procedure is similar to the alignment of any two circuit I.F. transformer; merely tune for a symmetrical curve of maximum amplitude.
   - (c) Output connections for the cathode ray oscillograph should be made to pin No. 8 on 6Q7 tube socket and to the end terminal on the terminal strip; at this point the diode load resistors terminate.
4. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers "E" and "F" of input I.F. transformer for maximum gain.

NOTE: A red dot on top of output I.F. can designates location of trimmer "G"

BROADCAST ALIGNMENT:

1. With the dial on the Remote Tuner Unit set at 1560 K. C., connect test oscillator set at 1560 K. C. in series with broadcast dummy to the antenna lead of receiver. (175 MMF COND)
2. Adjust oscillator trimmer (adjustment "C", on back of Remote Tuner Unit) to resonance. (See Fig. 4, back view).
3. Re-set test oscillator to 1400 K.C. and pick up signal by rotating dial on Remote Tuner Unit. Adjust R. F. trimmer (adjustment "B", on back of Remote Tuner Unit), and Antenna Trimmer (adjusment "A", on side of Remote Tuner Unit), to resonance.
4. Re-set test oscillator to 600 K.C. and rotate Remote Tuner Unit dial to 600 K. C.
   Adjust shunt oscillator adjustment "D", rotating dial to and fro at the same time adjusting shunt oscillator for maximum gain. This adjustment is accessible from the top of the radio chassis, (See Fig. 3, top view).
5. Go back and check 1400 K. C. If adjustment is made here, check 600 K. C again.

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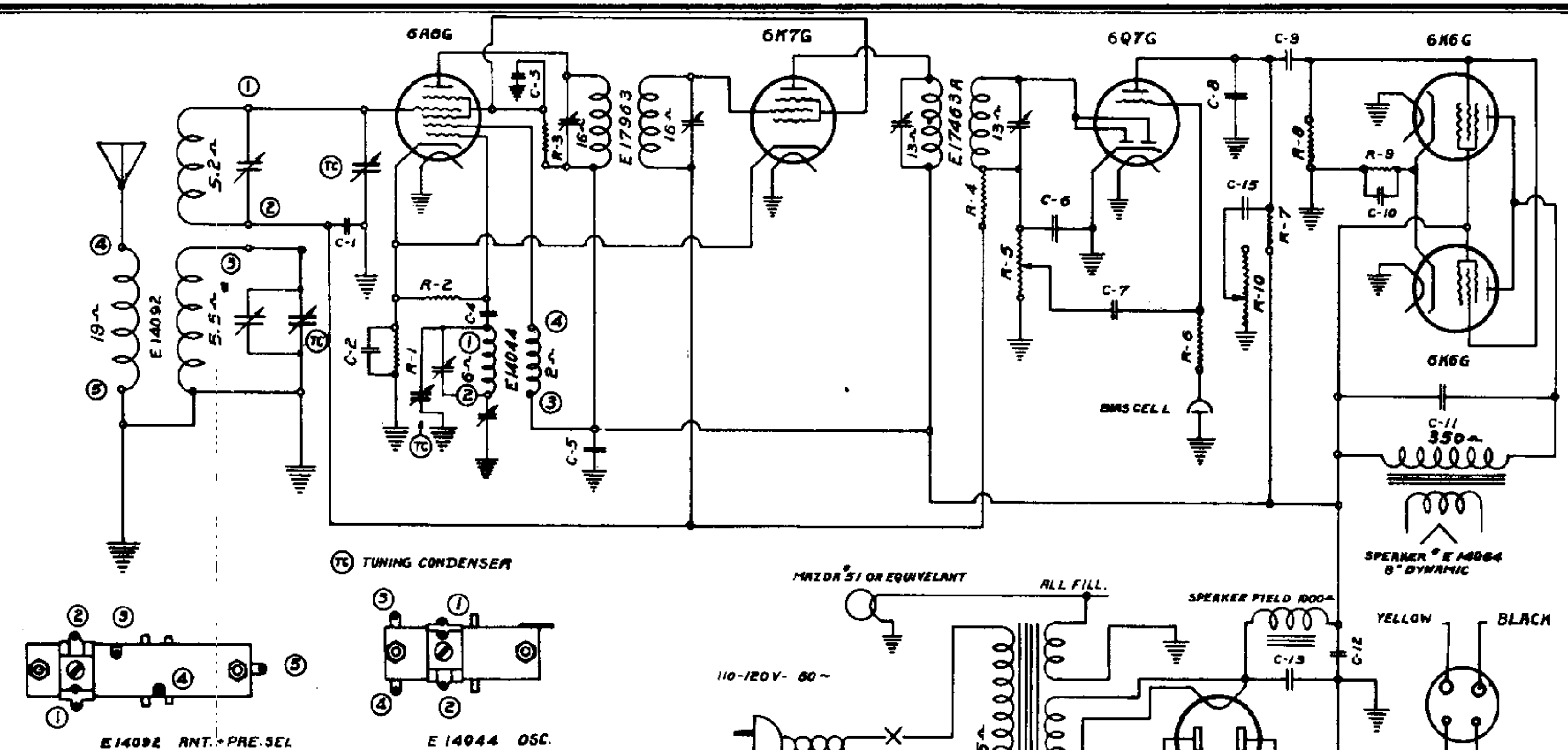

C-1	.05	200 V.
C-2	.25	150 V.
C-3	.05	400 V.
C-4	.0001	MICA.
C-5	.1	400 V.
C-6	.0005	600 V.
C-7	.01	200 V.
C-8	.0005	600 V.
C-9	.01	400 V.
C-10	10	MFD. 25V.
C-11	.005	600 V.
C-12	16	MFD. 250V.
C-13	16	MFD. 350V.
C-14	.05	400V.
C-15	.01	400V.

C-10 ~ C-12 ~ C-13 ALL IN SAME CAN

R-1	200	OHM	1/4 WATT.
R-2	50000	OHM	1/4 WATT.
R-3	30000	OHM	1 WATT.
R-4	1000000	OHM	1/4 WATT.
R-5	500000	VOLUME CONTROL	
R-6	500000	OHM	1/4 WATT.
R-7	350000	OHM	1/4 WATT.
R-8	500000	OHM	1/4 WATT.
R-9	300	OHM	1 1/2 WATT.
R-10	100000	TONE CONTROL	

I.F. 456 K.C.
B.C. 540-1725 K.C.

TUBE FUNCTIONS: "6A8G" First detector - oscillator, "6K7G" Intermediate amplifier, "6Q7G" Second detector and first audio, two "6K6G" as parallel power tubes, "5Y3G" rectifier.

IF ALIGNMENT: Connect signal generator to grid of 6A8G tube, through a .01 condenser, leave grid cap in place and turn tuning condenser open - peak IF transformers at 456 KC.

BROADCAST ALIGNMENT: Check pointer setting - should reach end of scale with condenser closed - may be changed slightly by loosening set screw on lower pulley and slipping pulley around on tuning shaft. Connect signal generator to antenna terminal through .00025 condenser. Trim oscillator at 1400 KC-- this trimmer is reached through hole in top of chassis to the right of antenna coil. Pad at 540 KC, recheck at 1400, and trim preselector trimmer on coil on top of chassis, and antenna trimmer on gang condenser at 1400 KC. Use as low output from generator as possible for final adjustments and it is best to use an output meter connected across speaker to indicate "peak".

MODEL 715B
Schematic
Alignment

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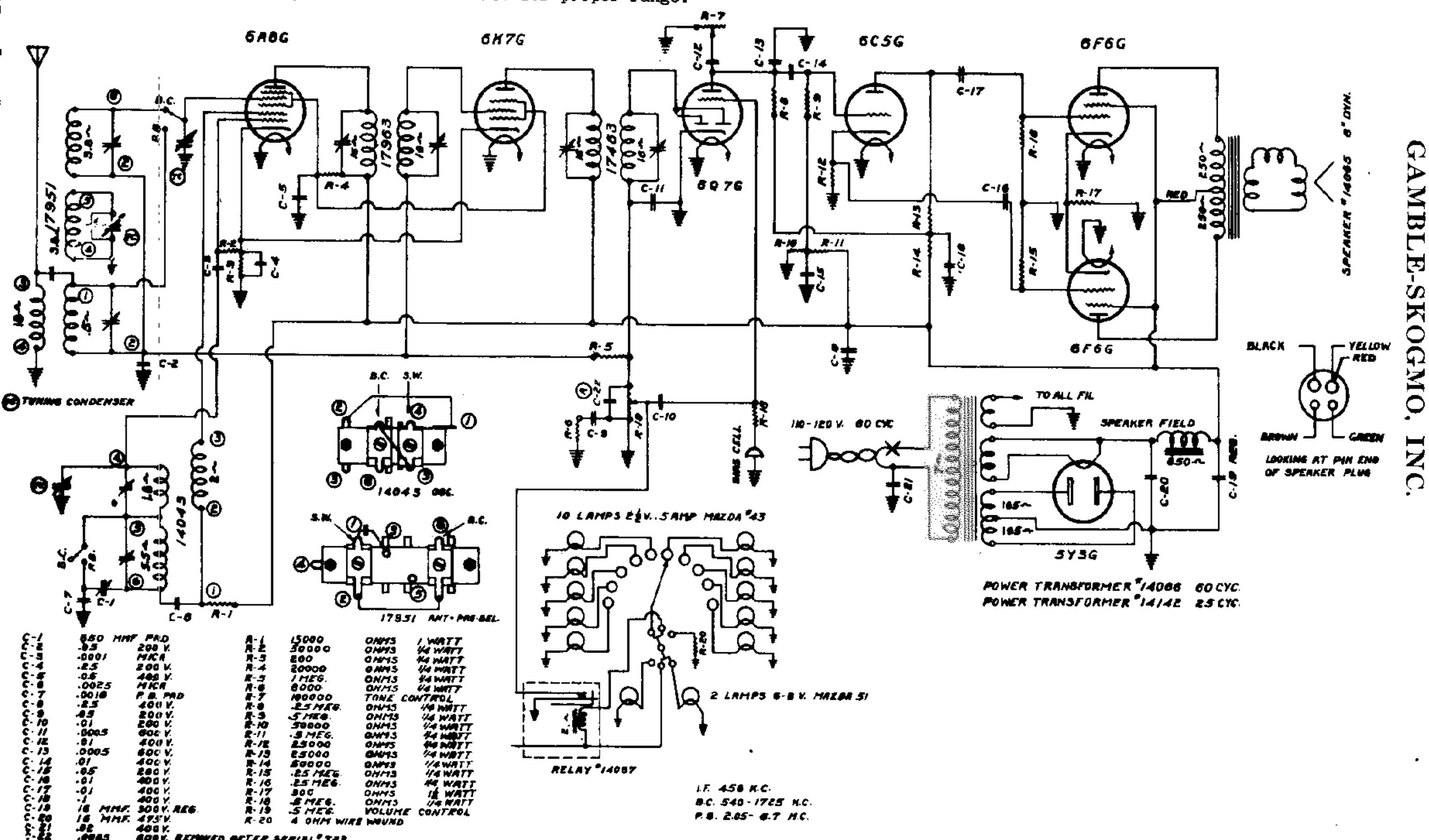
IF ALIGNMENT: Connect signal generator to grid of 6A8G tube, through a .01 condenser, leave grid cap in place and turn tuning condenser open - peak IF transformers at 456 KC.

BROADCAST ALIGNMENT: Connect signal generator to antenna terminal through a .00025 condenser. Trim oscillator at 1400 KC (see picture of coil on circuit diagram for location of trimmer). Adjust padder condenser at 540 KC, recheck at 1400 KC, then peak antenna and preselector trimmers at 1400 KC. (See picture on diagram for location of antenna trimmer, preselector trimmer is on gang condenser.)

SHORT WAVE ALIGNMENT: Connect signal generator to antenna terminal through a 300 or 400 ohm resistor. Be sure wave switch is to the "left". Trim SW oscillator at 6 MC., also SW antenna coil at same frequency. The SW pad condenser is fixed for proper range.



C-1	550 MMF PAD		
C-2	.05	200 V.	
C-3	.0001	MICA	
C-4	.25	200 V.	
C-5	.05	400 V.	
C-6	.0025	MICA	
C-7	.0018	P.B. PAD	
C-8	.25	400 V.	
C-9	.05	200 V.	
C-10	.01	200 V.	
C-11	.0005	600 V.	
C-12	.01	400 V.	
C-13	.0005	600 V.	
C-14	.01	400 V.	
C-15	.05	200 V.	
C-16	.01	400 V.	
C-17	.01	400 V.	
C-18	.1	400 V.	
C-19	16 MMF.	300 V. REG.	
C-20	16 MMF.	475 V.	
C-21	.02	400 V.	
C-22	.0085	600 V.	REMOVED AFTER SERIAL #723

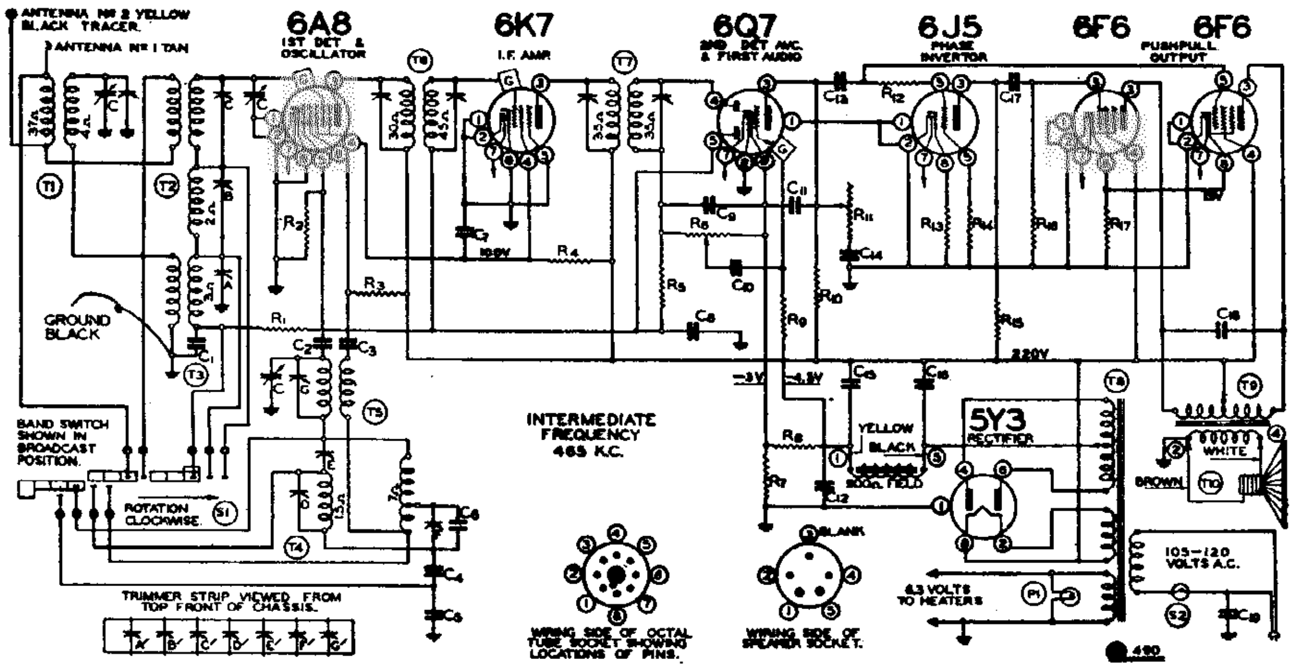
R-1	15000	OHMS	1 WATT
R-2	30000	OHMS	1/4 WATT
R-3	200	OHMS	1/4 WATT
R-4	20000	OHMS	1/4 WATT
R-5	1 MEG.	OHMS	1/4 WATT
R-6	8000	OHMS	1/4 WATT
R-7	100000	TONE CONTROL	
R-8	.25 MEG.	OHMS	1/4 WATT
R-9	.5 MEG.	OHMS	1/4 WATT
R-10	50000	OHMS	1/4 WATT
R-11	.5 MEG.	OHMS	1/4 WATT
R-12	25000	OHMS	1/4 WATT
R-13	25000	OHMS	1/4 WATT
R-14	50000	OHMS	1/4 WATT
R-15	.25 MEG.	OHMS	1/4 WATT
R-16	.25 MEG.	OHMS	1/4 WATT
R-17	300	OHMS	1/2 WATT
R-18	.5 MEG.	OHMS	1/4 WATT
R-19	.5 MEG.	VOLUME CONTROL	
R-20	4 OHM WIRE WOUND		

TUBE FUNCTIONS & CIRCUIT: "6A8G" First detector - oscillator, "6K7G" Intermediate amplifier, "6Q7G" Second detector and first audio, "6C5G" Phase inverter, two "6F6G" as push-pull power tubes, "5Y3G" Rectifier.

MODEL 761A
Schematic, Voltage
Socket, Trimmers

GAMBLE-SKOGMO, INC.

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Lower Scale	540 to 1750 K.C. (Kilocycles)
Middle Wave	Upper Scale	1730 to 5000 K.C. (Kilocycles)
Short Wave	Center Scale	5.5 to 18.1 M.C. (Megacycles)



MODEL 761 A

PARTS (Serial No. 8A973750 and up)

Code No.	Part No.	Description
		RESISTORS
R1	130-103	100M ohm - 1/3 w. 10%
R2	130-12	50M ohm - 1/3 w. 20%
R3	130-123	15M ohm - 1/2 w. 10%
R4	130-196	30M ohm - 1 w. 10%
R5	130-4	3 megohm - 1/3 w. 20%
R6	101-104	1 megohm volume control
R7	130-198	40 ohm - 1/2 w. 10%
R8	130-197	20 ohm - 1/3 w. 10%
R9	130-4	3 megohm - 1/3 w. 20%
R10	130-103	100M ohm - 1/3 w. 10%
R11	101-105	300M ohm - tone control
R12	130-163	400M ohm - 1/3 w. 10%
R13	130-22	5M ohm - 1/3 w. 20%
R14	130-103	100M ohm - 1/3 w. 10%
R15	130-12	50M ohm - 1/3 w. 20%
R16	130-102	500M ohm - 1/3 w. 10%
R17	130-195	250 ohm - 1.2 w. 10%
		CONDENSERS
C	102-62	3 gang variable
C1	100-22	.05 x 200 v. 25%
C2	129-67	.00004 Mica 10%
C3	100-25	.002 x 600 v. 25%
C4	129-83	.0027 Mica 2-1/2%
C5	129-84	.003 Mica 2-1/2%
C6	129-88	.0006 Mica 5%

Code No.	Part No.	Description
C7	100-39	.1 x 400 v. 20%
C8	100-26	.02 x 400 v. 25%
C9	129-5	.0001 Mica 20%
C10	100-26	.02 x 400 v. 25%
C11	129-2	.0005 Mica 20%
C12	100-20	.1 x 200 v. 25%
C13	100-26	.02 x 400 v. 25%
C14	100-57	.006 x 600 v. + 10 - 20%
C15	103-14	16 mfd. lytic 275 w.v. Reg.
C16	103-6	8 mfd. lytic 350 w.v.
C17	100-26	.02 x 400 v. 25%
C18	100-37	.003 x 600 v. 10%
C19	100-61	.02 x 600 v. bakelite 20%

FOR ALIGNMENT AND TUNER DATA SEE INDEX

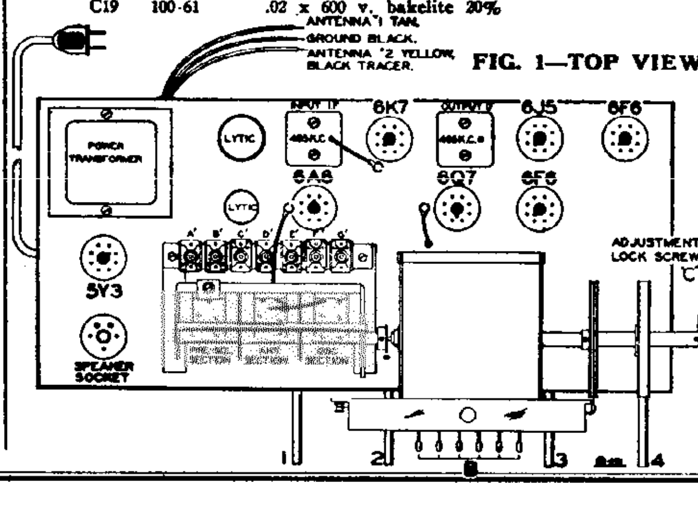


FIG. 1—TOP VIEW

NOS. 9, 10, & 11 — 17 BUTTON TELEPHONE DIAL

NOS. 3 & 7 — PHANTOM LIGHT DIAL

APRIL, 1937

Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.

No. 11 Dial—Same as No. 9 Dial except push buttons are brown.

No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in escutcheon ring. Equipped with visible tone and volume indicators.

No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.

No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.

Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on an assembly attached at the front of the chassis. An examination of this assembly will clearly show the method of operation.

Silencer Circuit. A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

Telephone Dial Adjustments

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

If Noise Occurs on All Buttons—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to insure a good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

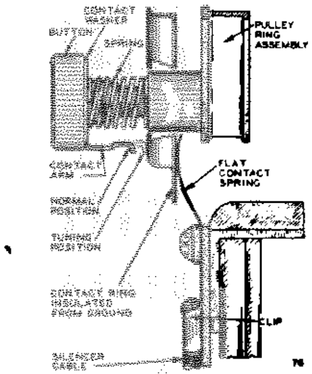


Fig. 1—Silencer Assembly

If Noise Occurs on One Button Only—This is due to a poor contact between the pulley ring stud, spring, contact washer, and contact ring—See Fig. 1. Clean all of these items of the particular button, in the same manner as mentioned previously, so as to provide a good electrical connection.

Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord tension pulley. Loosen the tension pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not completely open or close. The travel of the rotor in this respect is controlled by the gang stop pin on the pulley ring—See Fig. 4. This is necessary to protect the gang condenser in case the telephone dial is swung rapidly to either of the extreme positions. When the gang stop pin is properly set, it will serve as the stop at both extreme positions. If the rotor is seen to open completely or close completely, the stop pin should be pulled back and re-set to overcome this condition.

Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

Telephone Dial Replacements

Replacing Complete Dial and Condenser Assembly

Remove the grid lead clip from tube grid cap.

Remove silencer cable from the contact spring assembly. Unsolder dial lamp lead from terminal of tube socket.

Unsolder the three stator section connections of the gang condenser. Unsolder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a cotter pin. Remove only the cotter pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushions slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the procedure as given above.

Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from prong of the tube socket. Pull this lead through and out to the front of the assembly.

Remove the four escutcheon screws which hold the escutcheon ring and glass crystal in place. The

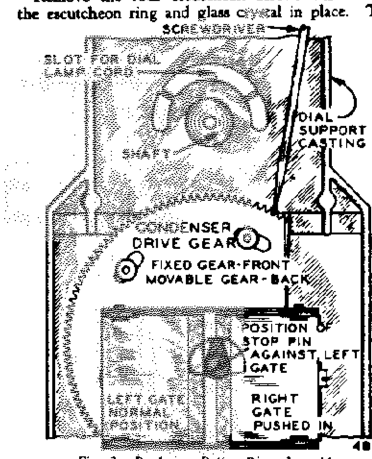


Fig. 2—Replacing Pulley Ring Assembly

dial scale pointer is removed by unhooking it from the center stud. Unscrew and remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin (Fig. 2) is directly in back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the center position —See Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—See. Fig. 2.

Place the pulley ring assembly on the shaft with the knot of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the pulley ring gear and through the long slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) ½ revolution until the stop pin passes over the right gate and comes to rest against the left gate—See Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the *fixed gear only* (front) of the condenser drive gear assembly. Hold the pulley ring assembly and with a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—See Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, lay the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button spacer ring. Center the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

Replace the drive cord as explained in the article "Replacing Drive Cord."

Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in the article "Replacing Pulley and Button Ring Assembly."

The stop gate assembly is then removed by taking out the two screws at the bottom of the assembly

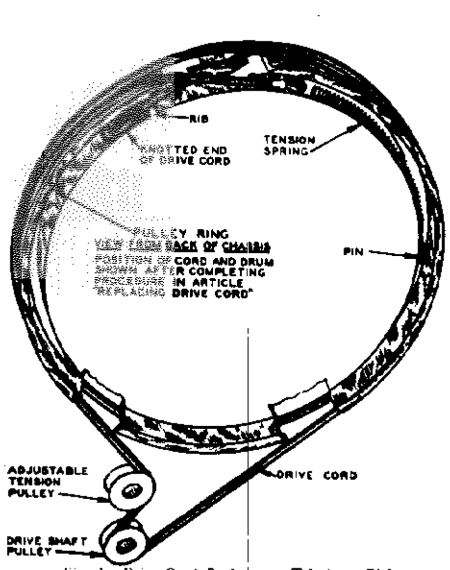


Fig. 3—Drive Cord Replacement—Telephone Dial

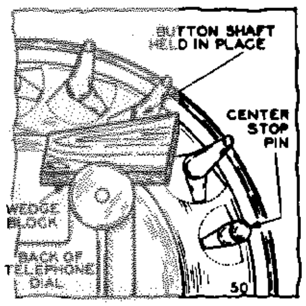


Fig. 4—Holding a Push Button Shaft in Place

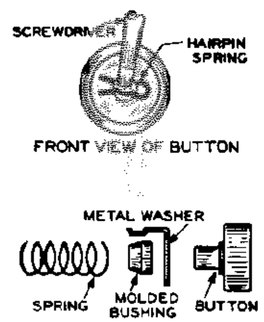


Fig. 5—Putting a Hair Spring on a Push Button Shaft

Replacing a Telephone Dial Button or Button Shaft

A telephone dial button or button shaft may be replaced without removing the chassis from the cabinet.

Rotate the dial until the button shaft to be replaced is in the position shown in Fig. 4. Using a wooden wedge block or any other wedge, hold this button shaft in place as shown. Remove the clear celluloid disc and the call letter disc with the point of a pin from the button of the shaft to be replaced (No. 10 dial—brown opaque celluloid disc only).

Remove the hairpin spring from the front of this shaft, spreading it with an ice pick or screwdriver. Take off the button, metal washer, molded bushing, and spring. Take out the wedge block, remove the button shaft to be replaced from the back of the dial assembly and put in the new one. Then put the wedge block back in place again as illustrated.

Lay the cabinet back down against a chair so that it will be about 30 degrees from the vertical position.

Assemble the spring, molded bushing, metal washer, and button in the order shown in Fig. 5. (Last three items may be in one unit). Push the button and spring assembly over the button shaft with the tab of the metal washer in the normal position—See illustration in instruction book. Hold the tab and rotate the button until the flat in the shank coincides with the flat on the shaft. Push the button all of the way on.

Put the hairpin spring in place, as shown in Fig. 5, with the upper part of the slot near the end of the button shaft and the lower part over the end of the shaft. Place the blade of a screwdriver at the center of the lower part of the spring and push down until the spring snaps into place in the slot on the shaft. Remove the wedge block.

Phantom Light Dial - Replacing Drive Cord

Remove the dial assembly as follows: Take out the screw which secures the dial frame brace to the back of the gang condenser. Take out the two screws which secure the brackets on the bottom of the dial frame to the chassis. Lay the dial assembly face down in front of the chassis—it is not necessary to remove the volume control and tone control indicator cords.

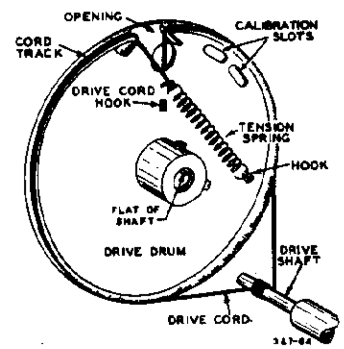


Fig. 6—Drive Cord Replacement, Phantom Light Dial

Remove the phantom light assembly from the drive drum by taking out the screw.

Take off the old cord and tension spring. Tie a knot with a small loop in it in one end of the new cord. Then tie the other end of this cord to the hook on the tension spring. The distance from the loop on one end to the tension spring is 17¼ inches.

From the front of the chassis, place the looped end of the cord through the drum hole located near the cord track opening, and hook it over the hook provided for it at the back of the drum.

Bring the cord up and around the right side of the drum, keeping the cord in the grooved track of the drum.

Bring the cord down to the right side of the drive shaft and wind it three and one-third times around this shaft progressing toward the back.

Then bring the cord up and around the left side of the drive drum. Hook the tension spring on the hook of the drive drum.

Replace the phantom light and the dial assembly.

Phantom Light Dial Parts

See article "Identification of Dial and Chassis" in this manual in order to determine the correct dial and chassis assembly number.

Prices Subject to Change Without Notice.

DESCRIPTION	No. 3 DIAL PARTS — PART NO.	No. 3 — LIST PRICE	No. 7 DIAL PARTS — PART NO.	No. 7 — LIST PRICE
DIAL ASSEMBLY				
Dial Assembly, Complete with Dial Glass, Dial Assembly Mounting Plate, Brace, Support Bracket, Celluloid Dial Background, Indicator Tension Spring, Indicator Cords, Indicator Cord Takeup Collars, Side Reflectors, Lamp Sockets and Lamps, Fibre Strips, and Fibre Light Shield	Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio	$10.85	Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio	$10.70
Dial Glass Only (Series A1-A5)	See Above	.95	See Above	.80
Dial Glass Only (Series A4)	See Above	.95	See Above	.70
Celluloid Background for Dial (Series A1-A5)	9BX206	.45	9X41	.40
Celluloid Background for Dial (Series A4)	9BX206	.45	9X42	.40
Dial Assembly Mounting Plate with Tone & Volume Indicators, and Indicator Pulleys	28X301	.90	25X411	1.00
Dial Assembly Brace (Attached to Gang Condenser)	25X303	.10	25X303	.10
Fibre Strip (At Back of Tone and Volume Indicator Lamps)	11X58	.10	11X58	.10
Tension Spring for Tone and Volume Indicators	20X80	.10	20X80	.10
8" Black Cord for Indicators	doz.	.28	doz.	.28
Brass Collars with Set Screws—to secure Indicator Cords to Shafts	29X20 ea.	.18	29X20 ea.	.18
Dial Lamp Reflector (Right From Front)	41X18	.10	41X18	.10
Dial Lamp Reflector (Left From Front)	41X17	.10	41X17	.10
Dial Lamp Sockets and Clips (For Edge Lighting of Dial and Tone & Volume Indicators)	7A62	.10	7A62	.10
Dial Lamp Socket Assembly (4 Sockets) Less Lamps	7A64	.40	7A64	.40
Dial Lamp (No. 51 Bayonet Type)	7A32	.20	7A32	.20
Phantom Light Assembly Complete with Lamps (Series A1-A5)	25A164	1.65	25A164	1.65
Phantom Light Assembly Complete with Lamps (Series A4)	25A207	1.30	25A207	1.30
Springs for Lamps of Above Assembly	20X86 ea.	.10	20X86 ea.	.10
Brass Collars for Lamps of Above Assembly	19X61	.10	19X61	.10
Bracket (To secure Phantom Light Assembly to Drum)	25X360	.10	25X360	.10
Fibre Strip (At bottom of Dial Glass)	11X59	.10	11X59	.10
DRIVE ASSEMBLY				
Tuning Shaft Only	26X240	.15	26X240	.15
Tuning Drive Cord—20"	doz.	.46	doz.	.46
Tension Spring for Above Cord	20X27 ea.	.10	20X27 ea.	.10
Drive Drum & Hub	24X279	.40	24X279	.40
Rubber Cushion (Front) for Assembly Mounting	8X43 ea.	.10	8X43 ea.	.10
Rubber Cushion (Rear)—Gang Mounting	8X44 ea.	.10	8X44 ea.	.10
Rubber Cushion (Rear—under Chassis)—Gang Mounting	8X45 ea.	.10	8X45 ea.	.10
Rear Mounting Foot for Gang Condenser	25X283	.10	25X283	.10
Support Bracket and Drive Shaft Bushing for Gang Condenser	25X300	.45	25X300	.45

MODEL 762
MODEL 774
MODEL 776
Telephone Dial
Parts List

GAMBLE-SKOGMO, INC.

Telephone Dial Replacement Parts

See article "Identification of Dial and Chassis" in this manual in order to determine the correct dial and chassis assembly number.

Replacing Drive Cord

Remove the old drive cord and tension spring. Rotate telephone dial clockwise (from back of chassis) as far as it will go.

Viewing the pulley ring drum from above and to the back, place the knotted end of the drive cord in the slot provided for it, catching the knot in back of the rib as shown in Fig. 3.

Bring the cord down and around the right side (from back) of the drum at front part of groove in pulley ring drum and under the drive shaft pulley making one-half turn on this pulley. Then bring the cord around the right side (from back) of the adjustable tension pulley and up to the upper left side of the pulley ring drum in front of the cord already on.

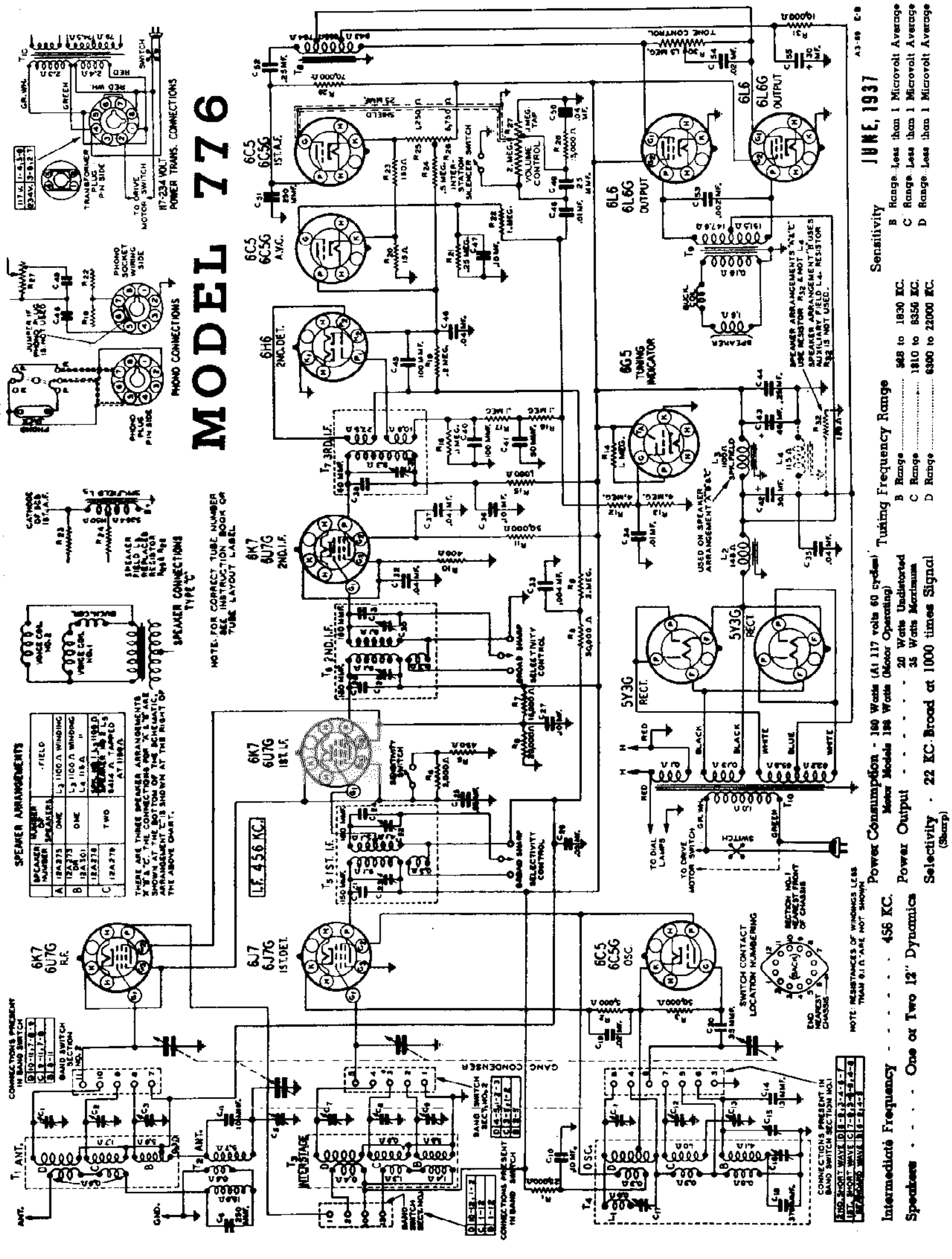
Hold the cord in the left hand and rotate the dial counter-clockwise with the right hand. Feed the cord on the drum in such a way that after passing the two openings at the top of the pulley ring drum, it passes to the back of the groove in the drum. After the pulley ring drum makes one complete revolution, place the cord through the left drum opening into the slot and secure the tension spring hook over the pin provided for it—See Fig. 3.

DESCRIPTION	No. 9 DIAL PARTS		No. 11 DIAL PARTS		No. 10 DIAL PARTS	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Pulley, Button Ring and Gang Cond. Assy. complete with Buttons, Dial Scale, Pointer and Glass Crystal (A1, A2, A5, and A7 Chassis)	11A103	$23.20	11A121	$23.40	11A114	$25.50
Pulley, Button Ring, and Gang Condenser Assembly, as above (A3 Chassis)	11A111	24.60	11A120	25.00	11A113	27.00
Support Casting for above	25X360	1.35	25X360	1.35	26X410	1.45
Brace for above Casting (over Tuning Cond.) (A1, A2, A5, and A7 Chassis)	25X371	.15	25X371	.15	25X371	.15
Brace as above (A3 Chassis)	25X367	.20	25X367	.20	25X367	.20
Hex. Brass Stud (Support Bracket Mounting)	20X152	.04	20X152	.04	20X152	.04
Rubber Grommet for above Stud	6X8	.10	6X8	.10	6X8	.10
"L" Bracket—Rear Gang Mounting (A1, A2, A5, and A7 Chassis)	25X362	.08	25X362	.08	25X362	.08
"L" Bracket—Rear Gang Mounting (A3 Chassis)	25X382	.10	25X282	.10	25X382	.10
Stud (Rear Gang Mounting)	20X150	.08	20X150	.08	20X150	.08
Rubber Washer for Gang Mounting on "L" Bracket	2X236 doz.	.15	2X236 doz.	.15	2X236 doz.	.15
Rubber Grommet for Gang Mounting on "L" Bracket	6X16 doz.	.30	6X16 doz.	.30	6X16 doz.	.30
Rubber Cushions for Support Bracket (Front)	8X43	.10	8X43	.10	8X43	.10
Drive Cord Tension Spring	28X114 doz.	.35	28X114 doz.	.35	28X114 doz.	.35
Drive Cord	10X23	.65	10X23	.65	10X23	.65
Cord Tension Adjustment Assembly complete	26A59	.20	26A59	.20	26A59	.20
Drive Shaft only (Tuning)	26X245	.10	26X245	.10	26X245	.10
Front Brass Bearing Race and Drive Pulley for Drive Shaft	29X74	.10	29X74	.10	29X74	.10
Rear Brass Bearing Race for Drive Shaft	29X73	.15	29X73	.15	29X73	.15
8 Ball Bearings in Retainer (Two sets used on above Shaft)	20X151	.10	20X151	.10	20X151	.10
Horseshoe Washer for Drive Shaft	19X67 doz.	.15	19X67 doz.	.15	19X67 doz.	.15
Gate Assembly complete	25A154	.45	25A154	.45	25A154	.45
Spring only for Gate Assembly	28X45 doz.	.10	28X46 doz.	.10	28X45 doz.	.10
Condenser Drive Gear Assembly complete	25A153	.60	25A153	.60	25A153	.60
Gear Spreader Spring for above	28X102 doz.	.20	28X102 doz.	.20	28X102 doz.	.20
Pulley and Button Ring complete (Less Dial Crystal, Dial Crystal Escutcheon, Dial Scale, Dial Scale Washers, Dial Pointer and Stud, and Dial Lamps and Sockets)	26A61	11.50	26A62	11.50	26A62	11.50
Pulley Ring Casting only	25A162	3.20	25A162	3.20	25A162	3.20
Button Spacer Ring only	24X273	1.70	24X285	1.70	24X285	1.70
Silencer Contact Ring	30X79	.30	30X79	.30	30X79	.30
Push Button Assembly complete (Including Hairpin Spring, Button Spring, Push Button, Button Bushing, Button Shaft, Metal Washer and Tab)	26A63	.40	26A64	.40	26A64	.40
Push Button only	10A105	.10	10A111	.10	10A111	.10
Metal Washer and Tab	19X66	.10	19X66	.10	19X66	.10
Bakelite Bushing for Push Button	10A104	.10	10A104	.10	10A104	.10
Shaft for Push Buttons	26X230	.15	26X238	.15	26X230	.15
Hairpin Springs for Push Button Assembly	28X111 doz.	.10	28X111 doz.	.10	28X111 doz.	.10
Springs for Push Buttons	28X109 doz.	.10	28X126 doz.	.10	28X126 doz.	.10
Stop Pin Shaft Assembly (Behind Wide Spacer)	26A60	.30	26A60	.30	26A60	.30
Stop Pin Shaft	26X244	.25	26X244	.25	26X244	.25
Spring for above Stop Pin	28X112 doz.	.10	28X112 doz.	.10	28X112 doz.	.10
Dial Scale (Specify Type of Dial, Name of Radio, and Series or Model Number)		.55		.55		1.20
Washer, Dial Spacer (Large with rectangular hole)	19X74 doz.	.10	19X74 doz.	.10	19X74 doz.	.10
Washer, Dial Clamp (Small with round hole)	19X73 doz.	.10	19X73 doz.	.10	19X73 doz.	.10
Dial Pointer	15X95	.20	15X95	.20	15X95	.20
Dial Pointer Cap	15X96	.10	15X104	.10	15X104	.10
Dial Pointer Stud	20X171	.10	20X171	.10	20X171	.10
Glass Crystal	17X21	.15	17X21	.15	17X21	.15
Glass Crystal Escutcheon	4X174	.45	4X196	.40	4X184	.40
Dial Lamp Socket	7A62 ea.	.10	7A62 ea.	.10	7A62 ea.	.10
Dial Lamp Socket Assembly (3 Sockets) Less Lamps	7A63	.50	7A63	.50	7A63	.60
Dial Lamp (No. 51 Bayonet Type)	7A32	.20	7A32	.20	7A32	.20
Celluloid Dial Light Diffusers	41X16	.10	41X16	.10	41X16	.10
Silencer Contact Spring Assembly	26A57	.10	26A57	.10	26A57	.10
Complete Set of Station Call Letter Discs with 25 Celluloid Discs	26A56	.35	26A56	.35	26A56	.35
Tone Indicator Assembly (Less Dial Light Socket and Dial Lights, Take up Cord and Collar)					26A65	.35
Celluloid Indicator and Arm (Tone or Volume)					26A67	.20
Indicator Mounting Bracket (Tone)					25X407	.10
Spring for Tone or Volume Indicator					28X133 doz.	.40
Brass Collar, Cord Take up (Tone or Volume)					29X20	.10
3" Tone and Volume Indicator Cord					doz.	.10
Volume Indicator Assembly (Less Dial Light Socket, Dial Light, Take up Cord and Collar)					26A66	.35
Indicator Mounting Bracket (Volume)					25X408	.10
Call Letter Holder, Celluloid					58X254	.25
Brown Opaque Discs for Telephone Dial Buttons					58X217 doz.	.10
Dial Lamp Socket Assembly (For Tone or Volume Indicator)					7A57	.10
Paper Light Diffuser—Circular 4⅝" Diameter					41X22	.10
Complete Set of Station Call Letter Cards					26A58	.40
Blank Sheet of Call Letter Cards (Used for Export Sets Only)					58X240	.15

Prices Subjec to Change Without Notice.

MODEL 776
Schematic, Phono
Speaker Data

GAMBLE-SKOGMO, INC.



MODEL 776
Alignment, Socket
Trimmers, Voltage
Coils, Notes

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

Local-Distance Switch — Distance Position.
Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
3rd I.F.	Range B	.1 mf.	456 KC	Grid of 2nd I.F. Tube	3rd I.F. (C39)	Turn Rotor to Full Open	Adjust to Maximum Output
2nd I.F.	Range B	.1 mf.	456 KC	Grid of 1st I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C15)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st & 2nd Ant. Range B (C5) & (C3)—Int. Range B (C9)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C16)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Ant. Range C (C2) Int. Range C (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C13)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C1) Int. Range D (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C17)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

On the electric drive models, the pointer is held to the shaft by a friction clip arrangement. With the electric-manual lever in the manual position, hold the tuning knob and move the pointer to the 1500 KC mark on the dial.

In sets using any other type of dial mechanism, it will be necessary to adjust the position of the indicator until it is at the 1500 KC mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

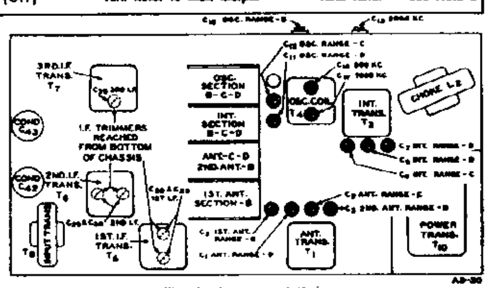


Fig. 3—Location of Trimmers

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control Maximum
Local-Distance Switch in Distance Position
Readings taken with 1000 Ohm-per-volt meter

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
6K7—6U7G	R.F.	0	6.1(1)	250	130	10.0(2)		6.1(1)	10.0(2)
6J7—6J7G	1st Det.	0	6.1(1)	250	115	0		6.1(1)	6.0
6C5—6C5G	Osc.	0	6.1(1)	115				6.1(1)	0
6K7—6U7G	1st I.F.	0	6.1(1)	250	130	10.0(2)		6.1(1)	10.0(2)
6K7—6U7G	2nd I.F.	0	6.1(1)	240	130	8.0		6.1(1)	5.0
6H6	2nd Det.	0	6.1(1)					6.1(1)	0
6C5—6C5G	A.V.C.	0	6.1(1)	8(3)				6.1(1)	.5
6C5—6C5G	1st A.F.	0	6.1(1)	145				6.1(1)	6.0
6L6—6L6G	Output	0	6.1(1)	330	250	21(4)		6.1(1)	0
5Y3G	Rectifier	0	4.7(5)		1100(6)		1100(6)		4.7(5)
6G5	Tuning Indicator	Plate to Ground 20(3)		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with a 1000 Ohm-per-volt meter (500 volt scale).
(4) Bias as read across L4 or R32, depending on speaker arrangement. See Schematic Diagram.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

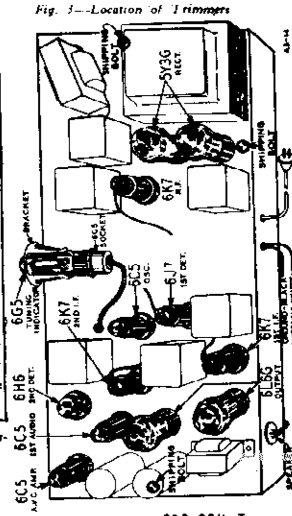
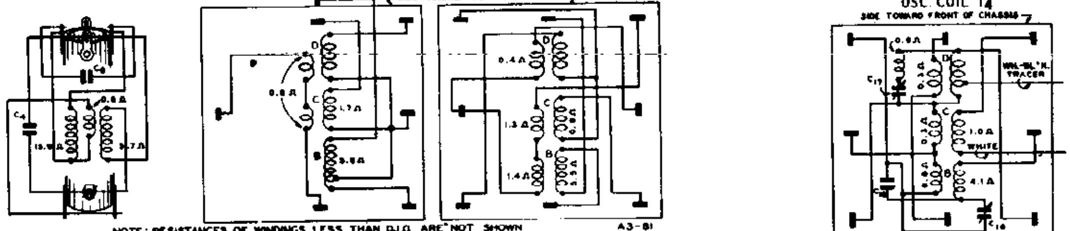


Fig. 4—Location of Tubes

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

1ST ANT. "B" TRANS. T2 — ANT. R.F. TRANS. "C" & "D"-2ND ANT. "B" T1 — INTERSTAGE R.F. TRANS. T3 — OSC. COIL T4



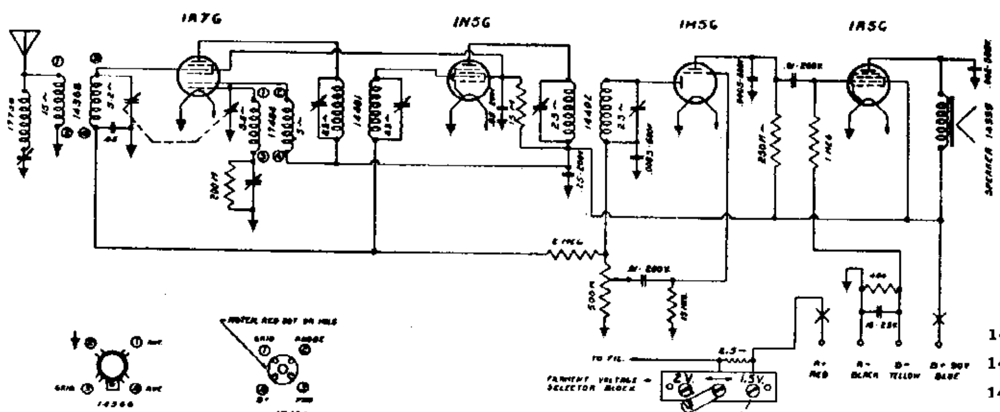
NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN

Fig. 7—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

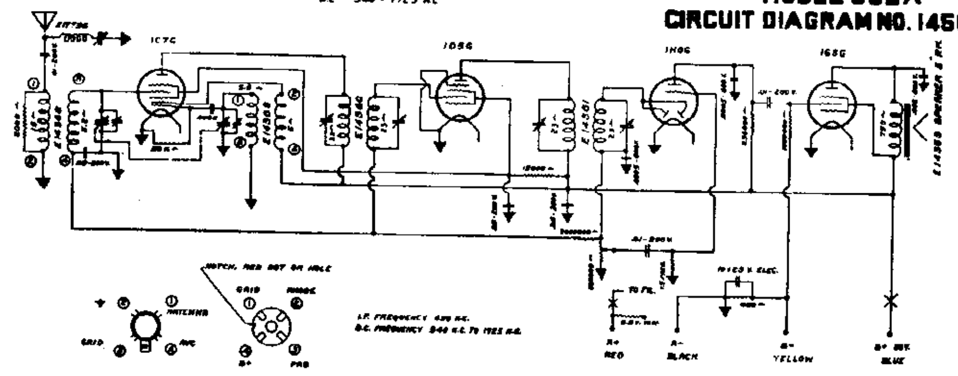
Schematics, Parts

GAMBLE-SKOGMO, INC.

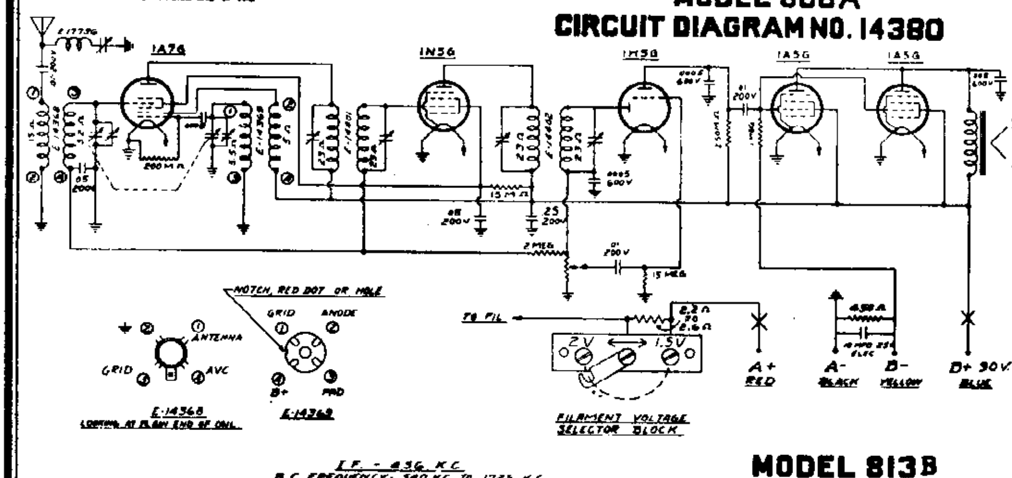
MODEL 802A
MODEL 806A
MODEL 813A
MODEL 813B



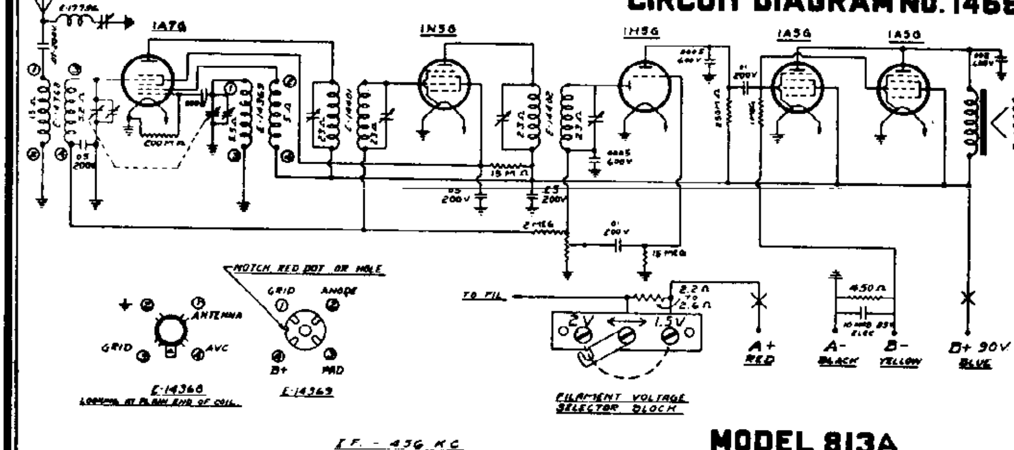
MODEL 802A CIRCUIT DIAGRAM NO. 14565



MODEL 806A CIRCUIT DIAGRAM NO. 14380



MODEL 813B CIRCUIT DIAGRAM NO. 14556



MODEL 813A CIRCUIT DIAGRAM NO. 14556

Model 802-A

Part No.	Description
14368	Coil—Antenna ......
17484	Coil—Oscillator .....
14464	Condenser—Tuning ..
17451	Control—Volume with Switch ....
14589	Disc—Dial Pointer with Hub ....
14555	Speaker—5" P. M. ....
14401	Transformer—IF Input
14402	Transformer—IF Output
17736	Trap—Wave ....

SERVICE - PARTS

MODEL —— 806A

Part		List Price
14368	COIL ANT	.60
14369	COIL OSC	.60
14305	COND TUNING	2.50
14357	CABLE BAT	1.00
14358	CONTROL VOL	.75
14316	KNOB LARGE	.20
14359	KNOB SMALL	.15
14317	POINTER	.10
14319	SCALE DIAL	.25
14363	SPEAKER	3.50
14360	I. F. INPUT	1.30
14361	I. F. OUTPUT	1.30
17736	TRAP WAVE	.50
17582	RESISTOR (DRY CELL)	.30

ORDER CONDENSERS AND RESISTORS BY VALUE ON DIAGRAM.

Model 813-B

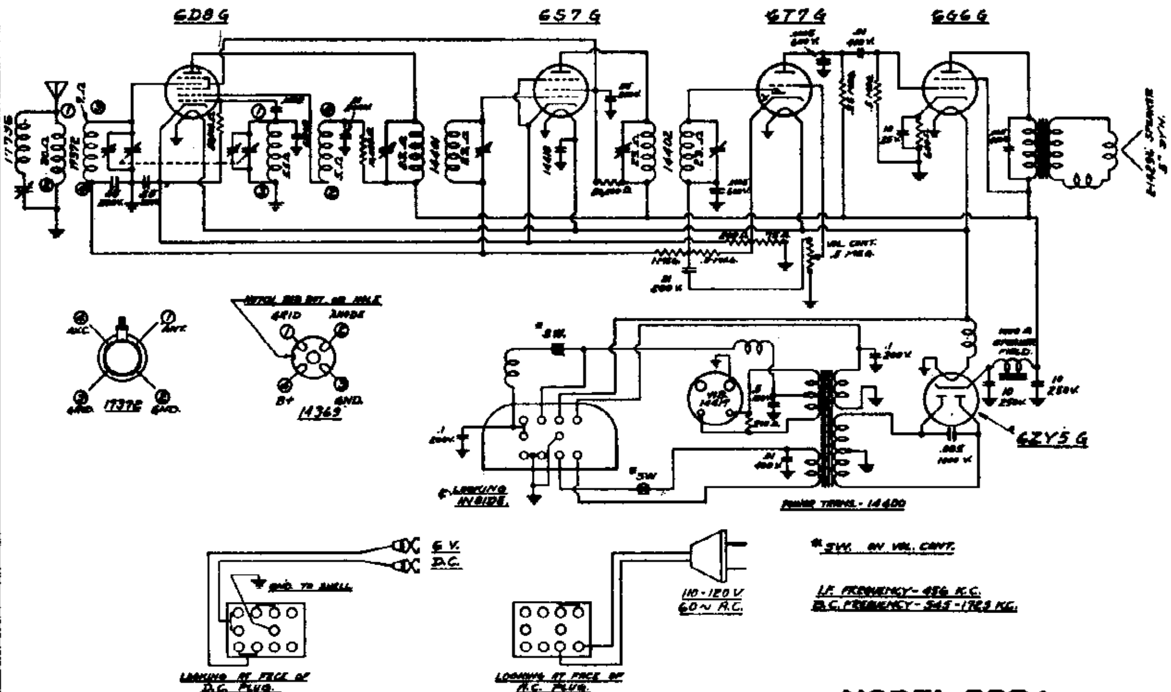
Part No.	Description
14384	Button Push ....
14437	Belt—Tuning ......
14368	Coil—Antenna .....
14369	Coil—Oscillator ....
14455	Condenser—Tuning
14573	Tuning Unit Assembly complete with tuning condenser ....
14401	Transformer—IF Input
14402	Transformer—IF Output
17736	Trap—Wave ....

Part No.	Description
14384	Button Push ......
14437	Belt—Tuning .....
14368	Coil—Antenna .....
14369	Coil—Oscillator ....
14455	Condenser—Tuning
14475	Control—Volume ...
14345	Dial—Scale ....
14425	Escutcheon—Dial with Crystal ....
14485	Speaker—5 Inch PM.
14364	Socket—Octal .....
14401	Transformer—IF Input
14402	Transformer—IF Output
17736	Trap—Wave ....

MODEL 803A
MODEL 803B

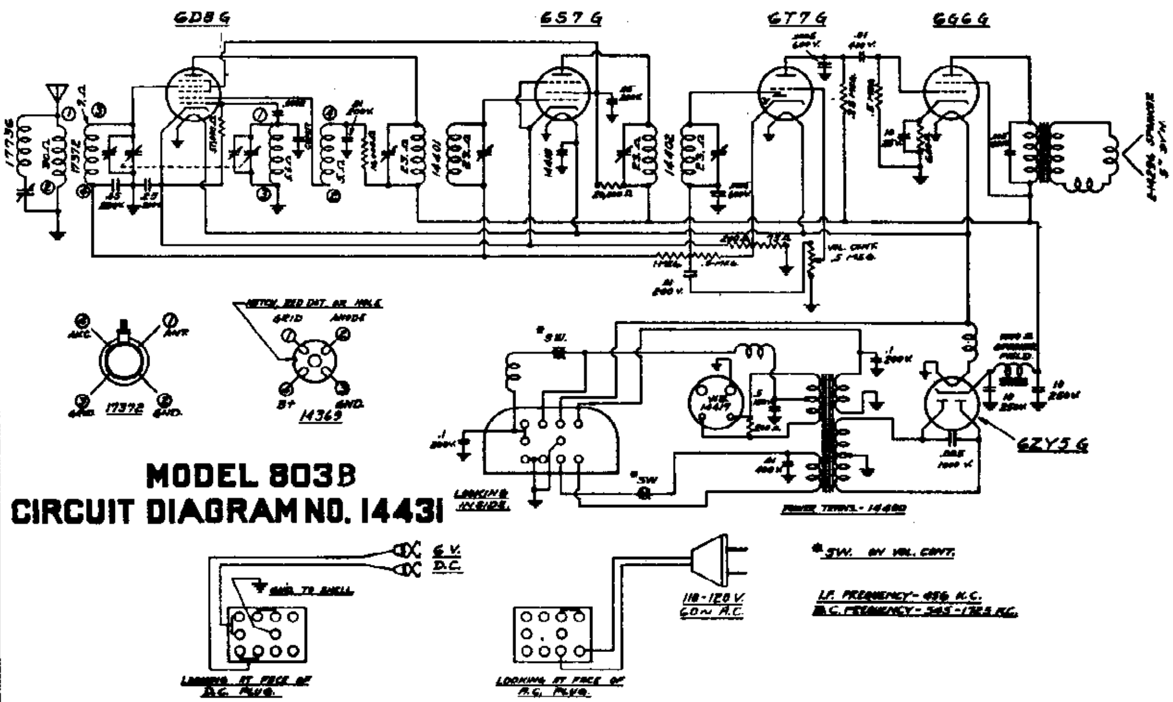
GAMBLE-SKOGMO, INC.

Schematics



MODEL 803A
CIRCUIT DIAGRAM NO. 14431

CHANGES IN ABOVE CIRCUIT FOR 803-B
Speaker field is replaced with filter choke No. 17790
Speaker changed to 6½ P. M.



MODEL 803B
CIRCUIT DIAGRAM NO. 14431

For Model 803 A.

Part No.	Name	List Price
14429	Clip "A" Battery	.15
14403	Condenser - Filter 10-250-10-250	.90
17080	Condenser - Filter 10-25	.60
14399	Control - Volume with Switch	1.50
14369	Coil-Oscillator	.60
17372	Coil-Antenna	.80
14404	Transformer-Speaker	.70
17736	Trap-Wave	.50
14400	Transformer-Power .	2.80
14401	Transformer - I. F. Input	1.20
14402	Transformer - I. F. Output	1.20
14417	Vibrator-6 Volt	2.50

For Model 803-B

Part No.	Name	List Price
14403	Condenser - Filter 10-250-10-250	.90
17080	Condenser - Filter 10-25	.60
17790	Choke—Filter	.80
14369	Coil-Oscillator	.60
17372	Coil-Antenna	.80
14571	Control—Volume with Switch	1.50
14404	Transformer-Speaker	.70
17736	Trap-Wave	.50
14400	Transformer-Power .	2.80
14401	Transformer - I. F. Input	1.20
14402	Transformer - I. F. Output	1.20
14417	Vibrator-6 Volt	2.50

GAMBLE SKOGMO, INC.

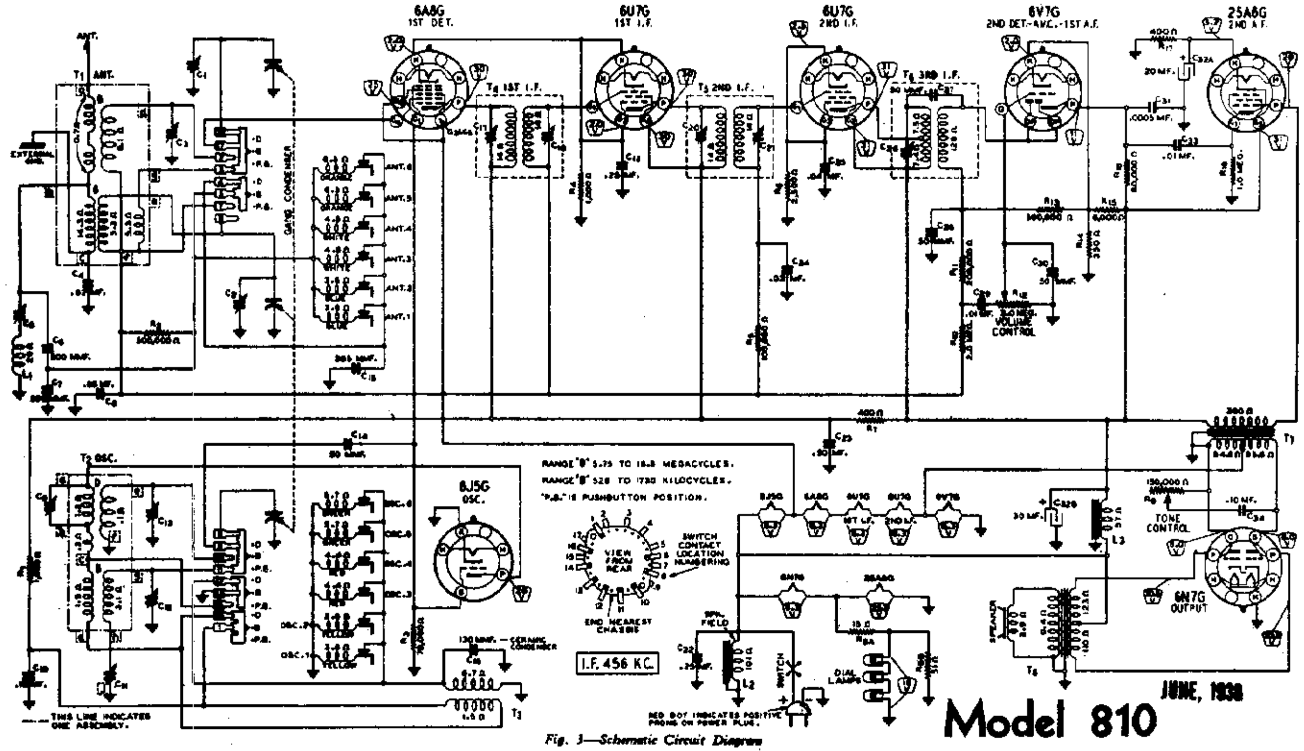
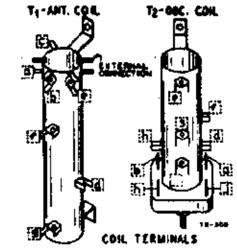


Fig. 3—Schematic Circuit Diagram



SPECIFICATIONS

Power Consumption	1.45 Amperes at 32 Volts DC
Power Output	.17 Watts Undistorted; .46 Watts Maximum
Selectivity	30 KC Broad at 1000 times Signal
Sensitivity	
B Range (Manual Tuning)	6.0 Microvolts Average
B Range (Automatic Tuning)	6.0 Microvolts Average
D Range	6.0 Microvolts Average
Intermediate Frequency	456 KC
Speaker	8" Dynamic
Tuning Frequency Range	
B Range (Manual Tuning)	528 to 1730 KC (Kilocycles)
D Range (Manual Tuning)	5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning)	820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning)	650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning)	530 to 980 KC

This model is a two band 32 Volt DC operated radio. A 6 button inductive type automatic tuning system is employed. This system is separate from the variable condenser tuned circuits which are used for the 2 manual tuning ranges.

A 3 position rotary switch is used to switch the tuning circuits from automatic (push button) tuning to either of the 2 manual tuning ranges.

In AUTOMATIC TUNING, the gang condenser is not used. A single tuned circuit is used before the 1st detector.

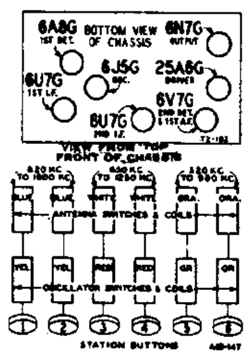
The antenna circuit is connected to the automatic tuning antenna coils numbered 1 to 6 on the schematic. When the band switch is in the automatic tuning position and one of the automatic tuning buttons is depressed, the coil corresponding to the button depressed is connected to the control grid circuit of the 1st detector tube. The antenna coil is tuned by fixed condensers C7 and C15. The antenna transformer B band No. 1 secondary is short circuited and the B band No. 2 secondary is open circuited. The antenna transformer D band secondary is open circuited.

The primary of the automatic tuning oscillator tracking coil assembly T3 is connected to the B+ line. The secondary of this assembly is connected through the band switch to the control grid circuit of the oscillator tube. This secondary coil is tuned by fixed condenser C16 and the inductance of one of the automatic tuning oscillator coils numbered 1 to 6 on the schematic.

The oscillator coil assembly B and D band grid coils are open circuited.

Tuning of the R.F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of the tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil. The iron cores within the antenna and oscillator automatic tuning coil forms are secured to a brass rod. This rod is moved back and forth by a screw located at the front of the radio.

Alignment between the oscillator and antenna tuning coils is obtained by moving the antenna (rear) coil position while the iron core remains stationary.



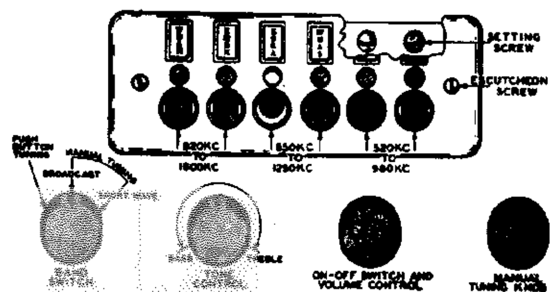


Fig. 1—Location of Controls and Push Buttons—No. 11 Dial Escutcheon

MODEL 810(1938)
Alignment, Trimmers

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C20) & (C21) 3rd I.F. (C26)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	Push Button Position Button No. 6 Depressed		Wave Trap (C5) Adjust for MINIMUM Output
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	1st Ant. Range B (C2) 2nd Ant. Range B (C1)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C11) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C9) Rock Rotor—See Note B

PERMEABILITY TUNING UNIT			BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C
1100 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

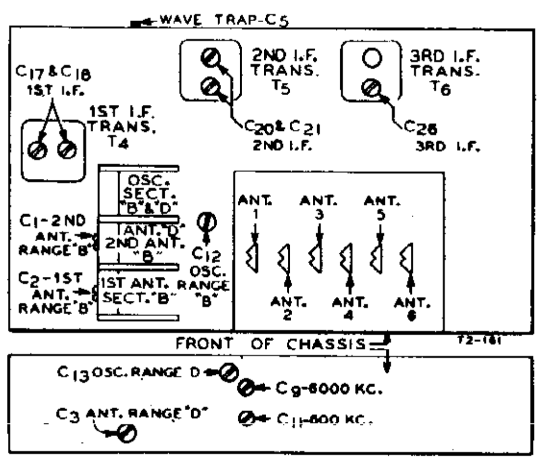
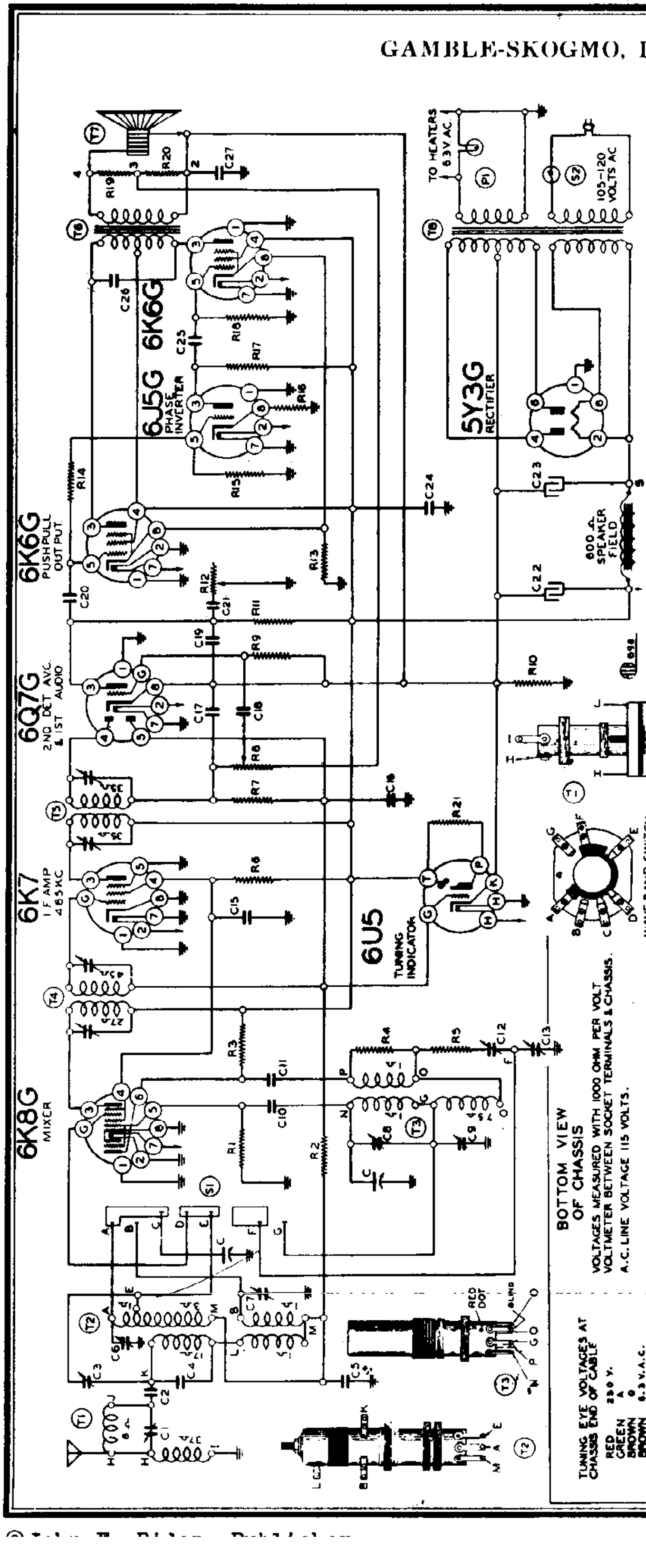


Fig. 2—Trimmer Location

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

MODEL 867A
Schematic, Voltage
Parts

GAMBLE-SKOGMO, INC.

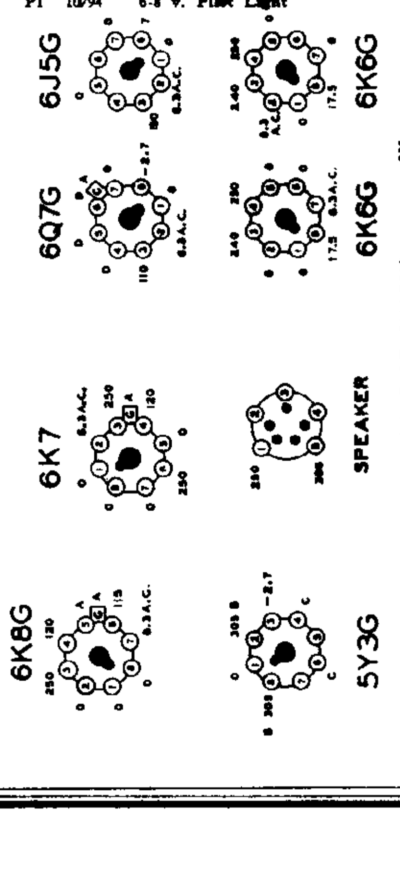


I. F. Frequency 465 K. C.

PARTS (Serial No. 8J271900 and up)

Model 867 A

Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	13094	50M ohm—⅓ w.
R2	13011	250M ohm—⅓ w.
R3	13030	25M ohm—1 watt
R4	13031	1500 ohm—⅓ w.
R5	130231	75 ohm—⅓ w.
R6	13030	25M ohm—1 watt
R7	1304	3 megohm—⅓ w.
R8	101144	1 megohm volume control
R9	130225	15 megohm—⅓ w.
R10	130240	30 ohm—⅓ w.
R11	130103	100M ohm—⅓ w.
R12	101145	1 megohm tone control
R13	130220	300 ohm—1 watt
R14	130'63	400M ohm—⅓ w.
R15	130103	100M ohm—⅓ w.
R16	130218	5M ohm—⅓ w.
R17	13094	50M ohm—⅓ w.
R18	130102	500M ohm—⅓ w.
R19	130168	100 ohm —⅓ w.
R20	130215	25 ohm—⅓ w.
R21	130110	1 megohm— 1/10 in tuning indicator socket
		CONDENSERS
C	10292	2 gang variable condenser
C1	12467	Wave Trap Trimmer
C2	10011	.01 x 400 v.
C3	12468	Image Adj. Trimmer
C4	129132	.000125 mica
C5	129131	.002775 mica
C6	12469	B. C. Antenna Trimmer
C7	12469	S. W. Antenna Trimmer
C8	12470	S. W. Oscillator trimmer
C9	12470	B. C. Oscillator Trimmer
C10	12939	.00005 mica
C11	10025	.002 x 600 v.
C12	12466	.000422 compression type B. C. Oscillator Pad
C13	12465	.001366 compression type S. W. Oscillator Pad
C15	1001	.1 x 400 v.
C16	1009	.05 x 200 v.
C17	1295	.0001 mica
C18	10019	.006 x 600 v.
C19	1292	.0005 mica
C20	10026	.02 x 400 v.
C21	10013	.05 x 400 v.
C22	11974	10 mfd. lytic—350 w. v.
C23	11973	16 mfd. lytic—400 w. v.
C24	1001	.1 x 400 v.
C25	10026	.02 x 400 v.
C26	10012	.005 x 600 v.
C27	10020	.1 x 200 v.
		PARTS
T1	108125	Wave Trap
T2	111112	B. C. and S. W. Antenna Coils
T3	11098	B. C. and S. W. Oscillator Coils
T4	108105B	Input I. F.—465 kc.
T5	108106M	Output I. F.—465 kc.
T6	10554B	Output Transformer
T7	114135	8" Dynamic Speaker (600 ohm field)
T7	114136	10" Dynamic Speaker (600 ohm field)
T8	104143B	Power Transformer
S1	12568	Wave Band Switch
S2		Off-on Switch on Vol. Control
P1	10794	6-8 v. Pilot Light



REAR OF CHASSIS

FIG. 5

MODEL 867A
Alignment
Trimmers

GAMBLE-SKOGMO, INC.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8G	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer (C9) (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 1500 Kc.	Trimmer (C6) (See Fig. 4)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer (C12C) (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
	465 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer (C1) (See Fig. 4)	I. F. Wave Trap	Adjust for minimum output
IMAGE REJECTION ADJUST-MENTS	2330 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Pick up signal at 1400 Kc. on dial	Trimmer (C3) (See Fig. 4)	Image rejection	Adjust for minimum output (See note "B")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 Mc.	Trimmer (C8) (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Dial Set at 17 Mc.	Trimmer (C7) (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 6 Mc.	Trimmer (C13) (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")

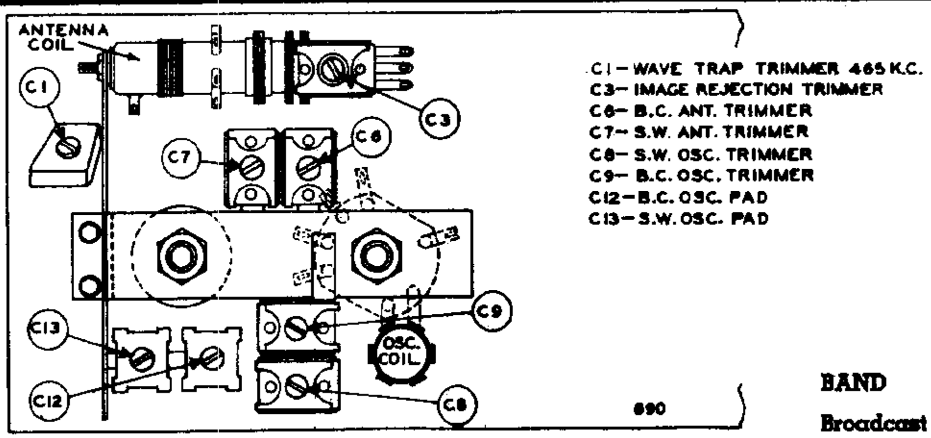


FIG. 4

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B" 1400KC is the image frequency of 2330KC. Adjust Trimmer (C3) until a minimum output is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

BAND SWITCH	BAND	FREQUENCY RANGE
Extreme Right Rotation	Short Wave	5.6 to 18 MC.
Extreme Left Rotation	Broadcast	540 to 1730 KC.

Power Consumption......80 Watts (At 115 volts 50-60 cycles)
Power Output......5 Watts Undistorted, 7 Watts Maximum
Intermediate Frequency......465 KC.

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper	540 to 1730 KC. (Kilocycles)
Short Wave	Lower	5.6 to 18.0 MC. (Megacycles)

GAMBLE SKOGMO, INC.

MODEL 867A
Socket, Trimmers
Tuner Data, Notes

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

IMPORTANT—Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be inserted into place over each of the station call letter tabs.

NOW, PROCEED AS FOLLOWS:—

1. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3), and rotate the tuning knob to the **left** (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism. (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)

2. Press **down all the way** any one of the automatic tuner levers. Holding it down **firmly**, press in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be **pressed in** (See Illus. "E" Fig. 3). Turn the dial **tuning** knob very slowly back and forth **(while still holding the automatic tuner lever in downward position)**, noting the width of the shadow on the screen of the cathode-ray tuning **indicator**. **Minimum** width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.

3. Press down another automatic tuner lever. Holding it down **firmly**, **press** in on the **dial tuning knob and carefully** tune in the station indicated on the call letter tab **on this lever.**

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3) and rotate the tuning knob to the **right** (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3).

This will lock the automatic tuner mechanism **and the stations** you have set up for automatic tuning will be **locked in place.** After you have locked the tuner mechanism, **push the dial** tuning knob **in.**

6. If you should desire to change any station you selected to another, pull the dial tuning knob all the way **out and** rotate the knob to the left (counterclockwise) **and** unlock the tuner mechanism. Select the new station as explained. (NOTE:—If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the tuner mechanism not being unlocked **all the way.** Pull the dail tuning knob out all the way and rotate the knob to the left (counterclockwise) until it will turn no further. The dial mechanism should work freely with the tuner lever pressed down).

7. After you have selected the new station, pull the **dial** tuning knob all the way **out** and rotate the **knob to the right** (clockwise) to lock the tuner mechanism. **Be sure** the knob is turned until it will turn **no further,** then **press** the **dial** tuning knob **in.**

8. The automatic tuner levers **are** now set up for quick tuning. Press down the lever key and—YOUR FAVORITE STATION IS SELECTED!

The **important** steps to remember when setting up stations on the tuner levers for automatic tuning are:

1. **To unlock** the tuner mechanism **pull the dial tuning** knob **all the way out.** You may find it necessary to rotate the knob slightly when pulling it out to make certain that the gears mesh properly. Rotate the dial tuning knob to the left (counterclockwise) as far as it will turn without forcing.

2. **To set a lever,** press down **all the way** and **hold** in this position while tuning in by means of the dial tuning knob the station you want this lever to be tuned to. (NOTE:—you will notice that it will be necessary to keep pressing in on the dial tuning knob while tuning in the station as a spring tends to push the knob out.) Set all the levers in the **same** manner before locking **the** mechanism.

3. **To lock** the tuner mechanism pull **the dial tuning** knob **all the way out.** Rotate the dial tuning **knob** to **the** right as far as it will turn **making certain that** it is **tight**, **but** it is not necessary to use force.

4. After locking or unlocking the tuner mechanism always return the dial tuning knob to its **normal position (pushed in).**

SERVICE NOTES:

Voltages taken from **different points of circuit** to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, **with** a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts A. C. on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit **diagram.**

To check for open by-pass condensers, **shunt each condenser** with **another condenser** of the **same** capacity **and** voltage rating, **which is known to be good, until** the defective unit is **located.**

Excessive hum, stuttering, low volume and a reduction in all D. C. **voltages** is usually caused **by a shorted electrolytic** condenser; **open** by-pass condensers **frequently cause** oscillation and distorted tone.

DIAL CALIBRATION:

To correct dial calibration rotate the **tuning** knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider **bar make** the pointer self-aligning, thereby correcting dial calibration.

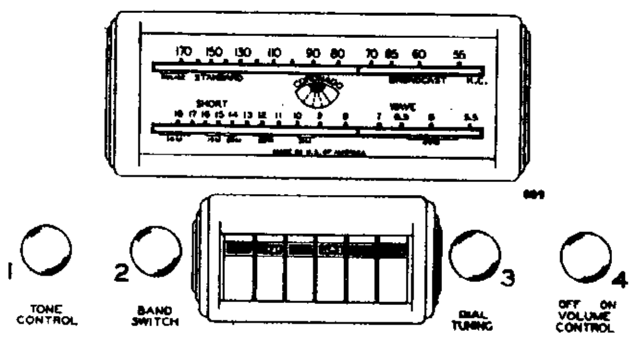
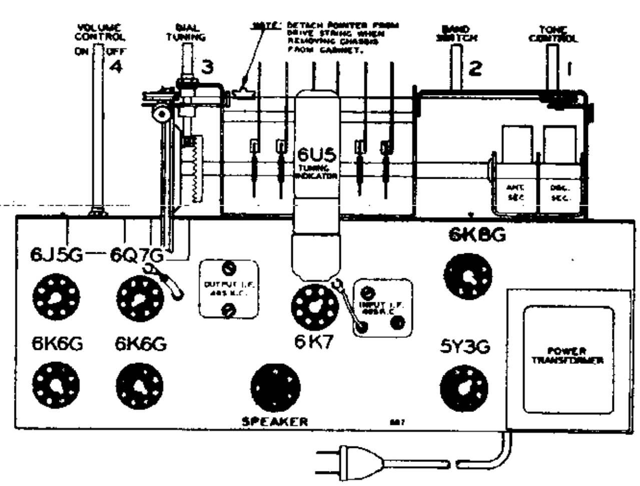
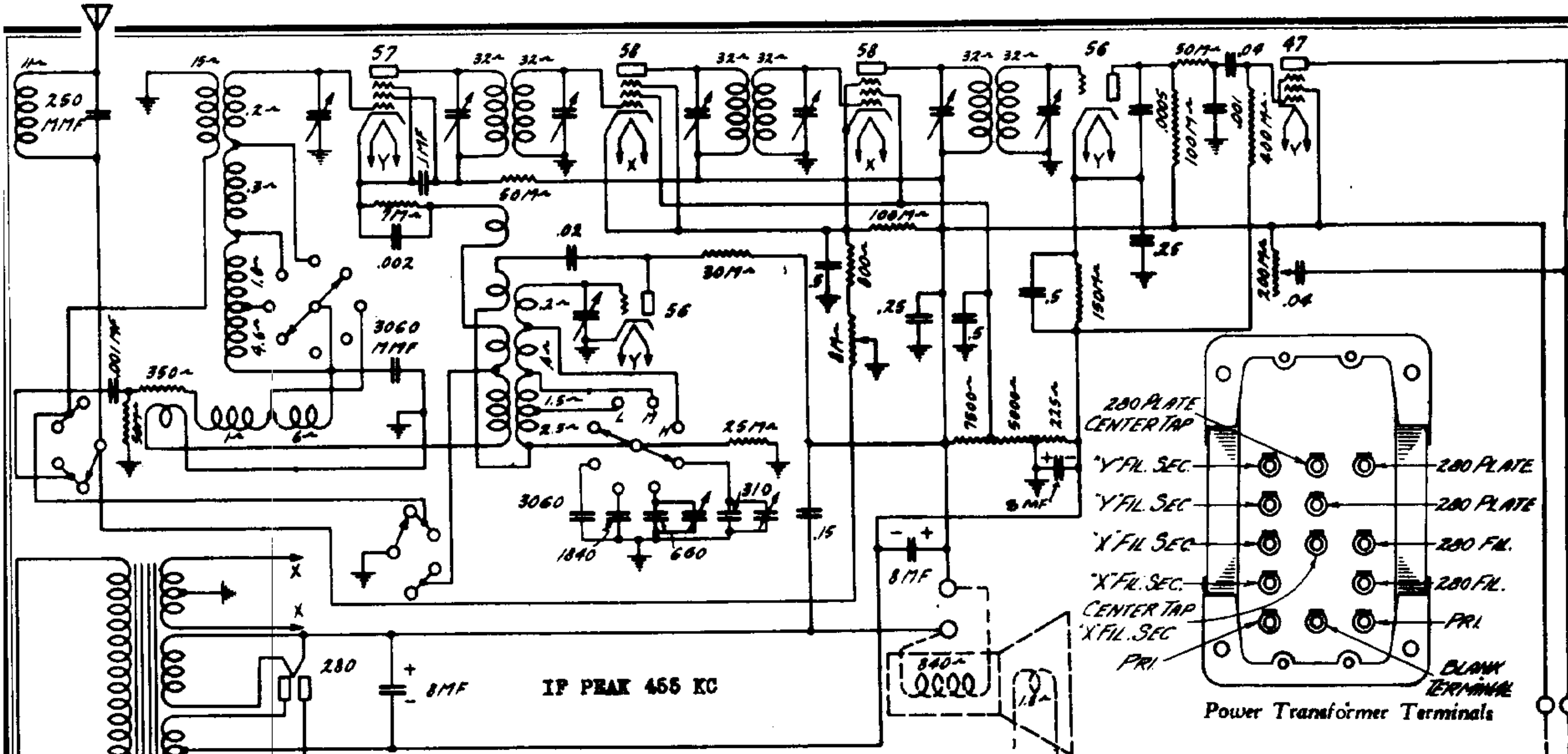


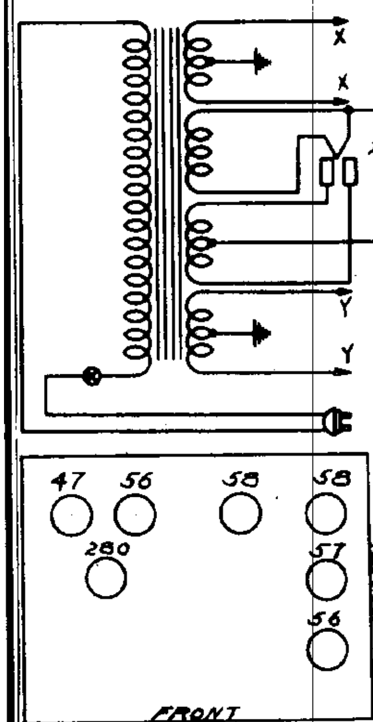
FIG. 2—FRONT VIEW



MODEL 2056AW
Schematic, Voltage
Socket, Alignment

GAMBLE SKOGMO, INC.





VOLUME CONTROL AT MAXIMUM—LINE VOLTAGE 115

Type of Tube	Position of Tube	Function	A Volts	B Volts	Control Grid C Volts	Screen Grid Volts	Screen Grid Current MA	Cathode Volts	Plate Current MA	Grid Test MA
56	1	Osc.	2.4	70	18(1)			0	6.2	6.2
57	2	1st Det.	2.4	170	8.0	170	.3	8.0	1.2	1.6
58	3	1st I.F.	2.4	260	7.0	90(2)	.6	7.0	2.5	4.0
58	4	2nd I.F.	2.4	260	7.0	90(2)	.6	7.0	2.5	4.0
56	5	2nd Det.	2.4	200(3)	17.0(2)			17.0	.2	.3
247	6	Audio	2.4	240	1.6(4)	265	6.8		33.0	38.0
280	7	Rect.	5.0						39 Per Plate	

(1) Varies with frequency. Actual voltage measured across 25,000 ohm bias resistor—39 Volts.
(2) Voltage measured with 120,000 ohm meter.
(3) Voltage measured with 600,000 ohm meter.
(4) Actual voltage measured across 225 ohm section of voltage divider resistor—17 Volts.

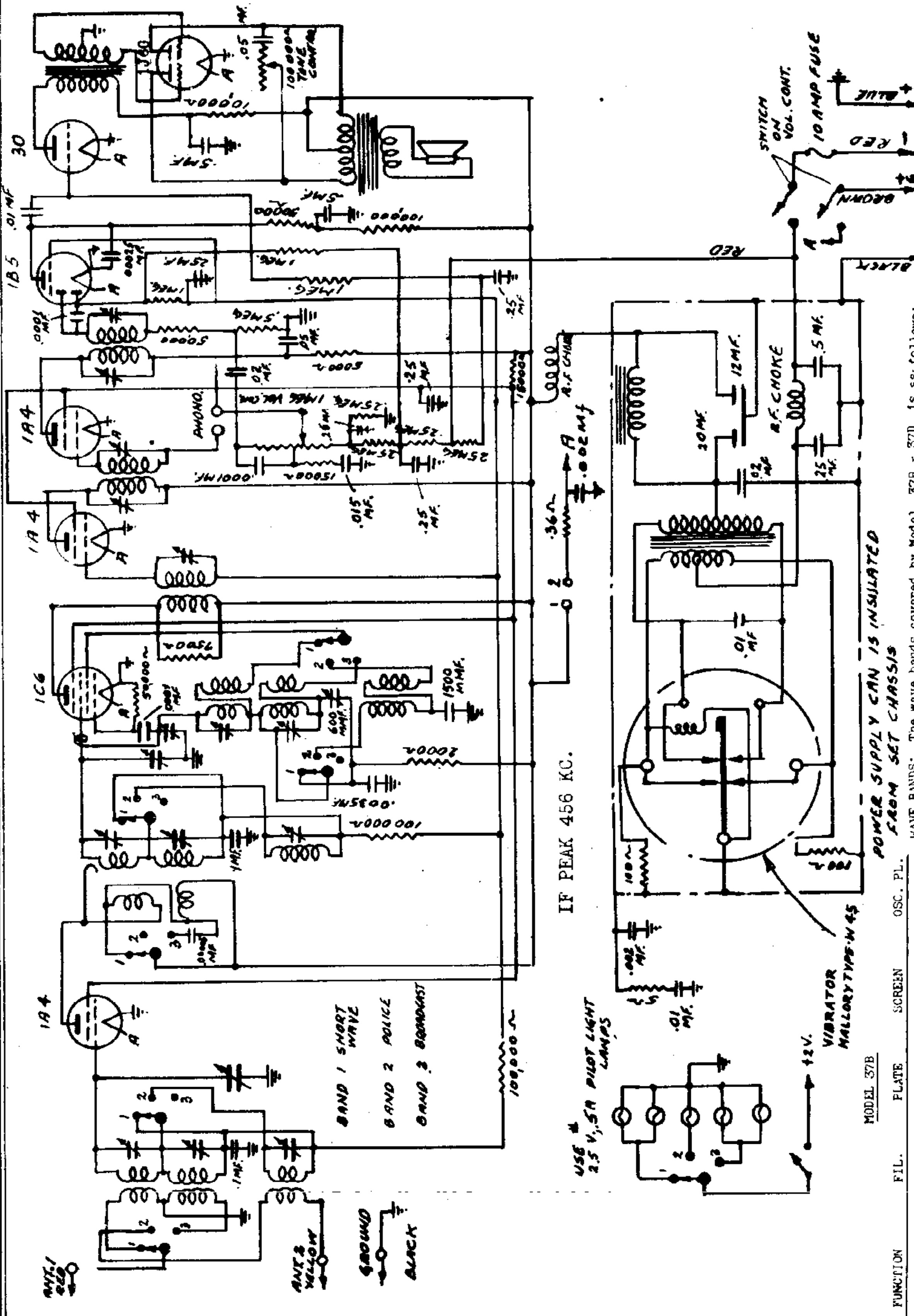
ALIGNMENT

Adjust the six I.F. trimmers at 455 KC. Then align 1st det. and osc. circuits.

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. V111

GAROD RADIO CORP.

MODELS 37B, 37D
Schematic, Voltage



WAVE BANDS: The wave bands covered by Model 37B - 37D is as follows:

BAND	KILOCYCLES or MEGACYCLES	METERS
1	5.65 to 19	15.8 to 53
2	1.45 to 3.65	82 to 207
3	540 to 1570	191 to 555

MODEL 37B

TUBE	FUNCTION	FIL.	PLATE	SCREEN	OSC. PL.
1A4	R.F. Amp.	2.0	135	67.5	
1C6	Converter	2.0	135	67.5	80
1A4	1st I.F. Amp.	2.0	135	67.5	
1A4	2nd I.F. Amp.	2.0	125	67.5	
1B5/25S	Det. & 1st. Audio	2.0	75		
30	Driver	2.0	110		
1J6G	Audio Output	2.0	135		

All voltages are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the Wave Band switch in broadcast position with Battery fully charged and new "B" Batteries.

Filament voltages are taken from filament prong to filament prong at tube socket.

MODELS 37B, 37D
Alignment, Socket

GAROD RADIO CORP.

MODEL 159
Schematic, Socket
Trimmers

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (1C6). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on tops of the i.f. transformer shield cans.

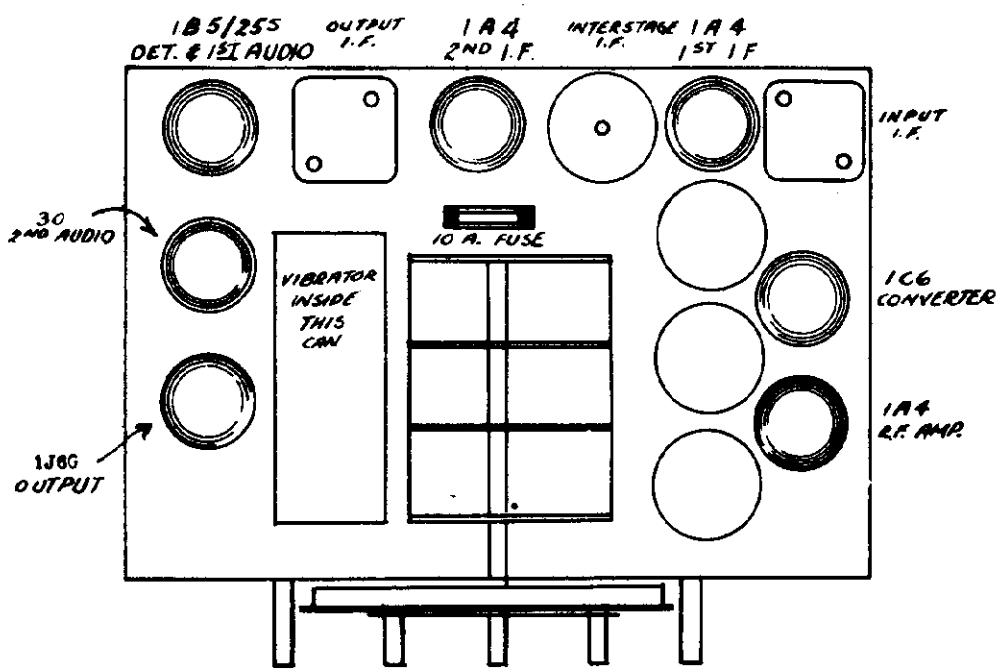
18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc signal is tuned in exactly at the 18 mc calibration point, with the volume control on full and the signal generator adjusted for minimum imput. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on Band #1.

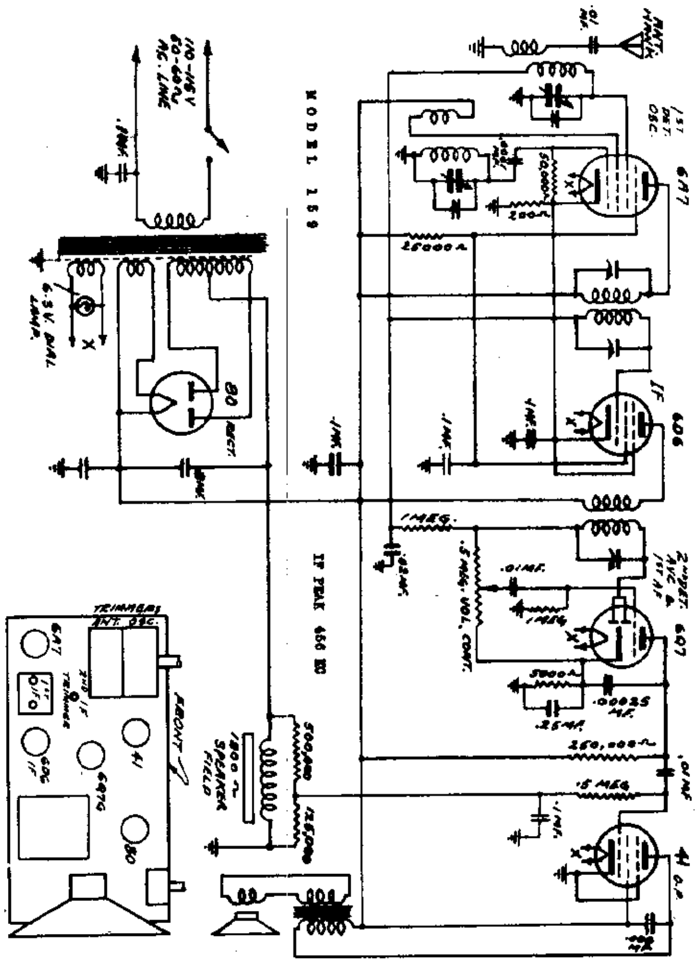
1500 K.C. ADJUSTMENT - With the band selector switch in position for operation on band no. 3. and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the upper opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 1500 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located as indicated in the sketch.

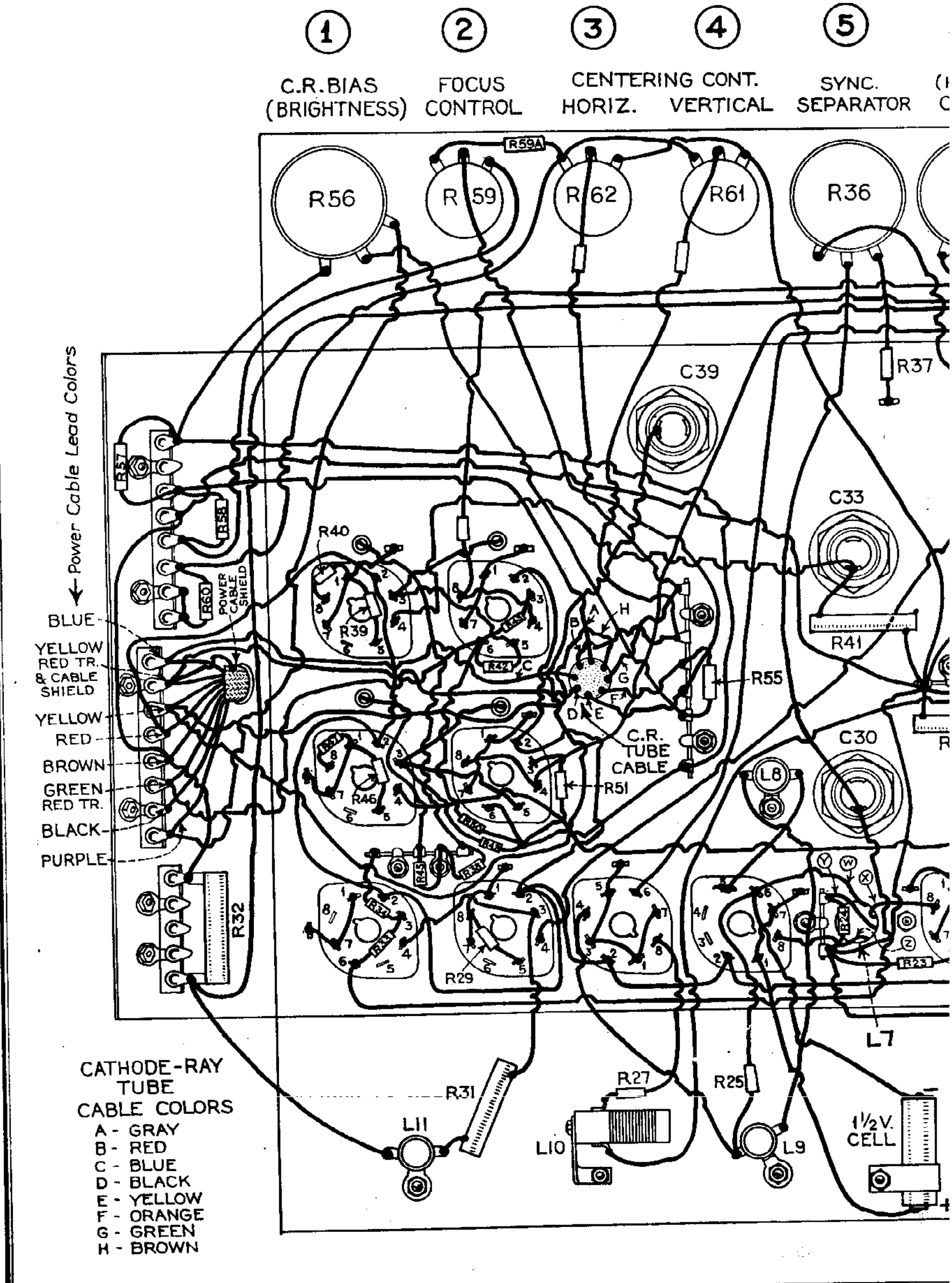
3 MC. ADJUSTMENT - The band selector switch is set in position for operation on the No. 2. band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the Police Band Coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.

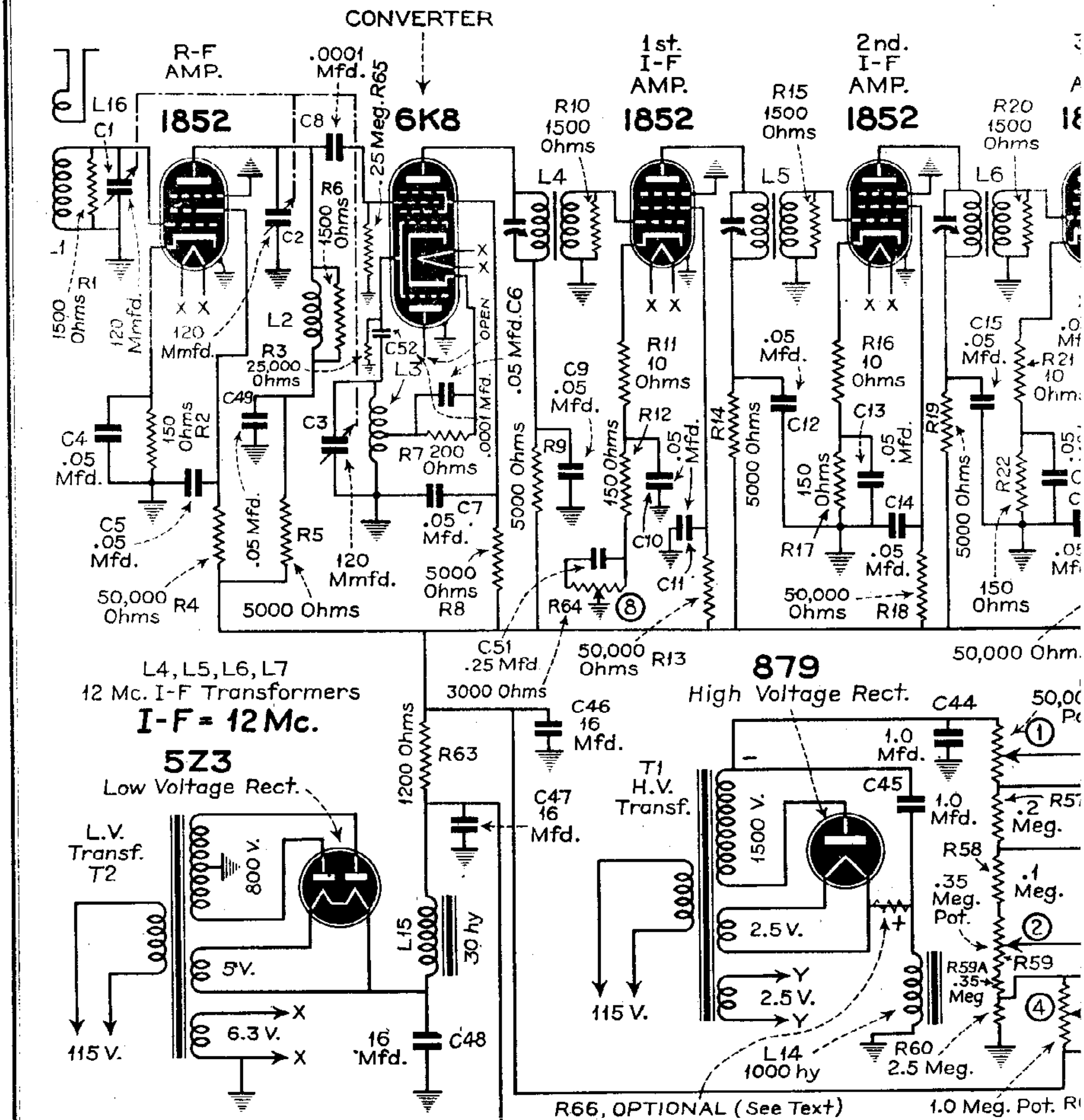
The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 MC. padder is located as indicated.





MODEL 100
Chassis Wiring (Top)




CONVERTER
R-F AMP.
1852
6K8
1st. I-F AMP.
1852
2nd. I-F AMP.
1852
L16
C1
.0001 Mfd.
C8
.25 Meg. R65
R6 1500 Ohms
C2
1500 Ohms R1
120 Mmfd.
120 Mmfd.
L2
R3 25,000 Ohms
C52
L3
OPEN
.05 Mfd. C6
.0001 Mfd.
C49
C3
R7 200 Ohms
C4 .05 Mfd.
150 Ohms R2
C5 .05 Mfd.
.05 Mfd.
R5
120 Mmfd.
C7 .05 Mfd.
5000 Ohms R8
50,000 Ohms R4
5000 Ohms
R10 1500 Ohms
L4
C9 .05 Mfd.
R9
5000 Ohms
R11 10 Ohms
R12
150 Ohms
.05 Mfd.
C10
C11
R64
8
C51 .25 Mfd
3000 Ohms
50,000 Ohms R13
R15 1500 Ohms
L5
.05 Mfd.
C12
R14
5000 Ohms
R16 10 Ohms
C13
.05 Mfd.
150 Ohms
R17
C14
.05 Mfd.
50,000 Ohms R18
R20 1500 Ohms
L6
C15 .05 Mfd.
R21 10 Ohms
R19
5000 Ohms
R22
150 Ohms
50,000 Ohms
L4, L5, L6, L7
12 Mc. I-F Transformers
I-F = 12 Mc.
5Z3
Low Voltage Rect.
L.V. Transf. T2
800 V.
5V.
6.3 V.
115 V.
1200 Ohms
R63
C46 16 Mfd.
C47 16 Mfd.
L15
30 hy
16 Mfd.
C48
879
High Voltage Rect.
T1 H.V. Transf.
1500 V.
2.5 V.
2.5 V.
115 V.
C44
1.0 Mfd.
C45
1.0 Mfd.
1
.2 Meg.
R58
.1 Meg.
.35 Meg. Pot.
2
R59
R59A .35 Meg
4
L14 1000 hy
R60 2.5 Meg.
R66, OPTIONAL (See Text)
1.0 Meg. Pot.

RADIO CORP.

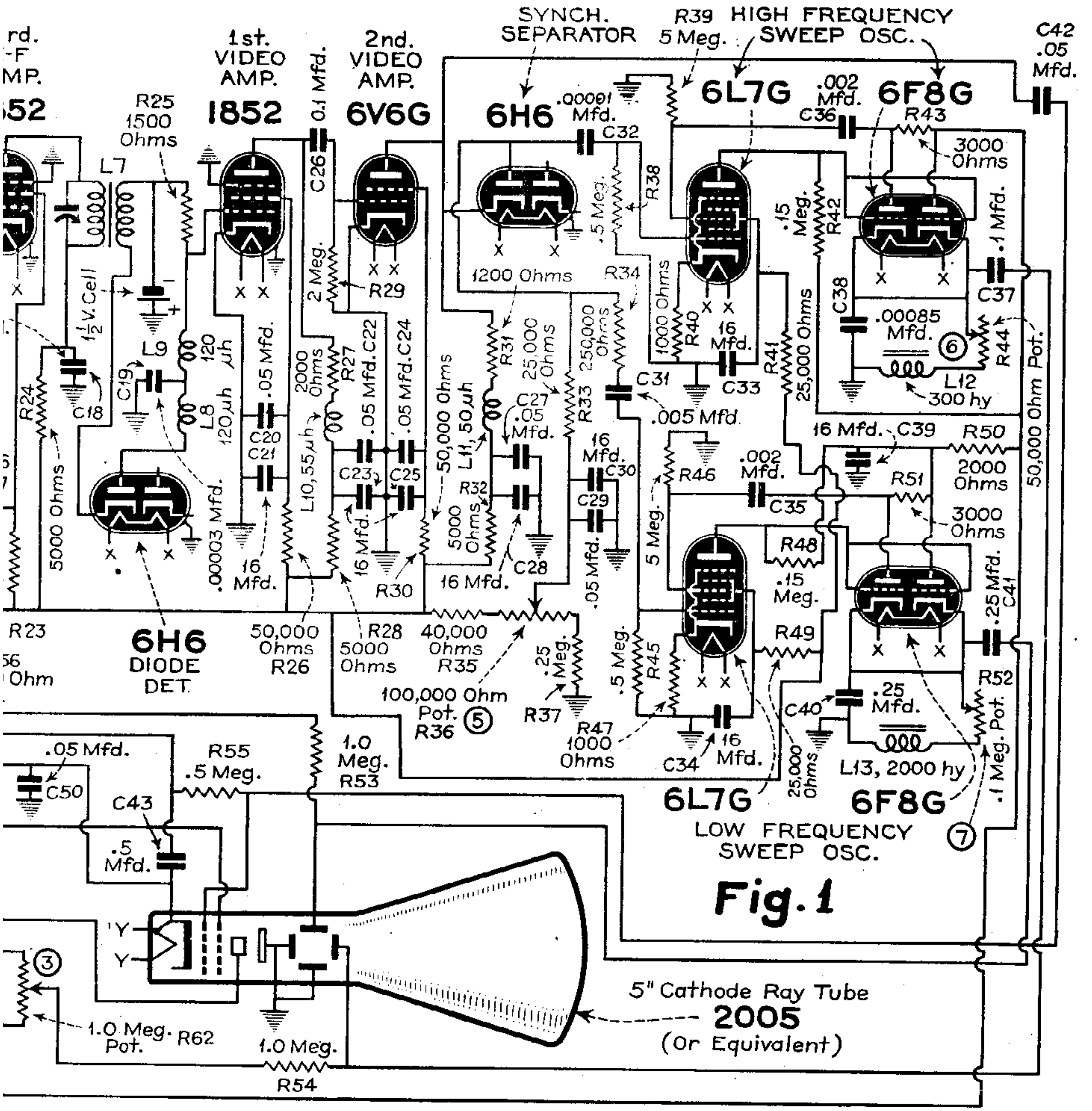


Fig. 1

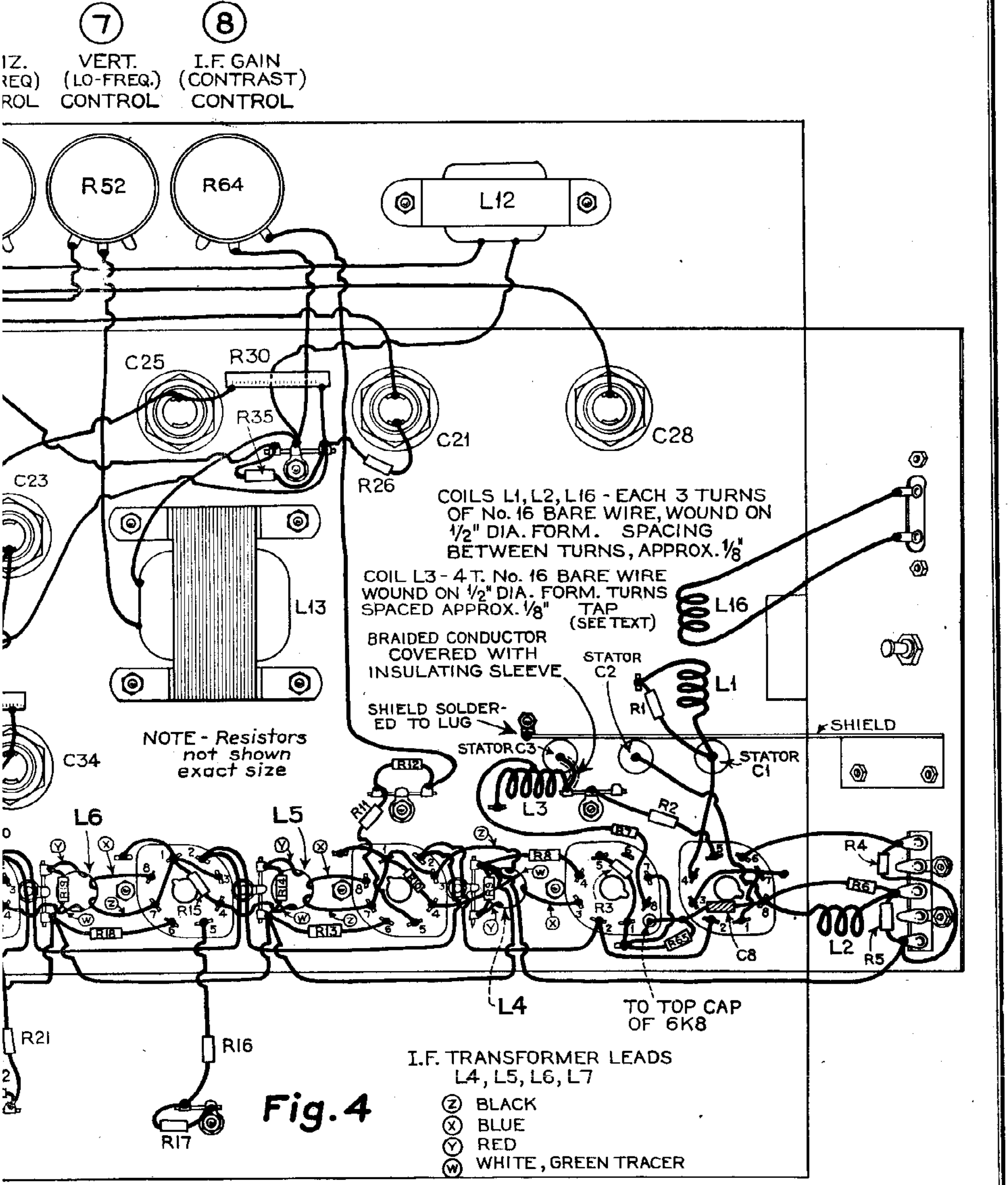
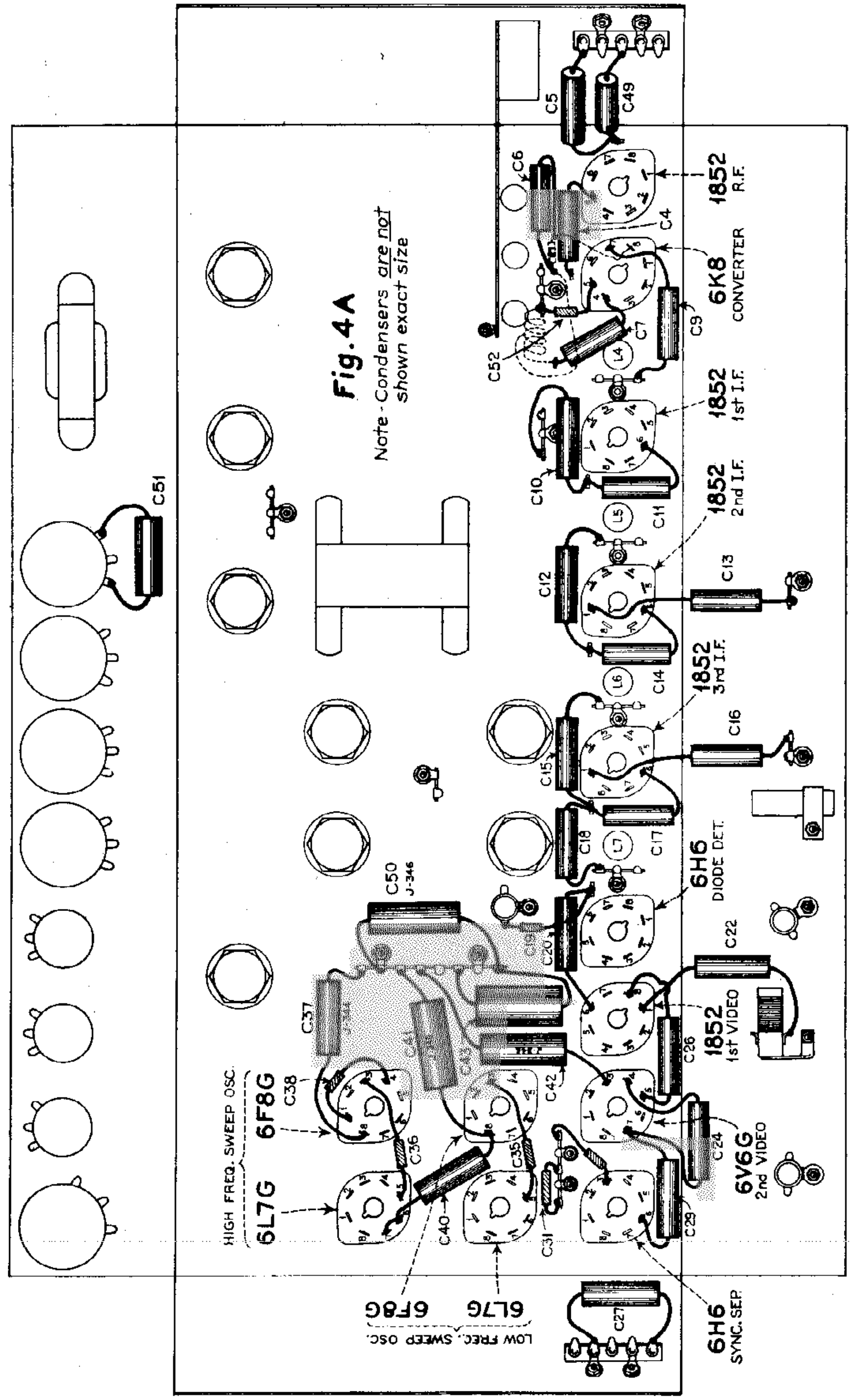

7
8
IZ.
REQ)
ROL
VERT.
(LO-FREQ.)
CONTROL
I.F. GAIN
(CONTRAST)
CONTROL
R52
R64
L12
C25
R30
R35
C21
C28
R26
C23
L13
C34
COILS L1, L2, L16 - EACH 3 TURNS OF No. 16 BARE WIRE, WOUND ON 1/2" DIA. FORM. SPACING BETWEEN TURNS, APPROX. 1/8"
COIL L3 - 4 T. No. 16 BARE WIRE WOUND ON 1/2" DIA. FORM. TURNS SPACED APPROX. 1/8"
TAP (SEE TEXT)
L16
BRAIDED CONDUCTOR COVERED WITH INSULATING SLEEVE
STATOR C2
L1
R1
SHIELD SOLDERED TO LUG
SHIELD
STATOR C3
STATOR C1
NOTE - Resistors not shown exact size
R12
R11
L3
R2
L6
L5
R7
R8
R4
R6
R18
R15
R13
R3
R65
C8
L2
R5
L4
TO TOP CAP OF 6K8
R21
R16
R17
I.F. TRANSFORMER LEADS L4, L5, L6, L7
Z BLACK
X BLUE
Y RED
W WHITE, GREEN TRACER

Fig. 4

MODEL 100
Chassis Wirin
(Bottom)

GAROD RADIO CO.



MODEL 100
Chassis View
Socket, Controls

GAROD RADIO CORP.

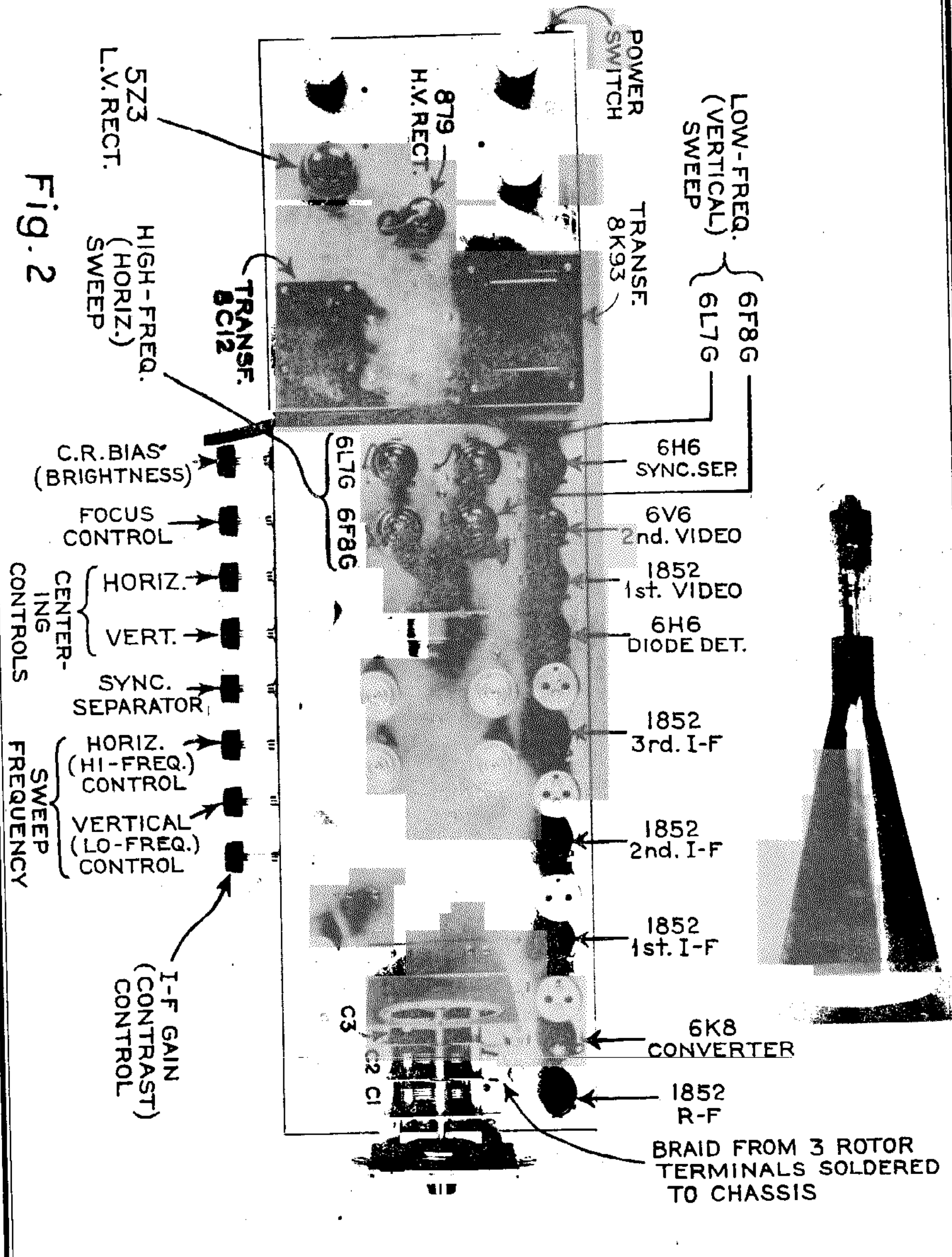


Fig. 2

GAROD RADIO CORP.

MODEL 100
Circuit Data
Assembly, Wiring Notes

Fig. I shows the Schematic circuit. It will be noted that is is of the Superheterodyne type. The antenna primary L 16 is connected to the Dipole (or other type) antenna thru a twisted pair. The secondary is tuned to the carrier frequency by the first section of the three gang condenser, and is fed into the grid of the 1852 R.F. amplifier. The plate circuit feeds thru inductor L 2 as a plate load into the control grid of the 6K8 converter (thru the .0001 mfd coupling condenser). The oscillator is of the Hartley type, although the elements have been used in a somewhat unconventional manner. Note that the oscillator plate (#6 pin) is not used. It was found that better stability was obtained with the circuit as shown, than with the conventional arrangement. The converter is followed by three I.F. stages operating at 12 M.C. The 6H6 is used as a diode detector in the usual way. The two chokes L8 – L9 together with the .00003 mfd condenser serve as a filter to remove the I.F. component from the VIDEO channel. The 1852 and 6V6 act as 1st and 2nd VIDEO AMPLIFIERS respectively for the picture signal. A single 1½volt cell such as is used for Pen-Lite flashlights supplies the "C" bias for the 1852 first video stage. This cell is not supplied with the kit, but can be obtained at any Five and Ten Cent store or hardware store. This cell will last for a considerable period, since no current is drawn. The output of the 6H6 is connected to the control grid of the Cathode Ray tube as well as the SYNCH. SEPARATOR.

A second 6H6 serves as a SYNCH. SEPARATOR. This function is accomplished by putting a negative bias on the DIODE plate. This bias may be varied by means of the 100,000 POT. (R36). Thus, since no current can flow until this negative bias is overcome, we have a means of selecting a part of the incoming wave, by adjusting this bias. Since the synchronizing impulses are of considerably higher amplitude than the picture signals, we can adjust our bias so as to bar the passage of these picture signals and permit only the high amplitude Synch. signals to come thru the diode.

The Low and High Frequency SYNCH impulses are then separated by frequency discrimination. The low frequency pulses cannot pass thru the .0001 condenser which couples to the high frequency sweep, but are attenuated very little by the .005 leading to the Low Frequency sweep oscillator.

The Sweep circuit oscillators are of the multi-vibrator type, are very stable in operation, and can be readily controlled by the SYNCH. pulses, which are introduced into the respective grids of the 6L7 tubes. Both sweeps utilize the same circuit arrangement, except of course, that different constants are used for the Horizontal (HIGH) and Vertical (LOW) sweep frequencies. The saw-tooth waves generated in such a multi-vibrator, are, if no compensating means is used, logarithmic in form. Chokes L12 and L13 are therefore inserted to correct this deficiency and produce a saw-tooth, substantially linear, so that the Electron beam is carried across the tube at a uniform rate.

The Synchronized saw-tooth pulses are then fed to the two sets of deflecting plates to scan the face of the Picture tube by means of the Electron Beam emitted by the Electron Gun in the neck of the tube. This beam is in turn modulated (thru the control grid) by the picture impulses obtained from the output of the 6V6.

An 879 Rectifier fed by a separate transformer supplies the High Voltage for the Cathode Ray tube. The 5Z3 serves as a full wave rectifier for the sweep circuits, and other receiver functions. Adequate filtering is used to eliminate any hum voltages that might otherwise interfere with proper operation.

Means are provided for centering the picture by varying the fixed positive potential on the two sets of deflecting plates. Other controls focus the beam by changing the potential on the focusing electrode (R59) and adjust the bias on the Cathode Ray tube (R56) to set the average brightness. (CONTRAST)

Note that the I.F. as well as R.F. circuits are very heavily loaded, so as to broaden the response curves sufficiently to pass the wide band required for good definition.

ASSEMBLY AND WIRING

The assembly of the component parts may be seen from the photographs FIGS 2 and 3 and diagrams 4, 4A and 5. All parts should be assembled as shown and checked against the circuit diagram to prevent any possibility of error. The dial assembly is shown in the sketch. (FIG 6) The 2 angle brackets which hold the dial to the chassis are fastened with Self-Tapping screws, which are provided. The cord is strung as indicated. The dial crystal is held by 2 TRIMOUNTS which are also provided. These are simply pressed into the holes, and may be removed to calibrate the scale by pushing them out from the rear. The pointer is fastened to the dial cord by pressing the prongs together, over the piece of sleeving, which has been slipped over the cord to prevent chafing.

Note that the end of the shield on the underside of the chassis is soldered to a lug fastened under one of the screws which holds the gang condenser. (See FIG4)

The large rubber grommet is slipped into the hole in the REAR picture tube support bracket and serves to insulate the leads from the tube socket.

Other grommets are located as shown in the various figures.

Coils L1, L2, L3, and L16 are wound with #16 bare wire (supplied with kit). A½" diameter form is used and removed after winding. Turns are spaced approximately 1/8". The number of turns is indicated in the diagram.

It is important that the wiring shown in FIGS 4 and 4A be followed carefully. As each wire or component is put in, it should be checked off on both schematic and picture diagrams. The grounds and heaters should be wired first, then the various B voltages, I.F. transformers; then resistors, mica and tubular condensers. All wiring should be as short and direct as possible. Particular care should be taken in wiring the Video Amplifier to avoid high Grid or Anode capacities to ground, since this will result in a loss of high frequencies with consequent poor detail. This applies especially to leads from the Diode detector to the 1852 and coupling condenser from 1852 to 6V6 as well as wiring from L 11. These should be lifted away from the chassis ¼ to ½ inch. Do not fasten the GRID LEAD from the picture tube to the chassis or wrap it around the other leads in the cable.

After the receiver has been assembled and wired it should be very carefully checked over, to see that it is wired in exact accordance with the schematic and pictorial diagrams. When this has been ascertained, insert all tubes into their respective sockets, as shown in the photograph.

CAUTION

Approximately 1400 volts is supplied to the high voltage Anode. This voltage should be treated with great respect, since under certain conditions it may be *DANGEROUS*. Be sure that the power switch is *OFF* or better still, remove the line cord from the outlet, when making any changes, or touching any parts, other than the control knobs.

With a High Resistance (1000 ohms per volt) Voltmeter, measure all voltages, with respect to the chassis. Results should be approximately as tabulated. Variations will occur due to line voltage conditions and tubes. If there is any SUBSTANTIAL deviation in voltage from that given in this table, ascertain the reason, and correct it before proceeding further, or damage to tubes or other components may result.

WARNING

Be sure that the Voltmeter prongs are well insulated and use great care in making these measurements to avoid shock from the High Voltage supply.

MODEL 100
S.P.U.Chassis Wiring
Voltage

GAROD RADIO CORP.

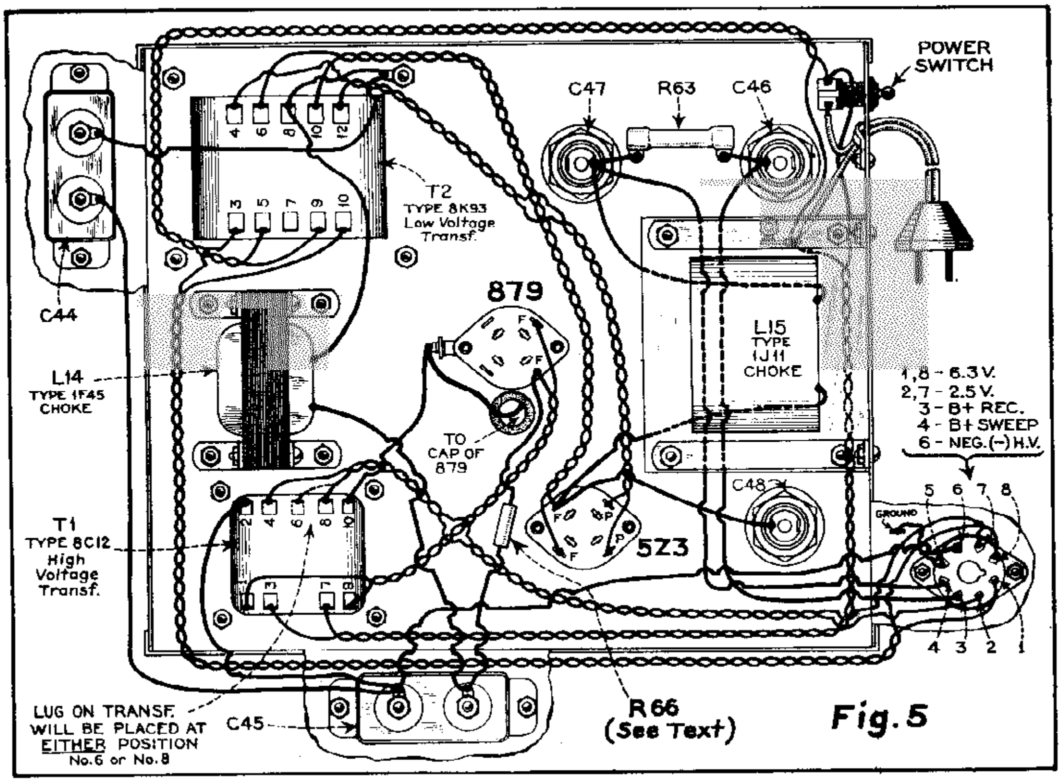


Fig. 5

VOLTAGE TABLE — TELEVISION RECEIVER

		CAP.	1		2		3		4		5		6		7		8	
1852	R. F. Amp.		SH.	0	H	6 A. C.	Sup.	0	GR.	0	K	2	SC.	160	H	0	P	290
6K8	Converter	Contr. GR. 0	SH.	0	H	6 A. C.	P	275	SC	135	Osc. GR.	0	Osc. Pl.	0	H	0	K	1.4
1852	1st I.F. Amp.		SH.	0	H	6 A. C.	Sup.	0	GR.	0	K	7	SC.	157	H	0	P	290
1852	2nd I.F. Amp.		SH.	0	H	6 A. C.	Sup.	0	GR.	0	K	2	SC.	170	H	0	P	150
1852	3rd I.F. Amp.		SH.	0	H	6 A. C.	Sup.	0	GR.	0	K	2	SC.	170	H	0	P	150
6H6	Diode Det.		SH.	0	H	6 A. C.	D.P.2	X	K-2	X	D.P.1	-15	X		H	0	K-1	-1.5
1852	1st Video		SH.	0	H	6 A. C.	Sup.	0	GR.	0	K	0	SC.	160	H	0	P	235
6V6G	2nd Video		X		H	6 A. C.	P	90	SC	125	G	-2	X		H	0	K	0
6H6	SYNC. Sep.		SH.	0	H	6 A. C.	D.P.2	100	K-2	92	D.P.1		X		H	0	K-1	
6L7G	Hi-Freq. Sweep	Contr. GR. 2	X	0	H	6 A. C.	P	150	SC	150	Inj.GR	2	X		H	0	K	10
6F8G			X	0	H	6 A. C.	P-2	435	K-2	250	G-1	150	P-1	435	H	0	K	-1250
6L7G	Low Freq. Sweep	Contr. GR. 2	X	0	H	6 A. C.	P	110	SC	135	Inj.Gr	2	X		H	0	K	8
6F8G			X	0	H	6 A. C.	P-2	235	K-2	270	G-1	110	P-1	240	H	0	K-1	170
2005	Videotron		A-2	0 (Black)	H	2.2 AC to #7 (Blue)	A-1	-850 (Yellow)	Def-1 Pl.	85 (Red)	GR-1	-1250 (Orange)	Def-3 Pl.	100 (Green)	H&K	-1250 (Brown)	GR#2	-1000 (Grey)
5Z3	Low Voltage Rect.		F	5AC 470	P				F	5AC 470								
879	High Voltage Rect.	-1380	F	2.3AC					F	2.3AC								

ALL VOLTAGES MEASURED WITH A HIGH - RESISTANCE D.C. VOLT METER (EXCEPT HEATERS)
ALL CONTROLS TURNED ALL WAY TO THE RIGHT (CLOCKWISE)

SH - Shell
H - Heater
Sup. - Suppressor Grid
GR. - Grid
K - Cathode
SC. - Screen
P - Plate
D.P. - Diode Plate
Def.Pl. - Deflecting Plate
A - Anode
Inj. Grid. - Injector Grid
F. - Filament
X. - No connection

MODEL 100
Alignment, Operating
Antenna Notes

GAROD RADIO CORP.

ALIGNMENT AND OPERATION

Set the Picture Tube bias control (#1) all the way to the right. Set the Horizontal and Vertical Sweep (#6 and 7) controls approximately half way.

Now turn the Spot locating control (#3) all the way to the left and rotate the other spot control (#4) thru its entire range. If neither a spot nor a Raster (the scanning pattern) appears, move the first spot locating control (#3) slightly to the right and rotate the other locating control thru its entire range again. Continue this procedure step by step until something appears upon the viewing screen of the Cathode Ray Tube.

Now adjust the Vertical and Horizontal Sweep controls until a complete raster appears. This should be approximately 4" square (The actual picture will be somewhat smaller due to the presence of the Blanking and Sync pulses in the station carrier).

By means of the Spot Location controls (#3 and #4) this Pattern may now be centered on the tube face. The Cathode Ray Tube socket can be rotated to level the Raster.

The size of the picture is determined by two factors, namely; the sweep circuit voltage and the voltage applied to the second anode. The picture increases with increase in sweep voltage and decreases INVERSELY as the square of the second or High voltage Anode potential. The saw-tooth voltage developed by the multi-vibrators is a function of the "B" voltage applied to the plates. Since we are operating near the voltage limit of the 5Z3 rectifier tube, it is impractical to obtain any improvement in this direction. Amplifiers could be used to increase the sweep voltages, but this would complicate matters greatly. The other alternative is to reduce the 2nd Anode voltage. Referring to the circuit diagram, a 100,000 ohm (R66) dropping resistor is indicated in series with the low voltage filter system. This results in a larger picture, at only a slight sacrifice in brilliance. The use of this resistor is optional, depending upon which characteristic is the more desirable.

The Image Ratio should be 4:3. If the picture does not conform to this ratio, a rearrangement of resistors in the sweep plate and screen circuits will correct this. Potentiometers could be inserted to control the voltages applied to the deflection plates, but these additional controls are hardly necessary, since once this adjustment is made, it need not be changed, for a given set of tubes.

After this has been satisfactorily checked, we may proceed to the I.F. amplifier adjustments. An output meter or preferably an Oscilloscope is connected across the output of the Video amplifier (6V6 plate). A signal from a Signal Generator or equivalent source is now introduced at the converter grid (6K8). The Intermediate Frequency is 12M.C. The I.F. transformers are now adjusted for maximum output in the conventional way.

Now introduce a signal, whose frequency is approximately that of the principal station to be received, into the antenna circuit. Tune this signal by rotating the dial, then align the antenna and R.F. circuits for maximum output by means of the trimmers on the variable condenser.

After this has been done, the receiver is ready for a test on the air. It is best to make adjustments on the fixed pattern transmitted by Television stations during test periods preceeding the regular scheduled programs. The I.F. system should now be readjusted by staggering the peaks to accept a wide band of frequencies (2 Megacycles). This will result in considerable improvement in picture detail, with relatively slight loss in gain.

The I.F. transformers are heavily loaded (with 1500 ohms across each secondary). It is possible to omit these, with an increase in gain if they are carefully realigned so as to stagger the peaks, with a resultant "square top" resonance curve over the desired band.

The R.F. circuits should now be realigned for best tracking. It may be necessary to adjust the R.F. coil inductances slightly to obtain the proper range and tracking. If necessary the end plates of the variable condenser may be bent to accomplish this.

About 20 Volts at the Control Grid of the Cathode Ray Tube is necessary in order to obtain a good picture. If everything is functioning properly this should be easily obtained from stations within range. This can be checked with a vacuum tube voltmeter or calibrated oscilloscope.

A little experience will enable the user to tune in a station quickly and clearly. Proper manipulation of the controls is important, and the function of each should be studied carefully and thoroughly understood. A cathode bias control in the first I.F. stage sets the over-all gain. Other controls locate the pattern, Vertically and Horizontally; set the Vertical and Horizontal Sweep Frequencies; adjust Focus of the Picture Tube, fix the Average Brightness (Contrast); and adjust the Sinc separator and Selector. See Illustration.

RECEIVING ANTENNA

The installation of an antenna for Television reception is extremely important. In residential locations, the antenna should be elevated as high as possible and located in such a way as to be furthest from sources of interference. Automobile ignition systems cause considerable interference, as do electrical devices having sparking or intermittant contacts. Reflections from buildings, bridges and steel or other metal structures may result in multiple transmission, thereby producing 2 or more images superimposed upon each other, due to the slight time difference in the arrival of the several reflected waves.

This effect may become extremely critical in large cities where a great number of these high structures are present. If possible a "line of sight" transmission path from the transmitter antenna should be selected. Again, care must be taken to obtain the maximum freedom from electrical interference, since this will result in spotting and blotching of the picture.

It is noticed that less of this "noise" interference, from automobile ignition systems particularly, is picked up when using a Horizontally polarized antenna than with a vertical antenna. Since, from all other considerations, it is equally as effective it is therefore desirable to use such an antenna for our Television receiver, when the field strength is sufficient to give us the necessary signal for satisfactory operation.

A simple dipole with twisted-pair lead-in (or a transposed lead-in) will usually give satisfactory results. These dipoles are available with arms of adjustable length and so arranged that they can be rotated. For a given station, maximum pickup will be obtained when the dipole is at right angles to the signal path from the transmitter. Where several stations are to be received, or the field strength is inadequate, more complicated forms of antennae may be required, or in the case of a directive antenna, a compromise may have to be reached so as to include all the desired stations within range. The length of the dipole is adjusted for maximum pickup from desired stations. An overall length of 120 inches is suggested for a start. In some cases, it may be desirable to use separate antennas facing in different directions for different stations.

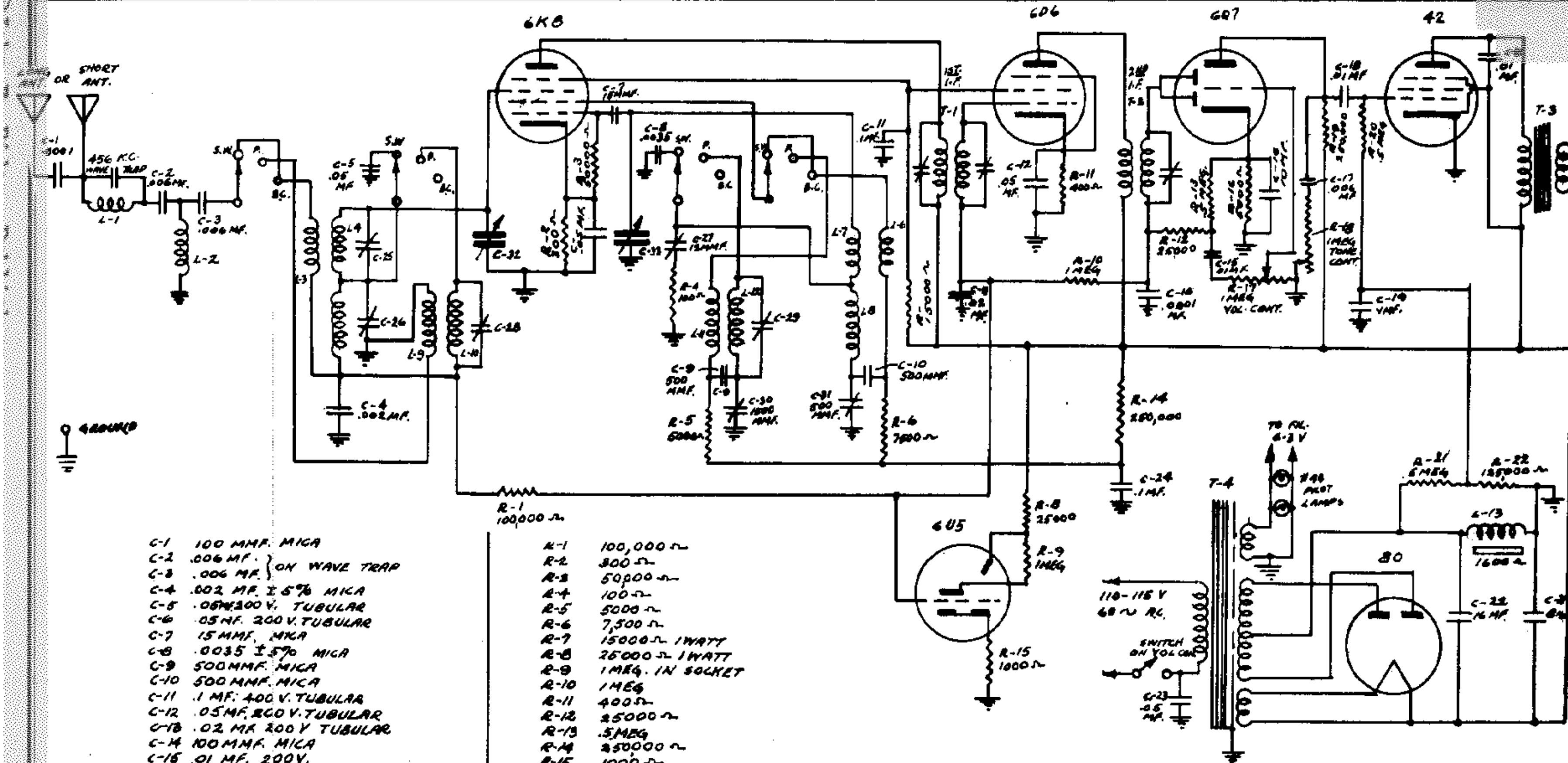
It is extremely important that the antenna be securely fastened so as to prevent swinging of either the antenna itself, or the transmission line, since this may result in intermittent blurring or loss of the picture. (To avoid complications, no A.V.C. system has been incorporated in this receiver.)

It is strongly recommended that the builder study all literature available on Television and Ultra Short waves before attempting to go ahead with the construction so as to enable him to proceed intelligently. A knowledge of the exact function of each component will help greatly towards the successful accomplishment of the desired results.

References: QST - Dec, Jan, Feb, Mar, Apr, May 1937
ELECTRONICS - 1937-38
TELEVISION - Vol I and II - RCA Technical Press.

MODEL L 369
Schematic

GAROD RADIO CORP.



SW. 22.5 M.C. - 5.8 M.C. OR 13.3 METERS - 51.7 METERS
P. 6.25 M.C. - 2.2 M.C. OR 48 METERS - 136.5 METERS
B.C. 1720 K.C. - 543 K.C. OR 174.5 METERS TO 552 METERS

FOR ALIGNMENT
SEE INDEX

I.F. = 456 K.C.

6 TUBE A.C. RECEIVER 3 BAND	
USED ON 369 C-21	
DWN BY J.K.	CHECKED BY.

C-1 100 MMF. MICA
C-2 .006 MF. } ON WAVE TRAP
C-3 .006 MF. }
C-4 .002 MF. ±5% MICA
C-5 .05 MF. 200 V. TUBULAR
C-6 .05 MF. 200 V. TUBULAR
C-7 15 MMF. MICA
C-8 .0035 ±5% MICA
C-9 500 MMF. MICA
C-10 500 MMF. MICA
C-11 .1 MF. 400 V. TUBULAR
C-12 .05 MF. 200 V. TUBULAR
C-13 .02 MF. 200 V TUBULAR
C-14 100 MMF. MICA
C-15 .01 MF. 200 V.
C-16 10 MF. 25 W.V.
C-17 .006 MF. 600 V.
C-18 .01 MF 400 V.
C-19 .1 MF. 200 V.
C-20 .01 MF. 400 V.
C-21 8 MF. 450 W.V.
C-22 16 MF. 450 W.V.
C-23 .05 MF 400 V TUBULAR
C-24 .1 MF. 400V.
C-25 30 MMF. TRIMMER
C-26 } DUAL 12 MMF. TRIMMER
C-27 }
C-28 } DUAL 12 MMF. TRIMMER
C-29 }
C-30 1500 MMF PADDER
C-31 500 MMF. PADDER
C-32 } TWO GANG 450 MMF. VARIABLE #2.136
C-33 }

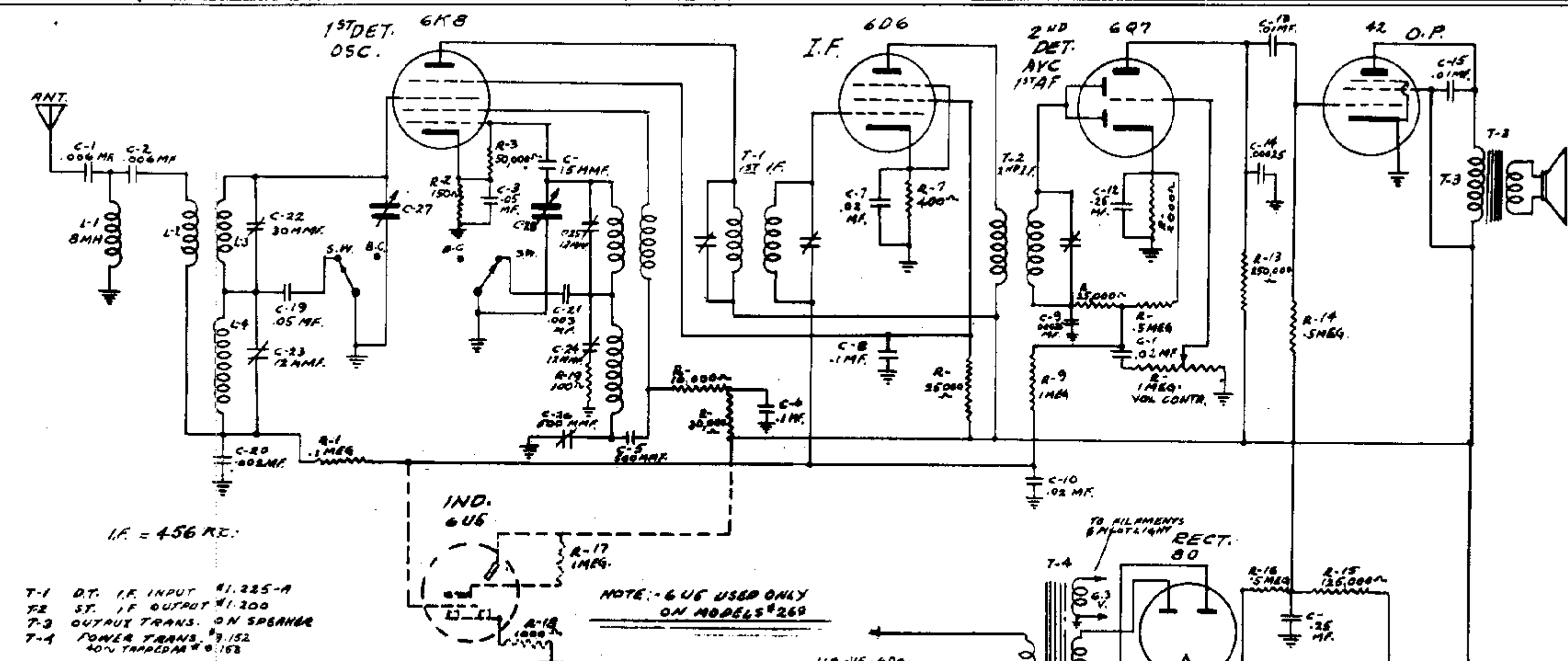
T-1 INPUT I.F. #1.163
T-2 OUTPUT I.F. #1.200
T-3 OUTPUT TRANS. ON SPEAKER
T-4 POWER TRANSFORMER

R-1 100,000 Ω
R-2 300 Ω
R-3 50,000 Ω
R-4 100 Ω
R-5 5000 Ω
R-6 7,500 Ω
R-7 15000 Ω 1 WATT
R-8 25000 Ω 1 WATT
R-9 1 MEG. IN SOCKET
R-10 1 MEG
R-11 400 Ω
R-12 25000 Ω
R-13 .5 MEG
R-14 250000 Ω
R-15 1000 Ω
R-16 5000 Ω
R-17 1 MEG. VOL. CONTROL
R-18 1 MEG TONE CONTROL
R-19 250 000 Ω
R-20 .5 MEG
R-21 .5 MEG
R-22 125,000 Ω
R-23

L-1 456 K.C. WAVE TRAP } ON #1.198
L-2 CHOKE }
L-3 }
L-4 } TWO BAND ANT. COIL #1.217
L-5 }
L-6 }
L-7 } TWO BAND OSC. COIL #1.218
L-8 }
L-9 } POLICE BAND ANT. COIL } #1.237
L-10 }
L-11 } POLICE BAND OSC. COIL }
L-12 }
L-13 1600 Ω SPEAKER FIELD

MODELS 259,269
Schematic, Socket
Trimmers

GAROD RADIO CORP.



I.F. = 456 KC.

T-1 DT. I.F. INPUT #1.225-A
T-2 ST. I.F. OUTPUT #1.200
T-3 OUTPUT TRANS. ON SPEAKER
T-4 POWER TRANS. #9.152 / 40N TAPPED PR. #9.153

NOTE:- 6U6 USED ONLY ON MODELS #269

SHORT WAVE (S.W.) 23 - 5.8 M.C.
BROADCAST (B.C.) 1720 - 545 K.C.

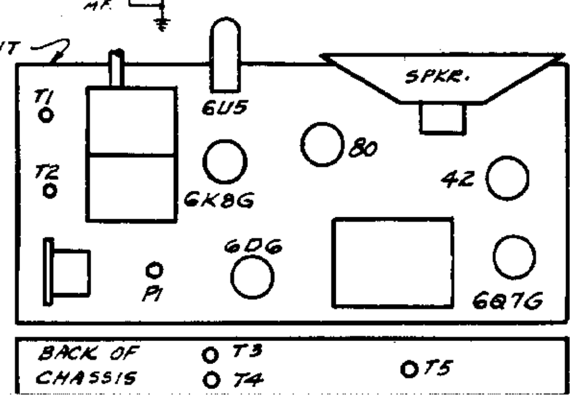
2 BAND A.C. RECEIVER	
USED ON MODEL #259	SCALE
PART#	
DR.	CH.	DATE 11-8-37

C-1 .006 MF. 600 V.
C-2 .006 MF. 600 V.
C-3 .05 MF. 200 V.
C-4 15 MMF. MICA
C-5 500 MMF. MICA
C-6 .1 MF. 400 V.
C-7 .02 MF. 200 V.
C-8 .1 MF. 400 V.
C-9 250 MMF. MICA
C-10 .02 MF. 200 V.
C-11 .02 MF. 400 V.
C-12 .25 MF. 200 V.
C-13 .01 MF. 400 V.
C-14 250 MMF. MICA
C-15 .01 MF. 400 V.
C-16 16 MF. 450 W.V.
C-17 16 MF. 450 W.V.
C-18 .01 MF. 400 V.
C-19 .05 MF. 200 V.
C-20 .002 MF. ±5% MICA
C-21 .003 MF. ±5% MICA
C-22 30 MMF. TRIMMER
C-23, C-24 } DUAL 12 MMF. TRIMMER COND.
C-25 12 MMF. TRIMMER COND.
C-26 500 MMF. PADDER COND.
C-27, C-28 } 2 GANG 450 MMF. VAR. COND. # 2.136

R-1 100,000 Ω
R-2 150 Ω
R-3 50,000 Ω
R-4 10,000 Ω
R-5 30,000 Ω
R-6 25,000 Ω 1 WATT
R-7 400 Ω
R-8 25000 Ω
R-9 1 MEG
R-10 .5 MEG
R-11 2000 Ω
R-12 1 MEG VOL. CONTR. #B.1398
R-13 250,000 Ω
R-14 .5 MEG.
R-15 125,000 Ω
R-16 .5 MEG
R-17 1 MEG. IN 6U6 SOCKET
R-18 1000 Ω (OPTIONAL)
R-19 100 Ω

L-1 8 MH. CHOKE
L-2, L-3, L-4 } 2 BAND ANT. COIL #1.217
L-5, L-6, L-7 } 2 BAND OSC. COIL #1.218
L-8 SPEAKER FIELD

FRONT



MODELS 259,269
MODEL 369
MODELS 629,729
MODEL 739
MODEL 7390

Alignment

GAROD RADIO CORP.

Re-alignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments are required.

During the alignment proceedure all adjustments should be made under the following conditions.

1) Line voltage as indicated on instruction sheet
2) Volume and tone control at maximum volume positions.
3) Minimum input from signal generator.

If this proceedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic volume control.

ALIGNMENT - MODELS 259,269,629,729,739,7390, and 369.

I.F. ADJUSTMENT The signal generator is set at 456 KC and is connected to the grid of the converter tube (6K8) through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 ohms between the converter grid and ground so that the grid circuit is at ground potential for D.C.

The Band switch should be set on Broadcast and the pointer set at 550 kc. The Imput I.F. transformer trimmers are located on the rear chassis apron, between the variable condenser and the 6D6 I.F. tube. Both screws are adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker output transformer.

The output I.F. transformer trimmer is located on the rear chassis apron, under the power transformer adjust the trimmer for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

BROADCAST BAND

The dummy antenna for this band consists of only a 250 MMFD condenser. Set the band Switch in the Broadcast position and condenser plates completely out of mesh.

MODEL -259,269.
Set the signal generator at 1720 KC and adjust the broadcast oscillator trimmer located on top of the chassis (it is the trimmer to the rear of the chassis) until a response is indicated on the output meter. The generator is now set at 1500 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1500 KC mark on the dial. Adjust the 1500 KC Antenna trimmer (located on top of the chassis, near the variable condenser. It is the trimmer to the front of the chassis.) for maximum output.

MODEL-629,729.
Set the signal generator at 1770 KC and adjust the broadcast oscillator trimmer on top of the chassis, to the right of the gang condenser. The oscillator trimmer is the front adjustment, until a response is indicated. The dial pointer should now co-incide with the 1500 KC mark on the dial. Adjust the 1500 KC Antenna for maximum output.

MODEL 739, 7390
Set the signal generator at 1720 KC and adjust the broadcast oscillator trimmer (under the chassis, behind the tone control. The oscillator trimmer is the one nearest the band switch) until a response is indicated on the output meter. The generator is now set at 1500 KC. Turn the variable condenser until a response is indicated. The dial pointer should now coincide with the 1500 KC mark on the dial. Adjust the 1500 KC Antenna trimmer (located adjacent to the oscillator trimmer, under the chassis) for maximum output.
Set the generator at 600 KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padder condenser (located directly behind the variable condenser) for maximum response while "rocking" the gang condenser. The high frequency adjustments should now be rechecked.

SHORT-WAVE BAND #1 ADJUSTMENT. (right position) FOR MODEL 369 ONLY
Set the band switch to the extreme (left hand position) which is short wave band #1. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is connected to the "short-antenna" lead through a dummy antenna consisting of a 250 MMFD condenser and a 400 ohm non-inductive resistor in series. *With the generator set at 22MC (22.5MC) the short wave oscillator trimmer is opened until a response is heard. The trimmer condenser is then opened further (capacity reduced) until a second response is heard. This response (with trimmer at low capacity) is the correct response to use. the other being the image.
With the generator set at 23MC—FOR MODELS 629,729.
Set the generator at 19MC Turn the condenser until a response is indicated. The pointer should coincide with the 19MC mark on the dial. Adjust the antenna trimmer for the short-wave band (located under the chassis, on the antenna coil) for maximum output while rocking the condenser gang from left to right.

SHORT WAVE BAND #2 MODEL 369 ONLY
Set the band switch to the middle position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for band #1. The generator is set at 6.25 MC and the Band #2 oscillator trimmer is opened until a response is indicated at the lower capacity setting of the trimmer. (Located on top of the chassis, behind the dial bracket. The one is the front trimmer). Set the generator at 6MC and turn the variable condenser until a response is indicated. The pointer should now co-incide with the 6 MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from right to left. The antenna trimmer is located on the top of the chassis, in line with and directly behind the oscillator trimmer. Set the generator at 2.4 MC and turn the variable condenser knob until a response is indicated. The padder for this band, which is located on top of the chassis and is the projecting adjacent screw to the right of the osculator trimmer, is now adjusted for maximum output while rocking the condenser gang from left to right. The high frequency adjustments should then be rechecked.

LONG WAVE BAND MODEL 7390 ONLY
The dummy antenna for this band is the same one used in aligning the broadcast band.

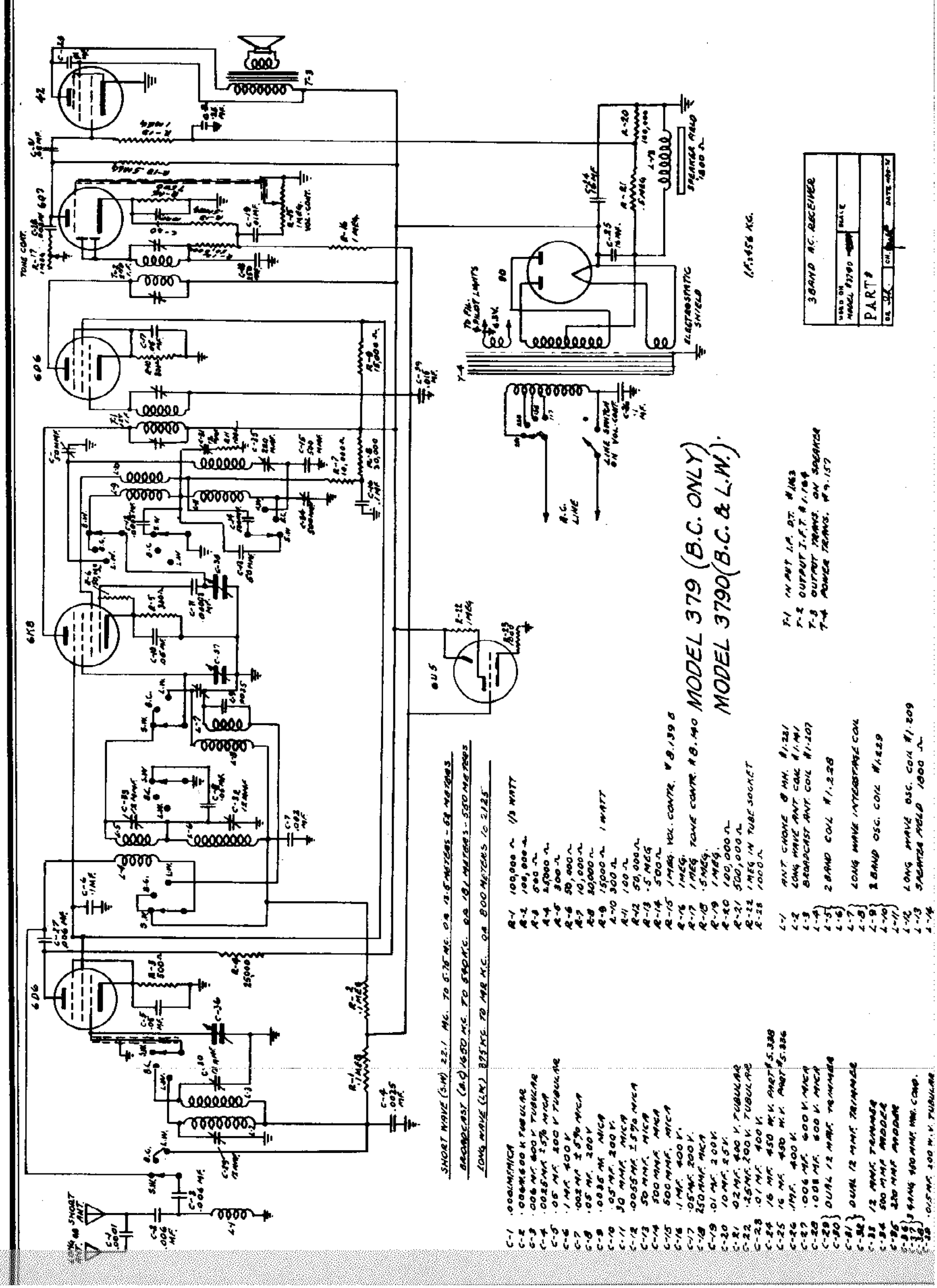
Set the generator at 300 KC. Set the dial pointer so as to coincide with the 300 KC mark on the dial. The long-wave oscillator trimmer (located on top of chassis, right hand side, behind the right hand dial bracket. The oscillator is the rear trimmer) is now adjusted until a response is indicated. The long wave antenna trimmer (located adjacent to the oscillator trimmer) is now adjusted for maximum output.

Set the generator at 150 KC and tune for a response. Adjust the Long-Wave padding condenser (located on top of chassis to the right and forward of the oscillator antenna trimmers for maximum output while "rocking" the gang condenser. The high frequency adjustments should now be rechecked.

Now set the signal generator at about 1200 kc and leave THE BAND SWITCH ON THE LONG WAVE POSITION. Adjust the generator output voltage until a response is heard. The 1200 kc wave trap on top right of the chassis is now adjusted for MINIMUM response.

MODELS 379,3790
Schematic

GAROD RADIO CORP.



MODELS 379,3790
Socket,Trimmers
Tuner Data

GAROD RADIO CORP.

MODEL 4159
Socket,Trimmers

MODELS 379 and 3790

PROCEDURE FOR SETTING STATION BUTTONS

Select the six favorite broadcast stations which you wish to set up for automatic tuning. The stations chosen should be from amount those received most clearly when using dial tuning. It is not advisable to use this system of tuning for short wave or distant broadcast stations.

Although each button will cover the entire dial range it may be most advisable, from the standpoint of convenience, to arrange the stations chosen in order of frequency.

SETTING THE STATION BUTTONS: The proper procedure is as follows--grasp the first button to be set with the finger tips and loosen it by unscrewing it about one-half turn to the left or in a counter clockwise direction. Now tune in the station which you desire to set on this button, using the regular tuning knob. After the station is perfectly tuned, hold the knob firmly with one hand and depress the button just loosened as far as it will go. Then tighten it gently by turning it to the right, or in a clockwise direction. The button should be kept depressed in the meantime, and the dial knob should be held firmly so that the station does not become detuned.

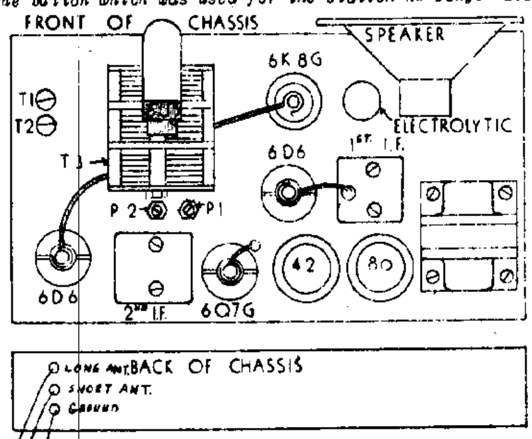
Now release the push button and turn it again in a clockwise direction to make sure it is firmly tightened. Then tune the dial off the station and try depressing the push button as far as it will go. The station should then be perfectly retuned. If it is not tuned properly that is, if you are able to retune it better with the dial, it will be necessary to repeat the above procedure.

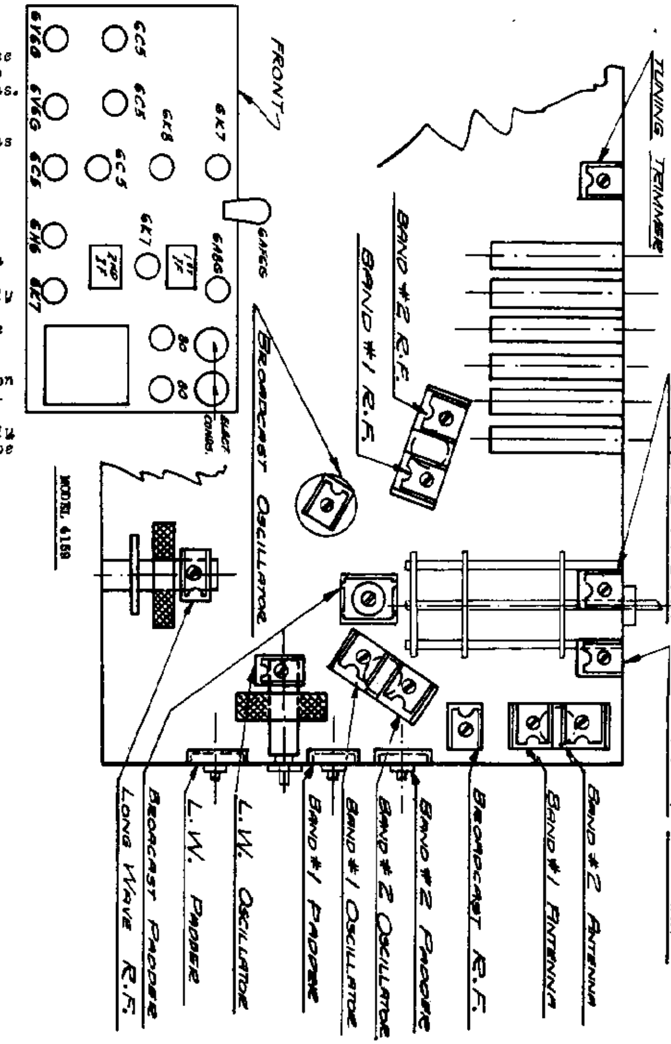
The other five buttons may now be set up in the same manner as described above, tuning each to one of the favorite stations which you have selected.

The tabs bearing the station call letters may now be removed from the sheet provided, and placed in the slots below the pushbuttons.

*When tuning with the pushbuttons, it must be remembered that this is a mechanically driven device, depending upon pressure for proper operation. For this reason the pushbuttons **must** be depressed firmly, otherwise the dial may not come to the correct setting before the button is released.*

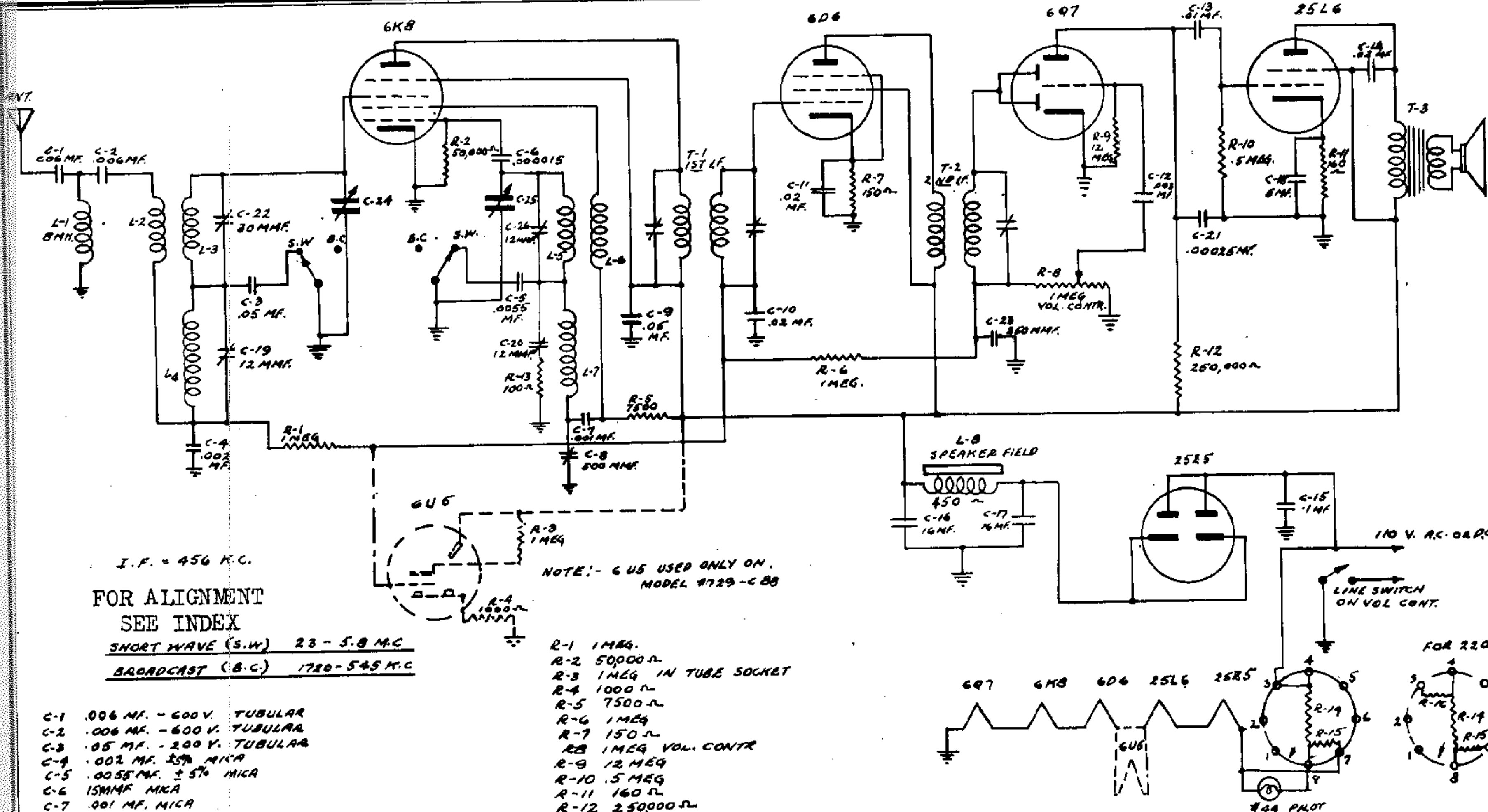
If at any time it is desired to change one of the stations which is set up for automatic tuning, this may be done without disturbing the settings of the other stations. Merely set up the new station on the button which was used for the station no longer desired.





MODEL 4159

GAROD RADIO CORP.



I.F. = 456 K.C.

FOR ALIGNMENT
SEE INDEX

SHORT WAVE (S.W.) 23 - 5.8 M.C
BROADCAST (B.C.) 1720 - 545 K.C

NOTE:- 6U6 USED ONLY ON MODEL #729-C88

C-1 .006 MF. - 600 V. TUBULAR
C-2 .006 MF. - 600 V. TUBULAR
C-3 .05 MF. - 200 V. TUBULAR
C-4 .002 MF. 5% MICA
C-5 .0055 MF. ± 5% MICA
C-6 15MMF MICA
C-7 .001 MF. MICA
C-8 500 MMF. PADDER
C-9 .05 MF 200 V. TUBULAR
C-10 .02 MF. 200 V. TUBULAR
C-11 .02 MF. 200 V.
C-12 .003 MF. 600 V. TUBULAR
C-13 .01 MF. 400 V.
C-14 .02 MF. 400 V.
C-15 .1 MF. 400 W.V.
C-16 } 16 MF. 150 W.V. ELECTROLYTIC } #5.337
C-17 } 16 MF. 150 W.V. ELECTROLYTIC
C-18 5 MF. 25 W.V.
C-19 } DUAL 3-12 MMF. TRIMMER
C-20 }
C-21 250 MMF. MICA
C-22 30 MMF. TRIMMER
C-23 250 MMF. MICA

R-1 1 MEG.
R-2 50,000 Ω
R-3 1 MEG IN TUBE SOCKET
R-4 1000 Ω
R-5 7500 Ω
R-6 1 MEG
R-7 150 Ω
R-8 1 MEG VOL. CONTR
R-9 12 MEG
R-10 .5 MEG
R-11 160 Ω
R-12 250,000 Ω
R-13 100 Ω
R-14 } BALLAST TUBE
R-15 }
R-16 } IN 220 V. BALLAST TUBE

L-1 8 MH. CHOKE
L-2 }
L-3 } 2 BAND ANT. COIL #1.217
L-4 }
L-5 }
L-6 } 2 BAND OSC. COIL #1.218
L-7 }

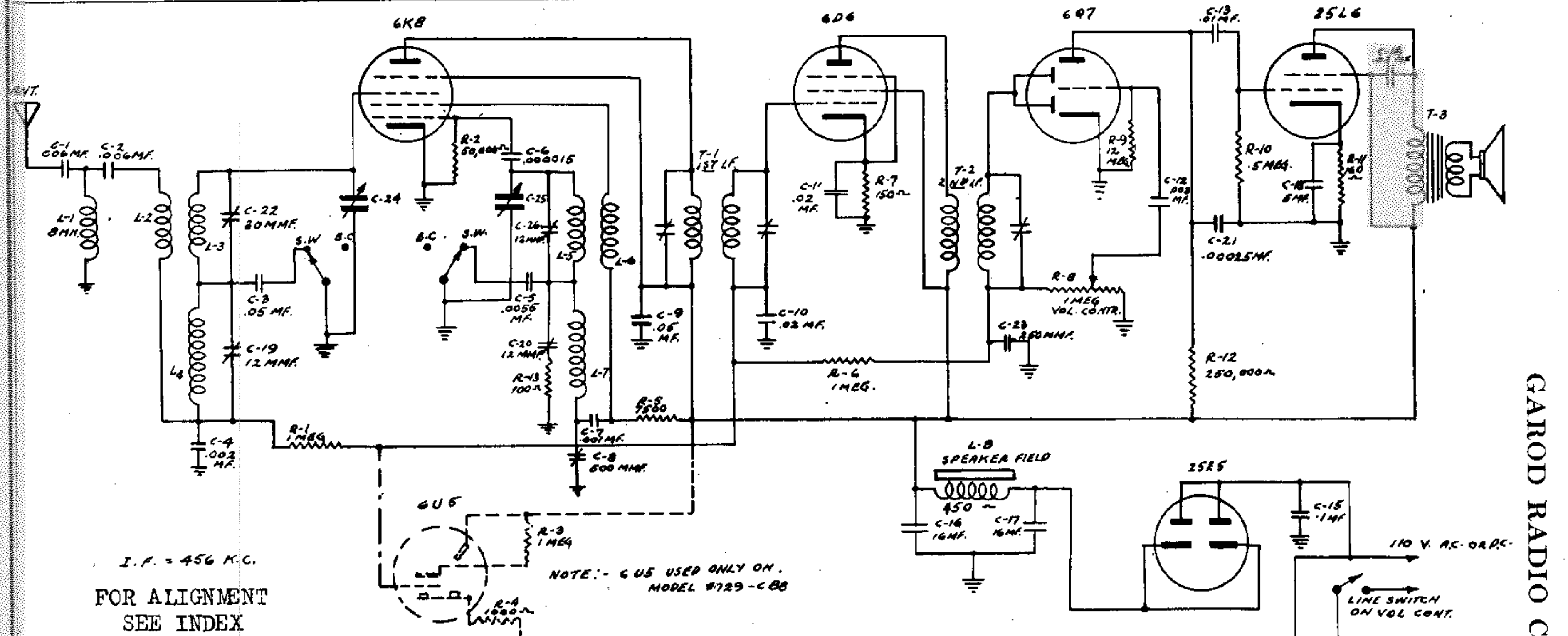
T-1 DOUBLE TUNED INPUT I.F. #1225
T-2 SINGLE TUNED OUTPUT I.F. #1200

SHORT WAVE (S.W.) 23 M.C. TO 5.8 M.C.
BROADCAST (B.C.) 1720 K.C. TO 545 K.C.

2 BAND A.C. & D.C. RECEIVER	
USED ON MODEL 629, [illegible]	SCALE
PART #	

MODELS 629,7
Schematic

GAROD RADIO CORP.



I.F. = 456 K.C.

NOTE:- 6U5 USED ONLY ON. MODEL #729-C88

FOR ALIGNMENT
SEE INDEX

SHORT WAVE (S.W) 23 - 5.8 M.C

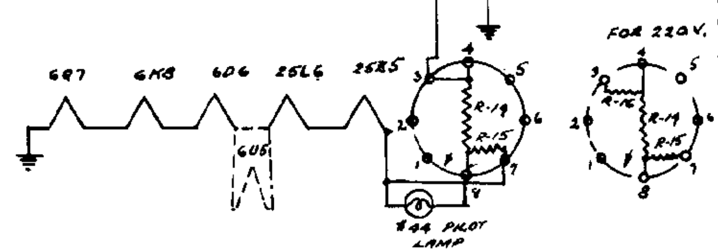
BROADCAST (B.C) 1720-545 K.C

C-1 .006 MF. - 600 V. TUBULAR
C-2 .006 MF. - 600 V. TUBULAR
C-3 .05 MF. - 200 V. TUBULAR
C-4 .002 MF. 25% MICA
C-5 .0055 MF. ± 5% MICA
C-6 15MMF MICA
C-7 .001 MF. MICA
C-8 500 MMF. PADDER
C-9 .05 MF. 200 V. TUBULAR
C-10 .02 MF. 200 V. TUBULAR
C-11 .02 MF. 200 V.
C-12 .003 MF. 600 V. TUBULAR
C-13 .01 MF. 400 V.
C-14 .02 MF. 400 V.
C-15 .1 MF. 400 W.V.
C-16 } 16 MF. 150 W.V. ELECTROLYTIC } #5.337
C-17 } 16 MF. 150 W.V. ELECTROLYTIC }
C-18 5 MF. 25 W.V.
C-19 } DUAL 3-12 MMF. TRIMMER
C-20 }
C-21 250 MMF. MICA
C-22 30 MMF. TRIMMER
C-23 250 MMF. MICA

R-1 1 MEG.
R-2 50,000 Ω
R-3 1 MEG IN TUBE SOCKET
R-4 1000 Ω
R-5 7500 Ω
R-6 1 MEG
R-7 150 Ω
R8 1 MEG VOL. CONTR
R-9 12 MEG
R-10 .5 MEG
R-11 160 Ω
R-12 250,000 Ω
R-13 100 Ω
R-14 } BALLAST TUBE
R-15 }
R-16 } IN 220 V. BALLAST TUBE

L-1 8 MH. CHOKE
L-2 }
L-3 } 2 BAND ANT. COIL #1.217
L-4 }
L-5 }
L-6 } 2 BAND OSC. COIL #1.218
L-7 }

T-1 DOUBLE TUNED INPUT I.F. #1225
T-2 SINGLE TUNED OUTPUT I.F. #1200



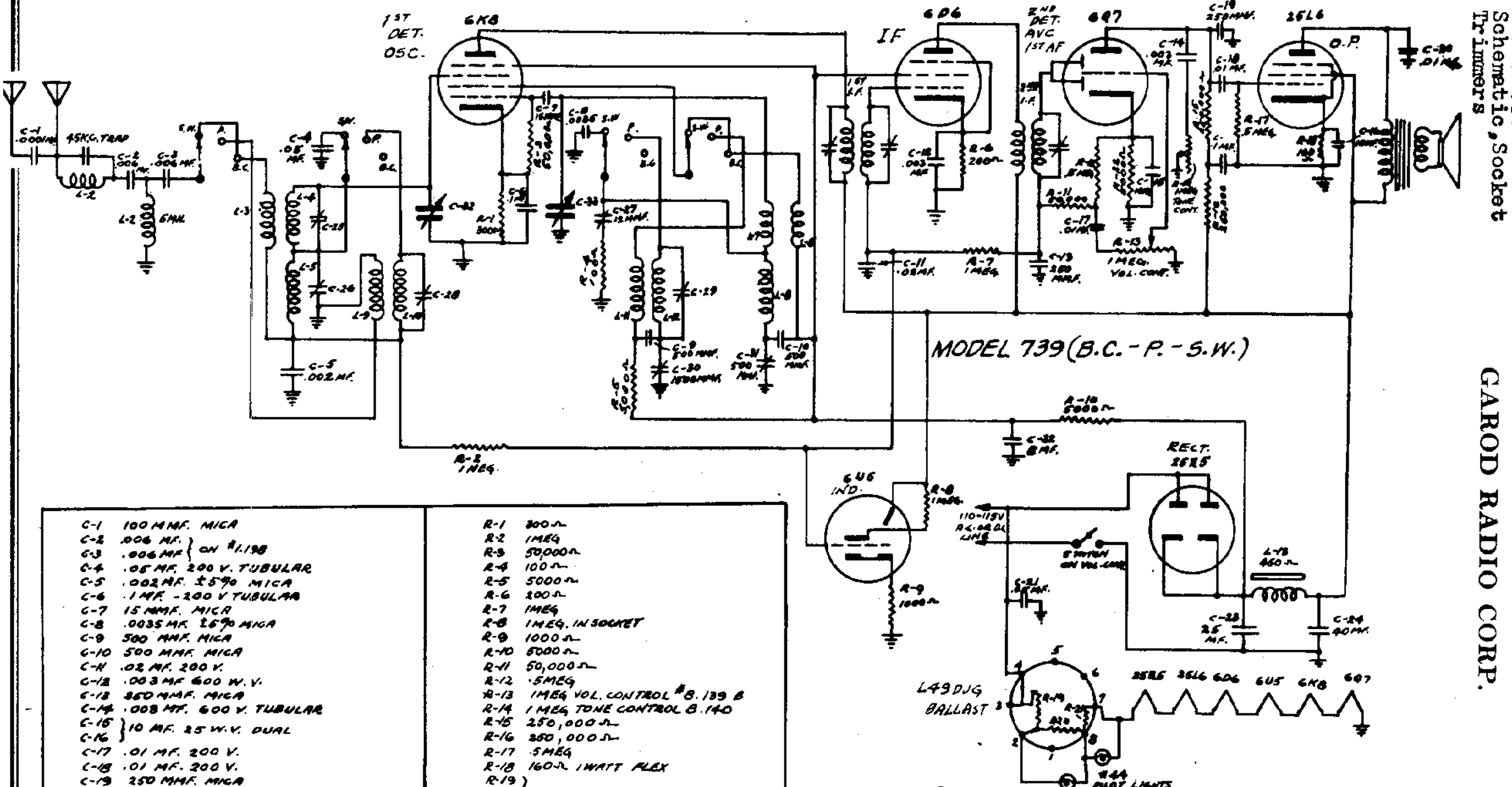
SHORT WAVE (S.W.) 23 M.C. TO 5.8 M.C.

BROADCAST (B.C) 1720 K.C. TO 545 K.C.

2 BAND A.C. & D.C. RECEIVER	
USED ON MODEL 629,	SCALE
PART #	

MODEL 739
Schematic, Socket
Trimmers

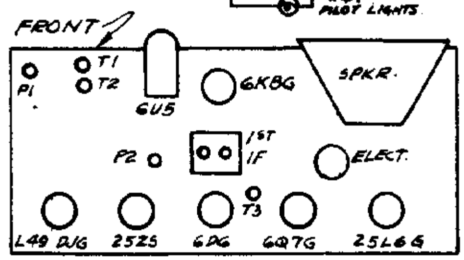
GAROD RADIO CORP.



C-1	100 MMF. MICA
C-2	.006 MF. } ON #1.198
C-3	.006 MF } ON #1.198
C-4	.05 MF. 200 V. TUBULAR
C-5	.002 MF. ±5% MICA
C-6	.1 MF. - 200 V TUBULAR
C-7	15 MMF. MICA
C-8	.0035 MF. ±6% MICA
C-9	500 MMF. MICA
C-10	500 MMF. MICA
C-11	.02 MF. 200 V.
C-12	.003 MF 600 W.V.
C-13	250 MMF. MICA
C-14	.008 MF. 600 V. TUBULAR
C-15 } C-16 }	10 MF. 25 W.V. DUAL
C-17	.01 MF. 200 V.
C-18	.01 MF. 200 V.
C-19	250 MMF. MICA
C-20	.01 MF. 200 V.
C-21	.05 MF 400 V.
C-22	8MF. 150 W.V.
C-23	25MF. 150 W.V. } #5.339
C-24	40 MF. 150 W.V. } #5.339
C-25	30 MMF. TRIMMER
C-26 } C-27 }	DUAL 12 MMF. TRIMMER
C-28 } C-29 }	DUAL 12 MMF. TRIMMER
C-30	1500 MMF. VARIABLE PADDER
C-31	500 MMF. VARIABLE PADDER
C-32 } C-33 }	2 GANG 450 MMF. VARIABLE #2.136-A

R-1	300 Ω
R-2	1MEG
R-3	50,000 Ω
R-4	100 Ω
R-5	5000 Ω
R-6	200 Ω
R-7	1MEG
R-8	1MEG. IN SOCKET
R-9	1000 Ω
R-10	5000 Ω
R-11	50,000 Ω
R-12	.5MEG
R-13	1MEG VOL. CONTROL #B.139 B
R-14	1MEG TONE CONTROL B.140
R-15	250,000 Ω
R-16	250,000 Ω
R-17	.5MEG
R-18	160 Ω 1WATT FLEX
R-19 } R-20 } R-21 }	IN BALLAST TUBE
R-22	5000 Ω

L-1	WAVE TRAP } ON 1.198
L-2	CHOKE } ON 1.198
L-3 } L-4 } L-5 }	2BAND ANT. COIL #1.217
L-6 } L-7 } L-8 }	2BAND OSC. COIL #1218
L-9 } L-10 }	POLICE BAND ANT. COIL } #1.231
L-11 } L-12 }	POLICE BAND OSC. COIL } #1.231
L-13	450 Ω SPEAKER FIELD



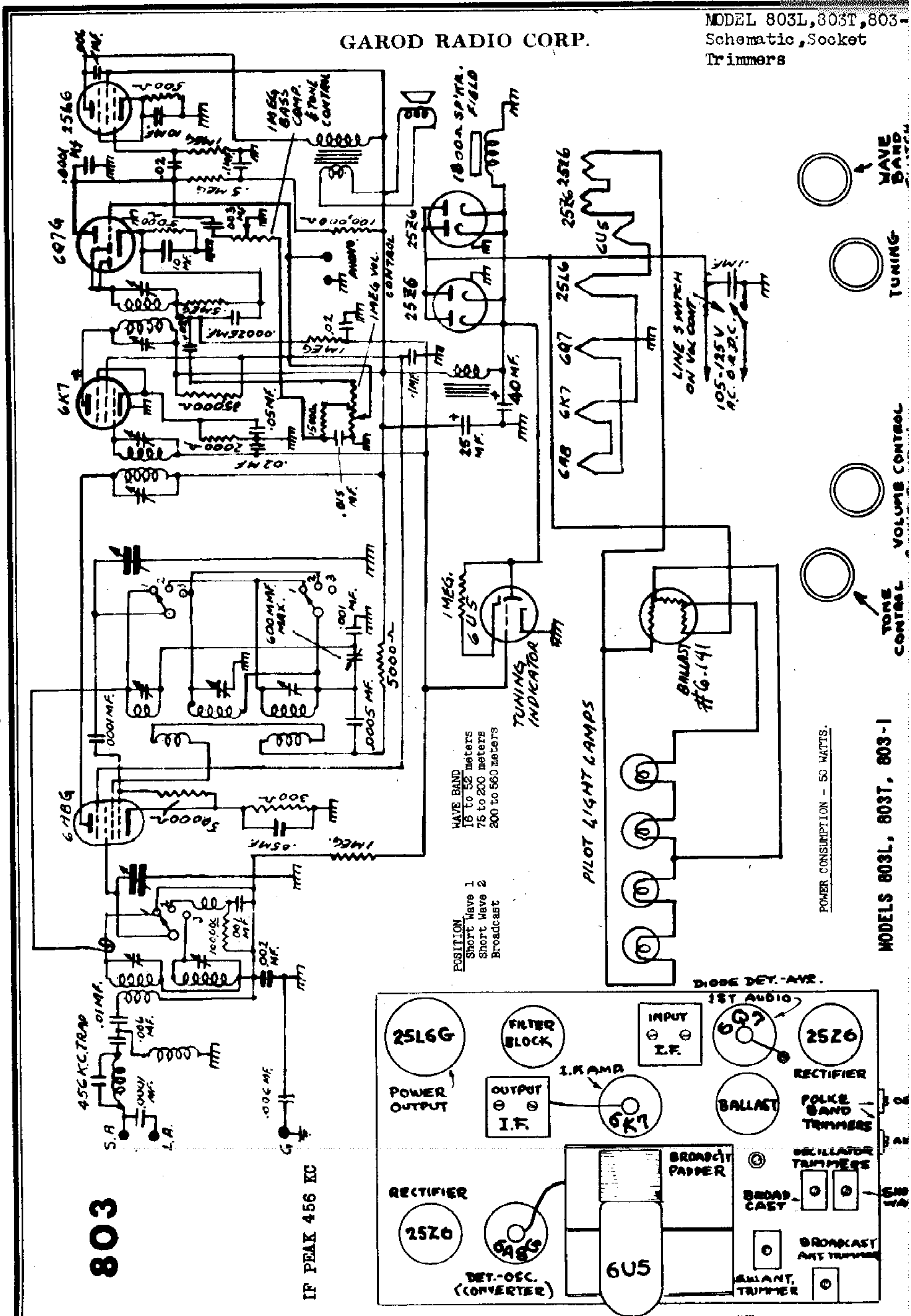
FOR ALIGNMENT
SEE INDEX

I.F. = 456 K.C.

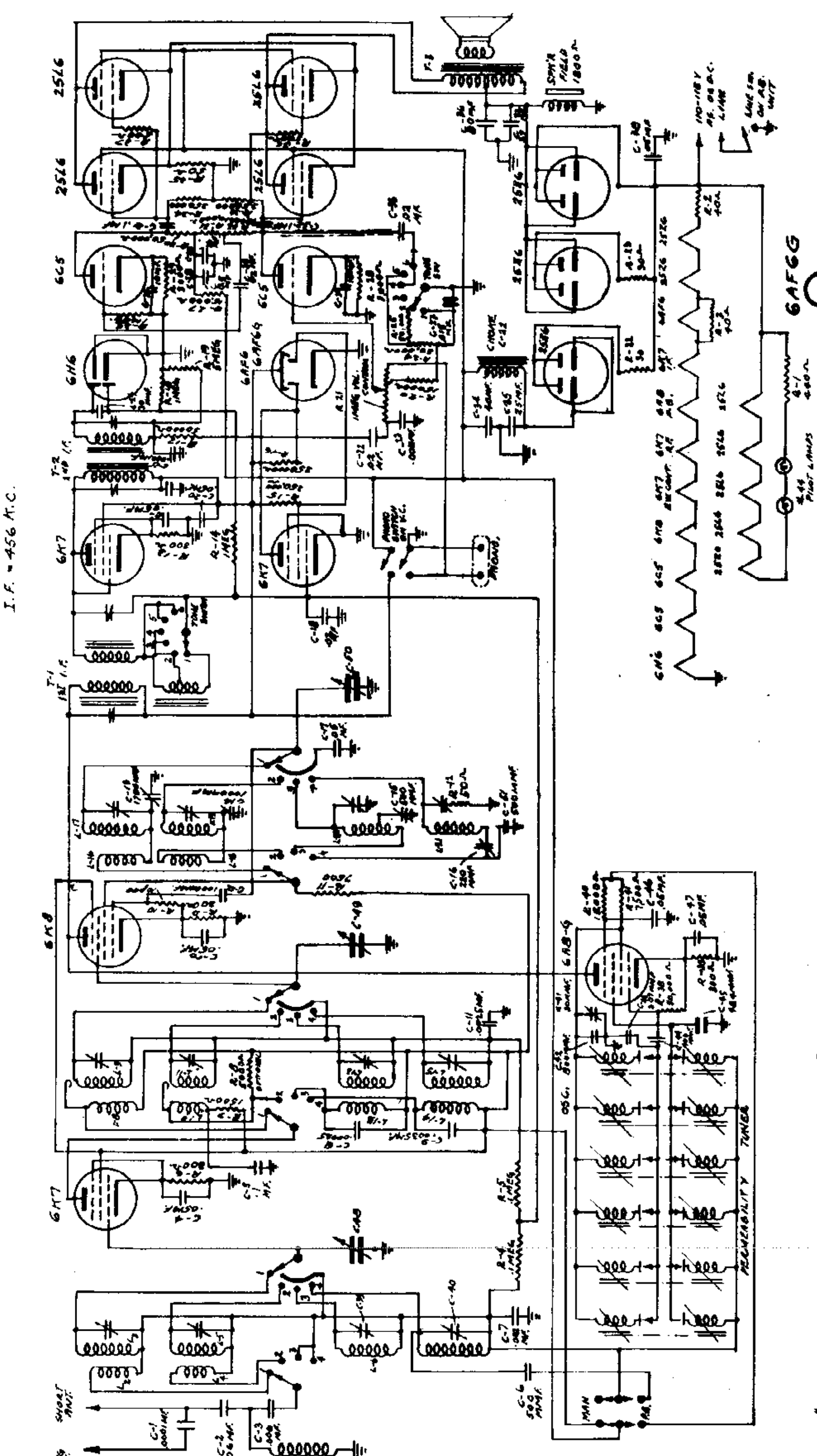
S.W. 22.5 M.C. - 5.8 M.C. OR 13.3 METERS - 51.7 METERS
P. 6.25 M.C. - 2.2 M.C. OR 48 METERS - 136 METERS
B.C. 1720 K.C. - 543 K.C. OR 174.5 METERS - 552 METERS

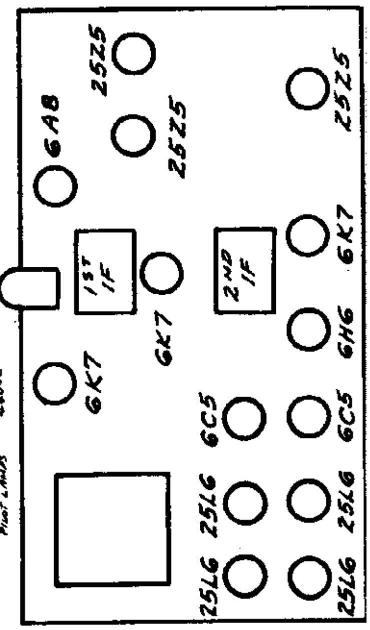
MODEL 803L,803T,803-
Schematic,Socket
Trimmers

GAROD RADIO CORP.



GAROD RADIO CORP.





FOR TUNER DATA SEE INDEX

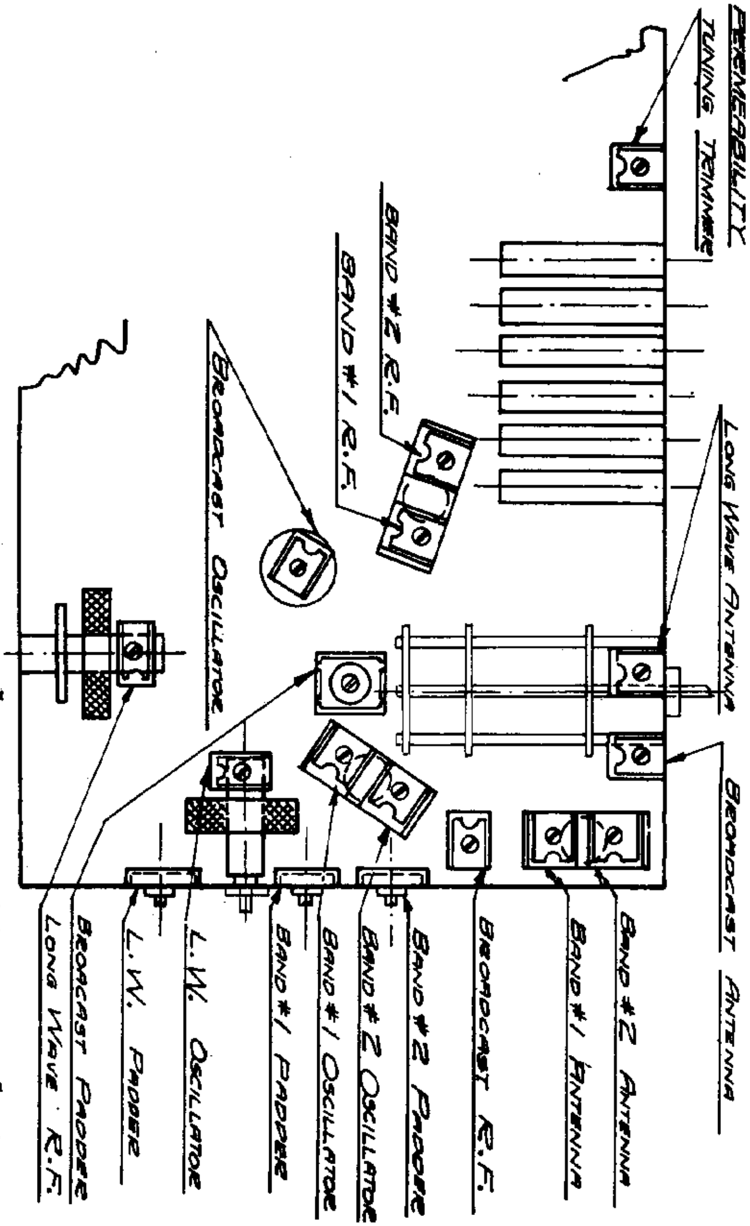
BAND #1 23 M.C. - 7.2 M.C. OR 13 METERS TO 41.75 METERS
BAND #2 7.4 M.C. - 2.34 M.C. OR 40.5 METERS TO 128.25 METERS
BAND #3 1720 K.C. - 547.5 K.C. OR 175 METERS TO 550 METERS
BAND #4 376 K.C. - 137.5 K.C. OR 800 METERS TO 2200 METERS

TUBES

6K7	RF Amplifier	6C5	Phase Inverter
6K8	First detector & Osc.	4-25L6	Output Amplifier
6A8G	Pushbutton Osc.	3-25Z5	Rectifiers
6K7	IF Amplifier	6AF6G	Indicator Tube
6H6	Second detector & AVC	6K7	Indicator Amplifier
6C5	First Audio Amplifier		

MODEL 1649
Alignment, Trimmers

GAROD RADIO CORP.



16 TUBE . . . 4 BAND . . . AC - DC RECEIVER

MODEL #1649 C 14

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. Adjustment: The signal generator is set at 456 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6K8). With the band switch set on "Broadcast", the pointer set at 550 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on tops of the I.F. transformer shield cans.

Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 250 mmfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser should be opened to minimum capacity and the signal generator then set to 23 megacycles. The oscillator trimmer is then increased in capacity until maximum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to 21 MC and the variable condenser turned until a response is obtained. The pointer should coincide with the 21 MC mark on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 7.2 mc and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum reading of the output meter while the generator tuning condenser is rocked slightly to right and left. The high frequency adjustment should then be rechecked.

Band #2: The band selector switch is set in position for operation on short wave band #2. The variable condenser is opened so that the plates are completely unmeshed and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.4 mc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity be used. Set the signal generator at 7 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. After high frequency adjustments have been made set the signal generator at 2.5 mc and turn the variable gang condenser until a response is observed. Adjust the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

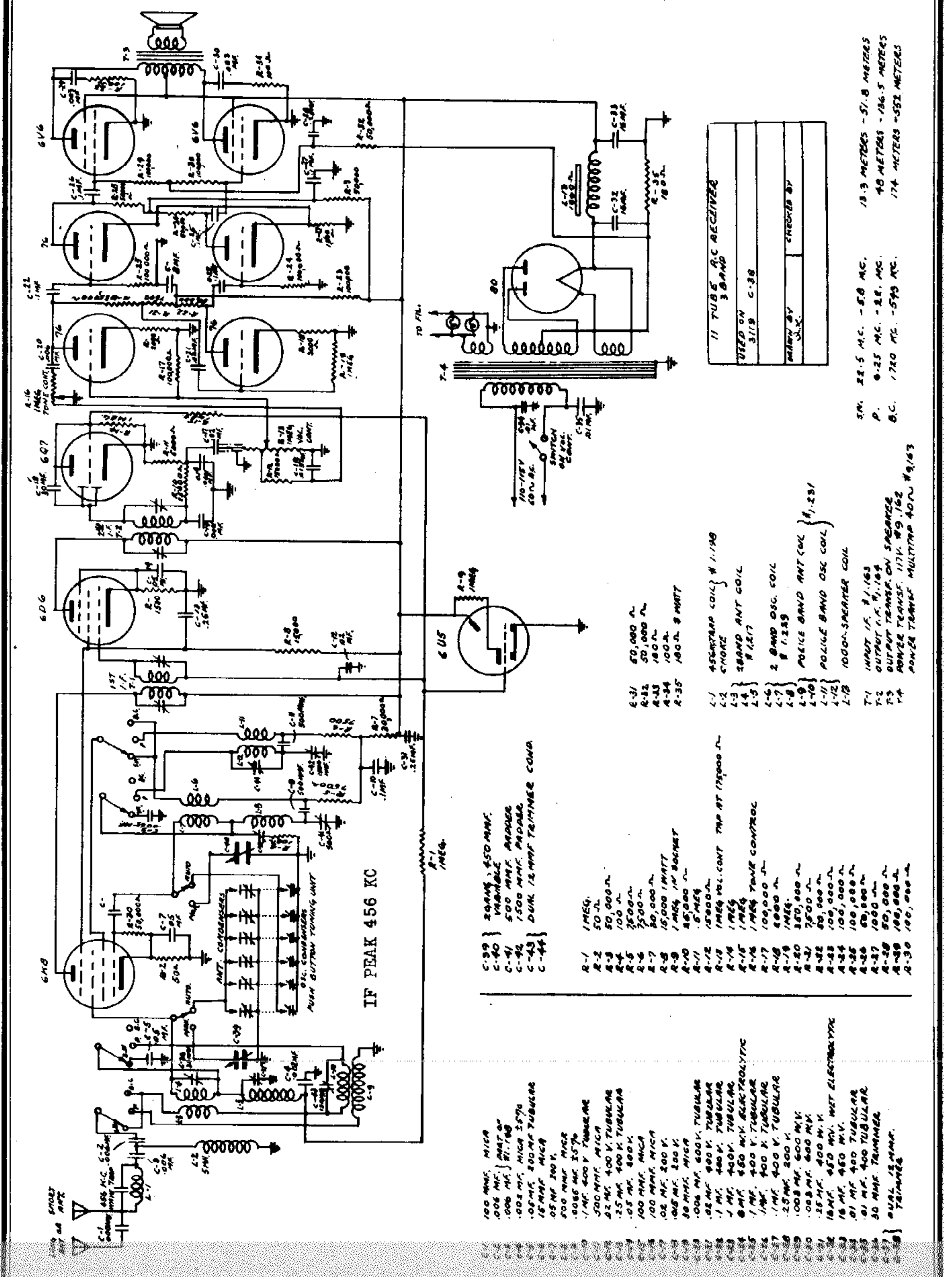
Broadcast Band: The dummy antenna for this band should consist of a 250 mmfd condenser only. The signal generator is set at 1720 kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1720kc). Set the signal generator at 1500 kc and tune the receiver until a response is indicated. The dial pointer should coincide with the 1500 kc mark on the dial. Then adjust the antenna and detector trimmers in the order indicated for maximum output. The signal generator is then set at 600 kc and the receiver tuned until a response is indicated. The padder condenser is then adjusted for maximum gain while the tuning gang condenser is rocked slightly to the left and right. The 1500 kc adjustment should then be rechecked.

Long Wave Band: The band selector switch is set in position for operation on the long wave band. The receiver and generator are both tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named for maximum output.

The signal generator is then set at 150 kc and the signal is tuned in. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.

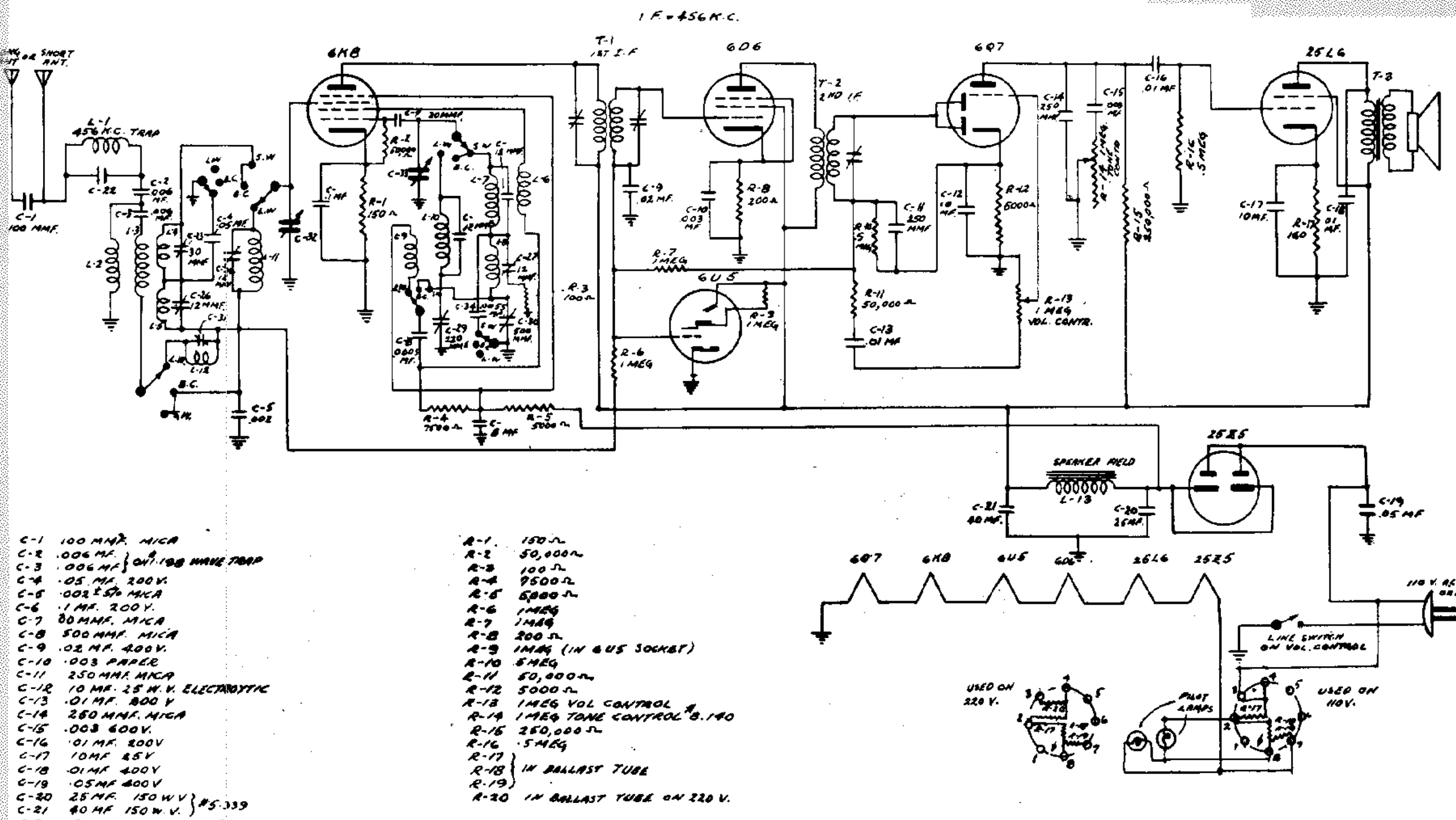
MODEL 3119
Schematic

GAROD RADIO CORP.



MODEL 7390
Schematic

GAROD RADIO CORP.



C-1 100 MMF. MICA
C-2 .006 MF. } ON #1.198 WAVE TRAP
C-3 .006 MF
C-4 .05 MF. 200 V.
C-5 .002 ±5% MICA
C-6 .1 MF. 200 V.
C-7 80 MMF. MICA
C-8 500 MMF. MICA
C-9 .02 MF. 400 V.
C-10 .003 PAPER
C-11 250 MMF. MICA
C-12 10 MF. 25 W.V. ELECTROLYTIC
C-13 .01 MF. 800 V
C-14 250 MMF. MICA
C-15 .003 600 V.
C-16 .01 MF. 200 V
C-17 10 MF 25 V
C-18 .01 MF 400 V
C-19 .05 MF 400 V
C-20 25 MF. 150 W.V. } #5.339
C-21 40 MF 150 W.V.
C-22 PART OF WAVETRAP #1.198
C-23 30 MMF TRIMMER
C-24 } DUAL 12 MMF.
C-25 } TRIMMER - OPTIONAL
C-26 } DUAL 12 MMF
C-27 } TRIMMER
C-28 12 MMF TRIMMER OPTIONAL
C-29 220 MMF. VAR. PADDER
C-30 500 MMF. VAR. PADDER
C-31 TUNES L-12 TO 1200 KC FOR L.W TRAP
C-32 } VARIABLE COND 2 GANG
C-33 } 450 MMF.
C-34 .0055 MF. ±5% MICA

R-1 150 Ω
R-2 50,000 Ω
R-3 100 Ω
R-4 7500 Ω
R-5 5000 Ω
R-6 1 MEG
R-7 1 MEG
R-8 200 Ω
R-9 1 MEG (IN 6U5 SOCKET)
R-10 .5 MEG
R-11 50,000 Ω
R-12 5000 Ω
R-13 1 MEG VOL CONTROL
R-14 1 MEG TONE CONTROL #8.140
R-15 250,000 Ω
R-16 .5 MEG
R-17 }
R-18 } IN BALLAST TUBE
R-19 }
R-20 IN BALLAST TUBE ON 220 V.

L-1 456 KC. TRAP (WITH C-22) # 1.198
L-2 6 MH CHOKE
L-3 }
L-4 } 2 BAND ANT. COIL #1.228
L-5 }
L-6 }
L-7 } 2 BAND OSC. COIL #1.229
L-8 }
L-9 } L.W. OSC. COIL #1.121
L-10 }
L-11 L.W. ANT. COIL #1.141
L-12 TRAP TUNED BY C-31 TO 1200 KC. #1.142 A
L-13 SPEAKER FIELD 450 Ω

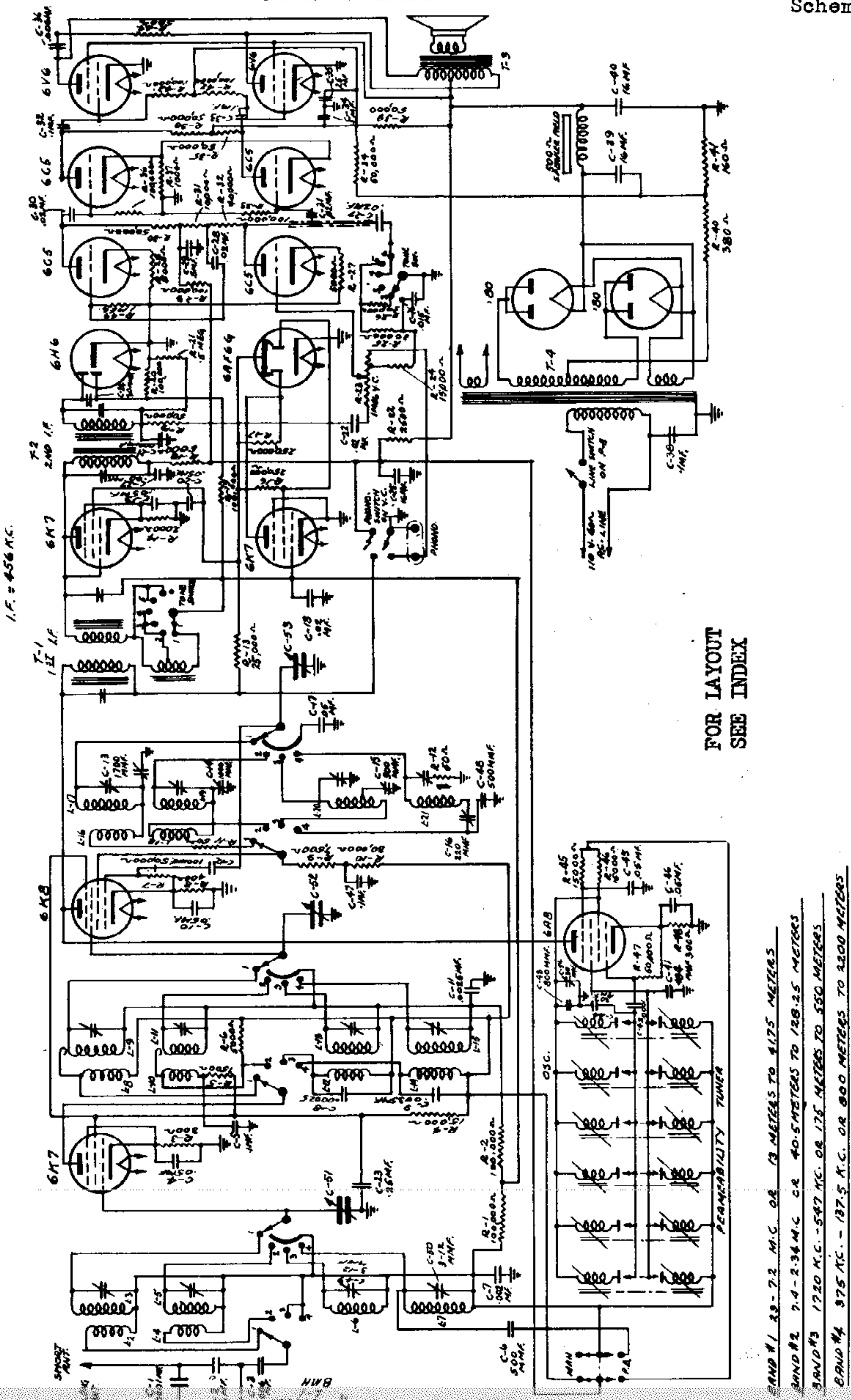
T-1 D.T. INPUT I.F. #1.163
T-2 S.T. OUTPUT I.F. #1.200
T-3 OUTPUT TRANS ON SPEAKER

(S.W.) SHORT WAVE 22 MC - 5.87 M.C. OR 13.6 METERS - 51 METERS
(B.C.) BROADCAST 1650 K.C. - 547 K.C. OR 181 METERS TO 550 METERS
(L.W.) LONG WAVE 375 K.C. TO 144 K.C. OR 800 METERS - 2080 METERS

FOR ALIGNMENT
SEE INDEX

2 BAND A.C. & D.C. RECEIVER	
USED ON 7390 - C 94	SCALE
PART #	
DRN BY D.C. / CHK'D / 11-23-36	

GAROD RADIO CORP.



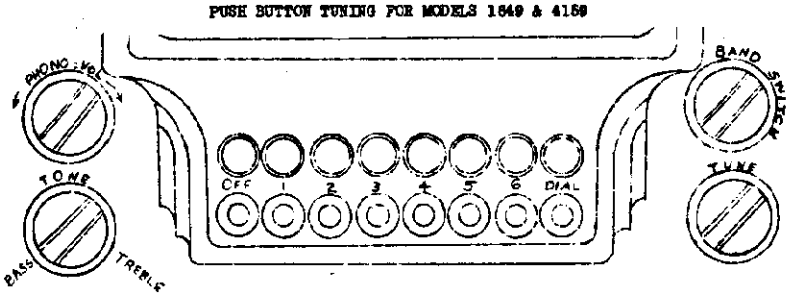
FOR LAYOUT SEE INDEX

MODEL 4159
Alignment, Tuner

GAROD RADIO CORP.

MODEL 1649
Tuner Data

PUSH BUTTON TUNING FOR MODELS 1649 & 4159



Line Voltage - 105/125 Volts
Line Frequency - 50/60 Cycles

CAUTION: THIS RECEIVER MUST NEVER BE USED ON VOLTAGES AND FREQUENCIES OTHER THAN THOSE GIVEN ABOVE. IF IN DOUBT ABOUT THE POWER IN USE IN YOUR LOCATION CONSULT YOUR LOCAL POWER COMPANY BEFORE PLUGGING IN THE RECEIVER.

NOTE: *Universal models supplied with tapped transformers may be used on 117, 135, 220 and 250 volts, 40 to 60 cycles alternating current. These may be identified by the cylindrical cap on the top of the power transformer, which covers the taps for the various voltages. To set the transformer for the voltage to be used, pull off the cap and clip the flexible lead to the lug marked for the desired voltage.*

PROCEDURE FOR SETTING STATION BUTTONS

SELECTING THE STATIONS TO BE SET: Make a list of the six favorite stations which you wish to set up for automatic tuning, and arrange them in order of frequency. They should be broadcast stations capable of putting in good signal strength at your locality as shown by the deflection of the tuning eye. It is not advisable to attempt the use of these buttons for tuning weak or distant stations. Next, consult the frequency chart below, in order to determine which button should be used for each station. For convenience in operating, arrange the stations in order of frequency from high to low frequency.

FREQUENCY RANGE OF PUSHBUTTONS

1 - 955 to 1560 Kilocycles
2 - 955 to 1560 "
3 - 685 to 1125 "
4 - 685 to 1125 "
5 - 520 to 840 "
6 - 520 to 840 "

SETTING THE STATION BUTTONS: The push-button frequency adjusting screws are accessable from the front panel. Under each of the tuning buttons you will find a circular pit with a hole in the center. Looking through this hole you should be able to see the slot of a screw. This is the adjusting screw for station setting.

After deciding which station is to be set up on the first button, tune in this station on the dial, using manual tuning. This is for identification only, and does not affect the button tuning. Then press in the button which you desire to set for automatic operation, until it remains depressed; the station which was tuned in will probably disappear and a different station or none at all will be heard.

With a small screw driver slowly turn the setting screw below button 1, until the desired station, the one previously heard, is tuned in. Be sure not to tune in some other station which is broadcasting the same program. Use the tuning eye as a guide for tuning in the station accurately. During this process, you will be able to check back by pressing the dial button and listening to the original station. The method of tuning will be exactly the same as with the dial except that the screw driver is used instead of the tuning knob.

The remaining buttons may be set up in the same manner. Once the adjustments have been made, no further changes will be necessary. The station markers may now be removed from the sheets provided, and inserted in the circular depressions below the corresponding buttons. Blank tabs may be used below buttons on which stations are not set.

ALIGNMENT FOR MODEL 4159

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. Adjustment: The signal generator is set at 456 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6K8). With the band switch set on "Broadcast", the pointer set at 550 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on tops of the I.F. transformer shield cans.

Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 250 mmfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser should be opened to minimum capacity and the signal generator then set to 23 megacycles. The oscillator trimmer is then increased in capacity until maximum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to 21 MC and the variable condenser turned until a response is obtained. The pointer should coincide with the 21 MC mark on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 7.2 mc and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum reading of the output meter while the generator tuning condenser is rocked slightly to right and left. The high frequency adjustment should then be rechecked.

Band #2: The band selector switch is set in position for operation on short wave band #2. The variable condenser is opened so that the plates are completely unmeshed and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.4 mc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity be used. Set the signal generator at 7 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. After high frequency adjustments have been made set the signal generator at 2.5 mc and turn the variable gang condenser until a response is observed. Adjust the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

Broadcast Band: The dummy antenna for this band should consist of a 250 mmfd condenser only. The signal generator is set at 1720 kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1720kc). Set the signal generator at 1500 kc and tune the receiver until a response is indicated. The dial pointer should coincide with the 1500 kc mark on the dial. Then adjust the antenna and detector trimmers in the order indicated for maximum output. The signal generator is then set at 600 kc and the receiver tuned until a response is indicated. The padder condenser is then adjusted for maximum gain while the tuning gang condenser is rocked slightly to the left and right. The 1500 kc adjustment should then be rechecked.

Long Wave Band: The band selector switch is set in position for operation on the long wave band. The receiver and generator are both tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named for maximum output.

The signal generator is then set at 150 kc and the signal is tuned in. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.

GENERAL ELECTRIC CO.

MODEL GM11
Wireless Record Player
Schematic,
Operating Notes

SERVICE DATA

Physical Specifications

Model.................................GM-11
Height................................8 inches
Width.................................15⅛ inches
Depth.................................13¼ inches

Electrical Specifications

115–125 volts..........60 cycles*.........25 watts

* Is also furnished in 50 and 25 cycle models. The operating frequency is shown on the label.

Record Player Oscillator

Frequency (Adjustable).....................1400–1600 K.C.
Oscillator tube.....................Type 12A7

Phonograph Mechanism

Motor......................Self-starting, induction
Pickup.....................Crystal
Impedance (pickup)..........80,000 ohms at 1,000 cycles
Record capacity.............Manual—10 or 12 inch
Turntable speed.............78 rpm.

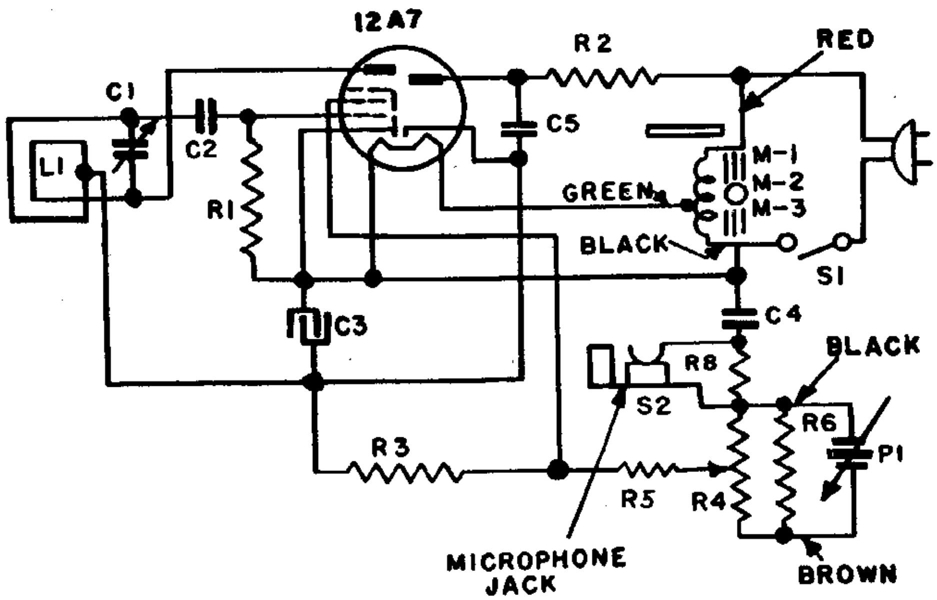
GENERAL INFORMATION

The Model GM-11 Wireless Record Player uses a Type 12A7 tube as combined rectifier and oscillator working directly from the A.C. power supply. The oscillator section of the 12A7 is modulated with audio from the phonograph recordings by means of a crystal pickup and its associated mechanism. The oscillator operates over a range of 1400–1600 kilocycles and the frequency is adjusted by the tuning trimmer (C-1). This is set at the factory to operate at 1500 K.C.

The turntable is driven at 78 revolutions per minute by a constant speed, self-starting induction motor. The motor is properly lubricated at the factory for long operation and should not require attention under normal weather conditions.

Symbol	Description
C1	160–375 mmf.. padder
C2	47 mmf., mica capacitor
C3	8 mfd., dry electrolytic
C4	.02 mfd., molded capacitor
C5	.01 mfd., molded capacitor

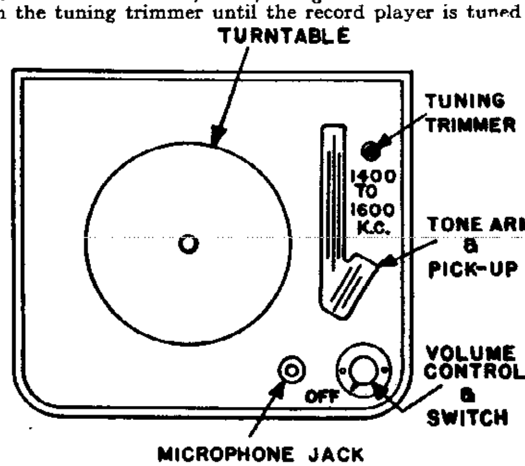
Symbol	Description
R1	470,000 ohm, carbon resistor
R2	15,000 ohm carbon resistor
R3	3.3 megohm carbon resistor
R4	Volume control, 0.5 meg.
R5	33,000 ohm carbon resistor
R6, 8	220,000 ohm carbon resistor
L1	Oscillator coil
M1, 2, 3	Phonograph motor
P1	Crystal pickup



Tuning Trimmer

This adjustment changes the frequency of the Wireless Record Player Signal. It is adjusted at the factory for approximately 1500 kilocycles and has a range of 1400–1600 kilocycles.

If the record player signal interferes with some local station (characterized by a whistle or low frequency beat note) or the receiver does not tune quite high enough to receive the record player signal, it will be necessary to adjust the tuning trimmer described in a previous paragraph. Proceed by tuning the radio to a quiet point above 1400 K.C. on the dial, then, using a small screw driver, turn the tuning trimmer until the record player is tuned to the dial setting of the receiver. Clockwise rotation of the trimmer lowers the frequency; while counterclockwise rotation raises the frequency.



Control Location

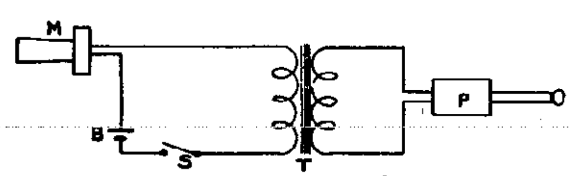
Microphone Connections

A suitable microphone (G-E No. GM-1) may be connected into the circuit of the record player by merely inserting the plug in the microphone jack (location shown in Fig. 1.)

A carbon microphone may be used provided a suitable step-up transformer is used. A suggested circuit is shown in Fig. 2.

Operating Notes

1. If a hum is noted when the pickup case is touched by the hand, merely reverse the power plug in the A.C. outlet.
2. If you are unable to receive the signal from the record player on the radio, it is possible that the oscillator tube in



M—Carbon Microphone
B—2-volt Battery
T—Step-up Transformer
P—Telephone Plug

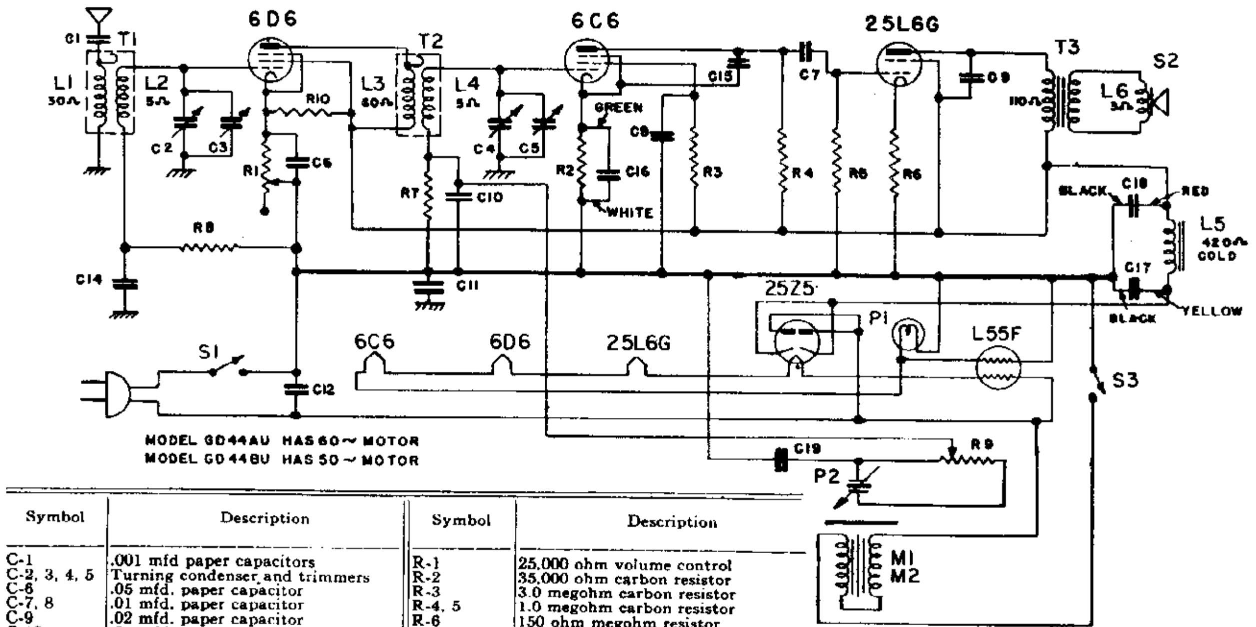
Fig. 2. Microphone Connections

the record player is defective. When replacing, it is advisable to use only a General Electric Type 12A7 tube; otherwise a proper hum balance might not be obtained.

3. A microphonic feedback may be noticed if the record player is located on top or too close to the receiver when the volume is turned up. For this reason it may be desirable and more convenient to operate the record player from a nearby point.

MODELS GD44A, GD44B
GD44AU, GD44BU
Schematic, Voltage
Alignment

GENERAL ELECTRIC CO.



Symbol	Description	Symbol	Description
C-1	.001 mfd paper capacitors	R-1	25,000 ohm volume control
C-2, 3, 4, 5	Turning condenser and trimmers	R-2	35,000 ohm carbon resistor
C-6	.05 mfd. paper capacitor	R-3	3.0 megohm carbon resistor
C-7, 8	.01 mfd. paper capacitor	R-4, 5	1.0 megohm carbon resistor
C-9	.02 mfd. paper capacitor	R-6	150 ohm megohm resistor
C-10	.01 mfd. paper capacitor	R-7	150,000 ohm carbon resistor
C-11	.1 mfd. paper capacitor	R-8	500,000 ohm carbon resistor
C-12	.05 mfd. paper capacitor	R-9	100,000 ohm volume control
C-14	.01 mfd. paper capacitor	R-10	50.000 ohm carbon reistor
C-15	100 mmf. mica capacitor	S-1	Power switch
C-16	5 mfd. dry electrolytic	S-3	Motor switch
C-17	16 mfd. dry electrolytic	T-1	Antenna transformer
C-18	10 mfd. dry electrolytic	T-2	RF transformer
C-19	.01 mfd. paper capacitor	T-3	Output transformer

Tuning Frequency

Band "B" ....540–1800 kc.
Alignment Frequency .... 1500 kc.

Electrical Power Output

Undistorted ....1.0 watt
Maximum ....2.0 watts

Loud-speaker—Electrodynamic

Outside Cone Diameter.........5 inches
Voice Coil Impedance..........3.5 ohms at 400 cycles
Field Coil Resistance.. .... ..420 ohms (cold)

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consump-tion (Volts)
GD-44A	105–125	60	48
GD-44B	105–125	50	48

Models GD-44A and GD-44B are compact four tube AC-DC tuned radio frequency receivers that operate in the broadcast band of frequencies. In addition they have facilities for the reproduction of phonograph recordings. Condensers are used to isolate the power supply voltage from the chassis frame.

Phonograph Mechanism

The record reproducing facilities consist of a high impedance crystal pick-up with its associated balanced tone arm connected across the grid resistor (R-7) of the 6C6 tube. When using the phonograph, the volume control (R-1) should be set at a minimum and control (R-9) used for the desired volume level.

ALIGNMENT

Connect the high side of the signal generator through a 250 mmf. condenser to the antenna lead. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the dial pointer should coincide with the horizontal dial line.
2. Tune receiver to the 1500 kc. point on the dial; then align trimmers (C-3 and C-5) on the gang condenser at 1500 kc. for a maximum output meter reading.

SOCKET VOLTAGES

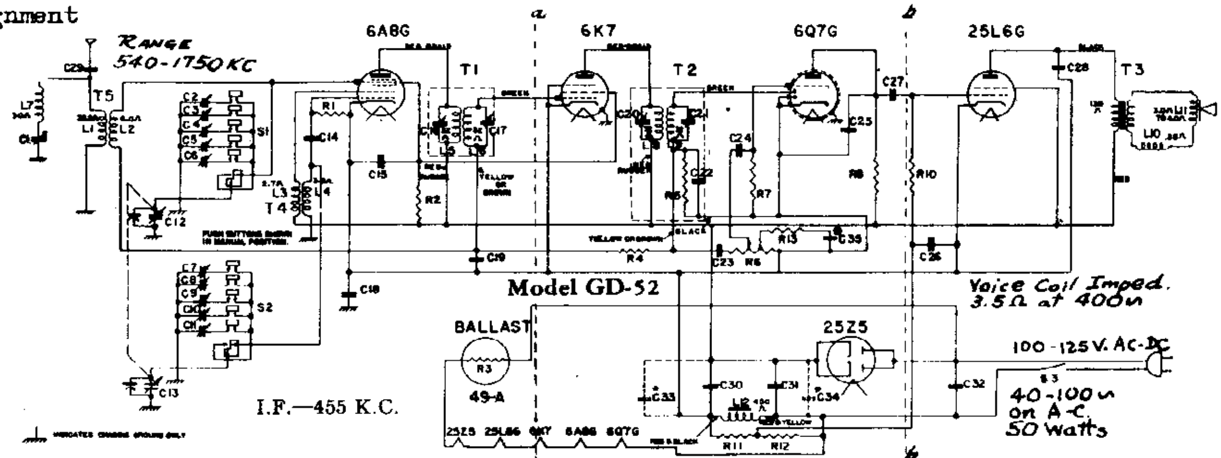
Tube No.	Plate to –B Volts D.C.		Screen to –B Volts D.C.		Cathode to –B Volts D.C.		Cathode Current M.A. D-C		Heater Volts	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
6D6	113	90	113	90	9.0	7.4	0.7	0.6	6.35	6.06
6C6	20 *	16.4 *	45	37	3.1	2.5	0.1	0.08	6.35	6.06
24L6G	108	88	113	90	7.6	6.2	40.5	33.1	25.0	23.5
25Z5	...	...			133	108	43.0	35.0	26.0	24.0

Line voltage 115 AC or DC—No signal input—1000 ohms per voltmeter.
Dial pointer at 540 kc. Volume control at minimum.
* Measured on 250-volt scale.
Note—The B – is not chassis ground.

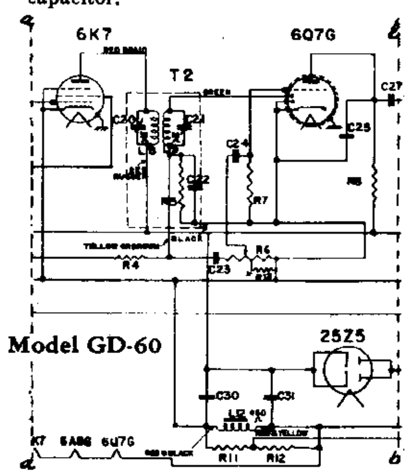
Schematics, Voltage
Socket, Trimmers
Alignment

GENERAL ELECTRIC CO.

MODEL GD52
MODEL GD60



* Used on 25 cycle receivers only.
† On early production receivers C-28 was changed to .03 mfd. capacitor.
⊕ On late production receivers only.



* Used on early production receivers only.
For replacement purposes, use specified volume control and omit resistor, R-13.
NOTE—In some receivers a 150,000 to 390,000 ohm resistor is connected across C-18.

Symbol	Description	Symbol	Description
C-1	Wave Trap Trimmer	C-27, C-35	Paper Capacitor, .005 Mfd.
C-2—C-6	R.F. Trimmer Strip	†C-28	Paper Capacitor, .01 Mfd.
C-7—C-11	Osc. Trimmer Strip	C-29	Paper Capacitor, .001 Mfd.
C-12, C-13	Variable Condenser	C-30	Dry Electrolytic Capacitor, 12 Mfd.
C-14	Mica Capacitor, 47 Mmf.	C-31	Dry Electrolytic Capacitor, 20 Mfd.
C-15	Paper Capacitor, .25 Mfd.	C-32	Paper Capacitor, .02 Mfd.
C-16, C-17	1st I.F. Trimmer	*C-33	Dry Electrolytic Capacitor, 35 Mfd.
C-18	Paper Capacitor, .25 Mfd.	*C-34	Dry Electrolytic Capacitor, 15 Mfd.
C-19	Paper Capacitor, .05 Mfd.	R-1	Carbon Resistor, 47,000 Ohms
C-20, C-21	2nd I.F. Trimmers	R-2	Carbon Resistor, 10,000 Ohms
C-22	Mica Capacitor, 470 Mmf.	R-3	Ballast Tube 49-A, 170 Ohms
C-23, C-24	Paper Capacitor, .002 Mfd.	R-4	Carbon Resistor, 2.2 Megohms
C-25	Mica Capacitor, 330 Mmf.	R-5	Carbon Resistor, 470,000 Ohms
C-26	Paper Capacitor, .15 Mfd.	R-6	Volume Control, 2.0 Megohms
		R-7	Carbon Resistor, 15.0 Megohms
		R-8	Carbon Resistor, 220,000 Ohms
		R-10	Carbon Resistor, 470,000 Ohms
		R-11	Carbon Resistor, 270,000 Ohms
		R-12	Carbon Resistor, 680,000 Ohms
		R-13	Carbon Resistor, 68,000 Ohms
		S-1	Antenna Switch
		S-2	Oscillator Switch
		S-3	Power Switch
		T-1	1st I.F. Transformer
		T-2	2nd I.F. Transformer
		T-3	Output Transformer
		T-4	Oscillator Transformer
		T-5	Antenna Transformer
		L-10	Hum Buck Coil
		L-11	Voice Coil
		L-12	Field Coil—450 Ohms (cold)

Tubes

Converter and Oscillator.... GE-6A8G
I.F. Amplifier.............. GE-6K7
Detector, AVC and Amplifier................. GE-6Q7G
Power Amplifier........... GE-25L6G
Rectifier................. GE-25Z5
Ballast Tube.............. 49-A

VOLTAGE CHART

Tube No.	6A8G	6K7	6Q7G	25L6G	25Z5
Plate to −B volts	115	115	55*	110	..
Screen to −B volts	75	75	..	115	..
Cathode to −B volts	0	0	0	0	115
Cathode Current MA	6.6	1.4	0.5	37	47
Filament Volts	6.0	6.0	6.1	24.5	24.0

Line Voltage—120 AC. No signal input
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

GENERAL INFORMATION

GD-60, GD-52, is a compact, five-tube AC-DC superheterodyne receiver, employing five General Electric Pre-tested Tubes as described above, in a superheterodyne circuit. It incorporates a simplified trimmer tuned "Touch-Tuning" system, allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic volume control and an improved dustproof speaker.

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G and keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

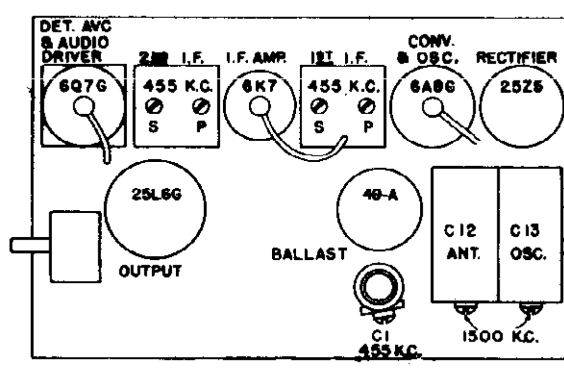
Wave Trap Alignment

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

R.F. Alignment

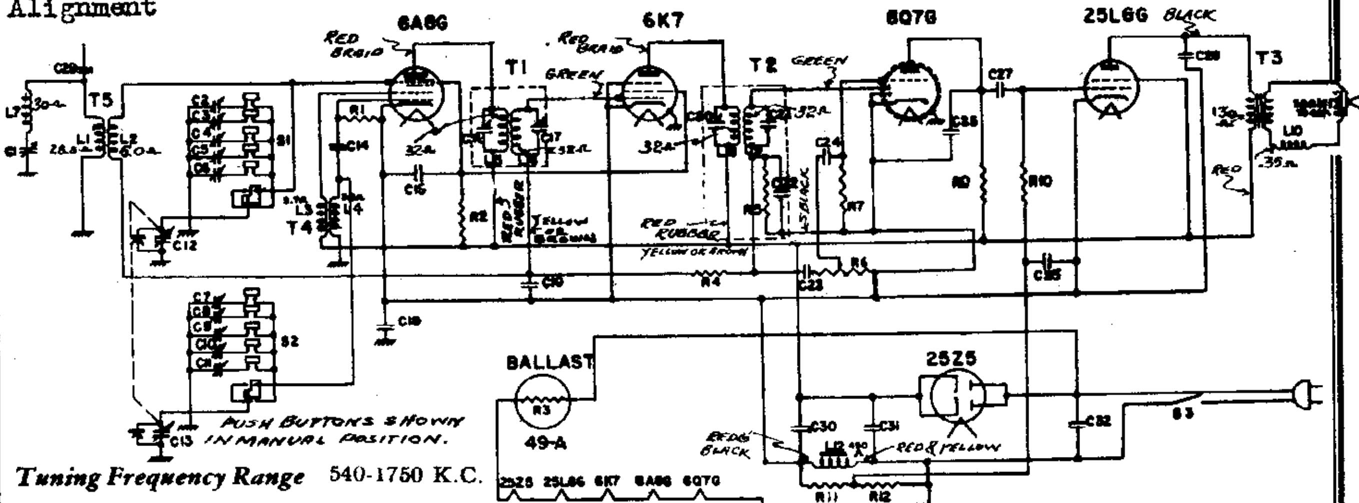
Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

Precaution—One side of the power supply is connected to the chassis through a .25 mfd. capacitor. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.



MODEL GD52A
Schematic, Voltage
Socket, Trimmers
Alignment

GENERAL ELECTRIC CO.



Tuning Frequency Range 540-1750 K.C.

Intermediate Frequency 455 K.C.

Voice Coil Impedance......3.5 ohms at 400 cycles
Field Coil Resistance......450 ohms (cold)

Symbol	Description	Symbol	Description	Symbol	Description
C-1	Wave Trap Trimmer, 45-145 Mmf.	C-20	Trimmer Capacitor, 50-135 Mmf.	R-7	Carbon Resistor, 15 Megohms
C-2	Selector Trimmer, 100-510 Mmf.	C-21	Trimmer Capacitor, 50-135 Mmf.	R-8	Carbon Resistor, 220,000 Ohms
C-3	Selector Trimmer, 75-410 Mmf.	C-22	Mica Capacitor, 470 Mmf.	R-10	Carbon Resistor, 470,000 Ohms
C-4	Selector Trimmer, 50-300 Mmf.	C-23	Paper Capacitor, .002 Mfd.	R-11	Carbon Resistor, 270,000 Ohms
C-5	Selector Trimmer, 50-300 Mmf.	C-24	Paper Capacitor, .002 Mfd.	R-12	Carbon Resistor, 68,000 Ohms
C-6	Selector Trimmer, 20-200 Mmf.	C-25	Mica Capacitor, 330 Mmf.	R-13	Carbon Resistor, 68,000 Ohms
C-7	Selector Trimmer, 50-300 Mmf.	C-26	Paper Capacitor, .15 Mfd.	S-1	Antenna Switch
C-8	Selector Trimmer, 50-300 Mmf.	C-27	Paper Capacitor, .005 Mfd.	S-2	Oscillator Switch
C-9	Selector Trimmer, 20-200 Mmf.	C-28	Paper Capacitor, .03 Mfd.	S-3	Power Switch combined with R-6
C-10	Selector Trimmer, 20-200 Mmf.	C-29	Paper Capacitor, .001 Mfd.	T-1	1st I.F. Transformer
C-11	Selector Trimmer, 10-100 Mmf.	C-30	Dry Electrolytic Cap., 12 Mfd.	T-2	2nd I.F. Transformer
C-12	Tuning Condenser Ant.	C-31	Dry Electrolytic Cap., 20 Mfd.	T-3	Output Transformer
C-13	Tuning Condenser Osc.	C-32	Paper Capacitor, .02 Mfd.	T-4	Oscillator Transformer
C-14	Mica Capacitor, 47 Mmf.	R-1	Carbon Resistor, 47,000 Ohms	T-5	Antenna Transformer
C-15	Paper Capacitor, .25 Mfd.	R-2	Carbon Resistor, 10,000 Ohms	L-10	Hum Buck Coil
C-16	Trimmer Capacitor, 50-135 Mmf.	R-3	Ballast Tube 49-A, 170 Ohms	L-11	Voice Coil
C-17	Trimmer Capacitor, 50-135 Mmf.	R-4	Carbon Resistor, 2.2 Megohms	L-12	Field Coil—450 Ohms (cold)
C-18	Paper Capacitor, .25 Mfd.	R-5	Carbon Resistor, 470,000 Ohms		
C-19	Paper Capacitor, 0.5 Mfd.	R-6	Volume Control, 2 Megohms		

NOTE—In some receivers a 150,000 to 390,000 ohm resistor is connected across C-18.

Fig. 2. Schematic Diagram

VOLTAGE CHART

Tube No.	6A8G	6K7	6Q7G	25L6G	25Z5
Plate to −B volts	115	115	55*	110	
Screen to −B volts	75	75		115	
Cathode to −B volts	0	0	0	0	115
Cathode Current MA	6.6	1.4	0.5	37	47
Filament Volts	6.0	6.0	6.1	24.5	24.0

Line Voltage—120 AC. No signal input
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.—455 K.C. Broadcast—1500

The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G and keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

Wave Trap Alignment

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

R.F. Alignment

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

Precaution—One side of the power supply is connected to the chassis through a .25 mfd. capacitor. If signal generator is AC operated connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

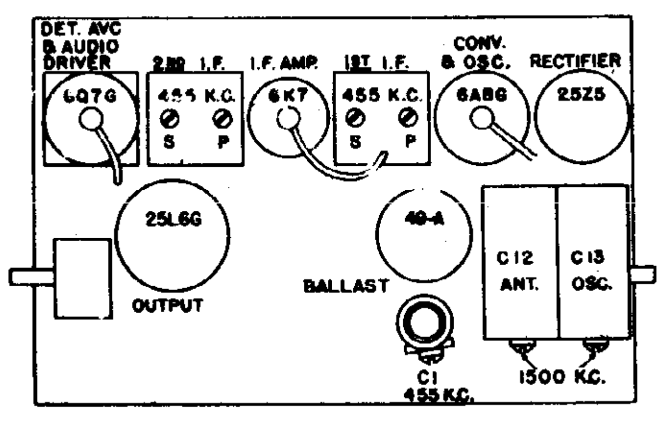
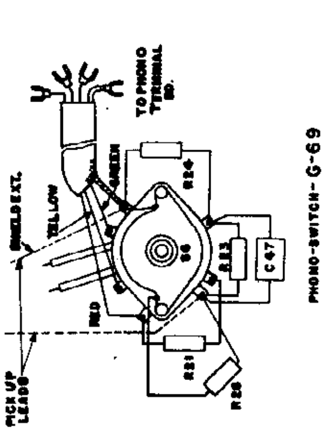


Fig. 1. Trimmer Location

GENERAL ELECTRIC CO.

MODELS G61,G66,G68,G69
Socket,Trimmers,Chassis
Phono,Connections,Dial



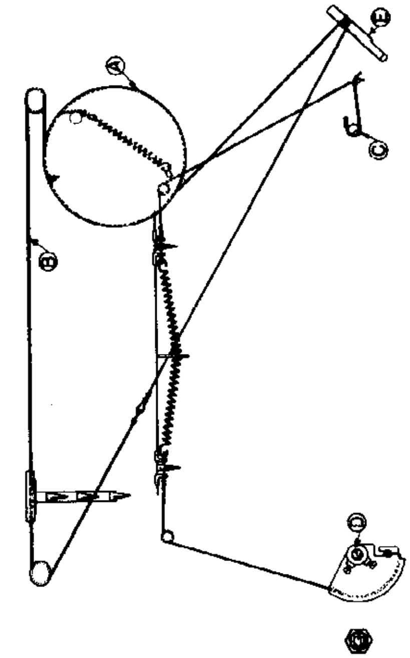


Fig. 5. Dial Mechanism

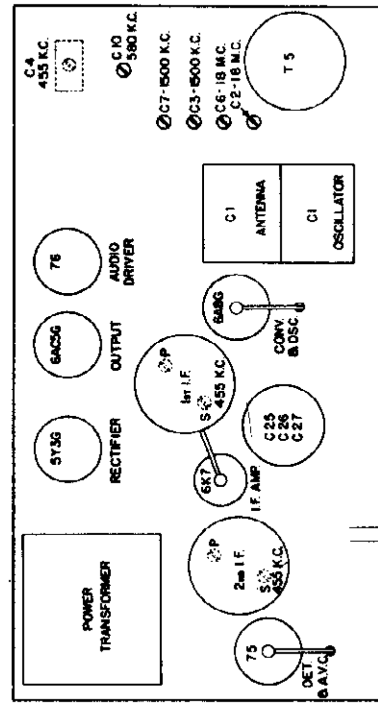
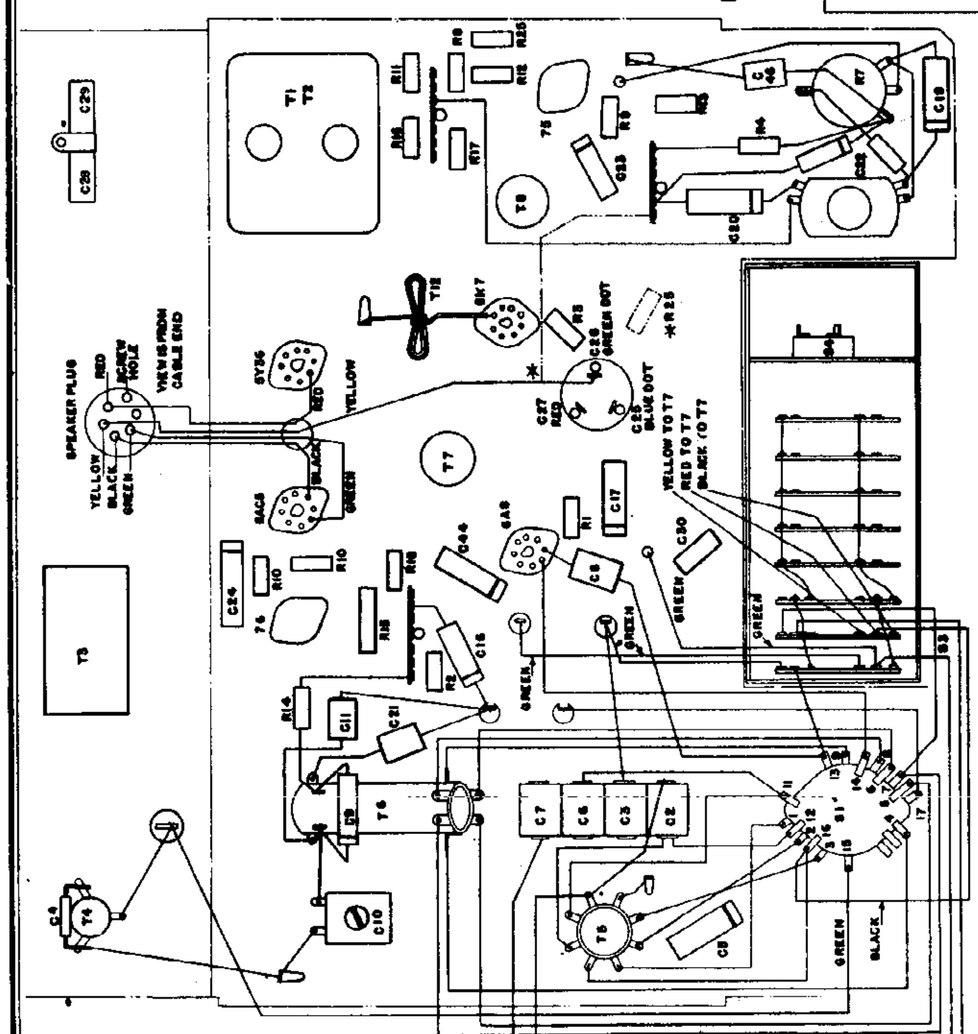


Fig. 4. Trimmer Location



*Used on 25-cycle receivers only

Fig. 6. Chassis Parts Layout

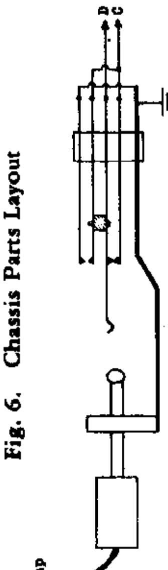
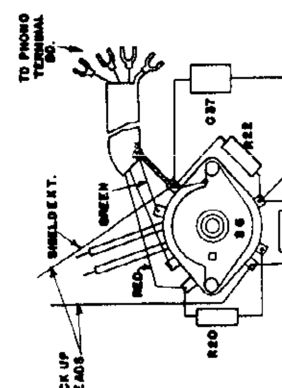
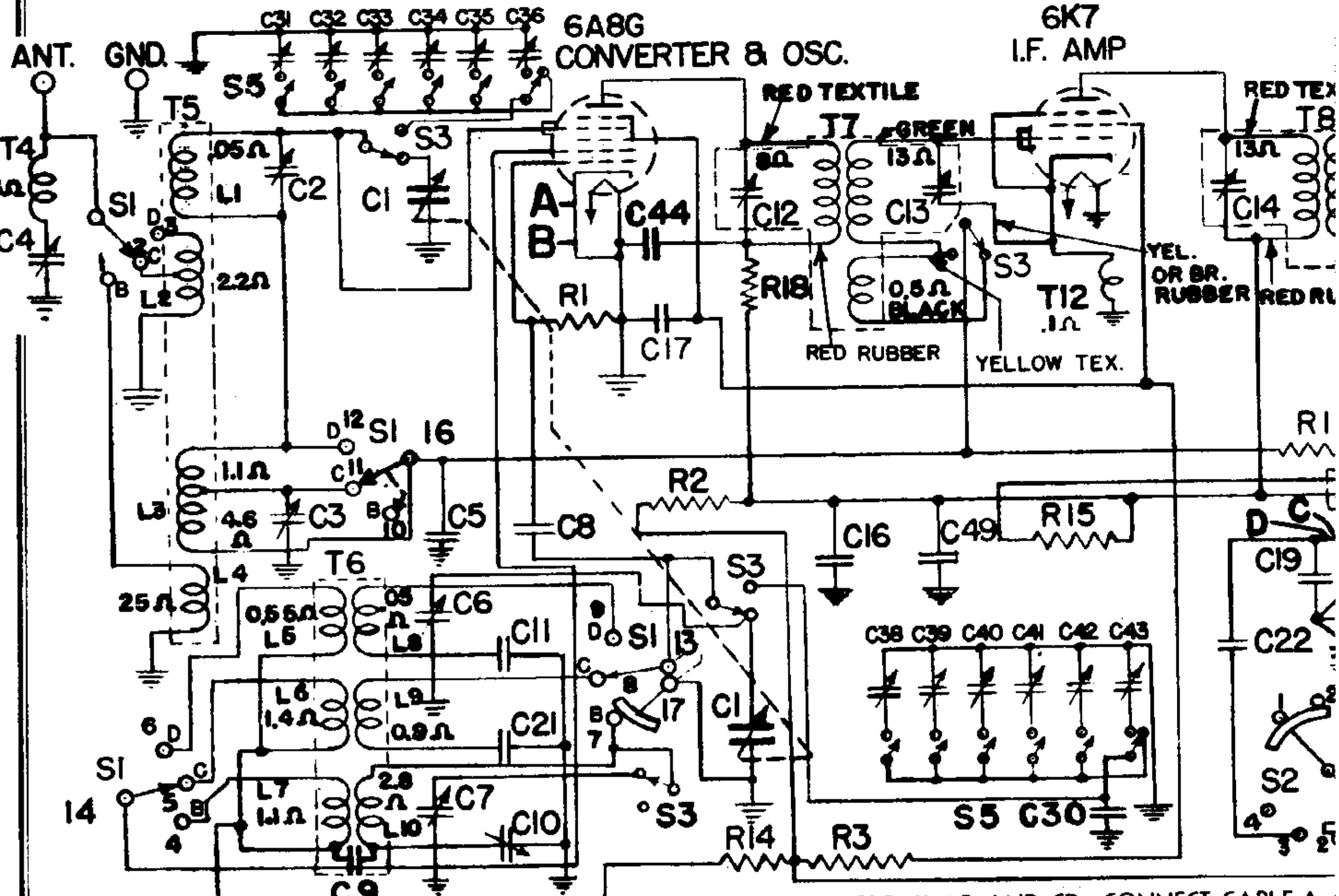
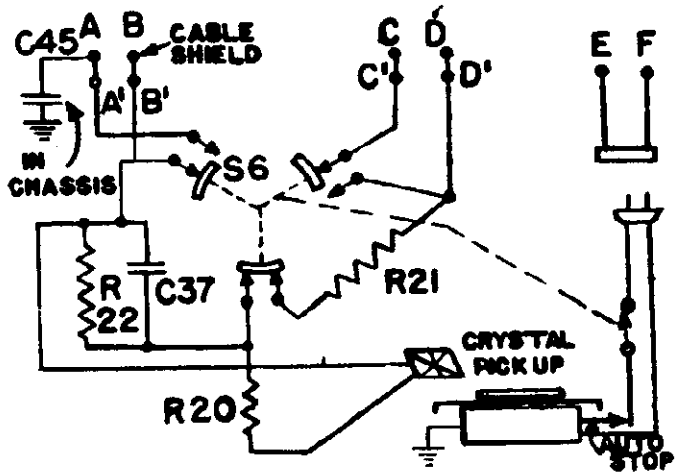


Fig. 1. Phonograph Connections

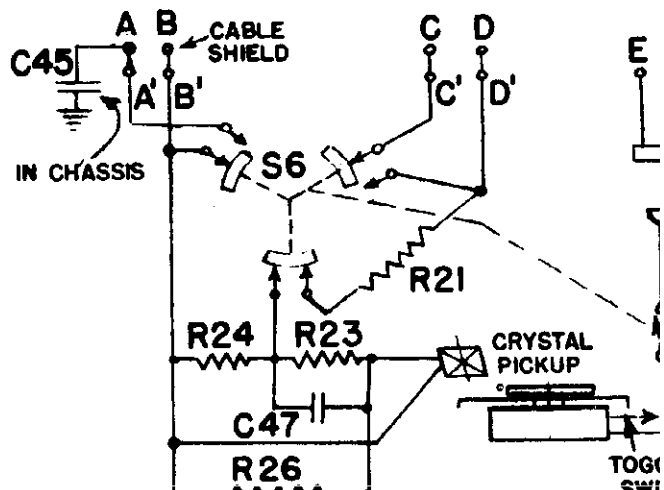




G69 ONLY—BREAK AB AND CD—CONNECT CABLE A-A' B-B' C-C' AND D-D' AS SHOWN. CONNECT *C48 FROM POINT G TO GROUND.



Model G-68



Model G-69

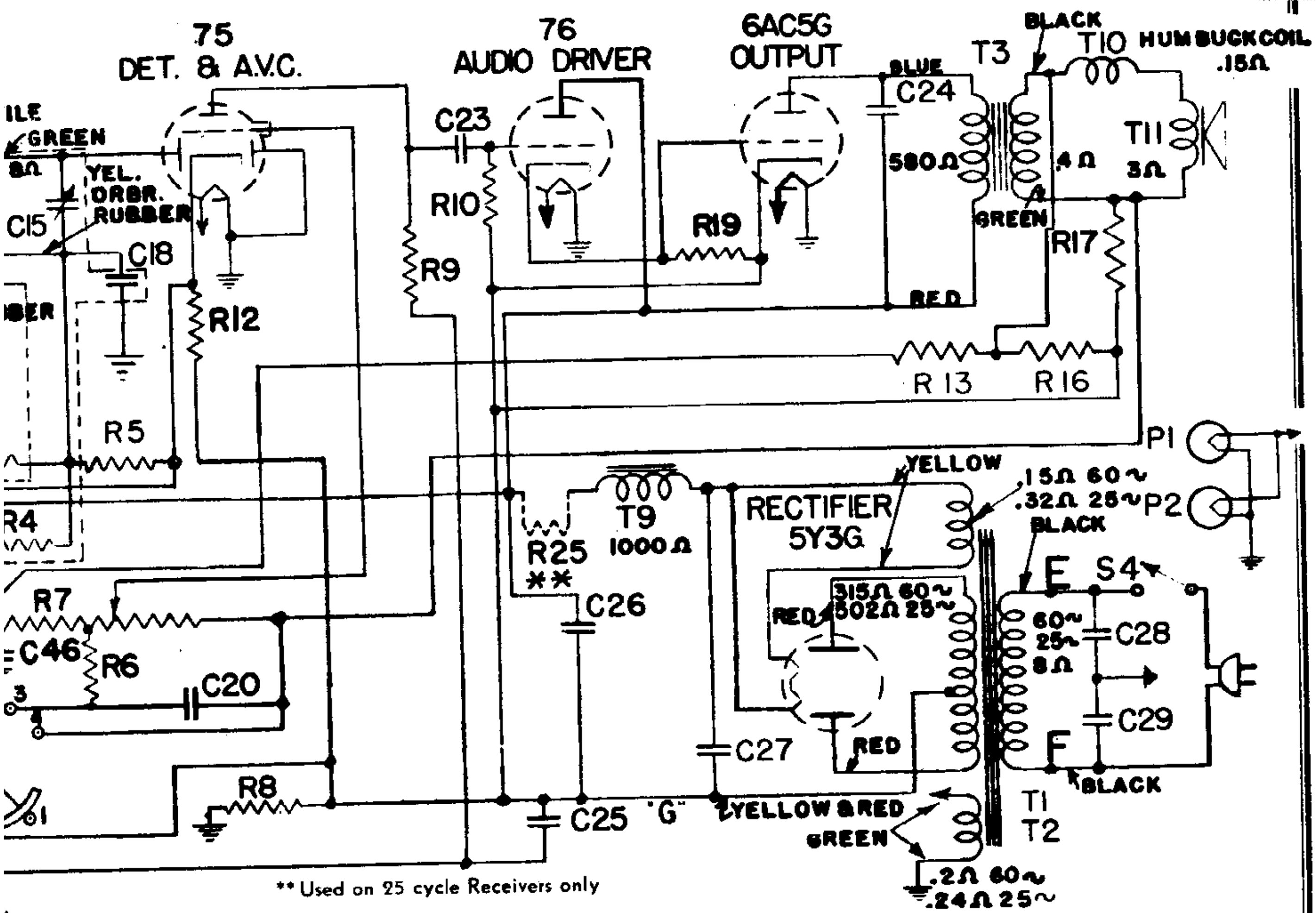
Loud-speaker—Electrodynamic

Model	G-61	G-66	G-68	G-69
Outside Cone Diameter	6½ in.	12 in.	12 in.	12 in.
Voice Coil Impedance	3.5 ohms at 400 cycles			
Field Coil Resistance	880 Ohms (cold)			

Phonograph

Model	G-68	G-69
Type Pick-up	Crystal	Crystal
Impedance (pick-up)	80,000 ohms at 1000 cycles	
Record Capacity	Manual	8–10 in., 7–12 in.
Turntable Speed	78 RPM	78 RPM

ECTRIC CO.



SYMBOL	DESCRIPTION
C1	450 mmf. tuning condenser
C2, C3, C6, C7	Ant. and Osc. trimmer capacitor
C4	Wave trap trimmer
C5	.1 mfd. paper capacitor
C8	50 mmf. mica capacitor
C9	.005 mfd. paper capacitor
C10	300–650 mmf. padder capacitor
C11	4300 mmf. mica capacitor
C16	.1 mfd. paper capacitor
C17	.05 mfd. paper capacitor
C18	47 mmf. mica capacitor
C19, C20	.003 mfd. paper capacitor
C21	1500 mmf. mica capacitor
C22	.0015 mfd. paper capacitor
C23	.005 mfd. paper capacitor
C24	.02 mfd. paper capacitor
C25, C26, C27	8 mfd., 8 mfd., 12 mfd., dry electrolytic capacitor
C28, C29	.01 mfd. line capacitor
C30	20 mmf. compensating capacitor
C31–C36	Keyboard tuning trimmers
C37	470 mmf. mica capacitor
C38–C43	Keyboard tuning trimmers
C44, C45	.05 mfd. paper capacitor
C46	100 mmf. mica capacitor
C47	820 mmf. mica capacitor
*C48	10 mfd. dry electrolytic capacitor
C49	.1 mfd. paper capacitor
R1	47,000 ohm carbon resistor

SYMBOL	DESCRIPTION
R2	6,800 ohm carbon resistor
R3	22,000 ohm carbon resistor
R4	47,000 ohm carbon resistor
R5	220,000 ohm carbon resistor
R6	180,000 ohm carbon resistor
R7	2 megohm volume control
R8	270 ohm carbon resistor
R9	220,000 ohm carbon resistor
R10	1.0 megohm carbon resistor
R11	2.2 megohm carbon resistor
R12	150 ohm carbon resistor
R13	2.2 megohm carbon resistor
R14	3300 ohm carbon resistor
R15	33,000 ohm carbon resistor
R16	47 ohm carbon resistor
R17	22 ohm carbon resistor
R18	6800 ohm carbon resistor
R19	22,000 ohm carbon resistor
R20, R21	47,000 ohm carbon resistor
R22	100,000 ohm carbon resistor
R23, R24	220,000 ohm carbon resistor
**R25	470 ohm carbon resistor
R26	220,000 ohm carbon resistor
S1	Band change switch
S2	Tone control
S6	Phono-radio switch
T1, T2	Power transformer
T3	Output transformer
T4	Wave trap coil

Fig. 2. Schematic Diagram

Models G-61 and G-66

Rating A.........115–125 volts, 50–60 cycles, 70 watts
Rating C.........115–125 volts, 25–60 cycles, 75 watts

Models G-68 and G-69

Rating A-6.........115–125 volts, 60 cycles, 95 watts
Rating A-5.........115–125 volts, 50 cycles, 100 watts
Rating C-2.........115–125 volts, 25 cycles, 100 watts

Tuning Frequency Range

Band "B"..................535– 1600 KC
Band "C"..................1600– 5700 KC
Band "D"..................5700–18000 KC

Intermediate Frequency..................455 KC

Electrical Power Output

Undistorted............................3.0 watts
Maximum...............................5.0 watts

Tone Control.......................4-position

MODELS G61, G66, G68, G69
Voltage, Alignment, Coils
Parts List

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

I. F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14)	Gang condenser plates closed—"manual" key depressed—connect audio input of oscilloscope to ground and to the junction of C-19 and R-4 of the 2nd I.F. transformer. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resultant curve is shown in Fig. 3.
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12)	
3. Band "B"	455 K.C. Sweep	Antenna Post	250 Mmf. 200 ohms	Wave Trap Trimmer (C-4)	Adjust trimmer for minimum amplitude.

I. F. ALIGNMENT WITH OUTPUT METER

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14)	Gang Condenser plates closed—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12)	
3. Band "B"	455 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Wave Trap Trimmer (C-4)	Adjust trimmer for minimum output.

R. F. ALIGNMENT

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-6) Ant. (C-2)	Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. below signal input when (C-6) is on proper peak. Example: 15 M.C. image—14.09 M.C. Peak (C-2) while rocking the gang condenser.
3. Band "C"	No adjustments necessary.				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-7) Ant. (C-3)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. Padder (C-10)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-7) Ant. (C-3)	Retrim for maximum output with a low input signal.

SOCKET VOLTAGES

Tube No.	6A8G	6K7	75	76	6AC5G	5Y3G
Plate to Gnd. Volts	Conv.-230 Osc.-180	250	*110	250	230	310/310 RMS
Screen to Gnd. Volts	87	87	...	...	...	
Cathode to Gnd. Volts	0	0	3.0	8.0	4.5	315
Cathode Current MA	11.0	7.3	1.3	6.1	33.5	70
Filament Volts	6.3	6.3	6.3	6.3	6.3	5.2

*A-c line voltage 125—no signal input. Dial pointer set at 550 KC on "B" band.

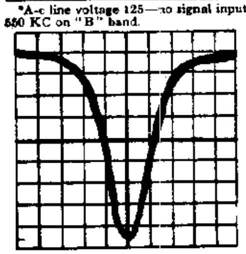


Fig. 3. Over-all I.F. curve taken on G-E Oscilloscope OFM-1

Coil System

T-5 and T-6 are the antenna and oscillator transformers respectively for the "B," "C," and "D" bands. All Band Switch terminals are numbered in Fig. 2 and Fig. 6 to facilitate in service by showing common points on the schematic diagram, Fig. 2 and the pictorial wiring diagram, Fig. 6. The following table shows the coils in use for various positions of the band change switch.

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid Coil	Oscillator Plate Coil	Remarks
Band "B"	L-4	L-1+L-3	L-10	L-7	
Band "C"	Part of L-2	L-1+Part of L-3	L-9	L-6	Part of L-3 shorted. L-10 shorted
Band "D"	L-2	L-1	L-8	L-5	L-9, L-10 shorted. L-3 shorted
Automatic Tuning	L-4	L-1+L-3	L-10	L-7	C-1 removed. Tuned by fixed trimmers

Models G-61, G-66, G-68, and G-69 are three-band AC operated receivers employing six General Electric Pre-tested tubes as described above, in a superheterodyne circuit. They incorporate a simplified trimmer tuned "Touch Tuning" system allowing a set-up of six stations for automatic tuning. Other features of design include IF wave trap, degenerative feedback and an improved dustproof electro-dynamic speaker.

In addition to the above features Models G-68 and G-69 have facilities for the reproduction of phonograph recordings. Model G-68 has a manually operated phonograph mechanism, while the Model G-69 is designed to play either 10-inch or 12-inch records on one side, automatically.

Loud-speaker

12-inch speaker—To center the voice coil, remove dust cover by softening with acetone. Loosen the two clamping screws and place three 1 in. by ¼ in. by 0.010 in. paper or celluloid strips equally spaced around pole piece for clearance—then tighten clamping screws. Remove strips and cement the dust cap back in place with Glyptal cement.

PARTS LIST

Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
*RB-036	BOARD—Antenna—ground terminal board	$0.10
*RB-048	BOARD—Terminal board (near 75 tube)	.15
*RB-062	BOARD—Terminal board (near power trans.)	.10
*RB-079	BOARD—Phono terminal board	.10
RC-006	CAPACITOR—.0015 mfd., 600 V. paper (C-22)	.25
*RC-023	CAPACITOR—.005 mfd., 600 V. paper (C-9, C-23)	.25
*RC-046	CAPACITOR—.02 mfd., 600 V. paper (C-24)	.30
*RC-055	CAPACITOR—.003 mfd., 600 V. paper (C-19, C-20)	.25
*RC-092	CAPACITOR—.05 mfd., 600 V. paper (C-17, C-44, C-45)	.30
*RC-104	CAPACITOR—.1 mfd., 600 V. paper (C-5, C-16, C-49)	.30
*RC-206	CAPACITOR—50 mmf., mica (C-8)	.35
RC-216	CAPACITOR—47 mmf., mica (C-18)	.25
RC-230	CAPACITOR—20 mmf. mica compensator (C-30)	.35
*RC-235	CAPACITOR—100 mmf. mica (C-46)	.25
RC-294	CAPACITOR—470 mmf., mica (C-37)	.30
*RC-310	CAPACITOR—820 mmf., mica (C-47)	.25
RC-346	CAPACITOR—1500 mmf., mica (C-21)	.30
RC-391	CAPACITOR—4300 mmf., mica (C-11)	.35
RC-594	CAPACITOR—8 mfd., 400 V.; 8 mfd., 400 V.; 12 mfd., 450 V. dry electrolytic (C-25, C-26, C-27)	1.60
RC-603	CAPACITOR—Wave trap trimmer (45-100 mmf.) (C-4)	.15
RC-678	CAPACITOR—300-650 mmf. padder (C-10)	.35
RC-677	CAPACITOR—Antenna and oscillator trimmer (C-2, C-3, C-6, C-7)	.55
RC-728	CONDENSER—2 gang tuning condenser (C-1)	2.95
*RC-755	CAPACITOR—.01 .01 mfd., 250 V. A. C. line capacitor (C-28, C-29)	.40
*RC-863	CORD—Power cord	.65
RC-5105	CAPACITOR—10 mfd., 50 volt dry electrolytic (C-48)	.60
RC-8035	CABLE—Speaker cable	.50
RG-015	GRID CLIP—Control grid clip (large) (Pkg. 5)	.05
RG-016	GRID CLIP—Control grid clip (small) (Pkg. 5)	.10
RK-027	KNOB—Control knob (winged) (Pkg. 5)	.50
RK-028	KNOB—Control knob (plain) (Pkg. 5)	.30
RL-062	COIL—Antenna coil band B, C, and D (T-5)	1.50
RL-266	COIL—Oscillator coil band B, C, and D (T-6)	1.30
RL-603	COIL—Wave trap coil (T-4)	.60
RL-802	COIL—Neutralizing coil (T-12)	.10
RQ-711	RESISTOR—470 ohm, 3 W. carbon (R-25)	.25
RQ-780	RESISTOR—33,000 ohm, 3 W. carbon (R-15)	.15
*RQ-1219	RESISTOR—22 ohm, ½ W. carbon (R-17) (Pkg. 5)	.70
*RQ-1227	RESISTOR—47 ohm, ½ W. carbon (R-16) (Pkg. 5)	.70
*RQ-1239	RESISTOR—150 ohm, ½ W. carbon (R-12) (Pkg. 5)	.70
*RQ-1245	RESISTOR—270 ohm, ½ W. carbon (R-8) (Pkg. 5)	.70
[illegible]	[illegible]OR—3,300 ohm, ½ W. carbon (R-14) (Pkg. 5)	.70
[illegible]	[illegible]OR—4,800 ohm, ½ W. carbon (R-2, R-15) (Pkg. [illegible]	.70
	[illegible]	
[illegible]	[illegible]Male speaker plug	$0.20
[illegible]	[illegible]R—6½-inch speaker	3.70
[illegible]	[illegible]LY—Speaker mounting assembly	.10
	[illegible]PEAKER ASSEMBLY (G-66, G-68, G-69)	
[illegible]	[illegible]12-inch cone and voice coil assembly	1.10
[illegible]	[illegible]—Cone spider clamp	.05
[illegible]	[illegible]AP—Speaker cone dust cap (Pkg. 5)	.10
[illegible]	[illegible]Male speaker plug	.20
RS[illegible]	[illegible]R—12-inch speaker	5.40
*RX[illegible]	[illegible]LY—Speaker mounting assembly	.10
	DIAL SCALE MECHANISM	
*RB[illegible]	[illegible]ET—Band change bracket (C)	.05
[illegible]	[illegible]Drive cord assembly (set) (B)	.25
[illegible]	[illegible]Tone control cord (Pkg. 5)	.35
[illegible]	[illegible]Volume control cord (Pkg. 5)	.35
[illegible]	[illegible]Condenser drive drum (A)	.35
[illegible]	[illegible]Dial scale	1.10
[illegible]	[illegible]—Vernier drive bracket assembly (B)	.35
[illegible]	[illegible]HEON—Dial scale escutcheon	1.40
[illegible]	[illegible]R—Volume and tone control pointer (Pkg. 5)	.10
[illegible]	[illegible]—Small idler pulley (Pkg. 5)	.20
[illegible]	[illegible]R—Dial scale pointer (Pkg. 5)	.90
[illegible]	[illegible]—Tone control pulley (D)	.10
[illegible]	[illegible]TOR—Lamp reflector	.10
[illegible]	[illegible]—Light shield (cardboard) (Pkg. 10)	.05
[illegible]	[illegible]—Lamp socket assembly	.10
*RS[illegible]	[illegible]—Drive drum spring (Pkg. 5)	.10
RS[illegible]	[illegible]—Tone and volume cord tension spring (Pkg. [illegible]	.25
RX[illegible]	[illegible]LY—Tuning condenser mounting assembly	.25
	PHONOGRAPH ASSEMBLY MODEL G-68	
[illegible]	[illegible]Pick-up tone arm	2.30
[illegible]	[illegible]AL—Crystal pick-up	6.00
[illegible]	[illegible]—Radio-phono shielded cable	.35
[illegible]	[illegible]Radio-phono switch knob (Pkg. 5)	.40
[illegible]	[illegible]—Motor complete, 115-125 V, 60 cy.	13.75
[illegible]	[illegible]—Motor complete, 115-125 V, 50 cy.	13.75
[illegible]	[illegible]—Motor complete, 115-125 V, 25 cy.	15.25
[illegible]	[illegible]To contact round female plug	.60
[illegible]	[illegible]Male connector plug	.30
[illegible]	[illegible]—Phono radio switch	1.10
[illegible]	[illegible]—Automatic stop and switch (complete)	1.50
[illegible]	[illegible]—Needle screw	.10
[illegible]	[illegible]ABLE—10-inch turntable (brown velveteen)	1.75
[illegible]	[illegible]LY—Motor mounting assembly	.30
	PHONOGRAPH ASSEMBLY MODEL G-69	
[illegible]	[illegible]ET—Pick-up locating lever mounting bracket (3)	.30
RC-1982	CAM—Cam and gear assembly (4)	2.00
*RQ-1291	RESISTOR—22,000 ohm, ½ W. carbon (R-19) (Pkg. 5)	$0.70
*RQ-1299	RESISTOR—47,000 ohm, ½ W. carbon (R-1, R-4, R-20, R-21) (Pkg. 5)	.70
*RQ-1307	RESISTOR—100,000 ohm, ½ W. carbon (R-22) (Pkg. 5)	.70
*RQ-1313	RESISTOR—180,000 ohm, ½ W. carbon (R-6) (Pkg. 5)	.70
*RQ-1315	RESISTOR—220,000 ohm, ½ W. carbon (R-5, R-9, R-23, R-24, R-26) (Pkg. 5)	.70
*RQ-1331	RESISTOR—1.0 megohm, ½ W. carbon (R-10) (Pkg. 5)	.70
*RQ-1339	RESISTOR—2.2 megohm, ½ W. carbon (R-11, R-13) (Pkg. 5)	.70
*RQ-1491	RESISTOR—22,000 ohm, 1 W. carbon (R-3)	.30
*RS-200	SOCKET—Tube socket (6AC5G) (Pkg. 5)	.75
*RS-204	SOCKET—Five prong octal base socket (Pkg. 5)	.75
*RS-215	SOCKET—Tube socket (75) (Pkg. 5)	.60
RS-227	SOCKET—Octal base tube socket	.15
RS-224	SOCKET—Tube socket (76) (Pkg. 5)	.50
RS-394	SWITCH—Band change switch (S-1)	.95
RS-395	SWITCH—Tone control switch (S-2)	.55
RS-3013	SWITCH—Phono radio switch (G-68, G-69)	1.00
*RT-0711	TRANSFORMER—Power transformer 120 V, 25-60 cycles	7.60
RT-0616	TRANSFORMER—Power transformer 120 V. 50-60 cycles	4.60
RT-281	TRANSFORMER—1st I.F. transformer and shield	1.60
RT-282	TRANSFORMER—2nd I.F. transformer and shield	1.60
RT-438	TRANSFORMER—Output transformer (T-3)	1.70
RV-041	VOLUME CONTROL—2 meg. volume control (R-7)	.70
*RW-101	WASHER—Felt washer (Pkg. of 10)	.45
*RX-021	ASSEMBLY—Chassis mounting assembly	.10
	TOUCH TUNING ASSEMBLY	
RB-613	BUTTON—Molded push button (Pkg. 5)	.35
RC-8036	CARDS—Station letter cards (set)	.25
RC-8053	CARD—"Off" tab card (strip of 10)	.06
RC-8086	CARD—"Manual" tab card (Strip of 10)	.05
RE-029	ESCUTCHEON—Push button escutcheon	.60
RS-393	SWITCH—Push button switch (S-5)	3.50
RS-444	SPRING—Spring for push-button (Pkg. 10)	.10
RT-854	TRIMMER STRIP—Oscillator trimmer strip (C-38, C-39, C-40, C-41, C-42, C-43)	1.15
RT-855	TRIMMER STRIP—Antenna trimmer strip (C-31, C-32, C-33, C-34, C-35, C-36)	1.15
RW-021	WINDOWS—Celluloid station windows (Pkg. 25)	.10
	SPEAKER ASSEMBLY (G-61)	
RC-931	CONE—6½-inch cone and voice coil assembly	.60
RD-300	DUST CAP—Speaker cone dust cap (Pkg. 5)	.10
RC-1963	CLUTCH—Trip lever friction clutch assembly (5)	$0.35
RC-1984	COUPLING—Motor coupling complete with turntable drive gear, rubber strips, motor coupling and drive arm (6)	1.80
RC-5001	CRYSTAL—Pick-up crystal cartridge and needle screw	4.25
RF-402	FINGER—Trip lever friction finger assembly (7)	.45
RG-103	GUIDE—Main lever spring guide (11)	.40
RG-500	GOVERNOR—Motor speed governor	3.05
RG-731	GEAR—Long arm and rack gear for front left-hand record post (8)	.60
RG-732	GEAR—Short arm and rack gear for front right-hand record post (9)	.55
RG-733	GEAR—Record post gear (10)	.90
RL-927	LEVER—Index lever assembly (12)	.75
RL-928	LEVER—Index lever tension spring lever (13)	.50
RL-929	LEVER—Locating lever and pawl assembly (14)	.70
RL-930	LEVER—Main lever assembly (15)	1.35
RL-931	LEVER—Pick-up lift cable lever and spring assembly (16)	.55
RL-932	LEVER—Pick-up locating lever assembly (17)	.85
RL-933	LEVER—Record separator elevating lever complete with adjustment screws (18)	.80
RL-934	LEVER—Trip detaining lever (19)	.30
RL-935	LEVER—Trip lever assembly (20)	1.85
RL-936	LEVER—Trip regulator lever (21)	.25
RM-116	MOTOR—Phono-motor 105-125 V., 25 cy.	23.70
RM-117	MOTOR—Phono-motor, 105-125 V., 50 cy.	20.50
RM-118	MOTOR—Phono-motor, 105-125 V., 60 cy.	17.75
RP-400	PAWL—Trip pawl assembly (22)	.80
RP-401	PIN[illegible] pin (23) (Pkg. 5)	.20
RP-501	PIC[illegible] arm complete	7.45
RR-922	ROL[illegible] cable roller and bracket assembly (24)	.55
RS-452	SPR[illegible]tension spring on main gear (Pkg. 5)	.20
RS-453	SPR[illegible]ing lever short spring (28) (Pkg. 5)	.40
RS-454	SPRING—Main lever tension spring (29)	.05
RS-455	SPRING—Pick-up locating lever long spring or index lever tension spring (30)	.05
RS-456	SPRING—Pick-up lift cable tension spring (31) (Pkg. 5)	.20
RS-457	SPRING—Record separator pressure spring (32) (Pkg. 5)	.10
RS-458	SPRING—Trip detaining lever or locating lever tension spring (33) (Pkg. 5)	.30
RS-[illegible]	[illegible] (25)	.75
RS-[illegible]	[illegible] (27)	1.25
RS-[illegible]	[illegible] spring	1.40
RS-[illegible]	[illegible]ing (set)	.40
RS-[illegible]	[illegible] trip lever hub or [illegible]	.30
RS-[illegible]	[illegible] nut (Pkg. 5)	.30
RS-[illegible]	[illegible]on-clutch tension [illegible]	.15
RS-870	SCREW—Pick-up needle screw (Pkg. 5)	.60
RS-917	SHAFT—Record separator post shaft (26)	.40
RS-918	SHAFT—Pick-up pivot arm and shaft assembly	.45
RS-3012	SWITCH—Motor toggle switch	.90
RT-907	TURNTABLE—Turntable assembly, less spindle	3.35
RW-111	WASHER—Turntable thrust washers (1 steel, 1 bronze, 1 felt)	.15

* Used on previous receivers.

(Prices subject to change without notice)

AUTOMATIC RECORD CHANGER (G-69)

General Information

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

Adjustments

A. Main Lever—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pick-up is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pick-up Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pick-up lift cable. To adjust pick-up for proper elevation, stop the changer "in-cycle" at the point where pick-up is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10-inch record. Position of eccentric stud "E" governs the landing of the needle on a 12-inch record; this, however, is dependent on the proper 10-inch adjustment.

To adjust for needle landing, place 10-inch record on turntable; push index lever to reject position and return to the 10-inch position; see that pick-up locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pick-up base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone-pointed screw "D."

After adjusting for needle landing on a 10-inch record, place 12-inch record on turntable; push index lever to reject and return to 12-inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10-inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10-inch record is nominally .085 inch, and for the 12-inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12-inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone-pointed screw "H."

If record shelves or knives are bent, or not perfectly horizontal improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pick-up head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

Miscellaneous Service Hints

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10- and 12-inch records—Make complete adjustments "D" and "E."
3. Needle does not land properly on 12-inch record but correct on 10-inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pick-up strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pick-up output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. Needle lands in 10 inch position on 12 inch record—Increase tension of pick-up locating lever spring "30."

MODELS G61,G66,G68,G69
Phono.Connections,Motor
Data,Assembly of Changer

GENERAL ELECTRIC CO.

PHONOGRAPH MECHANISM (G-68)

Motor Adjustments

The speed of the turntable is controlled by a governor which allows correct adjustment of the turntable rotation to 78 revolutions per minute. The speed may be checked by placing a piece of paper under a record and counting the number of revolutions in a minute while the record is being played. If adjustment is necessary lift up the turntable and the speed regulator setscrew will be found adjacent to the turntable hub of the motor. Clockwise rotation of this setscrew reduces speed.

The motor bearings and gears are properly lubricated for long operation under normal weather conditions. If the motor chatters or runs unevenly, place a few drops of light machine oil on the governor felt.

Trip Mechanism

The trip mechanism is of simple design and consists of a latch bar connected to the motor switch and a trip lever. The latch is held closed by means of a spring between the latch bar and the trip lever. The motor switch is mechanically connected to the latch bar so that when the trip mechanism is released the motor switch is in the "off" position. Be sure this latch bar mechanism works freely without binding.

The trip is actuated by an adjustable arm on the trip lever. When the eccentric groove in the record swings the tone arm back and forth, it pushes the latch out of engagement.

Phonograph Connections (G-61 and G-66)

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-61 or G-66 circuit for the reproduction of phonograph recordings. This method uses a two circuit jack and is connected into the receiver by opening the circuit at C-D at the output of the 2nd IF transformer; and connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert this plug into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be well shielded.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

NOTE.—A suitable load consisting of a 300,000 ohm resistor should be connected across the pick-up leads when using a crystal type unit.

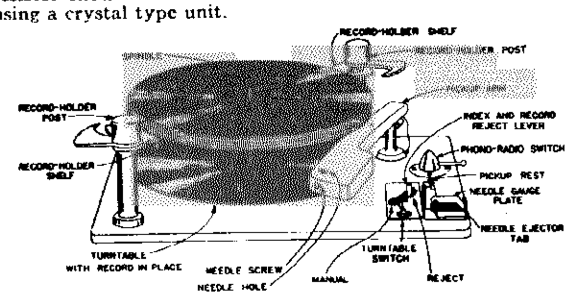
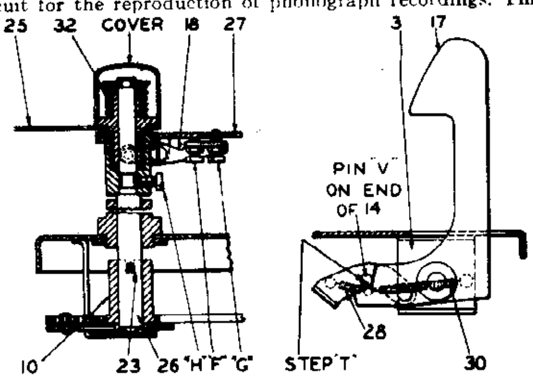
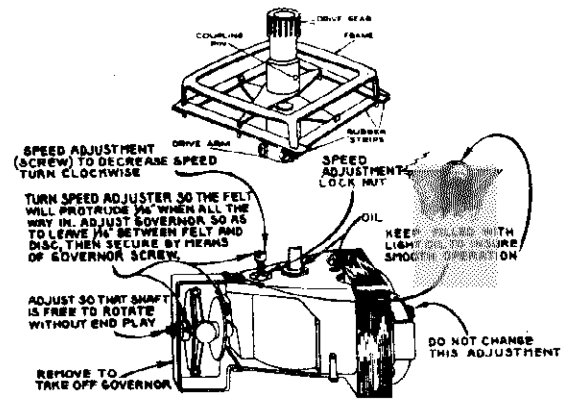


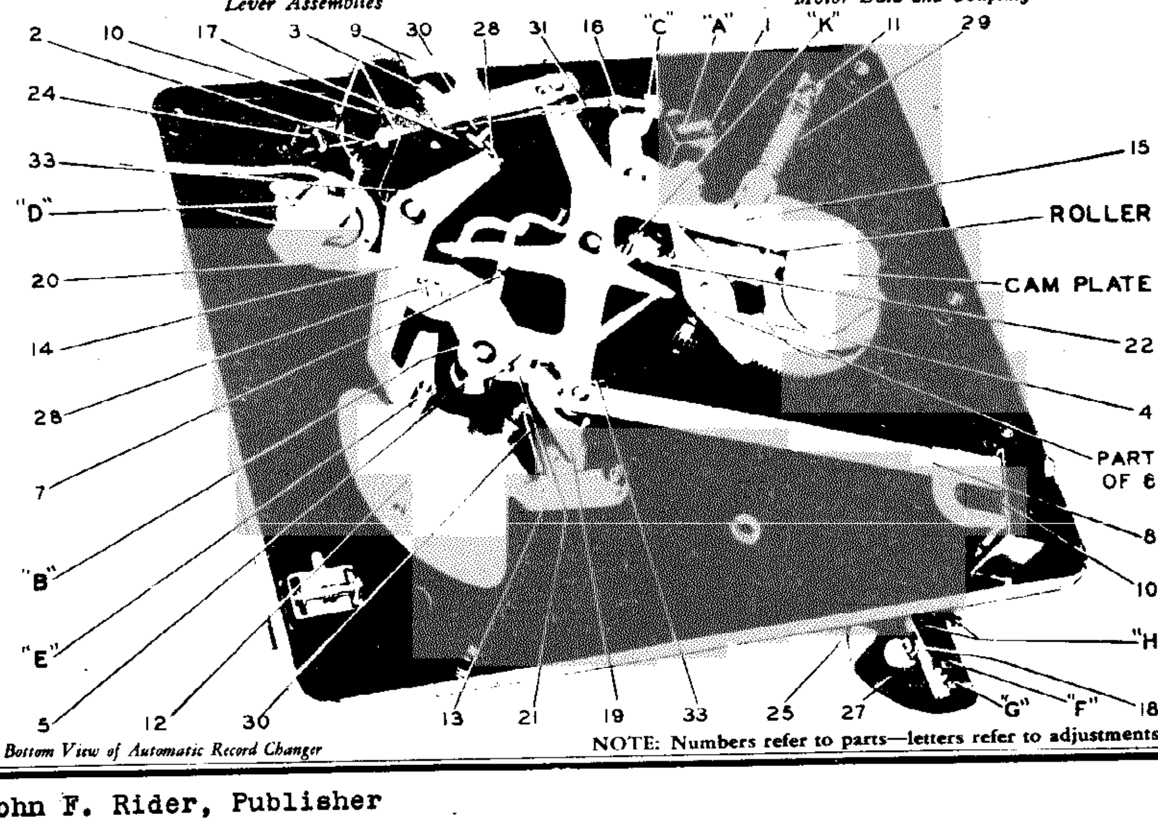
Fig. 7. Top View of Automatic Record Changer



Details of Record Shelf Posts, and Locating Lever Assemblies



Motor Data and Coupling

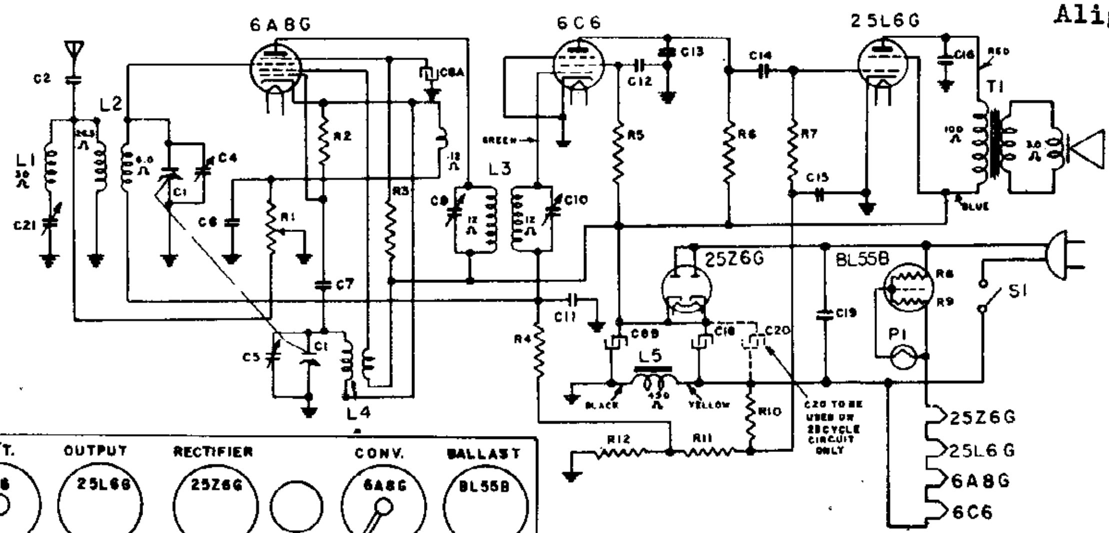


Bottom View of Automatic Record Changer

NOTE: Numbers refer to parts—letters refer to adjustments.

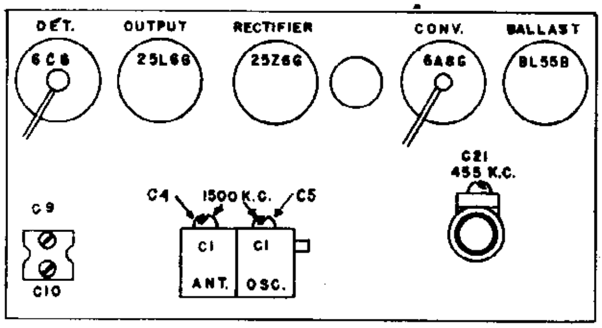
MODEL GD51
Schematic, Socket, Trimmers, Voltage Alignment

GENERAL ELECTRIC CO.



Electrical Power Output (120—line volts)

	DC	AC
Undistorted	0.9	1.0
Maximum	1.5	1.8



Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
100–125 Volts AC or DC	40–60	45

Tuning Frequency Range .... 540-1750 K.C.

Intermediate Frequency .... 455 K.C.

Symbol	Description	Symbol	Description	Symbol	Description
C-1, -4, -5	Tuning Condenser	C-16	.03 Mfd., Paper Capacitor	R-7	680,000 Ohm Carbon Resistor
C-2	.001 Mfd., Paper Capacitor	C-18	15 Mfd., Dry Electrolytic	R-8	162 Ohm Ballast Resistor
C-6	.05 Mfd., Paper Capacitor	C-19	.02 Mfd., Molded Capacitor	R-9	31 Ohm Ballast Resistor
C-7	47 Mmf., Mica Capacitor	C-20	35 Mfd., Dry Electrolytic	R-10	680,000 Ohm Carbon Resistor
C-8a	10 Mfd., Dry Electrolytic	C-21	Wave Trap Trimmer	R-11	150,000 Ohm Carbon Resistor
C-8b	15 Mfd., Dry Electrolytic	R-1	10,000 Ohm Volume Control	R-12	75,000 Ohm Carbon Resistor
C-11	.05 Mfd., Paper Capacitor	R-2	47,000 Ohm Carbon Resistor	L-1	Wave Trap Coil
C-12	.02 Mfd., Paper Capacitor	R-3	22,000 Ohm Carbon Resistor	L-2	Antenna Coil
C-13	100 Mmf., Mica Capacitor	R-4	4.7 Megohm Carbon Resistor	L-3	I.F. Transformer
C-14	.005 Mfd., Paper Capacitor	R-5	3.3 Megohm Carbon Resistor	L-4	Oscillator Coil
C-15	0.1 Mfd., Paper Capacitor	R-6	470,000 Ohm Carbon Resistor	T-1	Output Transformer

VOLTAGE CHART

Tube No.	6A8G	6C6	25L6G	25Z6G
Plate to -B Volts	102	30*	98	....
Screen to -B Volts	65	20*	102	....
Cathode to -B Volts	0–30	0	0	127
Filament Volts	6.2	6.2	24.5	25.0

Line voltage—120 VAC. No Signal Input.
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

Loud-speaker—Electrodynamic

Outside Cone Diameter .... 5 inches
Voice Coil Impedance (400 cycles) ... 4.0 ohms
Field Coil Resistance .... 420 ohms (cold)

Tubes

Converter and Oscillator GE-6A8G
I.F. Detector and Amplifier GE-6C6
Power Amplifier GE-25L6G
Rectifier GE-25Z6G
Ballast Resistor Tube BL-55B
Pilot Lamp .... Mazda No. 44

Model GD-51 is a compact, five-tube AC-DC superheterodyne receiver employing four General Electric tubes plus a ballast tube, as described above in a superheterodyne circuit. It incorporates a simplified mechanically tuned "Touch Tuning" system allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic overload control and an efficient electrodynamic speaker.

Alignment Frequencies

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust the two I.F. trimmers (C9 and C10) for maximum output.

Wave Trap Alignment

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-21) for minimum output.

R.F. Alignment

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-5) and antenna trimmer (C-4) for a maximum output.

Precaution—One side of the power supply is connected directly to the chassis. If the signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

MODEL GA62
Schematic, Voltage, Socket
Trimmers, Alignment

GENERAL ELECTRIC CO.

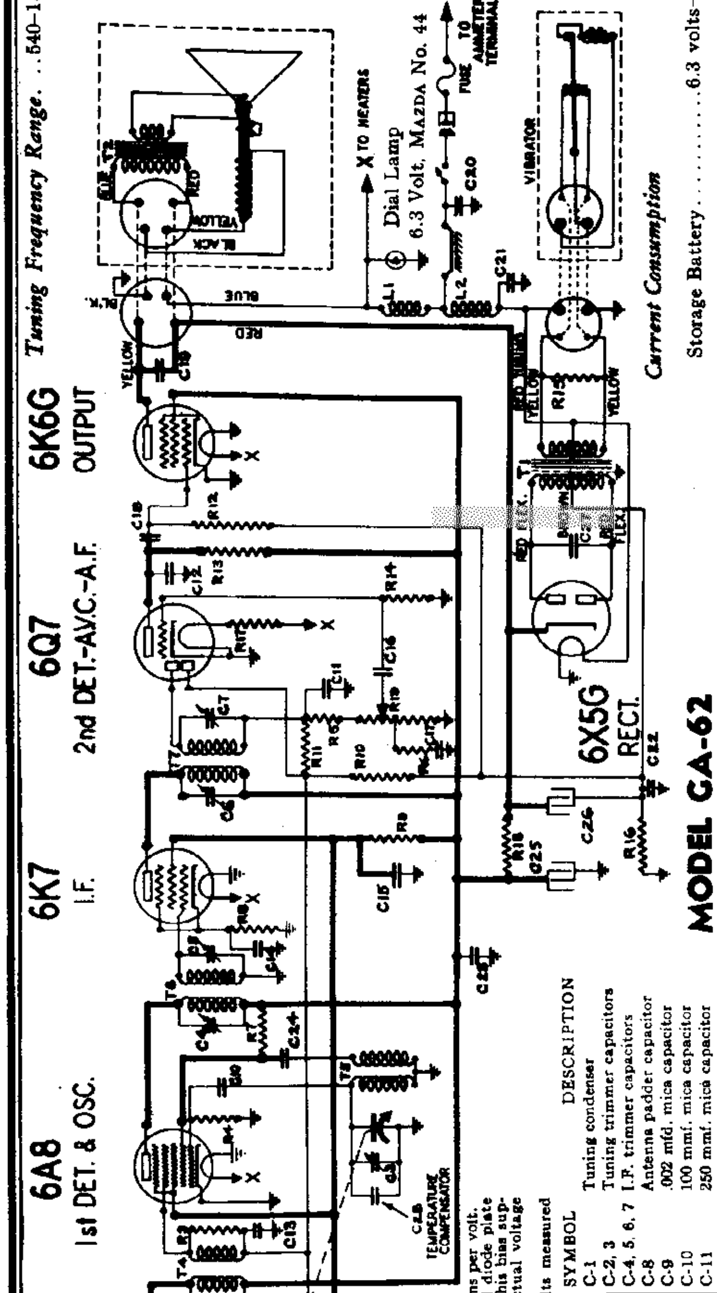
Loud-speaker—Electrodynamic

Speaker Diameter.........6 inches
Cone Coil Impedance......4 ohms at 400 cycles

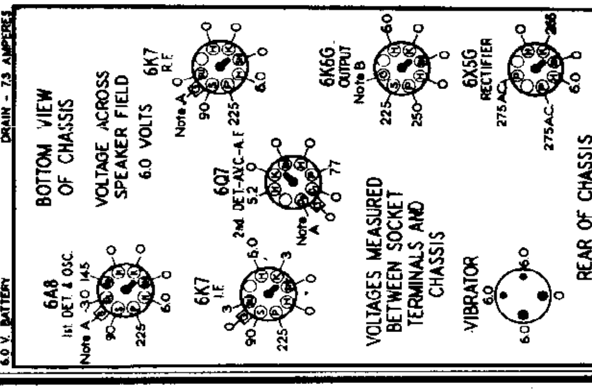
Tuning Frequency Range. . .540–1540 K.C.

Electrical Power Output
Undistorted.... 2.0 watts
Maximum.... 3.5 watts

Current Consumption
Storage Battery..........6.3 volts—7.3 amps



Use a high-resistance voltmeter or a 1000 ohms per volt.
Note A.—The actual bias on these grids and diode plate (Ds) is −3 volts. Due to the high resistance in this bias supply circuit, it is not possible to measure the actual voltage unless a vacuum-tube voltmeter is available.
Note B.—The bias on this grid is −18 volts measured across resistor R16.



SYMBOL	DESCRIPTION
C-1	Tuning condenser
C-2, 3	Tuning trimmer capacitors
C-4, 5, 6, 7	I.F. trimmer capacitors
C-8	Antenna padder capacitor
C-9	.002 mfd. mica capacitor
C-10	100 mmf. mica capacitor
C-11	250 mmf. mica capacitor
C-12	1100 mmf. mica capacitor
C-13	.05 mfd. paper capacitor
C-14, 15	.1 mfd. paper capacitor
C-16, 22	.004 mfd. paper capacitor
C-17, 24	.01 mfd. paper capacitor
C-18	.02 mfd. paper capacitor
C-19	.005 mfd. paper capacitor
C-20, 21	.5 mfd. paper capacitor
C-23	.1 mfd. paper capacitor
C-25, 26	8 mfd. dry electrolytic
C-27	.01 mfd. oil-filled capacitor
C-28	Temp. compensator capacitor
L-1	Choke coil (short)
L-2	Choke coil (long)
R-1	470,000 ohms, carbon resistor
R-2	68,000 ohms, carbon resistor
R-3	33,000 ohms, carbon resistor
R-4, 5, 6	47,000 ohms, carbon resistor
R-7	22,000 ohms, carbon resistor
R-8	820 ohms, carbon resistor
R-9	27,000 ohms, carbon resistor
R-10	10 megohms, carbon resistor
R-11	1.5 megohms, carbon resistor
R-12	470,000 ohms, carbon resistor
R-13	220,000 ohms, carbon resistor
R-14	10 megohms, carbon resistor
R-15	220 ohms, wire wound resistor
R-16	360 ohms, wire wound resistor
R-17	3 ohms, wire wound resistor
R-18	1500 ohms, wire wound resistor
R-19	500,000 ohms, volume control
T-1	Power transformer
T-2	Output transformer
T-3	Antenna transformer
T-4	Detector transformer
T-5	Oscillator transformer
T-6	1st I.F. transformer
T-7	2nd I.F. transformer

GENERAL INFORMATION

Model GA-62 is a compact, six-tube superheterodyne receiver, employing six General Electric Pre-tested Tubes as described previously. The power supply consists of a non-synchronous type vibrator and full-wave high-vacuum rectifier operating in a conventional rectifier circuit. The receiver incorporates a simplified mechanically adjusted "Touch-Tuning" system, allowing a setup of five stations for automatic tuning. The use of an antenna-matching trimmer results in the maximum transfer of energy from the antenna to the control grid of the 6K7 R.F. tube, providing a high signal-to-noise ratio.

ALIGNMENT

IF ALIGNMENT - Adj. 4 trimmers at 465 KC thru .1 mf cond.

RF ALIGNMENT - Adj. osc. and Ant. trimmers C-3 and C-2 at 1400 KC. thru 100 mmf cond.- PEAK C-8 at 600 KC.

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. V111.

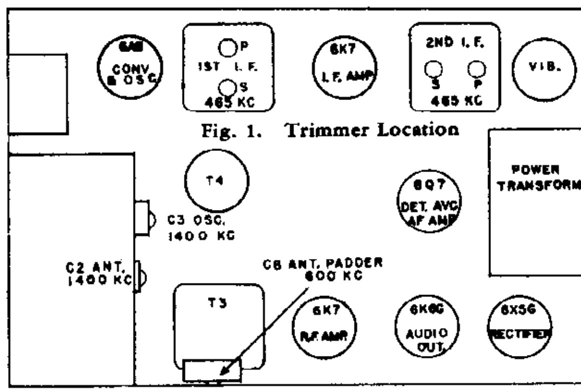


Fig. 1. Trimmer Location

GENERAL ELECTRIC CO.

MODELS GD62, GD67
Schematic, Voltage, Socket
Trimmers, Alignment

Symbol	Description	Symbol	Description	Symbol	Description
C1 C2, C3	Tuning condenser and trimmers	C23	.1 mfd paper capacitor	R10	220,000 ohm carbon resistor
C4	5-35 mmf. trimmer capacitor	C27	100 mmf mica capacitor	R11	15,000 ohm carbon resistor
C10	30-70 mmf. trimmer capacitor	C28	500 mmf mica capacitor	R12	470 ohm carbon resistor
C12	.1 mfd paper capacitor	C29	250 mmf mica capacitor	R13	1.5 megohm carbon resistor
C13	.001 mfd paper capacitor	C32, C33	50 mfd, 50 mfd, dry electrolytic	R14	68 ohm carbon resistor
C14	.05 mfd paper capacitor	R1	10 megohm carbon resistor	R15	230 ohm w.w. resistor
C15	.1 mfd paper capacitor	R2	47,000 ohm carbon resistor	R16	100,000 ohm carbon resistor
C16	.005 mfd paper capacitor	R3	15,000 ohm carbon resistor	R18, R19	100 ohm w.w. resistor
C17	.002 mfd paper capacitor	R4	2.2 megohm carbon resistor	L1	Wave trap coil
C18	.03 mfd paper capacitor	R5	2.0 megohm volume control	L2	Antenna coil
C19	.25 mfd paper capacitor	R6	470,000 ohm carbon resistor	L3	Oscillator coil
C20	.01 mfd moulded capacitor	R7	180,000 ohm carbon resistor	T2	Output transformer
C21	.005 mfd paper capacitor	R8	220,000 ohm carbon resistor		
C22	.1 mfd paper capacitor	R9	330,000 ohm carbon resistor		

VOLTAGE CHART

Tube No.	6A7	6D6	75	25L6G	25Z6G
Plate to —B Volts	115	115	50*	105	120 V. A.C.
Screen to —B Volts	70	115		115	
Cathode to —B Volts	3.0	3.0	0.5	8.5	115
Filament Volts	6.4	6.4	6.4	23.0	24.0

*Measured on 250-volt scale.
Line Voltage—120 A.C. No signal input.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

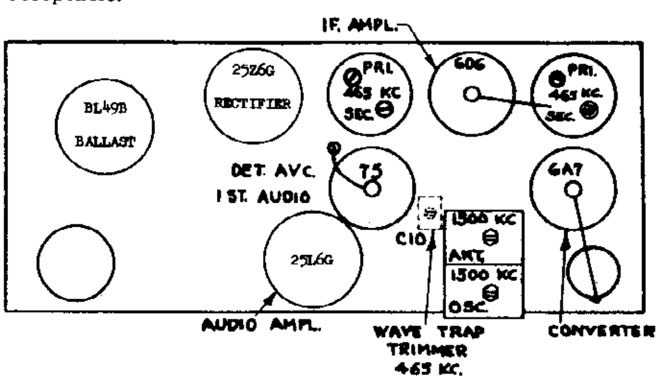


Fig. 1. Trimmer Location

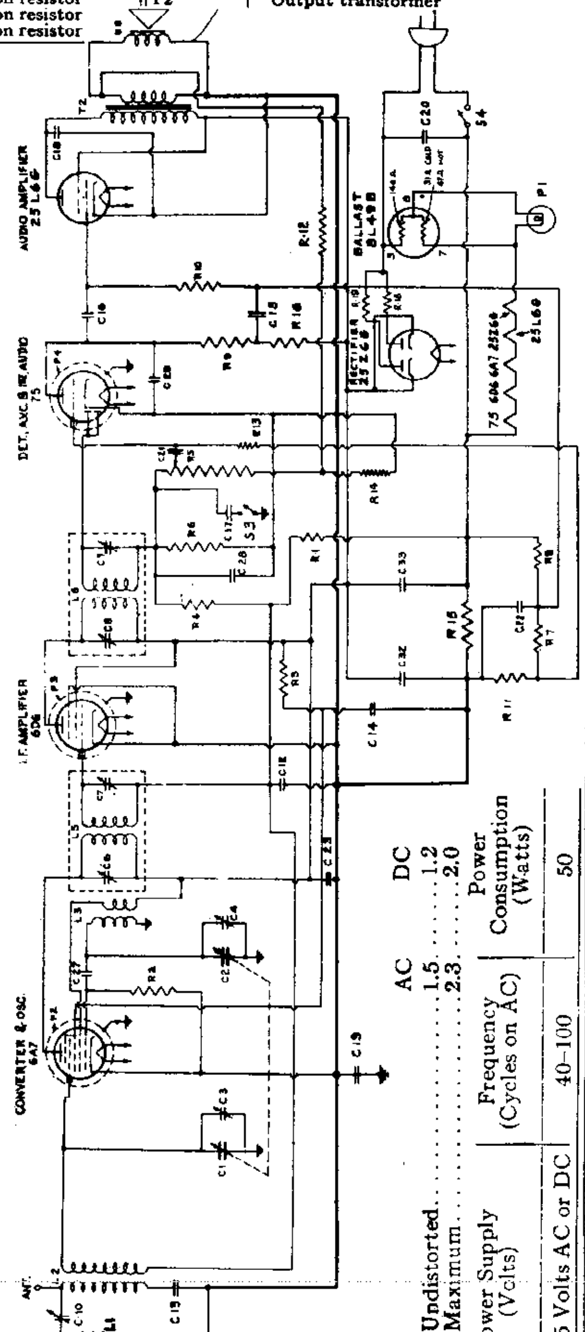
Touch-Tuning Mechanism

The dial mechanism is a very simple arrangement and should not require service. The frequency range of each of the automatic tuning buttons is as follows:

Button No.	Frequency Range (Kilocycles)	Button No.	Frequency Range (Kilocycles)
1	540-590	5	830-1150
2	570-670	6	1020-1400
3	630-780	7	1220-1700
4	710-940	8	1580-1800

Tuning Frequency Range .... 540-1800 K.C.

Intermediate Frequency .... 465 K.C.



Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)	AC	DC
100-125 Volts AC or DC	40-100	50		
Undistorted			1.5	1.2
Maximum			2.3	2.0

IF ALIGNMENT - Adj. 4 trimmers at 465 KC thru .05 mf condenser.

WAVE TRAP - Adj. C10 cond. at 465 KC thru 250 mmf and 200 ohms series.

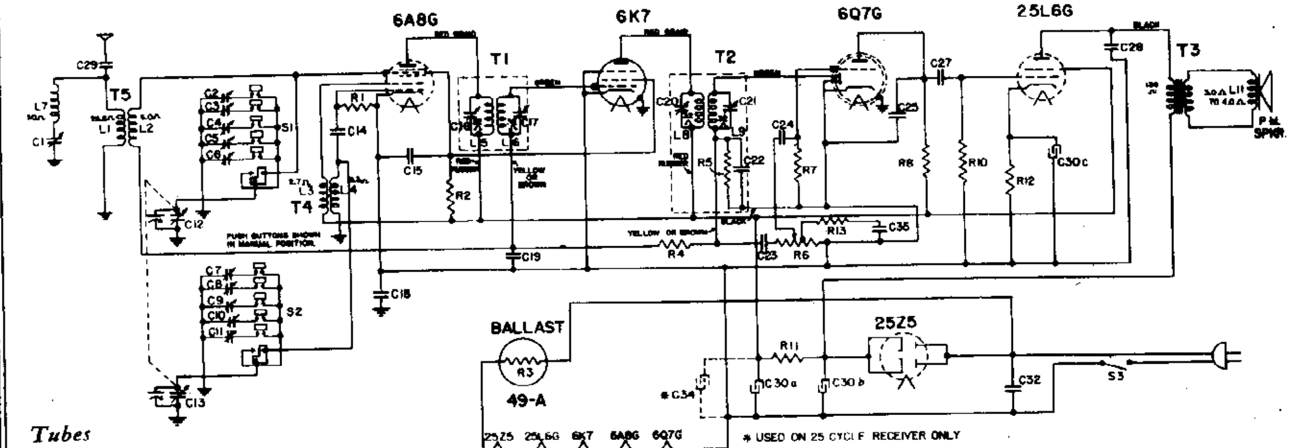
RF ALIGNMENT - Thru a 250 mmf and 200 ohm series :-Adj. C4 cond. osc. trimmer at 1830 KC - Adj. C3 Ant. trimmer at 1500 KC.

Pwr. Supply connection to chassis is thru .25 mf cond. If Sig. gen. is AC, connect .05 mf cond. in grd. side before chassis connection.

FOR CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME VIII.

MODEL GD63
Schematic, Voltage, Socket
Trimmers, Alignment

GENERAL ELECTRIC CO.



Tubes

Converter and Oscillator....GE-6A8G
I.F. Amplifier............ CE-6K7
Detector, AVC and Amplifier..................GE-6Q7G
Power Amplifier...........GE-25L6G
Rectifier..................GE-25Z5
Ballast Tube..............49-A

Tuning Frequency Range**.....540–1750 K.C.**

Intermediate Frequency**......455 K.C.**

Symbol	Description	Symbol	Description
C1	Wave trap trimmer	C34	15 mfd., dry electrolytic
C2–C6	Antenna trimmer strip	C35	.005 mfd., paper capacitor
C7–C11	Oscillator trimmer strip	R1	47,000 ohm, carbon resistor
C12 C13	Tuning condenser	R2	10,000 ohm, carbon resistor
C14	47 mmf., mica capacitor	R3	Ballast resistance, 49A
C15	.25 mfd., paper capacitor	R4	2.2 megohm, carbon resistor
C18	.25 mfd., paper capacitor	R5	470,000 ohm, carbon resistor
C19	.05 mfd., paper capacitor	R6	2.2 megohm, volume control
C22	470 mmf., mica capacitor	R7	15.0 megohm, carbon resistor
C23 24	.002 mfd., paper capacitor	R8	220,000 ohm, carbon resistor
C25	330 mmf., mica capacitor	R10	1.0 megohm, carbon resistor
C27	.005 mfd., paper capacitor	R11	2200 ohm, carbon resistor
C28	.01 mfd., paper capacitor	R12	180 ohm, carbon resistor
C29	.001 mfd., paper capacitor	R13	68,000 ohm, carbon resistor
C30a	20 mfd., dry electrolytic	T1	1st I.F. transformer
C30b	40 mfd., dry electrolytic	T2	2nd I.F. transformer
C30c	20 mfd., dry electrolytic	T3	Output transformer
C32	.02 mfd., molded capacitor	T4	Osc. transformer
		T5	Antenna transformer

GENERAL INFORMATION

Model GD-63 is a compact, six-tube AC-DC superheterodyne receiver, employing six General Electric Pre-tested Tubes as described above, in a superheterodyne circuit. It incorporates a simplified trimmer tuned "Touch-Tuning" system, allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic volume control and an improved dustproof speaker.

Electrical Specifications

Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
110-125 Volts AC or DC	40–100	50

Electrical Power Output (120—line volts)

	AC	DC
Undistorted	1.2	1.0
Maximum	2.5	2.0

Loud-speaker—Permanent Magnet

Outside Cone Diameter.....5-inch
Voice Coil Impedance......4.0 ohms at 400 cycles

VOLTAGE CHART

Tube No.	6A8G	6K7	6Q7G	25L6G	25Z5
Plate to −B volts	112	112	55*	130	..
Screen to −B volts	75	75	..	115	..
Cathode to −B volts	0	0	0	7.5	136
Cathode Current MA	6.6	1.4	0.5	40	50
Filament Volts	6.0	6.0	6.1	24.5	24.0

Line Voltage -120 AC. No signal input
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

Wave Trap Alignment

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

R.F. Alignment

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

Precaution—One side of the power supply is connected to the chassis through a .25 mfd. capacitor. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

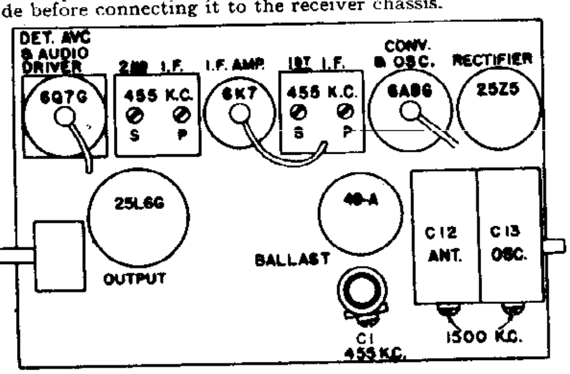


Fig. 1. Trimmer Location

GENERAL ELECTRIC CO. MODELS G64,G65 Schematic,Chassis Wiring

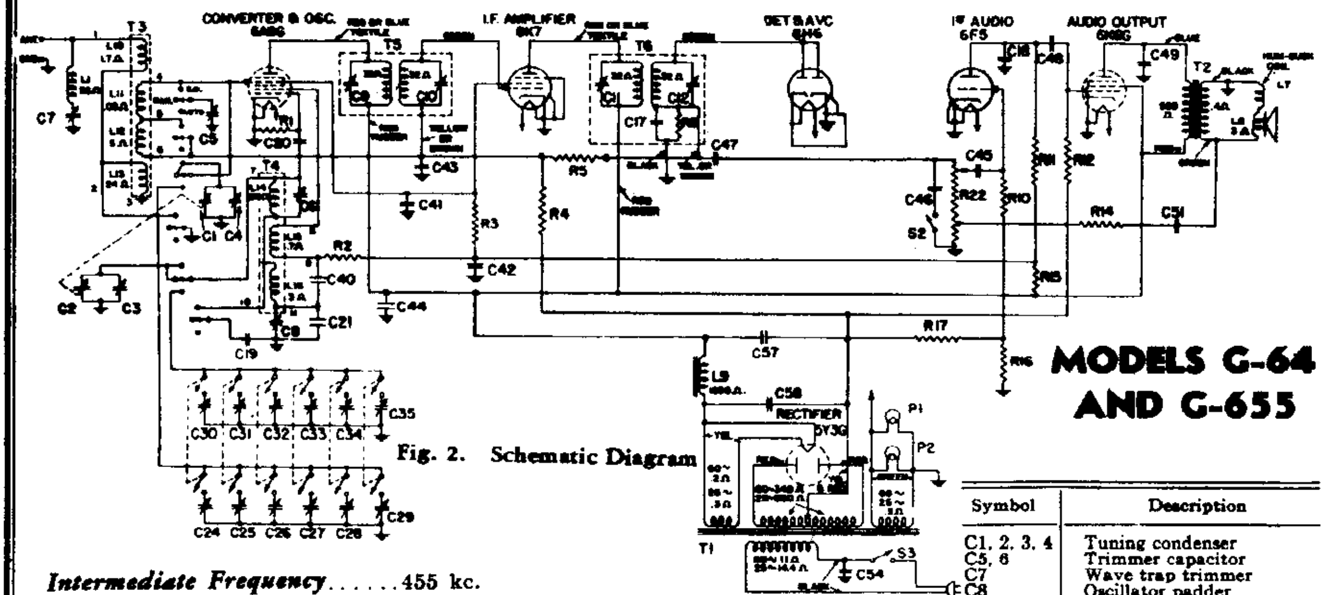


Fig. 2. Schematic Diagram

MODELS G-64 AND G-655

Intermediate Frequency......455 kc.

Symbol	Description
C1, 2, 3, 4	Tuning condenser
C5, 6	Trimmer capacitor
C7	Wave trap trimmer
C8	Oscillator padder
C17	470 mmf., mica capacitor
C18	330 mmf., mica capacitor
C19	3900 mmf., mica capacitor
C20	47 mmf., mica capacitor
C21	370 mmf., mica capacitor
C24, 29	Antenna trimmer strip
C30, 35	Oscillator trimmer strip
C40	.001 mfd., paper capacitor
C41	.05 mfd., paper capacitor
C42	0.5 mfd., paper capacitor
C43 44	.05 mfd., paper capacitor
C45	.01 mfd., paper capacitor
C46	.001 mfd., paper capacitor
C47 48	.005 mfd., paper capacitor
C49	.012 mfd., paper capacitor
C51	0.1 mfd., paper capacitor
C54	.01 mfd., molded paper
C57	8 mfd., dry electrolytic
C58	8 mfd., dry electrolytic
R1	47,000 ohm, carbon resistor
R2	4,700 ohm, carbon resistor
R3	18,000 ohm, carbon resistor
R4	10.0 megohm, carbon resistor
R5	1.5 megohm, carbon resistor
R9	470,000 ohm, carbon resistor
R10	2.2 megohm, carbon resistor
R11, 12	330,000 ohm, carbon resistor
R14	33,000 ohm, carbon resistor
R15	3900 ohm, carbon resistor
R16	22 ohm, carbon resistor
R17	330 ohm, carbon resistor
R22	2.0 megohm, volume control
T1	Power transformer
T2	Output transformer
T3	Antenna transformer
T4	Oscillator transformer

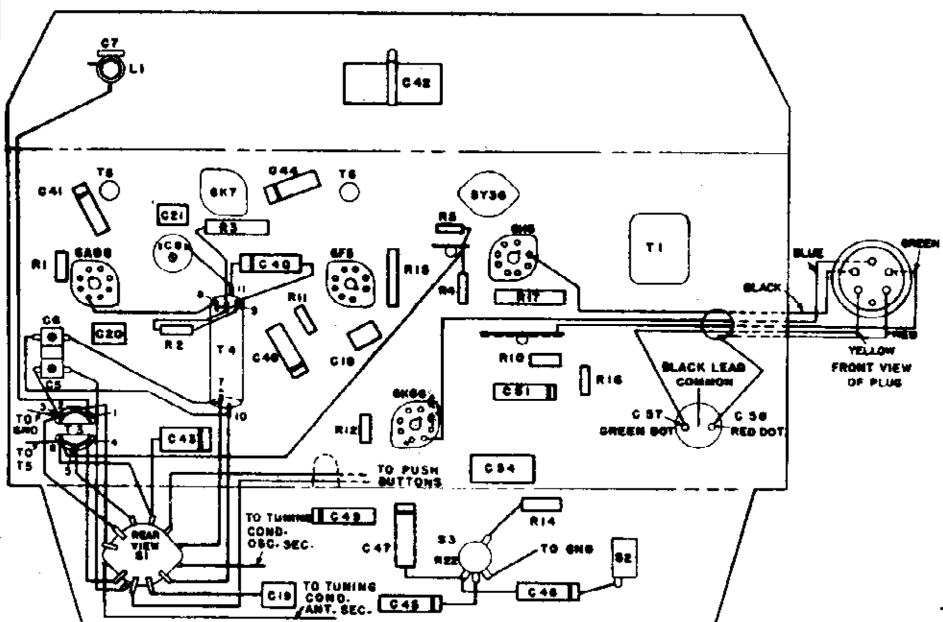


Fig. 3. Chassis Parts Layout

SERVICE DATA

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115–125	50–60	65
C	115–125	25–60	70
V	115–125 140–155 190–220 220–250	50–60	70

Tuning Frequency Range

Band "B"................540 to 1750 kc.
Band "D"................5700 to 18,300 kc.

Physical Specifications

Model	G-64	G-655
Height	11 inches	34 inches
Width	18⅛ inches	31 inches
Depth	7$\frac{1}{16}$ inches	11½ inches

Tuning Control Drive Ratio. 10 to 1

Electrical Power Output

Undistorted................2.0 watts
Maximum................4.0 watts

Tone Control................2 Point—Bass and Normal

Loud-speaker—Electrodynamic

Model	G-655	G-64
Cone Diameter	12 inches	6.5 inches
Voice Coil Impedance (400 cycles)	3.5 ohms	3.5 ohms

MODELS G64, G65
Alignment, Voltage, Socket
Trimmers, Phono. Connections
Parts List, Dial Data

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11)	Gang condenser plates wide open—connect audio input of oscilloscope to ground and to the junction of C-47 and R-5. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5.
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9)	
3. Band "B"	455 K.C. Sweep	Antenna Post	250 Mmf. 200 Ohms	Wave Trap Trimmer (C-7)	Adjust trimmer for minimum amplitude.

I.F. ALIGNMENT WITH OUTPUT METER

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9)	
3. Band "B"	455 K.C. with Modulation.	Antenna Post	250 Mmf. 200 Ohms	Wave Trap Trimmer (C-7)	Adjust trimmer for minimum output.

R.F. ALIGNMENT

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	....	......	....	....	Close gang condenser plates. Adjust pointer to first line at left end of tuning scale.
2. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-3) Ant. (C-4)	Connect output meter across voice coil—tone control on "bass" position—peak trimmers for maximum output with a low input signal.
3. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. Padder (C-8)	Adjust padder for a maximum output meter indication in vicinity of 580 kc. while rocking the gang condenser.
4. Band "B"	Repeat Operation 2				
5. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-6) Ant. (C-5)	Peak C-5 for maximum output while rocking the gang condenser at the 18 mc. point. The image of any signal on "D" band should be heard 930 kc. below the input signal when proper peak is obtained on oscillator trimmer C-6. Example: 12 mc. image—11.09 mc.

Use a dummy antenna in making all alignments. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. amplifier.

GENERAL INFORMATION

Coil System

The "B" and "D" band antenna coils are wound on a single coil form (T-3) as shown in Fig. 2. T-4 is the oscillator transformer for both the "B" and "D" bands. All coil terminals are numbered in Fig. 2 and 3 to facilitate in service by showing common points on the schematic diagram, Fig. 2, and the pictorial wiring diagram, Fig. 3.

Phonograph Connections

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the receiver circuit for the reproduction of phonograph recordings. S-1 is either a rotary or toggle triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit. It is very important that the pick-up leads have a shield such as copper braid to prevent hum interference. This lead should be connected to the chassis ground.

The circuit should be opened between the top end of the volume control (R-22) and (C-47), and phonograph connections made as shown. This procedure requires removal of the chassis from the cabinet.

When the pick-up is connected as shown, the regular radio volume and tone controls work for both radio and phonograph reproduction. The parts suggested are:

Symbol	Description	Stock No.
Sp	Phono Switch	RS-366
Rp	330,000 Ohm Resistor	RQ-1319

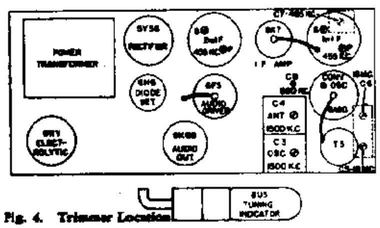
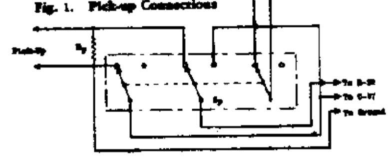


Fig. 4. Trimmer Location

Fig. 1. Pick-up Connections



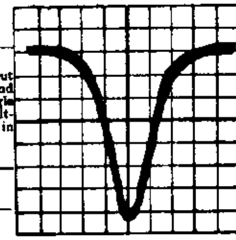


Fig. 5. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

KEYBOARD RADIOS

Models G-64 and G-655

VOLTAGE CHART

Tube No.	6A8G	6K7	6F5	6K6G	5Y3G
Plate to -B volts	Conv.-236 Osc.-186	236	84 *	220	....
Screen to -B volts	95	95	....	236	....
Cathode to -B volts	0	0	0	0	330
Filament volts	6.3	6.3	6.3	6.3	5.2

A-C line voltage—120.
* Measured on 500-volt scale.

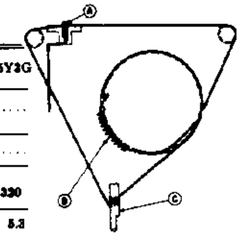


Fig. 6. Dial Drive Mechanism

REPLACEMENT PARTS LIST
MODELS G-64 AND G-655

12-38 (5M)

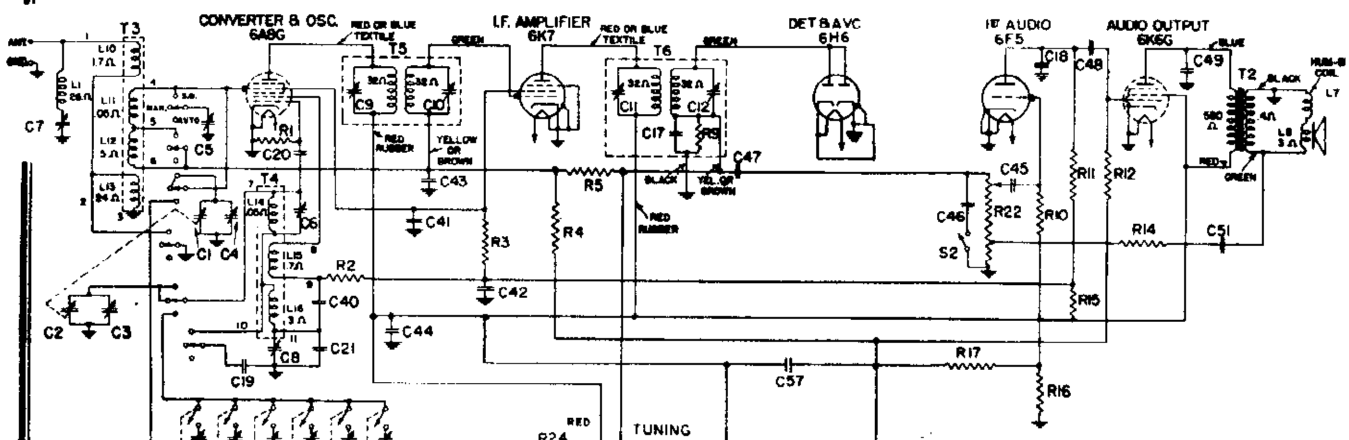
Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
*RB-008	BOARD—Terminal board (2 lug)	$0.10
RB-006	BOARD—Terminal board (6 lug)	.10
*RC-009	CAPACITOR—.001 mfd., 600 V. paper (C-40, 46)	.30
*RC-033	CAPACITOR—.005 mfd., 600 V paper (C-47, 48)	.25
*RC-030	CAPACITOR—.01 mfd., 200 V paper (C-45)	.25
RC-044	CAPACITOR—.012 mfd., 600 V paper (C-	.25
*RC-092	CAPACITOR—.05 mfd., 600 V paper (C-49)	.30
	41, 43, 44)	.30
*RC-104	CAPACITOR—0.1 mfd., 600 V paper (C-51)	.30
*RC-196	CAPACITOR—0.5 mfd., 600 V paper (C-42)	.75
RC-216	CAPACITOR—47 mmf., mica (C-20)	.25
*RC-274	CAPACITOR—330 mmf., mica (C-18)	.30
RC-285	CAPACITOR—370 mmf., mica (C-21)	.25
RC-294	CAPACITOR—470 mmf., mica (C-17)	.30
RC-390	CAPACITOR—3900 mmf., mica (C-19)	.35
RC-593	CAPACITOR—8 mfd., 450 V; 8 mfd., 450 V; dry electrolytic (C-57, 58)	1.40
RC-674	CAPACITOR—Wave trap trimmer (C-7)	.15
RC-696	CAPACITOR—Oscillator padder (C-8)	.40
RC-690	CAPACITOR—Trimmer capacitors "D" band (C-5, 6)	.30
RC-727	CONDENSER—Tuning condenser (C-1, 2, 3, 4)	2.25
RC-791	CAPACITOR—.01 mfd., 250 V. AC (C-54)	.30
RC-8103	CABLE—Speaker cable and plug	.50
*RC-863	CORD—Power cord	.65
RG-016	GRID CLIP—Control grid clip	.10
RK-027	KNOB—Winged control knob (Pkg. 5)	.50
RK-028	KNOB—Plain control knob (Pkg. 5)	.30
RL-061	COIL—Antenna coil bands "B & D"	1.15
RL-255	COIL—Oscillator coil bands "B & D"	.75
RL-603	COIL—Wave trap coil (L-1)	.60
*RQ-1219	RESISTOR—22 ohm, ½-W. carbon (R-16) (Pkg. 5)	.70
*RQ-1275	RESISTOR—4,700 ohm, ½-W. carbon (R-2) (Pkg. 5)	.70
*RQ-1295	RESISTOR—33,000 ohm, ½-W. carbon (R-14) (Pkg. 5)	.70
*RQ-1299	RESISTOR—47,000 ohm, ½-W. carbon (R-1) (Pkg. 5)	.70
*RQ-1319	RESISTOR—330,000 ohm, ½-W. carbon (R-11, 12) (Pkg. 5)	.70
*RQ-1323	RESISTOR—470,000 ohm, ½-W. carbon (R-9) (Pkg. 5)	.70
*RQ-1335	RESISTOR—1.5 megohm, ½-W. carbon (R-8) (Pkg. 5)	.70
*RQ-1339	RESISTOR—2.2 megohm, ½-W. carbon (R-10) (Pkg. 5)	.70
*RQ-1355	RESISTOR—10 megohm, ½-W. carbon (R-4) (Pkg. 5)	.70
*RQ-1447	RESISTOR—330 ohm, 1-W. carbon (R-17)	.20
*RQ-1473	RESISTOR—3900 ohm, 1-W. carbon (R-15)	.20
*RQ-1489	RESISTOR—18,000 ohm, 1-W. carbon (R-3)	.20
*RS-200	SOCKET—Octal base tube socket (Pkg. 5)	.75
*RS-204	SOCKET—Rectifier tube socket (Pkg. 5)	.75
*RS-228	SOCKET—Socket for 6A8G (Pkg. 5)	.80

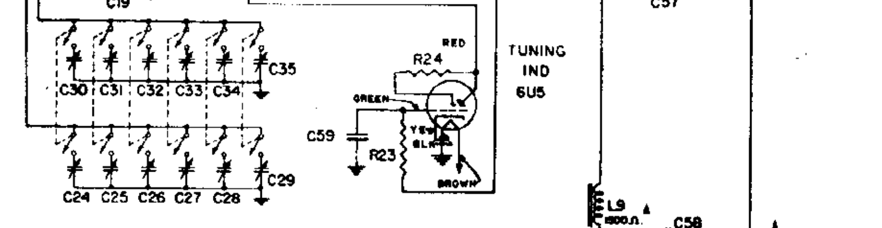
Stock No.	Description	List Price
RS-236	SOCKET—Lamp Socket Assembly	$0.10
RS-390	SWITCH—Tone control switch (S-2)	.25
RS-391	SWITCH—Band change switch (S-1)	.90
RT-0516	TRANSFORMER—Power transformer (50-60 cy.) (T-1)	4.20
RT-0517	TRANSFORMER—Power transformer (25 cy.) (T-1)	7.05
RT-0518	TRANSFORMER—Power transformer—Universal (T-1)	9.00
RT-300	TRANSFORMER—1st IF transformer (complete)	1.15
RT-286	TRANSFORMER—2nd IF transformer (complete)	1.40
RT-438	TRANSFORMER—Output transformer (T-2)	1.70
RV-040	VOLUME CONTROL—2 meg. volume control and power switch (R-22, S-3)	.95
*RW-101	WASHER—Felt washers for control knobs (Pkg. 10)	.45
RX-046	ASSEMBLY—Gang condenser mounting assembly	.20
*RX-015	ASSEMBLY—Chassis mounting assembly	.10
	SPEAKER ASSEMBLY G-64	
RC-931	CONE—6½ inch cone and voice coil assembly	.60
RD-300	DUST CAP—6½ inch cone dust cap (Pkg. 5)	.10
*RP-015	PLUG—Male speaker plug	.20
RS-098	SPEAKER—6½ inch speaker (less output trans.)	4.25
RX-047	ASSEMBLY—Speaker nuts and washers	.05
	SPEAKER ASSEMBLY G-655	
RC-932	CONE—12 inch cone and voice coil assembly	1.10
RD-301	DUST CAP—Speaker dust cap (Pkg. 5)	.10
*RP-015	PLUG—Male speaker plug	.20
RS-096	SPEAKER—12 inch speaker (less output trans.)	6.00
RX-047	ASSEMBLY—Speaker nuts and washers	.05
	TOUCH-TUNING AND DIAL SCALE MECHANISM	
RB-617	BUTTON—Molded push button (Pkg. 5)	.45
RC-8034	CORD—Drive cord (Pkg. 5)	.70
RC-8033	CARD—Station letter card (set)	.45
RD-070	DRUM—Condenser drive drum	.20
RD-090	DIAL—Dial scale	1.25
RD-204	DRIVE—Drive shaft	.15
RE-028	ESCUTCHEON—Dial scale escutcheon	1.60
*RP-075	PULLEY—Pointer drive cord pulley (Pkg. 6)	.20
RP-108	POINTER—Dial scale pointer	.15
RS-392	SWITCH—Touch-tuning switch (less trimmer strips)	2.35
*RS-452	SPRING—Drive cord tension spring (Pkg. 5)	.20
RS-444	SPRING—Spring for molded push button (Pkg. 10)	.10
RT-852	TRIMMER STRIP—Push button trimmer strip; osc. sec.	1.05
RT-853	TRIMMER STRIP—Push button trimmer strip; RF section	1.05
RW-027	WINDOW—Station letter windows (Pkg. 25)	.40

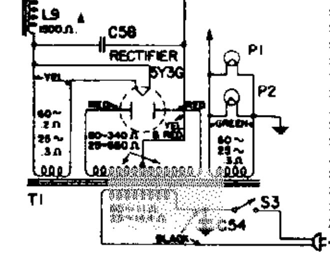
* Used on previous productions.

(Prices subject to change without notice)

GENERAL ELECTRIC CO. MODEL G75 Schematic, Chassis Wiring







Symbol	Description
C54	.01 mfd. molded capacitor
C57	8 mfd. dry electrolytic
C58	8 mfd. dry electrolytic
C59	.05 mfd. paper capacitor
R1	47,000 ohm carbon resistor
R2	4,700 ohm carbon resistor
R3	18,000 ohm carbon resistor
R4	10 megohm carbon resistor
R5	1.5 megohm carbon resistor
R9	470,000 ohm carbon resisto
R10	2.2 megohm carbon resistor
R11, R12	330,000 ohm carbon resisto
R14	33,000 ohm carbon resistor
R15	3,900 ohm carbon resistor
R16	22 ohm carbon resistor
R17	330 ohm carbon resistor
R22	2.0 megohm volume contro
R23	2.2 megohm carbon resistor
R24	1.0 megohm carbon resistor
T1	Power transformer
T2	Output transformer
S1	Band switch
S2	Tone control switch
S4	Keyboard tuning switch

Symbol	Description
C1, C4	Tuning condenser and trimmers
C5, C6	Ant. and osc. trimmer capacitor
C7	Wave trap trimmer
C8	Oscillator padder
C17	470 mmf. mica capacitor
C18	330 mmf. mica capacitor
C19	3900 mmf. mica capacitor
C20	47 mmf. mica capacitor
C21	370 mmf. mica capacitor
C24-C29	Antenna trimmer strip
C30-C35	Oscillator trimmer strip
C40	.001 mfd. paper capacitor
C41	.05 mfd. paper capacitor
C42	.05 mfd. paper capacitor
C43, C44	.05 mfd. paper capacitor
C45	.01 mfd. paper capacitor
C46	.001 mfd. paper capacitor
C47, C48	.005 mfd. paper capacitor
C49	.012 mfd. paper capacitor
C51	0.1 mfd. paper capacitor

Fig. 2. Schematic Diagram

Tuning Frequency Range
Band "B" ....540 to 1750 kc.
Band "D" ....5700 to 18,300 kc.

Intermediate Frequency ....455 kc.

Electrical Power Output
Undistorted ....2.0 watts
Maximum ....3.8 watts

Tone Control ....2 Point— Bass and Normal

Loud-speaker—Electrodynamic
Cone Diameter ....12 inches
Voice Coil Impedance (400 cycles) ....3.5 ohms

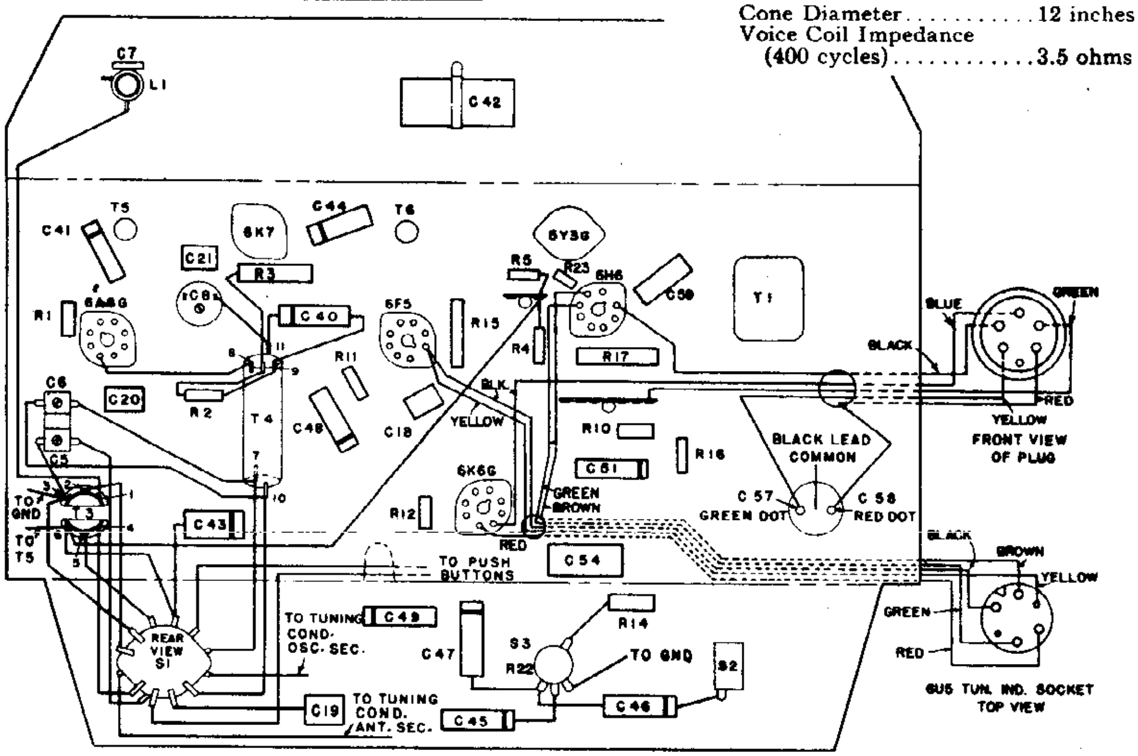


Fig. 3. Chassis Parts Layout

MODEL G75
Alignment, Voltage, Socket
Trimmers, Phono., Dial

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11)	Gang condenser plates wide open—connect audio input of oscilloscope to ground and to the junction of C-47 and R-5. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5.
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9)	
3. Band "B"	455 K.C. Sweep	Antenna Post	250 Mmf. 200 Ohms	Wave Trap Trimmer (C-7)	Adjust trimmer for minimum amplitude

I.F. ALIGNMENT WITH OUTPUT METER

1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9)	
3. Band "B"	455 K.C. with Modulation.	Antenna Post	250 Mmf. 200 Ohms	Wave Trap Trimmer (C-7)	Adjust trimmer for minimum output.

R.F. ALIGNMENT

Band "B"	......	......	....	....	Close gang condenser plates. Adjust pointer to first line at left end of tuning scale.
2. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-3) Ant. (C-4)	Connect output meter across voice coil—tone control on "bass" position—peak trimmers for maximum output with a low input signal.
3. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. Padder (C-8)	Adjust padder for a maximum output meter indication in vicinity of 580 kc. while rocking the gang condenser.
4. Band "B"	Repeat Operation 2				
5. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-6) Ant. (C-5)	Peak C-5 for maximum output while rocking the gang condenser at the 18 mc. point. The image of any signal on "D" band should be heard 930 kc. below the input signal when proper peak is obtained on oscillator trimmer C-6. Example: 12 mc. image—11.09 mc.

Use a dummy antenna in making all alignments. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. amplifier.

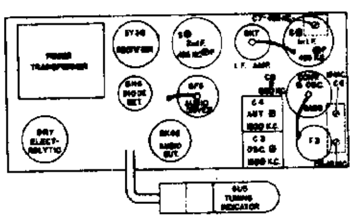


Fig. 4. Trimmer Location

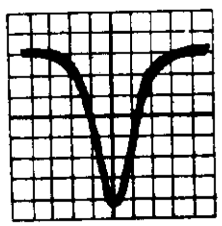


Fig. 5. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

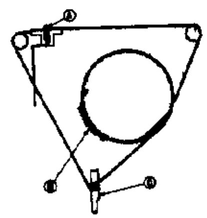


Fig. 6. Dial Drive Mechanism

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115–125	50–60	55
C	115–125	25–60	70
V	115–125 140–155 190–220 230–250	50–60	70

Coil System

The "B" and "D" band antenna coils are wound on a single coil form (T-3) as shown in Fig. 2. T-4 is the oscillator transformer for both the "B" and "D" bands. All coil terminals are numbered in Fig. 3 and 4 to facilitate in service by showing common points on the schematic diagram, Fig. 3, and the pictorial wiring diagram, Fig. 4.

The following table shows the coils in use for the various positions of the wave change switch.

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid Coil	Plate Coil	
Short Wave	L-10	L-11	L-14	L-15	L-12 Shorted L-16 Shorted
Manual Broadcast	L-10 and L-12	L-11 and L-13	L-14 and L-16	L-15	Tuned by gang condenser C-1 and C-2
Automatic Tuning	L-10 and L-12	L-11 and L-13	L-14 and L-16	L-15	C-1 and C-2 removed and replaced by fixed trimmers

Phonograph Connections

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-75 circuit for the reproduction of phonograph recordings. S-1 is either a rotary or toggle triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit. It is very important that the pick-up leads have a shield such as copper braid to prevent hum interference. This lead should be connected to the chassis ground.

The circuit should be opened between the top end of the volume control (R-22) and (C-47), and phonograph connections made as shown. This procedure requires removal of the chassis from the cabinet.

When the pick-up is connected as shown, the regular radio volume and tone controls work for both radio and phonograph reproduction. The parts suggested are:

Symbol	Description	Stock No.
Sp	Phono Switch	RS-366
Rp	330,000 Ohm Resistor	RQ-1319

VOLTAGE CHART

Tube No.	6A8G	6K7	6F5	6K6G	5Y3G
Plate to —B volts	Conv.-236 Osc.-180	236	84*	220	....
Screen to —B volts	95	95	....	236	
Cathode to —B volts	0	0	0	0	330
Filament volts	6.3	6.3	6.3	6.3	5.0

A-C line voltage—120.
* Measured on 500-volt scale.

PARTS LIST—MODEL G-75

Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
*RB-008	BOARD—Terminal board (2 lug)	$0.10
RB-089	BOARD—Terminal board (8 lug)	.10
*RB-156	BRACKET—Tuning indicator tube bracket	.15
*RC-009	CAPACITOR—.001 mfd., 600 V paper (C-40, 46)	.30
*RC-083	CAPACITOR—.005 mfd., 600 V paper (C-47, 48)	.26
*RC-039	CAPACITOR—.01 mfd., 200 V paper (C-45)	.25
RC-044	CAPACITOR—.012 mfd., 600 V paper (C-49)	.25
*RC-092	CAPACITOR—.05 mfd., 600 V paper (C-41, 43, 44, 50)	.30
*RC-104	CAPACITOR—0.1 mfd., 600 V paper (C-51)	.30
*RC-196	CAPACITOR—.05 mfd., 600 V paper (C-42)	.75
RC-216	CAPACITOR—47 mmf., mica (C-20)	.25
*RC-274	CAPACITOR—330 mmf., mica (C-18)	.30
RC-285	CAPACITOR—370 mmf., mica (C-21)	.25
RC-294	CAPACITOR—470 mmf., mica (C-17)	.30
RC-390	CAPACITOR—3900 mmf., mica (C-19)	.35
RC-593	CAPACITOR—6 mfd., 450 V; 8 mfd., 450 V; dry electrolytic (C-57, 58)	1.40
*RC-630	CAPACITOR—Oscillator padder (C-8)	.40
RC-674	CAPACITOR—Wave trap trimmer (C-7)	.15
RC-675	CAPACITOR—Trimmer capacitors "D" band (C-5, 6)	.30
RC-727	CONDENSER—Tuning condenser (C-1, 2, 3, 4)	2.25
RC-791	CAPACITOR—.01 mfd., 250 V A.C. (C-54)	.20
RC-8098	CABLE—Tuning indicator cable	.50
RC-8099	CABLE—Speaker cable and plug	.50
*RC-863	CORD—Power cord	.65
RG-015	GRID CLIP—Control grid clip (Pkg. 5)	.10
RK-027	KNOB—Winged control knob (Pkg. 5)	.50
RK-028	KNOB—Plain control knob (Pkg. 5)	.30
RL-061	COIL—Antenna coil bands "B" and "D"	1.15
RL-265	COIL—Oscillator coil bands "B" and "D"	.75
RL-503	COIL—Wave trap coil (L-1)	.60
*RQ-1219	RESISTOR—22 ohm. ½-W. carbon (R-16) (Pkg. 5)	.70
*RQ-1275	RESISTOR—4,700 ohm, ½-W. carbon (R-2) (Pkg. 5)	.70
*RQ-1296	RESISTOR—33,000 ohm, ½-W. carbon (R-14) (Pkg. 5)	.70
*R[illegible]	RESISTOR—47,000 ohm, ½-W. carbon (R-1) (Pkg. 5)	.70
*R[illegible]	RESISTOR—330,000 ohm, ½-W. carbon (R-11, 12) (Pkg. 5)	.70
*R[illegible]	RESISTOR—470,000 ohm, ½-W. carbon (R-6) (Pkg. 5)	.70
*R[illegible]	RESISTOR—1.0 megohm, ½-W. carbon (R-24) (Pkg. 5)	.70
*R[illegible]	RESISTOR—1.5 megohm, ½-W. carbon (R-5) (Pkg. 5)	.70
*R[illegible]	RESISTOR—2.2 megohm, ½-W. carbon (R-10, 23) (Pkg. 5)	.70
*R[illegible]	RESISTOR—10 megohm, ½-W. carbon (R-4) (Pkg. 5)	.70
*RQ-1447	RESISTOR—220 ohm, 1-W. carbon (R-17)	$0.20
*RQ-1472	RESISTOR—3900 ohm, 1-W carbon (R-18)	.20
*RQ-1489	RESISTOR—18,000 ohm, 1-W. carbon (R-3)	.20
*[illegible]200	SOCKET—Octal base tube socket (Pkg. 5)	.75
*RS-204	SOCKET—Rectifier tube socket (Pkg. 5)	.75
*RS-218	SOCKET—Lamp socket assembly	.10
*RS-223	SOCKET—Socket for 6A8G (Pkg. 5)	.30
RS-390	SWITCH—Tone control switch (S-2)	.25
RS-391	SWITCH—Band change switch (S-1)	.90
RT-0712	TRANSFORMER—Power transformer (50-60 cycles) (T-1)	5.80
RT-0713	TRANSFORMER—Power transformer (25 cycles) (T-1)	8.10
RT-0818	TRANSFORMER—Power transformer—Universal (T-1)	9.00
RT-359	TRANSFORMER—2nd I.F. transformer (complete)	1.40
RT-360	TRANSFORMER—1st I.F. transformer (complete)	1.15
RT-458	TRANSFORMER—Output transformer (T-2)	1.70
RV-040	VOLUME CONTROL—2 meg. volume control and power switch (R-22, S-3)	.95
*RW-101	WASHER—Felt washers for control knobs (Pkg. 10)	.45
RX-046	ASSEMBLY—Gang condenser mounting assembly	.30
*RX-015	ASSEMBLY—Chassis mounting assembly	.10
	SPEAKER ASSEMBLY	
RC-932	CONE—12-in. cone and voice coil assembly	1.10
RD-301	DUST CAP—Speaker dust cap (Pkg. 5)	.10
RP-015	PLUG—Male speaker plug	.20
RS-096	SPEAKER—12-in. speaker (less output transformer)	6.00
RX-047	ASSEMBLY—Speaker nuts and washers	.05
	TOUCH-TUNING AND DIAL SCALE MECHANISM	
RB-617	BUTTON—Molded push button (Pkg. 5)	.45
RC-8033	CARD—Station letter card (set)	.45
RC-8034	CORD—Drive cord (Pkg. 5)	.70
RD-070	DRUM—Condenser drive drum	.20
RD-204	DRIVE—Drive shaft	.15
RE-028	ESCUTCHEON—Dial scale escutcheon	1.00
RE-046	ESCUTCHEON—Tuning indicator escutcheon	.25
*RP-075	PULLEY—Pointer drive cord pulley (Pkg. 5)	.20
RP-108	POINTER—Dial scale pointer	.15
RS-392	SWITCH—Touch-tuning switch (less trimmer strips)	3.25
*RS-432	SPRING—Drive cord tension spring (Pkg. 5)	.20
RS-444	SPRING—Spring for molded push button (Pkg. 10)	.10
RT-852	TRIMMER STRIP—Push button trimmer strip; osc. section	1.05
RT-853	TRIMMER STRIP—Push button trimmer strip; R.F. section	1.05
RW-027	WINDOW—Celluloid station letter window (Pkg. 25)	.40

*Used on previous receivers

(Prices subject to change without notice)

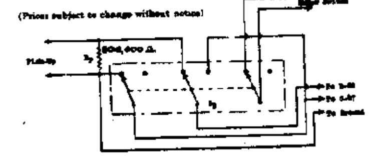


Fig. 1. Pick-up Connections

GENERAL ELECTRIC CO.

MODEL G78
Schematic, Socket, Trimmer
Chassis Wiring, Voltage

SOCKET VOLTAGES

Tube No.	6A8G	6SK7	6SF5	76	6AC5G	5Y3G
Plate to Gnd. Volts	Conv.-210 Osc.-165	215	*100	245	225	310/310 RMS
Screen to Gnd. Volts	100	100	...	...	...	
Cathode to Gnd. Volts	0	0	3.0	8.0	4.7	315
Cathode Current MA	12.0	9.0	0.3	6.0	33.5	71
Filament Volts	6.4	6.4	6.4	6.4	6.4	5.2

A-c line voltage 125—no signal input. Dial pointer set at 550 kc. on "B" band. *Measured on 500-volt scale.

Electrical Power Output

Undistorted....................3.0 watts
Maximum.........................5.0 watts

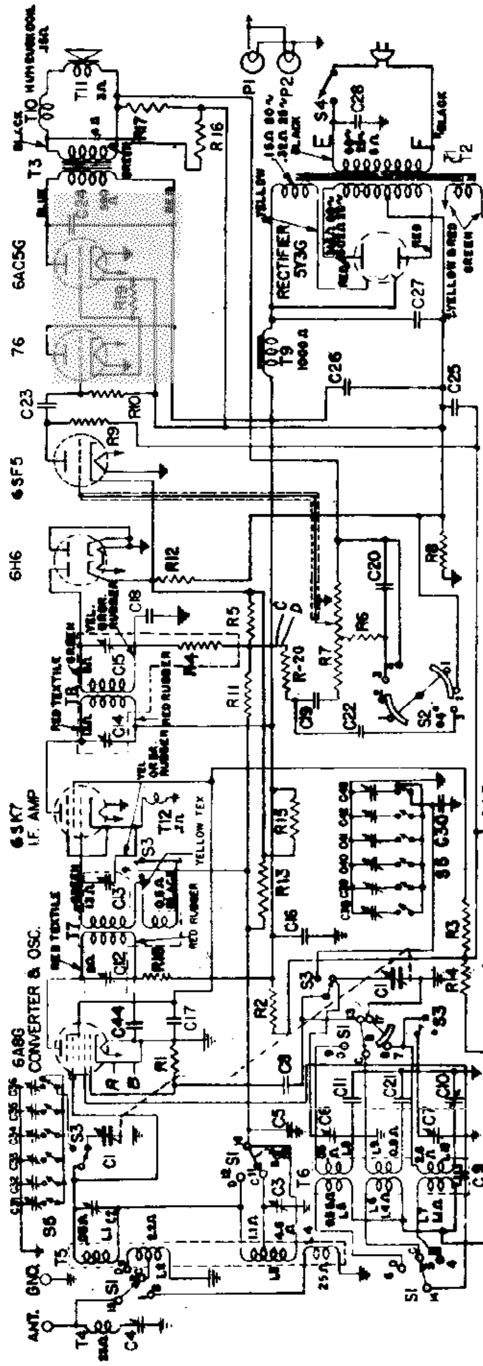
Tone Control......................4-position

Loud-speaker—Electrodynamic

Outside Cone Diameter...........12 inches
Voice Coil Impedance (400 Cycles)..3.5 ohms
Field Coil Resistance.............880 ohms (cold

MODEL G-78

Symbol	Description
C1	Tuning condenser
C2, 3	Antenna trimmers
C4	Wave trap trimmer
C5	.1 mfd., paper capacitor
C6, 7	Oscillator trimmer
C8	50 mmf., mica capacitor
C9	.005 mfd., paper capacitor
C10	300-650 mmf., padder
C11	4300 mmf., mica capacitor
C16	.1 mfd., paper capacitor
C17	.05 mfd., paper capacitor
C18	47 mmf., mica capacitor
C19, 20	.003 mfd., paper capacitor
C21	1500 mmf., mica capacitor
C22	.0015 mfd., paper capacitor
C23	.005 mfd., paper capacitor
C24	.015 mfd., paper capacitor
C25	8 mfd., dry electrolytic
C26	8 mfd., dry electrolytic
C27	12 mfd., dry electrolytic
C28	.02 mfd., line capacitor
C30	20 mmf., compensating capacit
C31-C36	Antenna trimmer strip
C38-C43	Oscillator trimmer strip
C44	.05 mfd., paper capacitor
C45	.1 mfd., paper capacitor
R1	47,000 ohm carbon resistor
R2	6800 ohm carbon resistor
R3	15,000 ohm carbon resistor
R4	47,000 ohm carbon resistor
R5	220,000 ohm carbon resistor
R6	180,000 ohm carbon resistor
R7	2.0 megohm volume control
R8	220 ohm carbon resistor
R9	220,000 ohm carbon resistor
R10	1.0 megohm carbon resistor
R11	2.2 megohm carbon resistor
R12	150 ohm carbon resistor
R13	3.3 megohm carbon resistor
R14	3300 ohm carbon resistor
R15	33,000 ohm carbon resistor
R16	100 ohm carbon resistor
R17	22 ohm carbon resistor
R18	6800 ohm carbon resistor
R19	22,000 ohm carbon resistor
R20	47,000 ohm carbon resistor
T1, T2	Power transformer
T3	Output transformer
T4	Wave trap coil
T5	Antenna coil
T6	Oscillator coil



Intermediate Frequency...........455 kc.

Tuning Frequency Range
Band "B"............535 to 1600 kc.
Band "C"............1600 to 5700 kc.
Band "D"............5700 to 18,000 kc.

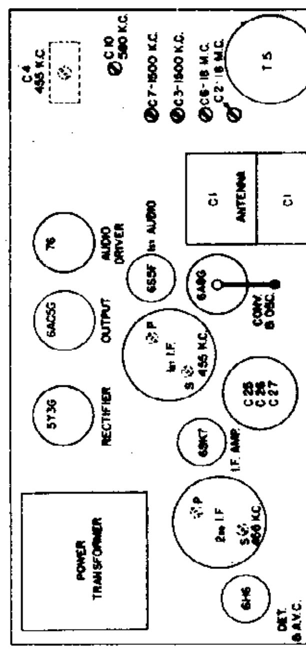


Fig. 4. Trimmer Location

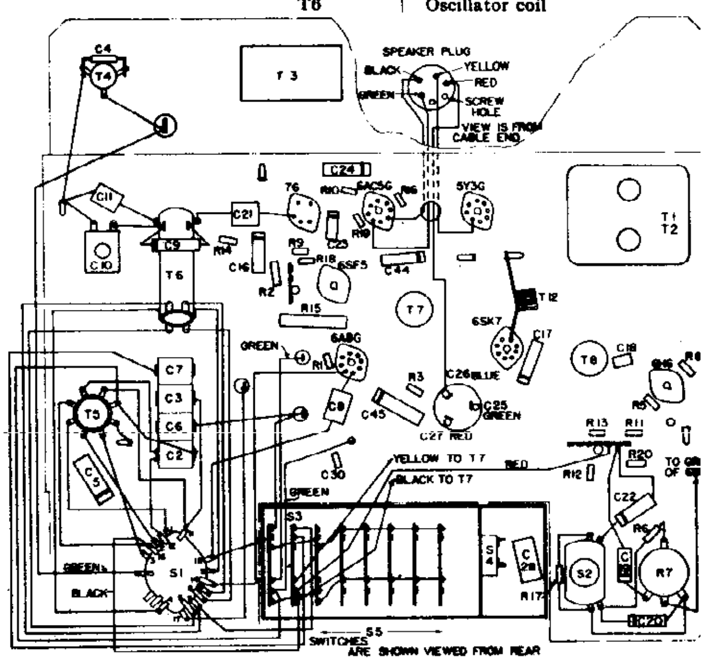


Fig. 3. Chassis Layout

MODEL G78
Alignment, Dial, Phono.

GENERAL ELECTRIC CO.

SERVICE DATA

Physical Specifications

Model G-78
Height .... 39¼ inches
Width .... 27¾ inches
Depth .... 12¾ inches

Tuning Control Drive Ratio .... 13 to 1

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115-125	50-60	70
C	115-125	25-60	75

GENERAL INFORMATION

Coil System

T-5 and T-6 are the antenna and oscillator transformers respectively for the "B," "C," and "D" bands. All band switch terminals are numbered in Fig. 2 and Fig. 3 to facilitate circuit tracing by showing common points on the schematic diagram, Fig. 2 and the pictorial wiring diagram, Fig. 3.

The following table shows the coils in use for various positions of the band change switch.

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid Coil	Oscillator Plate Coil	Remarks
Band "B"	L-4	L-1+L-3	L-10	L-7	
Band "C"	Part of L-2	L-1+Part of L-3	L-9	L-6	Part of L-3 shorted. L-10 shorted
Band "D"	L-2	L-1	L-8	L-5	L-9, L-10 shorted. L-3 shorted
Automatic Tuning	L-4	L-1+L-3	L-10	L-7	C-1 removed. Tuned by fixed trimmers

Loud-speaker

12-inch speaker—To center the voice coil, remove dust cover by softening with acetone. Loosen the two clamping screws and place three 1 in. by ¼ in. by 0.010 in. paper or celluloid strips equally spaced around pole piece for clearance—then tighten clamping screws. Remove strips and cement the dust cap back in place with Glyptal cement.

Phonograph Connections

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pickup into the G-78 circuit for the reproduction of phonograph recordings. Sp is a rotary triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pickup leads when using a crystal type unit. It is very important that the pickup leads have a shield such as copper braid to prevent hum interference. This lead should be connected to the chassis ground.

The 6A8G cathode circuit should be opened between A-B on the schematic. Also open the circuit between C-D in the diode circuit and make connections of phono switch as indicated in Fig. 1.

When the pickup is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction. The following are suggested parts:

Symbol	Description	Stock No.
Sp	Triple-pole, double-throw switch	RS-8013
Rp	330,000-ohm carbon resistor	RQ-1319

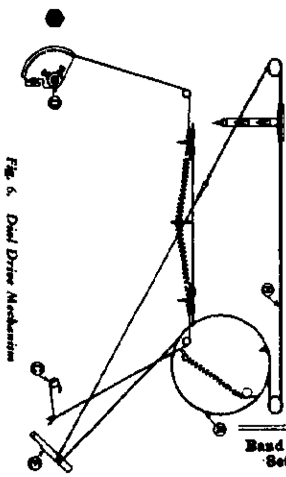


Fig. 6. Dial Drive Mechanism

Tubes:
Converter and Oscillator-GE-6A8G
IF Amplifier- GE-6SK7
Detector and AVC- GE-6H6
1st Audio- GE-6SF5
Driver --- GE-76
Power Output- GE-6AC5G
Rectifier- GE-5Y3G
Pilot Lamp (2) Mazda No. 44

MODEL G-78

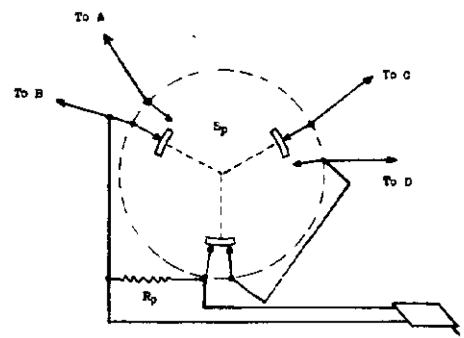


Fig. 1. Pickup Connections

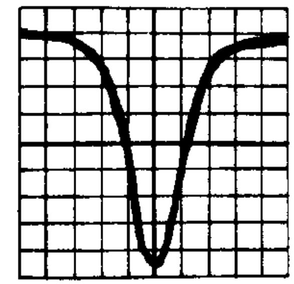


Fig. 5. Over-all I. F. curve taken on G-E oscilloscope OFM-1

ALIGNMENT PROCEDURE

I. F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14)	Gang condenser plates closed—"manual" key depressed—connect audio input of oscilloscope to ground and to the junction of C-19 and R-20 of the 2nd I.F. transformer. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resultant curve is shown in Fig. 5.
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12)	
3. Band "B"	455 K.C. Sweep	Antenna Post	250 Mmf. 200 ohms	Wave Trap Trimmer (C-4)	Adjust trimmer for minimum amplitude.

I. F. ALIGNMENT WITH OUTPUT METER

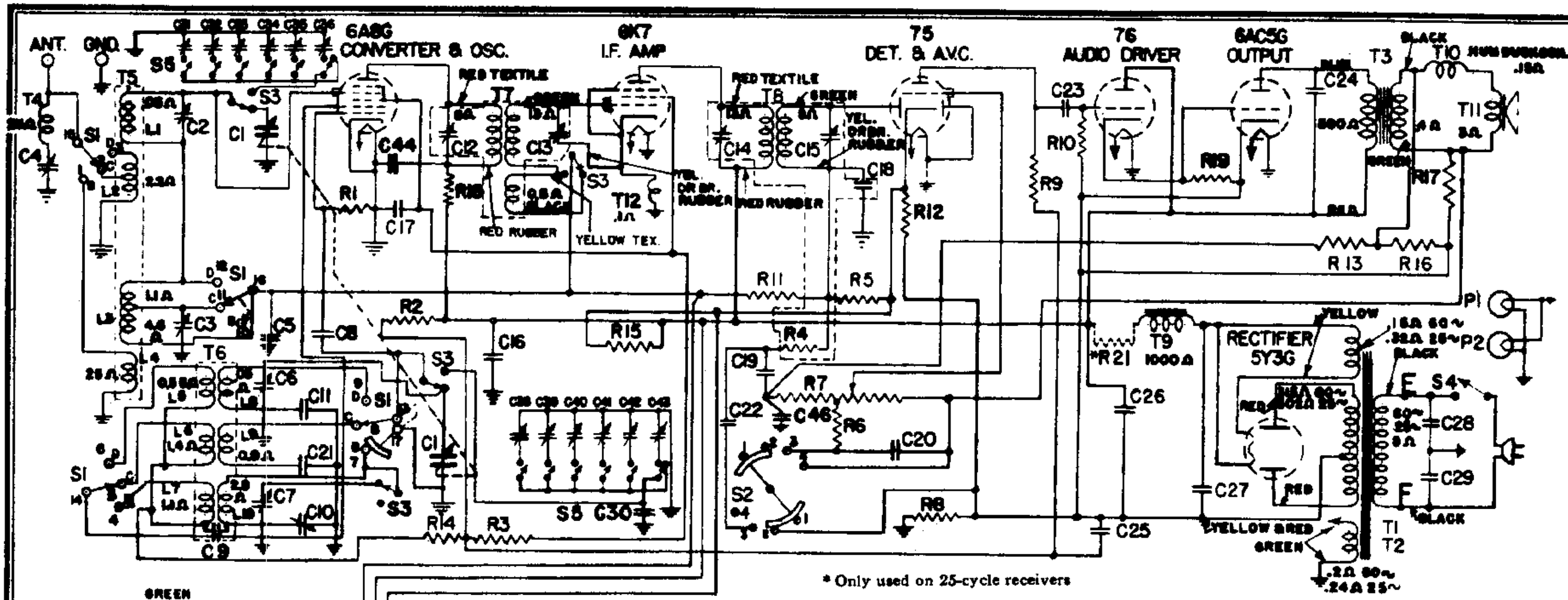
Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14)	Gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12)	
3. Band "B"	455 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Wave Trap Trimmer (C-4)	Adjust trimmer for minimum output.

R. F. ALIGNMENT

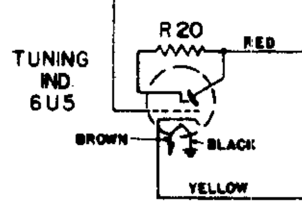
Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-6) Ant. (C-2)	Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. below signal input when (C-6) is on proper peak. Example: 15 M.C. image—14.09 M.C. Peak (C-2) while rocking the gang condenser.
3. Band "C"	No adjustments necessary.				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-7) Ant. (C-3)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. Padder (C-10)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (3-7) Ant. (C-3)	Retrim for maximum output with a low input signal.

MODEL G76
Schematic, Socket
Alignment, Trimmers

GENERAL ELECTRIC CO.



* Only used on 25-cycle receivers



Symbol	Description	Symbol	Description	Symbol	Description
C1	450 mmf. tuning condenser	C25	8 mfd. dry electrolytic	R9	220,000 ohm carbon resistor
C2, C3, C6, C7	Ant. and osc. trimmer capacitors	C26	8 mfd. dry electrolytic	R10	1.0 megohm carbon resistor
C4	Wave trap capacitor	C27	12 mfd. dry electrolytic	R11	2.2 megohm carbon resistor
C5	.1 mfd. paper capacitor	C28, C29	.01 mfd. line capacitor	R12	150 ohm carbon resistor
C8	50 mmf. mica capacitor	C30	20 mmf. compensating capacitor	R13	2.2 megohm carbon resistor
C9	.005 mfd. paper capacitor	C31-C36	Automatic tuning trimmers	R14	3300 ohm carbon resistor
C10	300-650 mmf. padder capacitor	C38-C43	Automatic tuning trimmers	R15	33,000 ohm carbon resistor
C11	4300 mmf. mica capacitor	C44	.05 mfd. paper capacitor	R16	47 ohm carbon resistor
C16	.1 mfd. paper capacitor	C46	100 mmf. mica capacitor	R17	22 ohm carbon resistor
C17	.05 mfd. paper capacitor	R1	47,000 ohm carbon resistor	R18	6800 ohm carbon resistor
C18	47 mmf. mica capacitor	R2	6,800 ohm carbon resistor	R19	22,000 ohm carbon resistor
C19, C20	.003 mfd. paper capacitor	R3	22,000 ohm carbon resistor	R20	1.0 megohm carbon resistor
C21	1500 mmf. mica capacitor	R4	47,000 ohm carbon resistor	R21*	470 ohm carbon resistor
C22	.0015 mfd. paper capacitor	R5	220,000 ohm carbon resistor	S1	Band change switch
C23	.005 mfd. paper capacitor	R6	180,000 ohm carbon resistor	S2	Tone control switch
C24	.02 mfd. paper capacitor	R7	2.0 megohm volume control	T1 T2	Power transformer
		R8	270 ohm carbon resistor	T3	Output transformer
				T4	Wave trap coil

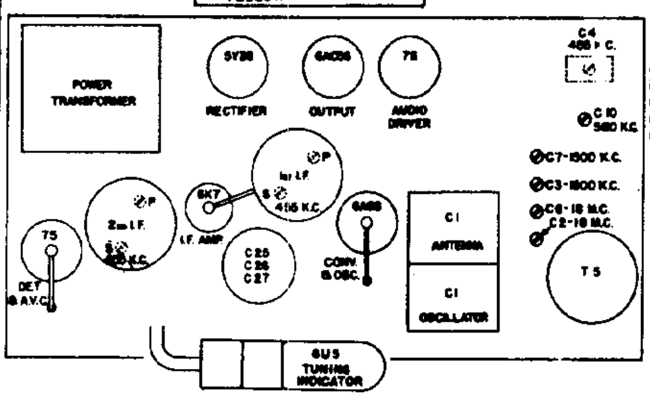


Fig. 1. Trimmer Location

Align the I.F. at 455 K.C. by visual or output meter method.

Align wave trap trimmer C-4 at 455 K.C. by peaking for a minimum output.

Band change switch on "D" band, align C-6 at 18 M.C. Rock the gang condenser when peaking C-2 for maximum output. The image of any signal on the "D" band should be heard 910 K.C. below input signal. Example: 18 M.C. image at 17.09 M.C.

On Broadcast band, align trimmers C-7 and C-3 at 1500 K.C. Align C-10 at 580 K.C. while rocking the gang condenser.

ALIGNMENT

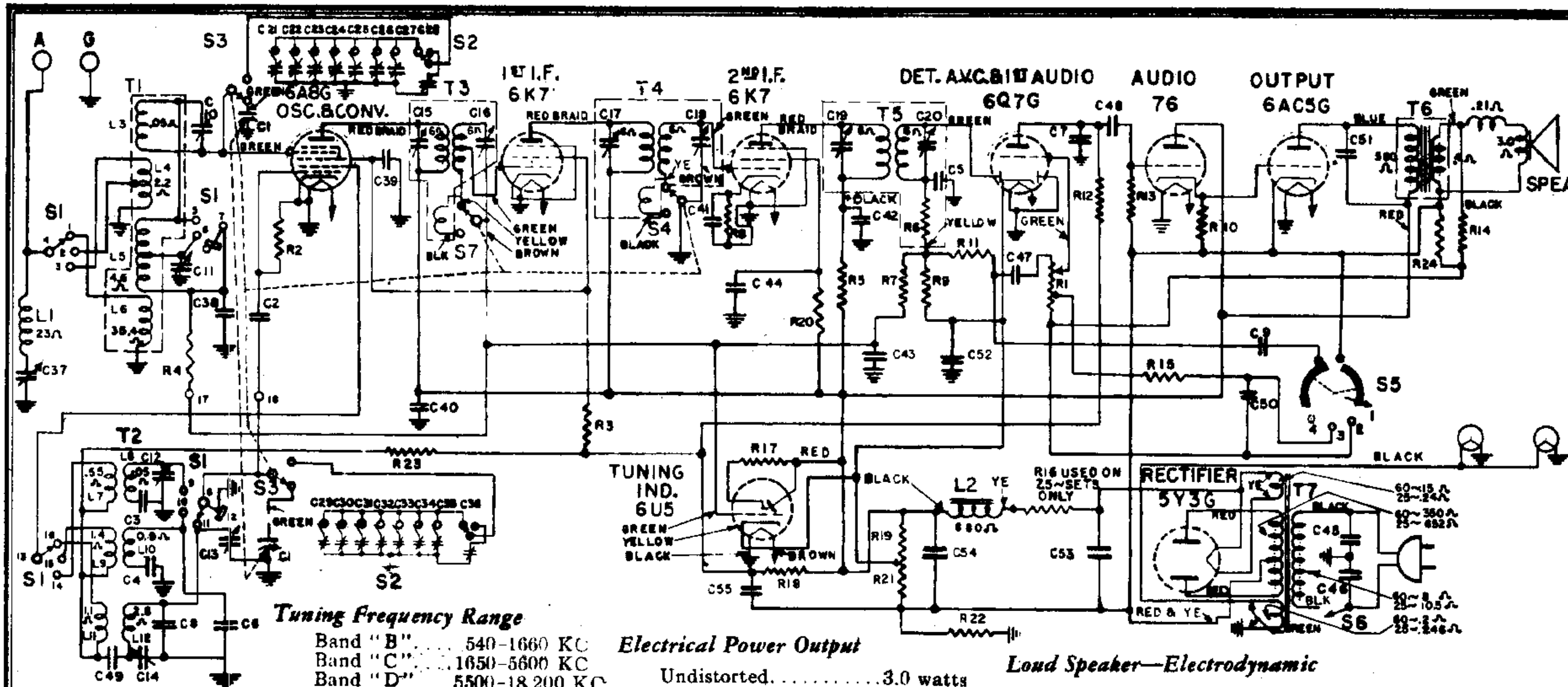
I.F.	"D" Band
455 K.C.	18.0 M.C.

"B" Band

1500 K.C. and 580 K.C.

MODEL G85

Schematic, Socket, Trimmers **GENERAL ELECTRIC CO.**



Tuning Frequency Range

Band "B" ...... 540-1660 KC
Band "C" ...... 1650-5600 KC
Band "D" ...... 5500-18,200 KC.

Intermediate Frequency

455 KC

Electrical Power Output

Undistorted .... 3.0 watts
Maximum .... 5.0 watts

Loud Speaker—Electrodynamic

Outside Cone Diameter .... 12 inches
Voice Coil Impedance .... 3.5 ohms at 400 cycles
Field Coil Resistance .... 880 ohms (cold)

C1 Tuning Condenser
C2 50 mmf Mica Capacitor
C3 3900 mmf Mica Capacitor
C4 1200 mmf Mica Capacitor
C5 47 mmf Mica Capacitor
C6 6 mmf Mica Capacitor
C7 47 mmf Mica Capacitor
C8 20 mmf Compensating Capacitor
C9 .0012 mf 600 V. Paper Capacitor
C10 3-20 mmf "D" Ant. Trimmer
C11 3-20 mmf "B" Ant. Trimmer
C12 3-20 mmf "D" Osc. Trimmer
C13 3-30 mmf "B" Osc. Trimmer
C14 300-650 mmf. "B" Padder
C15 200-400 mmf. 1st I.F. Pri. Trimmer
C16 200-400 mmf 1st I.F. Sec. Trimmer
C17 200-400 mmf 2nd I.F. Pri. Trimmer
C18 200-400 mmf 2nd I.F. Sec. Trimmer
C19 200-400 mmf 3rd I.F. Pri. Trimmer
C20 200-400 mmf 3rd I.F. Sec. Trimmer
C21-C28 Antenna Trimmer Strip
C29-C36 Oscillator Trimmer Strip
C37 30-70 mmf Wave Trap Trimmer
C38 .05 mfd 200 V. Paper Capacitor
C39 .05 mfd 400 V. Paper Capacitor
C40 0.1 mfd 400 V. Paper Capacitor
C41 0.1 mfd 100 V. Paper Capacitor
C42 .05 mfd 400 V. Paper Capacitor
C43 .05 mfd 200 V. Paper Capacitor
C44 .05 mfd 400 V. Paper Capacitor
C45 .01 mfd 250 V.—Ac Line Capacitor
C46 .01 mfd 250 V.—Ac Line Capacitor
C47 .003 mfd 600 V. Paper Capacitor
C48 .005 mfd 600 V. Paper Capacitor
C49 .005 mfd 600 V. Paper Capacitor
C50 .004 mfd 600 V. Paper Capacitor
C51 .02 mfd 600 V. Paper Capacitor
C52 0.1 mfd 100 V. Paper Capacitor
C53 12 mfd 450 V., Dry Electro
C54 8 mfd 400 V., Dry Electro
C55 8 mfd 200 V., Dry Electro

L1 Wave Trap Coil

R1 2 megohm, Volume Control
R2 47,000 ohm, Car. Resistor
R3 15,000 ohm, Car. Resistor
R4 470,000 ohm, Car. Resistor
R5 1,000 ohm, Car. Resistor
R6 47,000 ohm, Car. Resistor
R7 2.2 megohm, Car. Resistor
R8 1,000 ohm, Car. Resistor
R9 220,000 ohm, Car. Resistor
R10 22,000 ohm, Car. Resistor
R11 82,000 ohm, Car. Resistor
R12 220,000 ohm, Car. Resistor
R13 1,000,000 ohm, Car. Resistor
R14 82 ohm, Car. Resistor
R15 120,000 ohm, Car. Resistor
R16 470 ohm, 3 watt, Car. Resistor
R17 1.0 megohm, Car. Resistor
R18 6800 ohm, Car. Resistor
R19 39,000 ohm, 2 watt, Car. Resistor
R20 82,000 ohm, Car. Resistor
R21 150 ohm, Car. Resistor
R22 180 ohm, Car. Resistor
R23 3300 ohm, Car. Resistor
R24 22 ohm, Car. Resistor

S1 Band Change Switch
S2 Station Selector Switch
S3 Man.-Auto. Switch
S4 I.F. Band Expansion Switch on S-3 1st
S5 Tone Control
S6 Power Switch on S-3
S7 I.F. Band Expansion Switch on S-3 (2nd
SPKR Speaker 12 in.

T1 Antenna Transformer
T2 Oscillator Transformer
T3 1st I.F. Transformer
T4 2nd I.F. Transformer
T5 3rd I.F. Transformer
T6 Output Transformer
T7 50-60 Power Transformer
T8 25-60 Power Transformer

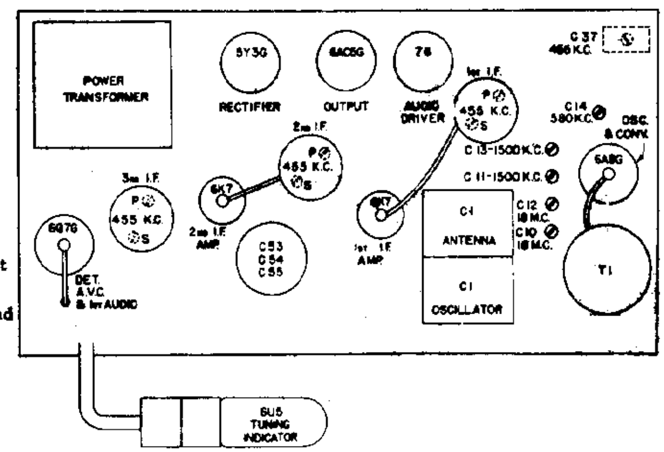


Fig. 6. Chassis Layout and Trimmer Location

Dial Mechanism

GENERAL ELECTRIC CO.

MODEL G85
Chassis Wiring, Coil Dat

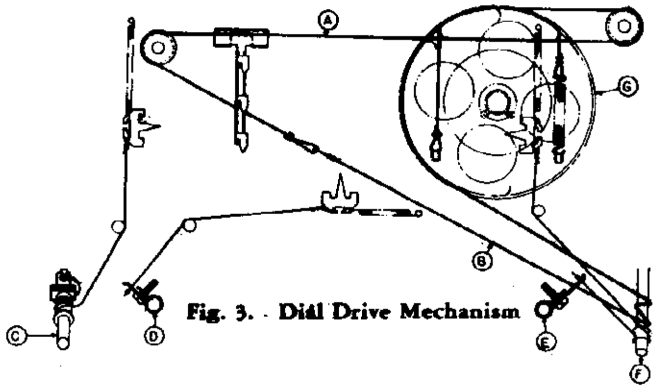


Fig. 3. Dial Drive Mechanism

Band Switch Position	Antenna Primary	Antenna Secondary	Oscillator Grid Coil	Oscillator Plate Coil	Remarks
Band "B"	L-6	L-3 + L-5	L-12	L-11	
Band "C"	Part of L-4	L-3 + L-5	L-10	L-9	Lower portio of L-5 shorte
Band "D"	L-4	L-3	L-8	L-7	L-5 shorted
Automatic Tuning	L-6	L-3 + L-5	L-12	L-11	Condenser C- removed. Tuned by fixed trimmer

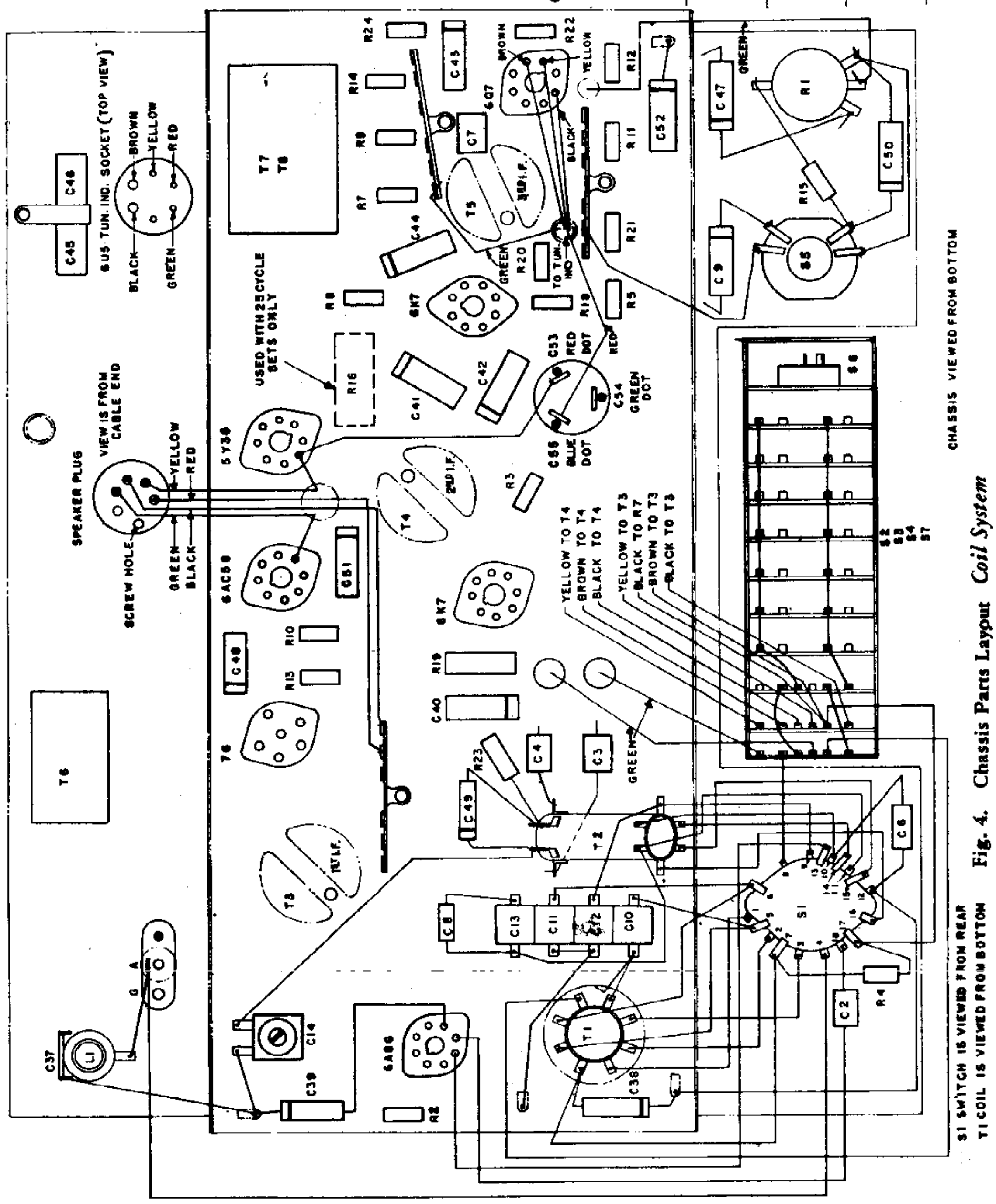


Fig. 4. Chassis Parts Layout

Coil System

The "B," "C" and "D" band antenna coils are wound on a single coil form, T-1 as shown in Fig. 2. T-2 is the oscillator transformer for all three bands. All switch points are numbered in Fig. 2 to facilitate in locating these switch points on the pictorial wiring diagram Fig. 4.

The following table gives the coils in use for the various positions of the wave change switch.

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Volts)
A	115-125	50-60	70
[illegible]	115-125	25-60	75

MODEL G85
Alignment, Voltage
Parts List

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"	455 K.C. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-20) Pri. (C-19)	Manual key depressed—gang condenser plates closed—connect vertical input of oscilloscope to ground and the junction of R-9 and R-11 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5.
2. Band "B"	455 K.C. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-18) Pri. (C-17)	
3. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-16) Pri. (C-15)	
4. Band "B"	455 K.C. Sweep	Antenna Post	250 Mmf. 200 Ohms	Wave trap trimmer (C-37)	Adjust trimmer for minimum amplitude.

I.F. Alignment with Output Meter

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"	455 K.C. with Modulation	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-20) Pri. (C-19)	Manual key depressed—gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an overall realignment after stage by stage alignment has been accomplished.
2. Band "B"	455 K.C. with Modulation	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-18) Pri. (C-17)	
3. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-16) Pri. (C-15)	
4. Band "B"	455 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Wave trap trimmer (C-37)	Adjust trimmer for minimum output.

R.F. Alignment

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-12) Ant. (C-10)	Connect output meter across voice coil—manual key depressed. The image of any "D" band signal should be heard 930 K.C. below input signal when (C-12) is on proper peak. Example: 15 M.C. image—14.09 K.C. Peak (C-10) while rocking the gang condenser.
3. Band "C"	No adjustment necessary				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-13) Ant. (C-11)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. padder (C-14)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	Repeat operation 4				

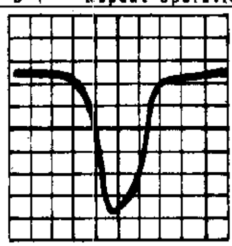


Fig. 5. Overall IF Curve Taken on G-E Oscilloscope OPM-1

VOLTAGE CHART

Tube No.	Plate to Gnd. Volts D.C.	Screen to Gnd. Volts D.C.	Cathode to Gnd. Volts D.C.	Filament Volts
6A8G	240 Conv. 160 Osc.	97	0	6.4
6K7	240	97	0	6.4
6K7	230	105	5.1	6.4
6Q7G	102	...	3.0	6.4
76	230	...	7.5	6.4
6AC5G	230	...	4.5	6.4
5U4	240	...	3.0	6.4
5Y3G	306/306 A.C. RMS.		310	5.1

Socket voltages taken at 120 volt line—No signal input. —1000 ohms per volt meter—Dial pointer at 550 K.C. on "B" band.

PARTS LIST

Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
*RB-017	BOARD—Terminal board (1 lug)	$0.[illegible]
*RB-026	BOARD—Ant. Grd. terminal board	[illegible]
*RB-062	BOARD—Terminal board (6 lug)	[illegible]
RC-012	CAPACITOR—.0012 mfd., 600 V. paper (C-9)	[illegible]
*RC-028	CAPACITOR—.005 mfd., 600 V. paper (C-48, 49)	[illegible]
*RC-048	CAPACITOR—.02 mfd., 600 V. paper (C-51)	[illegible]
*RC-049	CAPACITOR—.004 mfd., 600 V. paper (C-50)	[illegible]
*RC-055	CAPACITOR—.003 mfd., 600 V. paper (C-47)	[illegible]
*RC-092	CAPACITOR—.05 mfd. 600 V. paper (C-38, 39, 42, 43, 44)	[illegible]
*RC-104	CAPACITOR—.1 mfd., 600 V paper (C-40, 41, 52)	[illegible]
*RC-206	CAPACITOR—50 mmf., mica (C-2)	[illegible]
RC-216	CAPACITOR—47 mmf., mica (C-5, 7)	[illegible]
RC-220	CAPACITOR—6 mmf., mica (C-6)	[illegible]
RC-230	CAPACITOR—20 mmf. compensating capacitor (C-8)	[illegible]
RC-341	CAPACITOR—1200 mmf., mica (C-4)	[illegible]
RC-390	CAPACITOR—398 mmf., mica (C-3)	[illegible]
RC-594	CAPACITOR—8 mfd., 400 V.; 8 mfd., 400 V.; 12 mfd., 450 V.; dry electrolytic (C-53, 54, 55)	1.[illegible]
RC-674	CAPACITOR—Wave trap trimmer (30–70 mmf.) (C-37)	[illegible]
RC-676	CAPACITOR—300-650 mmf., "B" padder (C-14)	[illegible]
RC-677	CAPACITOR—Antenna and oscillator trimmer (C-10, 11, 12, 13)	[illegible]
RC-728	CONDENSER—2 gang tuning condenser (C-1)	2.[illegible]
*RC-754	CAPACITOR—.01-.01 mfd., 250 V. A.C. line capacitor (C-45, 46)	[illegible]
*RC-863	CORD—Power cord	[illegible]
RC-8035	CABLE—Speaker cable and plug	[illegible]
RC-8054	CABLE—Tuning indicator cable and socket	[illegible]
RD-205	DRIVE—Vernier drive bracket assembly	[illegible]
RG-016	GRID CLIP—Control grid clip (pkg. of 5)	[illegible]
RK-027	KNOB—Control knob (winged) (pkg. 5)	[illegible]
RK-028	KNOB—Control knob (plain) (pkg. 5)	[illegible]
RL-062	COIL—Ant. coil assembly	1.[illegible]
RL-266	COIL—Oscillator coil and bracket	1.[illegible]
RL-603	COIL—Wave trap coil (T-4)	[illegible]
RQ-711	RESISTOR—470 ohm, 3 w. carbon (R-16) (Pkg. of 5)	[illegible]
*RQ-1219	RESISTOR—22 ohm, ½ w. carbon (R-24) (pkg. 5)	[illegible]
*RQ-1233	RESISTOR—82 ohm, ½ w. carbon (R-14) (pkg. 5)	[illegible]
*RQ-1239	RESISTOR—150 ohm, ½ w., carbon (R-21) (pkg. 5)	[illegible]
RQ-1241	RESISTOR—180 ohm, ½ w. carbon (R-22) (pkg. 5)	[illegible]
*RQ-1259	RESISTOR—1000 ohm, ½ w. carbon (R-5, 8) (pkg. 5)	[illegible]
*RQ-1271	RESISTOR—3300 ohm, ½ w. carbon (R-23) (pkg. 5)	[illegible]
*RQ-1279	RESISTOR—[illegible] ohm, ½ w. carbon (R-18) (pkg. 5)	[illegible]
*RQ-1287	RESISTOR—15,000 ohm, ½ w. carbon (R-3) (pkg. 5)	[illegible]
*RQ-1291	RESISTOR—[illegible] ohm, ½ w. carbon (R-10) (pkg. 5)	[illegible]
*RQ-1299	RESISTOR—47,000 ohm, ½ w. carbon (R-2, 6) (pkg. 5)	[illegible]
RQ-1305	RESISTOR—82,000 ohm, ½ w. carbon (R-11, 20) (pkg. 5)	[illegible]
*RQ-1309	RESISTOR—120,000 ohm, ½ w. carbon (R-15) (pkg. 5)	[illegible]
*RQ-1315	RESISTOR—220,000 ohm, ½ w. carbon (R-9, 12) (pkg. 5)	[illegible]
*RQ-1323	RESISTOR—470,000 ohm, ½ w. carbon (R-4) (pkg. 5)	[illegible]
*RQ-1331	RESISTOR—1.0 megohm, ½ w. carbon (R-13, 17) (pkg. 5)	[illegible]
*RQ-1339	RESISTOR—2.2 megohm, ½ w. carbon (R-7) (pkg. 5)	$0.70
*RR-281	RESISTOR—39,000 ohm, 2 w. carbon (R-19)	.30
RS-185	SHIELD—6A8G tube shield and base	.15
RS-188	SHIELD—Antenna coil shield	.20
*RS-200	SOCKET—Octal base tube socket (pkg. 5)	.75
*RS-204	SOCKET—Rectifier tube socket (pkg. 5)	.75
*RS-223	SOCKET—Octal base tube socket (pkg. 5)	.60
RS-224	SOCKET—Tube socket (76) (pkg. 5)	.50
RS-227	SOCKET—Octal base tube socket (6A8G)	.15
RS-394	SWITCH—Band change switch (S-1)	.95
RS-395	SWITCH—Tone control switch (S-2)	.55
RT-0711	TRANSFORMER—Power transformer (T-7) 120 V., 25-60 cy.	7.60
RT-0616	TRANSFORMER—Power transformer (T-7) 120 V., 50-60 cy.	4.60
RT-265	TRANSFORMER—3rd I.F. transformer	1.60
RT-266	TRANSFORMER—2nd I.F. transformer and shield	1.80
RT-267	TRANSFORMER—1st I.F. transformer and shield	1.90
RT-438	TRANSFORMER—Output transformer (T-3)	1.70
RV-051	VOLUME CONTROL—2 megohm volume control (R-1)	.80
*RW-101	WASHER—Felt washer for control shafts (pkg. 10)	.45
*RX-021	ASSEMBLY—Chassis mounting assembly	.10
RX-048	ASSEMBLY—Tuning condenser mounting assembly	.25
	SPEAKER ASSEMBLY	
RC-932	CONE—12-inch cone and V.C. assembly	1.10
*RC-991	CLAMP—Cone spider clamp	.05
RD-301	DUST CAP—Speaker cone dust cap (pkg. 5)	.10
RP-109	PLUG—Male speaker plug	.20
RS-073	SPEAKER—12-inch speaker	5.40
*RX-030	ASSEMBLY—Speaker mounting assembly	.10
	DIAL DRIVE MECHANISM	
*RB-152	BRACKET—Tone control indicator bracket (D)	.05
*RB-155	BRACKET—Band change bracket (E)	.05
RB-614	BUSHING—Volume control drive bushing (C)	.15
RC-1977	CLAMP—Tuning indicator tube clamp and thumbscrews	.10
RC-8048	CORD—Volume indicator cord (pkg. 5)	.50
RC-8049	CORD—Tone indicator cords (pkg. 5)	.50
RC-8050	CORD—Band change indicator cord (pkg. 5)	.50
RC-8051	CORD—Dial pointer drive cord (A) (B)	.20
*RD-013	DRUM—Condenser drive drum (G)	.35
RD-074	DIAL—Dial scale	2.70
RE-033	ESCUTCHEON—Dial scale escutcheon	1.65
RP-112	POINTER—Tone, band change and volume indicator pointer	.10
RP-113	POINTER—Dial scale pointer	.30
RP-303	PULLEY—Idler pulley (pkg. 2)	.10
RR-920	REFLECTOR—Lamp reflector assembly	.50
RS-167	SHIELD—Lamp shield (pkg. 10)	.05
*RS-218	SOCKET—Lamp socket assembly	.10
*RS-425	SPRING—Drive drum spring (pkg. 5)	.10
*RS-427	SPRING—Volume, tone, and band change cord spring (pkg. 5)	.20
	TOUCH TUNING ASSEMBLY	
RB-613	BUTTON—Molded push button (pkg. 5)	.35
RC-8036	CARDS—Station letter cards (set)	.25
RC-8052	CARDS—"Manual" tab cards (strip of 10)	.05
RC-8053	CARDS—"Off" tab cards (strip of 10)	.05
RE-032	ESCUTCHEON—Push button escutcheon	.50
RS-444	SPRING—Spring for push button (pkg. 10)	.10
RS-3002	SWITCH—Power switch	2.15
RS-3010	SWITCH—Push button switch (less trimmers)	3.90
RT-856	TRIMMER STRIP—Osc. trimmer strip (C-29, 30, 31, 32, 33, 34, 35, 36)	1.40
RT-857	TRIMMER STRIP—Antenna section trimmer strip (C-21, 22, 23, 24, 25, 26, 27, 28)	1.40
RW-021	WINDOWS—Celluloid station windows (pkg. 25)	.10

*Indicates parts used in previous production receivers.

(Prices subject to change without notice)

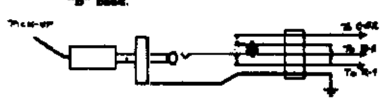


Fig. 1. Phonograph Connections

Phonograph Connections

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-85 circuit for the reproduction of phonograph recording. This method uses a two circuit jack and is connected into the receiver by opening the circuit between R-11 and the junction of R-7 and R-9; connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert it into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be properly shielded to prevent interference.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

NOTE—A suitable loading circuit consisting of a 300,000 ohm resistor should be connected across the pick-up leads when using a crystal type unit.

GENERAL ELECTRIC CO.

MODEL G86
Schematic, Voltage, Socket
Trimmers

Tone Control ....4 position

Intermediate Frequency ....455 K.C.

Electrical Power Output
Undistorted......................3.0 watts
Maximum..........................5.0 watts

Loud-speaker—Electrodynamic
Outside Cone Diameter..............12 inches
Voice Coil Impedance (400 cycles)...3.5 ohms
Field Coil Resistance..............880 ohms (cold)

Tubes
Oscillator and Converter..............GE-6A8G
I.F. Amplifier........................GE-6SK7
Detector and AVC......................GE-6H6
1st Audio Amplifier...................GE-6SF5
Driver................................GE-76
Power Output..........................GE-6AC5G
Tuning Indicator......................GE-6U5
Rectifier.............................GE-5Y3G
Pilot Lamps...........................(2) Mazda No. 44

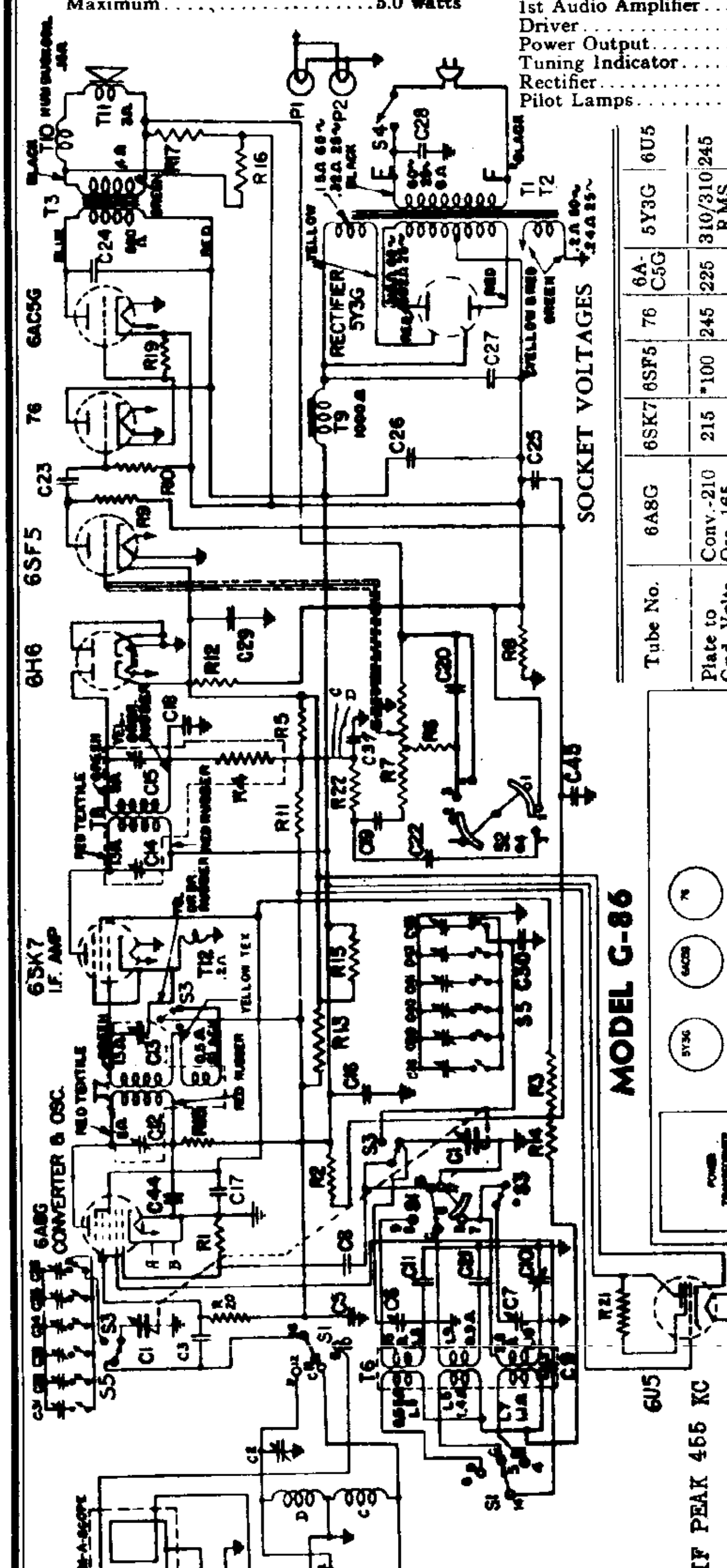


Fig. 2. Schematic Diagram

SOCKET VOLTAGES

Tube No.	6A8G	6SK7	6SF5	76	6A-C5G	5Y3G	6U5
Plate to Gnd. Volts	Conv.-210 Osc.-165	215	*100	245	225	310/310 RMS	245
Screen to Gnd. Volts	100	100	..	..	..		
Cathode to Gnd. Volts	0	0	3.0	8.0	4.7	315	3.0
Cathode Current MA	12.0	9.0	0.3	6.0	33.5	72	1.0
Filament Volts	6.4	6.4	6.4	6.4	6.4	5.2	6.4

*Measure on 500-volt scale.
A-c line voltage 125—no signal input. Dial pointer set at 550 K.C. on "B" band.

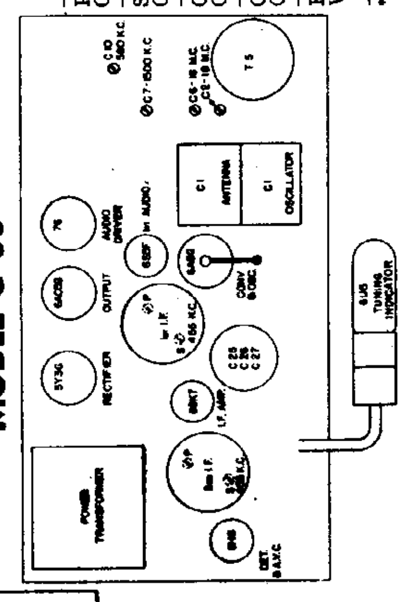


Fig. 6. Chassis Layout and Trimmer Location

Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
C1	450 mmf. tuning condenser	C22	.0015 mfd., paper capacitor	R1	47,000 ohm, carbon resistor	R15	33,000 ohm, carbon resistor
C2	3-20 mmf. ant. trimmer	C23	.005 mfd., paper capacitor	R2	6,800 ohm, carbon resistor	R16	100 ohm, carbon resistor
C3	150 mmf., mica capacitor	C24	.015 mfd., paper capacitor	R3	15,000 ohm, carbon resistor	R17	22 ohm, carbon resistor
C5	.1 mfd., paper capacitor	C25	8 mfd., dry electrolytic	R4	47,000, carbon resistor	R18	6,800 ohm, carbon resistor
C6, C7	3-20 mmf., osc. trimmer	C26	8 mfd., dry electrolytic	R5	220,000 ohm, carbon resistor	R19	22,000 ohm, carbon resistor
C8	50 mmf., mica capacitor	C27	12 mfd., dry electrolytic	R6	180,000 ohm, carbon resistor	R20	1.0 megohm, carbon resistor
C9	.005 mfd., paper capacitor	C28	.02 mfd., line capacitor	R7	2.0 megohm, volume control	R21	1.0 megohm, carbon resistor
C10	300-680 mmf., padder capacitor	C29	.1 mfd., paper capacitor	R8	220 ohm, carbon resistor	R22	47,000 ohm, carbon resistor
C11	4300 mmf., mica capacitor	C30	20 mmf., compensating capacitor	R9	220,000 ohm, carbon resistor	T1, T2	Power transformer
C16	.1 mfd., paper capacitor	C31, C36	Antenna trimmer strip	R10	1.0 megohm, carbon resistor	T3	Output transformer
C17	.05 mfd., paper capacitor	C37	47 mmf., mica capacitor	R11	2.2 megohm, carbon resistor	T6	Oscillator transformer
C18	47 mmf., mica capacitor	C38, C43	Oscillator trimmer strip	R12	150 ohm, carbon resistor	L1	Beam-a-scope antenna
C19, 20	.003 mfd., paper capacitor	C44	.05 mfd., paper capacitor	R13	3.3 megohm, carbon resistor		
C21	1500 mmf., mica capacitor	C45	.1 mfd., paper capacitor	R14	3,300 ohm, carbon resistor		

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Volts)
A	115-125	50-60	70
C	115-125	25-60	75

Tuning Frequency Range
Band "B"............................540-1600 K.C.
Band "C"...........................1600-5700 K.C.
Band "D"...........................5700-18,000 K.C.

MODEL G86
Alignment, Chassis Wiring "Beam-A-Scope" Data, Dial Phono. Data

GENERAL ELECTRIC CO.

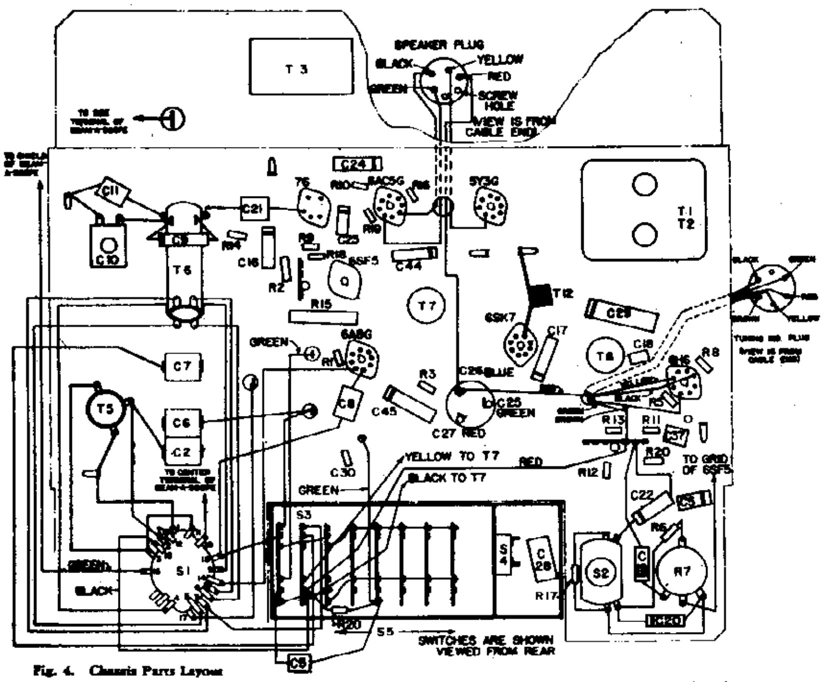


Fig. 4. Chassis Parts Layout

SERVICE DATA

Physical Specifications

Model G-86
Height .... 42 inches
Width .... 29⅝ inches
Depth .... 14½ inches

Tuning Control Drive Ratio

.... 18:1

GENERAL INFORMATION

The Model G-86 is a three-band A-C operated receiver, employing eight General Electric Pre-tested tubes in a superheterodyne circuit as described above. It incorporates a simplified trimmer tuned "Touch Tuning" system; and the new and exclusive self-contained antenna system, "Beam-a-Scope." Other features of design include I.F. band expansion when using Touch Tuning, degenerative audio feedback, and an improved dustproof electrodynamic speaker.

BEAM-A-SCOPE

The "Beam-a-Scope" is essentially a tuned coil antenna wound on an impregnated frame and shielded by a Faraday screen against electrostatic disturbances. This construction discriminates in favor of the desired signal as against a local man-made noise source in three ways. First, since any noise source is composed of two components—electrostatic and magnetic fields—the "Beam-a-Scope" may be revolved so that a null point is found where no voltage is produced from these two components in the direction where the noise originates. Due to the fact that this null point is very sharp, it is very unusual that any desired station will be in a direct line with the rejected noise signal and thereby have its signal strength reduced appreciably. In the second place, the "Beam-a-Scope" eliminates the external return path to ground present in the case of an unshielded antenna. This reduces or eliminates local man-made noise sources in much the same way as a shielded antenna lead-in does in an ordinary antenna installation. In the third place, the "Beam-a-Scope" discriminates against the electrostatic component of an incoming wave in comparison with the magnetic component, because of the Faraday shield. Since the electrostatic component of a local noise source is a great deal larger than the magnetic component, this rejection property brings about an enormous increase in signal-to-noise ratio.

The above operation is only available on the broadcast band and in this position the Beam-a-Scope is also the first tuned grid circuit. On the "C" and "D" bands, the Beam-a-Scope is connected to operate as a capacity type antenna. When an outside antenna is connected to the receiver, it is tapped in on the grid coil (Beam-a-Scope L-1) when operating on the "B" band. On the "C" and "D" bands the outside antenna is connected through the Beam-a-Scope to the "C" and "D" band primaries of the antenna coil.

Loud-speaker

To center the voice coil, remove the dust cover by softening with acetone. Loosen the two spider clamping screws and place three 1 in. by ¼ in. by 0.010 in. paper or celluloid strips equally spaced around pole piece for clearance; then tighten clamping screws. Remove centering strips and cement the dust cap in place with Glyptal cement

Coil System

The "C" and "D" band antenna coils are wound on a single coil form as shown in Fig. 2. T-6 is the oscillator transformer for all three bands. All switch points are numbered in Fig. 2 and Pig. 4 to facilitate in service by showing common points on the schematic diagram, Fig. 2, and the pictorial wiring diagram, Fig. 4.

Phonograph Connections

Fig. 1 shows a simple sketch for connecting a crystal or high-impedance magnetic pick-up into the G-86 circuit for the reproduction of phonograph recordings. SP is a rotary triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit. It is very important that the pick-up leads have a shield such as copper braid to prevent hum interference. This lead should be connected to chassis ground.

The 6A8G cathode circuit should be opened between A-B as shown on the schematic. Also open the circuit between C-D in the diode load and make connections to phonograph switch as indicated in Fig. 1.

When the pick up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction. The following are suggested parts:

Symbol	Description	Stock No.
SP	Triple-pole, double-throw switch	RS-3013
RP	330,000-ohm carbon resistor	RQ-1219

ALIGNMENT PROCEDURE

MODEL G-86

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14)	Gang condenser plates closed—"manual" key depressed—connect audio input of oscilloscope to ground and to the junction of R-11 and R-4 of the 2nd I.F. transformer. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resultant curve is shown in Fig. 3. When a station key is depressed, this I.F. curve should expand considerably.
2. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12)	

I.F. Alignment with Output Meter

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	455 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14)	Gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12)	

R.F. Alignment

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-6) Ant. (C-2)	Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 910 K.C. below signal input when (C-6) is on proper peak. Example: 15 M.C. image—14.09 M.C. Peak (C-2) while rocking the gang condenser.
3. Band "C"	No adjustments necessary.				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-7)	Peak oscillator trimmer C-7 for maximum output in vicinity of 1500 K.C. while rocking the gang condenser.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. Padder (C-10)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 ohms	Osc. (C-7)	Retrim for maximum output as described in step No. 4.

Use a "dummy" antenna in making all alignments. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. amplifier.

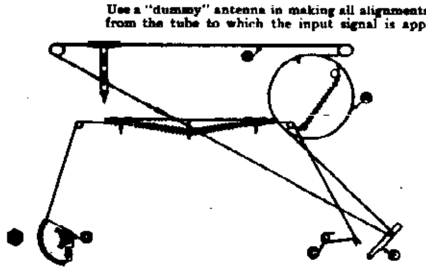


Fig. 3. Dial Drive Mechanism

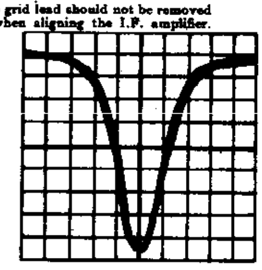


Fig. 3. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

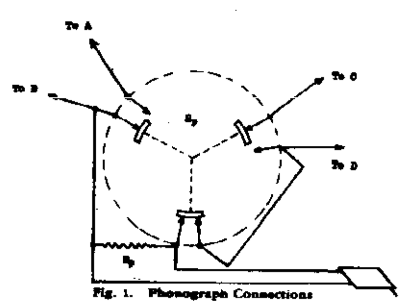


Fig. 1. Phonograph Connections

GENERAL ELECTRIC CO.

MODEL G95, Radioforte
Alignment, Phono., Parts

Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
RS-396	SWITCH—Tone control switch (S-2)	1.35
RS-397	SWITCH—Station set-up lamp switch (S-4)	.20
RS-399	SWITCH—Antenna-Beam-a-Scope switch (S-6)	.35
RS-446	SPRING—Drive cord tension spring (K) (Pkg. of 5)	.25
RS-448	SPRING—Vol. control drive pulley spacer spring (C)	.05
RS-449	SPRING—Tone control drive cord tension spring (H) (Pkg. of 5)	.10
RC-006	CAPACITOR—.0015 mfd., 1500 V. paper (C-43, 44)	.25
*RC-011	CAPACITOR—.002 mfd., 600 V. paper (C-34)	.25
*RC-023	CAPACITOR—.005 mfd., 600 V. paper (C-36)	.25
RC-028	CAPACITOR—.006 mfd., 600 V. paper (C-33)	.30
*RC-048	CAPACITOR—.02 mfd., 600 V. paper (C-32, 37, 40)	.30
*RC-092	CAPACITOR—.05 mfd., 600 V. paper (C-9, 11, 12, 15, 18, 21, 25, 26, 31, 41, 42)	.30
*RC-104	CAPACITOR—.1 mfd., 600 V. paper (C-14)	.30
*RC-136	CAPACITOR—.25 mfd., 200 V. paper (C-55, 56)	.30
RC-217	CAPACITOR—50 mmf., mica (silver plated) (C-19)	.35
RC-230	CAPACITOR—20 mmf., compensating capacitor (C-52)	.35
*RC-242	CAPACITOR—150 mmf., mica (C-29-30)	.25
RC-245	CAPACITOR—175 mmf., compensating capacitor (C-45)	.45
RC-263	CAPACITOR—270 mmf., mica (C-39)	.25
RC-393	CAPACITOR—4700 mmf., mica (silvered) (C-20)	.50
*RC-429	CAPACITOR—30 mfd., 450 V. wet electrolytic (C-48, 49)	1.35
RC-596	CAPACITOR—25 mfd., 25 V; 10 mfd., 400 V. dry electrolytic (C-46, 47)	1.10
RC-597	CAPACITOR—60 mfd., 40 V. A.C. motor capacitor (C-51)	1.00
*RC-672	CAPACITOR—5-35 mmf., R.F. trimmer (C-16)	.15
RC-678	CAPACITOR— mmf., "B" padder (C-8)	.30
*RQ-1305	RESISTOR—82,000 ohm, ½-W. carbon (R-28) (Pkg. of 5)	$0.70
*RQ-1315	RESISTOR—220,000 ohm, ½-W. carbon (R-1, 17, 32, 33) (Pkg. of 5)	.70
*RQ-1323	RESISTOR—470,000 ohm, ½-W. carbon (R-26, 38) (Pkg. of 5)	.70
*RQ-1333	RESISTOR—1.2 megohm, ½-W. carbon (R-22, 29) (Pkg. of 5)	.70
*RQ-1335	RESISTOR—1.5 megohm, ½-W. carbon (R-27) (Pkg. of 5)	.70
*RQ-1337	RESISTOR—1.8 megohm, ½-W. carbon (R-8) (Pkg. of 5)	.70
*RQ-1339	RESISTOR—2.2 megohm, ½-W. carbon (R-14) (Pkg. of 5)	.70
RQ-1459	RESISTOR—1000 ohm, 1-W. carbon (R-23)	.20
RQ-1497	RESISTOR—39,000 ohm, 1-W. carbon (R-6)	.20
RR-740	RESISTOR—Voltage divider resistor (R-35)	.85
RR-1006	RESISTOR—20 ohm, ½-W. W.W. resistor (R-40) (Pkg. of 5)	.70
RR-1007	RESISTOR—230 ohm, 2-W. resistor (R-34)	.30
RS-509	SPACER—Volume control pulley spacers (Pkg. of 2)	.10
RS-911	SHAFT—Idler drive wheel shaft and collar	.15
RS-914	SHAFT—Tone or volume flexible drive shaft (A)	.35
RS-915	SHAFT—Vol. or tone drive shafts	.10
RT-104	TRANSFORMER—Power transformer, 105-125 V, 25-60 cycles (T-1)	14.75
RT-105	TRANSFORMER—Power transformer, 105-125 V, 50-60 cycles (T-1)	9.00
RT-263	TRANSFORMER—1st I.F. transformer and shield (T-6)	2.30
RC-679	CAPACITOR—2-20 mmf., trimmer (C-54)	$0.20
RC-681	CAPACITOR—7-23 mmf., "B" osc. trimmer (C-5)	.90
RC-683	CAPACITOR—5-40 mmf., ant. trimmer (C-1)	.35
RC-729	CONDENSER—3-gang tuning condenser (C-10)	5.60
*RC-755	CAPACITOR—.01-.01 mfd., line capacitor (C-50)	.40
*RC-863	CORD—Power cord	.65
RC-1980	COUPLER—Volume or tone control coupling unit (B)	.20
RC-8035	CABLE—Speaker cable and plug	.50
RC-8044	CABLE—Condenser drive cable (J) (Pkg. of 5)	.65
RC-8083	CABLE—Tone control drive cable (G)	.25
RC-8084	CABLE—Vol. control drive cable	.20
RG-016	GRID CLIP—Control grid clip (for metal tubes) (Pkg. of 5)	.10
RL-063	COIL—Ant. coil Band "B," "C," and "D" (T-3)	1.25
RL-149	COIL—R.F. coil Band "B," "C," and "D" (T-4)	1.15
RL-267	COIL—Osc. Coil Band "B," "C," and "D"	1.25
RL-500	BEAM-A-SCOPE—Beam-a-Scope Antenna (complete)	9.15
RM-112	MOTOR—Tuning motor, 50-60 cycles	4.00
RM-113	MOTOR—Tuning motor, 25 cycles	5.35
*RP-048	DRIVE PULLEY—Condenser drive pulley (F)	.35
*RP-076	PULLEY—Vol. control driven pulleys or tone control driven pulleys (D)	.16
RP-300	PULLEY—Rubber cone drive pulley (motor)	.25
RP-301	PULLEY—Drive cord idler pulley (Pkg. of 2)	.10
RP-305	PULLEY—Tone control driven pulley (I)	.30
RP-306	PULLEY—Volume control drive pulley (E)	.20
*RQ-1247	RESISTOR—330 ohm, ½-W. carbon (R-2, 4, 15, 18) (Pkg. of 5)	.70
*RQ-1259	RESISTOR—1000 ohm, ½-W. carbon (R-7, 24, 36, 37) (Pkg. of 5)	.70
*RQ-1291	RESISTOR—22,000 ohm, ½-W. carbon (R-9) (Pkg. of 5)	.70
*RQ-1299	RESISTOR—47,000 ohm, ½-W. carbon (R-5, 25) (Pkg. of 5)	.70
*RQ-1301	RESISTOR—56,000 ohm, ½-W. carbon (R-16) (Pkg. of 5)	.70
*RQ-1303	RESISTOR—68,000 ohm, ½-W. carbon (R-20, 21, 30, 31) (Pkg. of 5)	.70
RT-264	TRANSFORMER—2nd I.F. transformer and shield (T-7)	$1.80
RT-439	TRANSFORMER—Output transformer (T-2)	3.20
RV-046	VOLUME CONTROL—2 meg. vol. control (R-19)	.75
*RW-101	WASHERS—Felt washers for knobs (Pkg. of 10)	.45
*RB-008	BOARD—Terminal board (2 lug)	$0.10
*RB-023	BOARD—Terminal board (4 lug)	.10
*RB-049	BOARD—Ant.-Gnd. terminal board	.10
*RB-062	BOARD—Terminal board (6 terminals)	.10
*RB-066	BOARD—Terminal board (4 lugs)	.10
*RB-070	BOARD—Terminal board (3 lugs)	.10
RB-094	BOARD—Terminal board (7 lugs)	.10
RB-160	BRACKET—Reduction drive wheel bracket	.20
RB-161	BRACKET—Manual and motor drive bracket	.40
RB-162	BRACKET—Tuning condenser mtg. bracket (front)	.45
RB-700	BRAKE—Drive wheel friction brake (complete)	.20
*RS-174	SHIELD—Grid shield cap (Pkg. of 5)	.35
*RS-200	SOCKET—8-prong octal base socket (Pkg. of 5)	.75
*RS-204	SOCKET—5-prong octal tube socket (Pkg. of 5)	.75
RS-226	SOCKET—Octal base (on rear deck of chassis)	.15
RS-227	SOCKET—Tube socket (low loss octal base)	.15
RS-228	SOCKET—Station set-up lamp socket	.20
RS-239	SOCKET—Tube socket (6A8G)	.35
RW-900	WHEEL—Idler drive wheel	.45
RW-904	WHEEL—Vol. control wheel	.65
RW-905	WHEEL—Tone control wheel	.65
*RX-027	ASSEMBLY—Chassis mounting assembly	.15
RX-049	ASSEMBLY—Condenser mounting assembly	.15
	SPEAKER ASSEMBLY	
RC-936	CONE—12-inch cone and voice coil assembly	1.10
RC-991	CLAMP—Cone spider clamp	.05
RD-301	DUST CAP—Speaker cone dust cap (Pkg. of 5)	.10
RP-109	PLUG—Male speaker plug	.20
RS-075	SPEAKER—12-inch speaker	5.50
*RX-030	ASSEMBLY—Speaker mounting assembly	.10
	PUSH-BUTTON MECHANISM	
RC-8045	CARDS—Station letter cards (set)	.60
RC-8046	CABLE—Power cable and plug to push button assembly	.50
RC-8047	CABLE—Station selector button cable	.95
RK-903	KEY—Station key (Pkg. of 5)	.30
RS-444	SPRING—Station button springs (Pkg. of 10)	.10
RS-864	SCREWS—Keyboard assembly thumb screws (Pkg. of 10)	.40
RS-3008	SWITCH—Button "On-Off" switch	.50
RT-906	TAB—"Off" tab for station button (Strip of 10)	.05
RW-025	WINDOW—Celluloid station window (Pkg. of 25)	.15
RX-051	ASSEMBLY—Keyboard Touch Tuning Assembly switch	7.40
	STATION SELECTOR ASSEMBLY (BEHIND TUNING CONDENSER)	
RB-701	BAND—Contactor band	.10
RC-1978	CONTACT—Thumbscrew contact (complete) (Pkg. of 5)	.45
RD-080	DIAL—Dial scale for contactor drum	.15
RI-108	INSULATOR—Contactor band insulator (Pkg. of 5)	.15
RS-447	SPRING—Contactor band tension spring (Pkg. of 5)	.15
RW-901	WHEEL—Contactor wheel (CT) (complete)	2.00

(Prices subject to change without notice)

*Used on previous receivers.

I.F. Alignment with Oscilloscope

Step No.		Input Frequency	Tone Control Position	Point of Input	Trimmer	Comments
1.	Band B	455 K.C. and 30 K.C. Sweep	Normal	I.F. 6K7 Grid	2nd I.F. Sec. 2nd I.F. Pri.	Condenser gang at minimum capacity—vertical input to ground and junction at R-25, R-12, and R-17. Adjust trimmers in order mentioned for a single curve of maximum amplitude. The resulting curve on the "normal" position is shown in Fig. 2A. The expanded curve taken with tone control at "Treble I" is shown in Fig. 2B.
2.	Band B	455 K.C. and 30 K.C. Sweep	Treble I	Converter 6A8 Grid	1st I.F. Sec. 1st I.F. Pri.	
3.	Band B	455 K.C. and 30 K.C. Sweep	Normal	Converter 6A8 Grid	1st I.F. Tertiary	
4.	Band B	455 K.C. and 30 K.C. Sweep	Normal	Converter 6A8 Grid	All IF Trimmers	

I.F. Alignment with Output Meter

Step No.		Input Frequency	Tone Control Position	Point of Input	Trimmer	Comments
1.	Band B	455 K.C. modulated	Normal	I.F. 6K7 Grid	2nd I.F. Sec. 2nd I.F. Pri.	Condenser gang at minimum capacity-output meter connected across voice coil-volume control at maximum-input as low as practical. Adjust all trimmers in order listed for maximum output. Do not attempt an alignment in the expanded position.
2.	Band B	455 K.C. modulated	Normal	Converter 6A8 Grid	1st I.F. Sec. 1st I.F. Pri. 1st I.F. Tertiary	
3.	Band B	455 K.C. modulated	Normal	Converter 6A8 Grid	All I.F. trimmers	

R.F. Alignment

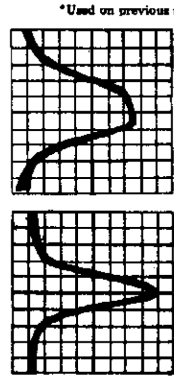
Step No.		Input Frequency	Tone Control Position	Point of Input	Trimmer	Comments
1.	Band B					Adjust tuning mechanism so that pointer coincides with first line at left hand end of dial scale when condenser plates are fully meshed.
2.	Band B	1500K.C. modulated	Bass	Antenna post	Osc. (C-5) R.F. (C-16) Ant. (C-1)	Connect output meter across voice coil-antenna switch turned to counter-clockwise position. Adjust trimmers in order listed for maximum output.
3.	Band B	580 K.C. modulated	Bass	Antenna post	Osc. Padder-(C-8)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking gang condenser.
4.	Band B	Repeat Step 2				
5.	Band B	1500 K.C. modulated	Bass	Antenna post	Beam-a-Scope (C-54)	Turn antenna switch to clockwise position, align Beam-a-Scope trimmer for maximum output.

Fig. 11. Phonograph Connections

Phonograph Connections

Fig. 11 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the Radioforté circuit for the reproduction of phonograph recording. This method uses a two circuit jack and is connected into the receiver by opening the circuit between G-32 and the volume control (R-19) and connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert it into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be properly shielded to prevent pick-up.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.



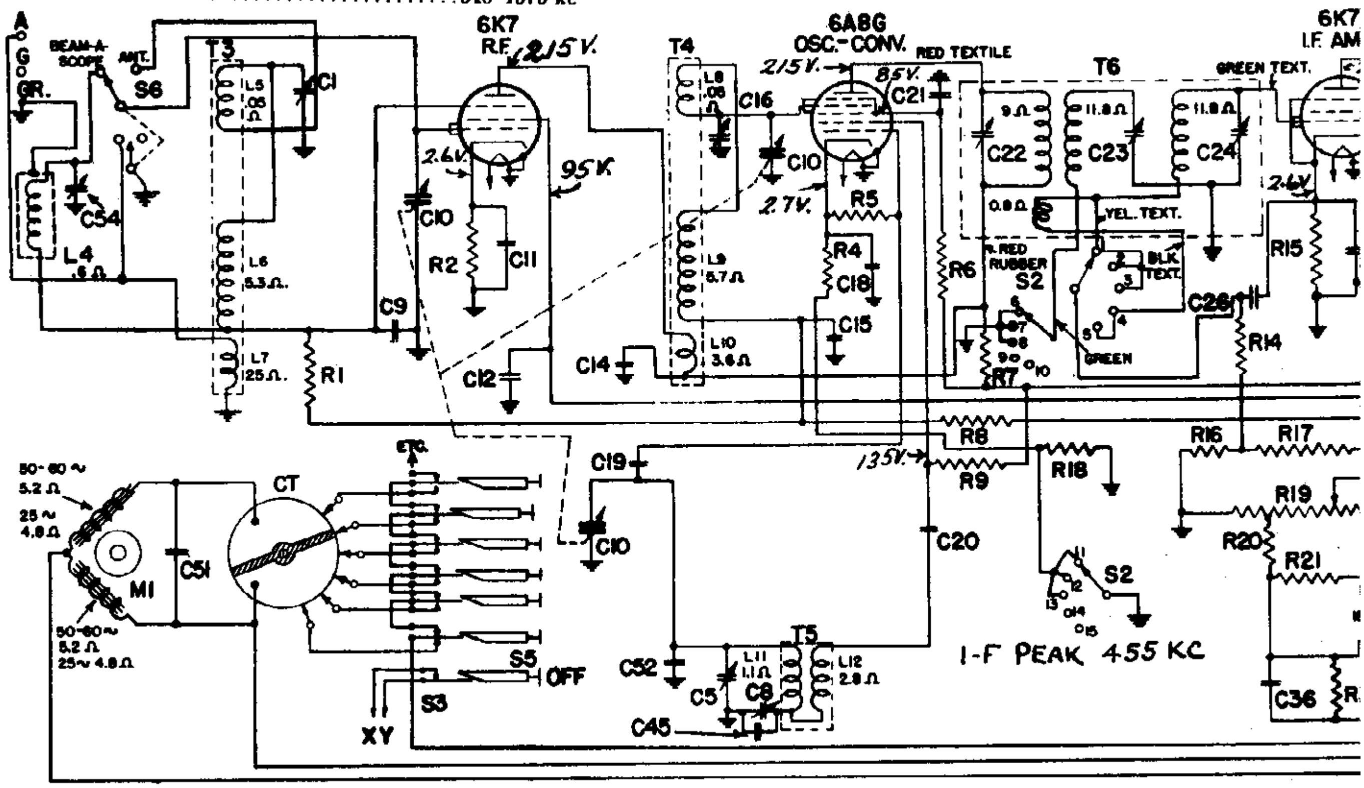
(a) Sharp position (b) Expanded position

Fig. 2. I.F. curves taken on G-E oscilloscope OFM-1

NOTE—In most cases a suitable loading circuit composed of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit.

Tuning Frequency Range

Band "B"..............................540–1575 kc



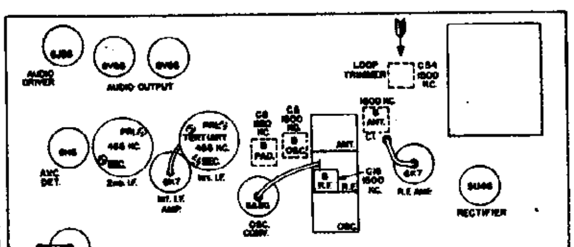


Fig. 1. Trimmer Location

Rating "A"....105–115 (115–125)* volts, 50–60 cycles, 155 watts

Rating "C"....105–115 (115–125)* volts, 25–60 cycles, 160 watts

* The receivers as shipped from the factory have the power cord connected to the 115–125-volt tap of the transformer (black and red lead). If the normal voltage of the power supply is always below 110 volts, the connection of the power cord should be removed from this lead and soldered to the 105–115-volt tap (black and yellow lead). After changing the connection, tape the soldered joint as well as the exposed end of the unused lead. This change requires removal of the chassis from the cabinet.

SYMBOL	DESCRIPTION
R-1	220,000 Ohm Carbon Resistor
R-2	330 Ohm Carbon Resistor
R-4	330 Ohm Carbon Resistor
R-5	47,000 Ohm Carbon Resistor
R-6	39,000 Ohm Carbon Resistor
R-7	1,000 Ohm Carbon Resistor
R-8	1.8 Megohm Carbon Resistor
R-9	22,000 Ohm Carbon Resistor
R-14	2.2 Megohm Carbon Resistor
R-15	330 Ohm Carbon Resistor
R-16	56,000 Ohm Carbon Resistor
R-17	220,000 Ohm Carbon Resistor
R-18	330 Ohm Carbon Resistor
R-19	2 Megohm, 1 Megohm Tap. Vol. Control
R-20	68,000 Ohm Carbon Resistor
R-21	68,000 Ohm Carbon Resistor
R-22	1.2 Megohm Carbon Resistor
R-23	1,000 Ohm Carbon Resistor
R-24	1,000 Ohm Carbon Resistor
R-25	47,000 Ohm Carbon Resistor
R-26	470,000 Ohm Carbon Resistor
R-27	1.5 Megohm Carbon Resistor
R-28	82,000 Ohm Carbon Resistor
R-29	1.2 Megohm Carbon Resistor
R-30	68,000 Ohm Carbon Resistor
R-31	68,000 Ohm Carbon Resistor
R-32	220,000 Ohm Carbon Resistor

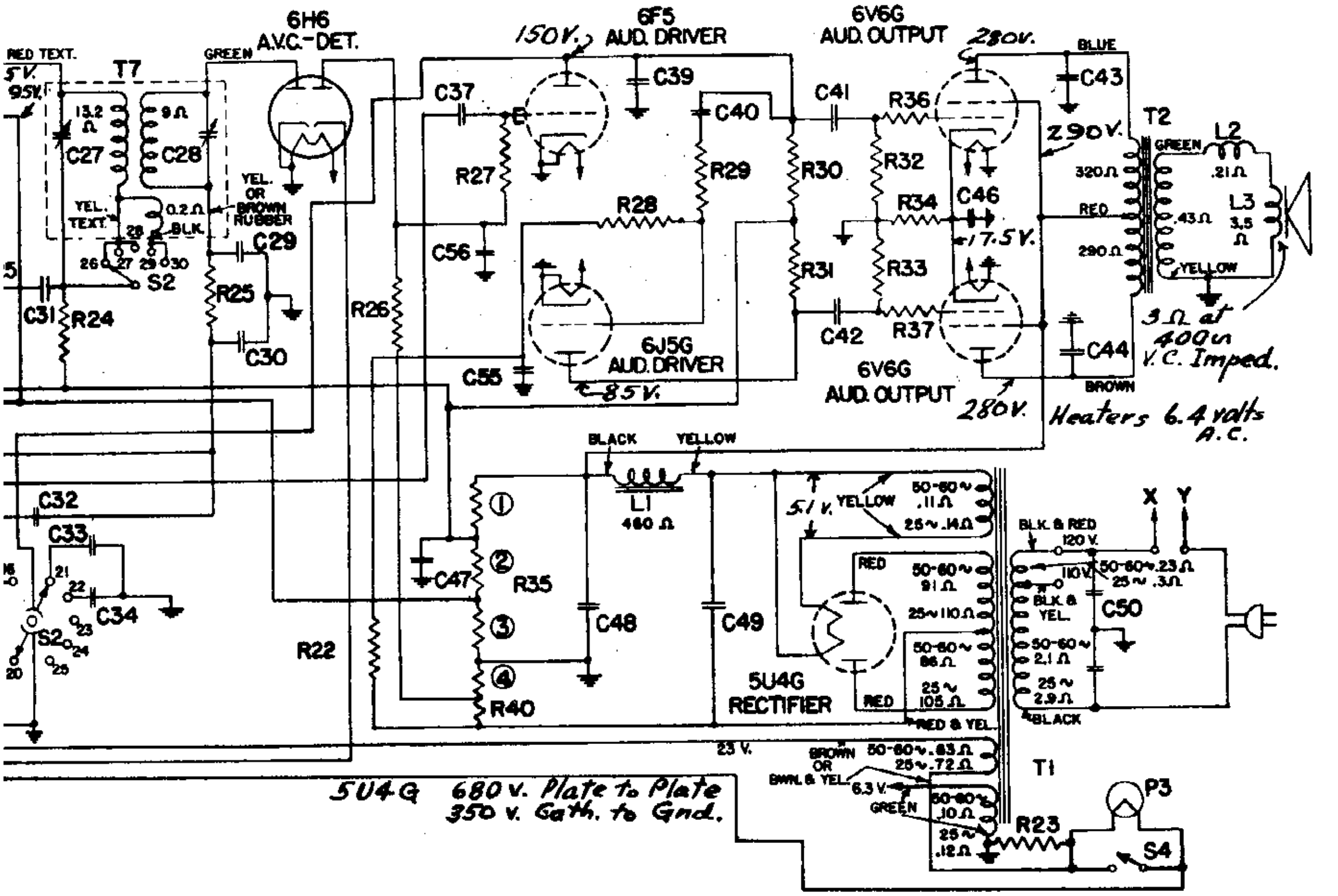
SYMBOL	DESCRIPTION
R-33	220,000 Ohm Carbon Resistor
R-34	230 Ohm Resistor (W.W.)
R-35	4 Sections Voltage Divider
(1)	1600 Ohms
(2)	9000 Ohms
(3)	9000 Ohms
(4)	11 Ohms
R-36	1,000 Ohm Carbon Resistor
R-37	1,000 Ohm Carbon Resistor
R-38	470,000 Ohm Carbon Resistor
R-40	20 Ohm W.W. Resistor
C-1	5–40 MMF. "B" Ant. Trimmer
C-5	7–23 MMF. "B" Osc. Trimmer
C-8	160–375 MMF. "B" Padder
C-9	.05 MFD. 200 V. Paper Capacitor
C-10	10–450 MMF. Tuning Capacitor
C-11	.05 MFD. 200 V. Paper Capacitor
C-12	.05 MFD. 200 V. Paper Capacitor
C-14	.1 MFD. 400 V. Paper Capacitor
C-15	.05 MFD. 200 V. Paper Capacitor
C-16	5-30 MMF. "B" R.F. Trimmer
C-18	.05 MFD. 200 V. Paper Capacitor
C-19	50 MMF. Silver Plated Capacitor
C-20	4,700 MMF. Mica Capacitor
C-21	.05 MFD. 400 V. Paper Capacitor
C-22	100-230 MMF. 1st I.F. Pri. Trimmer
C-23	50-135 MMF. 1st I.F. Sec. Trimmer

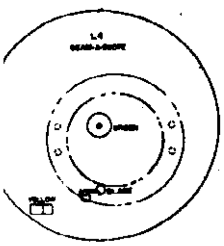
SYMBOL	DESCRIPTION
C-24	50-135 MMF. 1st I.F. Tert. Trimmer
C-25	.05 MFD. 200 V. Paper Capacitor
C-26	.05 MFD. 200 V. Paper Capacitor
C-27	50-135 MFF. 2nd I.F. Pri. Trimmer
C-28	100-230 MMF. 2nd I.F. Sec. Trimmer
C-29	150 MMF. Mica Capacitor
C-30	150 MMF. Mica Capacitor
C-31	.05 MFD. 400 V. Paper Capacitor
C-32	.02 MFD. 200 V. Paper Capacitor
C-33	.0055 MFD. 600 V. Paper Capacitor
C-34	.002 MFD. 600 V. Paper Capacitor
C-35	.05 MFD. 200 V. Paper Capacitor
C-36	.0055 MFD. 600 V. Paper Capacitor
C-37	.02 MFD. 200 V. Paper Capacitor
C-39	270 MMF. Mica Capacitor
C-40	.02 MFD. 400 V. Paper Capacitor
C-41	.05 MFD. 400 V. Paper Capacitor
C-42	.05 MFD. 400 V. Paper Capacitor
C-43	.0015 MFD. 1500 V. Paper Capacitor
C-44	.0015 MFD. 1500 V. Paper Capacitor
C-45	175 MMF. Compensating Capacitor
C-46	25 MFD. 25 V. W.V. Dry Electro.
C-47	10 MFD. 400 V. W.V. Dry Electro.
C-48	30 MFD. 450 V. W.V. Wet Electro.
C-49	30 MFD. 450 V. W.V. Wet Electro.
C-50	.01-.01 MFD. 250 V. A.C. Line Capacitor

SYMBOL	
C-51	60 MFD
C-52	20 MMI
C-54	2-20 MI
C-55	.25 MFI
C-56	.25 MFI
T-1	Power cycles
T-2	Output
T-3	Ant. Tr
T-4	R.F. Tr
T-5	Osc. Tr
T-6	1st I.F.
T-7	2nd I.F
L-1	Field C
L-2	Hum Bu
L-3	Voice C
L-4	Beam-a
CT	Contact
P-3	Tuning
S-2	Tone C
S-3	Power S
S-4	Tuning
S-5	Station
S-6	Beam-a
M	Tuning Cycle

ECTRIC CO.

MODEL G95, Radioforte
Schematic, Chassis Wiring
Socket, Trimmers, Voltage





DESCRIPTION

0 V. A.C. Dry Electro.
Compensating Capacitor
. Trimmer Capacitor
00 V. Paper Capacitor
00 V. Paper Capacitor
ansformer, 50-60 cycles,

ansformer
former
former
former
ansformer
ransformer
460 Ohms (cold)
Coil
3.5 Ohms
ope
Assembly
mp 25 V.—.2 Amps.
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otor 23 V. 50-60 Cycles. 25

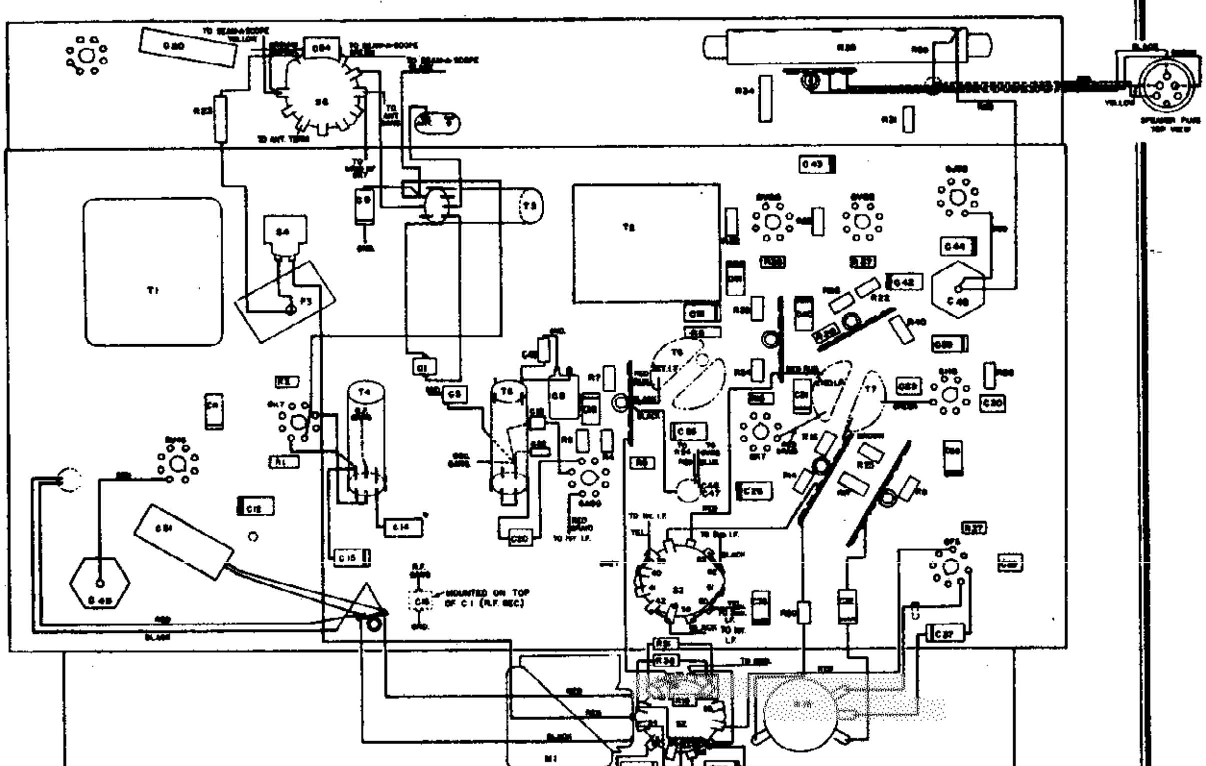


Fig. 3 Chassis Parts Layout

MODEL G95, Radioforte
Tuner and Remote Cont.
Schematics, Data

GENERAL ELECTRIC CO.

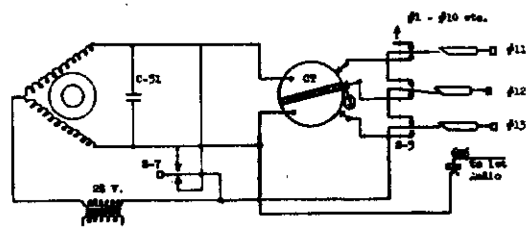


Fig. 5. Schematic of Touch-Tuning System

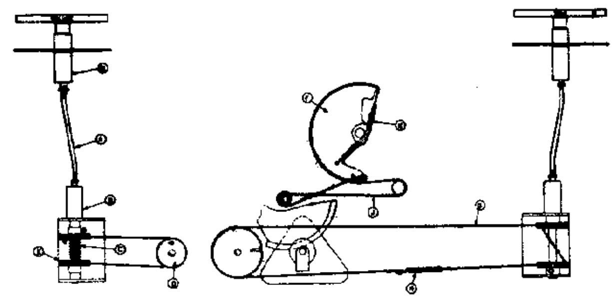


Fig. 8. Drive Mechanism

TOUCH-TUNING

The General Electric "Touch-Tuning" system consists of three essential units: the keyboard assembly of fourteen keys, used for touch-tuning control; the motor and drive mechanism; and the split contact segment with its adjustable station buttons, allowing a set up of thirteen different stations to be tuned automatically.

Thirteen keys are used for the selection of pre-set stations while the No. 14 key is used to turn power "Off." Pressing-in any key will lock the key in a semi-depressed position and release any other that may be in the circuit, thus the selection of any station by a station key will release the "Off" key, turning the set power on.

The tuning motor is operated as a 23-volt split phase induction motor using capacitor C-51 as the phase shifting device. The 23 volts is supplied directly from the receiver power transformer.

Fig. 5 shows a simplified schematic of the control circuit and the following cycle of operation may be traced very easily. When a key is depressed, it completes the 23-volt circuit through the button making contact with the contact segment (CT) and energizes one winding of the motor. The other winding on the motor is energized through the condenser C-51. The rotation of the motor is dependent upon whichever half of the contact segment (CT) that the station button first energizes. When voltage is applied to the motor, the rotor is pulled further into motor field, and engages its rubber cone hub with the dial drive wheel which in turn rotates the gang condenser and contact segment (CT). This operation continues until the insulated segment (I) breaks the station button circuit to the contact segment and removes voltage from the motor. The inertia in the tuning system drives the insulated segment past the station button and makes contact with the other half of the contact segment. This energizes the other winding of the motor and causes the motor to reverse. The brake on the dial drive wheel does not allow the tuning system to store up enough inertia to go past this insulated strip on the reversal of the motor and thus allows the station button to come to rest on the narrow insulated segment, thus stopping the tuning operation to this pre-set position.

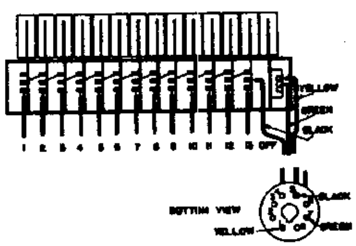


Fig. 6. Keyboard Wiring Diagram

Silent Tuning

During period of motor operation, either for automatic station selection or for scanning, silent tuning is incorporated. This is accomplished by a circuit which gives both instantaneous cut-off of the audio amplifier and time delay in restoring the response. By reference to the schematic Fig. 4, it will be observed that one half of the 6H6 diode is used to rectify the 23.0 volts AC available from the motor and the resulting DC voltage is used to bias the audio amplifier tube to cut-off. Note that the charging time of the bias circuit is only determined by the diode resistance which is very small. The time required for the audio amplifier (6F5) to return to normal bias however, is determined by the product of R-26 and C-56 and is therefore controllable.

Drive Wheel Brake Adjustment

A friction brake has been incorporated on the drive wheel circumference (D) to accomplish accurate stopping of the motor-driven tuning system. When the button passes into the insulated segment it will easily over-ride the insulated segment on the contactor drum, since this segment is very narrow. If this condition continues an oscillatory motion or "Hunting" is set up and the motor will not come to rest as long as the station key is pressed. The brake, located at the left side of dial scale, should be adjusted on normal line voltage so that the motor only has to make one or two reversals.

This adjustment should be made under an average operating line voltage and allowance made for changes in voltage over the 24-hour period.

Stopping Accuracy

The exact location at which the drive mechanism will come to rest may be made more accurate by slightly lowering the insulated segment (X) on the contactor wheel as shown in Fig. 7. Merely loosen the two screws (Y) and lower the yoke (Z).

The proper adjustment is made at the factory and should not require alteration provided the contactor drum is kept well lubricated.

Fig. 7

Lubrication

For smooth and noiseless operation of the tuning system, it is absolutely necessary to keep it well lubricated.

Contactor drum—use thin film of petroleum jelly.

Dial Pointer Guide Rods—use thin film of petroleum jelly.

Motor bearings—These are oilless type and do not require lubrication.

REMOTE CONTROL

The GM-8 Remote Control is merely another station keyboard assembly that is wired in parallel with the regular station keys. In addition, a remotely controlled motor is used to either raise or lower the volume at the receiver. By referring to Fig. 10, the details of the operation of this device may be readily understood. Leads No. 2 to No. 7 are the automatic tuning button control leads that parallel any six of the regular receiver station keys. Lead No. 1 supplies twenty-three volts to the remote keyboard assembly while leads No. 8 and No. 9 are the phase reversing leads to the volume control motor.

When the remote control is attached to a receiver, then the semi-depressed positions of the receiver push button keys may or may not indicate which station is tuned in. This will then depend upon whether the receiver was last operated from the remote control or from the station keys of the receiver itself. For this reason, the key assembly of the remote control has not been equipped with a latch bar.

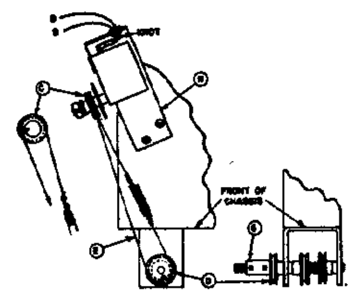


Fig. 9. Volume Control Motor Mounting

All keys of the remote control key assembly are wired in series to avoid possibility of two keys completing the circuit to the motor at the same time.

The remote volume control motor uses a phase shifting resistor in place of a condenser as used on the tuning motor when operating from a 50 or 60 cycle power supply. When operation is desired from 25 cycles replace the 30 ohm, 10-watt resistor across the volume control motor terminals with a 60 microfarad motor capacitor (RC-597).

The mechanical installation of the volume control motor is shown in Fig. 9. For full installation instructions refer to service notes RGMS-8.

Remote Control Notes

1. If key assembly on remote control unit is too high in the case, it is possible that one or all of the keys may be slightly depressed at all times so as to cause faulty operation of the system. To remedy, lower the complete assembly by loosening the two set screws on the inside of the case and then lower assembly—tighten set screws.

2. The tension of the friction clutch on the remote control motor is adjusted at the factory and should not require resetting. If it is set too tight, the volume control may be damaged when "VOL DEC." key is held in a depressed position after the volume control is turned to the minimum position. If this slip clutch is too loose the control will fail to turn.

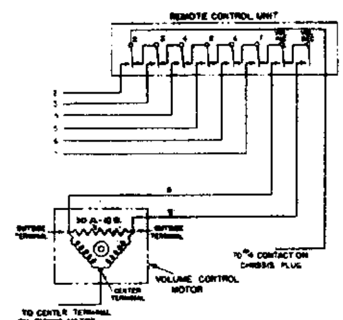
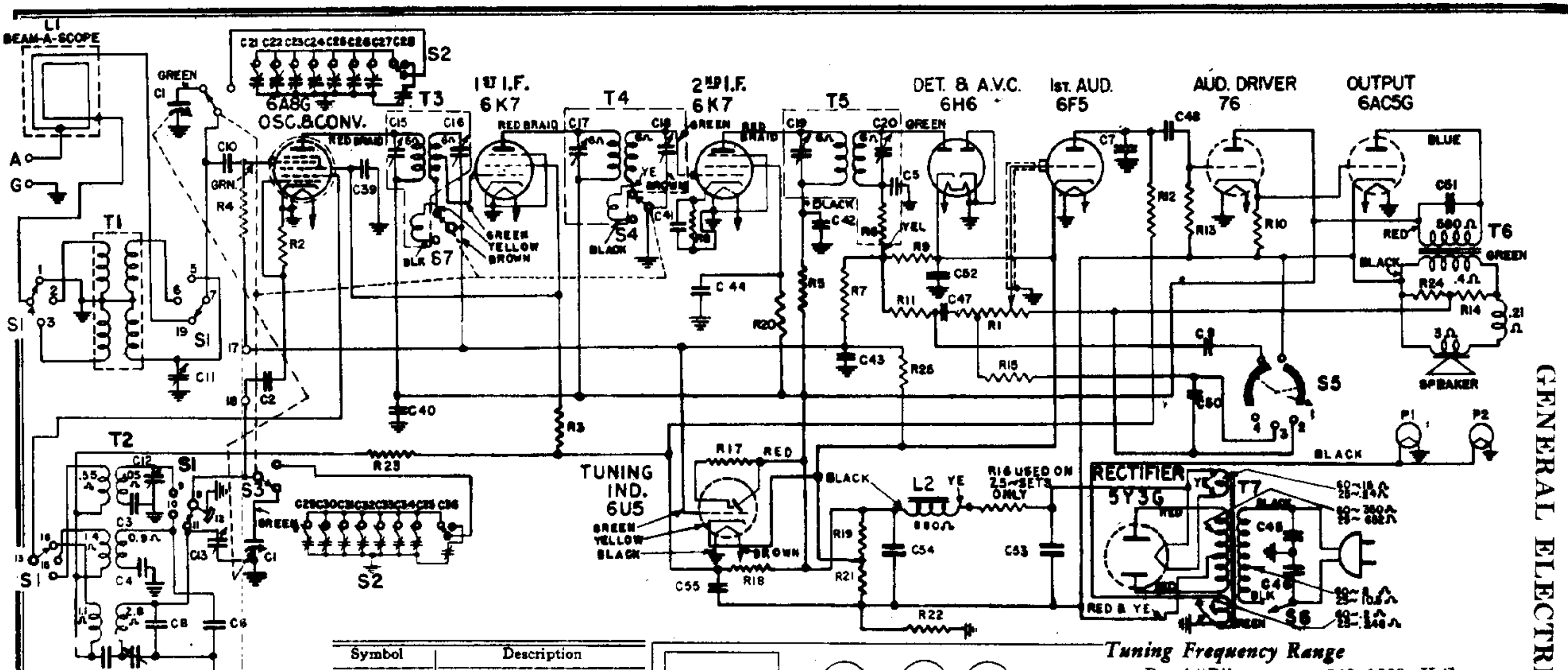


Fig. 10. Remote Control Schematic

GENERAL ELECTRIC CO.

MODEL G99
Schematic, Socket, Trimmer



Symbol	Description
C1	Tuning Capacitor
C2	50 mmf mica capacitor
C3	3900 mmf mica capacitor
C4	1200 mmf mica capacitor
C5	47 mmf mica capacitor
C6	6 mmf mica capacitor
C7	47 mmf mica capacitor
C8	20 mmf regulating capacitor
C9	.0012 mfd paper capacitor
C10	150 mmf mica capacitor
C11-C13	Trimmer capacitors
C14	"B" band padder
C21-C28	Antenna trimmer strip
C29-C36	Oscillator trimmer strip
C39	.05 mfd paper capacitor
C40, 41	0.1 mfd paper capacitor
R23	3300 ohm carbon resistor
R24	12 ohm carbon resistor
R25	1.0 megohm carbon resistor
S1	Band change switch
S2, S3	Station selector switch
S5	Tone control switch
T1	Antenna transformer
T2	Oscillator transformer
T3	1st I.F. transformer
T4	2nd I.F. transformer
T5	3rd I.F. transformer

Symbol	Description
C42, 43, 44	.05 mfd paper capacitor
C45, 46	.01 mfd line capacitor
C47	.003 mfd paper capacitor
C48, 49	.005 mfd paper capacitor
C50	.004 mfd paper capacitor
C51	.02 mfd paper capacitor
C52	0.1 mfd paper capacitor
C53	12 mfd 450 V dry electrolytic
C54	8 mfd 400 V dry electrolytic
C55	8 mfd 400 V dry electrolytic
R1	2 megohm volume control
R2	47,000 ohm carbon resistor
R3	15,000 ohm carbon resistor
R4	1.5 megohm carbon resistor
R5	1,000 ohm carbon resistor
R6	47,000 ohm carbon resistor
R7	2.2 megohm carbon resistor
R8	1,000 ohm carbon resistor
R9	220,000 ohm carbon resistor
R10	22,000 ohm carbon resistor
R11	82,000 ohm carbon resistor
R12	220,000 ohm carbon resistor
R13	1.0 megohm carbon resistor
R14	82 ohm carbon resistor
R15	120,000 ohm carbon resistor
R16	470 ohm carbon resistor
R17	1.0 megohm carbon resistor
R18	6,800 ohm carbon resistor
R19	39,000 ohm carbon resistor
R20	82,000 ohm carbon resistor
R21	150 ohm carbon resistor

Tuning Frequency Range

Band "B" . . . . 540–1660 K.C.
Band "C" . . . . 1650–5600 K.C.
Band "D" . . . . 5500–18,200 K.C.

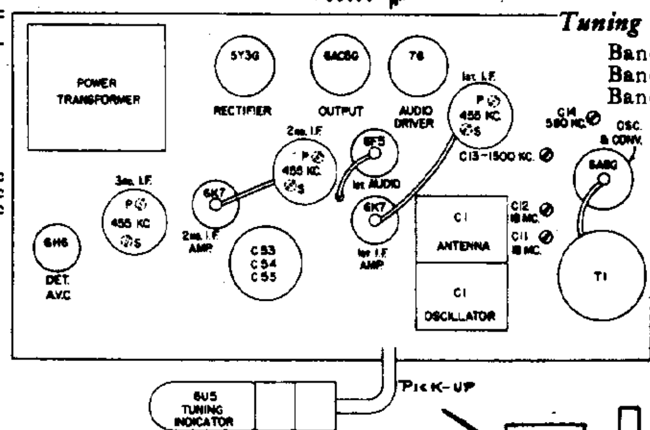


Fig. 6. Chassis Layout and Trimmer Location

IF PEAK 455 KC

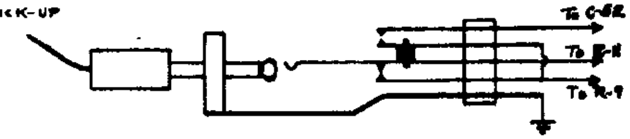


Fig. 1. Phonograph Connections

MODEL G99
Voltage, Chassis Wiring
Dial Mechanism

GENERAL ELECTRIC CO.

VOLTAGE CHART

Tube No.	Plate to Ground Volts, D.C.	Screen to Ground Volts, D.C.	Cathode to Ground Volts, D.C.	Fila-ment Volts
6A8G	240 Conv. 150 Osc.	97	0	6.4
6K7	240	97	0	6.4
6K7	230	105	5.1	6.4
6F5	102	....	3.0	6.4
76	230	....	7.5	6.4
6AC5G	230	....	4.5	6.4
6U5	240	....	3.0	6.4
5Y3G	306/306 A.C. RMS.	...	310 V	5.1

Socket voltages taken at 120-volt line—no signal input—1000 ohms per volt meter—Dial pointer at 550 K.C. on "B" band.

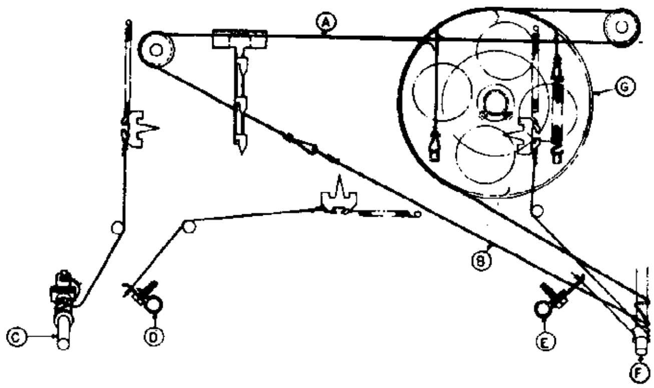


Fig. 3. Dial Drive Mechanism

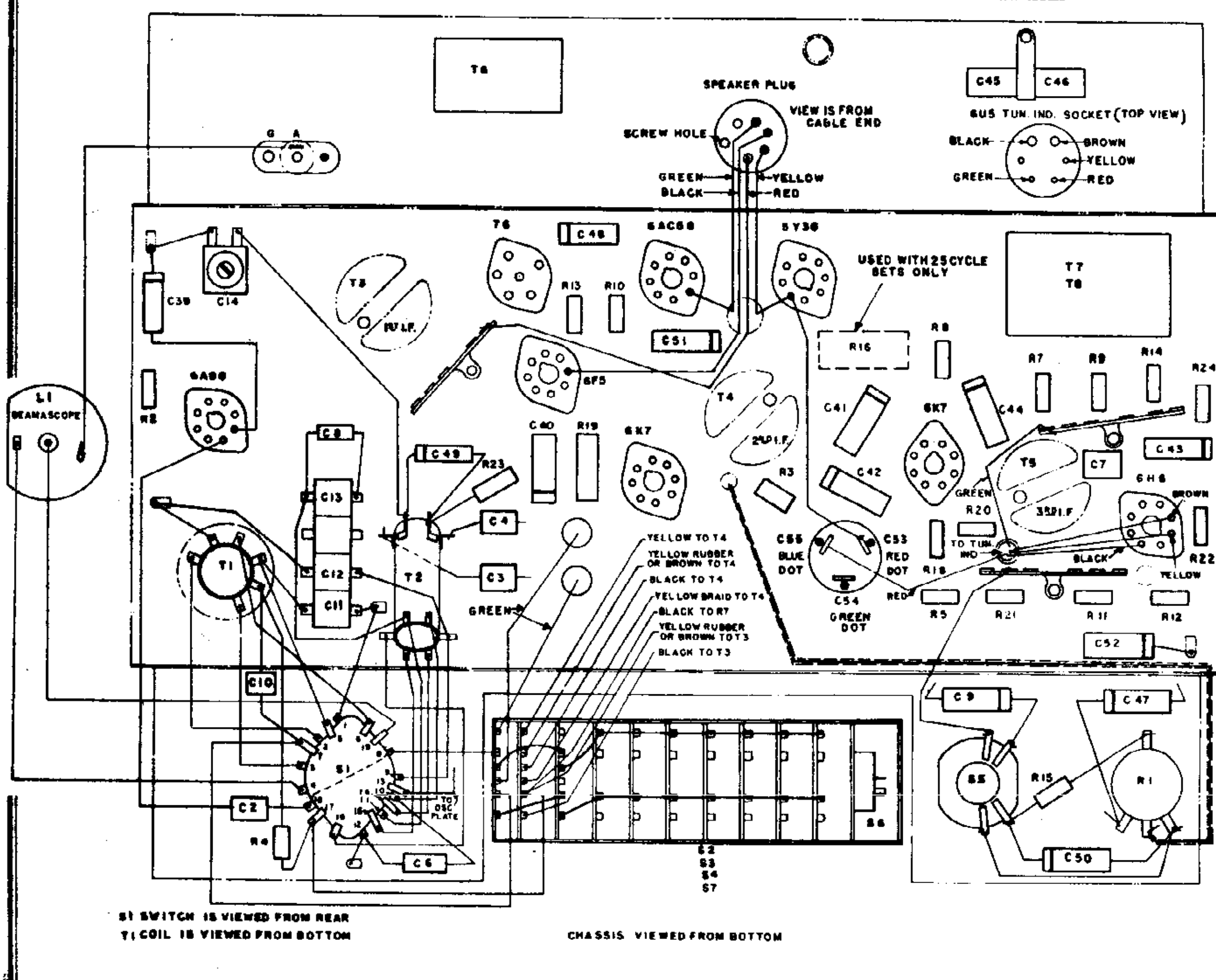


Fig. 4. Chassis Parts Layout

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"	455 K.C. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-20) Pri. (C-19)	Manual key depressed—gang condenser plates closed—connect vertical input of oscilloscope to ground and the junction of R-9 and R-11 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5. When a station key is pressed this I.F. curve should expand considerably.
2. Band "B"	455 K.C. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-18) Pri. (C-17)	
3. Band "B"	455 K.C. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-16) Pri. (C-15)	

I.F. Alignment with Output Meter

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"	455 K.C. with Modulation	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-20) Pri. (C-19)	Manual key depressed—gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an over-all realignment after stage by stage alignment has been accomplished.
2. Band "B"	455 K.C. with Modulation	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-18) Pri. (C-17)	
3. Band "B"	455 K.C. with Modulation	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-16) Pri. (C-15)	

R.F. Alignment

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-12) Ant. (C-11)	Connect output meter across voice coil—manual key depressed. The image of any "D" band signal should be heard 930 K.C. below input signal when (C-12) is on proper peak. Example: 15 M.C. image—14.09 K.C. Peak (C-11) while rocking the gang condenser.
3. Band "C"	No adjustment necessary.				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Osc. (C-13)	Peak oscillator trimmer (C-13) for maximum output in vicinity of 1500 K.C. while rocking the gang condenser.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 200 Ohms	Padder (C-14)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	Repeat Operation 4				

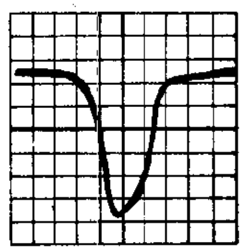


Fig. 5. Over-all IF Curve Taken on G-E Oscilloscope OFM-1

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Volts)
A	115-125	50-60	70
C	115-125	25-60	75

Electrical Power Output

Undistorted .... 3.0 watts
Maximum .... 5.0 watts

Tone Control

.... 4-position

Loud-speaker—Electrodynamic

Outside Cone Diameter .... 12 inches
Voice Coil Impedance .... 3.5 ohms at 400 cycles
Field Coil Resistance .... 880 ohms (cold)

REPLACEMENT PARTS LIST

MODEL G-99

Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
*RB-017	BOARD—Terminal board (1 lug)	$0.10
*RB-026	BOARD—Ant. grid terminal board	.10
*RB-062	BOARD—Terminal board (near power trans.)	.10
RC-012	CAPACITOR—.0012 mfd., 600 V. paper (C-9)	.25
*RC-023	CAPACITOR—.006 mfd., 600 V. paper (C-48, 49)	$0.25
*RC-048	CAPACITOR—.02 mfd., 600 V. paper (C-51)	.30
*RC-049	CAPACITOR—.004 mfd., 600 V. paper (C-50)	.35
*RC-055	CAPACITOR—.003 mfd., 600 V. paper (C-47)	.25

MODEL G-99

Stock No.	Description	List Price
*RC-092	CAPACITOR—.05 mfd., 600 V. paper (C-39, 42, 43, 44)	$0.30
*RC-104	CAPACITOR—.1 mfd., 600 V. paper (C-40, 41, 52)	.30
*RC-206	CAPACITOR—50 mmf., mica (C-2)	.35
RC-216	CAPACITOR—47 mmf., mica (C-5, 7)	.25
RC-220	CAPACITOR—6 mmf., mica (C-6)	.25
RC-330	CAPACITOR—20 mmf., compensating capacitor (C-8)	.35
RC-342	CAPACITOR—150 mmf., mica (C-10)	.25
RC-341	CAPACITOR—1200 mmf., mica (C-4)	.35
RC-390	CAPACITOR—3900 mmf., mica (C-3)	.35
RC-504	CAPACITOR—8 mfd., 400 V.; 8 mfd., 400 V; 12 mfd., 450 V.; dry electrolytic (C-53, 54, 55)	1.60
RC-676	CAPACITOR—300-650 mmf., "B" padder (C-14)	.35
RC-693	CAPACITOR—Antenna and oscillator trimmer (C-11, 12, 13)	.30
RC-736	CONDENSER—2-gang tuning condenser (C-1)	2.95
*RC-754	CAPACITOR—.01-.01 mfd., 250 V. A.C. line capacitor (C-45, 46)	.40
*RC-863	CORD—Power cord	.65
RC-8026	CABLE—Speaker cable and plug	.50
RC-8054	CABLE—Tuning indicator cable and socket	.40
RD-205	DRIVE—Vernier drive bracket assembly	.35
RG-016	GRID CLIP—Control grid clip (Pkg. of 5)	.10
RK-037	KNOB—Control knob (winged) (Pkg. of 5)	.50
RK-038	KNOB—Control knob (plain) (Pkg. of 5)	.30
RL-062	COIL—Ant. coil assembly	1.50
RL-265	COIL—Oscillator coil and bracket	1.30
RL-501	BEAM-A-SCOPE—Beam-a-Scope antenna (L-1)	9.25
RQ-711	RESISTOR—470 ohms, 3 W. carbon (R-16)	.25
RQ-1213	RESISTOR—12 ohm, ½ W. carbon (R-24) (Pkg. of 5)	.70
*RQ-1232	RESISTOR—82 ohm, ½ W. carbon (R-14) (Pkg. of 5)	.70
*RQ-1239	RESISTOR—150 ohm, ½ W. carbon (R-21) (Pkg. of 5)	.70
RQ-1241	RESISTOR—180 ohm, ½ W. carbon (R-22) (Pkg. of 5)	.70
*RQ-1259	RESISTOR—1000 ohm, ½ W. carbon (R-5, 8) (Pkg. of 5)	.70
*RQ-1271	RESISTOR—3300 ohm, ½ W. carbon (R-23) (Pkg. of 5)	.70
*RQ-1279	RESISTOR—6800 ohm, ½ W. carbon (R-18) (Pkg. of 5)	.70
*RQ-1287	RESISTOR—15,000 ohm, ½ W. carbon (R-3) (Pkg. of 5)	.70
*RQ-1291	RESISTOR—22,000 ohm, ½ W. carbon (R-10) (Pkg. of 5)	.70
*RQ-1299	RESISTOR—47,000 ohm, ½ W. carbon (R-2, 6) (Pkg. of 5)	.70
RQ-1305	RESISTOR—82,000 ohm, ½ W. carbon (R-11, 20) (Pkg. of 5)	.70
*RQ-1309	RESISTOR—120,000 ohm, ½ W. carbon (R-15) (Pkg. of 5)	.70
*RQ-1315	RESISTOR—220,000 ohm, ½ W. carbon (R-9, 12) (Pkg. of 5)	.70
*RQ-1331	RESISTOR—1.0 megohm, ½ W. carbon (R-13, 17, 25) (Pkg. of 5)	.70
*RQ-1335	RESISTOR—1.5 megohm, ½ W. carbon (R-4) (Pkg. of 5)	.70
*RQ-1339	RESISTOR—2.2 megohm, ½ W. carbon (R-7) (Pkg. of 5)	.70
*RR-281	RESISTOR—39,000 ohm, 2 W. carbon (R-19)	.30
RS-185	SHIELD—6A8G tube shield and base	.15
*RS-200	SOCKET—Octal base tube socket (Pkg. of 5)	.75
*RS-204	SOCKET—Rectifier tube socket (Pkg. of 5)	.75
*RS-223	SOCKET—Octal base tube socket (Pkg. of 5)	.80
RS-224	SOCKET—Tube socket (78) (Pkg. of 5)	.50
RS-237	SOCKET—Octal base tube socket (6A8G)	$0.15
RS-395	SWITCH—Tone control switch (S-2)	.55
RS-3011	SWITCH—Band change switch (S-1)	.95
RT-0711	TRANSFORMER—Power transformer (T-7) 120 V. 25-60 cy.	7.60
RT-0616	TRANSFORMER—Power transformer (T-7) 120 V. 50-60 cy.	4.60
RT-265	TRANSFORMER—3rd I.F. transformer	1.60
RT-266	TRANSFORMER—2nd I.F. transformer and shield	1.80
RT-267	TRANSFORMER—1st I.F. transformer and shield	1.90
RT-438	TRANSFORMER—Output transformer (T-3)	1.70
RV-051	VOLUME CONTROL—2 megohm volume control (R-1)	.80
*RW-101	WASHER—Felt washer for control shafts (Pkg. of 10)	.45
*RX-021	ASSEMBLY—Chassis mounting assembly	.10
RX-048	ASSEMBLY—Tuning condenser mounting assembly	.25
	SPEAKER ASSEMBLY	
RC-932	CONE—12-inch cone and V. C. assembly	1.10
*RC-901	CLAMP—Cone spider clamp	.05
RD-301	DUST CAP—Speaker cone dust cap (Pkg. of 5)	.10
RP-109	PLUG—Male speaker plug	.20
RS-073	SPEAKER—12-inch speaker	5.40
*RX-030	ASSEMBLY—Speaker mounting assembly	.10
	DIAL DRIVE MECHANISM	
*RB-152	BRACKET—Tone control indicator bracket (D)	.05
*RB-155	BRACKET—Band change bracket (E)	.05
RB-614	BUSHING—Volume control drive bushing (C)	.15
RC-1977	CLAMP—Tuning indicator tube clamp and thumbscrews	.10
RC-8048	CORD—Volume indicator cord (Pkg. of 5)	.50
RC-8049	CORD—Tone indicator cord (Pkg. of 5)	.50
RC-8050	CORD—Band change indicator cord (Pkg. of 5)	.50
RC-8051	CORD—Dial pointer drive cord (A) (B)	.20
*RD-013	DRUM—Condenser drive drum (G)	.35
RD-074	DIAL—Dial scale	2.70
RE-033	ESCUTCHEON—Dial scale escutcheon	1.65
RP-112	POINTER—Tone, band change or volume indicator pointer	.10
RP-113	POINTER—Dial scale pointer	.30
RP-303	PULLEY—Idler pulley (Pkg. of 2)	.10
RR-920	REFLECTOR—Lamp reflector assembly	.50
RS-187	SHIELD—Lamp shield (Pkg. of 10)	.05
*RS-218	SOCKET—Lamp socket assembly	.10
*RS-425	SPRING—Drive drum spring (Pkg. of 5)	.10
*RS-427	SPRING—Volume, tone or band change cord spring (Pkg. of 5)	.20
	TOUCH TUNING ASSEMBLY	
RB-613	BUTTON—Molded push button (Pkg. of 5)	.35
RC-8036	CARDS—Station letter cards (set)	.25
RC-8052	CARDS—"Manual" tab cards (strip of 10)	.05
RC-8053	CARDS—"Off" tab cards (strip of 10)	.05
RE-032	ESCUTCHEON—Push button escutcheon	.50
RS-444	SPRING—Spring for push button (Pkg. of 10)	.10
RS-3009	SWITCH—Power switch	1.00
RS-3010	SWITCH—Push button switch (less trimmers)	3.90
RT-856	TRIMMER STRIP—Osc. trimmer strip (C-29, 30, 31, 32, 33, 34, 35, 36)	1.40
RT-857	TRIMMER STRIP—Antenna section trimmer strip (C-21, 22, 23, 24, 25, 26, 27, 28)	1.40
RW-021	WINDOWS—Celluloid station windows (Pkg. of 25)	.10

* Used on previous receivers.

(Prices subject to change without notice)

Phonograph Connections

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-99 circuit for the reproduction of phonograph recordings. This method uses a two circuit jack and is connected into the receiver by opening the circuit between R-11 and the junction of R-7 and R-9; connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert it into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be properly shielded to prevent interference.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

NOTE—A suitable loading circuit consisting of a 300,000 ohm resistor should be connected across the pick-up leads when using a crystal type unit.

MODEL GM125
Power Supply and
Operating Notes

GENERAL ELECTRIC CO.

Antenna and Ground

Since this receiver operates at a relatively high radio frequency, it is very essential to construct a good antenna and ground system in order to obtain maximum results.

For distances up to within thirty miles from the transmitter, a simple horizontal di-pole as shown in Fig. 1 should give excellent results. It should be located free from all obstructions and placed as high from the earth as possible. Make sure it is run approximately at right angles to the direction of the transmitter: i.e., if the transmitter is located due west, run the horizontal doublet in a north and south direction. The horizontal flat top has an effective antenna length of 10-feet, 8-inches and consists of #12 or #14 bare copper wire (preferably stranded), cut in the middle and the two halves insulated by glass insulators. A twisted lead-in wire is then soldered to each side of the doublet as shown, and the other two ends of the transmission line are connected to the #1 and #2 terminals on the receiver chassis. The lead-in transmission line may be of any length up to 100 feet and should consist of low loss antenna lead-in wire. A good ground connection to a water pipe is connected to the terminal marked "G".

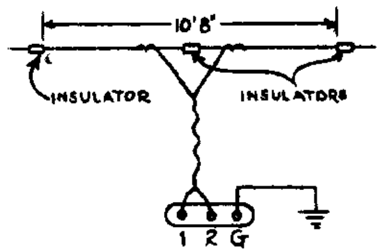


Fig. 1

Somewhat better results may be obtained by constructing the antenna shown in Fig. 2. This varies somewhat from the di-pole antenna and is more efficient due to the fact that the transmission line has very little loss.

The antenna proper consists of a 10-foot, 8-inch length of 1-inch diameter copper pipe supported at the middle by a pole located as high above ground as possible. The transmission line is made up of two #12 or #14 copper wires, spaced about 2-inches apart and transposed every two or three feet. The antenna end of the transmission line is soldered 13-1/2 inches each side of the center of the copper pipe and should form a triangle, 27 inches on all sides. As in the previous installation, the horizontal flat-top should run approximately at right angles to the direction of the transmitter.

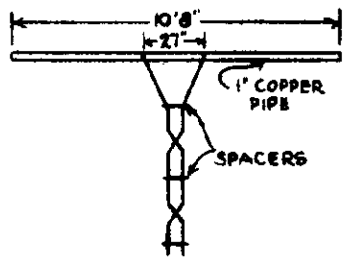


Fig. 2

For greater distances, somewhat better results may be obtained by using a reflector in conjunction with the antenna described and shown in Fig. 2. A suggested system is to use a 1-inch diameter copper pipe similar to the antenna, running parallel to the regular antenna and located farthest from the direction of the received signal. Fig. 3 shows a diagram looking from top and dimensions should be followed very carefully. By experimenting, however, with the distance between reflector and antenna, improvement in the individual installation may be noted.

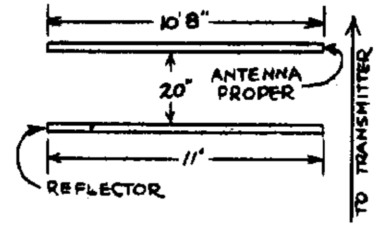


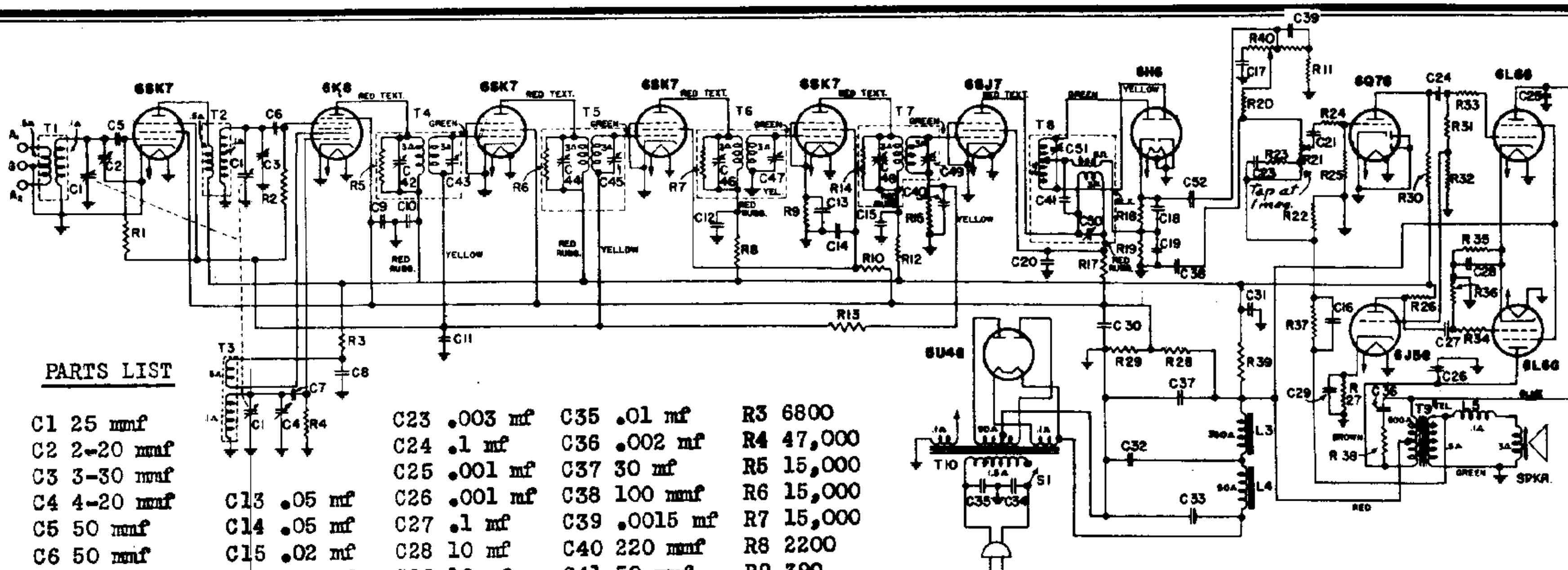
Fig. 3

Note - The reflector is a floating copper bar and there are no external connections. Connect and install the regular antenna as shown in Fig. 2.

Model	GM-125
Height	36-1/4 inches
Width	39-3/8 inches
Depth	17-1/8 inches
Tuning Control Drive Ratio	1:1
Electrical Specifications	
Volts	115-125
Frequency	50/60 Cycles
Watts Consumption	160
Tuning Frequency Range	37-44 M.C.
Intermediate Frequency	
Mid-frequency	3.0 M.C.
Band Width	300 K.C.
Electrical Power Output	
Undistorted	12.0 Watts
Maximum	15.0 Watts
Loudspeaker - Electrodynamic	
Cone - Outside Diameter	10 inches
Voice Coil Impedance (400 cycles)	3.5 Ohms
Field Resistance	450 Ohms (cold)

MODEL GM125
Schematic, Voltage

GENERAL ELECTRIC CO.



IF FREQUENCY
Mid-frequency ..... 3 MC
Band Width .... 300 KC

PARTS LIST

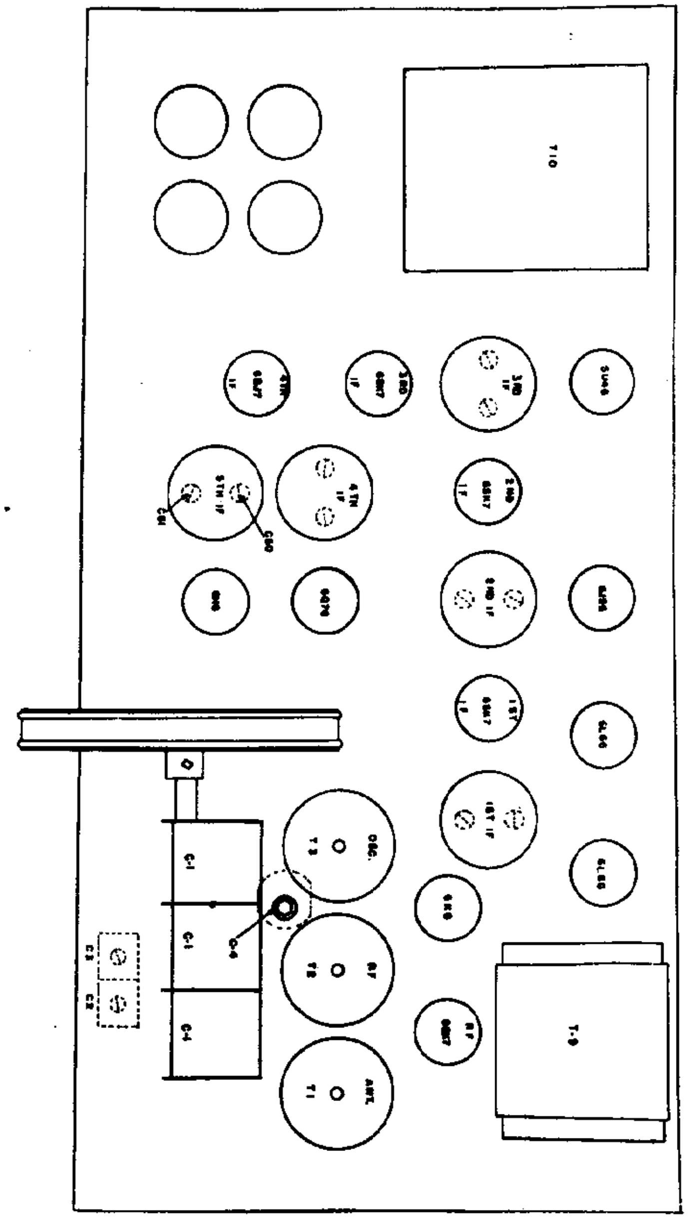
C1 25 mmf
C2 2-20 mmf
C3 3-30 mmf
C4 4-20 mmf
C5 50 mmf
C6 50 mmf
C7 50 mmf
C8 220 mmf
C9 .05 mf
C10 .05 mf
C11 .05 mf
C12 .02 mf
C13 .05 mf
C14 .05 mf
C15 .02 mf
C16 .05 mf
C17 68 mmf
C18 22 mmf
C19 22 mmf
C20 .05 mf
C21 .01 mf
C23 .003 mf
C24 .1 mf
C25 .001 mf
C26 .001 mf
C27 .1 mf
C28 10 mf
C29 10 mf
C30 8 mf
C31 8 mf
C32 30 mf
C33 30 mf
C34 .01 mf
C35 .01 mf
C36 .002 mf
C37 30 mf
C38 100 mmf
C39 .0015 mf
C40 220 mmf
C41 50 mmf
C42 to C51
14-50 mmf
C52 .02 mf
R1 470,000
R2 470,000
R3 6800
R4 47,000
R5 15,000
R6 15,000
R7 15,000
R8 2200
R9 390
R10 2200
R11 270,000
R12 2200
R13 2.2 meg.
R14 15,000
R15 330,000
R17 2200
R18 100,000
R19 100,000
R20 470,000
R21 2 meg.
R22 15
R23 180,000
R24 47,000
R25 15 meg.
R26 68,000
R27 1500
R28 5600
R29 5600
R30 220,000
R31 120,000
R32 8200
R33 1000
R34 1000
R35 180
R36 120,000
R37 47
R38 10,000
R39 2000
R40 2 meg.

Tube	Application	Plate to Gnd Volts	Screen to Gnd Volts	Cathode to Gnd Volts	Cathode Cur.MA	Filament Volts
6SK7	RF	240	90	0	7.5	6.4
6K8	Conv.	238	90	0	8.0	6.4
	Osc.	188				
6SK7	1st IF	238	90	0	8.1	6.4
6SK7	2nd IF	230	83	0	6.1	6.4
6SK7	3rd IF	225	83	2.9	6.1	6.4
6SJ7	4th IF	65	65	0	7.2	6.4
6Q7G	1st Audio	65	--	0	---	6.4
6J5G	Inverter	48	--	1.7	2.0	6.4
(2) 6L6G	Output	267	285	21	112	6.4
5U4G	Rectifier	350/350 V. A.C. RMS	---	---	180	50

Line Voltage - 120   No signal input.   Pilot Light-Mazda 44

MODEL GM125
Socket, Trimmers
Alignment

GENERAL ELECTRIC CO.



TUBE AND TRIMMER LOCATION

CIRCUIT ALIGNMENT

IF Amplifier

Due to the good stability of components and the wide band characteristics of this amplifier, alignment should be unnecessary under normal operating conditions. Should it become imperative that an IF alignment is desirable, it will be necessary to use a cathode ray oscilloscope in conjunction with a 3.0 megacycle signal generator with a superimposed ±300 K.C. sweep frequency. This generator may be built up by constructing an oscillator with the tank condenser semi-fixed and variable, the variable portion being designed to be rotated by a motor and of proper capacity to give ±300 K.C. variation of the 3.0 megacycle mid-frequency. Connect the vertical plates of the oscilloscope across the resistor R-15 of the 4th IF stage and align transformers T-7, T-6, T-5 and T-4 in a progressive step by step method.

Frequency Demodulator

With the same oscillator and sweep signal as used above, connect the vertical oscilloscope plates across the resistors, R-18 and R-19, then align the transformer T-8 for a cross-over curve as shown in Fig. 4. Proper alignment of trimmer C-51 is indicated when the curve crosses about mid-way in a vertical plane. Proper alignment of C-50 is indicated when the sides of the curve near cross-over are nearest to a straight line.

Note - Keep signal input high enough so that noise limiter is functioning. This point is indicated when an increase in signal input no longer changes the size of the curve.

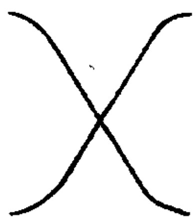


Fig. 4

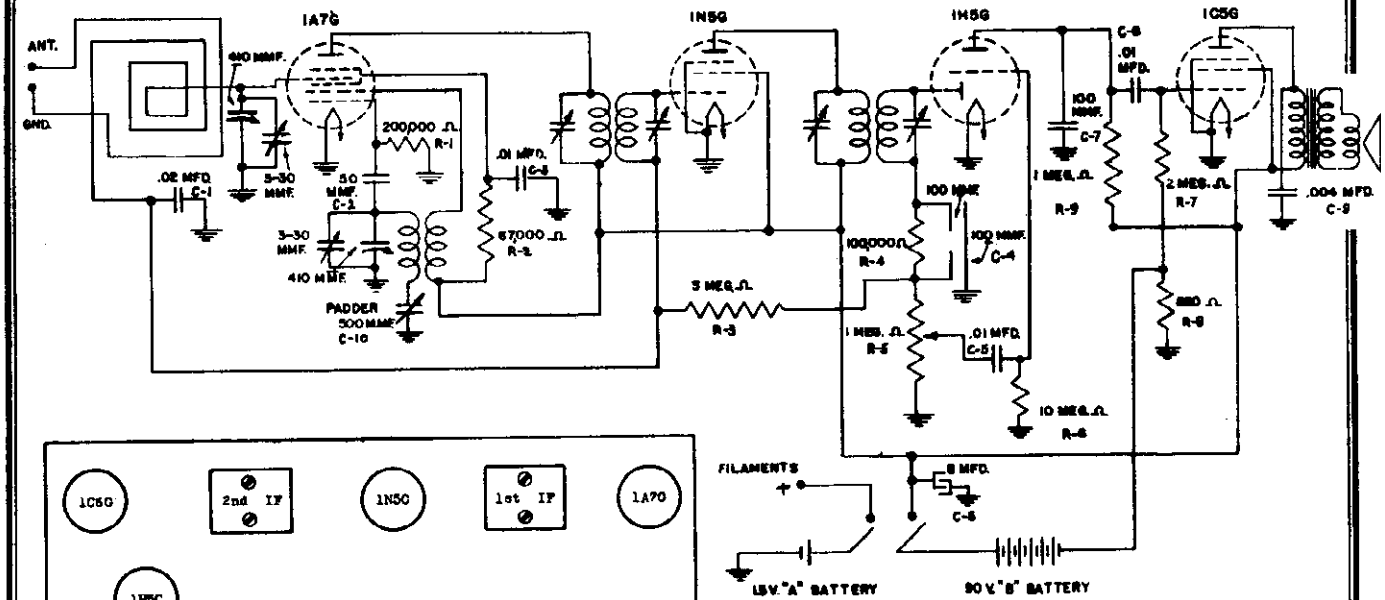
RF Alignment

Make sure the last division on the low frequency end of the drum dial coincides with the escutcheon mark when the gang condenser is completely closed; then, proceed as follows:

1. Connect a high resistance 0-10 V D.C. voltmeter across R-15.
2. Apply a 42.8 megacycle unmodulated signal to the antenna terminal board.
3. Set dial scale so it is tuned to 42.8 megacycle and peak oscillator trimmer C-4 for maximum voltage reading on the meter.
4. Peak the antenna (C-2) and RF (C-3) trimmers for maximum voltage output on meter.

Note - The proper location of the trimmers is shown on a following page.

GENERAL ELECTRIC CO. MODEL GD400 Schematic, Socket, Trimmers Alignment



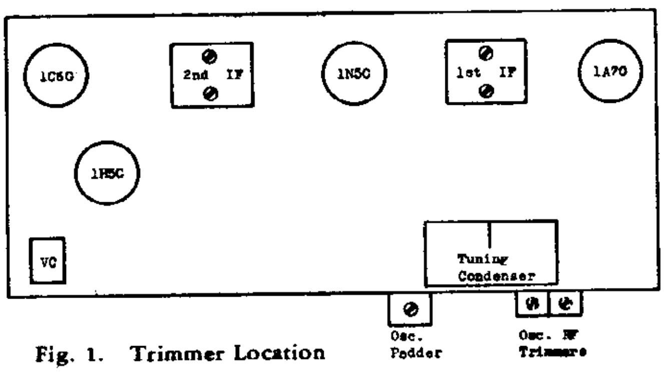


Fig. 1. Trimmer Location

MODEL GB-400 BATTERY-OPERATED

SERVICE DATA

Physical Specifications

Model	GB-400
Height	9⅛ inches
Width	13 inches
Depth	8¼ inches

Tuning Control Drive Ratio 1:1

Batteries Required

1 1½-volt "A" battery (Eveready No. 741 or equivalent).

2—45-volt "B" batteries (Eveready No. 762 or equivalent).

Tuning Frequency Range .... 540–1600 kc.

Alignment Frequency

IF	455 kc.
RF	600 and 1500 kc.

Loud-speaker—Permanent Magnet

Over-all diameter	5 inch
Cone Coil Impedance (400 cycles)	3.0 ohms

Tubes

Converter and Oscillator	GE-1A7G
IF Amplifier	GE-1N5G
Detector and 1st Audio	GE-1H5G
Power Amplifier	GE-1C5G

GENERAL INFORMATION

The Model GB-400 is a compact and portable battery-operated receiver that employs four tubes in a superheterodyne circuit. Features of design include self-contained "A" and "B" battery supply, an efficient loop antenna built inside of the cabinet, and an efficient P.M. speaker.

ALIGNMENT PROCEDURE

Alignment Frequencies

IF—455 kc. Broadcast—1500 kc. and 600 kc.

NOTE—Do not rest the chassis on any of its sides when attempting to align; place in either an inverted or upright position.

IF Alignment

To align the IF, it will be necessary to remove the chassis from the cabinet. Connect an output meter across the voice coil. Set the volume control for maximum.

Adjust the test oscillator to 455 kc. and apply the signal to the control grid of the 1A7G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 1A7G tube. Keep the test oscillator output as low as possible to give a readable output. Adjust all four IF trimmers for maximum output.

RF Alignment

The following alignment should be made with the receiver fastened in the case. Turn the receiver to its inverted position and make trimmer and padder alignments through the holes provided in the bottom of the case.

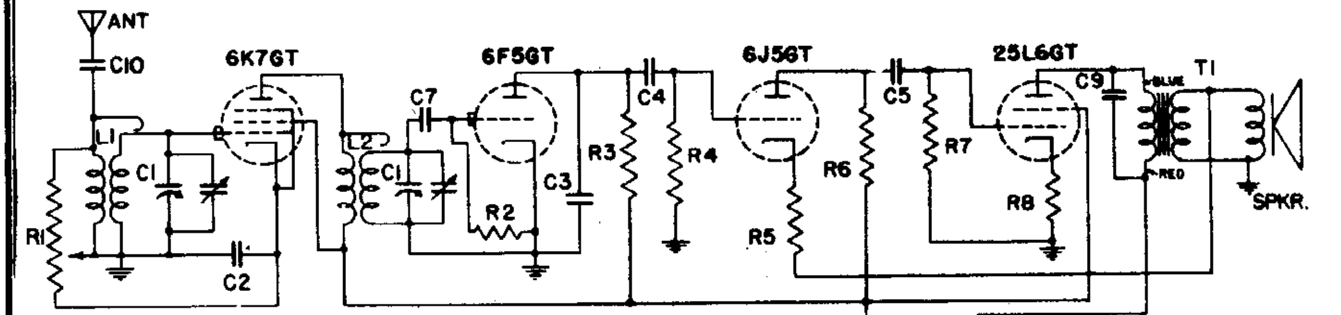
Connect the ground lead of the signal generator to the receiver chassis and the other lead to the receiver antenna terminal (located underneath cabinet). A dummy antenna consisting of a 250 mmf. capacitor in series with 200 ohms should be connected in the antenna lead of the signal generator. Apply a 600 kc. modulated signal and adjust the oscillator padder for a maximum output while rocking the gang condenser in vicinity of 600 kc. mark on the dial.

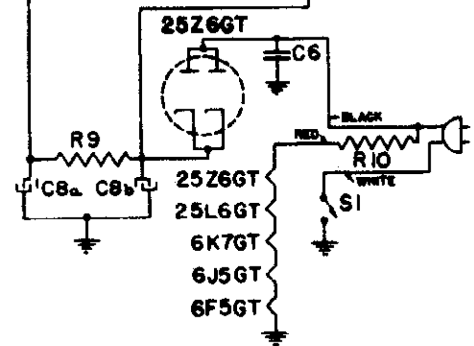
Using the same dummy antenna with a 1500 kc. signal generator input, adjust the oscillator trimmer for a maximum output. Now remove signal generator leads, tune in a station at approximately the 1500 kc. point on dial and then peak the RF trimmer for a maximum signal.

MODEL GD 500 Schematic, Socket, Trimmers

GENERAL ELECTRIC CO.

Voltage, Alignment





Symbol	Description
C-1	Tuning Condenser
C-2	.05 mfd., Paper Capacitor
C-3	.001 mfd., Paper Capacitor
C-4, -5	.005 mfd., Paper Capacitor
C-6, -7	.01 mfd., Paper Capacitor
C-8a	15 mfd., Dry Electrolytic
C-8b	30 mfd., Dry Electrolytic
C-9	.02 mfd., Paper Capacitor
C-10	.002 mfd., Paper Capacitor
R-1	30,000 ohm, Volume Control
R-2	15 megohm, Carbon Resistor
R-3, -4	470,000 ohm, Carbon Resistor
R-5	3,300 ohm, Carbon Resistor
R-6	100,000 ohm, Carbon Resistor
R-7	470,000 ohm, Carbon Resistor
R-8	150 ohm, Carbon Resistor
R-9	4,700 ohm, Carbon Resistor
R-10	162 ohm, Power Cord Resistor
L-1	Antenna Coil
L-2	RF Coil
T-1	Output Transformer

Tubes

RF Amplifier.....GE-6K7GT
Detector..........GE-6F5GT
1st Audio.........GE-6J5GT
Power Output.....GE-25L6GT
Rectifier..........GE-25Z6GT

MODEL GD-500
TRF RECEIVER

VOLTAGE CHART

Tube No.	6K7GT	6J5GT	6F5GT	25L6GT	25Z6GT
Plate to −B Volts	88	30 *	35 *	132	120 AC
Screen to −B Volts	88	...	....	88	....
Cathode to −B Volts	0	1.3	0	5.5	140
Filament Volts	6.4	6.3	6.2	25.0	25.0

Voltage measured when volume control is set to maximum. Line Voltage—120 AC. No signal input.
* Measured on 500-volt scale.
On DC. voltages should read approximately 10% lower.

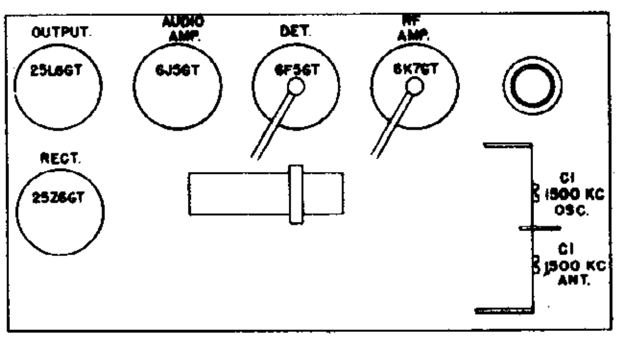


Fig. 1. Trimmer Location

Electrical Specifications

Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
110–120 AC or DC	25–60	45

Tuning Frequency Range

Band "B"..........................540–1750 KC
Alignment Frequency...............1500 KC

Electrical Power Output

Undistorted..........................1.4 watts
Maximum.............................2.0 watts

Loudspeaker—Permanent Magnet

Outside Cone Diameter...............4½ inches
Voice Coil Impedance (400 cycles).....3.5 ohms

GENERAL INFORMATION

Model GD-500 is a compact five-tube AC-DC tuned radio frequency receiver that tunes the broadcast band of frequencies. One side of the power line is connected directly to the chassis ground, therefore, caution should be exercised in servicing.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If any hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

ALIGNMENT

Connect the high side of the signal generator through a 250 mmf. condenser to the antenna lead. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the tuning mark should be over the last mark on the dial.
2. Tune receiver to the 1500 KC point on the dial; then align trimmers on the gang condenser at 1500 KC for a maximum output meter reading.

Precaution—One side of the power supply is connected to the chassis. Do not connect chassis to any external ground.

MODELS GD520, GD521
Schematic, Socket, Trimmers
Voltage, Alignment

GENERAL ELECTRIC CO.

Tuning Frequency Range

Band "B" .... 535 to 1730 kc

Electrical Power Output

Undistorted .... 1.1 watts
Maximum .... 2.0 watts

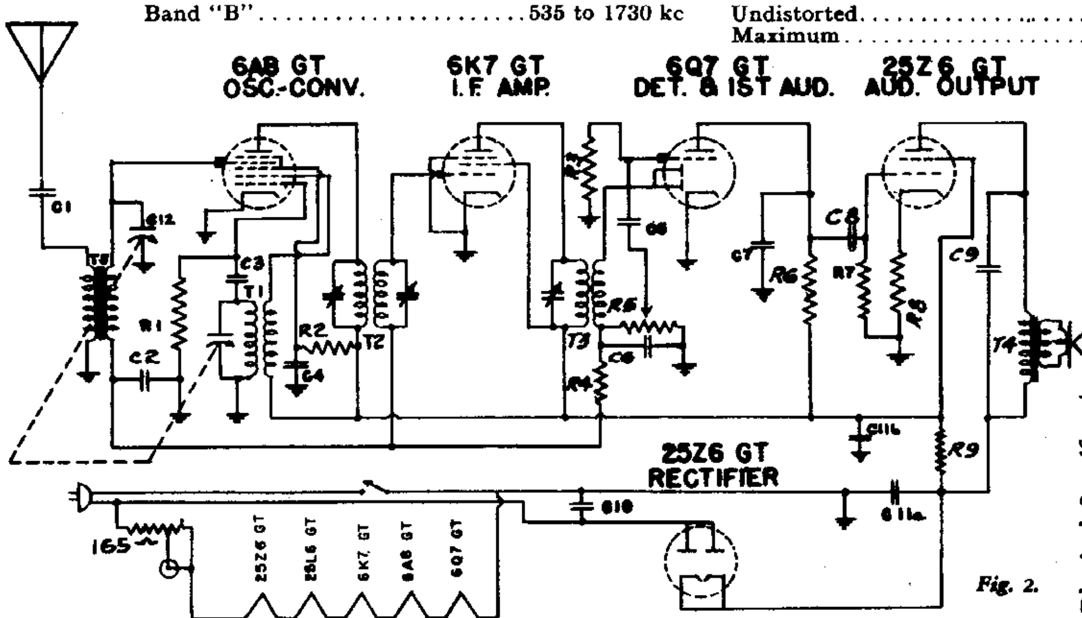


Fig. 2.

Physical Specifications

Height .... 5 [illegible]/16 inches
Width .... 7 5/8 inches
Depth .... 4 1/16 inches

Tuning Control Drive Ratio .... 3 to 1

Loud-speaker—Permanent Magnet

Outside Cone Diameter .... 3 7/16 inches
Voice Coil Impedance (400 cycles) .. 3.0 ohms

Symbol	Description	Symbol	Description	Symbol	Description
C1	.005 mfd. paper capacitor	C10	.05 mfd. paper capacitor	R6	250,000 ohm, carbon resistor
C2	.02 mfd. paper capacitor	C11a	25 mfd. dry electrolytic	R7	500,000 ohm, carbon resistor
C3	50 mmf. mica capacitor	C11b	20 mfd. dry electrolytic	R8	180 ohm, carbon resistor
C4	.01 mfd. paper capacitor	C12	Tuning condenser	R9	2000 ohm, carbon resistor
C5	.01 mfd. paper capacitor	R1	50,000 ohm, carbon resistor	T1	Oscillator transformer
C6	250 mmf. mica capacitor	R2	40,000 ohm, carbon resistor	T2	1st I.F. transformer
C7	250 mmf. mica capacitor	R3	5 megohm, carbon resistor	T3	2nd I.F. transformer
C8	.01 mfd. paper capacitor	R4	2 megohm, carbon resistor	T4	Output transformer
C9	.03 mfd. paper capacitor	R5	500,000 ohm, volume control	T5	Antenna transformer

Power Supply	Frequency	Power Consumption
105–125 Volts AC or DC	60 Cycles	45 Watts

MODELS GD-520 AND GD-521

GENERAL INFORMATION

Models GD-520 and GD-521 are compact five-tube AC-DC superheterodyne receivers, employing five General Electric Pre-tested Tubes. One side of the power line is connected directly to the chassis ground in either receiver; therefore, caution should be exercised in servicing.

When operating from a D-c source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If any hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

Alignment Frequencies

I.F.—456 kc. .... Broadcast—1500 kc

The location of all trimmers is shown in **Fig. 1.**

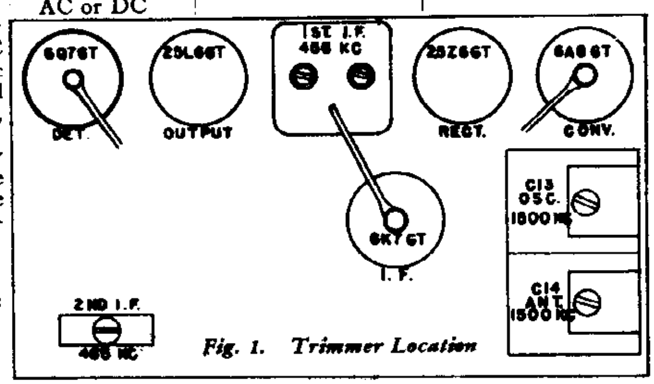


Fig. 1. Trimmer Location

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 456 kc and apply signals to the control grid of the 6A8GT tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8GT. Keep the test oscillator output as low as possible to give a readable output. Adjust all three I.F. trimmers for maximum output.

R.F. Alignment

Set test oscillator to 1500 kc and connect one output lead to the receiver chassis† and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust the oscillator trimmer (C-13) and the antenna trimmer (C-14) for a maximum output.

†**Precaution.** One side of the power supply is connected to the chassis. Do not connect chassis to any external ground. If signal generator is A-c operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

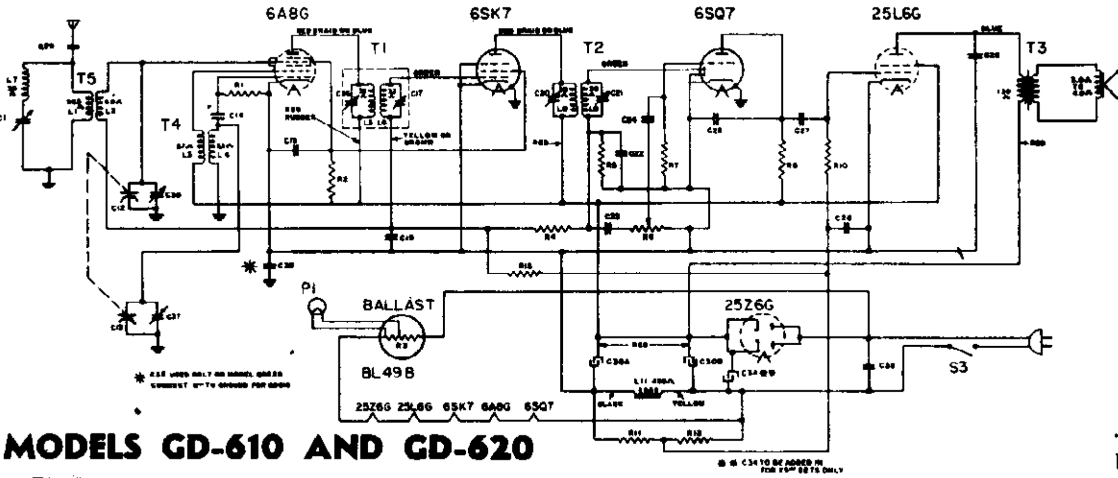
VOLTAGE CHART

Tube No.	6A8GT	6K7GT	6Q7GT	25L6GT	25Z6GT
Plate to −B Volts	92	92	32*	125	120 AC
Screen to −B Volts	37	92	....	92	....
Cathode to −B Volts	0	0	0	5.9	133
Filament Volts	6.4	6.3	6.2	25.0	25.0

Voltage measured when volume control is set to minimum.
Line Voltage—120 AC. No signal input.
* Measured on 500-volt scale.
On DC, voltages should read approximately 10% lower.

MODELS GD610, GD620
Schematic, Socket, Trimmers
Voltage, Alignment

GENERAL ELECTRIC CO.



MODELS GD-610 AND GD-620

Tubes

Converter and Oscillator GE-6A8G
I.F. Amplifier GE-6SK7
Detector and A.V.C. GE-6SQ7
Power Output GE-25L6G
Rectifier GE-25Z6G
Pilot Lamp .... Mazda No. 44
Ballast BL-49B

Symbol	Description	Symbol	Description	Symbol	Description
C1	Wave trap trimmer	C29	.001 mfd., paper capacitor	R7	15 megohm, carbon resistor
C12, 13	Tuning condenser	C30a	10 mfd., dry electrolytic	R8	220,000 ohm, carbon resistor
C14	47 mmf., mica capacitor	C30b	30 mfd., dry electrolytic	R10	470,000 ohm, carbon resistor
C15	.25 mfd., paper capacitor	C32	.02 mfd., paper capacitor	R11	270,000 ohm, carbon resistor
C19	.05 mfd., paper capacitor	**C34	35 mfd., dry electrolytic	R12	680,000 ohm, carbon resistor
C22	470 mmf., mica capacitor	*C35	.2 mfd., paper capacitor	R13	15 megohm, carbon resistor
C23	.002 mfd., paper capacitor	R1	47,000 ohm, carbon resistor	T1	1st I.F. transformer
C24	.002 mfd., paper capacitor	R2	10,000 ohm, carbon resistor	T2	2nd I.F. transformer
C25	330 mmf., mica capacitor	R3	Ballast resistance, BL49B	T3	Output transformer
C26	.15 mfd., paper capacitor	R4	2.2 megohm, carbon resistor	T4	Oscillator transformer
C27	.005 mfd., paper capacitor	R5	470,000 ohm, carbon resistor	T5	Antenna transformer
C28	.03 mfd., paper capacitor	R6	2.0 megohm, volume control		

SERVICE DATA

Specifications

Model	GD-610	GD-620
Height	8¼ inches	8¼ inches
Width	12⅜ inches	12⅜ inches
Depth	5¾ inches	5¾ inches

Tuning Control Drive Ratio 1:1

VOLTAGE CHART

Tube No.	6A8G	6SK7	6SQ7	25L6G	25Z6G
Plate to —B volts	112	112	50*	102	....
Screen to —B volts	75	75	..	112	..
Cathode to —B volts	0	0	0	0	134
Filament Volts	6.4	6.4	6.4	24.5	24.5

Line Voltage—120 V. AC. Volume control at maximum.
* Measured on 250 volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 K.C. and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

Wave Trap Alignment

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

R.F. Alignment

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-37) and antenna trimmer (C-36) for a maximum output.

Precaution—On the Model GD-610 one side of the power supply is connected to the chassis. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
100-125 Volts AC or DC	40-60	50

Tuning Frequency Range .... 540-1750 K.C.

Intermediate Frequency .... 455 K.C.

Electrical Power Output (120-line Volts)

	A-C	D-C
Undistorted	1.0	0.9
Maximum	1.8	1.5

Loud-speaker—Electrodynamic

Outside Cone Diameter .... 5 inches
Voice Coil Impedance (400 cycles) .... 4.0 ohms
Field Coil Resistance .... 420 ohms

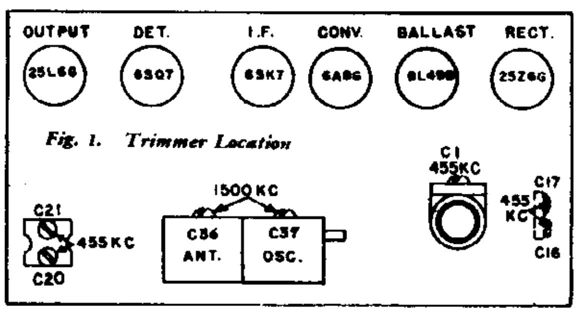


Fig. 1. Trimmer Location

Production Change

On a number of receivers, substitute electrolytic capacitor RC-5113 is used for C30b with both sections tied in parallel and RC5114 is used for C30a.

GENERAL INFORMATION

The models GD-610 and GD-620 are compact six tube AC-DC superheterodyne receivers employing five General Electric tubes plus a ballast tube, described above in a superheterodyne circuit. Features of design include I.F. wave trap, automatic volume control, and an efficient electrodynamic speaker. Model GD-620 is fully approved by Underwriters Laboratories.

MODEL GD600
MODEL GD630
Schematics

GENERAL ELECTRIC CO.

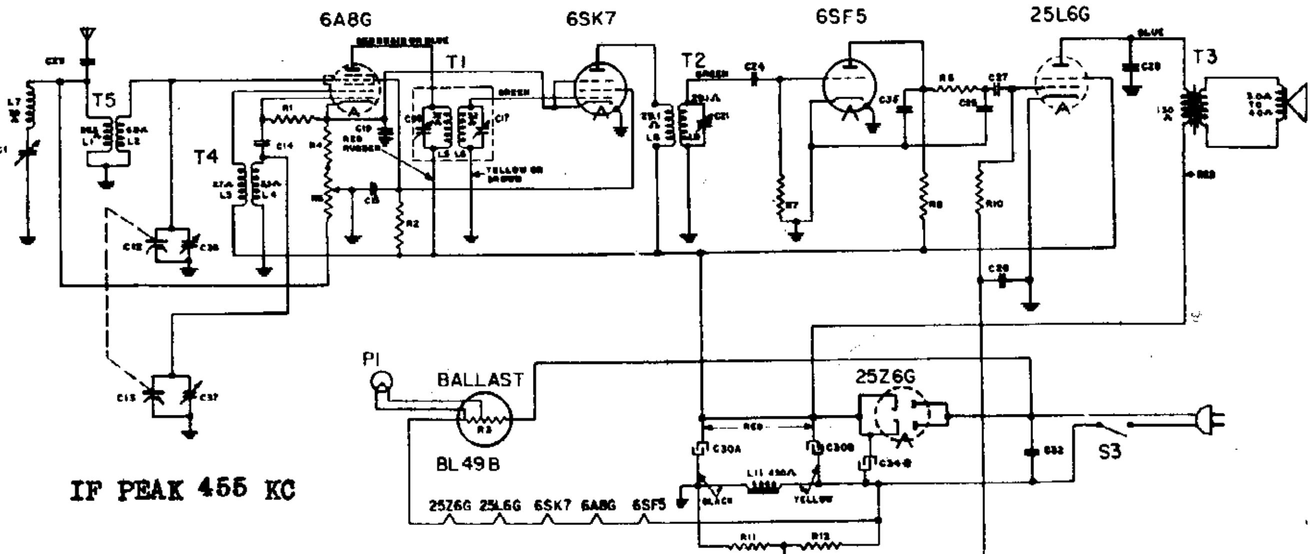


Fig. 2. Schematic diagram, Model GD-600

Symbol	Description
C1	Wave trap trimmer
C12, 13	Tuning condenser
C14	47 mmf., mica capacitor
C15	.25 mfd., paper capacitor
C19	.05 mfd., paper capacitor
C24	.002 mfd., paper capacitor
C25	330 mmf., mica capacitor
C26	.15 mfd., paper capacitor
C27	.005 mfd., paper capacitor
C28	.03 mfd., paper capacitor
C29	.001 mfd., paper capacitor
C30a	10 mfd., dry electrolytic
C30b	30 mfd., dry electrolytic
C32	.02 mfd., line capacitor
C34	35 mfd., dry electrolytic (for 25 v sets only)
C35	150 mmf., mica capacitor
R1	47,000 ohm carbon resistor
R2	10,000 ohm carbon resistor
R3	Ballast resistor
R4	330 ohm carbon resistor
R5	10,000 ohm carbon resistor
R6	10,000 ohm volume control
R7	15 megohm carbon resistor
R8, 10	470,000 ohm carbon resistor
R11	270,000 ohm carbon resistor
R12	680,000 ohm carbon resistor
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
T4	Oscillator transformer
T5	Antenna transformer

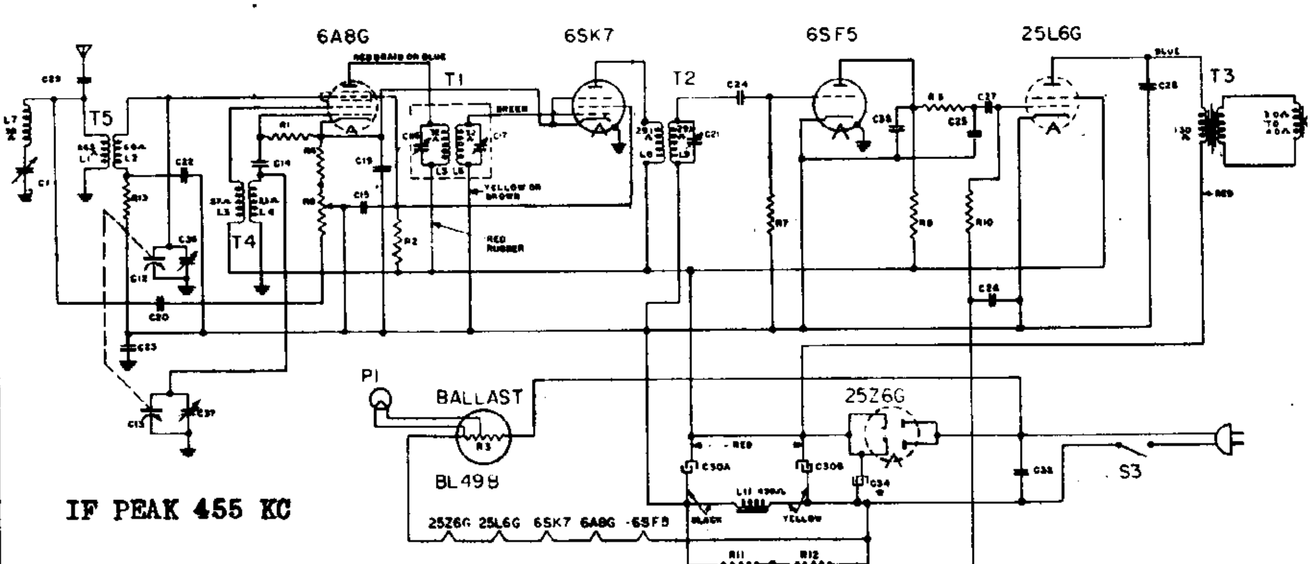


Fig. 3. Schematic diagram, Model GD-630

Symbol	Description
C1	Wave trap trimmer
C12, 13	Tuning condenser
C14	47 mmf., mica capacitor
C15	.25 mfd., paper capacitor
C19	.05 mfd., paper capacitor
C20	.05 mfd., paper capacitor
C22	.05 mfd., paper capacitor
C23	.20 mfd., paper capacitor
C24	.002 mfd., paper capacitor
C25	330 mmf., mica capacitor
C26	.15 mfd. paper capacitor
C27	.005 mfd., paper capacitor
C28	.03 mfd., paper capacitor
C29	.001 mfd., paper capacitor
C30a	10 mfd., dry electrolytic
C30b	30 mfd., dry electrolytic
C32	.02 mfd., line capacitor
C34	35 mfd. dry electrolytic (used on 25-cycle sets only)
C35	150 mmf., mica capacitor
R1	47,000 ohm carbon resistor
R2	10,000 ohm carbon resistor
R3	Ballast resistor
R4	330 ohm carbon resistor
R5	10,000 ohm carbon resistor
R6	10,000 ohm volume control
R7	15 megohm carbon resistor
R8, 10	470,000 ohm carbon resistor
R11	270,000 ohm carbon resistor
R12	680,000 ohm carbon resistor
R13	470,000 ohm carbon resistor
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
T4	Oscillator transformer
T5	Antenna transformer

MODEL GD600
MODEL GD630
Socket, Trimmers
Voltage, Alignment

GENERAL ELECTRIC CO.

MODELS GD-600 AND GD-630

SERVICE DATA

Specifications

Model	GD-600	GD-630
Height	8¼ inches	8¼ inches
Width	12⅞ inches	12⅞ inches
Depth	5¾ inches	5¾ inches

Tuning Control Drive Ratio 1:1

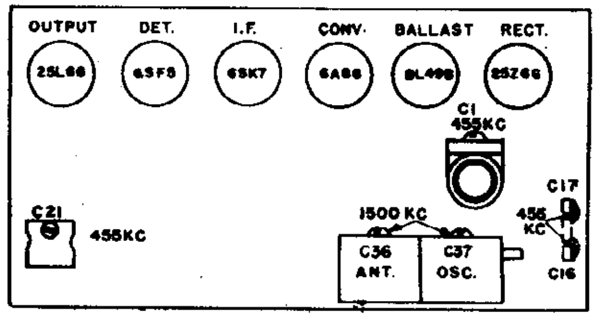


Fig. 1. Trimmer Location

Electrical Specifications

Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption (Watts)
100–125 Volts AC or DC	40–60	50

VOLTAGE CHART

Tube No.	6A8G	6SK7	6SF5	25L6G	25Z6G
Plate to −B volts	112	112	35*	102	..
Screen to −B volts	75	75	..	112	..
Cathode to −B volts	3.4	3.4	0	0	134
Filament volts	6.4	6.4	6.4	24	24

Line Voltage—120 V. AC. No signal input—Vol. control at max.
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

Tuning Frequency Range..........540–1750 kc.

Intermediate Frequency...........455 kc.

Electrical Power Output (120-line Volts)

	AC	DC
Undistorted	1.0	0.9
Maximum	1.8	1.5

Loud-speaker—Electrodynamic

Outside Cone Diameter.........5 inches
Voice Coil Impedance (400 cycles)..................4.0 ohms
Field Coil Resistance...........420 ohms

Tubes

Converter and Oscillator	GE-6A8G
I.F. Amplifier	GE-6SK7
Detector	GE-6SF5
Power Output	GE-25L6G
Rectifier	GE-25Z6G
Pilot Lamp	Mazda No. 44
Ballast	BL49-B

Production Change

On a number of receivers, substitute electrolytic RC-5113 is used for C30b with both sections tied in parallel and RC-5114 is used for C30a.

GENERAL INFORMATION

The models GD-600 and GD-630 are compact six-tube AC-DC superheterodyne receivers employing five General Electric tubes plus a ballast tube, as described above in a superheterodyne circuit. Features of design include I.F. wave trap, automatic overload control and an efficient electrodynamic speaker. Model GD-630 is fully approved by Underwriters' Laboratories.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 K.C. and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust all I.F. trimmers for maximum output.

Wave Trap Alignment

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

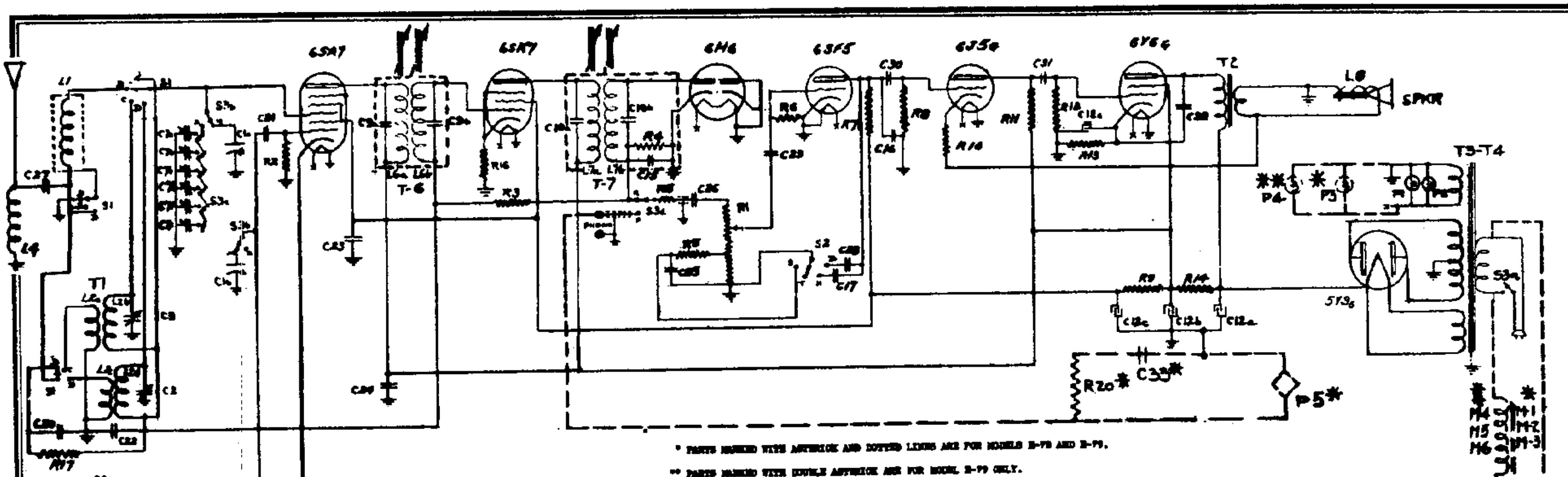
R. F. Alignment

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-37) and antenna trimmer (C-36) for a maximum output.

Precaution—On the Model GD-600, one side of the power supply is connected to the chassis. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

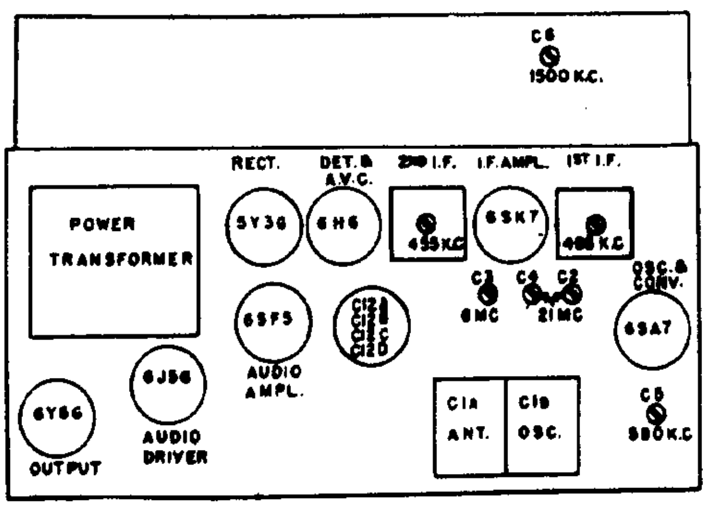
GENERAL ELECTRIC CO.

MODELS H73, H77, H79
Preliminary
Schematic, Socket
Alignment, Trimmers



* PARTS MARKED WITH ASTERISK AND DOTTED LINES ARE FOR MODELS H-77 AND H-79.

** PARTS MARKED WITH DOUBLE ASTERISK ARE FOR MODEL H-79 ONLY.



Symbol	Description
C-1	Tuning Condenser
C-2	"D" band antenna trimmer
C-3	"C" band antenna trimmer
C-4	"D" band oscillator trimmer
C-5	"B" band oscillator padder
C-6	"B" band oscillator trimmer
C-7	Station selector trimmers
C-8	750 mmf. silvered mica capacitor
C-9	Adjusted silvered mica capacitor
C-10	Adjusted silvered mica capacitor
C-12a	40 mfd. 300 V. dry electrolytic
C-12b	20 mfd. 300 V. dry electrolytic
C-12c	20 mfd. 300 V. dry electrolytic
C-12d	20 mfd. 25 V. dry electrolytic
C-13	2000 mmf. mica capacitor
C-14	5600 mmf. mica capacitor
C-15	100 mmf. mica capacitor
C-16	100 mmf. mica capacitor
C-17	680 mmf. mica capacitor
C-19	22 mmf. mica capacitor
C-20	4700 mmf. mica capacitor
C-21	50 mmf. mica capacitor
C-22	.05 mfd. 600 V. paper capacitor
C-23	.05 mfd. 600 V. paper capacitor
C-24	.05 mfd. 600 V. paper capacitor
C-25	.0072 mfd. 600 V. paper capacitor
C-26	.006 mfd. 600 V. paper capacitor
C-27	0.1 mfd. 200 V. paper capacitor
C-28	.006 mfd. 600 V. paper capacitor
C-29	.01 mfd. 600 V. paper capacitor
C-30	.005 mfd. 600 V. paper capacitor
C-31	.02 mfd. 600 V. paper capacitor
C-32	.01 mfd. 600 V. paper capacitor
C-33	.01 mfd. 600 V. paper capacitor
L-1	Beam-a-scope
L-2	antenna coil
L-3	oscillator coil
L-4	antenna choke
L-6	station selector inductances
M-1	Phono motor, 60 cycles
M-2	Phono Motor, 50 cycles
M-3	Phono motor, 25 cycles
M-4	Phono motor, 60 cycles
M-5	Phono motor, 50 cycles
M-6	Phono motor, 25 cycles
P-1	Pilot Lamp, Mazda No.44
P-2	Pilot Lamp, Mazda No.44
P-3	Pilot Lamp, Mazda No.44
P-4	Pilot Lamp, Mazda No.44
P-5	Crystal Pick-up.
R-1	Volume Control
R-2	22,000 ohms 1/2 W. carbon
R-3	2.2 megohms 1/2 W. carbon
R-4	470,000 ohms 1/2 W. carbon
R-5	56,000 ohms 1/2 W. carbon
R-6	15 megohms 1/4 W. carbon
R-7	820,000 ohms 1/2 W. carbon
R-8	1.0 megohm 1/2 W. carbon
R-9	3,900 ohms 1/2 W. carbon
R-10	3,300 ohms 1/2 W. carbon
R-11	100,000 ohms 1/2 W. carbon
R-12	820,000 ohms 1/2 W. carbon
R-13	220 ohms 2 W. carbon
R-14	3,300 ohms 2 W. carbon
R-15	47,000 ohms 1/2 W. carbon
R-16	470 ohms 1/2 W. carbon
R-17	47,000 1/2 W. carbon
R-18	150 ohms 1/2 W. carbon
R-19	68 ohms 1/2 W. carbon
R-20	100,000 ohms 1/2 W. carbon
S-1	Band switch
S-2	Tone switch
S-3a	Power switch
S-3b	Manual switch
S-3c	Station selector switch
S-3d	Phonograph switch
T-2	Output Transformer
T-3	Power Transformer, 60 cycles
T-4	Power Transformer, 25 cycles
T-6	1st I.F. Transformer
T-7	2nd I.F. Transformer

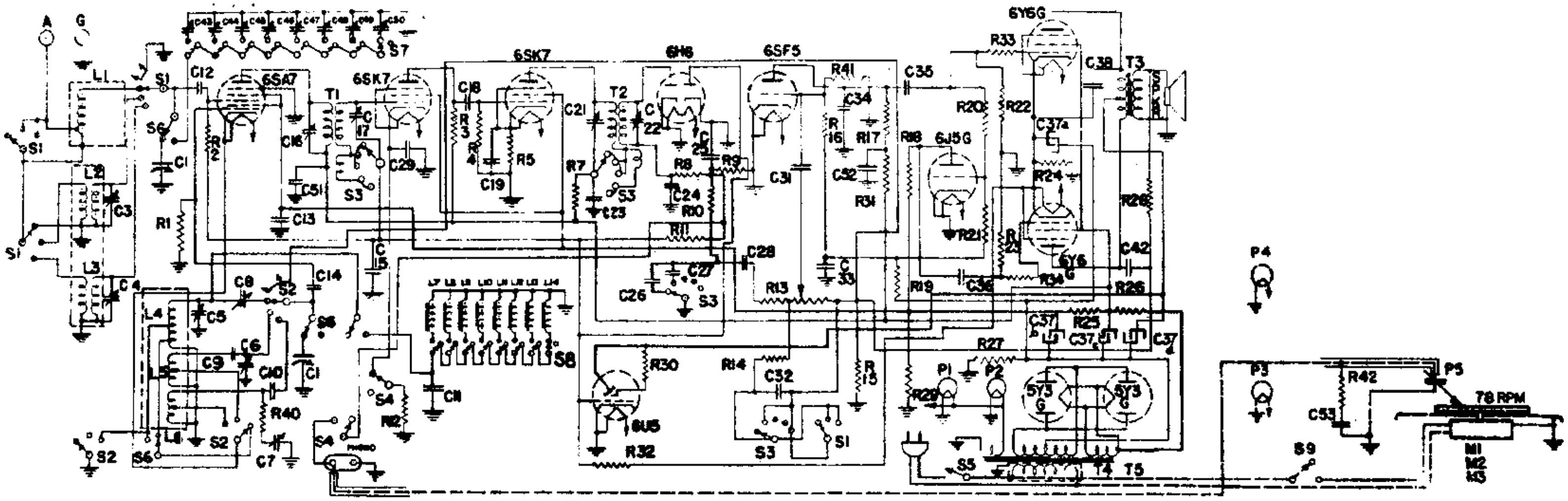
ALIGNMENT

Set dial pointer to first line at left end of scale with gang condenser plates completely closed.

1. Turn band switch to "B" band and, using non-metallic screwdriver, align I.F. at 455 K.C. by visual or output meter method. I.F. transformers are double, permeability tuned with adjusting shafts at top and bottom of shield cans.
2. On "B" band, set dial pointer to 580 K.C. mark and tune in 580 K.C. signal with (C5). Then peak (C6) on 1500 K.C. while rocking gang condenser. Re-peak (C5) on 580 K.C. and end by re-peaking (C6) on 1500 K.C.
3. On "C" band, tune gang condenser to 6MC signal and peak with (C3) for maximum output.
4. On "D" band, align (C4) at 21 MC. Peak (C2) for maximum output by rocking gang condenser. The image of the 21 MC signal should be heard at approximately 20 MC.

MODELS H116,H118
Preliminary
Schematic,Socket
Alignment,Trimmers

GENERAL ELECTRIC CO.



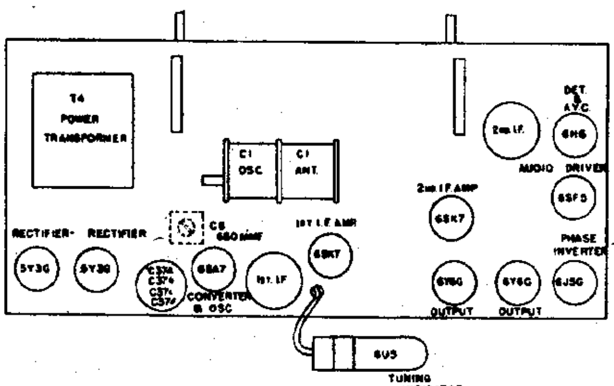
Symbol	Description
C-1	Tuning Capacitor
C-3	"C" Band Antenna Trimmer
C-4	"D" Band Antenna Trimmer
C-5	"B" Band Oscillator Trimmer
C-6	"C" Band Oscillator Trimmer
C-7	"D" Band Oscillator Trimmer
C-8	"B" Band Padder
C-9	1600 mmf. mica Capacitor
C-10	4300 mmf. Mica Capacitor
C-11	750 mmf. Silvered Mica Capacitor
C-12	150 mmf. Mica Capacitor
C-13	0.1 mfd. 400 V. Paper Capacitor
C-14	47 mmf. mica Capacitor
C-15	0.1 mfd. 200 V. Paper capacitor
C-16	47 mmf. mica Capacitor
C-19	.05 mfd. 200 V. Paper Capacitor
C-23	.05 mfd. 400 V. Paper Capacitor
C-24	100 mmf. Mica Capacitor
C-25	47 mmf. Mica Capacitor
C-26	.001 mfd. 600 V. Paper Capacitor
C-27	470 mmf. Mica Capacitor
C-28	.01 mfd. 600 V. Paper Capacitor
C-29	.05 mfd. 200 V. Paper Capacitor
C-31	.01 mfd. 600 V. Paper Capacitor
C-32	.005 mfd. 400 V. Paper Capacitor
C-33	0.1 mfd. 200 V. Paper Capacitor
C-34	47 mmf. Mica Capacitor
C-35	.05 mfd. 600 V. Paper Capacitor
C-36	.05 mfd. 600 V. Paper Capacitor
C-37a	20 mfd. 25 V. Dry Electrolytic
C-37b	20 mfd. 300 V. Dry Electrolytic
C-37c	20 mfd. 300 V. Dry Electrolytic
C-37d	40 mfd. 350 V. Dry Electrolytic
C-38	.02 mfd. 1600 V. Paper Capacitor
C-42	.01 mfd. 1000 V. Paper Capacitor
C-51	0.1 mfd. 200 V. Paper Capacitor
C-52	.25 mfd. 400 V. Paper Capacitor
C-53	.01 mfd. 600 V. Paper Capacitor
R-1	22,000 ohms, 1/2-W. Carbon Resistor
R-2	1.0 megohm, 1/2-W. Carbon Resistor
R-3	6800 ohms, 1/2-W. Carbon Resistor
R-4	47,000 ohms, 1/2-W. Carbon Resistor
R-5	330 ohms, 1/2-W. Carbon Resistor
R-7	1000 ohms, 1/2-W. Carbon Resistor
R-8	47,000 ohms, 1/2-W. Carbon Resistor
R-9	220,000 ohms, 1/2-W. Carbon Resistor
R-10	47,000 ohms, 1/2-W. Carbon Resistor
R-11	2.2 megohms, 1/2-W. Carbon Resistor
R-12	470 ohms, 1/2-W. Carbon Resistor
R-13	2 megohm Volume Control
R-14	100,000 ohms, 1/2-W. Carbon Resistor
R-15	15 ohms, 1/2-W. Carbon Resistor
R-16	4.7 megohms, 1/2-W. Carbon Resistor
R-17	150,000 ohms, 1/2-W. Carbon Resistor
R-18	47,000 ohms, 1/2-W. Carbon Resistor
R-19	1.0 megohms, 1/2-W. Carbon Resistor
R-20	3.3 megohms, 1/2-W. Carbon Resistor
R-21	270,000 ohms, 1/2-W. Carbon Resistor
R-22	220,000 ohms, 1/2-W. Carbon Resistor
R-23	220,000 ohms, 1/2-W. Carbon Resistor
R-24	100 ohms, 3.4 W. Wire Wound
R-25	2400 ohms, 2 W. Carbon Resistor
R-26	2200 ohms, 2.5 W. Wire Wound
R-27	12 ohms, 1/2-W. Carbon Resistor
R-28	68 ohms, 1/2-W. Carbon Resistor
R-29	47,000 ohms, 1/2-W. Carbon Resistor
R-30	1.0 megohm, 1/2-W. Carbon Resistor
R-31	47,000 ohms, 1/2-W. Carbon Resistor
R-32	5.6 megohms, 1/2-W. Carbon Resistor
R-33	1000 ohms, 1/2-W. Carbon Resistor
R-34	1000 ohms, 1/2-W. Carbon Resistor
R-40	33 ohms, 1/2-W. Carbon Resistor
R-41	4.7 megohms, 1/2-W. Carbon Resistor
R-42	100,000 ohms, 1/2-W. Carbon Resistor
PL-4	Pilot Lights, Mazda #44

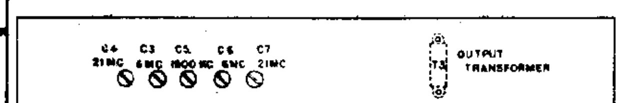
PARTS AND CONNECTIONS SHOWN WITH DASH LINES ARE FOR H-118 ONLY.

ALIGNMENT

Set dial pointer to first line at left end of scale with gang condenser plates completely closed.

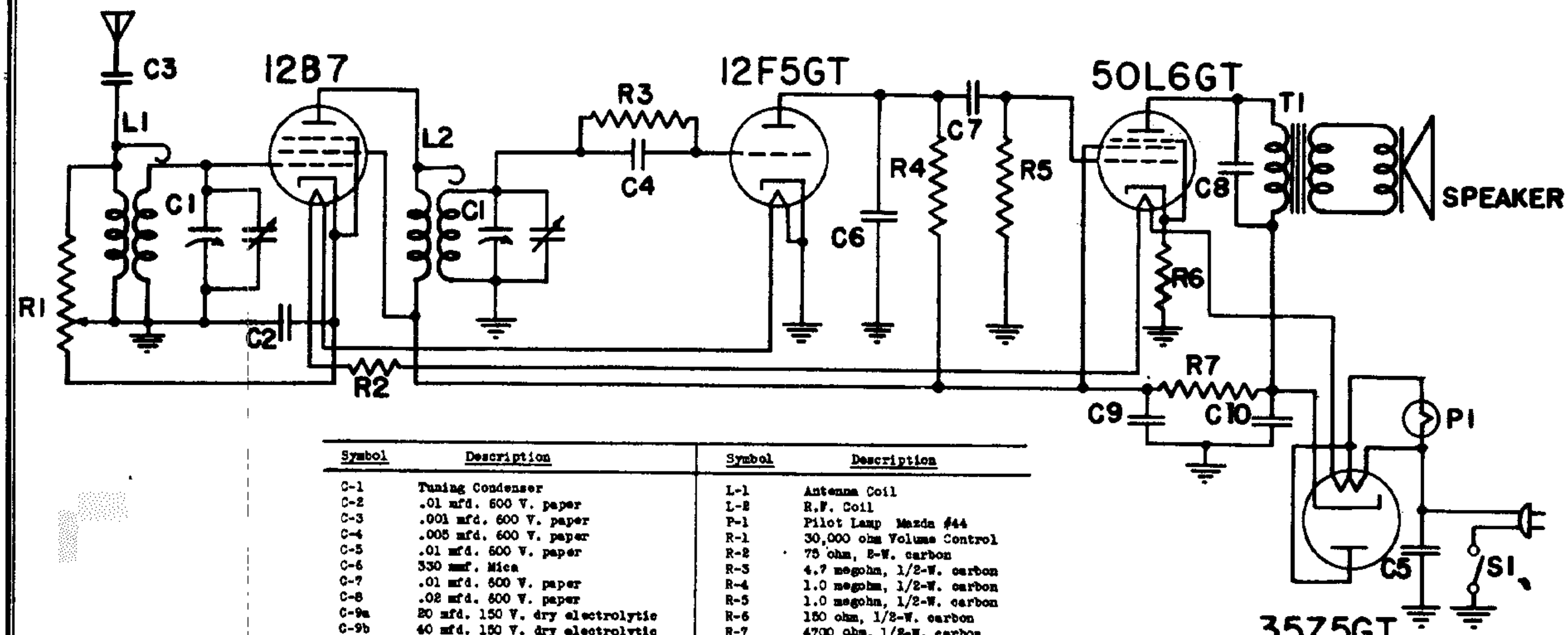
1. Turn band switch to "B" band and, using non-metallic screw-driver, align I.F's at 455 KC by visual or output meter method. I.F. transformers are double, permeability tuned with adjusting shafts at top and bottom of shield cans.
2. On "B" band, set dial pointer to 580 KC mark and tune in 580 KC signal with (C-8). Then peak (C-5) on 1500 KC while rocking gang condenser. Re-peak (C-8) on 580 KC and end by re-peaking (C-5) on 1500 KC.
3. On "C" band, set pointer to 6MC mark and align (C-6) to 6MC. Peak (C-3) for maximum output.
4. On "D" band, align (C-7) at 21 MC. Peak (C-4) for maximum output by rocking gang condenser. The image of the 21 MC signal should be heard at approximately 20 MC.





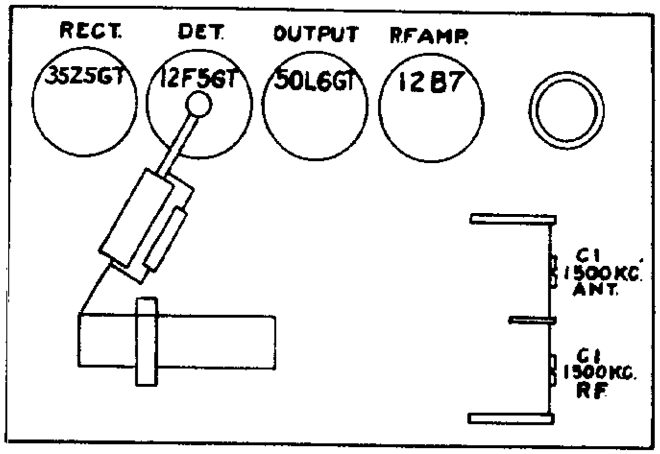
GENERAL ELECTRIC CO.

MODEL H400, Preliminary
Schematic, Socket
Alignment, Trimmers



Symbol	Description
C-1	Tuning Condenser
C-2	.01 mfd. 600 V. paper
C-3	.001 mfd. 600 V. paper
C-4	.005 mfd. 600 V. paper
C-5	.01 mfd. 600 V. paper
C-6	330 mmf. Mica
C-7	.01 mfd. 600 V. paper
C-8	.02 mfd. 600 V. paper
C-9a	20 mfd. 150 V. dry electrolytic
C-9b	40 mfd. 150 V. dry electrolytic

Symbol	Description
L-1	Antenna Coil
L-2	R.F. Coil
P-1	Pilot Lamp Mazda #44
R-1	30,000 ohm Volume Control
R-2	75 ohm, 2-W. carbon
R-3	4.7 megohm, 1/2-W. carbon
R-4	1.0 megohm, 1/2-W. carbon
R-5	1.0 megohm, 1/2-W. carbon
R-6	150 ohm, 1/2-W. carbon
R-7	4700 ohm, 1/2-W. carbon



ALIGNMENT

Connect the high side of the signal generator through a 100 mmf. capacitor to the terminal to which the antenna lead is soldered. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the tuning mark should be over the last mark on the dial.

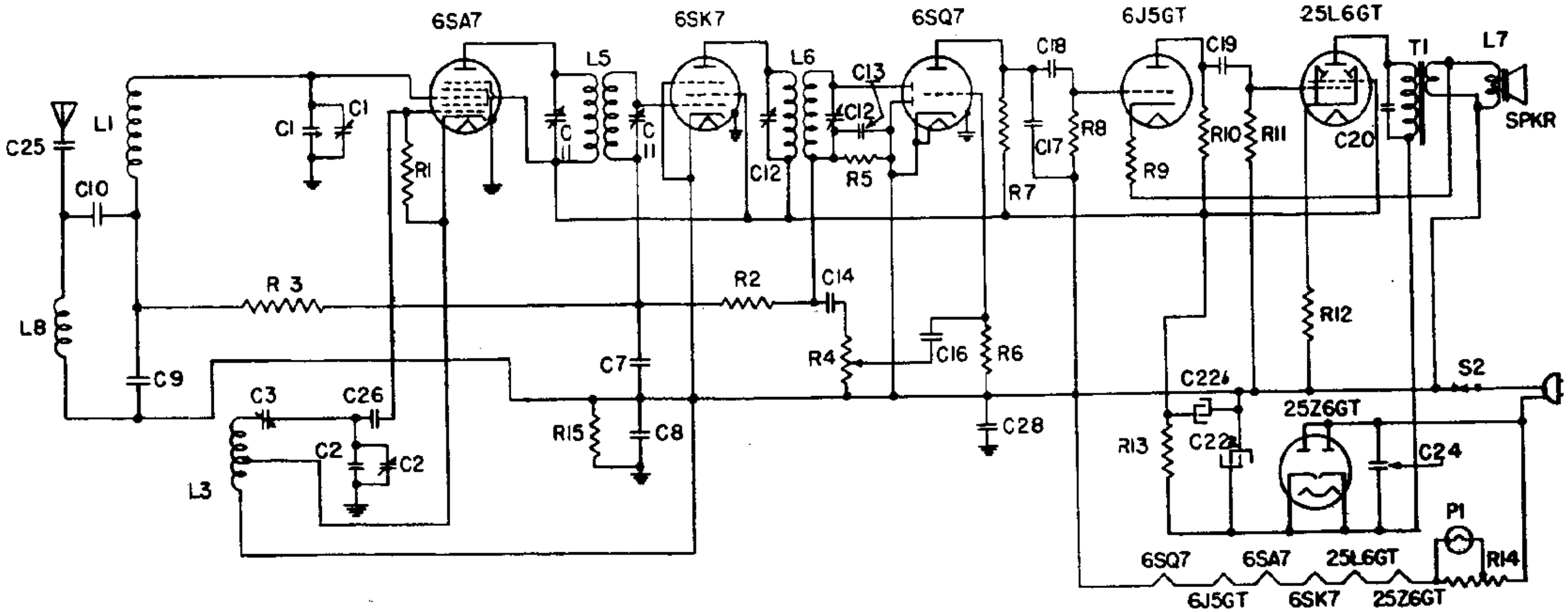
2. Set volume control to about 3/4 maximum.

3. Rotate gang to minimum capacity and tune trimmers on the gang condenser to 1750 K.C. signal. Re-tune gang to 1500 K.C. signal and peak trimmers by alternate adjustment.

Precaution--one side of the power supply is connected to the chassis. Do not connect the chassis to any external ground.

MODELS H600,H601,H610
H611, Preliminary
Schematic,Socket
Alignment,Trimmers

GENERAL ELECTRIC CO.

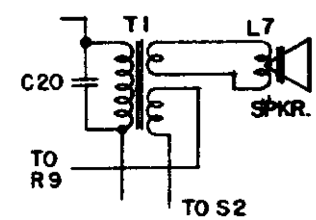


ALIGNMENT

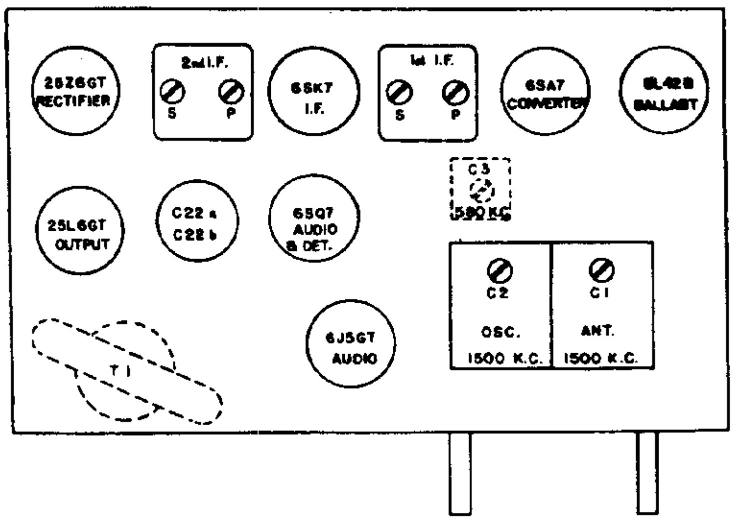
With gang condenser plates completely closed, set dial pointer to first line at left-end of scale.

1. Align I. F.'s at 455 K.C. by visual or output meter method.

2. Apply a 1500 K.C. signal either through a standard I.R.E. dummy to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500 K.C. signal is fed and which magnetically couples to the receiver Beam-a-scope. Align (C-2) at 1500 K.C. and peak (C-1) for maximum output. Then peak (C-3) on 580 K.C. while rocking the gang condenser. Retrim at 1500 K.C.



ON H-601 & H-611 RECEIVERS SUBSTITUTE THIS TRANSFORMER (T-1) FOR ONE SHOWN ABOVE.



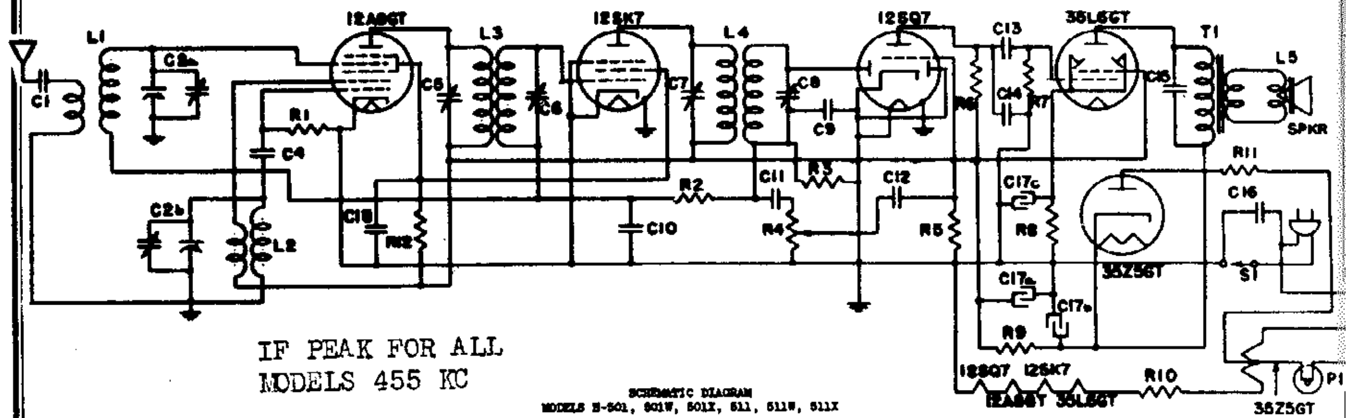
Symbol	Description	Symbol	Description	Symbol	Description
C-1, 2	Tuning Condenser	C-20	.01 mfd. Paper Capacitor	R-3	470,000 ohms Carbon Resistor
C-3	"B" Band Padder	C-22a	50 mfd. Dry Electrolytic	R-4	Volume Control, 2 megohms
C-7	.05 mfd. Paper Capacitor	C-22b	30 mfd. Dry Electrolytic	R-5	470,000 ohms Carbon Resistor
C-8	.1 mfd. Paper Capacitor	C-24	.05 mfd. Paper Capacitor	R-6	15 megohms Carbon Resistor
C-9	3900 mmf. Mica Capacitor	C-25	.01 mfd. Paper Capacitor	R-7	470,000 ohms Carbon Resistor
C-10	.01 mfd. Paper Capacitor	C-26	47 mmf. Mica Capacitor	R-8	1.0 megohm Carbon Resistor
C-13	470 mmf. Mica Capacitor	C-28	.1 mfd. Paper Capacitor	R-9	3300 ohms Carbon Resistor
C-14	.002 mfd. Paper Capacitor	L-1	Loop	R-10	39,000 ohms Carbon Resistor
C-16	.002 mfd. Paper Capacitor	L-3	"B" Band Oscillator Coil	R-11	470,000 ohms Carbon Resistor
C-17	470 mmf. Mica Capacitor	L-8	Antenna Choke 1 1/2 MH.	R-12	150 ohms Carbon Resistor
C-18	.005 mfd. Paper Capacitor	P-1	Pilot Lamp Mazda #44	R-13	1000 ohms Carbon Resistor
C-19	.005 mfd. Paper Capacitor	R-1	33,000 ohms Carbon Resistor	R-14	Ballast Resistor BL42B
		R-2	2.2 megohms Carbon Resistor	R-15	470,000 ohms Carbon Resistor

MODELS H520,H520W,H520X
MODELS H521,H521W,H521X
Schematics Preliminary

GENERAL ELECTRIC CO.

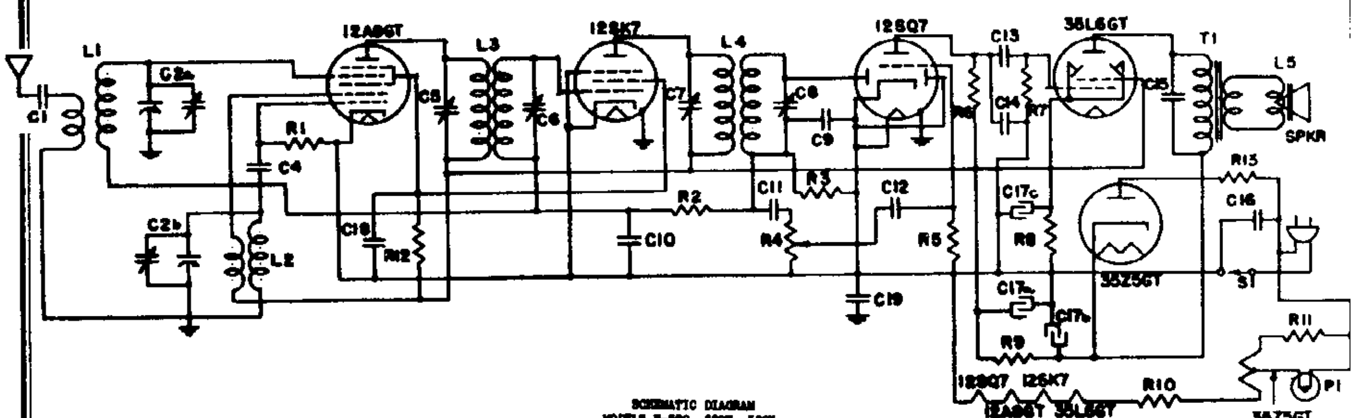
MODELS H500,H500W,H500X
H510,H510W,H510X
MODELS H501,H501W,H501X
H511,H511W,H511X

MODELS H-500, 500W, 500X, 510, 510W, 510X

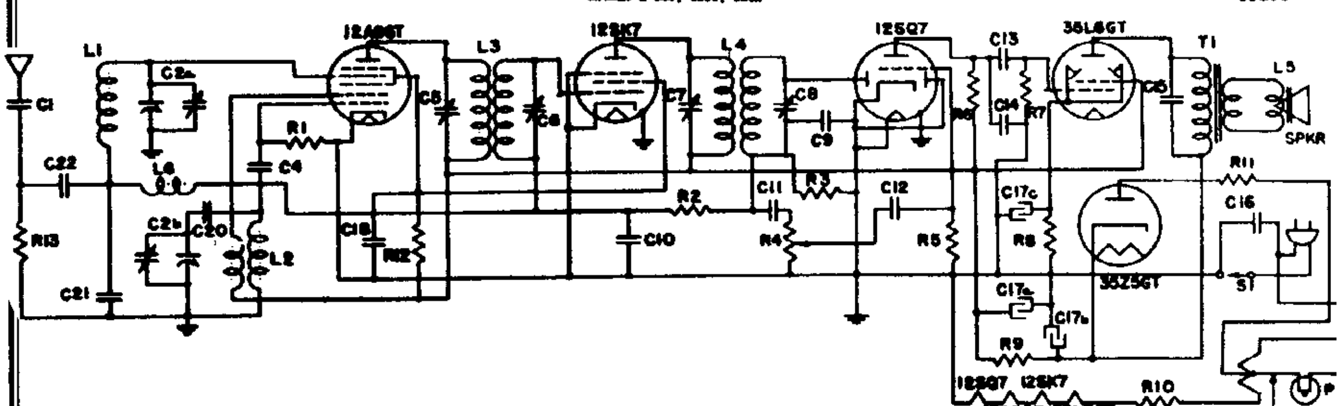


IF PEAK FOR ALL
MODELS 455 KC

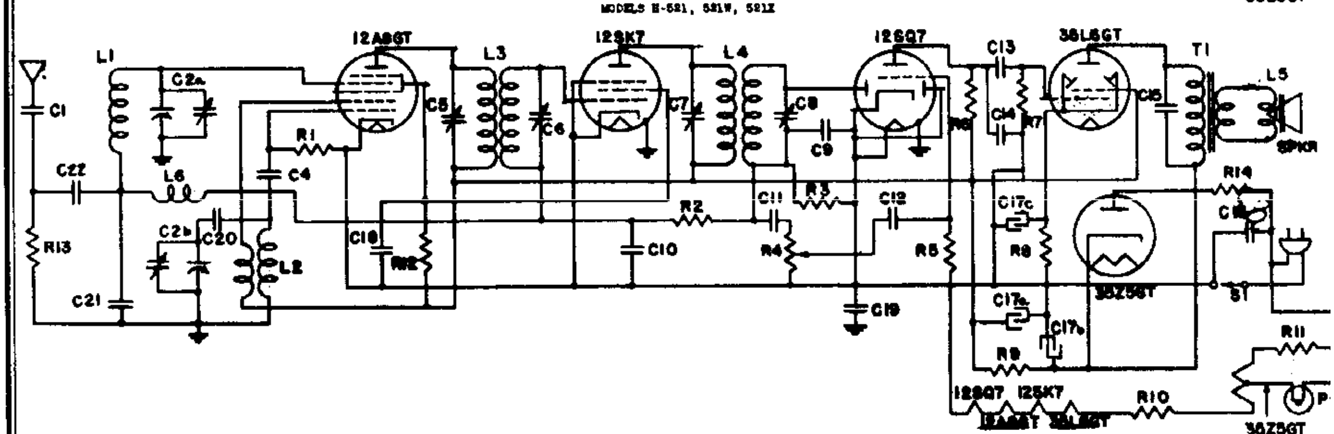
SCHEMATIC DIAGRAM
MODELS H-501, 501W, 501X, 511, 511W, 511X



SCHEMATIC DIAGRAM
MODELS H-520, 520W, 520X



SCHEMATIC DIAGRAM
MODELS H-521, 521W, 521X



MODELS H500,H500W,H500X
H510,H510W,H510X
MODELS H501,H501W,H501X
H511,H511W,H511X

GENERAL ELECTRIC CO.

MODELS H520,H520W,H520X
MODELS H521,H521W,H521X
Alignment,Socket,Parts
Trimmers Preliminary

PRELIMINARY
REPLACEMENT PARTS LIST
MODELS H-500, 501, 510, 511, 520, 521
(W & X MODELS INC.)

Stock No.		Description	List Price
*RB-008	BOARD	- Terminal board (8 lug)	.10
*RB-013	BOARD	- Terminal board (5 lug) for models H-500, 501, 510, 511	.10
*RB-070	BOARD	- Terminal board (5 lug) for models H-520 and H-521	.10
RB-179	BRACKET	- Bracket for beam-a-scope frame for models H-520 and H-521	
RB-914	BACK COVER	- Cabinet back for models H-500, 501, 510, 511 (W and X models included)	
RB-915	BACK COVER	- Plastic cabinet back for models H-520 and H-521	
RB-916	BACK COVER	- Plastic cabinet back for models H-520W and H-521W	
RB-917	BACK COVER	- Plastic cabinet back for models H-520X and H-521X	
RC-016	CAPACITOR	- .005 mfd. 600 V. paper (C-1,11,18)	.25
*RC-083	CAPACITOR	- .005 mfd. 600 V. paper (C-13)	.25
*RC-059	CAPACITOR	- .01 mfd. 600 V. paper (C-15)	.25
*RC-072	CAPACITOR	- .05 mfd. 600 V. paper (C-10,15)	.25
*RC-098	CAPACITOR	- .05 mfd. 600 V. paper (C-16)	.30
*RC-120	CAPACITOR	- .2 mfd. 600 V. paper for models H-501, H-511, H-521 (C-19)	.30
*RC-216	CAPACITOR	- 47 mmf. mica (C-4)	.25
*RC-274	CAPACITOR	- 330 mmf. mica (C-14)	.30
*RC-294	CAPACITOR	- 470 mmf. mica (C-9)	.30
*RC-348	CAPACITOR	- 1600 mmf. mica for models H-520, 521	.35
*RC-390	CAPACITOR	- 3900 mmf. mica for models H-520 and H-521 C-21	.35
*RC-863	CORD	- Power Cord	.65
RC-1990	CLAMP	- Antenna coil clamp for models H-500, 501, 510, 511	
RC-6126	CAPACITOR	- 30 mfd. 150 V; 40 mfd. 150 V; 20 mfd. 25 V; dry electrolytic (C-17a, 17b, 17c)	
RC-7012	CONDENSER	- Tuning condenser for models H-510, 511, 520, 521 (C-2a, 2b)	
RC-7015	CONDENSER	- Tuning condenser for models H-500 and H-501 (C-2a, 2b)	
RC-8808	CARDS	- Station letter cards for models H-510, 511, 520, 521	
RD-9013	CONE ASSEMBLY	- Cone assembly for all models	
RD-111	DIAL	- Dial scale for models H-500, 501, 510, 511	
RD-113	DIAL	- Dial scale for models H-520 and H-521	
RD-410	DRUM	- Tuning condenser drive drum assembly for models in brown	
RD-411	DRUM	- Tuning condenser drive drum assembly for all models in white and onyx	
*RG-016	GRID CLIP	- Tube control grid clip (Pkg. 8)	.10
RH-007	MASK	- Antenna mask for models H-500,501,510,511	
RK-049	KNOB	- Control knob for all white models	
RK-061	KNOB	- Control knob for all models except white	
RK-806	KEY	- Station selector key for models H-510,511, 520,521	
RK-807	KEY	- Station selector key for models H-510W, H-511W, H-520W, H-521W	
RK-808	KEY	- Station selector key for models H-510X, H-511X, H-520X, H-521X	
RL-085	COIL	- Antenna coil for models H-500,501,510,511 (L-1)	
RL-890	COIL	- Oscillator coil for models H-500,501,510,511 (L-2)	
RL-891	COIL	- Oscillator coil for models H-520 and H-521 (L-2)	
RL-344	CHOKE	- RF choke for models H-520 and H-521 (L-6)	
RL-510	LOOP	- Beam-a-scope assembly for models H-520 and H-521 (L-1)	
RP-134	PIN	- Key pin for models H-510,511,520,521	
*RQ-1215	RESISTOR	- 15 ohms, 1/2-W. carbon (Pkg. 5)	.70
*RQ-1219	RESISTOR	- 22 ohms, 1/2-W. carbon (R-11)(Pkg. 5) Models H-501,511,521	.70
*RQ-1239	RESISTOR	- 150 ohms, 1/2-W. carbon (R-6)(Pkg. 5)	.70
*RQ-1261	RESISTOR	- 1200 ohms, 1/2-W. carbon (R-9)(Pkg. 5)	.70
*RQ-1281	RESISTOR	- 8800 ohms, 1/2-W. carbon (R-12)(Pkg. 5)	.70
*RQ-1283	RESISTOR	- 10,000 ohms, 1/2-W. carbon (R-13)(Pkg. 5) Models H-520 and H-521	.70
*RQ-1299	RESISTOR	- 47,000 ohms, 1/2-W. carbon (R-1)(Pkg. 5)	.70
*RQ-1323	RESISTOR	- 470,000 ohms, 1/2-W. carbon (R-5,6,7)(Pkg.5)	.70
*RQ-1339	RESISTOR	- 2.2 megohms, 1/2-W. carbon (R-2)(Pkg. 5)	.70
*RQ-1365	RESISTOR	- 15 megohms, 1/4 W. carbon (R-3)(Pkg. 5)	.70
RR-261	RESISTOR	- 100 ohms, 3.4 W. Wire Wound (R-10)	
*RS-236	SOCKET	- Octal tube socket	.15
RS-256	SOCKET	- Electrolytic mounting socket for models H-501,511,521	
RS-267	SOCKET	- Electrolytic mounting socket for models H-500,510,520	
RS-288	SOCKET	- Pilot lamp socket	
RS-951	SPACER	- Speaker cabinet spacer	
RS-1016	SPEAKER	- 4-inch speaker for models H-501,511,521 (L-5)	
RS-1017	SPEAKER	- 4-inch speaker for models H-500,510,520 (L-5)	
RT-321	TRANSFORMER	- 1st IF transformer (L-3) for models H-520 and H-521 (W and X models included)	
RT-322	TRANSFORMER	- 2nd IF transformer (L-4)	
RT-323	TRANSFORMER	- 1st IF transformer for models H-500,H-501,H-510, H-511 (W and X models included)	
RT-465	TRANSFORMER	- Output transformer (T-1)	
RV-070	VOLUME CONTROL	- 2 meg. volume control (R-4)	
RW-039	WINDOW	- Celluloid station letter window for models H-510, 511,520,521	
RZ-152	CABINET	- Cabinet for models H-510,511,520,521	
RZ-153	CABINET	- Cabinet for models H-510W,H-511W, H-520W,H-521W	
RZ-154	CABINET	- Cabinet for models H-510X,H-511X,H-520X,H-521X	
RZ-155	CABINET	- Cabinet for models H-500,H-501	
RZ-156	CABINET	- Cabinet for models H-500W, H-501W	
RZ-157	CABINET	- Cabinet for models H-500X, H-501X	

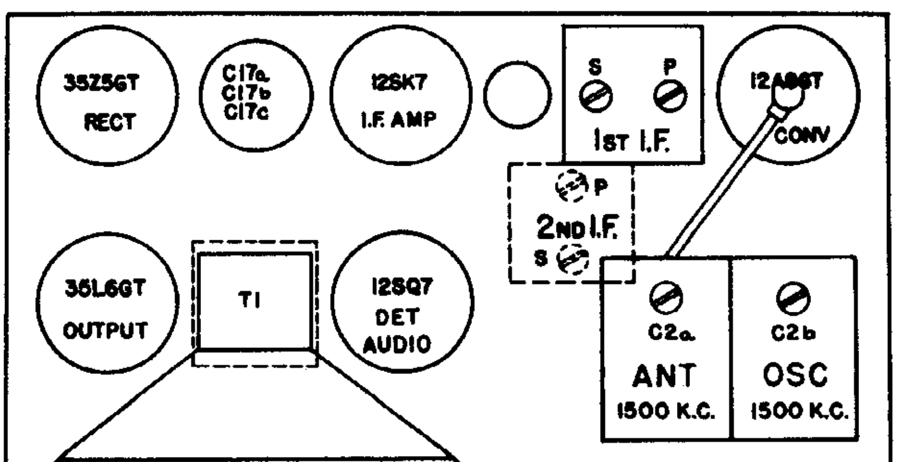
*Used on previous receivers

(Prices subject to change without notice)

ALIGNMENT FOR
MODELS
H-500,H-501,H-510,H-511
H-520,H-521
(W and X Models incl.)

I-F ALIGNMENT:

Apply a 455-kc signal to the grid of the 12SK7 and align the 2nd i-f transformer by visual or output meter method. Repeat the procedure,applying the 455-kc signal to the grid of the 12A8GT and aligning the 1st i-f transformer.



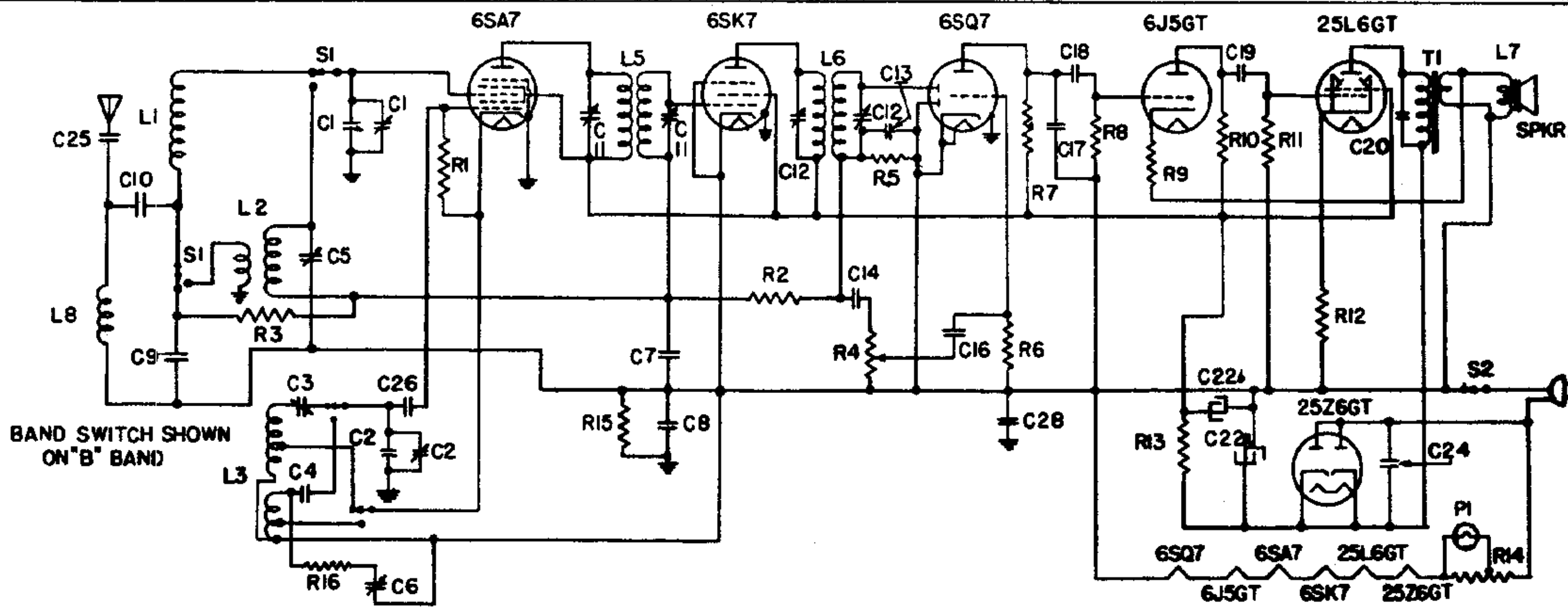
R-F ALIGNMENT:

On Models H500,H501,H510 and H511 (W and X models incl.) apply a 1500-kc signal through a 100 mmf mica condenser to the antenna terminal. Align C-2b. Peak C-2a for maximum output.

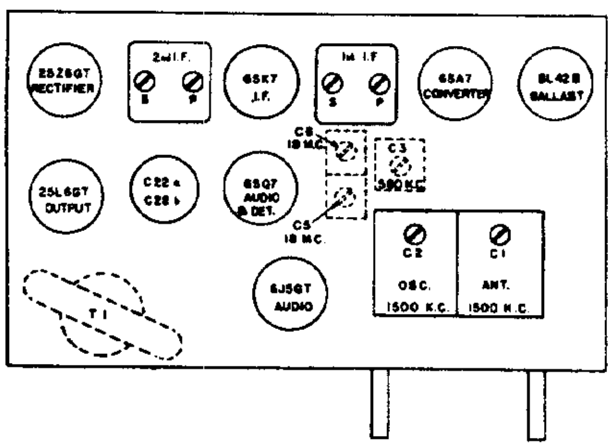
On Models H-520 and H-521 (W and X models incl.), apply a 1500-kc signal either through a standard I.R.E. dummy to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500-kc signal is fed and which magnetically couples to the receiver Beam-a-scope. Align C-2b. Peak C-2a for maximum output.

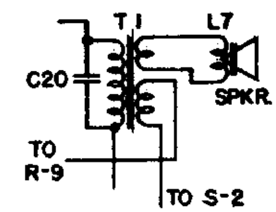
MODELS H620, H621, H630
H631, H632, H633
Schematic, Socket, Trimmers
Alignment Preliminary

GENERAL ELECTRIC CO.



Symbol	Description	Symbol	Description	Symbol	Description
C-1, 2	Tuning Condenser	C-19	.005 mfd. Paper Capacitor	R-2	2.2 megohms Carbon Resistor
C-3	"B" Band Padder	C-20	.01 mfd. Paper Capacitor	R-3	470,000 ohms Carbon Resistor
C-4	3900 mmf. Mica Condenser	C-22a	50 mfd. Dry Electrolytic	R-4	Volume Control, 2 megohms
C-5	"D" Band Antenna Trimmer	C-22b	30 mfd. Dry Electrolytic	R-5	470,000 ohms Carbon Resistor
C-6	"D" Band Oscillator Trimmer	C-24	.05 mfd. Paper Capacitor	R-6	15 megohms Carbon Resistor
C-7	.05 mfd. Paper Capacitor	C-25	.01 mfd. Paper Capacitor	R-7	470,000 ohms Carbon Resistor
C-8	.1 mfd. Paper Capacitor	C-26	47 mmf. Mica Capacitor	R-8	1.0 megohm Carbon Resistor
C-9	3900 mmf. Mica Capacitor	C-28	0.1 mfd. Paper Capacitor	R-9	3300 ohms Carbon Resistor
C-10	.01 mfd. Paper Capacitor	L-1	Loop	R-10	39,000 ohms Carbon Resistor
C-13	470 mmf. Mica Capacitor	L-2	"D" Band antenna coil	R-11	470,000 ohms Carbon Resistor
C-14	.002 mfd. Paper Capacitor	L-3	"B-D" Band Oscillator Coil	R-12	150 ohms Carbon Resistor
C-16	.002 mfd. Paper Capacitor	L-8	Antenna Choke 1 1/2 mH.	R-13	1000 ohms Carbon Resistor
C-17	470 mmf. Mica Capacitor	P-1	Pilot Lamp Mazda #44	R-14	Ballast Resistor BL42B
C-18	.005 mfd. Paper Capacitor	R-1	33,000 ohms Carbon Resistor	R-15	470,000 ohms Carbon Resistor
				R-16	100 ohms Carbon Resistor





ON H-621, H-631 & H-633 RECEIVERS SUBSTITUTE THIS TRANSFORMER (T-1) FOR ONE SHOWN ABOVE

ALIGNMENT

With gang condenser plates completely closed, set dial pointer to first line at left-end of scale.

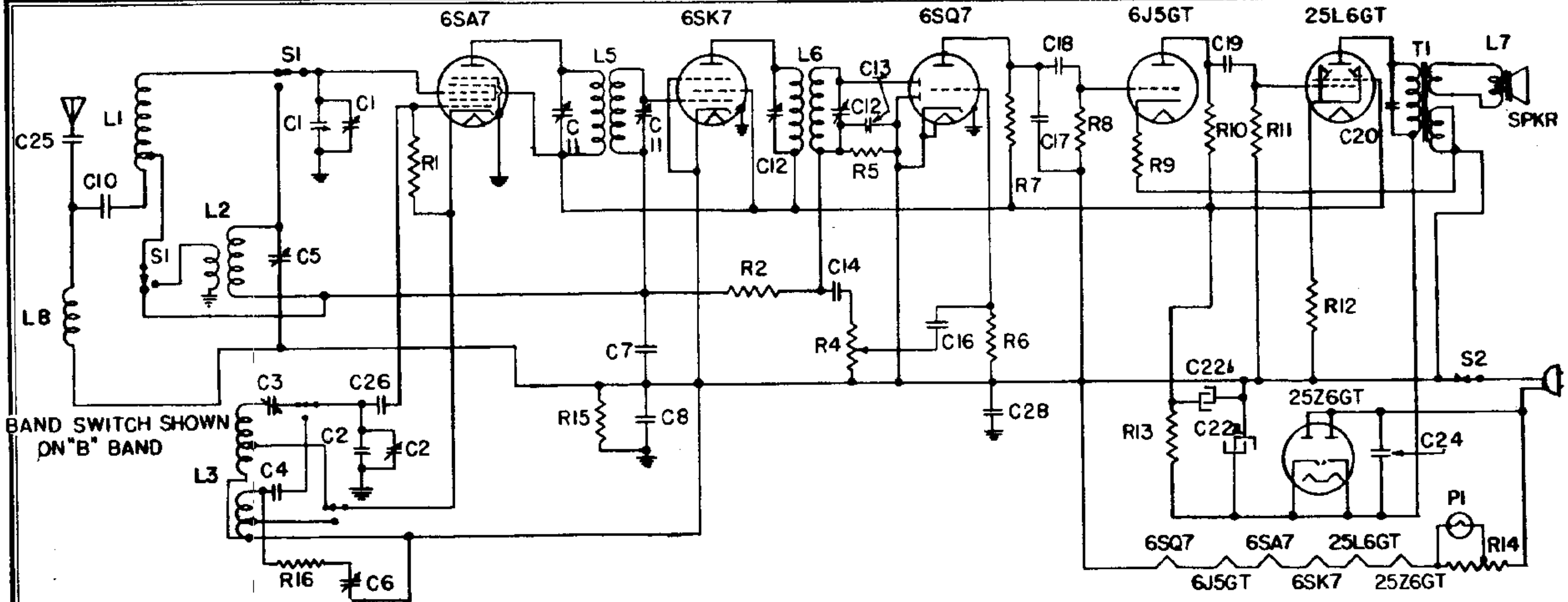
1. Turn band switch to "B" band, if the receiver has two bands, and align I.F.'s at 455 K.C. by visual or output meter method.

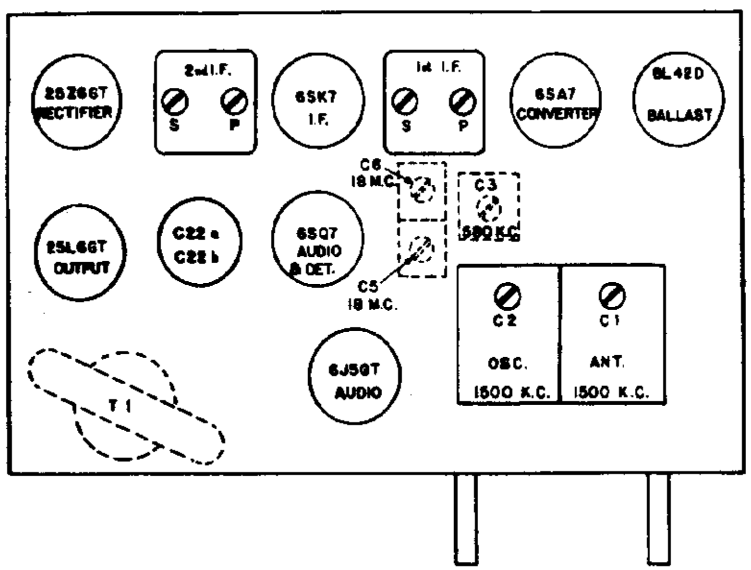
2. Apply a 1500 K.C. signal either through a standard I.R.E. dummy to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500 K.C. signal is fed and which magnetically couples to the receiver Beam-a-scope. Align (C-2) at 1500 K.C. and peak (C-1) for maximum output. Then peak (C-3) on 580 K.C. while rocking the gang condenser. Retrim at 1500 K.C.

3. Turn band switch to "D" band, align (C-6) at 18 M.C. and peak (C-5) while rocking the gang condenser. The image of the 18 M.C. signal should be heard at approximately 17 M.C.

MODEL H625 Preliminary
Schematic, Socket
Alignment, Trimmers

GENERAL ELECTRIC CO.





C-1, 2	Tuning Condenser
C-3	"B" Band Padder
C-4	3900 mmf. Mica Condenser
C-5	"D" Band Antenna Trimmer
C-6	"D" Band Oscillator Trimmer
C-7	.05 mfd. Paper Capacitor
C-8	.1 mfd. Paper Capacitor
C-10	.01 mfd. Paper Capacitor
C-13	470 mmf. Mica Capacitor
C-14	.002 mfd. Paper Capacitor
C-16	.002 mfd. Paper Capacitor
C-17	280 mmf. Mica Capacitor
C-18	.005 mfd. Paper Capacitor
C-19	.005 mfd. Paper Capacitor
C-20	.01 mfd. Paper Capacitor
C-22a	50 mfd. Dry Electrolytic
C-22b	30 mfd. Dry Electrolytic
C-24	.05 mfd. Paper Capacitor
C-25	.01 mfd. Paper Capacitor
C-26	47 mmf. Mica Capacitor
C-28	0.1 mfd. Paper Capacitor
L-1	Loop
L-2	"D" Band Antenna Coil
L-3	"B-D" Band Oscillator Coil
L-8	Antenna Choke 1 1/2 MH.
P-1	Pilot Lamp Mazda #44
R-1	33,000 ohms Carbon Resistor
R-2	2.2 megohms Carbon Resistor
R-4	Volume Control, 2 megohms
R-5	470,000 ohms Carbon Resistor
R-6	15 megohms Carbon Resistor
R-7	470,000 ohms Carbon Resistor
R-8	1.0 megohm Carbon Resistor
R-9	3300 ohms Carbon Resistor
R-10	39,000 ohms Carbon Resistor
R-11	470,000 ohms Carbon Resistor
R-12	150 ohms Carbon Resistor
R-13	1000 ohms Carbon Resistor
R-14	Ballast Resistor BL42D
R-15	470,000 ohms Carbon Resistor
R-16	100 ohms Carbon Resistor

ALIGNMENT

With gang condenser plates completely closed, set dial pointer to first line at left-end of scale.

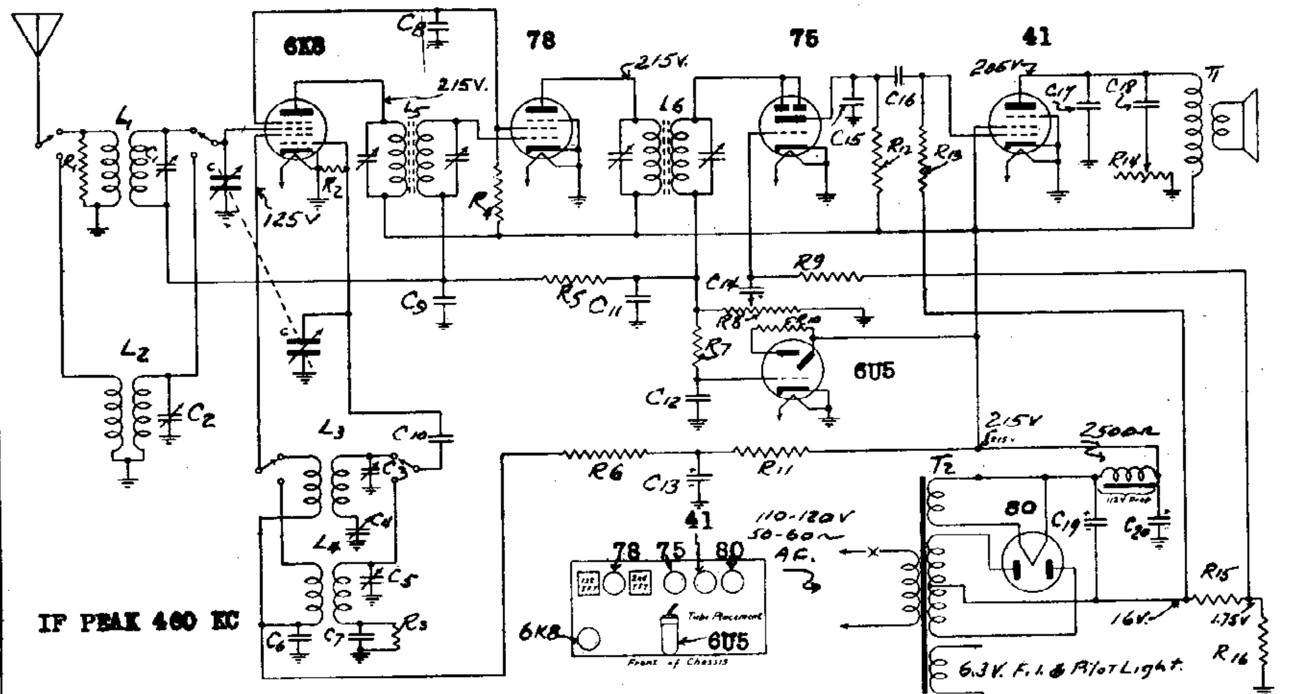
1. Turn band switch to "B" band and align I.F's at 455 KC by visual or output meter method.

2. Apply a 1500 KC signal either through a standard I.R.E. dummy to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500 KC signal is fed and which magnetically couples to the receiver Beam-a-scope. Align (C-2) at 1500 KC and peak (C-1) for maximum output. Then peak (C-3) on 580 KC while rocking the gang condenser. Retrim at 1500 KC.

3. Turn band switch to "D" band, align (C-6) at 18 MC and peak (C-5) while rocking the gang condenser. The image of the 18 MC signal should be heard at approximately 17 MC.

GILFILLAN BROS., INC.

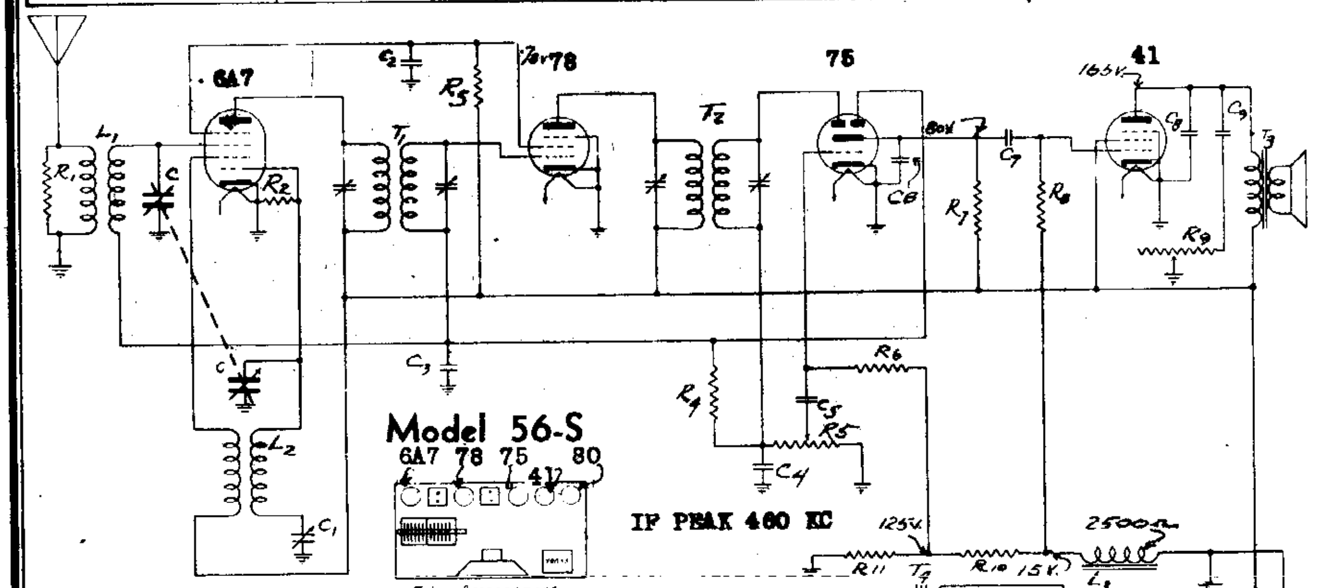
MODEL 56S
MODEL 66S
Schematics
Socket, Voltage

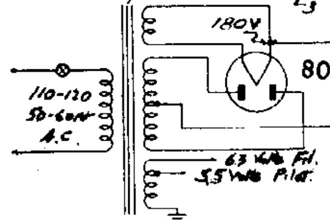


C	2 Gang Condenser		
C1	3-30 MMF.	Trimmer	
C2	3-30 MMF.	"	
C3	3-30 MMF.	"	
C4	500 MMF.	Padder	
C5	3-30 MMF	Trimmer	
C6	.05 MF.	400V	
C7		Mica	
C8	.25 MF.	400V	
C9	.05 MF.	200V	
C10	50 MMF.	Mica	
C11	250 MMF.	Mica	
C12	.02 MF	200V	
C13	16 MF.	350V Elec.	
C14	.01 MF.	400V	
C15	.001 MF.	600V	
C16	.01 MF.	600V	
C17	.01 MF.	600V	
C18	.03 MF.	600V	
C19	12 MF.	375V	Elec.
C20	16 MF	250V	"
R1	25000	Ohms	1/4 Watt
R2	100000	"	"
R3	30000	"	"
R4	50000	"	1 "
R5	2 Meg	"	1/4 "
R6	10000	"	"
R7	2 Meg	"	"
R8	50000	"	Vol Control
R9	2 Meg	"	1/4 Watt
R10	1 Meg	"	"
R11	10000	Ohms	1/4 Watt
R12	250000	"	"
R13	1 Meg	"	"
R14	50000	"	Tone Control
R15	350	"	1/2 Watt
R16	30	"	1/4 "
L1, L2	Antenna Coil B.C. & S.W.		
L3	Oscillator Coil B.C.		
L4	" " S.W.		
L5	1st I.F. Trans.		
L6	2nd I.F. Trans.		
T1	Output Trans.		
T2	Power Trans.		

Power consumption:-
40 watts at 115 volts
60 cycles on primary,
All voltages to ground
with a 1000 ohm per
volt meter.

Gilfillan Bros. Inc.
MODEL 66-S
1938





C1	500 mmf	C7	.01 mf	R2	100,000	R7	250,000
C2	.05 mf	C8	.006 mf	R3	50,000	R8	1 meg.
C3	.05 mf	C9	.03 mf	R4	2 meg	R9	50,000
C4	250 mmf	C10	8x8 mf	R5	500,000	R10	350
C5	.01 mf	R1	25000	R6	2 meg.	R11	30
C6	.001 mf						

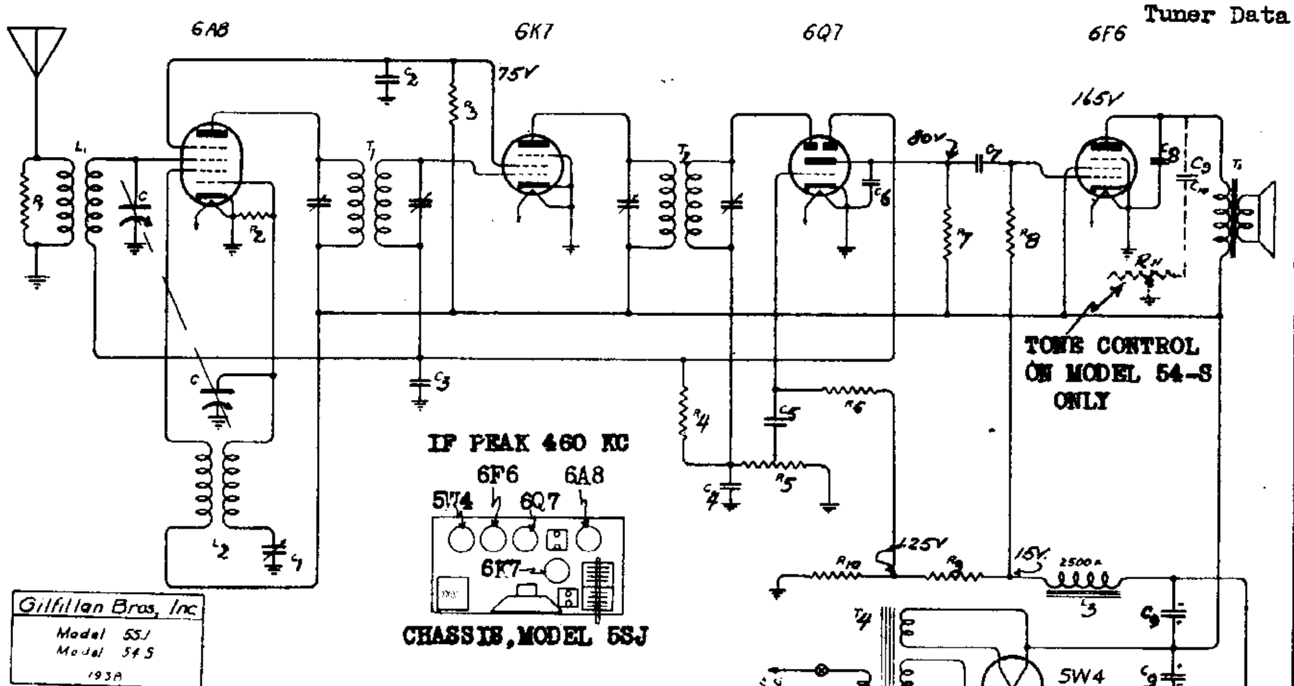
Power consumption at 115 Volts, 60 cycles - 37 watts
All voltages measured to ground with 115 volts, 60 cycles applied to transformer primary using 1000 ohms per volt meter.

Gilfillan Bros Inc.
Model 56-S
1938

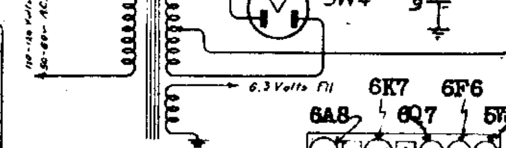
MODELS 5SJ,54S
Schematic,Socket

GILFILLAN BROS., INC.

MODEL 56S
MODEL 66S
Tuner Data

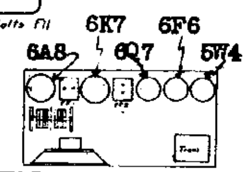


CHASSIS,MODEL 5SJ



Code	Value	Type	Part No.	Code	Value	Type	Part No.	Code	Item	Part No.
C	2 Gang Variable Condenser			R	25,000 Ohms	½ Watt		L_1	Antenna Coil	
C_1	500 MMF	Padder		R_1	100,000 "	" "		L_2	Oscillator Coil	
C_2	.05 MF	400 V. Tubular		R_3	50,000 "	" "		L_3	Speaker Field - 2500 Ω	
C_3	.05 MF	200 V "		R_4	2 Meg "	" "		T_1	IF Transformer #1	
C_4	250 MMF	Mica		R_5	500,000 "	Vol. Control		T_2	IF Transformer #2	
C_5	.01 MF	200 V. Tubular		R_6	2 Meg "	¼ Watt		T_3	Output Transformer	
C_6	.001 MF	600 V "		R_7	250,000 "	" "		T_4	Power Transformer	
C_7	.01 MF	600 V "		R_8	1 Meg "	" "				
C_8	.006 MF	600 V "		R_9	350 "	½ Watt				
C_9	8×8 MF	450 V Elec.		R_{10}	50 "	½ Watt				
C_{10}	.03 MF	800 V Tub.		R_H	500,000 "	Tone Control				

Power Consumption at 115 Volts, 60 Cycles is 35 Watts.
All voltages measured to ground with 115 Volts 60 cycles applied to transformer primary

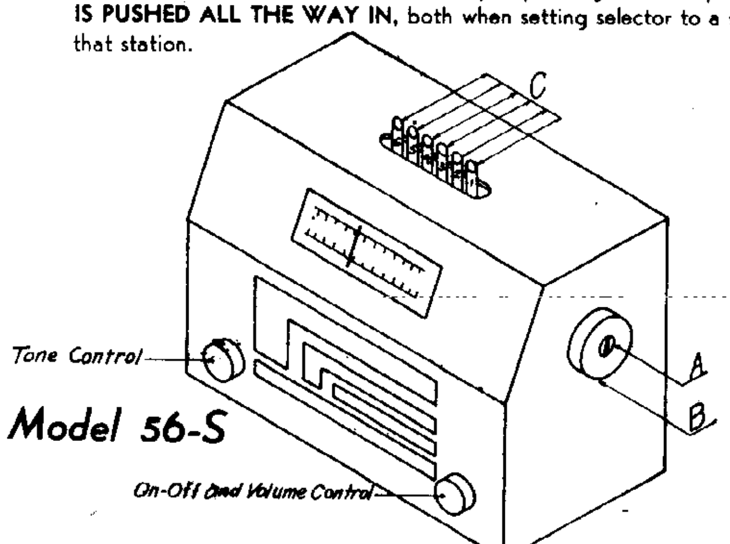


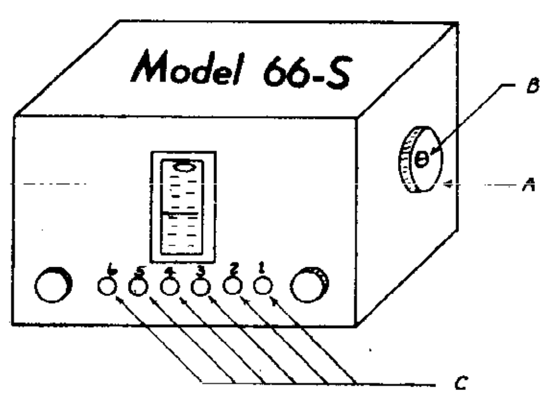
CHASSIS,MODEL 54-S

SETTING PUSH BUTTONS MODELS 56-S, 66-S.

To set push button station selector proceed as follows:

1. Release mechanism by turning screw "B" in center of manual control knob "A" approximately three turns to the left.
2. Manually tune the radio set by means of turning knob "A" until the pointer is at the bottom end of the dial scale (so that it is pointed at 170). Starting from this point tune the desired station you want to hear (on No. 1 button)
3. Press button marked 1 all the way in, then release. Tune the next station desired manually, then press button No. 2 all the way in, then proceed progressively until all six buttons have been tuned.
4. Turn screw "B" in center of manual control "A" to right until tight, locking the selector mechanism. Any of the stations selected can now be received by depressing its corresponding push button. **BE SURE SELECTOR BUTTON IS PUSHED ALL THE WAY IN,** both when setting selector to a station and when using push button tuning to receive that station.

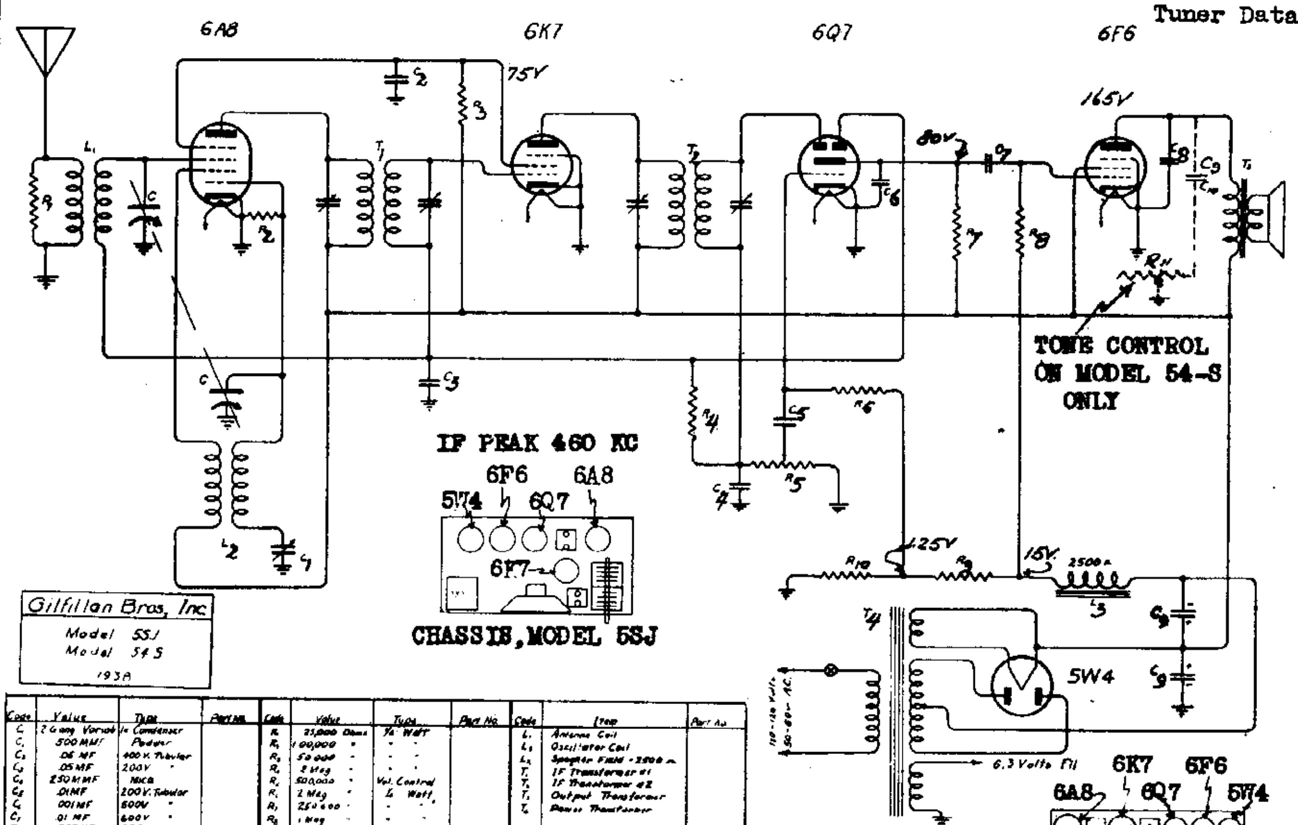




MODELS 5SJ,54S
Schematic,Socket

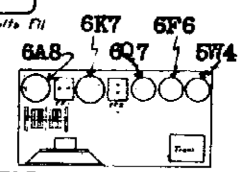
GILFILLAN BROS., INC.

MODEL 56S
MODEL 66S
Tuner Data



Code	Value	Type	Part No.	Code	Value	Type	Part No.	Code	Item	Part No.
C	2 Gang Variable Condenser			R_1	25,000 Ohms	1/4 Watt		L_1	Antenna Coil	
C_1	500 MMF	Padder		R_2	100,000 "	- -		L_2	Oscillator Coil	
C_2	.05 MF	400 V. Tubular		R_3	50,000 -	- -		L_3	Speaker Field - 2500 Ω	
C_3	.05 MF	200V "		R_4	2 Meg -	" "		T_1	IF Transformer #1	
C_4	250 MMF	Mica		R_5	500,000 "	Vol. Control		T_2	IF Transformer #2	
C_5	.01 MF	200 V. Tubular		R_6	2 Meg "	1/4 Watt		T_3	Output Transformer	
C_6	.001 MF	600V "		R_7	250,000 -	- -		T_4	Power Transformer	
C_7	.01 MF	600V "		R_8	1 Meg "	- -				
C_8	.005 MF	600V "		R_9	350 "	1/2 watt				
C_9	8x8 MF.	450V Elec.		R_{10}	30 "	1/2 watt				
C_{10}	.03 MF	800 V. Tub.		R_{11}	50,000 "	Tone Control				

Power Consumption at 115 Volts, 60 Cycles is 33 Watts.
All voltages measured to ground with 115 Volts 60 cycles applied to transformer primary

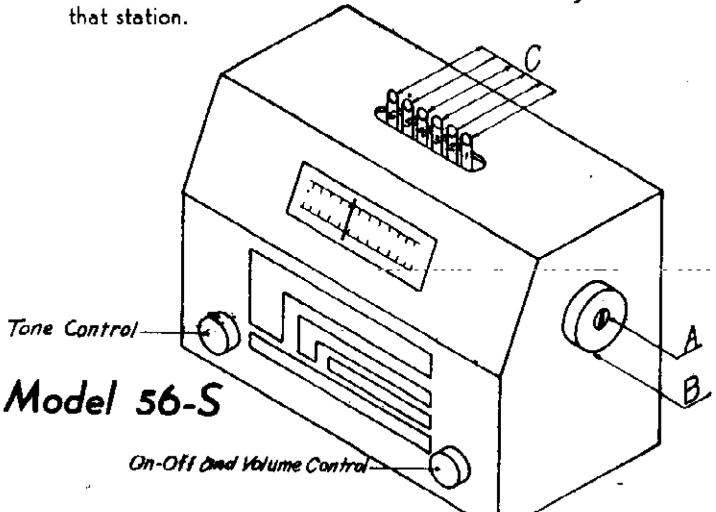


CHASSIS,MODEL 54-S

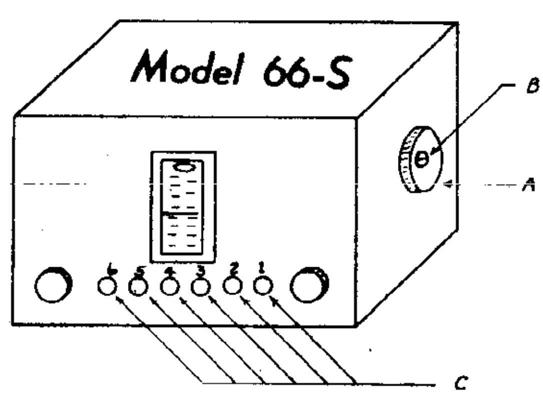
SETTING PUSH BUTTONS MODELS 56-S, 66-S.

To set push button station selector proceed as follows:

1. Release mechanism by turning screw "B" in center of manual control knob "A" approximately three turns to the left.
2. Manually tune the radio set by means of turning knob "A" until the pointer is at the bottom end of the dial scale (so that it is pointed at 170). Starting from this point tune the desired station you want to hear (on No. 1 button)
3. Press button marked 1 all the way in, then release. Tune the next station desired manually, then press button No. 2 all the way in, then proceed progressively until all six buttons have been tuned.
4. Turn screw "B" in center of manual control "A" to right until tight, locking the selector mechanism. Any of the stations selected can now be received by depressing its corresponding push button. **BE SURE SELECTOR BUTTON IS PUSHED ALL THE WAY IN,** both when setting selector to a station and when using push button tuning to receive that station.



Model 56-S



Model 66-S

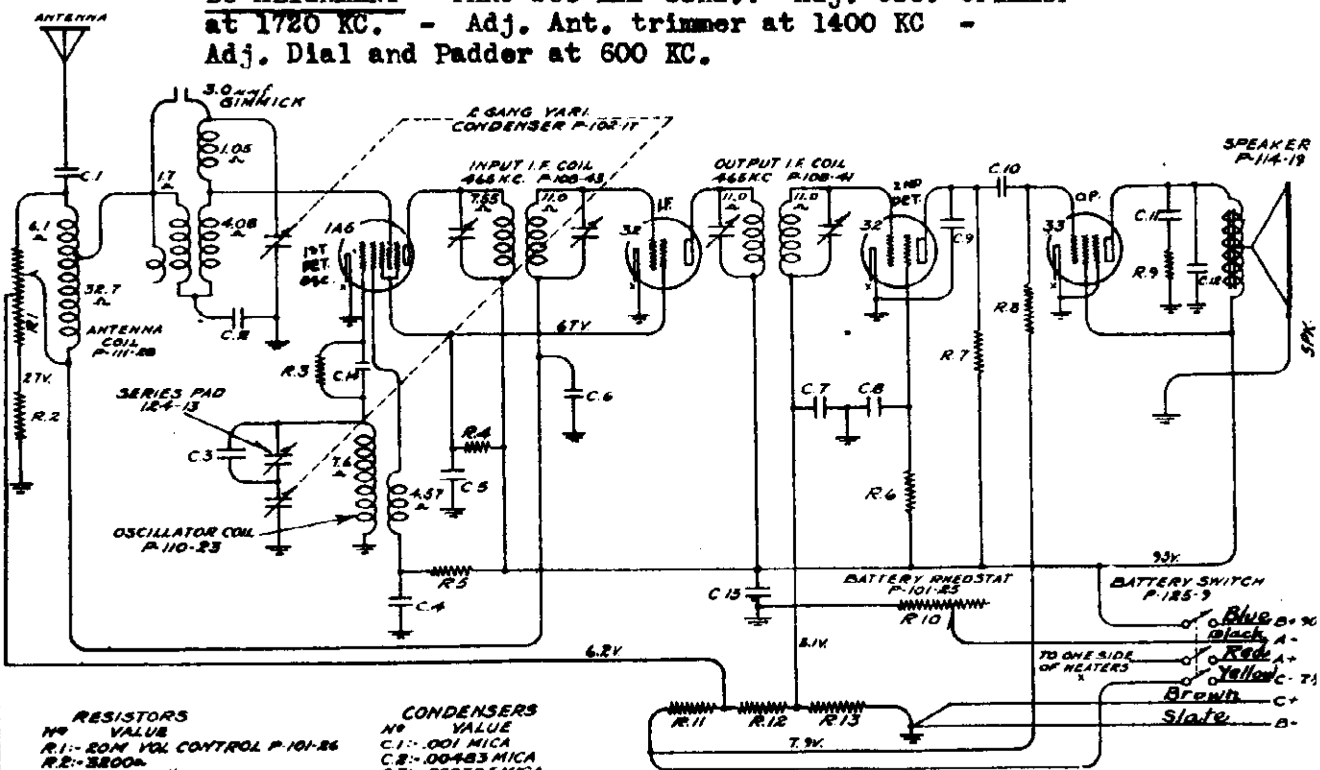
Socket, Trimmers
Alignment

MODEL 404

GOODYEAR TIRE & RUBBER CO., INC.

Schematic, Voltage

IF ALIGNMENT - Adj. trimmers at 465 KC thru .1 mf cond.-
BC ALIGNMENT - THRU 200 mmf cond.:- Adj. Osc. trimmer at 1720 KC. - Adj. Ant. trimmer at 1400 KC - Adj. Dial and Padder at 600 KC.



RESISTORS

Nº	VALUE
R.1	20M VOL. CONTROL P-101-26
R.2	3200Ω
R.3	50MΩ ½W.
R.4	11MΩ ½W.
R.5	10MΩ ½W.
R.6	3MEG.Ω ½W.
R.7	750MΩ ½W.
R.8	500MΩ ½W.
R.9	35MΩ ½W.
R.10	4Ω BAT. RHEOSTAT P-101-25
R.11	1300Ω
R.12	1920Ω
R.13	9600Ω ½W.

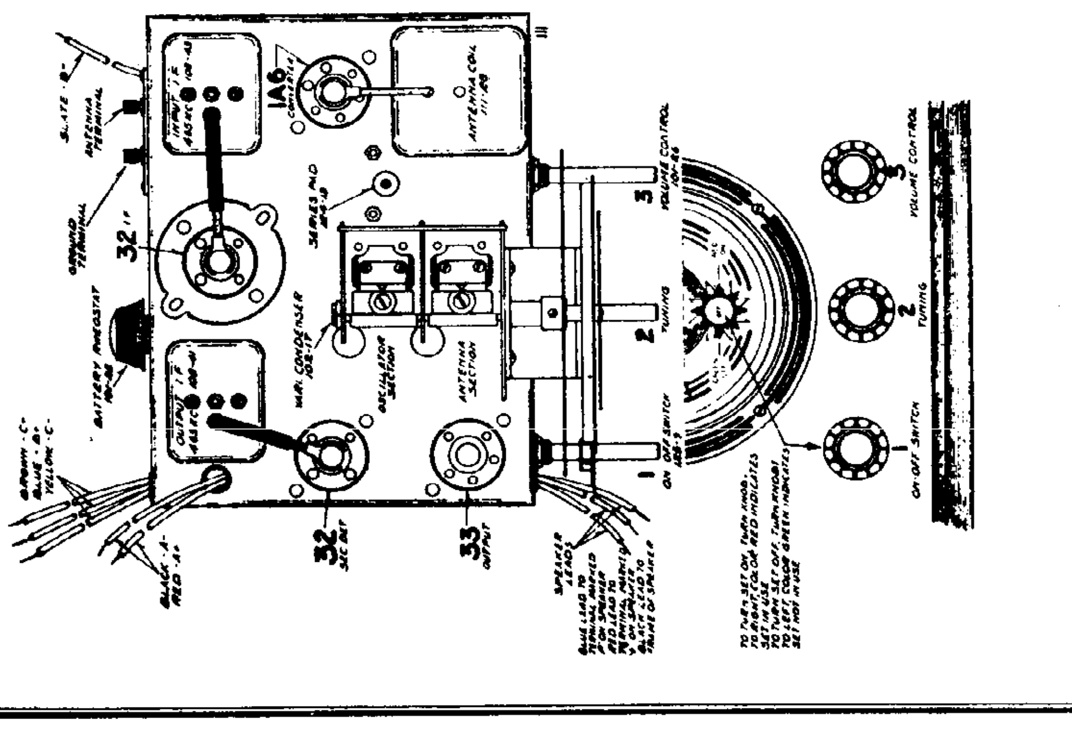
CONDENSERS

Nº	VALUE
C.1	.001 MICA
C.2	.00483 MICA
C.3	.000395 MICA
C.4	.01 X 200V.
C.5	.05 X 200V.
C.6	.25 X 200V.
C.7	.05 X 200V.
C.8	.01 X 200V.
C.9	.00025 MICA
C.10	.01 X 400V.
C.11	.01 X 400V.
C.12	.0005 MICA
C.13	.25 X 200V.
C.14	.00025 MICA

- NOTE -
R.2, R.11, R.12 ARE IN ONE UNIT. P-106-21
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " " P-118-5
C.7, C.8 " " " " P-118-11
NUMBERS PREFIXED BY LETTER P ARE PART Nºs
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES. VOLUME CONTROL ON FULL

IF PEAK 465 KC

Serial No. 5D115200A and up



BATTERIES NEEDED

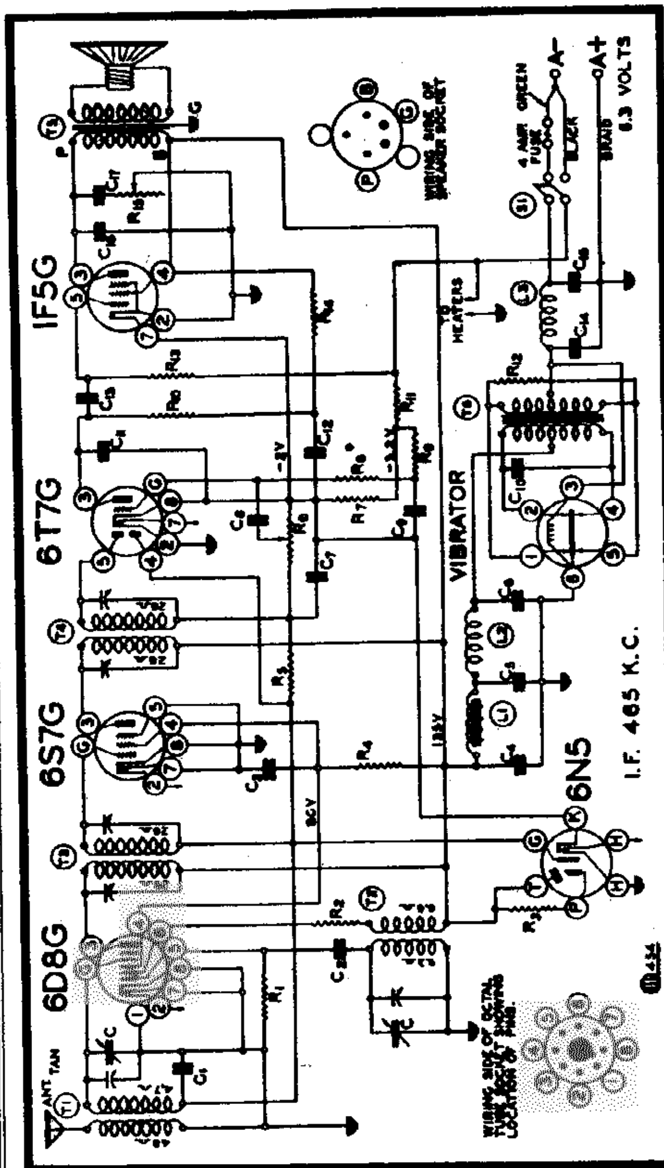
The following batteries are needed.
2........45 volt "B" Batteries.
1........7½ Volt "C" Battery.
1........3 Volt Dry "A" Battery or 2 Volt Storage Battery.

MODEL 504
Schematic, Voltage
Socket, Trimmers
Alignment

GOODYEAR TIRE & RUBBER CO., INC.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.



Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-85 Output I.F. Transformer.

Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments.
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.
   (b) Move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-84) to resonance.
   (c) With oscillator still connected to 6D8G readjust output I.F. transformer (108-85) if necessary.

R. F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick-up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser)
   (c) Check sensitivity at 600 and 1000 kilocycles.

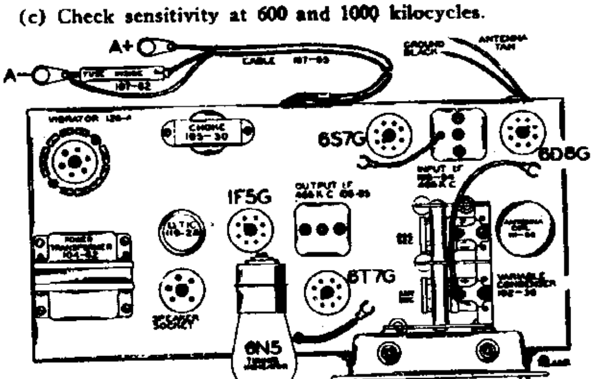


FIG. 1—TOP VIEW

504 SERIES A

535-1720 Kilocycles
Battery Operated

No.	Part No.	Description
		RESISTORS
R1	130-76	30M ohm - 1/3 w.
R2	130-23	2M ohm - 1/3 w.
R3	130-106	250M ohm - 1/10 w. - in tuning indicator
R4	130-123	15M ohm - 1/2 w.
R5	130-121	3.2 megohm - 1/3 w.
R6	101-56	1 megohm volume control
R7	106-36	10 ohms - resistor strip
R8	130-19	1 megohm - 1/3 w.
R9	130-19	1 megohm - 1/3 w.
R10	130-100	190M ohm - 1/3 w.
R11	106-36	25 ohms - resistor strip
R12	130-84	200 ohms - 1/3 w.
R13	130-19	1 megohm - 1/3 w.
R14	130-20	100M ohm - 1/3 w.
R15	101-72	300M ohm - tone control
		R7 and R11 in same unit
		CONDENSERS
C	102-38	2 gang variable
C1	100-9	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-33	.1 x 200 v.
C4	119-28	5.0 mfd. - 200 w. v. lytic
C5	119-28	5.0 mfd. - 200 w. v. lytic
C6	100-33	.1 x 200 v.
C7	129-5	.0001 Mica
C8	100-11	.01 x 400 v.
C9	100-11	.01 x 400 v.
C10	100-34	.005 x 1200 v.
C11	129-12	.00025 Mica
C12	100-33	.1 x 200 v.
C13	100-11	.01 x 400 v.
C14	100-40	.5 x 200 v.
C15	100-40	.5 x 200 v.
C16	100-37	.003 x 600 v.
C17	100-11	.01 x 400 v.
		C4 and C5 in same unit
		PARTS
T1	111-66	Antenna coil complete
T2	110-45	Oscillator coil complete
T3	108-84	Input I.F. coil complete - 465 kc.
T4	108-85	Output I.F. coil complete - 465 kc.
T5	114-63	P.M. Speaker
T6	104-62	Power Transformer
L1	105-30	Filter Choke
L2	123-3	R. F. "B" Choke
L3	105-19	"A" Choke
S1		Switch on volume control
	126-4	Vibrator

GOODYEAR TIRE & RUBBER CO., INC.

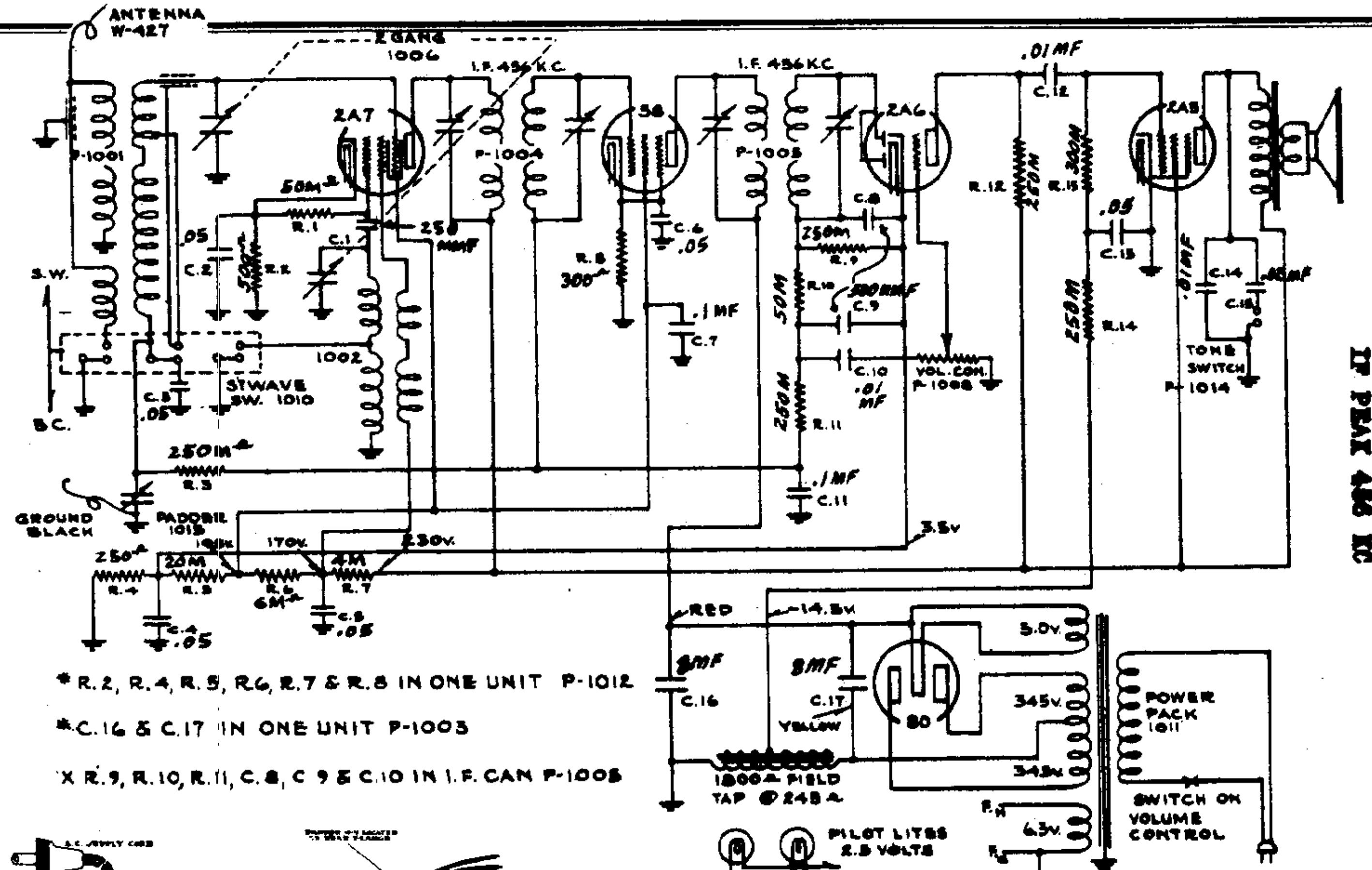
MODEL 550
Schematic, Voltage
Socket, Trimmers
Alignment

106-115 volts alternating current 50-60 cycles - 60 watts.
GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
VOLTAGES WITH 119V. A.C. LINE

33248

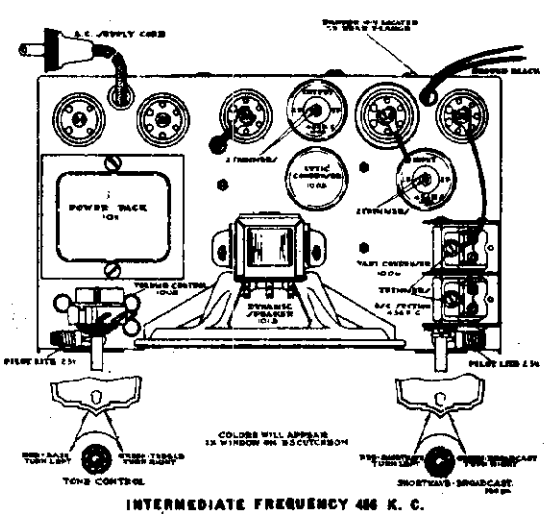
IF PEAK 456 KC



* R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012

*C.16 & C.17 IN ONE UNIT P-1003

X R.9, R.10, R.11, C.8, C.9 & C.10 IN I.F. CAN P-1005



To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 2A7 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser at minimum capacity disconnect antenna wire and connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). <u>DO NOT BEND PLATES</u>.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.

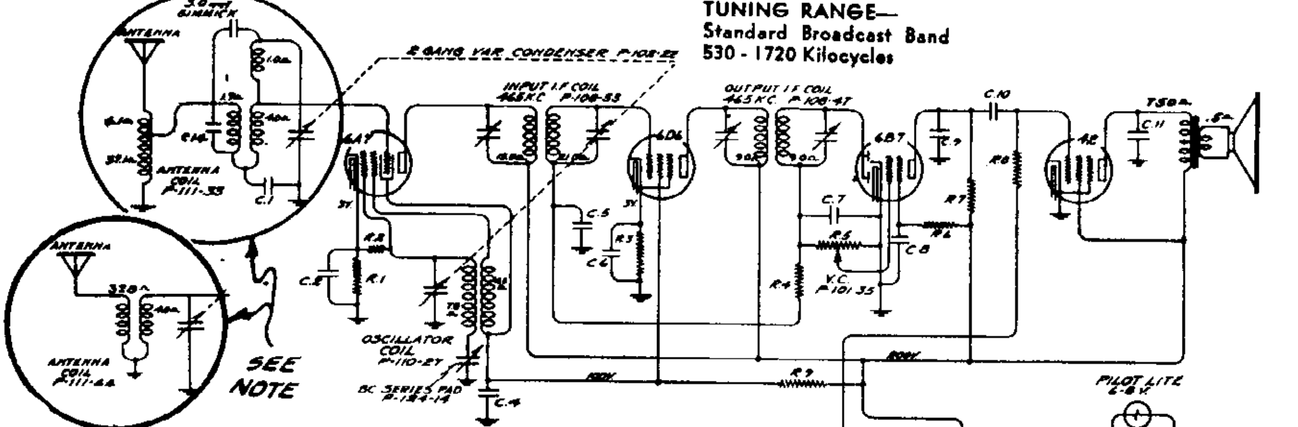
MODEL 578, Series A
Schematic, Voltage

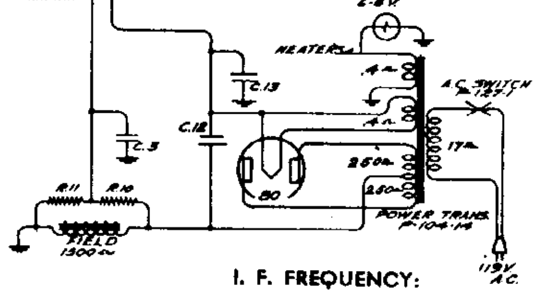
GOODYEAR TIRE & RUBBER CO., INC.

Socket, Trimmers
Alignment

MODEL 578—5G133670A—5K173250A

TUNING RANGE—
Standard Broadcast Band
530 - 1720 Kilocycles





CONDENSERS
C.1—.00385 Mica
C.2—.1x200 V.
C.3—.1x200 V.
C.4—.1x200 V.
C.5—.1x200 V.
C.6—.1x200 V.
C.7—.00025 Mica
C.8—.1x200 V.
C.9—.0001 Mica
C.10—.01x400 V.
C.11—.006x600 V.
C.12—8.0 mfd. x 350 V P-103-6
C.13—8.0 mfd. x 300 V P-103-7
C.14—110 mfd. Either external Mica Cond. or cap. winding in coil.

RESISTORS
R.1—350 Ohm
R.2—50M Ohm ½ W.
R.3—350 Ohm
R.4—500M Ohm ½ W.
R.5—1 meg vol. cont. P-101-35
R.6—1 meg. ½ W.
R.7—250M Ohm ½ W.
R.8—500M Ohm ½ W.
R.9—12M Ohm 1 W.
R.10—800M Ohm ½ W.
R.11—201M Ohm ½ W.

NOTE: C.4—C.8 One Unit P-118-1
C.5—C.6 One Unit P-118-1

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GRD. VOL. CONT. ON FULL.

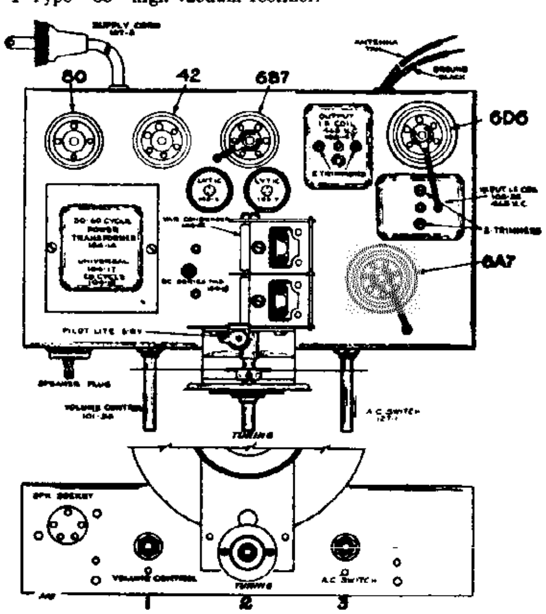
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

I. F. FREQUENCY: 465 K.C.

Tubes

The Tube complement of this chassis is as follows:

1 Type 6A7—pentagrid electron coupled oscillator and first detector.
1 Type 6D6—remote cut-off pentode as I.F. amplifier.
1 Type 6B7—duplex diode pentode as diode detector, A.V.C. and A.F.
1 Type 42—pentode output tube.
1 Type 80—high vacuum rectifier.



Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram

All voltages are measured with 119 volts on the primary of the power transformer.

NOTE:—

Beginning with 5K173250A, Antenna Coil No. 111-44 replaced No. 111-33, and capacities C1—.00385 mfd. and C14—.00011 mfd. were eliminated. Note: On early models C14 was a capacity winding on the primary of the No. 111-33 Antenna Coil.

See revised diagram

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-53 and 108-47)

(a) Connect external oscillator which has been adjusted to 465 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-47, to resonance.

(b) Move generator output clip from grid of 6D6 to grid cap of 6A7 tube and align input I.F. transformer, part number 108-53.

(c) With generator connected to grid of type 6A7 tube, readjust output I.F. transformer, part number 108-47, to resonance.

R. F. Alignment—

(530 - 1720 Kilocycles)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer, (rear of gang condenser).

(b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance, (front section of gang condenser).

(c) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer.

25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

ALIGNING INSTRUCTIONS

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

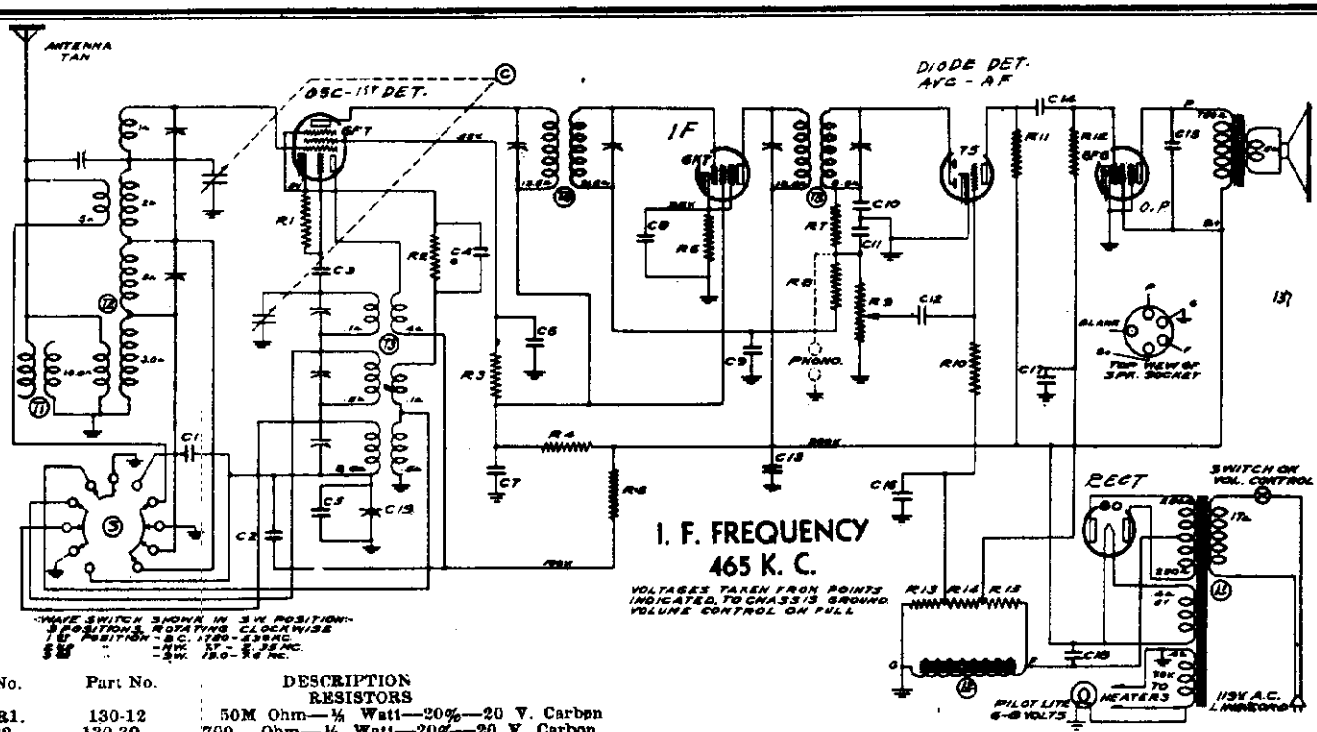
(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 585
Schematic, Voltage
Socket, Trimmers
Alignment

MISCELLANEOUS

T1.	105-10	Antenna Choke Coil
T2.	111-27	Antenna Coil
T3.	110-22	Oscillator Coil
T4.	108-38A	Input I.F. Transformer
T5.	108-40	Output I.F. Transformer
C	102-12	Two Gang Variable Cond.
S	125-6	Wave Change Switch
L1.	104-14A	Power Transformer 50/60 Cycle
L1.	104-18	Power Transformer 25 Cycle
L2.	114-11	Speaker—Field Resistance 1350 Ohms
L1.	104-17	Power Trans. Universal 50/60 Cycle
L1.	104-41	Power Trans. Universal 25 Cycle.



I. F. FREQUENCY
465 K. C.

VOLTAGES TAKEN FROM POINTS INDICATED, TO CHASSIS GROUND. VOLUME CONTROL ON FULL

No.	Part No.	DESCRIPTION
		RESISTORS
R1.	130-12	50M Ohm—½ Watt—20%—20 V. Carbon
R2.	130-39	700 Ohm—¼ Watt—20%—20 V. Carbon
R3.	130-20	100M Ohm—¼ Watt—20%—50 V. Carbon
R4.	130-44	25M Ohm—½ Watt—20%—150 V. Carbon
R5.	130-42	20M Ohm—½ Watt—20%—100 V. Carbon
R6.	130-32	250 Ohm—¼ Watt—20%—10 V. Wire Wound
R7.	130-12	50M Ohm—⅛ Watt—20%—20 V. Carbon
R8.	130-3	500M Ohm—½ Watt—20%—100 V. Carbon
R9.	101-18	500M Ohm Volume Control
R10.	130-10	1 meg Ohm—⅛ Watt—20%—100 V. Carbon
R11.	130-11	250M Ohm—½ Watt—10%—100 V. Carbon
R12.	130-11	250M Ohm—¼ Watt—10%—100 V. Carbon
R13.	130-48	15M Ohm—½ Watt—10%—20 V. Carbon
R14.	130-47	180M Ohm—⅛ Watt—10%—100 V. Carbon
R15.	130-46	800M Ohm—½ Watt—10%—100 V. Carbon
		CONDENSERS
C1.	129-23	.002 Mica—MW—5%
C2.	100-20	.1 x 120 V.—25%
C3.	129-5	.0001 Mica—MT—20%
C4.	100-20	.1 x 200 V.—25%
C5.	129-24	.00038—MT—5%
C6.	118-1	.1x 200 V.—Dual Plus 50%; Minus 10%
C7.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C8.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C9.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C10.	129-51	.000125—Mica MT—20%
C11.	129-51	.000125—Mica MT—20%
C12.	100-22	.05 x 200 V.—25%
C13.	103-7	.8 mfd. x 300 V. Electrolytic
C14.	100-11	.01 x 400 V.—25%
C15.	100-19	.006 x 600 V.—25%
C16.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C17.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C18.	103-6	.8 mfd. x 350 V. Electrolytic
C19.	124-5	B. C. Series Pad J-3-S.

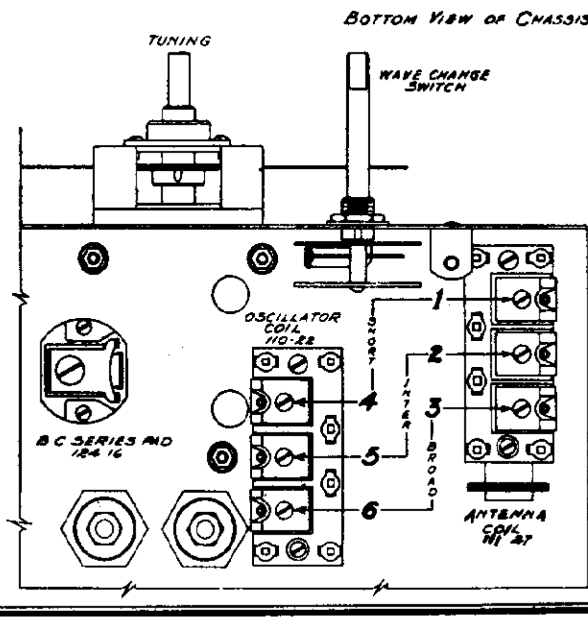
TUNING RANGE—

Standard Broadcast Band
530-1720 Kilocycles.

Intermediate Band
2350-7700 Kilocycles.

Short Wave Band
7.6-19.0 Megacycles.

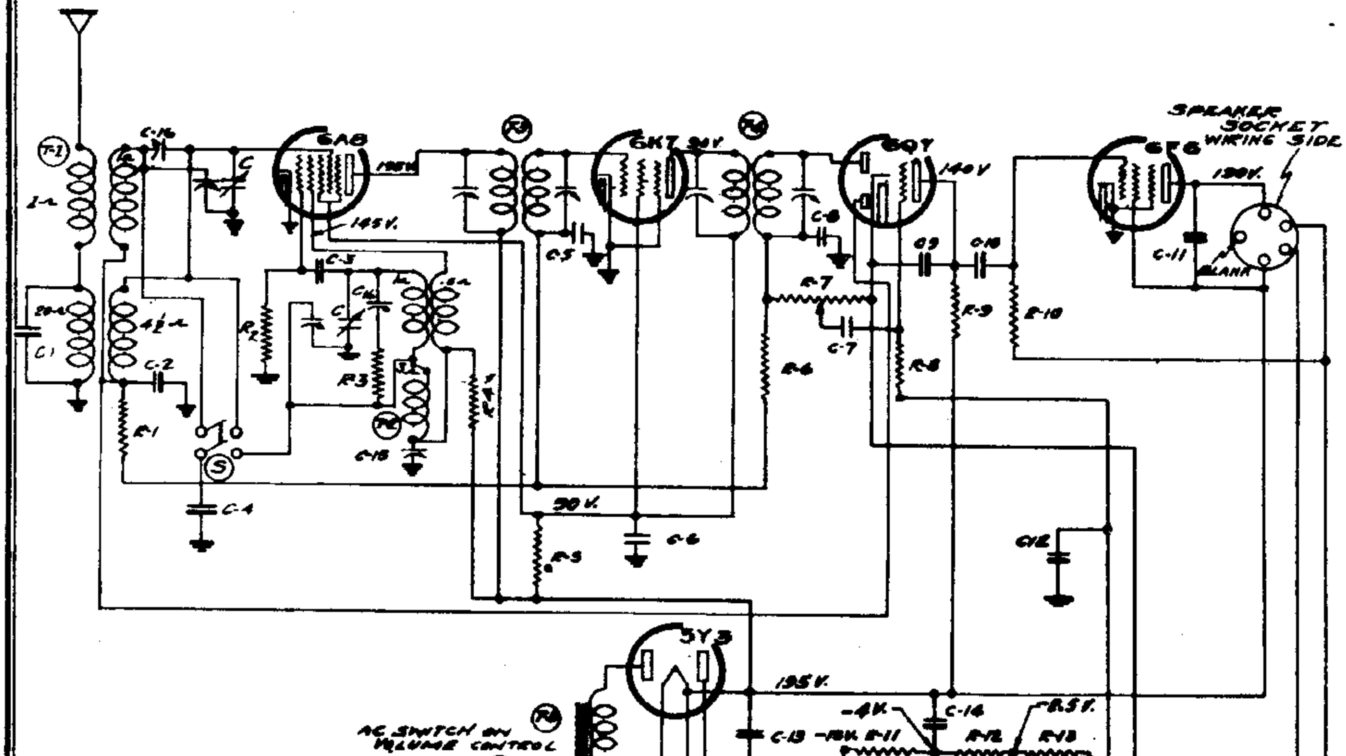
FOR ALIGNMENT SEE
MODEL 585 Run No. 2
Vol. IX page 2.

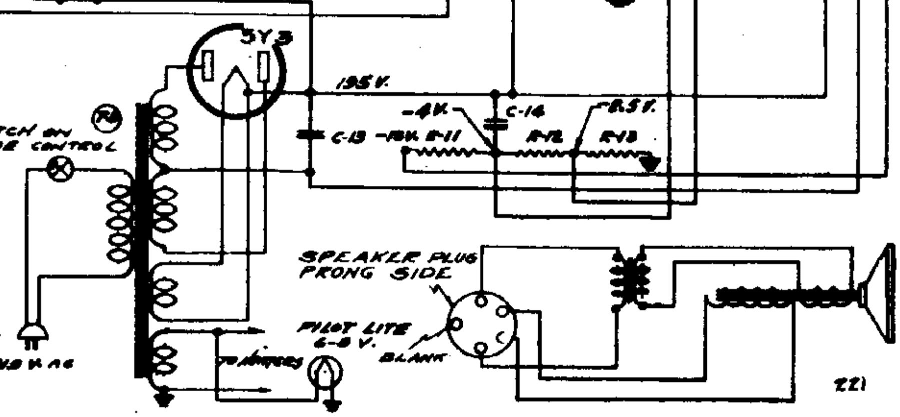


MODEL 587
Schematic

GOODYEAR TIRE & RUBBER CO., INC.

Voltage
Socket, Trimmers
Alignment





MISCELLANEOUS PARTS

T1	111-56A	Antenna Coil
T2	110-44	Oscillator Coil
T3	108-75A	Input I.F. 465 Kc.
T4	108-76A	Output I.F. 465 Kc.
T5	104-56	Power Transformer—60 Cycles
S	125-19	Band Switch
C	102-31	One Section of Two Gang Condenser

RESISTORS

No.	Part No.		Description
R1	130-111	100M	Ohms 1/10W—20%—50V Carbon
R2	130-12	50M	Ohms 1/3 W—20%—20V Carbon
R3	130-112	100	Ohms 1/10W—20%—10V Carbon
R4	130-22	5M	Ohms 1/3 W—20%—10V Carbon
R5	130-77	10M	Ohms 1 W—20%—100V Carbon
R6	130-110	1 meg	Ohm 1/10W—10%—100V Carbon
R7	101-49	1 meg	Ohm Volume Control
R8	130-113	2 meg	Ohm 1/10W—20%—100V Carbon
R9	130-20	100M	Ohms 1/3W—20%— 50V Carbon
R10	130-100	150M	Ohms 1/3W—20%— 50V Carbon
R11	106-26	220	Ohms
R12	106-26	33	Ohms
R13	106-26	52	Ohms

NOTE: R11, R12, and R13 in one unit—106-26

CONDENSERS

C1	129-63	.0004 Mica—W—10%
C2	100-26	.02 x 400 Volt—25%
C3	129-62	.00003 Mica—0—10%
C4	129-61	.0017 Mica—W—2½%
C5	100-9	.05 x 200 Volt—25%
C6	100-6	.25 x 200 Volt—25%
C7	100-11	.01 x 400 Volt—25%
C8	129-12	.00025 Mica—0—20%
C9	129-12	.00025 Mica—0—20%
C10	100-11	.01 x 400 Volt—25%
C11	100-19	.006 x 600 Volt—25%
C12	100-6	.25 x 200 Volt—25%
C13	103-6	8 mfd. x 350 Volt Electrolytic
C14	103-7	8 mfd. x 300 Volt Electrolytic
C15	124-29	Adjustable condenser 390 mmf. working capacity
C16	124-30	Adjustable Dual Condenser

**I. F. FREQUENCY
465 K. C.**

MODEL 587

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

ALIGNMENT FREQUENCIES

I.F. 465 KC.
S.W.OSC. TRIMMER 6.6 M.C.
B.C.OSC. TRIMMER 1720 KC.
B.C.ANT. TRIMMER 1550 KC.
B.C.SERIES PAD 600 KC.
S.W.ANT. TRIMMER 6M.C.

TUNING RANGE—
Standard Broadcast Band
535-1720 Kilocycles.
Short Wave Band
2280-6000 Kilocycles

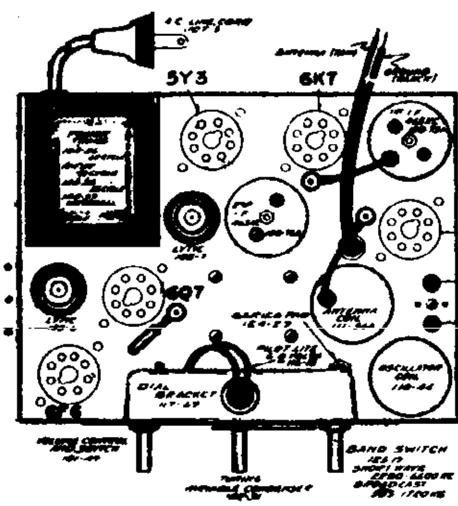


FIG. 1—TOP VIEW

Socket, Trimmers
Alignment

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 601, Runs 1,2
Schematic, Voltage

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83 Output I.F. Transformer
Part No. 108-82 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 78 tube, and adjust the output I.F. transformer (No. 108-83) to resonance.

(b) Move oscillator output clip from grid of 78 grid cap of 6A7 and adjust input I.F. transformer (No. 108-82) to resonance.

(c) With oscillator still connected to 6A7, readjust output I.F. transformer (108-83) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

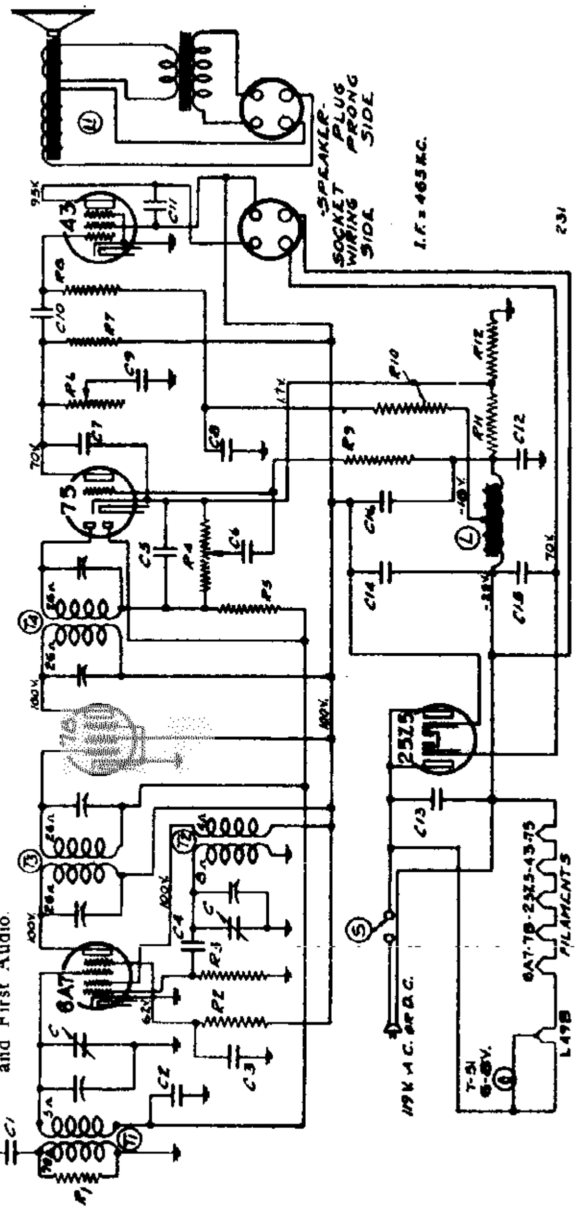
1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mmf. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

(b) Re-set external oscillator to 1550 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

(c) Check sensitivity at 600 and 1000 kilocycles.

Type 6A7 Pentagrid Mixer, First Detector-oscillator
Type 78 Remote Cut-Off Pentode, I.F. Amplifier (465 K.C.)
Type 75 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
Type 43 Pentode Output Amplifier
Type 25Z5 High Vacuum Rectifier.
Type L49B Ballast Tube.



MODEL 601—SERIES A

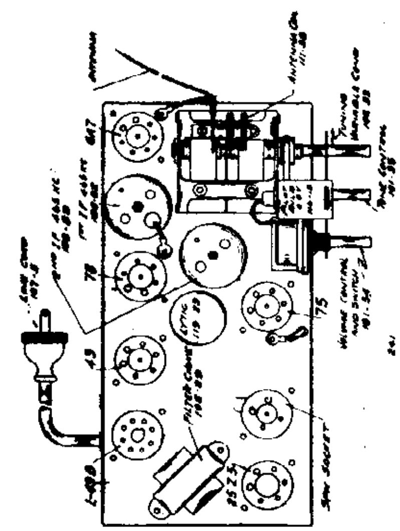


FIG. 2—TOP VIEW

RESISTORS

No.	Part No.		Description
R1	130-12	50M	Ohm—½W—20%— 20V—Carbon
R2	130-21	20M	Ohm—½W—20%— 20V—Carbon
R3	130-12	50M	Ohm—½W—20%— 20V—Carbon
R4	101-54	1 meg	Ohm—Volume Control
R5	130-119	3 meg	Ohm—½W—20%—100V—Carbon
R6	101-55	1 meg	Ohm—Tone Control
R7	130-120	100M	Ohm—½W—20%— 50V—Carbon
R8	130-5	300M	Ohm—½W—20%—100V—Carbon
R9	130-38	2 meg	Ohm—½W—20%—100V—Carbon
R10	130-9	200M	Ohm—½W—20%— 20V—Carbon
R11	106-28	35	Ohm—Muter Strip
R12	106-28	50	Ohm—Muter Strip

NOTE: R11 and R12 in one unit—No. 106-28.

CONDENSERS

C1	100-29	.002	x600 Volt—25%
C2	100-22	.05	x200 Volt—25%
C3	100-22	.05	x200 Volt—25%
C4	129-12	.00025	Mica—MT—20%
C5	129-12	.00025	Mica—MT—20%
C6	100-11	.01	x400 Volt—20%
C7	129-2	.0005	Mica—MT—20%
C8	100-20	.1	x200 Volt—25%
C9	100-11	.01	x400 Volt—25%
C10	100-11	.01	x400 Volt—25%
C11	100-25	.002	x600 Volt—25%
C12	100-6	.25	x200 Volt—20%
C13	100-39	.1	x400 Volt—20%
C14	119-25	16 mfd.	x100 Volt—Working Voltage
C15	119-25	5 mfd.	x100 Volt—Working Voltage
C16	119-25	8 mfd.	x100 Volt—Working Voltage

NOTE: C14, C15, and C16 in one unit—No. 119-25

C	102-33	One section of two gang condenser
T1	111-57	Antenna Coil
T2	110-46	Oscillator Coil
T3	108-82	Input I.F. Coil—465 Kc.
T4	108-83	Output I.F. Coil—465 Kc.
L	105-29	Filter Choke (Resistance 600 Ohms)
L1	114-43	Five Inch Speaker (Field resistance 3000 Ohms)
S	101-54	On and off switch on Volume Control

TUNING RANGE—
Standard Broadcast Band
535-1720 Kilocycles

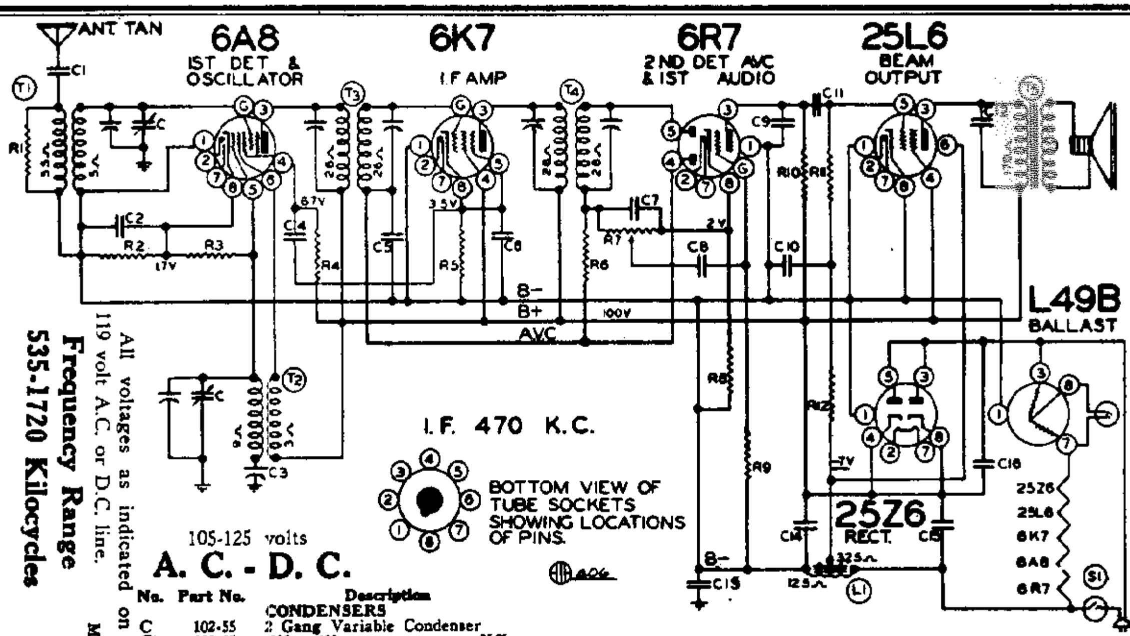
MODEL 601—SERIES B is the same as Series A, except for the following changes:-

1 - The C15 condenser was eliminated.
2 - The C14 condenser was replaced by a C15 (Part #119-29) 30 mfd. capacity, and the C16 was replaced by a C14 (Part #119-29) 5 mfd. capacity.

MODEL 602, Runs 1, 2
Schematic, Voltage

GOODYEAR TIRE & RUBBER CO., INC.

Socket, Trimmers
Alignment



I.F. 470 K.C.

BOTTOM VIEW OF TUBE SOCKETS SHOWING LOCATIONS OF PINS.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

Frequency Range
535-1720 Kilocycles

105-125 volts

A. C. - D. C.

No.	Part No.	Description	
		CONDENSERS	
C	102-55	2 Gang Variable Condenser	
C1	100-25	.002 x 600	25%
C2	100-22	.05 x 200	25%
C3	129-75	.0003386 Compression Type Condenser 1%	
C4	100-22	.05 x 200	25%
C5	100-9	.05 x 200	25%
C6	100-20	.1 x 200	25%
C7	129-21	.0002 Mica	20%
C8	100-11	.01 x 400	25%
C9	129-2	.0005 Mica	20%
C10	100-75	.22 x 200	10%
C11	100-10	.05 x 200	10%
C12	100-67	.025 x 400	25%
C13	100-53	.25 x 400	20%
C14	119-42	5. mfd. lytic 100 w. v.	
C15	119-42	20. mfd. lytic 100 w. v.	
C16	100-39	.1 x 400	20%
		RESISTORS	
R1	130-17	10M ohm — 1/3 w.	20%
R2	130-97	200 ohm — 1/3 w.	10%
R3	130-12	50M ohm — 1/3 w.	20%
R4	130-149	15M ohm — 1/3 w.	20%
R5	130-54	500 ohm — 1/3 w.	20%
R6	130-4	3 megohm — 1/3 w.	20%
R7	101-77	Volume Control (1 meg)	
R8	130-193	3M ohm — 1/3 w.	10%
R9	130-19	1 megohm — 1/3 w.	20%
R10	130-94	50M ohm — 1/3 w.	10%
R11	130-103	100M ohm — 1/3 w.	10%
R12	130-194	35M ohm — 1/3 w.	10%
		PARTS	
T1	111-79	Antenna Coil Complete	
T2	110-62	Oscillator Coil Complete	
T3	108-82B	Input I. F. Complete	
T4	108-83B	Output I. F. Complete	
T5	114-88	5" Dynamic Speaker	
L1		Speaker field 450 ohm— total tapped 125 ohm	
S1		Switch on volume control	

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

ALIGNING I.F. TRANSFORMERS: (470 K.C.):

Part No. 108-83B Output I.F. Transformer

Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

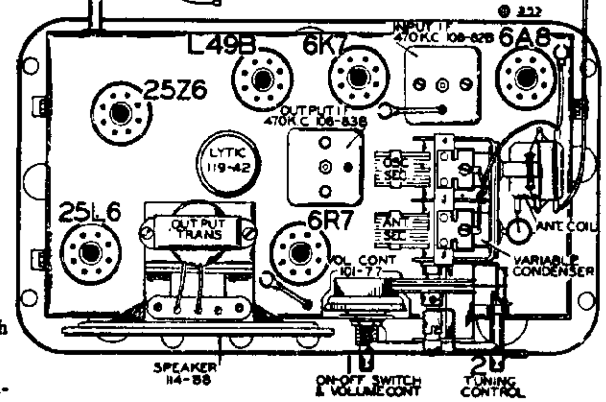
1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 470 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mmf. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

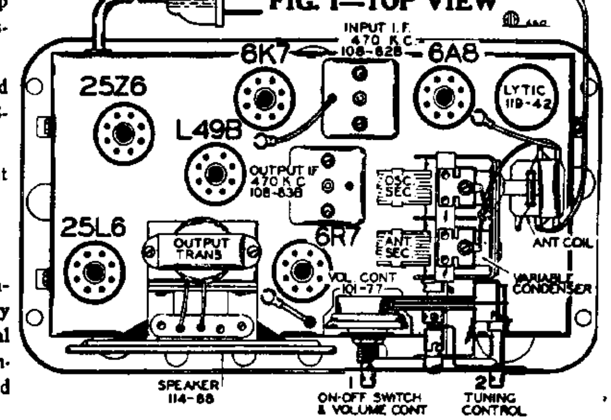
601 RUN1

FIG. 1—TOP VIEW



602 RUN2 **(Serial No. 878500 and up)**

FIG. 1—TOP VIEW

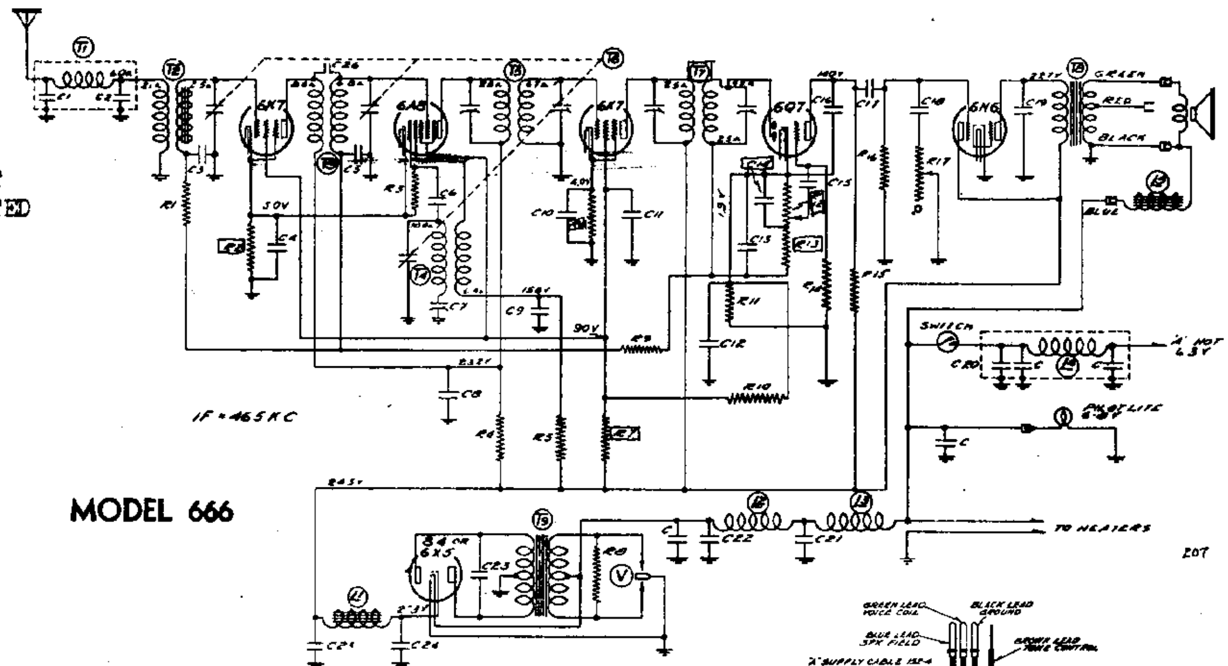


MODEL 666, Runs 1, 2
Schematic, Voltage
Socket, Trimmers
Changes

GOODYEAR TIRE & RUBBER CO., INC.

NOTE:- IN RUN 2 CERTAIN PARTS HAVE BEEN SUBSTITUTED WHICH DIFFER FROM THOSE OF THE FIRST RUN. THESE CHANGES ARE INDICATED BY THE BOXED NUMBERS ON THE SCHEMATIC AND IN THE PARTS LIST BELOW.

R2	130-79	400 Ohm - ½ Watt - 10% - 10 Volt - Carbon IRC
R6	130-101	600 Ohm - ½ Watt - 10% - 10 Volt - Carbon
R7	130-116	15M Ohm - 1.5 Watt - 10% - 100 Volt - Carbon
R12	101-41	500M Ohm - Volume Control and Switch
R13	130-94	50M Ohm - ½ Watt - 10% -10 Volt - Carbon
C14	129-66	.00015 Mica - MT - "O" 20%
T7	108-70	Output I.F. Coil—465 Kc.



No.	Part No.	Description
		RESISTORS
R1	130-20	100M Ohm - ½ Watt 20% - 50 Volt - Carbon
*R2	130-99	300 Ohm - ½ Watt - 20% - 10 Volt - Carbon
R3	130-94	50M Ohm - ½ Watt - 10% - 10 Volt - Carbon
R4	130-98	1500 Ohm - ½ Watt 20% - 25 Volt - Carbon
R5	130-42	20M Ohm - ½ Watt - 20% - 100 Volt - Carbon
*R6	130-70	500 Ohm - ½ Watt - 10% - 10 Volt - Carbon
*R7	130-95	12M Ohm - 1.2 Watt - 10% - 100 Volt - Carbon
R8	130-97	200 Ohm - ½ Watt - 10% - 10 Volt - Carbon
R9	130-3	500M Ohm - ½ Watt 20% - 100 Volt - Carbon
R10	130-108	40M Ohm - ½ Watt - 10% - 100 Volt - Carbon
R11	130-107	800 Ohm - ½ Watt - 10% - 10 Volt - Carbon
*R12	101-42	50M Ohm - Volume Control and Switch
*R13	130-22	5M Ohm - ½ Watt - 20% -10 Volt - Carbon
R14	130-68	1 Meg Ohm - ½ Watt - 10% - 20 Volt - Carbon
R15	130-9	200M Ohm - ½ Watt - 20% - 20 Volt - Carbon
R16	130-3	500M Ohm - ½ Watt - 20% - 100 Volt - Carbon
R17	101-45	1 Meg Ohm - Tone Control

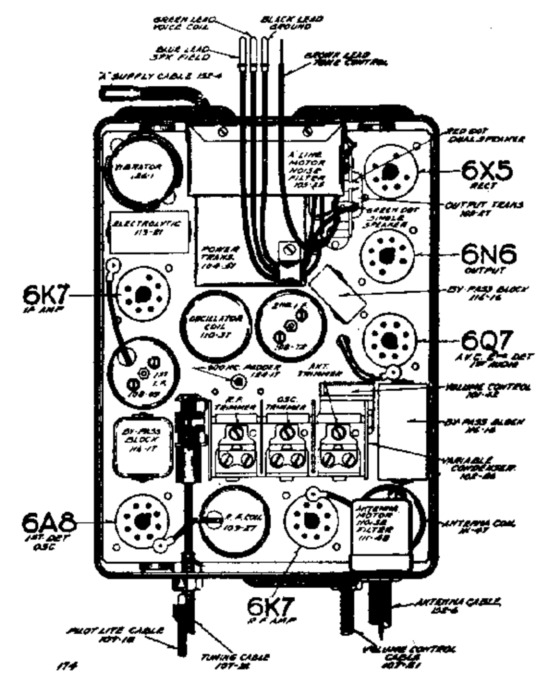
CONDENSERS

C		Spark Plate
C1	129-3	.00002 Mica - "O" - 20%
C2	129-49	.00009 Mica - "O" - 5%
C3	116-18	.05 x 200 Volt
C4	116-18	.25 x 200 Volt
C5	116-17	.05 x 200 Volt
C6	129-21	.0002 Mica - MT - "O" - 20%
C7	124-17	Single Padder J-4-8
C8	116-17	.1 x 400 Volt
C9	116-18	.1 x 400 Volt
C10	116-17	.1 x 200 Volt
C11	116-17	.1 x 200 Volt
C12	116-16	.05 x 200 Volt
C13	129-5	.0001 Mica - MT - "O" - 20%
*C14	129-2	.0005 Mica - MT - "O" - 20%
C15	116-18	.02 x 200 Volt
C16	129-5	.0001 Mica - MT - "O" - 20%
C17	116-16	.05 x 400 Volt
C18	100-37	.003 x 600 Volt - 10%
C19	116-16	.01 x 800 Volt
C20	100-35	.5 x 200 Volt - 50% - 10%
C21	100-35	.5 x 200 Volt - 50% - 10%
C22	100-35	.5 x 200 Volt - 50% - 10%
C23	100-36	.01 x 1400 Volt - 10%
C24	119-21	8.0 mfd. Lytic Cond. 350 Working Volts
C25	119-21	4.0 mfd. Lytic Cond. 350 Working Volts
C26		5.0 mmf. Gimmick

PARTS

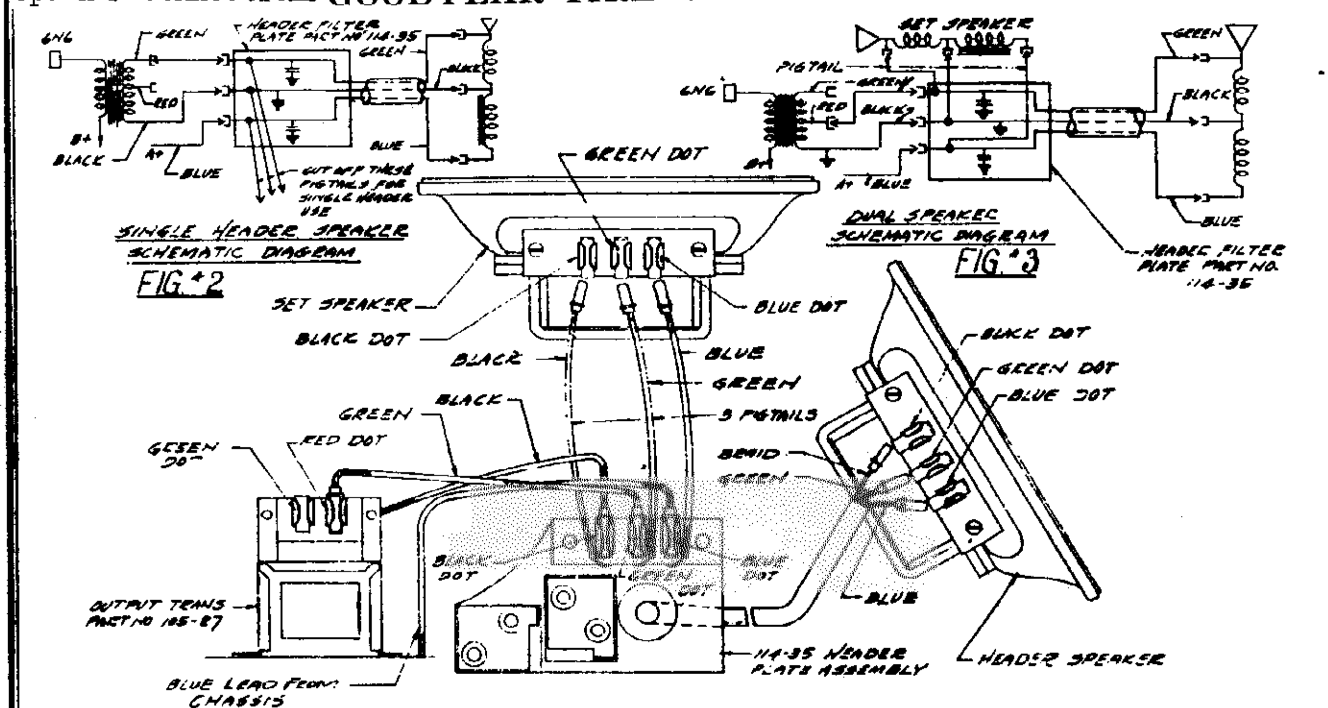
T1	111-48	Antenna Filter Coil Assembly
T2	111-47	Antenna Coil Assembly
T3	109-27	R.F. Coil Assembly
T4	110-37	Oscillator Coil Assembly
T5	108-69	Input I.F. Coil—465 Kc.
T6	102-26	Three Gang Variable Condenser
*T7	108-72	Output I.F. Coil—465 Kc.
T8	105-27	Output Transformer
T9	104-51	Power Transformer
L1	105-23	Filter Choke
L2	105-19	"A" Choke
L3	105-24	"A" Choke
L4	105-26	"A" Choke
L5	114-34	5¼" Speaker (Field Resistance—4 Ohms)
V	126-1	Vibrator

C3, C4, C9, C15, in one unit—part No. 110-18.
C5, C8, C10, C11, in one unit—part No. 116-17.
C12, C17, C19, in one unit—part No. 116-16.
C24, C25, in one unit—part No. 119-21.



MODEL 666, Runs 1, 2 — Alignment
Speaker Connections

GOODYEAR TIRE & RUBBER CO., INC.



NO SPARK PLUG SUPPRESSORS ARE REQUIRED

DESCRIPTION:

Model No. 666 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give *minimum* drift and variation of gain due to climatic changes.

The receiver is so designed that it may be used as either a single or two unit installation. Taps are provided on the output transformer to a pin jack terminal board, a red dot distinguishing dual speaker tap and green dot for single speaker operation.

For complete details see illustration and Header speaker data chart.

Dash kits for the remote control head are available for 1936 cars drilled for dash plates.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

TUBE COMPLEMENT

1—Type No. 6K7—Remote Cut-off Pentode as an R.F. Amplifier
1—Type No. 6A8—Pentagrid Converter (composite first detector and oscillator)
1—Type No. 6K7—Remote Cut-off Pentode as an I.F. Amplifier (465 K.C.)
1—Type No. 6Q7—Duplex Diode Triode Second Detector, A.V.C. and First Audio
1—Type No. 6N6—Twin Triode Output Amplifier
1—Type No. 6X5—High Vacuum Rectifier

The tube complement consists of the latest "Metal-Glass" tubes which are interchangeable with metal tubes.

Cars with floating power must have the motor bonded to the bulkhead and again to the frame to provide a direct path for the high frequency interference developed in the ignition system. ⅝" copper braid will be necessary, SMALL DIAMETER WIRE WILL NOT DO. Bond flexible shaft leads, such as free wheeling, choke wires, etc., which pick up motor noise and reradiate it into the car. Free wheeling cables should be grounded at the point at which they go through the fire wall of the car. In extreme cases it has been found necessary to ground the steering column.

I.F. ALIGNMENT

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-72 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-69 to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT

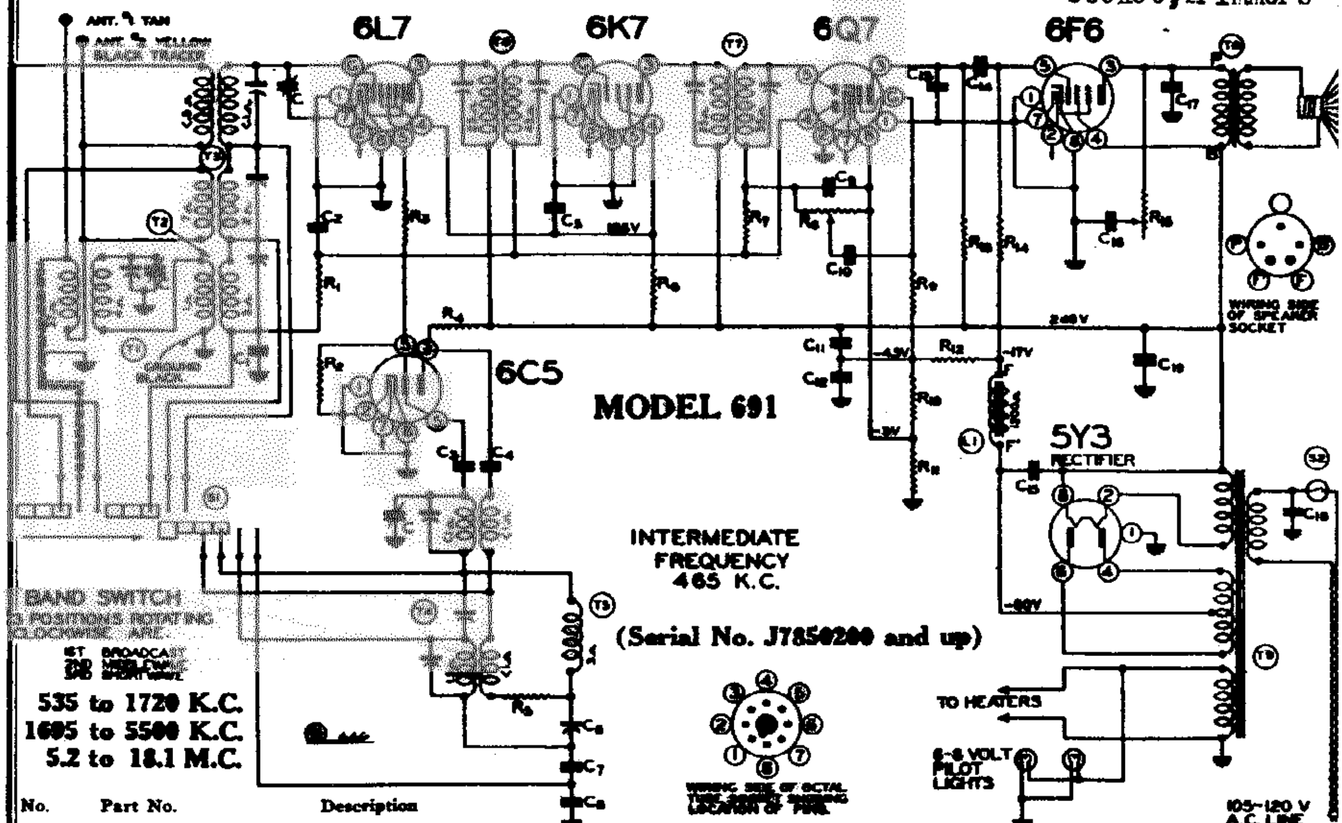
1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 KC. Adjust series pad rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

Make certain that the instrument panel has a ground connection to the frame of the car.

NOTE—Where ignition coils are mounted in motor compartments a .5 mfd cond (148-1 or 148-3) connected between primary coil terminal and receiver mounting bolt will often reduce motor noise.

MODEL 691
Schematic, Voltage
Socket, Trimmers

GOODYEAR TIRE & RUBBER CO., INC.



No.	Part No.	Description
		RESISTORS
R1	130-103	100M ohm - 1/3 w.
R2	130-12	50M ohm - 1/3 w.
R3	130-105	150 ohm - 1/3 w.
R4	130-77	10M ohm - 1 watt
R5	130-27	50 ohm - 1/3 w.
R6	130-34	19M ohm - 1 watt
R7	130-4	3 meg - 1/3 w.
R8	101-93	1 meg volume control
R9	130-4	3 meg - 1/3 w.
R10	106-26	32 ohm - resistor strip
R11	106-26	52 ohm - resistor strip
R12	106-26	280 ohm - resistor strip
R13	130-103	100M ohm - 1/3 w.
R14	130-102	500M ohm - 1/3 w.
R15	101-92	50M ohm - tone control
		R10, R11 and R12 in same unit
		CONDENSERS
C	108-60	3 gang variable
C1	100-22	.05 x 200
C2	100-26	.02 x 400
C3	120-30	.00005 Mica
C4	100-37	.003 x 600
C5	100-1	.1 x 400
C6	124-40	.000715 W.C. Series Pad
C7	120-55	.0034 Mica
C8	120-54	.003 Mica
C9	120-5	.0001 Mica
C10	100-26	.02 x 400
C11	119-45	8 mfd. - 400 w. v. lytic
C12	100-20	.1 x 200
C13	120-2	.0005 Mica
C14	100-11	.01 x 400
C15	119-45	8 mfd. 400 w. v. lytic
C16	100-65	.015 x 600
C17	100-37	.003 x 600
C18	100-61	.02 x 600
C19	100-11	.01 x 400
		C11 and C15 in same unit
		PARTS
T1	111-51	Preselector Coil
T2	111-49	B. C. Antenna Coil Complete
T3	111-50	S.W. M.W. Antenna Coil complete
T4	110-39	S.W. M.W. Oscillator Coil complete
T5	110-38	B.C. Oscillator Coil complete
T6	108-109	Input I.F. Coil complete 465 kc.
T7	108-110	Output I.F. Coil complete 465 kc.
T8	114-85B	6" dynamic Speaker
T9	104-106	Power Transformer
L1		Speaker field 1200 ohm
S1	125-40	Wave band switch
S2		Off-On Switch on Volume Control

Mica condensers are coded with an additional dot indicating tolera

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

The power consumption of this receiver is 75 watts.

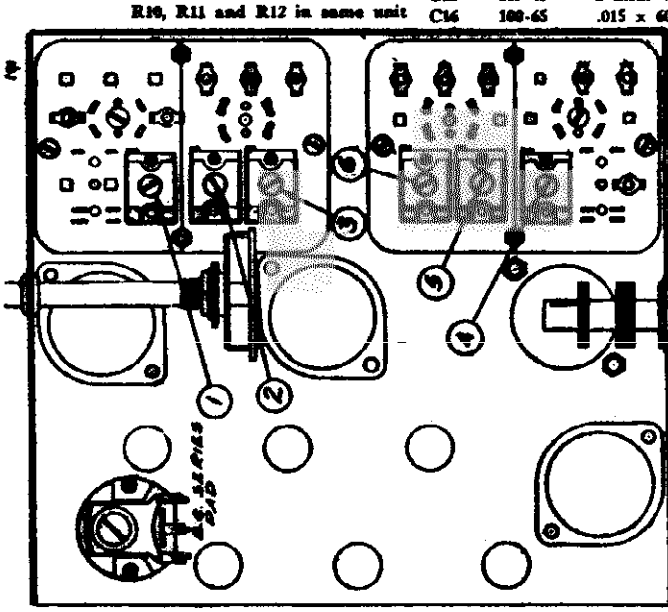


FIG. 3—BOTTOM VIEW SHOWING TRIMMERS

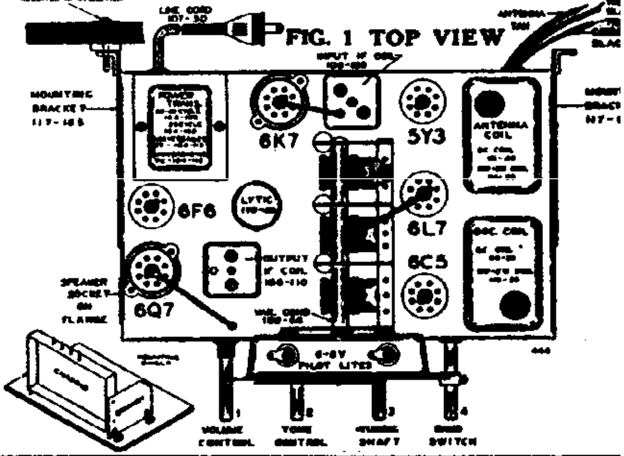


FIG. 1 TOP VIEW

MODEL 691
MODEL 787
Alignment

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 691 (Serial No. J7850200 and up)

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-110 Output I.F. Transformer
Part No. 108-109 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-110) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6L7 and adjust input I.F. transformer (No. 108-109) to resonance.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number, 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.2 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.2 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments.
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5500 kilocycles and 1695 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

MODEL 787

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS; (465 K.C.):

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly, Fig. 3).
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.2 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

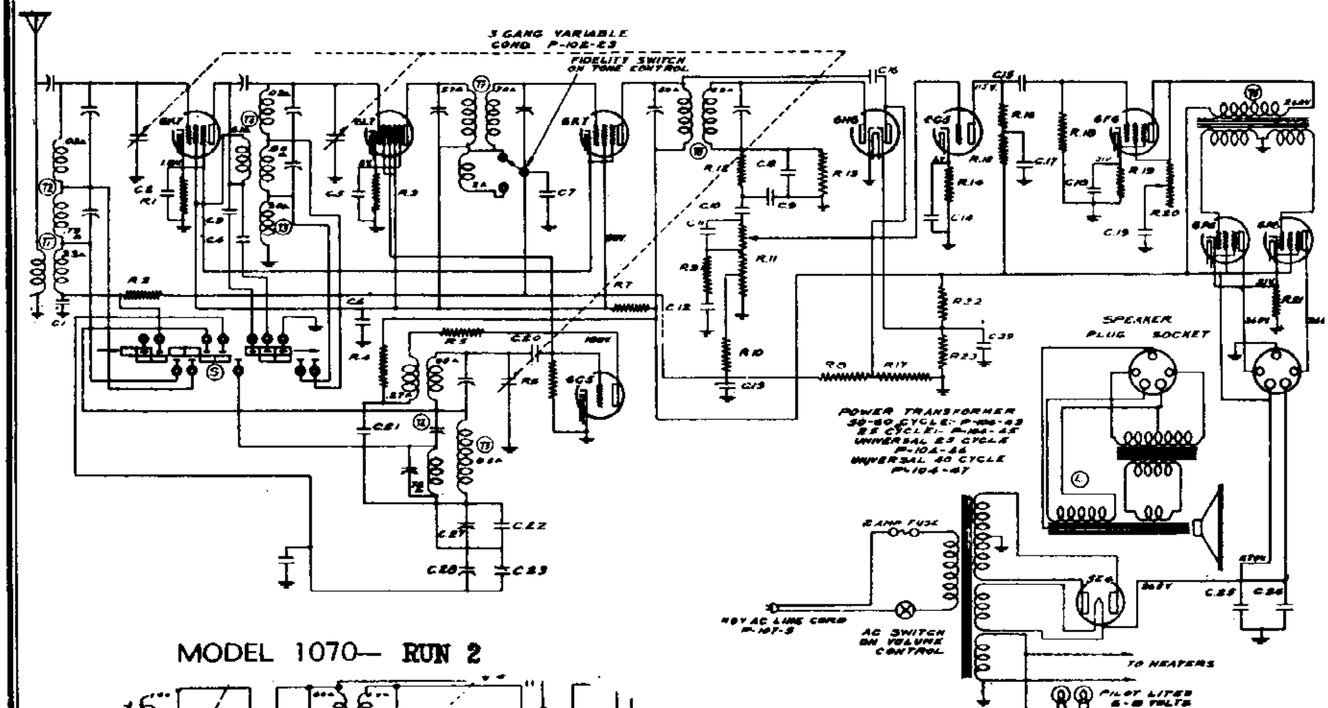
MIDDLE WAVE BAND ALIGNMENT:
1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

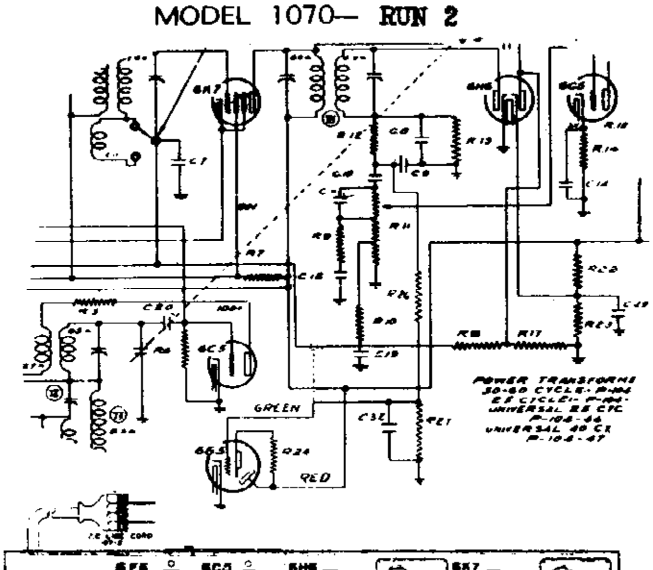
Schematic,Socket
Trimmers,Changes

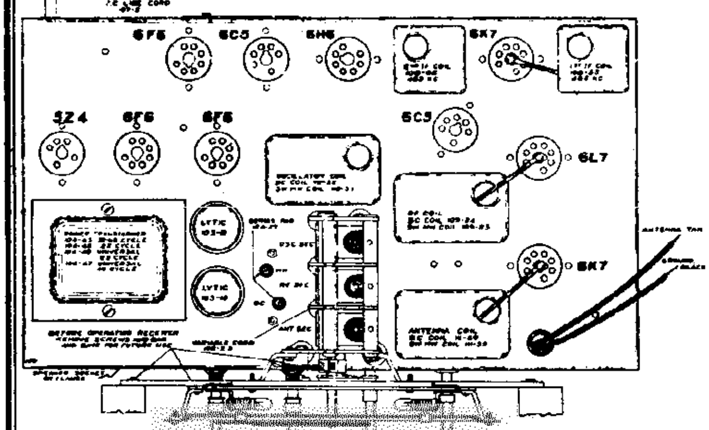
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 1070— RUN 1



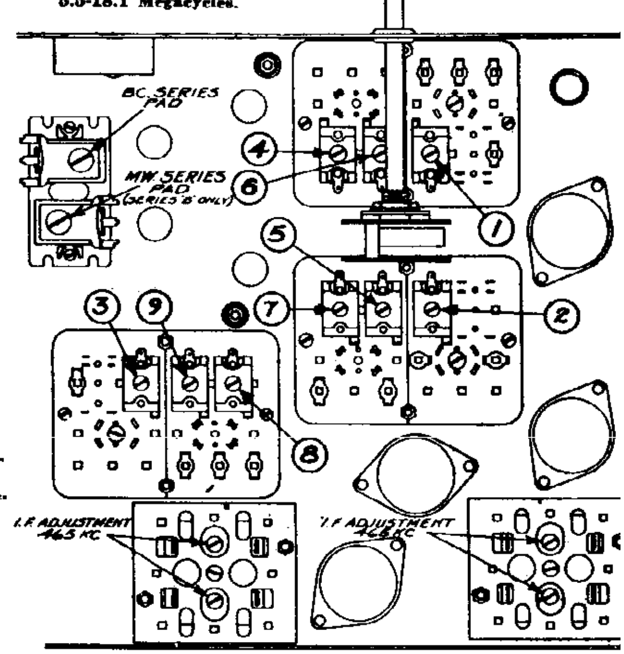
MODEL 1070— RUN 2





I. F. FREQUENCY 465 K. C.

TUNING RANGE—
Standard Broadcast Band 535-1725 Kilocycles.
Intermediate Band 1720-5500 Kilocycles
Short Wave Band 5.5-18.1 Megacycles.



BOTTOM VIEW—SHOWING TRIMMERS

MODEL 1070, Runs 1, 2
Alignment, Parts

GOODYEAR TIRE & RUBBER CO., INC.

10-Tube A. C. All Wave

3-Band High Fidelity Superheterodyne Receiver with Cathode Ray Tuning Indicator

MODEL 1070 - RUN 2

NOTE:—Operation of Cathode-Ray Tuning Indicator

Due to unsatisfactory indication of the cathode-ray tuning indicator on weak signals in some territories, a change was made in the circuit to correct this condition and still allow the tube to operate correctly on a strong signal.

Referring to the circuit diagram, resistors R26, R27 and condenser C32 were added and connected to the green wire from the cathode-ray tuning indicator as shown.

The dotted line on the circuit diagram indicates the manner in which the green wire for the cathode-ray tuning indicator cable was formerly connected, before resistors R26, R27 and condenser C32 were added.

1—Type 6G5 Cathode ray tuning indicator.

Form 1086 [illegible]

MODEL 1070 - RUN 1

DESCRIPTION

The tube complement of this chassis is as follows:
1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6L7 Pentode and detector
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (466 K.C.)
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6C6 First audio amplifier
1—Type 6F6 Pentode driver stage
2—Type 6F6 Class AB Output pentodes in push-pull
1—Type 5Z4 High vacuum rectifier

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 240 volts (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are [illegible] control full on, all tubes in their sockets [illegible] with a volt meter having a resistance of [illegible]. These voltages are clearly indicated on the [illegible].

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON [illegible] ACCURACY OF VOLTAGE MEASUREMENTS [illegible] AND GROUND LEADS SHOULD [illegible] WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 119 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

This chassis is protected against damage from faulty tubes or abnormal line conditions by a fuse in the primary circuit.

If when set is turned on pilot lights do not light, look for a blown fuse.

This fuse is made accessible for replacement by removing fuse cover located on back flange of chassis, replace only with a 2 ampere fuse. If replacement fuse blows out, check tubes, (particularly 5Z4 rectifier) circuit, repair or replace defective tubes or parts.

NEVER ATTEMPT TO REPLACE FUSE WITHOUT FIRST DISCONNECTING POWER.

NEVER REPLACE WITH FUSE OTHER THAN 2 AMPERE RATING.

NOTE: Chassis with serial numbers from 5K194560 to 5K[illegible] have the fuse mounted on the under-side of the chassis, it is necessary to remove the chassis from the cabinet to replace the fuse.

ALIGNING INSTRUCTIONS
Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first [illegible] trouble, [illegible] low [illegible] order [illegible] absorpted [illegible] them [illegible] four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS (466 K.C.)

Part No. 108-82 Output I.F. Transformer
Part No. 108-66 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

1. With volume control full on, [illegible] the following adjustments:

(a) Connect external oscillator set at 466 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer to resonance.

(c) With oscillator still connected to 6L7, re-adjust output I.F. transformer.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

(a) Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.

(b) Re-set external oscillator to 1400 K.C., move dial/pointer to 1400 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.

(c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

(a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.

(b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 1800 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

(a) Rotate variable condenser to approximately 1800 K.C., tune in oscillator signal and adjust M.W. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.

(b) Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.

(c) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. intermediate wave adjustments.

REPAIR PARTS LIST—MODEL 1070—RUN 1
REPAIR PARTS LIST—MODEL 1070—RUN 2

Part No.	Description	Circuit Diagram Reference	List Price Each
	CONDENSERS		
[illegible]	[illegible] Tubular	C17, C19	$0.25
[illegible]	[illegible] Tubular with Bracket	C2	.35
[illegible]	[illegible] Tubular	C39	.25
[illegible]	[illegible] Tubular	C1, C7, C10	.25
[illegible]	[illegible]	C32	.25
[illegible]	[illegible]	C18, C21	.25
[illegible]	[illegible]	C5	.25
[illegible]	[illegible]	C12, C13	.25
[illegible]	[illegible]	C6	.35
[illegible]	[illegible]	C31	.35
[illegible]	[illegible] Electrolytic	C25	1.35
[illegible]	[illegible] Electrolytic	C26	1.35
[illegible]	[illegible] Electrolytic	C14, C15	1.35
[illegible]	[illegible]	C30	.75
[illegible]	[illegible]	C11	.25
[illegible]	[illegible]	C16	.25
[illegible]	[illegible]	C4	.25
[illegible]	[illegible]	C23	.25
[illegible]	[illegible]	C22	.25
[illegible]	[illegible]	C24	.30
[illegible]	[illegible]	C3	.25
[illegible]	[illegible]	C8, C9	.25
[illegible]	[illegible]	C20	.25
	RESISTORS		
[illegible]	Metal Clad Resistor	R19, R21	.50
[illegible]	400M Ohm - ½ Watt - 20% - 100 Volt Carbon	R8, R17, R18	.20
[illegible]	300M Ohm - ½ Watt - 20% - 50 Volt Carbon	R22	.20
[illegible]	200M Ohm - ½ Watt - 20% - 50 Volt Carbon	R13	.20
[illegible]	100M Ohm - ½ Watt - 20% - 50 Volt Carb	R2, R12, R15, R16	.20
[illegible]	50M Ohm - ½ Watt - 20% - 50 Volt Carbon	R24, R25	.20
[illegible]	5M Ohm - ½ Watt - 20% - 10 Volt Carbon	R9	.20
[illegible]	10M Ohm - ½ Watt - 20% - 50 Volt Carbon	R14	.20
[illegible]	[illegible] Ohm - 1 Watt - 20% - 100 Volt Carbon	[illegible]	.20
[illegible]	[illegible] Ohm - ½ Watt - 20% - 10 Volt Carbon	[illegible]	.20
[illegible]	150 Ohm Watt—10%	R5	.20
[illegible]	250 Ohm - ½ Watt - 20% - 10 Volt Carbon	R3	.20
[illegible]	150 Ohm - ½ Watt - 20% - 10 Volt Carbon	R1	.20
[illegible]	[illegible] Ohm - ½ Watt - 20% - 10 Volt Carbon	R10	.20
[illegible]	[illegible] Ohm - ½ Watt - Wire Wound	R7	[illegible]
[illegible]	1 Megohm—1/10 Watt—20%—100 Volt Carbon	R26	.20
[illegible]	1 Megohm—1/10 Watt—20%—100 Volt Carbon	R6	.20
[illegible]	4 Megohm—1/10 Watt—20%—100 Volt Carbon	R27	.20
	COILS		
[illegible]	Input I.F. Coil Assembly Complete—Less Can	T7	2.00
[illegible]	Output I.F. Coil Assembly Complete—Less Can	T8	1.50
[illegible]	Broadcast R.F. Coil Assembly Complete—Less Can	T3	.50
[illegible]	Mid-Wave & Short Wave R.F. Coil Assembly Complete—Less Can	T4	1.50
110-35	Broadcast Oscillator Coil Assembly Complete—Less Can	T5	.50
110-32	Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can	T6	1.00
111-39	Mid-Wave & Short Wave Antenna Coil Assembly Complete—Less Can	T2	1.00
111-40	Broadcast Antenna Coil Assembly Complete—Less Can	T1	.75
	TRANSFORMERS		
104-45	50/60 Cycle Power Transformer		[illegible]
104-46	25 Cycle Power Transformer		[illegible]
104-66	Universal - 25 Cycle Primary		[illegible]
104-47	Universal - 40 Cycle Primary		[illegible]
104-50	50/60 Cycle - Special 135 Volt Power Transformer		7.00
	SOCKETS		
121-4	Five Prong Socket - "Speaker"		.10
121-13	Seven Prong Socket - "6K7"		[illegible]
121-14	Seven Prong Socket - "6F6"		[illegible]
121-16	Five Prong Socket - "5Z4"		[illegible]
121-17	Six Prong Socket - "6C5"		[illegible]
121-18	Seven Prong Socket - "6L7"		[illegible]
121-15	Seven Prong Socket - "6H6"		[illegible]
	SPEAKER		
114-30	Twelve Inch Dynamic (Field 1540 Ohm)	L	10.00
	MISCELLANEOUS		
101-66	Volume Control and Switch (1 Meg. Ohm)	R11	[illegible]
101-40	Tone Control and Fidelity Switch (5M Ohm)	R20	[illegible]
102-[illegible]	Three Gang Variable Condenser		[illegible]
107-5	Line Cord and Plug		[illegible]
[illegible]	Antenna, Oscillator & R. F. Shield		[illegible]
[illegible]	I.F. Shield		[illegible]
[illegible]-17	Audio Transformers	T9	1.00
[illegible]	J-4-D Series Dual Pad	C27, C28	[illegible]
[illegible]-10	Wave Change Switch	S	[illegible]
[illegible]-47	Fuse Clip Assembly		[illegible]
[illegible]-11	Wood Knob with Spring		[illegible]
121-34	2 Amp. Fuse - Type 3AG		.10

CATHODE-RAY TUNING INDICATOR PARTS

Part No.	Description	List Price Each
107-33	Cable and Socket Assembly	$0.75
115-[illegible]	Metal Oval Escutcheon	[illegible]
117-67	Holder and Clamp	[illegible]
[illegible]-110	1 Meg. Ohm—1/10 Watt—10%—100 Volt Carbon	.20

DIAL PARTS LIST

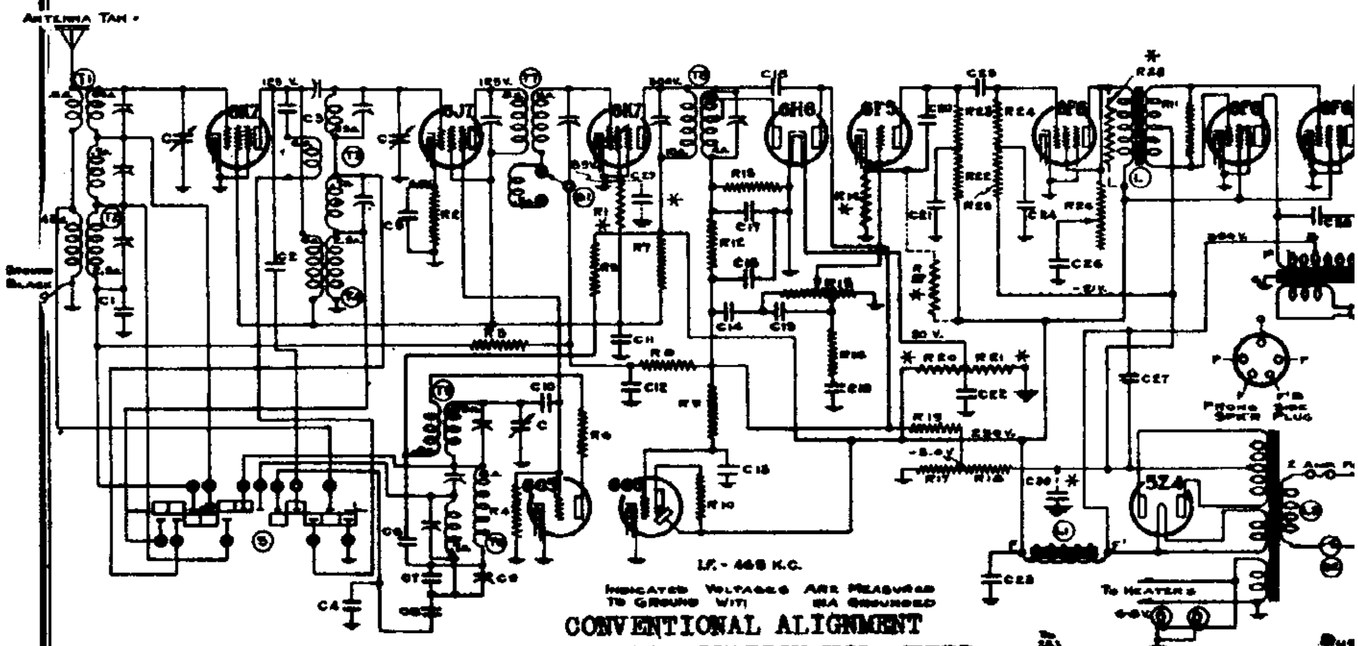
ASSEMBLIES

Part No.	Description	List Price Each
119-134	Belt Take-up Assembly—Including: 1—No. 117-[illegible] Take-up Arm; 1—No. 117-[illegible] Take-up Pulley; 1—No. 117-[illegible]A Stud for Above; [illegible]—No. 117-[illegible]A Stud; 1—No. 121-[illegible] Spring Washer; [illegible]—No. 124-[illegible] Horse Shoe Washer	.40
119-13[illegible]	Switch Assembly—Including: [illegible]	.65
119-135	Volume Indicator Assembly—Including: [illegible]; 1—No. 124-0 [illegible] Washer	.75
119-136	Tone Indicator Assembly—Including: 1—No. 119-13[illegible] [illegible]; 1—No. 117-[illegible] [illegible]; 1—No. 120-[illegible]A [illegible]; 1—No. 120-7 Coil Spring; [illegible]—No. 120-[illegible] Fish Line; 1—No. 117-[illegible] Pulley; 1—No. 124-[illegible] Red Celluloid	.70
119-137	Dial Plate Assembly—Including: 1—No. 117-17 Dial Plate; [illegible]—No. 117-11 Dial Bracket; [illegible]—No. 120-[illegible] Rivets; [illegible]—No. 117-[illegible]A Volume & Tone Indicator Stude; 1—No. 117-10 Bushing for Tuning Shaft; No. 124-0 Horse Shoe Washer	1.00
119-138	Switch Arm Assembly—Including: 1—No. 117-1[illegible] Switch Arm; 1—No. 117-[illegible] Bushing; [illegible]—No. 121-1[illegible] Set Screw	.50

DIAL PARTS ONLY

Part No.	Description	List Price Each
119-[illegible]A	Tuning Shaft [illegible]	.05
11[illegible]	[illegible] Escutcheon Only	1.00
11[illegible]	[illegible] No. 120-5 Screw	[illegible]
11[illegible]	[illegible] Disc	.10
11[illegible]	[illegible] Dial Only	[illegible]
11[illegible]	[illegible]	1.[illegible]
11[illegible]	[illegible]	[illegible]
119-136	Pilot Light Socket	.10
12[illegible]-137	Pilot Light Socket	.10
12[illegible]-12[illegible]	Oval Glass Retaining Ring	[illegible]
107-14	6-8 Volt, T-46 Pilot Light	[illegible]
117-[illegible]A	Drive Belt Pulley	.10
117-20	Background Plate (Specify if Blue or Brown Desired)	[illegible]
117-[illegible]	Reflector Plate	[illegible]
120-4	Drive Belt Take-up Coil Spring	[illegible]
121-[illegible]	Glass Retaining Clips	.025

GOODYEAR TIRE & RUBBER CO., INC.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

BAND CHANGE SWITCH
THREE POSITIONS, ROTATING
CLOCKWISE ARE:
1st BROADCAST: 535-1720 K.C.
2nd MIDDLE WAVE: 1690-5300 K.C.
3rd SHORT WAVE: 5.2-18.1 M.C.

TUNING RANGE—

Standard Broadcast Band
535-1720 Kilocycles.

Middle Wave Band
1690-5300 Kilocycles

Short Wave Band
5.2-18.1 Megacycles.

No.	Part No.	Description
		RESISTORS
*R1	130-76	30M Ohm—½ Watt—20%—Carbon
R2	130-129	2500 Ohm—½ Watt—10%—Carbon
R3	130-20	100M Ohm—½ Watt—20%—Carbon
R4	130-12	50M Ohm—½ Watt—20%—Carbon
R5	130-77	10M Ohm—1 Watt—20%—Carbon
R6	130-60	100 Ohm—½ Watt—20%—Carbon
R7	130-88	10M Ohm—2 Watt—20%—Wire Wound
R8	130-19	1 meg Ohm—½ Watt—20%—Carbon
R9	130-4	3 meg Ohm—½ Watt—20%—Carbon
R10	130-110	1 meg Ohm—1/10 Watt—10%—Carbon
R11	130-21	20M Ohm—½ Watt—20%—Carbon
R12	130-20	100M Ohm—½ Watt—20%—Carbon
R13	130-20	100M Ohm—½ Watt—20%—Carbon
*R14	130-70	500 Ohm—½ Watt—10%—Carbon
R15	101-47	1 meg Ohm—Volume Control
R16	130-22	5M Ohm—½ Watt—20%—Carbon
R17	106-31	30 Ohm—Muter
R18	106-31	175 Ohm—Muter
R19	130-3	500M Ohm—½ Watt—20%—Carbon
*R20	130-130	100M Ohm—½ Watt—10%—Carbon
*R21	130-82	10M Ohm—½ Watt—10%—Carbon
R22	130-20	100M Ohm—½ Watt—20%—Carbon
R23	130-20	100M Ohm—½ Watt—20%—Carbon
R24	130-45	250M Ohm—½ Watt—20%—Carbon
R25	130-45	250M Ohm—½ Watt—20%—Carbon
R26	101-40	5000 Ohm Tone Control
*R27	130-130	100M Ohm—½ Watt—10%—Carbon
*R28	130-131	20M Ohm—½ Watt—10%—Carbon

NOTE: R17 and R18 in one Unit—No. 106-31.

CONDENSERS

C1	100-9	.05 x 200 Volt—25%
C2	129-59	.0003 Mica—5%—MT—0
C3	129-39	.00005 Mica—20%—MT—0
C4	129-69	.0033 Mica—2½%—MT—0
C5	100-9	.05 x 200 Volt—25%
C6	100-13	.05 x 400 Volt—25%
C7	129-57	.0005 Mica—5%—MT—0
C8	129-55	.0034 Mica—2½%—MT—0
C9	124-34	200 mmf. Working cap. adjustable Pad
C10	129-31	.000025 Mica—15%—MT—0
C11	100-41	.25 x 400 Volt—20%
C12	100-9	.05 x 200 Volt—25%
C13	100-11	.01 x 400 Volt—25%
C14	100-22	.05 x 200 Volt—25%
C15	129-12	.00025 Mica—20%—MT—0
C16	129-60	.00015 Mica—20%—MT—0
C17	129-60	.00015 Mica—20%—MT—0
C18	129-3	.00002 Mica—20%—MT—0
C19	100-9	.05 x 200 Volt—25%
C20	129-5	.0001 Mica—20%—MT—0
C21	100-20	.1 x 200 Volt—25%
C22	100-19	.006 x 600 Volt—25%
C23	103-8	14 mfd.—400 Volt—Electrolytic
C24	100-20	.1 x 200 Volt—25%
C25	100-13	.05 x 400 Volt—25%
C26	100-45	.1 x 600 Volt—25%
C27	103-10	30 mfd. x 450 Volt—Electrolytic
C28	100-32	.0005 x 1000 Volts—20%
*C29	100-11	.01 x 400 Volts—25%
*C30	100-20	.1 x 200 Volt—25%

PARTS

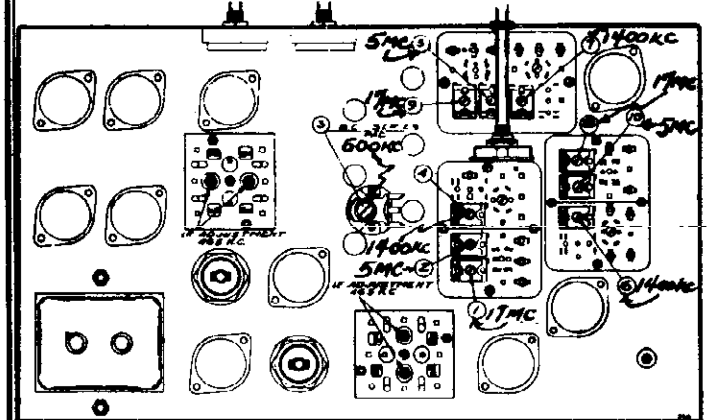
C	102-35	One section of three gang condenser
T1	111-54	MW and SW Antenna Coil Assem.
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-29	MW and SW R.F. Coil Assem.
T4	109-30	Broadcast R.F. Coil
T5	110-42	MW and SW Osc. Coil Assem.
T6	110-43	Broadcast Osc. Coil Assem.
T7	108-64	Input I.F. Coil—465 Kc.
T8	108-63	Output I.F. Coil—465 Kc.
L	105-33	Audio Transformer
L1	114-47C	Speaker (Field Resist. 1225 ohm) H
L2	104-72	Power Transformer (50-60 Cycle)
S	125-18	Band Switch
S1	101-40	Fidelity Switch on Tone Control
S2	101-47	On-Off Switch on Volume Control

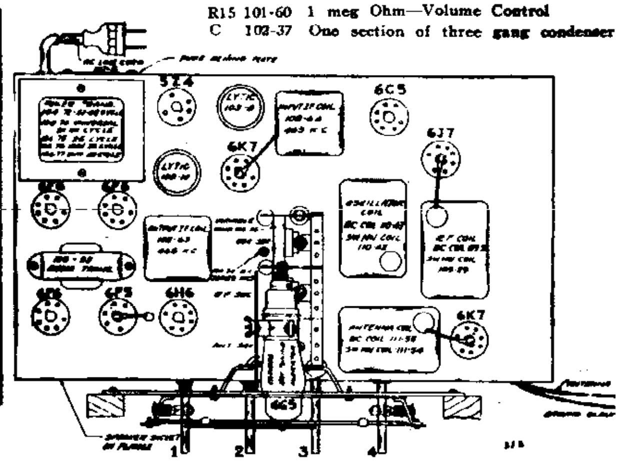
NOTE: Resistors and Condensers which are pr fixed with an asterisk (*) on the circuit diagra and parts list were added or the values chang during production to meet certain conditions.

Resistors R1, R27, R28, and Condensers C29, C were added to correct certain variances of tu characteristics. Resistors R14, R20, R21 the valu were changed. In some chassis the values of the resistors are as follows:
R14—2500 Ohm—½ Watt
R20—200M Ohm—½ Watt
R21—20M Ohm—½ Watt
Present values of these resistors are:
R14—500 Ohm—½ Watt
R20—100M Ohm—½ Watt
R21—10M Ohm—½ Watt

MODEL 1171 USES THESE PART NUMBERS:-

R15	101-60	1 meg Ohm—Volume Control
C	102-37	One section of three gang condenser



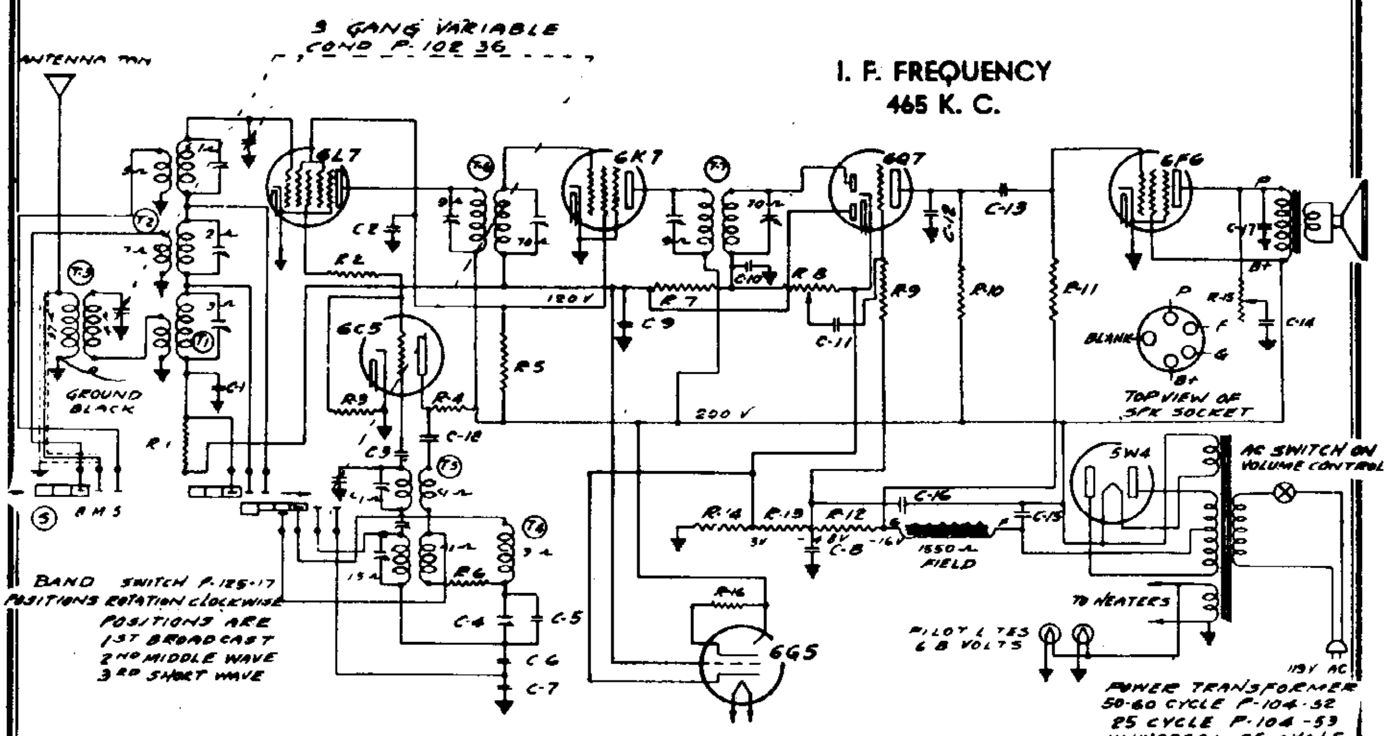


ORDER OF ADJUSTMENTS
I.F., B.C., S.W., MIDDLE BAND

FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

MODEL 787
Schematic, Voltage
Socket, Trimmers

GOODYEAR TIRE & RUBBER CO., INC.



RESISTORS

No.	Part No.	Description
R1	130-20	100M Ohm—½ Watt—20%— 50 Volt Carbon
R2	130-105	150 Ohm—½ Watt—20%— 10 Volt Carbon
R3	130-12	50M Ohm—½ Watt—20%— 10 Volt Carbon
R4	130-104	9M Ohm— 1 Watt—20%—100 Volt Carbon
R5	130-34	19M Ohm— 1 Watt—20%—100 Volt Carbon
R6	130-27	50 Ohm—½ Watt—20%— 3 Volt Carbon
R7	130-19	1 Meg Ohm—½ Watt—20%—100 Volt Carbon
R8	101-46	1 Meg Ohm—Volume Control
R9	130-4	3 Meg Ohm—½ Watt—20%—100 Volt Carbon
R10	130-103	100M Ohm—½ Watt—20%— 50 Volt Carbon
R11	130-102	500M Ohm—½ Watt—10%— 50 Volt Carbon
R12	106-26	220 Ohm
R13	106-26	32 Ohm
R14	106-26	52 Ohm
R15	101-53	50M Ohm—Tone Control
R16	130-110	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon

CONDENSERS

No.	Part No.	Description
C1	100-22	.05x200 Volt—25%
C2	100-1	.1x400 Volt—+50%—10%
C3	129-39	.00005 Mica (MT-O)—20%
C4	124-28	Series Pad (80-225)
C5	129-65	.00055 Mica (MT-O)—5%
C6	129-55	.0034 Mica (MW-W)—2½%
C7	129-54	.003 Mica (MW-W)—2½%
C8	100-20	.1x200 Volt—25%
C9	100-22	.05x200 Volt—25%
C10	129-12	.00025 Mica (MT-O)—20%
C11	100-11	.01x400 Volt—25%
C12	129-2	.0005 Mica (MT-O)—20%
C13	100-11	.01x400 Volt —25%
C14	100-27	.025x600 Volt—25%
C15	103-6	8 Mfd. x 350 Volt Electrolytic
C16	103-7	8 Mfd. x 300 Volt Electrolytic
C17	100-25	.002x600 Volt—20%
C18	100-37	.003x600 Volt—10%

PARTS

No.	Part No.	Description
T1	111-49	Broadcast Antenna Coil
T2	111-50	S.W.-M.W. Antenna Coil
T3	111-51	B.C.-Pre-Selector Coil Assem.
T4	110-38	B.C. Oscillator Coil
T5	110-39	S.W.-M.W. Oscillator Coil
T6	108-74	Input I.F. - 465 K.C.
T7	108-73	Output I.F. - 465 K.C.
S	125-17	Wave Change Switch

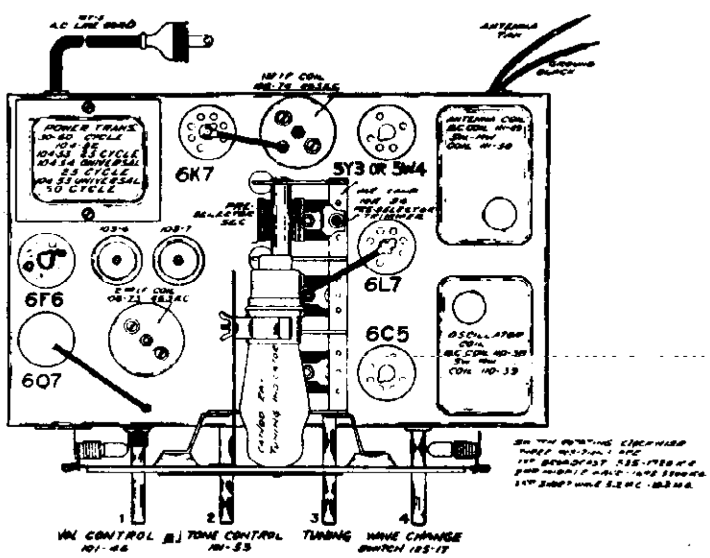
TUNING RANGE—

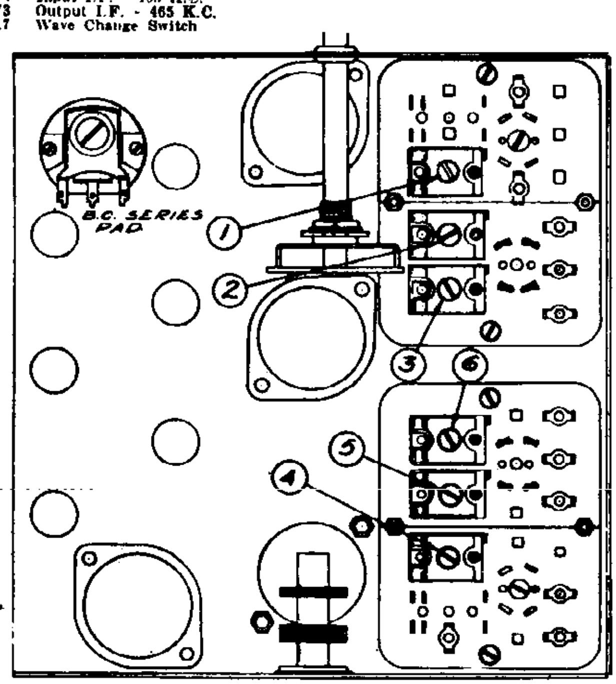
Standard Broadcast Band
535-1720 Kilocycles.

Middle Wave Band
1695-5500 Kilocycles.

Short Wave Band
5.2-18.3 Megacycles.

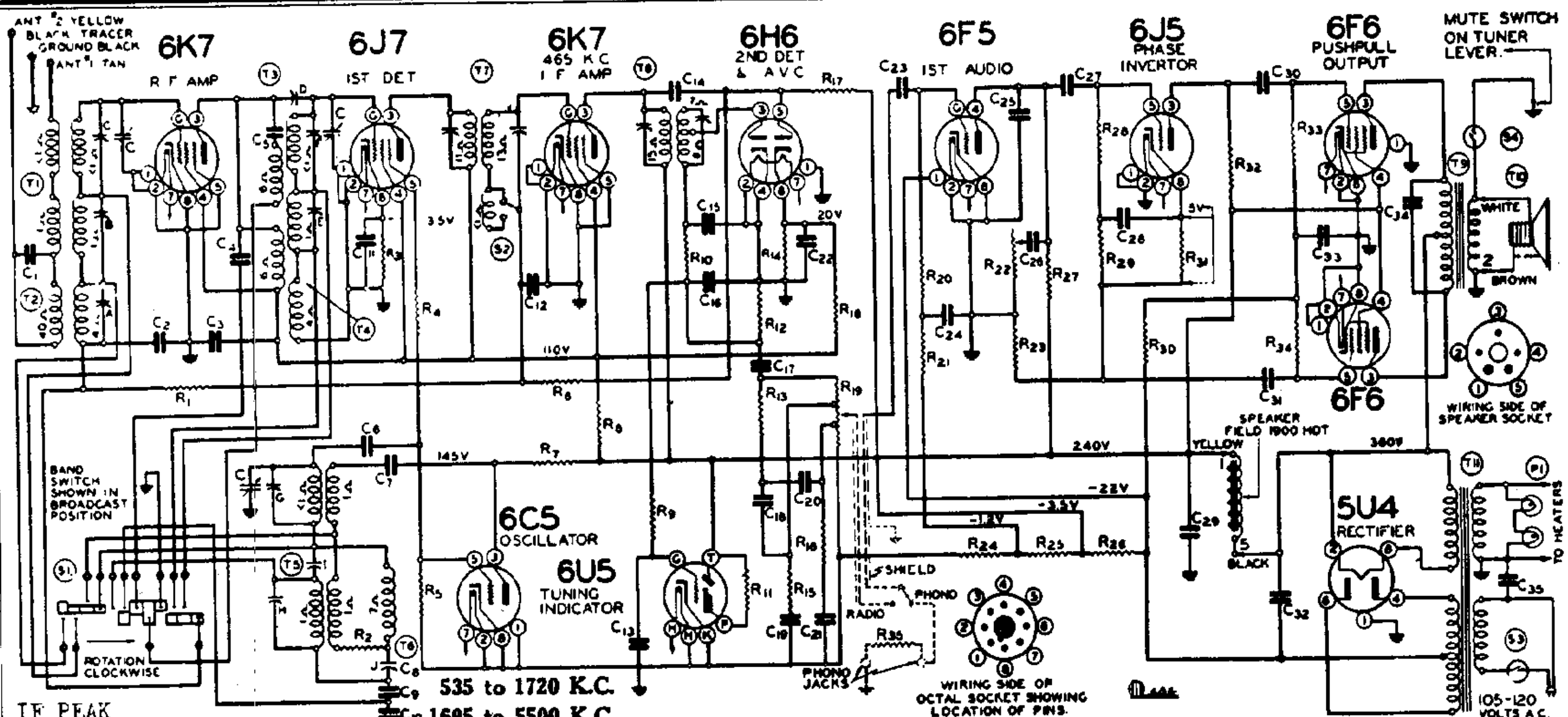
FOR ALIGNMENT
SEE INDEX





BOTTOM VIEW (Showing Trimmers)

GOODYEAR TIRE & RUBBER CO., INC.



IF PEAK
465 KC.

FREQUENCY RANGE 5.35 to 18.1 M.C.

CHASSIS MODEL 1175 (Serial No. 7M920500 and up)

RESISTORS

Code	Part No.	Description
R1	130-20	100M ohm - 1/3 w. - 20%
R2	130-166	150 ohm - 1/3 w. - 10%
R3	130-129	2500 ohm - 1/3 w. - 10%
R4	130-60	100 ohm - 1/3 w. - 20%
R5	130-12	50M ohm - 1/3 w. - 20%
R6	130-19	1 megohm - 1/3 w. - 20%
R7	130-133	15M ohm - 1/2 w. - 20%
R8	106-46	2900 ohm - resistor strip
R9	130-4	3 megohm - 1/3 w. - 20%
R10	130-201	25M ohm - 1/10 w. - 20%
R11	130-110	1 megohm - in tubing indicator socket 1/10 w. - 20%
R12	130-186	250M ohm - 1/10 w. - 20%
R13	130-12	50M ohm - 1/3 w. - 20%
R14	106-46	600 ohm - Resistor Strip
R15	130-22	5M ohm - 1/3 w. - 20%
R16	130-85	3M ohm - 1/3 w. - 20%
R17	130-3	500M ohm - 1/3 w. - 20%
R18	106-46	2500 ohm - resistor strip
R19	101-102	1 megohm - volume control
R20	130-37	750M ohm - 1/3 w. - 20%
R21	130-45	250M ohm - 1/3 w. - 20%
R22	101-103	300M ohm - Tone control
R23	130-103	100M ohm - 1/3 w. - 10%
R24	106-47	Resistor Strip - 11 ohm
R25	106-47	22 ohm - Resistor strip
R26	106-47	170 ohm - Resistor strip
R27	130-45	250M ohm - 1/3 w. - 20%
R28	130-37	750M ohm - 1/3 w. - 20%
R29	130-45	250M ohm - 1/3 w. - 20%
R30	130-103	100M ohm - 1/3 w. - 10%
R31	130-82	10M ohm - 1/3 w. - 10%
R32	130-103	100M ohm - 1/3 w. - 10%
R33	130-45	250M ohm - 1/3 w. - 20%
R34	130-45	250M ohm - 1/3 w. - 20%

R8, R14 and R18 in same unit
R24, R25 and R26 in same unit
R10 and R12 in output I.F. Can

CONDENSERS

Code	Part No.	Description
C	102-66	3 gang variable Condenser
C1	129-40	.0001 - 10% Mica
C2	100-22	.05 x 200 v. - 25%
C3	100-53	.25 x 400 v. - 20%
C4	129-34	.0002 - 5% Mica
C5	129-38	.00005 - 10% Mica
C6	129-38	.00005 - 10% Mica
C7	100-25	.002 x 600 v. - 25%
C8	124-35	.00074 Series Pad
C9	129-92	.0033 - 2-1/2% Compression type condenser
C10	129-90	.0023 - 2-1/2% Compression type condenser
C11	100-33	.1 x 200 v. - 50 - 10%
C12	100-22	.05 x 200 v. - 25%
C13	100-78	.01 x 200 v. - 25%
C14	129-3	.00002 - 20% Mica
C15	129-39	.00005 - 20% Ceramicon
C16	129-38	.00005 - 10% Mica
C17	100-9	.05 x 200 v. - 25%
C18	129-3	.00002 - 20% Mica
C19	100-22	.05 x 200 v. - 25%
C20	129-38	.00005 - 10% Mica
C21	100-19	.006 - 600 v. - 25%
C22	100-78	.01 x 200 v. - 25%
C23	100-11	.01 x 400 v. - 25%
C24	100-9	.05 x 200 v. - 25%
C25	129-40	.0001 - 10% Mica
C26	100-12	.003 x 600 v. - 25%
C27	100-26	.02 x 400 v. - 25%
C28	100-33	.1 x 200 v. - 50 - 10%
C29	103-10	30 mfd. - 450 w.v. lytic
C30	100-13	.05 x 400 v. - 25%
C31	100-80	.05 x 400 v. - 25%
C32	103-10	30 mfd. - 450 w.v. lytic
C33	100-33	.1 x 200 v. - 50 - 10%
C34	100-32	.0005 - 1000 v. - 20%
C35	100-61	.02 x 600 v. - 20% Bakelite

PARTS

Code	Part No.	Description
T1	111-90	SW - MW - Antenna Coil
T2	111-68	BC - Antenna Coil
T3	109-32B	SW - MW - R.F. Coil
T4	109-33	BC - R.F. Coil
T5	110-53B	SW - MW Oscillator Coil
T6	110-52B	BC - Oscillator Coil
T7	108-113	Input I.F. 465 kc.
T8	108-114	Output I.F. 465 kc.
T9	105-56	Output Transformer
T10	114-107	12" Dynamic Speaker
T11	104-117	Power Transformer 50/60 cycle
S1	125-44	Band Switch
S2		Hi Fi Switch on tone control
S3		Off-on switch on volume control
S4	125-14	Mute Switch
P1	107-94	6-8 v. Pilot lights

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red

For conventional types of antennas connect the tan wire to the antenna lead and the **yellow with black tracer** and the **black wire** together to the ground lead.

When a doublet antenna is used connect the tan wire and

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 60 cycles are so marked. The power consumption of this receiver is 125 watts.

MODEL 1175
Socket, Trimmers
Tuner Data

GOODYEAR TIRE & RUBBER CO., INC.

1—Type 6K7 Remote cut-off pentode I.F. amplifier
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6F5 First audio amplifier
1—Type 6J5 Phase Inverter stage
2—Type 6F6 Output pentodes in push-pull
1—Type 5U4 High vacuum rectifier
1—Type 6U5 Cathode-Ray Tuning Indicator.

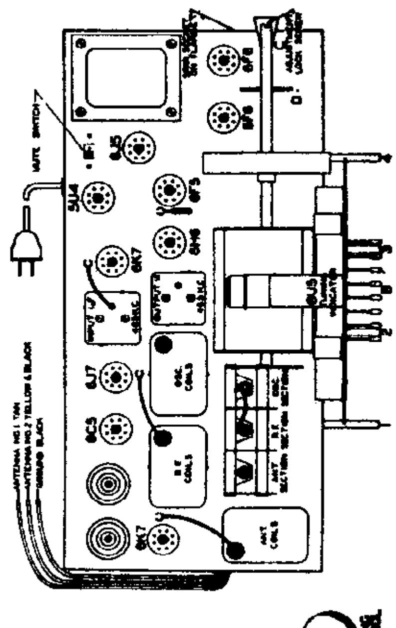


FIG. 1—TOP VIEW

The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes:
1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7 Pentode first detector
1—Type 6C5 Oscillator

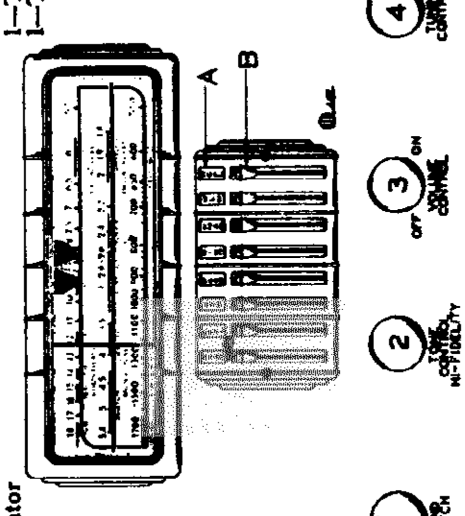


FIG. 2—FRONT VIEW

MODEL 1175
(Serial No. 7M92[illegible] and up)

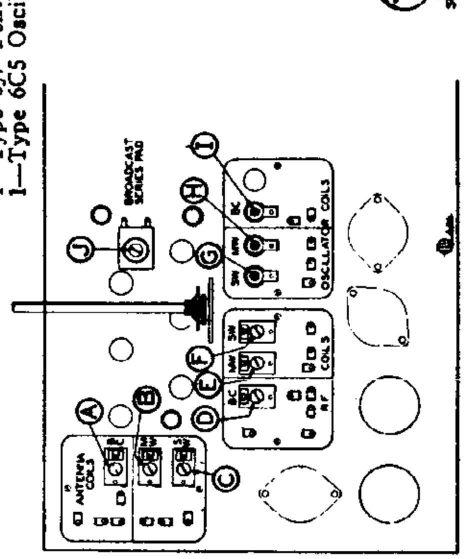


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

IMPORTANT—READ CAREFULLY BEFORE SETTING THE AUTOMATIC LEVERS:

A mute feature has been incorporated in the automatic tuning mechanism of the Model 1175. The function of this feature is to permit SILENT TUNING from one station to another by means of the automatic tuning levers. When any one of the levers are pressed down, the speaker is automatically disconnected from the radio and NO SIGNAL is heard until the lever is RELEASED.

To facilitate an accurate adjustment of the levers it is desirable to hear the station being tuned in while the lever is being adjusted; therefore a MUTE SWITCH is provided to manually connect or disconnect the silent tuning feature.

Referring to the top view of the radio (Fig. 1 in this manual), THE POSITION OF THE SWITCH (located on the top of the radio chassis alongside the power transformer), IS IMPORTANT.

Set the switch as follows:

WHILE SETTING THE AUTOMATIC LEVERS:
Switch should be snapped to the right (white dot not visible).

AFTER AUTOMATIC LEVERS HAVE BEEN SET:
Switch should be snapped to the left (white dot showing).

There are eight levers on the dial by means of which eight stations may be selected, (See "B", Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including 8.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2). Any order of grouping may be used, however, it is recommended that the left hand four automatic levers be used for high frequency stations (1750 to 1000 K.C.) and the right hand four automatic levers for low frequency stations (1000 to 540 K.C.).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob No. 4 the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position), noting the width of the shadow indicated on the screen of the cathode-ray tuning eye. Minimum width on the eye indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob No. 4 to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the locking adjustment screw "C". It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT. If a screw driver is not available, the locking screw can be tightened by reaching in from the back of the cabinet, and, by means of the pin "D" (see Fig. 1), rotate the locking screw shaft to the right (clockwise) until thoroughly tight.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN THE LOCKING SCREW; otherwise the stations you have selected will not stay adjusted to the levers.

Snap mute switch to silent tuning position (white dot showing)

MODEL 1175
Alignment
MODEL 01029
Tuner Alignment

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 1175

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-114 Output I.F. Transformer
Part No. 108-113 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1." to the control grid cap of the type 6K7 I.F. tube and adjust the output I.F. transformer 108-114 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-113) to resonance.
   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 1720 Kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 1720 Kilocycles and adjust broadcast oscillator trimmer (adjustment I) to resonance. See bottom view, Fig. 3.
   (b) Re-set external oscillator to 1400 Kilocycles, move dial pointer to 1400 Kilocycles and adjust broadcast antenna trimmer, (adjustment A) and broadcast R.F. trimmer (adjustment D) to resonance.
   (c) With external oscillator set at 600 K.C. adjust broadcast series pad (adjustment J) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained.
   (d) Repeat adjustments (a) and (c) until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 Kilocycles. UNDER NO CIRCUMSTANCES BEND PLATES OF VARIABLE CONDENSER TO CORRECT TRACKING.

SHORT WAVE BAND ALIGNMENT:
5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 Megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 Megacycles and adjust short wave oscillator (adjustment G), short wave R.F. (adjustment F) and short wave antenna (adjustment C) to resonance.
   (b) Re-set external oscillator to 6 Megacycles and pick up signal by rotating variable condenser and check for sensitivity.

   NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. As an example of this a fundamental 17 megacycle signal can be tuned in not only at 17 on the dial, but also at approximately 16.1 megacycles.

MIDDLE WAVE ALIGNMENT:
1605 to 5800 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 Megacycles connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate condenser, pick up signal and adjust middle wave oscillator (adjustment H), middle wave R.F. (adjustment E) middle wave antenna (adjustment B) to resonance.
   (b) Re-check broadcast alignment and if it is found necessary; re-adjust either R.F. or antenna trimmers. Repeat the 17 megacycles short wave and 5 megacycles middle wave adjustments.

MODEL 01029 CHASSIS 860

(Serial No. 7L807400 and up)

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

There are eight levers on the dial by means of which eight stations may be selected, (See "B", Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including 8.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2). Any order of grouping may be used, however, it is recommended that the left hand four automatic levers be used for high frequency stations (1730 to 1000 K.C.) and the right hand four automatic levers for low frequency stations (1000 to 540 K.C.).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 4) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) noting the width of the shadow indicated on the screen of the cathode-ray tuning eye. Minimum width on the eye indicates the ideal tuning position (resonance). The station will then be sharply and accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob (No. 4) to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the locking adjustment screw "C". It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT. If a screw driver is not available, the locking screw can be tightened by reaching in from the back of the cabinet, and, by means of the pin "D" (see Fig. 1), rotate the locking screw shaft to the right (clockwise) until thoroughly tight.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN the LOCKING SCREW, otherwise the stations you have selected will not stay adjusted to the levers.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106E Output I.F. Transformer
Part No. 108-105D Input I.F. Transformer

These I. F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106E) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105D) to resonance.

BROADCAST BAND ALIGNMENT:
540 to 1750 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1750 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment E'; see top view, Fig. 1).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment A') to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (Adjustment F') to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained.
   (d) Repeat adjustments "a" and "c" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:
5.5 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment G') and short wave antenna (Adjustment C') to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.5 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

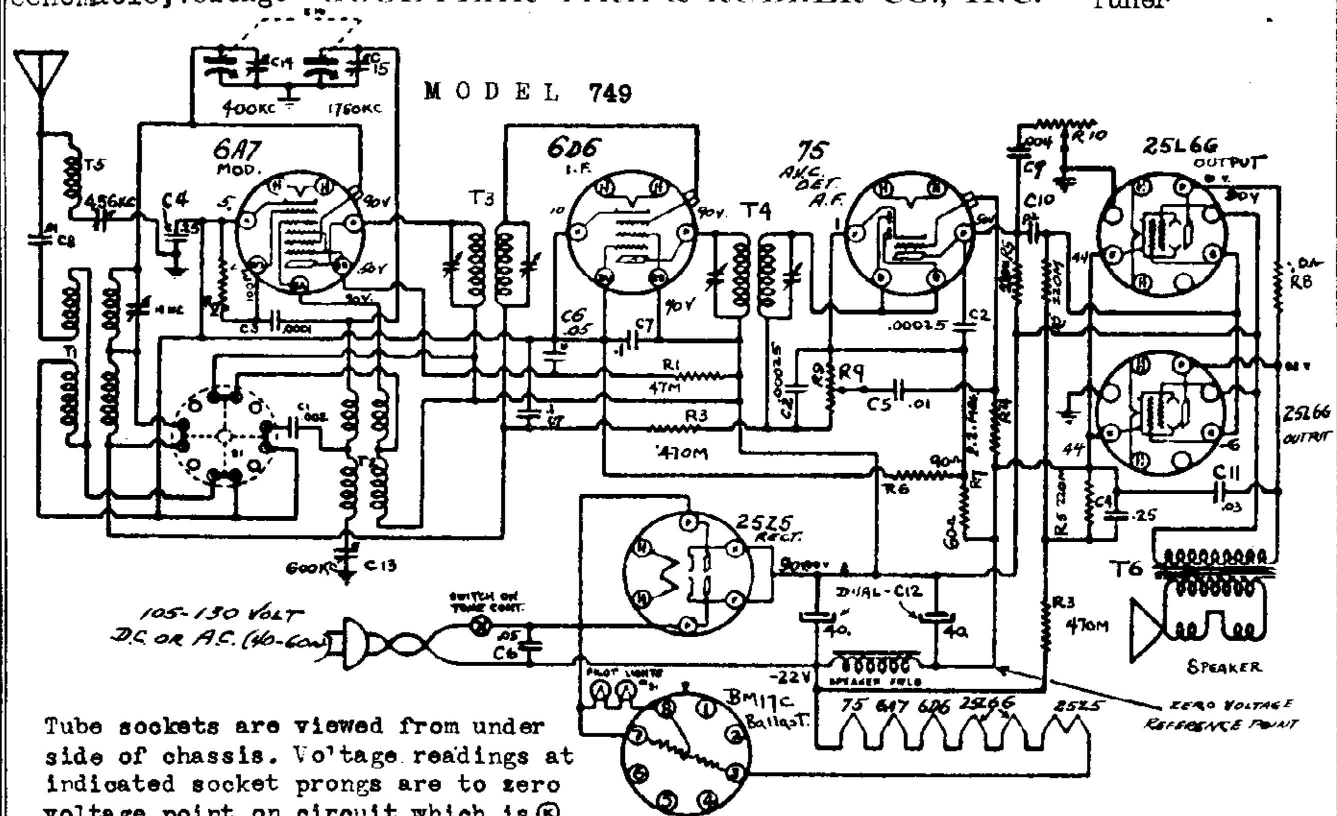
MIDDLE WAVE BAND ALIGNMENT:
1730 to 5800 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment D') and middle wave antenna (Adjustment B') to resonance.
   (b) Re-set external oscillator to 1900 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-check broadcast band alignment.

MODEL 749
Schematic, Voltage

GOODYEAR TIRE & RUBBER CO., INC.

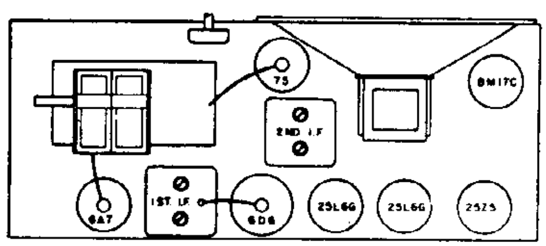
Socket, Trimmers
Tuner



Tube sockets are viewed from under side of chassis. Voltage readings at indicated socket prongs are to zero voltage point on circuit which is ⓧ on 25L6G tube. Voltages must be measured with no signal. Alignment is to be made at the frequencies shown on the trimmer condensers.

Figures at cathodes are cathode currents in milliamperes. Capacity values are in microfarads.

Wave trap adjustment at 456 KC. Input is made to provide maximum reduction of signal. Where no voltage reading is shown at socket prongs, it indicates zero voltage or very low reading.



LOCATION OF PARTS ON TOP OF CHASSIS

IF PEAK 456 KC

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in **WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE** the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, **PUSH THE PUSH-BUTTON IN ALL THE WAY** with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your six selected stations for automatic operation, merely push in **ALL THE WAY** the Button set up for that station.

To receive all other stations in the regular manner, push in the Station Selector Knob and turn it to the frequency of the station desired.

GOODYEAR TIRE & RUBBER CO.,

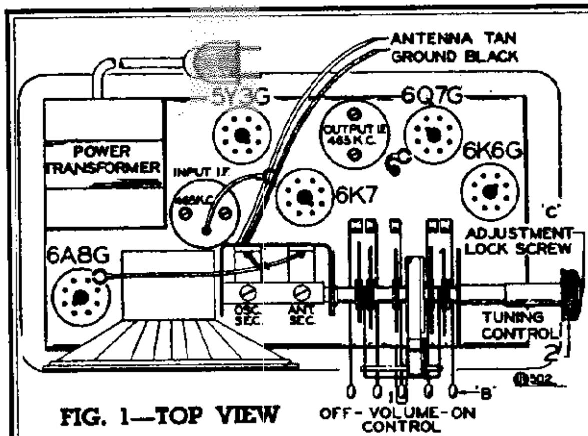
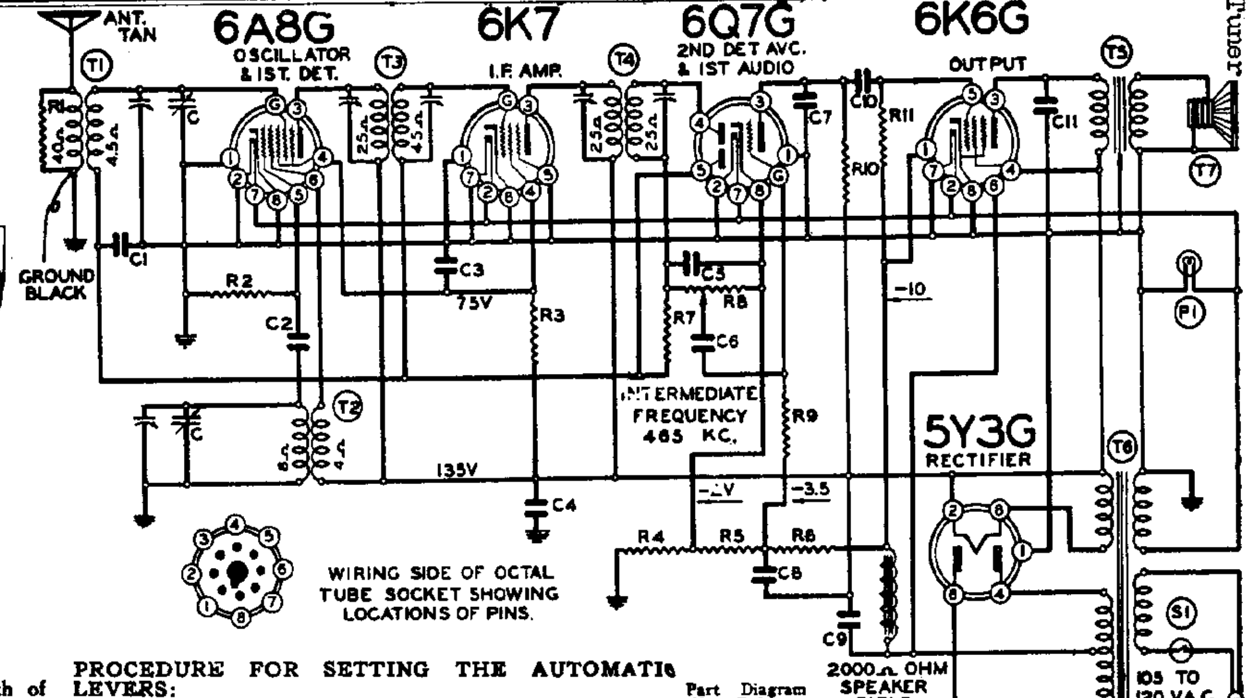


FIG. 1—TOP VIEW

Mica condensers are coded with an additional dot indicating tolerance.

Color of Dot	Tolerance percent
White	2½%
Green	5%
Blue	10%
Yellow	15%
Red	20%
None	More Than 20%



ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No.108-95B Output I.F. Transformer
Part No. 108-96 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condensor, to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input I.F. transformer (No. 108-96) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-95B) if necessary.

1. **R.F. ALIGNMENT: (535-1720 K.C.)**

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condensor to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now hold tuning knob securely with left hand to prevent it from turning, or Rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighter the special locking screw ("C") in the center of the tuning knob, (See Fig. 1).

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

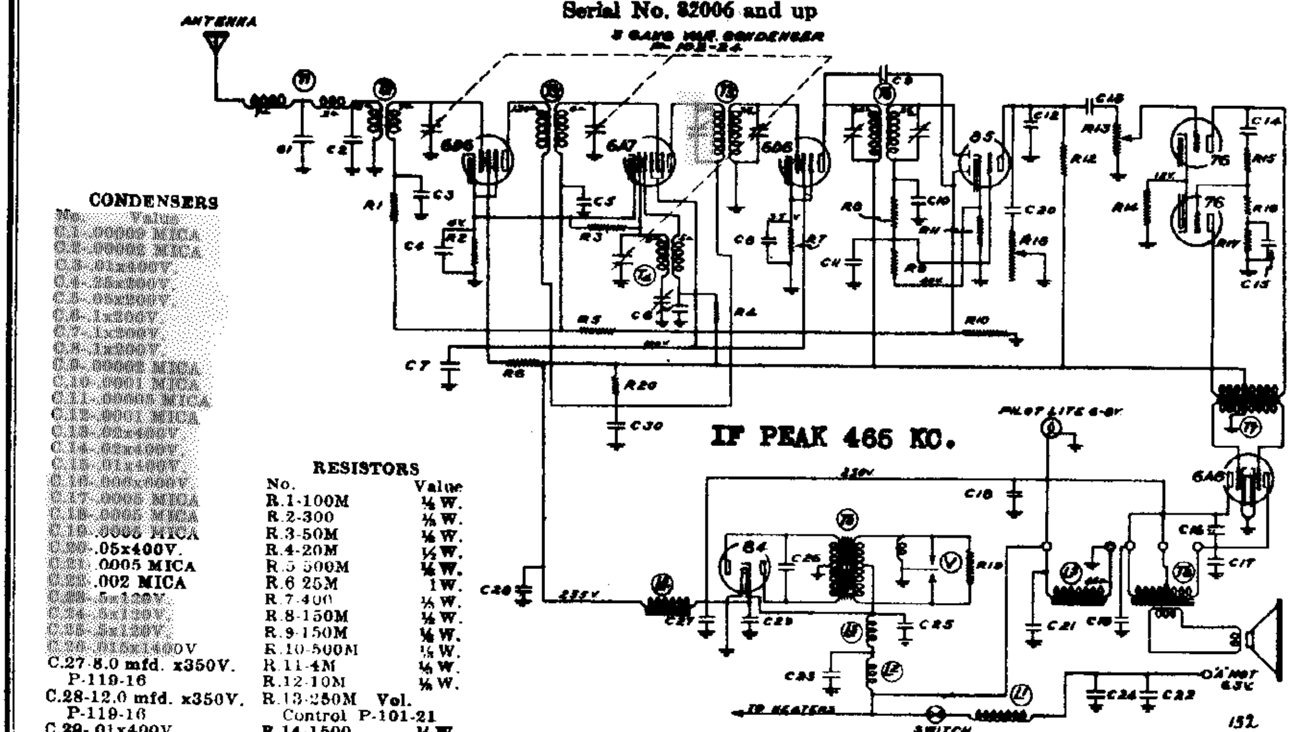
If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. **Be sure to retighten the locking screw,** otherwise the stations you have selected will not stay adjusted to the levers.

Part No.	Diagram Reference	
		CONDENSORS
100-1	C3	.1 x 400 volt Tubular Condenser
100-9	C1	.05 x 200 volt Tubular Condenser
100-11	C6, C10	.01 x 400 volt Tubular Condenser
100-13	C4	.05 x 400 volt Tubular Condenser
100-19	C11	.006 x 600 volt Tubular Condenser
119-47D	C8, C9	Dual 5MFD x 250 W. V. Filter Condenser
129-2	C7	.0005 Mica Type Condenser — 20%
129-5	C5	.0001 Mica Type Condenser — 20%
129-12	C2	.00025 Mica Type Condenser — 20%
		RESISTORS
106-35	R4, R5, R6	65 Ohm, 45 Ohm, 220 Ohm Metal Clad
130-9	R10	200M Ohm — 1/3 Watt Resistor — 20%
130-12	R2	50M Ohm — 1/3 Watt Resistor — 20%
130-21	R1	20M Ohm — 1/3 Watt Resistor — 20%
130-118	R11	600M Ohm — 1/3 Watt Resistor — 20%
130-149	R3	15M Ohm — 1/3 Watt Resistor — 20%
130-170	R7, R9	3 Megohm — 1/3 Watt Resistor — 25%
		COILS
108-95B	T4	Output I.F. Coil Assembly Complete with can
108-96	T3	Input I.F. Coil Assembly Complete with can
110-73	T2	Oscillator Coil Assembly Complete
111-92	T1	Antenna Coil Assembly Complete
		SOCKETS
121-93		Eight Prong Octal Socket for "6K6"
121-93		Eight Prong Octal Socket for "6Q7"
121-93		Eight Prong Octal Socket for "6A8"
121-93		Eight Prong Octal Socket for "5Y3"
121-94		Seven Prong Octal Socket for "6K7"
		TRANSFORMERS
104-129	T6	50/60 Cycle Transformer 105-115 volt Primary
104-130		25/60 Cycle Transformer 105-115 volt Primary
		SPEAKER
114-111	T7	Five Inch Dynamic Speaker (Field 2000 Ohms)
105-55c	T5	Output Transformer for Speaker (Mounted on Chass
		MISCELLANEOUS
101-107	R8, S1	Volume Control and Switch (500M Ohms)
102-67	C	Two Gang Variable Condenser

MODEL 01018, Runs 1,2
Chassis 880
Schematic, Voltage
Socket, Trimmers
Alignment

GOODYEAR TIRE & RUBBER CO., INC.

Serial No. 82006 and up



CONDENSERS

No. Value
C.1-.00009 MICA
C.2-.00009 MICA
C.3-.01x400V.
C.4-.25x200V.
C.5-.05x200V.
C.6-.1x200V.
C.7-.1x200V.
C.8-.1x200V.
C.9-.00005 MICA
C.10-.0001 MICA
C.11-.00005 MICA
C.12-.0001 MICA
C.13-.02x400V.
C.14-.02x400V.
C.15-.01x400V.
C.16-.005x600V.
C.17-.0005 MICA
C.18-.0005 MICA
C.19-.0005 MICA
C.20-.05x400V.
C.21-.0005 MICA
C.22-.002 MICA
C.23-.5x120V.
C.24-.5x120V.
C.25-.5x120V.
C.26-.015x1600V
C.27-8.0 mfd. x350V. P-119-16
C.28-12.0 mfd. x350V. P-119-16
C.29-.01x400V.
C.30-.1x400V.
117-2 Dash Mounting Bracket
117-1 Bracket Steering Column
Dash Mounting Assembly

RESISTORS

No.	Value
R.1-100M	¼ W.
R.2-300	⅛ W.
R.3-50M	¼ W.
R.4-20M	½ W.
R.5-500M	¼ W.
R.6 25M	1 W.
R.7-400	⅛ W.
R.8-150M	¼ W.
R.9-150M	¼ W.
R.10-500M	¼ W.
R.11-4M	¼ W.
R.12-10M	⅛ W.
R.13-250M Vol. Control P-101-21	
R.14-1500	¼ W.
R.15-1 meg	¼ W.
R.16-91M	⅛ W.
R.17-75M	½ W.
R.18-100M Tone Control P-101-39	
R.19-200	¼ W.
R.20-1500	⅛ W.

PARTS

No.	Part No.
T1-Antenna Filter	P-111-43
T2-Antenna Coil	P-111-42
T3-R.F. Coil	P-109-20
T4-Oscillator Coil	P-110-34
T5-Input I.F. Coil	P-108-56
T6-Output I.F. Coil	P-108-57
T7-Audio Trans.	P-105-13
T8-Output Trans.	
T9-Power Trans.	P-104-21
L1-"A" Choke	P-105-18
L2-"A" Choke	P-105-18
L3-"A" Choke	P.105-19
L4-Filter Choke	P-105-11
L5-Speaker Field	
V-Vibrator	142-4

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillater output lead.

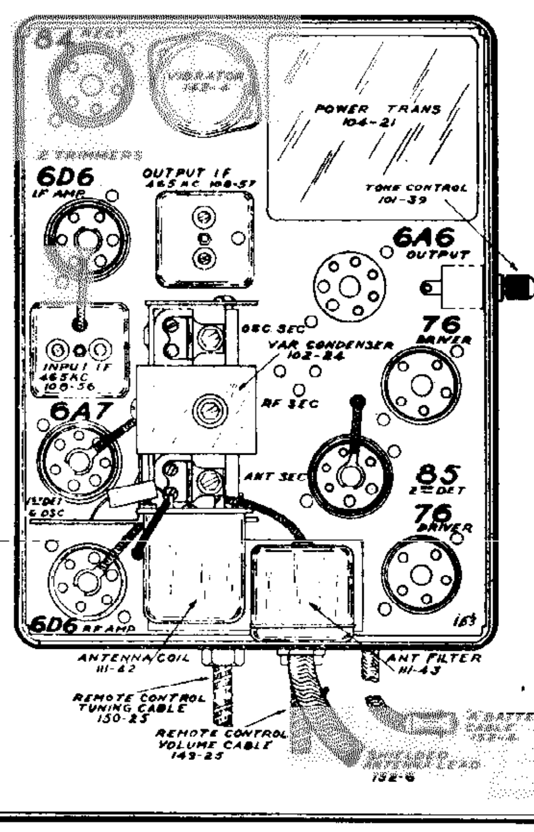
"Broadcast Dummy"—A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

I.F. ALIGNMENT:

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-56) and output (108-57) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

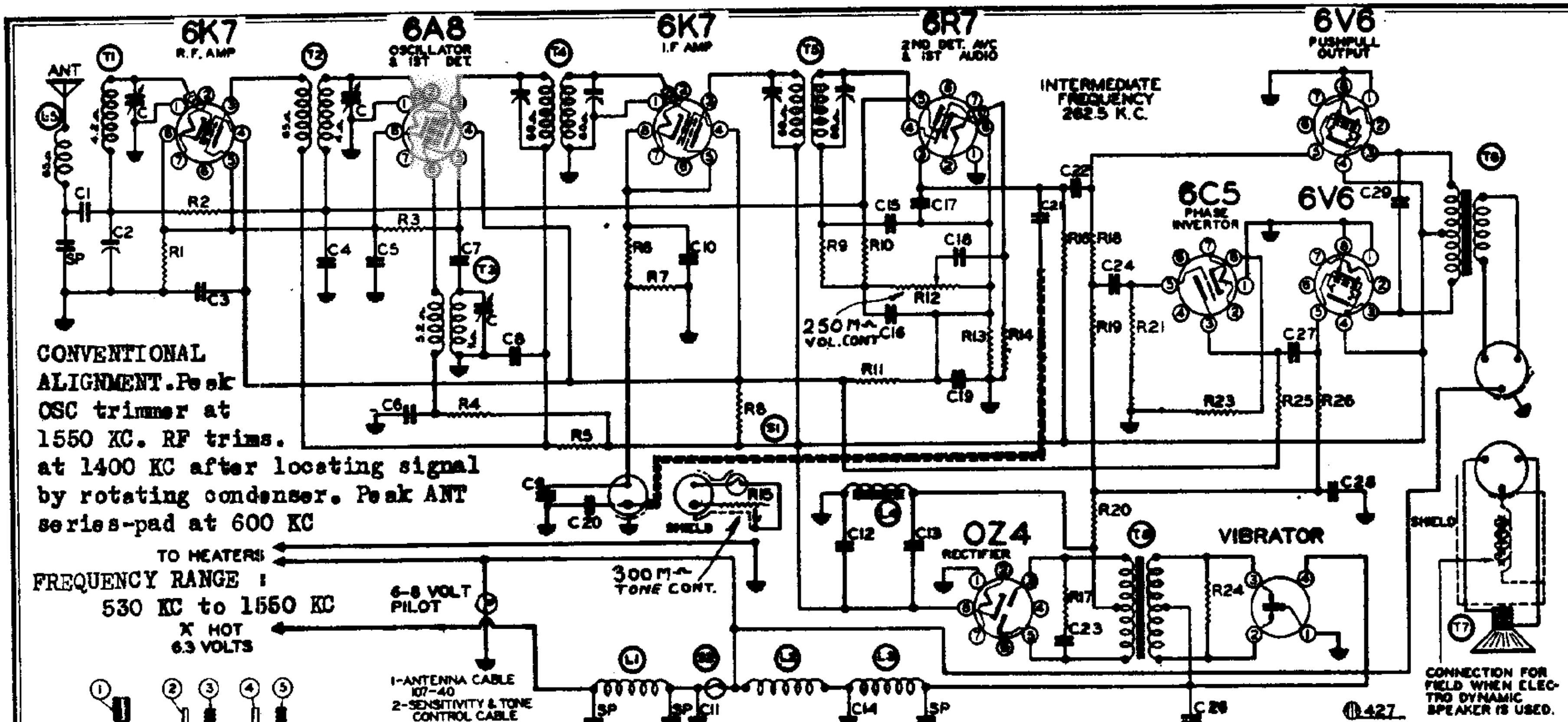
BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
4. Re-set external oscillator to 600 K.C. and adjust series pad to resonance, rotate condenser and move dial pointer to 600 K.C. by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance. This adjustment is accessible from the bottom of the chassis.
   (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.



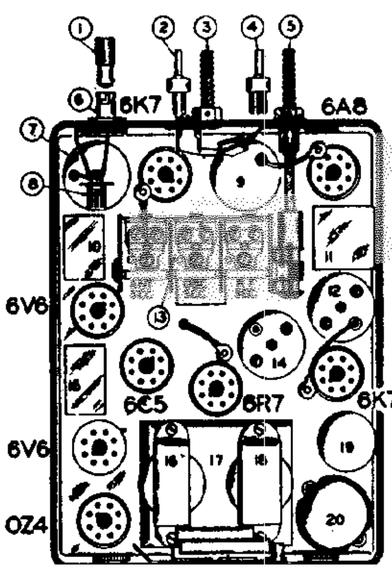
MODEL 01020
Chassis 881
Schematic, Socket
Trimmers, Alignment

GOODYEAR TIRE & RUBBER CO., INC.



CONVENTIONAL ALIGNMENT. Peak OSC trimmer at 1550 KC. RF trims. at 1400 KC after locating signal by rotating condenser. Peak ANT series-pad at 600 KC

FREQUENCY RANGE : 530 KC to 1550 KC



1-ANTENNA CABLE 107-40
2-SENSITIVITY & TONE CONTROL CABLE 107-124
3-VOLUME CONTROL CABLE
4-SPEAKER CABLE
5-
6-
7-ANTENNA COIL 111-73A
8-ANTENNA FILTER CHOKE 111-76
9-R.F COIL 109-36
10-BY-PASS BLOCK 116-20B
11-BY-PASS BLOCK 116-19B
12-INPUT I F 262.5KC 108-101
13-VARIABLE CONDENSER 102-45A
14-OUTPUT I F 262.5KC 108-102B
15-BY-PASS BLOCK 116-23
16-B FILTER CHOKE 105-48
17-POWER TRANSFORMER 104-112
18-OUTPUT TRANS- 105-49
19-'LYTIC CONDENSER 119-43
20-VIBRATOR 126-1
21-A FILTER ASSEMBLY 105-50

R1	130-54	500 ohm - 1/3 w.
R2	130-141	250M ohm - 1/3 w.
R3	130-52	50M ohm - 1/3 w.
R4	130-138	50M ohm - 1/2 w.
R5	130-31	1500 ohm - 1/3 w.
R6	130-154	1000 ohm - 1/3 w.
R7	130-161	4M ohm - 1/3 w.
R8	130-185	20M ohm - 1/2 w.
R8	130-185	20M ohm - 1.2 w.
R9	130-162	50M ohm - 1/3 w.
R10	130-142	1 megohm - 1/3 w.
R11	130-139	40M ohm - 1/3 w.
R12	101-86	Volume control - head
R13	130-184	700 ohm - 1/3 w.
R14	130-142	1 megohm - 1/3 w.
R15	101-90	Tone control in control head
R16	130-181	100M ohm - 1/3 w.
R17	130-22	5M ohm - 1/3 w.
R18	130-183	150M ohm - 1/3 w
R19	130-181	100M ohm 1/3 w.
R20	130-141	250M ohm - 1/3 w.
R21	130-190	30M ohm - 1/3 w.
R23	130-178	3M ohm - 1/3 w.
R24	130-87	200 ohm - 1/3 w.
R25	130-181	100M ohm - 1/3 w.
R26	130-141	250M ohm - 1/3 w.
		CONDENSERS
C	102-45A	3 gang variable
C2	124-36	350 mmf. Nominal - Series pad
C3	116-20B	.25 x 200 v. - Red
C4	116-19B	.05 x 200 v. - Yellow
C5	116-20B	.1 x 200 v. - Yellow
C6	116-19B	.1 x 400 v. - Red
C7	129-12	.00025 Mica
C8	116-19B	.1 x 200 v. - Green
C9	129-2	.0005 - Mica
C10	116-19B	.05 x 200 v. - Black
C11	100-31	.5 x 120 v.
C12	119-43	8.0 mfd. 'lytic
C13	119-43	12.0 mfd. 'lytic
C14	100-31	.5 x 120 v.
C15	129-5	.0001 Cer.
C16	129-5	.0001 Cer.
C17	129-5	.0001 Mica
C18	116-20B	.02 x 200 v. - Blue
C19	116-20B	.02 x 200 v. - Green
C20	129-2	.0005 - Mica
C21	100-13	.05 x 400
C22	116-23	.02 x 400 v. - White
C23	100-68	.003 x 1400 v.
C24	116-23	.1 x 200 v. - Red
C26	100-31	.5 x 120 v.
C27	116-23	.02 x 400 v. - Green
C28	116-23	.5 x 200 v. - Yellow
C29	100-58	.005 x 1200 v.

C3, C5, C18 and C19 in same unit
C4, C6, C8 and C10 in same unit
C22, C24, C27 and C28 in same unit

PARTS

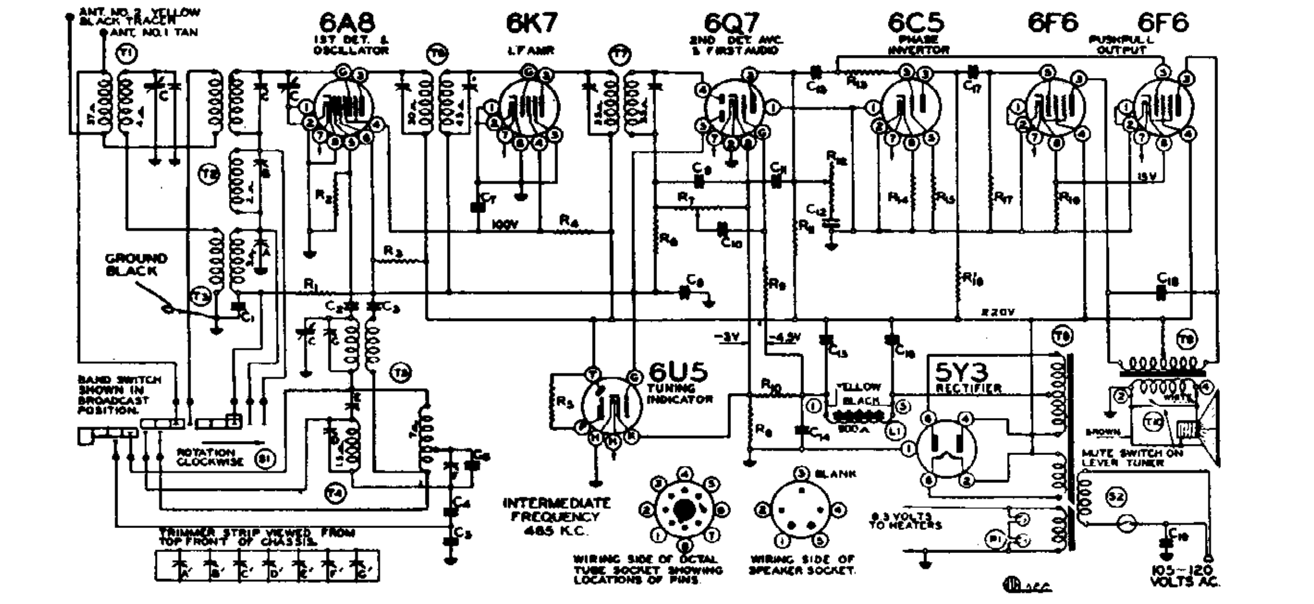
T1	111-73A	Antenna Coil
T2	109-36	R. F. Coil
T3	110-59	Oscillator Coil
T4	108-101	Input I. F. Coil
T5	108-102B	Output I. F. Coil
T6	105-49	Output Transformer
T7	114-94	8" Dynamic Speaker
T8	104-112	Power transformer
L1	105-26	RFA Choke
L2	105-24	RFA Choke
L3	105-19	A Choke
L4	105-48	B Choke
L5	111-76	Antenna Filter choke assembly
S1		Sensitivity switch in control head
S2		On-off Switch in control head

881
(Serial No. 88000 and up)

MODEL 01029
Chassis 860
Schematic, Voltage

GOODYEAR TIRE & RUBBER CO., INC.

Socket, Trimmers



Code No.	Part No.	Description
		RESISTORS
R1	130-103	100M ohm - 1/3 w. 10%
R2	130-12	50M ohm - 1/3 w. 20%
R3	130-123	15M ohm - 1/2 w. 10%
R4	130-196	30M ohm - 1 w. 10%
R5	130-110	1 megohm - 1/10 w. 20% In tuning indicator socket
R6	130-4	3 megohm -1/3 w. 20%
R7	101-97	1 megohm volume control
R8	130-198	40 ohm - 1/2 w. 10%
R9	130-4	3 megohm - 1/3 w. 20%
R10	130-197	20 ohm - 1/3 w. 10%
R11	130-103	100M ohm - 1/3 w. 10%
R12	101-98	300M ohm - tone control
R13	130-163	400M ohm - 1/3 w. 10%
R14	130-22	5M ohm - 1/3 w. 20%
R15	130-103	100M ohm - 1/3 w. 10%
R16	130-12	50M ohm - 1/3 w. 20%
R17	130-102	500M ohm - 1/3 w. 10%
R18	130-195	250 ohm - 1.2 w. 10%
		CONDENSERS
C	102-62	3 gang variable
C1	100-22	.05 x 200 v. - 25%
C2	129-67	.00004 Mica 10%
C3	100-25	.002 x 600 v. 25%
C4	129-83	.0027 Mica 2-1/2%
C5	129-84	.003 Mica 2-1/2%
C6	129-88	.0006 Mica 5%
C7	100-1	.1 x 400 v. - 50 - 10%
C8	100-26	.02 x 400 v. 25%
C9	129-5	.0001 Mica 20%
C10	100-26	.02 x 400 v. 25%
C11	129-2	.0005 Mica 20%
C12	100-57	.006 x 600 v. - 10 - 20%
C13	100-26	.02 x 400 v. 25%
C14	100-20	.1 x 200 v. 25%
C15	103-14	16 mfd. Regulating Lytic - 275 w.v.
C16	103-6	8 mfd. Lytic - 350 w.v.
C17	100-26	.02 x 400 v. 25%
C18	100-37	.003 x 600 v. 10%
C19	100-61	.02 x 600 v. 20% Bakelite
		PARTS
T1	111-88	B.C. Pre-selector complete
T2	111-87	S.W.M.W. Antenna Coil - complete
T3	111-86	B.C. Antenna Coil Complete
T4	110-69	M.W. Osc. Coil Complete
T5	110-70	S.W.B.C. Osc. Coil Complete
T6	108-105D	Input I.F. Coil - complete 465 kc.
T7	108-106E	Output I.F. Coil - complete 465 kc.
T8	104-87B	Power Transformer
T9	105-54	Output Transformer
T10	114-99	10" Dynamic speaker
L1		900 ohm speaker field
S1	125-42	Wave change switch
S2		Off-on switch on tone control
P1	107-94	6-8 volt pilot light

For conventional types of antennas connect the yellow wire to the antenna lead and the yellow with black tracer and the black wire together to the ground lead.

When a doublet antenna is used connect the yellow wire and the yellow with black tracer wire to the doublet antenna and the solid black wire to the ground lead. (See Fig. 1-Top View)

FOR ALIGNMENT AND TUNER DATA, SEE INDEX

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

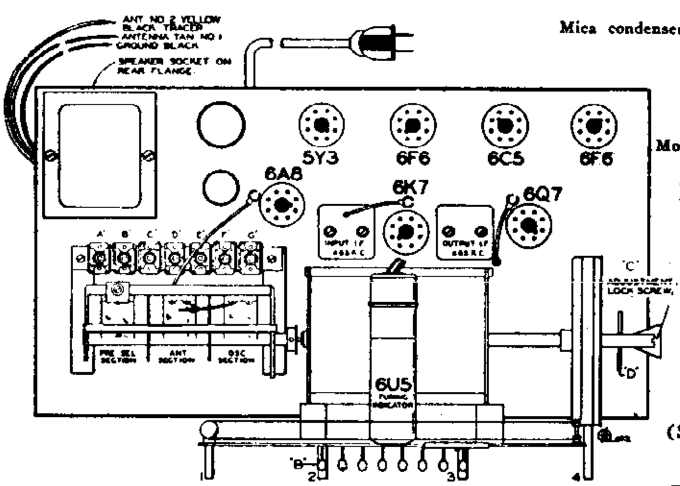


FIG. 1—TOP VIEW

FREQUENCY RANGE
540 to 1750 K.C.
1730 to 5800 K.C.
5.5 to 18.1 M.C.

CHASSIS MODEL 860

(Serial No. 7L897400 and up)

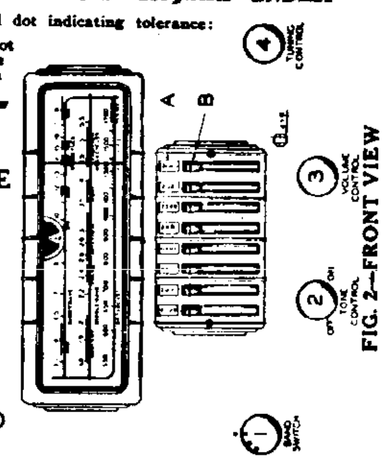
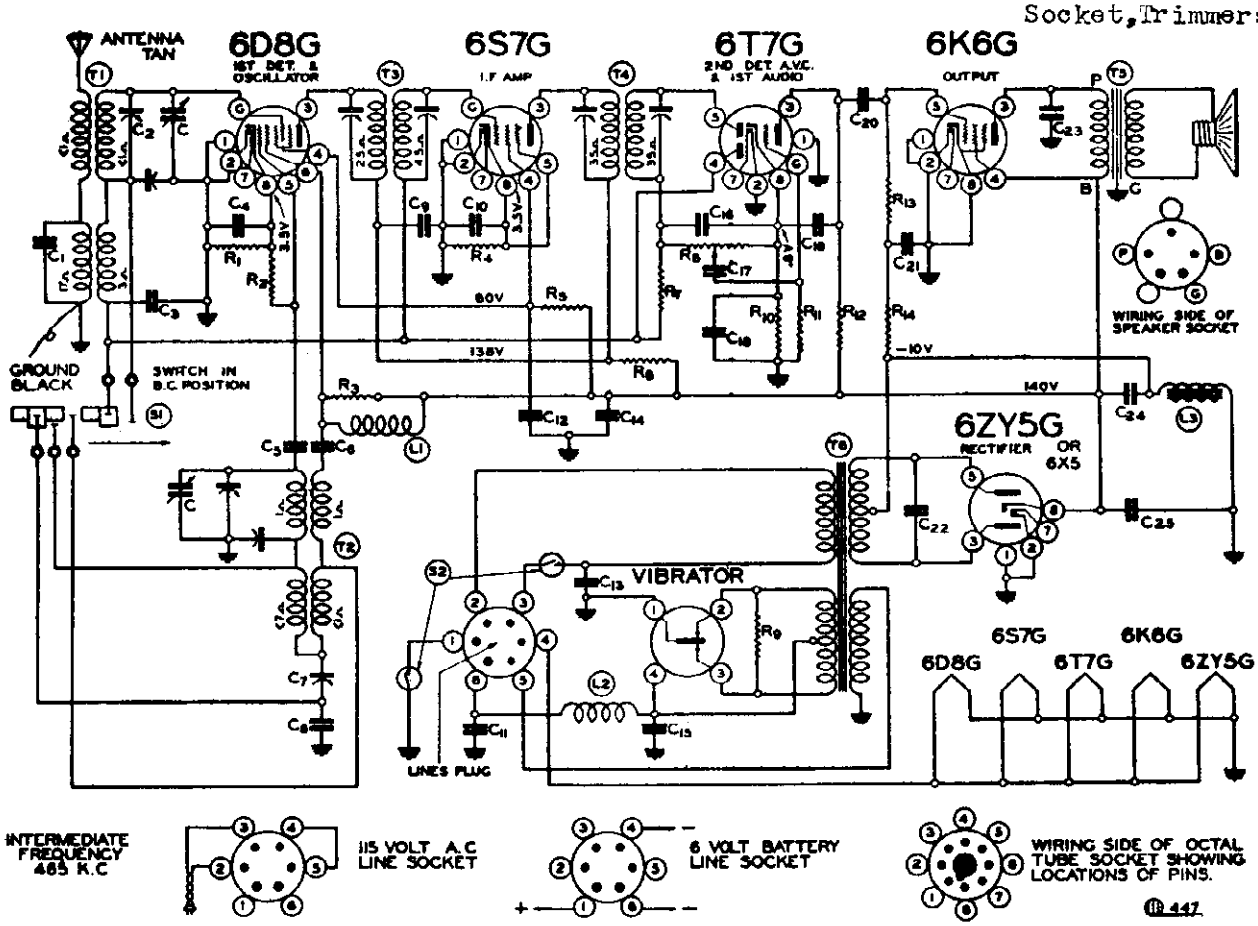


FIG. 2—FRONT VIEW

3-Band All-Wave A.C. Superheterodyne Receiver

MODEL 01554
Chassis 505
Schematic, Voltag
Socket, Trimmers

GOODYEAR TIRE & RUBBER CO., INC.



R1	130-70	500 ohm - 1/3 w.
R2	130-12	50M ohm - 1/3 w.
R3	130-12	50M ohm - 1/3 w.
R4	130-92	1000 ohm - 1/3 w.
R5	130-149	15M ohm - 1/3 w.
R6	130-192	2M ohm - 1/3 w.
R7	130-170	3 megohm - 1/3 w.
R8	101-91	1 meg volume control
R9	130-84	200 ohm - 1/3 w.
R10	130-192	2M ohm - 1/3 w.
R11	130-19	1 meg - 1/3 w.
R12	130-100	150M ohm - 1/3 w.
R13	130-3	500M ohm - 1/3 w.
R14	130-11	250M ohm - 1/3 w.
C	102-43	2 gang variable
C1	129-5	.0001 Mica
C2	124-39B	Adj. condenser
C3	100-22	.05 x 200
C4	100-20	.1 x 200
C5	129-39	.00005 Mica
C6	100-25	.002 x 600
C7	124-38	Series Pad
C8	129-54	.003 Mica
C9	100-6	.25 x 200
C10	100-20	.1 x 200
C11	100-40	.5 x 200
C12	100-20	.1 x 200
C13	129-82	.003 Mica
C14	129-12	.00025 Mica
C15	100-40	.5 x 200
C16	129-5	.0001 Mica
C17	100-11	.01 x 400
C18	119-22	10 mfd. lytic 25 wv.
C19	129-12	.00025 Mica
C20	100-11	.01 x 400
C21	100-20	.1 x 200
C22	100-73	.008 x 1200
C23	100-37	.003 x 600
C24	119-24B	5 mfd. lytic
C25	119-24B	5 mfd. lytic

505 SERIES "A"

(Serial No. 7J851300 and up)

FOR ALIGNMENT SEE INDEX

T1	111-83	Antenna Coil
T2	110-66B	Oscillator Coil
T3	108-105B	Input I.F.
T4	108-106B	Output I.F.
T5	114-95	or
	114-96	Speaker
T6	104-114	Power Transformer
L1	123-4	"B" Choke
L2	105-19	"A" Choke
S1	125-39	Wave band switch
S2		Off-On Switch on Volume Control
L3	105-52	300 ohm 4.5 henry filter choke

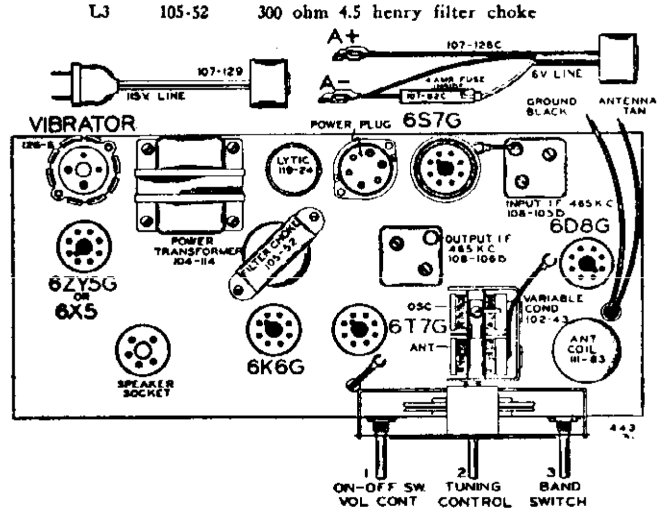


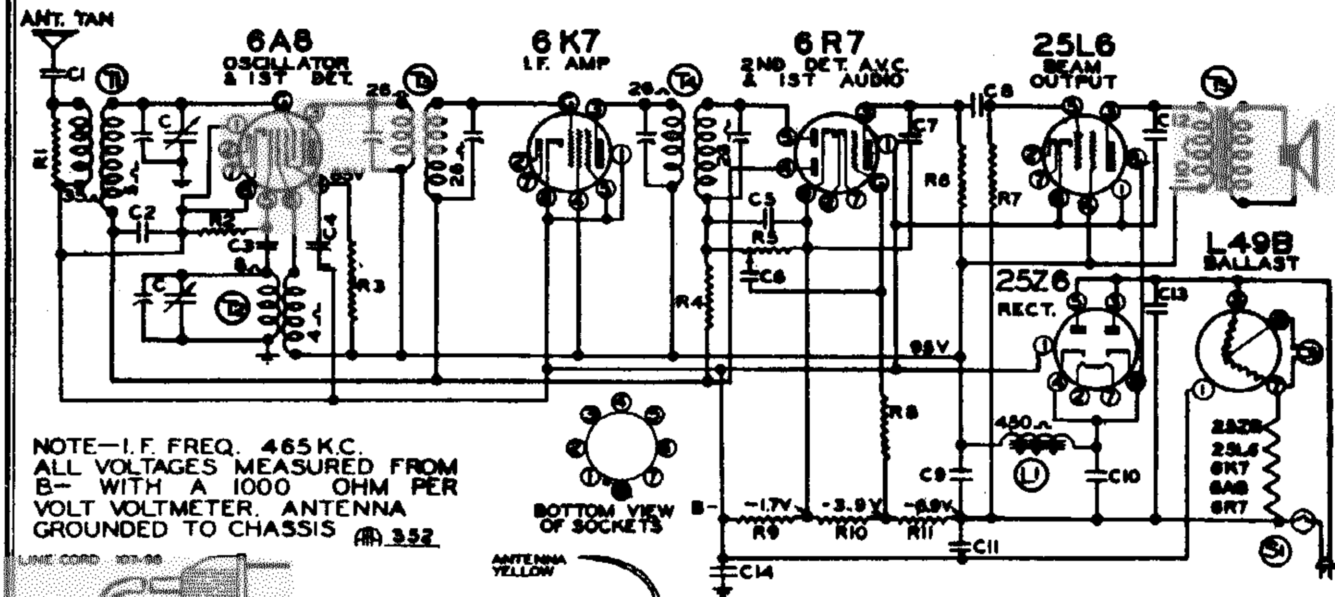
FIG. 1—TOP VIEW

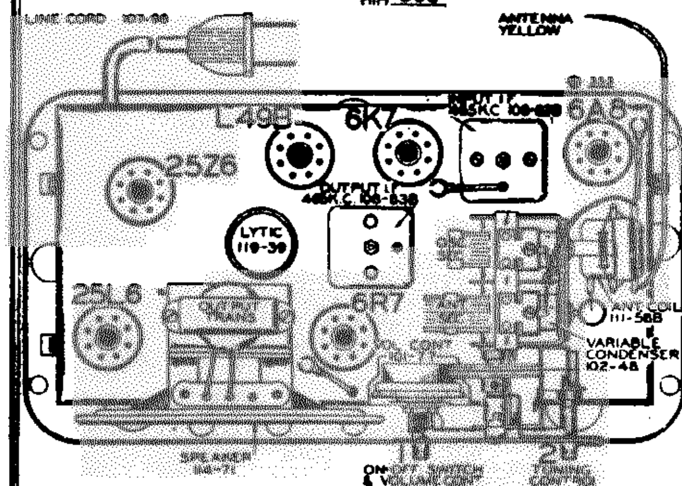
BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast......	Upper......	535 to 1720 K.C. (Kilocycles)
Short Wave..	Lower......	5.5 to 18.1 M.C. (Megacycles)

MODEL 010211, Ch. 602E
MODEL 010222
Ch. 602I

GOODYEAR TIRE & RUBBER CO., INC.

Schematic, Voltage
Socket, Trimmers
Alignment





ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83B Output I.F. Transformer
Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

RESISTORS

No.	Part No.	Description	
R1	130-17	10M ohm - 1/3 w.	20%
R2	130-12	50M ohm - 1/3 w.	20%
R3	130-149	15M ohm - 1/3 w.	20%
R4	130-4	3 meg ohm - 1/3 w.	20%
R5	101-77	Volume Control (1 Meg)	
R6	130-12	50M ohm - 1/3 w.	20%
R7	130-20	100M ohm - 1/3 w.	20%
R8	130-19	1 megohm - 1/3 w.	20%
R9	106-38	30 ohm	
R10	106-38	40 ohm	
R11	106-38	55 ohm	

R9, R10, and R11 in one unit

CONDENSERS

No.	Part No.	Description	
C	102-48	2 gang variable	
C1	100-25	.002 x 600	25%
C2	[illegible]	.05 x 200	25%
C3	[illegible]	.00025 Mica	20%
C4	100-22	.05 x 200	25%
C5	120-5	.0001 Mica	20%
C6	100-11	.01 x 400	25%
C7	120-2	.0005 Mica	20%
C8	100-22	.05 x 200	25%
C9	119-39	20 mfd. lytic - 100 w.v.	
C10	119-39	15 mfd. lytic - 100 w.v.	
C11	100-20	.1 x 200	25%
C12	100-13	.05 x 400	25%
C13	100-39	.1 x 400	20%
C14	100-53	.25x400	20%

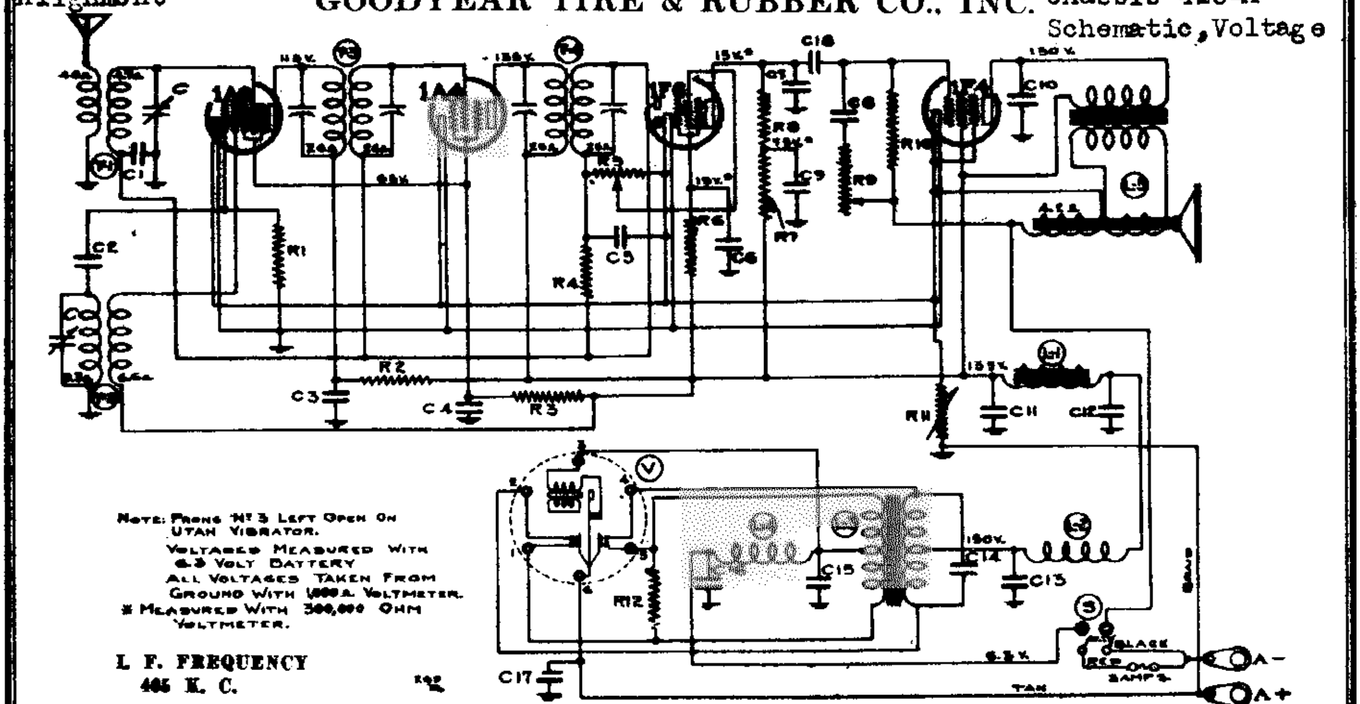
PARTS

No.	Part No.	Description
T1	111-58B	Antenna Coil Complete
T2	110-46	Oscillator Coil Complete
T3	108-82B	Input I. F. Complete
T4	108-83B	Output I. F. Complete
T5	114-71	Dynamic Speaker
L1		450 ohm speaker field
S1		Switch on Volume Control

Socket, Trimmers
Alignment

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 010219, Run 1
Chassis 415-A
Schematic, Voltage



I. F. FREQUENCY
465 K. C.

No.	Part No.	Description
		CONDENSERS
C1	100-10	.05 x 200 Volts
C2	129-12	.00025 Mica
C3	100-33	.1 x 200 Volts
C4	100-33	.1 x 200 Volts
C5	129-12	.00025 Mica
C6	100-33	.1 x 200 Volts
C7	129-5	.0001 Mica
C8	100-25	.002 x 600 Volts
C9	100-9	.05 x 200 Volts
C10	100-7	.005 x 600 Volts
C11	119-28	5 mfd. x 200 Working Voltage
C12	119-28	5 mfd. x 200 Working Voltage
C13	100-33	.1 x 200 Volts
C14	200-34	.005 x 1200 Volts
C15	100-40	.5 mfd. x 200 Working Voltage
C16	100-40	.5 mfd. x 200 Working Voltage
C17	100-35	.5 x 200 Volts
C18	100-11	.01 x 400 Volts

NOTE: C11 & C12 in one unit—No. 119-28

No.	Part No.	Description
		RESISTORS
R1	130-94	50M Ohm—1/3 Watt
R2	130-17	10M Ohm—1/3 Watt
R3	130-123	15M Ohm—1/2 Watt
R4	130-121	3.2 megohm—1/3 Watt
R5	101-56	1 meg ohm—Volume Control
R6	130-19	1 meg ohm—1/3 Watt
R7	130-20	100M Ohm—1/3 Watt
R8	130-11	250M Ohm—1/3 Watt
R9	101-59	1 meg ohm—Tone Control
R10	130-37	750M Ohm—1/3 Watt
R11	101-44	4.75 Ohm—Filament Rheostat
R12	130-124	200 Ohm—1/2 Watt

No.	Part No.	Description
		MISCELLANEOUS PARTS
C	102-38	One Section of Two Gang
T1	111-66	Antenna Coil
T2	110-45	Oscillator Coil
T3	108-84	Input I.F.—465 Kc.
T4	108-85	Output I.F.—465 Kc.
L1	105-30	Filter Choke
L2	123-3	R.F. Choke Coil
L3	104-62	Power Transformer
L4	105-19	"A" Choke
L5	114-50	6" Spkr. (Field Res. 4.2 Ohms)
S	101-56	On Volume Control
V	126-4	Vibrator Unit

NOTE: R11, Part No. 101-44 Variable Filament Rheostat is adjusted at the factory to keep the filament voltage of the tubes at 2 volts.

TUBES:

The tube complement of this chassis consists of the following tubes:

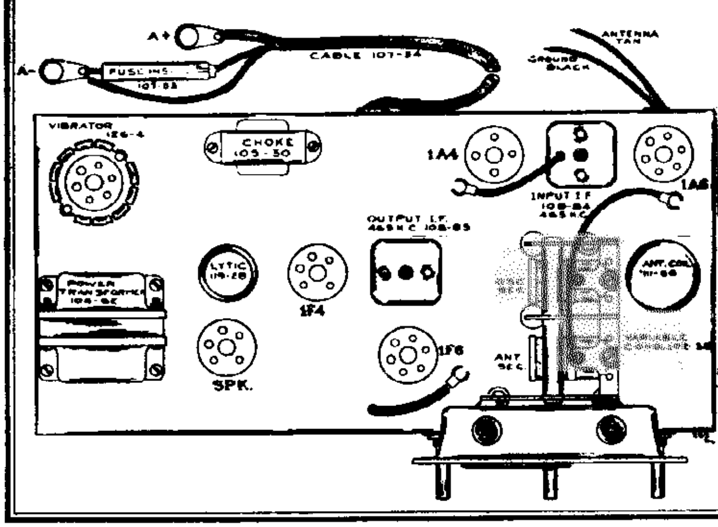
The type and function of each tube is as follows:

1—Type 1A6 Pentagrid Mixer, First Detector-oscillator.

1—Type 1A4 Super Control R. F. Tetrode I. F. Amplifier (465 K.C.)

1—Type 1F6 Duplex Diode Pentode, Second Detector, A.V.C. and First Audio.

1—Type 1F4 Pentode Output Amplifier.



ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view)

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 1A4 tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   (b) Move oscillator output clip from grid of 1A4 to grid cap of 1A6 and adjust input I.F. transformer (No. 108-84) to resonance.

   (c) With oscillator still connected to 1A6, readjust output I.F. transformer (108-85) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

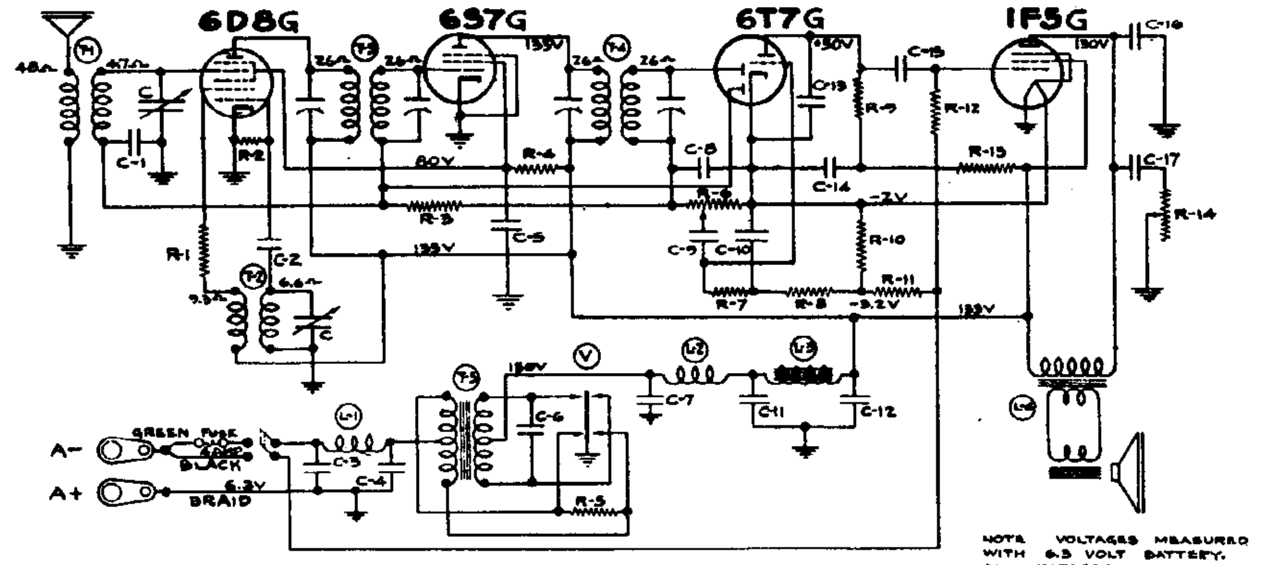
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

MODEL 010219, Run 2
Chassis 415-B
Schematic, Voltage

GOODYEAR TIRE & RUBBER CO., INC.

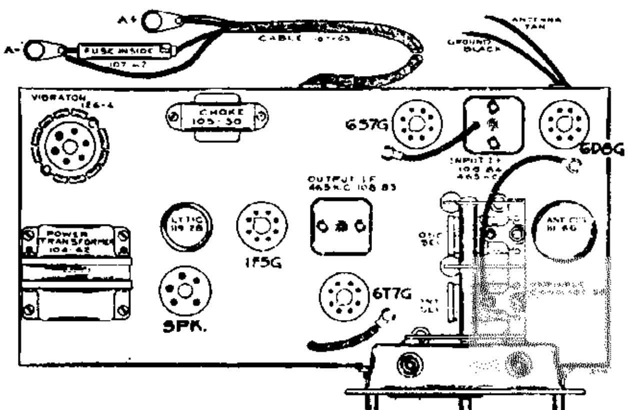
Socket, Trimmers
Alignment



IF PEAK 465 KC

305

No.	Part No.	DESCRIPTION
		RESISTORS
R1	130-23	2M-1/3
R2	130-76	30M-1/3
R3	130-121	3.2 meg-1/3
R4	130-123	15M-1/2
R5	130-84	200-1/3
R6	101-56	1 meg-Volume Control
R7	130-19	1 meg-1/3
R8	130-19	1 meg-1/3
R9	130-100	150M-1/3
R10	106-36	10 Ohm Muter
R11	106-36	25 Ohm Muter
R12	130-19	1 meg-1/3
R13	130-20	100M-1/3
R14	101-72	300M-Tone control
		CONDENSERS
C1	100-9	.05-200 v.
C2	129-39	.00005-Mica
C3	100-40	.5-200 v.
C4	100-40	.5-200 v.
C5	100-33	.1-200 v.
C6	100-34	.005-1200 v.
C7	100-33	.1-200 v.
C8	129-5	.0001-Mica
C9	100-11	.01-400 v.
C10	100-11	.01-400 v.
C11	119-28	5. Electrolytic-200 wv.
C12	119-28	5. Electrolytic-200 wv.
C13	129-12	.00025-Mica
C14	100-33	.1-200 v.
C15	100-11	.01-400 v.
C16	100-37	.003-600 v.
C17	100-11	.01-400 v.
		PARTS
T1	111-66	Antenna Coil
T2	110-45	Oscillator Coil
T3	108-84	Input I. F. Coil
T4	108-85	Output I. F. Coil
T5	104-62	Power Transformer
L1	105-19	"A" Choke
L2	123-3	RF "B" Choke
L3	105-30	Filter Choke
L4	114-63	Speaker (P. M. Dynamic)
V	126-4	Vibrator
C	102-38	Variable Condenser



The type and function of each tube is as follows:

1—Type 6D8G Pentagrid Mixer, First Detector-oscillator.

1—Type 6S7G Remote Cut-off Pentode I. F. Amplifier (465 K.C.)

1—Type 6T7G Duplex Diode Triode, Second Detector, A.V.C. and First Audio.

1—Type 1F5G Pentode Output Amplifier.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1F5G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view page 2).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments.

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   (b) Move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-84) to resonance.

   (c) With oscillator still connected to 6D8G readjust output I.F. transformer (108-85) if necessary.

R. F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

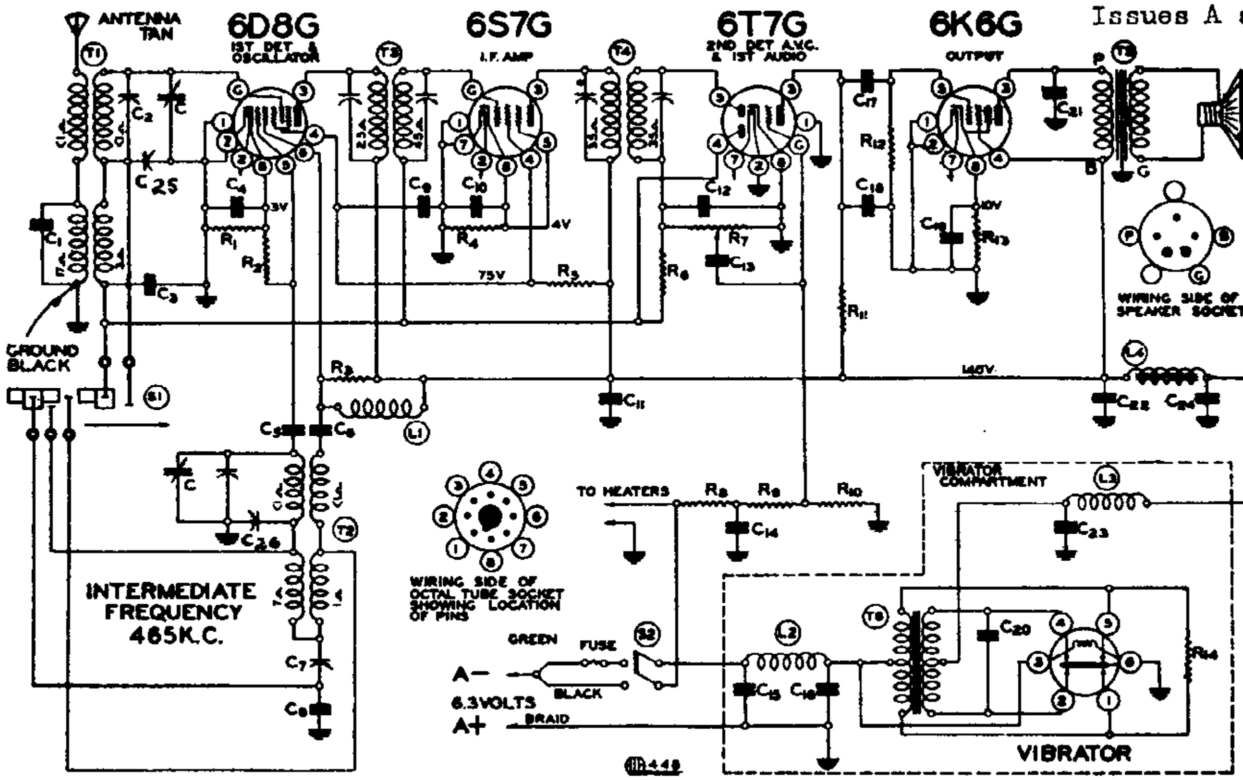
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick-up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

Schematic, Voltage
Socket, Trimmers

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 010219
Runs 3,4
Chassis 489
Series A
Issues A and B



RESISTORS

R1	130-54	500 ohm - 1/3 w.
R2	130-12	50M ohm - 1/3 w.
R3	130-12	50M ohm - 1/3 w.
R4	130-26	1000 ohm - 1/3 w.
R5	130-149	15M ohm - 1/3 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-91	1 meg volume control
R8	130-191	1.5 megohm - 1/3 w.
R9	130-4	3 megohm - 1/3 w.
R11	130-9	200M ohm - 1/3 w.
R12	130-3	500M ohm - 1/3 w.
R13	130-153	700 ohm - 1/3 w.
R14	130-84	200 ohm - 1/3 w.
R10	130-191	1.5 meg - 1/3 w.

CONDENSERS

C	102-43	2 gang variable
C1	129-5	.0001 Mica
C2	124-39B	Adj. Cond. 2-25 mmf.
C3	100-22	.05 x 200
C4	100-20	.1 x 200
C5	129-39	.00005 Mica
C6	100-25	.002 x 600
C7	124-38	Series pad 600 mmf. W. C.
C8	129-54	.003 Mica
C9	100-20	.1 x 200
C10	100-20	.1 x 200
C11	100-11	.01 x 400
C12	129-5	.0001 Mica
C13	100-11	.01 x 400
C14	100-11	.01 x 400
C15	100-40	.5 x 200
C16	100-40	.5 x 200
C17	100-26	.02 x 400
C18	129-2	.0005 Mica
C19	119-22	10.0 mfd. 25 v. lytic
C20	100-34	.005 x 1200
C21	100-19	.006 x 600
C22	119-28B	5.0 mfd. lytic
C23	100-20	.1 x 200
C24	119-28B	5.0 mfd. lytic

C22 - C24 in same unit

C25	124-30B	Adjustable Trimmer, 2-20 mmf.
C26	124-30B	Adjustable Trimmer, 2-20 mmf.

C25 and C26 in same unit

(Serial No. 7J852300 and up)

ISSUE B (Serial No. 8C136800 and up)

PARTS

T1	111-83	Antenna coil complete
T2	110-66B	Oscillator coil complete
T3	108-105B	Input I.F. complete 465 kc.
T4	108-106B	Output I.F. complete 465 kc.
T5	114-96	6" speaker (P.M.)
T6	104-62E	Power Transformer
L1	123-4	R. F. "B" Choke
L2	105-19	A Choke
L3	123-3	R. F. "B" Choke
L4	105-30E	"B" Filter Choke (400 ohms)
S1	125-39	Wave Band Switch
S2		Switch on volume control

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper	535 to 1720 K.C. (Kilocycles)
Short Wave	Lower	5.5 to 18.1 M.C. (Megacycles)

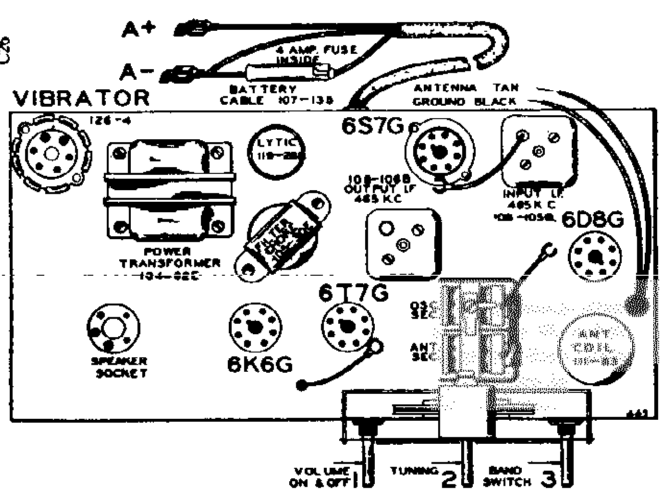


FIG. 1—TOP VIEW

MODEL 010219
Runs 3,4
Chassis 489
Series A
Issues A and B
Socket, Trimmers
Alignment

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 01554
Trimmers
Alignment

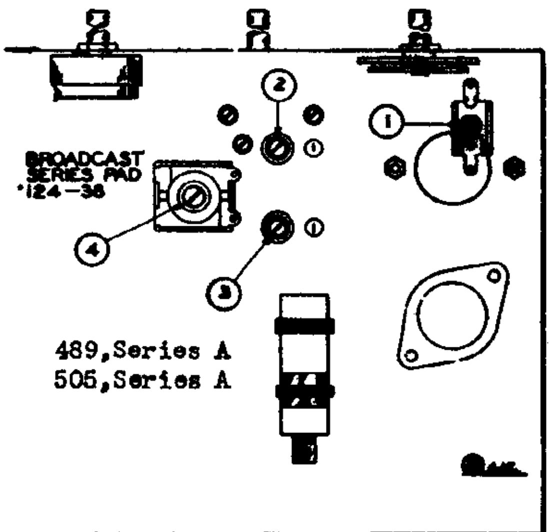


FIG 3.—BOTTOM VIEW

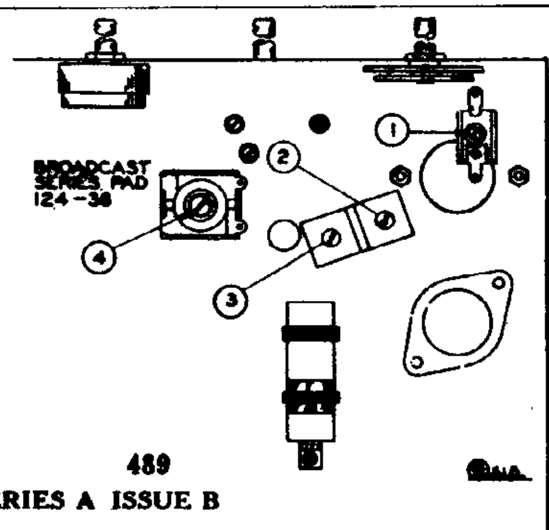


FIG 3.—BOTTOM VIEW

(Serial No. 8C130800 and up)

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-106B Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   - (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-106B) to resonance.
   - (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-105B) to resonance.

SHORT WAVE BAND ALIGNMENT:
5.5 to 18.1 Megacycles

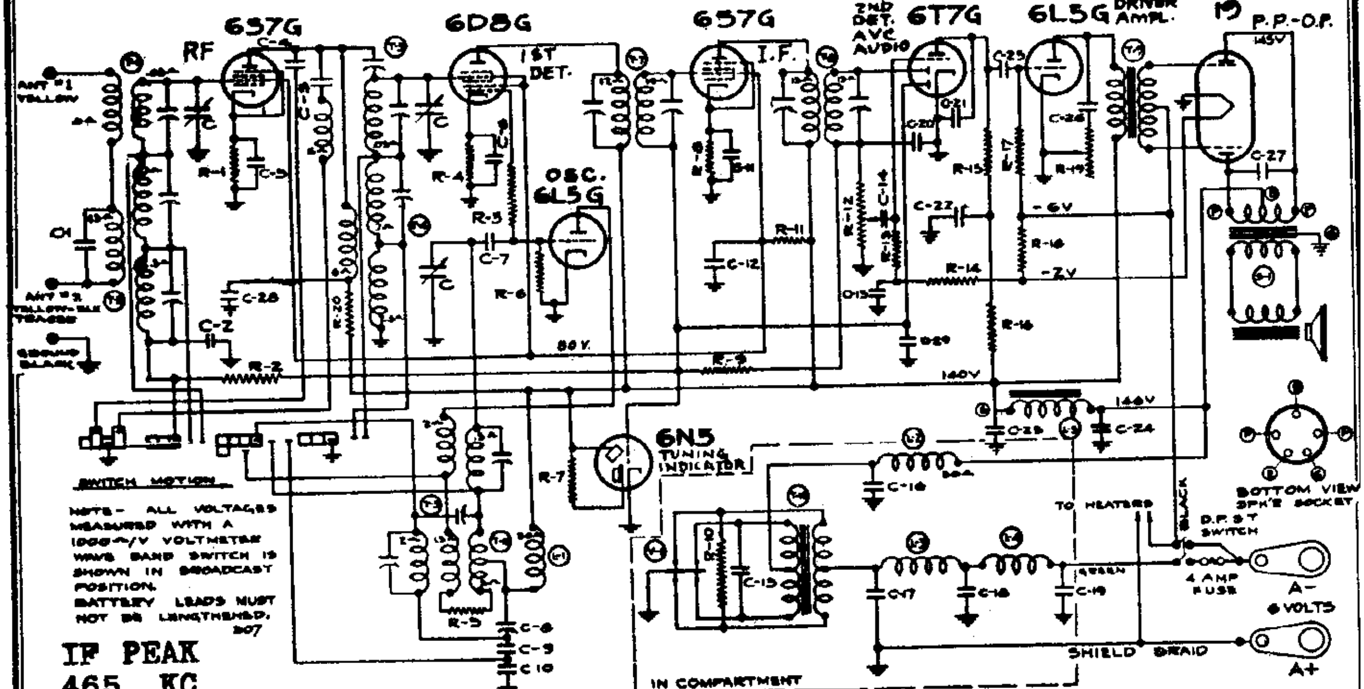
1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   - (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.

     This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).
   - (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

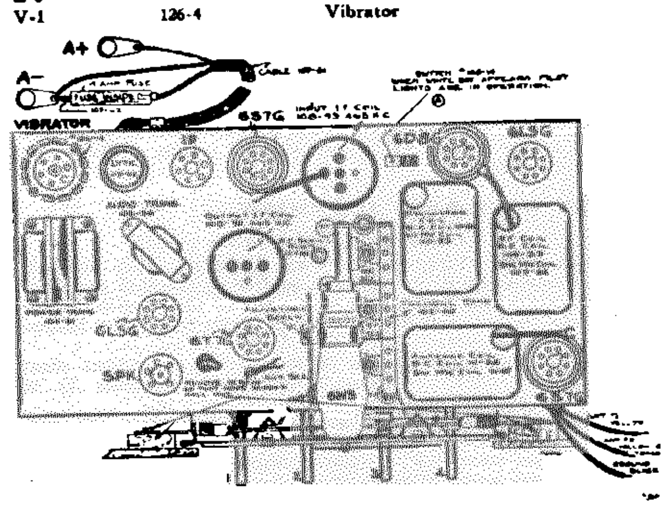
1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   - (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).
   - (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.
   - (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   - (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   - (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

GOODYEAR TIRE & RUBBER CO., INC.



IF PEAK 465 KC

No.	Part No.	Description	
		CONDENSERS	
C	100-40	Variable Condenser	
C1	129-5	.0001 Mica—MO—O—20%	
C2	100-9	.05 x 200 v.—25%	
C3	100-9	.05 x 200 v.—25%	
C4	129-72	.0004 Mica—MT—W—5%	
C5	129-38	.00005 Mica—MO—O—10%	
C6	100-9	.05 x 200 v.—25%	
C7	129-38	.00005 Mica—MO—O—10%	
C8	124-35	J.S. Series Pad	
C9	129-70	.004 Mica MW—J—2½%	
C10	129-71	.002—Mica MW—W—2½%	
C11	100-20	.1 x 200v.—25%	
C12	100-20	.1 x 200v.—25%	
C13	100-34	.005 x 1200 v.—10%	
C14	100-11	.01 x 400 v.—25%	
C15	100-11	.01 x 400 v.—25%	
C16	100-14	.1 x 200 v.—25%	
C17	100-56	.5 x 200 v.—50%—10%	
C18	100-56	.5 x 200 v.—50%—10%	
C19	100-25	.002 x 600 v.—25%	
C20	129-5	.0001 Mica MO—O—20%	
C21	129-2	.0005 Mica MT—O—20%	
C22	100-20	.1 x 200 v.—25%	
C23	119-32	4. mfd. 200 w. v. Lytic	
C24	119-32	8. mfd. 200 w. v. Lytic.	
C25	100-11	.01 x 400 v.—25%	
C26	100-26	.02 x 400 v.—25%	
C27	100-25	.002 x 600 v.—25%	
C28	100-50	.25 x 200 v.—20%	
C29	100-22	.05 x 200 v.—25%	
		RESISTORS	
R1	130-140	1200 ohm	1/3 w.—20%
R2	130-20	100M	1/3 w.—20%
R3	130-27	50	1/3 w.—20%
R4	130-34	500 ohm	1/3 w.—20%
R5	130-27	50	1/3 w.—20%
R6	130-2	75 M	1/3 w.—20%
R7		½ meg	(in m. e. socket)
R8	130-140	1200 ohm	1/3 w.—20%
R9	130-38	2 meg	1/3 w.—20%
R10	130-84	200 ohm	1/3 w.—20%
R11	130-157	12M	½ w.—10%
R12	101-66	500M	Volume Control
R13	130-19	1 meg	1/3 w.—20%
R14	130-19	1 meg	1/3 w.—20%
R15	130-20	100M	1/3 w.—20%
R16	130-20	100M	1/3 w.—20%
R17	130-4	3 meg	1/3 w.—20%
R18	130-158	16 ohm	1 w.—Insulated
R19	101-67	100M	Tone Control
R20	130-85	3 M	1/3 w.—20%
		PARTS	
T1	111-67	S.W. M.W. Ant. Coil	
T2	111-68	B.C. Antenna Coil	
T3	109-32	S.W. M. W. R.F. Coil	
T4	109-33	B.C. R.F. Coil	
T5	110-53	S.W. M.W. Osc. Coil	
T6	110-55	B.C. Osc. Coil	
T7	108-93	Input I.F. Coil	
T8	108-92	Output I.F. Coil	
T9	105-36	Audio Input Transformer	
T10	104-81	Power Transformer	
S1	114	P.M. Dynamic Spkr. 8"	
L-1	123-3	Osc. "B" Choke	
L-2	123-3	R.F. "B" Choke	
L-3	105-19	"A" Choke	
L-4	105-19	"A" Choke	
L-5	105-30	"B" Filter Choke	
V-1	126-4	Vibrator	



Vol. Control On-Off Switch | Tone Control | Tuning Control | Band Switch

MODEL 010221
Chassis 804
Trimmers, Alignment

GOODYEAR TIRE & RUBBER CO., INC.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-92 Output I.F. Transformer
Part No. 108-93 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-92) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap to 6D8G and adjust input I.F. transformer (No. 108-93) to resonance.

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 18 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 18 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.
   (b) Re-set external oscillator to 17 megacycles and pick up signal by rotating variable condenser and adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5.5 megacycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5.5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.
   (b) Re-set external oscillator to 5 megacycles and pick up signal by rotating variable condenser and adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.
   (c) Re-set external oscillator and check sensitivity at 1700 kilocycles.

BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trimmer (adjustment number 7) to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

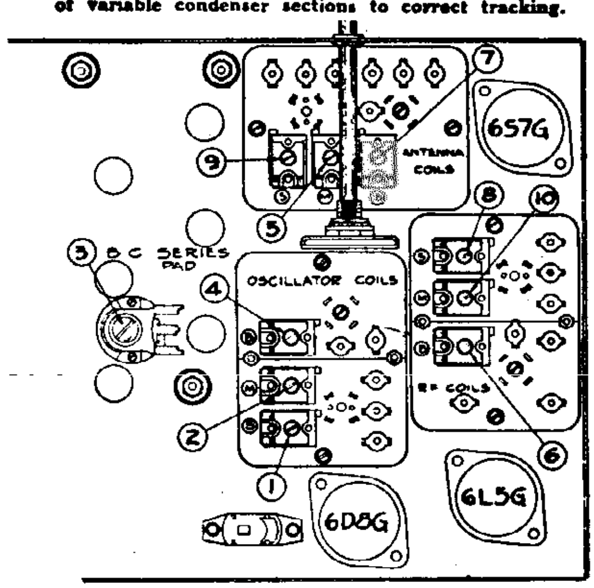
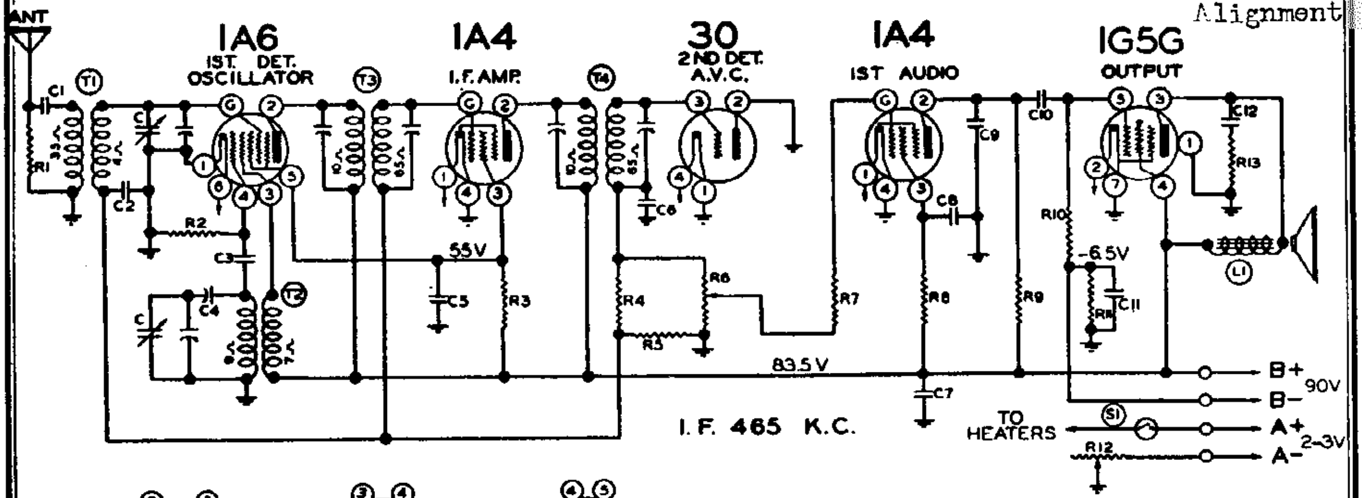


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 01022 Run 2
Chassis 523B
Schematic, Voltage
Socket, Trimmers
Alignment



No.	Part No.	Description	
		CONDENSERS	
C	102-56	2 Gang Variable Condenser	
C1	100-11	.01 x 400 v.	25%
C2	100-22	.05 x 200 v.	25%
C3	129-12	.00025 Mica	20%
C4	124-14	Series Pad	
C5	100-9	.05 x 200 v.	25%
C6	129-5	.0001 Mica	20%
C7	100-48	.25 x 200 v.	20%
C8	100-9	.05 x 200 v.	25%
C9	129-2	.0005 Mica	20%
C10	100-11	.01 x 400 v.	25%
C11	119-22	10.0 mfd. x 25 w. v.	
C12	100-11	.01 x 400 v.	25%
		RESISTORS	
R1	130-17	10M ohm - 1/3 w.	20%
R2	130-52	50M ohm - 1/3 w.	20%
R3	130-17	10M ohm - 1/3 w.	20%
R4	130-38	2 megohm - 1/3 w.	20%
R5	130-38	2 megohm - 1/3 w.	20%
R6	101-69	1 megohm Volume Control	
R7	130-52	50M ohm - 1/3 w.	20%
R8	130-19	1 megohm - 1/3 w.	20%
R9	130-9	200M ohm - 1/3 w.	20%
R10	130-19	1 megohm - 1/3 w.	20%
R11	130-93	450 ohm - 1/3 w.	10%
R12	101-44	475 ohm Rheostat	
R13	130-52	50M ohm - 1/3 w.	20%
		PARTS	
T1	111-46	Antenna Coil Complete	
T2	110-36	Oscillator Coil Complete	
T3	108-67	Input I.F. Coil Complete	
T4	108-68	Output I.F. Complete	
L1	114-76	6" P. M. Speaker	
L1	114-19	Speaker - 6" Magnetic	
S1		Switch on Volume Control	

ALIGNING I.F. TRANSFORMERS: (465 K.C.)

1. With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and wth external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-67 and 108-68, to resonance. Both of these transformers have two (2) adjustments each, they are accessible from the tops of the cans (for location see top view).

Use as a resonance indicator an output meter connected across the outside terminals of the speaker or by means of an adapter to the plate and screen of the type 1G5G output tube. Maximum deflection of the volt meter indicates resonance.

Use only enough signal to get a readily readable output.

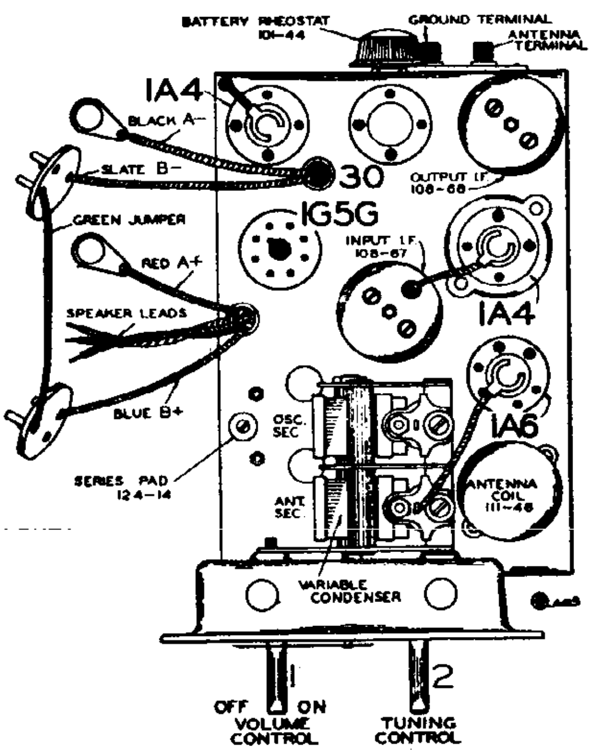
A low range output meter or the low scale of a multi-range meter should be used.

BROADCAST BAND ALIGNMENT:

1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
   (a) With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 K.C. Rotate variable condenser, pick up signal and adjust antenna trimmer (front section of variable condenser) to resonance.
   (c) Re -set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-14 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.
   (d) Check for sensitivity at 1400, 1000, 600 K.C. DO NOT BEND PLATES.

FOR BEST OPERATION THIS RECEIVER MUST HAVE AN OUTSIDE AERIAL NOT OVER FIFTY FEET LONG INCLUDING THE LEAD IN.

Frequency Range 535-1720 Kilocycles

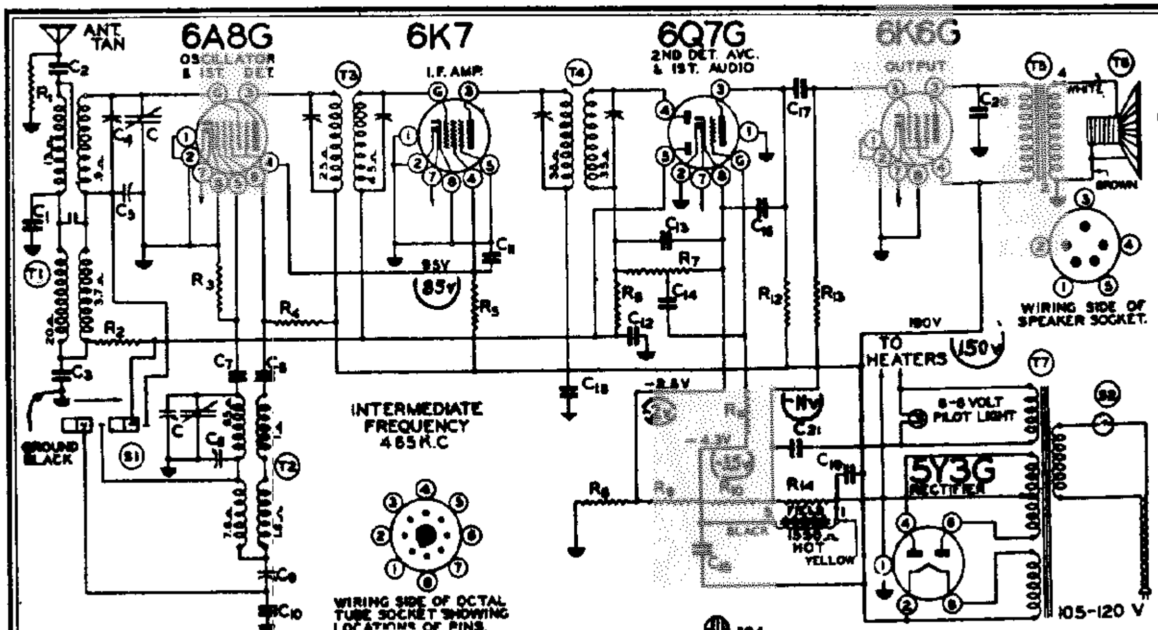


MODEL 01050
Runs 1,2
Chassis 582
Series A,B

GOODYEAR TIRE & RUBBER CO., INC.

Schematic, Voltage
Socket, Trimmers
Alignment

Voltages in Circles are for Series "A"



Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½ %	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

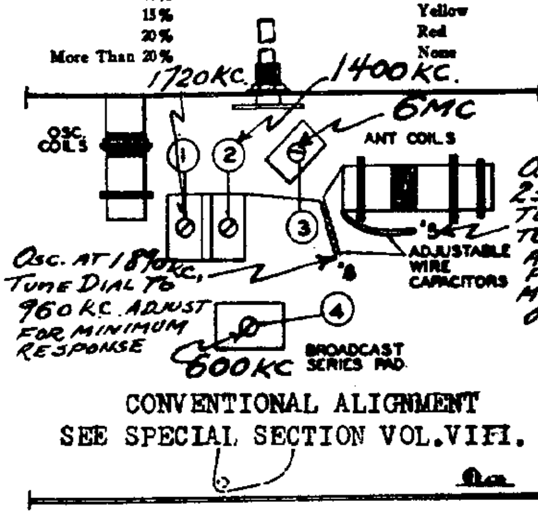


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

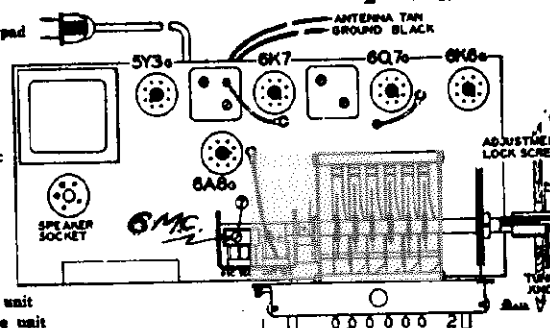


FIG. 1—TOP VIEW

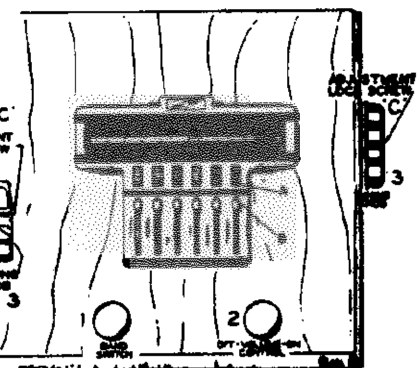


FIG. 2—FRONT VIEW

Code No.	Part No.	Description
		RESISTORS
R1	130-17	10M ohm - 1/3 w. 20%
R2	130-20	100M ohm - 1/3 w. 20%
R3	130-12	50M ohm - 1/3 w. 20%
R4	130-17 *	10M ohm - 1/3 w. 20%
R5	130-42	20M ohm - ½ w. 20%
R6	130-4	3 megohm - 1/3 w. 20%
R7	101-100	1 megohm - Volume Control
R8	130-204	55 ohm - 1/3 w. 10%
R9	130-203	40 ohm - 1/3 w. 10%
R10	130-205	100M ohm - ½ w. 10%
R11	130-4	3 megohm - 1/3 w. 20%
R12	130-9	200M ohm - 1/3 w. 20%
R13	130-102	500M ohm - 1/3 w. 10%
R14	130-46	800M ohm - 1/3 w. 10%
		CONDENSERS
C	102-63	2 Gang Variable
C1	129-86	.000038 Mica 5%
C2	129-87	.000105 Mica 10%
C3	100-77	.00304 x 600 v. 5%
C4	124-39C	2-25 mmf. Adjustable Condenser
C5	124-30B	2-20 mmf. Dual Adjustable Condenser
C6	124-30B	2-20 mmf. Dual Adjustable Condenser
C7	129-5	.0001 Mica 20%
C8	100-12	.003 x 600 25%
C9	124-44	450 wkg. cap. - Series pad
C10	129-85	.0014 - 2½% Mica
C11	100-79	.25 x 400 v. 50 - 10%
C12	100-9	.05 x 200 v. 25%
C13	129-5	.0001 Mica 20%
C14	100-11	.01 x 400 v. 25%
C15	119-48	8 mfd. x 350 w. v. lytic
C16	129-2	.0005 Mica 20%
C17	100-16	.01 x 400 v. 10%
C18	100-13	.05 - 400 v. 25%
C19	119-48	4 mfd. x 350 w. v. lytic
C20	100-19	.006 x 600 v. 25%
C21	100-4	.1 x 200 v. 10%
		C5 and C6 in same unit
		C15 and C19 in same unit
		PARTS
T1	111-89	Antenna Coil Complete
T2	110-71	Oscillator Coil Complete
T3	108-105E	Input I.F. 465 kc. Complete
T4	108-106F	Output I.F. 465 kc. Complete
T5	105-37	Output Transformer
T6	114-110	6" Dynamic speaker (1550 Ohm Field)
T7	104-124	Power Transformer
S1	125-48	Wave band switch
S2		Switch on volume control

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

All voltages are to be measured with 115 volts on the primary of the power transformer.

MODEL 582

535 to 1720 K.C.

2000 to 7000 K.C.

FOR TUNER DATA, SEE INDEX

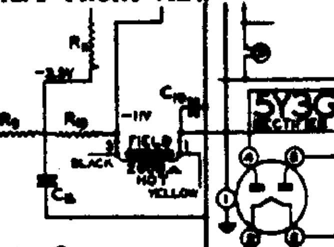
SERIES "A" (Serial No. 7L894500 and up)

R5	130-149	15M ohm - 1/3 w. 20%
R8	106-45	65 ohm 10%
R9	106-46	45 ohm 10%
R10	106-45	220 ohm 10%

R_{14} Grid Bias Res. NOT USED

C15	119-47	5.0 mfd. 250 w. v. lytic
C19	119-47	5.0 mfd. 250 w. v. lytic
C20	100-12	.003 x 600 v. 25%

C_{21} Bias-Filter Cond. NOT USED

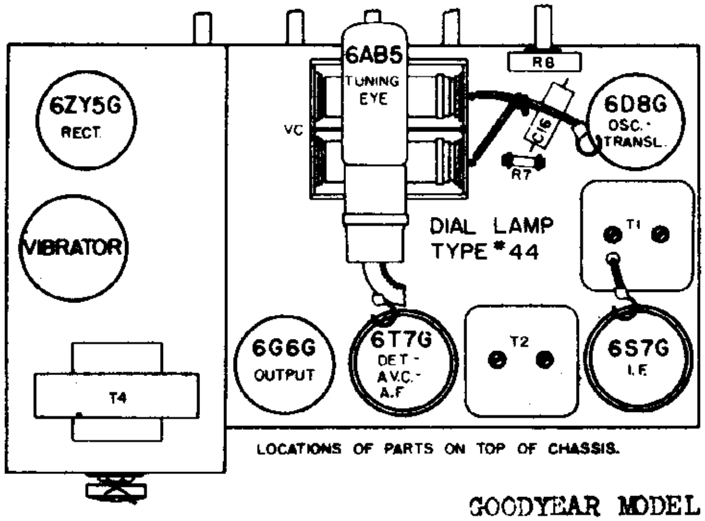


MODEL 015130
Socket, Trimmers

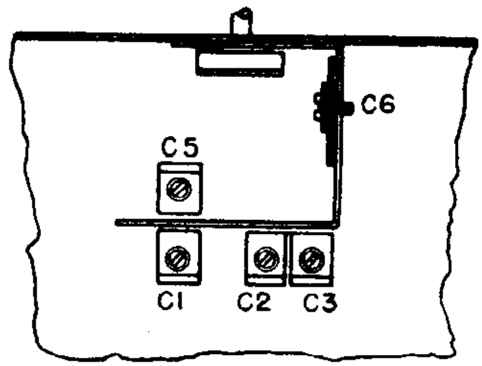
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015040
Schematic, Voltage
Socket, Trimmers
Alignment

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
CAPACITY VALUES ARE IN MICROFARADS.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

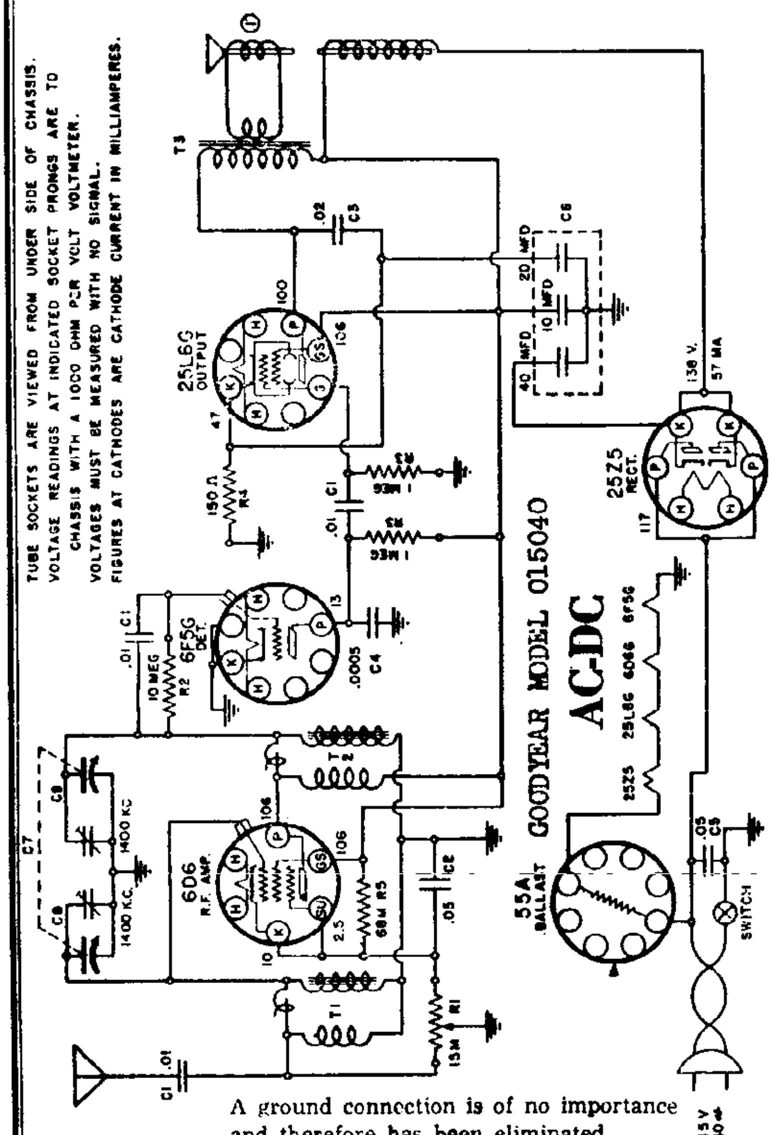


LOCATIONS OF TRIMMERS UNDER CHASSIS

GOODYEAR MODEL 015130.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. V111

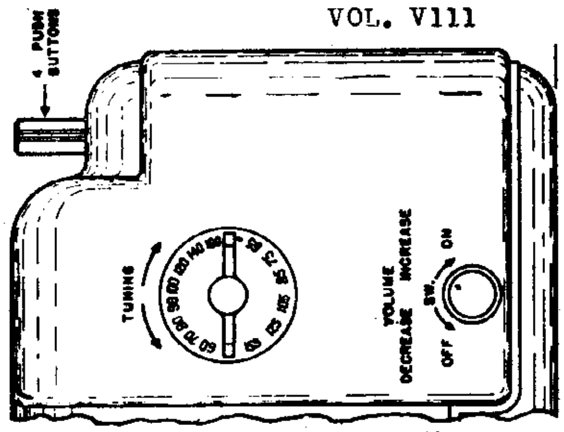
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS WITH A 1000 OHM PER VOLT VOLTMETER.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

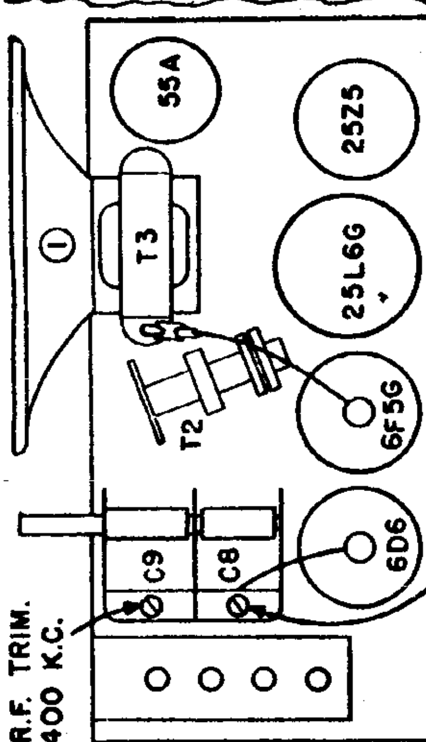


GOODYEAR MODEL 015040

AC-DC

A ground connection is of no importance and therefore has been eliminated





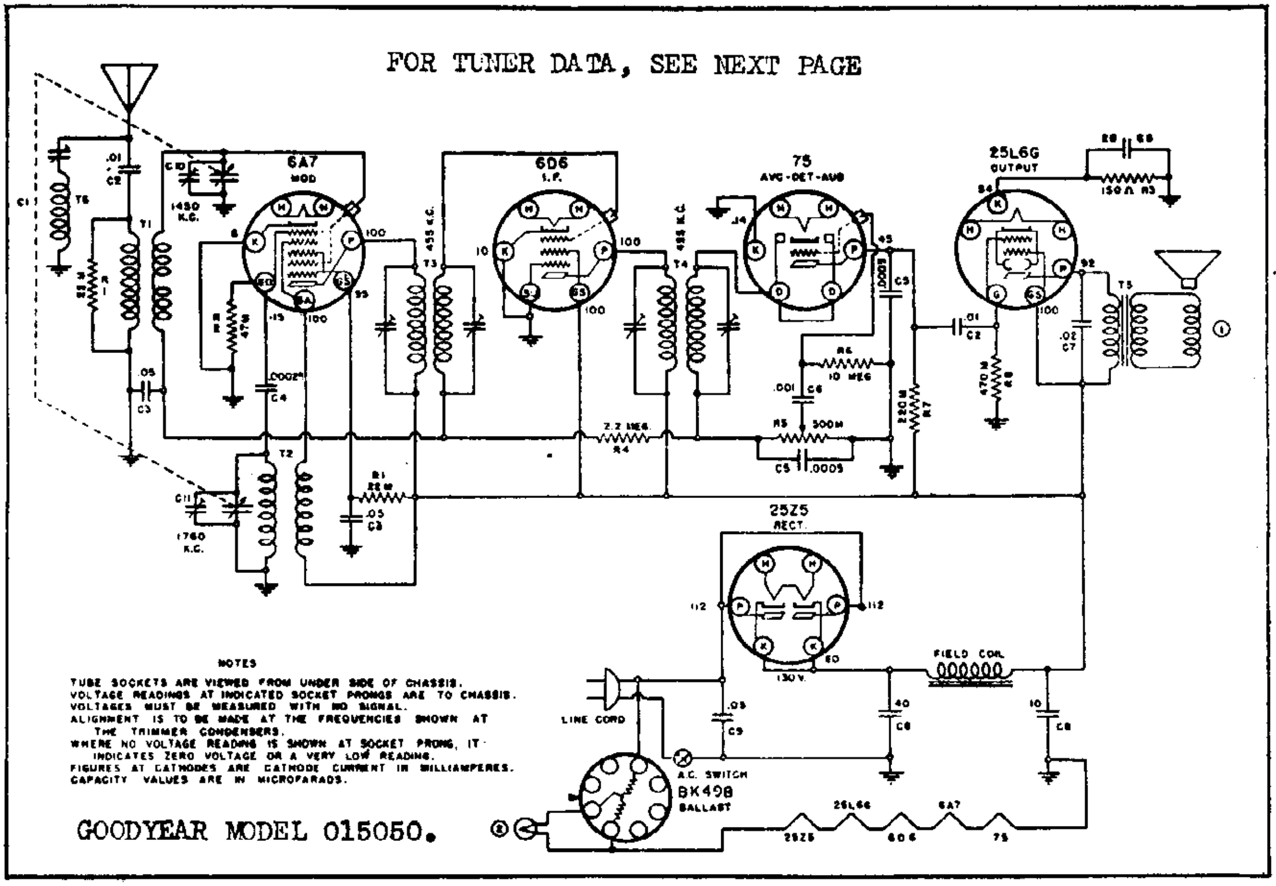
ANT. TRIM. 1400 K.C.

R.F. TRIM. 1400 K.C.

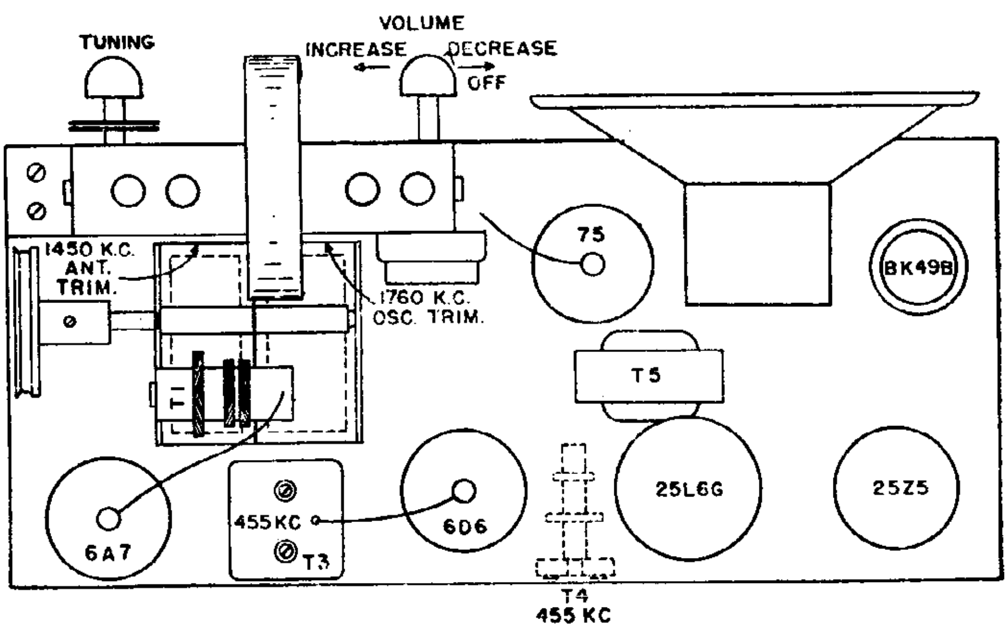
For SETTING PUSH BUTTONS see MODEL 015050.

MODEL 015050
Schematic, Voltage
Socket, Trimmers
Alignment

GOODYEAR TIRE & RUBBER CO., INC.



FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII



IF PEAK 455 KC

POWER SUPPLY

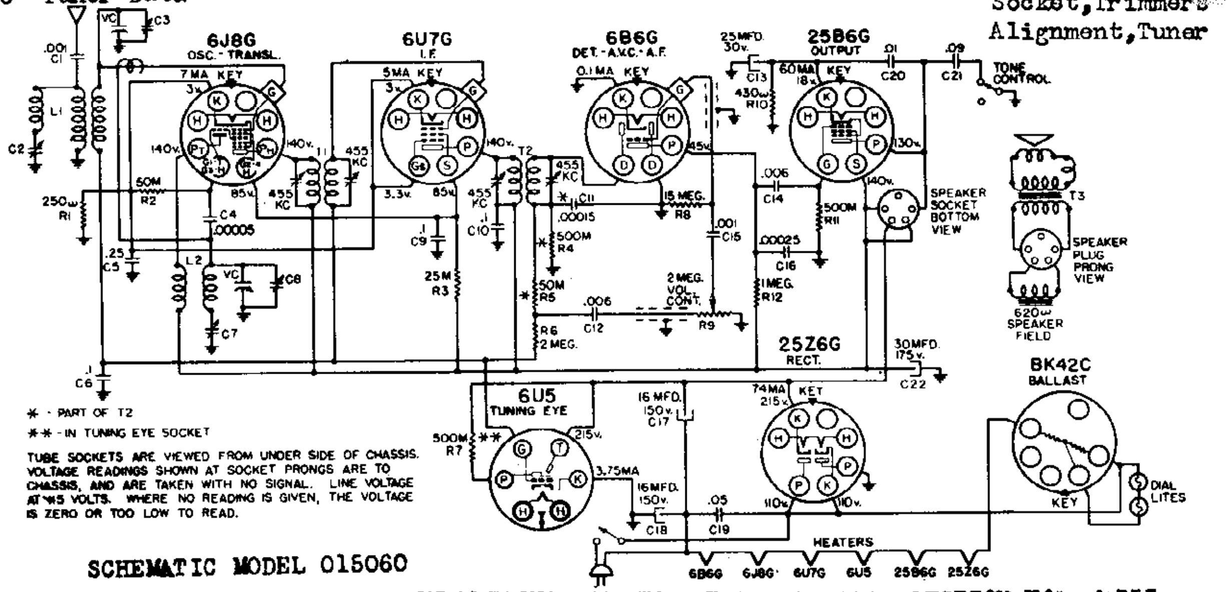
The receiver is designed for operation from 105-130 volt Alternating Current (A.C.) supply or a 105-130 volt Direct Current (D.C.) supply. Never connect the receiver to any supply having a higher voltage than that specified on the sticker. If you are not sure of the power supply voltage at your home, your Power Company will furnish the information.

When using a D.C. supply allow sufficient time for tubes to warm up (approximately 1½ minutes), and if at that time the receiver does not operate, remove the line cord plug from the socket and reverse. Replace plug in the reverse position and allow tubes to warm up, at which time the receiver will operate.

MODELS 015040,015050
015100,015110,015120
015130 Tuner Data

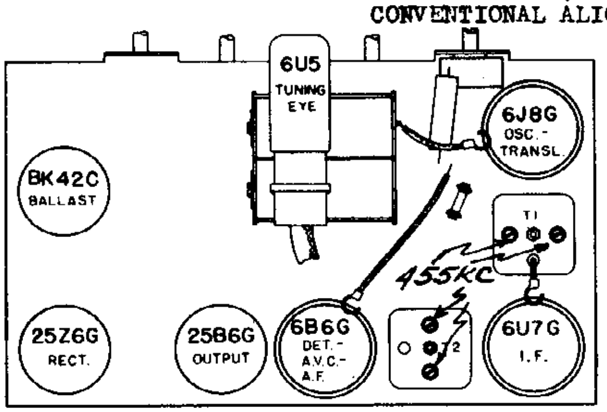
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015060
Schematic,Voltage
Socket,Trimmers
Alignment,Tuner

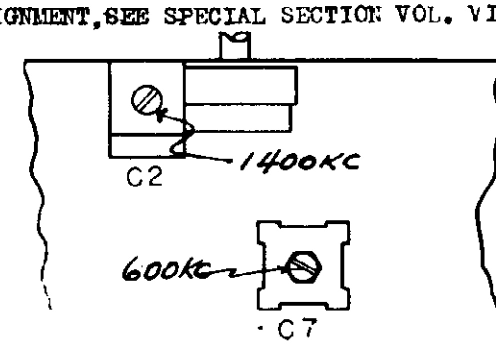


SCHEMATIC MODEL 015060

CONVENTIONAL ALIGNMENT,SEE SPECIAL SECTION VOL. VIII



LOCATION OF PARTS ON TOP OF CHASSIS



GOODYEAR MODEL 015060.
LOCATION OF TRIMMERS
UNDER CHASSIS

PUSH BUTTON TUNING FOR MODELS 015040, 015050, 015100, 015110

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, your selected station which is tuned in nearest number 160 on the Station Selector Knob.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of highest frequency and the Call Letter Tab for this station should be in the Push-button nearest the rear of the receiver.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second highest in frequency and the third station set up will be third highest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner turn the tuning knob to the frequency of the station desired.

PUSH BUTTON TUNING FOR MODELS 015060, 015120, 015130

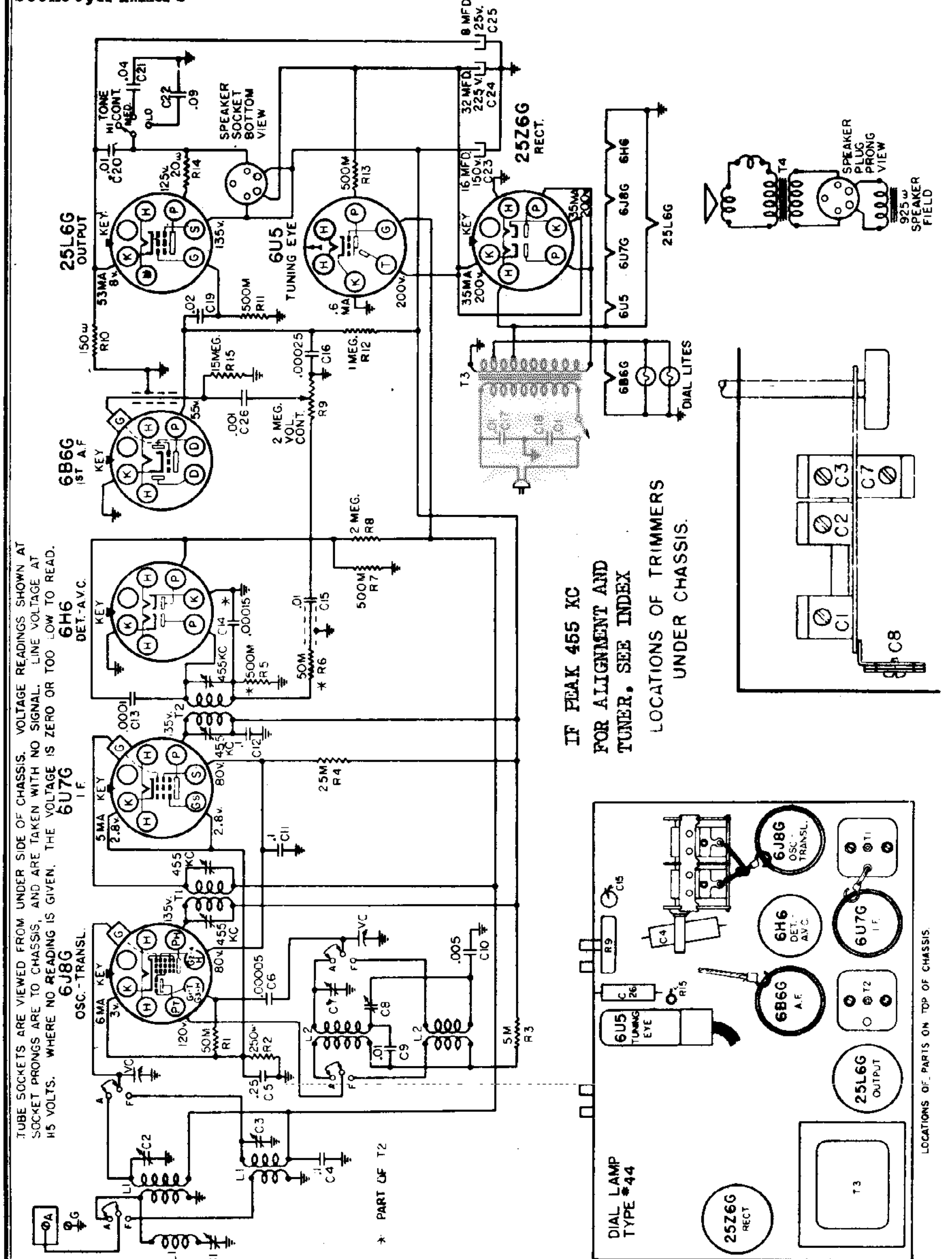
SETTING UP:

Unscrew (turn counter-clockwise) the push button two or three turns. (Use a token or screwdriver in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it in firmly and at the same time tune in your desired station. With your station tuned in, lock the adjustment by securely tightening (turn clockwise) the push button knob, using token or screwdriver. Hold the button in while tightening it. Unless the button is tightened securely, the adjustments may slip. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

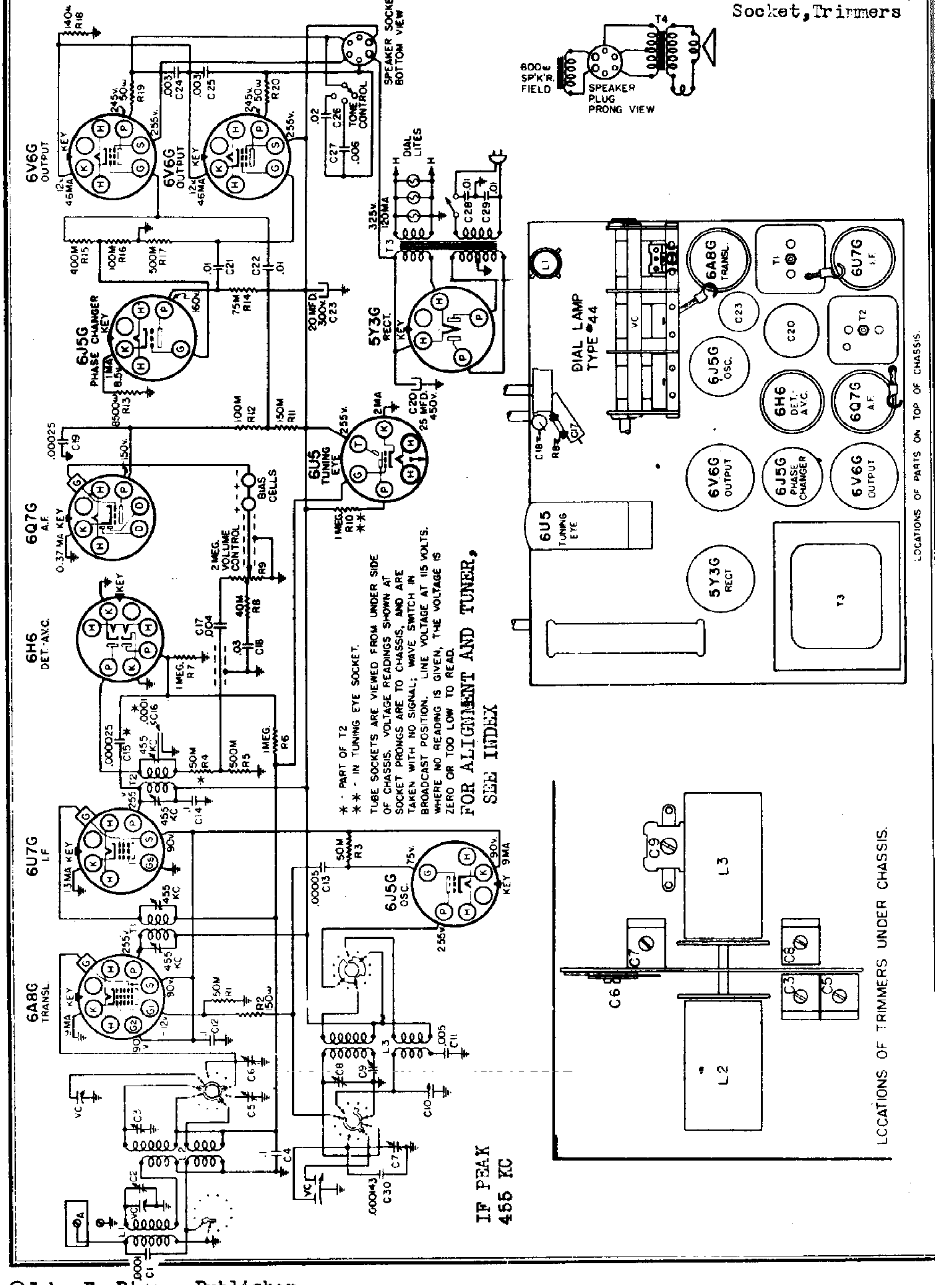
MODEL 015070
Schematic, Voltage
Socket, Trimmers

GOODYEAR TIRE & RUBBER CO., INC.



MODEL 015080
Schematic, Voltage
Socket, Trimmers

GOODYEAR TIRE & RUBBER CO., INC.



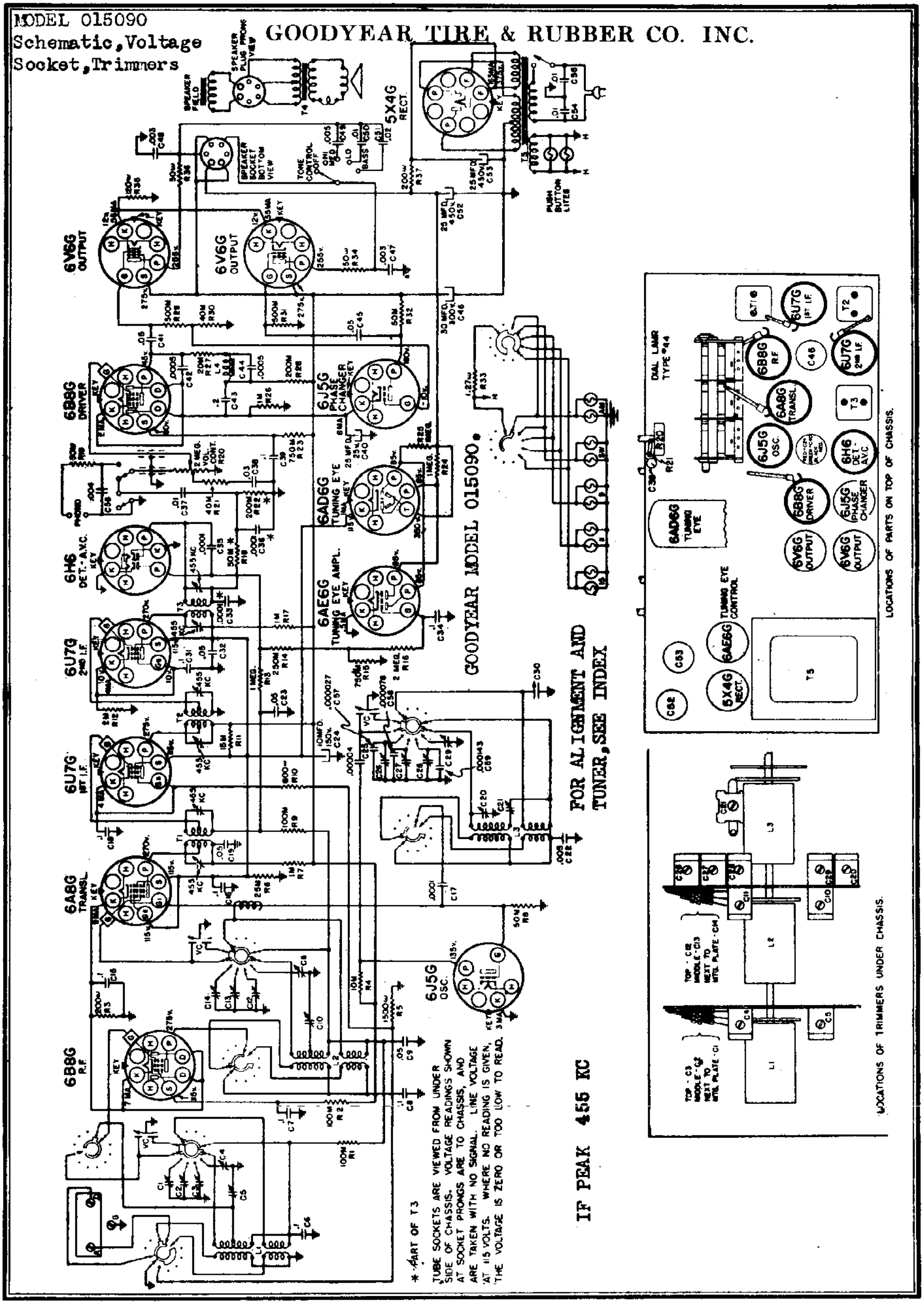
* - PART OF T2
** - IN TUNING EYE SOCKET.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

FOR ALIGNMENT AND TUNER, SEE INDEX

IF PEAK 455 KC

MODEL 015090
Schematic, Voltage
Socket, Trimmers

GOODYEAR TIRE & RUBBER CO. INC.



GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015070
MODEL 015080
MODEL 015120
MODEL 015130
Alignment

GOODYEAR MODEL 015120

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.37 volts
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . HI
Position of Dial Pointer with variable fully closed . . . . Horizontal

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	1076 Grid	T2, T1	IF Output IF Input
"AM"	600 kc	455 kc*	.0002 mfd.	Ant. Term.	C1*	Wave Trap
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C6, C3	Osc.,Transl.
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C7	Padder
"SW"	16 mc(rock)	16 mc	400 ohms	Ant. Term.	C4	Transl.

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

PUSH BUTTON TUNING

FOR SETTING UP PUSH BUTTONS
SEE GOODYEAR MODEL 015060

GOODYEAR MODEL 015130

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across Loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.32 volts
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . HI
Position of Dial Pointer with variable fully closed . . . . . Horizontal. To be along first heavy line below 550 kc

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	[illegible] Grid	T2, T1	IF Output IF Input
"AM"	400 kc	455 kc*	.0002 mfd.	Ant. Term.	C1*	Wave Trap
"AM"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C5, C3	Os.,Transl.
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C6	Padder
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C3	Transl.

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

GOODYEAR MODEL 015070

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 1.58 volts
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . HI
Position of Dial Pointer with variable fully closed . . . . . . Center of first mark to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	6J8G Grid	T2, T1	IF Output IF Input
"AM"	600 kc	455 kc*	.0002 mfd.	Ant. Term.	C1*	Wave Trap
"AM"	Fully open	1730 kc	.0002 mfd.	Ant. Term.	C7	Oscillator
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8	Translator
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C6	Padder
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C3	Translator

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

GOODYEAR MODEL 015080

ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 0.96 volts
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . HI
Position of Dial Pointer with variable fully closed . . . . Center of block to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	6A8G Grid	T2, T1	IF Output IF Input
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C5	Translator
"SWD"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C7* C5	Oscillator Translator
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C6,C3,C8	Osc.,Trans.,Ant.
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder

IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

MODEL 015070
MODEL 015080
MODEL 015090
Tuner Data

GOODYEAR TIRE & RUBBER CO., INC.

MODELS 015080 and 015090

PUSH BUTTON TUNING

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is helpful to arrange the stations in the order of their frequency (kilocycles): that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, short wave stations that can be tuned in on a SPREAD BAND scale can be set up for push button tuning. The stations selected must give strong and reliable reception.

2. Remove the four screws that hold the plate through which the push buttons protrude, and remove the plate. (This plate is called the "escutcheon".)

3. Push the tuning knob in and turn it so that the dial pointer comes to the left end of the dial. Engage the small screw driver, supplied, with the slotted shaft that is between the tuning knob and the push buttons. Unlock the mechanism by pushing the shaft in and unscrewing it (turn counter-clockwise) about four turns. Then remove the screw driver.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly, as indicated by the tuning eye. Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button. Then let go of the push button <u>before</u> turning the tuning knob again. If properly done, the tuning eye indication will not change when you let go of the push button.

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button; then the tuning knob. Proceed in the same manner for the other stations on your list.

<u>CAUTION: Use the small screw driver supplied for performing the next operation. Use of a larger screw driver than the one supplied will result in too much force being applied. The locking mechanism must not be turned too far to the right. Otherwise it may be impossible to obtain proper operation of the push buttons and the mechanism is liable to be permanently damaged.</u>

6. After the last station has been set up, lock the mechanism by pushing the slotted shaft in and securely tightening it (turn clockwise), using the <u>small</u> screw driver, supplied. (Pushing the slotted shaft in will release the last push button. The dial pointer will move to the right end of the dial as the slotted shaft is turned.) Then remove the screw driver. If the slotted shaft remains pushed in when the screw driver is removed, turning it back and forth very slightly will release it.

After locking the mechanism, test the setting of each button by pushing it in. Then see if the station can be tuned still more accurately by using the tuning knob. Increased accuracy of tuning with the knob will be indicated by a narrower shadow of the tuning eye. If you find any stations that have not been correctly set up, unlock the mechanism, as described in Step 3, and readjust the setting. Be sure to lock the mechanism again before tuning any stations.

7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the recesses in the front of the push buttons. Cover the call letters with the clear celluloid tabs supplied. Replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the proper push button.

OPERATION:

Push the button, indicated for your desired station, all the way in. Your station then will be tuned in. If you have selected short wave stations for push button tuning, be sure the band switch is turned to the proper band. The button will remain part way in, indicating what station is tuned in, until you push another button or until you push the tuning knob.

GOODYEAR 015070

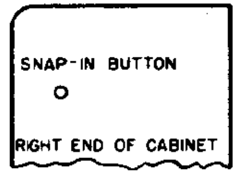
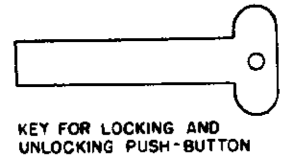


FIG. 1



KEY FOR LOCKING AND UNLOCKING PUSH-BUTTON MECHANISM.

FIG. 2

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is advisable, but not necessary, to arrange the stations in the order of their frequency (kilocycles); that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, short wave stations can be set up for approximate push button tuning and then tuned accurately with the tuning knob. The stations selected must give strong and reliable reception.

2. Remove the four screws that hold the plate through which the push buttons protrude, and remove the plate. (This plate is called the "escutcheon".) If your radio is a table model (not a console), remove the snap-in button at the right side of the cabinet. See Fig. 1

3. Push the tuning knob in and turn it so that the dial pointer comes to the right end of the dial. If your radio is a table model, a key, illustrated in Fig. 2, will be found in the Instruction Leaflet envelope. Insert this key in the hole in the side of the cabinet from which the snap-in button was removed and engage the key with the slot at the end of the push button locking mechanism. Unscrew (turn counter-clockwise) the key a few turns, unlocking the mechanism. (A screw driver can be used for unlocking the mechanism instead of the key supplied.)

If yours is a console model, the mechanism can be unlocked by reaching in from the back of the cabinet and unscrewing (turning counter-clockwise) the wing nut, at the end of the mechanism, a few turns. (This can be done by hand.)

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is <u>tuned in exactly.</u> Then let go of the push button, making sure not to turn the tuning knob <u>until you have let go of the button.</u> (Turning the knob while the button is pushed in would spoil the accuracy of the adjustment.) Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button.

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button and then the tuning knob. Proceed in the same manner for the other stations on your list.

6. When all of the stations have been set up, push the tuning knob in and turn it so that the dial pointer comes to the left end of the dial. Then lock the mechanism by tightening (turning clockwise) the wing nut for console models or by using the key for table models. If yours is a table model, replace the snap-in button in the side of the cabinet.

7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the celluloid holders at the back of the escutcheon. Be sure to insert the call letters so that they are opposite their respective push buttons. Then replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the call letter holder in their proper position.

GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT GOODYEAR MODEL 015090

Output meter connection .... Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts..............1.06 volts*
Generator ground lead connection ....Receiver chassis
Dummy antenna value to be in series with generator output,See chart below
Connection of generator output lead..................... See chart below
Generator modulation...................................... 30%, 400 cycles
Position of volume control.............................. Fully clockwise
Position of tone control.. HI
Position of dial pointer(variable closed) .... Center of block to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	6A8G Grid	T3,T2,T1	IF Output, IF Interstage, IF Input.
"SW"	18 mc	18 mc	400 ohms	Ant. Term.	C39*	Oscillator
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C11,C4	Translator,RF
"9"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C28* C12 C3	Oscillator Translator RF
"11"	11.7 mc	11.7 mc	400 ohms	Ant. Term.	C27* C13 C3	Oscillator Translator RF
"15"	14.9 mc	14.9 mc	400 ohms	Ant. Term.	C26* C14 C1	Oscillator Translator RF
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C20 C10 C5	Oscillator Translator RF
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C21	Padder

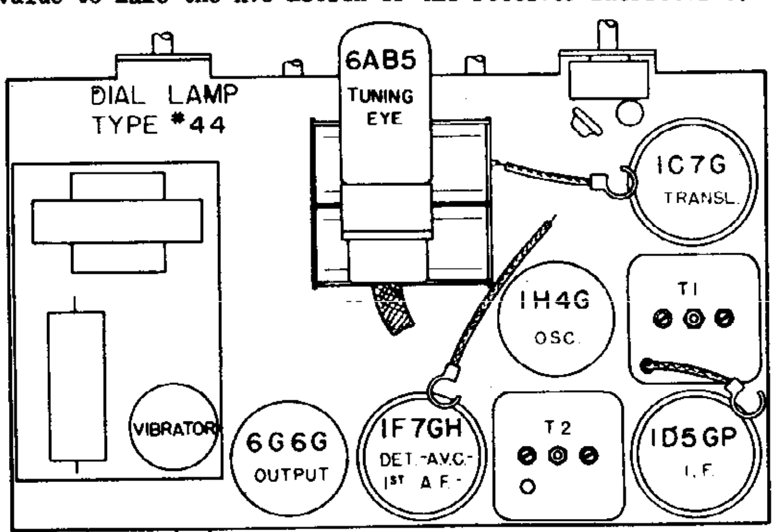
IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

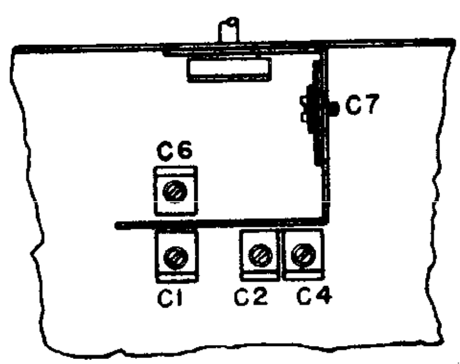
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATION OF PARTS ON TOP OF CHASSIS

MODEL 015120



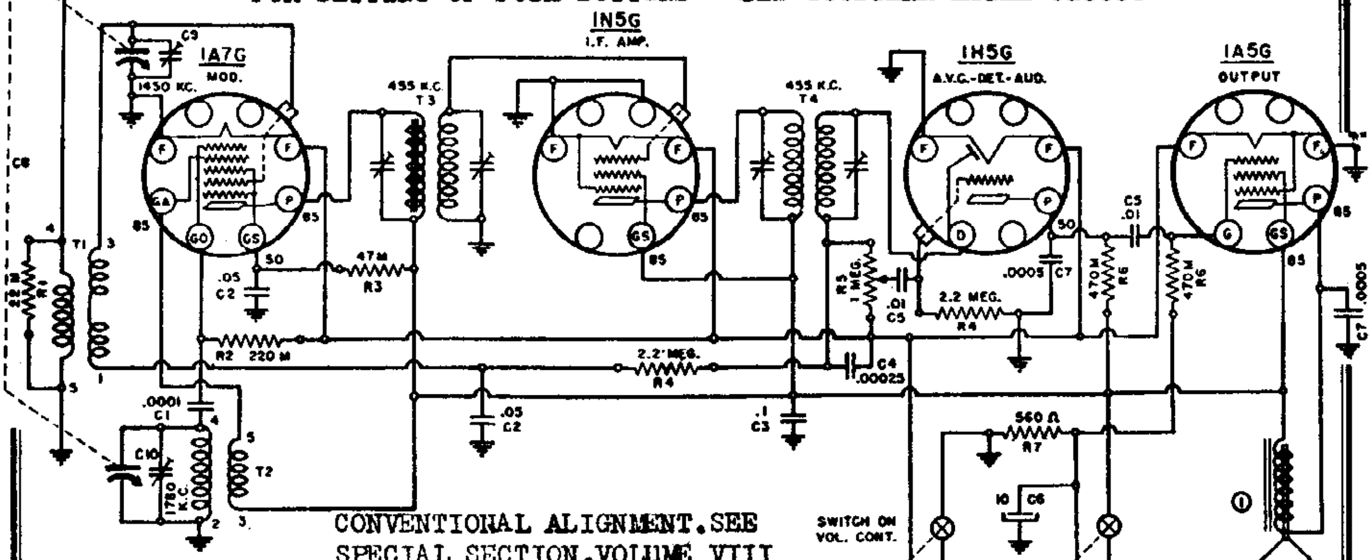
LOCATIONS OF TRIMMERS UNDER CHASSIS

MODEL 015100
Schematic, Voltage

GOODYEAR TIRE & RUBBER CO., INC.

Socket, Trimmers
Alignment

FOR SETTING UP PUSH BUTTONS - SEE GOODYEAR MODEL 015050

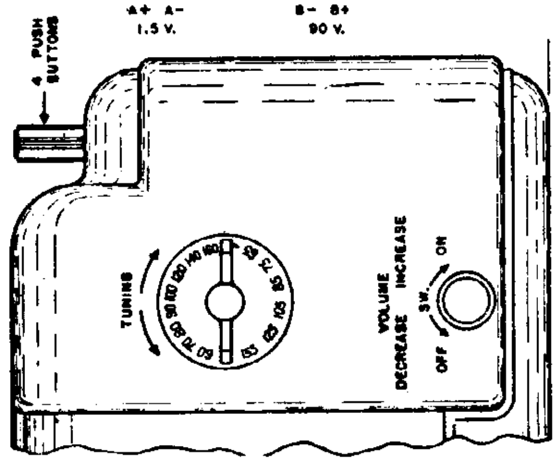


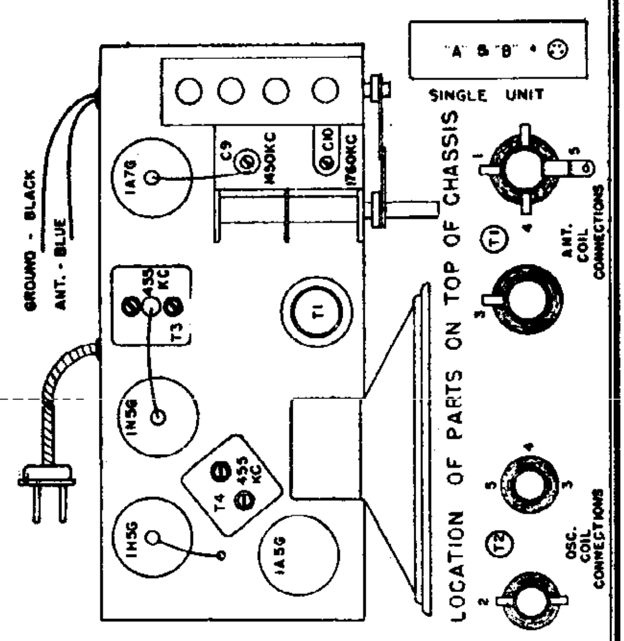
CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION, VOLUME VIII

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER COND.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY VALUES ARE IN MICROFARADS.

Schematic Location	Part No.	Description	Price Each
	10141463	Booklet—Call Letter	.25
	101419422	Booklet—Instruction	.25
	1011242184	Cabinet—Molded, Ivory	4.70
	1011242184	Cabinet—Molded, Walnut	2.65
	1011323130	Cable—Battery	.62
	101373509	Clips—Grid ... Doz.	.15
C1		Condenser—.0001 mfd. Mica	.25
C2		Condenser—.05 mfd. 200 V. Tub.	.25
C3		Condenser—.1 mfd. 200 V. Tub.	.25
C4		Condenser—.00025 mfd. Mica	.25
C5		Condenser—.01 mfd. 400 V. Tub.	.25
C6	1012118235	Condenser—Elec. 10 mfd. 35 Volts	.50
C7		Condenser—.0005 mfd. Mica	.25
C8	1012019134	Condenser—Variable C9 and C10	.80
R5	1012524126	Control—Volume 1 meg ohm	.90
	101374710	Grommet—Rubber 3/8" ... Doz.	.20
	101374700	Grommet—Rubber 1/4" ... Doz.	.20
	1014067367	Knob—Tuning, Ivory or Cream & Tan	.38
	1014052116	Knob—Volume, Ivory or Cream & Tan	.15
	1012752129	Knob—(Push Button) & Stem, Ivory or Cream and Tan	.15
	1012739251	Lever—Driven	.15
	1012739252	Lever—Driver	.10
	1012739253	Link—Connecting	.05
	10137862	Lockwasher—3/8" ... Doz.	.05
	1013756102	Nut—Hex 3/8" ... Doz.	.15
	1013783118	Panel—Back	.20
R1		Resistor—22 M ohm 1/3 W	.20
R2		Resistor—220 M ohm 1/3 W	.20
R3		Resistor—47 M ohm 1/3 W	.20
R4		Resistor—2.2 meg ohm 1/3 W	.20
R6		Resistor—470 M ohm 1/3 W	.20
R7		Resistor—560 ohm 1/3 W	.20
	10127654	Rivets—Shoulder ... Doz.	.10
	1012774117	Screws—Set 8/32 hex hd. cup. pt. ... Doz.	.20
	101386855	Socket—8 Prong	.10
1	10151179260	Speaker—5" Permanic	2.40
	1012770109	Spring	.05
T1	1011810258	Transformer—Antenna	.75
T2	1011810257	Transformer—Oscillator	.75
T3	1015510251	Transformer—1st I.F.	1.50
T4	1015710259	Transformer—2nd I.F.	1.25
	1013722112	Tri-points—Back panel ... Doz.	.15
	101289956	Tuner	1.30

ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE





MODEL 015110
Schematic, Voltage
Socket, Trimmers
Alignment

GOODYEAR TIRE & RUBBER CO., INC.

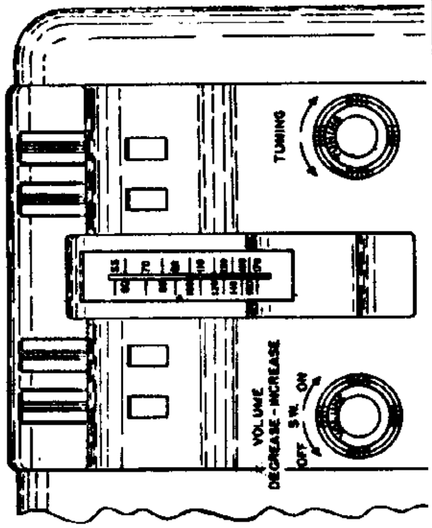
Schematic Location	Part No.	Description	Selling Price Each
	1011323128	Cable—Battery	.45
	101373509	Caps—Grid Small ... Doz.	.10
	1012739257	Drum & Lever Assem.	.40
	1014052127	Knob—Tuning, Ivory or Cream & Tan	.15
	1014052132	Knob—Volume, Ivory or Cream & Tan	.15
	101318901	Lamp—Pilot No. 40	.15
	1012739248	Lever—Driver	.05
	1012739247	Link—Connecting	.05
L3	1011633218	Choke—Filament	.20
L2	1011610246	Choke—R.F. (B)	.20
L1	1011633217	Choke—Vibrator	.20
	101373516	Clamps—Battery	.20
C1	1012216127	Condenser—Buffer .004 mfd. 1000V	.25
C2		Condenser—.05 mfd. 400V Tub.	.25
C3		Condenser—.004 mfd. 400V Tub.	.25
C4		Condenser—.001 mfd. 400V Tub.	.25
C5		Condenser—.5 mfd. 200V Tub.	.25
C6		Condenser—.25 mfd. 200V Tub.	.25
C7		Condenser—.1 mfd. 200V Tub.	.25
C8		Condenser—.05 mfd. 200V Tub.	.25
C9		Condenser—.0005 mfd. Mica	.25
C10		Condenser—.00025 mfd. Mica	.25
C11		Condenser—.0001 mfd. Mica	.25
C12	1012118236	Condenser—Electrolytic 40x16 mfd. 200V	1.00
C13	1012019132	Condenser—Variable C14 & C15	2.05
	1012524124	Control—Volume 500M ohm	.75
1		1015179256 Speaker—5" P.M. with	5.00
T5	*	Output Transformer	
	1012770110	Spring—Drive	.05
	1012670111	Spring—Ribbon	.05
	1012770105	Spring—String	.05
T1	1011810239	Transformer—Antenna	.45
T2	1011810240	Transformer—Oscillator	.30
T3	1015510253	Transformer—1st I.F.	1.25
T4	1015710252	Transformer—2nd I.F.	.80
T6	1016580160	Transformer—Power, Virb.	1.75
	1013722112	Tripoints—Back Panel ... Doz.	.15
	1013722103	Tripoints—Ribbon ... Doz.	.15
	10127957	Tuner—4 Button	1.20
2	1016234103	Vibrator	4.00
	10128866	Washers—"C" ... Doz.	.10

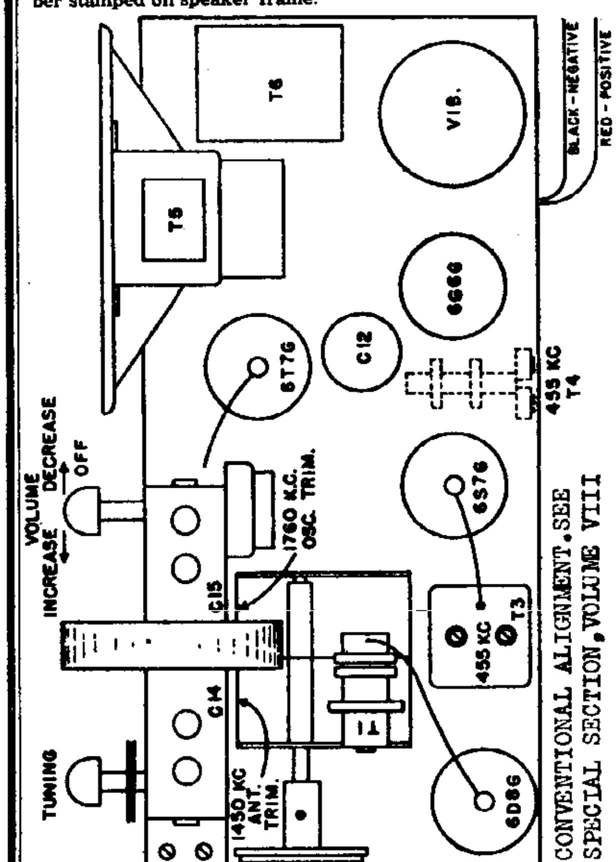
*When ordering Speaker output transformer refer to number stamped on speaker frame.

Schematic Location	Part No.	Description	Selling Price Each
	1012752131	Push Button & Stems, Cream & Tan or Ivory	.15
R1		Resistors—10 meg ohm 1/3W	.20
R2		Resistors—1 meg ohm 1/3W	.20
R3		Resistors—220M ohm 1/3W	.20
R4		Resistors—47M ohm 1/3W	.20
R5		Resistors—22M ohm 1/3W	.20
R6		Resistors—15M ohm 1/3W	.20
R7		Resistors—100 ohm 1/3W	.20
R8		Resistors—1500 ohm 1/2W	.20
R9		Resistors—220 ohm 1/2W	.20

Part No.	Description	Selling Price Each
10146844	Ribbon—Eyelet Assem. (Pointer)	.15
101276504	Rivets—Shoulder ... Doz.	.10
10127845	Roller & Shaft Assem.	.35
1012687394	Scale-Dial	.15
1012774117	Screws—Set 8/32x3/8 hex. hd. cup. pt. ... Doz.	.10
10128846	Shaft Assem.—Drive	.35
10149717	Shield—Tube	.10
101386852	Socket—6 Prong	.10
101386855	Socket—8 Point	.10
10138875	Socket—Pilot Light	.10

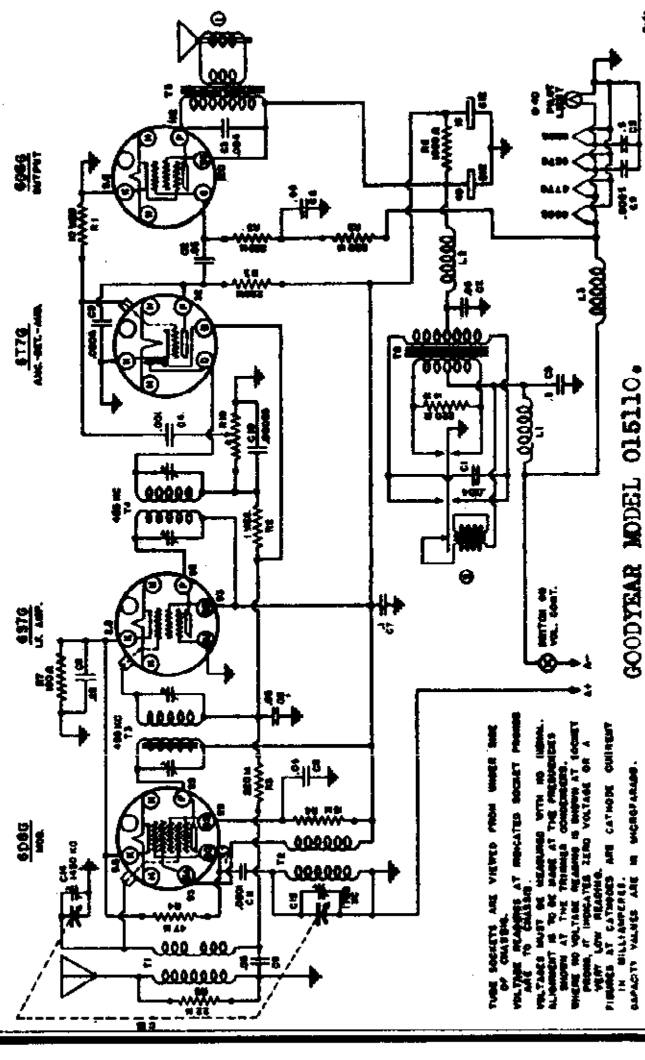
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE





CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION, VOLUME VIII

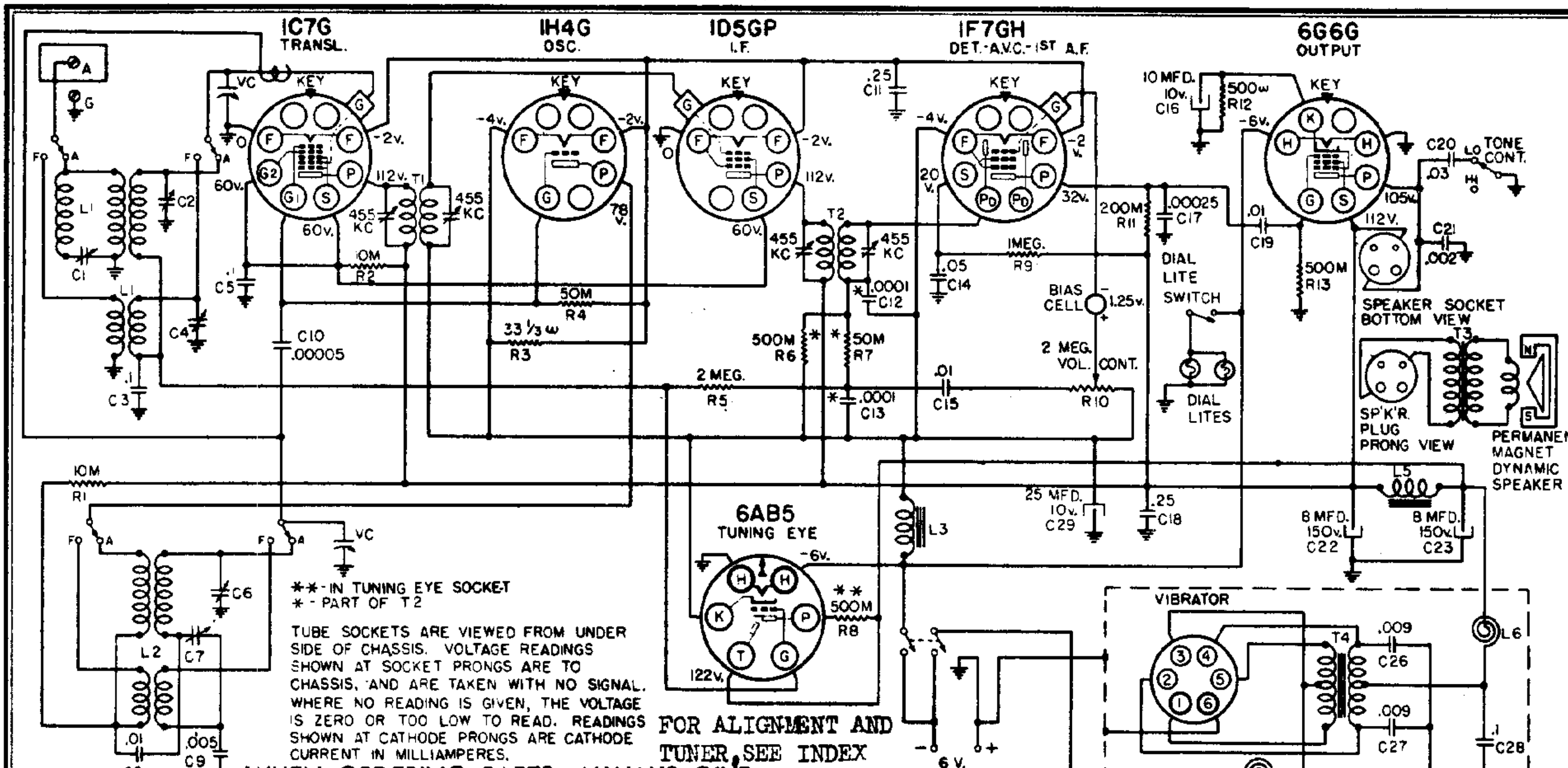
FOR SETTING UP PUSH BUTTONS - SEE GOODYEAR MODEL 015050



GOODYEAR MODEL 015110.

MODEL 015120
Schematic, Voltage

GOODYEAR TIRE & RUBBER CO., INC.



** - IN TUNING EYE SOCKET
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERES.

FOR ALIGNMENT AND TUNER, SEE INDEX

WHEN ORDERING PARTS, ALWAYS GIVE:

The PART NUMBER and the DESCRIPTION. THE SELLING PRICE. THE IDENTIFICATION NUMBER of your radio.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	1034019749	Knob - Volume	.14
	1034019992	Knob - On-off and tone	.16
	1023114914	Lamp - Dial, type #44	.12
	10313181971	Lead - Battery, red, with clip	.33
	10313197811	Lead - Battery, black, with clip	.31
	1034119859	Leaflet - Instruction	.30
	1034119653	Log - Station	.03
	1033718112	Mounting - Bias cell	.08
	1034518114	Pointer - Dial	.09
R5		Resistor - 2 megohms, 1/3 watt	.15
R9		Resistor - 1 megohm, 1/3 watt	.15
R13		Resistor - 500M ohms, 1/3 watt	.15
R11		Resistor - 200M ohms, 1/3 watt	.15
R4		Resistor - 50M ohms, 1/3 watt	.15
R1, R2		Resistor - 10M ohms, 1/3 watt	.15
R12		Resistor - 500 ohms, 1/3 watt	.15
R3		Resistor - 33-1/3 ohms, 1/3 watt	.15
	1023819930	Sheet - Station call letters	.15
	1023817981	Socket - Speaker	.07
	1023817983	Socket - Vibrator	.08
	1023817989	Socket - 7 prong	.09
	1023819820	Socket - 4 prong	.07
	1033817987	Socket - 8 prong	.10
	1023817431	Socket - 8 prong, rubber mounting	.37
	1026118212	Speaker - 6" PM Dynamic	3.93
	1025018213	Cone and voice coil	.94
T3	1026118314	Transformer	1.05
	1025116456	Speaker - 8" PM Dynamic	4.68
	1025018574	Cone and voice coil	1.50
T3	1024118575	Transformer	1.57
	1025218885	Switch - Wave	.40
	1025319793	Switch - On-off and tone	.54
T1	10355197871	Transformer - IF Input	.87
T2	1025718125	Transformer - IF Output	1.02
T4	1024518193	Transformer - Power	1.08
	1023018931	Tuner - Push button, with var. cond.	4.05
	1026214840	Vibrator	3.39
	1021317998	Board - Antenna connection	.03
	1023713981	Button - Snap, dial mounting	.01
	1023719822	Button - Push	.07
	1021319794	Cable - Tuning eye, with socket	.35
	1021517918	Cell - Bias, 1.25 volts	.09
	1023714310	Clip - Battery lead	.13
	1023816578	Clip - Dial light socket	.11
L1	1021818176	Coil - Antenna	.66
L2	1021819884	Coil - Oscillator	.61
L3	1021718188	Coil - "A" Choke	.49
L5	1021511995	Coil - RF Choke	.13
L6	1021718183	Coil - "B" Choke	.57
L4	10215154231	Coil - Choke	.16
C16, C22, C23	1022119788	Condenser - Electrolytic	.51
C29	1022118572	Condenser - Electrolytic, 25 mfd., 10 V.	.26
C1, C2, C4	1021915185	Condenser - Trimmer, triple	.29
C6	1021918197	Condenser - Trimmer	.10
C7	1021918196	Condenser - Padder	.18
C24, C25		Condenser - .5 mfd., 200 volts	.29
C11, C18		Condenser - .25 mfd., 200 volts	.18
C3, C5, C28		Condenser - .1 mfd., 200 volts	.15
C14		Condenser - .05 mfd., 200 volts	.13
C20		Condenser - .03 mfd., 400 volts	.08
C15, C19		Condenser - .01 mfd., 400 volts	.08
C8		Condenser - .01 mfd., 200 volts	.13
C26, C27		Condenser - .009 mfd., 1000 volts	.09
C9		Condenser - .005 mfd., mica	.35
C21		Condenser - .002 mfd., 400 volts	.10
C17		Condenser - .00025 mfd., mica	.09
C10		Condenser - .00005 mfd., mica	.07
R10	1022519789	Control - Volume	.50
	1022418822	Cover - Celluloid, station call letters	.06
	1022519790	Dial	.16
	1022919708	Escutcheon - Dial	.49
	1022919825	Escutcheon - Push button	.09
	1034019748	Knob - Tuning	.14
	1034019751	Knob - Wave switch	.16

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL 100502
Double Eagle
Above Serial 42,000
Schematic, Changes, Tuner

GOODYEAR TIRE & RUBBER CO., INC.

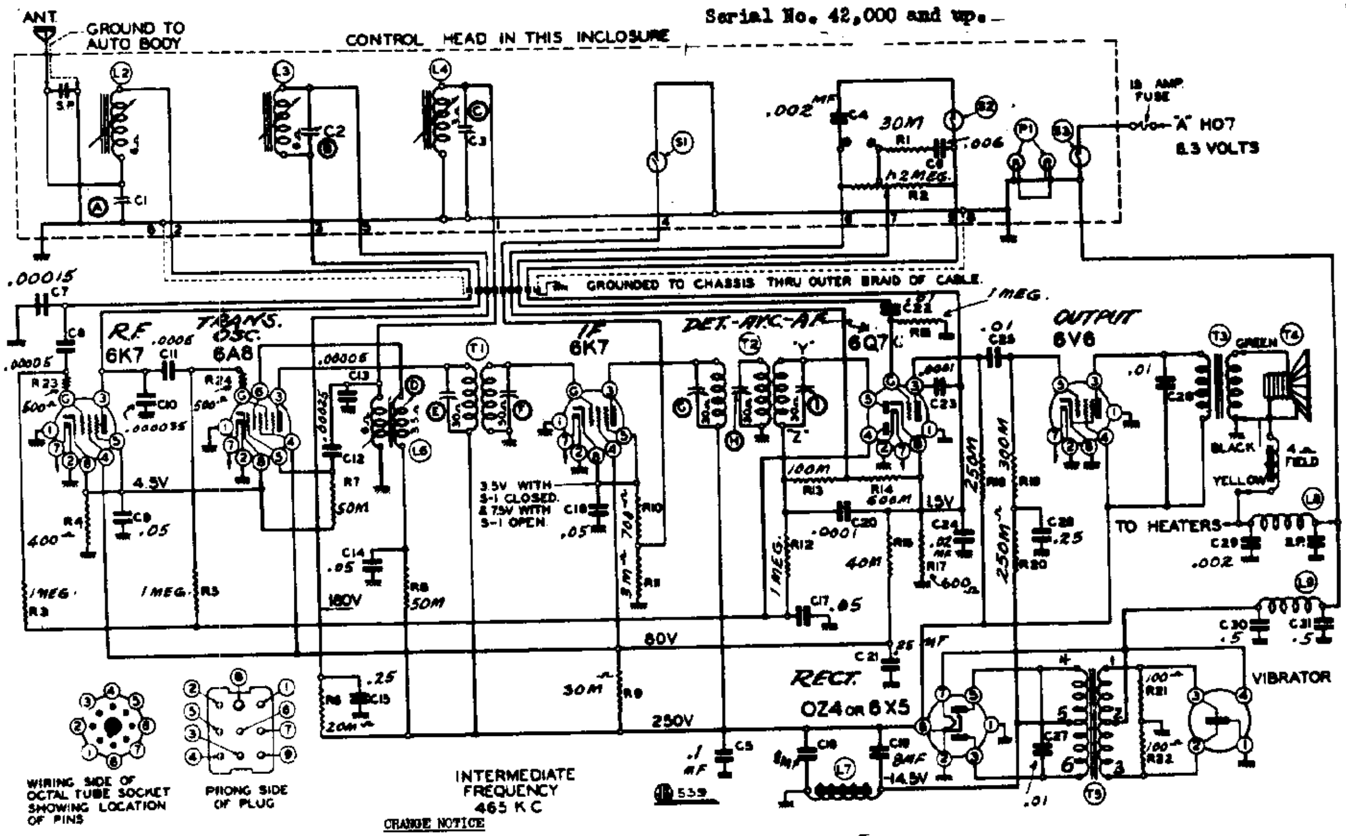
SETTING THE AUTOMATIC TUNER LEVERS TO STATIONS:

When setting up stations for the tuner levers it is important that the lever is pressed all the way down and held firmly in this position until the station is carefully selected by means of the manual tuning control.

This same procedure is followed until all the levers have been set up for stations, then the locking screw should be turned until it is absolutely tight. This is extremely important inasmuch as if the locking screw is not tight the cams on the cam shaft will slip and the stations will not stay adjusted to the tuner lever settings.

To reset one or more tuner levers to other stations it is only necessary to loosen the locking screw sufficiently to permit the mechanism to turn freely when the lever is pressed down as explained above and select the new station for the particular lever, however, make sure to re-tighten the locking screw again to lock the cams back in place.

DIAGRAM FOR GOODYEAR CHASSIS 100502



CHANGE NOTICE

The antenna tuning coil assembly and oscillator tuning coil assembly contained in the remote tuner unit on all models, starting with serial No. 42,000, were revised slightly from the coils used on radios serial numbered from 30,000 to 40,500.

The two groups of coils are interchangeable, however, it is recommended that in cases where replacement of a coil is necessary, that the early type coils be used on radios serial numbered from 30,000 to 40,500 and the later type coils on radios serial numbered from 42,000 up, it is apparent that L1 and L5 have been eliminated in the later type coils.

The part numbers of the coils were changed and following is a list giving the part number for both groups of coils.

SERIAL NO. 30,000 to 40,500

Schematic Location	Part Number	Description	Selling Price Each
L1, L2	1001811196	Antenna tuning coil assembly complete with antenna trimmer assembly, antenna choke coil, iron slug and shield can	2.60
L4, L5	1001811077	Oscillator tuning coil assembly, complete with trimmer assembly, series oscillator coil, iron slug and shield can	2.60

SERIAL NO. 42,000 AND UP

Schematic Location	Part Number	Description	Selling Price Each
L2	1001811100	Antenna tuning coil assembly, complete with antenna trimmer assembly, iron slug and shield can	2.60
L4	1001811084	Oscillator tuning coil assembly, complete with trimmer assembly, iron slug and shield can	2.60

FOR EARLY SCHEMATIC OF COILS, SEE NEXT PAGE

POWER TRANS COLOR CODE
1-YELLOW 4-BLUE
2-YELLOW 5-RED
(DOUBLE CONDUCTOR) 6-BLUE
3-YELLOW

POWER SUPPLY:
"A" . . 6 volt, Automobile storage battery.
"B" . . . . Vibrator-Rectifier

"A" Drain . . . . 7.5 amperes
"B" Drain . . . . 57 ma

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	R.F. Trimmer	Antenna & Shunt Oscillator Trimmer
1560 kc	1400 kc	600 kc

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 8"
Approximate Field Resistance . . 4 ohms

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . 6 watts
Maximum . . . . 7 watts

FREQUENCY RANGE:
Broadcast . . . . 535-1560 kc

Model 100502
Double Eagle
Early Schematic of Coils

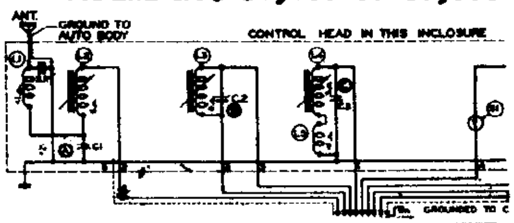
GOODYEAR TIRE & RUBBER CO., INC.

Early, Late Alignment, Socket, Trimmers

ALIGNMENT PROCEDURE

WIRING DIAGRAM FOR GOODYEAR WINGS 100502

Serial No. 30,000 to 40,500



Preliminary:

Output meter connections........................Across voice coil leads
Output meter readings to indicate 1 watt output...............1.78 volts
Average sensitivity in microvolts for 1 watt output.......3 micro volts
Dummy antenna value to be in series with generator output See chart below
Connection of generator output lead.....................See chart below
Connection of generator ground lead.........................To chassis
Generator modulation..................................30%, 400 cycles
Position of volume control.............................Fully clockwise
Position of tone control...............................Snapped to "Hi"
Position of local-distance switch.......... Snapped to Distance position

Dial setting of remote tuner unit	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (in order shown)	Trimmer Function	Adjustment	Approximate Microvolts
1400 K.C.	465 K.C.	.5 mfd.	Grid of 6K7 I.F. tube	G, H See note "A" below	Output I.F.	Adjust to maximum output	20,000
1400 K.C.	465 K.C.	.5 mfd.	Grid of 6K7 I.F. tube	I See "B" below	Output I.F.	Adjust to maximum output	20,000
1400 K.C.	465 K.C.	.5 mfd.	Grid of 6A8 Converter Tube	E,F	Input I.F.	Adjust to maximum output	512
1560 K.C.	1560 K.C.	.000175 mfd.	Antenna Lead	C. See Fig. 11	Oscillator	Adjust to resonance	512
1400 K.C.	1400 K.C.	.000175 mfd.	Antenna Lead	A, B See Fig. 11	Antenna and R.F.	Adjust to maximum output	3
600 K.C.	600 K.C.	.000175 mfd.	Antenna Lead	D See Fig. 10	Shunt oscillator Series adjustment	Adjust to maximum output Rock dial See note "C"	1.5

IMPORTANT ALIGNMENT NOTES

A- To align the output I.F. transformer without using a cathode ray oscillograph, a 10M ohm resistor must be shunted across one winding of the output I.F. coil assembly while adjustment to trimmers G and H are being made.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The white lead with green tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point.

B- Disconnect the 10M ohm resistor before adjusting trimmer "I". If a cathode ray oscillograph is used it will not be necessary to connect a 10M ohm resistor across a portion of the I.F. coil as explained.

C- When adjusting the shunt oscillator trimmer "D", which is mounted on the base of the radio receiver unit (See Fig. #10), the dial on the remote tuner unit should be rotated slightly to and fro at the same time adjusting trimmer "D" for maximum gain.

It is advisable to repeat the entire alignment procedure to insure greater accuracy.

Always keep the output from the test generator (oscillator) at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

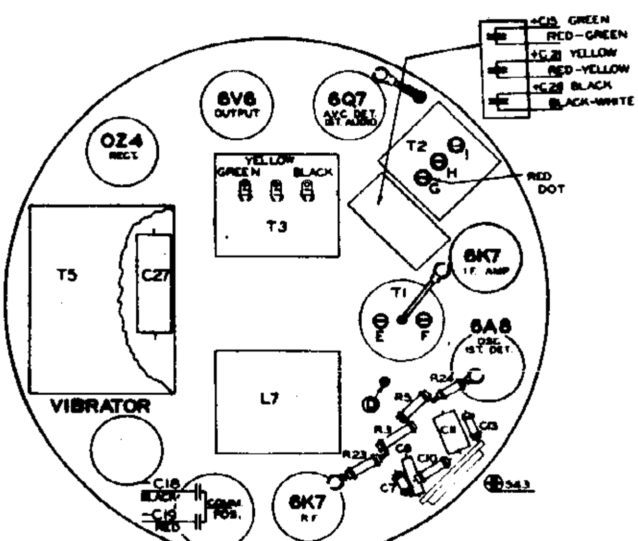


FIG. 10

LOCATIONS OF PARTS ON TOP OF CHASSIS

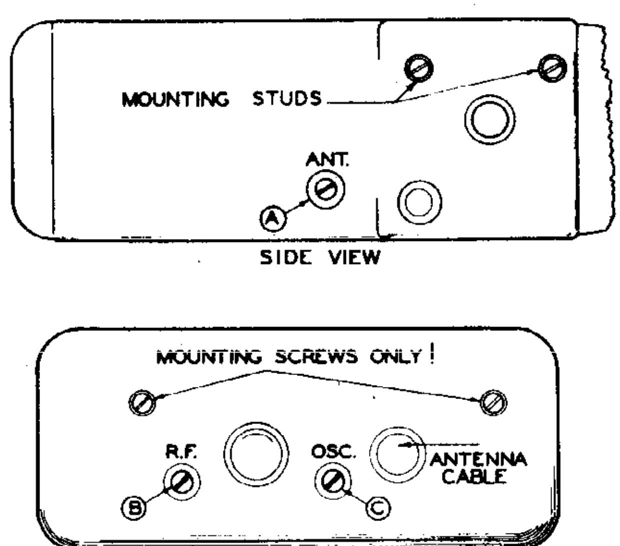
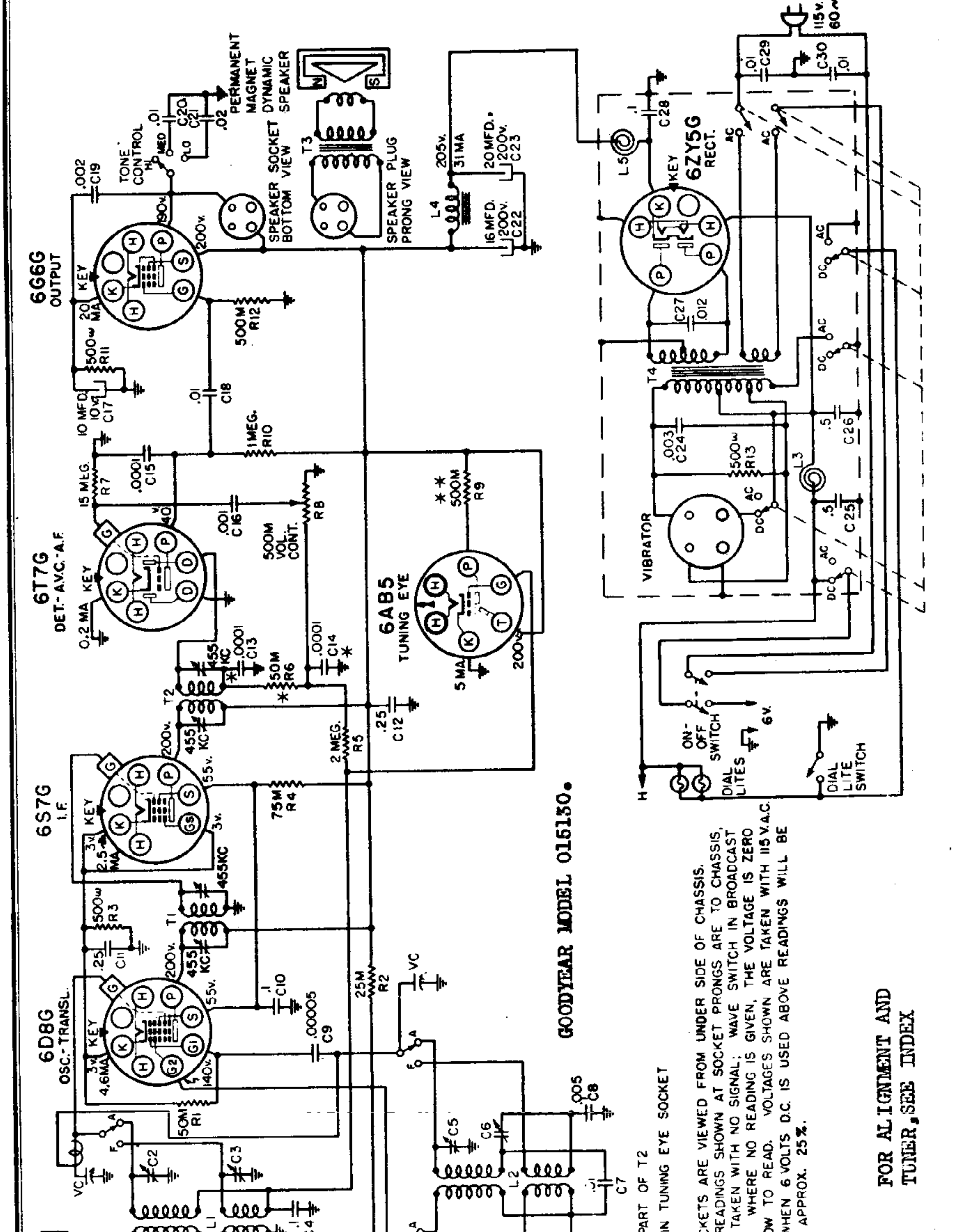


FIG. 11

MODEL 015130
Schematic, Voltage

GOODYEAR TIRE & RUBBER CO., INC.



GOODYEAR MODEL 015130.

* - PART OF T2

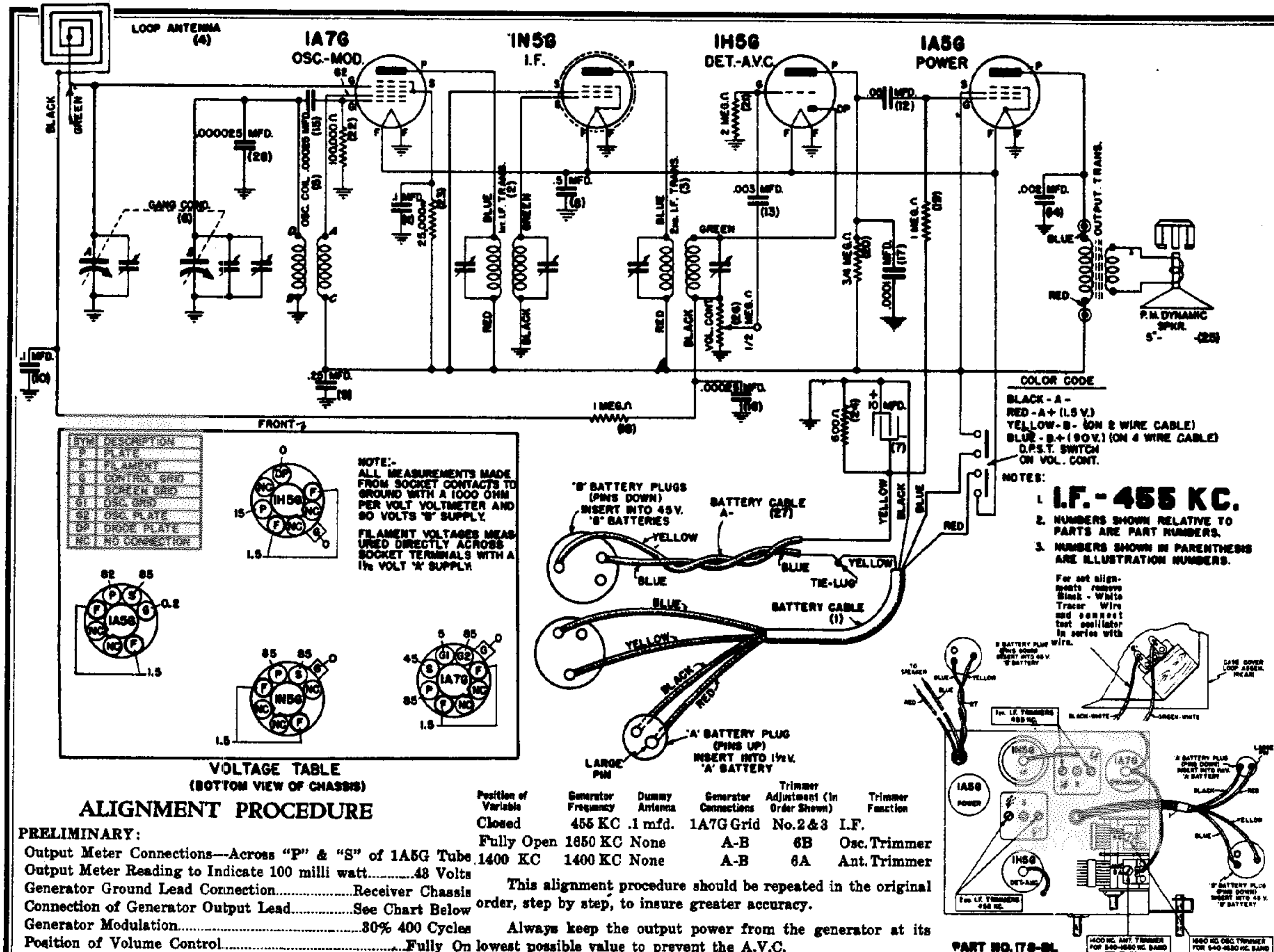
** - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TO LOW TO READ. VOLTAGES SHOWN ARE TAKEN WITH 115 V.A.C. INPUT. WHEN 6 VOLTS D.C. IS USED ABOVE READINGS WILL BE REDUCED APPROX. 25%.

FOR ALIGNMENT AND TUNER, SEE INDEX

MODEL 103533
Schematic, Socket
Trimmers, Voltage
Alignment

GOODYEAR TIRE & RUBBER CO., INC.



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter Connections—Across "P" & "S" of 1A5G Tube
Output Meter Reading to Indicate 100 milli watt............48 Volts
Generator Ground Lead Connection....................Receiver Chassis
Connection of Generator Output Lead................See Chart Below
Generator Modulation..30% 400 Cycles
Position of Volume Control..Fully On

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Trimmer Adjustment (In Order Shown)	Trimmer Function
Closed	455 KC	.1 mfd.	1A7G Grid	No. 2 & 3	I.F.
Fully Open	1650 KC	None	A-B	6B	Osc. Trimmer
1400 KC	1400 KC	None	A-B	6A	Ant. Trimmer

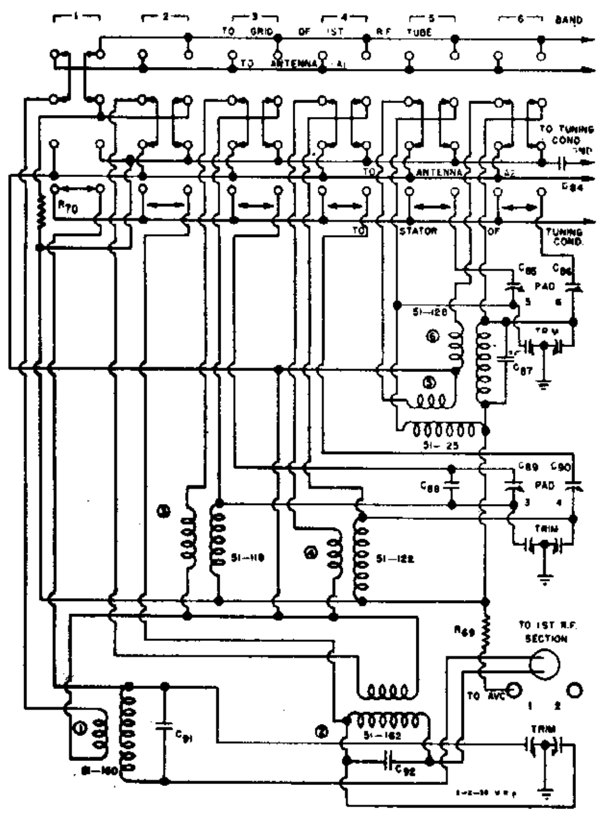
This alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C.

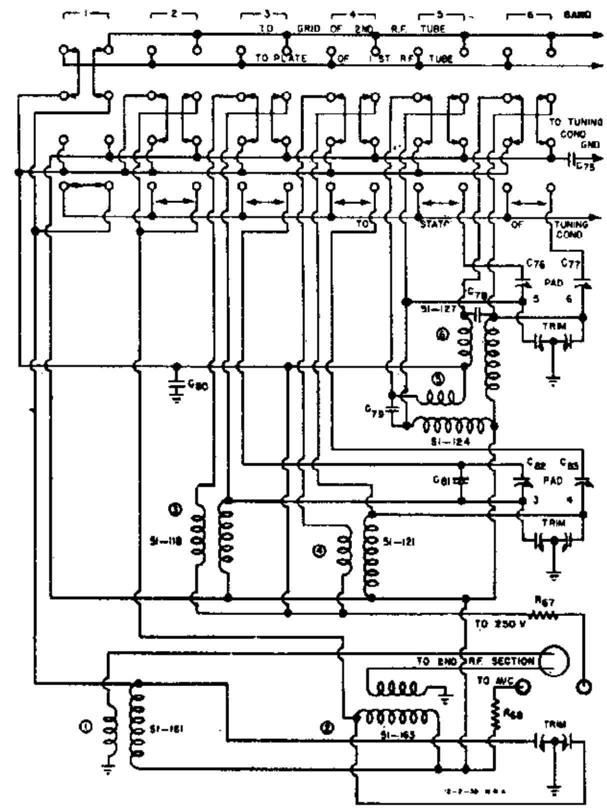
THE HALLICRAFTERS INC.

MODEL DD-1
Dual Diversity
Detailed Schematic

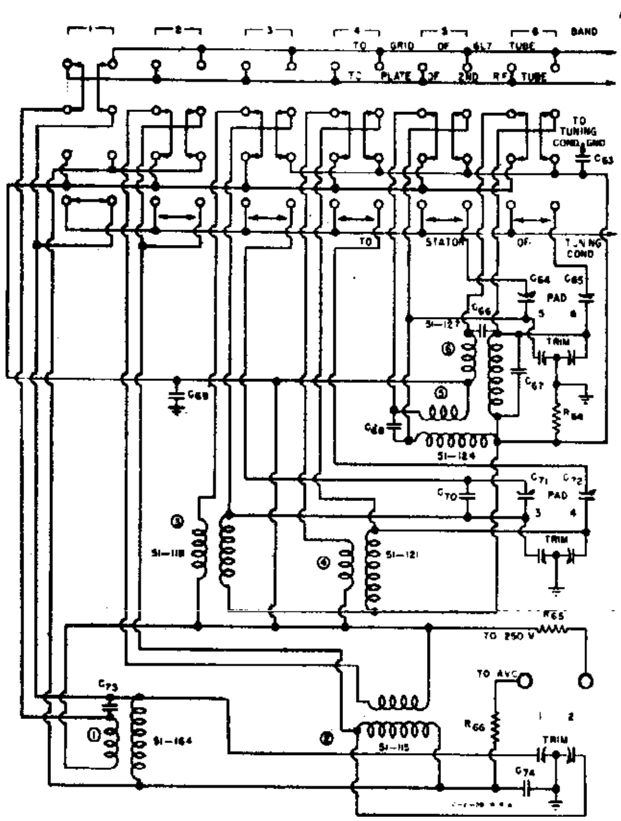
ANTENNA SECTION



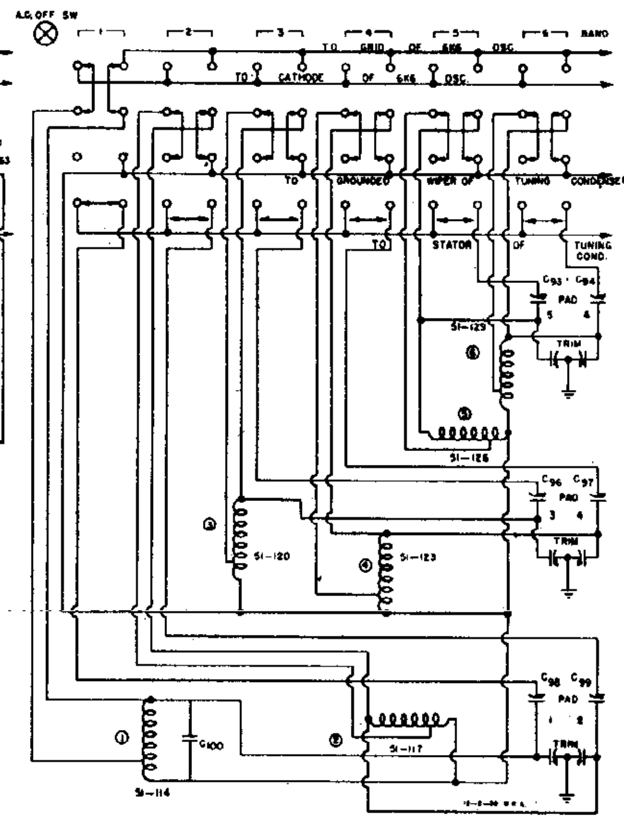
1ST R.F. SECTION



2ND R.F. SECTION



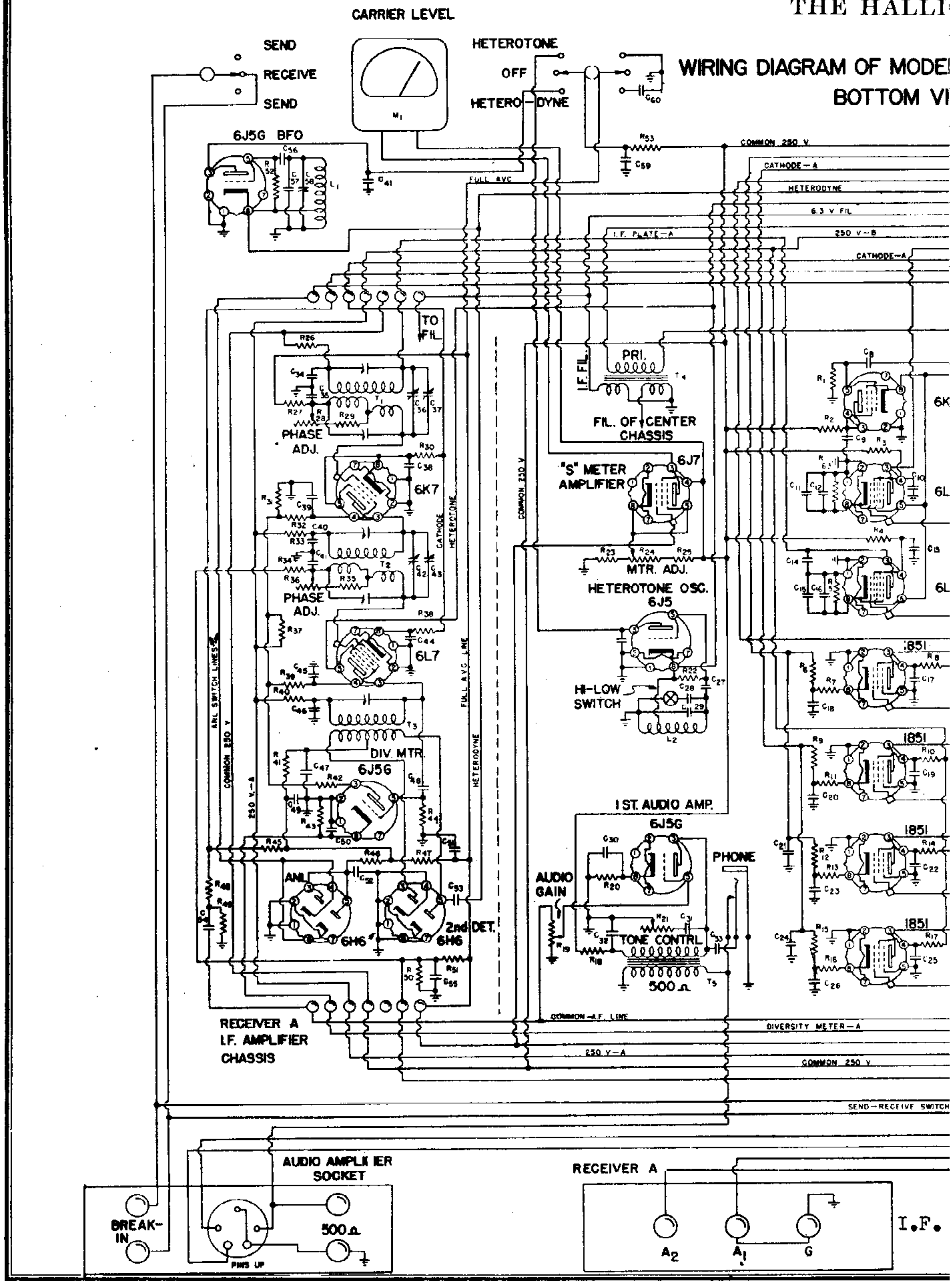
OSCILLATOR SECTION

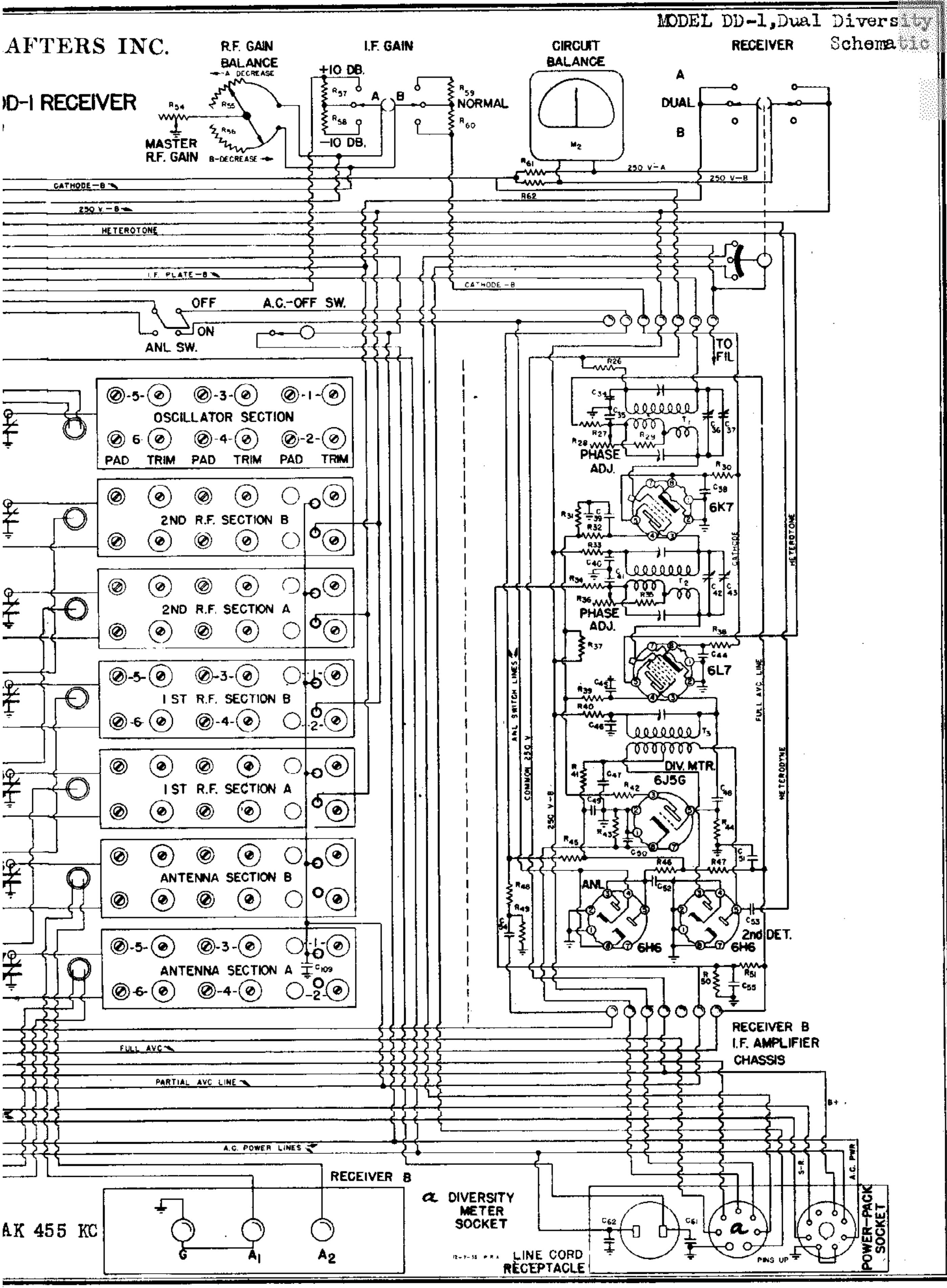


THE HALLI

WIRING DIAGRAM OF MODEL

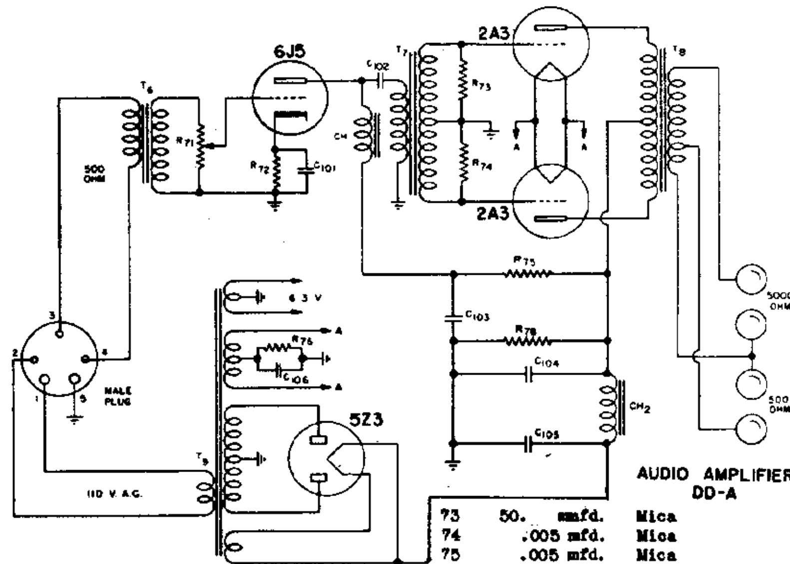
BOTTOM VI




AFTERS INC.
D-1 RECEIVER
R.F. GAIN BALANCE
A DECREASE
B-DECREASE
MASTER R.F. GAIN
I.F. GAIN
+10 DB.
-10 DB.
NORMAL
CIRCUIT BALANCE
RECEIVER
A
DUAL
B
CATHODE-B
250 V-B
HETEROTONE
I.F. PLATE-B
CATHODE-B
OFF
ON
A.C.-OFF SW.
ANL SW.
TO FIL
OSCILLATOR SECTION
PAD TRIM PAD TRIM PAD TRIM
2ND R.F. SECTION B
2ND R.F. SECTION A
1 ST R.F. SECTION B
1 ST R.F. SECTION A
ANTENNA SECTION B
ANTENNA SECTION A
PHASE ADJ.
6K7
6L7
DIV. MTR.
6J5G
ANL
6H6
2nd DET.
FULL AVC LINE
HETERODYNE
HETEROTONE
CATHODE
ANL SWITCH LINES
COMMON 250 V
250 V-B
RECEIVER B
I.F. AMPLIFIER
CHASSIS
FULL AVC
PARTIAL AVC LINE
A.C. POWER LINES
B+
S-R
A.C. PWR
RECEIVER B
AK 455 KC
G
A1
A2
a DIVERSITY METER SOCKET
LINE CORD RECEPTACLE
PINS UP
POWER-PACK SOCKET

MODEL DD-1, Dual Diversity
A-F Schematic
Parts List

THE HALLICRAFTERS INC.



RESISTOR PARTS LIST MODEL DD-1

NO.	VALUE OHMS	WATTAGE	PARTS NO.
R1	50,000	1/3	20-084
2	3,500	2	22-126
3	30,000	1	22-075
4	30,000	1	22-075
5	600	1/3	22-128
6	120	1/3	22-127
7	35	1/3	20-115
8	60,000	1/3	22-056
9	120	1/3	22-127
10	60,000	1/3	22-056
11	35	1/3	20-115
12	120	1/3	20-116
13	35	1/3	20-115
14	60,000	1/3	22-056
15	120	1/3	22-127
16	35	1/3	20-115
17	60,000	1/3	22-056
18	5,000	1	22-051
19	500,000	Audio Gain	25-038
20	4,000	1/3	22-050
21	100,000	Tone Control	25-037
22	50,000	1/3	20-084
23	400	1/3	22-023
24	500	1/3	22-026
25	50,000	1	22-081
26	1,000	1/3	20-033
27	1,000	1/3	20-033
28	15,000	1/3	22-068
29	30,000	1/3	22-077
30	300	1/3	22-020
31	20,000	1	20-072
32	1,000	1/3	20-033
33	1,000	1/3	20-033
34	1,000	1/3	20-033
35	25,000	1/3	22-074
36	15,000	1/3	22-068
37	15,000	2	22-129
38	300	1/3	22-020
39	1,000	1/3	20-033
40	1,000	1/3	20-033
41	20,000	1/3	20-072
42	5,000	1/3	22-053
43	10,000	1/3	20-063
44	1,000,000	1/3	20-108
45	100,000	1/3	20-093
46	1,000,000	1/3	20-108
47	500,000	1/3	22-098
48	100,000	1/3	20-093
49	250,000	1/3	20-099
50	750,000	1/3	22-104
51	500,000	1/3	22-098
52	50,000	1/3	20-084
53	20,000	1	20-070
54	2,500	Mas. R.F. Gain	25-122
55	1,000	Bal. Control	25-035
56	1,000	Bal. Control	
57	600	1/3	22-125
58	600	1/3	22-125
59	600	1/3	22-125
60	600	1/3	22-125
61	200	1/3	22-014
62	200	1/3	22-014
63	600	1/3	22-125
64	100,000	1/3	20-093
65	1,000	1/3	20-033
66	100,000	1/3	20-093
67	1,000	1/3	20-033
68	100,000	1/3	20-093
69	100,000	1/3	20-093
70	100,000	1/3	20-093
71	250,000	A.F. Gain Con.	25-036
72	1,000	1	22-030
73	100,000	1/2	22-091
74	100,000	1/2	22-091
75	10,000	2	24-042
76	750	10	26-000
77	10,000	20	26-002
78	30,000	20	26-001

CONDENSER PARTS LIST MODEL DD-1

NO.	CAPACITY	TYPE	VOLTAGE	PART NO.
C1				
2		Main		48-023
3	440 mmfd.			
4	per section	Tunive		
5	" "			48-024
6	" "	Gang		
7	" "			
8	100 mmfd.	Mica		40-011
9	.01 mfd.		600	45-002
10	.05 mfd.		400	41-005
11	.01 mfd.	Mica		43-022
12	.05 mfd.		200	41-004
13	.05 mfd.		400	41-005
14	15 mmfd.	Mica		40-022
15	.01 mfd.	Mica		43-022
16	.05 mfd.		200	41-004
17	.05 mfd.		400	41-005
18	.01 mfd.	Mica		43-022
19	.05 mfd.		400	41-005
20	.01 mfd.	Mica		43-022
21	1 mfd.		200	41-012
22	.05 mfd.		400	41-005
23	.01 mfd.	Mica		41-022
24	1 mfd.		200	41-012
25	.05 mfd.		400	41-005
26	.01 mfd.	Mica		43-022
27	.01 mfd.		400	41-001
28	.01 mfd.	Mica		41-022
29	.01 mfd.	Mica		41-022
30	20. mfd.		25	42-025
31	.02 mfd.		200	41-002
32	10. mfd.	Elec.	250	42-007
33	.02 mfd.		400	41-003
34	.05 mfd.		600	45-007
35	.01 mfd.		400	41-001
36	25. mmfd.	Air		48-012
37	1. mmfd.	Air		48-027
38	.05 mfd.		400	41-005
39	.05 mfd.		400	41-005
40	.05 mfd.		600	45-007
41	.01 mfd.		400	41-001
42	25. mmfd.	Air		48-012
43	1. mmfd.	Air		48-027
44	.05 mfd.		400	41-005
45	.05 mfd.		400	41-005
46	.05 mfd.		600	45-007
47	50. mmfd.	Mica		40-023
48	100. mmfd.	Mica		40-011
49	50. mmfd.	Mica		40-023
50	.05 mfd.		400	41-005
51	.05 mfd.		400	41-005
52	.05 mfd.		400	41-005
53	10. mmfd.			40-021
54	.05 mfd.		400	41-005
55	.05 mfd.		400	41-005
56	100. mmfd.	Mica		40-007
57	400. mmfd.	Pad		44-036
58	25. mmfd.	Air		48-034
59	10. mfd.	Elec.	400	42-007
60	8. mfd.		150	45-012
61	.01 mfd.		600	45-002
62	.01 mfd.		600	45-002
63	.005 mfd.	Mica		45-011
64	315. mmfd.	Pad		44-028
65	100. mmfd.	Pad		
66	15. mmfd.	Mica		40-022
67	10. mmfd.			40-021
68	10. mmfd.			40-021
69	.002 mfd.	Mica		40-013
70	1500. mmfd.	Mica		43-021
71	2200. mmfd.	Pad		44-029
72	440 mmfd.	Pad		
73	50. mmfd.	Mica		40-023
74	.005 mfd.	Mica		45-011
75	.005 mfd.	Mica		45-011
76	315. mmfd.	Pad		44-028
77	100. mmfd.	Pad		
78	15. mmfd.	Mica		40-022
79	10. mmfd.	Mica		40-021
80	.002 mfd.	Mica		40-013
81	1500. mmfd.	Mica		43-021
82	2200. mmfd.	Pad		44-029
83	440. mmfd.	Pad		
84	.005 mfd.	Mica		45-011
85	315. mmfd.	Pad		44-028
86	100. mmfd.	Pad		
87	25. mmfd.	Mica		40-024
88	1000. mmfd.	Mica		40-011
89	2200. mmfd.	Pad		44-029
90	440. mmfd.	Pad		
91	25. mmfd.	Mica		40-024
92	25. mmfd.	Mica		40-024
93	230. mmfd.	Pad		44-030
94	90. mmfd.	Pad		
95				
96	1120. mmfd.	Pad		44-031
97	340. mmfd.	Pad		
98	540. mmfd.	Pad		44-032
99	1.070 mmfd.	Pad		
100	6 mmfd.	Mica		40-025
101	10. mfd.	Elec.	50	42-003
102	.1 mfd.		600	45-008
103	1. mfd.		400	41-013
104	16. mfd.		475	42-022
105	16. mfd.		475	42-022
106	20. mfd.		100	42-023
107	16. mfd.		400	42-019
108	16. mfd.		400	42-019
109	.1 mfd.		200	41-006

THE HALLICRAFTERS INC.

ALIGNMENT & SERVICING INSTRUCTIONS
FOR
SKYRIDER DIVERSITY RECEIVER
MODEL DD1

SWITCHING ARRANGEMENT

For speed, ease and accuracy in aligning the Duel Diversity receiver, it is recommended that the output of the signal generator be terminated in a switching box in which you have installed a double throw single pole switch. From this switching box enclosed in a shielded cable which will serve as ground, run two leads one of which is connected appropriately to section "A" and the other to Section "B". Operation of the switch will readily allow you to switch the signal generator to either receiver section being aligned for a quick comparative check.

INTERMEDIATE FREQUENCY ALIGNMENT

Have controls set as follows:-
Have I.F. gain switch in NORMAL position.
Receiver switch to "A" side.
Set rejector control to 3 KC marking.
Balance control in center position.
All other gain controls adjusted for maximum gain.

IN ALIGNING "A" SECTION:-

Connect signal generator to the grid of the "A" section 6L7 converter (see diagram for location.) Adjust the signal generator for 455 KC output. Adjust I.F. transformers in the "A" receiver until they are peaked for maximum gain.

In Aligning "B" Section:-

Connect the signal generator as indicated above to the 6L7 converter tube in the "B" receiver and duplicate the adjustments done to the I.F. transformers of section "A". The receiver switch will necessarily be switched to the "B" side.

REJECTOR ADJUSTMENT

Before aligning the I.F. Rejector Circuit, the variable rejector condensers found below the chassis and driven by the long flexible copper cable, should be set as follows: With the rejector pointer set at ± 3 KC, check the first rejector condenser (closest to front panel in each I.F. section). It should have its rotor plates about 80% in mesh. The second rejector condenser (farthest from front panel) should have its plates about 20% in mesh. The same relationship should also exist between the condensers in the other I.F. section. When turning the rejector control from ± 3 KC toward ± 18 KC, the plates on the first rejector condenser should unmesh at the same time the plates on the second rejector condenser are meshing.

To correctly adjust the rejector circuit it is necessary to have two signals available which are accurately removed from the 455 KC fundamental by 3 KC on each side. The most satisfactory way to accomplish this is to use two crystals, one for 452 KC output and the other for 458 KC output. In the event, however, that crystals of those frequencies are not available, a satisfactory substitute can be used which consists of the following procedure: Put the BFO switch in the heterodyne position. Feed 455 KC from the signal generator into either 6L7 converter. Remove modulation from the signal being delivered by the generator. Obtain zero beat on the B.F.O. by operating the pitch control knob. Tune the generator slowly away from the 455 KC setting until a beat note of 3000 cycles (+ or - of 455 KC) is heard. Remember the pitch of that note. It will be necessary in adjusting the signal generator to a frequency 3000 cycles on the other side of 455 KC. A little practice will enable you to reset to each side of 455 KC by the 3 KC difference quite accurately and when signals of 452 and 458 KC are then available by this method, these signals should be used to properly peak the rejection circuit. This method is recommended only when a closely calibrated signal generator or a crystal controlled signal generator are not available.

Begin with receiver B. Set signal generator to 458 KC output. Adjust the 2nd Rejector Control (shown in the top chassis view) for minimum response. There should be two points of minimum output. If there is only one minimum point, rotate the adjusting nut on this control approximately 1/4 turn from the minimum, and very, very carefully adjust the 1st rejector control until a minimum occurs. After this has been accomplished, adjust the 2nd rejector control for minimum response. Now adjust the first phasing control (screw driver shaft nearest front panel), for minimum response. Readjust the 2nd rejector control carefully for minimum response. Repeat with "A" side without changing setting of the signal generator, connecting the signal generator to the "A" side 6L7, and switching the receiver to the "A" side. Readjust signal generator to 452 KC. Make similar adjustments on Rejector Controls 3 and 4 and the rear phasing control. Switch over to the "B" receiver and repeat these adjustments on the "B" side.

Now retune signal generator to 455 KC (still connected to "B" side). Carefully repeat each of the I. F. transformer trimming condensers. Switch signal generator output to 6L7 in "A" side and repeat the above operation.

NOTE: The gain of each receiver should be approximately the same, variation between receiver sections should not exceed 25% as shown on output meter readings. If gain-balance is far off, interchanging the 6L7 I.F. amplifier tubes sometimes improves it.

R. F. ALIGNMENT

Adjust receiver to Band 1, set "A". Have all gain controls at maximum, balance control in center position.

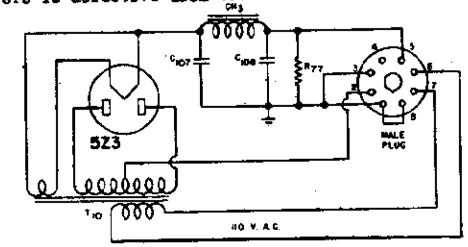
Now connect signal generator to antenna post of "A" receiver section through a 400 ohm resistor. Be sure shorting strap from A2 to G remains connected. During all adjustments the grounded side of the generator should be connected to the ground post on the receiver.

Set band spread dial to "0" and leave it there during entire alignment. Adjust generator to 1400 KC. Set dial on receiver to that frequency. Align oscillator, 2nd R. F., 1st R. F. and antenna trimmers in the order named for maximum gain. Switch over to Receiver "B" and repeat the above operations with the exception of the oscillator section which does not require readjustment this time. Set generator and receiver to 600 KC. Adjust oscillator padder for maximum response. Retrim oscillator at 1400 KC. Repeat the above procedure on the remaining bands, except that on bands 3-4-5-6 the R. F. padders should also be adjusted for maximum response at the low frequency ends of each band.

Care should be exercised in avoiding alignment on the image frequency. In every case, the image will be heard approximately 1 megacycle lower in frequency when adjusting the main tuning dial.

The greatest caution should be taken when adjusting the No. 6 band oscillator padder because only a slight change causes a large variation in frequency and may throw the oscillator frequency completely out of the band. The relative sensitivities of receivers "A" and "B" should not vary more than 50%. A frequent cause of unbalance between receivers is defective 1851 tubes or R. F. coils.

POWER PACK
DD-P



MODEL DD-1,Dual Diversity
Socket,Trimmers
Alignment,Part 2

THE HALLICRAFTERS INC.

BEAT FREQUENCY OSCILLATOR ADJUSTMENTS

Place the B.F.O. Key in the Heterodyne position.

With 455 KC signal from generator feeding into the "A" 6L7 converter and receiver "A" functioning, and the chassis standing on its left end (looking at set from the front) adjust the padding condenser inside the B.F.O. Shield can until zero beat is reached. The B.F.O. shield can is located directly behind the pitch control. Prior to making this adjustment assure yourself that the PITCH CONTROL condenser is at 50% capacity pointer on control positioned vertically). When properly adjusted, rotation of the pitch control condenser will show two beat note signals 180 degrees apart.

S METER ADJUSTMENT

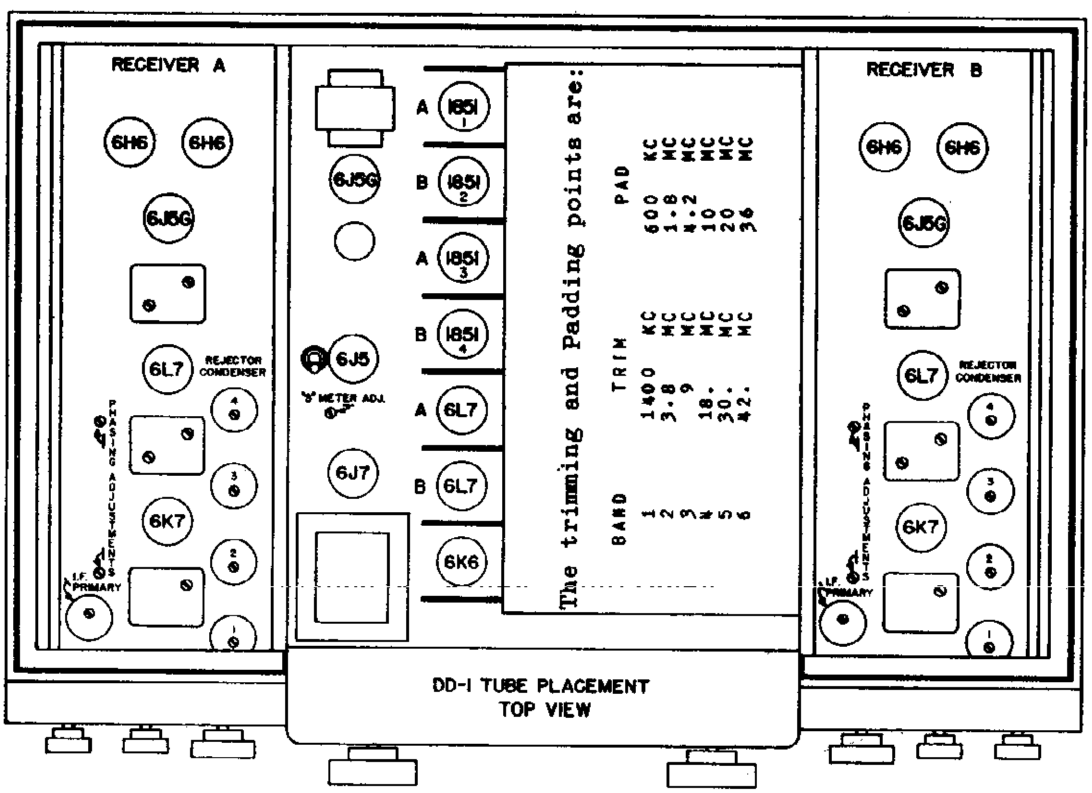
Push in No. 6 Band Button. With gain controls at maximum, adjust the zero reset control on all meters for zero.

NOTES:

If overload occurs on the broadcast band it might be advisable to shorten the length of the receiving antennas. If this recommendation is of little help check for a short to ground in the A.V.C. circuit.

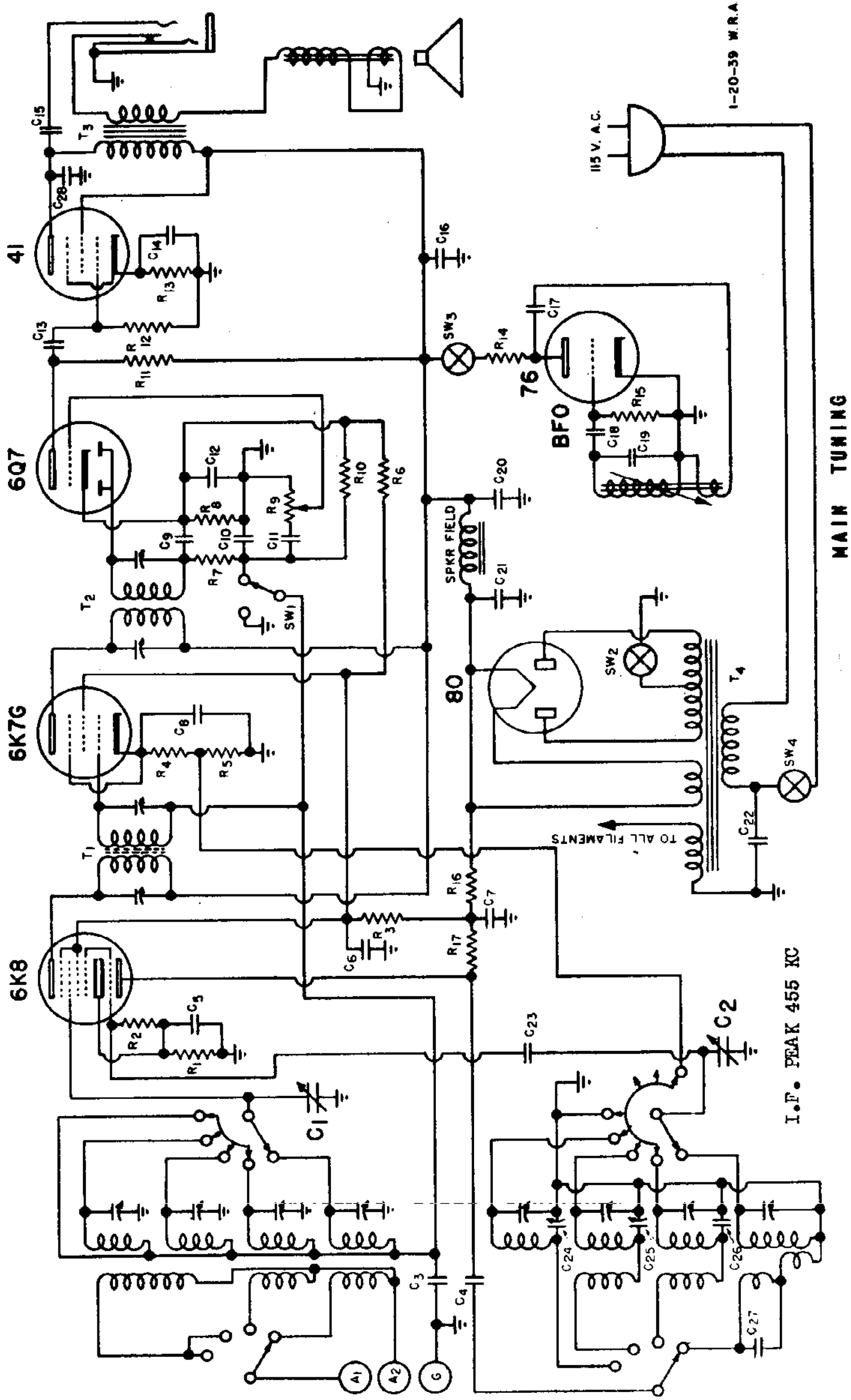
Should the occasion of examining the coil units arise, exercise extreme care in moving the heavy leads attached to the switch terminals. Excessive movement of one of these leads may cause the contacting portion of the switch to be thrown out of alignment and provide improper contact.

If it becomes difficult to properly heterodyne a strong signal when listening to C. W. reception, reduce the overall gain with the master gain control 'till a satisfactory note is obtained.



DD-I TUBE PLACEMENT
TOP VIEW

THE HALLICRAFTERS INC.



This control rotates the large calibrated dial so that the desired frequency can be easily located. The accuracy of calibration is held to close tolerances. This calibration will be correct, however, only if the "Bandspread" dial is set at "0" or minimum capacity.

SCHEMATIC DIAGRAM
SKY BUDDY—MODEL S-19R

MODEL S-19R, Sky Buddy
Socket, Trimmers, Parts

THE HALLICRAFTERS INC.

Sky Buddy **Model S19-R**

The model S19-R Sky Buddy is a 6 tube 4 band superheterodyne receiver covering the following frequencies:

Band 1 - 540 KC to 1700 KC
2 - 1.7 MC to 5.5 MC
3 - 5.5 MC to 17.0 MC
4 - 16.0 MC to 46.0 MC

S19R CONDENSER PARTS LIST

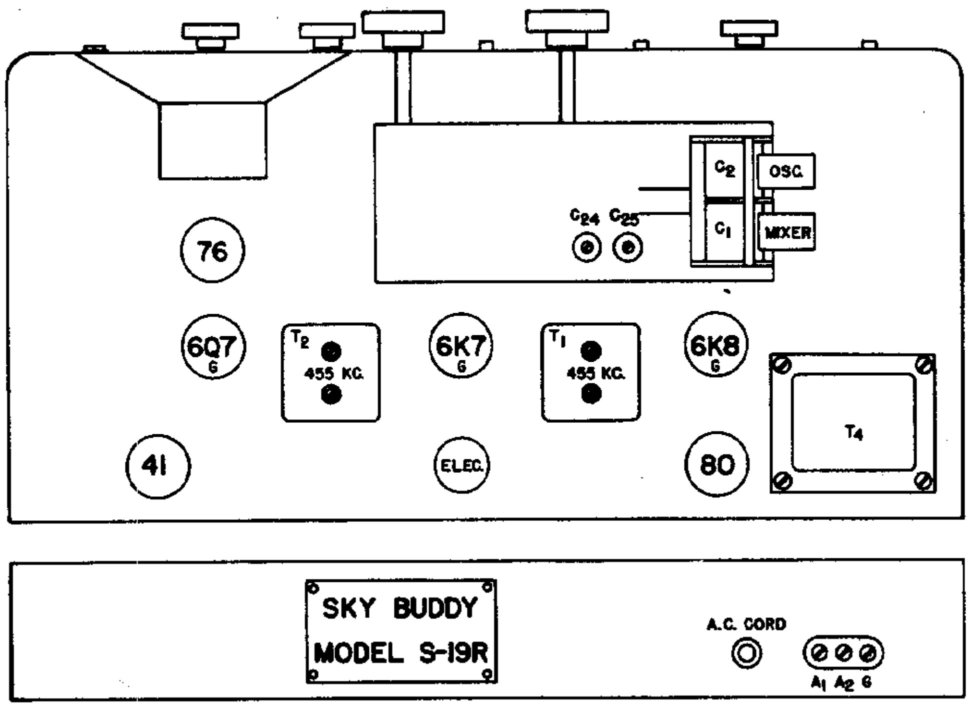
NO.	CAPACITY		TYPE	VOLTAGE
C1	.000375	mfd.		
2	"	"	Maintaining	
3	.05	"		200
4	.01	"		400
5	.05	"		200
6	.05	"		200
7	10	"		300
8	.05	"		200
9	.0001	"	Mica	
10	.0001	"	"	
11	.02	"		200
12	.1	"		200
13	.02	"		200
14	10	"		25
15	.01	"		600
16	.1	"		400
17	.01	"		400
18	.0001	"	Mica	
19	.0005	"	"	
20	10	"		300
21	10	"		350
22	.01	"		600
23	.0001	"	Ceramic	
24	.000375	"	Pad	
25	.001	"	"	
26	.0043	"		
27	.0001	"	Mica	
28	.01	"		600

S19R RESISTOR PARTS LIST

NO.	OHMS	WATTAGE
R1	300	1/3
2	50000	"
3	10000	1
4	500	1/3
5	3500	"
6	25000	1
7	50000	1/3
8	300	"
9	1000000	Variable
10	500000	1/3
11	250000	"
12	1000000	"
13	600	1/2
14	50000	1/3
15	50000	"
16	3000	1/2
17	10000	1/2

SWITCHES

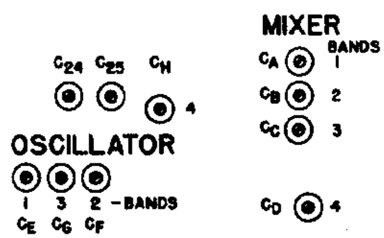
SW	
1	A.V.C. on - off
2	Send - Receive
3	BFO on - off



The tube lineup of the S19-R Sky Buddy is as follows:

6K8G 1st Detector - mixer
6K7G IF Amplifier
6Q7G 2nd Detector - 1st stage of audio
41 2nd Audio Amplifier
76 BFO
80 Rectifier

The Sky Buddy, model S19-R draws 50 watts at 117 volts, 60 cycles A.C.



THE HALLICRAFTERS INC.

ANTENNA

For successful operation of the receiver throughout its tuning range very satisfactory results can be obtained with an inverted "L" type antenna 75 feet long overall. When this type of antenna is used the jumper should remain connected between A2 and G.

If the operator should wish to obtain the maximum in performance from the receiver on any one frequency, it is suggested that a half wave doublet antenna cut for that frequency be installed.

The formula for calculating the overall length of this antenna is:

$$\text{Length in feet} = \frac{463}{\text{Frequency in megacycles}}$$

The antenna is cut in the center and connected to a twisted pair transmission line having a characteristic impedance of 75 ohms. The other end of this line is connected to the A1 and A2 antenna posts.

This antenna will not perform well at harmonic frequencies but should be better than the inverted "L" on the frequency for which it has been designed. Performance on the #4 band, even with a suitable antenna, is subject to varying conditions of the time of the day and year.

A ground is usually not necessary for satisfactory performance of the model S19-R Sky Buddy receiver. If a ground does prove helpful it is connected to the "G" post of the antenna terminal strip.

"BANDSPREAD"

In no other similar receiver but the S19-R Sky Buddy can be found such extremely smooth and satisfactory electrical bandspread action. The stator plates are an integral part of the main condenser and the separate rotor sections are driven by a gearless mechanism through the separate bandspread knob.

The controls along the bottom edge of the receiver are:

SEND-RECEIVE SWITCH which, when in the "send" position, removes plate voltage from the tubes.

The BAND SWITCH allows selection of any one of the four ranges covered by the receiver. The newly incorporated 10 meter band will prove to be most interesting when conditions are favorable for reception on that range.

The B.F.O. "ON-OFF" SWITCH allows optional use of the Beat Frequency Oscillator and is used when the operator is copying code signals. It will be of additional help in locating weak fone signals by first locating their carrier. Once located, the B.F.O. may then be turned off to eliminate the whistle.

The PITCH-CONTROL Knob allows the operator to vary the pitch of the beat note when the BFO switch is in the "on" position. Selection of the pitch of the beat note most pleasing to the operator will be of help in copying through interference. The A.V.C. "OFF" and "ON" Switch is for optional use of automatic volume control. Should the strength of the telephone signal be so strong as to block the receiver the A.V.C. switch should be "on". For maximum sensitivity leave the AVC switch "off" and manually adjust the gain of the receiver with the audio gain control.

The receiver is turned on and off with this control and additionally provides variation of the volume delivered by the receiver to suit the requirements of the listener.

A Headphone Jack is mounted on the panel to the right of the Pitch Control Knob. When headphones are used, inserting the phone plug in the jack automatically disconnects the speaker.

ALIGNMENT PROCEDURE FOR SKY BUDDY MODEL S19-R

I. F. ALIGNMENT

Have the controls set as follows:

Audio gain control at maximum

A.V.C. switch "on".

Range switch on Band #2.

Set main dial to minimum capacity 5.5 M.C. position

Remove 6K8 grid cap and connect signal generator to this tube.

Set signal generator for 455 KC output.

Adjust trimmers on transformers T1, T2 for maximum output.

For adjustment of the B.F.O., place the BFO switch in the "on" position. Remove the knob from the pitch control shaft. You will see a small adjustment screw in the center of this shaft. On the under-chassis side of this shaft you will see a set screw which should be loosened in order to allow adjustment of the screw in the center of the pitch control shaft. Adjust to zero beat. Tighten the set screw and replace the knob. Should the BFO still fail to operate check the .0005 condenser in the BFO circuit, or the 76 BFO tube.

R. F. ALIGNMENT

Connect the generator to the A1 terminal on the antenna terminal strip found on the rear apron of the chassis through a 400 ohm resistor. Leave the jumper connected between A2 and G. The trim and pad points for the 4 bands are indicated below:

Set the signal generator to the required frequencies for each band, adjust the main tuning dial to those frequencies (with the bandspread condenser at minimum capacity) and then adjust the indicated trimmers and padders to resonance.

Trim	Band	Pad
1400 KC Adjust C_A C_E	Band 1	600 KC Adjust C_{24}
4 MC Adjust C_B C_F	Band 2	2 MC Adjust C_{25}
14 MC Adjust C_C	Band 3	None-check at 7 MC
30 MC Adjust C_D C_H	Band 4	None-check at 18 MC

On the two high frequency bands where no padding adjustments are found, the checking frequencies should fall within 1 division of the dial calibration with no further adjustments.

During the R.F. alignment process it is advisable to "Rock" the main tuning condenser across the frequency on which you are making adjustments to the receiver. Once the exact point of maximum output is obtained further adjustment is unnecessary.

MODEL SX23
Super Skyrider
Operating Data
Antenna Notes

THE HALLICRAFTERS INC.

MODEL SX24
Skyrider Defiant
Antenna Notes

ANTENNA: SUPER SKYRIDER MODEL SX23

The SKYRIDER 23 has an antenna input circuit which will allow the use of either a doublet or Marconi (inverted "L") antenna. The approximate antenna input impedance of the SKYRIDER 23 is 400 ohms.

A very serviceable antenna will be the inverted "L", or Marconi type. This antenna should be approximately 75 feet long overall, including the lead-in to the set. Satisfactory operation of the SKYRIDER 23 is obtained throughout its tuning range with this type of antenna and because of that fact as well as its ease of construction it is highly recommended. Should a doublet antenna be used it is suggested that a transmission line of 400 ohms value of impedance be constructed so that a most efficient transfer of energy is obtained. The commercially available all wave doublet antennas are usually provided with a coupling transformer which matches the transmission line to the receiver. This transformer connects to the A_1 and A_2 terminals on the antenna strip. The half-wave length-doublet antenna cut for a particular frequency can be computed by the following formula:

$$\text{Length in feet} = \frac{465}{\text{Frequency in megacycles}}$$

This type of antenna is broken in the center with an insulator and has the transmission line connected to each resulting quarter wave section at that point. This antenna is a very good performer, in a direction broadside to its length, only on the relatively narrow group of frequencies for which it was cut. It does not function well on harmonic frequencies.

When using either type of doublet antennas the transmission line should be connected to A_1 and A_2 binding posts. The wire connecting the A_2 to ground or G can be left connected if the performance of the receiver is improved.

CONTROLS AND OPERATION

Each of the controls is identified by appropriate marking on the panel. The "Tone Control" turns the receiver "on" and "off", and also allow the operator to make adjustments for the type of reproduction most pleasing to him. Treble reproduction is to the far left position, just after the set is turned on, while the base is at the extreme right. Intermediate positions allow for any desired degree of mixing.

The "Pitch Control" is to be used when code or CW signals are being received. In its counter clockwise position the Beat Frequency Oscillator is "off". Rotating the control clockwise turns on the B.F.O. in addition to varying the pitch of the beat note to the operator's taste.

Directly below the two controls mentioned will be found the "Phone Jack". Any type of high impedance headphones may be used because no direct current flows in the headphone circuit. The strength of the signal in the headphones will be found to be at the proper level for most comfortable headphone reception. When headphones are used the speaker is automatically disconnected.

The "AF Gain" control adjusts the volume of the receiver by varying the output of the audio amplifier. Volume is controlled in both the headphone and loud speaker circuits and the setting of this control is optional with the user of the receiver for the amount of volume desired.

"AVC Off" positions, an extremely strong signal will cause the receiver to block. Because of the unusually low residual noise level of the SKYRIDER 23 it is advised to adjust all controls carefully in familiarizing yourself with their functions and effects.

The "Stand-By" or "Send-Receive" switch when in the "Send" position removes plate voltage from the tubes. This allows the receiver to be made temporarily inoperative should it be used in conjunction with a transmitter.

The hand-wheel marked "Tuning", is for adjusting the main dial to the frequency desired. The mechanism is quiet in operation and free from back lash. The conveniently located control will give the greatest tuning ease after continued hours of operation.

The "ANL" or Automatic Noise Limiter control turns the noise limiter "on" or "off". No modern communications receiver is complete without an effective noise limiter. With the A.N.L. switch in the "on" position the noise limiter will prove to be of great assistance and frequently mean the difference between hearing a signal which otherwise would be inaudible on the higher frequencies where ignition and other pulsating types of interference are most aggravating.

The "RF Gain" control adjusts the sensitivity of the receiver by varying the cathode bias on the RF and IF amplifiers. Maximum sensitivity will be obtained with this control rotated clockwise as far as it will go. When this is done a switch will be operated, the function of which will be described under S meter.

When using the receiver under varying local conditions of noise, it will be advisable to adjust both the "RF" and "AF" gain controls until the most favorable signal to noise ratio is found. Until such a time as you have become thoroughly familiar with the function of all controls it is suggested that the R. F. gain be advanced until the white dot on the knob is pointing approximately at the "S" on SKYRIDER. Later experiment to find the best position for a given signal bearing in mind that with the selectivity switch in any of the

CRYSTAL OPERATION

There are three controls which must be properly adjusted for most satisfactory crystal filter operation. Their operation shall be treated in the order in which they are called upon to perform their functions in the receiver.

Selectivity Switch -

There are three positions of selectivity with the Automatic Volume Control circuit operating. For high fidelity broadcast reception the selectivity switch should be rotated to the "IF Broad" position.

With the switch placed in the "IF Sharp" position the selectivity is greatly increased at no apparent sacrifice in tone reproduction.

The "Phone Crystal" position affords maximum selectivity with automatic volume control. The receiver will have to be accurately resonated on each desired signal because this step of selectivity greatly attenuates the side-bands of a modulated carrier. You will notice the apparent slot into which the signal falls, only in the exact center of which will intelligibility of a good order be maintained. The "Phone Crystal" position is recommended under conditions of extreme interference where adjacent channel stations are causing objectionable heterodynes.

Rotating the switch in a counter-clockwise position still farther allows the receiver to be used in the three selectivity positions with the A.V.C. circuit disconnected. When the selectivity switch is so adjusted it is then necessary to manually adjust the "RF Gain" to keep the signal under control.

In the "CW Crystal" position the maximum selectivity of the set is obtained. The drop in background noise is immediately apparent. This position is recommended only for the reception of CW or code signals because the selectivity is so great phone signals are practically unreadable. To realize the maximum in performance from the SKYRIDER 23 crystal circuit, the following two controls should be adjusted as described. First tune in an extremely strong CW signal.

The "Pitch Control" should be turned until a beat note is audible. Then adjust the main tuning control and go across the signal. Two distinct signals will be heard either side of zero beat, or the dull position in the center tuning through which no signal is audible. See whether the low or the high frequency side of the signal (that which appears either side of zero beat) is the weaker. Leave the receiver set on whichever of the two signals is the weaker. Now very carefully adjust the "Phasing Control" until you have eliminated that signal as much as possible. As an additional step to see whether you have chosen the proper low or high frequency image to reject, rotate the "Pitch Control" through zero beat to the other side so that a beat note of approximately the same pitch as before is obtained. Now return the receiver and it will be apparent that the signal on the other side of zero beat (as referred to the markings on the dial at which this signal was first tuned in) is reduced in volume. Again carefully adjust the "Phasing Control" and compare the strength of the audio image when this side has been phased out, or rejected. When you have demonstrated that the phasing or rejection is better on either the low or high frequency audio image the phasing control is left in that position and you then have the SKYRIDER 23 adjusted for the extremely selective crystal action for which it is noted.

The "Pitch and Phasing Controls" should be called upon frequently to demonstrate how, through proper adjustment, extreme conditions of interference can be coped with. Frequently, a slight adjustment of the pitch control will place a desired signal in the clear when the two signals differ in frequency by only a few hundred cycles. Minute adjustment of the phasing control will frequently obliterate an interferring signal by dropping it in the crystal slot.

MODEL SX23
Super Skyrider
Schematic, Notes

THE HALLICRAFTERS INC.

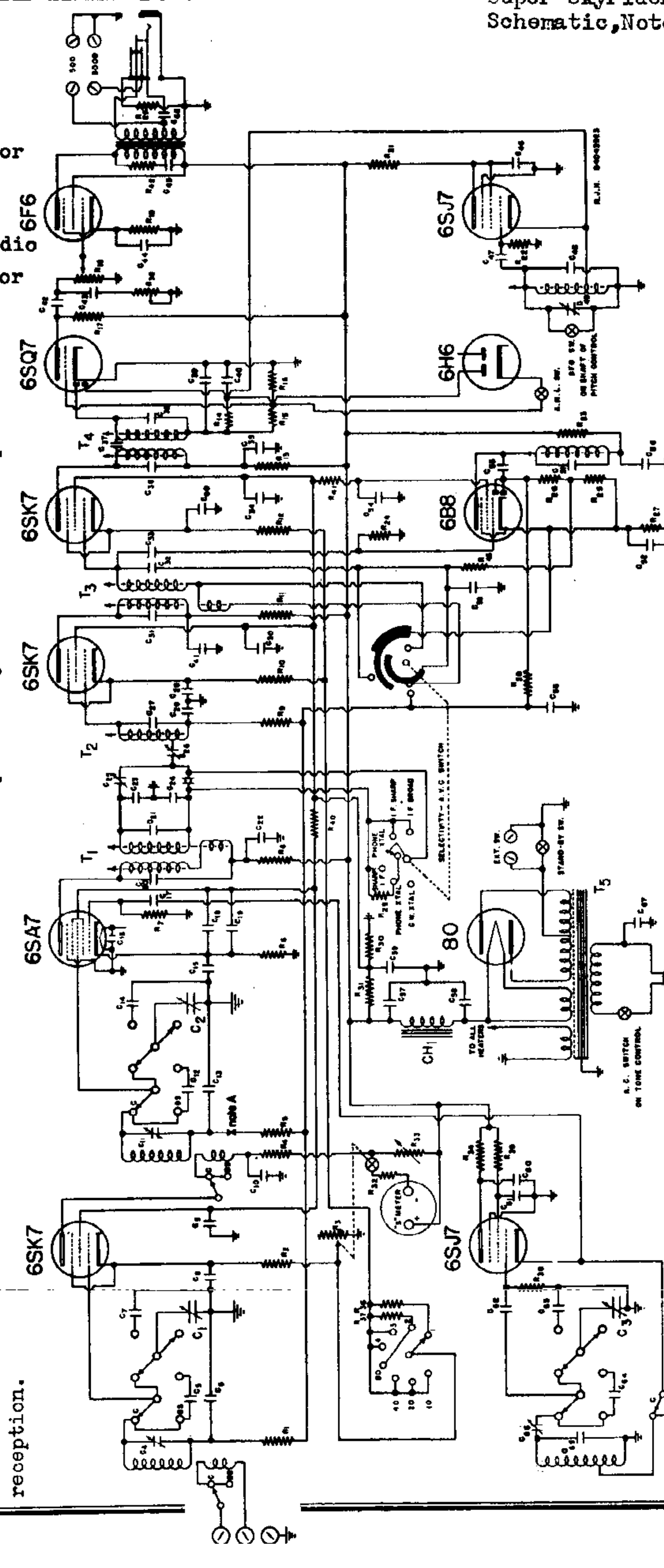
TUBE LINE-UP

6SK7	R.F. Amplifier
6SA7	1st Detector-Mixer
6SJ7	High Frequency Oscillator
6SK7	1st I.F. Amplifier
6SK7	2nd I.F. Amplifier
6SQ7	2nd Detector, 1st Stage of Audio
6F6	2nd Stage of Audio
6SJ7	Beat Frequency Oscillator
6H6	Automatic Noise Limiter
6B8	Amplified A.V.C.
80	Rectifier

S METER

Close to the license tag on the rear of the receiver will be found a knurled shaft which is to be used in adjusting the "S" meter. Prior to adjusting this control the R. F. gain control must be in the maximum gain position, or rotated clockwise until a switch which is mounted on this control is heard to operate. Additionally, the Selectivity Switch must be in any one of the three "A.V.C. On" selectivity positions. When the above two conditions are filled the meter is in the circuit and should be adjusted as follows: Disconnect the antenna from the receiver, being sure no strong local signal is being picked up by the receiver with the antenna removed. Now adjust the S meter shaft until the meter rests at zero. Reconnecting the antenna will then show the meter indicating relative carrier strength in both S units as well as DB's or decibels. Should most accurate S meter indication be desired, it is recommended that the meter be adjusted with the Selectivity Switch in the step of selectivity most frequently used.

The S meter does not function with the Selectivity Switch in the "A.V.C. Off" position because the meter is connected in the A.V.C. circuit which preferably is used for telephone reception.

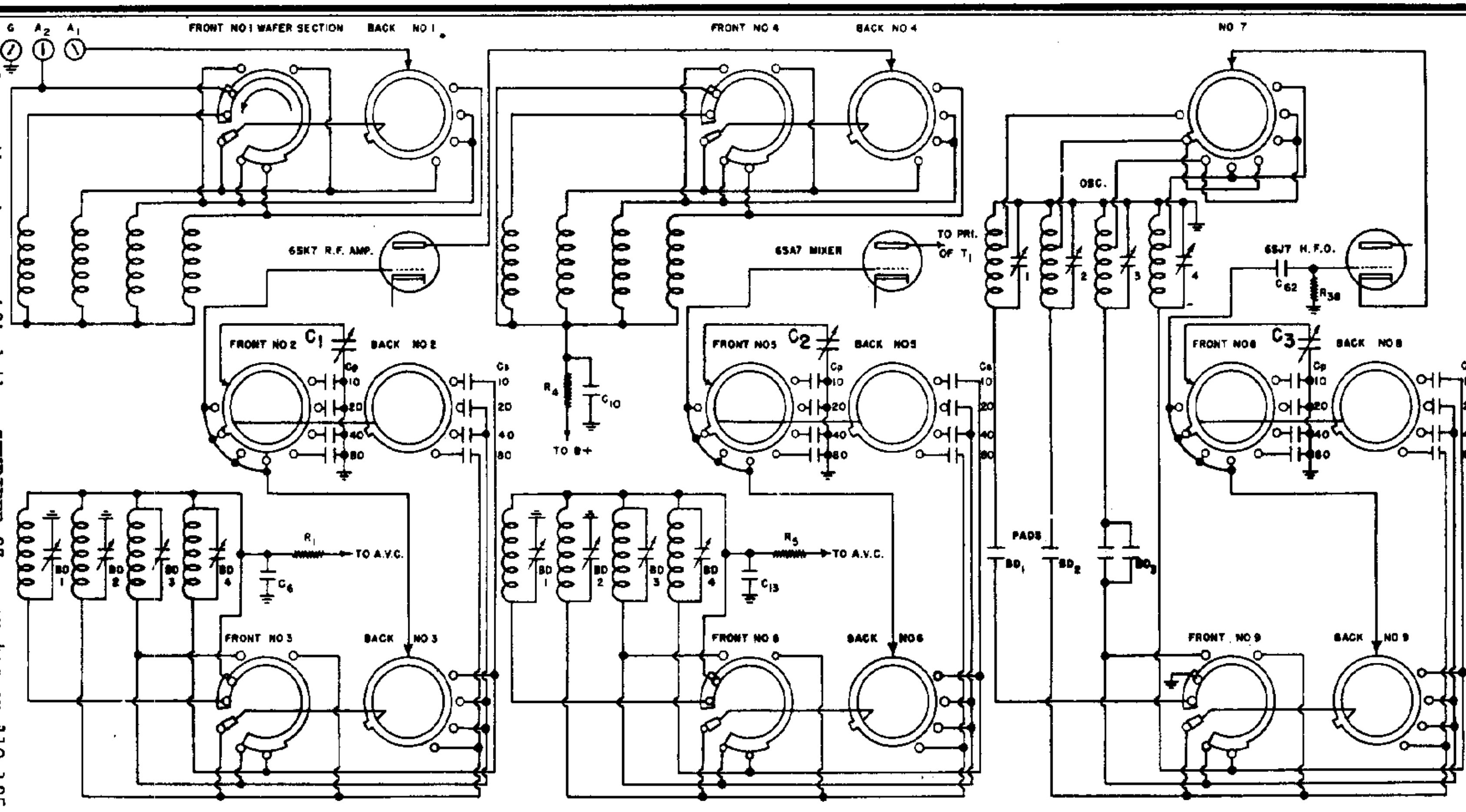


SCHEMATIC DIAGRAM—SKYRIDER 23

... 110 volts at 115 watts 60 cycles alternating current.

MODEL SX23, Super Skyrider
R-F Switching Schematic
Notes

THE HALLICRAFTERS INC.



NO. 1 WAFER IS FARTHEST FROM THE FRONT PANEL AND SELECTS ANTENNA PRIMARIES

R.J.H. 04113923

Cp (CONDENSERS PARALLEL)

10	59.7	mmfd	CERAMICON
20	104.4	"	"
40	571.	"	"
80	94.3	"	"

Cs (CONDENSERS SERIES)

10	51.4	mmfd	CERAMICON
20	38.	"	"
40	313.6	"	"
80	99.5	"	"

DETAILED SCHEMATIC R.F. SWITCHING SECTION

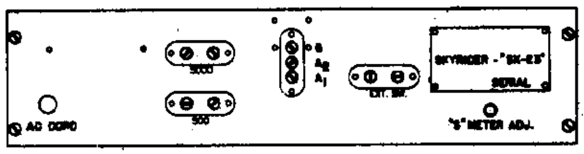
On the rear apron of the chassis you will find output terminal strips marked 500 and 5000 ohms. The Hallicrafters permanent magnet dynamic matching S23 speaker should be connected to the 5000 ohm terminals. The 500 ohm contacts can be connected to a separate speaker or a load of that impedance value. The terminals marked "EXT SW" should be connected to an external switch, a portion of which is used to turn "on" and "off" your transmitter. The "EXT SW" terminals are paralleled with the front panel "Send Receive" switch. In order to make the external switch operate the "Send Receive" switch must be left in the "send" position. In viewing the receiver from the back the right hand "EXT SW" contact is grounded. When connecting to associated equipment this point should be borne in mind so that no potential difference will arise between it and the receiver.

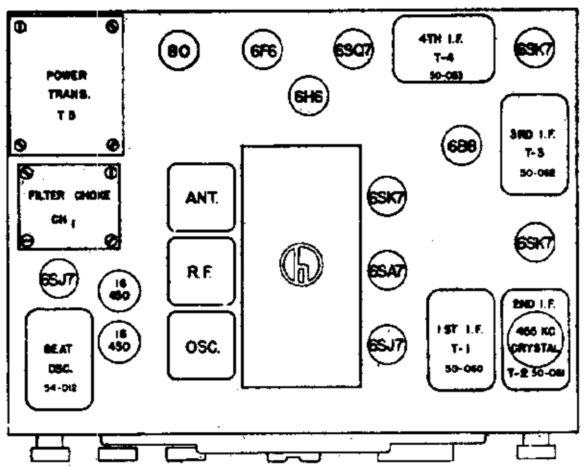
FREQUENCY RANGE

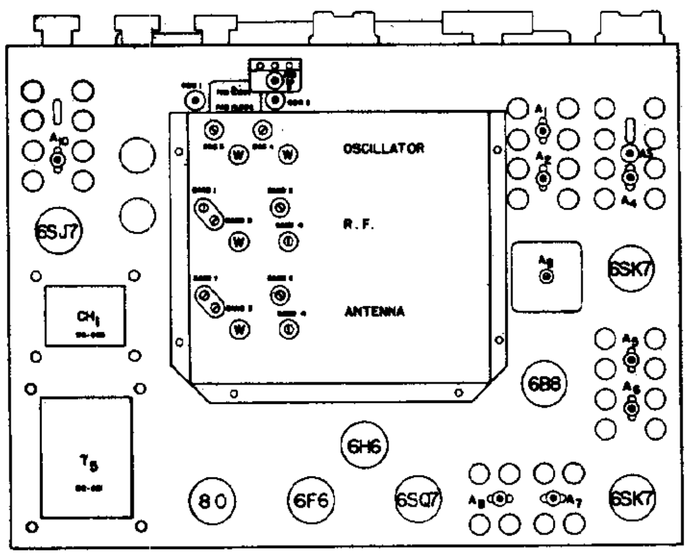
Band 1	-	540	KC	-	1,700	KC
2	-	1.7	MC	-	5.2	MC
3	-	5.2	MC	-	16.5	MC
4	-	11	MC	-	34.0	MC

Unless otherwise specified the SKYRIDER 23 operates on 110-125 volts 60 cycle alternating current. A universal transformer model is available which will operate on 25-60 cycle current. This transformer is provided with taps to cover in 5 steps a voltage range from 110 to 250 volts. Actual operation is identical with either the 25 or 60 cycle transformer.

THE HALLICRAFTERS INC.







LIST OF CONDENSERS SKYRIDER 23

NO.	VALUE	VOLTAGE	TYPE
1, 2, 3	437 mmfd.		Main tuning gang
4	1.2-12.0 "		R.F. Circuit trimmer
5	Series padding for Band Spread. See detailed Schematic.		
6	.05 mfd.	200	Paper
7	Parallel padding for Band Spread. See detailed Schematic.		
8	.05 mfd.	200	Paper
9	.01 "	400	"
10	.05 "	"	"
11	1.2-12 mmfd.		R.F. Circuit trimmer
12	Series padding for Band Spread		
13	.05 mfd.	200	Paper
14	Parallel Padding for Band Spread		
15	.05 mfd.	200	Paper
16	.002 "		Mica
17	50 mmfd.		Ceramic
18	.01 mfd.	400	Paper
19	.002 "		Mica
20	250 mmfd.		Ceramic
21	200 "		"
22	.05 mfd.	400	Paper
23	100 mmfd.		Ceramic
24	100 "		"
25	2-25 "	Variable	
26	5-50 "	"	Mica
27	250 "		Ceramic
28	.05 mfd.	200	Paper
29	.01 "	"	"
30	.05 "	"	"
31	250 mmfd.		Ceramic
32	250 "		"
33	250 "		Mica
34	.05 mfd.	200	Paper
35	.05 mfd.	400	Paper
36	250 mmfd.		Ceramic
37	5 "		Gimmick
38	100 "		Ceramic
39	50 "		Ceramic
40	.05 mfd.	200	Paper
41	.05 "	400	"
42	.01 "	"	"
43	.01 "	"	"
44	20 "	25	Electrolytic
45	.002 "		Mica
46	.01 "	400	Paper
47	250 mmfd.		Mica
48	500 "		Ceramic
49	2-25 "		Variable
50	.05 mfd.	400	Paper
51	150 mmfd.		Ceramic
52	.1 mfd.	200	Paper
53	250 mmfd.		Mica
54	.05 mfd.	"	Paper
55	.05 "	"	"
56	.05 "	"	"
57	16 "	475	Electrolytic
58	16 "	"	"
59	.25 "	200	Paper
60	.002 "		Mica
61	.002 "		"
62	50 mmfd.		Ceramic
63	Parallel padding for Band Spread		
64	Series " " " "		
65	1.2-12 mmfd.		O & C trimmer
66	.002 mfd. In 3rd Band OSC Series tracking pad		
67	.01 "	400	Paper
68	.02 "	200	"
69	.1 "	"	"

LIST OF RESISTORS SKYRIDER 23

NO.	OHMS	WATTAGE	TOLERANCE
R1	100,000	1/3	20%
2	1,000	"	10%
3	10,000	R.F. Gain Control	
4	5,000	1/3	20%
5	100,000	"	"
6	600	"	10%
7	20,000	"	20%
8	5,000	"	"
9	100,000	"	"
10	1,000	"	10%
11	5,000	"	20%
12	1,000	"	10%
13	5,000	"	20%
14	1,000,000	"	"
15	200,000	"	10%
16	400,000	"	"
17	500,000	"	20%
18	500,000	A.F. Gain Control	
19	400	1	10%
20	5,000	2	20%
21	50,000	1	"
22	50,000	1/3	"
R23	5,000	1/3	20%
24	500,000	"	"
25	250,000	"	10%
26	200,000	"	"
27	500	"	"
28	1,000,000	"	20%
29	25,000	"	"
30	5,000	2	
31	6,500	7	
32	500	1/3	10%
33	500	"S" Meter Adjustment	
34	15,000	1	20%
35	25,000	"	"
36	3,000	1/3	10%
37	500	"	"
38	50,000	"	20%
39	500,000	Tone Control	
40	1,000	1/3	10%
41	1,000	"	"
42	10,000	1/2	20%
43	100,000	1/3	"

MODEL SX23, Super Skyrider
Alignment, Notes

THE HALLICRAFTERS INC.

BAND SPREAD

Realizing that reset accuracy is a very desirable feature the SKYRIDER 23 was designed so that only the amateur bands from 10 to 80 meters could be bandspread. The switch mechanism and associated temperature compensated condensers are unique and eliminate the necessity of accurately resetting the main tuning dial whenever it is desired to band spread the amateur frequencies.

The four "Band Spread" positions found on the SKYRIDER 23 cover the frequencies indicated below:

Band 10 - 28 MC to 30 MC	40 - 7 MC to 7.30 MC
20 - 14 MC to 14.4 MC	80 - 3.50 MC to 4.00 MC

When operating the receiver in the band spread position it will be noticed that more than just the frequencies of each amateur band are covered. This has been found advisable for the reception of signals being sent on frequencies outside the amateur bands, as well as the reception of commercial stations for marker purposes, inasmuch as their exact frequency is usually known.

Each amateur band is spread over a sufficient number of divisions on the band spread scale to make tuning on that particular band effortless and accurate.

In addition to the frequency range in the circuit being identified by the Hallicrafters band switch knob under the main tuning dial, that particular band is also shown by referring to the illuminated indicator directly to the right of the main dial.

ALIGNMENT PROCEDURE

The alignment of the S23 is straightforward and requires no equipment other than the usual signal generator, or other signal source, and an output meter.

I. F. ALIGNMENT

No. 1 - Remove the "Bottom Pan" from the cabinet and then the square "RF Coil Shield Bottom" so that the RF oscillator and mixer tube bases, switch and coils are accessible.

No. 2 - Unsolder the control grid wire from 6SA7 tube base at the point at which it connects to switch section No. 6. Signal is applied to this grid for alignment of I. F. AVC and BFO circuits. An output meter is connected across 5000 ohm speaker terminals.

No. 3 - Connect the signal generator to the control grid of the 6SA7 mixer through a .01 mfd condenser. Now connect a 100,000, 1/3 watt, resistor from the control grid of the 6SA7 to AVC Return on the mixer RF coil form. (See note "A" Schematic).

No. 4 - Place the selectivity switch in "AVC Off IF Sharp" position; the wave band switch in #5.2-16.0 megacycle position or #3 band, volume and RF controls in maximum gain position.

No. 5 - Apply 455 KC signal of sufficient strength to give an approximate output of 500 milliwatt and adjust trimmers A1, A2, A4, A5, A6, A7 and A8 to maximum deflection of output meter.

B.F.O. ADJUSTMENT

Turn the BFO control so that the dot on the knob is pointing to the top of the cabinet and then adjust A10 until the beat note is zero frequency.

CRYSTAL ALIGNMENT

No. 6 - For alignment of crystal, place selectivity switch in CW crystal position, remove modulation from signal source, adjust BFO pitch control until a beat note of approximately 1000 cycles is attained. Detune the signal source from 455 KC and then adjust the crystal phasing control to a point where the hiss noise from the speaker is reduced to a minimum. Now vary the frequency of the signal source from about 453 to 457 KC. At some frequency between these points a sharp increase in speaker output will be noted. This is the resonant frequency of the crystal. The signal generator should be adjusted to this point of crystal resonance for maximum meter deflection. Touch up all trimmers, No. A2, A4, A5, A6, A7 and A8 for precise alignment to the crystal frequency. Assuming the output beat note is still set at approximately 1000 cycles, and leaving all controls on the receiver as previously adjusted, change the frequency of the signal generator until the output beat note is reduced from 1000 cycles down thru zero beat and up to the other side to a frequency of approximately 400 cycles. Now balance A1, and the crystal phasing control until the rejection slot is at minimum. It will be necessary to increase the output of the signal generator for this adjustment in order to obtain a satisfactory output level.

Note: A3 is a coupling condenser which should never need adjustment as it will not effect the alignment of the set but only vary the gain of the I. F. unit.

No. 7 - To adjust the AVC, turn the BFO pitch control to "off" position, the selectivity switch to "AVC On I. F. Sharp" position. Adjust the frequency of the modulated signal source to the resonant frequency of the I. F. unit with the signal strength sufficient to set up about 500 milliwatts in output meter. Now adjust A9 until the output is reduced to a minimum, which is the point where the AVC is resonant and operating properly.

Resolder the grid wire of the 6SA7 to the switch section contact and replace the R.F. coil shield bottom.

R.F. ALIGNMENT

The holes in the "RF Coil Box Cover" marked "W" as shown in the instruction book are to permit the insertion of a "Wand" into the coil forms for checking of alignment. The "Wand" is a rod of insulating material having a brass slug in one end and a powdered iron slug in the other. When the iron slug is placed in field of coil the inductance is increased, and when the brass slug is used, the inductance is decreased.

NOTE: When checking points of alignment the meter deflection should decrease when either end of "Wand" is used, if the set is properly aligned. If the meter deflection increases when the "Iron" end of "Wand" is in the field then the trimmer capacity should be increased. If, however, the meter reading increases when the "Brass" end of "Wand" is used then the trimmer capacity will have to be reduced.

When the condenser gang is fully closed be certain that the indicating line on the dial window is in line with the zero mark on the band spread calibration and the small line below the 550 KC calibration point. Place selectivity control in the "I. F. Sharp-AVC off" position. R. F. and Audio gain controls adjusted for maximum gain and signal of sufficient strength fed to the receiver to give approximately 500 milliwatts output.

Band No. 1 - "545 KC to 1700 KC"

Connect a wire between A2 and ground terminal or "G" on the antenna strip. Connect the ground side of the signal generator to the ground terminal of antenna strip and connect the high side of signal generator to A1 thru a 200 mmfd condenser.
Set the receiver dial and signal generator dial to 1500 KC - align trimmer indicated as Osc. 1 to resonance with this signal frequency and then adjust RF trimmer and antenna trimmer as indicated Band No. 1 to obtain maximum deflection on output meter. Next set the generator signal and receiver to 600 KC and while rocking the main tuning knob adjust low frequency pad (indicated as Pad BD1) until the output is maximum. Recheck alignment at 1500 KC and then the 600 KC position again for precise alignment.

Band No. 2 - "1700 KC to 5.2 Megacycles"

Note: Replace the 200 mmfd condenser with a 400 ohm resistor for alignment of Bands Nos. 2, 4 and 5.

Following same procedure as Band No. 1, align first at 4000 KC, using trimmers indicated as "Osc. 2" and R. F. trimmers "Band 2". The low frequency end is checked at 1800 KC by rocking condenser gang while adjusting pad BD2 until maximum output is obtained.

Band No. 3 - "5.2 Megacycles to 16 Megacycles"

The high frequency end of this band is aligned at 14 megacycles, using oscillator Trimmer "Osc-3" and RF trimmers indicating Band 3. The low frequency end is padded at 7. megacycles using series pad indicated "Pad BD3".

Band No. 4 - "10 Megacycles to 34. Megacycles"

This band is aligned at 30 megacycles first by setting dial at 30 megacycles and adjust Osc. 4 until signal is received, then by "rocking" condenser gang slightly and adjusting ("Band 4") RF trimmer until maximum output is obtained. Antenna trimmer, Band 4, is not aligned until the oscillator and R. F. trimmers are first adjusted for maximum output. It is not necessary to adjust the oscillator for low frequency tracking as this is adjusted at factory and should be permanent.

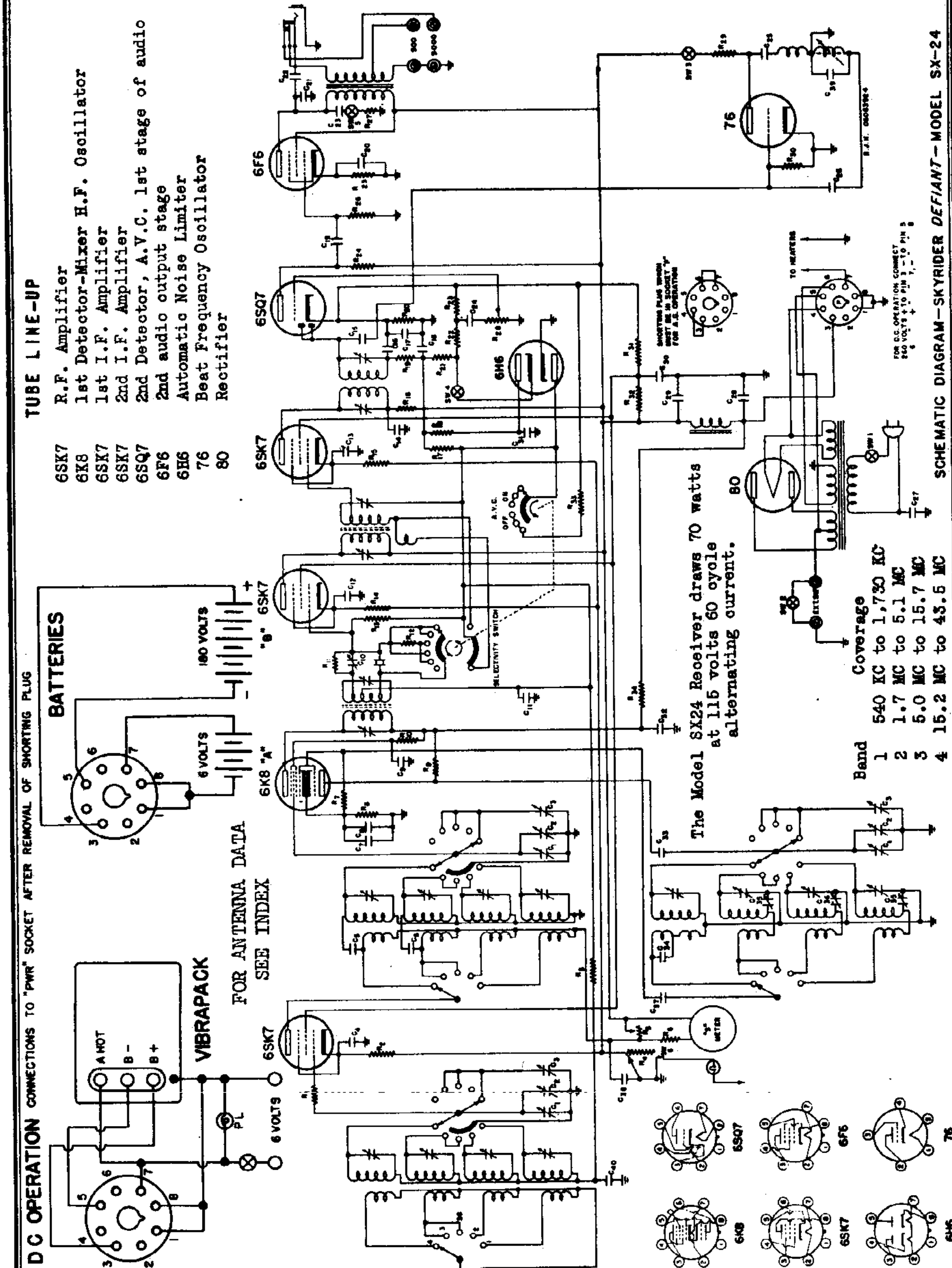
The band spread positions do not require alignment as the alignment for band coverage position also takes care of band spread alignment.

Schematic

THE HALLICRAFTERS INC.

MODEL SX24
Skyrider Defiant

Unless otherwise specified the SX24 Receiver operates on 100-125 volt 50-60 cycle current.



MODEL SX24, Skyrider Defiant
Socket, Trimmers
Parts List
Alignment

THE HALLICRAFTERS INC.

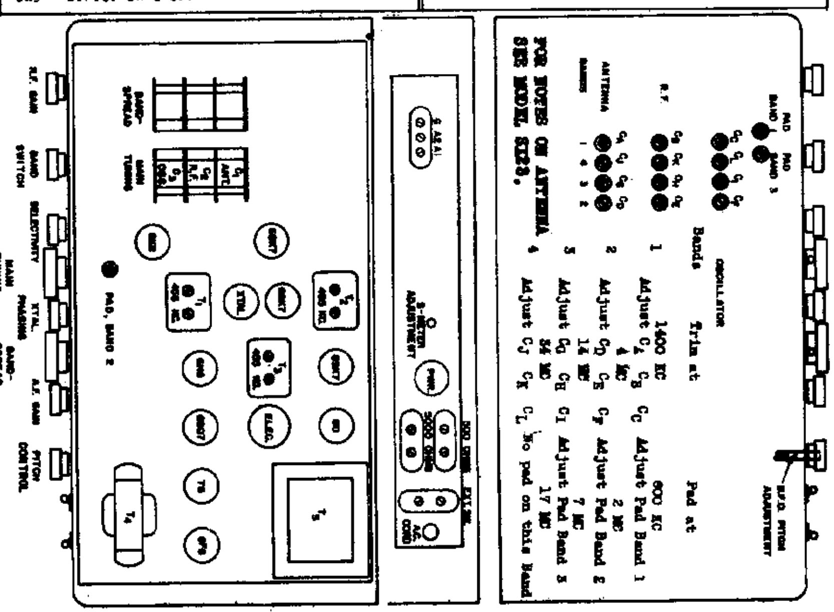
RESISTORS

NO.	OHMS	WATTAGE	NO.	OHMS	WATTAGE
1	30	1/3	18	1,000,000	1/3
2	200	"	19	50,000	"
3	100,000	R.F. Gain Control	20	100	"
4	10,000	Variable	21	250,000	"
5	500	1/3	22	100,000	"
6	400	"	23	250,000	"
7	50,000	"	24	250,000	"
8	200	"	25	500	1
9	15,000	1	26	500,000	1/3
10	30,000	1	27	5,000	1
11	2,000,000	1/3	28	500,000	A.F. Gain Control
12	50,000	"	29	20,000	1
13	500,000	"	30	50,000	1/3
14	300	"	31	20,000	1
15	300	"	32	15,000	1
16	1,000	"	33	150	1/3
17	1,000,000	"	34	5,000	1

CONDENSERS

NO.	CAPACITY	VOLTAGE	TYPE	NO.	CAPACITY	VOLTAGE	TYPE
1	440 mmfd	Per Section		21	.005 mfd	600	Paper
2	4 "	" "		22	.01 "	400	"
3	26 "	" "		23	.02 "	600	"
4	.05 mfd	200	Paper	24	.02 "	200	"
5	25. mmfd		Ceramicon	25	.01 "	400	"
6	10. "		"	26	100. mmfd		Mica
7	.002 mfd		Mica	27	.01 mfd	600	Paper
8	.05 "	200	Paper	28	30. "	350	Electrolytic
9	.05 "	400	"	29	10. "	"	Electrolytic
10	25. mmfd	Crystal Phasing	Air	30	.1 "	400	Paper
11	.02 "	200	Paper	31	.05 "	200	"
12	.05 "	"	"	32	10. "	350	"
13	.05 "	"	"	33	100 mmfd		Mica
14	.02 "	400	"	34	105 "		Ceramicon
15	3. "	Twisted Pair		35	2200 450 "	Dual Pad	
16	100. "		Mica	36	1400 "	"	
17	10. mfd	25	Electrolytic	37	.002 mfd		Mica
18	50. mmfd		Mica	38	.05 "	400	Paper
19	.05 mfd	400	Paper	39	.0005 "		Mica
20	10. "	25	Electrolytic	40	.05 "	200	Paper

SW1 – AC Switch On AF Gain
SW2 – Send RC Switch
SW3 – B.F.O. on & OFF
SW4 – A.N.L. on & OFF
SW5 – Hi-Low Tone Switch
SW6 – S-Meter



Note: The accuracy of the main dial calibration will hold only if the BAND SPREAD condenser is set at minimum capacity, or the position indicated by "0" on the Band Spread dial which has been approached by turning the Band Spread Knob in a clockwise direction, or to the right, as far as it will go.

ALIGNMENT PROCEDURE

455 KC, Intermediate-Frequency Alignment.
Have the controls set as follows:
AF and RF gain controls for maximum volume.
B.F.O. switch in the "ON" position.
Set band switch to #2 band.
Set main dial to 2 megacycles, band spread to zero.
Selectivity switch in "CW Sharp" position.

Remove 6K8 grid cap and connect the hot side of your 455 KC generator to this tube. Connect the ground terminal of the signal generator to the chassis of the receiver. Now feed a 455 KC signal into the receiver and set the pitch control to give a beat note of approximately 1000 cycles. Adjust all I.F. transformer trimmers for maximum gain with the exception of the secondary trimmer on transformer T1. In adjusting this trimmer it will be noted that the output reaches a maximum goes through a dip and then back to maximum again. Wobbulate the IF frequency and align to the dip between the two maximum points. A distinct change in the crystal note sounding like an apparent broadening of the crystal action will be noted when the correct adjustment has been reached. Now repeak carefully the other trimmers for maximum gain.

R. F. ALIGNMENT

Re-connect the grid cap to the 6K8 tube. Connect the hot side of the generator to the A_1 antenna terminal on the rear of the chassis. Be sure a jumper is connected to A_2 and G. Leave signal generator ground connected to the chassis of the receiver.

The location of the following trimmers and padders can be determined by referring to the top and bottom chassis views. All pad adjustments are for the low frequency end of each band while the trimmers are for the high frequency ends.

In order to get at the RF trimmers the guarantee card can be removed by placing a knife under the small snap fasteners holding it in place. So that most satisfactory adjustment of the trimmers and padders can be made, it is advisable to "Rock" the condenser gang across the signal being delivered by the generator until that particular circuit has been accurately peaked.

"S" METER

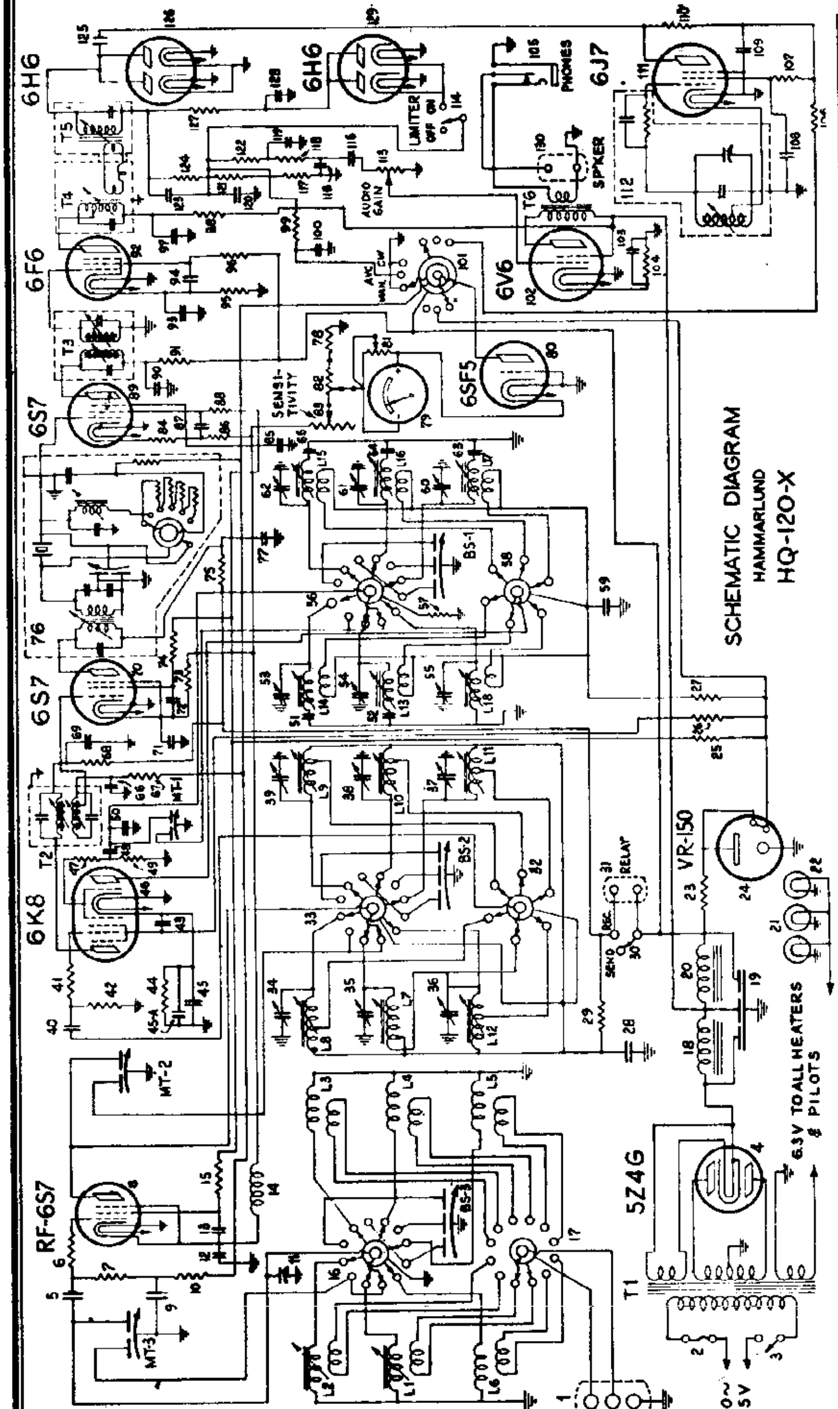
When the R.F. gain control is advanced until a switch is heard to operate, a light will appear behind the translucent scale of the meter itself. Only when this light is on will the meter indicate in "S" units. With the R.F. gain control backed off from maximum the meter is still in the circuit but will not indicate carrier level accurately. When so adjusted the meter can be used as a resonance indicator. On the rear apron of the chassis is the "S" meter adjustment screw. To set the "S" meter, disconnect the antenna and have the R.F. Gain Control on full and the selectivity switch in the "I.F. sharp A.V.C. on" position. Now, adjust this knurled knob until the meter reads zero. Reconnecting the antenna and tuning in a station will show its relative carrier intensity.

The 500 and 5000 ohm terminals are for connections to a loud speaker or other load of those impedance values. The matching SX23 speaker should be connected to the 5000 ohm strip. When headphones are plugged into the phone jack the 5000 ohm speaker connection is automatically disconnected.

MODEL HQ-120X, Crystal
Schematic, Socket
Trimmers, Notes

HAMMARLUND MFG. CO.

12-tube superheterodyne covers a continuous range of from 31 to .54 mc. (9.7 to 555 meters) in 6 steps, thus taking in all important communication, amateur and broadcast bands.



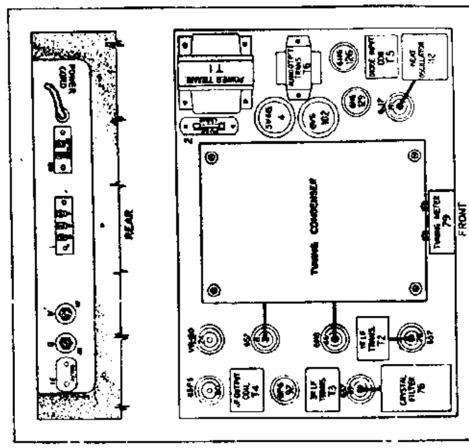


FIG. 11—Chassis layout and meter adjustments "A" and "B."

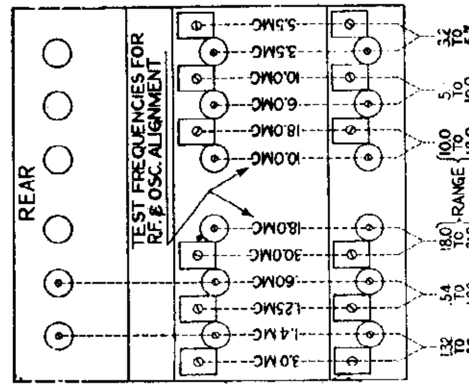


FIG. 10—Chart for R.F. alignment.

CRYSTAL MODEL

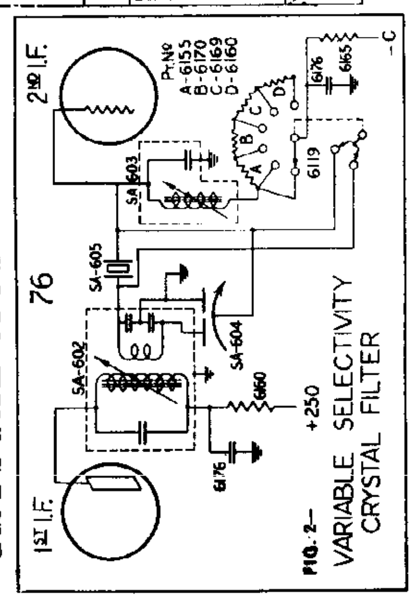


FIG. 2— VARIABLE SELECTIVITY CRYSTAL FILTER

I.F. PEAK 455 KC.

ANTENNA REQUIREMENTS

The input of the "HQ-120" is arranged so that various types of antennas may be employed. The average input impedance is 400 to 600 ohms. The most common type of antenna used generally by the amateur and short wave listener is the Marconi, consisting of a single wire and ground connection.

MODEL HQ-120X, Crystal Circuit Data, Voltage Alignment

HAMMARLUND MFG. CO.

CIRCUIT ARRANGEMENT

PRE-SELECTION: The pre-selector stage in this receiver is extremely high in gain due to its tuned grid and tuned plate circuits. An additional feature has been included in this stage in order to compensate for various types of antennas which may be used with the receiver. The adjustable compensating control which appears on the panel, directly underneath the meter, provides an external adjustment for perfectly aligning the circuits with any given antenna system. This is highly desirable for it is almost impossible to maintain fixed circuit alignment when antennas are frequently changed. Also, because the selectivity is thus improved and the gain considerably increased, this feature affords maximum signal-to-noise ratio and maximum image rejection. See Fig. 1.

BAND SPREAD: Much of the detail as to the band-spread arrangement has been covered in the introduction of this book. The band-spread control has five scales. The first is an arbitrary scale reading 0 to 200 for calibration in any of the bands covered by the receiver. This dial also includes four other scales calibrated in megacycles for the 80, 40, 20, and 10 meter amateur bands. It is rather unusual to find a band-spread dial calibrated directly in megacycles. However, due to the excellent stability of the receiver in general, and the outstanding design of the tuning condenser assembly, this has proved absolutely practical and, to say the least, most convenient.

CONVERTER STAGE: The converter stage uses the newly developed 6K8 tube which, incidentally, becomes more efficient as the frequency increases. The converter stage in this receiver has been treated in such a manner that the overall RF gain is relatively constant not only from one end of a particular amateur band to the other, but also from one band to the other. This is done because it can be readily seen that if the RF gain is not relatively uniform throughout each band and from one band to the other, the "S" meter reading will not be a true indication of signal strength. In some bands it would require a stronger signal to indicate "S-8" on the meter than in others. This has for a long time been a common ailment in receivers and a barrier to true meter readings. However, in the case of the "HQ-120-X" circuit adjustment has been made to permit accurate meter readings.

In order to increase stability, the oscillator is operated from a controlled voltage circuit employing the VR 150 voltage regulator tube. It is a well-known fact that fluctuations in power line voltage in many cases induce a frequency change in the high frequency oscillator stage. The use of the voltage regulator tube in a very effective circuit eliminates all danger from this source because the voltage applied to the oscillator portion of the converter remains constant regardless of power line changes. Also, the calibration of the receiver is maintained more accurately.

CRYSTAL FILTER: The crystal filter included in the "HQ-120-X" is an outstanding HAMMARLUND development. Unlike most other crystal filters, this one has five ranges of selectivity. These five degrees of selectivity are controllable directly from the panel by operation of a rotary switch. And, these degrees of selectivity remain permanent regardless of the rejector control setting. These five steps include 1, 2, and 3 for phone reception, varying from broad to fairly sharp, in convenient steps. The fourth and fifth are for CW or code reception. Four, being moderately selective and "five" the maximum selectivity of the crystal filter. The crystal can also be cut out for general use, by the sixth contact on the switch; see diagram in Fig. 2. Various curves showing the selectivity for these settings of the selectivity control are indicated in Fig. 3. There is absolutely no interlocking of the controls in this crystal filter. The rejector or phasing control can be set to eliminate a heterodyne of some particular frequency within its range, and will not require re-adjustment when the selectivity control of the filter is changed. Also, the output, or overall gain, of the receiver is not noticeably affected by changes in selectivity of the filter. This feature is extremely desirable, especially from the standpoint of accurately determining the strength of incoming signals. It is not necessary to make allowances for usual attenuation in the crystal filter, should it be necessary to change the selectivity in order to eliminate interference.

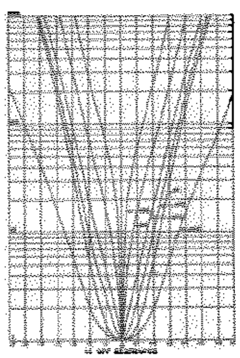


FIG. 3—Overall selectivity curves for 455 kc. I.F. amplifier and crystal filter. Labeling of the curves corresponds to the markings on the panel.

I. F. AMPLIFIER: The intermediate frequency amplifier consists of three stages employing iron core permeability-tuned transformers. The intermediate frequency is 455 kc. which has now become the R.M.A. standard. Overall selectivity curves for the I. F. amplifier with crystal filter are shown in Fig. 3. The A.V.C. arrangement in this amplifier provides remarkably smooth operation. There is a switch for cutting out the A.V.C. and providing manual control of volume or sensitivity.

NOISE LIMITER: The automatic noise limiter faithfully follows the carrier signal strength. It is intended to eliminate automobile-ignition interference and other similar disturbances. It works with the A.V.C either on or off and is so arranged that its operation does not affect the intelligibility of the received signal by altering the audio form. Its effect on modulation is negligible. There is also a switch on the panel for cutting out the noise limiter when it is not required, although it can be left in the circuit permanently without ill effects.

"S" METER: The "S" meter is calibrated to read in "S" units from 1 to 9. "S-1" corresponds to approximately .39 microvolts input at the antenna terminals. "S-9" corresponds to 100 microvolts. The meter is also calibrated up to 40 DB. above "S-9." "S-8" equals 50 M.V., "S-7"—25, "S-6"—12.5, etc. Special compensating controls for the meter are provided so that, regardless of particular local conditions, corrections can always be made for irregularities. These controls and the adjustment of them are thoroughly discussed under "Operation."

BEAT FREQUENCY OSCILLATOR: The beat frequency oscillator circuit is designed to effectively heterodyne signals of varied signal level. This oscillator is so isolated that it has no material effect on the operation of the I.F. amplifier. The variable control on the panel provides a wide selection of beat frequencies. A switch is also provided for cutting the oscillator off.

A. F. AMPLIFIER: The A.F. amplifier consists of a 6V6 tube with an output of approximately 4 watts. A manual gain control is provided in this stage in order that the operator may choose the proper amount of amplification. The output impedance is 6 ohms, and the output terminals connect directly to the voice coil of a permanent-magnet dynamic speaker.

POWER SUPPLY: Special care has been exercised in the design of this part of the receiver. Components used have a very large safety factor in order to insure satisfactory operation over a long period of time. A two-section filter is employed with a total inductance of 40 henries, and a total capacity of 40 microfarads. This heavy duty filter provides humless operation.

REALIGNMENT PROCEDURE

I. F. AMPLIFIER: The "HQ-120-X" receiver is aligned by the usual oscillographic method during final inspection. Its I. F. circuits are of an extremely stable type employing high grade silver-plated mica fixed condensers which are practically unaffected by even extreme changes in temperature or humidity. Accurate circuit alignment is accomplished by adjusting the position of the iron dust cores in the I. F. coils by means of the slotted screws protruding from the sides of the I. F. transformers T2, T3, T4, and T5 and the crystal filter shield 76. This construction results in tuned circuits that hold their adjustment regardless of mechanical shocks or atmospheric conditions. For these reasons it is extremely unlikely that realignment will be necessary and it should not be attempted unless there is very good reason to suspect trouble in the I. F. end of the receiver. Slight misalignment of transformers T2 and T3 will have the most marked effect on sensitivity and selectivity and their adjustment can be checked as follows;

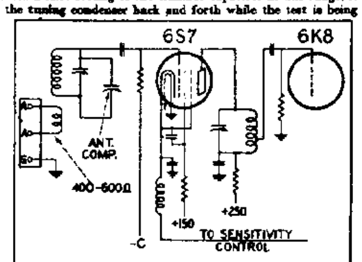
Connect an output meter across the speaker voice coil leads. A low reading copper-oxide rectifier meter is quite suitable for this purpose. Connect a test oscillator (modulated) to the input terminals of the receiver. The frequency of this test oscillator may be anything within the range of the receiver, but its output must be steady. Then tune in its signal on the receiver with the crystal selectivity switch set on No. 1 (phasing control at centerscale) and adjust sensitivity (MAN) until a reading of approximately 1 volt is obtained on the output meter. It will now be found that the output meter reading is very sensitive to slight changes in tuning. After adjusting the tuning dial for peak output meter reading, check each adjusting screw on I. F. transformers T2 and T3. If any great change occurs readjust the tuning dial and again check the four I. F. adjustments. When no further improvement can be made T2 and T3 will be perfectly aligned. The lower, or plate circuit adjusting screw of the Crystal Filter transformer 76 may be checked at the same time and in the same manner.

To *perfectly* align the upper, or grid circuit of the crystal filter 76 an oscillograph and sweep oscillator are required. When such equipment is available the Crystal Selectivity switch may be set on No. 3 or No. 4 and the sweep frequency oscillator adjusted to coincide with the quartz crystal resonant frequency (phasing control at centerscale). Then, with Crystal Selectivity switch on No. 1, adjust the upper screw of Crystal Filter 76 for symmetrical pattern on the oscillograph screen. When such visual aligning equipment is not available a fairly satisfactory setting of this upper screw may be made as follows: After checking the alignment of T2, T3 and the lower screw of Crystal Filter 76 with the output meter as previously outlined, leave the Crystal Selectivity switch on No. 1 and tune in a broadcast station. Then adjust the upper screw in Crystal Filter 76 for best quality of reproduction of speech and music. In making this adjustment no attention should be paid to loudness. On either side of the correct setting, the speech and music will sound low and drummy, with a conspicuous absence of high audio frequencies. The correct setting can be checked by means of the tuning dial, by slowly turning it back and forth across resonance. When the upper screw is properly adjusted, the signal will tune in and out smoothly and there will be no peaks or hardspots as the dial is turned. In fact, the signal should tune in and out just as smoothly as with the Crystal "off" except that the band width will be noticeably narrower.

R. F. AND H. F. OSCILLATOR: Before attempting to realign these circuits the following instructions should be read through very carefully. As in the case of the I. F. amplifier, these circuits have also been accurately aligned during final inspection and great care has been taken in their design to insure stability and permanence of adjustment. Therefore, they should not be disturbed unless it is absolutely certain that readjustment is necessary. Even in that case, only very slight alterations will be necessary to restore the receiver to its original efficiency. In general, a small fraction of a turn on either inductance adjuster or trimmer condenser will suffice. These adjustments, together with their respective test frequencies, are clearly shown on the chart (Fig. 10). On the bands from 3.2 mc. to 31 mc. it is extremely important to have the band spread dial set at 200, since that is the setting at which the main dial has been calibrated. Naturally, the alignment of the receiver cannot be more accurate than the source of the test signal. The aligning during final inspection at the factory is accomplished with special test oscillators which are frequently compared with standard frequency crystals. The front row of adjustments shown on the chart on page 13 control the high frequency oscillator circuits and consequently the dial calibration. These adjustments should be disturbed *only* if the calibration of the main dial (with band spread dial at 200) is known to be off. As clearly indicated in the diagram, the inductance should be adjusted at the low test frequency in each band and the trimmer capacitor at the high test frequency. These adjustments mutually affect each other, therefore, if any considerable change is made at one end of a band the other end of the same band must be readjusted. This procedure must be repeated until no further readjustment at either end is necessary.

The adjustments in the middle row control the first detector input circuits. No great accuracy of test signal is required to check their correctness. Set the oscillator approximately to the frequency shown on the chart and tune in on the receiver (using the output meter). Then adjust for peak meter reading by means of the inductance adjuster at the low test frequency and the trimmer capacitor at the high frequency end. At 30 mc. there is a certain amount of interlock between the detector and H. F. oscillator, so in order to avoid a false setting of the trimmer capacitor in this range, it will be necessary to rock the tuning condenser back and forth while the test is being made.

FIG. 1—Fundamental R.F. amplifier diagram showing antenna compensating condenser.



FUNDAMENTAL R.F. AMP. CIRCUIT

MAINTENANCE

This chart provides information as to the various voltages which will appear between certain tube socket prongs and the ground or B-negative side of the circuit. A slight explanation of the chart might be in order. As an example, when checking the R.F. tube (6S7) we find that the reading from pin 3 to ground should be 200 volts if read on a 0–250 scale meter. The scale that should be used for making the check is contained in the parentheses below the voltage. In the course of making this check it may be found that the voltage will vary slightly in some cases. This, of course, will be due to varying line voltage conditions in the particular location where the receiver is being tested. The voltage values indicated should be found in cases where the line voltage is exactly 117 volts. A meter having a resistance of 1000 ohms per volt with scales approximately as indicated can be used for the checking.

In compiling the parts lists, an endeavor has been made to indicate all values of parts readily obtainable in the open market. For instance, such common items as .02 mf. paper condensers with 500 volt ratings and 10,000 ohm ½w. resistors are standard items. Other parts whose values are not standard should be obtained by writing to the factory. Such parts as 5.5 mmf. silver mica condenser, of course, are not readily obtainable. However, in many cases these special items are located in parts of the circuit where it is almost impossible for them to become defective through ordinary operation of the receiver.

	SWITCH ON MAN.							SWITCH ON CW	SWITCH ON AVC
TUBE	RF 6S7	Conv. 6K8	1-IF 6S7	2-IF 6S7	3-IF 6F6	Audio 6V6-G	REG VR150	B.O. 6J7	Meter 6F5
Pin 3 to ground	200 (250)	215 (250)	215 (250)	210 (250)	270 (500)	260 (500)	...	35. (250)	...
Pin 4 to ground	115 (250)	105 (250)	115 (250)	115 (250)	122 (250)	275 (500)	...	75. (250)	150 (250)
Pin 5 to ground	...	...	...	...	...	...	150 (250)	...	...
Pin 6 to ground	...	115 (250)	...	...	...	...	...	...	...
Pin 8 to ground	3.2 (10)	3.2 (10)	6.2 (10)	6.2 (10)	9.3 (10)	16. (100)	...	...	1.8 (10)

HAMMARLUND MFG. CO.

HQ-120-X

OPERATION

After unpacking the receiver check the chassis carefully to determine that all tubes are properly fitted into their respective sockets. Also, be certain that all grid clips are in place on the tops of the tubes. It is possible that the grid clips or tubes may have been dislodged during transportation.

This receiver, unless it is a special model, operates on 105 to 125 volts AC at 50 to 60 cycles. If you are uncertain as to the type of power available for operating the receiver, check with your local power company office. An attempt to operate the set on other types of power is liable to ruin it. Next, connect the speaker to the receiver. Two wires from the permanent magnetic dynamic speaker connect to the two terminals on the rear edge of the chassis marked "speaker." The main power supply switch that turns the receiver on and off is operated in conjunction with the "audio gain" control. When this control is in the "off" position, the receiver is completely inoperative. So, the next operation is to turn this control on slightly and wait for the tubes to heat up to their operating temperature. In the meantime, set the band selector switch in the .54–1.32 megacycle position; this is the major part of the standard broadcast band, the remainder is covered in the 1.32 to 3.2 mc. band. Also, set the control marked "MAN-AVC.-BFO." in the AVC position. The crystal selectivity control knob should be set in the "off" position. This is the broadest setting. The control in the lower left-hand corner of the panel should be set in the "REC" position. This latter control turns the receiver on and off for stand-by and transmitting periods during communication, but does not disconnect the receiver from the power line thus leaving the tubes heated and ready for instant use. By this time, the receiver is in operation—tubes having had ample time to heat up. We can now tune in broadcast stations by turning the sensitivity control full on and advancing the audio gain control to the point permitting the desired volume. All tuning in the broadcast band is done with the "main tuning" control. The band-spread control does not operate in the first two ranges. For accurate tuning, it will be necessary to watch the "S" meter. At this point it might be well to mention that it is possible that the meter may not be operating properly and may require adjustment. Along the rear edge of the chassis we find two screw driver adjustments (see Fig. 11) marked "A" and "B." These are for aligning the meter so that it operates properly. First, with the receiver turned off the indicator on the meter should rest to the extreme left, at the beginning of the scale to the left of the first arrow. If not, the zero adjustment on the meter (the small screw in the lower central portion) should be adjusted and the receiver turned on again. Also, it might be wise to short-circuit the two antenna posts to ground in order to eliminate signal pickup because in adjusting the meter no signal should be present. With the receiver in the AVC position and the sensitivity control set on zero, the screw driver adjustment "A" on the rear of the chassis should be adjusted so that the indicating needle of the meter is opposite the arrow at the extreme right of the scale. With the "sensitivity" control turned to 10, adjust "B" so that the meter needle is opposite the small arrow at the left of the scale. This should be rechecked because there is a slight interlocking of these controls. It may be necessary to repeat the operation two or three times.

After the meter circuit has been properly aligned and the antenna system connected to the receiver (see chapter on antenna requirements) the main tuning control should be adjusted for maximum reading of the meter on any particular station. The antenna compensating control is the final tuning adjustment. This should be set also for maximum meter reading. If, for any reason, automatic volume control is not desired, the switch so marked should be set in the "MAN" (or manual) position. In this case, sensitivity is controlled with the control thus marked and then the audio control should be turned all the way on.

A jack is provided in the lower right-hand corner of the panel for those who desire to use head-phones. This jack cuts the speaker out of the circuit. On the rear of the chassis, will be found terminals marked "relay." These pin jacks are in parallel with the "send-receive" switch and can be connected to a send-receive relay for break-in operation.

Operation on the remaining high frequency bands is essentially the same, except that the band spread dial comes into use. There are five scales on the band-spread dial. The 0–200 scale is for general coverage and is an arbitrary scale for accurately logging in any one of the various short wave broadcast bands. The other scales are for each of the amateur bands from 80 to 10 meters inclusive, and are calibrated in megacycles. The main tuning dial is also calibrated in megacycles and this calibration holds true when the band-spread dial is set at 200 on the arbitrary scale.

In short wave reception of either amateur or short wave broadcast stations, other features of the receiver are brought into use. For instance, the beat frequency oscillator is used for CW code reception and also for logging weak phone stations. This oscillator is only available without the AVC action and, when turned on, brings the main sensitivity control into operation. The beat oscillator tuning control provides wide variety of tones—the selection of which will depend upon the operator. Also in short wave reception we may need the noise limiter. There is a switch on the panel which provides this feature. The noise limiter operates independent of the setting of any of the other controls on the panel. Its purpose is to limit the interference caused by automobile ignition and similar disturbances.

The next important feature is the crystal filter. Detailed description and diagram can be found under "Circuit Arrangement." The variable feature permits the operator to select the band width that best suits receiving conditions. Normally, the phasing control should be set at the arrow in the center of its scale. Adjustment of this control will cut out interference from stations on either side of the desired signal in any of the five selectivity ranges of the crystal filter. When using the crystal filter, select the band width that provides the greatest fidelity with a minimum of interference. The selectivity of the filter increases as the switch is rotated clockwise. The first three positions of the selectivity control are intended for phone reception, although they can also be used for code in cases where interference is not too severe. The remaining positions are, of course, for single signal code reception in extremely crowded bands.

HQ-120-X PARTS LIST

DIAGRAM	DESCRIPTION	PART NO.
L-1	Antenna coil .54–1.32 mc. range	6007
L-2	Antenna coil 1.32–3.2 mc. range	6010
L-3	Antenna coil 3.2–5.7 mc. range	6013
L-4	Antenna coil 5.7–10 mc. range	6016
L-5	Antenna coil 10–18 mc. range	6019
L-6	Antenna coil 18–31 mc. range	6022
L-7	R.F. coil .54–1.32 mc. range	6008
L-8	R.F. coil 1.32–3.2 mc. range	6011
L-9	R.F. coil 3.2–5.7 mc. range	6014
28	.005 mf. mica condenser	6056
30-114	Send-Receive and Limiter switches	6098
31	Relay pin jack	6143
32	Det. grid tap and osc. plate switch wafers	6064
34-35-36-37-38-39-53-54-55-60-61-62	Special MEX trimmer cond.	6055
42-49-117-118-121-122-124	50,000 ohm resistor (½ W.)	6075
44	230 ohm resistor (½ W.)	6156
45-71-85-94-100-108-109	.05 mf. condenser (500 V.)	6174
45A	.005 mf. mica condenser	6194
46	Tube socket 6K8-Conv. (iso.)	6107
47	15 ohm resistor (½ W.)	6154
48	50. mmf. condenser (silver)	6074
50	5.5 mmf. condenser (silver)	6151
51	673 mmf. condenser (silver)	6061
52	300 mmf. condenser (silver)	6060
56	H.F. osc. grid switch wafer	6132
57	10. ohm resistor (½ W.)	6069
64	.0015 mf. mica condenser	6058
65	.001 mf. mica condenser	6059
70-89	Tube socket 6S7	6109
73	700. ohm resistor (½ W.)	6159
76	Crystal filter	SA-600
78	50. ohm resistor ½ (W.)	6170
79	Tuning meter	6139
80	Tube socket 6SF-5	6106
81-82	80. ohm meter circ. potentiometers	6140
83	Sensitivity control 10,000 ohms	6096
84	400 ohm resistor (½ W.)	6168
86	300. ohm resistor (½ W.)	6169
92	Tube socket 6F6	6108
93-128	.1 mf. condenser (500 V.)	6173
95	600 ohm resistor (½ W.)	6158
96	50,000 ohm resistor 1 watt	6166
99-127	1-meg. resistor (½ W.)	6167
101	AVC-MAN-BFO switch	6097
102	Tube socket 6V6—Audio	6113
103	40 mf. electrolytic condenser	6171
104	350. ohm resistor (1 W.)	6157
105	Phone jack	6087
107-110	100,000 ohm resistor (½ W.)	6135
111	Tube socket 6J7	6112
112	Beat oscillator	SA-680
113	Audio gain control (500,000 ohm combined with power switch)	6095
115	.01 mf. condenser (500 V.)	6175
116-119-120	100. mmf. mica condenser	6191
123	1000. mmf. mica condenser	6177
125	10. mmf. mica condenser	6178
126-129	Tube socket 6H6	6111
130	Speaker terminal strip	3843
L-10	R.F. coil 5.7–10 mc. range	6017
L-11	R.F. coil 10–18 mc. range	6020
L-12	R.F. coil 18–31 mc. range	6023
L-13	H.F. osc. coil .54–1.32 mc. range	6009
L-14	H.F. osc. coil 1.32–3.2 mc. range	6012
L-15	H.F. osc. coil 3.2–5.7 mc. range	6015
L-16	H.F. osc. coil 5.7–10 mc. range	6018
L-17	H.F. osc. coil 10–18 mc. range	6021
L-18	H.F. osc. coil 18–31 mc. range	6024
T-1	Power transformer 50–60 cycle, 115 V	6082
T-2	First I.F. transformer	6116
T-3	Third I.F. transformer	6118
T-4	I.F. output coil assembly	SA-660
T-5	Diode input coil	SA-670
T-6	Audio output transformer 6 ohm	6086
1	Antenna terminal strip	6088
2	Fuse block (1.5A fuse Pt. No. 6065)	3859
3	Power switch (comb. with audio gain control), 500,000 ohm	6095
4	Rectifier tube socket 5V4-G	6114
5-40	600 mmf. grid coupling condensers	6073
6-41	25. ohm resistor (½ W.)	6155
7	500,000 ohm resistor (½ W.)	6076
8	Tube socket 6S7-RF (iso.)	6107
9-12-13-43-59-66-69-72-77-87-90-97	.02 mf. paper cond. (500 V.)	6176
10-67-106	10,000 ohm resistor (½ W.)	6165
11	Antenna compensating condenser	SA-617
14	R.F. choke	CHX
15-29-68-74-75-88-91-98	2000 ohm resistor (½ W.)	6160
16-33	R.F. and detector grid switch wafer	6063
17	Antenna switch wafer	6062
18	First filter choke	6083
19	Filter condenser	6085
20	Second filter choke	6084
21	.15 amp. pilot lamps (6-8 V.)	6036
22	Dial and meter lamps socket assembly	6045
23	3000 ohm resistor (10 W. wire wound)	6161
24	Tube socket VR-150	6115
25	6000 ohm resistor (1 W.)	6163
26	7000 ohm resistor (1 W.)	6164
27	10,000 ohm resistor (1 W.)	6162

HAMMARLUND MFG. CO.

HQ-120-X

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HQ-120-X PARTS LIST

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L-5	Antenna coil 10–18 mc. range	6019
L-6	Antenna coil 18–31 mc. range	6022
L-7	R.F. coil .54–1.32 mc. range	6008
L-8	R.F. coil 1.32–3.2 mc. range	6011
L-9	R.F. coil 3.2–5.7 mc. range	6014

DIAGRAM	DESCRIPTION	PART NO.
28	.005 mf. mica condenser	6056
30-114	Send-Receive and Limiter switches	6098
31	Relay pin jack	6142
32	Det. grid tap and osc. plate switch wafers	6064
34-35-36-37-38-39-53-54-55-60-61-62	Special MEX trimmer cond.	6055
42-49-117-118-121-122-124	50,000 ohm resistor (½ W.)	6075
44	230 ohm resistor (½ W.)	6156
45-71-85-94-100-108-109	.05 mf. condenser (500 V.)	6174
45A	.005 mf. mica condenser	6194
46	Tube socket 6K8-Conv. (iso.)	6107
47	15 ohm resistor (½ W.)	6154
48	50. mmf. condenser (silver)	6074
50	5.5 mmf. condenser (silver)	6151
51	673 mmf. condenser (silver)	6061
52	300 mmf. condenser (silver)	6060
56	H.F. osc. grid switch wafer	6132
57	10. ohm resistor (½ W.)	6089
64	.0015 mf. mica condenser	6058
65	.001 mf. mica condenser	6059
70-89	Tube socket 6S7	6109
73	700. ohm resistor (½ W.)	6159
76	Crystal filter	SA-600
78	50. ohm resistor ½ (W.)	6170
79	Tuning meter	6139
80	Tube socket 6SF-5	6106
81-82	80. ohm meter circ. potentiometers	6140
83	Sensitivity control 10,000 ohms	6096
84	400 ohm resistor (½ W.)	6168
86	300. ohm resistor (½ W.)	6169
92	Tube socket 6F6	6108
93-128	.1 mf. condenser (500 V.)	6173
95	600 ohm resistor (½ W.)	6158
96	50,000 ohm resistor 1 watt	6166
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101	AVC-MAN-BFO switch	6097
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103	40 mf. electrolytic condenser	6171
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116-119-120	100. mmf. mica condenser	6191
123	1000. mmf. mica condenser	6177
125	10. mmf. mica condenser	6178
126-129	Tube socket 6H6	6111
130	Speaker terminal strip	3848
L-10	R.F. coil 5.7–10 mc. range	6017
L-11	R.F. coil 10–18 mc. range	6020
L-12	R.F. coil 18–31 mc. range	6023
L-13	H.F. osc. coil .54–1.32 mc. range	6009
L-14	H.F. osc. coil 1.32–3.2 mc. range	6012
L-15	H.F. osc. coil 3.2–5.7 mc. range	6015
L-16	H.F. osc. coil 5.7–10 mc. range	6018
L-17	H.F. osc. coil 10–18 mc. range	6021
L-18	H.F. osc. coil 18–31 mc. range	6024
T-1	Power transformer 50–60 cycle, 115 V	6082
T-2	First I.F. transformer	6116
T-3	Third I.F. transformer	6118
T-4	I.F. output coil assembly	SA-660
T-5	Diode input coil	SA-670
T-6	Audio output transformer 6 ohm	6086
1	Antenna terminal strip	6088
2	Fuse block (1.5A fuse Pt. No. 6065)	3859
3	Power switch (comb. with audio gain control), 500,000 ohm	6095
4	Rectifier tube socket 5V4-G	6114
5-40	600 mmf. grid coupling condensers	6073
6-41	25. ohm resistor (½ W.)	6155
7	500,000 ohm resistor (½ W.)	6076
8	Tube socket 6S7-RF (iso.)	6107
9-12-13-43-59-66-69-72-77-87-90-97	.02 mf. paper cond. (500 V.)	6176
10-67-106	10,000 ohm resistor (½ W.)	6165
11	Antenna compensating condenser	SA-617
14	R.F. choke	CHX
15-29-68-74-75-88-91-98	2000 ohm resistor (½ W.)	6160
16-33	R.F. and detector grid switch wafer	6063
17	Antenna switch wafer	6062
18	First filter choke	6083
19	Filter condenser	6085
20	Second filter choke	6084
21	.15 amp. pilot lamps (6-8 V.)	6086
22	Dial and meter lamps socket assembly	6045
23	3000 ohm resistor (10 W. wire wound)	6161
24	Tube socket VR-150	6115
25	6000 ohm resistor (1 W.)	6163
26	7000 ohm resistor (1 W.)	6164
27	10,000 ohm resistor (1 W.)	6168

HOWARD RADIO CO.

MODEL 4B - BATTERY RECEIVER

This model must not be confused with the Model 4BT. Electrically they are much the same but the Model 4B is built into an upright table cabinet with an oval dial, whereas the 4BT is a flat type cabinet with straight line dial.

The function of the tubes is as follows: 1A7G - Modulator, 1N5G - IF Amplifier, 1H5G - Diode Det. AVC, 1C5G - Output.

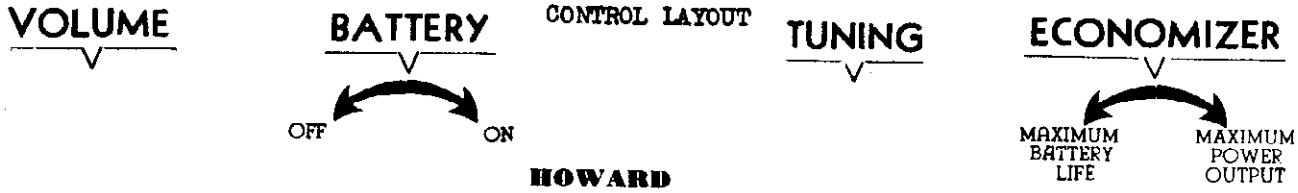
The trimmers for the antenna and oscillator coils are mounted directly on each coil.

The output is rated at .180 to .360 milliwatts.

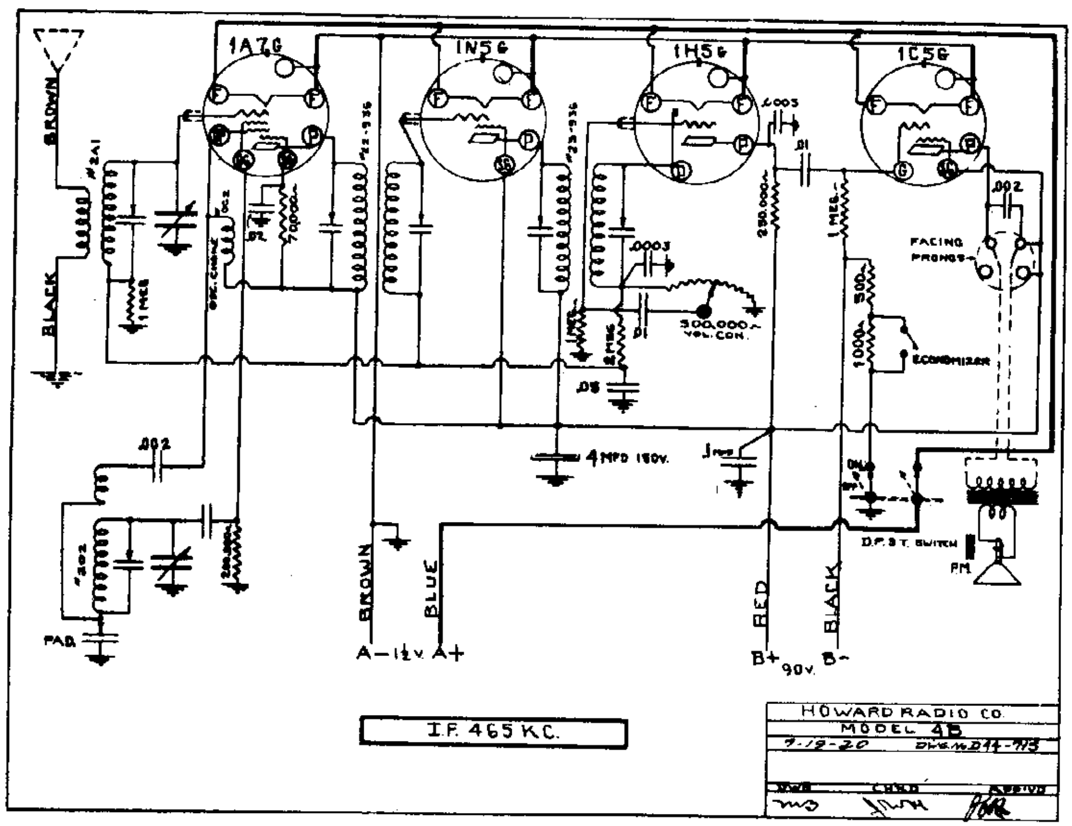
"A" Battery Drain at $1\frac{1}{4}$ volts - .25 amps.

"B" Battery Drain at 90 volts - .012 mils., or 7 mils. when using the "Economizer".

CONTROL LAYOUT



HOWARD



PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
18-190T	Cabinet	21-720X	Drive Shaft with Friction Discs
21-270	Condenser - 2 Gang	10-328X	Drive Disc - 5-1/8 OD with Hub
36-266	Condenser - "E" Filter - Dual 10 Mfd. 200 V.	16-352	Escutcheon
		22-936	I.F. Assembly - 1st
49-262	Condenser - Padding	23-936	I.F. Assembly - 2nd
8218-3	Condenser - Trimmer, 3-30 Mmfd.	18-490	Knob - 1", Brown Bakelite
23-281	Control - Volume	8-490	Knob - 13/16", Brown Bakelite
0C2	Choke - Oscillator	17-602	Plug - 3 Prong, "B" Circuit
2A1	Coil - Antenna	18-602	Plub - 2 Prong, "A" Circuit
202	Coil - Oscillator	1-806	Speaker - 6", PM Type
7-427B	Dial Glass - 1 Band	12-917	Switch - S.P.S.T. for Economizer
4059	Dial Hand	16-917	Switch - D.P.S.T. - OFF-ON

MODEL 4BT
Schematic, Voltage
Notes

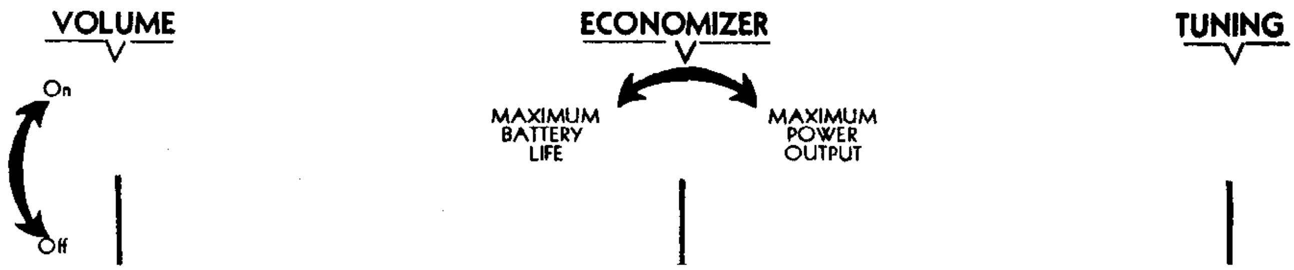
HOWARD RADIO CO.

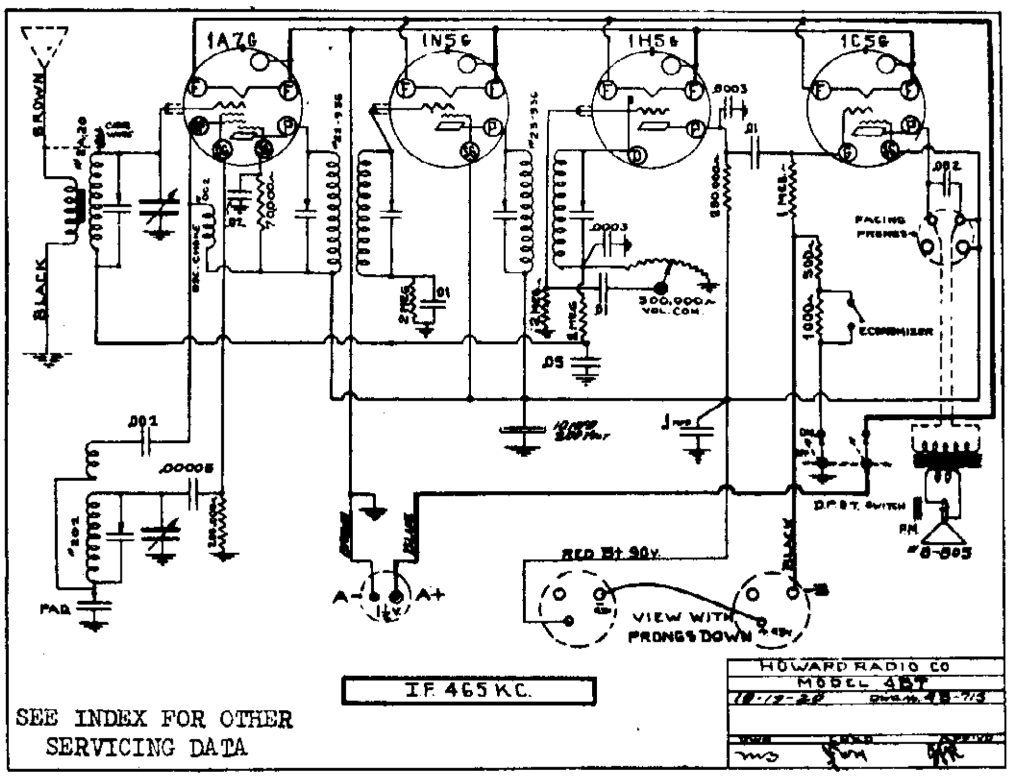
MODEL 4BT - BATTERY RECEIVER

This receiver is designed on the 220 style chassis.
"A" Battery Drain at 1¼ volts - .25 amps.
"B" Battery Drain at 90 volts - .012 mils., or 7 mils. when using the "Economizer".
Output - .180 to .360 milliwatts, maximum.

The set is equipped with plugs that are inserted directly into the "A" and "B" batteries of the socket type construction since most all batteries are made that way at this time.

CONTROL LAYOUT





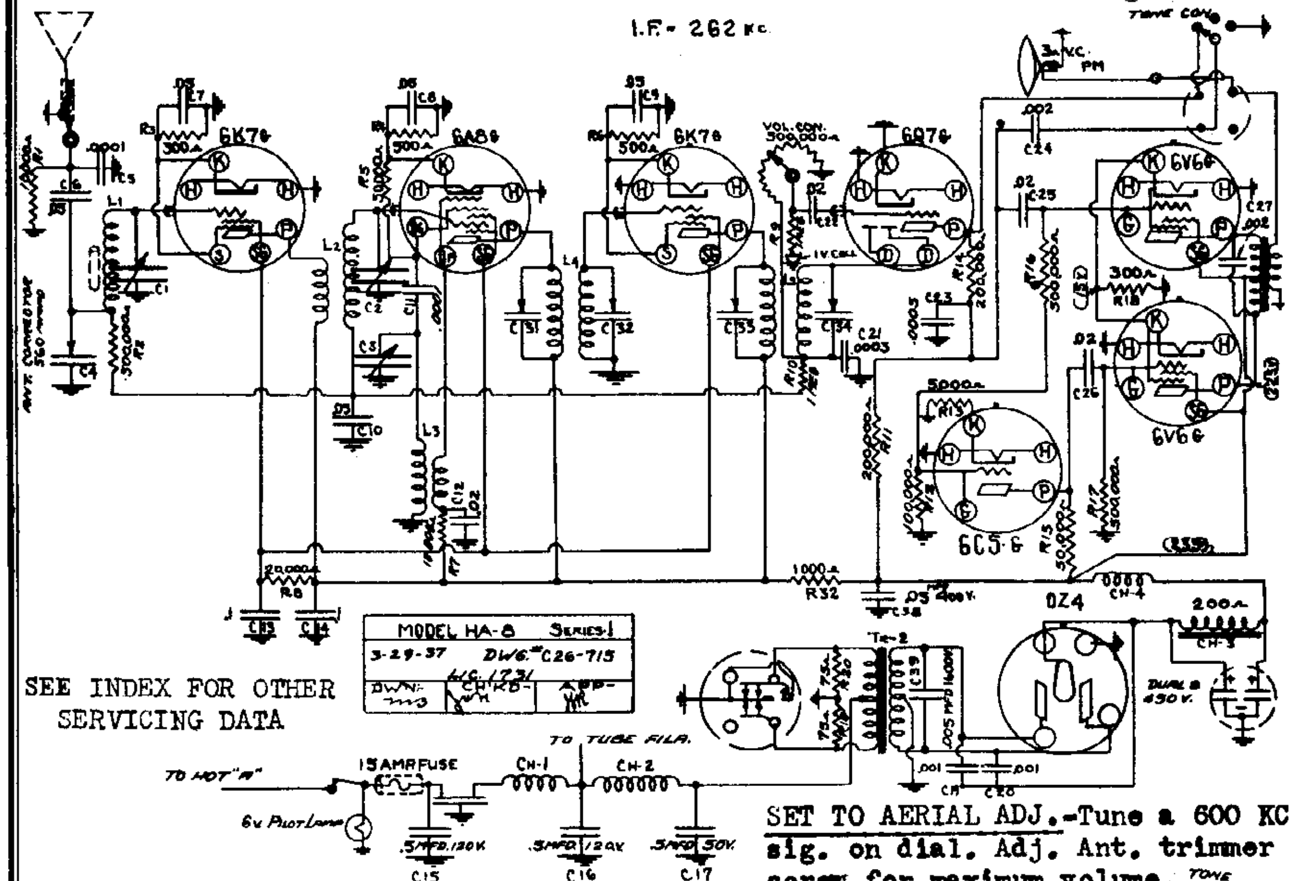
REPLACEMENT PARTS LIST - MODEL 4BT

PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
38-270	Condenser - 2 Gang for Model 4BT	17-829	Drive Cord Spring
36-266	Condenser - "E" Filter - Dual 10 Mfd. 200 V.	34-720X	Drive Shaft with Wood Hub
49-262	Condenser - Padding	4-429	Drive Shaft Grommet
39-281	Control - Volume, with Switch	12-788	Drive Shaft & Wood Hub
56-188	Cabinet	22-936	I.F. Assembly
2A20	Coil - Antenna	23-936	I.F. Assembly
202	Coil - Oscillator	18-490	Knob - 1" Diameter - Brown Bakelite
OC2	Choke - Oscillator	1-609X	Pulley with 4-425 Gear Assembly
62-310	Dial Glass - 1 Band	3-609	Pulleys for Drive Cord
20-448	Dial Hand finished with Eyelet	J8-805	Speaker - 5" with Transformer - PM
1-288	Drive Cord - 36"	17-917	Switch, Rotary Shaft

Alignment

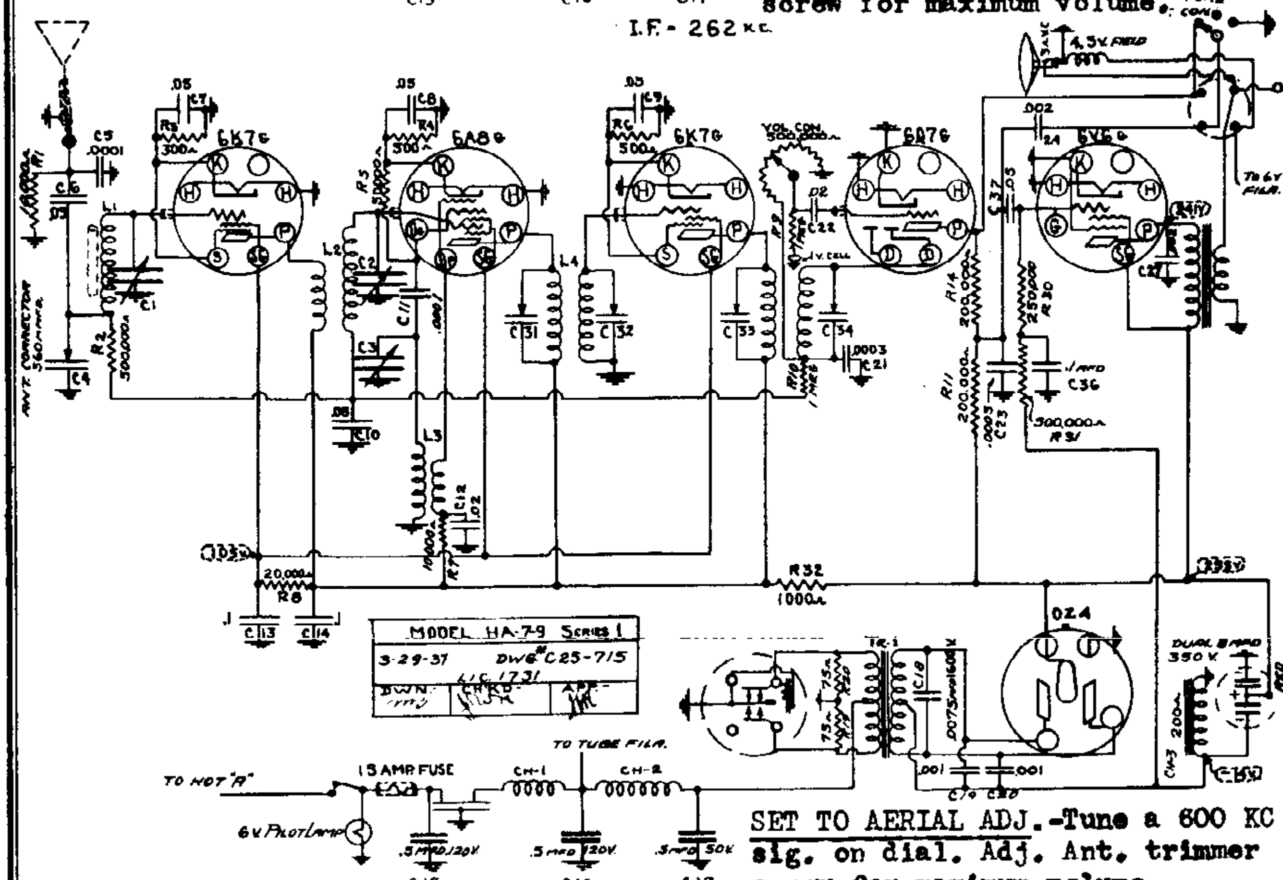
MODELS HA7, HA9
MODEL HA8
Schematics, Voltage

HOWARD RADIO CO.



SEE INDEX FOR OTHER SERVICING DATA

SET TO AERIAL ADJ.-Tune a 600 KC sig. on dial. Adj. Ant. trimmer screw for maximum volume.

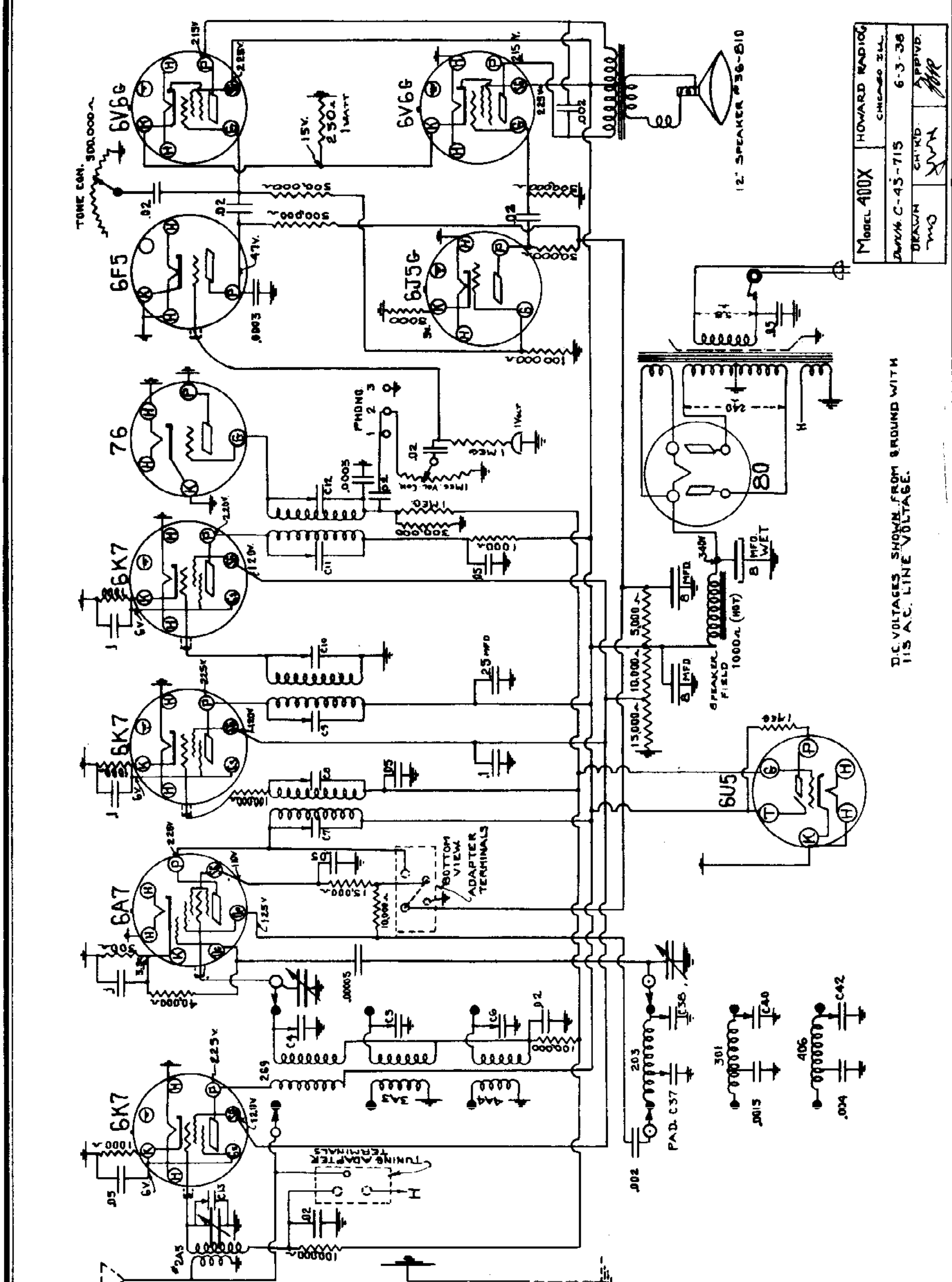


SET TO AERIAL ADJ.-Tune a 600 KC sig. on dial. Adj. Ant. trimmer screw for maximum volume

At any future date should the tubes be checked and changed it is very important that the same type tubes

MODEL 400X
Schematic, Voltage

HOWARD RADIO CO.



HOWARD RADIO CO.

MODEL 210
Push Button Adapter
Schematic, Instructions
Parts List

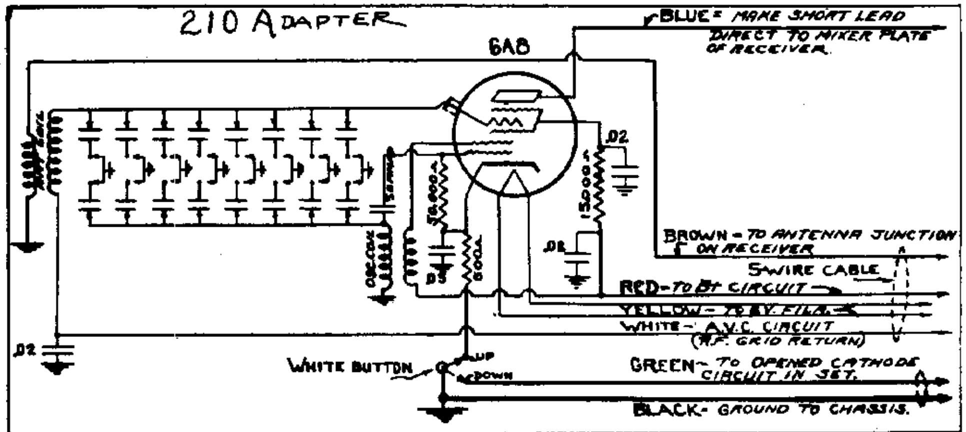
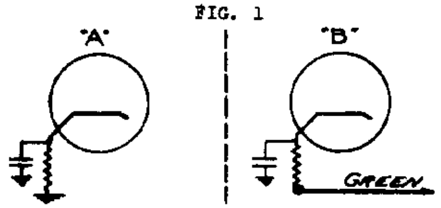
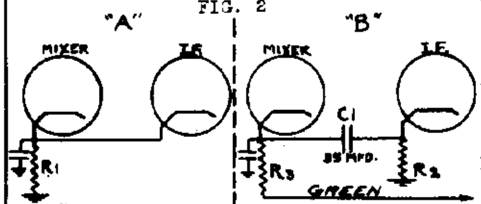


FIG. 1



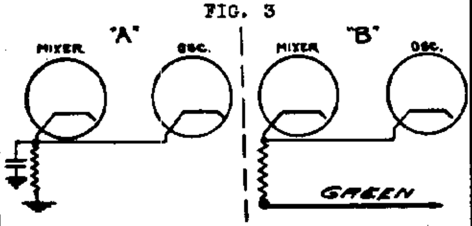
CATHODE CIRCUIT OF THE 6A7 OR 6A8 TUBES WHERE NO OTHER CATHODES ARE COMMON - MERELY REMOVE RESISTOR FROM GROUND AND ATTACH GREEN WIRE TO THE RESISTOR.
NOTE-SHOULD CATHODE BE ALREADY DIRECT TO GROUND - REMOVE GROUND AND CONNECT GREEN WIRE DIRECT TO CATHODE TERMINAL.

FIG. 2



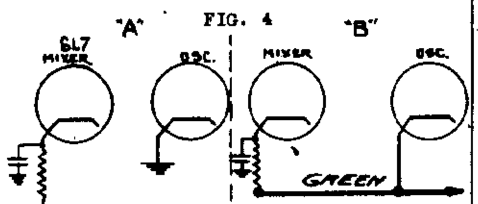
CIRCUITS IN WHICH I. F. CATHODES ARE CONNECTED COMMON TO MIXER CATHODE — SUBSTITUTE RESISTORS R2 AND R3 FOR R1 OF SUCH VALUES TO OBTAIN ORIGINAL CATHODE VOLTAGE. ADD C1 CONDENSER (.05 MFD 200 V.) BETWEEN CATHODES AS SHOWN, AND CONNECT GREEN WIRE TO END OF R3 RESISTOR.

FIG. 3



THE ABOVE ARRANGEMENT IS USED WHEN OSCILLATOR CATHODE AND THE MIXER CATHODE ARE COMMONLY COUPLED BY RESISTOR - MERELY REMOVE GROUND AND ATTACH GREEN WIRE AS SHOWN.

FIG. 4



WITH CIRCUITS AS SHOWN ABOVE WHERE 6L7 CATHODE USES BIAS RESISTOR AND THE SEPARATE OSCILLATOR CATHODE IS GROUNDED - TIE CATHODES TOGETHER SO THAT GREEN WIRE CONTROLS THE GROUND RETURN FOR BOTH.

H.R.CO.
DWG.No 41-713

PARTS LIST FOR MODEL "210" ADAPTER

QUANTITY PER SET	PART NO.	LIST PRICE	DESCRIPTION
1	2A12	.40	Coil - Antenna
1	2011	.40	Coil - Oscillator
1	20-266	1.10	Condenser - 16-8 Mfd. Electrolytic
1		.16	Condenser - .02 Mfd. 200 Volt
2		.16	Condenser - .02 Mfd. 400 Volt
1		.16	Condenser - .05 Mfd. 200 Volt
1		.16	Condenser - .00005 Mfd. Mica
1	39-262	.40	Condenser - Dual Trimmer
1	40-262	.40	Condenser - Dual Trimmer
1	41-262	.40	Condenser - Dual Trimmer
1	42-262	.40	Condenser - Dual Trimmer
1	43-262	.40	Condenser - Dual Trimmer
1	44-262	.40	Condenser - Dual Trimmer
1	45-262	.40	Condenser - Dual Trimmer
1	46-262	.40	Condenser - Dual Trimmer
1	22-352	.35	Escutcheon Plate
2	2-114	.25	Moulded Bar Trim
1	14-602	.15	Plug with shell, 3 prong
1	15-602	.15	Plug with shell, 4 prong
8		.05	Push Buttons - Brown
1		.05	Push Buttons - White
1		.15	Resistor - 500 Ohm 1/2 Watt
1		.15	Resistor - 15,000 Ohm 1/2 Watt
1		.12	Resistor - 40,000 Ohm 1/3 Watt
1		.15	Socket - 8 Prong
1	9-772	.15	Socket - 3 Prong for part # 14-602
1	10-772	.15	Socket - 4 Prong for part # 15-602
1		.30	Station Tab Sheet
4	7-658	.05	Filister Head Screws - 6-32 x 3/4 Long
4	1-182	.05	Cinch Buttons
4	17-844	.03	Friction Strip
4		.02	Wood Spacer - 1/4" long 3/8 OD
1	10-917	3.30	Switch - Push Button complete (less knobs)
			REPLACEMENT PARTS FOR ABOVE
1		.10	Selector Key "Off" position
8	4-488	.08	Selector Keys
1	5-114	.10	Latch Bar
1	11-829	.05	Bronze Spring for latch bar
1	10-829	.05	Coil Type Spring 1" for key
8	9-829	.05	Coil Type Spring 13/16" for 4-488 keys
9	21-972	.02	Felt Washers
18	7-829	.04	Main Contact springs, silver finish

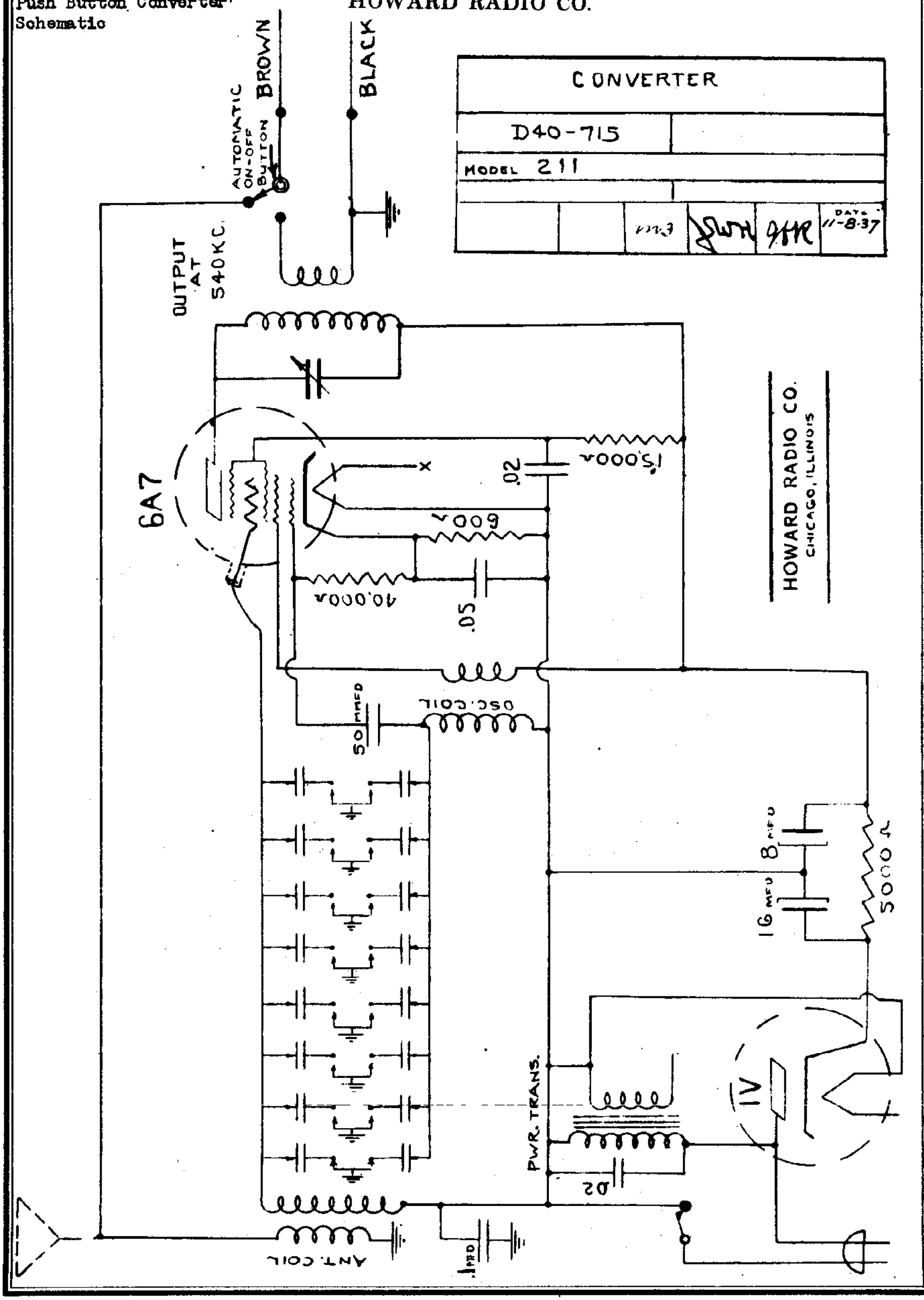
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

NOTE:

See installation instructions for the operation of this adapter.

MODEL 211
Push Button Converter
Schematic

HOWARD RADIO CO.



MODEL 210
MODEL 211
Instructions

HOWARD RADIO CO.

MODEL 4B
MODEL 4BT
MODELS 220,270
MODELS 221,271
Alignment

MODELS 220, 221, 270, 271,
4B, 4BT
ALIGNMENT CHART

MODELS	CHECK BAND SWITCH POSITION & SET DIAL TO	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER LOCATION	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS FOR 50 MILLIWATT OUTPUT
220, 221	Maximum Capacity	465 KC	Grid of 6A7	C31,C32, C33,C34 Fig. 2	IF	27
220, 221	107 MC (1700 KC)	1700 KC	Antenna Lead	T10,T11 Fig. 2	Osc. & RF	9
220, 221	600 KC	600 KC	Antenna Lead	P 12	Osc. Pad. (Rock Dial)	10
270, 271	Maximum Capacity	465 KC	Grid of 6A7	C31,C32, C33,C34 Fig. 2	IF	27
270, 271	18 MC	18 MC	Antenna Lead	T1, T2 Fig. 3	Osc. & RF	30
270, 271	1.7 MC (1700 KC)	1.7 MC	Antenna Lead	T3, T4 Fig. 3	Osc. & RF	9
270, 271	600 KC	600 KC	Antenna Lead	P 12	Osc. Pad. (Rock Dial)	10
4BT	Maximum Capacity	465 KC	Grid of 1A7C	C31,C32, C33,C34 Fig. 2	IF	50-75
4BT	1.7 MC	1.7 MC	Antenna Lead	T10,T11	Osc. & RF	29
4BT	600 KC	600 KC	Antenna Lead	P 12 Fig. 2	Osc. Pad. (Rock Dial)	30

NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

NOTE 4: Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.

BATTERY RECOMMENDATIONS

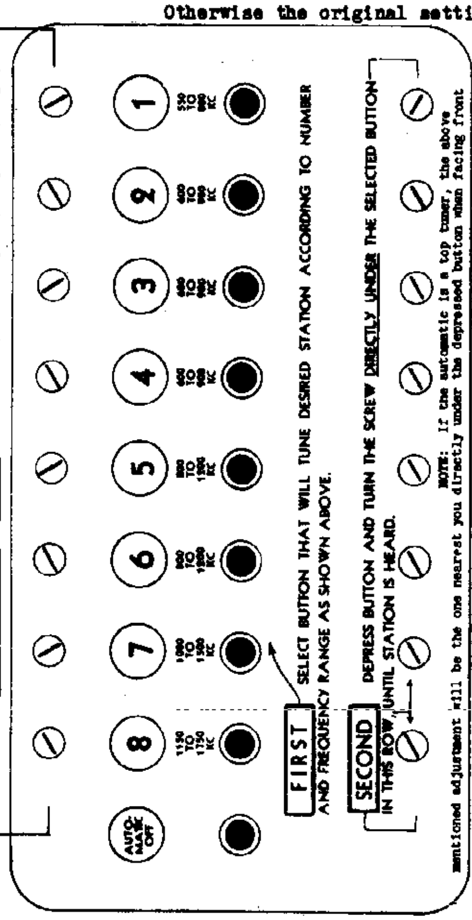
The color code for the battery leads for the Models 4B or 4BT

Red	B+ 90 volts
Black	B— 90 volts
Blue	A+ 1½ volts
Brown	A— 1½ volts

SET-UP INSTRUCTIONS—HOWARD AUTOMATIC

MODELS 210 & 211

THIRD MOVE THE SCREW ADJUSTMENT DIRECTLY ABOVE THE DEPRESSED BUTTON UNTIL TUNING EYE, OR TUNING INDICATOR REGISTERS MAXIMUM DEFLECTION. NOW RE-ADJUST THE SCREW MENTIONED IN SECOND OPERATION FOR MAXIMUM TUNING INDICATION.



FIRST SELECT BUTTON THAT WILL TUNE DESIRED STATION ACCORDING TO NUMBER AND FREQUENCY RANGE AS SHOWN ABOVE.

SECOND DEPRESS BUTTON AND TURN THE SCREW DIRECTLY UNDER THE SELECTED BUTTON IN THIS ROW, UNTIL STATION IS HEARD.

NOTE: If the automatic is a top tuner, the above mentioned adjustment will be the one nearest you directly under the depressed button when facing front of cabinet. Should the adjustment holes be covered with a trim, pry the trim up with a screw driver and remove while making adjustments.

FOURTH Insert the station call letter tab over button number just selected. Repeat this procedure for the remaining buttons. Replace trim.

TO USE RADIO IN THE CONVENTIONAL MANNER, DEPRESS BUTTON MARKED "AUTOMATIC OFF".

EXAMPLE

Station desired, WGN: Frequency is 720 KC, therefore button 2, 3, or 4 can be used. Button 3 is depressed, the lower adjustment is moved until WGN is heard. The adjustment above #3 button is then adjusted for maximum eye deflection. The lower adjustment is again checked for maximum deflection.

WGN tab is removed from tab sheet and inserted in escutcheon over #3. Insert tab by pushing in place with finger-tip.

SUGGESTIONS

FIRST: Do not try to extend the adjustments beyond their frequency rating.

SECOND: Move adjustments slowly.

THIRD: Double-check before moving any adjustment to make sure the adjustment about to be moved corresponds to the depressed button. Carelessness will cause you to misadjust adjustments already completed.

FOURTH: Check adjustments occasionally for maximum deflection of eye or tuning indicator, while receiver is in service. This will not have to be done often but it is good assurance that your receiver is always tuned perfectly.

A good method to identify the station being set up, is to tune the station in by dial on radio set, then switch to automatic by depressing the button on which set-up is being made and tune in by adjustment same program as heard when tuned in by dial as mentioned above.

When selecting a station automatically it is only necessary to depress button carrying the desired station call letters.

To use manual tuning depress "Automatic OFF" button.

8-541

MODEL 4B
MODEL 4BT
MODELS 220, 270
MODELS 221, 271

HOWARD RADIO CO.

Socket, Trimmers
Tuner Data, Dial

HOW TO SET AUTOMATIC TUNING BUTTONS

(1) From the rear of the tuning mechanism within the cabinet extends a slotted screw; loosen this screw by turning it to the left.
(2) Tune set in the regular way and decide upon what four stations are used the most in your locality.
(3) With a station exactly in tune press one button ALL THE WAY DOWN which will set the adjustment, then the button will spring back in its original position.
(4) Repeat this procedure for each of the remaining three buttons, being careful not to touch any other buttons while pressing down on one.
(5) Now tighten the rear screw, using a coin in the slot when tightening, if necessary, to make sure it will not loosen. Insert station letters into top of buttons.

THE GEAR ADJUSTMENT between the gear on the selector unit and the gear on the variable condenser is located on the top of the variable condenser in the form of a screw. The selector unit always tends to press against this screw head due to the mounting at point "A". See Fig. 2

To lower or raise the selector unit to change the gear spacing, loosen the hex nut that locks the adjustment screw and adjust as required.

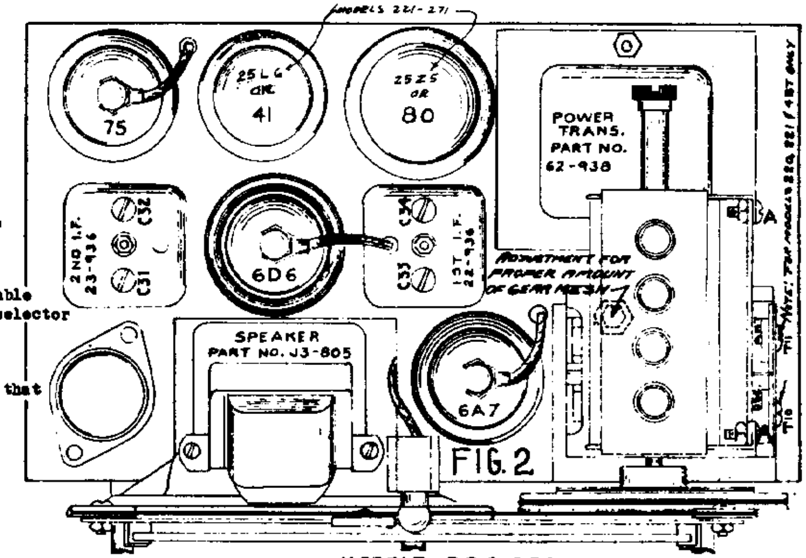


FIG. 2
MODELS 220, 270

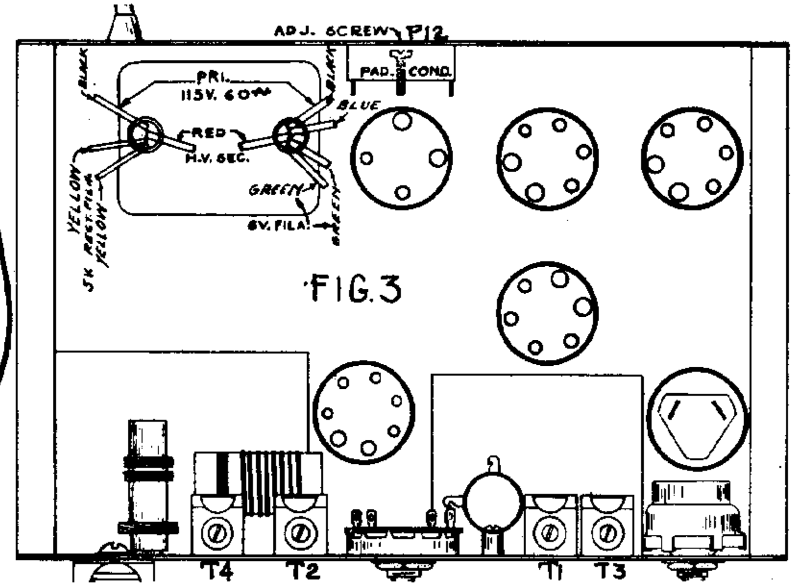
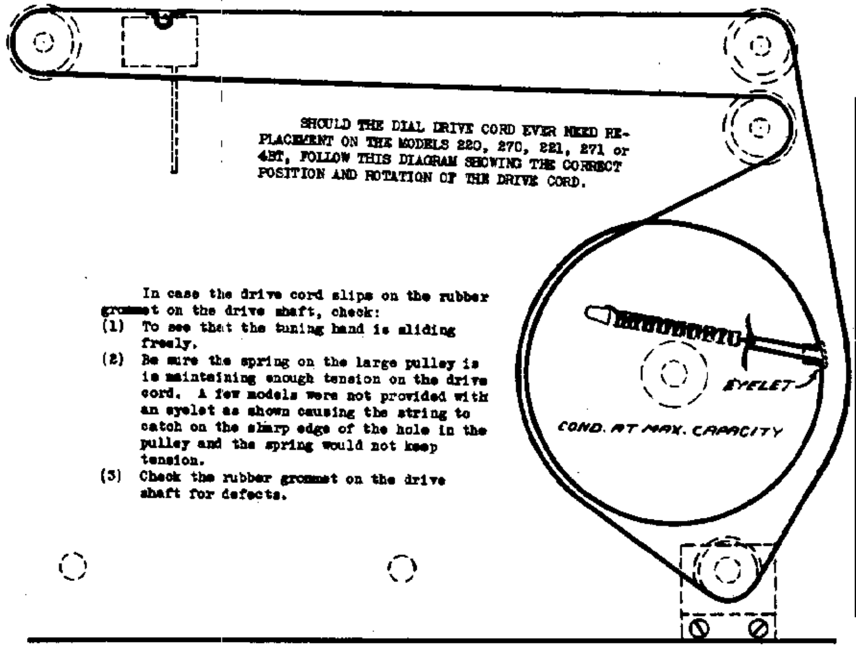


FIG. 3
MODEL 270
DIAGRAM ALSO REFERRED TO FOR TRIMMER LOCATIONS FOR OTHER MODELS



SHOULD THE DIAL DRIVE CORD EVER NEED REPLACEMENT ON THE MODELS 220, 270, 221, 271 or 4BT, FOLLOW THIS DIAGRAM SHOWING THE CORRECT POSITION AND ROTATION OF THE DRIVE CORD.

In case the drive cord slips on the rubber grommet on the drive shaft, check:
(1) To see that the tuning band is sliding freely.
(2) Be sure the spring on the large pulley is is maintaining enough tension on the drive cord. A few models were not provided with an eyelet as shown causing the string to catch on the sharp edge of the hole in the pulley and the spring would not keep tension.
(3) Check the rubber grommet on the drive shaft for defects.

MODELS 220,270
Schematic,Voltage
Notes

HOWARD RADIO CO.

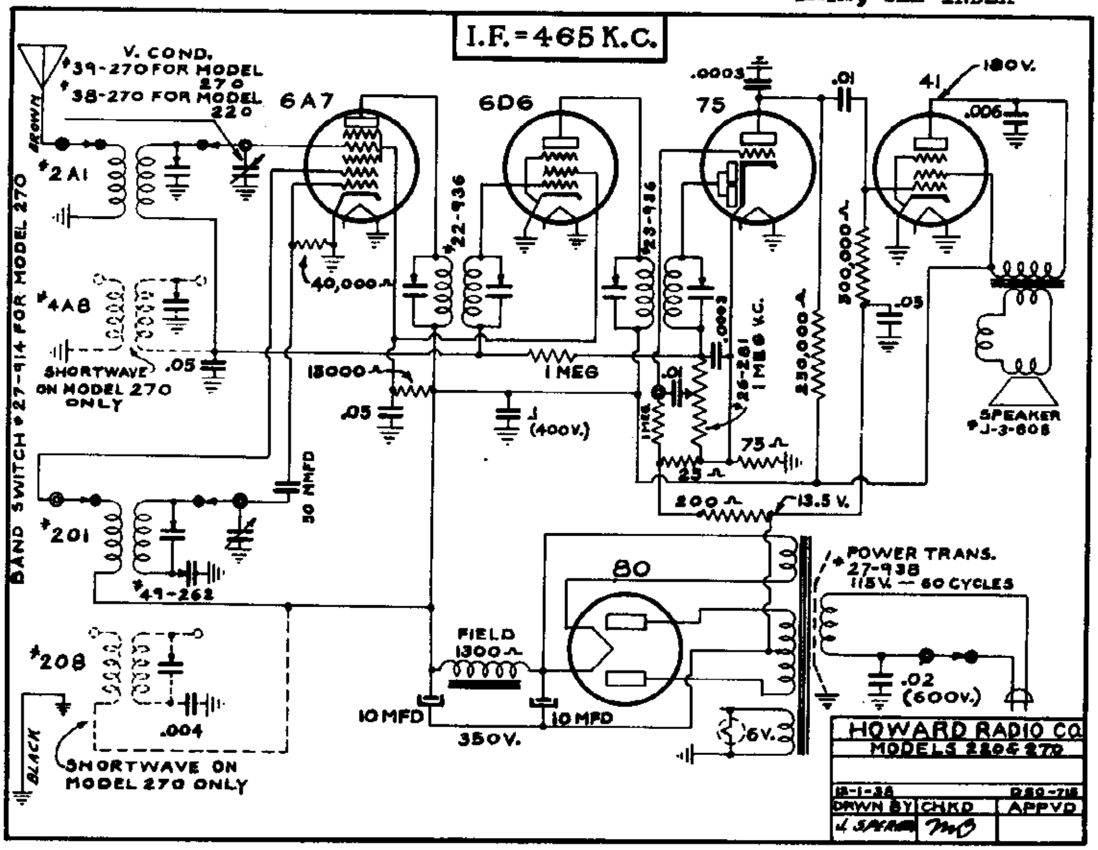
GENERAL DESCRIPTION - MODELS 220 and 270
FOR USE ON ALTERNATING CURRENT ONLY

The schematic diagram below covers both models 220 and 270, the main difference being the use of the short wave band for Model 270. The circuit is conventional with 6A7 mixer, 6D6, IF amplifier, 75 Diode Det. AVC, 41 Output, 80 Rectifier. The cathode circuit of the filter system is not grounded direct, the bias voltages are obtained by resistors from C.T. of high voltage to ground.

The output to be obtained will be from 1-1/2 to 2/25 watts, maximum.

For the models having four push buttons, a mechanical type tuner, the proper set-up is given on the following page.

FOR OTHER SERVICING DATA, SEE INDEX



REPLACEMENT PARTS LIST - MODELS 220 - 270

PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
27-914	Band Switch for Model 270	34-720X	Drive Shaft with Wood Hub
39-270	Condenser - 2 Gang for Model 270	4-429	Drive Shaft Grommet
38-270	Condenser - 2 Gang for Model 220	12-788	Drive Shaft & Wood Hub
31-277	Condenser - "E" Filter - Dual 10 Mfd. 350 V.	6-425X	Gear with Hub for Selector Unit
50-262	Condenser - Single Trimmer 3-30 Mfd.	18-490	Knob - 1" Diameter - Brown Bakelite
49-262	Condenser - Padding	36-290	Push Buttons
36-281	Control - Volume, with Switch	2-276	Push Button Selector Unit
53-188	Cabinet - Model 270	1-609X	Pulley with 4-425 Gear Assembly
54-188	Cabinet - Model 220	3-609	Pulleys for Drive Cord
62-310	Dial Glass - Model 220 - 1 Band	11-786	Pilot Light Sockets
61-310	Dial Glass - Model 270 - 2 Band	2-498	Pilot Light - 6 V. Bayonet Type
20-448	Dial Hand finished with Eyelet	J3-805	Speaker - 5-1/2" with Transformer 1300 Ohm Field
1-288	Drive Cord - 36"	27-938	Transformer - Power 115 V. 60 Cycle
17-829	Drive Cord Spring		

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

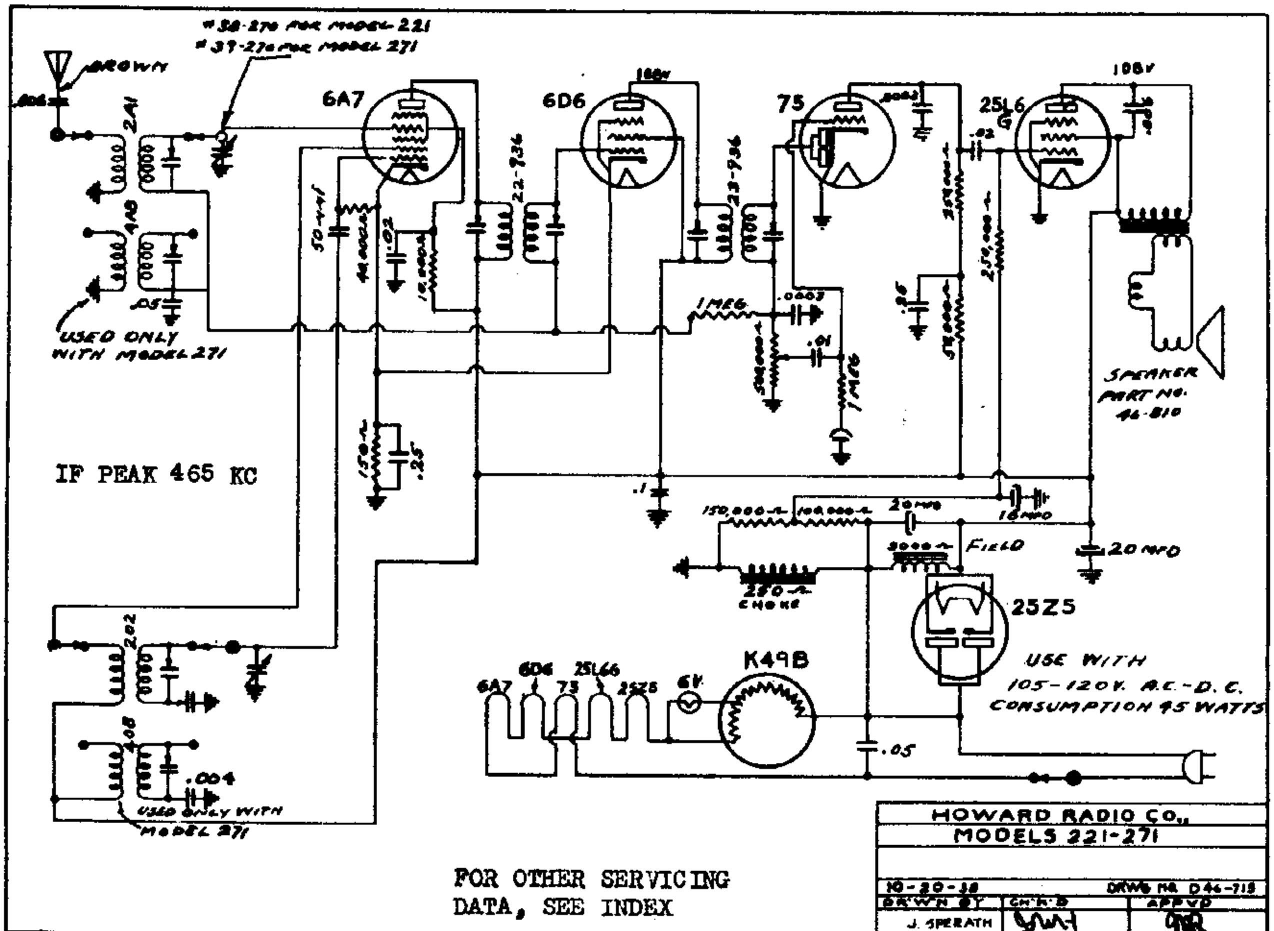
MODELS 221,271
Schematic,Voltage
Notes

HOWARD RADIO CO.

GENERAL DESCRIPTION - MODELS 221 and 271
FOR USE ON EITHER DIRECT OR ALTERNATING CURRENT

The schematic diagram below covers both 221 and 271 AC-DC Models, the main difference being that the 271 has a short wave band. Mechanical specifications are similar to the 220 - 270 series.

The maximum power output to be obtained is 2.7 watts, 1.7 watts undistorted.



FOR OTHER SERVICING DATA, SEE INDEX

REPLACEMENT PARTS LIST .- MODELS 221 - 271

PART NUMBER	DESCRIPTION
27-914	Band Switch for Model 271
39-270	Condenser - 2 Gang for Model 271
38-270	Condenser - 2 Gang for Model 221
32-266	Condenser - "E" Filter - Dual 20 Mfd. 150 Volt
50-262	Condenser - Single Trimmer 3-30 Mfd.
49-262	Condenser - Padding
36-281	Control - Volume, with Switch
53-188	Cabinet - Model 271
54-188	Cabinet - Model 221
62-310	Dial Glass - Model 221 - 1 Band
61-310	Dial Glass - Model 271 - 2 Band
20-448	Dial Hand finished with Eyelet
1-288	Drive Cord - 36"
17-829	Drive Cord Spring

PART NUMBER	DESCRIPTION
34-720X	Drive Shaft with Wood Hub
4-429	Drive Shaft Grommet
12-788	Drive Shaft and Wood Hub
19-212	Filter Choke - 240 Ohms
6-425X	Gear with Hub for Selector Unit
18-490	Knob - 1" Diameter - Brown Bakelite
36-290	Push Buttons
2-276	Push Button Selector Unit
1-609X	Pulley with 4-425 Gear Assembly
3-609	Pulleys for Drive Cord
2-498	Pilot Light - 6 V. Bayonet Type
46-810	Speaker - 5-1/2" with Transformer 3000 Ohm Field

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

HOWARD RADIO CO.

Each of the three bands has a separate antenna and oscillator coil.

The intermediate frequency stages are tuned to 465 KC and have a sensitivity of about 27 microvolts. (for 50 milliwatt output)
The maximum output is rated at about 5 watts, and 3.5 watts undistorted.

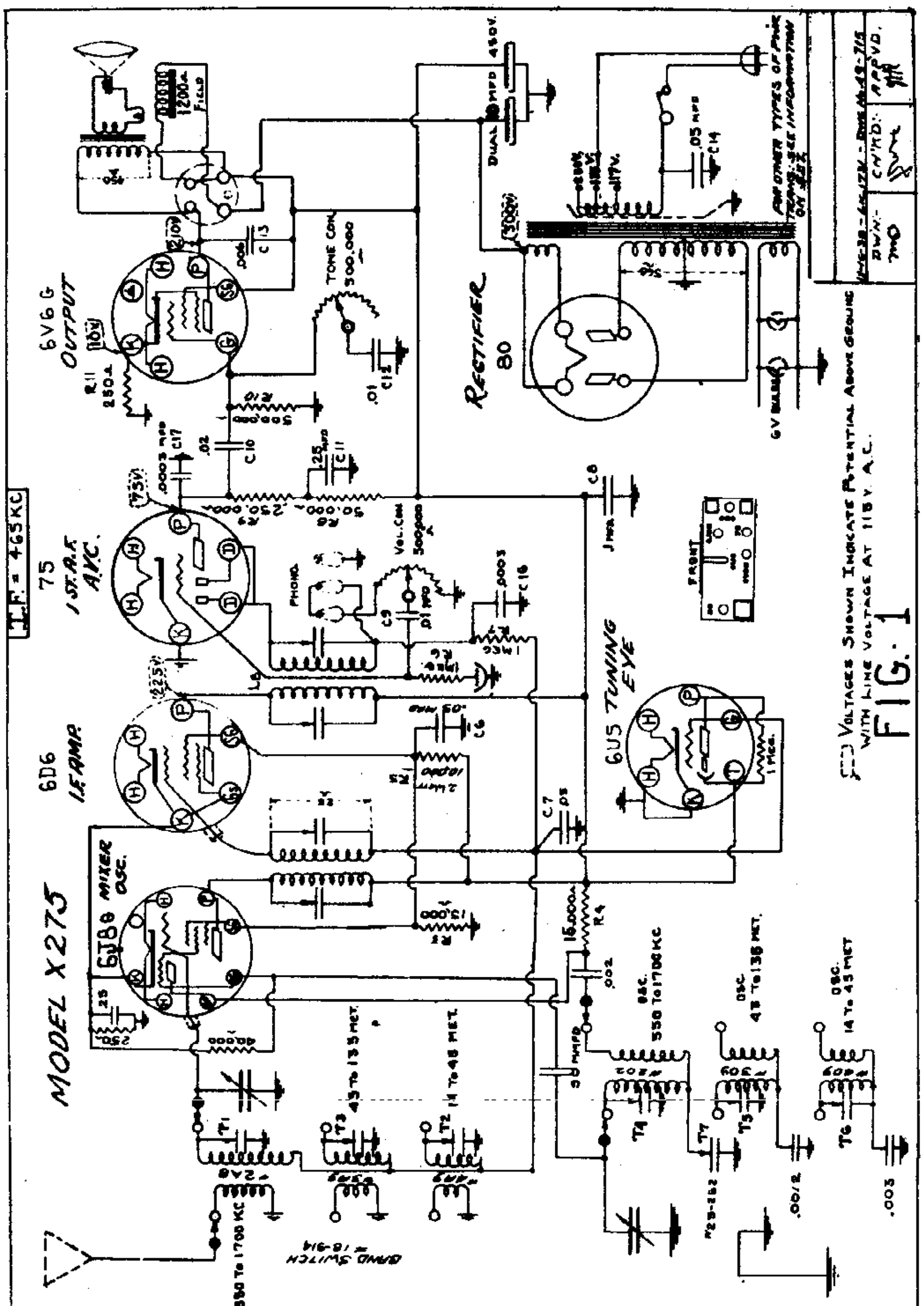


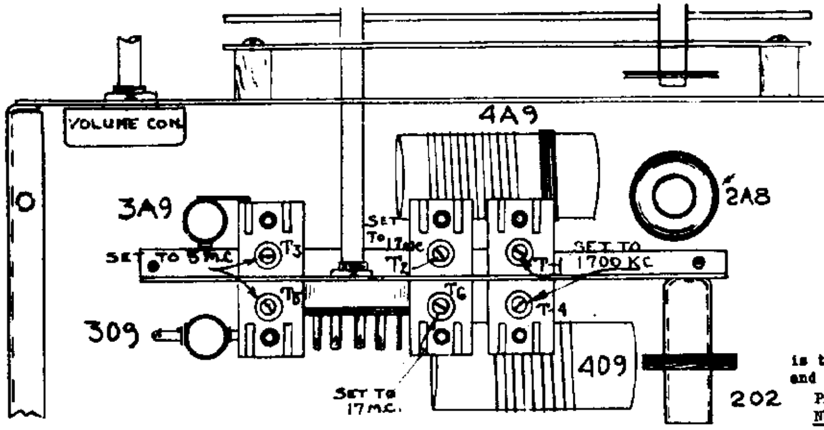
FIG. 1

Use this receiver only with Alternating Current, 40-60 Cycles. The receiver is adaptable to three line voltages; determine the line voltage with which the set is to be used, then check the adjustable plug position on top of the power transformer, with the coded socket for 117, 135 and 240 volts. Insert plug in the correct socket before turning on set. REFER TO INSTRUCTION TAG ATTACHED TO POWER TRANSFORMER.

If any other type transformer is being used, a different tag will explain the correct connections.

MODEL X275
MODEL 285
Trimmers, Alignment
Parts List

HOWARD RADIO CO.



BOTTOM VIEW

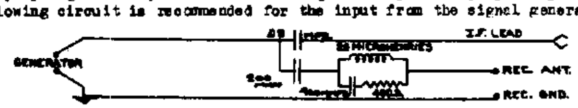
FIG. 3

MODEL X275, 285

ALIGNMENT

No change should be made with the I.F. or R.F. adjustments unless it is certain that such adjustments are necessary.

The following instructions are given with the assumption that the service station has the proper generator, means of measuring the output and proper input connections. The following circuit is recommended for the input from the signal generator.



See that the dial hand is straight across when the condenser is at full capacity.

After aligning the four trimmers of the IF system to 465 KC, refer to Fig. 3 showing the position of the R.F. trimmer and the frequency to which they are to be adjusted. Although the dial is calibrated in meters, there will be found on the dial extra points representing the frequency in kilocycles corresponding to the trimmer adjustments as shown in Fig. 3.

N O T E S:

Always peak the oscillator circuit first and recheck after the antenna circuit is adjusted.

Be certain the alignment is not made at an image frequency.

Seal trimmers after final adjustment.

The normal voltages are shown on the schematic circuit taken from the various points to ground.

THE ADAPTATION OF THE SET FOR USE WITH PHONOGRAPH

Out of the back of the chassis there extends three lugs labeled "Phono" 1-2-3. For phonograph use, the jumper is removed and the pick-up leads from the pick-up are connected to Nos. 1 and 2 terminals, with the overall wire shield grounded to No. 3 terminal. A single pole double throw switch may be used to change from Radio to "Phono". See Fig. 2.

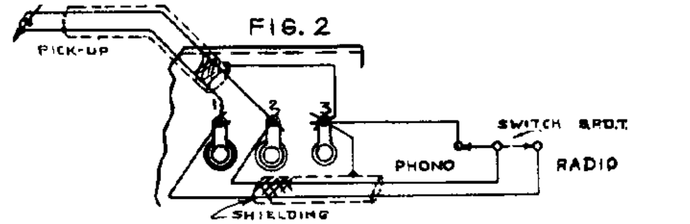


FIG. 2

NOTE:

With certain models, the chassis is floated on cushion rubber. In shipment the chassis is tightened on corner wood strips. To release, loosen the four bottom screws, remove strips and let chassis float free

REPLACEMENT PARTS LIST MODEL 285

PART NUMBER	DESCRIPTION
18-914	Band Switch - 4 pole, 3 position
19-212	Choke - 340 Ohm
22-936	Coil Assembly
23-936	Coil Assembly
2A8	Coil - B.C. Antenna
202	Coil - B.C. Oscillator
4A9	Coil - S.W. Antenna
409	Coil - S.W. Oscillator
3A9	Coil - P.B. Antenna
309	Coil - P.B. Oscillator
00-8	Choke - Oscillator Plate
32-266	Condenser - Dual 30 Mfd. 150 Volt
8218-3	Condenser - Single Trimmer
25-268	Condenser - Padding, 5 Plate
23-281	Control - Volume
11-278	Control - Tone & Switch
285	Dial Glass - Specify name on glass
2-498	Dial Lamp - 6 V. Bayonet Type
12-768	Dial Lamp Socket Assembly
9-328	Drive Disc - 2-3/4" dia. with hub & friction assembly
11-328	Drive Disc for mounting on V. Cond.
285	Drive Shaft with friction discs
18-490	Knob for Controls
2-625	Resistor - Candohm 50 Ohms
3-191	Resistance Line Cord, 215 Ohms
75-806	Speaker

REPLACEMENT PARTS LIST MODEL X275

PART NUMBER	DESCRIPTION
18-914	Band Switch - 4 pole, 3 position
22-936A	Coil - 1st I.F. Complete
23-936A	Coil - 2nd I.F. Complete
8547	Coil - P.B. Oscillator (301)
30-266	Condenser, Electrolytic Dual 10, 450 V.
8218-3	Condenser, Single Trimmer
25-262	Condenser, Padding
21-270	Condenser, Variable 2 Gang
11-278	Control - Volume
23-281	Control - Tone & Switch
X275	Dial Glass - Calibrated, specify name on glass
2-498	Dial Lamp - 6 V. Bayonet Type
11-768	Dial Lamp Socket Assembly
11-328	Drive Disc - for mounting on V. Cond. Shaft
9-328	Drive Disc - 2-3/4" dia. with hub & friction assembly
X275	Drive Shaft with friction discs
18-490	Knob for Controls
6-771	Socket and Cable for Tuning Eye
36-810	Speaker - 6-1/2"
58-938	Transformer - 40-60 Cycle, 5 tap Primary
37-938	Transformer - 40-60 Cycle, 2 range Primary
2A8	Coil - B.C. Antenna
202	Coil - B.C. Oscillator
4A6	Coil - S.W. Antenna
406	Coil - S.W. Oscillator
8546	Coil - P.B. Antenna

HOWARD RADIO CO.

MODEL 285
Schematic, Voltage Notes

THIS RECEIVER CAN BE USED ON EITHER ALTERNATING OR DIRECT CURRENT AND IS ADAPTABLE TO THREE DIFFERENT LINE VOLTAGES BY CHANGING THE TERMINAL ARRANGEMENT ON THE BACK OF THE CHASSIS.

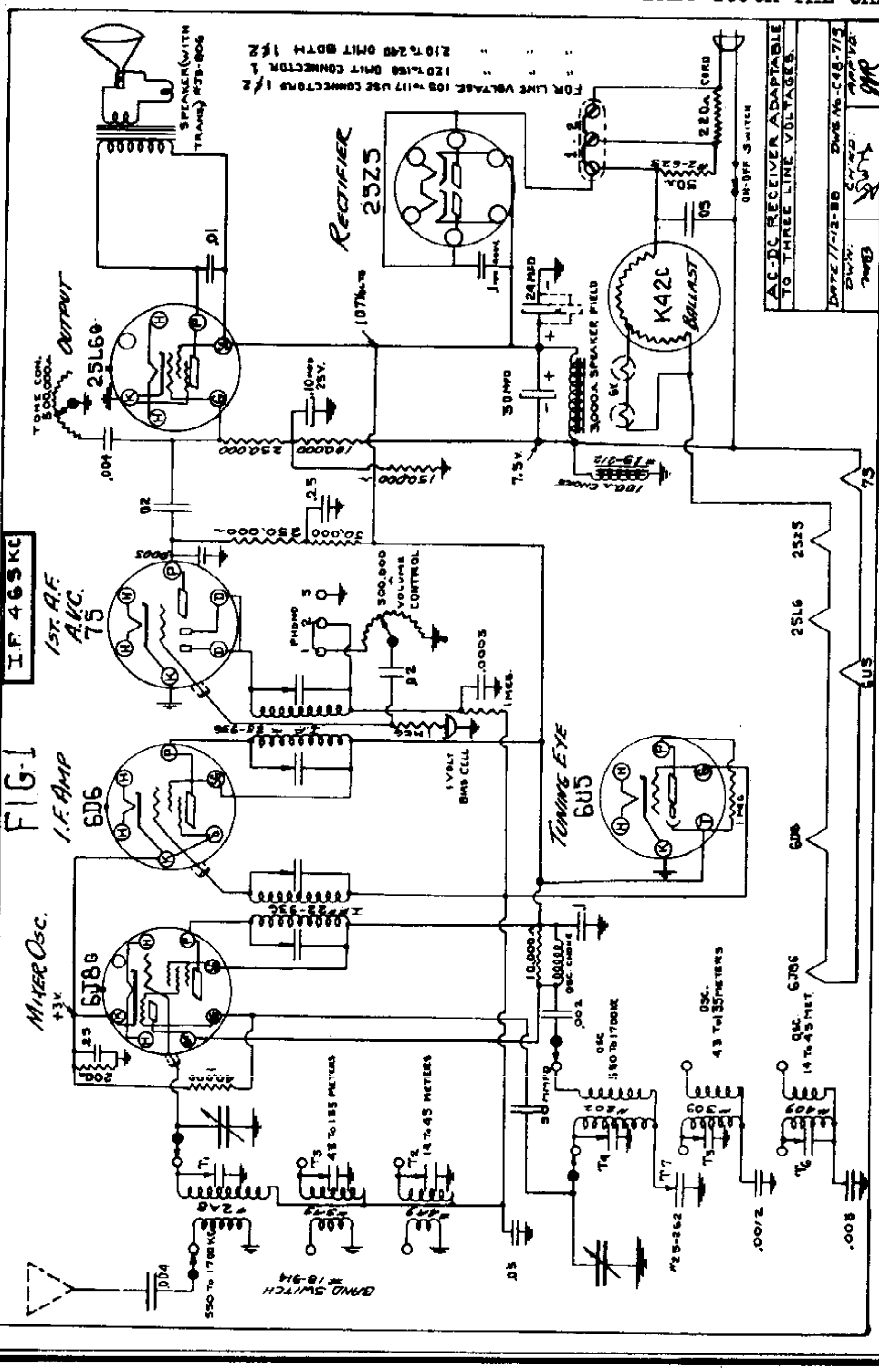
BEFORE CONNECTING RADIO, VERIFY THE VOLTAGE WITH WHICH THE RADIO IS TO BE USED, AND FOLLOW DIRECTIONS AS GIVEN ON CHASSIS, OR AS FOLLOWS:

FOR A LINE VOLTAGE BETWEEN 100 and 125 VOLTS, CONNECT ALL THREE TERMINALS TOGETHER.

FOR A LINE VOLTAGE FROM 125 to 150 VOLTS, OMIT JUMPER BETWEEN EXTREME LEFT TERMINAL AND CENTER TERMINAL.

FOR A LINE VOLTAGE BETWEEN 200 and 240 VOLTS, REMOVE ALL CONNECTIONS.

BE CAREFUL NOT TO LET LOOSE ENDS OF THE WIRES TOUCH THE CHASSIS



DO NOT USE A GROUND ON THIS RECEIVER.

MODEL 285

Each of the three bands has a separate antenna and oscillator coil.

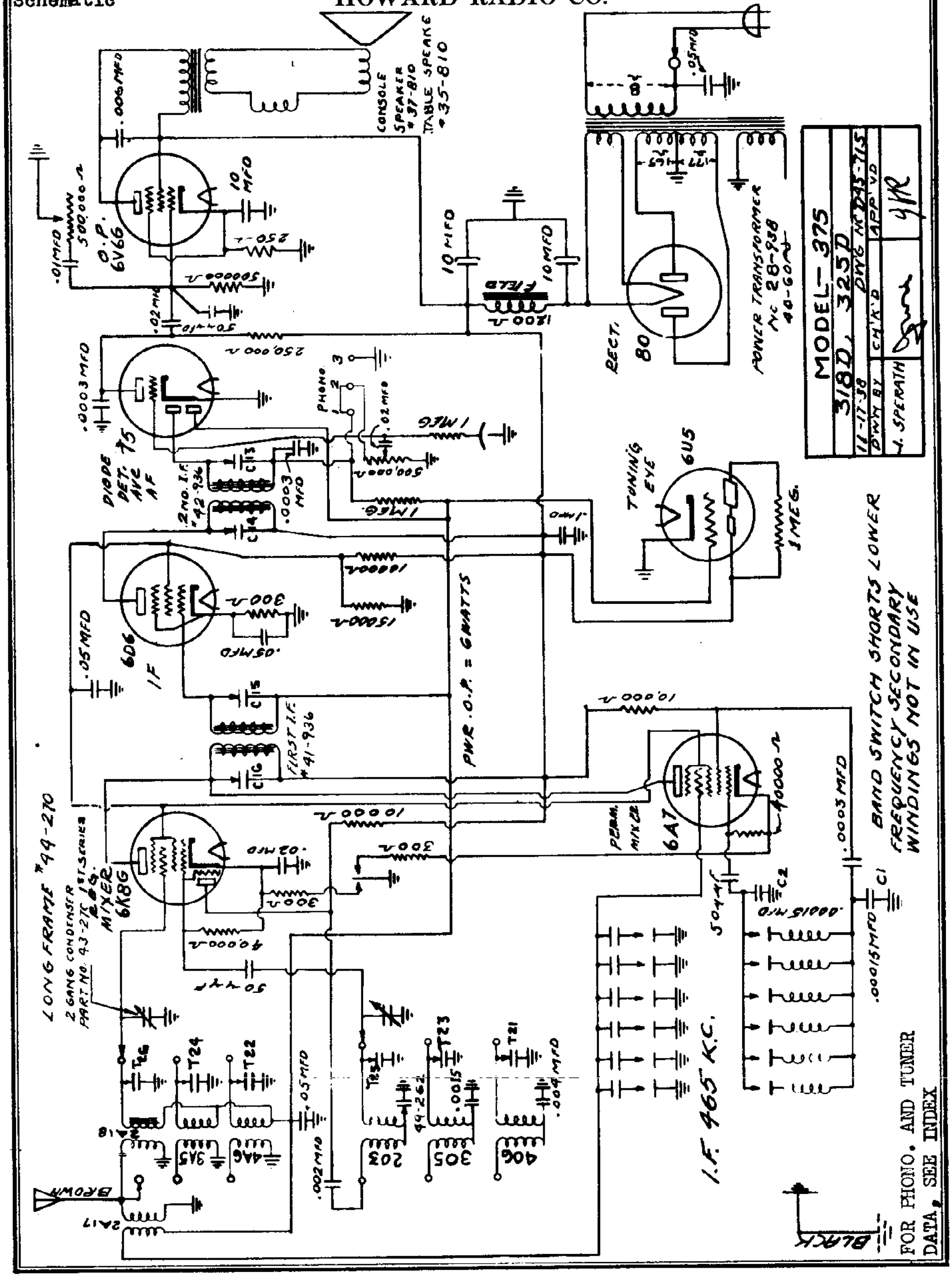
The intermediate frequency stages are tuned to 465 KC and have a sensitivity of about 27 microvolts. (for 50 milliwatt output)

The maximum output is rated at about 4-1/2 watts, and 2.4 watts undistorted.

The three line voltage ranges are obtained by use of the resistance cord, an extra resistor within the chassis, and the Ballast tube. See schematic diagram. The Ballast tube also provides necessary voltage for the two pilot lights connected in series.

MODELS 318D,325D,375
Schematic

HOWARD RADIO CO.



MODEL 377
Schematic, Voltage

HOWARD RADIO CO.

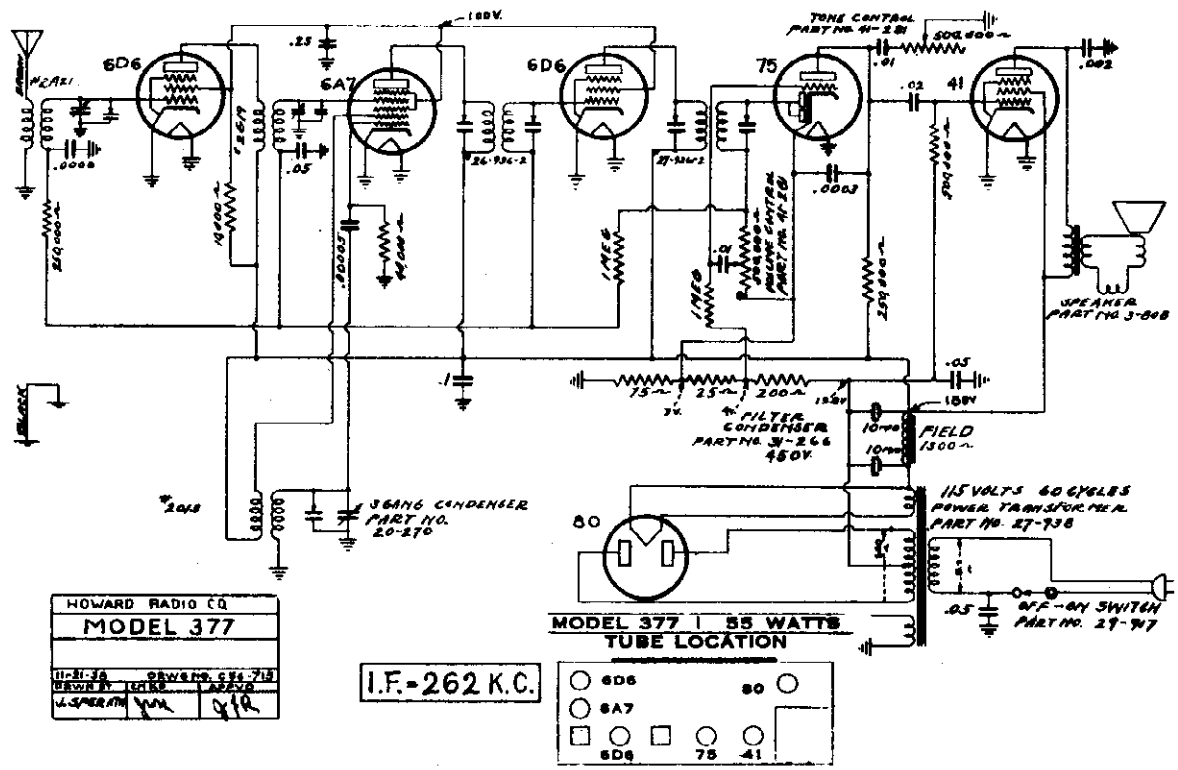
MODELS 318D, 325D, 375
Socket, Trimmers
Alignment

The Model 377 is designed as a single band for Broadcast reception. Three gang condenser is used to tune the Antenna, R.F. and Oscillator circuits. The Intermediate Frequency is 262 KC. The bias voltages are obtained by series resistors from the high voltage center tap to ground. The negative side of the filter is not grounded.

The maximum output obtainable is $2\frac{1}{2}$ watts.

The variable condenser section for the oscillator circuit is the cut-plate type.

See circuit diagram for other specifications.



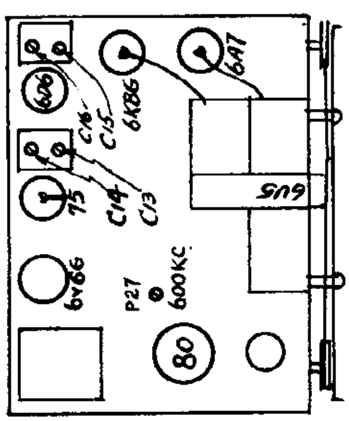
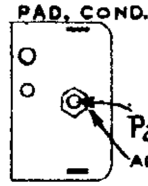


FIG. 6



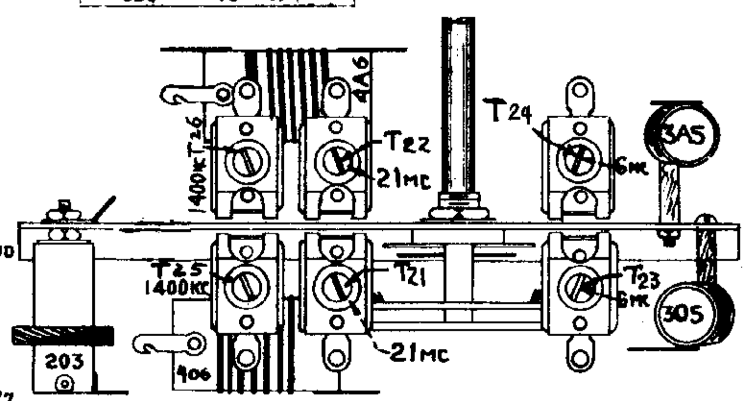


FIG. 7

ALIGNMENT CHART FOR MODEL 375

CHECK BAND SWITCH POSITION & SET DIAL TO	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER LOCATION	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS FOR 50 MILLIWATT OUTPUT
540 KC	465 KC	Grid of 6K8G	C13, C14, C15, C16 Fig. 6	I.F.	20
21 MC	21 MC	Antenna Lead	T21, T22 Fig. 7	OSC. & ANT.	5
6 MC	6 MC	Antenna Lead	T23, T24	OSC. & ANT.	3
1400 KC	1400 KC	Antenna Lead	T25, T26	OSC. & ANT.	1
600 KC	600 KC	Antenna Lead	P27	OSC. PAD	1

MODELS 1 and 2
Perm-A-Matic Tuners
Adjustments

HOWARD RADIO CO.

SET-UP INSTRUCTIONS FOR HOWARD PERMA-MATIC AUTOMATIC TUNER NO 1

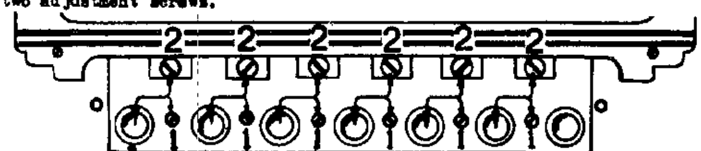
NOTE:-DO NOT ATTEMPT ANY ADJUSTMENTS UNTIL THE SET HAS BEEN TURNED ON AT LEAST 20 MINUTES.

(1) Remove the push-button escutcheon plate by prying forward from ends; taking care not to scratch cabinet.

(2) Depress any one of the selector buttons, tune the desired station in by turning slotted screw with small screw-driver (this screw is numbered 1 in the illustration and is always the screw adjacent to and right of depressed button.) This moves the iron core in oscillator circuits.

(3) Adjust the screw with slotted head for maximum electric eye deflection. This adjustment is numbered 2 in illustration and always the one directly above the station selector adjustment mentioned in above paragraph. If electric eye overlaps on strong stations, adjust for maximum overlap.

When making the two adjustments it is possible to obtain a strong deflection of the tuning eye apparently for a station and yet no station is present. THIS IS A NORMAL CONDITION and just means that the two adjustments are not close enough in relation to each other and can be corrected by varying the two adjustment screws.



THERE IS NO FREQUENCY DISCRIMINATION BETWEEN BUTTONS. ANY ONE OF SELECTORS WILL TUNE THE ENTIRE BROADCAST BAND (1600-540 KC).

NOTICE: DO NOT FORCE ANY ADJUSTMENTS if they tighten up in the course of adjustment, either the maximum or minimum has been reached and the adjustment should be made in opposite rotation.

It will be found easier to adjust if the low frequency stations are started on right side and progress toward high frequency stations to left. IN SAME ORDERS AS MAIN DIAL.

However, the above procedure is not absolutely necessary if there should be some preference for arranging stations otherwise.

AFTER ALL ADJUSTMENTS HAVE BEEN MADE -- GO OVER EACH ADJUSTMENT THE SECOND TIME TO MAKE CERTAIN THEY ARE CORRECT AND TO COMPENSATE FOR SUBSEQUENT ADJUSTMENTS.

It is a big help to tune the desired station in on mail dial while making adjustments, in order that the station can be quickly recognized by switching from manual back to button being adjusted.

It is not necessary to look any of the adjustments as they are automatically locked.

Place station call letter tabs in escutcheon and replace escutcheon by pressing in place on cabinet.

NOTICE: Turning station selector screw clock-wise lowers the frequency.

Best results will be had when band switch is in broadcast position when using automatic tuning.

MECHANICAL ACTION OF THE HOWARD PERM-A-MATIC TUNER NO. 2 8-966 WITH SLIDE TYPE CONTACTS

USED IN MODELS 318D, 325D 375, 418, 468 AND 525

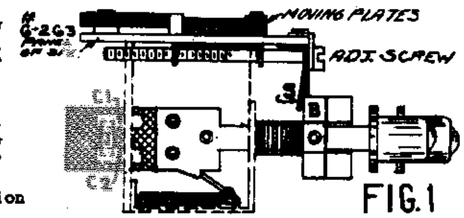


FIG. 1

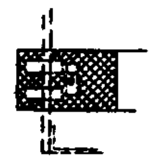


FIG. 2

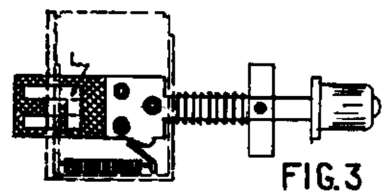


FIG. 3

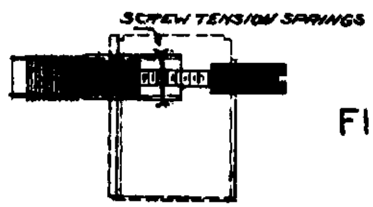


FIG. 4

Fig. 1 shows one of the buttons depressed for a station. The trimmer panel assembly (for the antenna circuit) is designed with spring fingers "S" that make contact with cross bar "B" completing the ground circuit of the R.F. Trimmer.

When making the original set-up, the adjusting screw may indicate two positions for resonance. This is due to the possibility of the small amount of play in the screw thread and is of no concern as long as it is set to the exact resonance point.

The jumper contact "J" connects C1 contact to C2 contact with the button "IN". This completes the oscillator circuit for that particular button.

Fig. 2 shows the jumper position with the button "OUT".

Fig. 3 shows the manual OFF-ON button in the "OUT" position.

The "L" shaped sliding contact is the common cathode return circuit and alternates the bias on the 6K8 for manual tuning or on the 6A7 for push button tuning.

Fig. 4 shows the iron core movement within the oscillator coil. Its position is held stationary by the small spring wire across the coil form. The position of this spring must be such that no spring action is apparent from the end of the adjustment stud due to pressure with a screwdriver. Otherwise, when the screwdriver is removed, the core will shift out of position.

The button is held down by action of the latch bar and is released when another key raises the latch bar on its way down.

If it is necessary to replace a coil, mount it in line with the other coils and cement it in place.

WHEN ORDERING ANY PARTS, SPECIFY PART NUMBER AND DETERMINE WHETHER THE PART IS FOR PERM-A-MATIC TUNER NO. 1 OR NO. 2. TUNER NO. 1 WAS CONSTRUCTED WITH THE SLOTTED BRASS SCREW FOR CORE ADJUSTMENT, WHEREAS TUNER NO. 2 CONSISTED OF THE BLACK RUBBER STUD AS SHOWN IN FIG. 4.

MODEL Perm-A-Matic Tuner No.9-966 Changes

HOWARD RADIO CO.

REPLACE HOWARD PERM-A-MATIC TUNERS #7-966 or #8-966 WITH PERM-A-MATIC TUNER #9-966 WHICH REQUIRES THE CHANGE OF THE ANTENNA COIL ON THE CHASSIS AS EXPLAINED AT THE BOTTOM OF THIS PAGE.

There are six leads between the tuner and the receiver circuits to be unsoldered. UNSOLDER THE CONNECTIONS FROM THE RECEIVER TERMINALS AND NOT FROM THE TUNING UNIT AS THE NEW TUNER WILL HAVE THE NECESSARY LEADS.

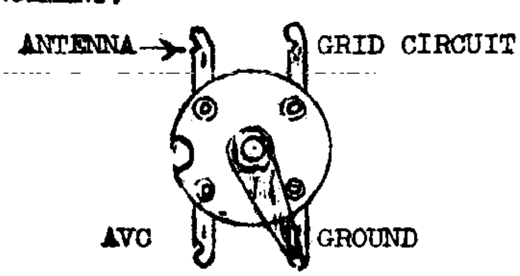
Mechanically, it is only necessary to remove two screws from the front plate to release the tuner.

Due to the fact that the two ceramic condensers (green in color), one each in the grid and plate circuits of the oscillator, are now a part of the new Tuner, they must be removed from within the receiver and returned with the tuner being replaced.

Since the colors of the leads are different in the two type tuners, it is advisable to follow the schematic diagram together with the following chart.

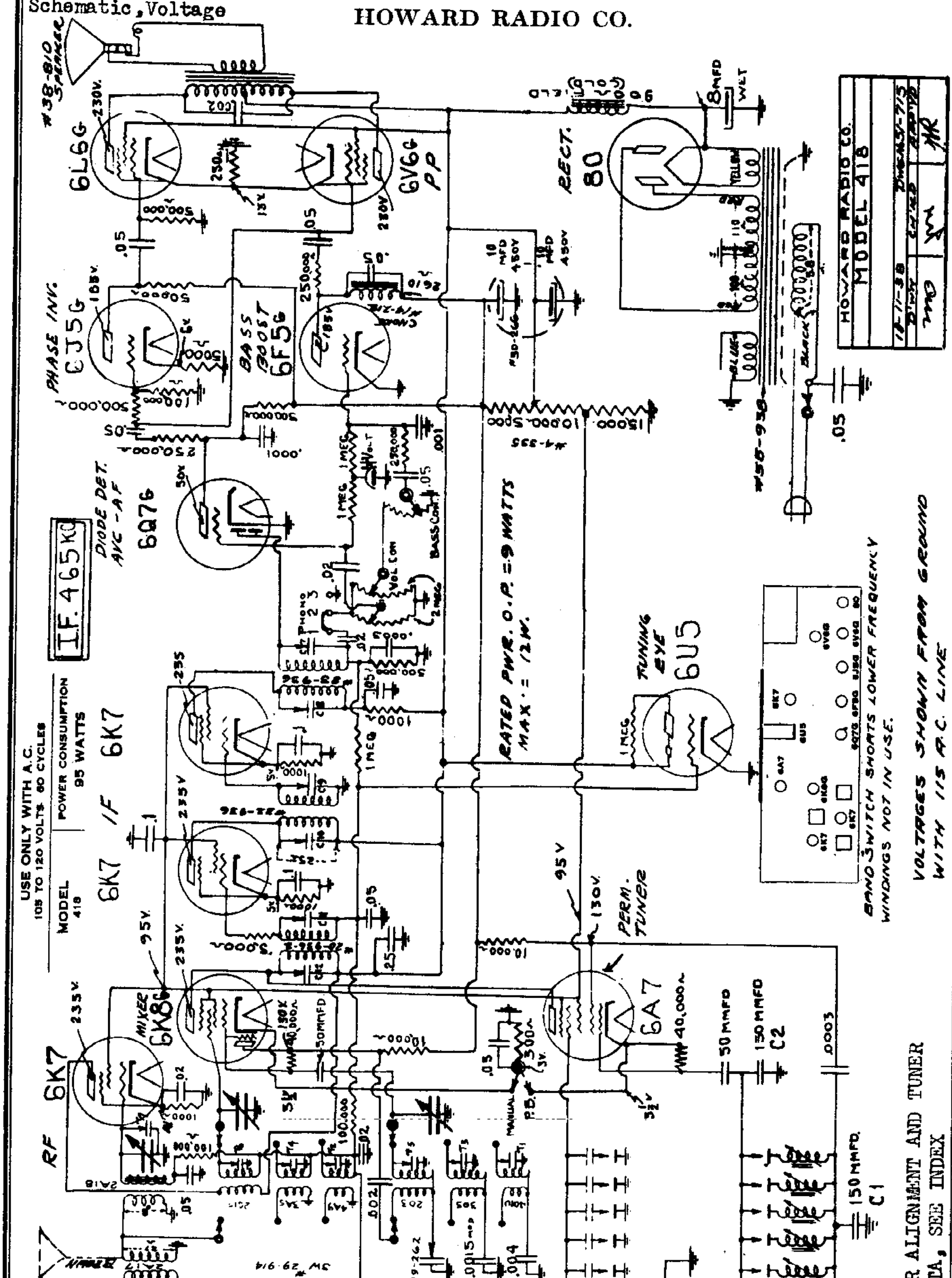
TUNER NO. 1 (7-966) LEAD COLOR	CIRCUIT	TUNER NO. 2 (8-966) TUNER NO. 3 (9-966) LEAD COLOR
Unsolder from ANTENNA COIL 2A17	GRID 6A7	SAME
WHITE WITH BLUE TRACER	CATHODE BIAS SWITCH	SAME
GREEN Unsolder from .0005 Condenser	OSCILLATOR GRID 6A7	SAME
GREEN Unsolder from .0003 Condenser	OSCILLATOR PLATE 6A7	BLUE
BROWN Unsolder from 6K8 Cathode	CATHODE RETURN FOR 6K8	BROWN WITH WHITE TRACER
BLUE	CATHODE RETURN FOR 6A7	GREEN WITH WHITE TRACER

DUE TO THE FACT THAT THIS NEW UNIT, #9-966, HAS A DIFFERENT TRIMMER CAPACITY RANGE, THE ASSOCIATED ANTENNA COIL, 2A17, IN THIS CIRCUIT MUST BE CHANGED TO 2A23. THIS IS THE COIL ON THE LEFT SIDE WHEN FACING FRONT OF SET. FOLLOW DIAGRAM FOR TERMINAL ARRANGEMENT.

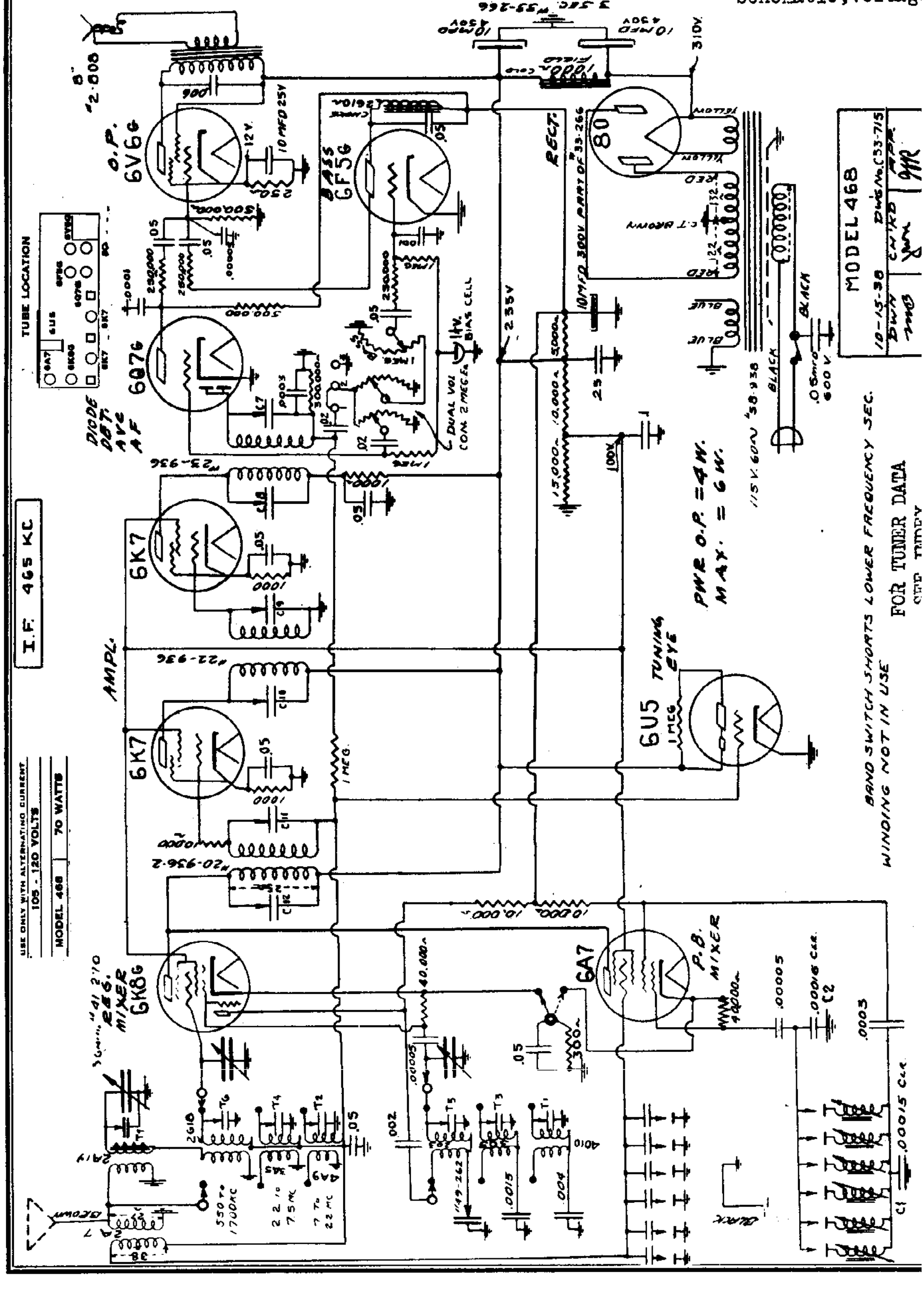


BOTTOM VIEW

MODEL 418
Schematic, Voltage



MODEL 468
Schematic,Voltag



MODEL 418
MODEL 468
MODEL 525
Socket, Trimmers, Alignment
Phono. Data

HOWARD RADIO CO.

MODELS 318D, 325D, 375
Phono. Data

FOR ALL MODELS ADAPTABLE TO PHONOGRAPH CONNECTION

Out of the back of the chassis there extends three lugs as shown in Diagram Fig. 1. For phonograph use, the jumper is removed and a single pole, double throw switch is connected as shown in Fig. 2. The pick-up leads from the pick-up are connected to Nos. 1 and 2 terminals, with the overall shield grounded to No. 3 terminal.

Fig. 1

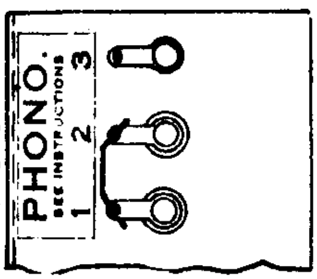
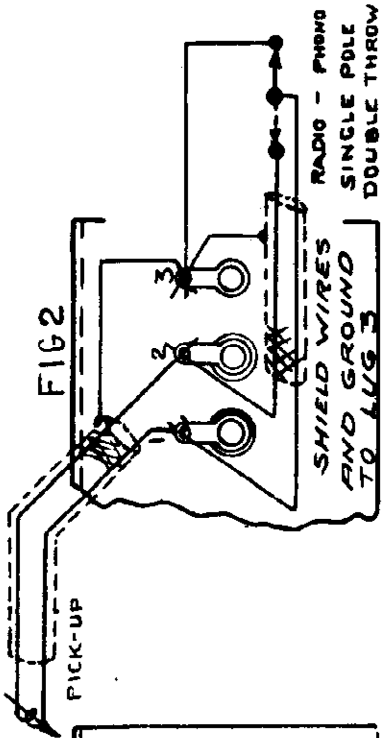


FIG 2



NOTE 1 - When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.
NOTE 2 - When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.
NOTE 3 - When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.
NOTE 4 - When aligning the short wave band, be sure not to adjust at the image frequency. This can be checked as follows:
If the signal generator is set for 21,000 KC, the signal will be heard at 21,000 KC on the dial. The image signal, which is much weaker, will be heard at 21,000 less 2 times the IF, 465, (930KC) or 20,070 KC on the dial. It may be necessary to increase the input to hear the image. If the image is not heard then, the original alignment was not made at the right peak.
NOTE 5 - If there is an apparent lack of sensitivity, especially on the short wave bands, first check the 6K8G tube by substituting one or more in its place.

FIG. 3

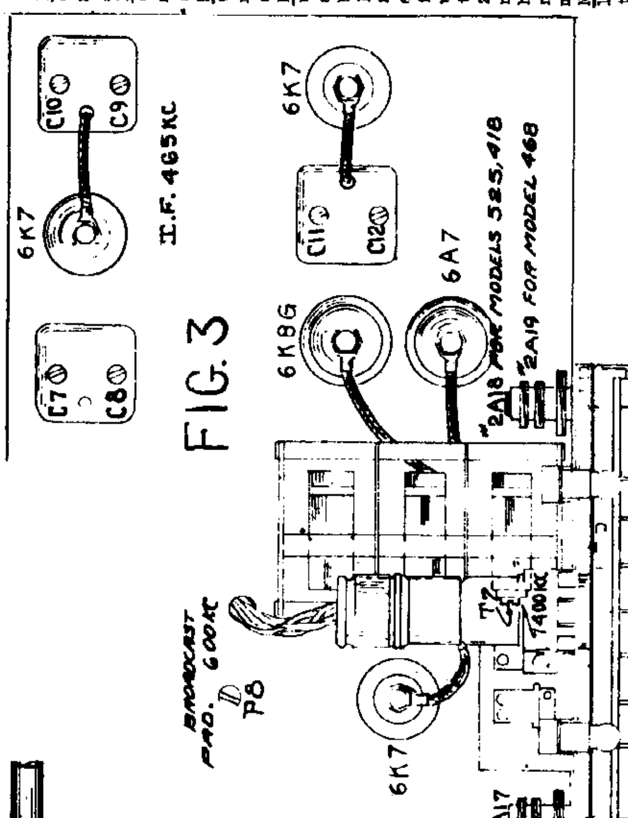
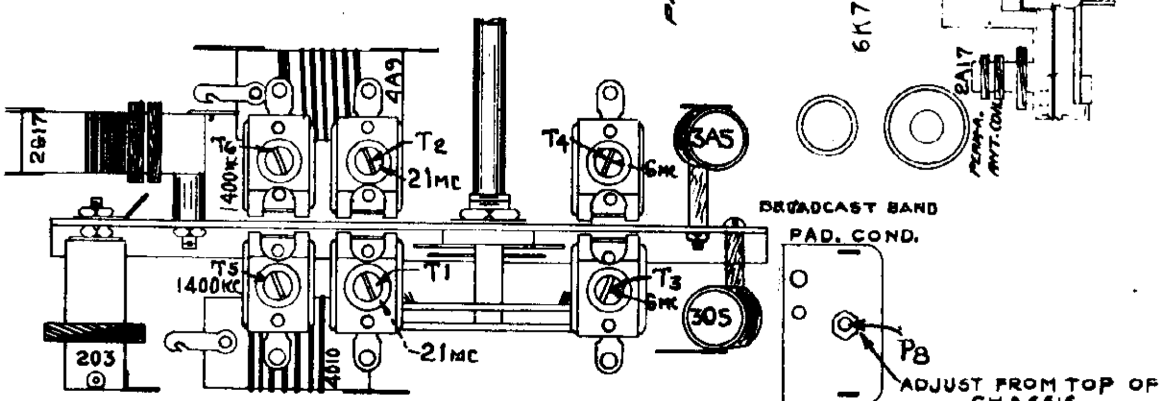


FIG. 4



CHECK BAND SWITCH POSITION & SET DIAL TO	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER LOCATION	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS FOR 50 MILLIWATT OUTPUT
540 KC	465 KC	Grid of 6K8G	C7,C8,C9,C10,C11,C12 Fig. 3	I.F.	10 to 20
21 MC	21 .MC	Antenna Lead	T1, T2 Fig. 4	OSC. & ANT.	1
6 MC	6 MC	Antenna Lead	T3, T4 Fig. 4	OSC. & ANT.	5
1400 KC	1400 KC	Antenna Lead	T5,T6,T7 Fig. 4	OSC., R.F. & ANT.	1
600 KC	600 KC	Antenna Lead	P8 Fig. 3	OSC. PAD (Rock Dial)	1

MODEL 418
MODEL 468
MODEL 525
Socket, Trimmers, Alignment
Phono. Data

HOWARD RADIO CO.

MODELS 318D, 325D, 375
Phono. Data

FOR ALL MODELS ADAPTABLE TO PHONOGRAPH CONNECTION

Out of the back of the chassis there extends three lugs as shown in Diagram Fig. 1. For phonograph use, the jumper is removed and a single pole, double throw switch is connected as shown in Fig. 2. The pick-up leads from the pick-up are connected to Nos. 1 and 2 terminals, with the overall shield grounded to No. 3 terminal.

Fig. 1

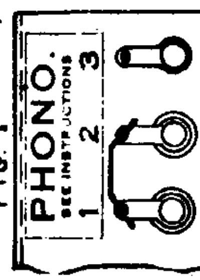
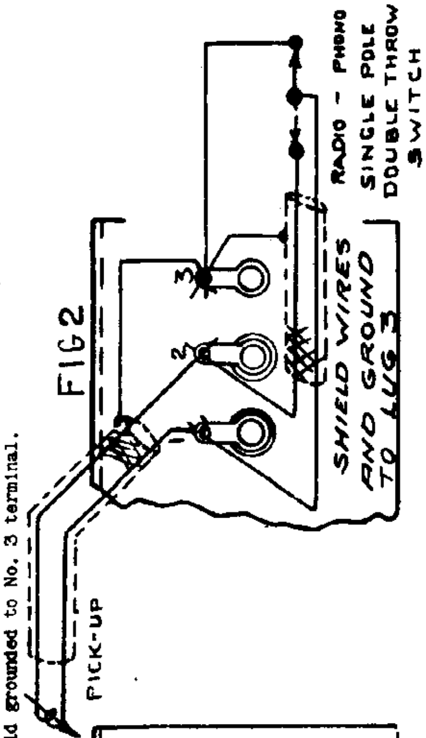


FIG 2



NOTE 1 - When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.
NOTE 2 - When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.
NOTE 3 - When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.
NOTE 4 - When aligning the short wave band, be sure not to adjust at the image frequency. This can be checked as follows:
If the signal generator is set for 21,000 KC, the signal will be heard at 21,000 KC on the dial. The image signal, which is much weaker, will be heard at 21,000 less 2 times the IF, 465, (930KC) or 20,070 KC on the dial. It may be necessary to increase the input to hear the image. If the image is not heard then, the original alignment was not made at the right peak.
NOTE 5 - If there is an apparent lack of sensitivity, especially on the short wave bands, first check the 6K8G tube by substituting one or more in its place.

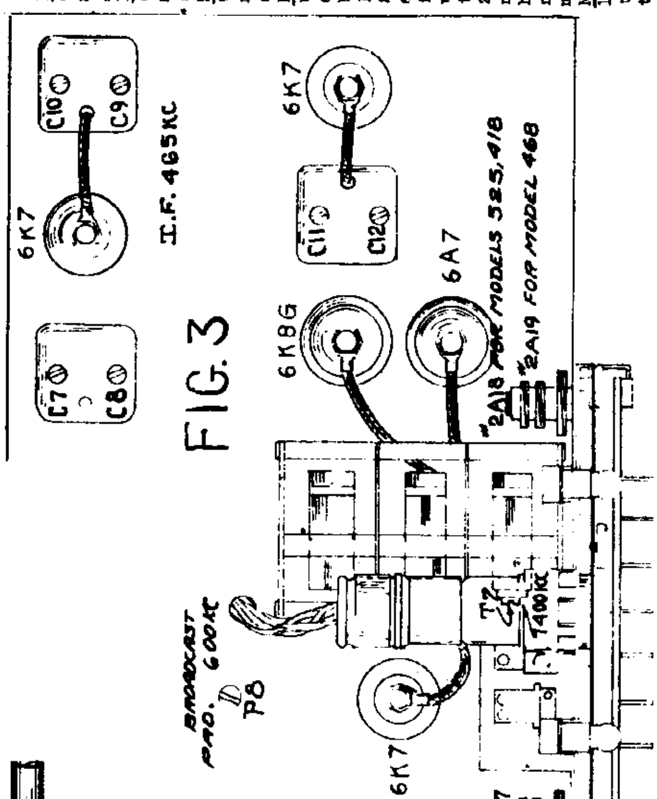
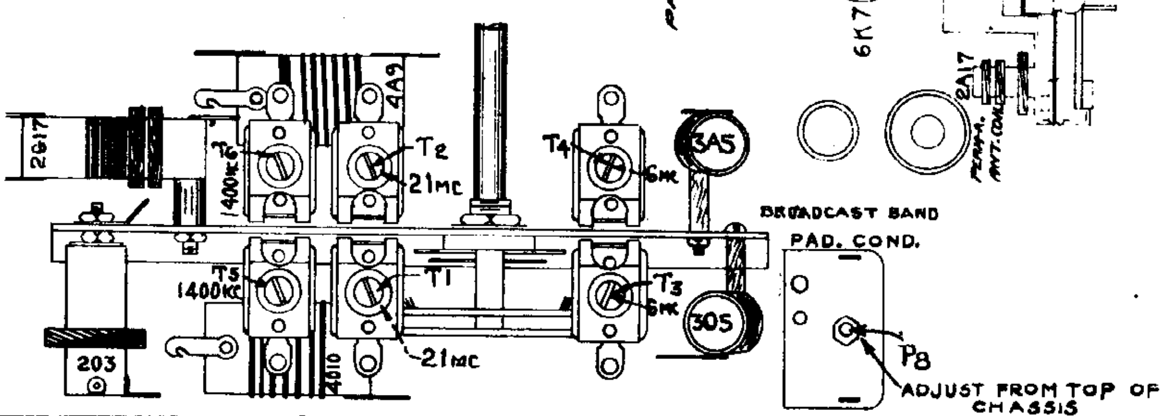


FIG. 3

FIG. 4



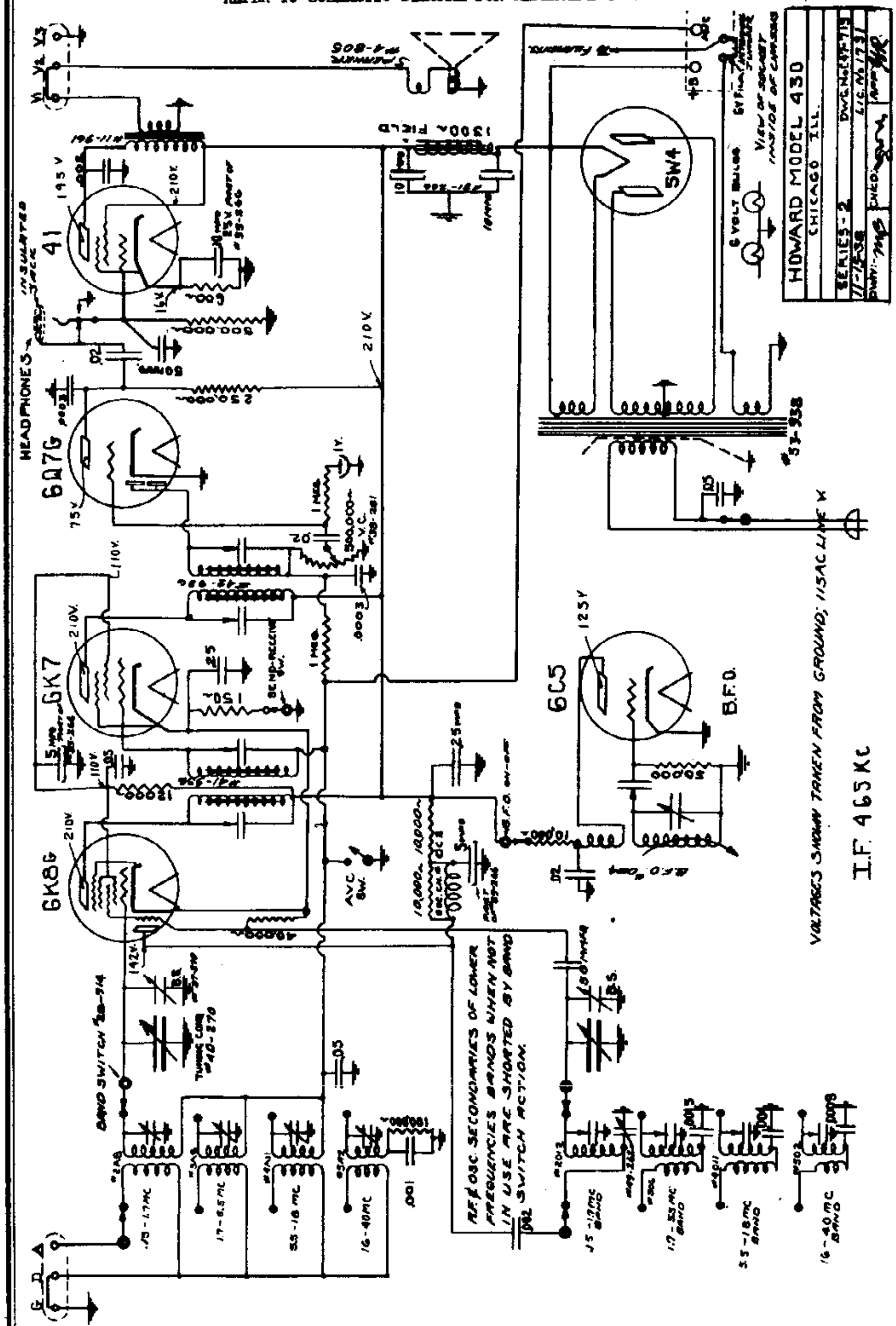
CHECK BAND SWITCH POSITION & SET DIAL TO	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER LOCATION	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS FOR 50 MILLIWATT OUTPUT
540 KC	465 KC	Grid of 6K8G	C7,C8,C9,C10,C11,C12 Fig. 3	I.F.	10 to 20
21 MC	21 MC	Antenna Lead	T1, T2 Fig. 4	OSC. & ANT.	1
6 MC	6 MC	Antenna Lead	T3, T4 Fig. 4	OSC. & ANT.	5
1400 KC	1400 KC	Antenna Lead	T5,T6,T7 Fig. 4	OSC., R.F. & ANT.	1
600 KC	600 KC	Antenna Lead	P8 Fig. 3	OSC. PAD (Rock Dial)	1

MODEL 430, Series
Schematic, Voltage

HOWARD RADIO CO

PART NUMBER	DESCRIPTION
9-132	Ball Bearing - 1/8" Dia.
7601	Bias Cell - $1\frac{1}{2}$ V.
52-186	Cabinet - Complete
17-829	Coil Spring for Drive Cord
50-262	Condenser - Single Trimmer
49-262	Condenser - Padding, BC Band
	Condenser - .0015 Mfd. - Mica
	Condenser - .0009 Mfd. - Mica
	Condenser - .004 Mfd. - Mica
40-270	Condenser - 2 Gang - Tuning
37-270	Condenser - 2 Gang - Band Spread
31-266	Condenser - "E", 10-10 Mfd. 350 V.
35-266	Condenser - "E", 10-5-5 Mfd. 350,350,25 V.
47-590	Dial Plate - Calibrated
1-288	Drive Cord
27-448	Tuning Hand
38-281	Volume Control - 1 Meg.
3-485	Headphone Jack
41-936	I.F. Assembly Complete (Input)
42-936	I.F. Assembly Complete (Output)
28-448	Indicator Pointer Hands
20-490	Knob - 1-1/8"
21-490	Knob - 1-9/16"
2-498	Pilot Light - 6 V. Bayonet
14-768	Pilot Light Socket - Bayonet
19-427	Pyralin Window
4-167	Rubber Mounting Feet
4-805	Speaker - $6\frac{1}{2}$", Cord and Plug
15-829	Spring Clamp for Ball Bearing on Shaft
14-917	Toggle Switches - S.P.S.T.
53-938	Transformer - Power 115 V. 60 Cycles
11-961	Transformer - Output

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

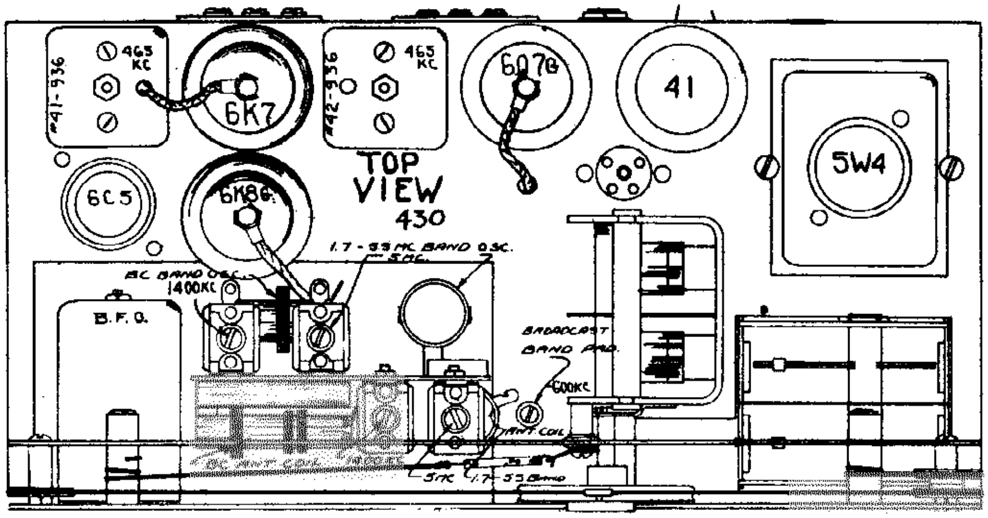


THE POWER OUTPUT for the Model 430 is about $1\frac{1}{2}$ watts, undistorted. Ceramic coil forms are used on the high frequency band. Ceramic trimmers are used throughout. The unused secondaries of the lower frequency bands are shorted as the band switch is shifted toward the higher frequency bands.

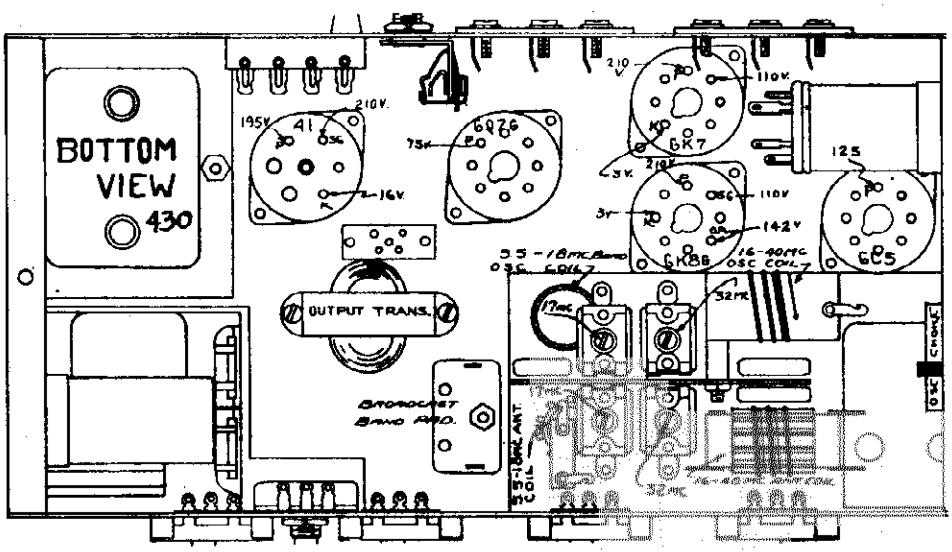
The frequency coverage from .55 to 42 megacycles is divided into four bands. The lower scale from 0 to 100 is for logging purposes. The left hand pointer indicates the band in operation. For correct tuning calibration, the Band Spread pointer must be at 100.

MODEL 430, Series 2
Alignment, Socket
Trimmers, Dial Data
MODEL 438
Dial Data

HOWARD RADIO CO.



NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.
NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.
NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.



NOTE 4: After the chassis has been removed from the cabinet, be sure when it is again assembled that the speaker plug is in place in the socket on top of the chassis and that the speaker cable wires do not lay back near the RF circuit, thus causing howling.

NOTE 5: Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.

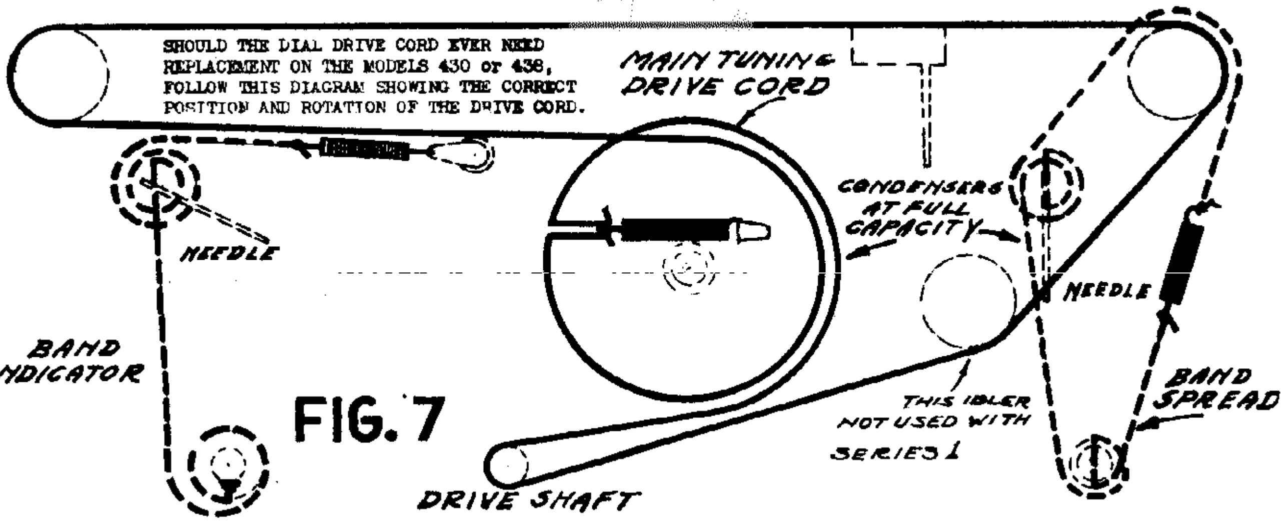
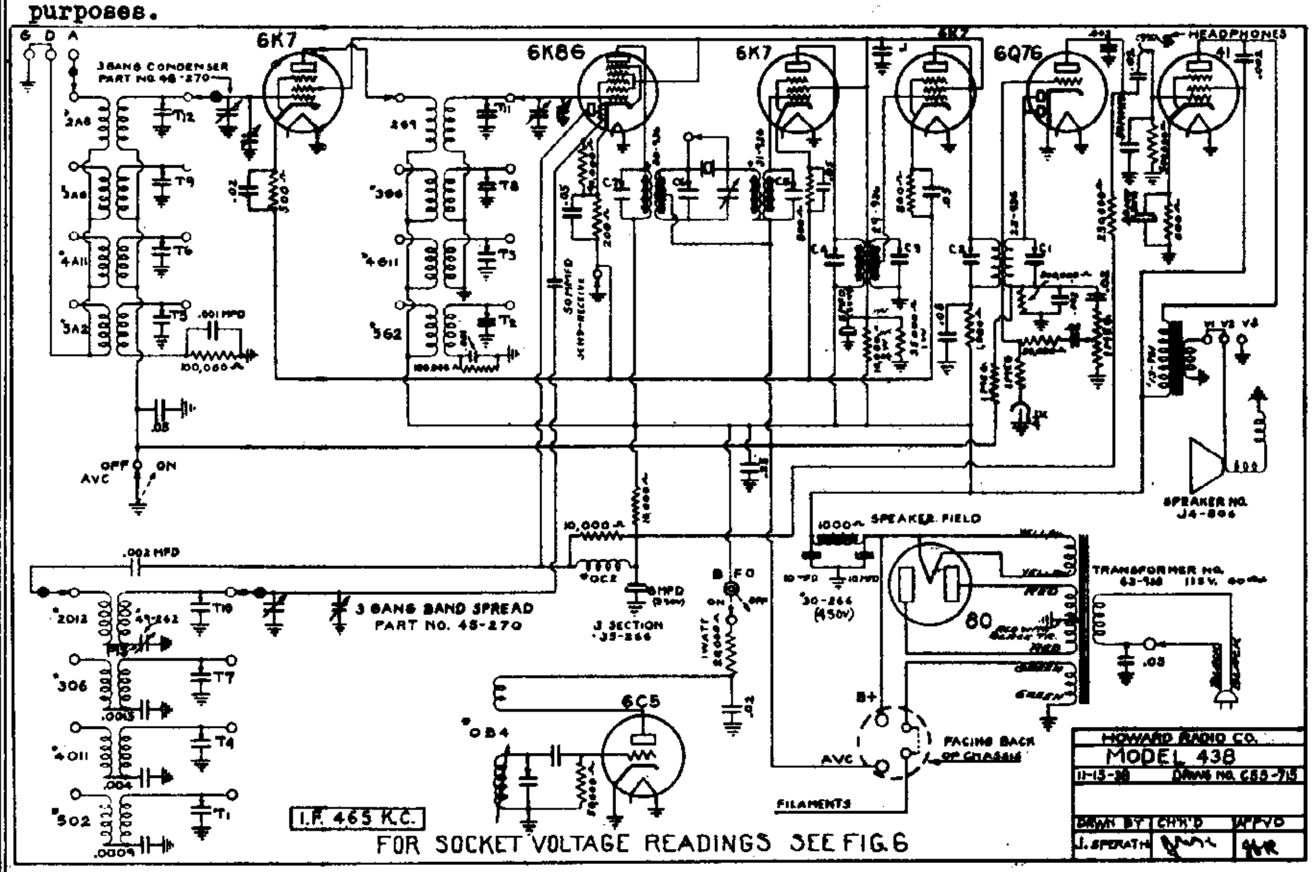


FIG. 7

MODEL 438
Schematic

HOWARD RADIO CO.

The frequency coverage from .55 to 42 megacycles is divided into four bands. The left-hand pointer indicates the band in operation. For correct tuning calibration, the band spread pointer must be set at 100. The lower scale 0 to 100 is for logging purposes.



THE POWER OUTPUT will be about 2½ watts, undistorted.

For each band there is a Radio Frequency stage with individual coils for the RF Oscillator and Mixer stages for each band.

Ceramic coil forms are used on the high frequency band. Ceramic trimmers are used throughout. The unused coil secondaries of the lower frequency bands are shorted as the band switch is shifted to the higher bands.

The Intermediate Frequency is 465 KC. The Crystal input, Crystal output, and the 2nd IF consist of windings wound on iron cores.

PART NO.	DESCRIPTION
9-132	Ball Bearing - 1/8" dia.
7601	Bias Cell - 1¼ V.
57-188	Cabinet - Complete
17-829	Coil Spring for Drive Cord
50-262	Condenser - Single Trimmer
58-262	Condenser - Variable Trimmer (Xtal Phase)
49-262	Condenser - Padding, BC Band
	Condenser - .0015 Mfd. - Mica
	Condenser - .0009 Mfd. - Mica
	Condenser - .004 Mfd. - Mica
1-303	Crystal - 465 KC
1-288	Drive Cord
35-268	Filter Condenser - 5,5,20 Mfd. 350,350 25 Volt
30-266	Filter Condenser - 10,10 Mfd. 450,450 Volt

PART NO.	DESCRIPTION
3-485	Headphone Jack
28-448	Indicator Pointer Hands
20-490	Knob - 1-1/8"
21-490	Knob - 1-9/16"
2-498	Pilot Light - 6 V. Bayonet
14-768	Pilot Light Socket - Bayonet
19-427	Pyralin Window
19-917	Rotary Switch
7-167	Rubber Mtg. Feet
J4-806	Speaker - 6½", Cord and Plug
15-829	Spring Clamp for Ball Bearing on Shaft
14-917	Toggle Switches - S.P.S.T.
27-448	Tuning Hand
40-281	Volume Control - 1 Meg.

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

MODEL 438
Alignment, Socket
Trimmers

HOWARD RADIO CO.

MODEL 440, Series 1, 2
Crystal Alignment

NOTE: When using a Crystal set Phasing Control to almost minimum capacity. See special alignment instructions below for Crystal.

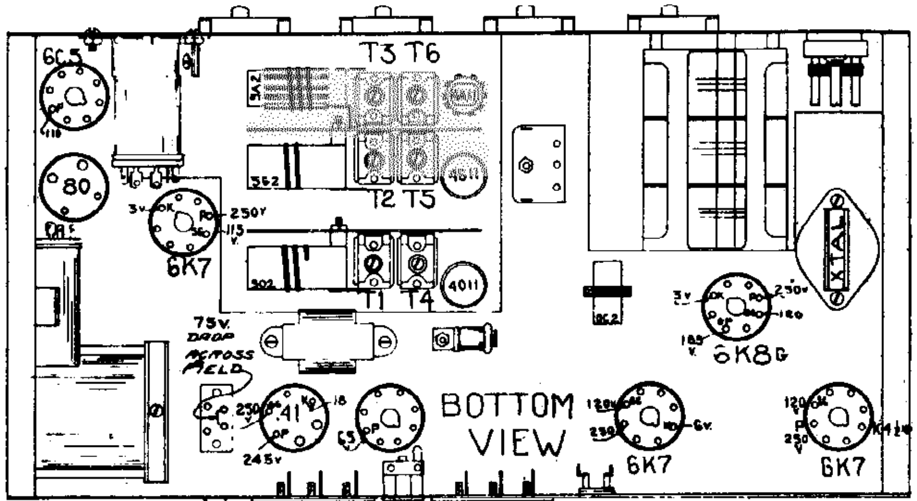


FIG. 5

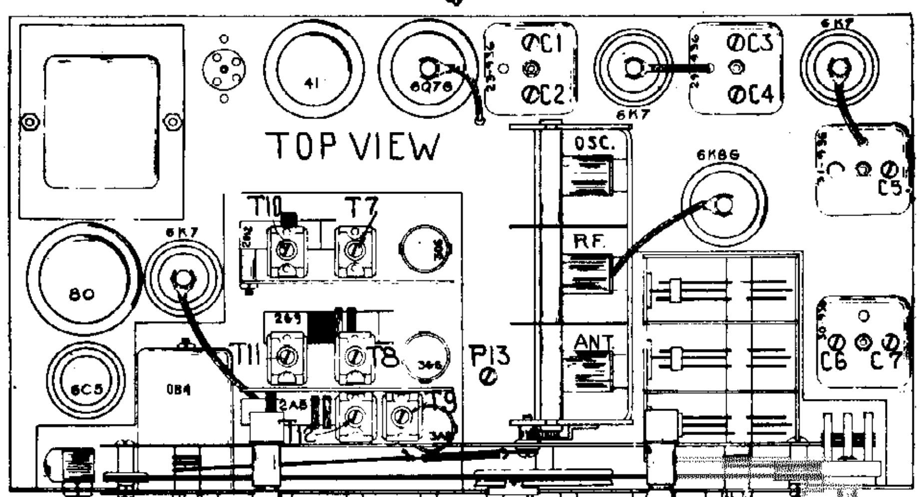


FIG. 6

NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

NOTE 4: After the chassis has been removed from the cabinet, be sure when it is again assembled that the speaker plug is in place in the socket on top of the chassis and that the speaker cable wires do not lay back near the RF circuit, thus causing howling.

NOTE 5: Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.

ALIGNMENT CHART

BAND MC	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER LOCATION	TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	APPROX. MICROVOLTS
IF	465 KC	Grid of 6K8G	See Fig. 6	C1, C2, C3, C4, C5, C6, C7	IF	15
42-16	32 MC	A and DG	See Fig. 5	T1, T2, T3	OSC. RF. ANT.	8
18- 5.5	17 MC	A and DG	See Fig. 5	T4, T5, T6	OSC. RF. ANT.	3
5.5- 1.7	5 MC	A and DG	See Fig. 6	T7, T8, T9	OSC. RF. ANT.	1
1.6- 5.5	1400 KC	A and DG	See Fig. 6	T10, T11, T12	OSC. RF. ANT.	1
1.6- 5.5	600 KC	A and DG	See Fig. 6	P13	OSC. PAD.	1

ALIGNMENT INSTRUCTIONS - FOR RECEIVERS EQUIPPED WITH CRYSTALS

(1) REMOVE CRYSTAL, set crystal phasing condenser to almost minimum capacity and throw "XTAL" switch to "IN" position.

(2) With the 465 KC signal, re-adjust the I.F. Trimmer C-6 by turning the screw counterclockwise. The signal now may be slightly weaker than before and sound "off-side". This, however, is a normal condition.

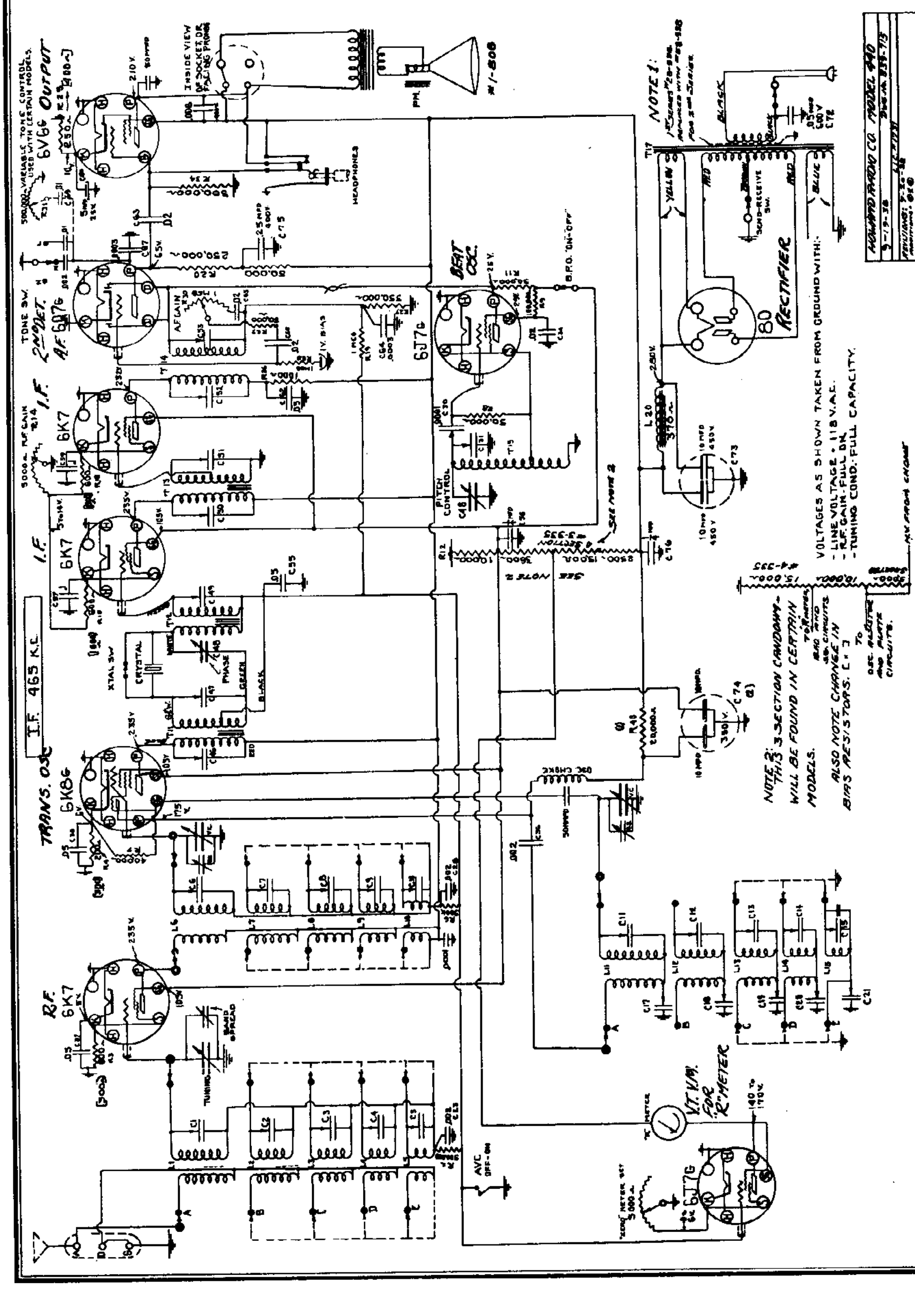
(3) REPLACE THE CRYSTAL - A very noticeable drop in signal strength may be noted due to the filtering action of the crystal and the frequency control of the signal generator must be "rocked" slowly back and forth until the increase in signal strength indicates the exact frequency of the crystal being used. Now re-align the entire I.F. system to this frequency.

(4) Adjust "XTAL" phasing condenser for the lowest pitched note possible and re-adjust signal generator frequency. Repeat and continue to repeat this alignment procedure until no further improvement in the alignment can be accomplished.

NOTE: If the "XTAL" switch should now be thrown to another position, an apparent rise in gain will be noticed, which is caused by the addition of higher frequencies and background noise, so it does not mean that the sensitivity of this set is impaired in any way by use of the crystal.

MODEL 440, Series 1,2
Schematic, Voltage

HOWARD RADIO CO.



USE THIS SET ON 105 TO 120 VOLTS, 60 CYCLE A.C. unless otherwise specified on the back of the set.

MODEL 440, Series 1,2
Socket, Trimmers
Alignment

HOWARD RADIO CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection - 4000 ohm or more copper oxide meter across 5 ohm terminals. Shunt with speaker.

Output meter reading to indicate .5 watt . . . . 1.575 V.

Average sensitivity in microvolts for .5 watt output . . . . See chart below

Generator ground lead connection . . . . Direct to chassis

A.V.C. Switch . . . . On

Band spread dial set at 100 . . . . Min. Capacity

Generator modulation . . . . 30%, 400 cycles

Position of volume control A.F. gain Position of volume control R.F. gain . Full On

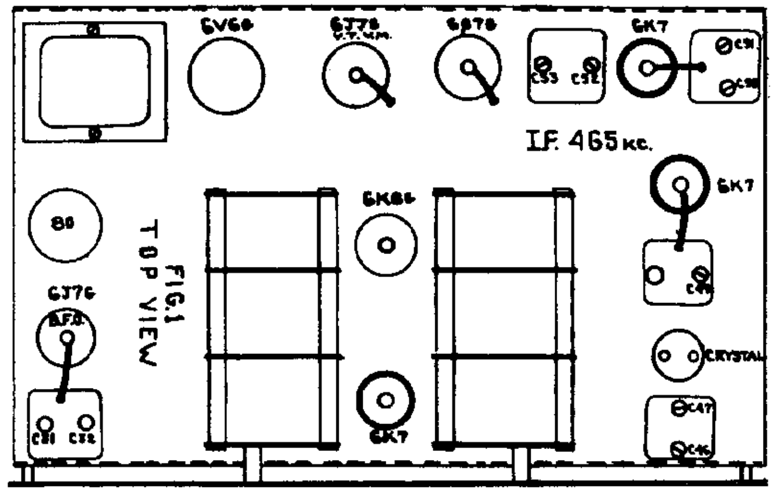
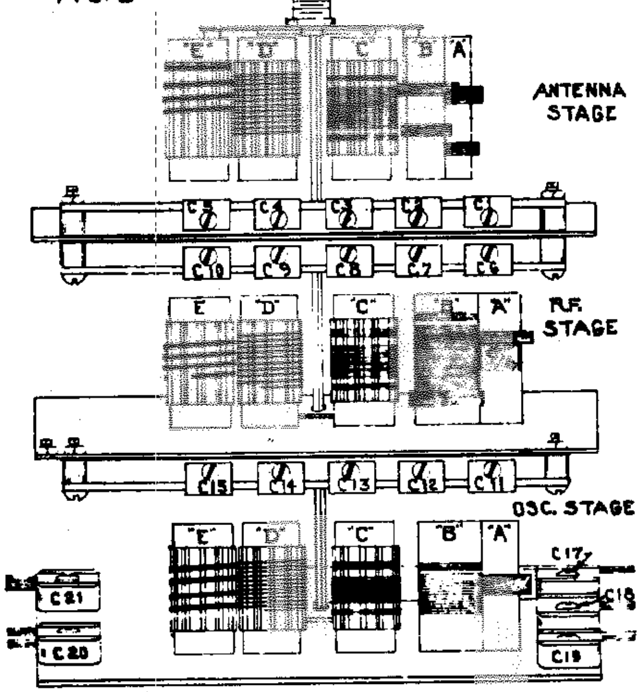


FIG.1 TOP VIEW

BOTTOM VIEW FIG. 2



NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

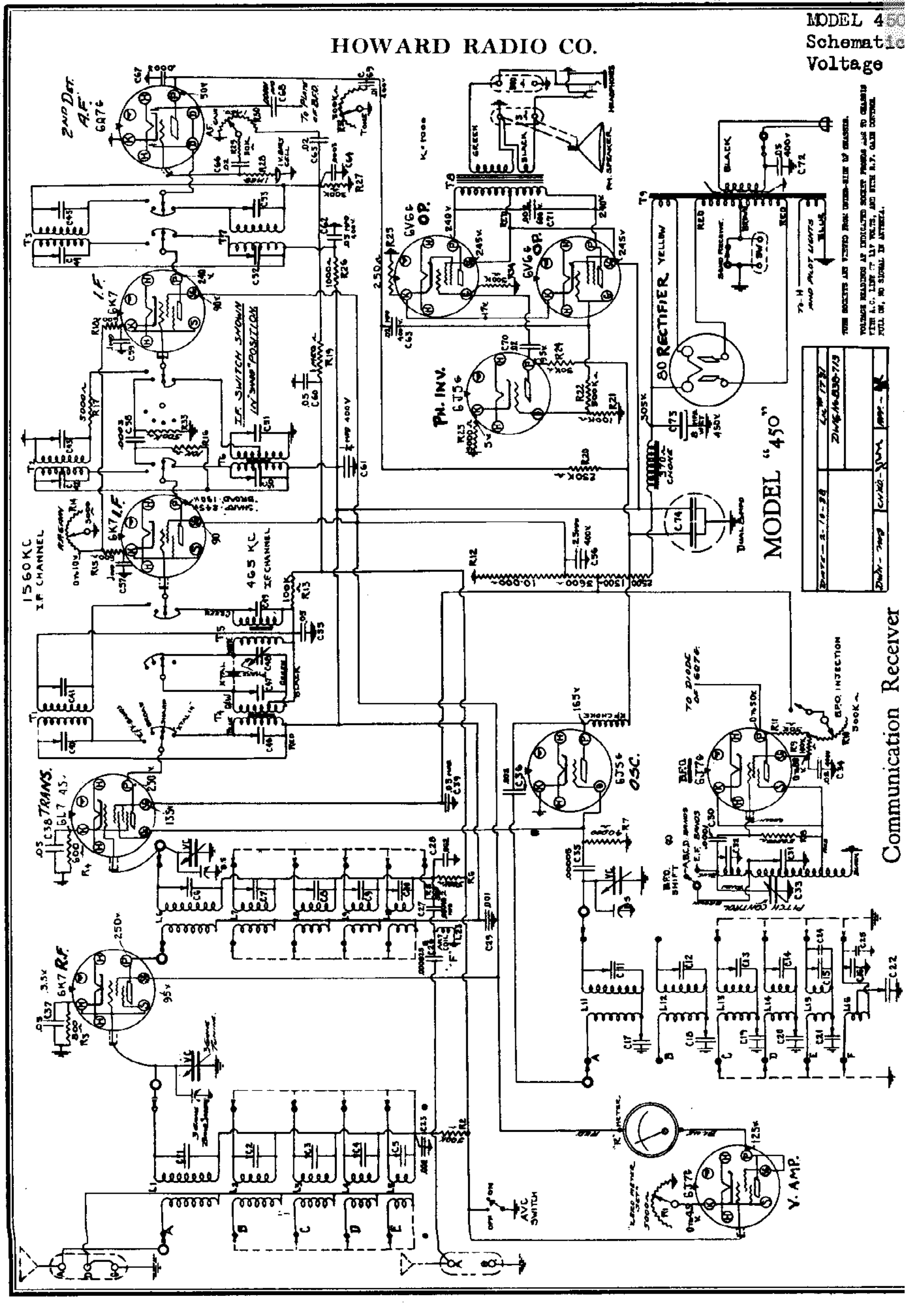
NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

POSITION OF VARIABLE AND BAND SW.	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER LOCATION	TRIMMER ADJUSTMENTS IN ORDER	TRIMMER FUNCTION	APPROX. MICRO-VOLTS
Closed "A" Band	465 KC	6L7 Grid	See Fig.1	C53,52,51, 53,49,47,46	I.F.	15
36 MC "E"	36 MC	A-D-G Ant. Term.	See Fig.2	C15, 10, 5	Osc Trans.Ant.	3
16 MC "E"	16 MC	A-D-G Ant. Term.		C21	Padder	3
15 MC "D"	15 MC	A-D-G Ant. Term.	See Fig.2	C14, 9, 4	Osc.Trans.Ant.	1
7 MC "D"	7 MC	A-D-G Ant. Term.			Padder	1
6 MC "C"	6 MC	A-D-G Ant. Term.	See Fig.2	C13, 8, 3	Osc.Trans.Ant.	1
3 MC "C"	3 MC	A-D-G Ant. Term.		C19	Padder	1
2.6 MC "B"	2.6 MC	A-D-G Ant. Term.	See Fig.2	C12, 7, 2	Osc.Trans.Ant.	1
1.3 MC "B"	1.3 MC	A-D-G Ant. Term.		C18	Padder	1
1.2 MC "A"	1200 KC	A-D-G Ant. Term.	See Fig.2	C11, 6, 1	Osc.Trans.Ant.	1
.6 MC "A"	600 KC	A-D-G Ant. Term.		C17	Padder	1

NOTE 4: When using a CRYSTAL, set PHASING CONTROL to almost minimum capacity. See special alignment instructions for Crystal MODEL 438

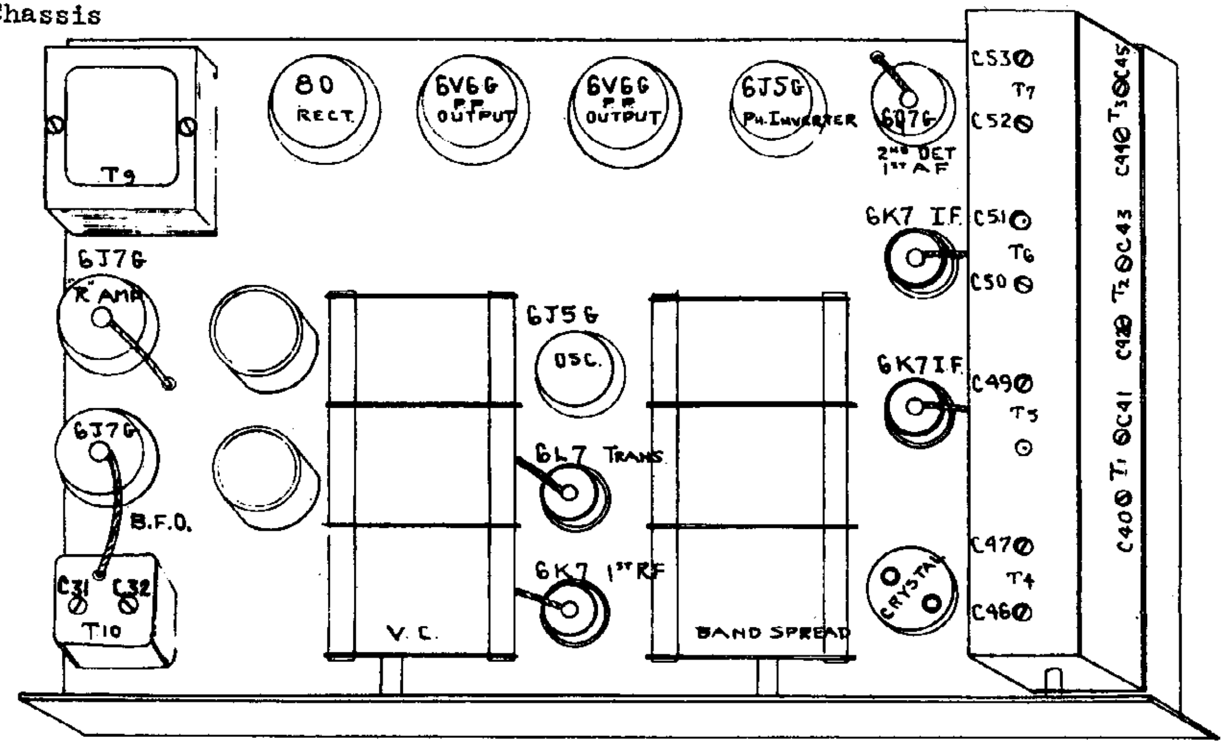
MODEL 450
Schematic
Voltage

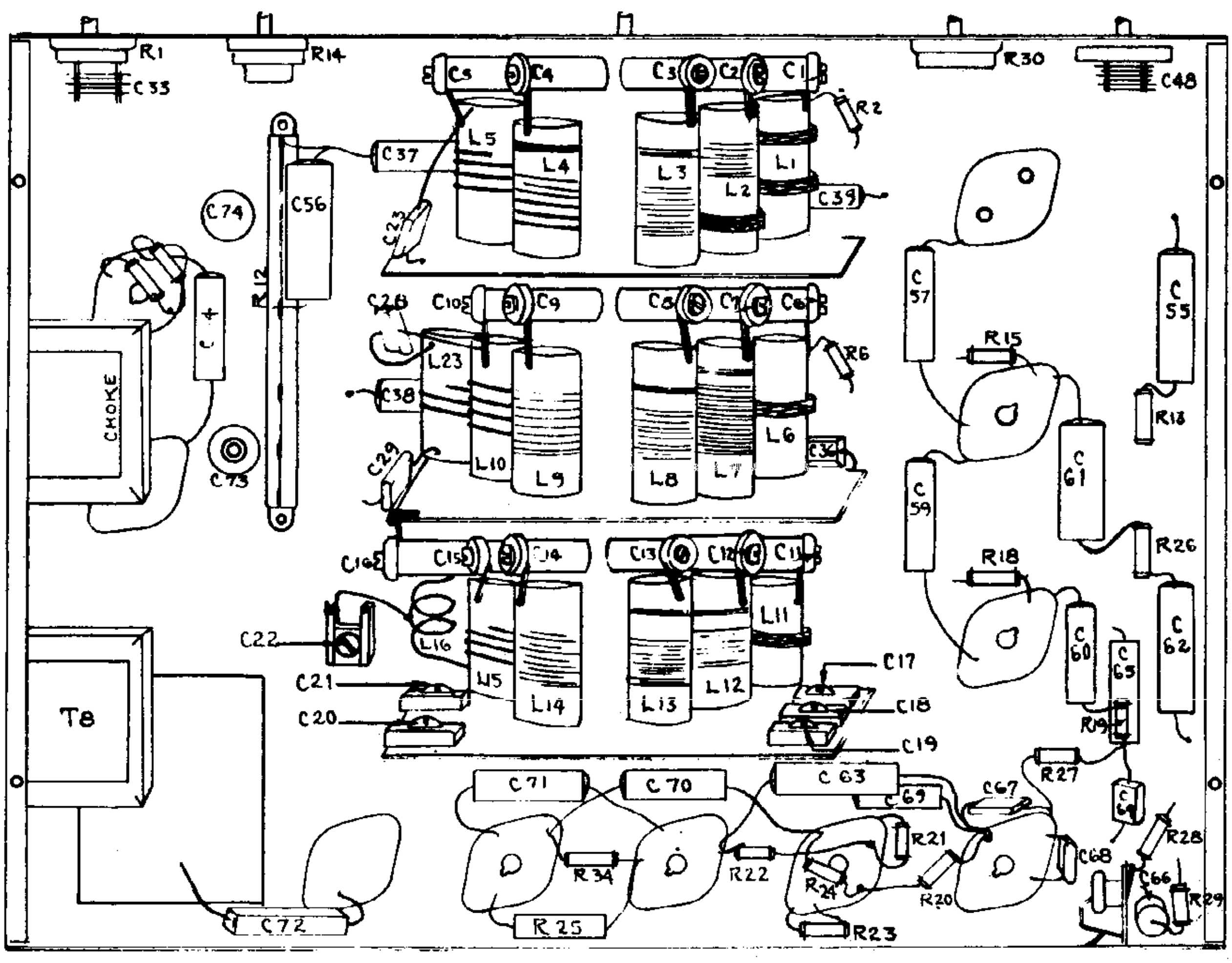
HOWARD RADIO CO.



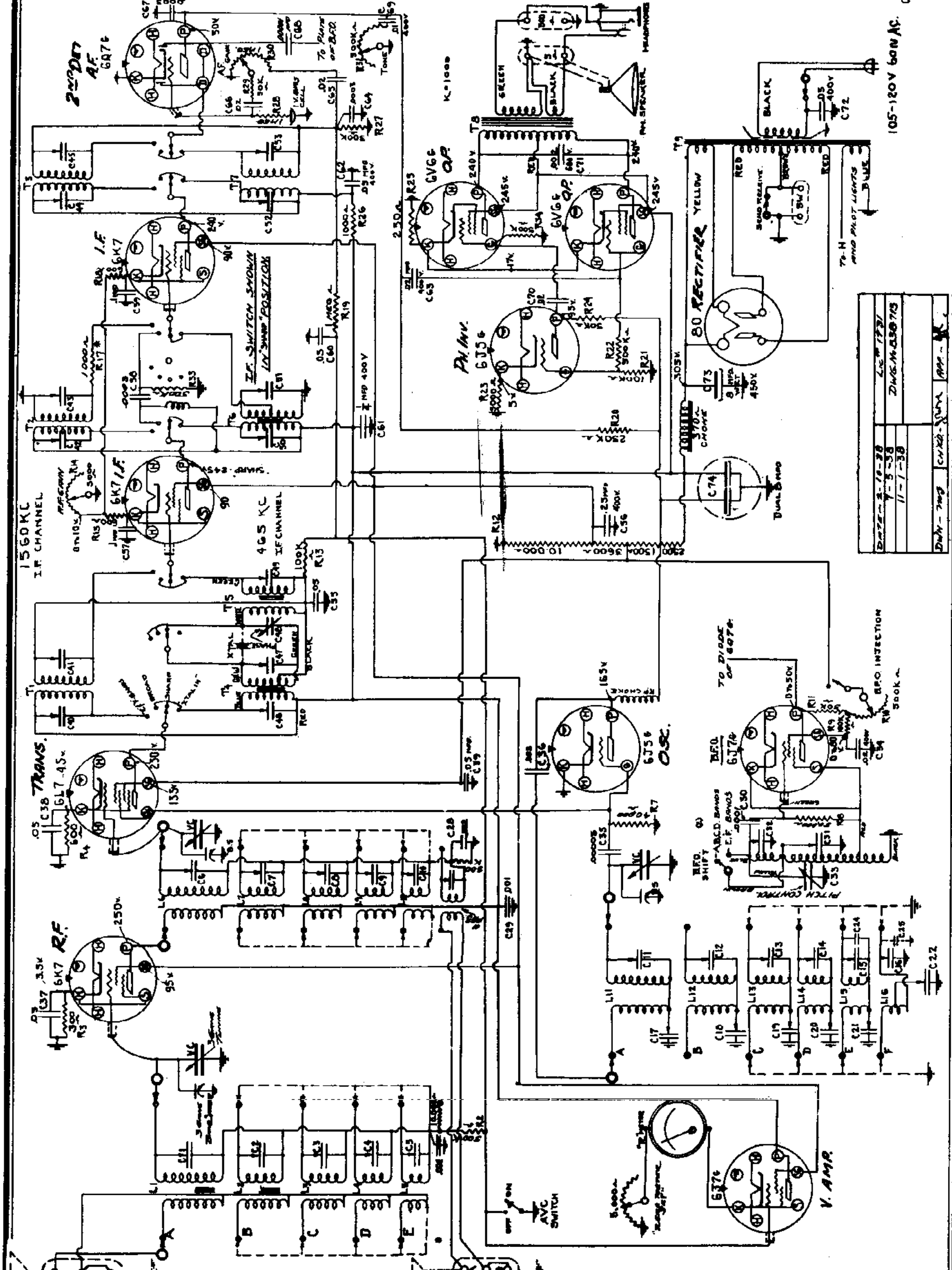
MODEL 450
MODEL 450A
Socket, Trimmers
Chassis

HOWARD RADIO CO.





MODEL 450A
Schematic
Voltage



MODEL 450
MODEL 450A
Antenna Data

HOWARD RADIO CO.

Color Code Data

ALIGNMENT FREQUENCIES:

Band A	600 AND 1200 KC
Band B	1.3 AND 2.6 MC
Band C	3.0 AND 6.0 MC
Band D	7.0 AND 15 MC
Band E	16 AND 36 MC
Band F	40 AND 60 MC
BANDS E & F -	1560 KC

LOUD SPEAKER:

Type . . . . . . Permanent Magnet Dynamic
Size . . . . Within Separate Case 10 Inch

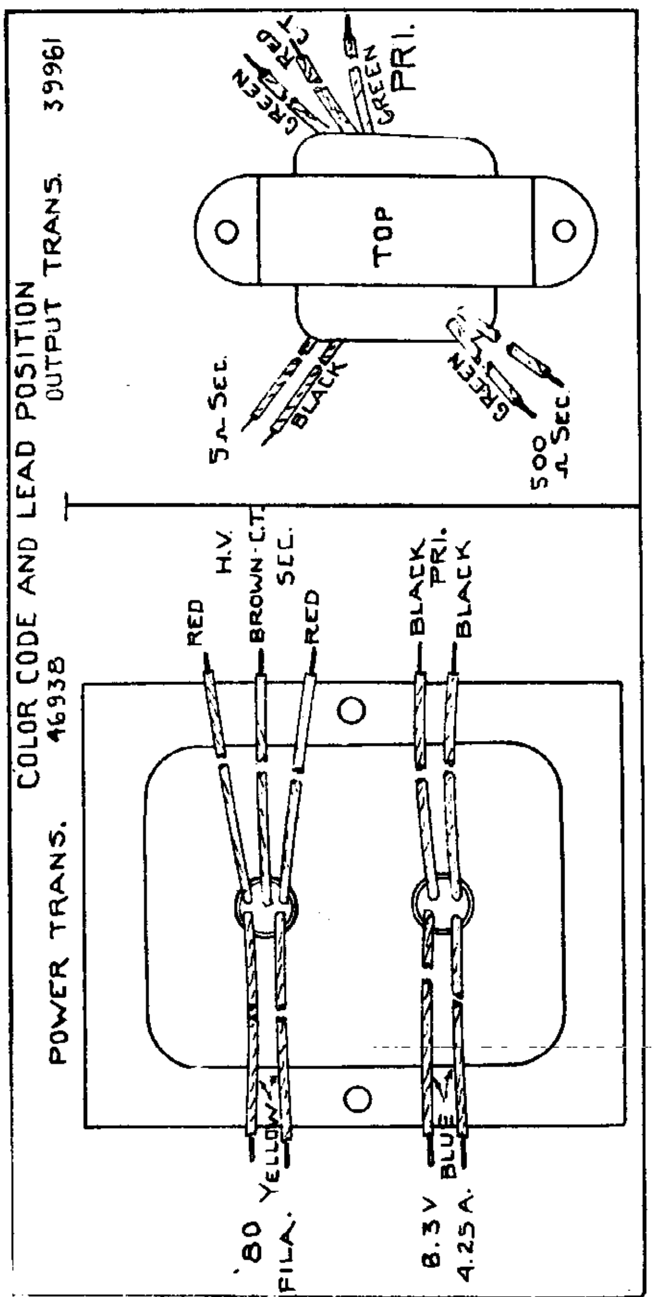
INTERMEDIATE FREQUENCY = BANDS A,B,C, & D - 465 KC

CHASSIS FEATURES:

SEND-RECEIVE terminals in rear of chassis for break-in connection.
RF Stages . . . . One
VARIABLE CONDENSER . . . . . . Three Gang
ANTENNAE . . . . TWO REQUIRED
TYPE . . . . SEE PAGE 3
HEADPHONE JACK . . . . ON FRONT PANEL
Crystal Phaser.
Beat Frequency Oscillator, Pitch Control.
B.F.O. OFF-ON Switch with Injection Control.
Two range B.F.O. switch

OPERATING FEATURES:

A.V.C. with ON-OFF Switch
Three Gang Electrical Band Spread
A.F. Gain or Audio Level
R.F. Gain or Sensitivity
Tone Control
"R" Meter Showing Signal Strength
"R" Meter Zero Adjustment
Four-position IF Setting: 1560 KC
Iron Core Broad 465 KC
Iron Core Sharp 465 KC
Crystal Filter-In Position



POWER OUTPUT:

Type . . . . Push Pull Output
Undistorted . . . . 9 Watts
Maximum . . . . 15 Watts

SPECIFICATIONS FOR A 5 METER ANTENNA
On the "F" band, we have found very good results by the use of a vertical rod 3/16" in diameter and about 59" long. Note that the lead from the base of this rod to the antenna terminal of the set should not be more than about eight inches.

The "G" terminal is for the connection to ground.

THE THREE TERMINALS - A, D, and G in the middle back of the chassis are for the ANTENNA AND GROUND connections. When using the conventional flat-top and lead-in type of antenna, CONNECT THE LEAD-IN TO THE TERMINAL MARKED "A", being sure that a wire jumper connects from D to G terminals. The G terminal is for the ground connection.

For any DOUBLET TYPE of antenna, remove the shorting jumper from D to G and connect the two leads of the doublet system to A and D.
Note* For maximum performance on short waves especially the two highest bands, a little experimenting can be done regarding the antenna location, length and type which is very important.
THE TERMINALS MARKED 500 OHMS which are connections from the out-put transformer can be connected when and if desired to any output load having 500 ohms impedance.
THE TERMINALS MARKED S W are for use of an external switch to turn the set on or off for a stand by This set of contacts may be connected to a relay or separate switch. Since these terminals are in the circuit across the panel switch for SEND and RECEIVE the switch would therefore have to be in the SEND position if the back CONTACTS are used in any way.

HOWARD RADIO CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection......................4,000 ohm or more copper oxide meter across 5 ohm terminals. Shunt with speaker

Output meter reading to indicate .5 watt..1.575 V.

Average sensitivity in microvolts for .5 watt output..........................See chart below

Generator ground lead connection..Direct to chassis

Dummy antenna value in series with generator output.......................See Note 1 below

Connection of generator output lead.......................................See Chart Below

Generator modulation..50%, 400 cycles

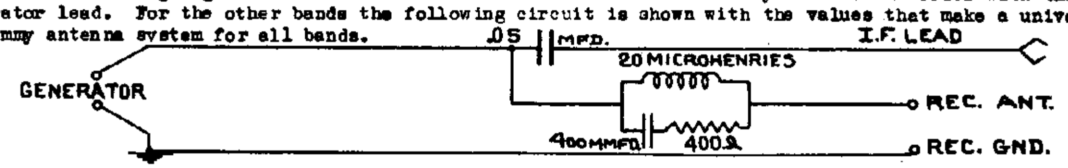
Position of volume control A.F. gain.......................................Full on

Position of volume control R.F. gain.......................................Full on

A.V.C. Switch..On

Band spread dial set at 100..Min. Capacity

NOTE 1 When aligning the two I.F. channels a condenser of .05 Mfd. may be used in series with the generator lead. For the other bands the following circuit is shown with the values that make a universal dummy antenna system for all bands.



POSITION OF VARIABLE AND BAND SW.	GENERATOR FREQ.	GENERATOR CONNECTION	POSITION OF I.F. BAND SWITCH	TRIMMER ADJUSTMENTS IN ORDER	TRIMMER FUNCTION	APPROX. MICROVOLTS
Closed "A" Band	465 KC	6L7 Grid	"XTAL" See Note 2	C53,52,51 50,49,47,46	I.F.	15
Closed "A" Band	1560 KC	6L7 Grid	"E" & "F"	C45,44,43 42,41,40	I.F.	15
60 MC "F"	60 MC	A-G Ant. Term.	"E" & "F"	C16	Osc.	Approx. 10
40 MC "F"	40 MC	A-G Ant. Term.	"E" & "F"	C22	Padder	Approx. 10
36 MC "E"	36 MC	A-D-G Ant. Term.	"E" & "F"	C15,10,5	Osc. Trans. Ant.	Approx. 3
16 MC "E"	16	A-D-G Ant. Term.	"E" & "F"	C21	Padder	Approx. 3
15 MC "D"	15 MC	A-D-G Ant. Term.	XTAL or "Sharp"	C14, 9,4	Osc. Trans. Ant.	Approx. 1
7 MC "D"	7 MC	A-D-G Ant. Term.	XTAL or "Sharp"	C20	Padder	Approx. 1
6 MC "C"	6 MC	A-D-G Ant. Term.	XTAL or "Sharp"	C13, 8,3	Osc. Trans. Ant.	Approx. 1
3 MC "C"	3 MC	A-D-G Ant. Term.	XTAL or "Sharp"	C19	Padder	Approx. 1
2.6MC "B"	2.6	A-D-G Ant. Term.	XTAL or "Sharp"	C12, 7,2	Osc. Trans. Ant.	Approx. 1
1.3MC "B"	1.3	A-D-G Ant. Term.	XTAL or "Sharp"	C18	Padder	Approx. 1
1.2MC "A"	1200 KC	A-D-G Ant. Term.	XTAL or "Sharp"	C11, 6,1	Osc. Trans. Ant.	Approx. 1
.6 MC "A"	600 KC	A-D-G Ant. Term.	XTAL or "Sharp"	C17	Padder	Approx. 1

NOTE 2: When using a CRYSTAL, set PHASING CONTROL to almost minimum capacity. See special alignment instructions below for Crystal. Align set in "sharp" position if set is without crystal.

ALIGNMENT INSTRUCTIONS - FOR RECEIVERS EQUIPPED WITH CRYSTALS

(A) REMOVE CRYSTAL, set crystal phasing condenser to almost minimum capacity and throw IF switch to "XTAL" position.

(B) With the 465 KC signal, re-adjust the I.F. Trimmer C-46 - the one nearest the front panel of the receiver - by turning the screw counter-clockwise. The signal now may be slightly weaker than before and sound "off-side". This, however, is a normal condition.

(C) REPLACE THE CRYSTAL - A very noticeable drop in signal strength may be noted, due to the filtering action of the crystal, and the frequency control of the signal generator must be "rocked" slowly back and forth, until the increase in signal strength indicates the exact frequency of the crystal being used. Now re-align the entire I.F. system to this frequency.

(D) Adjust "XTAL" phasing condenser for the lowest pitched note possible and re-adjust signal generator frequency. Repeat and continue to repeat this alignment procedure until no further improvement in the alignment can be accomplished.

NOTE: If the IF switch should now be thrown to another position, an apparent rise in gain will be noticed, which is caused by the addition of higher frequencies and background noise, so it does not mean that the sensitivity of this set is impaired in any way by use of the crystal.

NOTE 3: THE BEAT FREQUENCY OSCILLATOR is adjusted for the A, B, C, D, Bands with Trimmer C31. With models having an "E" & "F" Band B.F.O.---Adjust C32 with dial at 1560 on Band D to 1560 KC. Recheck C31. Set pitch control to half capacity.

SINCE THE BAND SPREAD SYSTEM is accomplished by means of a separate three-gang condenser, the spread in degrees over the assigned amateur bands is as follows:-

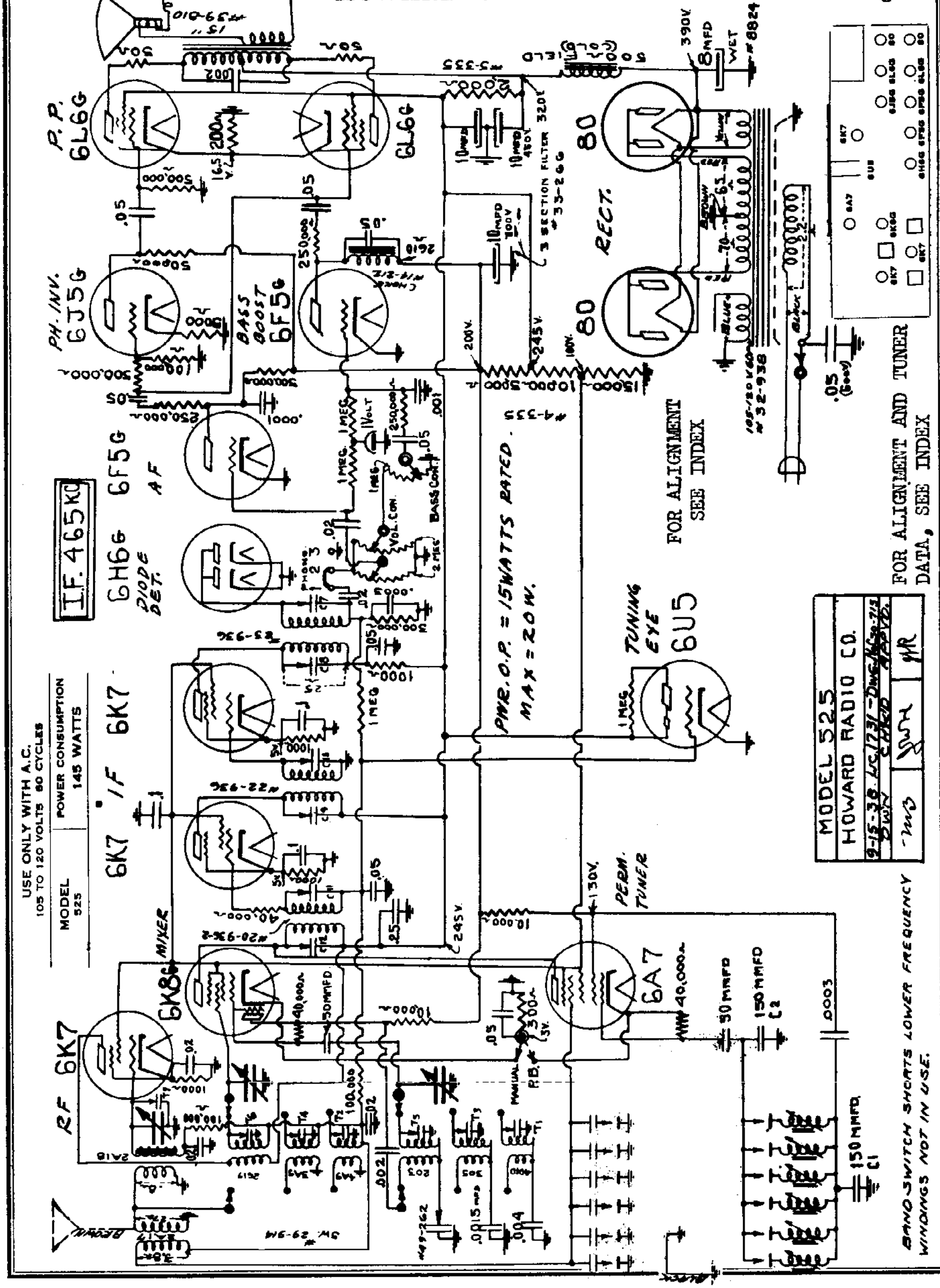
(3.5-4 MC = 540° + 126°)
(14.005-14.395 MC = 81°)
(1.716-2 MC = 360 + 162°)
(56-60 MC = 144°)
(7-7.3 MC = 130° + 186°)
(28-30 MC = 160°)

However, for those who wish to DOUBLE the amount of band spread, it is only ~~necessary to remove~~ one ROTOR plate from each section of the BAND SPREAD CONDENSER. This accomplished by merely cutting the separating link holding the two plates together and ~~pulling the plate~~ from the rotor shaft.

MODEL 525

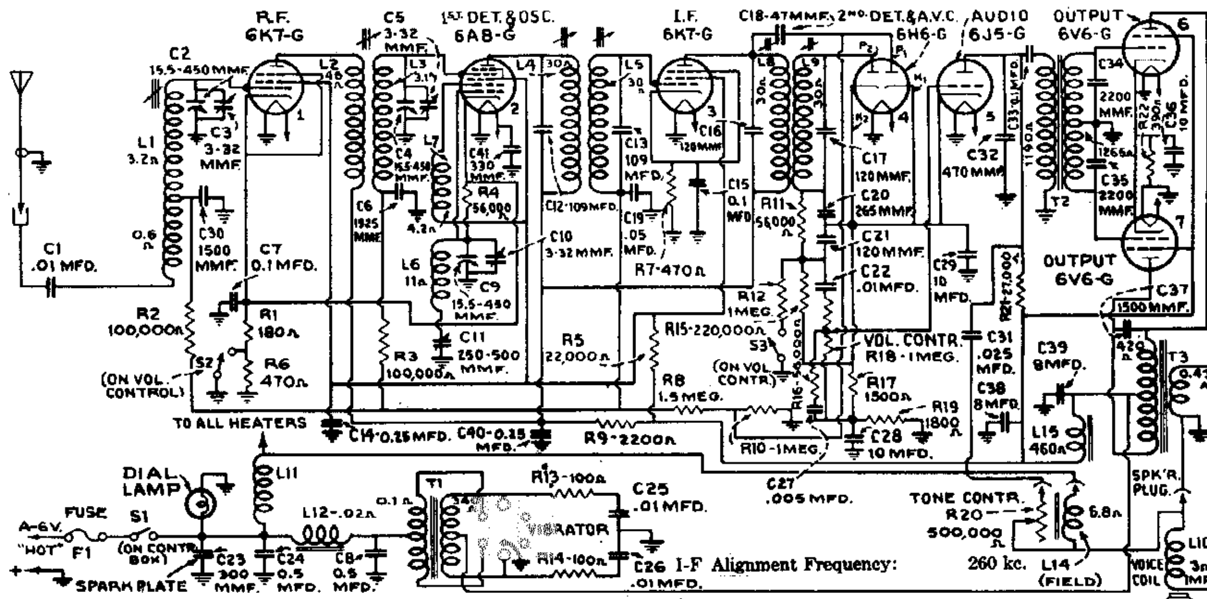
HOWARD RADIO CO.

Schematic
Voltage



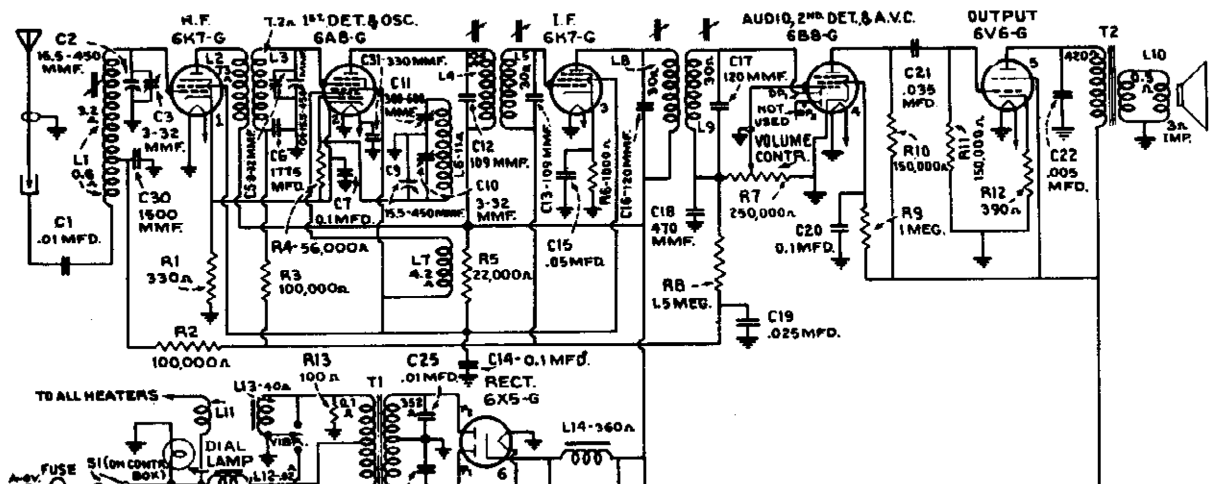
MODEL DB-38
MODEL SA-38
Schematics, Socket
Trimmers, Alignment

HUDSON MOTOR CAR CO.



I-F Alignment Frequency: 260 kc.

Figure 2239—Schematic Circuit Diagram—Model DB-38



I-F Alignment Frequencies: 260 kc.

Figure 2237—Schematic Circuit Diagram—Model SA-38

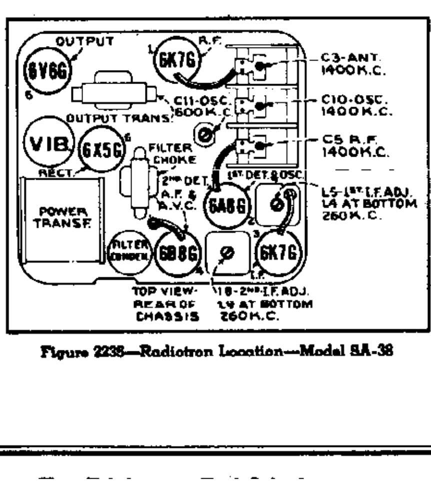


Figure 2238—Radiotron Location—Model SA-38

1938 HUDSON RADIOS
MODELS SA-38 AND DB-38

SA-38		DB-38	
(1)	6K7-G	(1)	6K7-G
(2)	6A8-G	(2)	6A8-G
(3)	6K7-G	(3)	6K7-G
(4)	6B8-G	(4)	6H6-G
		(5)	6J5-G
(5)	6V6-G	(6)	6V6-G
(6)	6X5-G	(7)	6V6-G

Tuning Range: 550 kc. to 1600 kc. both models

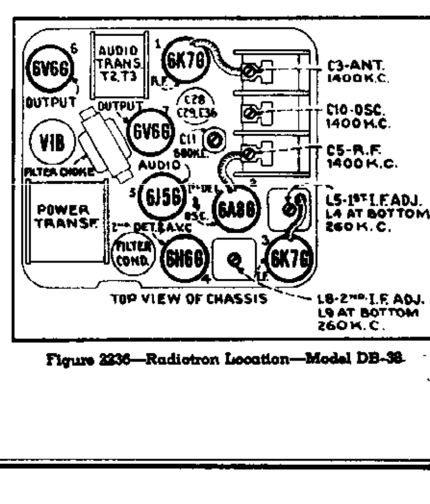


Figure 2236—Radiotron Location—Model DB-38

MODEL DB-38
Chassis Wiring
Voltage, Connections

HUDSON MOTOR CAR CO.

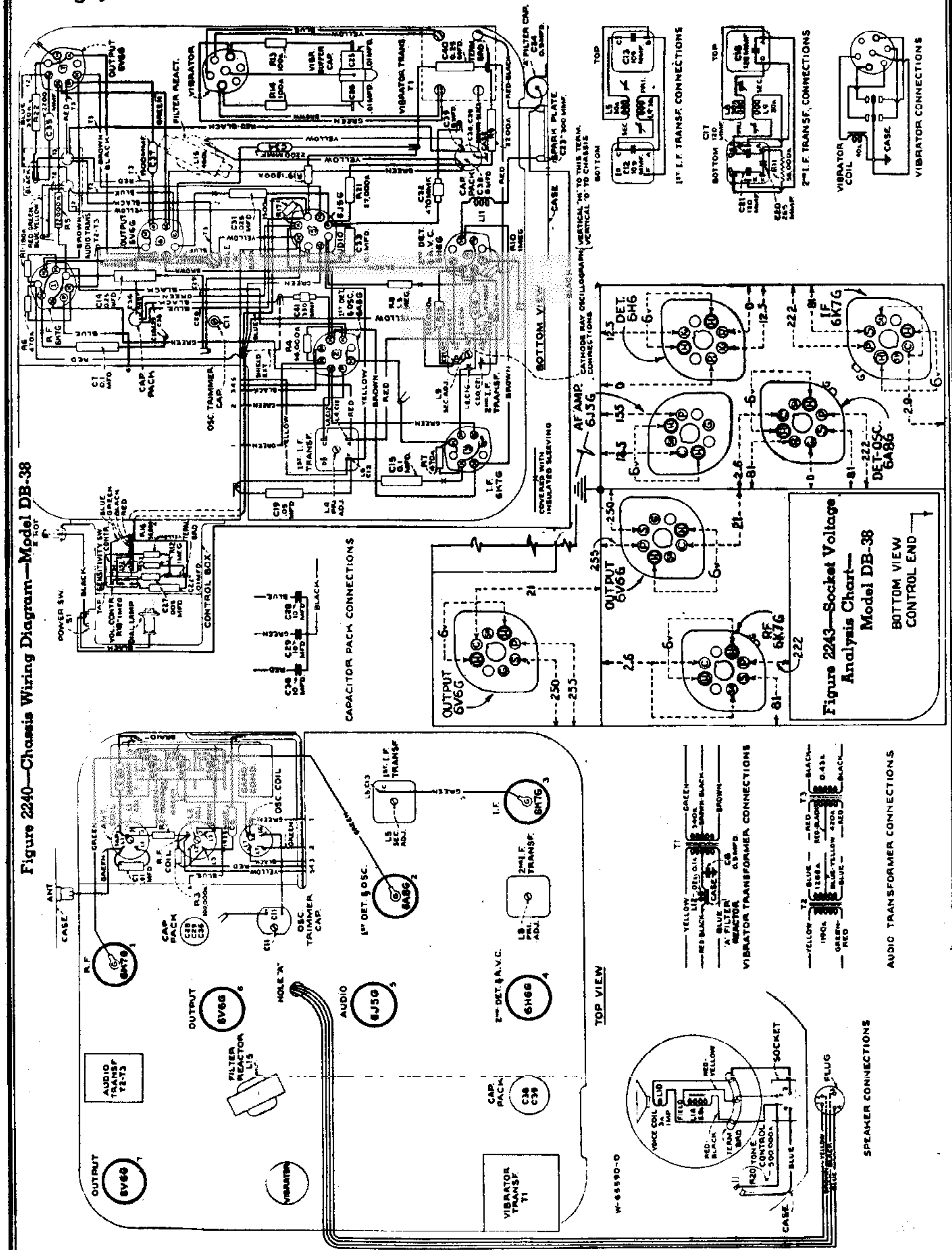


Figure 2240—Chassis Wiring Diagram—Model DB-38

Figure 2243—Socket Voltage Analysis Chart—Model DB-38

MODEL SA-38
Chassis Wiring
Voltage, Connections

HUDSON MOTOR CAR CO.

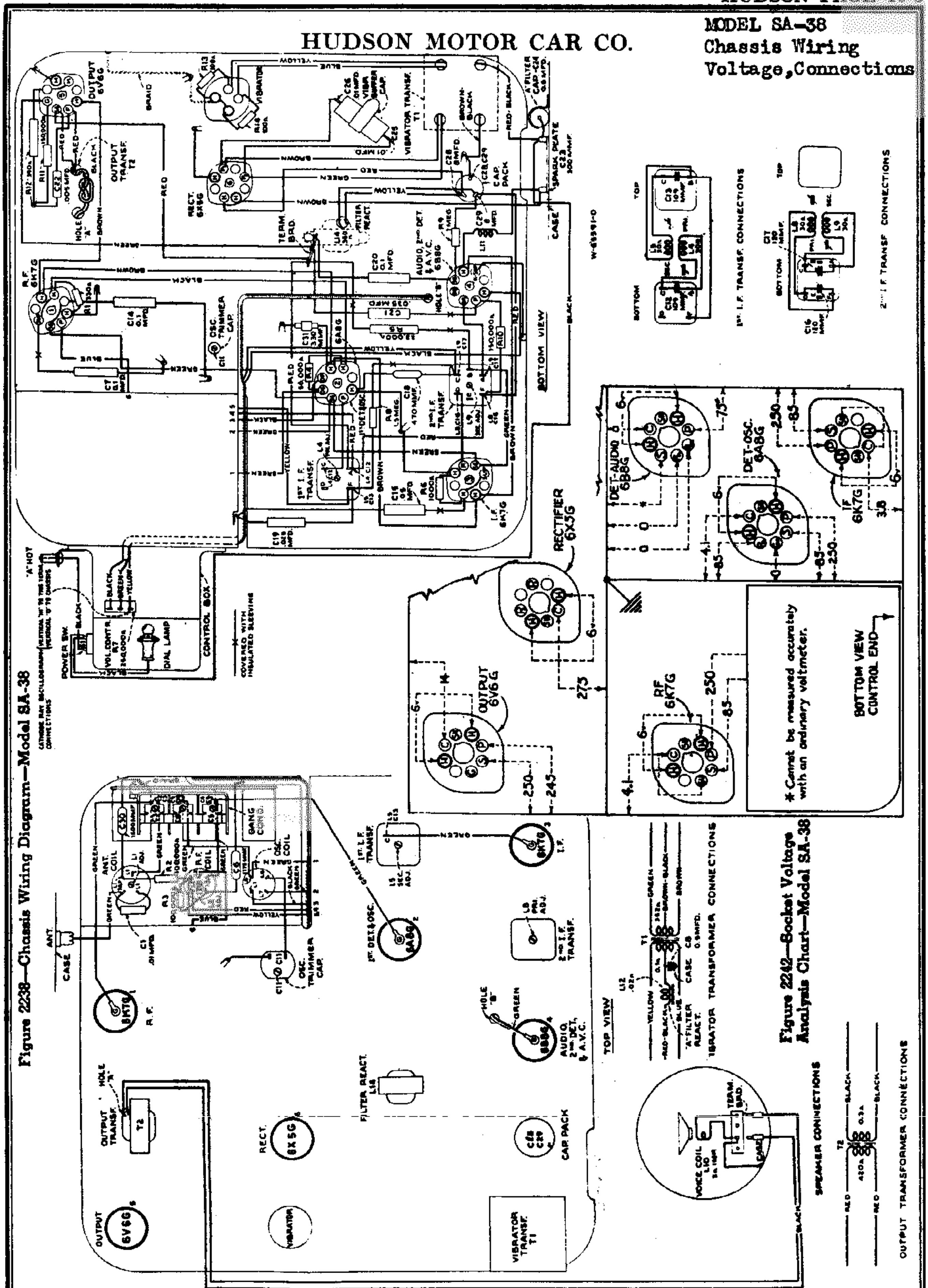


Figure 2238—Chassis Wiring Diagram—Model SA-38

Figure 2242—Socket Voltage Analysis Chart—Model SA-38

ALIGNMENT PROCEDURE

In readjusting the tuned circuits, it is important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator will be required as the source of signal at the specified alignment frequencies. Means for indication of the receiver output during alignment is also necessary to show accurately when the correct point of adjustment is reached. Two indication methods are applicable. One requires use of cathode-ray oscillograph equipment, and the other requires a voltmeter or output indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave image which represents the resonance characteristics of the circuits being tuned.

Adjust the control box by turning the tuning knob clockwise until a definite stop is reached at the high-frequency end of the dial scale. Then turn the tuning knob counter-clockwise until a definite stop is reached at the low-frequency end of the dial scale.

Figures 2235 and 2236 give the locations of the tubes and trimmer screws for adjustable capacitors and magnetite cores for models SA-38 and DB-38 respectively.

Place the receiver in operation with its two covers removed. Attach the output indicator across the loudspeaker voice coil circuit and advance the receiver volume control to full volume position. (If cathode-ray oscillograph is used for output indication, the vertical input terminals should be connected between the i-f transformer side of R15 (Figure 2240) and the receiver chassis for the DB-38 model, and between the high side of the volume control R7 (in control unit) (Figure 2238) and the receiver chassis for model SA-38. The cathode-ray oscillograph method of i-f alignment requires the conventional cathode-ray oscillograph, frequency modulator and signal generator set-up.)

For each adjusting operation, regulate the test oscillator output control so that the signal level is as low as possible and still observable on the indicating device. Use of such small signal will obviate broadness of tuning which would otherwise result from a.v.c. action on a stronger one.

I-F ADJUSTMENTS

1. Connect the "high" output of the test oscillator to the control grid cap of the i-f tube (6K7-G) through a 0.25 mfd. capacitor and connect the ground of the test oscillator to the receiver chassis. Adjust the frequency of the test oscillator to 260 kc. Tune the receiver to a point where no interference is received from the heterodyne oscillator or local stations.
2. Adjust the two screws L8 and L9 (attached to magnetite cores) of the second i-f transformer, one on top and one on bottom, until maximum output is produced on the indicating device.
3. Remove the test oscillator from the i-f tube input and connect it between the control grid cap of the first detector tube (6A8-G) and chassis ground, using the 0.25 mfd. capacitor as previously. Allow its tuning to remain at 260 kc. Tune the receiver to avoid interference as in 1.
4. Adjust the two screws L4 and L5 of the first i-f transformer for maximum (peak) receiver output.
5. Repeat procedures 1, 2, 3 and 4 as a check.

R-F ADJUSTMENTS

6. Connect the "high" output of the test oscillator to the antenna plug of the receiver through a 100 mmfd. capacitor, leaving the test oscillator ground connected to the receiver chassis. If the antenna lead-in is used, the value of this capacitor should be 50 mmfd. Tune the test oscillator to 1400 kc. Allow the output indicator to remain attached to the receiver as for i-f alignment.
7. Tune the receiver so that the dial reading is approximately halfway between 1300 and 1500 kc., which gives a 1400 kc. setting. Then adjust the oscillator, detector and antenna coil trimmers, C10, C5, and C3 respectively, adjusting each to the point producing maximum indicated receiver output.
8. Shift the test oscillator frequency to 600 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is received. The oscillator series trimmer C11 should then be adjusted, simultaneously rocking the receiver tuning control backward and forward through the signal until maximum (peak) receiver output results from these combined operations.
9. The adjustment of C10, C5 and C3 should then be repeated as in operation 7 to correct for any change in their alignment due to the adjustment of C11.

NOTE: The antenna coil L1 has a magnetite core which is adjusted at the factory for the correct inductance. This adjustment should not be disturbed.

DB-38

Speaker:
Type: Electrodynamic 8"
Impedance (v.c.) 3 ohms. at 400 cycles
Vibrator: Synchronous
Power Output: Undistorted, 6 watts; maximum, 9 watts

Power Rating:	Supply voltage	6.3 volts (storage battery)
	Current drain	8.25 amperes at 6.3 volts
	Fuse protection	15 amperes
R-F Alignment Frequencies:	Antenna coil	1400 kc.
	Oscillator coil	600 kc. and 1400 kc.
	Detector coil	1400 kc.

SA-38

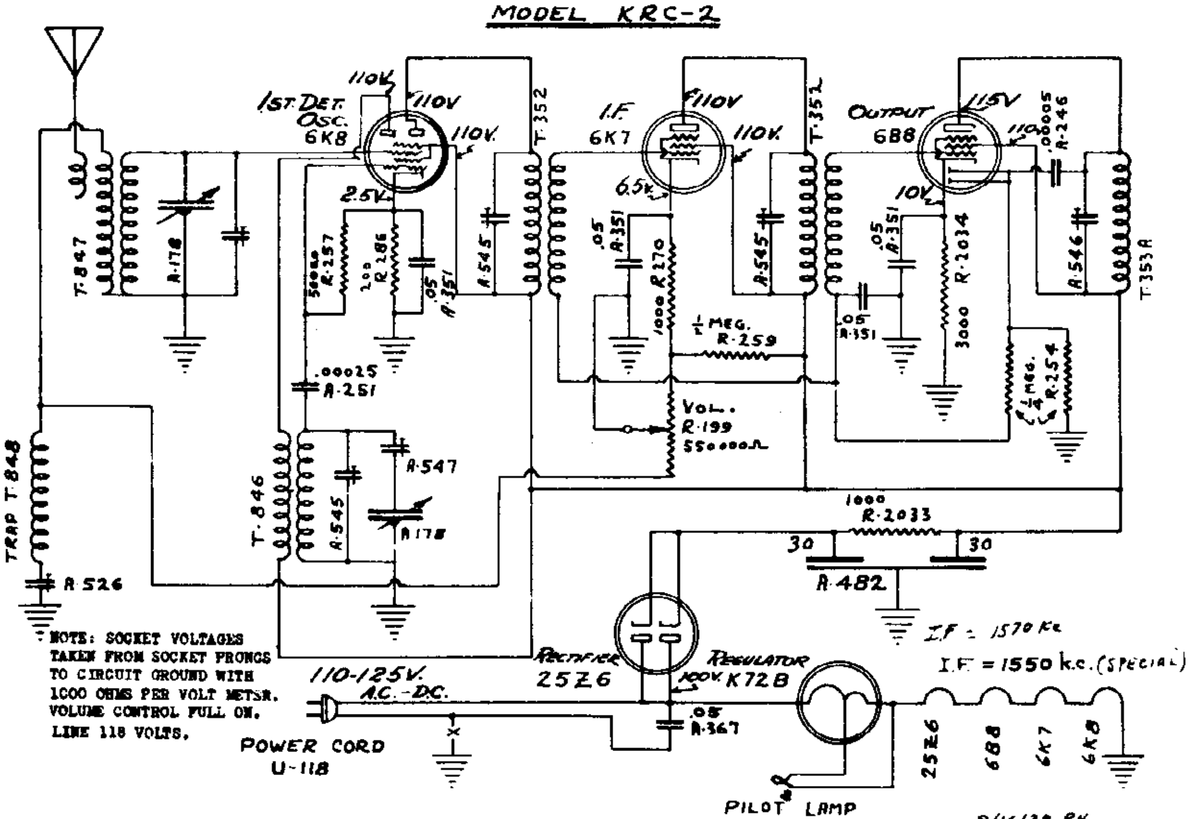
Speaker:
Type: Six Inch Dynamic
Impedance (v.c.) 3 ohms. at 400 cycles
Vibrator: Non-synchronous
Power Output: Undistorted, 2.6 watts; maximum, 4 watts

Power Rating:	Supply voltage	6.3 volts (storage battery)
	Current drain	6.0 amperes at 6.3 volts
	Fuse protection	15 amperes
R-F Alignment Frequencies:	Antenna coil	1400 kc.
	Oscillator coil	600 and 1400 kc.
	Detector coil	1400 kc.

MODEL KRC-2, Tunemaster
MODEL 845
Schematics

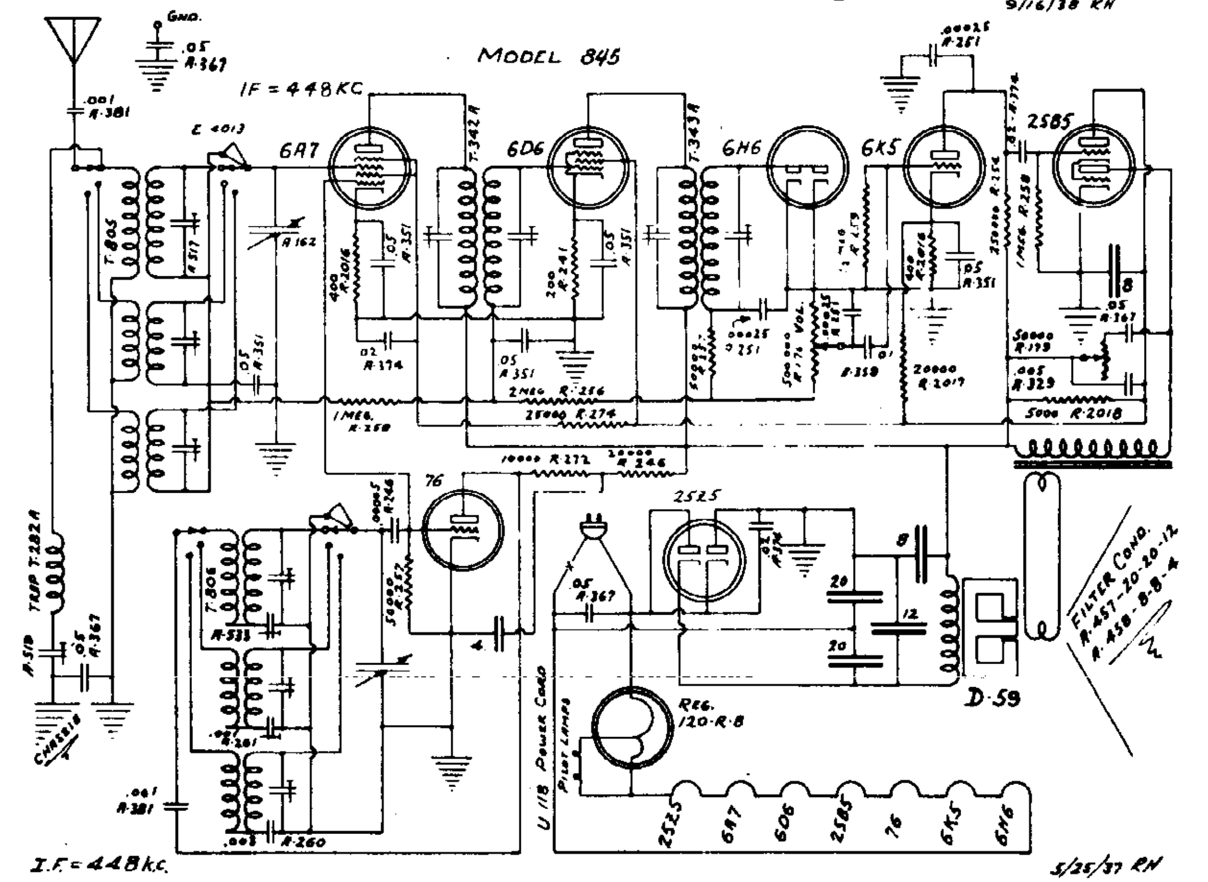
INTERNATIONAL INDUSTRIES, INC.

MODEL KRC-2



NOTE: SOCKET VOLTAGES TAKEN FROM SOCKET PRONGS TO CIRCUIT GROUND WITH 1000 OHMS PER VOLT METER. VOLUME CONTROL FULL ON. LINE 118 VOLTS.

MODEL 845

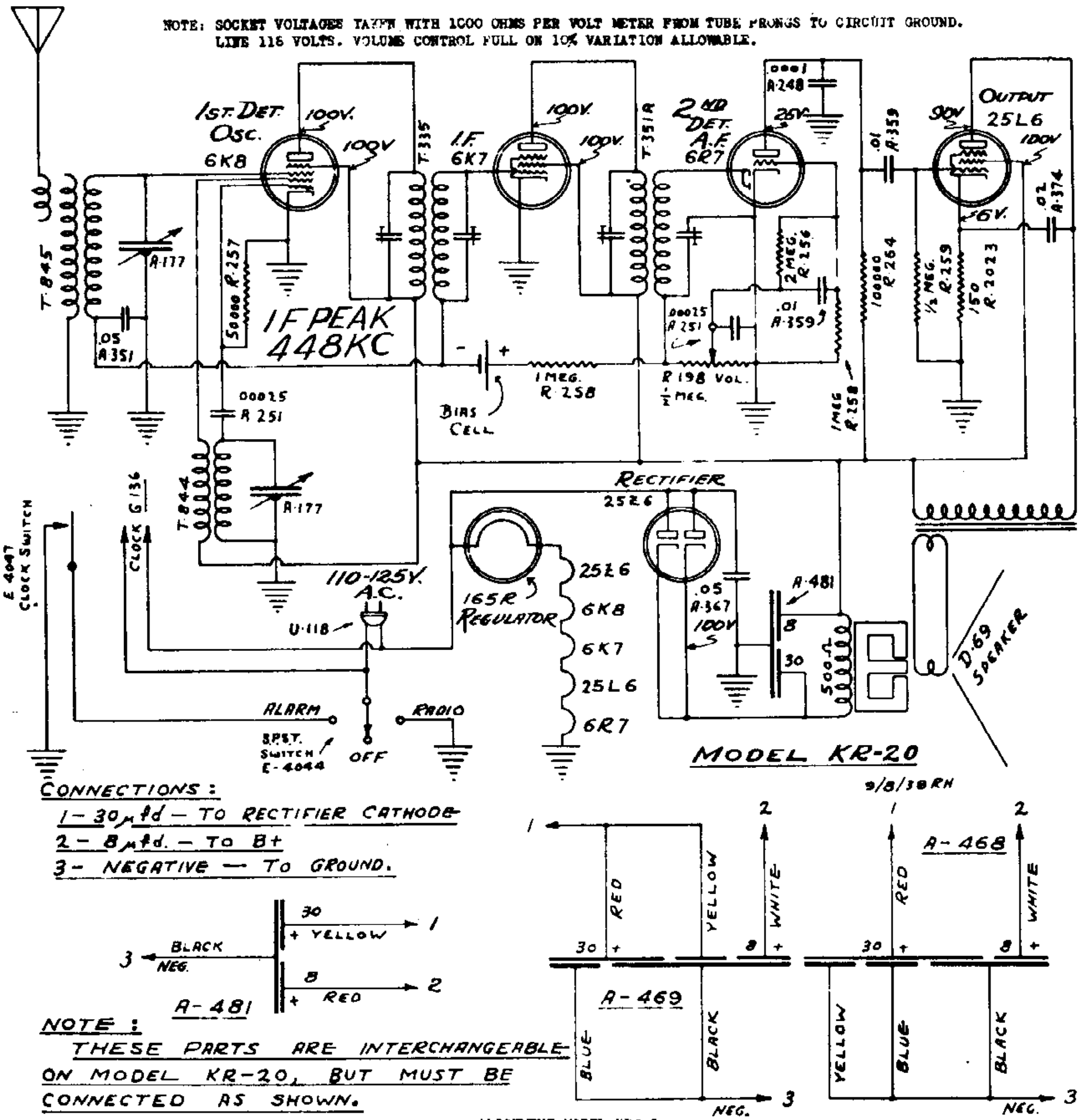


MODEL KR-20, Autime
Schematic, Voltage
Alignment

INTERNATIONAL INDUSTRIES, INC.

MODEL KRC-2
Alignment

NOTE: SOCKET VOLTAGES TAKEN WITH 1000 OHMS PER VOLT METER FROM TUBE PRONGS TO CIRCUIT GROUND. LINE 115 VOLTS. VOLUME CONTROL FULL ON 10% VARIATION ALLOWABLE.



ALIGNMENT MODEL KRC-2

I. F. TRIMMERS: Feed 1570 Kc. modulated signal from signal generator directly to antenna of Tunemaster. Adjust both IF trimmers to maximum reading on output meter. Then adjust output coil trimmer to maximum.
R. F. TRIMMERS: Set Tunemaster dial at 1500 Kc. and feed 1500 Kc. signal from signal generator to antenna of Tunemaster. Set antenna trimmer approximately 1/4 turn from tight. Peak oscillator trimmer at 1500 Kc. Set dial at 600 Kc. and peak series oscillator trimmer. Move dial and series trimmer simultaneously by small amounts so as to get maximum output at 600 Kc. Tune back to 1500 Kc. and peak oscillator trimmer. Repeat previous peaking of series trimmer at 600 Kc. Retune to 1500 Kc. and peak oscillator trimmer. Set dial at approximately 1400 Kc. Tune signal generator to resonance with Tunemaster. Then peak antenna trimmer.

ALIGNMENT MODEL KR 20

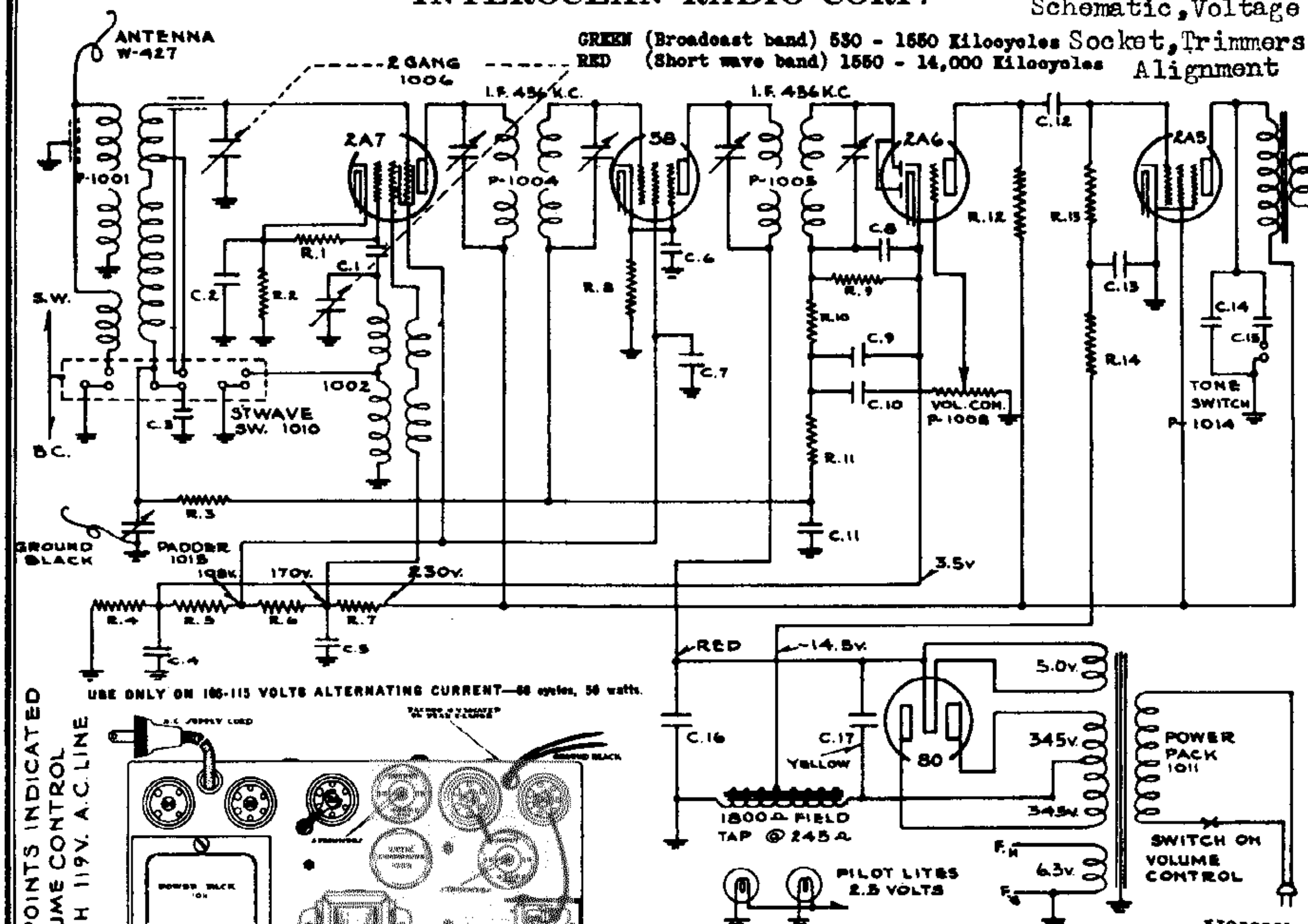
I. F. TRIMMERS: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I. F. transformer. If adjustments are not made accurately, selectivity will be poor and I. F. oscillation may result.
R. F. TRIMMERS: Turn the dial to 1500 Kc. and feed a very weak 1500 Kc. modulated signal from your signal generator to the antenna. Adjust the oscillator trimmer for maximum reading. Then peak the antenna trimmer to this setting. Aligning of broadcast band should be done on 1500, 1000 and 600 kilocycles. There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

KR 20 autime

INTEROCEAN RADIO CORP.

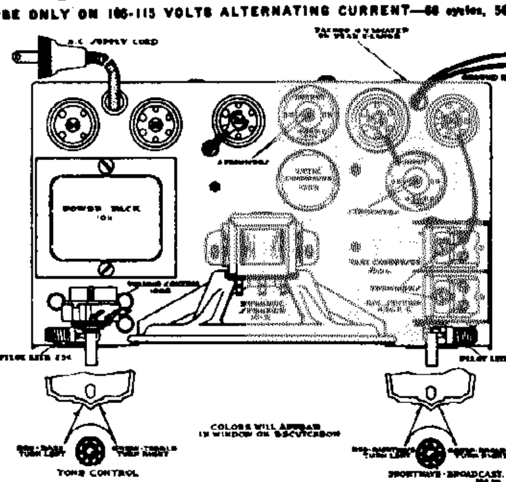
MODEL 202
Schematic, Voltage
Socket, Trimmers
Alignment

GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles



USE ONLY ON 105-115 VOLTS ALTERNATING CURRENT—60 cycles, 50 watts.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL VOLTAGES WITH 119V. A.C. LINE



Nº	VALUE
C.1:-	250MMF.
C.2:-	.05
C.3:-	.05
C.4:-	.05
C.5:-	.05
C.6:-	.05
C.7:-	.1
C.8:-	500MMF. X
C.9:-	500MMF. X
C.10:-	.01 X
C.11:-	.1
C.12:-	.01
C.13:-	.05
C.14:-	.01
C.15:-	.02
C.16:-	8MF. *
C.17:-	8MF. *

RESISTORS

Nº	VALUE	Nº	VALUE
R.1:-	50M	R.8:-	300 *
R.2:-	500 *	R.9:-	250M X
R.3:-	250M	R.10:-	50M X
R.4:-	250 *	R.11:-	250M X
R.5:-	20M *	R.12:-	250M
R.6:-	6M *	R.13:-	300M
R.7:-	4M *	R.14:-	250M.

* R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012
* C.16 & C.17 IN ONE UNIT P-1003
X R.9, R.10, R.11, C.8, C.9 & C.10 IN I.F. CAN P-1005

ALIGNMENT

Connect oscillator at 456 KC to grid of 2A7 tube and ground wire. Variable condenser at minimum capacity, adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance.

Broadcast band, wave changing switch to Green, variable condenser at minimum capacity. Disconnect antenna wire, connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

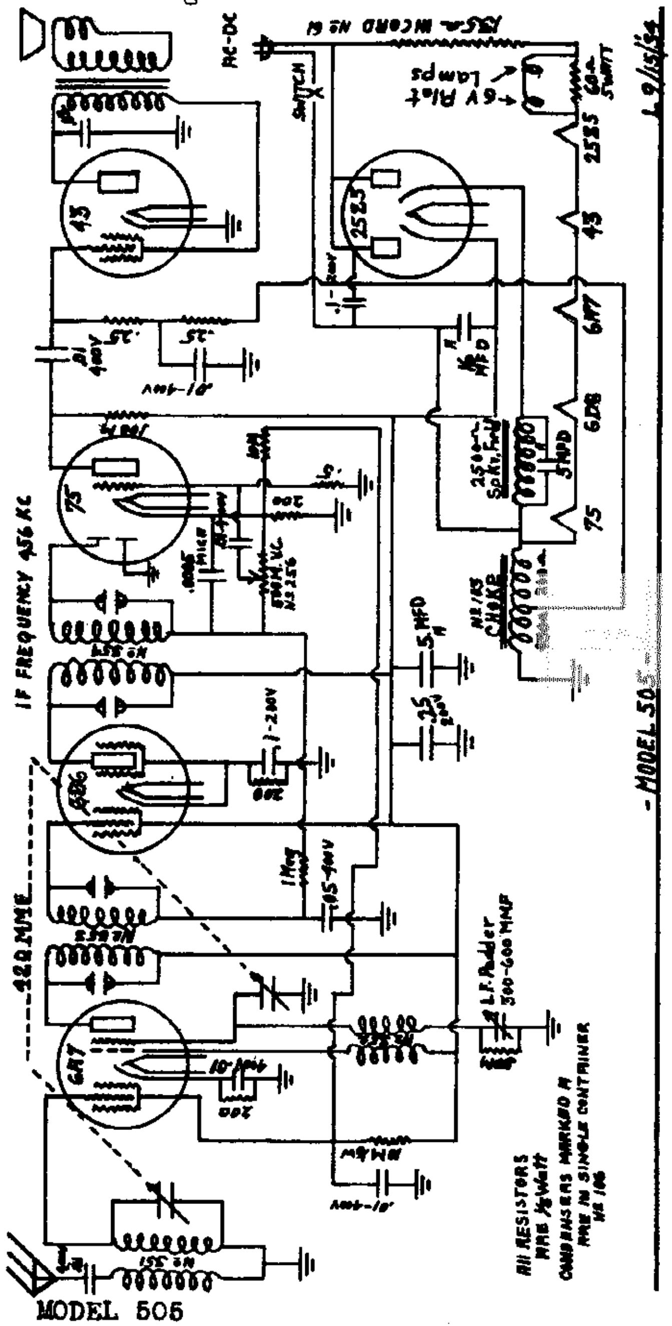
Short wave band, set wave changing switch to RED and with input oscillator connected as above and set at 1720 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.

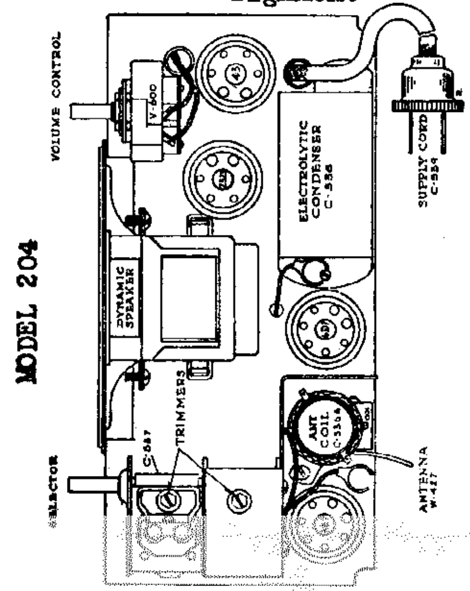
MODEL 505
Schematic, Alignment

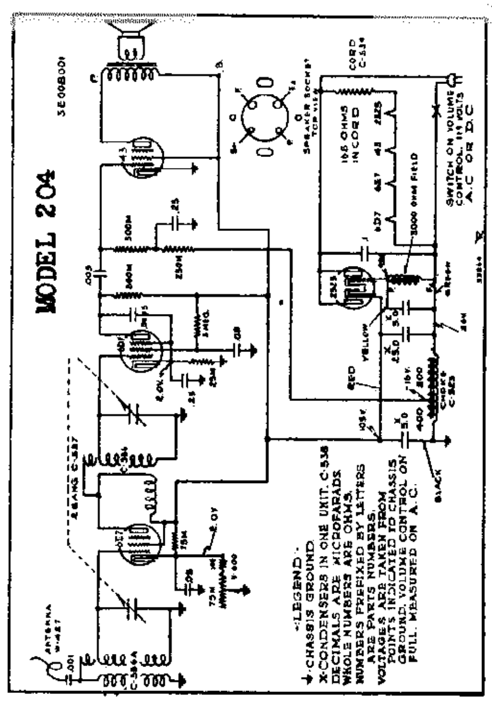
INTEROCEAN RADIO CORP.

MODEL 204
Schematic, Socket
Trimmers, Voltage
Alignment



MODEL 505





Schematic circuit diagram AC-DC Radio Receiver.

USE ONLY ON 105-115 VOLTS ALTERNATING (any cycles) or DIRECT CURRENT—35 WATTS.

Should it be necessary at any time to rebalance this set the procedure is as follows:
Disconnect antenna wire and attach an oscillator in series with a 50 mmfd. condenser to the antenna coil. With variable condenser at its minimum capacity position—at the extreme left of its rotation-touch trimmer condensers for maximum deflection on an output meter connected across the primary of the speaker input transformer, check trimmer adjustment at 1400 kilocycles, then align at 1200-1000-800-600-540 kilocycles. bend slotted plates of variable condenser if necessary.

1. I.F. Alignment -
To peak I.F. transformers, apply an oscillator note of 456 KC to the grid of the 6A7 tube and adjust screws seen in tops of I.F. transformers until maximum peak is obtained.
2. Broadcast -
Connect an oscillator adjusted to 1720 KC, to the antenna of set, then adjust trimmer ~~of oscillator section first~~ with variable condenser way open to peak output, next adjust antenna section trimmer on variable condenser to peak output.
3. Low Frequency Padder -
Next apply a 600 KC note from oscillator and while rocking variable condenser back and forth across signal, adjust padder to maximum output.
4. Check alignment again at 1400 KC; 1000 KC and 800 KC. It will not be necessary to bend plates to align this receiver.

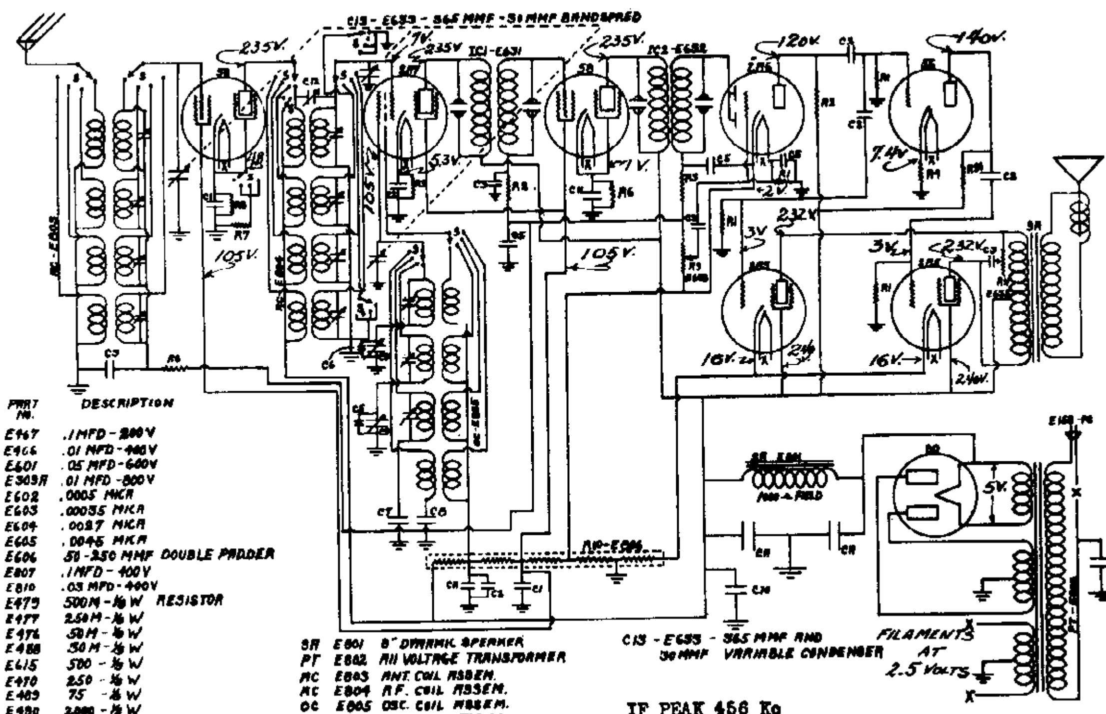
MODELS 508,522,525,525A INTEROCEAN RADIO CORP. MODELS 511,524,527,527A

Chassis 508

Chassis 511

Schematics, Voltage

Trimmers



DIAG. NO.	PART NO.	DESCRIPTION
C1	E467	.1 MFD - 200 V
C2	E466	.01 MFD - 400 V
C3	E601	.05 MFD - 600 V
C4	E303A	.01 MFD - 800 V
C5	E602	.0005 MICA
C6	E603	.00035 MICA
C7	E604	.0027 MICA
C8	E605	.0045 MICA
C9	E606	50 - 250 MMF DOUBLE PADDER
C10	E807	.1 MFD - 400 V
C11	E810	.03 MFD - 400 V
R1	E479	500 M - ⅓ W RESISTOR
R2	E477	250 M - ⅓ W
R3	E476	50 M - ⅓ W
R4	E488	30 M - ⅓ W
R5	E615	500 - ⅓ W
R6	E470	250 - ⅓ W
R7	E469	75 - ⅓ W
R8	E490	2000 - ⅓ W
R9	E608	500 M VOL. CONT. WITH SWITCH
R10	E806	METAL RESISTANCE STRIP
R11	E635	50 M V TONE CONTROL
R31	E808	100 M - ⅓ W RESISTOR
CA	E607	4+8 MFD - 500 V, 4 MFD - 300 V

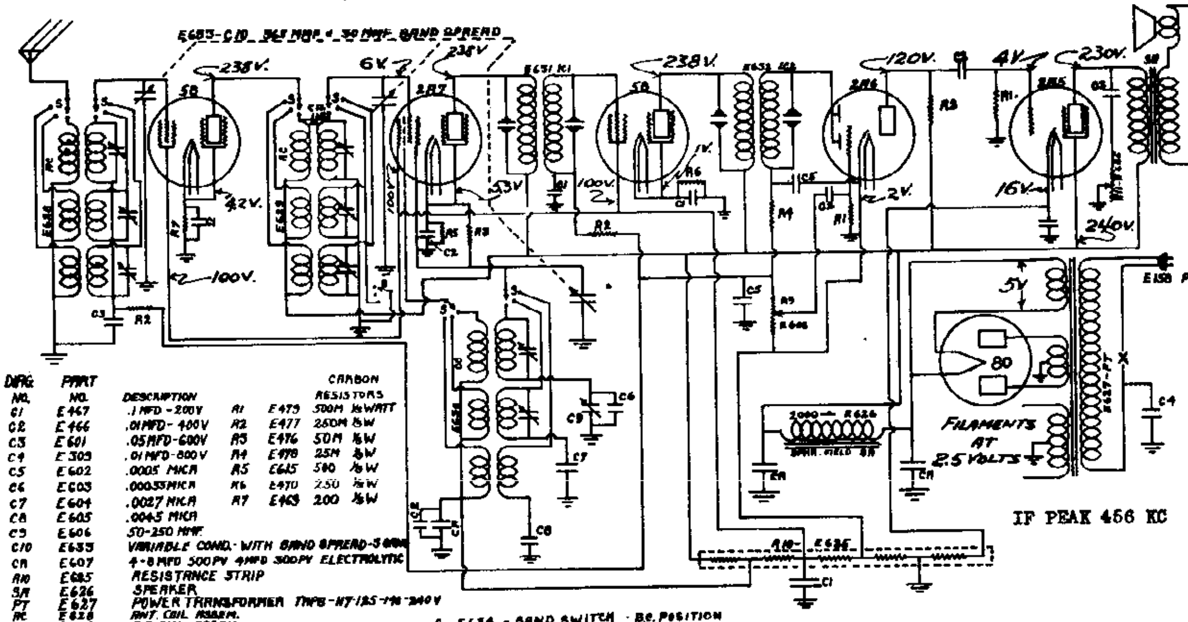
SR	E801	8" DYNAMIC SPEAKER
PT	E802	All VOLTAGE TRANSFORMER
AC	E803	ANT. COIL ASSEM.
RC	E804	R.F. COIL ASSEM.
OC	E805	OSC. COIL ASSEM.
IC1	E651	I.F. TRANS. TOP GRID
IC2	E652	I.F. TRANS. BOTTOM GRID
PC	E158	POWER CORD
S	E809	5 GANG BAND SW. BC. POSITION
C12	E811	3-30 MMF PADDER

TRIMMER LOCATION (BOTH MODELS)

CHASSIS 508:- BAND 1, TOPS OF RESPECTIVE CANS. BANDS 2 AND 3, BOTTOM OF CANS, (ANT., R.F., OSC.).

CHASSIS 511:-TRIMMERS WILL BE FOUND IN BOTTOM OF CANS, EXCEPT BAND 4 OSC (HAS NO TRIMMER).

NOTE:- THE VOLTAGES SHOWN ON BOTH SCHEMATICS ARE TAKEN WITH LINE 115 VOLTS. AERIAL AND GROUND DISCONNECTED, USING 1000 OHMS PER VOLT METER; TAKEN FROM POINTS INDICATED TO GROUND.



DIAG. NO.	PART NO.	DESCRIPTION			CARBON RESISTORS
C1	E467	.1 MFD - 200 V	R1	E479	500 M ⅓ WATT
C2	E466	.01 MFD - 400 V	R2	E477	250 M ⅓ W
C3	E601	.05 MFD - 600 V	R3	E476	50 M ⅓ W
C4	E303	.01 MFD - 800 V	R4	E478	25 M ⅓ W
C5	E602	.0005 MICA	R5	E615	500 ⅓ W
C6	E603	.00035 MICA	R6	E470	250 ⅓ W
C7	E604	.0027 MICA	R7	E463	200 ⅓ W
C8	E605	.0045 MICA			
C9	E606	50-250 MMF.			
C10	E633	VARIABLE COND. - WITH BAND SPREAD - 3 GANG			
CA	E607	4-8 MFD 500 PV 4 MFD 300 PV ELECTROLYTIC			
R10	E625	RESISTANCE STRIP			
SR	E626	SPEAKER			
PT	E627	POWER TRANSFORMER TYPE - H7 - 125 - 110 - 240 V			
AC	E628	ANT. COIL ASSEM.			
RC	E629	R.F. COIL ASSEM.			
OC	E630	OSC. COIL ASSEM.			
IC1	E631	I F TRANS. - TOP GRID.			
IC2	E632	I F TRANS. - BOTTOM GRID			
PC	E158	POWER CORD + PLUG			
R9	E608	500 M ~ VOLUME CONTROL WITH SWITCH			

S - E634 - BAND SWITCH - BC. POSITION

R11 - E635 - 50 M ~ TONE CONTROL

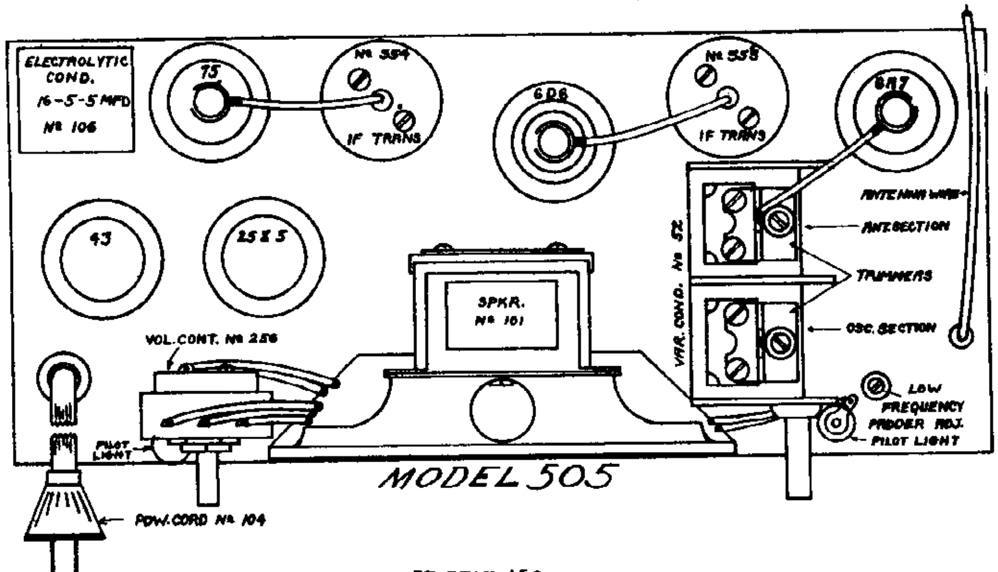
C11 - E636 - 10 MFD 35 V ELECTROLYTIC

C12 - E811 - 3-30 MMF PADDER

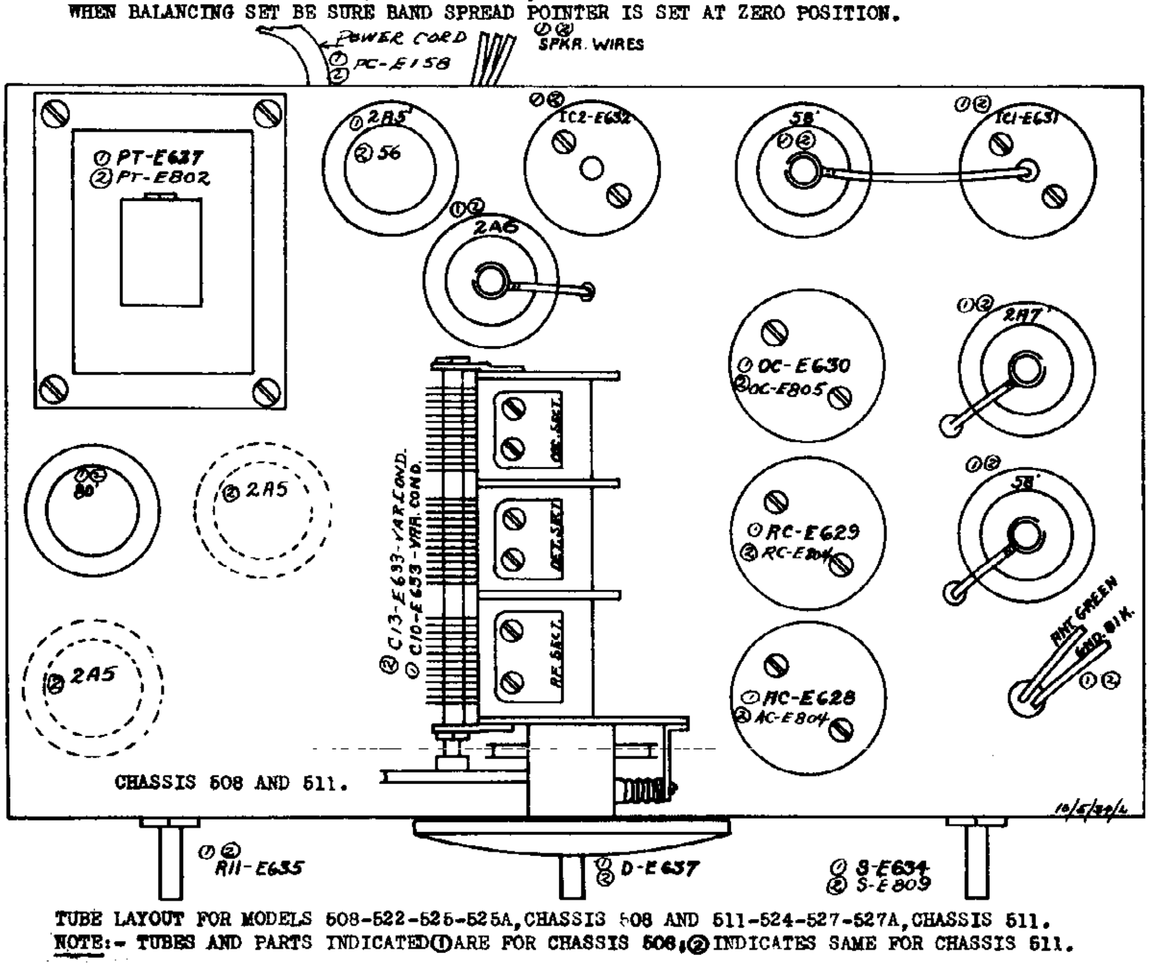
MODELS 508, 522, 525, 525A
MODELS 511, 524, 527, 527A
Socket, Trimmers
Alignment

INTEROCEAN RADIO CORP.

MODEL 505
Socket, Trimmers



ALIGNMENT CHASSIS 508 AND 511. IF PEAK 456 KC
BAND 1:- ADJUST TRIMMERS AT 1500 KC AND IF PADDER AT 600 KC(BOTH AT RIGHT OF CHASSIS).
BAND 2:-(CHASSIS 508 ONLY) ADJUST AT 9000KC (NO L.F. PADDER ON THIS BAND).
BAND 2:-(CHASSIS 511 ONLY) ADJUST AT 3700KC, L.F. PADDER AT 1700 KC.
BAND 3:-(CHASSIS 508 ONLY) ADJUST AT 21,000KC (NO L.F. PADDER ON THIS BAND)
BAND 3:-(CHASSIS 511 ONLY) ADJUST AT 9,000KC.
BAND 4:-(CHASSIS 511 ONLY) ADJUST AT 21,000KC.
WHEN BALANCING SET BE SURE BAND SPREAD POINTER IS SET AT ZERO POSITION.



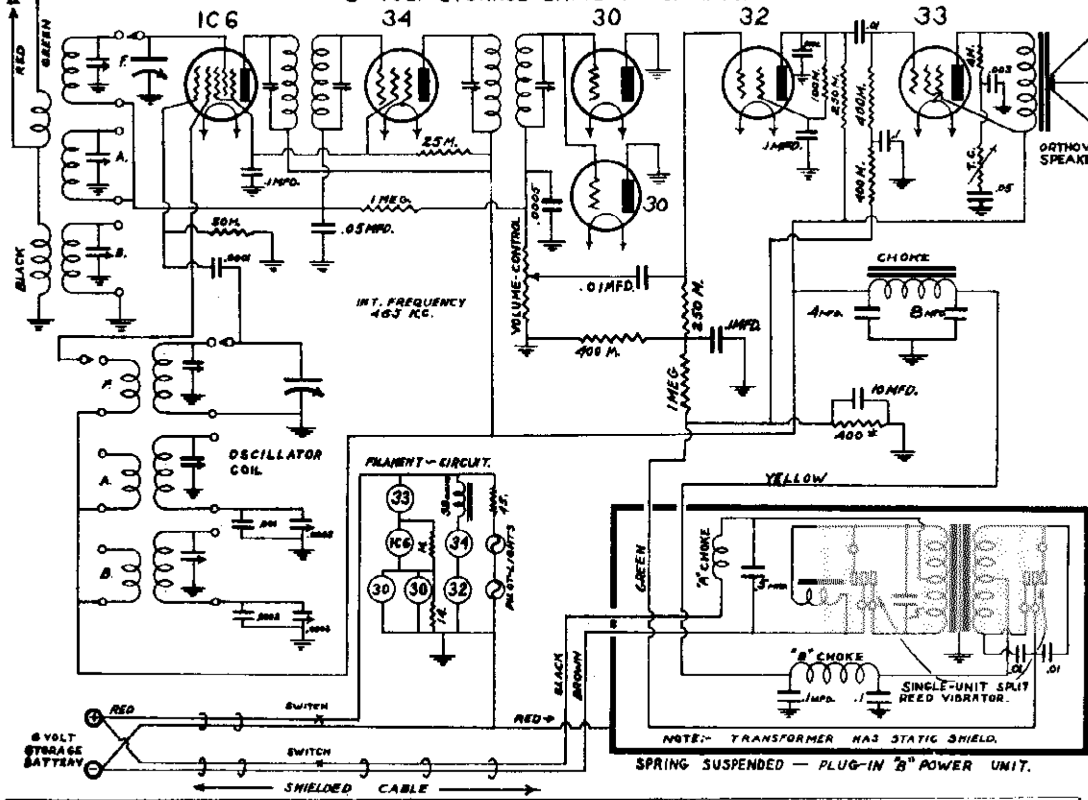
TUBE LAYOUT FOR MODELS 508-522-525-525A, CHASSIS 508 AND 511-524-527-527A, CHASSIS 511.
NOTE:- TUBES AND PARTS INDICATED ① ARE FOR CHASSIS 508; ② INDICATES SAME FOR CHASSIS 511.

LAFAYETTE RADIO MFG. CO.

MODEL C20
MODEL J50
Schematics

3 • BAND • BATTERY • SUPERHET

6 VOLT STORAGE BATTERY OPERATION

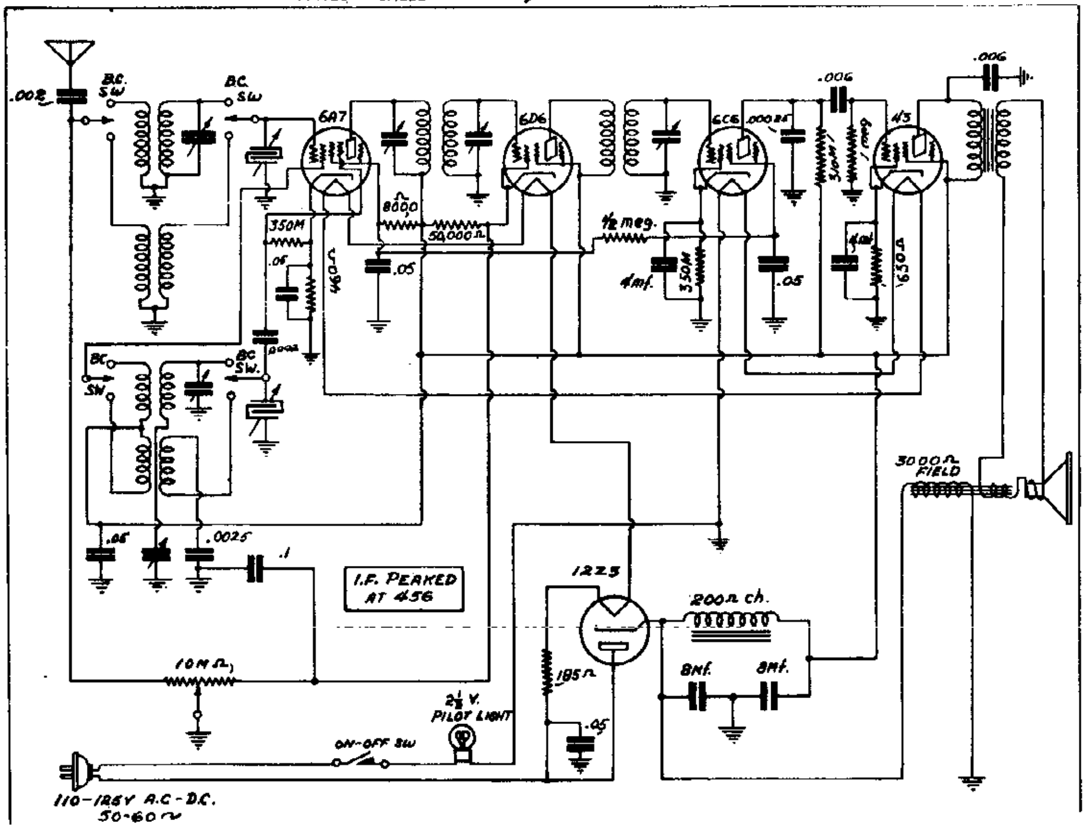


SPRING SUSPENDED — PLUG-IN "B" POWER UNIT.

J50

(681-2) 1936 MODEL

ENGINEERING-DEPARTMENT



MODEL No. C-20

Dated Sept. 19 1935

Drawn by LyK

Checked by

Print No. 508

—old No 7133—

LAFAYETTE RADIO MFG. CO.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator to the grid of the 1st detector through a 0.1 MF condenser.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C38) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C13) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C9 and C12) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C10 and C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

D. C. Resistance of Windings

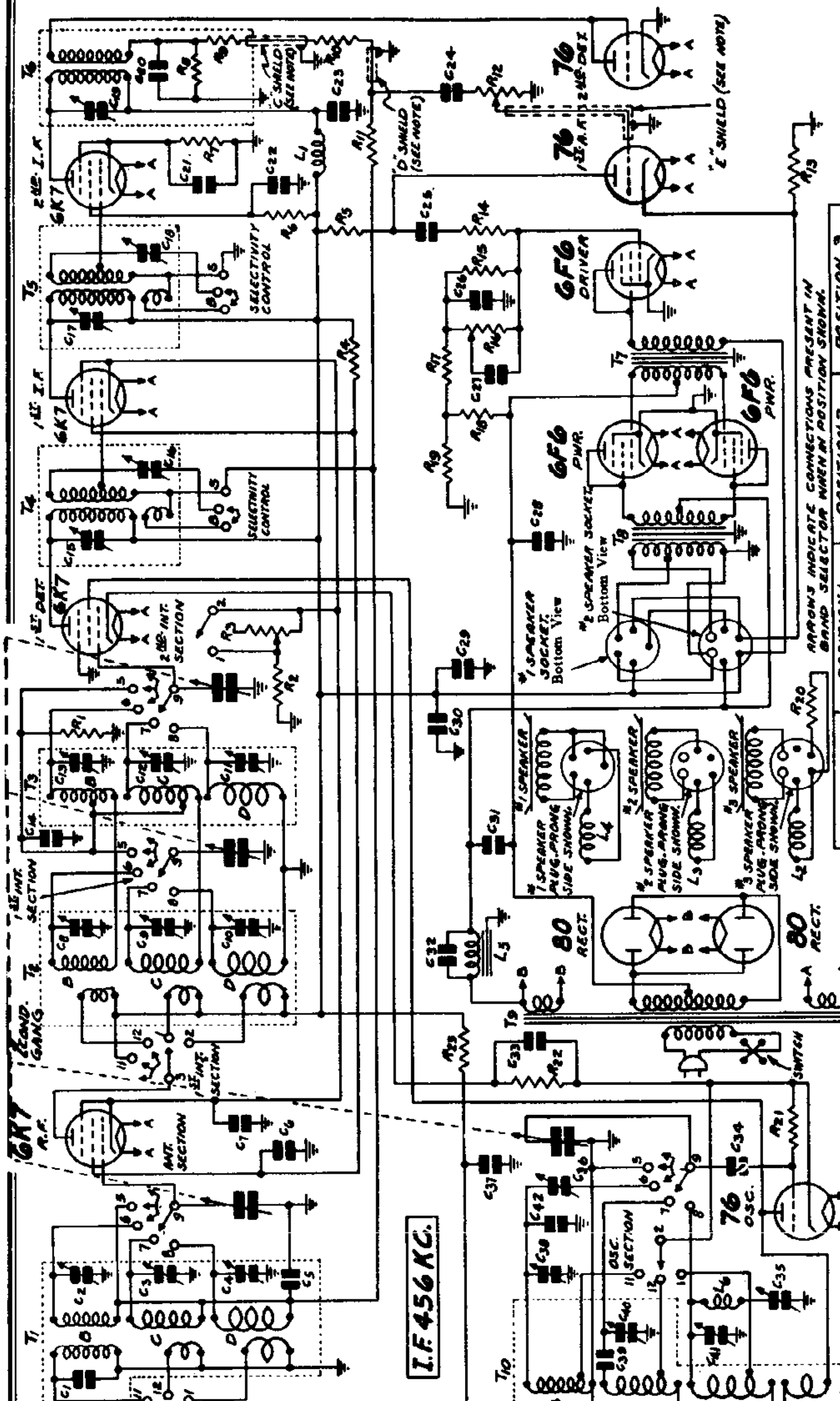
Part No.	Winding	Code	In Ohms
P-9A418	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.4
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		2.1
	Range D Secondary Winding		Small
P-9A411	1st Interstage R. F. Transformer	T2	
	Range B Primary Winding		3.6
	Range C Primary Winding		2.4
	Range D Primary Winding		0.5
	Range B Secondary Winding		3.8
	Range C Secondary Winding		2.1
	Range D Secondary Winding		Small
P-50X24	Audio Input Transformer	T7	
	Primary Winding		415.0
	Secondary Winding		
	Center Tap to Inside		211.7
	Center Tap to Outside		286.5
P-51X26	Audio Output Transformer	T8	
	Primary Winding		
	Center Tap to Inside		135.5
	Center Tap to Outside		155.3
	Secondary Winding		
	Tap to Upper Side		0.16
	Tap to Ground Side		0.12
P-53X82	Power Transformer (115 Volt-60 Cycle)	T9	
	Primary Winding		1.7
	Tube Filament Secondary (A-A)		Small
	Tube Filament Secondary (B-B) (80)		Small
	High Voltage Secondary Winding		
	Center Tap to Inside		97.9
	Center Tap to Outside		106.4
P-9A427	Oscillator Coils	T10	
	Range B Grid Coil		
	Red White Tap to White		3.1
	Red White Tap to Ground		0.7
	Range C Grid Coil		
	Green White Tap to Green		1.7
	Green White Tap to Ground		0.5
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
P-9A400	2nd I. F. Plate Isolating Reactor	L1	34.7
P-12A204	12" Dynamic Speaker (No. 1—See Fig. 2)		
	Speaker Field	L4	6400.
	Voice Coil		Small
P-12A206	12" Dynamic Speaker (No. 2—See Fig. 2)		
	Speaker Field	L3	1000.
	Voice Coil		Small
P-12A226	12" Dynamic Speaker (No. 3—See Fig. 2)		
	Speaker Field	L2	1000.
	Voice Coil		Small
P-52X39	Reactor Assembly	L5	143.6
P-9A391	High Frequency Oscillator Tracking Coil	L6	1.6
P-9A412	2nd Interstage R. F. Coils	T3	
	Range B Section		
	Long Portion		5.9
	Short Portion		0.2
	Range C Section		
	Long Portion		1.8
	Short Portion		0.2
	Range D Section		Small
P-9A413	1st I. F. Transformer	T4	
	Primary Winding		4.4
	Coupling Winding		0.3
	Secondary Winding		
	Tap to Condenser Side		2.3
	Tap to Switch Side		2.3
P-9A414	2nd I. F. Transformer	T5	
	Primary Winding		4.3
	Coupling Winding		0.3
	Secondary Winding		
	Tap to Condenser Side		2.3
	Tap to Switch Side		2.3
P-9A415	3rd I. F. Transformer	T6	
	Primary Winding		9.8
	Secondary Winding		30.0

MODELS B30, B32
Schematic

LAFAYETTE RADIO MFG. CO.

Power Consumption - 140 Watts (At 115 volts 60 cycles)
Power Output - - - - - 15 Watts Undistorted

Tuning Frequency Range
B Range - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - 5750 to 18300 KC.



October, 1935

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SELECTOR WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. AND ANT. SECTION	11 12 1 2 5 6 7 8 9	11 12 1 2 5 6 7 8 9	11 12 1 2 5 6 7 8 9
2ND INT. SECTION	1 2 5 6 7 8 9	1 2 5 6 7 8 9	1 2 5 6 7 8 9
1ST INT. SECTION	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9

CONTACT LOCATIONS 3, 4 AND 10 IN OSC. AND ANT. SECTIONS, 3, 4, 10, 11 AND 12 IN 2ND INT. SECTION AND 4 AND 10 IN 1ST INT. SECTION ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
"B" AND "S" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY.
THE CAPACITY OF THE "C" SHIELD IS 20 μμf.
THE CAPACITY OF THE "D" SHIELD IS 70 μμf.
THE CAPACITY OF THE "E" SHIELD IS 16 μμf.
ON SETS USING ONE SPEAKER THE #3 SPEAKER IS FURNISHED.
ON SETS USING TWO SPEAKERS THE #1 AND #2 SPEAKERS ARE FURNISHED.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .70 mf. 360 V.
C 7 .25 mf. 180 V.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 2-25 mmf.
C11 2-25 mmf.
C12 2-25 mmf.
C13 2-25 mmf.
C14 .05 mf. 180 V.
C15 150-250 mmf. } One Unit
C16 150-250 mmf. }
C17 150-250 mmf. } One Unit
C18 150-250 mmf. }
C19 70-150 mmf.
C20 50 mmf.
C21 .05 mf. 180 V.
C22 .05 mf. 360 V.
C23 .10 mf. 360 V.
C24 .01 mf. 400 V.
C25 .06 mf. 360 V.
C26 .25 mf. 180 V.
C27 .004 mf. 600 V.
C28 125.0 mf. 45 V. Electrolytic
C29 18.0 mf. 290 V. Electrolytic
C30 .25 mf. 360 V.
C31 30.0 mf. 450 V. Electrolytic
C32 .15 mf. 280 V. A. C.
C33 .05 mf. 180 V.
C34 35 mmf.
C35 40-100 mmf. } One Unit
C36 300-600 mmf. }
C37 .25 mf. 360 V.
C38 2-25 mmf.
C39 1400 mmf.
C40 2-25 mmf.
C41 2-25 mmf.
C42 10 mmf.

R 1 25,000 ohm 0.2 watt
R 2 150 ohm 0.2 watt
R 3 2500 ohm } Dual Volume Control
R12 2.0 megohm }
R 4 50,000 ohm 1.0 watt
R 5 60,000 ohm 0.5 watt
R 6 100,000 ohm 0.5 watt
R 7 500 ohm 0.2 watt
R 8 200,000 ohm 0.5 watt
R 9 100,000 ohm 0.2 watt
R10 100,000 ohm 0.2 watt
R11 2.0 megohm 0.2 watt
R13 200 ohm 0.5 watt
R14 250,000 ohm 0.2 watt
R15 250,000 ohm 0.2 watt
R16 3.0 megohm Tone Control
R17 100,000 ohm 0.2 watt
R18 128 ohm 2.5 watt } Armored Wire-Wound
R19 145 ohm 3.0 watt }
R20 7800 ohm 12.0 watt
R21 80,000 ohm 0.2 watt
R22 2,500 ohm 0.2 watt
R23 27,000 ohm 1.0 watt

T 1 Ant. R.F. Trans.
T 2 1st Interstage R.F. Trans.
T 3 2nd Interstage R.F. Trans.
T 4 1st I.F. Trans.
T 5 2nd I.F. Trans.
T 6 3rd I.F. Trans.
T 7 Push-Pull Input Trans.
T 8 Push-Pull Output Trans.
T 9 Power Trans.
T10 Osc. Inductors

L 1 2nd I. F. Plate Isolating Reactor
L 2 No. 3 Speaker Field (100 ohm)
L 3 No. 2 Speaker Field (100 ohm)
L 4 No. 1 Speaker Field (640 ohm)
L 5 Choke Coil
L 6 Osc. Tracking Coil

MODELS B30,B32
Voltage,Socket,Coils
Trimmers,Phono,Data

LAFAYETTE RADIO MFG. CO.

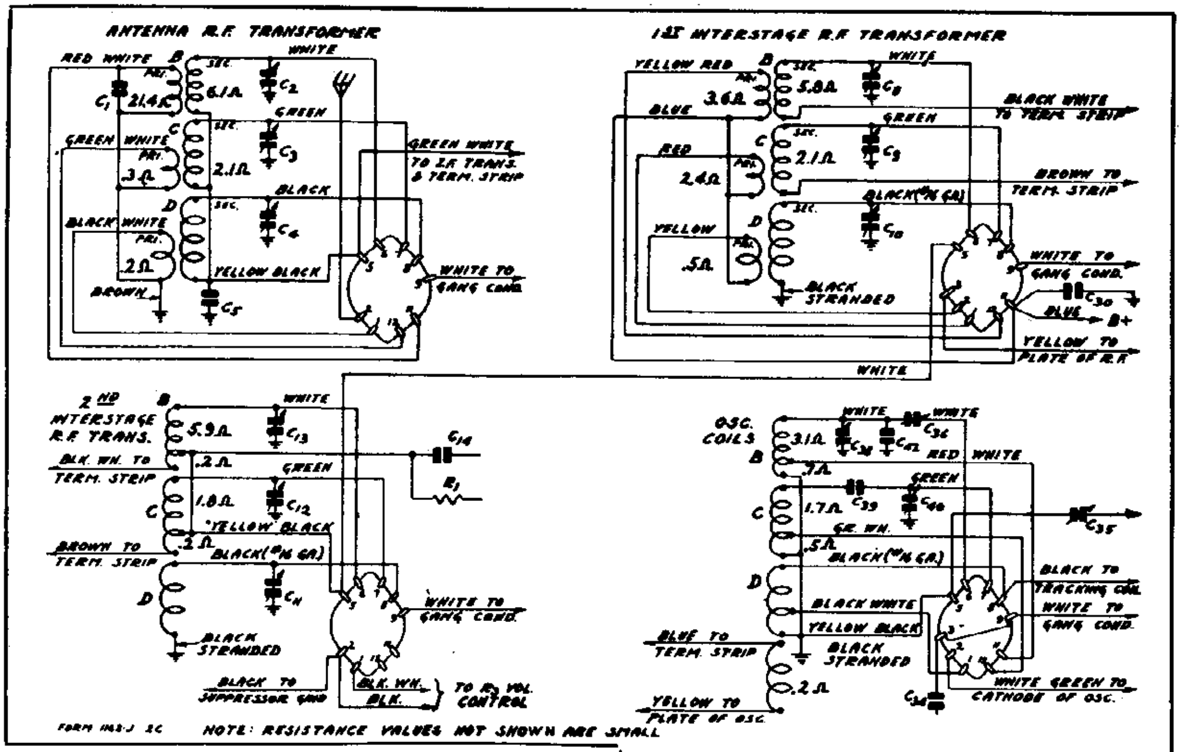
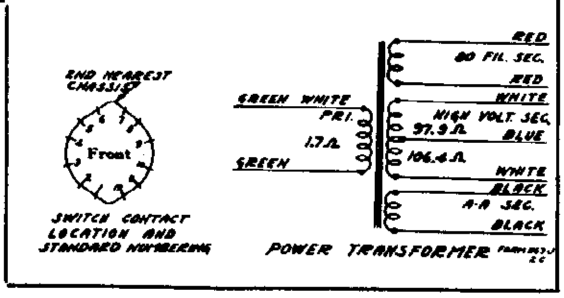


Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List)



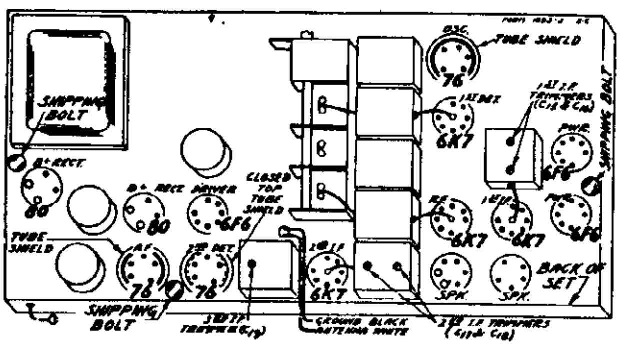


Fig. 5—Location of Tubes

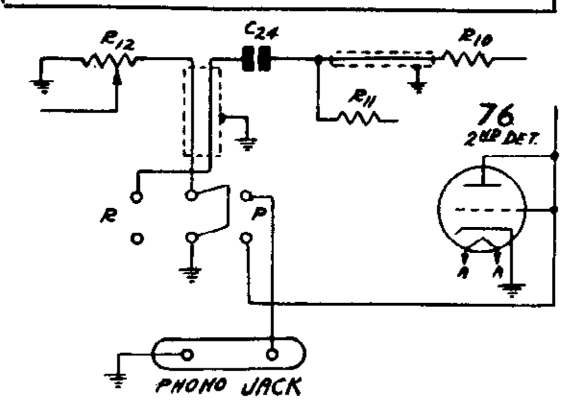


Fig. 7—Phonograph Connections

VOLTAGES AT SOCKETS

Line Voltage 115 - Antenna Shorted to Ground
Volume Control at Maximum

Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Cath. M A
6K7	R. F.	6.2	245	80	2.8	7.6
6K7	1st Det.	6.2	245	90	6.5	2.6
76	Osc.	6.2	90			5.3
6K7	1st I. F.	6.2	245	80	2.8	7.6
6K7	2nd I. F.	6.2	245	74	3.9	7.0
76	2nd Det.	6.2				
76	1st A. F.	6.2	110		5.6	2.1
6F6	Driver	6.2	235	230	20.0(1)	27.0
6F6	Power	6.2	345	345	38.0(2)	22.5
80	Rectifier	5.1	500(3)			140.0(4)

(1) As read across R19
(2) Grid to Ground
(3) Plate to Center Tap
(4) Two tubes in parallel

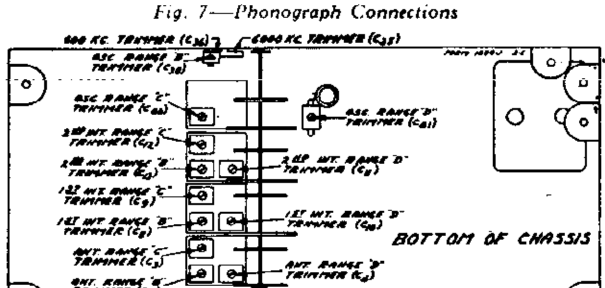


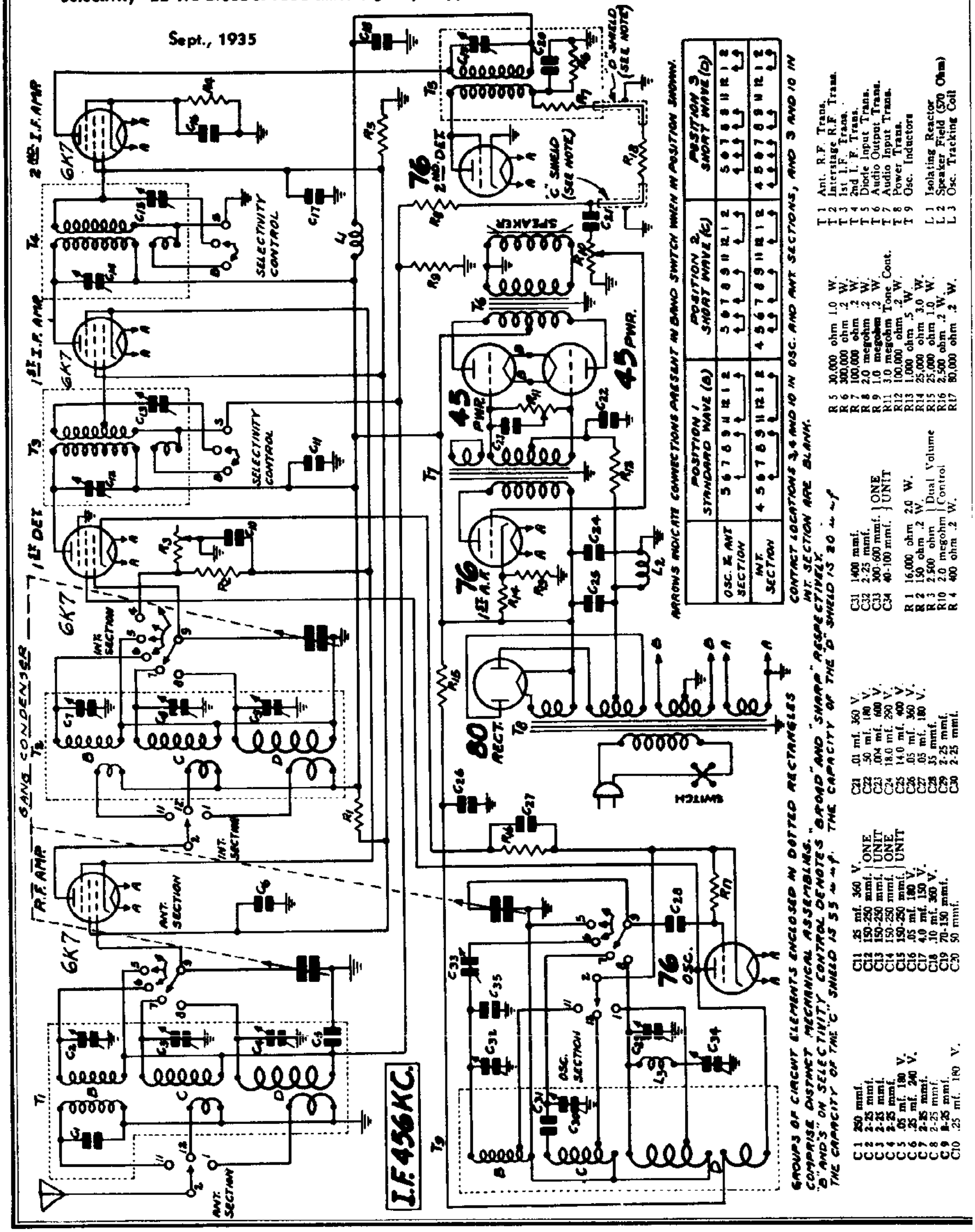
Fig. 3—Location of Trimmers

MODELS B35, B36
Schematic

LAFAYETTE RADIO MFG. CO.

Power Consumption - 90 Watts (At 115 volts 60 cycles)
Power Output - - - - - - 5 Watts Undistorted
Selectivity - 22 KC Broad at 1000 times Signal (Sharp)

Tuning Frequency Range
B Range - - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - - - - 5750 to 18300 KC.



MODELS B35,B36
Voltage,Socket,Coils
Trimmers,Phono.Data

LAFAYETTE RADIO MFG. CO.

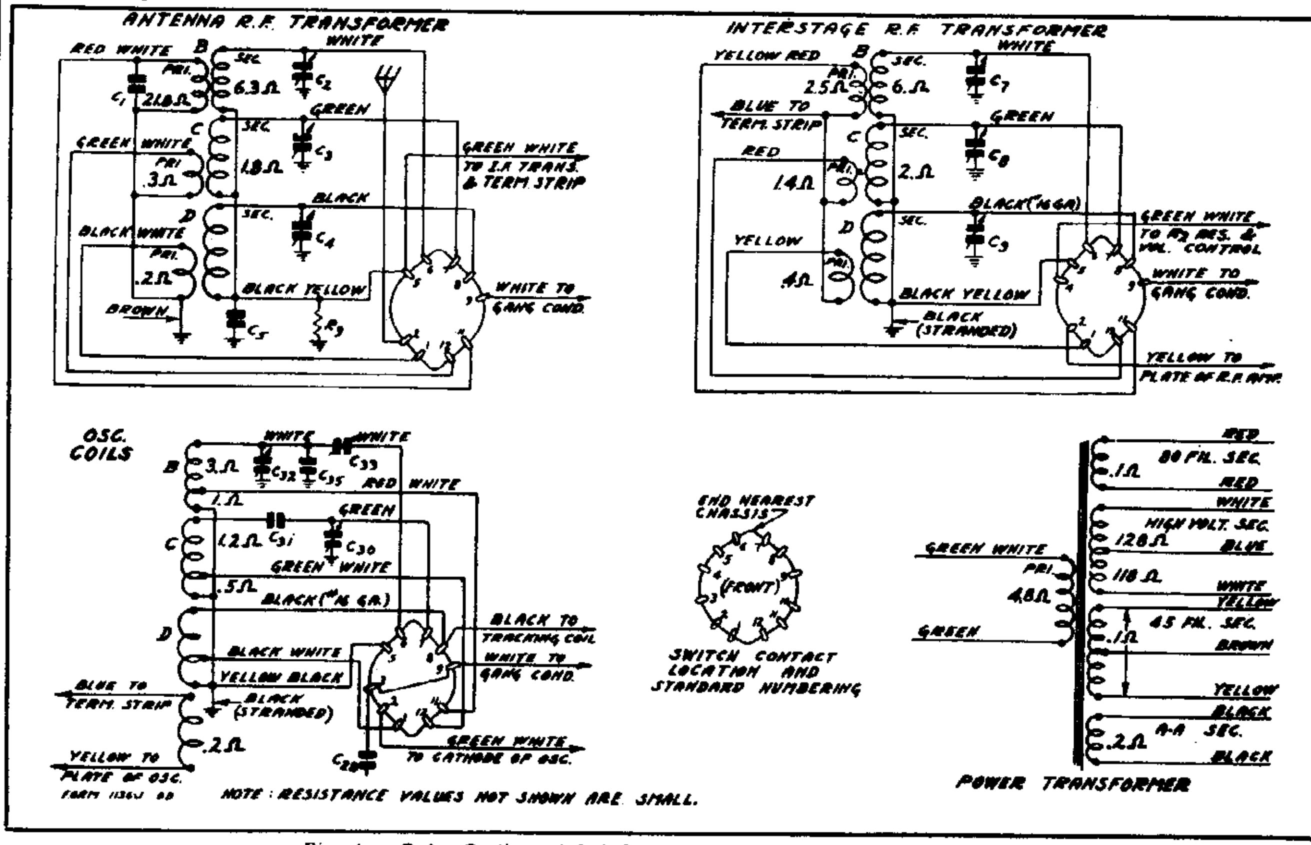


Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

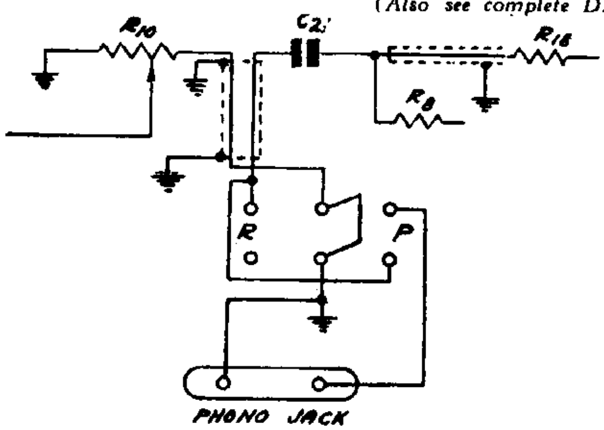


Fig. 7—Phonograph Connections

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Ca'hode M. A.
6K7 (6D6)	R. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	1st Det.	6.1	265	110	9.5	3.8
76	Osc.	6.1	110			5.8
6K7 (6D6)	1st. I. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	2nd I. F.	6.1	265	120	3.7	9.0
76	2nd Det.	6.1				
76	1st A. F.	6.1	265		14.	5.0
45	Power	2.5	265		50.(1)	22.
80	Rectifier	4.9				90. (total)

(1) As read with 500 Volt Scale. Grid to Ground.

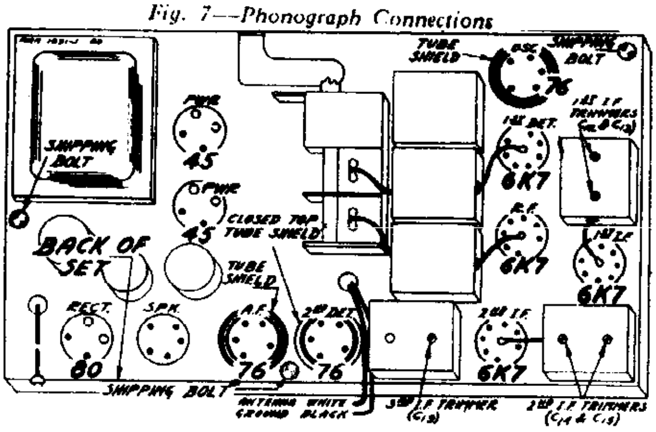


Fig. 5—Location of Tubes

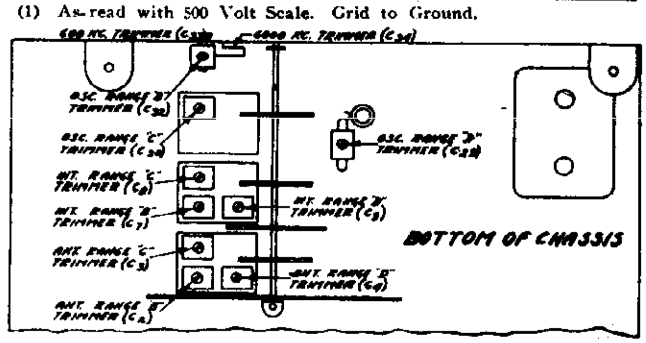


Fig. 3—Location of Trimmers

LAFAYETTE RADIO MFG. CO.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

D. C. Resistance of Windings
Refer to Fig. 4.

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A408	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.8
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.3
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A405	Interstage R. F. Transformer	T2	
	Range B Primary Winding		2.5
	Range C Primary Winding		1.4
	Range D Primary Winding		0.4
	Range B Secondary Winding		6.0
	Range C Secondary Winding		2.0
	Range D Secondary Winding		Small
P-9A406	Oscillator Coils	T9	
	Range B Grid Coil		
	Red White Tap to White		3.0
	Red White Tap to Ground		1.0
	Range C Grid Coil		
	Green White Tap to Green		1.2
	Green White Tap to Ground		0.5
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
P-9A397	1st I. F. Transformer	T3	
	Primary Winding		4.6
	Secondary Winding		
	Long Portion		3.4
	Short Portion		1.7
	Coupling Winding		0.2
P-9A398	2nd I. F. Transformer	T4	
	Primary Winding		9.4
	Secondary Winding		9.0
	Coupling Winding		0.5
P-9A399	3rd I. F. Transformer	T5	
	Primary Winding		10.2
	Secondary Winding		28.4
P-30X16	Audio Input Transformer	T7	
	Primary Winding		2350.
	Secondary Winding		
	Center Tap to Inside		2000.
	Center Tap to Outside		2890.
P-31X32	Audio Output Transformer	T6	
	Primary Winding		
	Center Tap to Inside		198.
	Center Tap to Outside		222.
	Secondary Winding		0.4
P-12A206	Dynamic Speaker (10")		
	Speaker Voice Coil		1.6
	Speaker Field	L2	570.
P-51X94	115 Volt 60 Cycle Power Trans.	T8	
	Primary Winding		4.8
	Tube Filament Secondary (A-A)		0.2
	Tube Filament Secondary (B-B) (45)		0.1
	Rectifier Filament Secondary		0.1
	High Voltage Secondary Winding		
	Center Tap to Inside		118.
	Center Tap to Outside		128.
P-9A408	2nd I. F. Plate Isolating Reactor	L1	36.
P-9A391	High Frequency Oscillator Tracking Coil	L3	1.2

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Changes in Early Models

In the early models of this receiver the tone control resistor (R11) was connected as a series variable resistor connecting in series through the condenser C23 between the grids of the 45 tubes in the audio output stage. In the later models it is employed as a potentiometer in the manner shown in Fig. 2.

The 100,000 ohm resistor (R18) was not used in the early models. Condenser C21 was connected directly to resistor R7.

The type 6K7 metal tubes replace the type 6D6 glass tubes which were used in the early models.

Condenser C35 was added to the oscillator coil standard wave section in later models. It is not, however, used in all cases but only when this capacity is required in this circuit.

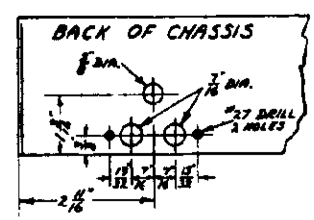


Fig. 8.—Details of Panel Drilling for Phono Assembly

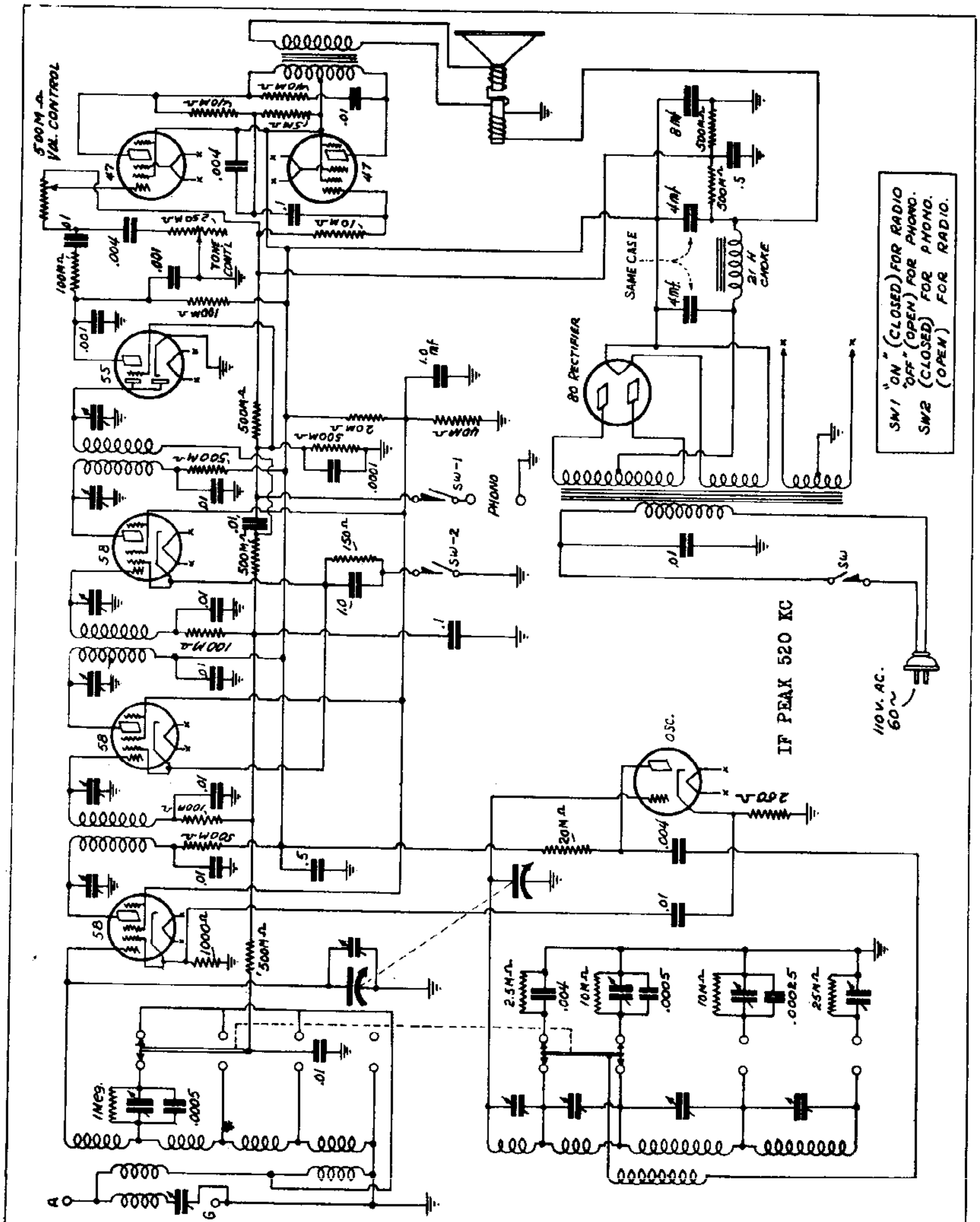
Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes of a size and in the position shown in Fig. 8 at the left hand side (from back) of the rear panel of the chassis.

MODELS M41, M43
Schematic

LAFAYETTE RADIO MFG. CO.

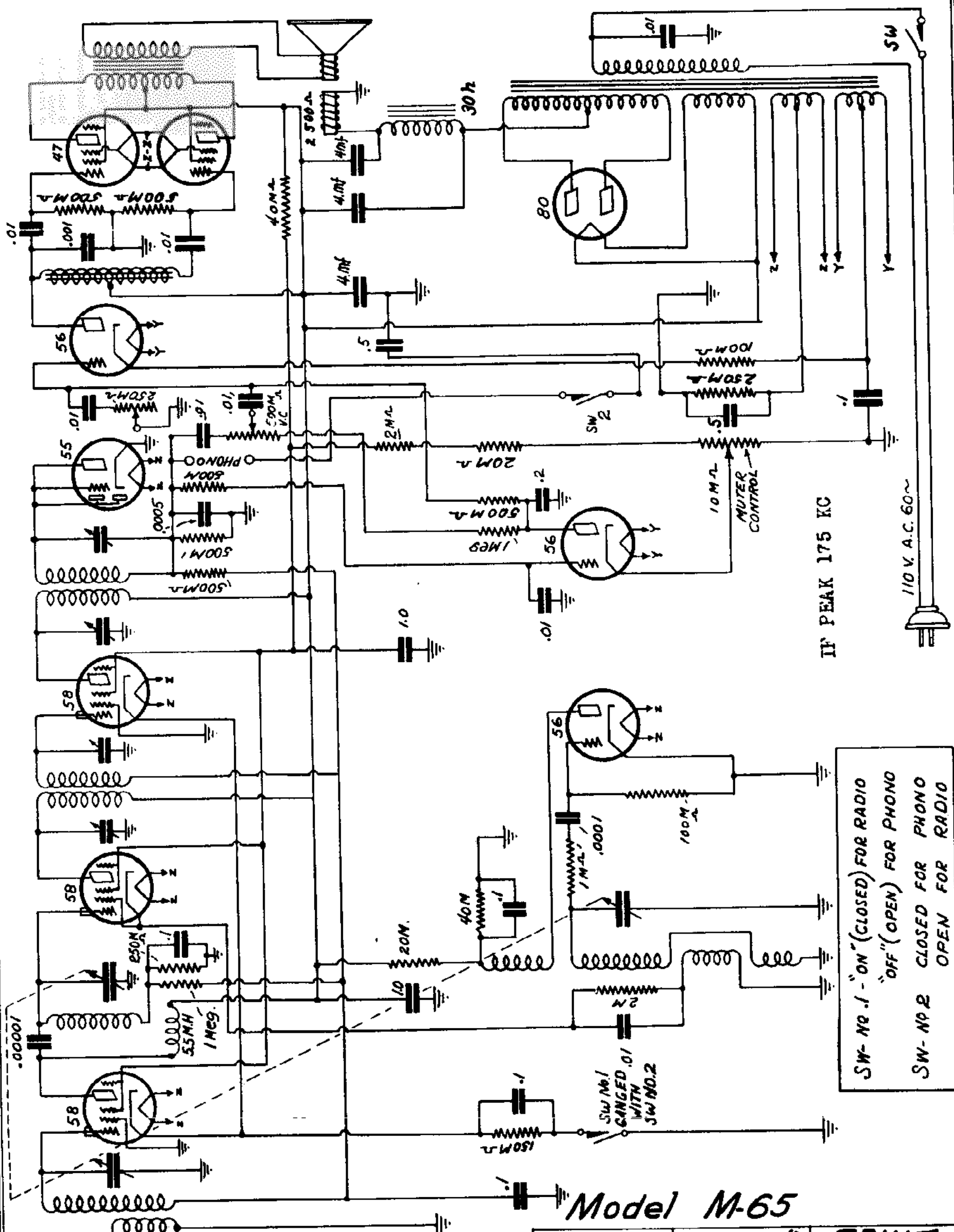


Lafayette Dual Wave M-41 - M-43
8 Tube Superhet'

Dated	Drawn by	PRINT
Sept. 26 1935	Checked by	No. 110

MODEL M65
Schematic

LAFAYETTE RADIO MFG. CO.

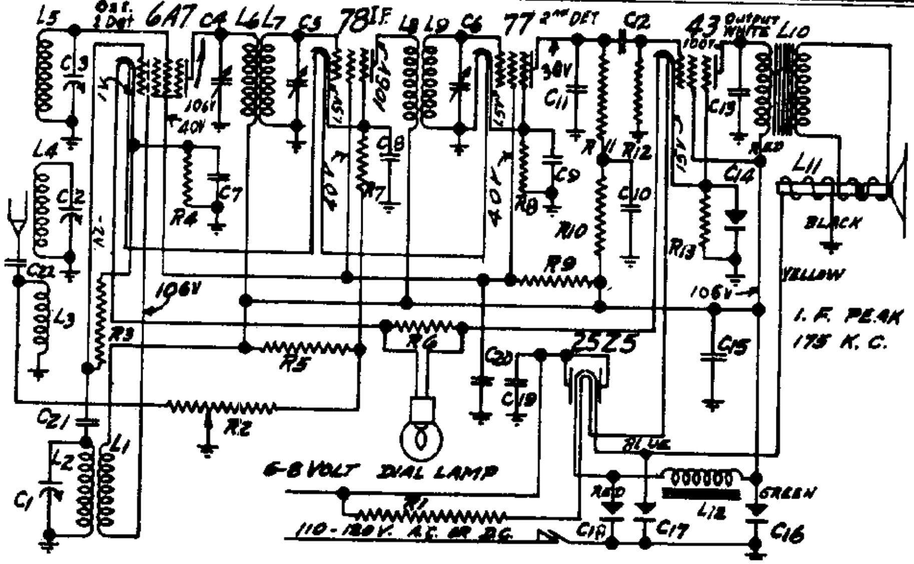


Model M-65

Dated Sept 27 1935	Drawn by WR Checked by	PRINT No. 105

MODEL A77
MODELS A81,A81L
Schematics, Socket

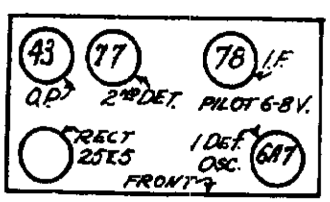
LAFAYETTE RADIO MFG. CO.



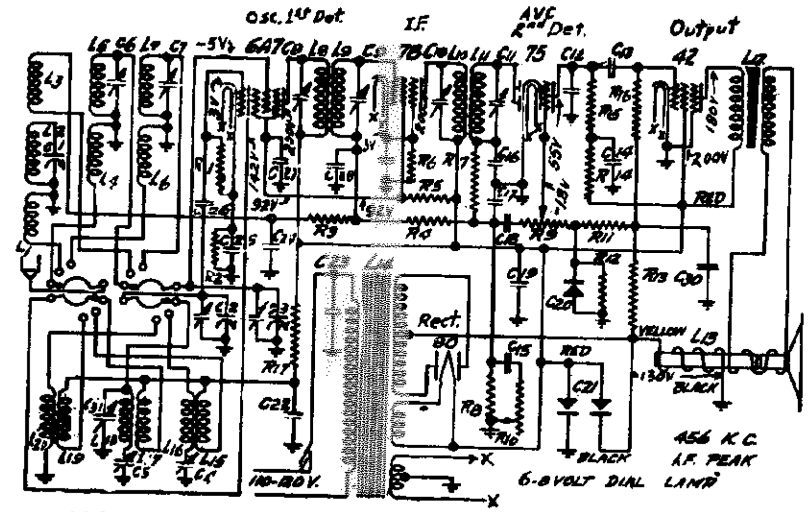
MODEL A77

R1	20-1125	150	Ohm Resistor in Power Cord
R2	19-1296	10,000	Ohm Volume Control & Switch
R3	53-898	50,000	Ohm Resistor Oscillator Grid
R4	53-1062	250	Ohm Resistor 6A7 Cathode
R5	53-922	75,000	Ohm Resistor I.F.Cathode Feed
R6	53-1806	80	Ohm Resistor Pilot Light Shunt
R7	53-1063	500	Ohm Resistor I.F.Cathode
R8	53-941	20,000	Ohm Resistor Second Detector Cathode
R9	53-921	40,000	Ohm Resistor Screen Feed
R10	53-923	100,000	Ohm 77 Plate Hum Resistor
R11	53-924	250,000	Ohm Resistor 77 Plate
R12	53-925	500,000	Ohm Resistor Output Grid
R13	53-1063	500	Ohm Resistor Output Cathode

C1	77-833	336 MMFD. Oscillator Section 3 Gang
C2	77-833	371 MMFD. Preselector Section 3 Gang
C3	77-833	371 MMFD. Preselector Section 3 Gang
C4	78-2008	First I.F. Primary Trimmer
C5	78-2007	First I.F. Secondary Trimmer
C6	78-788	Second I.F. Trimmer
C7	75-272A	.1 Mfd. 200 Volt 6A7 Cathode
C8	75-272A	.1 Mfd. 200 Volt 78 Cathode
C9	75-267A	5. Mfd. 200 Volt 77 Cathode
C10	75-272A	.1 Mfd. 200 Volt 77 Plate Hum Filter
C11	76-265	.001 Mfd. Mica 77 Plate By-Pass
C12	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C13	75-343A	.004 Mfd. Paper Output Plate By-Pass
C14	18-928	25 Mfd. 25 Volt Output Cathode
C15	75-267A	.5 Mfd. 200 Volt B Supply By-Pass
C16	18-1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C17	18-1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C18	18-1085	10 Mfd. 150 Volt Dry Electrolytic Condenser
C19	75-272A	.1 Mfd. 200 Volt 110 Volt Line By-Pass
C20	75-272A	.1 Mfd. 200 Volt Screen By-Pass
C21	76-264	.00005 Mfd. Mica Oscillator Grid Condenser
C22	76-265	.001 Mfd. Mica Antenna Series Condenser
L11	54-1260	3000 Ohm Speaker Field
L12	14-940	20 Henry Choke



CHASSIS LAYOUT

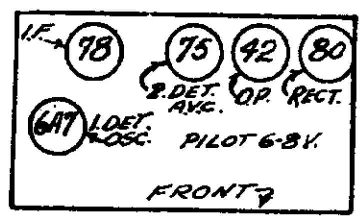


MODEL A81,A81L

R1	53-941	20,000	Ohm Oscillator Grid Resistor
R2	53-1042	250	Ohm Oscillator Cathode Resistor
R3	53-923	100,000	Ohm A.V.C. Network
R4	53-926	1	Megohm A.V.C. Network
R5	53-1042	25,000	Ohm Screen Feed
R6	53-1063	500	Ohm I.F. Cathode
R7	53-898	50,000	Ohm Diode Filter
R8	53-925	500,000	Ohm Diode Load
R9	19-1291	500,000	Ohm Volume Control & Switch
R10	19-1317	250,000	Ohm Tone Control
R11	53-923	100,000	Ohm C Bias Network
R12	53-919	5,000	Ohm C Bias Network
R13	53-926	1	Megohm C Bias Network
R14	53-923	100,000	Ohm 75 Plate Hum Resistor
R15	53-924	250,000	Ohm 75 Plate
R16	53-925	500,000	Ohm 42 Grid
R17	53-877	10,000	Ohm Oscillator Plate Resistor

L1	17-20[illegible]	Broadcast Preselector Primary
L2	17-2031	Broadcast Preselector First Secondary
L3	17-2031	Broadcast Preselector Second Secondary
L4	17-2031	Long Wave Band Preselector Primary
L5	17-2031	Long Wave Band Preselector Secondary
L6	17-2017	Foreign Band Preselector Primary
L7	17-2017	Foreign Band Preselector Secondary
L8	17-2016	First I.F. Primary
L9	17-2016	First I.F. Secondary
L10	17-2016	Second I.F. Primary
L11	17-2016	Second I.F. Secondary
L12	64-2003	Single 42 Output Transformer
L13	-2003	2500 Ohm Speaker Field

C1	77-1581	16-366	MMFD. Third Section of 3 Gang Condenser
C2	77-1581	16-366	MMFD. Oscillator Section of 3 Gang Condenser
C3	77-1581	16-366	MMFD. Second Section of 3 Gang Condenser
C4	78-1569	450	MMFD. Broadcast Oscillator Trimmer
C5	78-1569	140	MMFD. Long Wave Band Oscillator Trimmer
C6	78-1588	3-30	MMFD. Long Wave Band Preselector Trimmer
C7	78-1588	3-30	MMFD. Skip Band Preselector Trimmer
C8	78-2005	80	MMFD. First I.F. Primary Trimmer
C9	78-2005	80	MMFD. First I.F. Secondary Trimmer
C10	78-2005	80	MMFD. Second I.F. Primary Trimmer
C11	78-2005	80	MMFD. Second I.F. Secondary Trimmer
C12	76-265	.001	MFD. Mica Second Detector Plate
C13	75-269A	.01	MFD. 400 Volt Audio Feed Condenser
C14	75-1326A	.1	MFD. 400 Volt 75 Plate Hum Filter
C15	75-269A	.01	MFD. 400 Volt Tone Control Condenser
C16	76-339	.0001	MFD. Mica Diode Filter Network
C17	76-339	.0001	MFD. Mica Diode Filter Network
C18	75-269A	.01	MFD. 400 Volt Audio Feed Condenser
C19	75-266	1.	MFD. 400 Volt B. Supply By-Pass
C20	18-928	25	MFD. 25 Volt C Bias
C21	18-1274	4-4	MFD. 450 Volt Dry Electrolytic Condenser
C22	75-269A	.01	MFD. 400 Volt Oscillator Plate By-Pass
C23	75-269A	.01	MFD. 400 Volt 110 Volt Line By-Pass
C24	75-272A	.1	MFD. 200 Volt A.V.C. Network By-Pass
C25	75-272A	.1	MFD. 200 Volt 6A7 Cathode By-Pass
C26	76-264	.00005	MFD. Mica Oscillator Grid Condenser
C27	75-272A	.1	MFD. 200 Volt Screen By-Pass
C28	75-272A	.1	MFD. 200 Volt A.V.C. Network By-Pass
C29	75-272A	.1	MFD. 200 Volt 78 Cathode By-Pass
C30	75-163A	.2	MFD. 200 Volt C Bias Network By-Pass
C31	78-1508	3-30	MMFD. Long Wave Band Oscillator Trimmer



CHASSIS LAYOUT

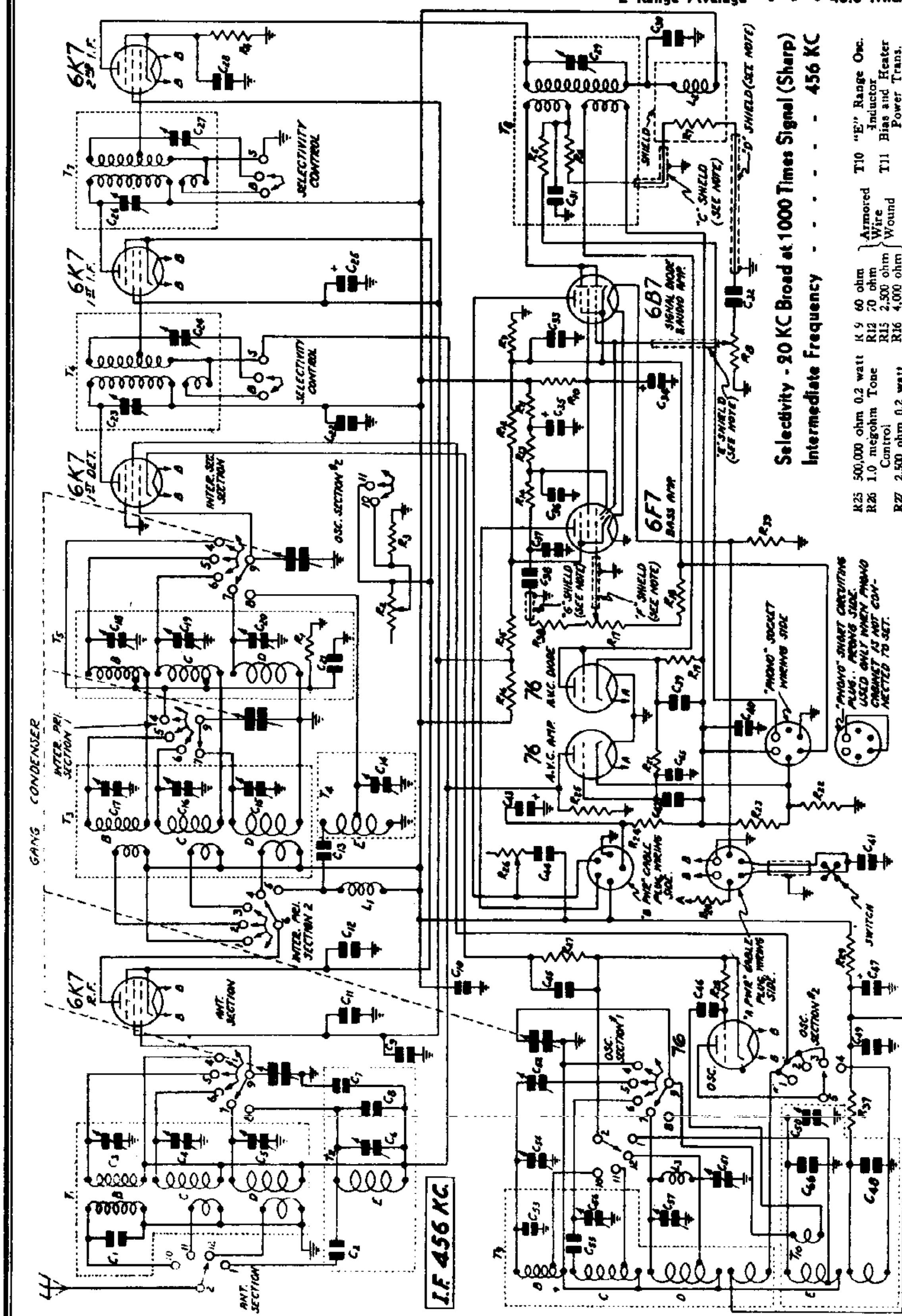
LAFAYETTE RADIO MFG. CO.

Power Consumption - - - - - - - 290 Watts
(At 115 Volts 60 Cycles)

Power Output - - - - 30 Watts Undistorted

Sensitivity

B Range Average - - - 0.5 Microvolts Absolute
C Range Average - - - 1.0 Microvolts Absolute
D Range Average - - - 2.0 Microvolts Absolute
E Range Average - - - 40.0 Microvolts Absolute



Selectivity - 20 KC Broad at 1000 Times Signal (Sharp)
Intermediate Frequency - - - - - - 456 KC

C 1 250 mmf.
C 2 35 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 2-25 mmf.
C 6 2-25 mmf.
C 7 .05 mf. 180 V.
C 8 35 mmf.
C 9 250 mmf.
C10 .05 mf. 480 V.
C11 .25 mf. 180 V.

C21 .05 mf. 180 V.
C22 .25 mf. 480 V.
C23 150-250 mmf. } Dual
C24 150-250 mmf. }
C25 60.0 mf. Electrolytic
C26 150-250 mmf. } Dual
C27 150-250 mmf. }
C28 .05 mf. 180 V.
C29 70-150 mmf.
C30 .10 mf. 480 V.
C31 50.0 mmf.

C41 .02 mf. 600 V.
C42 .05 mf. 180 V.
C44 .01 mf. 360 V.
C45 .05 mf. 180 V.
C46 35 mmf.
C48 .05 mf. 360 V.
C49 .10 mf. 360 V.
C50 2-25 mmf.
C53 10 mmf.
C54 2-25 mmf.
C55 1400 mmf.

C63 30. mf. 400 V. Electrolytic
C64 30. mf. 400 V. Electrolytic
C65 500 mmf.
C66 20 mmf.
C67 .70 mf. 280 V. (Block)
C68 .70 mf. 280 V. (Block)

R 5 100,000 ohm 0.2 watt
R 6 100,000 ohm 0.2 watt
R 7 100,000 ohm 0.2 watt
R10 60,000 ohm 1.0 watt
R11 10,000 ohm 0.5 watt
R13 60,000 ohm 0.5 watt
R14 40,000 ohm 0.2 watt
R18 150,000 ohm 0.2 watt
R19 100,000 ohm 0.2 watt
R20 2.0 ohm 1.0 watt armored wire wound

R25 500,000 ohm 0.2 watt
R26 1.0 megohm Tone Control
R27 2,500 ohm 0.2 watt
R28 30,000 ohm 0.2 watt
R29 15,000 ohm 3.0 watt
R30 50,000 ohm 0.2 watt
R31 2,000 ohm 0.2 watt
R32 2,000 ohm 0.2 watt
R33 200,000 ohm 0.2 watt
R34 200,000 ohm 0.2 watt
R35 2,000 ohm 0.2 watt
R36 2,000 ohm 0.2 watt
R37 150 ohm 0.2 watt

R 9 60 ohm } Armored Wire Wound
R12 70 ohm }
R15 2,500 ohm }
R16 4,000 ohm }
R39 130 ohm 2.5 watt armored wire wound

T 1 Ant. R.F. Trans.
T 2 "E" Range Ant. R.F. Trans.
T 3 1st Interstage R.F. Trans.
T 4 "E" Range Int. R.F. Trans.
T 5 2nd Interstage R.F. Trans.

T10 "E" Range Osc. Inductor
T11 Bias and Heater Power Trans.
T12 "B" Power Trans.
T13 P-P Input Trans.
T14 P-P Output Trans.
B 1 Block Cond. and 10 KC Filter
L 1 "E" Range Int. Plate Reactor
L 2 2nd I.F. Plate Isolating Reactor
L 3 Osc. Tracking Coil
L 4 Filter Reactor

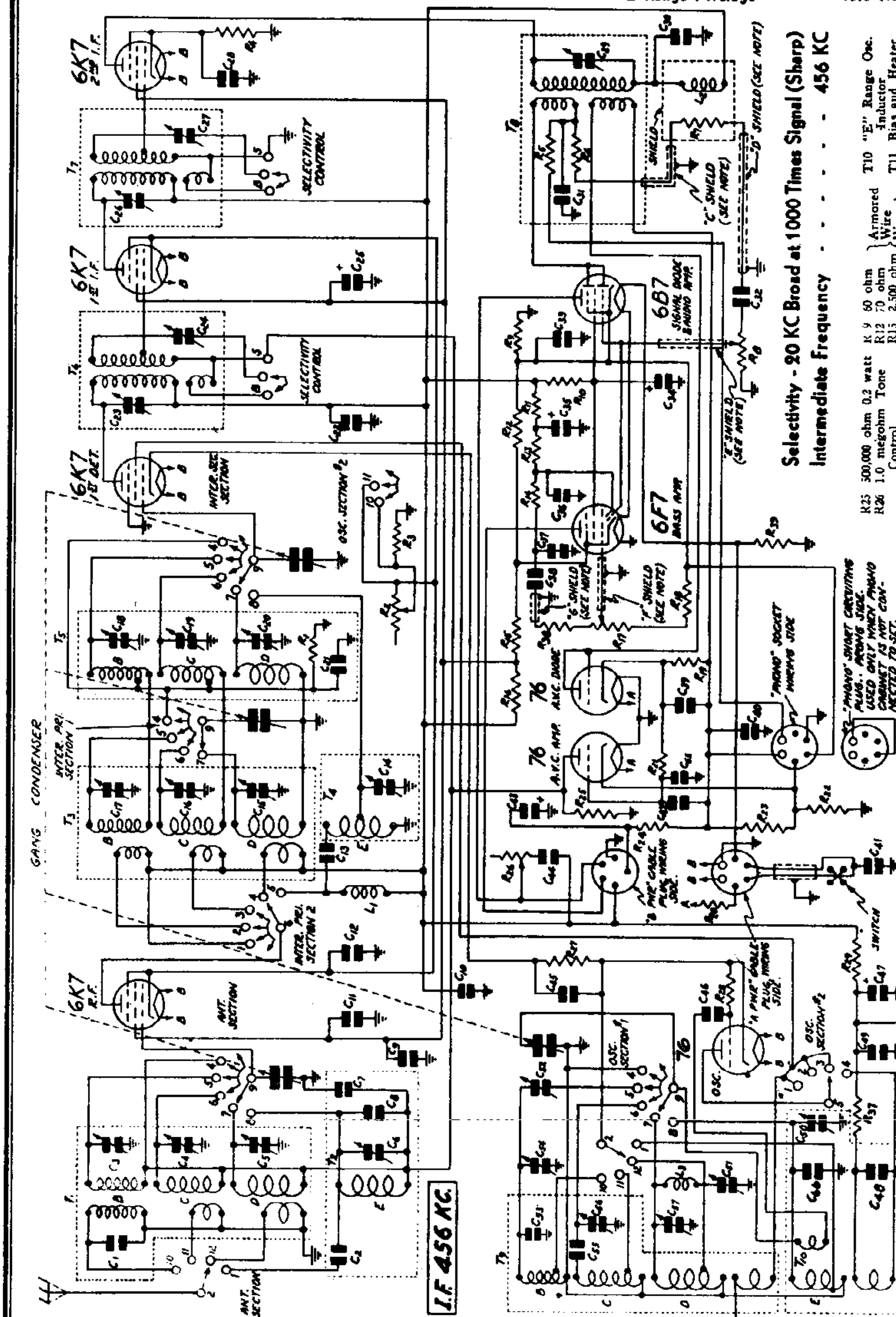
LAFAYETTE RADIO MFG. CO.

Power Consumption - - - - - - - 290 Watts
(At 115 Volts 60 Cycles)

Power Output - - - - 30 Watts Undistorted

Sensitivity

B Range Average	- - -	0.5 Microvolts Absolute
C Range Average	- - -	1.0 Microvolts Absolute
D Range Average	- - -	2.0 Microvolts Absolute
E Range Average	- - -	40.0 Microvolts Absolute



Selectivity - 20 KC Broad at 1000 Times Signal (Sharp)

Intermediate Frequency - - - - - - - 456 KC

C 1	250 mmf.
C 2	35 mmf.
C 3	2-25 mmf.
C 4	2-25 mmf.
C 5	2-25 mmf.
C 6	2-25 mmf.
C 7	.05 mf. 180 V.
C 8	35 mmf.
C 9	250 mmf.
C10	.05 mf. 480 V.
C11	.25 mf. 180 V.
C21	.05 mf. 180 V.
C22	.25 mf. 480 V.
C23	150-250 mmf. } Dual
C24	150-250 mmf. } Dual
C25	60.0 mf. Electrolytic
C26	150-250 mmf. } Dual
C27	150-250 mmf. } Dual
C28	.05 mf. 180 V.
C29	70-150 mmf.
C30	.10 mf. 480 V.
C31	50.0 mmf.
C41	.02 mf. 600 V.
C42	.05 mf. 180 V.
C44	.01 mf. 360 V.
C45	.05 mf. 180 V.
C46	35 mmf.
C48	.05 mf. 360 V.
C49	.10 mf. 360 V.
C50	2-25 mmf.
C53	10 mmf.
C54	2-25 mmf.
C55	1400 mmf.
C63	30. mf. 400 V. Electrolytic
C64	30. mf. 400 V. Electrolytic
C65	500 mmf.
C66	20 mmf.
C67	.70 mf. 280 V. (Block)
C68	.70 mf. 280 V. (Block)

R 5	100,000 ohm 0.2 watt
R 6	100,000 ohm 0.2 watt
R 7	100,000 ohm 0.2 watt
R10	60,000 ohm 1.0 watt
R11	10,000 ohm 0.5 watt
R13	60,000 ohm 0.5 watt
R14	40,000 ohm 0.2 watt
R18	150,000 ohm 0.2 watt
R19	100,000 ohm 0.2 watt
R20	2.0 ohm 1.0 watt armored wire wound
R25	500,000 ohm 0.2 watt
R26	1.0 megohm Tone Control
R27	2,500 ohm 0.2 watt
R28	30,000 ohm 0.2 watt
R29	15,000 ohm 3.0 watt
R30	50,000 ohm 0.2 watt
R31	2,000 ohm 0.2 watt
R32	2,000 ohm 0.2 watt
R33	200,000 ohm 0.2 watt
R34	200,000 ohm 0.2 watt
R35	2,000 ohm 0.2 watt
R36	2,000 ohm 0.2 watt
R37	150 ohm 0.2 watt
R 9	60 ohm } Armored Wire Wound
R12	70 ohm } Armored Wire Wound
R15	2,500 ohm } Armored Wire Wound
R16	4,000 ohm } Armored Wire Wound
R39	130 ohm 2.5 watt armored wire wound

T 1	Ant. R.F. Trans.
T 2	"E" Range Ant. R.F. Trans.
T 3	1st Interstage R.F. Trans.
T 4	"E" Range Int. R.F. Trans.
T 5	2nd Interstage R.F. Trans.
T10	"E" Range Osc. Inductor
T11	Bias and Heater Power Trans.
T12	"B" Power Trans.
T13	P-P Input Trans.
T14	P-P Output Trans.
B 1	Block Cond. and 10 KC Filter
L 1	"E" Range Int. Plate Reactor
L 2	2nd I.F. Plate Isolating Reactor
L 3	Osc. Tracking Coil
L 4	Filter Reactor

MODEL B78

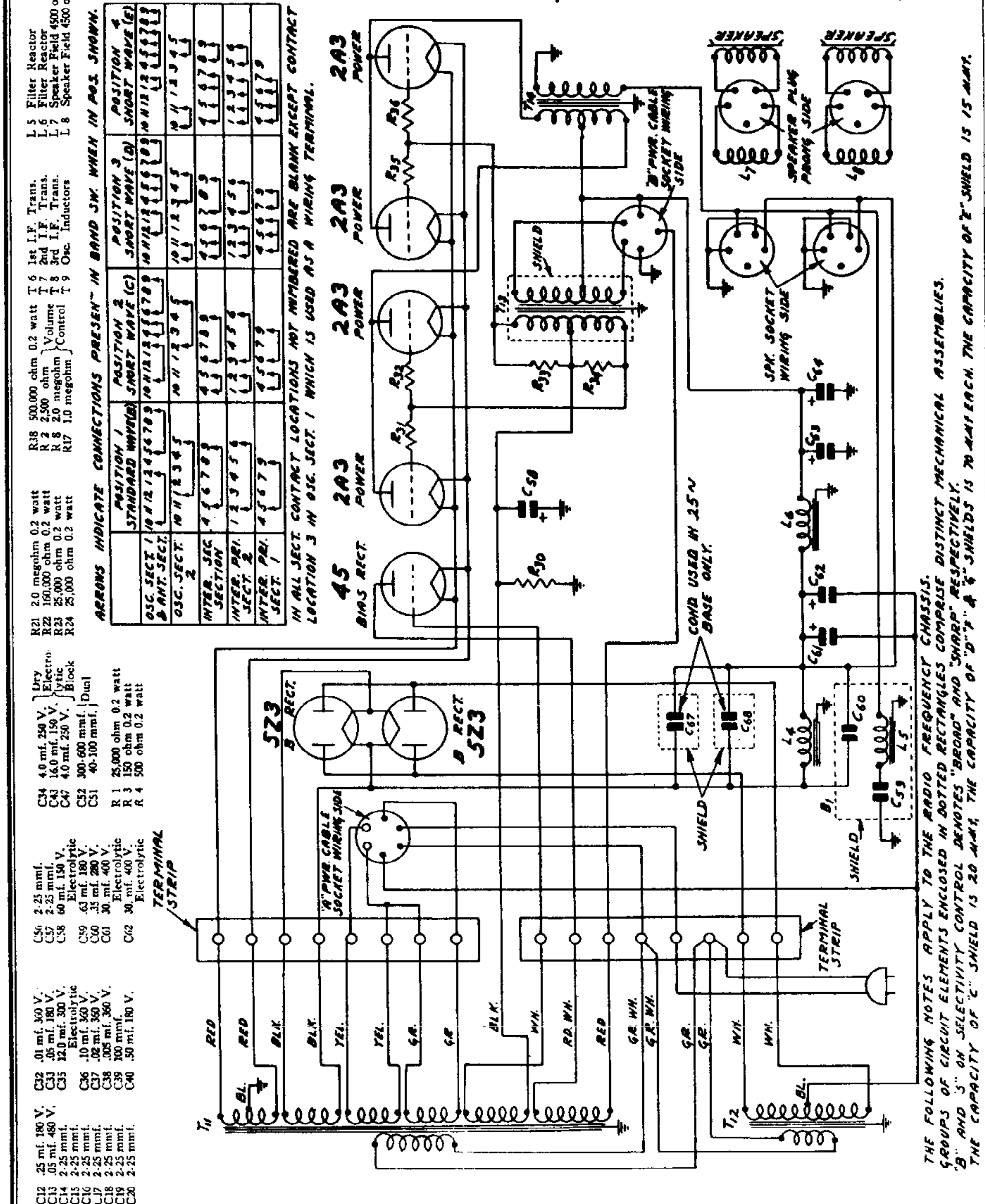
S.P.U. Schematic

LAFAYETTE RADIO MFG. CO.

Tuning Frequency Range

B Range - - - - - - - - - - - 535 to 1730 KC
C Range - - - - - - - - - - - 1715 to 5800 KC
D Range - - - - - - - - - - 5750 to 18300 KC
E Range - - - - - - - - - - 17500 to 48000 KC

Speaker - - - Two 12 Inch Auditorium Dynamics



MODEL B78
Voltage, Trimmers
Chassis

LAFAYETTE RADIO MFG. CO.

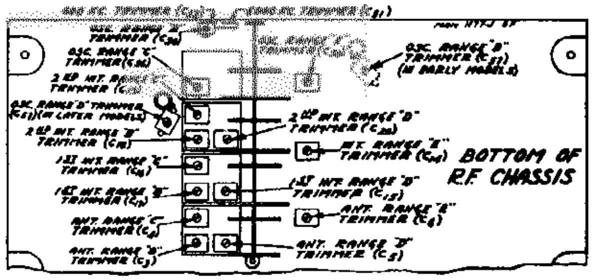


Fig. 6—Trimmer Location

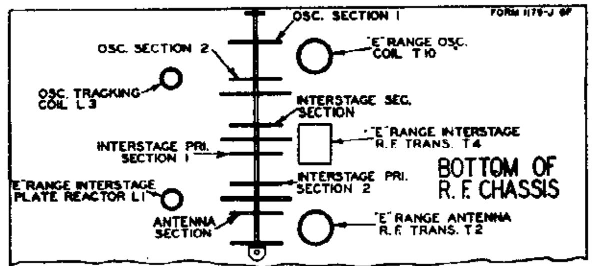


Fig. 5—Bottom View of Chassis Showing Coil and Switch Section Location

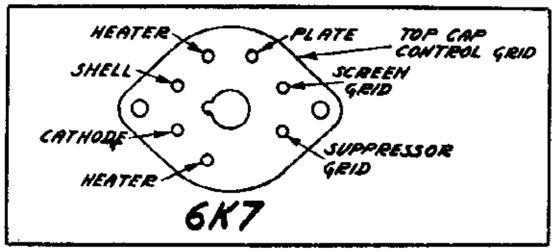


Fig. 7—Bottom View of Metal Tube Socket

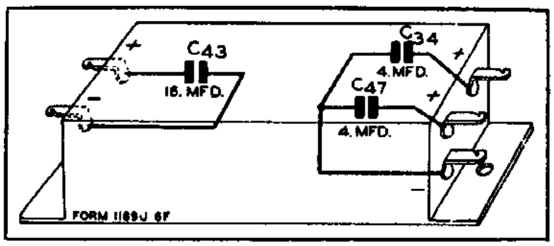


Fig. 8—Condenser Block Internal Wiring

VOLTAGES AT SOCKETS

Antenna Shorted to Ground - Line Voltage 110
Volume Control Maximum

Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode M. A.
6K7	R. F.	5.8	300	110	4.1	10.5
6K7	1st Det.	5.8	300	142	10.0	3.5
76	Osc.	5.8	142			10.0
6K7	1st I. F.	5.8	300	110	4.1	10.5
6K7	2nd I. F.	5.8	300	110	3.7	10.0
6B7	Sig. Diode & Audio Amp.	5.8(1) 5.6(2)	300	115	3.6	4.5
6F7	Bass Amp.	5.8(1) 5.6(2)	275(3) 125(4)	115	7.2	9.0
76	A.V.C. Diode	4.9				
76	A.V.C. Amp.	4.9	0		-62.0	
2A3	Power	2.35	300		60(5)	60.0(6)
5Z3	'B' Rect.	4.8				375.0(7)
45	Bias Rect.	2.4				

(1) Measured with A. C. Voltmeter—early models with letter "A" under chassis.
(2) Measured with D. C. Voltmeter—later models with letter "B" under chassis.
(3) Pentode Plate
(4) Triode Plate
(5) Control Grid to ground.
(6) Each Side of push-pull Circuit—120 Ma. total for 4 tubes.
(7) Total for both tubes—Milliameter in series with 1st Choke.

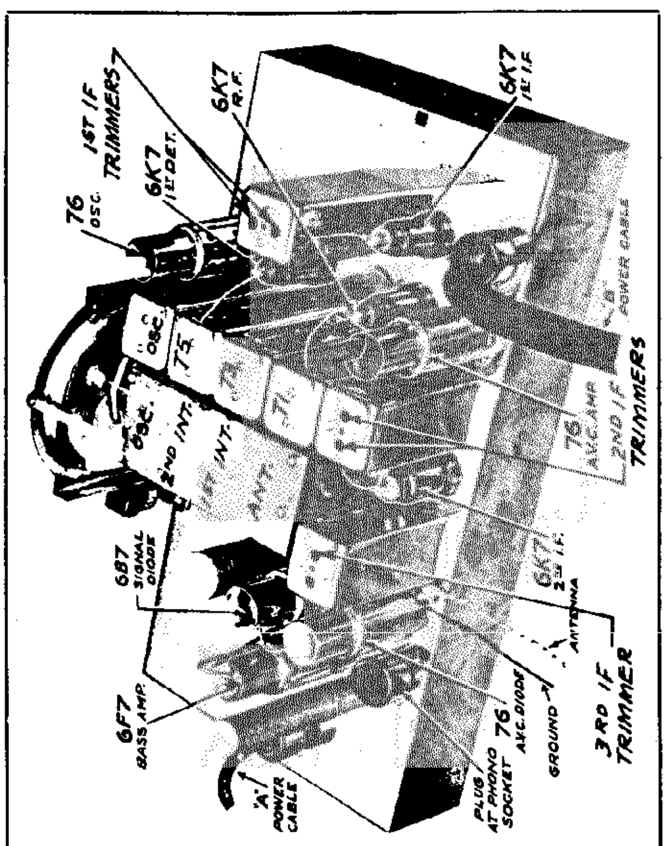


Fig. 10—Tube Arrangement in R.F. Chassis

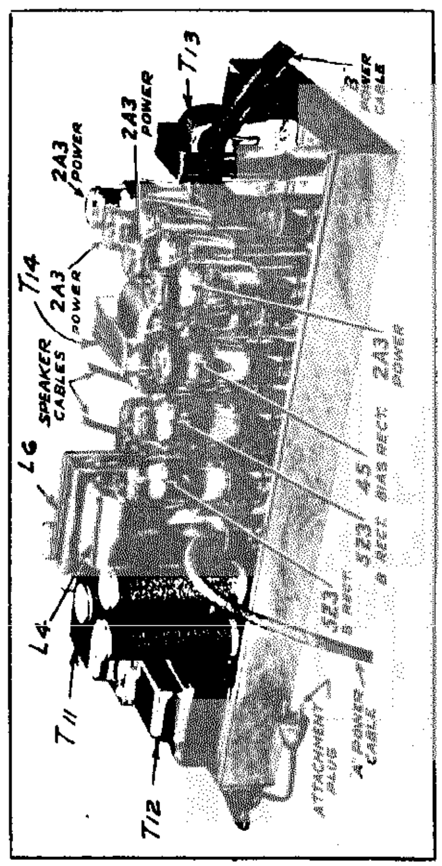


Fig. 11—Tube Arrangement in A.F. Chassis

MODEL B78
Trimmers, Color Code
Changes, Phono.

LAFAYETTE RADIO MFG. CO.

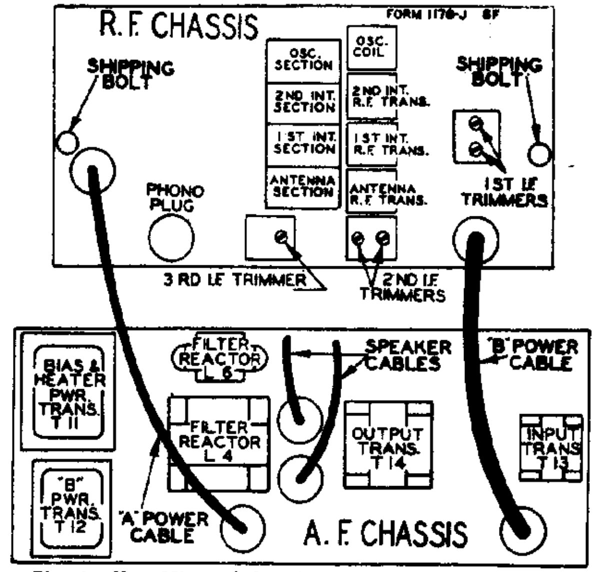


Fig. 4—Top View of Chassis Showing Location of Units

Changes in Early Models

In the early models condenser C65, shown in the R.F. Schematic Fig. 2, was not used. A 20 mmf. condenser, also designated as C65, was connected in parallel with condenser C14.

Condenser C10 from B+ to ground was not used in early models. Another condenser in the early models, also designated as C10 and 250 mmf. in value, was connected from the A.V.C. amplifier plate to ground.

Resistor R38 was not used in early models.

On the A.F. chassis the speaker sockets were wired with ground to the opposite side of voice coil.

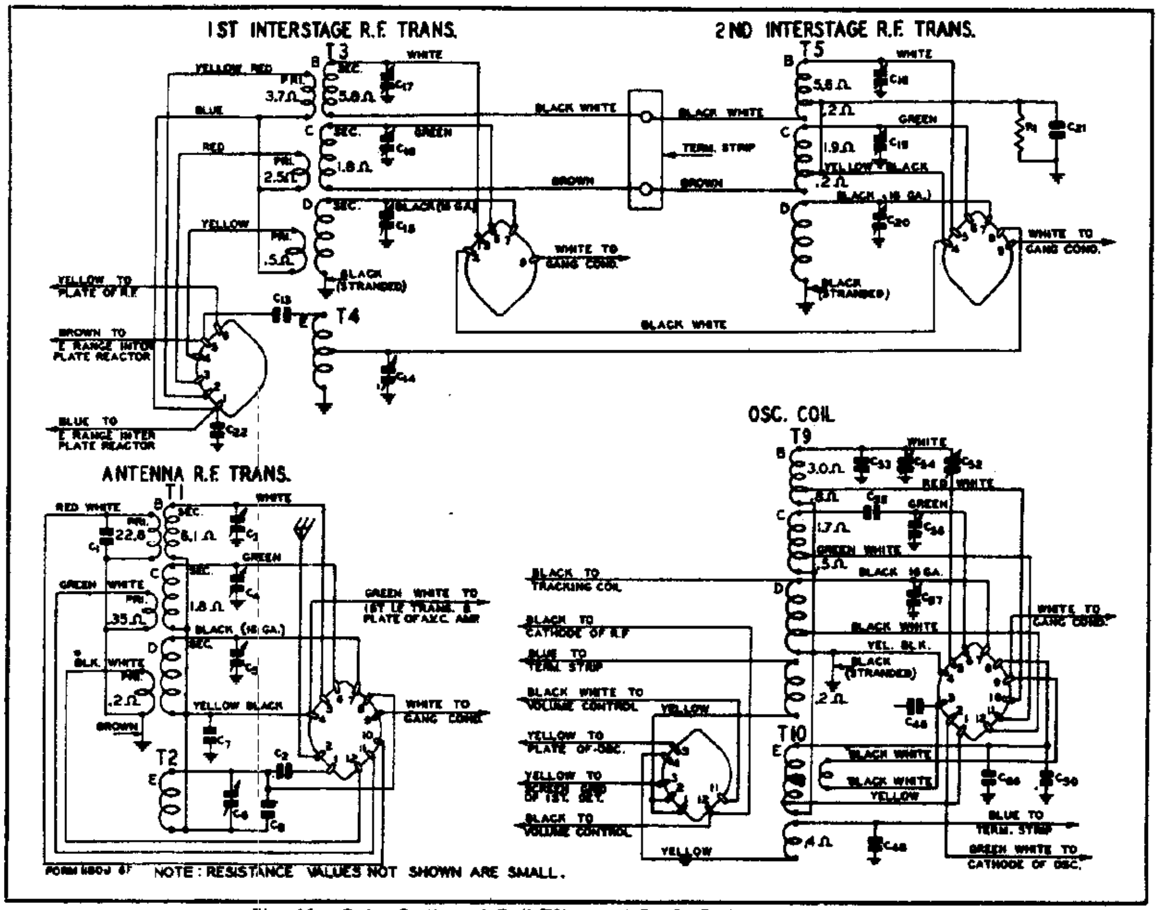


Fig. 12—Color Coding of Coil Wires and D. C. Resistances of Windings

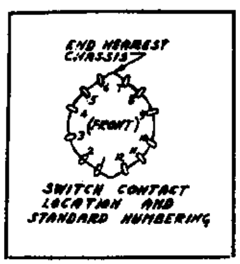


Fig. 9—Numbering of Switch Contacts

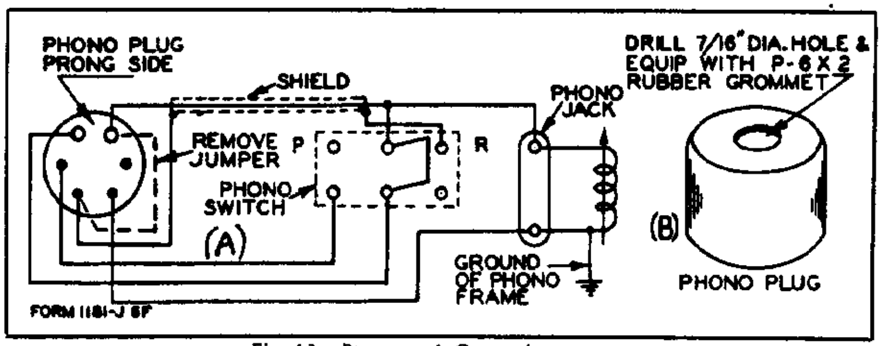


Fig. 13—Phonograph Connections

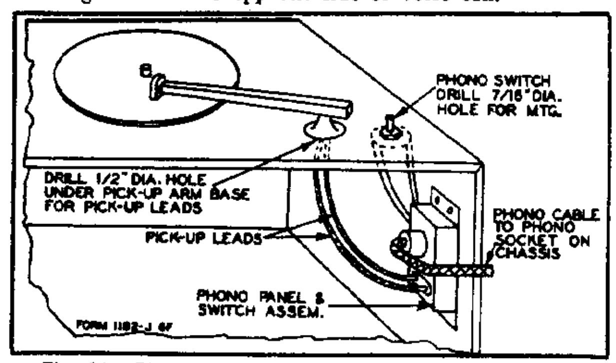


Fig. 14—Phonograph Connections Using Phono Cable and Panel Assembly

LAFAYETTE RADIO MFG. CO.

D. C. Resistance of Windings

Refer to Figs. 12, 2 & 3.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A428	Antenna R.F. Transformer	T1	
	Range B Primary Winding		22.8
	Range C Primary Winding		0.35
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A435	"E" Range Antenna R.F. Coil	T2	Small
P-9A429	1st Interstage R.F. Transformer	T3	
	Range B Primary Winding		3.7
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		5.8
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A436	"E" Range Interstage R.F. Coil	T4	
	Tap to either side		Small
P-53X85	"B" Power Transformer (115 Volts 60 Cycles)	T12	
	Primary Winding		1.9
	Secondary Winding		
	Center Tap to Inside		48.0
	Center Tap to Outside		53.1
P-50X25	Audio Input Transformer	T13	
	Primary Winding		
	Tap to Plate of 6F7		6600.
	Tap to Tone Control and Plate of 6B7		4650.
	Secondary Winding		
	Center Tap to Inside		2840.
	Center Tap to Outside		3260.
P-51X33	Audio Output Transformer	T14	
	Primary Winding		
	Center Tap to Inside		19.7
	Center Tap to Outside		22.4
	Secondary Winding		0.4
P-12A206	12" Dynamic Speaker		
	Speaker Voice Coil		6.3
	Speaker Field	L7	4500.
P-12A213	12" Dynamic Speaker		
	Speaker Voice Coil		6.3
	Speaker Field	L8	4500.
P-9A391	"E" Range Interstage Plate Reactor	L1	1.0
P-9A450	2nd I.F. Plate Isolating Reactor	L2	35.0
P-9A391	High Frequency Oscillator Tracking Coil	L3	1.0
P-52X35	Filter Reactor	L4	51.6
P-52X36	Filter Reactor	L6	11.2
P-48X201	Block Condenser & 10 KC Reactor Assembly	B1	
	10 KC Reactor	L5	0.6
P-9A430	2nd Interstage R.F. Coils	T5	
	Range B Section		
	Long Portion		5.6
	Short Portion		0.2
	Range C Section		
	Long Portion		1.9
	Short Portion		0.2
	Range D Section		Small
P-9A432	1st I.F. Transformer	T6	
	Primary Winding		4.4
	Coupling Winding		0.3
	Secondary Winding		
	Tap to Condenser Side		3.0
	Tap to Switch Side		1.3
P-9A433	2nd I.F. Transformer	T7	
	Primary Winding		4.4
	Coupling Winding		0.3
	Secondary Winding		
	Tap to Condenser Side		3.0
	Tap to Switch Side		1.3
P-9A434	3rd I.F. Transformer	T8	
	Primary Winding (Yellow to Blue)		9.7
	Signal Diode Secondary		12.4
	A.V.C. Secondary (Brown to Green)		7.0
P-9A431	Oscillator Coils	T9	
	Range B Grid Coil		
	Red-White tap to White		3.0
	Red-White tap to Black-Yellow		0.8
	Range C Grid Coil		
	Green-White tap to Green		1.7
	Green-White tap to Black-Yellow		0.5
	Range D Grid Coil		
	Black-White tap to Black		Small
	Black-White tap to Black-Yellow		Small
	Oscillator Range D Plate Coil		0.2
P-9A437	"E" Range Oscillator Coils	T10	
	Range E Grid Coil		Small
	Range E Plate Coil		.4
	Range E Series Grid Coil		Small
P-53X88	Filament Transformer (115 Volts 60 Cycles)	T11	
	Primary Winding		4.4
	Filament Transformer Secondaries, below		
	Red to Red		Small
	Black to Black		Small
	Yellow to Yellow		Small
	Green to Green		Small
	Black to White		22.8
	Red-White to Red		32.9

Phonograph in Separate Cabinet

For this assembly, a 5 conductor cable and a small metal panel assembly are supplied. This assembly has the radio-phono switch, tip jacks for pick-up leads and terminal plate for phono cable.

The phono panel is mounted at the most convenient place in the cabinet at which connections can be completed. The switch is secured to the motor board as illustrated in Fig. 14.

The socket at the end of the cable is secured to the terminal plate on the panel and the plug at the other end of the cable is inserted into the phono socket on the R.F. chassis.

When the switch is thrown to the radio side, the phono pick-up is excluded from the signal diode circuit. When it is thrown to the phono side, the signal diode circuit is opened and the phonograph connections completed to this circuit. Resistor R23 is short circuited. This brings the grid and cathode of the 76 A.V.C. amplifier to the same potential and causes a plate-current in this tube of sufficient intensity to bring the R.F. and 1st I.F. tubes to the point of cut off (See article on circuit for further information regarding operation of A.V.C. system).

Phonograph and Radio in Combination Cabinet

For this assembly, a number of separate items as shown in the parts list are supplied. The phono short circuiting plug supplied with the receiver is used after certain changes have been made.

First take off the shell of this plug by twisting the shell in either direction. The shell is then drilled and equipped with a rubber grommet as shown in Fig. 13 (B). Next unsolder and remove the jumper wire from the plug as shown in Fig. 13 (A). Extend the leads through the hole in the shell and solder the leads to the prongs on the plug as illustrated. Complete the connections to the switch and tip jacks as shown. The switch is mounted on the motor board and the tip jacks at the nearest convenient place.

The description of the connections as given for the separate phonograph cabinet also applies to the combination.

Alignment and Calibration

Correct alignment is extremely important in connection with all-wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000, 6000, 48,000 and 40,000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator to the grid of the 1st detector through a 0.1 mf. condenser.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 4.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C54) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave ~~band scale. Re-tighten the set screw.~~

Adjust the 1st and 2nd interstage Range B trimmers (C17 and C18) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C56) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C16 and C19) and antenna Range C trimmer (C4) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C57) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C15 and C20) and antenna Range D trimmer (C5) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Range E Alignment

48,000 KC Adjustment

Set the signal generator for 48,000 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range E position (3rd short wave band—brown dial color).

Adjust the oscillator Range E trimmer (C50) until maximum output is obtained. See Fig. 6 for location of this trimmer.

40,000 KC Adjustment

Set the signal generator for 40,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range E trimmer (C14) and antenna Range E trimmer (C6) to maximum.

Do not change the setting of the oscillator Range E trimmer.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 9. In contact locations not used, the number applying to that particular location is not employed.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver in the fact that special twenty-five cycle filament and "B" power transformers must be used. It also has two additional condensers in the power unit—C67 and C68 as illustrated in Fig. 3. The twenty-five cycle transformers and the condensers are shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply if the two condensers C67 and C68 are removed. However, the reverse is not true, that is, a sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

115-230 Volt, 40 to 60 cycle filament and "B" power transformers are also available for this model.

MODEL B90(R)Early
Voltage, Socket
Trimmers, Coils
Resistances

LAFAYETTE RADIO MFG. CO.

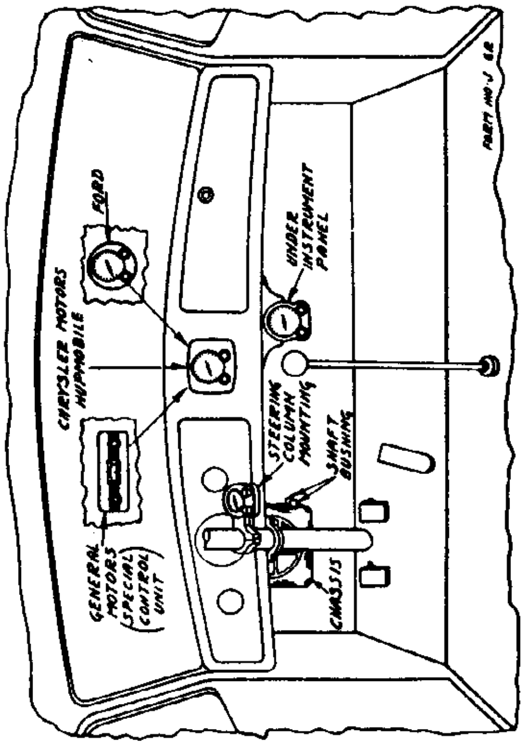


Fig. 5—Various Control Unit Mountings

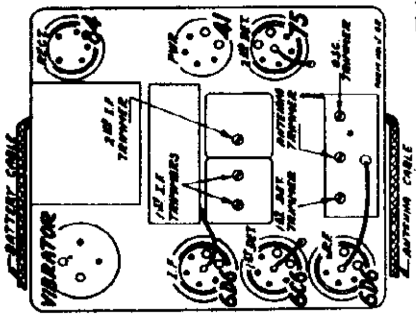


Fig. 2—Location of Tubes and Trimmers

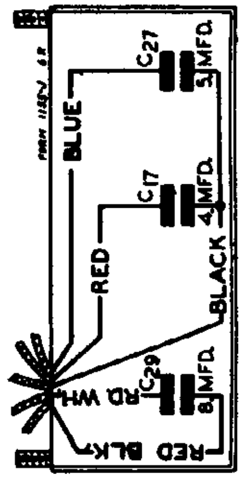


Fig. 4—Condenser Block—Internal Wiring

VOLTAGES AT SOCKETS

Antenna Disconnected — **Battery 6 Volts Under Load**

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode Current M. A.
6D6	R. F. Amp.	5.8	220	90	4.5	6.3
6C6	1st Det. Osc.	5.8	220	90	0	2.4
6D6	I. F. Amp.	5.8	220	90	4.5	6.3
75	2nd Det.	5.8	130(1)		1.2	0.3
41	Power	5.8	210	220	16(2)	25.[illegible]
84	Rectifier	5.8				50.0

(1) With 250,000 Ohm Meter
(2) As read across filter choke.

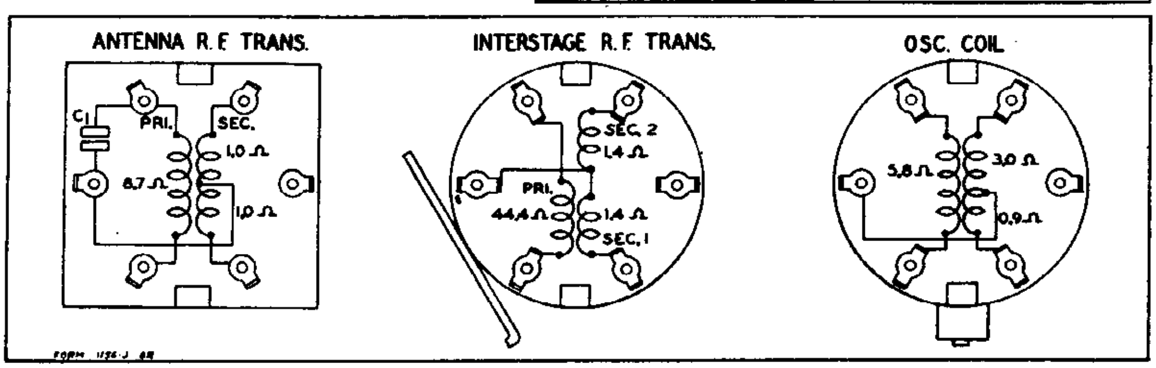


Fig. 3—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

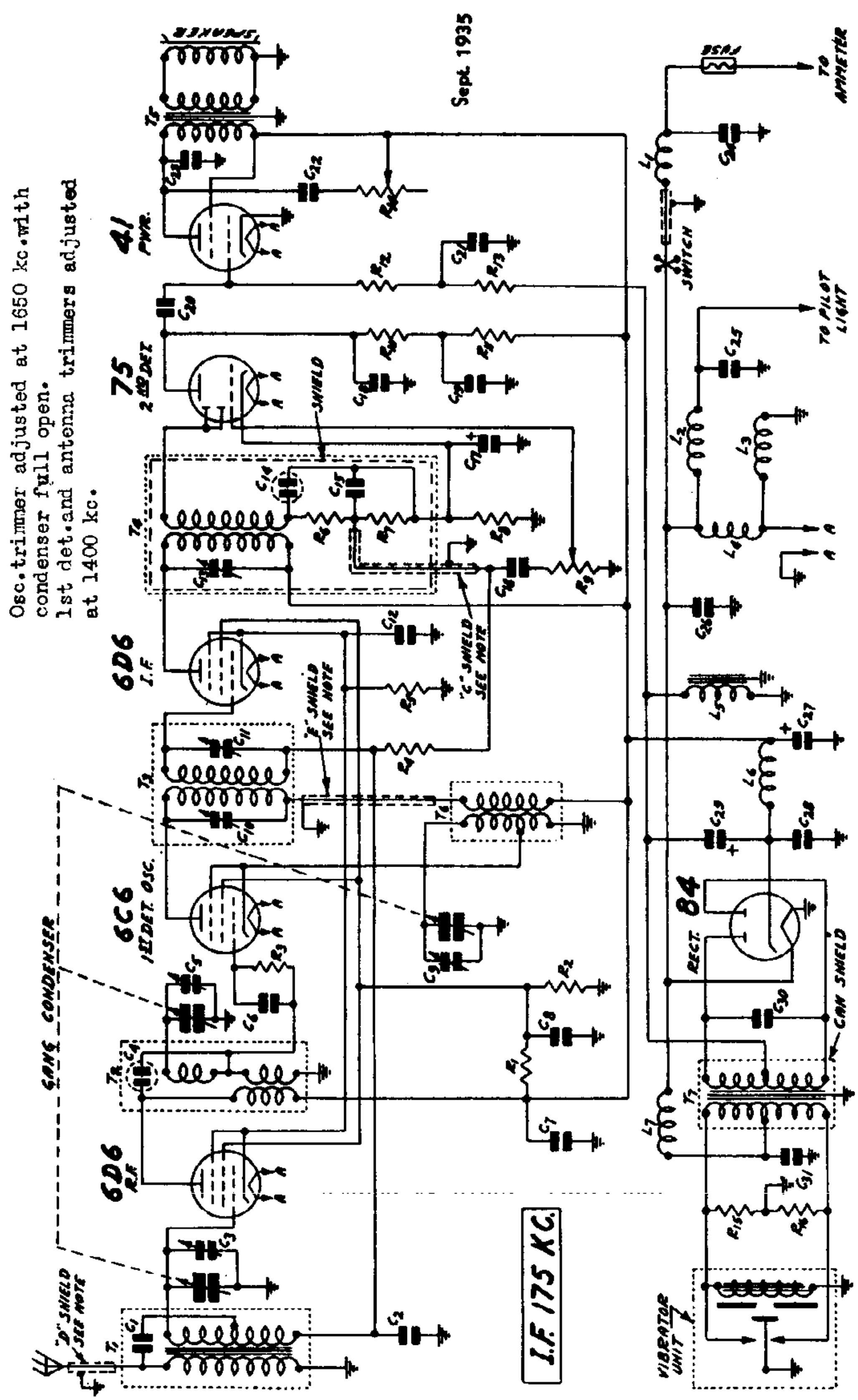
D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A443	Antenna Transformer	T1	
	Primary Winding		8.7
	Secondary Winding--Either Portion		1.0
P-9A439	Interstage Transformer	T2	
	Primary Winding		44.4
	Secondary Winding—Either Portion		1.4
P-9A441	1st I. F. Transformer	T3	
	Primary Winding		93.5
	Secondary Winding		97.6
P-9A442	2nd I. F. Transformer	T4	
	Primary Winding		44.1
	Secondary Winding		49.6
P-12A227	Dynamic Speaker		
	Output Transformer Primary	T5	416.6
	Output Transformer Secondary	T5	Small
	Speaker Field	L3	5.3
	Speaker Voice Coil		Small
P-9A440	Oscillator Coils	T6	
	Grid Coil		
	Long Portion		3.0
	Short Portion		0.9
	Plate Coil		5.8
P-53X108	Power Transformer	T7	
	Primary Winding		
	Center Tap to Inside		Small
	Center Tap to Outside		Small
	Secondary Winding		
	Center Tap to Inside		200.
	Center Tap to Outside		200.
P-9A444	Motor Noise Reactor	L1	Small
P-9A448	Pilot Light Line Reactor	L2	Small
P-9A446	Filament Reactor	L4	Small
P-52X42	Filter Choke	L5	312.5
P-9A447	R. F. "B" Plate Reactor	L6	4.1
P-9A445	Vibrator Filter Reactor	L7	Small

LAFAYETTE RADIO MFG. CO.

Power Consumption - - 6.5 Amperes at 6.3 Volts
Power Output - - - - 3 Watts Undistorted
Tuning Frequency Range - - - - 530-1650 KC



Osc. trimmer adjusted at 1650 kc. with condenser full open.
1st det. and antenna trimmers adjusted at 1400 kc.

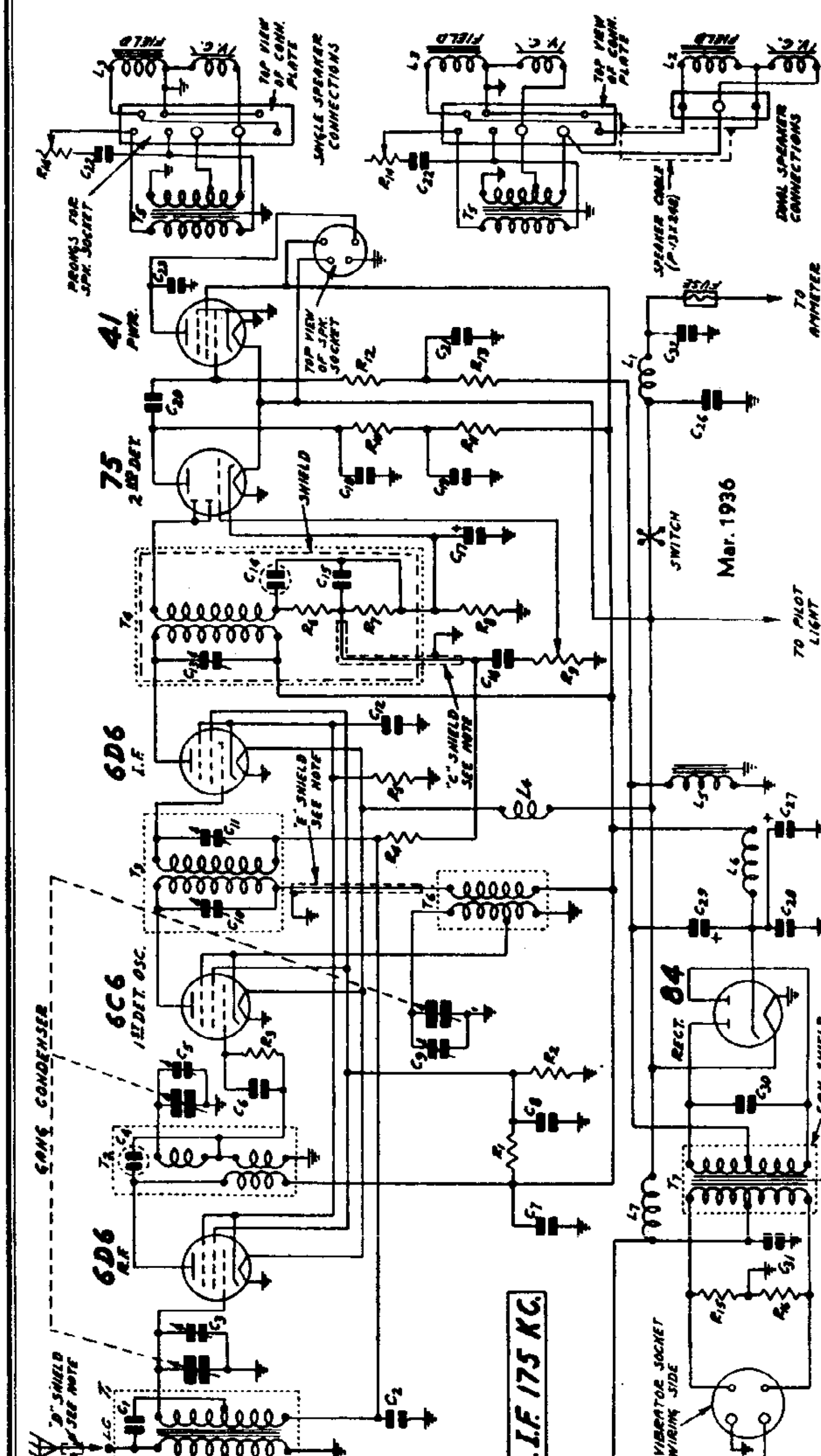
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.
THE CAPACITY OF "C" SHIELD IS 37 MMF, THE CAPACITY OF "D" SHIELD IS 85 MMF AND THE CAPACITY OF "E" SHIELD IS 15 MMF.

C 1	21 mmf.
C 2	.05 mf. 180 V.
C 3	Gang Trimmer
C 4	40 mmf.
C 5	Gang Trimmer
C 6	35 mmf.
C 7	.10 mf. 360 V.
C 8	.10 mf. 180 V.
C 9	Gang Trimmer
C10	70-150 mmf. } One Unit
C11	70-150 mmf. } One Unit
C12	.10 mf. 180 V.
C13	70-150 mmf.
C14	250 mmf.
C15	250 mmf.
C16	.01 mf. 360 V.
C18	250 mmf.
C19	.10 mf. 360 V.
C20	.01 mf. 360 V.
C21	.25 mf. 180 V.
C22	.02 mf. 600 V.
C23	.002 mf. 600 V.
C24	.50 mf. 180 V.
C25	2000 mmf.
C26	2000 mmf.
C28	.01 mf. 360 V.
C30	.0075 mf. 1600 V.
C31	.50 mf. 180 V.
C17	4.0 mf. 25 V. } Electrolytic Block
C27	5.0 mf. 350 V } Electrolytic Block
C29	8.0 mf. 350 V } Electrolytic Block
R 1	17000 ohm 1.0 W.
R 2	20000 ohm ohm .5 W.
R 3	.50 Megohm .2 W.
R 4	1.0 Megohm .2 W.
R 5	350 ohm .2 W.
R 6	50000 ohm .2 W.
R 7	500000 ohm .2 W.
R 8	6000 ohm .2 W.
R 9	2.0 Megohm Volume Control
R10	150000 ohm .2 W.
R11	50000 ohm .2 W.
R12	.50 Megohm .2 W.
R13	100000 ohm .2 W.
R14	150000 ohm Tone Control
R15	50 ohm .5 W.
R16	50 ohm .5 W.
T 1	Antenna Trans.
T 2	R. F. Interstage Trans.
T 3	1st I. F. Trans.
T 4	2nd I. F. Trans.
T 5	Output Trans.
T 6	Osc. Inductor
T 7	Power Trans.
L 1	Motor Noise Reactor
L 2	Pilot Light Reactor
L 3	Speaker Field 5.3
L 4	Filament Reactor
L 5	Filter Choke
L 6	"B" Reactor
L 7	Vibrator Reactor

MODEL B90(N)Late
Schematic,Socket
Trimmers

LAFAYETTE RADIO MFG. CO.

Power Consumption - - 7.0 Amperes at 6.0 Volts	Tuning Frequency Range - - - 530 to 1650 KC
Power Output - - - - - 3 Watts Undistorted	Intermediate Frequency - - - - - - 175 KC
Sensitivity - - - - - 1.0 Microvolt Absolute	Speaker - - - - - - - - - - 6 Inch Dynamic
Selectivity - - 45 KC Broad at 1000 Times Signal	



GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.
THE CAPACITY OF "C" SHIELD IS 37 MMF, THE CAPACITY OF "D" SHIELD IS 85 MMF AND THE CAPACITY OF "E" SHIELD IS 15 MMF.

C 1	10 mmf.	C22	.02 mf. 600 V.	R12	.50 Megohm .2 W.		
C 2	.05 mf. 180 V.	C23	.002 mf. 600 V.	R13	100000 ohm .2 W.		
C 3	Gang Trimmer	C26	2000 mmf.	R14	150000 ohm Tone Control		
C 4	40 mmf.	C28	2000 mmf.	R15	50 ohm .5 W.		
C 5	Gang Trimmer	C30	.0075 mf. 1600 V.	R16	50 ohm .5 W.		
C 6	35 mmf.	C31	.50 mf. 180 V.	T 1	Antenna Trans.		
C 7	.10 mf. 360 V.	C32	2000 mmf.	T 2	R.F. Inter. Trans.		
C 8	.10 mf. 180 V.	C17	4.0 mf. 25 V. (Electrolytic Block)	T 3	1st I.F. Trans.		
C 9	Gang Trimmer	C27	5.0 mf. 350 V. (Electrolytic Block)	T 4	2nd I.F. Trans.		
C10	70-150 mmf. (Dual)	C29	8.0 mf. 350 V. (Electrolytic Block)	T 5	Output Trans.		
C11	70-150 mmf. (Dual)	R 1	17000 ohm 1.0 W.	T 6	Osc. Inductor		
C12	.10 mf. 180 V.	R 2	20000 ohm .5 W.	T 7	Power Trans.		
C13	70-150 mmf.	R 3	.50 Megohm .2 W.	L 1	Motor Noise Reactor		
C14	250 mmf.	R 4	1.0 Megohm .2 W.	L 2	Speaker Field 4.9 ohm		
C15	250 mmf.	R 5	350 ohm .2 W.	L 3	Speaker Field 5.3 ohm		
C16	.01 mf. 360 V.	R 6	50000 ohm .2 W.	L 4	Filament Reactor		
C18	250 mmf.	R 7	500000 ohm .2 W.	L 5	Filter Reactor		
C19	.10 mf. 360 V.	R 8	6000 ohm .2 W.	L 6	"B" Reactor		
C20	.01 mf. 360 V.	R 9	2.0 Megohm Vol. Control	L 7	Vibrator Reactor		
C21	.25 mf. 180 V.	R10	150000 ohm .2 W.				
		R11	50000 ohm .2 W.				

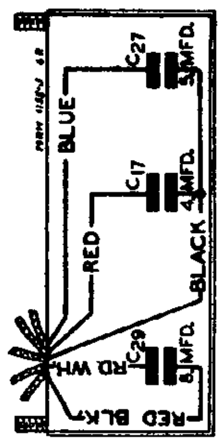


Fig. 4—Condenser Block—Internal Wiring

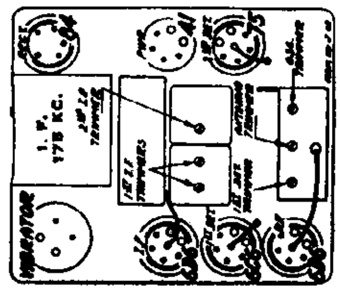


Fig. 2—Location of Tubes and Trimmers

LAFAYETTE RADIO MFG. CO.

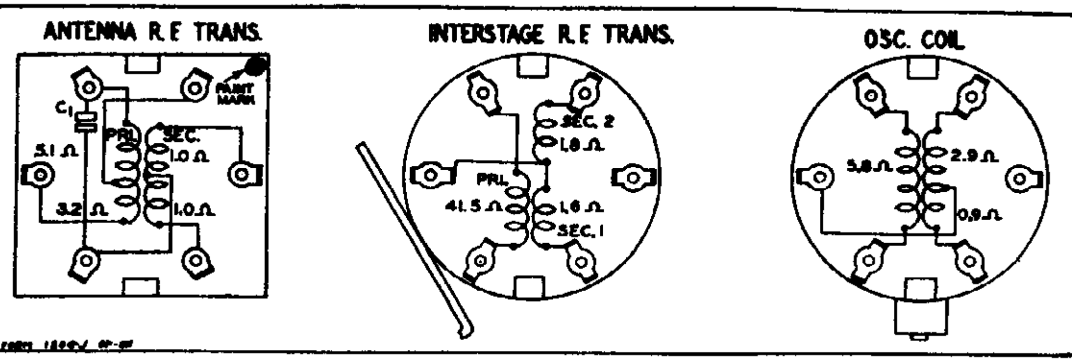


Fig. 3—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Code	Winding	D. C. Resistance in Ohms
T1	Antenna Transformer	
	Primary Winding	
	Long Portion	5.1
	Short Portion	3.2
	Secondary Winding—Either Portion	1.0
T2	Interstage Transformer	
	Primary Winding	41.5
	Secondary Winding	
	No. 1	1.6
	No. 2	1.8
T3	1st I. F. Transformer	
	Primary Winding	88.0
	Secondary Winding	87.0
T4	2nd I. F. Transformer	
	Primary Winding	43.0
	Secondary Winding	48.2
T5	Dynamic Speaker	
	Output Transformer	
	Primary	416.6
	Secondary	Small
L3	Speaker Field	5.3
	Speaker Voice Coil	Small
T6	Oscillator Coils	
	Grid Coil	
	Long Portion	2.9
	Short Portion	0.9
	Plate Coil	5.8
T7	Power Transformer	
	Primary Winding	
	Center Tap to Inside	Small
	Center Tap to Outside	Small
	Secondary Winding	
	Center Tap to Inside	200.0
	Center Tap to Outside	200.0
L1	Motor Noise Reactor	Small
L4	Filament Reactor	.22
L5	Filter Choke	300.0
L6	R. F. "B" Plate Reactor	4.0
L7	Vibrator Filter Reactor	Small

VOLTAGES AT SOCKETS

Antenna Disconnected Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode Current M. A.
6D6	R. F. Amp.	5.6	245	105	5.2	7.5
6C6	1st Det. Osc.	5.6	245	105	0	2.9
6D6	I. F. Amp.	5.6	245	105	5.2	7.5
75	2nd Det.	5.8	120(1)		1.4	0.14
41	Power	5.8	235	245	15.0(2)	30.0
84	Rectifier	5.8				52.0

(1) With 250,000 Ohm Meter
(2) Read Across Filter Choke

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. (See Fig. 2 for location of this section.) This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1650 KC Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

If a low capacity antenna is used connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.)

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is on the center tuning condenser section—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Antenna

IMPORTANT—If the car antenna is of high capacity (600 mmf. or higher) insert the antenna plug with the mark on the HC side—See Fig. 10. If it is a low capacity antenna, insert the plug with the mark on the LC side.

The General Motors cars have steel roofs, and a running board or other under car antenna must be used. These are low capacity antennas. The Chrysler motor cars (except Plymouth) have a steel roof separated from the body proper, which is used as an antenna. These are high capacity antennas. Other cars without steel roofs such as Ford and Plymouth have a built-in roof antenna which is of low capacity.

If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

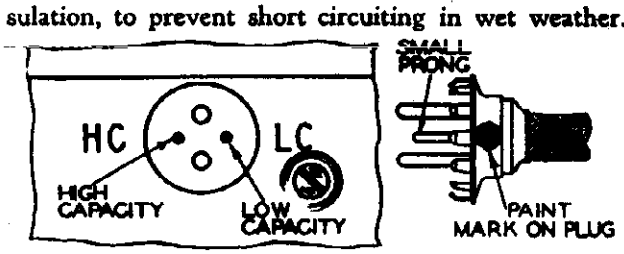


Fig. 10—Antenna Plug Insertion

MODEL B92(K)Early
Schematic,Socket

LAFAYETTE RADIO MFG. CO.

Coils,Alignment
Voltage,Trimmers

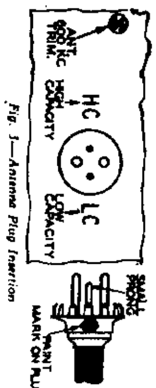


Fig. 3—Antenna Plug Insertion

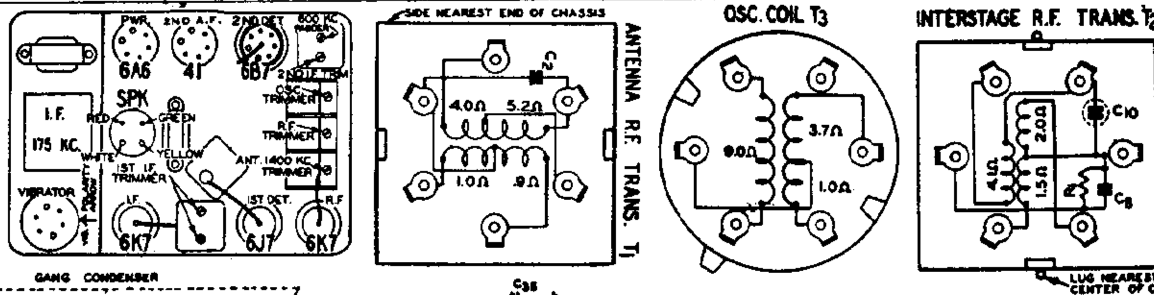
Adjusting Antenna 600 KC Trimmer

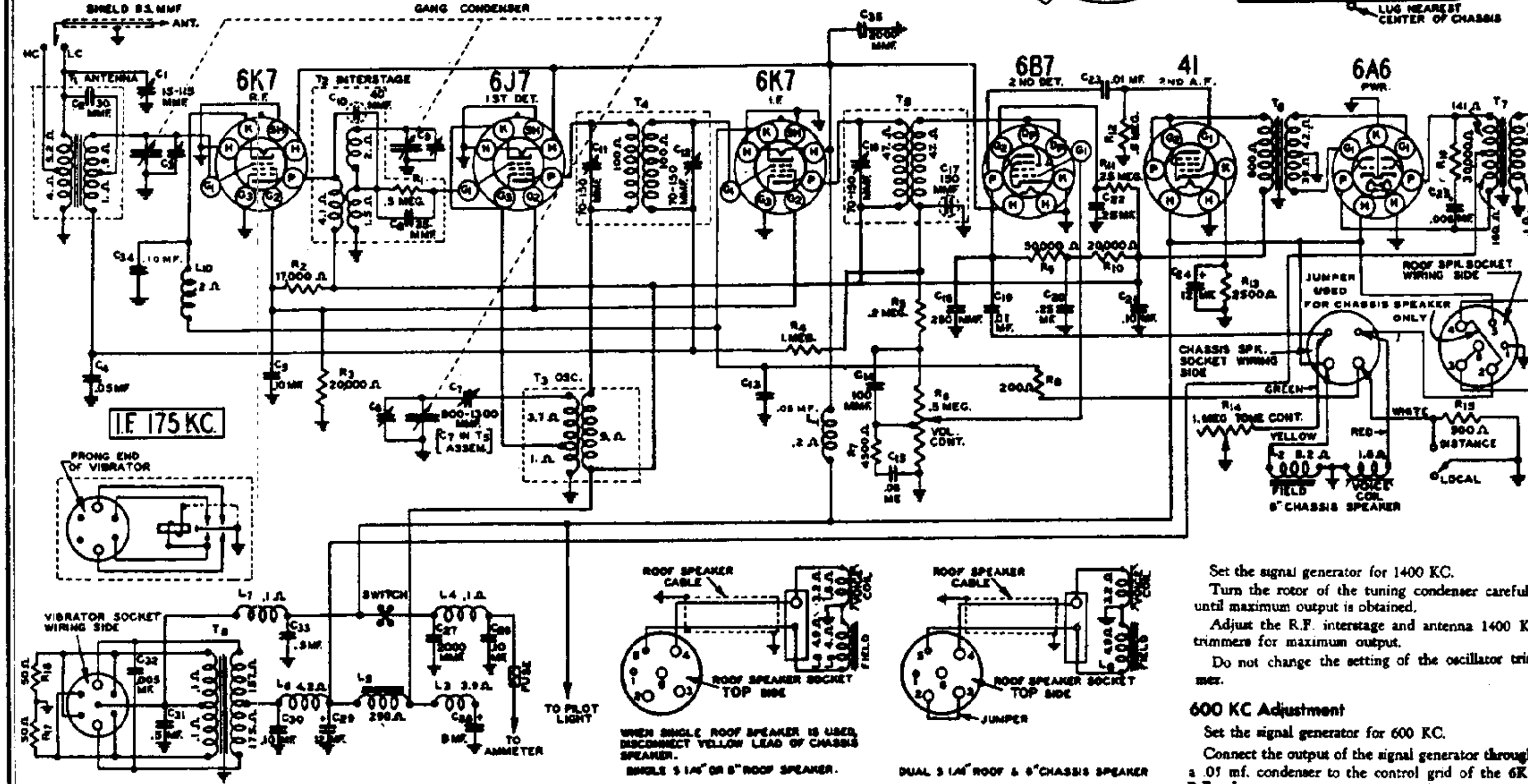
After the receiver is installed and the car antenna is connected, it will be necessary to adjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

As shown in this illustration, the antenna plug is inserted in one of two ways, depending on whether the car has a high or low capacity antenna. Full instructions are in the installation manual packed with each radio.

VOLTAGES AT SOCKETS Antenna Plug Withdrawn	L-D Switch in Distant Position Battery 6.3 Volts under Load				
Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.6	260	110	3
6J7	1st Det.	5.6	260	110	
6K7	I.F.	5.6	260	110	3
6B7	2nd Det.	5.6	55	50	
41	2nd A.F.	5.7	255	55	30
6A6	Pwr.	5.7	275		

CHASSIS LAYOUT





I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis ground.

Turn the Local-Distance switch to the Distance position and keep it in this position for all adjustments.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1575 KC Adjustment

Set the signal generator for 1575 KC.

Turn the rotor of the tuning condenser to the full open position.

If a low capacity antenna is used, connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.) The antenna plug must be correctly inserted, dependent on the capacity of the antenna used.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6K7 R.F. tube.

Turn the tuning condenser rotor until maximum output is obtained. Then turn the tuning condenser rotor back and forth, at the same time adjusting the 600 KC padder (see Fig. 2) until the peak of greatest intensity is obtained.

Re-connect the output of the signal generator to the shielded antenna lead through a 150 mmf. condenser (1500 mmf. if antenna is high capacity).

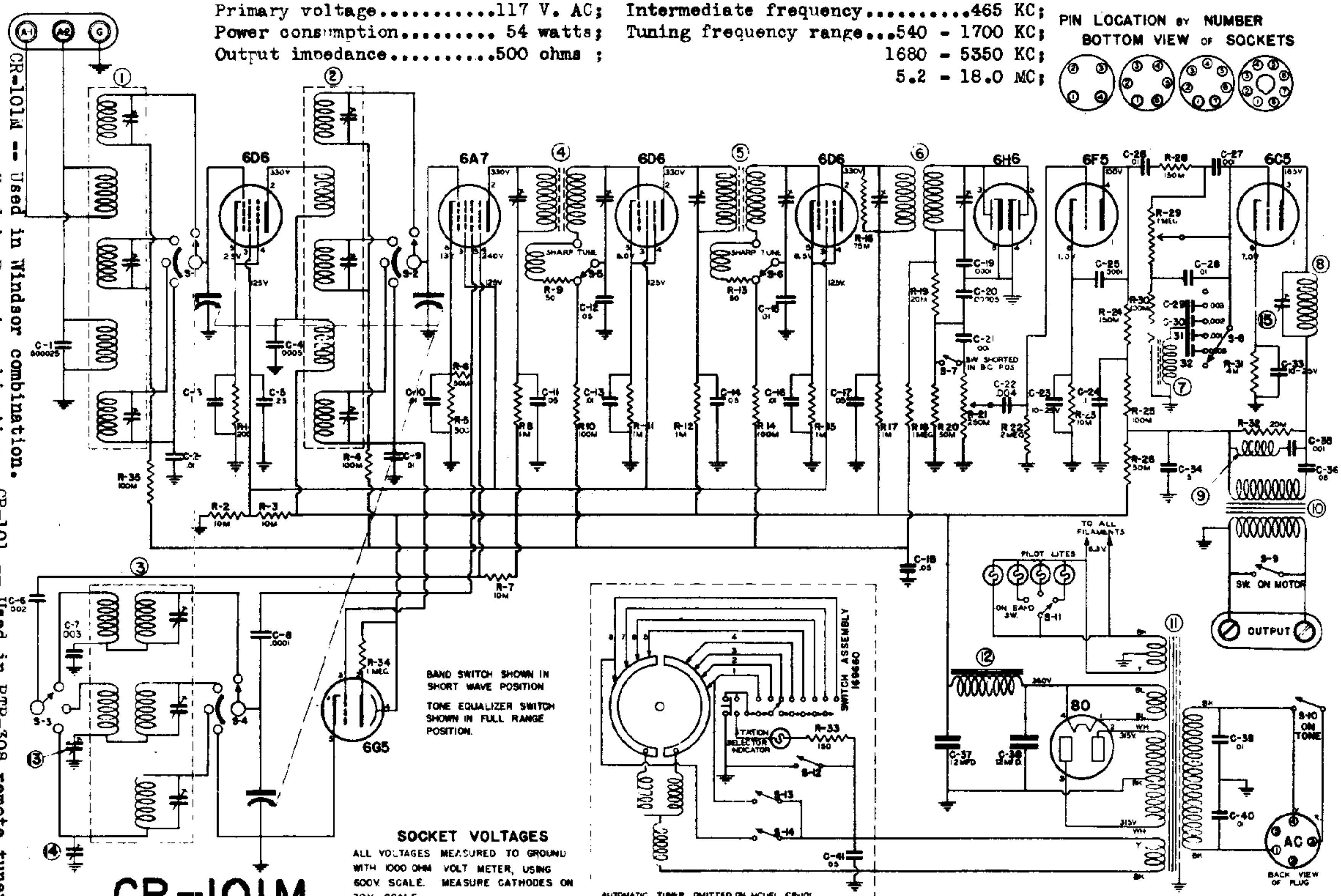
Adjust the 600 KC antenna trimmer to maximum. This trimmer is reached from the outside of the case

THE MAGNAVOX CO., INC.

CHASSIS CR101,CR101M
Schematic,Voltage

Primary voltage...........117 V. AC; Intermediate frequency..........465 KC;
Power consumption......... 54 watts; Tuning frequency range...540 - 1700 KC;
Output impedance..........500 ohms ; 1680 - 5350 KC;
5.2 - 18.0 MC;

PIN LOCATION BY NUMBER
BOTTOM VIEW OF SOCKETS



BAND SWITCH SHOWN IN SHORT WAVE POSITION

TONE EQUALIZER SWITCH SHOWN IN FULL RANGE POSITION.

SOCKET VOLTAGES

ALL VOLTAGES MEASURED TO GROUND WITH 1000 OHM VOLT METER, USING 600V. SCALE. MEASURE CATHODES ON 30V. SCALE.

CR-101M -- Used in Windsor combination.
Used in Regent combination.

CR-101 -- Used in RTR-308 remote tuner.

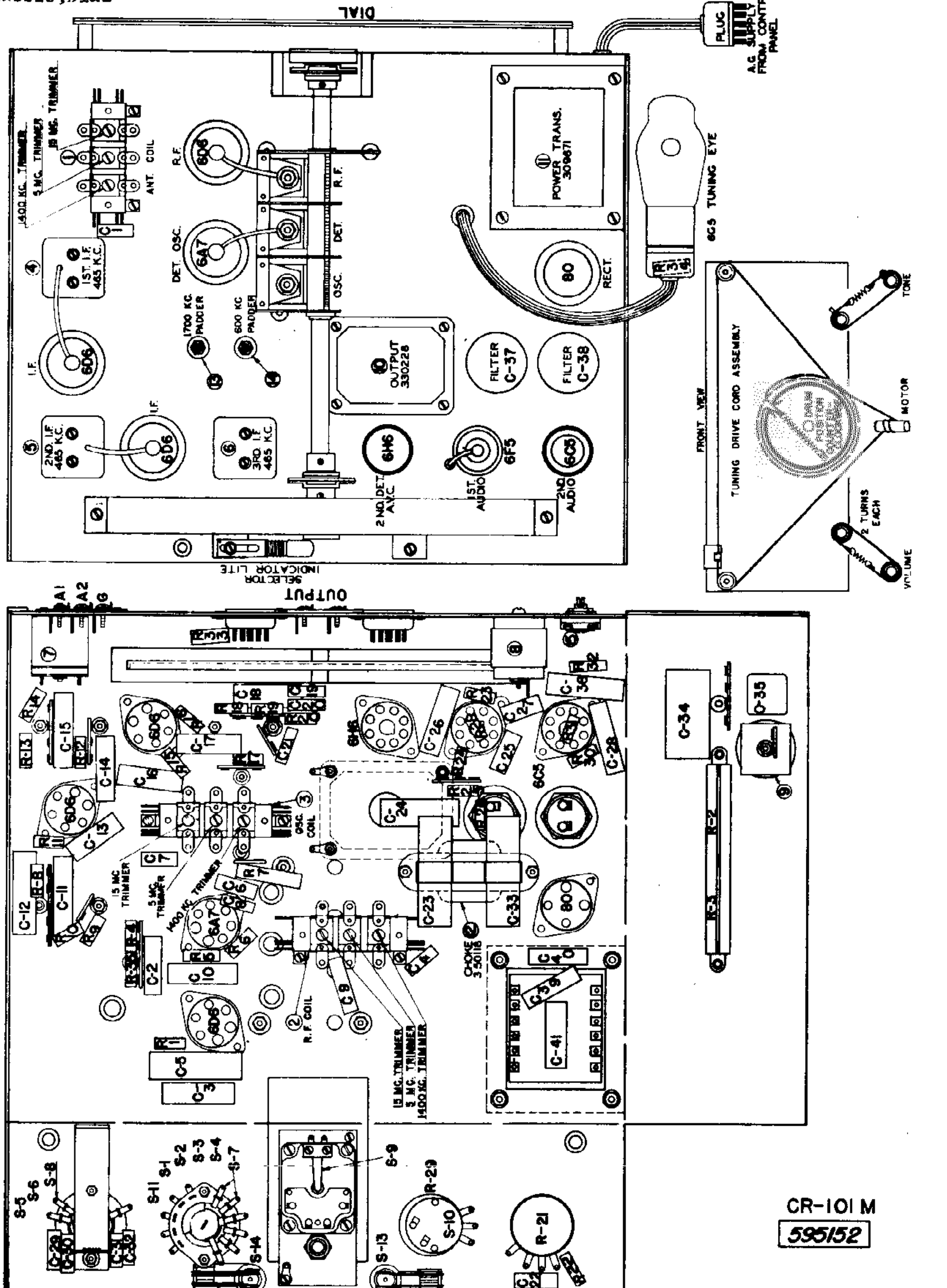
CR-101M

MAGNAVOX RADIO CHASSIS

Type Circuit: High-fidelity superheterodyne, with three tuning ranges, bass and tuned treble controls, automatic volume control, band expansion, and bass compensation in volume control for phonograph pickup.

CHASSIS CR101, CR101M
Socket, Trimmers
Chassis, Dial

THE MAGNAVOX CO., INC.



It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies partiuclarly to ground points.

THE MAGNAVOX CO., INC.

ALIGNMENT PROCEDURE

It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

ALIGNING THE I.F. STAGES AT 465 KILOCYCLES

1. Use a .00025 mfd. condenser in series with the signal generator output.
2. Connect an output meter across the voice coil of the speakers.
3. Turn the tone equalizer to the "sharp-tune" position.
4. Turn the volume control up to 10 or more, and adjust the signal generator output until a reading of one volt is obtained when a signal is applied.
5. Align the third I.F. transformer first by connecting the signal generator to the grid of the 6D6 second I.F. tube. Now adjust the third I.F. transformer until a maximum deflection is obtained on the output meter.
6. Align the second I.F. transformer by connecting the output of the signal generator to the grid of the 6D6, first I.F. tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the second I.F. transformer until a maximum deflection of the output meter is obtained.
7. Connect the output of the signal generator to the grid of the 6A7 tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the first I.F. transformer until a maximum deflection of the output meter is obtained.

ALIGNING THE 540-1700 KILOCYCLE BAND

1. Use a .00025 Mfd. condenser in series with the signal generator output.
2. Set the wave band switch for reception on the broadcast band.
3. Run the dial pointer to the extreme left position. This will adjust the tuning condensers to maximum capacity.
4. Holding the tuning condensers at maximum capacity, adjust the dial pointer to a position at the end of the horizontal scale. This is done by sliding the pointer on the dial string.
5. Connect the signal generator output to the grid of the 6A7 tube, tune the radio and signal generator to 600 KC and adjust the 600 KC padder for maximum deflection of the output meter.
6. Turn the signal generator and radio to 1400 KC and adjust the 1400 KC oscillator trimmer for maximum deflection of the output meter.
7. Leave the signal generator and radio set at 1400 KC, connect the signal generator output to the antenna binding post "A1", connect binding post "A2" to ground and adjust the 1400 KC R.F. trimmer and the 1400 KC antenna trimmer for maximum deflection of the output meter.

ALIGNING THE 1680-5350 KILOCYCLE BAND

1. Use a 400 ohm resistor in series with the signal generator output when connecting to the antenna binding post. Use both this resistor and a .00025 mfd. condenser when connecting to the 6A7 grid.
2. Set the band switch for reception on the foreign band.
3. Connect the output of the signal generator to the grid of the 6A7 tube, set the signal generator and the radio to 1700 KC and adjust the 1700 KC padder for maximum deflection on the output meter.
4. Set the signal generator and radio to 5000 KC and adjust the 5000 KC oscillator trimmer for maximum deflection of the output meter.
5. Leave the signal generator and radio set at 5000 KC, connect the signal generator output to the antenna binding post "A1" and adjust the 5000 KC R.F. trimmer and the 5000 KC antenna trimmer for maximum deflection of the output meter.

ALIGNING THE 5.6-18.0 MEGACYCLE BAND

1. Use a 400 ohm resistor in series with the signal generator when connecting to the antenna post. Use both this resistor and a .00025 Mfd. condenser when connecting to the 6A7 grid.
2. Set the band switch for reception on the foreign band.
3. Connect the signal generator output to the grid of the 6A7 tube, set the signal generator and the radio to 15 megacycles and adjust the 15 megacycle oscillator trimmer for maximum deflection of the output meter.
4. Leave the signal generator and radio set for 15 megacycles, connect the signal generator output to the antenna binding post "A1" and adjust the 15 megacycle R.F. trimmer and the 15 megacycle antenna trimmer for maximum deflection of the output meter.

RESTRINGING THE DIAL CABLE

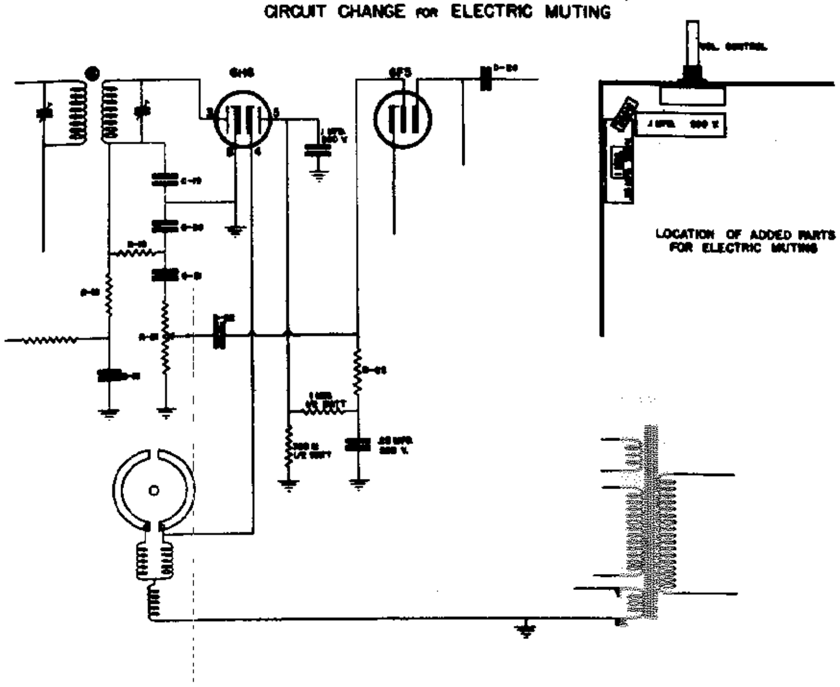
To restring the cable on this model, it is necessary first to remove the glass dial. Bend back the small metal ears that hold the glass in place, on the left and lower sides only. Slip the three dividing strips from the assembly and the four glass strips will be easily removable. Slip the brown backing from the assembly exposing the cable tension spring inside the disc.

Remove the spring "A" from the small hook "B", and tie one end of cable to the spring, lacing it through the opening in the groove of the disc, allowing about 1/2 inch between the end of the spring and the inside edge of the groove. Proceed around the disc in a clockwise direction for one complete revolution, continue around the drive shaft "C" for 2 1/2 turns in a clockwise direction up through the left-hand idler pulley "D", across the top and around the right-hand idler pulley "E"; downward around the disc in a clockwise direction, through the opening in the groove and secure it to the spring, until the other end can be secured to the hook. Replace the dial strips in their original locations and the operation is completed.

CHASSIS CR101,CR101M
Changes,Notes

THE MAGNAVOX CO., INC.

CIRCUIT CHANGE FOR ELECTRIC MUTING



LOCATION OF ADDED PARTS FOR ELECTRIC MUTING

Some of the earlier models were not equipped with electric muting. This feature may be incorporated by following the instructions outlined below.

1. Remove the two jumpers shunting the cathodes and plates of the 6H6 tube.

2. One cathode (8) is left at ground potential and the other cathode (4) is connected to the tuning motor as shown in the above schematic.

3. One plate (3) is left in its original circuit connection and the other plate (5) is connected to the junction of the 1 megohm and 300,000 ohm resistors that have been inserted in series with R-22 to ground.

4. Install one .25 Mfd. condenser from the junction of R-22 and the 1 megohm resistor to ground.

5. Ground the side of the transformer winding that connects to the tuning motor, completing the operation.

MISCELLANEOUS NOTES

The radio chassis must "float" freely and it is, therefore, important that none of the knobs touch the panel. The four holes in the radio support bracket "C" Fig. 1, are sufficiently large to permit adjustment of the chassis until it "floats" properly. Be sure that this "floating" condition exists before attempting to tighten the screws "A" Fig. 1, after replacing the chassis in the cabinet.

If one of the push-button switches does not function, remove the radio panel in the manner outlined in the foregoing instructions, and check the switch contacts. It is entirely probable that the trouble can be corrected by either cleaning the contacts or by bending them so that they form a solid connection.

When the release button on the radio push-button assembly is depressed, the switch arm nearest the end of the assembly must break one contact before making the other contact. Failure of the release button switch to operate in this manner will cause the "set-up" pilot lamp to burn out, in which case the arm of the switch should be bent until the "break-before-make" action is obtained.

Due to the extremely high sensitivity of the receiver, it is possible for some excessively strong signals to overload and cause distortion in the radio. This condition is very rare and occurs only on a very strong signal when the receiver has a very efficient antenna. This difficulty is recognized by distortion on a strong signal and being absent on weak signals. To correct this trouble, it is necessary to connect a 500 ohm resistor across the broadcast antenna primary to ground. The terminal for making this connection is available at the rear of the R.F. transformer on the top of the chassis. Connect the resistor from the lug having the red-with-blue tracer lead connected to it, to the ground bus wire which ties the three trimmer condensers together.

It is possible for the distortion mentioned above, to occur due to defective 6D6 I.F. tubes. The second I.F. tube is more susceptible to this difficulty and should be replaced before checking the first I.F. tube.

When push-button tuning is used, the dial pointer may have a tendency to "hunt" on either side of the desired frequency before coming to rest. This condition is caused by insufficient pressure of the small spring at the rear of the tuning motor, against the armature shaft. The spring should be "kinked" slightly to provide additional pressure, using a pair of long-nosed pliers to make the adjustment.

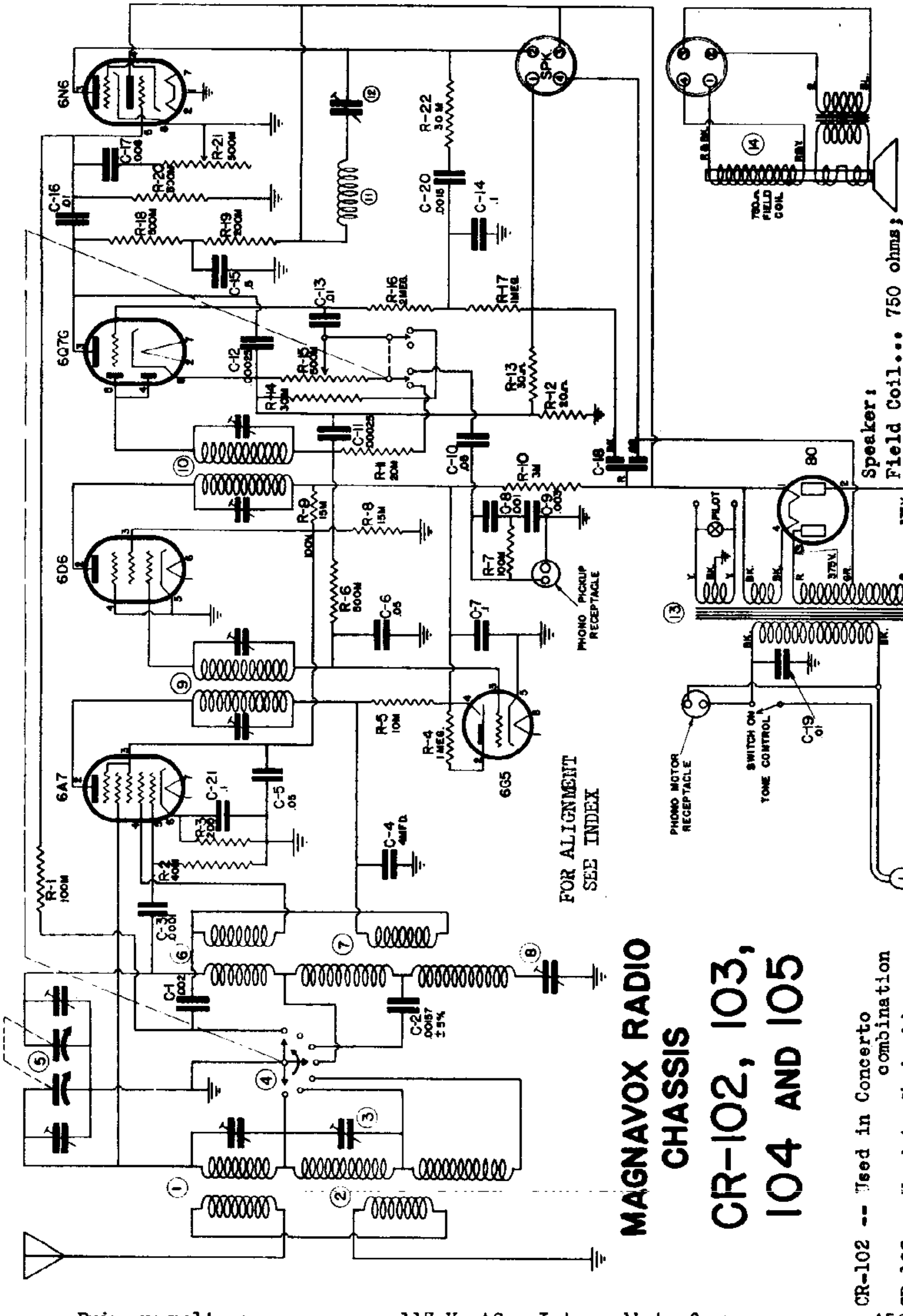
If a distinct hum is heard in the speakers when using the radio, the 6F5 tube should be replaced as a possible cure. It is extremely important that the grid lead of the 6F5 tube is shielded as near to the cap of the tube as is possible, or hum will be picked up in this lead.

The two .05 Mfd. condensers connected across the two motor push-button switches should be removed to prevent a "scraping" noise that may be apparent when the receiver is tuned manually.

The 1000 ohm bias resistor in the cathode circuit of the 6A7 tube should be replaced with a 300 ohm resistor to increase the stability of the receiver.

CHASSIS CR102,CR103
CR104,CR105
Schematic

THE MAGNAVOX CO., INC.



Speaker:
Field Coil... 750 ohms;
Transformer..7000 ohms;

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C. bass compensation in volume control for phonograph pickup.

FOR ALIGNMENT SEE INDEX

MAGNAVOX RADIO CHASSIS CR-102, 103, 104 AND 105

CR-102 -- Used in Concerto combination

CR-103 -- Used in Chairside combination

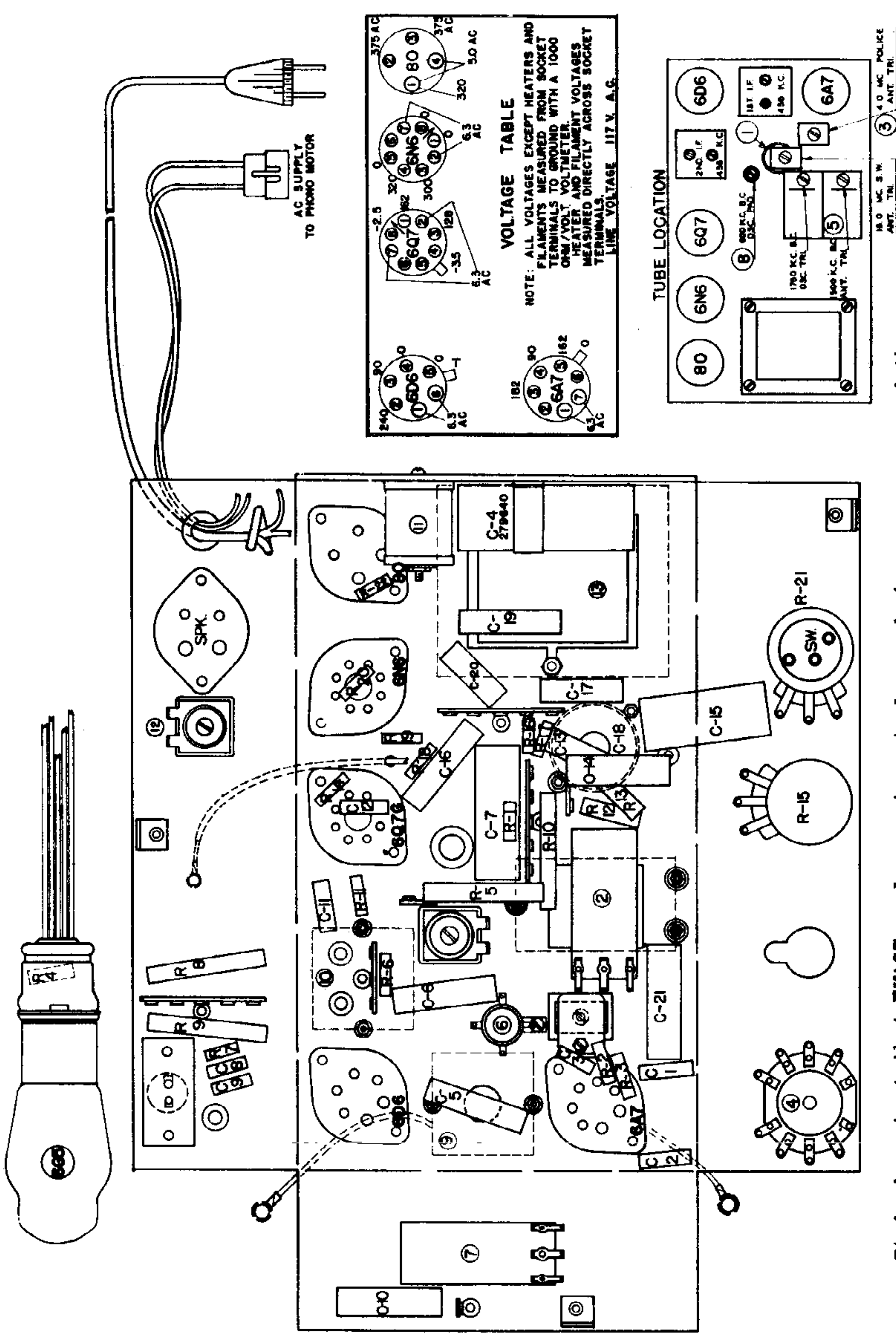
CR-104 -- Same as CR-102 except for addition of Items 11, 12, C-20 and R-22.

CR-105 -- Same as CR-103 except for addition of Items 11, 12, C-20 and R-22.

Primary voltage.............117 V. AC; Intermediate frequency.......456 KC;
Power consumption........... 80 watts; Tuning frequency range 540 -1760 KC;
Power output.............. 4 watts; 1.6 - 5.0 MC;
5.0 - 19. MC;

CHASSIS CR102, CR103
CR104, CR105
Socket, Voltage
Chassis, Trimmers

THE MAGNAVOX CO., INC.



It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

THE MAGNAVOX CO., INC.

CHASSIS CR106, CR109, CR111
Schematic, Voltage

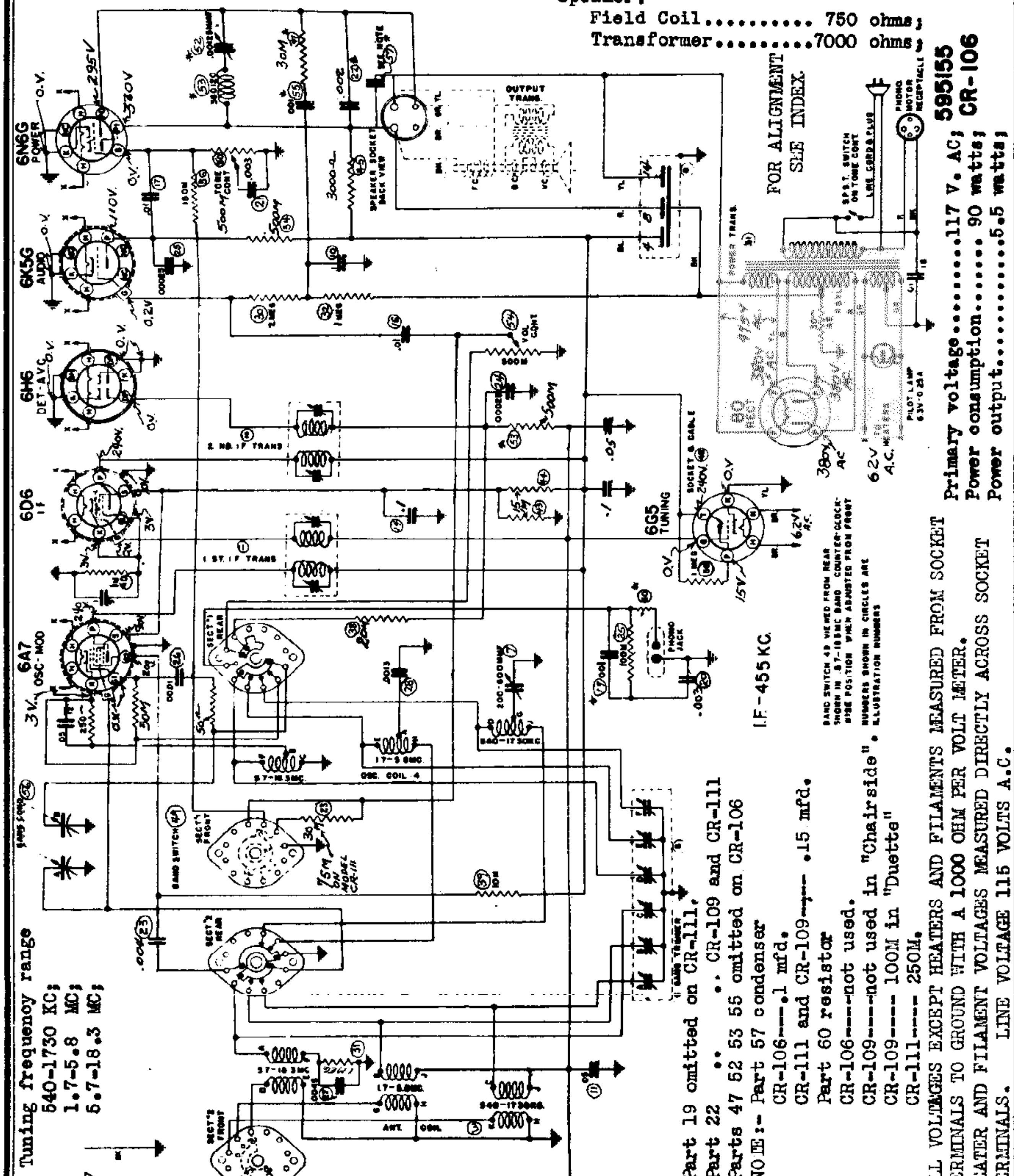
CR-106 -- Used in Concerto combination.

CR-109 -- Used in Chairside combination.

CR-111 -- Used in Berkeley combination.

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C. bass compensation in volume control for phonograph pickup.

Speaker:
Field Coil.......... 750 ohms;
Transformer..........7000 ohms;



FOR ALIGNMENT SEE INDEX

595155 CR-106

Primary voltage..........117 V. AC;
Power consumption........ 90 watts;
Power output..........5.5 watts;

I.F.-455 KC

Tuning frequency range
540-1730 KC;
1.7-5.8 MC;
5.7-18.3 MC;

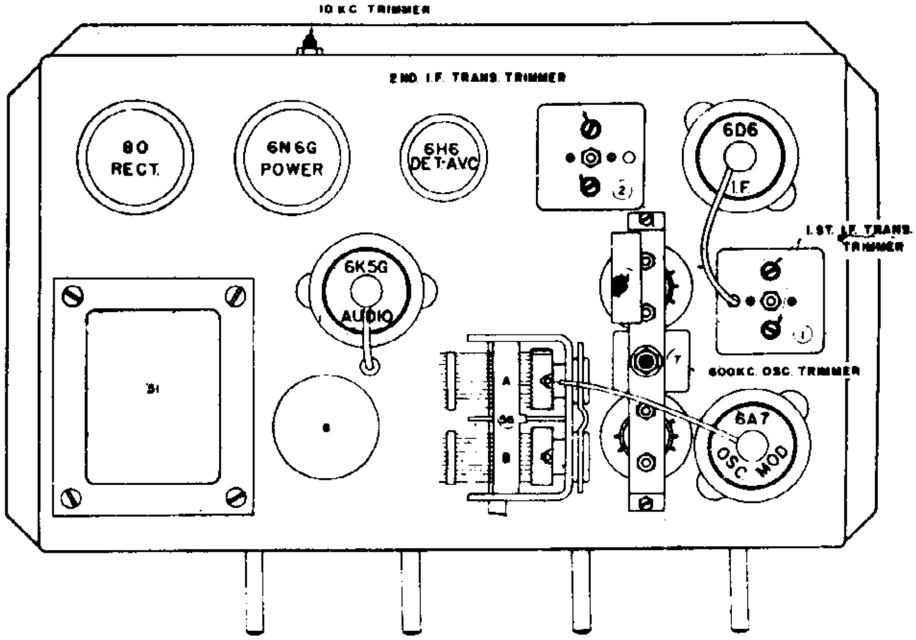
Part 19 omitted on CR-111.
Part 22 " " CR-109 and CR-111
Parts 47 52 53 55 omitted on CR-106
NOTE:- Part 57 condenser
CR-106----.1 mfd.
CR-111 and CR-109------ .15 mfd.
Part 60 resistor
CR-106----not used.
CR-109----not used in "Chairside".
CR-109---- 100M in "Duette"
CR-111---- 250M.

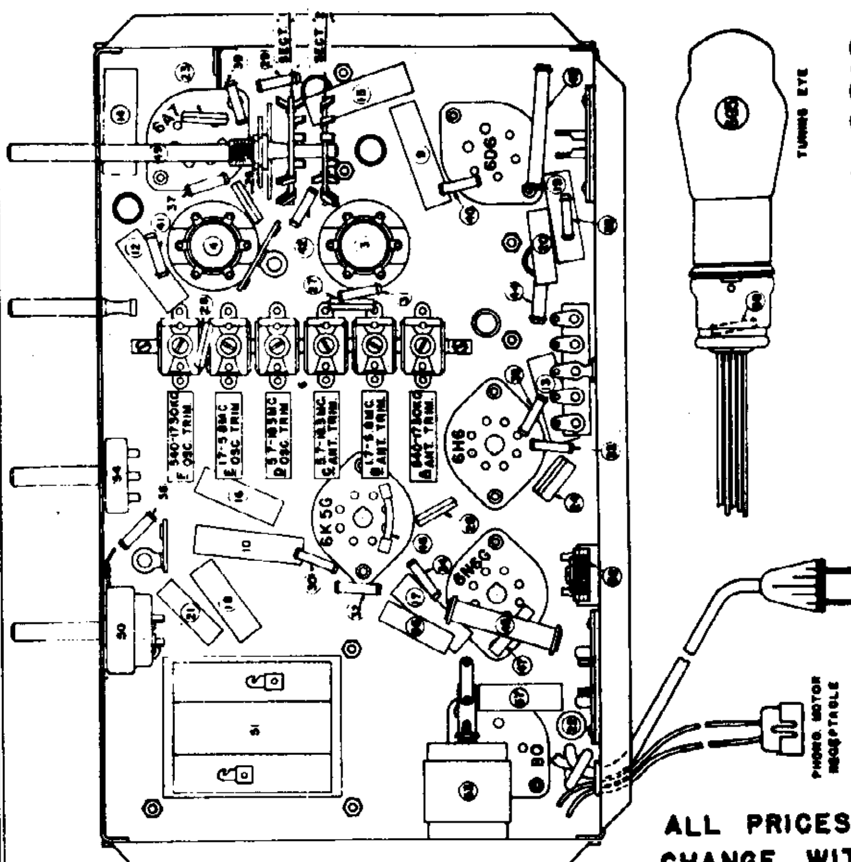
ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT METER.
HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. LINE VOLTAGE 115 VOLTS A.C.

CHASSIS CR106,CR109,CR111
Socket,Trimmers,Chassis
Filter Adjustment

THE MAGNAVOX CO., INC.

CHASSIS CR113,-114,-115
-118,-125
Filter Adjustments





MAGNAVOX RADIO CHASSIS CR-106, 109 AND 111

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser on the back of the chassis near the speaker socket.

143267	Knob	"Tuning"	.15
143265	Knob	"Tone"	.15
143266	Knob	"Volume"	.15
143268	Knob	"O-B-P-F"	.15
633320	Pulley	Dial pulley	.10
633315	Shaft	Tuning shaft	.20

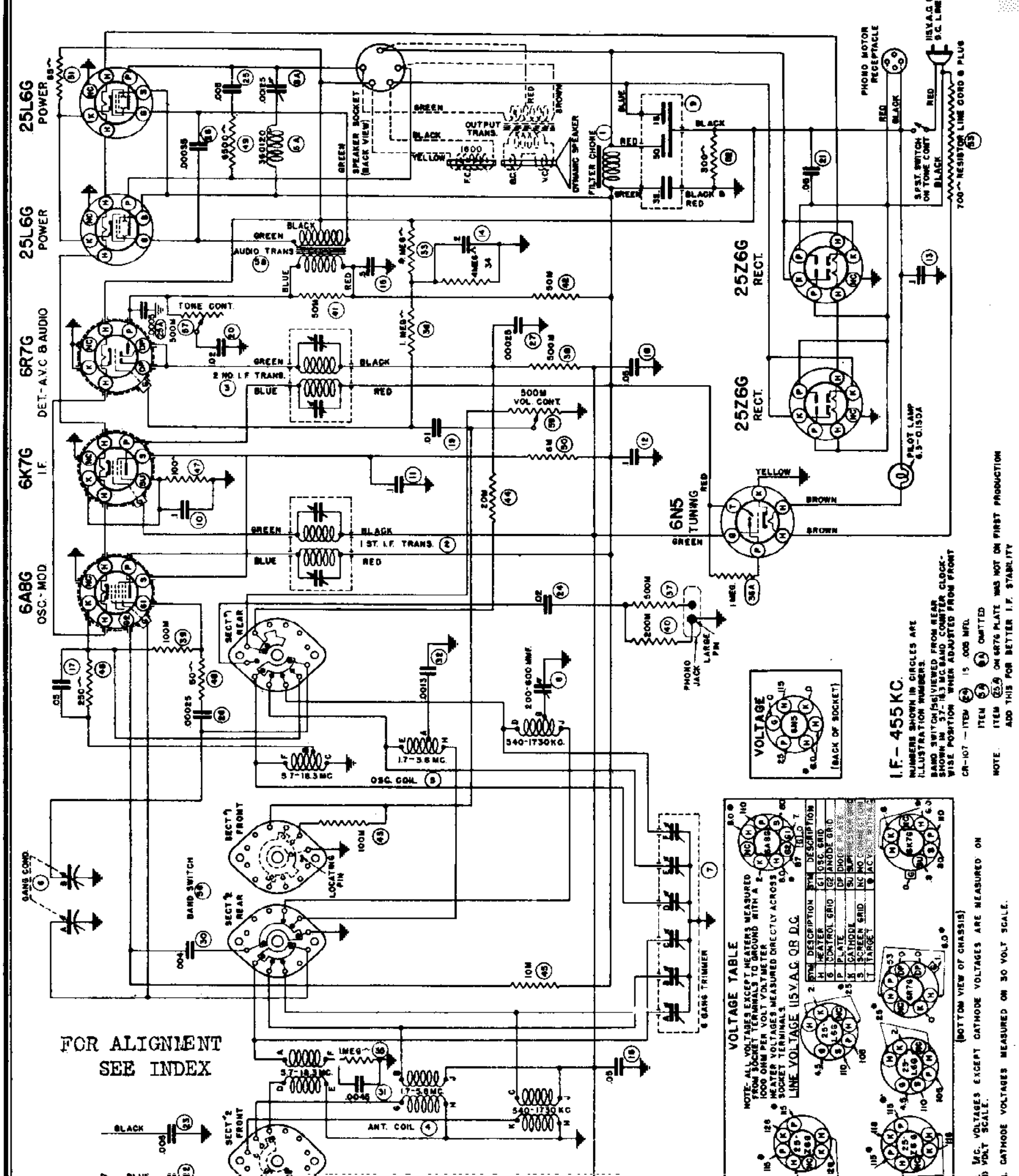
ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

182592	Bulb	Pilot lamp, 6.3 volt .25 ampere	.15
103322	Washer	"C" washer, tuning shaft retainer	.05
449801	Cable	Dial drive cable	
883308	Dial Assb.	Complete assembly less glass scale	4.00
153238	Dial	Calibrated glass scale	1.20
153273	Escutcheon	Dial escutcheon with crystal	1.80
103321	Spring	Dial cord tension spring	.05

Schematic, Voltage Socket

THE MAGNAVOX CO., INC.

CHASSIS CR107,-110,-112 -119,-120,-126,-127



Primary voltage........117 V. AC-DC;
Power consumption......... 80 watts;
Power output............. 6 watts;

Speaker:
Field coil.............1800 ohms;
Transformer............3000 ohms;

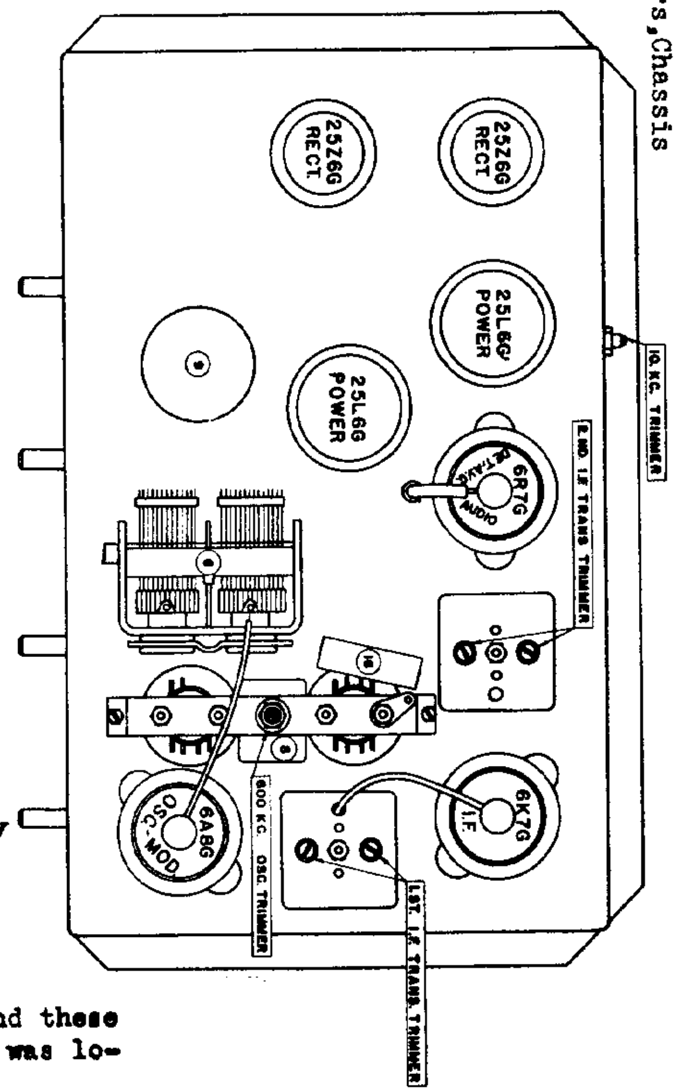
Tuning frequency range 540 - 1730 KC; 1.7 - 5.8 MC; 5.7 - 18.3 MC;

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C., bass compensation in volume control for phonograph pickup.

CHASSIS CR107,-110,-112
-119,-120,-126,-127
Socket,Trimmers,Chassis

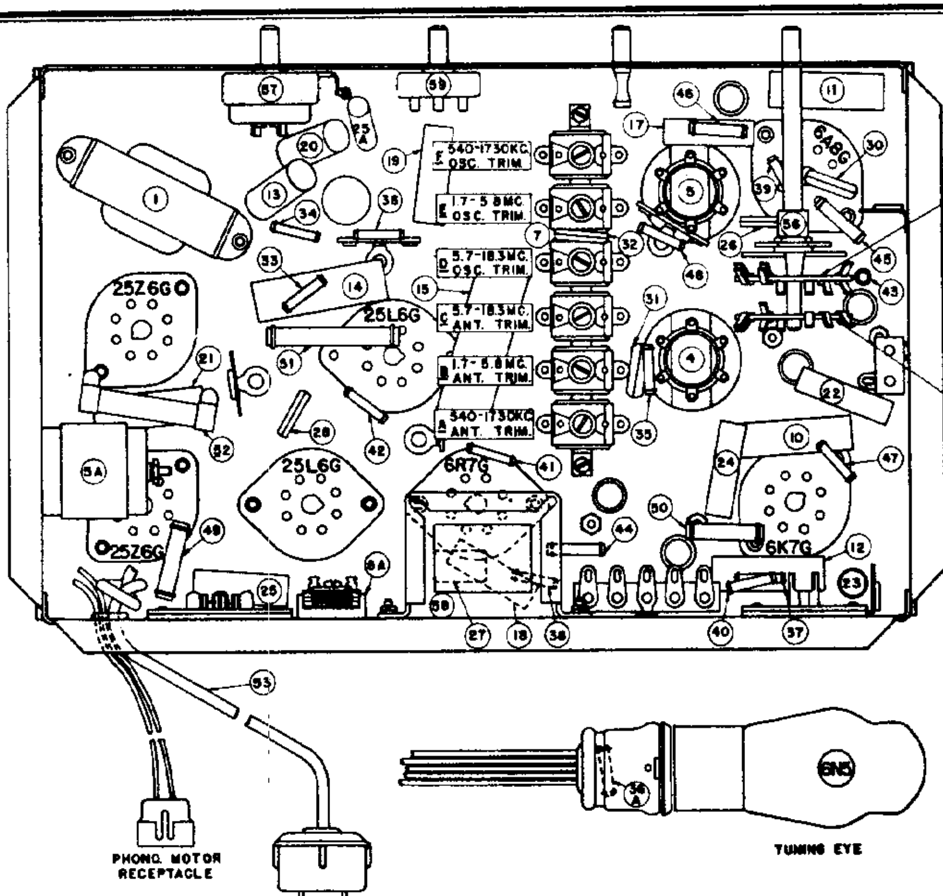
THE MAGNAVOX CO., INC.

MAGNAVOX RADIO CHASSIS
CR-107, 110, 112, 119, 120, 126, 127



ALIGNMENT PROCEDURE

SEE CHASSIS CR-106.



CR-107 -- Used in AC-DC Concerto combination.
Has .005 mfd. condenser for item 24.
10 KC filter consisting of items 5A and 8A are omitted.

CR-110 -- Has brackets for mounting in Chairside cabinet.

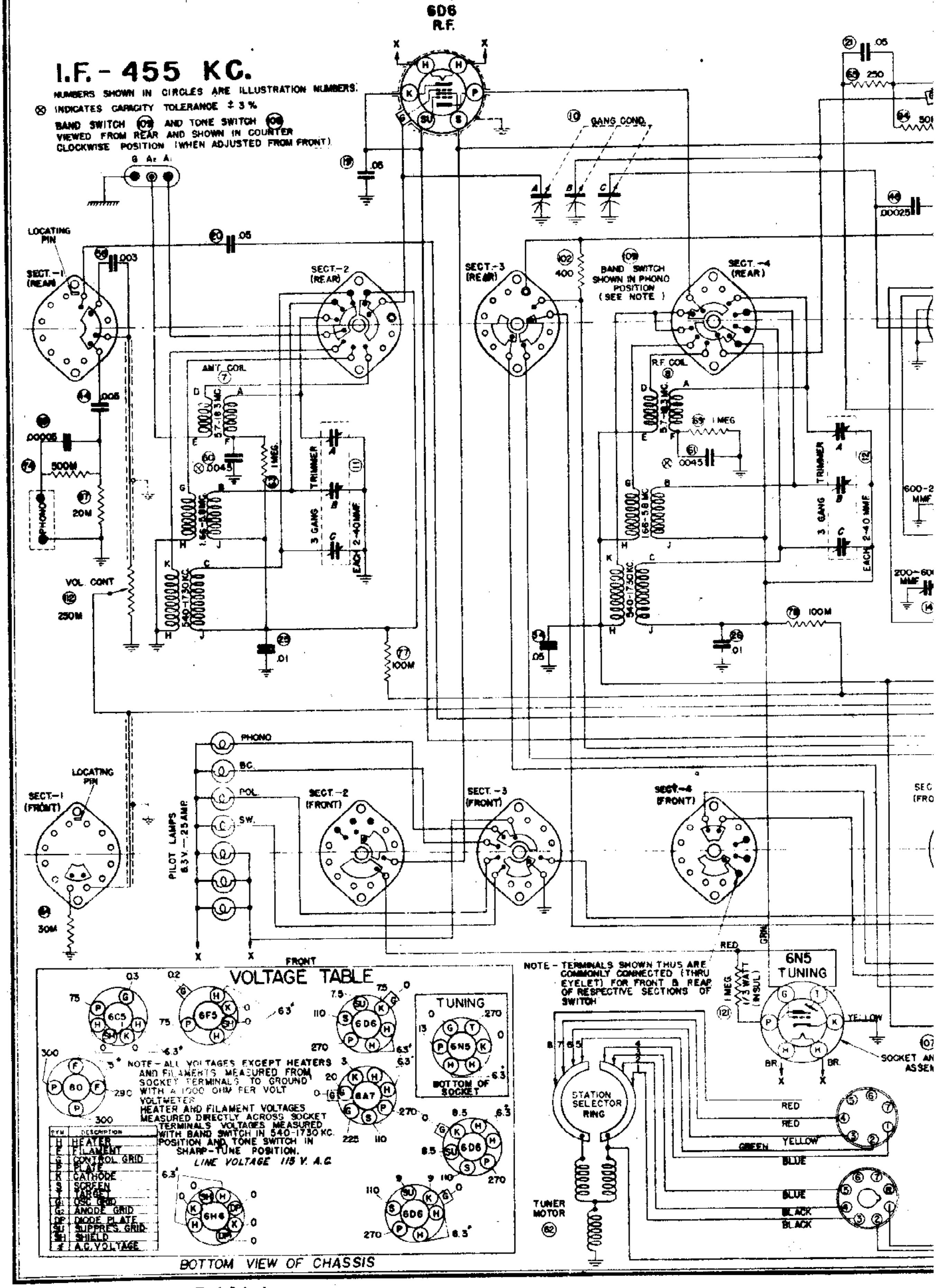
CR-112 -- Has brackets insulated from chassis for mounting in Berkeley cabinet.

CR-120 -- Speaker mounted on the chassis for use in AC-DC Playfellow combination.

CR-126 -- Has brackets for mounting in Berkeley cabinet.

CR-127 -- Has brackets for mounting in Hepplewhite cabinet.

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.


6D6
R.F.
I.F. - 455 KC.
NUMBERS SHOWN IN CIRCLES ARE ILLUSTRATION NUMBERS.
⊗ INDICATES CAPACITY TOLERANCE ± 3 %
BAND SWITCH (109) AND TONE SWITCH (108) VIEWED FROM REAR AND SHOWN IN COUNTER CLOCKWISE POSITION (WHEN ADJUSTED FROM FRONT)
G A2 A1
GANG COND.
LOCATING PIN
SECT.-1 (REAR)
SECT.-2 (REAR)
SECT.-3 (REAR)
SECT.-4 (REAR)
BAND SWITCH SHOWN IN PHONO POSITION (SEE NOTE)
ANT. COIL
R.F. COIL
TRIMMER
3 GANG
EACH 2-40 MMF
1 MEG.
500M
20M
PHONO
VOL. CONT
250M
100M
LOCATING PIN
SECT.-1 (FRONT)
SECT.-2 (FRONT)
SECT.-3 (FRONT)
SECT.-4 (FRONT)
PHONO
BC.
POL.
SW.
PILOT LAMPS 6.3 V. - .25 AMP.
30M
FRONT
VOLTAGE TABLE
TUNING
BOTTOM OF SOCKET
NOTE - ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. VOLTAGES MEASURED WITH BAND SWITCH IN 540-1730 KC. POSITION AND TONE SWITCH IN SHARP-TUNE POSITION.
LINE VOLTAGE 115 V. A.C.
SYM. DESCRIPTION
H HEATER
F FILAMENT
G CONTROL GRID
P PLATE
K CATHODE
S SCREEN
T TARGET
G1 OSC. GRID
G2 ANODE GRID
DP DIODE PLATE
SU SUPPRES. GRID
SH SHIELD
≠ A.C. VOLTAGE
BOTTOM VIEW OF CHASSIS
NOTE - TERMINALS SHOWN THUS ARE COMMONLY CONNECTED (THRU EYELET) FOR FRONT & REAR OF RESPECTIVE SECTIONS OF SWITCH
6N5 TUNING
1 MEG. (1/3 WATT) (INSUL.)
YELLOW
SOCKET AN ASSEM
STATION SELECTOR RING
TUNER MOTOR
RED
RED
YELLOW
GREEN
BLUE
BLUE
BLACK
BLACK

THE MAGNAVOX CO., INC.

ALIGNMENT PROCEDURE

It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

ALIGNING THE I. F. STAGES AT 455 KILOCYCLES

1. Connect an output meter across the voice coil of the speakers.
2. Turn the tone equalizer to the sharp-tune position.
3. Turn the volume control up to 7 or more, and adjust the signal generator output until a reading of one volt is obtained on the output meter when a signal is applied.
4. Align the third I.F. transformer first, by connecting the signal generator to the grid of the 6A6, second I.F. tube; now adjust the third I.F. transformer until a maximum output meter deflection is obtained. THE OUTPUT OF THE SIGNAL GENERATOR IS TO BE CONNECTED THROUGH A .00025 MFD. CONDENSER AT ALL TIMES.
5. Align the second I.F. transformer first, by connecting the signal generator to the grid of the 6D6 first I.F. tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the second I.F. transformer until a maximum deflection of the output meter is obtained.
6. Connect the output of the signal generator to the grid of the 6A7 tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt, and adjust the first I.F. transformer until a maximum deflection of the output meter is obtained.

ALIGNING THE 540-1730 K.C. BAND

1. Set the wave-band switch for reception on the broadcast band.
2. Run the dial pointer to the extreme left position. This will adjust the tuning condensers to maximum capacity.
3. Holding the tuning condensers at maximum capacity, adjust the dial pointer to a position at the end of the horizontal scale. This is done by sliding the pointer on the dial string.
4. Connect the signal generator output to the grid of the 6A7 tube, tune the radio and signal generator to 600 KC and adjust the 600 KC padder for maximum deflection of the output meter.
5. Turn the radio and signal generator to 1400 KC and adjust the 1400 KC trimmer for maximum deflection of the output meter.
6. Leave the signal generator and radio switch at 1400 KC, connect the signal generator output to the antenna binding post "A1" and adjust the 1400 KC R.F. stage trimmer for maximum deflection of the output meter.

ALIGNING THE 1660-5800 K.C. BAND

1. Set the band switch for reception on the police band.
2. Connect the output of the signal generator to the grid of the 6A7 tube, set the signal generator and radio to 1800 KC and adjust the 1800 KC padder for maximum deflection of the output meter.
3. Set the radio and the signal generator to 5000 KC and adjust the 5000 KC oscillator trimmer for maximum deflection of the output meter.
4. Leave the radio and signal generator set at 5000 KC, connect the signal generator output to the antenna binding post "A1", and adjust the 5000 KC first detector trimmer and the 5000 KC R.F. trimmer for maximum deflection of the output meter.

ALIGNING THE 5700-18300 K.C. BAND

1. Set the band switch for reception on the foreign band.
2. Connect the signal generator output to the grid of the 6A7 tube, set the radio and the signal generator to 15 megacycles and adjust the 15 megacycle oscillator trimmer for maximum deflection of the output meter.
3. Leave the signal generator and the radio set for 15 megacycles, connect the signal generator output to the antenna binding post "A1" and adjust the 15 megacycle first detector trimmer and the 15 megacycle oscillator trimmer for maximum deflection of the output meter.

MISCELLANEOUS NOTES

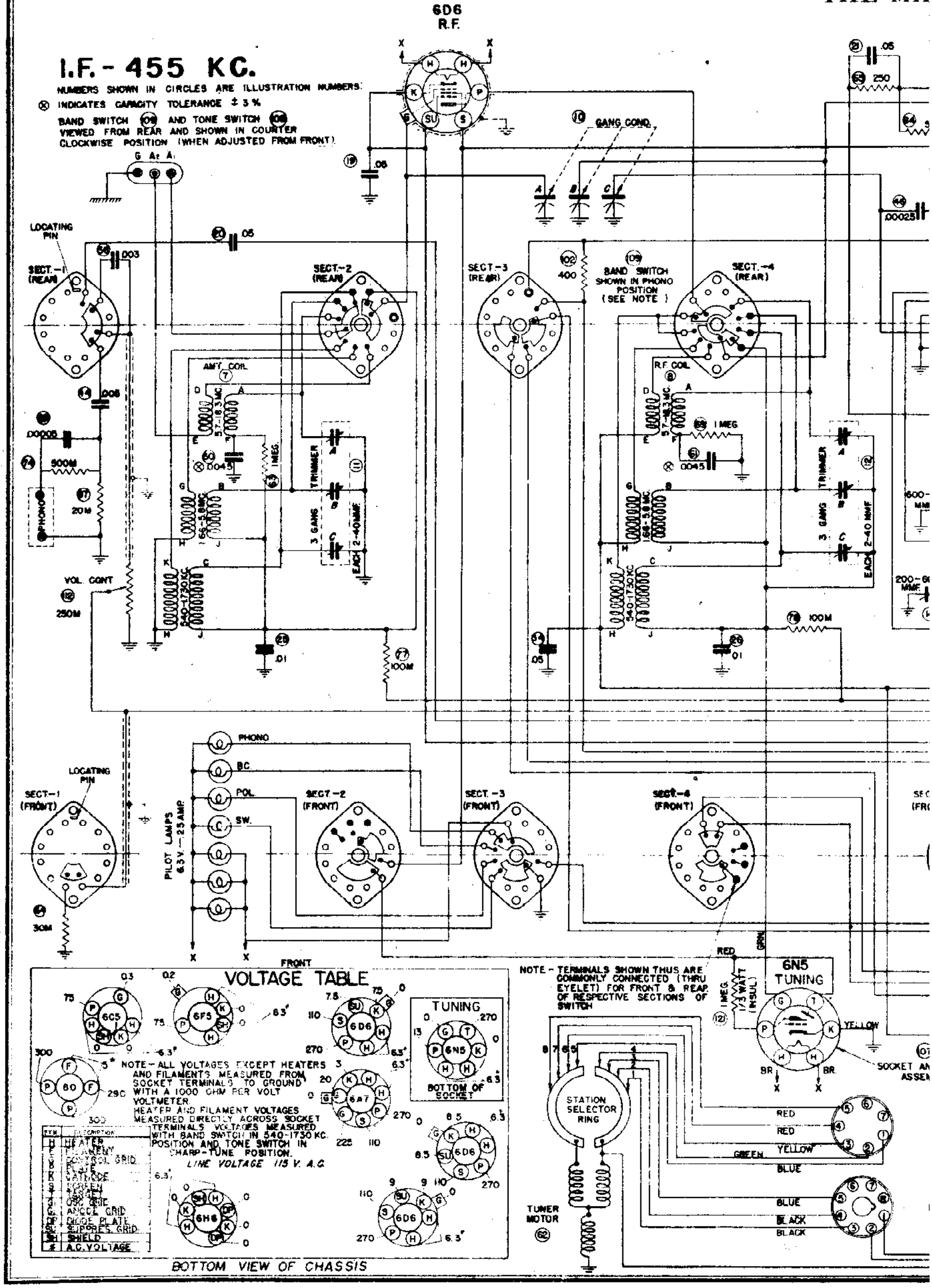
The radio chassis must "float" freely and it is therefore important that none of the knobs touch the panel. The four holes in the radio support bracket "C" Fig. 1, are sufficiently large to permit adjustment of the chassis until it "floats" properly. Be sure that this "floating" condition exists before attempting to tighten the screws "A" Fig. 1, after replacing the chassis in the cabinet.

If one of the push-button switches does not function, remove the radio panel in the manner outlined in the foregoing instructions, and check the switch contacts. It is entirely probably that the trouble can be corrected by either cleaning the contacts or by bending them so that they form a solid connection.

When the release button of the radio push-button assembly is depressed, the switch arm nearest the end of the assembly must break one contact before making the other contact. Failure of the release button to operate in this manner will cause the setup pilot lamp to burn out, in which case the arm of the switch should be bent until the "break-before-make" action is obtained.

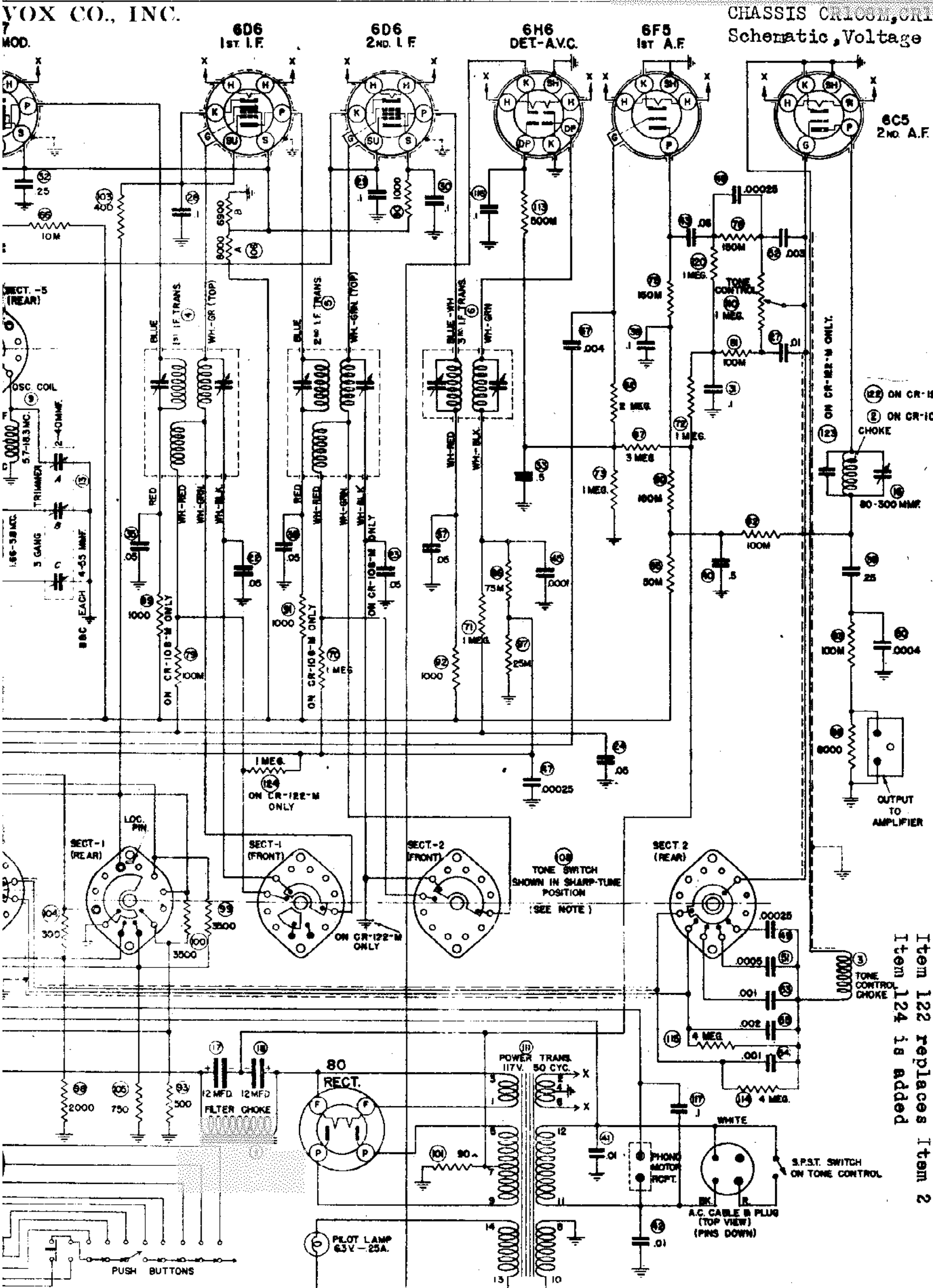
Due to the extremely high sensitivity of the receiver, it is possible for some excessively strong signals to overload and cause distortion in the radio. This condition is very rare and occurs only on a very strong signal when the receiver has a very efficient antenna. This difficulty is recognized by distortion on a strong signal and being absent on weak signals. To correct this trouble, it is necessary to connect a 500 ohm resistor across the broadcast antenna primary to ground. The terminal for making this connection is accessible at the rear of the R.F. transformer on the top of the chassis. Connect the resistor from the lug having the red-with-blue tracer lead connected to it, to the ground bus wire which ties the three trimmer condensers together.

It is possible for the distortion mentioned above, to occur due to defective 6D6 I.F. tubes. The second I.F. tube is more susceptible to this difficulty and should be replaced before checking the first I.F. tube.



6D6
R.F.
I.F. - 455 KC.
NUMBERS SHOWN IN CIRCLES ARE ILLUSTRATION NUMBERS.
⊗ INDICATES CAPACITY TOLERANCE ± 3 %
BAND SWITCH (109) AND TONE SWITCH (108) VIEWED FROM REAR AND SHOWN IN COUNTER CLOCKWISE POSITION (WHEN ADJUSTED FROM FRONT)
G A2 A1
GANG COND.
LOCATING PIN
SECT.-1 (REAR)
SECT.-2 (REAR)
SECT.-3 (REAR)
SECT.-4 (REAR)
BAND SWITCH SHOWN IN PHONO POSITION (SEE NOTE)
ANT. COIL
R.F. COIL
TRIMMER
3 GANGS
EACH 2-40 MMF
VOL. CONT
PHONO
BC
POL.
SW.
PILOT LAMPS 6.3 V. - .25 AMP.
SECT.-1 (FRONT)
SECT.-2 (FRONT)
SECT.-3 (FRONT)
SECT.-4 (FRONT)
FRONT
VOLTAGE TABLE
TUNING
BOTTOM OF SOCKET
NOTE - ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. VOLTAGES MEASURED WITH BAND SWITCH IN 540-1730 KC. POSITION AND TONE SWITCH IN SHARP-TUNE POSITION.
LINE VOLTAGE 115 V. A.C.
H HEATER
F FILAMENT
G CONTROL GRID
P PLATE
K CATHODE
S SCREEN
T TARGET
OG OSC. GRID
AG ANODE GRID
DP DIODE PLATE
SU SUPPRES. GRID
SH SHIELD
A.C. VOLTAGE
BOTTOM VIEW OF CHASSIS
NOTE - TERMINALS SHOWN THUS ARE COMMONLY CONNECTED (THRU EYELET) FOR FRONT & REAR OF RESPECTIVE SECTIONS OF SWITCH
6N5 TUNING
1 MEG. 1/3 WATT (INSUL)
YELLOW
SOCKET AN ASSEM
STATION SELECTOR RING
TUNER MOTOR
RED
GREEN
YELLOW
BLUE
BLACK

CHASSIS CR108M,CR122
Schematic,Voltage



CR-122 -- Same as CR-108M except Items 23, 70 and 79 are omitted
Item 122 replaces Item 2
Item 124 is added

CR-108M - Nine-tube superheterodyne

CHASSIS CR108M,CR122
Notes,Part 2,Dial Data

THE MAGNAVOX CO., INC.

MISCELLANEOUS NOTES (continued)

The tuning shaft "A" Fig. 2, can be bent very easily when the chassis is out of the cabinet if extreme care is not exercised. If the shaft is bent only slightly, it can possibly be bent back to its original shape, otherwise it should be replaced.

To replace the tuning shaft, first slip the dial cable from the front groove of the disc "B" Fig. 2, by releasing the spring holding that cable in place. Now rotate the disc until the dial pointer is at the extreme right end of the scale, at which point the hole "C" in the disc is in line with the hole in the shaft support bracket. Insert a small screw driver through the two holes and remove the motor mounting screw. Remove the other two motor mounting screws and lift the motor from the chassis.

Now remove the "C" washer from the shaft immediately to the front of the shaft support bracket, and slide the shaft toward the inside of the chassis. Insert a new shaft and gear, wrap 2 1/2 turns of the dial cable in the groove provided, and fasten the "C" washer in place. The method of properly stringing the dial cable is shown in detail in Fig. 2 and is fully described in the following paragraphs. Remount the motor with the three mounting screws. The holes through which these screws pass, are sufficiently large to permit adjustment of the motor so that the gears mesh properly. The procedure outlined above for replacing a tuning shaft may also be used in replacing a tuning motor.

To adjust the position of the volume or tone compensator semaphore discs, loosen the small set-screw on the brass bushing behind the disc, and slide the disc until the proper setting is obtained. Tighten the set-screw, and the operation is completed.

When push-button tuning is used, the dial pointer may have a tendency to "hunt" on either side of the desired frequency before coming to rest. This condition is caused by insufficient pressure of the small spring at the rear of the tuning motor, against the armature shaft. The spring should be "kinked" slightly to provide additional pressure, using a pair of long-nosed pliers to make the adjustment.

If a distinct hum is heard in the speakers when using the radio, the 6F5 tube should be replaced as a possible cure. It is extremely important that the grid lead of the 6F5 tube is shielded as near to the cap of the tube as is possible or hum will be picked up in this lead.

The shell of the cap on the phonograph input plug should not be allowed to contact the chassis or else a hum will be heard in the speakers with phonograph operation. A small felt washer is used between the plug and the receptacle to prevent this and should be replaced at any time that it is necessary to remove this plug from its receptacle.

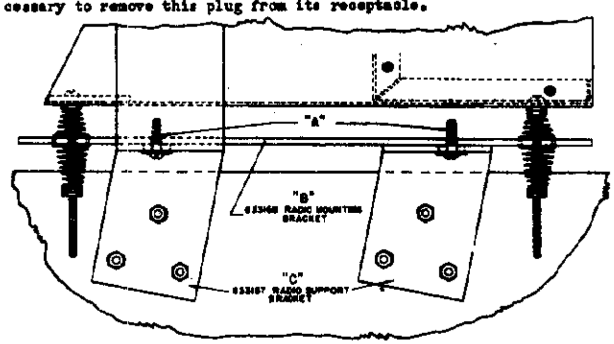


FIG. 1

RESTRINGING THE DIAL CABLE

To restring the pointer cable, first tie one end of the cable to the pointer tension spring, Fig. 2, after the spring has been removed from the small hook on disc "B". Lace the cord through the eyelet in the rear groove, allowing about 1/2 inch between the spring and the inside edge of the groove. Proceed around the idler pulley at the left end of the dial, across the front of the disc "B", through the back of the pointer clamp (see inset Fig. 2), around the right-end idler pulley and around the rear disc groove in a counter-clockwise direction threading it into the eyelet mentioned above. Knot the cable to the spring, bringing the spring toward the inside rim of the disc as close as possible. Now stretch the spring until the other end can be secured to the hook, completing the operation.

To restring the drive shaft cable, first tie one end of the cable to the drive shaft cable tension spring, after the spring has been removed from the small hook on disc "B". Lace the cord through the eyelet in the front groove allowing about 1/2 inch between the end of the spring and inside edge of the groove. Proceed around the disc in a counter-clockwise direction, wrap two and one-half turns around shaft "A" Fig. 2, in a clockwise direction and from front to rear. Continue around the groove in a counter-clockwise direction threading the cable through the eyelet near the spring. Knot the cable to the spring, bringing the spring toward the inside rim of the disc as close as possible. Stretch the spring until the other end can be secured to the hook, and the operation is completed.

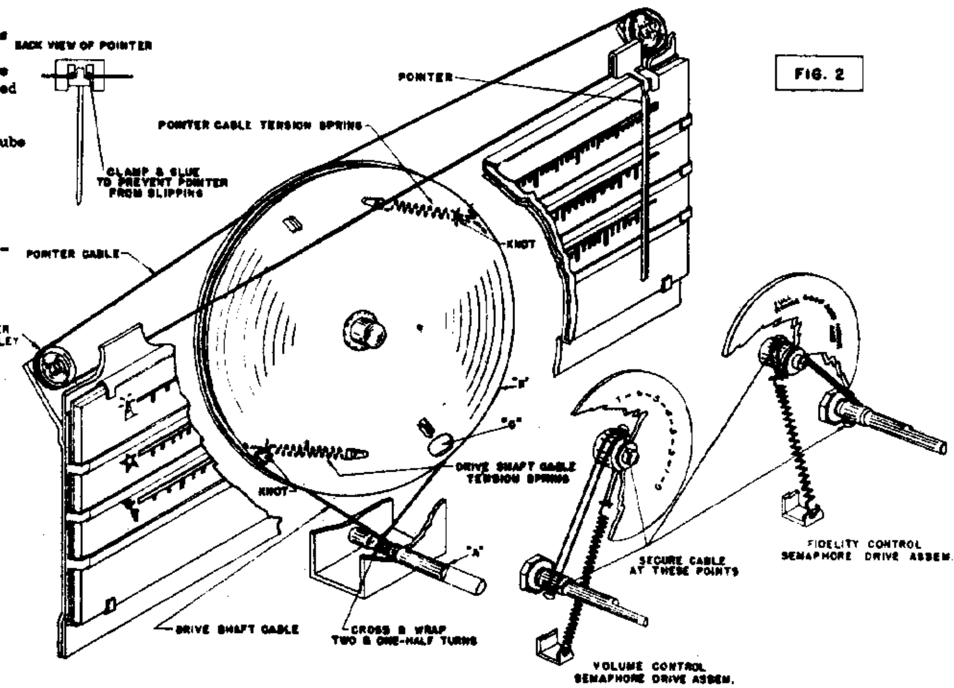
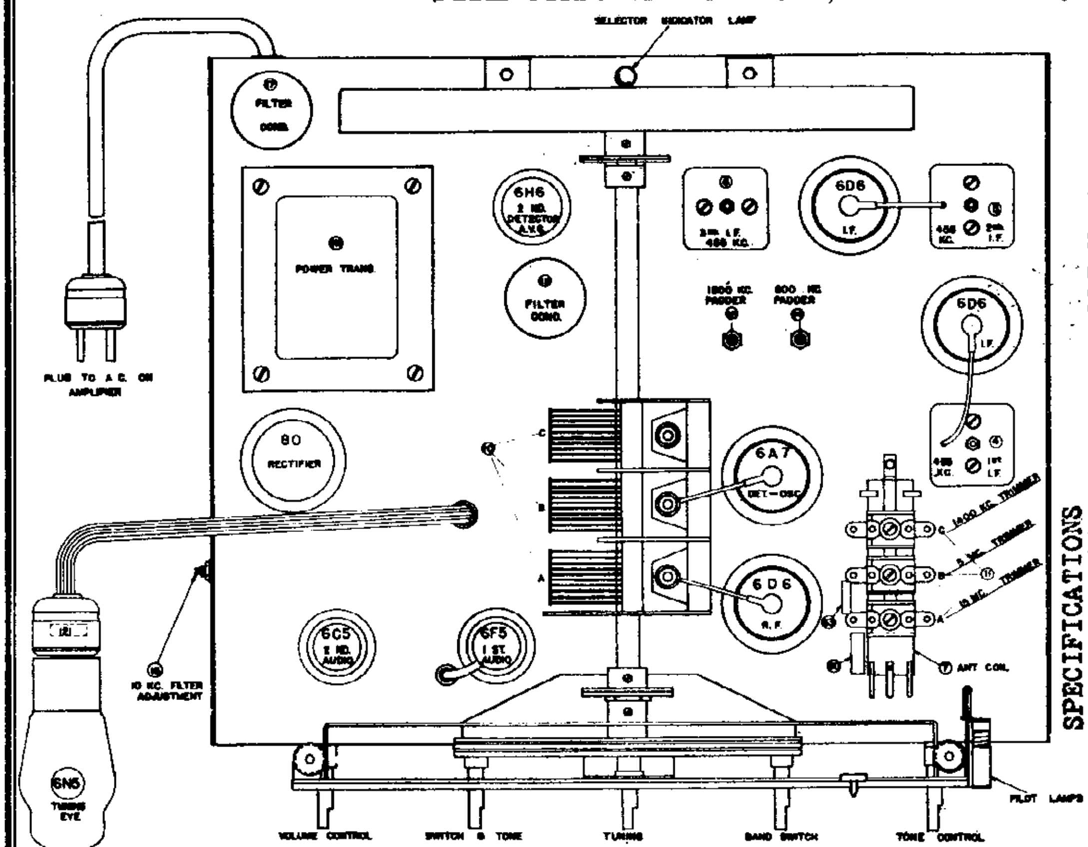
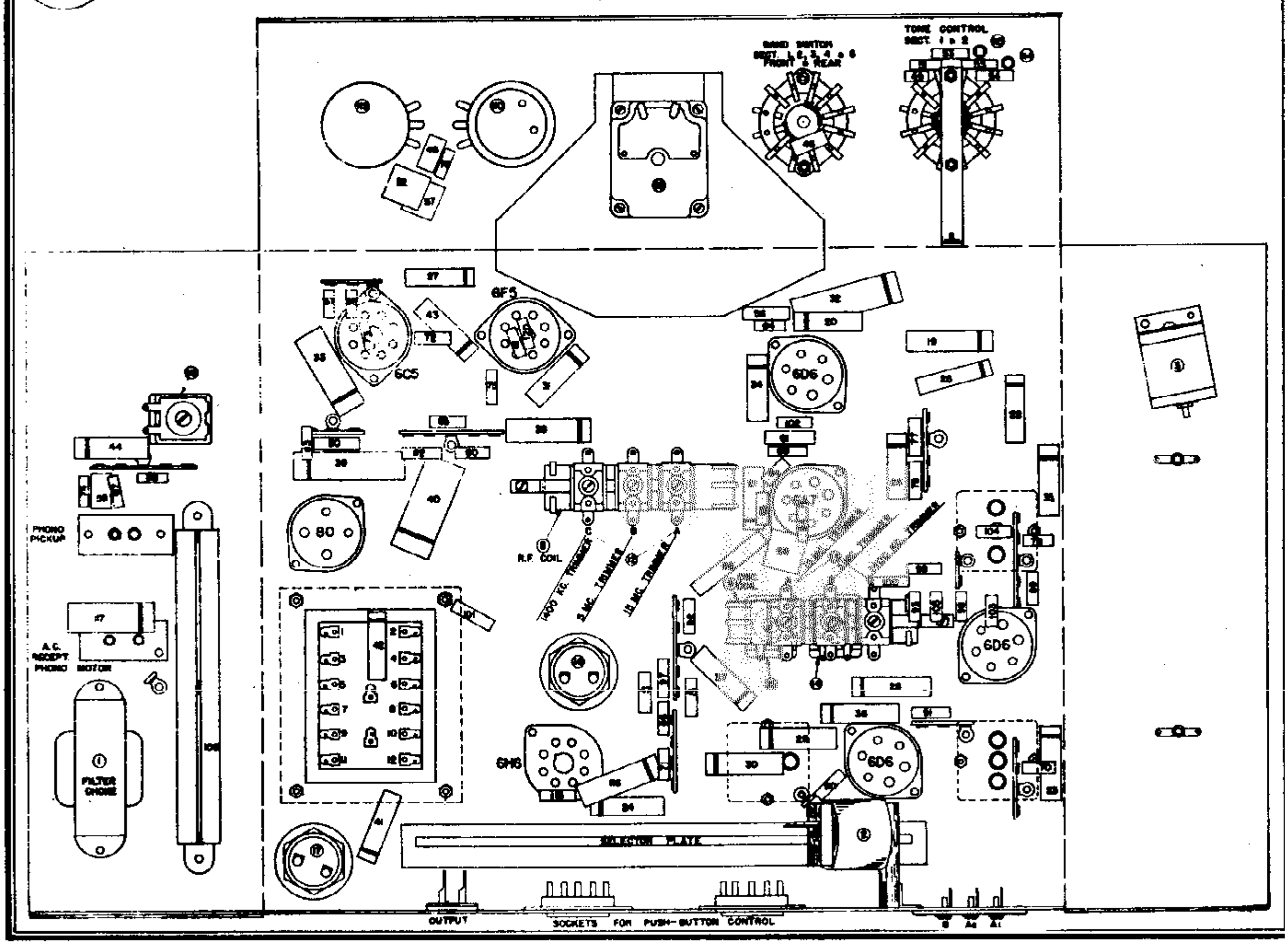


FIG. 2

CHASSIS CR108M, CR122
Socket, Trimmers, Chassis

THE MAGNAVOX CO., INC.





SPECIFICATIONS

Primary voltage..........117 V. AC;

Power consumption.......... 54 watts;

Output impedance..........8000 ohms;

Intermediate frequency..........455 KC;

Tuning frequency range: 540-1730 KC
1660-5800 KC
5700-18,300 KC

CHASSIS CR102,-103,104,105
CHASSIS CR106,-109,-111
CHASSIS CR107,-110,-112,
-119,-120,-126,-127

THE MAGNAVOX CO., INC.

CHASSIS CR113,-114,-115,
-118,-125
CHASSIS 121,-124
Alignment

MODELS CR106, 109, 111; CR107, 110, 112, 119, 120, 126, 127;
CR113, 114, 115, 118, 125; CR121, 124

ALIGNING THE I.F. STAGES AT 455 K.C.

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .00025 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to its maximum setting.

3. Peak each of the second I.F. transformer trimmer condensers.

4. Peak each of the first I.F. transformer trimmer condensers.

ALIGNING THE 540-1730 K.C. BAND

Remove the test oscillator lead from the grid of the 6A7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.

Set the test oscillator frequency and receiver dial to EXACTLY 1730 kilocycles. Adjust the 1730 kilocycle oscillator trimmer to bring in 1730 kilocycle test oscillator signal to maximum output.

Tune the receiver and test oscillator frequency to EXACTLY 1400 kilocycles and adjust the 1400 kilocycle antenna trimmer for maximum output as indicated on the output meter.

Set the test oscillator and receiver frequency to approximately 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum signal.

ALIGNING THE 1.7-5.8 M.C. BAND

Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the antenna lead.

Tune the receiver and test oscillator frequency to EXACTLY 5 megacycles and adjust the 5 megacycle antenna trimmer for maximum output.

ALIGNING THE 5.7-18.3 M.C. BAND

Leave the 400 ohm resistor in series with the test oscillator lead and set the band selector switch for operation on the 5.7 - 18.3 megacycle band (short wave).

Set the receiver and test oscillator frequency to EXACTLY 18.3 megacycles.

Adjust the 18.3 megacycle oscillator trimmer for maximum signal as indicated on the output meter.

When adjusting this trimmer two peaks may be noticed, in which case CARE MUST BE TAKEN THAT THE PROPER PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.3 MC. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak -- if more than one is noticed -- which is the correct one to use, is tuned in.

Set the receiver and test oscillator frequency to EXACTLY 15 megacycles.

Rock the gang condenser slightly to the right and to the left, adjusting the 15 megacycle antenna trimmer for maximum signal as indicated on the output meter.

MODELS CR102, 103, 104, 105

ALIGNING THE I.F. AT 456 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or set ground lead (black). Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .00025 mfd. condenser.

2. Set the band switch for reception on the broadcast band and set the dial pointer to 1,000 kilocycles, adjusting the receiver volume control to its maximum setting.

3. Now feed a 456 kilocycle signal from the test oscillator and peak each of the second I.F. trimmer condensers.

4. Peak each of the first I.F. trimmer condensers, repeating the adjustments several times for most accurate setting.

ALIGNING THE 540-1760 KILOCYCLE BAND

1. Remove the test oscillator lead from the grid of the 6A7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. condenser.

2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed at which point the dial pointer must be exactly even with the last line at the low frequency end of the band (540 KC).

3. With the band selector set for reception on the broadcast band, set the dial pointer to the extreme high frequency end of the band (1760 KC) and feed a 1760 KC signal from the signal generator, adjusting the 1760 kilocycle oscillator trimmer for maximum output.

4. Now set the receiver and test oscillator frequency to 1500 KC and adjust the 1500 KC antenna trimmer for maximum output.

5. Set the receiver and test oscillator frequency to 600 KC and adjust the 600 KC oscillator padder to maximum output while tuning the receiver back and forth across the signal. This completes the alignment of the broadcast band.

ALIGNING THE 1600-5000 KILOCYCLE BAND

1. Set the band selector for operation on the police band.

2. Set the receiver and test oscillator frequency to 4 megacycles and adjust the 4 megacycle antenna trimmer for maximum output.

ALIGNING THE 4.0-19.0 MEGACYCLE BAND

1. Set the band selector for operation on the foreign band.

2. Set the receiver and test oscillator frequency to 15 megacycles and adjust the 15 megacycle antenna trimmer for maximum output.

10 KILOCYCLE FILTER ADJUSTMENT

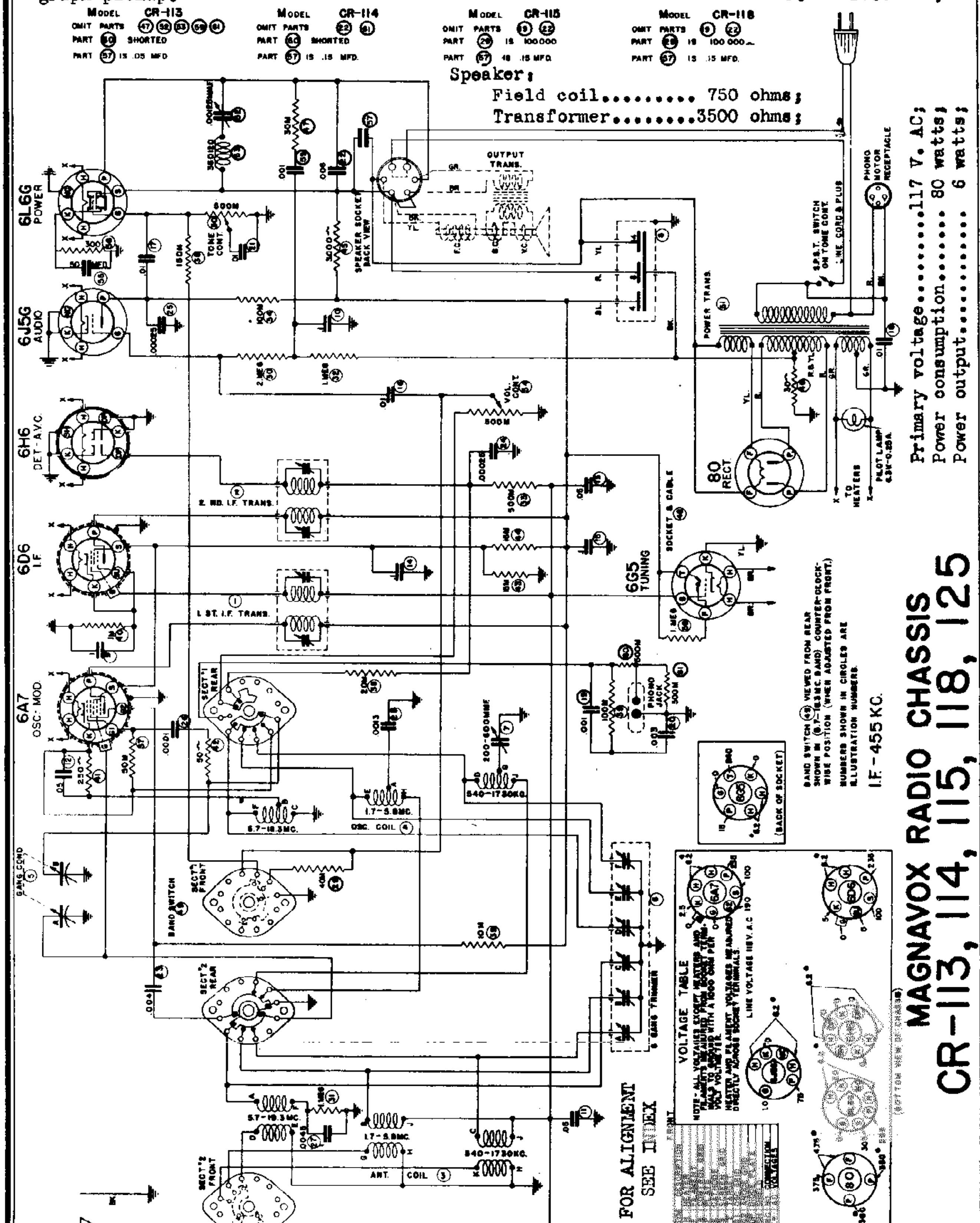
With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser on the rear of the chassis adjacent to the speaker socket.

CHASSIS CR113,-114,-115
CR118,-125
Schematic, Voltage

THE MAGNAVOX CO., INC.

Type circuit: Superheterodyne with three tuning ranges, tone control, A.V.C., bass compensation in volume control for phonograph pickup.

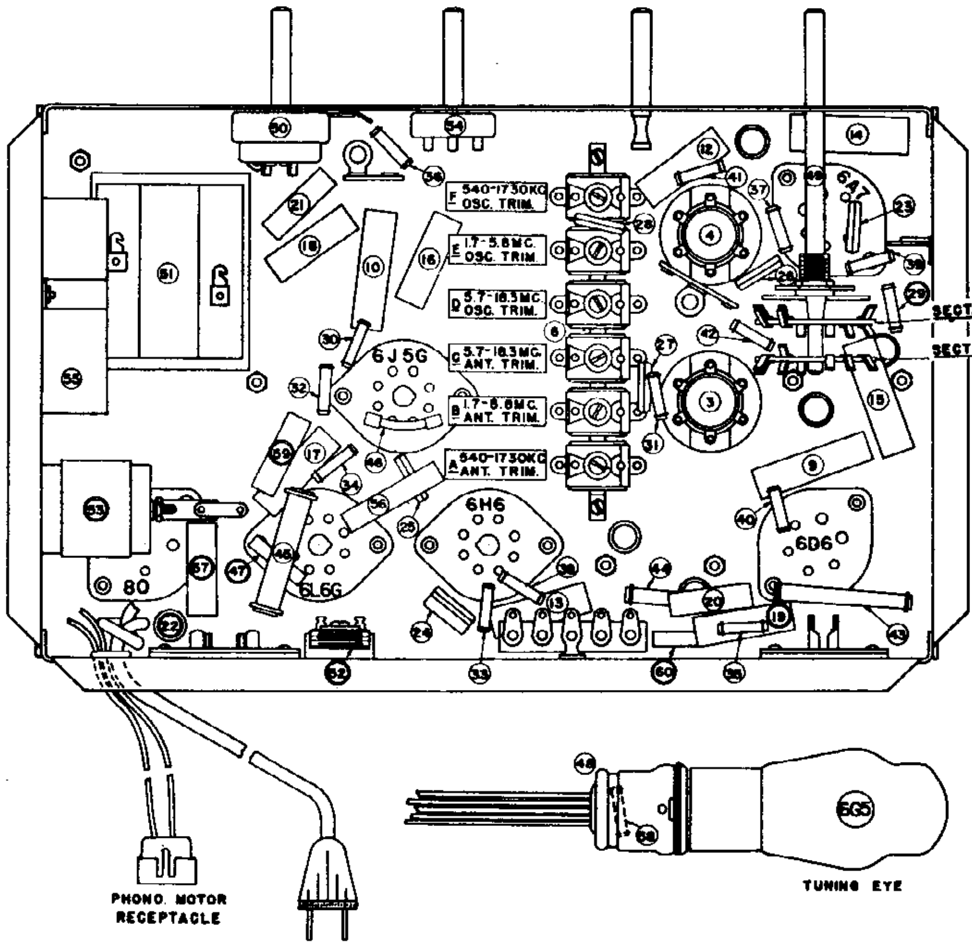
Intermediate frequency............455 KC;
Tuning frequency range 540 - 1730 KC;
1.7 - 5.8 MC;
5.7 - 18.3 MC;



CHASSIS CR113,-114,-115
CR118,-125
Socket,Trimmers,Chassis

THE MAGNAVOX CO., INC.

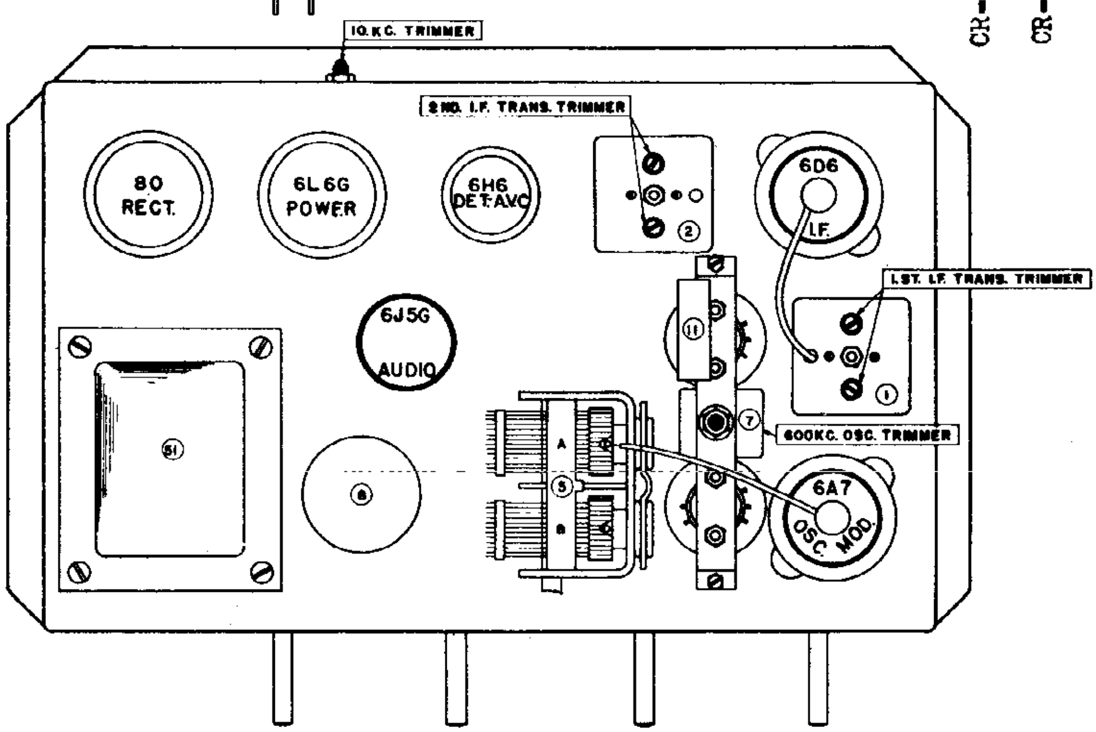
It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.



CR-114 -- Has brackets for mounting in Chairside combination.
Omit items 22 and 61.

CR-115 -- Has brackets for mounting in Duette combination.
Omit items 19 and 22.
Item 29 is 100,000 ohms.
Item 57 is .15 mfd.

CR-118 -- Has brackets for mounting in Berkeley combination.
Omit items 19 and 22.
Item 29 is 100,000 ohms.
Item 57 is .15 mfd.



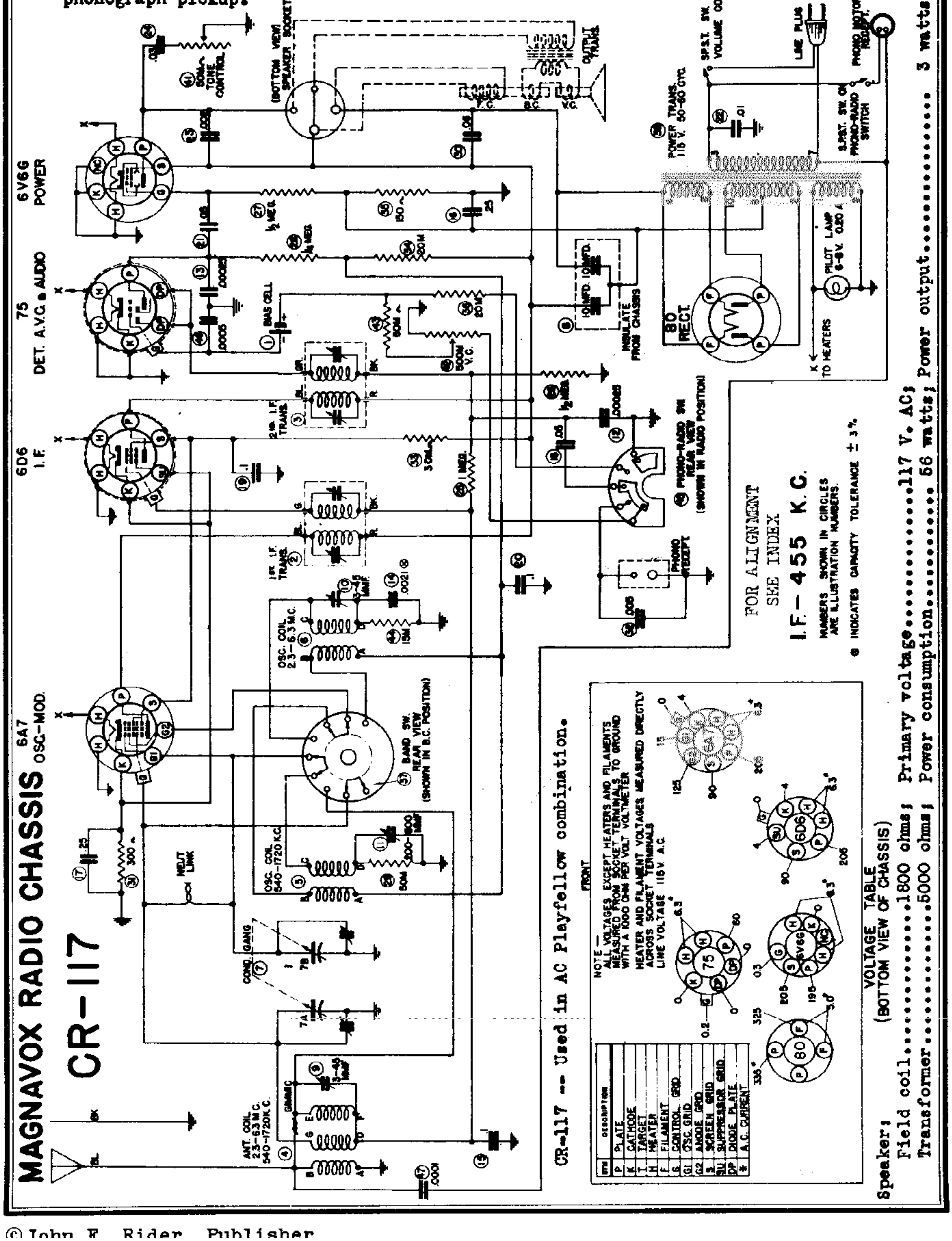
CR-113 -- Used in Concerto combination.
Omit items 47, 52, 53, 59 and 61.
Item 60 is shorted.
Item 57 is .05 mfd.

CHASSIS CR117
Schematic,Voltage

THE MAGNAVOX CO., INC.

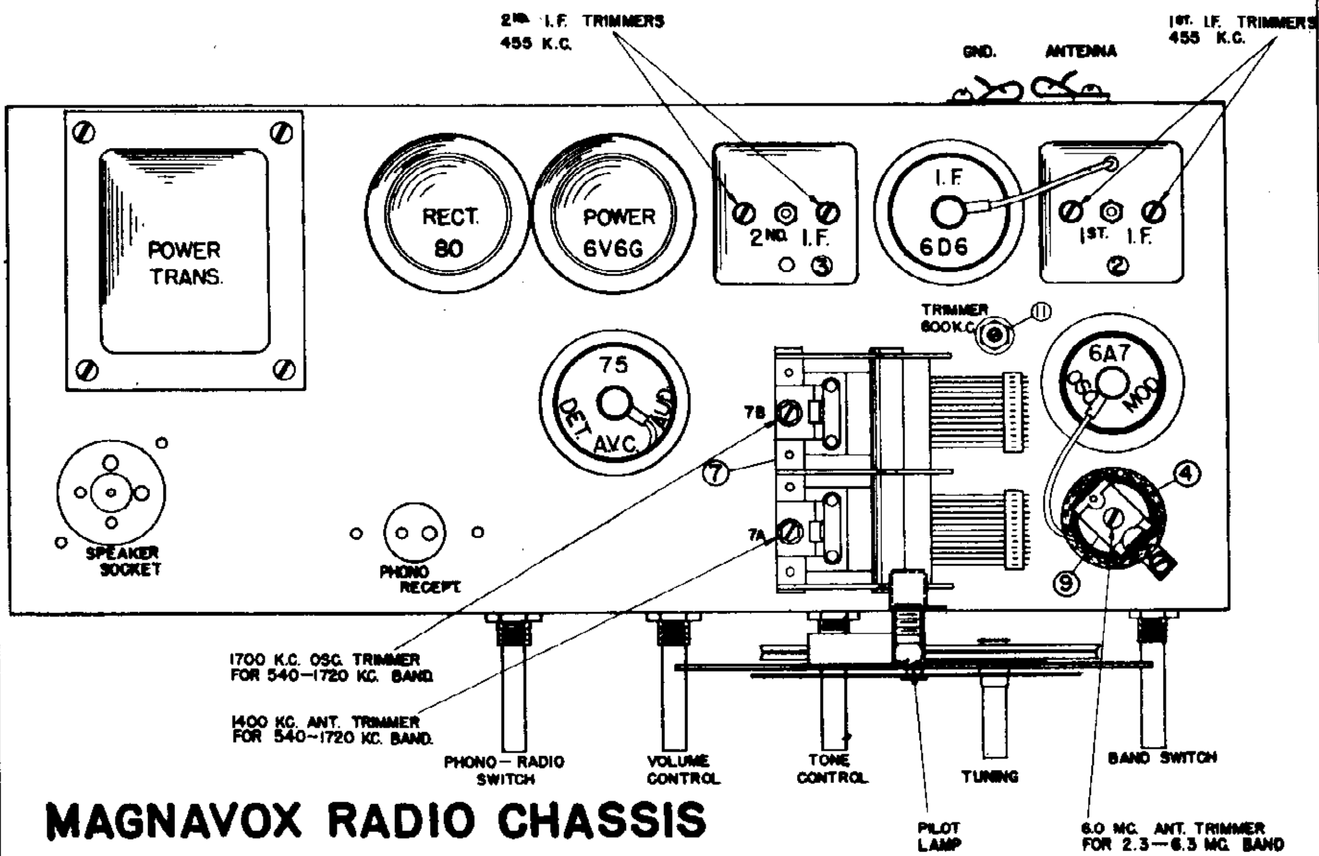
Type Circuit: Superheterodyne with two tuning ranges, tone control, A.V.C. bass compensation in volume control for phonograph pickup.

Tuning frequency range....540-1720 KC
2.3-6.3 MC



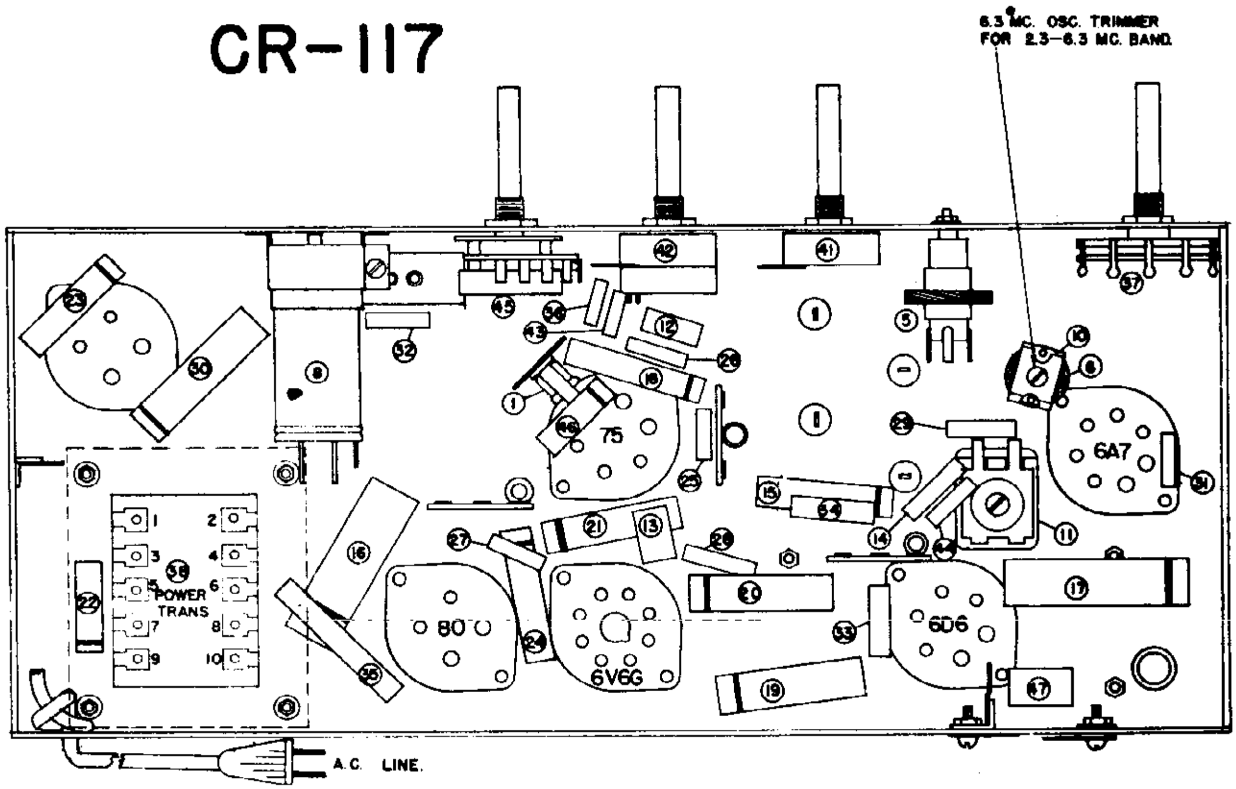
CHASSIS CR117
Socket, Trimmers
Chassis

THE MAGNAVOX CO., INC.



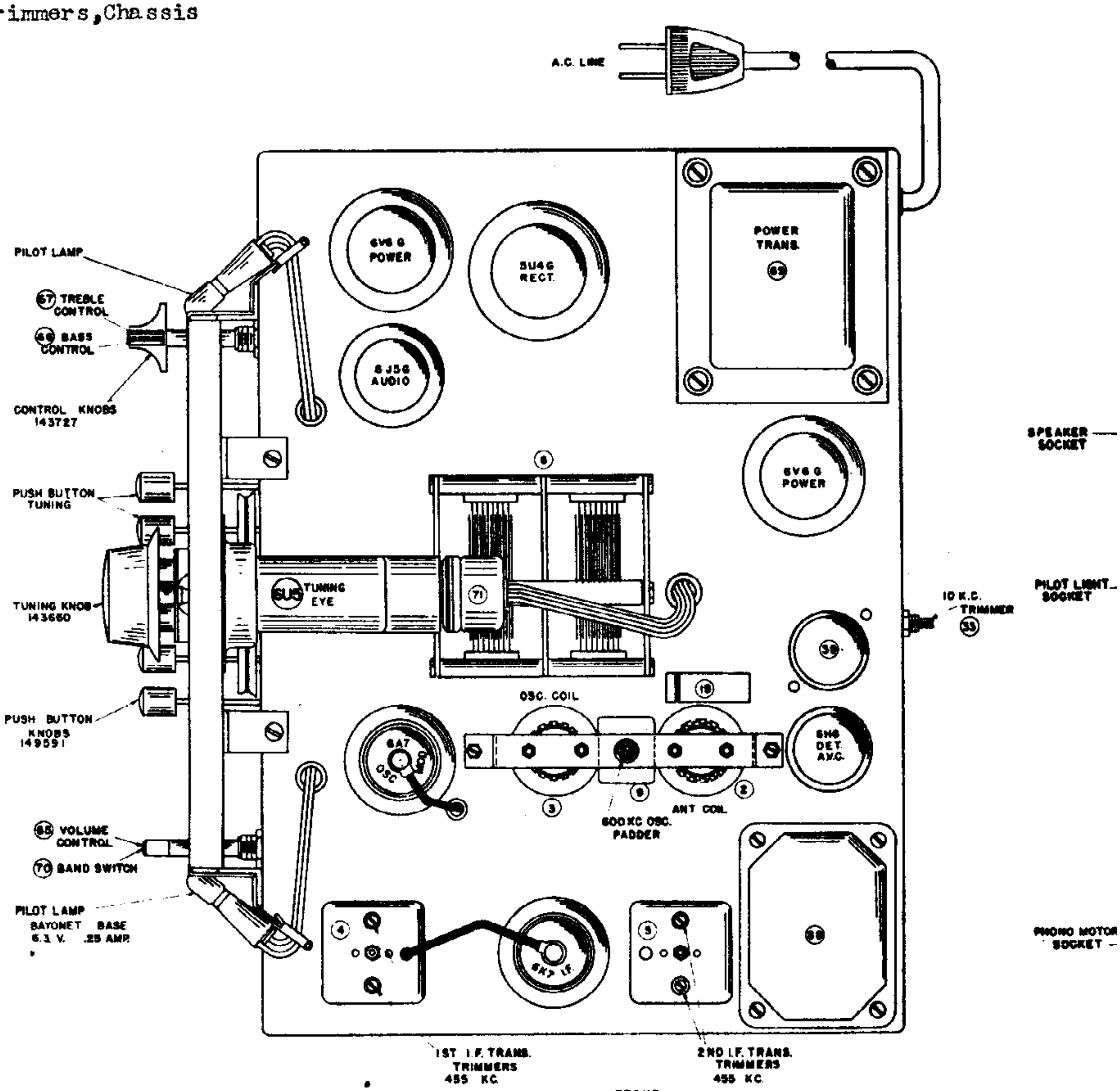
MAGNAVOX RADIO CHASSIS

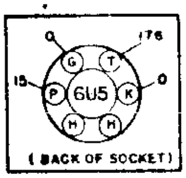
CR-117

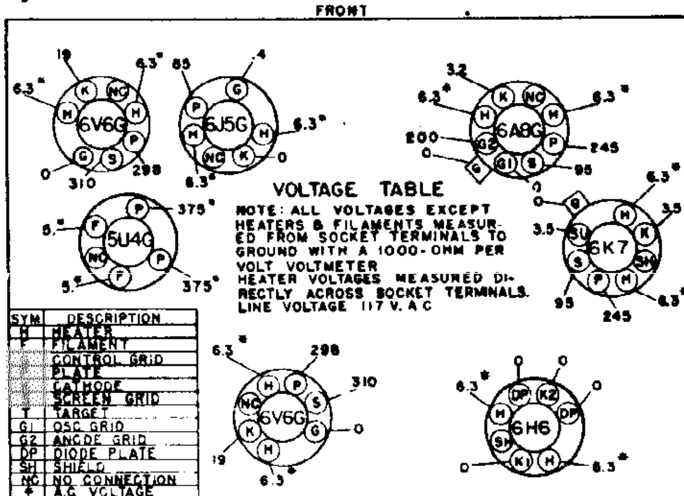


It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

CHASSIS CR121
Voltage, Socket
Trimmers, Chassis



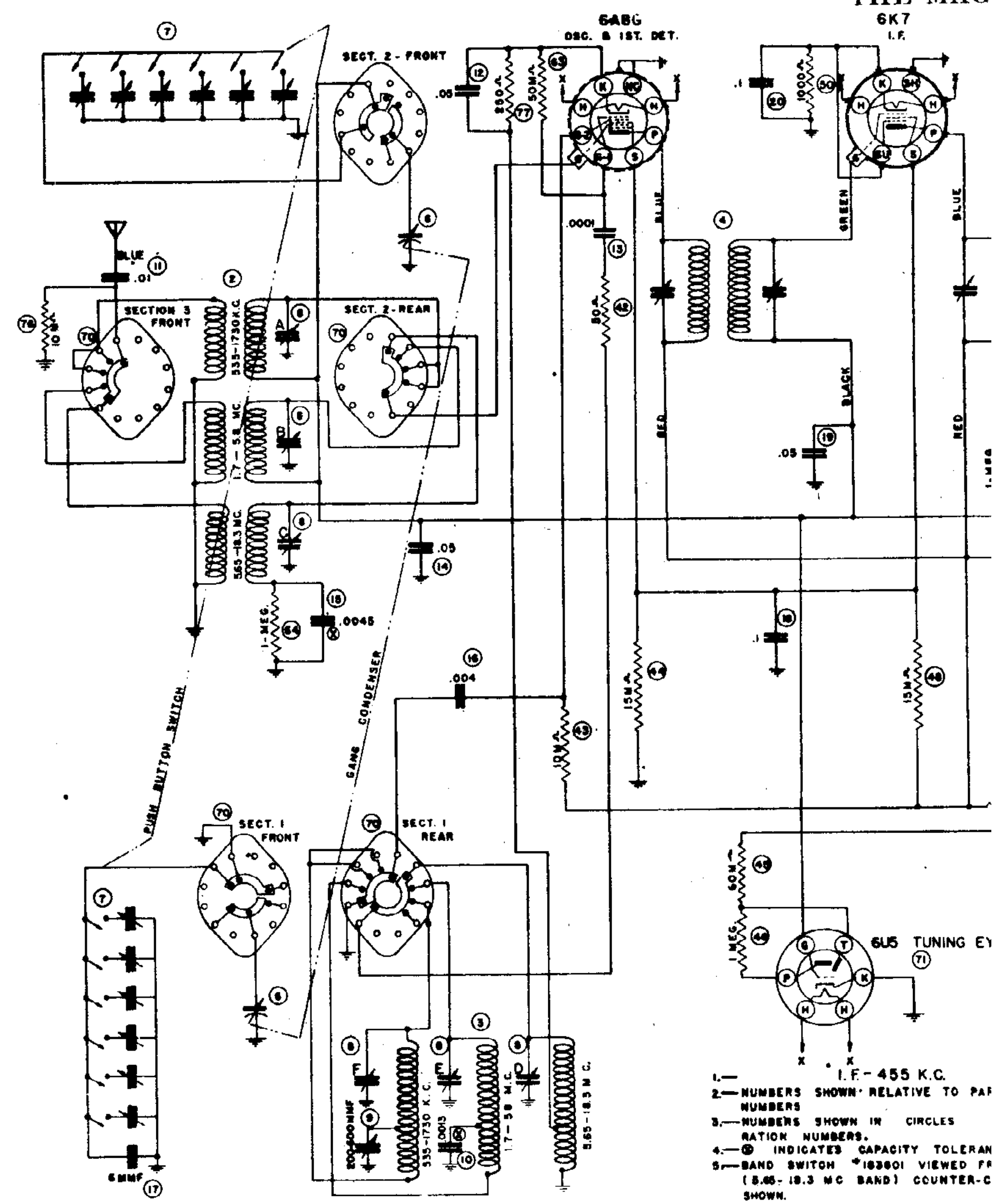




VOLTAGE TABLE

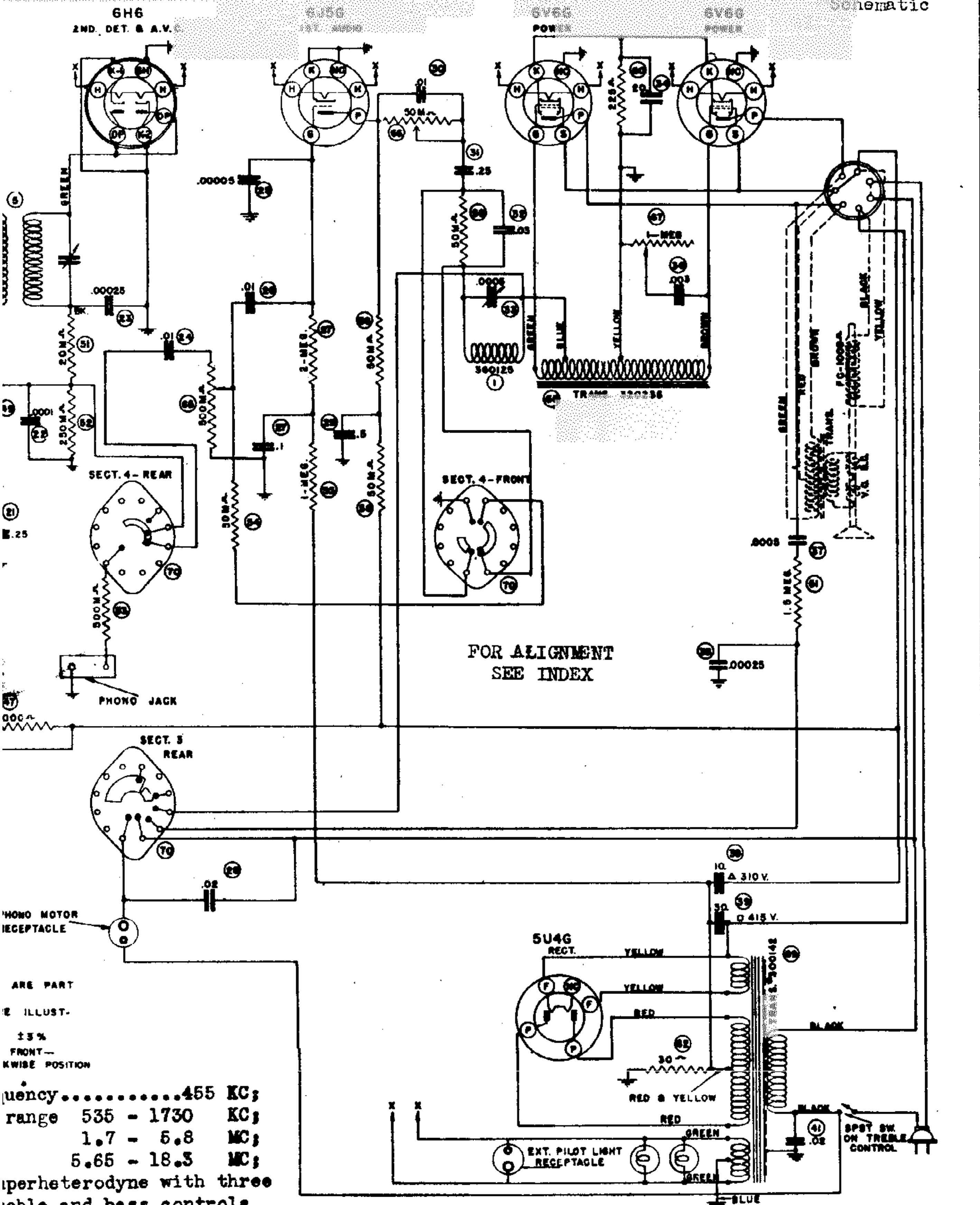
NOTE: ALL VOLTAGES EXCEPT HEATERS & FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000-OHM PER VOLT VOLTMETER
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
LINE VOLTAGE 117 V. A C

SYM	DESCRIPTION
H	HEATER
F	FILAMENT
G	CONTROL GRID
P	PLATE
K	CATHODE
S	SCREEN GRID
T	TARGET
G1	OSC. GRID
G2	ANODE GRID
DP	DIODE PLATE
SH	SHIELD
NC	NO CONNECTION
*	A.C. VOLTAGE
SU	SUPPRESSOR



MAGNAVOX RADIO
CR-121
CHASSIS

Primary voltage.........117 V. AC; Intermediate fr
Power consumption.......100 watts; Tuning frequenc
Power output........... 12 watts;
Speaker:
Field Coil.........1000 ohms; Type Circuit:
Transformer........8000 ohms; tuning ranges,
A.V.C., bass co
trol for phonog



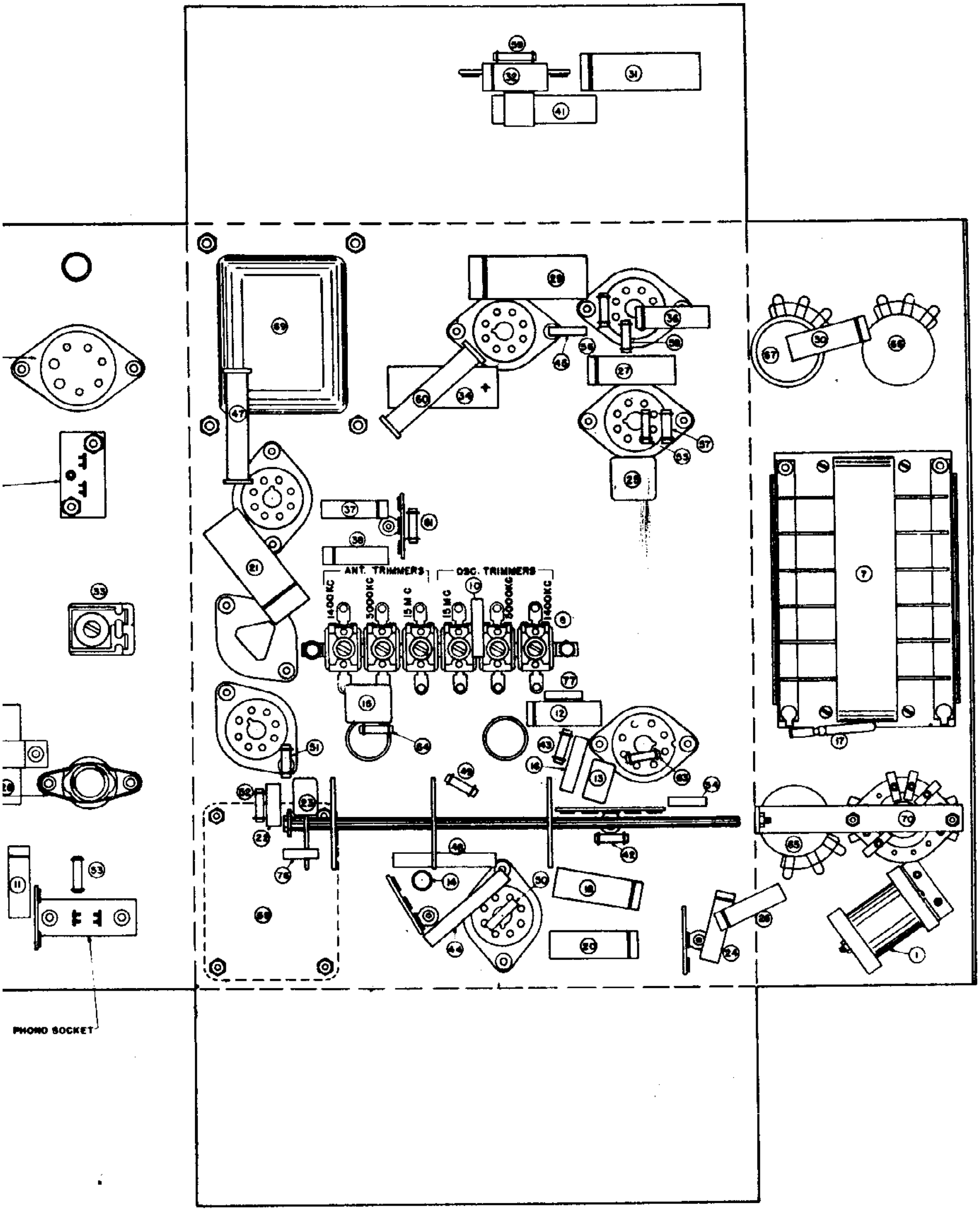
ARE PART

E ILLUST-

±3%
FRONT—
KWISE POSITION

quency...........455 KC;
range 535 - 1730 KC;
1.7 - 5.8 MC;
5.65 - 18.3 MC;
perheterodyne with three
reble and bass controls,
pensation in volume con-
ph pickup.

CR-121 -- Used in AC Hepplewhite Manual combination.
Used in AC Berkeley combination.

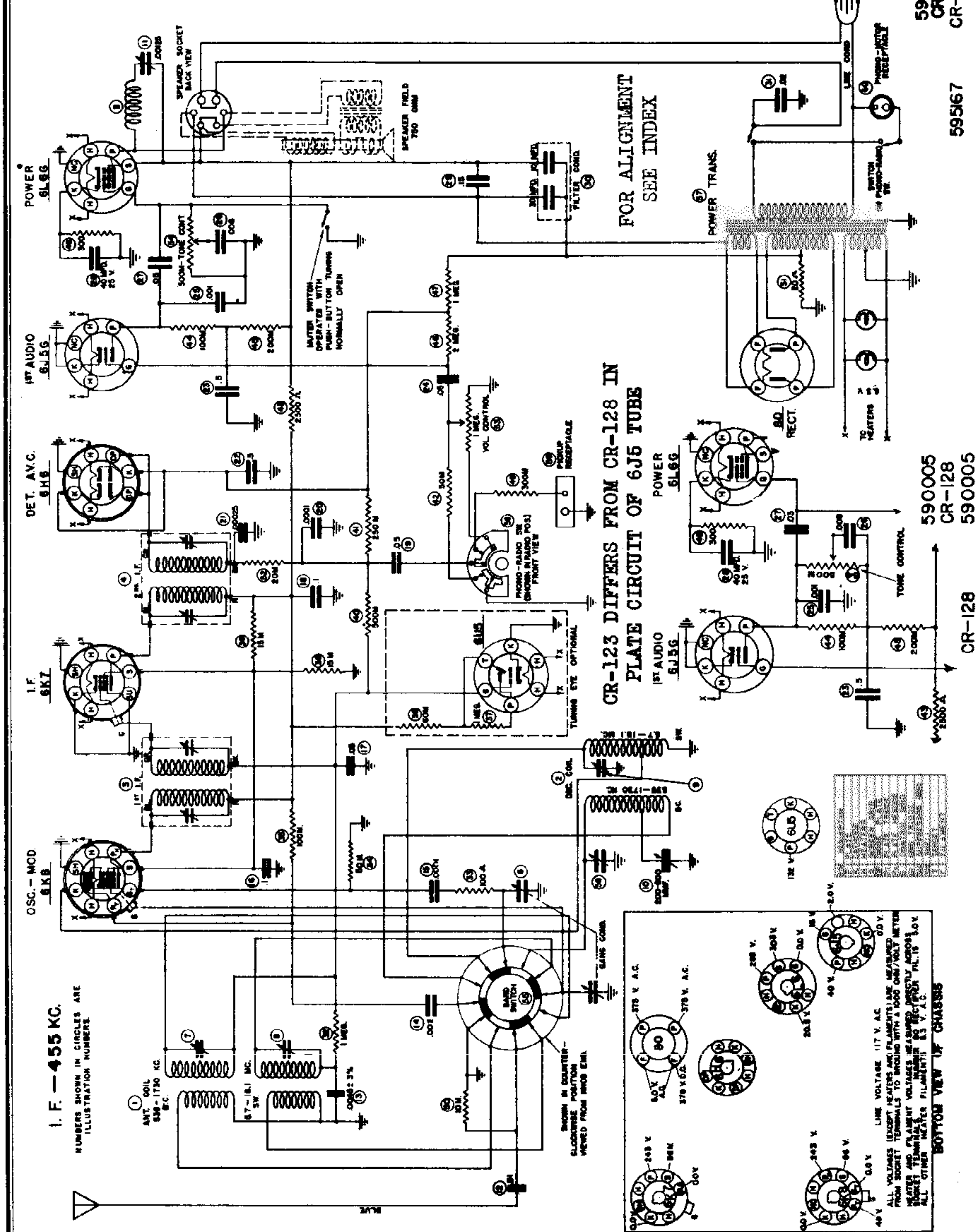


It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

CHASSIS CR123,CR128
Schematic,Voltage

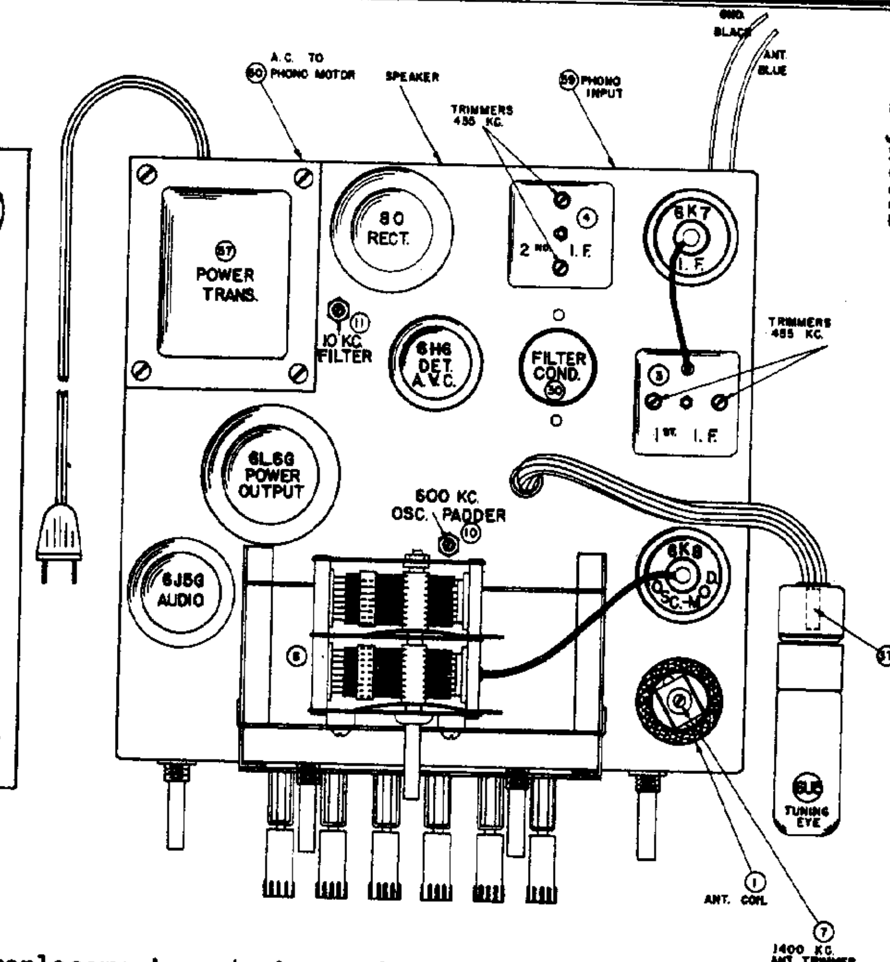
THE MAGNAVOX CO., INC.

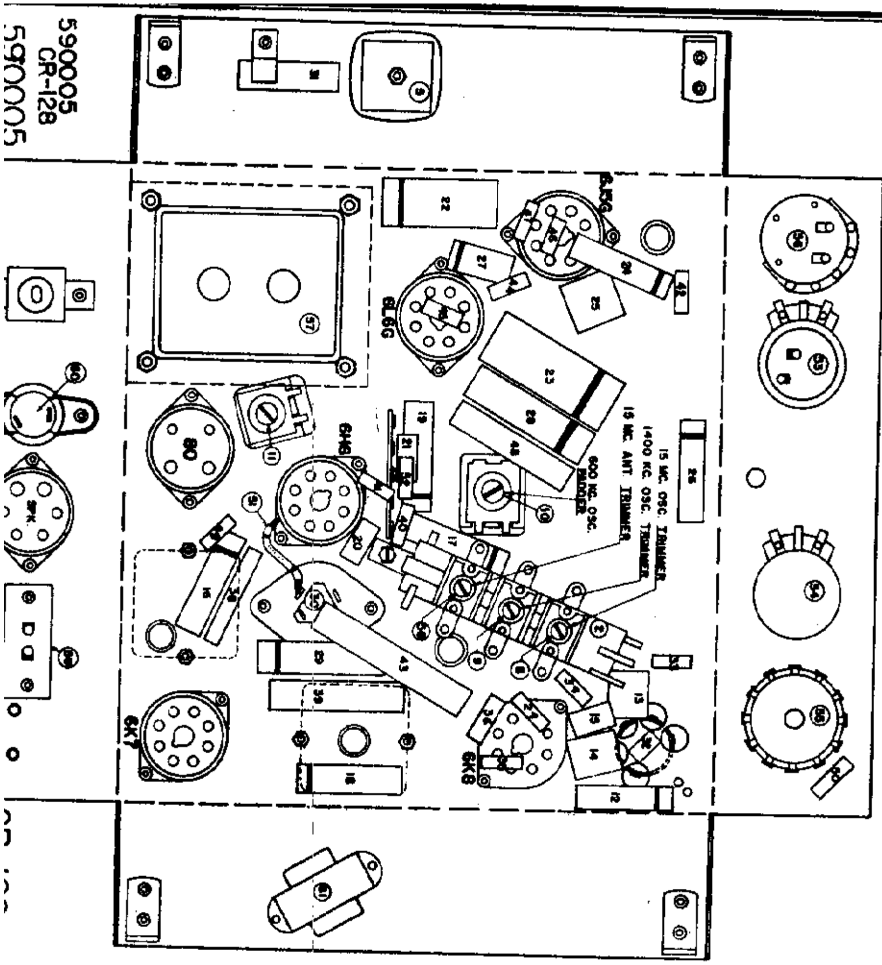
TO REMOVE THE CHASSIS FROM THE CABINET: SEE CHASSIS CR-106.



CHASSIS CR123,CR128
Socket,Trimmers
Chassis,Notes

THE MAGNAVOX CO., INC.





R-123, 128

It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

rmediate frequency.........455 KC;
ng frequency range: 535 - 1730 KC;
5.7 - 18.1 MC;
uit: Superheterodyne with two tun- ranges, treble control, A. V. C.; compensation in volume control for ograph pickup; push-button conden- type tuner.

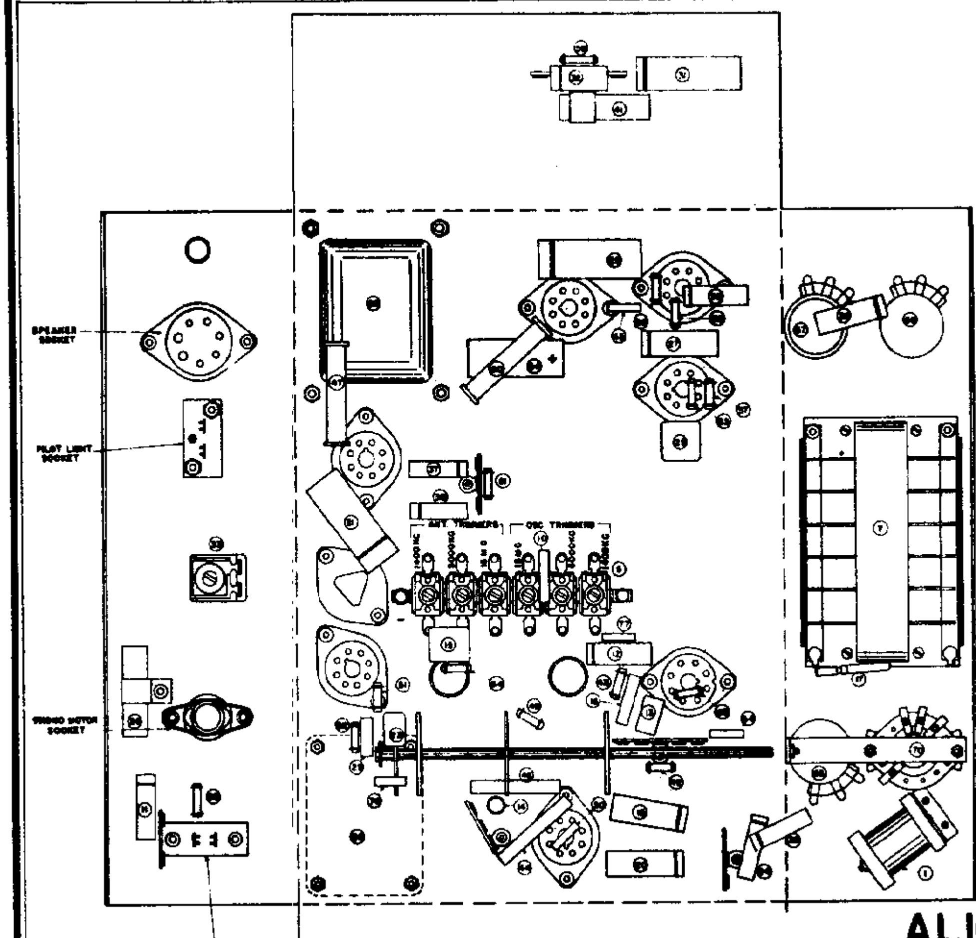
Speaker:
Field Coil.... 750 ohms;
Transformer...3500 ohms;

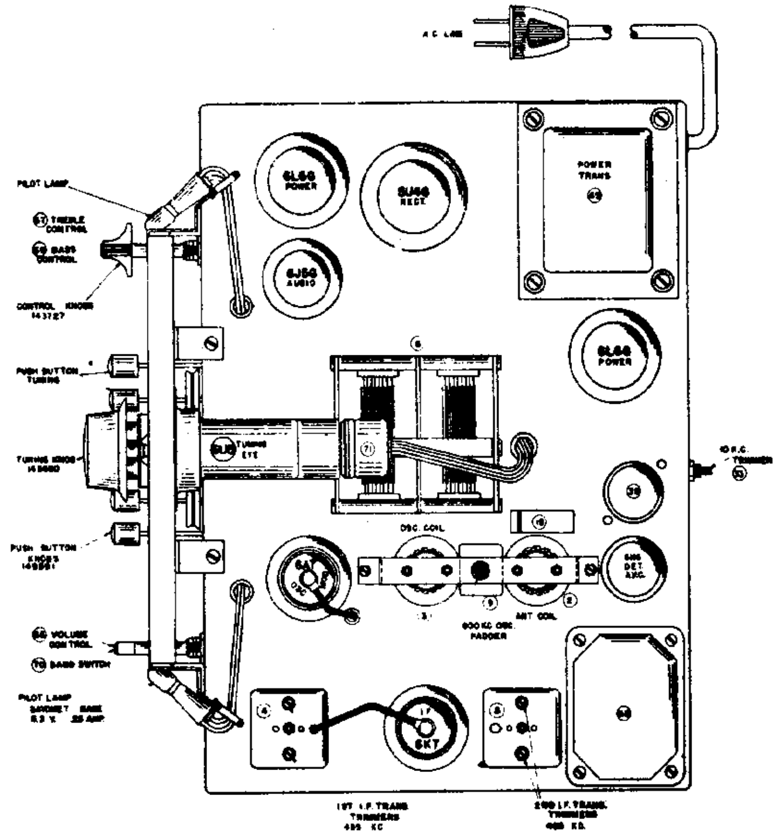
Primary voltage...........117 V. AC;
Power consumption......... 90 watts;
Power output.............. 6 watts;

CR-123 -- Used in Concerto, Chairside and Hepplewhite combinations.
Same as CR-128 except:
Item 61 is eliminated.
Item 27 is .03 mfd.

CR-128 -- Used in Hepplewhite automatic combination.

THE MAGNAVOX CO., INC.





Primary voltage...........117 V. AC;
Power consumption.........165 watts;
Power output............. 17 watts;
Circuit; Superheterodyne with three tuning ranges, treble and bass controls A.V.C., bass compensation in volume control for phonograph pickup.
Speaker (302);
Field Coil.............250 ohms ;
Transformer............10M ohms ;
Speaker (12C131);
Field Coil.............250 ohms ;
Transformer............. None

ALIGNMENT PROCEDURE

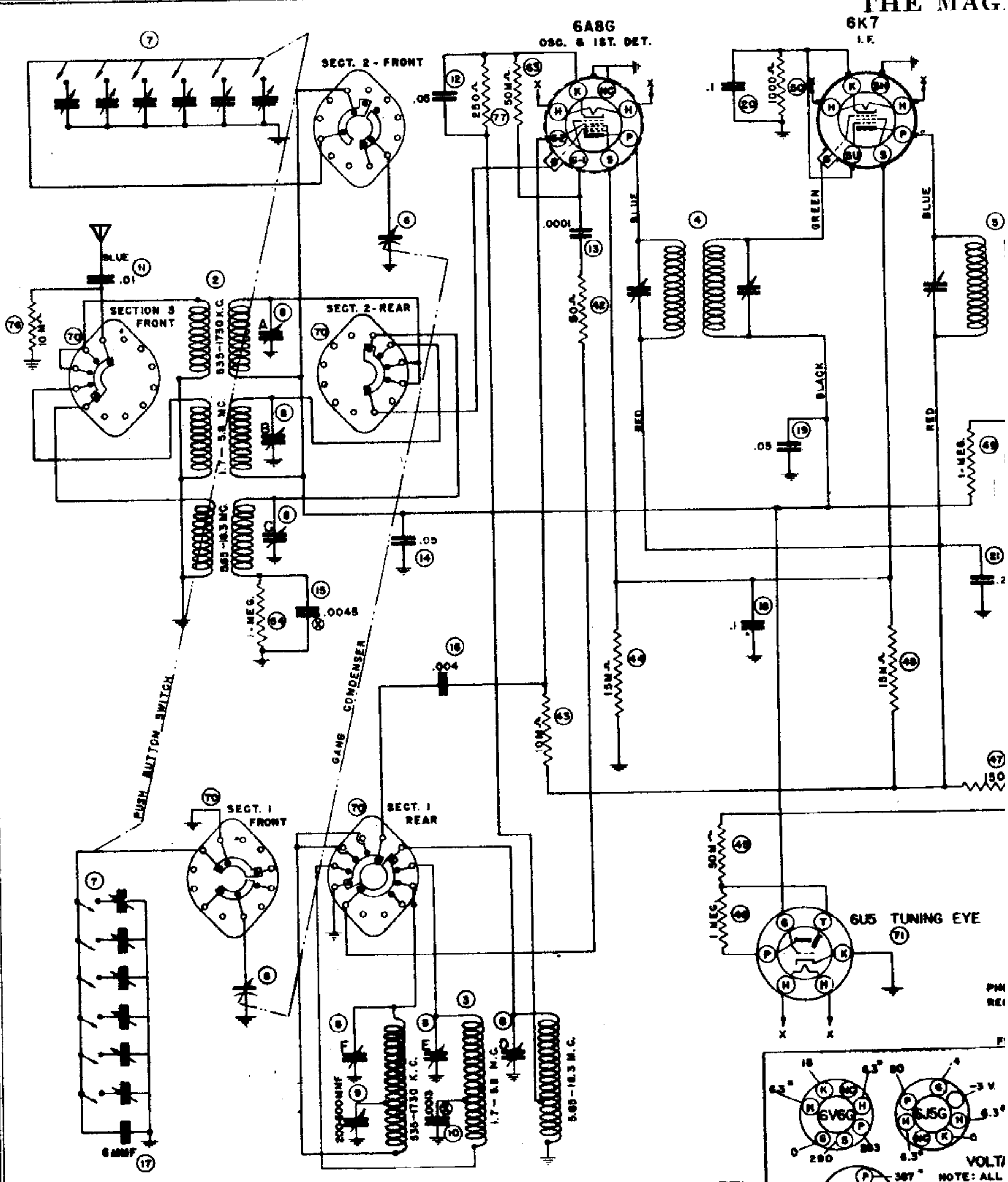
It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

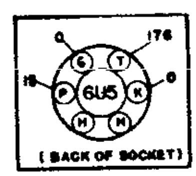
TUNING FREQUENCY RANGE: 535 - 1730 KC; 1.7 - 5.8 and 5.65 - 18.3 MC.

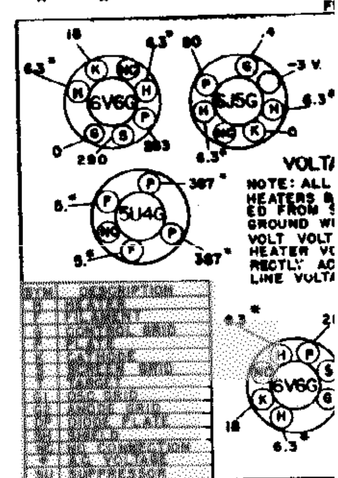
FOLLOW ALIGNMENT PROCEDURE OF MAGNAVOX CHASSIS CR-106.

10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis.







MAGNAVOX RADIO CHASSIS CR-124

1.— I.F - 455 K.C.

2.—NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.

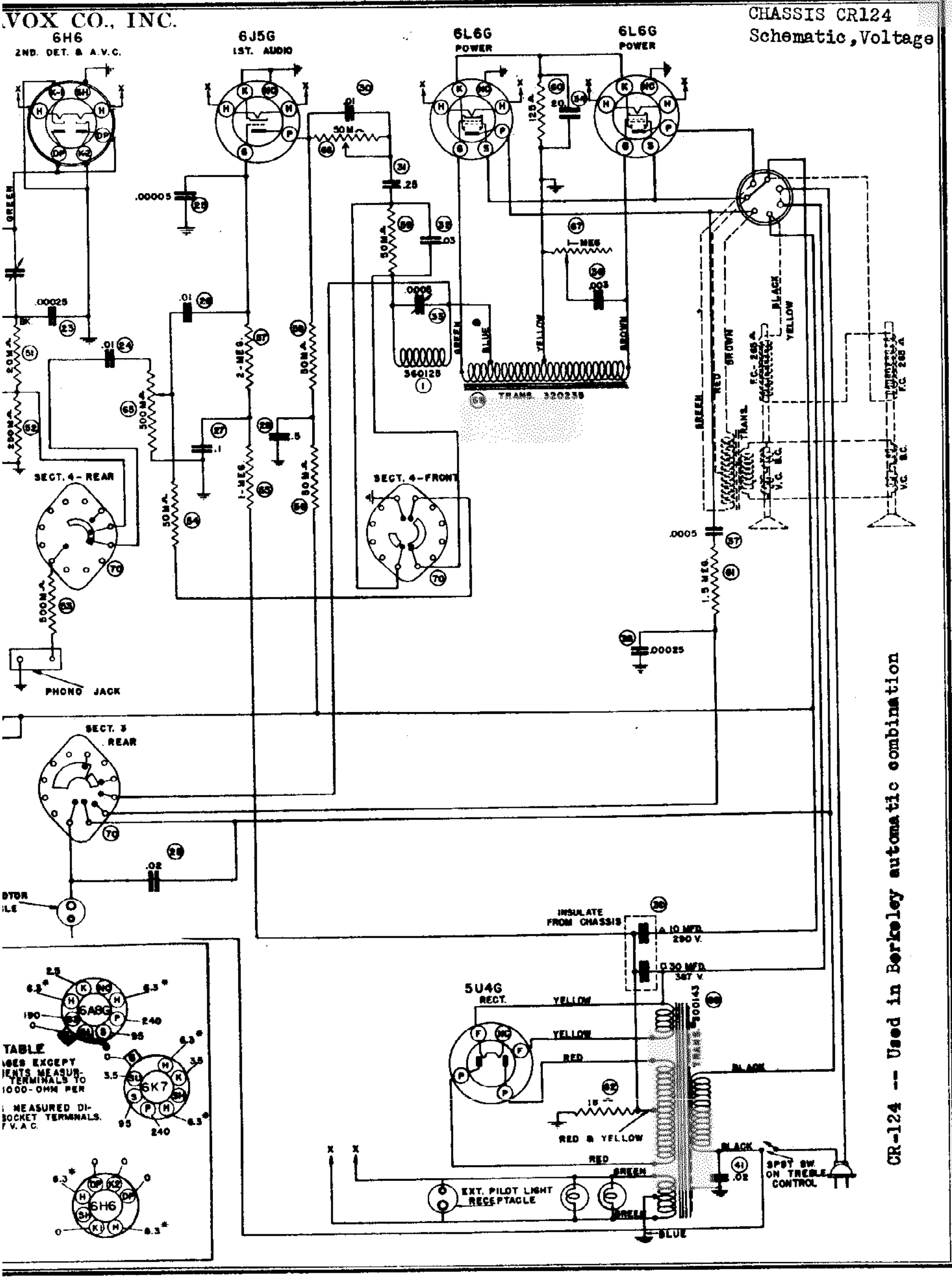
3.—NUMBERS SHOWN IN CIRCLES ARE ILLUSTRATION NUMBERS.

4.—⑬ INDICATES CAPACITY TOLERANCE ±5%

5.—BAND SWITCH #183601 VIEWED FROM FRONT—(5.85-18.3 MC BAND) COUNTER-CLOCKWISE POSITION SHOWN.

FOR ALIGNMENT SEE INDEX

CHASSIS CR124
Schematic, Voltage



CR-124 -- Used in Berkeley automatic combination

CHASSIS CR117
CHASSIS CR123,CR128
Alignment

THE MAGNAVOX CO., INC.

MODEL CR 117

ALIGNING THE I.F. STAGES AT 455 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .00025 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

2. Set the test oscillator to **EXACTLY** 455 kilocycles and turn the receiver volume to maximum setting.

3. Peak each of the second I.F. transformer trimmer condensers.

4. Peak each of the first I.F. transformer trimmer condensers.

To insure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING THE 540-1720 KILOCYCLE BAND

1. Remove the test oscillator lead from the grid of the 6A7 tube and attach it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.

2. Check tuning dial adjustment by turning the gang condenser until plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.

3. Set the receiver and test oscillator frequency to **EXACTLY** 1700 kilocycles.
4. Adjust the oscillator trimmer "7B" Fig. 2, for maximum output as indicated on the output meter.

5. Set the receiver and test oscillator frequency to **EXACTLY** 1400 kilocycles.

6. Adjust the antenna trimmer "7A" Fig. 2, for maximum output, as indicated on the output meter.

7. Now set the receiver and test oscillator frequency to 600 kilocycles, and adjust the oscillator padder condenser "11" Fig. 2, accessible from the top of the chassis, for maximum output.

ALIGNING THE 2.3-6.3 MEGACYCLE BAND

1. Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the antenna lead.

2. Adjust the band selector switch for short-wave band and tune the receiver and test oscillator frequency to **EXACTLY** 6.3 megacycles.

3. Now adjust the 6.3 megacycle oscillator trimmer "10" Fig. 2, for maximum deflection on the output meter.

4. Set the receiver and test oscillator frequency to **EXACTLY** 6 megacycles, and adjust the 6 MC antenna trimmer "9" Fig. 2, for maximum deflection on the output meter.

MODELS CR 123, CR 128

ALIGNING THE I.F. AT 455 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the grid of the 6K8 tube through a .00025 Mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

2. Set the test oscillator to **EXACTLY** 455 kilocycles and turn the receiver volume to maximum setting.

3. Peak each of the second I.F. transformer trimmer condensers.

4. Peak each of the first I.F. transformer trimmer condensers.

ALIGNING THE 535-1730 KILOCYCLE BAND

1. Remove the test oscillator lead from the grid of the 6K8 tube and connect it to the receiver antenna lead (blue) through a .00025 Mfd. series condenser.

2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.

3. Adjust the band selector switch for operation on the 535-1730 kilocycle (broadcast) band.

4. Set the test oscillator frequency and receiver dial to **EXACTLY** 1400 kilocycles. Adjust the 1400 kilocycle oscillator trimmer and the antenna trimmer to bring in the 1400 kilocycle test oscillator signal to maximum output.

5. Set the test oscillator and receiver frequency to 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum output.

ALIGNING THE 5.7-18.1 MEGACYCLE BAND

1. Substitute a 400 ohm resistor for the .00025 Mfd. condenser in series with the antenna lead.

2. Adjust the band selector switch to the 5.7-18.1 megacycle (foreign) band, tune the receiver and test oscillator frequency to **EXACTLY** 15 megacycles and adjust the 15 megacycle oscillator trimmer and antenna trimmer for maximum output as indicated on the output meter.

While adjusting the oscillator trimmer, two peaks may be noticed, in which case care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always back off the trimmer to minimum capacity, then screw down the trimmer until the second peak (if more than one is noticed) which is the correct one, is tuned in.

10 K.C. FILTER ADJUSTMENT

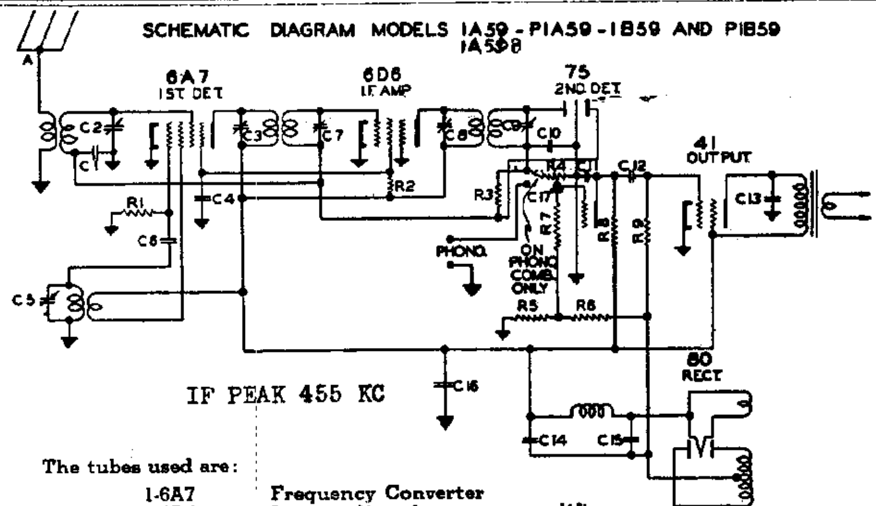
With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis.

Schematics, Socket Trimmers, Alignment

MAJESTIC RADIO & TELEV. CORP.

MODELS 1A59, 1A59B, P1A59, 1B59, P1B59
MODELS 149I, 149N, 149W

SCHEMATIC DIAGRAM MODELS 1A59 - P1A59 - 1B59 AND P1B59 1A59B



IF PEAK 455 KC

The tubes used are:

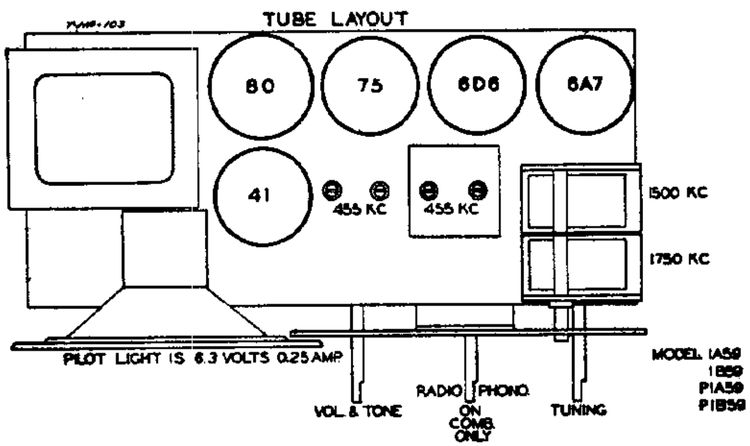
1-6A7	Frequency Converter
1-6D6	Intermediate frequency amplifier
1-75	Second detector, AVC, and audio frequency amplifier
1-41	Output
1-80	Rectifier

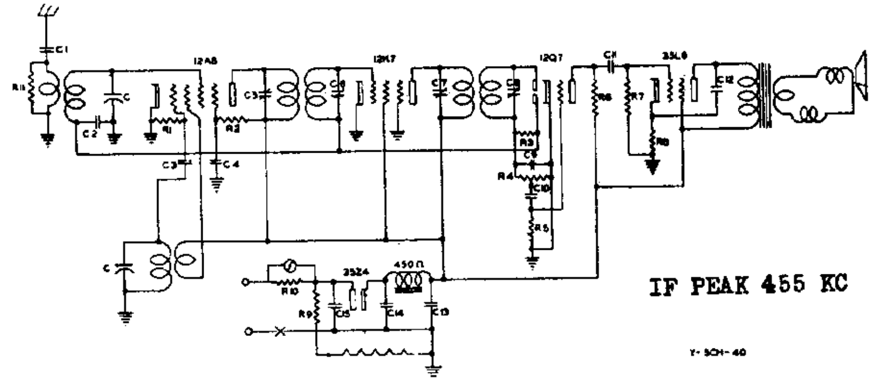
PARTS LIST FOR MODEL NO. 1A59

Schematic Location	Part No.	Description
C1	C-15752	.05 mfd. 200V
C4,C16	C-15756	.05 mfd. 400V
C12,C17	C-15754	.01 mfd. 400V
C13	C-25	.006 mfd. 400V
C2,C5	Y-CV-30	Gang condenser
C3,C7	Y-CT-1	1st I. F. Trimmer
C8,C9	Y-CT-23	2nd I. F. Trimmer
C10	CM-30	250 mmf. Mica
C11	CM-31	100 mmf. Mica
C6	CM-29	50 mmf. Mica
C14,C15	Y-CE-51	8 8 mfd. 300V Electrolytic

Schematic Location	Part No.	Description
R1	R-15511	50K ¼W 20%
R2	R-83	35K 1W 20%
R3	R-15500	2 meg ¼W 20%
R5	R-82	35 ohms ¼W 20%
R6	R-27	250 ohms ½W 20%
R7	R-15517	1 meg ¼W 20%
R8	R-15520	500K ¼W 20%
R9	R-62	400K ¼W 20%
R4	Y-VC-30	Volume Control

TUBE LAYOUT





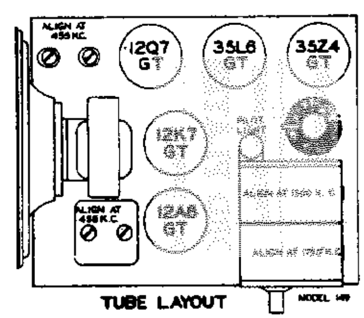
IF PEAK 455 KC

PARTS LIST FOR MODELS 149-W, 149-I, 149-N

Schematic Location	Part No.	Description
C1,C11	C-15754	Tubular cond. .01 mfd. 400V
C2,C4	C-15752	Tubular cond. .05 mfd. 200V
C3	CM-29	Mica cond. 50 mmf. 30%
C9	CM-30	Mica cond. 250 mmf. 30%
C10	C-15774	Tubular cond. .002 mfd. 400V
C12,C15	C-15760	Tubular cond. .02 mfd. 400V
C5,C6	Y-CT-18	Trimmer cond. 1st I. F. Trans.
C7,C8	Y-CT-23	Trimmer cond. 2nd I. F. Trans.
C13,C14	Y-CE-50	Electr. 16 mfd. 24 mfd. 150V

Schematic Location	Part No.	Description
R1	R-15511	Carbon resistor 50K ¼W 20%
R2	R-15516	Carbon resistor 15K ¼W 20%
R3	R-15500	Carbon resistor 2 meg. ¼W 20%
R4	Y-VC-29	Volume Control
R5	R-79	Carbon resistor 15 meg ¼W 20%
R6,R7	R-15520	Carbon resistor 500K ¼W 20%
R8	R-80	Carbon res. 110 ohm ½W 20%
R9	R-86	Flexible res. 70 ohm 2W 20%
R11	R-15531	Carbon res. 10K ohm ¼W 20%
R10	R-85	Carbon res. 35 ohm 1W 20%
		Pilot Lite Mazda #40 .15 amp.
	Y-CR-16	Antenna Coil
	Y-CR-17	Oscillator Coil
	Y-CI-31	1st I. F. Transformer
	Y-CI-32	2nd I. F. Transformer
	Y-SP-37	Speaker
	Y-CV-27	Variable Condenser

TUBE LOCATION CHART



TUBE LAYOUT

This receiver is a 5-tube, super-heterodyne using two double purpose tubes.

It operates on either AC or DC current, of 105 to 125 volts. It receives stations lying between 535 and 1750 Kilocycles. This includes standard broadcast and most police stations.

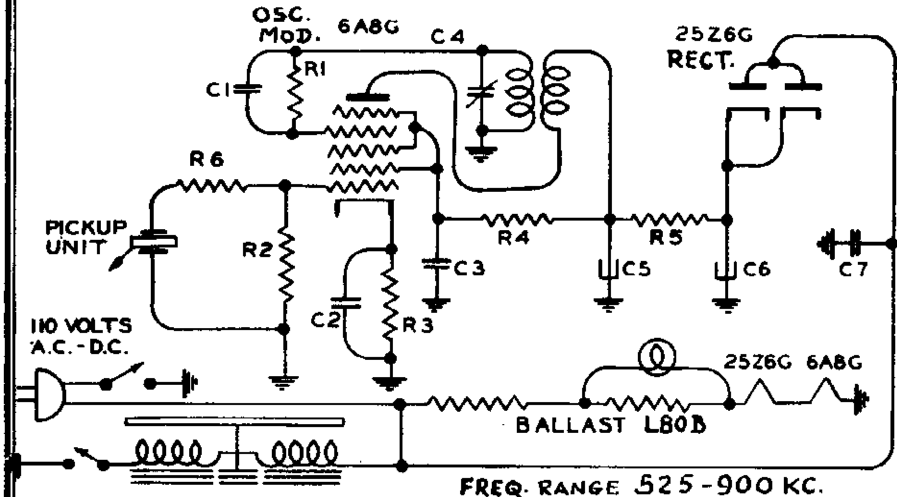
The tubes used are:

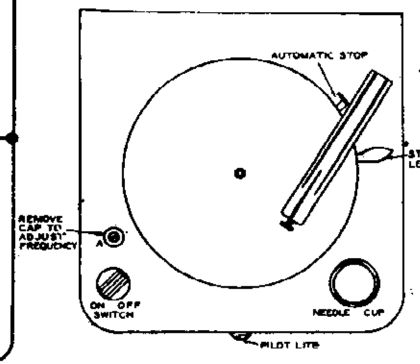
1-12A8GT	Combined oscillator and first detector
1-12K7GT	Intermediate frequency amplifier
1-12Q7GT	Second detector, automatic volume control, gas gate, and audio amplifier
1-35L6GT	Beam power output
1-35Z4GT	Rectifier

MODEL 3PW Record Player
Schematic, Socket

MAJESTIC RADIO & TELEV CORP.

MODEL 651
Schematic, Socket
Trimmers, Alignment



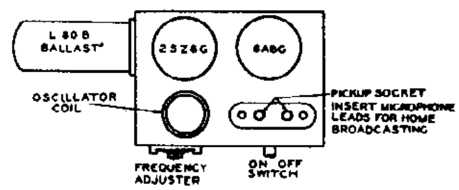


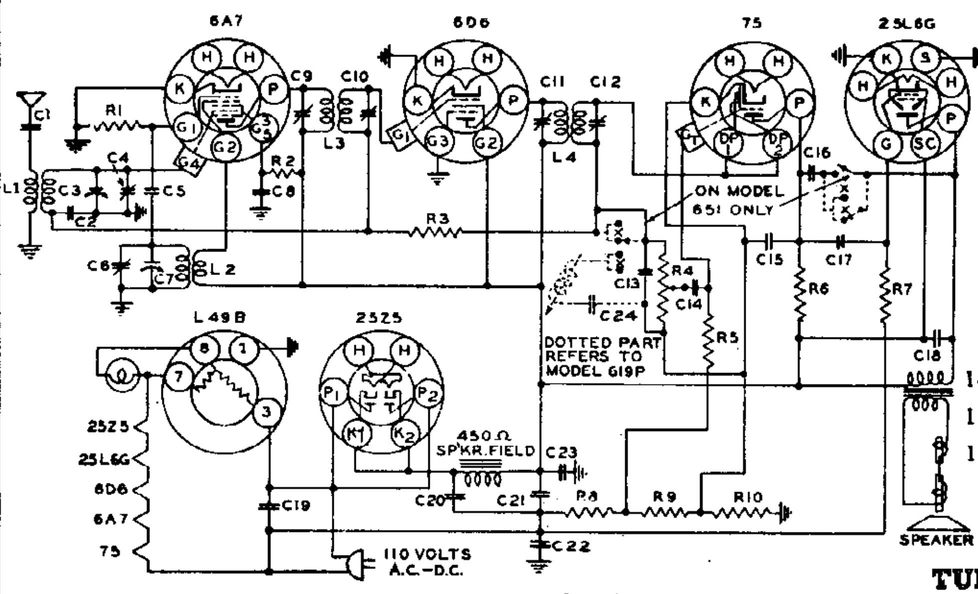
RECORD PLAYER MODEL 3-PW

REPLACEMENT PARTS LIST FOR MODEL 3-PW

Schematic Location	Part No.	Description
R4,R5	R-2	Carbon resistor 5K ¼W20%
R1	R-65	Carbon resistor 10K ¼W20%
R3	R-15542	Carbon resistor 1K ¼W20%
R6	R-15512	Carbon resistor 250K ¼W20%
R2	R-15515	Carbon resistor 100K ¼W20%
C5,C6	CE-47	Elect. cond. 8.16 mfd. 150V
C4	Y-CT-6-	Adj. padder cond.
C7	C-15757	Paper cond. .1 mfd. 400V
C2,C3	C-15761	Paper cond. .1 mfd. 200V
C1	CM-15929	Mica cond. 50 mmf. 20%

TUBE LOCATION CHART



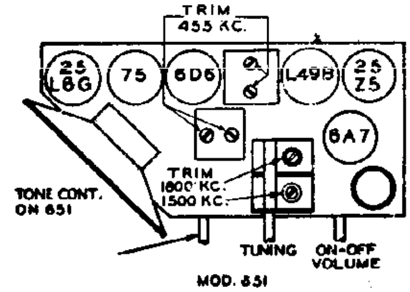


The tubes used are:

1-6A7 Frequency Converter
1-6D6 Intermediate frequency amplifier
1-75 Second detector, AVC, and audio driver
1-25L6G Beam power output
1-25Z5 Rectifier
1-L49B Plug-in ballast resistor

IF PEAK 455 KC

TUBE LOCATION CHART

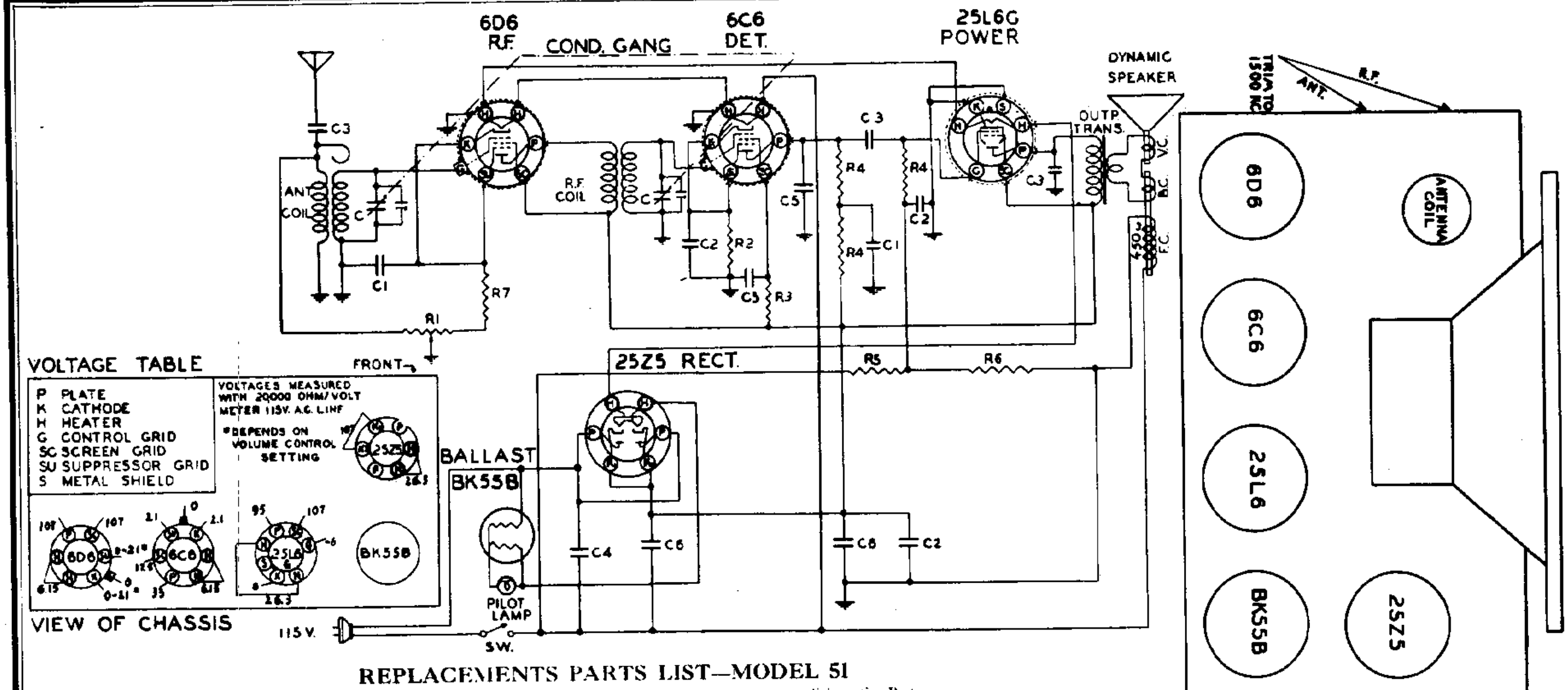


REPLACEMENT PARTS LIST FOR MODEL 651

Schematic Location	Part No.	Description
C1,C14,C17	C-15754	Tubular cond. .01 mfd 400V
C2,C8,C23	C-15752	Tubular cond. .05 mfd, 200V
C18	C-15760	Tubular cond. .02 mfd. 400V
C19	C-15757	Tubular cond. 1 mfd. 400V
C24	C-15750	Tubular cond. .25 mfd. 400V
C5	CM-15929	Mica cond. 50 mmf.
C15	CM-15928	Mica cond 250 mmf.
C13,C16	CM-15918	Mica cond. 100 mmf.
C3	Y-CV-22	Variable cond. (Signal Section)
C7		Variable cond. (Osc. Section)
C4		Trimmer cond. (Signal Section)
C6		Trimmer cond. (Osc. Section)
C9 C10	Y-CT-1	Trimmer cond 1st I. F. Trans.
C11 C12	Y-CT-1	Trimmer cond. 2nd I. F. Trans.
C20		lectr. cond. 40 mfd 150WV
C21	Y-CE-46	ectr. cond 16 mfd. 150WV
C22		Electr cond. 20 mfd 25WV

Schematic Location	Part No.	Description
R1	R-15811	Carbon resistor 50K ¼W20%
R2	R-15516	Carbon resistor 15K ¼W20%
R3	R-15500	Carbon resistor 2 meg. ¼W20%
R5	R-15517	Carbon resistor 1 Meg ¼W20%
R6	R-15512	Carbon resistor 250K ¼W20%
R7	R-15528	Carbon resistor 400K ¼W20%
R8		Candohn 50 ohms
R9	Y-RC-8	Candohn 20 ohms
R10		Candohn 50 ohms
R4	Y-VC-21	Volume control 500K ohms
L1	Y-CS-33	Antenna Coil
L2	Y-CS-46	Oscillator Coil
L3	Y-CI-15	1st I. F Transformer
L4	Y-CI-28	2nd I. F. Transformer

MAJESTIC RADIO & TELEV. CORP.



REPLACEMENTS PARTS LIST—MODEL 51

Schematic Location	Part No.	Description
C	Y-CV-2	Condenser Variable Gang
C1	C-15761	Cond. Tub. .1 MFD 200 V.
C2	C-15751	Cond. Tub. .25 MFD 200 V.
C3	C-15754	Cond. Tub. .01 MFD 400 V.
C4	C-15757	Cond. Tub. .1 MFD 400 V
C5	CM-15939	Cond. Mica 1000 MMF 20%
C6	Y-CE-2	Cond. Dry Electrolytic 20 MFD 175 V.
R1	Y-VC-2	Volume Control 50,000 Ohms
R2	R-3	Resistor Carbon 18,000 Ohms 1/4W 20%
R3	R-15559	Resistor Carbon 3 Megohms 1/4W 20%
R4	R-15512	Resistor Carbon 250,000 Ohms 1/4W 20%
R5	R-15528	Resistor Carbon 400,000 Ohms 1/4W 20%
R6	R-8	Resistor Car. 120,000 Ohms 1/4W 10%
R7	R-22	Resistor Carbon 450 Ohms 1/4W 20%
	Y-CR-1	Antenna Coil
	Y-CR-2	R. F. Coil
	Y-SP-2	Dynamic Speaker 5¼"
	Y-PA-10	Pilot Light Indicator

TUBES

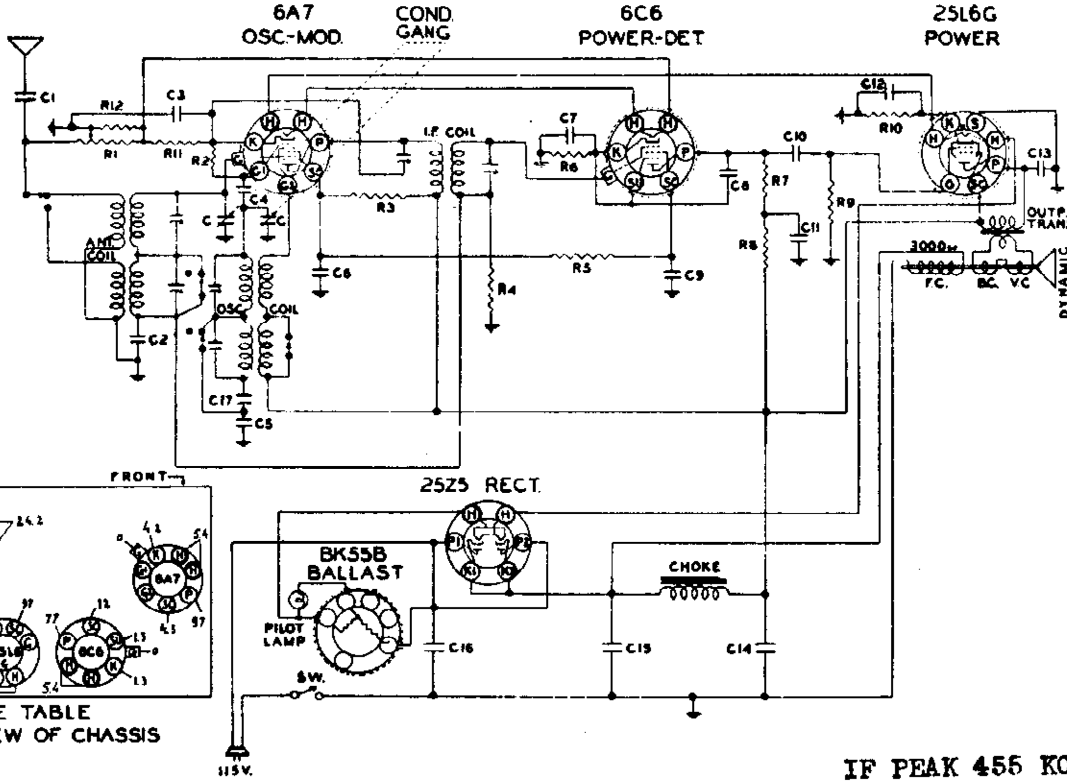
The following tube numbers are employed:

Tube	Purpose	Kind
6D6	Radio frequency amplifier	GLASS
6C6	Power detector	GLASS
25L6G	Beam Power Output	GLASS
25Z5	Rectifier	GLASS
YTU9 (BK55B)	Line Ballast Tube	METAL

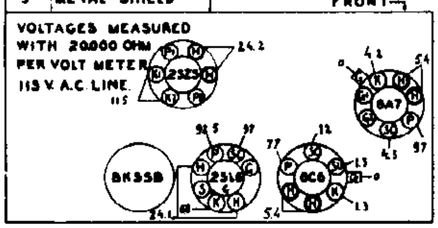
This receiver is a 5 tube AC-DC compact type radio receiver employing tuned radio frequency circuit. The tuning range covers all frequencies between 528 kilocycles and 1750 kilocycles (171 meters to 565 meters). These frequencies cover the standard broadcast band and in addition police calls and some amateur transmitters. This receiver is designed to operate on 50-60 cycle AC or DC at voltages between 105 and 130. These are standard voltages used practically all over the United States and in some foreign countries. The audio power output of the receiver is a maximum of 2 watts. The receiver should not be connected to any power line having higher voltage than mentioned above. On DC operation reverse plug if receiver does not commence operating one minute after switch is turned on. On AC operation reversal of the plug in some cases may reduce hum.

MODELS 55B,55P,55W
Chassis 155
Schematic,Socket
Trimmers,Alignment

MAJESTIC RADIO & TELEV. CORP.



SYM	DESCRIPTION
P	PLATE
K	CATHODE
H	HEATER
G	CONTROL GRID
G1	OSCILLATOR GRID
G2	ANODE GRID
SC	SCREEN GRID
SU	SUPPRESSOR GRID
S	METAL SHIELD

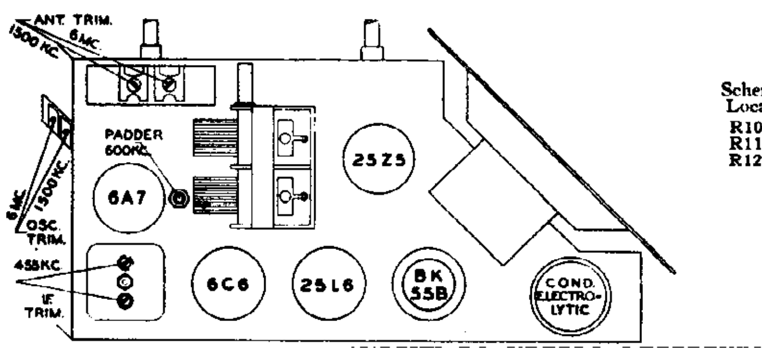


VOLTAGE TABLE
BOTTOM VIEW OF CHASSIS

IF PEAK 455 KC

REPLACEMENTS PARTS LIST—MODEL 55

Schematic Location	Part No.	Description
C	Y-CV-3	Condenser Variable Gang
C1, C3, C9, C10	C-15754	Condenser Tubular .01 Mfd. 400 V.
C2, C6	C-15752	Condenser Tubular .05 Mfd. 200 V.
C7	C-15751	Condenser Tubular .25 Mfd. 200 V.
C11	C-15761	Condenser Tubular .1 Mfd. 200 V.
C13	C-4	Condenser Tubular .025 Mfd. 400 V.
C16	C-15757	Condenser Tubular .1 Mfd. 400 V.
C4	CM-15929	Condenser Mica 50 Mmf —20%
C5	CM-15942	Condenser Mica 1710 Mmf. 5%
C8	CM-15928	Condenser Mica 250 Mmf. 20%
C12	Y-CE-4	Condenser Electrolytic Dry 12 Mfd. 25 V.
C14	Y-CE-4	Condenser Electrolytic Dry 16 Mfd. 150 V.
C15	Y-CE-4	Condenser Electrolytic Dry 35 Mfd. 150 V.
C17	Y-CP-16472	Condenser Padder
R1	Y-VC-2	Volume Control 50,000 Ohms
R2, R3	R-15511	Resistor Carbon 50,000 Ohms ¼ W. 20%
R4	R-15559	Resistor Carbon 3 Meg. ¼ W. 20%
R5	R-7	Resistor Carbon 1⅓ Meg. ¼ W. 20%
R6	R-11	Resistor Carbon 18,000 Ohms ¼ W. 10%
R7	R-15517	Resistor Carbon 1 Meg. ¼ W. 20%
R8	R-15512	Resistor Carbon ¼ Meg. ¼ W. 20%
R9	R-15520	Resistor Carbon ⅓ Meg. ¼ W. 20%



CHASSIS LAYOUT
MODEL 55.

Schematic Location	Part No.	Description
R10	R-12	Res. Car. 170 Ohms ¼ W. 10%
R11	R-22	Res. Car. 450 Ohms ¼ W. 20%
R12	R-15564	Res. Car. 1,500 Ohms ¼ W. 20%
	Y-CK-4	Filter Choke
	Y-CS-1	Antenna Coil
	Y-CS-8	Oscillator Coil
	Y-C1-11	I. F. Coil
	Y-SP-4	Dynamic Speaker 5½"
	SPA-2	Speaker V. C. and Cone
	SPA-3	Speaker Transformer
	P-16885	Pilot Lamp

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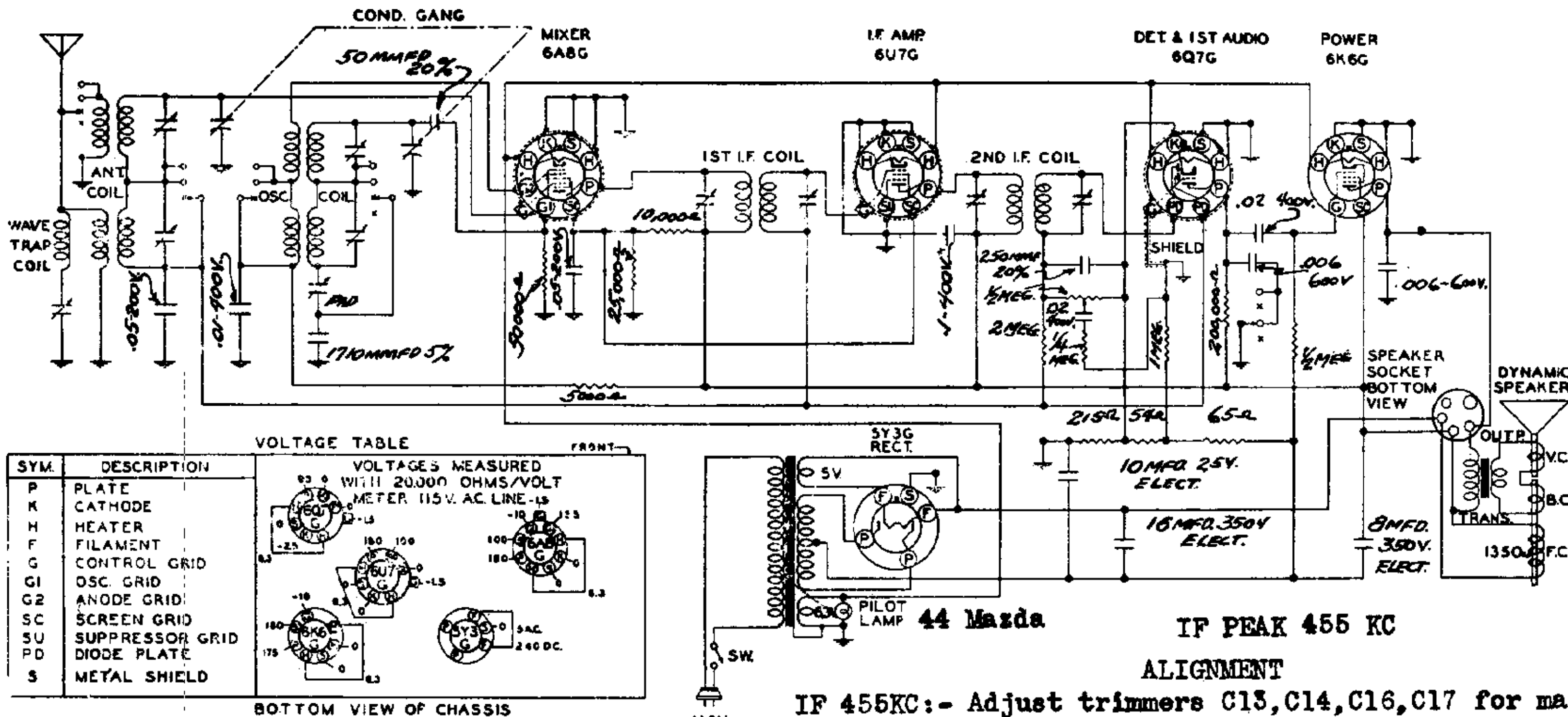
In a super-heterodyne it is very important when realigning the receiver, to use the same frequencies as are used at the factory. Alignment is best accomplished by using an output meter across the voice coil and aligning for maximum. The I. F. frequency is 455 K. C. The short wave must be aligned before the broadcast band. This is done at only one frequency, 6 megacycles. On the broadcast band the alignment frequencies are 1500 and 600 K. C. 1500 K. C. is the first to be aligned using the shunt trimmers. When aligning 600 K. C., adjust the series pad, rocking the gang condenser to assure proper alignment.

MODEL 56
Chassis 156
Schematic,Voltag

Socket,Trimmers
Alignment

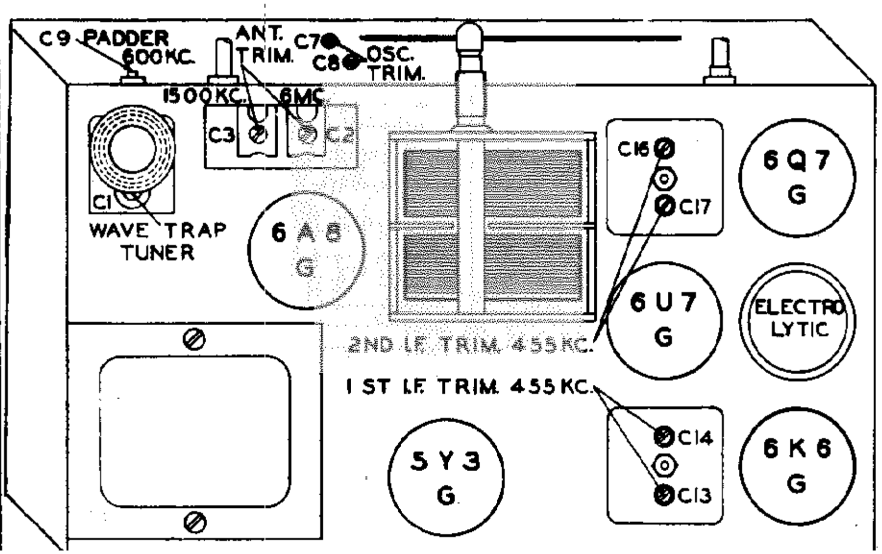
MAJESTIC RADIO & TELEV. CORP.



SYM.	DESCRIPTION
P	PLATE
K	CATHODE
H	HEATER
F	FILAMENT
G	CONTROL GRID
G1	OSC. GRID
G2	ANODE GRID
SC	SCREEN GRID
SU	SUPPRESSOR GRID
PD	DIODE PLATE
S	METAL SHIELD

44 Mazda

IF PEAK 455 KC



ALIGNMENT

IF 455KC:- Adjust trimmers C13,C14,C16,C17 for maximum signal; attenuate signal to avoid misalignment due to A.V.C.

SW BAND:- Ground signal gen. to chassis through .1 mf cond. Osc. at 7.2 MC through 400 ohm carbon resistor to Ant. lead (blue). Turn band selector clockwise to 3rd pos. from extreme left.Variable fully open; set C7 at minimum cap.tighten to signal. Osc. at 6 MC tune receiver to signal,adjust C2 to max. and adjust dial calibration. Check band at 4.25 and 2.40 MC.

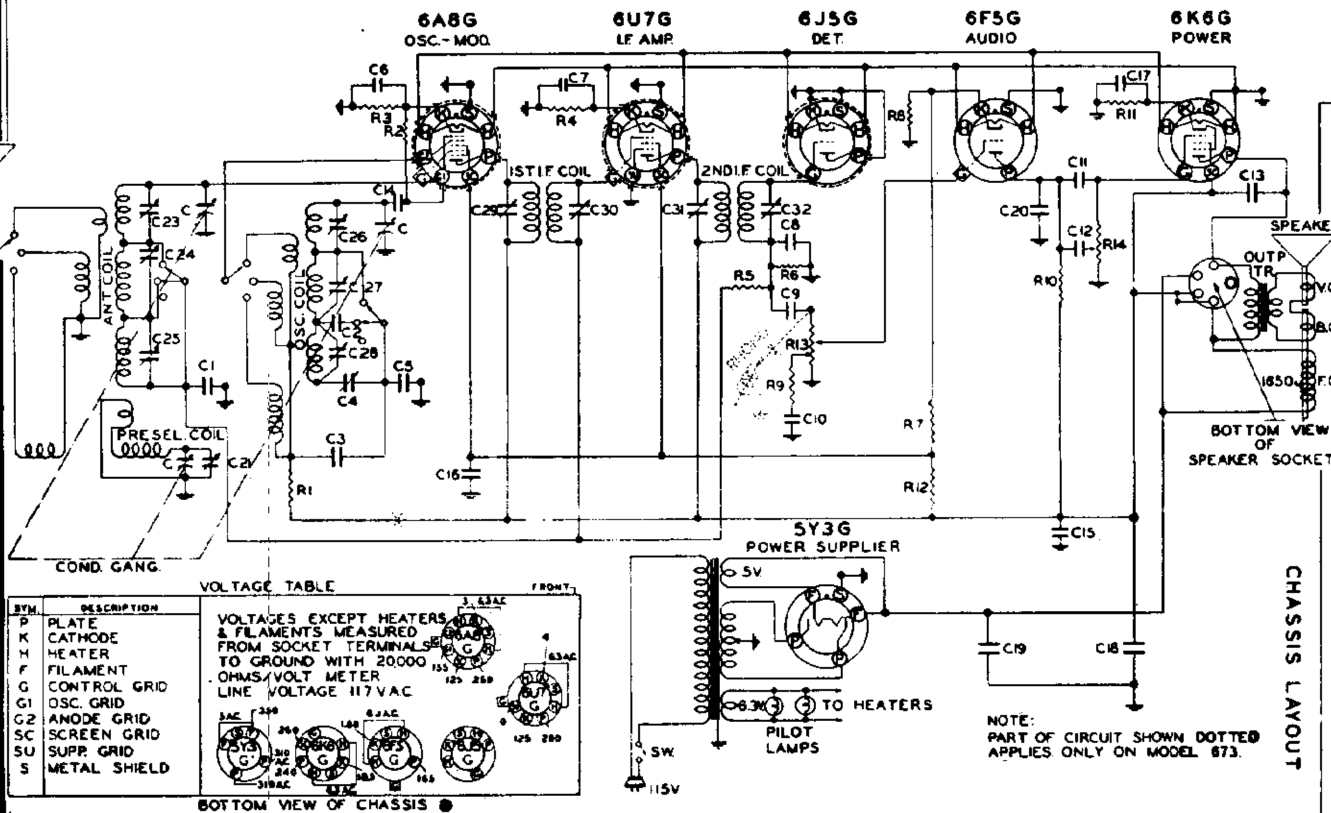
BC BAND:-Band selector and tone control switch to extreme left. Apply 600 KC through 200 mmf cond to Ant. lead,dial at 600 KC; adj. C9 to max. signal. Osc. at 1750 KC;dial at 1750 KC;adj. C8 to max. sig.Signal at 1500KC,dial to signal,adj. C3 to max.sig. Osc.at 600 KC adjust C9 to max. sig. with variable. Osc at 1500 KC, tune to max. sig.,readjust C3 to maximum signal.

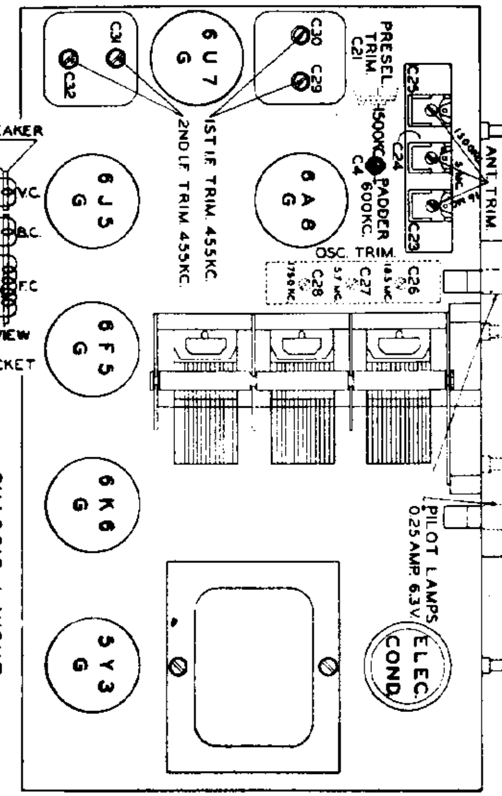
WAVE TRAP:- Band sw. in BC position,dial below 650KC

MODELS 67,68,670,671
672,673
Chassis 167 and 1673

MAJESTIC RADIO & TELEV. CORP.

Schematic, Voltage
Socket, Trimmers
Alignment





IF PEAK 455 KC

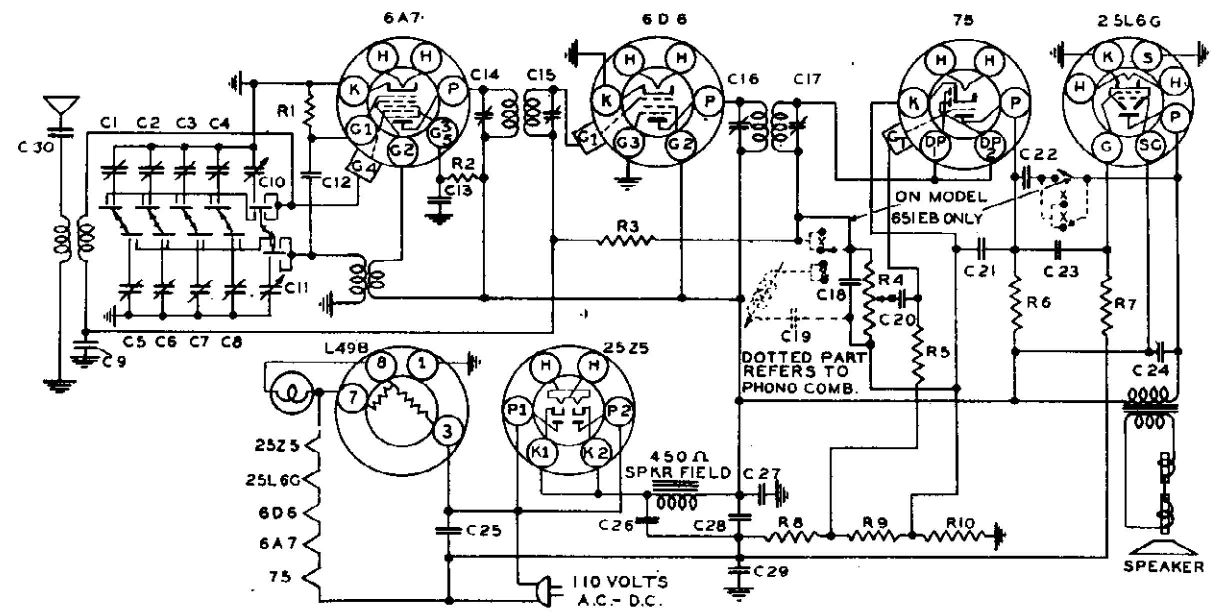
Correct alignment is extremely important. The receiver is properly aligned at the factory and should not be disturbed unless it is absolutely necessary The procedure is as follows: Turn wave change switch to broadcast position (full counter clock wise) and rotate variable condenser until it is about 50% engaged. Apply a 455 KC signal to the grid of 6A8G mixer tube through a tubular condenser on the order of .1 MFD. Referring to chassis layout, adjust C30, C29, C31 and C32 for maximum signal using of course some sort of indicating device such as an AC volt meter or output meter across the voice coil of the speaker. It may be necessary to apply a very strong signal to "find" the signal until alignment is approached. It is advisable to maintain as low a signal imput as conveniently possible in order to minimize the possibility of misalignment resulting from A.V.C. and overload effects. If a squeal is heard while tuning, rotate the gang condenser slightly and it should disappear. Naturally, the ground side of the generator should be connected to the chassis either directly or through the .1 MFD. condenser.

SHORT WAVE BAND

Rotate the wave band switch to full clock wise position. Connect high side of generator output to antenna lead through a 400 ohm dummy antenna. Completely disengage variable condenser. Apply 18.5 meg. signal. Unscrew trimmer C26 to a minimum capacity, slowly turn the screw so that the trimmer capacity increases until the signal is heard. Apply 16 meg. signal, rotate gang condenser until this signal is heard. Adjust C23 for maximum response. It may be found advisable to "rock" generator frequency back and forth through signal to offset detuning effect from inter action between imput and oscillator circuits at high frequencies. Check alignment through medium of sensitivity at 11 meg. and 6

MODEL 651-EB
Schematic, Tuner

MAJESTIC RADIO & TELEV. CORP.



REPLACEMENT PARTS LIST—MODEL 651-EB

Schematic Location	Part No.	Description
C20,C23,C30	C-15754	Tubular cond. .01 mfd. 400 V
C24	C-15760	Tubular cond. .02 mfd. 400V
C9,C13,C27	C-15752	Tubular cond. .05 mfd. 200V
C25	C-15757	Tubular cond. .1 mfd. 400V
C19	C-15750	Tubular cond. .25 mfd. 400V
C12	CM-15929	Mica cond. 50 mmf. Type "O"
C18,C22	CM-15918	Mica cond. 100 mmf. Type "O"
C21	CM-15928	Mica cond. 250 mmf. Type "O"
C14,C15	Y-CT-1	Trimmer cond. 1st I.F.
C16,C17	Y-CT-1	Trimmer cond. 2nd I.F.
C10,C11	Y-CV-24	Variable 2 gang condenser
C26	Y-CE-46	Elect. cond. 40 mfd. 150WV
C28		Elect. cond. 16 mfd. 150WV
C29		Elect. cond. 20 mfd. 25WV
C1,C2,C3,C4 C5,C6,C7,C8	Y-CT-20	Trimmer cond. strip
R1	R-15511	Carbon resistor 50K ¼W 20%
R2	R-15516	Carbon resistor 15K ¼W 20%
R3	R-15500	Carbon resistor 2meg ¼W 20%
R5	R-15517	Carbon resistor 1meg ¼W 20%
R6	R-15512	Carbon resistor 250K ¼W 20%
R7	R-15528	Carbon resistor 400K ¼W 20%
R8	Y-RC-8	Candohm 50 ohms
R9		Candohm 20 ohms
R10		Candohm 50 ohms
R4	Y-VC-21	Volume control 500K

I.F. PEAK 455 KC.

The tubes used are:

1-6A7	Frequency Converter
1-6D6	Intermediate frequency amplifier
1-75	Second detector, AVC, and audio driver
1-25L6G	Beam power output
1-25Z5	Rectifier
1-L49B	Plug-in ballast resistor

ADJUSTMENT OF PUSH BUTTONS

1—Determine which four stations you desire to set up on the push buttons.

2—Determine the frequency of these stations.

3—Determine the proper push button on which these stations should be set up from the following table.

No. 1 Push button is for manual tuning.
No. 2 " " is for stations lying between 540 and 920 KC's.
No. 3 " " is for stations lying between 540 and 920 KC's.
No. 4 " " is for stations lying between 750 and 1200 KC's.
No. 5 " " is for stations lying between 850 and 1550 KC's.

4—Push the proper push button.

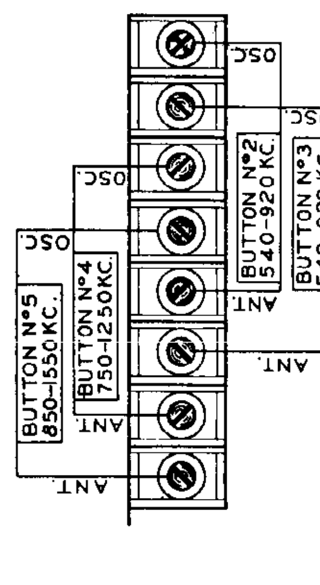
5—Using an insulated screw driver adjust the oscillator trimmer corresponding to the proper push button as shown in Fig. 2 until your station is tuned in with best tonal response.

6—Adjust the antenna trimmer corresponding to the proper push button until the station already heard is received with maximum volume.

7—Repeat steps 4, 5, and 6 for the other push buttons.

It may be desirable to check the push buttons occasionally for proper adjustment as extreme climatic variations may affect the push buttons set on high frequency stations.

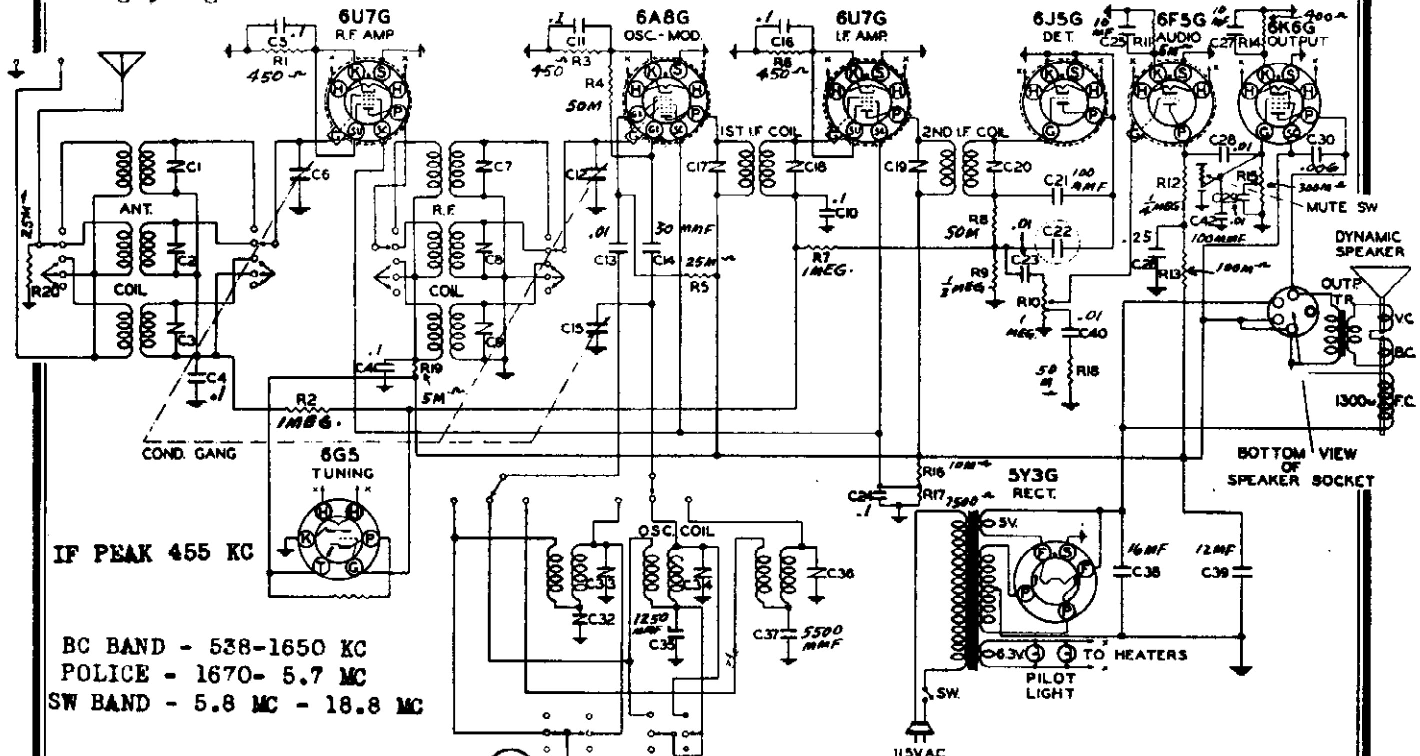
PUSH BUTTONS VIEWED FROM FRONT OF CABINET
FIG. 1

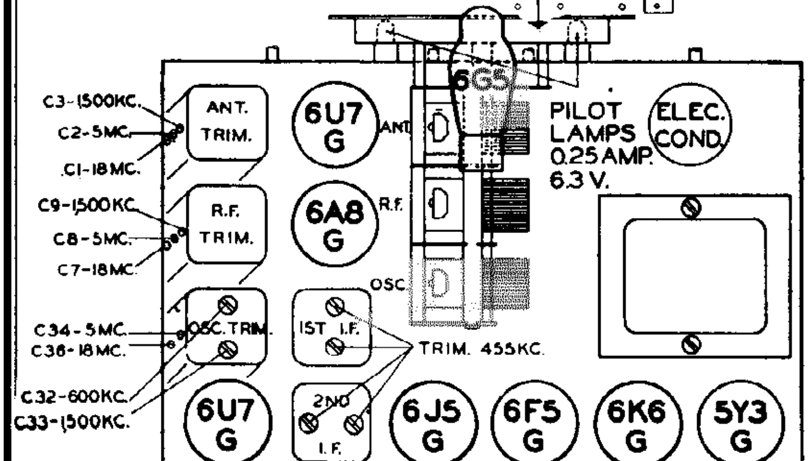


TRIMMERS VIEWED FROM BACK OF SET
FIG. 2

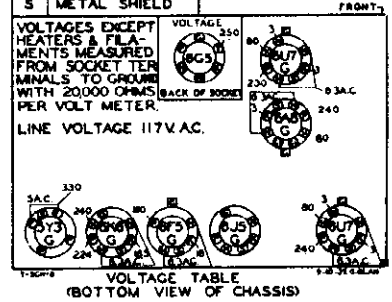
Chassis 1870
Schematic, Socket, Trimmers
Voltage, Alignment

MAJESTIC RADIO & TELEV. CORP.





SYM.	DESCRIPTION
P	PLATE
K	CATHODE
H	HEATER
F	FILAMENT
G	CONTROL GRID
G1	OSC. GRID
G2	ANODE GRID
SC	SCREEN GRID
SU	SUPP. GRID
T	TARGET
S	METAL SHIELD



ALIGNMENT - Turn wave change switch to BC pos. and rotate var. cond. until about 50 percent engaged. Apply a 455 KC sig. to 6A8G thru a .1 mf cond. Adjust trimmers marked "Trim 455 KC" for maximum signal.

SHORT WAVE BAND - Rotate wave band switch to full clockwise pos. Connect high side of gen. o.p. to ant. lead thru 400 ohm dummy ant. Set dial at 18 MC - Apply 18 MC signal. Adj. C36 trim. to min. cap., slowly turn screw so trim. cap. increases until signal is heard. Apply 18 MC sig. and adj. C7 and C1 for max. - Check align. thru medium of sensitivity at 11 meg. and 6 meg. resp. - When align. at 18 MC the C7 trim. may indicate 2 maxima. Maxima obtained with trimmer tighter is the desired one. Check by leaving gang cond. set and shifting to higher freq. : 19 meg. where image should appear. If properly aligned it should require about 10 times six. volt. for image to give same O.P. as real signal.

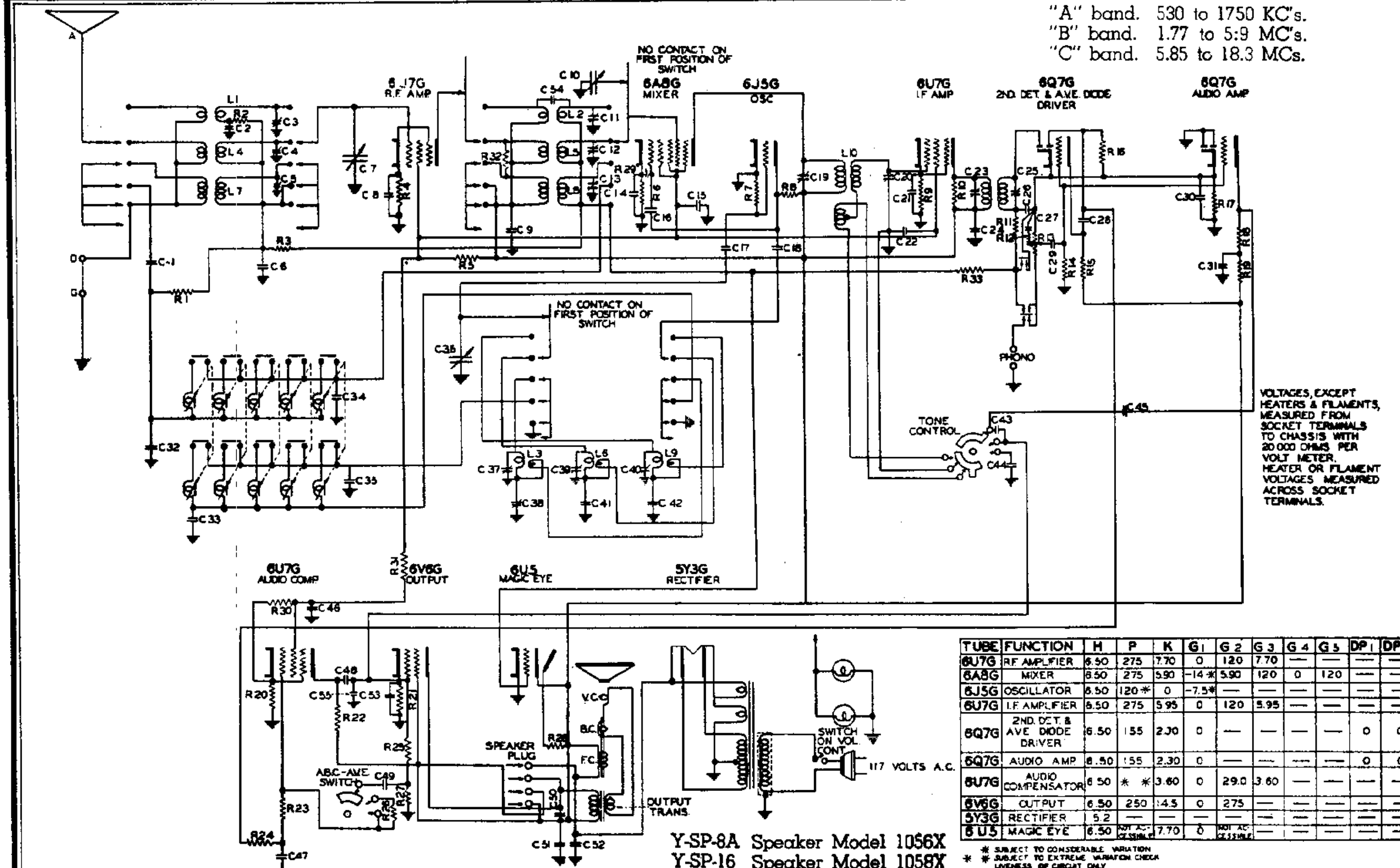
POLICE BAND - Shift waveband switch to middle pos. - Apply 5 MC sig. - Dial at 5 Mc. - Adj. C34 trim. as previous band until max. sig. is heard. Apply 5 meg. sig. and adj. Check alignment at 3.5 and 2 MC resp. Check for image same as previous band.

BROADCAST BAND - Use a 200 mmf cond. for dummy ant. on this band. Shift wave band sw. to full counter clockwise. Adj. trims. C3 and C9 to medium tight pos. - Dial at 600 KC. Apply 600 KC sig. and adj. padder C32 for max. - Dial at 1500 KC and 1500 KC sig. adj. C33 for same. Then adj. trims. C3 and C9 for max. - Shift gang to 600 KC and apply 600 KC sig. - Adjust C4 for max. sig. - Recheck 1500 KC trimming.

MODELS 1056X, 1058X
Schematic, Voltage

MAJESTIC RADIO & TELEV. CORP.

"A" band. 530 to 1750 KC's.
"B" band. 1.77 to 5:9 MC's.
"C" band. 5.85 to 18.3 MCs.



TUBE	FUNCTION	H	P	K	G1	G2	G3	G4	G5	DP1	DP2
6U7G	R.F. AMPLIFIER	6.50	275	7.70	0	120	7.70	—	—	—	—
6A8G	MIXER	6.50	275	5.90	-14 *	5.90	120	0	120	—	—
6J5G	OSCILLATOR	6.50	120 *	0	-7.5 *	—	—	—	—	—	—
6U7G	I.F. AMPLIFIER	6.50	275	5.95	0	120	5.95	—	—	—	—
6Q7G	2ND. DET. & AVE DIODE DRIVER	6.50	155	2.30	0	—	—	—	—	0	0
6Q7G	AUDIO AMP	6.50	155	2.30	0	—	—	—	—	0	0
6U7G	AUDIO COMPENSATOR	6.50	* *	3.60	0	29.0	3.60	—	—	—	—
6V6G	OUTPUT	6.50	250	14.5	0	275	—	—	—	—	—
5Y3G	RECTIFIER	5.2	—	—	—	—	—	—	—	—	—
6U5	MAGIC EYE	6.50	NOT ACCESSIBLE	7.70	0	NOT ACCESSIBLE	—	—	—	—	—

* SUBJECT TO CONSIDERABLE VARIATION
* * SUBJECT TO EXTREME VARIATION CHECK LIVENESS OF CIRCUIT ONLY

Y-SP-8A Speaker Model 1056X
Y-SP-16 Speaker Model 1058X

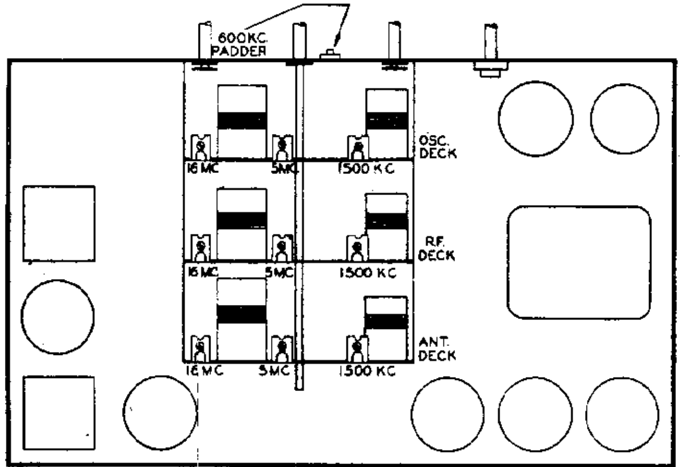
IF PEAK 455 KC

The tubes used are:

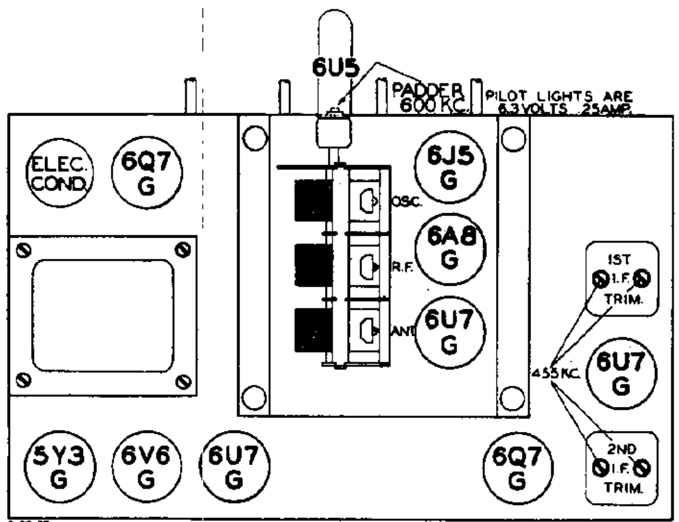
1 - 6U7G	R. F. amplifier	1 - 6U7G	AVE and ABC
1 - 6A8G	Modulator	1 - 6Q7G	Driver
1 - 6J5G	Oscillator	1 - 5Y3G	Rectifier
1 - 6U7G	I. F. amplifier	1 - 6V6G	Beam power output
1 - 6Q7G	2nd det. and AVE amp.	1 - 6U5	Tuning indicator

MODELS 1056X, 1058X
Socket, Trimmers,
Parts List, Notes
Alignment

MAJESTIC RADIO & TELEV. CORP.



CHASSIS LAYOUT
(BOTTOM VIEW)



CHASSIS LAYOUT
(TOP VIEW)

Antenna

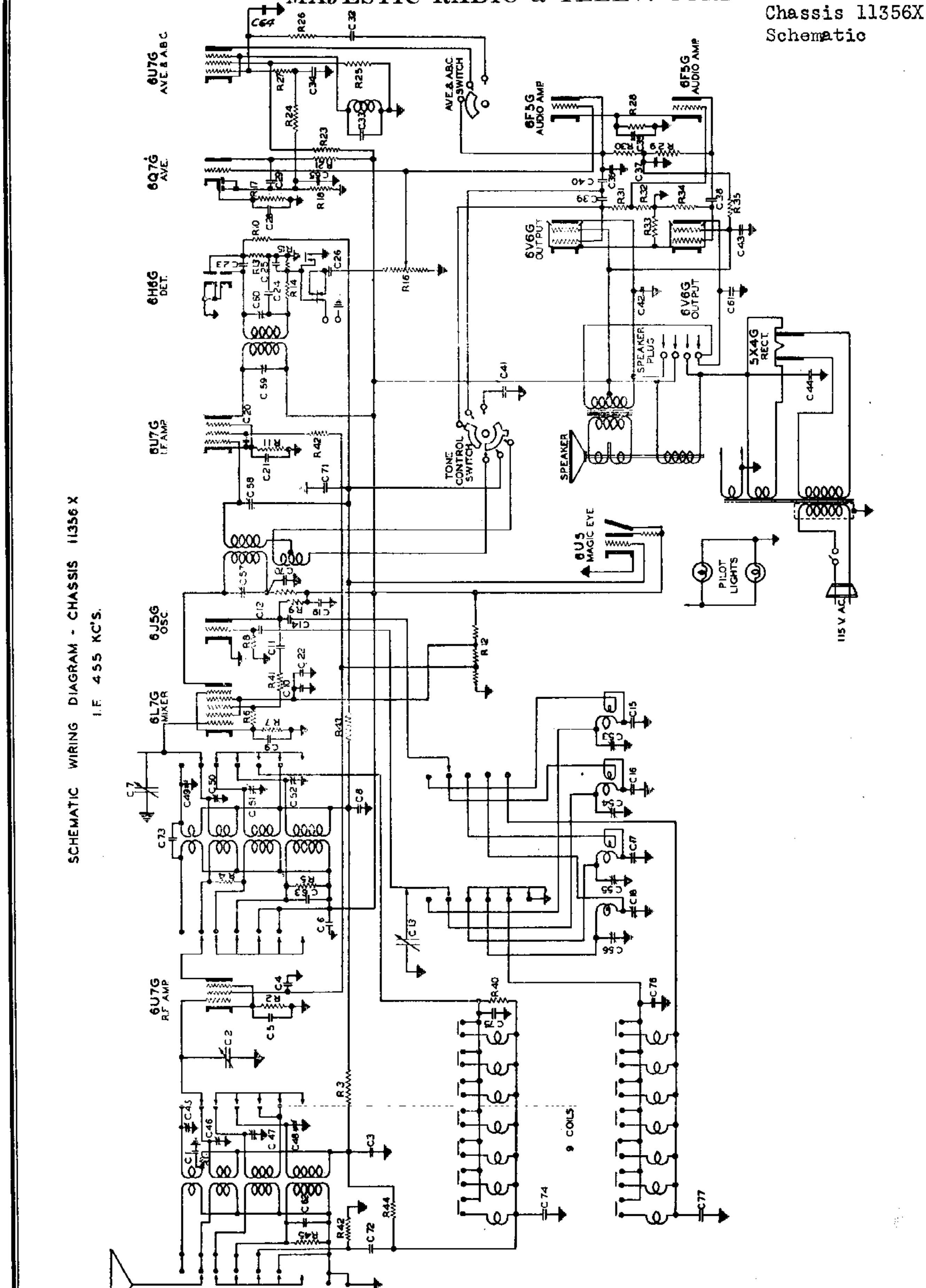
There are three terminals on back of chassis marked A D G. Terminal A is for use with ordinary outdoor antennas from 30 to 50 feet in length. Terminal G is for connection to a suitable ground such as a water pipe, although radiators or other type grounds are often used successfully. Terminal D is to used in combination with A when a doublet type antenna is used and under these conditions there should be no connection between terminals D and G.

Schematic Location	Part Number	Description
C7 C10 C36	Y-CV 7	Variable condenser
C32	CM-27	2000 MMF 3% silver condensers
C34	CM-24	484 MMF 1% silver condensers
C33	CM-26	710 MMF 1% silver condensers
C35	CM-25	274 MMF 1% silver condensers
C2 C9 C18	C-5	.01 MFD 400 Volt R. F. type
C1 C8 C14	C-6	.05 MFD 200 Volt R. F. type
C21	C-15761	.1 MFD 200 Volt
C22 C46	C-15757	.1 " 400 "
C29 C49	C-15754	.01 " 400 "
C44 C48 C50	C-15759	.006 " 600 "
C24 C31	C-15750	.25 " 400 "
C47	C-9	.15 " 200 "
C27	C-15772	.02 " 200 "
C6 C15 C45	C-15756	.05 " 400 "
C16	CM-15928	250 MMF Mica Condenser
C17	CM-15929	50 " " "
C42	CM-9	5500 " " "
C41	CM-6	1350 " " "
C43	CM-15939	1000 " " "
C26 C28 C55	CM-15918	100 " " "
C54	CM-10	10 " " "
C38	Y-CT-4	Padding Condenser
C3 C4 C5 C11 C12 C13 C 37 C39 C40	Y-CT-3	Trimmer Condenser
C51 C52 C53	Y-CE-10	16+16 MFD 400 Volt. 10 MFD - 25 Volt electrolytic cond.
C30	CE-25	10 MFD 25 Volt
C19 C20 C23 C25	Y-CT-2	Trimmer I. F.
R13	Y-VC-5	Volume Control
R25 R27	15512	250K ¼W 20%
R4	15543	1000 ¼W 20%
R1 R2 R3 R19	15515	100K ¼W 20%
R5	R-26	10K 3W 10%
R6	15571	500 ohm ¼W 10%
R7 R11 R29	15511	50K ¼W 20%
R8	15501	25K 1W 20%
R9 R72	15519	700 ohm ¼W 10%
R10 R18	15549	300K ¼W 20%
R12	15557	20K ¼W 20%
R14 R16 R23 R26 R33	15517	1M ¼W 20%
R31	15513	20K ½W 20%
R15 R22	15528	400K ¼W 20%
R17	R-40	4K ¼W 20%
R20	R-76	400 ohm ¼W 10%
R21	15584	250 ohm 1W 10%
R24	15500	2M ¼W 20%
R30	15576	5K ¼W 20%
R32	15530	2500 ¼W 20%
R28		1M connected internal in magic eye socket
R13	Y-B9	Tone control
	Y-B-11	ABC-AVE switch
	Y-VC-5	Volume control
	Y-B-43	Band switch

FOR PHONOGRAPH AND
TUNER DATA, SEE INDEX

MAJESTIC RADIO & TELEV. CORP.

MODEL 1356X
Chassis 11356X
Schematic

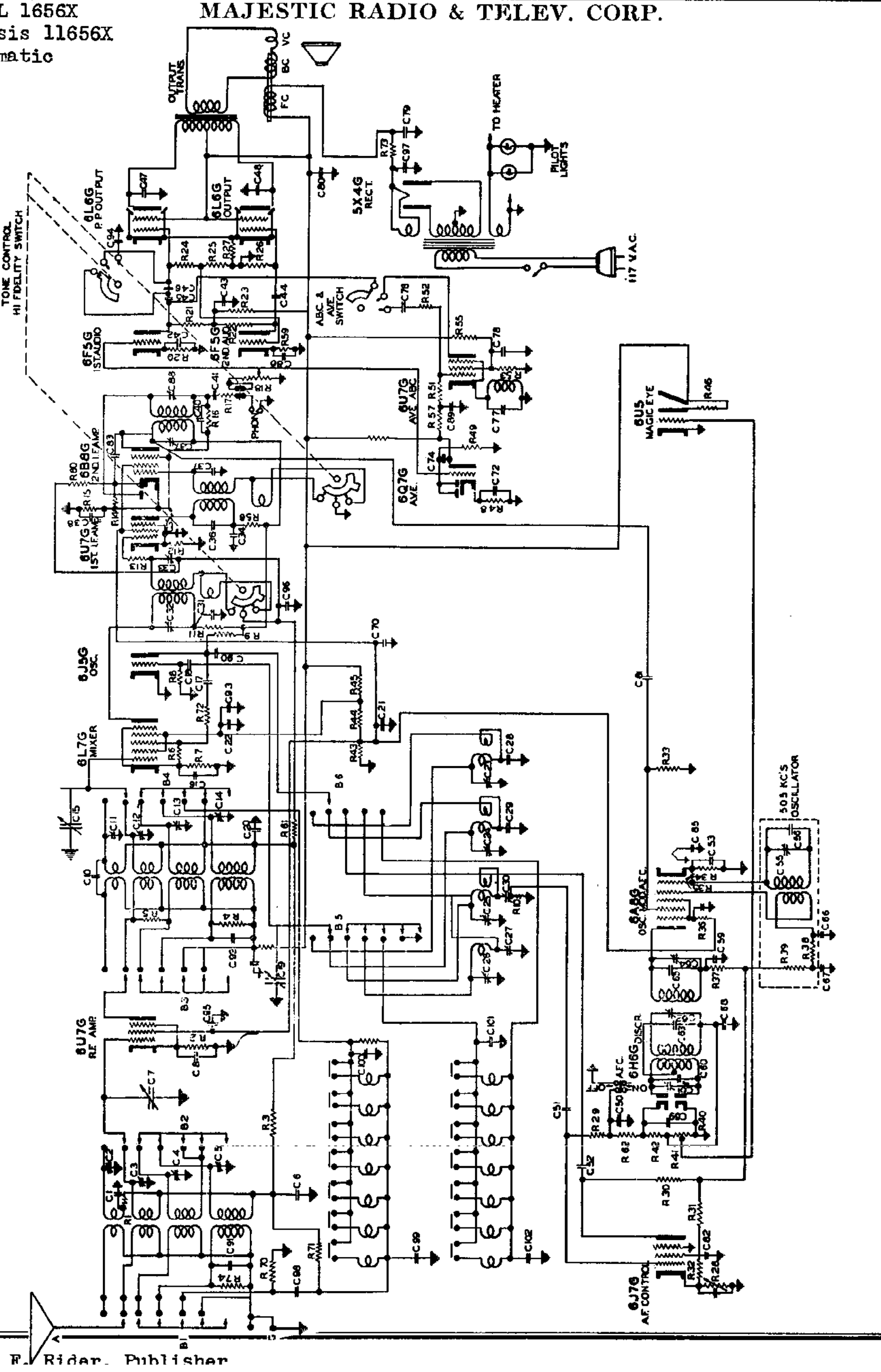


MODEL 1656X
Chassis 11656X
Schematic

MAJESTIC RADIO & TELEV. CORP.

SCHEMATIC WIRING DIAGRAM - CHASSIS 11656X

I.F. 455 KC'S.



MODELS 1056X,1058X
Phono.,Tuner Data

MAJESTIC RADIO & TELEV. CORP.

MODEL 1356X
MODEL 1656X
Socket,Trimmers
Phono.,Tuner Data
Alignment

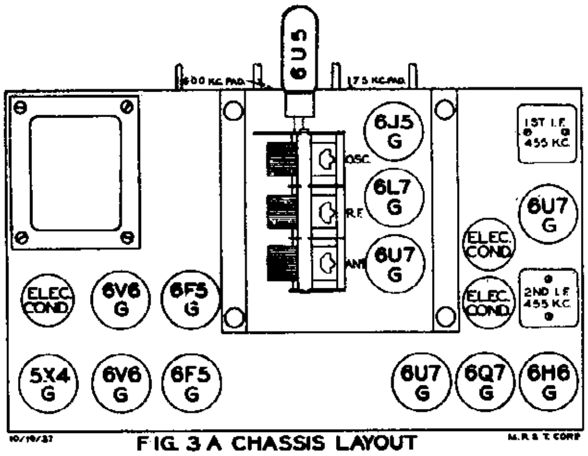


FIG. 3 A CHASSIS LAYOUT
TOP VIEW
MODEL 1356X

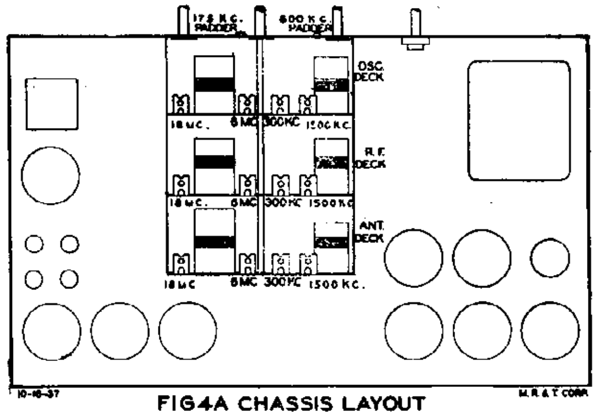


FIG 4A CHASSIS LAYOUT
BOTTOM VIEW MODEL 1356X

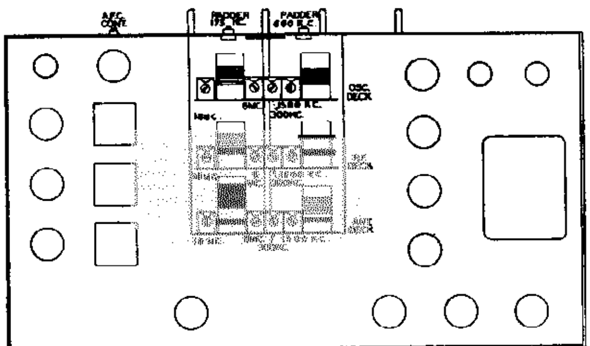


FIG.4B CHASSIS LAYOUT (BOTTOM VIEW)
MODEL 1656X

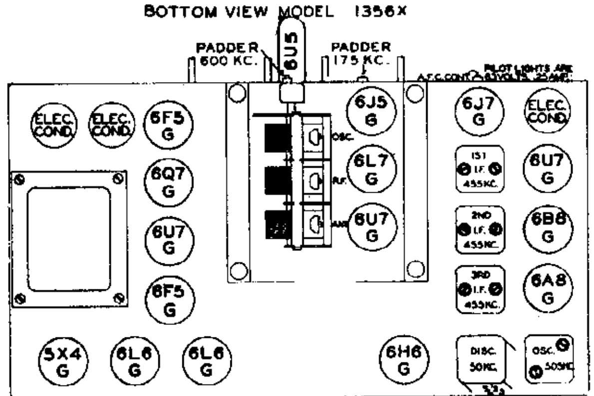


FIG.3B CHASSIS LAYOUT (TOP VIEW)
MODEL 1656X

MODELS 1056X,1058X,1356X,1656X

PHONOGRAPH—For phonograph, you can use the MAJESTIC Wireless record player, Model 3 PW, or any standard record player. When using a standard record player, plug in the pick-up tips in the jacks marked "PHONO" at the rear of the receiver. If you get undue hum, reverse these pick-up tips. Push the push-button marked "PHONO" and adjust the Volume, Tone, Volume Expansion and Bass Compensation by means of the controls on the receiver.

AUTOMATIC FREQUENCY CONTROL—Model 1656X.

When tuning manually on the broadcast or "A" band, the station may be pulled and held into proper tuning by using the AFC. This is done by pushing the first button from the left. If the station is approximately tuned, the AFC will do the rest and insure proper tuning.

This should be used only on local or strong stations as the AFC will cause the set to tune itself to the strongest stations within its range.

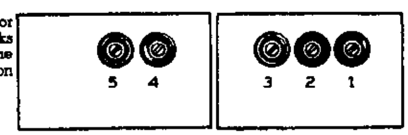
To release the AFC, push the AFC button slightly upward. This will cause it to come out in the same manner as the "PHONO" button.

SETTING UP OF PUSH BUTTONS

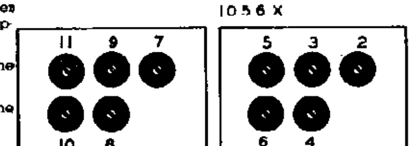
To adjust the push buttons, turn the band switch knob, the second one from the left, all the way to the left, to the position marked "E" on the cabinet. Going to the back of the receiver, adjust the coil marked No. in figure two (2), by turning the screw in the center of the coil by means of a screw driver, until the station you desire to hear is heard with maximum volume and best tone.

It is desirable to turn the tone control to high fidelity when listening on the push-buttons.

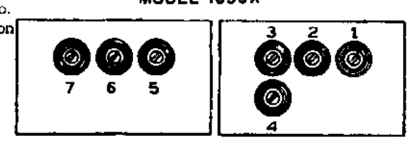
Only local or strong stations should be set up on the push-buttons.



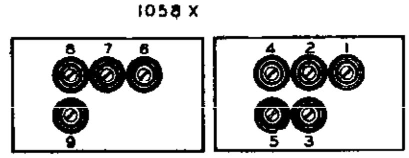
1056X



MODEL 1656X



1058X



1356X

Push button Number	Model 1356X	Model 1656X
1 is for stations lying between	1250 and 1750 KC's	AFC
2 " " " " "	950 and 1560 KC's	1250 and 1750 KC's
3 " " " " "	950 and 1560 KC's	950 and 1560 KC's
4 " " " " "	680 and 1110 KC's	950 and 1560 KC's
5 " " " " "	680 and 1110 KC's	680 and 1110 KC's
6 " " " " "	680 and 1110 KC's	680 and 1110 KC's
7 " " " " "	540 and 720 KC's	680 and 1110 KC's
8 " " " " "	540 and 720 KC's	680 and 1110 KC's
9 " " " " "	540 and 720 KC's	540 and 720 KC's
10 " " " " "	PHONO	540 and 720 KC's
11 " " " " "		540 and 720 KC's
12 " " " " "		PHONO

Push-Button Number	1056X	1058X
1	980 KC's to 1600 KC's	980 KC's to 1600 KC's
2	680 KC's to 1150 KC's	980 KC's to 1600 KC's
3	680 KC's to 1150 KC's	680 KC's to 1150 KC's
4	540 KC's to 880 KC's	680 KC's to 1150 KC's
5	540 KC's to 880 KC's	680 KC's to 1150 KC's
6	Phonograph	540 KC's to 880 KC's
7		540 KC's to 880 KC's
8		Phonograph

When the buttons are set up and the wave band switch is turned all the way to the left, counter clockwise, pushing any one of the buttons will cause the receiver to receive the station set up on that particular button.

WARNING

When operating this set on "RADIO," make certain that the phonograph push-button is out. If it is not, pushing slightly upwards on this push-button will cause it to be released and come out.

MODEL 1356X
MODEL 1656X
Parts Lists

MAJESTIC RADIO & TELEV. CORP.

Replacement Parts List For Chassis 1656X

Schematic location	Part Number	Description
C7, C15, C19	Y-CV-7	Condenser 3 gang variable
C88, C69	C-15772	" Tubular .02 mfd 200 V
C1, C9, C90, C98	C-5	" " .01 mfd 400 V
C6 C8, C16, C22, C95, C20	C-6	" " .05 mfd 200 V (H.F.)
C31, C34, C58, C59, C66, C87	C-15757	" " .1 mfd 400 V
C35, C38, C78, C84, C96	C-15761	" " .1 mfd 200 V
C89	C-15770	" " .2 mfd 200 V
C21	C-15775	" " .5 mfd 200 V
C76	C-15771	" " .004 mfd 600 V
C47, C48	C-15	" " .002 mfd 800 V
C85	C-14	" " .5 mfd 120 V
C94	C-15759	" " .006 mfd 600 V
C70	C-15750	" " .25 mfd 400 V
C77	C-9	" " .15 mfd 200 V
C46	C-15767	" " .001 mfd 600 V
C41, C44, C45, C50	C-15760	" " .02 mfd 400 V
C49, C53, C74, C82	C-15758	" " .05 mfd 400 V
C51	CM-11	" Mica 500 mmf 10%
C56	CM-16	" " 150 mmf 10%
C80, C83, C85	CM-15917	" " 650 mmf 5%
C18, C57, C81, C83, C91	CM-15919	" " 50 mmf 10%
C28	CM-9	" " 5500 mmf 5%
C29	CM-6	" " 1350 mmf 5%
C17, C75, C92	CM-7	" " 250 mmf 5%
C10	CM-10	" " 10 mmf 5%
C52, C40	CM-15906	" " 100 mmf 10%
C99	CM-27	" " 2000 mmf silver plated
C100	CM-24	" " 484 mmf silver plated
C101	CM-25	" " 274 mmf silver plated
C102	CM-26	" " 710 mmf silver plated
C42, C72, C98	CE-25	" Tubular Dry Elec. 10 mfd 25 V
C43	CE-27	" Tubular Dry Elec. 4 mfd 300 V
C97	CE-22	" Tubular Dry Elec. 28 mfd 400 V
C79	CE-15	" Wet Electrolytic
C80	CE-13	" Wet Electrolytic
C93	B-17042	" Wet Electrolytic
C54, C55	Y-CT-5	" Air trimmer
C2, C3, C4, C11, C12, C13, C23, C24, C25	Y-CT-3	" Trimmer 3-30 mmf
C5, C14, C26	Y-CT-7	" Trimmer 40-100 mmf
C30	Y-CT-4	" Trimmer
C27	Y-CT-6	" Trimmer
C61, C62, C64	Y-CP-3	" Padder
C32, C33, C36, C37, C97, C98	Y-CT-2	I. F. Trimmer
R13	R-39	Carbon Resistor 750K ¼ W 20%
R10	R-41	" " 75 ohm ¼ W 10%
R9	R-15501	" " 25K 1 W 20%
R8, R17, R23, R35	R-15511	" " 50K ¼ W 20%
R4, R5	R-15530	" " 2500 ohm ¼ W 10%
R2, R7	R-15610	" " 900 ohm ¼ W 10%
R1, R3, R6, R21, R71	R-15515	" " 100K ¼ W 20%
R30, R31, R32	R-15510	" " 20K ¼ W 20%
R14, R42, R49, R52, R57, R60, R61	R-15517	" " 1 meg. ¼ W 20%
R16, R24, R26, R29, R40, R41	R-15520	" " 500K ¼ W 20%
R11, R53, R56	R-2	" " 5000 ohm ¼ W 20%
R12	R-15519	Carbon Resistor 700 ohms ¼ W 10%
R15, R34	R-15551	" " 250 ohms ¼ W 10%
R36	R-15566	" " 2000 ohms ¼ W 10%
R33, R62	R-15500	" " 2 Meg. ¼ W 20%
R22, R51, R58	R-15512	" " 250K ¼ W 20%
R20, R38, R39, [illegible], [illegible]	R-15556	" " 10000 ohms ¼ W 10%
R37, R48	R-15617	" " 3000 ohms ¼ W 20%
R25	R-16	" " 8000 ohms ¼ W 20%
R55	R-15524	" " 50K 1 W 10%
R72	R-15601	" " 100 ohms ¼ W 20%
R73	R-78	" " 150 ohms 4 W 20%
R74	R-15570	" " 2000 ohms ¼ W 20%
R28	Y-PA-12	Variable resistor 1000 ohms
R18	Y-VC-9	Volume control 1 meg
R27	Y-RC-5	Candohm resistor
R43, R44, R65	Y-RC-3	Candohm resistor
R46		1 MEG. Internal connection in magic eye socket
R70	R-15542	Carbon resistor 1000 ohms ¼ W 20%
B1, B2, B3, B4, B5, B6, B7 B8, B9, B10	B-45	Band Switch
	Y-B-8	Tone control and Hi. Fidelity switch
	Y-B-11	A.B.C. and A.V.E. switch
	Y-CK-5	A.B.C. filter choke
	Y-TP-8	Power Transformer
	Y-SP-10	Speaker 12"
	Y-CI-8	1st and 2nd I.F. coil assembly
	Y-CI-7	3rd I.F. coil assembly
	Y-CI-9	Discriminator coil assembly
	Y-CI-10	Oscillator coil assembly
	AM-88	Antenna bank assembly
	AM-89	R. F. bank assembly
	AM-90	Oscillator bank assembly
	SPA-18	Speaker voice coil and cone
	SPA-19	Speaker transformer
	ES-7	Escutcheon
	DC-3	Dial crystal
	2-P-16569	Pilot light Mazda No. 51

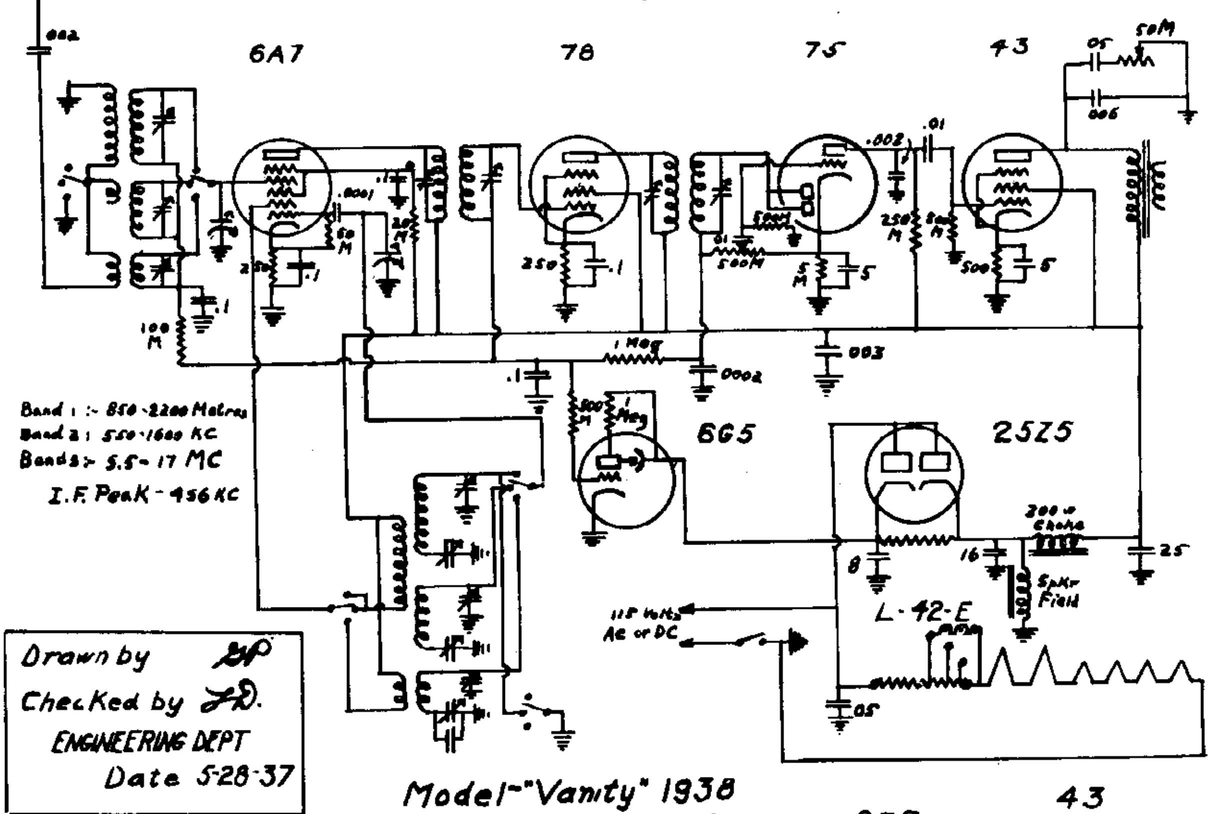
Replacement Parts List for Chassis 1356X

Schematic Location	Part Number	Description
C2, C7, C13	Y-CV-7	Cond. 3 gang variable
C3, C4, C5, C8, C9, C10	C-6	" tubular .05 mf. 200 V (H. F.)
C1, C8, C14	C-5	" " .01 mf 400 V (H. F.)
C19	C-15750	" " .25 mf 400 V
C32	C-15771	" " .004 mf 600 V
C26, C38, C40	C-15760	" " .02 mf 400 V
C39	C-15767	" " .001 mf 600 V
C20, C29, C70	C-15756	" " .05 mf 400 V
C21	C-15761	" " .1 mf 200 V
C33	C-9	" " .15 mf 200 V
C42, C61	C-11	" " .001 mf 800 V
C41	C-15759	" " .006 mf 600 V
C34	C-15770	" " .2 mf 200 V
C71	C-15752	" " .05 mf 200 V
C72	C-15754	" " .01 mf 400 V
C73	CM-10	" Mica 10 mmf 5%
C74	CM-27	" " 2000 mmf silver plated
C75	CM-24	" " 484 mmf silver plated
C76	CM-25	" " 274 mmf silver plated
C77	CM-26	" " 710 mmf silver plated
C16	CM-6	" " 1350 mmf 5%
C15	CM-9	" " 5500 mmf 5%
C12, C23, C36, C62, C65	CM-15919	" " 50 mmf 10%
C24, C25	CM-15918	" " 100 mmf 20%
C11, C63, C64	CM-15928	" " 250 mmf 20%
C45, C46, C47; C49, C50, C51; C53, C54, C55	Y-CT-3	" Antenna trim 3-30 mmf; " R. F. trim 3-30 mmf; " Oscillator trim 3-30 mmf
C48; C52; C56	Y-CT-7	" Antenna trim 40-100 mmf; " R. F. trim 40-100 mmf; " Oscillator trim 40-100 mmf
C57, C58; C59, C60	Y-CT-2	" 1st I. F. trimmer; " 2nd I. F. trimmer
C43	Y-CE-13	" Wet Electrolytic 40 mf 300 V
C44	Y-CE-15	" Wet Electrolytic 30 mf 415 V
C35; C22; C28	Y-CE-23	Cond. Dry Electrolytic 20 mf 25 V; 20 mf 200 V; 10 mf 25 V
C37	CE-26	Cond. Tubular Dry Elec. 4 mf. 300 V
C17	Y-CT-4	Cond. Variable Padder 200-600 mmf
C18	Y-CT-6	Cond. Variable Padder 100-300 mmf.
R8, R14, R35	R-15511	Resistor Carbon 50K ¼ W 20%
R9	R-15501	" " 25K 1 W 20%
R1, R3, R6, R30, R44	R-15515	" " 100K ¼ W 20%
R2, R7	R-15610	" " 900 ohms ¼ W 10%
R4, R5	R-15530	" " 2500 ohms ¼ W 10%
R11	R-15537	" " 400 ohms ¼ W 10%
R15	R-15520	" " 500K ¼ W 20%
R18, R24, R26, R10, R13, R40	R-15517	" " 1 meg ¼ W 20%
R27, R43, R21, R29	R-15512	" " 250K ¼ W 20%
R17	R-15611	" " 3000 ohms ¼ W 10%
R23	R-21	" " 75K 1 W 10%
R29	R-40	" " 4000 ohms ¼ W 10%
R31, R34	R-15554	" " 500K ¼ W 10%
R32	R-33	" " 8000 ohms ¼ 10%
R33	R-15607	Resistor Carbon. 250 ohms 2 W 10%
R25	R-2	" " 5000 ohms ¼ W 20%
R12	Y-RC-3	" Candohm 7000, 2250, 5800 ohms
R16	Y-VC-9	Volume control 1 meg.
R45	R-15570	2000 ohms ¼ W 20%
R41	R-15601	Resistor Carbon 100 ohms ¼ W 20%
R42	R-15542	" " 1000 ohms ¼ W 20%
	AM-88	Antenna bank assembly
	AM-89	R. F. bank assembly
	AM-90	Oscillator bank assembly
	Y-CI-6	1st I. F. coil assembly
	Y-CI-5	2nd I. F. coil assembly
	B45	Band switch
	Y-B-9	Tone and High Fidelity switch
	Y-B-11	A.B.C. - A.V.E. switch
	Y-SP-9	Dynamic speaker 12"
	SPA-16	Speaker voice coil and cone
	SPA-17	Speaker transformer
	Y-TP-7	Power transformer
	DC-3	Dial crystal
	ES-16	Escutcheon
	Y-CK-5	Filter choke (A.V.E. - A.B.C.)

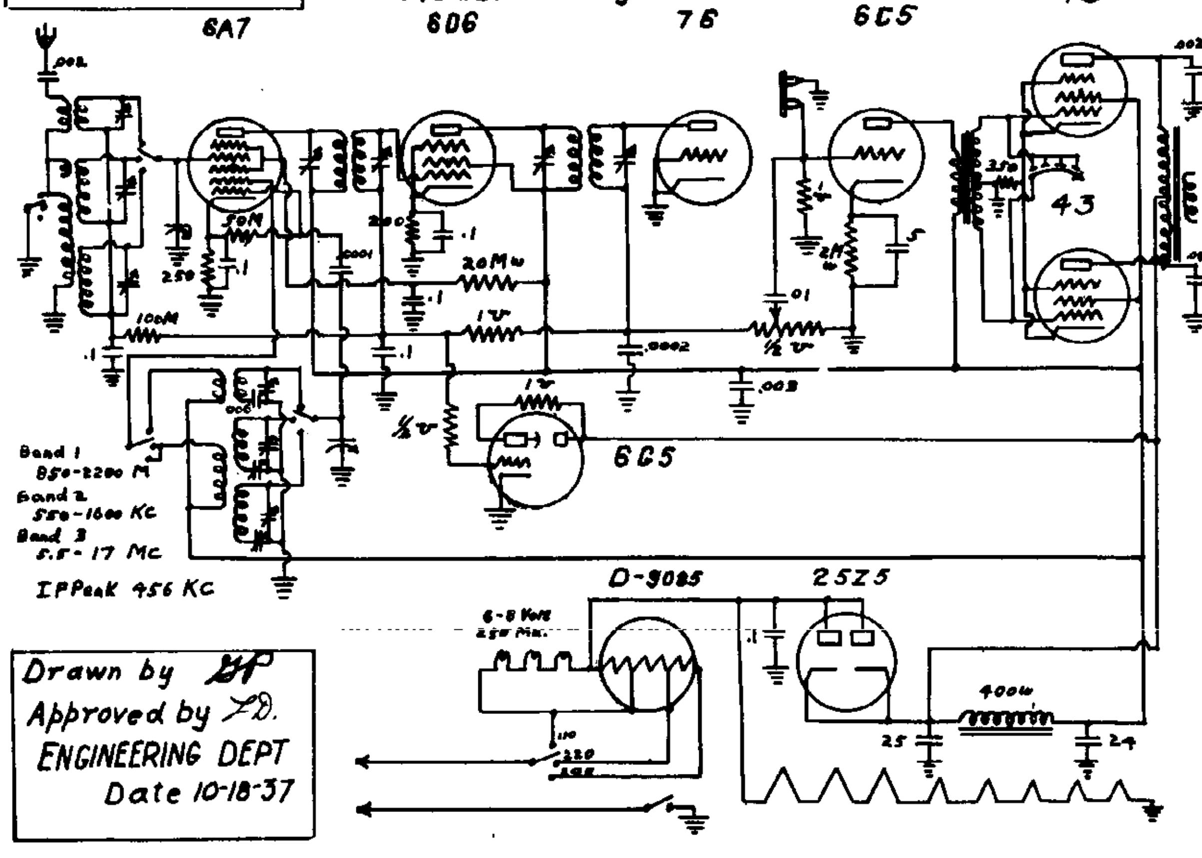
MODEL Vanity 1937
MODEL Vanity 1938
Schematics

MARCONIPHONE INC.

Model-"Vanity" 1937

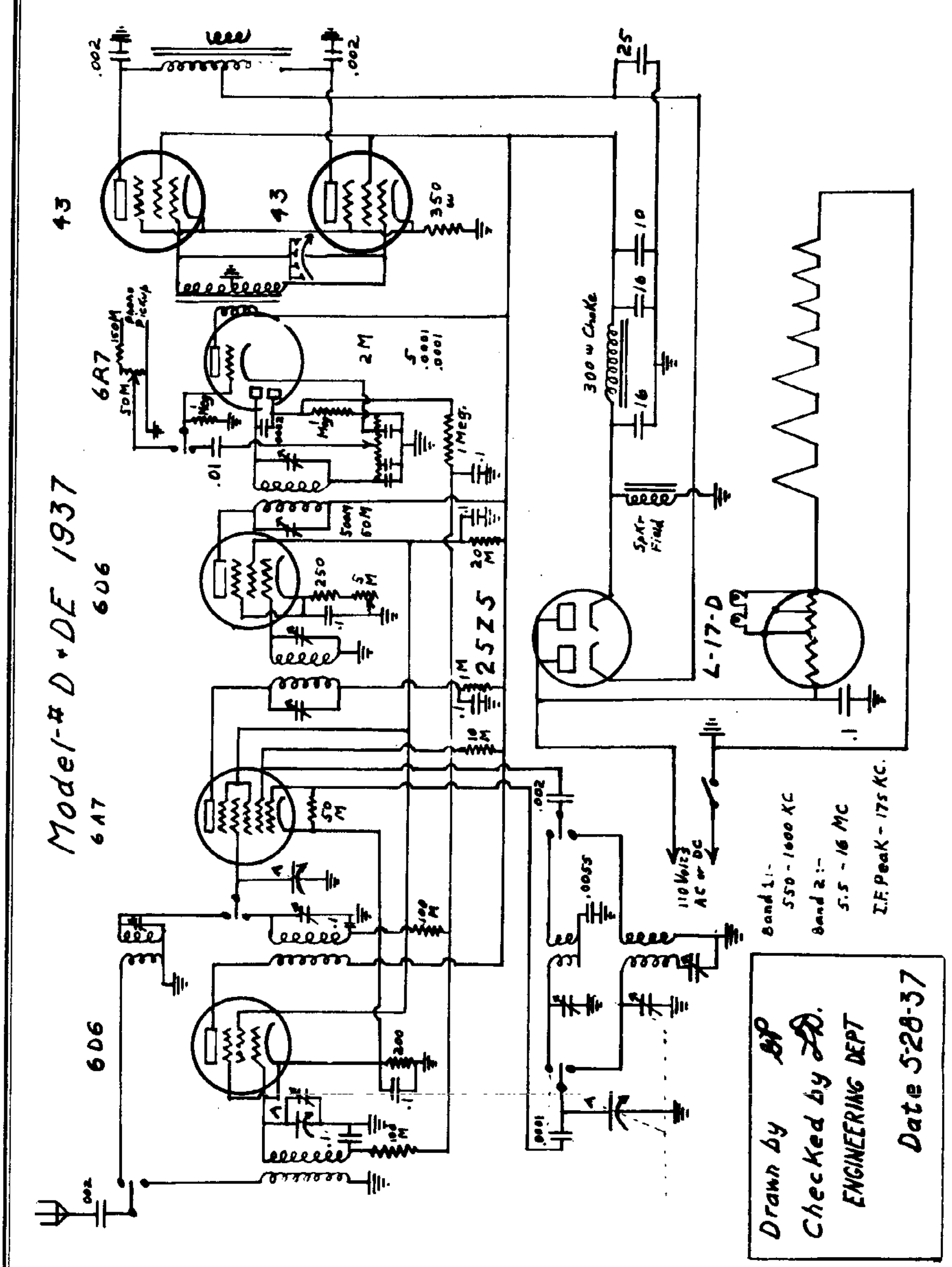


Model-"Vanity" 1938

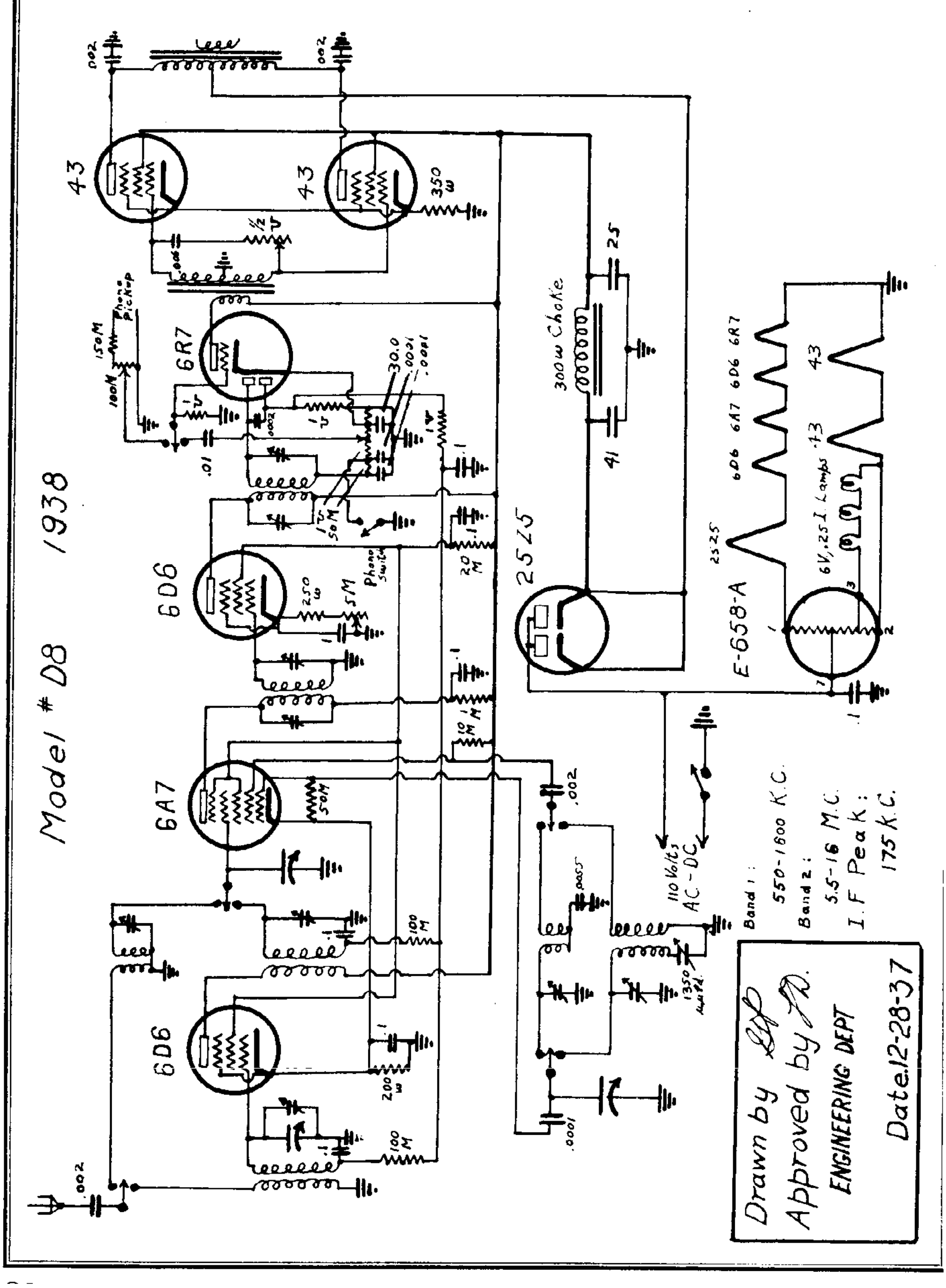


MODELS D,DE 1937
Schematic

MARCONIPHONE INC.

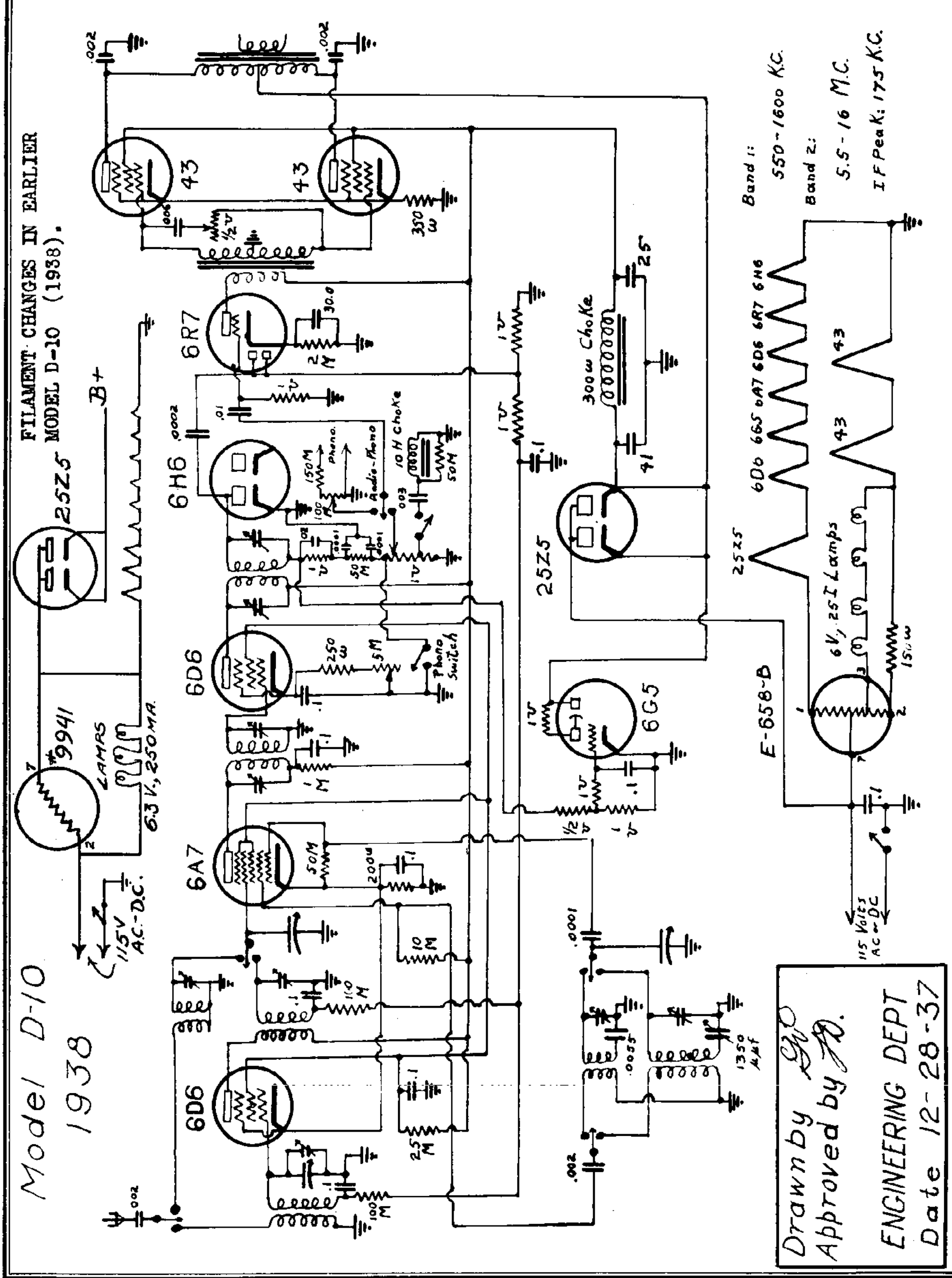


MARCONIPHONE INC.



MODEL D10,1938
Schematic

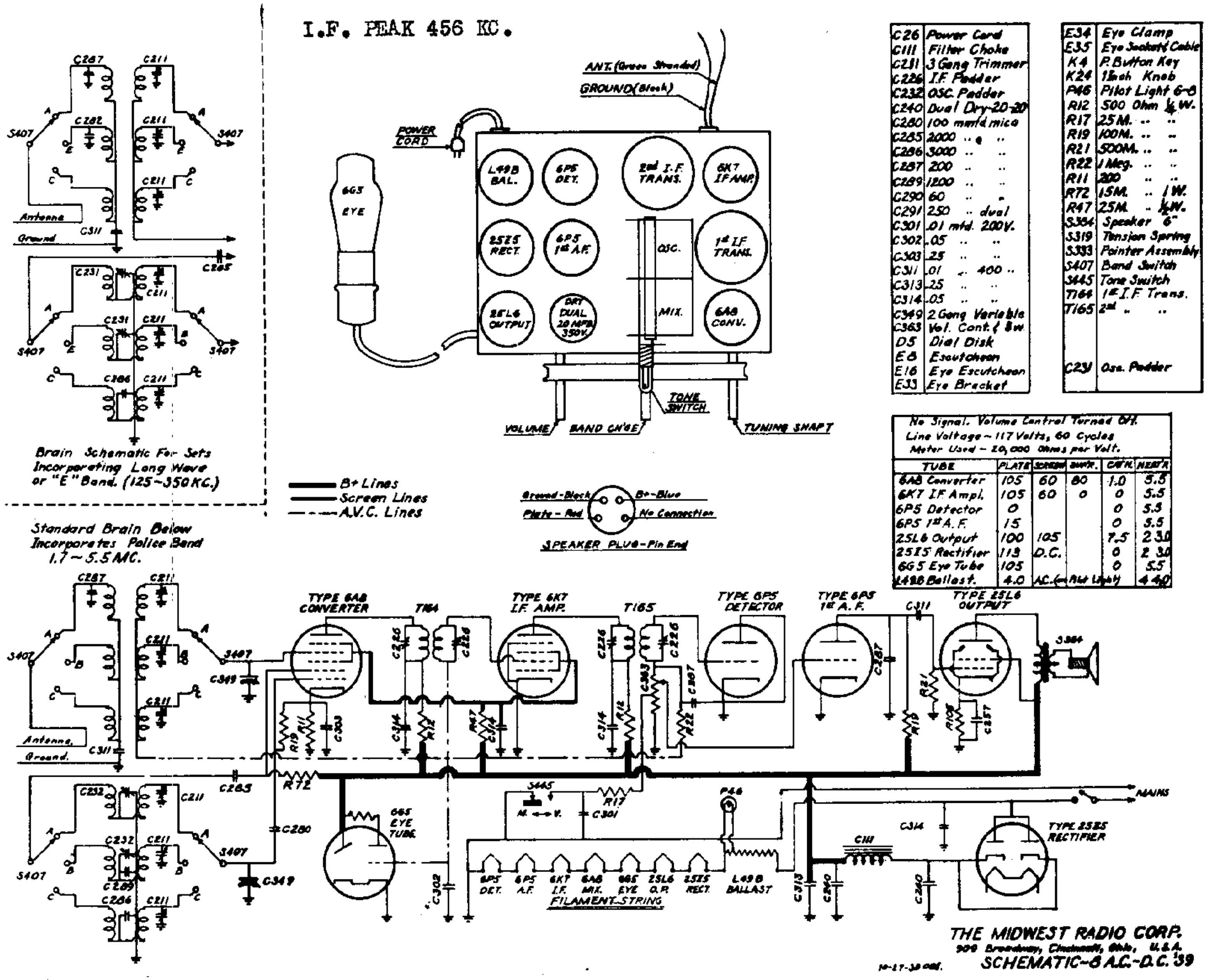
MARCONIPHONE INC.



MID-WEST RADIO CORP.

MODEL 8 AC-DC '39
Schematic, Socket
Voltage

I.F. PEAK 456 KC.



C26	Power Cord
C111	Filter Choke
C211	3 Gang Trimmer
C226	I.F. Padder
C232	OSC. Padder
C240	Dual Dry-20-20
C280	100 mmfd mica
C285	2000 .. ..
C286	3000 .. ..
C287	200 .. ..
C289	1200 .. ..
C290	60 .. ..
C291	250 .. dual
C301	.01 mfd. 200V.
C302	.05 .. ..
C303	.25 .. ..
C311	.01 .. 400 ..
C313	.25 .. ..
C314	.05 .. ..
C349	2 Gang Variable
C363	Vol. Cont. & Sw.
D5	Dial Disk
E8	Escutcheon
E16	Eye Escutcheon
E33	Eye Bracket

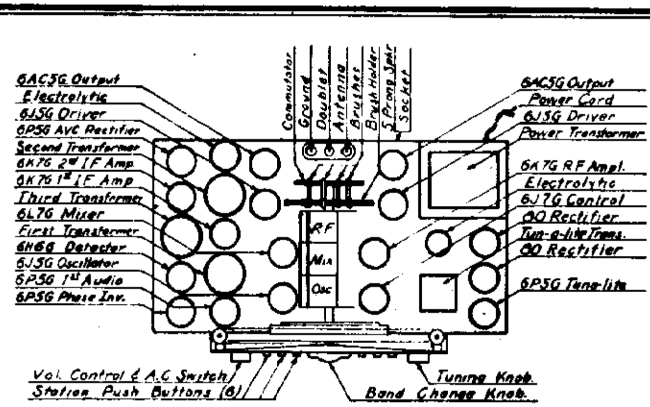
E34	Eye Clamp
E35	Eye Socket & Cable
K4	P. Button Key
K24	1 Inch Knob
P46	Pilot Light 6-8
R12	500 Ohm ½ W.
R17	25 M. .. ..
R19	100 M. .. ..
R21	500 M. .. ..
R22	1 Meg. .. ..
R11	200 .. ..
R72	15 M. .. 1 W.
R47	25 M. .. ½ W.
S384	Speaker 6"
S319	Tension Spring
S333	Pointer Assembly
S407	Band Switch
S445	Tone Switch
T164	1st I.F. Trans.
T165	2nd .. ..
C231	Osc. Padder

No Signal. Volume Control Turned Off.
Line Voltage ~ 117 Volts, 60 Cycles
Meter Used ~ 20,000 Ohms per Volt.

TUBE	PLATE	SCREEN	SUPR.	CATH.	HEAT'R
6A8 Converter	105	60	80	1.0	5.5
6K7 I.F. Ampl.	105	60	0	0	5.5
6P5 Detector	0			0	5.5
6P5 1st A.F.	15			0	5.5
25L6 Output	100	105		7.5	23.0
25Z5 Rectifier	113	D.C.		0	23.0
6G5 Eye Tube	105			0	5.5
L49B Ballast.	4.0	A.C. (on Pilot Light)			44.0

MODEL 17-'39
Schematic, Socket
Voltage

MID-WEST RADIO CORP.



OPERATING VOLTAGES

No Signal. Volume Control Turned Off. Motor Switch In Off Position. Line Voltage 117 Volts, 60 Cycles. Meter Used - 20,000 Ohms per Volt.

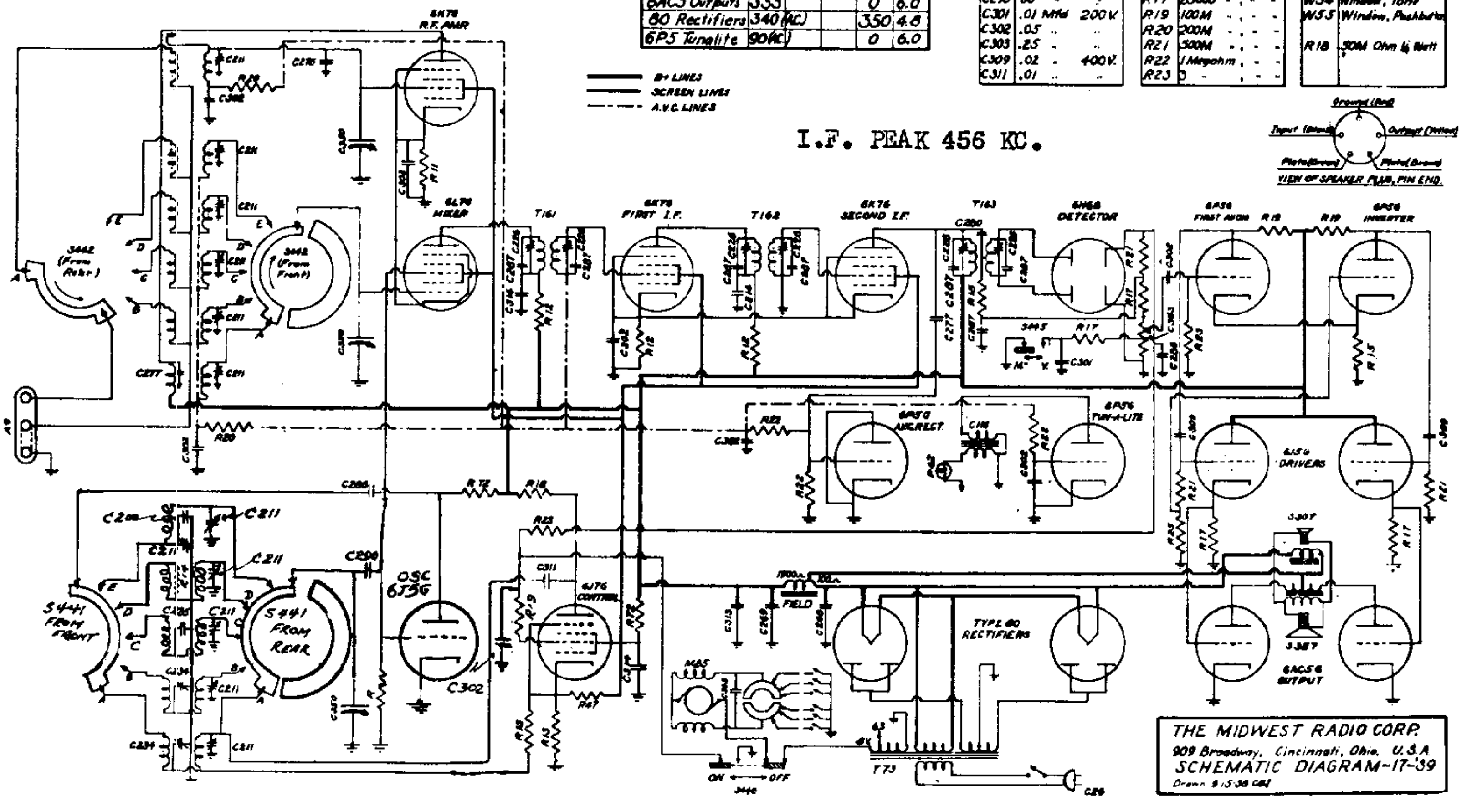
TUBE	PLATE	SCREEN	SUP.	CATH.	HEATER
6K7 R.F.	245	85	2.4	2.4	6.0
6L7 Mixer	245	85		2.4	6.0
6J5 Osc.	140			0	6.0
6J7 Control	200	85	4.4	4.4	6.0
6K7 1st I.F.	245	85	4.4	4.4	6.0
6K7 2nd I.F.	245	85	4.4	4.4	6.0
6P5 AVC. Rect.	0				6.0
6H6 2nd Det.	0				6.0
6P5 1st A.F.	150			9.2	6.0
6P5 Inverter	150			9.2	6.0
6J5 Drivers	245			10	6.0
6AC5 Outputs	335			0	6.0
80 Rectifiers	340 (AC)			350	4.8
6P5 Tunalite	90 (AC)			0	6.0

A9	Antenna Strip
B26	Brush Holder
B27	Brush Clip
B28	Brush Contact
C26	Cable & Plug, A.C.
C116	Tune-lite Trans.
C145	Commutator Disk
C146	Commutator Segments
C211	3 Gang Trimmer
C226	I.F. Padder
C234	Osc. Padder
C268	24 MFD. 500 V.
C269	40 MFD. 350 V.
C276	10 MMFD. Mica
C277	25 " "
C280	100 " "
C285	2000 " "
C286	3000 " "
C287	200 " "
C290	60 " "
C301	.01 Mfd. 200 V.
C302	.05 " "
C303	.25 " "
C309	.02 " 400 V.
C311	.01 " "

C313	.25 Mfd. 400 V.
C314	.05 " "
C350	3 Gang Variable
C363	Control, Volume, WS
C401	Fish Line Cord
D3	Dial Background
D4	Dial, Glass
K24	Knob, 1 inch
K25	Knob, 2 inch
M25	Motor
P9	Panel, Molded
P42	Pilot Light 3.2 V
P46	Pilot Light 6-8 V
P59	Pointer & Slide
R11	200 Ohm, ¼ Watt
R12	500 " " "
R13	1000 " " "
R14	2000 " " "
R15	5000 " " "
R17	25000 " " "
R19	100M " " "
R20	200M " " "
R21	500M " " "
R22	1 Megohm " " "
R23	3 " " "

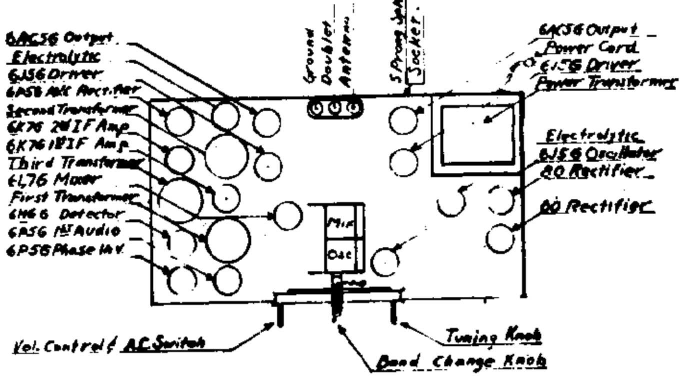
R25	40M Ohm, ¼ W.
R47	25M Ohm, ½ W.
R48	50M " " "
R72	15M " , 1 W.
S307	Speaker, 3½"
S319	Spring, Belt Ten.
S387	Speaker, 12 in.
S441	Coil Switch, Osc.
S442	Coil Switch, R.F.
S443	Switch Clicker
S445	Tone Switch
S446	Motor Switch
T73	Power Transformer
T161	1st I.F. Trans.
T162	2nd I.F. Trans.
T163	3rd I.F. Trans.
W51	Window, Tuning
W52	Window, Volume
W53	Window, Motor
W54	Window, Tone
W55	Window, Pushbutton
R18	50M Ohm ¼ Watt

I.F. PEAK 456 KC.



MODEL 14-Z-9
Schematic, Voltage
Socket

MID-WEST RADIO CORP.

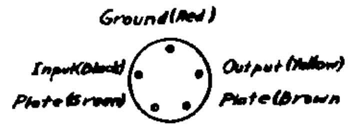


OPERATING VOLTAGES

No Signal, Volume Control Turned Off

Line Voltage 117 Volts 60 Cycles
Meter Used 2000 Ohms per Volt

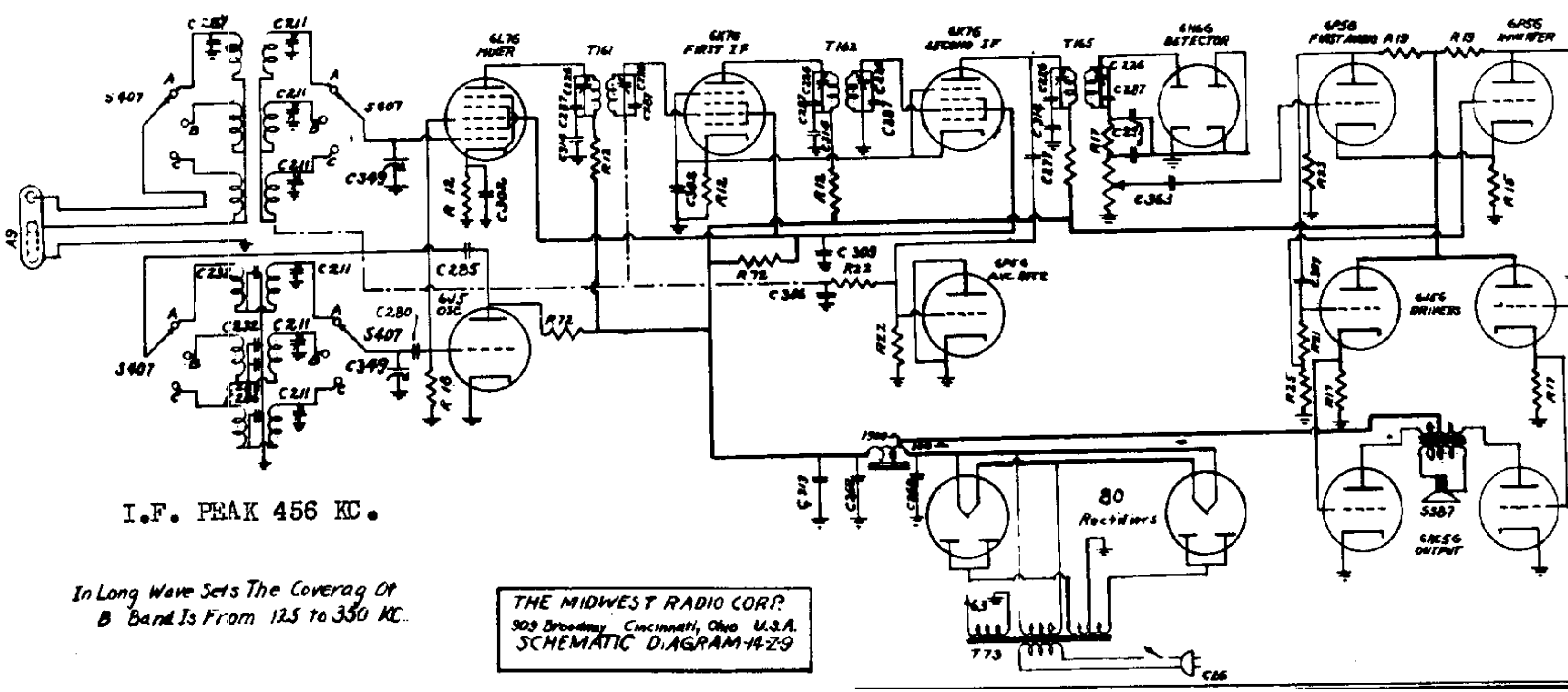
TUBE	PLATE	SCREEN	SUP	CATH	HEATER
6L7 Mixer	245	85		2.4	6.0
6J5 Osc.	140			0	6.0
6K7 1st IF	245	85	4.4	4.4	6.0
6K7 2nd IF	245	85	4.4	4.4	6.0
6P5 AVC Rect.	0				6.0
6H6 2nd DET.	0				6.0
6P5 1st AF	150			9.2	6.0
6J5 Drivers	245			10	6.0
6P5 Inverter	150			9.2	6.0
6AC5 Drivers	335			0	6.0
80 Rectifiers	340 (AC)			350	4.8



View of Speaker Plug (Pin End)

A9	Antenna Strip
C26	Cable & Plug Ust
C211	3 Gang Trimmer
C226	I F Padder
C232	Osc Padder
C268	24 MFD 500 V.
C269	40 MFD 350 V
C291	250 Mica Dual
C277	25 MMFD Mica
C286	3000 " "
C287	200 " "
C289	1200 " "
C302	.05 MFD 200 V.
C309	.02 MFD 400 V.
C313	.25 " "
C314	.05 " "
C349	2 Gang Variable
C363	Control, Volume
C401	Fish Line Cord
K24	Knob 1 inch
P96	Pilot Lite 68K
R11	200 Ohm ½ Watt
R12	500 " " "
R15	5000 " " "
R17	25000 " " "

R18	5000 Ohm ½ Watt
R19	100 M " "
R21	300 M " "
R22	1 Meg Ohm " "
R23	3 " " "
R25	40 M Ohm ½ W
R72	15 M " 1 W
3319	Spring Batt Ten.
3301	Speaker 8"
3333	Pointer
3407	Coil Switch
T73	Power Trans.
T161	1st I F Trans.
T162	2nd " "
T165	3rd " "
C285	2,000 MMFD
C280	100 "



I.F. PEAK 456 KC.

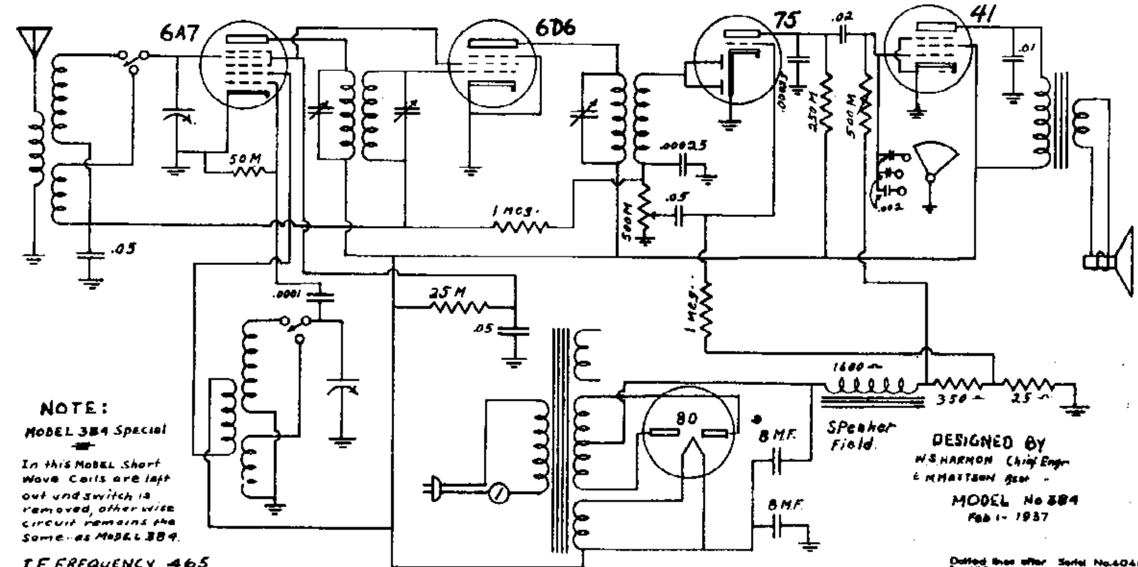
In Long Wave Sets The Coverag Of B Band Is From 125 to 350 KC.

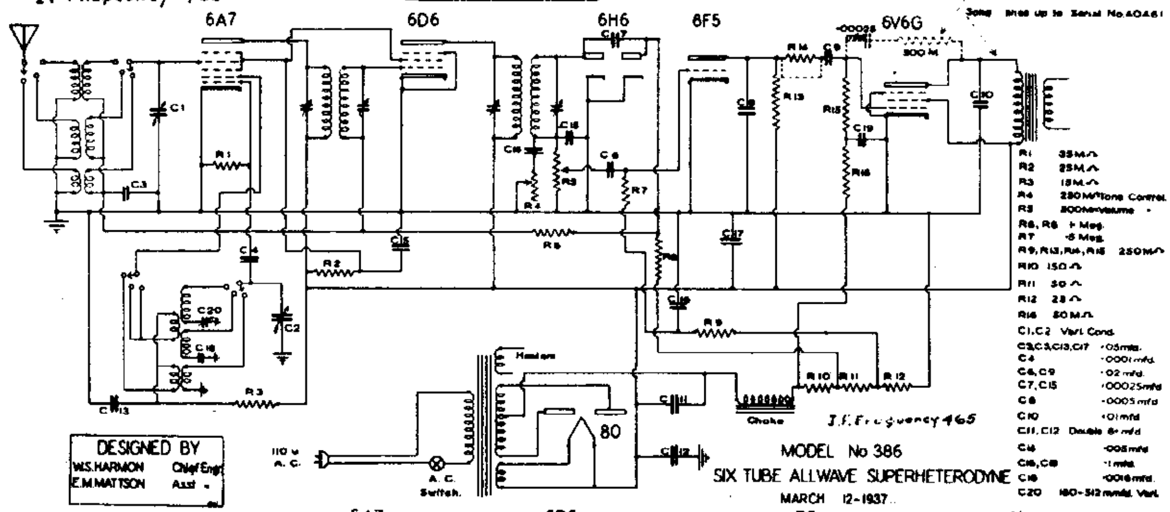
THE MIDWEST RADIO CORP.
909 Broadway Cincinnati, Ohio U.S.A.
SCHEMATIC DIAGRAM 14-Z-9

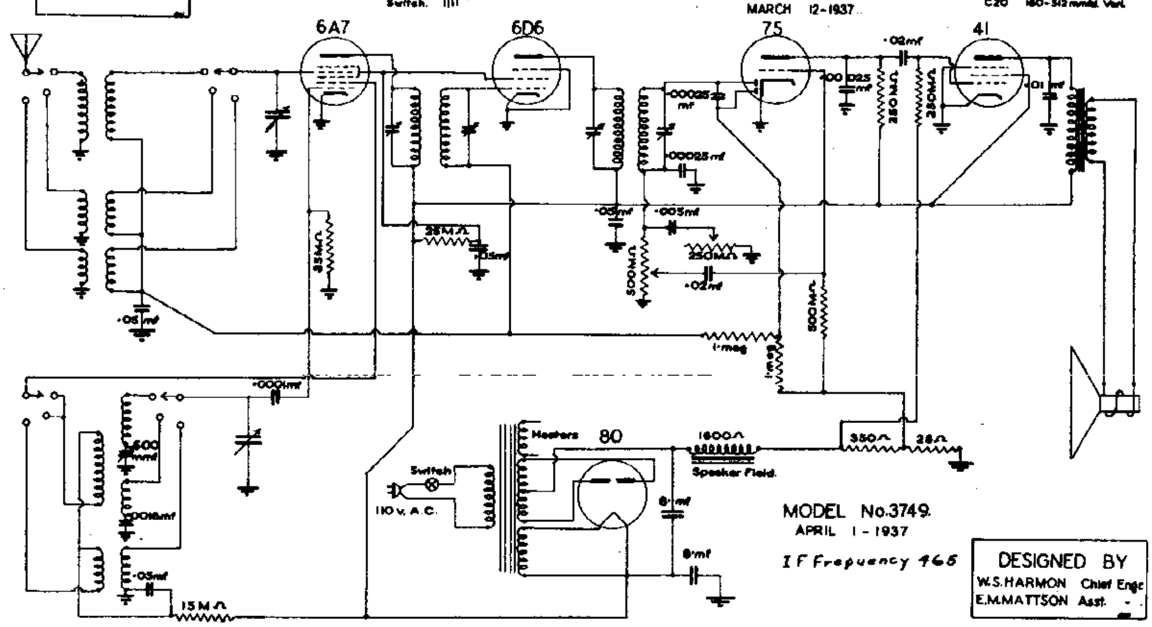
MODEL 3749
Schematics

MISSION-BELL RADIO MFG. CO., INC.

MODEL 384
384 Special
MODEL 386
Above, Below
Serial No. 40461

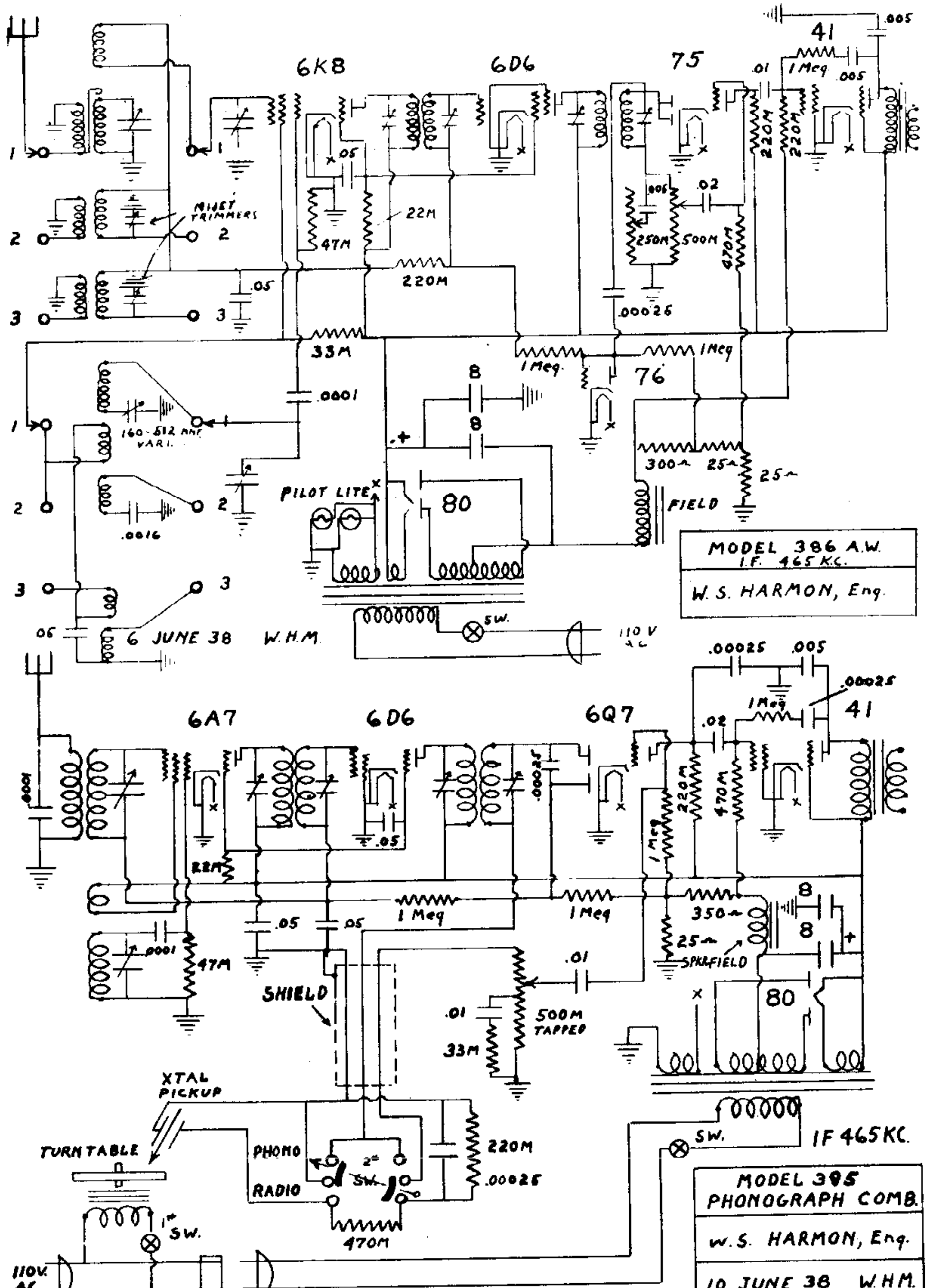






MODEL 386 AW
MODEL 395
Schematics

MISSION-BELL RADIO MFG. CO., INC.

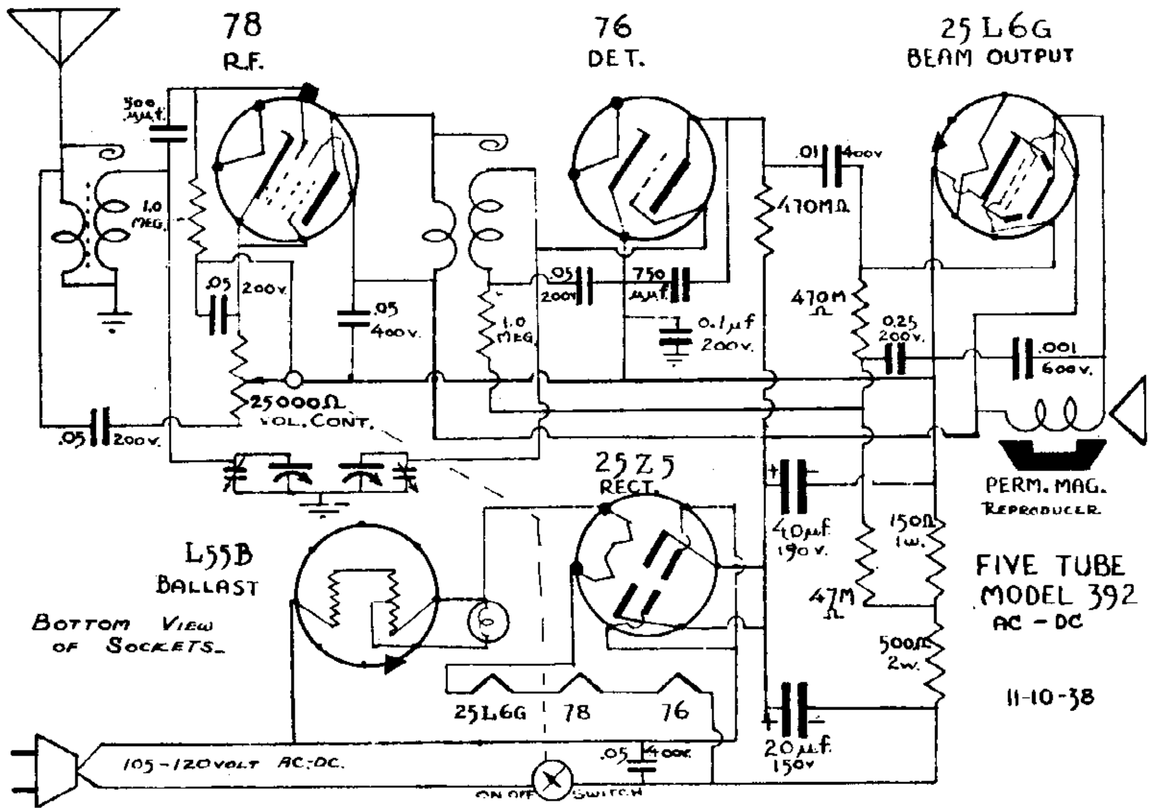


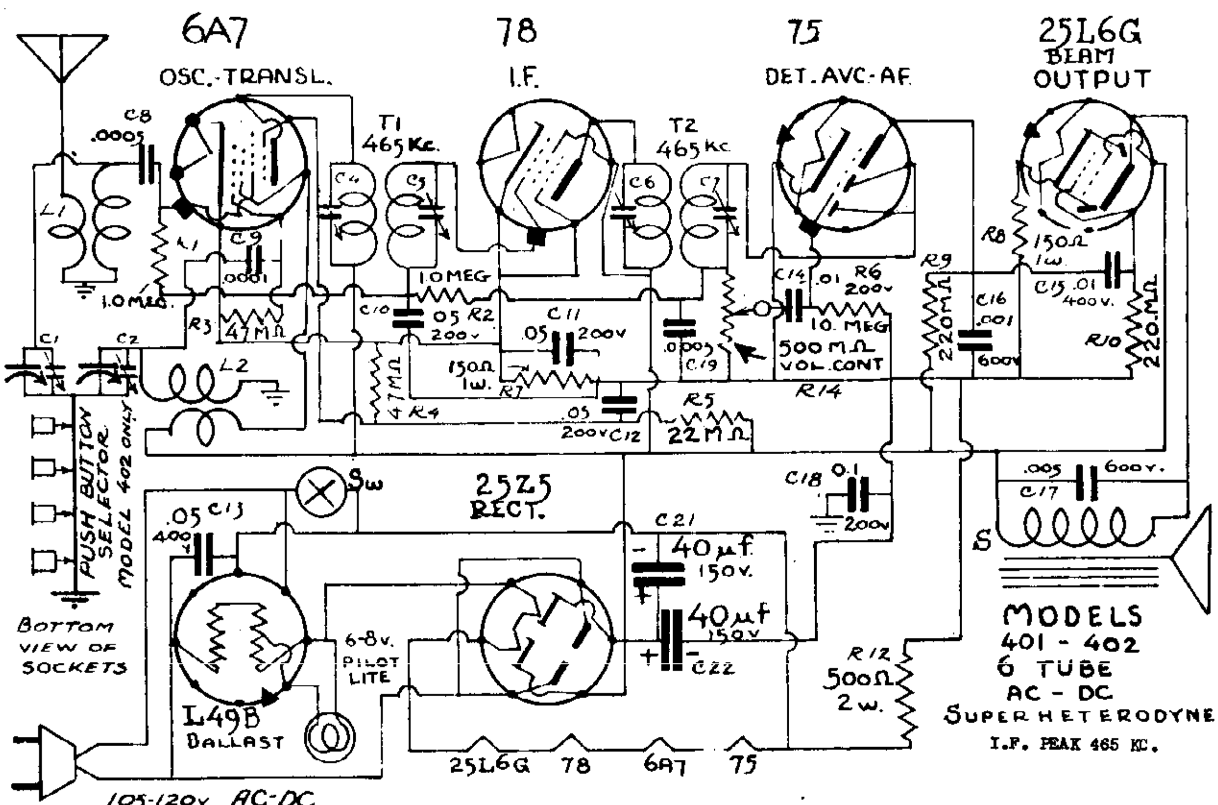
MODEL 386 A.W. I.F. 465 K.C.
W. S. HARMON, Eng.

MODEL 395 PHONOGRAPH COMB.
W. S. HARMON, Eng.
10 JUNE 38 W.H.M.

MISSION-BELL RADIO MFG. CO., INC.

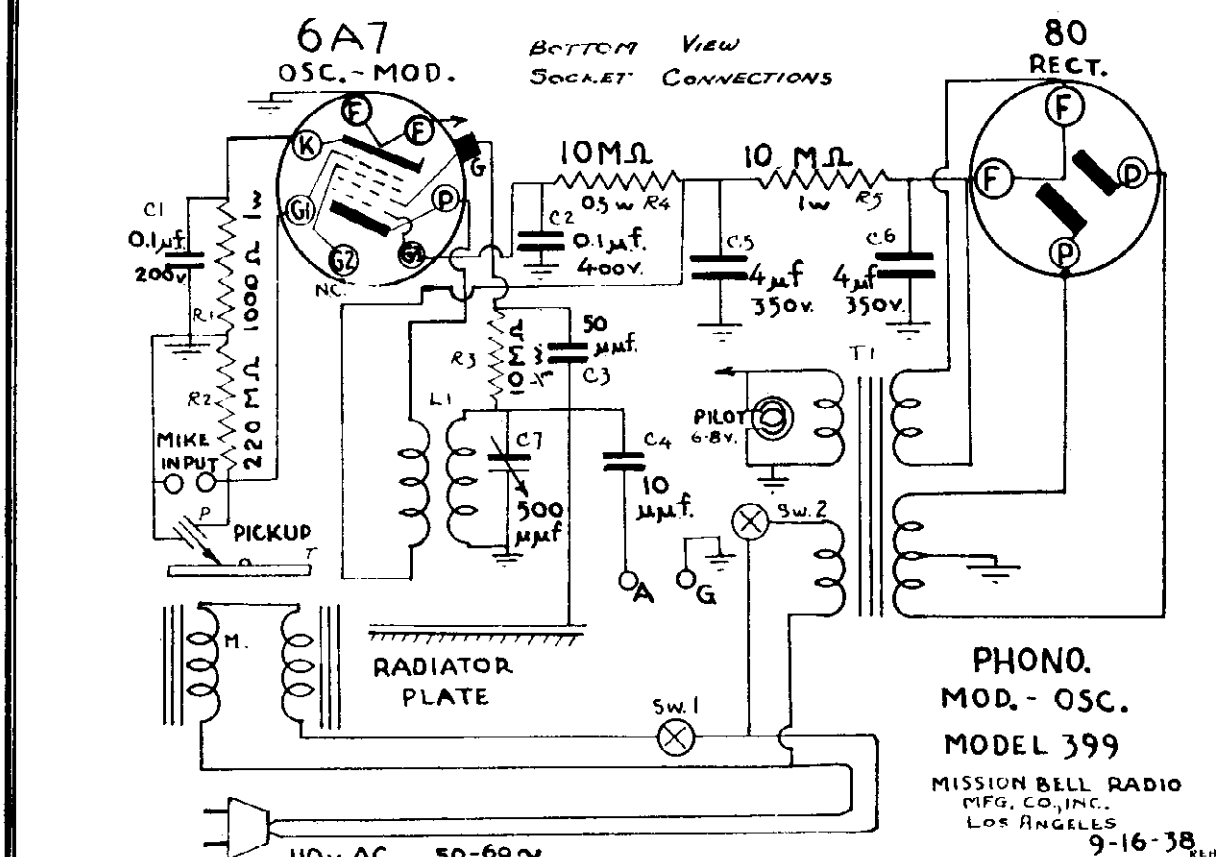
MODEL 392
MODELS 401,402
Schematics

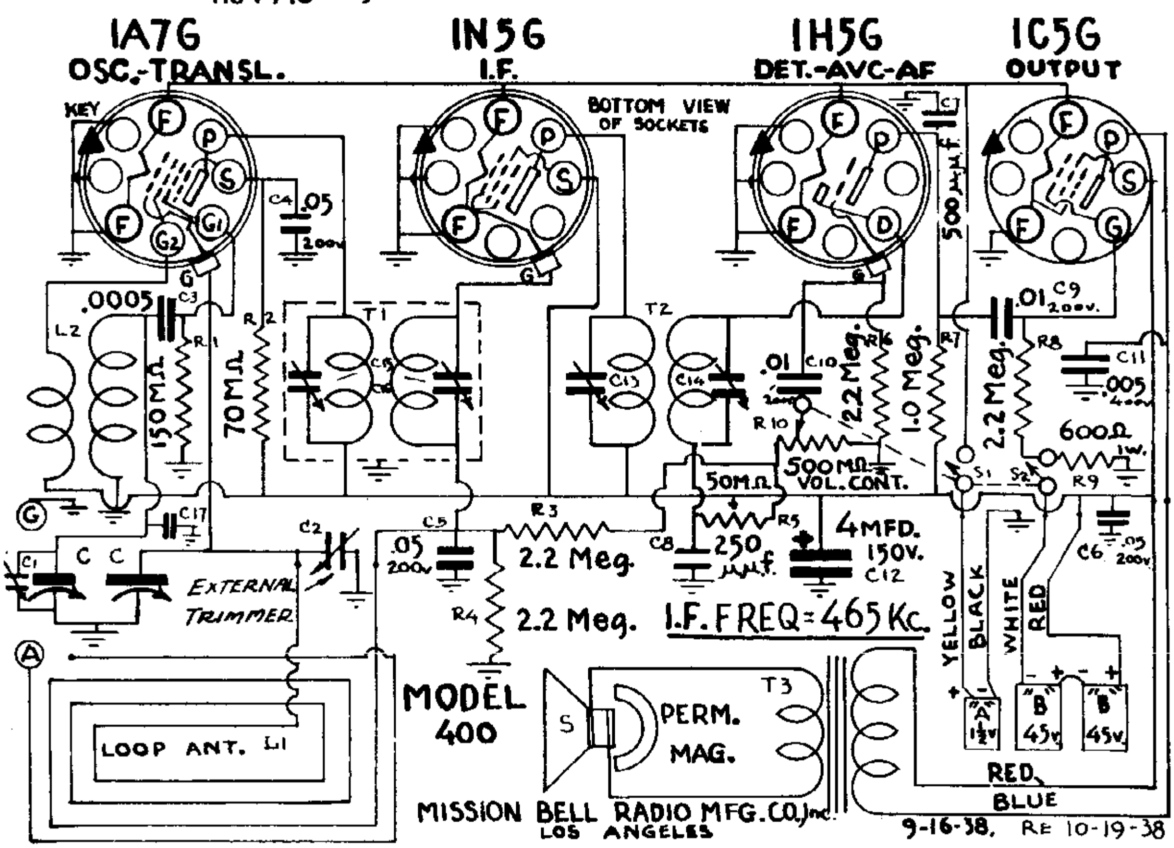




MODEL 399 Phono. Osc.
MODEL 400
Schematics

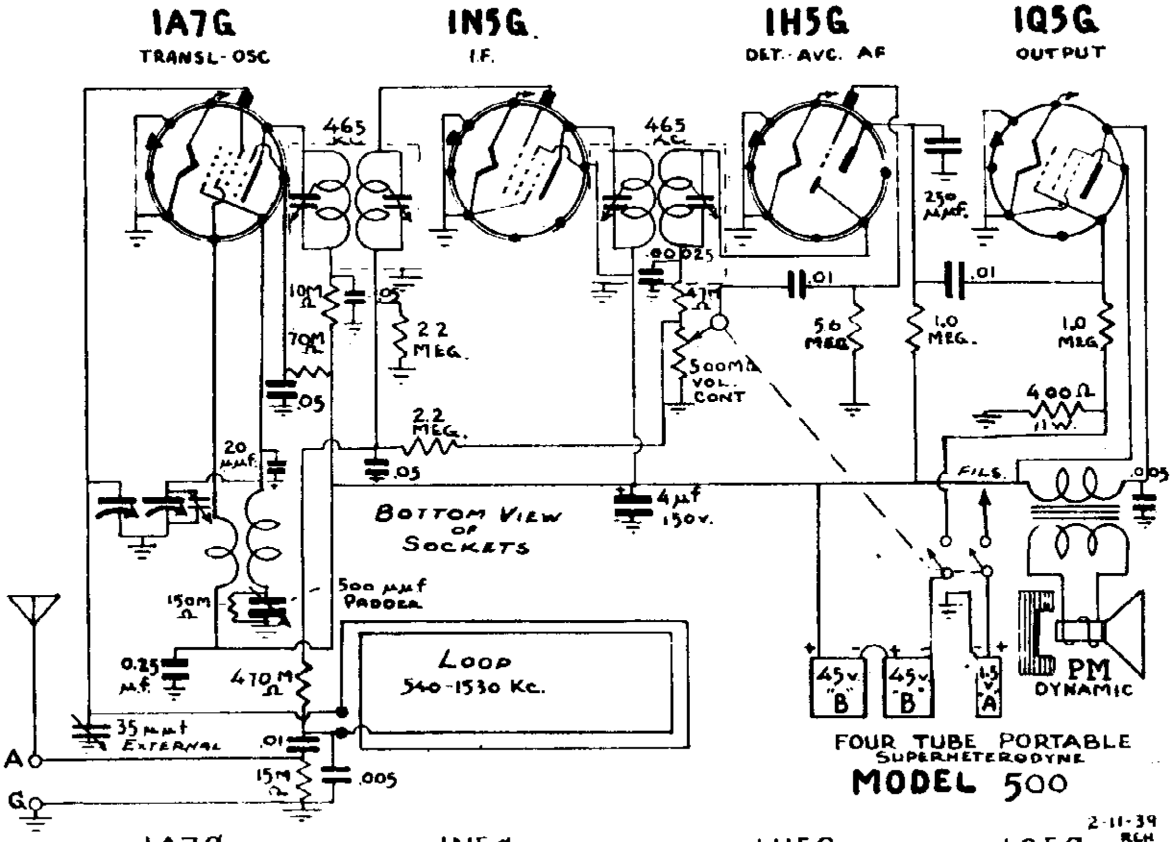
MISSION-BELL RADIO MFG. CO., INC.

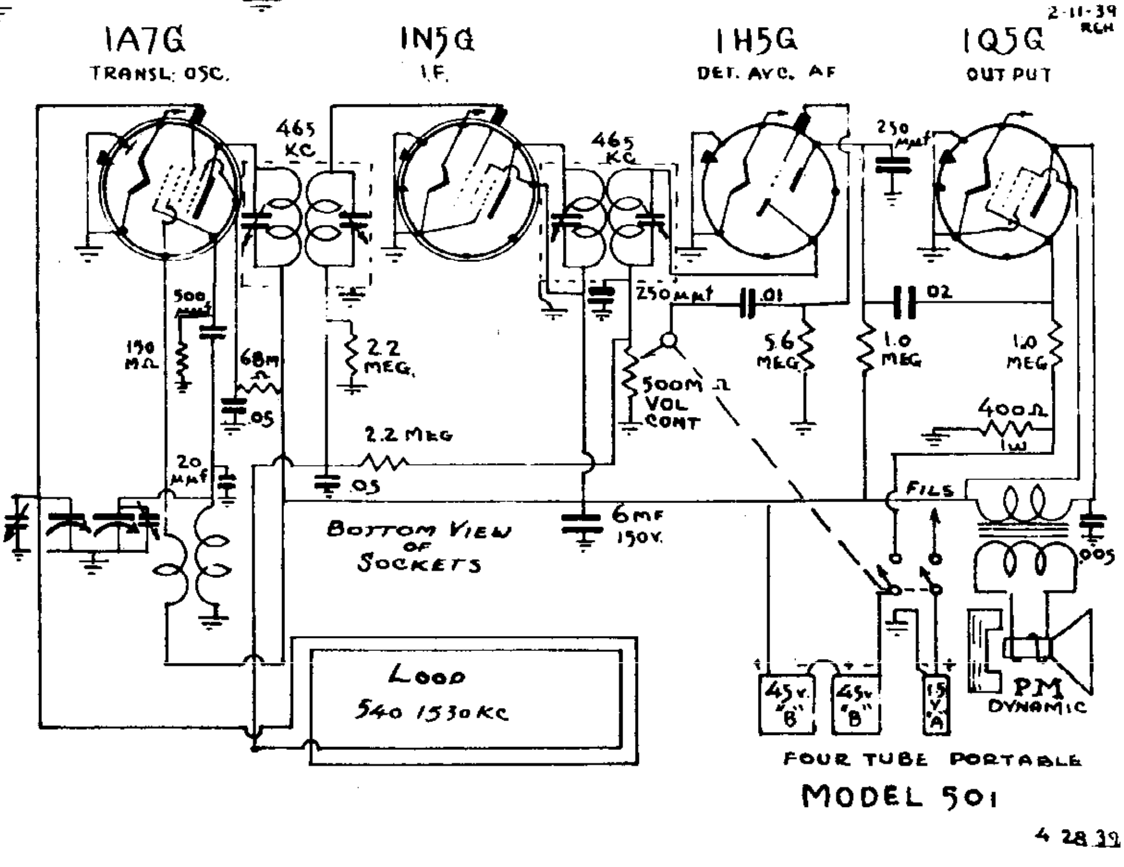




MISSION-BELL RADIO MFG. CO., INC.

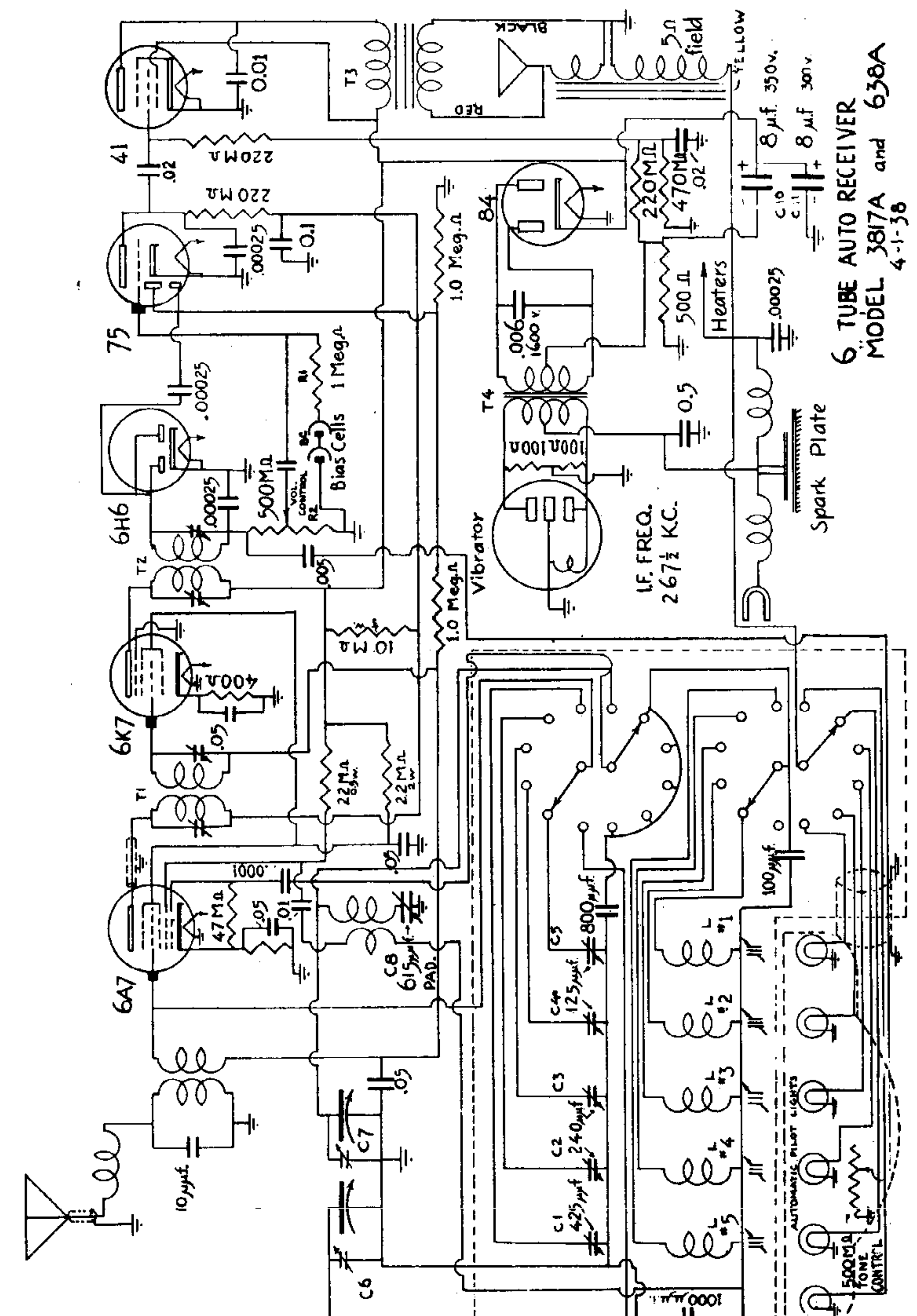
MODEL 500
MODEL 501
Schematics





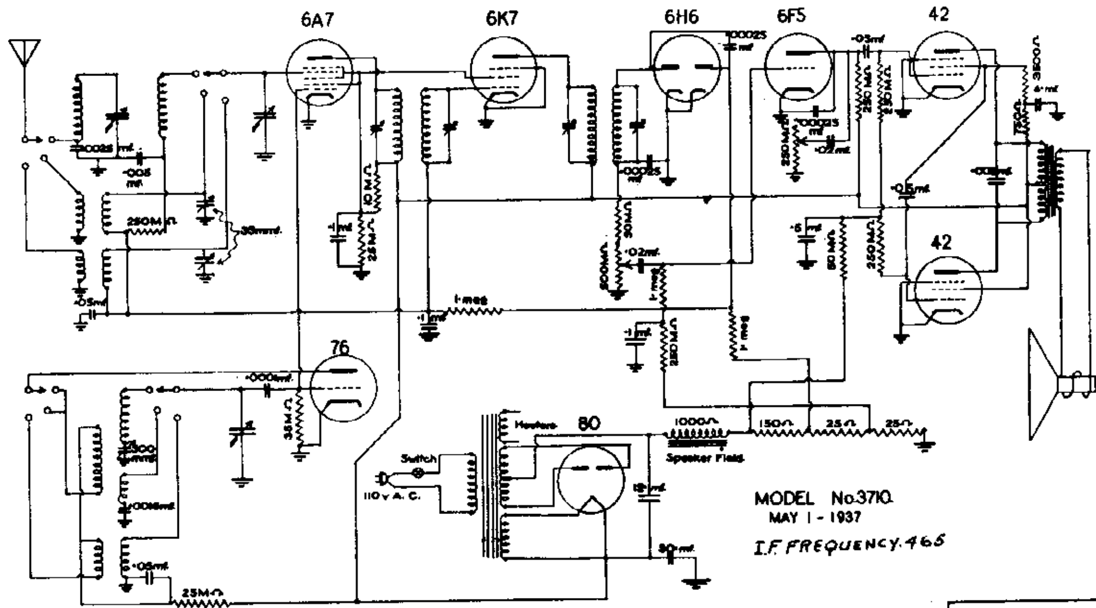
MODELS 638A, 3817A
Schematic

MISSION-BELL RADIO MFG. CO., INC.

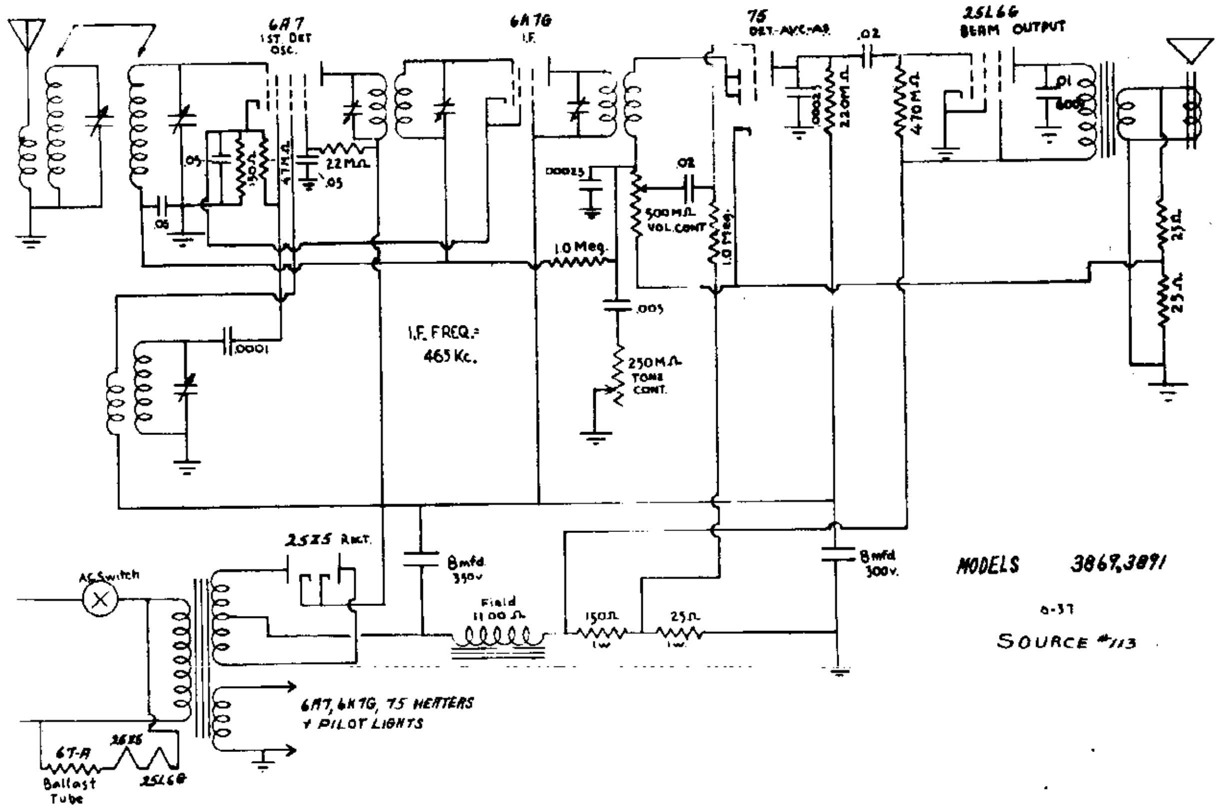


MISSION-BELL RADIO MFG. CO., INC.

MODEL 3710
MODELS 3869,3891
Schematics

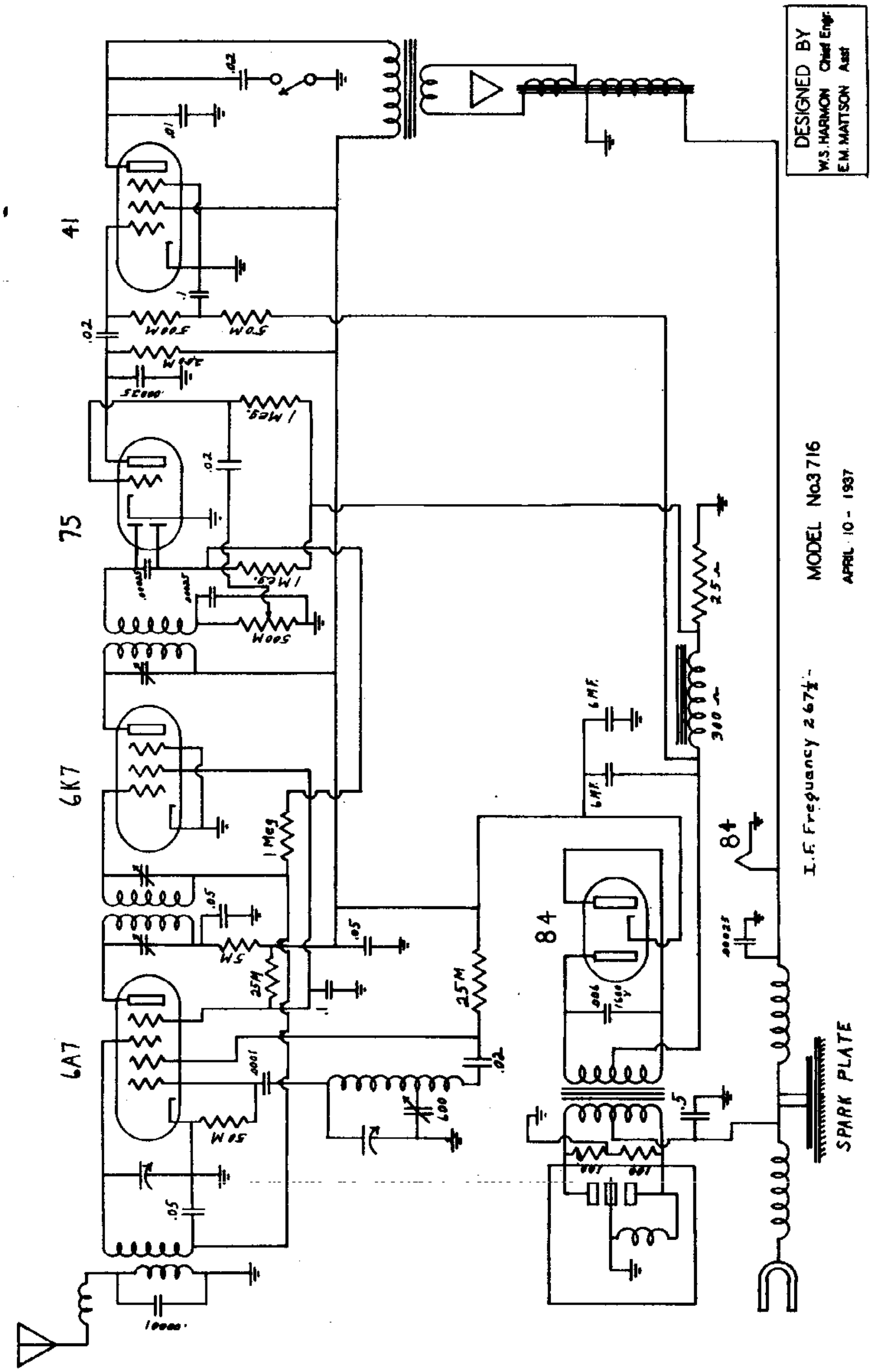


DESIGNED BY
W.S.HARMON Chief Engr.
E.M.MATTSON Asst.



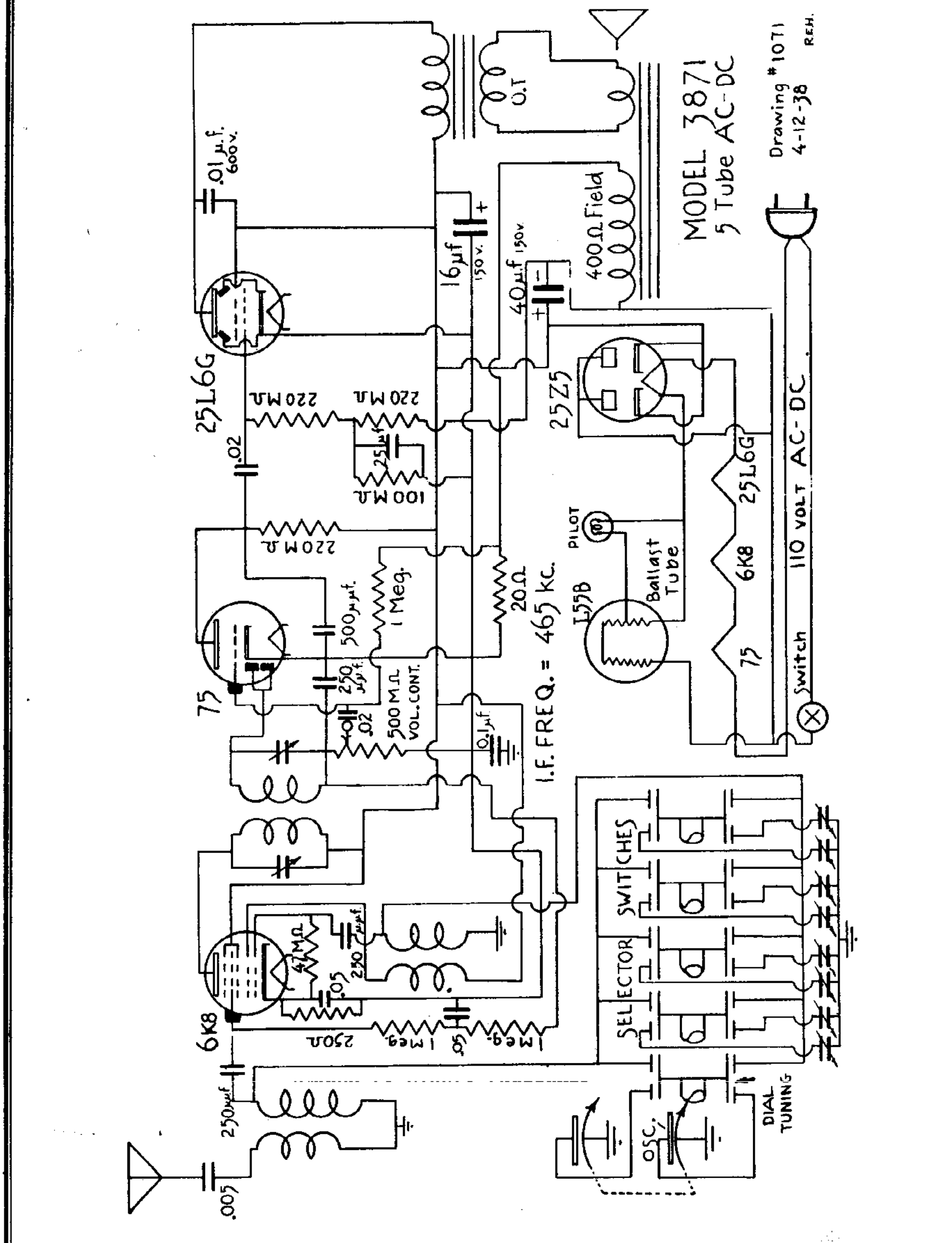
MODEL 3716
Schematic

MISSION-BELL RADIO MFG. CO., INC.



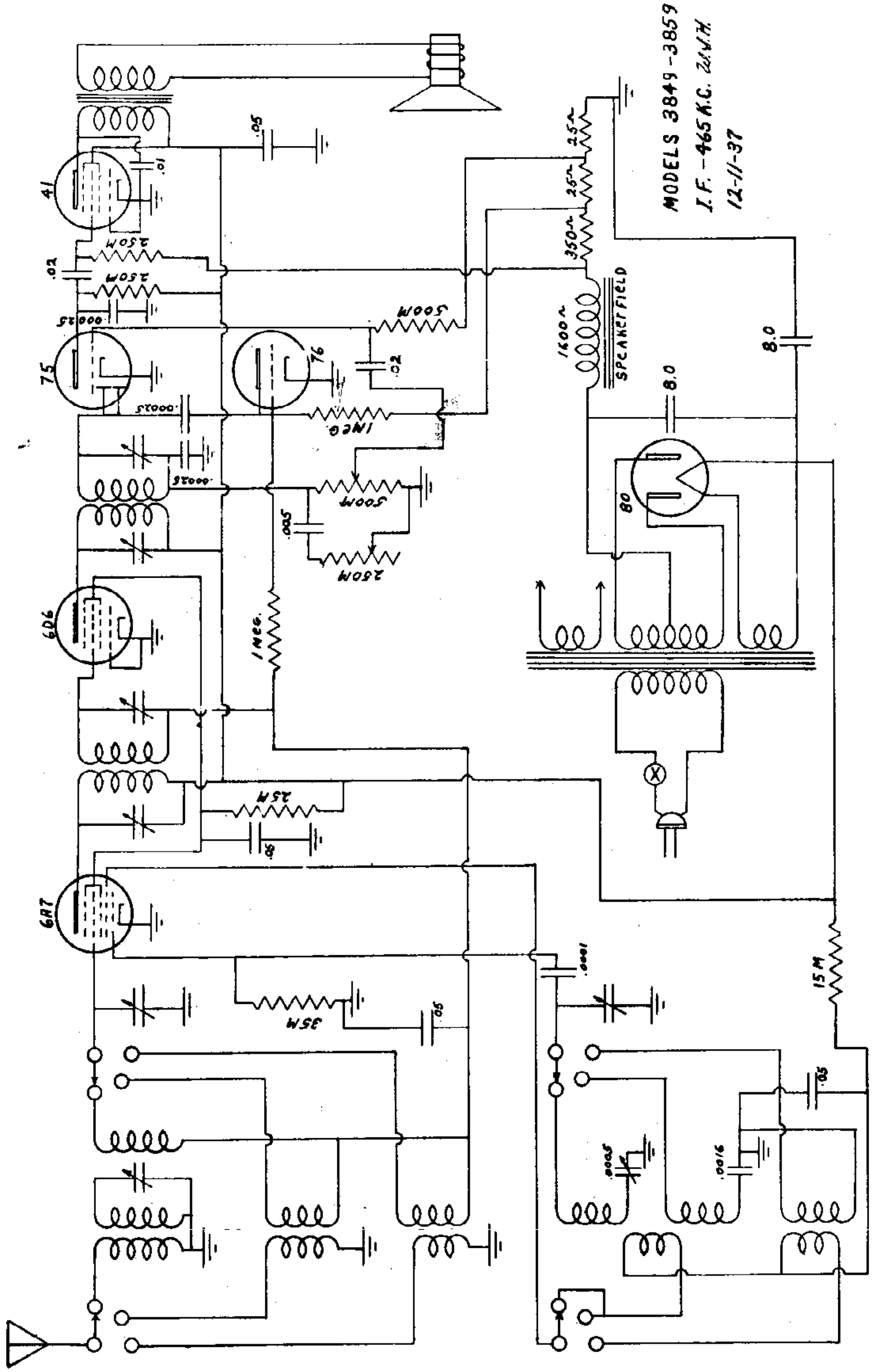
MISSION-BELL RADIO MFG. CO., INC.

MODEL 3871
Schematic



MODELS 3849,3859
Schematic

MISSION-BELL RADIO MFG. CO., INC.



Schematic, Spcket Trimmers, Alignment

MONTGOMERY-WARD & CO.

MODELS 62-123, 62-131 62-133, 62-142, 62-144 62-152, 62-158

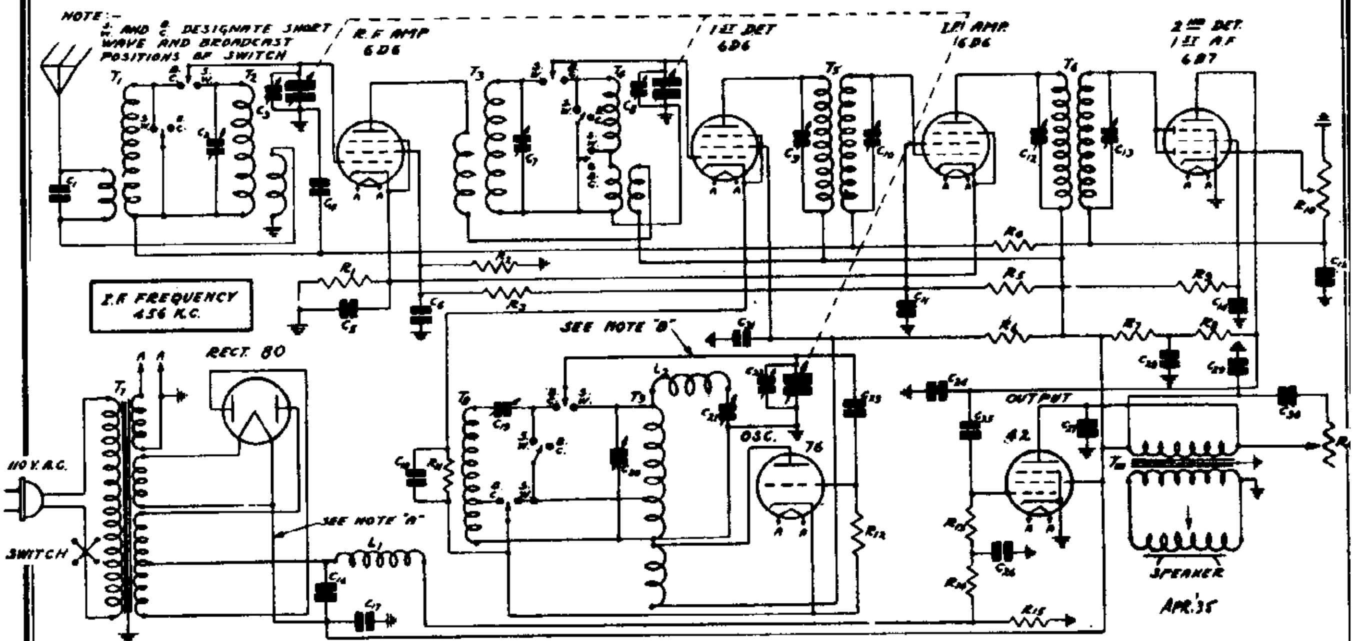


Fig. 1—Schematic Circuit Diagram

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to the trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.

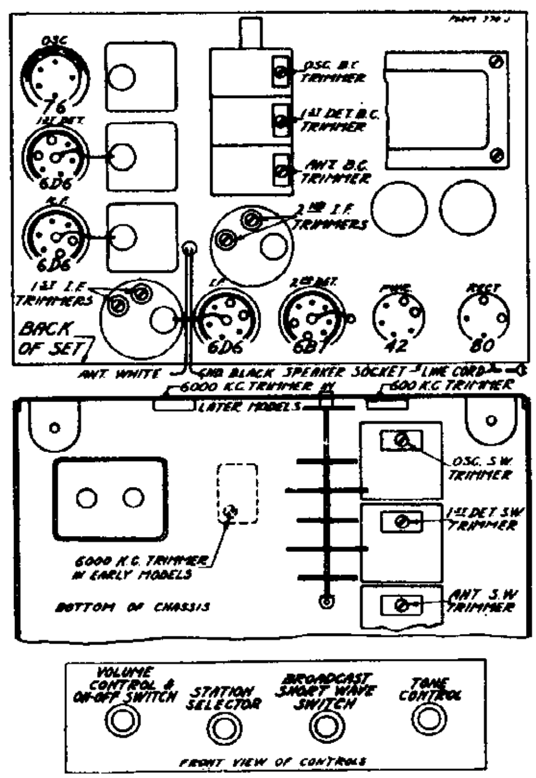


Fig. 2—Tube Arrangement and Location of Trimmers

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Attenuate the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the pointer screw and set the pointer at the 1500 K. C. mark on broadcast band scale. Retighten pointer screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over

MODELS 62-123, 62-131
62-133, 62-142, 62-144
62-152, 62-158

MONTGOMERY WARD & CO.

Alignment, Part 2
Voltage, Drive Data
Changes, Parts

this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be attenuated to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2.

Next set the signal generator for 15,000 K. C. Turn the rotor until the dial pointer is at the 15,000 K. C. mark on the short wave portion of the dial scale. Then adjust the antenna and 1st detector short wave trimmers until maximum output is obtained.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. In the first models of this receiver, this condenser was located at the point shown in Fig. 2 in dashed lines. In the later models it is reached through a hole in the front panel of the chassis as shown in the same illustration. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained. In the early models this adjustment is broad while in the later models it is more critical.

Caution

The can of electrolytic condenser C16 is not at ground potential. Therefore in any work on the chassis, care should be taken not to touch this can and any other grounded point such as the other electrolytic condenser can.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 3.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 3. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fils. or Heater	Plate to Cath.	Screen to Cath.	Control Grid to Cath.	Normal Plate M.A.
6D6	R. F.	6.3	246	100	3.6(1)	5.3
6D6	1st Det.	6.3	237	97	8.0(2)	3.4
76	Osc.	6.3	115		0	4.8
6D6	I. F.	6.3	246	130	3.6(1)	8.3
6B7	2nd Det.	6.3	50(3)	40(3)	0	2.7
42	Power	6.3	230	245	17.0(4)	33.0
80	Rectifier	5.0				37.0 per plate

(1) Cathode to ground
(2) Subject to variation
(3) Read with 1,000,000 ohm meter
(4) As read across R15

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

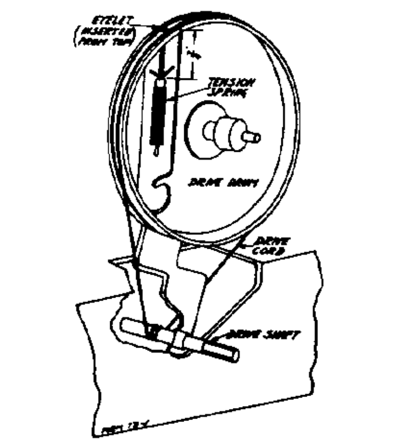


Fig. 3—Drive Cord Replacement

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 3.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¼" from the flange of the drum as shown in Fig. 3. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

Changes in Early Models

There are two points at which the early models of this receiver differ from the present models. These points are indicated in Fig. 1 and described below.

Power Unit

In the early models a separate filter choke was used in series at the point indicated in note A in Fig. 1. The values of the two filter condensers C16 and C17 were less than as used at present. The values of the old and new condensers are shown in the parts list. A different power transformer was also used with the early filter system and this is likewise shown in the parts list.

The two power transformers are not interchangeable and care must be taken in ordering for replacement purposes to order the correct one. The original chassis can be identified by the separate filter choke.

Short Wave Oscillator

Referring to Fig. 1 it will be noted that there is a tracking coil L2 and a trimmer condenser C21 connected in series between the short wave oscillator coil and ground. In the first models of this receiver these two units, which are required for tracking the short wave oscillator, are not used. Instead a series padding condenser was used at the point in the circuit indicated by note B in Fig. 1.

At the time this change was made a change was also made in the oscillator assembly and care must be taken in ordering for replacement purposes to order the correct one. Early models with the original oscillator assembly have no spot of paint or a green spot of paint on the 80 socket rivet. Later models with the new oscillator assembly and new tracking system have a red spot of paint on the 80 socket rivet.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty-cycle power supply. However, the reverse is not true, the sixty-cycle receiver cannot be operated from a twenty-five cycle power supply.

A 110-220 Volt, 40-60 cycle Power Transformer is also available for this model.

REPAIR PARTS LIST FOR 7 TUBE BROADCAST AND SHORT WAVE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

Part No.	Item	List Price
P-1441	Double Mounting Strip	.10
P-1421	Single Mounting Strip	.10
P-2080	Knob Small	.20
P-2062	Knob Large	.20
P-10337	Small Tone & Volume Control Disc	.10
P-20912	Pointer, Large	.20
P-2072	Pilot Light Bulb 6-8 volt	.15
P-10272	Rubber Mounting Feet	.10
P-10020	Glass Crystal	.15
P-20075	Crystal Retainer Ring	.10
P-2090	6" Speaker Mantel Sets L1 - 1250 ohm	6.00
P-2091	8" Speaker Console Sets L1 - 1250 ohm	6.75
	8" Black Drive Cord (V. C. or T. C. Ind.)	.05
	39" Black Drive Cord (Cond. Drive)	.10
P-2136	Pilot Lamp Socket & Clip Assembly	.10
P-2101	Broadcast-Short Wave Switch	1.05

Part No.	Item	List Price
P-1883	No. 6D6 Socket	$ .15
P-2022	No. 76 Socket	.15
P-1944	No. 6B7 Socket	.15
P-1884	No. 42 Socket	.15
P-2023	No. 80 Socket	.15
P-1612	Speaker Socket	.10
P-40445	Tube Shield for 6D6 & 6B7 Tubes	.15
P-40444	Tube Shield for 76 Tube	.15
P-40443	Tube Shield Bases	.10
*P-50634	Power Transformer 115 Volts, 60 Cycles	3.00
*P-50635	Power Transformer 115 Volts, 25 Cycles	4.50
*P-50636	Power Transformer 115-230 Volts, 40-60 Cycles	3.25
†P-50646	Power Transformer 115 Volts, 60 Cycles	3.25
†P-50647	Power Transformer 115 Volts, 25 Cycles	4.50
†P-50648	Power Transformer 115-230 Volts, 40-60 Cycles	3.75
*P-50637	Filter Reactor	.85
P-50699 A	Output Transformer T 10	1.15
P-5176	Antenna R.F. Trans. less can T1 & T2	1.00
P-5177	Inter-Stage R. F. Trans. less can T3 & T4	1.75
*P-5178	Oscillator Coil Assembly Less can T8 & T9	1.70
†P-5183	Oscillator Coil Assembly Less can T8 & T9	1.70
P-40433	Cans for the above Assemblies	.15
†P-5190	High Frequency Oscillator Tracking Coil L2	.33
P-5179	1st I. F. Assembly Complete with Can T5	2.15
P-5180	2nd I. F. Assembly Complete with Can T6	1.75
P-30342-A	Grid Cap Only	.10
P-70702	AC Cord & Plug	.70
P-1504	8 Terminal Mounting Strip	.10

Part No.	Code	Resistance	Watts	Type	List Price
P-98004	R1	200 ohm	.2	Flex. Wire Wound	$ .15
P-B93300	R2	30,000 ohm	.5	Carbon	.20
P-B94602	R3	6,000 ohm	.5	Carbon	.15
P-A95205	R4	2.0 megohm	.2	Carbon	.15
P-98050	R5	16,000 ohm	1.5	Armored wire wound	.65
	R6	25,000 ohm	1.0		
P-A94203	R7	20,000 ohm	.2	Carbon	.15
P-B94603	R8	60,000 ohm	.5	Carbon	.15
P-B94254	R9	250,000 ohm	.5	Carbon	.15
P-96014	R10	500,000 ohm		Vol. Control & Switch	1.06
P-A94252	R11	2,500 ohm	.2	Carbon	.15
P-A94304	R12	100,000 ohm	.2	Carbon	.15
P-A95304	R13	300,000 ohm	.2	Carbon	.20
P-A94104	R14	100,000 ohm	.2	Carbon	.15
P-98013	R15	235 ohm	2.0	Flex. Wire Wound	.15
P-97011	R16	150,000 ohm		Tone Control	.75

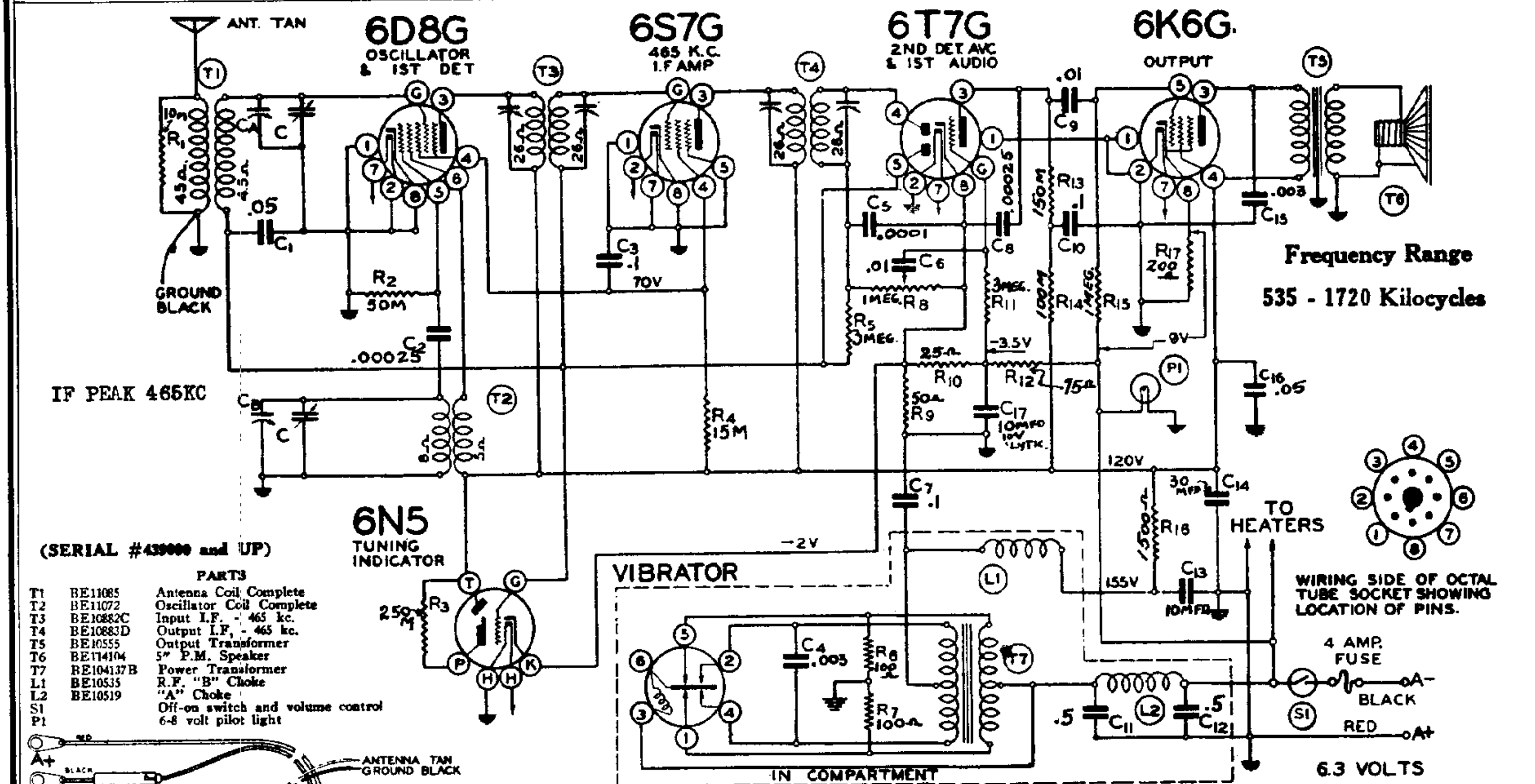
Part No.	Code	Capacity	Volts	Type	List Price
P-80019	C1	.00025 mfd.		Moulded	$ .20
P-2102	C2	3-40 mmfd.		Ant. S.W. Trimmer	.15
	C3	(See 3 Gang Cond.)		Gang Trimmer	
P-80862	C4	.05 mfd.	200V.	Tubular	.15
P-80886	C5	.25 mfd.	200V.	Tubular	.25
P-80890	C6	.05 mfd.	400V.	Tubular	.20
P-2102	C7	3-40 mmfd.		1st Det.S.W. Trim.	.15
	C8	(See 3 Gang Cond.)		Gang Trimmer	
P-1386-B	C9	90±30 mmfd.		Dual Trimmer Part of I. F. Assem.	
	C10	90±30 mmfd.			
P-81034	C11	.25 mfd.	200V.	Tubular	.20
P-1386-B	C12	90±30 mmfd.		Dual Trimmer Part of I. F. Assem.	
	C13	90±30 mmfd.			
P-81040	C14	.25 mfd.	400V.	Tubular	.35
P-80977	C15	.0001 mfd.		Moulded	.20
†P-81043	C16	18.0 mfd.	300V.	Electrolytic Wet	1.30
*P-80916	C16	8.0 mfd.	450V.	Electrolytic Wet	1.25
*P-82032	C17	8.0 mfd.	500V.	Electrolytic Wet	1.30
†P-81042	C17	14.0 mfd.	400V.	Electrolytic Wet	1.45
P-80862	C18	.05 mfd.	200V.	Tubular	.15
P-2112	C19	300-500 mmfd.		600 K.C. Trimmer	.46
P-2102	C20	3-40 mmfd.		Osc. S.W. Trimmer	.15
†P-1683	C21	70±30 mmfd.		6000 K.C. Trimmer	.35
	C22	(See 3 Gang Cond.)		Gang Trimmer	
P-81005	C23	.000005 mfd.		Moulded	.15
P-80914	C24	.002 mfd.	600V.	Tubular	.20
P-80981	C25	.01 mfd.	400V.	Tubular	.20
P-81044	C26	.03 mfd.	400V.	Tubular	.15
P-80914	C27	.002 mfd.	600V.	Tubular	.20
P-81033	C28	.25 mfd.	400V.	Tubular	.35
P-80887	C29	.1 mfd.	400V.	Tubular	.20
P-80890	C30	.05 mfd.	400V.	Tubular	.20
P-80887	C31	.1 mfd.	400V.	Tubular	.20
P-81027-B		3 Gang Condenser			3.25
*P-2113		600-1300 mmfd.		6000 K.C. Trimmer	.62

* Used in early Models. See Article on changes in this Manual
† Used in Later Models. See Article on changes in this Manual

Schematic, Voltage, Socket Trimmers, Alignment

MONTGOMERY WARD & CO.

MODELS 62-280, 62-282, 62-284 Series B, Above Ser. 439000



(SERIAL #439000 and UP)

PARTS

T1	BE11085	Antenna Coil Complete
T2	BE11072	Oscillator Coil Complete
T3	BE10882C	Input I.F. - 465 kc.
T4	BE10883D	Output I.F. - 465 kc.
T5	BE10555	Output Transformer
T6	BE114104	5" P.M. Speaker
T7	BE104137B	Power Transformer
L1	BE10535	R.F. "B" Choke
L2	BE10519	"A" Choke
S1		Off-on switch and volume control
P1		6-8 volt pilot light

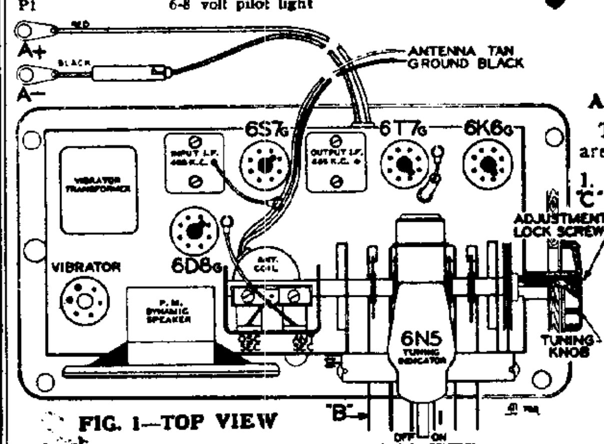


FIG. 1—TOP VIEW

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-83D) to resonance.

(b) Move oscillator output clip from grid of 6S7G to grid of 6D8G and adjust input I.F. transformer (No. 108-82C) to resonance.

(c) With oscillator still connected to 6D8G, readjust output I.F. transformer (108-83D) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.):

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).

(b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).

(c) Check sensitivity at 600 and 1000 kilocycles.

MODELS 62-280,62-282,62-284
MODELS 62-323,62-353
MODEL 62-324
MODEL 62-453
MODEL 62-459
MODELS 62-501,62-502
MODELS 62-504,62-505
TUNER DATA

MONTGOMERY WARD & CO

MODEL 62-552
MODEL 62-553
MODELS 62-558,62-1558,62-2558
MODEL 62-601
MODELS 93BR508A,93BR509A
MODEL 93BR564A
Tuner Data

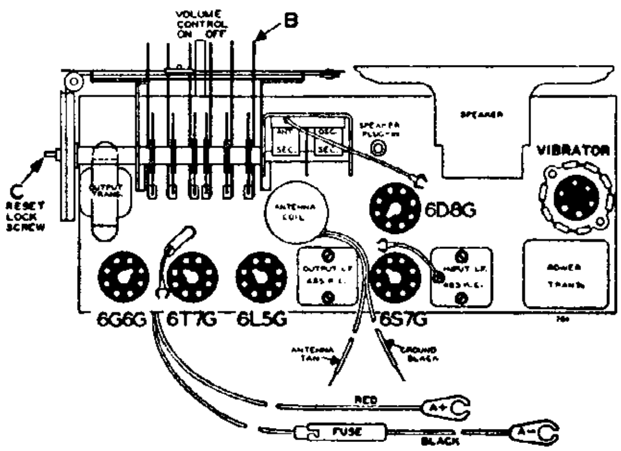


FIG. 1—TOP VIEW

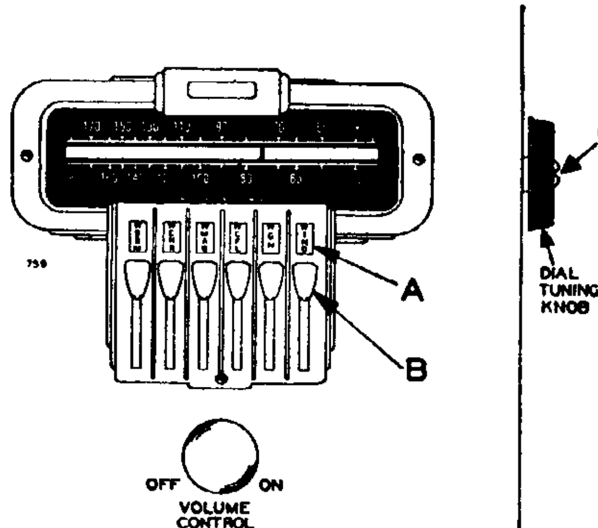


FIG. 2—FRONT VIEW

OPERATION:

The two control knobs in sequence from left to right are (see Fig. No. 2)

Knob 1, Volume Control and On-Off Switch.
Knob 2, Tuning Knob. (Side of Cabinet).

KNOB 1. VOLUME CONTROL AND "ON"-"OFF" SWITCH ARE COMBINED:

When turning on, a click will be heard and the dial will light. Wait approximately 45 seconds for the tubes to heat up. Turn knob all the way to the left to turn set off.

KNOB 2. MANUAL TUNING:

This radio may be used to tune in stations either by the conventional manual method or by using the Automatic levers. The tuning range of the radio is from 535 to 1735 kilocycles, the dial being calibrated in channel numbers. It covers all standard broadcast channels and one police band.

To convert channel numbers to kilocycles, add one zero. For example, 170 is 1700 kilocycles.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected, (See "B," Fig. 2).

Press down any one of the six Automatic levers. Holding it down, tune in by means of tuning knob No. 2 any one of your favorite stations. Turn the tuning knob very slowly back and forth until signal is clearest. The stations will then be accurately tuned in.

Release this lever and press down any other Automatic lever. Hold this lever down and tune in by means of knob No. 2 another favorite station.

Follow this procedure until stations have been set on all the levers. Hold tuning knob securely with left hand to prevent it from turning and with a coin or screw driver, tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

This screw will lock in place all stations you have selected on the Automatic levers. (Note: Locking Screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob securely and loosen locking screw ("C") one or two turns; select the new station as explained.

BE SURE TO RETIGHTEN THE LOCKING SCREW, otherwise the stations will not stay adjusted to the levers.

Above each Automatic lever an opening in the escutcheon is provided for inserting station call letters, (See "A," Fig. 2).

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the rectangular openings in the escutcheon above each of the levers. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

The Automatic Tuner dial is now set up for quick tuning. Press down on the lever and your favorite station is selected.

TYPICAL TUNING DATA

The procedure for setting the Automatic Levers is the same for all the above mentioned models. However, the number of Automatic Levers may differ.

The locking screw "C" and automatic levers shown in both figs 1 and 2 are for the Model 62-552 receiver. However, this is a typical receiver.

MODELS 62-292,62-294
62-373,62-374
Schematic

MONTGOMERY-WARD & CO.

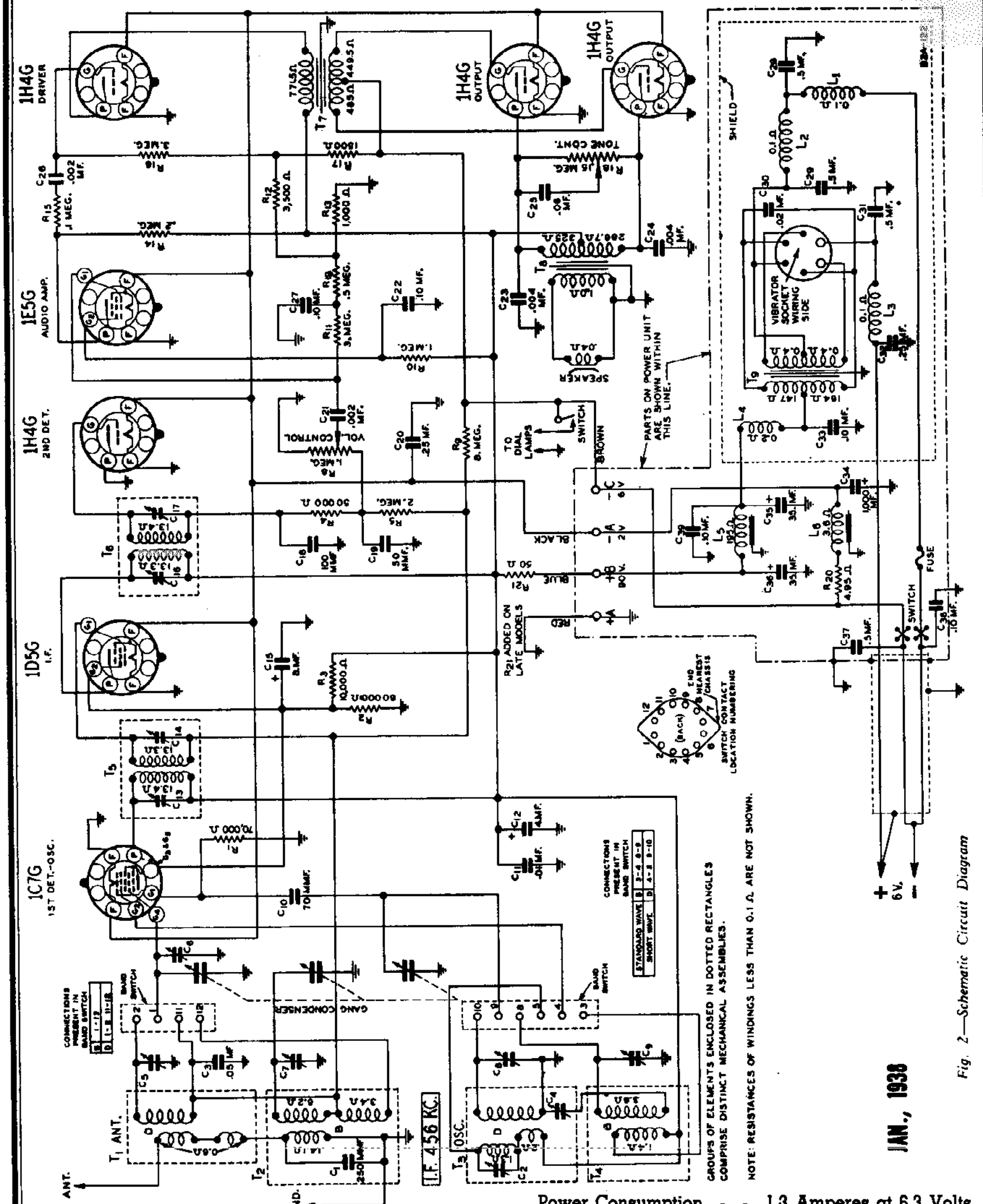


Fig. 2—Schematic Circuit Diagram

Sensitivity

B Range.......13.5 Microvolts Average
D Range.......21.0 Microvolts Average

Tuning Frequency Range

B Range.......528 to 1730 KC
D Range.......5750 to 18300 KC

Power Consumption - - 1.3 Amperes at 6.3 Volts

Power Output - - - - - 360 Milliwatts Undistorted
725 Milliwatts Maximum

Selectivity - - 35 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - - 456 KC

Speaker - - - - 6" P.M. Dynamic—Mantel Models
8" P.M. Dynamic—Console Models

MODELS 62-292, 62-294
62-373, 62-374
Alignment, Voltage

MONTGOMERY-WARD & CO.

Coils, Socket, Trimmers
Drive Data, Notes

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.	Range B	.1 mf.	466 KC	Grid of 1st Det.	1st I.F. (C13) & (C14) 2nd I.F. (C16) & (C17)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B 1730 KC	Range B	200 mmf.	1730 KC	Antenna Lead	Oscillator Range B (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C6)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C4)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
RANGE D 18300 KC	Range D	400 Ohm	18300 KC	Antenna Lead	Oscillator Range D (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
15000 KC	Range D.	400 Ohm	15000 KC	Antenna Lead	Ant. Range D (C5)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
6000 KC	Range D	400 Ohm	6000 KC	Antenna Lead	6000 KC (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B

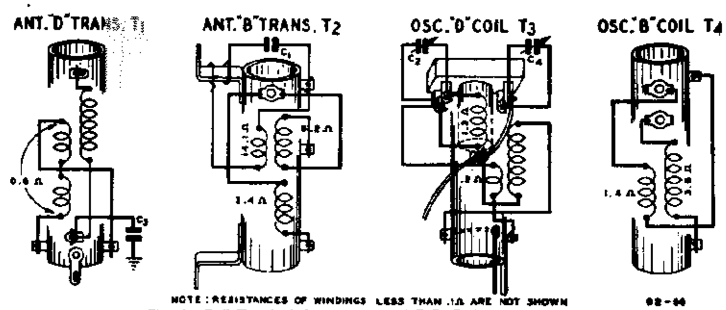


Fig. 6—Coil Terminal Arrangement and D.C. Resistance of Windings

NOTE A—In sets using the finger tip tuning dial, remove the retaining ring which holds the dial scale in position. Readjust rotor to maximum output. Hold the station selector ring and turn the dial scale until the pointer is at the 1500 KC mark. Replace the retaining ring.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

VOLTAGES AT SOCKETS

Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Band Switch in Standard Wave Position

TUBE	FUNCTION	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Control Grid Bias
		VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)						
1C7G	1st Det.—Osc.	0	103	66		103	2	
1D5G	I.F.	0	103	66			2	
1H4G	2nd Det.	0	0				2	
1E5G	Audio Amp.	0	40(1)	19(1)			2	1.0 Across R13
1H4G	Driver	0	100				2	4.5 Across R12 & 13
1H4G	Output	0	102		6		2	6 —C to Ground

(1) As read on 1000 volt scale.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

If, after a new 2 section dry electrolytic condenser has been installed, vibrator hash is encountered, reverse the connections of the 2 sections.

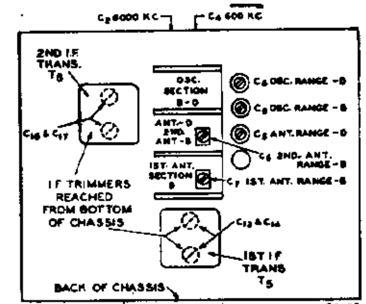


Fig. 3—Location of Trimmers

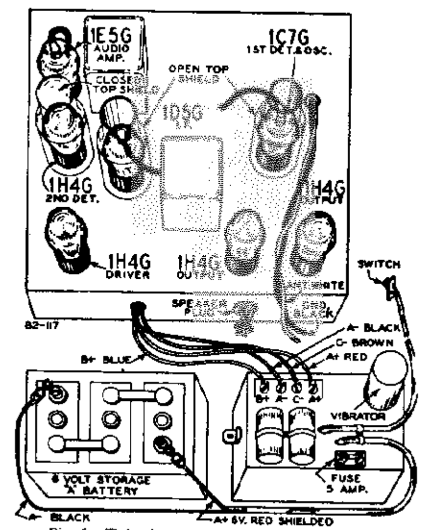


Fig. 5—Tube Arrangement and Battery Connections

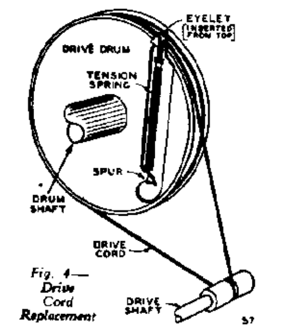


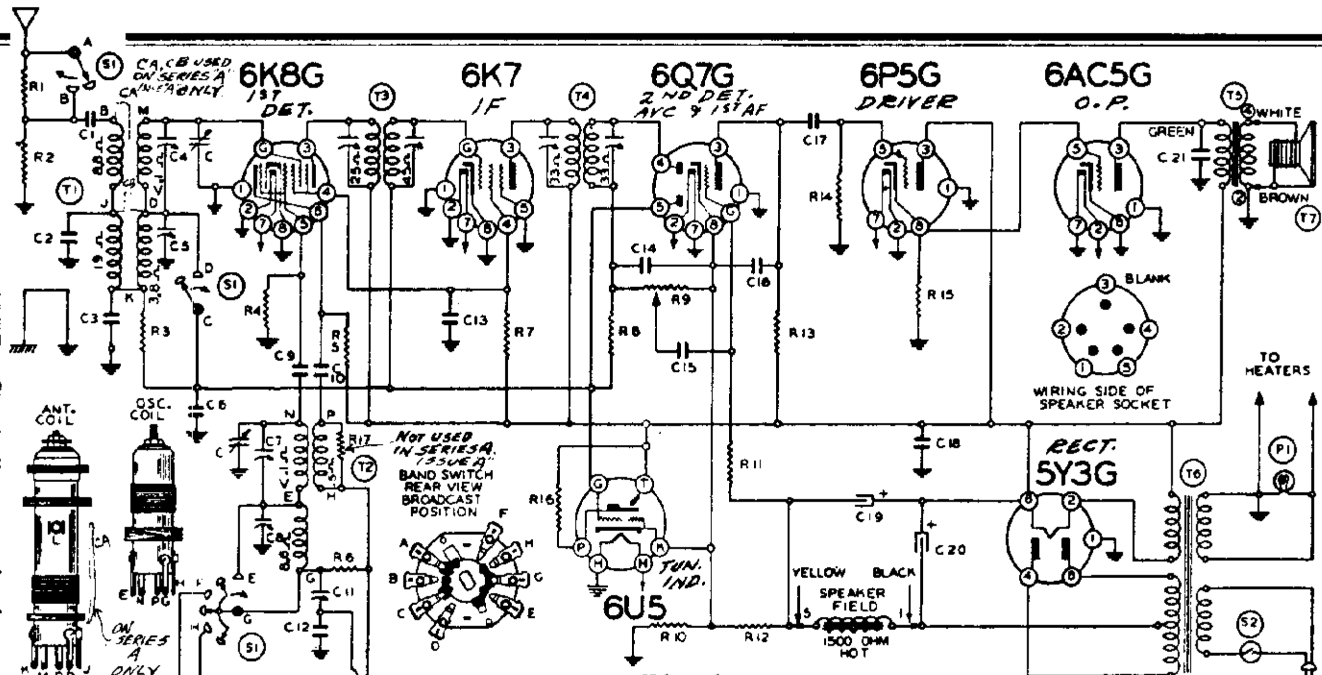
Fig. 4—Drive Cord Replacement

Schematic, Voltage
Socket, Trimmers

MONTGOMERY WARD & CO.

MODELS 62-323, 62-353
Series A, Issue A
Ser. 8J305400 up
Issue B, Ser. 9B613100 up

Power Consumption .... 55 Watts (at 115 Volts 60 Cycles)
Power Output .... 1.5 Watts Undistorted, 3.2 Watts Maximum



I. F. Frequency 465 Kilocycles

FREQUENCY RANGE 540 to 1720 Kilocycles 5.45 to 18.3 Megacycles

C13	BE10053	.25 x 400 v.
C14	BE12939	.00005 Mica
C15	BE10011	.01 x 400 v.
C16	BE1292	.0005 Mica
C17	BE10011	.01 x 400 v.
C18	BE10013	.05 x 400 v.
C19	BE11963B	8 mfd.—350 w. v. lytic
C20	BE11963B	12 mfd.—350 w. v. lytic
C21	BE10089	.008 x 800 v.

C5 and C8 in same unit. C18 and C19 in same unit.

PARTS

T1	BE11193C	SW. BC. Antenna Coil Complete
T2	BE11089	SW. BC. Oscillator Coil Complete
T3	BE108105G	Input I. F.—465 kc.
T4	BE108106D	Output I. F.—465 kc.
T5	BE10575	Output Transformer
T6	BE104124B	Power Transformer
T7	BE114125	6" Speaker Dynamic (1500 ohm field)
S1	BE12554	Band Switch
S2	BE101126	Off-on Switch on volume control
P1	BE10794	6.3 v. Pilot Light T-44

CERTAIN PARTS ARE DIFFERENT IN THE TWO ISSUES. THESE DIFFERENCES ARE SHOWN BELOW.

FOR ISSUE "A" ONLY

CA		Adjustable Capacitor
CB		Adjustable Capacitor
R5	BE13017	10M ohm—½ w.
R10	BE130233	60 ohm—½ w.

FOR ISSUE "B" ONLY

R5	BE13065	30M ohm—1 w.
R10	BE130203	40 ohm—½ w.

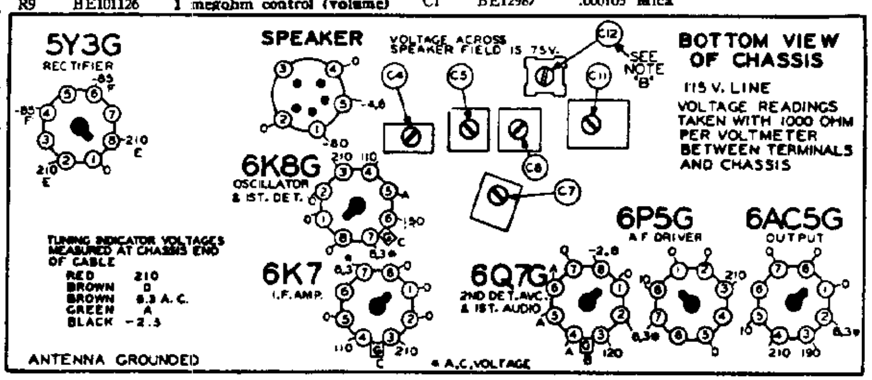
FOR SETTING UP PUSH BUTTONS, SEE INDEX.

THE FOLLOWING PARTS ARE COMMON TO BOTH ISSUES A AND B:

RESISTORS

R1	BE13041	800 ohm—½ w.
R2	BE13017	10M ohm—½ w.
R3	BE13020	100M ohm—½ w.
R4	BE13012	50M ohm—½ w.
R6	BE13031	1500 ohm—½ w.
R7	BE13042	20M ohm—½ w.
R8	BE1304	3 megohm—½ w.
R9	BE101126	1 megohm control (volume)
R11	BE1304	3 megohm—½ w.
R12	BE130203	40 ohm—½ w.
R13	BE1309	200M ohm—½ w.
R14	BE13019	1 megohm—½ w.
R15	BE130232	25M ohm—½ w.
R16	BE130110	1 Megohm (in Tuning Eye Socket)
R17	BE13023	2M ohm—½ w.
C	BE10274	2 gang variable condenser
C1	BE12987	.000105 Mica
C2	BE12949	.00009 Mica
C3	BE10077	.00304 x 600 v.
C4	BE12439	SW. Antenna Trimmer 2-25 mfd.
C5	BE12453	BC. Antenna Trimmer 1-10 mmfd.
C6	BE10022	.05 x 400 v.
C7	BE12439	SW. Oscillator Trimmer 2-25 mmfd.
C8	BE12453	BC. Oscillator Trimmer 2-25 mmfd.
C9	BE12938	.00005 Mica
C10	BE10025	.002 x 600 v.
C11	BE12451B	350 mmfd. W.C. B.C. Series Pad
C12	BE129112	.0041 Compression Type (Short Wave Osc. Pad)

REPAIR PARTS
Series A Issue A
(Serial No. 8J305400 and up)
Series A, Issue B
(Serial No. 9B613100 and up)



A - CANNOT BE MEASURED WITH VOLTMETER.
B - BIAS OF -1.8V READ ACROSS R-12
C - BIAS OF -2.8V READ ACROSS R-10
E - 5V AC READ ACROSS TER. 2 & 8
F - 560V AC READ ACROSS TER. 4 & 6

REAR OF CHASSIS

NOTE "B" Trimmer (C12) is the short wave osc. series pad. It is preadjusted at the factory and should not be tampered with.

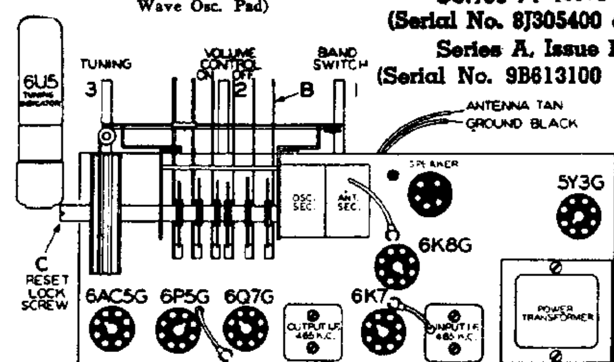


FIG. 1—TOP VIEW

NOTE: Circuit diagram and voltage chart indicate connections and voltage measurements for the cathode-ray tuning eye tube type 6U5. This data only applies to the model 62-323; the model 62-353 is not equipped with a cathode-ray tuning eye.

Feb. '39

MODELS 62-323, 62-353
Series A, Issues A, B
Alignment, Notes

MONTGOMERY WARD & CO.

MODEL 62-380, Series A
Alignment, Socket
Trimmers

MODELS 62-323, and 62-353 Series A, Issues A & B

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short wave (Extreme right rotation)	Set dial at 17 MC	Trimmer (C 7) (See Fig. 3)	Short wave Oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short wave (Extreme right rotation)	Dial set at 17 MC	Trimmer (C 4) (See Fig. 3)	Short wave Antenna	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer (C 8) (See Fig. 3)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 1400 Kc.	Trimmer (C 5) (See Fig. 3)	Broadcast Antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 600 Kc.	Trimmer (C 11) (See Fig. 3)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
IMAGE REJECTION ADJUST-MENTS	2300 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Pick up signal at 1170 Kc. on dial	Wire capacitor (CB) (See circuit diagram)	Image rejection	Adjust by twisting for minimum output. (See note "B")
	2600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Pick up signal at 1700 Kc. on dial	Wire capacitor (CA) (See circuit diagram)	Image rejection	Adjust by moving for minimum output. (See note "C")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

- Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
- After each band is completed, repeat the procedure as a final check.

ISSUE "A" ONLY.

NOTE "B" 2300KC is the image frequency of 1170 KC. Adjust wire capacity (CB) by twisting the two wires until a minimum output is obtained.
NOTE "C" 2600KC is the image frequency of 1700KC. Adjust wire capacity (CA) by moving the wire either toward or away from the antenna coil winding until a minimum output is obtained on the output meter.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.
All voltages as indicated on the voltage chart are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.
Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded

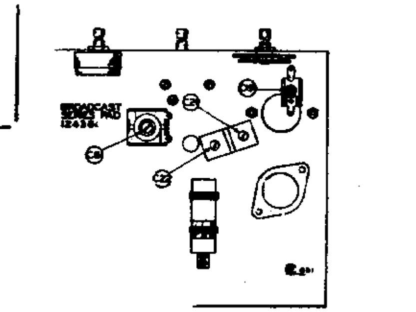


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

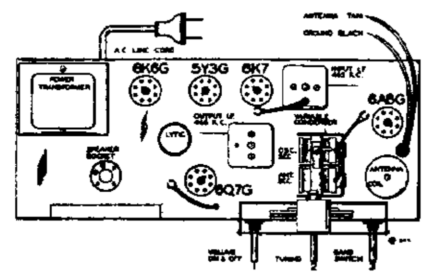


FIG. 1—TOP VIEW

ALIGNMENT PROCEDURE MODEL 62-380 Series A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6A8	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set dial at 17 MC.	Trimmer—Top of rear section of gang. (See Fig. 1)	Short wave Oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Dial set at 17 MC.	Trimmer (C30) (See Fig. 3)	Short wave Antenna	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer (C32) (See Fig. 3)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 1400 Kc.	(Trimmer (C31) (See Fig. 3)	Broadcast Antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 600 Kc.	Trimmer (C33) (See Fig. 3)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

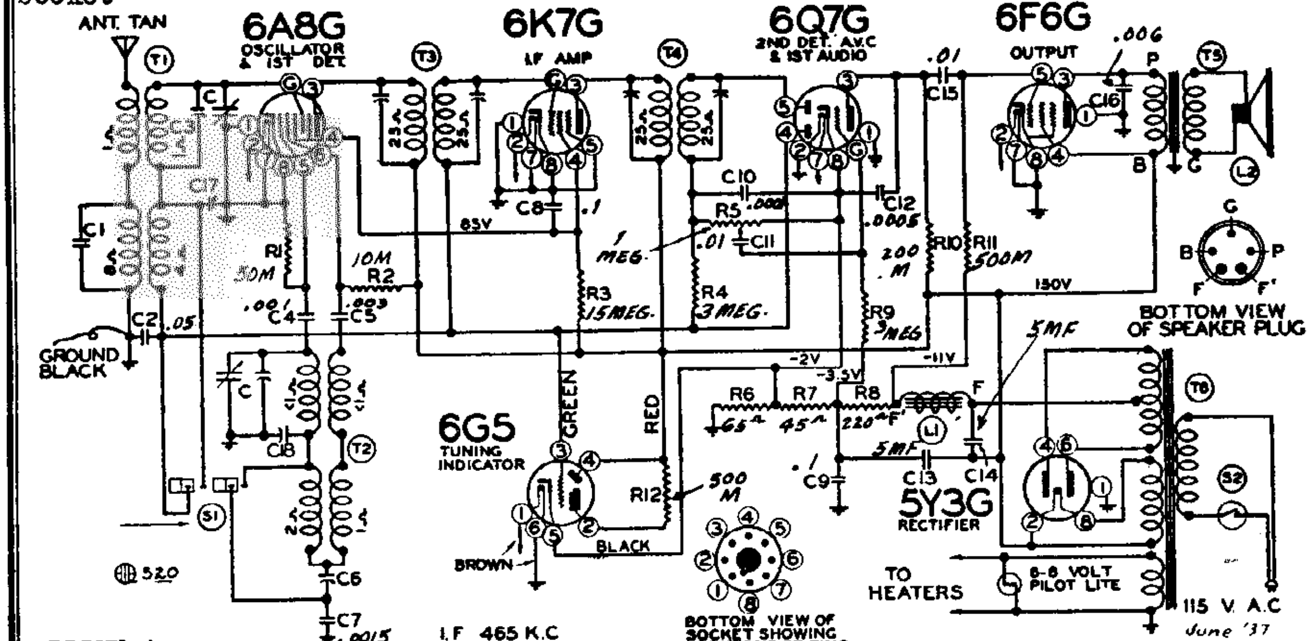
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

Schematic, Voltage, Trimmers, Alignment Socket

MONTGOMERY WARD & CO.

MODELS 62-306, 62-406
Issue A, Above Ser. 7E659000
Issue B, Above Ser. 8C146800



ISSUE A PARTS (SERIAL No. 7E659000 and UP)

ISSUE B PARTS (SERIAL No. 8C146800 and UP)

IF ALIGNMENT - 465 KC

Vol. Control full on, variable condenser in minimum capacity position:
Adjust to resonance 2 trimmers at 465 KC, thru a .1 mf. condenser.

SHORT WAVE ALIGNMENT - 2000 to 7000 KC

Dial at 6 MC, adjust to resonance the SW oscilator trimmer (at top of rear variable gang condenser) and SW Antenna trimmer No. 1 (Fig. 1) at 6 M.C. , thru a .1 mf. condenser and 400 ohm resistor series.

BROADCAST ALIGNMENT- 535 to 1720 KC

Gang condenser in minimum capacity position; signal generator in series with a 200 mmf condenser and 20 ohm resistor series;-

(a) Adjust oscilator trimmer No. 3 Fig.3. to resonance at 1720 KC.
(b) Adjust Antenna trimmer No. 2 Fig. 3, to resonance at 1400 Kc.
(c) Adjust Padder No. 4 Fig. 3, to resonance at 600 KC.
(d) Repeat adjustments a & c until sensitivity is at maximum.
(e) Check for tracking & sensitivity at 1400, 1000 and 600 KC.

DO NOT BEND PLATES OF CONDENSER TO CORRECT TRACKING.

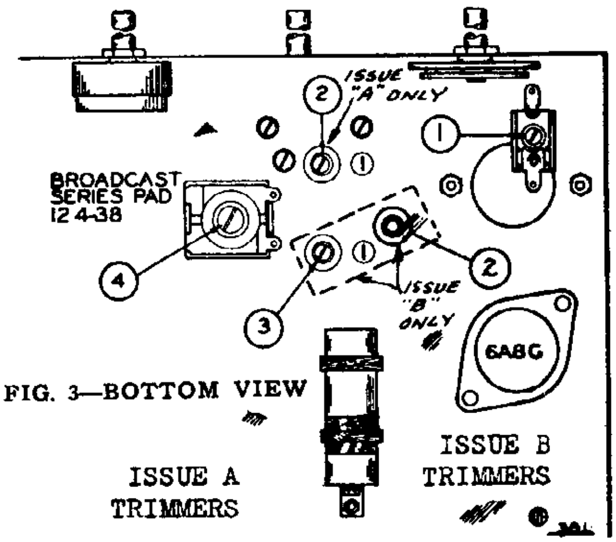


FIG. 3—BOTTOM VIEW

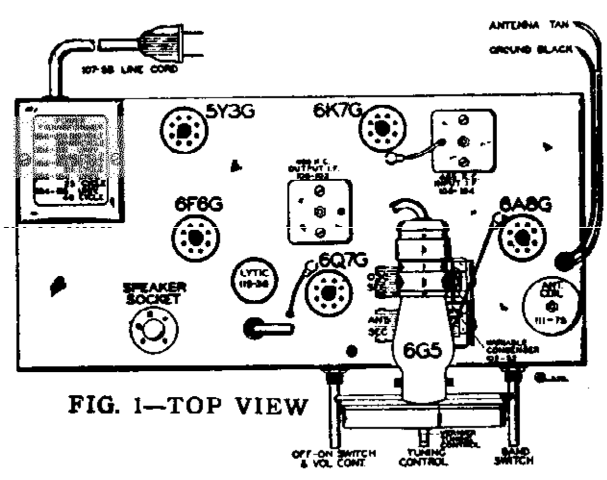
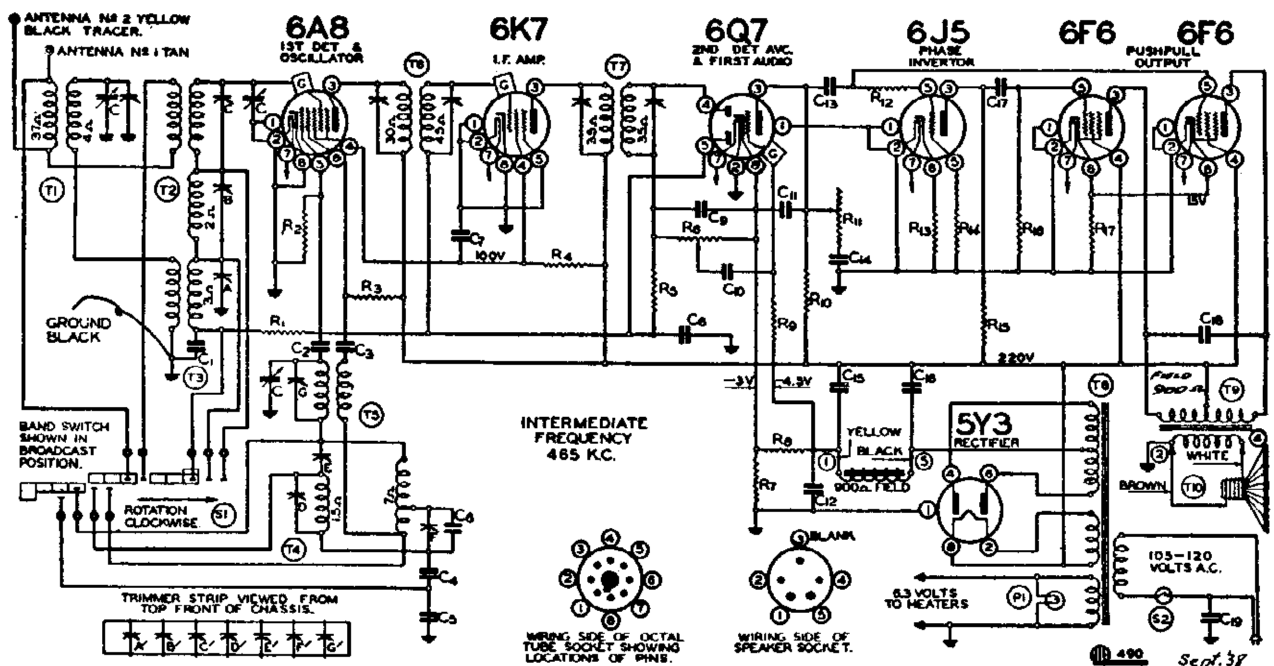


FIG. 1—TOP VIEW

MODEL 62-324
Schematic, Voltage

MONTGOMERY WARD & CO.

Socket, Trimmers
Alignment



PARTS (Serial No. 8H261200 and up)

RESISTORS

R1	130-103	100M ohm - 1/3 w. 10%
R2	130-12	50M ohm - 1/3 w. 20%
R3	130-123	15M ohm - 1/2 w. 10%
R4	130-196	30M ohm - 1 w. 10%
R5	130-4	3 megohm - 1/3 w. 20%
R6	101-104	1 megohm volume control
R7	130-198	40 ohm - 1/2 w. 10%
R8	130-197	20 ohm - 1/3 w. 10%
R9	130-4	3 megohm - 1/3 w. 20%
R10	130-103	100M ohm - 1/3 w. 10%
R11	101-105	300M ohm - tone control
R12	130-163	400M ohm - 1/3 w. 10%
R13	130-22	5M ohm - 1/3 w. 20%
R14	130-103	100M ohm - 1/3 w. 10%
R15	130-12	50M ohm - 1/3 w. 20%
R16	130-102	500M ohm - 1/3 w. 10%
R17	130-195	250 ohm - 1.2 w. 10%

CONDENSERS

C	102-62	3 gang variable
C1	100-22	.05 x 200 v. 25%
C2	129-67	.00004 Mica 10%
C3	100-25	.002 x 600 v. 25%
C4	129-83	.0027 Mica 2-1/2%
C5	129-84	.003 Mica 2-1/2%
C6	129-88	.0006 Mica 5%
C7	100-39	.1 x 400 v. 20%
C8	100-26	.02 x 400 v. 25%
C9	129-5	.0001 Mica 20%
C10	100-26	.02 x 400 v. 25%
C11	129-2	.0005 Mica 20%
C12	100-20	.1 x 200 v. 25%
C13	100-26	.02 x 400 v. 25%
C14	100-57	.006 x 600 v. + 10 - 20%
C15	103-14	16 mfd. lytic 275 w.v. Reg.
C16	103-6	8 mfd. lytic 350 w.v.
C17	100-26	.02 x 400 v. 25%
C18	100-37	.003 x 600 v. 10%
C19	100-61	.02 x 600 v. bakelite 20%

FOR TUNER DATA
SEE INDEX

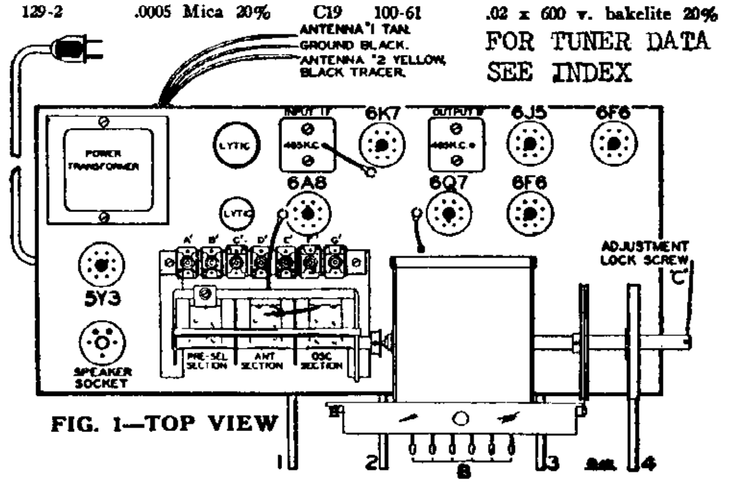


FIG. 1—TOP VIEW

I.F.-Vol.contr.full on; Var.at 1400KC. At 465KC-.1 mfd.dummy to grid cap of 6K7 tube,align output I.F.;signal to 6A8 grid cap,align input I.F.

B.C.BAND-Sw.in B.C.pos.;Var.at min.cap.;200mfd.and 20 ohm series resistor dummy to tan ant. lead. At 1750KC adjust trimmer E' to resonance. At 1400KC,trimmer A' and PRE-SEL section of var. to resonance. At 600KC trimmer F' to resonance. Repeat all adjustments of the band. Check sensitivity at 1000 KC.

S.W.BAND-.1 mfd.cond. in series with 400 ohm resistor as dummy;band sw. in S.W. pos. At 17MC,dial at 17MC,adjust G'and C' to resonance. At 6 MC check sensitivity For band coverage check set at 18,1 and 5,5 MC.

MIDDLE BAND- Band sw. at middle wave pos.Dummy as for S.W. adjustments. At 5000 KC, dial at 5000 KC, adjust D'and B' to resonance. At 1900KC check sensitivity; then recheck B.C.Band alignment.

Socket, Trimmers
Alignment

MONTGOMERY-WARD & CO.

MODEL 62-364
Schematic
Voltage

After the antenna is connected, tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 1400 KC trimmer up or down until maximum output is obtained.

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the interstage section (middle) of the tuning condenser. Connect the ground lead of the signal generator to the chassis. Set the volume control at maximum and the L-D switch in the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the 4 IF trimmers until maximum output is obtained.

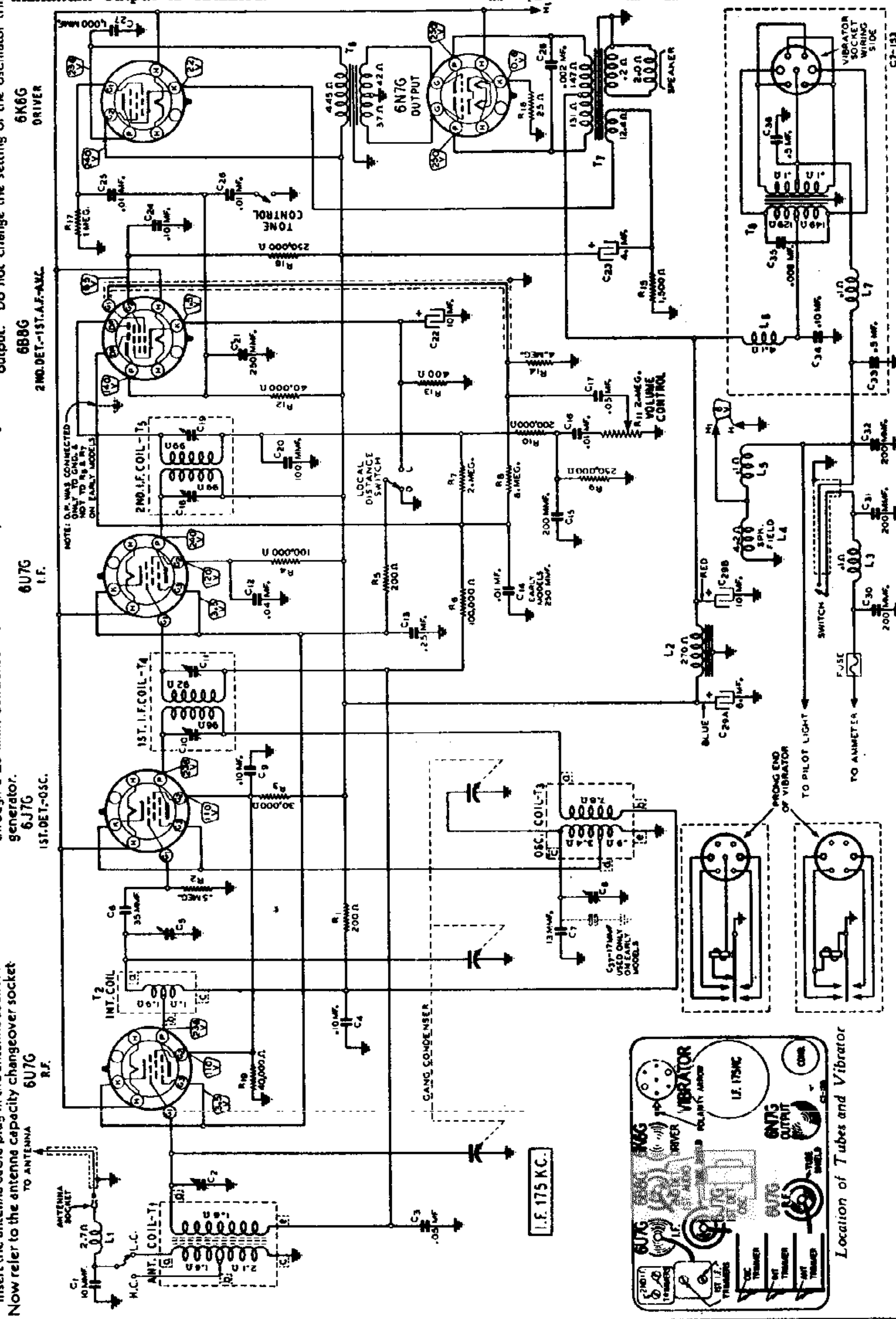
Insert the antenna cable plug in the antenna socket on the chassis. Now refer to the antenna capacity changeover socket.

If the jumper is inserted between the HC holes of this socket and the entire 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 120 mmf. condenser to the antenna post of the signal generator.

If the jumper is inserted between the LC holes of this socket, the antenna cable has been cut as explained in the instructions. If cut in half (30-inch length), the capacity of the antenna cable is approximately 35 mmf. Connect the antenna wire, in this case, through a 25 mmf. condenser to the antenna post of the signal generator.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Adjust the trimmer of the oscillator section of the gang condenser until maximum output is obtained. See Fig. 4 for location of this trimmer.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the interstage and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.



MODEL 62-369
Schematic, Socket

MONTGOMERY-WARD & CO.

Trimmers, Alignment

Alignment and Calibration

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Connect the ground lead of the signal generator to the chassis. The chassis should be in the case. Set the volume control at maximum and the L-D switch in the distance position. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC. Then adjust the three I.F. trimmers until maximum output is obtained - See Fig. 2.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Carefully turn the rotor of the tuning condenser until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

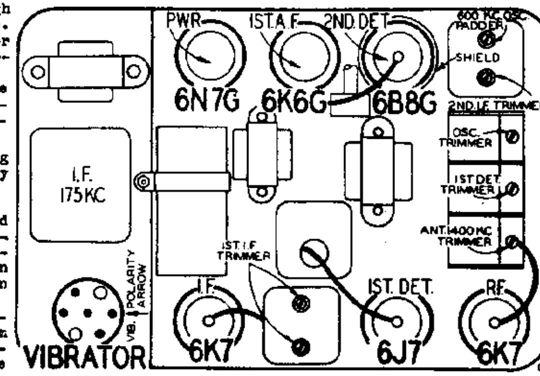
Set the signal generator for 600 KC. Connect the output through a .05 mf. condenser to the control grid of the 6K7 R. F. tube. Rock the tuning condenser rotor and adjust the 600 KC oscillator padder (See Fig. 2) until the peak of greatest intensity is obtained.

Leave the signal generator set for 600 KC and re-connect the output to the shielded antenna lead through a 120 mmf. condenser. Adjust the 600 KC antenna trimmer to maximum. (This trimmer is reached from outside of the case - See Fig. 1.)

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

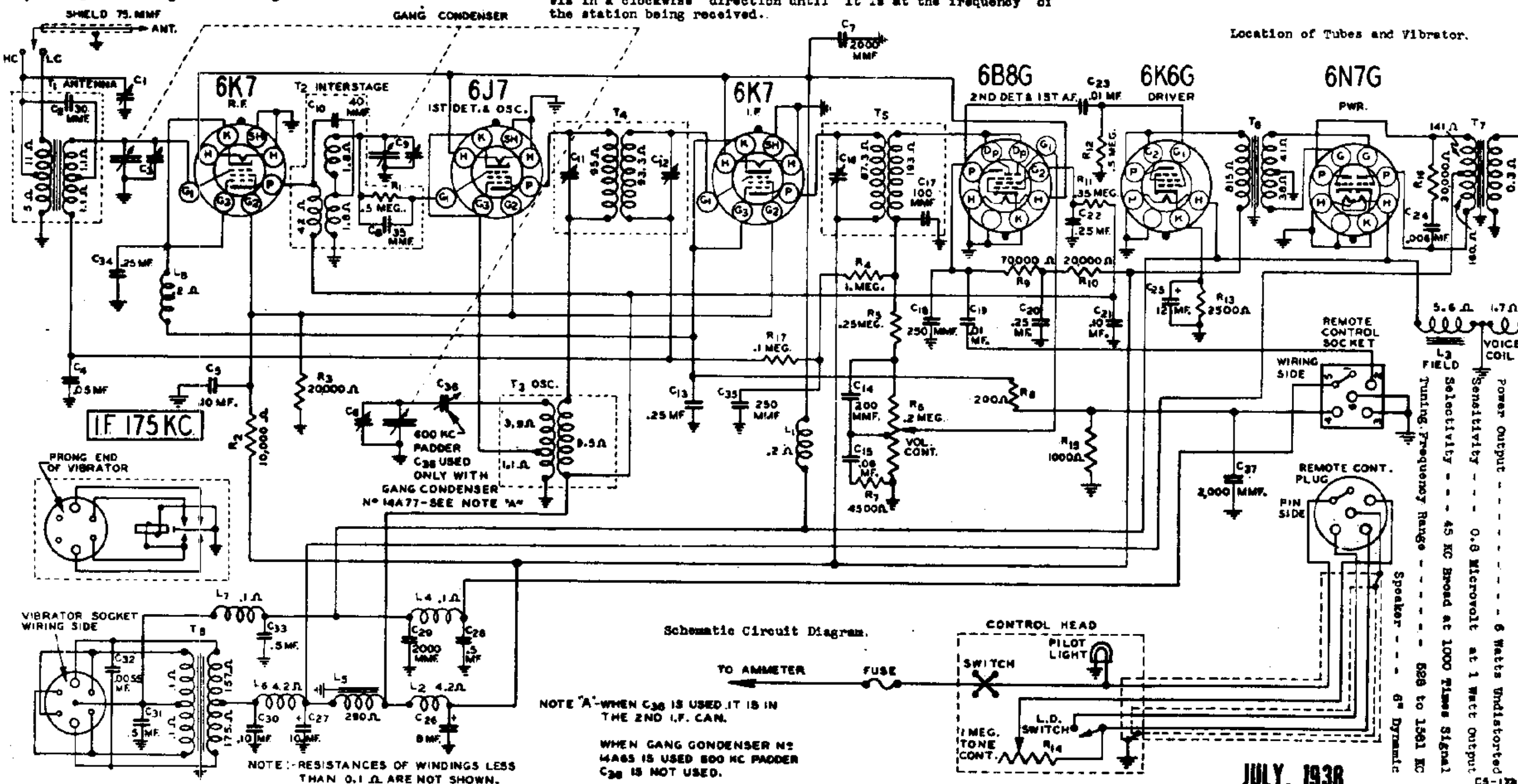
__Adjusting Antenna 600 KC Trimmer__ - After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained.

__Calibrating the Radio__ - To calibrate the radio, tune in a station of known frequency. Remove the dial lamp assembly from the back of the dial unit. The calibration screw is at the bottom of the dial lamp tube. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw so that the POINTER travels in a clockwise direction until it is at the frequency of the station being received.



Location of Tubes and Vibrator.

Power Consumption - - - 8.25 Amperes at 6.3 Volts
Power Output - - - - - - - - 6 Watts Undistorted
Sensitivity - - - 0.8 Microvolt at 1 Watt Output
Selectivity - - - 45 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - - - - 528 to 1581 KC
Speaker - - - 6" Dynamic



Schematic Circuit Diagram.

JULY, 1938

CS-172

MONTGOMERY-WARD & CO.

MODELS 62-370, 62-470, 62-700
Schematic, Voltage, Socket
Coils, Phono

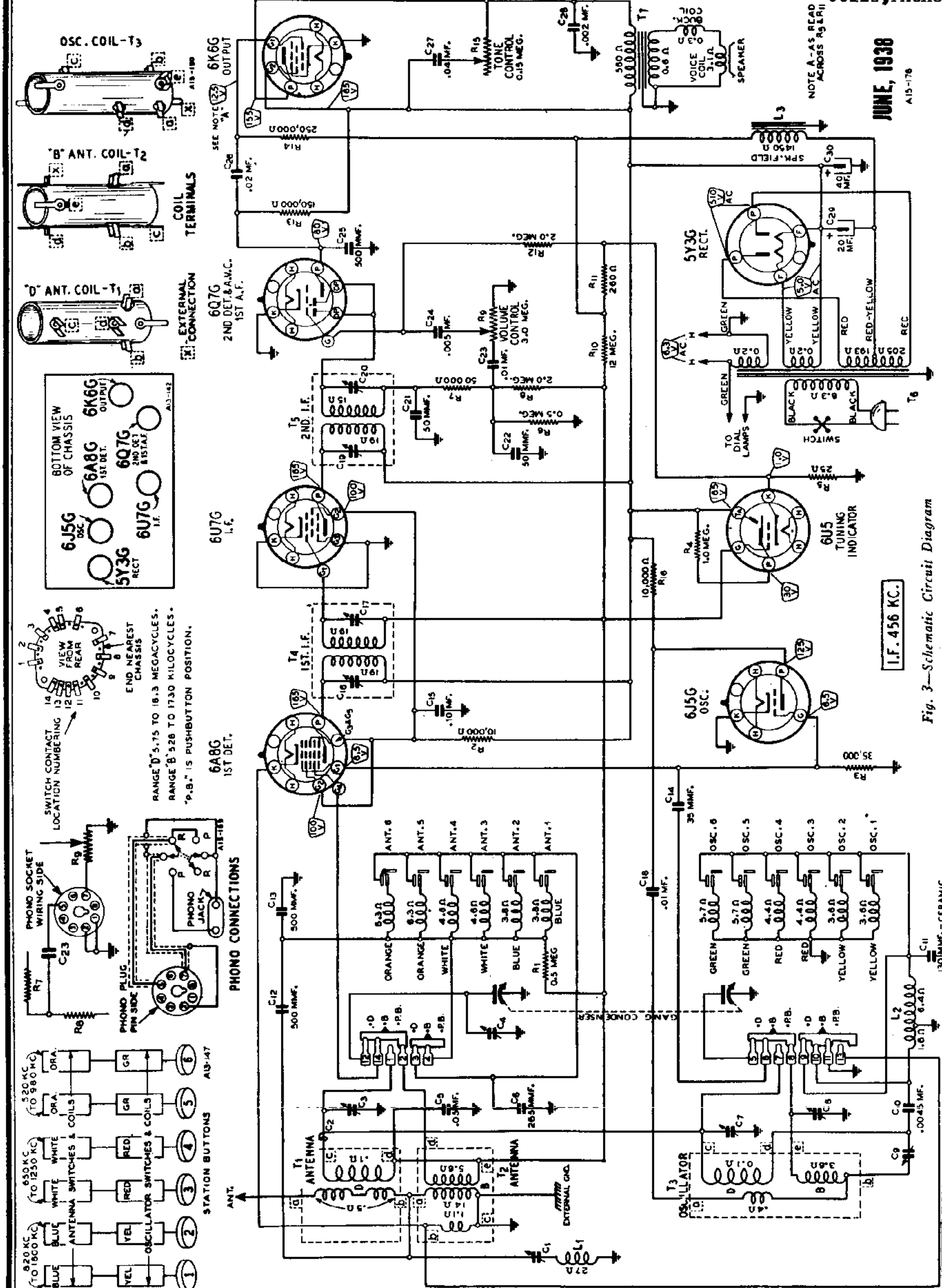


Fig. 3—Schematic Circuit Diagram

MODELS 62-370,62-470,62-700
Alignment,Trimmers

MONTGOMERY WARD & CO.

Power Consumption - 50 Watts (At 117 volts 60 cycles)
Power Output - - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum
Selectivity - - 38 KC Broad at 1000 times Signal
Sensitivity
B Range (Manual Tuning)..................15 Microvolts Average
B Range (Automatic Tuning)...........15 Microvolts Average
D Range ....25 Microvolts Average

Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - - 6" or 8" Dynamic
Tuning Frequency Range
B Range (Manual Tuning).... 528 to 1730 KC (Kilocycles)
D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning)...........820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning)...........650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning)...........520 to 980 KC

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C16) & (C17) 2nd I.F. (C19) & (C20)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C4)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C	Wave Trap (C1) Adjust for MINIMUM Output
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B.
PERMEABILITY TUNING UNIT			BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D
1100 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

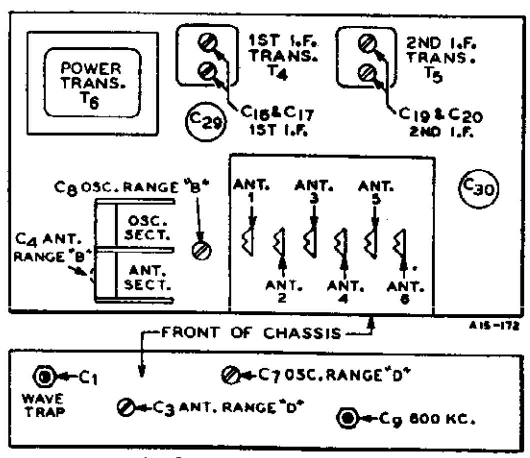


Fig. 2—Location of Trimmers

MODEL 93BR560A
MODEL 93BR657A
MODEL 93BR713A
Tuner Data

MONTGOMERY WARD & CO.

MODELS 62-370,62-470
62-700
MODELS 62-704 to 62-712
MODELS 62-902,62-905

MODELS 62-370, 62-470, 62-700; 62-902, 62-905; 62-704 to 62-712

Procedure for Setting the Station Buttons

Selecting the Stations to be Set

There are 6 buttons on the push button tuning dial by means of which 6 stations may be set for quick tuning. They are numbered 1 to 6 in Fig. 2.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position —See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, *accurately* tune in this station. The station is now set on this button.

To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.

MODELS 62-370 etc.

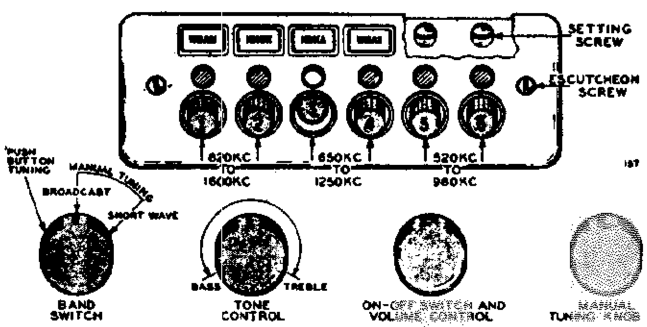


Fig. 2—Location of Controls and Push Buttons

MODELS 93BR560A, 93BR657A, 93BR713A

PROCEDURE FOR SETTING THE AUTOMATIC TUNER PUSHBUTTONS

NOW, PROCEED AS FOLLOWS:—

Unlock the tuner mechanism.
(NOTE:—The automatic tuner mechanism is locked tight when radio is shipped from the factory.)

1. Remove the snap-in button from the dial escutcheon plate on the front panel of the radio (see "C," Reset Lock Screw, Fig. 2). If the snap-in button will not come out easily using your fingers, pry it off with a screwdriver or a knife, being careful not to mar the finish on the escutcheon plate.
2. Unlock the tuner mechanism by inserting a screwdriver through the hole in the panel. Press in and loosen the locking screw by turning it to the right as far as it will turn without forcing.
You will note that as the locking screw is turned it will turn easily until the dial reaches its stop and then a slight amount of force will be required to actually start unlocking the tuner mechanism. Beyond this point, the locking screw will turn quite easily again until the tuner mechanism is completely unlocked. At this point do not force the locking screw any further. The tuner mechanism is now unlocked.

SETTING PUSHBUTTONS:

1. Press in all the way any one of the automatic tuner pushbuttons. Holding it in firmly, press on the Dial Tuning Control, No. 4, and tune in the station indicated on the station call letter tab on this pushbutton. You will note that in order to tune the station, the Dial Tuning Control will have to be pressed slightly. Move the Dial Tuning Control very slowly up and down (while still holding the automatic tuner pushbutton in firmly), noting the width of the shadow on the screen of the cathode-ray tuning eye. Minimum width on the tuning eye indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.
2. Press in another tuner pushbutton. Holding it in firmly, press on the Dial Tuning Control and carefully tune in the station indicated on the call letter tab on this pushbutton.
3. Follow this procedure until you have selected all of your favorite stations. (NOTE:—If the dial mechanism works hard or has a tendency to slip when setting up a station for one of the pushbuttons, it is due to the tuner mechanism not being unlocked all the way. Loosen the reset locking screw. The Dial Tuning Control should turn the dial drum freely with a pushbutton pushed in).

LOCKING THE TUNER MECHANISM

1. To lock the tuner mechanism insert a screwdriver through the hole in the escutcheon panel and press in and turn the reset locking screw to the left, until it cannot be turned any further without forcing it.
2. This will lock the tuner mechanism and all the stations that have been set up on the pushbuttons will be locked in place for automatic tuning.
Press in any one of the pushbuttons and—YOUR FAVORITE STATION IS SELECTED.

MODELS 93BR560A etc.

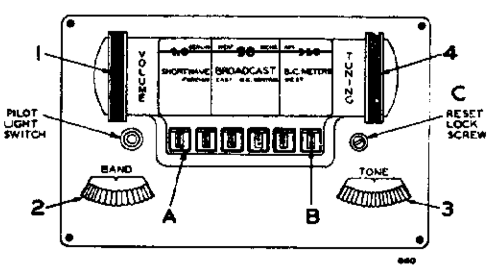


FIG. 2—FRONT VIEW

MODEL 62-380
Series A
Ser.9C618200 up
Schematic, Voltage
Socket

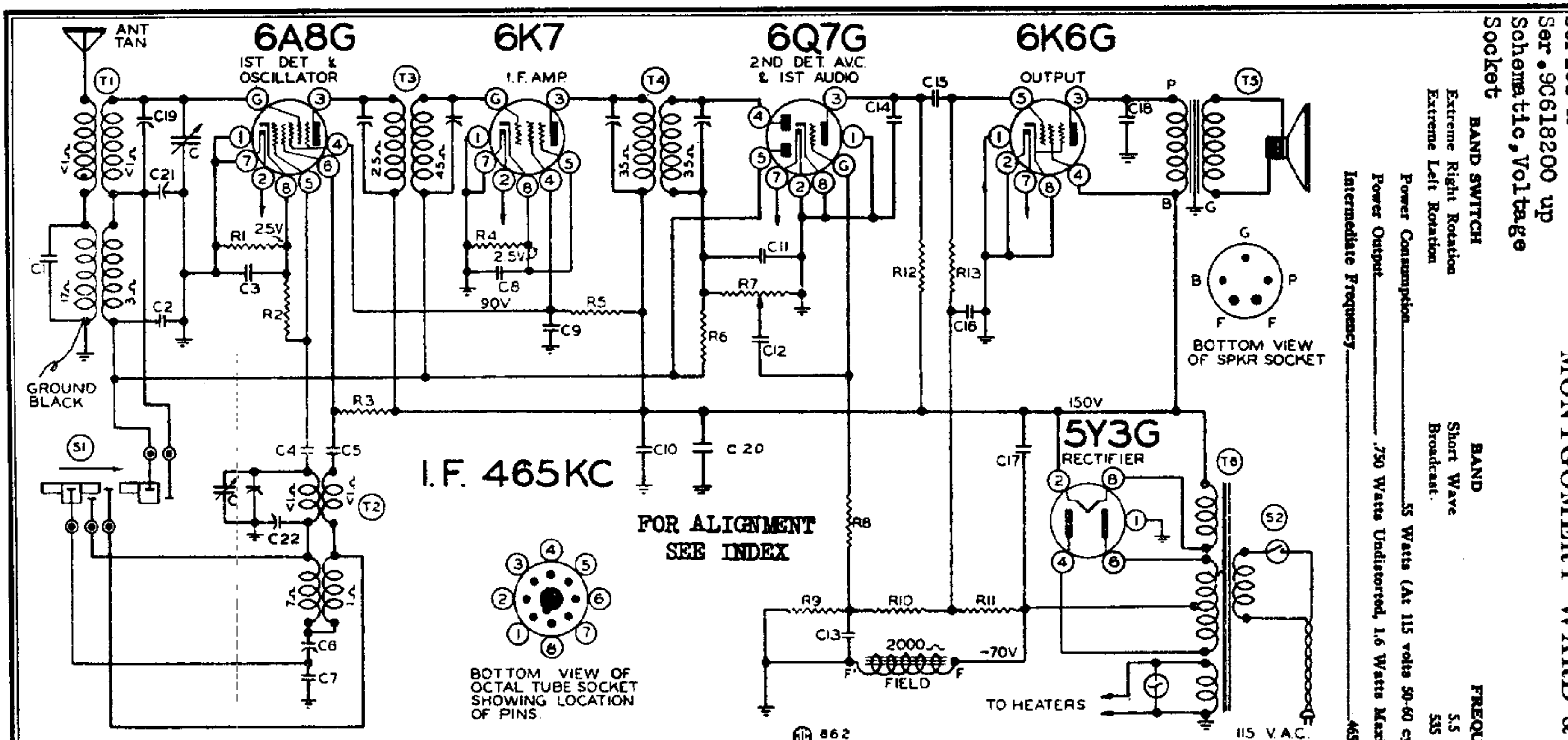
MONTGOMERY WARD & CO.

BAND SWITCH	BAND	FREQUENCY RANGE
Extreme Right Rotation	Short Wave	5.5 to 18.1 MC.
Extreme Left Rotation	Broadcast.	535 to 1720 KC.

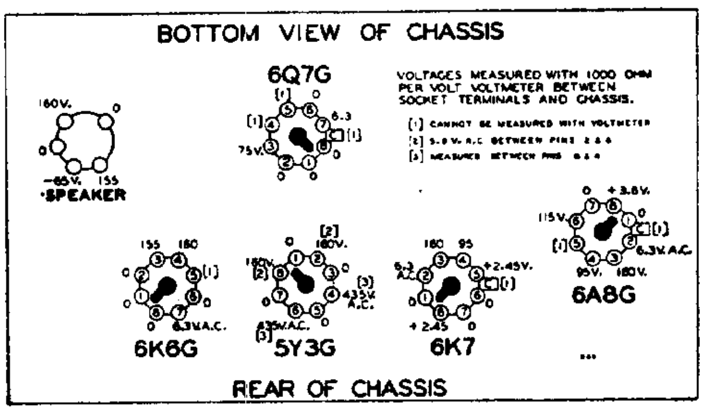
Power Consumption........55 Watts (At 115 volts 50-60 cycles)

Power Output........ .750 Watts Undistorted, 1.6 Watts Maximum

Intermediate Frequency........465 KC.



PARTS (SERIAL No. 9C618200 and UP)



RESISTORS

R1	BE13083	300 ohm—½ w.—10%
R2	BE13012	50M ohm—½ w.—20%
R3	BE13017	10M ohm—½ w.—20%
R4	BE13093	450 ohm—½ w.—10%
R5	BE130149	15M ohm—½ w.—20%
R6	BE1304	3 megohm—½ w.—20%
R7	BE10171	1 megohm Volume control
R8	BE1304	3 megohm—½ w.—20%
R9	BE130176	20M ohm—½ w.—10%
R10	BE13080	150M ohm—½ w.—10%
R11	BE13046	800M ohm—½ w.—10%
R12	BE1309	200M ohm—½ w.—20%
R13	BE1303	500M ohm—½ w.—20%

CONDENSERS

C	BE10243B	2 gang variable condenser
C1	BE1295	.0001 Mica
C2	BE10022	.05 x 200 v.—25%
C3	BE10020	.1 x 200 v.—25%
C4	BE12939	.00005—20%—Mica
C5	BE10025	.002 x 600 v.—20%
C6	BE12438	600 mmf. Series Pad Adj.
C7	BE12954	.003—2½% Mica
C8	BE10020	.1 x 200 v.—25%
C9	BE1001	.1 x 400 v.—50-10%
C10	BE11938	5.0 mfd.—250 w. v. 'Lytic
C11	BE1295	.0001—20% Mica
C12	BE10011	.01 x 400 v.—25%
C13	BE10020	.1 x 200 v.—25%
C14	BE1292	.0005—20% Mica
C15	BE10026	.02 x 400 v.—25%
C16	BE10020	.1 x 200 v.—25%
C17	BE11938	5.0 mfd.—250 w. v. 'Lytic
C18	BE10037	.003 x 600 v.—10%
C19	BE12439B	2-25 mmf. Adj. Cond.
C20	BE10013	.05 x 400 v.—25%
C21	BE12430C	Adj. Cond. 1-10 mmf.
C22	BE12430C	Adj. Cond. 2-20 mmf.
		C21—C22 in same unit
T1	BE11183	Ant. Coil
T2	BE11066B	Osc. Coil
T3	BE108105B	Input I. F.—465 kc.
T4	BE108106B	Output I. F.—465 kc.
T5	BE11461	6" Dynamic Speaker (2000 ohm field)
T6	BE10460B	Power Transformer
S1	BE12537	Wave Band Switch
S2		On-off switch on volume control

MONTGOMERY WARD & CO.

MODELS 62-386, 62-636, 62-646
Schematic, Voltage, Alignment
Resistances

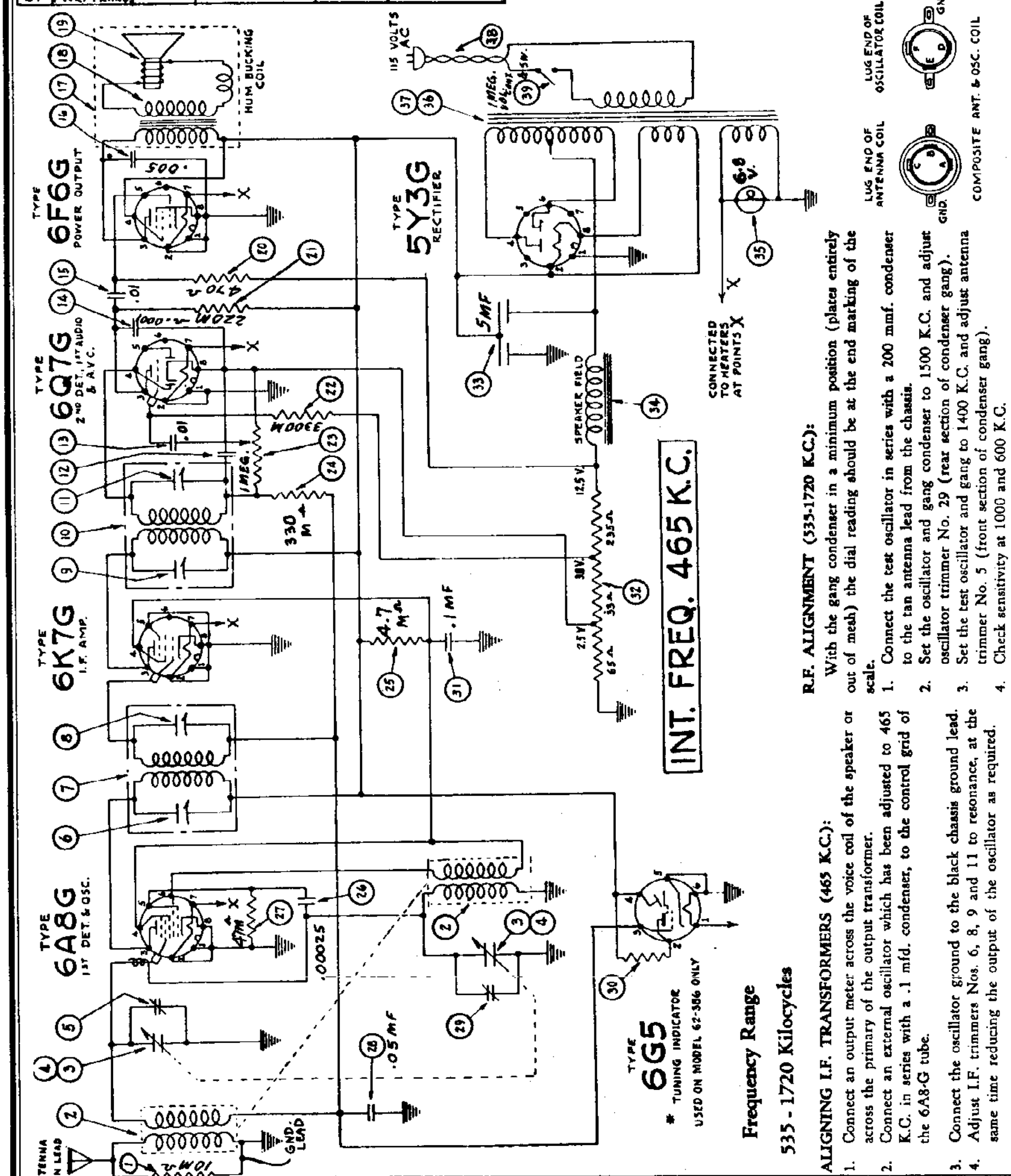
WINDING RESISTANCE

PART	FUNCTION	PRIMARY OHMS	PRIMARY IDENT.	SECONDARY OHMS	SECONDARY IDENT.
2	ANT. COIL	19	A To GND.	4.5	B To C
2	OSC. COIL	2.0	D To E	4.0	F To GND.
7	1ST I.F. COIL	18.5	GREEN TO RED & YEL	18.5	RED TO BLUE
10	2ND I.F. COIL	18.5	GREEN TO RED & YEL.	18.5	RED TO BLUE
18	OUTPUT TR.	550	3 TO 4 6F6G SOCK.	.3	
19	VOICE COIL	3.5			
34	SPKR FIELD	1700	YELLOW TO BLACK		
36	PWR. TRANS.	15	3 ON RECT. SOCK. TO SW.	558	4 To 6 RECT. SOCK.
	5 V. SEC.			.2	2 TO 8 " "
	6.3 V. SEC.			.25	2 TO 7 6Q7G SOCK.
37	PWR. TRANS.				

SOCKET VOLTAGES

NOTE: ALL VOLTAGES READ WITH 1000 OHM PER VOLT VOLTMETER FOR 115 V. LINE

TUBE	STAGE	FIL.	PIN NO.	PLATE	PIN NO.	SCREEN	PIN NO.
6A8G	DET.-OSC.	6.3	2 To 7	[illegible]	1 To 3	100	1 To 4
6K7G	I.F. AMPLIFIER	6.3	2 To 7	155	1 To 3	100	1 To 4
6Q7G	2ND. DET. 1ST A.F.	6.3	2 To 7	75	1 To 3	100	1 To 4
6F6G	OUTPUT A.F.	6.3	2 To 7	148	1 To 3	155	1 To 4
5Y3G	RECTIFIER	5.0	2 To 8				
6G5	TUNING INDICATOR	6.3	1 To 6	155	6 To 4		



Frequency Range
535 - 1720 Kilocycles

ALIGNING I.F. TRANSFORMERS (465 K.C.):

1. Connect an output meter across the voice coil of the speaker or across the primary of the output transformer.
2. Connect an external oscillator which has been adjusted to 465 K.C. in series with a .1 mfd. condenser, to the control grid of the 6A8-G tube.
3. Connect the oscillator ground to the black chassis ground lead.
4. Adjust I.F. trimmers Nos. 6, 8, 9 and 11 to resonance, at the same time reducing the output of the oscillator as required.

R.F. ALIGNMENT (535-1720 K.C.):

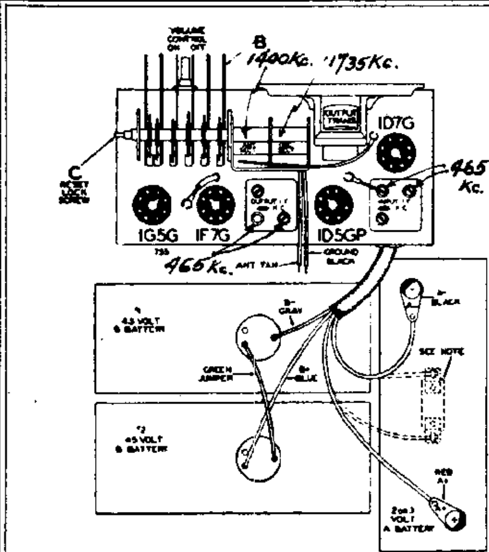
With the gang condenser in a minimum position (plates entirely out of mesh) the dial reading should be at the end marking of the scale.

1. Connect the test oscillator in series with a 200 mmf. condenser to the tan antenna lead from the chassis.
2. Set the oscillator and gang condenser to 1500 K.C. and adjust oscillator trimmer No. 29 (rear section of condenser gang).
3. Set the test oscillator and gang to 1400 K.C. and adjust antenna trimmer No. 5 (front section of condenser gang).
4. Check sensitivity at 1000 and 600 K.C.

MODEL 62-453, Series A
Ser. 489500 up
Schematic, Voltage
Socket, Trimmers
Alignment

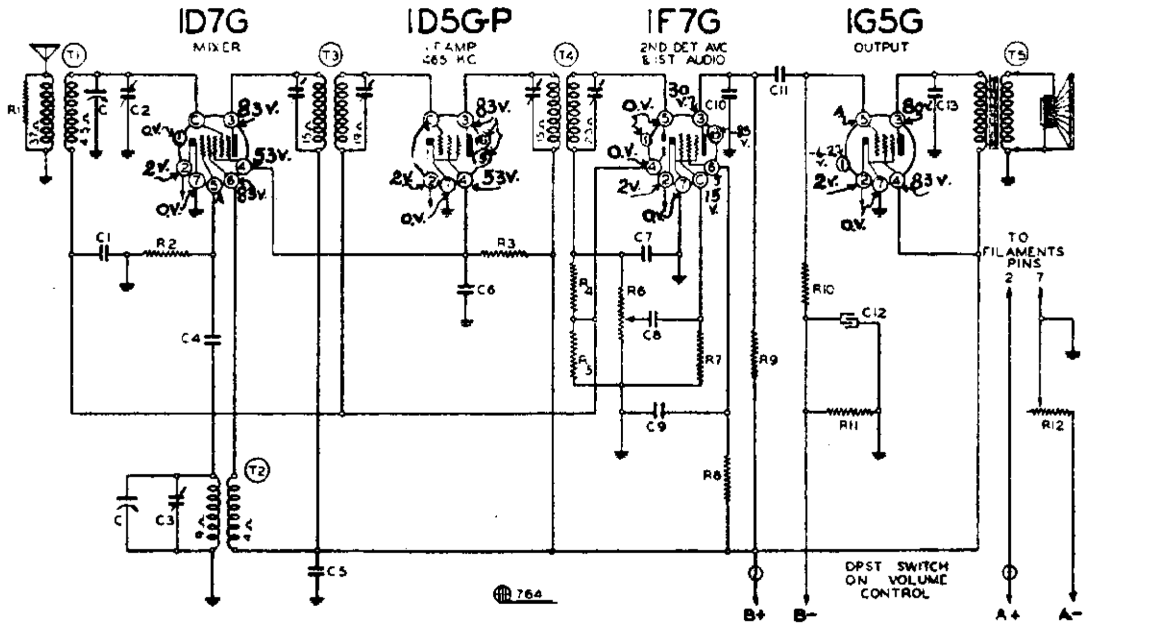
MONTGOMERY WARD & CO.

MODEL 62-459
MODEL 62-552
MODEL 62-553
MODEL 62-601
Alignment



Dec. '38

FIG. 1—TOP VIEW



D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
VOLUME CONTROL AT MIN., ANT. GROUNDED.
2 VOLT "A" AND 90 VOLT "B" BATTERIES
A-CANNOT BE READ WITH VOLTMETER

The following batteries are required:

2—45 Volt "B" Batteries.

1—3 Volt Dry "A" Battery or 2 Volt Storage Battery.

Check the Position of the Knob on the Back of the Radio Before Making any Battery Connections

PARTS (SERIAL No. 489,500 and UP)

RESISTORS

R1	BE13021	20M ohm—½ w.
R2	BE13012	50M ohm—½ w.
R3	BE13017	10M ohm—½ w.
R4	BE13038	2 megohm—½ w.
R5	BE13038	2 megohm—½ w.
R6	BE101155	1 megohm—volume control
R7	BE13019	1 megohm—½ w.
R8	BE13019	1 megohm—½ w.
R9	BE1309	200M ohm—½ w.
R10	BE13019	1 megohm—½ w.
R11	BE13093	450 ohm—½ w.
R12	BE101156	3.2 ohm rheostat

CONDENSERS

C	BE10287B	2 gang variable condenser
C1	BE1009	.05 x 200 v.
C2		Antenna Trimmer
C3		Oscillator Trimmer
C4	BE12912	.00025 mica
C5	BE10064	.25 x 200 v.
C6	BE10020	.1 x 200 v.
C7	BE1295	.0001 mica
C8	BE10011	.01 x 400 v.
C9	BE1009	.05 x 200 v.
C10	BE1292	.0005 mica
C11	BE10011	.01 x 400 v.
C12	BE11952	25 mfd. x 25 w. v. lytic
C13	BE10071	.004 x 600 v.

PARTS

T1	BE111114	Antenna Coil
T2	BE11095	Oscillator Coil
T3	BE108111E	Input I. F.—465 kc.
T4	BE108112D	Output I. F.—465 kc.
T5	BE114145	5" P. M. Speaker

FOR ADJUSTMENT OF AUTOMATIC TUNING LEVERS, SEE INDEX.

ALIGNMENT PROCEDURE

- **Volume control**—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

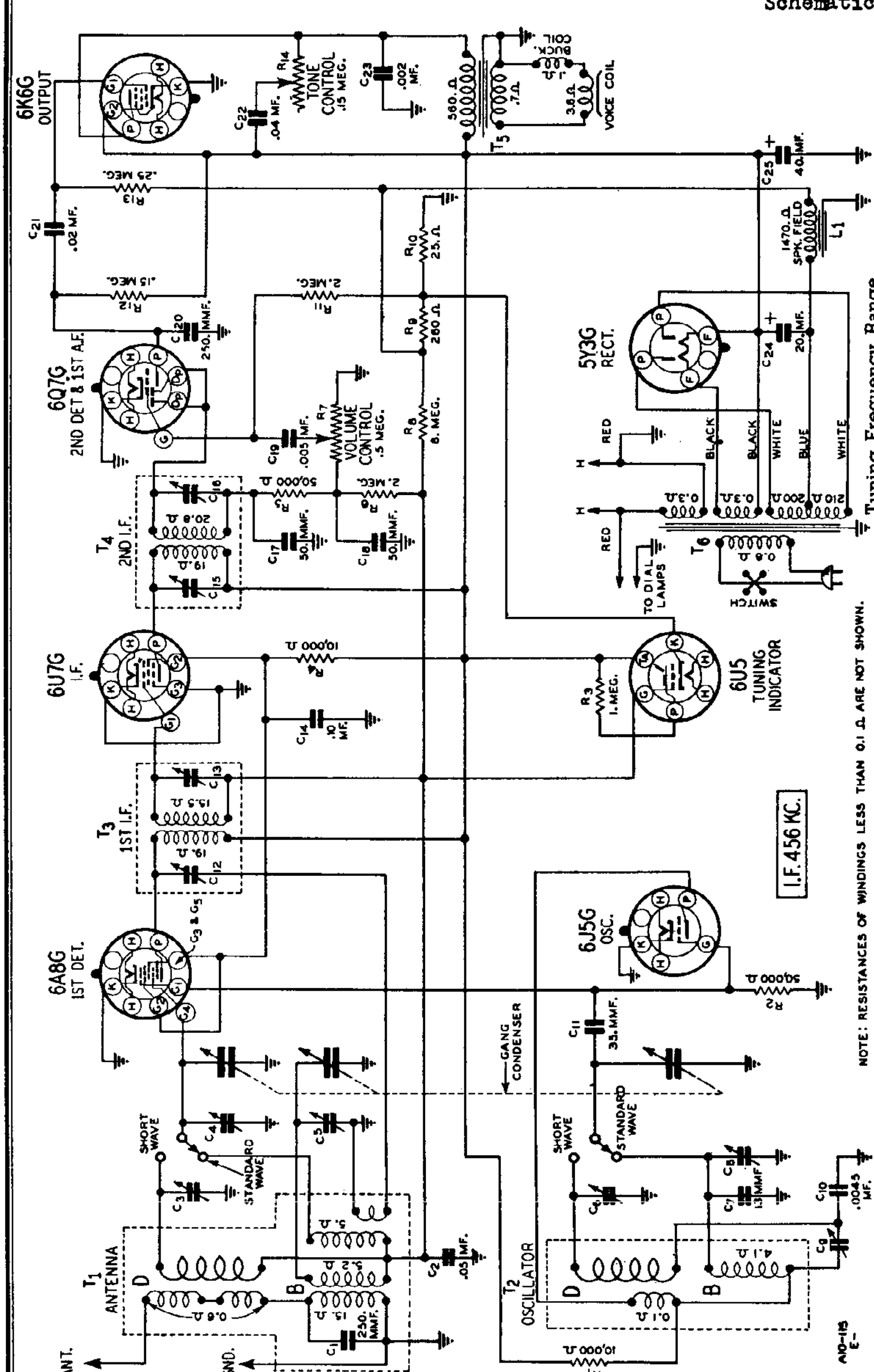
THIS ALIGNMENT APPLIES ALSO TO
MODELS 62-459, 62-553, 62-601, and 62-552.

BAND	Signal Generator Frequency Setting	Signal Generator Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of last I.F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of first I.F. (Mixer Tube).	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1735 Kc.	200 mmf.	Antenna Lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna Lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Antenna Broadcast	Adjust to maximum output

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. **After each band is completed, repeat the procedure as a final check.**

MONTGOMERY WARD & CO.

MODELS 62-471, 62-472
Schematic



NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

Fig. 1—Schematic Circuit Diagram

Tuning Frequency Range

B Range .... 528 to 1730 KC (Kilocycles)

D Range .... 5750 to 18300 KC (Kilocycles)

Sensitivity

B Range .... 15 Microvolts Average

D Range .... 20 Microvolts Average

Speaker - - - 6" or 8" Dynamic

Power Consumption - 50 Watts (At 117 volts 60 cycles)

Power Output - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum

Selectivity - - 38 KC Broad at 1000 times Signal

JAN., 1938

MODELS 62-471,62-472
Socket,Trimmers,Tuner
Alignment,Voltage
Drive Cord Data

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An all Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter: Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
456 KC	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C12) & (C13) 2nd I.F. (C15) & (C16)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1730 KC	Range B	200 mmf.	1730 KC	Antenna Lead	Oscillator Range B (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C9)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor— See Note B
RANGE D							
18300 KC	Range D	400 Ohm	18300 KC	Antenna Lead	Oscillator Range D (C6)	Turn Rotor to Full Open	Adjust to Maximum Output
15000 KC	Range D	400 Ohm	18000 KC	Antenna Lead	Ant. Range D (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor— See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

NOTE A—After the 1500 KC adjustment is made, the dial indicator should be at the 1500 KC mark on the dial scale. If it is not, the position of the indicator on the drive cord must be changed. This procedure, however, should not be followed unless it is absolutely necessary as there is danger of breaking the clamp which holds the indicator in place.

If the indicator must be moved, loosen the clamp at the back which holds it in place, move the indicator to the correct position, and bend the clamp back into place again.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION —When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

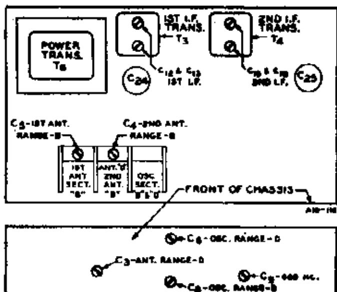


Fig. 2—Location of Trimmers

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum. **Antenna Shorted to Ground.**
Readings taken with a 1000 Ohm-per-volt meter. **Position of Band Switch: Standard Wave.**

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
6A8G	1st Det.	0	6.1(1)	165	90	6.5	90	6.1(1)	0
6J5G	Osc.	0	6.1(1)	125		6.5		6.1(1)	0
6U7G	I.F.	0	6.1(1)	165	90	0		6.1(1)	0
6Q7G	2nd Det. & 1st. Audio	0	6.1(1)	80				6.1(1)	0(2)
6K6G	Output	0	6.1(1)	155	165	12.5(3)		6.1(1)	0
5Y3G	Rectifier	0	4.7(4)		480(5)		480(5)		4.7(4)
6U5	Tuning Indicator	Plate to Ground 35		Target to Ground 165		Cathode to Ground 1		Across Heater 6.1 A.C.	

(1) A.C. voltage read across heater terminals 2 and 7.
(2) Bias (1.2 volts) as read across R10.
(3) Bias voltage as read across R9 and R10.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

Replacing Drive Cords

Three drive cords, Nos. 1, 2, and 3, as shown in Fig. 5, are used. To replace any of these cords, proceed as follows:

Cord No. 1

Turn the gang condenser to full open position.

Turn the drive shaft so that the holes for the cord are vertical. The positions of the drive shaft and drive drum are shown in Fig. 5.

Tie a double knot in one end of the cord. From the bottom of hole (A) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Fasten the shorter of the two springs used to the free end of the cord, making the distance between the two knots 27⅞ inches.

Starting at the point where the cord leaves hole (A), wind it around the shaft ¾ of a turn as shown in Fig. 5. Bring the end up to the wide groove (B) in the drive drum and wind on 2¼ turns, progressing toward the edge of the groove. Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

Cord No. 2

The gang condenser and tuning shaft should be in the same position as explained for Cord No. 1.

Tie a double knot in one end of the cord. From the top of hole (E) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Tie a slip knot with a small loop in the free end of the cord so that the length of the cord is 12 inches between the knots.

Starting at the point where the cord leaves hole (E), wind it around the shaft 3¼ turns as shown in Fig. 5. Do not attempt to wind the cord on the drive drum, but put the loop in the slip knot over pin (G). Rotate the drive drum clockwise about ½ a turn. This will unwind the cord on the drive shaft at (E).

Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut. While holding the cord on the wide flange, rotate the drive drum counterclockwise. The cord will be pulled into position in the groove.

Cord No. 3

The gang condenser and drive drum should be in the same position as explained for Cord No. 1.

Tie one end of the cord on hook (H).

Slide a ½ inch length of fabric tubing over the cord. Place this tubing approximately 13½ inches from the end of the cord to be attached to the spring.

Tie the other end of the cord to the longer of the two springs used. The length of the cord between the knots should be 34¾ inches.

Pass the cord through slot (J) in groove (P) of the drive drum. Bring the cord up to pulley (K), around the other pulleys as shown in Fig. 5, and down to groove (P). After passing the cord around the drive drum ½ turn in groove (P), fasten the spring to hook (Q).

Attaching Dial Pointer—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. After the pointer has been moved to the correct position, clamp it tightly over the fabric tubing on the cord—See Fig. 5.

Lever Tuning Assembly Adjustments

Pressure of Spacers on Heart Cams — The heart cams must rotate freely relative to the shaft spacers when the tightening lever is in the "loose" position and must not rotate relative to the shaft spacers when this lever is in the "tight" position.

Pressure of the spacers against the heart cams is determined by the position of nut (R) on the threaded shaft—See Fig. 5. If, after the tightening lever is turned to the "tight" position, the cams can turn relative to the shaft, this nut must be tightened

Bend back the ears of washer (S)—See Fig. 5, and tighten nut (R) about ½ turn. Bend the ears of the washer down again on nut (R). Tighten the tightening lever and see if the cams are sufficiently tight.

In general, nut (R) should be at such a position on the threaded shaft that the stop on the tightening lever moves to about ⅛ inch from the end of the slot in the tightening washers when a reasonable amount of pressure is exerted on this lever.

Connection between Gang Condenser and Cam Shaft—One screw only should be used in the universal joint connection between the condenser shaft and the cam shaft. If 2 screws are used, considerably more pressure must be exerted on the station levers to rotate the cam shaft.

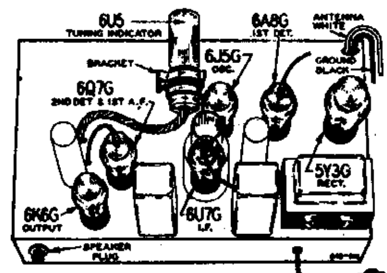


Fig. 4—Location of Tubes

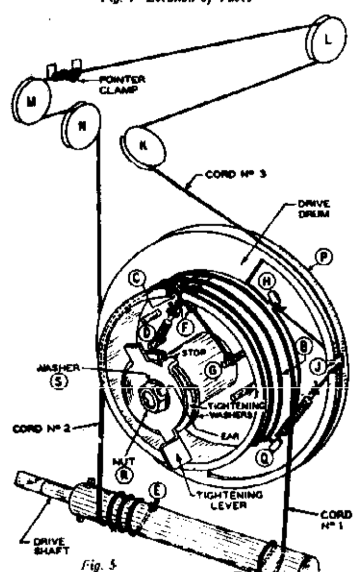
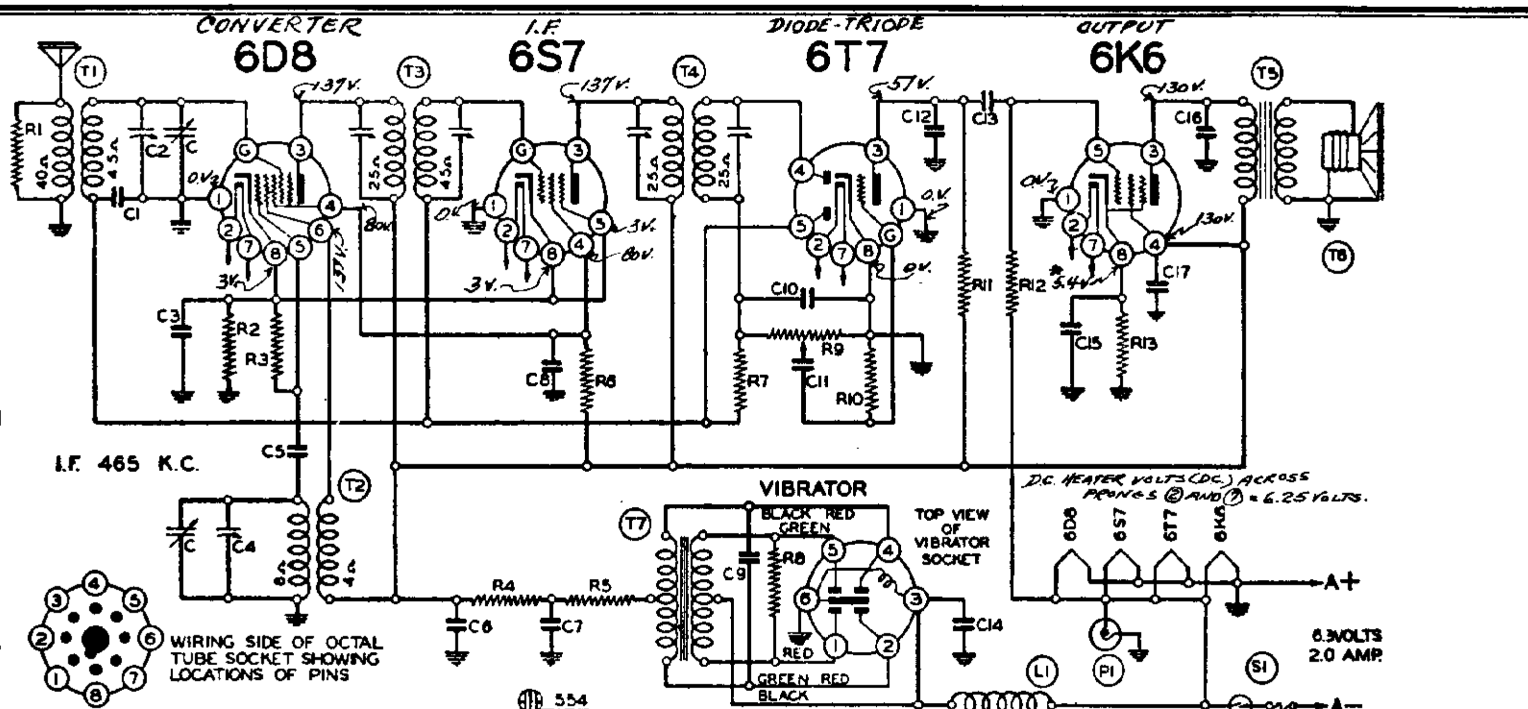


Fig. 5
Replacement of Drive Cords

Schematic, Voltage
Socket, Trimmers

MONTGOMERY WARD & CO.

MODEL 62-459
Series A



FREQUENCY RANGE
535 to 1720 KC.

*Bias (11.6 volts) as read across terminals 8 to 7.

TO REMOVE CHASSIS FROM THE CABINET:

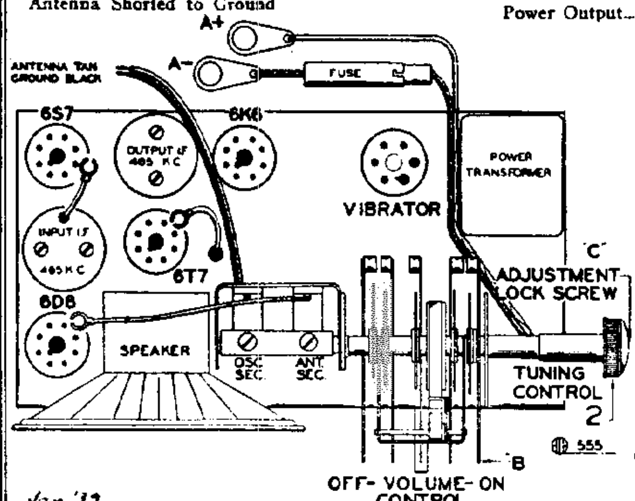
To remove chassis from the cabinet unscrew the locking screw in the center of the tuning knob and pull tuning knob and volume knob off their shafts. Remove the four mounting screws that hold the bottom plate and chassis to the cabinet Pull off the five buttons on the levers. Move the chassis toward back of cabinet so that control shafts and dial assembly clear holes in cabinet. then chassis can be slipped out.

VOLTAGES AT SOCKETS

Supply Voltage 6.3 DC—Volume Control: Maximum
Readings taken with 1000 ohm-per-volt meter
Antenna Shorted to Ground

Power Consumption .... 2 Amperes at 6.3 Volts
Power Output .... 4 Watts Undistorted, 1 Watt Maximum

In case of difficulty, the fuse contained in the metal fuse receptacle should be checked. A 4 ampere Type 3AG fuse (Part No. BE13179) should be used.



RESISTORS

R1	BE13021	20M ohm—½ w.
R2	BE13081	250 ohm—⅓ w.
R3	BE13012	50M ohm—½ w.
R4	BE13084	200 ohm—⅓ w.
R5	BE13084	200 ohm—⅓ w.
R6	BE130149	15M ohm—½ w.
R7	BE130170	3 megohm—¼ w.
R8	BE13084	200 ohm—⅓ w.
R9	BE101107	500M ohm Volume control
R10	BE130225	15 megohm—⅓ w.
R11	BE1309	200M ohm—⅓ w.
R12	BE1303	500M ohm—⅓ w.
R13	BE13024	400 ohm—⅓ w.

CONDENSERS

C	BE10267B	2 gang variable condenser
C1	BE1009	.05 x 200 v.
C2		Antenna trimmer on gang condenser
C3	BE10022	.05 x 200 v.
C4		Oscillator trimmer on gang condenser
C5	BE12912	.00025—mica
C6	BE11957	15 mfd.—150 w. v.
C7	BE11958	30 mfd.—150 w. v.
C8	BE10022	.05 x 200 v.
C9	BE10068	.003 x 1400
C10	BE12912	.00025—Mica
C11	BE10011	.01 x 400 v.
C12	BE1292	.0005—Mica
C13	BE10011	.01 x 400 v.
C14	BE10031	.5 x 120 w. v.
C15	BE11957	15 mfd.—25 w. v.
C16	BE10019	.006 x 600 v.
C17	BE10020	.1 x 200 v.

C6 and C 15 in same unit

PARTS

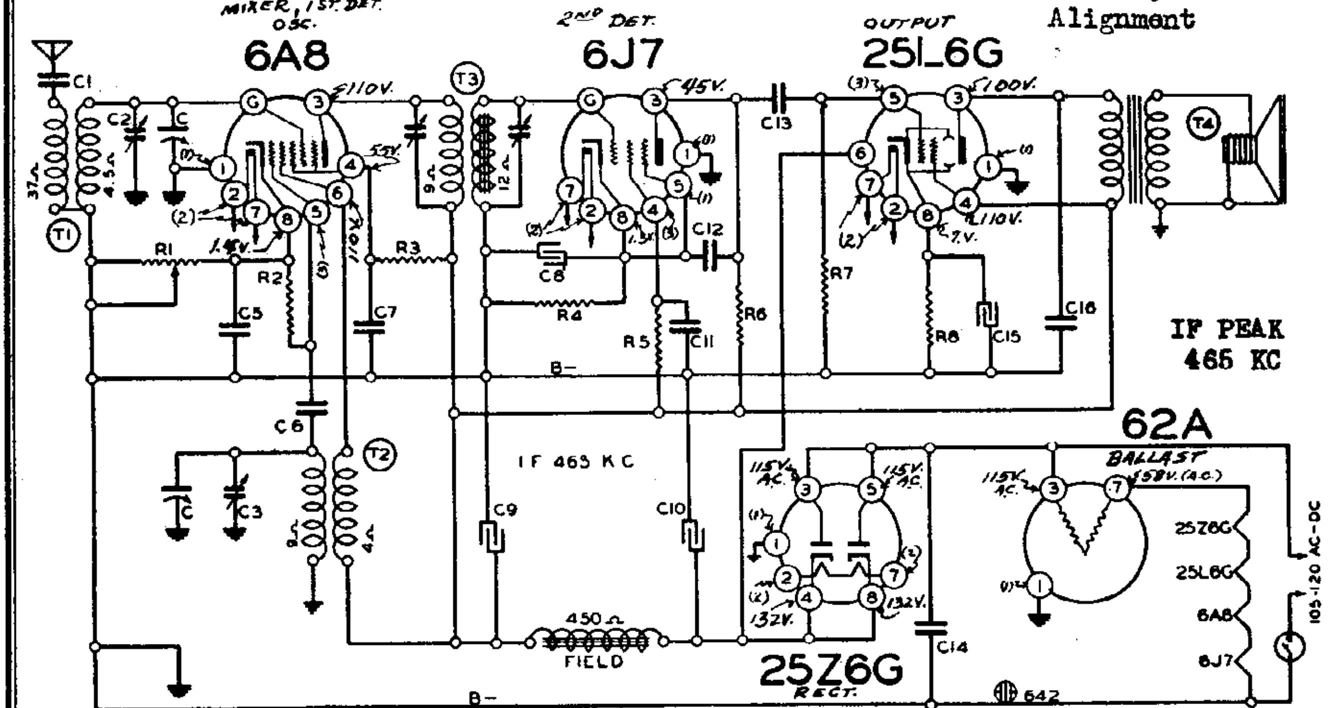
T1	BE11192	Antenna Coil Complete
T2	BE11073	Oscillator Coil Complete
T3	BE10896E	Input I. F.—465 kc. Complete
T4	BE10895D	Output I. F.—465 kc. Complete
T5	BE10570	Output Transformer
T6	BE114118	5" P. M. Speaker
T7	BE104137	Power Transformer
L1	BE10568	"A" Choke—
P1	BE10789	Pilot light—Type 40—6.3 v.—.15 amp.
S1		Off-on switch on volume control
	BE1268	Vibrator

FOR ALIGNMENT PROCEDURE AND SETTING AUTOMATIC TUNING LEVERS, SEE INDEX.

MODELS 62-501, 62-502
Series A, Ser. 286700 up

MONTGOMERY WARD & CO.

Schematic, Voltage Socket, Trimmers Alignment



IF PEAK 465 KC

Power Consumption .... 45 Watts
Power Output .... 800 Milliwatts Undistorted, 1300 Milliwatts Maximum
Intermediate Frequency .... 465 K.C.

Sept.'38

D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B–, WITH LINE VOLTAGE OF 115 VOLTS A.C. OR D.C.
NOTE: TERMINALS MARKED "0" ARE B- POINTS.

VOL. CONT. ON FULL
ANTENNA GROUNDED

(1) NO READING (CONNECTED TO CHASSIS)
(2) 6.3 V.A.C. READ BETWEEN TERMINALS 2 & 7 OF SAME SOCKET
(3) CANNOT BE READ WITH VOLTMETER

PARTS (Serial 286,700 and UP)

RESISTORS

R1	BE101138	20M ohm volume control
R2	BE13012	50M ohm—½ w.
R3	BE130194	35M ohm—⅓ w.
R4	BE130252	6M ohm—⅓ w.
R5	BE13038	2 megohm—½ w.
R6	BE13045	250M ohm—½ w.
R7	BE1303	500M ohm—½ w.
R8	BE130251	160 ohm—⅓ w.

CONDENSERS

C	BE10287	2 gang variable condense
C1	BE1292	.0005 mica
C2		Antenna Trimmer
C3		Oscillator Trimmer
C5	BE1009	.05 x 200 v.
C6	BE12912	.00025 mica
C7	BE1009	.05 x 200 v.
C8	BE11971	5 mfd. x 25 v. lytic
C9	BE11970	30 mfd. x 150 v. lytic
C10	BE11970	30 mfd. x 150 v. lytic
C11	BE10020	.1 x 200 v.
C12	BE1292	.0005 mica
C13	BE10026	.02 x 400 v.
C14	BE1001	.1 x 400 v.
C15	BE11970	40 mfd. x 25 w. v. lytic
C16	BE10095	.035 x 400 v.

C9, C10 and C15 in one unit, part no. BE11970

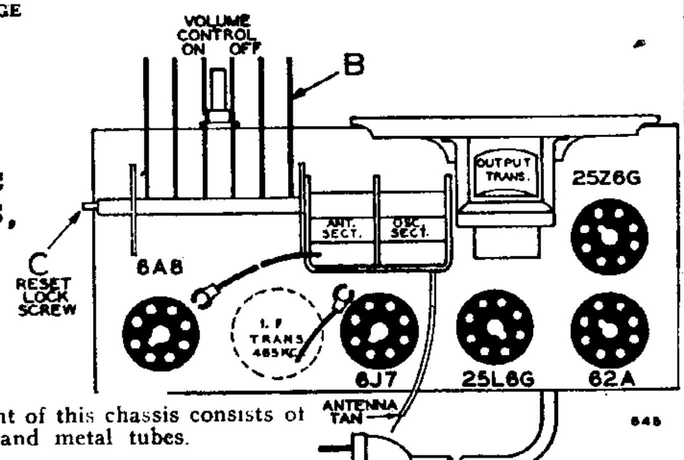
PARTS

T1	BE111110	Antenna Coil
T2	BE11095	Oscillator Coil
T3	BE108123	I. F. Transformer—465 kc.
T4	BE114130	5 inch Dynamic Speaker

FREQUENCY RANGE

530 to 1720 K.C.

FOR SETTING THE AUTOMATIC TUNING LEVERS, SEE INDEX.



The tube complement of this chassis consists of octal base glass and metal tubes.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

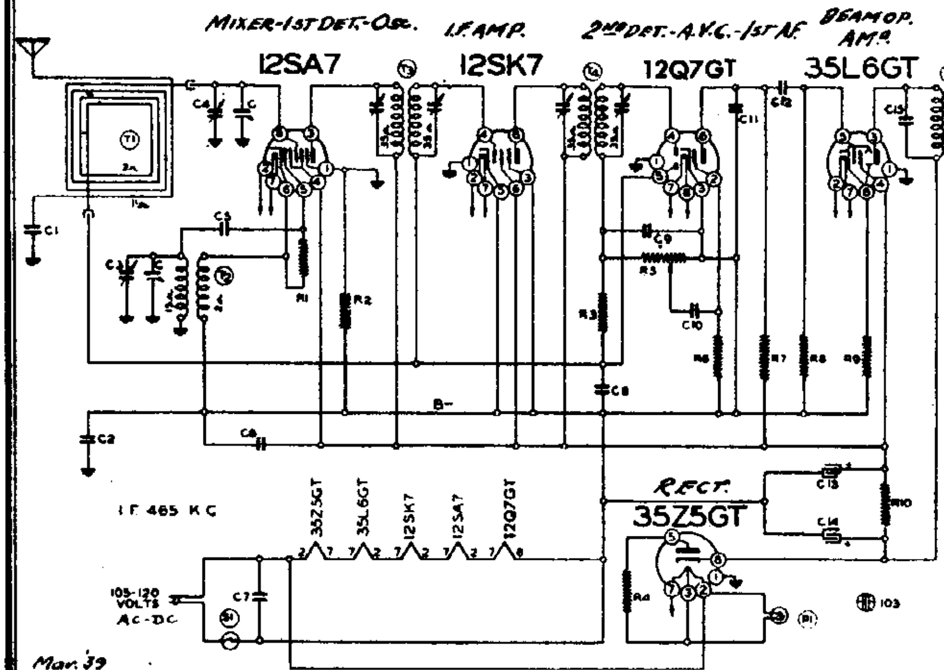
- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6A8	Rotor full open (Plates out of mesh)	Two trimmers	I. F.	Adjust to maximum output
BROAD-CAST BAND	1720 Kc.	100 mmf.	Antenna Lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	100 mmf.	Antenna Lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang	Broadcast Antenna	Adjust to maximum output

Schematic, Voltage
Socket, Trimmers
Alignment, Changes

MONTGOMERY WARD & CO.

MODELS 62-504, 62-505
Series A, Issues A, B
Ser. 623100 up



PARTS (Serial No. 623,100 and UP) ISSUES A AND B

RESISTORS

R1	BE13021	20M ohm—1/3 w.
R2	BE130100	150M ohm—1/3 w.
R3	BE1304	3 megohm—1/3 w.
R4	BE130215	25 ohm—1/3 w.
R5	BE101164	1 megohm—volume control
R6	BE130225	15 megohm—1/3 w.
R7	BE13011	250M ohm—1/3 w.
R8	BE1303	500M ohm—1/3 w.
R9	BE130166	150 ohm—1/3 w.
R10	BE130199	1500 ohm—1 watt

CONDENSERS

C	BE102102	2 gang variable condenser
C1	BE1292	.0005 Mica
C2	BE10091	.15 x 400 v.
C3		Osc. Trimmer on Gang
C4		Ant. Trimmer on Gang
C5	BE12912	.00025 mica
C6	BE1009	.05 x 200 v.
C7	BE1001	.1 x 400 v.
C8	BE10022	.05 x 200 v.
C9	BE1295	.0001 mica
C10	BE10071	.004 x 600 v.
C11	BE12912	.00025 mica
C12	BE10011	.01 x 400 v.
C13	BE11982	30 mfd. lytic
C14	BE11982	30 mfd. lytic
C15	BE10095	.035 x 400 v.

C13 and C14 in same unit

PARTS

T1	BE120268	Loop Antenna
T2	BE110113	Oscillator Coil
T3	BE108140B	Input I. F.
T4	BE108141	Output I. F.
T5	BE10587	Output Transformer
T6	BE114157	4" P. M. Speaker
S1		Off-on switch on vol. contro
P1	BE107249	6.3 volt Pilot Light

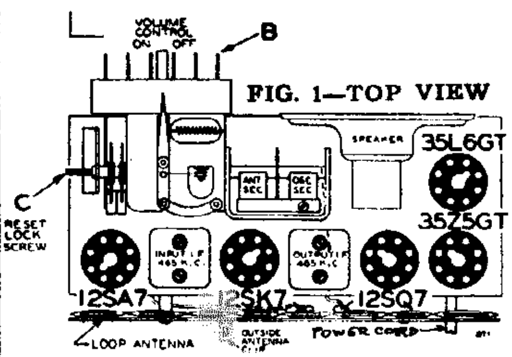
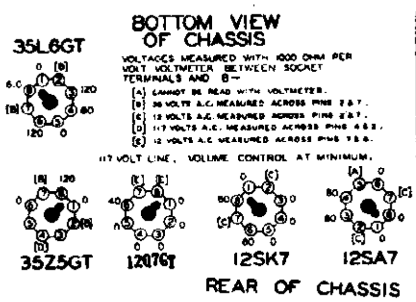


FIG. 1—TOP VIEW



FOR SETTING AUTOMATIC TUNING LEVERS, SEE INDEX

Frequency Range 540-1650 Kilocycles
I. F. Frequency 465 K. C.

NOTE:- In ISSUE A, a 12SQ7 is used as 2nd Det.-A.V.C.-1st. Audio; Resistor, R 10, part BE 130282, 2000 ohm 1 watt, and P1, part BE 10794, 6.8 v. Pilot Light are used. For all other parts see parts list.

ALIGNMENT PROCEDURE

Do not remove the back cover of the radio which contains the loop antenna from the chassis. It is important during alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through two holes which are provided on the bottom of the cabinet.

The two adjustments on the variable gang condenser can be reached with a long insulated type screw driver through these two holes.

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top (See Fig. 1)	Output and Input I.F.	Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer—Bottom of rear section of gang (See Bottom of Radio)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer—Bottom of front section of gang (See Bottom of Radio)	Broadcast Antenna	Adjust to maximum output

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

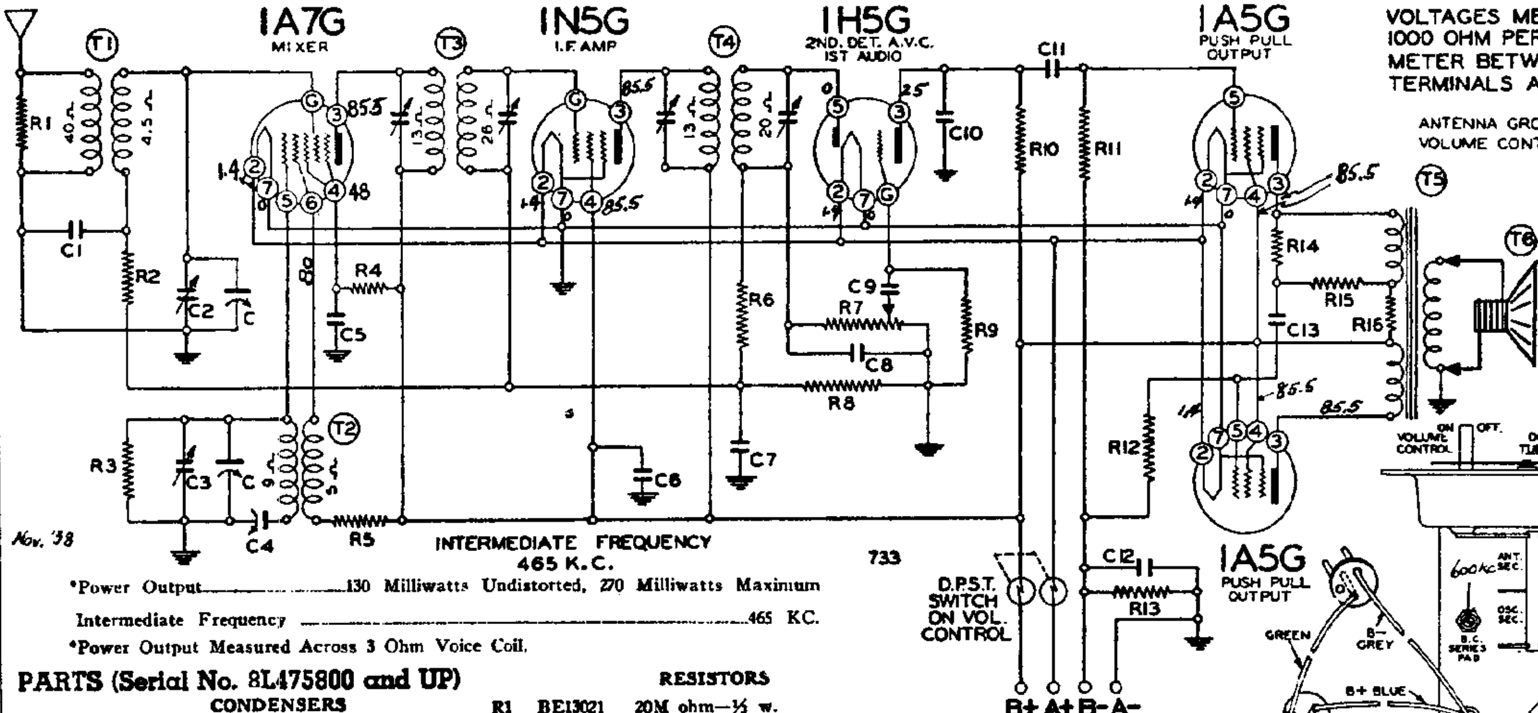
Power Consumption — 40 Watts
Power Output — 1.3 Watts Undistorted, 2.5 Watts Maximum
Intermediate Frequency — 465 K.C.

MODELS 62-551, 62-1551
62-2551
Series A, Ser. 8L475800 up
Schematic, Voltage, Socket
Trimmers, Alignment

MONTGOMERY WARD & CO.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

ANTENNA GROUNDED
VOLUME CONTROL AT MINIMUM.



Nov. '38

INTERMEDIATE FREQUENCY
465 K.C.

733

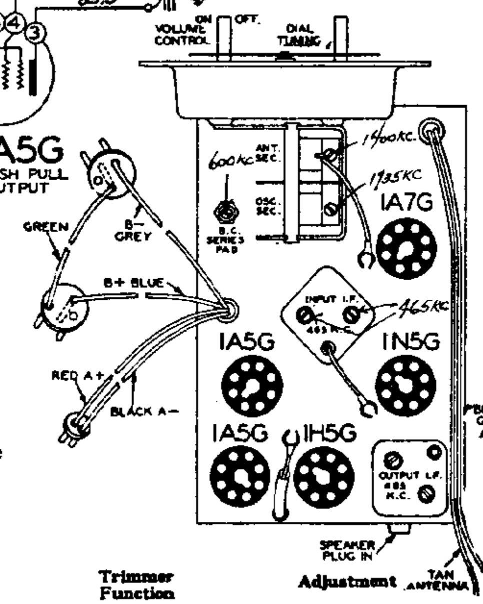


FIG. 1—
TOP VIEW

*Power Output..........130 Milliwatts Undistorted, 270 Milliwatts Maximum

Intermediate Frequency ....465 KC.

*Power Output Measured Across 3 Ohm Voice Coil.

FREQUENCY RANGE
535 to 1735KC.

PARTS (Serial No. 8L475800 and UP)

CONDENSERS

C	BE10289	2 gang Variable Condenser
C1	BE1009	.05 x 200 v.—25%
C2		Antenna Section Trimmer
C3		Oscillator Section Trimmer
C4	BE12464	Series Pad
C5	BE10070	.5 x 120 v.—20%
C6	BE10048	.25 x 200 v.
C7	BE1009	.05 x 200 v.
C8	BE1295	.0001 Mica
C9	BE10011	.01 x 400 v.
C10	BE12921	.0002 Mica
C11	BE10078	.01 x 200 v.
C12	BE11935	10 mfd. x 25 volts—lytic
C13	BE10078	.01 x 200 v.

RESISTORS

R1	BE13021	20M ohm—⅓ w.
R2	BE13020	100M ohm—⅓ w.
R3	BE1309	200M ohm—⅓ w.
R4	BE130208	40M ohm—⅓ w.
R5	BE13071	4M ohm—⅓ w.
R6	BE13038	2 megohm—⅓ w.
R7	BE101140	1 megohm—volume control
R8	BE13038	2 megohm—⅓ w.
R9	BE13019	1 megohm—⅓ w.
R10	BE13037	750M ohm—⅓ w.
R11	BE13019	1 megohm—⅓ w.
R12	BE13019	1 megohm—⅓ w.
R13	BE130222	350 ohm—⅓ w.
R14	BE13019	1 megohm—⅓ w.
R15	BE130232	25M ohm—⅓ w.
R16	BE130264	1000 ohm—⅓ w.

PARTS

T1	BE11192B	Antenna Coil Complete
T2	BE11096	Oscillator Coil Complete
T3	BE108111C	Input I. F. Complete
T4	BE108112	Output I. F. Complete
T5	BE10578	Output Transformer
T6	BE114137	6" P. M. Speaker

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1N5G I.F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
I. F.	465 Kc.	.1 MFD.	Grid of 1A7G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROADCAST BAND	1735 Kc.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
BROADCAST BAND	1400 Kc.	200 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Antenna Broadcast	Adjust to maximum output
BROADCAST BAND	600 Kc.	200 mmf.	Antenna lead	Set dial at 600 Kc.	B.C. Series Pad (See Fig. 1)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

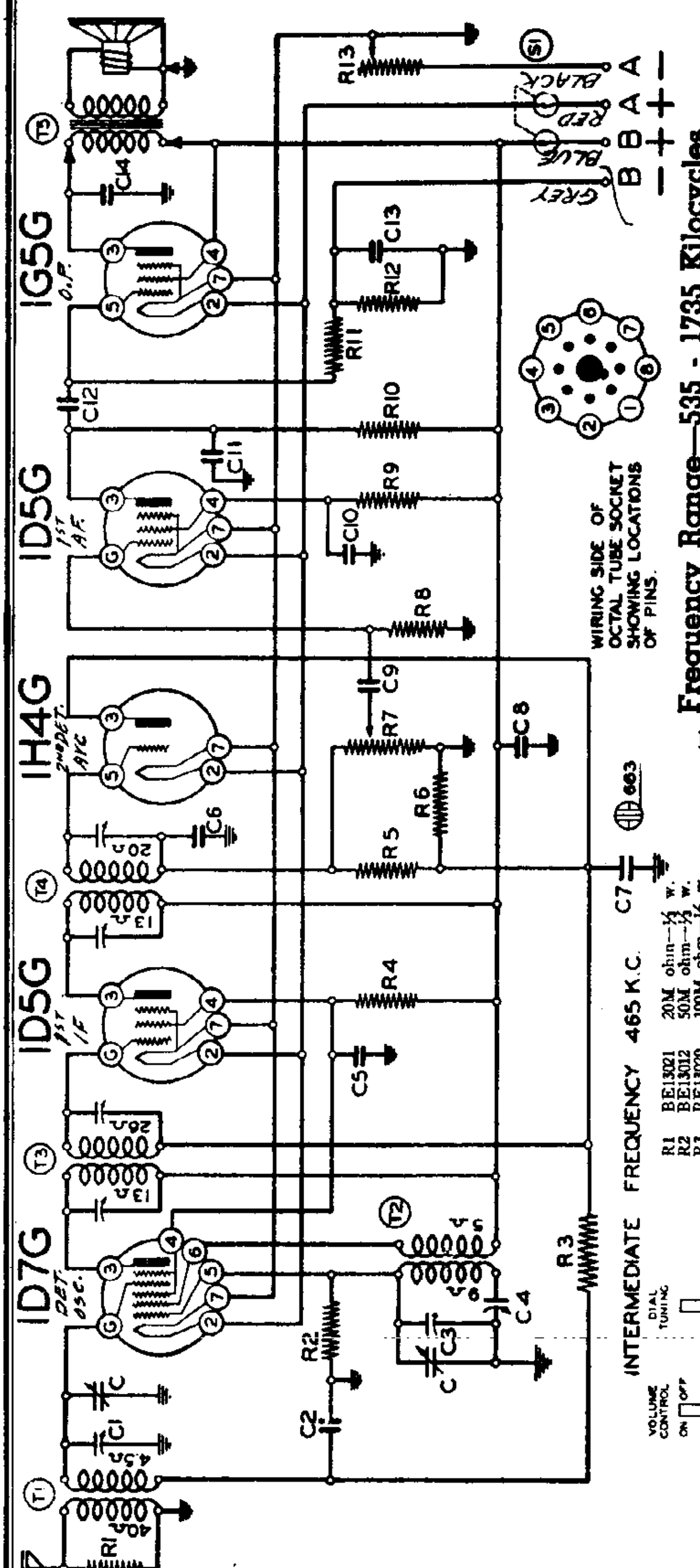
Schematic, Voltage Socket, Trimmers

MONTGOMERY WARD & CO.

MODELS 62-550, 62-1550 62-2550, Series A Ser. 8J312900 up

5 TUBE

Broadcast Band 2-Volt Battery Operated Superheterodyne Receiver



INTERMEDIATE FREQUENCY 465 K.C.

Frequency Range—535 - 1735 Kilocycles

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

BACK OF CHASSIS

This radio may be operated with a 2 volt storage battery instead of the 3 volt Dry "A".

When this is done the knob at left should be turned to the point marked storage battery and left there at all times. Never attempt to use a 6 volt Auto or Radio storage battery.

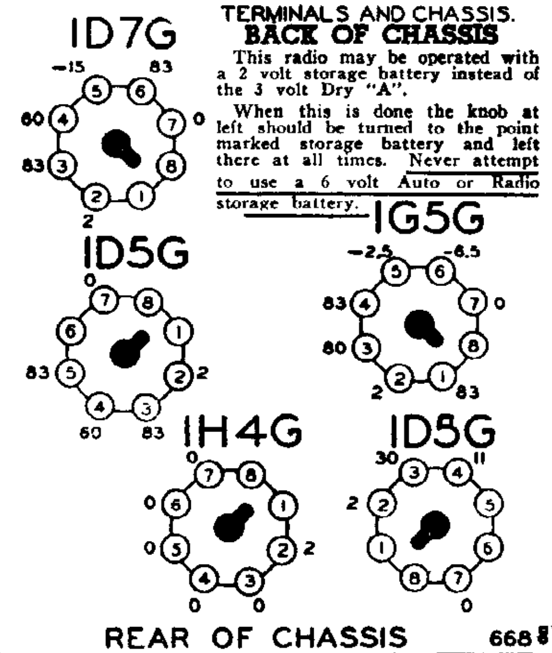


FIG. 3

PARTS (SERIAL No. 8J312900 and UP)

RESISTORS

R1	BE13021	20M ohm—⅓ w.
R2	BE13012	50M ohm—⅓ w.
R3	BE13020	100M ohm—⅓ w.
R4	BE13017	10M ohm—⅓ w.
R5	BE13038	2 megohm—⅓ w.
R6	BE13038	2 megohm—⅓ w.
R7	BE101140	1 megohm Volume Control
R8	BE13019	1 megohm—⅓ w.
R9	BE13019	1 megohm—⅓ w.
R10	BE1309	200 M ohm—⅓ w.
R11	BE13019	1 megohm—⅓ w.
R12	BE13093	450 ohm—⅓ w.
R13	BE10179	Filament Rheostat (4.75 ohms)

CONDENSERS

C	BE10289	Two Gang Variable Condenser
C1		Antenna Section Trimmer
C2	BE1009	.05 x 200 v.
C3		Oscillator Section Trimmer
C4	BE12464	Series Pad
C5	BE10022	.05 x 200 v.
C6	BE1295	.0001 Mica
C7	BE1009	.05 x 200 v.
C8	BE10048	.25 x 200 v.
C9	BE10011	.01 x 400 v.
C10	BE1009	.05 x 200 v.
C11	BE1292	.0005 Mica
C12	BE10011	.01 x 400 v.
C13	BE11935	25 mfd. 25 v. Lytic Condenser
C14	BE10071	.004 x 600 v.

PARTS

T1	BE11192B	Antenna Coil Complete
T2	BE11096	Oscillator Coil Complete
T3	BE108111C	Input I.F. Complete
T4	BE108112	Output I.F. Complete
T5	BE11476	6 in. P. M. Speaker
S1		Double Pole Double Throw Switch on Volume Control.

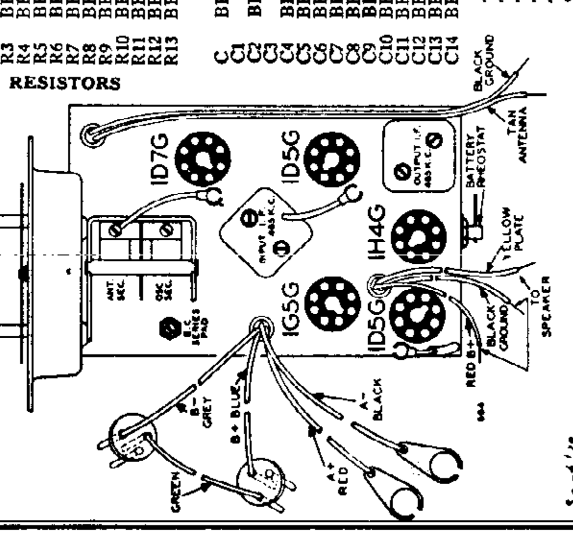


FIG 1—TOP VIEW

Sept. '38

MODELS 62-550, 62-1550
62-2550
MODELS 93WG602, 93WG603
Alignment

MONTGOMERY WARD & CO.

MODELS 62-558, 62-1558
62-2558
MODEL 62-653
Alignment, Trimmers

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

MODELS 62-550, 62-1550, 62-2550
Series A

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1D5G I.F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1D7G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1735 Kc.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Antenna Broadcast	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Set dial at 600 Kc.	B.C. Series Pad (See Fig. 1)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

FREQUENCY RANGE
535 to 1725KC.

Power Output ——— 150 Milliwatts Undistorted, 250 Milliwatts Maximum
Intermediate Frequency ——— 465 KC.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

MODELS 62-558, 62-1558, 62-2558
Series A, Issue A

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1N5G 2nd I. F.	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1N5G 1st I. F.	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Interstage I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1A7G Mixer	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 Mc.	Trimmer C6 — Top of front section of gang (See Fig. 1)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 Mc.	Trimmer C2 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 6 Mc.	Trimmer C7 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum dial. (See note "A")
BROAD-CAST BAND	1750 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer C8 (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 1500 Kc.	Trimmer C3 (See Fig. 4)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer C9 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

ALIGNMENT PROCEDURE Model 62-653

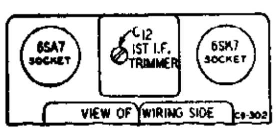


Fig. 6—Location of 1st I.F. Trimmer in Tuning Unit

Remove grille and speaker from speaker unit.

Remove the chassis from tuning unit case in accordance with the article under "General Installation Items" in this manual.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6SA7 1st detector tube (prong No. 8). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control at maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. Three of the trimmers are in the speaker unit—See Fig. 2. One trimmer is at the top of the tuning unit —See Fig. 6.

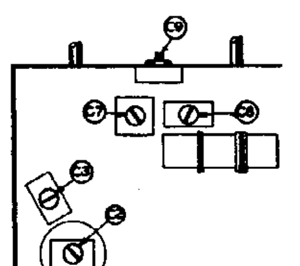
Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 25 mmf., use a 35 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Set the signal generator for 1580 KC. Turn the tuning knob until the iron cores are as far out of the tuning coils as they will go. Then adjust the oscillator trimmer C6 (Fig. 1) until maximum output is obtained.

Set the signal generator for 1000 KC. Turn the tuning knob until maximum output is obtained. Adjust interstage trimmer C7 and antenna trimmer C2 for maximum output—See Fig. 1.

Reassemble the radio and install it in the automobile. Insert the car antenna cable. Tune in a weak signal near 1000 KC and readjust the antenna trimmer C2 for maximum output.

Calibration—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—See article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 KC. Loosen the set screw of the large gear that drives the dial drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.



Ⓜ316

MODELS 62-558, 62-1558
62-2558
Series A

ALIGNMENT PROCEDURE Models 93WG602 and 93WG603

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes. Connect Ground Post of Signal Generator to B—(12SK7—Prong No. 3) in Chassis.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	.1 mf.	Turn Rotor to full open	1st I.F. (C7) & (C8) 2nd I.F. (C9) & (C10)
1730 KC	Signal Grid of 1st Det.	.1 mf.	Turn Rotor to full open	Oscillator (C2)
1500 KC	None—See Note		Turn Rotor to max. output	Antenna (C3)

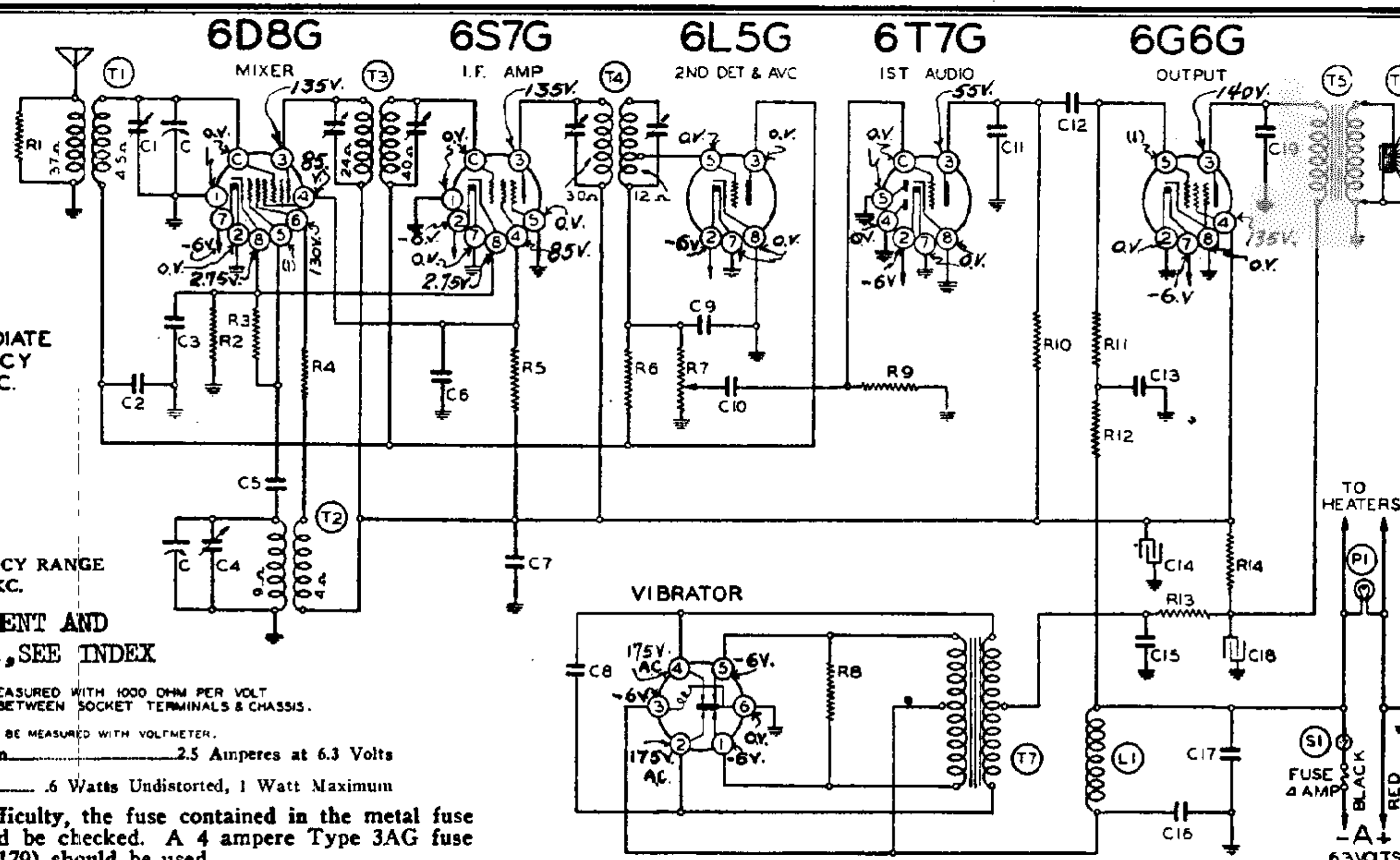
CALIBRATION—If it is necessary to calibrate the radio, remove the back cover. Turn the tuning control drum until the 2 set screws on the dial hub near the volume control can be reached with a screwdriver. Loosen the 2 set screws by turning them about 1/8th turn in a counter-clockwise direction. Tune in an 800 KC signal. Hold the tuning control motionless and at the same time turn the dial drum until the dial is in calibration. Then slowly turn the tuning control drum until the 2 set screws can be reached and re-tightened with a screwdriver. Check to see that the dial has remained in calibration.

Dummy Antenna—.1 mf.

NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

MONTGOMERY WARD & CO.

MODEL 62-552, Series A
Schematic, Voltage
Socket, Trimmers
Alignment



INTERMEDIATE FREQUENCY 465 K.C.

FREQUENCY RANGE 535 to 1735 KC.

FOR ALIGNMENT AND TUNER DATA, SEE INDEX

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

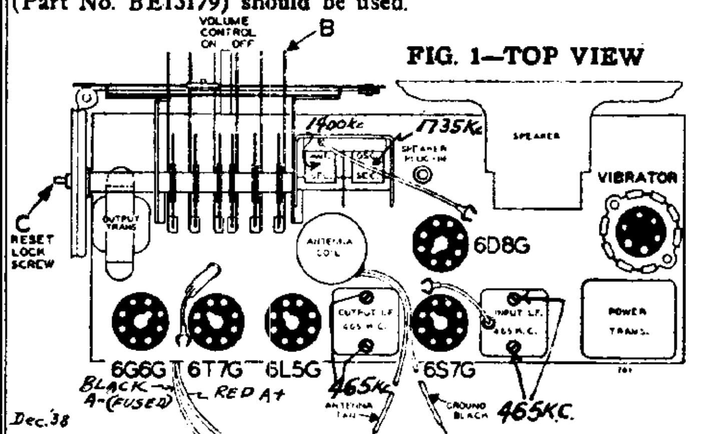
(1)—CANNOT BE MEASURED WITH VOLTMETER.

Power Consumption.................2.5 Amperes at 6.3 Volts

Power Output.............. .6 Watts Undistorted, 1 Watt Maximum

In case of difficulty, the fuse contained in the metal fuse receptacle should be checked. A 4 ampere Type 3AG fuse (Part No. BE13179) should be used.

FIG. 1—TOP VIEW



R1	13017	10M ohm—1/3 w.
R2	13097	200 ohm—1/3 w.
R3	13012	50M ohm—1/3 w.
R4	13092	1000 ohm—1/3 w.
R5	130157	12M ohm—1/3 w.
R6	1304	3 megohm—1/3 w.
R7	101126	1 megohm—volume control
R8	13097	200 ohm—1/3 w.
R9	130225	15 megohm—1/3 w.
R10	13011	250M ohm—1/3 w.
R11	130102	500M ohm—1/3 w.
R12	130103	100M ohm—1/3 w.
R13	130168	100 ohm—1/3 w.
R14	13092	1000 ohm—1/3 w.

CONDENSERS

C	10294	2 gang variable condenser
C1		Antenna Trimmer
C2	1009	.05 x 200 v.
C3	10048	.25 x 200 v.
C4		Oscillator Trimmer
C5	1295	.0001 mica
C6	10020	.1 x 200 v.
C7	10020	.1 x 200 v.
C8	10068	.003 x 1400 v.
C9	12960	.00015 mica
C10	10011	.01 x 400 v.
C11	1292	.0005 mica
C12	10011	.01 x 400 v.
C13	10020	.1 x 200 v.
C14	11959C	10 mfd. lytic—200 w. v.
C15	10020	.1 x 200 v.
C16	10040	.5 x 120 v.
C17	10040	.5 x 120 v.
C18	11959C	30 mfd. lytic—200 w. v.
C19	10019	.006 x 600 v.

C14 and C18 in same unit

PARTS

T1	11185C	Antenna Coil
T2	110103	Oscillator Coil
T3	108129B	Input I. F. Coil—465 kc.
T4	108130B	Output I. F. Coil—465 kc.
T5	10569B	Output Transformer
T6	114143	6" P. M. Speaker
T7	104137D	Power Transformer
L1	10568	"A" Choke
P1	10789	6.3 volt pilot light T40—150 ma.
S1		Off-on switch on volume control

MODEL 62-553
Schematic, Voltage
Socket, Trimmers

MONTGOMERY WARD & CO.

PARTS (Serial No. 8M502000 and up)

RESISTORS

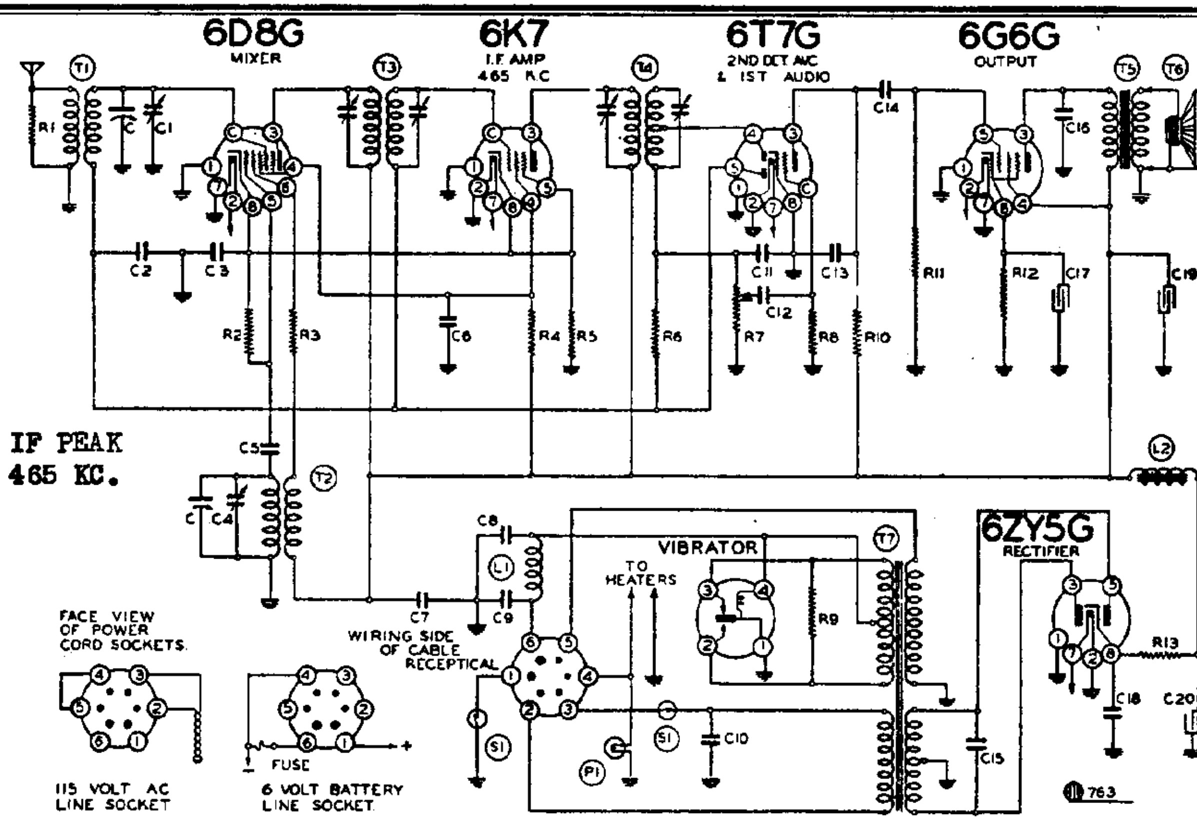
R1	BE13017	10M ohm—⅓ w.
R2	BE13012	50M ohm—⅓ w.
R3	BE13092	1000 ohm—⅓ w.
R4	BE130157	12M ohm—⅓ w.
R5	BE13097	200 ohm—⅓ w.
R6	BE1304	3 megohm—⅓ w.
R7	BE101150	1 megohm volume control
R8	BE130225	15 megohm—⅓ w.
R9	BE13097	200 ohm—⅓ w.
R10	BE130266	200M ohm—⅓ w.
R11	BE130102	500M ohm—⅓ w.
R12	BE13093	450 ohm—⅓ w.
R13	BE130168	100 ohm—⅓ w.

CONDENSERS

C	BE10294	2 gang variable condenser
C1		Antenna Trimmer
C2	BE1009	.05 x 200 v.
C3	BE10064	.25 x 200 v.
C4		Oscillator Trimmer
C5	BE1295	.0001 mica
C6	BE10020	.1 x 200 v.
C7	BE10020	.1 x 200 v.
C8	BE10040	.5 x 120 v
C9	BE10040	.5 x 120 v.
C10	BE10011	.01 x 400 v.
C11	BE12960	.00015 mica
C12	BE10011	.01 x 400 v.
C13	BE1292	.0005 mica
C14	BE1009	.05 x 200 v.
C15	BE10073	.008 x 1200 v.
C16	BE10019	.006 x 600 v.
C17	BE11979	20 mfd. x 25 w. volt
C18	BE10020	.1 x 200 v.
C19	BE11979	16 mfd. x 200 w. volt
C20	BE11979	16 mfd. x 200 w. volt

PARTS

T1	BE11185C	Antenna Coil
T2	BE110103	Oscillator Coil
T3	BE108129	Input I. F. Coil—465 kc.
T4	BE108130	Output I. F. Coil—465 kc.
T5	BE10569B	Output Transformer
T6	BE114143	6" P. M. Speaker
T7	BE104114B	Power Transformer
S1		Off-on switch on volume control
P1	BE10789	6.3 v. Pilot Light T40-150 ma.
L1	BE10568	"A" Choke
L2	BE10530G	"B" Choke



Power Consumption.........40 Watts (at 115 Volts 50/60 Cycles) or 2.5 Amperes at 6.3 Volts

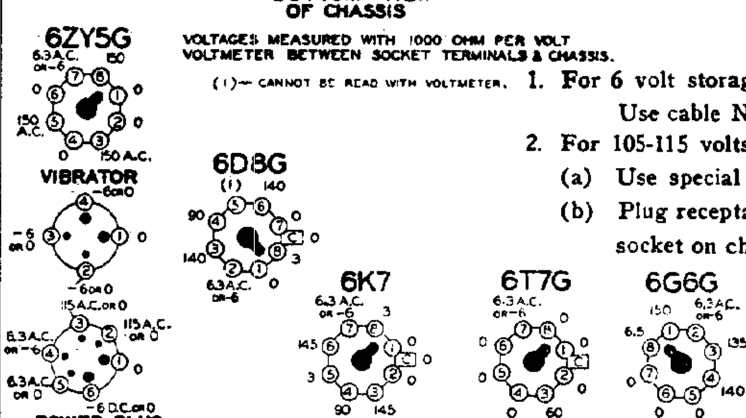
Power Output.........6 Watts Undistorted, 1 Watt Maximum

FREQUENCY RANGE
535 to 1735 KC.

BOTTOM VIEW
OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

(1)— CANNOT BE READ WITH VOLTMETER.



REAR OF CHASSIS

1. For 6 volt storage battery operation:
   Use cable No. BE107128C.
2. For 105-115 volts, 60 cycle operation:
   (a) Use special cable No. BE107129.
   (b) Plug receptacle of cable into power socket on chassis.

FOR ALIGNMENT
SEE INDEX

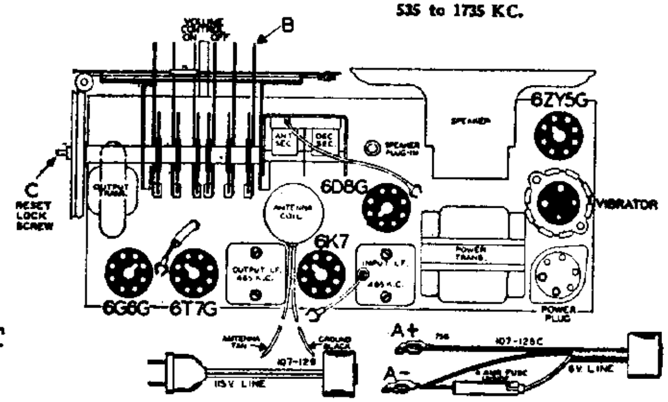


FIG. 1—TOP VIEW

Dec. '38

Socket, Trimmers
Alignment

MODEL 62-554
Schematic, Voltage

MONTGOMERY WARD & CO.

SPECIFICATIONS

Power Consumption - 6.25 Amperes at 6.3 Volts

Power Output - - - - - 1.5 Watts Undistorted

Sensitivity - - 1.5 Microvolts at .5 Watt Output

Selectivity - 42 KC Broad at 1000 Times Signal

Tuning Frequency Range - - - 540 to 1560 KC

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - 6" Electro-Dynamic

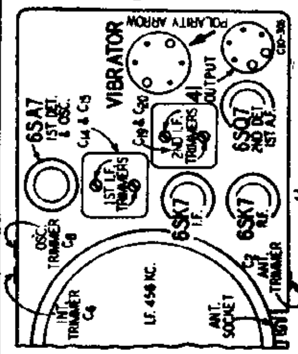
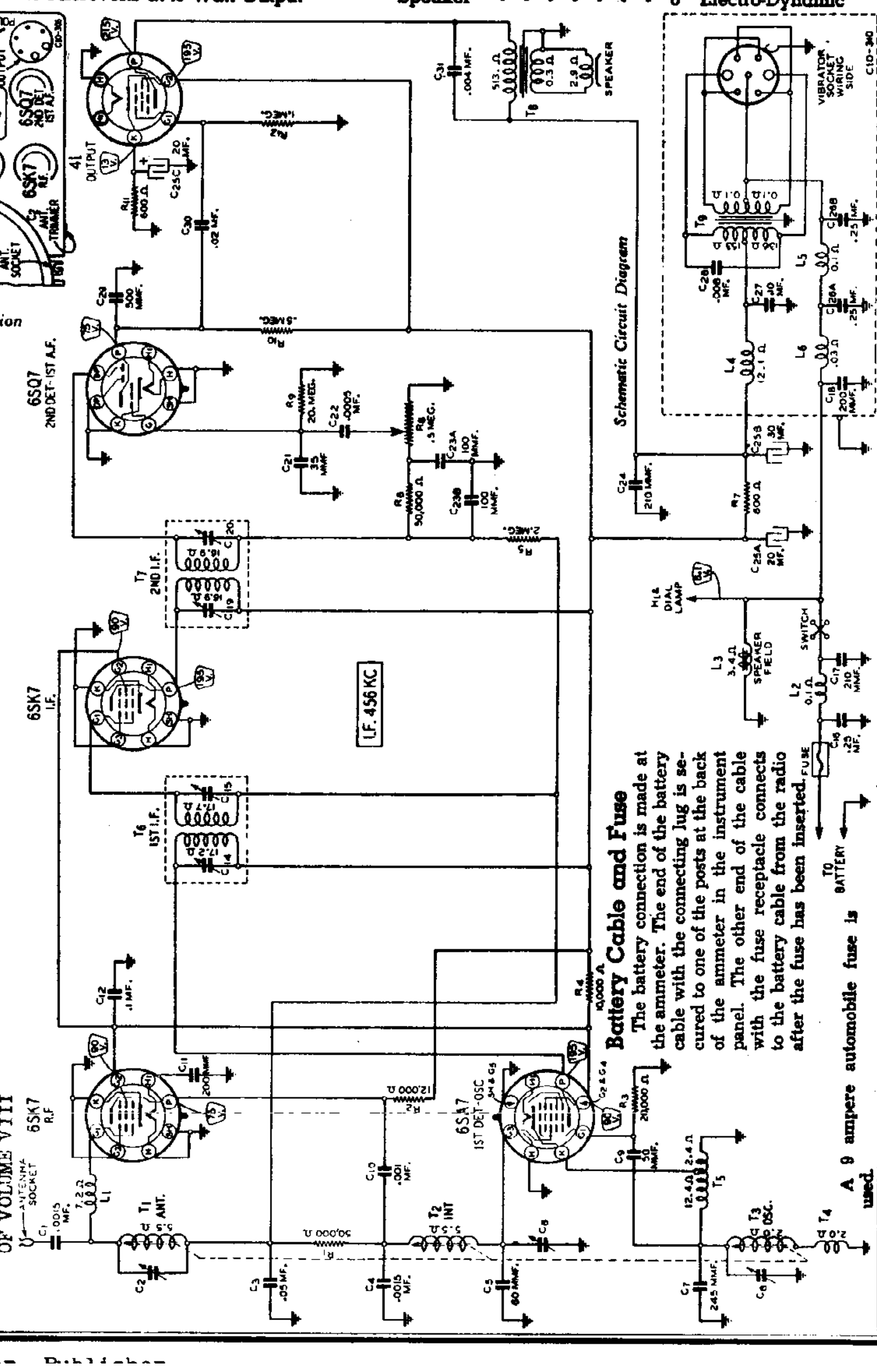


Fig. 2—Tube and Vibrator Location



IF ALIGNMENT
Adjust at 456 KC through 0.05 mfd. condenser.
BC ALIGNMENT
Adjust oscillator trimmer C8 at 1560 KC.
Adjust C6 and C2 trimmers at 1000 KC.

FOR CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION OF VOLUME VIII

FOR SETTING PUSH BUTTONS, SEE INDEX.

Battery Cable and Fuse

The battery connection is made at the ammeter. The end of the battery cable with the connecting lug is secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the cable with the fuse receptacle connects to the battery cable from the radio after the fuse has been inserted.

A 9 ampere automobile fuse is used.

MODEL 62-554
MODEL 62-653
MODEL 93WG562
MODELS 93WG602, 93WG603

MONTGOMERY WARD & CO.

Tuner Data

Procedure for Setting the Station Buttons

TYPICAL TUNING DATA (FOR NUMBER OF BUTTONS AND LOCATION OF LOCKING SCREWS - SEE FIGURES).

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you can receive.

Depress the manual tuning button AND KEEP IT DEPRESSED DURING THE ENTIRE SETTING OPERATION AS DESCRIBED BELOW. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

UNLOCK THE TUNING MECHANISM by inserting a SMALL HANDLE screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counter-clockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Insert a celluloid reinforcement tab half-way in the slot at the front of station button No. 1—See Fig. 3.

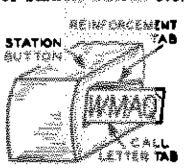


Fig. 3—Inserting Station Tab

Remove the correct station call letter tab for button No. 1 from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure outlined above. Changing the setting of one button will not affect the setting of the others.

KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the first (left hand) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

TURN THE MANUAL TUNING KNOB CAREFULLY BACK AND FORTH UNTIL THE ABOVE MENTIONED STATION IS ACCURATELY TUNED IN TO THE LOUDEST POINT. This station is now set on button No. 1.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Next KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the second station button FIRMLY AND GENTLY. Then proceed to set the second station on your list in the same manner as described above.

Then continue to set any additional stations on your list on the remaining buttons.

After all desired stations have been set, release any station button which is depressed as follows: KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push in the OFF button a slight amount—only enough to release any station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial, until the stop is reached.

NOW LOCK THE TUNING MECHANISM by inserting the SMALL HANDLE screwdriver, as shown in Fig. 1, in the locking screw opening. Turn the locking screw in a clockwise direction until it is tight. DO NOT tighten too much to avoid stripping the threads.

MODEL 62-554 ONLY

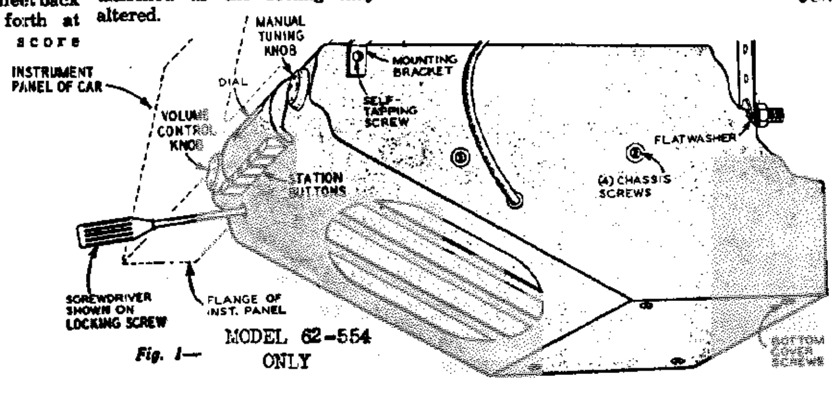
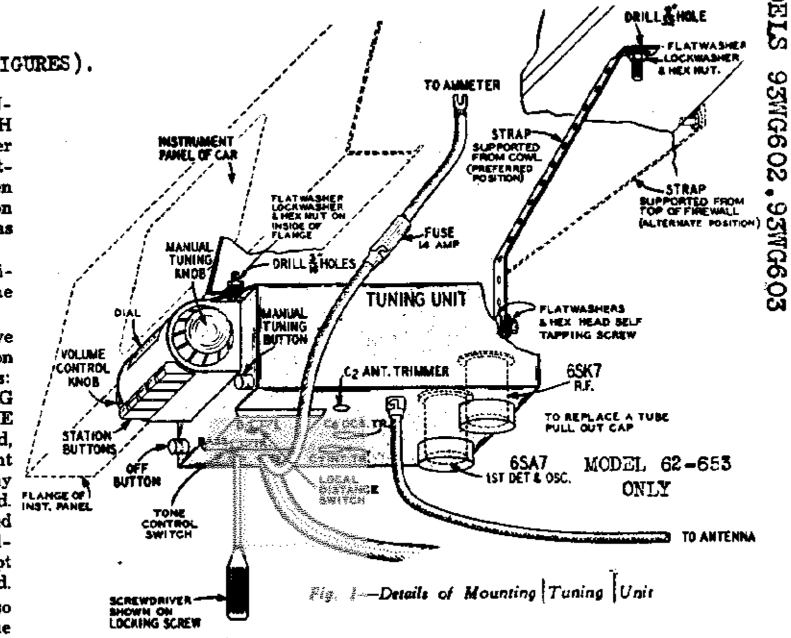
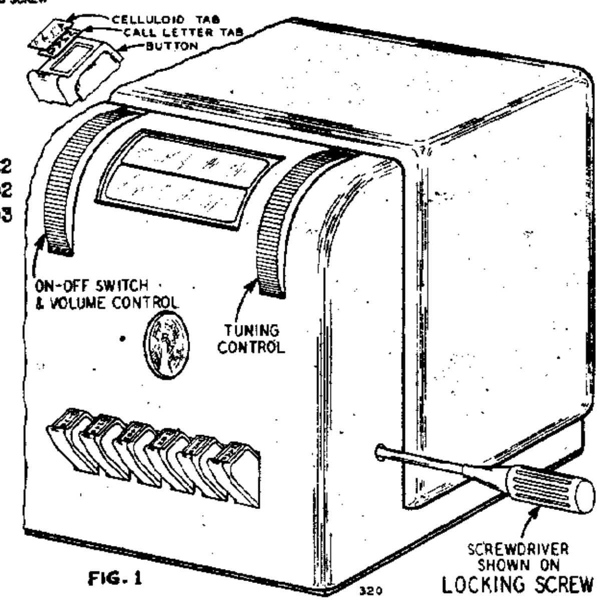


Fig. 1— MODEL 62-554 ONLY



MODEL 62-653 ONLY

Fig. 1—Details of Mounting Tuning Unit



MODELS 93WG-562 93WG-602 93WG-603

FIG. 1

Schematic, Voltage Socket, Alignment Trimmers

MONTGOMERY WARD & CO.

MODELS 62-555, 62-557
62-2555, 62-2557

SPECIFICATIONS

Input Voltages and Currents

"A" Battery.......................1.5 Volts—.30 Amperes
"B" Battery.......................90 Volts—12 to 15 Ma.

Power Output - - - 140 Milliwatts Undistorted

Selectivity - - 41 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - - 456 KC.

Speaker - - - - - - - - - 6" P.M. Dynamic

Tuning Frequency Range - - - 540 to 1600 KC.

Sensitivity (For .05 Watt Output)

Table Model.......................10.5 Microvolts Average
Portable Model...........20 Microvolts Per Meter Average

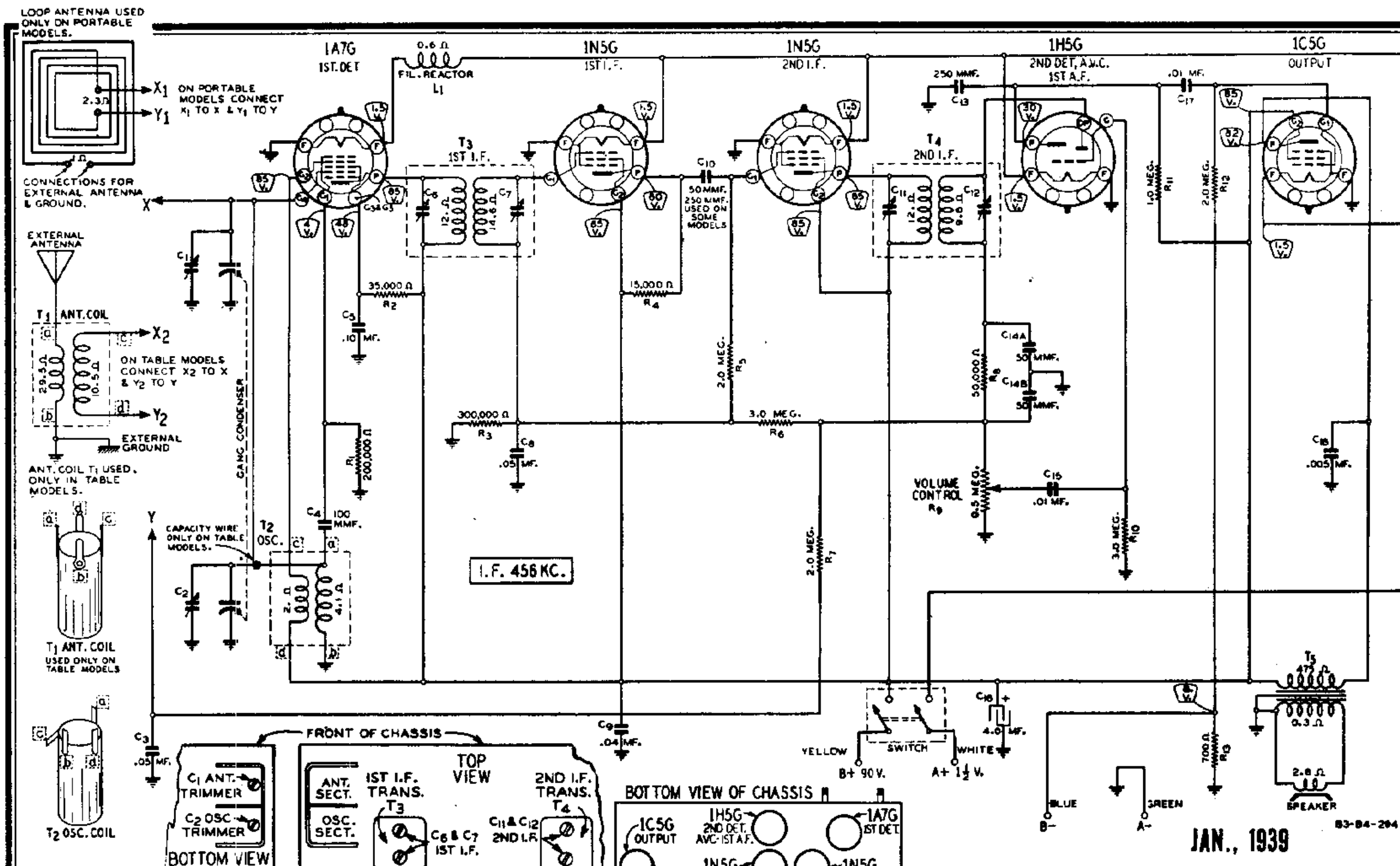


Fig. 3—Location of Trimmers

JAN., 1939

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Fig. 3)
456 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C11) & (C12)
1600 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
TABLE MODEL ONLY				
1500 KC	Antenna Lead	200 mmf.	Turn rotor to max. output	Antenna (C1)
PORTABLE MODEL ONLY				
1500 KC	None—See Note		Turn rotor to max. output	Antenna (C1)

Dummy Antennas—.1 mf. and 200 mmf.

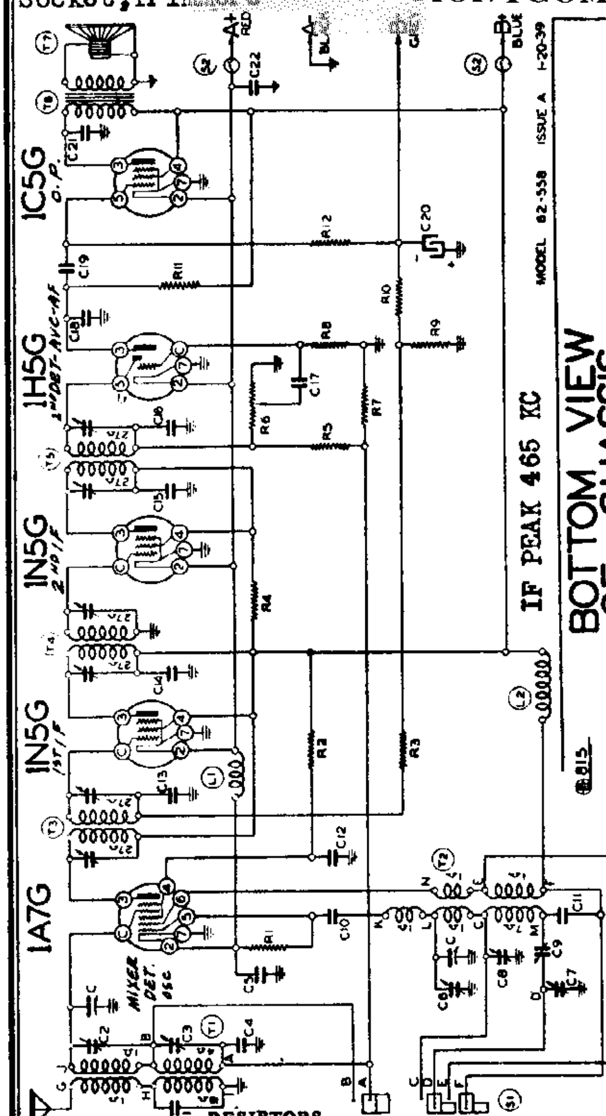
NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Connections for the output meter may be made through the opening for the outside antenna and ground connecting posts. This opening is at the bottom of the cabinet near the back. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

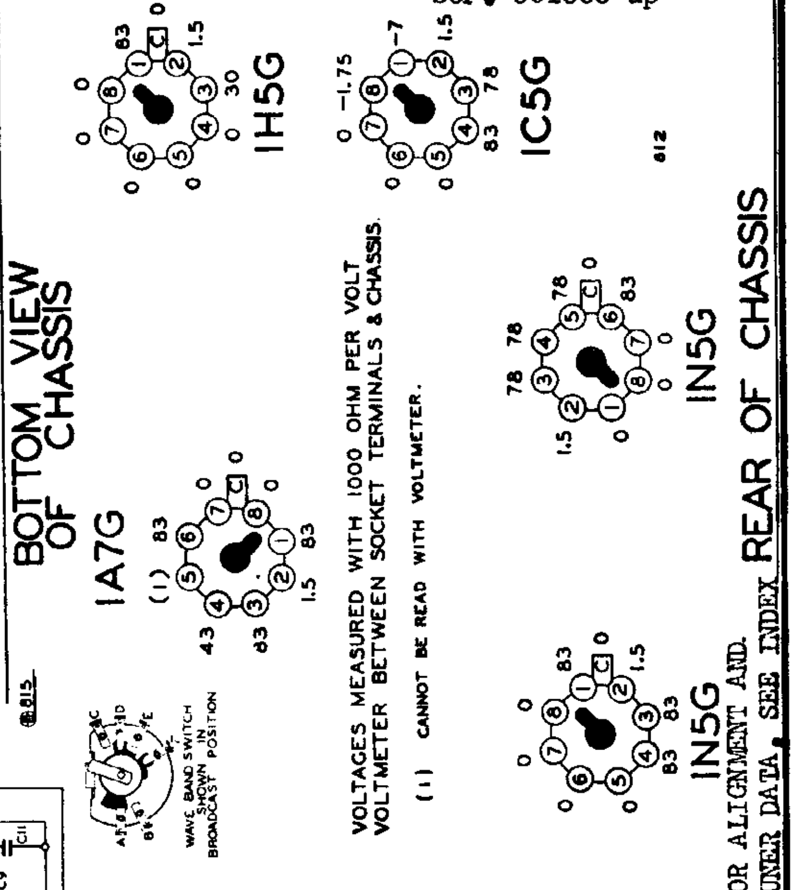
CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

Schematic, Voltage
Socket, Trimmers

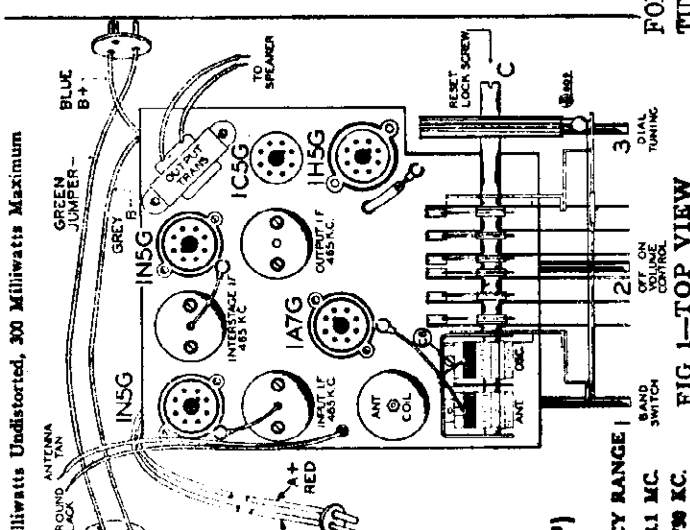
MONTGOMERY WARD & CO.

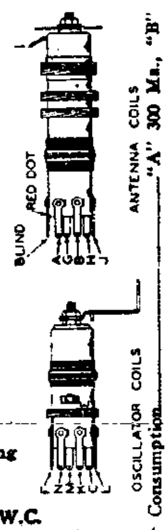
MODELS 62-558, 62-1558
62-2558
Series A, Issue A
Ser. 591000 up





FOR ALIGNMENT AND TUNER DATA, SEE INDEX





Power Output 150 Milliwatts Undistorted, 300 Milliwatts Maximum

Power Consumption "A" 300 Ma., "B" 13 Ma.

RESISTORS

R1	BE130266	200M ohm—½ w.
R2	BE13094	50M ohm—½ w.
R3	BE13019	1 megohm—½ w.
R4	BE130193	3M ohm—½ w.
R5	BE13038	2 megohm—½ w.
R6	BE101160	250M ohm—volume control
R7	BE130271	4 megohm—½ w.
R8	BE13019	1 megohm—½ w.
R9	BE130270	180 ohm—½ w.
R10	BE13093	450 ohm—½ w.
R11	BE1303	500M ohm—½ w.
R12	BE13019	1 megohm—½ w.

CONDENSERS

C	BE10299	2-gang variable condenser			
C1	BE12940	.0001 mica			
C2	BE12455	S.W. Antenna Adj. Trimmer			
C3	BE12439	B.C. Antenna Adj. Trimmer			
C4	BE10022	.05 x 200 v.			
C5	BE10064	.25 x 200 v.			
C6		S.W. Osc. Adj. Trimmer on gang			
C7	BE12994	S.W. Adj. Series pad .003 w.c.			
C8	BE12439	B.C. Osc. Adj. Trimmer			
C9	BE12438	B.C. Adj. Series Pad 580 mmf. W.C.			
C10	BE129135	.00005 mica	C16	BE12912	.00025 mica
C11	BE1009	.05 x 200 v.	C17	BE10019	.006 x 600 v.
C12	BE10020	.1 x 200 v.	C18	BE12921	.0002 mica
C13	BE10059	.05 x 200 v.	C19	BE10011	.01 x 400 v.
C14	BE10050	.25 x 200 v.	C20	BE11952	20 mfd. lytic w. v. 25
C15	BE10020	.1 x 200 v.	C21	BE10071	.004 x 600 v.
			C22	BE1006	.25 x 200 v.

PARTS

T1	BE111117	Antenna Coil Complete
T2	BE110106	Oscillator Coil Complete
T3	BE108133	Input I. F. 465 kc. complete
T4	BE108135	Interstage I. F.—465 kc. complete
T5	BE108134	Output I. F. — 465 kc. complete
T6	BE114115	6" P. M. Speaker
L1	BE10568	"A" Choke
L2	BE1233	R. F. "B" Choke
S1	BE12573	Wave Band Switch
S2		D.P. S.T. Switch on Volume Control
T7	BE10569	Output Transformer

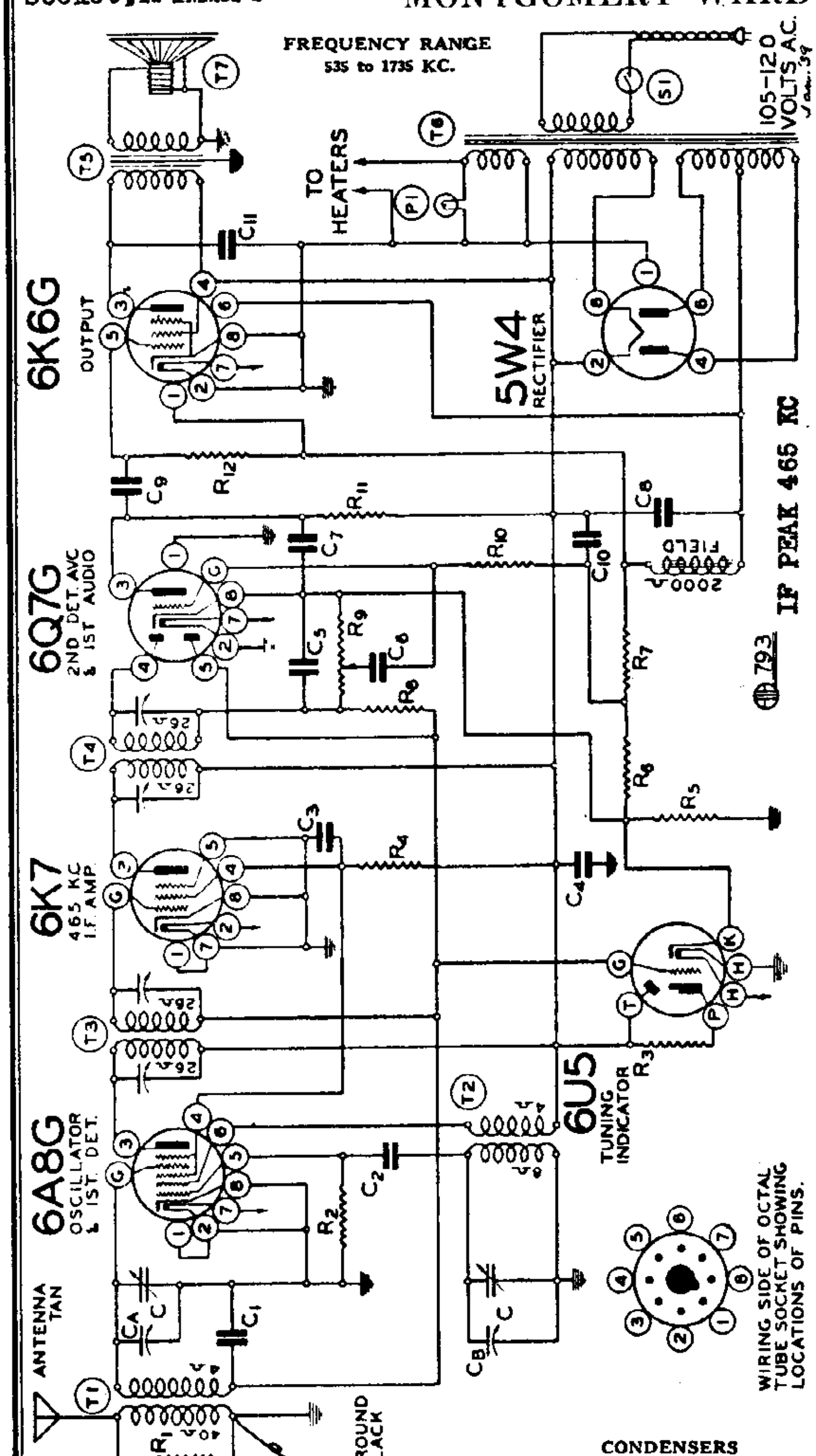
REPAIR PARTS (SERIAL No. 591000 and UP)

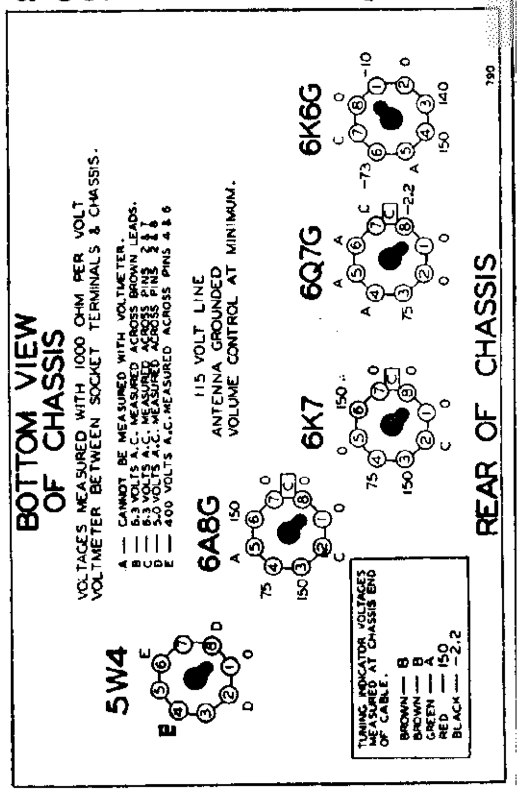
BAND SWITCH	FREQUENCY RANGE
Extreme Right Rotation	5.7 to 18.1 MC.
Extreme Left Rotation	530 to 1730 KC.

Schematic, Voltage
Socket, Trimmers

MONTGOMERY WARD & CO.

MODEL 62-601, Series A
Ser. 545900 up





Power Consumption — 45 Watts (at 115 Volts 50/60 Cycles)

Power Output — 1 Watt Undistorted, 2 Watts Maximum

FOR ALIGNMENT AND TUNER DATA, SEE INDEX

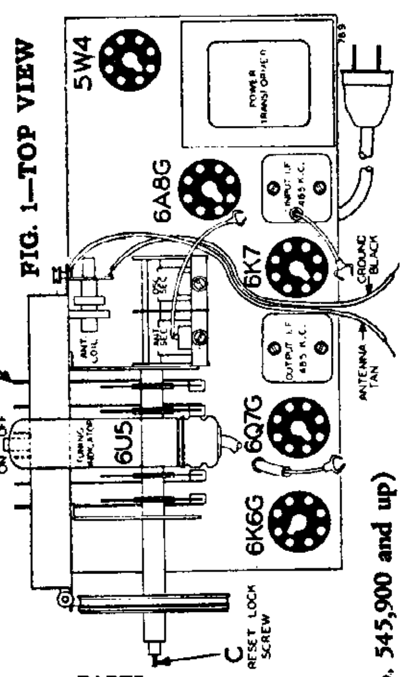


FIG. 1—TOP VIEW

RESISTORS

R1	BE13017	10M ohm—⅓ w.
R2	BE13012	50M ohm—⅓ w.
R3	BE130186	250M ohm—1/10 w.
R4	BE13021	20M ohm—⅓ w.
R5	BE10635	65 ohm Resistor Strip
R6	BE10635	45 ohm Resistor Strip
R7	BE10635	220 ohm Resistor Strip
R8	BE130170	3 megohm—⅓ w.
R9	BE101158	1 megohm—Volume control
R10	BE130170	3 megohm—⅓ w.
R11	BE1309	200M ohm—⅓ w
R12	BE130118	600M ohm—⅓ w

R5, R6 and R7 in same unit

CONDENSERS

C	BE10296	2 gang variable condenser
CA		Antenna Trimmer on Gang
CB		Oscillator Trimmer on Gang
C1	BE1009	.05 x 200 v.
C2	BE12912	.00025 Mica
C3	BE1001	.1 x 400 v.
C4	BE10013	.05 x 400 v.
C5	BE1295	.0001 Mica
C6	BE10011	.01 x 400 v.
C7	BE1292	.0005 Mica
C8	BE11947BC	5.0 mfd. 250 w. v. lytic
C9	BE10011	.01 x 400 v.
C10	BE11947BC	5.0 mfd. 250 w. v. lytic
C11	BE10019	.006 x 600 v.

C8 and C10 in same unit

PARTS

T1	BE111102	Antenna Coil Complete
T2	BE11072	Oscillator Coil Complete
T3	BE10882D	Input I. F.—465 kc.
T4	BE10883D	Output I. F.—465 kc.
T5	BE10555	Output Transformer
T6	BE104100B	Power Transformer
T7	BE114152	6" Dynamic Speaker (2000 ohm field)
S1		Off-on Switch on Volume Control
P1	BE10794	6-8 volt pilot light type 44

PARTS (Serial No. 545,900 and up)

MODELS 62-651,62-652
MODELS 62-654,62-655,62-1654,
62-2654,62-2655 ,62-1655,
MODELS 62-656,62-1656,62-2656
MODELS 62-750,62-751

MONTGOMERY WARD & CO.

Tuner Data

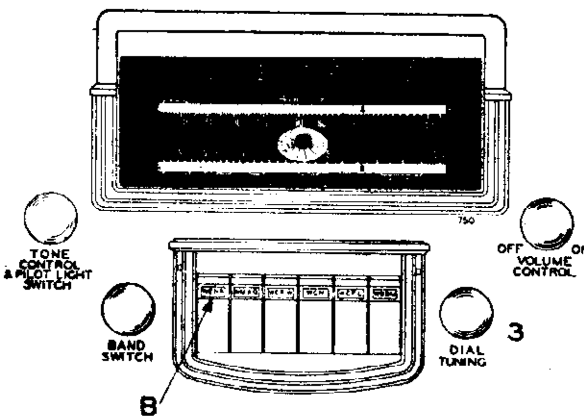


FIG. 2—FRONT VIEW

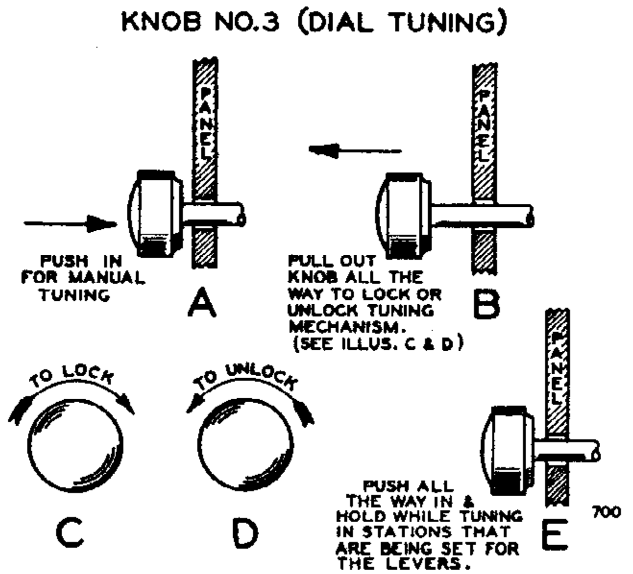


FIG. 3

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

IMPORTANT—Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be inserted into place over each of the station call letter tabs.

NOW, PROCEED AS FOLLOWS:—

1. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3), and rotate the tuning knob to the **left** (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism. (NOTE:—Automatic tuner **mechanism is locked TIGHT** when radio is shipped from the factory.)

2. Press down all the way any one of the automatic tuner levers. Holding it down firmly, press in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be **pressed in** (See Illus. "E," Fig. 3). Turn the dial tuning knob very slowly back and forth (**while still holding the automatic tuner lever in downward** position), noting the width of the shadow on the screen of the cathode-ray tuning indicator. Minimum width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.

3. Press down **another** automatic tuner lever. Holding it down **firmly, press** in on the dial tuning knob and carefully tune in the station indicated on the call letter tab on this lever.

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3) and rotate the tuning knob to the **right** (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3). This will lock the automatic tuner mechanism and the stations you have set up for automatic tuning will be locked in place. After you have locked the tuner mechanism, push the dial tuning knob in.

6. If you should desire to change any station you selected to another, pull the dial tuning knob all the way **out** and rotate the knob to the left (counterclockwise) and unlock the tuner mechanism. Select the new station as explained. (NOTE:—If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the tuner mechanism not being unlocked all the way. Pull the dial tuning knob out all the way and rotate the knob to the left (counterclockwise) until it will turn no further. The dial mechanism should work freely with the tuner lever pressed down).

7. After you have selected the new station, pull the dial tuning knob all the way **out** and rotate the knob to the **right** (clockwise) to lock the tuner mechanism. Be sure the knob is turned until it will turn no further, then **press** the dial tuning knob **in**.

8. The automatic tuner levers are now set up for quick tuning. Press down the lever key and—YOUR FAVORITE STATION IS SELECTED!

The **important** steps to remember when setting up stations on the tuner levers for automatic tuning are:

1. **To unlock** the tuner mechanism pull the dial tuning knob **all the way out.** You may find it necessary to rotate the knob slightly when pulling it out to make certain that the gears mesh properly. Rotate the dial tuning knob to the left (counterclockwise) as far as it will turn without forcing.

2. **To set a lever**, press down **all the way** and **hold** in this position while tuning in by means of the dial tuning knob the station you want this lever to be tuned to. (NOTE:—you will notice that it will be necessary to keep pressing in on the dial tuning knob while tuning in the station as a spring tends to push the knob out.) Set all the levers in the same manner before locking the mechanism.

3. **To lock** the tuner mechanism pull the dial tuning knob **all the way out.** Rotate the dial tuning knob to the right as far as it will turn making certain that it is tight, but it is not necessary to use force.

4. After locking or unlocking the tuner mechanism always return the dial tuning knob to its normal position (**pushed in**).

TYPICAL TUNING DATA

The procedure for setting the Automatic Levers is the same for all the above mentioned models. However, the number of Automatic Levers may differ.

Schematic, Socket, Trimmers

MODELS 62-651, 62-652
Series A, Ser. 8M498700 up

MONTGOMERY WARD & CO.

PARTS (SERIAL No. 8M498700 and UP)

CONDENSERS

C	BE10292C	2 gang variable condenser
C1	BE10012	.003 x 600 w.
C2	BE12469	B. C. Antenna Trimmer
C3	BE129132	.000125 mica
C4	BE129131	.002775 mica
C5	BE12469	S. W. Antenna Trimmer
C6	BE12466	.00045 Series Pad B. C.
C7	BE12466	.0015 Series Pad S. W.
C8	BE10020	.1 x 200 v.
C9	BE12470	S. W. Oscillator Trimmer
C10	BE12470	B. C. Oscillator Trimmer
C11	BE12938	.00005 mica
C12	BE10025	.002 x 600 v.
C13	BE10020	.1 x 200 v.
C14	BE10020	.1 x 200 v.
C15	BE1295	.0001 mica
C16	BE10020	.1 x 200 v.
C17	BE11959C	10 mfd. lytic
C18	BE10068	.003 x 1400 v.
C19	BE1009	.05 x 200 v.
C20	BE10012	.003 x 600 v.
C21	BE10020	.1 x 200 v.
C22	BE1292	.0005 mica
C23	BE10076	.02 x 400 v.
C24	BE10019	.006 x 600 v.
C25	BE1009	.05 x 200 v.
C26	BE10031	.5 x 120 v.
C27	BE10040	.5 x 120 v.
C28	BE10089	.008 x 800 v.
C29	BE11959C	.30 mfd. lytic

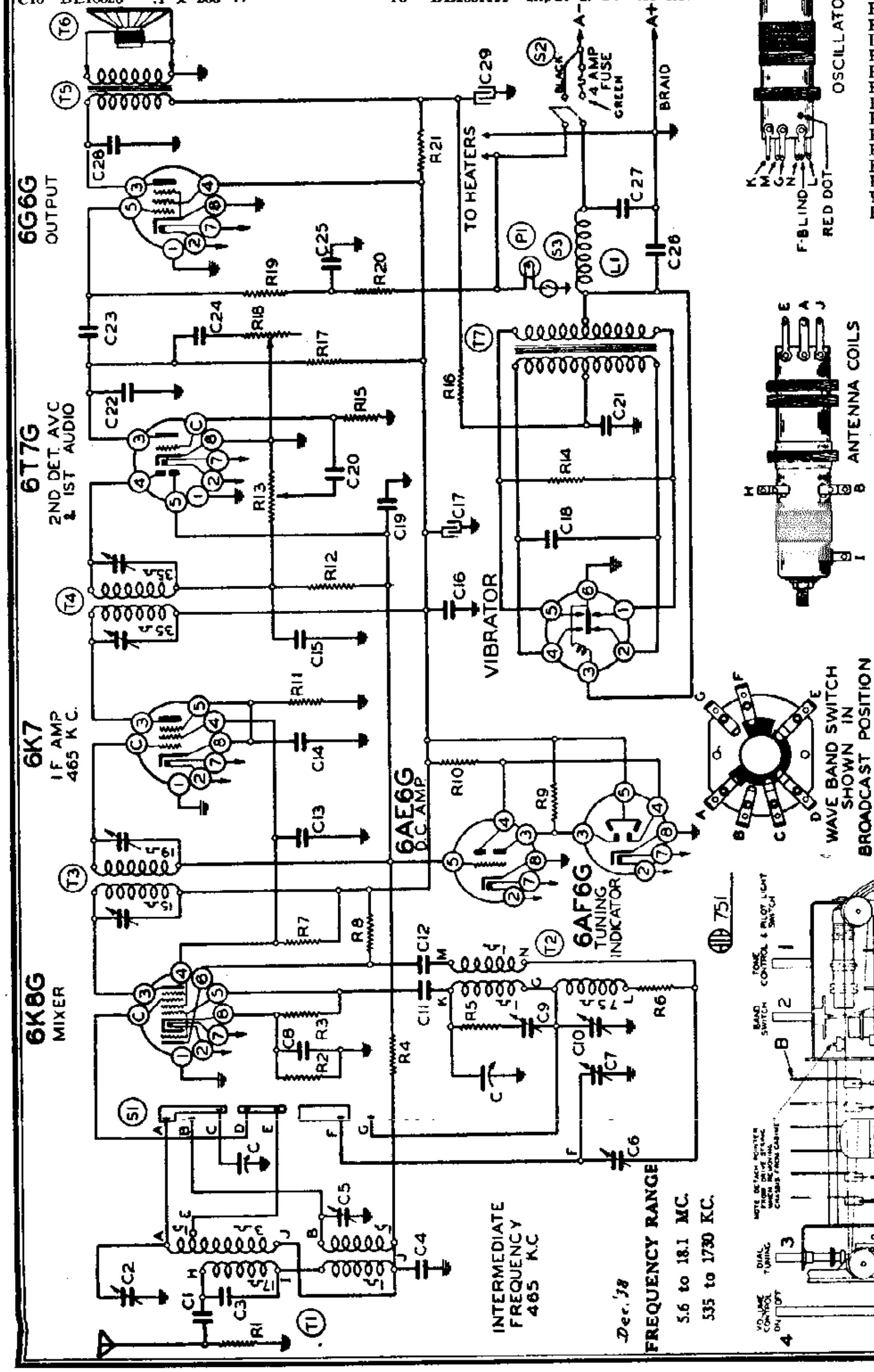
C17 - C29 in same unit

PARTS

T1	BE111112	Antenna Coil
T2	BE11098	Oscillator Coil
T3	BE108111F	Input I. F.—465 kc.
T4	BE108106-O	Output I. F.—465 kc.
T5	BE10569C	Output Transformer
T6	BE114143	6 in. P. M. Speaker (62-651)
T6	BE114139	8 in. P. M. Speaker (62-652)
T7	BE104137E	Power Transformer
L1	BE10568	"A" Choke
S1	BE12568	Band Switch
S2		Off-on Switch on Volume Control
S3		Push button pilot light switch on tone control
P1	BE10789	6.3 volt pilot light—T40—150 ma.

RESISTORS

R1	BE13017	10M ohm—½ w.
R2	BE13097	200 ohm—⅓ w.
R3	BE13012	50M ohm—⅓ w.
R4	BE13011	250M ohm—⅓ w.
R5	BE130240	30 ohm—⅓ w.
R6	BE130197	20 ohm—⅓ w.
R7	BE13082	10M ohm—⅓ w.
R8	BE13048	15M ohm—⅓ w.
R9	BE13019	1 megohm—⅓ w.
R10	BE13019	1 megohm—⅓ w.
R11	BE13070	500 ohm—⅓ w.
R12	BE1304	3 megohm—⅓ w.
R13	BE101153	1 megohm volume control
R14	BE13097	200 ohm—⅓ w.
R15	BE130225	15 megohm—⅓ w.
R16	BE130168	100 ohm—⅓ w.
R17	BE1309	200M ohm—⅓ w.
R18	BE101154	250M ohm—tone control
R19	BE130163	400M ohm—⅓ w.
R20	BE130103	100M ohm—⅓ w.
R21	BE13079	400 ohm—⅓ w.



BATTERY CONNECTIONS:

Referring to Fig. 1, connect the battery cable to the storage battery in the following manner:

(a) The storage battery should be located as far from the receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.

(c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.

FUSE:

In case of difficulty, the fuse contained in the metal fuse receptacle should be checked. A 4 ampere Type 3AG fuse (Part No. BE13179) should be used.

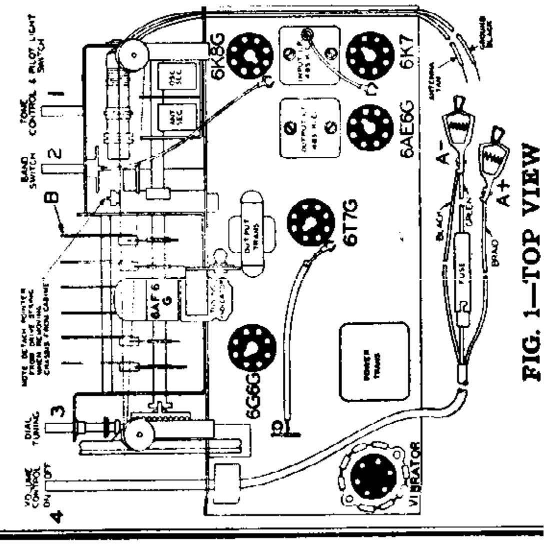


FIG. 1—TOP VIEW

MODELS 62-651,62-652
MODELS 62-654,62-655
62-1654,62-2654,62-2655
Voltage,Alignment,Trimmers

MONTGOMERY WARD & CO.

MODELS 62-750,62-751
Alignment,Trimmers

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8G	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer (C10) (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 1500 Kc.	Trimmer (C2) (See Fig. 4)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer (C6) (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 Mc.	Trimmer (C9) (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Dial Set at 17 Mc.	Trimmer (C5) (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 6 Mc.	Trimmer (C7) (See Fig. 4)	Short Wave Oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

Power Consumption.....2.8 Amperes at 6.3 Volts
Power Output.....6 Watts Undistorted, 1.1 Watts Maximum
Intermediate Frequency.....465 KC.

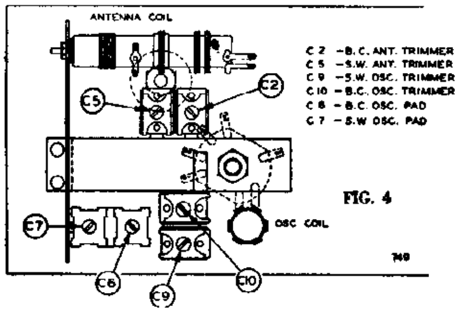
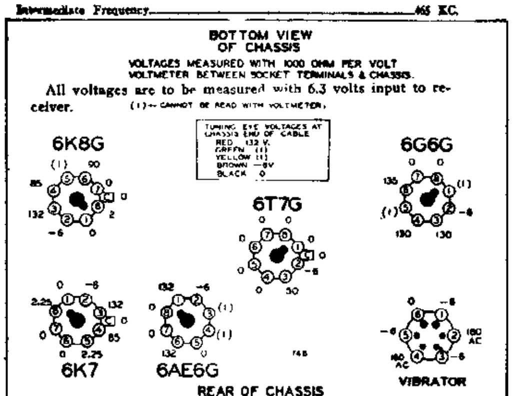


FIG. 4

ALIGNMENT
SOCKET
VOLTAGE
TRIMMERS

MODELS
62-651
62-652
Series A



To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE:—On the side of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

ALIGNMENT
TRIMMERS

MODELS
62-750
62-751

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1D5G-P 2nd I. F.	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1D5G-P 1st I. F.	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Interstage I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1C7G Mixer	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer C8 (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 1500 Kc.	Trimmer C2 (See Fig. 4)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer C11 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 Mc.	Trimmer C7 (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 Mc.	Trimmer C5 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 6 Mc.	Trimmer C6 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

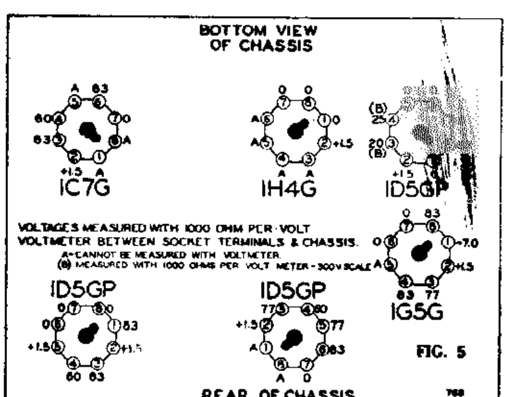


FIG. 5

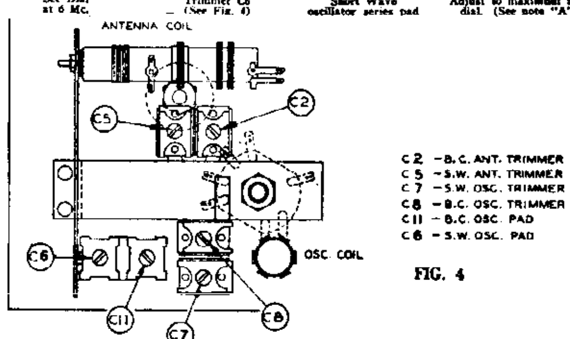


FIG. 4

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE:—On the side of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

MODELS 62-654, -655,
-1654, -1655,
-2654, -2655
Series A

FOR TUNER DATA
SEE INDEX

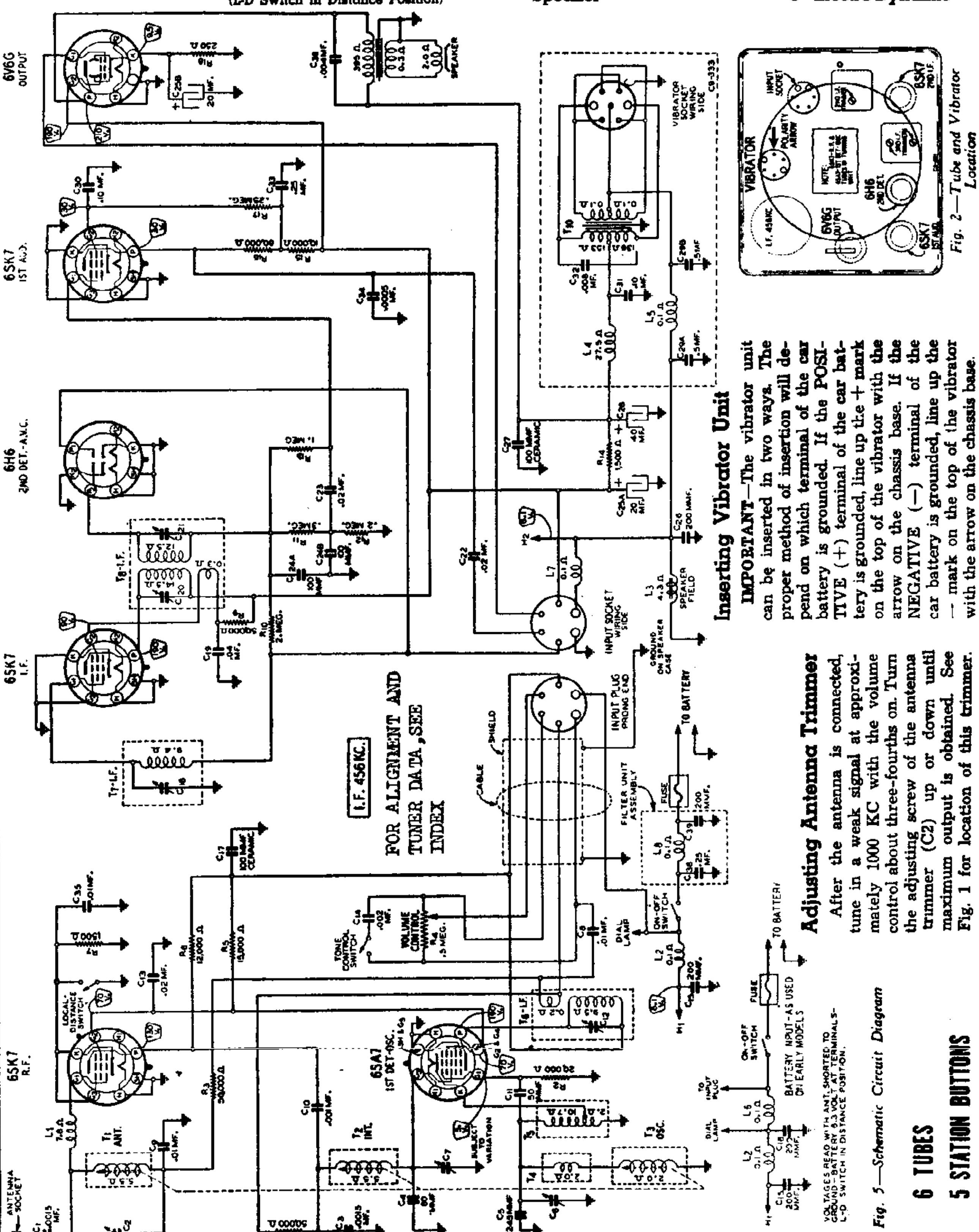
MODEL 62-653
Schematic, Voltage
Socket, Trimmers

MONTGOMERY WARD & CO.

SPECIFICATIONS

Power Consumption - 6.8 Amperes at 6.3 Volts
Power Output - - - - - 3 Watts Undistorted
Sensitivity - - 1.5 Microvolts at .5 Watt Output
(L-D Switch in Distance Position)

Selectivity - 39 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - 540 to 1560 KC
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - 6" Electro-Dynamic



Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (−) terminal of the car battery is grounded, line up the − mark on the top of the vibrator with the arrow on the chassis base.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

Fig. 2—Tube and Vibrator Location

I.F. 456KC.

FOR ALIGNMENT AND TUNER DATA, SEE INDEX

VOLTAGES READ WITH ANT. SHORTED TO GROUND—BATTERY 6.3 VOLT AT TERMINALS—L-D SWITCH IN DISTANCE POSITION.

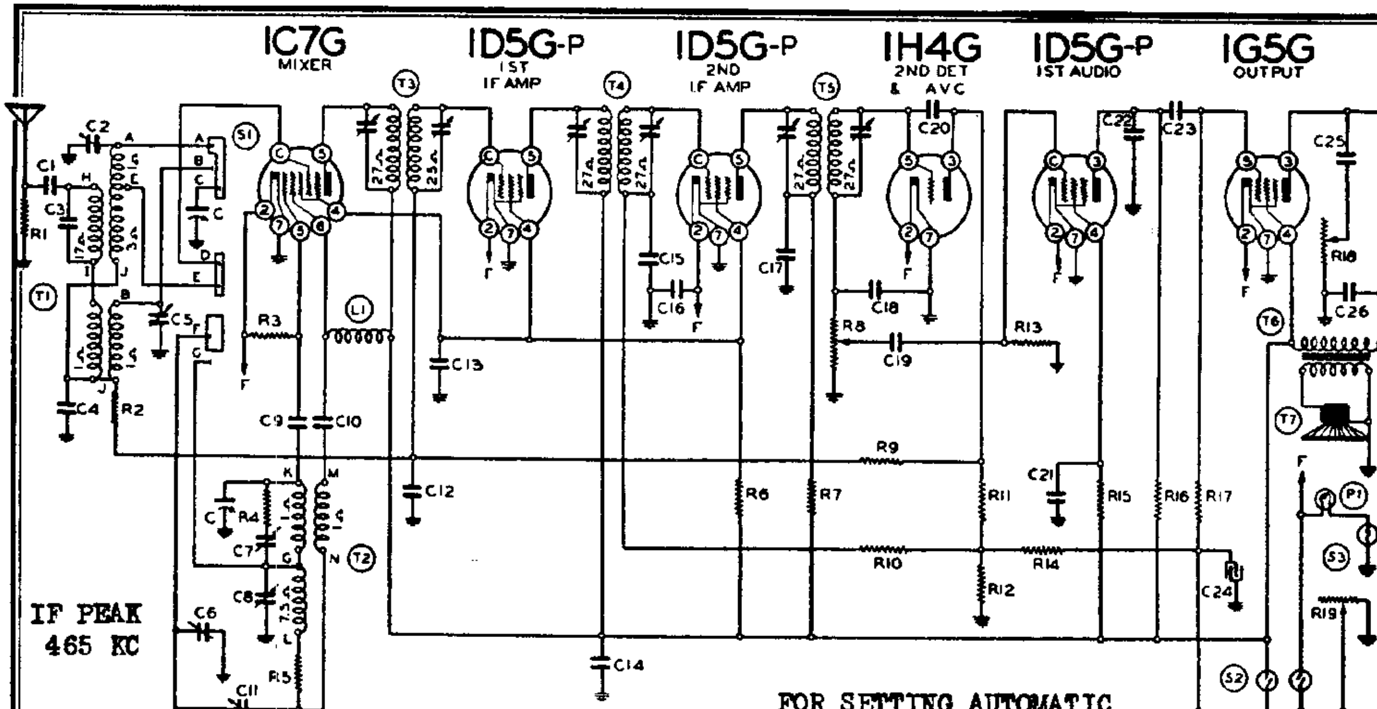
Fig. 5—Schematic Circuit Diagram

6 TUBES
5 STATION BUTTONS

MODELS 62-654, 62-655
62-1654, 62-1655
62-2654, 62-2655
Series A
Ser. 509200 up

MONTGOMERY WARD & CO.

Schematic, Socket
Trimmers



IF PEAK
465 KC

FOR SETTING AUTOMATIC TUNING LEVERS AND ALIGNMENT, SEE INDEX.

FREQUENCY RANGE

5.6 to 18.1 MC.
535 to 1730 KC.

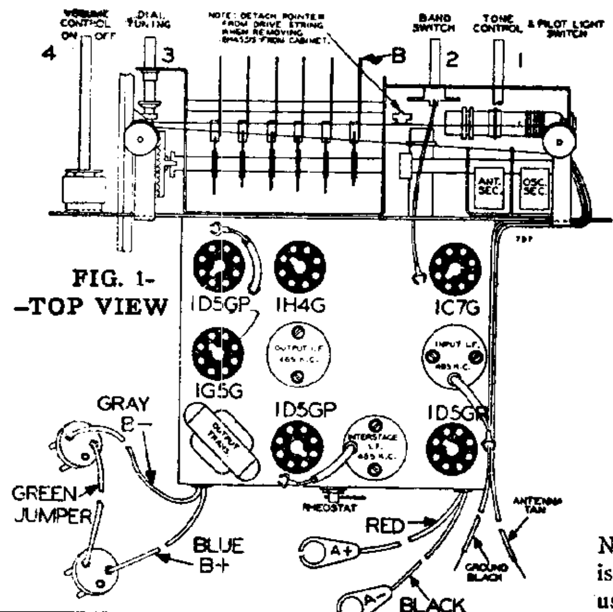
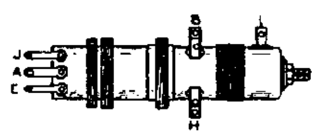
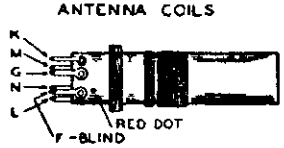


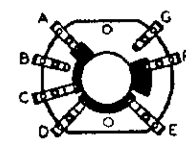
FIG. 1-
-TOP VIEW



ANTENNA COILS



OSCILLATOR COILS



WAVE BAND SWITCH SHOWN IN BROADCAST POSITION

Power Consumption

250 Milliwatts Maximum

170 Milliwatts Undistorted,

Power Output

"A"—480 Ma., "B"—19 Ma.

NOTE:—The letter "P" indicates that the 1D5G Tube used is a Pentode. It is important that only this type 1D5G-P be used in this radio.

PARTS
(SERIAL No. 509200 and UP)

RESISTORS

R1	BE13017	10M ohm—⅓ w.
R2	BE1309	200M ohm—⅓ w.
R3	BE13012	50M ohm—⅓ w.
R4	BE130197	20 ohm—⅓ w.
R5	BE130197	20 ohm—⅓ w.
R6	BE130265	8M ohm—⅓w.
R7	BE13043	2500 ohm—⅓ w.
R8	BE101152	250M ohm—volume control
R9	BE13019	1 megohm—⅓ w.
R10	BE13019	1 megohm—⅓ w.
R11	BE13019	1 megohm—⅓ w.
R12	BE13083	300 ohm— ⅓ w.
R13	BE130225	15 megohm—⅓ w.
R14	BE130168	100 ohm—⅓ w.
R15	BE13019	1 megohm—⅓ w.
R16	BE1303	500M ohm—⅓ w.
R17	BE13019	1 megohm—⅓ w.
R18	BE101151	1 megohm tone control
R19	BE101112	3.2 ohm—rheostat

CONDENSERS

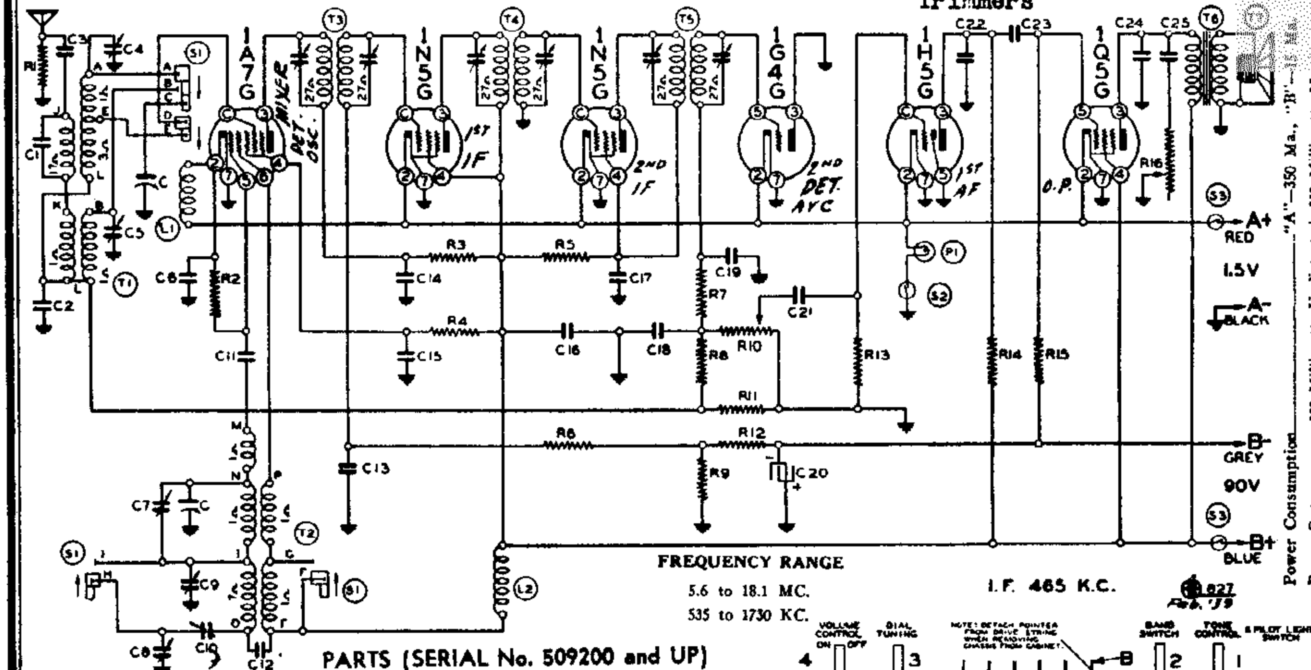
C	BE10292C	2 Gang Variable
C1	BE10078	.01 x 200 v.
C2	BE12469	B.C. Antenna Trimmer
C3	BE129132	.000125 mica
C4	BE129131	.002775 mica
C5	BE12469	S.W. Antenna Trimmer
C6	BE12466	S.W. Oscillator Series Pad
C7	BE12470	S.W. Oscillator Trimmer
C8	BE12470	B.C. Oscillator Trimmer
C9	BE12939	.00005 mica
C10	BE10025	.002 x 600 v.
C11	BE12466	B.C. Oscillator Series Pad
C12	BE10026	.02 x 400 v.
C13	BE10048	.25 x 200 v.
C14	BE10048	.25 x 200 v.
C15	BE10022	.05 x 200 v.
C16	BE10048	.25 x 200 v.
C17	BE10020	.1 x 200 v.
C18	BE12912	.00025 mica
C19	BE1007	.005 x 600 v.
C20	BE12939	.00005 mica
C21	BE10020	.1 x 200 v.
C22	BE1295	.0001 mica
C23	BE10086	.02 x 400 v.
C24	BE11952	25 mfd.-25 w. v. lytic
C25	BE10011	.01 x 400 v.
C26	BE10071	.004 x 600 v.

PARTS

T1	BE111112	Antenna Coil
T2	BE11098B	Oscillator Coil
T3	BE108128	Input I. F.—465 Kc.
T4	BE108127	Interstage I. F.—465 Kc.
T5	BE10879E	Output I. F.—465 Kc.
T6	BE10569	Output Transformer
T7	BE114115	6" P. M. Speaker (62-654)
T7	BE114146	8" P. M. Speaker (62-655)
L1	BE1233	R. F. Choke
S1	BE12568	Wave Band Switch
S2		Off-on switch on volume control
S3		Push-in switch on tone control

MONTGOMERY WARD & CO.

MODELS 62-656,62-1656,62-2656
Series A,Ser.509200 up
Schematic,Voltage,Socket
Trimmers



FREQUENCY RANGE
5.6 to 18.1 MC.
535 to 1730 KC.

I.F. 465 K.C.

PARTS (SERIAL No. 509200 and UP)

RESISTORS

R1	BE13017	10M ohm—⅓ w.
R2	BE130266	200M ohm—⅓ w.
R3	BE13043	2500 ohm—⅓ w.
R4	BE13094	50M ohm—⅓ w.
R5	BE13043	2500 ohm—⅓ w.
R6	BE13019	1 megohm—⅓ w.
R7	BE13094	50M ohm—⅓ w.
R8	BE13038	2 megohm—⅓ w.
R9	BE130166	150 ohm—⅓ w.
R10	BE101152	250M ohm—volume control
R11	BE1304	3 megohm—⅓ w.
R12	BE13097	200 ohm—⅓ w.
R13	BE13019	1 megohm—⅓ w.
R14	BE1308	500M ohm—⅓ w.
R15	BE13019	1 megohm—⅓ w.
R16	BE101151	1 megohm tone control

CONDENSERS

C	BE10292C	2 Gang Variable Condenser
C1	BE129132	.000125 mica
C2	BE129131	.002775
C3	BE10078	.01 x 200 v.
C4	BE12469	B.C. Antenna Trimmer
C5	BE12469	S.W. Antenna Trimmer
C6	BE10048	.25 x 200 v.
C7	BE12470	S.W. Oscillator Trimmer
C8	BE12479	.00136 W.C. S.W. Series Pad
C9	BE12470	B. C. Oscillator Trimmer
C10	BE12479	.00049 W.C. B.C. Series Pad
C11	BE12939	.00005 mica
C12	BE1009	.05 x 200 v.
C13	BE10022	.05 x 200 v.
C14	BE10048	.25 x 200 v.
C15	BE10020	.1 x 200 v.
C16	BE10048	.25 x 200 v.
C17	BE10020	.1 x 200 v.
C18	BE12912	.00025 mica
C19	BE1295	.0001 mica
C20	BE11952	25 mfd.—25 w.v. lytic
C21	BE1007	.005 x 600 v.
C22	BE1295	.0001 mica
C23	BE10026	.02 x 400 v.
C24	BE10071	.004 x 600 v.
C25	BE10011	.01 x 400 v.

PARTS

T1	BE111112	Antenna Coils
T2	BE110108	Oscillator Coils
T3	BE108128	Input I.F. Coil—465 kc.
T4	BE108127	Interstage I.F. Coil—465 kc.
T5	BE108134B	Output I.F. Coil—465 kc.
T6	BE10569	Output Transformer
T7	BE114115	6" Speaker—P.M.
T7	BE114146	8" Speaker—P.M.
S1	BE12575	Wave Band Switch
S2		Pilot Light Switch on tone control
S3		Off-On Switch on Volume Control
P1	BE107243	1½ v. pilot light
L1	BE10568	"A" Choke
L2	BE1233	R.F. "B" Choke

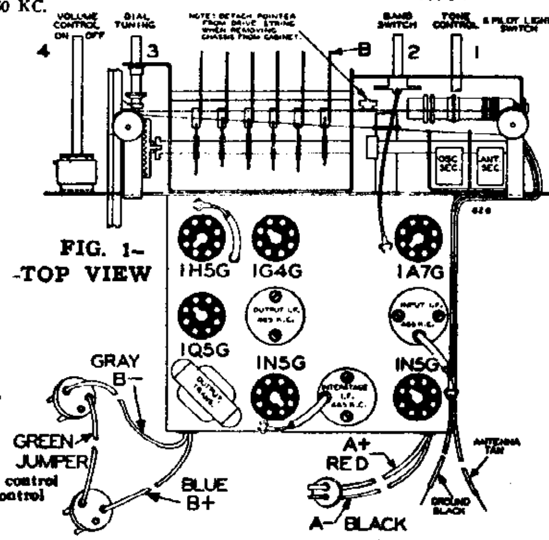
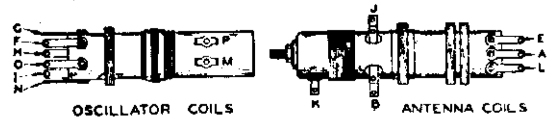
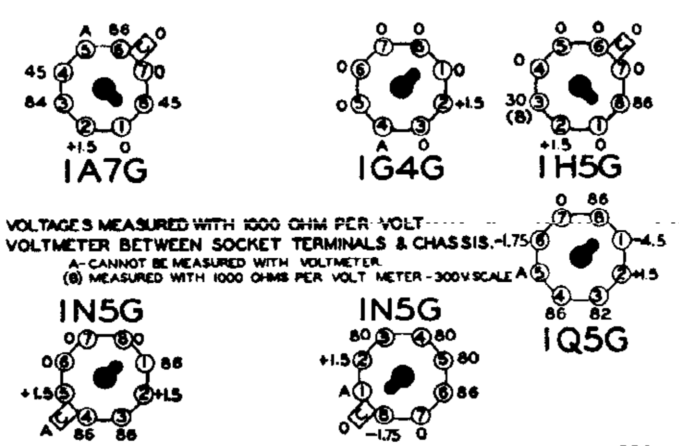


FIG. 1-
-TOP VIEW



FOR SETTING AUTOMATIC TUNING LEVERS SEE INDEX

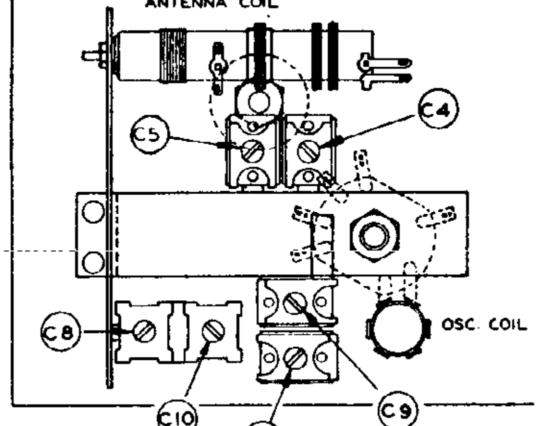
BOTTOM VIEW OF CHASSIS



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
A-CANNOT BE MEASURED WITH VOLTMETER.
(8) MEASURED WITH 1000 OHMS PER VOLT METER-300V SCALE

REAR OF CHASSIS

829



C4 - B.C. ANT. TRIMMER
C5 - S.W. ANT. TRIMMER
C7 - S.W. OSC. TRIMMER
C9 - B.C. OSC. TRIMMER
C10 - B.C. OSC. PAD
C8 - S.W. OSC. PAD

MODELS 62-656, 62-1656, 62-2656
MODELS 93BR454A, 93BR1455A MONTGOMERY WARD & CO.
MODEL 93BR713A

Alignment

MODELS 62-656, 62-1656, 62-2656
Series A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., and 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1N5G 2nd I. F.	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1N5G 1st I. F.	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Interstage I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1A7G Mixer	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set dial at 17 Mc.	Trimmer C7 (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set dial at 17 Mc.	Trimmer C5 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set dial at 6 Mc.	Trimmer C8 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer C9 (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 1400 Kc.	Trimmer C4 (See Fig. 4)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set dial at 600 Kc.	Trimmer C10 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")

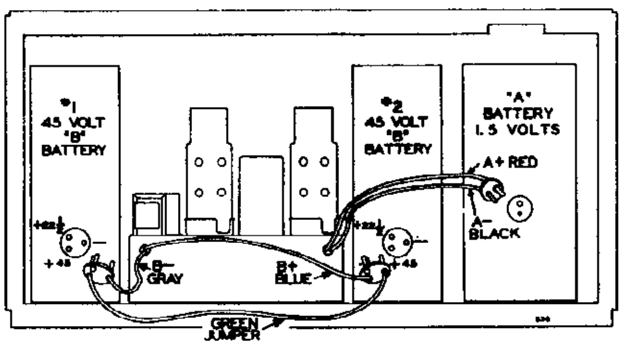
BAND SWITCH	BAND	FREQUENCY RANGE
Extreme Right Rotation	Short Wave	5.6 to 18.1 MC.
Extreme Left Rotation	Broadcast	535 to 1730 KC.

Power Consumption .... "A"—350 Ma., "B"—15 Ma.
Power Output .... 200 Milliwatts Undistorted, 350 Milliwatts Maximum
Intermediate Frequency .... 465 K.C.

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.



Connecting A Battery

First—Place the A Battery in the cabinet as shown.
NEXT—Insert the special two-prong connector plug into the socket on the A batteries as shown in illustration.

Connecting B Batteries

First—Place both B Batteries in the cabinet exactly as shown.
NEXT—Insert the special three-prong connector plugs into the sockets on the B batteries as shown in illustration.
NOTE: The above procedure and illustration pertains to the new style B batteries which have sockets; however, the old style B batteries which have terminals can be used by connecting them as follows.

FIRST—Remove the special plugs by cutting the wires off at the plugs.

NEXT—Connect gray colored B minus (—) wire to minus (—) terminal of battery on left side of receiver (marked Battery No. 1 in illustration).

NEXT—Connect one end of green connecting wire to plus (+45) terminal of battery No. 1 and other end to the minus (—) terminal of Battery No. 2.

NOW—Connect blue B plus (+) wire to the plus (+45) terminal of Battery No. 2.

MODELS 93BR-454A & 93BR-1455A

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1A7G Tube	Rotor full open (Plates out of mesh)	Four trimmers on top (See Fig. 1)	Output and input I. F.	(See Note "A") Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	200 mmf.	Grid of 1A7G Tube	Rotor full open (Plates out of mesh)	Trimmer (C3) front section of gang (See Fig. 4)	Oscillator	(See Note "A") Adjust to maximum output
	1400 Kc.		See Note "C"	Set dial at 1400 Kc.	Trimmer (C2) rear section of gang (See Fig. 4)	Antenna	(See Note "B") Adjust to maximum output

NOTE "A" — A 1 megohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer. (C3). The loop antenna must be disconnected from the chassis.
NOTE "B" — Remove the 1 megohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust trimmer (C2). (See note "C")
NOTE "C" — Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

FREQUENCY RANGE
545 to 1650 KC.

Power Output .... 200 Milliwatts Undistorted, 300 Milliwatts Maximum
Intermediate Frequency .... 465 KC.

CHASSIS No. 93BR713A

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C13) (See Fig. 4)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer (C7) (See Fig. 3)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C10) (See Fig. 3)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
	465 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at [illegible] Kc.	Trimmer (C1) (See Fig. 4)	I. F. Wave Trap	Adjust for minimum output
IMAGE ADJUSTMENT	2430 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Pick up signal at 1500 Kc. on dial	Trimmer (C6) (See Figs. 1 and 4)	Image rejection	Adjust for minimum output (See note "B")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer (C12) (See Fig. 4)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave	Dial Set at 17 Mc.	Trimmer (C8) (See Fig. 3)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 6 Mc.	Trimmer (C11) (See Fig. 3)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B" 1500 KC. is the image frequency of 2430 KC. Adjust Trimmer (C6) until a minimum output is obtained. Trimmer (C6) is mounted on the bottom of the chassis.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

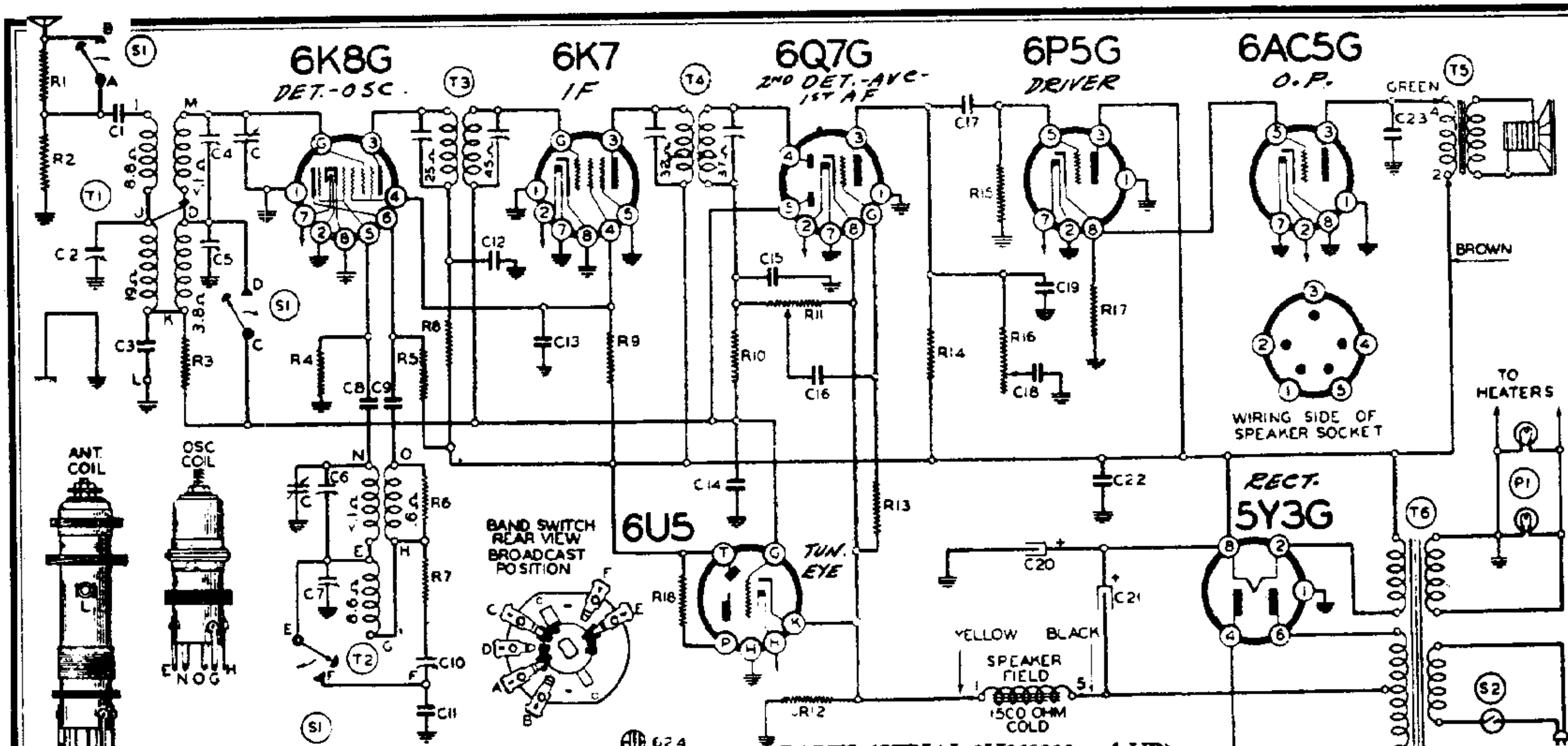
Schematic, Voltage
Socket, Trimmers

MONTGOMERY·WARD & CO.

MODELS 62-702, 62-703
Series A, Issue B
Ser. 8H262200 up

BAND SWITCH	BAND	FREQUENCY RANGE
Extreme Right Rotation	Short Wave	5.65 to 18.3 MC.
Extreme Left Rotation	Broadcast	535 to 1720 KC.

Power Consumption — 45 Watts (At 115 volts 50-60 cycles)
Power Output — 1.6 Watts Undistorted, 3 Watts Maximum
Selectivity — 58 KC. Broad at 1000 KC. 1000 Times Signal Strength
Intermediate Frequency — 465 KC.



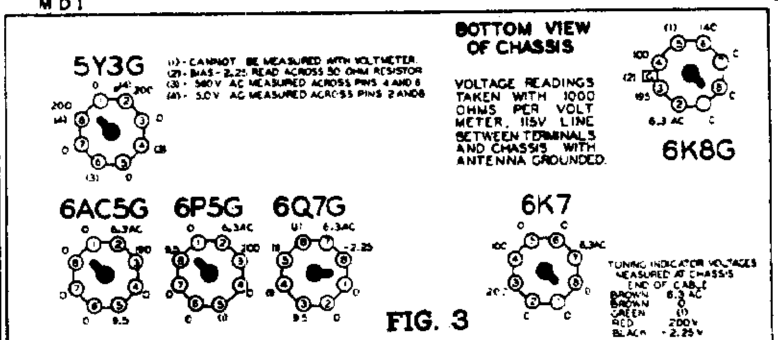
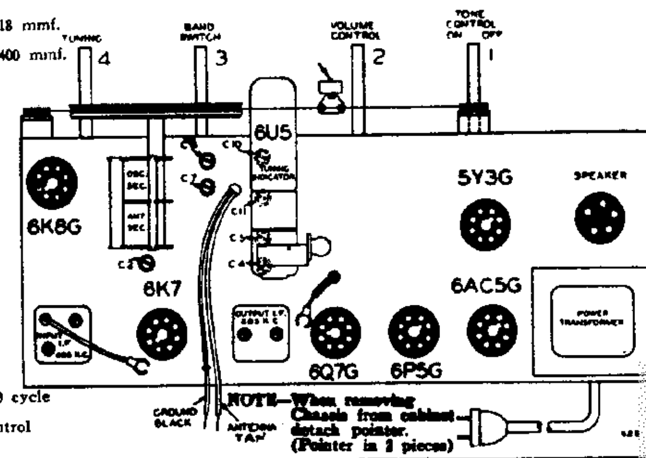


FIG. 3

PARTS (SERIAL 8H262200 and UP)

C3	BE129128	.0027 Mica
C4	BE12462	Dual Adjustable Trimmer
C5	BE12462	Dual Adjustable Trimmer
C6	BE12463	Dual Adjustable Trimmer
C7	BE12463	Dual Adjustable Trimmer
C8	BE12939	.000050 Mica
C9	BE10025	.002 x 600 v.
C10	BE12460 W. C.	Dual Compression Mica 418 mmf.
C11	BE12460 W. C.	Dual Compression Mica 3400 mmf.
C12	BE10026	.02 x 400 v.
C13	BE1001	.1 x 400 v.
C14	BE10096	.02 x 200 v.
C15	BE1295	.0001 mica
C16	BE10019	.006 x 600 v.
C17	BE10011	.01 x 400 v.
C18	BE10019	.006 x 600 v.
C19	BE1292	.0005 Mica
C20	BE11969	16 mfd. lytic
C21	BE11969	16 mfd. lytic
C22	BE10013	.05 x 400 v.
C23	BE10019	.006 x 600 v.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts.



REAR OF CHASSIS

RESISTORS

R1	BE130250	800 ohm—¼ w.
R2	BE130249	10M ohm—¼ w.
R3	BE13020	100M ohm—⅓ w.
R4	BE13012	50M ohm—⅓ w.
R5	BE13082	10M ohm—⅓ w.
R6	BE130235	1500 ohm—⅓ w.
R7	BE130240	30 ohm—⅓ w.
R8	BE13023	2M ohm—⅓ w.
R9	BE130176	20M ohm—⅓ w.
R10	BE1304	3 megohm—⅓ w.
R11	BE101137	Volume Control—1 Megohm
R12	BE130174	50 ohm—⅓ w.
R13	BE130225	15 megohm—⅓ w.
R14	BE1309	20M ohm—⅓ w.
R15	BE13019	1 megohm—⅓ w.
R16	BE101136	Tone Control—250M Ohm
R17	BE13006	25M ohm—½ watt
R18	BE130148	1 megohm—in tuning indicator socket—1/10 w.

CONDENSERS

C	BE10285	2 gang variable
C1	BE129127	.0001 Ceramic
C2	BE12461	Adjustable Trimmer

PARTS

T1	BE11193E	BC.—SW. Antenna Coil
T2	BE11089B	BC.—SW. Oscillator Coil
T3	BE108122	Input I.F.—465 kc.
T4	BE108106J	Output I.F.—465 kc.
T5	BE11415	6" Dynamic Speaker (1500 Ohm Field)
T6	BE104124F	Power Transformer—50/60 cycle
S1	BE12566	Band Switch
S2		Off-on switch on tone control
P1	BE10794	6-8 v. Pilot Lights (2)

MODELS 62-702, 62-703
Series A, Issue B
Alignment

MONTGOMERY WARD & CO.

MODEL 62-901
Alignment, Trimmers
Dial Data, Phono.

MODELS 62-702, 62-703 Series A Issue B

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Set Dial at 17 MC	Trimmer (C 6, Top of Chassis (See Fig. 1)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave (Extreme right rotation)	Dial Set at 17 MC	Trimmer (C 4) (See Fig. 1)	Short Wave antenna	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Rotor full open (Plates out of mesh)	Trimmer (C[illegible]) (See Fig. 1)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 1400 Kc.	Trimmer (C[illegible]) (See Fig. 1)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Set Dial at 600 Kc.	Trimmer (C[illegible]) (See Fig. 1)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
IMAGE REJECTION ADJUST-MENTS	2330 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme left rotation)	Pick up signal at 1400 kc. on dial	Trimmer (C2) (See Fig. 1)	Image rejection	Adjust for minimum output. (See note "B")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B" 1400KC is the image frequency of 2330KC. Adjust Trimmer (C2) until a minimum output is obtained.

NOTE "C" Trimmer (C11) is preadjusted at factory and should not be tampered with.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

MONTGOMERY WARD MODEL 62-901

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

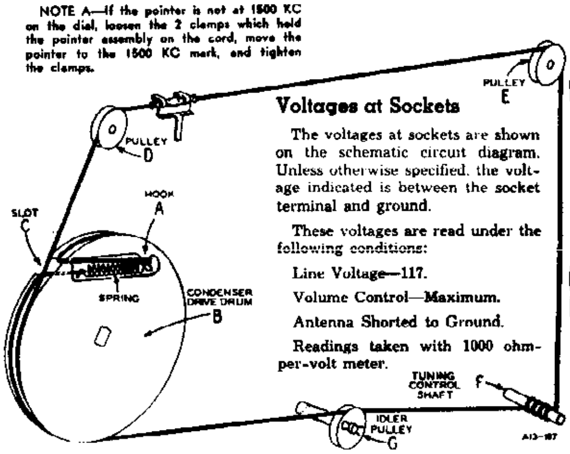


Fig. 4—Drive Cord Replacement

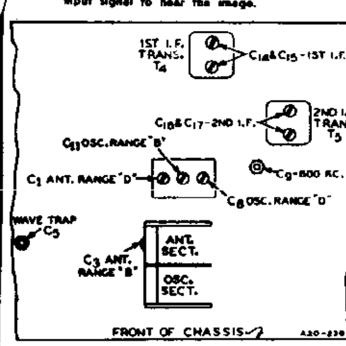


Fig. 2—Location of Trimmers

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾-inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 48½ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. See that the fabric tubing is now between pulleys D and E. Continue cord down to shaft F and wind 2¼ turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

DIAL POINTER ATTACHMEN—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. Clamp pointer tightly over the fabric tubing on the cord—See Fig. 4.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the back panel of the chassis base is a round knockout 1-9/64 inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

MONTGOMERY WARD & CO. MODELS 62-704 to 62-712 inc. Schematic, Voltage

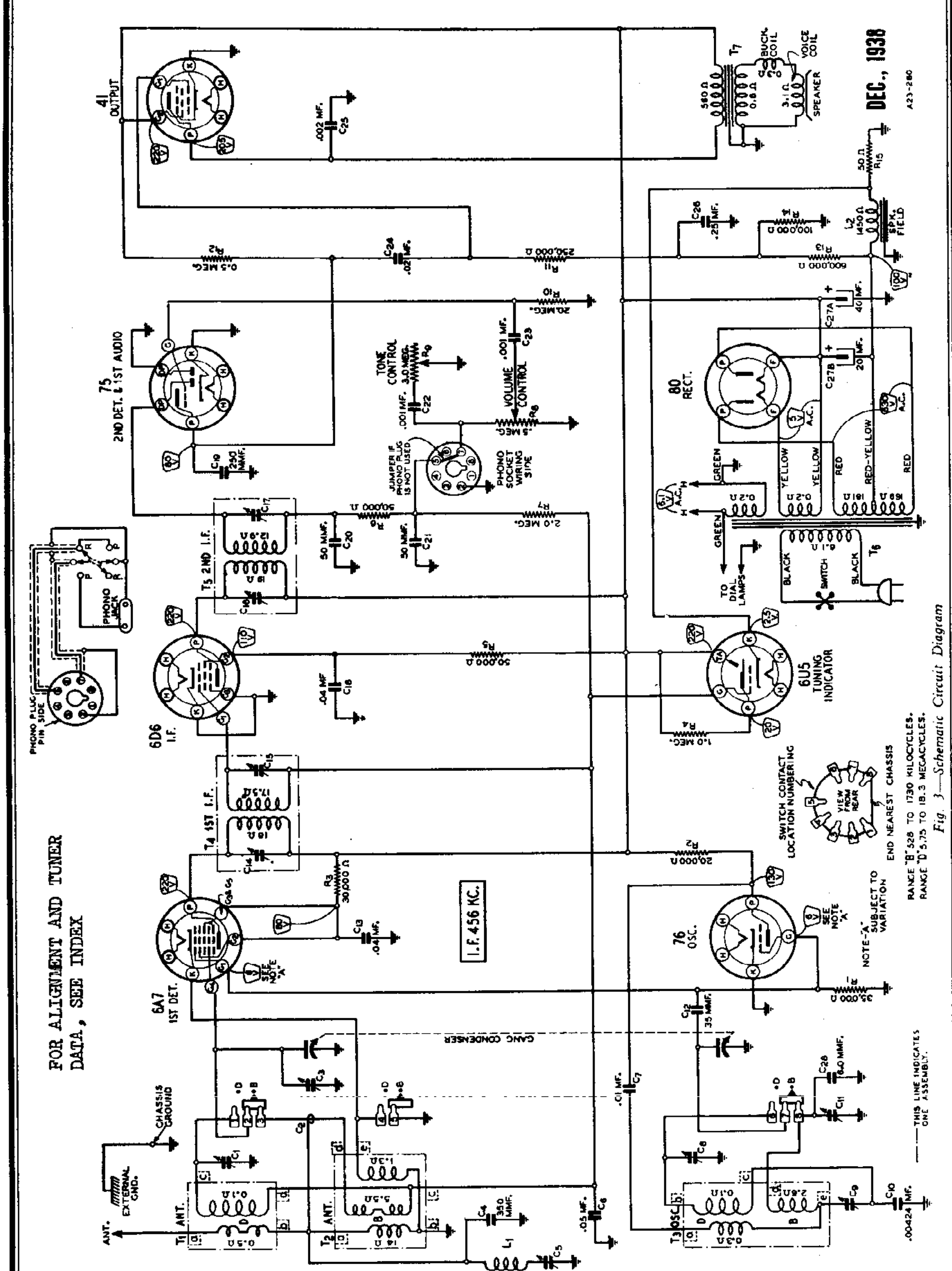
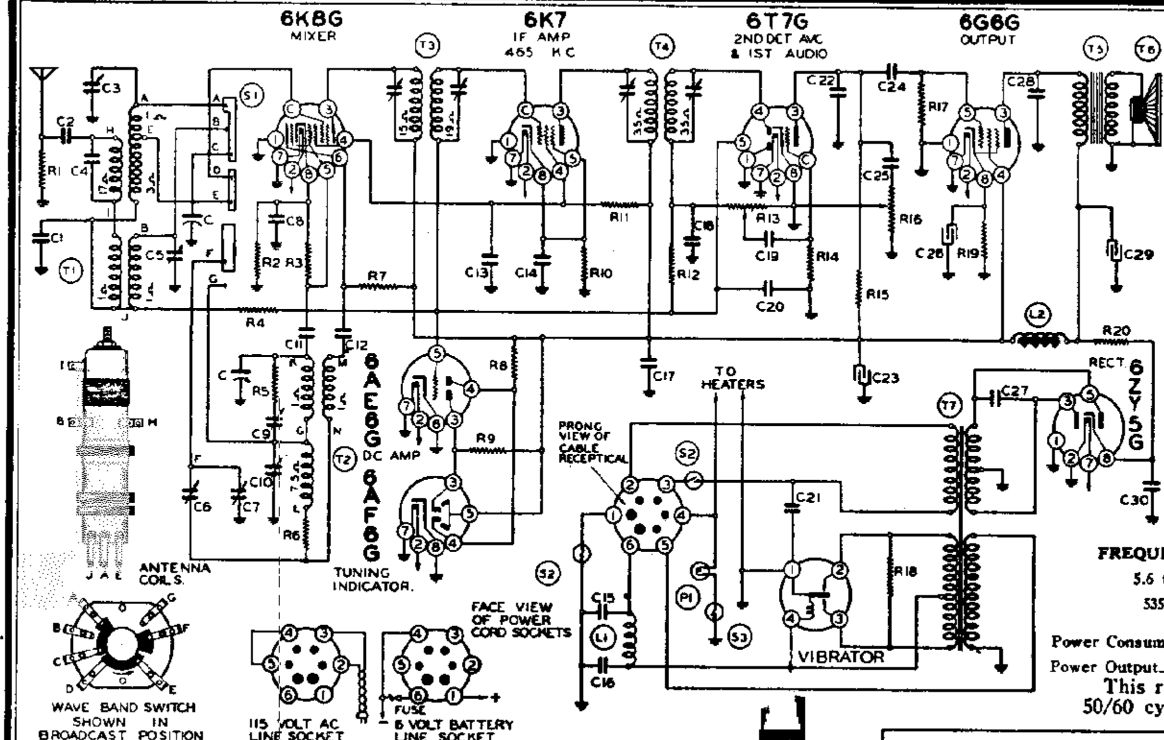


Fig. 3—Schematic Circuit Diagram

MODELS 62-750,62-751
Series A,Ser.8M499800 up
Schematic,Voltage
Socket,Trimmers

MONTGOMERY WARD & CO.



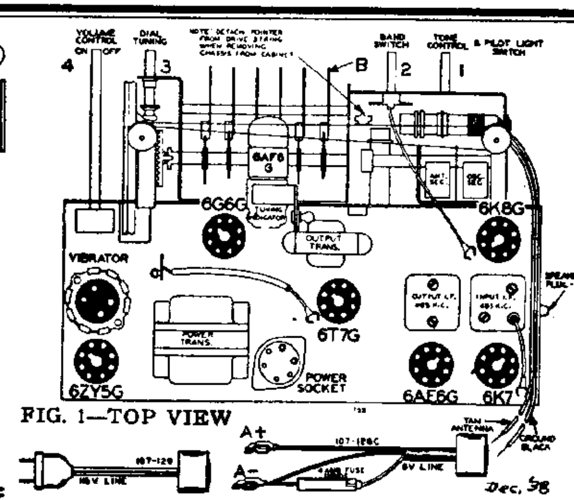


FIG. 1—TOP VIEW

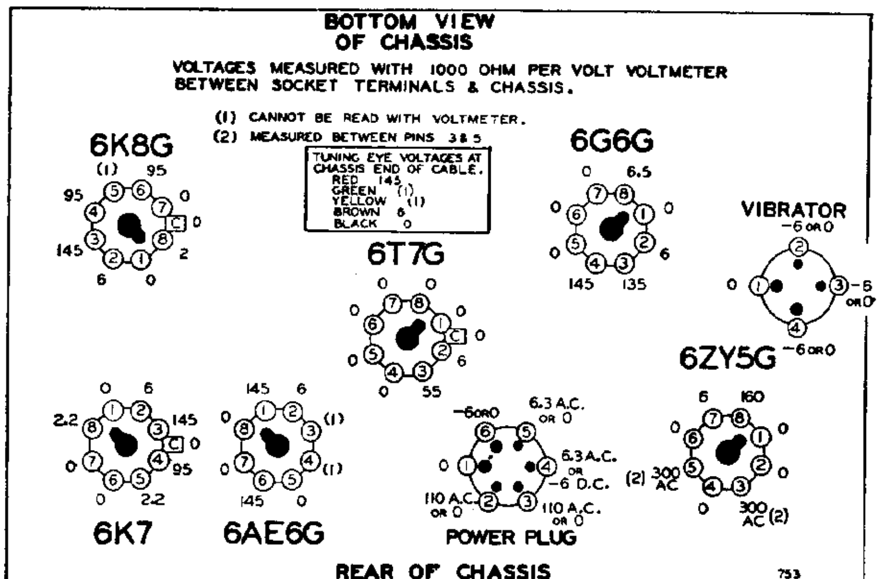
FOR TRIMMERS, ALIGNMENT PROCEDURE, AND SETTING AUTOMATIC TUNING LEVERS, SEE INDEX.

FREQUENCY RANGE
5.6 to 18.1 MC.
535 to 1730 KC.

Power Consumption........40 Watts (At 115 volts 50-60 cycles), or 3.3 amperes at 6.3 volts
Power Output.......................................6 Watts Undistorted, 1 Watt Maximum

This radio is designed to operate from either 105-125 volts 50/60 cycle A.C. supply or a 6 volt storage battery.

OSCILLATOR COILS



PARTS [SERIAL No. 8M499800 and UP]

R1	BE13017	10M ohm—⅓ w.
R2	BE13097	200 ohms—⅓ w.
R3	BE13094	50M ohm—⅓ w.
R4	BE13011	250M ohm—⅓ w.
R5	BE130240	30 ohms—⅓ w.
R6	BE130197	20 ohms—⅓ w.
R7	BE13048	15M ohm—⅓ w.
R8	BE13068	1 megohm—⅓ w.
R9	BE13068	1 megohm—⅓ w
R10	BE13079	400 ohms—⅓ w
R11	BE13082	10M ohms—⅓ w
R12	BE1304	3 megohm—⅓ w.
R13	BE101153	1 megohm volume control
R14	BE130225	15 megohm—⅓ w
R15	BE13011	250M ohm—⅓ w.
R16	BE101154	250M ohm tone control
R17	BE1303	500M ohm—⅓ w.
R18	BE13097	200 ohms—⅓ w.
R19	BE13093	450 ohms—⅓ w.
R20	BE130168	100 ohms—⅓ w.

CONDENSERS

C	BE10292C	2 gang variable condenser
C1	BE129131	.002775 mica
C2	BE10012	.003 x 600 v.
C3	BE12469	BC Antenna Trimmer
C4	BE129132	.000125 mica
C5	BE12469	S. W. Antenna Trimmer
C6	BE12466	B. C. Series Pad
C7	BE12466	S. W. Series Pad
C8	BE10020	.1 x 200 v.
C9	BE12470	S. W. Oscillator Trimmer
C10	BE12470	B. C. Oscillator Trimmer
C11	BE12938	.00005 mica
C12	BE10025	.002 x 600 v.
C13	BE10020	.1 x 200 v.
C14	BE10020	.1 x 200 v.
C15	BE10040	.5 x 120 v.
C16	BE10040	.5 x 120 v.
C17	BE10020	.1 x 200 v.
C18	BE12960	.00015 mica
C19	BE10019	.006 x 600 v.
C20	BE1099	.05 x 200 v.
C21	BE10011	.01 x 400 v.
C22	BE1292	.0005 mica
C23	BE11979B	16 mfd. lytic—200 w. v.
C24	BE10026	.02 x 400 v.
C25	BE10019	.006 x 600 v.
C26	BE11979B	20 mfd.—25 w. v. lytic
C27	BE10073	.008 x 1200 v.
C28	BE10019	.006 x 600 v.
C29	BE11979B	16 mfd. lytic—200 w. v.
C30	BE10020	.1 x 200 v.

C23, C26 and C29 in same unit

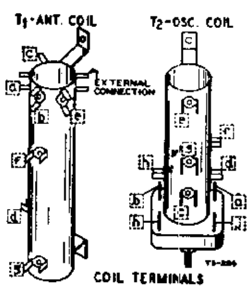
T1	BE111112	Antenna Coil
T2	BE11098	Oscillator Coil
T3	BE108111F	Input I. F.—465 kc.
T4	BE108106 "O"	Output I. F.—465 kc.
T5	BE10569C	Output Transformer
T6	BE114143	6 in. P. M. speaker—62-750
T6	BE114139	8 in. P. M. speaker—62-751
T7	BE104114C	Power Transfomer
L1	BE10568	"A" Choke
L2	BE10530H	"B" Choke
S1	BE12568	Wave Band Switch
S2		L.P.S.T. Switch on volume control
S3		Push in switch on tone control
P1	BE10789	6.3 volt pilot light T40—150 ma.

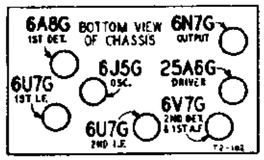
MODELS 62-752, 62-753
Schematic, Voltage
Socket, Trimmers, Notes

MONTGOMERY WARD & CO.

Power Consumption	1.45 Amperes at 32 Volts DC	Intermediate Frequency	456 KC
Power Output	.17 Watts Undistorted, .40 Watts Maximum	Speaker	6" or 8" Electro-Dynamic
Selectivity	30 KC Broad at 1000 times Signal	Tuning Frequency Range	
Sensitivity (For .05 watt output)			
B Range	6.0 Microvolts Average	B Range	528 to 1730 KC (Kilocycles)
D Range	6.0 Microvolts Average	D Range	5750 to 18300 KC (Kilocycles)

32 Volt Power Supply





This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Caution

If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.

Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

Starting Current

When first turned on for a few seconds the drain is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

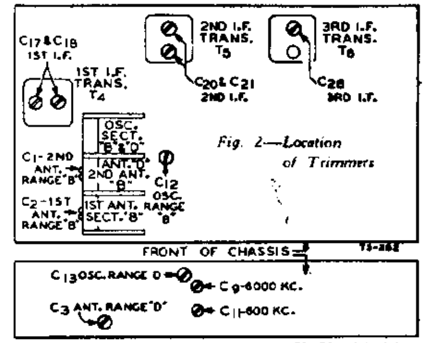
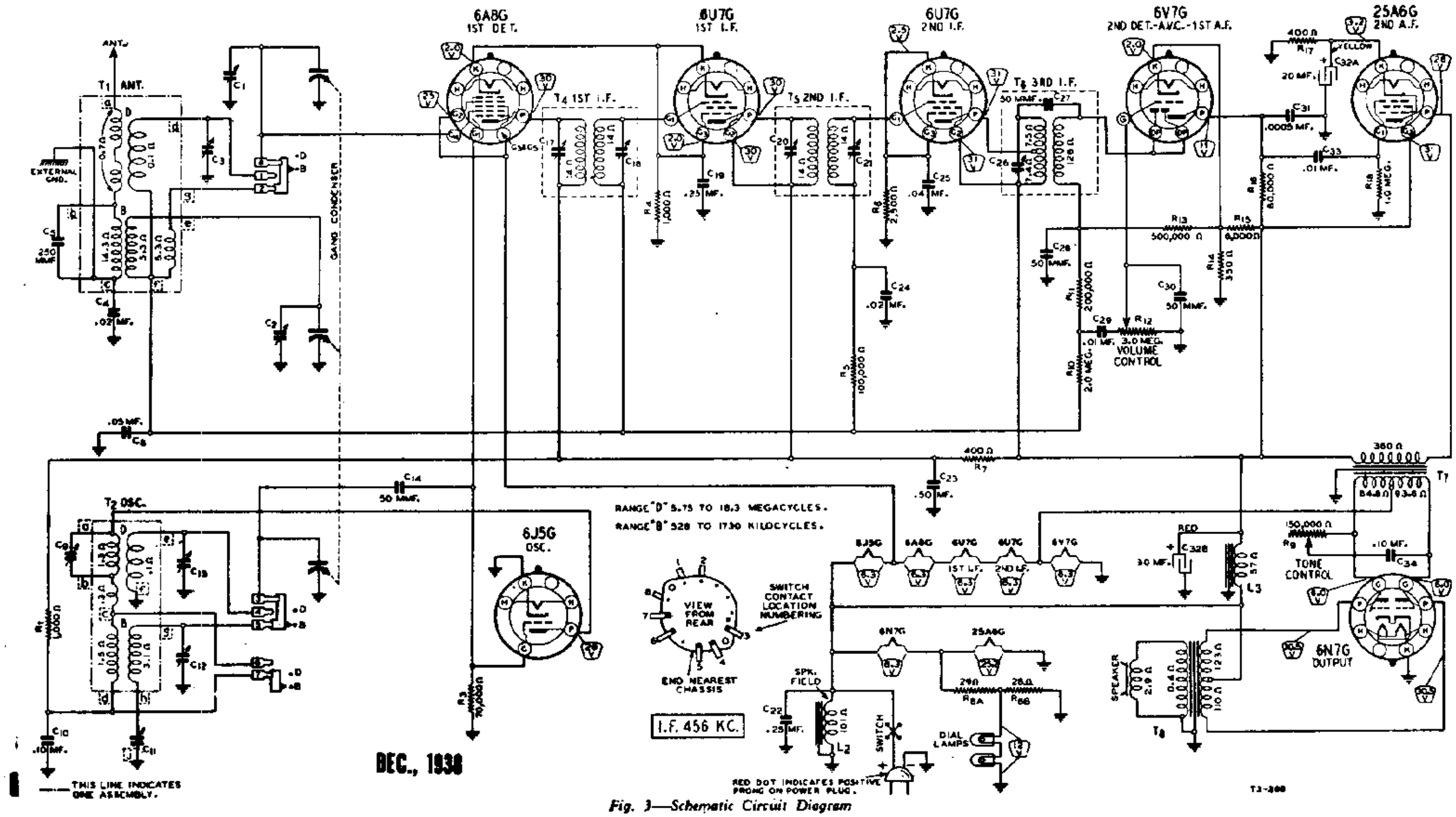


Fig. 2—Location of Trimmers



DEC., 1938

Fig. 3—Schematic Circuit Diagram

MODELS 62-704 to 62-712 inc.
Socket, Trimmers, Alignment
MODELS 62-752, 62-753
Alignment, Drive Data

MONTGOMERY WARD & CO.

MODELS 62-752 and 62-753

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

Signal Generator Frequency Setting	Signal Generator Connection at Radio	Dummy Antenna	Band Switch	Condenser Setting	Adjust Trimmers to Maximum
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C20) & (C21) 3rd I.F. (C26)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	1st Ant. Range B (C2) 2nd Ant. Range B (C1)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C11) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C9) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTE A—If the pointer is not at 1500 KC on the dial, hold the drive cord and move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Dial Pointer Attachment—Tune in a station of known frefrequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 49¾ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. Continue cord down to shaft F and wind 4 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

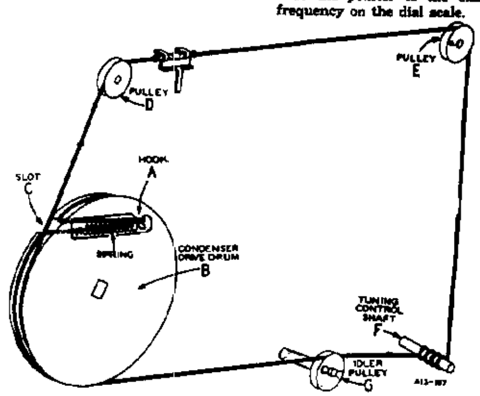
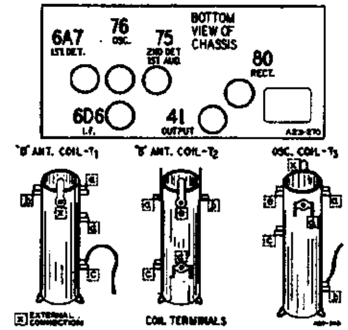


Fig. 4—Drive Cord Replacement

MODELS 62-704 to 62-712



Tuning Frequency Range
- B Range.......528 to 1730 KC (Kilocycles)
- D Range.......5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)
- B Range.......30 Microvolts Average
- D Range.......50 Microvolts Average

Power Consumption - - 60 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 1.5 Watts Undistorted; 3.0 Watts Maximum

Selectivity - - 45 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - 6", 8" or 10" Dynamic

FOR DRIVE CORD REPLACEMENT AND RACK AND PANEL ASSEMBLY SEE MODEL62--005

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

Signal Generator Frequency Setting	Signal Generator Connection at Radio	Dummy Antenna	Band Switch Setting	Condenser or Dial Setting	Adjust Trimmers to Maximum (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B				Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.	
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor until dial pointer is at 1500 KC	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Leave Rotor at above setting	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

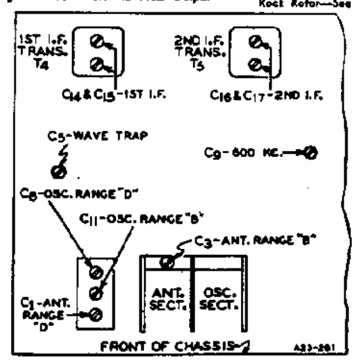


Fig. 2—Location of Trimmers

MODEL 62-901, Issues A, B
Schematic, Voltage
Socket, Changes

MONTGOMERY WARD & CO.

SPECIFICATIONS

Power Consumption - - 60 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted / 4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - - - 10" Dynamic

Tuning Frequency Range

B Range .... 528 to 1730 KC (Kilocycles)

D Range .... 5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

B Range .... 25 Microvolts Average

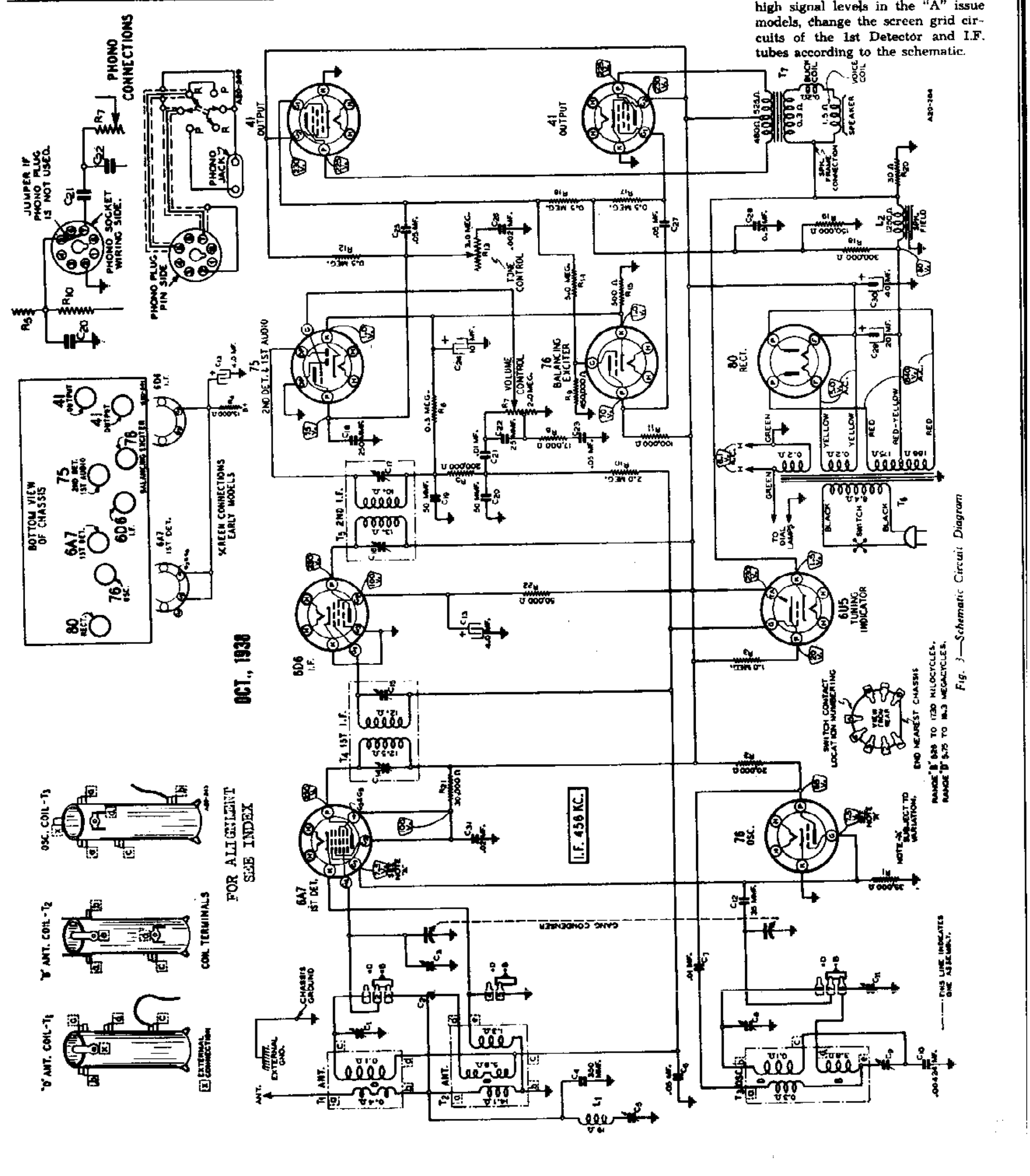
D Range .... 40 Microvolts Average

"B" Issue Models

The issue letter is the last letter of the chassis number on the chassis number label.

In "B" issue models, the screen grid circuits of the 1st Detector and I.F. tubes are supplied through separate resistors as shown in the schematic.

If distortion is encountered at high signal levels in the "A" issue models, change the screen grid circuits of the 1st Detector and I.F. tubes according to the schematic.

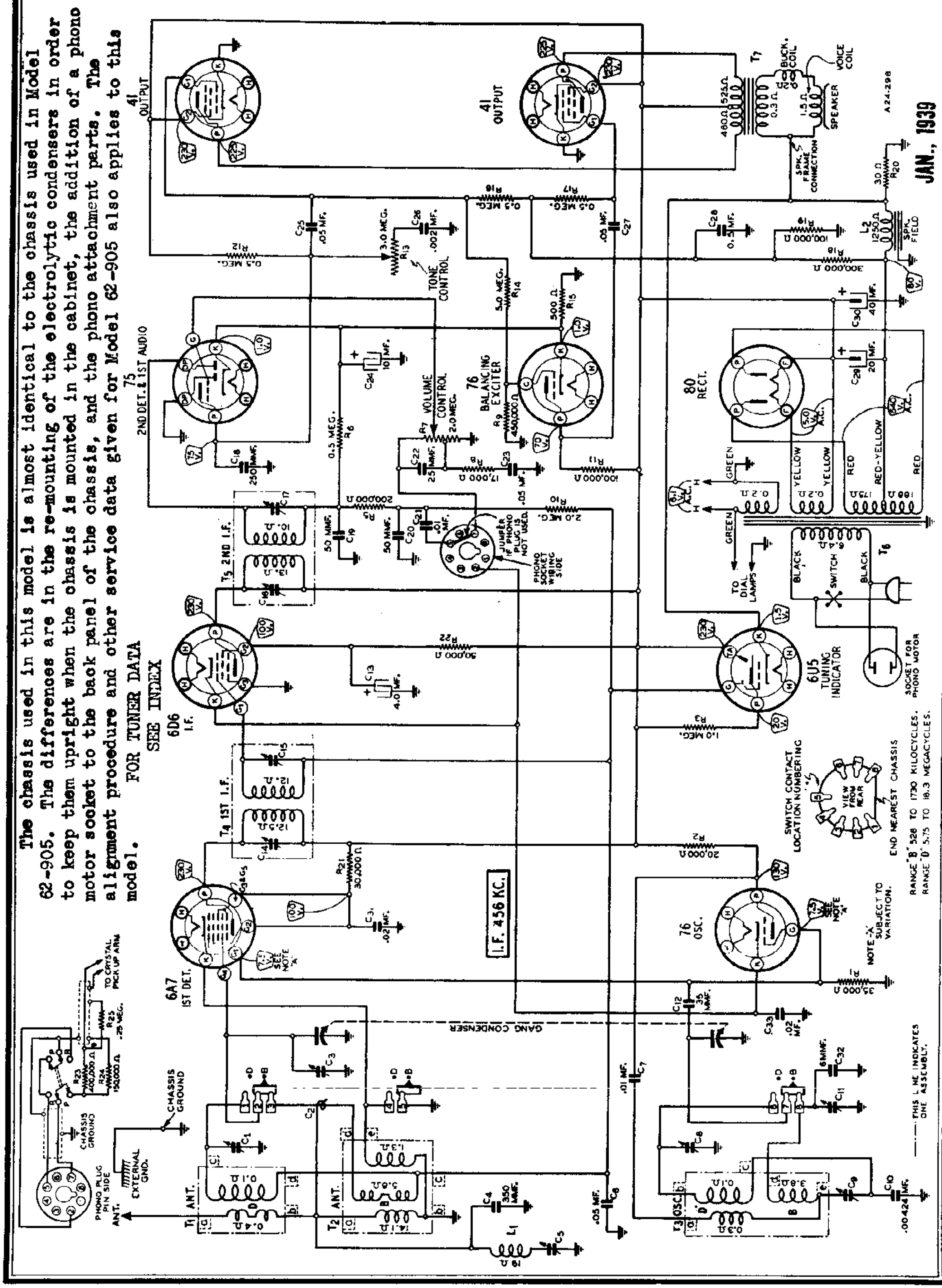


MODEL 62-902
Schematic, Voltage
Notes, Phono.

MONTGOMERY WARD & CO.

The chassis used in this model is almost identical to the chassis used in Model 62-905. The differences are in the re-mounting of the electrolytic condensers in order to keep them upright when the chassis is mounted in the cabinet, the addition of a phono motor socket to the back panel of the chassis, and the phono attachment parts. The alignment procedure and other service data given for Model 62-905 also applies to this model.

FOR TUNER DATA
SEE INDEX



JAN., 1939

MODELS 62-704 to 62-712 inc.
Drive Data

MONTGOMERY WARD & CO.

MODEL 62-902
MODEL 62-905
Alignment, Trimmers
Drive Data

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B				Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.	
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor until dial pointer is at 1500 KC	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Leave Rotor at above setting	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

General Service Data

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the other end to the tension spring, leaving a distance of 64⅛ inches between the knots.

Turn the gang condenser to the full open position. Secure the free end of the spring over hook A—See Fig. 4. Turn the gang condenser to the completely closed position.

Pass the cord through slot B and, guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. Hook the cord in slot B and turn the gang condenser to the completely closed position. Unhook the cord from slot B and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind 2½ turns counter-clockwise (from front of chassis) around the drive shaft spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. If necessary, stretch the tension spring and pull the drive cord taut. Pass drive cord through slot B and secure the loop to the tension spring at point G.

EARLY MODELS—In the early models using a larger drive shaft spool (See Fig. 4), there should be a distance of 65½ inches between the knots.

DIAL POINTER ATTACHMENT—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale

Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5.

The lower rack should be meshed with the pinion gear so that the 8th tooth from the front on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the axis of the pinion gear shaft.

The rear and side brackets can then be mounted on the rack and pinion assembly.

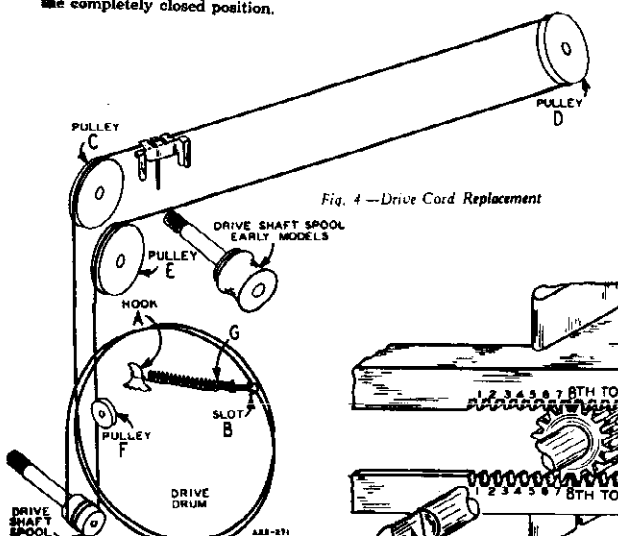


Fig. 4 —Drive Cord Replacement

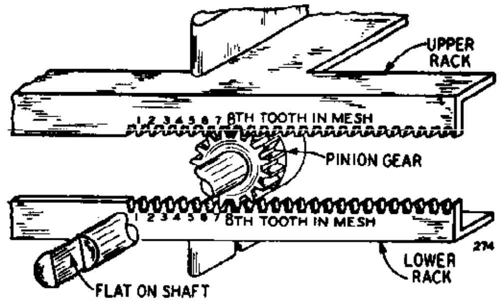


Fig. 5—Rack and Pinion Assembly

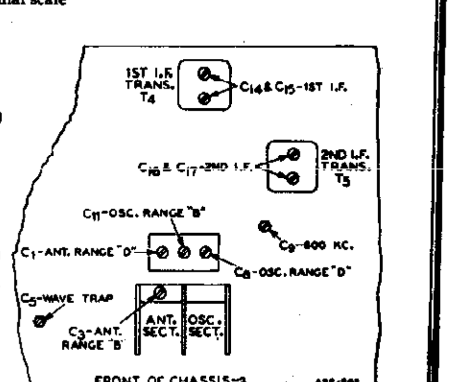


Fig. 2—Location of Trimmers

MODEL 62-905
Schematic, Socket
Coils, Voltage

MONTGOMERY-WARD & CO.

SPECIFICATIONS

Power Consumption - - 65 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted, 4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - - - - 10" Dynamic

Tuning Frequency Range

B Range .... 528 to 1730 KC (Kilocycles)

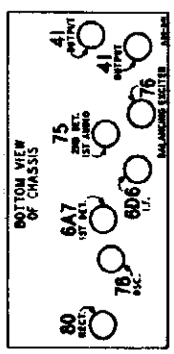
D Range .... 5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

B Range .... 25 Microvolts Average

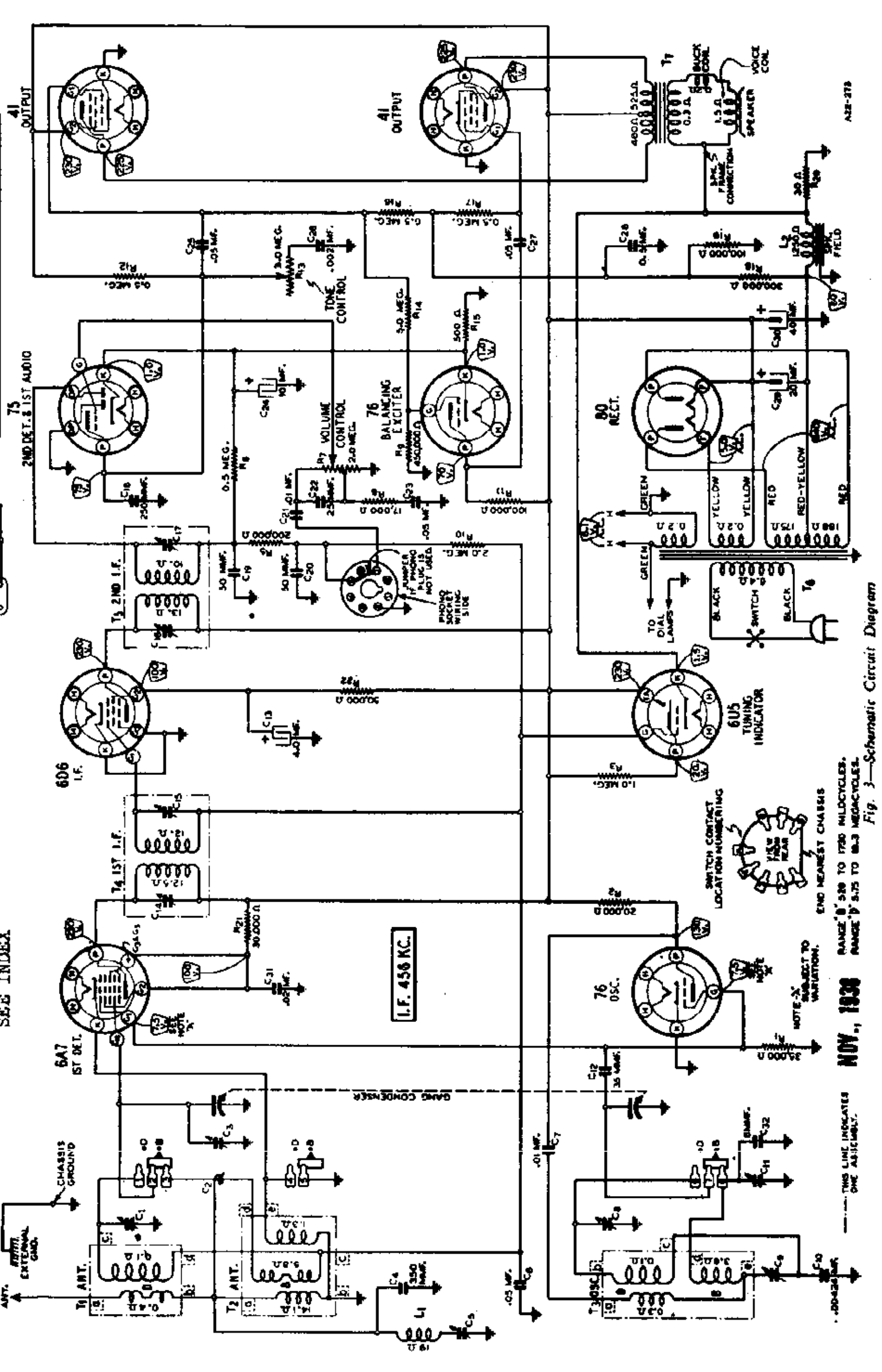
D Range .... 40 Microvolts Average

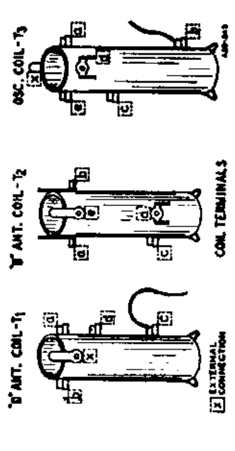
Twenty-Five Cycle Models
The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.



Volume Control—Maximum. Antenna Shorted to Ground. Readings taken with 1000 ohm-per-volt meter.

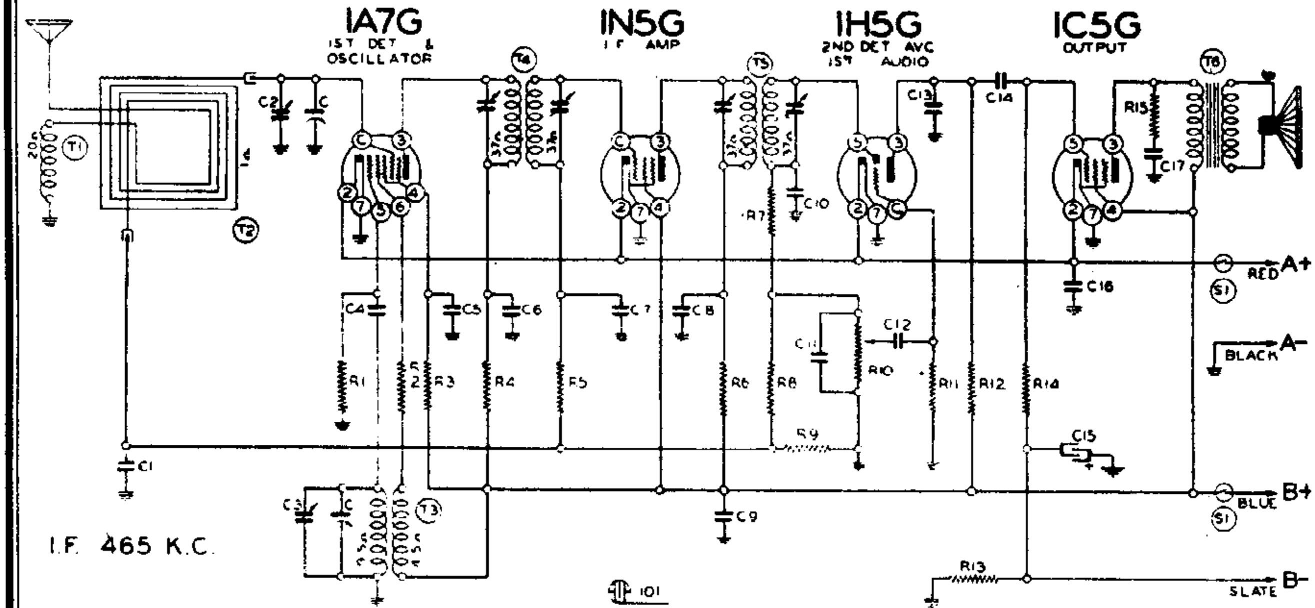
Voltages at Sockets
The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground. These voltages are read under the following conditions: Line Voltage—117.





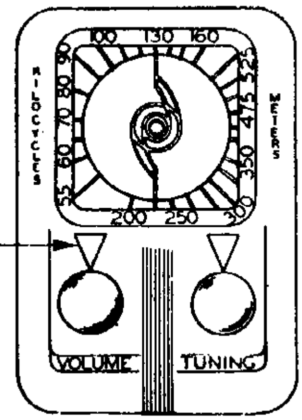
MONTGOMERY WARD & CO.

MODELS 93BR454A, 93BR1455A
Series A
Schematic, Voltage, Socket
Trimmers

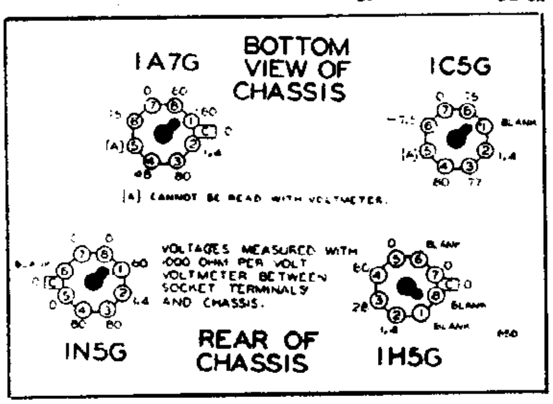


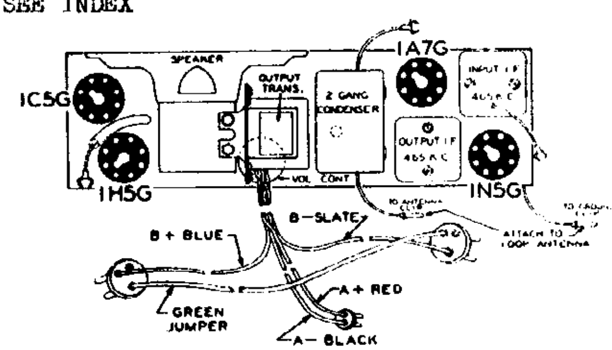
Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE1309	200M ohm—⅓ w.
R2	BE13071	4M ohm—⅓ w.
R3	BE130308	40M ohm—⅓ w.
R4	BE13026	1000 ohm—⅓ w.
R5	BE13020	100M ohm—⅓ w.
R6	BE13026	1000 ohm—⅓ w.
R7	BE13040	19M ohm—⅓ w.
R8	BE13038	2 megohm—⅓ w.
R9	BE13038	2 megohm—⅓ w.
R10	BE101163	1 megohm volume control
R11	BE13038	2 megohm—⅙ w.
R12	BE1303	500M ohm—⅓ w.
R13	BE130283	750 ohm—⅓ w.
R14	BE13019	1 megohm—⅓ w.
R15	BE130218	5M ohm—⅓ w.
		CONDENSERS
C	BE102103	2 gang variable condenser
C1	BE10022	.05 x 200 v.
C2		Loop ant. trimmer on gang
C3		Oscillator trimmer on gang

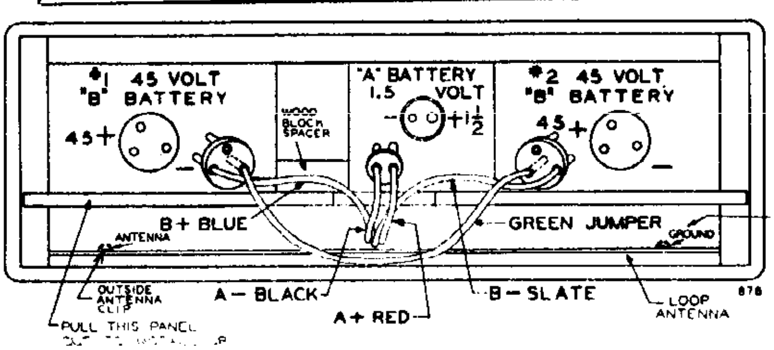
Schematic Ref. No.	Part No.	Description
C4	BE12912	.00025 mica
C5	BE10022	.05 x 200 v.
C6	BE10078	.01 x 200 v.
C7	BE10078	.01 x 200 v.
C8	BE10078	.01 x 200 v
C9	BE10064	.25 x 200 v.
C10	BE1295	.0001 mica
C11	BE1295	.0001 mica
C12	BE10078	.01 x 200 v.
C13	BE12912	.00025 mica
C14	BE10078	.01 x 200 v.
C15	BE11935	25 mfd. 25 w v. lytic
C16	BE10056	.5 x 200 v.
C17	BE10012	.003 x 600 v.
		PARTS
T1	BE1236	Antenna load coil (on loop)
T2	BE120257	Loop antenna coil (complete)
T3	BE110110	Oscillator coil
T4	BE108142	Input I. F. coil
T5	BE108143	Output I. F. coil
T6	BE114158	5" P. M. Speaker
S1		Off-on switch D.P.S.T. on vol. control



FOR ALIGNMENT
SEE INDEX







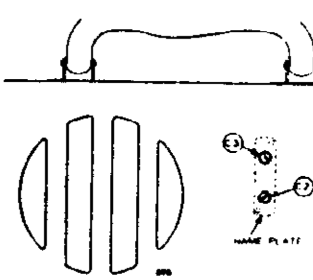
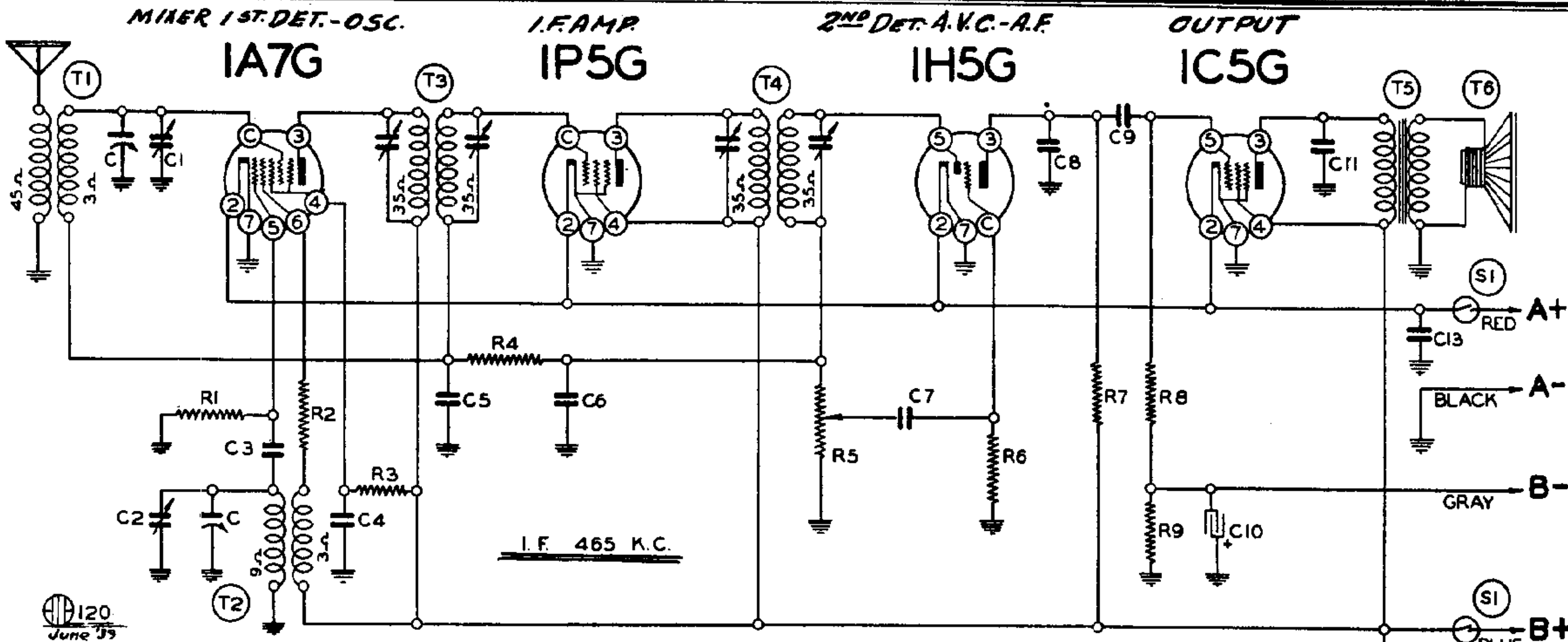


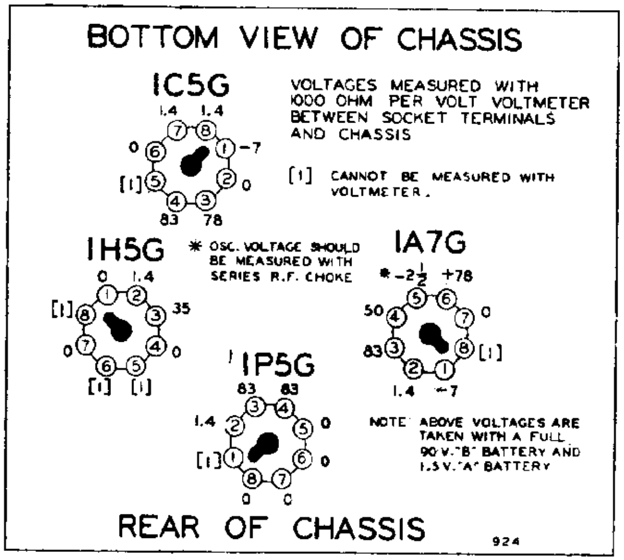
FIGURE 4

MODELS 93BR460A, 93BR1460A
Schematic, Voltage, Socket
Trimmers

MONTGOMERY WARD & CO.



FOR ALIGNMENT
SEE INDEX



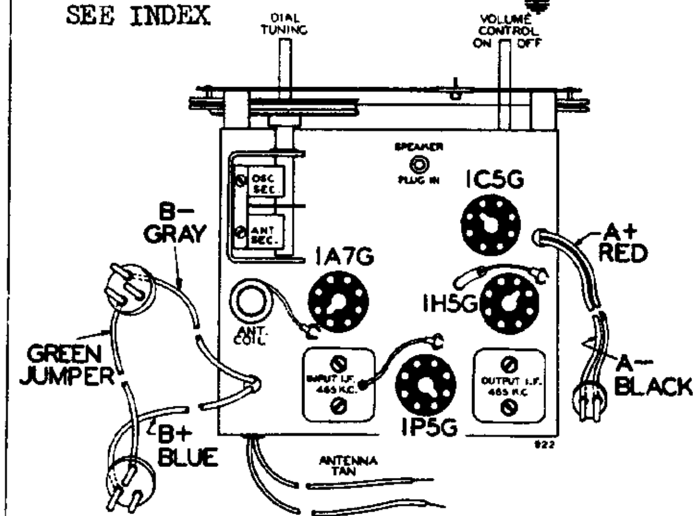


FIG. 1 — TOP VIEW

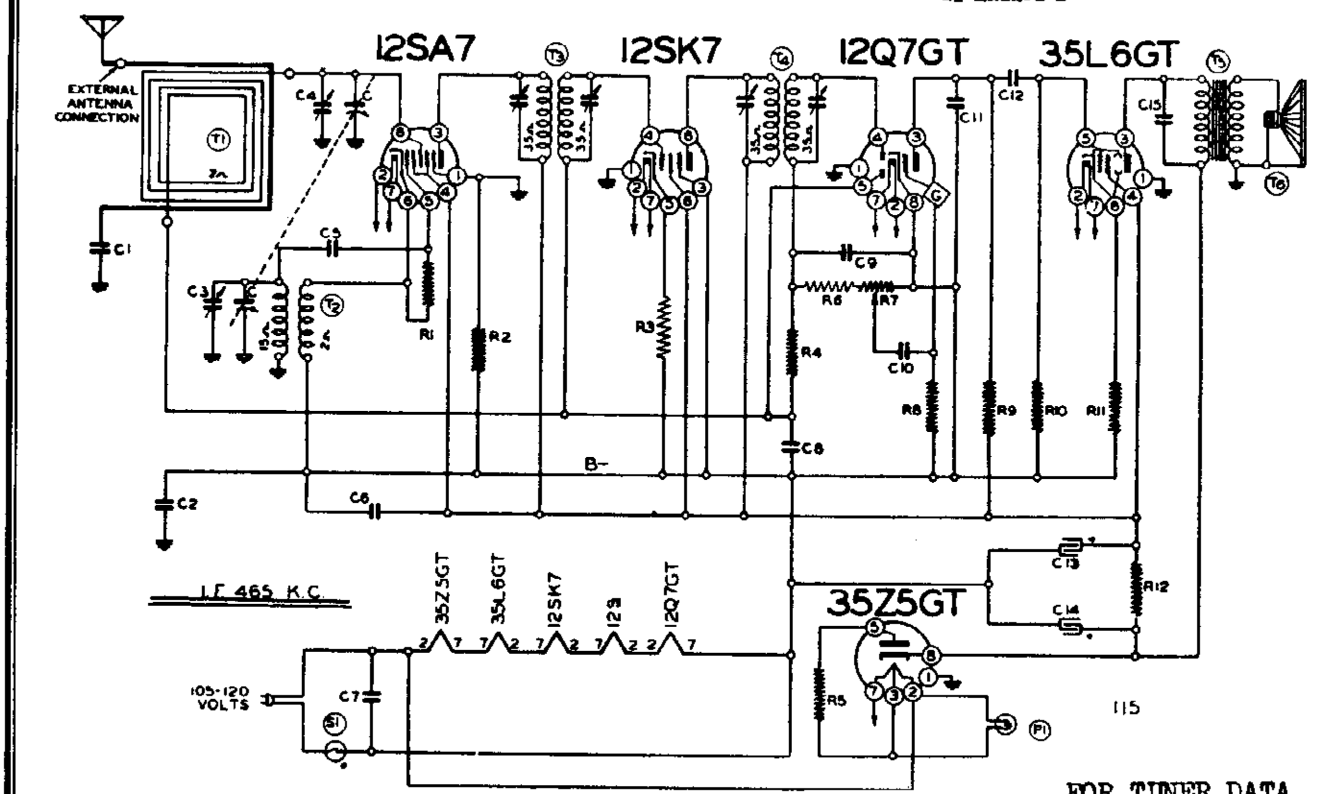
RESISTORS

R1	BE130266	200M ohm—⅓ w.
R2	BE13018	4M ohm—⅓ w.
R3	BE1307	40M ohm—⅓ w.
R4	BE1304	3 megohm—⅓ w.
R5	BE101175	1 megohm volume control
R6	BE130257	5 megohm—⅓ w.
R7	BE1303	500M ohm—⅓ w.
R8	BE13019	1 megohm—⅓ w.
R9	BE130200	700 ohm—⅓ w.

CONDENSERS

C	BE102110	2 gang variable condenser
C1		Antenna Trimmer on gang
C2		Oscillator trimmer on gang
C3	BE12912	.00025 mica
C4	BE1009	.05 x 200 v.
C5	BE1009	.05 x 200 v.
C6	BE1295	.0001 mica
C7	BE10012	.003 x 600 v.
C8	BE1295	.0001 mica
C9	BE10011	.01 x 400 v.
C10	BE11975	10 mid. x 25 w. v.
C11	BE10012	.003 x 600 v.
C12	BE10064	.25 x 200 v.
C13	BE10020	.1 x 200 v.
T1	BE111132	Antenna Coil
T2	BE110122	Oscillator Coil
T3	BE108151B	Input I. F. - 465 kc.
T4	BE108153	Output I. F. - 465 kc.
T5	BE10591	Output Transformer
T6	BE114166	5" P. M. Speaker
S1		Off-on switch on Volume control

MONTGOMERY WARD & CO. MODELS 93BR508A, 93BR509A
Schematic, Voltage, Socket
Trimmers



FOR TUNER DATA
SEE INDEX.

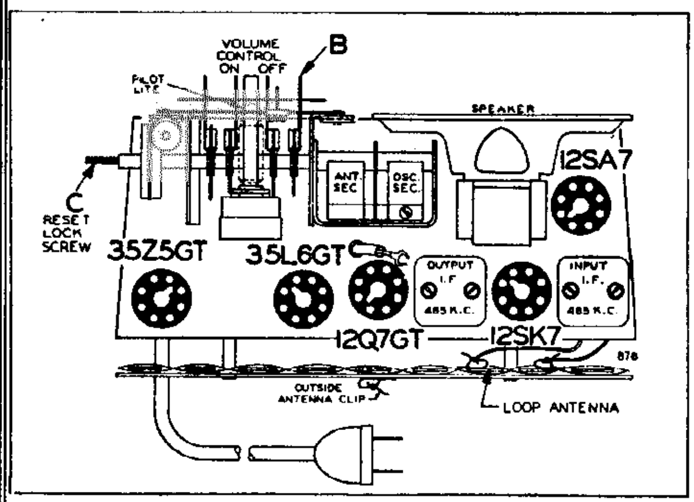
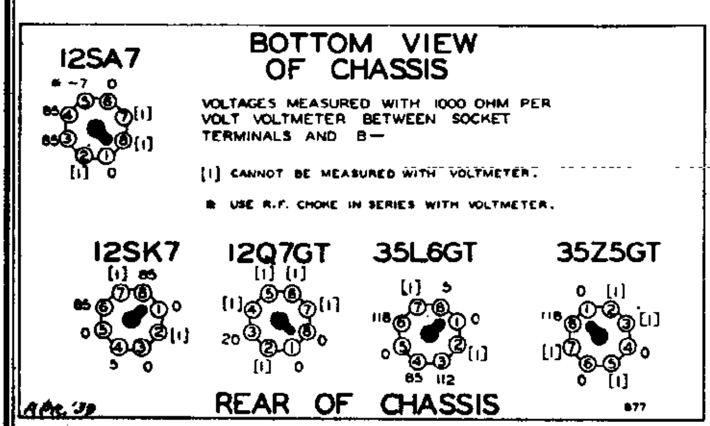


FIG. 1—TOP VIEW



Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE130176	20M ohm—1/3 w.—10%
R2	BE1309	200M ohm—1/3 w.
R3	BE130203	40 ohm—1/3 w.—10%
R4	BE1304	3 megohm—1/3 w.
R5	BE130215	25 ohm—1/2 w.
R6	BE1301	25M ohm—1/3 w.
R7	BE101170	1 megohm—volume control
R8	BE130257	5 megohm—1/3 w.
R9	BE1303	500M ohm—1/3 w.
R10	BE1303	500M ohm—1/3 w.
R11	BE130166	150 ohm—1/3 w.
R12	BE130199	1500 ohm—1 watt
		CONDENSERS
C	BE102107	2 gang variable condenser
C1	BE10011	.01 x 400 v.
C2	BE10091	.15 x 400 v.
C3		Osc. Trimmer on Gang
C4		Antenna Trimmer on Gang
C5	BE12921	.0002 mica

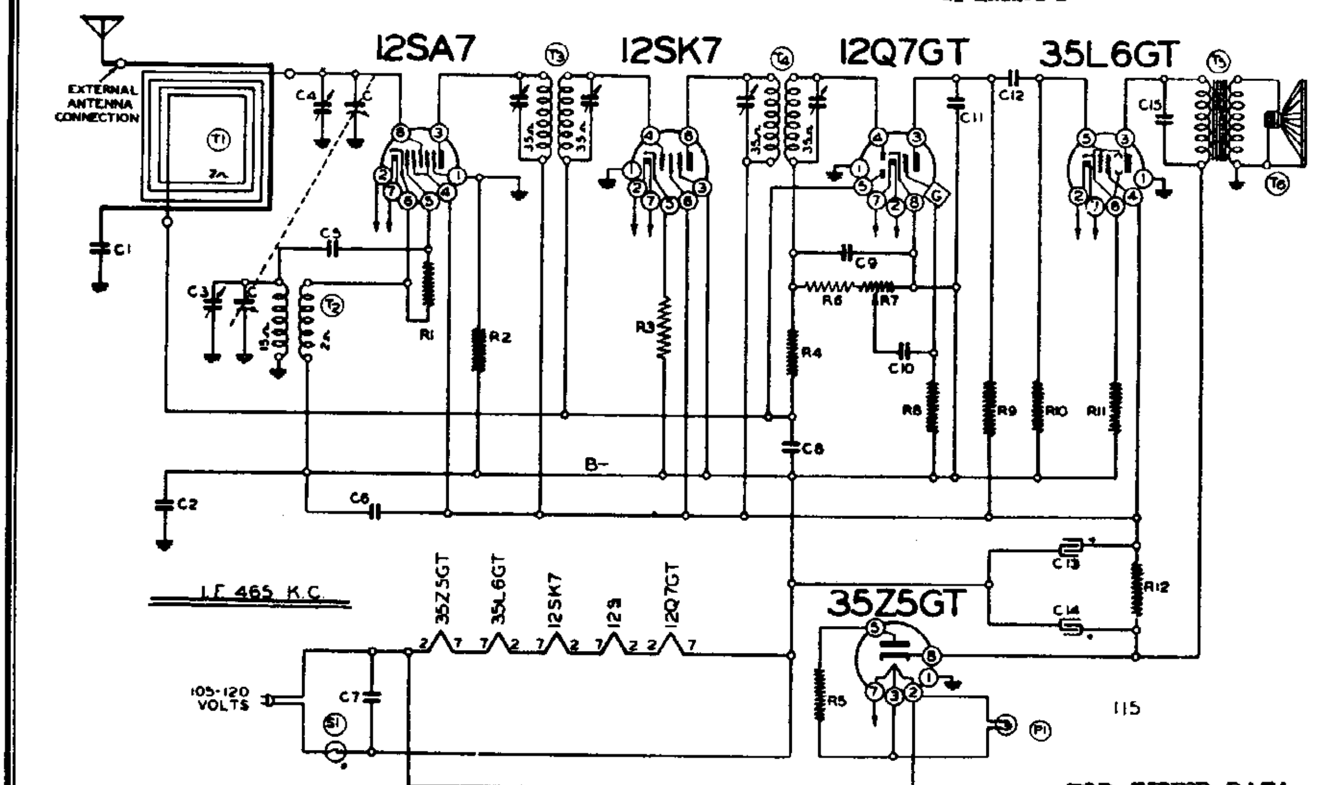
Schematic Ref. No.	Part No.	Description
C6	BE1009	.05 x 200 v.
C7	BE1001	.1 x 400 v.
C8	BE1009	.05 x 200 v.
C9	BE1295	.0001 mica
C10	BE10025	.002 x 600 v.
C11	BE12912	.00025 mica
C12	BE100106	.004 x 600 v.
C13	BE11987	30 mfd. lytic
C14	BE11987	30 mfd. lytic
C15	BE10026	.02 x 400 v.
		C13 and C14 in same unit
		PARTS
T1	BE111128	Loop Antenna
T2	BE110116	Oscillator Coil
T3	BE108140E	Input I. F.
T4	BE108141B	Output I. F.
T5	BE10589	Output Transformer
T6	BE114160	5" P. M. Speaker
S1		Off-on switch on vol. control
P1	BE107249	6-8 v. pilot light T-47

The tube complement of this chassis consists of the following octal base glass and metal tube.

The type and function of each tube is as follows.

1—Type 12SA7 Mixer, First Detector-oscillator.
1—Type 12SK7 I. F. Amplifier.
1—Type 12Q7GT Second Detector, A.V.C. and First Audio.
1—Type 35L6GT Beam Output Amplifier.
1—Type 35Z5GT High Vacuum Rectifier.

MONTGOMERY WARD & CO. MODELS 93BR508A, 93BR509A
Schematic, Voltage, Socket
Trimmers



FOR TUNER DATA SEE INDEX.

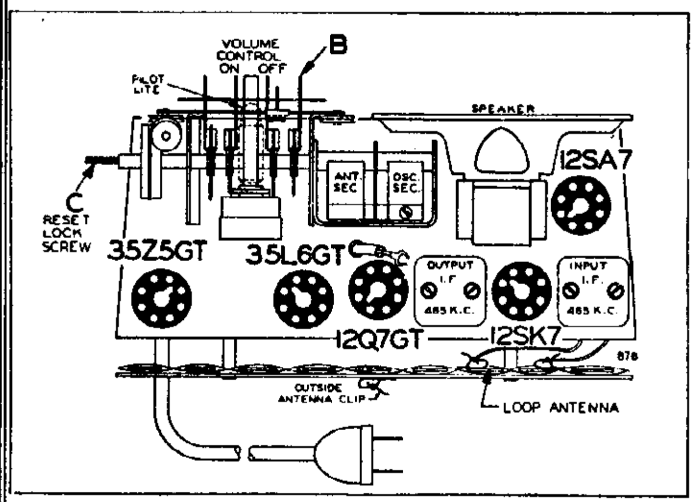
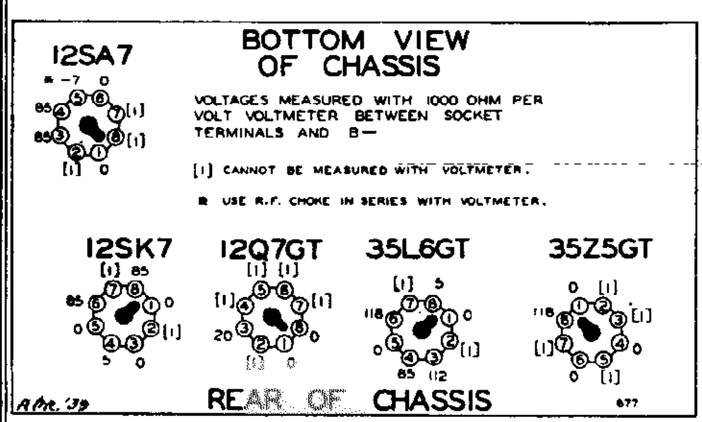


FIG. 1—TOP VIEW



Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE130176	20M ohm—⅓ w.—10%
R2	BE1309	200M ohm—⅓ w.
R3	BE130203	40 ohm—⅓ w.—10%
R4	BE1304	3 megohm—⅓ w.
R5	BE130215	25 ohm—½ w.
R6	BE1301	25M ohm—⅓ w.
R7	BE101170	1 megohm—volume control
R8	BE130257	5 megohm—⅓ w.
R9	BE1303	500M ohm—⅓ w.
R10	BE1303	500M ohm—⅓ w.
R11	BE130166	150 ohm—⅓ w.
R12	BE130199	1500 ohm—1 watt
		CONDENSERS
C	BE102107	2 gang variable condenser
C1	BE10011	.01 x 400 v.
C2	BE10091	.15 x 400 v.
C3		Osc. Trimmer on Gang
C4		Antenna Trimmer on Gang
C5	BE12921	.0002 mica

Schematic Ref. No.	Part No.	Description
C6	BE1009	.05 x 200 v.
C7	BE1001	.1 x 400 v.
C8	BE1009	.05 x 200 v.
C9	BE1295	.0001 mica
C10	BE10025	.002 x 600 v.
C11	BE12912	.00025 mica
C12	BE100106	.004 x 600 v.
C13	BE11987	30 mfd. lytic
C14	BE11987	30 mfd. lytic
C15	BE10026	.02 x 400 v.
		C13 and C14 in same unit
		PARTS
T1	BE111128	Loop Antenna
T2	BE110116	Oscillator Coil
T3	BE108140E	Input I. F.
T4	BE108141B	Output I. F.
T5	BE10589	Output Transformer
T6	BE114160	5" P. M. Speaker
S1		Off-on switch on vol. control
P1	BE107249	6-8 v. pilot light T-47

The tube complement of this chassis consists of the following octal base glass and metal tube.

The type and function of each tube is as follows.

1—Type 12SA7 Mixer, First Detector-oscillator.
1—Type 12SK7 I. F. Amplifier.
1—Type 12Q7GT Second Detector, A.V.C. and First Audio.
1—Type 35L6GT Beam Output Amplifier.
1—Type 35Z5GT High Vacuum Rectifier.

Apr. '39

MODELS 93BR508A, 93BR509A
MODEL 93BR564A
Alignment

MONTGOMERY WARD & CO.

CHASSIS No. 93-BR-508A and 93-BR-509A

Power Consumption - - - - - - - - - 40 Watts
Power Output - - - 800 Milliwatts Undistorted
Sensitivity (for .05 Watts Output) - 250 Microvolts Per Meter at 1000 KC. (For Loop Antenna)

Selectivity - 70 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - - 540 to 1650 KC
Intermediate Frequency - - - - - - - - - 465 KC
Speaker - - - - - - - - - - - 5 in. P. M. Dynamic

ALIGNMENT PROCEDURE

IMPORTANT: See Aligning Instructions on Page 4.

- Volume control—Maximum all adjustments.
- Connect B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver
- Dummy antennas—.1 Mfd.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 12SK7 I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	(See Note "A") Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	(See Note "A") Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer—Bottom of rear section of gang (See Bottom of Radio)	Oscillator	(See Note "A") Adjust to maximum output
	1400 Kc.		(See Note "B" and "C")	Set dial at 1400 Kc.	Trimmer—Bottom of front section of gang (See Bottom of Radio)	Antenna	(See Note "B") Adjust to maximum output

NOTE "A" — A 200M ohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer. The loop antenna must be disconnected from the chassis.

NOTE "B" — Remove the 200M ohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust the antenna trimmer through hole in bottom of cabinet.

NOTE "C" — Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

MODEL 93BR508A
" 93BR509A

ALIGNMENT PROCEDURE Model No. 93BR-564A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7 I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6D8G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna Lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna Lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Antenna Broadcast	Adjust to maximum output

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

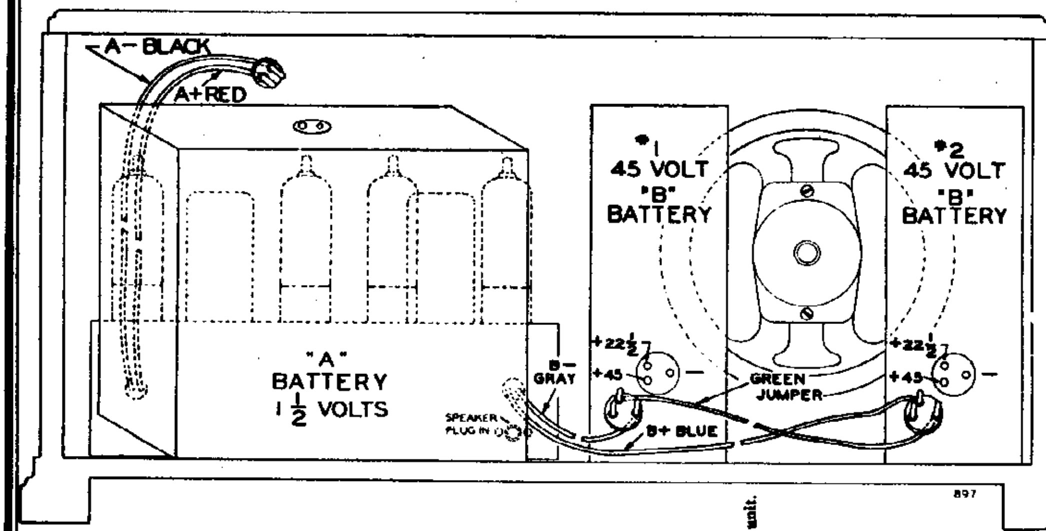
After each band is completed, repeat the procedure as a final check.

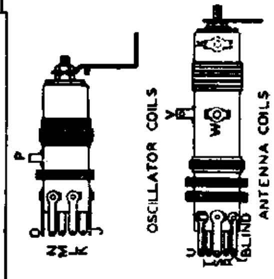
Power Consumption - - - - - 40 Watts (at 117 Volts 50/60 Cycles) 2.5 Amp. at 6.3 Volts
Power Output - - - - - - - - - - - .6 Watts Undistorted
Sensitivity (for .05 Watts Output) - - - - - 25 Microvolts Average

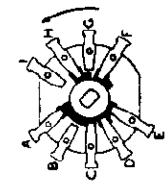
Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - - - 535 to 1735 KC
Intermediate Frequency - - - - - - - - - - - 465 KC
Speaker - - - - - - - - - - - 6 in. P. M. Dynamic

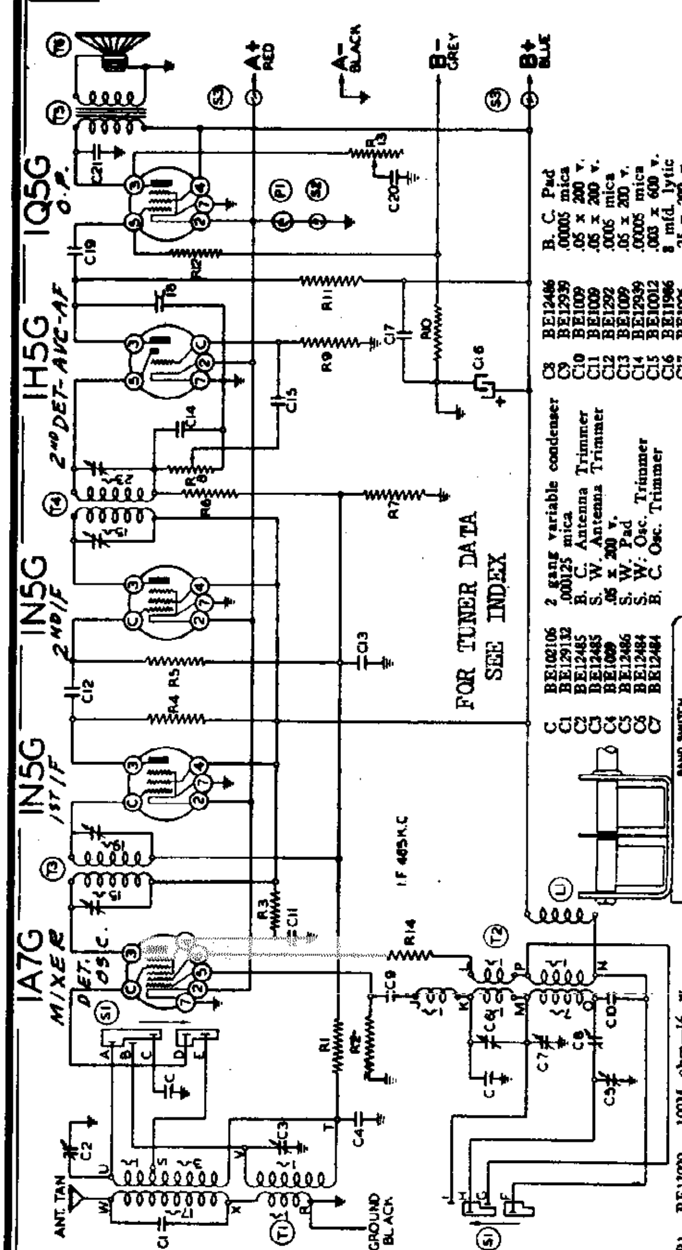
MONTGOMERY WARD & CO.

MODEL 93BR560A
Schematic, Voltage
Socket, Trimmers









C	BE102106	2 gang variable condenser
C1	BE129132	.000125 mica
C2	BE12485	B. C. Antenna Trimmer
C3	BE12485	S. W. Antenna Trimmer
C4	BE1009	.05 x 200 v.
C5	BE12486	S. W. Pad
C6	BE12484	S. W. Osc. Trimmer
C7	BE12484	B. C. Osc. Trimmer

C8	BE12486	B. C. Pad
C9	BE12939	.00005 mica
C10	BE1009	.05 x 200 v.
C11	BE1009	.05 x 200 v.
C12	BE1292	.0005 mica
C13	BE1009	.05 x 200 v.
C14	BE12939	.00005 mica
C15	BE10012	.003 x 600 v.
C16	BE11986	8 mfd. lytic
C17	BE1006	.25 x 200 v.
C18	BE12921	.002 mica
C19	BE10011	.01 x 400 v.
C20	BE10026	.02 x 400 v.
C21	BE10071	.004 x 600 v.

C2 and C3 in one unit. C6 and C7 in same unit.
C5 and C8 in one unit.

R1	BE13020	100M ohm—½ w.
R2	BE1309	200M ohm—½ w.
R3	BE13012	50M ohm—½ w.
R4	BE13022	5M ohm—½ w.
R5	BE13020	100M ohm—½ w.
R6	BE1304	3 megohm—½ w.
R7	BE1304	3 megohm—½ w.
R8	BE101166	1 megohm—volume control
R9	BE130225	15 megohm—½ w.
R10	BE130101	600 ohm—½ w.
R11	BE1303	500M ohm—½ w.
R12	BE13019	1 megohm—½ w.
R13	BE101169	Tone Control—1 Megohm
R14	BE13056	100 ohm—½ w.

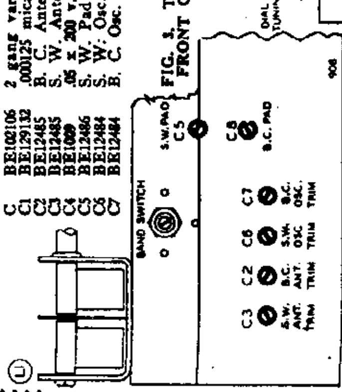


FIG. 3. TRIMMERS ON FRONT OF CHASSIS

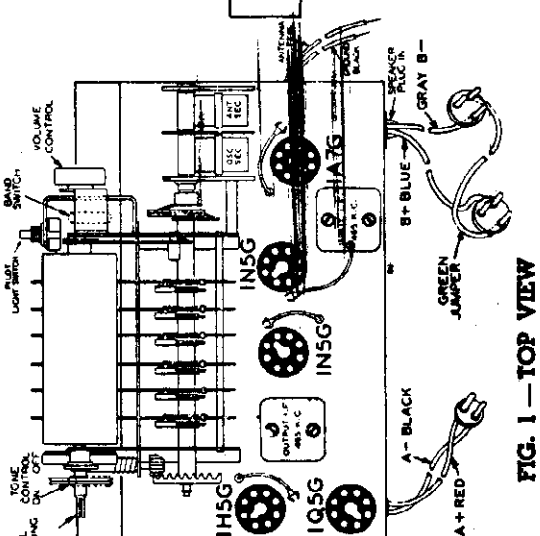
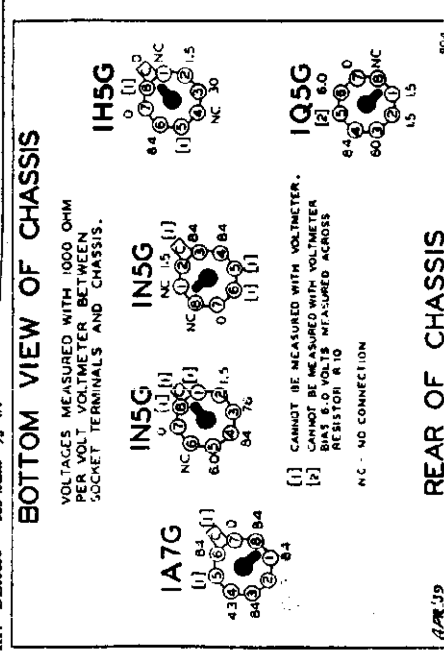


FIG. 1 — TOP VIEW



MODELS 93BR460A, 93BR1460A
Alignment, Battery Data

MONTGOMERY WARD & CO.

MODEL 93BR560A
Alignment

Chassis No. 93BR560A

Power Consumption - - - "A" Battery 300 MA; "B" Battery 11 MA.
Power Output - - - - - - - - - - - 190 Milliwatts, Undistorted
Sensitivity (for .05 Watts) - Broadcast Band—10 Microvolts Average; Short Wave Band—20 Microvolts Average
Selectivity - - - 35 Kc. Broad at 1000 Times Signal at 1000 Kc.
Tuning Range - Broadcast 535—1720 Kc.; Shortwave 5.8—18.3 Mc.
Intermediate Frequency - - - - - - - - - - - 465 Kc.
Speaker - - - - - - - - - - - - 6 in. P. M. Dynamic

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas .1 mf., 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1N5G 2nd I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1A7G Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output (See Note "A")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C6 (See Fig. 3)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer C3 (See Fig. 3)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 6 Mc.	Trimmer C5 (See Fig. 3)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "B")
BROAD-CAST BAND	1720 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C7 (See Fig. 3)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer C2 (See Fig. 3)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer C8 (See Fig. 3)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "B")

NOTE "A" Do not re-adjust the trimmers on the output I. F. Transformer.

NOTE "B" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

Model No. 93BR-460A and 93BR-1460A

Power Consumption - - - "A" Battery 260 MA; "B" Battery 11.5 MA.
Power Output - - - - - - - - - - - 150 Milliwatts, Undistorted
Sensitivity (for .05 Watts) - - - - - - - - - 45 Microvolts Average
Selectivity - - - 45 Kc. Broad at 1000 Times Signal at 1000 Kc.
Tuning Range - - - - - - - - - - - - - 535 to 1730 Kc.
Intermediate Frequency - - - - - - - - - - - - - 465 Kc.
Speaker - - - - - - - - - - - - - - 5 in. P. M. Dynamic

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

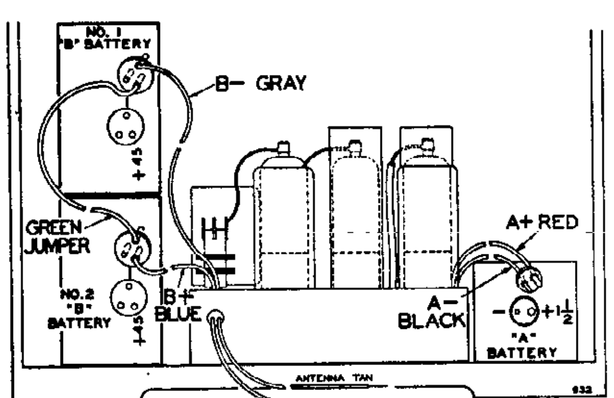
The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1P5G I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1A7G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of front section of gang (See Fig. 1)	Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmer—Top of rear section of gang (See Fig. 1)	Antenna	Adjust to maximum output

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.



STEP 1—CONNECTING "A" BATTERY:

First—Place the "A" Battery in the cabinet as shown, (alongside right hand side of the radio chassis).

NEXT—Insert the special two-prong connector plug into the socket on the "A" battery as shown in illustration.

STEP 2—CONNECTING "B" BATTERIES:

First—Place both "B" Batteries in the cabinet exactly as shown (alongside left hand side of the radio chassis).

NEXT—Insert the special three-prong connector plugs into the sockets on the "B" batteries as shown in illustration.

NOTE: The above procedure and illustration pertains to the new style "B" batteries which have sockets; however, the old style "B" batteries which have terminals can be used by connecting them as follows:

FIRST—Remove the special plugs by cutting the wires off at the plugs.

NEXT—Connect gray colored B minus (—) wire to minus (—) terminal of "B" battery (marked Battery No. 1 in illustration).

NEXT—Connect one end of green connecting wire to plus (+45) terminal of battery No. 1 and other end to the minus (—) terminal of Battery No. 2.

NOW—Connect blue B plus (+) wire to the plus (+45) terminal of Battery No. 2.

MONTGOMERY WARD & CO.

MODEL 93WG562
Schematic, Socket
Alignment, Trimmers

SPECIFICATIONS

Power Consumption - 2.2 Amperes at 6.3 Volts

Power Output - - - - - - - - .5 Watt Undistorted, 1.0 Watt Maximum

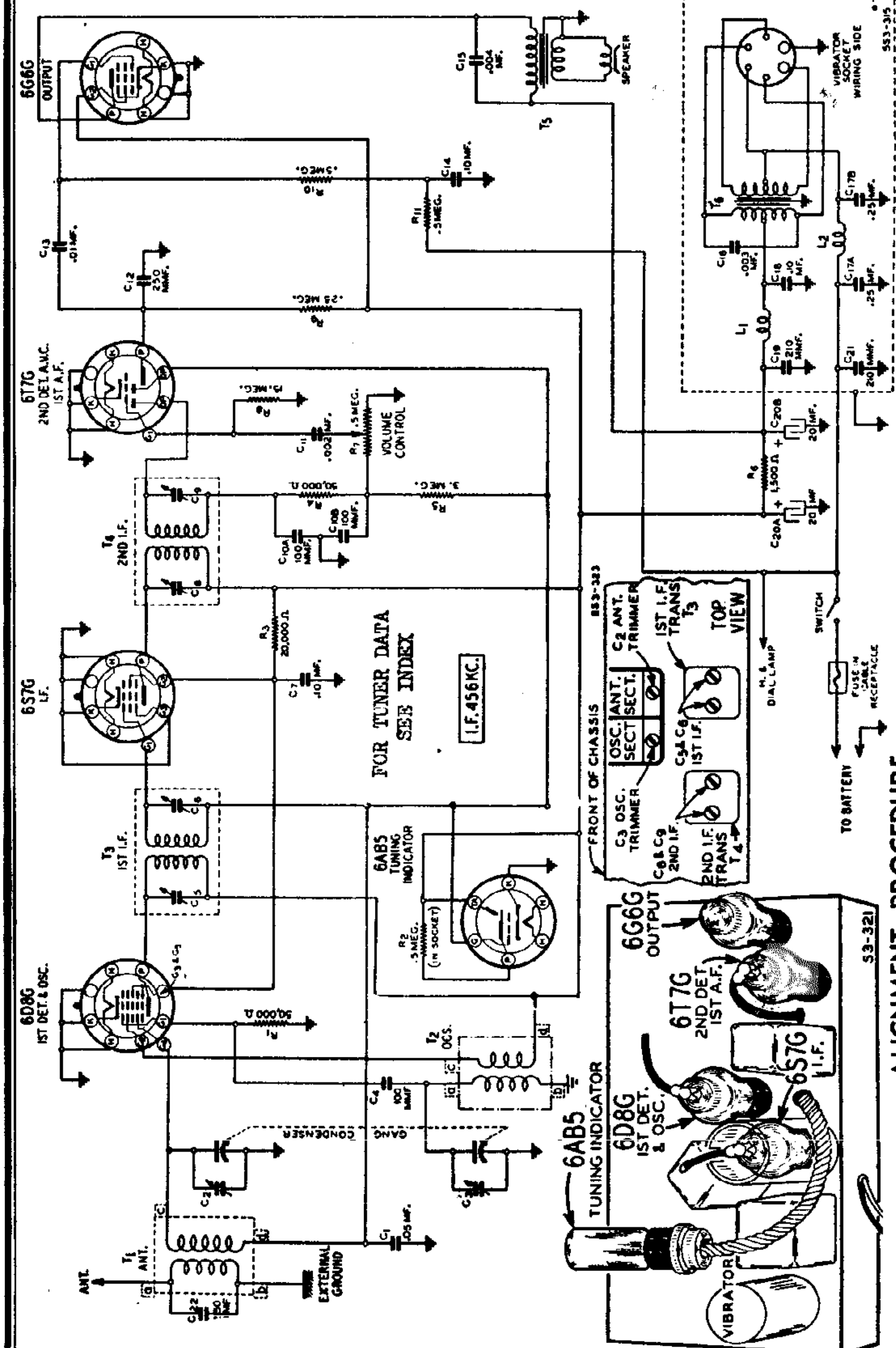
Selectivity - 41 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - - - 5" P. M. Dynamic

Tuning Frequency Range - - 528 to 1730 KC.

Sensitivity (For .05 Watt Output) 15 Microvolts Average



CALIBRATION—If it is necessary to calibrate the radio, accurately tune in a signal of known frequency near 800 KC and note distance and direction dial is off calibration. Remove chassis from cabinet. Loosen the 2 set screws in the hub at the side of the dial drum nearest the center of the chassis. Turn the dial drum the necessary amount in required direction. Place the chassis back in the cabinet and see if it is in calibration. If it is, remove the chassis, tighten the set screws and reassemble.

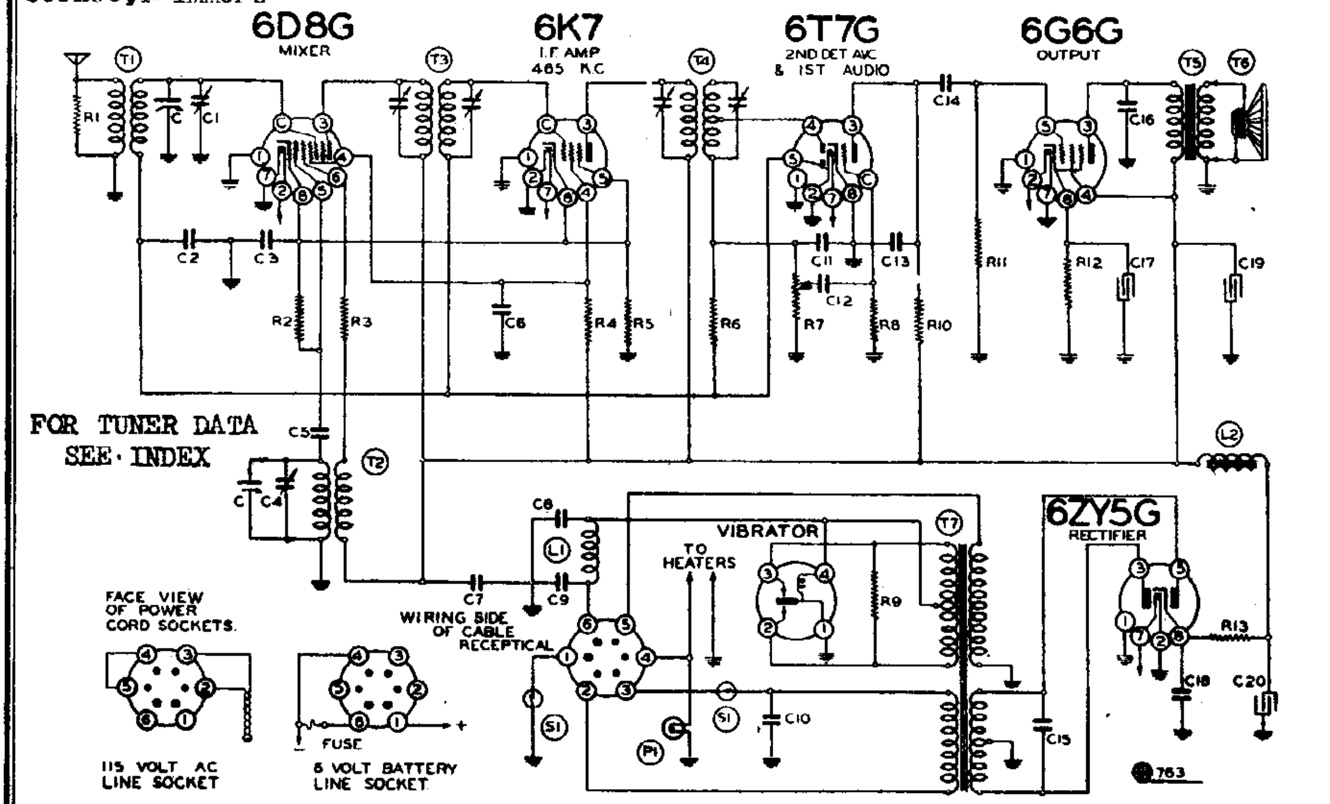
ALIGNMENT PROCEDURE

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Signal Grid of 1st Det.	.1 mf.	Turn rotor to full open	1st I.F. (C5) & (C6) 2nd I.F. (C8) & (C9)
1730 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C3)
1500 KC	Antenna Lead	200 mmf.	Turn rotor to max. output	Antenna (C2)

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

MODEL 93BR564A
Schematic, Voltage
Socket, Trimmers

MONTGOMERY WARD & CO.



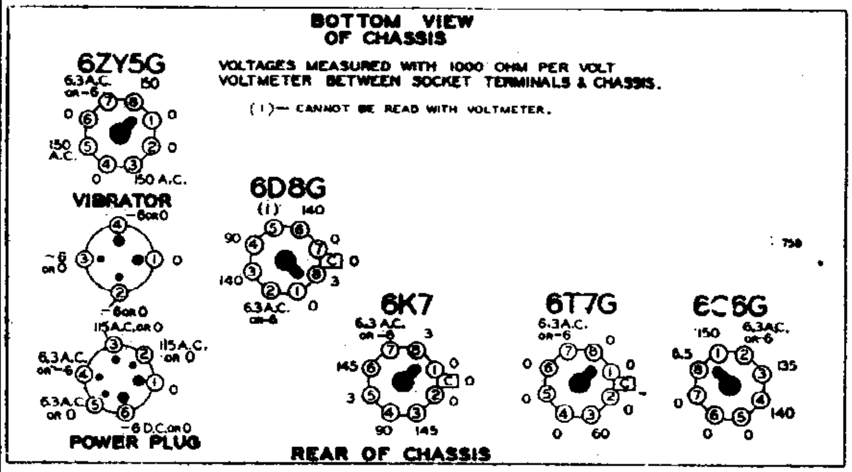


FIG. 3

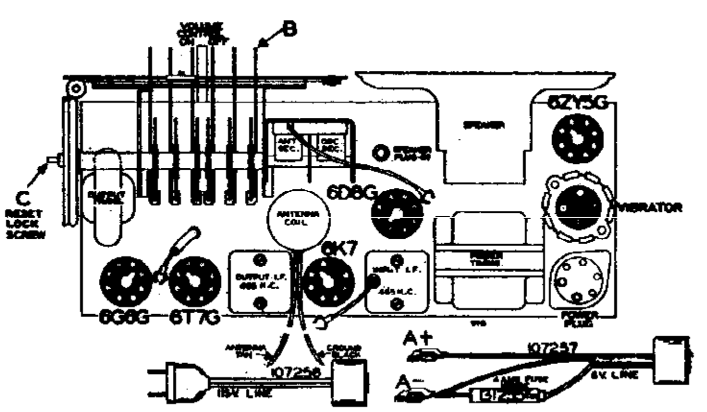


FIG. 1—TOP VIEW

Schematic Reference No.	Part No.	Description
		RESISTORS
R1	BE13017	10M ohm—⅓ w.
R2	BE13012	50M ohm—⅓ w.
R3	BE13082	1000 ohm—⅓ w.
R4	BE130157	12M ohm—⅓ w.
R5	BE13097	300 ohm—⅓ w.
R6	BE1304	3 megohm—⅓ w.
R7	BE101150	1 megohm volume control
R8	[illegible]	15 megohm—⅓ w.
R9	[illegible]	200 ohm—⅓ w.
R10	[illegible]	200M ohm—⅓ w.
R11	[illegible]	500M ohm—⅓ w.
R12	BE13093	450 ohm—⅓ w.
R13	BE130168	100 ohm—⅓ w.
		CONDENSERS
C	BE102113	2 gang variable condenser.
C1		Antenna Trimmer
C2	BE1009	.05 x 200 v.
C3	BE10064	.25 x 200 v.
C4		Oscillator Trimmer
C5	BE1295	.0001 mica
C6	BE10020	.1 x 200 v.
C7	BE10020	.1 x 200 v.
C8	BE10040	.5 x 120 v.
C9	BE10040	.5 x 120 v.
C10	BE10011	.01 x 400 v.
C11	BE12960	.00015 mica
C12	BE10011	.01 x 400 v.
C13	BE1292	.0005 mica
C14	BE1009	.05 x 200 v.
C15	BE10073	.008 x 1200 v.
C16	BE10019	.006 x 600 v.
C17	BE11979	20 mfd. x 25 w. volt
C18	BE10020	.1 x 200 v.
C19	BE11979	16 mfd. x 200 w. volt
C20	BE11979	16 mfd. x 200 w. volt
		PARTS
T1	BE11185C	Antenna Coil
T2	[illegible]	Oscillator Coil
T3	[illegible]	Input I. F. Coil—465 kc.
T4	[illegible]	Output I. F. Coil—465 kc.
T5	[illegible]	Output Transformer
T6	BE114143B	6" P. M. Speaker
T7	BE104114B	Power Transformer
S1		Off-on switch on volume control
P1	BE107249	6.3 v. Pilot Light Type 47
L1	BE10568	"A" Choke
L2	BE10530G	"B" Choke

MODELS 93WG602, 93WG603
Schematic, Voltage
Socket, Trimmers

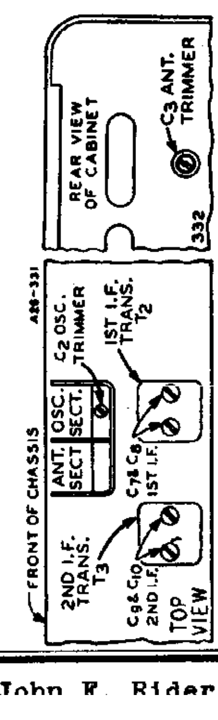
MONTGOMERY WARD & CO.
SPECIFICATIONS

Power Consumption - 28 Watts (At 117 volts AC Supply)
Power Output - - - - - - .8 Watt Undistorted
Selectivity - - 50 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - - - - 5" Electro Dynamic
Tuning Frequency Range - - - 528 to 1730 KC
Sensitivity - - - 40 Microvolts per Meter Average (For .05 Watt Output)

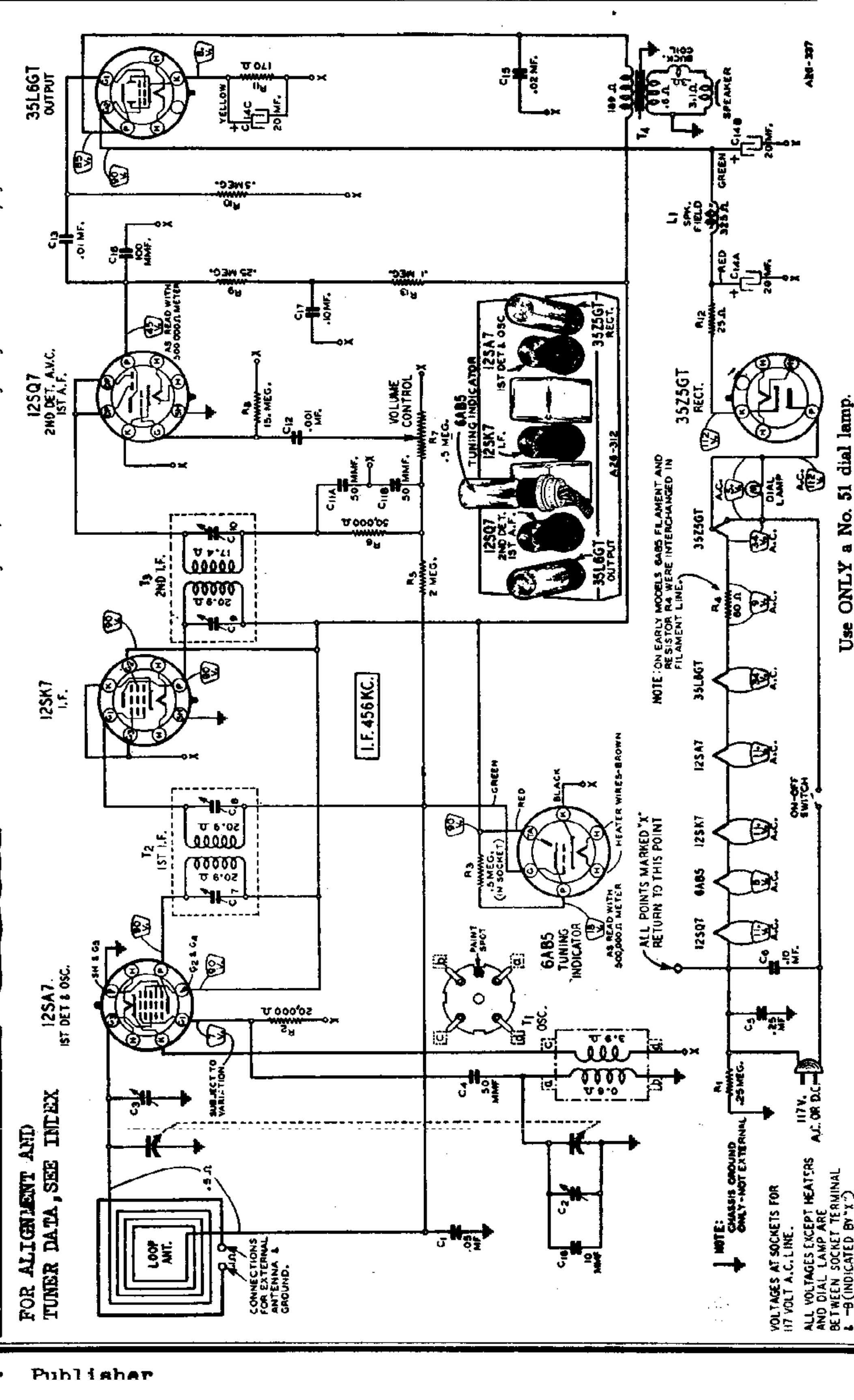
Caution

The metal chassis is connected to one side of the line through a .25 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.



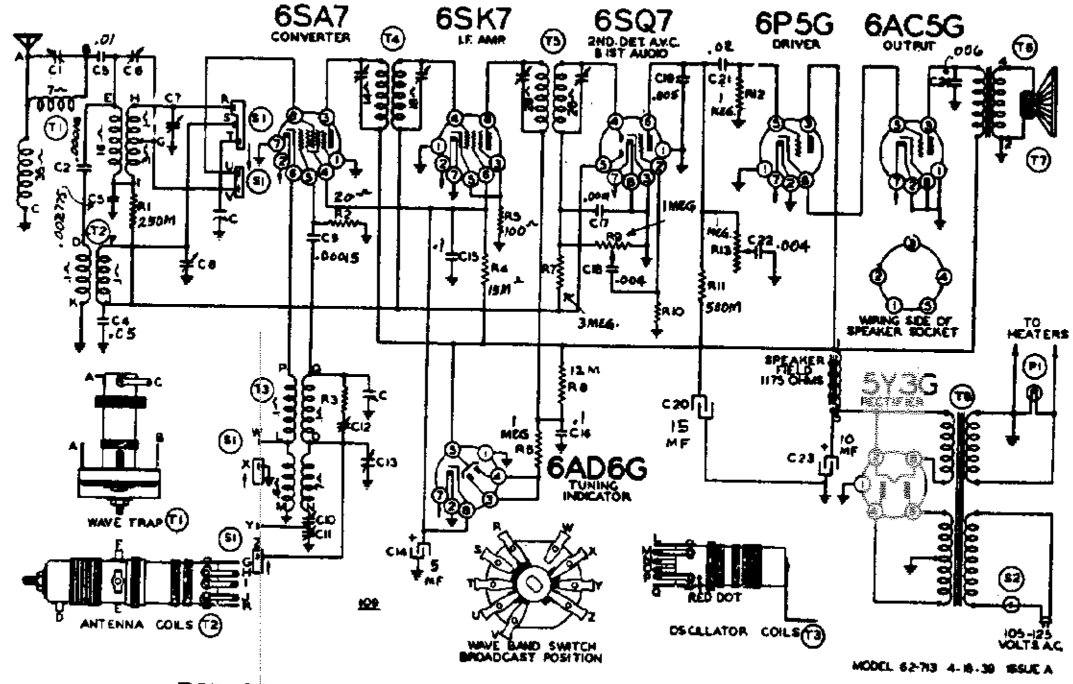
FOR ALIGNMENT AND TUNER DATA, SEE INDEX



Use ONLY a No. 51 dial lamp.

MODEL 93BR713A
Schematic, Voltage
Socket, Trimmers

MONTGOMERY WARD & CO.



FOR ALIGNMENT AND
TUNER DATA, SEE INDEX

IF PEAK
465 KC

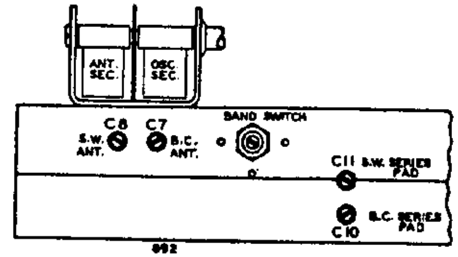


Fig. 3. FRONT VIEW

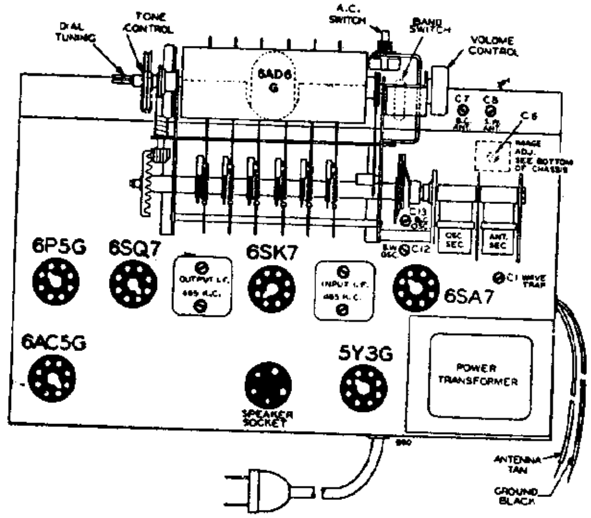
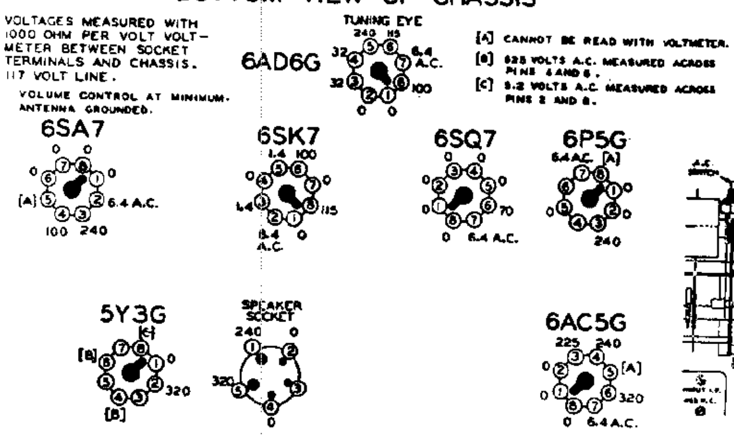


FIG. 1—TOP VIEW

BOTTOM VIEW OF CHASSIS



REAR OF CHASSIS

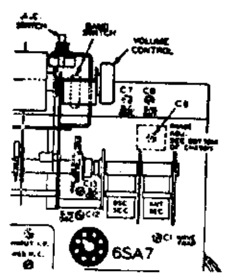
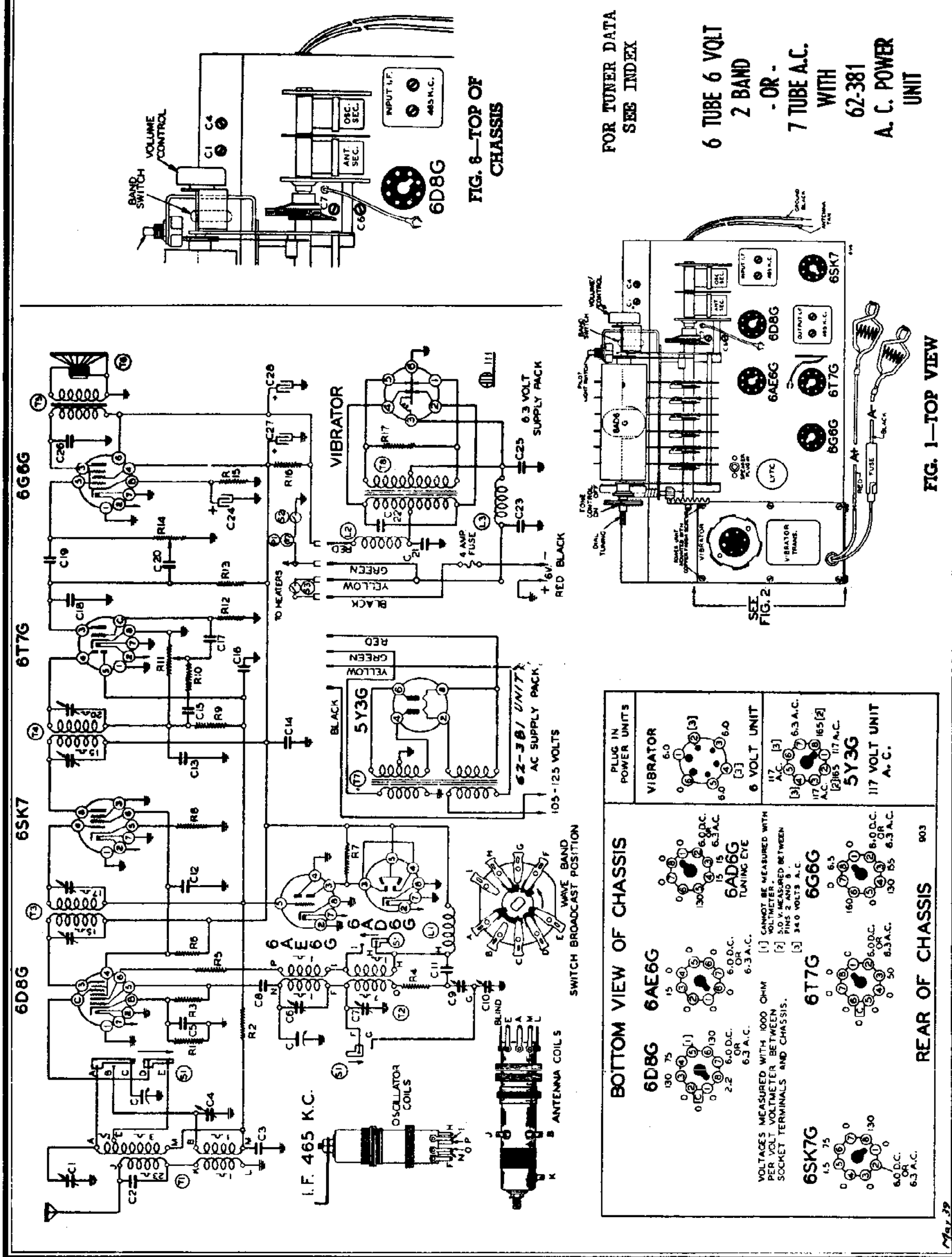


Fig. 4. TOP VIEW

Power Consumption - - - - - - - - - 65 Watts
Power Output - - - - - - 2.5 Watts Undistorted
Sensitivity (for .5 Watts Output) - - 60 Microvolts Average
Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - - - - 535 to 1730 KC; 5.5 to 18.3 MC
Intermediate Frequency - - - - - - - - - - - 465 KC
Speaker - - - - - - - - - - - - - 8 In. Electro Dynamic

MONTGOMERY WARD & CO.

MODEL 93BR657A
Schematic, Voltage
Socket, Trimmers
MODEL 62-381 S.P.U.
Schematic



MODEL 93BR657A
Alignment
MODEL 62-381 S.P.U.
Chassis

MONTGOMERY WARD & CO.

Chassis No. 93BR657A

Power Consumption	2.5 Amp. at 6.3 Volts
Power Output	.8 Watts Undistorted
Sensitivity (for .05 Watts Output)	Broadcast 10 Microvolts Average; Shortwave 20 Microvolts Average
Selectivity	35 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range	535 to 1730 KC; 5.8 to 18.3 MC
Intermediate Frequency	465 KC
Speaker	6 in. P. M. Dynamic

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

- The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

BAND	Signal Generator Frequency Setting	Signal Generator Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6D8G	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer (C6) (See Fig. 6)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 Mc.	Trimmer (C4) (See Fig. 5)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 6 Mc.	Trimmer (C10) (See Fig. 5)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROADCAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C7) (See Fig. 6)	Broadcast oscillator	Adjust to maximum output
	1500 Kc	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmer (C1) (See Fig. 5)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C9) (See Fig. 5)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

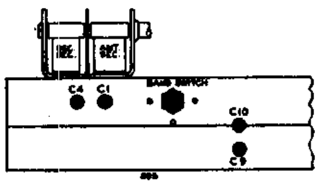


FIG. 5—FRONT OF CHASSIS

TUBES:

The following complement of this chassis consists of the following octal base glass and metal tubes:

The type and function of each tube is as follows:

1—Type 6D8G First Detector-oscillator.
1—Type 6SK7 Remote Cut-Off Pentode, I. F. Amplifier (465 K. C.).
1—Type 6T7G Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6G6G Output Amplifier.
1—Type 6AE6G D. C. Amplifier.
1—Type 6AD6G Cathode-Ray Tuning Eye.

NOTE:—If the 62-381 A. C. power unit is installed in place of the 6 volt power unit, the tube complement of the radio will consist of one more tube:
1—Type 5Y3G Rectifier.

No.	Part No.	Description
		RESISTORS
R1	BE13083	300 ohm—⅓ w.
R2	BE13020	100M ohm—⅓ w.
R3	BE13012	50M ohm—⅓ w.
R4	BE130286	20 ohm—⅓ w.
R5	BE130168	100 ohm—⅓ w.
R6	BE13048	15M ohm—½ w.
R7	BE13019	1 megohm—⅓ w.
R8	BE13097	200 ohm—⅓ w.
R9	BE1304	3 megohm—⅓ w.
R10	BE13012	50M ohm—⅓ w.
R11	BE101166	1 Megohm volume control
R12	BE130225	15 megohm—⅓ w.
R13	BE1305	300M ohm—⅓ w.
R14	BE101171	500M ohm tone control
R15	BE13070	500 ohm—⅓ w.
R16	BE130199	1500 ohm—1 watt
R17	BE130285	200 ohm—⅓ w.
		CONDENSERS
C	BE102106B	2 gang variable condenser
C1	BE12475	BC Antenna Trimmer
C2	BE129132	.000125 mica
C3	BE1009	.05 x 200
C4	BE12475	S. W. Antenna Trimmer
C5	BE10020	.1 x 200 v.
C6	BE12476	S. W. Oscillator Trimmer
C7	BE12476	B. C. Oscillator Trimmer
C8	BE12938	.00005 Mica
C9	BE12488	B. C. Series Pad
C10	BE12488	S. W. Series Pad
C11	BE10020	.1 x 200 v.
C12	BE10020	.1 x 200 v.
C13	BE1295	.0001 Mica
C14	BE10020	.1 x 200 v.
C15	BE1295	.0001 mica
C16	BE10026	.02 x 400 v.
C17	BE10019	.006 x 600 v.
C18	BE1292	.0005 mica
C19	BE10026	.02 x 400 v.
C20	BE10019	.006 x 600 v.
C21	BE10020	.1 x 200 v.
C22	BE10068	.003 x 1400 v.
C23	BE10040	.5 x 120 v.
C24	BE11985	20 mfd.—25 w. v. lytic
C25	BE10040	.5 x 120 v.
C26	BE10019	.006 x 600 v.
C27	BE11985	30 mfd.—200 w. v. lytic
C28	BE11985	30 mfd.—200 w. v. lytic
		C24, 27, 28 in same unit
		PARTS
T1	BE111121	Antenna Coil
T2	BE110117	Oscillator Coil
T3	BE108111-I	Input I. F.
T4	BE108112E	Output I. F.
T5	BE10569C	Output Transformer
T6	BE114162J	6 in. P. M. Speaker
T7	BE104165	AC Power Transformer
T8	BE104164	Vibrator Transformer
	BE12616	Vibrator
L1	BE1233	R. F. Choke
L2	BE1233	R. F. Choke
L3	BE10568	"A" Choke
S1	BE12576	Wave Band Switch
S2	BE12577	Pilot Light Switch
S3		Off-on switch on tone control
P1	BE10789	Pilot light 6.3 v.—150 ma.—T-40

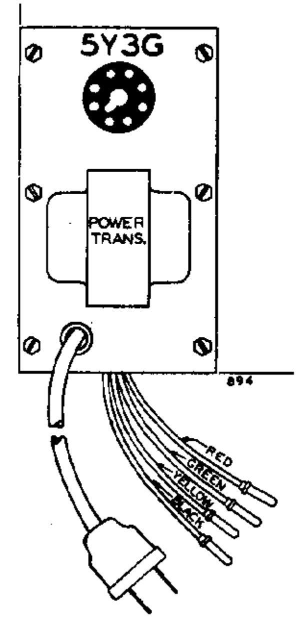


FIG. 2—MODEL 62-381 A. C. POWER UNIT

Model 62-381 Power Unit

(For 105-125 Volt 50/60 Cycle A. C. Operation)

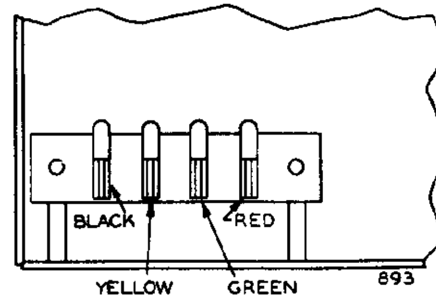
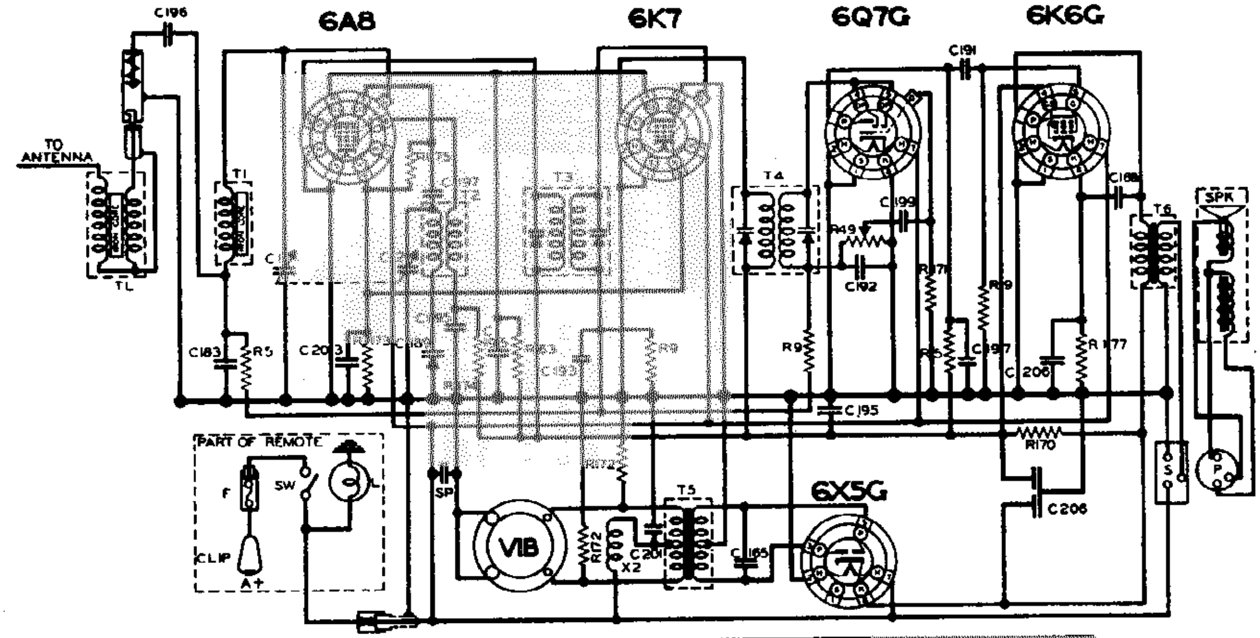


FIG. 3—CONNECTOR STRIP ON CHASSIS FOR POWER UNIT

Schematics
Voltage

NOBLITT-SPARKS INDUSTRIES, INC. MODEL 7A, Chassis RE44
MODEL 44C, Chassis RE46

ARVIN CAR RADIO CHASSIS RE44



Resistors No.	Ohms	Watt	Part No.	Condensers No.	Capacity	Volt	Part No.	Coils & Transformers No.	Type	Part No.	Misc. Units Symbol	Description	Part No.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17-2228
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] MAZDA NO. 51	17-13904
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17-4780
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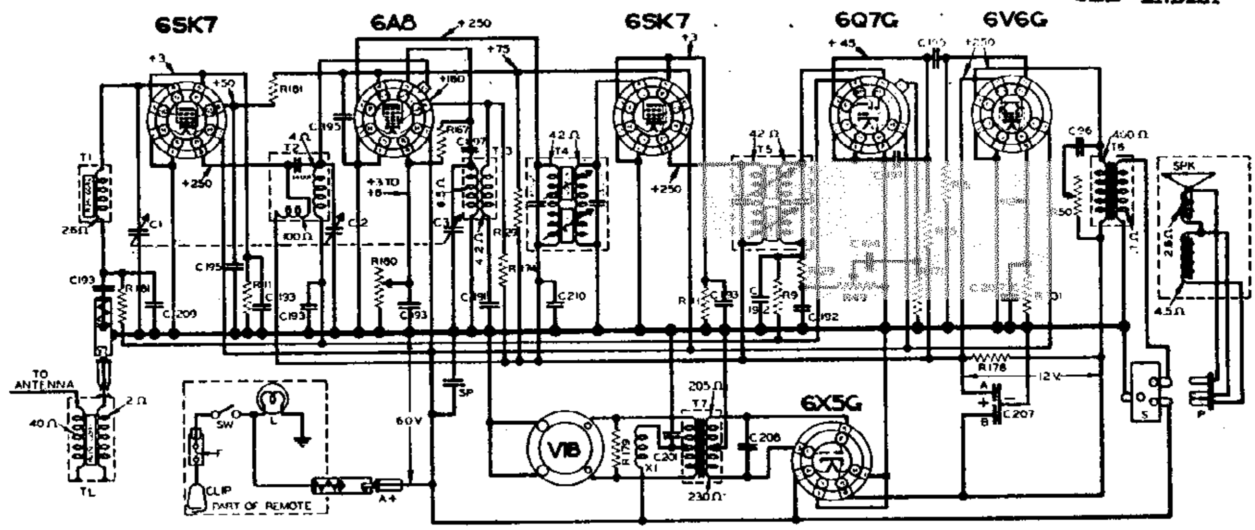
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17-13370
171	15M	1/4	17-14288	191	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	00-16364	[illegible]	[illegible]	—
172	100	1/4	17-14289	192	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	00-18233
173	200	1/4	17-14290	193	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	—
174	20K	1/4	17-14291	195	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	17-14742
175	40K	1/4	17-14292	196	[illegible]	[illegible]	[illegible]	A	CHOKES				
177	650	1/4	17-14298	197	[illegible]	[illegible]	[illegible]	[illegible]	SUPPRESSION CHOKE	29-13459			
				199	[illegible]	[illegible]	[illegible]						
				201	[illegible]	[illegible]	[illegible]						
				203	[illegible]	[illegible]	[illegible]						
				206	[illegible]	[illegible]	[illegible]						
				208	[illegible]	[illegible]	[illegible]						
				186	[illegible]	[illegible]	[illegible]						

I.F PEAK 455 K.C
FREQUENCY RANGE 1575 TO 540 K.C
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

MODEL 7A

ARVIN CAR RADIO CHASSIS RE46

FOR ANTENNA DATA
SEE INDEX



R5--500K	R171--15M	C96--.05-600v.	C207A) 10mfd.-400v.
R9--1M	R174--20K	C104-.01-200v.	C207B)
R11-2K	R178-1200	C191-.01-400v.	C207C 20mfd.-25v.
R29-50K	R179--100	C192-.00025-200v.	C208--.005-1600v.
R31-260	R180-2000	C193-.05-200v.	C209-.001725-600v.
R49-500K	R181-100K	C195-.05-400v.	C210--.1-400v.
R50-100K	All 1/4 W.	C197-.0001-600v.	F-fuse-20 amp.
R167-60K	but R31-1/2.	C201-.5-150v.	L-Mazda No.51

INTERMEDIATE FREQUENCY 170 K.C.
FREQUENCY RANGE 1570 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

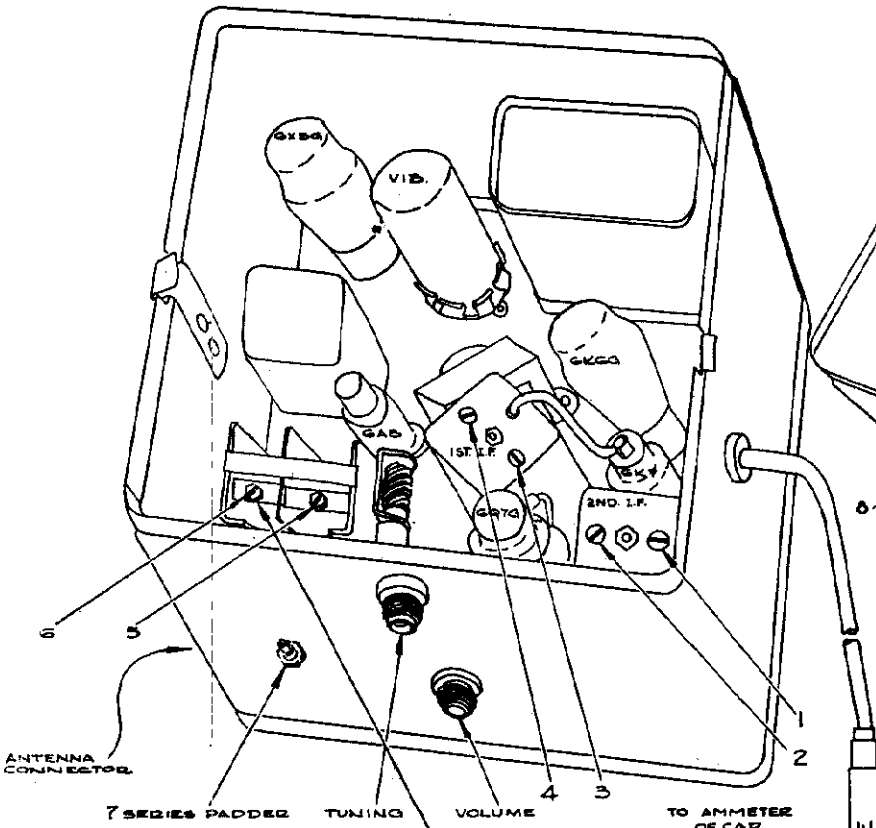
MODEL 44C

NOTE - ALL VOLTAGES GIVEN FOR "A" INPUT OF 6 VOLTS. ALLOW ±10% ON ALL VOLTAGES & RESISTANCES OF WINDING.

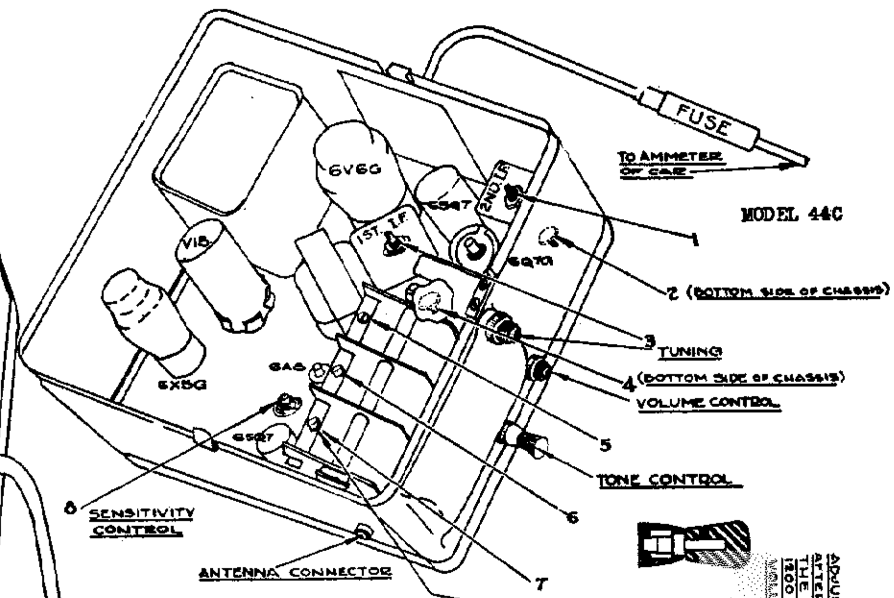
MODEL 7A, Chassis RE44
MODEL 44C, Chassis RE46

NOBLITT-SPARKS INDUSTRIES, INC.

Alignment, Socket
Sensitivity
Trimmers



ADJUST THIS ANTENNA BALANCING SCREW AFTER INSTALLATION OF THE RADIO ON THE CAR. TUNE IN A WEAK STATION FROM 1200 TO 1400 K.C. AND TURN UNTIL MAXIMUM VOLUME IS OBTAINED.



ADJUST THIS ANTENNA BALANCING SCREW AFTER INSTALLATION OF THE RADIO ON THE CAR. TUNE IN A WEAK STATION FROM 1200 TO 1400 K.C. AND TURN UNTIL MAXIMUM VOLUME IS OBTAINED.

BALANCING INSTRUCTIONS

ARVIN MODEL 7A CAR RADIO

All sensitivities given for ½ watt output equals 1.4 V. across Voice Coil

Operation No.	Connect Bal. Oscillator To	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6A8 Grid	455	1, 2, 3 and 4	550 KC	50 uv
2	Ant. Coupler Through 30 uuf	1400	5	1400	
3	"	1400	6	1400	10 uv
4	"	600	7	600	10 uv

BALANCING INSTRUCTIONS

ARVIN MODEL 44C CAR RADIO

All sensitivities are given for 1 watt output = 1.73 V across speaker voice coil.

SPECIAL NOTE: The intermediate frequency transformers in this receiver are coupled so as to secure flat top characteristics and provide semi-high fidelity reception of radio stations. These transformers may be balanced with a standard signal generator and output meter as follows:

Feed a signal of 170 kc into the grid of the 6A8 tube through .002 mfd. capacity, connect a 30,000 ohm resistor across the primary of the second I. F. transformer (P to B+) and adjust screw No. 1 for maximum output. Disconnect the resistor and place it across the secondary of the same transformer and adjust screw No. 2.

Then connect the resistor across the primary of the 1st I. F. transformer and adjust screw No. 3 and then after placing the resistor across the secondary, adjust screw No. 4.

Operation No.	Connect Bal. Oscillator To	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1 (See note above)	6A8 Grid	170 kc	1, 2, 3 & 4	Condenser Closed	700 uv
2	Ant. Coupler Through 20 uuf	1570 kc	5	Condenser Open	—
3	Through 20 uuf	1400 kc	6 & 7	1400 kc	5 uv
*4	Through 20 uuf	600 kc	8	600 kc	3.5 uv

*Operation No. 4 adjusts bias on 6A8 to obtain 5 uv sensitivity; for metropolitan areas this sensitivity may be set as low as 10 uv, and in mountainous areas as high as 1 uv, to secure the most satisfactory reception.

MODELS 828AT,838AT **NOBLITT-SPARKS INDUSTRIES, INC.** MODEL 7A MODEL 8A MODEL 44C

Alignment,Tuner Data
Sensitivity

Antenna Data

ARVIN 828AT-838AT AUTOMATIC DIAL TUNING INDICATOR

This receiver should first be removed from its carton and the cabinet carefully cleaned with a soft rag to remove packing lint.

The hook bolts or clips which secure the chassis to the cabinet to hold it rigidly during shipment should next be removed. One will be found on each side of the chassis. Do not confuse these with the brackets which suspend the chassis through rubber grommets. These latter brackets should not be molested unless it is necessary to service the receiver.

The receiver may be prepared for operation by connecting an antenna lead at "A" on the rear terminal strip and connecting a ground lead at "G", leaving the jumper from "D" to "G" in place; or by removing the jumper and connecting the transmission line lead from an Arvin all-wave antenna kit. (Black lead to "D" and red lead to "A".) Plug the line cord into a suitable receptacle.

Make a list of ten stations in your locality which you desire to set up on the station selector, arranging this list so that the stations appear in the order of their frequencies. Cut the call letters of these stations from the sheets supplied with this receiver, leaving a white tab on each end of the piece cut out.

The receiver is placed in operation by turning the right-hand knob in a clockwise direction. This knob also functions as a tone control. The second knob to the left should be turned to the maximum counter-clockwise or manual tuning position.

Tune in the first station on your list, using the tuning indicator to determine whether station is properly tuned in. Change the Manual-Automatic Tuning switch to the automatic tuning position. Unless one of the buttons about to be adjusted happens to be set at this point the receiver will now appear to be inoperative. (In event a button does happen to be set at the proper point—no adjustment is necessary. If the pilot light is not in proper rotation, the sockets may be exchanged from the rear.) Looking at the rear of the dial and on the side toward which the pointer is now pointing, locate the button in the circular slot whose lead goes to the lowest pilot light on that side of the dial. Loosen this button by means of a turn in the counter-clockwise direction and slide the button in its track slowly until a point is reached where the receiver operates. The correct location for this button is directly behind the brass strip carried by the arm behind the plate on which the buttons are mounted. If this correct location cannot be attained by sliding the button in the particular track it now occupies, the button should be slid along this track to the point where it may be taken out and inserted in a track where this adjustment is possible.

The Manual-Automatic Tuning switch should now be returned to the Manual position; the second station on the list tuned in; the Manual-Automatic Tuning switch again thrown to the Automatic Tuning position; the button at the rear of the dial selected whose lead goes to the second pilot light; this button should be loosened, slid along the track and again tightened at the point where the receiver operates.

This same procedure should be continued for each station successively right around the dial, which then completes the set-up.

The switch may now be turned to the Automatic Tuning position. Tune in each station again, placing the proper call letters in each clip, inserting them from the rear of the receiver and at the edge of the dial frame. Push the call letter strips in so that they properly center in each window when viewed from the front.

This Arvin receiver has special advanced features which must be properly understood in order that full benefit may be derived from this fine instrument.

When the receiver is being operated with the Manual-Automatic Tuning switch in the manual position, the receiver tunes sharply and any station within the range of the receiver may be selected at will. Tonal quality to suit the taste of the listener may be obtained by adjustment of the tone control.

On the other hand, when the Manual-Automatic Tuning switch is in the automatic tuning position, the receiver functions in an entirely different manner. Throwing this switch automatically broadens the selectivity characteristics of the receiver.

It should be noted that this broad selectivity will only function satisfactorily on the louder stations, that is, those which are normally selected for use on the Arvin-Station-Selector. (This broadened selectivity is not practical in the manual tuning position because of inter-station interference which would inevitably result.)

Should the listener so desire, this increased fidelity can be compensated for by readjusting the setting of the tone control.

When this receiver is being operated on the police-amateur or foreign-short wave band, tuning should always be done manually and no attempt made to utilize the station selector feature which has been set up for the broadcast band.

ARVIN MODELS 7A, 8A, AND 44C, ANTENNAS A22, A23 and A24

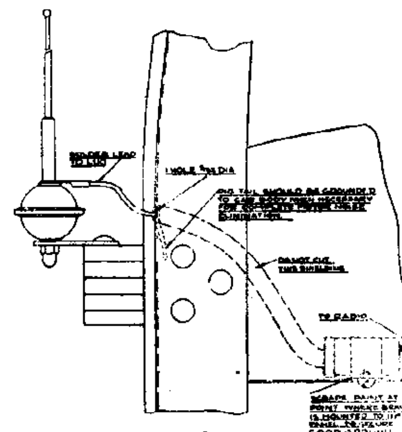


FIG-1

INSTALLATION FOR DOOR HINGE ANTENNA

Antenna:

Arvin antennae A22, A23 and A24 are recommended for use with the Arvin Model 7A Radio. These antennae are supplied with special connector shield cups to provide for good motor noise elimination.

The use of UNDER CAR or built in ROOF TYPE ANTENNA is not recommended nor will satisfactory reception be obtained if this type antennae is used.

The Phantom Filter should be mounted as shown in Figure 1 if a door hinge type antenna is used. Fig 2 illustrates the proper connections for the side cowl type Arvin Antenna and the Arvin Phantom Filter.

Installation:

A clear space, preferably above the steering column, approximately 8½" square and free of obstructions is required for mounting the model 7A radio chassis.

Remove the cap screw in the rear of the radio chassis and insert the stud, (supplied in the hardware envelope) in its place. Drill a ½" hole in the center of the space selected for the chassis.

Scrape the paint from the motor side of the dash around the ½" hole to secure a good ground for the mounting stud.

BALANCING INSTRUCTIONS
MODELS 828AT and 838AT

SENSITIVITY:

A. Broadcast Band—50 Microvolts Minimum
B. Police Band—75 Microvolts Minimum
C. Short Wave Band—100 Microvolts Minimum

NOTE: Standard output is considered 500 milliwatts which is equal to 1.12 R.M.S. AC volts across the voice coil of the speaker. Sensitivity is determined by the amount of input in microvolts required to produce 1.12 volts at the voice coil. Measurement may be made with any AC voltmeter or output meter.

The intermediate frequency transformers embodied in the circuit of Arvin Models 828AT-838AT are of the semi-permatune type, the only adjustment being variable iron cores in the fields of the transformers. It is advisable before attempting to rebalance the intermediate stages of this receiver, therefore, to check the overall intermediate frequency stage sensitivity. This may be accomplished by connecting the 455 K. C. output of a standard signal generator to the grid cap of the 6A8G tube after removing the grid clip. Connection should be made through a standard 200 mmf. dummy antenna. Check sensitivity and perform all balancing procedure with the automatic tuning in the "off" position. The intermediate frequency sensitivity should be at least 75 microvolts for 50 milliwatts output. If the I. F. sensitivity is within the limits prescribed the following instructions for balancing may then be followed.

If the I. F. sensitivity is low then adjust screws 1, 2, 3 and 4 for maximum output.

1. Connect the signal generator to the A and G terminals on the rear of the radio. Rotate the condenser until it is fully in mesh (maximum clockwise position.) The dial pointer should point to the center of the station window which is alongside 550 kilocycles (55 on the American broadcast band.)
2. Rotate dial pointer to 1,400 K. C. Set band switch to Broadcast Position. Adjust padder No. 5 to resonance. Adjust padder No. 6 for maximum output.
3. Rotate dial pointer to 600 K. C. With 600 K. C. input from the signal generator adjust padder No. 7 for resonance.
4. Set band switch to mid-band position. Rotate dial pointer to 5.0 megacycles. With 5,000 K. C. input from signal generator adjust padder No. 8 for resonance. Adjust padder No. 9 for maximum output.
5. Set band switch to short-wave band position. Rotate dial pointer to 15.0 megacycles. With 15 megacycles input from signal generator turn padder No. 10 to the extreme clockwise position. Then rotate padder screw counter-clockwise selecting the second resonance point reached. Then adjust padder No. 11 for maximum output.

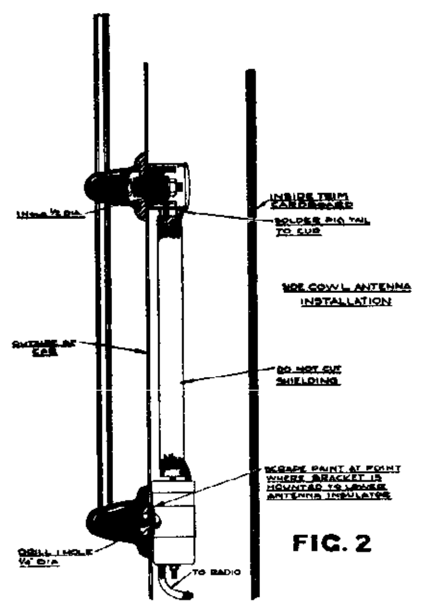


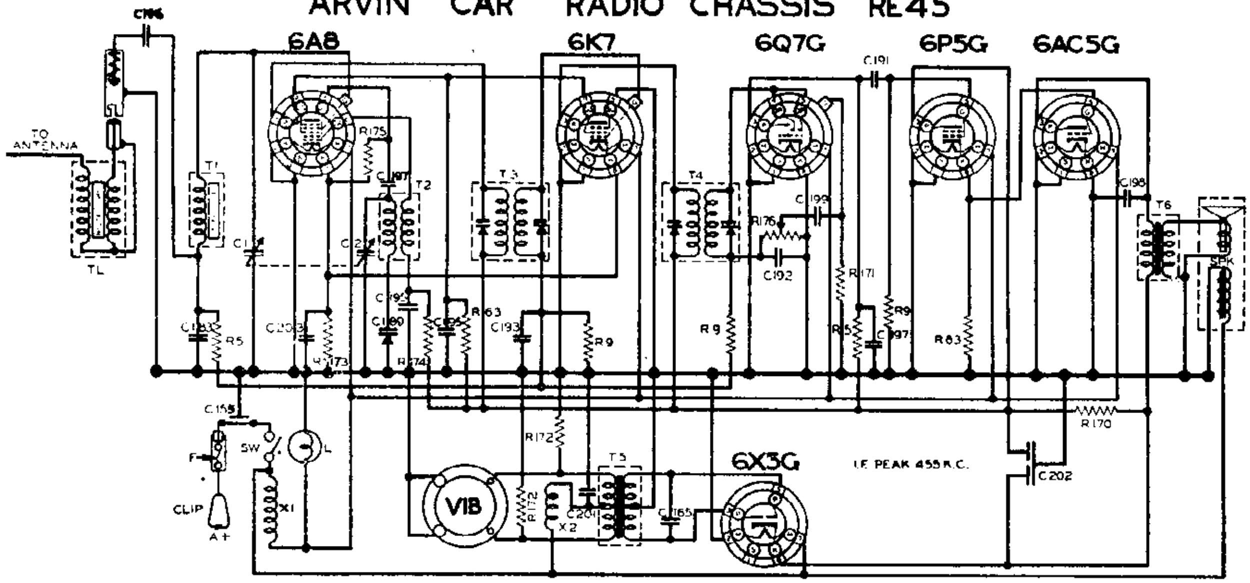
FIG. 2

MODEL 8A
Chassis RE 45
Schematic

NOBLITT-SPARKS INDUSTRIES, INC.

Alignment
Socket
Trimmers

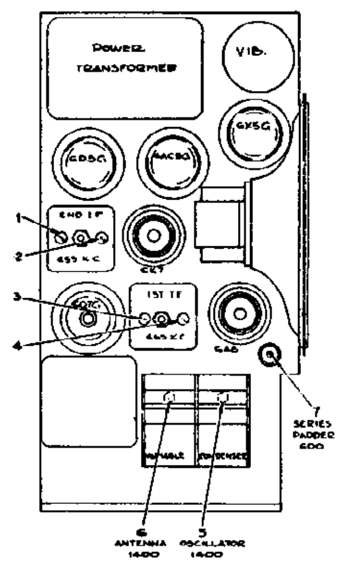
ARVIN CAR RADIO CHASSIS RE45



BALANCING INSTRUCTIONS:

All sensitivities given for ½ watt output = 1.4 V. across Voice Coil

Operation No.	Connect Bal. Oscillator to	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6A8 Grid	455	1, 2, 3 & 4	550 KC	50 uv
2	Ant. Coupler Through 20 uuf	1400	5	1400	
3	"	1400	6	1400	10 uv
4	"	600	7	600	10 uv



RESISTORS:

Ref. No.	Part No.	Description
R5	17-2070	500,000 ohm, ¼ W.
R9	17-2080	1,000,000 ohm, ¼ W.
R63	17-14091	25,000 ohm, ¼ W.
R170	17-14287	800 ohm, 1 W.
R171	17-14288	15,000,000 ohm, ¼ W.
R172	17-14289	100 ohm, ¼ W.
R173	17-14290	200 ohm, ¼ W.
R174	17-14291	20,000 ohm, ¼ W.
R175	17-14292	40,000 ohm, ¼ W.
R176	17-16225	500,000 ohm, vol. control

CONDENSERS:

Ref. No.	Part No.	Description
C182	29-16217	Tuning Condenser
C155	17-14217	.0002 mfd. 600 V.
C165	17-14230	.005 mfd. 1200 V.
C183	17-14294	.003 mfd. 600 V.
C189	17-14266	.0005 mfd. padder
C191	17-14272	.01 mfd., 400 V.
C192	17-14273	.00025 mfd., 600 V.
C193	17-14274	.05 mfd., 200 V.
C195	17-14276	.05 mfd., 400 V.
C196	17-14277	.1 mfd., 200 V.
C197	17-14278	.0001 mfd., 600 V.
C198	17-14279	.005 mfd., 400 V.
C199	17-14283	.02 mfd., 200 V.
C201	17-14285	.5 mfd. -150 V.
C202	17-15286	10-10 mfd., 300 V.
C203	17-16242	2 mfd., 200 V.

COILS and TRANSFORMERS:

T—1	00-16219	Antenna Coil
T—2	00-16220	Oscillator Coil
T—3	00-16221	1st. I. F. Trans.
T—4	00-16222	2nd I. F. Trans.
T—5	00-16223	Power Transformer
T—6	00-16224	Output Transformer
X—1	20-13458	Suppression Choke
X—2	29-13459	Suppression Choke
TL	00-16233	Phantom Filter

FREQUENCY RANGE 1575 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC,
COLUMBUS, INDIANA

FOR ANTENNA DATA
SEE INDEX

MISCELLANEOUS:

Part No.	Description
17-16213	Speaker Assembly (5¼")
37-13423	Rear Mounting Bracket
61-16230	Dial Glass
26-16212	Dial Pointer
29-13583	24" Dial Cord
17-14747	Vibrator.
29-16024	Tuning & Volume Knob
29-16232	Push Button Knobs
10-5145	Mounting Screw $\frac{5}{16}$x1½"
10-5141	Mounting Screw No. 10 x ¾"
29-3219	Instruction Sheet
29-3150	Call Letter Sheets
23-16249	Ford Mounting Spacer

MODEL 578B
Alignment, Voltage
Data

NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 9A
Voltage

MODEL 9A SOCKET VOLTAGES

Tube	Heater	Cathode	Suppressor Grid	Screen Grid	Plate	Oscillator Grid	Anode Grid	Diode Plates	Control Grid
78	6.3	0	0	75	175	......	......	......	3.4
6A7	6.3	0	......	75	175	4-7	135	......	3.4
78	6.3	3.2	0	75	175	......	......	......	0
75	6.3	0	......	......	90	......	......	2.0	1.6
41	6.3	0	......	175	172	......	......	......	17.0
84	6.3	195	......	——	215 A. C.	......	......	......	......

Socket voltages given in table are for an input of 5.8 volts at the tubes in the receiver. 5.8 volts is the average obtained in various cars after allowing for drop in car wiring.

FOR OTHER SERVICING DATA ON THESE MODELS SEE INDEX

MODEL 578B ARVIN RADIO

TUBES: 1C7G—1st Detector-Oscillator
1D5G—I. F. Amplifier
1H6G—2nd Detector
1G5G—Audio Output Amplifier

FREQUENCY RANGE: 540 to 1,725 Kilocycles

POWER OUTPUT: 300 Milliwatts

SPEAKER:
6″ Permanent Magnet Dynamic
3 ohm voice coil—400 cycles

VOLTAGE AND POWER CONSUMPTION:
"A" Battery—360 milliamperes at 2.1 volts
"B" Battery—12-15 milliamperes at 90 volts

SENSITIVITY:
1000 KC.—100 Microvolts for 50 milliwatts output
456 KC.—200 Microvolts for 50 milliwatts output

COIL RESISTANCES

Antenna Coil Primary	14.5 Ω
Antenna Coil Secondary	4.4 Ω
Oscillator Coil Primary	4.5 Ω
Oscillator Coil Secondary	4.7 Ω
1st I. F. Primary	14 Ω
1st I. F. Secondary	14 Ω
2nd I. F. Primary	14 Ω
2nd I. F. Secondary	14 Ω
Output Transformer Primary	800 Ω
Output Transformer Secondary	.3 Ω

POINT TO POINT RESISTANCES

1C7G

Filament	0 Ω
Filament	∞
Screen to B+	15,000 Ω
Oscillator Grid	50,000 Ω
Anode Grid to B+	0 Ω
Control Grid	2,500.000 Ω
Plate to B	15 Ω

1D5G

Filament	0 Ω
Filament	∞
Screen to B+	15,000 Ω
Plate to B+	15 Ω
Control Grid	2,500,000 Ω

1H6G

Filament	0 Ω
Filament	∞
Plate to B+	250,000 Ω
Diode Plates	500,000 Ω
‡Grid	500,000 Ω

1G5G

Filament	0 Ω
Filament	∞
Screen to B+	800 Ω
Grid	1,000,400 Ω

‡ Volume control in full-on position.

SOCKET VOLTAGES MODEL 578B

Tube	Filament	Plate	Screen Grid	Oscillator *Grid	Anode Grid	Diode *Plates	Control *Grid
1C7G	2.1	84	45	3-6V	84	......	0
1D5G	2.1	84	45	......	......	......	0
1H6G	2.1	35	......	......	......	0	0
1G5G	2.1	84	84	......	......	......	—6

* Measured with a vacuum tube voltmeter. 600 to 1500 K. C.

No signal applied to receiver: with 100,000 microvolts to input diode voltage approximately 12 volts.

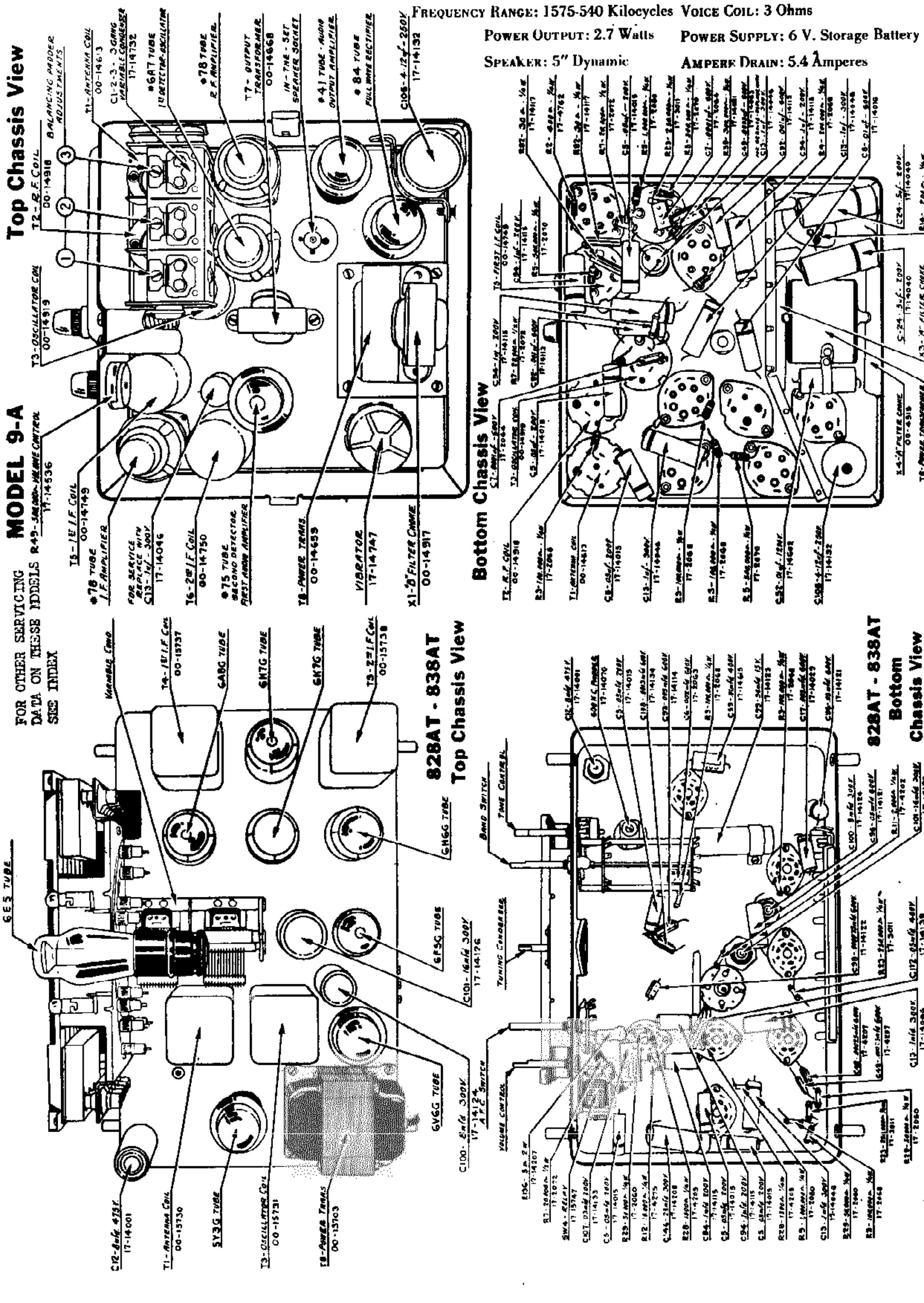
BALANCING INSTRUCTIONS

CONNECT an output meter or A. C. Voltmeter across the speaker coil leads.

1. Connect the signal generator to the grid cap of the 1C7G tube and with an input of 456 K. C. adjust padders 1, 2, 3 and 4 for maximum output.
2. Connect the signal generator through a standard 200 micromicrofarad dummy antenna to the antenna (green) lead wire on the rear of the chasis. Ground the generator to the (black) ground wire.
3. Rotate the tuning condenser to the wide open position. Check the dial pointer to see that it is parallel to the horizontal line across the dial face.
4. Rotate the dial pointer to 1,400 K. C. and with an input of that frequency adjust padder No. 5 to resonance. Adjust padder No. 6 for maximum output.
5. Rotate the dial pointer to 600 K. C. and with an input of that frequency adjust the series padder No. 7 to resonance.
6. Return to 1,400 K. C. and recheck the settings of padders No. 5 and No. 6.

MODEL 9A
MODELS 828AT,838AT NOBLITT-SPARKS INDUSTRIES, INC.
Socket,Trimmers
Chassis

FREQUENCY RANGE: 1575-540 Kilocycles VOICE COIL: 3 Ohms
POWER OUTPUT: 2.7 Watts POWER SUPPLY: 6 V. Storage Battery
SPEAKER: 5" Dynamic AMPERE DRAIN: 5.4 Amperes

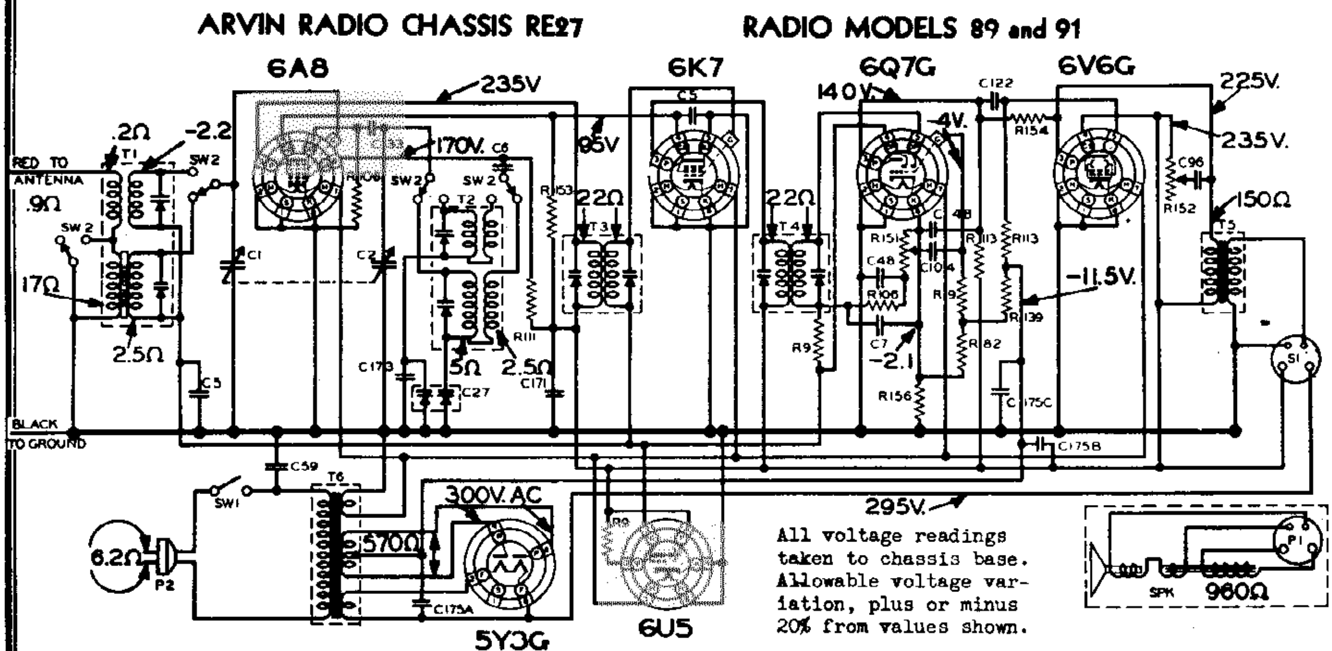


Alignment, Trimmers
Sensitivity

NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 89, 91
Chassis RE27
Schematic, Voltage

ARVIN RADIO CHASSIS RE27 RADIO MODELS 89 and 91



All voltage readings taken to chassis base. Allowable voltage variation, plus or minus 20% from values shown.

RESISTORS

Ref. No.	Part No.	Description	Price
R9	17-2080	1,000,000 ohm, 1/4 watt	.20
R82	17-14117	30 ohm, 1/4 watt	.20
R106	17-14171	50,000 ohm, 1/4 watt	.20
R111	17-14176	20,000 ohm, 1/4 watt	.20
R113	17-14178	250,000 ohm, 1/4 watt	.20
R139	17-14219	100 ohm, 1 watt	.30
R153	17-14243	30,000 ohm, 1/2 watt	.20
R154	17-14244	1,500,000 ohm, 1/4 watt	.20
R156	17-14246	35 ohm, 1/4 watt	.20

CONDENSERS

Ref. No.	Part No.	Description	Price
C6	17-2063	.002 mfd. 600V	.25
C7	17-2064	.0001 mfd. 600V	.25
C122	17-2189	.01 mfd. 400 V	.35
C104	17-4206	.01 mfd. 200 V	.30
C48	17-4207	.00025 mfd. 600 V	.25
C27	17-13077	Series Padder	.60
C5	17-14015	.05 mfd. 200 V	.30
C33	17-14047	.00005 mfd. 600 V	.25
C96	17-14121	.05 mfd 600 V	.40
C171	17-14238	.1 mfd. 400 V	.40
C173	17-14247	.003 mfd. 600V	.25
C175 A,B,& C	17-14249	10-10 mfd. 450V 20 mfd. 25V	3.00
C59	17-14615	.01 mfd. 400V	.35
C1,2 & 3	17-16005	Tuning Condenser	4.00

COILS AND TRANSFORMERS

Ref. No.	Part No.	Description	Price
T6	00-15995	Power Transformer	4.50
T5	00-15996	Output Transformer	1.75
T1 & 2	00-15997	Antenna & Oscillator Coil Assembly	3.00
T3	00-15998	1st I.F. Transformer	1.50
T4	00-15999	2nd I.F. Transformer	1.50

SPEAKER, DIAL PARTS, CABINET & MISCELLANEOUS

Part No.	Description	Price
29-3188	Instruction sheet	.02
28-5186	Dial Drive Pulley (rubber)	.10
17-13249	Speaker socket	.15
29-13583	Dial Drive Cord	.10
34-13660	Dial Drive Cord Spring	.05
17-13875	Tuning Eye Cable	.60
17-13904	Dial Light (M-51)	.15
17-15791B	110 V. Line Cord	.40
29-15951A	Dial Pointer	.15
61-16000	Dial Glass	1.00
17-16007	Band Switch	.75
17-16008	Volume Control	.75
17-16009	Tone Control	1.00
29-16013	Knob (Pushbutton)	.10
41-16030	Electric Eye Escutcheon	.25
41-16031	Escutcheon Plate (Dial)	1.50
41-16032	Escutcheon Plate (Pushbutton)	.35
17-16047	Speaker 8"	6.50
27-16115	Cabinet Model 89	15.00
27-16122	Cabinet Model 91	30.00
29-16123	Knob (Tuning and volume)	.15

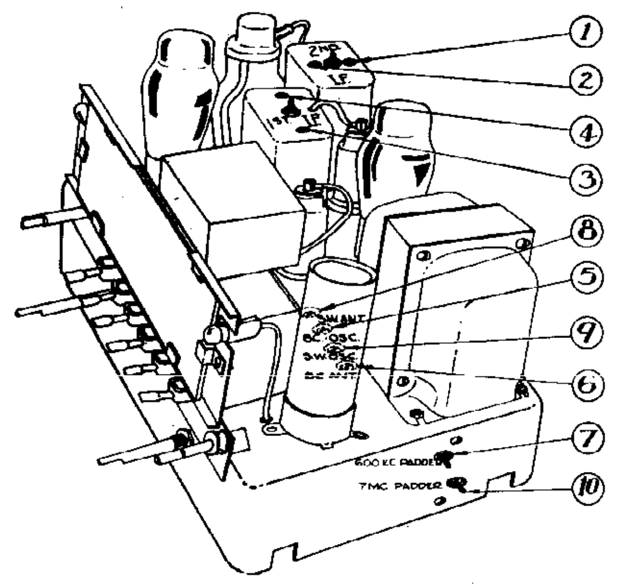
BALANCING INSTRUCTIONS

ARVIN MODELS 89, 91 - - RE27 CHASSIS

All sensitivities given for 200 milliwatts output - .78 V across voice coil

Operation No.	Connect Sig. Generator To	Input Frequency	Adjust Padder No.	Dial Setting	Band Switch Position	Sensitivity
1	6A8 Grid	455 KC	1,2,3,& 4	600 KC	Broadcast	70 uv
*2	Antenna Wire	1400 KC	5	1400 KC	Broadcast	-------
3	Antenna Wire	1400 KC	6	1400 KC	Broadcast	25 uv
**4	Antenna Wire	600 KC	7	600 KC	Broadcast	40 uv
5	Antenna Wire	15 MC	8	15 MC	Short Wave	-------
6	Antenna Wire	15 MC	9	15 MC	Short Wave	120 uv
7	Antenna Wire	7 MC	10	7 MC	Short Wave	150 uv

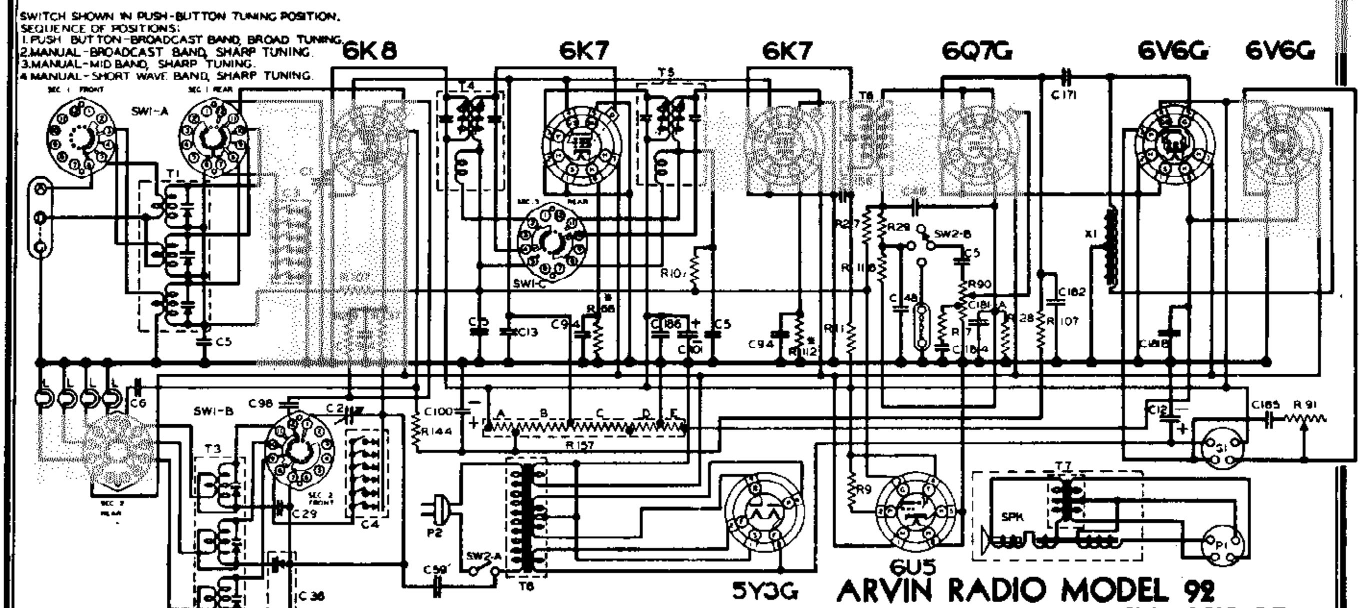
* Dial pointer should be parallel with horizontal line across center of dial with tuning condenser in closed position (maximum capicity) before proceeding with adjustments.
** After balancing 600 KC padder, return and recheck the adjustments of padders 5& 6



MODEL 92
Chassis RE31
Schematic, Alignment

NOBLITT-SPARKS INDUSTRIES, INC.

Trimmers
Sensitivity



SOCKET VOLTAGES

6K8: P-255; Gs-65; Po-70; K-2. 6K7: P-255; Gs-65; K-2. 6V6G: P-245; Gs-255; K-11.5
5Y3G: P-380AC; P-380AC; K-300. 6K7; P-255; Gs-65; K-5. 6Q7: P-115; K-2.
6V6G: P-245; Gs-255; K-11.5. 6U5: *P-255; T-255; K-0.

* Through 1 megohm resistor. Voltage Divider: A=1650; B=6310; C=4230; D=145; E=170.
Speaker Field = 600 ohms.

RESISTORS

Ref. No.	Part No.	Description	Price
R29	17-2060	50,000 ohm, 1/4 watt	.20
R7	17-2072	20,000 ohm, 1/4 watt	.20
R9	17-2080	1,000,000 ohm, 1/4 watt	.20
R11	17-4202	2,000 ohm, 1/4 watt	.20
R28	17-4205	1,500 ohm, 1/4 watt	.20
R68	17-4290	8,000 ohm, 1/4 watt	.20
R27	17-4788	2,000 ohm, 1/4 watt	.20
R37	17-14033	300 ohm, 1/4 watt	.20
R107	17-14172	100,000 ohm, 1/4 watt	.20
R112	17-14177	500 ohm, 1/4 watt	.20
R118	17-14183	300,000 ohm, 1/4 watt	.20
R144	17-14231	40,000 ohm, 1/4 watt	.20
R157	17-14251A	12,500 ohm tapped res.	1.50

CONDENSERS

Ref. No.	Part No.	Description	Price
C6	17-2063	.002 mfd. 600V	.25
C48	17-4207	.00025 mfd. 600V	.25
C5	17-14015	.05 mfd. 200V	.30
C12	17-14001	8 mfd. 475 V	.75
C29	17-14022	.005 mfd. 600 V	.35
C13	17-14046	.1 mfd. 300 V.	.35
C36	17-14054	Series Padder Condenser	.75
C156	17-4397	.05 mfd. 400 V.	.35
C94	17-14115	.1 mfd. 200 V.	.40
C98	17-14122	.000075 mfd. 600 V.	.30
C100	17-14124	8 mfd. 300 V.	.75
C101	17-14126	16 mfd. 300 V.	.90
C171	17-14238	.1 mfd. 400 V.	.40
C181 A&B	17-13250	4 mfd. 15V. 50 mfd. 25V.	1.25
C182	17-14261	.0002 mfd. 600 V.	.25
C184	17-14263	.03 mfd. 200 V.	.30
C185	17-14265	.03 mfd. 600 V.	.40
C59	17-14615	.01 mfd. 400 V.	.35
C1&2	17-15965	Tuning Condenser	4.50
C3&4	17-15967	Six section Push button condenser assembly	5.50

COILS & TRANSFORMERS

X1	00-15966	Input Choke (Audio)	2.20
T8	00-15972	Power Transformer	5.00
T7	17-16050	Output Transformer	2.00
T1	00-16078	Antenna Transformer	2.60
T3	00-16079	Oscillator Coil	2.75
T4	00-16080	1st I. F. Transformer	1.75
T5	00-16081	2nd I. F. Transformer	1.75
T6	00-16082	3rd I. F. Transformer	1.50

SPEAKER, DIAL PARTS, CABINET & MISCELLANEOUS

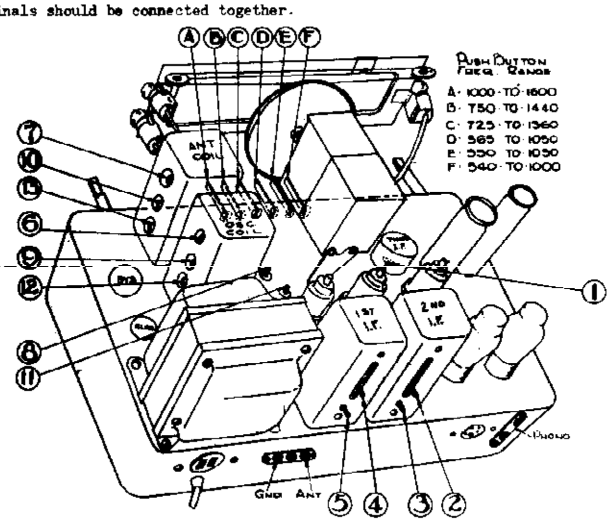
61-16017	Dial Glass (Broadcast)	.75	29-3167	Call letter sheets	.40
61-16018	Dial Glass (Mid Band)	.50	29-3189	Carton	1.50
61-16019	Dial Glass (Short Wave)	.50	29-3190	Instruction Sheet	.02
41-16030	Escutcheon (Tuning Eye)	.35	17-13249	Speaker Socket	.15
41-16051	Escutcheon (Dial)	1.75	29-13583	Dial Drive Cord, 38"	.25
41-16052	Escutcheon (Push Button)	.65	17-13761	110 V Outlet Socket	.65
29-16057	Knob (Push Button)	.10	17-13795	Volume Control	.75
29-16085	Dial Pointer	.20	17-13796	Tone Control	.75
17-16125	Speaker (12")	7.50	17-15731	Line Cord & Plug	.40
27-16126	Cabinet	50.00	17-15952	Band Switch	2.50
29-16127	Knob (Tuning, Volume, etc)	.15	17-16014	AC, Phono-Radio Switch	.90

BALANCING INSTRUCTIONS

(All sensitivities given for 1 watt output - 1.73 V. across voice coil)

Operation No.	Connect Sig. Generator To	Input Frequency	Adjust Padder No.	Dial Setting	Band Switch Position	Sensitivity (Minimum)
1	6K8 Grid	455 kc	1,2,3,4,& 5	600 kc	Broadcast	75 uv
*2	Antenna Term.	1400 kc	6	1400 kc	Broadcast	------
3	Antenna Term.	1400 kc	7	1400 kc	Broadcast	50 uv
**4	Antenna Term.	600 kc	8	600 kc	Broadcast	50 uv
5	Antenna Term.	5.0 mc	9	5.0 mc	Mid-Band	------
6	Antenna Term.	5.0 mc	10	5.0 mc	Mid-Band	75 uv
7	Antenna Term.	2 mc	11	2 mc	Mid-Band	75 uv
8	Antenna Term.	15 mc	12	15	Short Wave	------
9	Antenna Term.	15 mc	13	15 mc	Short Wave	120 uv

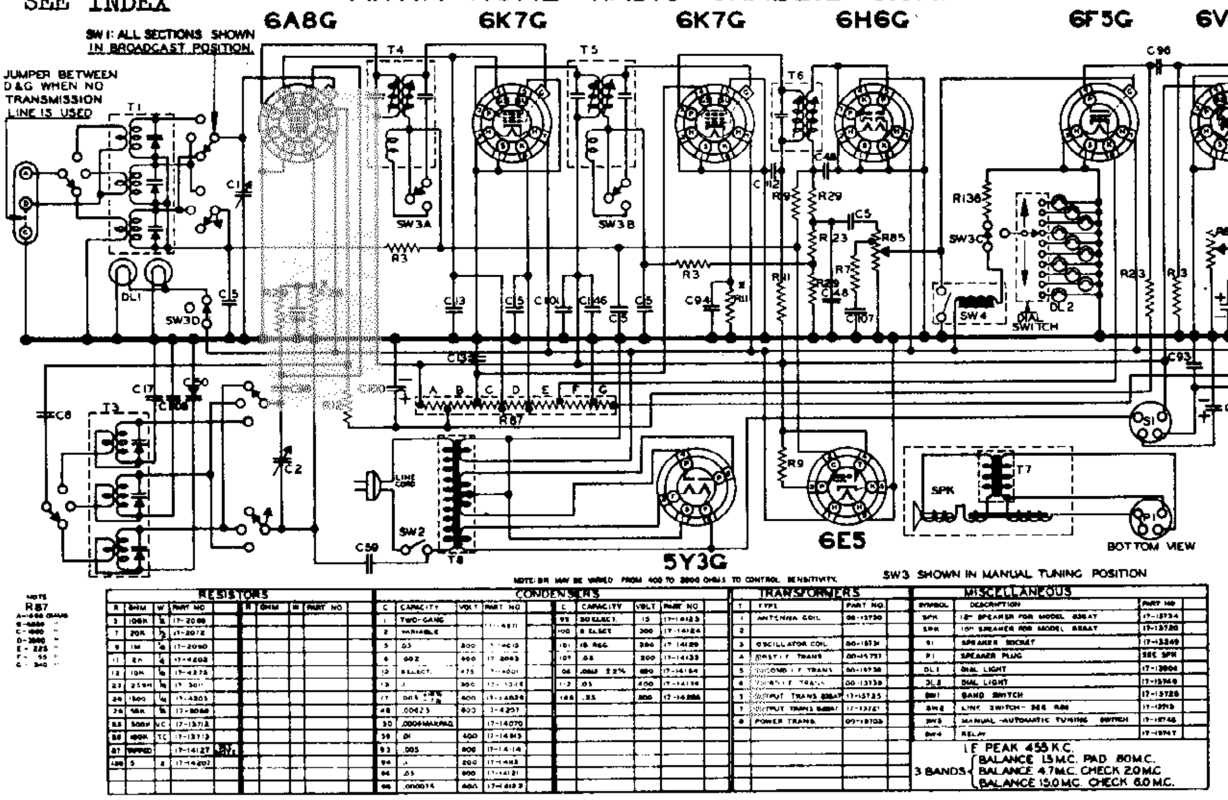
* Dial pointer should line up with end of broadcast band dial calibration with tuning condenser fully closed.
** After balancing 600 kc padder, return and recheck the adjustments of padders 6 & 7.
* NOTE: Signal generator should be connected to A & G terminals on rear of radio chassis. D & G terminals should be connected together.



NOBLITT-SPARKS INDUSTRIES, INC.

FOR OTHER DATA
SEE INDEX

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO CHASSIS 818AT



VOLTAGE AND FREQUENCY: 110 Volts, 60 Cycles

WATTS POWER CONSUMPTION: 75 Watts **POWER OUTPUT: 5 Watts**

MODEL 838AT-828AT SOCKET VOLTAGES (Input Voltage 110 V. RMS)

Tube	Heaters	Plate	Screen	Cathode	Osc. Grid	Anode Grid	Suppressor Grid
6A8G	6.3	252	85	3.4	—5 to —20 V.	155	......
6K7G	6.3	252	85	5.8	......	......	0
6K7G	6.3	252	114	3.1	......	......	0
6H6G	6.3	......	......	0	......	......	......
6F5C	6.3	105	......	1.0	......	......	......
6V6G	6.3	240	252	10.8	......	......	......
5Y3G	5.0	365AC	......	325	......	......	......
6E5	6.3	150	......	0	......	......	‡

‡ AVC voltage developed approximately 30 volts with 100,000 microvolts input to antenna. Reading taken with a vacuum tube voltmeter.

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise stated. * Volume control in pull on position. All shell terminals grounded to chassis.

6A8G
Heater .... 0 Ω
Heater .... .05 Ω
Cathode .... 1,500 Ω
Oscillator Grid .... 51,500 Ω
Anode Grid to B+ .... 11,666 Ω
Screen to B+ .... 7,811 Ω
Plate to B+ .... 12.0 Ω
Control Grid .... 1,450,000 Ω

6K7G
Heater .... 0 Ω
Heater .... .05 Ω
Cathode .... 280 Ω
Suppressor .... 0 Ω
Screen to B+ .... 7,811 Ω
Plate to B+ .... 12.0 Ω
Control Grid .... 1,350,000 Ω

6K7G
Heater .... 0 Ω
Heater .... .05 Ω
Cathode .... 200,000 Ω
Suppressor .... 0 Ω
Screen to B+ .... 5,951 Ω
Plate to B+ .... 2,000 Ω
Control Grid .... 150,000 Ω

6H6G
Heater .... 0 Ω
Heater .... .05 Ω
Cathode .... 0 Ω
Plate .... 350,000 Ω
Plate .... 350,000 Ω
Cathode .... 0 Ω

6F5G
Heater .... 0 Ω
Heater .... .05 Ω
Cathode .... 55 Ω
*Control Grid .... 500,000 Ω
Plate to B+ .... 250,000 Ω

6V6G
Heater .... 0 Ω
Heater .... .05 Ω
Cathode .... 240 Ω
Control Grid .... 100,000 Ω
Screen Grid to B+ .... 0 Ω
Plate to B+ .... 760 Ω
Screen .... 12,200 Ω

6E5
Heater .... 0 Ω
Heater .... .05 Ω
Cathode .... 0 Ω
Control Grid .... 1,450,000 Ω
Plate to B+ .... 1,000,000 Ω
Target to B+ .... 0 Ω

5Y3G
Filament to B+ .... 1,000 Ω
Filament .... 12,000 Ω
Plate .... 155 Ω
Plate .... 145 Ω
Plate to Plate .... 300 Ω

T7—Output Transformer (838AT)
Primary .... 760 Ω
Secondary .... .1 Ω

*R87 tapped as follows: A—1,666; B—4,285; C—1,860; D—3,890; E—225; F—55; G—240.

COIL, TRANSFORMER AND SPEAKER RESISTANCES

T1—Antenna Coil
Broadcast Primary...... 18.5 Ω
Broadcast Secondary...... 3.5 Ω
Mid-Band Primary...... .1 Ω
Mid-Band Secondary...... .07 Ω
Short-Wave Primary...... .05 Ω
Short-Wave Secondary...... .02 Ω

T3—Oscillator Coil
Broadcast Primary...... .15 Ω
Broadcast Secondary...... .27 Ω
Mid-Band Primary...... .08 Ω
Mid-Band Secondary...... .06 Ω
Short-Wave Primary...... .08 Ω
Short-Wave Secondary...... .01 Ω

T4—1st I. F. Transformer
Primary .... 12.0 Ω
Secondary .... 12.0 Ω

T5—2nd I. F. Transformer
Primary .... 12.0 Ω
Secondary .. 12.0 Ω

T6—3rd I. F. Transformer
Primary ...... 64.0 Ω
Secondary ...... 64.0 Ω

T7—Output Transformer (828AT)
Primary ...... 760 Ω
Secondary ...... .1 Ω

T8—Power Transformer
110 V. Primary.......... 6.5 Ω
6 V. Secondary.......... .05 Ω
5 V. Secondary.......... .05 Ω
Hi-Volt Secondary.. 155-0-145 Ω

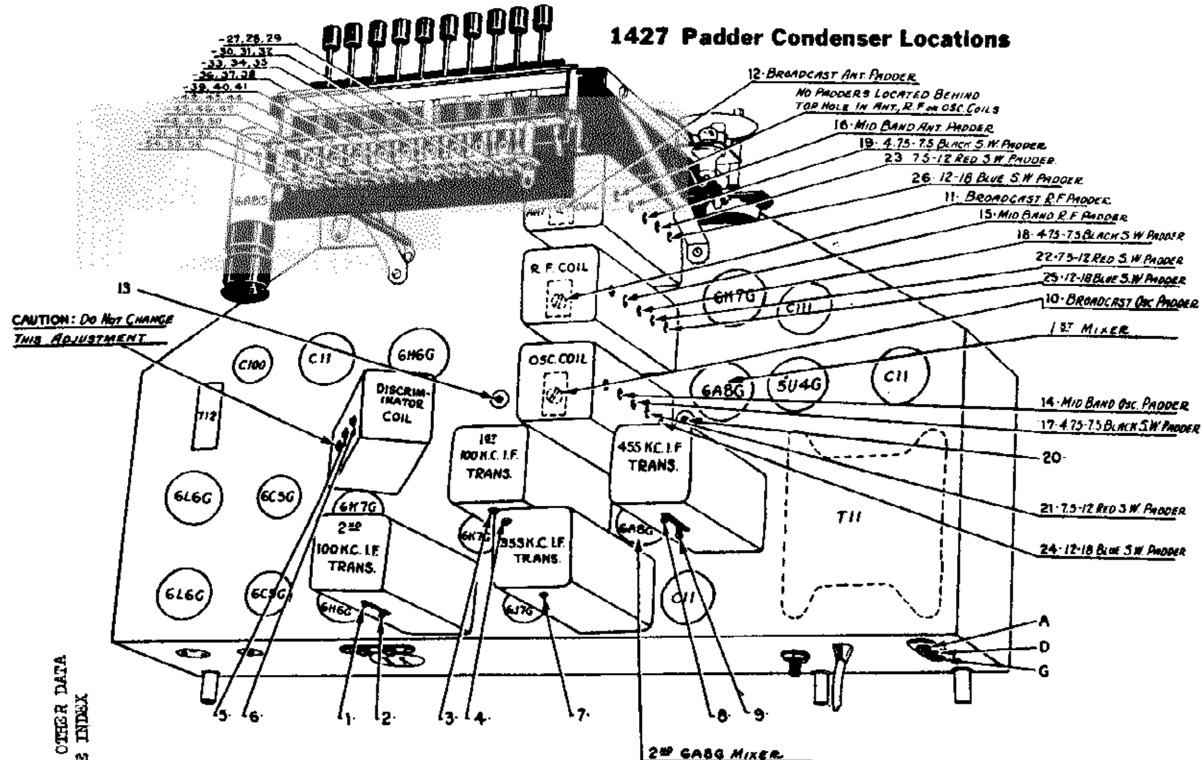
SPK—Speaker (828AT or 838AT)
Field .... 1,000 Ω

MODEL 578B
Socket, Trimmers
Chassis

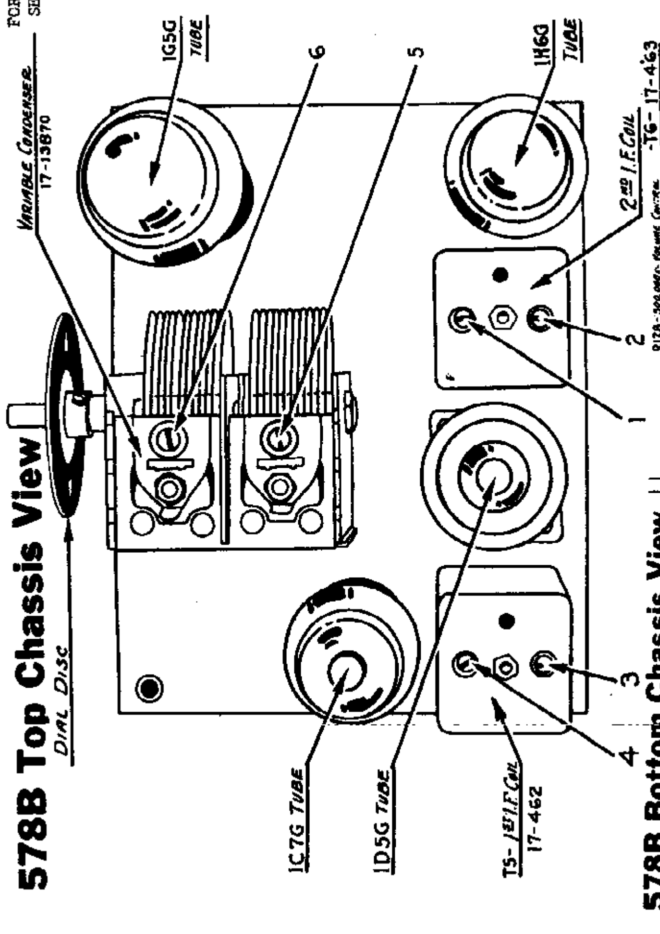
NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 1427, 1427D
Trimmers, Socket

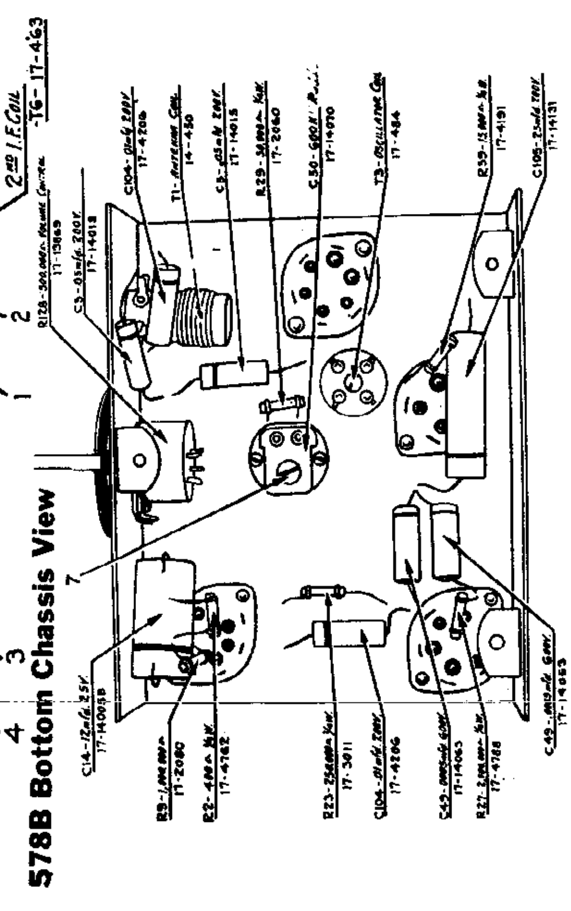
1427 Padder Condenser Locations



FOR OTHER DATA SEE INDEX



578B Top Chassis View



578B Bottom Chassis View

NOBLITT-SPARKS INDUSTRIES, INC. Voltage, Resistances

MODEL 1427

SOCKET VOLTAGES

All readings taken to ground unless otherwise specified. Allow speaker to remain connected.

Tube	Heater	Plate	Screen	Cathode	Suppressor	‡ Grid	Anode Grid	Osc. Grid	Target
6K7G	6.3	250	95	0	0	3.6	.....	.....	.....
6A8G	6.3	250	95	0	.....	3.6	150	—17	.....
6A8G	6.3	250	90	0	.....	3.4	165	—4	.....
6K7G	6.3	250	90	4.2	0	6.1	.....	.....	.....
6K7G	6.3	250	90	0	0	.7	.....	.....	.....
6J7G	6.3	250	90	4.5	0	5.5	.....	.....	.....
6H6G	6.3	.....	.....	‡.5	.....	.....	.....	.....	.....
6H6G	6.3	.....	.....	0	.....	.....	.....	.....	.....
6C5G	6.3	75	.....	3.5	.....	0	.....	.....	.....
6C5G	6.3	250	.....	0	.....	3.4	.....	.....	.....
6L6G	6.3	245	250	16	.....	0	.....	.....	.....
6L6G	6.3	245	250	16	.....	0	.....	.....	.....
5U4G	5.0	330	.....	325	.....	.....	.....	.....	.....
6AB5	6.3	*250	.....	0	.....	6.8	.....	.....	250

‡ Measured with a vacuum tube voltmeter.
* Through 1,000,000 Ω Resistor.

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Allow speaker to remain connected.

6K7G—R. F.

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Suppressor Grid	0 Ω
Screen Grid to B+	8,000 Ω
Control Grid	1,700,000 Ω
Plate to B+	3.6 Ω

6A8G—First Mixer

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Oscillator Grid	50,000 Ω
Oscillator Anode to B+	18,000 Ω
Screen to B+	8,000 Ω
Plate to B+	106 Ω
Control Grid	1,600,000 Ω

6A8G—Second Mixer

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Oscillator Grid	100,000 Ω
Oscillator Anode to B+	19,000 Ω
Screen to B+	9,000 Ω
Control Grid	1,500,000 Ω

6J7G—Controlled Oscillator

Heater	0 Ω
Heater	.05 Ω
Cathode	500 Ω
Suppressor Grid	0 Ω
Screen Grid to B+	20,000 Ω
Plate to B+	1,100 Ω
Control Grid	1,180,000 Ω

6C5—First Audio

Heater	0 Ω
Heater	.05 Ω
Cathode	10,000 Ω
*Control Grid	500,000 Ω
Plate to B+	250,000 Ω

* Volume control pull on position.

6K7G—I. F. Amplifier

Heater	0 Ω
Heater	.05 Ω
Cathode	500 Ω
Suppressor Grid	0 Ω
Screen Grid to B+	9,000 Ω
Plate to B+	1,000 Ω
Control Grid	31.5 Ω

6AB5—Electric Eye

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Target to B+	0 Ω
Grid	1,100,000 Ω
Plate to B+	300,000 Ω

6K7G—A. F. C. Amplifier

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Suppressor Grid	0 Ω
Screen Grid to B+	10,000 Ω
Plate to B+	3,000 Ω
Control Grid	1,000,000 Ω

6HG6—Detector A. V. C.

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Diode Plate	130,000 Ω
Diode Plate	500,000 Ω
Cathode	0 Ω

5U4G

Filament to B+	1,700 Ω
Filament to Ground	19,700 Ω
Plate	90 Ω
Plate	95 Ω
Plate to Plate	185 Ω

6H6G—A. F. C. Bias Rectifier

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Plate	1,050,000 Ω
Cathode	1,000,000 Ω
Plate	1,050,000 Ω
Plate to Plate	36.5 Ω

6C5—Second Audio

Heater	0 Ω
Heater	.05 Ω
Cathode	0 Ω
Control Grid	800,000 Ω
Plate to B+	2,000 Ω

6L6G—Power Output Transformer

Heater	0 Ω
Heater	.05 Ω
Cathode	150 Ω
Screen Grid to B+	0 Ω
Plate to B+	190 Ω
Control to Grid	2,200 Ω

6L6G—Power Output

Heater	0 Ω
Heater	.05 Ω
Cathode	150 Ω
Screen Grid to B+	0 Ω
Plate to B+	220 Ω
Control Grid	2,000 Ω

COIL, TRANSFORMER AND SPEAKER RESISTANCES

T1—Antenna Coil

B. C. Primary	19.0 Ω
B. C. Secondary	3.6 Ω
Mid-Band Pri.	.6 Ω
Mid-Band Sec.	.17 Ω
Black S. W. Band Pri.	.5 Ω
Black S. W. Band Sec.	.2 Ω
Red S. W. Band Pri.	.3 Ω
Red S. W. Band Sec.	.02 Ω
Blue S. W. Band Pri.	.35 Ω
Blue S. W. Band Sec.	.015 Ω

T2—R. F. Coil

B. C. Primary	2.7 Ω
B. C. Secondary	3.6 Ω
Mid-Band Pri.	.4 Ω
Mid-Band Sec.	.2 Ω
Black S. W. Band Pri.	.4 Ω
Black S. W. Band Sec.	.2 Ω
Red S. W. Band Pri.	.3 Ω
Red S. W. Band Sec.	.2 Ω
Blue S. W. Band Pri.	.2 Ω
Blue S. W. Band Sec.	.2 Ω

T3—Oscillator Coil

B. C. Primary	1.9 Ω
B. C. Secondary	.4 Ω
Mid-Band Pri.	.17 Ω
Mid-Band Sec.	.23 Ω
Black S. W. Band Pri.	.05 Ω
Black S. W. Band Sec.	.05 Ω
Red S. W. Band Pri.	.035 Ω
Red S. W. Band Sec.	.03 Ω
Blue S. W. Band Pri.	.02 Ω
Blue S. W. Band Sec.	.015 Ω

T4—455 K. C. Band Pass Filter

Shunt Coil	14.5 Ω
Plate Coil	100 Ω

T5—455 K. C. I. F. Trans.

Primary	6.4 Ω
Secondary	6.4 Ω

T6—355 K. C. Osc. Coil

Primary	20,000 Ω
Secondary	1,100 Ω

T7—100 K. C. First I. F. Trans.

Primary	1,000 Ω
Secondary	31.5 Ω

T8—100 K. C. Second I. F. Trans.

Primary	31.5 Ω
Secondary	31.5 Ω

T9—100 K. C. Discriminator Coil

Primary	3,000 Ω
Secondary (Tapped)	36.5 Ω

T10—Output Trans. 12" Spk.

Primary	550 Ω
Secondary	.4 Ω

T11—Power Transformer

110 Volt Primary	2.0 Ω
Hi-Volt Secondary	90-0-95 Ω
5 Volt Secondary	.04 Ω
6 Volt Secondary	.05 Ω

T12—Audio Input Transformer

Primary	2,000 Ω
Secondary	2,000-0-2,200 Ω

T13—Output Trans. 6" Spk.

Primary	1,200 Ω
Secondary	.6 Ω

X-1—B Filter Choke

X-1 B Filter Choke	1,000 Ω

Spk—1 12" Speaker

Speaker Voice Coil	8 Ω-400 cycles
Speaker Field	235 Ω

Spk—2 6" Speaker

Speaker Voice	4 Ω-400 cycles
Speaker Field	550 Ω

Coils Listed Below Contain Other Circuit Parts Not Shown on Chassis Plan Views.

T4—455 K. C. Band Pass Filter
(Contains the Following Parts)

1-C113	.0002 mfd. 600 V.	17-14143
1-C147	.0005 mfd. 600 V.	17-14215

T5—455 K. C. I. F. Trans. 00-13779
(Contains the Following Parts)

2-C113	.0002 mfd. 600 V.	17-14143
2-C15	.05 mfd. 200 V.	17-14036

T6—355 K. C. Osc. Coil 00-13782
(Contains the Following Parts)

1-R24	1,000 Ω ⅓ w.	17-2065
1-R123	100 Ω ⅓ w.	17-14188
1-R109	500,000 Ω ⅓ w.	17-14174
2-C33	.00005 mfd. 600 V.	17-14047
1-C116	.0005 mfd. 600 V.	17-14151
1-C112	.05 mfd. 400 V.	17-14139
1-R107	100,000 Ω ⅓ w.	17-14172
1-C9	.001 mfd. 600 V.	17-4292
1-R88	18,000 Ω ⅓ w.	17-14135

T7—100 K. C. Input Trans. 00-13780
(Contains the Following Parts)

2-R108	2,000,000 Ω ¼ w.	17-14173
2-C117	.0004 mfd. 600 V.	17-14142
1-C85	.1 mfd. 400 V.	17-14101
1-R24	1,000 Ω ¼ w.	17-2065

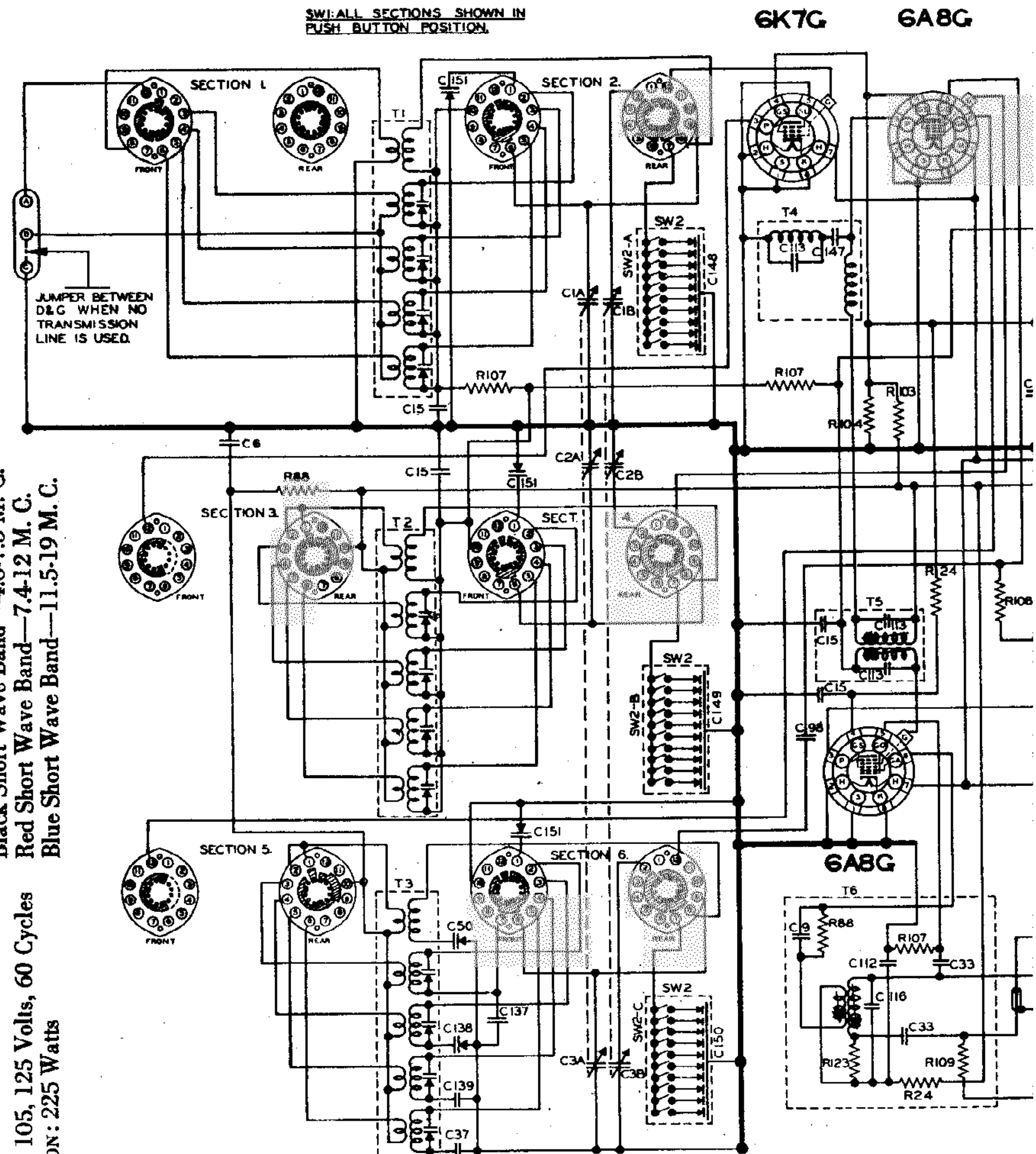
T8—100 K. C. I. F. Output Trans. 00-13781
(Contains the Following Parts)

2-C117	.0004 mfd. 600 V.	17-14142
1-R9	1,000,000 Ω ¼ w.	17-2080
1-R107	100,000 Ω ¼ w.	17-14172

T9—100 K. C. Discriminator Coil 00-13783
(Contains the Following Parts)

1-C115	.00007 mfd. 600 V.	17-14149
1-C114	.0003 mfd. 600 V.	17-14148
2-R105	50,000 Ω ¼ w.	17-14169
2-C15	.05 mfd. 200 V.	17-14036
1-R9	1,000,000 Ω ¼ w.	17-2080
1-C85	.1 mfd. 400 V.	17-14101
1-C125	.00001 mfd. 600 V.	[illegible]
1-C116	.0005 mfd. 600 V.	[illegible]
1-R32	3,000 Ω ¼ w.	[illegible]

NOBLITT-SPARK



Black Short Wave Band—4.6-7.5 M. C.
Red Short Wave Band—7.4-12 M. C.
Blue Short Wave Band—11.5-19 M. C.

Power Output: 30 Watts
Voltage and Frequency: 105, 125 Volts, 60 Cycles
Watts Power Consumption: 225 Watts

RESISTORS

R	OHM	W	PART NO	R	OHM	W	PART NO.
9	1M	¼	17-2080	117	20K	1	17-14182
11	2K	¼	17-4202	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]				
107	100K	¼	17-14172				
108	200K	¼	17-14173				
109	500K	¼	17-14174				
111	20K	½	17-14176				
112	500	¼	17-14177				
113	250K	¼	17-14178				

CONDENSERS

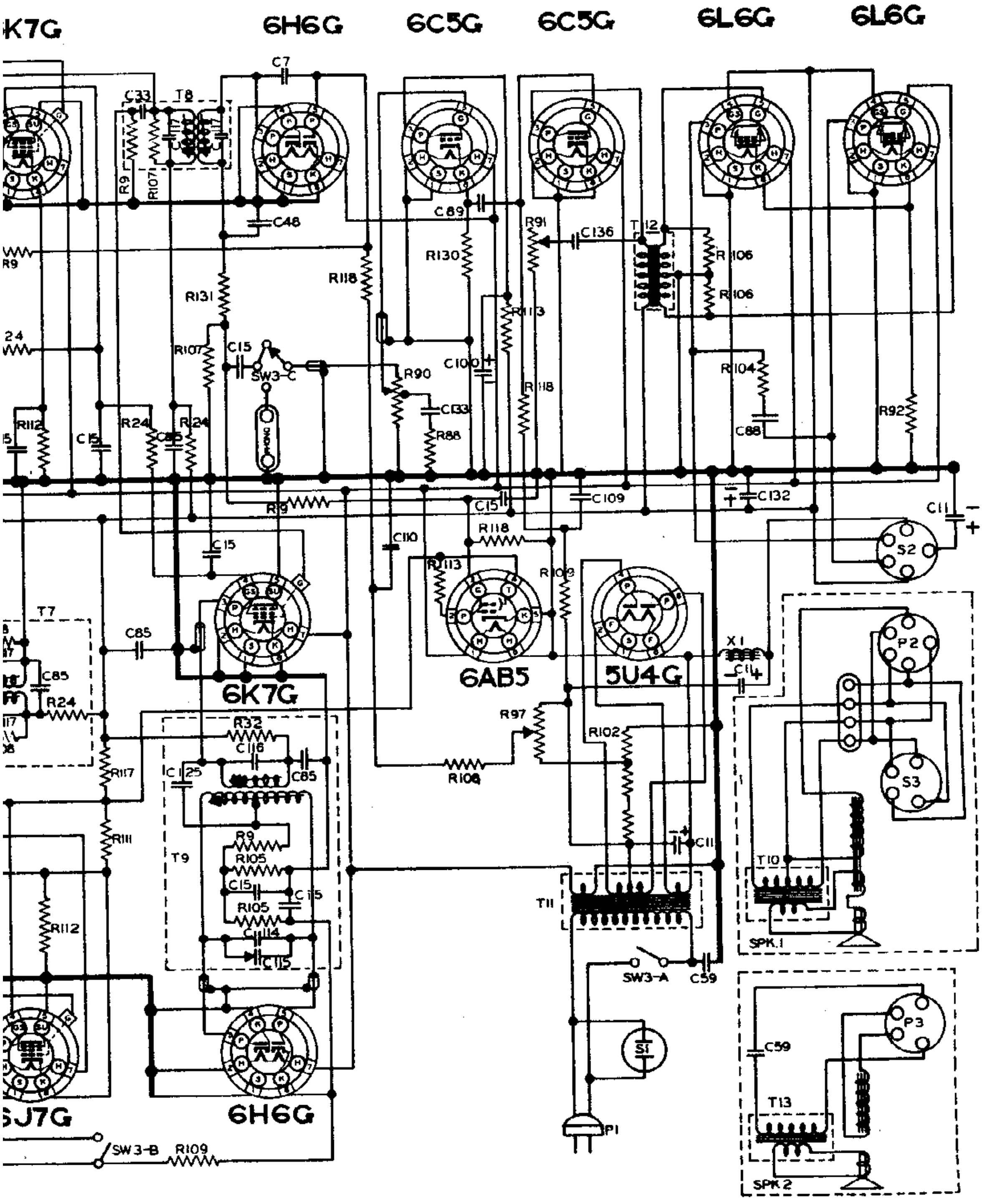
C	CAPACITY	VOLT	PART NO	C	CAPACITY	VOLT	PART NO	C	CAPACITY	VOLT	PART NO.
1A	LARGE SECTION	[illegible]	17-15723	109	.25	200	17-14136				
[illegible]	[illegible]	[illegible]		110	.1	200	17-14137				
[illegible]	[illegible]	[illegible]		112	.05	400	17-14139				
[illegible]	[illegible]	[illegible]		113	.0002	600	17-14143				
[illegible]	[illegible]	[illegible]		114	.0003	600	17-14148				
[illegible]	[illegible]	[illegible]		115	.00007	600	17-14149				
[illegible]	[illegible]	[illegible]	17-2063	116	.0005	600	17-14151				
[illegible]	[illegible]	[illegible]	[illegible]	117	.0004	600	17-14142				
[illegible]	[illegible]	[illegible]	[illegible]	125	.00001	600	17-14166				
[illegible]	[illegible]	[illegible]	[illegible]	132	30. REG.	300	17-14192				
[illegible]	[illegible]	[illegible]	[illegible]	133	.03	200	17-14193				
[illegible]	[illegible]	[illegible]	[illegible]	136	.04	600	17-14196				
[illegible]	[illegible]	[illegible]	[illegible]	137	.0015	600	17-14199				
[illegible]	[illegible]	[illegible]	[illegible]	138	PADDER	600	17-14200				
[illegible]	[illegible]	[illegible]	[illegible]	139	.00155	600	17-14201				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	600	17-142[illegible]				
85	1	400	17-14101	148	STRIP OF 10 PADDERS		17-14209				
88	.02	600	17-14105	149	STRIP OF 10 PADDERS		17-14210				
89	.05	600	17-14106	150	STRIP OF 10 PADDERS		17-14211				
96	.000075	600	17-14122	[illegible]	[illegible]	[illegible]	[illegible]				
100	8.0	300	[illegible]								

TRANSFORMERS

T	TYPE	PART
1	ALLWAVE ANT COIL	00-
2	ALLWAVE R. F. COIL	00-
3	ALLWAVE OSC. COIL	00-
4	455 K.C. BAND PASS	00-
5	455 K.C. I.F. COIL	00-
6	355 K.C. OSC. COIL	00-
7	100 K.C. I.F. INPUT	00-
8	100 K.C. I.F. OUTPUT	00-
9	100 K.C. DISCRIMINATOR	00-
10	OUTPUT TRANS	17-
11	POWER TRANS.	00-
12	INPUT TRANS	00-
13	OUTPUT TRANS	17-

MODELS 1427,1427D
Schematic,Alignment

NDUSTRIES, INC.



FREQUENCY RANGE:
Broadcast Band—540-1,600 K. C.
Mid Band—1,600-5,000 K. C.

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO CHASSIS 1427 & 1427D

CHOKES

TYPE	PART NO.
"B" CHOKE	00-13061

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO
SW1	BAND SWITCH ASSEMBLY	17-13572
SW2ABC	PUSH BUTTON SWITCH (LESS PADDERS)	17-13581
SW2	PUS[illegible] (WITH PADDERS)	29-13576
SW3	AC-[illegible] SWITCH	17-13813
S1	AC [illegible]	17-13761
S2	SP[illegible]	17-4153
S3	SPE[illegible] OF SPK 1)	SEE BELOW
P1	PLU[illegible]EMBLY	17-13781
P2	SPE[illegible] OF SPK 1)	SEE BELOW
P3	SPE[illegible] OF SPK 2)	SEE BELOW
SPK1	DYN[illegible]	17-13787
SPK2	DYNAMIC SPEAKER 6"	17-13785

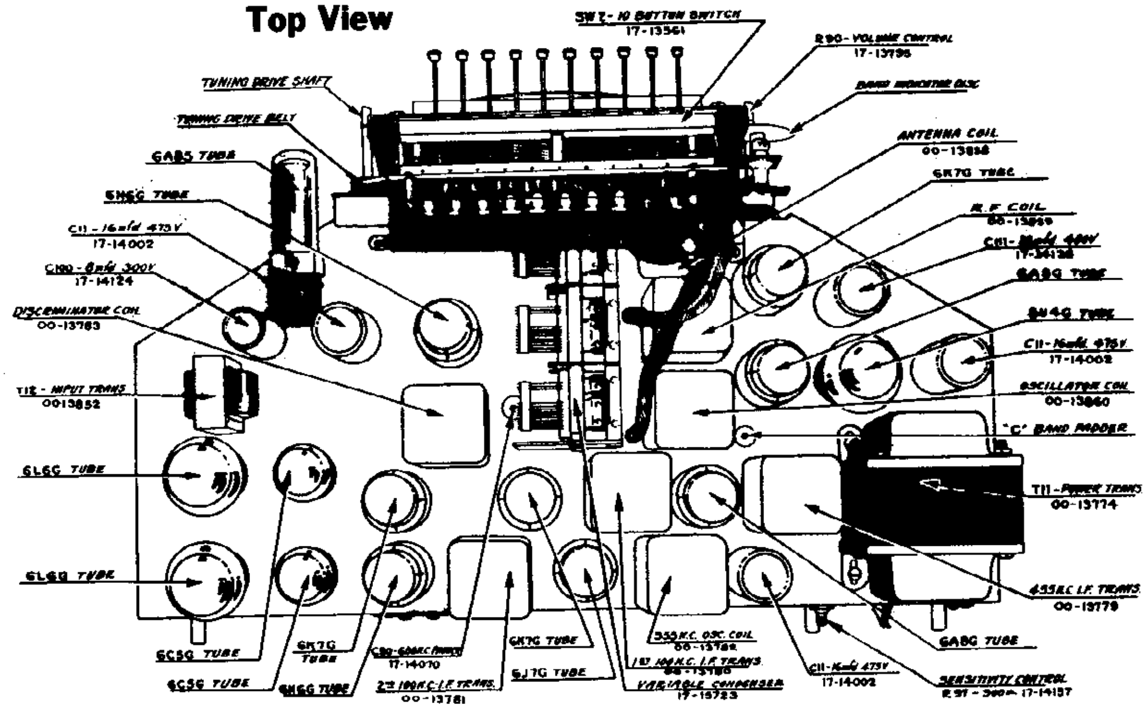
"A" BAND-.535 TO 1.600 M.C. - BALANCE AT 1.400 M.C.
CHECK AT 1.000 M.C. - PAD AT .800 M.C.
"B" BAND-1.575 TO 4.750 M.C. - BALANCE AT 4.2 M.C.
CHECK AT 3.0 M.C. - CHECK AT 1.8 M.C.
"C" BAND-4.725 TO 7.40 M.C. - BALANCE AT 7.0 M.C.
CHECK AT 6.0 M.C. - PAD AT 5.0 M.C.
"D" BAND-7.35 TO 11.6 M.C. - BALANCE AT 11.0 M.C.
CHECK AT 9.5 M.C. - CHECK AT 8.0 M.C.
"E" BAND-11.5 TO 18.2 M.C. - BALANCE AT 17.0 M.C.
CHECK AT 15.0 M.C. - CHECK AT 12.0 M.C.

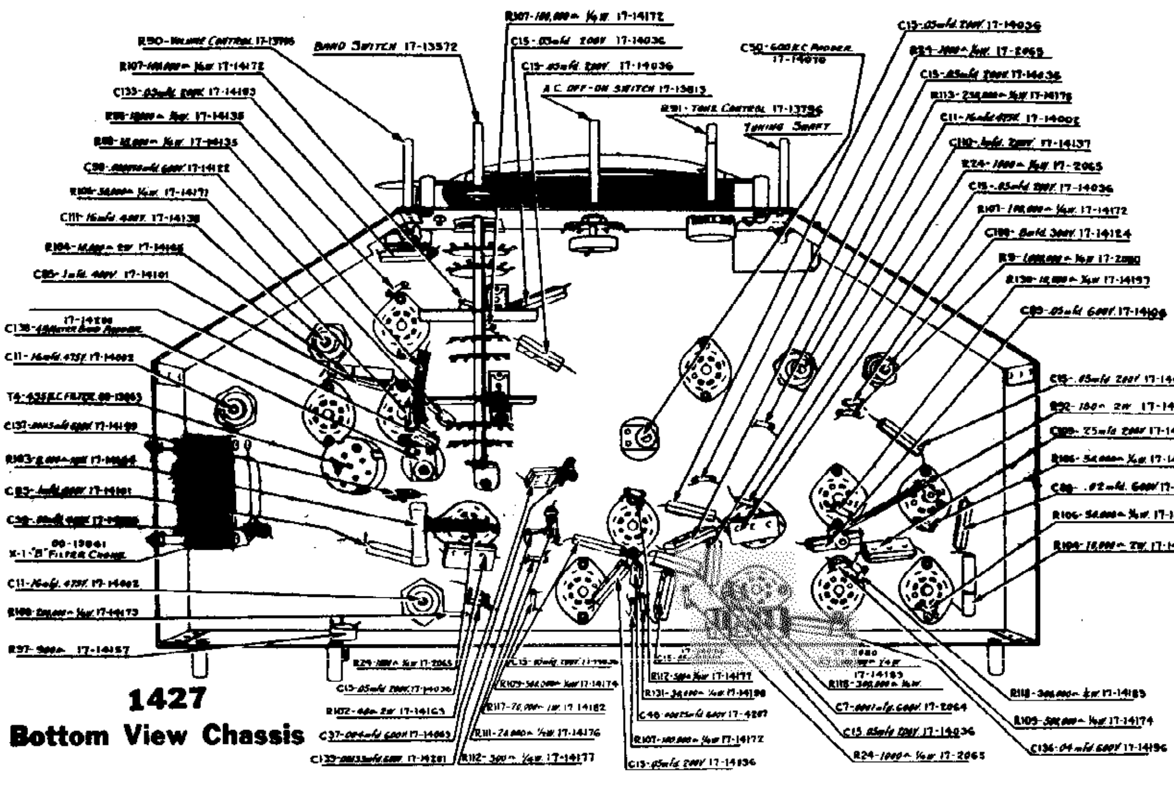
FIRST I.F. PEAK 455 K.C.
SECOND I.F. PEAK 100 K.C.
SECOND OSCILLATOR 355 K.C.

MODELS 1427,1427D
Chassis Views

NOBLITT-SPARKS INDUSTRIES, INC.

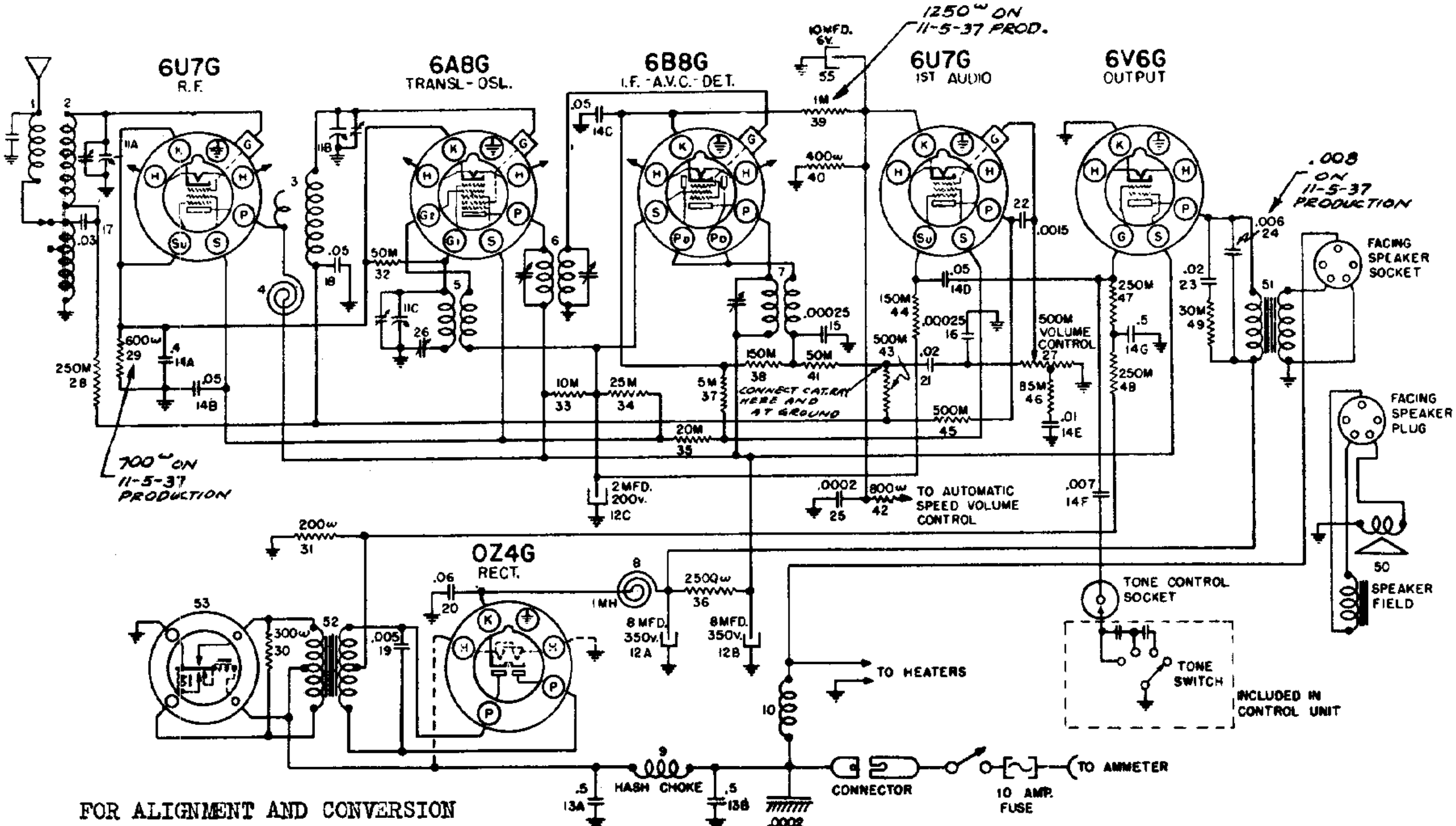
Model -- 1427 Chassis
Top View





1427
Bottom View Chassis

OLDSMOBILE DIV.—GEN. MOTORS



FOR ALIGNMENT AND CONVERSION
CONTROL UNIT, SEE INDEX

IF PEAK 262 KC

FIG. 1 MODEL 982083 - CIRCUIT DIAGRAM

The Oldsmobile Model 982083 is a six tube single unit receiver with variable tone control. This receiver was designed specifically for 1938 Model Oldsmobiles and is equipped with an instrument panel tuning control having a variable tone control in addition to the tuning and volume controls.

MODEL 982083
Early, Late
Socket, Trimmers
Chassis
Condenser Schematic

OLDSMOBILE DIV.—GEN. MOTORS

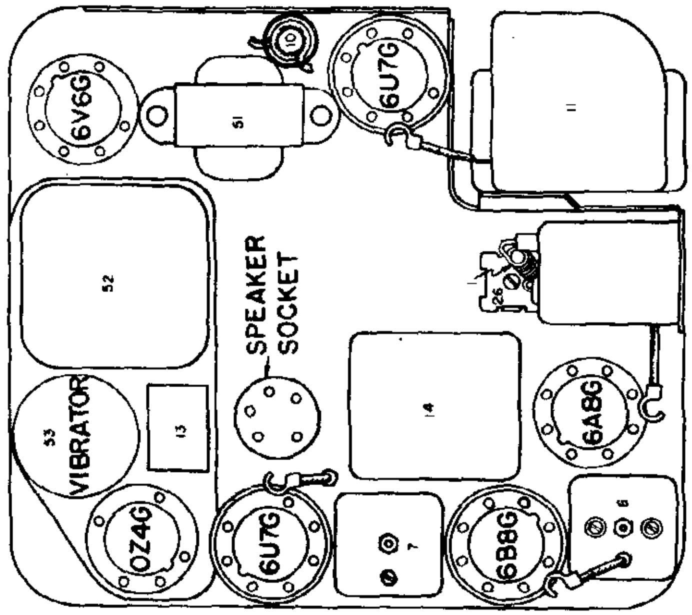


FIG. 2 PARTS LAYOUT - TOP VIEW

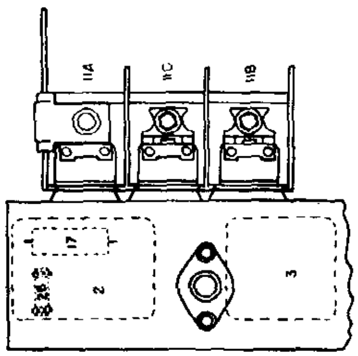


FIG. 3 GANG CONDENSER

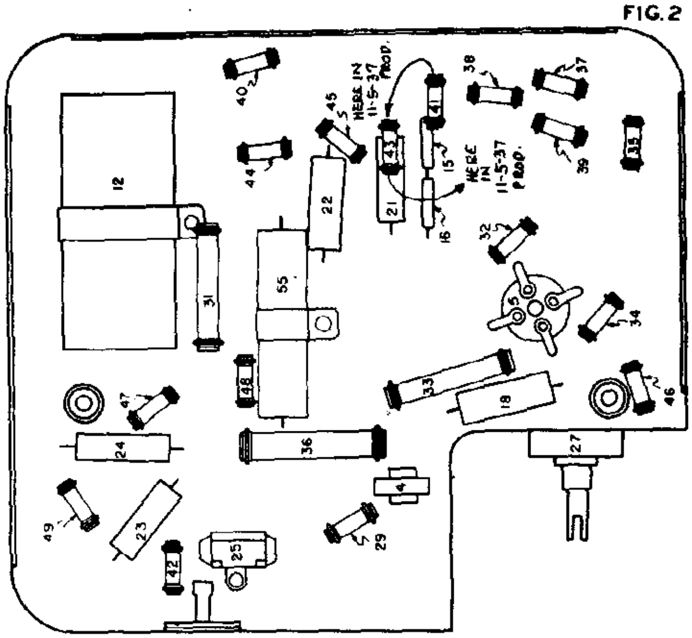


FIG. 4 PARTS LAYOUT - BOTTOM VIEW

SCHEMATIC - BY PASS CONDENSER

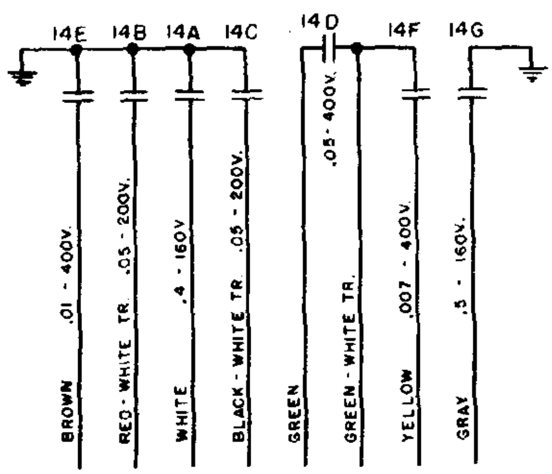


FIG. 6

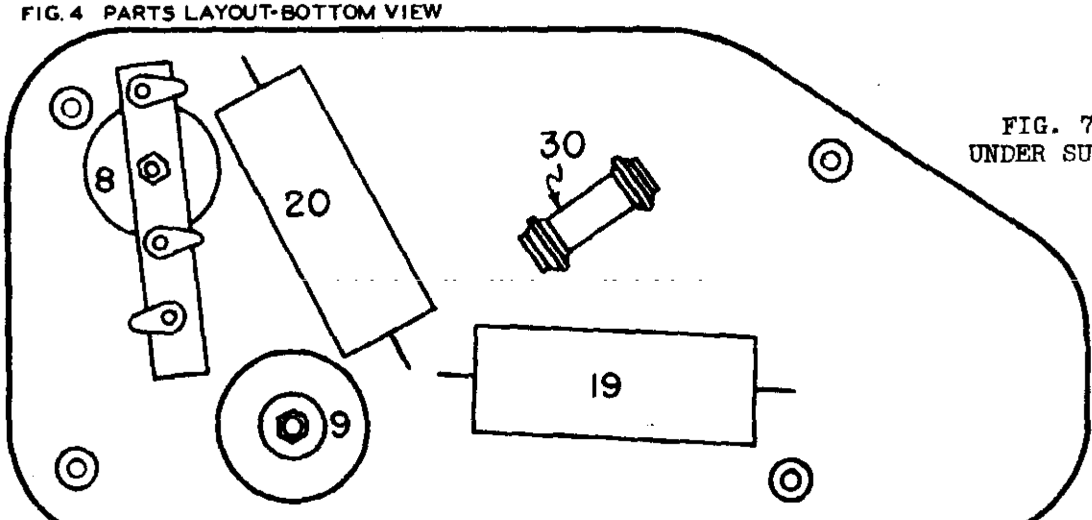
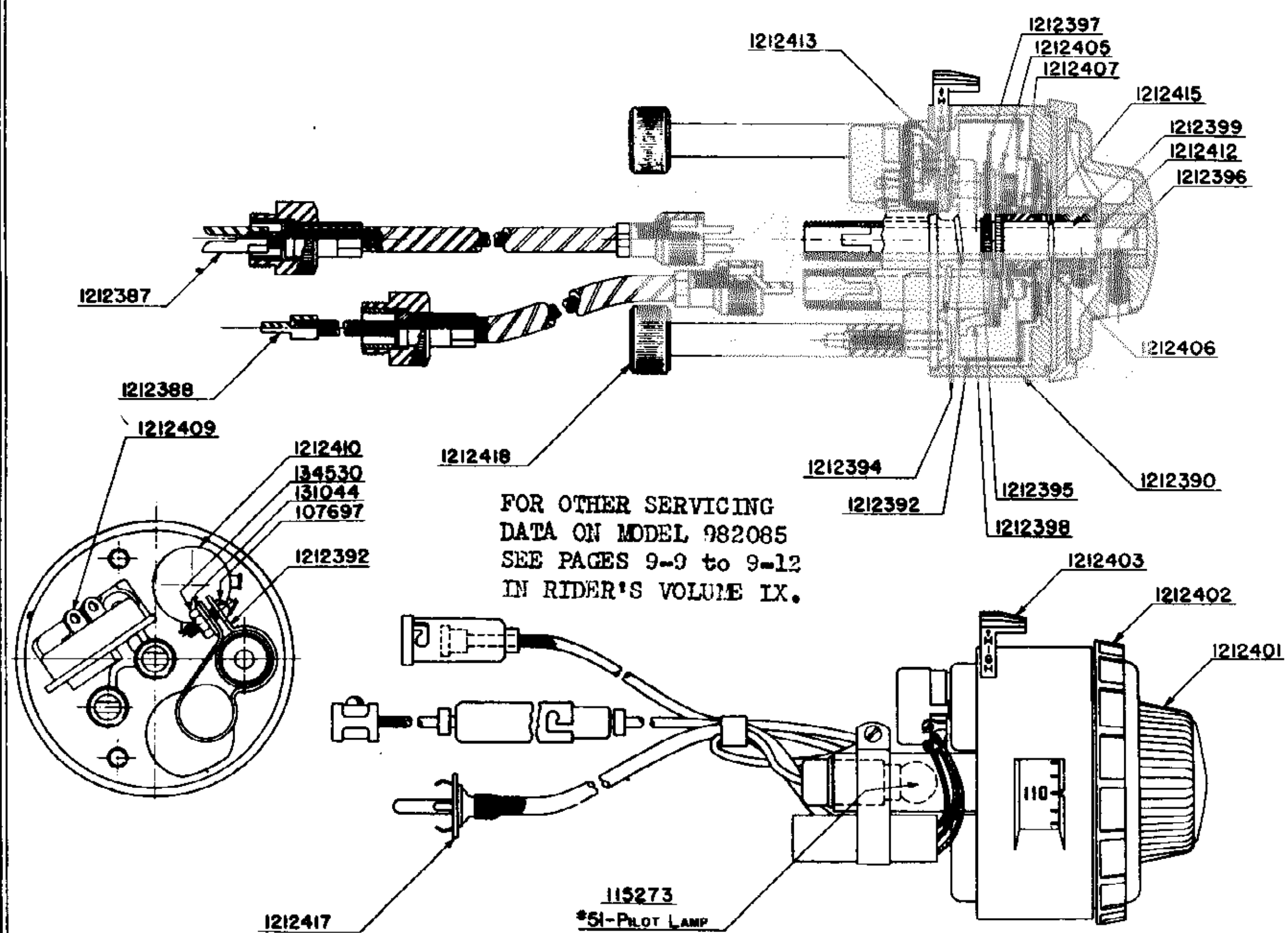


FIG. 7 PARTS UNDER SUB. PANEL

Remote Cont.Head
Details,Parts

OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982083
MODEL 982085



FOR OTHER SERVICING
DATA ON MODEL 982085
SEE PAGES 9-9 to 9-12
IN RIDER'S VOLUME IX.

FIG. 8 REMOTE CONTROL HEAD

409976	Control Unit Complete .	Standard ....
1212484	Base	Control Assembly ....
1212387	Cable Assembly Flexible	Station Selector ....
1212388	Cable Assembly Flexible	Volume Control ....
1212392	Clamp	Lead ....
1212393	Clip	Shaft Retaining ....
1212394	Clutch Dial Assembly ..	....
1212397	Gear and Shaft Assembly	Idler Driving and Dial Drive ....
1212396	Gear and Shaft	Dial Drive (Driving Pinion) ....
1212398	Gear and Shaft	Off-On Volume (Driving) ....
1212399	Gear and Shaft	Off-On Volume (Driven) ....
1212401	Knob	Station Selector ....
1212402	Knob	Off-On and Volume Control ....
1212403	Knob	Tone Control ....
115275	Lamp No. 51 Miniature Bayonet Base	Pilot Light ....
134530	Nut 6/32	Lead Clamp Mtg. ....
1212405	Plate	Gear Retaining ....
1212482	Screw 4/36 x 3/16	Binder Head ....
107697	Screw 6/32 x 3/8 R.H. .	Lead Clamp Mtg. ....
1212406	Spring	Case Retaining ....
1212407	Spring	Dial Tension ....
1212418	Stud	Control Unit Mtg. ....
1212409	Switch	Off-On ....
1212410	Switch	Tone Control 4 Positions ....
1212413	Washer	Knob Retaining ....
1212414	Washer	Off-On and Volume Shaft Retaining ...
131044	Washer Lock	Lead Clamp Mtg. ....

1212395	Washer Plain	Pinion Gear and Shaft Mtg.
1212415	Washer Plain	Dial Drive Bushing Mtg. ..
1212417	Cable and Plug Assy. ..	Tone Control
1212390	Case Control Unit	Escutcheon ..
1212480	Condenser Dual	Tone Control
121841	Washer	No. 8 Lock ..

MODEL 982083
MODEL 982084
"Hash" Elimination
Changes, Notes

OLDSMOBILE DIV.—GEN. MOTORS

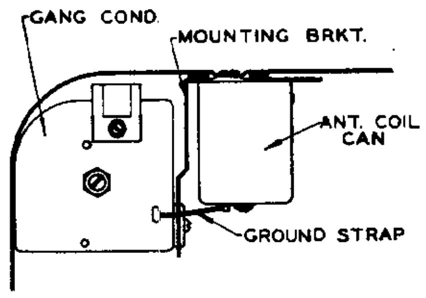


FIG. 1
BEFORE

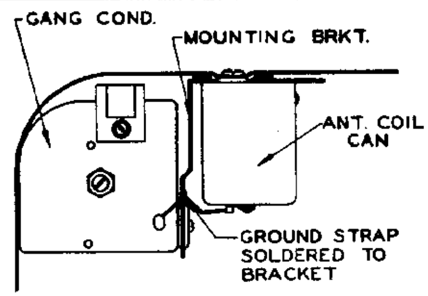


FIG. 2
AFTER

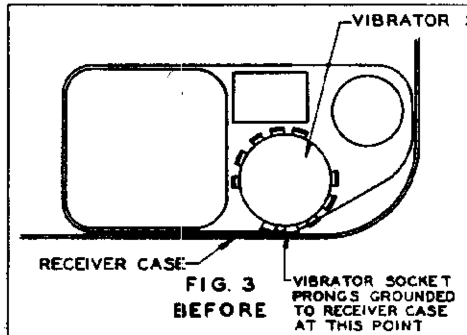


FIG. 3
BEFORE

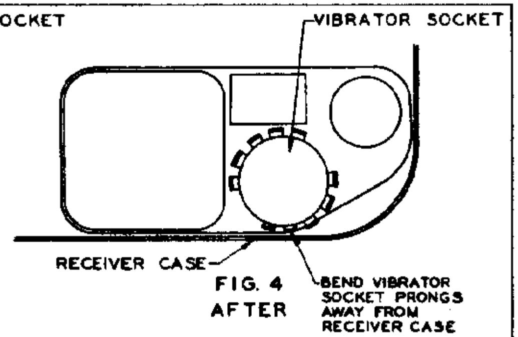


FIG. 4
AFTER

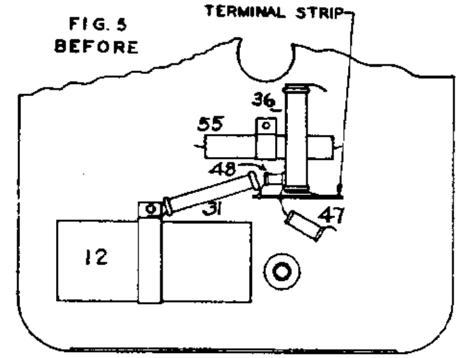


FIG. 5
BEFORE

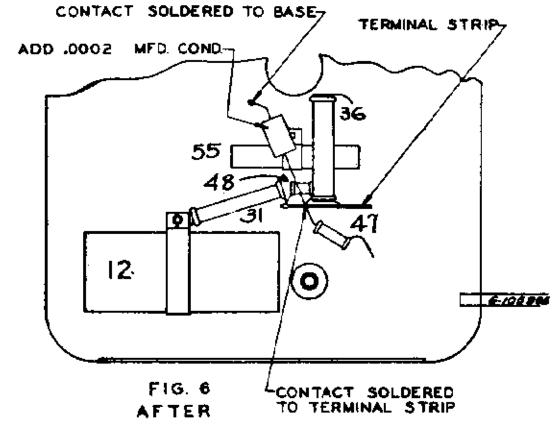


FIG. 6
AFTER

SUBJECT--VIBRATOR "HASH" NOISE

Caution: Only radios that have a vibrator hash noise should have this correction made. If there is no hash noise and these changes are made to prevent hash development, it will only tend toward driving hash noise into the radio.

CORRECTION

The following procedure to correct vibrator hash is:

Deluxe Model - 982084 ONLY

1. The Bond that grounds the Gang Condenser to the Antenna Coil can should be held against the Gang Condenser bracket and soldered. This is shown in Figure 1 before change, and Figure 2 after change.

2. Vibrator prongs may be contacting the receiver case as shown in Figure 3. Bend vibrator prongs away from receiver case as shown in Figure 4.

3. Tighten power supply mounting nuts.

Standard Model - 982083 ONLY

1. Ground the Gang Condenser can as shown in Figure 2.

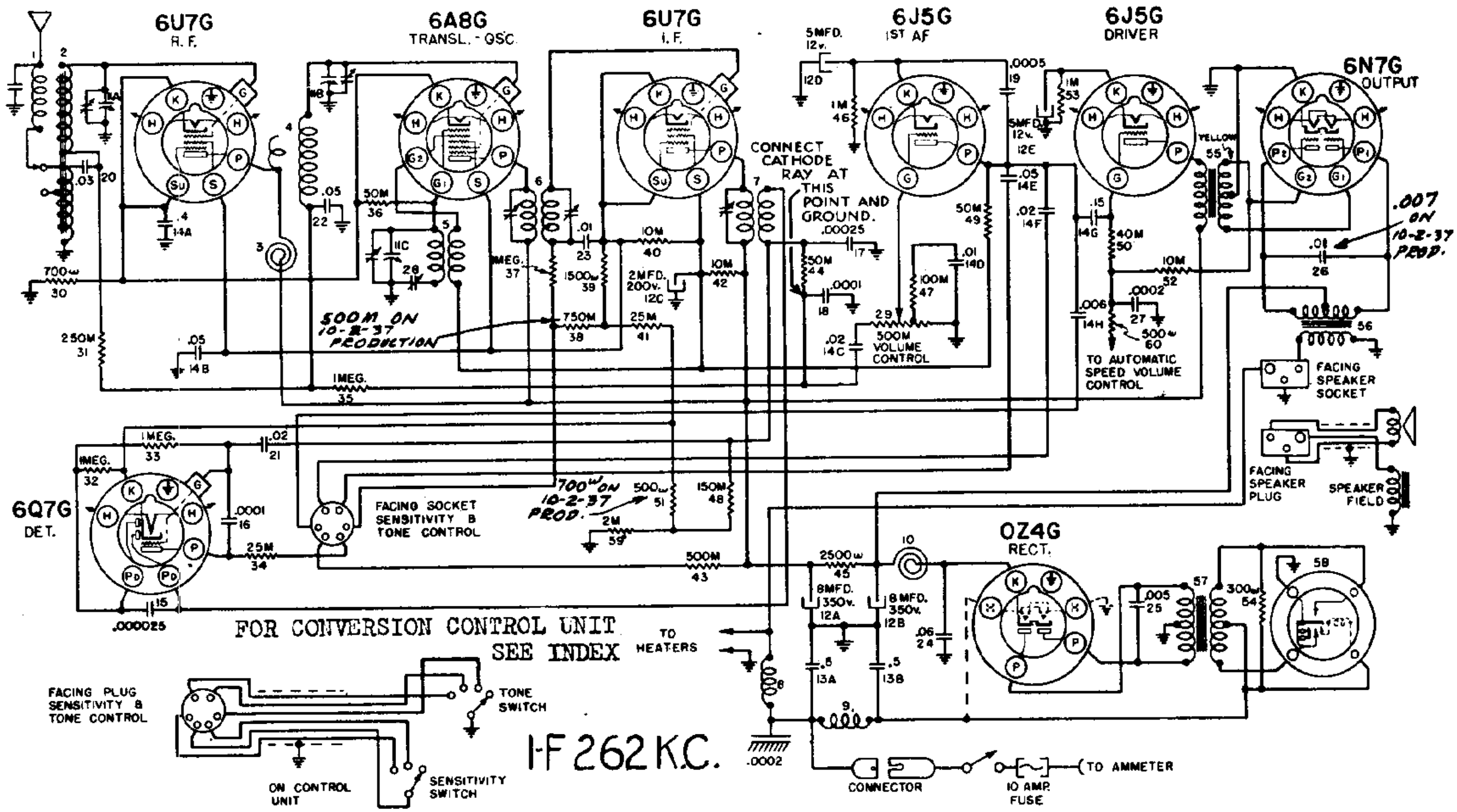
2. Bend vibrator prongs away from receiver case as shown in Figure 4.

3. Tighten power supply mounting nuts.

4. Remove the receiver from the car and add a .0002 MFD condenser from the small terminal strip to ground. Solder one end of condenser to the same terminal that the two small resistors are soldered to and solder the other end of the condenser to the chassis ground, as shown in Figure 6.

MODEL 982084
Early, Late
Schematic, Notes

OLDSMOBILE DIV.—GEN. MOTORS



The Oldsmobile Model 982084 is an eight tube Dash Speaker DeLuxe Receiver, with tone and sensitivity controls. This receiver was designed specifically for 1938 Oldsmobiles and is equipped with an instrument panel tuning control having a sensitivity switch and variable tone control in addition to the tuning and volume controls.

The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some previous Oldsmobile Models. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 K.C.) instead of at the low frequency end as with the capacity coupled sets. There are two taps provided on the Antenna Coil. One for use with the Running Boards Antenna and the other for use with overhead (Roof) type Antennas.

MODEL 982084
Early, Late

OLDSMOBILE DIV.—GEN. MOTORS

Socket, Trimmers
Chassis

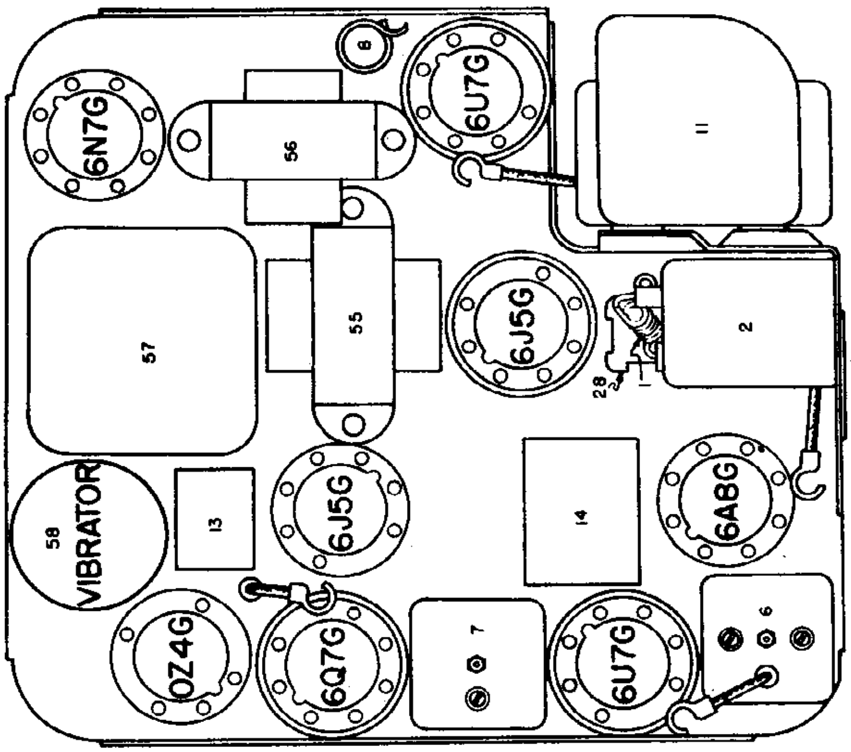


FIG. 2 PARTS LAYOUT-TOP VIEW

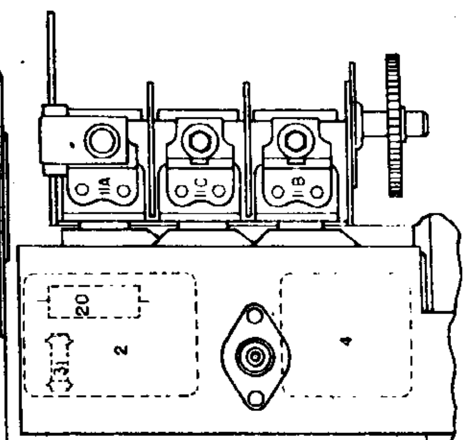


FIG. 3 GANG CONDENSER

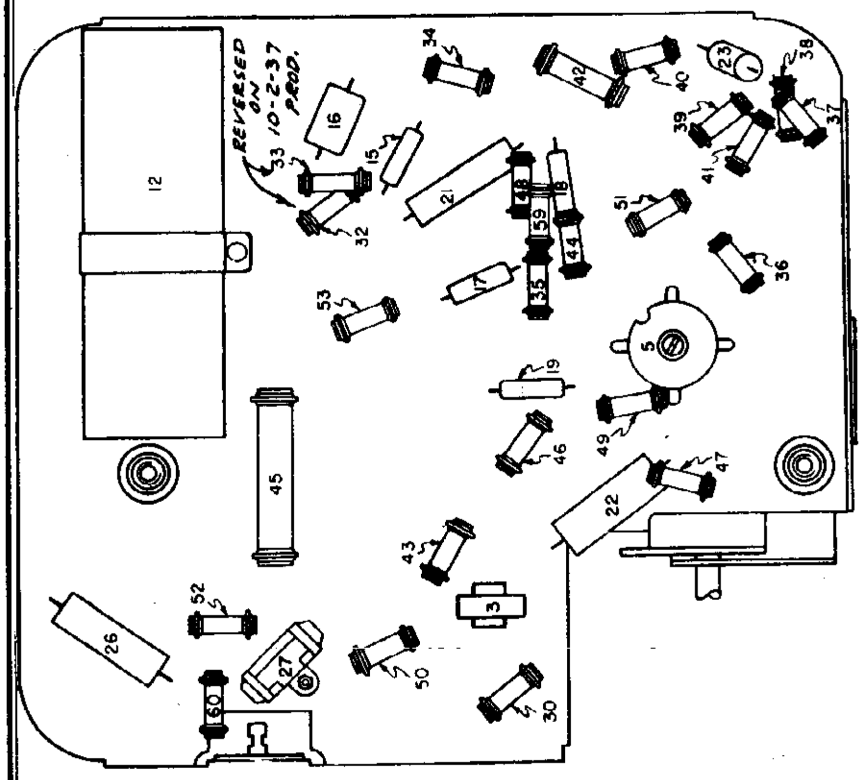


FIG. 4 PARTS LAYOUT-BOTTOM VIEW

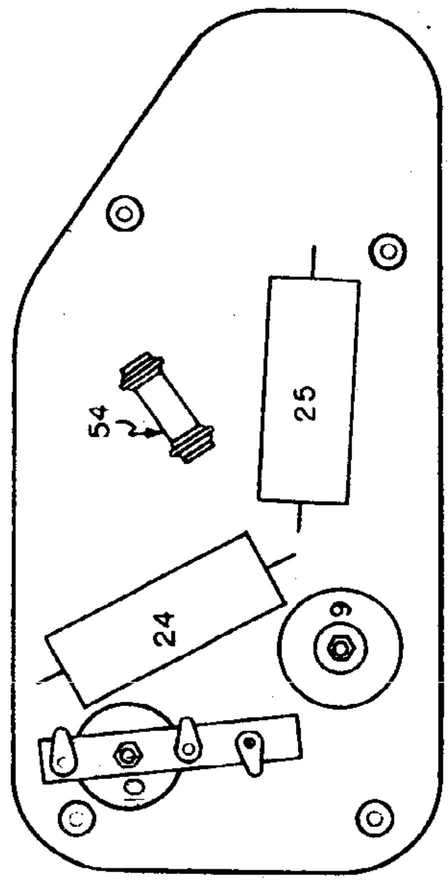


FIG. 2-3-4 PARTS LAYOUT

FIG. 7 PARTS UNDER SUB. PANEL

OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982084
Early, Late
Alignment, Voltage

1. **Aligning I-F Stages at 262 Kilocycles:**

IMPORTANT: The sensitivity switch on the tuning control should be in the "Distance" position when aligning the receiver, or the cable from the control unit to the receiver disconnected.

a. Connect the signal lead of the test oscillator to the grid cap of the 6A8G Tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

b. Connect the ground lead of the test oscillator to the chassis frame.

c. Connect the output meter across the plate prongs of the output tube. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. Voltages.

d. Set the test oscillator to exactly 262 K.C.

e. Adjust the trimmers on the I-F coils (Illustration 6 and 7, Figure 2) for maximum output. These adjustments should be repeated several times and during alignment, the test oscillator output should be kept to as low a value as is consistant with obtaining a readable indication on the output meter.

2. **Aligning at 1520 Kilocycles:**

a. Leave the test oscillator leads connected the same as for aligning the I-F circuits.

b. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

c. Set the test oscillator to 1520 Kilocycles.

d. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illustration 11C, Figure 3) for maximum output. (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. **Aligning at 540 Kilocycles:**

a. Leave test oscillator leads connected the same as before.

b. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

c. Set the test oscillator to 540 K.C.

d. Adjust the oscillator padding condenser (Illustration 28, Figure 2) located on the mounting plate of the receiver to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. **Aligning at 1400 Kilocycles:**

a. Remove the signal lead of the test oscillator from the grid of the Translator tube and connect to the antenna terminal of the receiver THROUGH A .00055 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00055 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.)

b. Set the test oscillator to 1400 K.C.

c. Turn the condenser rotor plates until the frequency is tuned in with maximum output.

d. Adjust the R-F parallel trimmer on the condenser gang (Illustration 11B) and the antenna compensating condenser which is the parallel trimmer on the Condenser Gang (Illustration 11A, Figure 3).

5. **Aligning at 600 Kilocycles:**

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

a. Set the test oscillator on 600 K.C.

b. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

c. Maintain a low output signal from the test oscillator and readjust the oscillator gang tuning shaft back and forth through the signal.

d. This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.

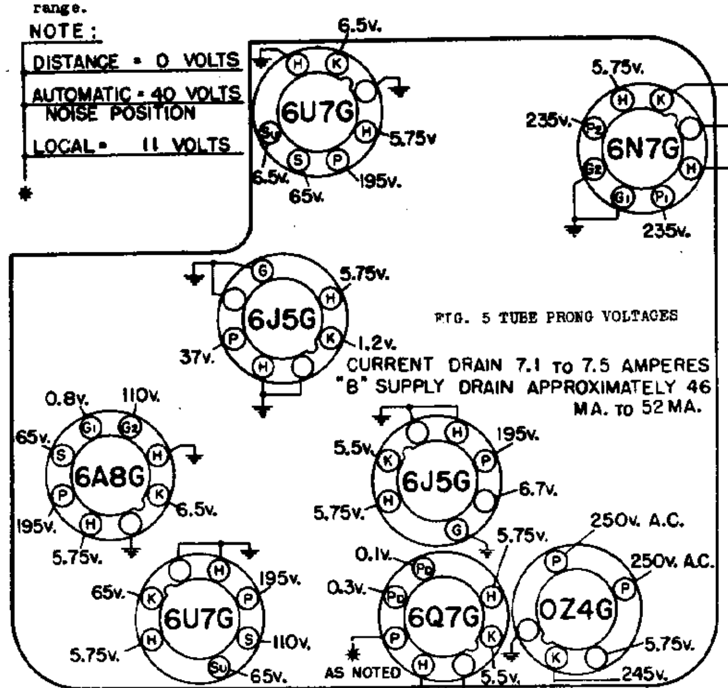


FIG. 5 TUBE PRONG VOLTAGES

BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6 VOLTS

MODEL 982084
Early, Late

OLDSMOBILE DIV.—GEN. MOTORS

Remote Cont. Head
Assembly, Details
Condenser Schematic

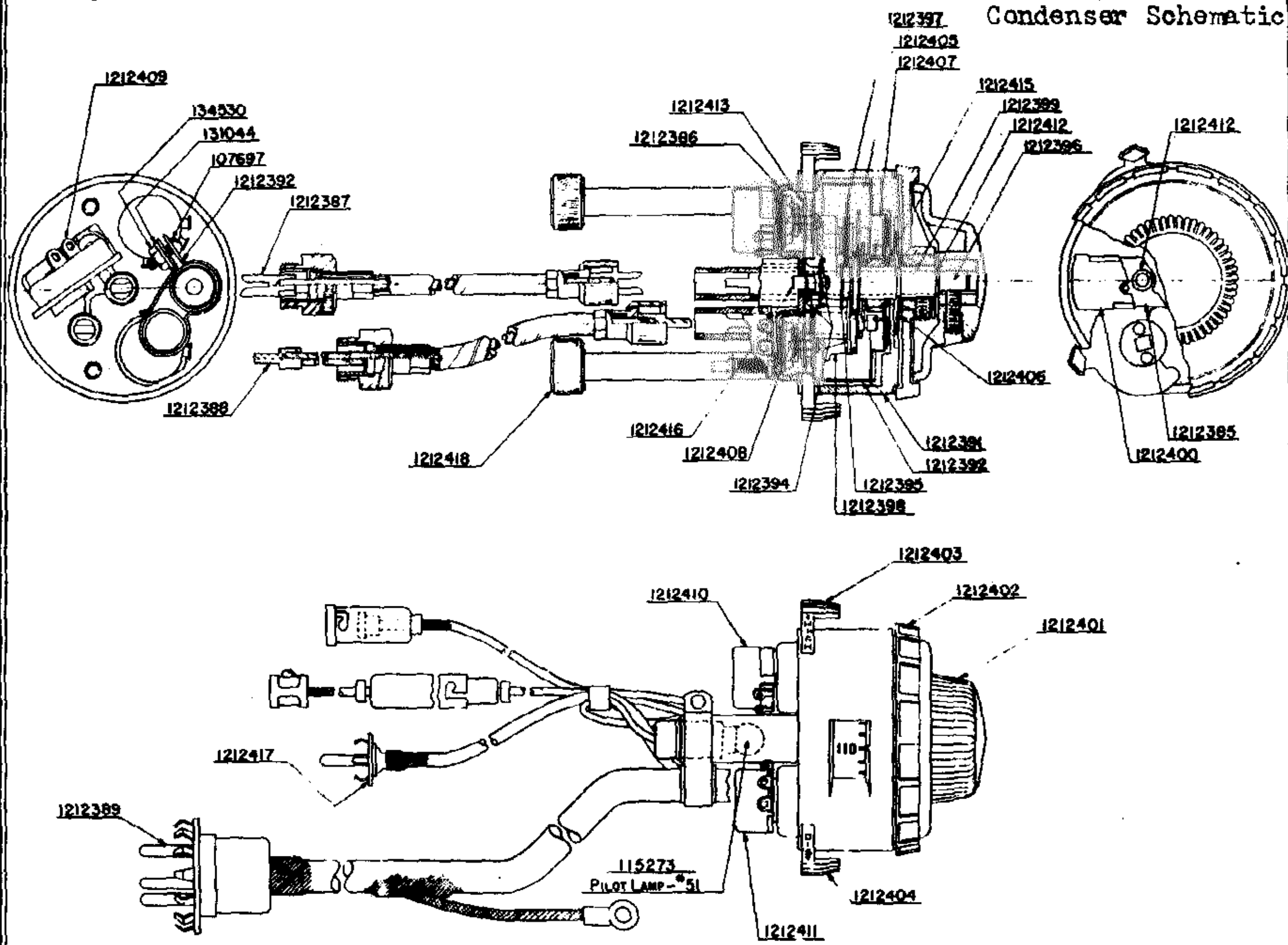


FIG. 8 REMOTE CONTROL HEAD

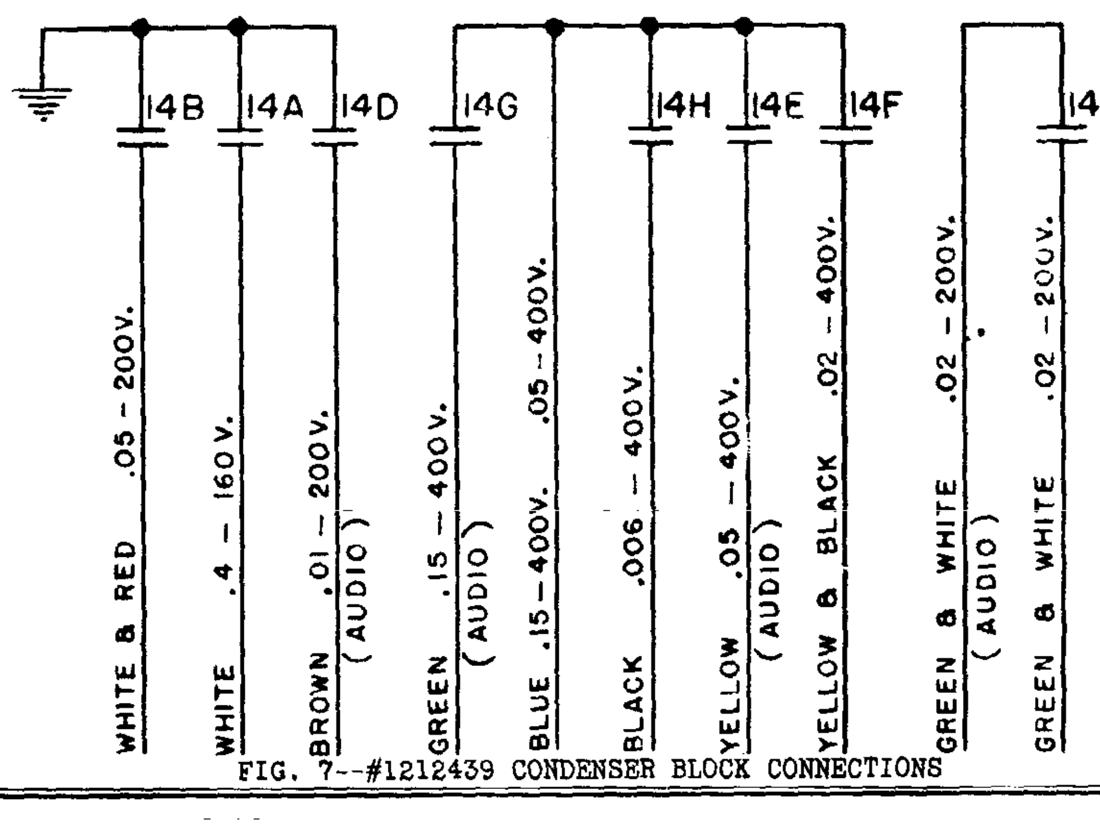
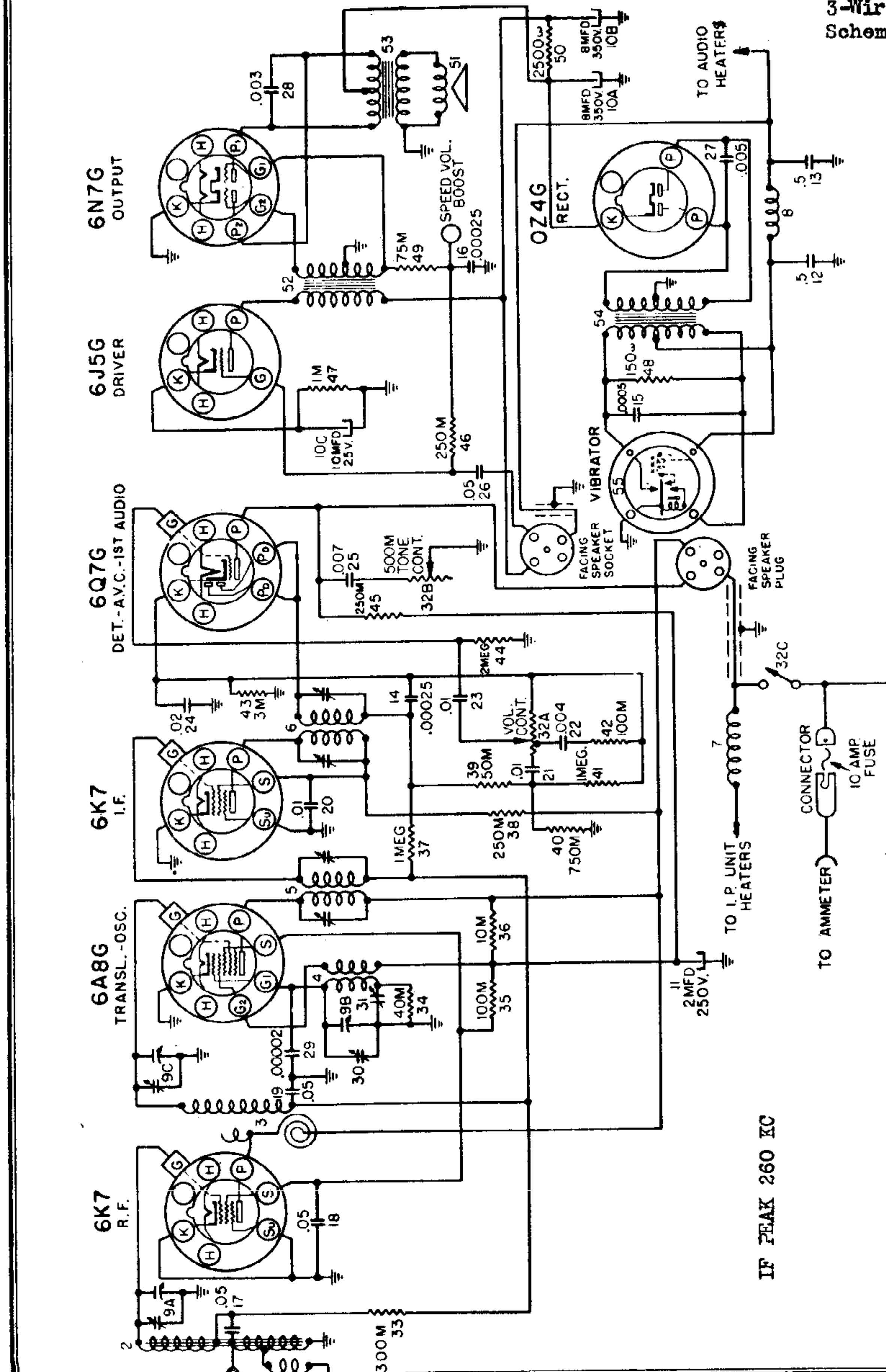


FIG. 7--#1212439 CONDENSER BLOCK CONNECTIONS

MODEL 982126
3-Wire Speaker
Schematic

OLDSMOBILE DIV.—GEN. MOTORS



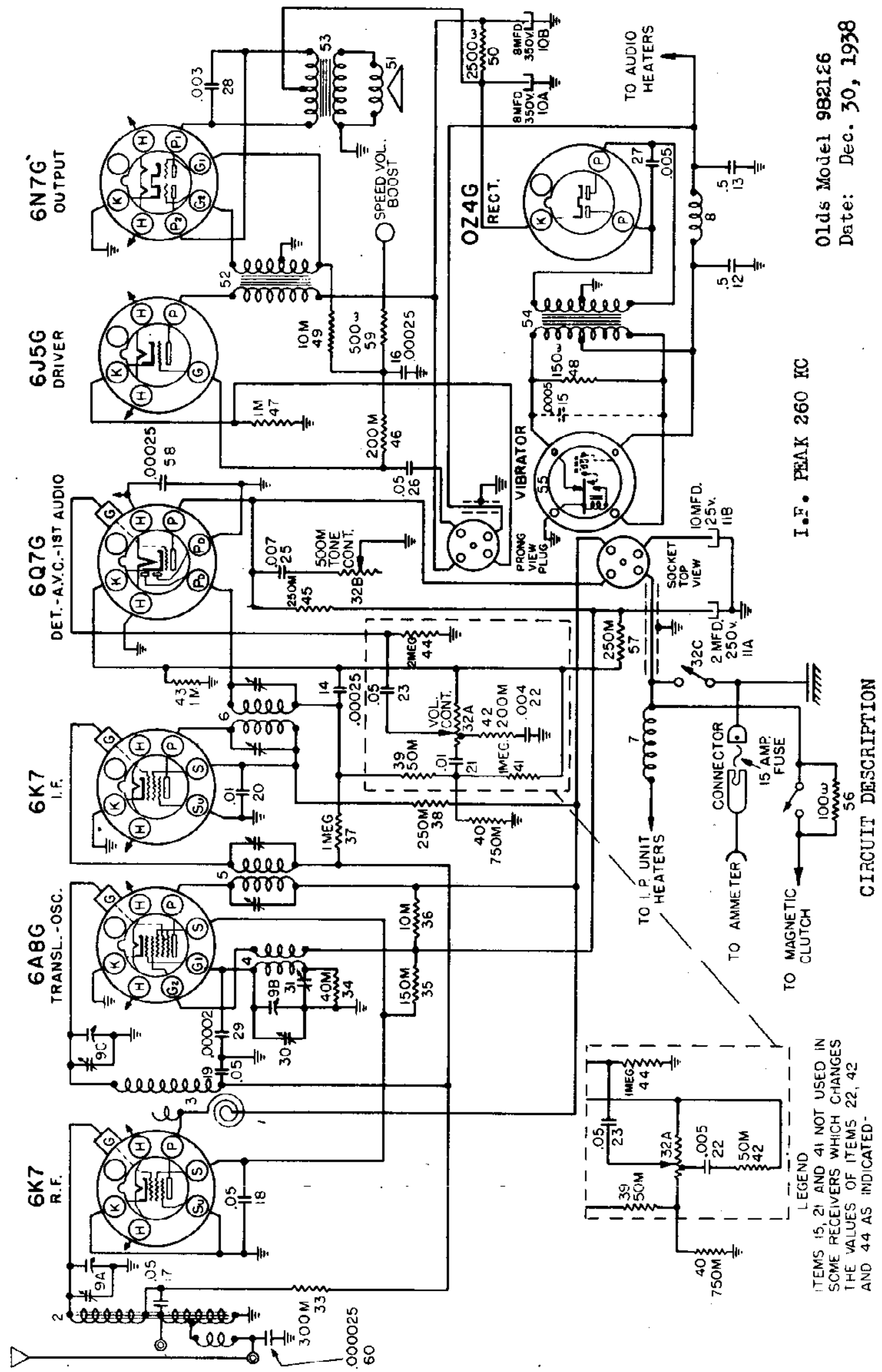
CIRCUIT DIAGRAM - 3 WIRE SPEAKER

IF PEAK 260 KC

Olds Model 982126
Date: Dec. 30, 1938

MODEL 982126
4-Wire Speaker
Schematic

OLDSMOBILE DIV.—GEN. MOTORS



Olds Model 982126
Date: Dec. 30, 1938

I.F. PEAK 260 KC

CIRCUIT DESCRIPTION

The circuit used in this receiver is the conventional superheterodyne type and does not employ regeneration.

An Automatic Speed Volume Control, which increases volume with car speed, is incorporated in the receiver.

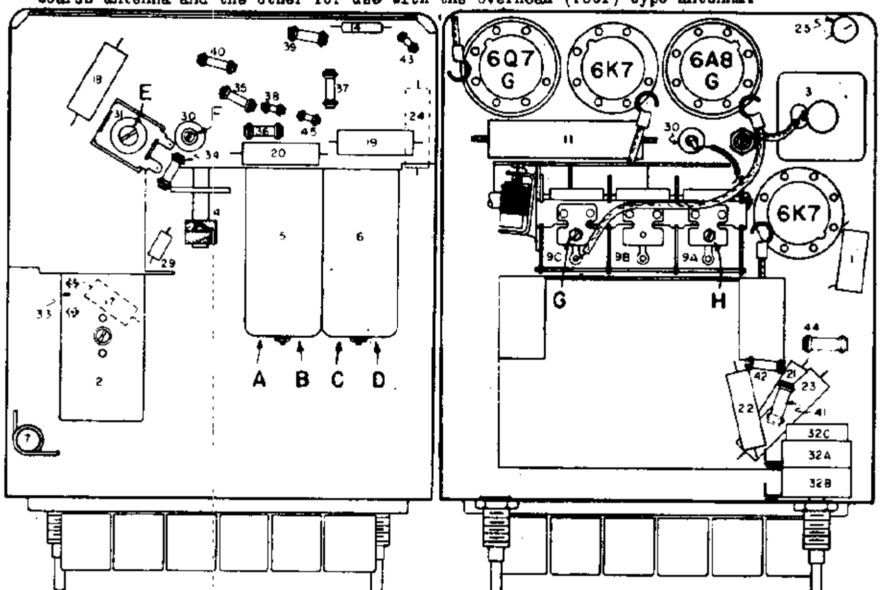
CIRCUIT DIAGRAM OLDS MODEL 982126
4 PRONG CABLE SPEAKER

MODEL 982126
Socket, Trimmers
Chassis, Alignment

OLDSMOBILE DIV.—GEN. MOTORS

ANTENNA CIRCUIT

The antenna circuit is directly coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 K.C.) There are two antenna receptacles provided on the receiver. One for use with the running boards antenna and the other for use with the overhead (roof) type antenna.



1. Aligning I-F stages at 260 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G Tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Connect the output meter across the plate prongs of the output tube. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D. C. voltages.

(d) Set the test oscillator to exactly 260 Kilocycles.

(e) Adjust the trimmers "A", "B", "C" and "D" on the I-F Transformers for maximum output. (See parts layout). These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

(a) Leave the test oscillator leads connected as for aligning the I-F Circuits.

(b) Turn the Rotor plates of the gang condenser (Illustration #9) all the way out and against the high frequency stop.

(c) Set the test oscillator to 1560 kilocycles.

(d) Adjust the condenser "F" for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial.)

3. Aligning at 540 Kilocycles

(a) Leave the test oscillator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the test oscillator to 540 kilocycles.

(d) Adjust the oscillator padding condenser "E" for maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

(a) Remove the signal lead of the test oscillator from the grid of the 6A8G tube and connect to the Running Board Antenna receptacle of the receiver THROUGH a .00045 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00045 mfd. mica condenser be used when aligning the antenna stage of these receivers and that the lead from the test oscillator is in the correct terminal in order that this circuit can be made to track properly.)

(b) Set the test oscillator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency is tuned in with Maximum output.

(d) Adjust the R-F Parallel trimmer "G" on the condenser gang and the antenna compensating condenser "H" which is the parallel trimmer on the Condenser Gang.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator at 600 K. C.

(b) Turn the Condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser "E" while rocking the variable condenser gang tuning shaft back and forth through the signal.

(d) This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished accurately, the receiver should be very nearly uniformly sensitive over the entire frequency range.

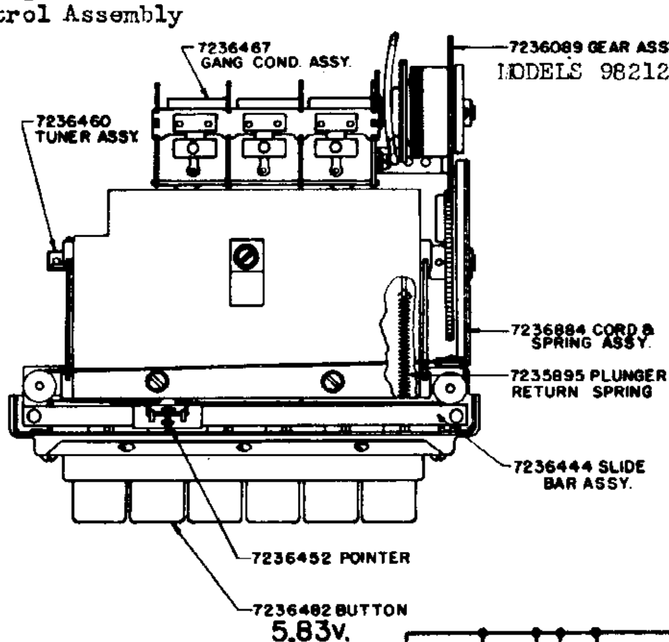
Model 982126
Date: Dec. 30, 1938.

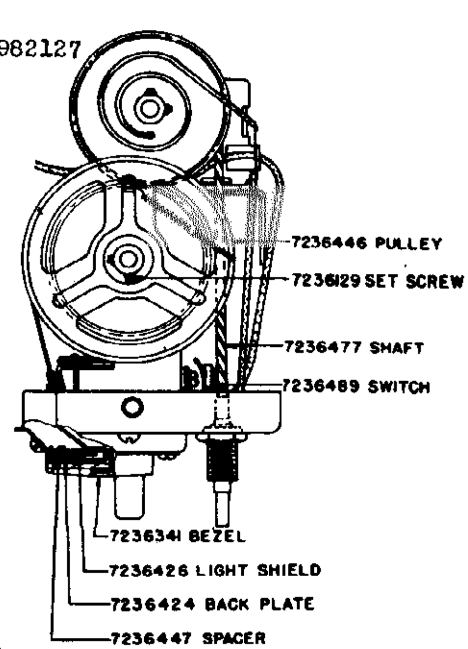
MODEL 982126
Voltage,Chassis
Control Assembly

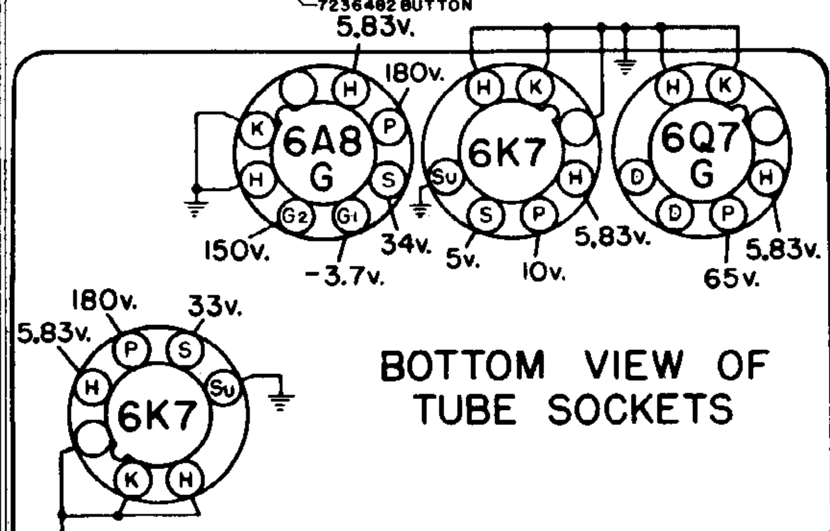
OLDSMOBILE DIV.—GEN. MOTORS

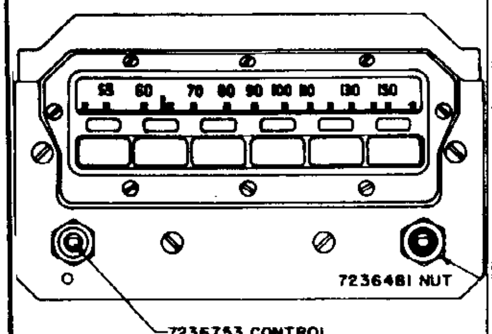
MODEL 982127
Control Assembly

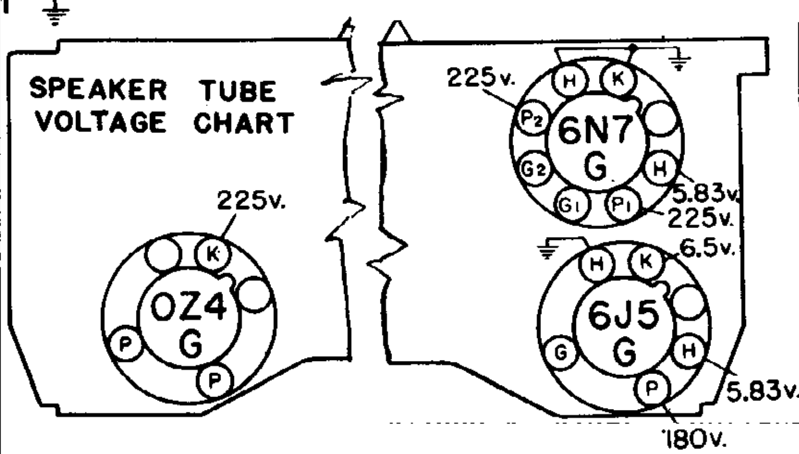
MODELS 982126 AND 982127





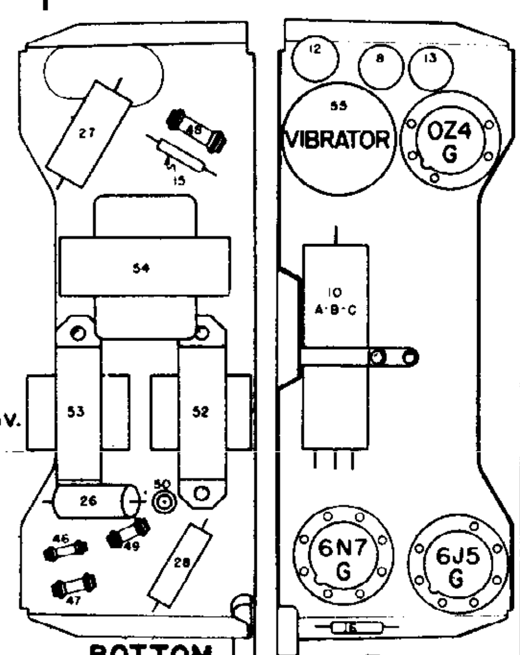






READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6 VOLTS.

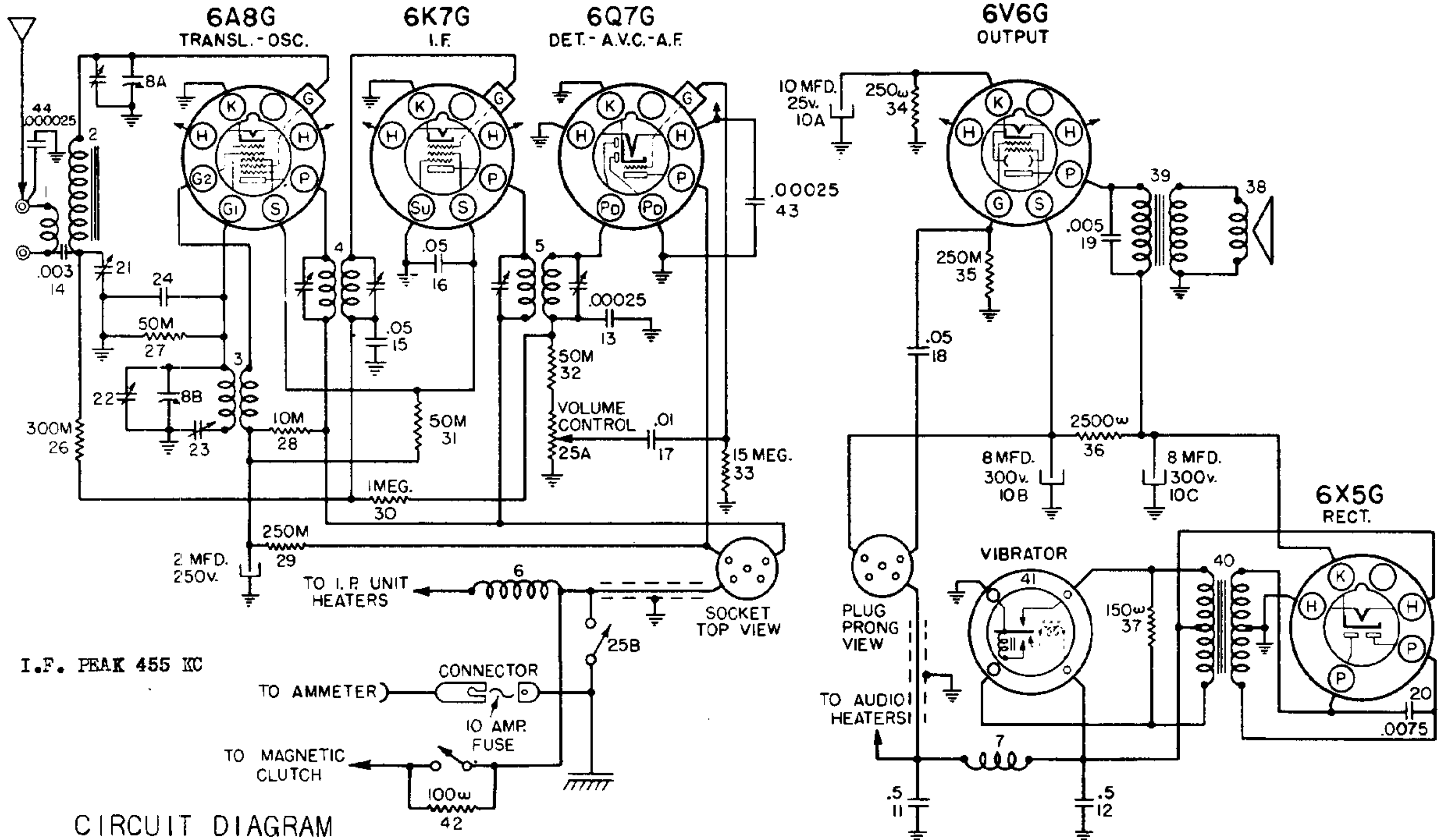
CURRENT DRAIN 6.7 TO 7.6 AMPERES.
"B" SUPPLY DRAIN APPROXIMATELY



BOTTOM SPEAKER LAYOUT TOP PARTS

MODEL 982127
Schematic

OLDSMOBILE DIV.—GEN. MOTORS



I.F. PEAK 455 KC

CIRCUIT DIAGRAM

OLDS MODEL 982127

Olds Model 982127
Date: April 20, 1939

ANTENNA CIRCUIT

The antenna circuit is capacity coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the low frequency end of the band (600 K.C.) There are two antenna receptacles provided on the receiver. One for use with the Running Boards Antenna and the other for use with Side Cowl Mounted type Antenna.

MODEL 982127
Socket, Trimmers
Alignment

OLDSMOBILE DIV.—GEN. MOTORS

1. Aligning I-F Stages at 455 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G Tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Connect the output meter from the plate prong of the output tube to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D. C. Voltages.

(d) Set the test oscillator to exactly 455 K.C.

(e) Turn volume control to maximum.

(f) Adjust the trimmers "A", "B", "G" and "H" on the I-F Transformers for maximum output. (See parts layout) These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1520 Kilocycles

(a) Leave the test oscillator leads connected the same as for aligning the I-F Circuits.

(b) Turn the Rotor plates of the gang condenser (Illus. #8) all the way out and against the high frequency stop.

(c) Set the test oscillator to 1520 kilocycles.

(d) Adjust the condenser "F" for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. Aligning at 540 Kilocycles

(a) Leave test oscillator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the test oscillator to 540 K.C.

(d) Adjust the oscillator padding condensor "E" for maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning the Antenna Stage

(a) Remove the signal lead of the test oscillator from the grid of the 6A8G tube and connect to the Running Board Antenna receptacle of the receiver THROUGH a .0004 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .0004 mfd. mica condenser be used when aligning the antenna stage of these receivers and that the lead from the test oscillator is in the correct receptacle in order that this circuit can be made to track properly.

(b) Set the test oscillator to 600 K.C.

(c) Adjust antenna trimmer condenser "D" for maximum output.

(d) Set the test oscillator to 1400 K.C.

(e) Turn the condenser rotor plates until this frequency is tuned in with maximum output.

(f) Adjust the Parallel trimmer "C" on the condenser gang for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condensor was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator padding condensor at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

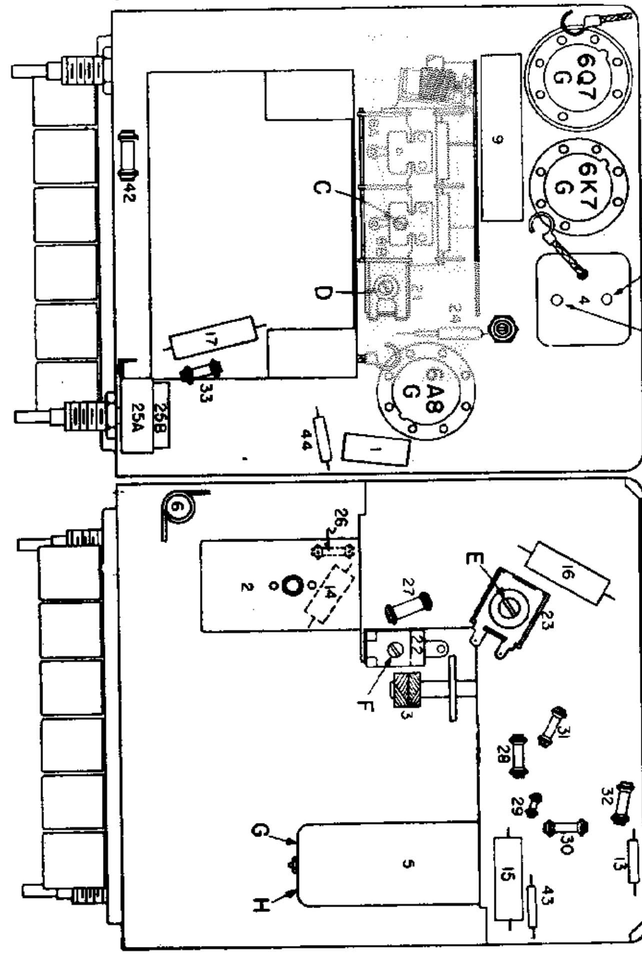
(a) Set the test oscillator at 600 K.C.

(b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and readjust the oscillator padding condenser "E" while rocking the variable condenser gang tuning shaft back and forth through the signal.

(d) This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.

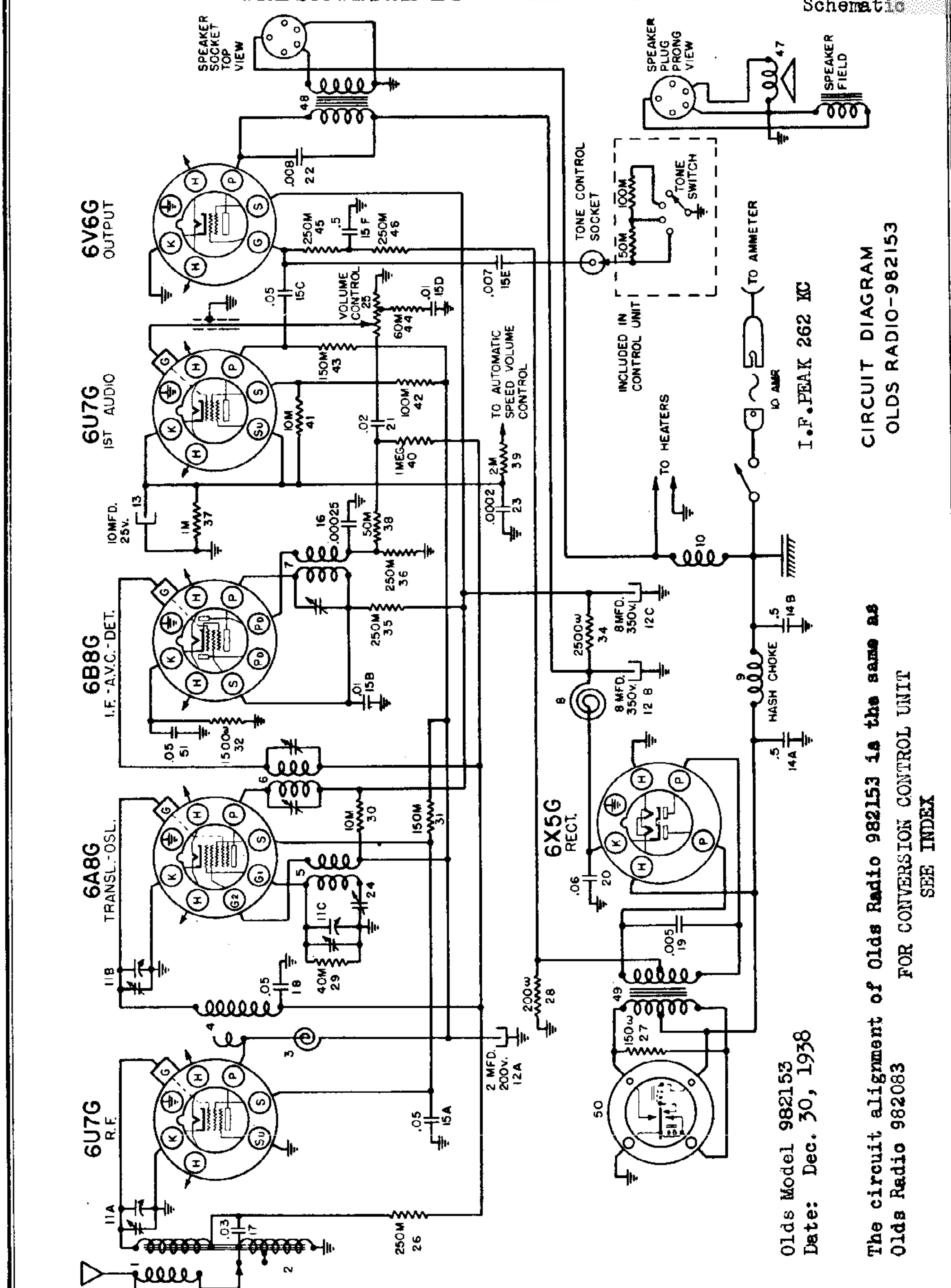


LOCATION OF PARTS - OLDS MODEL 982127

Note: For tuning head mechanism parts, refer to Olds Model Radio 982126.

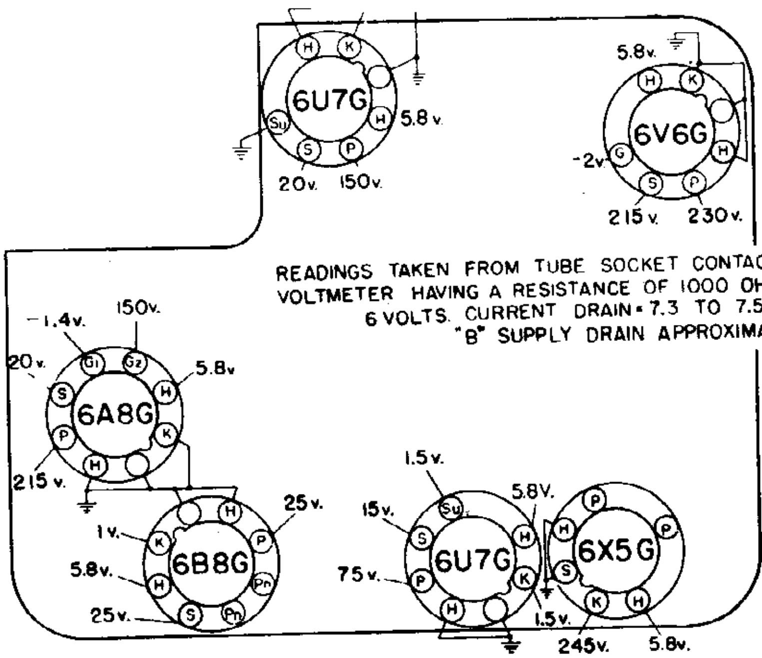
OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982153
Schematic



MODEL 982153
Voltage, Chassis
Socket, Trimmers

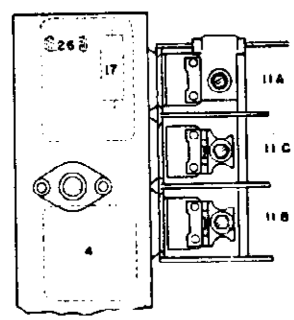
OLDSMOBILE DIV.—GEN. MOTORS

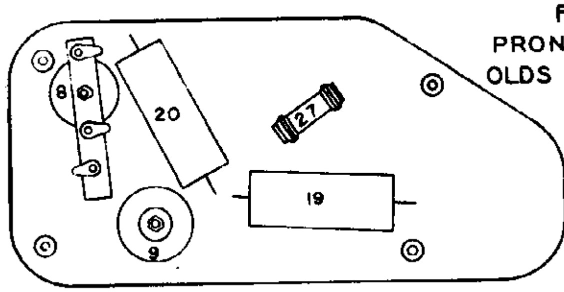


READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6 VOLTS. CURRENT DRAIN = 7.3 TO 7.5 AMPS. "B" SUPPLY DRAIN APPROXIMATELY 52 TO 55 MA

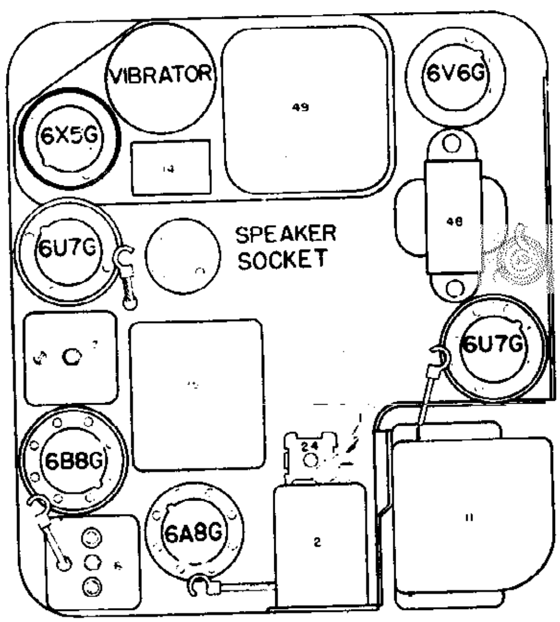
BOTTOM VIEW OF TUBE SOCKETS

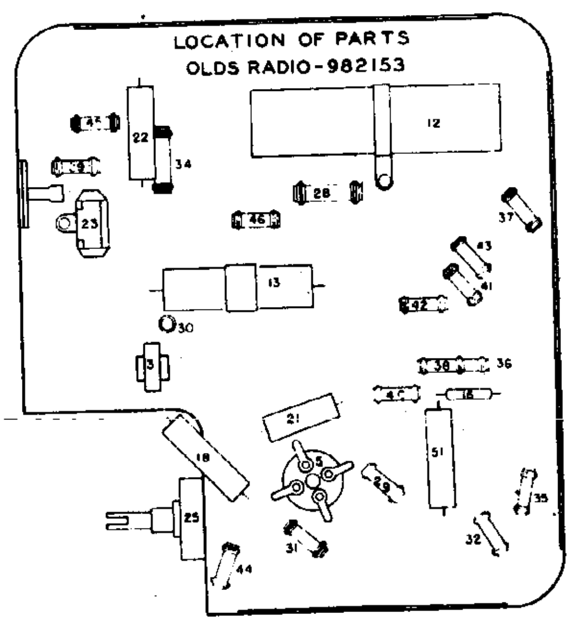
FIG. 3
PRONG VOLTAGES
OLDS RADIO-982153





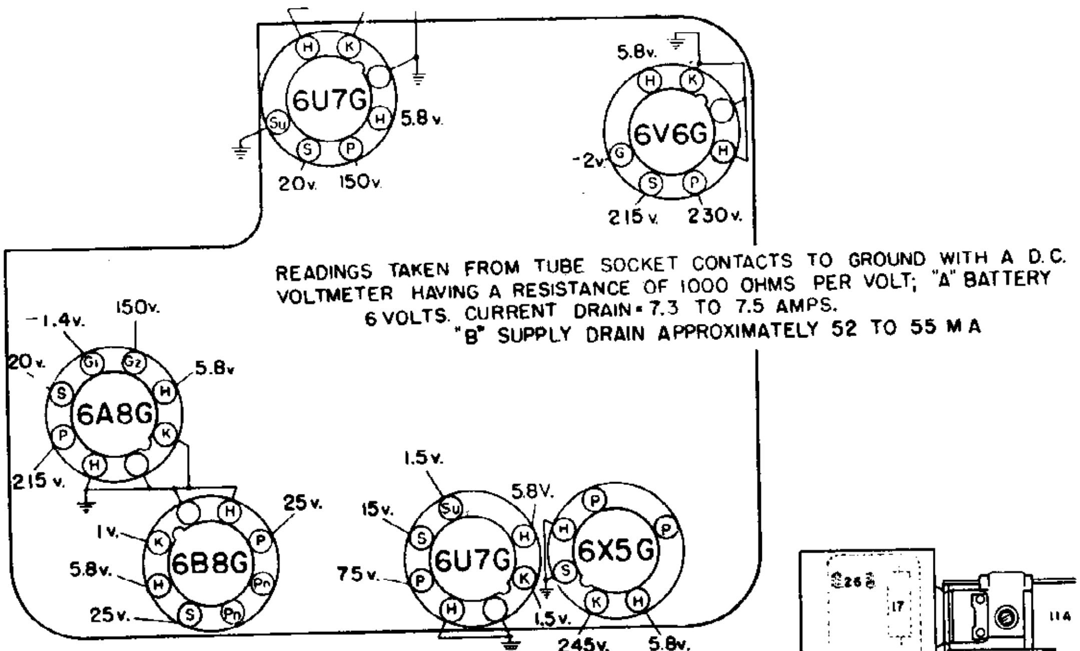
POWER SUPPLY UNIT LOCATION OF PARTS
RADIO 982153





MODEL 982153
Voltage, Chassis
Sôcket, Trimmers

OLDSMOBILE DIV.—GEN. MOTORS



BOTTOM VIEW OF TUBE SOCKETS

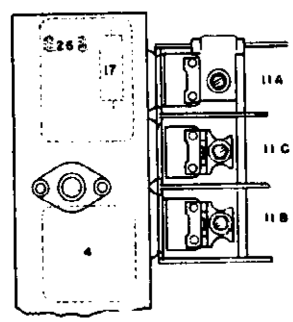
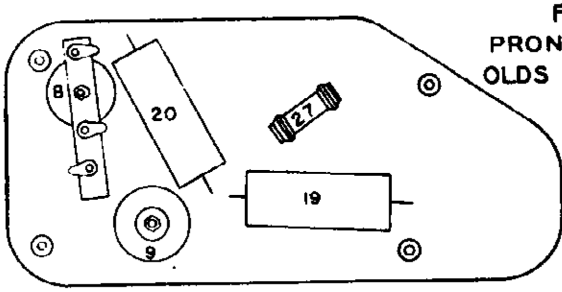
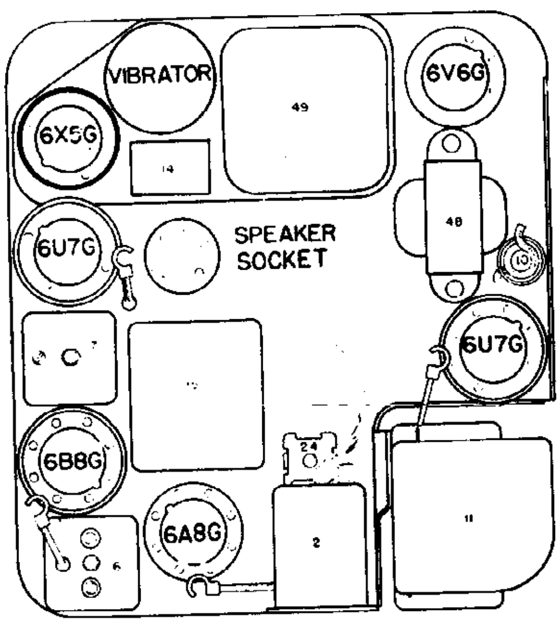
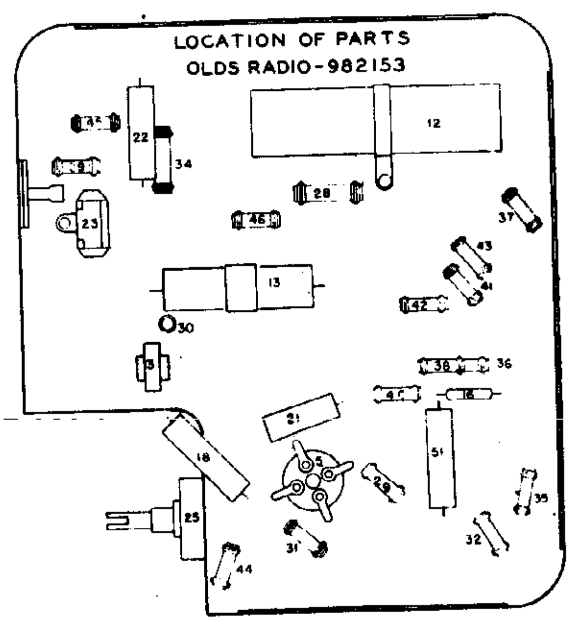


FIG. 3
PRONG VOLTAGES
OLDS RADIO-982153



POWER SUPPLY UNIT LOCATION OF PARTS
RADIO 982153





MODEL 982153
Alignment

OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982083
Voltage, Alignment

1. Aligning I-F Stages at 262 Kilocycles:

a. Connect the signal lead of the test oscillator to the grid cap of the 6A8G tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

b. Connect the ground lead of the test oscillator to the chassis frame.

c. Connect the output meter from the plate prong of the 6V6G to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. voltages.

d. Set the test oscillator to exactly 262 K.C.

e. Adjust the trimmers on the I-F coils (Illustration 6 and 7, Figure 2) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistant with obtaining a readable indication on the output meter.

2. Aligning at 1520 Kilocycles:

a. Leave the test oscillator leads connected the same as for aligning the I-F circuits.

b. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

c. Set the test oscillator to 1520 kilocycles.

d. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illustration 11C, Figure 3) for maximum output. (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles:

a. Leave test oscillator leads connected the same as before.

b. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

c. Set the test oscillator to 540 K.C.

d. Adjust the oscillator padding condenser (Illustration 26, Figure 2) located on the mounting plate of the receiver to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles:

a. Remove the signal lead of the test oscillator from the grid of the Translator tube and connect to the antenna terminal of the receiver THROUGH A .00055 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00055 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.)

b. Set the test oscillator to 1400 K.C.

c. Turn the condenser rotor plates until the frequency is tuned in with maximum output.

d. Adjust the R-F parallel trimmer on the condenser gang (Illustration 11-B) and the antenna compensating condenser which is the parallel trimmer on the Condenser Gang (Illustration 11-A, Figure 3).

5. Aligning at 600 Kilocycles:

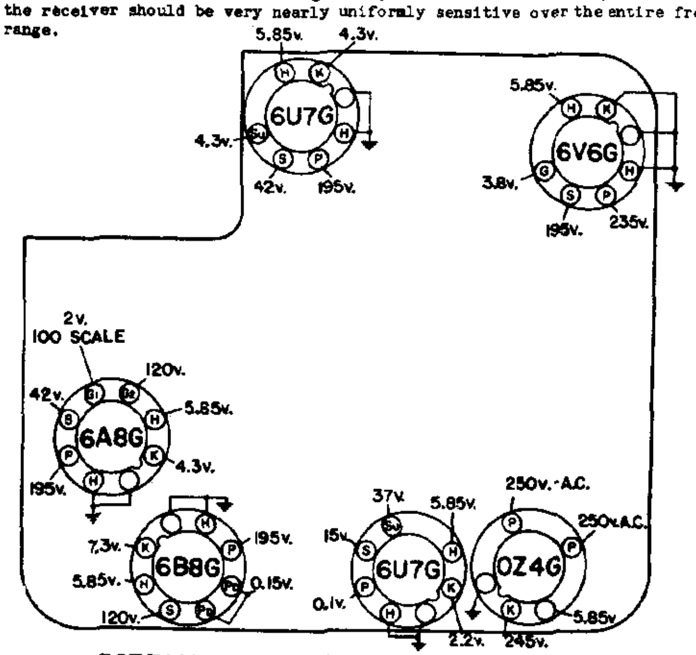
The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeat the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

a. Set the test oscillator on 600 K.C.

b. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

c. Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illustration 26, Figure 2) while rocking the variable condenser gang tuning shaft back and forth through the signal.

d. This operation should be continued until no further increase in output is obtained. Note if the entire alignment procedure has been accomplished correctly the receiver should be very nearly uniformly sensitive over the entire frequency range.



BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6 VOLTS. CURRENT DRAIN-6.6 TO 6.8 AMPS. "B" SUPPLY DRAIN APPROXIMATELY 50 TO 54 M.A.

FIG. 5 TUBE PRONG VOLTAGES - MODEL 982083

MODEL 982083
MODEL 982084
MODEL 982085
MODEL 982153

OLDSMOBILE DIV.—GEN. MOTORS

Conversion Cont.Units
Assembly, Parts List

CONVERSION CONTROL UNIT 412304.

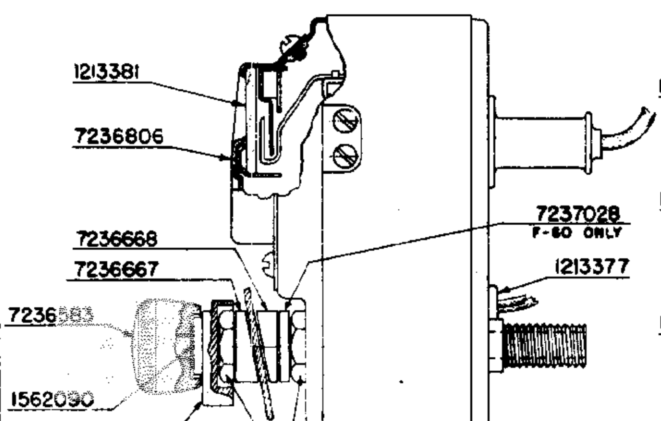
1213385	Arm Assembly	Off-On Switch Actuating
7236806	Bezel Assembly	
5271383	Cable & Plug Assembly	Tone Control
	Cable & Plug Assembly	Tone Control
1213379	Clamp	Cable Retaining
1213382	Clip	Pulley Retaining
1213381	Dial Glass	Station Indicator
1213388	Gear Assembly	Idler & Pinion
1213389	Gear Assembly	Driving Pinion
1213380	Gear & Bushing Assy.	Driven
1213377	Grommet	Cable Insulating
115273	Lamp #51	Pilot Light
7236583	Knob	Station Selector & Volume
7236739	Knob	Tone Control & Local Distant Switch
7236481	Nut 7/16-28 Hex	Control Mounting

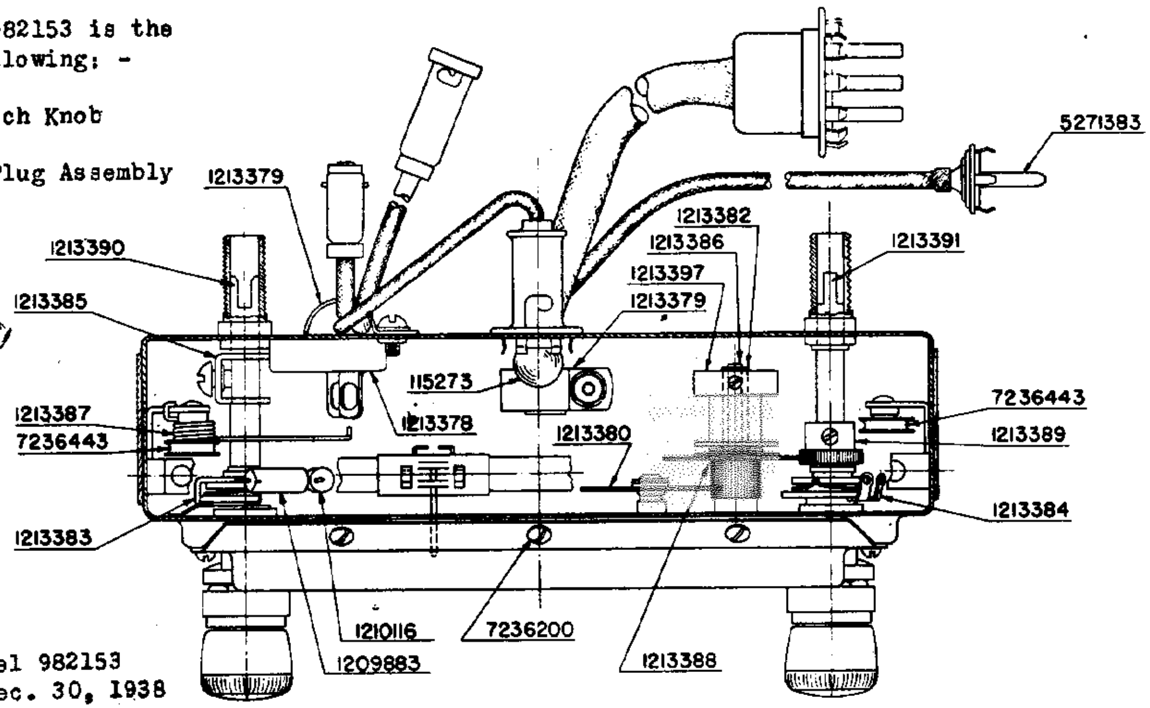
1213397	Pulley Assembly	Dial Drive
7236443	Pulley	Wood
1210116	Resistor	Insulated 50,000 ohms, 1/2 Watt
1209883	Resistor	Insulated 100,000 ohms, 1/2 Watt
7236230	Screw 4-36 x 3/16	Bezel Mounting
1213391	Shaft	Station Selector
1213390	Shaft	Volume Control
1213387	Spring	Dial Pointer - String Tension
1213386	Stud	Idler Gear
1213378	Switch	Off-On
1213383	Switch	Tone Control
1213384	Switch	Local Distance

CONVERSION CONTROL UNIT 412304
INCLUDED IN PACKAGE 982123
USED IN CONNECTION WITH RECEIVER
982083-4-5

Note that Remote Control, 412073, for Radio 982153 is the same as 412304 except it will be less the following: -

7236739	Local Distance Switch Knob
1213384	Switch
5271569	6 Prong Cable and Plug Assembly

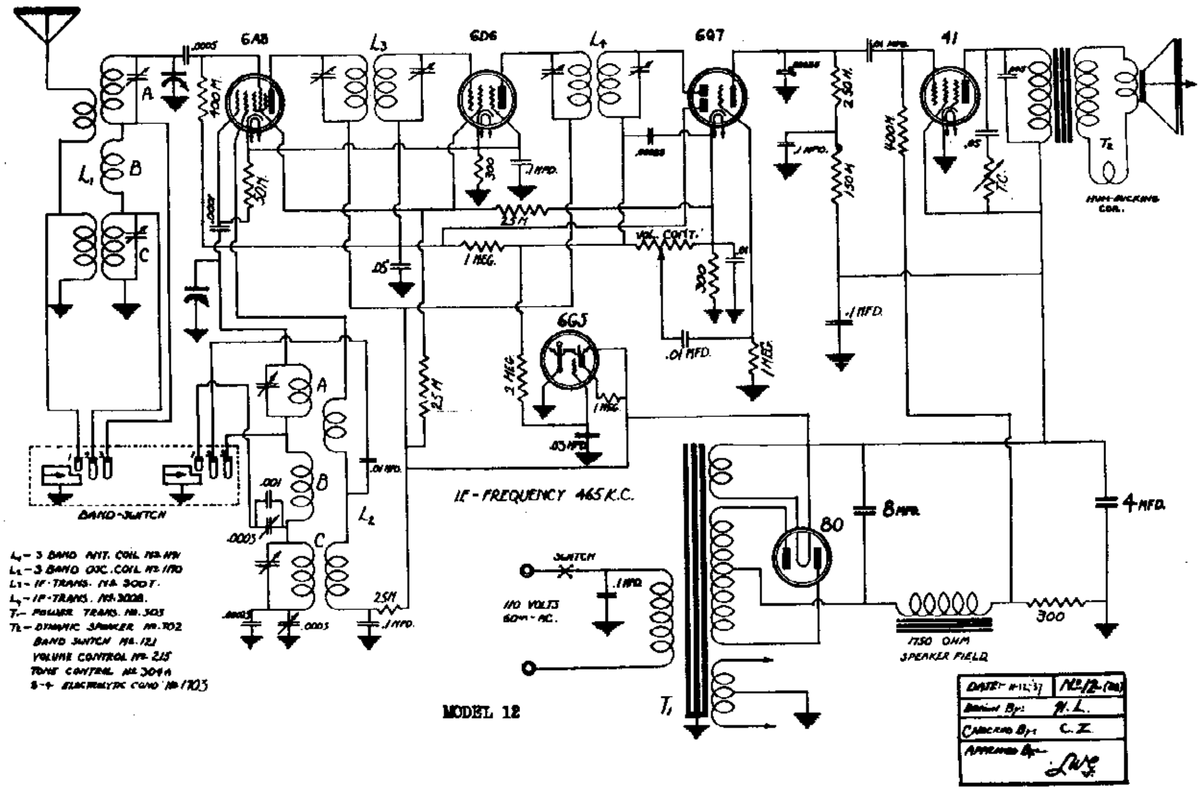




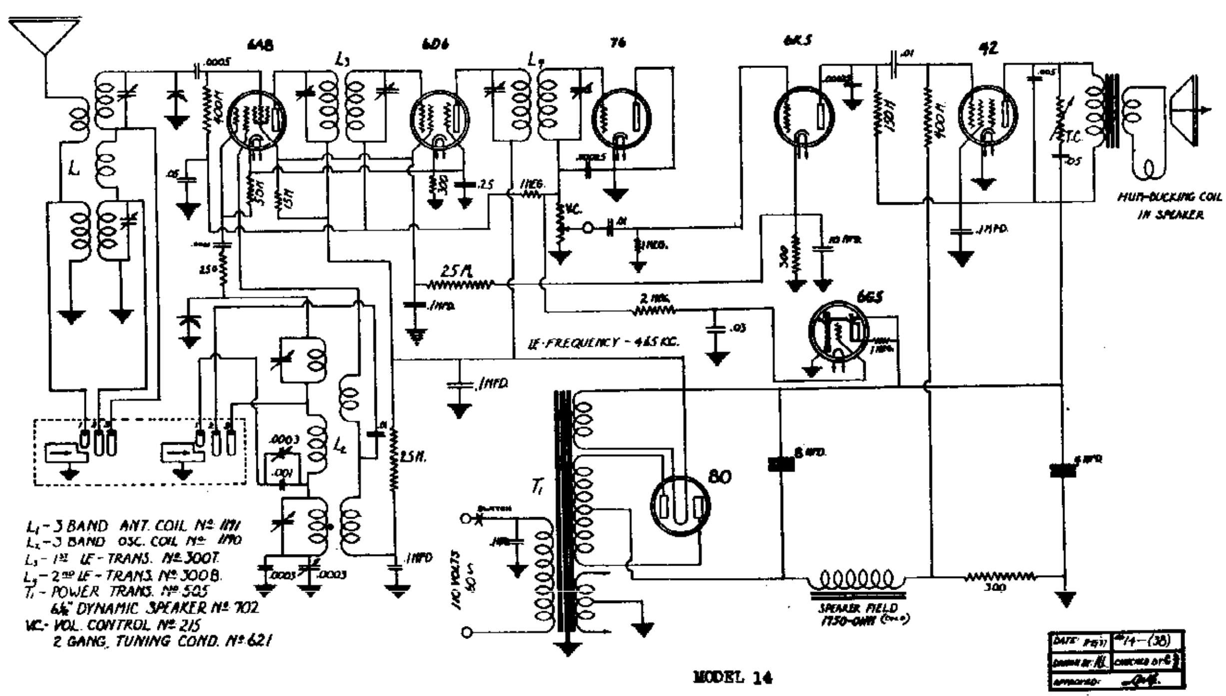
7236739
7236481

Olds Model 982153
Date: Dec. 30, 1938

PACIFIC RADIO CORP.



MODEL 12

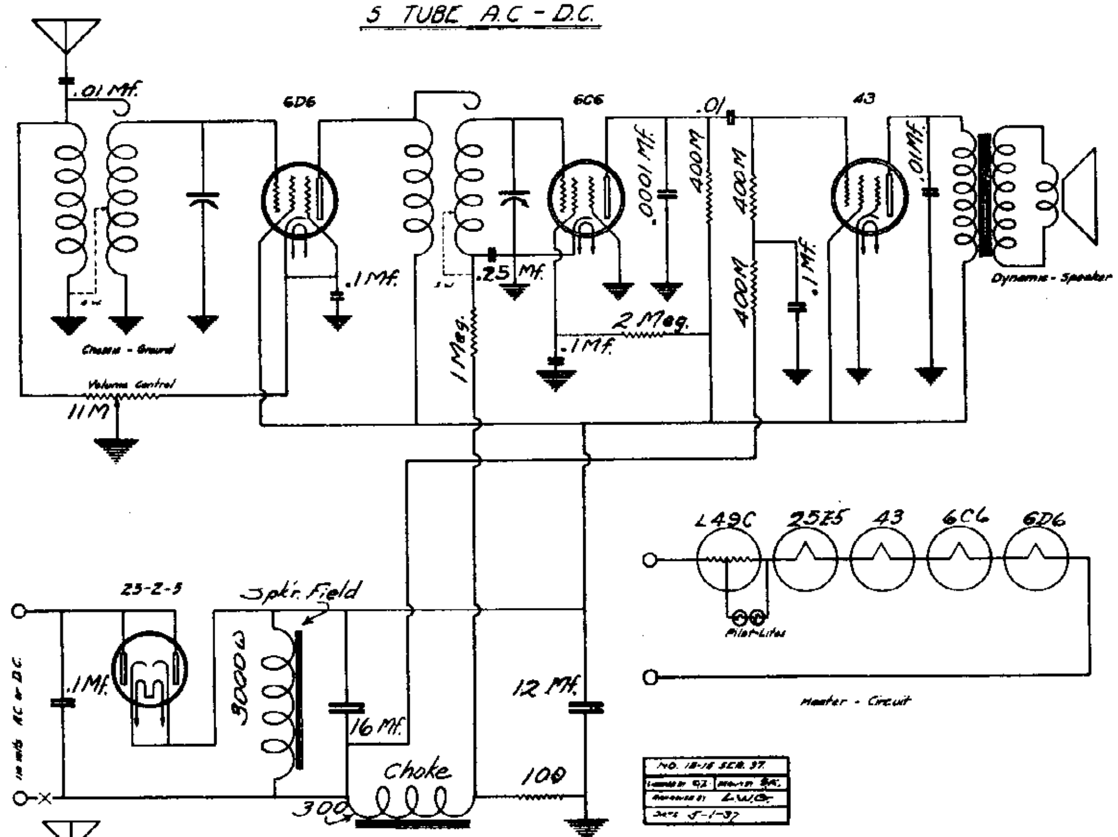


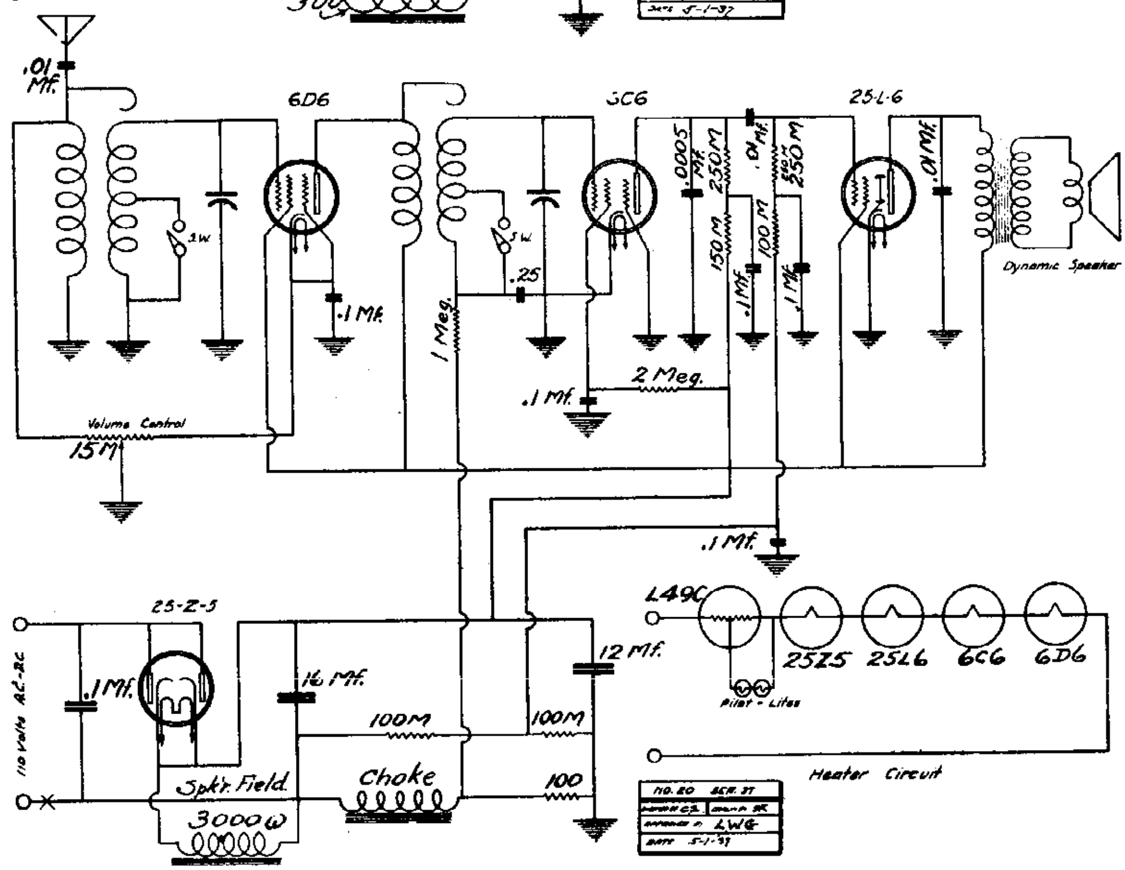
MODEL 14

MODELS 15,16 Ser.37
MODEL 20,Ser.37
Schematics

PACIFIC RADIO CORP.

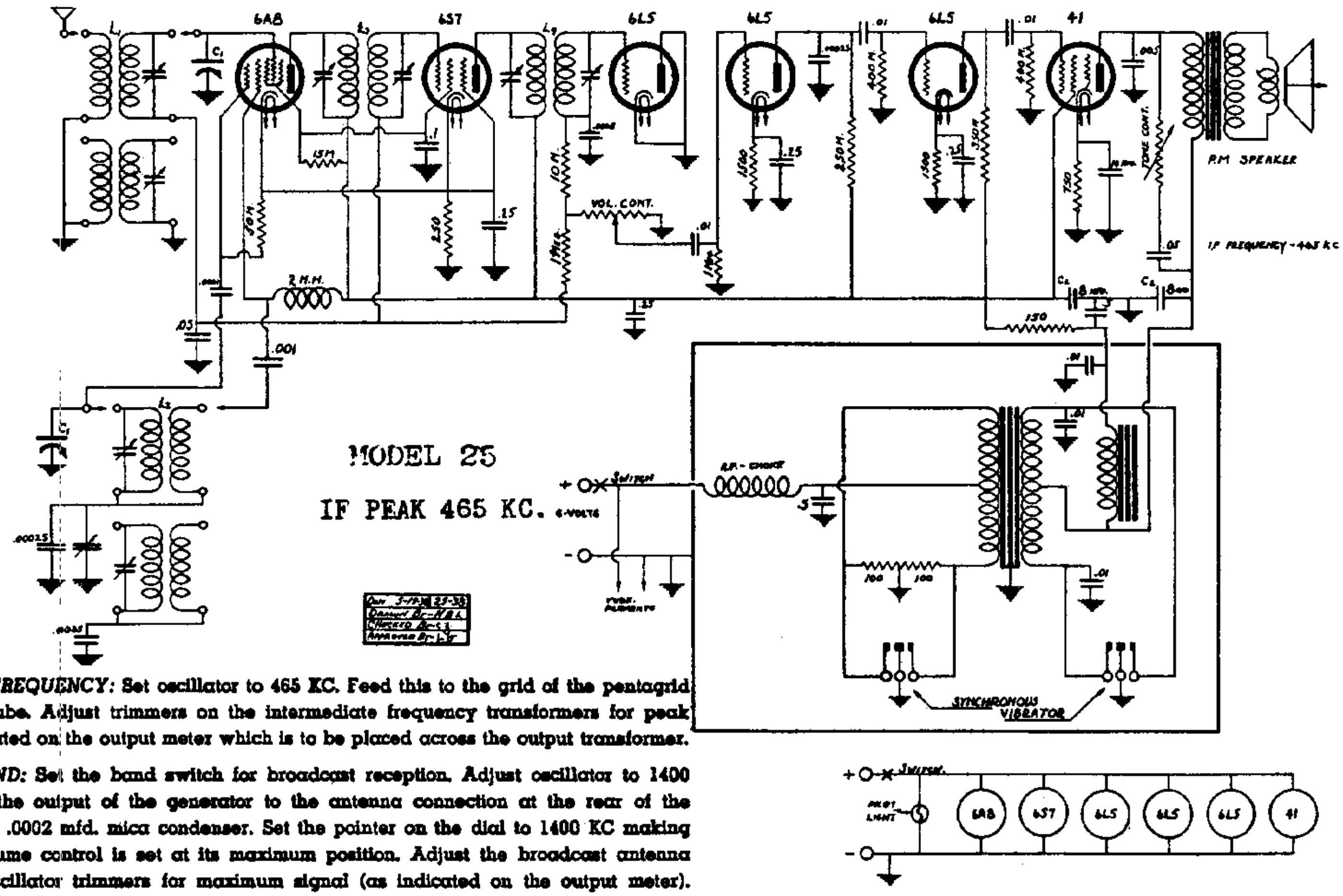
5 TUBE A.C - D.C.





MODEL 25
Schematic
Alignment

PACIFIC RADIO CORP.



L₁ - ANT. COIL № 430
L₂ - OSC COIL № 431
L₃ - 1ST IF TRANSFORMER № 101 T
L₄ - 2ND IF TRANSFORMER № 1016
BAND SWITCH № 124
TONE CONT. № 385
VOL. CONT. & SWITCH № 221

C₁ - TUNING COND. № 624
C₂ - FILTER COND. № 1720
SPEAKER 6" № 712 - 8" № 723
OUTPUT TRANSFORMER № 524
POWER TRANSFORMER № 526
VIBRATOR № 460

INTERMEDIATE FREQUENCY: **Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.**

BROADCAST BAND: **Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.**

SHORT WAVE: **Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.**

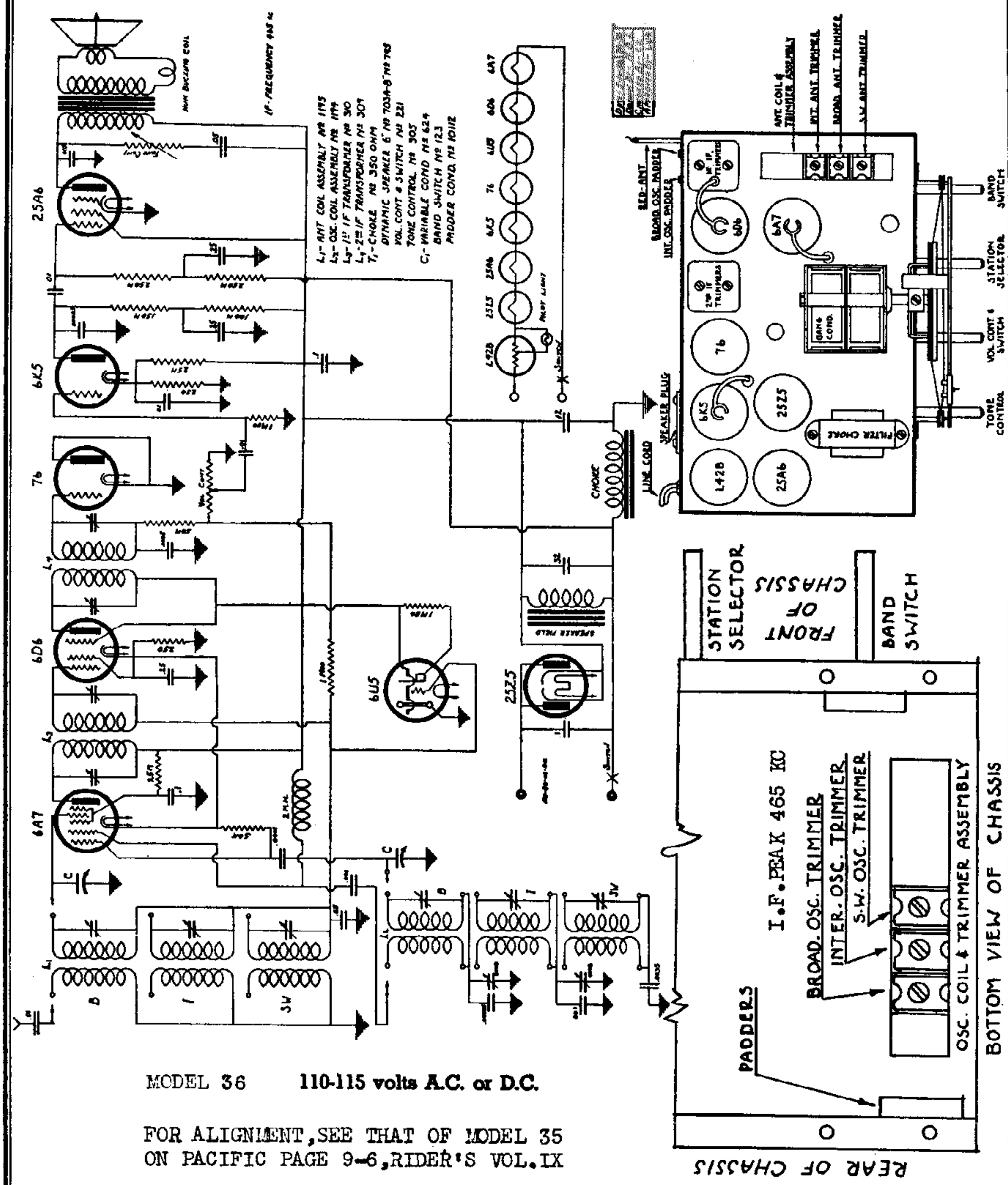
It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

This receiver is designed to operate over two tuning ranges.

from 540 K.C. to 1730 and
from 5800 K.C. to 18000 K.C.

MODEL 36
Schematic, Socket
Trimmers

PACIFIC RADIO CORP.



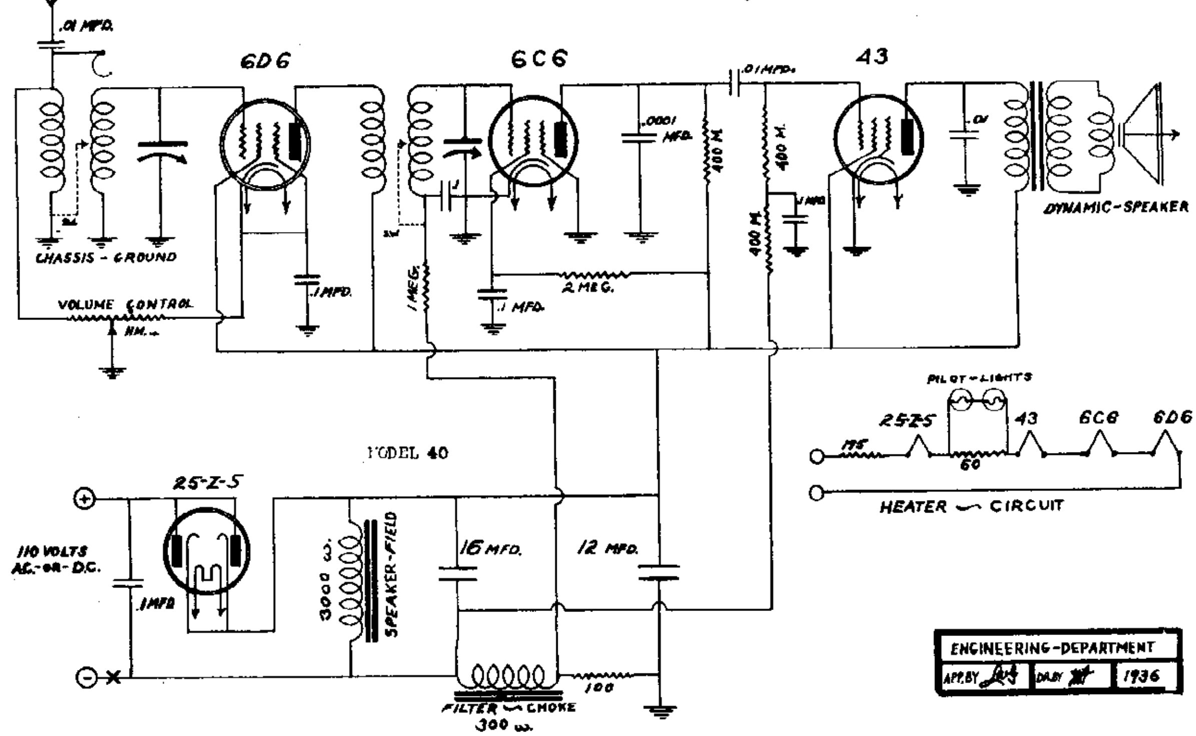
MODEL 36 **110-115 volts A.C. or D.C.**

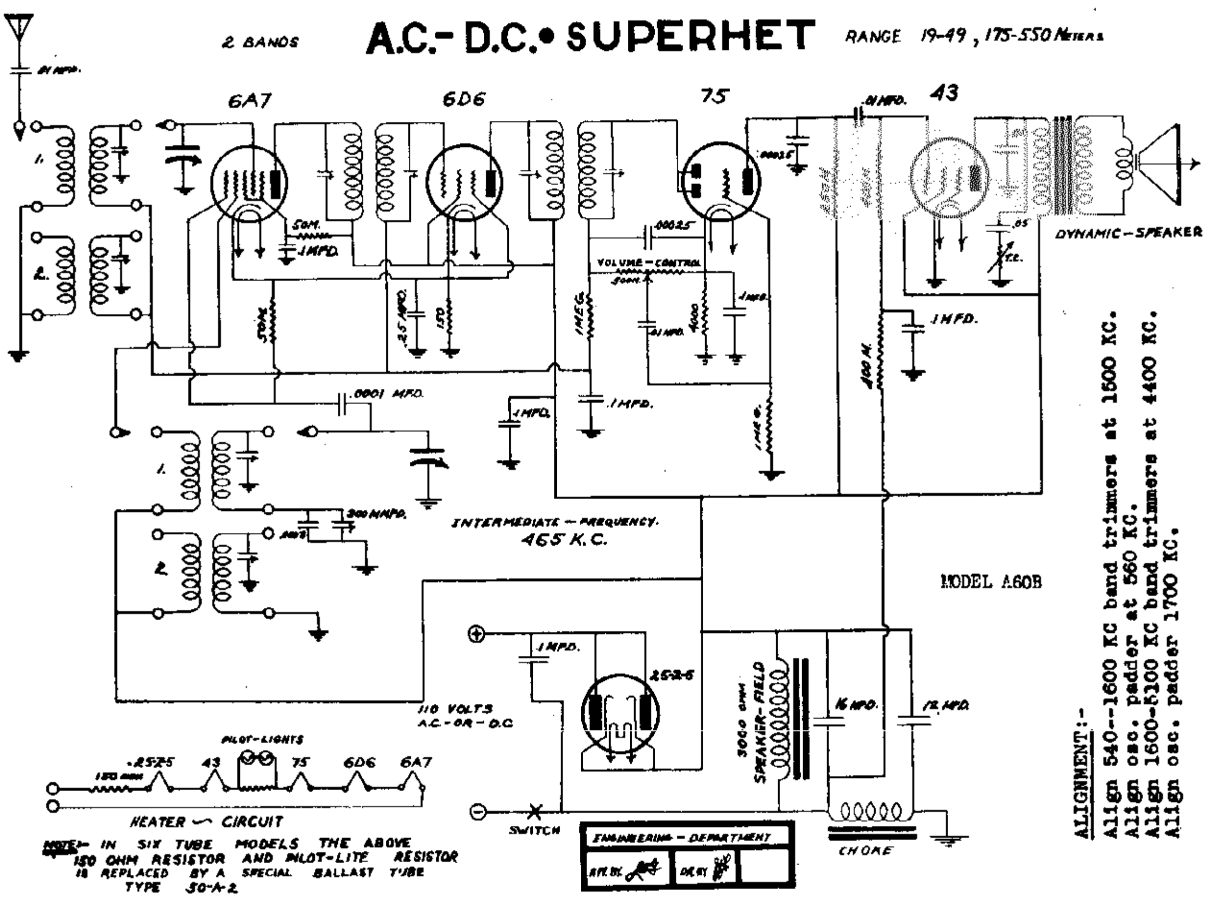
FOR ALIGNMENT, SEE THAT OF MODEL 35 ON PACIFIC PAGE 9-6, RIDER'S VOL. IX

SWITCH POSITION	BAND	RANGE IN KILOCYCLES
Left	Broadcast	540— 1710 KC
Center	Intermediate	1710— 5800 KC
Right	Short Wave (foreign)	5800—17500 KC

PACIFIC RADIO CORP.

4 TUBE A.C.-D.C.

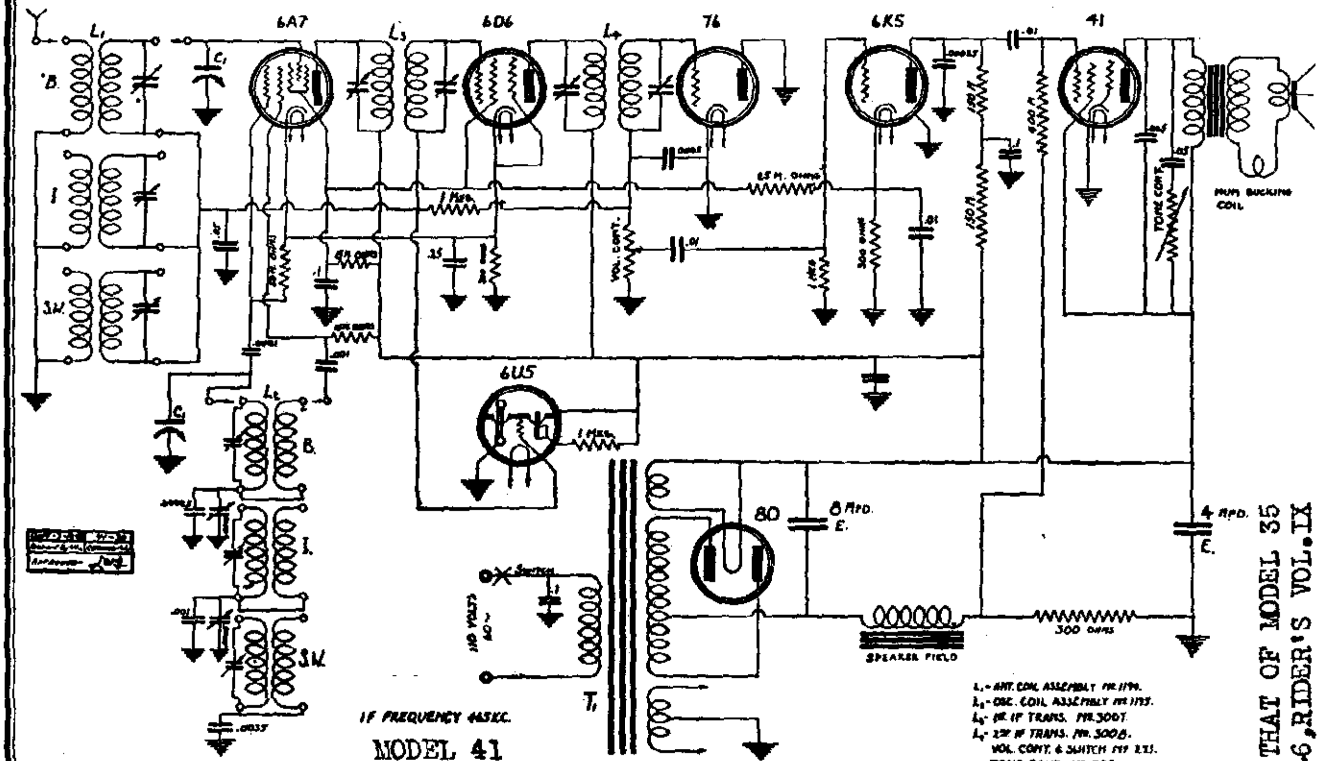




ALIGNMENT:-
Align 540--1600 KC band trimmers at 1500 KC.
Align osc. padder at 560 KC.
Align 1600-5100 KC band trimmers at 4400 KC.
Align osc. padder 1700 KC.

MODEL 41
Schematic, Socket
Trimmers

PACIFIC RADIO CORP.



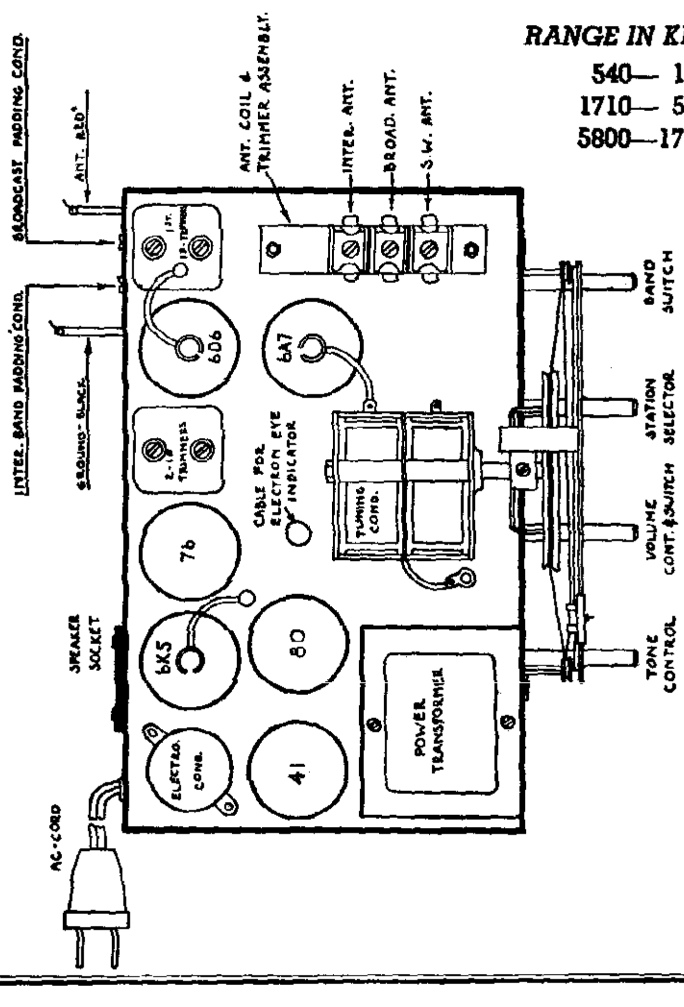
MODEL 41

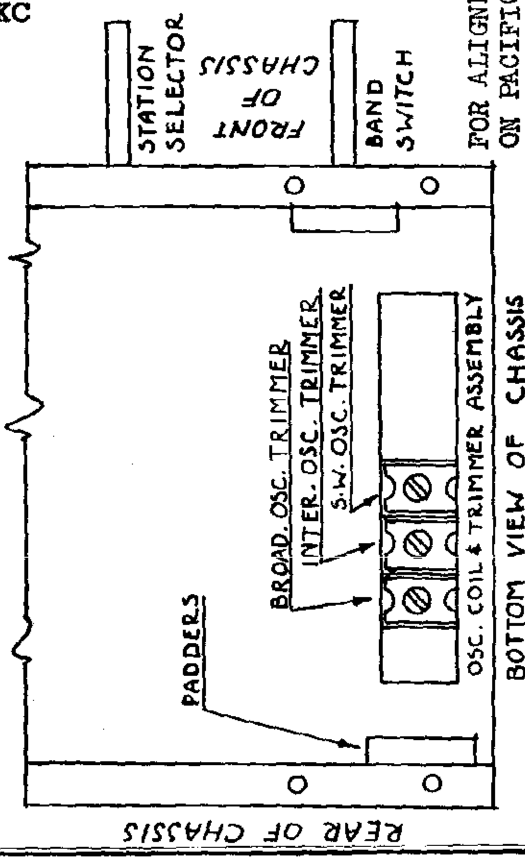
L_1 - ANT. COIL ASSEMBLY Nº 1190.
L_2 - OSC. COIL ASSEMBLY Nº 1125.
L_3 - 1ST IF TRANS. Nº 300T.
L_4 - 2ND IF TRANS. Nº 300B.
VOL. CONT. & SWITCH Nº 235.
TONE CONT. Nº 305.
T_1 - POWER TRANS. Nº 527.
DYNAMIC SPEAKER 6" Nº 702A
DYNAMIC SPEAKER 8" Nº 703
E - ELECTROLYTIC FILTER COND. Nº 700
BAND SWITCH Nº 123.
C_1 - GANG COND. Nº 624.

RANGE IN KILOCYCLES

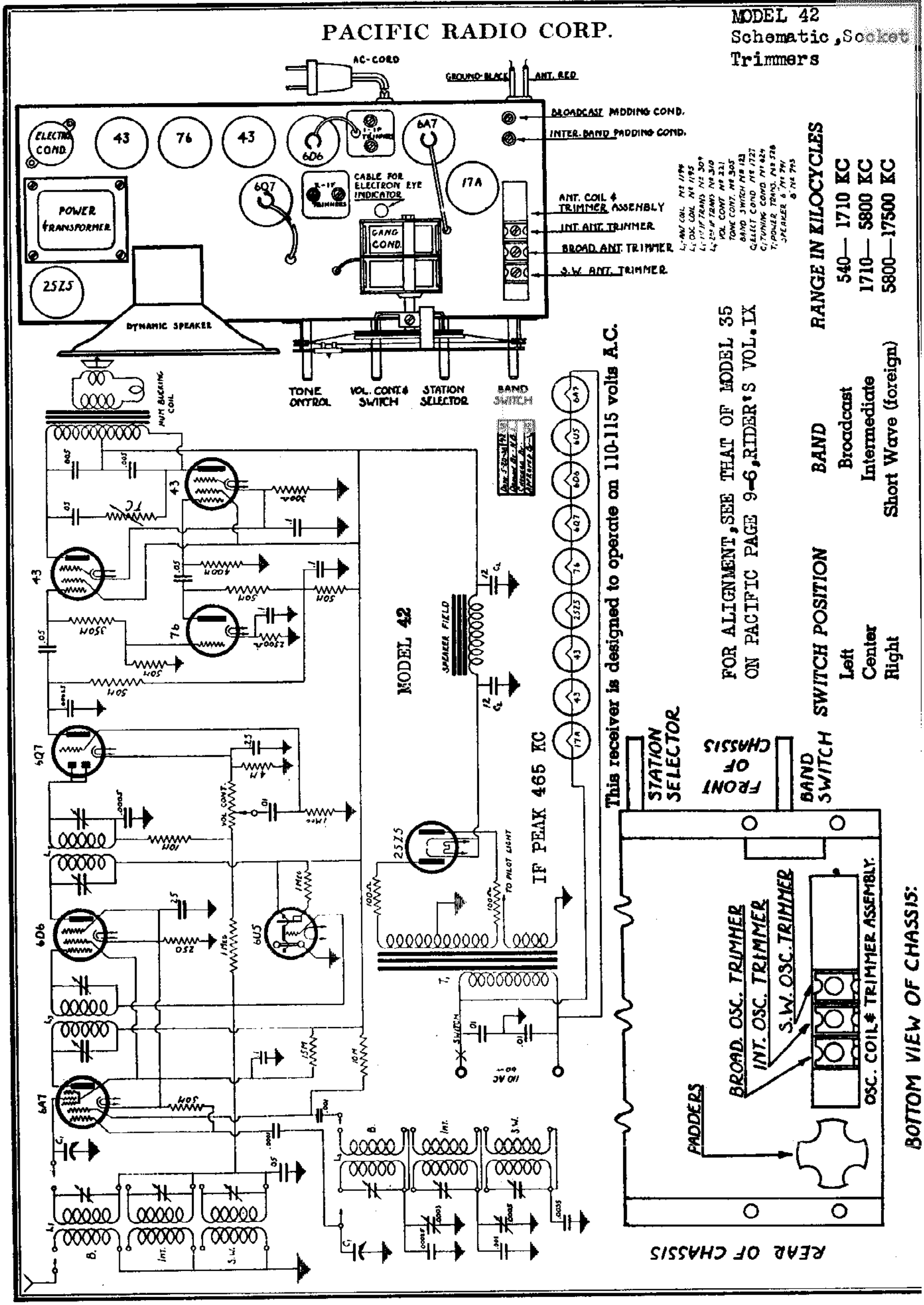
540— 1710 KC
1710— 5800 KC
5800—17500 KC

FOR ALIGNMENT, SEE THAT OF MODEL 35 ON PACIFIC PAGE 9-6, RIDER'S VOL. IX





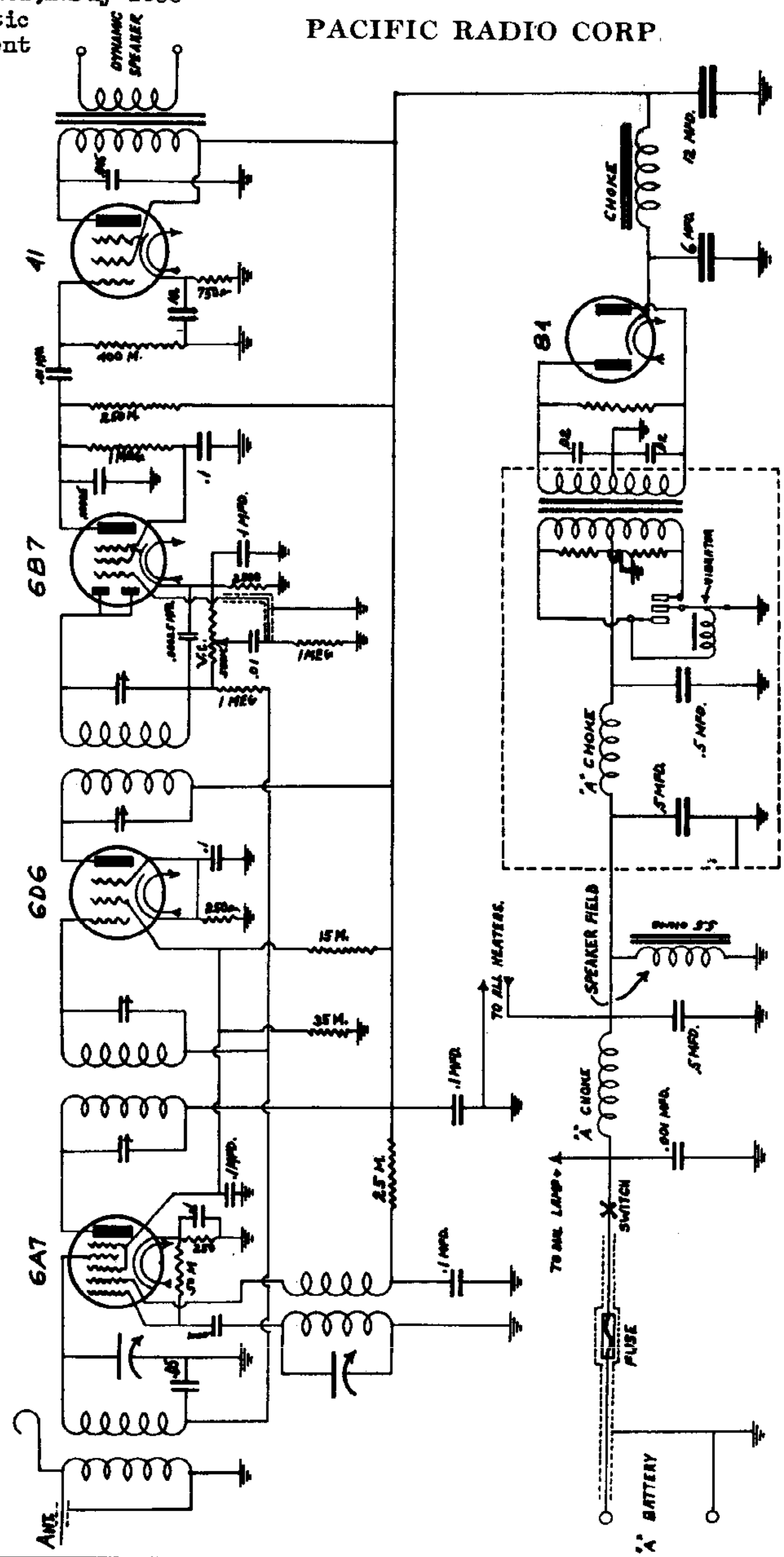
MODEL 42
Schematic, Socket
Trimmers



MODEL 101, Early 1935
Schematic
Alignment

PACIFIC RADIO CORP.

5 TUBE AUTO RADIO



CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION VOLUME VIII

ENGINEERING	DEPARTMENT
CIRCUIT — 5 TUBE AUTO SUPERHET	
	APRIL 1, 1935

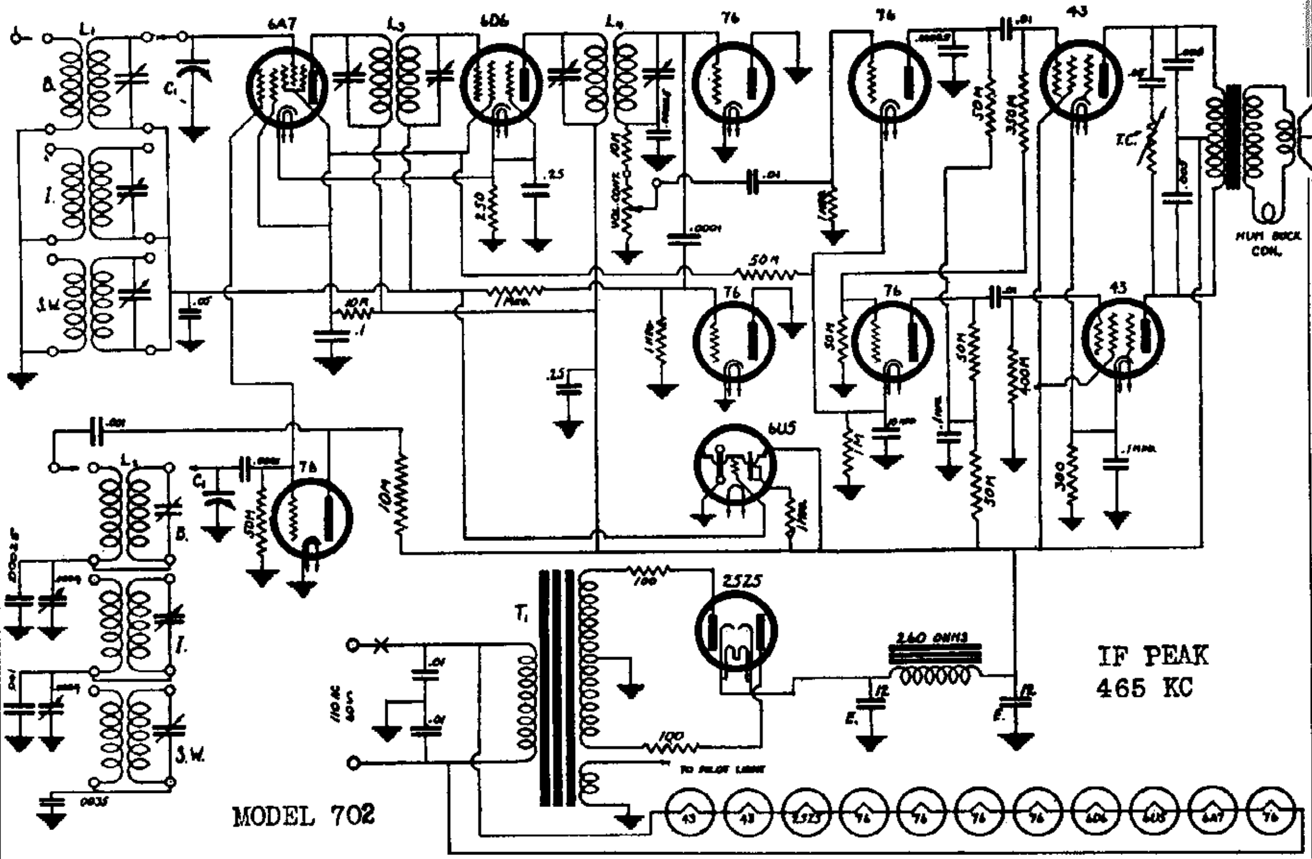
ALIGNMENT

INT. FREQ. PEAK----456 KC

ALIGN TRIMMER CONDENSERS AT 1400 KC

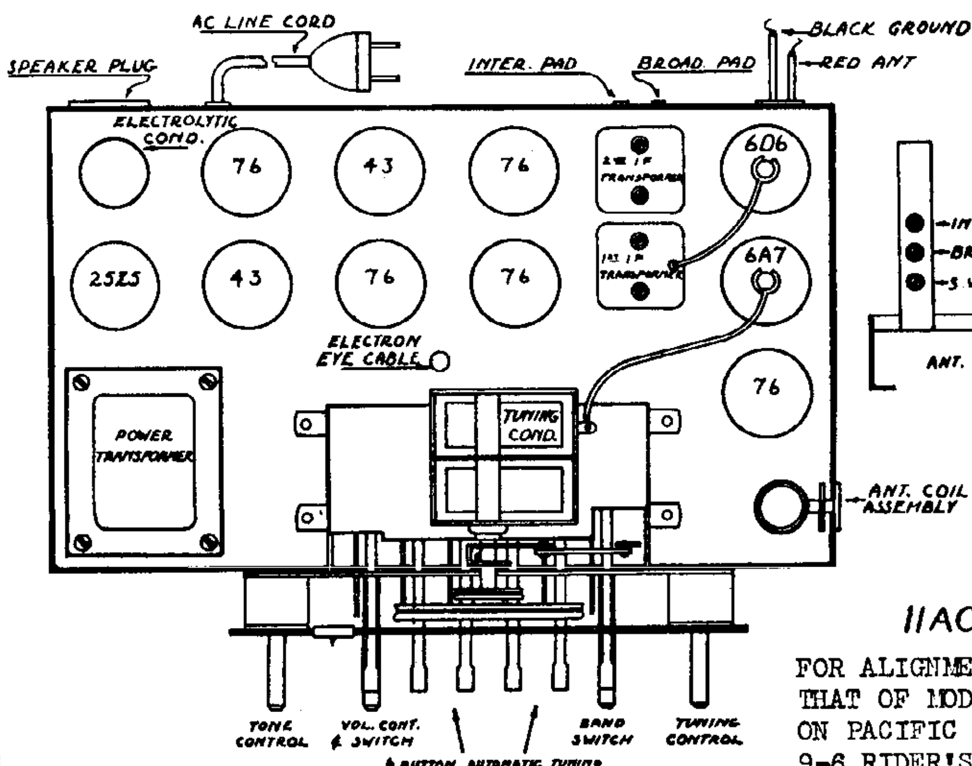
MODEL 702
Schematic, Socket
Trimmers

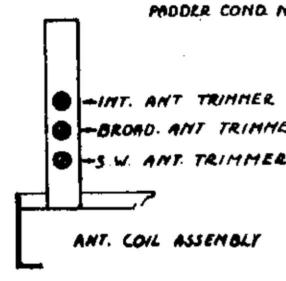
PACIFIC RADIO CORP.



This receiver is designed to operate on 110-115 volts A.C. 60 cycles.

L_1-ANT. COIL ASSEMBLY No. 1194.
L_2-OSC. COIL ASSEMBLY No. 1195.
L_3-1st IF TRANSFORMER No. 309.
L_4-2nd IF TRANSFORMER No. 310.
T_1-POWER TRANSFORMER No. 528.
DYNAMIC SPEAKER 6" No. 741 8" No. 742.
VOL. CONT. & SWITCH No. 221.
TONE CONTROL No. 305.
C_1-VARIABLE COND. No. 624.
E-ELECTROLYTIC FILTER COND. No. 1789.
BAND SWITCH No. 123.
PADDER COND. No. 10112.





RANGE IN KILOCYCLES

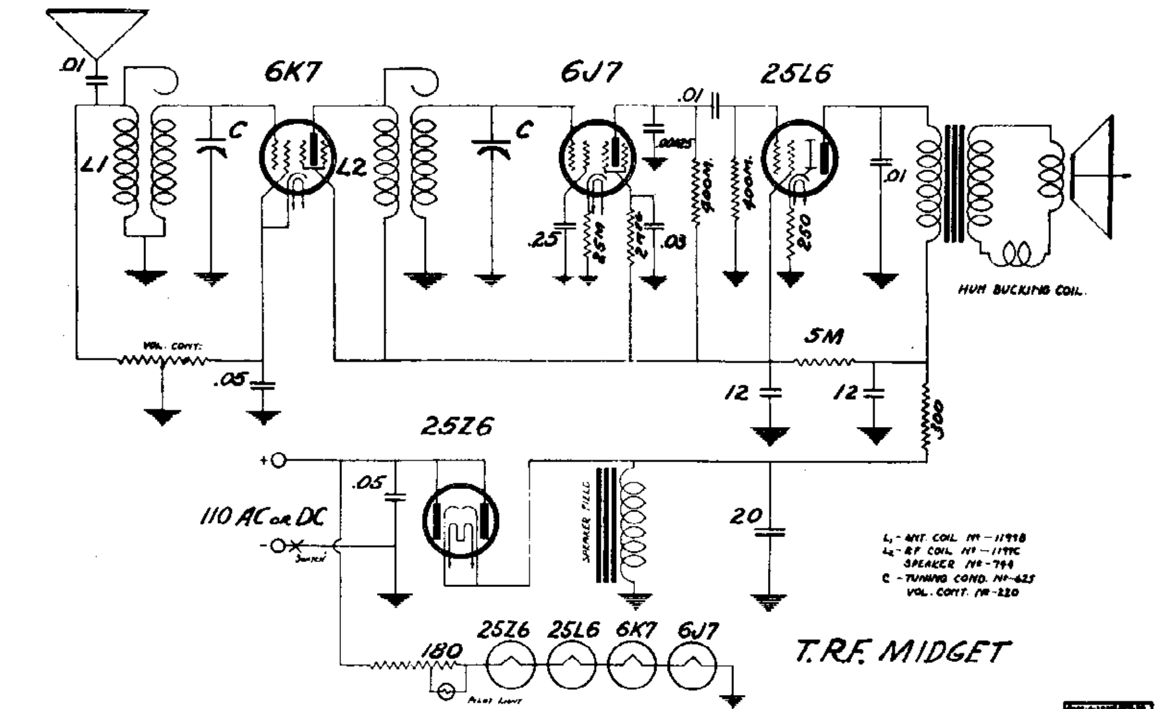
BAND	
Broadcast	540— 1710 KC
Intermediate	1710— 5800 KC
Short Wave (foreign)	5800—17500 KC

11AC

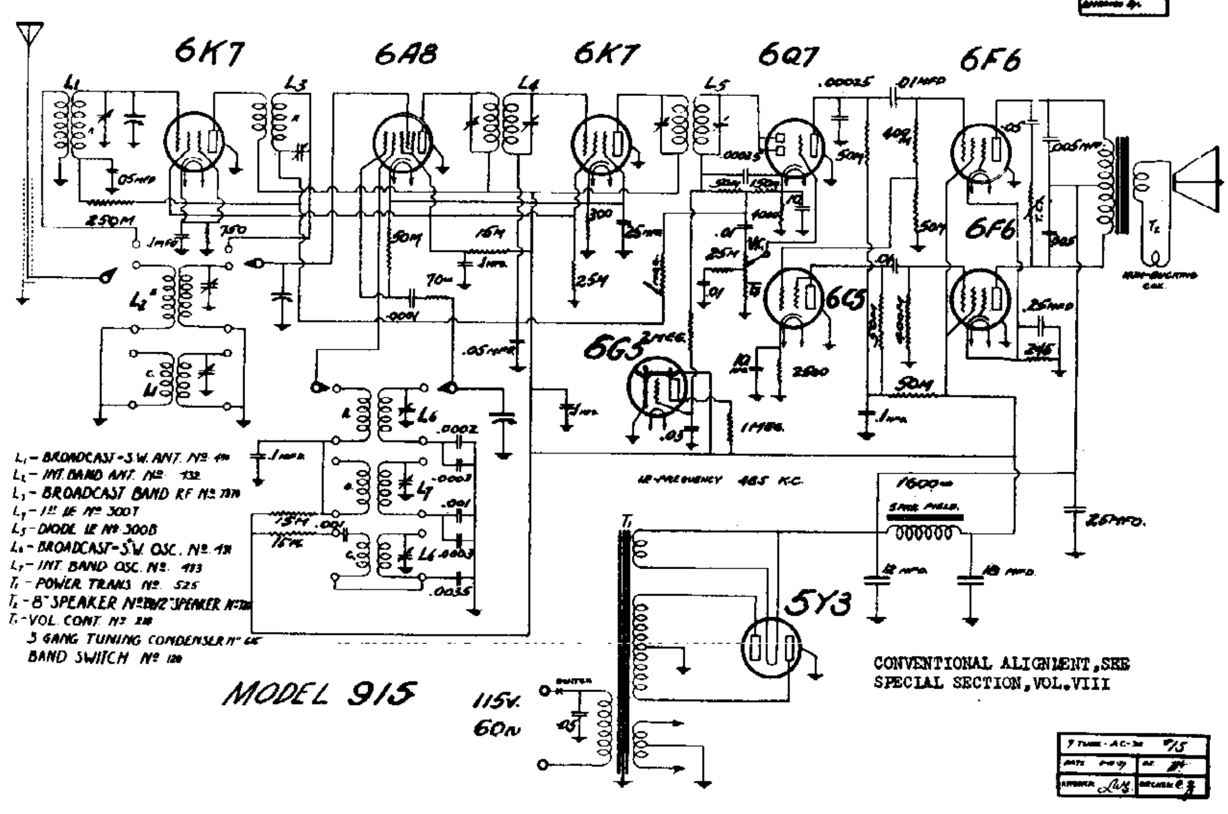
FOR ALIGNMENT, SEE THAT OF MODEL 35 ON PACIFIC PAGE 9-6, RIDER'S VOL. IX

MODEL TRF Midget
Schematic
MODEL 915
Schematic, Alignment

PACIFIC RADIO CORP.



T.R.F. MIDGET



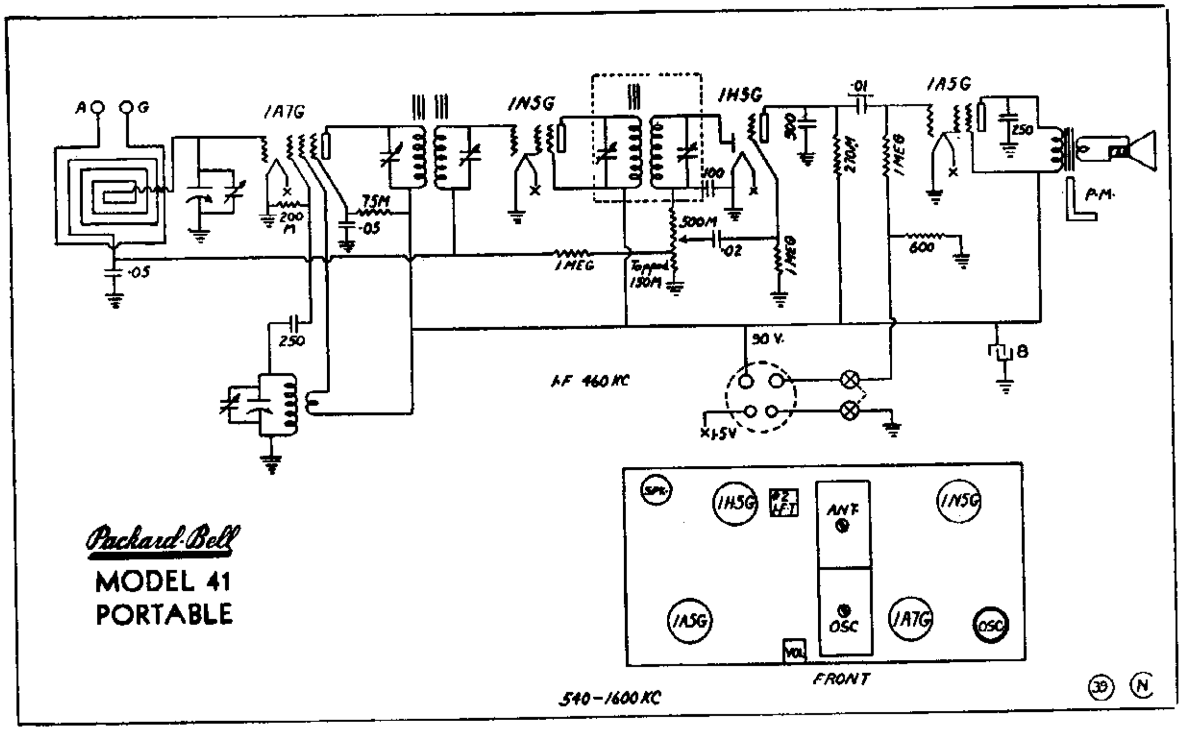
MODEL 915

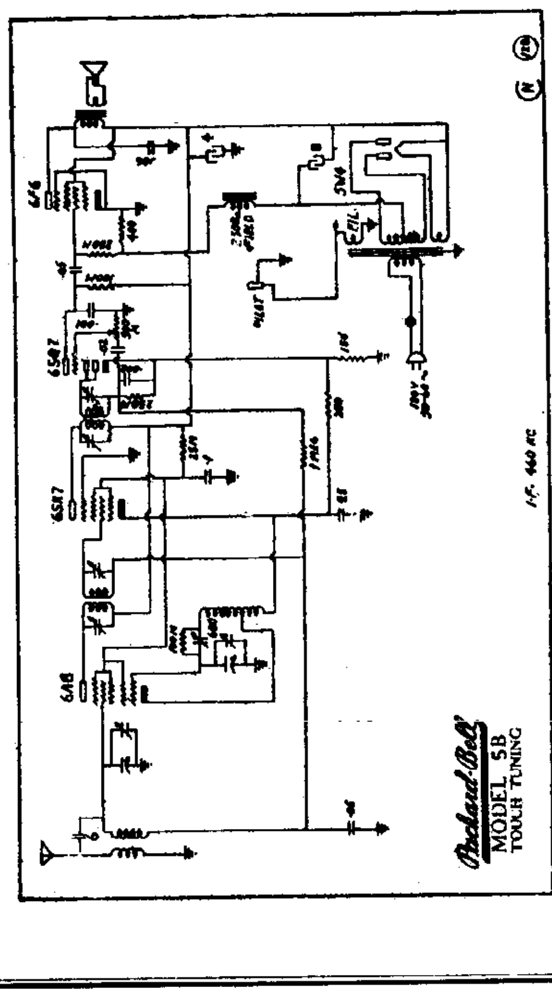
CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION, VOL. VIII

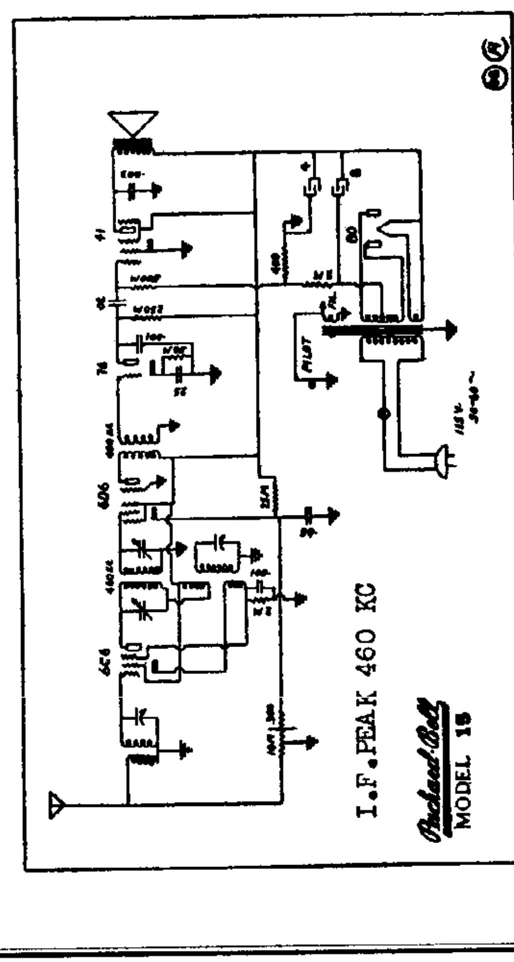
MODEL 41
Schematic, Socket
Trimmers

PACKARD BELL CO.

MODEL 5B
MODEL 15
Schematics





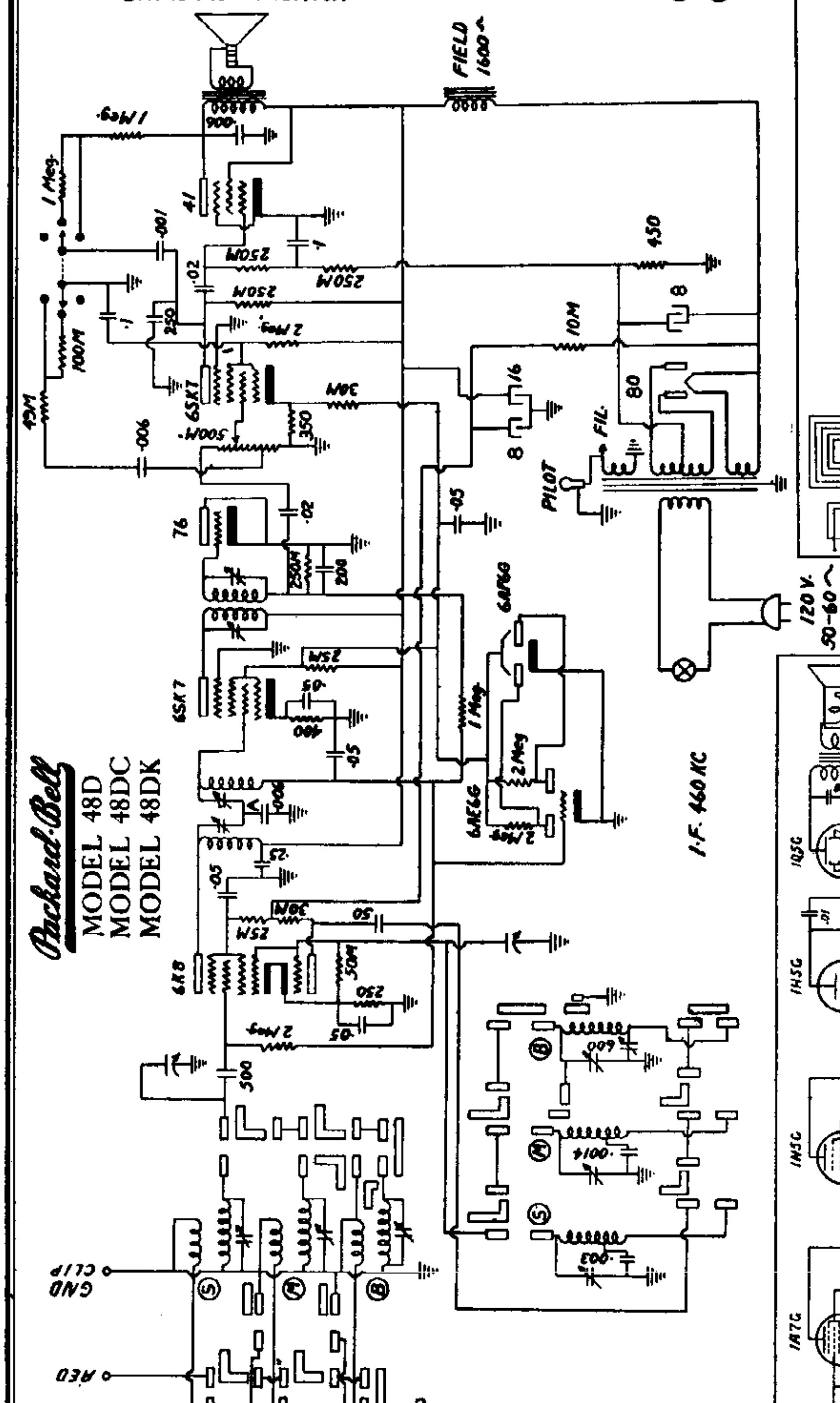


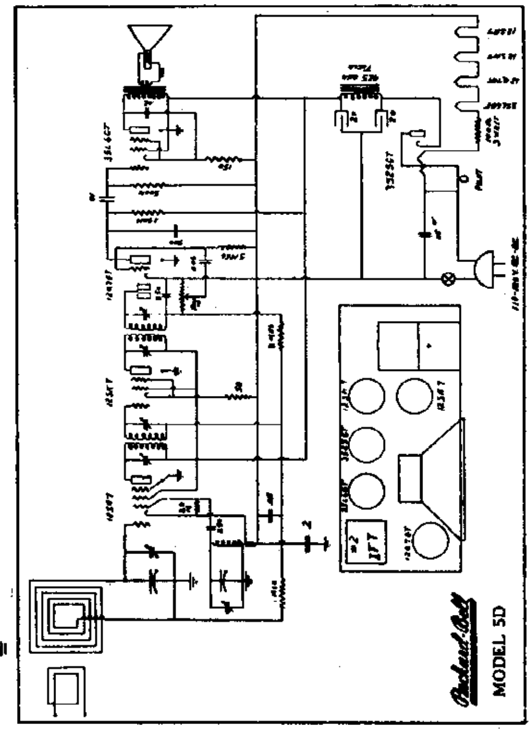
MODEL 5D
MODEL 40 Portable
Schematics, Socket
MODELS 48D, 48DC, 48DK
Schematic

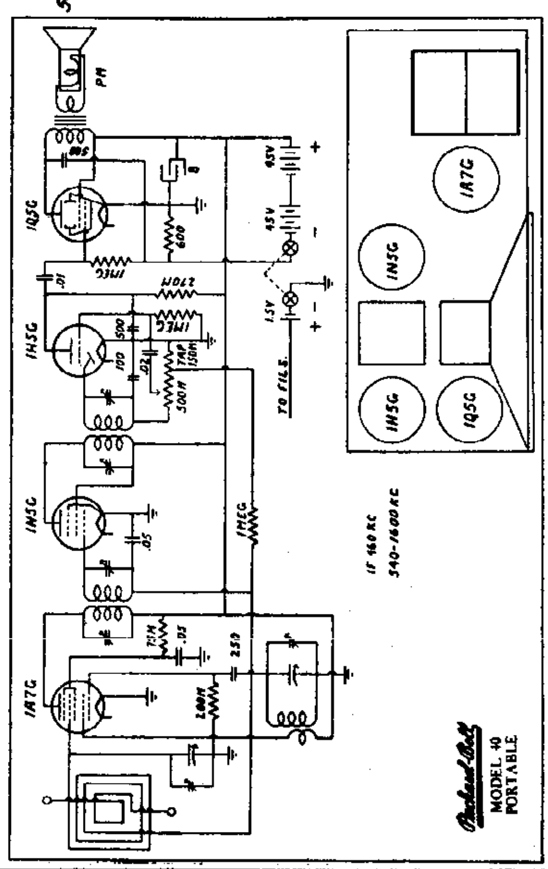
PACKARD BELL CO.

NOTE---
1. GROUND POINT "A"
2. ALIGN I.F. USUAL METHOD
3. REMOVE GROUND AT "A"
4. BAND SWITCH SHOWN IN BROADCAST POSITION

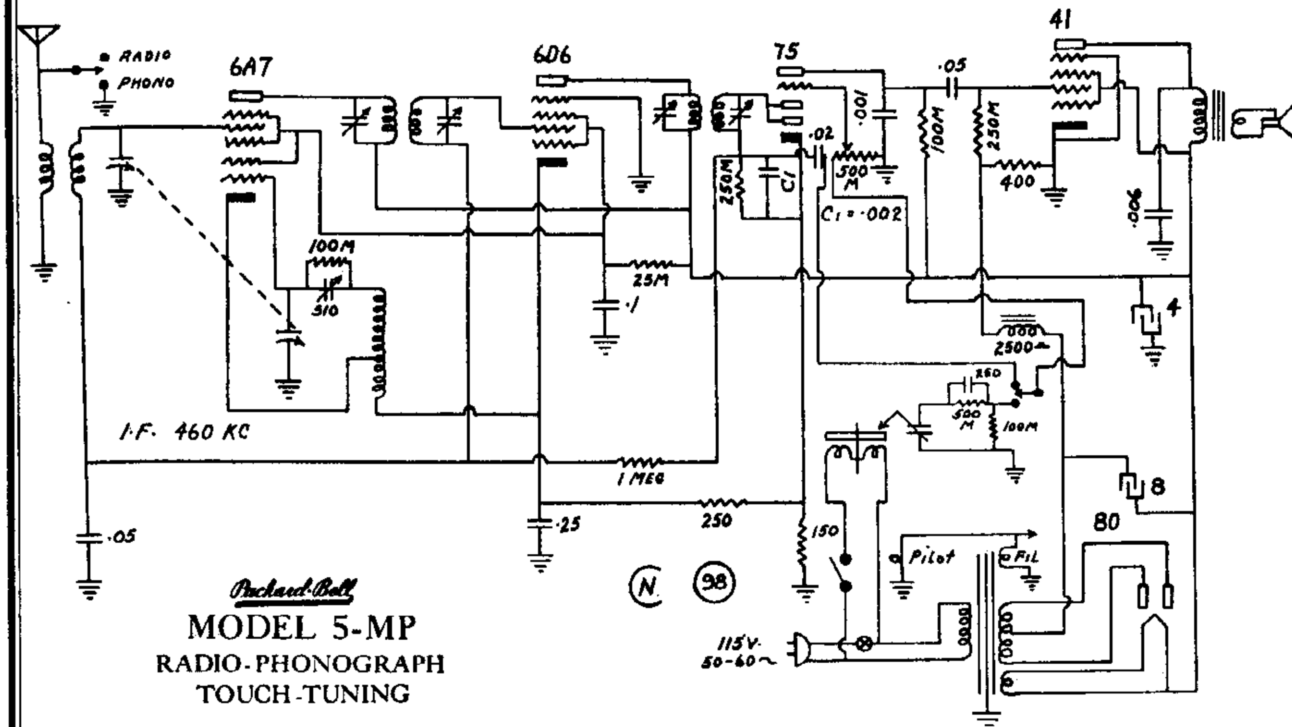
B. 550-1750 KC
M. 1.75-6.25 MC
S. 6.25-22 MC



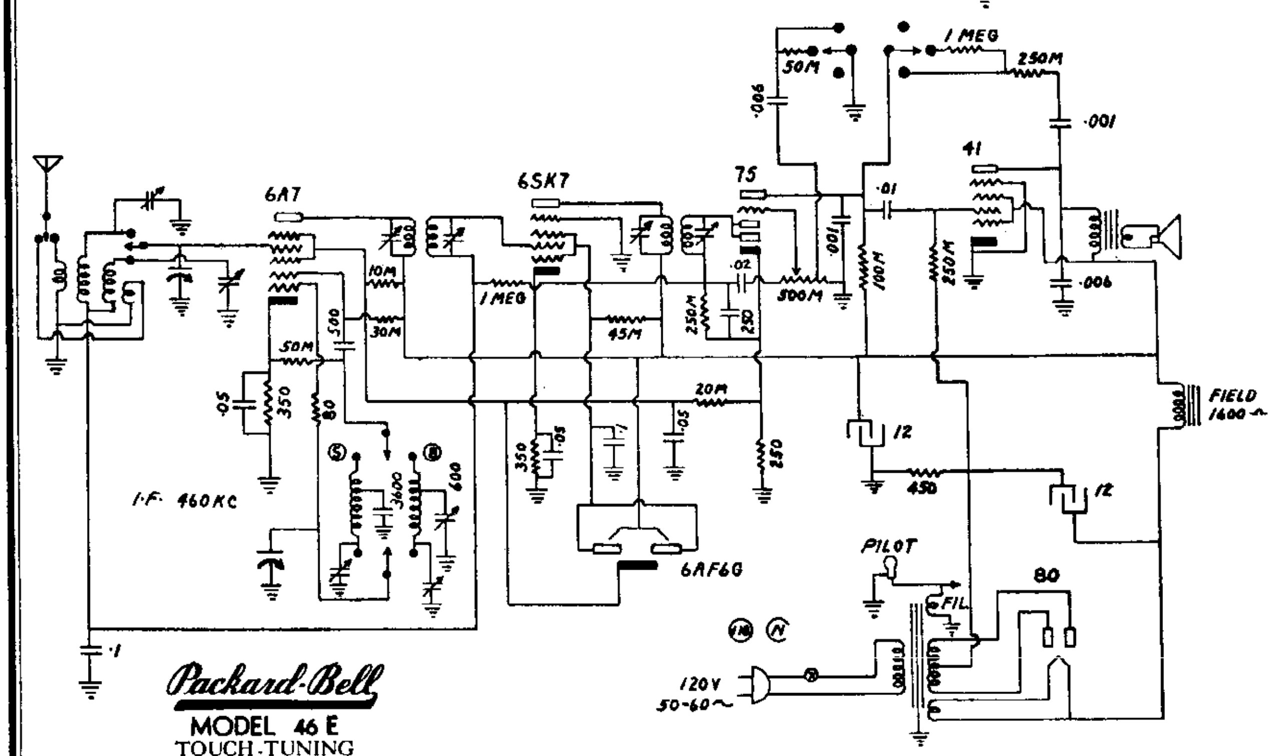




PACKARD BELL CO.



Packard-Bell
MODEL 5-MP
RADIO-PHONOGRAPH
TOUCH-TUNING

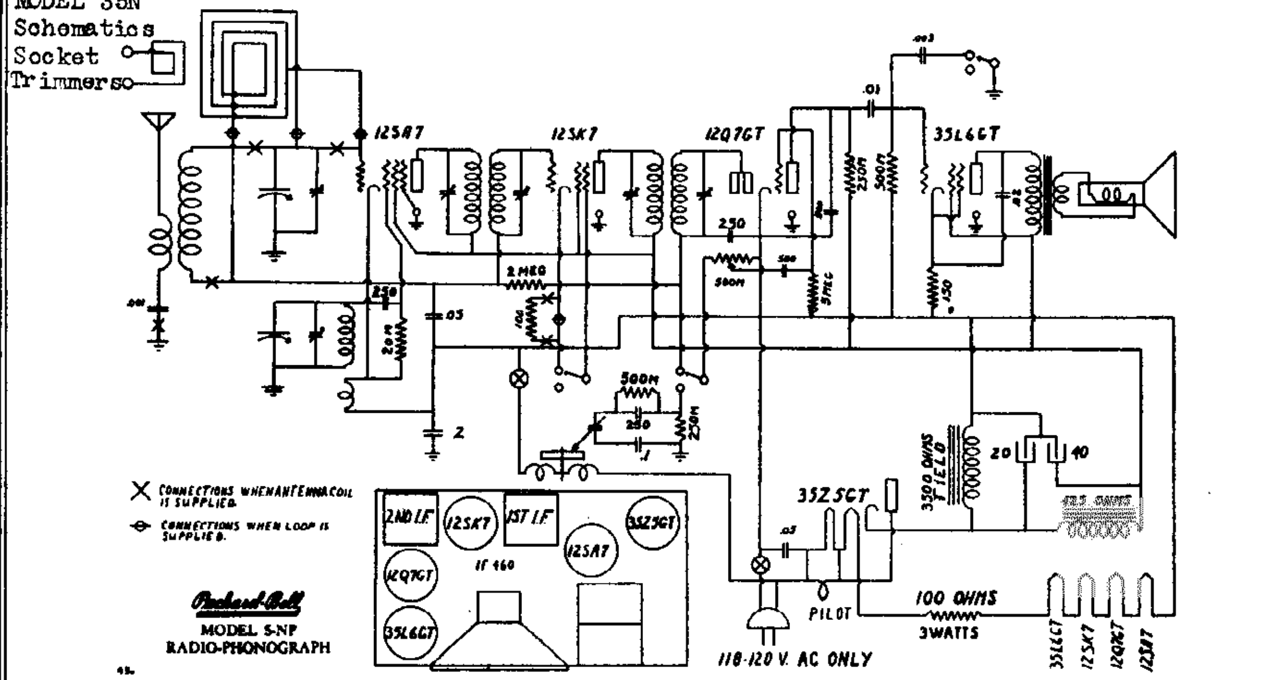


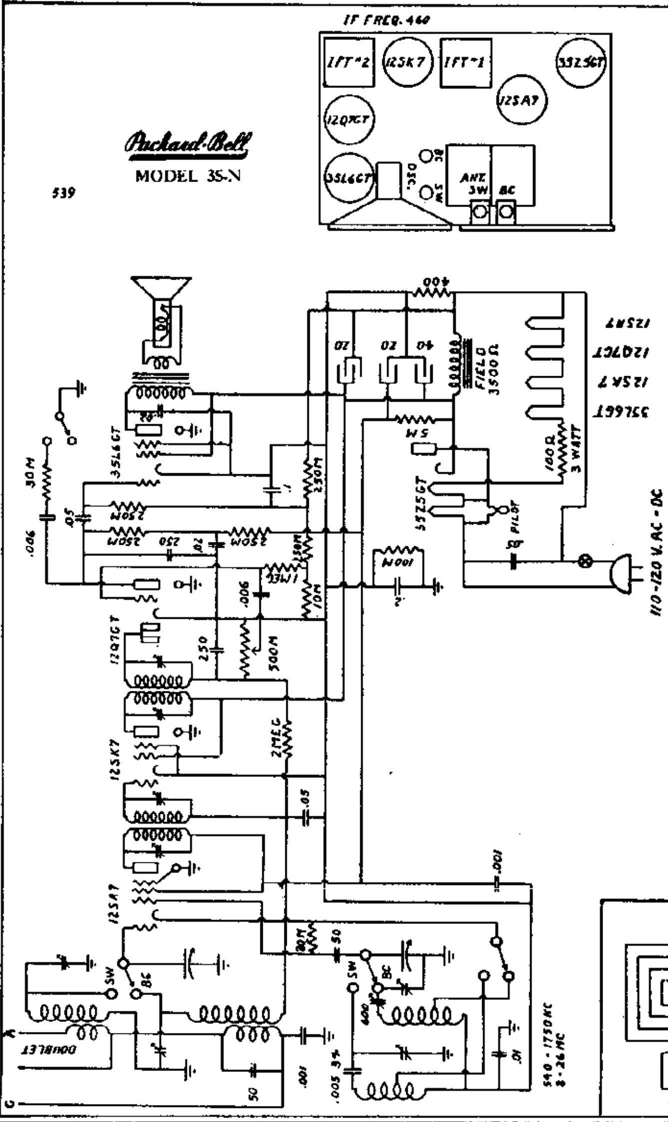
Packard-Bell
MODEL 46 E
TOUCH-TUNING

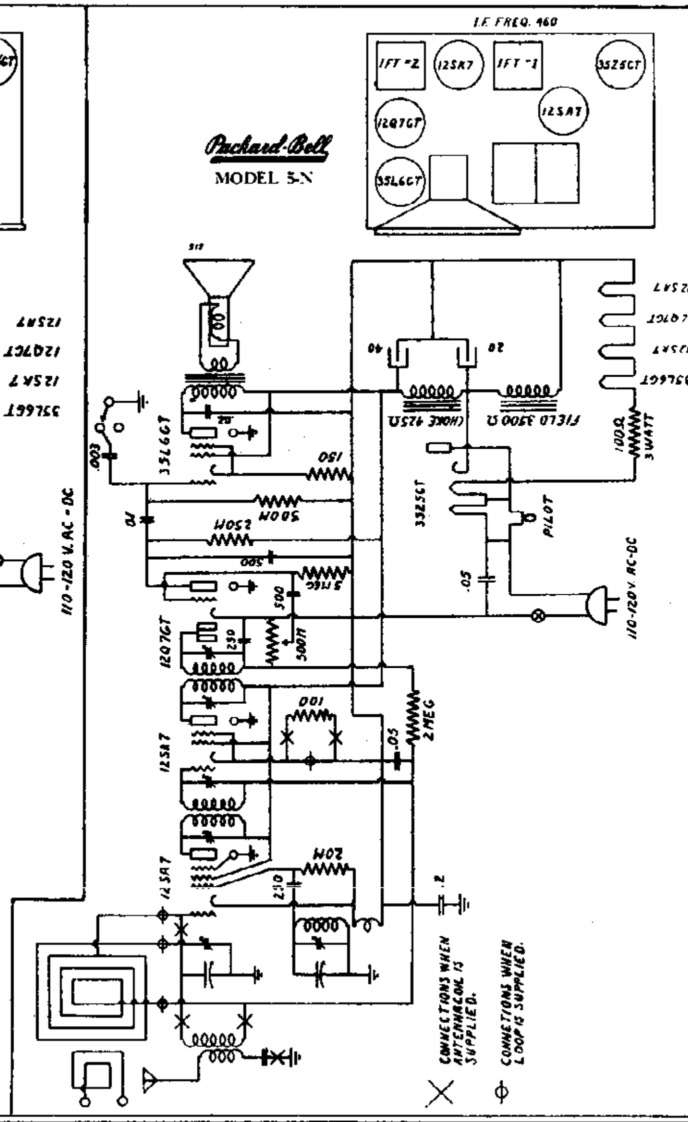
B 540-1750 KC
S 5.7-18.5 MC

MODEL 5N
MODEL 5NP
MODEL 35N
Schematics
Socket
Trimmers

PACKARD BELL CO.



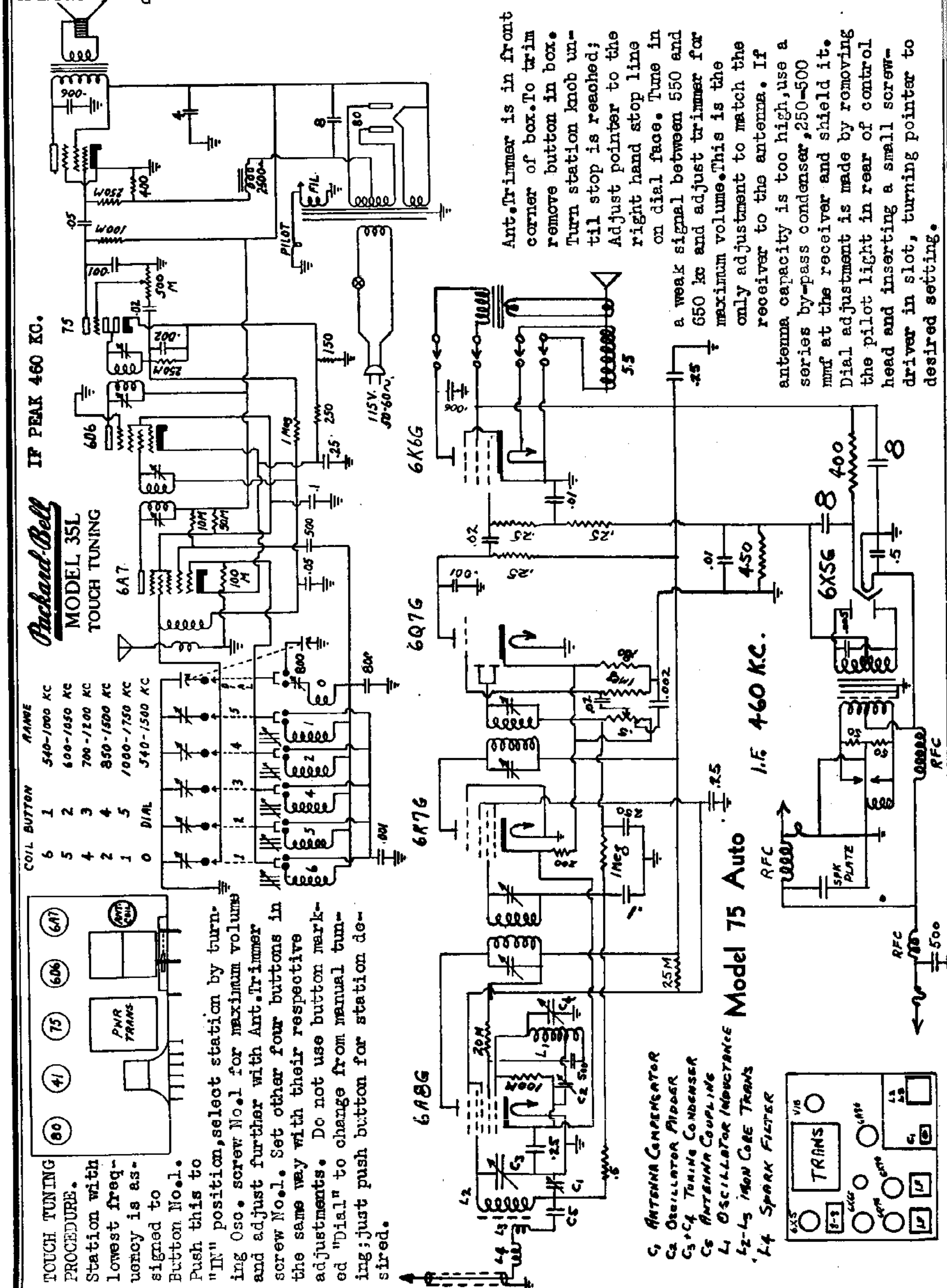




MODEL 75 Auto
Schematic, Socket
Trimmers, Alignment

PACKARD BELL CO.

MODEL 35L
Schematic, Socket
Tuner Data



COIL	BUTTON	RANGE
6	1	540-1000 KC
5	2	600-1050 KC
4	3	700-1200 KC
2	4	850-1500 KC
1	5	1000-1750 KC
0	DIAL	540-1500 KC

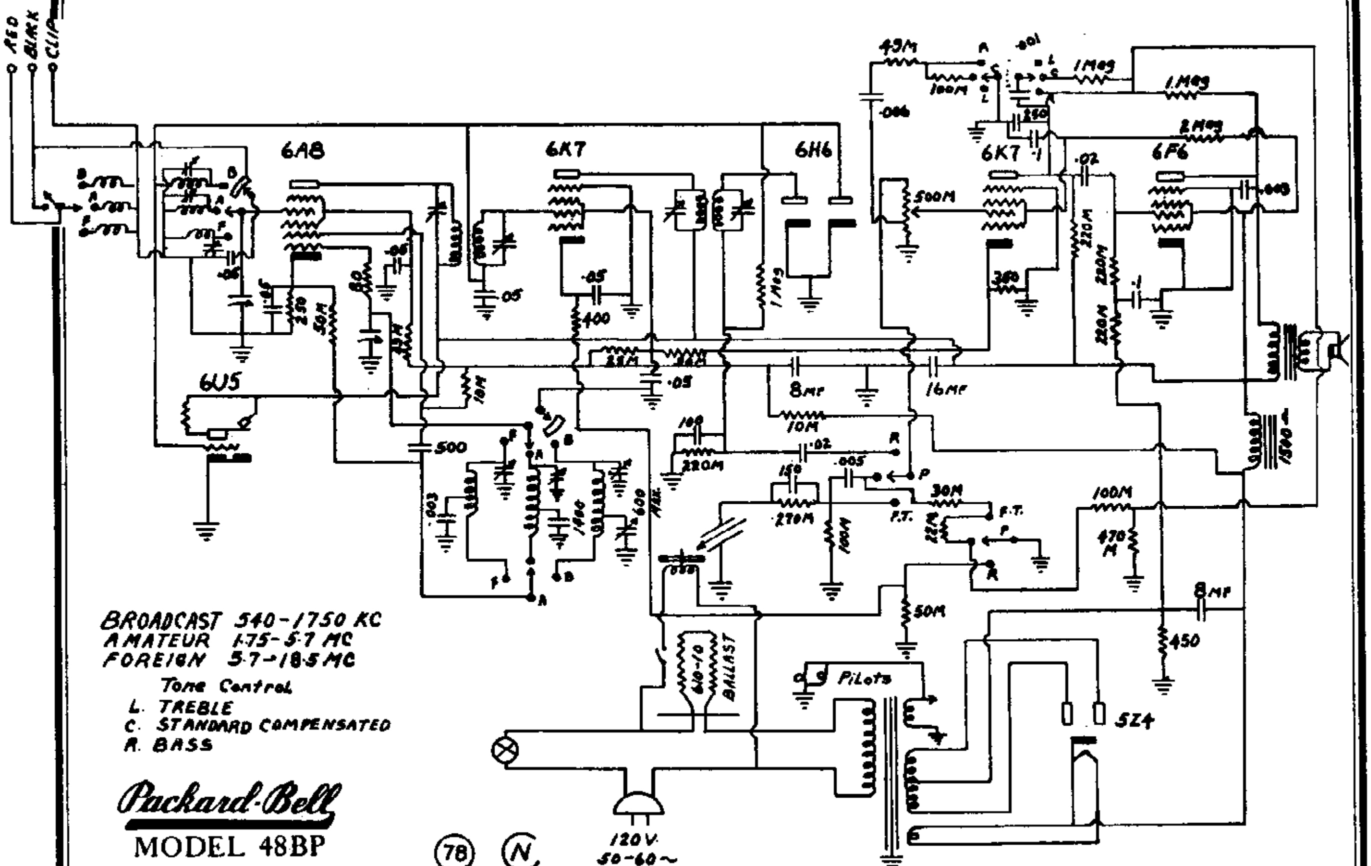
TOUCH TUNING PROCEDURE. Station with lowest frequency is assigned to Button No. 1. Push this to "IN" position, select station by turning Osc. screw No. 1 for maximum volume and adjust further with Ant. Trimmer screw No. 1. Set other four buttons in the same way with their respective adjustments. Do not use button marked "Dial" to change from manual tuning; just push button for station desired.

Ant. Trimmer is in front corner of box. To trim remove button in box. Turn station knob until stop is reached; Adjust pointer to the right hand stop line on dial face. Tune in a weak signal between 550 and 650 kc and adjust trimmer for maximum volume. This is the only adjustment to match the receiver to the antenna. If antenna capacity is too high, use a series by-pass condenser, 250-500 mmf at the receiver and shield it. Dial adjustment is made by removing the pilot light in rear of control head and inserting a small screwdriver in slot, turning pointer to desired setting.

C_1 Antenna Compensator
C_2 Oscillator Padder
C_3+C_4 Tuning Condenser
C_5 Antenna Coupling
L_1 Oscillator Inductance
L_2-L_3 Iron Core Trans
L_4 Spark Filter

MODEL 48BP
MODEL 160
Schematics

PACKARD BELL CO.

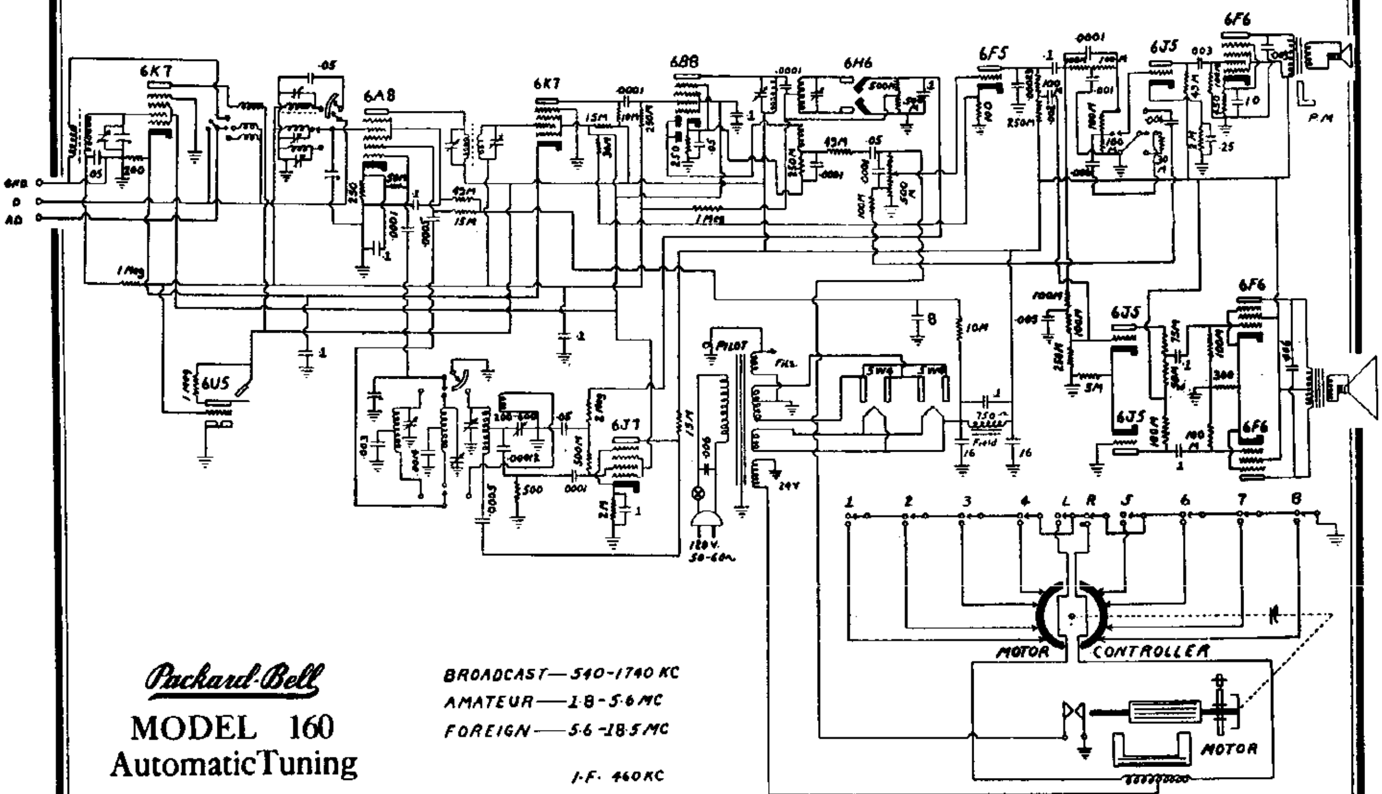


BROADCAST 540-1750 KC
AMATEUR 1.75-5.7 MC
FOREIGN 5.7-18.5 MC

Tone Control
L. TREBLE
C. STANDARD COMPENSATED
R. BASS

Packard-Bell
MODEL 48BP
RADIO-PHONOGRAPH

I.F. 460 KC.



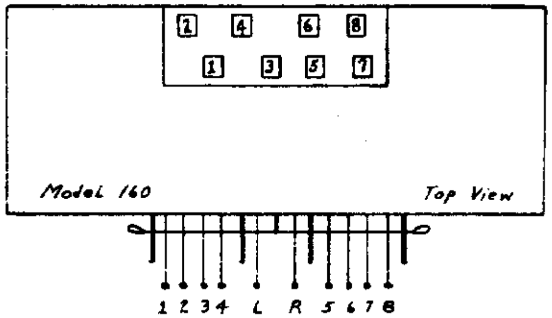
Packard-Bell
MODEL 160
Automatic Tuning

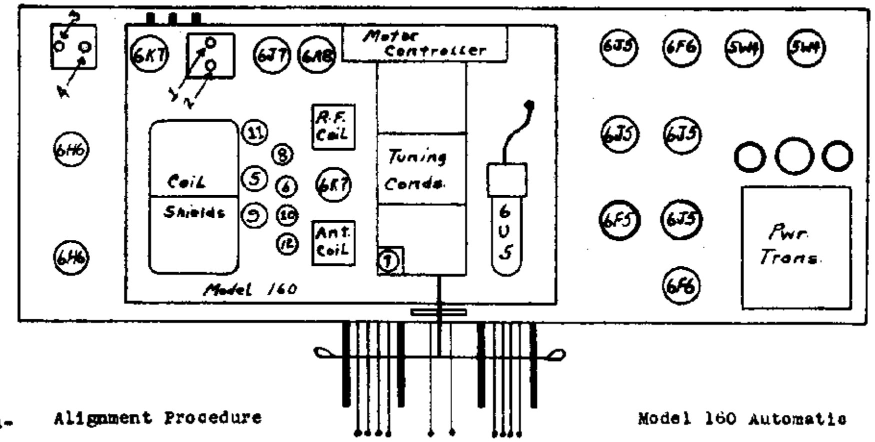
BROADCAST—540-1740 KC
AMATEUR—1.8-5.6 MC
FOREIGN—5.6-18.5 MC

I.F. 460 KC

MODEL 160
Socket, Trimmers
Tuner Data, Alignment

PACKARD BELL CO.





Model 160 Automatic

The automatic frequency control in the Model 160 Packard-Bell Radio is so adjusted that it does not interfere with the normal selectivity of the receiver. Any station that can be received without automatic frequency control can also be received with it. The only instances where A.F.C. will give preference to a more powerful station is where the stronger station will be heard in the background of the weaker one. From this it is obvious that an A.F.C. switch is unnecessary. This eliminates a control which would have been confusing to most people.

INSTRUCTION FOR SETTING MARKERS ON CONTROLLER. To begin with, in setting the motor controller (located at center-rear of chassis) one must first determine what stations are desired on the eight station keyboard. To do this examine the stationized dial and determine the location of stations related to each side of dial center. This done, it is then necessary to allot a sufficient number of sliders (station markers) corresponding to push-button switches on station keyboard of receiver panel below large dial.

Let us take for example a choice which would give us 5 stations between center and left hand side of dial, and 3 between center and right hand side of dial. We then consider push-button switches to correlate in numerical order with stations chosen as follows: KECA, KGFJ, KHKD, KMX, KFWB, KHJ, KMPC, and KFI, giving KECA No. 1 position, others following consecutively, completing with KFI as No. 8. Considering push-buttons on panel from left to right as reading from 1 to 8, a correct sequence will result for control sliders at rear of chassis. Control sliders are set up to correspond with buttons in correct numerical order, (that is, on rear slider rail you will find 4 buttons, and on front slider rail 4 buttons). Buttons or sliders on front are odd numbers, i.e., 1-3-5-7, and on rear rail are the even numbers, i.e., 2-4-6-8. Looking from rear the right hand slider corresponds to left front panel push button looking from the front.

OPERATION: Starting with KECA, push button No. 1 until it locks. We then reach back and push slider No. 1 back and forth until dial pointer comes to rest at KECA as marked on dial. Follow this procedure for all other stations.

The buttons marked R and L are used to tune in stations not set up on the keyboard. For example: If one is listening to KHJ and decides to change to KFOX then all that is necessary is to press the button L down until pointer turns to KFOX, then release the button and the pointer will stop. Or if one is listening to KHJ and wants to change to KEHE just press the button R down and hold until the pointer gets to KEHE, then release. In other words button R controls the motor to the right and button L to the left.

Alignment Procedure — Model 160 Automatic

Turn the dial (manually) to 1740 kc position (plates of tuning condenser completely unmeshed) and set the volume control at maximum. Turn the band switch to broadcast position. Short the cathode of 6H6 tube (now connected to 2 meg.resistor) to chassis so that the automatic frequency control action will be nullified during alignment. Connect the output lead of the signal generator to the control grid of the 6A8 tube through a .006 condenser and set dial of generator to 460 kc. Adjust I.F. trimmers 1-2-3 and 4 until maximum output is obtained, meanwhile maintaining as low a value of signal as will allow obtaining of accurate adjustment.

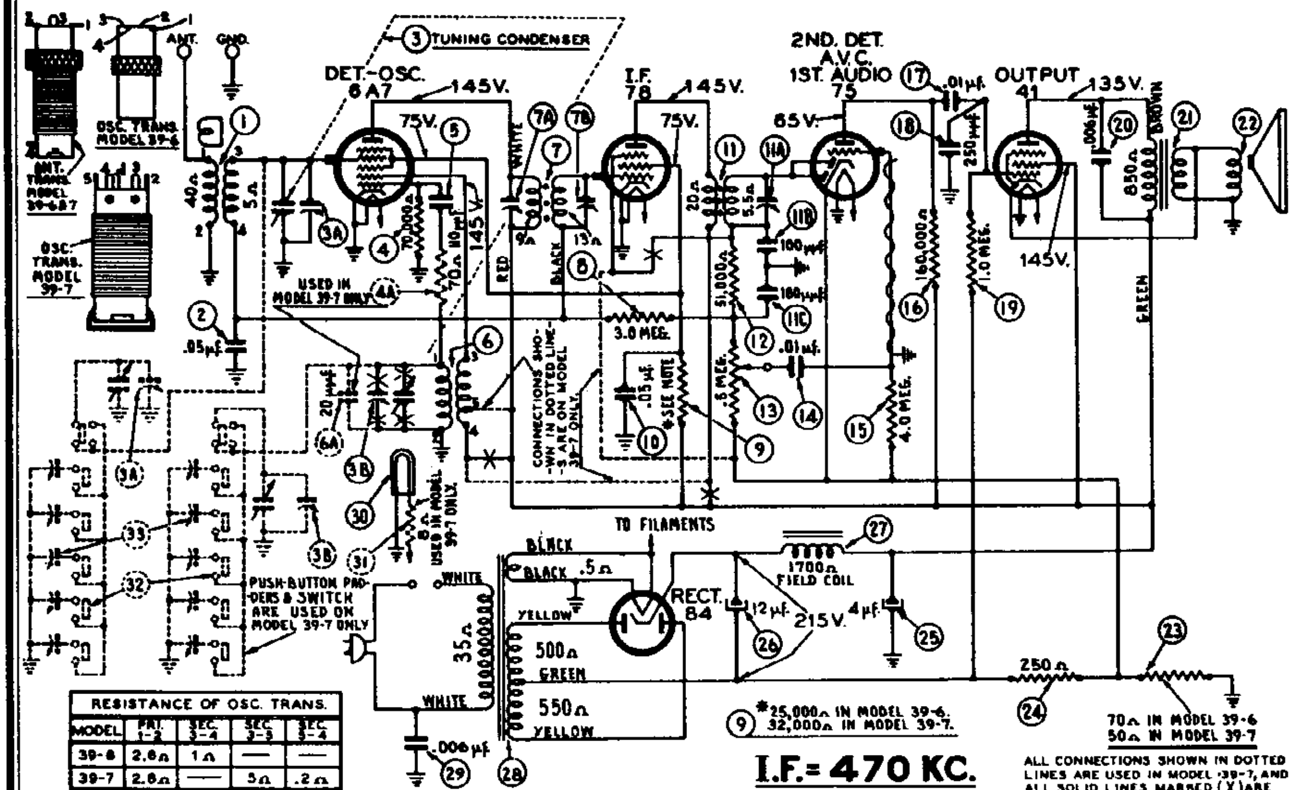
Now tune signal generator to 1740 kc and connect output lead through .006 condenser to antenna post of receiver. Turn dial pointer of receiver to horizontal position and adjust oscillator trimmer 5, antenna trimmer 7 and first detector trimmer 6 for maximum output. Next tune the generator to 600 kc. Turn dial pointer of radio to point of maximum signal and adjust trimmer 8 for increase in signal. At the same time rock the tuning condenser back and forth through resonance while adjusting the padder until maximum output is obtained. This should occur when the receiver dial is set at approximately 600 kc. Now tune back across the dial and if not exactly on kc at the high frequency end readjust trimmers 5-6 and 7 for correction. Do not attempt to play this receiver with only one speaker as there are two audio channels and the tone quality will be very poor unless both speakers are used.

Band Number 2. (1.8 to 5.6 Mc) Turn knob of waveband switch to Amateur position. Tune signal generator to 5.5 mc and set radio dial to 5.5 position. Adjust oscillator trimmer 9 and antenna trimmer 10 for maximum output. There is no R.F. stage on the Amateur and Foreign bands.

Band Number 3. (5.6 to 18.5Mc) Turn knob of waveband switch to Foreign position. Tune signal generator to 18 mc and connect output lead to antenna post through a 200 MMfd condenser and a 400 ohm resistor. Set volume control at maximum. Turn radio dial to 18 mc and adjust oscillator trimmer 11 and first detector trimmer 12 for maximum output. After completing alignment of all bands then disconnect 6H6 cathode jumper so that the AFC will be active again. The discriminator circuit is adjusted at the factory and should not be touched under any circumstances.

PHILCO RADIO & TELEV. CORP.

MODELS 39-6, 39-7, Code 121
Schematic, Voltage
Socket, Trimmers



RESISTANCE OF OSC. TRANS.				
MODEL	PRI. 1-2	SEC. 3-4	SEC. 3-5	SEC. 5-4
39-6	2.6Ω	1Ω	—	—
39-7	2.6Ω	—	.5Ω	.2Ω

SCHEMATIC DIAGRAM MODELS 39-6 & 39-7

Models 39-6, 39-7, Code 121

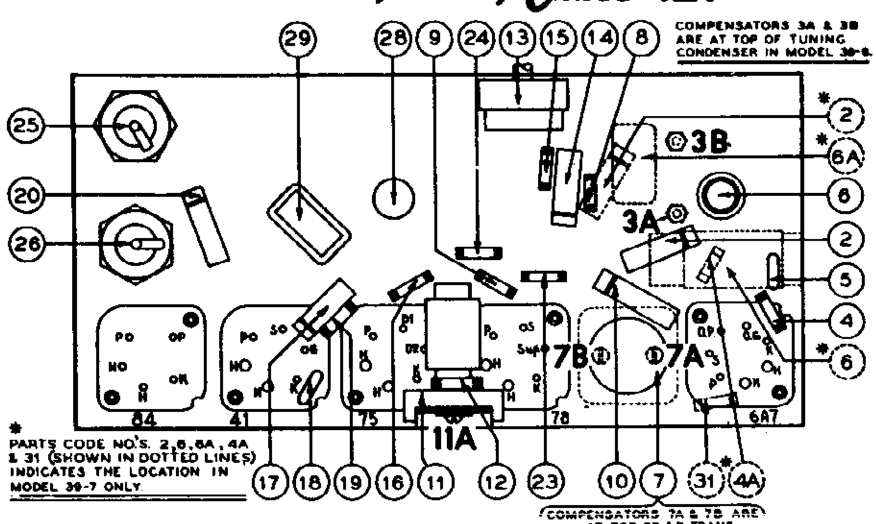


Fig. 2. Part Locations, Underside of Chassis

FREQUENCY RANGE: 530 to 1720 K.C.

INTERMEDIATE FREQUENCY: 470 K.C.

PHILCO TUBES USED: 6A7, First Detector Oscillator; 78, I.F. Amplifier; 75, Second Detector, A.V.C., First Audio; 41, Audio Output and 84, Rectifier.

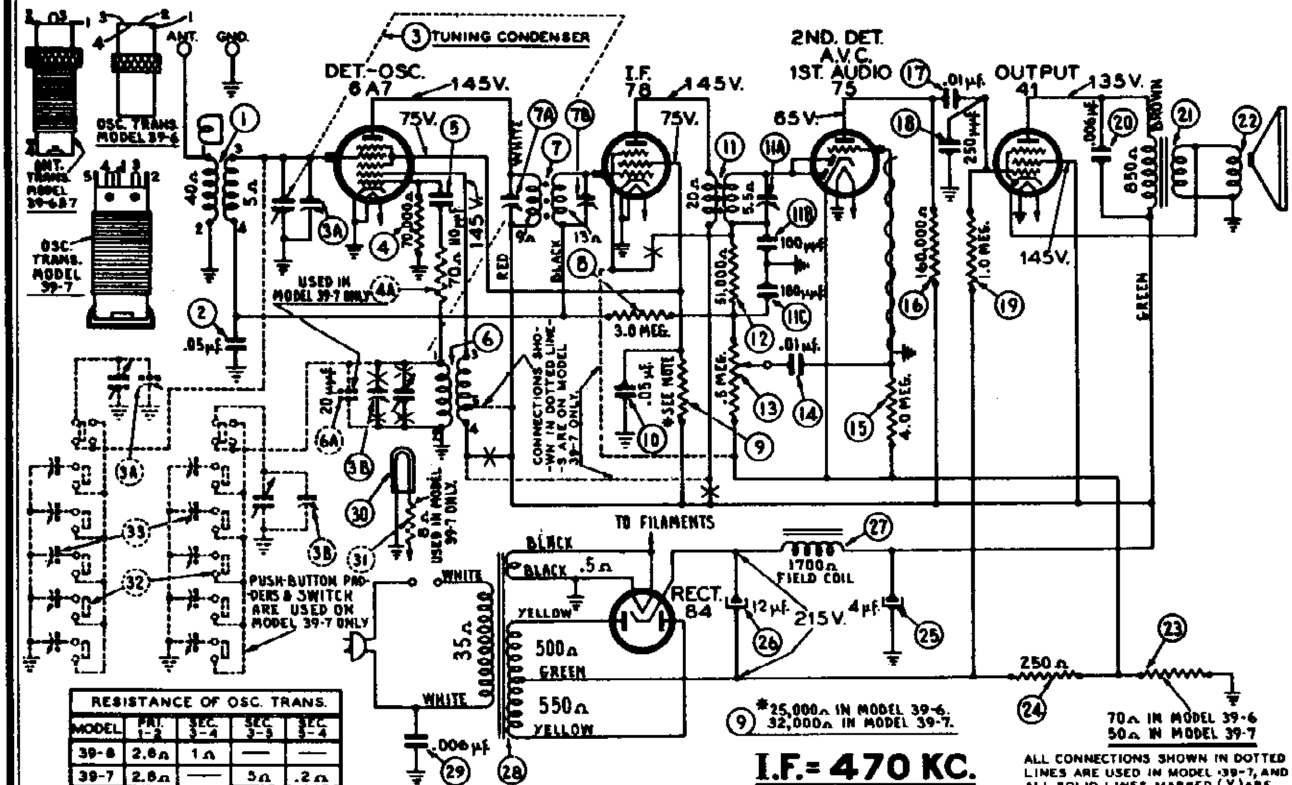
POWER SUPPLY: 115 V., 50 to 60 cycle A.C.
Power Transformers are available for operation on 115 V., 25 to 40 cycles A.C.

POWER CONSUMPTION: 30 watts.

AUDIO OUTPUT: One (1) watt.

MODELS 39-6, 39-7, Code 121 Schematic, Voltage Socket, Trimmers

PHILCO RADIO & TELEV. CORP.



RESISTANCE OF OSC. TRANS.

MODEL	PRI. 1-2	SEC. 3-4	SEC. 3-5	SEC. 3-4
39-6	2.6Ω	1Ω	—	—
39-7	2.6Ω	—	.5Ω	.2Ω

SCHEMATIC DIAGRAM MODELS 39-6 & 39-7

Models 39-6, 39-7, Code 121

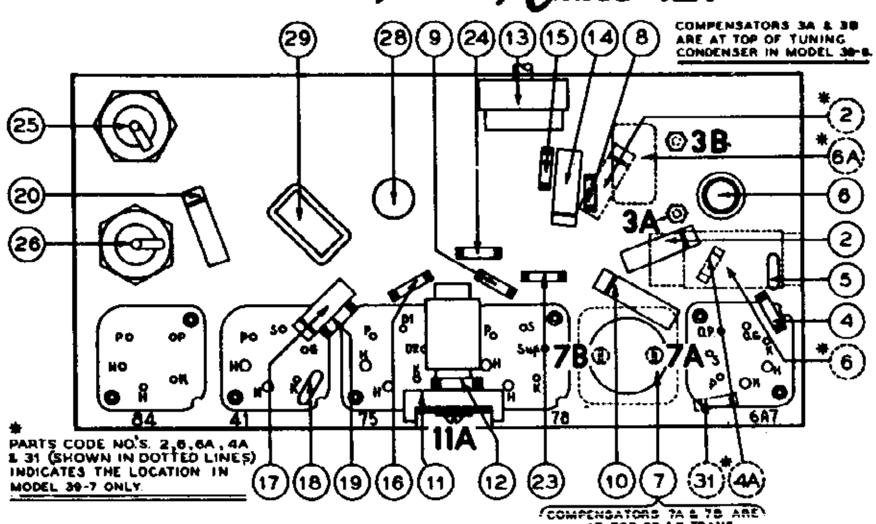


Fig. 2. Part Locations, Underside of Chassis

FREQUENCY RANGE: 530 to 1720 K.C.

INTERMEDIATE FREQUENCY: 470 K.C.

PHILCO TUBES USED: 6A7, First Detector Oscillator; 78, I.F. Amplifier; 75, Second Detector, A.V.C., First Audio; 41, Audio Output and 84, Rectifier.

POWER SUPPLY: 115 V., 50 to 60 cycle A.C.

Power Transformers are available for operation on 115 V., 25 to 40 cycles A.C.

POWER CONSUMPTION: 30 watts.

AUDIO OUTPUT: One (1) watt.

MODELS 39-6,39-7,Code 121
Alignment,Parts

PHILCO RADIO & TELEV. CORP.

Alignment of Compensators

EQUIPMENT REQUIRED:

(1) Signal Generator; Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K.C. is the correct instrument for this purpose.

(2) Output Meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended.

(3) Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and screen terminals of the type 41 tube and adjusted for the 0 to 30 V.A.C. scale. After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on Fig. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Schem. No.	Description	Part No.
4A*	Silver Mica Cond. (20 mfd.) (39-7)	30-1123
7	1st I.F. Trans. Assy. (39-6)	32-3120
	1st I.F. Trans. Assy. (39-7)	32-3121
8	Resistor (3.0 meg., ½ watt)	33-350339
9	Resistor (25,000 ohms, ½ watt) (39-6)	33-325339
	Resistor (32,000 ohms, ½ watt) (39-7)	33-332339
10	Tubular Cond. (.05 mfd.)	30-4444
11	2nd I.F. Trans. Assy.	32-2674
12	Resistor (51,000 ohms, ½ watt)	33-351339
13	Volume Control (.5 meg.)	33-5254
14	Tubular Cond. (.01 mfd.)	30-4479
15	Resistor (4.0 meg., ½ watt)	33-540339
16	Resistor (160,000 ohms, ½ watt)	33-416339
17	Tubular Cond. (.01 mfd.)	30-4169
17	Tubular Cond. (.01 mfd.) (39-7)	30-4572
18	Mica Cond. (250 mmfd.)	30-1032
19	Resistor (1.0 meg., ½ watt)	33-510339
20	Tubular Cond. (.006 mfd.)	30-4125
21	Output Trans. (Speaker 36-1461)	
22	Cone and Voice Coil Assy. (Speaker 36-1461)	36-4095
23	Resistor (70 ohms, ½ watt), Model 39-6	33-070339
	Resistor (50 ohms, ½ watt), Model 39-7	33-050339
24	Resistor (250 ohms, ½ watt)	33-125339
25	Electrolytic Cond. (4 mfd., 300 V.)	30-2327
26	Electrolytic Cond. (12 mfd., 300 V.)	30-2328
27	Field Coil (Replace Speaker 36-1461)	
28	Power Trans. (115 V., 50 to 60 cycles)	32-7979

Schem. No.	Description	Part No.
1	Ant. Trans. (39-6)	32-2583
1	Ant. Trans. (39-7)	32-3039
2	Tubular Cond. (.05 mfd.)	30-4519
3	Tuning Cond. (39-6)	31-2335
3	Tuning Cond. (39-7)	31-2338
4	Resistor (70,000 ohms, ½ watt)	33-370339
4A*	Resistor (70 ohms, ½ watt) (39-7)	33-070339
5	Mica Cond. (110 mfd.)	30-1031
6	Oscillator Trans. (39-6)	32-3021
	Oscillator Trans. (39-7)	32-2122
29	Condenser (.006, moulded)	30-4428
30	Pilot Lamp	34-2064
31*	Pilot Lamp Resistor (8 ohms, ½ watt)	33-980331
32*	Push-Button Switch	42-1477
33*	Padder Strip Assy.	31-6290

**Indicates parts used on Model 39-7 only.*

TYPE OF CIRCUIT: Models 39-6, code 121; and 39-7, code 121, employ a five-tube A.C. operated superheterodyne circuit, covering standard broadcast frequencies; Automatic Volume Control, and Pentode Audio Output. In general the two models are similar but differ in their tuning mechanisms and cabinets.

Model 39-6 is manually tuned and is assembled in cabinet type C.

Model 39-7, code 121, in addition to being manually tuned, is equipped with six Electric Automatic Push-Buttons. Five push-buttons are used for selecting any one of five stations in the standard broadcast range, and one push-button for changing to manual tuning. The procedure for adjusting the push-buttons for reception of stations will be found in the instructions supplied with each set.

Operation in Order	SIGNAL GENERATOR			RECEIVER			Special Instructions
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	6A7	.1 mf.	470 K.C.	580 K.C.	Vol. Cont. Max.	11A, 7B, 7A	Adjust for max. output
2	Ant. Lead	100 mf.	1550 K.C.	1550 K.C.	Vol. Cont. Max.	3B, 3A	Adjust for max. output Note A, B

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: With the tuning condenser in "maximum capacity" position (plates fully meshed), set the dial pointer between the two horizontal lines at the low frequency end of the scale (550 K.C.).

Schematic, Chassis
Parts List

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS
Model 39-17; Codes 121 & 122

Schem. No.	Description	Part No.
1	Antenna Transformer	32-3039
2	Condenser (.05 mf. tubular)	30-4519
3	Tuning Condenser Assembly	31-2265
4	Resistor (51,000 ohms, ½ watt)	33-351339
5	Condenser (110 mmf. mica)	30-1031
6	Condenser (25 mmf., silver plated mica)	30-1112
7	Oscillator Transformer	32-3040
8	Resistor (3.0 megohm)	33-530339
9	Condenser (.03 mf. tubular)	30-4449
10	Resistor (40,000 ohms, ½ watt)	33-340339
11	1st I. F. Transformer Assembly	32-3075
12	2nd I. F. Transformer Assembly	32-2944
13	Resistor (51,000 ohms, ½ watt)	33-351339
14	Volume Control and On-Off Switch	33-5276
15	Condenser (.01 mf. tubular)	30-4479
16	Condenser (mica), 250 mmf.	30-1032
17	Condenser (.01 mf. tubular)	30-4572
18	Resistor (16,000 ohms, ½ watt)	33-316339
19	Resistor (1.0 megohm, ½ watt)	33-510339
20	Resistor (4.0 megohm, ½ watt)	33-540339
21	Condenser (.01 mf. tubular)	30-4572
22	Output Transformer	32-7980
23	Cone and Voice Coil Assembly for Speaker (Part No. 36-1426-1)	36-4083
	(Part No. 36-1426-3)	36-4085
	Cone and Voice Coil Assembly for Speaker (Part No. 36-1440)	36-4086
24	Resistor (250 ohms, wire wound)	33-125431
25	Resistor (70 ohms, ½ watt)	33-070339
26	†Field Coil for Speaker (Pt. No. 36-1426)	
	†Field Coil for Speaker (Pt. No. 36-1440)	
27	Condenser (12 mf. electrolytic)	30-2319
28	Condenser (4 mf. electrolytic)	30-2236
29	Condenser (.03 mf. tubular)	30-4449
30	Power Transformer (115 volts, 50-60 cycles)	32-7974
31	Condenser (.01 mf.—.01 mf., bakelite)	3903DG
32	Pilot Lamp	34-2064
33	Pilot Lamp	34-2064

MISCELLANEOUS PARTS

Description	Part No.
Automatic Tuning Unit (complete)	31-2282
Bezel Assembly (dial)	40-6364
Bezel Gasket (dial)	27-9174
Bezel (push buttons)	28-5929
Bezel Gasket (push buttons)	27-9218
Bezel Clamp (dial)	28-5153
Cable and Plug (power)	L-2778
Dial and Frame Assembly	31-2283
Dial Tuning Drum Assembly	31-2281
Dial Tuning Cord Assembly	31-2275
Dial Tuning Spring (cord)	28-8919
Clip (Mtg. R. F. Coils)	28-5002
Clip (Mtg. R. F. Coils)	28-5003
Escutcheon Plate (extension shafts, F cabinet)	56-1051
Escutcheon Pin	W-950
Knob (Tuning)	27-4750
Knob (Volume)	27-4753
Pilot Lamp Socket Assembly	38-9612
Pointer (dial)	28-5934
Push-Buttons	27-4749
Shaft Extension (Volume)	38-9640
Shaft Extension (Tuning)	28-6928
Sleeve-long Tuning Shaft Extension (F Cabinet)	28-6935
Sleeve-short Tuning Shaft (T and F Cabinet)	28-6887
Spring-retaining Volume Shaft	28-8915
Socket (6 prong)	27-6036
Socket (7 prong)	27-6107
Socket (5 prong)	27-6035
Speaker (F Cabinet)	36-1440
*Speaker (T Cabinet) optional	36-1426-1
	36-1426-3
Tab Kit	40-6391

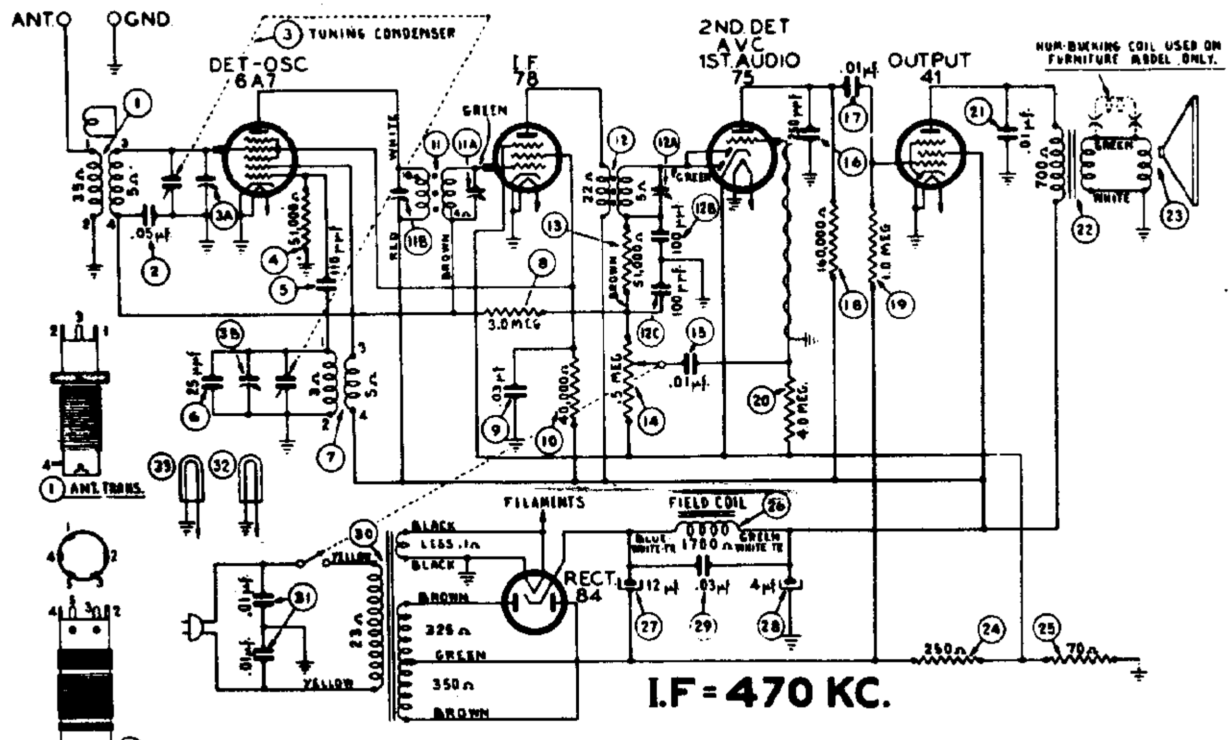


Fig. 3. Schematic Diagram—Model 39-17, Code 121-122

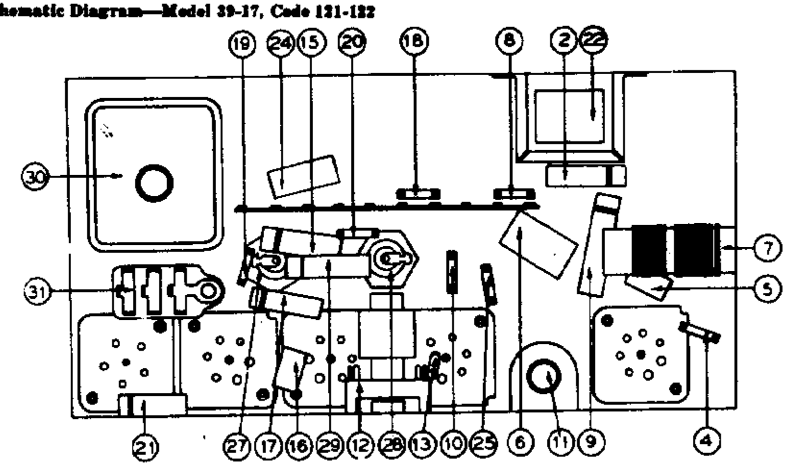


Fig. 4. Part Locations. Underside of Chassis

† Replace Speaker.
* When ordering Speaker or Cone assembly specify which of the small numbers (-1 or -3) following the part number is required.

June 1938

MODEL 39-17
Codes 121,122
Socket,Trimmers,
Alignment,Voltage

PHILCO RADIO & TELEV. CORP.

SPECIFICATIONS

TYPE OF CIRCUIT: A. C. operated; superheterodyne circuit, covering standard broadcast band (540 K. C. to 1720 K. C.); Automatic Volume Control; and pentode output.

Codes 121 and 122 chassis of this model are similar with the exception of Speaker and Cabinet.

The receiver is designed to operate from a "Philco Utility Aerial," part No. 45-2450. This aerial system should be used to obtain maximum performance from the receiver.

POWER SUPPLY: Voltage—115 volts. Frequency—50-60 cycles. Power consumption—40 watts.

INTERMEDIATE FREQUENCY: 470 K.C.

TUNING RANGE: 540 to 1720 K.C.

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED: Five tubes: 1-6A7, 1st detector and oscillator; 1-78, I. F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output; and 1-84, Rectifier.

TUNING MECHANISM: Pulley and cable drive for Manual tuning. Push-Button for Automatic Tuning. The procedure for adjusting and operating the Automatic Tuning Push-Buttons will be found in the instructions supplied with each set.

CABINETS: Code 121 chassis in type "T" cabinet.
Code 122 chassis in type "F" cabinet.

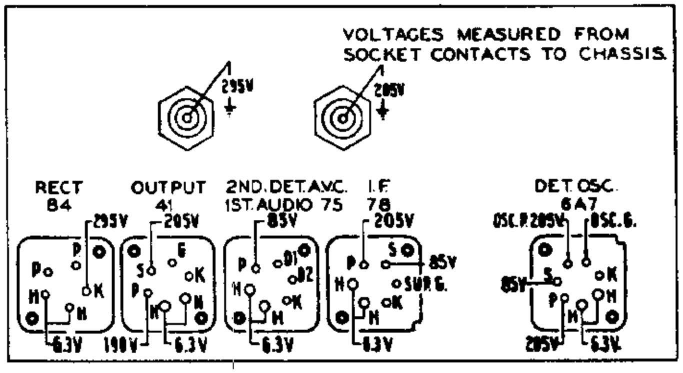


Fig. 1. Socket Voltage—Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

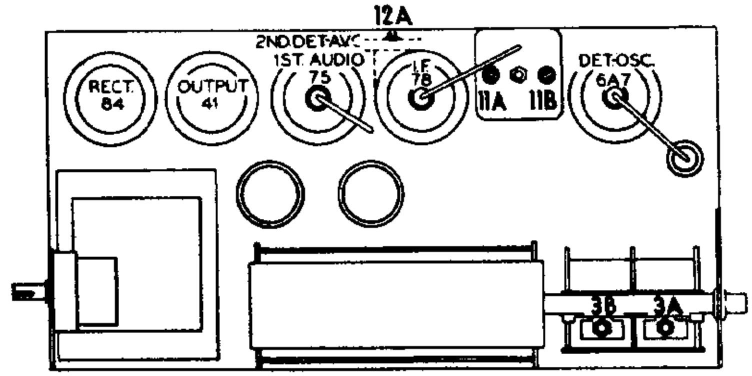


Fig. 2. Locations of Compensators

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator: Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose. (2) Output meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended (3) Philco Fiber Handle Screw Driver, part No. 27-7059, and Fiber Wrench, part No. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube Set the meter to use the 0-30 volt scale.

Operations In Order	Signal Generator			Receiver			Special Instructions
	Output Connections To Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	
1	6A7 Grid	.1 mf.	470 K. C.	580 K. C.	Vol. Cont. (Max.)	(12A) (11A) (11B)	
2	Ant. Ter.	100 mmf.	1550 K. C.	1550 K. C.	Vol. Cont. (Max.)	(3B) (3A)	See Note B

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the push button unit disconnected from the gang, the pointer is to be set on the extreme left edge of the index line (low frequency end of the scale) with the gang closed. The gang is then opened until the pointer is at the right edge of the index line and, with the push button shaft at its closed stop, the push button coupling is tightened on the gang shaft.

MODEL 39-18
Codes 121,122
Schematic,Chassis
Parts List

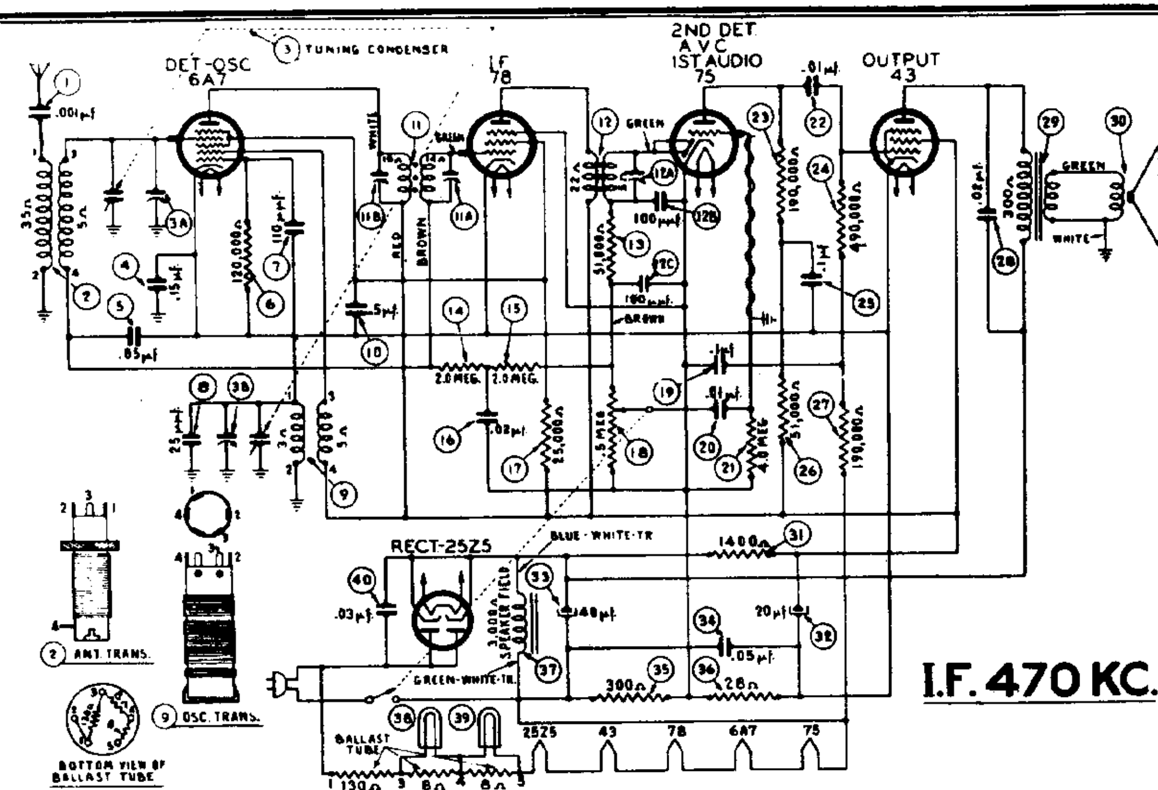
PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS
Model 39-18, Codes 121 & 122

Schem. No.	Description	Part No.
1	Condenser (.001 mfd. tubular)	30-4453
2	Antenna Transformer	32-3039
3	Tuning Condenser Assembly	31-2265
4	Condenser (.15 mfd. tubular)	30-4505
5	Condenser (.05 mfd. tubular)	30-4519
6	Resistor (120,000 ohms, ½ watt)	33-412339
7	Condenser (110 mmf., mica)	30-1031
8	Condenser (25 mmf., silver plated mica)	30-1112
9	Oscillator Transformer	32-3040
10	Condenser (.5 mf., tubular)	30-4551
11	1st I. F. Transformer Assembly	32-3075
12	2nd I. F. Transformer Assembly	32-2944
13	Resistor (51,000 ohms, ½ watt)	33-351339
14	Resistor (2.0 megohms, ½ watt)	33-520339
15	Resistor (2.0 megohms, ½ watt)	33-520339
16	Condenser (.02 mf., tubular)	30-4516
17	Resistor (25,000 ohms, ½ watt)	33-325339
18	Volume Control and On-Off Switch	33-5276
19	Condenser (.1 mf., tubular)	30-4499
20	Condenser (.01 mf., tubular)	30-4572
21	Resistor (4.0 megohms, ½ watt)	33-540339
22	Condenser (.01 mf., tubular)	30-4572
23	Resistor (190,000 ohms, ½ watt)	33-419339
24	Resistor (490,000 ohms, ½ watt)	33-449339
25	Condenser (.1 mf., tubular)	30-4499
26	Resistor (51,000 ohms, ½ watt)	33-351339
27	Resistor (190,000 ohms, ½ watt)	33-419339
28	Condenser (.02 mf., tubular)	30-4215
29	Output Transformer	32-7986
30	Cone and Voice Coil Assembly (Speaker Part No. 36-1444-1)	36-4083
	(Speaker Part No. 36-1444-3)	36-4085
	Cone and Voice Coil Assembly (Speaker Part No. 36-1445)	36-4086
31	Resistor (1400 ohms, ½ watt)	33-214339
32	Condenser (20 mf., electrolytic)	30-2245
33	Condenser (40 mf., electrolytic)	30-2332
34	Condenser (.05 mf., tubular)	30-4444
35	Resistor (300 ohms, wire wound)	33-130431
36	Resistor (28 ohms, ½ watt)	33-028339
37	†Field Coil for Speaker (Pt. No. 36-1444)	
	†Field Coil for Speaker (Pt. No. 36-1445)	
38	Pilot Lamp	34-2068
39	Pilot Lamp	34-2068
40	Condenser (.03 mf., tubular)	30-4449

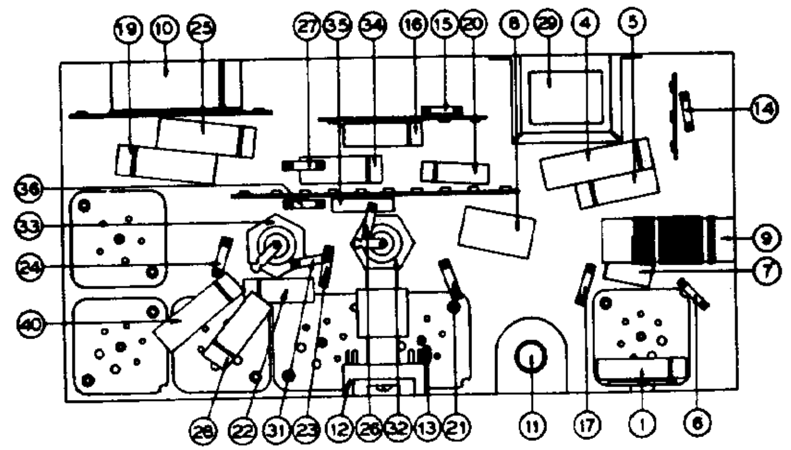
* When ordering Speaker or Cone assembly specify which of the small numbers (-1 or -3) following the part number is required.
† Replace Speaker.

Description	Part No.
Dial Tuning Spring (cord)	28-8919
Clip (Mtg. R. F. Coils)	28-5002
Clip (Mtg. R. F. Coils)	28-5003
Escutcheon Plate (extension shafts, F Cabinet)	56-1051
Escutcheon Pin	W-950
Felt (Dial Lamps)	27-9222
Knob (Tuning)	27-4750
Knob (Volume)	27-4753
Mtg. Rubber (Tuning Condenser)	27-4596
Pilot Lamp Socket Assembly	38-9649
Pointer	28-5934
Push-Button	27-4749
Screw (Tuning Knob)	28-6882
Shaft Extension (Volume, F Cabinet)	38-9640
Shaft Extension (Tuning, F Cabinet)	28-6928
Sleeve-long Tuning Shaft Extension (F Cabinet)	28-6935
Sleeve-short Tuning Shaft (T and F Cabinet)	28-6887
Spring-retaining Volume Ext. Shaft	28-8915
*Speaker (T Cabinet, code 121)	36-1444-3
optional	36-1444-1
Speaker (F Cabinet)	36-1445
Socket (5 prong)	27-6035
Socket (6 prong)	27-6036
Socket (7 prong)	27-6107
Tab Kit (Stations)	40-6391



I.F. 470 KC.

Fig. 3. Schematic Diagram, Model 39-18, Code 121-122



June 1938

Fig. 4. Part Locations, Underside of Chassis

MODEL 39-18
Codes 121, 122
Socket, Trimmers

Alignment, Voltage

PHILCO RADIO & TELEV. CORP.
SPECIFICATIONS

TYPE OF CIRCUIT: A. C. - D. C. operated; superhetrodyne circuit, covering standard broadcast (540 K. C. to 1720 K. C.) frequency; Automatic Volume Control; and pentode output.

Codes 121 and 122 chassis of this model are similar with the exception of Speaker and Cabinet.

The receiver is designed to operate from a "Philco Utility Aerial," part No. 45-2450. This aerial system should be used to obtain maximum performance from the receiver.

POWER SUPPLY: Voltage—115 volts A. C. or D. C. Power consumption—55 watts.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGE: 540 to 1720 K. C.

PHILCO TUBES USED: 1—6A7, 1st detector and oscillator; 1—78, I. F.; 1—75, 2nd detector, Automatic Volume Control, and 1st audio; 1—43, Output; 1—25Z5, Rectifier; and 1—BKV51DJ, ballast tube.

TUNING MECHANISM: Pulley and cable drive for Manual tuning. Push-Button for Automatic Tuning. The procedure for adjusting and operating the Automatic Tuning Push-Buttons will be found in the instructions supplied with each set.

CABINETS: Code 121 chassis in type "T" cabinet.
Code 122 chassis in type "F" cabinet.

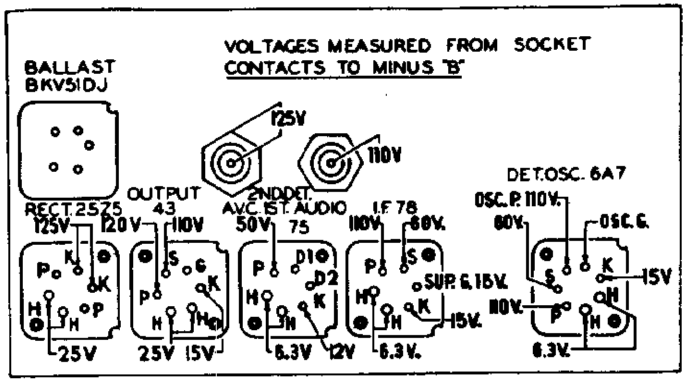


Fig. 1. Socket Voltage—Underside of Chassis View
The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

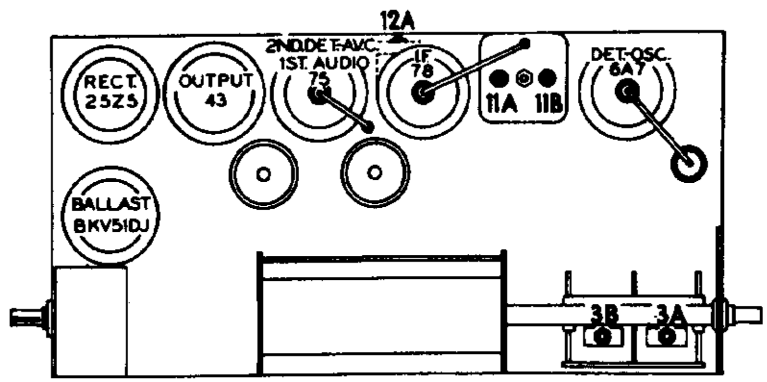


Fig. 2. Locations of Compensators

Alignment of Compensators

EQUIPMENT REQUIRED:

(1) Signal Generator; Philco Model 077 Signal Generator, which has a fundamental frequency range from 115 to 36,000 KC., is the correct instrument for this purpose.

(2) Output meter; Philco Model 027 Circuit Tester incorporates a sensitive output meter and is recommended.

(3) Philco Fiber Handle Screw Driver, part No. 27-7059 and Fiber Wrench, part No. 2164.

(4) Philco Set Transformer, part No. 32-2763.

OUTPUT METER:
The Philco 027 Output Meter is connected to the plate and cathode terminals of the Type 43 tube. Set the meter to use the 0-30 volt scale.

Operations in Order	Signal Generator			Receiver			Special Instructions
	Output Connections to Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	6A7 Grid	.1 mf.	470 KC	580 KC	Vol. Cont. Max.	(12A) (11A) (11B)	See Note B
2	Ant. Ter.	100 mmf.	1550 KC	1550 KC	Vol. Cont. Max.	(3B) (3A)	See Note C See Note D

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator. Connect the other end of the output lead to terminal No. 1 on the Set Transformer, part No. 32-2763, and the cable ground to terminal No. 2. Nos. 3 and 4 terminals of Set Transformer are then connected to the chassis and 6A7 grid respectively of the receiver with short pieces of wire. Insert the 0.1 mf. in series with the No. 4 lead which connects to the grid.

NOTE C—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the push button unit disconnected from the gang, the pointer is to be set on the extreme left edge of the index line (low frequency end of the scale) with the gang closed. The gang is then opened until the pointer is at the right edge of the index line and, with the push-button shaft at its closed stop, the push-button coupling is tightened on the gang shaft.

NOTE D—Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator. Connect the other end of the output lead to terminal No. 1 on the Set Transformer, part No. 32-2763, and the cable ground to terminal No. 2. Nos. 3 and 4 terminals of Set Transformer are then connected to the chassis and antenna lead respectively of the receiver with short pieces of wire. Insert the 100 mmf. in series with the No. 4 lead which connects to the antenna lead.

MODEL 39-19
Codes 121,122
Schematic, Chassis
Parts List

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS
Model 39-19, Codes 121 & 122

Schem. No.	Description	Part No.
1	Antenna Transformer (Range 2)	32-2822
2	Antenna Transformer (Range 1)	32-2821
3	Condenser (.05 mf. tubular)	30-4519
4	Tuning Condenser Assembly	31-2273
5	Resistor (51,000 ohms, ½ watt)	33-351339
6	Oscillator Transformer (Ranges 1 and 2)	32-3036
7	Resistor (20 ohms, ½ watt)	33-020339
8	Compensator (two sections)	31-6257
9	Condenser (370 mmf., silver plated mica)	30-1110
10	Condenser (3500 mmf., mica)	30-1094
11	Condenser (250 mmf., mica)	30-1032
12	Resistor (5000 ohms, ½ watt)	33-250339
13	1st I. F. Transformer Assembly	32-3075
14	2nd I. F. Transformer Assembly	32-2944
15	Resistor (51,000 ohms, ½ watt)	33-351339
16	Condenser (.03 mf. tubular)	30-4449
17	Resistor (32,000 ohms, ½ watt)	33-332339
18	Resistor (10,000 ohms, 1 watt)	33-310439
19	Resistor (1.0 meg., 3 watts)	33-510339
20	Volume Control and On-Off Switch	33-5276
21	Resistor (1.0 meg., ½ watt)	33-510339
22	Condenser (110 mmf., mica)	30-1031
23	Condenser (250 mmf., mica)	30-1032
24	Condenser (.01 mf. tubular)	30-4572
25	Resistor (99,000 ohms, ½ watt)	33-399339
26	Resistor (490,000 ohms, ½ watt)	33-449339
27	Resistor (490,000 ohms, ½ watt)	33-449339
28	Condenser (.1 mf., tubular)	30-4499
29	Condenser (.01 mf., tubular)	30-4479
30	Resistor (4.0 meg., ½ watt)	33-540339
31	Condenser (8 mf.-4 mf., electrolytic)	30-2323
32	Condenser (.01 mf., tubular)	30-4572
33	Output Transformer	32-7980
34	Cone and Voice Coil Assembly (Speaker Part No. 36-1426-1)	36-4083
	Part No. 36-1426-3	36-4085
	Cone and Voice Coil Assembly (Speaker Part No. 36-1449)	36-4086
35	†Field Coil for Speaker (Part No. 36-1426)	
	†Field Coil for Speaker (Part No. 36-1449)	
36	Condenser (8 mf. electrolytic)	30-2319
37	Resistor (250 ohms, wire wound)	33-125431
38	Resistor (70 ohms, ½ watt)	33-070339
39	Power Transformer, 115 v., 50-60 cycles	32-7974
40	Condenser (.01 mf.-.01 mf., bakelite)	3903-DG
41	Pilot Lamp	34-2064
42	Pilot Lamp	34-2064
43	Wave Switch	42-1449

† Replace Speaker.

Description	Part No.
Automatic Tuning Unit (complete)	31-2282
Bezel Assembly (dial)	40-6364
Bezel Gasket (dial)	27-9174
Cable and Plug (power)	L 2778
Cable Speaker (F Cabinet)	41-3431
Dial and Frame Assembly	31-2298
Dial Tuning Drum Assembly	31-2281
Dial Tuning Cord Assembly	31-2275
Dial Tuning Spring (cord)	28-8919
Clip (mtg. R. F. coils)	28-5002
Clip (mtg. R. F. coils)	28-5003
Escutcheon Plate (extension shafts, F Cabinet)	56-1051
Escutcheon Pins	W-950
Knob (Tuning)	27-4750
Knob (Volume)	27-4753
Knob (Wave Switch)	27-4754
Pilot Lamp Socket Assembly	38-9612
Pointer (Dial)	28-5934
Push-Button	27-4749
Screw Tuning Knob	28-6882
Shaft Extension (Volume and Wave Switch)	38-9640
Shaft Extension (Tuning)	28-6928
Sleeve Long Tuning Shaft Extension (F Cabinet)	28-6935
Sleeve Short Tuning Shaft (T and F Cabinet)	28-6887
*Speaker (T Cabinet—code 121)	36-1426-3
optional	36-1426-1
Speaker (F Cabinet—code 122)	36-1449
Spring Retaining Volume Shaft	28-8915

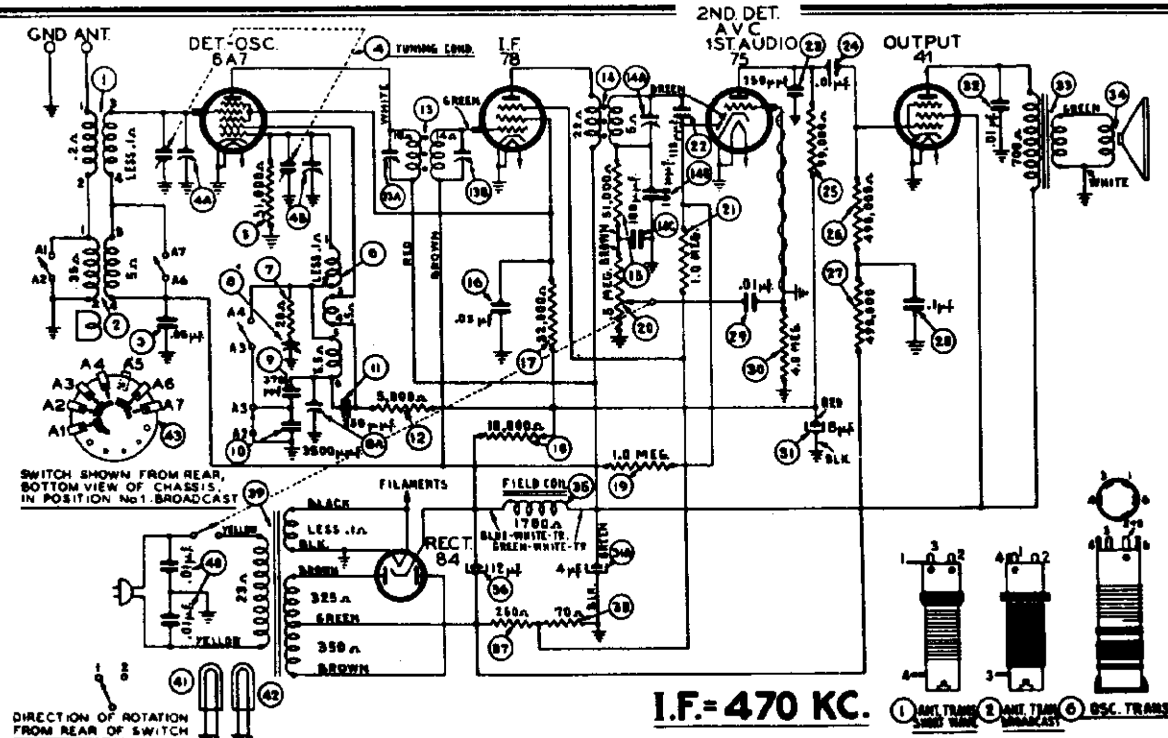
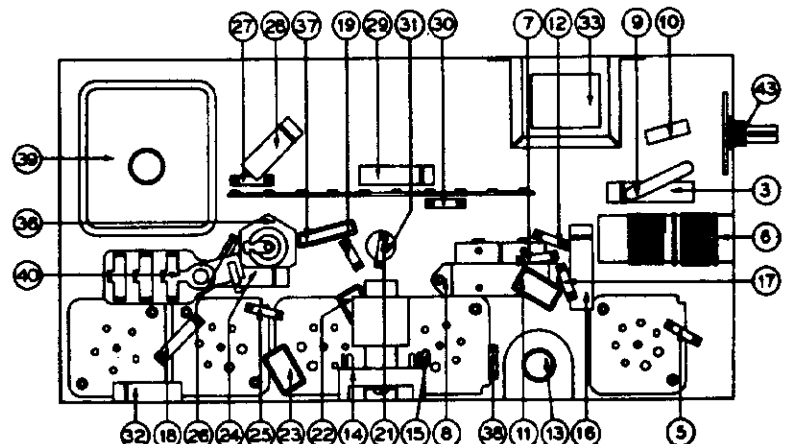


Fig. 3. Schematic Diagram, Model 39-19, Code 121-122



June 1938

Fig. 4. Part Locations, Underside of Chassis

* When ordering Speaker or Cone assembly specify which of the small numbers (-1 or -3) following the part number

MODEL 39-19
Codes 121,122
Socket,Trimmers

PHILCO RADIO & TELEVISION CORP. Alignment,Voltage

SPECIFICATIONS

TYPE OF CIRCUIT: A. C. operated; superhetrodyne circuit with two tuning ranges, covering standard broadcast (540 K.C. to 1720 K.C.) and short wave (5.6 M.C. to 18.0 M.C.) frequencies; Automatic Volume Control; and pentode output.

Codes 121 and 122 chassis of this model are similar with the exception of Speaker and Cabinet.

The receiver is designed to operate from a "Philco Utility Aerial," part No. 45-2450. This aerial system should be used to obtain maximum performance from the receiver.

POWER SUPPLY: Voltage—115 volts. Frequency—50-60 cycles. Power consumption—40 watts.

INTERMEDIATE FREQUENCY: 470 K.C.

TUNING RANGES: 540 K. C. to 1720 K. C. 5.5 M. C. to M. C. 19.0

AUDIO OUTPUT: 2 watts.

PHILCO TUBES USED: Five tubes: 1-6A7, 1st detector and oscillator; 1-78, I. F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output; and 1-84, Rectifier.

TUNING MECHANISM: Pulley and cable drive for Manual Tuning. Push-Button for Automatic Tuning. The procedure for adjusting and operating the Automatic Tuning Push-Buttons will be found in the instructions supplied with each set

CABINETS: Code 121 chassis in type "T" cabinet
Code 122 chassis in type "F" cabinet

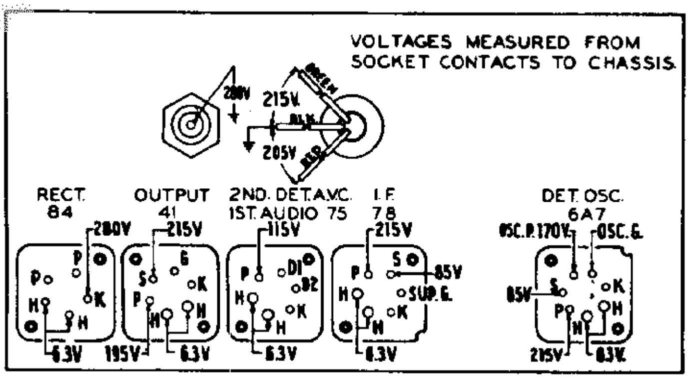


Fig. 1. Socket Voltage—Underside of Chassis View
The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

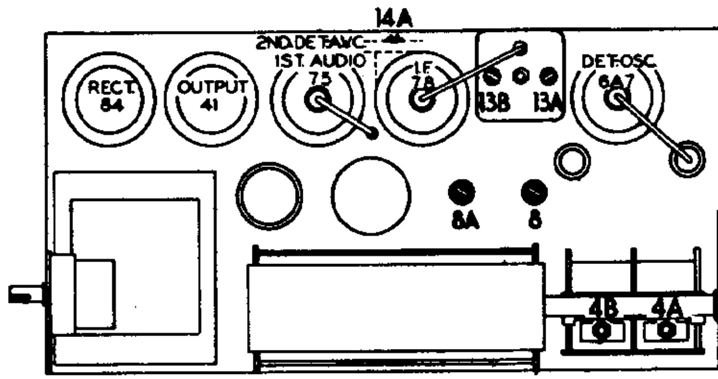


Fig. 2. Locations of Compensators

ALIGNMENT OF COMPENSATORS

EQUIPMENT REQUIRED: (1) Signal Generator. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K.C. is the correct instrument for this purpose. (2) Output meter: Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended. (3) Philco Fiber Handle Screw Driver, part no. 27-7059 and Fiber Wrench, part no. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube. **Set the meter to use the 0-30 volt scale.**

Operations In Order	Signal Generator			Receiver			Special Instructions
	Output Connections To Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	
1	6A7 Grid	.1mf	470 KC	580 KC	Vol. Cont. (max.)	(14A) (13B) (13A)	
2	Ant. Ter.	100mmf	18 MC	18 MC	"	(4B)	Note B
3	"	"	1550 KC	1550 KC	"	(8) (4A)	
4	"	"	580 KC	580 KC	"	(8A)	Roll Tuning Condenser
5	"	"	1550 KC	1550 KC	"	(8)	

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the push button unit disconnected from the gang, the pointer is to be set on the extreme left edge of the index line (low frequency end of the scale) with the gang closed. The gang is then opened until the pointer is at the right edge of the index line and, with the push button shaft at its closed stop, the push button coupling is tightened on the gang shaft.

MODEL 39-25, Code 121
Schematic

PHILCO RADIO & TELEV. CORP.

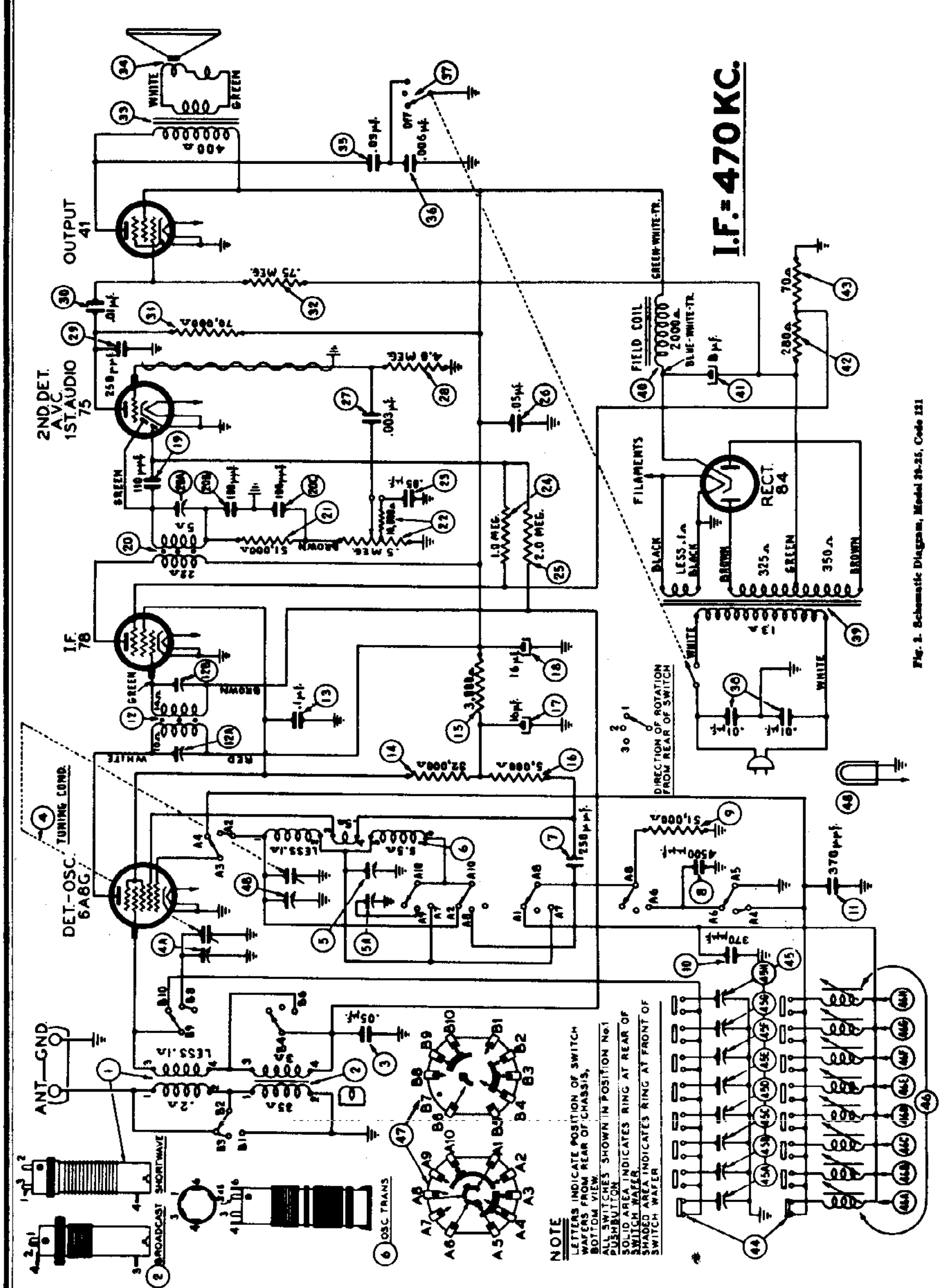


Fig. 1. Schematic Diagram, Model 39-25, Code 121

MODEL 39-25
Code 121
Alignment, Chassis
Tuner Data

PHILCO RADIO & TELEVISION CORP.

TYPE OF CIRCUIT: A. C. operated; superheterodyne circuit with two tuning ranges, covering standard broadcast (540 K. C. to 1720 K. C.) and short wave (4.9 M. C. to 18.0 M. C.) frequencies; Automatic Volume Control; and pentode output.

The receiver is designed to operate from a "Philco Safety Aerial," part No. 40-6371. This aerial system should be used to obtain maximum performance from the receiver.

POWER SUPPLY: Voltage—115 volts. Frequency 50-60 cycles. Power consumption 45 watts.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: 540 K. C. to 1720 K. C.; 4.9 M. C. to 18.0 M. C.

PHILCO TUBES USED: 1-6A8G, 1st detector and oscillator; 1-78, I. F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output; and 1-84, Rectifier.

TUNING MECHANISM: Pulley and cable drive for Manual tuning. Electric Push-Button for Automatic tuning.

CABINETS: Types "T" and "XF."

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose. (2) Output meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended. (3) Philco Fiber Handle Screw Driver, part No. 27-7059, and Fiber Wrench, part No. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and cathode terminals of the Type 41 tube. Set the meter to use the 0-30 volt scale. After connecting the output meter adjust compensators in the order as given below.

Operations in Order	Signal Generator			Receiver			Special Instructions
	Output Connections to Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	6A8G Grid	.1 mf.	470 KC	580 KC	Vol. Cont. max.	(20A) (12B) (12A)	
2	Ant. Ter.	100 mmf.	18.0 MC	18.0 MC	Vol. Cont. max.	(4B)	See Note B
3	Ant. Ter.	100 mmf.	1550 KC	1550 KC	Vol. Cont. max.	(5) (4A)	
4	Ant. Ter.	100 mmf.	580 KC	580 KC	Vol. Cont. max.	(5A)	
5	Ant. Ter.	100 mmf.	1550 KC	1550 KC	Vol. Cont. max.	(5)	

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser closed, set the dial pointer on the extreme left index line at the low frequency end of the scale.

These detailed instructions have been prepared to make sure the correct procedure is followed in setting the stations on the Philco Electric Push-Button Tuning models. The work requires the use of a Philco Model 077 Station Setter and a part No. 27-7059 Insulated Screw Driver.

(A) Select eight of the most popular stations received in the locality and remove their call letters from the call letter sheets supplied. Place the call letters in the windows above the buttons, making sure that each respective button covers the frequency of the station for which it is to be used. The frequency range of the circuits are as follows:

Circuits	Frequency Range
1 and 2	540 to 1030 kilocycles
3 and 4	670 to 1160 kilocycles
5 and 6	900 to 1470 kilocycles
7 and 8	1170 to 1600 kilocycles

These numbers are stamped on the unit as seen from the rear. Looking at the front of the cabinet the numbers read from left to right.

(B) Connect the aerial and ground to the "ANT" and "GND" terminals of the receiver.

(C) Turn the receiver Tuning Range Selector to position two ("Manual Tuning") and tune the receiver to the station to be set on the first button.

(D) Plug the output leads of the Station Setter into the "High" and "Gnd" jacks, and turn the output controls to maximum. Turn the modulation control to "Modulation Off." Connect the output lead of the Station Setter to the "ANT" and "GND" terminals of the receiver and tune to the frequency of the station being received. As the indicator is slowly tuned through the frequency of the station there will be two points at which a high pitched swish will be heard, one above and one below the frequency of the station. When the indicator is on the frequency of the station, minimum high pitched swish will be heard.

(E) Set the modulation control of the Station Setter for "Modulation On." The modulated signal of the Station Setter will then be heard through the receiver.

(F) Turn the receiver Tuning Range Selector to position one (Automatic Tuning) and push in the first button. Using the Part No. 27-7059 Insulated Screw Driver, turn the number 1 "OSC" screw until the modulated signal of the Station Setter is tuned in to maximum volume. Then adjust the number 1 "ANT" screw for maximum signal.

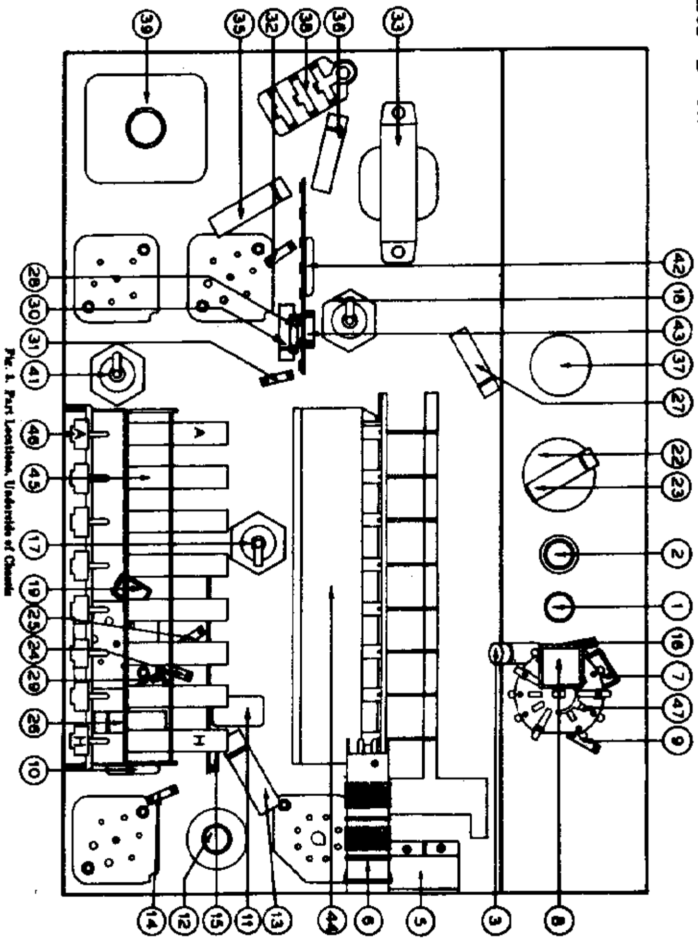


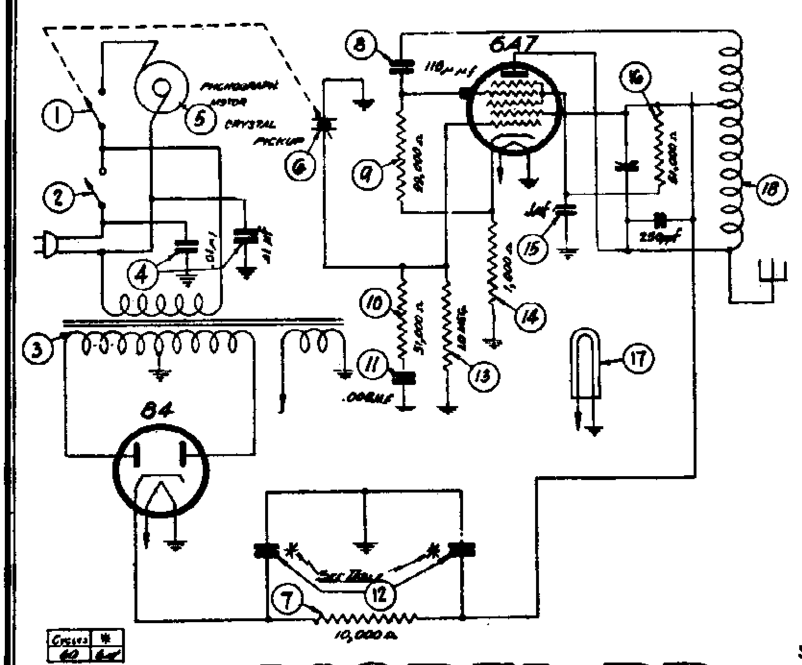
Fig. 1. Part Locations, Underside of Chassis

(G) Remove the output lead of the Philco Station Setter from the "ANT" terminal of the receiver and turn its indicator off the frequency of the station. The program of the desired station will then be heard on the receiver.

(H) With the volume of the receiver low, slowly turn the number 1 "OSC" back and forth until maximum output is received. Repeat the same procedure for the number 1 "ANT" screw.

After setting up the first station, the same procedure given under (C) to (H) is used for the other stations.

MODEL RP-1,Code 122
Wireless Record Player PHILCO RADIO & TELEV. CORP.
Schematic,Instructions



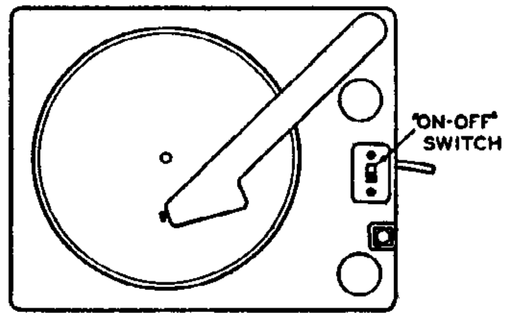


DIAGRAM A

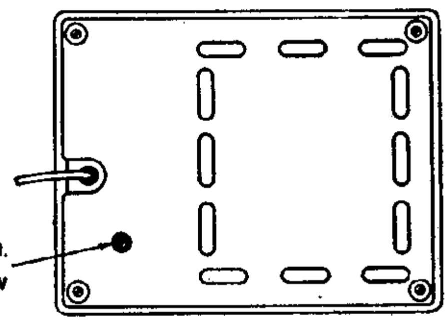


DIAGRAM B

MODEL RP-1

CODE - 122

WIRELESS RECORD PLAYER

The Model RP-1 is a remote type record player which can be used in conjunction with any standard broadcast receiver to reproduce phonograph records.

To place unit in operation:

First. Remove all packing material, being sure to save the small envelope attached to the tone arm. This envelope contains needles, needle screw, and rubber bumper.

Second. Lift off record turn-table and remove motor support tape by carefully pulling out tack and cutting the tape. Replace turn-table.

Third. Disengage tone arm (pickup") by rolling rubber locking ring down along arm rest and pushing sideways on tone arm. **Do not lift arm vertically when locked.**

Fourth. Place rubber bumper (contained in small envelope attached to tone arm) between the jaws of the arm rest, large end up. This forms a suitable rest for tone arm when not in use.

Fifth. Insert needle as far as possible into the tone arm head, and tighten securely with the needle screw, which should be inserted in the head of the tone arm. **A Philco needle (like furnished) is recommended for best results.**

Sixth. Check to make sure your electric supply agrees with that specified on the name label located on under side of cabinet and insert line cord plug into a convenient power outlet.

If in doubt as to the electric supply, check with your local power company.

The unit is now ready for operation. Place record on turn-table and slide "Off-On Switch" (Diagram "A") to "On" position; this will be indicated by pilot light in tone arm.

After allowing sufficient time for tubes to warm up, place tone arm on record; this automatically starts motor.

Next go to your radio and tune to approximately 540 KC (54 on most dials), at which setting the phonograph signal will be picked up. Volume can be regulated by the radio receiver's volume control in the normal way.

At the end of the record, return the tone arm to rest position, which will automatically turn motor off. **It is not necessary to slide "Off-On Switch" to the "Off" position between records.**

If interference from broadcast stations is encountered the frequency of the unit can be changed to any other frequency between 530 KC and 580 KC by adjusting the small screw indicated in Diagram "B." Turning screw clockwise lowers the frequency, counter-clockwise raises the frequency. **This adjustment is best made while the unit is in operation.**

If hum is experienced it may be necessary to reverse the power plug of the record player, the radio, or both. In some cases it may be advisable to use the same receptacle for record player and radio.

No definite rule can be established for the relative location of the record player to your radio; individual trial will establish best location. However, in general, satisfactory operation may be obtained up to a distance of fifty (50) feet, provided local noise conditions are not too severe.

IMPORTANT . . . Do not attempt to force tone arm past stops.

MODEL RP-1-122 WIRELESS RECORD PLAYER

Schem. No.	Description	Philco Part No.
1	Motor Switch and Plate Assembly	42-1486
2	Master Switch	42-1406-2
3	Power Transformer	32-8043
4	Line Condenser (.01-.01 mf., 600 v.)	3903-DG
5	Motor	35-2021
6	Crystal Pickup	35-2022
7	Filter Resistor (10,000 ohms, 1/2 watt)	33-310344
8	Oscillator Grid Condenser (110 mmf)	30-1031
9	Oscillator Grid Resistor (99,000 ohms, 1/2 watt)	33-399344
10	Comp. Resistor (51,000 ohms, 1/2 watt)	33-351344
11	Comp. Condenser (.006 mf., 200 v.)	30-4467
12	Electrolytic Condenser (6 mf.-6 mf., 150 v.)	30-2388
13	Grid Resistor (1 meg., 1/2 watt)	33-510344
14	Cathode Bias Resistor (1000 ohms, 1/2 watt)	33-210344
15	Screen By-Pass (.1 mf., 200 v.)	30-4499-S
16	Screen Resistor (51,000 ohms, 1/2 watt)	33-351344
17	Pilot Light (6-8 v., 250 amp.)	34-2064
18	Oscillator Coil and Padder Assembly	32-3218

MODEL 39-25
Code 121
Socket, Trimmers
Voltage, Parts

PHILCO RADIO & TELEV. CORP.

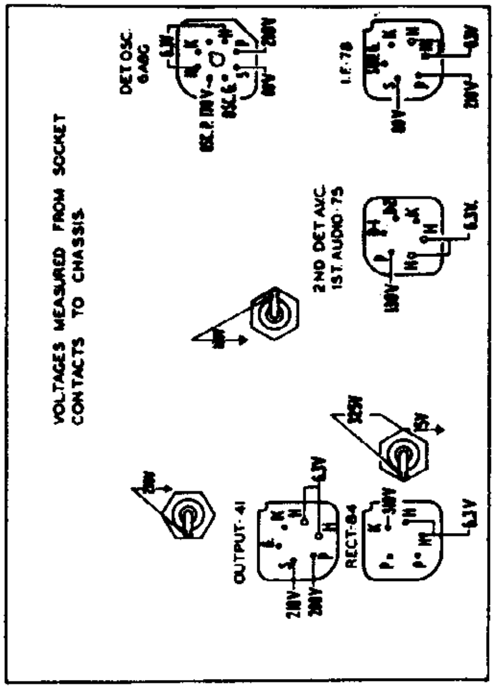


Fig. 1. Socket Voltage—Underside of Chassis
The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

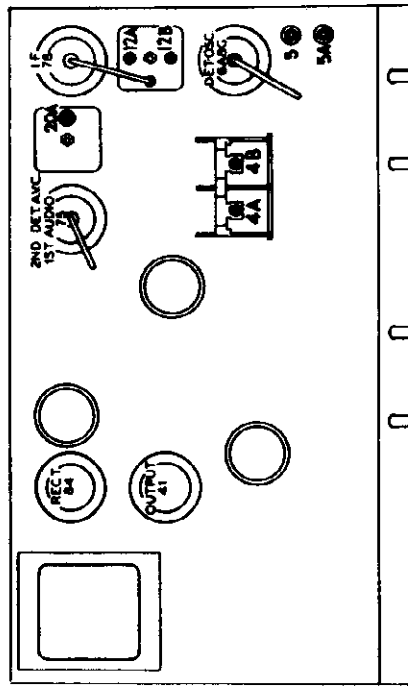


Fig. 4. Locations of Compensators

REPLACEMENT PARTS—MODEL 39-25, CODE 121

Schem. No.	Description	Part No.
1	Antenna Transformer (short wave)	32-3027
2	Antenna Transformer (broadcast)	32-3026
3	Tubular Condenser (.05 mf.)	30-4519
4	Tuning Condenser Assembly	31-2267
5	Dual Padder Unit	31-6255
6	Oscillator Transformer	32-3028
7	Condenser (250 mmf., mica)	30-1032
8	Condenser (4500 mmf., mica)	30-1109
9	Resistor (51,000 ohms, ½ watt)	33-351339
10	Condenser (370 mmf., silver plated mica)	30-1110
11	Condenser (370 mmf., silver plated mica)	30-1110
12	1st I. F. Transformer Assembly	32-3018
13	Condenser (.1 mf., tubular)	30-4455
14	Resistor (32,000 ohms, ½ watt)	33-332339
15	Resistor (3000 ohms, ½ watt)	33-230339
16	Resistor (5000 ohms, ½ watt)	33-250339
17	Electrolytic Condenser (16 mf., 250 V.)	30-2331
18	Electrolytic Condenser (16 mf., 250 V.)	30-2331
19	Condenser (110 mmf., mica)	30-1031
20	2nd I. F. Transformer Assembly	32-3030
21	Resistor (51,000 ohms, ½ watt)	33-351339
22	Volume Control (500,000 ohms)	33-5289
23	Condenser (.05 mf., tubular)	30-4444
24	Resistor (1 meg., ½ watt)	33-510339
25	Resistor (2 megs., ½ watt)	33-520339
26	Condenser (.05 mf., tubular)	30-4518
27	Condenser (.003 mf., tubular)	30-4469
28	Resistor (4.0 megs., ½ watt)	33-540339
29	Condenser (250 mmf., mica)	30-1032
30	Condenser (.01 mf., tubular)	30-4572
31	Resistor (70,000 ohms, ½ watt)	33-370339
32	Resistor (750,000 ohms, ½ watt)	33-475339
33	Output Transformer	32-7978
34	Voice Coil and Cone Assembly	
	(for "T" Speaker, part No. 36-1439)	36-4087
	(for "XF" Speaker, part No. 36-1437)	36-4088
35	Condenser (.03 mf., tubular)	30-4449
36	Condenser (.006 mf., tubular)	30-4445
37	Tone Control and On-Off Switch	42-1443
38	Condenser (.01 mf.-.01 mf., bakelite)	3903-DG
39	Power Transformer	32-7976
40	*Field Coil for Speaker, part No. 36-1439	
	*Field Coil for Speaker, part No. 36-1437	
41	Electrolytic Condenser (8 mf., 400 V.)	30-2330

Schem. No.	Description	Part No.
42	Resistor (280 ohms, wire wound)	33-128431
43	Resistor (70 ohms, ½ watt)	33-070339
44	Push-Button Switch	42-1446
45	Compensator Strip Assembly	31-6256
45A	Compensator, No. 1, 540-1030 K. C.	31-6274
45B	Compensator, No. 2, 540-1030 K. C.	31-6274
45C	Compensator, No. 3, 670-1160 K. C.	31-6276
45D	Compensator, No. 4, 670-1160 K. C.	31-6276
45E	Compensator, No. 5, 900-1470 K. C.	31-6278
45F	Compensator, No. 6, 900-1470 K. C.	31-6278
45G	Compensator, No. 7, 1170-1600 K. C.	31-6280
45H	Compensator, No. 8, 1170-1600 K. C.	31-6280
46	Electric Tuning Coil Assembly (complete)	32-3031
46A	Osc. Coil, No. 1, 540-1030 K. C.	32-3042
46B	Osc. Coil, No. 2, 540-1030 K. C.	32-3042
46C	Osc. Coil, No. 3, 670-1160 K. C.	32-3042
46D	Osc. Coil, No. 4, 670-1160 K. C.	32-3042
46E	Osc. Coil, No. 5, 900-1470 K. C.	32-3041
46F	Osc. Coil, No. 6, 900-1470 K. C.	32-3041
46G	Osc. Coil, No. 7, 1170-1600 K. C.	32-3041
46H	Osc. Coil, No. 8, 1170-1600 K. C.	32-3041
47	Range Switch	42-1445
48	Pilot Lamp	34-2210
	Bezel Assembly	40-6365
	Bezel Gasket	27-9175
	Bezel Screw	W-1834
	Cable (speaker)	41-3443
	Cable (power)	L-2778
	Dial Scale	27-5403
	Dial Spring	28-8908
	Dial Pointer	28-5941
	Dial Drive Cord Assembly	31-2269
	Dial Drive Spring	28-8913
	Dial Tuning Shaft Assembly	31-2260
	Dial Tuning Drum	31-2281
	Knob	27-4332
	Socket (5 Prong)	27-6035
	Socket (6 Prong)	27-6036
	Socket (7 Prong)	27-6099
	Pilot Lamp Socket Assembly	38-9607
	Pushbutton	27-4759
	Speaker (T Cabinet)	36-1439
	Speaker (XF Cabinet)	36-1437

* Replace Speaker.

PHILCO RADIO & TELEVISION CORP.

MODELS 39-30, 39-35
Code 121
Schematic

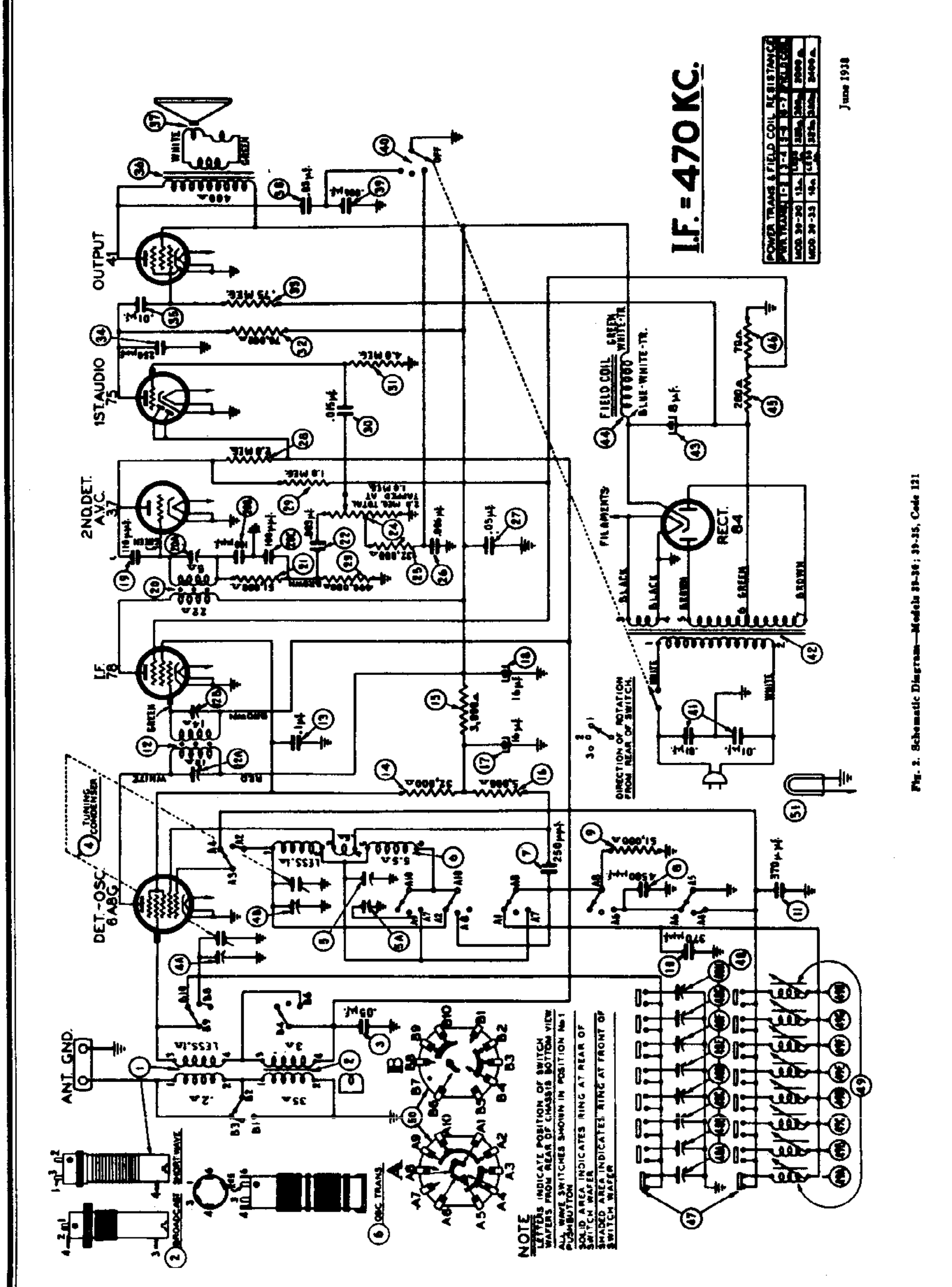
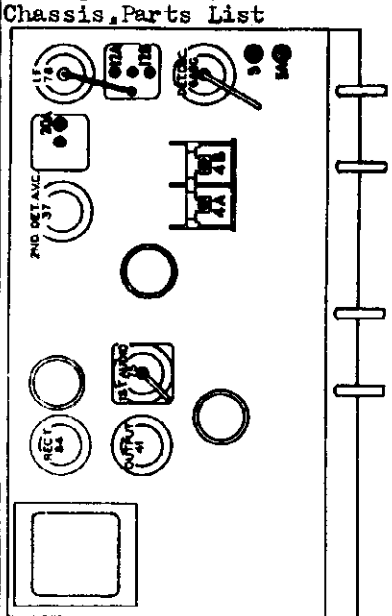


Fig. 2. Schematic Diagram—Models 39-30; 39-35, Code 121

MODELS 39-30, 39-35, Code 121
Voltage, Socket, Trimmers
Chassis, Parts List

PHILCO RADIO & TELEVISION CORP.



MODELS 39-35, 39-30, CODE 121.
Fig. 4. Location of Compensators—Top of Chassis

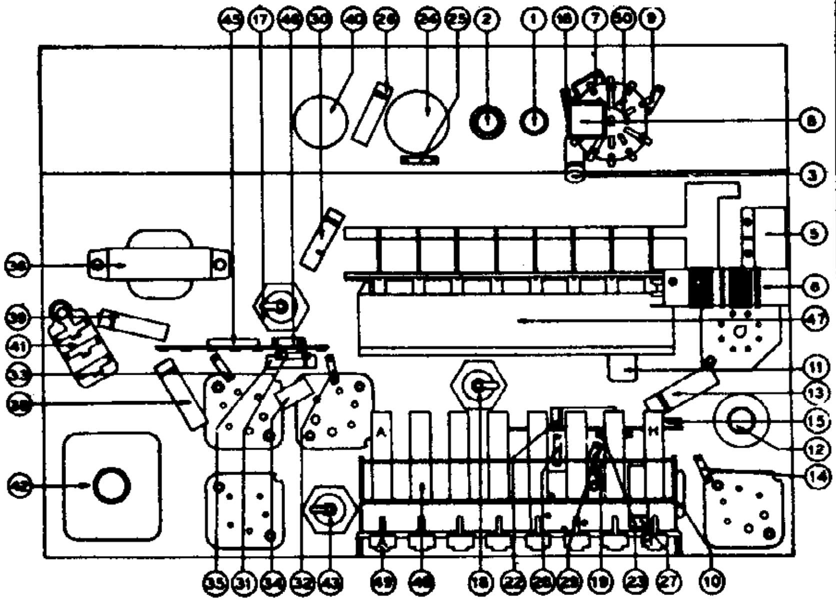


Fig. 3. Parts Locations—Underside of Chassis

No.	Description	Part No.
1	Antenna Transformer (short wave)	32-3027
2	Antenna Transformer (broadcast)	32-3026
3	Condenser (.05 mf., tubular)	30-4519
4	Tuning Condenser Assembly	31-2267
5	Dual Padder Unit	31-6255
6	Oscillator Transformer	32-3028
7	Condenser (250 mmf., mica)	30-1032
8	Condenser (4500 mmf., mica)	30-1109
9	Resistor (51,000 ohms, ½ watt)	33-351339
10	Condenser (370 mmf., silver plated mica)	30-1110
11	Condenser (370 mmf., silver plated mica)	30-1110
12	1st I. F. Transformer Assembly	32-3018
13	Condenser (.1 mf., tubular)	30-4455
14	Resistor (32,000 ohms, ½ watt)	33-332339
15	Resistor (3000 ohms, ½ watt)	33-230339
16	Resistor (5000 ohms, ½ watt)	33-250339
17	Electrolytic Condenser (16 mf., 250 V.)	30-2331
18	Electrolytic Condenser (16 mf., 250 V.)	30-2331
19	Condenser (110 mmf., mica)	30-1031
20	2nd I. F. Transformer Assembly	32-3030
21	Resistor (51,000 ohms, ½ watt)	33-351339
22	Condenser (.003 mf., tubular)	30-4469
23	Resistor (490,000 ohms, ½ watt)	33-449339
24	Volume Control (2.0 megs)	33-5275
25	Resistor (32,000 ohms, ½ watt)	33-332339
26	Condenser (.006 mf., tubular)	30-4467
27	Condenser (.05 mf., tubular)	30-4518
28	Resistor (2.0 meg., ½ watt)	33-520339
29	Resistor (1.0 meg., ½ watt)	33-510339
30	Condenser (.015 mf., tubular)	30-4515
31	Resistor (4.0 megs., ½ watt)	33-540339
32	Resistor (70,000 ohms, ½ watt)	33-370339
33	Resistor (750,000 ohms, ½ watt)	33-475339
34	Condenser (250 mf., mica)	30-1032
35	Condenser (.01 mf., tubular)	30-4572
36	Output Transformer	32-7978
37	†Cone and Voice Coil Assembly	
	for 39-30 T, speaker pt. No. 36-1439-3	36-4091
	for 39-30 T, speaker pt. No. 36-1439-2	36-4087
	for 39-35 XX, speaker pt. No. 36-1438-2	36-4089
38	Condenser (.03 mf., tubular)	30-4449
39	Condenser (.006 mf., tubular)	30-4445
40	Tone Control and On-Off Switch	42-1444
41	Condenser (.01 mf. - .01 mf., bakelite)	3903 DG
42	Power Transformer: 115 V., 60 cycle:	
	for 39-30	32-7976
	for 39-35	32-7977
43	Electrolytic Condenser (8 mf., 400 V.)	30-2330
44	*Field Coil for Speaker, part No. 36-1439	
	*Field Coil for Speaker, part No. 36-1438	
45	Resistor (280 ohms, wire wound)	33-128431
46	Resistor (70 ohms, ½ watt)	33-070339
47	Push-Button Switch	42-1446
48	Padder Strip Assembly	31-6256
48A	Compensator, No. 1, 540 — 1030 KC.	31-6274
48B	Compensator, No. 2, 540 — 1030 KC.	31-6274
48C	Compensator, No. 3, 670 — 1160 KC.	31-6276
48D	Compensator, No. 4, 670 — 1160 KC.	31-6276
48E	Compensator, No. 5, 900 — 1470 KC.	31-6278
48F	Compensator, No. 6, 900 — 1470 KC.	31-6278
48G	Compensator, No. 7, 1170 — 1600 KC.	31-6280
48H	Compensator, No. 8, 1170 — 1600 KC.	31-6280
49	Electric Push-Button Coil Assembly	32-3031
49A	Osc. Coil, No. 1, 540 — 1030 KC.	32-3042
49B	Osc. Coil, No. 2, 540 — 1030 KC.	32-3042
49C	Osc. Coil, No. 3, 670 — 1160 KC.	32-3042
49D	Osc. Coil, No. 4, 670 — 1160 KC.	32-3042
49E	Osc. Coil, No. 5, 900 — 1470 KC.	32-3041
49F	Osc. Coil, No. 6, 900 — 1470 KC.	32-3041
49G	Osc. Coil, No. 7, 1170 — 1600 KC.	32-3041
49H	Osc. Coil, No. 8, 1170 — 1600 KC.	32-3041
50	Wave Switch	42-1445
51	Pilot Lamp	34-2210
	Pilot Lamp Socket Assembly	38-9607
	Push-Button	27-4759
	Speaker (T Cabinet 39-30) optional	36-1439-3 36-1439-2
	Speaker (XX Cabinet 39-35)	36-1438
	Socket (5 Prong)	27-6035
	Socket (6 Prong)	27-6036
	Socket (7 Prong)	27-6099
	Tab Kit	40-6392

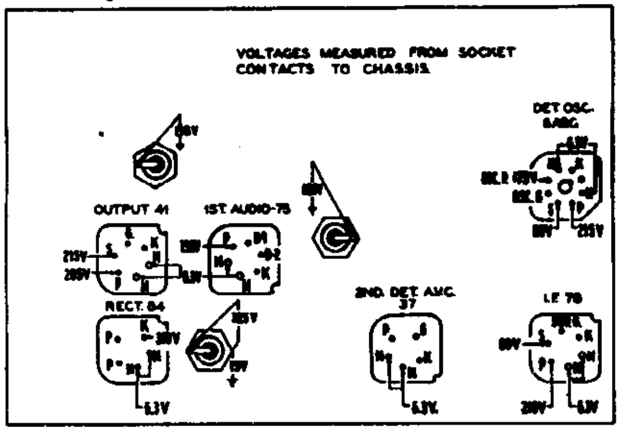


Fig. 1. Socket Voltages—Underside of Chassis

The voltages indicated by arrows were measured with a Philco 027 Circuit Tester which contains an accurate voltmeter. Volume control at minimum, range switch in broadcast position, line voltage 115 A. C.

TYPE OF CIRCUIT: A. C. operated; superheterodyne circuit with two tuning ranges, covering standard broadcast (540 K. C. to 1720 K. C.) and short-wave (4.9 M. C. to 18.0 M. C.) frequencies; Automatic Volume Control; and pentode output.

The receiver is designed to operate from a "Philco Safety Aerial," Part No. 40-6371. This aerial system should be used to obtain maximum performance from the receiver.

POWER SUPPLY: Voltage, 115 volts. Frequency, 50-60 cycles. Power consumption 45 watts.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: 540 K. C. to 1720 K. C.; 4.9 M. C. to 18.0 M. C.

PHILCO TUBES USED: 1-6A8G, 1st detector and oscillator; 1-78, I. F.; 1-37, 2nd detector, Automatic Volume Control; 1-75, first audio; 1-41, output; and 1-84, Rectifier.

TUNING MECHANISM: Pulley and cable drive for Manual tuning. Electric Push-Button for Automatic tuning.

CABINETS: Types: "T" for 39-30 and "XX" for 39-35.

* Replace Speaker
† Model T Cabinet uses two optional speakers. The part numbers of the speakers are the same with the exception of a dash number (-2 or -3) following the part number. When ordering a Cone and Voice Coil Assembly, the part number as indicated must be specified.

MODEL S-1622
Alignment, Socket, Trimmers

PHILCO RADIO & TELEVISION CORP.

MODELS 39-30, 39-35
Code 121
Alignment

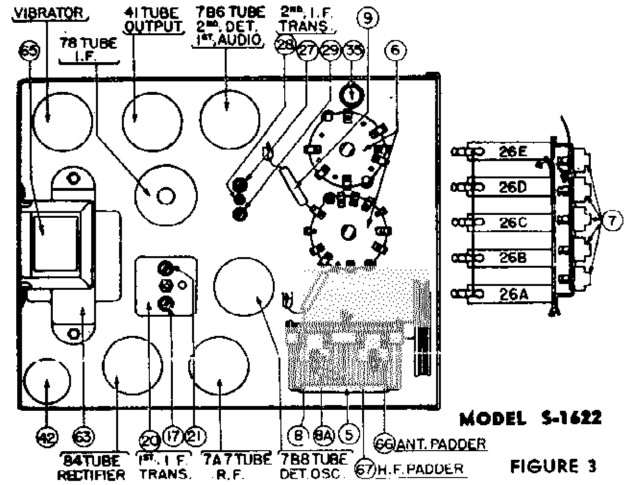
ALIGNMENT
MODELS 39-30, 39-35 (CODE 121); S1622.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.



MODEL S-1622

FIGURE 3

MODELS 39-30, 39-35, CODE 121.

Operations	Signal Generator: Output Connections To Receiver	Signal Generator: Dummy Antenna (Note A)	Signal Generator: Dial Setting	Receiver: Dial Setting	Receiver: Control Settings	Receiver: Adjust Compensators In Order	Special Instructions
1	6A8G Grid	.1 mf.	470 K.C.	580 K.C.	Vol. Cont. Max.	(20A) (12B) (12A)	
2	Ant. Ter.	100 mmf.	18.0 M.C.	18.0 M.C.	Vol. Cont. Max.	(4B)	See Note B
3	Ant. Ter.	100 mmf.	1550 K.C.	1550 K.C.	Vol. Cont. Max.	(5) (4A)	
4	Ant. Ter.	100 mmf.	580 K.C.	580 K.C.	Vol. Cont. Max.	(5A)	
5	Ant. Ter.	100 mmf.	1550 K.C.	1550 K.C.	Vol. Cont. Max.	(5)	

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser closed, set the dial pointer on the extreme left index line at the low frequency end of the scale.

MODEL S-1622

OPERATION	SIGNAL GENERATOR: FREQUENCY	SIGNAL GENERATOR: CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning.				
2	470 K.C.	To Antenna Receptacle on Radio	35 Mmfd. See Note 1	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible] 27 20 17
3	1580 K.C.	To Antenna Receptacle on Radio	35 Mmfd. See Note 1	Note 2	67
4	1500 K.C.	To Antenna Receptacle on Radio	35 Mmfd. See Note 1	Set Tuning Condenser at 1500 K.C.	66 Note 3

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 35 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODELS 39-30,39-35
MODELS 40-150,40-155
MODEL 40-160
MODELS 40-180,40-185,40-190
MODELS 40-195,40-200

PHILCO RADIO & TELEV. CORP.

MODEL 108
Tuner Data
MODELS 40-120,40-125
Alignment,Trimmers

EQUIPMENT REQUIRED: MODELS 40-120,40-125.

(1) Signal Generator; Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose.

(2) Output Meter; Philco Models 027 or 028 Vacuum Tube Voltmeters and Circuit Testers incorporate a sensitive output meter and are recommended.

(3) Philco Fiber Handle Screw Driver, Part No. 45-2610. Aligning adapter Part No. 45-2767.

OUTPUT METER: The Philco 027 or 028 Output Meter is connected to the plate and screen terminals of the type 35A5 tube and adjusted for the 0 to 30 V. A. C. scales.

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an alignment indicator make the following connections:

Remove the 7C6 tube from its socket and insert the aligning adapter, Part No. 45-2767, then replace the tube in the adapter. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adapter. Attach the positive terminal of the voltmeter to the chassis. The positive terminal is connected to the chassis.

After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on Fig. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	7C7 See Note C	.1 mf.	455 K. C.	580 K. C.	Vol. Cont. Max.	14A, 14B, 15A	Push "IN" Manual Button Model 40-125
2	Ant. Ter.	10 mmf.	1600 K. C.	1600 K. C.	Vol. Cont. Max.	2B	See Note B See Note C
3	Ant. Ter.	10 mmf.	1400 K. C.	1400 K. C.	Vol. Cont. Max.	2A	

NOTE A — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (High side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, the tuning pointer is set horizontal at the low frequency end of the scale (540 K. C.).

NOTE C — Compensators 2A and 2B are at the top of the tuning condenser. Compensator 2A is on the front section and compensator 2B on the rear section. When padding the I. F. the signal generator can be attached to the 7C7 grid on the front section of the tuning condenser.

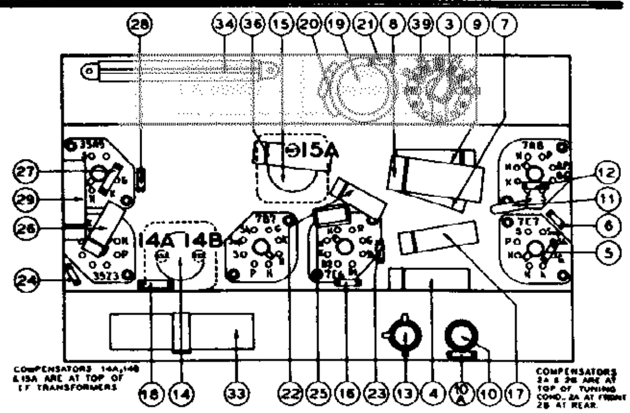


Fig. 1

Adjusting Push Button Tuning - MODELS 39-30,39-35,108 (CODE 121); 40-150,40-155; 40-160; 40-195,40-200;40-180,40-185,40-190.(FOR BUTTON ADJUSTMENT FREQUENCIES FOR MODELS 39-30,39-35, & 108 (CODE 121); SEE PARTS LISTS OF THESE MODELS).

In order to adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Model 027 and 028 should be used. In addition, an insulated padding screw driver part No. 45-2610 and Loktal aligning adapter part No. 45-2767 are required. With this equipment at hand proceed as follows:

Insert the station call letters into the windows above the buttons. The station with the lowest frequency is placed in the first button on the left and the highest frequency is placed in the button on the extreme right. Each push button is adjusted by two set screws located on the rear of the push button unit. Each set of screws is numbered and covers a frequency range as follows:

MODEL 40-160

Push Button	Frequency Range
1	540-1000 K.C.
2	650-1100 K.C.
3	740-1300 K.C.
4	900-1500 K.C.
5	1100-1600 K.C.

MODELS 40-195, 40-200

Push-Button	Frequency Range
1, 2, 3	540-1030 K. C.
4, 5	670-1160 K. C.
6, 7, 8	900-1600 K. C.

MODELS 40-150,40-155,40-180,40-185,40-190.

Push-Button	Frequency Range
1, 2, 3	540-1060 K. C.
4, 5	650-1110 K. C.
6, 7	920-1600 K. C.

Looking at the front of the cabinet, the first button on the left is adjusted by set screw No. 1. The next push button by set screw No. 2 and the remaining push buttons in order.

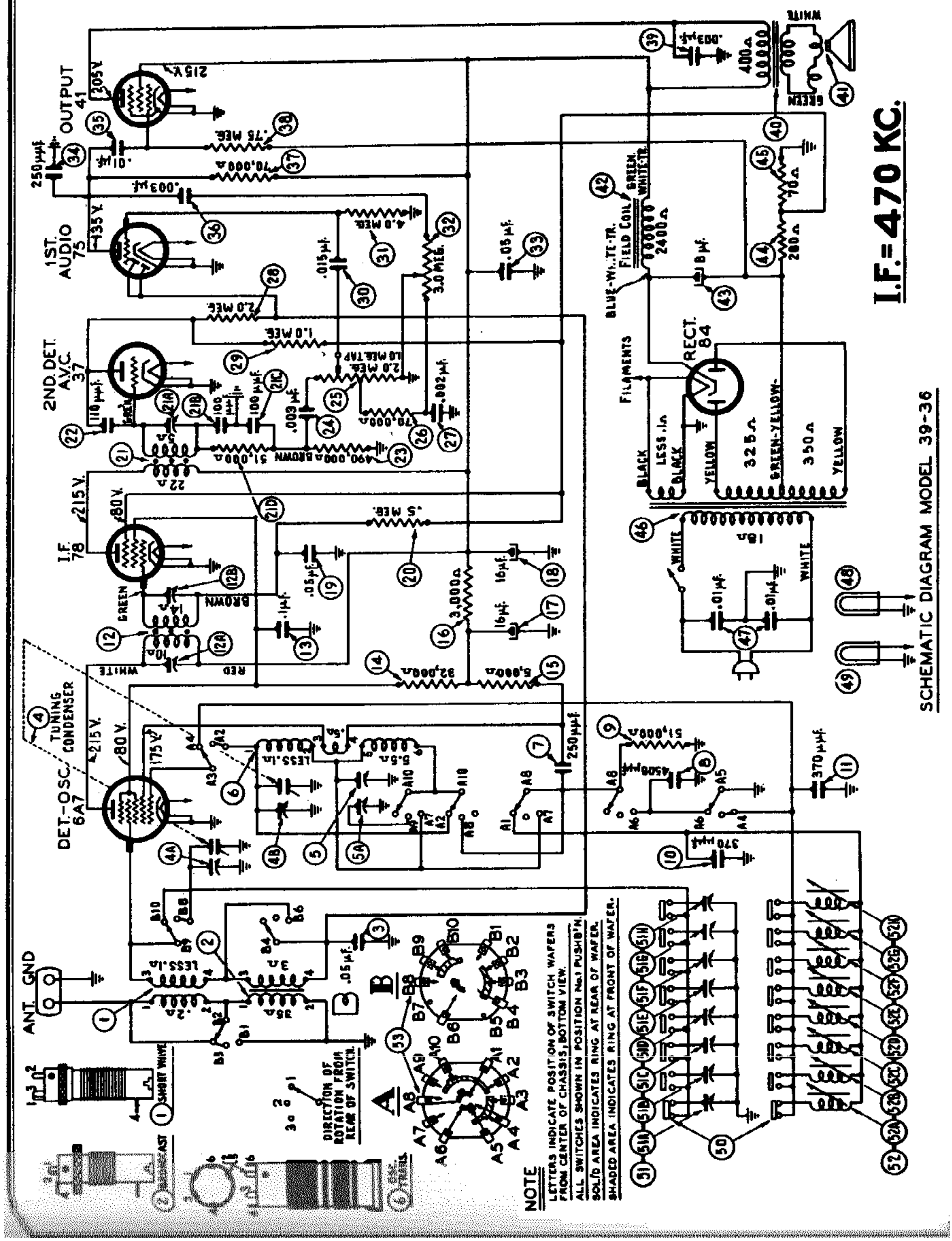
1. Remove the 7C6 A.F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the chassis.

2. Turn the receiver on and set the tuning range disc to "Broadcast" (Manual Tuning).

3. Set up the Model 077 Station Setter about 3 feet from the receiver and connect a loop constructed out of about 6 feet of wire to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON". Manually tune in the first station to be set up on push button No. 1. After doing this set the indicator of the 077 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point. Turn the receiver tuning range disc to "Push Button" and press in No. 1 button. Using the insulated screw driver turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer. Station No. 1 is now adjusted properly. After setting up the first station the same procedure as outlined above is used for the remaining stations.

When this model is to be set up to receive the sound of a television program tuned in by the special type Philco television sets or when it is to be used in conjunction with a Philco Record Player, push-button No. 1 should be used. To tune in these programs, the same procedure as given for ordinary broadcast stations as outlined above is used.

PHILCO RADIO & TELEV. CORP.



MODEL 39-36
Alignment, Socket
Trimmers, Chassis
Tuner Chassis, Parts

PHILCO RADIO & TELEV. CORP.

SPECIFICATIONS

TYPE CIRCUIT: Philco Model 39-36, code 121 is a six tube, A.C. operated superheterodyne circuit with two tuning ranges covering standard broadcast (540-1720 K.C.) and shortwave (5 M.C. to 18.0 M.C.) frequencies. In addition, the receiver employs Electric Automatic Push-Button Tuning for automatically selecting any of eight standard broadcast stations, continuously variable tone control, automatic volume control, and pentode audio output.

POWER SUPPLY: 115 V., 60 cycle A.C. 42 watts. For operation on 115V., 25 to 40 cycles, A.C. current or 220 V. 50 to 60 cycles A.C. current, different power transformers are required, and can be obtained from your distributor.

INTERMEDIATE FREQUENCY: 470 K.C.

PHILCO TUBES USED: 6A7, First Detector Oscillator, 78, I.F. Amplifier; 37, Second Detector-A.V.C.; 75, First Audio; 41, Audio Output and 84, Rectifier.

CONTROLS: The new Philco Disc Controls are used on this model for adjusting tuning, volume, tone and frequency range.

CABINETS: Type XX.

Alignment of Compensators

EQUIPMENT REQUIRED:

(1) Signal Generator; Philco Model 077.

(2) Output Meter, Philco 027 Circuit Tester.

(3) Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube. After connecting the Output Meter, adjust compensators in the order as given in tabulations below. Locations of the compensators are shown in Fig. 1.

Operations	SIGNAL GENERATOR			RECEIVER			Special Instructions
	Output Connections To Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	6A7 Grid.	.1 mf.	470 K.C.	580 K.C.	Vol Cont. Max. Range Switch (Brdcst.)	(21A) (12B) (12A)	
2	Ant. Ter.	100mmf.	18.0 M.C.	18.0 M.C.	Vol. Cont. Max. Range Switch (S.W.)	(4B)	See Note B, C
3	Ant. Ter.	100mmf.	1550 K.C.	1550 K.C.	Vol. Cont. Max. Range Switch (Brdcst.)	(5) (4A)	
4	Ant. Ter.	100mmf.	580 K.C.	580 K.C.	Vol. Cont Max. Range Switch (Brdcst.)	(5A)	
5	Ant. Ter.	100mmf.	1550 K.C.	1550 K.C.	Vol. Cont. Max.	(5)	

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—Dial Calibration: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown in Service Bulletin No. 305.

NOTE C—Compensators (4A) and (4B) are located on top of the tuning condenser. Compensator (4B) is the first one from the tuning drum side.

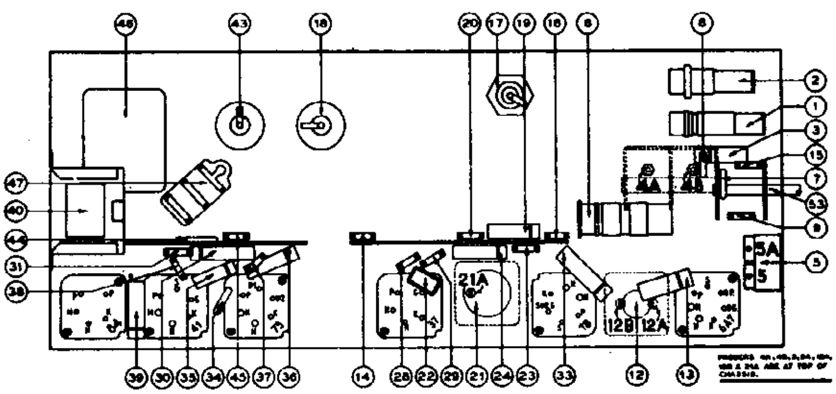


Fig. 1.—Part Locations—Underside of Chassis

Replacement Parts

Schem. No.	Description	Part No.
1	Ant. Trans. (S.W.)	32-3037
2	Ant. Trans. (B.C.	32-3036
3	Tubular Cond. (.05 mf.)	30-4519
4	Tuning Cond. Assy.	31-2346
5	Dual Padder Unit	31-6255
6	Oscillator Trans.	32-3038
7	Mica Cond. (250 mmf.)	30-1032
8	Mica Cond. (4500 mmf.)	30-1109
9	Resistor (51,000 ohms, ½ watt)	33-351339
10	Condenser (Silver Mica)—370 mmf.	30-1110
11	Condenser (Silver Mica)—370 mmf.	30-1110
12	1st I.F. Trans. Assy.	32-3018
13	Tubular Cond. (.1 mf.)	30-4455
14	Resistor (32,000 ohms) ½ watt	33-332339
15	Resistor (5,000 ohms) ½ watt	33-250339
16	Resistor (3,000 ohms) ½ watt	33-230339
17	Electro. Cond. (16 mf.)—350 Volts	30-2331
18	Electro. Cond. (16 mf.)—350 Volts	30-2370
19	Tubular Cond. (.05 mf.)	30-4519
20	Resistor (490,000 ohms, ½ watt)	33-449339
21	2nd I.F. Trans. Assy.	32-3129
21A	Compensator Part of 21	
21B	Condenser Part of 21A	
21C	Condenser Part of 21A	
21D	Resistor (51,000 ohms—½ watt)	33-351339
22	Mica Cond. (110 mmf.)	30-1031
23	Resistor (490,000 ohms, ½ watt)	33-449339
24	Tubular Cond. (.008 mf.)	30-4580
25	Volume Control (2 meg.)	33-5286
26	Resistor (70,000 ohms)	33-370339
27	Tubular Cond. (.002 mf.)	30-4597
28	Resistor (2.0 meg., ½ watt)	33-520339
29	Resistor (1.0 meg., ½ watt)	33-510339
30	Tubular Cond. (.015 mf.)	30-4515
31	Resistor (4.0 meg., ½ watt)	33-540339
32	Tone Control (3.0 meg.)	33-5287
33	Tubular Cond. (.05 mf.)	30-4518
34	Mica Cond. (250 mmf.)	30-1032
35	Tubular Cond. (.01 mf.)	30-4572
36	Tubular Cond. (.003 mf.)	30-4583
37	Resistor (70,000 ohms, ½ watt)	33-370339
38	Resistor (.75 meg. ½ watt)	33-475339
39	Tubular Cond. (.003 mf.)	30-4469
40	Output Trans. for Speaker Part No. 36-1438	32-7978
41	Cone and Voice Coil Assy. for Speaker Part No. 36-1438-2	36-4009
42	Field Coil, Replace Speaker Part No. 36-1438-2	
43	Electro. Cond. (8 mf.—400 V.)	30-2371
44	Resistor (280 ohms)	33-128421
45	Resistor (70 ohms, ½ watt)	33-070339
46	Power Trans. 115V. (50 to 60 cycles)	32-7077
46A	Power Trans. 115 V. (25 to 40 cycles)	
47	Bakelite Cond. (.01 mf.—.01 mf.)	3903DG
48	Pilot Lamp (Dial)	34-2044
49	Pilot Lamp (Dial)	34-2064
50	Push Button Switch	42-1463
51	Compensator Assy.	31-6256
51A	Compensator No. 1 (540-1030 K.C.)	
51B	Compensator No. 2 (540-1030 K.C.)	
51C	Compensator No. 3— 670-1160 K.C.	
51D	Compensator No. 4— 670-1160 K.C.	
51E	Compensator No. 5— 900-1470 K.C.	
51F	Compensator No. 6— 900-1470 K.C.	
51G	Compensator No 7—1170-1600 K.C.	
51H	Compensator No 8—1170-1600 K.C.	
52	Electric Push-Button Coil Assy.	32-3031
52A	Osc. Coil No. 1— 540-1030 K.C.	32-3042
52B	Osc. Coil No. 2— 540-1030 K.C.	32-3042
52C	Osc. Coil No. 3— 670-1160 K.C.	32-3043
52D	Osc. Coil No. 4— 670-1160 K.C.	32-3043
52E	Osc. Coil No. 5— 900-1470 K.C.	32-3041
52F	Osc. Coil No. 6— 900-1470 K.C.	32-3041
52G	Osc. Coil No. 7—1170-1600 K.C.	32-3041
52H	Osc. Coil No. 8—1170-1600 K.C.	32-3041
53	Wave Switch	42-1476

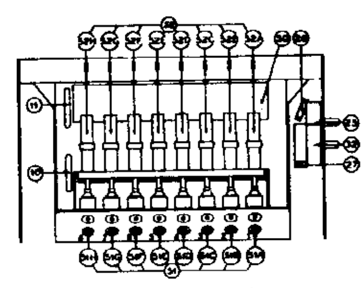


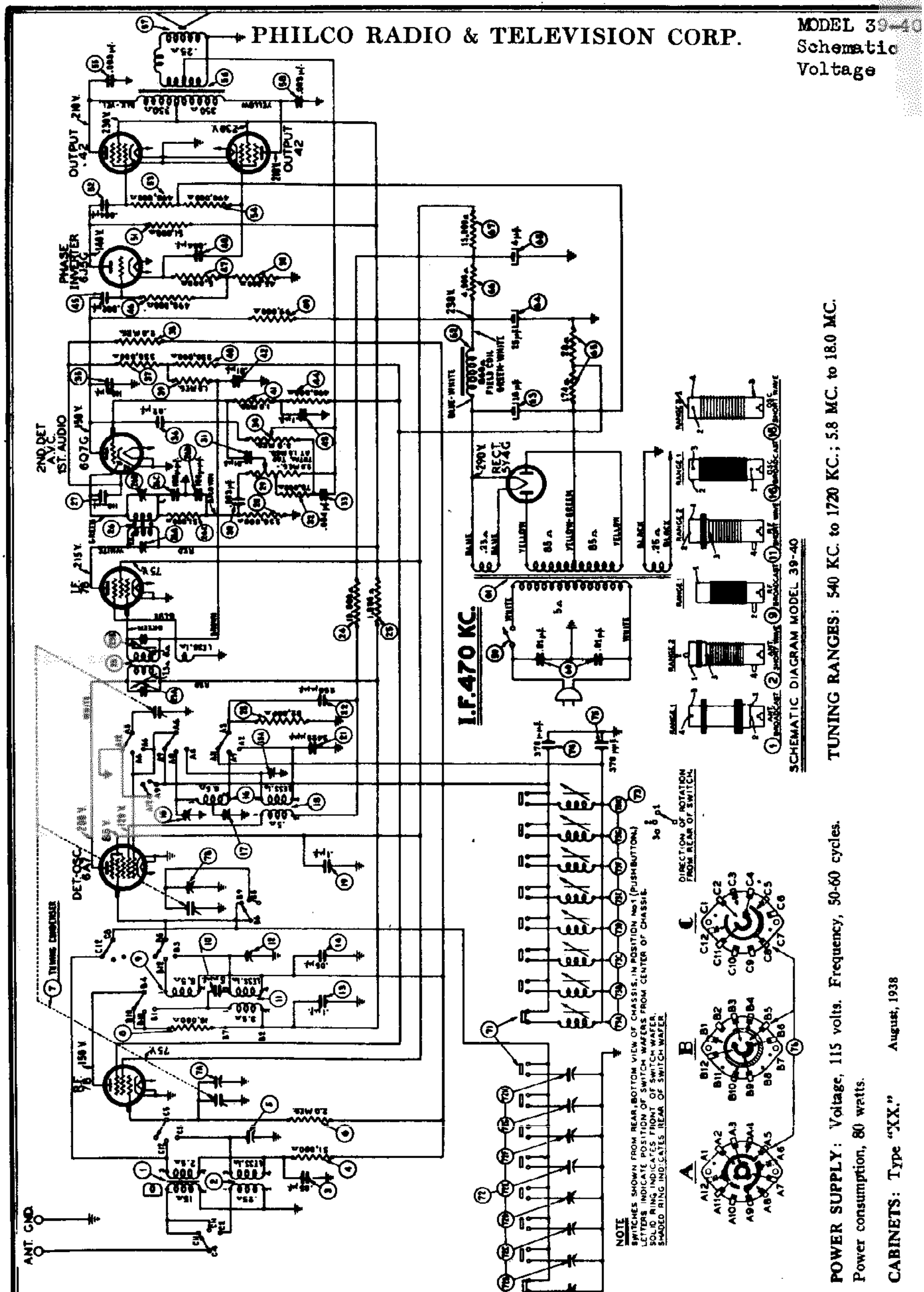
Fig. 2.—Part Locations—Push Button Unit

FOR PUSH-BUTTON ADJUSTMENTS
SEE INDEX

Miscellaneous Parts

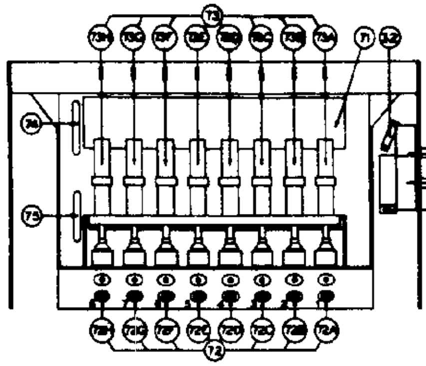
Description	Part No.
Bezel	56-1104
Bracket and Bearing (Tuning Drum)	28-9661
Cable (Power)	L-2778
Coupling (Tuning Condenser)	31-9201
Dial	27-5452
Dial Pointer	56-1022
Dial Drive Cord (Tuning)	31-2815
Dial Drive Cord (Pointer)	31-2816
Disc Control (Tuning)	27-4766
Disc Control Range Switch	27-4767
Disc Control (Tone)	27-4764
Disc Control (Volume)	27-4765
Drum (Tuning Condenser)	38-9716
Push-Buttons	27-4750
Socket (5 prong)	27-6035
Socket (6 prong)	27-6036
Socket (7 prong)	27-6009
Spring (Dial Drive Cord)	28-8013
Speaker	36-1438-2

MODEL 39-40
Schematic
Voltage

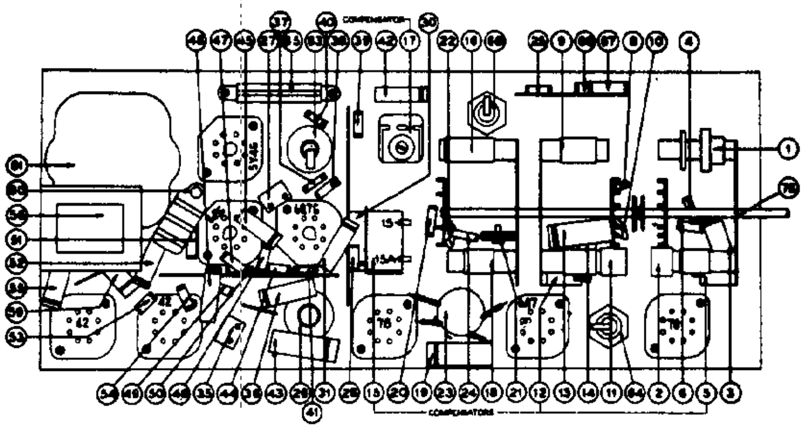


MODEL 39-40, Code 121
Socket, Trimmers
Chassis, Tuner Chassis
Drive Data, Parts

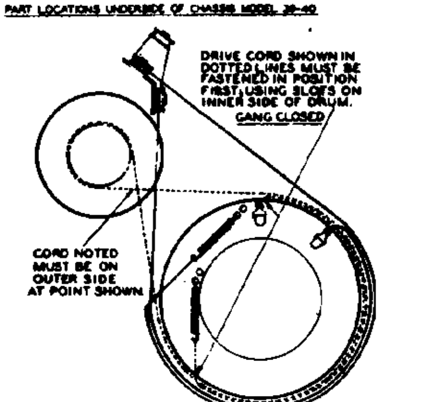
PHILCO RADIO & TELEV. CORP.



ELECTRIC AUTOMATIC PUSH BUTTON UNIT



PART LOCATIONS UNDERSIDE OF CHASSIS MODEL 39-40



CORRECT METHOD OF INSTALLING DRIVE CORDS ON TUNING CONDENSER DRUM

Replacement Parts
Model 39-40, Code 121

Schem. No.	Description	Part No.
1	Antenna Transformer (Range 1, Brdcst.)	32-3056
2	Antenna Transformer (Range 2)	32-3055
3	Condenser (.05 mf tubular)	30-4519
4	Resistor (51,000 ohms, ½ watt)	33-351339
5	Compensator (Range 2, S. W.)	31-6212
6	Resistor (2.0 megohms, ½ watt)	33-520339
7	Tuning Condenser	31-2296
8	Resistor (10,000 ohms, ½ watt)	33-310339
9	R. F. Transformer (Range 1, Brdcst.)	32-2379
10	Condenser (5 mmf mica)	30-1083
11	R. F. Transformer (Range 2, S. W.)	32-3046
12	Compensator (Range 2, S. W.)	31-6212
13	Condenser (.1 mf tubular)	30-4455
14	Condenser (.05 mf tubular)	30-4519
15	Compensator (two sections)	31-6093
16	Oscillator Transformer (Range 1, Brdcst.)	32-2120
17	Compensator	31-6230
18	Oscillator Transformer (Range 2, S. W.)	32-3051
19	Condenser (.1 mf tubular)	30-4455
20	Resistor (32,000 ohms, ½ watt)	33-332339
21	Condenser (3425 mmf mica)	31-6263
22	Condenser (250 mmf mica)	30-1032
23	1st I. F. Transformer Assembly	32-3079
24	Resistor (10,000 ohms, ½ watt)	33-310339
25	Resistor (1000 ohms, ½ watt)	33-210339
26	2nd I. F. Transformer	32-2582
27	Condenser (110 mmf mica)	30-1031
28	Resistor (330,000 ohms, ½ watt)	33-433339
29	Volume Control (2.0 megohms)	33-5286
30	Condenser (.003 mf tubular)	30-4580
31	Condenser (.01 mf tubular)	30-4581
32	Resistor (70,000 ohms, ½ watt)	33-370339
33	Condenser (.004 mf tubular)	30-4578
34	Tone Control (3.0 megohms)	33-5287
35	Condenser (110 mmf mica)	30-1031
36	Condenser (.02 mf tubular)	30-4481
37	Resistor (330,000 ohms, ½ watt)	33-433339
38	Resistor (2.0 megohms, ½ watt)	33-520339
39	Resistor (1.0 megohm, ½ watt)	33-510339
40	Resistor (330,000 ohms, ½ watt)	33-433339
41	Resistor (1.0 megohm, ½ watt)	33-510339
42	Condenser (.01 mf tubular)	30-4581
43	Condenser (.1 mf tubular)	30-4455
44	Resistor (490,000 ohms, ½ watt)	33-449339
45	Condenser (.002 mf tubular)	30-4579
46	Resistor (490,000 ohms, ½ watt)	33-449339
47	Resistor (5000 ohms, ½ watt)	33-250339
48	Condenser (.004 mf tubular)	30-4578
49	Resistor (99,000 ohms, ½ watt)	33-399339
50	Resistor (45,000 ohms, ½ watt)	33-345339
51	Resistor (51,000 ohms, ½ watt)	33-351339
52	Condenser (.004 mf tubular)	30-4578
53	Resistor (490,000 ohms, ½ watt)	33-449339
54	Resistor (490,000 ohms, ½ watt)	33-449339
55	Condenser (.003 mf tubular)	30-4469
56	Output Transformer	32-7981
57	Cone and Voice Coil Assembly for Speaker (Part No. 36-1450)	36-4089
58	Condenser (.003 mf tubular)	30-4469
59	A. C. Switch	42-1467
60	Condenser (.01 mf to .01 mf bakelite)	3903DG
61	Pwr. Trnsfrmr., 115 v., 60 cycle	32-7998
62	Field Coil, Replace Speaker	36-1450
63	Elect. Condenser (18 mf)	30-2335
64	Elect. Condenser (25 mf), 250	30-2333
65	B. C. Resistor	33-3358
66	Resistor (4000 ohms, ½ watt)	33-240339
67	Resistor (13,000 ohms, ½ watt)	33-313339
68	Elect. Condenser (4 mf), 250	30-2334
69	Pilot Lamp .. Dial	34-2064
70	Pilot Lamp	34-2064
71	Push-Button Switch	42-1462
72	Padder Strip Assem., Complete	31-6259
72A	Compensator No. 1 (540-1030 KC.)	
72B	Compensator No. 2 (540-1030 KC.)	
72C	Compensator No. 3 (670-1160 KC.)	
72D	Compensator No. 4 (670-1160 KC.)	
72E	Compensator No. 5 (900-1470 KC.)	
72F	Compensator No. 6 (900-1470 KC.)	
72G	Compensator No. 7 (1100-1600 KC.)	
72H	Compensator No. 8 (1100-1600 KC.)	
73	Coil Strip Assembly (8 coils)	32-3031
73A	Coil No. 1 (540-1030 KC.)	32-3042
73B	Coil No. 2 (540-1030 KC.)	32-3042
73C	Coil No. 3 (670-1160 KC.)	32-3042
73D	Coil No. 4 (670-1160 KC.)	32-3042
73E	Coil No. 5 (900-1470 KC.)	32-3041
73F	Coil No. 6 (900-1470 KC.)	32-3041
73G	Coil No. 7 (1100-1600 KC.)	32-3041
73H	Coil No. 8 (1100-1600 KC.)	32-3041
74	Condenser (370 mmf silver mica)	30-1110
75	Condenser (370 mmf silver mica)	30-1110
76	Wave Switch	42-1461
	Bezel	56-1104
	Bezel Gasket	27-9245
	Bearing (Drum Shaft)	56-1036
	Cable (Power)	L-2778
	Cable (Speaker)	41-3430
	Coupling (Tuning Condenser)	31-2291
	Dial (Scale)	27-5421
	Dial Clamp	56-1034
	Dial Gasket	27-9224
	Dial Gasket	27-9225
	Dial Pointer	56-1033
	Dial Drive Cord (Tuning)	31-2315
	Dial Drive Cord. Pointer	31-2316
	Dial Drive Cord Spring	28-8913
	Disc Control (Tuning)	27-4766
	Disc Control (Range Switch)	38-9702
	Disc (Tone Control)	27-4764
	Disc (Volume Control)	27-4765
	Drum Assembly (Tuning Condenser)	38-9661
	Drum Bracket and Bearing (Tuning Condenser)	38-9662
	Shaft (Control Drums)	28-6924
	Socket Assembly Dial Lamp	38-9694
	Socket Assembly-Dial Lamp	38-9695
	Socket (6-prong), 78-tube	27-6036
	Socket (6-prong), Octal	27-6086
	Socket (7-prong), Octal	27-6053
	Socket (7-prong), 6A7-tube	27-6107
	Speaker	36-1450
	Tab Kit	40-6392

Miscellaneous Parts

Description	Part No.
Grommet (Mtg. Push-Button Switch)	27-4610
Grommet (Mtg. Tuning Unit Assy.)	3914
Grommet (Mtg. Tuning Unit Assy.)	3915
Nut (A. C. Switch)	W-1757
Nut (Speaker Mtg.)	W-124
Screw (Mtg. Chassis)	W-1345
Screw (Bezel)	W-1834
Washer (Speaker Mtg.)	27-7467
Washer Rubber (Mtg. Chassis)	27-4571
Washer (A. C. Switch)	W-894

MODEL 39-40
MODEL 39-45
Alignment, Tuner Data

PHILCO RADIO & TELEVISION CORP.

MODEL 39-36
Tuner Data

ADJUSTING ELECTRIC PUSH-BUTTON TUNING FOR MODELS 39-36, 39-40, AND 39-45

In order to set the Electric Push-Buttons correctly for each station, the procedure as given below should be carefully followed. Accurate adjustment of the buttons requires the use of a Philco Model 077 Station Setter and a part No. 27-7059 insulated screw driver.

(A) Select eight of the most popular stations received in the locality and remove their call letters from the call letter sheets supplied. Place the call letters in the windows above the buttons, making sure that each button covers the frequency of the station for which it is to be used. Two adjustment screws for each button are located on the rear of the push-button unit. Each set of screws is numbered and covers a frequency range as follows:

Push-Button	Frequency Range
1 and 2	540-1030 KC.
3 and 4	670-1160 KC.
5 and 6	900-1470 KC.
7 and 8	1100-1600 KC.

Looking at the front of the cabinet, the first button on the left is adjusted by set screw No. 1, the next button by set screw No. 2, and the remaining buttons in the same order.

(B) Connect the aerial and ground to the "ANT" and "GND" terminals of the receiver.

(C) Turn the receiver Tuning Range Selector to position 2 (Broadcast) and tune the receiver to the station to be set on the first button.

(D) Plug the output leads of the Station Setter into the "High" and "Gnd" jacks, and turn the output controls to maximum.

Turn the modulation control to "Modulation On." Connect the output lead of the station setter to the "ANT" and "GND" terminals of the receiver and tune to the frequency of the station being received. As the indicator is slowly tuned through the frequency of the station, there will be two points at which a whistle will be heard, one above and one below the frequency of the station. When the indicator is on the frequency of the station the whistle will be eliminated and the modulated signal of the station setter will then be clearly heard through the receiver.

(E) Turn the receiver Tuning Range Selector to position 1 (Push-Button) and press in the first button. Using the part No. 27-7059 insulated screw driver; turn the No. 1 "OSC" screw until the broadcast station identified by the station setter signal is tuned to Maximum Volume.

(F) Remove the output lead of the station setter from the "ANT" terminal of the receiver and turn the indicator of the Station Setter off the frequency of the station. The program of the desired station will then be heard in the receiver without the modulated signal.

(G) With the volume of the receiver low, slowly turn the No. 1 "OSC" screw back and forth until maximum output is received. Repeat the same procedure for the No. 1 "ANT" screw.

After setting up the first station, the same procedure given under (C) to (G) is used for the other stations.

ALIGNMENT OF MODEL 39-40

Operations	SIGNAL GENERATOR			RECEIVER			Special Instructions
	Output Connections to Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Setting	Adjust Compensators to Max. Reading	
1	6A7	.1 mf	470 KC.	580 KC.	Vol. Max. Range Switch Broadcast	26B, 26A, 23B, 23A	
2	Ant. Ter.	150 mmf	1550 KC.	1550 KC.	"	15, 7B, 7A	See Note B and C
3	Ant. Ter.	150 mmf	580 KC.	580 KC.	"	17	Roll Tuning Condenser
4	Ant. Ter.	150 mmf	1550 KC.	1550 KC.	"	15	
5	Ant. Ter.	400 ohms	18.0 MC.	18.0 MC.	Range Switch S. W.	15A, 12, 5	

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—Dial Calibration. In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown on page 3.

NOTE C—Compensators (7A) and (7B) are located on top of the tuning condenser. Compensator (7A) is the first one from the tuning drum side.

ALIGNMENT OF MODEL 39-45

Operation	SIGNAL GENERATOR			RECEIVER			Special Instructions
	Output Connections to Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Setting	Adjust Compensators to Max. Reading	
1	6A7	.1 mf	470 KC.	470 KC.	Vol. Max. Range Switch Broadcast	30B, 30A, 27B, 27A	
2	Antenna	150 mmf	1550 KC.	1550 KC.	"	21, 8B, 8A	See Note B and C
3	Antenna	150 mmf	580 KC.	580 KC.	"	22	Roll Tuning Condenser
4	Antenna	150 mmf	1550 KC.	1550 KC.	"	21	
5	Antenna	400 ohms	5.0 MC.	5.0 MC.	Range Switch Police	21A	
6	Antenna	400 ohms	18.0 MC.	18.0 MC.	Range Switch S. W.	21B, 14, 4	

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown on page 3.

NOTE C—Compensators (8A) and (8B) are located on top of the tuning condenser. Compensator (8A) is the first one from the tuning drum side.

MODEL 39-71
Schematic, Voltage, Socket
Alignment, Trimmers, Parts
Chassis

PHILCO RADIO & TELEV. CORP.

Operations in Order	SIGNAL GENERATOR			RECEIVER			Special Instructions
	Output Connections to Receiver	Dummy Antenna (Note A)	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	1A7G Grid	.1 mfd.	470 K. C.	580 K. C.	Vol. Cont. Max.	12A, 11B, 11A	Note C
2	Ant. & Grd. Terminals	400 ohms	1550 K. C.	1550 K. C.	Vol. Cont. Max.	2B, 2A	Note B Note C

NOTE A — The "Dummy Antenna" consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

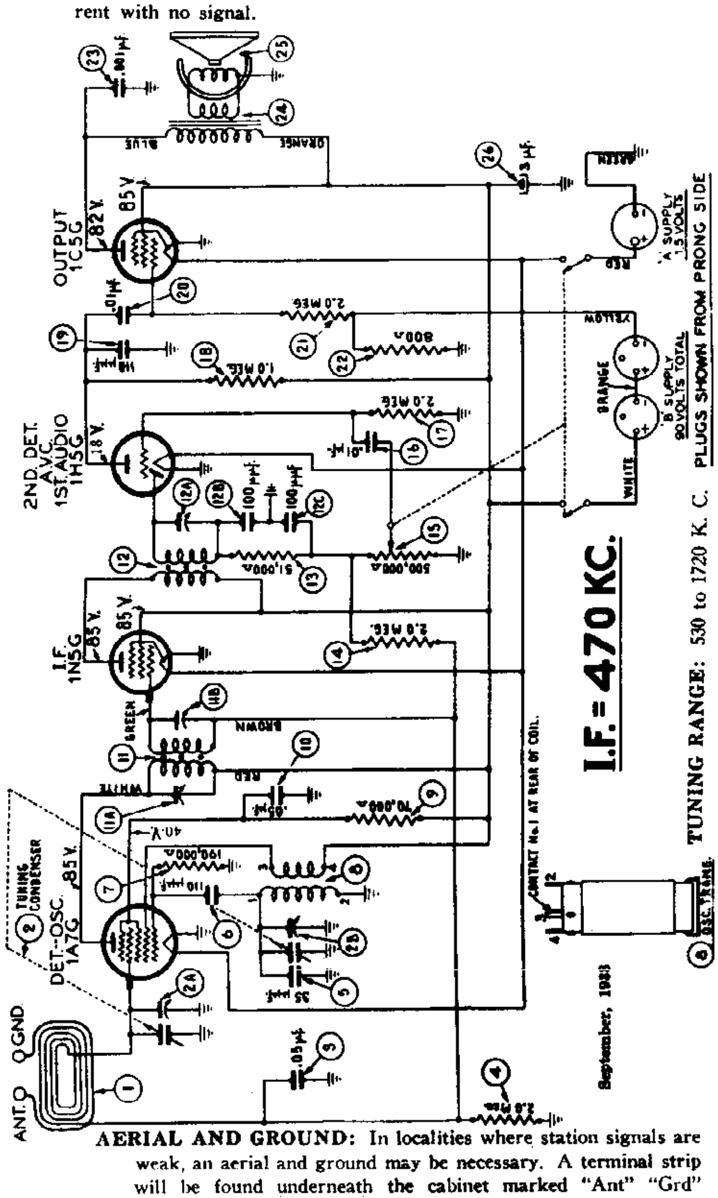
NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: Turn the tuning condenser to maximum capacity (plates fully meshed). With tuning condenser in this position set the pointer to the small "black dot" at the low frequency end of the dial scale.

NOTE C — To adjust the I. F. compensators, remove the back from the cabinet, which is held in place by four screws. The chassis is then taken out by removing the four screws and two corks underneath the cabinet, and the Tuning and Volume knobs. The I. F. compensators are located on top of the I. F. transformers.

When adjusting the Antenna (2A) and Oscillator (2B) compensators, the chassis must be assembled in the cabinet with the batteries and loop in place. The Signal Generator output lead with the "Dummy Antenna" is then connected to the terminals marked "Ant" and "Grd" underneath the cabinet. The antenna and oscillator compensators are then adjusted through the holes in the bottom of the cabinet.

BATTERIES REQUIRED: One (1) Philco "A" Pack, Part No. 41-8017; two (2) Philco "B" Packs, Part No. 41-8018.

BATTERY DRAIN: "A" — 240 Ma.; "B" 8.5 Ma. Total current with no signal.



TUNING RANGE: 530 to 1720 K. C.

INTERMEDIATE FREQUENCY: 470 K. C.

AERIAL AND GROUND: In localities where station signals are weak, an aerial and ground may be necessary. A terminal strip will be found underneath the cabinet marked "Ant" "Grd" for this purpose.

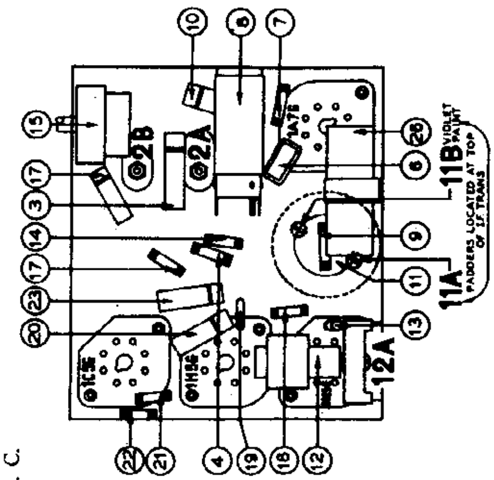


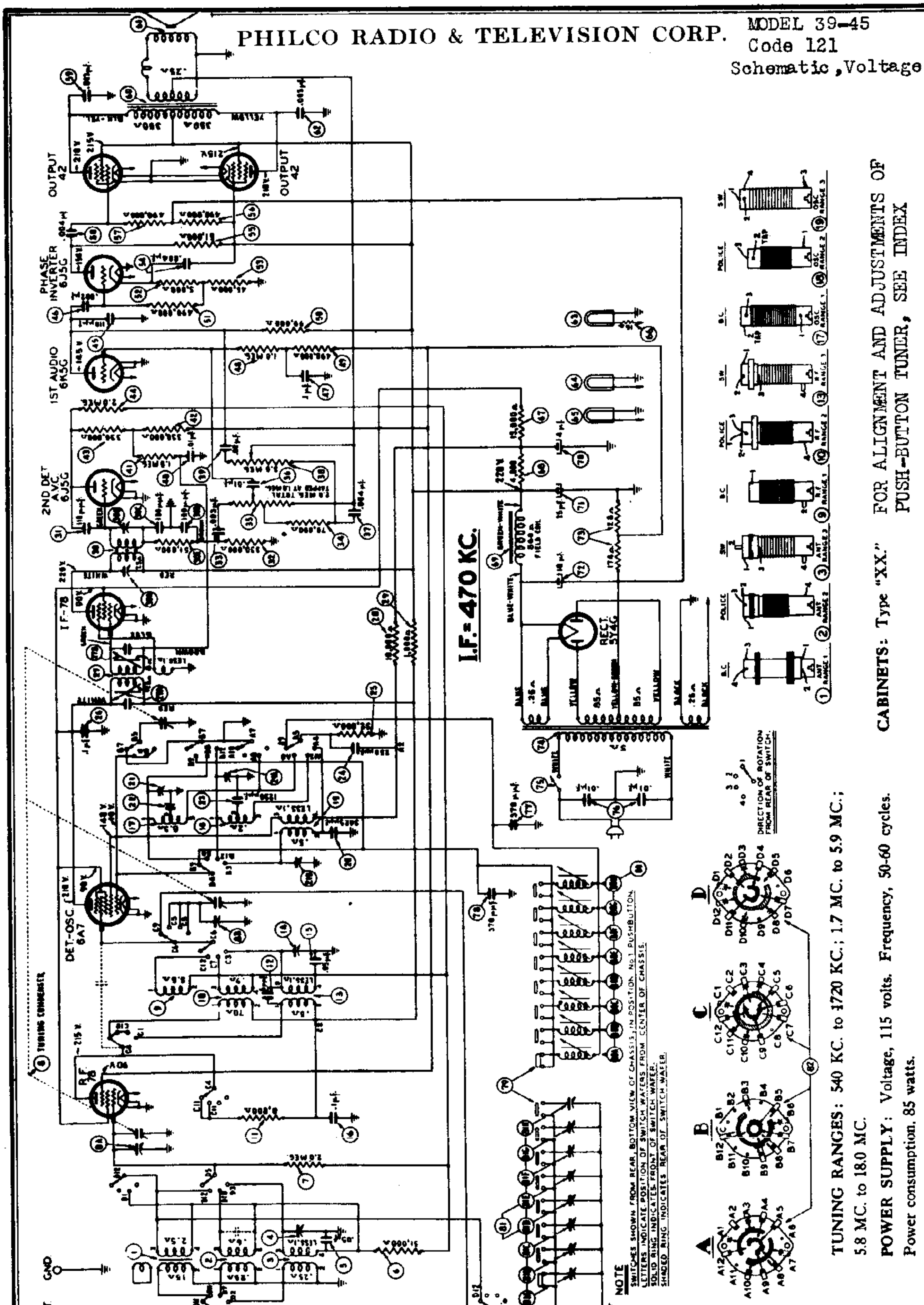
Fig. 1. Compensator and Part Locations Underside of Chassis

Replacement Parts

Code No.	Description	Part No.
1	Loop Assy.	40-6421
2	Tuning Cond.	31-2322
3	Tubular Cond. (.05 mf.)	30-4519
4	Resistor (2 megohm)	33-520339
5	Mica Cond. (35 mmf.)—mounted on top of tuning condenser	30-1095
6	Mica Cond. (110 mmf.)	30-1031
7	Resistor (190,000 ohms)	33-419339
8	Oscillator Trans.	32-3118
9	Resistor (70,000 ohms)	33-370339
10	Tubular Cond. (.05 mf.)	30-4444
11	1st I. F. Trans. Assy.	32-3103
12	2nd I. F. Trans. Assy.	32-3081
13	Resistor (51,000 ohms)	33-351339
14	Resistor (2 megohms)	33-520339
15	Volume Control & Switch	33-5301
16	Tubular Cond. (.01 mf.)	30-4572
17	Resistor (2 megohm)	33-520339
18	Resistor (1 megohm)	33-510339
19	Mica Cond. (110 mmf.)	30-1031
20	Tubular Cond. (.01 mf.)	30-4572
21	Resistor (2 megohm)	33-520339
22	Resistor (800 ohms)	33-180339
23	Tubular Cond. (.001 mf.)	30-4201
24	Output Trans. for Speaker No. 36-1451-3	
25	Voice Coil Assy. for Speaker No. 36-1451-3	36-4090
26	Electrolytic Cond. (3 mf.)	30-2359
	Bezel Window	27-5434
	Dial	31-2321
	Dial Pointer	28-5185
	Dial Drive Cord Assy.	31-2323
	Dial Tuning Shaft & Brkt. Assy.	31-2324
	Escutcheon (knobs)	56-1252
	Escutcheon (screws)	W-2129
	Knob (Tuning, Volume)	27-4331
	Loop Antenna	40-6421
	Pulley (Tuning Condenser)	28-6662
	Socket (6 prong)	27-6086
	Socket (7 prong)	27-6087
	Spring (Dial Cord)	28-8751
	Speaker	36-1451

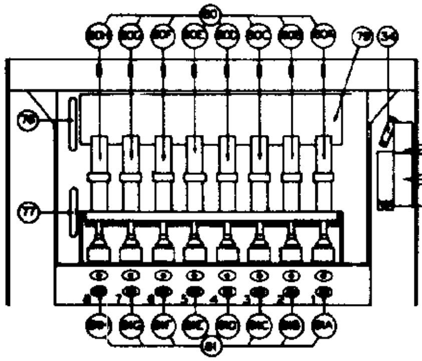
PHILCO RADIO & TELEVISION CORP.

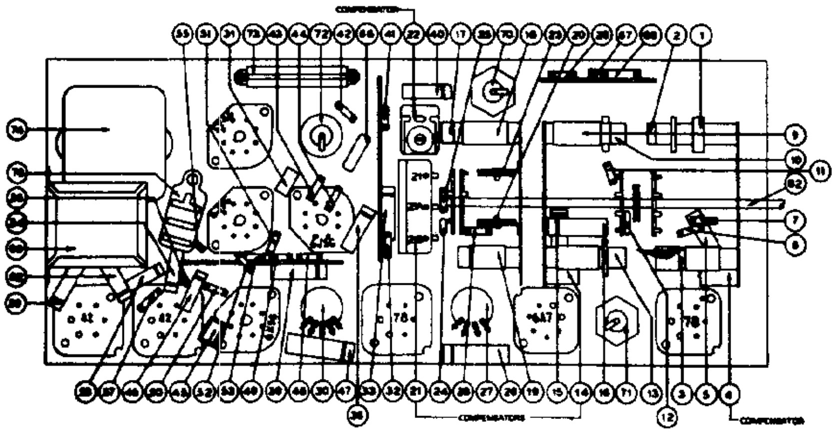
MODEL 39-45
Code 121
Schematic, Voltage

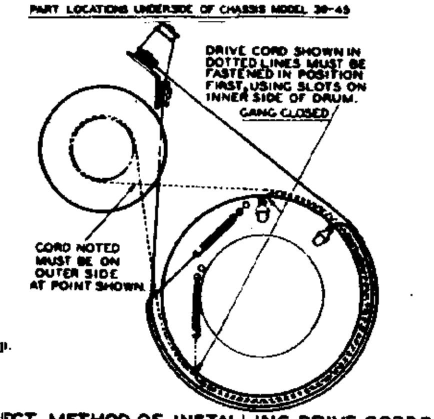


MODEL 39-45, Code 121
Socket, Trimmers, Chassis
Tuner Chassis, Drive Data
Parts List

PHILCO RADIO & TELEV. CORP.







August, 1938

Replacement Parts
Model 39-45, Code 121

Schem. No.	Description	Part No.
1	Ant. Trans. (Range 1), B. C.	32-3056
2	Ant. Trans. (Range 2), Police	32-3053
3	Ant. Trans. (Range 3), S. W.	32-3055
4	Ant. Compensator (Range 3)	31-6212
5	Tubular Cond. (.05 mf)	30-4519
6	Resistor (51,000 ohms)	33-351339
7	Resistor (2.0 megohms)	33-520339
8	Tuning Cond.	31-2296
9	R. F. Trans. (Range 1), B. C.	32-2379
10	R. F. Trans. (Range 2), Police	32-3054
11	Resistor (8000 ohms)	33-280339
12	Mica Cond. (5 mmf)	30-1083
13	R. F. Trans. (Range 3), S. W.	32-3046
14	R. F. Compensator (Range 3)	31-6212
15	Tubular Cond. (.05 mf)	30-4519
16	Tubular Cond. (.1 mf)	30-4455
17	Osc. Trans. (Range 1), B. C.	32-2120
18	Osc. Trans. (Range 2), Police	32-3052
19	Osc. Trans. (Range 3), S. W.	32-3051
20	Tracking Condenser, Semifixed (3425 mmf)	31-6263
21	Osc. Compensator (Broadcast)	31-6266
21A	Osc. Compensator (Police, Part of 21)	31-6266
21B	Osc. Compensator (s.w. part of 21)	
22	Osc. Compensator	31-6230
23	Tracking Condenser, Semifixed (1230 mmf)	31-6262
24	Mica Cond. (250 mmf)	30-1032
25	Resistor (32,000 ohms)	33-332339
26	Tubular Cond. (.1 mf)	30-4455
27	1st I. F. Trans. Assy.	32-3079
28	Resistor (10,000 ohms)	33-310339
29	Resistor (1000 ohms)	33-210339
30	2nd I. F. Trans. Assy.	32-2582
31	Mica Cond. (110 mmf)	30-1031
32	Resistor (330,000 ohms)	33-433339
33	Tubular Cond. (.003 mf)	30-4580
34	Resistor (70,000 ohms)	33-370339
35	Volume Control	33-5286
36	Tubular Cond. (.01 mf)	30-4169
37	Tubular Cond. (.004 mf)	30-4578
38	Tone Control	33-5287
39	Tubular Cond. (.02 mf)	30-4481
40	Tubular Cond. (.01 mf)	30-4169
41	Resistor (1.0 megohm)	33-510339
42	Resistor (330,000 ohms)	33-433339
43	Resistor (330,000 ohms)	33-433339
44	Resistor (2.0 megohms)	33-520339
45	Mica Cond. (110 mmf)	30-1031
46	Tubular Cond. (.002 mf)	30-4579
47	Tubular Cond. (.1 mf)	30-4455
48	Resistor (1.0 megohm)	33-510339
49	Resistor (490,000 ohms)	33-449339
50	Resistor (99,000 ohms)	33-399339
51	Resistor (490,000 ohms)	33-449339
52	Resistor (5000 ohms)	33-250339
53	Resistor (45,000 ohms)	33-345339
54	Tubular Cond. (.004 mf)	30-4578
55	Resistor (51,000 ohms)	33-351339
56	Resistor (490,000 ohms)	33-449339
57	Resistor (490,000 ohms)	33-449339
58	Tubular Cond. (.004 mf)	30-4578
59	Tubular Cond. (.003 mf)	30-4469
60	Output Trans.	32-7981
61	Cone and Voice Coil Assy. for Speaker (Part No. 36-1450)	36-4089
62	Tubular Cond. (.003 mf)	30-4469
63	Pilot Lamp Dial	34-2210
64	Pilot Lamp Dial	34-2210
65	Pilot Lamp Power	34-2210
66	Resistor (16 ohms)	33-016431
67	Resistor (13,000 ohms)	33-313439
68	Resistor (4000 ohms)	33-240339
69	Field Coil, Replace Speaker (Part No. 36-1450)	
70	Electrolytic Cond. (4 mf)	30-2334
71	Electrolytic Cond. (25 mf)	30-2333
72	Electrolytic Cond. (18 mf)	30-2335
73	B. C. Resistor	33-3358
74	Power Trans. (115v., 60 cycle)	32-7998
75	A. C. Switch	42-1467
76	Bakelite Cond. (.01 to .01 mfd)	3903DG
77	Silver Mica Cond. (370 mmf)	30-1110
78	Silver Mica Cond. (370 mmf)	30-1110
79	Push-Button Switch	42-1462
80	Push-Button Osc. Trans. Assy. (8 coils)	32-3031
80A	Coil No. 1 (540-1030 KC.)	32-3042
80B	Coil No. 2 (540-1030 KC.)	32-3042
80C	Coil No. 3 (670-1160 KC.)	32-3042
80D	Coil No. 4 (670-1160 KC.)	32-3042
80E	Coil No. 5 (900-1470 KC.)	32-3041
80F	Coil No. 6 (900-1470 KC.)	32-3041
80G	Coil No. 7 (1100-1600 KC.)	32-3041
80H	Coil No. 8 (1100-1600 KC.)	32-3041
81	Padder Strip	31-6259
81A	Comp. No. 1 (540-1030 KC.)	
81B	Comp. No. 2 (540-1030 KC.)	
81C	Comp. No. 3 (670-1160 KC.)	
81D	Comp. No. 4 (670-1160 KC.)	
81E	Comp. No. 5 (900-1470 KC.)	
81F	Comp. No. 6 (900-1470 KC.)	
81G	Comp. No. 7 (1100-1600 KC.)	
81H	Comp. No. 8 (1100-1600 KC.)	
82	Wave Switch	42-1451

Miscellaneous Parts

Description	Part No.
Bezel	56-1092
Bezel Gasket	27-9245
Bearing (Drum Shaft)	56-1036
Cable (Power)	L-2778
Cable (Speaker)	41-3430
Coupling (Tuning Condenser)	31-2291
Dial (Scale)	27-5404
Dial Clamp	56-1034
Dial Gasket	27-9224
Dial Gasket	27-9225
Dial Pointer	56-1033
Dial Drive Cord (Tuning)	31-2315
Dial Drive Cord, Pointer	31-2316
Dial Drive Cord Spring	28-8913
Disc Control (Tuning)	27-4766
Disc Control (Range Switch)	38-9702
Disc (Tone Control)	27-4764
Disc (Volume Control)	27-4765
Drum Assembly (Tuning Condenser)	38-9661
Drum-Bracket and Bearing (Tuning Condenser)	38-9662
Shaft Control Drums	28-6924
Socket Assembly Dial Lamp	38-9694
Socket Assembly Dial Lamp	38-9695
Socket Pilot Lamp	38-9696
Socket (6-prong) (78-tube)	27-6036
Socket (6-prong) (Octal)	27-6086
Socket (7-prong) (Octal)	27-6053
Socket (7-prong) (6A7-tube)	27-6107
Speaker	36-1450
Tab Kit	40-6392
Mounting Parts	
Grommet	
(Mtg. Push-Button Switch)	27-4610
(Mtg. Tuning Unit Assy.)	3914
(Mtg. Tuning Unit Assy.)	3915
Nut (A. C. Switch)	W-1757
Nut (Speaker Mtg.)	W-124
Screw (Mtg. Chassis)	W-1345
Screw (Bezel)	W-1834
Washer (Speaker Mtg.)	27-7467
Washer Rubber (Mtg. Chassis)	27-4571
Washer (A. C. Switch)	W-894

PHILCO RADIO & TELEV. CORP.

MODELS 39-70, Code 121,
39-75, Code 121, 122
Schematic, Socket, Trimmers
Chassis

Alignment Notes

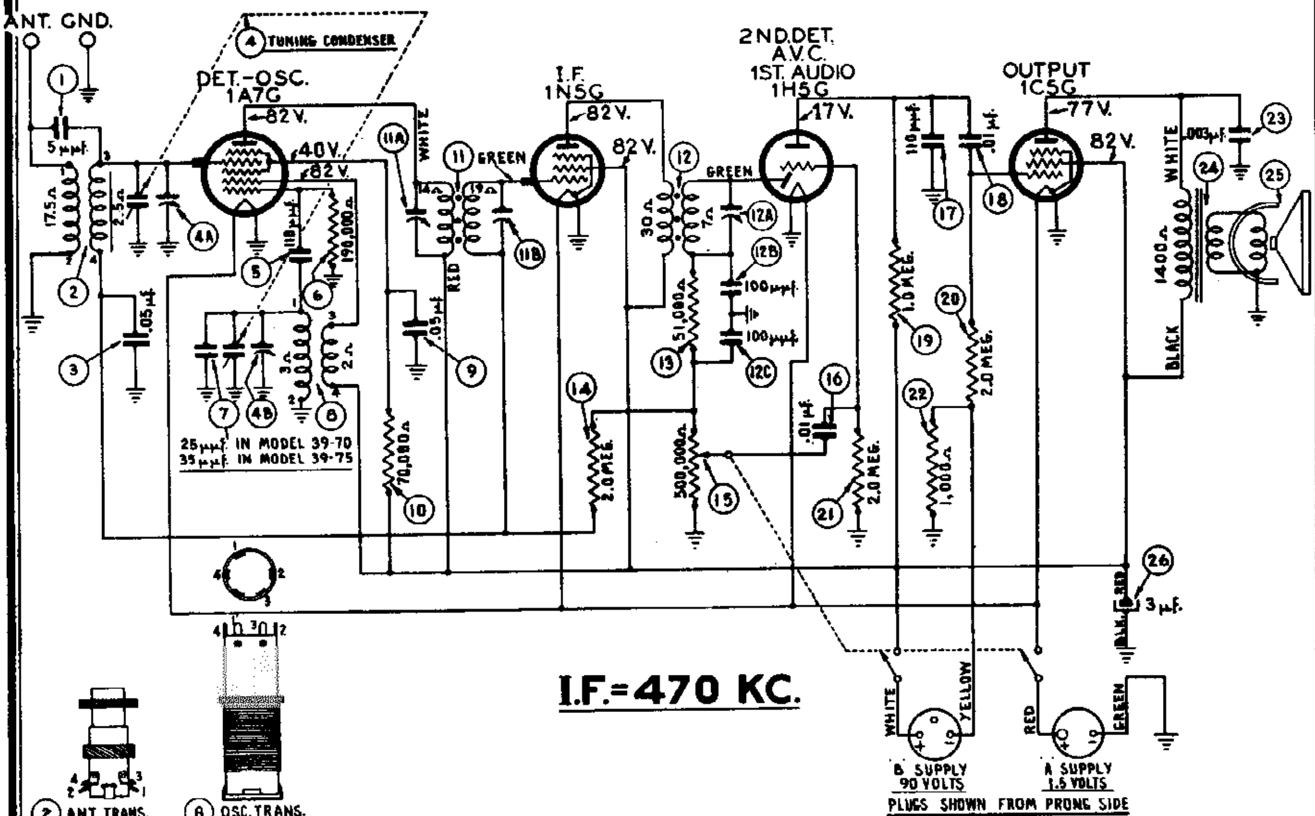
NOTE A—The "Dummy Antenna" consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser.

Model 39-70 and 39-80—To adjust the dial proceed as follows: Turn the tuning condenser to maximum capacity (plates fully meshed). With the tuning condenser in this position, set the pointer horizontally across the dial.

Model 39-75—With the tuning condenser in the maximum capacity position (plates fully meshed), loosen the coupling screws connecting the push-button unit to the condenser. The pointer is then set on the extreme left edge of the index line (low frequency end of the scale) with the tuning condenser fully closed. The gang is then opened until the pointer is at the right edge of the index line. The push-button shaft is then turned counter-clockwise to its "stop." With the tuning condenser and push-button shaft in these positions tighten the coupling set screws.

NOTE C—The locations of the compensators in Models 39-70, 39-75 and 39-80 are shown in Figs. (1), (2) and (3) respectively.



SCHEMATIC DIAGRAM MODEL 39-70 & 39-75

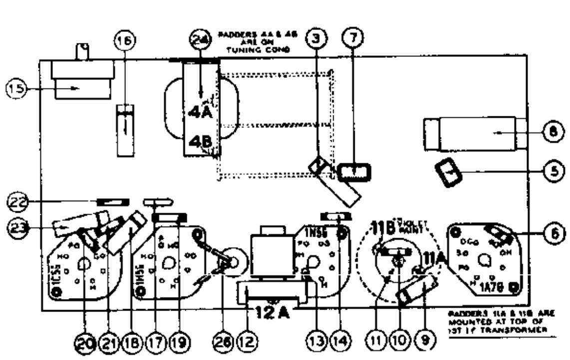


Fig. 1. Compensator and Part Locations
Model 39-70, Code 121
Underside of Chassis

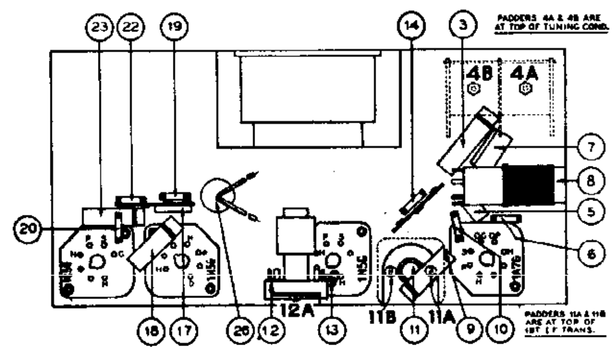


Fig. 2. Compensator and Part Locations
Model 39-75, Code 121-122
Underside of Chassis

MODELS 39-70,Code 121,
39-75,Code 121,122
Alignment,Parts List
MODEL 39-80,Code 121
Alignment

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS

Models 39-70, Code 121, and 39-75, Codes 121-122

Schem. No.	Description	Part No.
1	Condenser (5 mmf. mica) (Part of No. 2)	30-1097
2	Antenna Transformer (Includes No. 1)	32-3080
3	Condenser (.05 mf. tubular)	30-4519
4	Tuning Condenser Assembly, 39-70	31-2300
	Tuning Condenser Assembly, 39-75	31-2265
5	Condenser (110 mmf. mica)	30-1031
6	Resistor (190,000 ohms, ½ watt)	33-419339
7	Condenser (25 mmf. mica), 39-70	30-1067
	Condenser (35 mmf. silver plated mica), 39-75	30-1113
8	Oscillator Transformer, 39-70	32-3019
	Oscillator Transformer, 39-75	32-3083
9	Condenser (.05 mf. tubular)	30-4444
10	Resistor (70,000 ohms, ½ watt)	33-370339
11	1st I. F. Transformer Assembly, 39-70	32-2841
	1st I. F. Transformer Assembly, 39-75	32-3078
12	2nd I. F. Transformer Assembly	32-3081
13	Resistor (51,000 ohms, ¼ watt)	33-351339
14	Resistor (2.0 megohms, ½ watt)	33-520339
15	Volume Control and On-Off Switch, 39-70	33-5290
	Volume Control and On-Off Switch, 39-75	33-5291
16	Condenser (.01 mf. tubular)	30-4572
17	Condenser (110 mmf. mica)	30-1031
18	Condenser (.01 mf. tubular)	30-4572
19	Resistor (1.0 megohm, ½ watt)	33-510339
20	Resistor (2.0 megohms, ½ watt)	33-520339
21	Resistor (2.0 megohms, ½ watt)	33-520339
22	Resistor (1000 ohms, ½ watt)	33-210339
23	Condenser (.003 mf. tubular)	30-4469
24	Output Transformer	32-7995
*25	Cone and Voice Coil Assemblies—	
	39-70 "B," Spkr. Pt. No. 36-1435	36-4090
	39-70 "F," Spkr. Pt. No. 36-1447	36-4092
	39-75 "B," Spkr. Pt. No. 36-1442	36-4090
	39-75 "F," Spkr. Pt. No. 36-1447	36-4092
26	Electrolytic Condenser (3 mf.)	30-2346

MISCELLANEOUS PARTS

Model 39-70, Code 121

Description	Part No.
Bezel Window	27-5417
Cable (Battery)	41-3427
Dial	27-5416
Dial Drive Cord	31-2317
Dial Drive Spring	28-8751
Dial Pointer	28-5468
Knob	27-4332
On-Off Indicator Parts—	
Hub and Lever	38-9658
Toggle Link and Brkt. Assy.	38-9700
Spring (Toggle Link and Brkt. Assy.)	28-8925
Snap Fastener	56-1156
Pulley (Tuning Condenser)	28-6662
Pulley Screw (Tuning Condenser)	W-1400
Shaft Assy. (Tuning)	31-2290
*Speaker ("B" Cabinet)	36-1435
*Speaker ("F" Cabinet)	36-1447

Model 39-75, Code 121-122

Description	Part No.
Automatic Tuning Unit Complete	31-2282
Bezel (Dial)	40-6364
Bezel Gasket (Dial)	27-9174
Bezel (Push-Button)	28-5929
Bezel Gasket (Push-Button)	27-9218
Dial	27-5420
Dial Pointer	28-5934
Dial Drive Cord	31-2275
Dial Drive Cord Spring	28-8919
Dial Drive Drum (Tuning Condenser)	31-2281
Knob (Volume)	27-4753
Knob (Tuning)	27-4750
Knob Screw (Tuning)	28-6882
Push-Button	27-4749
Push-Button Spring	28-8918
Sleeve—Short (Tuning Shaft, Code 121-122)	28-6887
*Speaker (T Cabinet)	36-1442
Socket (1A7G)	27-6099
Socket (6 prong)	27-6086
Socket (7 prong)	27-6083

Model 39-75, Code 122

Description	Part No.
Extension Shaft (Volume)	38-9640
Extension Shaft (Tuning)	28-6928
Extension Sleeve—Long (Tuning Shaft)	28-6935
Socket (Speaker)	27-6115
*Speaker (Code 122)	36-1447
Spring (Retaining Vol. Knob)	28-8915

Specifications

TYPE OF CIRCUIT: Models 39-70, 39-75 and 39-80 are four tube battery operated superheterodyne receivers covering standard broadcast and state police stations. The receivers employ the new Philco Farm Radio Tubes, which require exceptionally low current for operation, Automatic Volume Control, and a Philco Speaker designed especially for battery radio. In general these models are similar but differ in their tuning mechanisms, speakers and cabinets.

Model 39-70 is manually tuned and is assembled in cabinet types "F" (floor model) and "B" (table model).

Model 39-75, codes 121 and 122 is equipped with automatic push-button and manual tuning. The automatic tuning mechanism contains six push-buttons for selecting any of six stations in the standard broadcast band. The procedure for adjusting and operating the push-buttons will be found in the instructions supplied with each set.

Code 122 of this model is assembled in cabinet type "F" (floor model); Code 121 in cabinet type "T" (table model).

Model 39-80 is manually tuned and is assembled in cabinet type "B" (table model) and cabinet type "XF" (floor model).

In addition to the new Philco speaker in Model 39-80 a sound chamber is also built into the cabinet. This sound chamber reinforces the sound produced by the speaker and results in greater clarity of tone and intensity of sound output. Bass compensation is also included in the volume control circuit.

TUNING RANGE: 530 to 1720 K. C.

INTERMEDIATE FREQUENCY: 470 K. C.

PHILCO TUBES: One 1A7G, First Detector and Oscillator; one 1N5G, I. F. Amplifier; one 1H5G, Second Detector; First Audio and Automatic Volume Control, and one 1C5G (1A5G Model 39-80) Pentode Output.

BATTERIES REQUIRED: One (1) Philco "A" Pack, Part No. 41-8014; one (1) Philco "B" Pack, Part No. 41-8015.

INSTALLING BATTERIES: The batteries are arranged in the cabinet in such a manner that they form part of the sound chamber air column.

It is very essential, therefore, that the following instructions be carefully observed when installing the batteries. Remove the back from the cabinet after removing the wood screws which hold it in place. Place the small "A" Pack in the left side (looking at the cabinet from the rear) of the cabinet, three inches in from the rear with the slanting portion facing the front of the cabinet. Place the long "B" Pack along the rear of the cabinet with the socket for the battery cable plug at the top towards the front.

Observe the arrangement of pins on the plugs of the battery cable and the corresponding holes in the sockets of the batteries, so you will be sure to insert them correctly. Insert plug with two prongs into the small "A" Pack and the plug with three prongs into the large "B" Pack.

Replace the back on the cabinet with the wood screws, making sure all of them are screwed in tight.

BATTERY DRAIN:

Models 39-70 and 39-75 .. "A"—(250 M. A.) "B"—(8½ M. A.)
Model 39-80 .... "A"—(200 M. A.) "B"—(6½ M. A.)

AERIAL AND GROUND: In order to obtain the highest amount of sensitivity from these receivers the Philco Farm Radio Aerial, Part No. 40-6383, should be used. This aerial is accurately designed to match the tuned antenna circuit in the receiver so that maximum performance will be obtained.

A good ground connection to the nearest water pipe or any other good ground source is also required.

CABINET DIMENSIONS:

Model	Height	Width	Depth
39-70B	13⅞"	11⅞"	6¼"
39-70F	37⅛"	23"	9⅝"
39-75T	8⅝"	13"	6⅛"
39-75F	37⅛"	23"	9⅝"
39-80B	17 7/16"	17 7/16"	9 11/16"
39-80XF	39⅜"	24¼"	12½"

Alignment of Compensators

EQUIPMENT REQUIRED:

(1) Signal Generator: Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose.

(2) Output Meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended.

(3) Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and screen terminals of the type 1C5G tube in Models 39-70 and 39-75 (1A5G Model 39-80) and adjusted for the 0 to 30 V. A. C. scale. After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on page 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

PROCEDURE FOR MODELS 39-70 AND 39-75

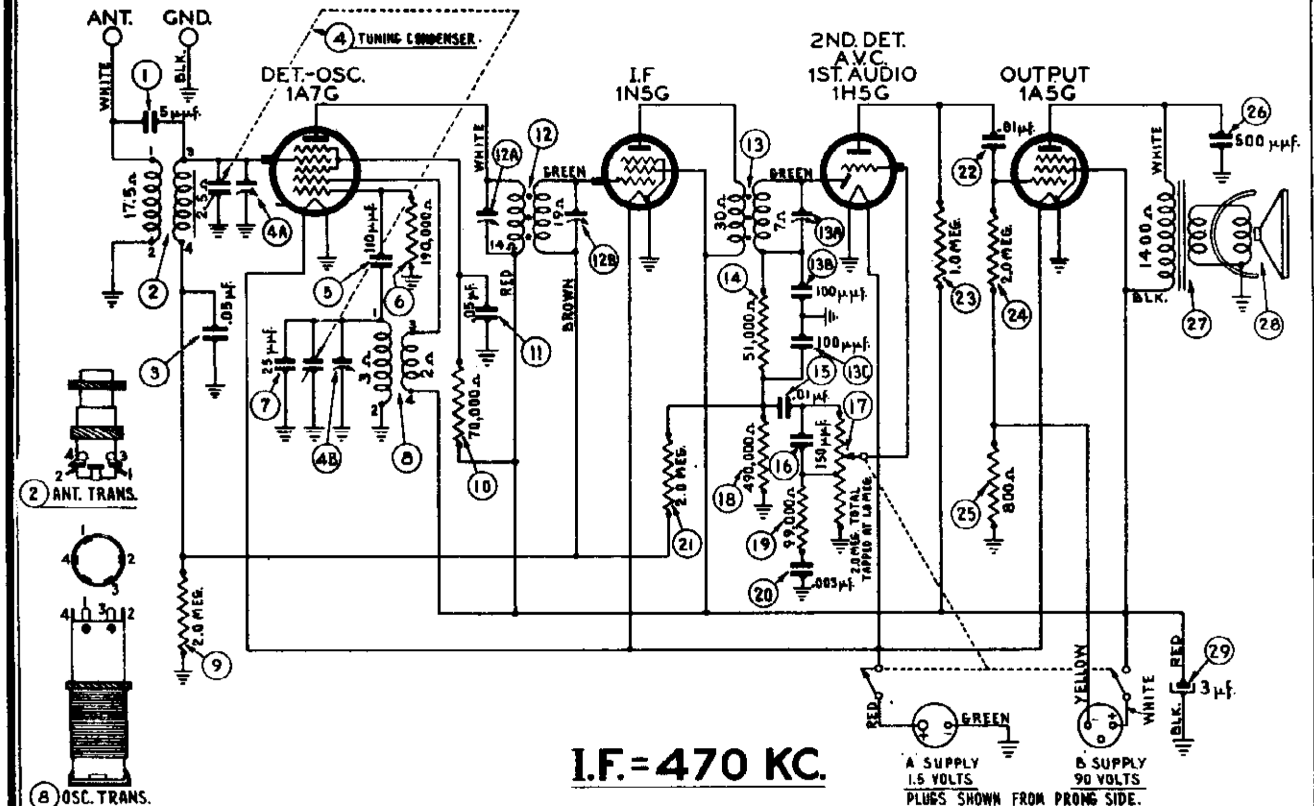
Operations in Order	Signal Generator: Output Connections to Receiver	Signal Generator: Dummy Antenna Note A	Signal Generator: Dial Setting	Receiver: Dial Setting	Receiver: Control Setting	Receiver: Adjust Compensators	Receiver: Special Instructions
1	1A7G Grid	.1 mfd.	470 K. C.	580 K. C.	Vol. Max.	12A, 11B, 11A	
2	Ant. (White)	225 mfd.	1550 K. C.	1550 K. C.	Vol. Max.	4B, 4A	Note B Note C

PROCEDURE FOR MODEL 39-80

Operations in Order	Signal Generator: Output Connections to Receiver	Signal Generator: Dummy Antenna Note A	Signal Generator: Dial Setting	Receiver: Dial Setting	Receiver: Control Setting	Receiver: Adjust Compensators	Receiver: Special Instructions
1	1A7G Grid	.1 mfd.	470 K. C.	580 K. C.	Vol. Max.	13A, 12B, 12A	
2	Ant. (White)	225 mfd.	1550 K. C.	1550 K. C.	Vol. Max.	4B, 4A	Note B Note C

PHILCO RADIO & TELEV. CORP.

MODEL 39-80, Code 121
Schematic, Socket
Trimmers, Chassis
Parts List



SCHEMATIC DIAGRAM MODEL 39-80

Replacement Parts Model 39-80, Code 121

Schem. No.	Description	Part No.
1	Condenser (mica, 5 mmf.—Part of No. 2)	30-1097
2	Antenna Trans.	32-3080
3	Condenser (tubular, .05 mf.)	30-4519
4	Tuning Cond.	31-2300
5	Condenser (mica, (110 mmf.)	30-1031
6	Resistor (190,000 ohms, ¼ watt)	33-419339
7	Condenser (mica, 25 mmfd.)	30-1067
8	Oscillator Trans.	32-3019
9	Resistor (2.0 meg., ½ watt)	33-520339
10	Resistor (70,000 ohms, ½ watt)	33-370339
11	Condenser (tubular, .05 mf.)	30-4444
12	1st I. F. Trans. Assy	32-2841
13	2nd I. F. Trans. Assy	32 3081
14	Resistor (51,000 ohms, ½ watt)	33-351339
15	Condenser (tubular, .01 mf.)	30-4572
16	Condenser (mica, 150 mmf.)	30-1033
17	Volume Control and On-Off Switch	33-5238
18	Resistor (490,000 ohms, ½ watt)	33-449339
19	Resistor (99,000 ohms, ½ watt)	33-399339
20	Condenser (tubular, .003 mf.)	30-4580
21	Resistor (2.0 meg., ½ watt)	33-520339
22	Condenser (tubular, .01 mf.)	30-4479
23	Resistor (1.0 meg., ½ watt)	33-510339
24	Resistor (2.0 meg., ½ watt)	33-520339
25	Resistor (800 ohms, ½ watt)	33-180339
26	Condenser (mica, 500 mmf.)	30-1114
27	Output Trans.	32-7984
28	Cone Assy. for Speaker 36-1410	36-4093
	Cone Assy. for Speaker 36-1436	36-4094
29	Electrolytic Condenser (3 mfd.)	30-2346
	Bezel Assy.	40-6374
	Bezel Screw	W-1834
	Brkt. (Mtg. Set in XF Cabinet)	56-1058
	Cable (Battery)	41-3437
	Dial	27-5413
	Dial Pointer	56-1091
	Dial Drive Cord	31-2318
	Dial Drive Cord Spring	28-8751

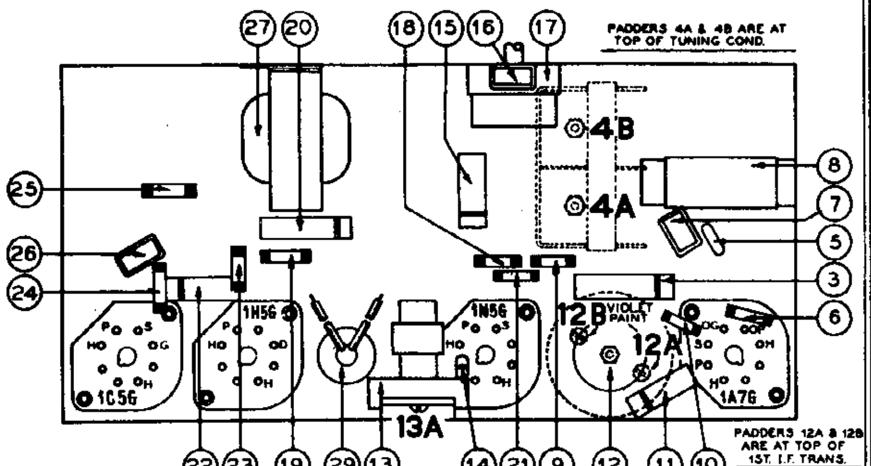


Fig. 2. Compensator and Part Locations
Model 39-80, Code 121
Underside of Chassis

Description	Part No.
Knob	27-4604
On-Off Indicator Parts—	
Hub and Lever	38-9658
Toggle Link and Brkt. Assy	38-9701
Spring (Toggle Assy.)	28-8925
Snap Fastener	56-1156
Pulley (Tuning Condenser)	28-6662

Description	Part No.
Pulley Screw (Tuning Condenser)	W-1400
Shaft Assy. (Tuning)	31-2290
*Speaker (B Cabinet)	36-1410
*Speaker (XF Cabinet)	36-1436
Socket (6 prong)	27-6086
Socket (7 prong)	27-6087
Socket (Speaker)	27-6115

MODELS 40-120, 40-125
Schematic, Voltage
Parts List

PHILCO RADIO & TELEV. CORP.

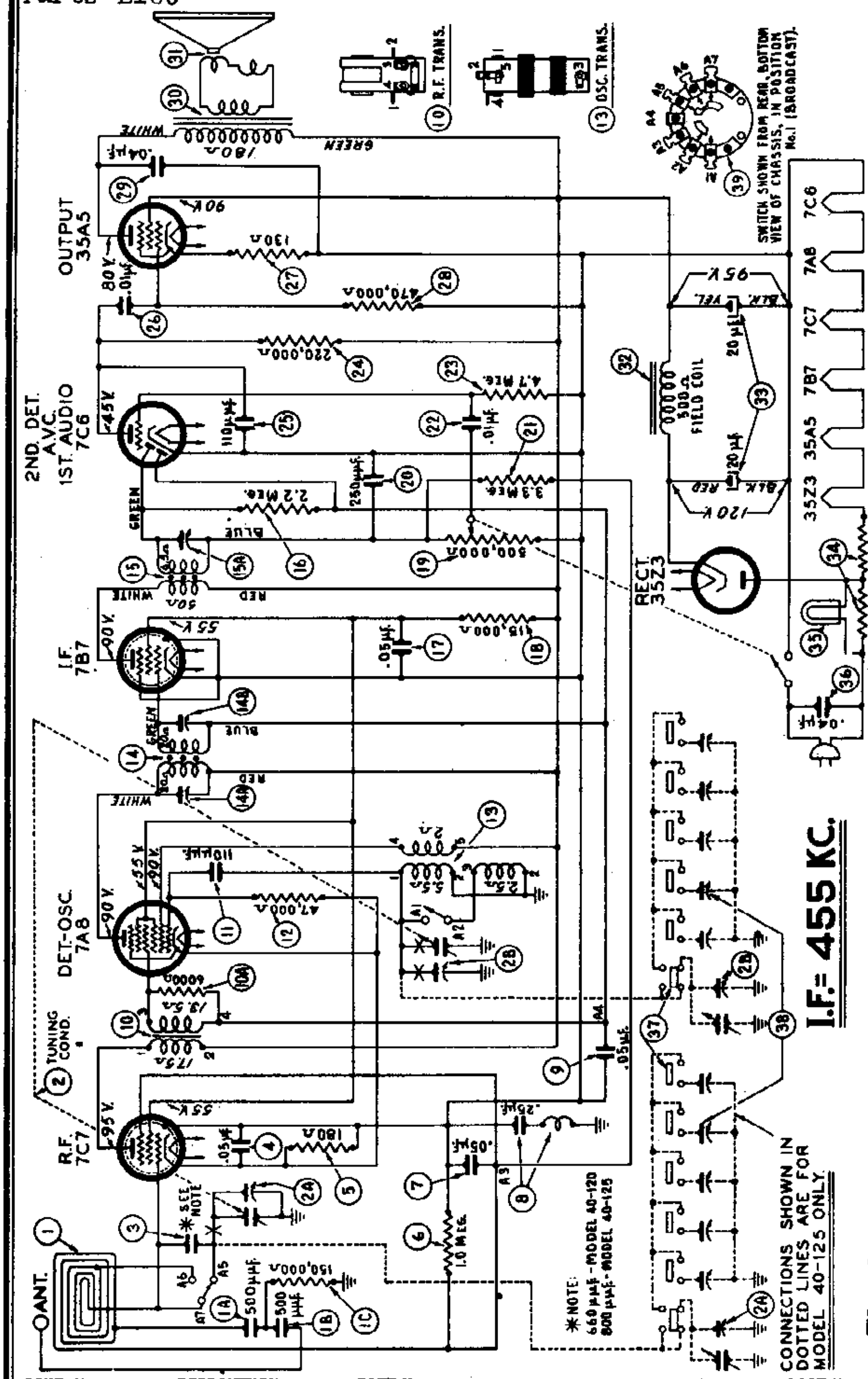


Fig. 2 SCHEMATIC DIAGRAM MODELS 40-120 & 40-125

May, 1939.

TYPE OF CIRCUIT: FOR ALIGNMENT, SEE INDEX

Models 40-120 and 40-125 are six (6) tube super-heterodyne receivers employing the new Philco built-in super aerial system which eliminate an outside aerial, and Philco High-Efficiency Loktal tubes. In addition, other features of design are: two tuning ranges; special high gain R. F. stage; automatic volume control and a Beam power audio output stage. In general, these models are similar but differ in their tuning mechanisms and cabinets.

Model 40-120 is dial tuned and assembled in cabinet type "C".

Model 40-125 is equipped with six electric push buttons for automatically selecting stations in addition to dial tuning. Five push buttons are used for stations one of which can be used in combination with a Special type PHILCO TELEVISION receiver for reception of television sound programs. The sixth push button selects dial tuning. The procedure for adjusting and operating push button tuning will be found in the instructions supplied with each receiver. Instructions for setting up the television push button is supplied with Philco Television Receivers. This model is assembled in special type "C" cabinet.

TUNING RANGE: 540 to 1600 K. C. 1.6 to 3.3 M. C.
INTERMEDIATE FREQUENCY: 455 K. C.
POWER SUPPLY: 115 volts A. C. or D. C. current.
POWER CONSUMPTION: 28 watts.
AUDIO OUTPUT: 1 watt.
PHILCO TUBES USED:
7C7, R. F.; 7A8, oscillator and first detector; 7B7, I. F.; 7C6, second detector, first audio; 35A5, output; 35Z3, rectifier.

CABINET DIMENSIONS:	Height	Width	Depth
Model 40-120	6 9/16	1 1/8	6 9/16
Model 40-125	7 7/16	11	6 5/8

SCHE. No.	DESCRIPTION	PART No.
1	Loop Antenna Assy. (Model 40-120)	38-9889
	(Model 40-125)	38-9890
1A	Mica Cond. (500 mmfd.)	30-1114
1B	Mica Cond. (500 mmfd.)	30-1114
1C	Resistor (150,000 ohms, ½ watt)	33-415339
2	Tuning Cond. Assy. (Model 40-120)	31-2386
	(Model 40-125)	31-2397
3	Mica Cond.	
	(660 mmfd., Model 40-120)	30-1136
	(800 mmfd., Model 40-125)	30-1135
4	Tubular Cond. (.05 mfd.)	30-4519
5	Resistor (180 ohms, ½ watt)	33-118339
6	Resistor (1.0 meg., ½ watt)	33-510339
7	Tubular Cond. (.05 mfd.)	30-4519
8	Tubular Cond. & Choke Assy.	
	(.25 mfd.)	38-9851
9	Tubular Cond. (.05 mfd.)	30-4519
10	R. F. Trans. Assy.	32-3273
10A	Resistor (6000 ohms, ½ watt)	33-260339
11	Mica Cond. (110 mmfd.)	30-1130
12	Resistor (47,000 ohms, ½ watt)	33-347339
13	Oscillator Trans. (Model 40-120)	32-3255
	(Model 40-125)	32-3256
14	1st I. F. Trans. Assy.	32-3237
15	2nd I. F. Trans. Assy.	32-3238
16	Resistor (2.2 meg., ½ watt)	33-522339
17	Tubular Cond. (.05 mfd.)	30-4519
18	Resistor (15,000 ohms, ½ watt)	33-315339
19	Volume Control & On-Off Switch	33-5306
20	Mica Cond. (250 mmfd.)	30-1074
21	Resistor (3.3 meg., ½ watt)	33-533339
22	Tubular Cond. (.01 mfd.)	30-4479
23	Resistor (4.7 meg., ½ watt)	33-547339
24	Resistor (220,000 ohms, ½ watt)	33-422339
25	Mica Cond. (110 mmfd.)	30-1130
26	Tubular Cond. (.01 mfd.)	30-4572
27	Resistor (130 ohms, ½ watt)	33-113336
28	Resistor (470,000 ohms, ½ watt)	33-447339
29	Tubular Cond. (.04 mfd.)	30-4119
30	Output Trans.	
	(Spkr. Part No. 36-1469-1)	32-8047
	(Spkr. Part No. 36-1469-9)	32-8044
31	Cone & Voice Coil Assy.	
	(Spkr. Part No. 36-1469-1)	36-4115
	(Spkr. Part No. 36-1469-9)	36-4113
32	Field Coil	
	(Replace Spkr. Part No. 36-1469)	
33	Electrolytic Cond. (20-20 mfd.)	30-2403
34	Filament Resistor	33-3375
35	Pilot Lamp	34-2068
36	Tubular Cond. (.04 mfd.)	30-4119
37	Push Button Switch (Model 40-125)	42-1512
38	Padder Strip (Model 40-125)	31-6312
39	Wave Switch	42-1505
	Cable & Plug (Power Supply)	L-3199
	Cabinet (Model 40-120)	10389A
	Clip (Coil Mtg.)	28-5002
	Dial	27-5517
	Drive Cord Assy.	31-2387
	Drive Shaft Assy.	31-2370
	Knobs (Volume-Tuning-Wave Switch)	27-4809
	Pilot Lamp Socket Assy.	38-9825
	Pointer (Dial)	27-4845
	Pointer (Knob)	56-1465
	Spring (Drive Cord Assy.)	28-8954
	Speaker Assy.	36-1469
	Sockets (Loktal)	55-0576

MISCELLANEOUS PARTS—MODEL 40-125

Cabinet	10390A
Escutcheon Plate (Pushbutton)	28-5742
Escutcheon Pins	W-1074
Knobs (Pushbutton)	27-4824
Tab (Dial)	27-5526
Tab Kit	40-6473

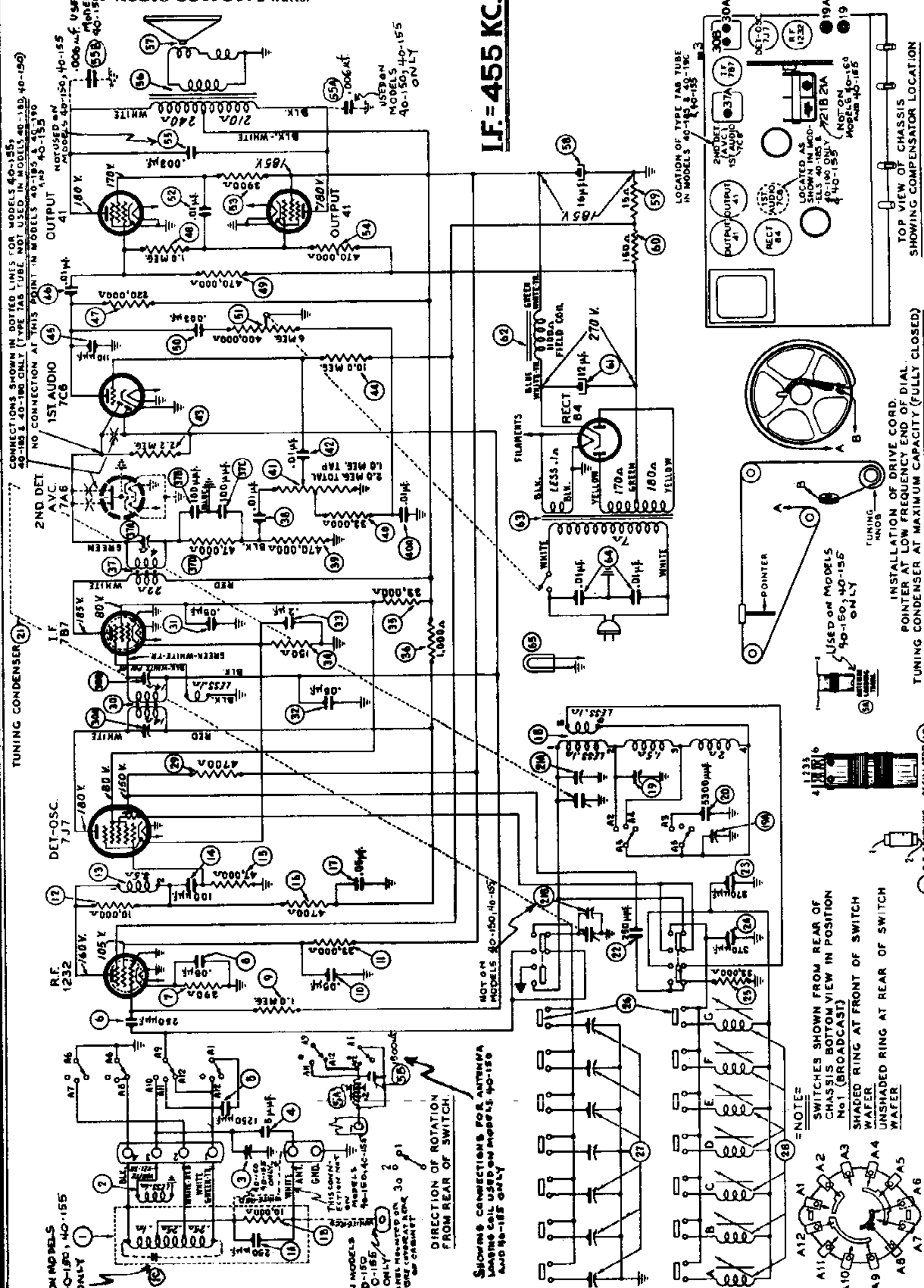
Schematic, Socket, Trimmers

PHILCO RADIO & TELEV. CORP.

MODELS 40-150, 40-155
MODELS 40-180, 40-185
40-190

POWER SUPPLY: 115 Volts, 25 and 60 cycle AC.
POWER CONSUMPTION: 60 watts.
AUDIO OUTPUT: 2 watts.

FREQUENCY TUNING RANGES: Three.
540 to 1550 K. C.
1.5 to 3.4 K. C.
6.0 to 18 M. C.



May, 1939.

FOR TUNER ADJUSTMENTS SEE INDEX

SCHEMATIC DIAGRAM MODELS 40-180, 40-185 & 40-190, models 40-150, 40-155

Fig. 1—Schematic Diagram

The voltages indicated were measured with a Philco Model 027 Voltmeter (1000 ohms per volt) — Power supply 115 volts, 60 cycle — Volume control minimum — No signal being received — Range switch "Brdcst."

MODELS 40-150,40-155 PHILCO RADIO & TELEV. CORP.
MODELS 40-180,40-185,40-190
Alignment

TYPE OF CIRCUIT: Models 40-150 and 40-155, Models 40-180, 40-185 and 40-190 are Electric Push-button and dial tuned radios incorporating the new Philco Built-in Super Aerial system which eliminates an outside aerial and reduces local static interference to a minimum. The models are also designed to receive the sound of a television program tuned in by special type Philco Television Sets.

PHILCO BUILT-IN SUPER AERIAL SYSTEM—Included in the built-in super aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. A feature of the built-in broadcast band statically shielded loop is that it may be turned to the position in which it picks up a minimum amount of interference, or if interference is not present the loop may be set in the position where best reception is obtained.

In general, these models are similar with the exception of the number of tubes used and cabinet design. Model 40-180 employs a seven tube receiver. Models 40-185 and 40-190 employ eight tube receivers assembled in different type cabinets.

Each model is equipped with eight electric tuning push buttons for automatically selecting stations. Six of the push buttons are used for broadcast stations, one for selecting dial tuning and one push button may be set up for use with a Philco wireless Record Player or the sound program tuned in by special Philco Television Sets. Model 40-150 employs seven (7) tubes and Model 40-155, eight (8) tubes.

Aligning of Compensating Condensers
Equipment Required

(1) *Signal Generator.* In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 077 is required. This signal generator covers a frequency range of 540 to 36,000 K. C. (2) *Indicating Device.* To obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. When using the vacuum tube voltmeter, an aligning adapter, Philco Part No. 45-2767, is necessary for connecting to the A. V. C. circuit. These testers also contain an audio output meter which may also be used as an indicating device. (3) *Aligning Tools.* Fiber handle screw driver, Philco Part No. 45-2610, and fiber wrench, Philco Part No. 7696.

Connecting Aligning Instruments

VACUUM TUBE VOLTMETER—To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Adjusting I. F. Circuit.

Remove the 12J2 R. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire (light color) which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

2. Adjusting R. F. Circuit.

To adjust the R. F. circuit, the aligning adaptor is inserted in the 7C6 A. F. tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the above paragraph.

With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 41 output tube and adjust the output meter for the 0 to 30 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram, page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders that the receiver be left in the cabinet.

Models 40-150, 40-155 40-180 – 185 – 190

	SIGNAL GENERATOR		RECEIVER			
Operations	*Output Connections*	*Dial Frequency*	*Dial Frequency*	*Control Settings*	*Adjust Compensators for Max. Signal*	*Remarks*
1	High Side to No. 1 Ter. Loop Panel	I. F. 455 K. C.	580 K. C. No Signal	Range Sw. "Brdcst." Volume "Max." Push-Button "Dial"	37A, 30, 30A	See Note A.
2	Use Loop on Generator	18 M. C.	18 M. C.	Range Sw. "SW." Volume "Max." Push-Button "Dial."	21A	Note B. Note D.
3	Use Loop on Generator	1400 K. C.	1400 K. C.	Range Sw. "Brdcst." Volume "Max."	19A, 21B	
4	Use Loop on Generator	580 K. C.	580 K. C.	Range Sw. "Brdcst." Volume "Max."	19	Roll Cond. Note C.
5	Use Loop on Generator	1400 K. C.	1400 K. C.	Range Sw. "Brdcst." Volume "Max."	19A, 21B	Roll Cond. Note C.
6	Use Loop on Generator	18 M. C.	18 M. C.	Range Sw. "SW."	3	Roll Cond. Note C.

NOTE A—A "Dummy Antenna" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic diagram.

NOTE C—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE D—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. below the frequency being used on any high frequency range.

Socket, Trimmers
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

MODELS 40-150, 40-155
MODELS 40-180, 40-185
40-190

PHILCO TUBES USED:

MODEL 40-150, 40-180—1232, R. F.; 7J7, Converter; 7B7, I. F.; 7C6, Second Detector and First Audio; two 41, Audio Power Outputs; 84, Rectifier.

MODEL 40-155, 40-185 AND 40-190—1232, R. F.; 7J7, Converter; 7B7, I. F.; 7A6, Detector; 7C6, First Audio; two 41, Power Outputs; 84, Rectifier.

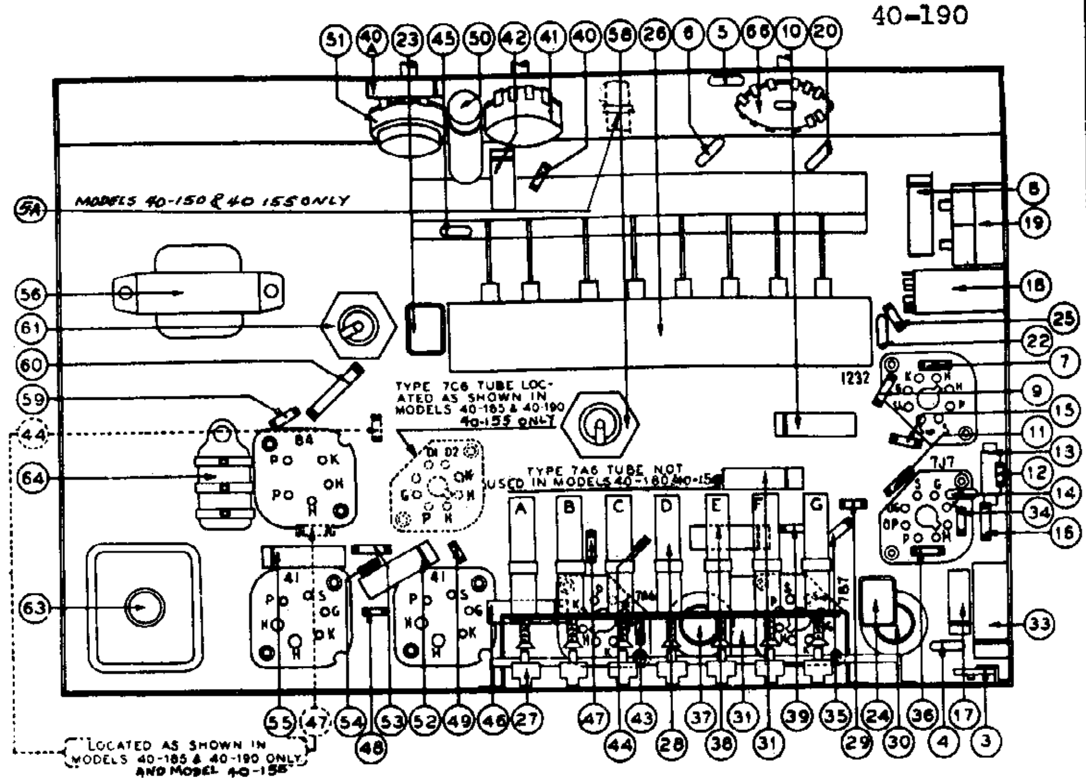


Fig. 2—Part locations underside of chassis

Replacement Parts—Models 40-180, 40-185, 40-190

Sch. No.	Description	Part No.
1	Loop Ass'y (Bróadcast)	38-9880
1A	Mica Cond. (250 mmfd.)	61-0033
1B	Resistor (10,000 ohms, ½ watt)	33-310339
2	Loop Ass'y (Short Wave)	38-9884
3	Compensator	31-6308
4	Mica Cond. (5 mmfd.)	30-1097
5	Mica Cond. (1250 mmfd.)	5886
6	Mica Cond. (250 mmfd.)	61-0033
7	Resistor (390 ohms, ½ watt)	33-139339
8	Tubular Cond. (.05 mfd.)	30-4444
9	Resistor (1.0 meg., ½ watt)	33-510339
10	Tubular Cond. (.05 mfd.)	30-4123
11	Resistor (33,000 ohms, ½ watt)	33-333339
12	Resistor (10,000 ohms, ½ watt)	33-310339
13	R. F. Coupling Trans.	32-3194
14	Mica Cond. (100 mmfd.)	30-1128
15	Resistor (47,000 ohms, ½ watt)	33-347339
16	Resistor (4700 ohms, ½ watt)	33-247339
17	Tubular Cond. (.05 mfd.)	30-4123
18	Oscillator Trans.	32-3195
19	Compensator (2 Section)	31-6298
20	Mica Cond. (5300 mmfd.)	30-1134
21	Tuning Cond. Ass'y	31-2391
22	Mica Cond. (250 mmfd.)	61-0033
23	Silver Mica Cond. (370 mmfd.)	30-1110
24	Silver Mica Cond. (370 mmfd.)	30-1110
25	Resistor (33,000 ohms, ½ watt)	33-333339
26	Push Button Switch	42-1489
27	Padder Strip (Push Buttons)	31-6299
28	Coil Strip Ass'y	
28A	Coil No. 1	
28B	Coil No. 2 — 540-1060 K. C.	32-3042
28C	Coil No. 3	
28D	Coil No. 4	
28E	Coil No. 5 — 650-1110 K. C.	32-3042
28F	Coil No. 6	
28G	Coil No. 7 — 920-1600 K. C.	32-3041
29	Resistor (4700 ohms, ½ watt)	33-247339
30	1st I. F. Trans. Ass'y	32-3245
31	Tubular Cond. (.05 mfd.)	30-4123
32	Tubular Cond. (.05 mfd.)	30-4519
33	Tubular Cond. (.2 mfd.)	30-4536
34	Resistor (150 ohms, ½ watt)	33-115339
35	Resistor (33,000 ohms, ½ watt)	33-333339
36	Resistor (1000 ohms, ½ watt)	33-210339
37	2nd I. F. Trans. Ass'y	32-3246
38	Tubular Cond. (.01 mfd.)	30-4479
39	Resistor (470,000 ohms, ½ watt)	33-447339
40	Resistor (33,000 ohms, ½ watt)	33-333339
40A	Tubular Cond. (.01 mfd.)	30-4479
41	Volume Control (2.0 meg.)	33-5275
42	Tubular Cond. (.01 mfd.)	30-4479
43	Resistor (2.2 megs., ½ watt)	33-522339
44	Resistor (10.0 megs., ½ watt)	33-610339
45	Mica Cond. (110 mmfd.)	30-1130
46	Tubular Cond. (.01 mfd.)	30-4572
47	Resistor (220,000 ohms, ½ watt)	33-422339
48	Resistor (1.0 meg., ½ watt)	33-510339
49	Resistor (470,000 ohms, ½ watt)	33-447339
50	Tubular Cond. (.003 mfd.)	30-4469
51	Tone Control & On-Off Switch	33-5314
52	Tubular Cond. (.01 mfd.)	30-4572
53	Resistor (3900 ohms, ½ watt)	33-239339
54	Resistor (470,000 ohms, ½ watt)	33-447339
55	Tubular Cond. (.003 mfd.)	30-4469
56	Output Trans.	32-8053
57	Cone & Voice Coil Ass'y	
	(Spkr. Part No. 36-1479-2)	36-4089
	(Spkr. Part No. 36-1479-4)	36-4111
58	Electrolytic Cond. (16 mfd., 200 V.)	30-2406
59	Resistor (15 ohms, ½ watt)	33-015351
60	Resistor (150 ohms, 1 watt)	33-115451
61	Electrolytic Cond. (12 mfd., 350 V.)	30-2405
62	Field Coil (Replace Spkr., Part No. 36-1479)	
63	Power Trans. (115 Volts, 50 to 60 Cycle)	32-8052
64	Line Cond. (Bakelite, .01-.01 mfd.)	3903-DG
65	Pilot Lamp	34-2210
66	Wave Switch	42-1490
	Speaker	36-1479

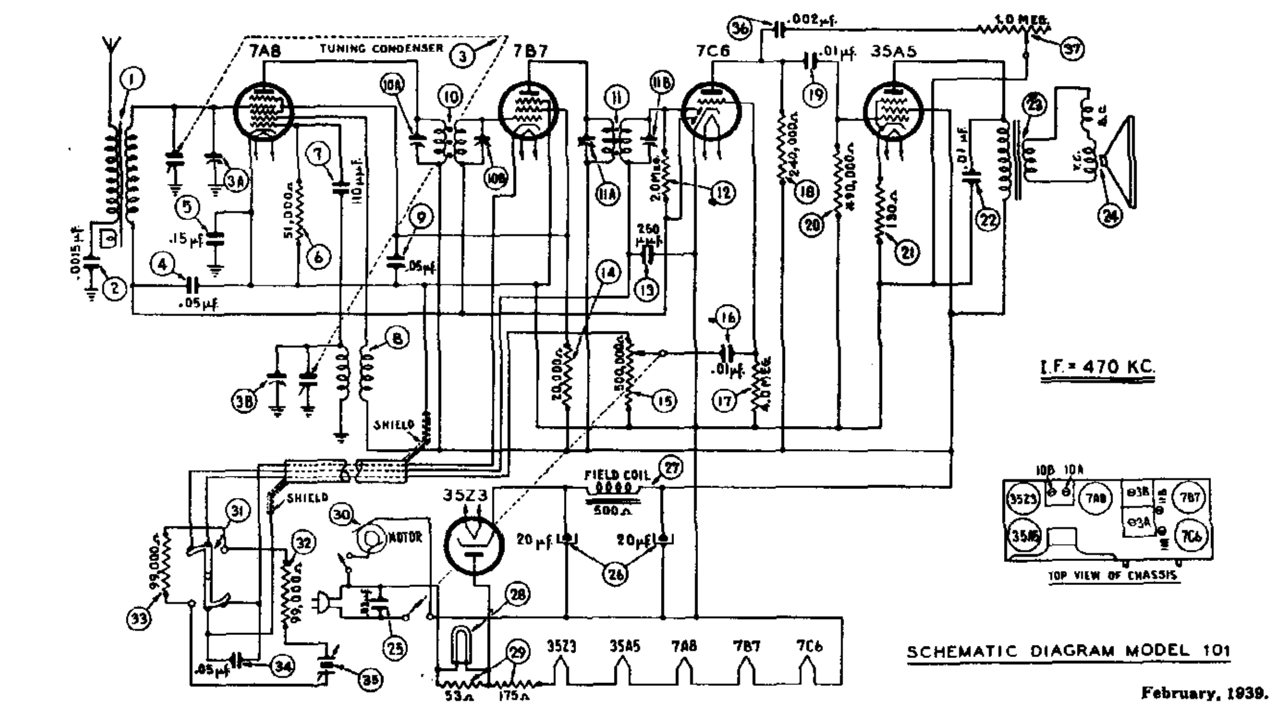
Models 40-150, 40-155

Parts listed below apply to Models 40-150, 40-155 only. For parts not found below refer to list for Models 40-180, 40-185 and 40-190 above.

Sch. No.	Description	Part No.
1	Loop Ass'y (Broadcast)	38-9894
1C	Compensator Ass'y	31-6318
4	Mica Cond. (5 mmfd.)	30-1120
5B	Mica Cond. (1500 mmfd.)	7139
5A	Ant. Loading Trans.	32-3290
8	Tubular Cond. (.05 mfd.)	30-4519
21	Tuning Cond. Ass'y	31-2401
33	Tubular Cond. (.2 mfd.)	30-4587
38	Tubular Cond. (.01 mfd.)	30-4581
40A	Tubular Cond. (.01 mfd.)	30-4581
42	Tubular Cond. (.01 mfd.)	30-4581
55B	Tubular Cond. (.006 mfd.)	30-4504
55A	Tubular Cond. (.006 mfd.)	30-4504
57	Cone and Voice Coil Ass'y (Spkr. Part No. 36-1483-2)	
62	Field Coil (Replace Spkr. Part No. 36-1483)	
63	Power Trans. (110 Volts, 60 Cycles)	32-8065
	Speaker	36-1483

MODEL 101
Schematic, Socket, Trimmers
Alignment, Parts

PHILCO RADIO & TELEV. CORP.



SCHEMATIC DIAGRAM MODEL 101

February, 1939.

Model 101 is a combination Phonograph and Radio Receiver. The phonograph section is designed to play 10 or 12 inch standard records (78 R. P. M.) and includes a manually operated crystal pickup and Turntable Motor.

The radio receiver employs an A. C. or D. C. operated superheterodyne circuit covering standard broadcast and police stations. (540 to 1720 K. C.)

POWER SUPPLY: Radio, 115 volts A. C. or D. C. Phonograph, 115 volts — 60 cycles **only.**

POWER CONSUMPTION: 57 watts.

INTERMEDIATE FREQUENCY: 470 K. C.

PHILCO TUBES USED: Five tubes; 1-7A8, first detector oscillator; 1-7B7, I. F. amplifier; 1-7C6, 2nd detector, A. V. C., first audio; 1-35A5, audio output, and 1-35Z3, rectifier.

ALIGNMENT OF COMPENSATORS

Operations in Order	SIGNAL GENERATOR				RECEIVER		SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna, Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Ant. Section of Gang	.004 mfd.	470 K. C.	540 K. C.	Vol. Max. Tone Treble	11A, 11B, 10A, 10B and 11B	Adjust for max. output
2	Ant.	100 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Tone Treble	3B, 3A	Adjust for max. output

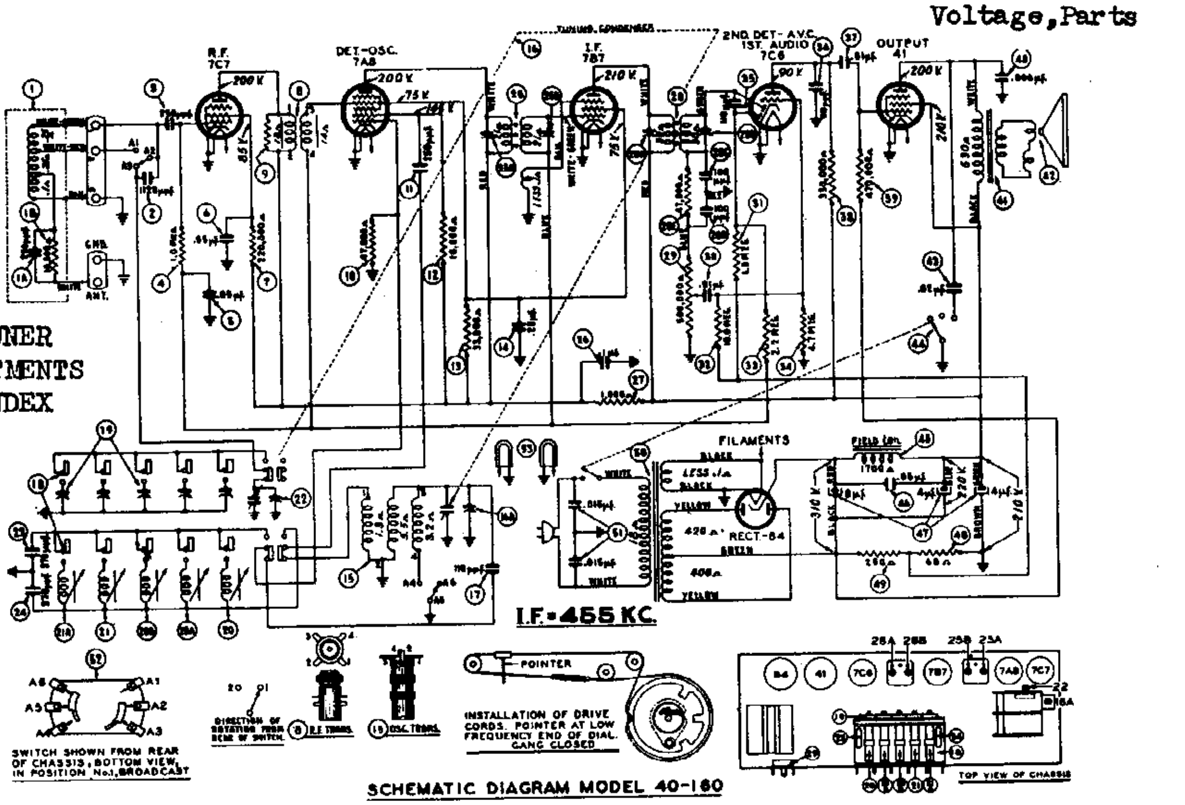
Sche. No.	Description	Part No.
1	Ant. Trans.	32-3151
2	Tubular Cond. (.0015 mfd., 200 V.)	30-4555
3	Tuning Cond.	31-2354
4	Tubular Cond. (.05 mfd., 400 V.)	30-4519
5	Tubular Cond. (.15 mfd., 400 V.)	30-4505
6	Resistor (51,000 ohms, ½ watt)	33-351339
7	Mica Cond. (110 mmfd.)	30-1031
8	Osc. Trans.	32-3152
9	Tubular Cond. (.05 mfd., 400 V.)	30-4519
10	1st I. F. Trans.	32-3149
11	2nd I. F. Trans.	32-3150
12	Resistor (2.0 megohms, ½ watt)	33-520339
13	Mica Cond. (250 mmfd.)	30-1032
14	Resistor (20,000 ohms, ½ watt)	33-320339
15	Volume Control (500,000 ohms)	33-5306
16	Tubular Cond. (.01 mfd., 200 V.)	30-4479
17	Resistor (4.0 megohms, ½ watt)	33-540339
18	Resistor (240,000 ohms, ½ watt)	33-424339
19	Tubular Cond. (.01 mfd., 400 V.)	30-4572
20	Resistor (490,000 ohms, ½ watt)	33-449339

Sche. No.	Description	Part No.
21	Resistor (130 ohms, ½ watt)	33-113339
22	Tubular Cond. (.01 mfd., 400 V.)	30-4572
23	Output Trans. (for speaker 36-1469-1)	32-8047
	Output Trans. (for speaker 36-1469-9)	32-8044
24	Speaker	36-1469
25	Tubular Cond. (.03 mfd., 400 V.)	30-4449
26	Electrolytic Cond. (20-20 mfd., 150 V.)	30-2382
27	Field Coil (Replace Speaker 36-1469)	
28	Pilot Lamp	34-2068
29	Line Resistor	33-3367
30	Phono Motor	35-1158
31	Radio Phono Switch	42-1500
32	Resistor (99,000 ohms, ½ watt)	33-399339
33	Resistor (99,000 ohms, ½ watt)	33-399339
34	Tubular Cond. (.05 mfd., 400 V.)	30-4519
35	Crystal Pickup	415-1027
	Tone Arm and Crystal Pickup complete	35-2026
36	Tubular Cond. (.002 mfd., 400 V.)	30-4579
37	Tone Control	33-5320
38	Motor Switch	42-1498

PHILCO RADIO & TELEV. CORP.

MODEL 40-160
Schematic, Socket
Trimmers, Chassis
Voltage, Parts

FOR TUNER
ADJUSTMENTS
SEE INDEX



SCHEMATIC DIAGRAM MODEL 40-160

Power Supply: 115 V., 25 and 60 Cyc. A. C.
Power Consumption: 45 watts.
Frequency Tuning Ranges: (Two) 540 to 1550 K.C. 1500 to 3350 K.C.
Intermediate Frequency: 455 K.C.
Audio Output: 2 watts.

May, 1939

Sch. No.	Description	Part No.
1	Loop Ass'y	38-9897
1A	Mica Cond. (250 mmfd.)	61-0033
1B	Resistor (10,000 ohms, ½ watt)	33-310339
2	Mica Cond. (1120 mmfd.)	30-1140
3	Mica Cond. (250 mmfd.)	61-0033
4	Resistor (1.0 meg., ½ watt)	33-510339
5	Tubular Cond. (.05 mfd.)	30-4519
6	Tubular Cond. (.05 mfd.)	30-4123
7	Resistor (220,000 ohms, ½ watt)	33-422339
8	R. F. Trans.	32-3283
9	Resistor (6800 ohms, ½ watt)	33-268339
10	Resistor (470,000 ohms, ½ watt)	33-447339
11	Mica Cond. (250 mmfd.)	61-0033
12	Resistor (10,000 ohms, ½ watt)	33-310339
13	Resistor (33,000 ohms, ½ watt)	33-333339
14	Tubular Cond. (.25 mfd.)	30-4448
15	Oscillator Trans.	32-3212
16	Tuning Cond.	31-2374
17	Mica Cond. (110 mmfd.)	30-1130
18	Push Button Switch	42-1493
19	Padder Strip and Bracket Assy.	31-6325
20	Coil No. 1—540-1000 K.C.	32-3042
20A	Coil No. 2 650-1100 K.C.	32-3042
20B	Coil No. 3 740-1300 K.C.	32-3042
21	Coil No. 4—900-1500 K.C.	32-3041
21A	Coil No. 5—1100-1600 K.C.	32-3041
22	Compensator	31-6308
23	Silver Mica Cond. (370 mmfd.)	30-1110
24	Silver Mica Cond. (370 mmfd.)	30-1110
25	1st I.F. Trans.	32-3210
26	Tubular Cond. (.1 mfd.)	30-4455
27	Resistor (1000 ohms, ½ watt)	33-210339
28	2nd I.F. Trans. Assy.	32-3211
29	Volume Control	33-5319
30	Tubular Cond. (.01 mfd.)	30-4572
31	Resistor (1.0 meg., ½ watt)	33-510339
32	Resistor (10.0 meg., ½ watt)	33-610339
33	Resistor (2.2 meg., ½ watt)	33-522339
34	Resistor (4.7 meg., ½ watt)	33-547339
35	Mica Cond. (110 mmfd.)	30-1130
36	Mica Cond. (110 mmfd.)	30-1130
37	Tubular Cond. (.01 mfd.)	30-4572
38	Resistor (330,000 ohms, ½ watt)	33-433339
39	Resistor (470,000 ohms, ½ watt)	33-447339
40	Tubular Cond. (.006 mfd.)	30-4504
41	Output Trans.	32-8056
42	Cone and Voice Coil Assy. (Spkr. Part No. 36-1480-3)	36-4086
43	Tubular Cond. (.02 mfd.)	30-4599
44	Tone Control and On-Off Switch	42-1520
45	Field Coil (Replace Spkr. Part No. 36-1480)	
46	Tubular Cond. (.05 mfd.)	30-4123
47	Electrolytic Cond. (8-4-4 mfd.)	30-2400
48	Resistor (60 ohms, ½ watt)	33-060339
49	Resistor (250 ohms, ½ watt)	33-125339
50	Power Trans.	32-8055
51	Line Cond. (.015-.015 mfd.)	3903-DG
52	Wave Switch	42-1494
53	Pilot Lamps	34-2064

MISCELLANEOUS PARTS

Description	Part No.
Bezel	27-4842
Cabinet	10398A
Cable and Plug (Power Supply)	L-3199
Clip (Coil Mtg.)	28-5002
Dial	27-5506
Drive Cord Assy. (Pointer)	31-2382
Drive Cord Assy. (Tuning Cond.)	31-2400
Escutcheon (Push Button)	27-4843
Insulating Bushing (Insulate Drive Shaft)	27-9437
Knobs (Tuning, Tone, Volume, Wave Switch)	27-4332
Knobs (Push Buttons)	27-4824
Pilot Lamp Socket Assy.	38-9908
Pointer	56-1479
Reflector (Pilot Lamp)	27-9455
Rubber Hose (Tuning Cond. Drive)	27-9432
Spring (Tuning, Drive Cord)	28-8751
Spring (Pointer, Drive Cord)	28-8953
Spring (Drive Shaft, Grounding)	28-8955
Screw (Bezel Mtg.)	W-1834
Speaker	36-1480
Socket (Type 84 Tube)	27-6035
Socket (Type 41 Tube)	27-6036
Socket (Loktal, Type 7A8 Tube)	27-6129
Socket (Loktal, Type 7C7, 7B7, 7C6 Tubes)	27-6131
Tab (Dial)	27-5528
Tab (Television)	27-9451
Tab Kit	40-6474
Tuning Shaft	56-6052
Tuning Drive Drum Assy.	38-9883
Washer ("C" Type, Tuning Shaft)	28-2043

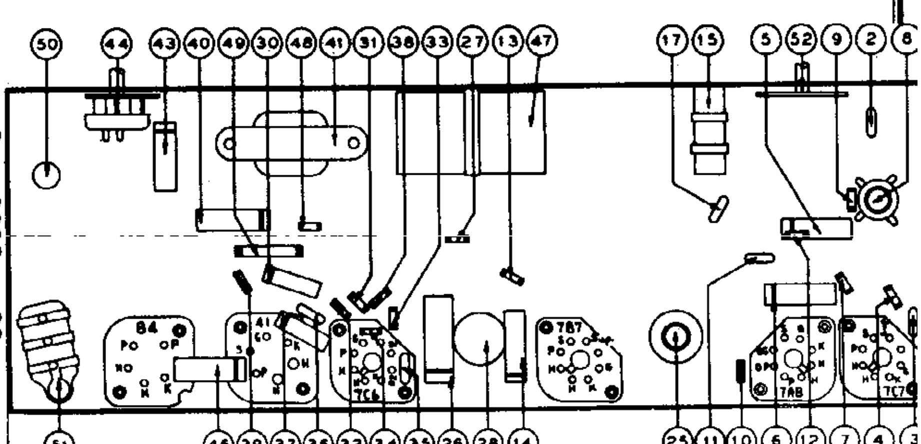


Fig. 2—Part Locations, Underside of Chassis

MODEL 108, Code 121
Socket, Trimmers, Chassis
Tuner Unit Chassis
Alignment

PHILCO RADIO & TELEV. CORP.

MODEL 40-160
Alignment

MODEL 40-160. Aligning of Compensating Condensers

Equipment Required

(1) Signal Generator. In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 077 is required. This signal generator covers a frequency range of 540 to 36,000 K.C. (2) Indicating Device. To obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. These testers also contain an audio output meter which may be used as an indicating device. (3) Aligning Tools. Fiber handle screw driver Philco Part No. 45-2610 and when using the vacuum tube voltmeter for adjusting the set, an aligning adaptor Part No. 45-2767 is required.

Connecting Aligning Instruments

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Adjusting I.F.: Remove the 7C7 R.F. tube from its socket and insert the aligning adaptor in the socket, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

2. Adjusting R.F. Padders: To adjust the R.F. padders, insert the aligning adaptor in the 7C6 socket and place the tube in the adaptor. The vacuum voltmeter remains connected to the adaptor as given in the Adjusting I.F. above.

With the voltmeter connected in this manner a very sensitive indication of the output voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 41 type tube and adjust the output meter for the 0 to 30 A.C. scale.

After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I.F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R.F. padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

SIGNAL GENERATOR			RECEIVER			
Operations in Order	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	adjust compensators	Special Instructions
1	High Side to No. 1 Ter. Loop Panel	455 K.C.	580 K.C.	Vol. Max. Range Switch "Broadcast." Dial push button "In"	28A 25 A 28B 25 B	See Paragraph on Signal Generator Above
2	Use Loop on Generator	1500 K.C.	1500 K.C.	Vol. Max. Range Switch "Broadcast"	16A 22	Note A

NOTE A—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Schematic Diagram.

MANY OF THE PARTS IN THIS PHILCO, SUCH AS CONDENSERS AND RESISTORS, ARE HELD TO MUCH CLOSER TOLERANCE THAN STANDARD REPLACEMENT PARTS. GENUINE PHILCO REPLACEMENT PARTS MUST BE USED TO OBTAIN SATISFACTORY PERFORMANCE OF THIS MODEL.

MODEL 108, CODE 121. ALIGNMENT OF COMPENSATORS

EQUIPMENT REQUIRED:

(1) Signal Generator; Philco Model 077.
(2) Output Meter, Philco 027 Vacuum Tube Voltmeter and Circuit Tester.
(3) Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube. The Vacuum Tube Voltmeter can also be used in aligning the receiver by connecting the Negative terminal through a one megohm Resistor to the 6A7 grid. The Positive terminal is connected to the chassis. After connecting the Output Meter, adjust compensators in the order as given in tabulation below. Locations of the compensators are shown in Fig. 1.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	6A7 Grid	.1 mf.	470 K. C.	580 K. C.	*Vol. Cont. Max. Range Sw. (Brdcst)	(21A) (12B) (12A)	
2	Ant. Ter.	100 mmf.	18.0 M. C.	18.0 M. C.	Vol. Cont. Max. Range Sw. (S. W.)	(4B)	See Note B, C
3	Ant. Ter.	100 mmf.	1550 K. C.	1550 K. C.	Vol. Cont. Max. Range Sw. (Brdcst)	(5) (4A)	
4	Ant. Ter.	100 mmf.	580 K. C.	580 K. C.	Vol. Cont. Max. Range Sw. (Brdcst)	(5A)	
5	Ant. Ter.	100 mmf.	1550 K. C.	1550 K. C.	Vol. Cont. Max.	(5)	

NOTE A — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown in Service Bulletin No. 305.

NOTE C — Compensators (4A) and (4B) are located on top of the tuning condenser. Compensator (4B) is the first one from the tuning drum side.

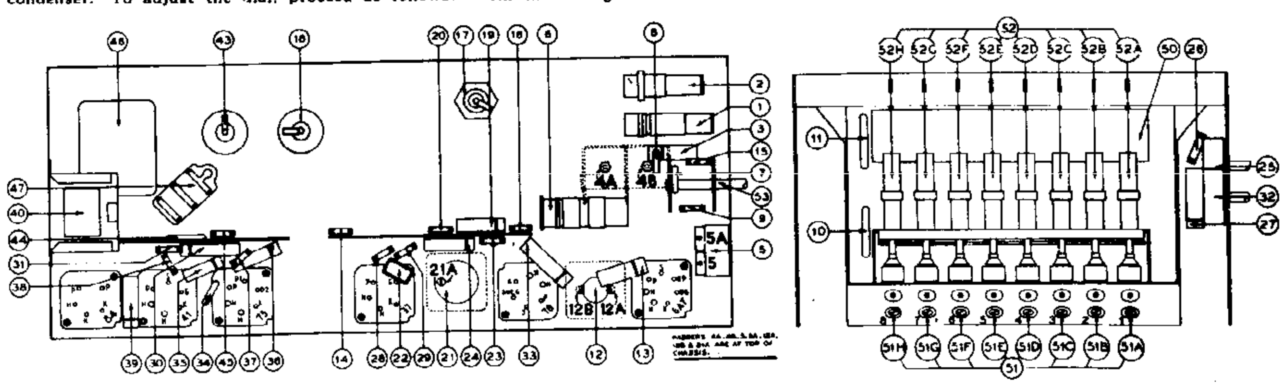


Fig. 1

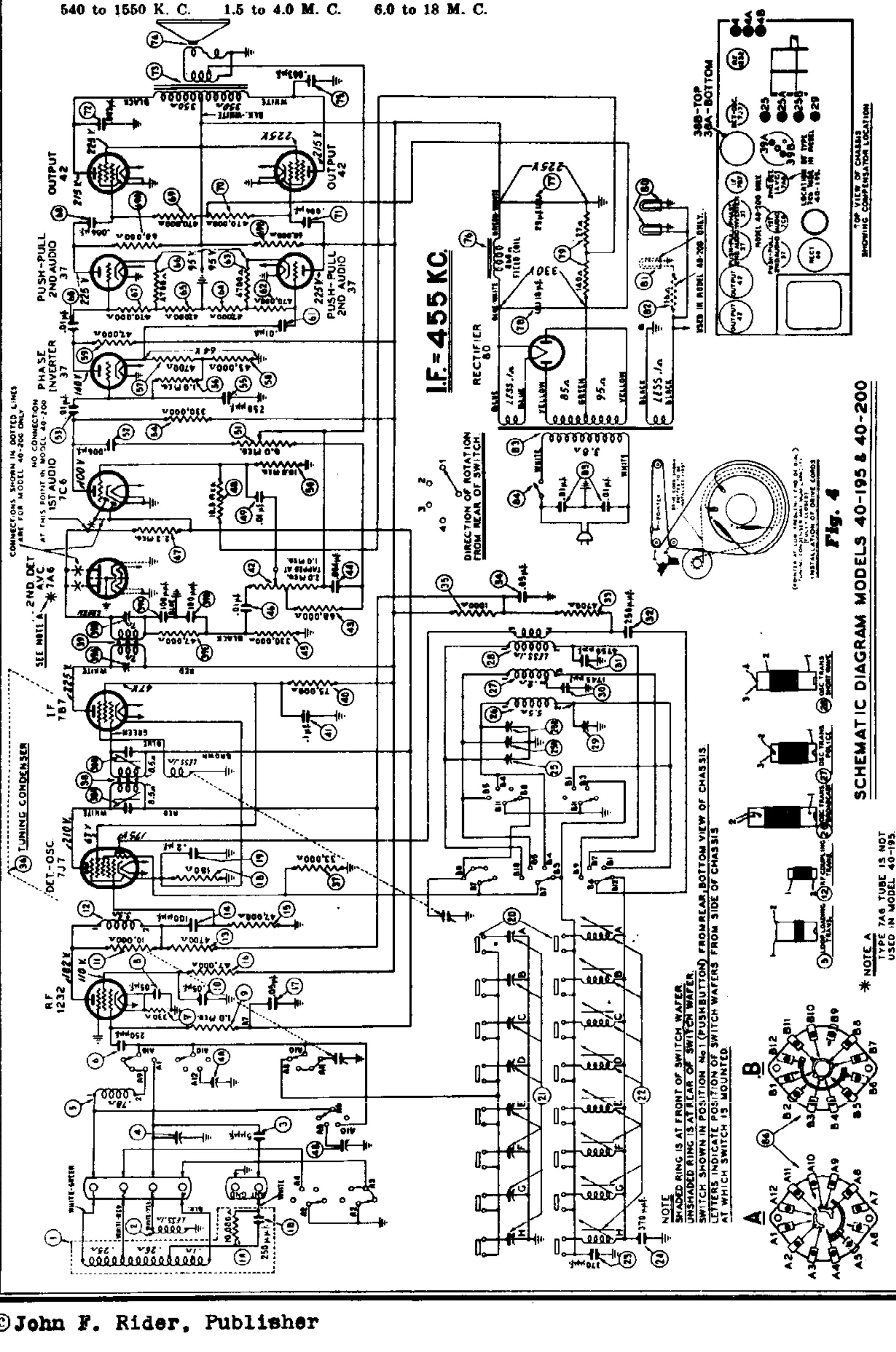
ELECTRIC AUTOMATIC PUSH BUTTON UNIT

PHILCO RADIO & TELEV. CORP.

MODELS 40-195,40-200
Schematic,Voltage,Socket
Trimmers

POWER SUPPLY: 115 Volts, 25 and 60 cycle A. C.
POWER CONSUMPTION: 110 watts.
FREQUENCY TUNING RANGES: (Three)
540 to 1550 K. C. 1.5 to 4.0 M. C. 6.0 to 18 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.
AUDIO OUTPUT: 5 watts.



FOR TUNER ADJUSTMENTS,SEE INDEX

Fig. 1 — **Schematic Diagram**

The voltages indicated were measured with a Philco Model 027 Voltmeter (1000 ohms per volt) — Power supply 115 volts, 60 cycle — Volume control minimum — No signal being received — Range switch "Brdcst."

May, 1939.

MODELS 40-195, 40-200
Chassis, Tuner Unit Chassis
Parts List

PHILCO RADIO & TELEV. CORP.

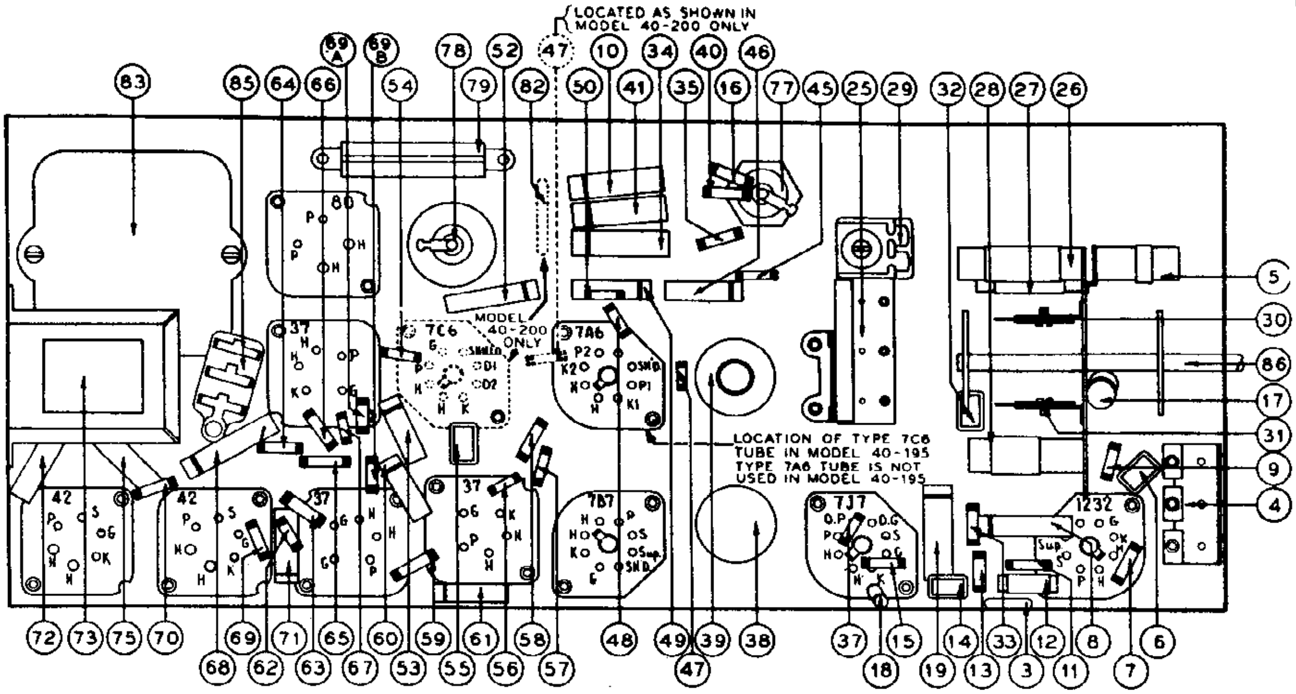


Fig. 2

Replacement Parts
Models 40-195 and 40-200

SCHE. No.	DESCRIPTION	PART No.	LIST PRICE
1	Loop Assy. (Broadcast)	38-9881	
1A	Resistor (10,000 ohms, ½ watt)	33-310339	.17
1B	Mica Cond. (250 mmfd.)	61-0033	.20
2	Loop Assy. (Short Wave)	38-9567	
3	Mica Cond. (5 mmfd.)	30-1097	.20
4	Compensator (3 section)	31-6305	
4A	Part of No. 4		
4B	Part of No. 4		
5	Loop Loading Coil	32-3252	
6	Mica Cond. (250 mmfd.)	61-0033	.20
7	Resistor (330 ohms, ½ watt)	33-133339	.17
8	Tubular Cond. (.05 mfd.)	30-4444	.15
9	Resistor (1.0 meg., ½ watt)	33-510339	.17
10	Tubular Cond. (.05 mfd.)	30-4518	.15
11	Resistor (10,000 ohms, ½ watt)	33-310339	.17
12	R. F. Coupling Coil	32-3194	
13	Resistor (4700 ohms, ½ watt)	33-247339	.17
14	Mica Cond. (100 mmfd.)	30-1128	.15
15	Resistor (47,000 ohms, ½ watt)	33-347339	.17
16	Resistor (47,000 ohms, ½ watt)	33-347339	.17
17	Tubular Cond. (.05 mfd.)	30-4519	.15
18	Resistor (180 ohms, ½ watt)	33-118339	.17
19	Tubular Cond. (.2 mfd.)	30-4507	.20
20	Push Button Switch	42-1515	
21	Compensator Strip	31-6313	
	Compensator		
21A	No. 1 (540-1030 K.C.)	Part of 31-6313	
21B	No. 2 (540-1030 K.C.)	Part of 31-6313	
21C	No. 3 (540-1030 K.C.)	Part of 31-6313	
21D	No. 4 (670-1160 K.C.)	Part of 31-6313	
21E	No. 5 (670-1160 K.C.)	Part of 31-6313	
21F	No. 6 (900-1600 K.C.)	Part of 31-6313	
21G	No. 7 (900-1600 K.C.)	Part of 31-6313	
21H	No. 8 (900-1600 K.C.)	Part of 31-6313	
22	Coil Strip (Complete)		
22A	Coil No. 1 (540-1030 K.C.)	32-3042	.50
22B	Coil No. 2 (540-1030 K.C.)	32-3042	.50
22C	Coil No. 3 (540-1030 K.C.)	32-3042	.50
22D	Coil No. 4 (670-1160 K.C.)	32-3042	.50
22E	Coil No. 5 (670-1160 K.C.)	32-3042	.50
22F	Coil No. 6 (900-1600 K.C.)	32-3041	.50
22G	Coil No. 7 (900-1600 K.C.)	32-3041	.50
22H	Coil No. 8 (900-1600 K.C.)	32-3041	.50
23	Silvered Mica Cond. (370 mmfd.)	30-1110	.45
24	Silvered Mica Cond. (370 mmfd.)	30-1110	.45
25	Compensator (3 section)	31-6092	.60
25A	Part of No. 25		
25B	Part of No. 25		
26	Broadcast Oscillator Coil	32-3240	
27	Police Oscillator Coil	32-3052	.75
28	Short Wave Oscillator Coil	32-3242	
29	Compensator	31-6230	.40
30	Tracking Cond. (1745 mmfd.)	31-6307	
31	Tracking Cond. (4750 mmfd.)	31-6306	
32	Mica Cond. (250 mmfd.)	61-0032	.20
33	Resistor (4700 ohms, ½ watt)	33-247339	.17
34	Tubular Cond. (.05 mfd.)	30-4518	.15
35	Resistor 1000 ohms, ½ watt)	33-210339	.17
36	Tuning Cond. Assy.	31-2369	
37	Resistor (33,000 ohms, ½ watt)	33-333339	.17
38	1st I. F. Trans. Assy.	32-3243	
39	2nd I. F. Trans. Assy.	32-3260	
39A	Part of No. 39		
39B	Part of No. 39		
39C	Part of No. 39		
39D	Part of No. 39		
39E	Resistor (47,000 ohms, ½ watt) (Part of No. 39)	33-347339	.17
40	Resistor (75,000 ohms, ½ watt)	33-375339	.17
41	Tubular Cond. (.1 mfd.)	30-4488	.20
42	Volume Control (2 meg.)	33-5206	1.00
43	Resistor (68,000 ohms, ½ watt)	33-368339	.17
44	Tubular Cond. (.004 mfd.)	30-4324	.15
45	Resistor (330,000 ohms, ½ watt)	33-433339	.17
46	Tubular Cond. (.01 mfd.)	30-4572	.15
47	Resistor (2.2 meg., ½ watt)	33-522339	.17
48	Resistor (10.0 meg., ½ watt)	33-610339	.17
49	Tubular Cond. (.01 mfd.)	30-4572	.15
50	Resistor (10.0 meg., ½ watt)	33-610339	.17
51	Tone Control (6 meg.)	33-5225	
52	Tubular Cond. (.006 mfd.)	30-4645	.15
53	Tubular Cond. (.01 mfd.)	30-4572	.15
54	Resistor (330,000 ohms, ½ watt)	33-433339	.17
55	Mica Cond. (250 mmfd.)	61-0033	.20
56	Resistor (1.0 meg., ½ watt)	33-510339	.17
57	Resistor (4700 ohms, ½ watt)	33-247339	.17
58	Resistor (43,000 ohms, ½ watt)	33-343339	.17
59	Resistor (47,000 ohms, ½ watt)	33-347339	.17
60	Tubular Cond. (.01 mfd.)	30-4572	.15
61	Tubular Cond. (.01 mfd.)	30-4572	.15
62	Resistor (470,000 ohms, ½ watt)	33-447339	.17
63	Resistor (4700 ohms, ½ watt)	33-247339	.17
64	Resistor (47,000 ohms, ½ watt)	33-347339	.17
65	Resistor (47,000 ohms, ½ watt)	33-347339	.17
66	Resistor (4700 ohms, ½ watt)	33-247339	.17
67	Resistor (470,000 ohms, ½ watt)	33-447339	.17
68	Tubular Cond. (.008 mfd.)	30-4583	.15
69	Resistor (470,000 ohms, ½ watt)	33-447339	.17
70	Resistor (470,000 ohms, ½ watt)	33-447339	.17
71	Tubular Cond. (.006 mfd.)	30-4583	.15
72	Tubular Cond. (.003 mfd.)	30-4469	.20
73	Output Trans.	32-7961	1.00
74	Cone and Voice Coil Assy.		
	(for Speaker 36-1450-2)	36-4080	2.50
	(for Speaker 36-1450-4)	36-4111	2.50
75	Tubular Cond. (.003 mfd.)	30-4469	.20
76	Field Coil (Replace Spkr. No. 36-1450)		
77	Electrolytic Con. (25 mfd., 250V.)	30-2333	1.00
78	Electrolytic Con. (15 mfd., 400V.)	30-2335	1.35
79	B. C. Resistor	33-3376	
80	Pilot Lamps	34-2064	.09
81	Pilot Lamps	34-2210	.15
82	Resistor (16 ohms, pilot lamp)	33-016431	.20
83	Power Trans. (110V, 60 cycle)	32-8099	
84	A. C. Switch	42-1517	
85	Line Con. (.01-.01 mfd., Bakelite)	3903-DG	.30
86	Wave Switch	42-1507	

Miscellaneous Parts
Model 40-200

DESCRIPTION	PART No.	LIST PRICE
Bezel Ass'y	40-6480	
Bearing (Drum Shaft)	56-1036	.10
Cable And Plug (Power Supply)	L-2778	.40
Cable (Speaker)	41-3430	.80

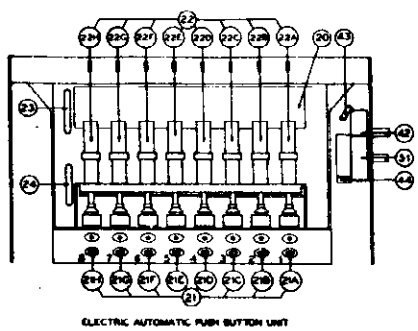


Fig. 3

SCHE. No.	DESCRIPTION	PART No.	LIST PRICE
	Coupling Assy. (Tuning Cond.)	31-2291	.35
	Dial	27-5213	
	Dial Clamp	56-1034	.05
	Dial Gasket	27-9224	.01
	Drive Cord Assy. (Pointer)	31-2316	.25
	Drive Cord Assy. (Tuning Cond.)	31-2350	.20
	Disc Control (Tuning)	27-4766	
	Disc Control (Volume)	27-4765	.30
	Disc Control (Tone)	27-4764	.30
	Disc Control (Wave Switch)	27-4767	.15
	Drum Assy. (Tuning Cond.)	38-9716	.60
	Drum Bracket & Bearing Assy.	38-9662	.10
	Pointer (Dial)	56-1033	.15
	Pilot Light Jewel	27-4777	.10
	Knobs (Push Buttons)	27-4892	
	Shaft (Control Drums)	28-6924	.05
	Spring (Drive Cord)	28-8913	.05
	Socket Assy. (Dial Lamp)	38-9694	.20
	Socket Assy. (Dial Lamp)	38-9695	.20
	Socket Assy. (Pilot Lamp)	38-9696	.40
	Socket (5 Prong, 37-Tube)	27-6032	.11
	Socket (6 Prong, 42-Tube)	27-6036	.11
	Socket (4 Prong, 80-Tube)	27-6044	.10
	Socket (Loktal, 7J7-Tube)	27-6129	
	Socket (Loktal, 7A6, 7C6, Tubes)	27-6131	
	Speaker	36-1450	9.00
	Tab Kit	40-6475	
	Phone Tab	27-9418	
	Dial Tab	27-5630	
	MOUNTING PARTS		
	Grommet (Push Button Sw. Mtg.)	27-4896	.03
	Grommet (Tuning Unit Assy. Mtg.)	3914	.02
	Grommet (Tuning Unit Assy. Mtg.)	3915	.02
	Screw (Bezel Mtg.)	W-1634	.90 Per C.
	Nut (Spkr. Mtg.)	W-124	.35 Per C.
	Screw (Loop Mtg. Rail)	W-546	.45 Per C.

Prices subject to change without notice

PHILCO RADIO & TELEV. CORP.

MODELS 40-195, 40-200
Alignment

TYPE OF CIRCUIT: Models 40-195 and 40-200 are Electric Push-Button and dial tuned radios incorporating the new Philco Built-in Super Aerial system which eliminates an outside aerial and reduces local static interference to a minimum. These models are also designed to receive the sound of a television program tuned in by special type Philco Television Sets.

PHILCO BUILT-IN SUPER AERIAL SYSTEM:

Included in the built-in aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. The feature of the built-in broadcast band statically shielded loop is that it may be turned to the position in which it picks up a minimum amount of interference, or if interference is not present the loop may be set in the position where best reception is obtained.

In general, both radios are similar with the exception of the number of tubes used and cabinet design. Models 40-195 and 40-200 employ ten and eleven tubes respectively.

Each receiver is equipped with eight electric tuning push buttons for automatically selecting stations. Seven of the push buttons are used for broadcast stations and one push button (left hand push button preferably) may be set up for use with a Philco wireless Record Player or the sound programs tuned in by Special Philco Television sets.

PHILCO TUBES USED: Model 40-195

1232, R. F.; 7J7, Converter; 7B7, I. F.; 7C6, Second Detector, A. V. C., and First Audio; 37, Phase Inverter; two 37, Drivers; two 42, Audio Power Outputs; 80, Rectifier.

Model 40-200

1232, R. F.; 7J7, Converter; 7B7, I. F.; 7A6 Detector A. V. C.; 7C6 First Audio; 37, Phase Inverter; two 37, Audio Drivers; two 42, Power Outputs; 80, Rectifier.

CABINET DIMENSIONS:	Height	Width	Depth
Model 40-195 type "XX".....	38"	29¼"	13¾"
Model 40-200 type "RX".....	36⅝"	34⅝"	14⅝"

Aligning of Compensating Condensers

Equipment Required

(1) Signal Generator. In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 077 is required. This signal generator covers a frequency range of 540 to 36,000 K. C. (2) Indicating Device, to obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. When using the vacuum tube voltmeter, an aligning adaptor Philco part No. 45-2767 is necessary for connecting to the A. V. C. circuit. These testers also contain an audio output meter which may also be used as an indicating device. (3) Aligning Tools, fiber handle screw driver Philco part No. 45-2610 and fiber wrench Philco part No. 7696.

Connecting Aligning Instruments

VACUUM TUBE VOLTMETER — To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. ADJUSTING I. F. CIRCUIT:
Remove the 1232 R. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the chassis.
2. ADJUSTING R. F. CIRCUIT:
To adjust the R. F. circuit, the aligning adaptor is inserted in the 7C6 A. F. tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the above paragraph.

With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 42 type tube and adjust the output meter for the 0 to 30 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiving loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order See Fig.	
1	High Side to No. 1 Ter. Loop Panel	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst."	39B, 39A 38B, 38A	See Note A
2	Use Loop on Generator		1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst."	29B, 4B	See Note B
3	Use Loop on Generator		580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst."	29	Roll Tuning Condenser Note C
4	Use Loop on Generator		1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst."	25B, 4B	
5	Use Loop on Generator		3.5 M. C.	3.5 M. C.	Vol. Max. Range Switch "Police"	25A, 4A	
6	Use Loop on Generator		18.0 M. C.	18.0 M. C.	Vol. Max. Range Switch "S. W."	25, 4	Check Image Signal Note D

NOTE A — A "Dummy Antenna" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Fig. 4.

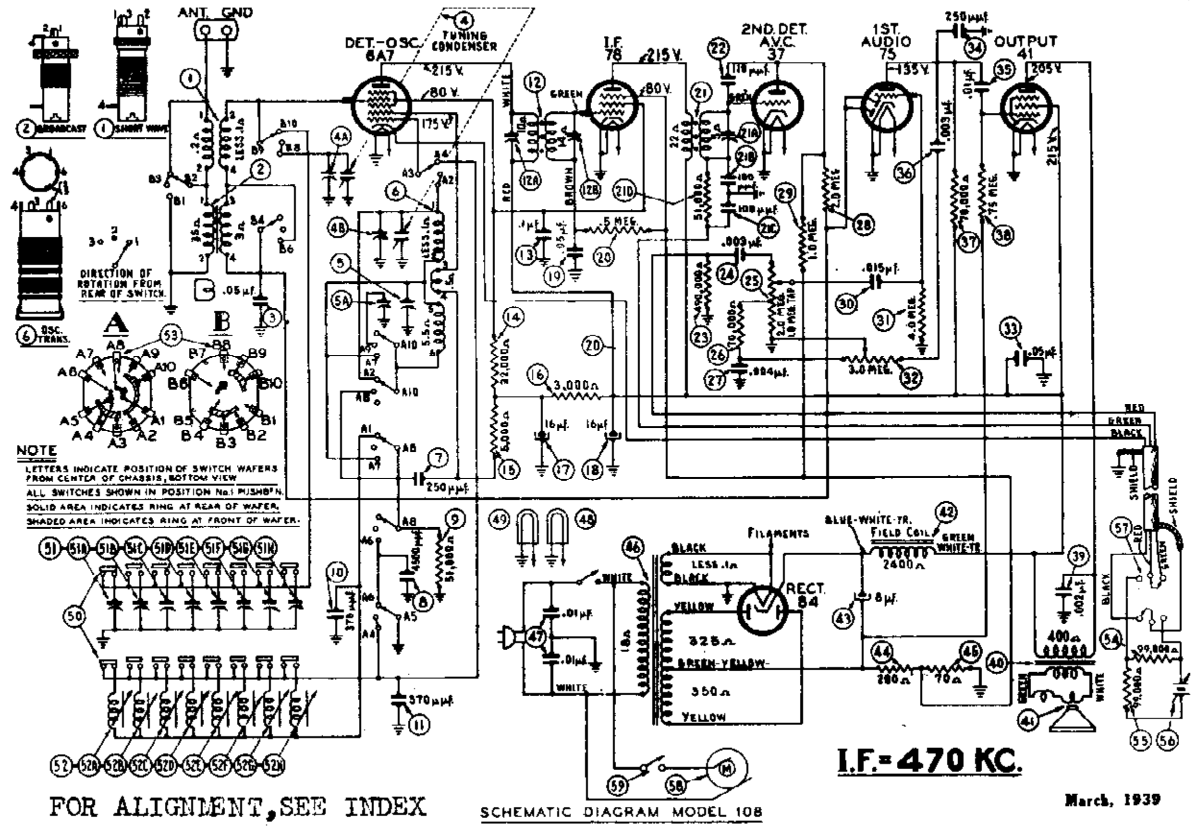
NOTE C — When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE D — To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. below the frequency being used on any high frequency range.

PHILCO RADIO & TELEV. CORP.

MODEL 108, Code 121
Schematic, Voltage
Parts



FOR ALIGNMENT, SEE INDEX

SCHEMATIC DIAGRAM MODEL 108

March, 1939

ADJUSTING ELECTRIC PUSH BUTTON TUNING:- For frequency ranges of buttons see parts 51A through 51H in parts list. For adjusting procedure see INDEX.

POWER SUPPLY: 115 V., 60 cycle A. C. 69 watts.
INTERMEDIATE FREQUENCY: 470 K. C.

PHILCO TUBES USED: 6A7, First Detector Oscillator; 78, I. F. Amplifier; 37, Second Detector, A. V. C.; 75, First Audio; 41, Audio Output and 84, Rectifier.

Sche. No.	Description	Part No.
1	Ant. Trans. (S. W.)	32-3027
2	Ant. Trans. (B. C.)	32-3026
3	Tubular Cond. (.05 mf.)	30-4519
4	Tuning Cond. Assy.	31-2346
5	Dual Padder Unit	31-6255
6	Osc. Trans.	32-3028
7	Mica Cond. (250 mmf.)	30-1032
8	Mica Cond. (4500 mmf.)	30-1109
9	Resistor (51,000 ohms, ½ watt)	33-351339
10	Condenser (Silver Mica) (370 mmf.)	30-1110
11	Condenser (Silver Mica) (370 mmf.)	30-1110
12	1st I. F. Trans. Assy.	32-3018
13	Tubular Cond. (.1 mf.)	30-4455
14	Resistor (32,000 ohms, ½ watt)	33-332339
15	Resistor (5,000 ohms, ½ watt)	33-250339
16	Resistor (3,000 ohms, ½ watt)	33-230339
17	Electro. Cond. (16 mf.) 250 volts	30-2331
18	Electro. Cond. (16 mf.) 250 volts	30-2370
19	Tubular Cond. (.05 mf.)	30-4519
20	Resistor (490,000 ohms, ½ watt)	33-449339
21	2nd I. F. Trans. Assy.	32-3129
21A	Compensator Part of 21	
21B	Condenser Part of 21A	
21C	Condenser Part of 21A	
21D	Resistor (51,000 ohms, ½ watt)	33-351339
22	Mica Cond. (110 mmf.)	30-1031
23	Resistor (490,000 ohms, ½ watt)	33-449339
24	Tubular Cond. (.003 mf.)	30-4580
25	Volume Control (2 meg.)	33-5286
26	Resistor (70,000 ohms)	33-370339
27	Tubular Cond. (.004 mf.)	30-4334
28	Risistor (2.0 meg., ½ watt	33-520339
29	Resistor (1.0 meg., ½ watt)	33-510339
30	Tubular Cond. (.015 mf.)	30-4515
31	Resistor (4.0 meg., ½ watt)	33-540339
32	Tone Control (3 meg.)	33-5287
33	Tubular Cond. (.05 mf.	30-4518
34	Mica Cond. (250 mmf.)	30-1032
35	Tubular Cond. (.01 mf.)	30-4572

Sche. No.	Description	Part No.
36	Tubular Cond. (.003 mf.)	30-4582
37	Resistor (70,000 ohms, ½ watt)	33-370339
38	Ressistor (75 meg., ½ watt)	33-475339
39	Tubular Cond. (.002 mf.)	30-4177
40	Output Trans. for Speaker Part No. 36-1438-2	32-7978
41	Cone and Voice Coil Assy. for Speaker Part No. 36-1438-2	36-4089
42	Field Coil, Replace Speaker Part No. 36-1438-2	
43	Electro. Cond. (8 mf. 400 V.)	30-2371
44	Resistor (280 ohms)	33-128431
45	Resistor (70 ohms, ½ watt)	33-070339
46	Power Trans. (115 V. 50 to 60 cycles)	32-7977
47	Bakelite Cond. (.01 mf. .01 mf.)	3903DG
48	Pilot Lamp (Dial)	34-2064
49	Pilot Lamp (Dial)	34-2064
50	Push Button Switch	42-1462
51	Compensator Assy.	31-6256
51A	Compensator No. 1 (540-1030 K. C.)	
51B	Compensator No. 2 (540-1030 K. C.)	
51C	Compensator No. 3 (670-1160 K. C.)	
51D	Compensator No. 4 (670-1160 K. C.)	
51E	Compensator No. 5 (900-1470 K. C.)	
51F	Compensator No. 6 (900-1470 K. C.)	
51G	Compensator No. 7 (1170-1600 K. C.)	
51H	Compensator No. 8 (1170-1600 K. C.)	
52	Electric Push Button Coil Assy.	32-3031
52A	Osc. Coil No. 1 (540-1030 K.C.)	32-3042
52B	Osc. Coil No. 2 (540-1030 K.C.)	32-3042
52C	Osc. Coil No. 3 (670-1160 K.C.)	32-3042
52D	Osc. Coil No. 4 (670-1160 K.C.)	32-3042
52E	Osc. Coil No. 5 (900-1470 K.C.)	32-3041
52F	Osc. Coil No. 6 (900-1470 K.C.)	32-3041
52G	Osc. Coil No. 7 (1170-1600 K.C.)	32-3041
52H	Osc. Coil No. 8 (1170-1600 K.C.)	32-3041
53	Wave Switch	42-1478
54	Resistor (99,000 ohms, ½ watt)	33-399339
55	Resistor (99,000 ohms, ½ watt)	33-399339

Sche. No.	Description	Part No.
56	Crystal Pickup (without mtg. Parts)	35-2031
	Crystal Pickup (complete with mtg. Parts)	35-2027
57	Radio Phono Switch	42-1509
58	Phono Motor (115 volt, 60 cycle)	35-1158
59	Motor Switch	42-1498
	Bezel	56-1104
	Bracket & Bearing (Tuning Drum)	38-9662
	Cable (Power)	L-2778
	Coupling (Tuning Condenser)	31-2291
	Dial	27-5452
	Drive Cord Assy. (Tuning)	31-2315
	Drive Cord Assy. (Pointer)	31-2316
	Disc Control (Tuning)	27-4766
	Disc Control (Range Switch)	27-4767
	Disc Control (Tone)	27-4764
	Disc Control (Volume)	27-4765
	Drum & Shaft (Tuning Cond.)	38-9716
	Needle Screw	218-1047
	Nut ("T" Type Motor Mtg.)	W-1758
	Knob (Pushbutton)	27-4758
	Pointer	56-1033
	Screw (Pickup Mtg.)	W-2027
	Screw (Motor Mtg.)	W-599
	Screw (Chassis Mtg.)	W-454
	Sleeve (Motor Mtg.)	28-5274
	Spring (Drive Cord Assy.)	28-8913
	Spring (Pushbutton)	56-1238
	Socket (5 prong)	27-6035
	Socket (6 prong)	27-6036
	Socket (7 prong)	27-6099
	Speaker	36-1438-2
	Turntable	315-1007
	Washer (Rubber coupling, Turntable shaft)	315-1002
	Washer (Metal coupling, Turntable shaft)	315-1003
	Washer (Rubber, Motor Mtg., top)	3915
	Washer (Rubber, Motor Mtg., bottom)	27-4818

MODEL 936
Schematic, Socket
Trimmers, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

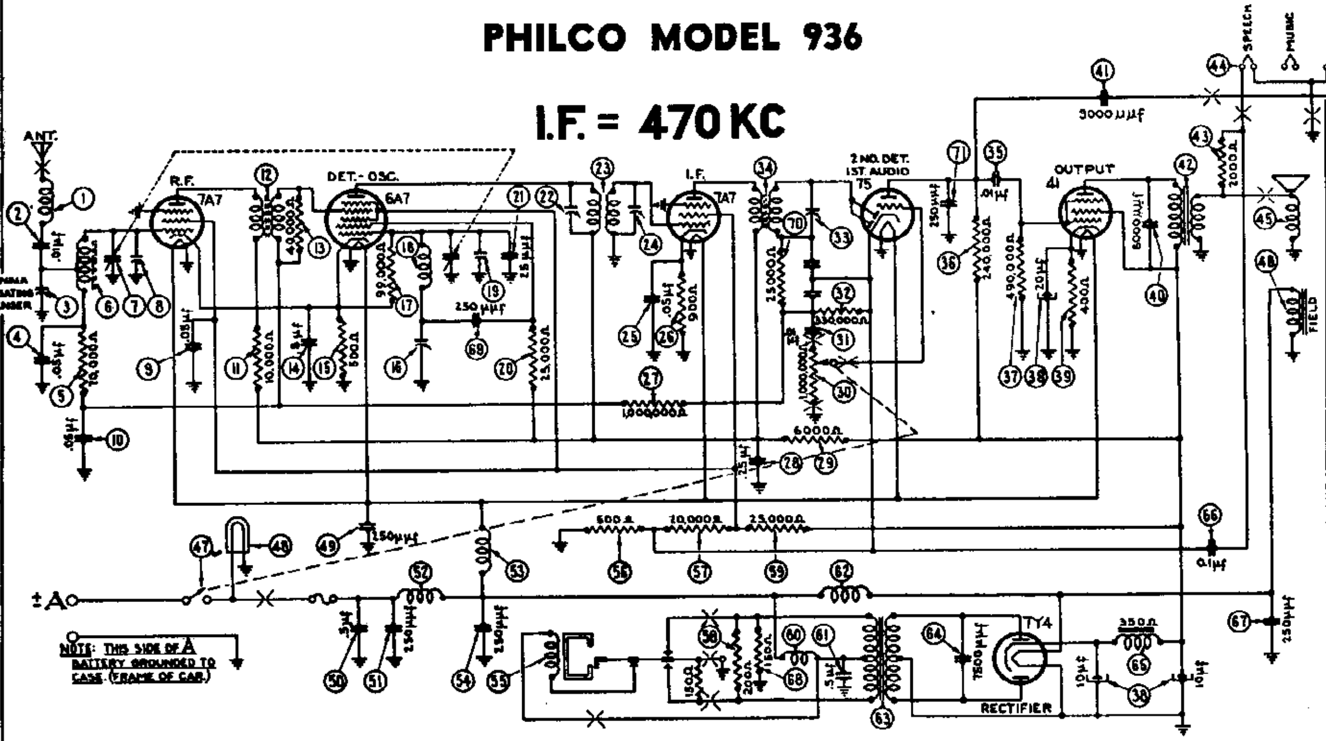


FIGURE 2

FOR ALIGNMENT, SEE INDEX

MODEL 936 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1956
2	Condenser (.01 mfd.)	30-4479
3	Antenna Compensator	31-6248
4	Condenser (.05 mfd.)	30-4444
5	Resistor (70,000 ohms)	33-370257
6	Antenna Transformer	65-0085
7	Tuning Condenser	63-0016
8	First Padder (on Tun. Cond.)	
9	Condenser (.05 mfd.)	30-4569
10	Condenser (.05 mfd.)	30-4444
11	Resistor (10,000 ohms)	33-310337
12	R. F. Transformer	65-0009
13	Resistor (40,000 ohms)	33-340237
14	Condenser (.5 mfd.)	30-4565
15	Resistor (500 ohms)	33-150438
16	Low Frequency Padder	31-6230
17	Resistor (99,000 ohms)	33-399337
18	Oscillator Transformer	65-0052
19	Second Padder (on Tun. Cond.)	
20	Resistor (25,000 ohms)	33-325337
21	Condenser (25 mmfd.)	30-1108
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	65-0044
24	Padder (Sec. 1st I. F. Trans.)	
25	Condenser (.05 mfd.)	30-4444
26	Resistor (900 ohms)	33-190438
27	Resistor (1,000,000 ohms)	33-510257
28	Condenser (.25 mfd.)	30-4448
29	Resistor (6,000 ohms)	33-260337
30	Vol. Control (1,000,000 ohms) and On-Off Switch	33-5268
31	Condenser (.01 mfd.)	61-0014
32	Resistor (330,000 ohms)	33-433337
33	Padder (Sec. 2nd I. F. Trans.)	
34	Second I. F. Transformer	65-0045
35	Condenser (.01 mfd.)	30-4501
36	Resistor (240,000 ohms)	33-424337
37	Resistor (490,000 ohms)	33-449337
38	Filter Condenser (10-10-20 mfd.)	61-0028
39	Resistor (400 ohms)	33-140438
40	Condenser (6,000 ohms)	30-4024
41	Condenser (3,000 mmfd.)	30-4469
42	Output Transformer	65-0048
43	Resistor (2,000 ohms)	33-220447
44	Reception Control	412-1004
45	Cone and Voice Coil Kit	91-0028
46	Field Coil	Not Replaceable
47	On-Off Switch and Vol. Control (1,000,000 ohms)	33-5268
48	Pilot Lamp	34-2040
49	Condenser (250 mmfd.)	61-0033
50	Condenser (.5 mfd.)	30-4474
51	Condenser (250 mmfd.)	61-0033
52	"A" Choke	65-0057
53	Filament Choke	65-0057
54	Condenser (250 mmfd.)	61-0033
55	Vibrator	41-3398
56	Resistor (500 ohms)	33-150438
57	Resistor (20,000 ohms)	33-320337
58	Resistor (200 ohms)	33-120347
59	Resistor (25,000 ohms)	33-325437
60	Vibrator Choke	32-2483
61	Condenser (.5 mfd.)	30-4565
62	Choke	32-1374
63	Power Transformer	65-0046
64	Condenser (7,500 mmfd.)	30-4567
65	Filter Choke	32-7959
66	Condenser (.01 mfd.)	30-4499
67	Condenser (250 mmfd.)	61-0033
68	Resistor (150 ohms)	33-115337
69	Condenser (250 mmfd.)	61-0034
70	Resistor (25,000 ohms)	33-325344
71	Condenser (250 mmfd.)	30-1032
	Control Unit	85-0058
	Dial	55-0304
	Tuning and Volume Knob	27-4725
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Control Mtg. Bracket	28-5790

No.	Description	Part No.
	Reception Control Mtg. Bracket	28-5852
	Flexible Shaft	57-0631
	"T" Bolt	28-6161
	Nut	W518

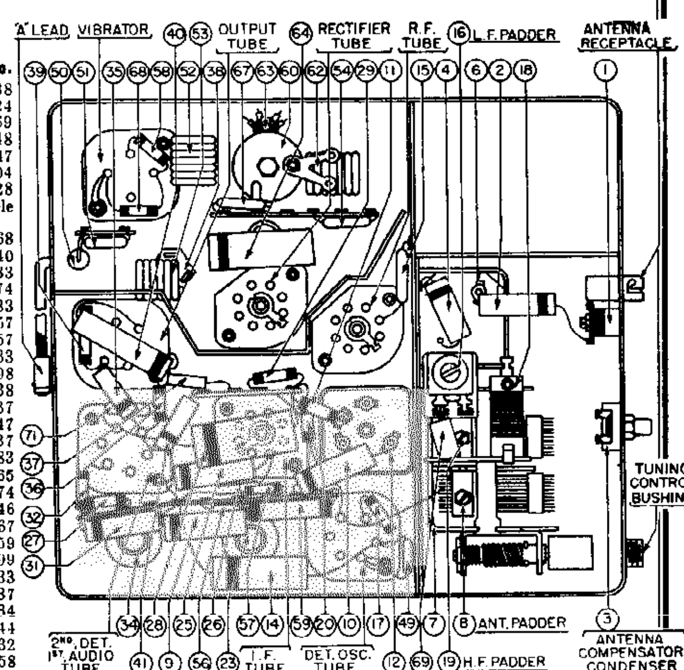


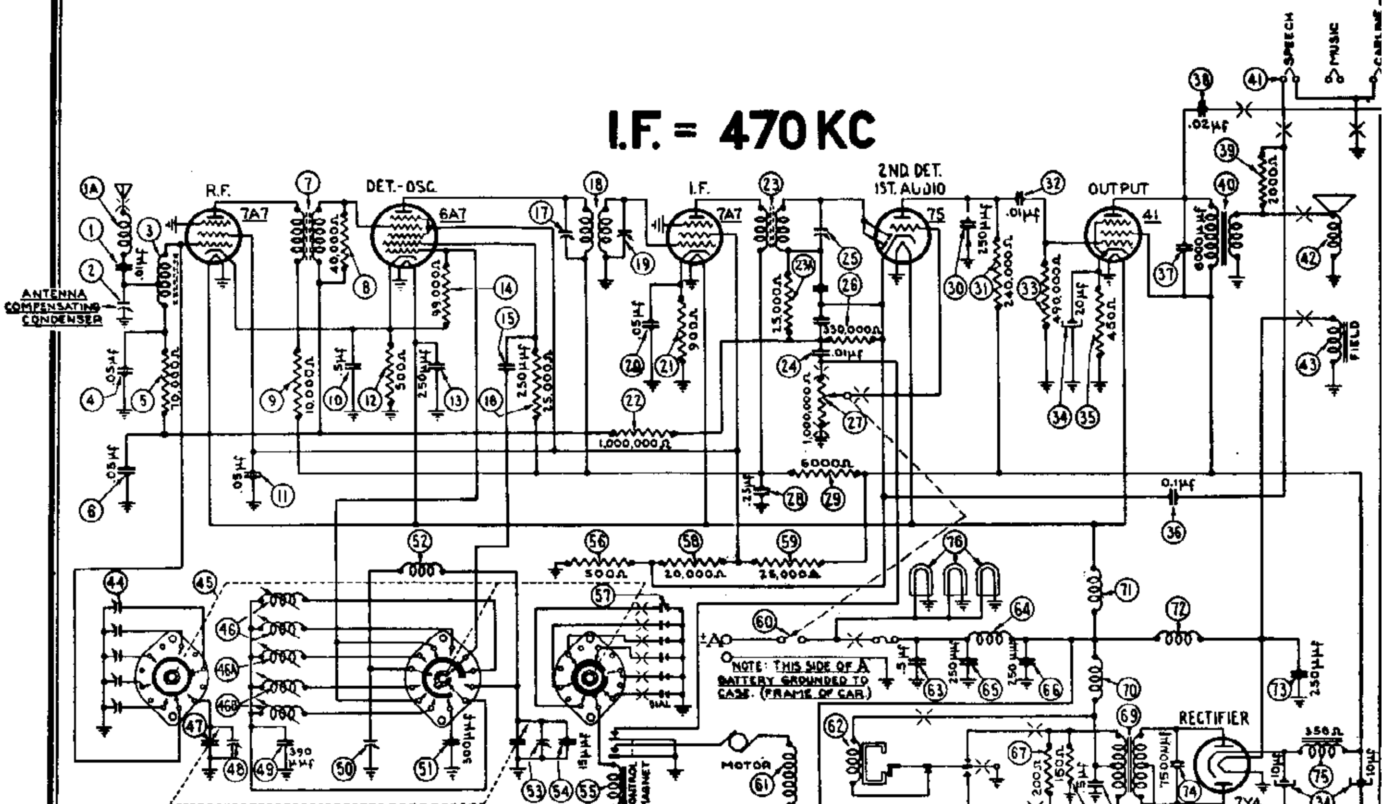
FIGURE 1

JANUARY 5, 1939

Trimmers, Chassis Parts

PHILCO RADIO & TELEV. CORP.

MODEL 937
Schematic, Socket



NOTE: TOP VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON COIL Nº 1. SHADED ROTORS ARE LOCATED ON UNDERSIDE OF SWITCH WAFERS.

FIGURE 1

MODEL 937 PARTS LIST

No.	Description	Part No.
1	Condenser (.01 mfd.)	30-4479
1a	Antenna Choke	77-0161
2	Antenna Compensating Condenser	Part of 44
3	Antenna Transformer	65-0085
4	Condenser (.05 mfd.)	30-4444
5	Resistor (70,000 ohms)	33-370257
6	Condenser (.05 mfd.)	30-4444
7	R. F. Transformer	65-0009
8	Resistor (40,000 ohms)	33-339137
9	Resistor (10,000 ohms)	33-310337
10	Condenser (.5 mfd.)	30-4565
11	Condenser (.05 mfd.)	30-4569
12	Resistor (500 ohms)	33-150438
13	Condenser (250 mmfd.)	61-0033
14	Resistor (99,000 ohms)	33-399337
15	Condenser (250 mmfd.)	61-0033
16	Resistor (25,000 ohms)	33-325337
17	Padder (Pri. 1st I. F. Trans.)	
18	First I. F. Transformer	65-0044
19	Padder (Sec. 1st I. F. Trans.)	
20	Condenser (.05 mfd.)	30-4444
21	Resistor (900 ohms)	33-190438
22	Resistor (1,000,000 ohms)	33-510257
23	Second I. F. Transformer	65-0045
23a	Resistor (25,000 ohms)	33-325337
24	Condenser (.01 mfd.)	61-0014
25	Padder (Sec. 2nd I. F. Trans.)	
26	Resistor (330,000 ohms)	33-433337
27	Vol. Control (1,000,000 ohms) and On-Off Switch	33-5268
28	Condenser (.25 mfd.)	30-4448
29	Resistor (6,000 ohms)	33-260337
30	Condenser (250 mmfd.)	30-1032
31	Resistor (240,000 ohms)	33-424337
32	Condenser (.01 mfd.)	30-4501
33	Resistor (490,000 ohms)	33-449337
34	Filter Condenser (10-10-20 mfd.)	61-0028
35	Resistor (430 ohms)	33-145337
36	Condenser (.1 mfd.)	30-4499
37	Condenser (6,000 mmfd.)	30-4024
38	Condenser (.02 mfd.)	30-4495
39	Resistor (2,000 ohms)	33-220447
40	Output Transformer	65-0048
41	Reception and Push Button Control	77-0179
42	Cone Kit	91-0028
43	Field Coil	Not Replaceable
44	Antenna Padder Assembly	77-0172
45	Wafer Switch	77-0180
46	Oscillator Transformer (High Freq.)	65-0088
46a	Oscillator Transformer (Med. Freq.)	65-0089
46b	Oscillator Transformer (Low Freq.)	65-0090
47	Tuning Condenser	63-0016
48	First Padder (on Tun. Cond.)	
49	Silver Cap Condenser (390 mmfd.)	61-0031
50	Low Frequency Padder	31-6230
51	Silver Cap Condenser (330 mmfd.)	61-0003
52	Oscillator Transformer	65-0052
53	Second Padder (on Tun. Cond.)	
54	Condenser (15 mmfd.)	61-0038
55	Motor and Relay Assembly	77-0178
56	Resistor (500 ohms)	33-150438
57	Push Button and Reception Control Assem'ly	77-0179
58	Resistor (20,000 ohms)	33-320337
59	Resistor (25,000 ohms)	33-325437
60	On-Off Switch and Volume Control (1,000,000 ohms)	33-5268
61	Motor	83-0001
62	Vibrator	41-3398
63	Condenser (.5 mfd.)	30-4474
64	"A" Choke	65-0057
65	Condenser (250 mmfd.)	61-0033
66	Condenser (250 mmfd.)	61-0033
67	Resistor (200 ohms)	33-120347
67a	Resistor (150 ohms)	33-115347
68	Condenser (.5 mfd.)	30-4565
69	Power Transformer	65-0046
70	Vibrator Choke	32-2483
71	Filament Choke	65-0057
72	Choke	32-1374
73	Condenser (250 mmfd.)	61-0033

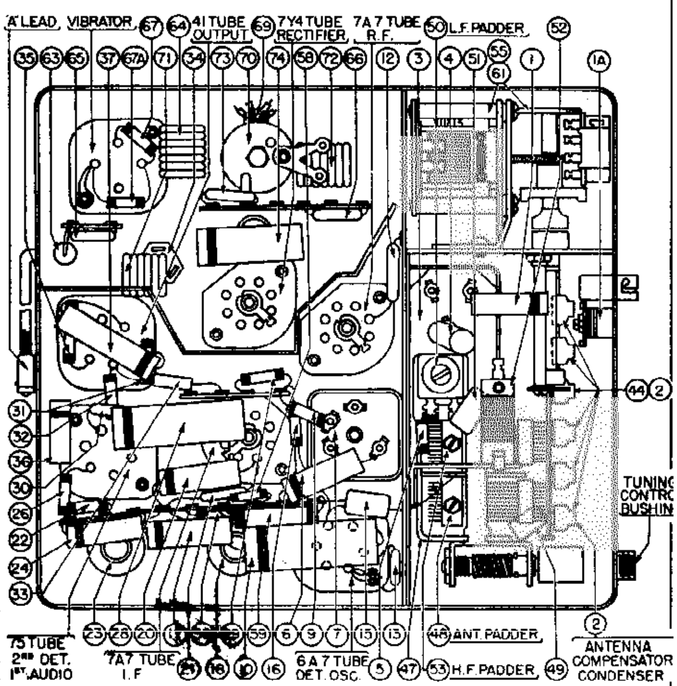


FIGURE 2

No.	Description	Part No.
74	Condenser (7,500 mmfd.)	30-4567
75	Filter Choke (350 ohms)	32-7959
76	Pilot Lamp	34-2040
	Call Letter Kit	81-0088
	Tuning Control (Manual)	85-0060

Description	Part No.
Bracket (Automatic Control Mtg.)	57-0638
Distributor Resistor	33-1196
Interference Condenser	30-4007
Dial	55-0304
Tuning and Volume Knob	27-4689

JANUARY 3, 1939

MODEL 936
MODEL 937
Trimmers, Alignment

PHILCO RADIO & TELEV. CORP.

MODEL 937 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

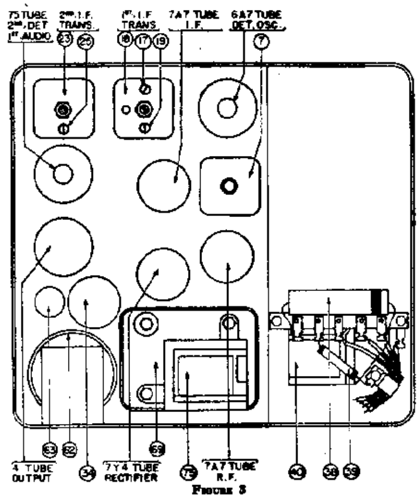


Figure 3

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	PRESS THE RETURN TO DIAL BUTTON UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING. ADJUST THE ANTENNA COMPENSATOR (8) TWO TURNS FROM TIGHT				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible] [illegible] 17
3	1580 K.C.	To Antenna Receptacle on Radio	See Note 1	Note 2	[illegible]
4	1400 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
5	580 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	See Note 1	Note 2	[illegible]
7	1400 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	(8)

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the antenna compensator (8) (See Figure 2) for maximum signal.

MODEL 936 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

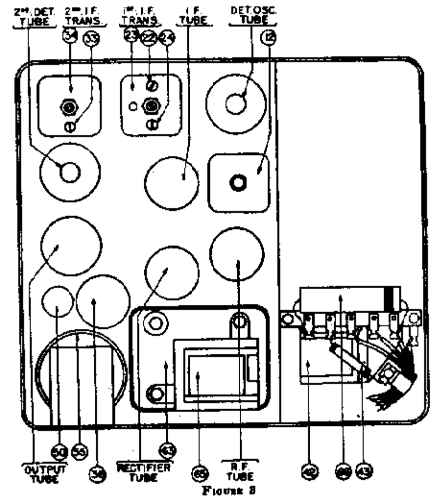


Figure 8

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	ADJUST THE ANTENNA COMPENSATOR (3) TWO TURNS FROM TIGHT				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible] [illegible] [illegible]
3	1580 K.C.	To Antenna Receptacle on Radio	See Note 1	Note 2	[illegible]
4	1400 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
5	580 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	See Note 1	Note 2	[illegible]
7	1400 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	(3)

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

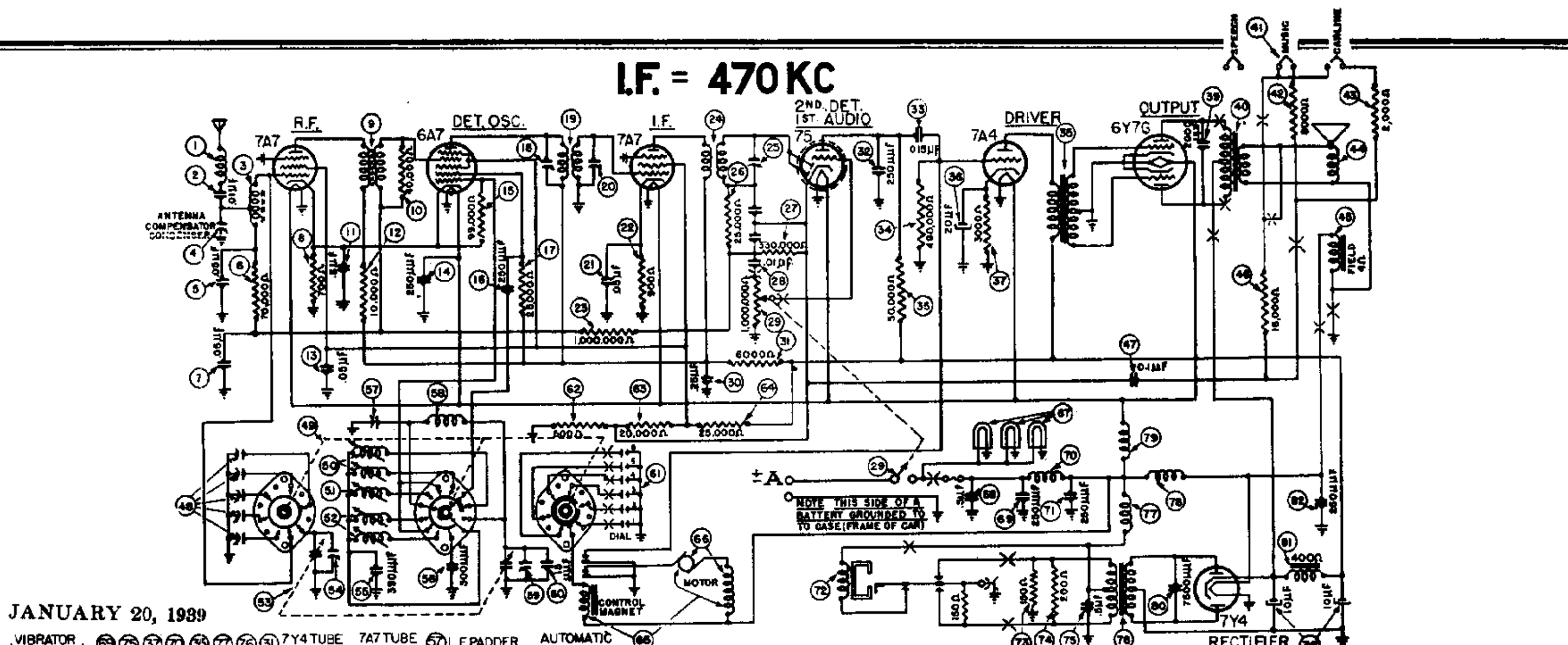
NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the antenna compensator (3) (See Figure 2) for maximum signal.

PHILCO RADIO & TELEV. CORP.

MODEL 938K
Schematic, Chassis
Parts



JANUARY 20, 1939

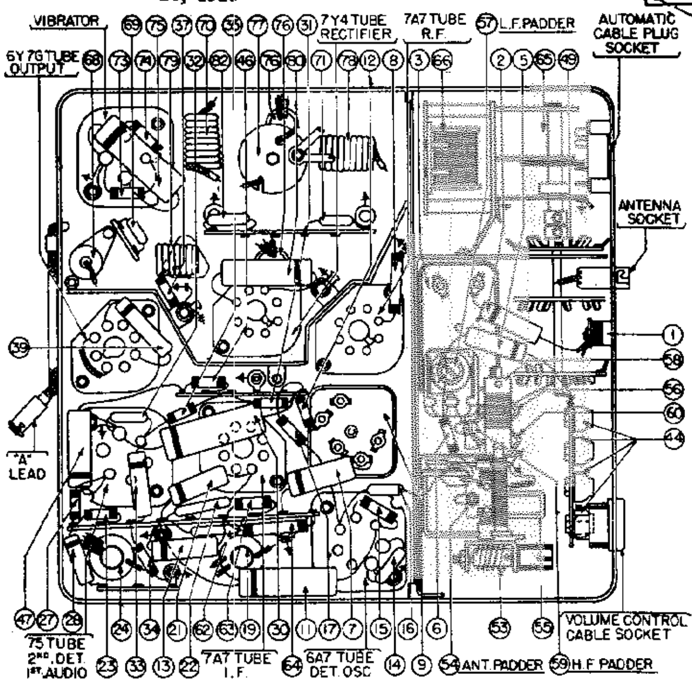


Figure 2

No.	Description	Part No.
1	Antenna Choke	77-0161
2	Condenser (.01 mfd.)	30-4479
3	Antenna Transformer	65-0085
4	Antenna Compensator	31-6248
5	Condenser (.05 mfd.)	30-4444
6	Resistor (70,000 ohms)	33-370257
7	Condenser (.05 mfd.)	30-4444
8	Resistor (700 ohms)	33-170438
9	R. F. Transformer	65-0009
10	Resistor (40,000 ohms)	33-340257
11	Condenser (.5 mfd.)	30-4565
12	Resistor (10,000 ohms)	33-310337
13	Condenser (.05 mfd.)	30-4569
14	Condenser (250 mmfd.)	61-0033
15	Resistor (99,000 ohms)	33-399337
16	Condenser (250 mmfd.)	61-0034
17	Resistor (25,000 ohms)	33-325337
18	Padder (Pri. 1st I. F. Trans.)	
19	First I. F. Transformer	65-0044
20	Padder (Sec. 1st I. F. Trans.)	
21	Condenser (.05 mfd.)	30-4444
22	Resistor (900 ohms)	33-190438
23	Resistor (1,000,000 ohms)	33-510257
24	Second I. F. Transformer	65-0045
25	Padder (Sec. 2nd I. F. Trans.)	
26	Resistor (25,000 ohms)	33-325257
27	Resistor (330,000 ohms)	33-433337
28	Condenser (.01 mfd.)	61-0014
29	Volume Control (1,000,000 ohms) and On-Off Switch	33-5268
30	Condenser (.25 mfd.)	30-4448
31	Resistor (6,000 ohms)	33-260337
32	Condenser (250 mmfd.)	30-1032
33	Condenser (.015 mfd.)	30-4515
34	Resistor (490,000 ohms)	33-449337
35	Resistor (50,000 ohms)	33-351337
36	Filter Condenser (10-16-20 mfd.)	61-0028
37	Resistor (3,000 ohms)	33-230337
38	Input Transformer	65-0097
39	Condenser (2,000 mmfd.)	30-4177
40	Output Transformer	65-0093
41	Automatic Station Selector and Reception Control	77-0204
42	Resistor (8,000 ohms)	33-280337
43	Resistor (2,000 ohms)	33-220337
44	Cone and Voice Coil Kit	45-2653
45	Field Coil Assembly	Not Replaceable
46	Resistor (15,000 ohms)	33-315337
47	Condenser (.1 mfd.)	30-4122
48	Antenna Padder Assembly	77-0172
49	Wafer Switch	77-0207
50	Oscillator Transformer (High Freq.)	65-0088
51	Oscillator Transformer (Med. Freq.)	65-0089
52	Oscillator Transformer (Low Freq.)	65-0090
53	Tuning Condenser	63-0016
54	First Padder (on Tun. Cond.)	
55	Silver Cap Condenser (390 mmfd.)	61-0031
56	Silver Cap Condenser (300 mmfd.)	61-0003
57	Low Frequency Padder	31-6230
58	Oscillator Transformer	65-0052
59	Second Padder (on Tun. Cond.)	
60	Condenser (.15 mmfd.)	61-0038
61	Station Selector Assembly	Part of 41
62	Resistor (500 ohms)	33-150438
63	Resistor (20,000 ohms)	33-320337
64	Resistor (25,000 ohms)	33-325447
65	Motor and Relay Assembly	77-0229
66	Motor	83-0001
67	Pilot Lamp	34-2040
68	Condenser (.5 mfd.)	30-4474
69	Condenser (250 mmfd.)	61-0033
70	"A" Choke	65-0057
71	Condenser (250 mmfd.)	61-0033
72	Vibrator	41-3398
73	Resistor (150 ohms)	33-115337
74	Resistor (200 ohms)	33-120347
75	Condenser (.5 mfd.)	30-4565
76	Power Transformer	65-0095
77	Vibrator Choke	32-2537
78	Choke	32-1374
79	Filament Choke	65-0057
80	Condenser (7,500 mmfd.)	30-4567
81	Filter Choke	65-0092
82	Condenser (250 mmfd.)	61-0033
83	Resistor (150 ohms)	33-115337
	Call Letter Kit	81-0088
	Automatic Tuning Unit	77-0204
	Tuning Control (Manual)	85-0060
	(Automatic Control Mtg.)	57-0638
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Dial	55-0304
	Tuning & Volume Knob	27-4689
	Speech Knob	27-4733
	Music Knob	27-4732
	Car Line Knob	27-4731
	Fuse	7227
	Fuse Insulator	27-7729
	"T" Bolt (Rec. Mtg.)	28-6161
	Nut (Rec. Mtg.)	W518
	Stud (Speaker Mtg.)	6122
	Nut (Speaker Mtg.)	W55A
	Call Letter Kit	81-0088

MODEL 938K
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

Alignment MODEL 938K

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 6Y7G output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

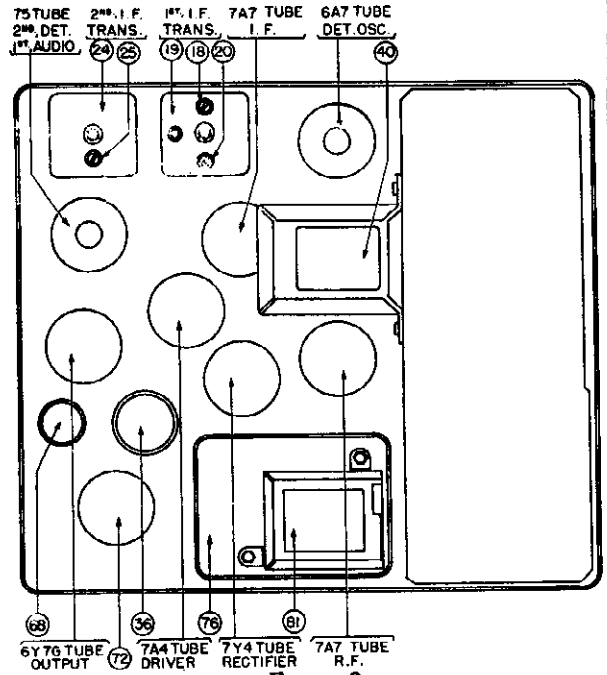


FIGURE 8

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	PRESS THE RETURN TO DIAL BUTTON UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING. ADJUST THE ANTENNA COMPENSATOR ④ TWO TURNS FROM TIGHT.				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	25 20 18
3	1580 K.C.	To Antenna Receptacle on Radio	See Note 1	Note 2	59
4	1400 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	54 Note 4
5	580 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 580 K.C.	57 Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	See Note 1	Note 2	59
7	1400 K.C.	To Antenna Receptacle on Radio	See Note 1	Set Tuning Condenser at 1400 K.C.	54 Note 4
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	④

Make all adjustments for maximum reading on the output meter.

1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the antenna lead.

2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

3 — Rock the tuning condenser while adjusting the low frequency paddor. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

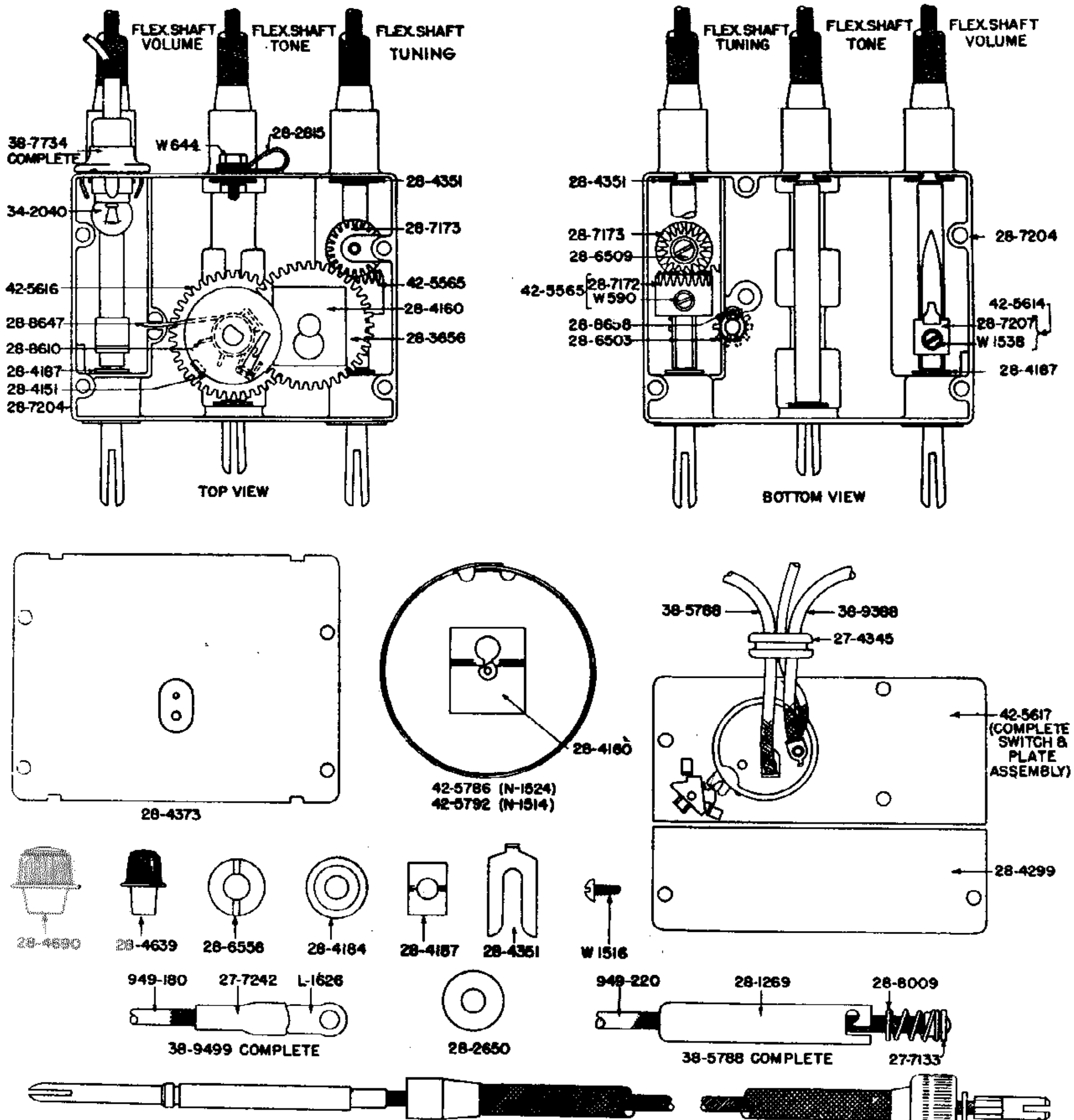
4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the antenna compensator ④ (See Figure 2) for maximum signal.

PHILCO RADIO & TELEV. CORP.

MODELS N-1514, N-1524
Nash Controls Details

NASH CONTROLS — MODELS N-1514 — N-1524



28-8813 TUNING CONTROL SHAFT (N-1524)
28-8815 TUNING CONTROL SHAFT (N-1514)
28-8814 VOLUME CONTROL SHAFT (N-1524)
28-8816 VOLUME CONTROL SHAFT (N-1514)
28-8798 TONE CONTROL SHAFT (N-1524)
28-8817 TONE CONTROL SHAFT (N-1514)

PARTS LIST AND PRICES (Prices Subject to Change Without Notice)

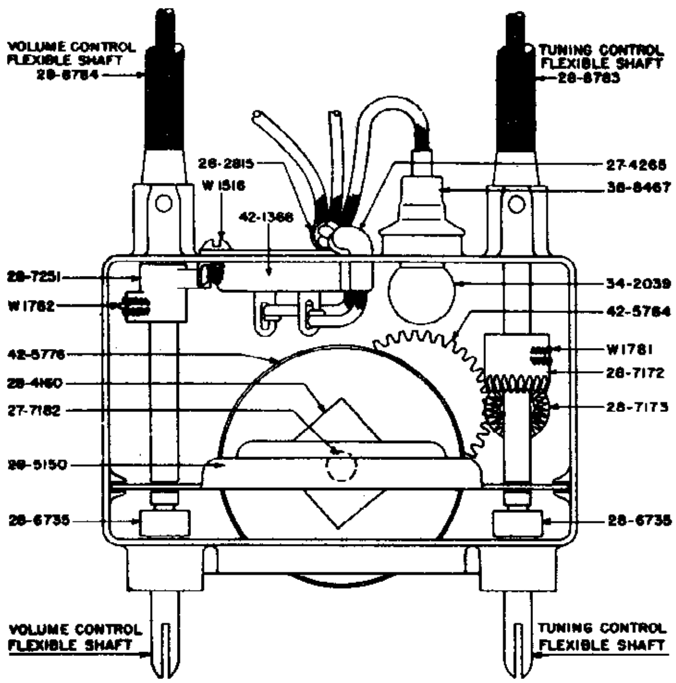
Part No.	Description	List Price	Part No.	Description	List Price	Part No.	Description	List Price
L-1626	Lug	$ .02	28-4299	Cover	.03	28-8798	Tone Shaft (N-1524)	1.00
W-590	Screw ....per 100	2.00	28-4351	Shaft Retainer	.01	28-8813	Tuning Shaft (N-1524)	1.00
W-644	Screw ....per 100	1.50	28-4373	Cover	.10	28-8814	Volume Shaft (N-1524)	1.00
W-1516	Screw ....per 100	1.30	28-4639	Tone Knob	*	28-8815	Tuning Shaft (N-1514)	1.00
W-1538	Screw ....per 100	1.80	28-4690	Tuning & Volume Knob	*	28-8816	Volume Shaft (N-1514)	1.00
27-4345	Grommet	.02	28-6503	Gear	.05	28-8817	Tone Shaft (N-1514)	1.00
27-7133	Terminal	.01	28-6509	Screw	.03	34-2040	Pilot Lamp	.09
27-7242	Sleeve ....per 100	.40	28-6558	Gland Nut	.25	38-5788	"A" Lead	*
28-1269	Fuse Hous'g	.01	28-7172	Miter Gear	.10	38-7734	Pilot Lamp Assembly	.35
28-2650	Washer ....per 100	.45	28-7173	Miter Idler Gear	.10	38-9388	"A" Lead	.20
28-2815	Clamp	.01	28-7204	Housing	.50	42-5565	Miter Gear Assembly	.15
28-3656	Gear	.02	28-7207	Switch Arm	.05	42-5614	Switch Arm Assembly	.15
28-4151	Friction Washer	.02	28-8009	Spring ....per 100	.50	42-5616	Drum Shaft & Gear	.10
28-4160	Spring	.01	28-8610	Spring	.03	42-5617	On-Off Switch	.40
28-4184	Knob Base	.02	28-8647	Anti-back Lash Spring	.02	42-5786	Dial Assembly (N-1524)	.35
28-4187	Washer	.01	28-8658	Spring	.03	42-5792	Dial Assembly (N-1514)	.40

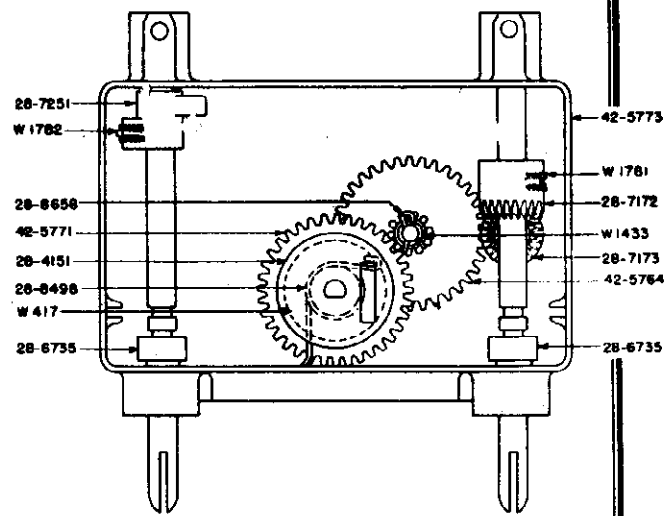
* Prices not available at this time.

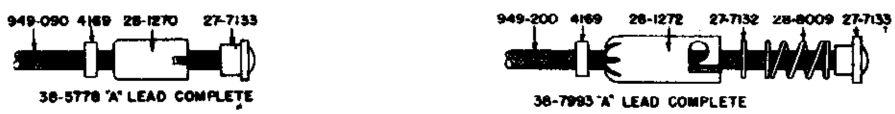
MODEL P-1517 Packard
Controls Details

PHILCO RADIO & TELEV. CORP.

PACKARD MODEL P-1517 CONTROL UNIT







28-6783 TUNING CONTROL FLEXIBLE SHAFT
28-6784 VOLUME CONTROL FLEXIBLE SHAFT

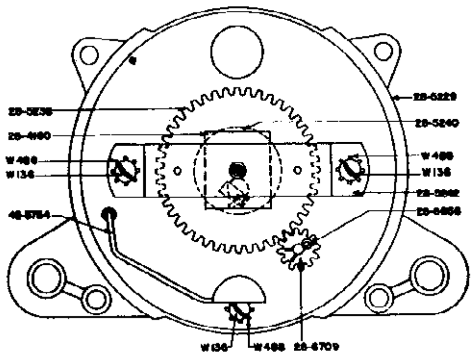
PARTS LIST AND PRICES
(Prices Subject to Change Without Notice)

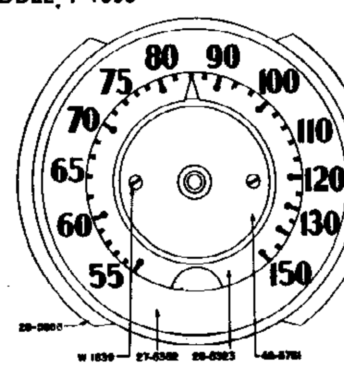
PART NUMBER	DESCRIPTION		LIST PRICE
W-417	Washer	per 100	$.50
W-1433	Washer	per 100	.15
W-1516	Screw	per 100	1.30
W-1781	Set Screw	per 100	2.00
W-1782	Set Screw	per 100	2.50
4169	Washer	per 100	1.20
27-4265	Sleeve	per 100	1.25
27-4688	Tuning and Volume Knob		.20
27-7132	Washer	per 100	.40
27-7133	Ferrule		.01
28-1270	Housing		.01
28-1272	Housing	per 100	.85
28-2815	Clamp		.01
28-4151	Washer		.02
28-4160	Spring		.01
28-5149	Cover		.10
28-5150	Shaft Retaining Plate		.05
28-6735	Bushing		**
28-6773	Gland Nut		.15
28-7172	Miter Drive Gear		.10
28-7173	Miter Gear		.10
28-7182	Felt Washer	per 100	.30
28-7251	Switch Lever		.15
28-7264	Knob Base		.20
28-8009	Spring	per 100	.50
28-8498	Anti Back Lash Spring		.10
28-8658	Spring		.03
28-8783	Tuning Control Flex. Shaft		1.00
28-8784	Volume Control Flex. Shaft		1.00
34-2039	Pilot Lamp		.09
38-5778	"A" Lead		.10
38-7993	"A" Lead		.20
38-8467	Pilot Lamp Assembly		.30
42-1368	On-Off Switch		.35
42-5764	Intermediate Gear Assembly		.20
42-5771	Drum Shaft and Gear Assembly		.15
42-5773	Housing and Stud Assembly		.85
42-5776	Dial Assembly		.35

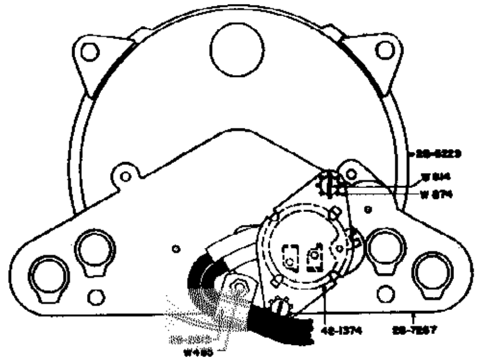
* Prices not available at this time.

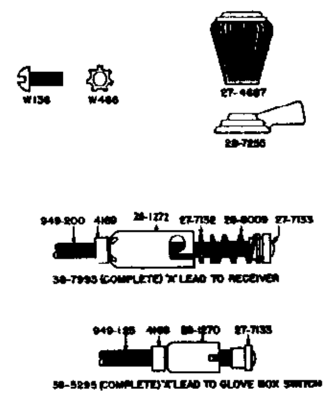
PHILCO RADIO & TELEV. CORP.

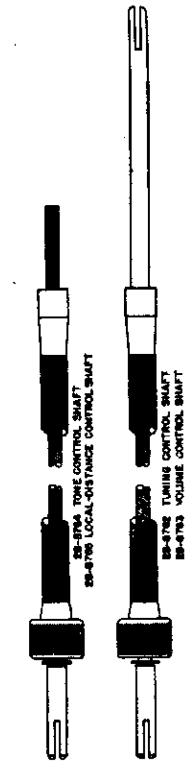
PACKARD CONTROL MODEL P-1535





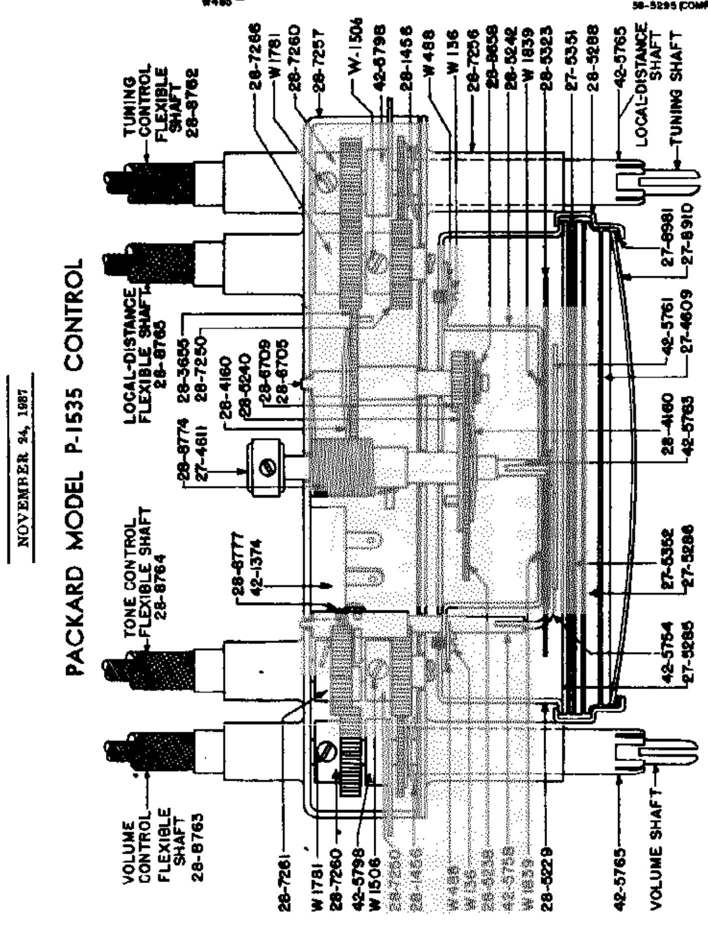






NOVEMBER 24, 1937

PACKARD MODEL P-1535 CONTROL



PARTS LIST AND PRICES

(Prices Subject to Change Without Notice)

PART NUMBER	DESCRIPTION	LIST PRICE
4169	Rubber Washers	per 100 $1.10
W-136	Screw	per 100 .90
W-453	Screw	per 100 1.30
W-488	Lockwasher	per 100 .35
W-775	Washer	per 100 1.30
W-814	Screw	per 100 .75
W-874	Lockwasher	per 100 .50
W-1504	Nut Screw	per 100 1.00
W-1781	Nut Screw	per 100 1.05
W-1839	Screw	per 100 1.25
949-125	Wire	*
949-200	Wire	*
27-4609	Gasket	.10
27-4611	Pointer Knob	*
27-4687	Tuning and Volume Knob	*
27-5285	Retainer	[illegible]
27-5286	Gasket Retainer	[illegible]
27-5351	Gasket	[illegible]
27-5352	Dial Face Glass	[illegible]
27-7152	Washer	[illegible]
27-7153	Ferrule	[illegible]
27-8910	Gasket	[illegible]
27-8981	Gasket	[illegible]
28-1270	Ferrule	[illegible]
28-1272	Bushing	[illegible]
28-1456	Bushing	[illegible]
28-3655	Spring Washer	[illegible]
28-4160	Clamp	[illegible]
[illegible]	Drive Gear	[illegible]
[illegible]	Friction Spring	[illegible]
[illegible]	Dial Cover	[illegible]
[illegible]	Dial Gear (large)	[illegible]
28-5240	Washer	*
28-5242	Bracket	*
28-5288	Bezel	.40
28-5323	Face	.10
28-6705	Intermediate Gear	*
28-6709	Dial Gear (small)	*
28-7250	Gear	.10
28-7255	Tone and Local Distance Knob	.35
28-7256	Control Shaft Cover	*
28-7257	Back Housing	*
28-7260	Gear	*
28-7261	Switch Gear	*
28-7265	Idler Gear	*
28-8009	Spring	per 100 .50
28-8658	Spring	.80
28-8762	Tuning Shaft	1.00
28-8763	Volume Shaft	1.00
28-8764	Tone Control	1.00
28-8765	Local — Distance Shaft	1.60
28-8774	Anti Back-lash Spring	*
28-8777	Spring	*
38-5295	"A" Lead	.15
38-7993	"A" Lead	.30
42-1374	On-Off Switch	.35
42-5754	Signal Panel Assembly	*
42-5758	Signal Panel Shaft	*
42-5761	Pointer Assembly	*
42-5763	Pointer Shaft Assembly	.25
42-5765	Gear and Sleeve Assembly	.30
42-5798	Friction Gear Assembly	*

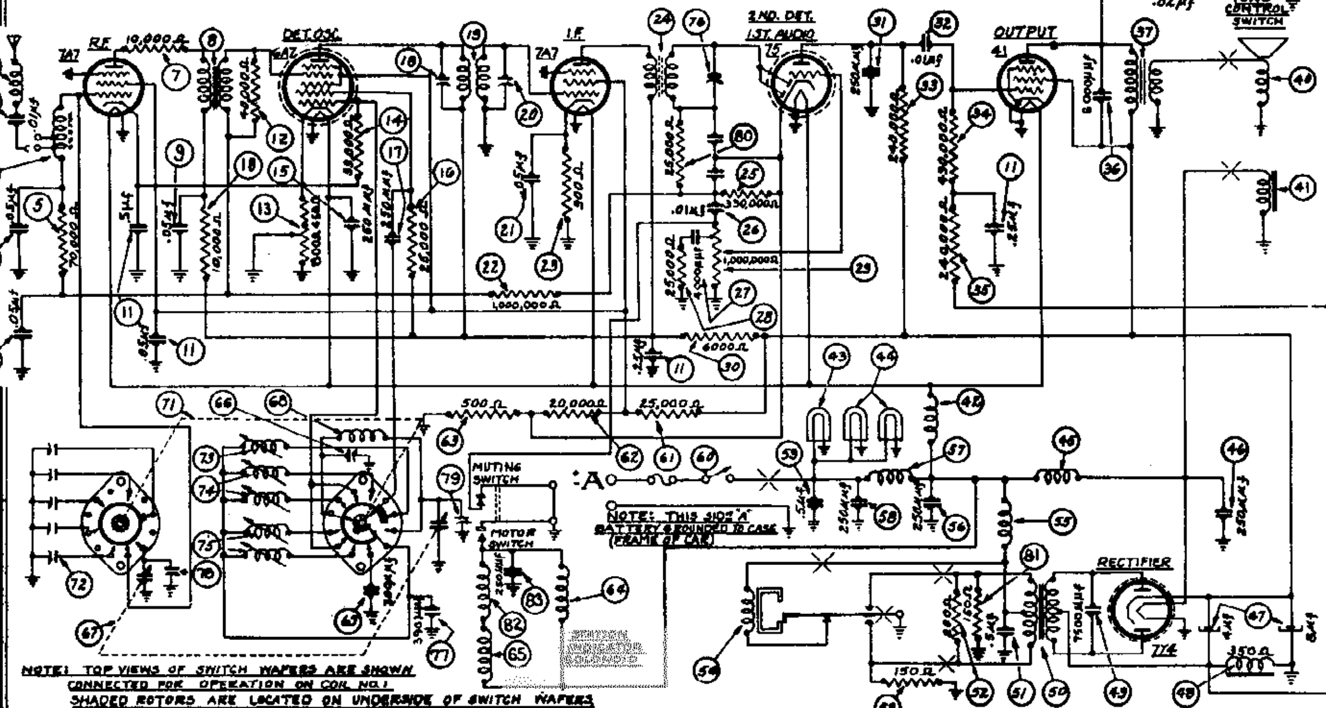
*Prices not available at this time.

MODEL S-1616 Studebaker
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

FOR ALIGNMENT, SEE INDEX

IF = 470KC



JANUARY 1939

FIGURE 1

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	65-0062
2	Condenser (.01 mfd.)	61-0014
3	Antenna Transformer	65-0047
4	Condenser (.05 mfd.)	30-4444
5	Resistor (70,000 ohms)	33-370337
6	Condenser (.05 mfd.)	30-4444
7	Resistor (10,000 ohms)	33-310337
8	R. F. Transformer	65-0009
9	Condenser (.05 mfd.)	30-4123
10	Resistor (10,000 ohms)	33-310337
11	Condenser (.05-.25-.25-.5 mfd.)	61-0016
12	Resistor (40,000 ohms)	33-340137
13	Sensitivity Control	33-5264
14	Resistor (99,000 ohms)	33-399337
15	Condenser (250 mmfd.)	61-0033
16	Resistor (25,900 ohms)	33-325337
17	Condenser (250 mmfd.)	30-1038
18	Padder (Pri. 1st I. F. Trans.)	
19	First I. F. Transformer	65-0044
20	Padder (Sec. 1st I. F. Trans.)	
21	Condenser (.05 mfd.)	30-4444
22	Resistor (1,000,000 ohms)	33-510337
23	Resistor (900 ohms)	33-190438
24	Second I. F. Transformer	65-0045
25	Resistor (330,000 ohms)	33-433337
26	Condenser (.01 mfd.)	61-0014
27	Condenser (4,000 mmfd.)	61-0020
28	Resistor (25,000 ohms)	33-325337
29	Volume Control & Switch (1,000,000 ohms)	67-0014-1 ..opt. 67-0014-2
30	Resistor (6,000 ohms)	33-260337
31	Condenser (250 mmfd.)	61-0033
32	Condenser (.01 mfd.)	30-4169
33	Resistor (240,000 ohms)	33-424337
34	Resistor (240,000 ohms)	33-424337
36	Condenser (6,000 mmfd.)	30-4024
37	Output Transformer	65-0048
38	Condenser (.02 mfd.)	30-4495
39	Tone Control Switch	42-1140
40	Cone & Voice Coil Kit	91-0047
41	Field Coil	Not Replaceable
42	Filament Choke	65-0057
43	Pilot Lamp	34-2040
44	Pilot Lamp	34-2040
45	Choke	32-1374
46	Condenser (250 mmfd.)	61-0033
47	Filter Condenser (4-8 mfd.)	61-0018
48	Filter Choke	32-7959
49	Condenser (7,500 mmfd.)	30-4567
50	Power Transformer	65-0046
51	Condenser (.5 mfd.)	30-4565
52	Resistor (200 ohms)	33-120337
53	Resistor (150 ohms)	In Vibrator
54	Vibrator	41-3398
55	Vibrator Choke	32-2537
56	Condenser (250 mmfd.)	61-0033
57	"A" Choke	65-0057
58	Condenser (250 mmfd.)	61-0033
59	Condenser (.5 mfd.)	30-4474
60	On-Off Switch and Volume Control	opt. 67-0014-1 / 67-0014-2
61	Resistor (25,000 ohms)	33-325437
62	Resistor (20,000 ohms)	33-320337
63	Resistor (500 ohms)	33-150438
64	Solenoid	77-0227
65	Impulse Motor	77-0259
66	Low Frequency Padder	31-6230
67	Tuning Condenser	63-0011
68	Oscillator Transformer	65-0058
69	Silver Cap Condenser (300 mmfd.)	61-0003
71	Selector Switch	77-0198
72	Antenna Padder Assembly	77-0126
73	Oscillator Transformer (High Freq.)	65-0049
74	Oscillator Transformer (Med. Freq.)	65-0050
75	Oscillator Transformer (Low Freq.)	65-0051
76	Padder (Sec. 2nd I. F. Trans.)	
77	Silver Cap Condenser (390 mmfd.)	61-0031
78	First Padder (on Tun. Cond.)	Part of Ant. Padder Assy.
79	Second Padder (on Tun. Cond.)	
80	Resistor (25,000 ohms)	33-325337
81	Resistor (150 ohms)	33-115337
82	Choke	32-1644
83	Condenser (250 mmfd.)	61-0033
	Dial Assembly	85-0079
	Tone Control and Automatic Drum	415-1009
	Automatic Push Button (Commander)	55-0100
	Automatic Push Button (President)	55-0172
	Tuning and Volume Knob (President)	27-4689
	Tuning and Volume Knob (Commander)	55-0102
	Flexible Shaft	57-0467

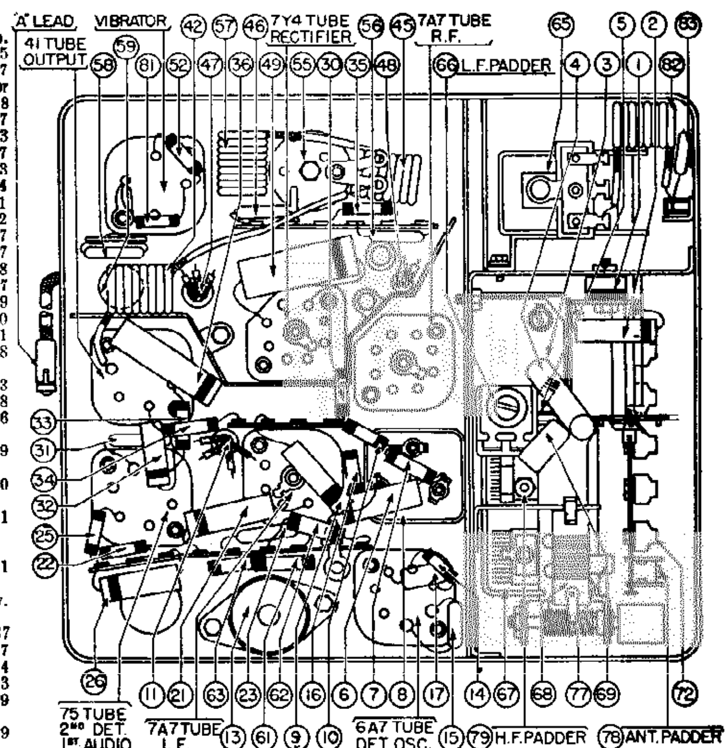
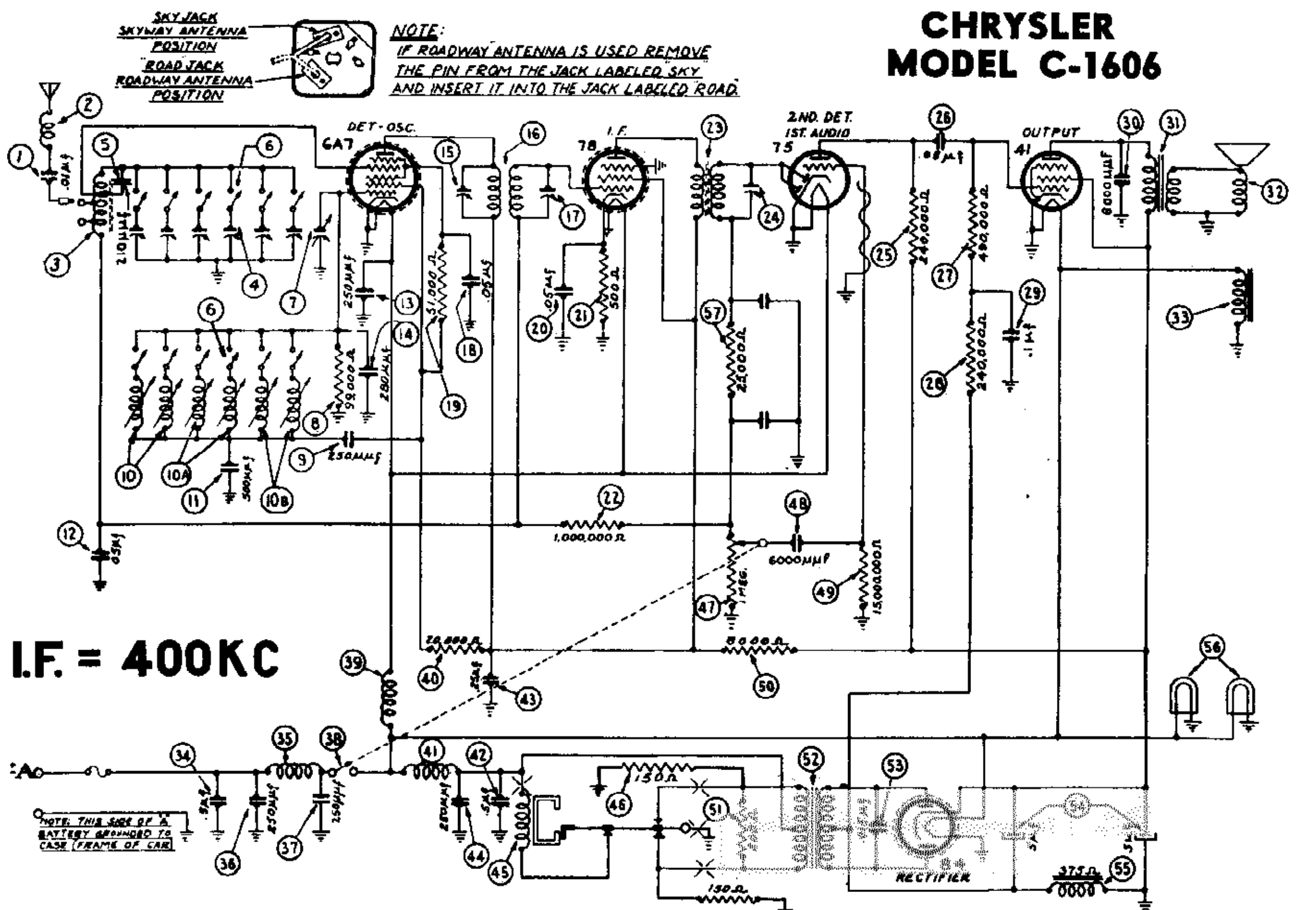


FIGURE 2

Description	Part No.
Call Letter Kit	81-0052
Condenser and Lug Assy.	30-1087
Interference Condenser	30-4007
Distributor Resistor	32-2250

Description	Part No.
"T" Bolt (Rec. Mtg.)	28-6161
Nut (Rec. Mtg.)	W518
Automatic Cable	95-0030
Tone and Volume Cable	95-0076

PHILCO RADIO & TELEV. CORP. MODEL C-1606 Chrysler
Schematic, Chassis
Parts List



FEBRUARY 1939

FIGURE 1

MODEL C-1606 PARTS LIST

No.	Description	Part No.
1	Condenser (.01 mfd.)	61-0014
2	Antenna Choke	65-0102
3	Antenna Transformer	65-0120
4	Antenna Padder Assembly	77-0141
5	Condenser (210 mmfd.)	61-0044
6	Automatic Switch	85-0046
7	Variator	63-0019
8	Resistor (99,000 ohms)	33-399337
9	Condenser (250 mmfd.)	61-0034
10	Oscillator Transformers	65-0125
10a	Oscillator Transformers	65-0126
10b	Oscillator Transformers	65-0127
11	Condenser (500 mmfd.)	61-0027
12	Condenser (.05 mfd.)	30-4444
13	Condenser (250 mmfd.)	61-0033
14	Condenser (280 mmfd.)	61-0043
15	Padder (Pri. 1st I. F. Trans.)	
16	First I. F. Transformer	65-0118
17	Padder (Sec. 1st I. F. Trans.)	
18	Condenser (.05 mfd.)	30-4444
19	Resistor (51,000 ohms)	33-351337
20	Condenser (.05 mfd.)	30-4444
21	Resistor (500 ohms)	33-150438
22	Resistor (1,000,000 ohms)	33-510337
23	Second I. F. Transformer	65-0119
24	Padder (Sec. 2nd I. F. Trans.)	
25	Resistor (240,000 ohms)	33-424337
26	Condenser (.05 mfd.)	30-4123
27	Resistor (490,000 ohms)	33-449337
28	Resistor (240,000 ohms)	33-424437
29	Condenser (.1 mfd.)	61-0023
30	Condenser (6,000 mmfd.)	30-4504
31	Output Transformer	65-0071
32	Cone Kit	91-0043
33	Field Coil	Not Replaceable
34	Condenser (.5 mfd.)	30-4565
35	"A" Choke	32-1374
36	Condenser (250 mmfd.)	61-0033
37	Condenser (250 mmfd.)	61-0033
38	On-Off Switch and Volume Control	67-0010
39	Filament Choke	32-1604
40	Resistor (20,000 ohms)	33-320337
41	Vibrator Choke	65-0075
42	Condenser (.5 mfd.)	30-4565
43	Condenser (.25 mfd.)	30-4446
44	Condenser (250 mmfd.)	61-0033
45	Vibrator	41-3398
46	Resistor (150 ohms)	33-115337
47	Volume Control (1,000,000 ohms) and On-Off Switch	67-0010
48	Condenser (6,000 mmfd.)	30-4445
49	Resistor (15,000,000 ohms)	33-615347
50	Resistor (8,000 ohms)	33-280337
51	Resistor (200 ohms)	33-120337
52	Power Transformer	65-0072
53	Condenser (.015 mfd.)	61-0030
54	Filter Condenser (5-5 mfd.)	61-0022
55	Filter Choke	65-0073
56	Pilot Lamps	34-2064
57	Resistor (25,000 ohms)	33-325237
	Tuning and Volume Knob	55-0164
	Push Button Knob	55-0206
	Station Tab Holder	57-0227FA7
	Push Button Bezel	57-0327FA7
	Oscillator Coil Bezel	57-0508FA3
	Oscillator Coil Bezel Cover	57-0509FA7
	Fuse	45-2559
	Call Letter Kit	81-0025
	Fuel Gauge Resistor	67-0011
	Interference Condenser	30-4490
	Antenna Lead (Cowl)	95-0065
	Bracket (Set Mtg.)	57-0502FA1
	Bolt (Set Mtg.)	97-0034
	Nut (Set Mtg.)	W55
	Bolt	97-0024
	Nut	W1667

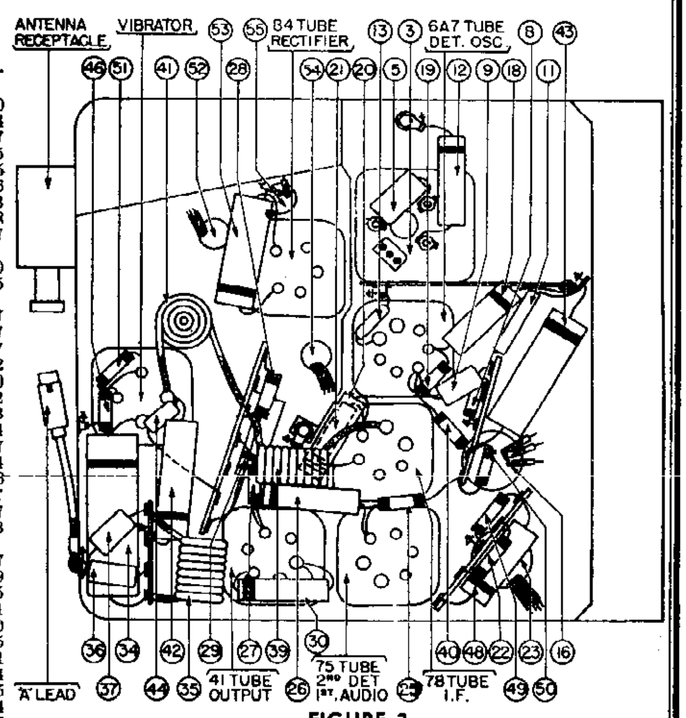


FIGURE 2

MODEL C-1606
Chrysler
Socket, Trimmers, Tuner
Alignment

PHILCO RADIO & TELEVISION CORP.

ADJUSTMENTS MODEL C-1606

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 077A or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

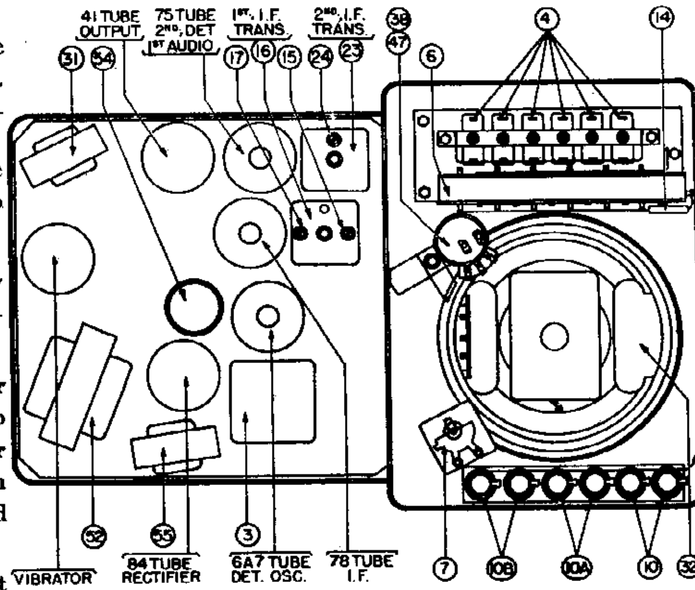


FIGURE 3

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	400 K.C.	To Grid of 6A7 Tube	.5 Mfd.	Turn Variator to the Indexed Position	24 17 15
2	950 to 1500 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Press Push Button No. 1 and adjust No. 1 Antenna Padder and No. 1 Oscillator Coil (Fig. 4)	Note 2 Fig. 4
3	950 to 1500 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Press Push Button No. 2 and adjust No. 2 Antenna Padder and No. 2 Oscillator Coil (Fig. 4)	Note 2 Fig. 4
4	750 to 1250 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Press Push Button No. 3 and adjust No. 3 Antenna Padder and No. 3 Oscillator Coil (Fig. 4)	Note 2 Fig. 4
5	750 to 1250 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Press Push Button No. 4 and adjust No. 4 Antenna Padder and No. 4 Oscillator Coil (Fig. 4)	Note 2 Fig. 4
6	550 to 950 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Press Push Button No. 5 and adjust No. 5 Antenna Padder and No. 5 Oscillator Coil (Fig. 4)	Note 2 Fig. 4
7	550 to 950 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Press Push Button No. 6 and adjust No. 6 Antenna Padder and No. 6 Oscillator Coil (Fig. 4)	Note 2 Fig. 4

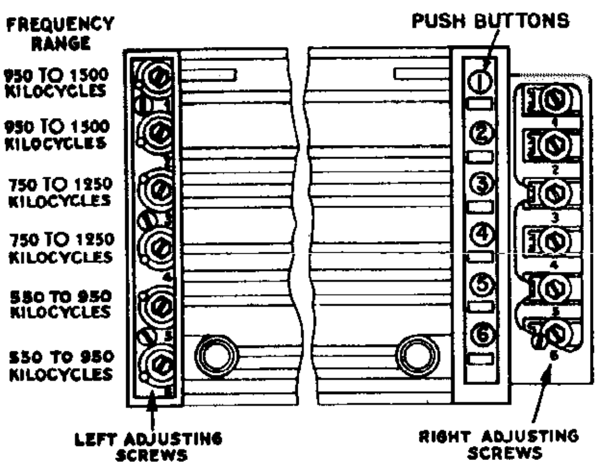


FIGURE 4

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 25 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is plugged into the "SKY" socket of the Antenna Transformer.

*When the undercar is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the Radio. Connect a 250 Mmfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is plugged into the "ROAD" socket of the antenna transformer.

NOTE 2 — The antenna padder screw is on the right, the oscillator coil screw is on the left (see Figure 4).

ALL ADJUSTMENTS MUST BE REPEATED.

PHILCO RADIO & TELEV. CORP.

CHRYSLER MODEL C-1608 SINGLE UNIT DELUXE CAR RADIO

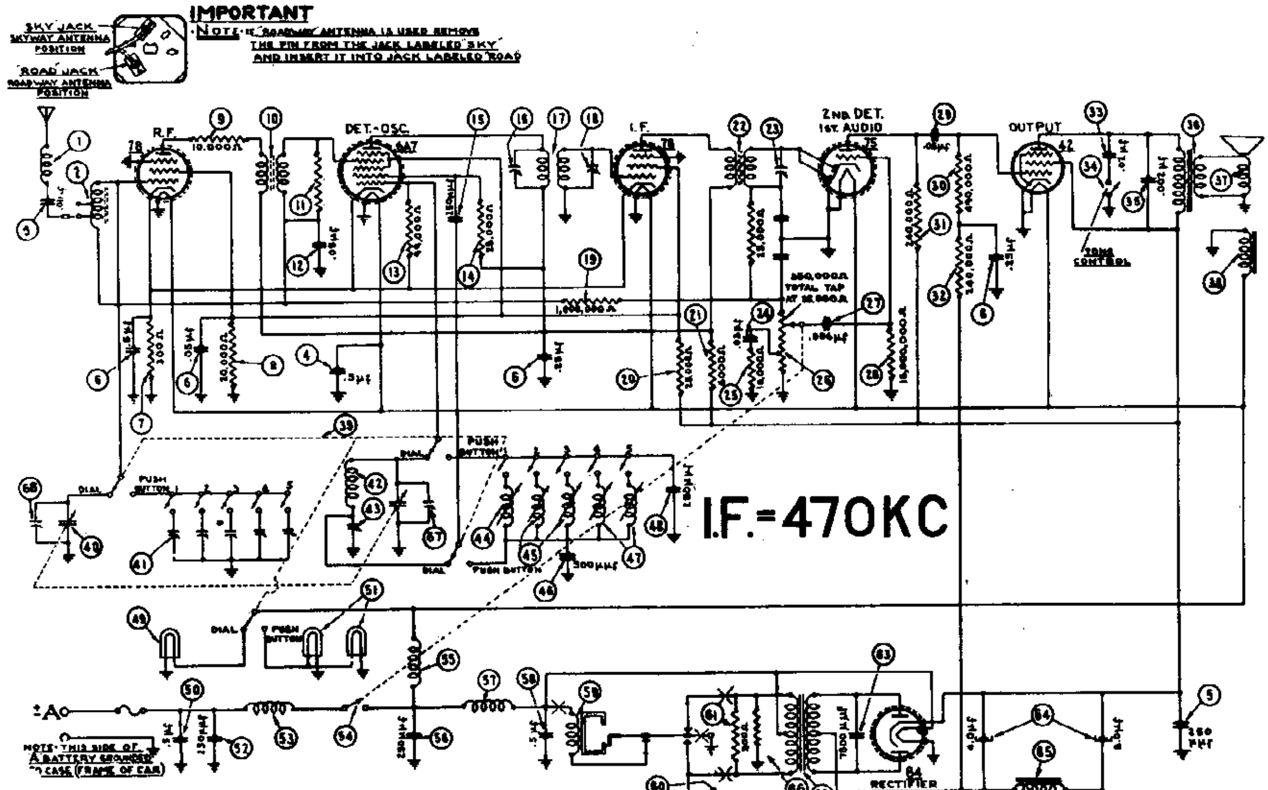


FIGURE 1

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	65-0026
2	Antenna Transformer	65-0021
3	Condenser (.01 mfd.)	61-0014
4	Condenser (.5 mfd.)	30-4565
5	Condenser (250 mmfd.)	61-0033
6	Condenser — (.05-.25-.25-.5 mfd.)	61-0008
7	Resistor (300 ohms)	33-130438
8	Resistor (20,000 ohms)	33-320337
9	Resistor (10,000 ohms)	33-310337
10	R. F. Transformer	65-0009
11	Resistor (39,000 ohms)	33-339137
12	Condenser (.05 mfd.)	30-4444
13	Resistor (99,000 ohms)	33-399337
14	Resistor (25,000 ohms)	33-325437
15	Condenser (250 mmfd.)	61-0034
16	Padder (Pri. 1st I. F. Trans.)	
17	First I. F. Transformer	65-0041
18	Padder (Sec. 1st I. F. Trans.)	
19	Resistor (1,000,000 ohms)	33-510337
20	Resistor (25,000 ohms)	33-325437
21	Resistor (6,000 ohms)	33-260337
22	Second I. F. Transformer	65-0043
23	Padder (Sec. 2nd I. F. Transformer)	
24	Condenser (.03 mfd.)	30-4449
25	Resistor (10,000 ohms)	33-310337
26	Volume Control (350,000 ohms) & On-Off Switch	67-0003
27	Condenser (6,000 mmfd.)	30-4467
28	Resistor (15,000,000 ohms)	33-615347
29	Condenser (.05 mfd.)	30-4518
30	Resistor (490,000 ohms)	33-449337
31	Resistor (240,000 ohms)	33-424437
32	Resistor (240,000 ohms)	33-424337
33	Condenser (.02 mfd.)	30-4419
34	Tone Control Switch	85-0010
35	Condenser (2,000 mmfd.)	30-4177
36	Output Transformer	65-0020
37	Cone & Voice Coil Kit	91-0028
38	Field Coil	Not Replaceable
39	Push Button Switch Assy.	85-0011
40	Tuning Condenser (manual)	63-0009
41	Antenna Push Button Padders	77-0091
42	Oscillator Transformer	65-0031
43	Low Freq. Padder	31-6230
44	Oscillator Transformer (High Freq.)	65-0038
45	Oscillator Transformer (Med. Freq.)	65-0039
46	Condenser (500 mmfd.)	61-0027
47	Osc. Transformer (Low Freq.)	65-0004
48	Condenser (280 mmfd.)	61-0010
49	Pilot Lamp	34-2039
50	Condenser (.5 mfd.)	30-4565
51	Pilot Lamps	34-2040
52	Condenser (250 mmfd.)	61-0033
53	"A" Choke	32-1644
54	Volume Control On-Off Switch	67-0003
55	Filament Choke	65-0037
56	Condenser (250 mmfd.)	61-0033
57	Vibrator Choke	65-0034
58	Condenser (.5 mfd.)	30-4465
59	Vibrator	41-3170
60	Resistor (150 ohms)	33-115337
61	Resistor (200 ohms)	33-120337
62	Power Transformer	65-0033
63	Buffer Condenser (7,500 mmfd.)	30-4567
64	Filter Condenser (4-8 mfd.)	61-0009
65	Filter Choke (325 ohms)	65-0035
66	Resistor (150 ohms)	33-115337
67	First Padder on Tun. Cond.	
68	Second Padder on Tun. Cond.	
	Receiver Housing	77-0096
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	~~Six Prong Socket~~	~~27-6036~~
	Seven Prong Socket	27-6037
	Fuse	45-2559
	Tuning & Vol. Knob (P7-8)	55-0164
	Tuning & Vol. Knob (D11-12)	55-0170
	Tuning & Vol. Knob (C22)	55-0168
	Tuning & Vol. Knob (S6)	55-0166
	Push Button & Spring (S6)	55-0167

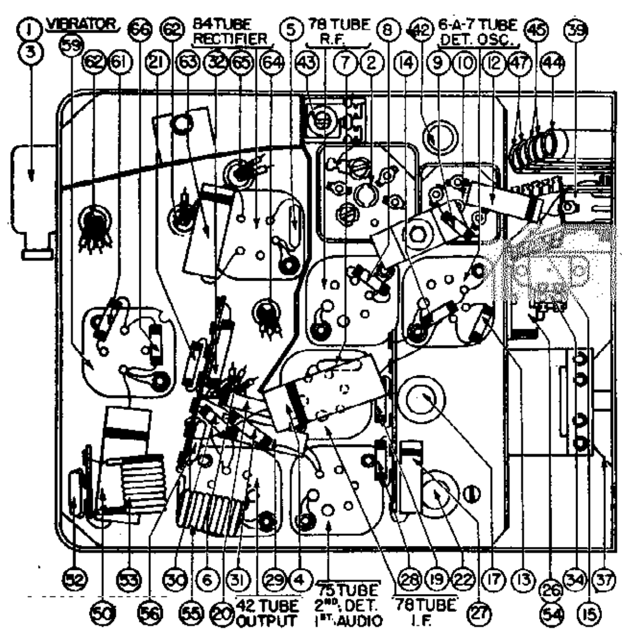


FIGURE 2

No.	Description	Part No.
	Push Button & Spring (P7-8)	55-0165
	Push Button & Spring (C22)	55-0169
	Push Button & Spring (D11)	55-0171
	Distributor Resistor Assy.	38-9562
	Interference Cond.	30-4490
	Dial Scale	55-0068
	Glass	55-0332
	Pointer	77-0042

OCTOBER, 1938

MODEL C-1608 Chrysler
MODEL S-1616 Studebaker

PHILCO RADIO & TELEV. CORP.

Socket, Trimmers Alignment

MODEL C-1608

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 42 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

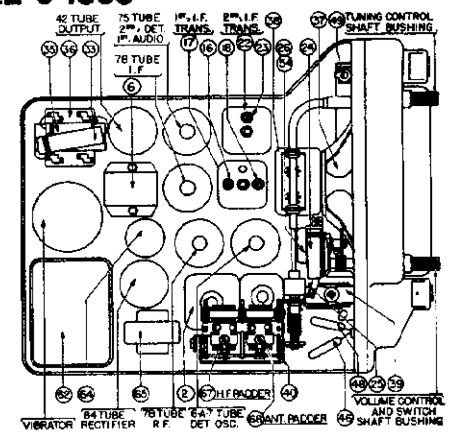


FIGURE 3

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	PADDER ADJUST
1	Press the "DIAL" button and stations can be tuned in by "DIAL" tuning.				
2	470 K.C.	To Grid of 6A7 Tube	.5 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible]
3	1580 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Note 2	[illegible]
4	1400 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
5	580 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Note 2	[illegible]
7	1400 K.C.	To Antenna Receptacle on Radio	*25 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 25 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is plugged into the "SKY" socket of the Antenna Transformer.
*When the undercar is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the Radio. Connect a 250 Mmfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is plugged into the "ROAD" socket of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL S-1616

MODEL S-1616

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 077A or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

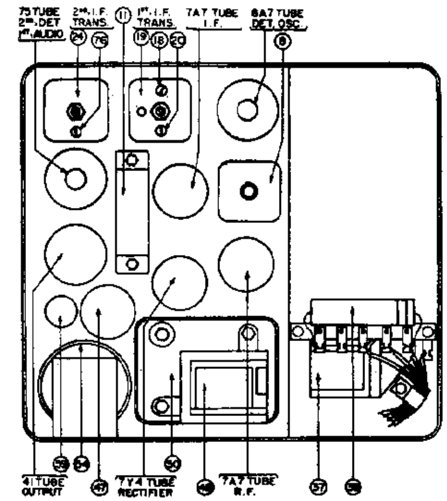


FIGURE 3

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning.				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible]
3	1580 K.C.	To Antenna Receptacle on Radio	20 Mmfd. See Note 1	Note 2	[illegible]
4	1400 K.C.	To Antenna Receptacle on Radio	20 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
5	580 K.C.	To Antenna Receptacle on Radio	20 Mmfd. See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	20 Mmfd. See Note 1	Note 2	[illegible]
7	1400 K.C.	To Antenna Receptacle on Radio	20 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 20 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

MODEL P-1617 Packard
Schematic, Chassis
Parts

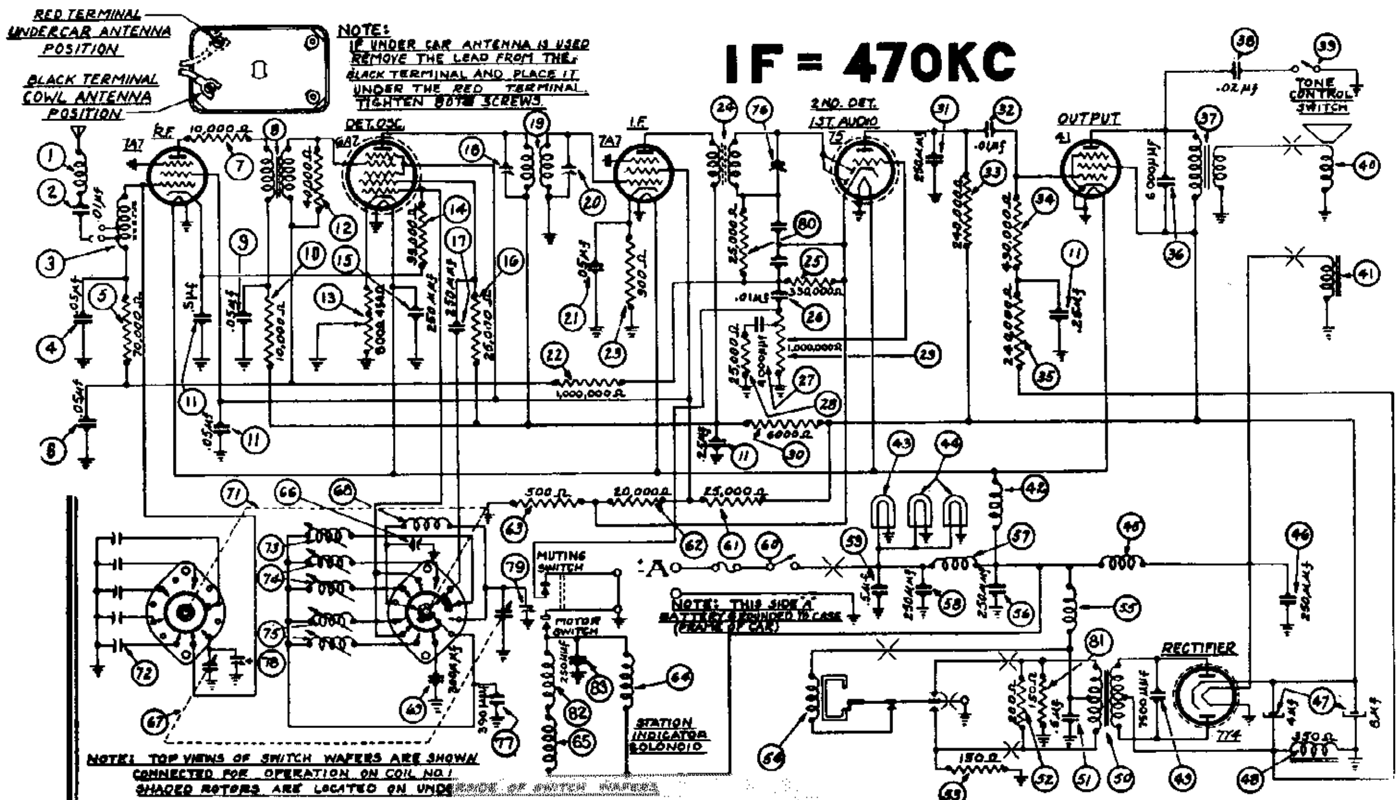


FIGURE 1

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	65-0062
2	Condenser (.01 mfd.)	61-0014
3	Antenna Transformer	65-0047
4	Condenser (.05 mfd.)	30-4444
5	Resistor (70,000 ohms)	33-370337
6	Condenser (.05 mfd.)	30-4444
7	Resistor (10,000 ohms)	33-310337
8	R. F. Transformer	65-0009
9	Condenser (.05 mfd.)	30-4123
10	Resistor (10,000 ohms)	33-310337
11	Condenser (.05-.25-.25-.5 mfd.)	61-0016
12	Resistor (40,000 ohms)	33-340137
13	Sensitivity Control	33-5264
14	Resistor (99,000 ohms)	33-399337
15	Condenser (250 mmfd.)	30-1032
16	Resistor (25,000 ohms)	33-325337
17	Condenser (250 mmfd.)	30-1038
18	Padder (Pri. 1st I. F. Trans.)	
19	First I. F. Transformer	65-0044
20	Padder (Sec. 1st I. F. Trans.)	
21	Condenser (.05 mfd.)	30-4444
22	Resistor (1,000,000 ohms)	33-510337
23	Resistor (900 ohms)	33-190438
24	Second I. F. Transformer	65-0045
25	Resistor (330,000 ohms)	33-433337
26	Condenser (.01 mfd.)	61-0014
27	Condenser (4,000 mmfd.)	61-0020
28	Resistor (25,000 ohms)	33-325337
29	Volume Control (1,000,000 ohms)	67-0004-1
30	Resistor (6,000 ohms)	33-260337
31	Condenser (250 mmfd.)	30-1032
32	Condenser (.01 mfd.)	30-4169
33	Resistor (240,000 ohms)	33-424337
34	Resistor (490,000 ohms)	33-449337
35	Resistor (240,000 ohms)	33-424337
36	Condenser (6,000 mmfd.)	30-4024
37	Output Transformer	65-0048
38	Condenser (.02 mfd.)	30-4495
39	Tone Control Switch	42-1140
40	Cone & Voice Coil Kit	91-0047
41	Field Coil	Not Replaceable
42	Filament Choke	65-0057
43	Pilot Lamp	34-2040
44	Pilot Lamp	34-2040
45	Choke	32-1374
46	Condenser (250 mmfd.)	30-1032
47	Filter Condenser (4-8 mfd.)	61-0018
48	Filter Choke	32-7959
49	Condenser (7,500 mmfd.)	30-4567
50	Power Transformer	65-0046
51	Condenser (.5 mfd.)	30-4565
52	Resistor (200 ohms)	33-120337
53	Resistor (150 ohms)	In Vibrator
54	Vibrator	41-3170
55	Vibrator Choke	32-2537
56	Condenser (250 mmfd.)	30-1032
57	"A" Choke	65-0057
58	Condenser (250 mmfd.)	30-1032
59	Condenser (.5 mfd.)	30-4474
60	On-Off Switch	77-0175
61	Resistor (25,000 ohms)	33-325437
62	Resistor (20,000 ohms)	33-320337
63	Resistor (500 ohms)	33-150438
64	Solenoid	
65	Impulse Motor	77-0108
66	Low Frequency Padder	31-6230
67	Tuning Condenser	63-0011
68	Oscillator Transformer	65-0058
69	Silver Cap Condenser (300 mmfd.)	61-0003
71	Selector Switch	77-0198
72	Antenna Padder Assembly	77-0126
73	Oscillator Transformer (High Freq.)	65-0049
74	Oscillator Transformer (Med. Freq.)	65-0050
75	Oscillator Transformer (Low Freq.)	65-0051
76	Padder (Sec. 2nd I. F. Trans.)	
77	Silver Cap Condenser (390 mmfd.)	61-0031
78	First Padder (on Tun. Cond.)	Part of Ant. Padder Assy.
79	Second Padder (on Tun. Cond.)	
80	Resistor (25,000 ohms)	33-325337
81	Resistor (150 ohms)	33-115337
82	Choke	32-1644
83	Condenser (250 mmfd.)	30-1032
	Interference Condenser	30-4007
	Interference Condenser	30-4475
	Distributor Resistor	33-1196
	Push Button	55-0173
	Push Button Cover	57-0472
	Tuning & Volume Knob	27-4687

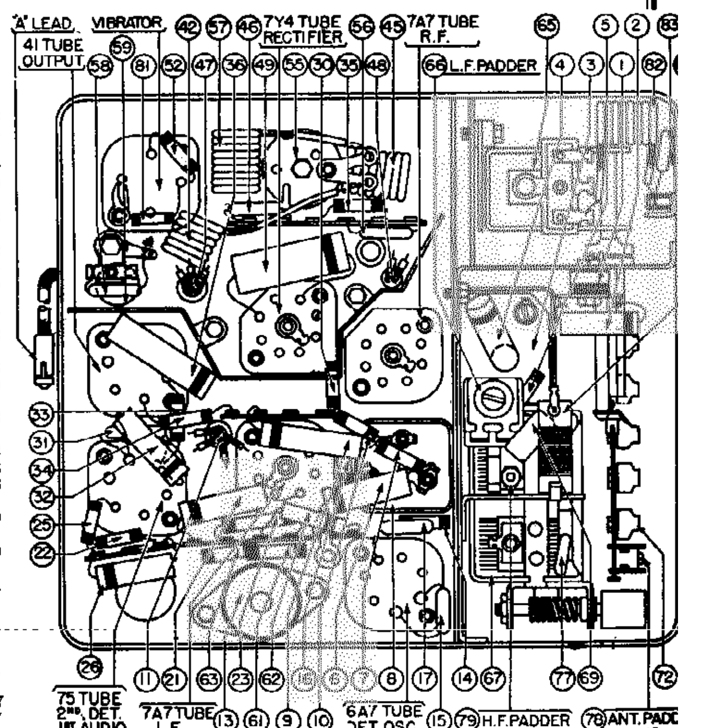


FIGURE 2

Description	Part No.	Description	Part No.
Knob Base	28-4184	Nut	W518
Call Letter Kit	81-0045	Station Indicator	85-0047
"T" Bolt	28-6268		

MODEL P-1617 Packard
MODEL P-1630 Packard PHILCO RADIO & TELEV. CORP.
Socket, Trimmers
Alignment

MODEL P-1617

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7169 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

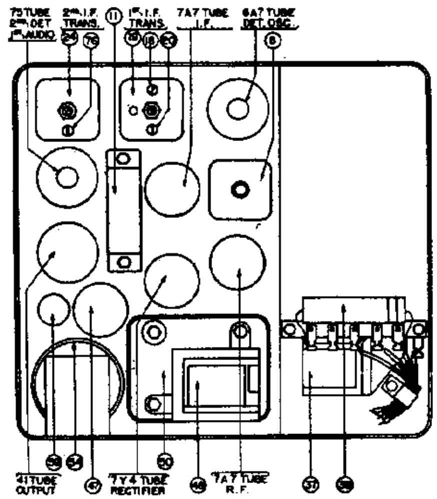


FIGURE 3

Operation	Signal Generator: Frequency	Signal Generator: Connection	Dummy Capacity	Special Instructions	Adjust Padder
1	Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible]
3	1580 K.C.	To Antenna Receptacle on Radio	*20 Mmfd. See Note 1	Note 2	[illegible]
4	1400 K.C.	To Antenna Receptacle on Radio	*20 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4
5	580 K.C.	To Antenna Receptacle on Radio	*20 Mmfd. See Note 1	Set Tuning Condenser at 580 K.C.	[illegible] Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	*20 Mmfd. See Note 1	Note 2	[illegible]
7	1400 K.C.	To Antenna Receptacle on Radio	*20 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	[illegible] Note 4

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 20 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the black terminal of the Antenna Transformer.
*When the undercar or roof antenna is used, connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the Radio. Connect a 250 Mmfd condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is connected to the red terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL P-1630

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7169 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 48 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should, be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

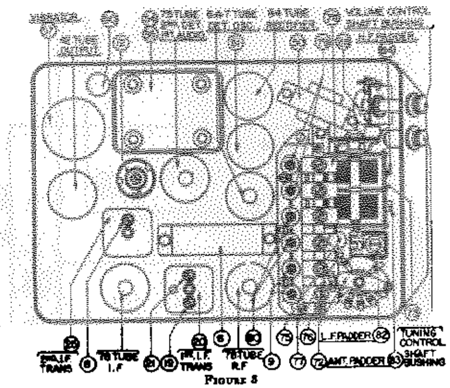


FIGURE 8

Operation	Signal Generator: Frequency	Signal Generator: Connection	Dummy Capacity	Special Instructions	Adjust Padder
1	Press the return to dial button until stations can be tuned in by manual tuning.				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	[illegible]
3	1580 K.C.	To Antenna Receptacle on Radio	* 20 Mmfd. See Note 1	Note 2	[illegible]
4	1400 K.C.	To Antenna Receptacle on Radio	* 20 Mmfd. See Note 1	Set Tuning Condenser at 1400 K. C.	[illegible] Note 4
5	580 K.C.	To Antenna Receptacle on Radio	* 20 Mmfd. See Note 1	Set Tuning Condenser at 580 K. C.	[illegible] Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	* 20 Mmfd. See Note 1	Note 2	[illegible]
7	1400 K.C.	To Antenna Receptacle on Radio	* 20 Mmfd. See Note 1	Set Tuning Condenser at 1400 K. C.	[illegible] Note 4

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 20 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the black terminal of the Antenna Transformer.
* When the undercar or roof antenna is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the Radio. Connect a 250 Mmfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is connected to the red terminal of the antenna transformer.

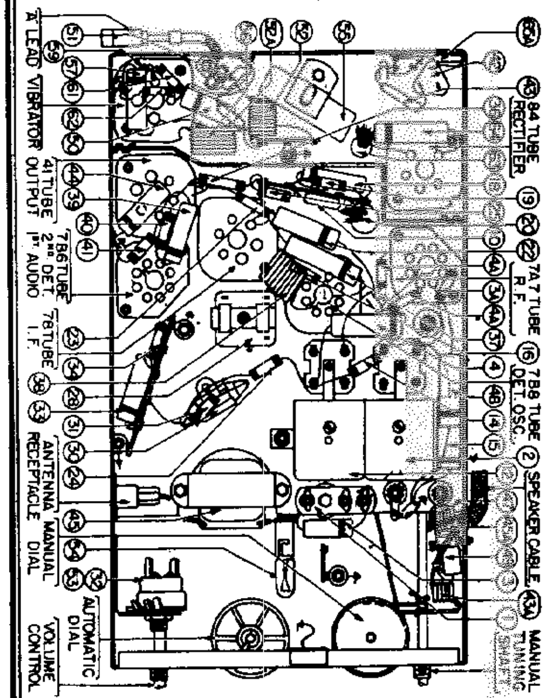
NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

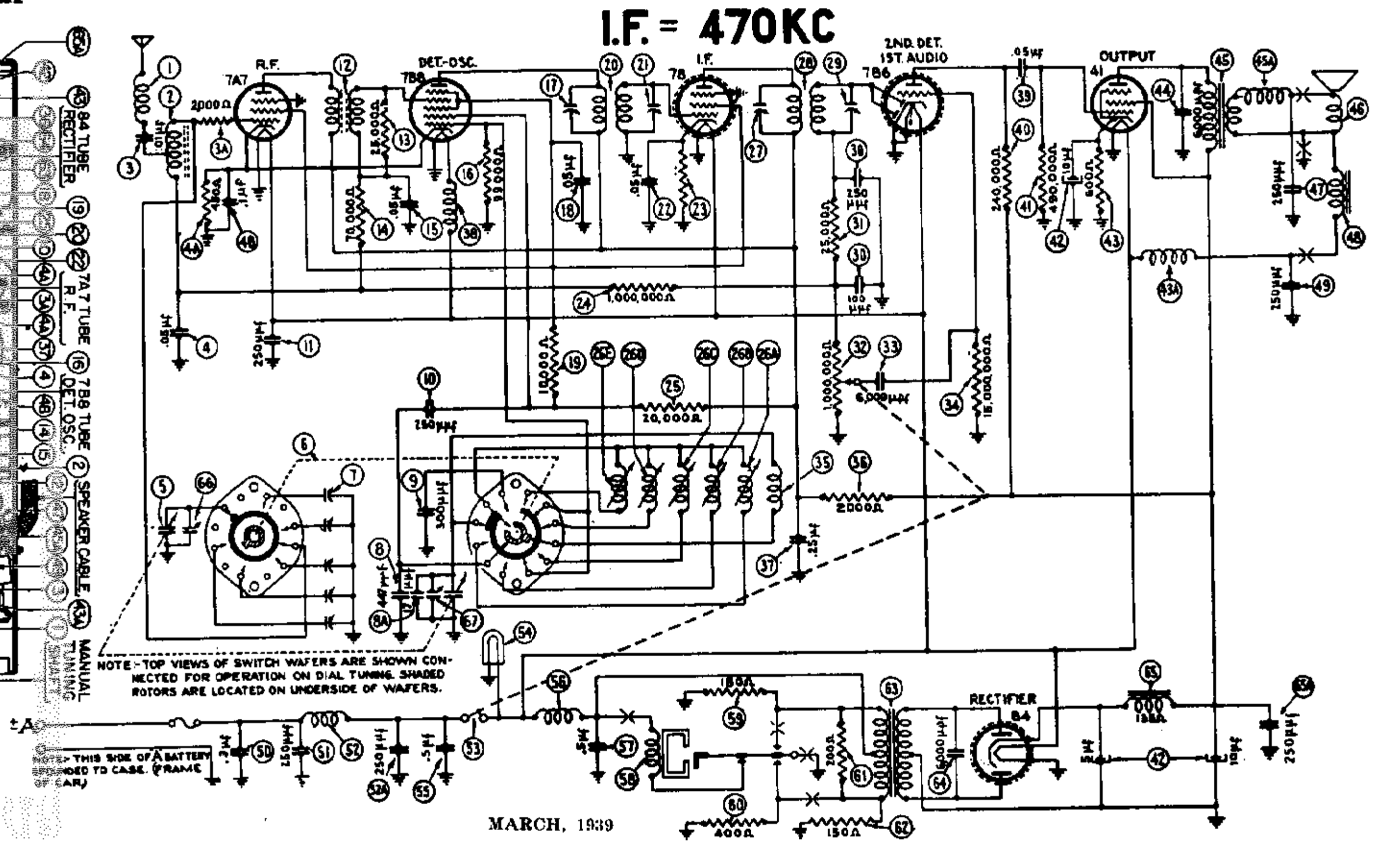
NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

FOR ALIGNMENT, SEE INDEX





MARCH, 1939

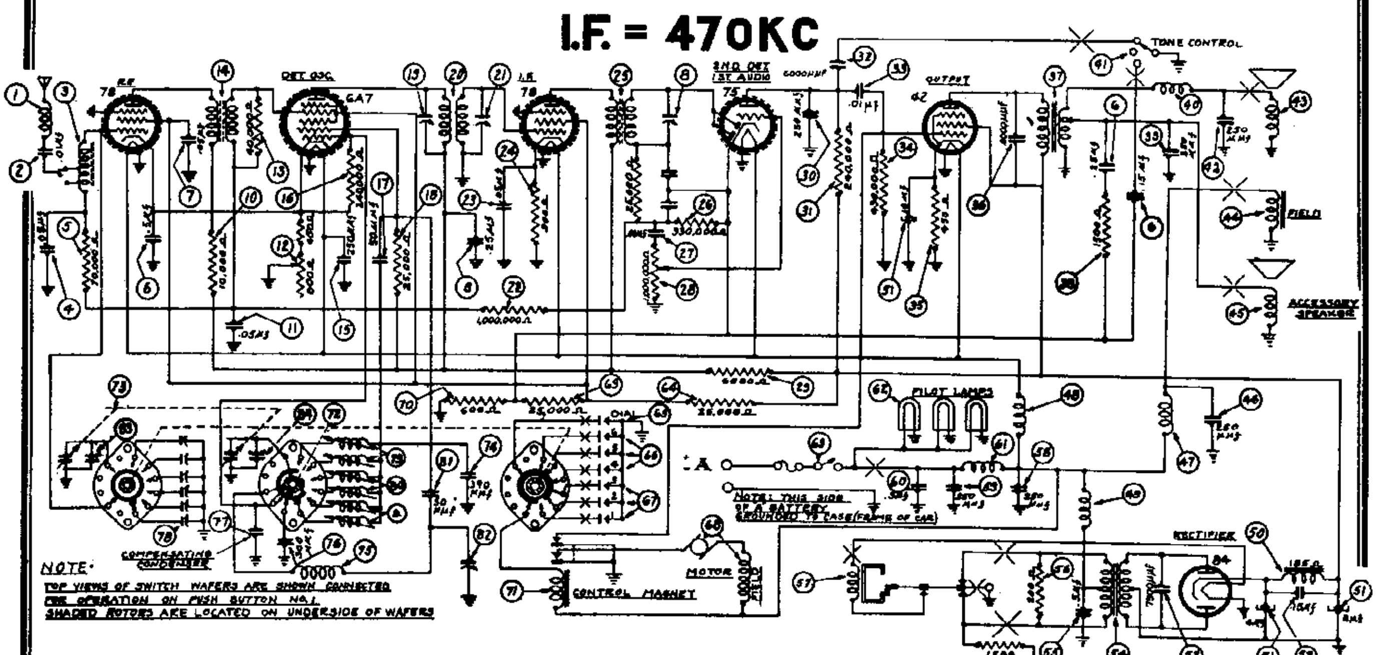
STUDEBAKER MODEL S-1622

No.	Description	Part No.
1	Antenna Choke	65-0102
2	Antenna Transformer	65-0115
3	Condenser (.01 mfd.)	61-0014
3a	Resistor (2,000 ohms)	33-220337
4	Condenser (.05 mfd.)	30-4444
4a	Resistor (450 ohms)	33-145438
4b	Condenser (.1 mfd.)	30-4499
5	Tuning Condenser	63-0028
6	Wafer Switch	412-1023
7	Antenna Padder Assy.	77-0262
8	Silver Mica Condenser (447-mmfd.)	61-0047
8a	Condenser (17 mmfd.)	61-0039
9	Silver Mica Condenser (300 mmfd.)	61-0003
10	Condenser (250 mmfd.)	30-1038
11	Condenser (250 mmfd.)	61-0033
12	R. F. Transformer	65-0114
13	Resistor (25,000 ohms)	33-325337
14	Resistor (70,000 ohms)	33-370337
15	Condenser (.05 mfd.)	30-4444
16	Resistor (99,000 ohms)	33-399337
17	Padder (Pri. 1st I. F. Trans.)	
18	Condenser (.05 mfd.)	30-4569
19	Resistor (10,000 ohms)	33-310337
20	First I. F. Transformer	65-0148
21	Padder (Sec. 1st I. F. Trans.)	
22	Condenser (.05 mfd.)	30-4444
23	Resistor (1,000 ohms)	33-210337
24	Resistor (1,000,000 ohms)	33-510337
25	Resistor (20,000 ohms)	33-320337
26a	Oscillator Transformer	65-0169
26b	Oscillator Transformer	65-0136
26c	Oscillator Transformer	65-0137
26d	Oscillator Transformer	65-0138
26e	Oscillator Transformer	65-0139
27	Padder (Pri. 2nd I. F. Trans.)	
28	Second I. F. Transformer	65-0149
29	Padder (Sec. 2nd I. F. Trans.)	
30	Condenser (100—250 mmfd.)	61-0049
31	Resistor (25,000 ohms)	33-325237
32	Volume Control (1,000,000 ohms) and On-Off Switch	67-0015
33	Condenser (6,000 mmfd.)	30-4467
34	Resistor (15,000 000 ohms)	33-615337
35	Oscillator Transformer	65-0134
36	Resistor (2,000 ohms)	33-220437
37	Condenser (.25 mfd.)	30-4446
38	Choke	65-0158
39	Condenser (.05 mfd.)	61-0053
40	Resistor (240,000 ohms)	33-424337
41	Resistor (490,000 ohms)	33-449337
42	Filter Condenser (5—10—10 mfd.)	61-0050
43	Resistor (600 ohms)	33-160338
43a	Choke	32-1438
44	Condenser (6,000 mmfd.)	30-4024
45	Output Transformer	65-0147
45a	Choke	32-1561
46	Cone and Voice Coil	91-0065
47	Condenser (250 mmfd.)	61-0033
48	Field Coil	Not Replaceable
49	Condenser (250 mmfd.)	61-0033
50	Condenser (.3 mfd.)	61-0056
51	Condenser (250 mmfd.)	61-0033
52	"A" Choke	32-1644
52a	Condenser (250 mmfd.)	61-0033
53	On-Off Switch and Volume Control	67-0015
54	Pilot Lamp	34-2064
55	Condenser (.5 mfd.)	30-4306
56	Vibrator Choke	65-0151
57	Condenser (.5 mfd.)	61-0054
58	Vibrator	41-3398
59	Resistor (150 ohms)	33-115337
60	Resistor (400 ohms)	33-140237
61	Resistor (200 ohms)	33-120337
62	Resistor (150 ohms)	33-115337
63	Power Transformer	65-0152
64	Condenser (6,000 mmfd.)	61-0052
65	Filter Choke	65-0150
65a	Condenser (250 mmfd.)	61-0033
66	First Padder (on Tun. Cond.)	
67	Second Padder (on Tun. Cond.	
	Drive Cord	55-0413
	Dial Disc and Drive Assy.	77-0233
	Automatic Dial	55-0197
	Call Letter Kit	81-0143
	Tuning and Volume Knob	27-4689
	Push Button	56-0412
	Mounting Bracket	57-0667FA3
	Fuse	45-2559
	"A" Lead	95-0032
	Complete Speaker	73-0022
	Interference Condenser	30-4007
	Distributor Resistor	33-1196
	Fuse Gauge Resistor	77-0335
	Steering Post Mtg. Strap	77-0336
	Bolt	77-0056FA3

MODEL P-1630 Packard
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

I.F. = 470KC



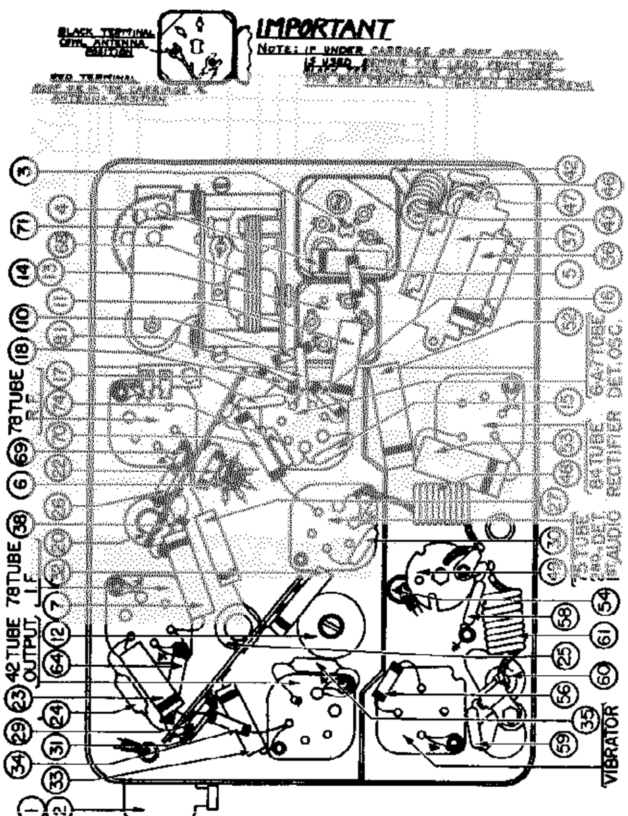
FOR ALIGNMENT, SEE INDEX

Figure 1

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1956
2	Condenser (.01 mfd.)	61-0014
3	Antenna Transformer	65-0008
4	Condenser (.05 mfd.)	30-4569
5	Resistor (70,000 ohms)	33-370337
6	Condenser (.15-.25-.25-.5 mfd.)	61-0013
7	Condenser (.05 mfd.)	30-4123
8	Padder (Sec. 2nd I. F. Trans.)	
9	Oscillator Transformers (High Freq.)	65-0004
10	Resistor (10,000 ohms)	33-310337
11	Condenser (.05 mfd.)	30-4444
12	Sensitivity Control (1,250 ohms)	33-5264-4
13	Resistor (40,000 ohms)	33-34033
14	R. F. Transformers	65-0009
15	Condenser (250 mmfd.)	30-1032
16	Resistor (240,000 ohms)	33-424337
17	Condenser (50 mmfd.)	30-1101
18	Resistor (25,000 ohms)	33-325337
19	Padder (Pri. 1st I. F. Trans.)	
20	First I. F. Transformer	65-0002
21	Padder (Sec. 1st I. F. Trans.)	
22	Resistor (1,000,000 ohms)	33-510337
23	Condenser (.05 mfd.)	30-4569
24	Resistor (900 ohms)	33-190438
25	Second I. F. Transformer	65-0003
26	Resistor (330,000 ohms)	33-433337
27	Condenser (.01 mfd.)	30-4479
28	Volume Control (1,000,000 ohms)	67-0002
29	Resistor (6,000 ohms)	33-260337
30	Condenser (250 mmfd.)	30-1032
31	Resistor (240,000 ohms)	33-424337
32	Condenser (6,000 mmfd.)	30-4504
33	Condenser (.01 mfd.)	30-4501
34	Resistor (490,000 ohms)	33-449337
35	Resistor (450 ohms)	33-145438
36	Condenser (6,000 mmfd.)	30-4024
37	Output Transformer	65-0024
38	Resistor (1,500 ohms)	33-215337
39	Condenser (250 mmfd.)	30-1032
40	Choke	32-1374
41	Tone Control Switch	77-0026

No.	Description	Part No.
42	Condenser (250 mmfd.)	30-1032
43	Cone & Voice Coil	91-0047
44	Field Coil Assembly	Not Replaceable
45	Accessory Speaker	36-1384
46	Condenser (250 mmfd.)	30-1032
47	Choke	32-2657
48	Filament Choke	32-1604
49	Vibrator Choke	32-2537
50	Filter Choke	65-0022
51	Filter Condenser (4-8-10 mfd.)	61-0012
52	Condenser (.15 mfd.)	30-4571
53	Condenser (7,500 mmfd.)	30-4567
54	Power Transformer	65-0016
55	Condenser (.5 mfd.)	30-4565
56	Resistor (200 ohms)	33-120337
57	Vibrator	41-3170
58	Condenser (250 mmfd.)	30-1032
59	Condenser (250 mmfd.)	30-1032
60	Condenser (.5 mfd.)	30-4474
61	"A" Choke	32-1644
62	Pilot Lamp	34-2040
63	On-Off Switch	85-0009
64	Resistor (25,000 ohms)	33-325437
65	Padder & Bracket Assembly	77-0017
66	Push Button Switch	77-0024
67	Push Button Switch	77-0024
68	Motor	83-0001
69	Resistor (25,000 ohms)	33-325337
70	Resistor (600 ohms)	33-160438
71	Motor & Relay Assembly	77-0178
72	Switch Mechanism Assembly	77-0034
73	Tuning Condenser	63-0003
74	Silver Cap Condenser (390 mmfd.)	61-0031
75	Oscillator Transformer	65-0007
76	Silver Cap Condenser (300 mmfd.)	61-0003
77	Thermel Compensating Condenser	61-0011
78	Antenna Padders	77-0017
79	Oscillator Transformer (Low Freq.)	65-0006
80	Oscillator Transformer (Medium Freq.)	65-0005



No.	Description	Part No.
81	Condenser (50 mmfd.)	30-1101
82	Low Frequency Padder	31-6230
83	First Padder on Tun. Cond.	
84	Second Padder on Tun. Cond.	
	Interference Condenser	30-4007
	Interference Condenser	30-4475
	Distributor Resistor	33-1196
	Push Buttons	85-0027

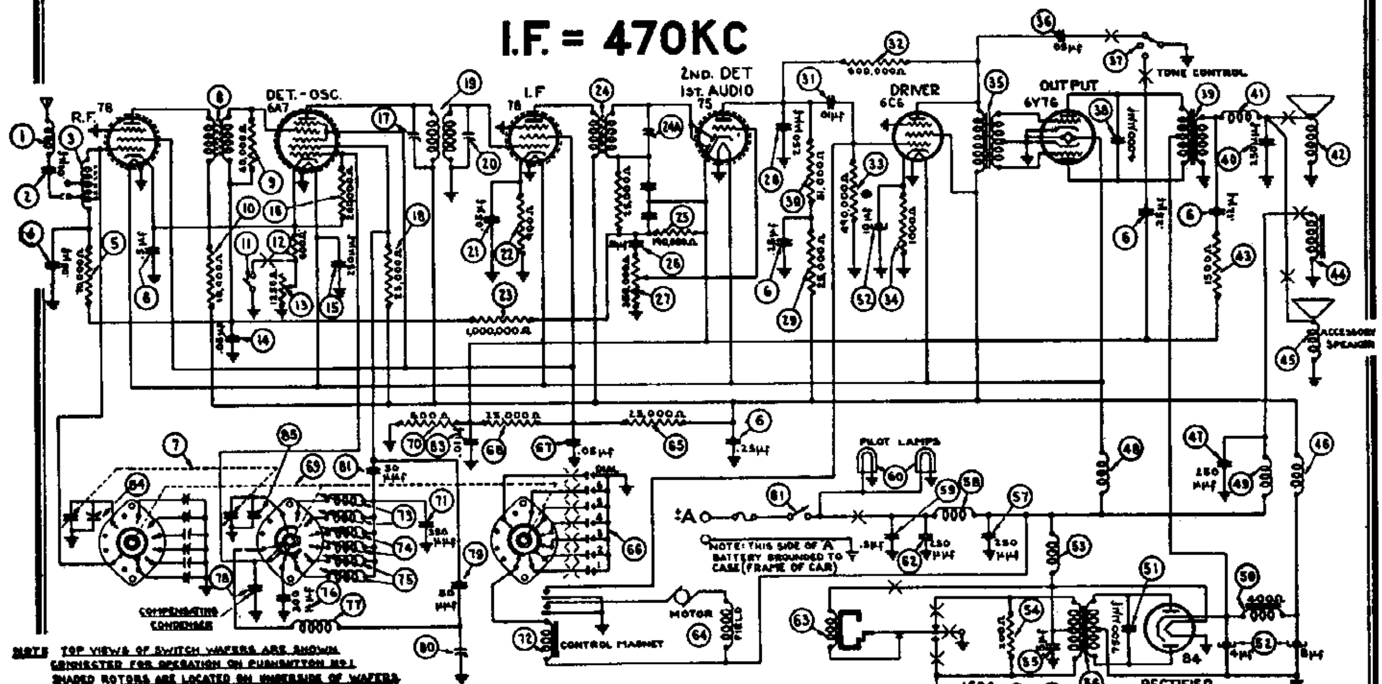
No.	Description	Part No.
	Return to Dial Switch	77-0025
	Tone Control Switch	77-0026
	On-Off Switch	85-0009
	Tuning & Volume Knob	27-4687
	Knob Base	28-4184
	"T" Bolt (Rec. Mtg.)	28-6268
	Nuts (Rec. Mtg.)	W518
	Call Letter Kit	81-0018

SEPTEMBER, 1938

MODEL P-1635 Packard
Schematic, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

I.F. = 470KC



PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1956
2	Condenser (.01 mfd.)	61-0014
3	Antenna Transformer	65-0008
4	Condenser (.05 mfd.)	30-4569
5	Resistor (70,000 ohms)	33-370337
6	Condenser (.12-.25-.25-.25-.5 mfd.)	61-0019
7	Tuning Condenser	63-0003
8	R. F. Transformer	65-0009
9	Resistor (40,000 ohms)	33-339137
10	Resistor (10,000 ohms)	33-310337
11	Local-Distant Switch	42-1429
12	Resistor (600 ohms)	33-160438
13	Sensitivity Control (1,250 ohms)	33-5248-4
14	Condenser (.05 mfd.)	30-4444
15	Condenser (250 mmfd.)	30-1032
16	Resistor (240,000 ohms)	33-424337
17	Padder (Pri. 1st I. F. Trans.)	
18	Resistor (25,000 ohms)	33-325337
19	First I. F. Transformer	65-0002
20	Padder (Sec. 1st I. F. Trans.)	
21	Condenser (.05 mfd.)	30-4569
22	Resistor (900 ohms)	33-190438
23	Resistor (1,000,000 ohms)	33-510337
24	Second I. F. Transformer	65-0003
24a	Padder (Sec. 2nd I. F. Trans.)	
25	Resistor (190,000 ohms)	33-419337
26	Condenser (.01 mfd.)	30-4479
27	Volume Control (350,000 ohms)	67-0005
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325337
30	Resistor (51,000 ohms)	33-351337
31	Condenser (.01 mfd.)	30-4501
32	Resistor (600,000 ohms)	33-460337
33	Resistor (490,000 ohms)	33-449337
34	Resistor (1,000 ohms)	33-210337
35	Input Transformer	32-7779
36	Condenser (.05 mfd.)	30-4012
37	Tone Control Switch	42-1430
38	Condenser (4,000 mmfd.)	30-4185
39	Output Transformer	32-7778
40	Condenser (250 mmfd.)	30-1032
41	Choke	32-1604
42	Cone and Voice Coil	91-0048
43	Resistor (1,500 ohms)	33-215337
44	Field Coil	Not Replaceable
45	Accessory Speaker	73-0019
46	"B" Choke	32-1281
47	Condenser (250 mmfd.)	30-1032
48	Filament Choke	32-1604
49	Choke	32-2657
50	Filter Choke	32-7811
51	Condenser (7,500 mmfd.)	30-4567
52	Filter Condenser (4-8-10 mfd.)	61-0012
53	Vibrator Choke	32-2537
54	Resistor (200 ohms)	33-120337
55	Condenser (.5 mfd.)	30-4474
56	Power Transformer	32-7720
57	Condenser (250 mmfd.)	30-1032
58	"A" Choke	32-1644
59	Condenser (.5 mfd.)	30-4474
60	Pilot Lamp	34-2064
61	On-Off Switch	42-1374
62	Condenser (250 mmfd.)	30-1032
63	Vibrator	41-3170
64	Motor	83-0001
65	Resistor (25,000 ohms)	33-325437
66	Push Button Switch	85-0017
67	Condenser (.05 mfd.)	30-4444
68	Resistor (25,000 ohms)	33-325337
69	Rotary Switch Assembly	77-0174
70	Resistor (600 ohms)	33-160438
71	Silver Cap Condenser (390 mmfd.)	61-0031
72	Motor and Relay Assembly	77-0178
73	Oscillator Transformer (Low Freq.)	65-0006
74	Oscillator Transformer (Med. Freq.)	65-0005
75	Oscillator Transformer (High Freq.)	65-0004
76	Silver Cap Condenser (300 mmfd.)	61-0003
77	Oscillator Transformer	65-0007
78	Thermel Comp. Condenser	61-0011
79	Condenser (50 mmfd.)	30-1101
80	Low Frequency Padder	31-6230
81	Condenser (50 mmfd.)	30-1101

IMPORTANT

NOTE: IF COWL ANTENNA IS USED REMOVE THE LEAD FROM THE RED TERMINAL AND PLACE IT UNDER THE BLK.TERMINAL TIGHTEN BOTH SCREWS

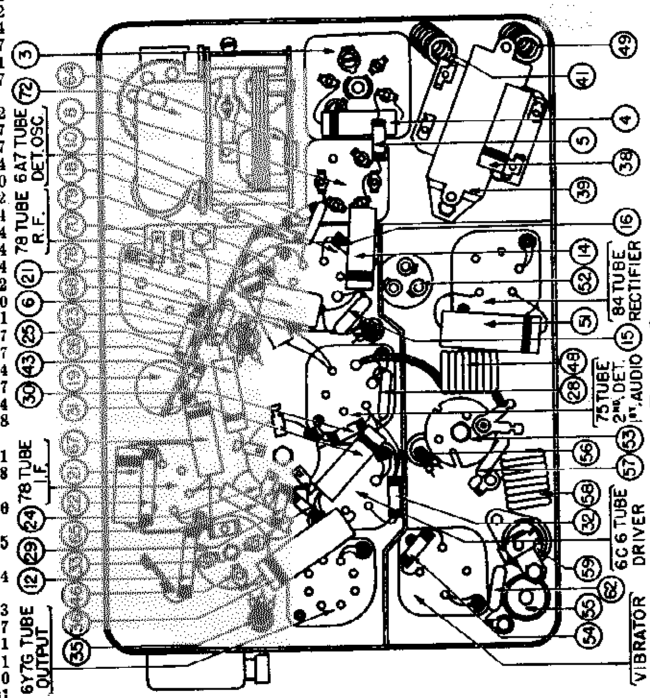


Figure 2

No.	Description	Part No.
82	Resistor (150 ohms)	33-115337
83	Condenser (.01 mfd.)	30-4479
84	First Padder (on Tun. Cond.)	
85	Second Padder (on Tun. Cond.)	
86	Resistor (25,000 ohms)	33-325337
87	Antenna Padder Assembly	77-0017
	Interference Condenser	30-4007
	Interference Condenser	30-4475
	Distributor Suppressor	32-2250
	Push Button	55-0021
	Return to Manual Button	55-0096

No.	Description	Part No.
	Tuning and Volume Knob	27-4687
	Return to Dial Switch	Part of 66
	Switch Knob	28-7255
	Call Letter Kit	81-0024
	"T" Bolt (Set Mtg.)	28-6161
	Nut (Set Mtg.)	W518
	Stud (Speaker Mtg.)	28-6088
	Nut (Speaker Mtg.)	W55
	Dial Face Glass	55-0014
	Pointer	57-0238

DECEMBER 20, 1938

MODEL P-1635 Packard
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 6Y7G output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attentuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

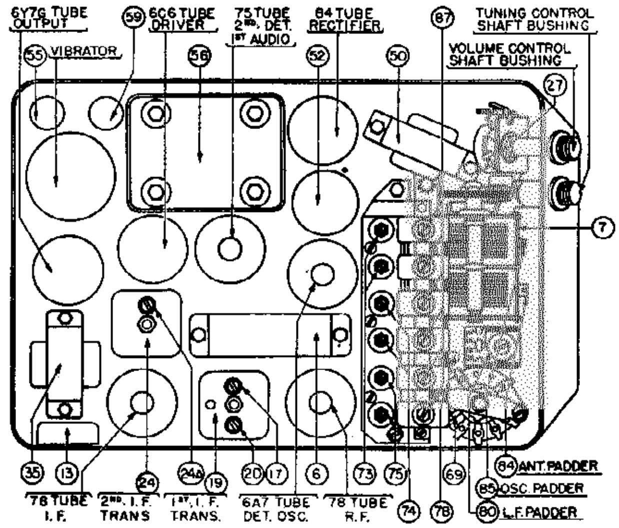


FIGURE 3

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	Press the return to dial button until stations can be tuned in by manual tuning.				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	24A 20 17
3	1580 K.C.	To Antenna Receptacle on Radio	*250 Mmfd. See Note 1	Note 2	85
4	1400 K.C.	To Antenna Receptacle on Radio	*250 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	84 Note 4
5	580 K.C.	To Antenna Receptacle on Radio	*250 Mmfd. See Note 1	Set Tuning Condenser at 580 K.C.	80 Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	*250 Mmfd. See Note 1	Note 2	85
7	1400 K.C.	To Antenna Receptacle on Radio	*250 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	84 Note 4

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 250 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the roof or undercarriage antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the red terminal of the Antenna Transformer.

*When the cowl antenna is used, connect the antenna lead, Part No. L-2765, to the antenna receptacle in the Radio. Connect a 20 mmfd. condenser in series with the signal generator and the antenna lead. Be sure the lead to the antenna transformer is connected to the black terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

PHILCO RADIO & TELEV. CORP.

I.F. PEAK 470 KC.

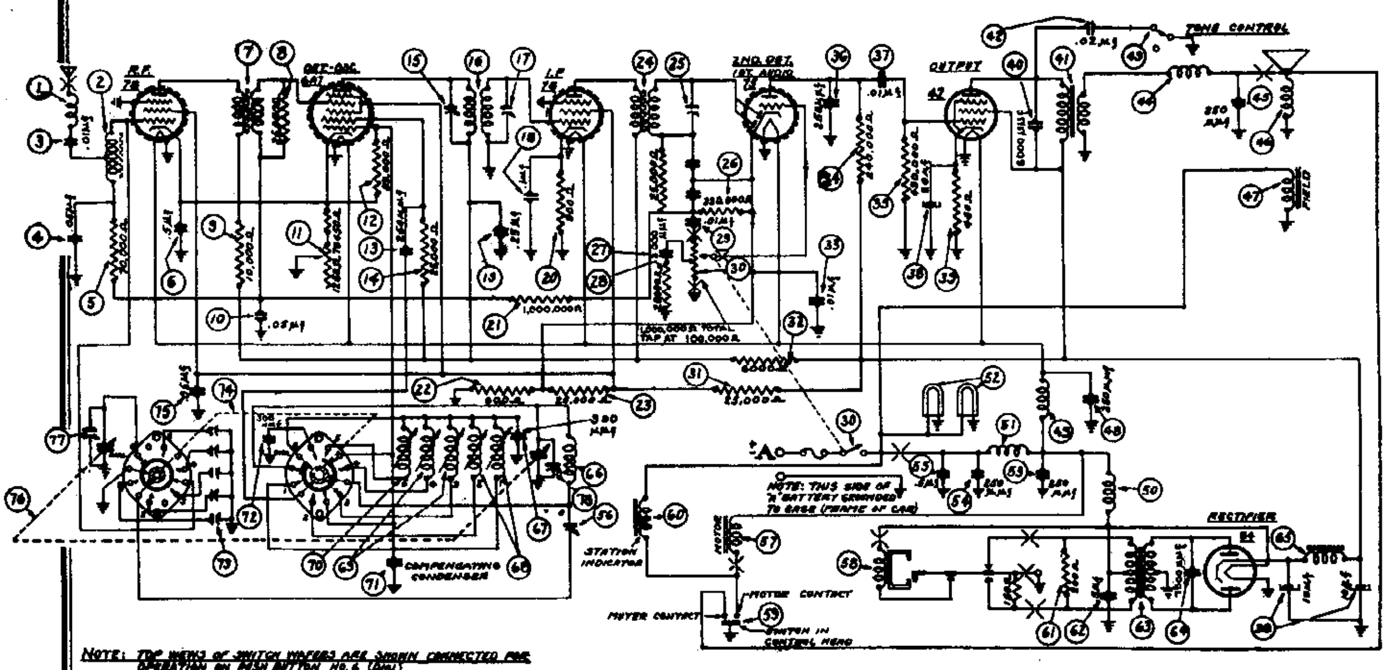


FIGURE 1

FORD MODEL F-1640 TWO UNIT DELUXE CAR RADIO

NOVEMBER, 1938

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1956
2	Antenna Transformer	65-0079
3	Condenser (.01 mfd.)	61-0014
4	Condenser (.05 mfd.)	30-4569
5	Resistor (70,000 ohms)	33-370337
6	Condenser (.5 mfd.)	61-0035
7	R. F. Transformer	65-0083
8	Resistor (25,000 ohms)	33-325337
9	Resistor (10,000 ohms)	33-310337
10	Condenser (.05 mfd.)	30-4444
11	Sensitivity Control	33-5264-4
12	Resistor (99,000 ohms)	33-399337
13	Condenser (250 mmfd.)	61-0034
14	Resistor (25,000 ohms)	33-325437
15	Padder (Pri. 1st I. F. Trans.)	
16	First I. F. Transformer	65-0002
17	Padder (Sec. 1st I. F. Trans.)	
18	Condenser (.1 mfd.)	30-4122
19	Condenser (.25 mfd.)	61-0036
20	Resistor (900 ohms)	33-190438
21	Resistor (1,000,000 ohms)	33-510437
22	Resistor (600 ohms)	33-160438
23	Resistor (25,000 ohms)	33-325437
24	Second I. F. Transformer	65-0003
25	Padder (Sec. 2nd I. F. Trans.)	
26	Resistor (330,000 ohms)	33-433337
27	Condenser (3,000 mmfd.)	30-4469
28	Resistor (20,000 ohms)	33-320337
29	Condenser (.1 mfd.)	30-4479
30	Volume Control (1,000,000 ohms) & On-Off Switch	67-0008
31	Resistor (25,000 ohms)	33-325437
32	Resistor (6,000 ohms)	33-260337
33	Condenser (.01 mfd.)	30-4479
34	Resistor (240,000 ohms)	33-424337
35	Resistor (490,000 ohms)	33-449347
36	Condenser (250 mmfd.)	30-1032
37	Condenser (.01 mfd.)	30-4501
38	Filter Condenser (10-10-20 mfd.)	61-0028
39	Resistor (450 ohms)	33-145437
40	Condenser (6,000 mmfd.)	30-4024
41	Output Transformer	65-0077

No.	Description	Part No.
42	Condenser (.02 mfd.)	30-4495
43	Tone Control Switch	42-1406
44	Choke	32-1561
45	Condenser (250 mmfd.)	30-1032
46	Cone & Voice Coil	91-0042
47	Field Coil	Not Replaceable
48	Condenser (250 mmfd.)	30-1032
49	Filament Choke	32-1604
50	Vibrator Choke	32-2537
51	"A" Choke	32-2477
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	61-0033
54	Condenser (250 mmfd.)	61-0033
55	Condenser (.5 mfd.)	30-4474
56	Low Frequency Padder	63-0017
57	Impulse Motor	77-0148
58	Vibrator	41-3398
59	Automatic Control Switch	77-0171
60	Control Mechanism Coil	
61	Resistor (200 ohms)	33-120347
62	Condenser (.5 mfd.)	30-4565
63	Power Transformer	65-0016
64	Condenser (1,500 mmfd.)	30-4567
65	Filter Choke	65-0022
66	Oscillator Transformer	65-0052
67	Silver Cap Condenser (390 mmfd.)	61-0031
68	Oscillator Transformer (High Freq.)	65-0049
69	Oscillator Transformer (Med. Freq.)	65-0050
70	Oscillator Transformer (Low Freq.)	65-0051
71	Thermol Coupling Condenser	61-0011
72	Silver Cap Condenser (300 mmfd.)	61-0003
73	Antenna Padder Assy.	77-0035
74	Wafer Switch Assy.	77-0185
75	Condenser (.05 mfd.)	30-4569
76	Tuning Condenser	63-0015
77	First Padder (on Tun. Cond.)	
78	Second Padder (on Tun. Cond.)	
	Call Letter Kit	81-0091

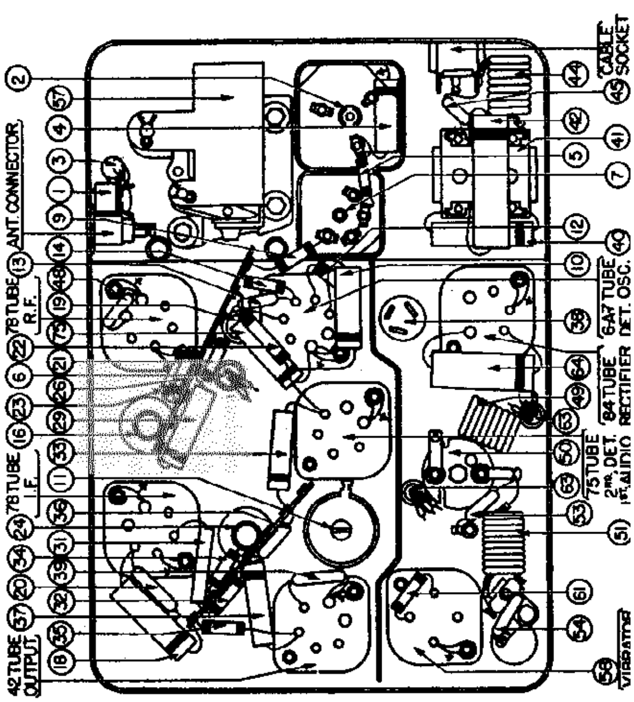


FIGURE 2

Description	Part No.
Flexible Shaft	57-0425
Dial Assembly	85-0052
Push Button Knob	55-0196
Tuning Control Knob	55-0234
Volume Control Knob	55-0235

Description	Part No.
"Tee" Bolt (Rec. Mtg.)	28-6161
Nut (Rec. Mtg.)	W518
Hook Bolt (Control Mtg.)	97-0043
Nut (Control Mtg.)	97-0048
Antenna Lead	95-0063

The letter "P" is stamped on the left end of the housing near the top cover on all Ford Philco Model F-1640 Radios.

MODEL F-1640 Ford
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 95-0063, to the antenna receptacle in the radio. Connect a 30 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 42 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

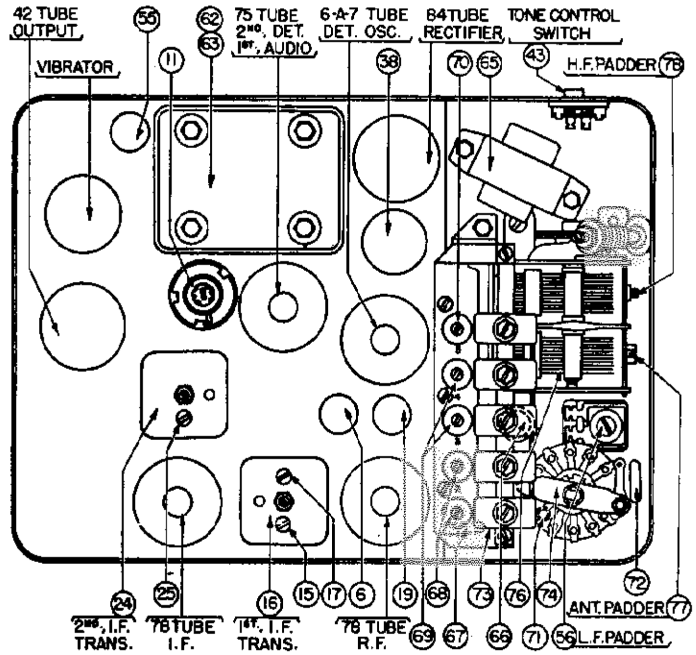


FIGURE 3

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning				
2	470 K.C.	To Grid of 6A7 Tube	.5 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	25 15 17
3	1580 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Note 2	78
4	1400 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	77 Note 4
5	580 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Set Tuning Condenser at 580 K.C.	56 Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Note 2	78
7	1400 K.C.	To Antenna Receptacle on Radio	30 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	77 Note 4

PHILCO RADIO & TELEV. CORP.

MODEL L-1660
Lincoln Zephyr
Schematic, Chassis
Parts

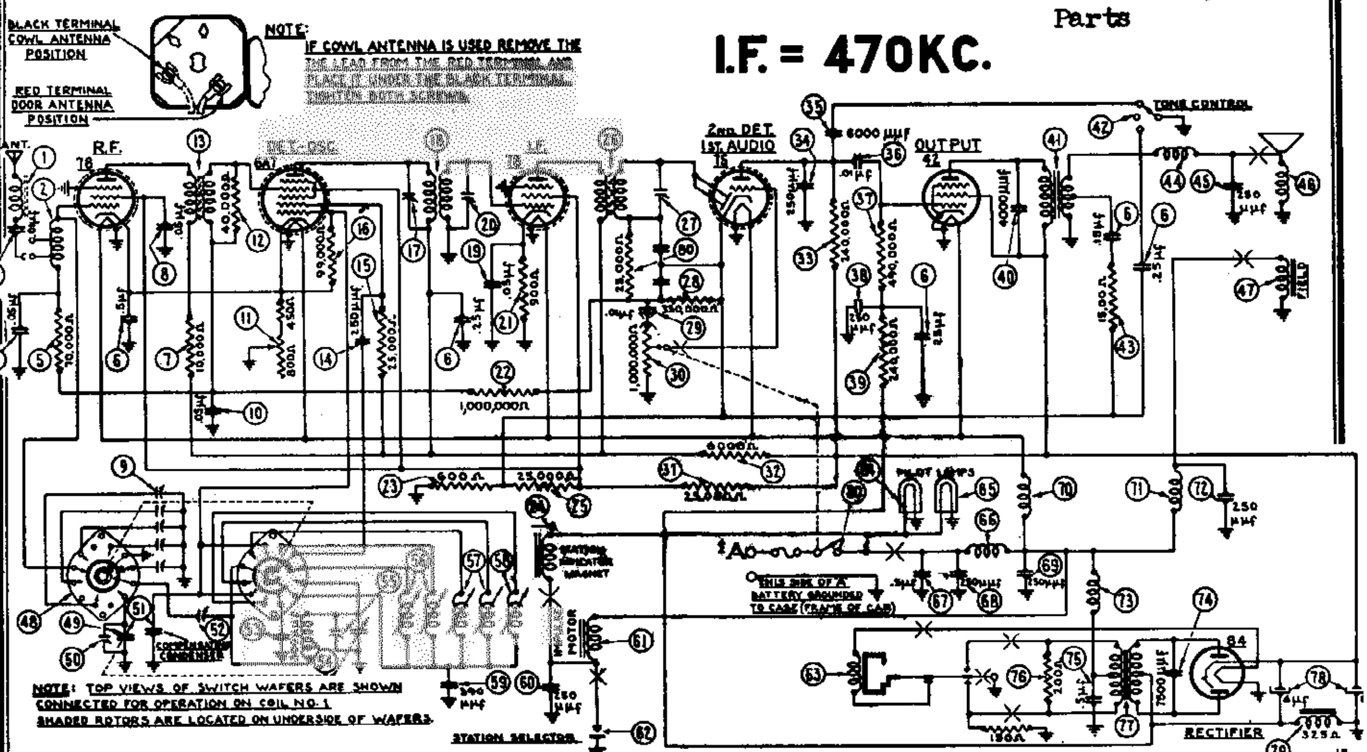
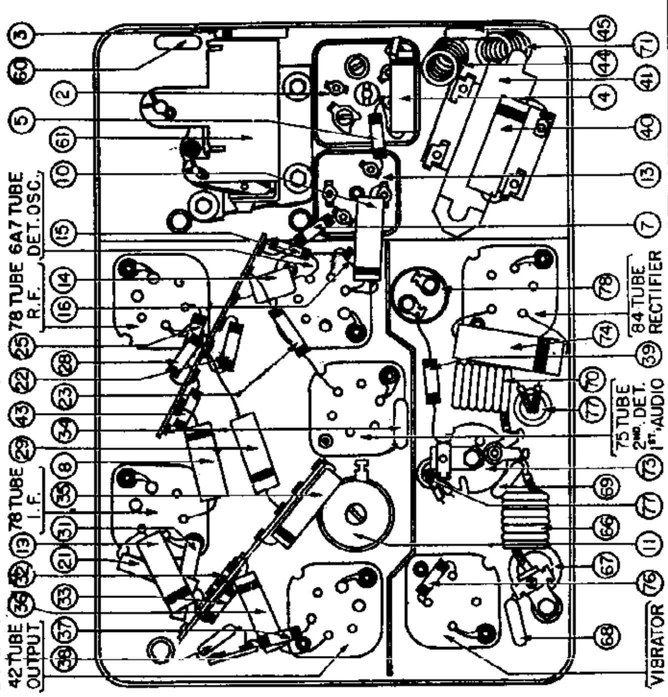


FIGURE 1

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	65-0062
2	Antenna Transformer	65-0063
3	Condenser (.01 mfd.)	61-0014
4	Condenser (.05 mfd.)	30-4569
5	Resistor (70,000 ohms)	33-370337
6	Condenser (.15-.25-.25-.25-.5 mfd.)	61-0024
7	Resistor (10,000 ohms)	33-310337
8	Condenser (.05 mfd.)	30-4444
9	Antenna Padder Assembly	77-0035
10	Condenser (.05 mfd.)	30-4444
11	Sensitivity Control	33-5264-4
12	Resistor (40,000 ohms)	33-339137
13	R. F. Transformer	65-0009
14	Condenser (250 mmfd.)	30-1038
15	Resistor (25,000 ohms)	33-325337
16	Resistor (99,000 ohms)	33-399337
17	Padder (Pri. 1st I. F. Trans.)	
18	First I. F. Transformer	65-0002
19	Condenser (.05 mfd.)	30-4569
20	Padder (Sec. 1st I. F. Trans.)	
21	Resistor (900 ohms)	33-190438
22	Resistor (1,000,000 ohms)	33-510337
23	Resistor (600 ohms)	33-160438
24	Solenoid	
25	Resistor (25,000 ohms)	33-325337
26	Second I. F. Transformer	65-0003
27	Padder (Sec. 2nd I. F. Trans.)	
28	Resistor (330,000 ohms)	33-433337
29	Condenser (.01 mfd.)	30-4479
30	Volume Control (1,000,000 ohms) and On-Off Switch	67-0009
31	Resistor (25,000 ohms)	33-323437
32	Resistor (6,000 ohms)	33-260337
33	Resistor (240,000 ohms)	33-424337
34	Condenser (250 mmfd.)	30-1032
35	Condenser (6,000 mmfd.)	30-4504
36	Condenser (.01 mfd.)	30-4501
37	Resistor (490,000 ohms)	33-449337
38	Condenser (250 mmfd.)	30-1032
39	Resistor (240,000 ohms)	33-424337
40	Condenser (4,000 mmfd.)	30-4185
41	Dutput Transformer	65-0024
42	Tone Control Switch	85-0042
43	Resistor (1,500 ohms)	33-215337
44	Choke	32-1374
45	Condenser (250 mmfd.)	30-1032
46	Cone and Voice Coil Kit	91-0053
47	Field Coil	Not Replaceable
48	Wafer Switch	77-0203
49	Tuning Condenser	63-0012
50	First Padder (on Tun. Cond.)	
51	Thermel Compensating Cond.	61-0011
52	Low Frequency Padder	63-0017
53	Silver Cap Condenser (300 mmfd.)	61-0003
54	Oscillator Transformer	65-0052
55	Second Padder (on Tun. Cond.)	
56	Oscillator Trans. (High Freq.)	65-0049
57	Oscillator Trans. (Med. Freq.)	65-0050
58	Oscillator Trans. (Low Freq.)	65-0051
59	Silver Cap Condenser (390 mmfd.)	61-0031
60	Condenser (250 mmfd.)	30-1032
61	Impulse Motor	77-0120
62	Station Indicator Switch	85-0041
63	Vibrator	41-3170
64	Pilot Lamp	34-2039
65	Pilot Lamp	34-2040
66	"A" Choke	32-1644
67	Condenser (.5 mfd.)	30-4474
68	Condenser (250 mmfd.)	30-1032
69	Condenser (250 mmfd.)	30-1032
70	Filament Choke	32-1604
71	Choke	32-2657
72	Condenser (250 mmfd.)	30-1032
73	Vibrator Choke	32-2812
74	Condenser (7,500 mmfd.)	30-4567
75	Condenser (.5 mfd.)	30-4565
76	Resistor (200 ohms)	33-120367
77	Power Transformer	65-0016
78	Filter Condenser (4-8 mfd.)	30-2295
79	Filter Choke	32-7910
80	Resistor (25,000 ohms)	33-325337
	Scale Assembly	85-0040
	Tuning Control Knob	55-0179

FIGURE 2



No.	Description	Part No.	No.	Description	Part No.
	Volume Control Knob	55-0180		Interference Condenser	30-4663
	Push Button Knob	55-0184		"T" Bolt (Rec. Mtg.)	28-6641
	Tuning Shaft	57-0491		Nut (Rec. Mtg.)	57-0489
	Call Letter Kit	81-0066		Bolt (Spker. Mtg.)	W1721
	Interference Condenser	30-4564		Nut (Spker. Mtg.)	W317
	Interference Condenser	30-4181		Automatic Station Selector Drum	55-0197
	Interference Condenser	30-4404			
	Interference Condenser	30-4307			

DECEMBER 1, 1938

MODEL L-1660
Socket, Trimmers

PHILCO RADIO & TELEV. CORP.

Alignment

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 800 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the tire compartment door antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the red terminal of the Antenna Transformer.
*When the cowl antenna is used, connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the Radio. No dummy capacity is necessary. Be sure the lead to the antenna transformer is connected to the black terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty shortage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 42 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

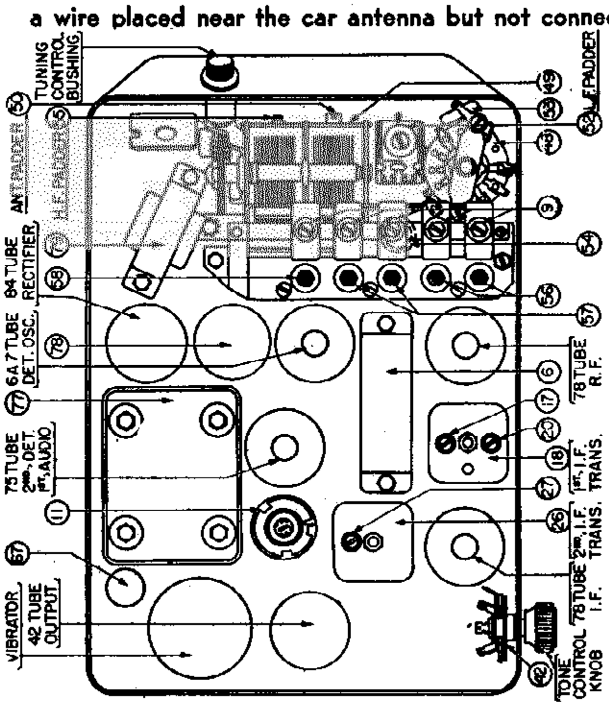


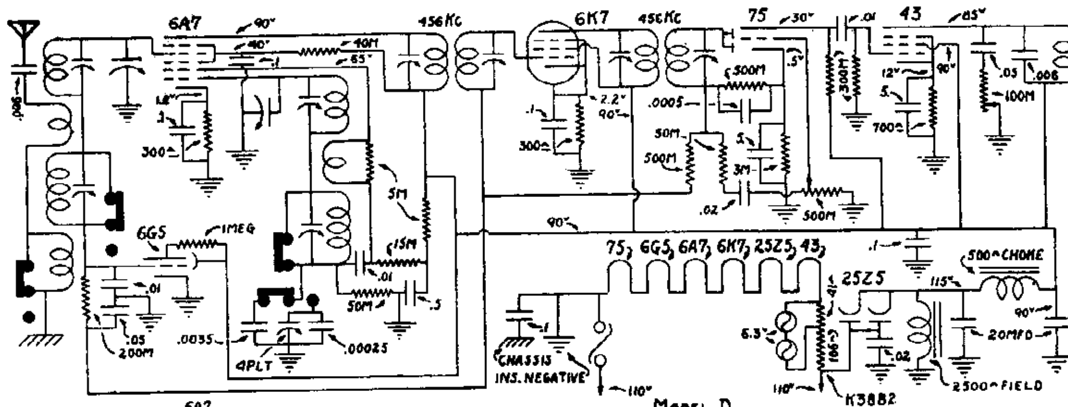
FIGURE 3

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning.				
2	470 K.C.	To Grid of 6A7 Tube	.1 Mfd.	Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.	27 20 17
3	1580 K.C.	To Antenna Receptacle on Radio	*800 Mmfd. See Note 1	Note 2	55
4	1400 K.C.	To Antenna Receptacle on Radio	*800 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	50 Note 4
5	580 K.C.	To Antenna Receptacle on Radio	*800 Mmfd. See Note 1	Set Tuning Condenser at 580 K.C.	52 Note 3
6	1580 K.C.	To Antenna Receptacle on Radio	*800 Mmfd. See Note 1	Note 2	55
7	1400 K.C.	To Antenna Receptacle on Radio	*800 Mmfd. See Note 1	Set Tuning Condenser at 1400 K.C.	50 Note 4

MODEL 930
Wireless Record Player
Schematic

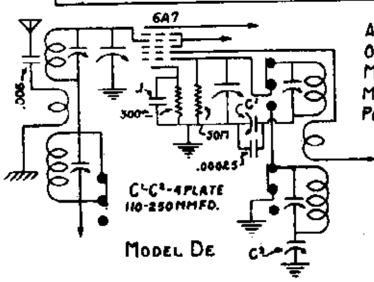
PILGRIM ELECTRIC CORP.

MODELS D,DE
MODELS GH,GHE
Schematics,Voltage



Model D
426,001 AND UP.

IF PEAK 456 KC

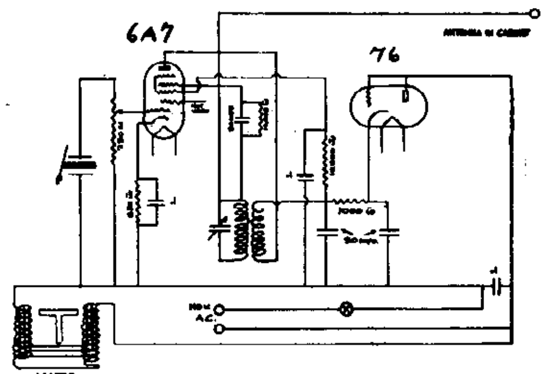


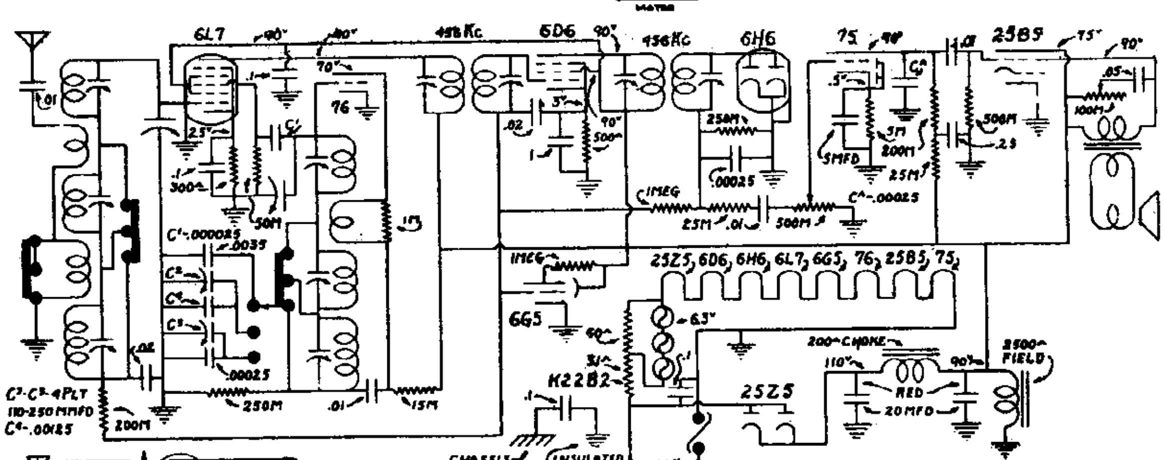
Model De

All Other Constants On Model De Same As Model D. All Voltages Measured With 1000~ Per Volt Meter.

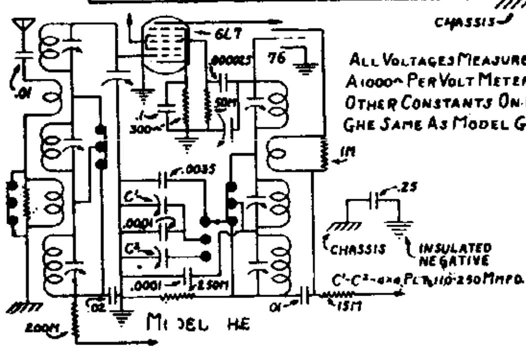
MODEL "D"

Pilgrim Model 930 Electric Wireless Record Player





Model GH
707,001 AND UP.



Model HE

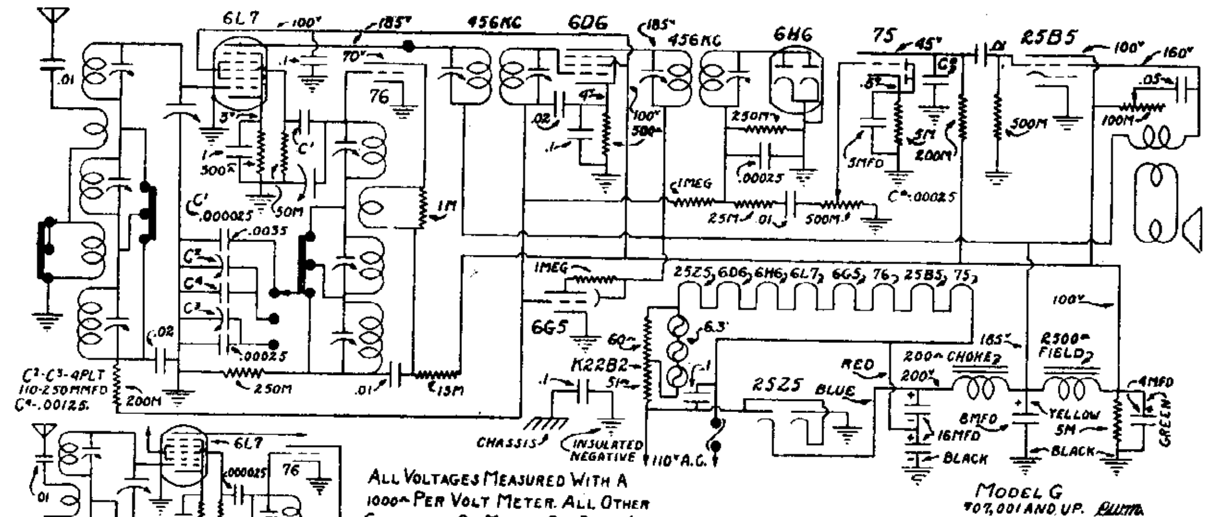
All Voltages Measured With A 1000~ Per Volt Meter. All Other Constants On Model GHE Same As Model GH.

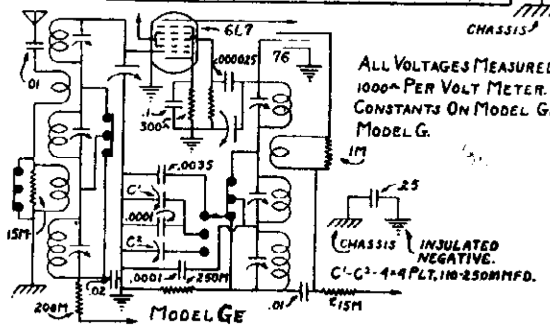
IF PEAK 456 KC

MODEL "GH"

MODELS G, GE
MODELS GB, GF, GBE, GFE
Schematics, Voltage

PILGRIM ELECTRIC CORP.

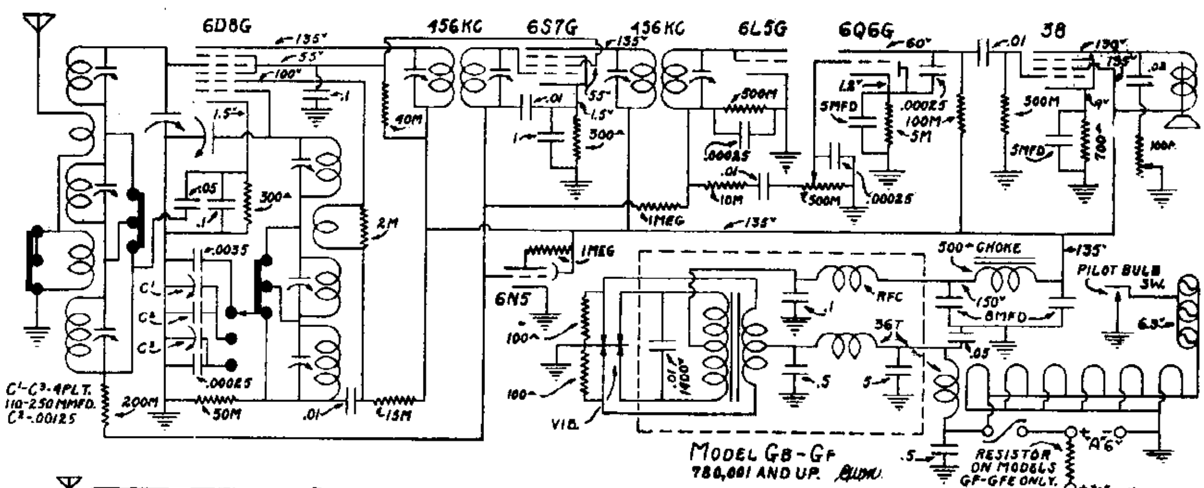


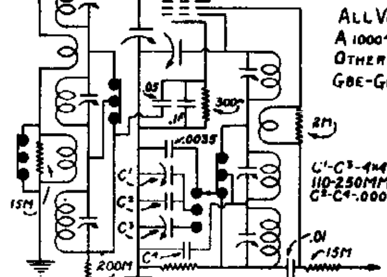


ALL VOLTAGES MEASURED WITH A 1000 PER VOLT METER. ALL OTHER CONSTANTS ON MODEL GE SAME AS MODEL G.

IF PEAK 456 KC

MODEL "G"



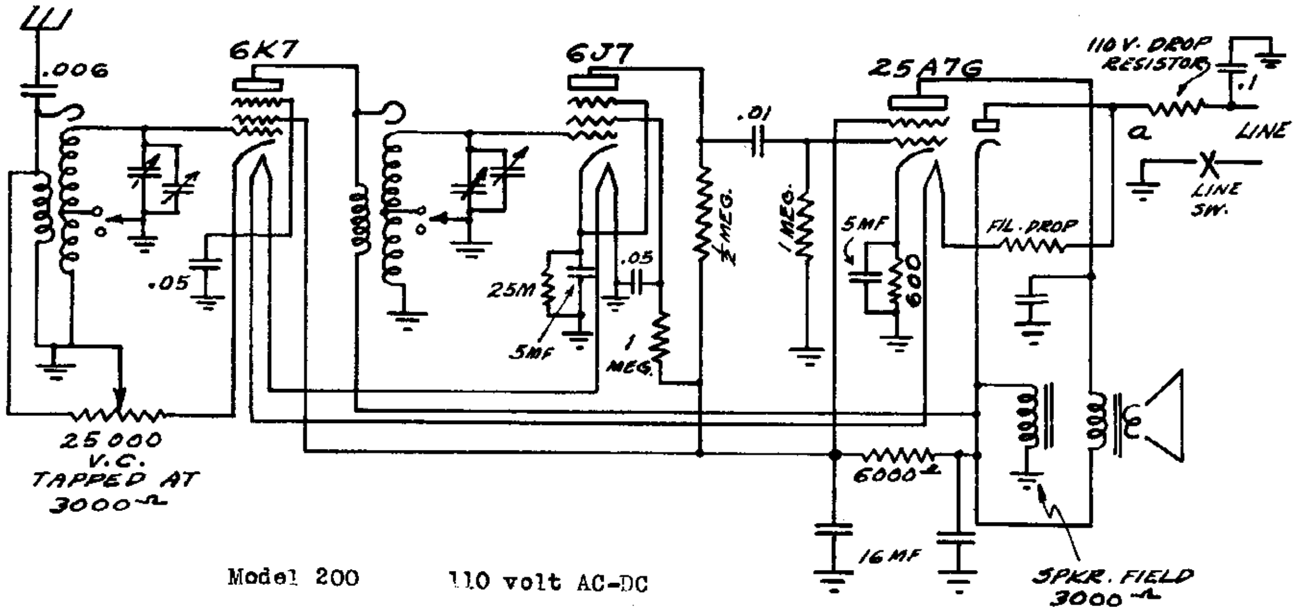


ALL VOLTAGES MEASURED WITH A 1000 PER VOLT METER. ALL OTHER CONSTANTS ON MODELS GBE-GFE SAME AS MODELS GB-GF.

IF PEAK 456 KC

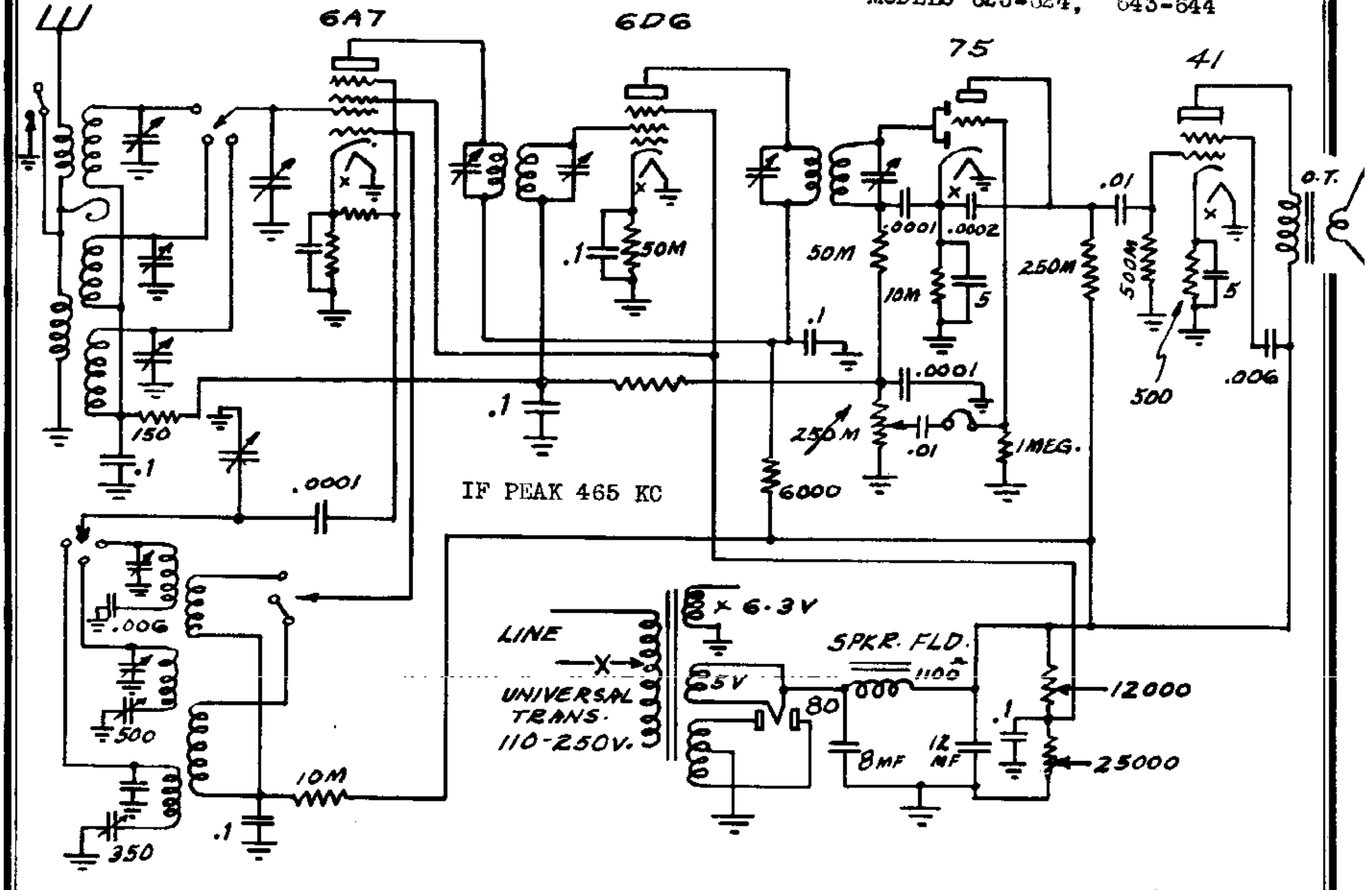
MODEL "GB-GF"

PILGRIM ELECTRIC CORP.



Model 200 110 volt AC-DC

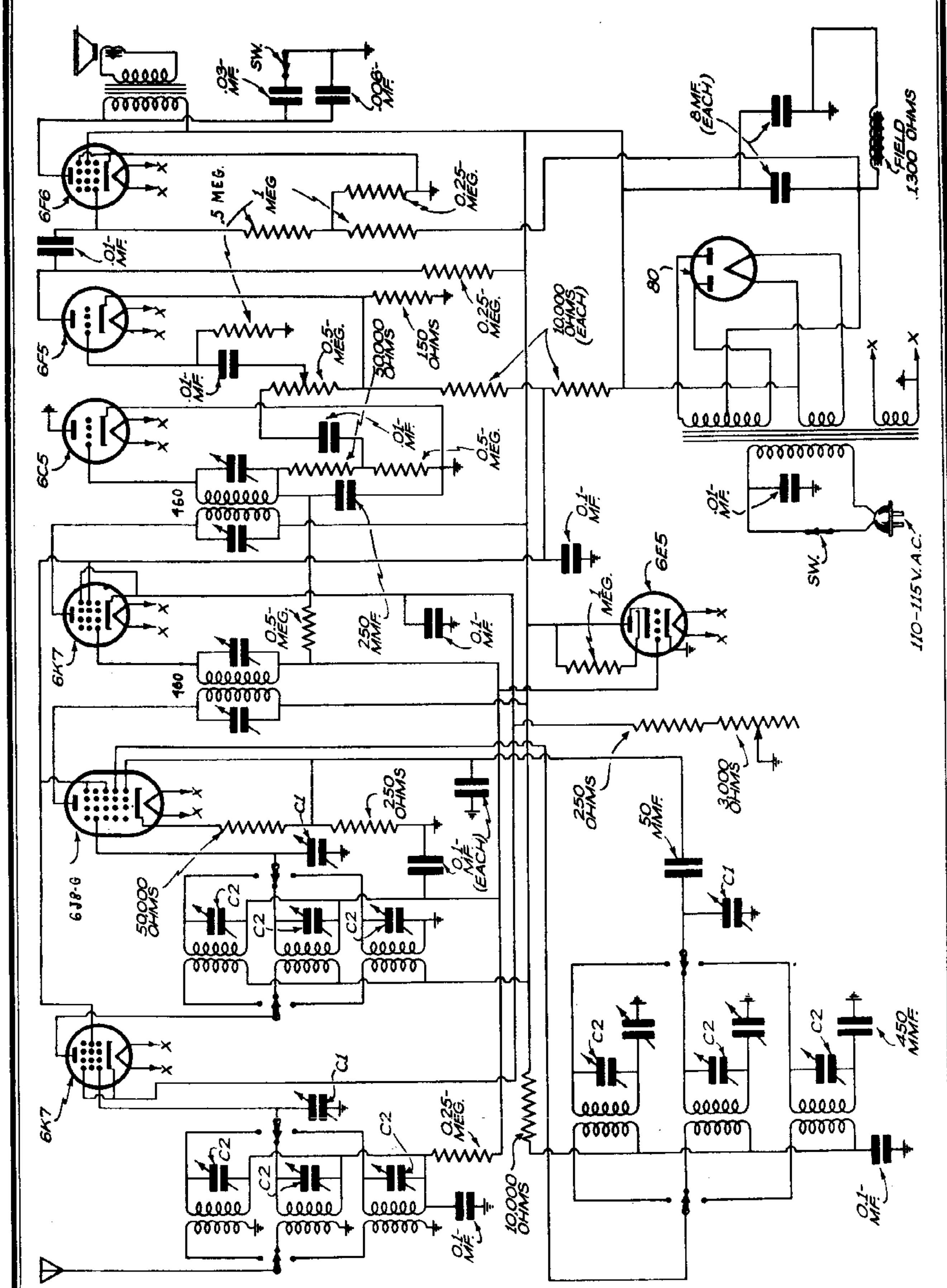
MODELS 623-624, 643-644



IF PEAK 465 KC

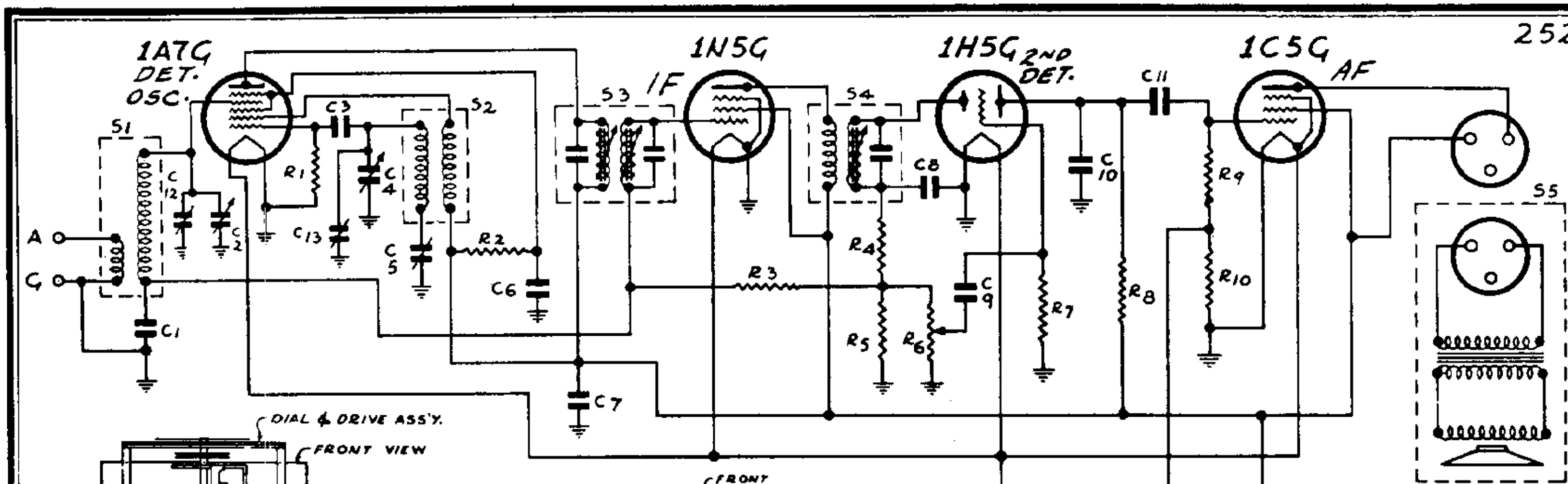
MODEL 860
Schematic

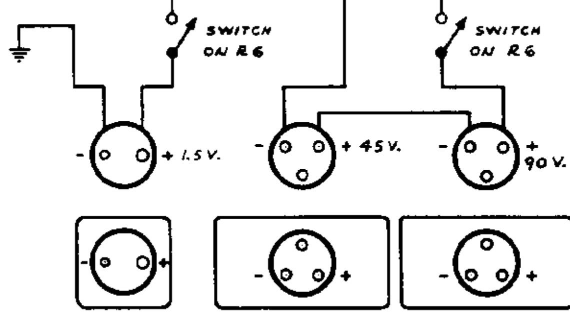
PILGRIM ELECTRIC CORP.



PILOT RADIO CORP.

MODEL H-11
Schematic, Socket
Trimmers, Alignment





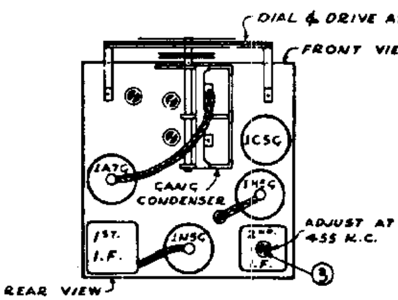
'A' BATTERY

'B' BATTERIES

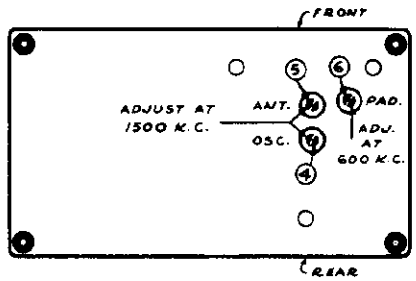
INTERMEDIATE FREQUENCY:-
455 K.C.

ALIGNING FREQUENCIES:-
B.C. - 1500 & 600 K.C.

PILOT RADIO CORPORATION
LONG ISLAND CITY N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-11
DATE 11-22-38
DRAWN BY B.R.
CHECKED BY ZACA
No. 25213-

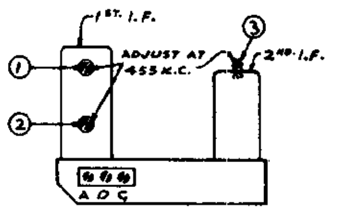


TOP VIEW OF CHASSIS



BOTTOM VIEW OF CABINET

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION, VOL. VIII

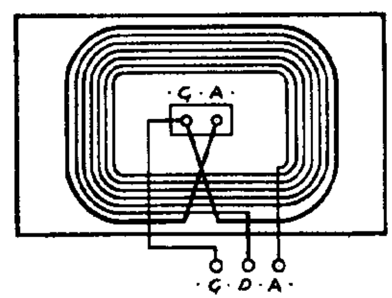


REAR VIEW OF CHASSIS

CONDENSERS FOR MODEL-H-11		
C1, C6, C9	22055-T	.01 MFD. 200 V. PAPER
C2, C4	79664	GANG CONDENSER
C3	28016-0	.0001 MFD. MICA
C5	79431-B	385 MMFDS. PADDER
C7	78704	4 MFD. 150 V. ELECTRO.
C8, C10	27701-0	.00025 MFD. MICA
C11	22055-W	.01 MFD. 400 V. PAPER
C12, C13	70969-E	TRIMMER STRIP ASS'Y.

RESISTORS FOR MODEL-H-11		
R1	13191	200,000 OHMS 1/4 WATT
R2	13241	60,000 OHMS 1/4 WATT
R3, R5, R7, R9	13223	3.3 MEGOHMS 1/4 WATT
R4	13164	50,000 OHMS 1/4 WATT
R6	83763-B	1 MEGOHM VOL. CONT. & SW.
R8	13171	250,000 OHMS 1/4 WATT
R10	13028	1,000 OHMS 1/4 WATT

MISCELLANEOUS FOR MODEL-H-11		
S1	68040	ANTENNA LOOP ASS'Y.
S2	73243	OSCILLATOR COIL ASS'Y.
S3	73192-2-C	1ST. I.F. TRANSFORMER ASS'Y.
S4	73244	2ND. I.F. " "
S5	40864	5" P.M. SPEAKER



CABINET BACK & ANTENNA LOOP ASS'Y.

GENERAL SPECIFICATIONS.

Circuit Battery-powered Super-Heterodyne, for operation with a conventional antenna, or as a portable receiver with self-contained loop antenna. Permeability tuned IF transformers. Permanent magnet speaker. Automatic volume control, Class A output stage.

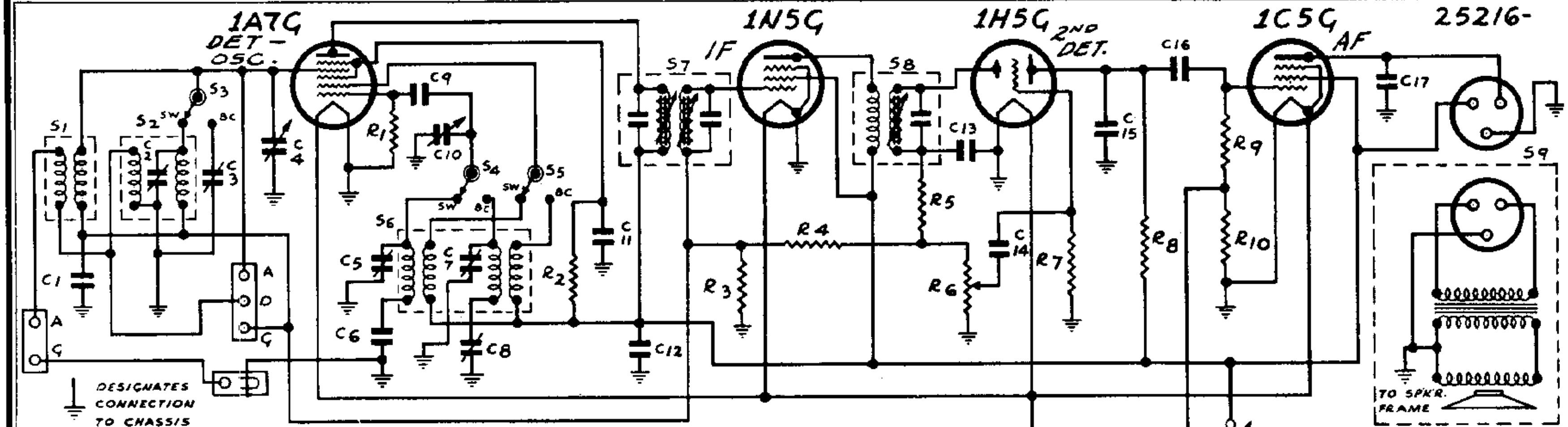
Tuning Range. 535 to 1600 kc or 560 to 187.5 meters

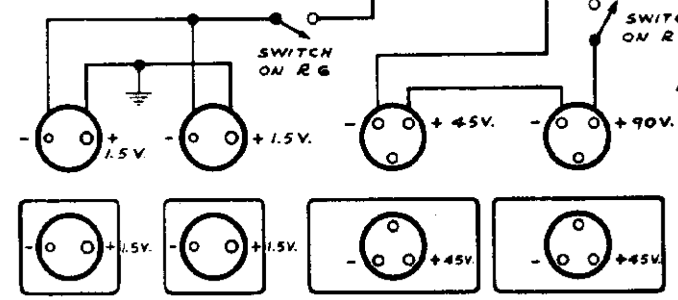
Batteries Required.

One 1-1/2 volt "A" Battery
Two 45 volt "B" Batteries

MODEL H-12
Schematic, Socket
Trimmers, Alignment

PILOT RADIO CORP.



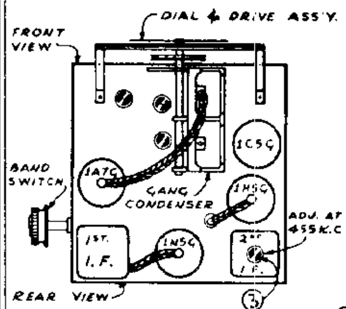


A- BATTERIES

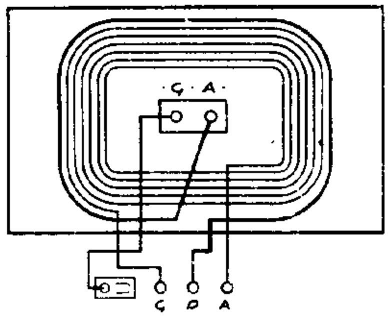
'B'-BATTERIES

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII

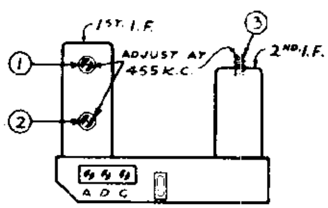
INTERMEDIATE FREQUENCY:- 455 K.C.
ALIGNING FREQUENCIES:
B.C.-1500 & 600K.C.
S.W. {ALIGN AT 15 MEGACYCLES / CHECK AT 6 "



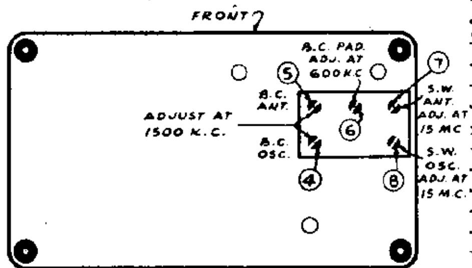
TOP VIEW OF CHASSIS



CABINET BACK & ANTENNA LOOP ASS'Y.



REAR VIEW OF CHASSIS



BOTTOM VIEW OF CABINET

CONDENSERS FOR MODEL-H-12		
C1, C11, C14	22055-T	.01 MFD. 200V. PAPER
C2, C3, C5, C7	70969-E	TRIMMER STRIP ASS'Y.
C4, C10	79664	GANG CONDENSER
C6	28120-W	.005 MFD. MICA ± 5%
C8	79431-B	385 MMFDS. PADDER
C9	28016-O	.0001 MFD. MICA
C12	23500-H	4 MFD. 150 V. ELECTRO.
C13, C15	27701-O	.00025 MFD. MICA
C16	22055-W	.01 MFD. 400V. PAPER
C17	22055-K	.002 MFD. 600 V. PAPER

RESISTORS FOR MODEL-H-12		
R1	13191	200,000 OHMS 1/4 WATT
R2	13241	60,000 OHMS 1/4 WATT
R3, R4, R7, R9	13223	3.3 MEGOHMS 1/4 WATT
R5	13164	50,000 OHMS 1/4 WATT
R6	83903	2 MEGOHMS VOLUME CONTROL & SWITCH
R8	13001	1 MEGOHM 1/4 WATT
R10	13048	800 OHMS 1/4 WATT

Tuning Range.

535 to 1600 kc or 560 to 187.5 meters
5.4 to 15.7 mc or 55.5 to 19.1 meters

Batteries Required

Two 1-1/2 volt "A" Batteries
Two 45 volt "B" Batteries

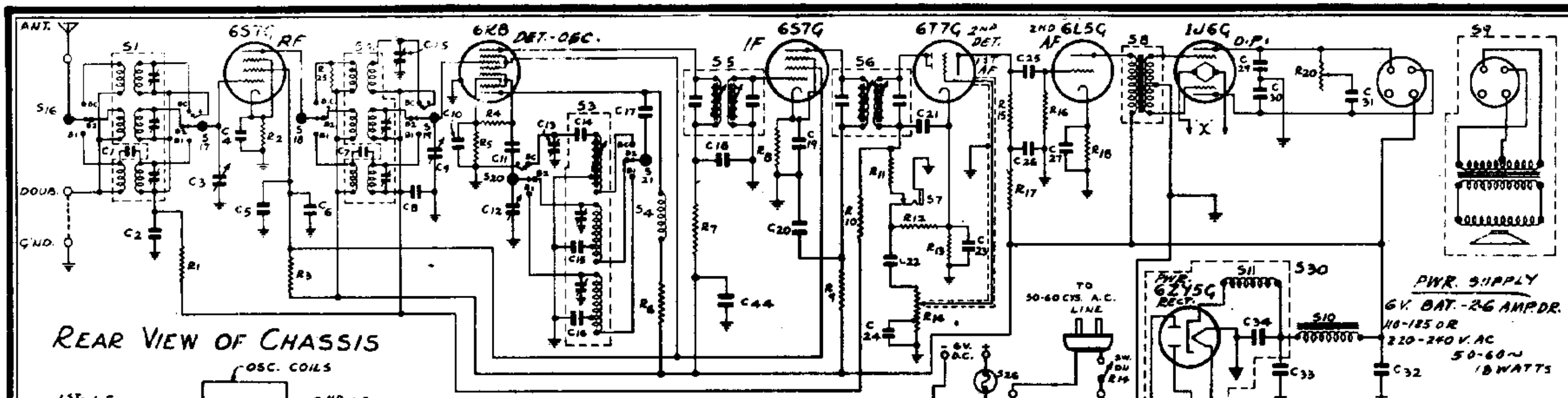
GENERAL SPECIFICATIONS.

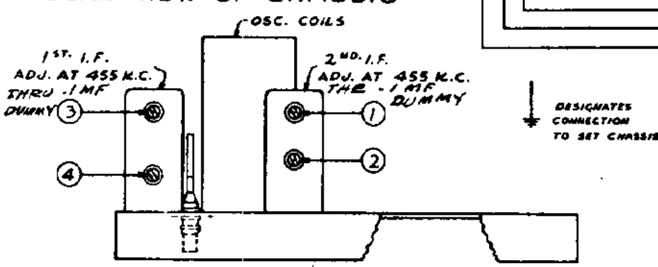
Circuit Battery-powered Super-Heterodyne, for operation with a conventional antenna, or as a portable receiver with self-contained loop antenna. Two tuning ranges as listed below. Permeability tuned IF transformers. Permanent magnet speaker. Automatic Volume control, Class A output stage.

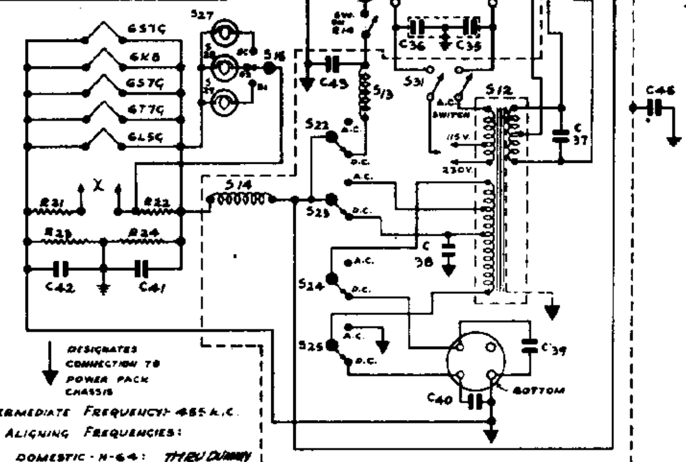
PILOT RADIO CORPORATION
LONG ISLAND CITY, N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-12
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY
APPROVED BY J.S.E.
DATE 1-11-39
DWG. NO. 25216

PILOT RADIO CORP.

MODEL H-64
Chassis H60
Schematic, Voltage
Socket, Trimmers
Alignment







D.C. SOCKET VOLTAGES

Tube		Socket Terminals 1	2	3	4	5	6	7	8
R.F.	6S7-G	-	-	145	62.5	2.5	-	-	2.5
1st Det.	6K8	-	-	150	62.5	-	140	-	1.6
I.F.	6S7-G	-	-	145	62.5	2.7	-	-	2.7
2nd Det.	6T7-G	-	-	80	-	-	-	-	1.2
A.F.	6L5-G	-	-	125	-	-	-	-	5.7
A.F.	1J6-G	-	-	145	-	-	145	-	0
Rect.	6ZY5-G	-	-	-	-	-	-	-	150

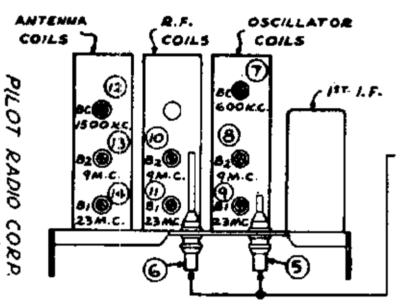
All voltage measurements are those between the indicated tube terminal and the chassis, and are made with a 1000 ohms per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

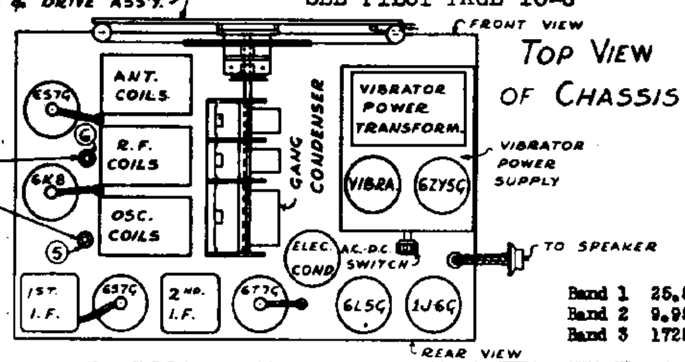
INTERMEDIATE FREQUENCY: 455 K.C.

ALIGNING FREQUENCIES:

DOMESTIC - H-64:	THRU DUMMY
B1 - 23 MEGACYCLES	400 Ω RES
B2 - 9 "	400 Ω RES
B.C. - 1500 & 600 K.C.	.0002 MF

FOR ALIGNMENT PROCEDURE
SEE PILOT PAGE 10-6





CONDENSERS FOR MODEL - H - 64		
C1	27737-O	.00001 MFD. MICA
C2, C8	22055-J	.05 MFD. 200 V. PAPER
C3, C9, C12	83359	GANG CONDENSER
C4, C10, C19	22055-M	.1 MFD. 200 V PAPER
C5, C32, C33	23600-C	5-30-10 MFD. 300 V. ELECTRO.
C6, C26	22055-L	.1 MFD. 400 V. PAPER
C7.	28115-O	.000015 MFD. MICA
C11	27723-O	.00005 MFD. MICA
C13, C45	83415	20 MMFDS. AIR TRIMMER
C14	92000-C	450 MMFDS. SILVER CAP PAD.
C15	27732	.0016 MFD. MICA
C16	28023-W	.0038 MFD. MICA
C17	27704-W	.002 MFD. MICA
C18, C20, C44	22055-P	.05 MFD. 400 V. PAPER
C21	27701-O	.00025 MFD. MICA
C22, C25	22055-W	.01 MFD. 400 V. PAPER
C23, C27	23500-B	10 MFDS. 25 V. MIDGET ELEC.
C24	22055-AY	.001 MFD. 200 V. PAPER
C29, C30	22055-K	.002 MFD. 600 V. PAPER
C31	22055-AJ	.03 MFD. 600 V. PAPER
C46	22490-F	.5 MFD. 50 V. H.F. PAPER
C34, C39, C40	22055-A	.01 MFD. 600 V. PAPER
C35, C36	78503	.01-.01 MFD. 1000 V. SHIELDED
C37	22055-U	.01 MFD. 1000 V. PAPER
C38, C43	22492-B	.5 MFD. 50 V. PAPER
C41 C42	22492-B	.5 MFD. 50 V. PAPER

RESISTORS FOR MODEL - H - 64		
R1, R17	13031	100,000 OHMS 1/4 WATT
R2	13115	400 OHMS 1/4 WATT
R3, R13	13074	20,000 OHMS 1/4 WATT
R4	13164	50,000 OHMS 1/4 WATT
R5	13203	200 OHMS 1/4 WATT
R6, R7, R9	13028	1000 OHMS 1/4 WATT
R8	13131	600 OHMS 1/4 WATT
R10	13001	1 MEGOHM 1/4 WATT
R11, R12	13043	150,000 OHMS 1/4 WATT
R14	83763	1 MEGOHM VOLUME CONTROL & D.P.S.T. SWITCH
R15	13147	300,000 OHMS 1/4 WATT
R16	13024	500,000 OHMS 1/4 WATT
R18, R25	13133	3,000 OHMS 1/4 WATT
R20	83447-C	100,000 OHMS TONE CONT.
R21	83656-E	8.5 OHMS 1/2 WATT, FLEX.
R22	83656-C	11.1 OHMS 1/2 WATT, FLEX.
R23, R24	13028	1000 OHMS 1/4 WATT
S26	70053-M	5 AMP. FUSE
S27, S28, S29	72127	PILOT LIGHT 2V. - .06 AMP.

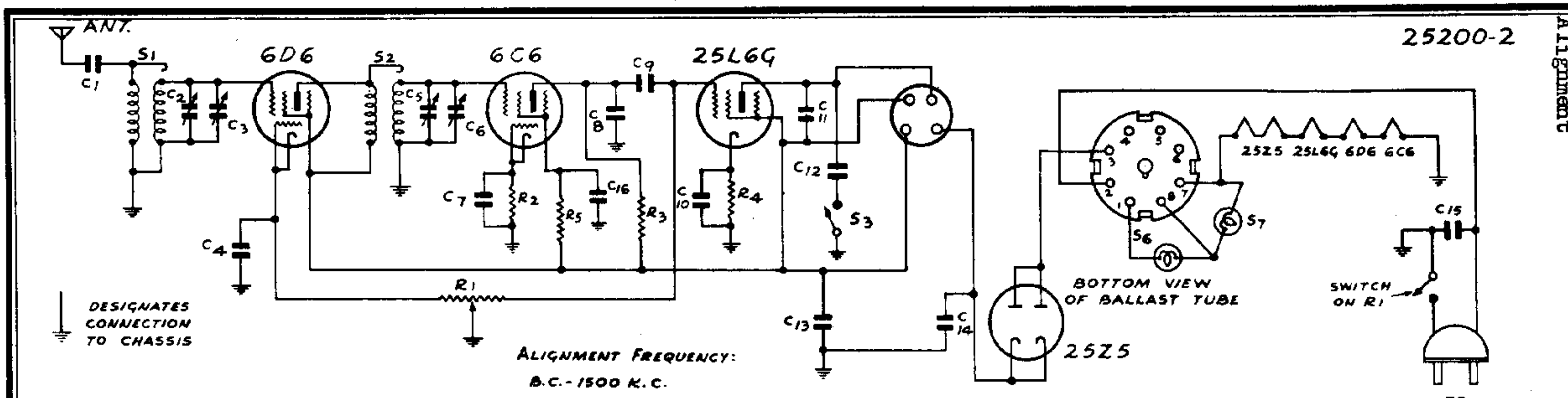
Band 1	25.5 - 8.85 mc.	11.7 - 33.9 meters
Band 2	9.95 - 2.96 mc.	30.1 - 101.3 meters
Band 3	1725 - 520 kc.	174 - 576 meters

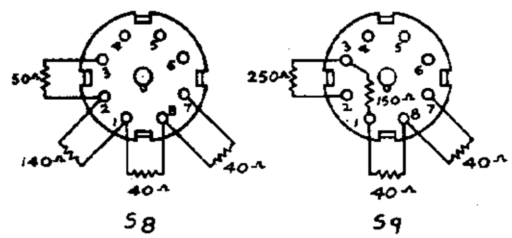
PILOT RADIO CORP.
LONG ISLAND CITY, N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-64
DATE:-11-5-38:
DRAWN BY:-A.R.
CHECKED BY:-
APPROVED BY:-
H-60-SERIES
Nº 25209-

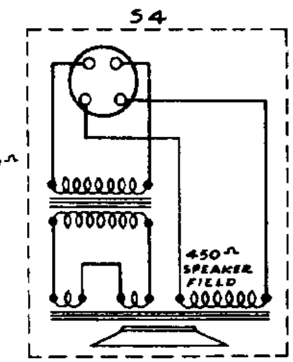
MODEL H-141
Schematic, Socket
Voltage, Trimmers
Alignment

PILOT RADIO CORP.

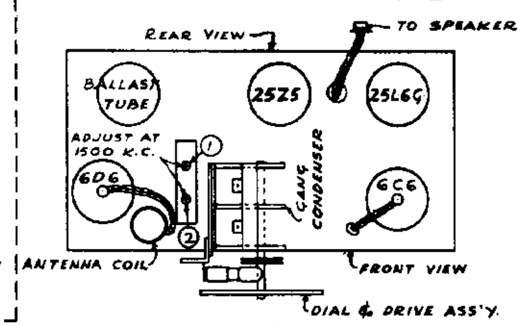
25200-2







TOP VIEW OF CHASSIS



CONDENSERS FOR MODEL-H-141		
C1	27726	200 MMFDS. MICA
C2, C5	70969-E	TRIMMER ASS'Y.
C3, C6	79664	GANG CONDENSER
C4	22055-1	.05 MFD. 200V. PAPER
C7, C10	23500-B	10 MFD. 25V. MIDGET TUB
C8	28016-O	.0001 MFD. MICA
C9	22055-W	.01 MFD. 400V. PAPER
C11	22055-AJ	.03 MFD. 600V. PAPER
C12	22055-AB	.1 MFD. 600 V. PAPER
C13, C14	23500-A	16 MFD. 150 V. MIDGET TUB
C15	22055-AF	.05 MFD. 1000 V. PAPER
C16	22055-Z	.02 MFD. 400 V. PAPER

RESISTORS FOR MODEL-H-141		
R1	83625	1/2 MEGOHM VOL. CONT. & SW.
R2	13183	36,000 OHMS 1/4 WATT
R3	13024	500,000 OHMS 1/4 WATT
R4	13055	150 OHMS 1/2 WATT
R5	13007	2 MEGOHMS 1/4 WATT

MISCELLANEOUS FOR MODEL-H-141		
S1	73214	ANTENNA COIL ASS'Y.
S2	73215	DETECTOR COIL ASS'Y.
S3	71657-B	TONE CONTROL
S4	40852	5" AC-DC SPEAKER-450Ω FIELD
S6, S7	71282	DIAL LAMP
S8	81974	BALLAST TUBE 110/125 V
S9	81975	BALLAST TUBE 220/240 V

ALTERATIONS (A) ADDED C16 & R5.-C.O. 2188-B.R. 8-30-38.
CLASSIFICATION MODEL-H-141
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO
DO NOT SCALE THIS PRINT
PILOT RADIO CORPORATION LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-141
DRAWN BY B.R. DATE 8-22-38
DWG. NO. 25200-2

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII

D.C. SOCKET VOLTAGES

	P	SG	Cath
6D6	100	100	21*
6C6	-*	8	8
25L6-G	95	100	8
25Z5	-	-	110

The above figures are for a supply voltage of 115 volts, on 230 volt operation they will be 10% higher.

* Cannot be measured.

Panel Controls Volume control with On-Off Power Supply switch, Tuning Control, Tone Control.

Maximum Power Output 81974 ballast tube. 1.25 Watts with 81975 ballast tube. 1.50 watts with

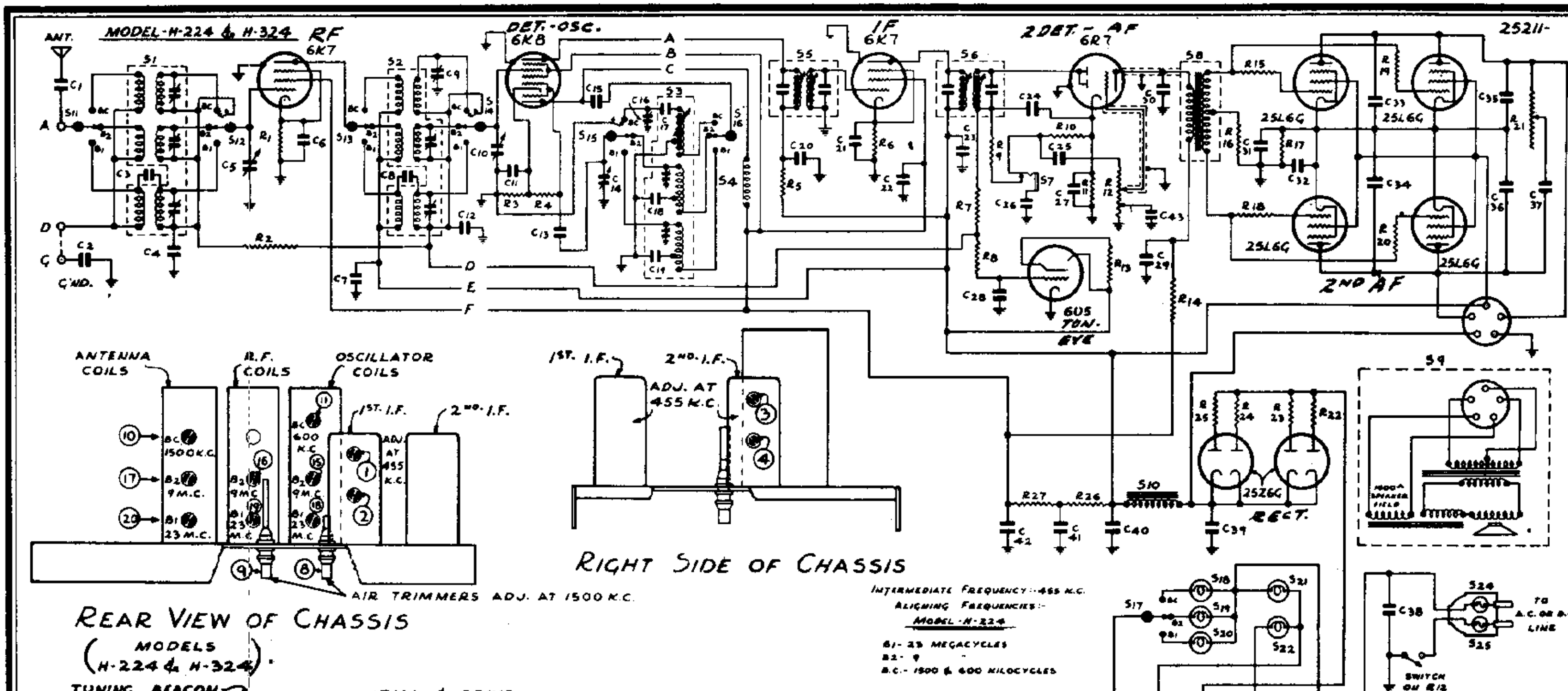
PILOTUBES Required One 6K6 RF Amplifier, one 6C6 Detector, one 25L6-G Output Tube, and one 25Z5 power supply rectifier.

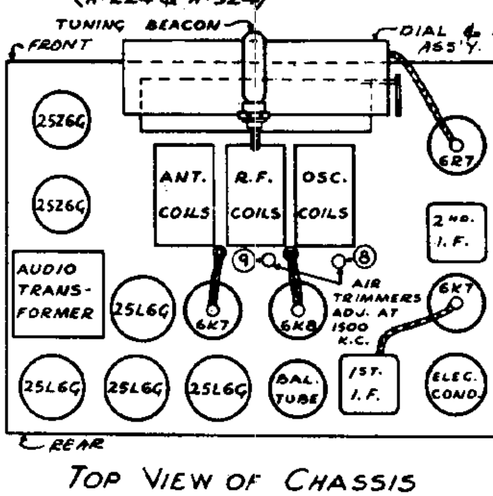
Power Supply

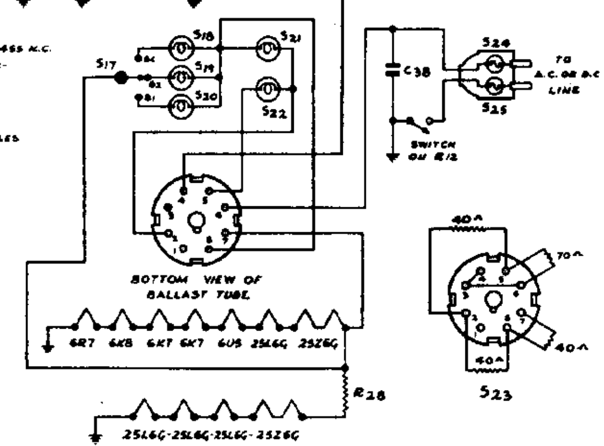
Voltage	Watts	Ballast Tube
110-125 AC or DC	40	#81974
220-240 AC or DC	90	#81975

PILOT RADIO CORP.

MODELS H-224, Chassis H-220
H-324, Chassis H-320
Schematic, Voltage, Socket
Trimmers, Alignment







CONDENSERS FOR MODEL-H-224 & H-324		
C1,C2,C33, C34,C35, C36	22055-R	.005 MFD. 1000 V. PAPER
C3	27737-0	10 MMFDS. MICA
C4,C12	22055-Z	.05 MFD. 200 V. PAPER
C5,C10,C14	83863	GANG CONDENSER
C6,C11,C21	22055-M	.1 MFD. 200 V. PAPER
C7,C22	22055-P	.05 MFD. 400 V. PAPER
C8	28115	15 MMFDS. MICA ±10% T.
C9,C16	83415	20 MMFDS. AIR TRIMMER
C13	27723-0	50 MMFDS. MICA
C15	27706	.002 MFD. MICA
C17	92000-C	450 MMFDS. SILVER CAP
C18	27732	.0016 MFD. MICA
C19	280234	.0038 MFD. MICA
C20	22055-Z	.02 MFD. 400 V. PAPER
C23	22055-L	.1 MFD. 400 V. PAPER
C24	27701-0	.00025 MFD. MICA
C25	22055-W	.01 MFD. 400 V. PAPER
C26	22055-S	.5 MFD. 200 V. PAPER
C27	23500-A	10 MFD. 25 V. ELECTRO.
C28	22055-T	.01 MFD. 200 V. PAPER
C29,C41, C42	23600-A	10-10-10 MFD. 300 V. ELEC.
C30	27726	.0002 MFD. MICA
C31	23500-G	50 MFD. 25 V. ELECTRO.
C32	27746-W	.001 MFD. MICA
C37	22055-AB	.1 MFD. 600 V. PAPER
C38	22055-U	.01 MFD. 1000 V. PAPER
C39,C40	23600-B	40-40 MFD. 300 V. ELEC.
C43	22055-AY	.001 MFD. 200 V PAPER

RESISTORS FOR MODEL-H-224 & H-324		
R1,R6	13119	400 OHMS ¼ WATT
R2	13031	100,000 OHMS ¼ WATT
R3	13203	200 OHMS ¼ WATT
R4,R9	13164	50,000 OHMS ¼ WATT
R5,R14, R26,R27	13028	1,000 OHMS ¼ WATT
R7	13001	1 MEGOHM ¼ WATT
R8	13007	2 MEGOHMS ¼ WATT
R10	13171	250,000 OHMS ¼ WATT
R11,R15,R16, R19,R20	13012	500 OHMS ¼ WATT
R12	83529-A	1 MEGOHM VOL. CONT. & SW.
R13	13024	500,000 OHMS ¼ WATT
R16	13030	10,000 OHMS ¼ WATT
R17	83014	65 OHMS 2 WATT VITREOUS
R21	79209-B	10,000 OHMS TONE CONT.
R22,R23, R24,R25	13207	100 OHMS 1 WATT
R28	83038	50 OHMS 10 WATT VITREOUS

PILOT RADIO CORP.
LONG ISLAND CITY, N.Y., U.S.A.

SCHEMATIC CIRCUIT DIAGRAM FOR MODELS - H-224 & H-324.

DATE:- 11-16-38
DRAWN BY:- B.R.
CHECKED BY:- [illegible]
APPROVED BY:-

Nº 25211-

D.C. SOCKET VOLTAGES

Socket Terminals

Tube	1	2	3	4	5	6	7	8
6K7	-	-	95	75	2.45	-	-	2.45
6K8	-	-	95	75	-	74	-	1.8
6K7	-	-	95	75	2.1	-	-	2.1
6R7	-	-	62	-	-	-	-	1.5
25L6-G	-	-	94	104	-	-	-	7.7
25Z6-G	-	-	-	104	-	-	-	104

MODELS H-224, Chassis H-220
H-324, Chassis H-320
Alignment Procedure

PILOT RADIO CORP.

PILOTUBES Required.

One	6K7	R.F. Amplifier
One	6K8	1st Detector-Oscillator
One	6K7	I.F. Amplifier
One	6R7	2nd Detector-AVC-1st Audio Amplifier
Four	25L6-G	Output Tubes
Two	25Z6-G	Power Supply Rectifiers
One	6U5	Cathode Ray Tuning Beacon

Power Supply. A.C. or D.C.

Voltage	Ballast Tubes	Watts
110-125	81973	110

Intermediate Frequency. 455 kc.

Panel Controls. Volume with On-Off switch, Tone, Band Selector Switch, Manual Tuning Control and an 8 key mechanically operated PIANO TUNING mechanism, with key locking knob. The PIANO TUNING mechanism is only on the H-320 series.

TUNING RANGES. The models H-324 and H-224 chassis have the following tuning ranges:

Band 1	8.72 - 25.5 mc.	or	11.8 - 34.4 meters
Band 2	2.96 - 9.95 mc.	or	30.2 -101.4 meters
Band 3	520 - 1725 kc.	or	174 - 577 meters

Maximum Power Output. 6 watts

SERVICE DATA

Removal of the chassis from the cabinet, when necessary is done as follows:

1. Remove the power supply cord from the supply outlet.
2. Remove the knobs and felt washers from all shafts on the front of the cabinet. These knobs, except the "locking" knob, are of the "push-on" type.
3. Remove the back of the cabinet.
4. Remove the speaker cord from the socket on the speaker.
5. Remove the four mounting screws located under the cabinet, and carefully slide the chassis out of the cabinet.

RECEIVER ALIGNMENT

Equipment Required.

1. Signal Generator. One using fundamental frequencies for all the frequencies used in the receiver is preferred.
2. Output Meter. Generally a copper-oxide rectifier meter is the most convenient.

Dummy Antennas. .1 mfd. condenser
.0002 mfd. mica condenser
400 ohm, non-inductive resistor

Alignment Connections.

The posts marked "D" and "G" on the rear of the chassis should be connected to the ground side of the signal generator.

Connect the "hot" post of the signal generator through the .1 mfd. condenser to the grid of the 6K8 detector-oscillator tube or the 6K7 I.F. Amplifier tubes when aligning the I.F. amplifier.

Connect the "hot" post of the signal generator through the 200 mmf. condenser to the post marked "A" on the rear of the chassis when aligning the Long-Wave and Broadcast Bands. Use the same connections for both short-wave bands, but replace the 200 mmf. condenser with the 400 ohm, non-inductive resistor.

In all measurements, connect the output meter through .1 mfd 600 volt condensers, from plate to plate terminals of the 25L6-G tubes, as this is a push-pull amplifier.

Procedure.

The volume and tone controls should be turned to the extreme clockwise positions, before starting.

The location of all trimmers is shown in the accompanying figure. Always keep the output from the signal generator at the lowest value which will give a readable deflection on the output meter.

I.F. Amplifier Alignment.

Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections" and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the I.F. amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the I.F. amplifier tube, and align the last I.F. transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

R.F. Alignment

Band 3 (Model H-324 and H-224)

Connect the "hot" terminal of the generator to the antenna post marked "A" through the .0002 mfd. condenser.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmers #9 and #10 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and accurately set the ROTOR dial to the 600 kc. mark. Then adjust trimmer #11 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmers #8 and #9.

Band 2 (Model H-324 & H-224 Short-Wave)

Remove the .0002 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator, and the ROTOR dial to 9 mc. Adjust trimmer #15 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmers #16 and #17 for maximum reading of the output meter, while slightly "rocking" the gang condenser. Readjust trimmer #15 if necessary to correct the calibration.

Band 1 (Model H-324 & H-224 Short-Wave)

Connections and dummy antenna are the same as on Band 1 above.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc. and the ROTOR dial to 23 mc. Adjust trimmer #18 to 23 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmers #19 and #20 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #18 so that calibration is correct if necessary.

Image Frequency

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, seperated by twice the Intermediate Frequency, set the ROTOR dial to that one which comes in at the higher frequency marking on the ROTOR dial.

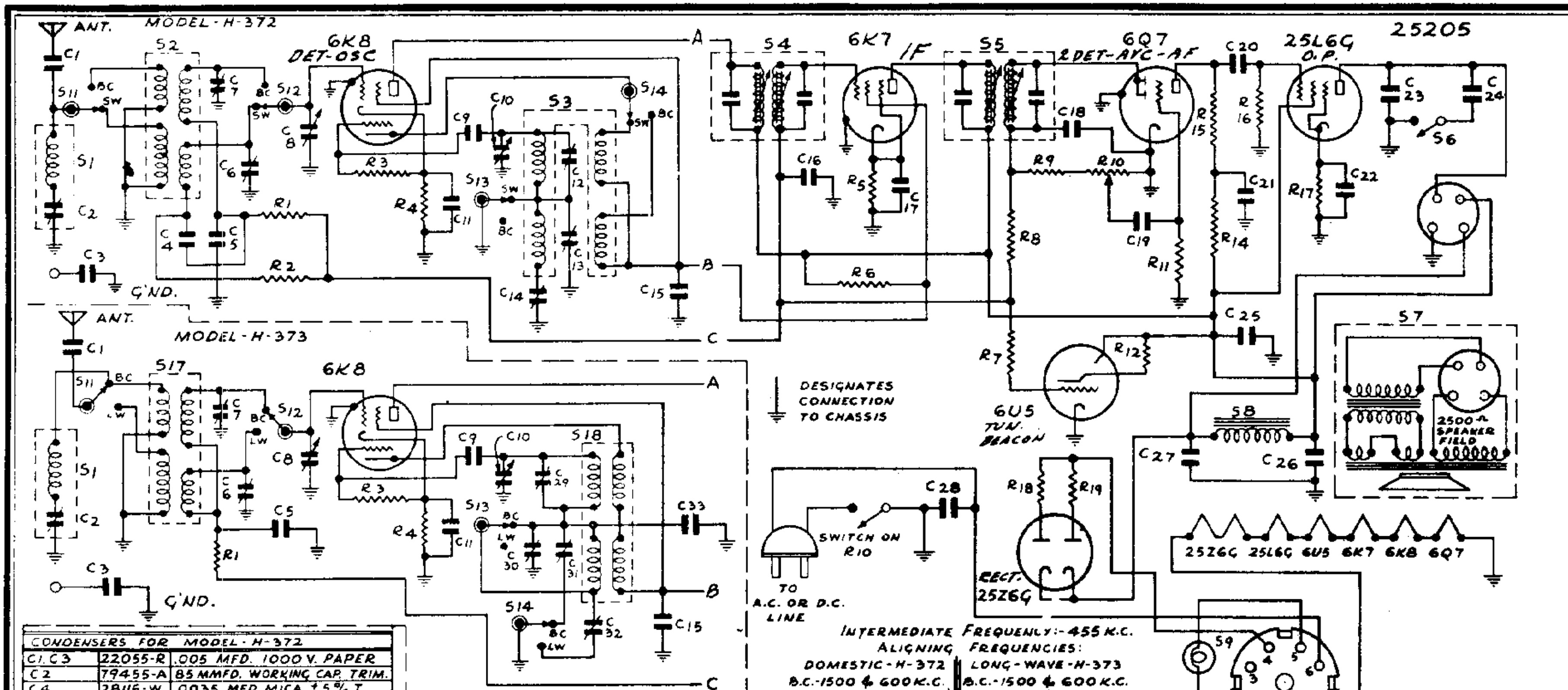
Miscellaneous Service Notes.

If a howling noise (sometimes referred to as Microphonic Howl) is heard, it is very probably because the four red screws under the cabinet have not been removed, along with the two narrow metal strips between the chassis and the bottom of the cabinet. These strips and screws are only intended as additional bracing during shipment, and must be removed before the receiver is put in operation.

The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chass rubs against the cabinet. The remedy is obvious.

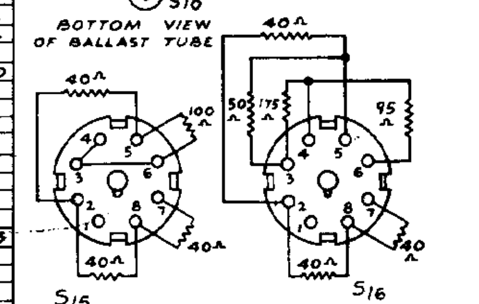
PILOT RADIO CORP.

MODELS H-372, H-373, Chassis H370
Schematic



INTERMEDIATE FREQUENCY:- 455 K.C.
ALIGNING FREQUENCIES:

DOMESTIC - H-372	LONG-WAVE - H-373
B.C.-1500 & 600 K.C.	B.C.-1500 & 600 K.C.
S.W.-17 MEGACYCLES	L.W.-375 & 150 K.C.



CONDENSERS FOR MODEL-H-372		
C1, C3	22055-R	.005 MFD. 1000 V. PAPER
C2	79455-A	85 MMFD. WORKING CAP. TRIM.
C4	28116-W	.0035 MFD. MICA ±5% T.
C5, C16	22055-I	.05 MFD. 200 V. PAPER
C6, C7	70969-J	TRIMMER ASS'Y.
C8, C10	79664-B	GANG CONDENSER
C9	27723-O	50 MMFD. MICA
C11, C17	22055-M	.1 MFD. 200 V. PAPER
C12, C13	70969-J	TRIMMER ASS'Y.
C14	79431-B	300-500 MMFDS. PADDER
C15	22055-P	.05 MFD. 400 V. PAPER
C18	27701-O	250 MMFD. MICA
C19, C20	22055-W	.01 MFD. 400 V. PAPER
C21, C25	22055-L	.1 MFD. 400 V. PAPER
C22	22481	10 MFD. 25 V. ELECTRO.
C23	22055-A	.01 MFD. 600 V. PAPER
C24	22055-C	.05 MFD. 600 V. PAPER
C26, C27	23500-E	30 MFD. 300 V. SMALL TUB.
C28	22055-U	.01 MFD. 1000 V. PAPER

CONDENSERS FOR MODEL-H-373 SAME AS FOR MODEL-H-372, EXCEPT FOLLOWING:		
C4, C12, C13, C14		NOT USED
C29, C30	70969-E	TRIMMER ASS'Y.
C31	72355-C	250-500 MMFDS. PADDER
C32	72355-C	30-150 MMFDS. PADDER
C33	28101-O	.000015 MFD. MICA

RESISTORS FOR MODEL-H-372		
R1, R2, R14	13031	100.000 OHMS 1/4 WATT
R3, R9	13164	50.000 OHMS 1/4 WATT
R4	13203	200 OHMS 1/4 WATT
R5	13115	400 OHMS 1/4 WATT
R6	13086	2000 OHMS 1/2 WATT
R7	13007	2 MEGOHMS 1/4 WATT
R8	13001	1 MEGOHM 1/4 WATT
R10	79540	250,000 OHMS VOL. CONT. & SW.
R11	13237	15 MEGOHMS 1/2 WATT
R12, R16	13024	500,000 OHMS 1/4 WATT
R15	13171	250,000 OHMS 1/4 WATT
R17	13235	150 OHMS 1 WATT
R18, R19	13207	100 OHMS 1 WATT

RESISTORS FOR MODEL-H-373 SAME AS FOR MODEL-H-372, EXCEPT FOLLOWING		
R2		NOT USED

MISCELLANEOUS FOR MODEL-H-372		
S1	73119	WAVE TRAP ASS'Y.
S2	73240	ANTENNA COIL ASS'Y.
S3	73228	OSCILLATOR COIL ASS'Y.
S4	73192-C	1ST I.F. TRANSFORMER ASS'Y.
S5	73193	2ND I.F. " "
S6	72049	TONE CONTROL SWITCH
S7	40853	6" AC-DC SPEAKER-2500Ω FIELD
S8	79029-A	FILTER CHOKE
S9, S10	71282	DIAL LAMP
S11-TO-S14	79454	BAND SWITCH
S15	B1971	BALLAST TUBE 110/125 V.
S16	B1972	BALLAST TUBE 220/240 V.

MISCELLANEOUS FOR MODEL-H-373 SAME AS FOR MODEL-H-372, EXCEPT FOLLOWING:		
S2, S3		NOT USED
S17	73241	ANTENNA COIL ASS'Y.
S18	73226	OSCILLATOR COIL ASS'Y.

SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-372 & MODEL-H-373
Date 9-21-38
Drawn by B.R.
Dwg. No. 25205

MODELS H-372, H-373
Chassis H-370

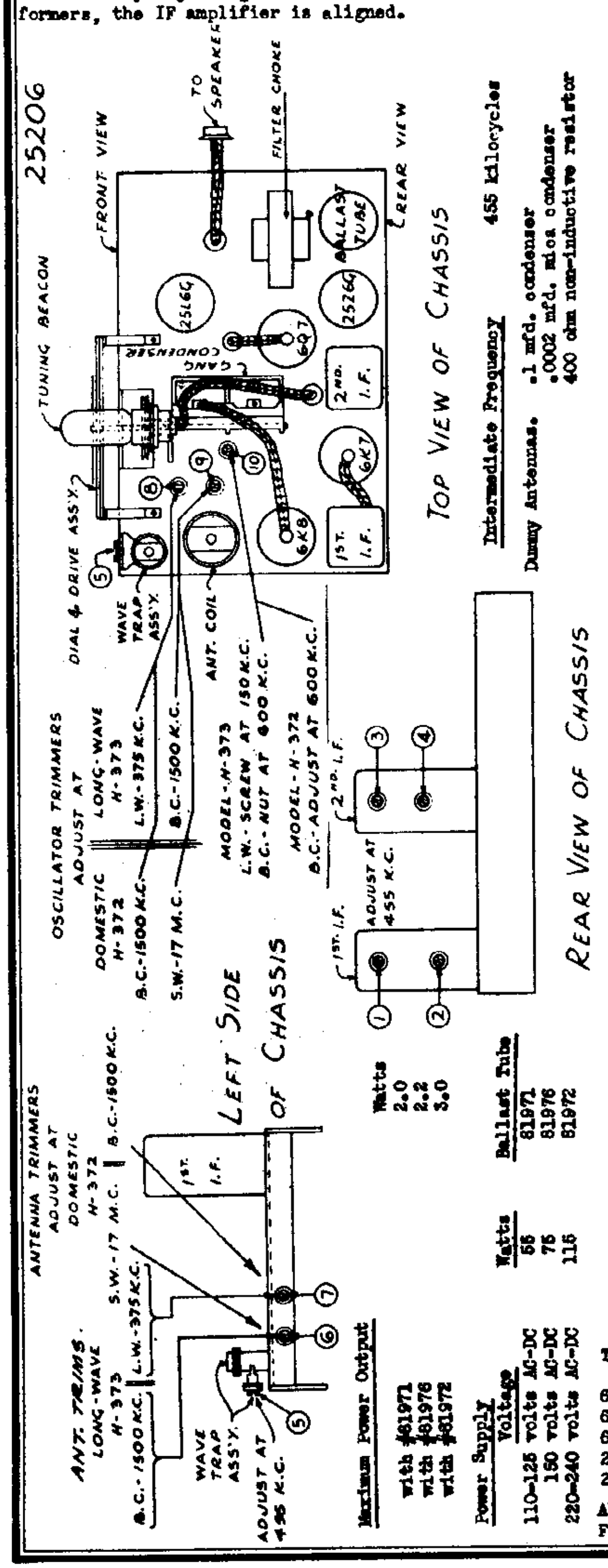
PILOT RADIO CORP.

Voltage, Socket, Trimmers
Alignment

IF Amplifier Alignment

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the trimmer screws 1, 2, 3, and 4, (see figure) for maximum reading of the output meter. Keep reducing the generator output as the output meter reading increases. When the reading of the output meter cannot be increased by adjusting the four screws of the IF transformers, the IF amplifier is aligned.



Intermediate Frequency 455 Kilocycles

Dummy Antennas. .1 mfd. condenser; .0002 mfd. mica condenser; 400 ohm non-inductive resistor

Maximum Power Output	Watts
with #81971	2.0
with #81976	2.2
with #81972	3.0

Power Supply Voltage	Watts	Ballast Tube
110-125 volts AC-DC	55	81971
150 volts AC-DC	75	81976
220-240 volts AC-DC	115	81972

R.F. Alignment

Long Wave Band (Model H-373)

Connect the "hot" terminal of the generator to the blue antenna wire through the .0002 mfd. condenser.

Set the generator frequency to 375 kilocycles and with the Band Selector Switch set to the Long Wave Band, turn the pointer of the receiver to 375 kilocycles. Adjust trimmer #6 for maximum reading of the output meter. Do likewise with trimmer #7. Then set the generator frequency to 150 kilocycles and the receiver dial pointer to approximately the same frequency. Adjust the screw of trimmer #10 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 375 kilocycle alignment.

Broadcast, or Medium Wave, Band (Models H-373 and H-372)

Connections are the same for the alignment of this band as they are for the Long Wave Band.

Set the generator frequency to 1500 kilocycles, and the receiver dial pointer to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #9 of Model H-373, or trimmer #8 of Model H-372 for maximum reading of the output meter. Also adjust trimmer #6 of Model H-373, or trimmer #7 of Model H-372 for maximum reading of the output meter. Next, set the generator frequency to 600 kilocycles. Then with the receiver dial pointer set at approximately the same frequency, adjust trimmer #10 for maximum reading of the output meter while carefully "rocking" the gang condenser. Finally, return and repeat the 1500 kilocycle adjustment.

Short Wave Band (Model H-372)

When aligning this band connect the "hot" terminal of the signal generator to the blue antenna wire of the receiver through the 400 ohm resistor.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 17 mc., and also tune the receiver to this frequency, as marked on the dial.

Carefully adjust trimmer #9 for maximum reading of the output meter. Be careful you do not adjust to the "Image Frequency".

Then adjust trimmer #6 for maximum output meter reading, while slightly "rocking" the gang condenser.

Readjust trimmer #9, if necessary, to keep the calibration correct.

Image Frequency

The Short Wave Band in model H-372 must be aligned with the oscillator frequency lower than the signal frequency. On the high frequency band, it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, turn the tuning knob so that the dial pointer points to that one which comes in at the lower frequency marking on the dial.

Wave Trap Alignment

With the Band Selector Switch set on the Broadcast or Medium Wave position, connect the generator to the blue antenna wire, with the .0002 mfd. condenser. Set the generator frequency to 455 kilocycles and adjust trimmer #5 for minimum reading of the output meter. There must always be sufficient output from the Signal Generator to have a reading on the output meter to make this adjustment.

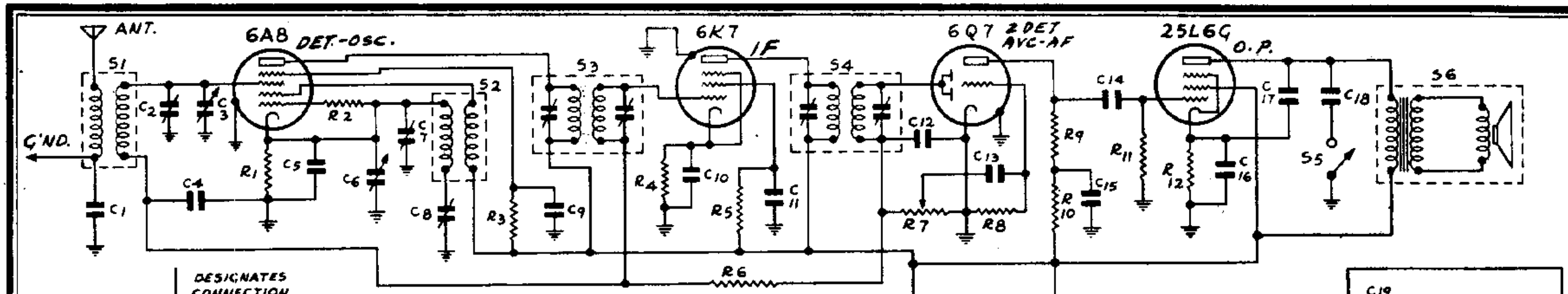
Socket Terminals **D.C. SOCKET VOLTAGES**

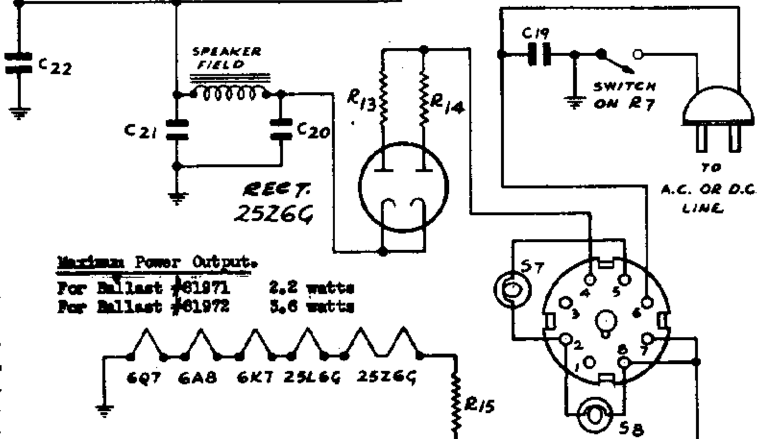
Tube	1	2	3	4	5	6	7	8
6K8	-	-	102(130)	85(110)	-	85(110)	-	2.(2.6)
6K7	-	-	102(130)	85(110)	1.7(2.5)	-	-	1.7(2.5)
6Q7	-	-	45(53)	-		-	-	-
25L6-G	-	-	96(125)	102(130)	-	-	-	6.5(8.8)
25Z6-G	-	-	-	110(145)	-	-	-	110(145)

Above figures in parenthesis are for Ballast tube #81972.
Figures not in parenthesis are for ballast tube #81971.

PILOT RADIO CORP.

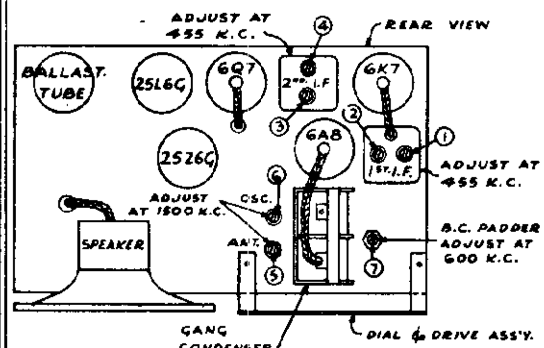
MODELS TH-150, H-151
Chassis H-150
Schematic, Voltage Socket, Trimmers Alignment





DESIGNATES CONNECTION TO CHASSIS

INTERMEDIATE FREQUENCY :- 455 K.C.
ALIGNING FREQUENCIES:
B.C.-1500 & 600 K.C.



TOP VIEW OF CHASSIS

S6	40860	5" A.C.-D.C. SPEAKER-450Ω FIELD
S7, S8	71282	DIAL LAMP
S9	81971	BALLAST TUBE 110/125 V.
S10	81972	BALLAST TUBE 220/240 V.
S11	81976	BALLAST TUBE 150 V.

CONDENSERS	FOR MODEL-H-151	
C1	22055-R	.005 MFD. 1000 V. PAPER
C2, C7	70969-E	TRIMMER ASS'Y.
C3, C6	79664	GANG CONDENSER
C4, C5, C10	22055-I	.05 MFD. 200 V. PAPER
C8	79431-B	300-500 MMFDS. PADDER
C9, C11	22055-Z	.02 MFD. 400 V. PAPER
C12	17726-0	.0002 MFD. MICA
C13, C14	22055-W	.01 MFD. 400 V. PAPER
C15, C22	22055-L	.1 MFD. 400 V. PAPER
C16	23500-B	10 MFD. 25 V. ETCH FOIL ELECT.
C17	22055-A	.01 MFD. 600 V. PAPER
C18	22055-AB	.1 MFD. 600 V. PAPER
C19	22055-C	.05 MFD. 600 V. PAPER
C20	23500-F	16 MFD. 300 V. ETCH FOIL ELECT.
C21	23500-E	30 MFD. 300 V. ETCH FOIL ELECT.

RESISTORS	FOR MODEL-H-151	
R1, R4	13115	400 OHMS 1/4 WATT
R2	13164	50,000 OHMS 1/4 WATT
R3	13186	25,000 OHMS 1/4 WATT
R5	13074	20,000 OHMS 1/4 WATT
R6	13001	1 MEGOHM 1/4 WATT
R7	79429	500,000 OHMS VOL. CONT. & SW.
R8	13237	15 MEGOHMS 1/2 WATT
R9	13171	250,000 OHMS 1/4 WATT
R10	13031	100,000 OHMS 1/4 WATT
R11	13024	500,000 OHMS 1/4 WATT
R12	13240	150 OHMS 1 WATT ±10% T
R13 & 14	13207	100 OHMS 1 WATT
R15	83656	20 OHMS 2 WATT FLEXIBLE

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII

Maximum Power Output.
For Ballast #81971 2.2 watts
For Ballast #81972 3.6 watts

Power Supply.

Voltage	Ballast Tube Number	Watts
110 to 125 volts	#81971	45
150 volts	81976	60
220 to 240 volts	81972	100

Tuning Range.
The Model H-151 Chassis has the following tuning range:
530 to 1720 kc or 566 to 174 meters

D.C. SOCKET VOLTAGES

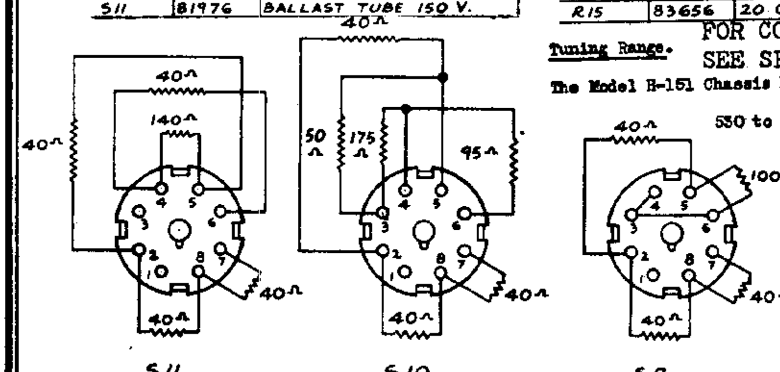
All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the AC or DC supply voltage is correct for the Ballast tube being used at the time of measurement.

Socket Terminals

Tube	1	2	3	4	5	6	7	8
6A8	-	-	95(145)	52(87)	-	95(145)	-	1.7(2.6)
6K7	-	-	95(145)	65(110)	2.(3.1)	-	-	2(3.1)
6Q7	-	-	-	-	-	-	-	-
25L6-G	-	-	90(135)	95(145)	-	-	-	.5.7(9.0)

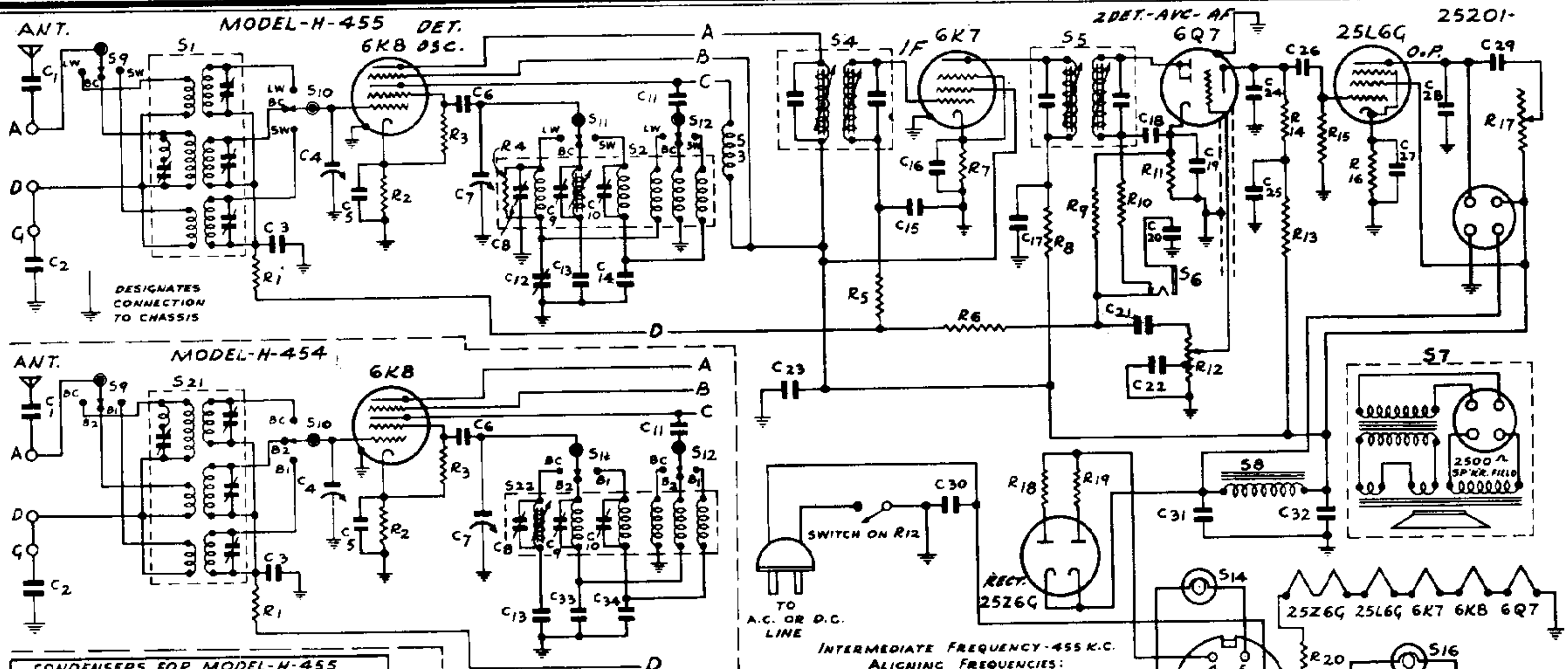
Figures in parenthesis are for ballast tube #81971
Figures not in parenthesis are for ballast tube #81972

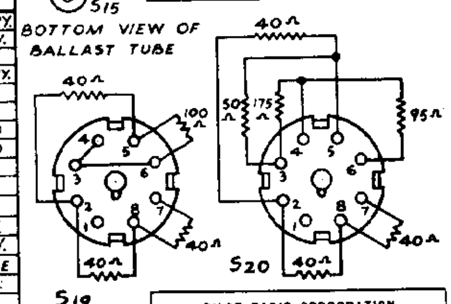


PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM
FOR MODEL - H-151
DATE 10-12-38
DRAWN BY B.R.
DWG. NO. 25208

MODELS H-454,H-455
Chassis H-450
Schematic

PILOT RADIO CORP.





INTERMEDIATE FREQUENCY-455 K.C.
ALIGNING FREQUENCIES:

LONG-WAVE H-455 { S.W. - 18 MEGACYCLES; B.C. - 1500 & 600 K.C.; L.W. - 300 & 175 K.C. }

DOMESTIC H-454 { B1 - 24 MEGACYCLES; B2 - 9 MEGACYCLES; B.C. - 1500 & 600 K.C. }

CONDENSERS FOR MODEL-H-455		
C1, C2	22055-R	.005 MFD. 1000 V. PAPER
C3, C15	22055-T	.01 MFD. 200 V. PAPER
C4, C7	83628	GANG CONDENSER
C5, C16	22055-M	.1 MFD. 200 V. PAPER
C6	27723-0	.00005 MFD. MICA
C8, C12	83416	DOUBLE TRIMMER BASE
C9	83415	AIR TRIMMER
C10	72283-A	TRIMMER ASS'Y.
C11	27704-W	.002 MFD. MICA
C13	92000-D	400 MMFD. SILVER CAP
C14	28106	.00325 MFD. MICA
C17, C21, C26	22055-W	.01 MFD. 400 V. PAPER
C18	27701-0	.00025 MFD. MICA
C19, C27	22481	10 MFD. 25 V. ELECTRO.
C20	22055-F	.25 MFD. 200 V. PAPER
C22	22055-AY	.001 MFD. 200 V. PAPER
C23, C25	22055-L	.1 MFD. 400 V. PAPER
C24	27701-W	.00025 MFD. MICA
C28, C30	22055-U	.01 MFD. 1000 V. PAPER
C29	22055-AB	.1 MFD. 600 V. PAPER
C31, C32	85039	30-40 MFD. 300 V. ELECT.
CONDENSERS FOR MODEL-H-454 SAME AS FOR MODEL-H-455, EXCEPT FOLLOWING:		
C12, C14		NOT USED
C33	27704-W	.002 MFD. MICA
C34	28106	.00325 MFD. MICA

RESISTORS FOR MODEL-H-455		
R1, R5, R10, R13	13031	100,000 OHMS 1/4 WATT
R2	13018	150 OHMS 1/4 WATT
R3	13164	50,000 OHMS 1/4 WATT
R4	13230	33,000 OHMS 1/4 WATT
R6	13001	1 MEGOHM 1/4 WATT
R7	13115	400 OHMS 1/4 WATT
R8	13028	1,000 OHMS 1/4 WATT
R9	13171	250,000 OHMS 1/4 WATT
R11	13030	10,000 OHMS 1/4 WATT
R12	83529-C	1 MEGOHM VOL. CONT. & SW.
R14	13043	150,000 OHMS 1/4 WATT
R15	13024	500,000 OHMS 1/4 WATT
R16	13055	150 OHMS 1/2 WATT
R17	83447-C	100,000 OHMS TONE CONT.
R18, R19	13207	100 OHMS 1 WATT
R20	83656	20 OHMS 2 WATT FLEXI.
RESISTORS FOR MODEL-H-454 SAME AS FOR MODEL-H-455, EXCEPT FOLLOWING:		
R4		NOT USED

MISCELLANEOUS FOR MODEL-H-455		
S1	73172	ANTENNA COILS & CAN ASS'Y.
S2	73179-B	OSCILLATOR COILS ASS'Y.
S3	73088	R.F. "B" CHOKE
S4	73192-C	1ST. I.F. TRANSFORMER ASS'Y.
S5	73193	2ND. I.F. " "
S6	70950	PHONO JACK
S7	40855	8" SPEAKER-2500Ω FIELD
	40817	12" SPEAKER-2500Ω FIELD
S8	79029-A	FILTER CHOKE
S9-TO-S13	83414-B	BAND SWITCH
S14-TO-S18	71282	DIAL LAMPS
S19	81971	BALLAST TUBE 110/125 V.
S20	81972	BALLAST TUBE 220/240 V.
MISCELLANEOUS FOR MODEL-H-454 SAME AS FOR MODEL-H-455, EXCEPT FOLLOWING:		
S1, S2		NOT USED
S21	73177	ANTENNA COILS & CAN ASS'Y.
S22	73178-C	OSCILLATOR COILS ASS'Y.

Intermediate Frequency 455 kilocycles

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-454 & MODEL-H-455
DATE 8-29-38
DRAWN BY B.R.
No. 25201-

PILOT RADIO CORP.

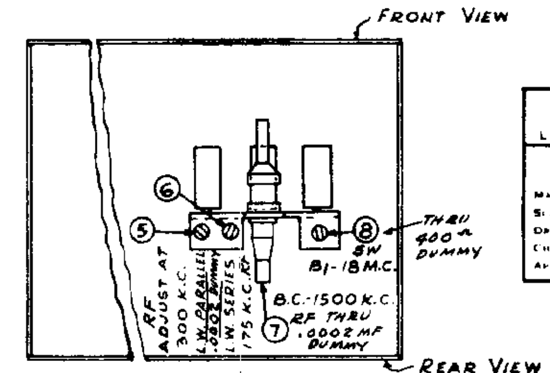
MODELS H-454,H-455
Chassis H-450
Socket,Trimmers
Voltage

Power Supply

Voltage	Watts	Ballast Tube
110 to 125 volts AC-DC	50	81971
220 to 240 volts AC-DC	115	81972

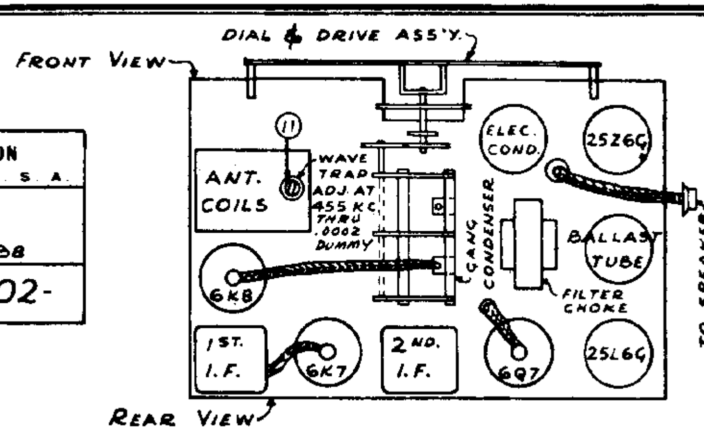
Circuit Super-Heterodyne, with Class A output stage. Three tuning ranges as listed below. Permeability tuned IF transformers. Tone compensated volume control. Continuously variable tone control, Automatic Volume Control.

Maximum power Output
2.0 watts with 81971 ballast tube
3.4 watts with 81972 ballast tube

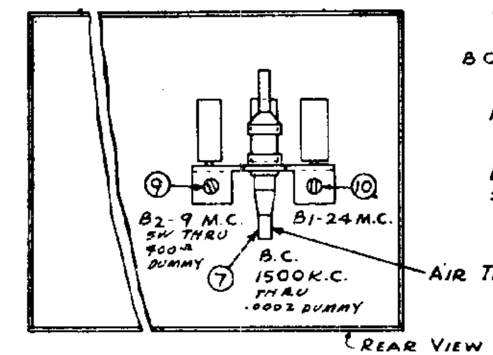


BOTTOM VIEW OF CHASSIS
LONG WAVE - H-455

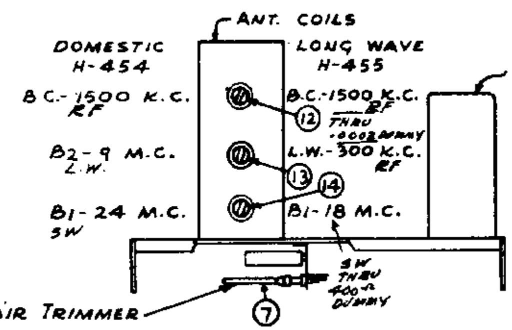
PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
TRIMMER LAYOUT
Drawn By B.R.
Date 9-1-38
No. 25202-



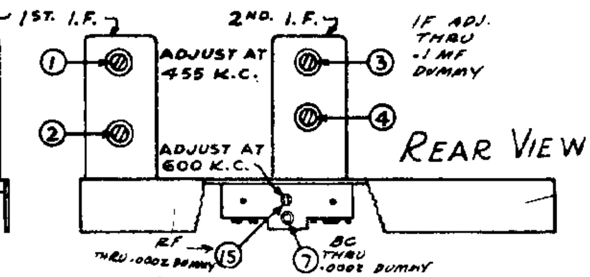
TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS
DOMESTIC - H-454



LEFT SIDE



REAR VIEW

Tuning Ranges The model H 454 Chassis has the following tuning ranges:

Band 1	24.8 to 8.3 mc	or	12.09 to 36.12 meters
Band 2	9.7 to 2.9 mc	or	30.9 to 103 meters
Band 3	1725 to 530 kc	or	174 to 566 meters

The model H 455 Chassis has the following tuning ranges:

Band 1	18.8 to 5.35 mc	or	15.9 to 56.04 meters
Band 2	1725 to 530 kc	or	174 to 566 meters
Band 3	375 to 145 kc	or	800 to 2069 meters

D.C. SOCKET VOLTAGES

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the AC or DC supply voltage is correct for the ballast tube being used at the time of measurement.

Numbers in parentheses indicate use of ballast tube 81972.

Socket Terminals

Tube	1	2	3	4	5	6	7	8
6K8	--	--	95(125)	95(125)	--	95(125)	--	2.3(3)
6K7	--	--	88(115)	95(125)	--	3(4)	--	3(4)
6Q7	--	--	60 (80)	—	--	--	--	1.(1.)
25L6-G	--	--	91(119)	95(125)	--	--	--	6(8.2)
25Z6-G	--	--	--	110(140)	--	--	--	110(140)

MODELS H-454, H-455
Chassis H-450

PILOT RADIO CORP.

Alignment Procedure

IF Amplifier Alignment Turn the Band Selector Switch to Band 3 and turn the receiver dial pointer to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd condenser. Then proceed with the alignment as follows:-

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and align the last IF transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment With the Band Selector Switch set on the Broadcast Band, replace the .1 mfd dummy antenna with the .0002 mfd dummy antenna. Set the generator frequency at 455 kc and tune trimmer #11 for minimum reading of the output meter. There must be sufficient output from the signal generator to always have a reading on the output meter; do not allow the meter to go to zero and call that the correct adjustment point.

R.F. Alignment

Band 3 (Model 455 Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the .0002 mfd condenser.

Set the generator frequency to 300 kc and with the Band Selector Switch set to Band 3, turn the receiver dial pointer to 300 kc. Adjust trimmer #6 for maximum reading of the output meter. Do likewise with trimmer #13. Then set the generator frequency to 175 kc and the receiver dial pointer to approximately the same. Adjust trimmer #6 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc alignment.

Band 2 (Model 455) Band 3 (Model 454) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the long-wave band.

Set the generator frequency to 1500 kc., and the receiver dial pointer to the same frequency, with the band selector switch set appropriately. Adjust trimmer #7 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmer #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc., and accurately set the receiver dial pointer to the 600 kc mark. Then adjust trimmer #15 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 kc adjustments and then tighten the lock nut on trimmer #7.

Band 1 (Model 455 Short-Wave)

Remove the .0002 mfd dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 18 mc and also set the receiver dial pointer to this frequency. Carefully adjust trimmer #8 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model 454 - Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed, "Image Frequency".

Set the generator and the receiver dial pointer to 9 mc. Adjust trimmer #9 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #13 for maximum reading of the output meter while slightly "rocking" the gang condenser. Readjust trimmer #9 if necessary to correct the calibration.

Band 1 Alignment (Model 454 Short-Wave)

Connections and dummy antenna are the same as on Band 2 of model 554.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 24 mc and the receiver dial pointer to 24 mc. Adjust trimmer #10 to 24 mc for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmer #14 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #10 so that calibration is correct if necessary.

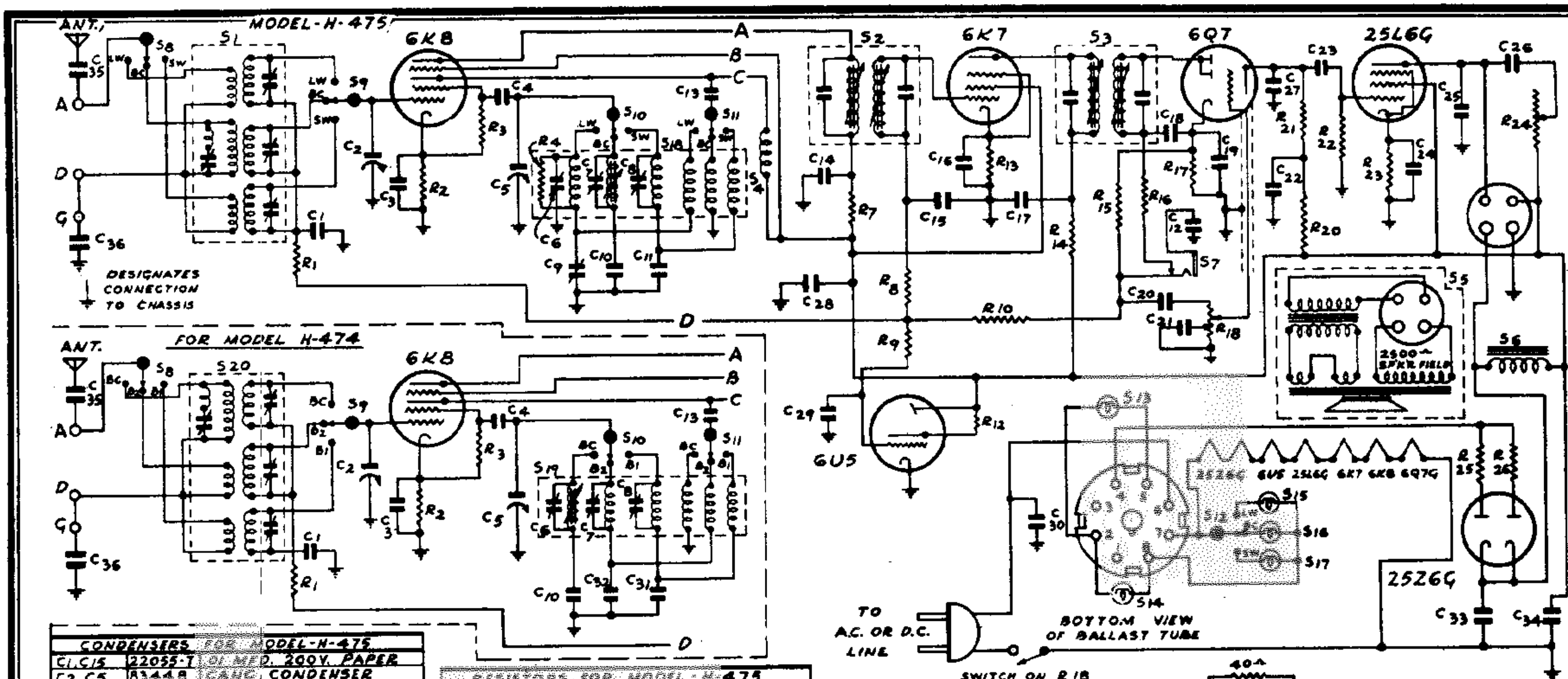
IMAGE FREQUENCY

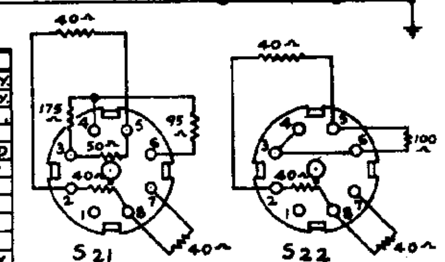
All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the long-wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the image frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the intermediate frequency, set the receiver dial pointer to that one which comes in at the higher frequency marking on the receiver dial pointer.

PILOT RADIO CORP.

MODELS H-474, H-475
Chassis H-470
MODELS H-134, H-135
Chassis H-130
Schematic





CONDENSERS FOR MODEL-H-475		
C1,C15	22055-T	.01 MFD. 200V. PAPER
C2,C5	83448	GANG CONDENSER
C3,C16	22055-M	.1 MFD. 200V. PAPER
C4	27723-O	.00005 MFD. MICA
C6,C9	83416	DOUBLE TRIMMER BASE
C7	83415	AIR TRIMMER
C8	72283-A	TRIMMER ASS'Y.
C10	92000-E	375 MMFD. SILVER CAP
C11	28106	.00025 MFD. MICA
C12	22055-S	.5 MFD. 200 V. PAPER
C13	27704-W	.002 MFD. MICA
C14,C17,C20, C23,C29	22055-W	.01 MFD. 400 V. PAPER
C18	27701-O	.00025 MFD. MICA
C19,C24	22481	10 MFD. 25 V. ELECTRO.
C21	22055-AY	.001 MFD. 200 V. PAPER
C22,C26, C28	22055-L	.1 MFD. 400 V. PAPER
C25,C30, C35,C36	22055-U	.01 MFD. 1000V. PAPER
C27	27701-W	.00025 MFD. MICA
C33,C34	85039	30-40 MFD. 300V. ELECT.

CONDENSERS FOR MODEL-H-474 SAME AS FOR MODEL-H-475, EXCEPT FOLLOWING:		
C9,C11		NOT USED
C31	27705-W	.003 MFD. MICA
C32	27716-W	.0015 MFD. MICA

RESISTORS FOR MODEL-H-475		
R1,R8,R20	13031	100,000 OHMS 1/4 WATT
R2	13203	200 OHMS 1/4 WATT
R3,R16	13164	50,000 OHMS 1/4 WATT
R4	13230	33,000 OHMS 1/4 WATT
R7,R14	13018	1,000 OHMS 1/4 WATT
R9,R10,R12	13001	1 MEGOHM 1/4 WATT
R13	13115	400 OHMS 1/4 WATT
R15,R22	13024	500,000 OHMS 1/4 WATT
R17	13116	12,000 OHMS 1/4 WATT
R18	83529-B	1 MEGOHM VOL. CONT. & SW.
R21	13171	250,000 OHMS 1/4 WATT
R23	13055	150 OHMS 1/4 WATT
R24	83447B	100,000 OHMS TONE CONT.
R25,R26	13207	100 OHMS 1 WATT

RESISTORS FOR MODEL-H-474 SAME AS FOR MODEL-H-475, EXCEPT FOLLOWING		
R4		NOT USED

MISCELLANEOUS FOR MODEL-H-475		
S1	73172	ANTENNA COILS & CAN ASS'Y.
S2	73192-A	1ST I.F. TRANSFORMER ASS'Y.
S3	73193	2ND I.F. " "
S4	73088	R.F. "B" CHOKE ASS'Y.
S5	40816	8" SPEAKER-2500~ FIELD
	40817	12" SPEAKER-2500~ FIELD
S6	79029-A	FILTER CHOKE
S7	70950	PHONO JACK
S8-TO-S12	83414	BAND SWITCH
S13-TO-S17	71282	DIAL LAMPS
S18	73179-A	OSCILLATOR COILS ASS'Y.
S21	81972	BALLAST TUBE 220/40 V.
S22	81971	BALLAST TUBE 110/125 V.

MISCELLANEOUS FOR MODEL-H-474 SAME AS FOR MODEL-H-475, EXCEPT FOLLOWING		
S1, S18		NOT USED
S19	73178-A	OSCILLATOR COILS ASS'Y.
S20	73177	ANTENNA COILS & CAN ASS'Y.

INTERMEDIATE FREQUENCY - 455 K.C.
ALIGNING FREQUENCIES:

LONG-WAVE-H-475	DOMESTIC-H-474
S.W.-18 & 6 MEGACYCLES	B1-24 MEGACYCLES
B.C.-1500 & 600 K.C.	B2-9 MEGACYCLES
L.W.-300 & 175 K.C.	B.C.-1500 & 600 K.C.

NOTE: Chassis H-470 has push-button tuner; H-130 does not. Otherwise chassis are the same.

ALTERATIONS (A) REVISED DIAL LAMPS.-B.R.-8-19-38.

CLASSIFICATION H-470 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO

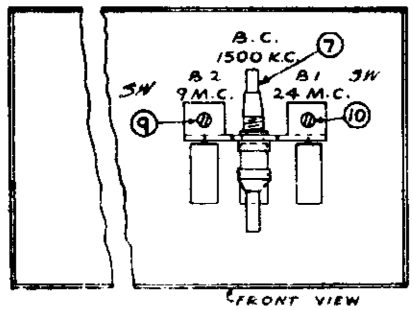
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-474 AND FOR MODEL-H-475
DATE 8-3-38
No. 25196-2

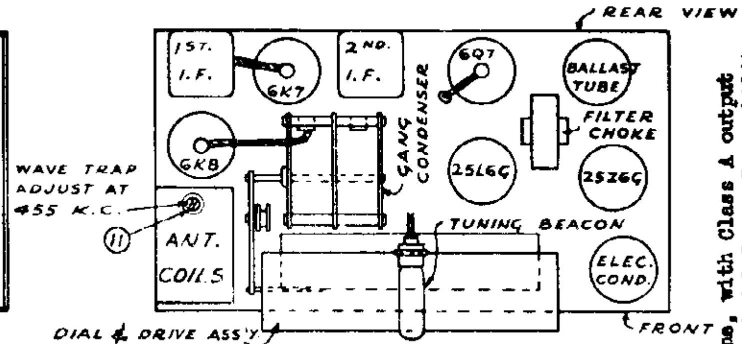
MODELS H-474,H-475
Chassis H-470
MODELS H-134,H-135
Chassis H-130

PILOT RADIO CORP.

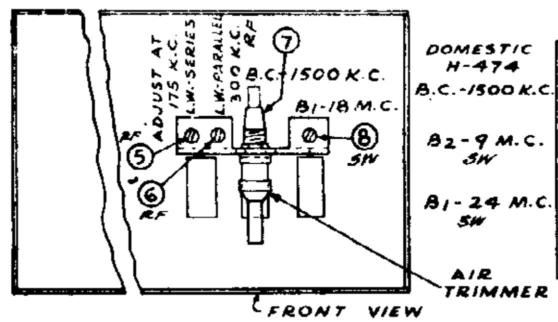
Voltage,Socket
Trimmers,Alignment



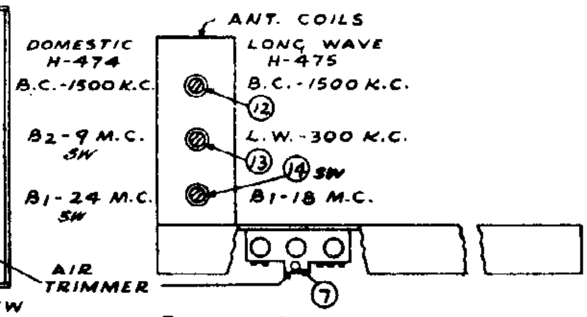
BOTTOM VIEW OF CHASSIS
DOMESTIC-H-474



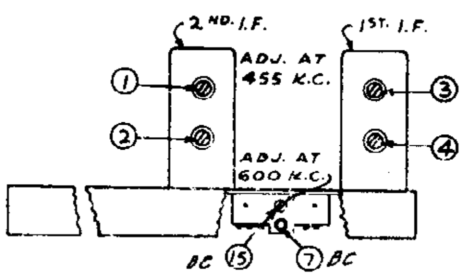
TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS
LONG WAVE - H-475



FRONT VIEW OF CHASSIS



REAR VIEW OF CHASSIS

Circuit Super-Heterodyne, with Class A output **stage.** Three tuning ranges as listed below. Permeability tuned IF transformers. Tone compensated volume control. Continuously variable tone control. Automatic Volume Control and Cathode Ray Tuning Beacon.

D.C. SOCKET VOLTAGES

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohms per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the A.C. supply voltage is correct for the ballast tube being used at the time of measurement.

Figures in parenthesis are for ballast tube #81972, other figures are for ballast tube #81971.

Socket Terminals

Tube	1	2	3	4	5	6	7	8
6K8	-	-	95(125)	95(125)	-	95(125)	-	2.3(3)
6K7	-	-	88(115)	95(125)	-	3(4)	-	3(4)
6Q7	-	-	60(80)	-	-	-	-	1.(1.)
25L6-G	-	-	91(119)	95(125)	-	-	-	6(8.2)
25Z6-G	-	-	-	110(140)	-	-	-	110(140)

Maximum Power Output

With #81971 Ballast Tube 2.0 watts
With #81972 Ballast Tube 3.4 watts

Power Supply A.C. or D.C.

Voltage	Ballast Tube	Watts
110-125	#81971	50
220-240	#81972	115

PILOT RADIO CORPORATION
LONG ISLAND CITY N. Y. U. S. A.
TRIMMER LAYOUT
MATERIAL
SCALE
DATE 8-5-38.
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DWG. No. 25197

Intermediate Frequency 455 kc.

Tuning Ranges The model H-474 chassis has the following tuning ranges:

Band 1	24.8	to	8.3 mc	or	12.09	to	36.1	meters
Band 2	9.7	to	2.9 mc	or	30.9	to	103.4	meters
Band 3	1725	to	530 kc	or	174	to	566	meters

The model H-475 chassis has the following tuning ranges:

Band 1	18.8	to	5.35 mc	or	15.95	to	56.04	meters
Band 2	1725	to	530 kc	or	174	to	566	meters
Band 3	375	to	145 kc	or	800	to	2068	meters

PILOTUBES Required

One 6K8 1st detector-oscillator
One 6K7 IF amplifier
One 6Q7 2nd detector-AVC-1st audio ampl
One 25L6-G Output tube
One 25Z6-G Power supply rectifier
One 6U5 Cathode ray tuning beacon

MODELS H-134, H-135
Chassis H-130
Alignment Procedure

PILOT RADIO CORP.

MODELS H-474, H-475
Chassis H-470

Alignment Connections

Connect the Black and Yellow wires together and to the ground post of the signal generator.

Connect the "hot" post of the generator through the correct dummy antenna or condenser to the appropriate point as noted hereafter. In all the measurements to follow, the output meter should be connected to the plate and screen grid terminals of the 25L6-G through .1 mfd. condensers in any convenient manner.

IF Amplifier Alignment Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end. Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:-

1. Adjust the Signal Generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4, (see figure) for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and align the last IF transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment With the Band Selector Switch set on the Broadcast Band, replace the .1 mfd. dummy antenna with the .0002 mfd. dummy antenna. Set the generator frequency at 455 kc. and tune trimmer #11 for minimum reading of the output meter. There must be sufficient output from the signal generator to always have a reading on the output meter. Do not allow the meter to go to zero and call that the correct adjustment point.

R.F. Alignment

Band 3 (Model H-475 - Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the .0002 mfd. condenser.

Set the generator frequency to 300 kc., and with the Band Selector Switch set to Band 3, turn the ROTOR dial to 300 kc. Adjust trimmer #6 for maximum reading of the output meter. Do likewise with trimmer #13. Then set the generator frequency to 175 kc., and the ROTOR dial to approximately the same. Adjust trimmer #5 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc. alignment.

Band 2 (Model H-475) **Band 3** (Model H-474)
(Standard Broadcast)

Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #7 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmer #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and accurately set the ROTOR dial to the 600 kc. mark. Then adjust trimmer #15 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally, return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmer #7.

Band 1 (Model H-475 - Short-Wave)

Remove the .0002 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 18 mc. and also set the ROTOR dial to this frequency. Carefully adjust trimmer #8 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmer #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model H-474 - Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator and the ROTOR dial to 9 mc. Adjust trimmer #9 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmer #13 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #9 if necessary to correct the calibration.

Band 1 (Model H-474 - Short-Wave)

Connections and dummy antenna are the same as on Band 1 above.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 24 mc. and the ROTOR dial to 24 mc. Adjust trimmer #10 to 24 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmer #14, while "rocking" the gang condenser for maximum reading of the output meter. Reset trimmer #10 so that calibration is correct if necessary.

Image Frequency

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator, to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the ROTOR dial to that one which comes in at the higher frequency marking on the ROTOR dial.

Miscellaneous Service Notes

If a howling noise (sometimes referred to as Microphonic howl) is heard, it is very probably because the four red screws under the cabinet have not been removed along with the two narrow metal strips between the chassis and the bottom of the cabinet. These strips and screws are only intended as additional bracing during shipment and must be removed before the receiver is put in operation.

The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chassis rubs against the cabinet. The remedy is obvious.

In replacing or resetting the ROTOR dial, always set the gang condenser at maximum capacity.

To reset the dial, loosen the set screws in the ROTOR dial pinion gear. Then, adjust the dial so that the low frequency end of the calibration line, at the base of the arrow tip, is directly under the indicator wire. Then, tighten the pinion gear set screws.

If it should be necessary to remove the ROTOR dial, first remove the top plate which carries the Tuning Beacon Clamp. Next, remove the bearing plates which hold the dial shaft in place, and lift out the whole dial assembly.

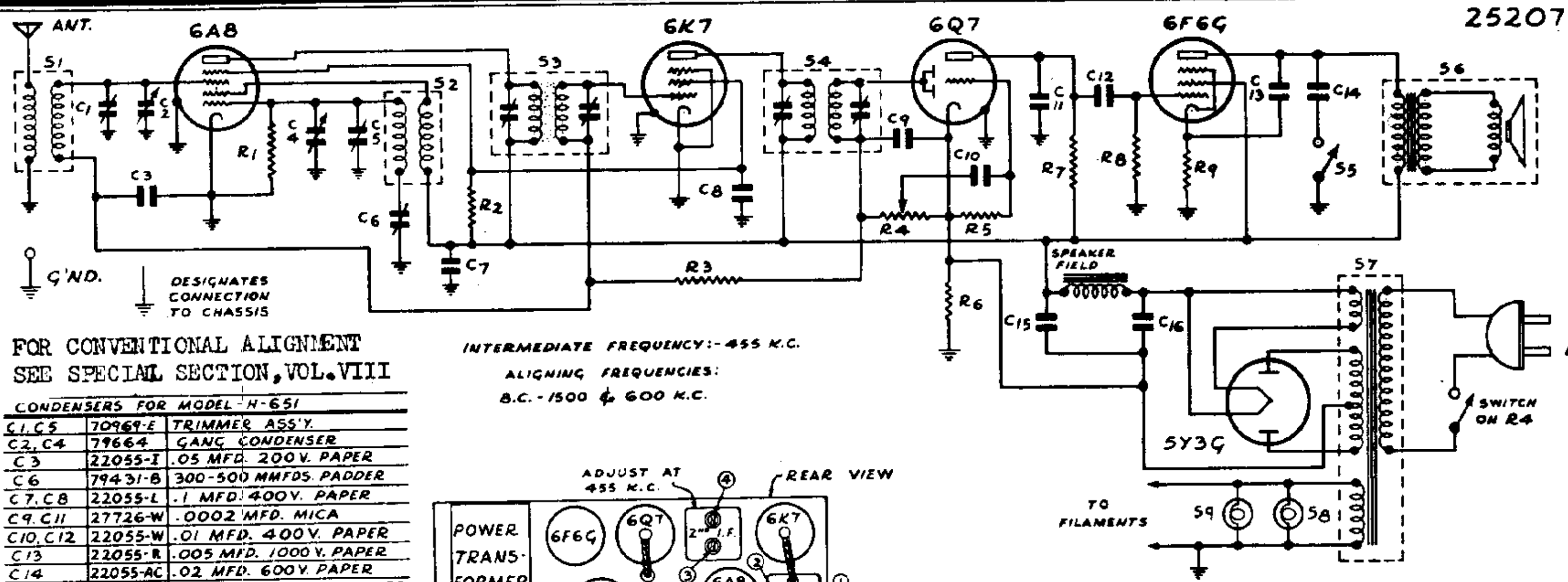
In replacing the dial, be sure to compress the "back lash" springs in the double gear approximately 1/16 of an inch.

Never loosen the set screws which connect the link motion to the gang condenser. If this should be done, the calibration of the receiver will be affected.

MODELS TH-650,H-651
Chassis H-650
Schematic,Voltage,Socket
Trimmers,Alignment

PILOT RADIO CORP.

25207



FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII

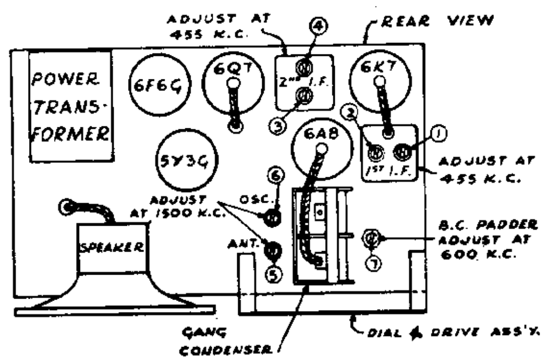
INTERMEDIATE FREQUENCY:- 455 K.C.
ALIGNING FREQUENCIES:
B.C. - 1500 & 600 K.C.

CONDENSERS FOR MODEL - H-651		
C1, C5	70969-E	TRIMMER ASS'Y.
C2, C4	79664	GANG CONDENSER
C3	22055-I	.05 MFD. 200V. PAPER
C6	79431-B	300-500 MMFDS. PADDER
C7, C8	22055-L	.1 MFD. 400V. PAPER
C9, C11	27726-W	.0002 MFD. MICA
C10, C12	22055-W	.01 MFD. 400V. PAPER
C13	22055-R	.005 MFD. 1000 V. PAPER
C14	22055-AC	.02 MFD. 600V. PAPER
C15, C16	23500-D	8 MFD. 450 V. MIDGET ELEC.

RESISTORS FOR MODEL - H-651		
R1	13164	50,000 OHMS 1/4 WATT
R2	13068	30,000 OHMS 1/2 WATT
R3, R5	13001	1 MEGOHM 1/4 WATT
R4	79429	500,000 OHMS VOL. CONT. & SW
R6	13080	50 OHMS 1/4 WATT
R7	13171	250,000 OHMS 1/4 WATT
R8	13024	500,000 OHMS 1/4 WATT
R9	13238	400 OHMS 1/2 WATT

MISCELLANEOUS FOR MODEL - H-651		
S1	73115-B	ANTENNA COIL ASS'Y.
S2	73200	OSCILLATOR COIL ASS'Y.
S3	73108-B	1ST. I.F. TRANSFORMER ASS'Y.
S4	73103	2ND I.F. " "
S5	71657	TONE CONTROL
S6	40854	5" A.C. SPEAKER 2000 Ω FIELD
S7	79428-R	PWR. TRANSFOR. 117 V.-60 CY.
	79428-AB	" " .210V.-60 CY.
	79428-RA	" " .115-250V.-60 CY.
	79428-L	" " .150V.-60 CY.
S8, S9	78889	DIAL LAMP

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM
FOR MODEL - H-651
MATERIAL
SCALE
DRAWN BY B.R.
DATE 10-7-38.
CHECKED BY
APPROVED BY
DRAWG. No. 25207



TOP VIEW OF CHASSIS

D.C. SOCKET VOLTAGES

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the A.C. supply voltage is correct for the transformer tap being used at the time of measurement.

Socket Terminals

Tube	1	2	3	4	5	6	7	8
6A8	-	-	185	70	-	185	-	-
6K7	-	-	185	70	-	-	-	-
6Q7	-	-	-	-	-	-	-	-2
6F6-G	-	-	170	185	-	-	-	11.5
5Y3-G	-	-	-	-	-	-	-	270

Maximum Power Output 2 watts

Tuning Range

The Model H-651 Chassis has the following tuning range:

550 to 1720 kc or 565 to 174 meters

Power Supply

Voltage	Frequency	Watts
110 to 125 volts	60	50
150 volts	60	50
220 to 240 volts	60	50
110 to 125 or 220 to 240 volts	60	50

TUBES Required

One 6A8	1st detector-oscillator
One 6K7	IF amplifier
One 6Q7	2nd detector-AVC-1st audio amplifier
One 6F6-G	output tube
One 5Y3-G	power supply rectifier

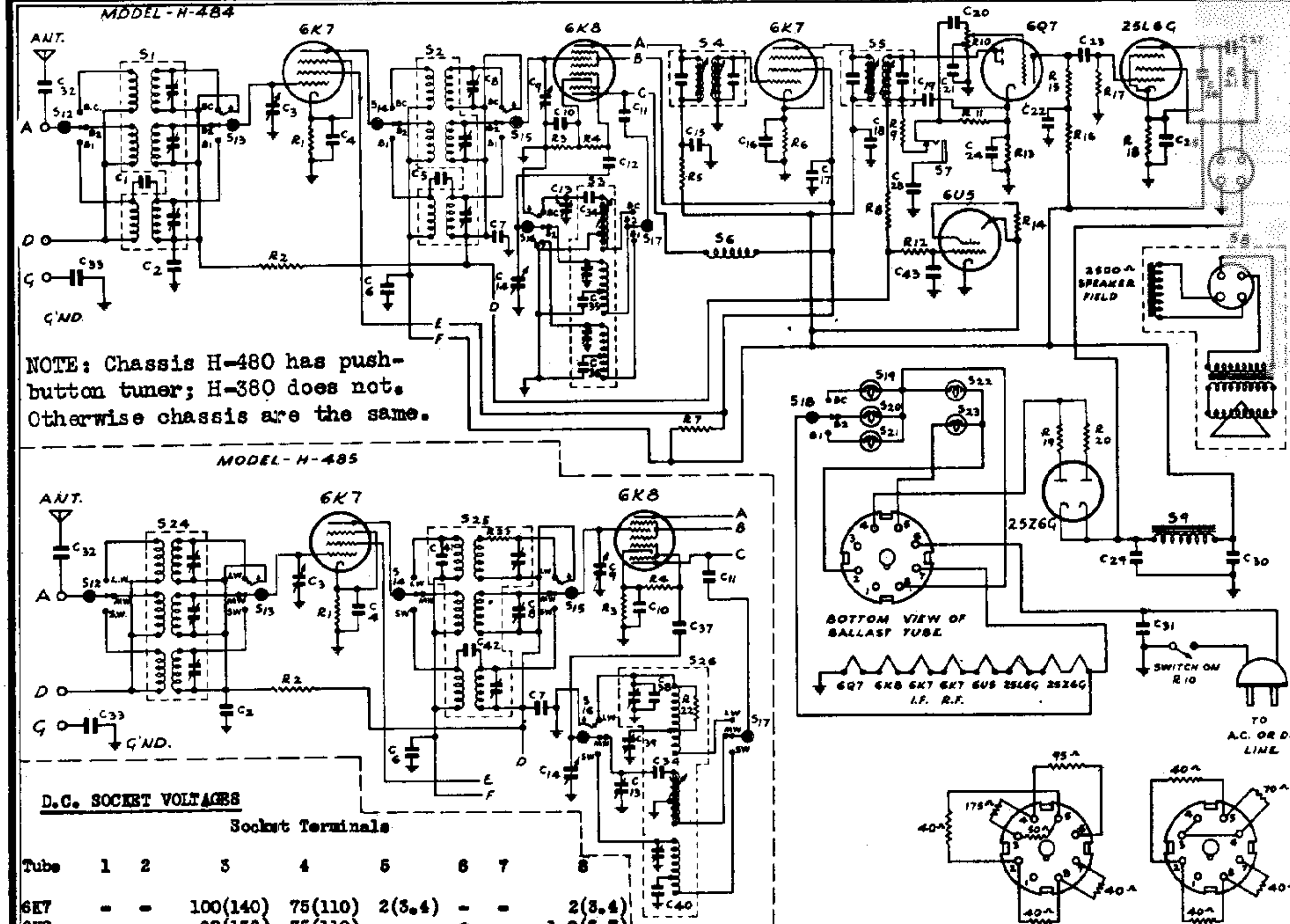
Total 5 tubes

GENERAL SPECIFICATIONS.

Circuit Super-Heterodyne, with Class A output stage. Tuning range as listed below. Continuously variable tone control and automatic volume control.

MODELS H-484, H-485
Chassis H-480
MODELS H-384, H-385
Chassis H-380
Schematic, Voltage

PILOT RADIO CORP.



NOTE: Chassis H-480 has push-button tuner; H-380 does not. Otherwise chassis are the same.

CONDENSERS FOR MODEL-H-484		
C1	37737-D	10 MMFD. MICA
C2, C7	32055-T	.05 MFD. 200V. PAPER
C3, C4, C14	83541	3 GANG CONDENSER
[illegible]	32055-M	.1 MFD. 200V. PAPER
C5	38115	15 MMFD. MICA [illegible]
C6, C17	32055-P	.05 MFD. 400V. PAPER
C8, C13	83413	30 MMFD. AIR TRIMMER
C11	37704	.002 MFD. MICA
C12	37723-G	50 MMFD. MICA
C18, C22	32055-J	.05 MFD. 400V. PAPER
C19, C23	32055-L	.1 MFD. 400V. PAPER
C15	37738	.0002 MFD. MICA
C20	32055-W	.01 MFD. 400V. PAPER
C21	32055-AH	.001 MFD. 200V. PAPER
C27	32055-AB	.1 MFD. 400V. PAPER
C24, C25	32481	10 MFD. 25V. ELECTRO.
C26	32055-A	.01 MFD. 600V. PAPER
C28	32055-X	.5 MFD. 200V. PAPER
C29, C30	83043	30-30 MFD. 100V. ELECT.
C31	32055-U	.01 MFD. 1000V. PAPER
C32, C33	32055-Z	.005 MFD. 1000V. PAPER
C34	42000-C	450 MMFD. SILVER CAP.
C35	37732	.0016 MFD. MICA
C36	38025-A	.0058 MFD. MICA
C43	32055-T	.01 MFD. 200V. PAPER

CONDENSERS FOR MODEL-H-485 SAME AS FOR MODEL-H-484 EXCEPT FOLLOWING:		
C1, C5, C13		NOT USED
C37	38016-D	100 MMFD. MICA
C38	37738	22 MMFD. MICA
C39	83514-B	140 MMFD. PADDER
C40	38108	.00235 MFD. MICA
C41	37760-D	.00025 MFD. MICA
C42	37737-D	10 MMFD. MICA

RESISTORS FOR MODEL-H-484		
R1, R6	13112	400 OHMS 1/4 WATT
R2, R16	13031	100,000 OHMS 1/4 WATT
R3	13003	300 OHMS 1/4 WATT
R4, R9	13164	50,000 OHMS 1/4 WATT
R5	13028	1,000 OHMS 1/4 WATT
R7	13086	2,000 OHMS 1/4 WATT
R8	13001	1 MEGOHM 1/4 WATT
R10	83127-A	1 MEGOHM VOL. CONT. & SW.
R11	13171	250,000 OHMS 1/4 WATT
R12	13007	2 MEGOHMS 1/4 WATT
R13	13050	10,000 OHMS 1/4 WATT
R14, R17	13024	500,000 OHMS 1/4 WATT
R15	13043	50,000 OHMS 1/4 WATT
R18	13336	150 OHMS 1 WATT 5%
R19, R20	13207	100 OHMS 1 WATT
R21	83447-A	100,000 OHMS TONE CONT.

RESISTORS FOR MODEL-H-485 SAME AS FOR MODEL-H-484 EXCEPT FOLLOWING:		
R22	13148	30,000 OHMS 1/4 WATT
R23	13029	250 OHMS 1/4 WATT

MISCELLANEOUS FOR MODEL-H-484		
S1	73205	ANTENNA COILS & CAN ASS'Y.
S2	73207	R.F. " " " "
S3	73209	OSCILLATOR " " " "
S4	73[illegible]	1ST I.F. TRANSFORMER ASS'Y.
S5	73[illegible]	2ND I.F. " "
S6	73[illegible]	R.F. "B" CHOKE ASS'Y.
S7	70[illegible]	PHONO JACK
S8	40[illegible]	8" SPEAKER 2500 Ω FIELD
	40[illegible]	12" SPEAKER 2500 Ω FIELD
S9	9027-A	FILTER CHOKE
S10	81972	BALLAST TUBE 230/240 V.
S11	81973	BALLAST TUBE 110/125 V.
S12 TO S18	83438	BAND SWITCH
S19 TO S23	71262	PILOT LIGHTS

MISCELLANEOUS FOR MODEL-H-485 SAME AS FOR MODEL-H-484 EXCEPT FOLLOWING:		
S1, S2, S3		NOT USED
S24	73204	ANTENNA COILS & CAN ASS'Y.
S25	73206	R.F. " " " "
S26	73208	OSCILLATOR " " " "

INTERMEDIATE FREQUENCY: 455 K.C.

ALIGNING FREQUENCIES:

FOR MODEL-H-484
B1 - 23 MEGACYCLES
B2 - 9 "
B.C. - 1500 & 600 K.C.

FOR MODEL-H-485.
S.W. - 17.6 MEGACYCLES
M.W. - 1500 & 600 K.C.
L.W. - 350 & 160 K.C.

PILOT RADIO CORP.
LONG ISLAND CITY, N.Y., U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-484 & MODEL-H-485
DATE:- 8-15-38
DRAWN BY:- B.R.
CHECKED BY:- [illegible]
APPROVED BY:-
No 25198-

D.C. SOCKET VOLTAGES

Socket Terminals

Tube	1	2	3	4	5	6	7	8
6K7	-	-	100(140)	75(110)	2(3.4)	-	-	2(3.4)
6K8	-	-	98(138)	75(110)	-	*	-	1.9(3.7)
6K7	-	-	100(140)	75(110)	2(3.4)	-	-	2(3.4)
6Q7	-	-	*	-	-	-	-	1.05(1.5)
25L6-G	-	-	98(135)	100(140)	-	-	-	6(9)

Figures in Parenthesis are for 230 volt operation, other figures are for 115 volt operation.

*Cannot be measured.

Power Supply. A.C. or D.C.

Voltage	Ballast Tubes	Watts
110-125	81973	50
220-240	81972	120

6K7	R.F. Amplifier
6K8	1st detector-oscillator
6K7	IF amplifier
6Q7	2nd detector-AVC-1st Audio amplifier
25L6-G	Output tube
25Z6-G	Power supply rectifier
6U5	Cathode ray tuning beacon

MODELS H-484, H-485
Chassis H-480
MODELS H-384, H-385
Chassis H-380

PILOT RADIO CORP.

Socket, Trimmers
Alignment

IF Amplifier Alignment. Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

R.F. ALIGNMENT

Band 3 (Model H-485, Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the .0002 mfd. condenser.

Set the generator frequency to 300 kc., and with the Band Selector Switch set to band 3, turn the ROTOR dial to 300 kc. Adjust trimmer #5 for maximum reading of the output meter. Do likewise with trimmer #6 and #7. Then set the generator frequency to 160 kc. and the ROTOR dial to approximately the same. Adjust trimmer #21 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc. alignment.

Band 2 (Model H-485) Band 3 (Model H-484) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmers #9 and #10 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and accurately set the ROTOR dial to the 600 kc. mark. Then adjust trimmer #11 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmers #8 and #9.

Band 1 (Model H-485 Short-Wave)

Remove the .0002 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency" (SEE MODEL H-151)

Set the generator frequency to 17.5 kc. and also set the ROTOR dial to this frequency. Carefully adjust trimmer #12 for maximum reading of the output meter. Be careful you do not tune in at the image frequency.

Then adjust trimmers #13 and #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #12 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model H-484 Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator, and the ROTOR Dial to 9 mc. Adjust trimmer #15 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmers #16 and #17 for maximum reading of the output meter, while slightly "rocking" the gang condenser. Readjust trimmer #15 if necessary to correct the calibration.

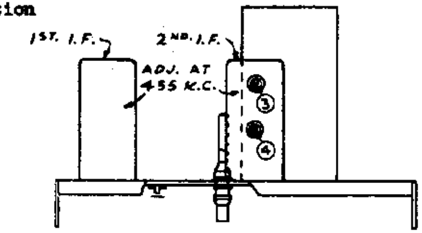
Band 1 (Model H-484 Short-Wave)

Connections and dummy antenna are the same as on Band 1 above

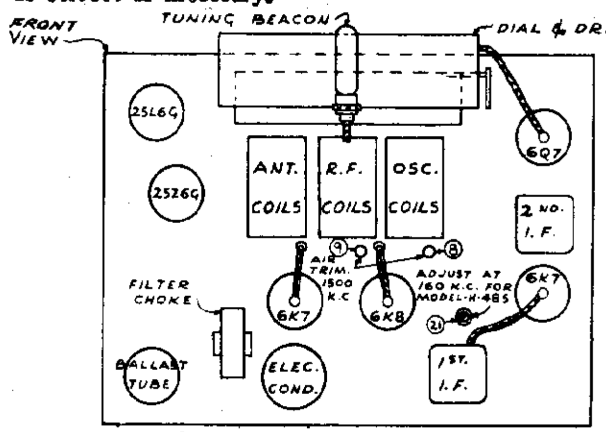
Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc. and the ROTOR dial to 23 mc. Adjust trimmer #18 to 23 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmers #19 and #20 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #18 so that calibration is correct if necessary.

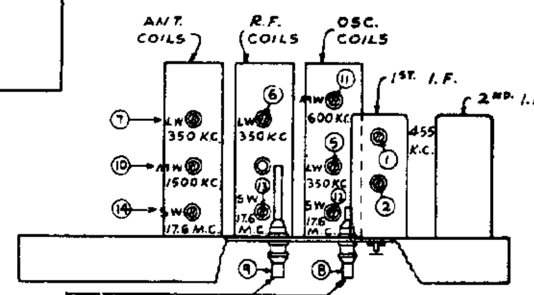
PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
TRIMMER LAYOUT
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DATE 8-17-38
DWG. NO. 25199



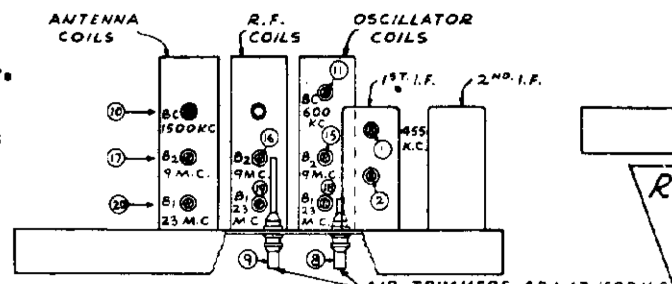
RIGHT SIDE OF CHASSIS



TOP VIEW OF CHASSIS



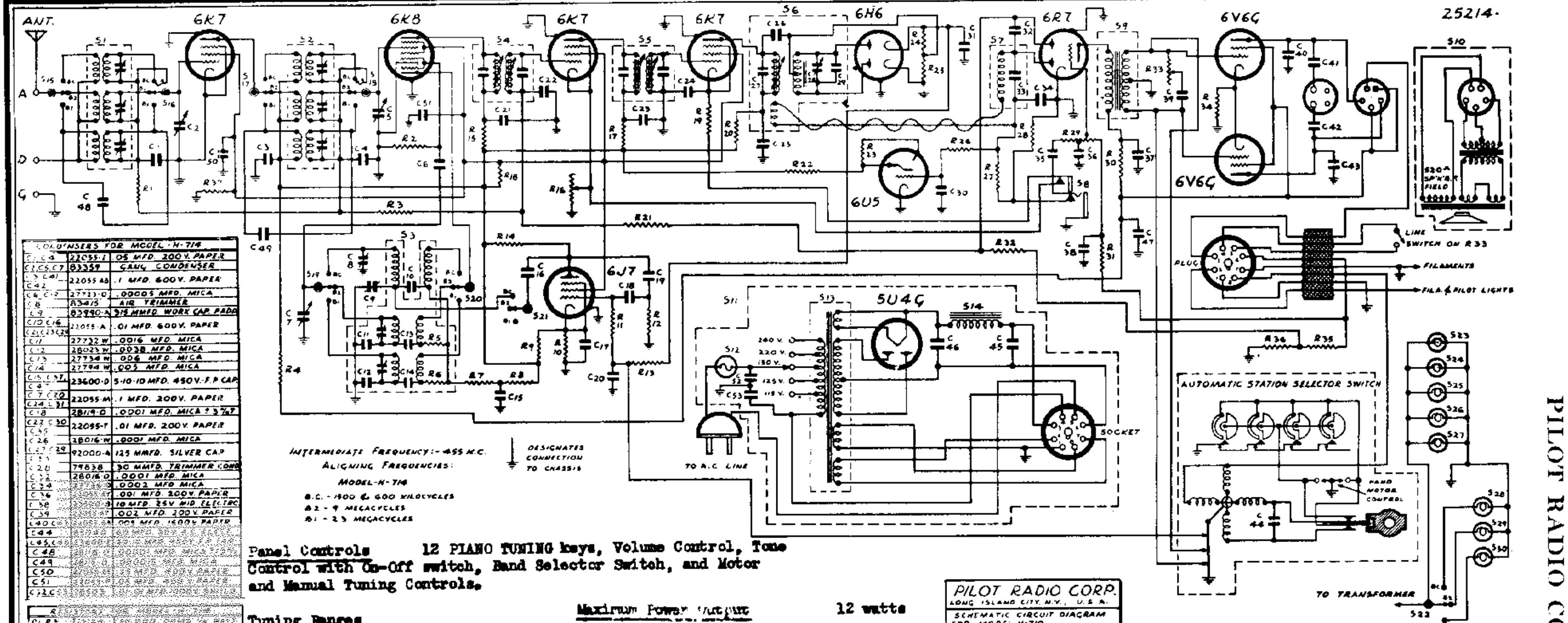
REAR VIEW OF CHASSIS (MODEL-H-485)



REAR VIEW OF CHASSIS (MODEL-H-484)

MODEL H-710
Schematic
Voltage

PILOT RADIO CORP.



CONDENSERS FOR MODEL-H-714		
C1, C4	22055-I	.05 MFD. 200 V. PAPER
C2, C5, C7	83359	GANG CONDENSER
C3, C41, C42	22055-AB	.1 MFD. 600 V. PAPER
C6, C9	27713-O	.00005 MFD. MICA
C8	83415	AIR TRIMMER
C9	83990-A	315 MMFD. WORK CAP. PADD
C10, C16, C21, C23, C29	22055-A	.01 MFD. 600 V. PAPER
C11	27732 W	.0016 MFD. MICA
C12	28023 W	.0038 MFD. MICA
C13	27734 W	.006 MFD. MICA
C14	27794 W	.005 MFD. MICA
C15, C37, C47	23600-D	5-10-10 MFD. 450 V.-F.P. CAP.
C17, C20, C24, C31	22055-M	.1 MFD. 200 V. PAPER
C18	28119-O	.0001 MFD. MICA ± 3%
C22, C30, C35	22055-T	.01 MFD. 200 V. PAPER
C26	28016-W	.0001 MFD. MICA
C27, C29, C33	92000-A	125 MMFD. SILVER CAP
C28	79838	30 MMFD. TRIMMER COND
C32	28016-O	.0001 MFD. MICA
C34	[illegible]	.0002 MFD. MICA
C36	[illegible]	.001 MFD. 200 V. PAPER
C38	[illegible]	10 MFD. 25 V MID ELECTRO
C39	[illegible]	.002 MFD. 200 V. PAPER
C40, C43	[illegible]	.005 MFD. 1600 V. PAPER
C44	[illegible]	[illegible]
C45, C46	[illegible]	[illegible]
C48	[illegible]	[illegible]
C49	[illegible]	[illegible]
C50	[illegible]	[illegible]
C51	[illegible]	[illegible]
C52, C53	[illegible]	[illegible]

RESISTORS FOR MODEL-H-714		
R1, R3	[illegible]	[illegible]
R2	[illegible]	[illegible]
R4	[illegible]	[illegible]
R5, R6, R7	[illegible]	[illegible]
R8	[illegible]	[illegible]
R9	[illegible]	[illegible]
R10, R12	[illegible]	[illegible]
R11, R26	[illegible]	[illegible]
R13	[illegible]	[illegible]
R14	[illegible]	[illegible]
R15, R17, R20	[illegible]	[illegible]
R16	[illegible]	[illegible]
R19	[illegible]	1500 OHMS ¼ WATT ±10%
R21, R23, R32	[illegible]	1 MEGOHM ¼ WATT
R22	[illegible]	75,000 OHMS ¼ WATT
R24, R25	[illegible]	420,000 OHMS ¼ WATT ±5%
R27	[illegible]	100,000 OHMS ¼ WATT
R28	[illegible]	200,000 OHMS ¼ WATT
R29	[illegible]	1 MEGOHM VOL. CONT.
R30	[illegible]	10,000 OHMS ½ WATT
R31	[illegible]	250,000 OHMS ¼ WATT
R33	[illegible]	750,000 OHMS TONE CONTROL & SWITCH
R34	[illegible]	190 OHMS 2 WATT FLEX.
R35	[illegible]	40 OHMS 1 WATT ±10%
R36	[illegible]	23 OHMS 1 WATT
R37	[illegible]	10,000 OHMS 1 WATT
R18	[illegible]	[illegible] 4 WATT FLEX

MISCELLANEOUS FOR MODEL-H-714		
S1	[illegible]	[illegible] & CAN ASS'Y.
S2	[illegible]	[illegible]
S3	[illegible]	[illegible]
S4, S5	[illegible]	[illegible] TRANSFOR ASS'Y
S6	[illegible]	[illegible] TRANSFOR. ASS'Y
S7	[illegible]	[illegible] COUP. COIL ASS'Y
S8	[illegible]	[illegible]
S9	83877	[illegible] INPUT TRANSFORMER ASS'Y.
S10	40865	[illegible] 320 Ω FIELD
	40866	[illegible] 320 Ω FIELD
S11	83859	[illegible] ASS'Y.
S12	70053	[illegible]
S13	83990	[illegible] 50-60 CY. UNIT
	83891	PWR. TRANSFO. 50-60 CY. UNIV.
S14	83980	FILTER CHOKE 100 Ω 3H
S15 TO S22	83866	BAND SWITCH
S23 TO S30	78889	DIAL LIGHTS

Panel Controls 12 PIANO TUNING keys, Volume Control, Tone Control with On-Off switch, Band Selector Switch, and Motor and Manual Tuning Controls.

Maximum Power Output 12 watts

Tuning Ranges

Band 1	25.3 - 8.92 mc	or 11.85 - 33.65 meters
Band 2	9.88 - 2.97 mc	or 30.3 - 100.8 meters
Band 3	1730 - 526 kc	or 173.4 - 570.3 meters

D.C. SOCKET VOLTAGES

Tubes	Socket Terminals 1	2	3	4	5	6	7	8
6K7 RF	-	-	240	92	0	-	-	0
6K8	-	-	232	92	0	-	-	0
6J7	-	-	225	92	4.5	-	-	4.5
6K7 IF	-	-	230	92	0	-	-	0
6K7 IF	-	-	232	92	5	-	-	5
6H6	-	-	0	0	0	-	-	0
6R7	-	-	200	-	-	-	-	0
6V6-G	-	-	252	260	0	-	-	15
5U4-G	-	345	-	-	-	-	-	345

PILOT RADIO CORP.
LONG ISLAND CITY, N.Y., U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL H-710
DATE 1-5-39
DRAWN BY A.R.
CHECKED BY G.J.
APPROVED BY:
H-710 SERIES
Nº 25214

Power Supply

Voltage	Frequency	Watts
117.5	60 cycles	90
115, 125, 150, 220, 240*	60 cycles	90

Universal Transformer
* (Not supplied in the United States).

6K7	R.F. Amplifier
6K8	1st Detector-Oscillator
6J7	Oscillator Frequency Control
6K7	IF Amplifiers
6H6	Discriminator
6R7	2nd Detector-AVC-1st Audio Amplifier
6V6-G	Output Tubes
5U4-G	Power Supply Rectifier
6U5	Cathode Ray Tuning Beacon

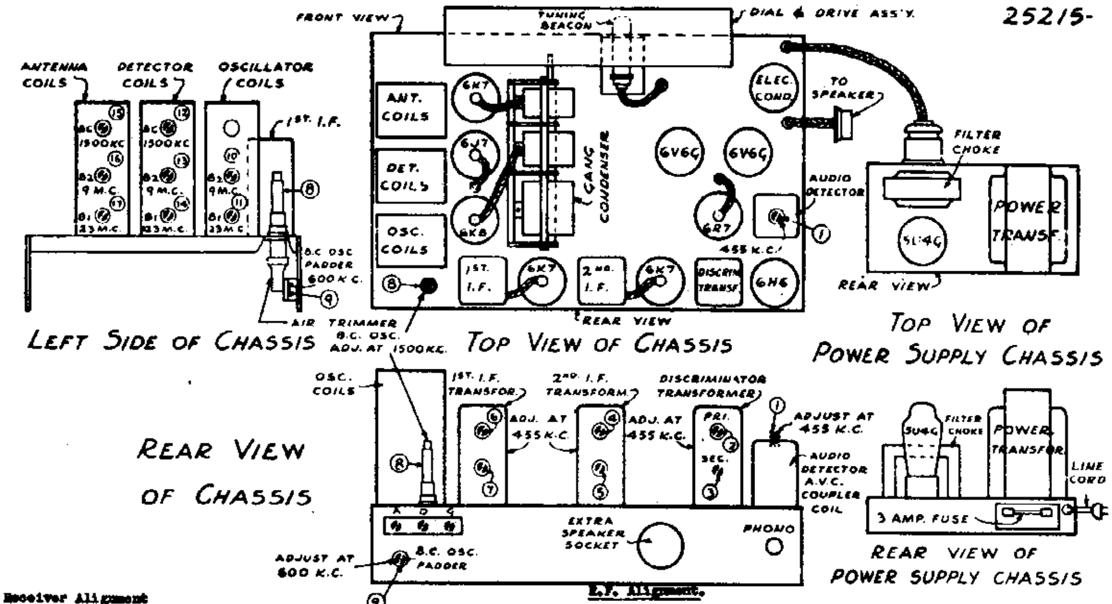
Circuit Super-Heterodyne, with push-pull output stage, and with Automatic Frequency Control of the oscillator on the Standard Broadcast Band. An R.F. stage is used on all bands. Iron Core, Permeability Tuned IF and Discriminator Transformers, which use, in addition, Silver-Mica Condensers.

Other features of the Receiver are:-

Continuously variable Tone Control, Tone Compensated Volume Control, Visible Indicators on all controls, Motor operated PIANO TUNING on the Broadcast Band. Manual Tuning is instantly available without extra switching. Motor Tuning, without the keys is also available on all bands. These receivers are supplied with a fuse in the power supply circuit, and a jack is provided for plugging in a high impedance phonograph pick-up. There is also provision for an external speaker.

MODEL H-710
Socket, Trimmers
Alignment

PILOT RADIO CORP.



Receiver Alignment

1. Signal Generator. One using fundamental frequencies for all the frequencies used in the receiver is preferred.
2. Output meter. Generally a copper-oxide rectifier meter is the most convenient.
3. Dummy Antennas. .1 mfd. condenser
   .0002 mfd. mica condenser
   400 ohm non-inductive resistor

IF Amplifier Alignment.

Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the generator to the grid of the 6K8 tube through the .1 mfd. condenser. See that none of the PIANO KEYS is down. Then proceed with the alignment as follows;-

1. Adjust the Signal Generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.
2. Adjust the screws 1, 2, 4, 5, 6, and 7, (see figure) for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the last IF amplifier tube, and then to the first IF amplifier tube, while aligning the transformers following these tubes. Always finish the alignment with the signal input to the 6K8 tube and, with this connection, readjust all screws in the IF amplifier, except the discriminator trimmer #3.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

If the receiver is placed in a noisy location when the above adjustments are being made, it may be convenient to reduce the sensitivity of the amplifier by means of the sensitivity control.

Discriminator Alignment

CAUTION; The discriminator compensator #3 has been accurately adjusted during manufacture. It will probably never need adjustment, even when tubes are replaced, and for these reasons should never be touched unless there is no doubt about its being out of adjustment, in which case, the following procedure should be followed carefully. The adjustment is quite critical and cannot be done correctly in a hasty manner.

1. Set compensator (3) at the minimum position. This is the setting when the screw slot is vertical and when the red half of the adjusting screw is at the left.
2. Tune the IF amplifier to 455 kc as described under "IF Amplifier Alignment".
3. With the signal generator connected to the grid of the 6K8 tube and with the output of the generator at a low value, note the reading of the output meter. Then very carefully turn compensator (3) until the output meter reading reaches a minimum value. That is the correct setting of this compensator.

It will be necessary to use a screw driver made from some insulating material in making this adjustment. If a metal tool is used, the adjustment will not be correct.

If the adjustment is not correctly made, the oscillator control tube will not function properly. It may even detune the oscillator instead of tuning it.

R.F. Alignment.

Band 3 (Standard Broadcast)

Connect the "hot" terminal of the generator to the post marked "A" on the rear of the chassis through the .0002 mfd. condenser.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set to Band 3. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by drawing the brass rod up or pushing it down with a hooked wire, and with a twisting motion. First loosen the lock nut). Then, without touching the tuning controls, adjust trimmer #12 and trimmer #15 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc., and the ROTOR dial to approximately the same. Adjust trimmer #9 for maximum output reading while "rocking" the gang condenser. Then go back and repeat the 1500 kc. adjustment, and tighten the lock nut on trimmer #8.

Band 2 (Short-Wave) Remove the .0002 mfd. dummy antenna used in aligning Band 3 and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 9,000 kc. (9 mc.) and also set the ROTOR dial to this frequency. Carefully adjust the oscillator trimmer #10 for maximum reading of the output meter. Be very careful that this trimmer is not set on the Image Frequency.

After the oscillator is set, trimmers #13 and #16 are adjusted for greatest reading of the output meter, resetting trimmer #10 if necessary to keep the calibration correct.

The adjustments on this band are more critical than the similar ones on the lower frequency bands and must be more carefully made.

The above adjustments, at the high frequency end of the band, are the only ones to be made on this band.

Band 1 (Short-Wave) Connections and dummy antenna are the same as on Band 2.

Set the generator, and the ROTOR dial to 23 mc. Adjust trimmer #11 for maximum reading of the output meter, when the lower frequency peak of the two which can be located coincides with the 23 mc. calibration point on the dial. Then adjust trimmers #14 and #17 while "rocking" the gang condenser, until the maximum reading is obtained on the output meter, resetting trimmer #11 if necessary to keep the calibration correct.

These are the only adjustments on this band.

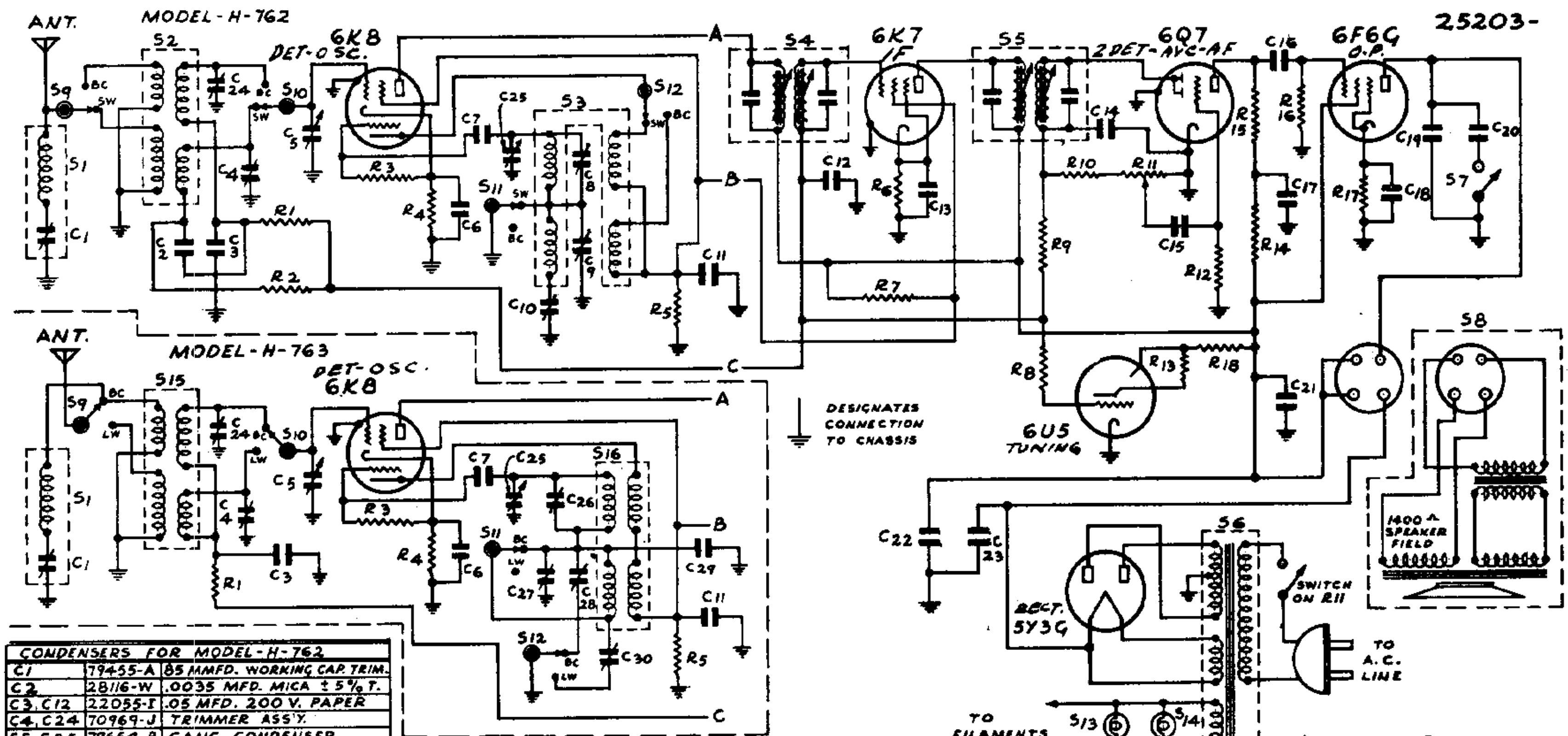
Image Frequency

All bands in this receiver, except Band 1 must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on Band 3. However, on the two high frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the dial on Band 2 to that one which comes in at the higher frequency marking on the ROTOR dial. That is, on Band 2 the two frequencies which will be picked up when the generator is set at 9 mc., will be at 9 mc. and at 8 mc. on the ROTOR dial. Adjust the oscillator trimmer so that the 9 mc. frequency one coincides with 9 mc. on the dial. Exactly the reverse is true on Band 1.

MODELS H-762, H-763
Chassis H-760
Schematic

PILOT RADIO CORP.



CONDENSERS FOR MODEL-H-762		
C1	79455-A	85 MMFD. WORKING CAP. TRIM.
C2	28116-W	.0035 MFD. MICA ± 5% T.
C3, C12	22055-I	.05 MFD. 200 V. PAPER
C4, C24	70969-J	TRIMMER ASS'Y.
C5, C25	79664-B	GANG CONDENSER
C6, C13	22055-M	.1 MFD. 200 V. PAPER
C7	27723-O	50 MMFD. MICA
C8, C9	70969-J	TRIMMER ASS'Y.
C10	79431-B	300-500 MMFDS. PADDER
C11	22055-P	.05 MFD. 400 V. PAPER
C14	27726-O	.0002 MFD. MICA
C15	22055-AU	.005 MFD. 400V. PAPER
C16	22055-AC	.02 MFD. 600 V. PAPER
C17, C21	22055-AB	.1 MFD. 600 V. PAPER
C18	22481	10 MFD. 25 V. ELECTRO.
C19	22055-R	.005 MFD. 1000 V. PAPER
C20	22055-AD	.02 MFD. 1000 V. PAPER
C22	23500-C	16 MFD. 450 V. ELECTRO.
C23	23500-D	8 MFD. 450 V. ELECTRO.

CONDENSERS FOR MODEL-H-763 SAME AS FOR MODEL-H-762, EXCEPT FOLLOWING:		
C2, C8		NOT USED
C9, C10		NOT USED
C26, C27	70969-E	TRIMMER ASS'Y.
C28	72355-C	250-500 MMFDS. PADDER
C30		30-150 MMFDS. PADDER
C29	28101-O	.000015 MFD. MICA

RESISTORS FOR MODEL-H-762		
R1, R2, R14	13031	100,000 OHMS 1/4 WATT
R3, R5, R10	13164	50,000 OHMS 1/4 WATT
R4	13003	300 OHMS 1/4 WATT
R6	13115	400 OHMS 1/4 WATT
R7	13239	12,000 OHMS 2 WATT
R8	13007	2 MEGOHMS 1/4 WATT
R9	13001	1 MEGOHM 1/4 WATT
R11	79429	1/2 MEGOHM VOL. CONT. & SW.
R12	13237	15 MEGOHMS 1/2 WATT
R13, R16	13024	500,000 OHMS 1/4 WATT
R15	13171	250,000 OHMS 1/4 WATT
R17	13108	410 OHMS 1 WATT
R18	13074	20,000 OHMS 1/4 WATT

RESISTORS FOR MODEL-H-763 SAME AS FOR MODEL-H-762, EXCEPT FOLLOWING:		
R2		NOT USED

MISCELLANEOUS FOR MODEL-H-762		
S1	73119	WAVE TRAP ASS'Y.
S2	73224	ANTENNA COIL ASS'Y.
S3	73228	OSCILLATOR COIL ASS'Y.
S4	73192-C	1ST I.F. TRANSFORMER ASS'Y.
S5	73193	2ND I.F. "
S6	83412-R	PWR. TRANSFORMER-117V-50-60CY.
	83412-AB	" 230V-50-60CY.
	83412-FB	" 115-230V-50-60CY.
	83412-L	" 150V-50-60CY.
	83697	" UNIVE-50-60CY.
S7	72049	TONE CONTROL SWITCH
S8	40851	6" A.C. SPEAKER-1400 Ω FIELD
S9 TO S12	79454	BAND SWITCH
S13, S14	78889	DIAL LAMP

SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-762 & MODEL-H-763
Drawn by B.R. Date 7-7-37
Checked by G.J.
Approved by 2.3L.
Dwg. No. 25203

INTERMEDIATE FREQUENCY-455KC
ALIGNING FREQUENCIES:

DOMESTIC H-762	LONG-WAVE H-763
B.C.-1500 & 600 K.C.	B.C.-1500 & 600 K.C.
S.W.-17 MEGACYCLES	L.W.-375 & 150 K.C.

MISCELLANEOUS FOR MODEL-H-763 SAME AS FOR MODEL-H-762, EXCEPT FOLLOWING:		
S2, S3		NOT USED
S15	73225	ANTENNA COIL ASS'Y.
S16	73226	OSCILLATOR COIL ASS'Y.

Power Supply Voltage	Watts	Frequency
110-125 volts AC	60	60
150 volts AC	60	60
220-240 volts AC	60	60
110-125 or 220-240 Volts AC	60	60
Universal primary (115,125,150,220,240)	60	60

Maximum Power Output 4.7 watts

Intermediate Frequency 455 kilocycles

MODELS H-762, H-763
Chassis H-760

PILOT RADIO CORP.

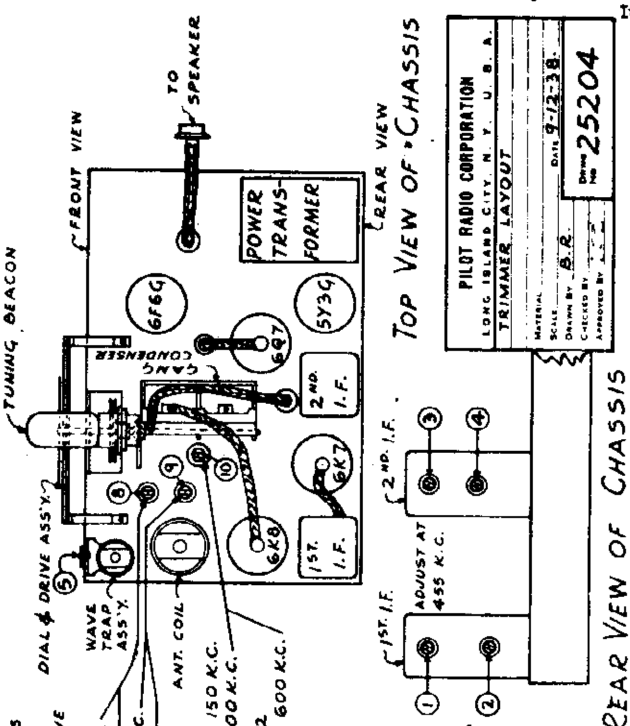
Voltage, Socket, Trimmers Alignment

D.C. SOCKET VOLTAGES

Socket Terminals

Tube	1	2	3	4	5	6	7	8
6K8	-	-	240	95	-	95	-	2.8
6K7	-	-	240	95	3.3	-	-	3.3
6Q7	-	-	*105	-	-	-	-	1.4
6F6-G	-	-	225	245	-	-	-	16.
5Y3-G	-	-	-	-	-	-	340	340
6U5	Voltages at the prongs of this tube cannot be measured, however, if the tube is removed from the socket, the voltages on the various terminals may be measured. As all these measured voltages would be measured through a high resistance, except the Cathode which is grounded, none of them are noted here.							

* Not true value, but as measured with voltmeter.



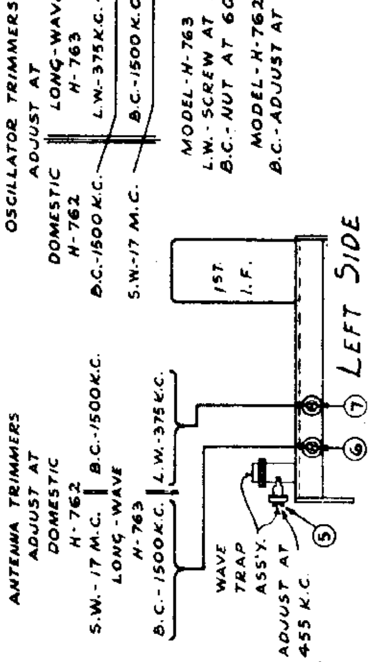


Image Frequency
The short wave band in the Model H-762 must be aligned with the oscillator frequency lower than the signal frequency. On the high frequency band, it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.
The chance of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, turn the tuning knob so that the dial pointer points to that one which comes in at the higher frequency marking on the dial.

IF Amplifier Alignment

Turn the Band Selector Switch to the Broadcast, or Medium Wave Band, and tune the gang condenser to the low frequency end of the dial. That is the condenser plates completely enmeshed.

Connect the output meter as described under "Connections" and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the trimmer screws 1, 2, 3, and 4, (see Figure for maximum reading of the output meter. Keep reducing the generator output as the output meter reading increases. When the reading of the output meter cannot be increased by adjusting the four screws of the IF transformers, the IF amplifier is aligned.

If the output of the generator is too great, while aligning the receivers, the alignment will be incorrect. It is very important that this be kept in mind.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and then align the last IF amplifier transformer. Always finish the alignment of the IF amplifier with the signal input to the grid of the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment

With the Band Selector Switch set on the Broadcast, or Medium Wave, position connect the generator to the blue antenna wire with the .0002 mfd. condenser. Set the generator frequency to 455 kilocycles and adjust trimmer #5 for minimum reading of the output meter. There must always be sufficient output from the signal generator to have a reading on the output meter to make this adjustment.

R.F. ALIGNMENT

Long Wave Band (Model H-763). Connect the "hot" terminal of the generator to the blue antenna wire through the .0002 mfd. condenser.

Set the generator frequency to 375 kilocycles and with the Band Selector Switch set to the Long Wave Band turn the pointer of the receiver to 375 kilocycles. Adjust trimmer #8 for maximum reading of the output meter. Do likewise with trimmer #7. Then set the generator frequency to 150 kilocycles and the receiver dial pointer to approximately the same frequency. Adjust the screw of trimmer #10 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 375 kilocycle alignment.

Broadcast, or Medium Wave, Band (Models H-763 & H-762)
Connections are the same for the alignment of this band as they are for the Long Wave Band.

Set the generator frequency to 1500 kilocycles, and the receiver dial pointer to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #9 of Model H-763, or trimmer #8 of Model H-762 for maximum reading of the output meter. Also adjust trimmer #6 of Model H-763, or trimmer #7 of Model H-762 for maximum reading of the output meter. Next, set the generator frequency to 600 kilocycles. Then with the receiver dial pointer set at approximately the same frequency, adjust trimmer #10 for maximum reading of the output meter while carefully "rocking" the gang condenser. Finally return and repeat the 1500 kilocycle adjustment.

Short Wave Band (Model H-762)
When aligning this band connect the "hot" terminal of the signal generator to the blue antenna wire of the receiver through the 400 ohm resistor.

Before aligning this band, refer to the paragraph headed "Image Frequency".

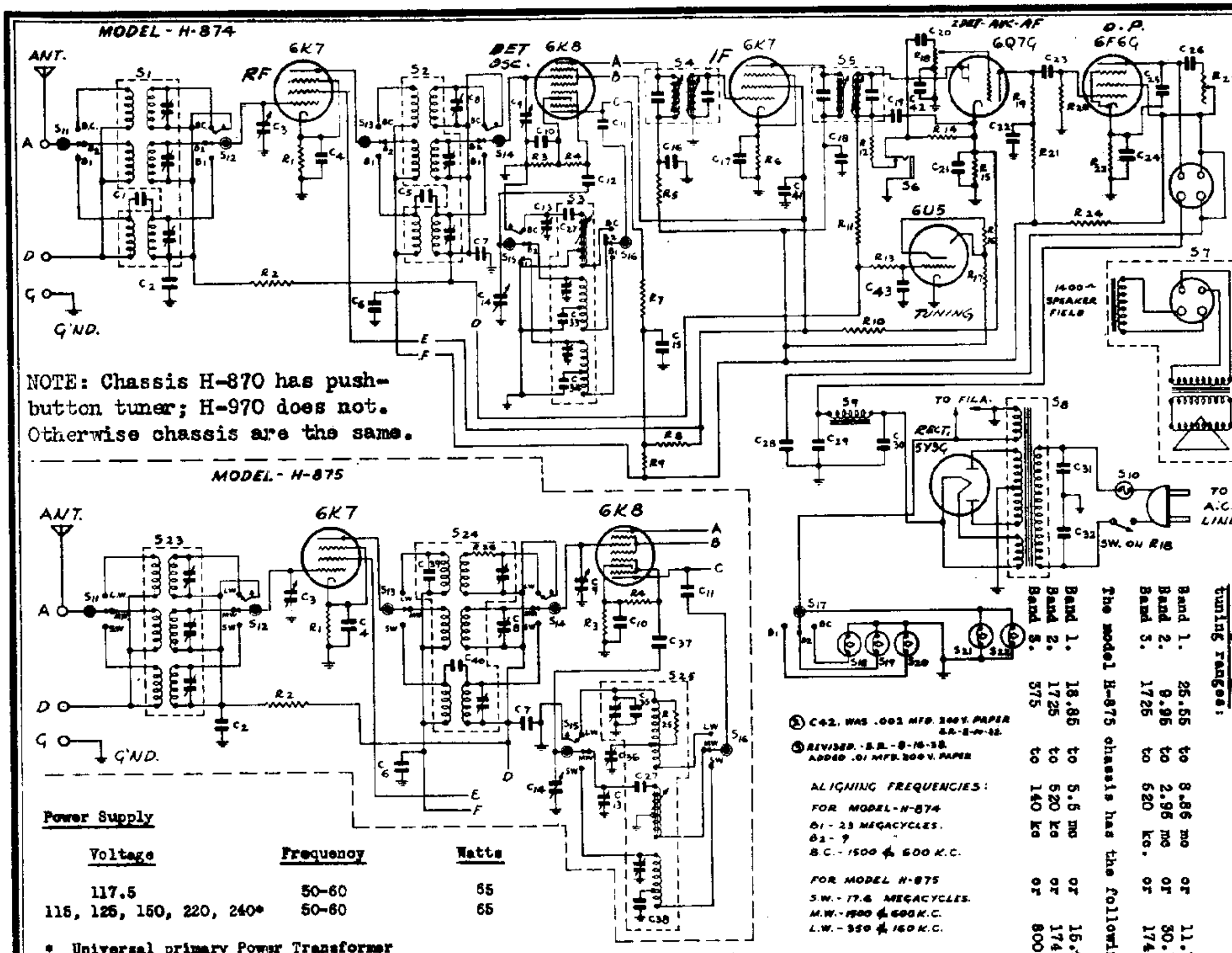
Set the generator frequency to 17 mc., and also the receiver to this frequency, as marked on the dial. Carefully adjust trimmer #9 for maximum reading of the output meter. Be careful you do not adjust to the Image Frequency.

Then adjust trimmer #6 for maximum output meter reading, while slightly "rocking" the gang condenser.

Adjust trimmer #9, if necessary, to keep the calibration correct.

MODELS H-874, H-875
Chassis H-870
MODELS H-974, H-975
Chassis H-970
Schematic, Voltage

PILOT RADIO CORP.



NOTE: Chassis H-870 has push-button tuner; H-970 does not. Otherwise chassis are the same.

CONDENSERS FOR MODEL H-874		
C1	27737-0	10 MMFDS. MICA
C2, C7	22055-I	.05 MFD. 200 V. PAPER
C3, C9, C14	83542	3 GANG CONDENSER
C4, C10, C17	22055-M	.1 MFD. 200 V. PAPER
C5	28115	15 MMFDS. MICA
C6, C18, C23	22055-C	.05 MFD 600 V. PAPER
C8, C13	83415	20 MMFDS. AIR TRIMMER
C11	27704	.002 MMFDS. MICA
C12	27723-0	50 MMFDS. MICA
C15, C28	85038	4-8 MFD. 450 V. ELECTRO.
C16, C22	22055-AC	.02 MFD. 600 V. PAPER
C19	27726	.0002 MFD. MICA
C20	22055-W	.01 MFD. 400 V. PAPER
C21, C24	22481	10 MFD. 25 V. ELECTRO.
C22	22055-AB	.1 MFD. 600 V PAPER
C25	22055-R	.005 MFD. 1000 V. PAPER
C27	92000-C	450 MMFD. SILVER CAP
C29, C30	71045-A	8-8 MFD. 475 V ELECTRO.
C31, C32	78503	.01-.01 - 1000 V. PAPER
C33	27732	.0016 MFD. MICA
C34	28023-W	.0038 MFD MICA
C41	22055-P	.05 MFD. 400 V. PAPER
C42	22055-AY	.001 MFD. 200 V. PAPER
C43	22055-T	.01 MFD. 200 V. PAPER
CONDENSERS FOR MODEL H-875 SAME AS FOR MODEL H-874 EXCEPT FOLLOWING		
C1, C5, C12		NOT USED
C35	27736	25 MMFDS. MICA
C36	83394-B	150 MMFDS. - PADDER
C38	28106	.00325 MFD. MICA
C39	27701-0	.00025 MFD. MICA
C40	27737-0	10 MMFDS. MICA
C37	28016-0	100 MMFDS. MICA
RESISTORS FOR MODEL - H-874		
R1, R6, R15	13115	400 OHMS 1/4 WATT
R2, R21	13031	100,000 OHMS 1/4 WATT
R3	13003	300 OHMS 1/4 WATT
R4, R12	13164	50,000 OHMS 1/4 WATT
R5	13028	1,000 OHMS 1/4 WATT
R7	13117	15,000 OHMS 1/4 WATT
R8	13234	6,000 OHMS 1 WATT
R9	13233	6,000 OHMS 2 WATT
R10	13068	30,000 OHMS 1/2 WATT
R11, R16	13001	1 MEGOHM 1/4 WATT
R13	13007	2 MEGOHMS 1/4 WATT
R14	13147	300,000 OHMS 1/4 WATT
R17	13199	22,000 OHMS 1/4 WATT
R18	83529-A	1 MEGOHM VOL. CONT. & SW.
R19	13171	250,000 OHMS 1/4 WATT
R20	13024	500,000 OHMS 1/4 WATT
R22, R24	[illegible]	400 OHMS 1 WATT
R23	[illegible]	100,000 OHMS TONE CONT.
RESISTORS FOR MODEL H-875 SAME AS FOR MODEL H-874 EXCEPT FOLLOWING		
R25	[illegible]	50,000 OHMS 1/4 WATT
R26	[illegible]	250 OHMS 1/4 WATT
MISCELLANEOUS FOR MODEL H-874		
S1	[illegible]	ANTENNA COILS & CAM ASS'Y
S2	[illegible]	INTERSTAGE
S3	[illegible]	OSCILLATOR
S4	[illegible]	1ST I.F. TRANSFORMER ASS'Y
S5	[illegible]	2ND I.F.
S6	[illegible]	PHONO JACK
S7	[illegible]	6" A.C. SPEAKER 1400 FIELD
	[illegible]	12" A.C. SPEAKER 1400 FIELD
S8	[illegible]	PWR. TRANSF. UNIV.
	[illegible]	PWR. TRANSF. 117V. 60 CY.
	[illegible]	PWR. TRANSF. 230V. 25 CY.
S9	[illegible]	FILTER CHOKE
S10	[illegible]	1/4 AMP. FUSE
S11 TO S17	[illegible]	BAND SWITCH
S18 TO S22	[illegible]	PILOT LIGHTS
MISCELLANEOUS FOR MODEL H-875 SAME AS FOR MODEL H-874 EXCEPT FOLLOWING		
S1, S2, S3		NOT USED
S23	[illegible]	ANTENNA COILS & CAM ASS'Y
S24	[illegible]	INTERSTAGE
S25	[illegible]	OSCILLATOR

Tuning Ranges The model H-874 chassis has the following tuning ranges:

Band 1.	25.55	to	8.86 mc	or	11.75	to	33.8 meters
Band 2.	9.95	to	2.96 mc	or	30.13	to	101.3 meters
Band 3.	1725	to	520 kc.	or	174	to	576 meters

The model H-875 chassis has the following tuning ranges:

Band 1.	18.85	to	5.5 mc	or	15.9	to	54.5 meters
Band 2.	1725	to	520 kc	or	174	to	576 meters
Band 3.	375	to	140 kc	or	800	to	2142 meters

(5) C42, WAS .002 MFD. 200 V. PAPER S.R.-8-11-38.
(5) REVISED.-S.R.-8-16-38. ADDED .01 MFD. 200 V. PAPER

ALIGNING FREQUENCIES:

FOR MODEL-H-874
B1 - 23 MEGACYCLES.
B2 - 9
B.C. - 1500 & 600 K.C.

FOR MODEL H-875
S.W. - 17.6 MEGACYCLES.
M.W. - 1500 & 600 K.C.
L.W. - 350 & 160 K.C.

INTERMEDIATE FREQUENCY :- 455 K.C.

Maximum Power Output 5.8 watts

Power Supply

Voltage	Frequency	Watts
117.5	50-60	65
115, 125, 150, 220, 240*	50-60	65

* Universal primary Power Transformer

SOCKET TERMINALS

Tube	1	2	3	4	5	6	7	8
6K7	-	-	250	95	3.18	-	-	3.18
6K8	-	-	247	95	5*	82	-	3.2
6K7	-	-	248	95	2.83	-	-	2.8
6Q7	-	-	97*	-	-	-	-	2.8
6F6-G	-	-	240	260	-	-	-	17.0
5Y3-G	-	395	-	-	-	-	-	395

* measurement made on 1000 volt scale.

SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-874 & MODEL-H-875
DATE:- 7-5-38
DRAWN BY:- D.R.
CHECKED BY:- G. JACOBS
APPROVED BY:- D.S.C.
No. 25192-3

H-870-SERIES

MODELS H-874, H-875
Chassis H-870

PILOT RADIO CORP.

MODELS H-974, H-975
Chassis H-970
Alignment Procedure

PILOT RECEIVERS OF THE H-870 SERIES

SERVICE DATA

Removal of the chassis from the cabinet, when necessary, is done as follows:-

1. Remove the power supply cord from the supply outlet.
2. Remove the knobs and felt washers from all shafts on the front of the cabinet. These knobs, except the "locking" knob, are of the "push-on" type.
3. Remove the speaker cord from the socket on the speaker.
4. Remove the four mounting screws located under the cabinet, and carefully slide the chassis out of the cabinet.

Receiver Alignment Equipment Required.

1. Signal Generator. One using fundamental frequencies for all the frequencies used in the receiver is preferred.
2. Output Meter. Generally a copper-oxide rectifier meter is the most convenient.
3. Dummy Antennas. .1 mfd. condenser
   .0002 mfd. mica condenser
   400 ohm, non-inductive resistor

Alignment Connections

The posts marked D and G on the rear of the chassis should be connected to the ground side of the signal generator.

Connect the "hot" post of the signal generator through the .1 mfd condenser to the grid of the 6K8 detector-oscillator tube or the 6K7 I.F. amplifier tubes when aligning the I.F. amplifier.

Connect the "hot" post of the signal generator through the 200 mmf condenser to the post marked A on the rear of the chassis when aligning the Long-Wave and Broadcast Bands. Use the same connections for both short-wave bands, but replace the 200 mmf condenser with the 400 ohm non-inductive resistor.

In all measurements connect the output meter, through .1 mfd 600 volt condensers, to the plate and screen terminals of the 6F6-G tube.

Procedure The volume and tone controls should all be turned to the extreme clockwise positions, before starting.

The location of all trimmers is shown in the accompanying figure. Always keep the output from the signal generator at the lowest value which will give a readable deflection on the output meter.

I.F. Amplifier Alignment Turn the Band Selector Switch to Band 3 and turn the ROTOR-DIAL to the low frequency end.

Connect the output meter as described under "Connections" and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd condenser. Then proceed with the alignment as follows:-

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the I.F. amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the I.F. amplifier tube, and align the last I.F. transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

R.F. ALIGNMENT

Band 3. (model 875, Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip, through the .0002 mfd condenser.

Set the generator frequency to 350 kc., and with the Band Selector Switch set to Band 3 turn the ROTOR-DIAL to 350 kc. Adjust trimmer #5 for maximum reading of the output meter. Do likewise with trimmer #6 and #7. Then set the generator frequency to 160 kc and the ROTOR-DIAL to approximately the same. Adjust trimmer #21 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 350 kc. alignment.

Band 2. (Model 875) Band 3. (Model 874) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1500 kc., and the ROTOR-DIAL to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut.) Then without touching any tuning controls adjust trimmers #9 and #10 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and set the ROTOR-DIAL to the 600 kc. mark. Then adjust trimmer #11 for maximum reading of the output meter, while "rocking" the gang condenser. Finally return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmers #8 and #9.

Band 1. (Model 875 Short-Wave)

Remove the .0002 mfd dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph head "Image Frequency".

Set the generator frequency to 17.6 mc and also set the ROTOR-DIAL to this frequency. Carefully adjust trimmer #12 for maximum reading of the output meter. Be careful you do not tune in at the image frequency.

Then adjust trimmers #13 and #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #12 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2. (Model 874 Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator, and the ROTOR-DIAL to 9 mc. Adjust trimmer #15 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmers #16 and #17 for maximum reading of the output meter, while slightly "rocking" the gang condenser. Readjust trimmer #15 if necessary to correct the calibration.

Band 1. Alignment (Model 874 Short-Wave)

Connections and dummy antenna are the same as on Band 2 of Model 874.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc and the ROTOR-DIAL to 23 mc. Adjust trimmer #18 to 23 mc for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmers #19 and #20 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #18 so that calibration is correct if necessary.

Image Frequency

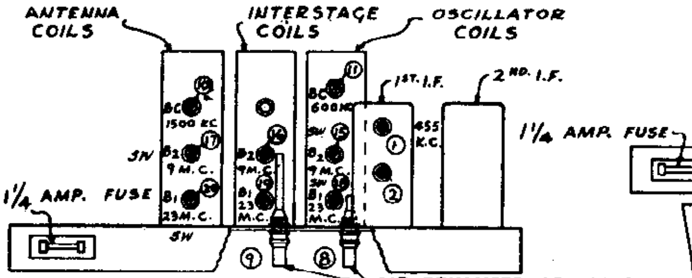
All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the ROTOR-DIAL to that one which comes in at the higher frequency marking on the ROTOR-DIAL.

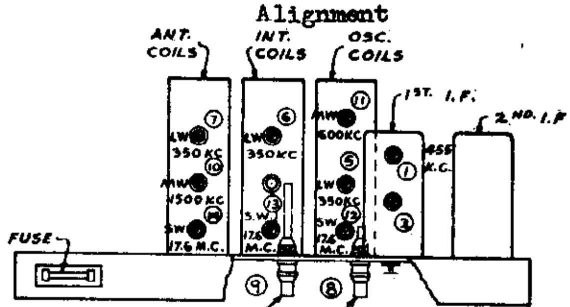
MODELS H-874, H-875
Chassis H-870
MODELS H-974, H-975
Chassis H-970
Socket, Trimmers

PILOT RADIO CORP.

MODEL T-1252
Schematic, Socket, Trimmers
Alignment



REAR VIEW OF CHASSIS
(MODEL-H-874)

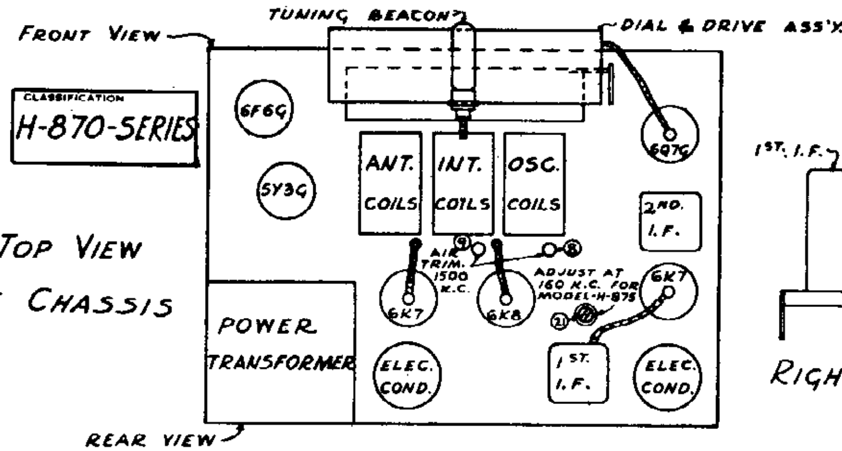


REAR VIEW OF CHASSIS
(MODEL-H-875)

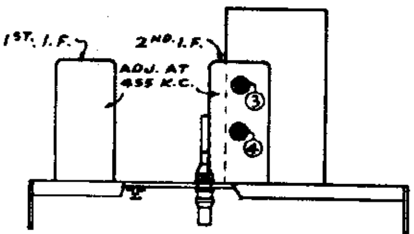
TRIMMER LAYOUT

Material
Scale
Date 7-5-38
Drawn By B.R.
Checked By G.J.
Approved By
Dwg. No. 25193

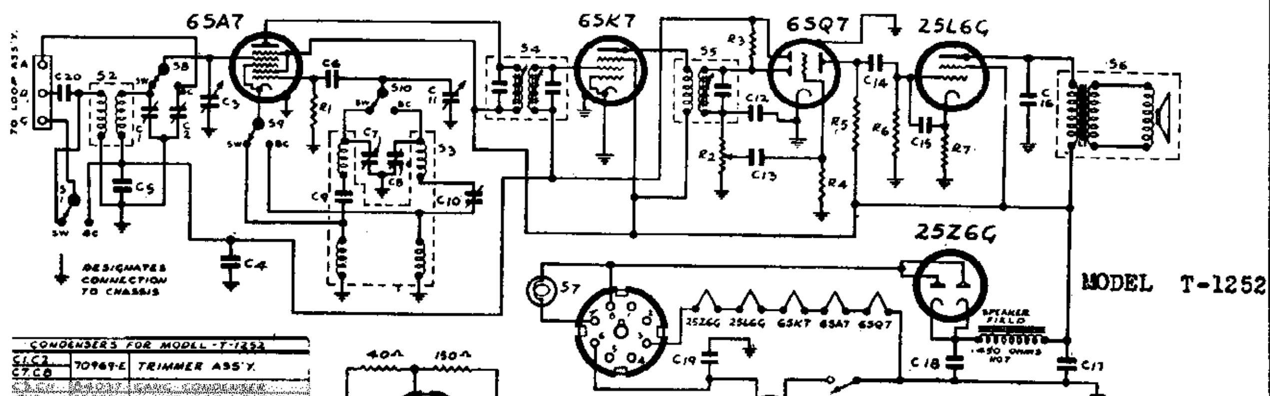
CLASSIFICATION
H-870-SERIES



TOP VIEW OF CHASSIS

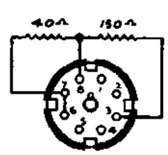


RIGHT SIDE OF CHASSIS



MODEL T-1252

CONDENSERS FOR MODEL-T-1252		
C1,C2, C7,C8	70969-E	TRIMMER ASS'Y.
C3,C11	84037	GANG CONDENSER
C4	[illegible]	.1 MFD. 400V. PAPER
C5	[illegible]	.01 MFD. 200V. PAPER
C6	[illegible]	.0001 MFD. MICA
C9	[illegible]	[illegible] MICA
C10	[illegible]	[illegible] PAPER
C12,C13	[illegible]	.00025 MFD. MICA
C15	[illegible]	.005 MFD. 400V. PAPER
C14,C16	[illegible]	.01 MFD. 400V. PAPER
C17,C18	[illegible]	[illegible]
C19	[illegible]	.01 MFD. 200V. PAPER
C20	[illegible]	.01 MFD. 400V. PAPER
MISCELLANEOUS FOR MODEL-T-1252		
S1	84060	BAND SWITCH
S2	75262	S.W. ANTENNA COIL ASS'Y.
S3	75262	B.C. & S.W. OSCILLATOR COIL ASS'Y.
S4	[illegible]	1ST. I.F. TRANSFORMER ASS'Y.
S5	[illegible]	2ND I.F.
S6	[illegible]	8" SPEAKER
S7	[illegible]	PILOT LIGHT
S8,S9,S10	84060	BAND SWITCH
S11	[illegible]	BALLAST TUBE 40/125V.



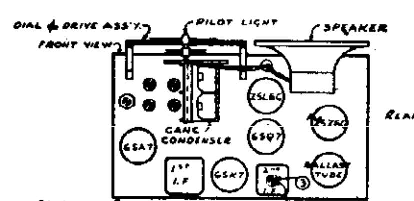
S11

PILOT RADIO CORPORATION
LONG ISLAND CITY N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL T 1252
Dwg. No. 25219

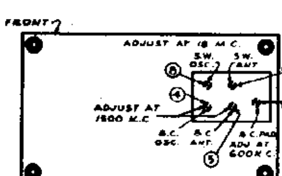
CONVENTIONAL ALIGNMENT SEE INDEX

INTERMEDIATE FREQUENCY:- 455 K.C.
ALIGNING FREQUENCIES:
B.C. - 1500 & 600 KILOCYCLES.
S.W. - ALIGN AT 18 MEGACYCLES. CHECK AT 6 "

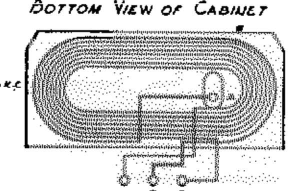
RESISTORS FOR MODEL-T-1252		
R1	13074	20.000 OHMS 1/4 WATT
R2	79429-B	500000 OHMS VOL. CONT. & SW.
R3,R4	13007	2 MEGOHMS 1/4 WATT
R5	13147	300.000 OHMS 1/4 WATT
R6	13024	500.000 OHMS 1/4 WATT
R7	13018	150 OHMS 1/4 WATT



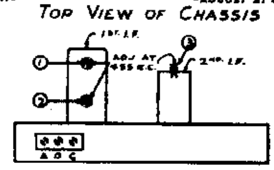
TOP VIEW OF CHASSIS



BOTTOM VIEW OF CABINET



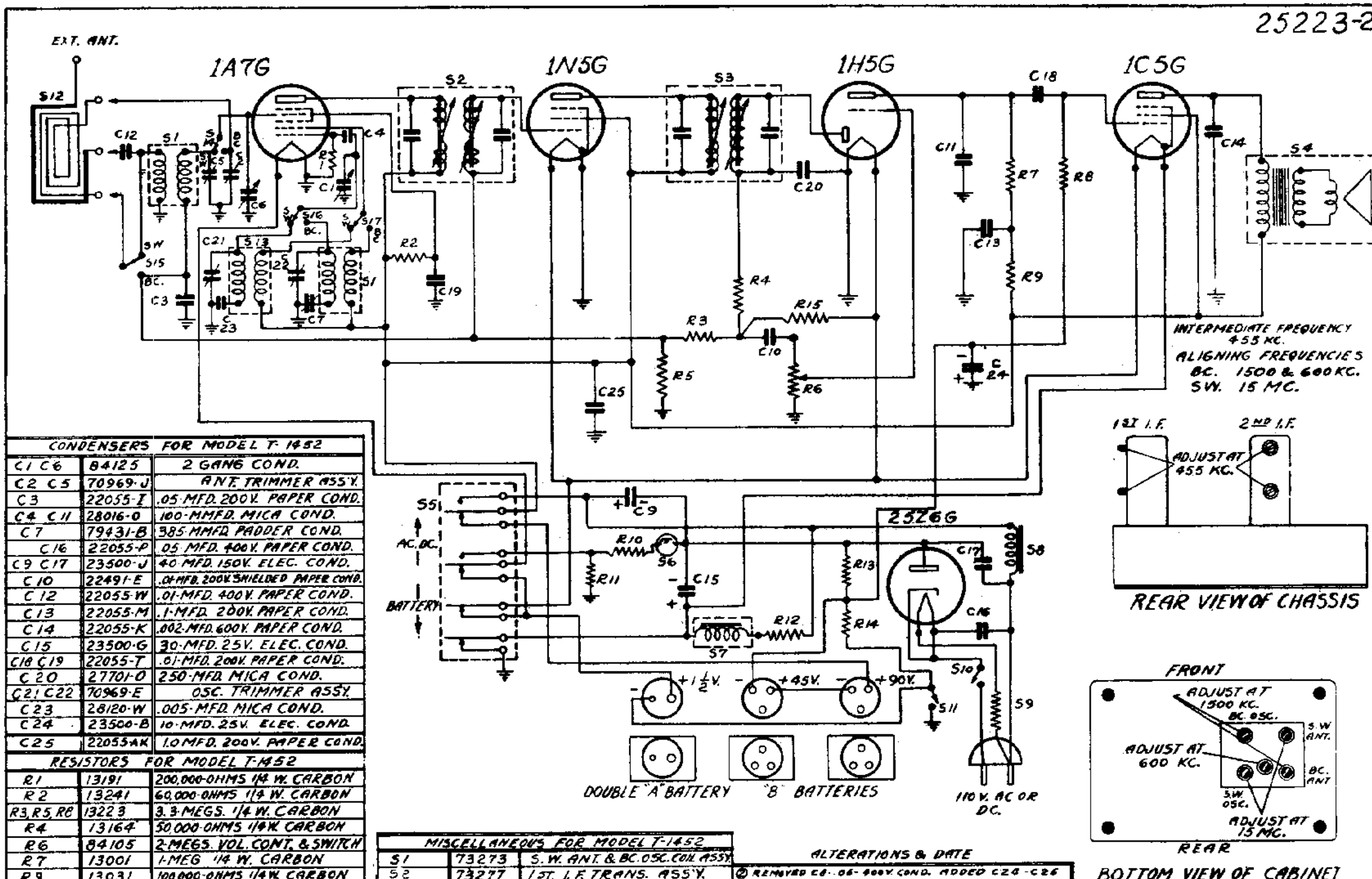
CABINET BACK & ANTENNA LOOP ASS'Y.



REAR VIEW OF CHASSIS

MODEL T-1452
Schematic, Trimmers
Alignment, Changes

PILOT RADIO CORP.



CONDENSERS	FOR MODEL T-1452	
C1 C6	84125	2 GANG COND.
C2 C5	70969-J	ANT. TRIMMER ASSY.
C3	22055-I	.05 MFD. 200V. PAPER COND.
C4 C11	28016-0	100-MMFD. MICA COND.
C7	79431-B	385 MMFD. PADDER COND.
C16	22055-P	.05 MFD. 400V. PAPER COND.
C9 C17	23500-J	40 MFD. 150V. ELEC. COND.
C10	22491-E	.01 MFD. 200V. SHIELDED PAPER COND.
C12	22055-W	.01 MFD. 400V. PAPER COND.
C13	22055-M	.1 MFD. 200V. PAPER COND.
C14	22055-K	.002 MFD. 600V. PAPER COND.
C15	23500-G	30 MFD. 25V. ELEC. COND.
C18 C19	22055-T	.01 MFD. 200V. PAPER COND.
C20	27701-0	250 MFD. MICA COND.
C21 C22	70969-E	OSC. TRIMMER ASSY.
C23	28120-W	.005 MFD. MICA COND.
C24	23500-B	10 MFD. 25V. ELEC. COND.
C25	22055-AK	1.0 MFD. 200V. PAPER COND.

RESISTORS	FOR MODEL T-1452	
R1	13191	200,000-OHMS 1/4 W. CARBON
R2	13241	60,000-OHMS 1/4 W. CARBON
R3, R5, R8	13223	3.3-MEGS. 1/4 W. CARBON
R4	13164	50,000-OHMS 1/4 W. CARBON
R6	84105	2-MEGS. VOL. CONT. & SWITCH
R7	13001	1-MEG 1/4 W. CARBON
R9	13031	100,000-OHMS 1/4 W. CARBON
R10	83656-J	50-OHMS 1W. FLEXIBLE
R11	83656-G	25-OHMS .5W. FLEXIBLE
R12	84116	700-OHMS 8W. W.W. IRON CLAD
R13	13019	2000-OHMS 1/4 W. CARBON
R14	13246	1200-OHMS 1/4 W. CARBON
R15	13007	2-MEGS. 1/4 W. CARBON

MISCELLANEOUS	FOR MODEL T-1452	
S1	73273	S.W. ANT. & BC. OSC. COIL ASSY.
S2	73277	1ST. I.F. TRANS. ASSY.
S3	73274	2ND. I.F. TRANS. ASSY.
S4	40872	5" P.M. SPEAKER
S5 S7	84110	RELAY
S6	72151	DIAL LIGHT .15 AMPS.
S8	84115	CHOKE 5HS. 200 & 100 MA.
S9	84106	LINE CORD 310 OHMS
S10 S11		SWITCHES ON VOL. CONT.
S12	73264	ANT. LOOP ASSY.
S13	73272	SW. OSC. COIL ASSY.
S14, 15, 16, 17	84060-B	BAND SWITCH

ALTERATIONS & DATE

② REMOVED C8-.05-600V. COND. ADDED C24-C25 REVISED WIRING. C.O.2568 E.F. 6-2-39

ALTERATIONS | FINISH

CLASSIFICATION T-1452

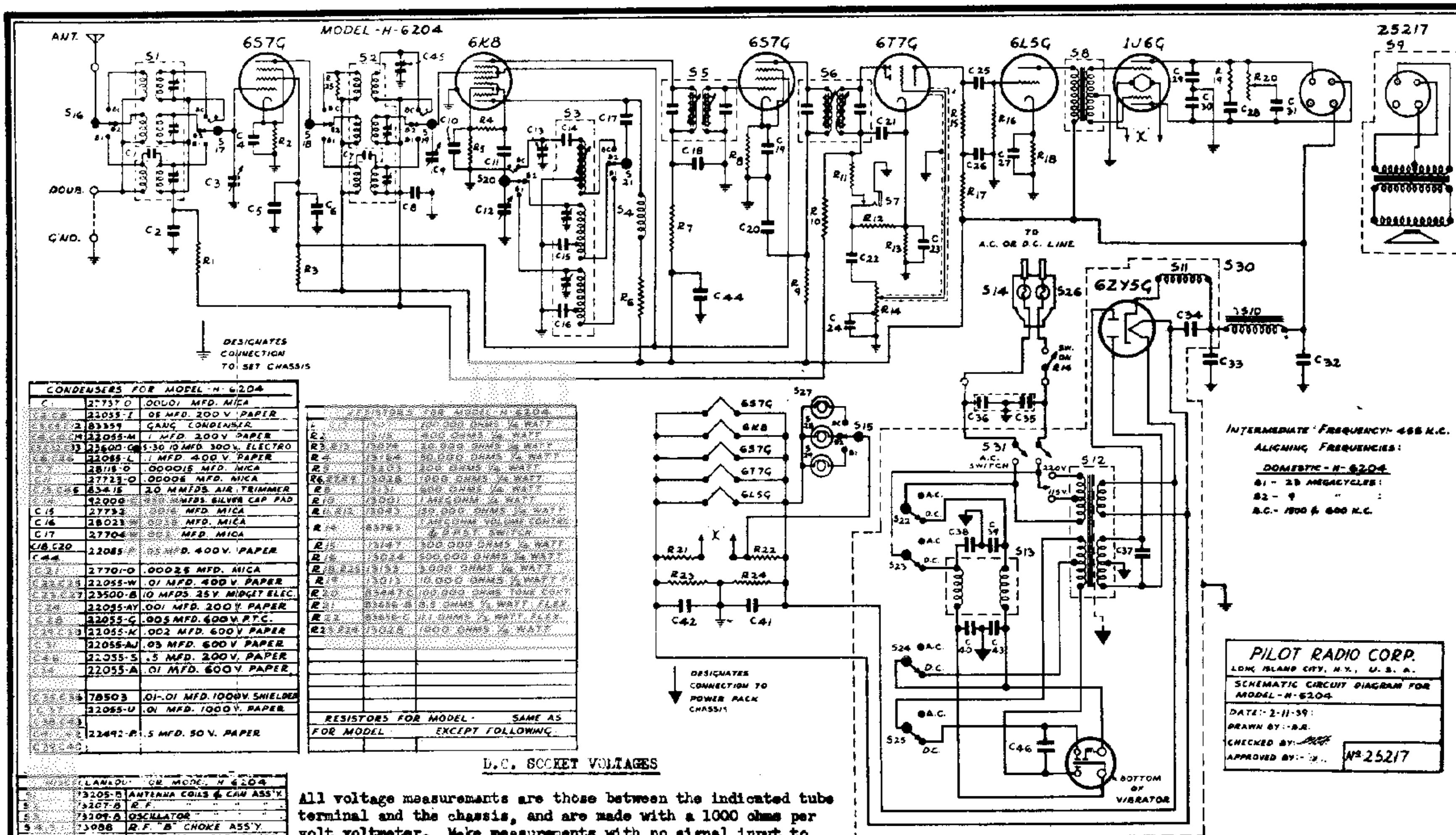
THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO

DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY N.Y. U.S.A.
SCHEMATIC WIRING DIAGRAM
DATE 5-24-39
DRAWN BY E.F.
DWG. NO. 25223-2

MODEL H-6204
Chassis H-6200
Schematic, Voltage

PILOT RADIO CORP.



CONDENSERS FOR MODEL - H - 6204		
C1	27737 O	.00001 MFD. MICA
[illegible]	22055-I	.05 MFD. 200 V. PAPER
[illegible] 2	83359	GANG CONDENSER
[illegible] 14	22055-M	.1 MFD. 200 V. PAPER
[illegible] 33	23600-G	5-30 10 MFD. 300 V. ELECTRO
[illegible]	22055-L	.1 MFD. 400 V. PAPER
[illegible]	28118-O	.000015 MFD. MICA
[illegible]	27723-O	.00006 MFD. MICA
[illegible]	83415	20 MMFDS. AIR TRIMMER
[illegible]	92000	[illegible] MMFDS. SILVER CAP PAD
C15	27732	[illegible] MFD. MICA
C16	28023	[illegible] MFD. MICA
C17	27704	[illegible] MFD. MICA
C18, C20, C44	22055	.05 MFD. 400 V. PAPER
[illegible]	27701-O	.00025 MFD. MICA
[illegible]	22055-W	.01 MFD. 400 V. PAPER
[illegible] 27	23500-B	10 MFDS. 25 V. MIDGET ELEC.
[illegible]	22055-AY	.001 MFD. 200 V. PAPER
[illegible]	22055-G	.005 MFD. 600 V. P.T.C.
[illegible]	22055-K	.002 MFD. 600 V. PAPER
[illegible]	22055-AJ	.03 MFD. 600 V. PAPER
[illegible]	22055-S	.5 MFD. 200 V. PAPER
[illegible]	22055-A	.01 MFD. 600 V. PAPER
[illegible]	78503	.01-.01 MFD. 1000 V. SHIELDED
[illegible]	22055-U	.01 MFD. 1000 V. PAPER
[illegible]	22492-R	.5 MFD. 50 V. PAPER

RESISTORS FOR MODEL H-6204		
R1	[illegible]	[illegible]
R2	[illegible]	[illegible]
R3 [illegible]	[illegible]	[illegible]
R4	[illegible]	[illegible]
R5	[illegible]	[illegible]
R6 [illegible]	[illegible]	[illegible]
R[illegible]	[illegible]	[illegible]
R[illegible]	[illegible]	[illegible]
R[illegible]	[illegible]	[illegible]
R[illegible]	[illegible]	[illegible] MEGOHM VOLUME CONTROL & [illegible] SWITCH
R[illegible]	[illegible]	[illegible]
R[illegible]	[illegible]	[illegible]
R[illegible]	[illegible]	[illegible]
R[illegible]	[illegible]	[illegible]
R20	[illegible]	[illegible] TONE CONT.
R21	[illegible]	[illegible] FLEX.
R22	[illegible]	[illegible] FLEX.
R2[illegible]	[illegible]	[illegible]
RESISTORS FOR MODEL		SAME AS
FOR MODEL		EXCEPT FOLLOWING

MISCELLANEOUS FOR MODEL H 6204		
S1	73205-B	ANTENNA COILS & CAM ASS'Y.
S2	73207-B	R.F. " " " "
S3	73209-B	OSCILLATOR " " " "
S4	73088	R.F. "B" CHOKE ASS'Y.
S5	73192-2L	1ST I.F. TRANSFORMER ASS'Y
S6	73193	2ND I.F. " "
S7	70950	PHONO JACK
S8	83748	CLASS "B" INPUT TRANSFORMER
S9	40859	8" P.M. SPEAKER
S10	79027-A	FILTER CHOKE
S12	84026	VIBRATOR PWR. TRANSFORMER
S13	83744	R.F. "A" CHOKE
[illegible]	83759	BAND SWITCH
[illegible]	83745	A.C.-D.C. SWITCH
[illegible]	70053-C	1 AMP. FUSE
[illegible]	72127	PILOT LIGHT 2V. -.06 AMP.
[illegible]	84021	VIBRATOR PWR. SUPPLY ASS'Y
S31	83745	A.C. LINE SWITCH ON A.C.-D.C. SWIT.
MISCELLANEOUS FOR MODEL		SAME AS
FOR MODEL		EXCEPT FOLLOWING

D.C. SOCKET VOLTAGES

All voltage measurements are those between the indicated tube terminal and the chassis, and are made with a 1000 ohms per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Tube		Socket Terminals 1	2	3	4	5	6	7	8
R.F.	6S7-G	-	-	145	62.5	2.5	-	-	2.5
1st Det.	6K8	-	-	150	62.5	-	140	-	1.5
I.F.	6S7-G	-	-	145	62.5	2.7	-	-	2.7
2nd Det.	6T7-G	-	-	80	-	-	-	-	1.2
A.F.	6L5-G	-	-	125	-	-	-	-	5.7
A.F.	1J6-G	-	-	145	-	-	145	-	0
Rect.	6ZY5-G	-	-	-	-	-	-	-	150

The above voltages apply with either the nominal Battery Supply or with the AC supply.

Tuning Ranges

The model H-6204 chassis has the following ranges:

Band 1	25.5 - 8.85 mc.	11.7 - 33.9 meters
Band 2	9.95 - 2.96 mc.	30.1 - 101.3 meters
Band 3	1725 - 520 kc.	174 - 576 meters

Maximum Power Output 2 watts

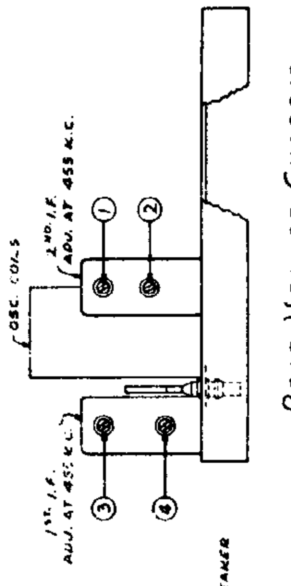
POWER SUPPLY

32 volt Storage Battery .5 amperes drain
110-125 or 220-240 volts AC 50-60 cycles 18 Watts

Intermediate Frequency 455 kc

MODEL H-6204
Chassis H-6200
Socket, Trimmers
Alignment

PILOT RADIO CORP.

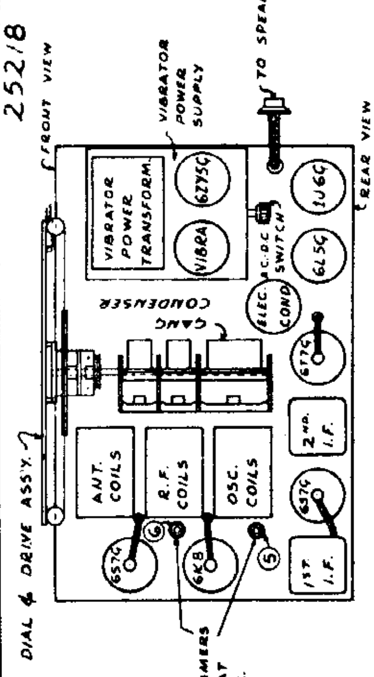


REAR VIEW OF CHASSIS

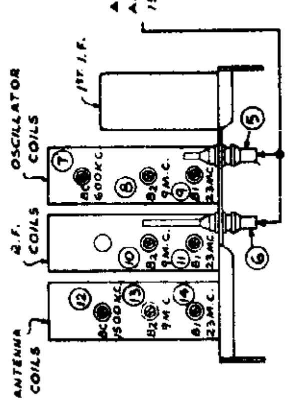
PILOTUBES Required

One	6S7-G	R.F. Amplifier
One	6K8	1st detector-oscillator
One	6S7-G	I.F. Amplifier
One	6T7-G	2nd Detector
One	6L5-G	A.F. Amplifier
One	1J6-G	Output Tube
One	6Z Y5-G	Power Supply Rectifier

25218



TOP VIEW OF CHASSIS



LEFT SIDE OF CHASSIS
(MODEL H-6204)

Miscellaneous Service Notes

If a howling noise (sometimes referred to as Microphonic howl) is heard, it is probably because the four red screws under the cabinet and the two narrow metal strips between the chassis and the bottom of the cabinet, have not been removed. These strips and screws are only intended as additional bracing during shipment and must be removed before the receiver is put in operation.

The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chassis rubs against the cabinet.

If the vibrator noise becomes loud or objectional, it is probably because the battery connections are not clean, or because the battery is old and its internal resistance is high, or because the vibrator is wearing out.

I.F. Alignment

Turn the Band Selector Switch to the Broadcast Band and tune the receiver to the low frequency end of the Band.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:-

1. Adjust the signal generator to 455 kilo-cycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the trimmer screws #1, 2, 3 and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the I.F. Amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the 6S7-G I.F. tube, and align the last I.F. transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

R.F. ALIGNMENT

Standard Broadcast Band

Connect the "hot" terminal of the generator to the post marked "A" on the rear of the chassis, through the .0002 mfd. condenser.

Set the generator frequency to 1500 kc., and the dial pointer of the receiver to the same frequency with the Band Selector Switch set appropriately. Adjust trimmer #5 for maximum reading of the output meter. Loosen the lock nut and adjust trimmer by moving the brass rod in or out with a hooked wire, and with a twisting motion. Then without touching the tuning controls adjust trimmers #6 and #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc., and move the receiver pointer to the same frequency. Adjust trimmer screw #7 for maximum reading of the output meter, while "rocking" the gang condenser. Finally, repeat the 1500 kc. adjustments, and tighten the lock nuts on trimmers #5 and #6.

Band #2

Remove the .0002 mfd. dummy antenna used in aligning the Broadcast Band and substitute the 400 ohm non-inductive resistor in its place.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 9 mc. and the receiver dial pointer to the same frequency with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmer #10 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to correct the calibration, and finally adjust trimmer #13 for maximum output meter reading.

Band #1

The connections and Dummy Antenna are the same as used in aligning Band #2.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc. and the receiver dial pointer to the same frequency. Adjust trimmer #9 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency. Then adjust trimmer #11, while "rocking" the gang condenser, for maximum reading of the output meter. Readjust trimmer #9, if necessary, to correct the calibration, and then adjust trimmer #14 for maximum reading of the output meter.

Image Frequency

All bands in this receiver must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Broadcast Band. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency. With sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the receiver dial pointer to that one which comes in at the higher frequency marking on the receiver dial calibration.

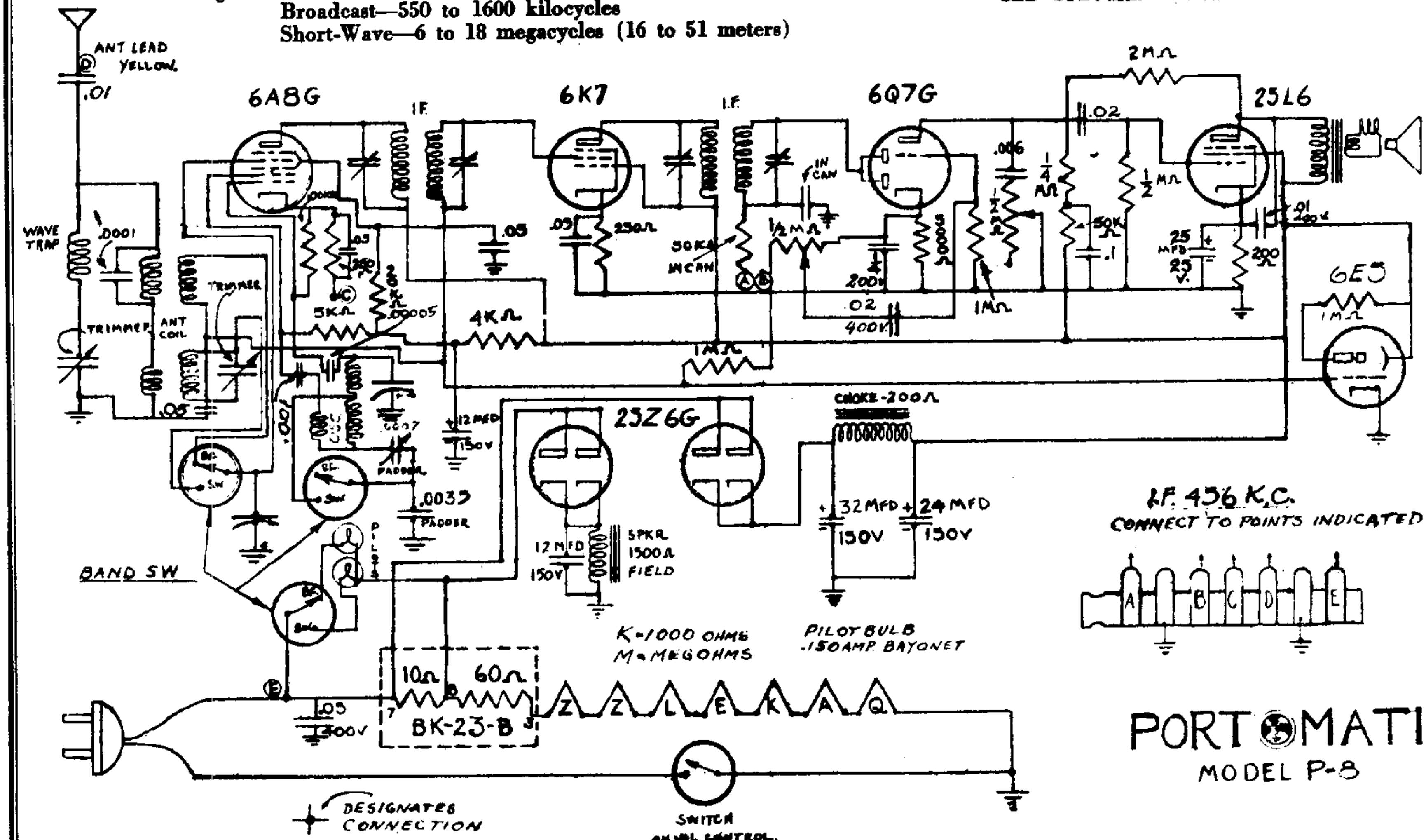
MODELS 18A, 18C, 18R 80F, 80A, 80C, 210F, 210C, 210R, 212F, 212C 212R. Chassis P-8 Schematic, Alignment

PORT-O-MATIC CORP.

The receiver is designed to operate over the following two tuning ranges:

Broadcast—550 to 1600 kilocycles
Short-Wave—6 to 18 megacycles (16 to 51 meters)

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.



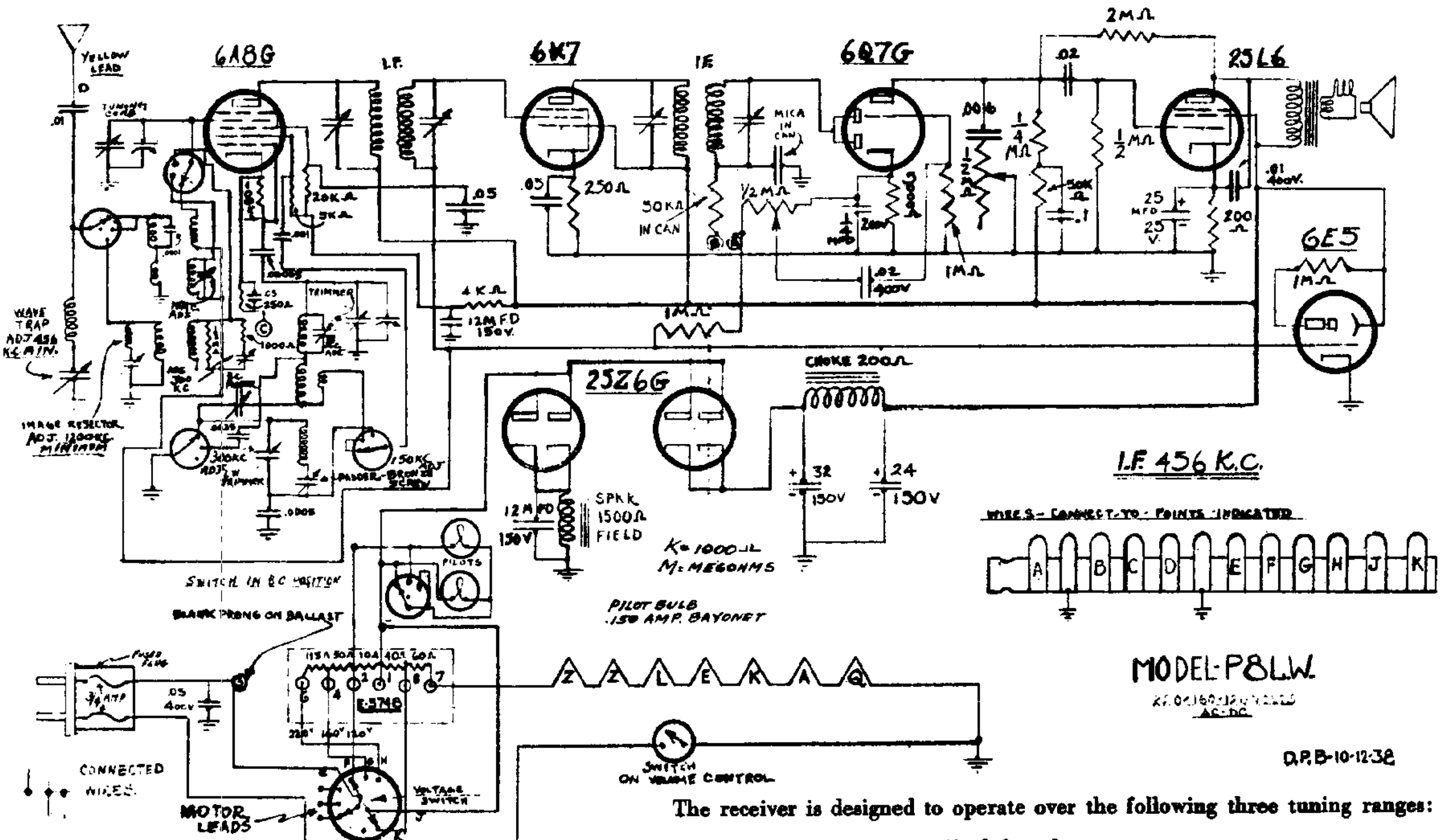
STANDARD MODEL
100-125 Volts
AC or DC Current
40-60 Cycles
65 Watts

EUROPEAN MODEL—A special switch is provided on the motor-plate located underneath the pick-up arm, and is marked "110-220." With this switch in 220 Volt position, the PORT-O-MATIC will operate safely on voltages from 200 to 250. To avoid damage, if switch is accidentally placed in wrong position, this particular model is equipped with a fused plug at the end of the electric cord. Should these fuses blow, replace same with no

MODELS 25A, 25C, 25R,
25OF, 25OC, 25OR
Chassis P8LW
Schematic, Alignment

PORT-O-MATIC CORP.

This portable radio will operate on any current or principal voltage throughout the world. By setting the knob, in the back of the radio, it can be used on AC or DC at 120, 160, or 240 volts.



PORT-O-MATIC

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII.

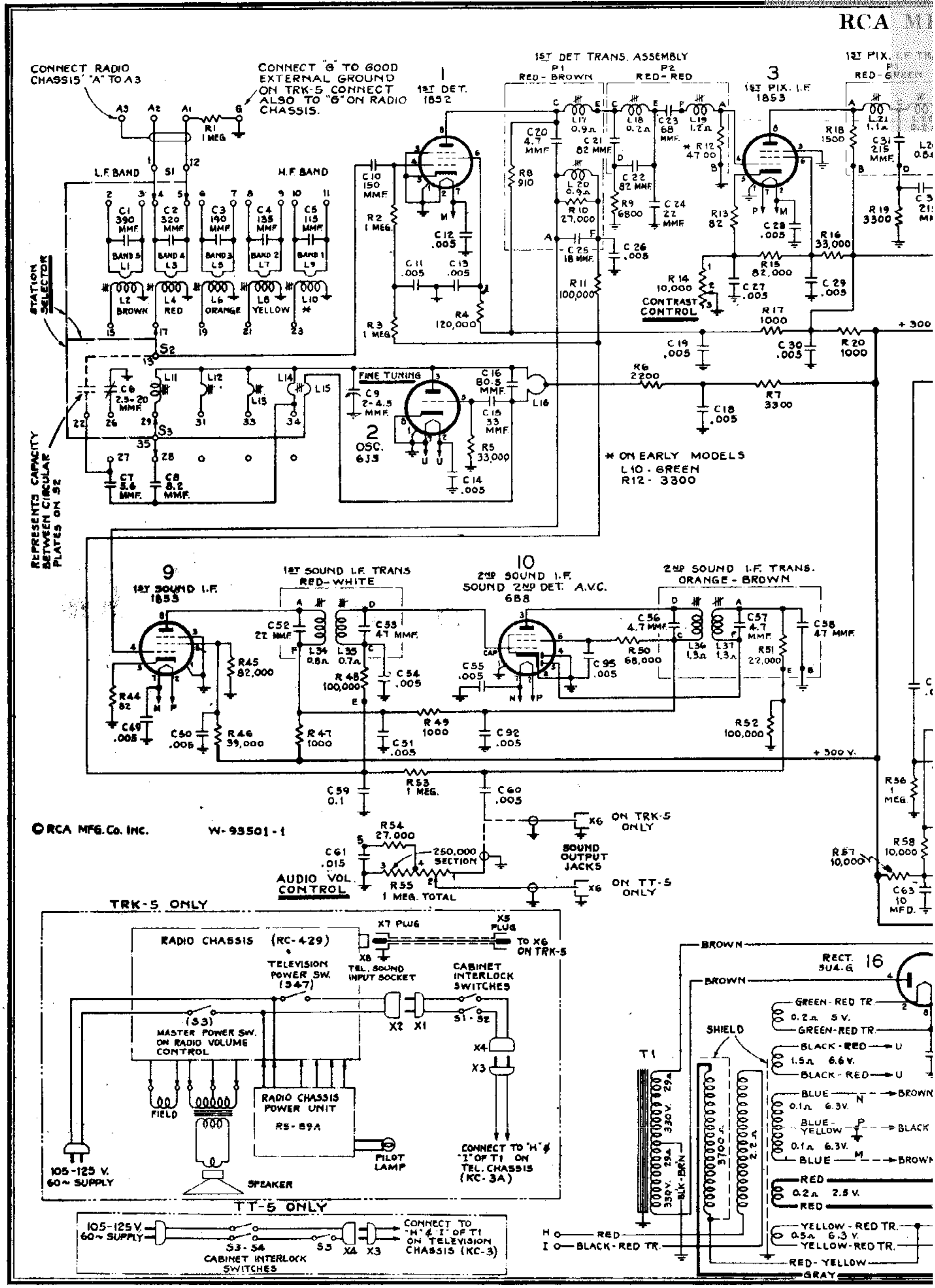
The receiver is designed to operate over the following three tuning ranges:

Broadcast—550 to 1600 kilocycles

Short-Wave—6 to 18 megacycles (16 to 51 meters)

Long-Wave—800-2000 Meters

IMPORTANT:—To avoid damage if switch is accidentally placed in wrong position, this particular model is equipped with a fused plug at the end of the electric cord. Should these fuses blow, replace with no higher than ¾ to 1 amp. standard automobile cartridge fuses.



RCA MF
CONNECT RADIO CHASSIS "A" TO A3
CONNECT "G" TO GOOD EXTERNAL GROUND ON TRK-5 CONNECT ALSO TO "G" ON RADIO CHASSIS.
1ST DET TRANS. ASSEMBLY
1ST DET. 1852
1ST PIX. I.F 1853
L.F. BAND
H.F. BAND
STATION SELECTOR
CONTRAST CONTROL
FINE TUNING
OSC. 6J5
* ON EARLY MODELS L10 - GREEN R12 - 3300
REPRESENTS CAPACITY BETWEEN CIRCULAR PLATES ON S2
1ST SOUND I.F. 1853
1ST SOUND I.F. TRANS RED-WHITE
2ND SOUND I.F. SOUND 2ND DET. A.V.C. 6B8
2ND SOUND I.F. TRANS. ORANGE - BROWN
© RCA MFG. Co. Inc.
W-93501-1
AUDIO VOL. CONTROL
SOUND OUTPUT JACKS
ON TRK-5 ONLY
ON TT-5 ONLY
TRK-5 ONLY
RADIO CHASSIS (RC-429)
TELEVISION POWER SW. (S47)
X7 PLUG
X5 PLUG
TO X6 ON TRK-5
TEL. SOUND INPUT SOCKET
CABINET INTERLOCK SWITCHES
MASTER POWER SW. ON RADIO VOLUME CONTROL
RADIO CHASSIS POWER UNIT RS-89A
FIELD
PILOT LAMP
SPEAKER
105-125 V. 60~ SUPPLY
CONNECT TO "H" & "I" OF T1 ON TEL. CHASSIS (KC-3A)
TT-5 ONLY
CONNECT TO "H" & "I" OF T1 ON TELEVISION CHASSIS (KC-3)
CABINET INTERLOCK SWITCHES
RECT. 5U4-G
SHIELD

CO., INC.

MODELS TRK-5, Chassis Nos. KC-3A, RC-429, RS-89A
TT-5, Chassis KC-3 Schematic

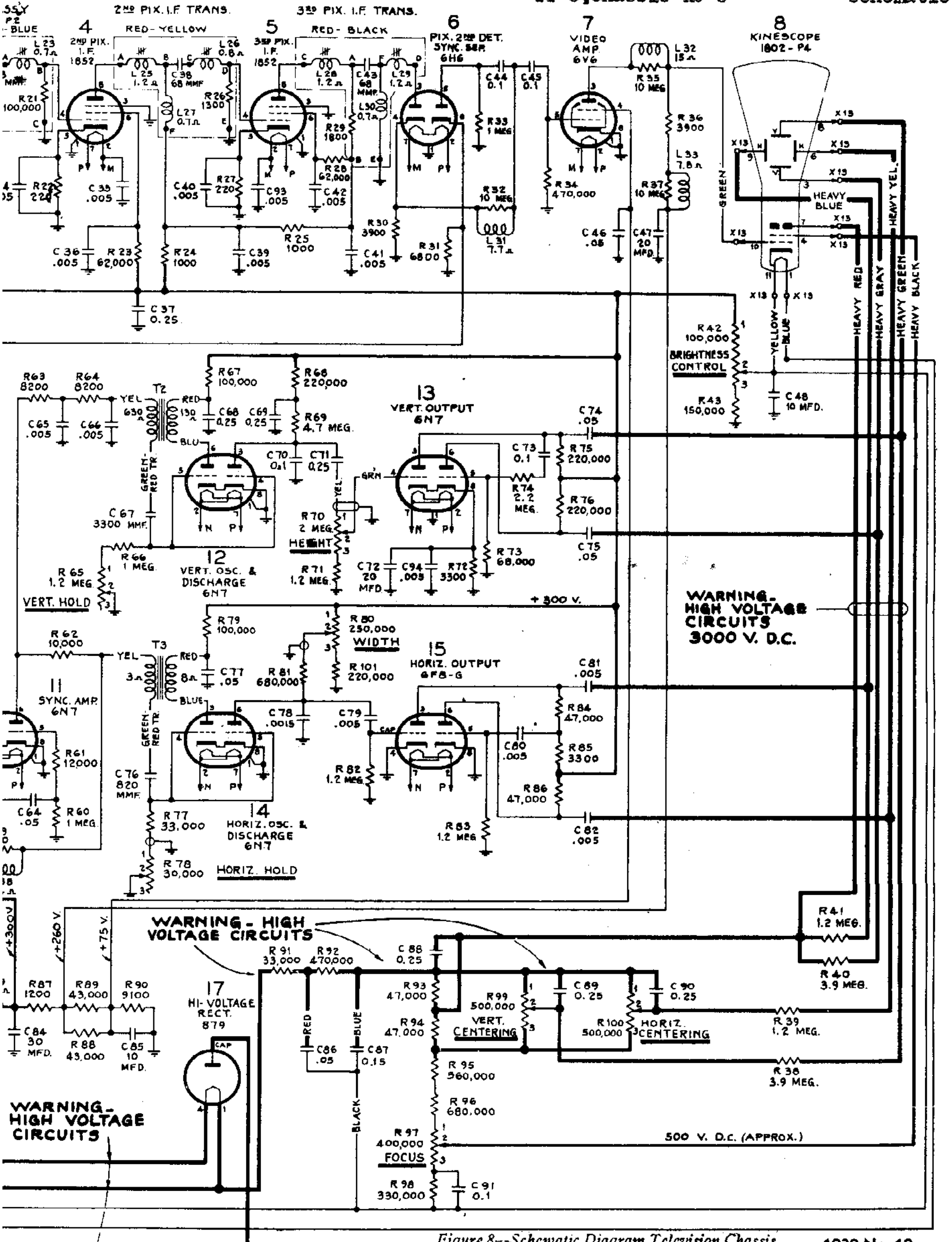


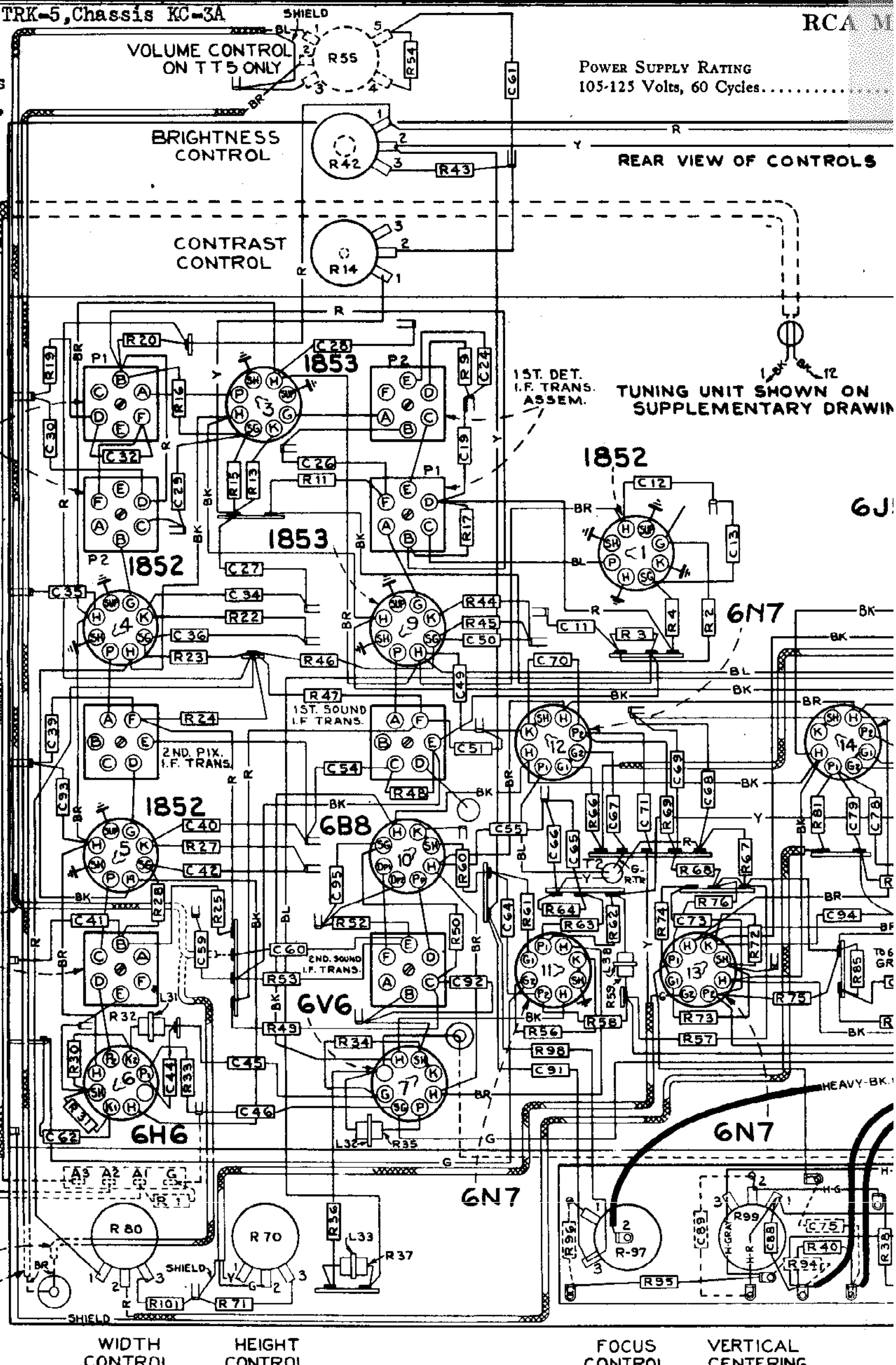
Figure 8--Schematic Diagram Television Chassis

Note: In some production, R12 (in grid circuit of 1st-pix-I. F.) is 4,700 ohms

MODELS TRK-5, Chassis KC-3A
TT-5,
Ch. KC-3
Chassis
Wiring,
Data

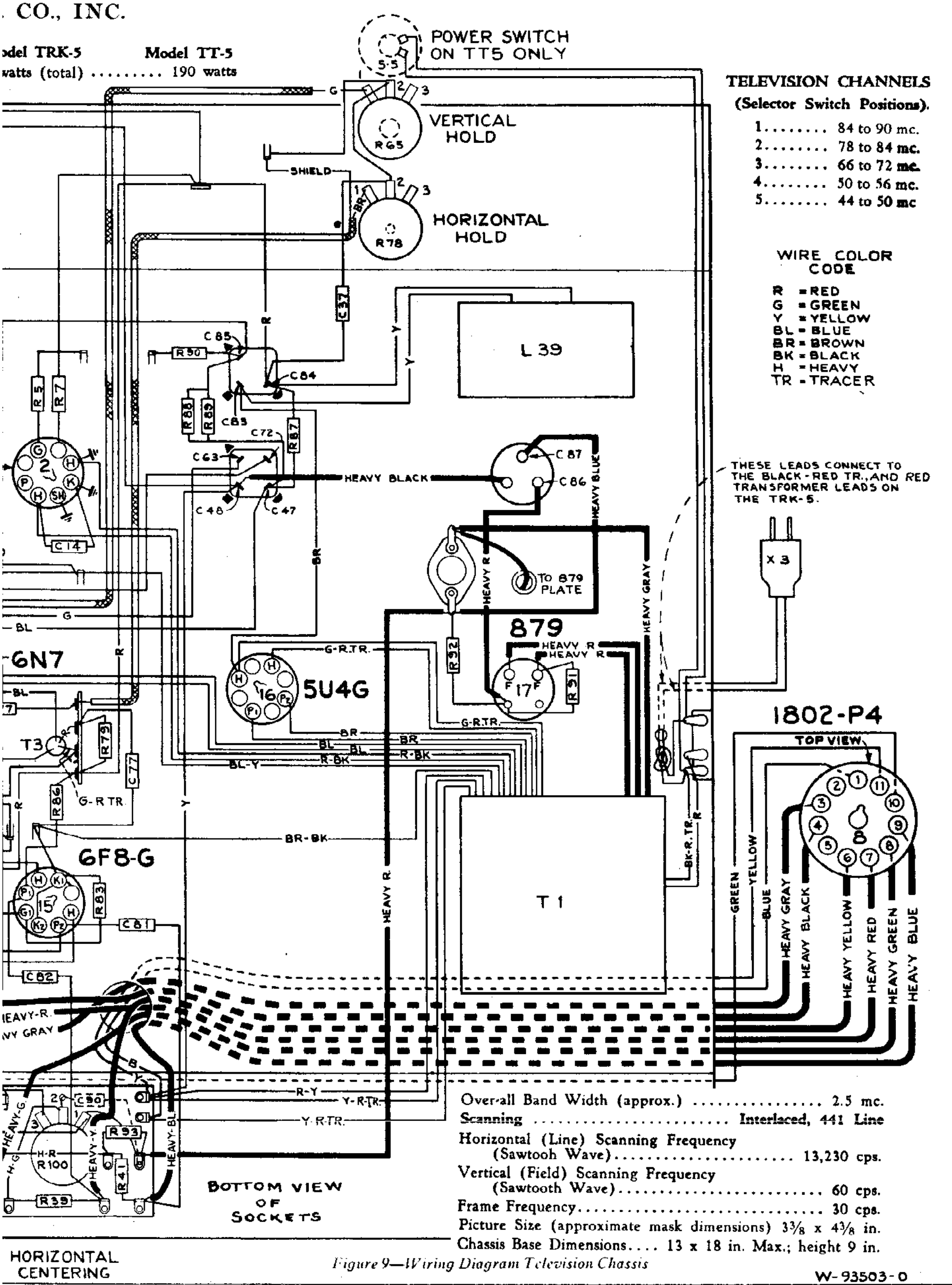
RCA M

Power Supply Rating
105-125 Volts, 60 Cycles..........



. CO., INC.

odel TRK-5	Model TT-5
watts (total)	190 watts



TELEVISION CHANNELS
(Selector Switch Positions).

1........	84 to 90 mc.
2........	78 to 84 mc.
3........	66 to 72 mc.
4........	50 to 56 mc.
5........	44 to 50 mc

WIRE COLOR CODE

R	= RED
G	= GREEN
Y	= YELLOW
BL	= BLUE
BR	= BROWN
BK	= BLACK
H	= HEAVY
TR	= TRACER

Over-all Band Width (approx.)	2.5 mc.
Scanning	Interlaced, 441 Line
Horizontal (Line) Scanning Frequency (Sawtooh Wave)................	13,230 cps.
Vertical (Field) Scanning Frequency (Sawtooth Wave).......................	60 cps.
Frame Frequency..............................	30 cps.
Picture Size (approximate mask dimensions)	$3\frac{3}{8}$ x $4\frac{3}{8}$ in.
Chassis Base Dimensions....	13 x 18 in. Max.; height 9 in.

Figure 9—Wiring Diagram Television Chassis

W-93503-0

Operation Model TRK-5

The power-volume control on the broadcast radio receiver turns on the power for the complete receiver. Pushing the button marked "Television" on the push button panel turns on the Television receiver, if the above power control is "On." The volume control of the broadcast receiver also controls the Television sound volume level.

Station Selector and Fine Tuning.—The outer ring "O" section of the central dual control knob on the Television panel selects the station from which it is desired to receive television transmission.

Five television channels are covered as follows:

(1) 84 to 90 M.C.
(2) 78 to 84 M.C.
(3) 66 to 72 M.C.
(4) 50 to 56 M.C.
(5) 44 to 50 M.C.

Set the station selector to the number corresponding to the frequency of the station from which it is desired to receive Television Broadcasts.

The inner section "I" of this knob is used for fine tuning and may eliminate moving ripples or distortion if due to interfering radio signals. A slight inward pressure must be exerted on the knob while turning.

Before the Television portion of the receiver is turned "ON" it is advisable to turn the Brightness and Contrast controls completely counter-clockwise to reduce the illumination of the spot which appears on the Kinescope before the sweep circuits have started functioning.

Contrast and Brightness Controls.—The inner "I" section of the "Contrast"-"Brightness" controls is the "Contrast" control and varies the black and white tones of the picture being received. Too little contrast makes the picture all half-tones or grays. Turning clockwise increases contrast from grays, to black and white. See Test Patterns Figs. 2, 4, and 5, Page 10-21

The outer ring "O" is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See test pattern Figs. 2, 4, 5.

Hold Controls.—The dual knobs on the Television panel marked "Horizontal" and "Vertical" Hold, control the picture stability. The inner section designated by a "I" is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture "locks in" horizontally. See test pattern Fig. 6. Page 10-21

The outer ring section designated by "O" is the Vertical Hold Control and when being set should be turned to the point where the picture "locks in" vertically. Pattern Fig. 7.

These two controls on this dual knob should not ordinarily require readjustment after good picture reception has once been obtained. An accasional resetting may be necessary due to changing to a different station, and to the gradual ageing of the tubes.

Focus Control.—This control is located on the rear of the Video chassis, and controls the electron beam focus of the Kinescope. Ordinarily, after once being focused the Kinescope should not require re-focusing for a considerable length of time. See test pattern Fig. 3.

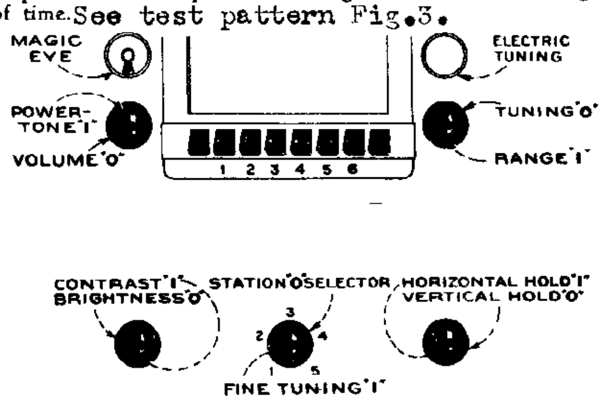


Figure 1—Control Panel Model TRK-5

Operation Model TT-5

The operation of Model TT-5 is the same as that for the Model TRK-5 except that there is a separate "ON-OFF" switch, and a separate sound volume control because the broadcast radio receiver is not included in this model. When Model TT-5 is connected to a broadcast receiver for the Television sound reproduction, the broadcast receiver volume control should be turned to maximum and the Television sound volume controlled with the control on the Television Receiver.

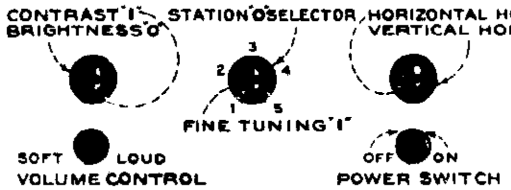


Figure 2—Control Panel Model TT-5

SERVICE DATA

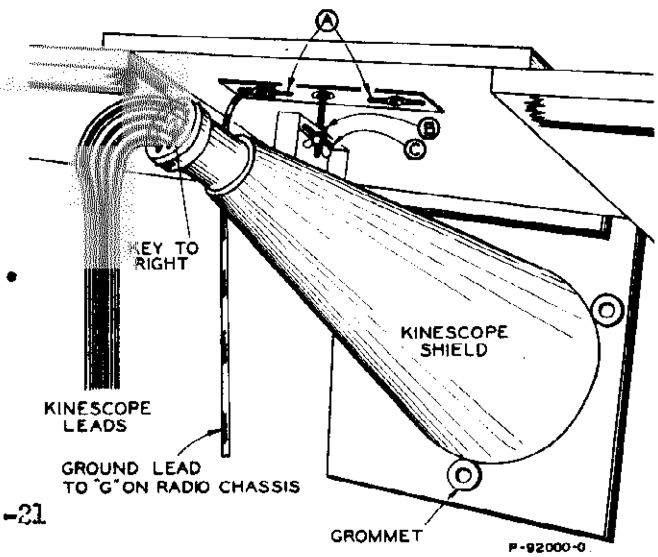


Figure 3—Kinescope Installation

Kinescope Installation Models TRK-5, TT-5: Refer to figure 3.

1. Remove back cover from cabinet.
2. Remove Kinescope mounting shield from shipping carton.
3. Using gloves and goggles remove Kinescope from shipping carton and place in the cone-shaped mounting shield.
4. Guide the Kinescope and mounting shield carefully into the cabinet, placing the Kinescope firmly up against the mask and viewing window. Fasten the mounting shield firmly in place with the thumb screw provided, so that it holds the Kinescope firmly against the mask. If the Kinescope does not line up properly with the mask, loosen the screws "A" and nut "B" and adjust in the direction desired.
5. After the receiver is operating, the Kinescope may be rotated to properly square up the picture with the mask.

CAUTION: When rotating tube the power should be turned "OFF."

Adjustments.—There are a series of screwdriver slot adjustments at the rear of the Video chassis used to obtain the proper picture size and centering. These adjustments are explained fully in the receiver operating instructions, and also in the booklet: **Practical Television by RCA.**

When the receiver is moved from one location to another, some readjustment of these controls may be necessary.

MODELS TRK-5, TT-5
Antenna, Transmission
Line Data,
Voltage

RCA MFG. CO., INC.

Antenna Installation:

In most cases, the antenna should not be installed permanently on the apartment or residence roof until the quality of the picture reception has been observed on a Television Receiver. A temporary transmission line can be run between receiver and the antenna allowing sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver and an assistant on the roof to find an antenna location, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of only a few feet in antenna position or direction may effect a tremendous difference in picture reception. Whenever possible, the antenna location should be chosen or erected so the antenna is not only broadside to the transmitter but removed as far as possible from highways, hospitals and doctors' offices, and similar sources of interference. Auto ignition and diathermy apparatus may cause noise interference which spoils the picture.

In mounting any antenna, care must be taken to keep the antenna rods or pickup wires proper at least 1/4 wave length (at least 6 feet) away from other antennas, metal roofs and gutters or metal objects.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions, as a wet surface has been known to have different reflecting characteristics than a dry surface.

In short, a television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals because:

(1) Intervening obstacles have a pronounced shielding effect on the ultra-high frequency waves producing low intensity signals. Severe trouble with multi-path transmissions may be experienced, especially in congested city areas.

(2) The picture signal is comprised of a very wide band or range of frequencies, all of which must be received with good efficiency.

(3) It must be continually remembered that the discernment of the eye is much more critical than that of the ear.

The Transmission Line

RCA Victor has made available two types of exterior transmission lines. One is a special low loss weather-proofed line having the correct surge impedance to match the RCA Victor Television antennas and the RCA Victor Television receivers. It is carried as Stock No. 9882 in 1,000 foot rolls. The second type is a standard weather-proofed line also having the correct surge impedance for proper antenna and receiver matching. It is carried as Stock No. 12430 in 90 ft. rolls, Stock No. 12429 in 40 ft. rolls and is available in 1,000 ft. spools as Stock No. 9881. Use of improper lines may result in excessive loss or may lead to line reflections, resulting in multiple images or "ghosts," thus marring the reception.

For transmission line runs up to 200 feet, and where the signal strength on the antenna is relatively high, the Stock No. 12430, or Stock No. 12429 transmission line may be used. For all other applications the Stock No. 9882 transmission line is recommended.

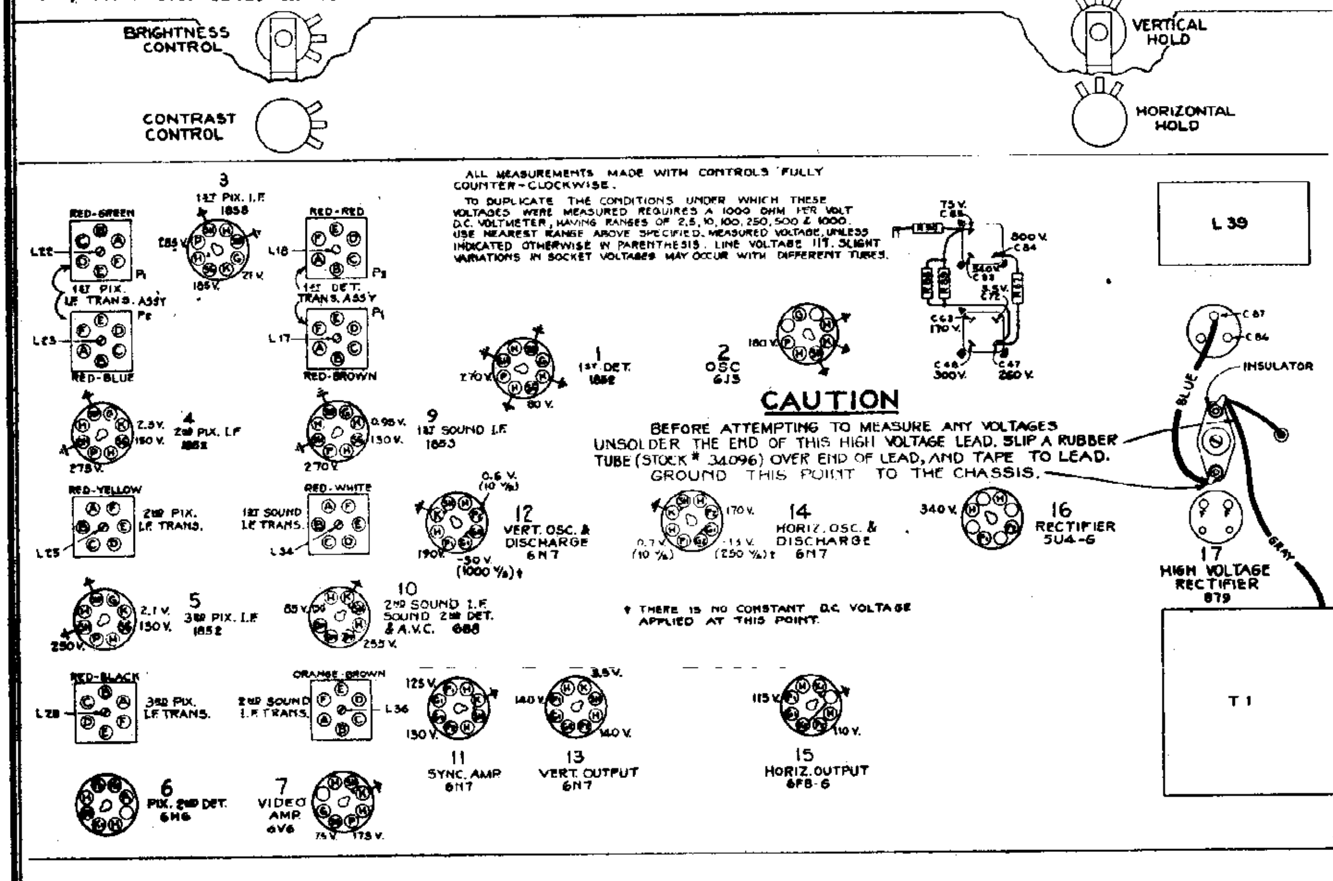


Figure 7—Voltage Diagram Television Chassis

Rear View,TRK-5

RCA MFG. CO., INC.

MODELS TRK-5,TT-5
Chassis KC-3A,KC-3
Socket,Voltage Data
Trimmers,Antenna

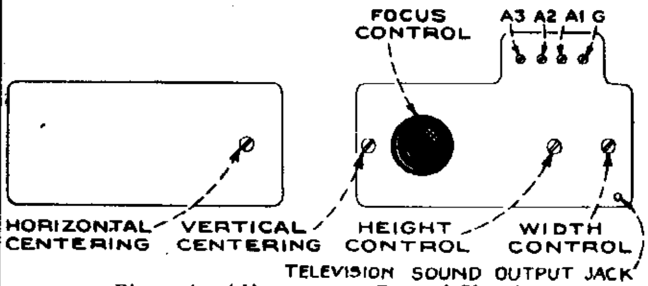


Figure 4—Adjustments at Rear of Chassis

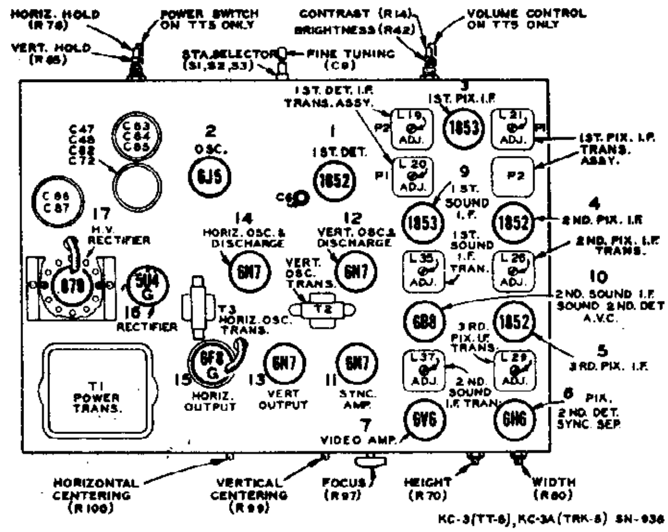


Figure 5—Top View Television Chassis

Video Chassis KC-3 (TT-5)
KC-3A (TRK-5)

No attempt should ever be made to measure the high (2,000 volts) voltage, because of the dangers and difficulties involved. If at any time it becomes necessary to service the high voltage circuit, the suspected parts should be replaced by parts known to be in good operating condition.

Always replace the red can over the 879 high voltage rectifier.

The most dangerous portion of the receiver is the plate (top cap) lead for the 879 high voltage rectifier. Always be very careful when working near or with this lead.

When working on the high voltage supply portion of this chassis, the following precautions should be observed:

1. Remove power supply cord from the power supply socket.
2. Use only one hand at a time.
3. Connect a shorting lead between ground (firstly) and to the high voltage side.
4. Whenever working with the oil-filled high voltage filter capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.
5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

When any changes are made on the Video portion of the chassis, the locations of leads and parts should be returned as closely as possible to their original positions.

Service Hints:

1. In some cases the horizontal sweep oscillator circuit will radiate energy to nearby broadcast receiving antennas and lead-ins, causing interference with standard broadcast receivers. It has been found that this trouble has been cleared up in some cases by use of an RCA "Magic Wave" antenna for the broadcast receiver receiving the interference.
2. If the picture "tears out" when the receiver is jarred it may be due to microphonic 1852, 1853, or 6J5 tubes.
3. The 6J5 oscillator tube should be removed without rocking it in its socket to loosen it, as the motion may cause the 80.5 mmf capacitor C16 to break off.
4. The coils or straps in the h.f. oscillator circuits **should not be touched or moved** or the alignment of the receiver will be disturbed.
5. The two Video coupling capacitors C44, 45, should be kept clear of chassis.
6. In some cases the metal Kinescope mounting shield may become magnetized by the earth's or some nearby magnetic field, and thus distort the picture on the screen towards the magnetized portion of the shield. The shield can be de-magnetized by passing it slowly through a solenoid which is energized by an a-c current.

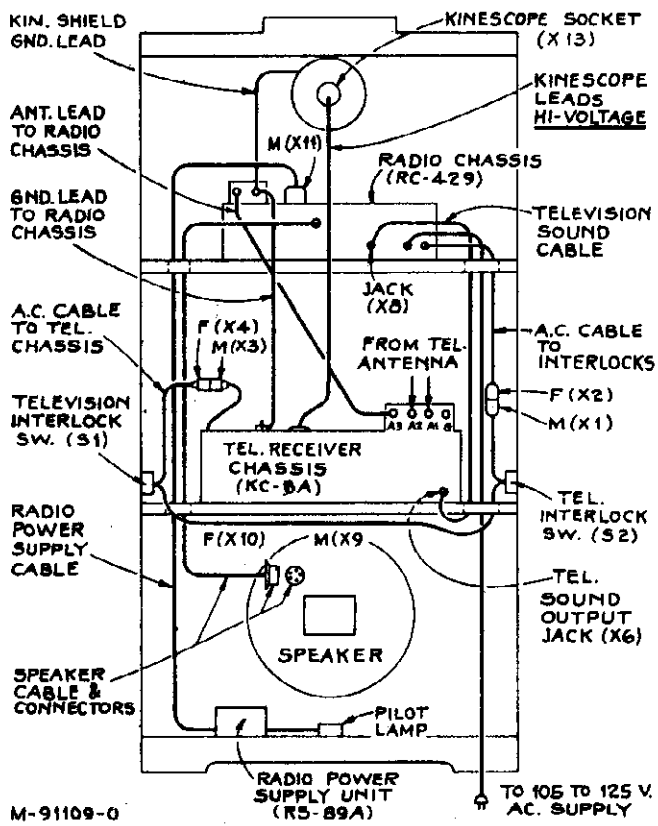


Figure 6—Rear View Model TRK-5

Antenna

The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and use care in its installation.

The RCA Double Dipole Antenna, Stock No. 9871, is recommended for use with these receivers. Both this antenna and the "V" antenna described below are especially designed for a sufficient broad frequency response to cover the contemplated television spectrum with good efficiency and are therefore superior to a single Dipole type antenna.

When greater signal pickup, or where a shielding effect from noise pickup or image reflections are desired, a reflector assembly Stock No. 9872 may be added to the Stock No. 9871 Antenna to obtain an improved signal-to-noise ratio.

The RCA Double "V" Wire type Television Antenna is alternative type of antenna designed for television sight and sound reception. Two points of support are necessary. It serves adequately in suburban areas but may not be sufficiently flexible and efficient for congested city areas where bad reflections and interference are encountered.

MODEL TRK-5
Receiver Chassis RC-429
Specifications, Dial Data

RCA MFG. CO., INC.

MODELS 98T, 98K2
Dial Calibration

Electrical Specifications

FREQUENCY RANGES
Standard Broadcast ("A" band) .... 540-1720 kc
Medium Wave ("B" band) .... 2.3-7.0 mc
Short Wave ("C" band) .... 7.0-22 mc

Intermediate Frequency .... 455 kc

TUBE COMPLEMENT
(1) RCA-6A8-G .... 1st-Det., and Osc.
(2) RCA-6K7 .... I-F Amplifier
(3) RCA-6Q7 .... 2nd-Det., A.V.C., 1st Audio
(4) RCA-6J5 .... Phase Inverter
(5) RCA-6K6-G .... Power Output
(6) RCA-6K6-G .... Power Output
(7) RCA-6U5 .... "Magic Eye"
(8) RCA-5Y3-G (in SPU RS-89A) ... Full-Wave Rectifier

Dial Lamps .... Mazda No. 44, 6.3 volts, .25 amp.

Power Supply Rating .... 105-125 volts, 60 cycles, 75 watts

POWER OUTPUT
Undistorted .... 5 watts
Maximum .... 5.5 watts

LOUDSPEAKER (RL-70H-5)
Type .... 12-inch electrodynamic
Voice-Coil impedance .... 2.2 ohms at 400 cycles

ELECTRIC TUNING RANGES
Two stations between approximately .... 550-950 kc
Two stations between approximately .... 690-1,225 kc
Two stations between approximately .... 890-1,500 kc

Mechanical Specifications

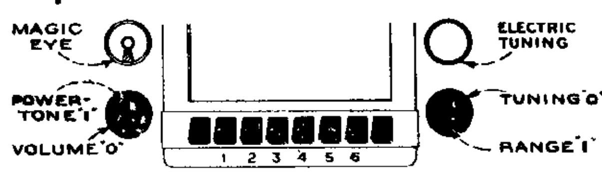
RC-429 CHASSIS BASE DIMENSIONS:
Height .... 2-½ inches
Width .... 13 inches
Depth .... 6-½ inches
Over-all Chassis Height .... 6-½ inches
Tuning Drive Ratio .... 12 to 1

General Description

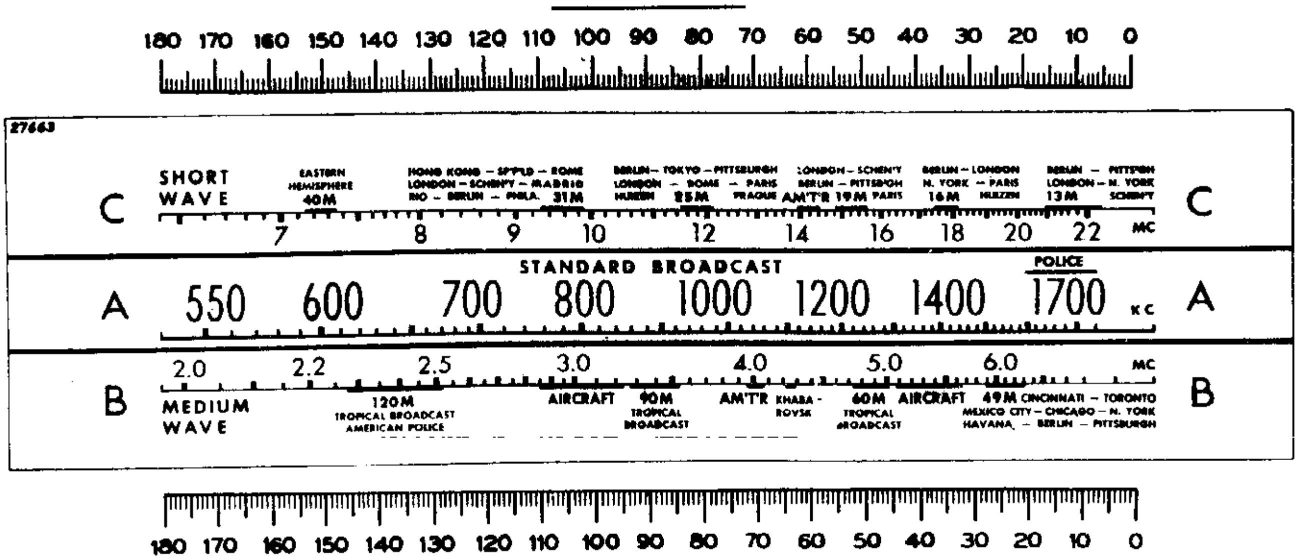
Radio receiver chassis No. RC-429 is used in RCA Victor Television console Model TRK-5.

The audio output of the television chassis is connected to the audio input of the RC-429 chassis by means of jack X-8 and the left-hand push-button switch (S44, S45, S46).

A separate plug-in power supply unit, RS-89A, is used to supply heater and plate voltage to the RC-427 chassis. Service data and diagrams for the power unit are contained in the following pages.



Location of Controls (Radio)

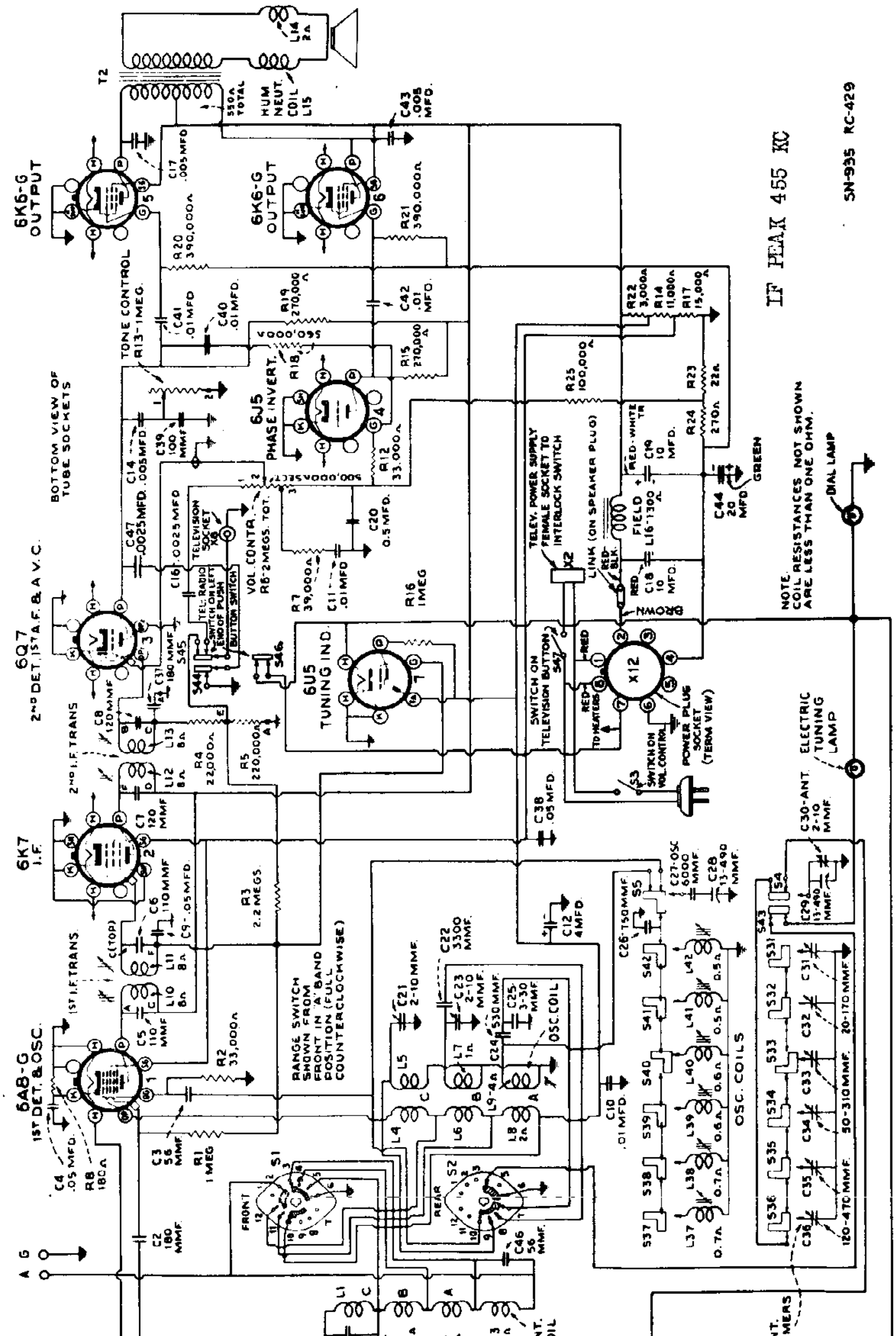


Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band. Read instructions under "Alignment Procedure."

RCA MFG. CO., INC.

MODEL TRK-5, Chassis RC-429
Schematic, Lead Dress



Schematic Circuit Diagram, Chassis No. RC-429

Precautionary Lead Dress:

1. Electric tuning lamp leads to S43 must be dressed in front of the range switch.
2. Dress leads away from antenna coil.
3. Leads across back of chassis must be dressed away from television jack (X8).
4. C26 (750 mmfd.) on push-button switch assembly must be dressed carefully to prevent shorts.

MODEL TRK-5, Chassis RC-429
Socket, Trimmers, Tuner
Alignment

RCA MFG. CO., INC.

Alignment Procedure
(RADIO CHASSIS)

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

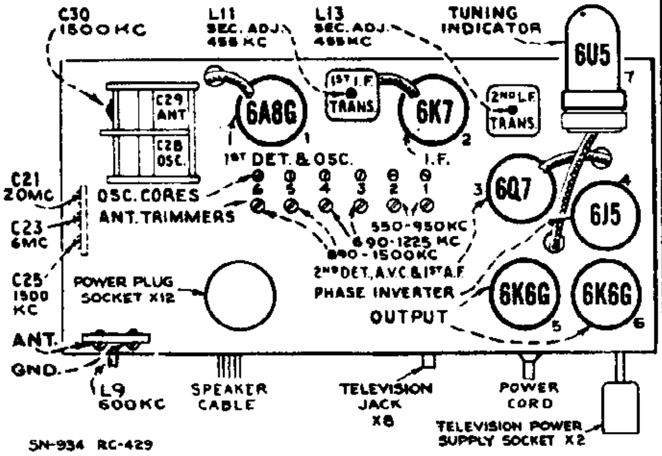
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial if fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.



SN-934 RC-429

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Step	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6A8-G 1st-Det. grid cap, in series with .01 mfd.			L10 and L11 (1st I-F Trans.)
3	Antenna terminal, in series with 200 mmfd.	600 kc	600 kc 150.5°	L9 (osc.)
4		1,500 kc	1,500 kc 28°	C25 (osc.) C30 (ant.)
5	Repeat steps 3 and 4.			
6	Antenna terminal, in series with 300 ohms	6 mc	6 mc 26.5°	C23 (osc.)*
7		20 mc	20 mc 22°	C21 (osc.)*
8	Follow "Adjustments for Electric Tuning."			

* Use **minimum** capacity peak if two peaks can be obtained, and check for image by tuning radio approximately 910 kc lower.

Note: The oscillator tracks above the signal on all bands.

Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Television switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

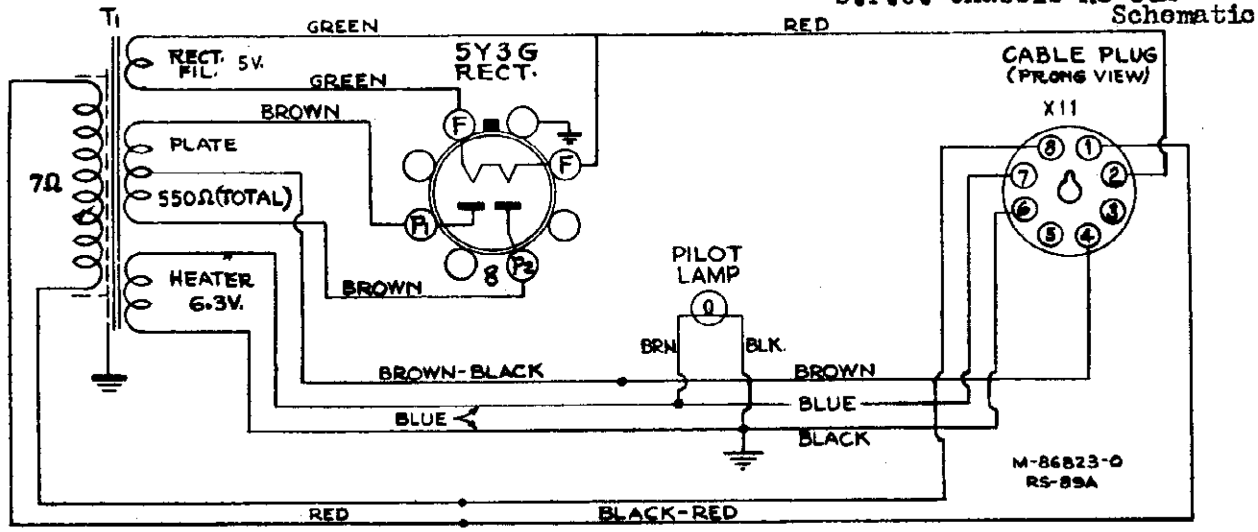
1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

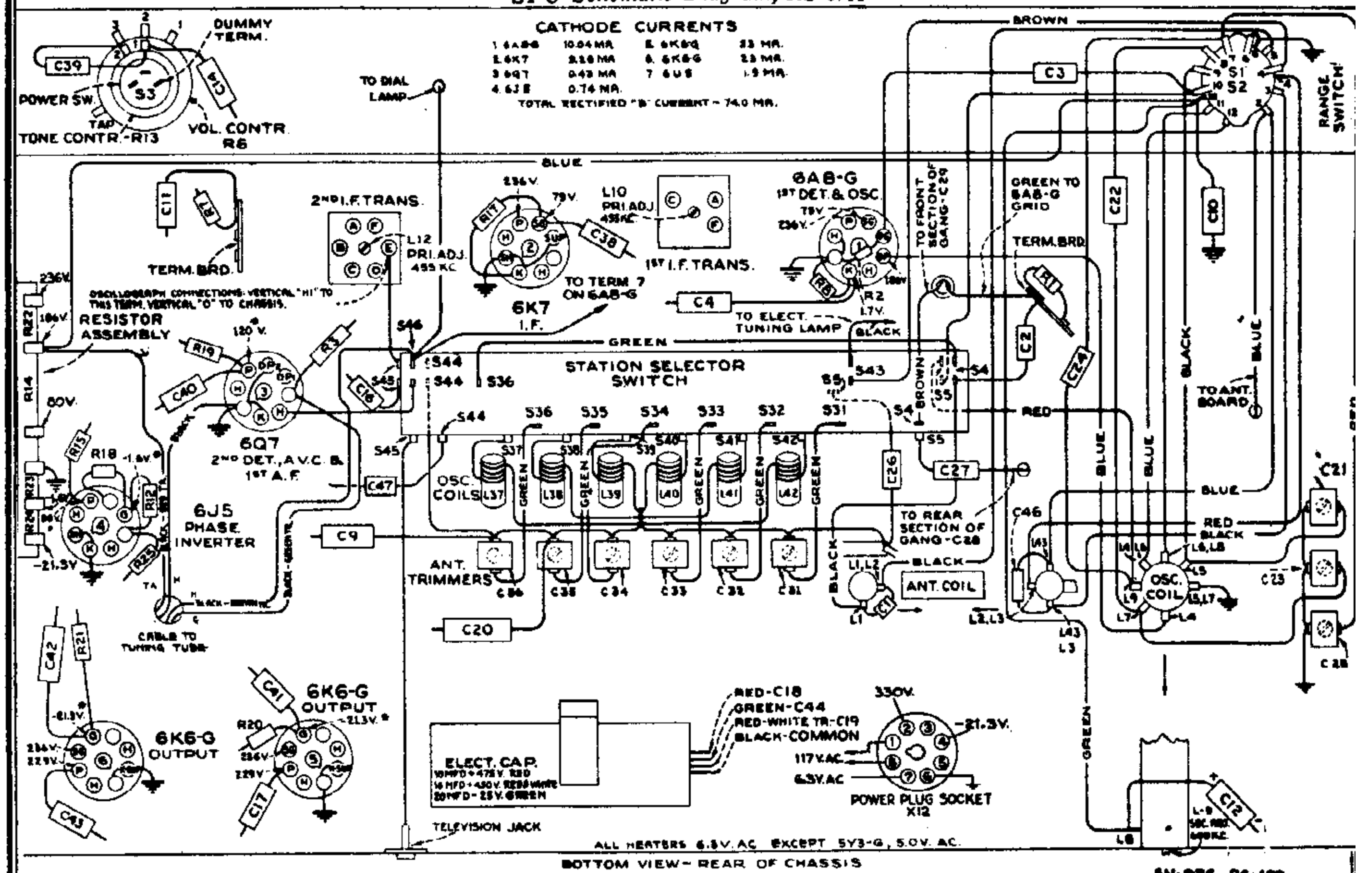
5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers. Use the "Magic Eye" to ensure sharp peaking.

RCA MFG. CO., INC.

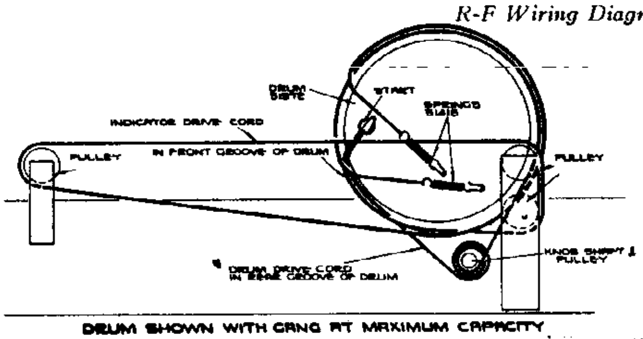
MODEL TRK-5, Chassis RC-429
R-F Chassis Wiring, Voltage
S.P.U. Chassis RS-89A
Schematic



SPU Schematic Diagram, RS-89A



R-F Wiring Diagram, Chassis No. RC-429



Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

At Left—Dial Mechanism

MODELS TRK-5, TT-5
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	TELEVISION CHASSIS ASSEMBLIES	
	TRK-5—KC-3A	
	TT-5—KC-3	
33387	Adjuster—Magnetite core and stud in tube for high frequency oscillator circuit adjustment. (Used with L11, L12, L14, L15)	.55
33836	Adjuster—Magnetite core and stud in tube for high frequency oscillator circuit adjustment. (Used with L13)	.55
31253	Board—Antenna ground terminal board	.25
12884	Capacitor—Plunger type air-trimmer—2½ to 20 mmfd. (Model TRK-5 only) (C6)	.60
12714	Capacitor—Plunger type air-trimmer—2½ to 12 mmfd. (C6) (Model TT-5 only)	.50
33097	Capacitor—4.7 mmfd. 500 volts (neg. temp. coeff.) (C20, C56, C57)	.35
33478	Capacitor—5.6 mmfd., 500 volts (neg. temp. coeff.) (C7)	.40
33476	Capacitor—8.2 mmfd., 500 volts (neg. temp. coeff.) (C8)	.40
33100	Capacitor—18 mmfd., 500 volts (neg. temp. coeff.) (C25)	.40
33101	Capacitor—22 mmfd., 500 volts (neg. temp. coeff.) (C24, C52)	.40
33111	Capacitor—33 mmfd., 500 volts (neg. temp. coeff.) (C15)	.35
33102	Capacitor—47 mmfd., 500 volts (neg. temp. coeff.) (C53, C58)	.45
33103	Capacitor—68 mmfd., 500 volts (neg. temp. coeff.) (C23, C33, C38, C43)	.35
33477	Capacitor—80.5 mmfd., 500 volts (neg. temp. coeff.) (C16)	.45
33104	Capacitor—82 mmfd., 500 volts (neg. temp. coeff.) (C21, C22)	.45
33106	Capacitor—115 mmfd. (C5)	.30
33107	Capacitor—135 mmfd., (C4)	.30
12725	Capacitor—150 mmfd., (C10)	.35
33108	Capacitor—190 mmfd., (C3)	.30
33105	Capacitor—215 mmfd., 500 volts (neg. temp. coeff.) (C31, C32)	.45
33109	Capacitor—820 mmfd. (C2)	.30
33110	Capacitor—390 mmfd. (C1)	.30
12536	Capacitor—820 mmfd., 400 volts (C76)	.45
4881	Capacitor—3,300 mmfd., 400 volts (C87)	.60
33806	Capacitor—.0015 mfd., 1,500 volts (C78)	.25
33584	Capacitor—.005 mfd., 1,200 volts (C11, C12, C13, C14, C18, C19, C26, C27, C28, C29, C30, C34, C35, C36, C39, C40, C41, C42, C49, C50, C51, C54, C55, C60, C65, C66, C79, C80, C92, C93, C94, C95)	.25
33340	Capacitor—.005 mfd., 3,000 volts (C81, C82)	.50
11515	Capacitor—.015 mfd., 400 volts (C61) (Model TT-5 only)	.20
32787	Capacitor—.05 mfd., 400 volts (C46, C64)	.20
4886	Capacitor—.05 mfd., 400 volts (C62, C77)	.20
33341	Capacitor—.05 mfd., 3,000 volts (C74, C75)	.50
32786	Capacitor—.1 mfd., 300 volts (C45, C44)	.25
4839	Capacitor—.1 mfd., 400 volts (C59, C91, C70, C73)	.30
33020	Capacitor—.15 mfd., 2,500 volts (C87). .05 mfd., 3,000 volts (C86)	2.65
30965	Capacitor—.25 mfd., 200 volts (C68, C71)	.30
12484	Capacitor—.25 mfd., 350 volts (C37, C69, C89, C89, C90)	.30
33195	Capacitor—10 mfd., 450 volts; 10 mfd., 450 volts; 20 mfd., 450 volts; 20 mfd., 25 volts (C63, C48, C47, C72)	2.20
33190	Capacitor—30 mfd., 450 volts; 30 mfd., 450 volts; 10 mfd., 150 volts (C83, C84, C85)	
33120	Choke—Filter choke (L39)	2.50
33243	Coil—High frequency oscillator coil with core and stud (L11)	.65
33234	Coil—1½-turn antenna coil, core, stud and capacitor assembly (C5, L9, L10) (green)	1.10
33233	Coil—2-turn antenna coil core, stud and capacitor assembly (C4, L7, L8) (yellow)	1.10
33232	Coil—3-turn antenna coil, core, stud and capacitor assembly (C3, L5, L6) (orange)	1.15
33231	Coil—5½-turn antenna coil, core, stud and capacitor assembly (C2, L3, L4) (red)	1.20
33230	Coil—7½-turn antenna coil, core, stud and capacitor assembly (C1, L1, L2) (brown)	1.25
33538	Coil—Peaking coil and 10 meg., ½ watt resistor assembly (L33, R37)	.55
33539	Coil—Peaking coil and 10 meg. resistor assembly (L31, R32)	.55
33540	Coil—Peaking coil and 10 meg., ½ watt resistor assembly (L32, R35)	.55
33541	Coil—Peaking coil and 1,500 ohm, ½ watt resistor assembly (L38, R59)	.55
33228	Condenser—Adjustable oscillator tuning condenser mounted on band switch (C9)	2.10
33385	Connector—Insulated plate connector and lead (Use with 879 Rectifier Tube)	.35
33280	Control—Audio volume control—1 meg. (Model TT-5 only) (R55)	1.50
33274	Control—Dual contrast and brightness control 10,000 ohm and 100,000 ohm (R14, R42)	2.00
33275	Control—Dual horizontal and vertical holding control—30,000 ohm and 1.2 meg. (R78, R65)	2.00
33278	Control—250,000 ohm "Width" control (R80)	1.00
33276	Control—400,000 ohm "focus" control (R97)	1.00
33277	Control—500,000 ohm "Vert. cent."—"Hor. cent." control (R99, R100)	1.00
33279	Control—2 megohm "Height" control (R70)	1.00
33615	Insulator—Stand-off porcelain insulator—less hardware	.30
4449	Knob—"Focus" control knob	.15
33225	Nut—Speed nut for use with high frequency coil assemblies (Pkg. of 10)	.01
14278	Receptacle—Television sound output receptacle (X6)	.25
14074	Resistor—82 ohms, ½ watt (R13, R44)	.20
14561	Resistor—220 ohms, ½ watt (R27, R22)	.20
11852	Resistor—910 ohms, ½ watt (R8)	.20
14720	Resistor—1,000 ohms, ½ watt (R17, R25, R49)	.20
30152	Resistor—1,000 ohms, 1 watt (R20, R24, R47)	.22
33318	Resistor—1,200 ohms, 2 watts (R87)	.25
11351	Resistor—1,300 ohms, ½ watt (R26)	.20
14499	Resistor—1,500 ohms, ½ watt (R18)	.20
12194	Resistor—1,800 ohms, ½ watt (R29)	.20
13486	Resistor—2,200 ohms, 1 watt (R6)	.22
13031	Resistor—3,300 ohms, 1/10 watt (R12 in early production)	.15
12312	Resistor—3,300 ohms, ½ watt (R19, R7)	.20
30150	Resistor—3,300 ohms, 1 watt (R7)	.22
12955	Resistor—3,900 ohms, ½ watt (R30)	.20
33546	Resistor—3,900 ohms, 2 watts (R36)	.25
11650	Resistor—4,700 ohms, 1/10 watt (R12 in later production)	.15
12265	Resistor—6,800 ohms, ½ watt (R31, R9)	.20
14075	Resistor—8,200 ohms, ½ watt (R63, R64)	.20
3155	Resistor—9,100 ohms, 1 watt (R90)	.22
3070	Resistor—10,000 ohms, ½ watt (R58, R62)	.20
8043	Resistor—10,000 ohms, 2 watts (R57)	.25
30123	Resistor—12,000 ohms, ½ watt (R61)	.20
14284	Resistor—22,000 ohms, 1/10 watt (R51)	.15
14390	Resistor—27,000 ohms, 1/10 watt (R10)	.15
12738	Resistor—27,000 ohms, ½ watt (R54) (Model TT-5 only)	.20
12454	Resistor—33,000 ohms, ½ watt (R5, R77)	.20
33639	Resistor—33,000 ohms, 1 watt (R91)	.20
30833	Resistor—33,000 ohms, 1 watt (R16)	.22
30434	Resistor—39,000 ohms, 1 watt (R46)	.22
33182	Resistor—43,000 ohms, 2 watts (R88, R89)	.25
12412	Resistor—47,000 ohms, ½ watt (R93, R94)	.20
30495	Resistor—47,000 ohms, 1 watt (R84, R86)	.22
33587	Resistor—62,000 ohms, ½ watt (R28, R23)	.20
13715	Resistor—68,000 ohms, ½ watt (R73)	.20
30678	Resistor—68,000 ohms, 1 watt (R50)	.22
8084	Resistor—82,000 ohms, ½ watt (R15, R45)	.20
11281	Resistor—100,000 ohms, 1/10 watt (R21)	.15
14560	Resistor—100,000 ohms, ½ watt (R11, R48, R52, R67, R79)	.20
30180	Resistor—120,000 ohms, ½ watt (R4)	.20
30493	Resistor—150,000 ohms, ½ watt (R43)	.20
12284	Resistor—220,000 ohms, ½ watt (R66, R75, R76, R101)	.20
33591	Resistor—330,000 ohms, 1 watt (R98)	.20
12285	Resistor—470,000 ohms, ½ watt (R34)	.20
33592	Resistor—470,000 ohms, 1 watt (R92)	.20
33593	Resistor—560,000 ohms, 1 watt (R96)	.22
12413	Resistor—680,000 ohms, ½ watt (R81)	.20
33598	Resistor—680,000 ohms, 1 watt (R86)	.22
13730	Resistor—1 meg. ½ watt (R1, R2, R3, R33, R53, R60, R56, R68)	.20
30206	Resistor—1.2 meg., ½ watt (R39, R82, R83, R71, R41)	.20
12679	Resistor—2.2 meg., ½ watt (R74)	.20
13167	Resistor—3.9 meg., ½ watt (R38, R40)	.20
30931	Resistor—4.7 meg., ½ watt (R69)	.20
33229	Roller—Rubber friction roller for use on band switch for adjustment of oscillator trimmer	.10
3682	Shield—Tube shield for "Hor. out." tube	.22
33211	Socket—4-prong rectifier tube socket	1.00
31251	Socket—Octal base wafer type tube socket	.25
33601	Socket—11-prong magnal Kinescope socket (X13)	1.20
18008	Socket—6J5 oscillator tube socket	.25
33226	Switch—Band switch complete—less tuning condenser and friction roller	4.60
33281	Switch—Rotary type power switch (S5) (Model TT-5 only)	.65
33519	Transformer—"1st Det. P1" I-F transformer (R8, C20, L17, L20, R10, C25) (red and brown)	2.70
33520	Transformer—"1st Det. P2" I-F transformer (L18, C21, C22, C23, L19, R18) (red and red)	2.70
33523	Transformer—"1st pix P1" I-F transformer (L21, L22, R15, C31) (red and green)	2.20
33524	Transformer—"1st pix P2" I-F transformer (L23, L24, C33, R21) (red and blue)	2.00
33526	Transformer—"1st Sound" I-F transformer (L34, L35, C52, C53) (red and white)	2.50
33522	Transformer—"2nd Picture" I-F transformer (L25, L28, L27, C38, R26) (red and yellow)	2.00
33527	Transformer—"2nd Sound" I-F transformer (L36, L37, C56, C57, R61) (brown and orange)	2.40
33525	Transformer—"3rd Picture" I-F transformer (L28, L29, L30, C43, R29) (red and black)	2.00
32899	Transformer—Horizontal oscillation transformer (T3)	1.75
33390	Transformer—Plate and filament power transformer (T1)	13.50
32898	Transformer—Vertical oscillation transformer (T2)	1.75
	5 BAND RADIO RECEIVER	
	No. RC-429 Used with Model TRK-5	
14517	Board—Antenna—Ground terminal board	.25
30752	Bracket—"Magic Eye" bracket	.25
30766	Cap—Rubber cap for "Magic Eye"	.10
32486	Capacitor—Antenna coil trimmer capacitor bank (C31, C32, C33, C34, C35, C36)	1.40
31400	Capacitor—Triple adjustable trimmer, two sections, 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25)	.50
12722	Capacitor—18 mmfd. (C1)	.35
12723	Capacitor—56 mmfd. (C3, C46)	.35
12720	Capacitor—100 mmfd. (C39)	.35
14262	Capacitor—100 mmfd. (C5, C6)	.30
12404	Capacitor—120 mmfd. (C7, C8)	.30
14712	Capacitor—180 mmfd. (C37)	.30
30232	Capacitor—200 mmfd. (C2)	.35
32492	Capacitor—530 mmfd. (C24)	.40
31436	Capacitor—750 mmfd. (C26)	.40
4881	Capacitor—3,300 mmfd. (C22)	.60
31405	Capacitor—6,000 mmfd. (C27)	.75
5107	Capacitor—.0025 mfd., 700 volt (C18, C47)	.30
4838	Capacitor—.005 mfd., 1,000 volt (C14, C17, C43)	.25
14393	Capacitor—.01 mfd., 300 volt (C11)	.30
30382	Capacitor—.05 mfd., 200 volt (C4, C9, C38)	.20
4858	Capacitor—.01 mfd., 500 volt (C10, C40, C41, C42)	.25
30867	Capacitor—0.5 mfd., 200 volt (C20)	.30
32145	Capacitor—4 mfd., 450 volt (C12)	.70
32142	Capacitor—10-10-20 mfd. (C18, C19, C44)	1.80
31382	Clip—Push button coil and core mounting clip	.04
32493	Coil—Antenna coil assembly A, B, and C band (L1, L2, L3, L43)	1.35
31385	Coil—Push button oscillator coil, "A" band (L37, L38) (550-850KC)	.30
32487	Coil—Push button oscillator coil, "A" band (L39, L40) (890-1225KC)	.35
31383	Coil—Push button oscillator coil, "A" band (L41, L42) (890-1,500KC)	.30
31951	Coil—Oscillator coil assembly for A, B, and C bands (L4, L5, L6, L7, L8, L9)	1.40
31389	Condenser—2 gang variable tuning condenser (C28, C29, C30)	2.65
33497	Control—Dual volume and tone control and switch (R6, R13, S3)	3.00
32634	Cord—Drive cord with clamping clips	.10
12890	Core—Adjustable core and stud for oscillator coil	.35
31372	Drum—Variable condenser drive cord drum and calibration dial	.65
11891	Lamp—6.3 volt dial lamp (Mazda No. 44)	.17
32470	Plate—Dial plate assembly	.75
12493	Plug—Female speaker cable plug (X10)	.30
32552	Pointer—Dial pointer	.20
31373	Pulley—Pointer drive cord pulley	.08
14278	Receptacle—Television sound input socket (X8)	.25
32143	Resistor—Voltage divider comprising one 11,000 ohm, one 3,000 ohm, one 22 ohm and one 270 ohm section (R14, R22, R23, R24)	.90
30545	Resistor—180 ohms, ½ watt (R8)	.20
5114	Resistor—15,000 ohms, 1 watt (R17)	.22
14284	Resistor—22,000 ohms, 1/10 watt (R4)	.15
12454	Resistor—33,000 ohms, ½ watt (R2, R12)	.20
12266	Resistor—39,000 ohms, ½ watt (R7)	.20
14560	Resistor—100,000 ohms, ½ watt (R25)	.20
11398	Resistor—220,000 ohms, 1/10 watt (R5)	.15
12199	Resistor—270,000 ohms, ½ watt (R15, R19)	.20
13479	Resistor—390,000 ohms, ½ watt (R20, R21)	.20
12486	Resistor—560,000 ohms, ½ watt (R18)	.20
12013	Resistor—1 meg., 1/10 watt (R16)	.15
13730	Resistor—1 meg., ½ watt (R1)	.20
13679	Resistor—2.2 meg., ½ watt (R3)	.20
14343	Retainer—Retainer for stock No. 33500 tuning shaft	.03
14887	Retainer—Retainer spring for stock No. 31373 pulley	.01
33500	Shaft—Tuning shaft	.30
12581	Shield—I-F transformer shield top	.25
31319	Socket—8 prong socket for power supply plug (X12)	.25
31839	Socket—Dial lamp socket, one wire non-insulated	.25
31304	Socket—Dial lamp socket, two wire insulated	.20
13871	Socket—Magic eye socket	.45
31251	Socket—Octal type tube socket	.25
31418	Spring—Indicator or drive cord tension spring	.05
33496	Switch—Range switch (S1, S2)	1.15
33498	Switch—Station selector push button switch (S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S4, S5, S44, S45, S46)	3.10
33499	Switch—Television power switch and cover (S47)	.45
14376	Transformer—1st I. F. transformer complete (L10, L11, C5, C6)	2.45
14283	Transformer—2nd I. F. transformer complete (L12, L13, C7, C8, C37, R4, R5)	3.80
	POWER SUPPLY UNIT	
	RS—89—A	
	USED WITH RC—429	
33606	Plug—8 prong plug for power supply cable (X11)	.45
31251	Socket—Octal base tube socket	.25
33224	Transformer—Power transformer (T1)	6.25
	SPEAKER ASSEMBLIES	
	TRK-5	
	RL-70—H-5	
31825	Cap—Speaker cone dust cap	.05
11469	Coil—Hum bucking coil (L15)	.30
12012	Coil—Speaker field coil (L16)	2.90
31275	Cone—Speaker cone and voice coil (L14)	1.75
31639	Plug—5 prong male speaker plug with link (X9)	.25
32146	Speaker—Speaker complete	12.10
14534	Transformer—Output transformer (T2)	2.10
	MISCELLANEOUS ASSEMBLIES	
	MODEL TRK-5	
	MODEL TT-5	
31397	Button—Station selector push button (Model TRK-5 only)	.15
33597	Cap—Pilot lamp "bull's eye" (Model TRK-5 only)	.20
33480	Cable—38-inch shielded cable with two male plugs. Used between Radio and television chassis (Model TRK-5 only) (X5, X7)	1.30
33479	Cable—61-inch audio connection cable with two male connectors (Model TT-5 only) (X5, X7)	1.60
33363	Connector—2 prong female plug for interlock cable (X2)	.45
4573	Connector—2 prong female connector used on television power cable (X4)	.30
31454	Cover—Package of eight protective push button covers	.08
32673	Dial—3-band glass dial scale	.60
33481	Escutcheon—Dial escutcheon and scale (Model TRK-5 only)	3.60
33518	Glass—Safety protective glass for kinescope	2.80
33504	Knob—Band switch knob (Model TRK-5 only)	.25
33471	Knob—"Brightness", "Vert. hold" or "volume" knob	.25
33470	Knob—"Contrast", "Hor. hold", "Fine tuning" or "Tone control" knob	.20
33469	Knob—"Off-on" control knob (Model TT-5 only)	.20
33505	Knob—Radio tuning knob (Model TRK-5 only)	.30
33472	Knob—"Station selector" control knob (white dot)	.25
33468	Knob—"Volume" control knob	.15
11891	Lamp—6.3 volt, Pilot indicator lamp (Mazda No. 44)	.17
31458	Marker—"Dial tuning" marker tab (Model TRK-5 only)	.01
33594	Marker—"Television marker tab (Model TRK-5 only)	.01
31589	Marker—Complete set of station call letter markers (TRK-5 only)	.35
33225	Nut—"Speed nut" for high frequency coil assembly (Pkg. of 10)	.01
4577	Plug—2 prong male connector used on television power cable (X3)	.45
33244	Plug—2 prong male connector used on interlock cable (X1)	.45
12493	Plug—5 prong female speaker connector plug (Model TRK-5 only)	.30
11210	Screw—¼x20x1 in. chassis mounting screw, washer and lock washer (5 req'd)	.08
4560	Screw—¼x20x1¼ chassis mounting screw, washer and lock washer (5 req'd)	.08
14270	Spring—Knob spring for stock No. 33468, 33471, 33472 and 33469 knobs	.05
30330	Spring—Knob spring for stock No. 33470 knob	.02
4982	Spring—Knob spring for stock No. 33505 knob	.05
33384	Switch—Interlock switch and cover (S1, S2, TRK-5, S3 S4, TT-5)	.55

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

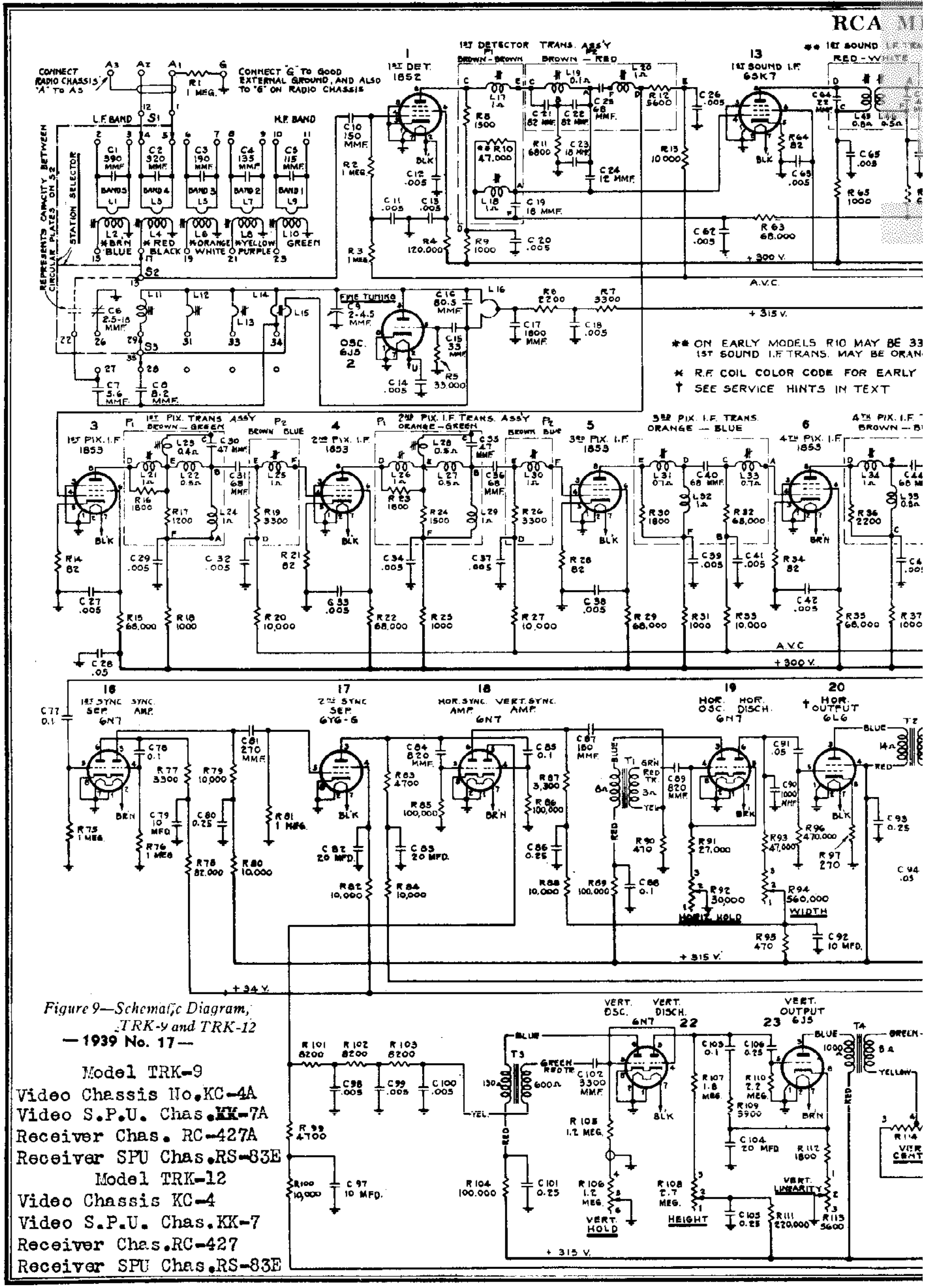


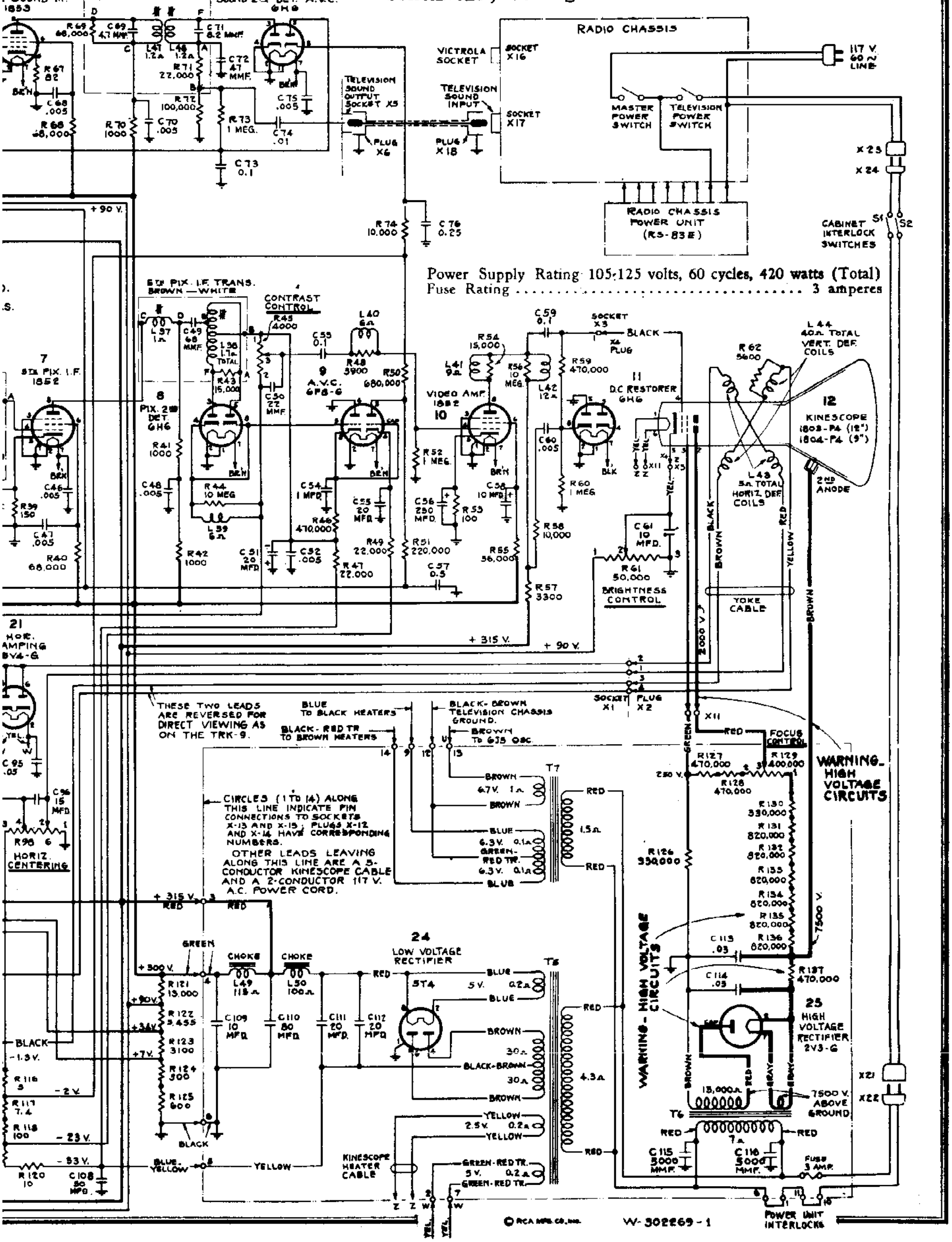
Figure 9—Schematic Diagram, TRK-9 and TRK-12

— 1939 No. 17 —

Model TRK-9
Video Chassis No. KC-4A
Video S.P.U. Chas. KK-7A
Receiver Chas. RC-427A
Receiver SPU Chas. RS-83E
Model TRK-12
Video Chassis KC-4
Video S.P.U. Chas. KK-7
Receiver Chas. RC-427
Receiver SPU Chas. RS-83E

CO., INC.

MODELS TRK-9, Video Chassis KC-4A, SPU Chassis KK-7A
TRK-12, Video Chassis KC-4, SPU Chassis KK-7
Schematic, Voltage



Power Supply Rating 105-125 volts, 60 cycles, 420 watts (Total)
Fuse Rating .... 3 amperes

MODELS TRK-9, TRK-12
Video Chassis Wiring

RCA MF

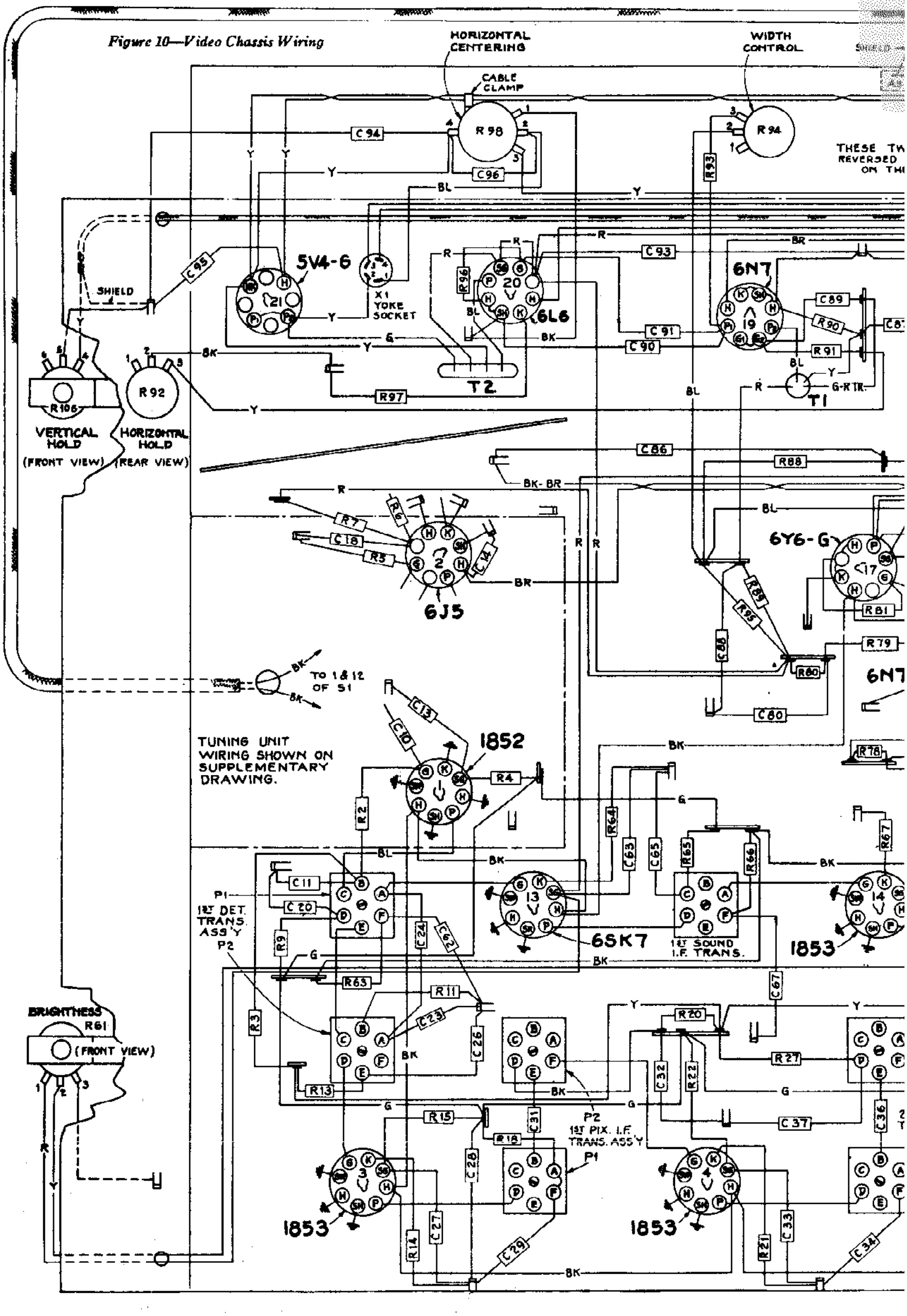
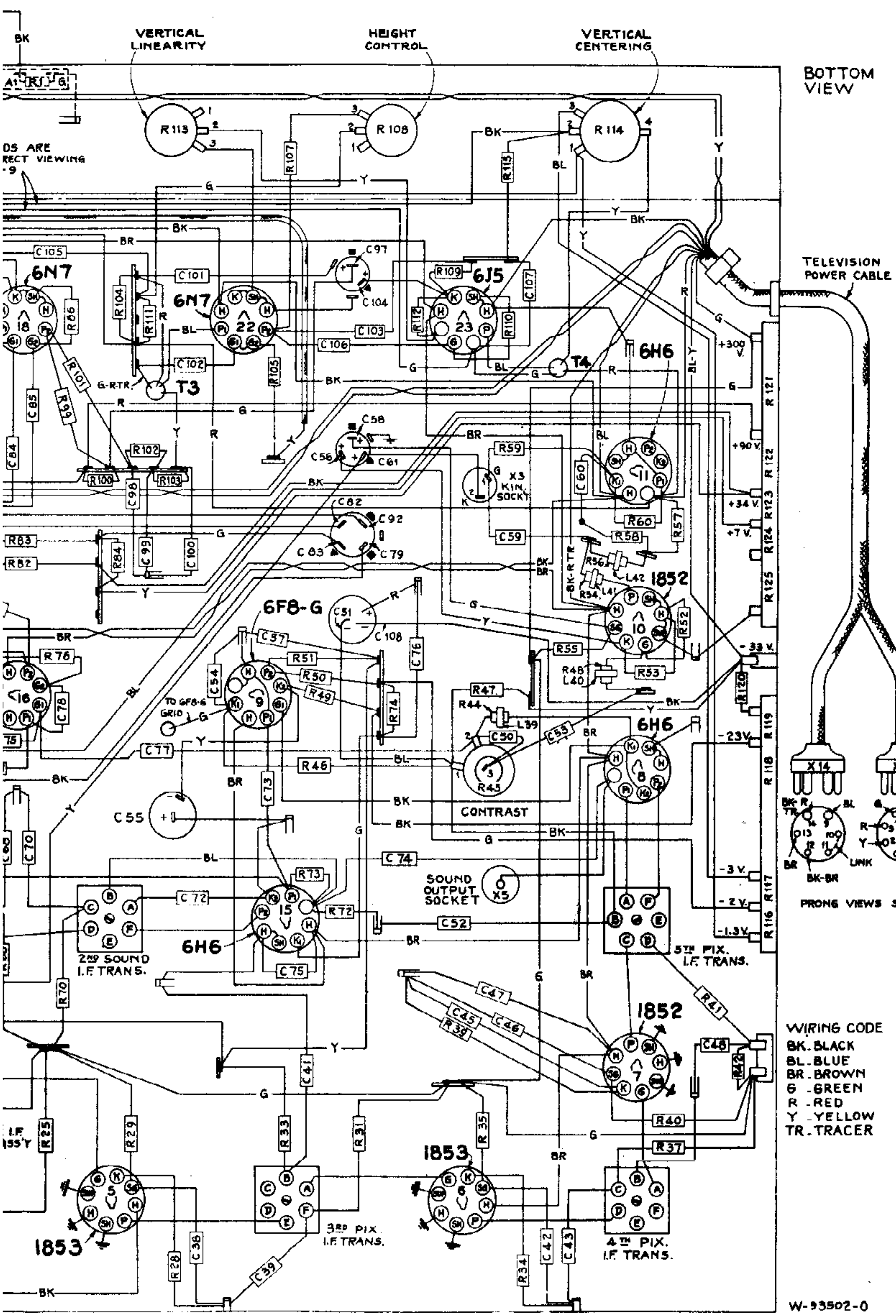


Figure 10—Video Chassis Wiring

CO., INC.



W-93502-0

RCA MFG. CO., INC.

MODEL TRK-12
Assembly, Operating Controls
Specifications

Television Channels (Selector Switch Positions)

1	84 to 90 mc.
2	78 to 84 mc.
3	66 to 72 mc.
4	50 to 56 mc.
5	44 to 50 mc.

Over-all Video Band Width .... 4 mc.
Scanning .... Interlaced, 441 Line
Horizontal (Line) Scanning Frequency (Sawtooth Wave) . 13,230 cps
Vertical (Field) Scanning Frequency (Sawtooth Wave) .... 60 cps
Frame Frequency (Picture Repetition Rate) .... 30 cps

Picture Size (Approx. Mask Dimensions)
TRK-9 .... 5½ x 7¼ in.
TRK-12 .... 7⅜ x 9¾ in.

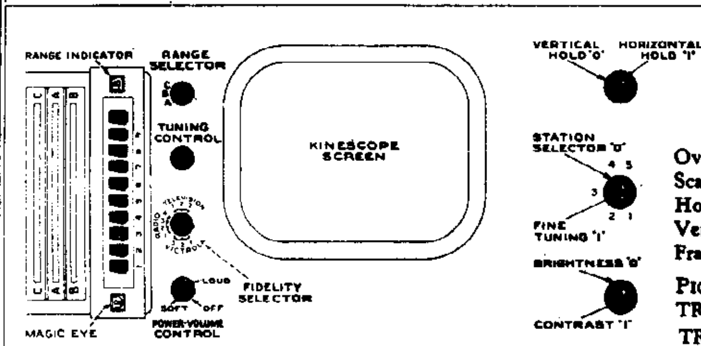


Figure 2—Operating Controls, TRK-12

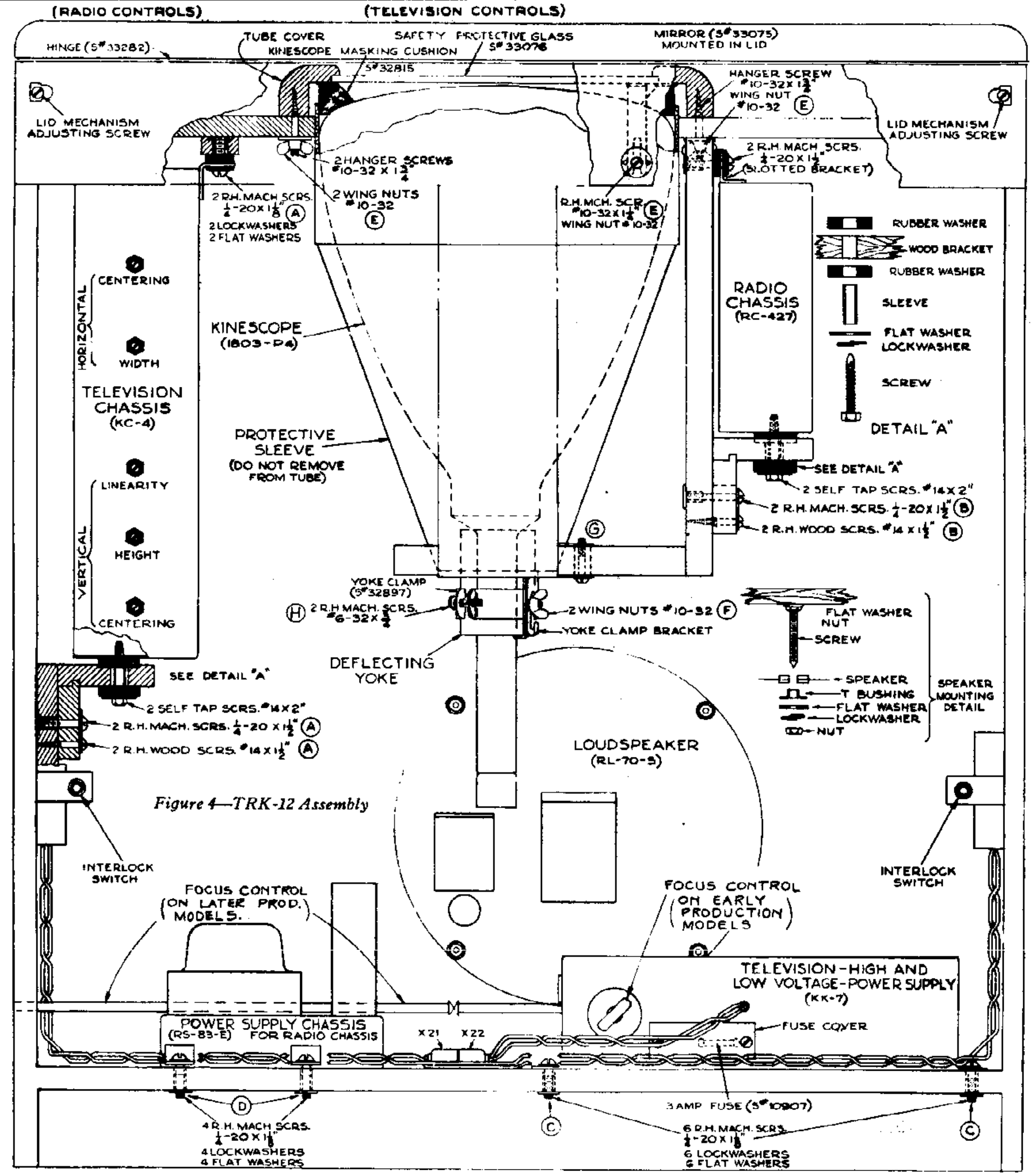


Figure 4—TRK-12 Assembly

MODELS TRK-9, TRK-12
Cabinet Wiring
Socket

RCA MFG. CO., INC.

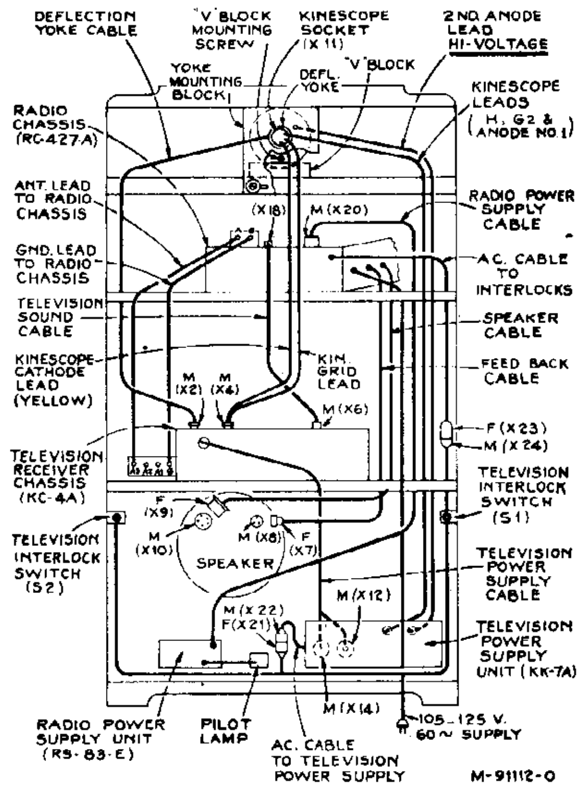


Figure 3—Cabinet Wiring—Model TRK-9

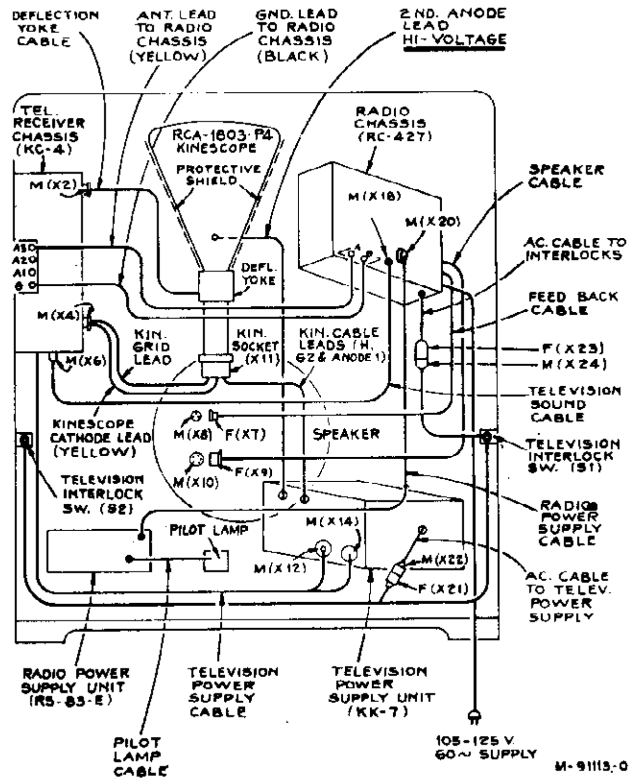
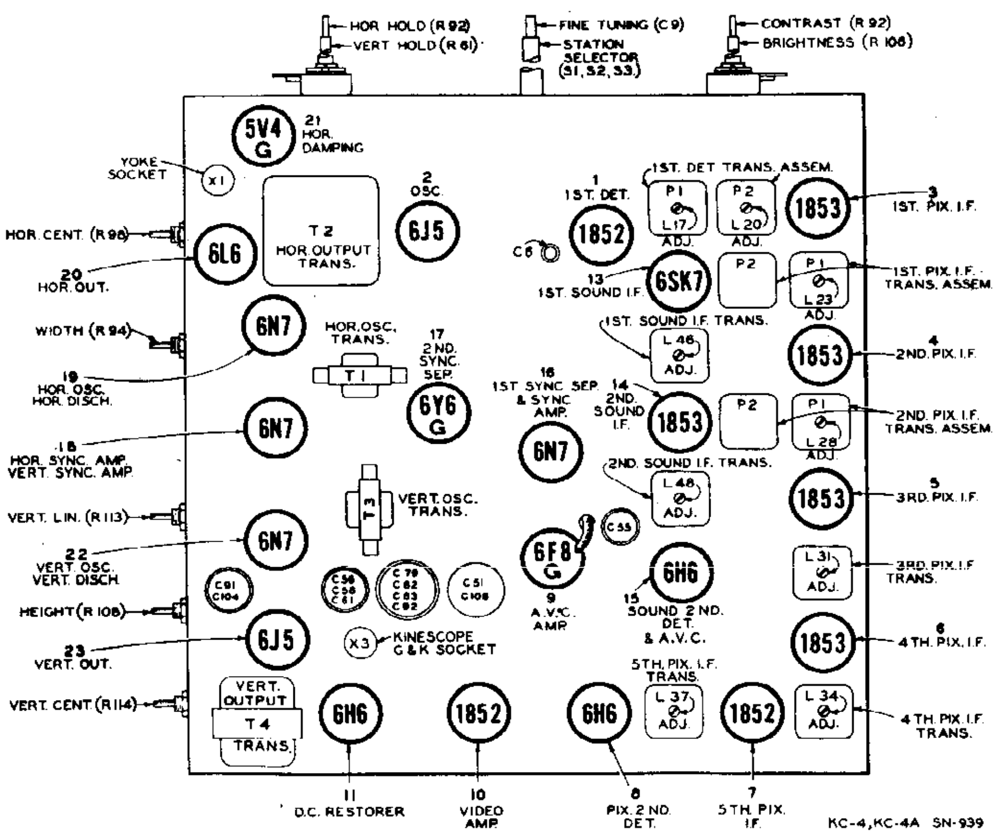
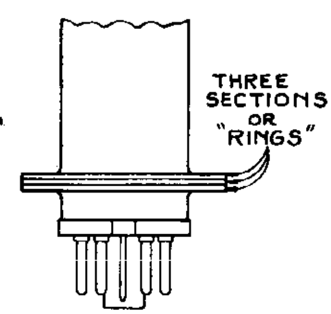


Figure 3a—Cabinet Wiring—Model TRK-12



At Left—Figure 5
Top View Video Chassis



(Above) Figure 6
Recommended Type
6L6 Identification

RCA MFG. CO., INC.

MODELS TRK-9, TRK-12
Video Voltage

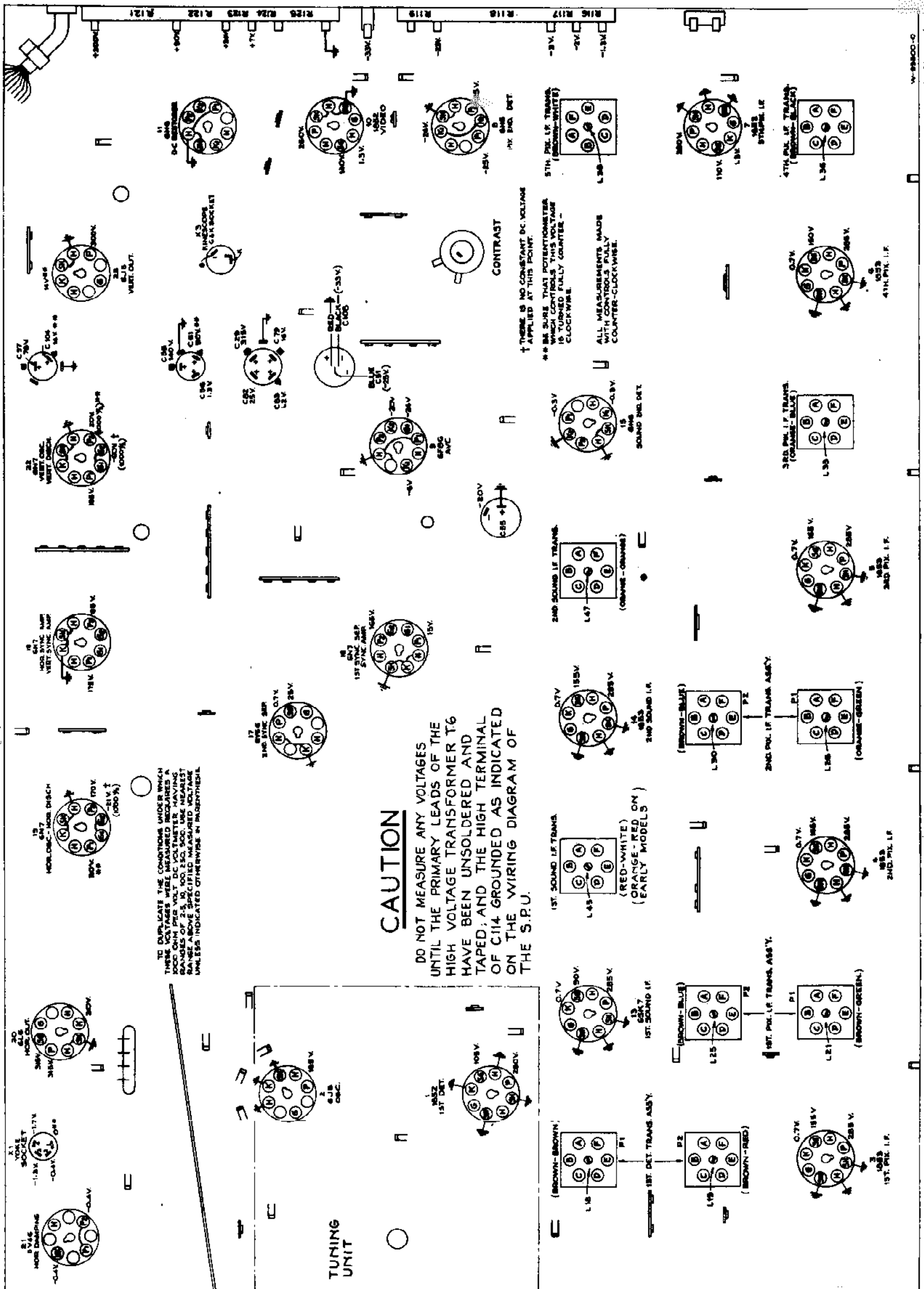


Figure 8—Voltage Diagram

Measurements made to chassis unless otherwise indicated; with set tuned to quiet point and all controls and adjustments full counter-clockwise. Values should hold within ±20% with 117-volt a-c supply.

* **NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODELS TRK-9, TRK-12
SPU Chassis KK-7, KK-7A
Chassis Wiring

RCA MFG. CO., INC.

Socket Power Units KK7, KK7A

No attempt should ever be made to measure the high (7,500 volts) voltage because of the difficulties and dangers involved. If, at any time it becomes necessary to service the SPU, the suspected parts should be replaced by parts known to be in good operating condition.

These precautions should be observed when any work on the SPU is being done:

1. Remove power supply cord from the power supply socket.
2. Use only one hand at a time. It is advisable to keep the other hand in one's pocket.
3. Connect a shorting lead between ground (first) and the high voltage side of C-114.
4. Whenever working with the oil-filled capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.
5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

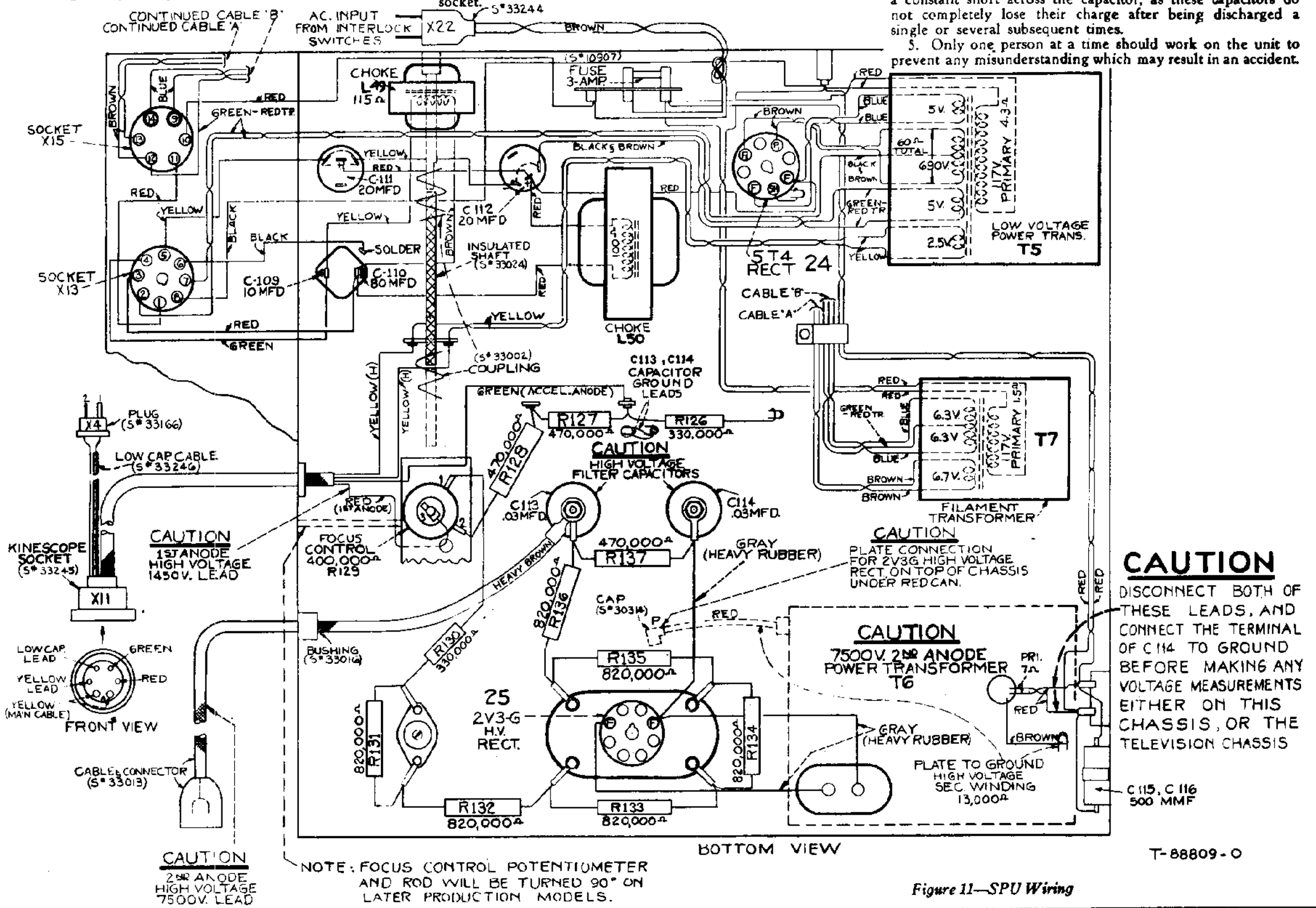


Figure 11—SPU Wiring

RCA MFG. CO., INC.

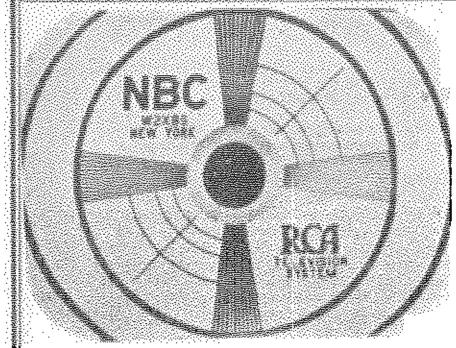


Figure 2 CORRECT PICTURE

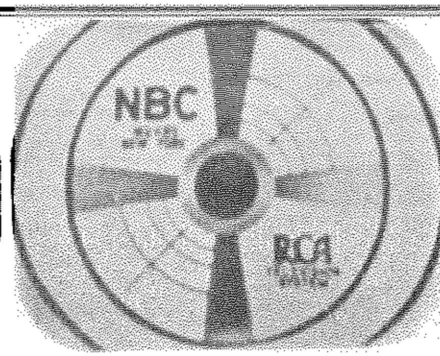


Figure 3 INCORRECT FOCUS
To correct—*Adjust Focusing Control for sharpest image*

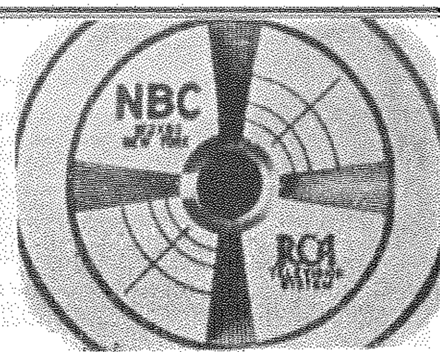


Figure 4 TOO MUCH CONTRAST
To correct—*Turn Contrast Control counterclockwise and Brightness Control clockwise*

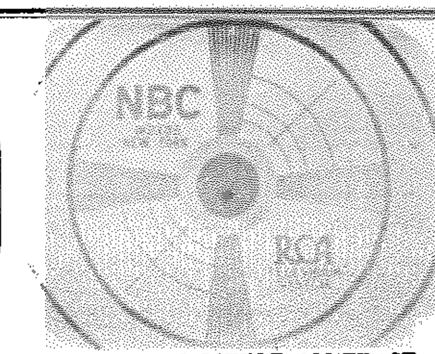


Figure 5—**TOO LITTLE CONTRAST**
To correct—*Turn Contrast Control* ***clockwise*** *and* ***Brightness Control counterclockwise***

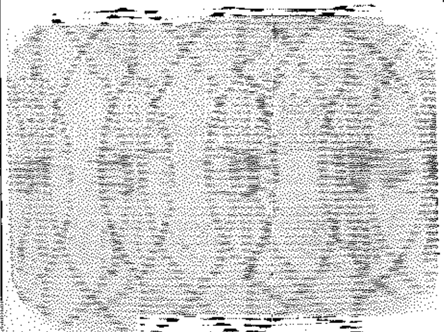


Figure 6—INCORRECT HORIZONTAL HOLD
To correct—*Adjust Horizontal Hold Control until picture "locks in"*

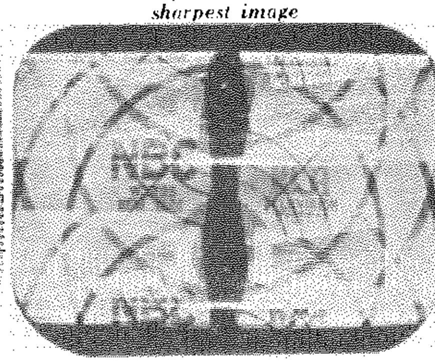


Figure 7—INCORRECT VERTICAL HOLD
To correct—*Adjust Vertical Hold Control until picture "locks in"*

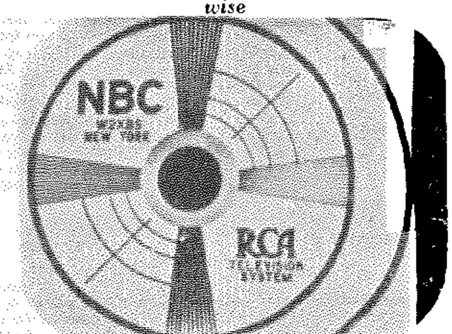


Figure 8—INCORRECT HORIZONTAL CENTERING
To correct—*Adjust Horizontal Centering Control (screwdriver adjustment) to center picture horizontally*

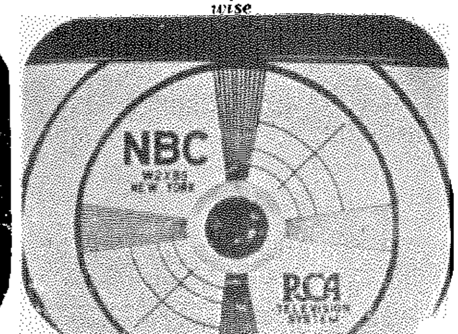


Figure 9—**INCORRECT VERTICAL CENTERING**
To correct—***Adjust*** *Vertical* ***Centering Control*** *(screwdriver adjustment) to* ***center picture vertically***

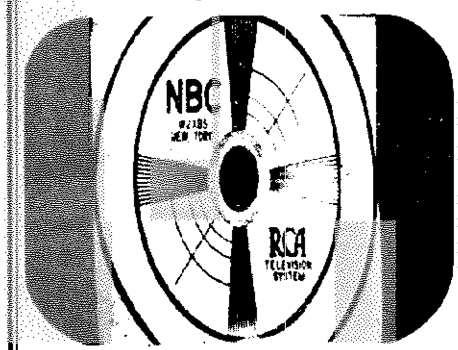


Figure 10—**INCORRECT WIDTH**
To correct—*Adjust Width* ***Control*** *(screwdriver adjustment) for correct width of picture*

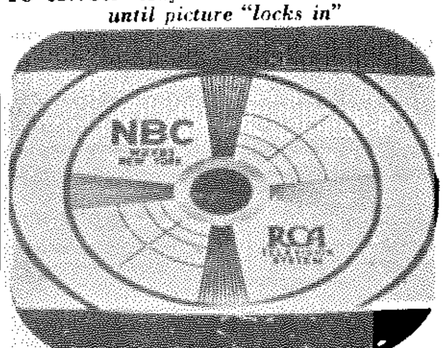


Figure 11—INCORRECT HEIGHT
To correct—*Adjust Height Control (screwdriver adjustment) for correct height of picture*

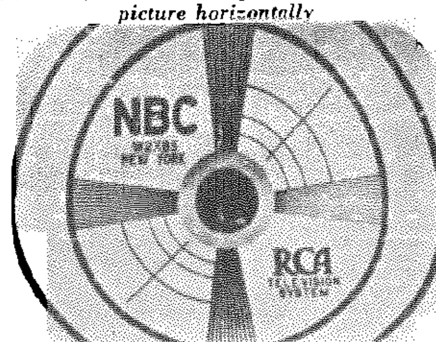


Figure 12—INCORRECT VERTICAL LINEARITY—(Circles flattened at bottom)
To correct—*Turn Vertical Linearity Control counterclockwise and Height Control clockwise (screwdriver adjustments)*

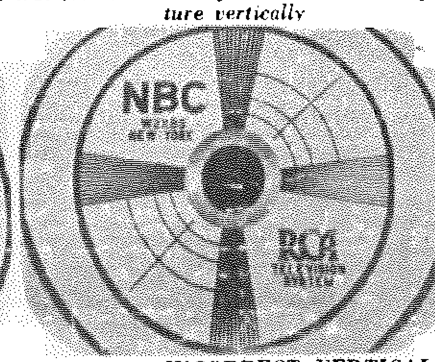


Figure 13—INCORRECT VERTICAL LINEARITY—(Circles flattened at top)
To correct—*Turn Vertical Linearity Control clockwise and Height Control counterclockwise (screwdriver adjustments)*

RCA MFG. CO., INC.

MODELS TRK-9, TRK-12

The RCA Model TRK 12 Television and All Wave Sound Receiver is designed for operation on the present Television Broadcast Bands between 44 and 90 megacycles to reproduce both picture and sound transmissions, and to receive Radio Broadcasts on the three standard major radio bands between 550 and 22,000 kilocycles.

Antenna

A television receiving antenna and its installation must conform to much higher standards than an antenna for reception of international Short Wave and Standard Broadcast signals because:

(1) At the short wave lengths employed, intervening obstacles have a pronounced shielding effect, causing low intensity signals, and often severe trouble with multi-path transmissions; these produce blurring and multi-images.

(2) The picture signal is comprised of a very wide band or range of frequencies, all of which must be received with good efficiency.

Only an RCA Television Antenna which has been designed for the particular instrument should be used with the TRK 12 to insure best results. Three types are available:

1. The Double "V" Type, Stock No. 9870.
2. The Double Dipole, Stock No. 9871.
3. The Double Dipole, Stock No. 9871, with Reflector, Stock No. 9872.

Under favorable conditions, good pictures may be obtained with the Double "V" Wire Type. In areas of weak signals or where interference or double images mar the picture a Double Dipole or Double Dipole and Reflector become necessary.

Full instructions accompany all RCA Television antennas and these instructions must be followed implicitly.

The two leads from the antenna transmission line are for connection to the terminals A1 and A2 showing at the back of the cabinet of the television receiver. *Terminal G must be connected to a good ground such as a cold water pipe.* Terminals A3 and G are connected to the Radio chassis and the circuit is designed so that the Television Antenna is also used for Standard Broadcast and Short-Wave Radio Reception.

An RCA Radio Antenna such as the RCA Magic Wave or RCA Spider-web may be installed. The connection from "A" on the terminal board on the radio chassis to "A3" on the terminal board on the Television chassis must then be removed and the leads from the radio antenna connected to the radio chassis in accordance with the instructions accompanying the antenna. The connection from "G" on the Radio chassis to "G" on the Television chassis must not be removed.

A good ground connection from the terminal "G" on the antenna terminal board to a cold water pipe or equivalent "good ground" is absolutely necessary to avoid possible danger from electric shock.

TELEVISION

The picture is formed on the Kinescope screen under the lid and is reflected in the mirror on the lid. The lid when opened must be set at the correct angle for best viewing of the picture. Once your TRK 12 is installed and giving good reception, the controls on the panel under the lid are all that are necessary for satisfactory pictures and sound. If the instrument is moved to another location in the home, the screwdriver-operated controls in the back, and also the Kinescope yoke, may have to be reset. *The ground connection to the antenna terminal board must always be reconnected.*

Controls

There are three dual control knobs for Television to the right of the screen, and four single control knobs in the Radio section to the left. Two of these single control knobs are all purpose controls and are used on Television, Radio and Phonograph reproductions. See Figure 1.

Power-Volume Control.—The knob nearest the front of the cabinet on the left hand side turns on the power to the receiver when rotated clockwise from its extreme "Off" position. Rotating it further increases sound volume for Television, Radio, or Phonograph (when an attachment is used).

Fidelity-Selector.—The second knob from the front in the Radio section selects the type of entertainment i.e. "Victrola," "Radio" or "Television."

Turned to the position marked "Victrola" it provides for operation of a Victrola Attachment such as the RCA R-100 or R-93-C. There are three variations of tone possible:

(1) Fully counterclockwise modifies tone, reducing surface noise on old recordings and emphasizing low tones.

(2) The middle Victrola point minimizes base response, thus emphasizing higher tones.

(3) The next point in a clockwise direction sets the instrument for full tone phonograph reproduction.

The position, marked "Radio," sets the instrument for Radio reception and provides four variations of radio tone control. Turning clockwise these are:

(1) Reduction of static and circuit hiss, and emphasis on low tones.
(2) Speech point with a modification of low tones.
(3) Full tone reception for normal reproductions.
(4) High Fidelity reception for special musical programs giving all the tone values possible.

The position marked "Television" sets the instrument for Television reception. The first and second points, give modified tones as for the "Victrola" position, points (1) and (2), and the third point (3) gives full tone reception.

Horizontal and Vertical Hold Controls.—The dual knob at the back of the panel on the right controls the picture stability. The inner section designated by a "I" is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture "locks in" horizontally. Figure 6 shows the effect of incorrect setting of the control.

The outer ring section designated by "O" is the Vertical Hold Control and when being set should be turned to the point where the picture "locks in" vertically. See Figure 7.

These two controls on this dual knob should not ordinarily require re-adjustment after good picture reception has once been obtained. An occasional resetting will be necessary due to changing to a different station, and to the gradual ageing of the tubes.

Station Selector and Fine Tuning.—The outer ring "O" section of the central dual control knob on the right hand side of the panel selects the station from which it is desired to receive television transmissions. The range covers five television channels:

(1) 84 to 90 M.C.
(2) 78 to 84 M.C.
(3) 66 to 72 M.C.
(4) 50 to 56 M.C.
(5) 44 to 50 M.C.

The inner "I" section of this knob is used to obtain best picture reception by elimination of distortion resulting from interfering radio signals. These interfering signals show as a moving ripple in the picture. Adjustment of this knob will often eliminate the interference. A slight downward pressure must be exerted on the knob while turning.

Contrast and Brightness Controls.—The inner "I" Contrast section of the dual knob near the front of the cabinet on the right regulates the sensitivity of the receiver, varying the black and white tones of the picture being received. Too much contrast gives blurred details and a lack of half-tones, while too little contrast makes it all half-tones or grays. Turning clockwise increases contrast from grays, to black and white. See Figures 2, 4 and 5.

The outer ring "O" is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See Figures 2, 4 and 5.

Focusing Control.—This control is a knob located on the back of the cabinet near the bottom and is used for adjustment of the picture focus. This adjustment affects the sharpness (detail observable) of the picture and must be carefully made when the receiver is first placed in operation. It may be checked occasionally to insure continuous best focusing. See Figure 3.

Pilot Light.—A little jewel pilot light at the bottom of the front of the cabinet tells when current is on.

Other Controls.—There are five other controls on the television chassis. All of these will be permanently adjusted at the time the TRK 12 is installed, but may require occasional resetting. These controls are accessible from the back of the cabinet. See Figure 15. They are adjustable by means of a screwdriver through a vertical row of holes in the left side of the back of the cabinet towards the top.

Receiving the Picture

To obtain picture reception, open the lid of the cabinet and:

1. Turn the Fidelity-Selector Control on the radio panel to "Television," fully clockwise.

2. Turn Power-Volume Control on radio panel clockwise and advance about half way.

3. Set the Station Selector on the Television panel to the desired television station 1-2-3-4 or 5.

4. Turn the Contrast Control fully counterclockwise and then turn Brightness Control slowly until illumination of the screen almost disappears. Advance the Contrast Control until the picture appears at its best as viewed in the mirror on the lid. The Contrast Control turned too far clockwise causes blurring. Make final adjustment for best picture by adjusting both the Contrast and Brightness Controls.
The illustrations shown in Figures 2, 4 and 5 give an idea of the effect of the Brightness and Contrast Controls. Incorrect setting has effects somewhat similar to under and over exposure on photographic prints.

5. If the picture is not steady, the "Hold" controls will require slight readjustment. If the picture is moving sideways the Horizontal Hold (inner "I" section of the knob) requires readjustment. If the picture is moving up or down or is off position, then the outer ring "O" of the knob, Vertical Hold Control, requires readjustment. See Figures 6 and 7.

6. Adjust the Volume Control and the Tone Control (Fidelity-Selector knob) for best sound reception.

7. If an interfering ripple is observed in the picture, adjustment of the Fine Tuning knob may reduce or eliminate the distortion.

8. If the picture appears out of focus, carefully turning the Focusing Control knob on the back of the cabinet will remedy the condition.

As long as the Television Receiver is not moved in any way, only an occasional setting of the other controls will be required.

A spot in the center and also a slight discoloration of the television screen may gradually appear as the Kinescope ages. This is normal and in no way affects good picture reproduction.

Television Fixed Controls

1. **Horizontal Centering.**—This is a screwdriver adjustment at the top of the row. It serves to center the picture horizontally on the Kinescope screen and is made at the time of installation of the receiver. It may require resetting, due primarily to the earth's magnetic field, if the receiver location is changed, the cabinet turned around, or the Kinescope replaced. Figure 8 shows the effect of incorrect setting of this control.

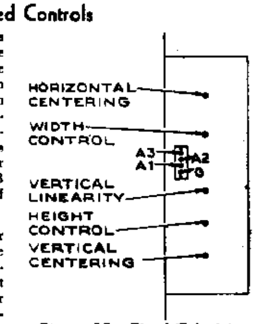


Figure 15—Fixed Television Controls

2. **Width.**—The next screwdriver control determines the width of the picture and is adjusted when the receiver is installed. Further adjustment may occasionally be necessary in order to compensate for the gradual reduction in horizontal deflection with tube life. See Figure 10.

3. **Vertical Linearity.**—The third control is operated in conjunction with the Height Control, No. 4, to give the correct vertical proportions to the picture. It may require readjustment due to changing of the Height Control and due to the gradual ageing of the tubes. See Figures 12 and 13. If the picture fills the frame but is crowded near the top, turn Vertical Linearity Control clockwise and Height Control counterclockwise. If crowded towards the bottom, turn these two controls in the reverse directions.

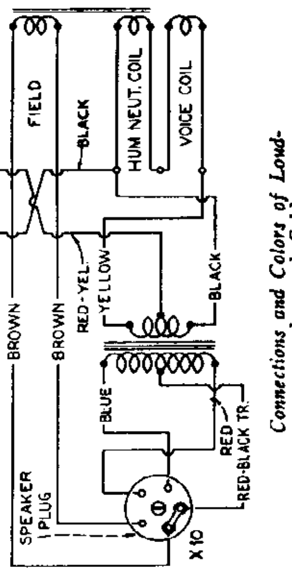
4. **Height.**—The fourth control determines the height of the picture and is adjusted in conjunction with Vertical Linearity when the receiver is installed. Further adjustment will occasionally be necessary in order to compensate for the gradual reduction in vertical deflection with tube life. See Figure 11.

5. **Vertical Centering.**—The screwdriver adjustment at the bottom of the row serves to center the picture vertically on the Kinescope screen and is made at the time of installation. It will require resetting whenever the receiver location is changed, the cabinet turned around, or the Kinescope replaced. See Figure 9.

MODEL TRK-9
Operating Controls
Chassis RC-427A
Loud Speaker Connections
MODEL TRK-12
Chassis RC-427
Socket, Speaker Connections

RCA MFG. CO., INC.

MODELS TRK-5, TT-5
MODELS TRK-9, TRK-12
Video Band Switch Wiring
MODELS TRK-9, TRK-12
SPU Chassis RS-83E Schematic



Connections and Colors of Loud-speaker and Cable

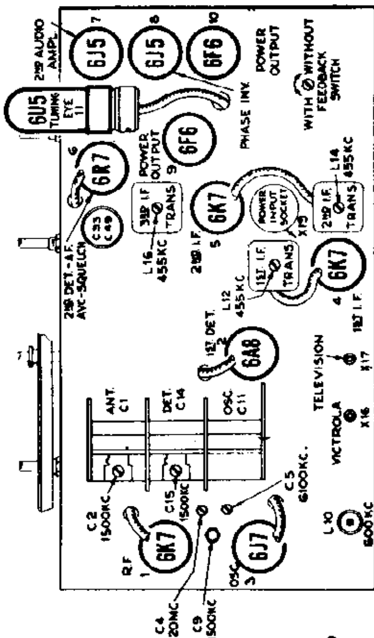


Figure 7—R. F. Unit Wiring

P-84672-O

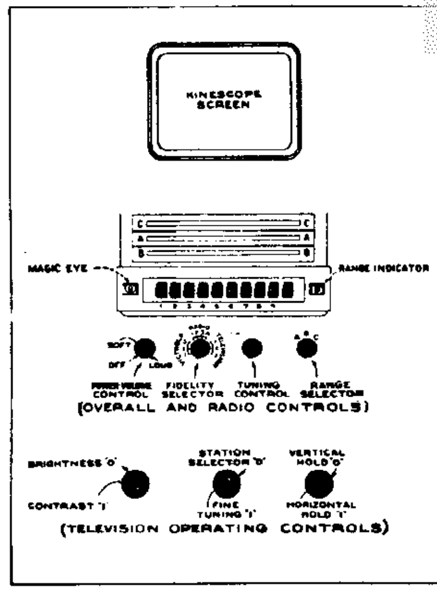
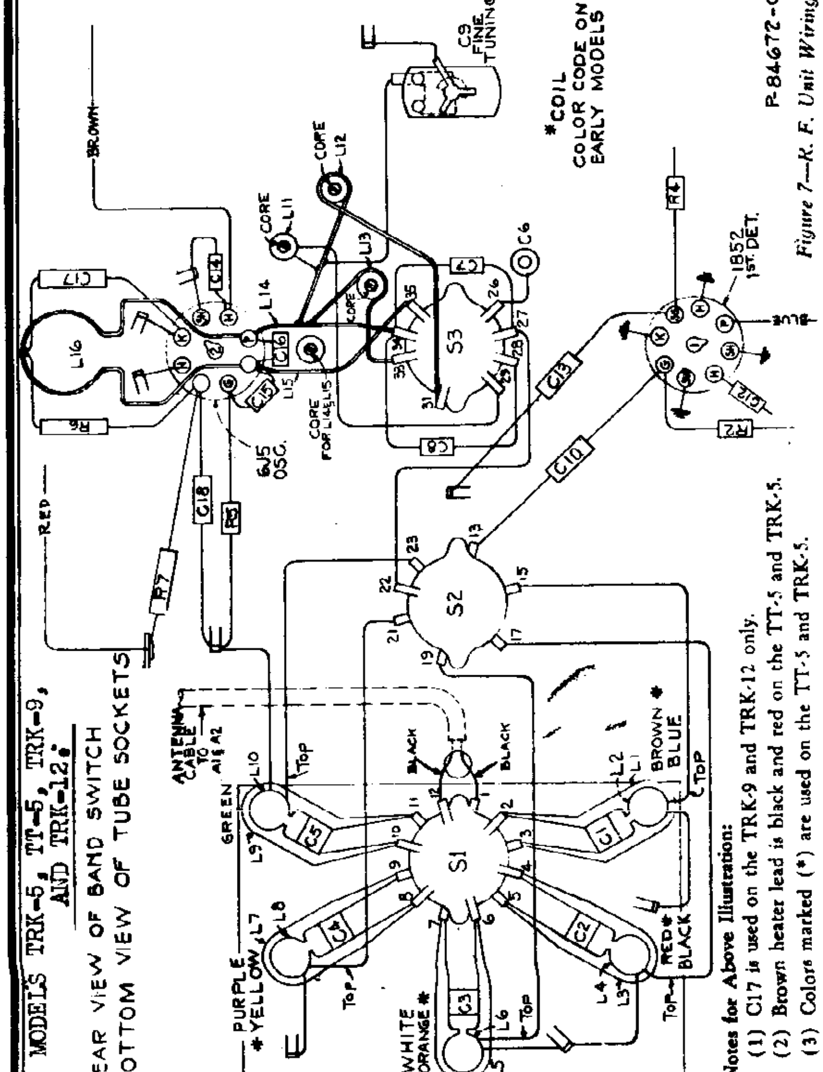


Figure 1—Operating Controls, TRK-9

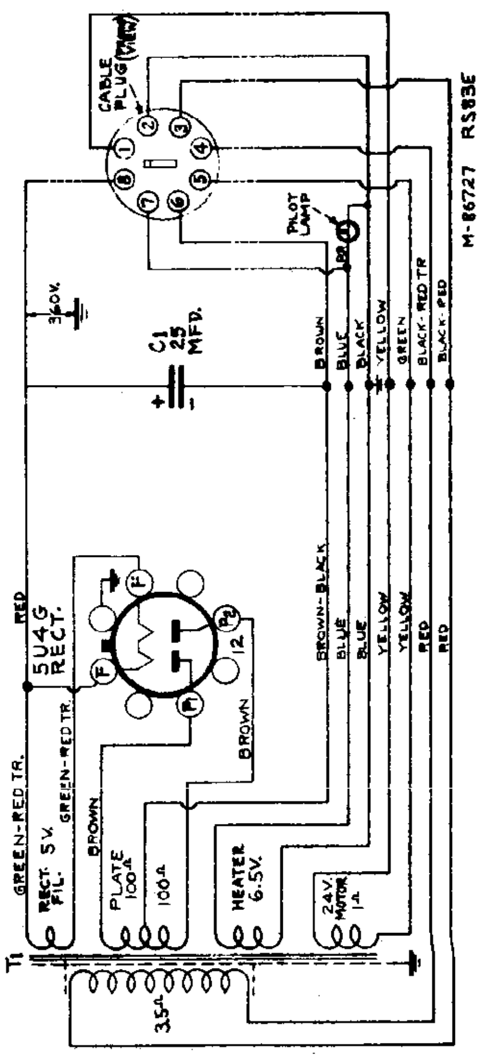
MODELS TRK-5, TT-5, TRK-9, AND TRK-12

REAR VIEW OF BAND SWITCH
BOTTOM VIEW OF TUBE SOCKETS



*COIL COLOR CODE ON EARLY MODELS

Notes for Above Illustration:
(1) C17 is used on the TRK-9 and TRK-12 only.
(2) Brown heater lead is black and red on the TT-5 and TRK-5.
(3) Colors marked (*) are used on the TT-5 and TRK-5.



M-86727 RS83E

SPU Schematic Diagram, RS-83E

MODELS TRK-9, TRK-12
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

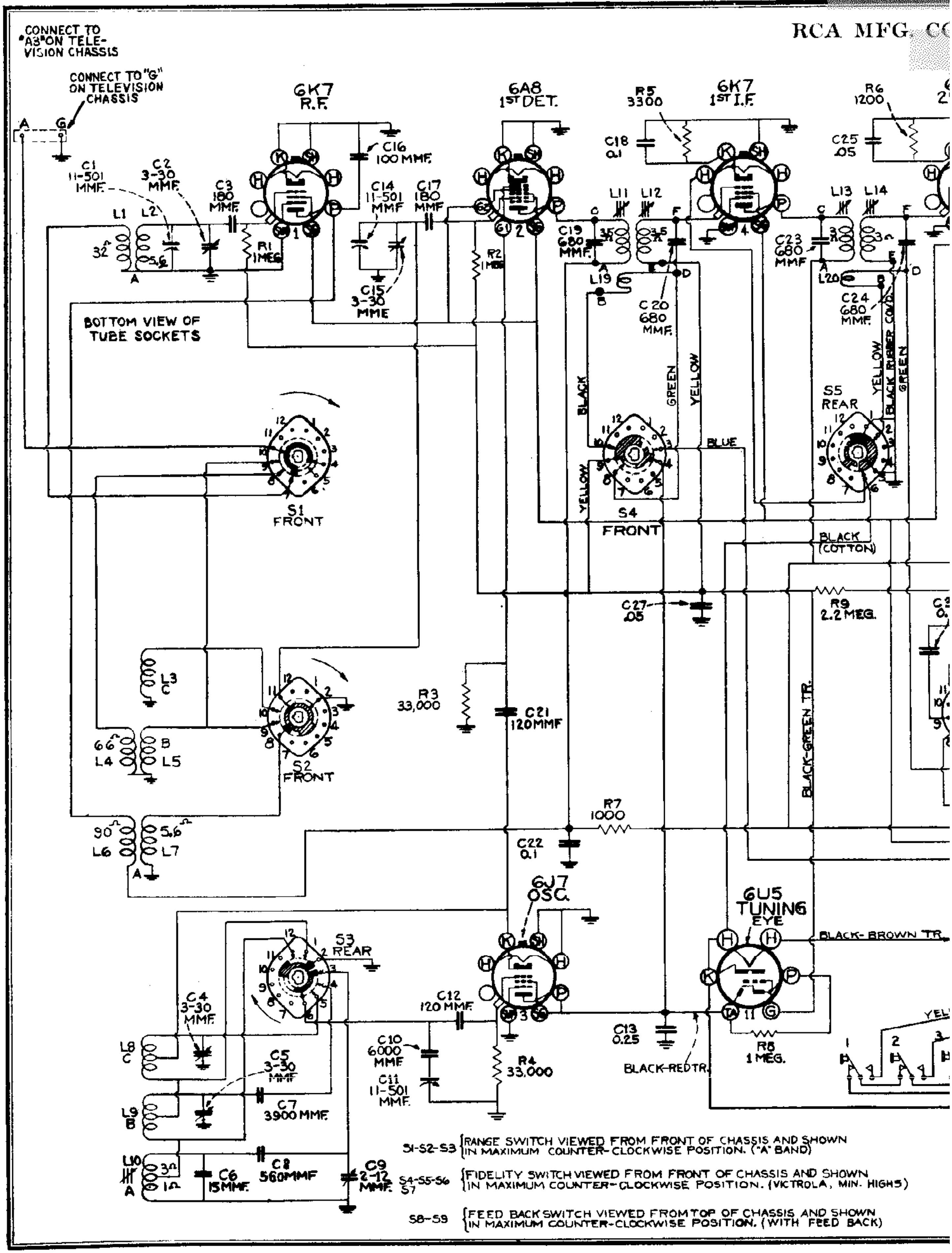
STOCK No.	DESCRIPTION	Unit List Price
	TELEVISION CHASSIS ASSEMBLIES	
	KC-4 in TRK-12	
	KC-4A in TRK-9	
33387	Adjuster—Magnetite core and stud in tube for high frequency oscillator circuit adjustment (Used with L11, L12, L14, L15)	.55
33835	Adjuster—Magnetite core and stud in tube, for high frequency oscillator circuit adjustment (Used with L13)	.60
31253	Board—4 terminal antenna-ground terminal board	.25
12834	Capacitor—Adjustable plunger type air trimmer (C6)	.60
33097	Capacitor—4.7 mmfd., (neg. temp. coeff.) (C69)	.34
33478	Capacitor—5.6 mmfd., 500 volts (C7)	.40
33476	Capacitor—8.2 mmfd., 500 volts (C8)	.40
33381	Capacitor—8.2 mmfd. (neg. temp. coeff.) (C71)	.40
33380	Capacitor—12 mmfd., 600 volts (C24)	.40
33100	Capacitor—18 mmfd., 600 volts (neg. temp. coeff.) (C19, C23)	.40
14021	Capacitor—22 mmfd. (C50)	.35
33101	Capacitor—22 mmfd. (neg. temp. coeff.) (C44)	.40
33111	Capacitor—33 mmfd., 500 volts (C15)	.35
33102	Capacitor—47 mmfd. (neg. temp. coeff.) (C30, C35, C66)	.45
33103	Capacitor—68 mmfd., 600 volts (C31, C36, C25, C40, C44, C49) (neg. temp. coeff)	.35
33477	Capacitor—80.5 mmfd., 500 volts (C16)	.45
33104	Capacitor—82 mmfd. (neg. temp. coeff.) (C21, C22)	.45
33106	Capacitor—115 mmfd. (C5)	.30
33107	Capacitor—135 mmfd. (C4)	.30
12725	Capacitor—150 mmfd., 400 volts (C10, C87)	.35
33108	Capacitor—190 mmfd. (C3)	.30
12488	Capacitor—270 mmfd. (C81)	.35
33109	Capacitor—320 mmfd. (C2)	.30
33110	Capacitor—390 mmfd. (C1)	.30
32788	Capacitor—820 mmfd., 400 volts (C84, C89)	.40
12635	Capacitor—1000 mmfd., 400 volts (C90)	.50
13580	Capacitor—1800 mmfd., 400 volts (C17)	.50
4881	Capacitor—3300 mmfd., 400 volts (C102)	.30
33584	Capacitor—.005 mfd., 1200 volts (C11, C12, C13, C14, C18, C20, C26, C27, C29, C32, C33, C34, C37, C38, C39, C41, C42, C43, C45, C46, C47, C48, C52, C60, C62, C63, C65, C67, C68, C70, C75, C98, C99, C100)	.25
4937	Capacitor—.01 mfd., 1000 volts (C74)	.25
4870	Capacitor—.025 mfd., 400 volts (C107)	.20
30682	Capacitor—.05 mfd., 200 volts (C94, C95)	.20
32787	Capacitor—.05 mfd., 400 volts (C28)	.20
4838	Capacitor—.05 mfd., 400 volts (C91)	.20
4839	Capacitor—0.1 mfd., 400 volts (C73, C53, C77, C78, C85, C59, C88, C103)	.30
12484	Capacitor—0.25 mfd., 350 volts (C86, C93, C101, C106, C80, C76, C105)	.30
12741	Capacitor—.5 mfd. (C57)	.30
32015	Capacitor—1.0 mfd., 150 volts (C54)	.60
33158	Capacitor—10 mfd., 150 volts, 20 mfd., 25 volts, (C97, C104)	1.00
33159	Capacitor—10 mfd., 350 volts, 10 mfd., 150 volts, 250 mfd., 15 volts (C58, C61, C56)	1.60
33160	Capacitor—10 mfd., 350 volts, 10 mfd., 150 volts, 20 mfd., 25 volts, 20 mfd., 25 volts (C92, C79, C82, C83)	1.60
32045	Capacitor—16 mfd. (C96)	.70
33475	Capacitor—20 mfd., 25 volts (C55)	.75
33161	Capacitor—20-50 mfd., 25 volts (C51, C108)	1.45
33248	Coil—Oscillator coil with core and stud (L11)	.65
33234	Coil—1-½ turn antenna coil, core, stud and capacitor assembly (C5, L9, L10) (green)	1.10
33647	Coil—2 turn antenna coil, core, stud and capacitor assembly (C4, L7, L8) (yellow or purple)	1.10
33646	Coil—3 turn antenna coil, core, stud and capacitor assembly (C3, L5, L6) (orange or white)	1.10
33645	Coil—5-½ turn antenna coil, core, stud and capacitor assembly (C2, C3, L4) (red or black)	1.10
33644	Coil—7-½ turn antenna coil, core, stud and capacitor assembly (C1, L1, L2) (brown or blue)	1.10
33535	Coil—Peaking coil and 10 megohm resistor assembly (L39, R44)	.55
33534	Coil—Peaking coil and 3900 ohm resistor assembly (L40, R48)	.55
33536	Coil—Peaking coil and 15,000 ohm resistor assembly (L41, R54)	.55
33537	Coil—Peaking coil and 10 megohm resistor assembly (L42, R56)	.55
33228	Condenser—Oscillator "Fine tuning" condenser, located on range switch (C9)	2.10
33164	Control—Dual 1.2 meg. and 50,000 ohms "Vertical hold" and "Horizontal hold" controls (R106, R92)	2.60

STOCK No.	DESCRIPTION	Unit List Price
33206	Control—6 ohm tapped "Horizontal centering" control (R98)	1.50
33210	Control—20 ohm tapped "Vertical centering" control (R114)	1.50
33162	Control—4000 ohm, "Contrast" control (R45)	1.00
33209	Control—5600 ohm, "Vertical linearity" control (R113)	1.00
33163	Control—60,000 ohms "Brightness" control (R61)	1.00
33207	Control—560,000 ohm "Width" control (R94)	1.00
33208	Control—2.7 meg. "Height" control (R108)	1.00
33002	Coupling—Flexible Bronze coupling, located on control shaft end of "contrast" control	.10
33383	Coupling—Flexible Bronze coupling located on panel shaft end of "contrast" control	.10
4574	Plug—6-prong male plug for Television chassis power supply cable (X14)	.48
18836	Plug—3-prong male plug for Television chassis power supply cable (X12)	.25
32723	Resistor—10 ohms, 1 watt (R126)	.22
33325	Resistor—Voltage divider comprising a 36-100-7.4 and 5 ohm section (R119, R118 R117, R116)	.80
14074	Resistor—82 ohms, ½ watt (R64, R67, R14, R21, R28, R34)	.20
14439	Resistor—100 ohms, ½ watt (R53)	.20
13428	Resistor—150 ohms, ½ watt (R39)	.20
13219	Resistor—270 ohms, 2 watts (R97)	.25
30499	Resistor—470 ohms, ½ watt (R90, R95)	.20
33326	Resistor—Voltage divider comprising a 600-300-3100-5455 and 13,000 ohm section (R125, R124, R123, R122, R121)	1.30
14720	Resistor—1000 ohms, ½ watt (R9, R65, R70, R18, R41, R26, R31, R37, R42)	.20
14993	Resistor—1200 ohms, 1/10 watt (R17)	.15
12267	Resistor—1200 ohms, ½ watt (R115)	.20
14499	Resistor—1500 ohms, ½ watt (R8, R24)	.20
31920	Resistor—1800 ohms, 1/10 watt (R16, R23, R30)	.15
12194	Resistor—1800 ohms, ½ watt (R112)	.20
11863	Resistor—2200 ohms, 1/10 watt (R38)	.15
13486	Resistor—2200 ohms, 1 watt (R6)	.22
13031	Resistor—3300 ohms, 1/10 watt (R19, R26)	.15
12312	Resistor—3300 ohms, ½ watt (R77, R87)	.20
30150	Resistor—3300 ohms, 1 watt (R7, R57)	.22
12956	Resistor—3900 ohms, ½ watt (R109)	.20
30146	Resistor—4700 ohms, ½ watt (R83, R99)	.20
31789	Resistor—5600 ohms, 1/10 watt (R12)	.15
12265	Resistor—6800 ohms, ½ watt (R11)	.20
14076	Resistor—8200 ohms, ½ watt (R101, R102, R103)	.20
14559	Resistor—10,000 ohms, ½ watt (R20, R27, R33, R13, R58, R82, R84, R86, R100, R74)	.20
13097	Resistor—10,000 ohms, 1 watt (R79, R80)	.22
13594	Resistor—15,000 ohms, 1/10 watt (R43)	.15
14281	Resistor—22,000 ohms, 1/10 watt (R71)	.15
13998	Resistor—22,000 ohms, ½ watt (R47, R49)	.20
12738	Resistor—27,000 ohms, ½ watt (R91)	.20
11300	Resistor—33,000 ohms, 1/10 watt (R10) (early production only)	.15
12454	Resistor—33,000 ohms, ½ watt (R5)	.20
12412	Resistor—47,000 ohms, ½ watt (R93) (R10—Late production only)	.20
30650	Resistor—56,000 ohms, ½ watt (R55)	.20
12010	Resistor—68,000 ohms, 1/10 watt (R32, R35, R69)	.15
13716	Resistor—68,000 ohms, ½ watt (R63, R66)	.20
14135	Resistor—68,000 ohms, ½ watt (R15, R22, R29, R36, R40, R68)	.20
14023	Resistor—82,000 ohms, ½ watt (R78)	.20
14560	Resistor—100,000 ohms, ½ watt (R72, R85, R86, R89, R104)	.20
30189	Resistor—120,000 ohms, ½ watt (R4)	.20
12284	Resistor—220,000 ohms, ½ watt (R51, R111)	.20
12285	Resistor—470,000 ohms, ½ watt (R46, R59, R96)	.20
12413	Resistor—680,000 ohms, ½ watt (R50)	.20
13730	Resistor—1 meg., ½ watt (R1, R2, R76, R75, R73, R52, R60, R81)	.20
2546	Resistor—1 meg., 1 watt (R3)	.22
30208	Resistor—1.2 meg., ½ watt (R105)	.20
5026	Resistor—1.8 meg., ½ watt (R107)	.20
12679	Resistor—2.2 meg., ½ watt (R110)	.20
33229	Roller—Rubber friction roller for oscillator condenser drive. Part of range switch assembly	.10
33165	Socket—2-prong female socket for Video output to Kinescope (X3)	.25
33011	Socket—4-contact female socket for Kinescope deflecting yoke (X1)	.25
31251	Socket—8-contact octal type socket	.25
18007	Socket—Ceramic octal socket for 6L6 "Hor. out" and 6J5 "Osc."	.65
14278	Socket—Television audio output pin socket (X5)	.25
33227	Switch—Range switch with shield plate and mounting studs—less coils, condenser and friction roller (S1, S2, S3)	4.65

STOCK No.	DESCRIPTION	Unit List Price
33330	Transformer—"1st det. P1" I-F transformer (L17, L18) (br. and br.)	2.60
33331	Transformer—"1st det. P2" I-F transformer (L19, L20) (Brown and red)	2.80
33334	Transformer—"1st pix P1" I-F transformer (L21, L22, L23, L24) (Brown and green)	2.50
33335	Transformer—"1st pix P2" (L25) or "2nd pix P2" (L30) I-F transformer (brown and blue)	1.65
33333	Transformer—"1st sound" I-F transformer (L45, L46) (orange and red) (Used in early production)	2.40
33526	Transformer—"1st sound" I-F transformer (L46, L46) (red and white) (Used in late production)	2.50
33574	Transformer—"2nd pix P1" I-F transformer (L26, L27, L28, L29) (orange and orange)	2.60
33339	Transformer—"2nd sound" I-F transformer (L47, L48) (orange and orange)	2.60
33333	Transformer—"3rd pix" I-F transformer (L31, L32, L33) (orange and blue)	2.40
33336	Transformer—"4th pix" I-F transformer (L34, L35, L36) (brown and black)	2.00
33337	Transformer—"5th pix" I-F transformer (L37, L38) (brown and white)	1.80
32899	Transformer—Horizontal oscillation transformer (T1)	1.75
9862	Transformer—Horizontal output transformer (T2)	17.50
32900	Transformer—Vertical output transformer (T4)	5.60
32898	Transformer—Vertical oscillation transformer (T3)	1.75
	3-BAND RADIO RECEIVER CHASSIS	
	RC-427 IN TRK-12	
	RC-427A IN TRK-9	
31883	Board—Antenna-ground terminal board	.20
32232	Body—Station setting contact body and spring	.15
32090	Bracket—Motor mounting bracket	.40
31282	Bracket—Magic Eye mounting bracket and clip	.22
32635	Cable—Indicator pointer drive cable—60-in. length	.24
30768	Cap—"Magic Eye" cap	.15
14392	Capacitor—4.7 mmfd. (C46)	.36
31353	Capacitor—15 mmfd. (C6)	.40
31270	Capacitor—100 mmfd. (C41, C42)	.36
12720	Capacitor—100 mmfd. (C38, C16)	.35
12724	Capacitor—120 mmfd. (C12, C21)	.35
13003	Capacitor—180 mmfd. (C3, C17)	.35
12952	Capacitor—330 mmfd. (C39)	.35
31433	Capacitor—560 mmfd. (C8)	.35
31552	Capacitor—680 mmfd. (C19, C20, C23, C24)	.40
32197	Capacitor—3300 mmfd., 600 volts (C7)	.55
31405	Capacitor—6800 mmfd., 600 volts (C10)	.75
5107	Capacitor—.0025 mfd., 700 volts (C35, C36, [illegible])	.20
30303	Capacitor—.0035 mfd., 700 volts (C40, C54)	.40
33584	Capacitor—.005 mfd., 1200 volts (C53)	.25
4937	Capacitor—.01 mfd., 1000 volts (C37, C44, C43, C29)	.25
11315	Capacitor—.015 mfd., 400 volts (C31)	.20
4870	Capacitor—.025 mfd., 400 volts (C32, C50)	.20
32787	Capacitor—.05 mfd., 400 volts (C27, C25)	.20
4839	Capacitor—0.1 mfd., 400 volts (C22, C18, C26, C34, C52)	.30
12484	Capacitor—.25 mfd., 350 volts (C13, C28, C48, C45, C51)	.30
12741	Capacitor—0.5 mfd., 150 volts (C47)	.30
18550	Capacitor—20-20 mfd., 350 volts (C33, C49)	3.00
32088	Capacitor—Motor capacitor 40 mfd., 40 volts (C30)	.90
31263	Coil—"A" Band antenna coil (L1, L2)	.95
31265	Coil—"A" Band detector coil (L8, L7)	1.20
31298	Coil—"A" Band oscillator coil (L10)	1.05
31980	Coil—"B" and "C" Band antenna coil (L3, L4, L5)	.80
31795	Coil—"B" and "C" band oscillator coil (L8, L9)	1.05
31234	Condenser—3-gang variable condenser (C1, C11, C14, C2, C15)	6.45
12714	Condenser—Air trimmer condenser (C9)	.80
31292	Condenser—Double section trimmer capacitor 3-30 mmfd., each section (C4, C5)	.40
31971	Contact—Push button switch contacts comprising 11 contacts riveted on insulating strip	.65
31972	Contact—Push button switch contacts—comprising 14 contacts riveted on insulating strip	1.25
31231	Contact—Station setting contact tip	.06
33446	Control—"Power-volume control"—1-½ meg. (R12, S10, S11)	2.00
32834	Cord—Band indicator and variable condenser drive cord	.10
31269	Core—Core and stud for 1st, 2nd, or 3rd I-F transformer	.15
32093	Damper—Flywheel for rear end of motor shaft	.25
32096	Disc—Friction disc and pinion gear	.35
32091	Drive—Friction drive gear assembly	1.30

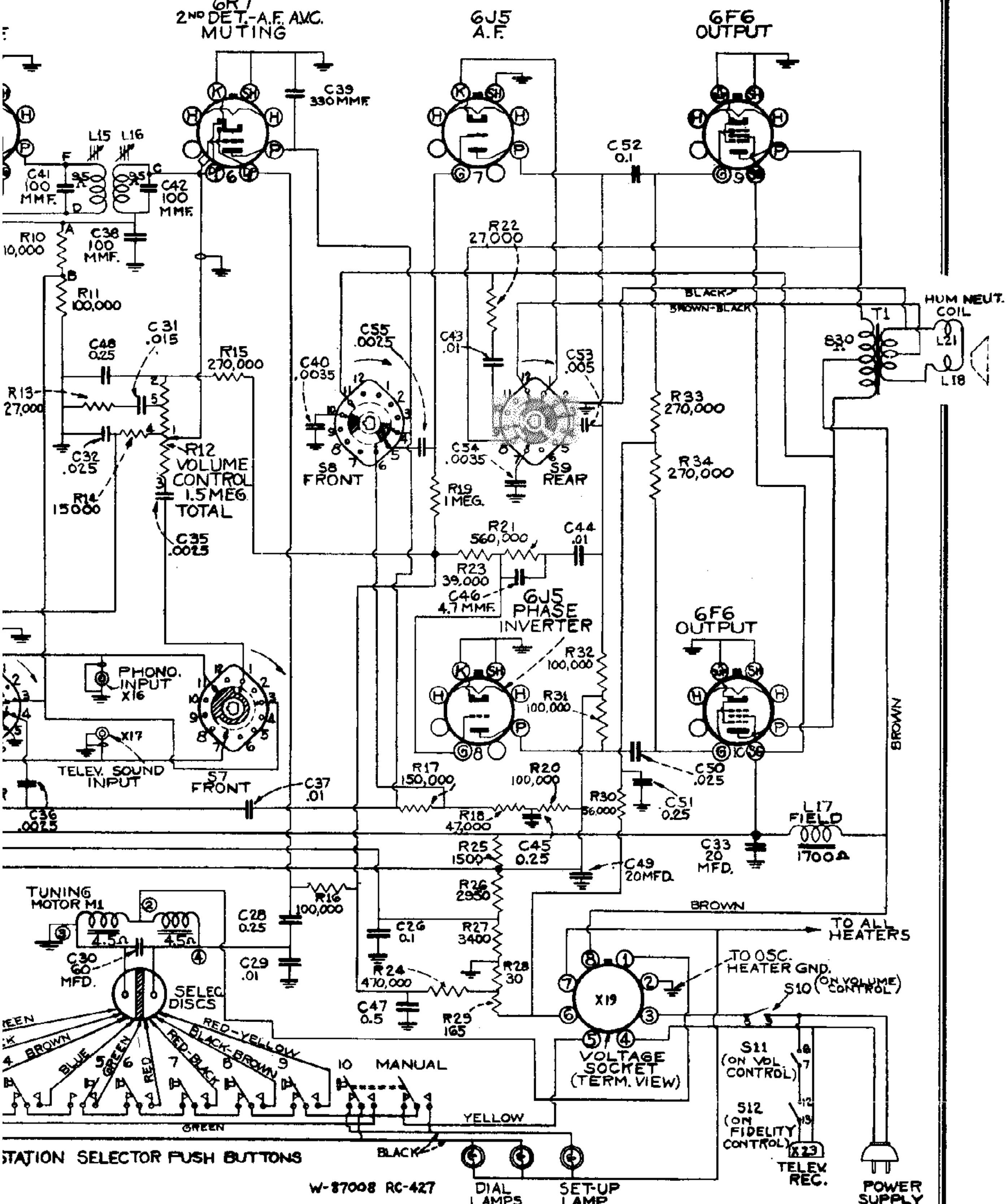
STOCK No.	DESCRIPTION	Unit List Price
31273	Drum—Variable condenser drive drum	.70
31239	Gear—Knob shaft drive gear and hub	.65
31632	Indicator—Band indicating strip (Model TRK-12 only)	.15
31304	Indicator—Band indicating strip (Model TRK-9 only)	.15
31480	Lamp—6.3 volt electric tuning set-up lamp Mazda No. 47	.20
11891	Lamp—6.3 volt dial lamp Mazda No. 44	.17
31969	Lockplate—Push button switch lockplate comprising 10 contact locks in 1 strip	.75
32095	Motor—Electric tuning drive motor complete (M1)	5.25
31228	Plate—Station selector contact plate — less plungers	.45
31227	Plate—Station selector mounting plate—mounts on rear of variable condenser	.50
12493	Plug—Female connector for speaker cable (X9)	.30
31271	Pulley—Drive pulley fastens on station selector knob shaft	.25
31280	Pulley—Indicator pointer drive cord pulley	.10
31272	Pulley—Range switch pulley	.20
14720	Resistor—1000 ohms, ½ watt (R7)	.20
12267	Resistor—1200 ohms, ½ watt (R6)	.20
12312	Resistor—3300 ohms, ½ watt (R5)	.20
14559	Resistor—10,000 ohms, ½ watt (R10)	.20
12695	Resistor—15,000 ohms, ½ watt (R14)	.20
12738	Resistor—27,000 ohms, ½ watt (R13)	.20
13477	Resistor—27,000 ohms, 1 watt (R22)	.22
12454	Resistor—33,000 ohms, ½ watt (R3, R4)	.20
12536	Resistor—39,000 ohms, ½ watt (R23)	.20
12412	Resistor—47,000 ohms, ½ watt (R18)	.20
12286	Resistor—56,000 ohms, ½ watt (R30)	.20
14560	Resistor—100,000 ohms, ½ watt (R11, R16, R20, R32, R31)	.20
14020	Resistor—150,000 ohms, ½ watt (R17)	.20
12199	Resistor—270,000 ohms, ½ watt (R15, R33, R34)	.20
18020	Resistor—470,000 ohms, 1 watt (R24)	.22
12436	Resistor—560,000 ohms, ½ watt (R21)	.20
12013	Resistor—1 meg., 1/10 watt (R8)	.15
13730	Resistor—1 meg., ½ watt (R1, R2, R19)	.20
12679	Resistor—2.2 meg., ½ watt (R9)	.20
31548	Resistor—Voltage divider consisting of one 1500, one 2950, one 3400, one 30 and one 3165 ohm section (R25, R26, R27, R28, R29)	.90
14887	Retainer—Drive cord pulley retainer	.01
32086	Roller—Rubber friction roller for front end of motor shaft	.10
31233	Rotor—Station selector rotor disc—mounts on rear of variable condenser shaft	1.16
5042	Screw—No. 8-32 set screw for drive pulley	.03
14350	Screw—No. 8-32 square head set screw for rotor disc stock No. 31233	.03
31681	Shaft—Dial drive knob shaft	.20
31364	Socket—Dial or electric tuning set-up lamp socket	.20
13871	Socket—"Magic Eye" socket	.45
31251	Socket—Octal type Radiotron or power supply socket	.25
14278	Socket—Pin socket for phono or television input with mounting plates (X16) (X17)	.25
31279	Spring—Band indicator tension spring	.03
13638	Spring—Indicator drive cord tension spring	.08
31970	Spring—Push button switch lock bar spring	.05
31232	Spring—Station setting tip spring	.01
12007	Spring—Stud retaining spring for I-F adjuster	.02
31418	Spring—Variable condenser drive cord tension spring	.06
33448	Switch—Feed-back switch (S8, S9)	1.40
33447	Switch—H. F. tone control phono-radio-Television and power switch (S4, S5, S6, S7, S12)	2.65
31979	Switch—Range switch (S1, S2, S3)	1.58
31968	Switch—Station selector push button switch complete	3.95
31565	Transformer—1st I-F transformer complete (L11, L12, C19, C20, L19)	2.40
31561	Transformer—2nd I-F transformer complete (L13 L14, C23, C24, L20)	2.40
31549	Transformer—3rd I-F transformer complete (L15, L16, C41, C42)	2.10
32231	Washers—Comprising one metal washer, two fibre washers and one solder lug or retainer for station setting body	.02
32094	Washers—Assorted washers for mounting damper on motor shaft	.10
	POWER SUPPLY UNIT	
	(TELEVISION AUDIO RECEIVER)	
	(RS-83E)	
14631	Capacitor—25 mfd. filter capacitor (C1)	1.55
33606	Plug—8-contact male plug for power supply cable (X20)	.45
31261	Socket—5U4G Radiotron socket	.25
33445	Transformer—110 V. 60 cycle power transformer (T1)	10.20

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.


CONNECT TO "A3" ON TELEVISION CHASSIS
CONNECT TO "G" ON TELEVISION CHASSIS
6K7 R.F.
6A8 1ST DET.
6K7 1ST I.F.
R5 3300
R6 1200
C16 100 MMF.
C18 0.1
C25 .05
C1 11-501 MMF.
C2 3-30 MMF.
C3 180 MMF.
C14 11-501 MMF.
C17 180 MMF.
R1 1 MEG.
R2 1 MEG.
C15 3-30 MMF.
C19 680 MMF.
C20 680 MMF.
C23 680 MMF.
C24 680 MMF.
BOTTOM VIEW OF TUBE SOCKETS
S1 FRONT
S2 FRONT
S3 REAR
S4 FRONT
S5 REAR
BLACK
GREEN
YELLOW
BLUE
BLACK RUBBER COV'D
BLACK (COTTON)
C27 .05
R9 2.2 MEG.
R3 33,000
C21 120 MMF.
BLACK-GREEN TR.
R7 1000
C22 0.1
6J7 OSC.
6U5 TUNING EYE
BLACK-BROWN TR.
C12 120 MMF.
C10 6000 MMF.
C11 11-501 MMF.
R4 33,000
C13 0.25
BLACK-RED TR.
R8 1 MEG.
C4 3-30 MMF.
C5 3-30 MMF.
C7 3900 MMF.
C6 15 MMF.
C8 560 MMF.
C9 2-12 MMF.
S1-S2-S3 RANGE SWITCH VIEWED FROM FRONT OF CHASSIS AND SHOWN IN MAXIMUM COUNTER-CLOCKWISE POSITION. ("A" BAND)
S4-S5-S6 S7 FIDELITY SWITCH VIEWED FROM FRONT OF CHASSIS AND SHOWN IN MAXIMUM COUNTER-CLOCKWISE POSITION. (VICTROLA, MIN. HIGHS)
S8-S9 FEED BACK SWITCH VIEWED FROM TOP OF CHASSIS AND SHOWN IN MAXIMUM COUNTER-CLOCKWISE POSITION. (WITH FEED BACK)

INC.

MODELS TRK-9,TRK-12
Receiver Chassis RC-427A,RC-427
Schematic



I.F. PEAK 455 KC

Schematic Circuit Diagram, Radio Chassis

MODELS TRK-9, TRK-12
Receiver Chassis Nos. RC-427A, RC-427
Chassis Wiring, R-F, Voltage

RCA MFG. CO., INC.

Dial Lamps	Two Mazda No. 44, 6.3 volts, .25 amp. One Mazda No. 47, 6.3 volts, .15 amp.
Power Supply Rating	105-125 volts, 60 cycles, 120 watts

(The Mazda No. 47 is the electric tuning set-up lamp, located at center of dial.)

Power Output

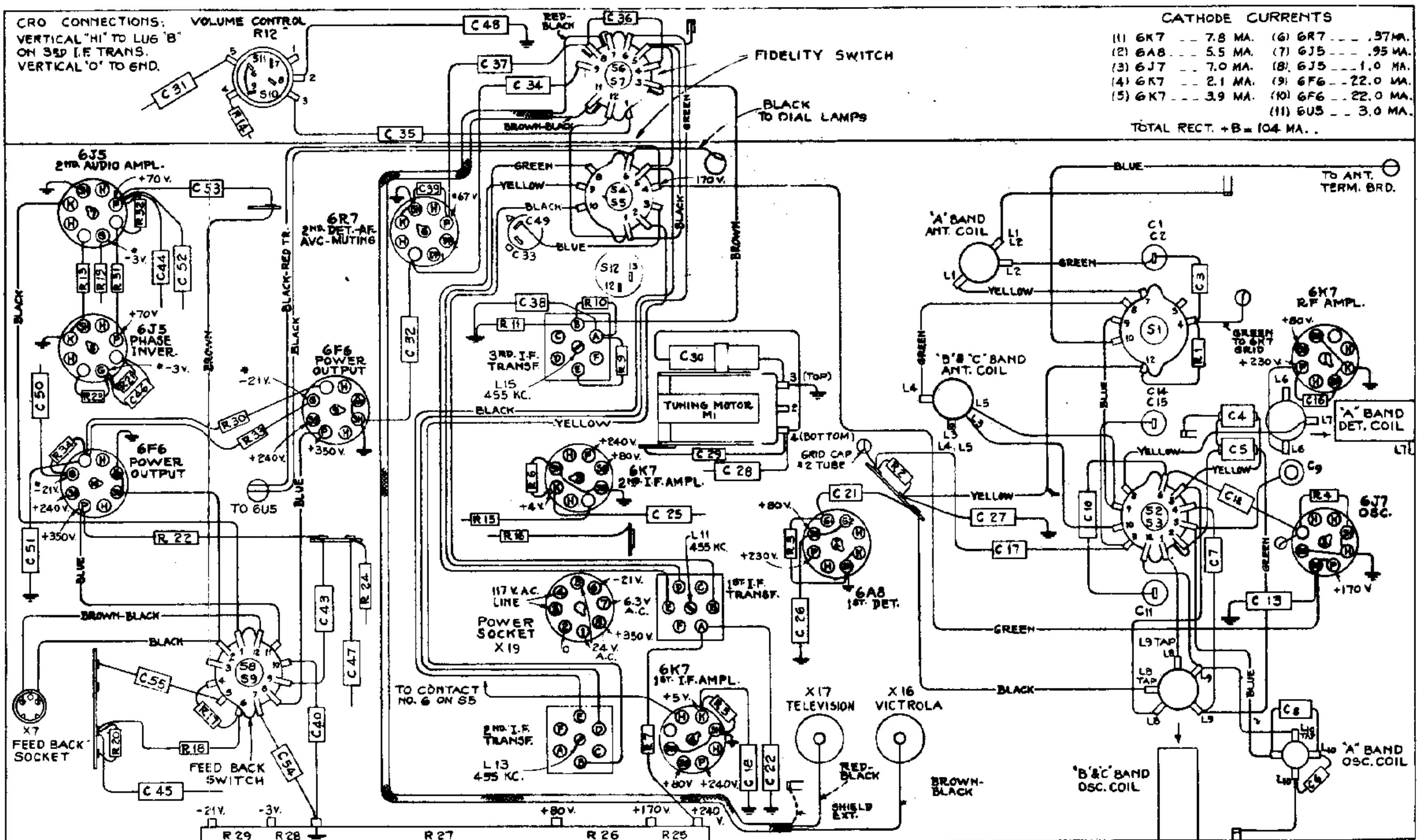
Undistorted	10 watts
Maximum	12 watts

Loudspeaker (RL-70F-5)

Type	12-inch electrodynamic
Voice-Coil Impedance	2.2 ohms at 400 cycles

Frequency Ranges

Standard Broadcast ("A" band)	540-1,720 kc
Medium Wave ("B" band)	2.3-7.0 mc
Short Wave ("C" band)	7.0-22 mc



ALL HEATER VOLTAGES 6.3 V. A.C.

*NOTE: Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

BOTTOM VIEW-REAR OF CHASSIS

R-F Wiring Diagram and Socket Voltages (Radio Chassis)

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point, volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

MODELS TRK-9,TRK-12
Receiver Chassis Nos.
RC-427A,RC-427
Alignment,Switching Data
Calibration Scale

RCA MFG. CO., INC.

MODELS U-30,U-129
Calibration Scale

Alignment Procedure

(RADIO CHASSIS)

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "O" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with O-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "O" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator approximately 1/16-inch above end dots at low-frequency ends of bands with gang condenser fully meshed. See that pointer does not rub background screen or dial face. The indicator has a spring clip for attachment to the cable.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Set tuning gang to—	Adjust the following—	To obtain—
1	Turn fidelity switch to No. 3 radio (sharp).				
2	6K7 2nd I-F grid cap, in series with .01 mfd.	455 kc	Quiet point on "B" band	L15, L16 (3rd I-F Trans.)	Coincidental images on cathode-ray oscillograph, or max. output on output meter.
3	6K7 1st I-F grid cap, in series with .01 mfd.	455 kc	Quiet point on "B" band	L13, L14 (2nd I-F Trans.)	Coincidental images on cathode-ray oscillograph, or max. output on output meter.
4	6A8 1st Det. grid cap, in series with .01 mfd.	455 kc	Quiet point on "B" band	L11, L12 (1st I-F Trans.)	Coincidental images on cathode-ray oscillograph, or max. output on output meter.
5	Turn fidelity switch to No. 4 radio (broad). The curve on CRO should broaden out to a double peak and reduce gain nearly 50%.				
6	Turn fidelity switch to No. 3 radio for the following adjustments. Back out the "B" and "C" oscillator trimmers, C5 and C4. Preset "A" band oscillator trimmer, C9, approximately an inch out.				
7	Antenna terminal, in series with 100 mmf.	600 kc	600 kc (31°) "A" band	L10 (osc.)	Max. Output
8	Antenna terminal, in series with 100 mmf.	1,500 kc	1,500 kc (151°) "A" band	C9 (osc.) C2 (ant.) C15 (det.)	Max. Output
9	Antenna terminal, in series with 100 mmf.	600 kc	600 kc "A" band	L10 (osc.)	Rock in for Max. Output
10	Repeat step No. 8.				
11	Antenna terminal, in series with 300 ohms	6,100 kc	6,100 kc (140°) "B" band	C5 (osc.)	Max. Output *
12	Antenna terminal, in series with 300 ohms	20 mc	20 mc (146°) "C" band	C4 (osc.)	Rock in for Max. Output *
	Follow "Adjustments for Electric Tuning."				

* Use minimum capacitance peak if two peaks can be obtained.
Note: The oscillator tracks 455 kc above the signal on all bands.

Radio receiver chassis No. RC-427 is used in RCA Victor Television Console Models TRK-9 and TRK-12.

The audio output of the television chassis is connected to the audio input of the radio chassis by means of jack X-17 and section S7 of the fidelity switch. The functions of this switch are tabulated on the following page.

A separate plug-in power unit, RS-83E, is used to supply heater and plate voltages to the radio chassis. Service data and diagram for this power unit are shown below.

Victrola Attachment

A jack (X-16) is located near the antenna terminal board for convenience in plugging in a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Feedback Switch (S8 and S9)

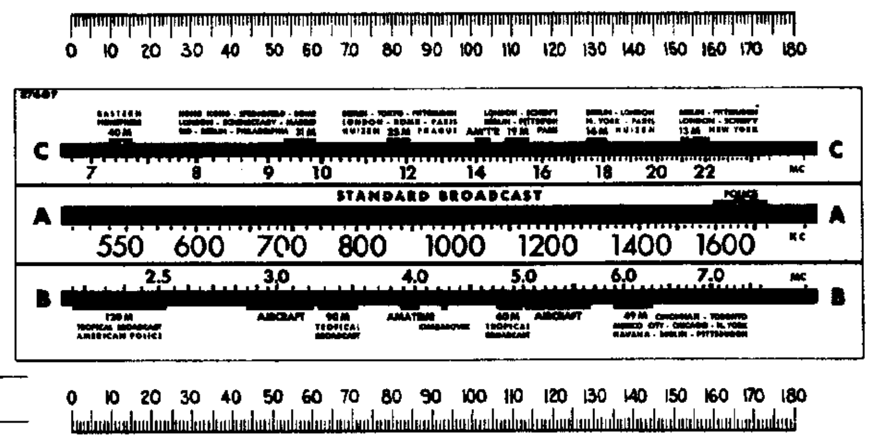
Counter-clockwise position (with feedback)	Clockwise position (without feedback)
1. Provides inversed feedback by connecting part of secondary of output transformer in cathode of 6J5 2nd-audio tube.	1. Removes reversed feedback and grounds cathode of 2nd-audio tube.
2. Disconnects compensating network (R22, C43, C54, C40) from plate circuit of output tubes.	2. Connects compensating network (R22, C43, C54, C40) to plate circuit of output tubes.
3. Connects grid of 2nd audio to high side of 1st A-F plate resistor R17, for maximum input.	3. Connects grid of 2nd audio to low side of 1st A-F plate resistor R17, for reduced input.
4. Connects capacitor C53 (.006) from plate of 2nd audio to chassis.	4. Disconnects C53 from plate of 2nd audio.

Fidelity Switch (S4, S5, S6, S7)

Switch Position	For	I-F Amp.	Audio Amp.	110-V. Supply for Tele. Chassis *	Magic Eye	Osc. and Eye+B Supply	Dial Lamps **
No. 1 (Counter-clockwise)	Victrola	—	Min. Highs	Off	—	Off	On
No. 2	Victrola	—	Max. Highs Reduced Lows	Off	—	Off	On
No. 3	Victrola	—	Full Range	Off	—	Off	On
No. 1	Radio	Sharp	Min. Highs Max. Lows	Off	On	On	On
No. 2	Radio	Sharp	Max. Highs Reduced Lows	Off	On	On	On
No. 3	Radio	Sharp	Max. Highs Full Lows	Off	On	On	On
No. 4	Radio	Broad	Full Range	Off	On	On	On
No. 1	Television	—	Min. Highs	On	Off	Off	Off
No. 2	Television	—	Med. Highs Reduced Lows	On	Off	Off	Off
No. 3	Television	—	Full Range	On	Off	Off	Off

* Controlled by switch (S12) on rear of fidelity switch.
** The 1st-I.F. heater is opened on positions 6, 9, and 10.

Calibration Scale



Tuning Dial, and Corresponding 0-180° Calibration Scale

The corresponding dial setting for any reading of the calibration scale can be determined by drawing a line straight up from this point; for example, 151° on the calibration scale corresponds to a dial reading of 1,500 kc on "A" band. Read instructions under "Alignment Procedure."

Precautionary Lead Dress

(1) All A-C leads should be twisted together and dressed away from parts in chassis to prevent hum pickup.

(2) Keep pilot light leads away from 6R7 grid.

(3) Yellow, green, and black leads from fidelity switch to 1st i-f transformer must be twisted together and dressed away from chassis.

(4) Yellow, green, and black leads from fidelity switch to 2nd i-f transformer must be twisted together and dressed away from chassis.

Electric Tuning Mechanism

When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

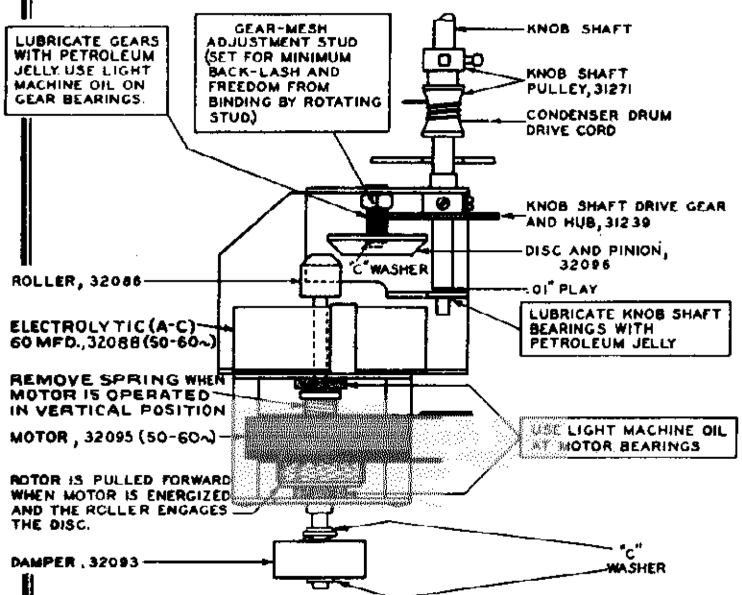
When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first-audio amplifier. This prevents audio amplification and makes the set quiet or "mute" while the mechanism is operating.

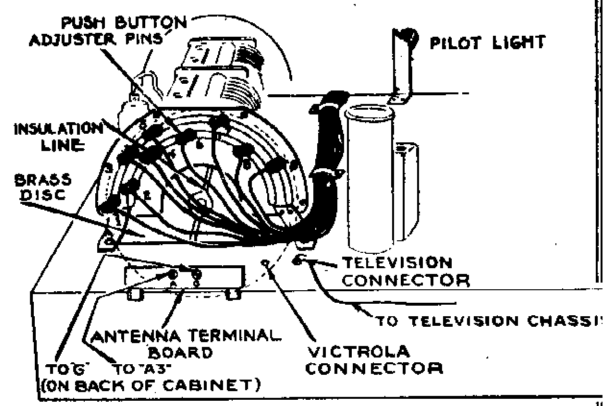
The brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set-screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal, with the operating-end at the left (viewed from rear). The brass is beveled at this end.

The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

LUBRICATION

Motor bearings and **gear bearings**; use light machine oil.
Gear faces; use "Pure Oil No. 611" or petroleum jelly.
Dial-indicator pulleys and **rails**; use "Castordag" or petroleum jelly.
Selector disc; apply *thin* film of petroleum jelly.



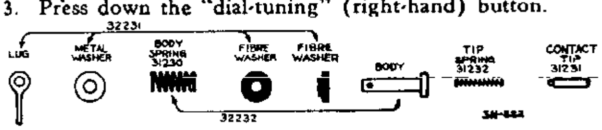


Station Button	Color of Lead To Station-Setting Contact	Station Button	Color of Lead To Station-Setting Contact
No. 1	Yellow-green	No. 6	Red
No. 2	Black	No. 7	Red-black
No. 3	Brown	No. 8	Brown-black
No. 4	Blue	No. 9	Red-yellow
No. 5	Green		

Adjustments for Electric Tuning

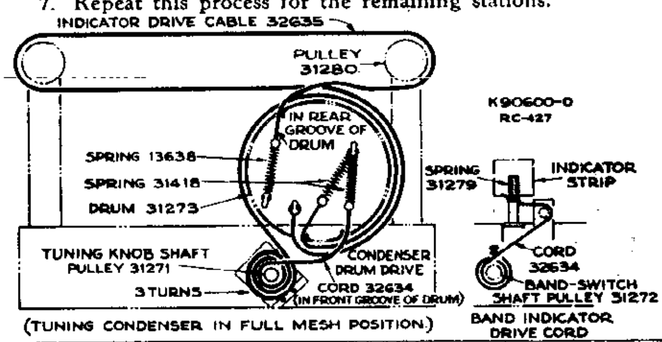
With power turned off, disconnect the antenna transmission line and ground connection, turn fidelity control to radio (3rd radio position—6th position from full counter-clockwise). Remove the back from the cabinet and reconnect the antenna transmission line and ground connection. The two interlock switches on the side panels should not be touched and care should be taken not to press on them when making the push-button set-up. Then turn on power, set range selector to "A," allow a few moments warm-up period and proceed as follows:

1. Make a list of the desired nine stations, arranged in order from low to high frequencies.
2. Turn on power-volume control, turn range selector to "A" band, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.
4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button and press down station button No. 1 (left-hand). Both buttons will stay down. Move station adjuster contact pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out completely.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Tune to some other section on the dial, and then press down station button No. 1 again; the electric tuning mechanism will function to tune in the first station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.



Components of Station Setting Contact

At Right—Dial Mechanism



MODELS TRK-9, TRK-12
Kinescope Data
Parts List

RCA MFG. CO., INC.

Precautions in Handling Kinescopes

The Kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, Kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the Kinescope bulb — particularly that part at the rim of the viewing surface — must not be struck, scratched or subjected to more than moderate pressure at any time. If the tube sticks, or fails to slip into its socket or deflecting yoke smoothly, investigate and remove the cause of trouble. Do not force the tube.

All RCA Kinescopes are shipped in special cartons and should always be left in the cartons until ready for installation in the receiver. Keep the carton for future use.

The RCA-1803-P4 (12-inch) Kinescope is equipped with a protective lid and shield. Do not at any time remove the close-fitting cone-shaped section of the protective shield from the Kinescope. This section should be installed with the tube in the cabinet and is designed to protect the user while handling the glass bulb.

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION	Unit List Price
	7,500 VOLT TELEVISION POWER UNIT	
	TRK-12—KK-7	
	TRK-9—KK-7A	
33016	Bushing—Porcelain bushing and spring	.25
33288	Cable—Insulated connector complete with cable for Kinescope (2nd anode)	2.10
33995	Capacitor—.005-.005 mfd., 1,000 v. (C115, C116)	xx
32901	Capacitor—0.03 mfd., 7,500 volt (C113, C114)	3.25
32400	Capacitor—20 mfd., 450 volt (C111, C112)	1.05
33023	Capacitor—80-10-mfd., 400 volt (C110, C109)	2.80
14854	Choke—Filter choke (L49)	1.80
32940	Choke—Filter choke (L50)	3.75
36314	Clip—Plate connector for 2V3G Radiotron	.03
33037	Control—Focus control, 400,000 ohms (R129) (Used in 1st production)	1.00
33971	Control—Focus control, 400,000 ohms (R129) (Used in 2nd production)	1.00
33002	Coupling—Flexible bronze coupling	.10
10907	Fuse—3 ampere, 250 volt	.08
33015	Insulator—Stand-off insulator only—less hardware	.30
32937	Knob—Focus control knob	.20
33244	Plug—2-prong male connector for A.C. power cord (X22)	.45
33166	Plug—Two prong male plug for Kinescope grid-cathode cable (X4)	.20
33501	Resistor—330,000 ohms, 1W (1,000V.) (R126, R130)	.20
33502	Resistor—470,000 ohms, 1W (1,000V.) (R127, R128, R137)	.20
33554	Resistor—820,000 ohms, 1W (1,000V.) (R131, R132, R133, R134, R135, R136)	.20
33024	Shaft—Bakelite shaft for focus control	.50
18007	Socket—Ceramic octal base socket and retaining ring for high voltage rectifier	.65
33245	Socket—Kinescope socket, less cable (X11)	.35
31251	Socket—Octal base 5T4 rectifier, or television power supply socket (X13)	.25
12143	Socket—6-prong television power supply socket (X15)	.50
32909	Support—Rectifier ..., plate, and stand-off insulator assemb...	2.00
32939	Transformer—Filament power transformer (T7)	5.65
9861	Transformer—High voltage power transformer (T6)	22.50
32938	Transformer—Low voltage power transformer (T5)	10.00
	SPEAKER ASSEMBLY	
	RL-70F-5	
31825	Cap—Cone center dust cap	.05
11469	Coil—Hum neutralizing coil (L21)	.30
11234	Coil—Speaker field coil (L17)	3.85
31275	Cone—Speaker cone assembly (L18)	1.75
31567	Plug—3-prong male feed back cable plug (X8)	.15
31539	Plug—5-prong speaker plug (X10)	.25
31556	Speaker—Speaker complete (RL-70F-5)	13.45
31557	Transformer—Speaker output transformer (T1)	3.20
	MISCELLANEOUS AS... IES	
	TRK-12	
	TRK-9	
31358	Button—Station selector push button	.15
33676	Cable—17½-inch shielded audio lead with plugs (X6, X18) (Model TRK-9 only)	.85
33480	Cable—38-inch shielded audio lead with plugs (Model TRK-12 only) (X6, X18)	1.30

STOCK No.	DESCRIPTION	Unit List Price
33246	Cable—Low capacity Kinescope grid cable (Model TRK-12 only)	1.25
33605	Cable—Low capacity Kinescope grid cable (Model TRK-9 only)	1.35
33597	Cap—Blue pilot lamp "Bulls Eye"	.20
32897	Clamp—Deflecting yoke clamp assembly	.65
4573	Connector—2-prong female connector for power supply circuit (X23)	.30
33363	Connector—2-prong female connector, used on interlock cable (X21)	.45
33002	Coupling—Flexible bronze coupling (Used in 2nd production receivers)	.10
31456	Cover—Eight protective covers for push button markers	.08
32815	Cushion—Kinescope masking cushion (Model TRK-12 only)	2.30
33019	Cushion—Kinescope masking cushion (Model TRK-9 only)	1.90
33643	Cushion—Television chassis mounting cushion with screw, spacer and washer (sufficient for one chassis)	.40
33442	Dial—Three-band glass dial scale	1.25
33329	Escutcheon—Dial escutcheon less buttons, button shaft and dial scale	2.60
32083	Frame—Dial frame with screen less pointer, carriage and rod	1.20
10907	Fuse—3 ampere line fuse	.08
33074	Glass—6¾ by 8¾ inch safety protective glass (Model TRK-9 only)	2.40
33076	Glass—8¾ by 11¼ inch safety protective glass (Model TRK-12 only)	3.90
33282	Hinge—Piano type lid hinge and screws	2.50
33468	Knob—Radio tuning, volume or range selector knob	.15
33470	Knob—Television "Contrast," "Hor. hold" or "Fine Tuning" knob	.20
33471	Knob—Television "Brightness" or "Vert. hold" knob	.25
33472	Knob—Television "Station selector" knob	.25
33469	Knob—"Victrola—Radio—Television—Fidelity selection" knob	.20
11891	Lamp—6.3 V. pilot lamp, Mazda No. 44	.17
31589	Marker—Complete set of call letter markers	.35
31458	Marker—"Dial Tuning" push button marker	.01
31457	Marker—"Victrola" push button marker	.01
33075	Mirror—20½ by 14¾ in. viewing mirror	9.00
33225	Nut—Speed nut for mounting high frequency coil assemblies	.01
4577	Plug—2-prong male plug for power supply circuit (X24)	.45
33244	Plug—2-prong male plug, used on interlock cable (X22)	.45
33166	Plug—2-prong male plug for Kinescope grid-cathode cable (X4)	.20
32816	Plug—4-prong male plug for deflecting yoke cable (X2)	.20
12493	Plug—5-prong female speaker cable plug (X9)	.30
4574	Plug—6-prong male plug for Television chassis power supply cable (X14)	.48
16836	Plug—8-prong male plug for Television chassis power supply cable (X12)	.25
31542	Pointer—Station selector pointer with carriage	.35
31287	Rod—Dial frame pointer slide rod	.15
32083	Screen—Dial frame difusing screen with rivets	1.20
4560	Screw—¼20 by 1¼ in. long, machine screw, washer and lockwasher for chassis mounting (12 required)	.06
33517	Sleeve—Bell mouth sleeve for screw-driver adjustments (Model TRK-9 only)	.05
14270	Spring—Knob spring for stock Nos. 33468, 33471, 33472, 33469 knobs	.05
30330	Spring—Knob spring for stock Nos. 33470, knob	.03
33362	Switch—Interlock switch with leads	1.80
31522	Support—Left hand lid support	2.25
31478	Support—Right hand lid support	2.20
9857	Yoke—Deflecting yoke complete with cable and 4-prong plug (L43, L44, R62)	17.50

XX—Price upon application to your RCA Parts Distributor

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Schematic, Transformer Data
Lead Dress, Specifications

RCA MFG. CO., INC.

MODELS 5Q5A, 5Q5B, 5Q5C, 5Q5D, 5Q5E, 5Q55, 5Q56, Chassis RC-396
MODEL 6Q7, Chassis RC-414A

Frequency Ranges

"Standard Broadcast" (A)	540-1,720 kc (555-174 m)
"Medium Wave" (B)	2.3-7.0 mc (130-42.8 m)
"Short Wave" (C)	7.0-22.0 mc (42.8-13.6 m)
Intermediate Frequency	455 kc

RCA Tube Complement

(1) RCA-6SA7	First Detector—Oscillator
(2) RCA-6K7	Intermediate Amplifier
(3) RCA-6SQ7	Second-Detector, A.V.C., and A-F Amplifier
(4) RCA-6F6-G	Power Output
(5) RCA-5Y3-G	Full-Wave Rectifier
(6) RCA-6U5 (Model 6Q7)	"Magic Eye"
Pilot Lamp (1)	Mazda 44, 6.3 volts, 0.25 amp.

Power Output Rating

Undistorted	1.5 watts
Maximum	3.3 watts

Loudspeaker

Type (5Q5, 5Q55, 5Q56) RL-78-2	5-inch Electrodynamic
(6Q7) RL-79-2	6-inch Electrodynamic
Voice-Coil Impedance	3.4 ohms at 400 cycles

Power Supply Ratings

Rating A	105-125 volts, 50-60 cycles, 70 watts
Rating B	105-125 volts, 25-60 cycles, 70 watts
Rating C	105-125/200-250 volts, 50-60 cycles, 70 watts

Cabinet Dimensions

	Models 5Q5, 5Q55 5Q56	Model 6Q7
Height	9⅝ inches	12-5/16 inches
Width	13¾ inches	14½ inches
Depth	8⅞ inches	8½ inches
Weight (net)	18½ pounds	16½ pounds

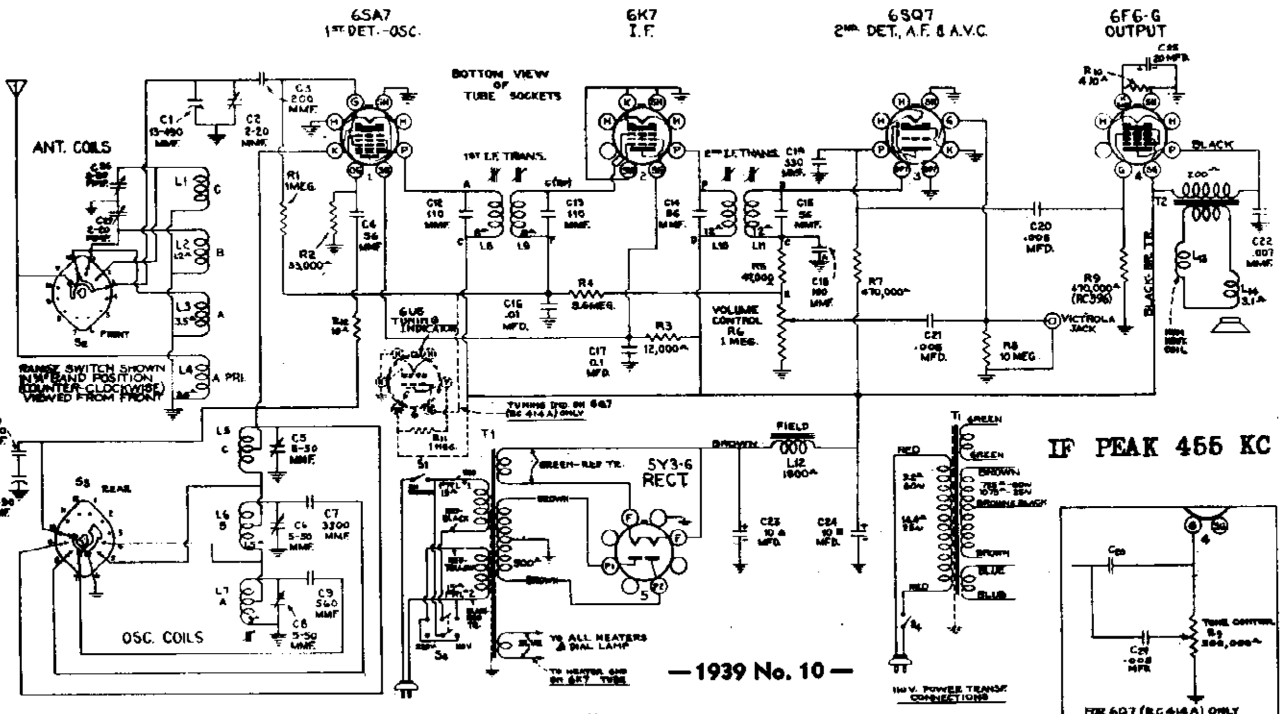
Chassis Base Dimensions	12 in. wide, 5½ in. deep, 2⅛ in. high
Overall Chassis Height	7 inches
Tuning Drive Ratio	18 to 1

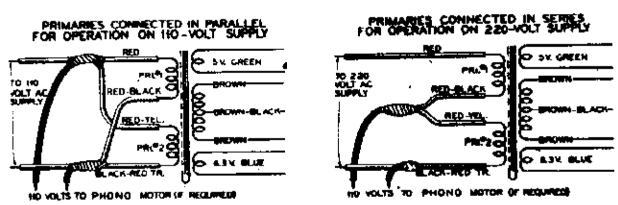
General Description

Models 5Q5, 5Q55, 5Q56 and 6Q7 are three-band table type superheterodyne receivers. They are designed to cover the standard broadcast range of 540 to 1,720 kilocycles, and the short-wave range from 2.3 to 22 megacycles.

Models 5Q5 and 6Q7 are Export Types.

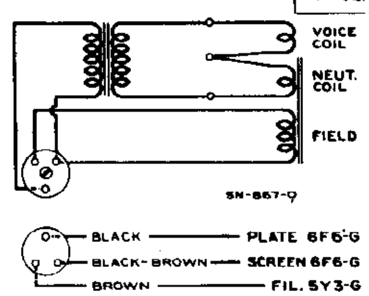
Features of design include: Magnetite-core I-F transformers; magnetite-core "A" band oscillator coil; automatic volume control; continuously-variable high-frequency tone control on Model 6Q7; edge-lighted straight-line dial; band indicator in dial; jack for Victrola Attachment; and dust-proof electrodynamic loudspeaker.





D-C Resistance	Primary No. 1	13 ohms
	Primary No. 2	15 ohms
	H. V. Secondary (Total)	500 ohms

Connections of Universal Power Transformer Primary for 220 and 110 Volts



Connections and Colors of Speaker and Cable

Miscellaneous Service Data

Precautionary Lead Dress

1. Lead from 2nd I.F. (E) to volume control should be kept close to chassis.
2. R.F. coil leads should be kept short and away from coil.
3. Leads to 6,000 mmf. (C10) should be as short as possible and condenser dressed away from chassis, bearing against 10 ohm (R12) resistor.

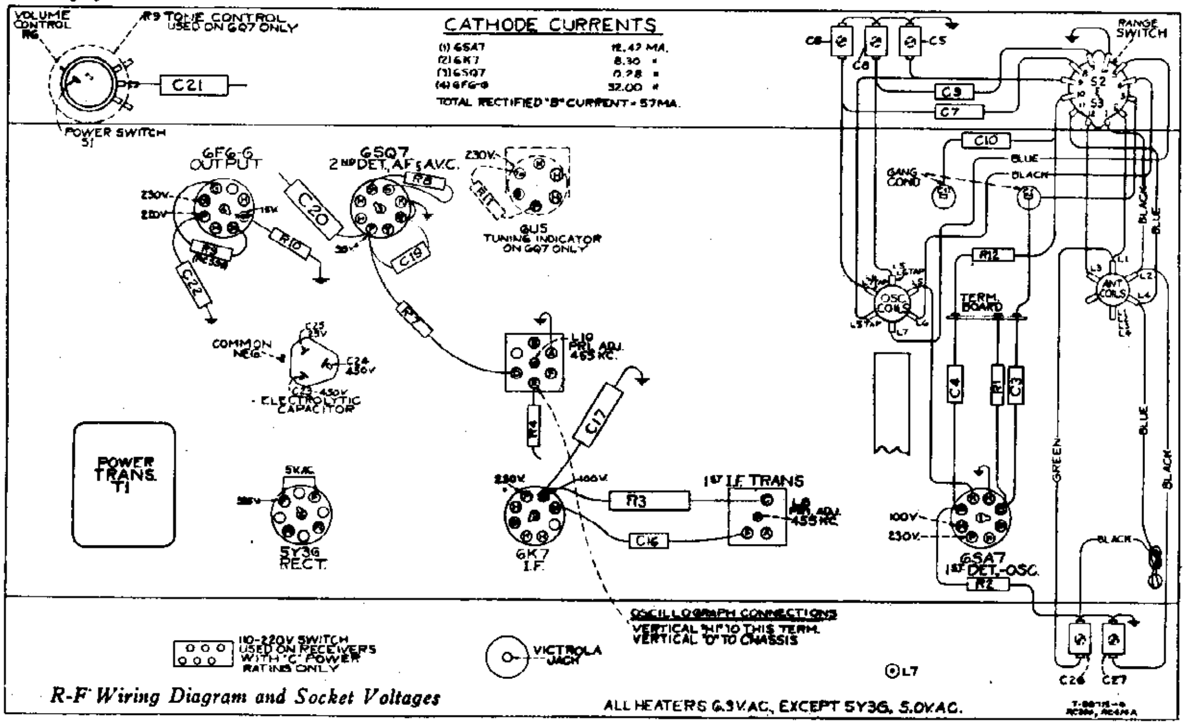
Victrola Attachment.—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

MODELS 5Q5A, 5Q5B, 5Q5C, 5Q5D, 5Q5E
5Q55, 5Q56, Chassis RC-396
MODEL 6Q7, Chassis RC-414A

RCA MFG. CO., INC.

Socket, Trimmers, Voltage
Drive Cord Data, Scale



R-F Wiring Diagram and Socket Voltages

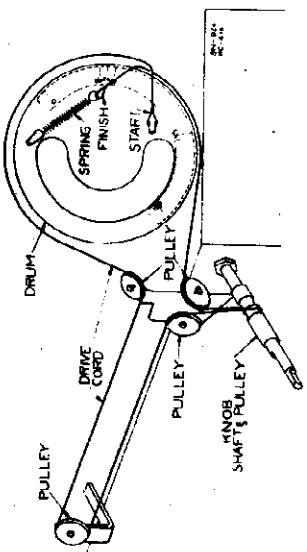
BOTTOM VIEW - REAR OF CHASSIS

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ± 20% with 117-volt a-c supply.

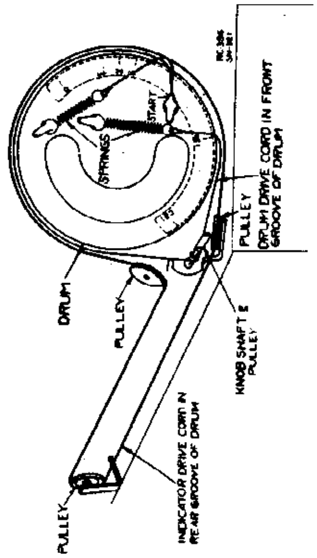
*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODELS	DESCRIPTION
5Q5A	Brown Plastic Cabinet
5Q5B	Black Plastic Cabinet
5Q5C	Ivory Plastic Cabinet
5Q5D	Maroon Plastic Cabinet
5Q5E	Black Plastic Cabinet with Metal Grille
5Q55	Mottled Brown Plastic Cabinet
5Q56	Ivory Finish Plastic Cabinet

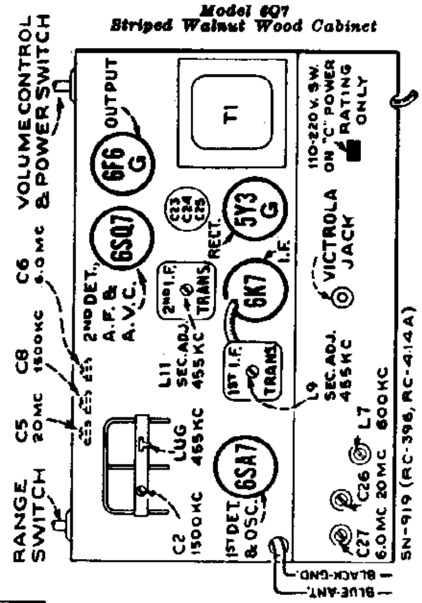
Model 6Q7
Striped Walnut Wood Cabinet



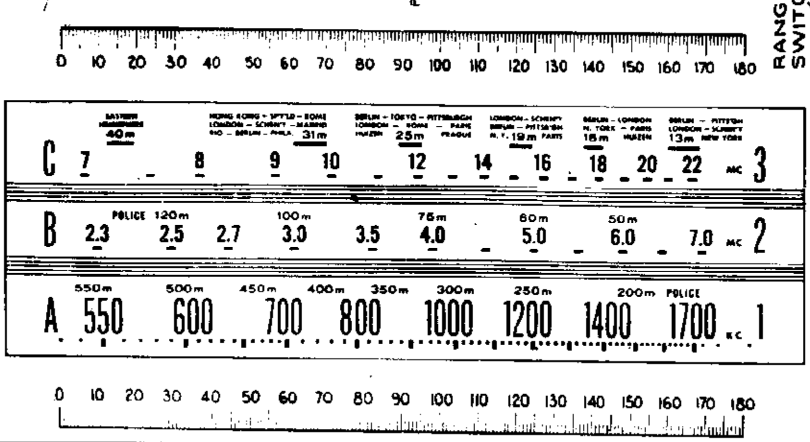
Arrangement of Drive Cord for Tuning Condenser and Dial Indicator (Model 6Q7) Drum Shown with Gang at Maximum Capacity



Arrangement of Drive Cords for Tuning Condenser and Dial Indicator (Models 5Q5, 5Q55 and 5Q56) Drum Shown with Gang at Maximum Capacity



Tube and Trimmer Locations



Calibration Scale

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

MODELS 5Q5A, 5Q5B, 5Q5C, 5Q5D, 5Q5E, 5Q55, 5Q56, Chassis RC-396
MODEL 6Q7, Chassis RC-414A
Alignment, Parts List

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
32832	Bracket—Drive bracket, pulleys, and tuning knob shaft complete (Models 5Q5, 5Q55 and 5Q56)	1.20
32635	Cable—Pointer drive cable (Models 5Q5, 5Q55 and 5Q56)	.24
12581	Cap—First I.F. transformer shield cap	.25
12723	Capacitor—56 mmfd. (C4)	.35
30949	Capacitor—56 mmfd. (C14, C15)	.25
14262	Capacitor—109 mmfd. (C12, C13)	.30
32238	Capacitor—110 mmfd. (C18)	.30
12694	Capacitor—220 mmfd. (C3)	.35
12952	Capacitor—330 mmfd. (C19)	.35
12537	Capacitor—560 mmfd. (C9)	.35
31403	Capacitor—3,300 mmfd. (C7)	.60
31405	Capacitor—6,000 mmfd. (C10)	.75
32830	Capacitor—Trimmer capacitor bank, 2 sections 2-20 mmfd. (C26, C27)	.40
32829	Capacitor—Trimmer capacitor bank, 3 sections 5-50 mmfd. (C5, C6, C8)	.55
4838	Capacitor—.005 mfd. (C20, C21, C29)	.25
5148	Capacitor—.007 mfd. (C22)	.20
14393	Capacitor—.01 mfd. (C16)	.30
4839	Capacitor—0.1 mfd. (C17)	.30
32240	Capacitor—Electrolytic, 2 sections 10 mfd., 1 section 20 mfd. (C23, C24, C25)	1.45
32821	Coil—Antenna coil A, B, C, bands (L1, L2, L3, L4)	1.35
32824	Coil—Oscillator coil—A, B, C bands (L5, L6, L7)	1.00
32817	Condenser—2-gang variable condenser (C1, C2, C11)	2.60
32634	Cord—Drive cord	.10
32713	Core—Core and stud for oscillator coil adjustment	.35
32835	Drum—Drive cord drum	.55
11891	Lamp—Dial lamp	.17
32953	Plate—Dial back plate and pointer—less dial scale (Model 6Q7)	1.60
5119	Plug—3-contact female for speaker cable	.25
32834	Pulley—Drive cord pulley and mounting bracket (1 pulley)	.25
32951	Pulley—Drive cord pulleys and mounting bracket (3 pulleys) (Model 6Q7)	.45
13988	Resistor—10 ohms, ¼ watt (R12)	.20
30681	Resistor—470 ohms, 1 watt (R10)	.22
12013	Resistor—1 meg., 1/10 watt (R11) (Model 6Q7)	.15
31389	Resistor—12,000 ohms, 3½ watt (R3)	.50
12454	Resistor—33,000 ohms, ¼ watt (R2)	.20
5132	Resistor—47,000 ohms, 1/10 watt (R5)	.15
12285	Resistor—470,000 ohms, ¼ watt (R7, R9)	.20
13730	Resistor—1 meg., ¼ watt (R1)	.20
11668	Resistor—5.6 meg., ¼ watt (R4)	.20
13601	Resistor—10 meg., ¼ watt (R8)	.20
14343	Retainer—Retaining ring for holding tuning knob shaft (Model 6Q7)	.03
14887	Retainer—Tuning knob shaft retainer (Models 5Q5, 5Q55 and 5Q56)	.01
32848	Screw—No. 8-32 square head set screw for drum	.03
32833	Shaft—Tuning knob shaft, eyelet and retainer (Models 5Q5, 5Q55 and 5Q56)	.30
32932	Shaft—Tuning knob shaft (Model 6Q7)	.30
31365	Socket—Dial lamp insulated socket	.30
31251	Socket—Octal base tube socket	.25
32950	Socket—Magic Eye socket and bracket (Model 6Q7)	.50
14278	Socket—Phonograph socket	.25
31418	Spring—Drive cord or pointer cable tension spring	.05
32819	Switch—Range switch (Models 5Q5, 5Q55 and 5Q56) (S2, S3)	1.00
32929	Switch—Range switch (Model 6Q7) (S2, S3)	1.10
32827	Switch—Voltage change switch—110-220 volts (S4)	.35
14376	Transformer—First i.f. transformer (L8, L9, C12, C13)	2.45
32825	Transformer—Second i.f. transformer (L10, L11, C14, C15, C18, R5)	2.50
32910	Transformer—Power transformer—105-120 volts, 25-60 cycles (T1)	6.20
32911	Transformer—Power transformer—105-120 volts, 50-60 cycles (T1)	4.10
32852	Transformer—Power transformer—105-120 and 200-240 volts, 50-60 cycles (T1)	4.50
32818	Volume control and switch (R6, S1) (Models 5Q5 and 5Q55)	1.50
32928	Volume control, tone control and power switch (R6, R9, S1) (Model 6Q7)	2.50
	SPEAKER ASSEMBLIES Models 5Q5, 5Q55 and 5Q56 (RL-78-2)	
32907	Cap—Cone center dust cap	.02
32903	Coil—Speaker field coil (L12)	1.25
32906	Coil—Speaker hum neutralizing coil (L13)	.25
32904	Cone—Speaker cone, voice coil, center suspension, and dust cap (L14)	1.20
5118	Plug—3-contact male for speaker	.25
32902	Speaker—Complete	4.00
32905	Transformer—Output transformer (T2)	1.35
	SPEAKER ASSEMBLIES Model 6Q7 (RL-79-2)	
32907	Cap—Speaker cone center dust cap	.02
32903	Coil—Speaker field coil (L12)	1.25
32906	Coil—Speaker hum neutralizing coil (L13)	.25
32934	Cone—Speaker cone and voice coil (L14) (Model 6Q7)	1.65
5118	Plug—3-prong male for speaker	.25
32933	Speaker—Complete	5.50
32905	Transformer—Output transformer (T2)	1.35
	MISCELLANEOUS ASSEMBLIES	
32845	Bracket—Dial mounting bracket and lamp bracket assembly—less pointer and pointer slide rods (Models 5Q5, 5Q55 and 5Q56)	.35
32837	Dial—Dial scale	.65
32843	Knob—Black range switch knob (Models 5Q5 and 5Q55)	.15
33085	Knob—Black tuning knob (Models 5Q5 and 5Q55)	.25
32841	Knob—Black volume control knob (Models 5Q5 and 5Q55)	.15
32839	Knob—Brown tuning knob (Models 5Q5 and 5Q55)	.25
33087	Knob—Ivory range switch knob (Models 5Q5 and 5Q55)	.15
33091	Knob—Ivory tuning knob (Models 5Q5 and 5Q55)	.25
33086	Knob—Ivory volume control knob (Models 5Q5 and 5Q55)	.15
33563	Knob—Maroon range switch knob (Models 5Q5 and 5Q55)	.15
33093	Knob—Maroon tuning knob (Models 5Q5 and 5Q55)	.25
33562	Knob—Maroon volume control (Models 5Q5 and 5Q55	.15
32847	Pointer—Dial pointer, carriage and clip	.35
32846	Rod—Pointer slide rod	.25
4393	Screw—No. 8-32 x 5/16 headless set screw for knob, Stock Nos. 32840, 32842, 32844, 33088, 33089, 33090, 33092 and 33094	.03
32937	Knob—Range switch knob (small) (Model 6Q7)	.20
33029	Knob—Tone control and switch knob (small) (Model 6Q7)	.15
32935	Knob—Tuning knob (large) (Model 6Q7)	.25
32936	Knob—Volume control knob (large) (Model 6Q7)	.25
4982	Spring—Retaining spring for knob, Stock No. 32935 (Model 6Q7)	.05
30330	Spring—Retaining spring for knob, Stock No. 33029 (Model 6Q7)	.03
14270	Spring—Retaining spring for knob, Stock Nos. 32839, 32841, 32843, 33085, 33086, 33087, 33091 and 33093	.05

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the ground terminal, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 45 degree mark on the drum scale (see "Drum Drive and Indicator Cord Assembly" drawings) must be in a horizontal position when the plates are fully meshed. The distance from the edge of the chassis to the drum must not exceed ⅜-inch. The drum is held to the shaft by means of a set screw, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" Band quiet point between 550-750 kc	L10 and L11 (2nd I.F. trans.)
2	Tuning condenser stator (osc.) in series with .01 mfd. **	455 kc	"A" Band quiet point between 550-750 kc	L8 and L9 (1st I.F. trans.)
3	Antenna lead (blue) in series with 200 mmfd.	600 kc	600 kc (33°) "A" Band	L7†
4	Antenna lead (blue) in series with 200 mmfd.	1,500 kc	1,500 kc (152.4°) "A" Band	C2 (ant.) C8 (osc.)
5	Repeat steps 3 and 4			
6	Antenna lead (blue) in series with 400 ohms	20 mc	20 mc (155.4°) "C" Band	C5 (osc.) * C28 (ant.)
7	Antenna lead (blue) in series with 400 ohms	6 mc	6 mc (149°) "B" Band	C6 (osc.) * C27 (ant.)
8	Antenna lead (blue) in series with 200 mmf.	1,500 kc	1,500 kc (152.4°) "A" Band	C8 (osc.)

* Use minimum capacity peak if two peaks can be obtained.
† Rock gang condenser slightly while adjusting L7.
** Make test-oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.
Note.—Oscillator tracks 455 kc above signal on all bands.

MODELS 5X5I, 5X5W
Chassis RC-406
Alignment, Parts

RCA MFG. CO., INC.

Model 5X5 Series (Chassis No. RC-406)

Five-Tube, Single-Band, AC-DC Multiplex Superheterodyne Receiver

Model PLF-10

Power Line Filter Coupling Unit

General Description

The following features are incorporated in the design of the Little Nipper Multiplex 5X5 Series Receiver:

First, it is a "standard broadcast" receiver. Second, it will operate any other radio in the home by "remote control" without the use of connecting wires. Third, records may be reproduced through the Little Nipper when used with Victrola Attachment. Fourth, the Model 5X5 (when used with Victrola Attachment) will reproduce records through any other radio in the home without the use of connecting wires.

When using the 5X5 as a remote control, the Model PLF-10 Power Line Filter Coupling Unit should be used in conjunction with the receiver to be controlled. The filter is connected between the power line receptacle and the receiver being controlled, as shown in accompanying drawing.

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

The Remote Control Oscillator in the 5X5 is set at the factory to approximately 540 kc. The frequency may be varied between 540 and 800 kc to suit local conditions by adjusting the trimmer condenser C7.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

If the electric supply circuit is a three-wire system, it may be necessary to connect a ½ mfd 700-volt capacitor between the two outside lines of the three-wire system.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3	Antenna term. of ant. trans. in series with 100 mmfd.	1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
13057	Capacitor—60 mmfd.	.35
12488	Capacitor—250 mmfd.	.35
12952	Capacitor—300 mmfd.	.35
30433	Capacitor—400 mmfd.	.35
4838	Capacitor—.005 mfd.	.25
4937	Capacitor—.01 mfd.	.25
4870	Capacitor—.025 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
12484	Capacitor—0.25 mfd.	.30
33321	Capacitor—Electrolytic, 2 sections 30 mfd. each	1.00
32572	Coil—Antenna coil	.60
33320	Coil—Duplex oscillator coil	.90
32962	Coil—Oscillator coil	.60
33323	Condenser—Trimmer 20-150 mmfd.	.35
32968	Condenser—2-gang variable tuning	2.25
32634	Cord—Drive cord	.10
32946	Drum—Condenser drive drum	.35
31480	Lamp—Dial lamp—Mazda No. 47	.20
12409	Lead—Antenna lead	.45
33322	Resistor—5 ohms, 5 watts	.20
14671	Resistor—33 ohms, ½ watt	.20
13428	Resistor—150 ohms, ½ watt	.20
13998	Resistor—22,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
12412	Resistor—47,000 ohms, ½ watt	.20
12264	Resistor—220,000 ohms, ½ watt	.20
12285	Resistor—470,000 ohms, ½ watt	.20
12679	Resistor—2.2 meg., ½ watt	.20
13601	Resistor—10 meg., ½ watt	.20
32945	Shaft—Tuning knob shaft and bushing	.20
32969	Socket—Dial lamp socket	.25
14278	Socket—Phonograph socket	.25
32537	Socket—Tube socket	.20
30585	Spring—Drive cord spring	.06
33324	Switch—Phonograph switch	.50
33319	Transformer—First i-f transformer	1.40
33057	Transformer—Second i-f transformer	1.25
32578	Volume control and power switch	1.50
	POWER LINE FILTER PLF-10	
13057	Capacitor—60 mmfd.	.35
12484	Capacitor—0.25 mfd.	.30
33492	Coil—Choke coil	.50
33493	Receptacle—Power receptacle	.40
33491	Switch	.35
	SPEAKER ASSEMBLIES (39105—2)	
32963	Speaker complete	3.95
32964	Transformer—Output transformer	1.25
	MISCELLANEOUS ASSEMBLIES	
X-639	Cabinet—Ivory finish—Model 5X5I (net)	2.20
X-638	Cabinet—Walnut finish—Model 5X5W (net)	1.35
32942	Dial—Glass dial scale	.30
33317	Fastener—Push fastener to hold cabinet back	.02
33306	Knob—Black tuning knob—Model 5X5I	.15
32447	Knob—Ivory knob—Model 5X5W	.15
32943	Nut—Speed nut to hold dial	.01
31646	Spring—Knob retaining spring	.02

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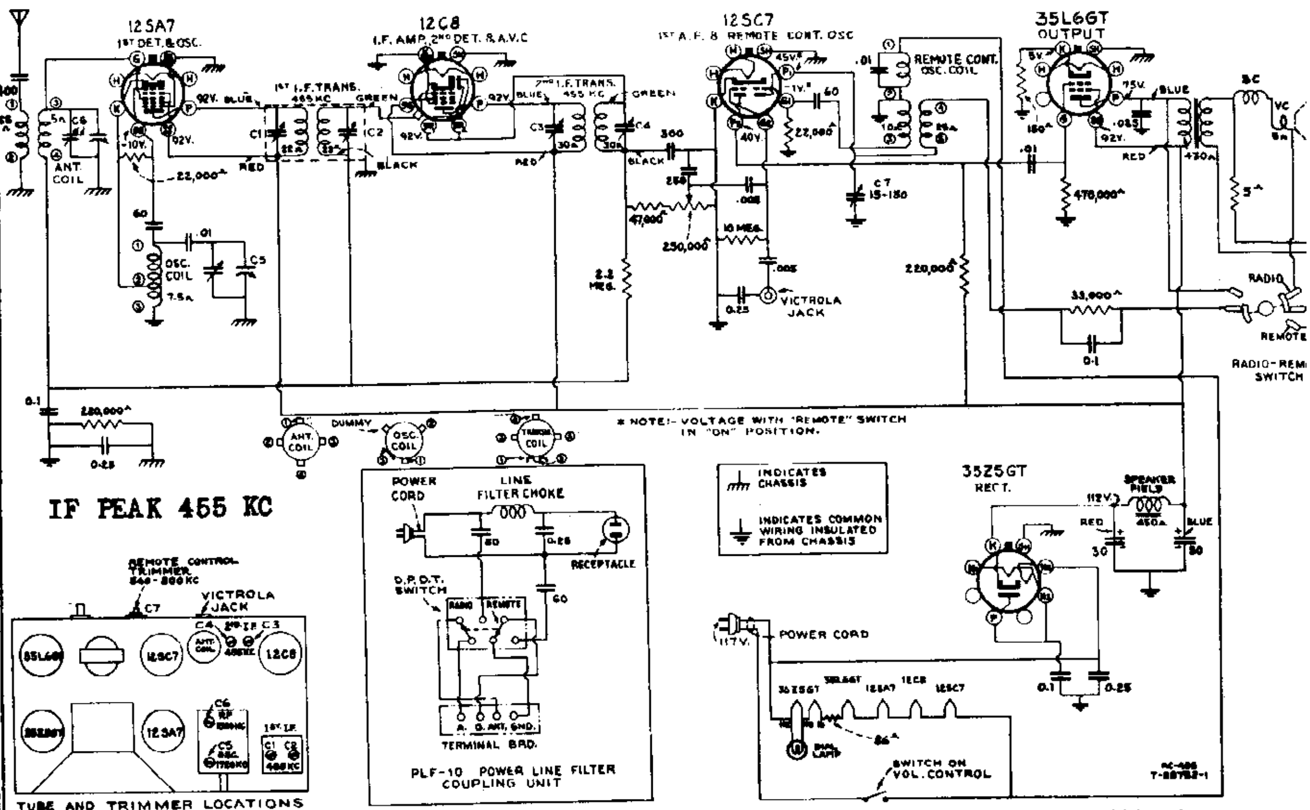
Socket, Trimmers

RCA MFG. CO., INC.

MODELS 5X5I, 5X5W
Chassis RC-406
MODEL PLF-10 Coupling Uni
Schematics, Tuner, Voltage



—1939 No. 18—

Electrical and Mechanical Specifications

Frequency Range
Receiver .... 540-1,720 kc
Remote Control Oscillator .... 540-800 kc

Tube Complement
(1) RCA-12SA7 .... 1st-Detector-Oscillator
(2) RCA-12C8 .... I-F Amp., 2nd-Det., and A.V.C.
(3) RCA-12SC7 .... 1st A-F and Remote Control Osc.
(4) RCA-35L6GT .... Power Output
(5) RCA-35Z5GT .... Half-Wave Rectifier
Dial Lamp (1) .... Mazda 47, 6.3 Volts, .15 amp.
Intermediate Frequency .... 455 kc

Power Supply Ratings
A-C Rating .... 100-125 volts, 50-60 cycles, 30 watt
D-C Rating .... 100-125 volts, direct current, 30 watt

Power Output (125 volt, 60 cycle supply)
Undistorted .... 1.5 watt
Maximum .... 2.0 watt

Loudspeaker
Type .... 4 inch Electrodynam
Cabinet Dimensions (inches) Height 5¼, Width 8¾, Depth 4
Weight (net) .... 5½ pounc

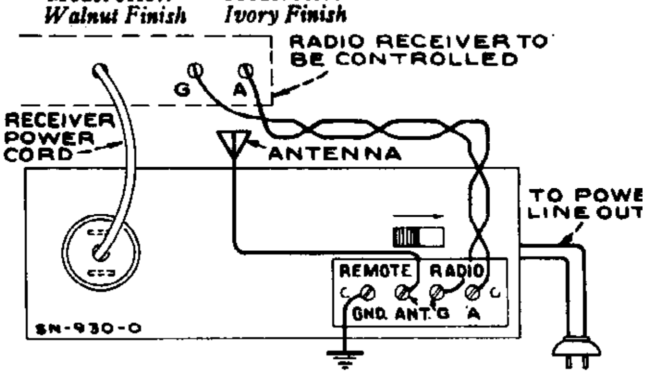
Model 5X5W Walnut Finish   *Model 5X5I Ivory Finish*

Set-up Procedure for Remote Control

1. Install the 5X5 and tune in any desired station.
2. Turn the control switch on the back of the 5X5 to its clockwise position marked "Remote." The 5X5 becomes silent.
   The 5X5 now becomes a small relay station for signalling to the controlled receiver via the power line wiring.
3. Next tune the main receiver to the exact frequency of transmission of the 5X5, usually 540 kc. Tune carefully to this frequency, setting the volume control as high as permissible with regard to hum and noise conditions. The station to which the 5X5 was tuned will be heard. If the receiver is equipped with tuning indicator (Magic Eye) the correct point will most easily be obtained by observing the indicator.
4. Now any station tuned in on the 5X5 dial will be heard on the controlled receiver. The volume will also be controlled with the 5X5 volume control.
5. If it is desired to operate the controlled receiver on its own controls it is only necessary to set the switch on the Power Line Filter Coupling Unit to its position marked "Radio."
6. In the event that, with the 5X5 being used as a remote control, other receivers in the home are in use, trouble may be experienced due to noise and hum. To avoid this, connect a Power Line Filter Coupling Unit, RCA Victor PLF-10, to each of these other receivers, as shown in accompanying drawing.

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12C8 close to chassis.
2. Dress A.V.C. condenser (0.1) close to chassis and tight to 0.25 mmfd. condenser.



PLF-10 COUPLING UNIT

Antenna.—The set is equipped with length of antenna wire. I not connect the antenna to ground. If an outdoor antenna is used, should not be longer than 100 feet, including lead-in. If it is long connect a 100 to 200 mmf. capacitor in series with the lead-in.

Victrola Attachment.—A jack is provided on the rear of chas for connecting a Victrola Attachment into the audio-amplifying c cuit. The cable from the Victrola Attachment should be terminat in a Stock No. 31048 plug to fit the jack.

Trademarks "Victrola," "Magic Eye" Reg. U. S. Pat. Off. by RCA Mfg. Co., Inc.

First Edition

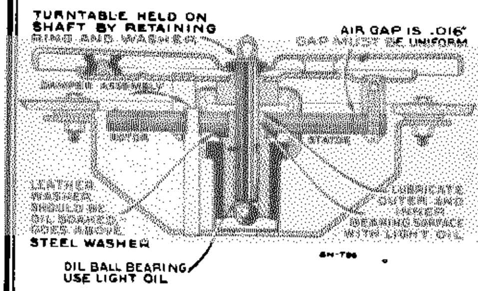
Printed in U. S.

MODELS U8M,U8W
Chassis RC-404A
Motor Assembly,Parts

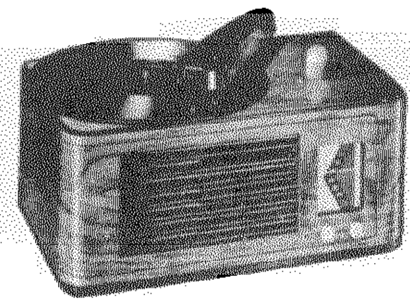
RCA MFG. CO., INC.

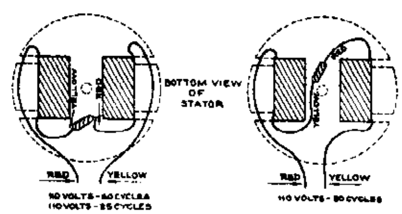
RCA Victor MODEL U-8 (Chassis No. RC-404A)

Five-Tube, Single-Band, A-C, Superheterodyne Victrola



Cross Section of Motor Assembly


Model U-8W Walnut Finish
Model U-8M Blonde Mahogany Finish



Motor Coil Assembly and Connections

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
12488	Capacitor—250 mmfd.	.35
12952	Capacitor—300 mmfd.	.35
4838	Capacitor—.005 mfd.	.25
4937	Capacitor—.01 mfd.	.25
33736	Coil—Antenna coil	.75
32962	Coil—Oscillator coil	.60
13057	Condenser—60 mmfd.	.35
30433	Condenser—400 mmfd.	.35
30303	Condenser—.0035 mfd.	.40
33584	Condenser—.005 mfd.	.25
4870	Condenser—.025 mfd.	.20
4839	Condenser—0.1 mfd.	.30
12536	Condenser—820 mfd.	.45
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd.	.90
32968	Condenser—2-gang variable tuning	2.25
32634	Cord—Drive cord	.10
33289	Dial—Glass dial scale	.40
33297	Drive—Dial drive mechanism—comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled	.85
33006	Feet—Rubber feet	.03
33295	Indicator—Dial pointer	.25
32571	Knob—Tan knob (tuning or volume)	.15
11765	Lamp—Dial lamp—Mazda 51	.15
31193	Lead—Antenna lead	.50
33292	Plate—Dial color plate	.25
33294	Pulley—Drive cord pulley	.02
33558	Resistor—86 ohms	.15
13428	Resistor—150 ohms, ¼ watt	.20
30538	Resistor—330 ohms, ¼ watt	.20
13998	Resistor—22,000 ohms, ¼ watt	.20
12266	Resistor—39,000 ohms, ¼ watt	.20
12412	Resistor—47,000 ohms, ¼ watt	.20
12264	Resistor—220,000 ohms, ¼ watt	.20
12285	Resistor—470,000 ohms, ¼ watt	.20
12679	Resistor—2.2 meg., ¼ watt	.20
13601	Resistor—10 meg., ¼ watt	.20
33464	Shaft—Tuning knob shaft and bearing	.25
32969	Socket—Dial lamp socket	.25
32537	Socket—Tube socket	.20
32803	Spring—Dial knob spring	.01
31615	Spring—Drive cord tension spring	.02
33296	Spring—Drive drum retaining spring	.06
32667	Spring—Knob or drive drum retaining spring.	.02
32966	Transformer—First i-f transformer	1.25
32967	Transformer—Second i-f transformer	1.05
33465	Transformer—Output transformer	1.35
33504	Volume control and power switch	1.50
	PICKUP AND ARM ASSEMBLIES	
33121	Arm—Pickup arm complete—less crystal cartridge	1.75
33592	Base—Pickup arm base and pivot arm	.70
33122	Crystal—Pickup crystal cartridge and needle screw	4.35
33123	Damper—Viscoloid damper for pickup armature.	.15
33529	Screw—Pickup needle screw	.15

STOCK No.	DESCRIPTION	Unit List Price
	MOTOR ASSEMBLIES	
31045	Base—Motor support, damper, and bearing cup assembly	.60
31046	Bearing—Rotor bearing	.70
33353	Cap—Turntable spindle cap (rubber)	.10
33357	Coil—Motor field coil—105-120 volts, 25 cycle.	.60
31918	Coil—Motor field coil—105-120 volts, 50 cycle.	.70
31917	Coil—Motor field coil—105-120 volts, 60 cycle	.70
31040	Cushion—One set rubber cushion for turntable mounting	.25
31047	Cushion—Rubber cushion for rotor bearing..	.15
33941	Frame—Motor frame and spindle—60 cycle..	
33641	Lamination—Rotor lamination—60 cycle	1.30
33358	Lamination—Stator laminations—25 cycle	1.30
33354	Lamination—Stator laminations—less coil 50 cycle	1.00
33355	Motor—105-120 volts, 25 cycle	11.75
33351	Motor—105-120 volts, 50 cycle	7.65
33940	Motor—105-120 volt, 60 cycle	7.30
32075	Ring—Lead ring for turntable—25 cycle	1.85
33041	Ring—Retaining ring and washer for spindle cap	.08
33356	Rotor—Rotor frame, laminations, and spindle shaft assembled—25 cycle	2.56
33352	Rotor—Rotor frame, laminations, and spindle shaft assembled—50 cycle	2.45
31036	Rotor—Turntable and rotor lamination for 60 cycle operation	4.55
31042	Stator—Stator assembly comprising coils and laminations for 60 cycle operation	2.50
32076	Turntable—Finished turntable plate only—25 cycle	1.40
31039	Turntable—Finished turntable plate only—50 cycle	.95
4083	Washer—Leather Washer	.02
33348	Washers—Leather and metal washers for stator bearing	.10
14231	Washer—Metal spacing washer	.02
32074	Weight—One upper and one lower weight for stator—25 cycle (2 each required)	.65
	SPEAKER ASSEMBLIES (RL—78—4)	
32907	Cap—Cone dust cap	.02
33809	Coil—Speaker field coil	1.10
32904	Cone—Speaker cone and voice coil	1.20
33466	Speaker complete (no output transformer)	4.25
	MISCELLANEOUS ASSEMBLIES	
33467	Control—Tone control and Radio-Record switch	1.35
33289	Dial—Glass dial scale	.40
30863	Knob—Tone control knob	.15
32895	Knob—Tuning or volume control knob	.15
33539	Mounting—Pickup arm rubber cushion, washer and nut	.10
30870	Plug—2-prong plug for motor leads	.35
32610	Rest—Pickup arm rest	.10

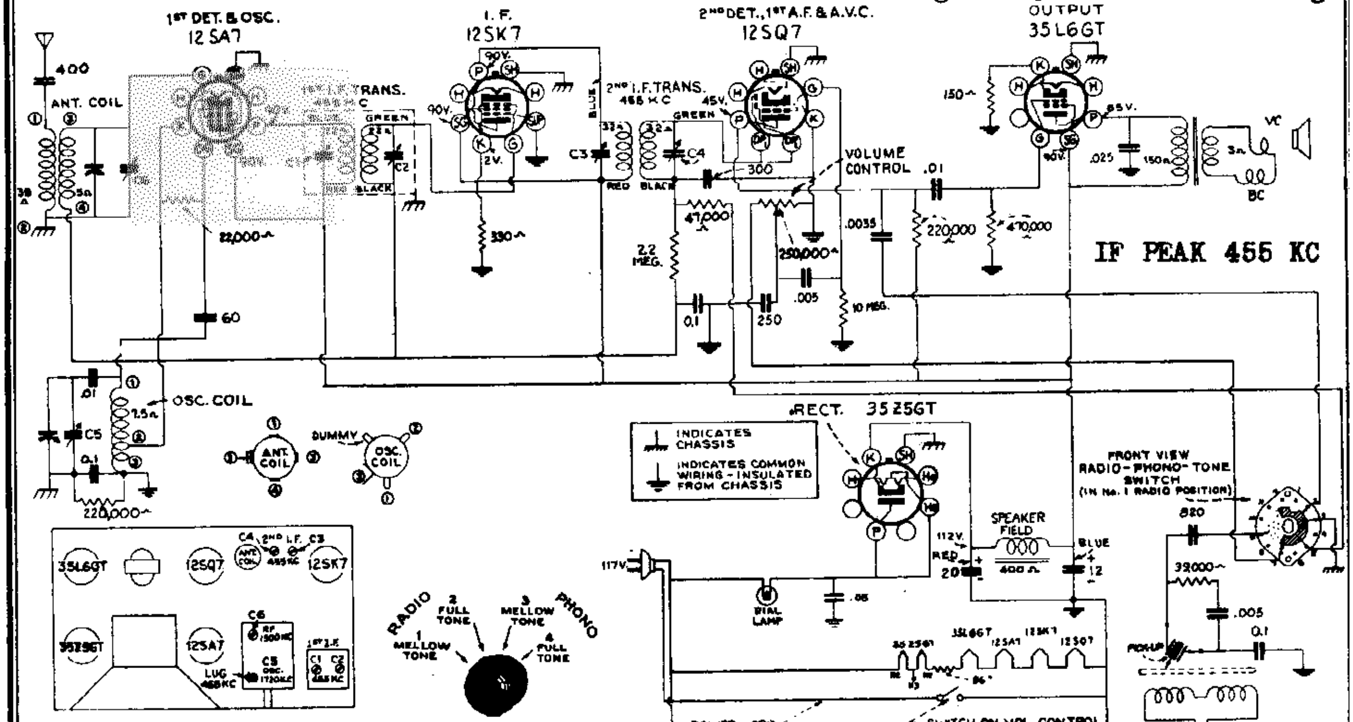
ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

First Edition

Printed in U. S. A.

RCA MFG. CO., INC.

MODELS U8M, U8W
Chassis RC-404A
Schematic, Socket, Trimmers
Alignment, Phono, Data, Voltage



TUBE AND TRIMMER LOCATIONS

— 1939 No. 21 —

Electrical and Mechanical Specifications

Frequency Range .... 540-1,720 kc
Intermediate Frequency .... 455 kc

Tube Complement
(1) RCA-12SA7 .... 1st-Detector-Oscillator
(2) RCA-12SK7 .... I-F Amplifier
(3) RCA-12SQ7 .... 2nd-Detector, 1st A-F, and A.V.C.
(4) RCA-35L6GT .... Power Output
(5) RCA-35Z5GT .... Half-Wave Rectifier
Dial Lamp (1) .... Mazda 51, 7.5 volts, 0.2 amp.

Power Supply Ratings
A-5 .... 105-125 volts, 50 cycles, 40 watts
A-6 .... 105-125 volts, 60 cycles, 40 watts

Power Output (125 volt, 60 cycle supply)
Undistorted .... .75 watts
Maximum .... 1.3 watts

Loudspeaker
Type .... 5-inch Electrodynamic
Voice-Coil Impedance .... 3.4 ohms at 400 cycles

Phonograph .... Synchronous (manual starting)
Records .... 10-inch and 12-inch, 78 r.p.m.
Pickup .... Crystal, 100,000 ohms at 1,000 c.p.s.
Average Output of Pickup .... 1½ volts at 1,000 c.p.s. across ½ meg. load

Cabinet Dimensions (inches)..Height 6 9/16, Width 14⅞, Depth 8⅜
Weight (net) .... 11½ pounds

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against chassis apron.

Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

Phonograph Service Data

The motor is started by turning the radio-phono tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.
5. The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.

Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rotor Adjustment.—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

Lubrication.—Oiling points are indicated in the diagram.

MODELS 9SX-1 to 9SX-8 incl.
Little Nipper
MODELS 9TX-1 to 9TX-5 incl.
Little Nipper-2nd
Parts Lists

RCA MFG. CO., INC.

"Little Nipper" Models 9SX-1, -2, -3, -4, -5, -6, -7, and -8

Five-Tube, Two-Band, AC-DC Superheterodyne Receivers

9SX-1, -2, -3, -4, -5, -6, -7, -8

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
31193	Antenna—35 ft. antenna wire—wound on reel	.50
X-569	Cabinet—Walnut and Ivory cabinet (9SX-2)	3.50 net
X-572	Cabinet—Blue and Onyx cabinet (9SX-6)	3.50 net
X-575	Cabinet—Onyx cabinet (9SX-7)	3.50 net
X-570	Cabinet—Walnut cabinet (9SX-1)	3.50 net
X-573	Cabinet—Ivory cabinet (9SX-3)	3.50 net
X-576	Cabinet—Marble cabinet (9SX-8)	3.50 net
X-571	Cabinet—Red and Ivory cabinet (9SX-4)	3.50 net
X-574	Cabinet—Black and Marble cabinet (9SX-5)	3.50 net
32392	Capacitor—.0005 mfd.	.20
32396	Capacitor—.0005 mfd. mica capacitor	.30
32393	Capacitor—.001 mfd.	.20
4858	Capacitor—.01 mfd.	.25
31796	Capacitor—.02 mfd.	.20
4886	Capacitor—.05 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
32386	Capacitor—10-20 mfd., Electrolytic	1.35
32394	Capacitor—Trimmer capacitor 1,500 K.C. adjustment (C4)	.20
32395	Capacitor—Trimmer capacitor 1,720 K.C. adjustment (C3)	.20
32387	Coil—Antenna coil (T1)	1.05
32388	Coil—Oscillator coil (T2)	1.05
32389	Coil—Short wave antenna coil (T3)	.85
32379	Condenser—2-gang variable tuning condenser	2.35
32384	Cord—Resistance power cord	.95
32399	Dial—Indicator dial scale	.35
32440	Knob—Station selector knob—Walnut	.25
32441	Knob—Station selector knob—Ivory	.25
32442	Knob—Station selector knob—Red	.25
32443	Knob—Station selector knob—Blue	.25
32444	Knob—Station selector knob—Black	.25
32445	Knob—Station selector knob—Maroon	.25
32446	Knob—Volume control or range switch knob—Walnut	.15
32447	Knob—Volume control or range switch knob—Ivory	.15
32448	Knob—Volume control or range switch knob—Red	.15
32449	Knob—Volume control or range switch knob—Blue	.15
32450	Knob—Volume control or range switch knob—Black	.15
32451	Knob—Volume control or range switch knob—Maroon	.15
4340	Lamp—Dial lamp—Mazda 40	.17
30540	Resistor—100 ohms, 1/3 watt	.20
32397	Resistor—120 ohms, 1/2 watt, Flexohm	.20
30880	Resistor—150 ohms, 1/3 watt	.20
30492	Resistor—20,000 ohms, 1/3 watt	.20
3594	Resistor—50,000 ohms, 1/3 watt	.20
30493	Resistor—150,000 ohms, 1/3 watt	.20
3048	Resistor—500,000 ohms, 1/3 watt	.20
30652	Resistor—1 megohm, 1/3 watt	.20
32398	Screw—No. 6-32 fibre screw—back cover mounting	.08
32390	Socket—8-prong moulded Octal tube socket	.25
32380	Speaker—Dynamic loudspeaker	2.90
32381	Transformer—Output transformer (T6)	1.00
32382	Transformer—First i.f. transformer (T4)	1.80
32383	Transformer—Second i.f. transformer (T5)	1.80
32385	Volume Control and Switch	1.50

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

"Little Nipper—2nd" Models 9TX-1, -2, -3, -4, and -5

Five-Tube, Single-Band, AC-DC Superheterodyne Receivers

9TX-1, -2, -3, -4, -5

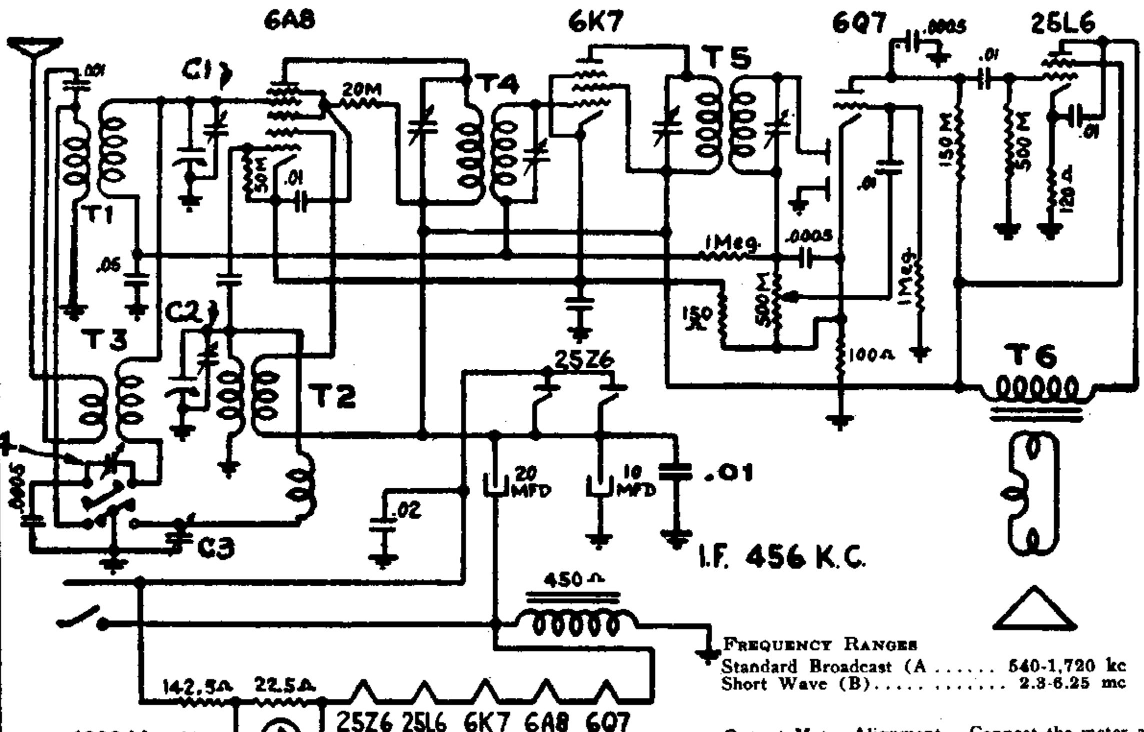
Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
X-587	Cabinet for 9TX1 (Walnut finish)	1.35 net
X-588	Cabinet for 9TX2 (Ivory finish)	2.20 net
X-589	Cabinet for 9TX3 (Wood, Mahogany finish)	2.80 net
X-590	Cabinet for 9TX4 (Arizona Cream Onyx finish)	4.50 net
X-591	Cabinet for 9TX5 (Brazilian Green Onyx finish)	4.50 net
32572	Coil—Antenna coil	.60
32573	Coil—Oscillator coil	.50
13057	Condenser—60 mmfd.	.35
12468	Condenser—250 mmfd.	.35
12952	Condenser—300 mmfd.	.35
30433	Condenser—400 mmfd.	.35
4858	Condenser—.01 mfd.	.25
4870	Condenser—.025 mfd.	.20
4886	Condenser—.05 mfd.	.20
4839	Condenser—0.1 mfd.	.30
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd.	.90
32579	Condenser—Variable tuning condenser	2.25
32577	Cord—Resistance power cord	.95
32566	Dial—Ivory dial for 9TX2 and 9TX5	.45
32567	Dial—Maroon dial for 9TX4	.45
32568	Dial—Tan dial for 9TX1 and 9TX3	.55
32569	Knob—Ivory volume control knob for 9TX2 and 9TX5	.20
32570	Knob—Maroon volume control knob for 9TX4	.15
32571	Knob—Tan volume control knob for 9TX1 and 9TX3	.15
31480	Lamp—Dial lamp—Mazda 47	.20
12409	Lead—Antenna lead	.45
14439	Resistor—100 ohms, ½ watt	.20
32535	Resistor—120 ohms, wire wound	.20
12412	Resistor—47,000 ohms, ¼ watt	.20
12264	Resistor—220,000 ohms, ¼ watt	.20
12265	Resistor—470,000 ohms, ¼ watt	.20
12679	Resistor—2.2 meg., ½ watt	.20
13601	Resistor—10 meg., ¼ watt	.20
31199	Shield—Dial lamp shield — Models 9TX1, 9TX2, 9TX4, and 9TX5	.04
32537	Socket—Tube socket	.20
32575	Speaker—Complete with transformer	4.00
32574	Transformer—First i.f. transformer	1.20
32581	Transformer—Output transformer	1.25
32534	Transformer—Second i.f. transformer	.90
32578	Volume Control and Power Switch—Models 9TX1, 9TX2, and 9TX3	1.50
32580	Volume Control and Power Switch—Models 9TX4 and 9TX5	1.50

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Schematic, Alignment, Socket Trimmers, Notes — RCA MFG. CO., INC. — MODELS 9SX-1 to 9SX-8 incl. Little Nipper

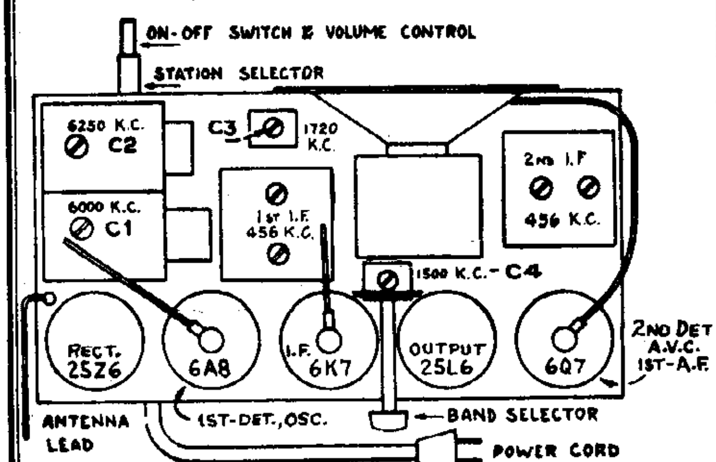


Frequency Ranges
Standard Broadcast (A ...... 540-1,720 kc
Short Wave (B) .... 2.3-6.25 mc

Power Supply Ratings
A-C Rating .... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating .... 105-125 volts, direct current, 50 watts
Power Output (125 volt, 60 cycle supply)
Undistorted .... 1.5 watt
Maximum .... 2.0 watts
Loudspeaker
Type .... 4-inch Electrodynamic

1938 No. 41

Model 9SX-1, Molded cabinet, walnut finish, ivory knobs.
Model 9SX-2, Molded cabinet, walnut body, ivory front, walnut knobs.
Model 9SX-3, Molded cabinet, ivory finish, red knobs.
Model 9SX-4, Molded cabinet, red body, ivory front, red knobs.
Model 9SX-5, Molded cabinet, black body, marble front, jet knobs.
Model 9SX-6, Molded cabinet, blue body, onyx front, blue knobs.
Model 9SX-7, Molded cabinet, onyx finish, maroon knobs.
Model 9SX-8, Molded cabinet, marble finish, jet knobs.



Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis through .01 mfd., and keep the output as low as possible to avoid a-v-c action.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6K7 I-F grid cap, in series with .01 mfd.	456 kc	Quiet point between 1,650-1,720 kc, with range switch at broadcast position (counter-clockwise from rear).	Two trimmers on 2nd I-F trans.
2	6A8 1st-Det. grid cap, in series with .01 mfd.	456 kc		Two trimmers on 1st I-F trans.
3	Antenna Term. on antenna trans., in series with 400 ohms.	6,250 kc	Max. clockwise (out of mesh) "B" band	C2 (osc. gang trimmer)*
4		6,000 kc	Resonance on 6,000 kc signal	C1 (ant. gang trimmer)**
5	Antenna Term. on antenna trans., in series with 90 mmf.	1,720 kc	Max. clockwise (out of mesh)	C3
6		1,500 kc	Resonance on 1,500 kc signal.	C4

* Use minimum capacity peak if two peaks can be obtained.
** After this adjustment, check for image by leaving test oscillator at 6,000 kc, and shifting receiver dial to 5,088 kc, where a weaker signal should be received.

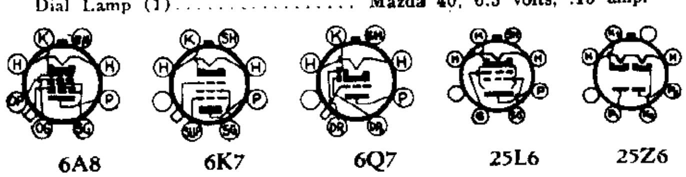
Tube Complement
(1) RCA-6A8 .... 1st-Detector—Oscillator
(2) RCA-6K7 .... I-F Amplifier
(3) RCA-6Q7 .... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 .... Power Output
(5) RCA-25Z6 .... Half-Wave Rectifier
Dial Lamp (1) .... Mazda 40, 6.3 volts, .15 amp.

	Height	Width	Depth
Cabinet Dimensions	4½ inches	8 inches	4½ inches
Weight		7 pounds (shipping)	

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord.—The power cord contains a resistor which becomes warm during operation.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

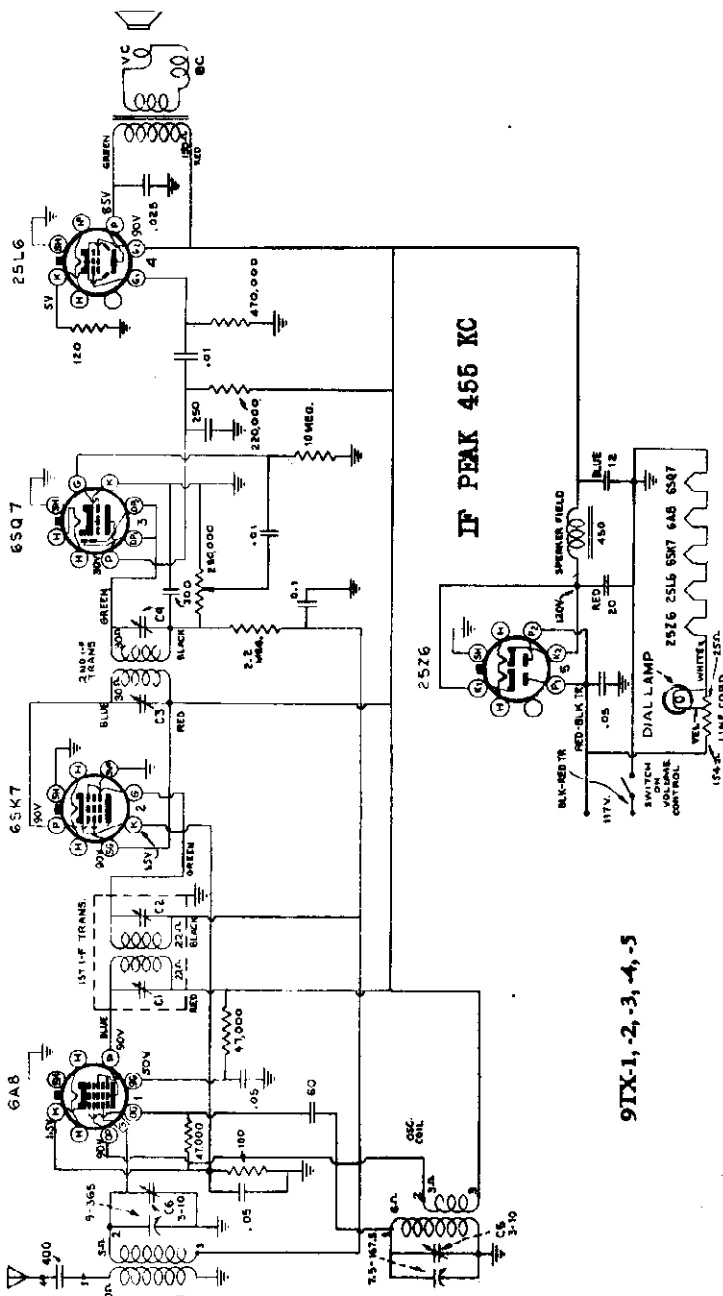


Bottom view of tube sockets

MODELS 9TX-1 to 9TX-5 incl.
Little Nipper-2nd

RCA MFG. CO., INC.

Schematic, Voltage, Socket
Trimmers, Alignment



—1938 No. 42—

Model 9TX-1, Molded cabinet, walnut finish, mottled tan dial and knob.

Model 9TX-2, Molded cabinet, ivory finish, ivory dial and knob.

Model 9TX-3, Two-tone wood cabinet, piano finish, mottled tan dial and knob.

Model 9TX-4, Molded Arizona cream onyx cabinet, maroon dial and knob.

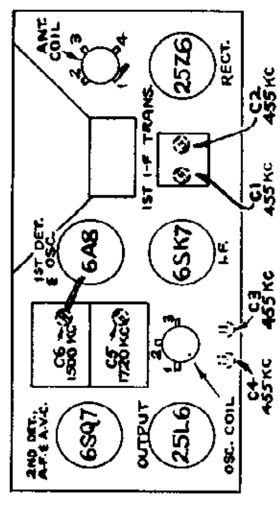
Model 9TX-5, Molded green onyx cabinet, ivory dial and knob.

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6A8 1st-Det. grid cap, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers).
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal.	C6 (antenna)



Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord.—The power cord contains a resistor which becomes warm during operation.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Electrical and Mechanical Specifications

FREQUENCY RANGE .... 580-1,720 kc

TUBE COMPLEMENT
(1) RCA-6A8 .... 1st-Detector—Oscillator
(2) RCA-6SK7 .... I-F Amplifier
(3) RCA-6SQ7 .... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 .... Power Output
(5) RCA-25Z6 .... Half-Wave Rectifier
Dial Lamp (1) .... Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS
A-C Rating .... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating .... 105-125 volts, direct current, 50 watts

INTERMEDIATE FREQUENCY .... 455 kc

POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted .... 1.5 watts
Maximum .... 2.0 watts

LOUDSPEAKER
Type .... 4-inch Electrodynamic

		Height	Width	Depth
Cabinet Dimensions	9TX-1, -2	5 inches	8½ inches	4¾ inches
	9TX-3	5⅞ inches	8⅞ inches	4⅞ inches
	9TX-4, -5	5½ inches	8½ inches	4¼ inches

Weight .... 7 pounds (shipping)

Schematic, Voltage, Socket
Trimmers, Alignment, Data

RCA MFG. CO., INC.

MODELS 9TX-21, 9TX-22
Chassis RC-403
MODEL 9TX-23
Chassis RC-403A

Electrical and Mechanical Specifications

Frequency Range .... 580-1,720 kc

Tube Complement
(1) RCA-6A8 .... 1st-Detector—Oscillator
(2) RCA-6SK7 .... I-F Amplifier
(3) RCA-6SQ7 .... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 .... Power Output
(5) RCA-25Z6 .... Half-Wave Rectifier
Dial Lamp (1) .... Mazda 47, 6.3 volts, .15 amp.

Power Supply Ratings
A-C Rating .... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating .... 105-125 volts, direct current, 50 watts

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord.—The power cord contains a resistor which becomes warm during operation.

Intermediate Frequency .... 455 kc

Power Output (125 volt, 60 cycle supply)
Undistorted .... 1.5 watts
Maximum .... 2.0 watts

Loudspeaker
Type .... 4-inch Electrodynamic

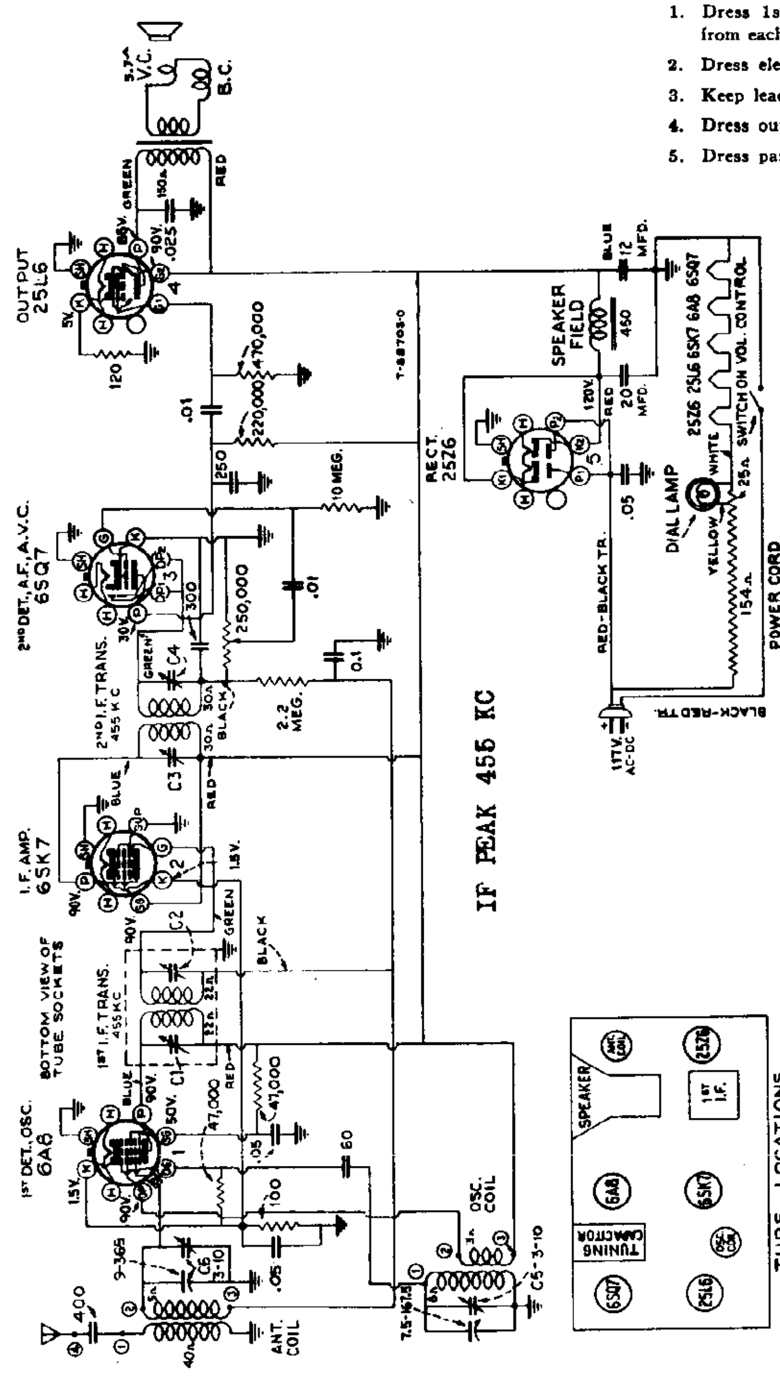
Cabinet Dimensions, 5⅜ in. high, 8¾ in. wide, 4½ in. deep.

Weight (approx.) .... 7 pounds (shipping)

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.



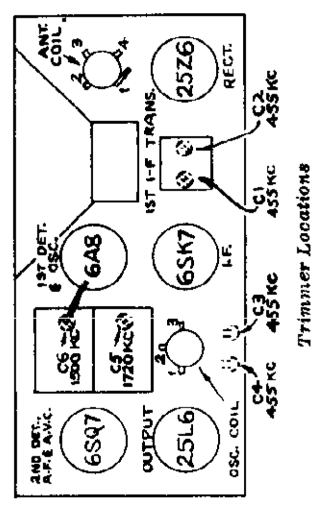
— 1939 No. 5 —

Alignment Procedure

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible. The antenna should be rolled up and kept at least one foot from chassis during alignment.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6A8 1st-Det. grid cap, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal.	C6 (antenna)

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.



Trimmer Locations

MODELS 9TX-21, 9TX-22
Chassis RC-403
MODEL 9TX-23, Chas. RC-403A
MODEL 9TX-31, Chas. RC-405

RCA MFG. CO., INC.

MODEL 9TX-32, Chas. RC405A
MODEL 9TX-33, Chas. RC405B
Parts Lists

Models 9TX-21, -22, and -23

Chassis No. RC-403 RC-403 RC-403A

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
X-638	Cabinet for 9TX21 (Walnut Finish) ...... (net)	1.35
X-639	Cabinet for 9TX22 (Ivory Finish) .... (net)	2.20
X-640	Cabinet for 9TX23 (Wood-Walnut Finish) . (net)	3.25
32572	Coil—Antenna coil	.60
32573	Coil—Oscillator coil	.50
13057	Condenser—60 mmfd.	.35
12488	Condenser—250 mmfd.	.35
12952	Condenser—300 mmfd.	.35
30433	Condenser—400 mmfd.	.35
4858	Condenser—.01 mfd.	.25
4870	Condenser—.025 mfd.	.20
4886	Condenser—.05 mfd.	.20
4839	Condenser—0.1 mfd.	.30
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd.	.90
32944	Condenser—2-gang variable tuning	2.20
32634	Cord—Drive cord	.10
32577	Cord—Resistance power cord	.95
32942	Dial—Glass dial scale—Models 9TX21, 9TX22.	.30
33289	Dial—Glass dial scale—Model 9TX23	.40
33297	Drive—Dial drive mechanism comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled—Model 9TX23	.85
32946	Drum—Variable condenser drive drum and indicator disc—Models 9TX21 and 9TX22	.35
33006	Feet—Rubber feet for 9TX23	.03
33295	Indicator—Dial pointer—Model 9TX23	.25
32447	Knob—Ivory knob (tuning or volume) Model 9TX22	.15
32571	Knob—Tan knob (tuning or volume) Models 9TX21 and 9TX23	.15
31480	Lamp—Dial lamp—Mazda 47	.20
12409	Lead—Antenna lead	.45
32943	Nut—Speed nut to fasten dial—Models 9TX21 and 9TX22	.01
33292	Plate—Dial color plate—Model 9TX23	.25
33294	Pulley—Drive cord pulley—Model 9TX23	.02
14439	Resistor—100 ohms, ¼ watt	.20
32535	Resistor—120 ohms, wire wound	.20
12412	Resistor—47,000 ohms, ¼ watt	.20
12264	Resistor—220,000 ohms, ¼ watt	.20
12285	Resistor—470,000 ohms, ¼ watt	.20
12679	Resistor—2.2 meg., ¼ watt	.20
13601	Resistor—10 meg., ¼ watt	.20
32945	Shaft—Tuning knob shaft—Models 9TX21 and 9TX22	.20
33293	Shaft—Tuning knob shaft and bushing—Model 9TX23	.30
33290	Socket—Dial lamp socket	.15
32537	Socket—Tube socket	.20
32575	Speaker—Complete with transformer	4.00
32803	Spring—Dial knob spring	.01
32947	Spring—Drive cord tension spring—Models 9TX21 and 9TX22	.05
31615	Spring—Drive cord tension spring—Model 9TX23	.02
33296	Spring—Drive drum retaining spring—Model 9TX23	.06
32667	Spring—Knob or drive drum retaining spring	.02
32574	Transformer—First i. f. transformer	1.20
32581	Transformer—Output transformer	1.25
32534	Transformer—Second i. f. transformer	.90
32578	Volume Control and power switch—Models 9TX21 and 9TX22	1.50
33291	Volume Control and switch—Model 9TX23	1.50

MODELS 9TX-31, 9TX-32, 9TX-33

Chassis No. RC-405, RC-405A, RC-405B

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
X-638	Cabinet for 9TX31 (Walnut Finish) ...... (net)	1.35
X-639	Cabinet for 9TX32 (Ivory Finish) .... (net)	2.20
X-640	Cabinet for 9TX33 (Wood—Walnut Finish) ... (net)	3.25
12488	Capacitor—250 mmfd.	.35
12952	Capacitor—300 mmfd.	.35
4838	Capacitor—.005 mfd.	.25
4937	Capacitor—.01 mfd.	.25
12484	Capacitor—0.25 mfd.	.30
32572	Coil—Antenna coil	.60
32962	Coil—Oscillator coil	.60
13057	Condenser—60 mmfd.	.35
30433	Condenser—400 mmfd.	.35
4870	Condenser—.025 mfd.	.20
4839	Condenser—0.1 mfd.	.30
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd	.90
32968	Condenser—2-gang variable tuning	2.25
32634	Cord—Drive cord	.10
32942	Dial—Glass dial scale (Models 9TX31, 9TX32)	.30
33289	Dial—Glass dial scale (Model 9TX33)	.40
13998	Resistor—22,000 ohms, ¼ watt	.20
12412	Resistor—47,000 ohms, ¼ watt	.20
12264	Resistor—220,000 ohms, ¼ watt	.20
12285	Resistor—470,000 ohms, ¼ watt	.20
12679	Resistor—2.2 meg., ¼ watt	.20
13601	Resistor—10 meg., ¼ watt	.20
32945	Shaft—Tuning knob shaft (Models 9TX31 and 9TX32)	.20
33293	Shaft—Tuning knob shaft and bushing (Model 9TX33)	.30
32969	Socket—Dial lamp socket	.25
14278	Socket—Phonograph socket	.25
32537	Socket—Tube socket	.20
32963	Speaker—Complete with transformer	3.95
33297	Drive—Dial drive mechanism—comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled (Model 9TX33)	.85
32946	Drum—Variable condenser drive drum and indicator disc (Models 9TX31 and 9TX32)	.35
33006	Feet—Rubber feet for 9TX33	.03
33295	Indicator—Dial pointer (Model 9TX33)	.25
32447	Knob—Ivory knob (tuning or volume) (Model 9TX32)	.15
32571	Knob—Tan knob (tuning or volume) (Models 9TX31 and 9TX33)	.15
31480	Lamp—Dial lamp—Mazda 47	.20
12409	Lead—Antenna lead	.45
32943	Nut—Speed nut to fasten dial (Models 9TX31 and 9TX32)	.01
33292	Plate—Dial color plate (Model 9TX33)	.25
33294	Pulley—Drive cord pulley (Model 9TX33)	.02
32970	Resistor—Dial lamp resistor—24 ohms	.15
32971	Resistor—Series dropping resistor—42 ohms	.15
13428	Resistor—150 ohms, ¼ watt	.20
30538	Resistor—330 ohms, ¼ watt	.20
32803	Spring—Dial knob spring	.01
32947	Spring—Drive cord tension spring (Models 9TX31 and 9TX32)	.05
31615	Spring—Drive cord tension spring (Model 9TX33)	.02
33296	Spring—Drive drum retaining spring (Model 9TX33)	.06
32667	Spring—Knob or drive drum retaining spring	.02
32966	Transformer—First i-f transformer	1.25
32967	Transformer—Second i-f transformer	1.05
32964	Transformer—Output transformer	1.25
32578	Volume Control and power switch (Models 9TX31 and 9TX32)	1.50
32545	Volume Control and switch (Model 9TX33)	1.50

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

MODELS 9TX-31, Chas. RC-405
9TX-32, Chas. RC-405A, 9TX-33
Chas. RC-405B
Schematic, Voltage, Socket
Trimmers, Alignment, Data

RCA MFG. CO., INC.

Electrical and Mechanical Specifications

Frequency Range .... 580-1,720 kc

Tube Complement
(1) RCA-12SA7 .... 1st-Detector—Oscillator
(2) RCA-12SK7 .... I-F Amplifier
(3) RCA-12SQ7 .... 2nd-Detector, 1st A-F, and A.V.C.
(4) RCA-35L6GT .... Power Output
(5) RCA-35Z4GT .... Half-Wave Rectifier

Dial Lamp (1) .... Mazda 47, 6.3 volts, .15 amp.

Power Supply Ratings
A-C Rating .... 105-125 volts, 50-60 cycles, 30 watts
D-C Rating .... 105-125 volts, direct current, 30 watts

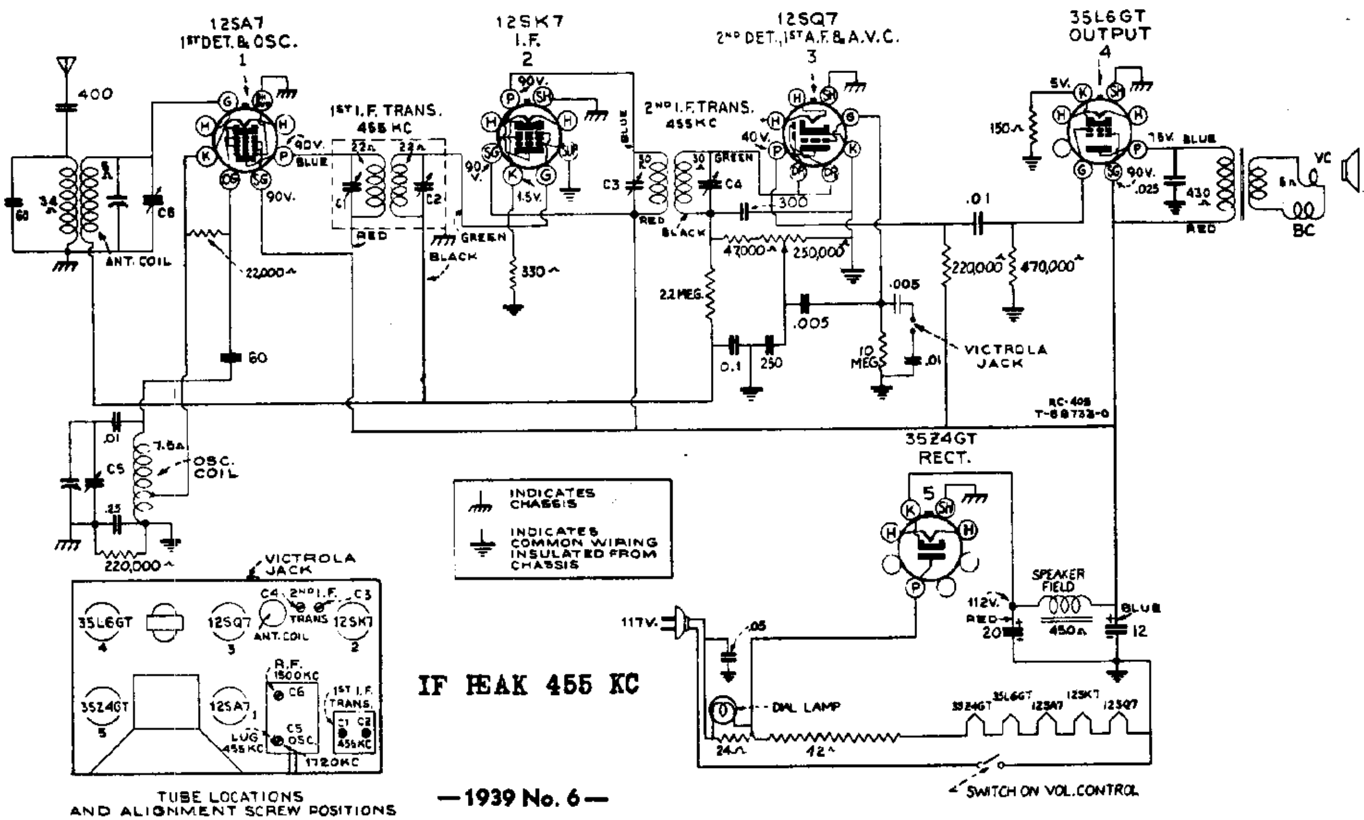
Intermediate Frequency .... 455 kc

Power Output (125 volt, 60 cycle supply)
Undistorted .... 1.5 watts
Maximum .... 2.0 watts

Loudspeaker
Type .... 4-inch Electrodynamic

Cabinet Dimensions	Height	Width	Depth
9TX-31	5½ inches	8⅝ inches	4½ inches
9TX-32	5½ inches	8⅝ inches	4½ inches
9TX-33	6½ inches	9⅝ inches	4⅞ inches

Weight (net) ...... 9TX-31, 32.. 4⅞ pounds; 9TX-33.. 5½ pounds



—1939 No. 6—

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.

Power-Supply Polarity. — For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Victrola Attachment.—A jack is provided on the rear of chassis for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Model 9TX-31
Walnut Finish, Tan Knobs

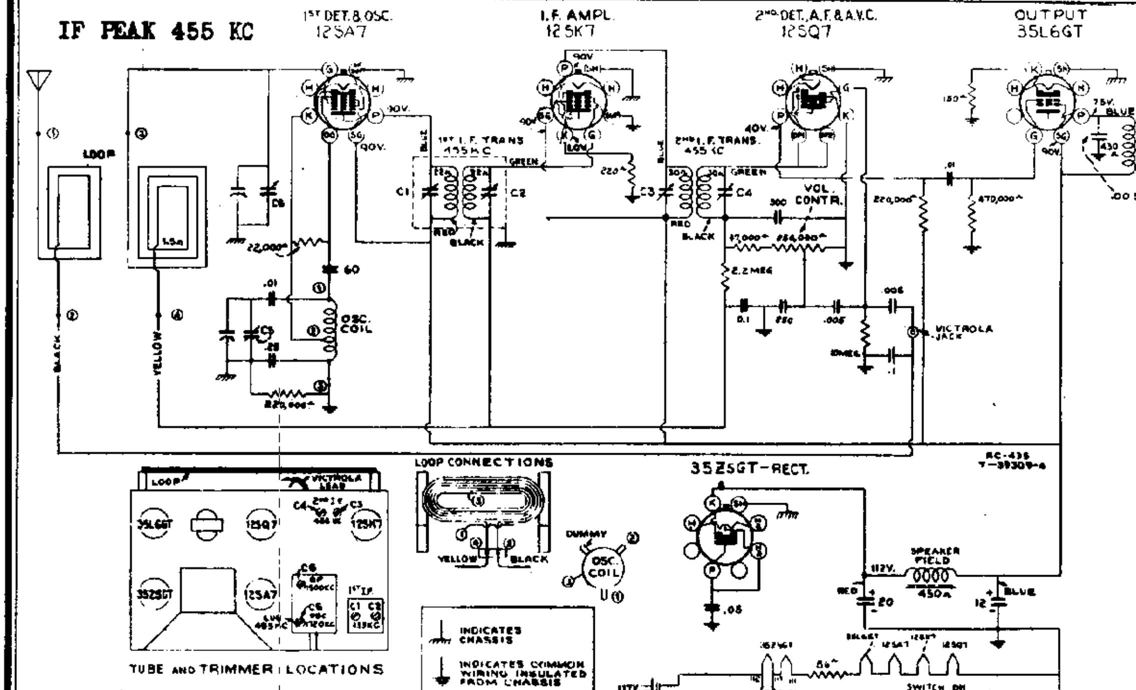
Model 9TX-32
Ivory Finish, Ivory Knobs

Model 9TX-33
Heart Walnut, Ornamental Sides
Tan Knobs

MODEL 9TX-50, Chassis RC-435
Schematic, Voltage, Socket
Trimmers, Alignment, Data, Parts

RCA MFG. CO., INC.

IF PEAK 455 KC



—1939 No. 14—

Features of design include: New Type, single-ended tubes (12SA7, 12SK7, and 12SQ7); edge-lighted dial; dust-proof electrodynamic loudspeaker; "Magic Voice"; "Magic Loop"; Television-Victrola Jack; and Beam Power Output.

Model 9TX-50 — *Light Mahogany Cabinet*

Model 9TX-50M — *Regular Mahogany Cabinet*

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC—435)	
32968	Capacitor—2 gang variable tuning	2.25
13057	Capacitor—60 mmfd.	.35
12488	Capacitor—250 mmfd.	.35
12952	Capacitor—300 mmfd.	.35
4838	Capacitor—.005 mfd.	.25
32787	Capacitor—.05 mfd.	.20
4839	Capacitor—.1 mfd.	.30
12484	Capacitor—.25 mfd.	.30
32576	Capacitor—Electrolytic 20-12 mfd.	.90
32962	Coil—Oscillator coil	.60
32634	Cord—Drive cord	.10
33662	Drum—Drive cord and indicator drum	.25
33295	Indicator—Dial pointer	.25
31480	Lamp—Pilot Lamp	.20
33663	Loop—Antenna loop	1.20
33294	Pulley—Drive cord pulley	.02
33558	Resistor—86 ohms	.15
13428	Resistor—150 ohms, ¼ watt	.20
14561	Resistor—220 ohms, ¼ watt	.20
13998	Resistor—22,000 ohms, ¼ watt	.20
12738	Resistor—27,000 ohms, ¼ watt	.20
12264	Resistor—220,000 ohms, ¼ watt	.20
12285	Resistor—470,000 ohms, ¼ watt	.20
12679	Resistor—2.2 meg. ¼ watt	.20
13601	Resistor—10 meg. ¼ watt	.20
33293	Shaft—Tuning knob shaft and bushing	.30
33557	Socket—Dial Light	.30
32537	Socket—Tube Socket	.30
31615	Spring—Drive cord tension spring	.02
33296	Spring—Drum retaining spring	.08
32966	Transformer—I. F. Input	1.25
32967	Transformer—I. F. Output	1.25
33291	Volume Control	1.50
	SPEAKER ASSEMBLIES	
33740	Speaker—Complete	4.00
33741	Transformer—Output	1.15
	MISCELLANEOUS ASSEMBLIES	
33289	Dial—Dial Scale	.40
33006	Foot—Rubber foot for cabinet	.03
32571	Knob—Tuning or volume control knob	.15
33742	Socket—Phonograph input socket	.20

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be adjusted so that top edge of pointer just touches rivet in dial plate.

Antenna.—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT" terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Victrola Attachment.—A jack is provided on the rear of cabinet for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. loop in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3	Antenna term. of ant. loop in series with 100 mmfd.	1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Precautionary Lead Dress

1. Dress 2nd I-F green lead close to chassis and under other parts.
2. Dress lead from gang condenser to grid of 12SA7 close to chassis and away from 12SQ7 socket.
3. Dress blue 1st I-F lead under volume control close to chassis.
4. Dress blue 2nd I-F lead close to chassis and behind 12SK7 socket.

Electrical and Mechanical Specifications

FREQUENCY RANGE .... 540-1,720 kc
Intermediate Frequency .... 455 kc

TUBE COMPLEMENT
(1) RCA-12SA7 .... 1st-Detector-Oscillator
(2) RCA-12SK7 .... I-F Amplifier
(3) RCA-12SQ7 .... 2nd-Detector, 1st A-F and A.V.C.
(4) RCA-35L6GT .... Power Output
(5) RCA-35Z5GT .... Half-Wave Rectifier

Dial Lamp (1) .... Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS
A-C Rating .... 105-125 volts, 50-60 cycles, 30 watts
D-C Rating .... 105-125 volts, direct current, 30 watts

POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted .... 1.5 watts
Maximum .... 3.0 watts

LOUDSPEAKER
Type .... 4-inch Electrodynamic
Cabinet Dimensions (inches) .. Height 7¾, Width 11½, Depth 6⅜
Weight (net) .... 6⅝ pounds

Schematic Changes
Parts

RCA MFG. CO., INC.

Model D22-1A

Service Data for Model D22-1 are directly applicable to these instruments except as follows:

(1) The schematic circuit diagram for Model D22-1A is shown by figure 5.

(2) The metal rectifier socket wiring for tube No. 14 is shown by figure 2.

(3) Figure 3 shows the Pickup details.

(4) The phonograph motor is of the capacitor type. Light machine oil should be used to lubricate the motor bearings. The motor is wired in this instrument as follows: One power-supply lead connects to one terminal of switch S201. The other terminal of S201 connects to one terminal of the brake switch S202. The other terminal of S202 connects to the yellow motor lead. The green motor lead connects to one lead of the motor capacitor. The red motor lead connects to the other capacitor lead and also to the remaining power-supply lead.

(5) The Radiotron socket voltages (figure 4 herein) apply to all Models D22-1 or D22-1A and should be used in place of figure 4 of the D22-1 Service Data.

(6) The resistor assembly R44 and R45 is mounted on the front chassis apron instead of the rear chassis apron.

(7) Change price on Stock No. 11879 Transformer from $3.50 to $8.15.

(8) Change price on Stock No. 11541 Arm from $0.82 to $8.15.

(9) Change price on Stock No. 11480 Microphone from $7.05 to $7.50.

(10) Refer to Substitute and Additional Replacement Parts contained herein for other parts changes.

SEE RIDER'S VOL.VI FOR OTHER DATA

Stock No.	Model D22-1A (use replacement parts from D22-1 except as listed below)	List Price
13405	Armature—Pickup armature	.95
4870	Capacitor—.025 mfd. (C47)	.20
11195	Socket—Five-contact Rectifier Radiotron socket for tube No. 14	.15
11887	Transformer—Power transformer—105-125 volts—25-50 cycles	6.95
11880	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)	5.80
12051	Capacitor—2-mfd. complete with 2-contact male connector for use with motor Stock Nos. 9650 or 9651—(C217)	4.18
13101	Capacitor—4-mfd. complete with 2-contact male connector for use with motor Stock No. 9735—(C217)	5.05
4674	Connector—2-contact male connector for capacitor Stock No. 12051 or 13101	.25
9735	Motor—105-125 volts—25 cycles—(M1)	49.50
9651	Motor—105-125 volts—50 cycles—(M1)	35.35
9650	Motor—105-125 volts—60 cycles—(M1)	35.35
12050	Suspension Spring—Motor mounting spring, washer, and stud assembly—comprising six springs, six cup washers, three spring washers and three studs	.60
11997	Capacitor—75 mmfd.—(C216)	.14
12352	Filter—Microphone and pickup input filter pack—(L307, C218, R223)	1.85
	Stock Nos. 4858 (C47), 11273, 4794 (tube 14), 8062, 8061, 9479, 9478, 9477, and 4562, are not used in Model D22-1A.	

The prices quoted above are subject to change without notice.

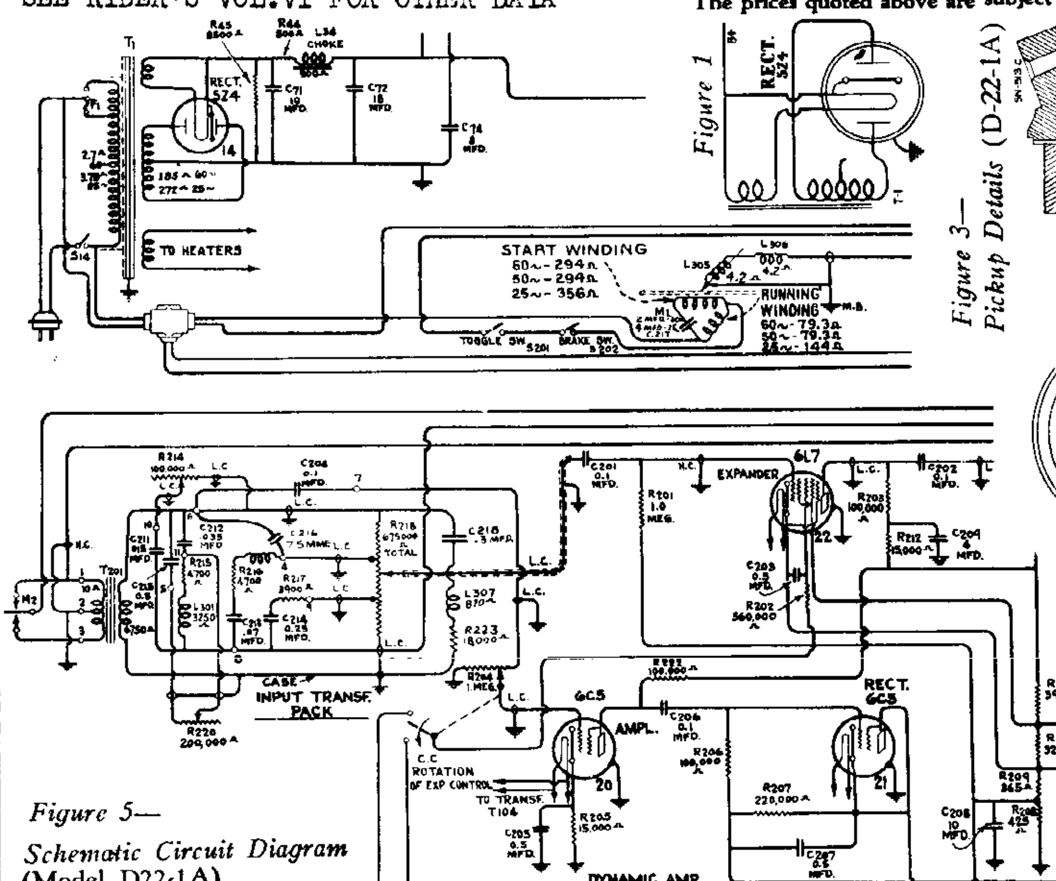


Figure 5—
Schematic Circuit Diagram
(Model D22-1A)

Figure 1

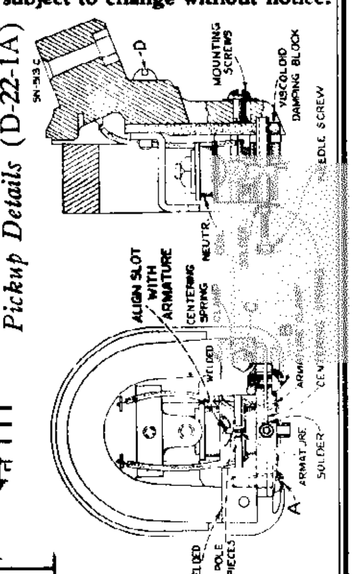


Figure 3—
Pickup Details (D-22-1A)

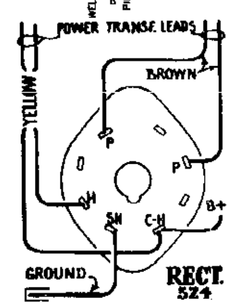
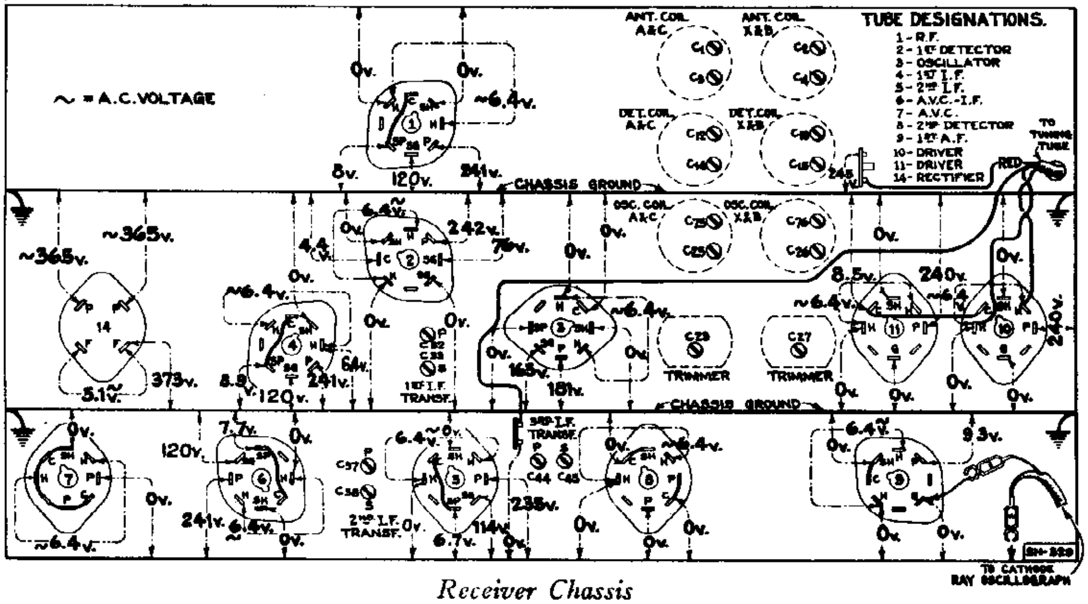


Figure 2

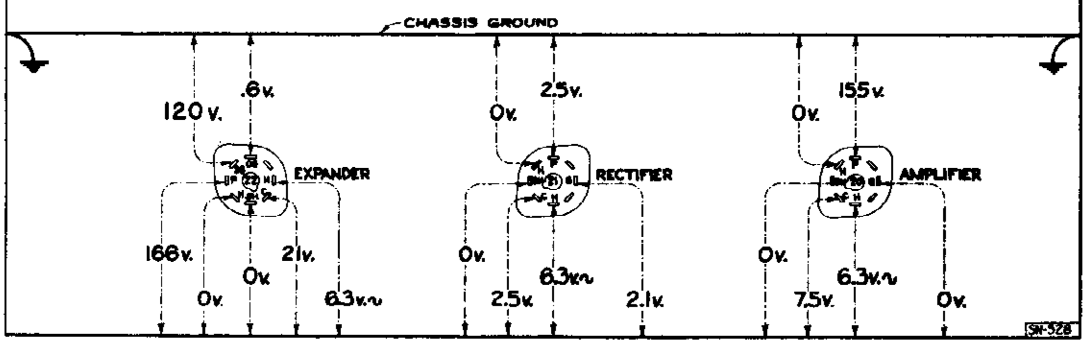
MODEL D22-1
Corrected Voltage
MODEL D22-1A
Voltage

RCA MFG. CO., INC.

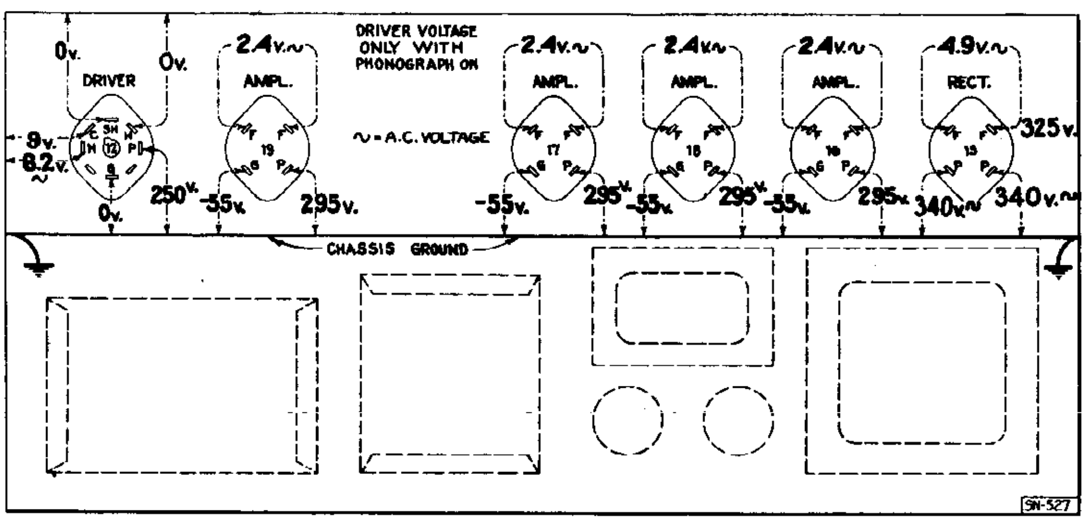


Receiver Chassis

USE THESE VOLTAGE CHARTS INSTEAD OF THOSE ON RCA PAGE 6-139 FOR MODEL D22-1



Dynamic Amplifier



Power Amplifier

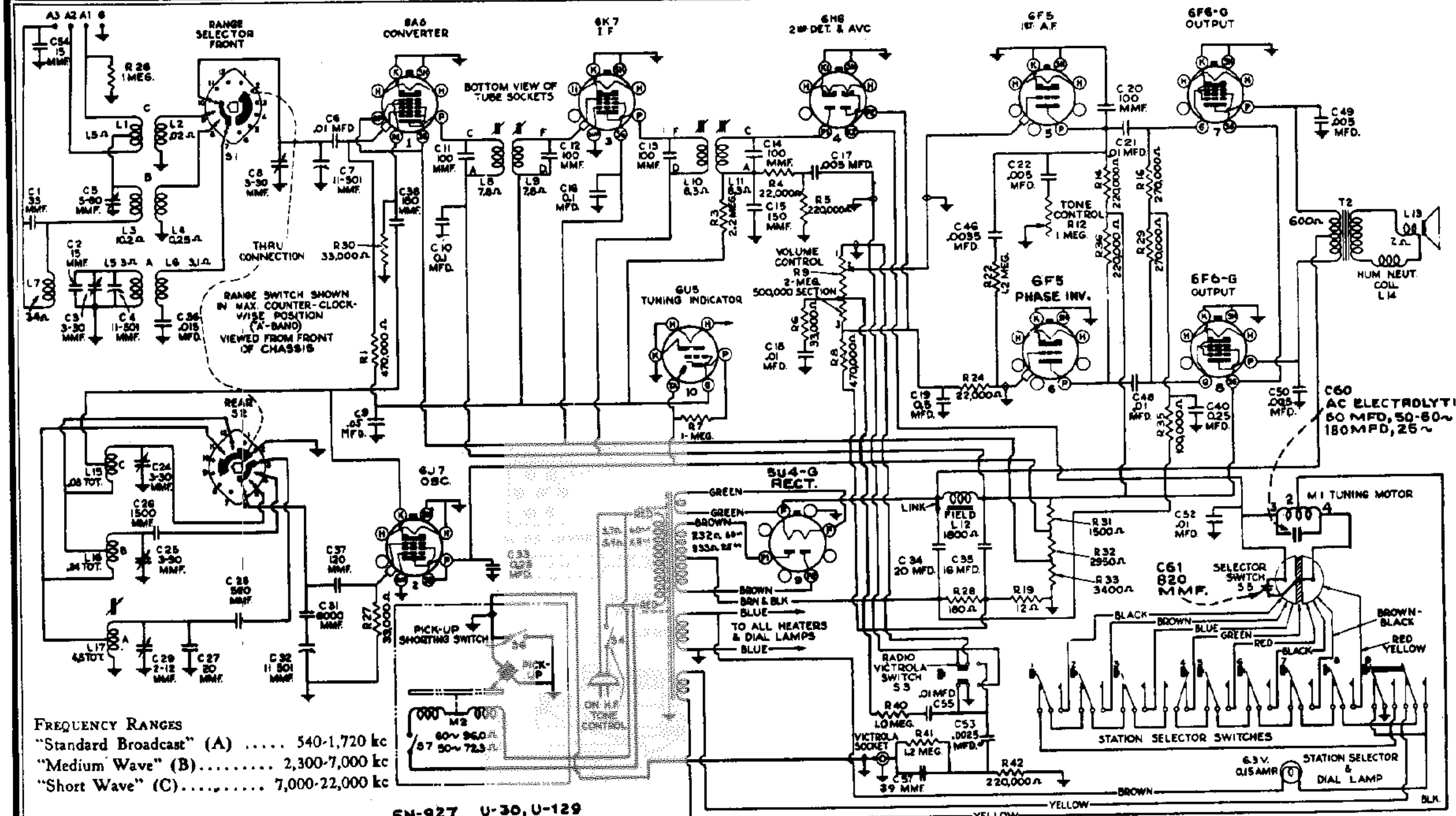
Figure 4—Radiotron Socket Voltages (D22-1 and D22-1A)
Measured at 115 volts, 60-cycle supply—No signal being received

MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K
Schematic, Data

RCA MFG. CO., INC.

Schematic Circuit Diagram

In Model U-30, a 1.0 megohm resistor (R43) is connected from the Victrola socket to chassis.



Frequency Ranges
"Standard Broadcast" (A) ..... 540-1,720 kc
"Medium Wave" (B)......... 2,300-7,000 kc
"Short Wave" (C).......... 7,000-22,000 kc

MODELS U-30 and U-129

—1939 No. 11—

Chassis No. RC-335KR, RC-335K

FOR DIAL CALIBRATION SEE INDEX

Ten-Tube, Three-Band, Electric Tuning, A-C Victrolas

Power Output
Undistorted.................................. 10 watts
Maximum.................................. 12 watts

Intermediate Frequency
455 kc

Phonograph
Record Capacity...............Seven ten or twelve inch
Turntable Speed..............78 R.P.M. (Adjustable)

Loudspeaker
Type........................ 12-inch Electrodynamic
Voice Coil Impedance............ 2.2 ohms at 400 cycles

Type Pickup..................Crystal
Pickup Impedance..............80,000 ohms at 1,000 cycles

Power Supply Rating

	Radio Only	Total
A	105-125 volts, 50-60 cycles, 120 watts	145 watts
A-6	105-125 volts, 60 cycles, 120 watts	145 watts
B-2	105-125 volts, 25 cycles, 120 watts	145 watts
C	105-130/140-160/200-250 volts, 50-60 cycles, 120 watts	145 watts
C-6	105-130/140-160/200-250 volts, 60 cycles, 120 watts	145 watts

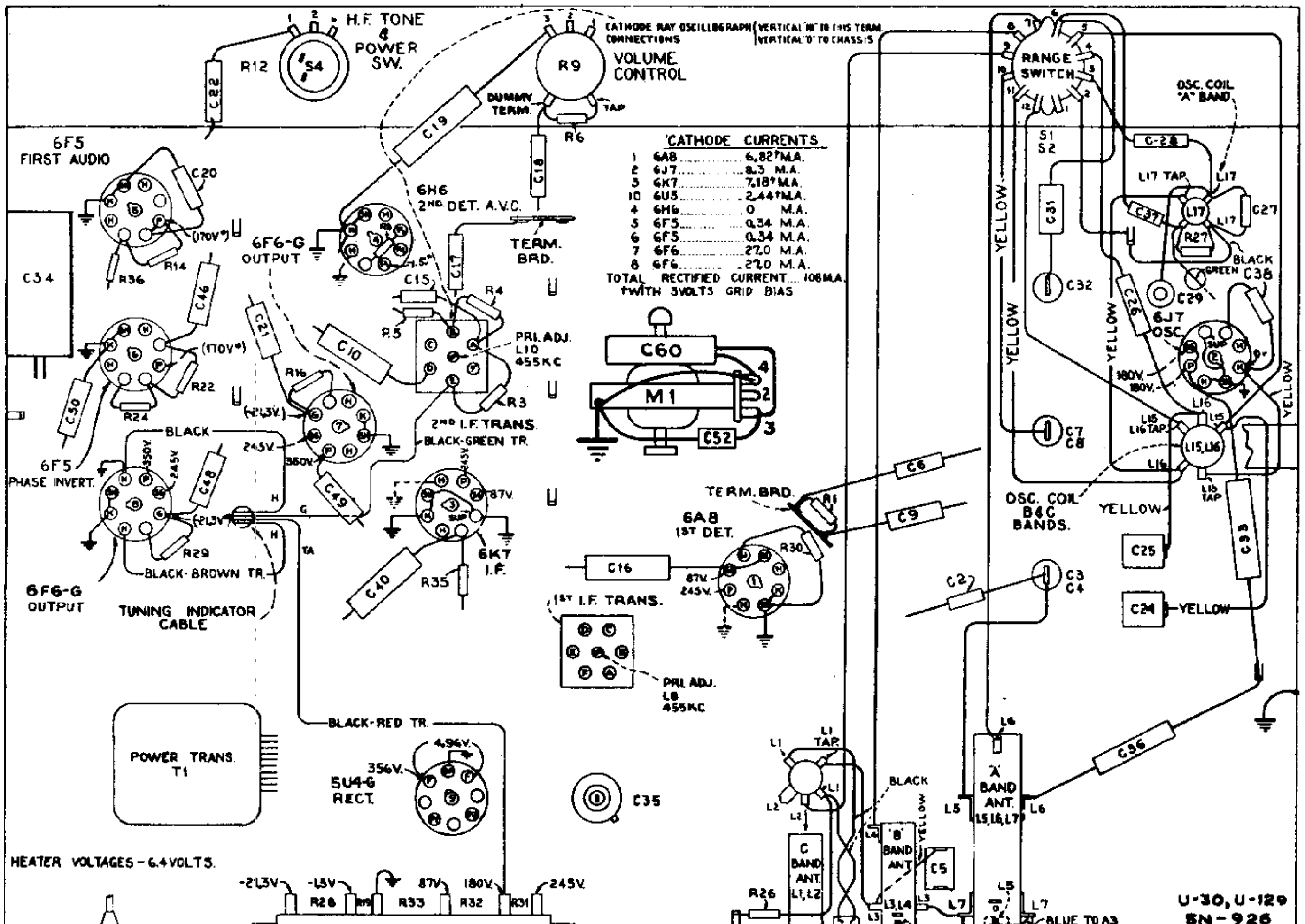
MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K
Voltage, Chassis Wiring
Transformer, Notes

RCA MFG. CO., INC.

Tube Complement

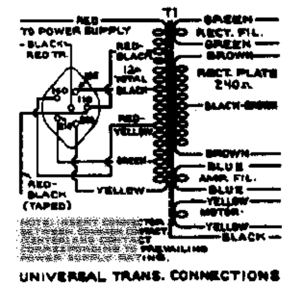
(1) RCA-6A8.......... First Det.
(2) RCA-6J7........... Oscillator
(3) RCA-6K7.......... I-F Amp.
(4) RCA-6H6.. 2nd Det. and A.V.C.
(5) RCA-6F5......... First Audio
(6) RCA-6F5....... Phase Inverter
(7) RCA-6F6-G..... Power Output
(8) RCA-6F6-G..... Power Output
(9) RCA-5U4-G......... Rectifier
(10) RCA-6U5....... "Magic Eye"

	U-30	U-129
Height (inches).......	34	35
Width (inches)........	36¼	33¼
Depth (inches)........	17⅛	17
Weight (Net lbs.)........	101	104
Weight (Shipping lbs.)....	141	134

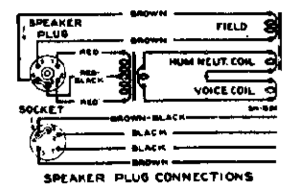


Chassis Base (inches)............ 15⅞ x 8½ x 3⅛ BOTTOM VIEW- REAR OF CHASSIS
Maximum chassis height (inches).............. 8¼

R-F Wiring Diagram and Socket Voltages



Above — Universal Power Transformer Connections.



Above — Connections and Colors of Loudspeaker and Cable.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point, volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

*** NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

General Description

These receivers employ a ten-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include: "Electric Tuning" for eight broadcast stations; a link-coupled antenna circuit; magnetite-core i-f transformers and "A" band oscillator coil; full automatic volume control; "Magic Eye" tuning tube; improved 12-inch dust-proof electro-dynamic loudspeaker; aurally compensated audio volume control; continuously variable high-frequency tone control; provision for armchair control attachment; illuminated band indicator; noise-reducing antenna adjustment on "A" band; temperature-stabilized capacitors; phase inverter audio amplifier; and push-pull power output stage.

The phonograph has a self-starting motor, crystal pickup, and may be set to play ten-inch and twelve-inch records singly, or automatically. In the automatic position, seven twelve-inch; eight ten-inch; or a mixed group of seven, ten- and twelve-inch records, may be played in succession. The output of the pickup is "shorted" out when the pickup is on the pickup rest.

RCA MFG. CO., INC.

ALIGNMENT PROCEDURE

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

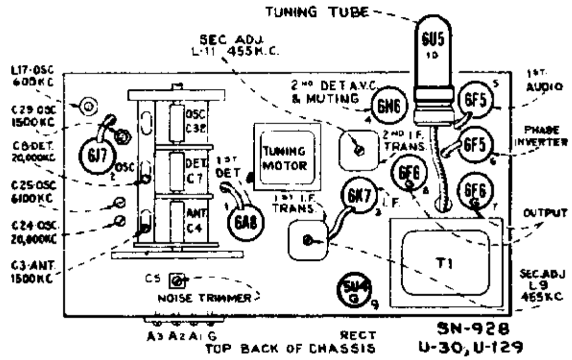
As the first step in r-f alignment, check the position of the drum. The "0" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Service Data

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow celluloid or paper feelers after first removing the front dust cover. A dust cover should be cemented in place upon completion of adjustment.



Precautionary Lead Dress. — (1) The lead from the left pilot light should be kept behind the bulb and toward the "Magic Eye," to keep it away from the 6F5 grid cap, (2) leads from mica trimmers to coil should be kept away from the coil and other parts, (3) leads on oscillator coil which are an extended part of the coil winding should be as short as possible, (4) "C" band series capacitor C31 must have leads as short as possible, (5) all leads from antenna board to antenna coils should be dressed toward back apron, (6) the one lead of the line cord and the primary lead of the power transformer which run to the power switch should be twisted together, (7) shielding on leads to Victrola switch should be kept away from the switch terminals and jack.

Steps	Connect the high side of test-oscillator to —	Tune test-oscillator to —	Range Selector	Set tuning gang to—	Adjust the following for max. peak output
No. 1	6K7 I-F grid cap in series with .01 mfd.	455 kc	"A"	Quiet point between 550-750 kc	L10, L11 (2nd I-F Transformer)
No. 2	6A8 Det. grid cap in series with .01 mfd.	456 kc	"A"		L8, L9 (1st I-F Transformer)
No. 3	A2 Connect A1 to chassis.	20 mc	"C"	20 mc (147.5°)	C24 (osc.)* C8 (det.)†
No. 4	A2, in series with 100 mmfd. Connect A3 to chassis.	6,100 kc	"B"	6,100 kc (145.5°)	C25 (osc.)**
No. 5	A2, in series with 100 mmfd. Connect A3 to chassis.	1,500 kc	"A"	1,500 kc (151.5°)	C29 (osc.) C3 (ant.)
No. 6	A2, in series with 100 mmfd. Connect A3 to chassis.	600 kc	"A"	600 kc (29.5°)	L17 (osc.)
No. 7	A2, in series with 100 mmfd. Connect A3 to chassis.	1,500 kc	"A"	1,500 kc (151.5°)	C29 (osc.)

* Use **minimum** capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used by turning to 141.5° (19,090 kc), at which point a weaker signal should be received.

** Use **minimum** capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used by turning to 124° (5,190 kc), at which point a weaker signal should be received.

† Rock gang condenser and use maximum capacity peak if two peaks can be obtained with C8.

ADJUSTMENTS FOR ELECTRIC TUNING

1. **Make a list of the desired eight stations, arranged in order from low to high frequencies.**
2. Turn range selector to "A" band, turn power on, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.
4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button, and press down station button No. 1 (second from left). Both buttons will stay down. Move adjusting pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Then press down station button No. 1 again. The electric tuning mechanism will function to tune in the station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.

Antenna Connections

RCA Victor Master Antenna Kit.—Connect the twisted-pair transmission line to terminals A1 and A2 on the terminal board at rear of chassis. Connect the counter-poise to A3. Terminal G may be connected to ground, but this connection is not necessary for correct operation.

Noise-Reducing Adjustment.—After the RCA Victor Master Antenna Kit is connected to the receiver, tune the receiver to a point near 900 kc where no station is heard. Turn volume control clockwise until noise is heard. If no noise of a regular character is audible, start any brush-type motor-driven appliance, such as a vacuum cleaner, electric razor, refrigerator, etc., but do not bring it too near the receiver. This will generate noise as a continuous crackling, or buzz. Adjust C5, which is mounted behind the antenna terminal board, to a point where this noise is reduced to a minimum.

Adjustment of the noise reducing trimmer C5 should be made in the customer's home, with the RCA Victor Master Antenna connected to the receiver.

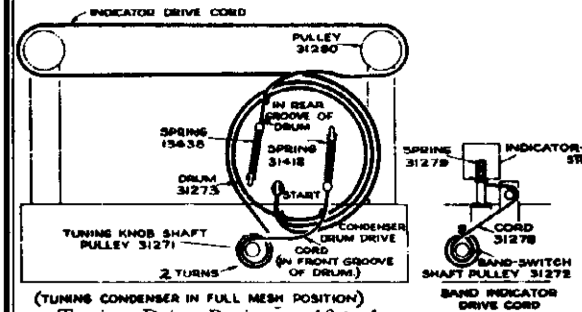
This adjustment is effective only when the RCA Victor Master Antenna is used. For all other types of antenna, the noise-adjustment trimmer C5 should be screwed all the way down.

Other Antennas.—Use terminals A1 and A3 on the receiver terminal board as antenna and ground connecting points respectively. Terminal A3 may be connected to terminal G, unless this causes interference, in which case this connection should be omitted.

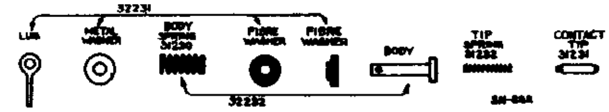
MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K

RCA MFG. CO., INC.

Tuning Mechanism, Data
Armchair Cont. Unit Data



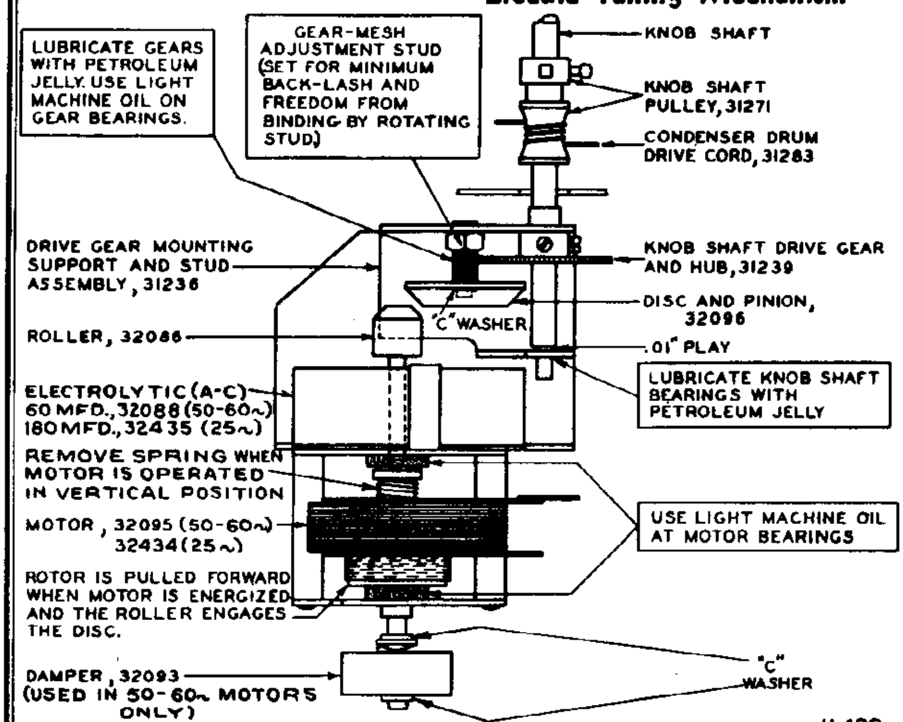
Tuning Drive Ratio.... 18 to 1



Component Parts of Station Setting Contact

At left—Dial Mechanism

Electric Tuning Mechanism



When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first-audio amplifier. This prevents audio amplification and makes the set quiet or "mute" while the mechanism is operating.

The brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set-screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal, with the operating-end at the left (viewed from rear). The operating-end has dark insulating material and the brass is beveled at this end.

The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

Lubrication

Motor bearings and gear bearings; use light machine oil.

Gear faces; use "Pure Oil No. 611" or petroleum jelly.

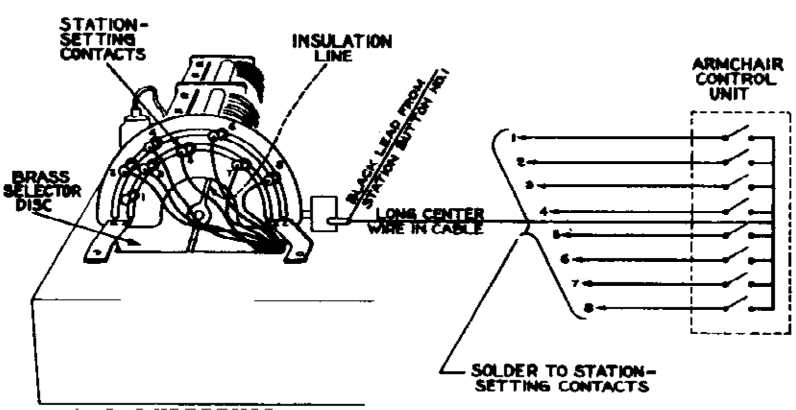
Dial-indicator pulleys and rails; use "Castordag" or petroleum jelly.

Selector disc; apply *thin* film of petroleum jelly.

Armchair Control Unit

U-129
SN-923

Station-Setting Contacts and Selector Disc



This illustration shows connections for a G8A Armchair Control Unit. This unit is not supplied with the receiver but may be added as an accessory.

Station Button	Color of Lead To Station-Setting Contact
No. 1	Black
No. 2	Brown
No. 3	Blue
No. 4	Green
No. 5	Red
No. 6	Red-black
No. 7	~~Brown-black~~
No. 8	Red-yellow

When a Model G8A Armchair Control is connected to the receiver it duplicates the action of the push-buttons on the front panel when No. 1 button is pressed down. The black lead from push-button No. 1 is unsoldered from No. 1 station-setting contact and soldered to a terminal board which is to be mounted on the frame of selector mechanism. If desired one of the other seven station buttons on the set may be used in place of No. 1 button.

This arrangement allows the use of only seven of the eight buttons when tuning in stations at the set, but allows the use of the entire eight buttons on the Armchair Control. In operating the G8A Armchair Control the push-button must be held down until the station has been tuned in. Care must be taken not to hold two of the station-buttons down at one time as both windings of the motor may be engaged instantaneously causing the motor to be inoperative and overheated.

Automatic Record Changer

GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record. — The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife. — The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34".

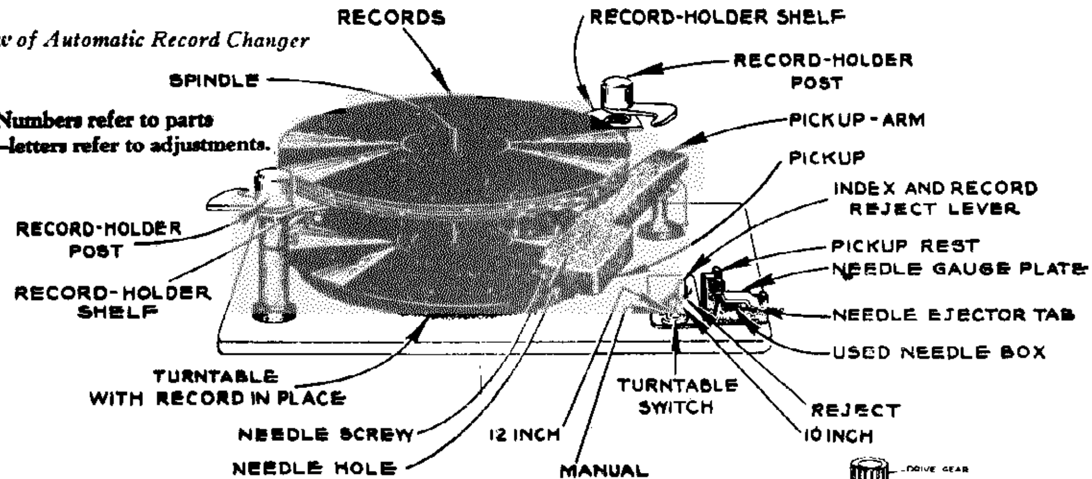
MODELS U-30,U-129
MODEL U-125

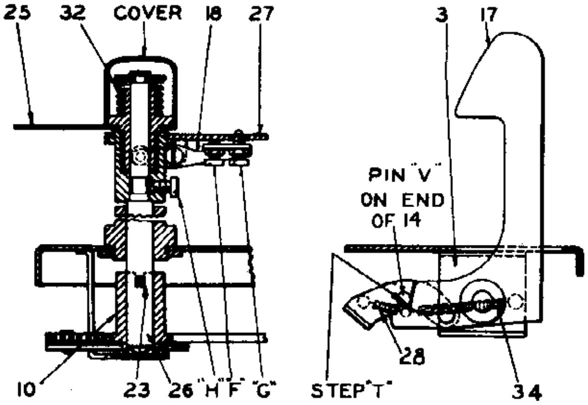
RCA MFG. CO., INC.

Record Changer
Assembly,Details

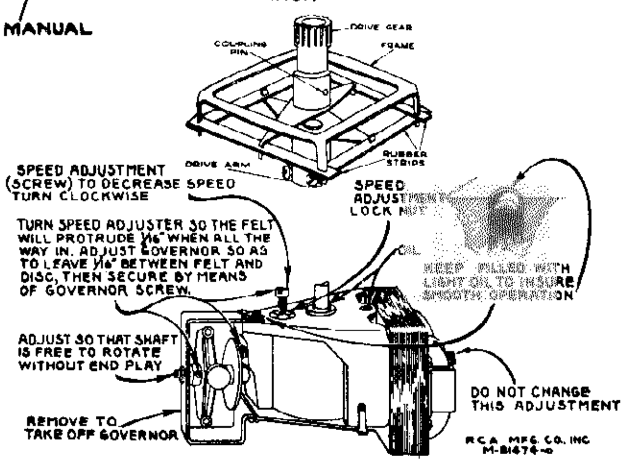
Top View of Automatic Record Changer

NOTE: Numbers refer to parts —letters refer to adjustments.

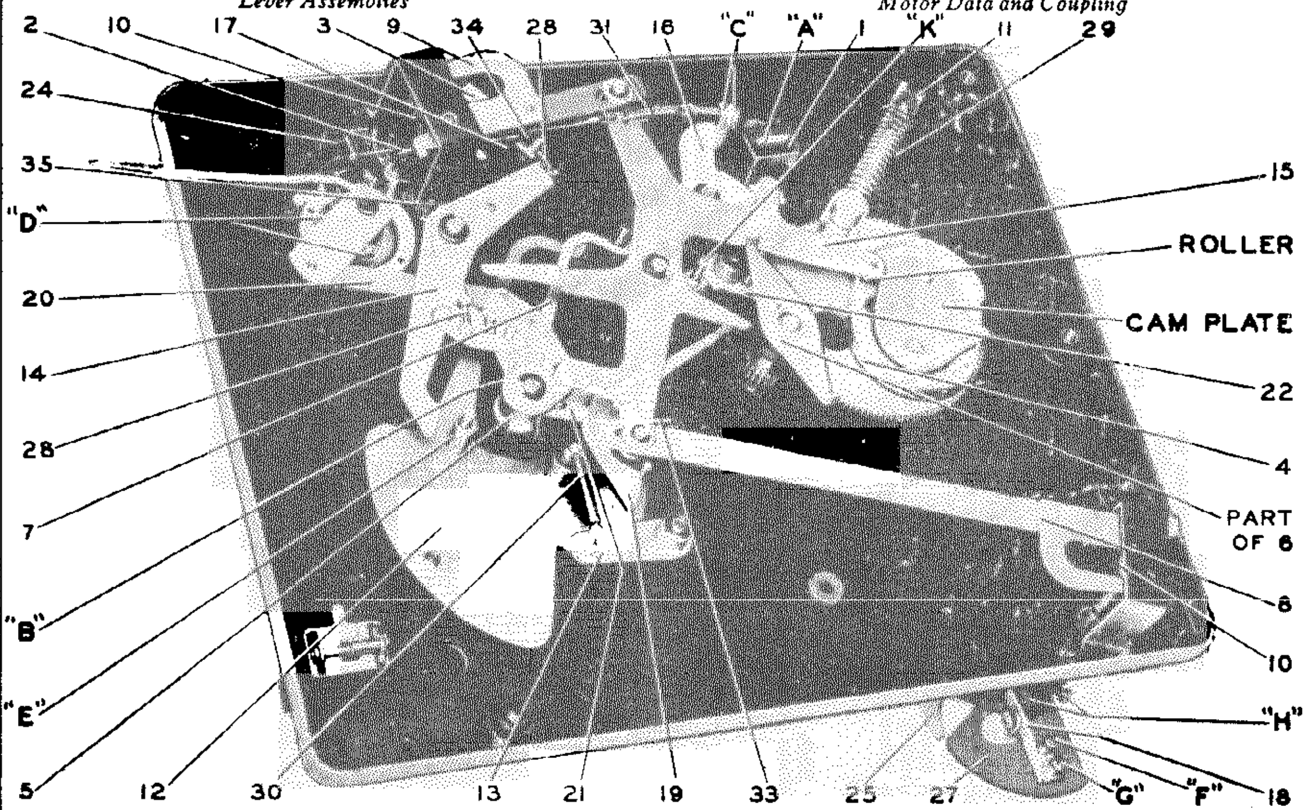




Details of Record Shelf Posts, and Locating Lever Assemblies



Motor Data and Coupling



Bottom View of Automatic Record Changer

RCA MFG. CO., INC.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-335K and RC-335KR)	
31531	Board—Antenna and ground terminal board	.25
32232	Body—Comprising one plunger body and one body spring	.15
31278	Bracket—Band indicator mounting bracket complete—less indicator strip, cord, and tension spring	.40
31282	Bracket—Magic Eye mounting bracket and holder	.22
32090	Bracket—Motor mounting bracket and studs	.40
12714	Capacitor—Adjustable trimmer, 2-12 mmfd. (C29)	1.50
31292	Capacitor—Dual adjustable trimmer, 3-30 mmfd. each section (C24, C25)	.40
31252	Capacitor—Adjustable trimmer, 5-80 mmfd. (C5)	.25
12899	Capacitor—15 mmfd. (C2, C34)	.35
12948	Capacitor—33 mmfd. (C1)	.35
31432	Capacitor—20 mmfd. (C27)	.40
13545	Capacitor—39 mmfd. (C57)	.35
12720	Capacitor—100 mmfd. (C20)	.35
31270	Capacitor—100 mmfd. (C11, C12, C13, C14)	.35
12724	Capacitor—120 mmfd. (C37, C38)	.35
12725	Capacitor—150 mmfd. (C15)	.35
31433	Capacitor—560 mmfd. (C28)	.35
31033	Capacitor—1,500 mmfd. (C26)	.35
31105	Capacitor—6,000 mmfd. (C31)	.75
5107	Capacitor—.0025 mfd. (C53)	.20
30302	Capacitor—.0035 mfd. (C46)	.40
4838	Capacitor—.005 mfd. (C17, C22, C49, C50)	.25
4858	Capacitor—.01 mfd. (C21, C48)	.25
14593	Capacitor—.01 mfd. (C4, C18, C39, C52)	.30
11515	Capacitor—.015 mfd. (C36)	.20
30582	Capacitor—.05 mfd. (C9)	.30
4839	Capacitor—0.1 mfd. (C10, C16)	.30
12484	Capacitor—0.25 mfd. (C33)	.30
30565	Capacitor—0.25 mfd. (C40)	.30
30867	Capacitor—0.5 mfd. (C19)	.30
31498	Capacitor—16 mfd. (C35)	1.25
31495	Capacitor—20 mfd. (C34)	1.75
32086	Capacitor—40 mfd., a-c electrolytic, 40 V. (50-60 cycle only)	.90
32435	Capacitor—180 mfd., a-c electrolytic, 40 V. (25 cycle only)	.90
31293	Coil—"A" band antenna coil (L5, L6, L7)	1.30
31296	Coil—"A" band oscillator coil (L17)	1.05
31294	Coil—"B" band antenna coil (L3, L4)	.80
31295	Coil—"B" and "C" band oscillator coil (L15, L16)	.85
31297	Coil—"C" band antenna coil (L1, L2)	.90
31290	Condenser—3-gang variable condenser (C3, C4, C7, C8, C32)	4.50
31231	Contact—Contact tip for station-setting contact	.06
31345	Contact—Push button switch contacts—comprising 10 contacts riveted on insulating strip	.70
31344	Contact—Push button switch contacts—comprising 13 contacts riveted on insulating strip	1.20
31278	Cord—Band indicator drive cord	.12
32635	Cord—Indicator pointer drive cord	.24
32634	Cord—Variable condenser drum drive cord	.10
31260	Core—Adjustable core and stud for i-f transformers	.15
31280	Core—Adjustable core and stud for "A" band oscillator coil	.36
32093	Damper—Flywheel damper—less mounting washers for rear end of tuning motor shaft (50-60 cycle motors only)	.25
32096	Disc—Friction disc and pinion gear	.35
32091	Drive—Drive gear assembly—comprising friction disc and pinion gear, drive gear, and knob shaft, assembled on gear-mounting bracket	1.50
31273	Drum—Indicator drive cord drum	.30
31239	Gear—Knob shaft drive gear and hub	.05
31545	Gear—Variable condenser intermediate drive gear and pinion gear—25 cycle models only	.40
31532	Indicator—Band indicator strip	.15
11891	Lamp—Dial, pilot, or compartment lamp, 6.3 V, 0.25 amp.	.17
31480	Lamp—Electric tuning adjustment indicator lamp, 6.3 V, 0.15 amp.	.20
31346	Lock—Push button switch lock plate—comprising 10 contact locks in one strip	.90
32095	Motor—Electric tuning motor, 80 mfd. capacitor, friction roller, and damper, assembled (50-60 cycle only)	5.25
32434	Motor—Electric tuning motor, 180 mfd. capacitor, and friction roller (25 cycle only)	9.50
31228	Plate—Selector contact plate—less contacts	.45
31227	Plate—Selector mounting plate—mounts on rear of variable condenser	.50
30869	Plug—2-contact female plug for phono. motor cable	.35
12493	Plug—5-contact female plug for speaker cable	.30
32232	Plunger—Station setting contact tip	.15
31280	Pulley—Indicator pointer drive cord pulley	.10
31271	Pulley—Motor pulley	.25

STOCK No.	DESCRIPTION	Unit List Price
31272	Pulley—Range switch pulley	.20
31250	Resistor—Voltage divider—comprising one 1,500 ohm, one 2,950 ohm, one 3,400 ohm, one 12 ohm, and one 100 ohm sections (R19, R28, R31, R32, R33)	.90
14284	Resistor—22,000 ohms, 1/10 watt (R24)	.15
13998	Resistor—22,000 ohms, ½ watt (R4)	.20
11300	Resistor—33,000 ohms, 1/10 watt (R27, R30)	.15
12464	Resistor—33,000 ohms, ½ watt (R6)	.20
14560	Resistor—100,000 ohms, ½ watt (R35)	.20
12264	Resistor—220,000 ohms, ½ watt (R5, R36)	.20
11398	Resistor—220,000 ohms, 1/10 watt (R14)	.15
11453	Resistor—270,000 ohms, 1/10 watt (R18, R29)	.15
11452	Resistor—470,000 ohms, 1/10 watt (R1)	.15
12285	Resistor—470,000 ohms, ½ watt (R8)	.20
12013	Resistor—1 meg., 1/10 watt (R7, R38, R40)	.15
13730	Resistor—1 meg., ½ watt (R43) (U-30 only)	.20
30208	Resistor—1.2 meg., ½ watt (R41)	.20
5131	Resistor—2.2 meg., 1/10 watt (R3)	.15
14887	Retainer—Indicator pointer drive cord pulley retainer	.01
32086	Roller—Rubber friction roller for front end of motor (attach to motor shaft with shellac)	.10
31233	Rotor—Selector rotor disc—mounts on rear of variable condenser shaft	1.16
4119	Screw—No. 8-32 headless set screw for gear, Stock No. 31238	.02
14350	Screw—No. 8-32 square head set screw for selector rotor disc	.03
[illegible]	Screw—No. 8-32 square head set screw for pulley, Stock Nos. 31271 and 31272, and drum, Stock No. 31273	.03
[illegible]	Shaft—Dial drive knob shaft	.20
[illegible]	Socket—Dial lamp socket	.20
[illegible]	Socket—Magic Eye socket	.45
[illegible]	Socket—Pickup socket and bracket	.30
[illegible]	Socket—Tube socket	.25
[illegible]	Socket—Tuning indicator lamp insulated socket	.30
[illegible]	Spring—Band indicator tension spring	.05
[illegible]	Spring—Contact tip spring for station-setting contact	.01
[illegible]	Spring—Indicator pointer drive cord tension spring	.03
[illegible]	Spring—Variable condenser drive cord tension spring	.05
32007	Spring—Retaining spring for core, Stock No. 31260	.02
31250	Spring—Station-setting contact body spring	.01
31262	Spring—Tension spring for core, Stock No. 31280	.01
31970	Spring—Tension spring for push button switch latch bar	.05
31236	Support—Variable condenser drive gear mounting support and studs assembly	.65
31360	Switch—Pickup switch for mounting on push button switch assembly (S3)	.35
31291	Switch—Range switch (S1, S2)	.95
31312	Switch—Station selector push button switch and bracket complete	4.25
31248	Tone Control—H.f. tone control and power switch (R12, S4)	1.50
31267	Transformer—First i-f transformer (L8, L9, C11, C12)	2.20
31268	Transformer—Second i-f transformer (L10, L11, C13, C14)	2.05
31308	Transformer—Power transformer, 105/130-140/160-200/250 volts, 50-60 cycle (T1)	13.85
31226	Transformer—Power transformer, 110 volts, 25-60 cycle (T1)	13.00
31225	Transformer—Power transformer, 110 volts, 50-60 cycle (T1)	8.50
31249	Volume Control (R9)	1.50
32231	Washer—Comprising 1 metal washer, 2 fibre washers, and 1 solder lug or retainer for station selector plunger	.03
32094	Washers—One set of washers for mounting damper on 50-60 cycle motors only—comprising 2 "C" washers, 1 spring washer, and 1 flat washer	.10
	OPERATING MECHANISM	
31134	Bracket—Pickup locating lever mounting bracket (3)	.30
31144	Cam—Cam and gear assembly (4) (U-129)	2.80
32878	Cam—Cam and gear assembly (4) (U-30)	2.80
4808	Clutch—Trip lever friction clutch assembly (5)	.35
31146	Coupling—Motor coupling complete with turntable drive gear, rubber strips, motor coupling, and drive arm (6)	1.80
31129	Cover—Cap for top of record post	.45
31116	Finger—Trip lever friction finger assembly (7)	.45
31119	Gear—Long arm and rack gear for front left-hand record post (8)	.60
31120	Gear—Short arm and rack gear for rear right-hand record post (9)	.55
31121	Gear—Record post gear (10)	.90
31123	Guide—Main lever spring guide (11)	.40

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STOCK No.	DESCRIPTION	Unit List Price
31114	Lever—Index lever assembly (12)	.75
31137	Lever—Index lever tension spring lever (13)	.30
31136	Lever—Locating lever and pawl assembly (14)	.70
31113	Lever—Main lever assembly (15)	1.35
31140	Lever—Pickup lift cable lever and spring assembly (16)	.55
31135	Lever—Pickup locating lever assembly (17)	.85
31130	Lever—Record separator elevating lever complete with adjustment screws (18)	.80
31132	Lever—Trip detaining lever (19)	.30
31115	Lever—Trip lever assembly (20)	1.85
31131	Lever—Trip regulator lever (21)	.25
31133	Pawl—Trip pawl assembly (22)	.80
31124	Pin—Record post drive pin (23)	.04
14807	Roller—Pickup lift cable roller and bracket assembly (24)	.55
31118	Screw—Cone pointed set screw for trip lever hub or record post shelf	.06
6583	Screw—Pickup lift cable screw and nuts	.04
14195	Screw—Set screw for flexible coupling	.06
31117	Screw—Special screw to adjust friction clutch tension	.03
31126	Separator—Record separator knife (25)	.75
31122	Shaft—Record separator post shaft (26)	.40
31125	Shelf—Record post shelf assembly (27)	1.25
31161	Spindle—Turntable spindle shaft	1.40
3870	Spring—Cam pawl tension spring on main gear (12 turns, .190-in. O.D., 43/64-in. lg.)	.04
14190	Spring—Pickup locating lever short spring or locating lever pawl tension spring (28) (16 turns, .180-in. O.D., 19/32-in. lg.)	.08
32082	Spring—Main lever tension spring (29) (18 turns, .6-in. O.D., 3-in. lg.)	.05
31138	Spring—Index lever tension spring (30) (25 turns, .190-in. O.D., 15/16-in. lg.)	.05
3888	Spring—Pickup lift cable tension spring (31) (20 turns, .195-in. O.D., 1-in. lg.)	.04
31127	Spring—Record separator pressure spring (32) (8 turns, ¼-in. O.D., ⅜-in. lg.)	.02
14191	Spring—Trip detaining lever tension spring (33) (15 turns, .190-in. O.D., ⅜-in. lg.)	.04
31175	Spring—Pickup locating lever tension spring (34) (14 turns, .220-in. O.D., 27/32-in. lg.)	.04
32435	Spring—Locating lever tension spring (35) (16 turns, .182-in. O.D., 21/32-in. lg.)	.06
31147	Strip—Complete set of rubber strips for flexible coupling	.40
31139	Turntable Assembly—less spindle	3.35
31128	Washer—"C" washer for top of record post	.04
31143	Washers—Turntable thrust washers (1 steel, 1 bronze, 1 felt)	.18
	PICKUP AND ARM ASSEMBLIES	
32098	Arm—Pickup arm, less crystal and cable (viscoloid-damped type for U-30 and 2nd-production U-129)	2.80
31169	Cable—Pickup arm lift cable and clips	.15
33118	Cable—Shielded cable and plug	.80
31158	Crystal—Pickup crystal cartridge and needle screw	4.25
33114	Damper—Viscoloid damper for armature (U-30 and 2nd-production U-129)	.15
31159	Pickup and arm complete (without viscoloid damper—for 1st-production U-129)	7.45
31160	Screw—Pickup needle screw	.12
31161	Shaft—Pickup pivot arm and shaft assembly	.45
	MOTORBOARD ASSEMBLIES	
31149	Base—Tone arm mounting base	.35
32927	Board—Record changer base complete with all welded and riveted posts and bearings (U-30 only)	6.30
31152	Board—Record changer base complete with all welded and riveted posts and bearings—less all operating parts (U-129 only)	7.90
14209	Bumper—Main lever rubber bumper (1)	.08
9845	Cup—Used needle cup, rest, and lid complete	.75
31148	Escutcheon—Index escutcheon (U-129 only)	.40
32977	Escutcheon—Index escutcheon (U-30 only)	.40
31151	Guide—Pickup lift cable guide (coil spring, 80T 2-in. large) (2)	.10
31150	Mounting—Pickup arm base rubber mounting complete	.45
31155	Spring—Needle cup lid tension spring	.04
	MOTOR ASSEMBLIES (U-129 only)	
31817	Bracket—Governor and bearing bracket	.30
31826	Coil—Field coil and laminations for 25 cycle motor	9.30
31619	Coil—Field coil and laminations for 50-60 cycle motor	7.90
31618	Coil—Field coil and laminations for 60 cycle motor	5.50
31884	Governor—Motor governor for 25-cycle motor	3.05
11703	Governor—Motor governor for 50-60 cycle motor	3.05

STOCK No.	DESCRIPTION	Unit List Price
31623	Governor—Motor governor for 60-cycle motor	2.80
31448	Motor—105-125 volts, 25 cycle (M1)	23.70
31163	Motor—105-125 volts, 50-60 cycles (M1)	20.80
31157	Motor—105-125 volts, 60 cycles (M1)	17.75
30870	Plug—2-contact male plug for motor power cable	.35
31447	Screw—Complete set of motor mounting screws, washers, and spacers—for 25 cycle models only	.40
31158	Screw—Complete set of motor mounting screws, washers, and spacers—for 50-60 cycle models only	.25
31616	Screw—Rotor bearing thrust screw	.25
31620	Screw—Speed regulator screw with nut	.20
31636	Spindle—Spindle and gear for 25 cycle motor	1.90
31634	Spindle—Spindle and gear for 50-60 cycle and 60 cycle motors	1.70
32913	Spring—Governor spring and ball for 25 cycle motor	.25
32914	Spring—Governor spring and ball for 50-60 cycle motor	.30
32912	Spring—Governor spring and ball for 60 cycle motor	.25
14206	Switch—Motor toggle switch (S7)	.90
31622	Washer—Metal and felt washers for lower spindle bearing	.10
	MOTOR ASSEMBLIES (U-30 only)	
31618	Field—Coils and laminations, 105-125 volts, 60 cycle	5.50
31619	Field—Coils and laminations, 105-125 volts, 50-60 cycle	7.90
31626	Field—Coils and laminations, 105-125 volts, 25 cycle	9.30
31623	Governor—60 cycle	2.80
11703	Governor—50-60 cycle	3.05
31624	Governor—25 cycle	3.05
31448	Motor—105-125 volts, 25 cycle (M1)	23.70
31163	Motor—105-125 volts, 50-60 cycle (M1)	20.80
31157	Motor—105-125 volts, 60 cycle (M1)	17.75
30870	Plug—2-contact male plug for motor power cable	.35
31447	Screw—Complete set of motor mounting screws, washers, and spacers—for 25-cycle models only	.40
31158	Screw—Complete set of motor mounting screws, washers, and spacers—for 50-60 cycle models only	.25
31634	Shaft—Turntable shaft and gear—60, and 50-60 cycle	1.70
31636	Shaft—Turntable shaft and gear—25 cycle	1.90
32275	Switch—Motor toggle switch	.30
32912	Weight—Governor weight and spring—60 cycle	.25
32914	Weight—Governor weight and spring—50-60 cycle	.30
32913	Weight—Governor weight and spring—25 cycle	.25
	SPEAKER ASSEMBLIES (RL-70H-4)	
13866	Cap—Dust cap for cone center	.03
11234	Coil—Field coil (L12)	3.25
11469	Coil—Neutralizing coil (L14)	.30
31275	Cone—Speaker cone and voice coil (L13)	1.75
31539	Plug—5-contact male plug for speaker	.25
31538	Speaker complete	10.65
14534	Transformer—Output transformer (T2)	3.35
14357	Washer—Spring washer to hold field coil securely	.04
	MISCELLANEOUS ASSEMBLIES	
31358	Button—Station selector push button	.18
13103	Cap—Pilot lamp cap	.15
31456	Cover—3 protective covers for push button markers	.09
31540	Cushion—Chassis mounting cushion and screw assemblies—sufficient for one chassis	.09
31541	Cushion—Motor plate mounting cushion and clamp assembly—sufficient for one instrument	.50
31461	Dial—Station selector dial scale and crystal	.95
31361	Escutcheon—Tuning dial escutcheon, less dial and push buttons	2.20
30698	Hinge—Cabinet lid hinge	.95
31542	Indicator—Station selector indicator pointer and carriage	.85
31355	Knob—Station selector, volume control, tone control, or range switch knob	.12
31478	Lid Support—Cabinet lid support	2.20
31589	Marker—Station call letter push button markers	.35
31457	Marker—"Victrola" push button marker	.01
31458	Marker—"Dial Tuning" push button marker	.01
32083	Screen—Dial color screen	1.20
14270	Spring—Retaining spring for knob, Stock No. 31355	.05
31470	Suspension—Motorboard suspension spring, screw, and lockwasher, 4 required	.10

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MODEL BT40, Chassis RC-408
Schematic, Voltage, Socket
Trimmers, Alignment, Parts

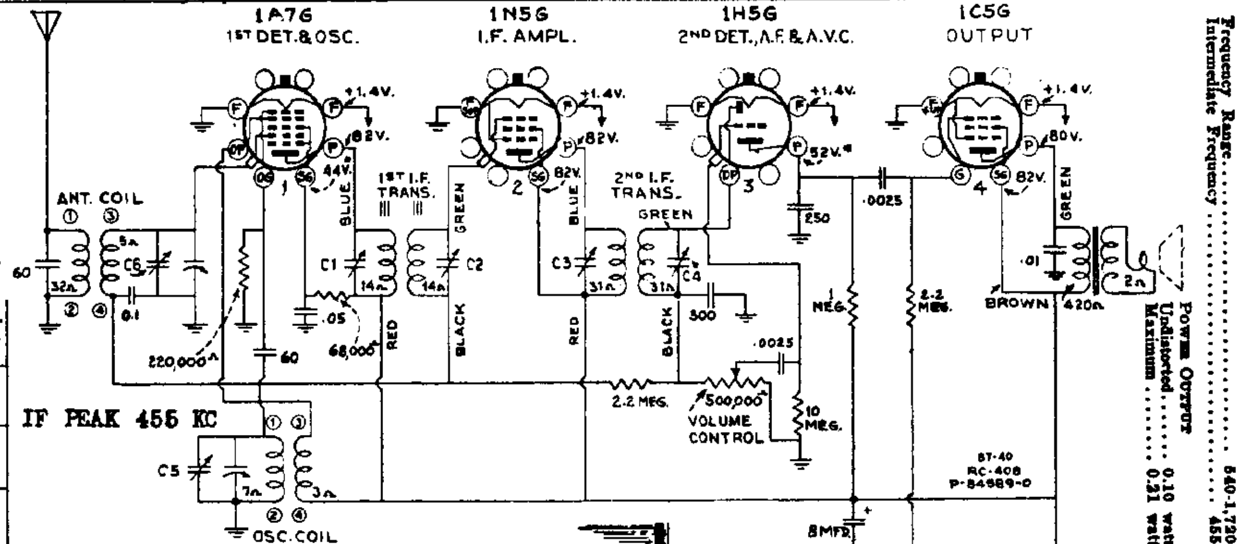
RCA MFG. CO., INC.

Frequency Range .... 540-1,720 kc
Intermediate Frequency .... 455 kc

Power Output
Undistorted .... 0.10 watt
Maximum .... 0.21 watt

Current Consumption
"A," 0.24 ampere—"B," 9.0 milliamperes.

Batteries Required
1 "A"—"B" Pack (Eveready No. 748 or equivalent).



Alignment Procedure

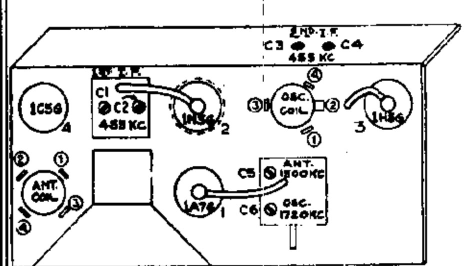
Output Meter Alignment.—If this method is used connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1A7G 1st-Det. grid cap, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna lead (blue) in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3	Antenna lead (blue) in series with 100 mmfd.	1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)



TUBE AND TRIMMER LOCATIONS

MODEL BT-40
Chassis No. RC-408

RCA Tube Complement

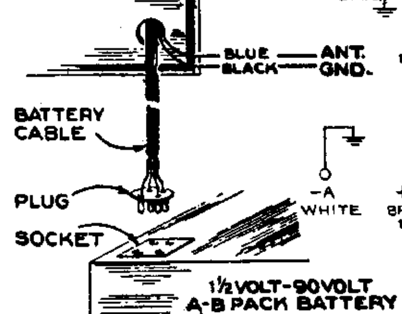
(1) RCA-1A7-G .... 1st-Det.—Osc.
(2) RCA-1N5-G .... I-F Amplifier
(3) RCA-1H5-G .... 2nd-Det., A-F, and A.V.C.
(4) RCA-1C5-G .... Output

Loudspeaker

Type .... 4-inch permanent-magnet dynamic
Voice-coil Impedance .... 2 ohms at 400 cycles

	Height	Width	Depth
Cabinet Dimensions (inches)	6¼	9¾	4-11/16
Chassis Base Dimensions (inches)	1⅛	8⅛	3⅞

Over-all Chassis Height .... 5¼ inches
Weight—Shipping weight .... 6½ pounds
Net weight .... 4½ pounds
Tuning Drive Ratio .... 11 to 1

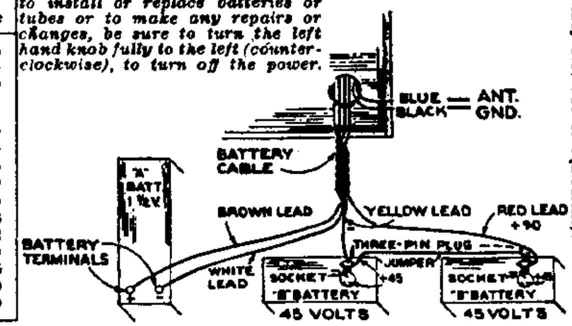


A-B PACK BATTERY

— 1939 No. 8 —

The RCA Victor Model BT-40 is a table type battery operated radio receiver. It is designed for operation on a combination 1½-volt - 90-volt A-B Pack Battery.

CAUTION.—Before attempting to install or replace batteries or tubes or to make any repairs or changes, be sure to turn the left hand knob fully to the left (counter-clockwise), to turn off the power.



SEPARATE "A" AND "B" BATTERIES

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
11591	Button—Plug button for chassis	.10	14076	Resistor—820 ohms, ½ watt	.20
13057	Capacitor—60 mmfd.	.35	13715	Resistor—68,000 ohms, ½ watt	.20
12488	Capacitor—250 mmfd.	.35	12264	Resistor—220,000 ohms, ½ watt	.20
12952	Capacitor—300 mmfd.	.35	13730	Resistor—1 meg., ½ watt	.20
5107	Capacitor—.0025 mfd.	.20	12679	Resistor—2.2 meg., ½ watt	.20
4937	Capacitor—.01 mfd.	.25	13601	Resistor—10 meg., ½ watt	.20
32787	Capacitor—.05 mfd.	.20	33061	Shaft—Tuning knob drive shaft	.20
4839	Capacitor—0.1 mfd.	.30	32595	Shield—Tube shield—less cap	.15
32187	Capacitor—Electrolytic, 8 mfd.	.65	32537	Socket—Tube socket	.20
32572	Coil—Antenna coil	.60	33058	Speaker complete	4.00
33055	Coil—Oscillator coil	.70	30585	Spring—Drive cord tension spring	.06
33060	Condenser—2-gang tuning	2.25	32667	Spring—Retaining spring for knobs or drive drum	.02
32634	Cord—Drive cord	.10	33056	Transformer—First i-f transformer	1.40
33310	Dial—Glass dial scale	.30	33057	Transformer—Second i-f transformer	1.25
32948	Drum—Variable condenser drive drum	.35	33062	Transformer—Output transformer	1.30
32571	Knob—Tan volume or tuning knob	.15	33059	Volume control and switch	1.50
30550	Plug—4-prong male plug for battery cable	.20			

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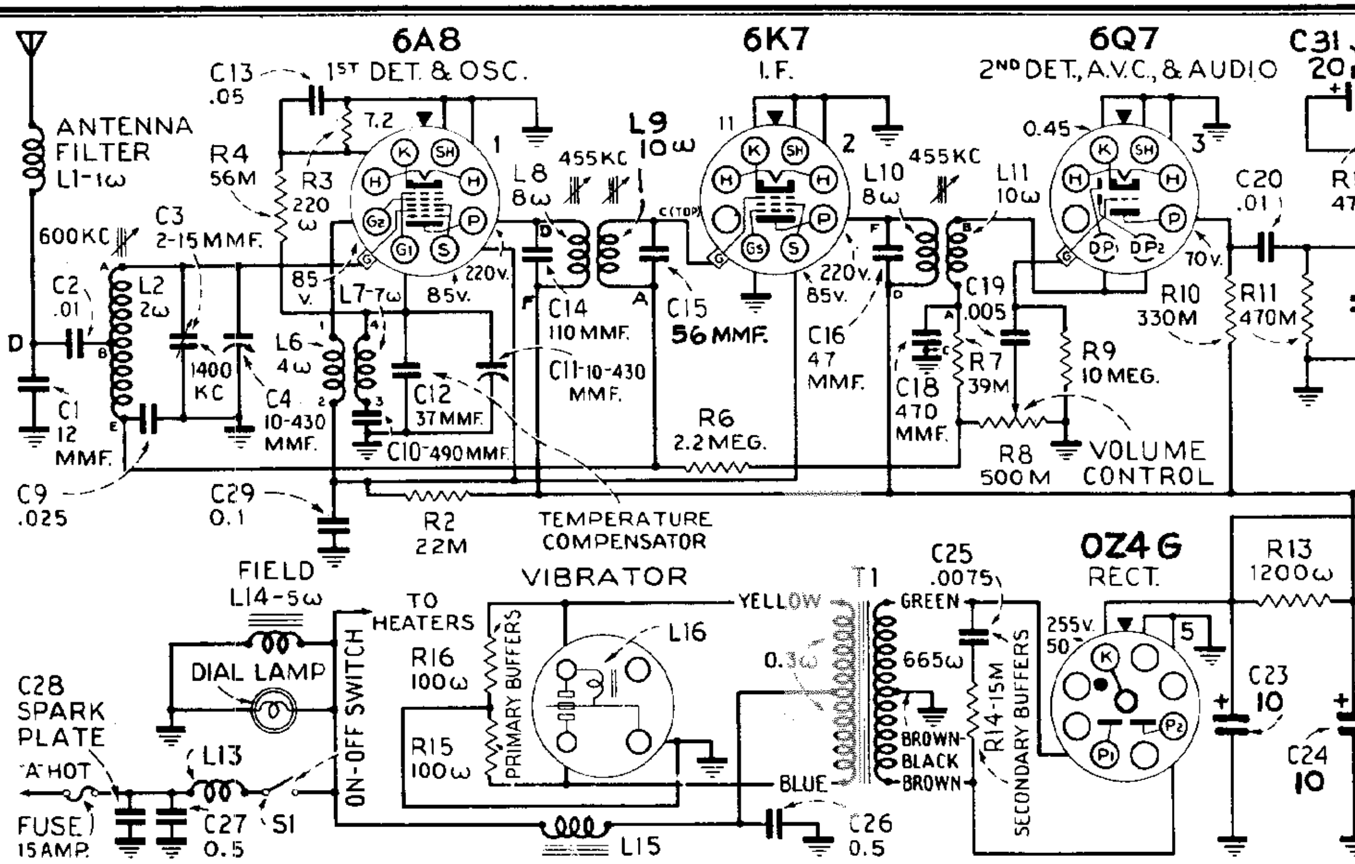


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES ARE TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

M = 1000 OHMS   IF PEAK 455 KC

Schematic Circuit Diagram

— 1939 No. 22 —

General Description

Model M50 is a five-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading "Push Button Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

Loudspeaker.—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with ambroid cement after adjustment has been completed.

Electrical Specifications

FREQUENCY RANGE........................ 550-1,550 kc

POWER OUTPUT

Type.. Pentode
Undistorted................................. 2 watts
Maximum..................................... 3.5 watts
Dial Lamp.............. 6-8 volts, 0.2 amp., Mazda 51

ALIGNMENT FREQUENCIES

I-F.. 455 kc
Ant............................... 600 and 1,400 kc
Oscl............................... No Adjustment

LOUDSPEAKER

Type.............. Electrodynamic
Size...................... 5 inches
V.C. Impedance........ 3.2 ohms at 400 cycles
Field Coil Resistance........ 5 ohms

POWER SUPPLY

"A".... 6.3 volt Auto Storage Battery
"B"...... Non-Synchronous Vibrator
Current Drain............ 6.0 amps.

CHASSIS FEATURES

No. I-F Stages.............. One
Completely Shielded Ant. Filter
Magnetite-core Adjusted Antenna and I-F Transformers
Ignition-Noise-Suppression Filters
Antenna Compensator Trimmer
Illuminated Dial

MODEL M50, Chassis RC-357J

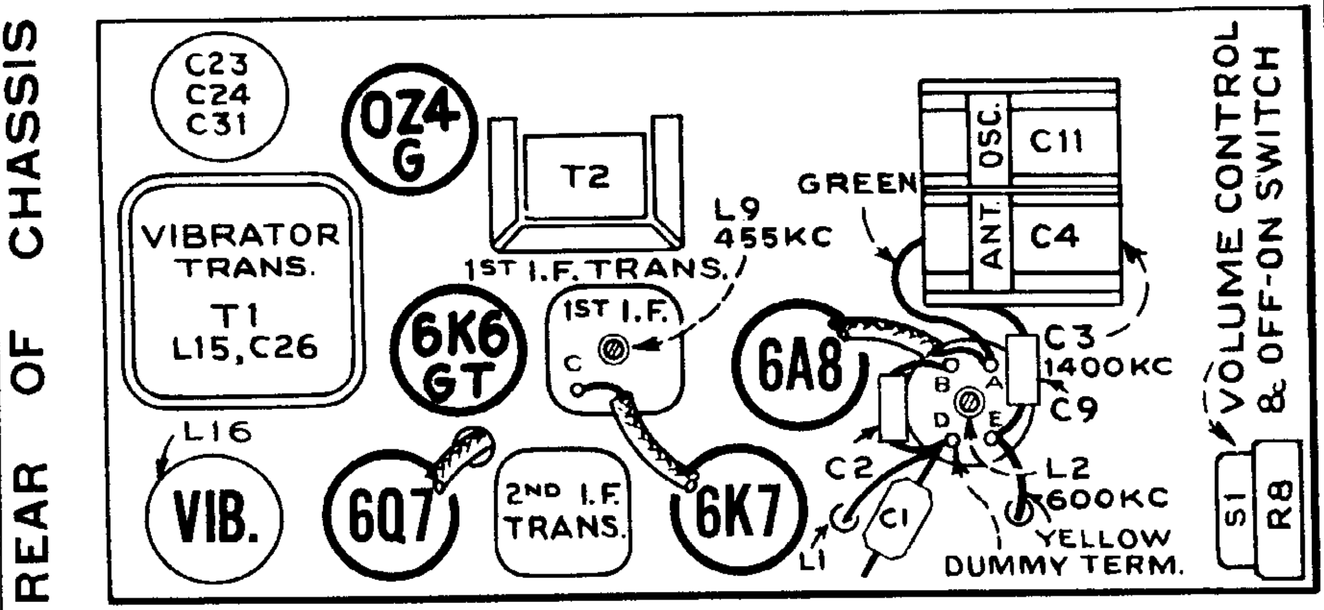
Chassis Wiring, Socket

Trimmers

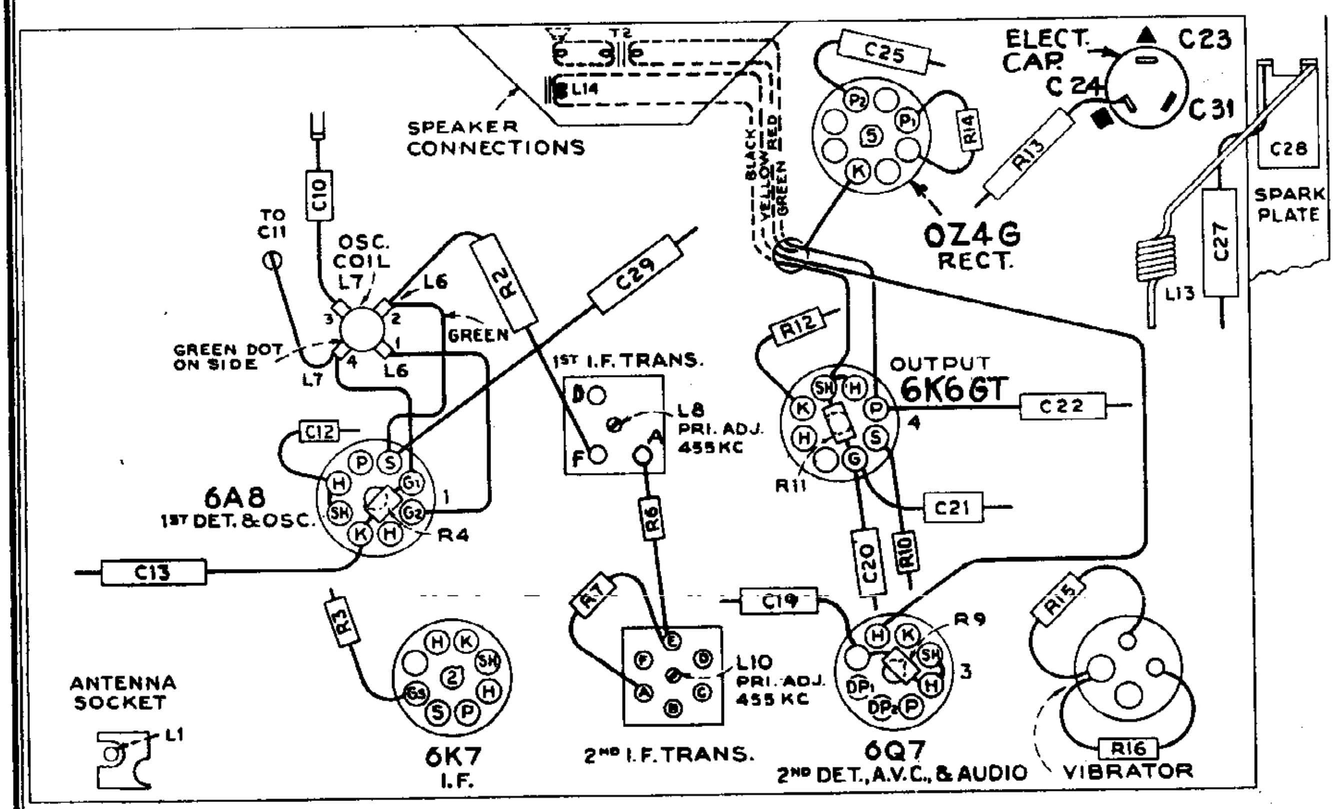
RCA MFG. CO., INC.

TUBES AND FUNCTIONS

(1) RCA-6A8.................. First Detector—Oscillator
(2) RCA-6K7.......................... I-F Amplifier
(3) RCA-6Q7....... Second Det., A-F Amp. and A.V.C.
(4) RCA-6K6GT.............................. Output
(5) RCA-OZ4G.............................. Rectifier



Location of Parts and Alignment Adjustments on Top of Chassis



Location of Parts and Alignment Adjustments on Bottom of Chassis

RCA MFG. CO., INC.

MODEL M50, Chassis RC-357J
MODEL M60, Chassis RC-357K
Alignment

PRELIMINARY:

Output meter connections .... Across speaker voice coil
Output meter readings to indicate 1 watt .... 1.8 volts
Generator ground lead connections .... To chassis
Generator modulation .... 30%, 400 cycles
Position of Volume Control .... Fully clockwise
Chassis must be in its case with front end removed, when aligning R-F circuit.

MODEL M50

Chassis No. RC 357J

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Adjustment Symbol	Circuit Adjusted
No Signal 550-750 kc	455 kc	.001 mfd.	6K7 Grid	L-10	2nd I.F. Trans.
No Signal 550-750 kc	455 kc	.001 mfd.	6A8 Grid	L-8, L-9	1st I.F. Trans.
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3	Ant.
600 kc	600 kc	.0001 mfd. †	Ant. Lead	L-2	Ant.
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3 *	Ant.

NOTE: No oscillator alignment adjustments are required in this receiver.

† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit"

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment is not required in this receiver at either end of the band; the oscillator coil is pre-adjusted for inductance in the factory.

Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case.

MODEL M60

Chassis No. RC 357K

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Adjustment Symbol	Circuit Adjusted
No Signal 550-750 kc	455 kc	.001 mfd.	6K7 I.F. Grid	L-10, L-11	2nd I.F. Trans.
No Signal 550-750 kc	455 kc	.001 mfd.	6A8 Grid	L-8, L-9	1st I.F. Trans.
Rock Through 600 kc	600 kc	.0001 mfd.†	Ant. Lead	L-7	Osc.
1,400 kc **	1,400 kc	.0001 mfd.†	Ant. Lead	C-5	Det.
1,400 kc **	1,400 kc	.0001 mfd.†	Ant. Lead	C-3	Ant.
Rock Through 600 kc	600 kc	.0001 mfd.†	Ant. Lead	L-7	Osc.
1,400 kc **	1,400 kc	.0001 mfd.†	Ant. Lead	C-5	Det.
1,400 kc **	1,400 kc	.0001 mfd.†	Ant. Lead	C-3*	Ant.

† Make the generator connection to the receiver through a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If a capacitor has been added in series with the lead from antenna filter L-1 to the antenna coil, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit".

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

**** OSCILLATOR CIRCUIT**

A magnetite core is used to provide temperature stability. The conventional high frequency trimmer has been replaced with a fixed temperature-compensating capacitor (C-12) which determines the high frequency range. Since the inductance of L-7 is adjustable, the conventional series trimmer has been replaced with a fixed capacitor (C-10). C-10 is a special capacitor having zero temperature coefficient to provide for oscillator stability in the low frequency range. Aligning the receiver for 600 kc is accomplished by adjusting L-7 to the antenna and det. circuits (gang condenser must be rocked while making this adjustment). The 1,400 kc alignment is accomplished by adjusting the antenna and the det. trimmers (C-3 and C-5) to the oscillator.

MODEL M50, Chas. RC-357J
MODEL M60, Chas. RC-357K
Antenna Data,
Tuner Data

RCA MFG. CO., INC.

Antenna Circuit

M50

The antenna circuit is designed to work with a low capacity antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If larger antennas, such as screened top or a double under the running-board having a total capacity of 200 to 550 mmf. is to be used, it will be necessary to reduce the value of the antenna coupling capacitor C-2 from .01 to approximately 200 mmf. (.0002). For even larger antennas such as insulated steel tops, a correspondingly smaller value of C-2 (approximately 125 to 150 mmf.) should be used keeping in mind to use the largest value possible with which the antenna circuit can be aligned.

M60

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from antenna filter L-1 to the antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mmf. the capacitor added should be approximately 300 mmf. The insulated running board type having an approximate capacity of 550 mmf. will require a capacitor of approximately 200 mmf. Cars using an insulated steel top of approximately 3,500 mmf. will require a series capacitor of 150 mmf.

M50 M60

After installation, and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer (C-3) for maximum signal output. This trimmer is accessible by prying off the nameplate between the control knobs.

Antenna Filter

A filter is included in the antenna circuit. Being completely shielded, it prevents radiating ignition interference within the set. It also reduces the possibility of picking up vibrator interference. The filter unit is mounted inside a steel shell which in turn is welded to the chassis. The shielded antenna lead-in makes contact with the filter unit within the steel shell and is held in place by a bayonet type connector.

Push Button Tuning Mechanism

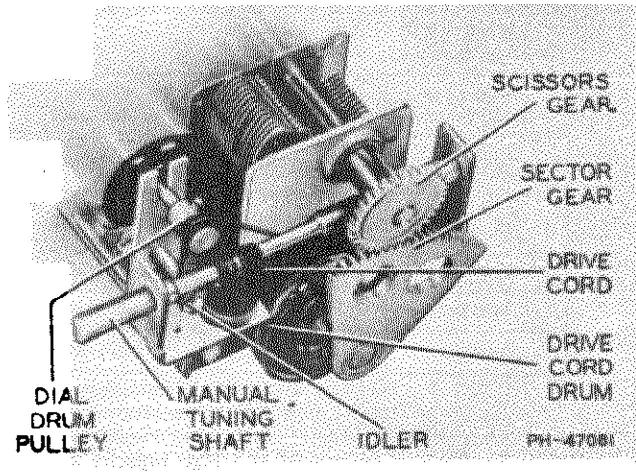
The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft. The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

Setting Up Stations

The push buttons should be adjusted for five favorite stations after the receiver is installed and operating.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.



Tuning Mechanism

3. With station accurately tuned in, press the first push button fully in and then gently release so as not to jar mechanism.
4. Tighten the push button securely with fingers. Do not force with pliers.
5. Proceed in same manner to adjust the other four push buttons.

Adjustments

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.

1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissor gear.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus correct adjustment prevents the rotation of the gang being limited by the rocker plates touching the frame.
3. The drive cord should have $8\frac{1}{2}$ turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord-tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off the drive cord.

Manual Tuning

A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. A sketch shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.

Parts List, Drive Data — RCA MFG. CO., INC. — MODEL M50, Chas. RC-357J / MODEL M60, Chas. RC-357K

CHASSIS ASSEMBLIES
MODEL M-50 (RC-357J)

STOCK No.	DESCRIPTION	Unit List Price
13002	Capacitor—12 mmfd. (C1)	.35
31728	Capacitor—37 mmfd. (C12)	.35
12405	Capacitor—47 mmfd. (C16)	.30
12629	Capacitor—56 mmfd. (C15)	.35
14262	Capacitor—109 mmfd. (C14)	.30
13894	Capacitor—390 mmfd. (C21)	.35
30673	Capacitor—470 mmfd. (C18)	.25
34250	Capacitor—490 mmfd. (C10)	.40
33584	Capacitor—.005 mfd. (C19, C22)	.25
30626	Capacitor—.0075 mfd. (C25)	.30
4937	Capacitor—.01 mfd. (C2, C20)	.25
4870	Capacitor—.025 mfd. (C9)	.20
30882	Capacitor—.05 mfd. (C13)	.20
4839	Capacitor—0.1 mfd. (C29)	.30
12741	Capacitor—0.5 mfd. (C27)	.30
32240	Capacitor—Electrolytic, 2 sections 10 mfd., and 1 section 20 mfd. (C23, C24, C31)	1.45
31596	Clip—Spring clip to hold oscillator coil	.02
31977	Coil—Antenna filter (L1)	.45
31594	Coil—Oscillator coil (L6, L7)	.75
31595	Coil—Oscillator coil (L6, L7)	1.35
11765	Lamp—Dial lamp	.15
30641	Lead—"A" lead	.30
30540	Resistor—100 ohms, ½ watt (R15, R16)	.20
14561	Resistor—220 ohms, ½ watt (R3)	.20
30499	Resistor—470 ohms, ½ watt (R12)	.20
6134	Resistor—1,200 ohms, 1 watt (R13)	.22
12695	Resistor—15,000 ohms, ½ watt (R14)	.20
13669	Resistor—22,000 ohms, 2 watts (R2)	.25
12266	Resistor—39,000 ohms ½ watt (R7)	.20
12286	Resistor—56,000 ohms, ½ watt (R4)	.20
14983	Resistor—330,000 ohms, ½ watt (R10)	.20
12285	Resistor—470,000 ohms, ½ watt (R11)	.20
12679	Resistor—2.2 meg., ½ watt (R6)	.20
13601	Resistor—10 meg., ½ watt (R9)	.20
3584	Ring—R.F. coil retaining ring	.03
31639	Socket—Dial lamp socket	.25
31319	Socket—Tube socket	.25
13686	Socket—Vibrator socket	.20
14261	Transformer—First i-f transformer (L8, L9, C14, C15)	2.05
30672	Transformer—Second i-f transformer (L10, L11, C16, C18)	2.10
31597	Transformer—Vibrator power transformer (T1, L15, C26)	4.85
13688	Vibrator—Plug-in vibrator complete (L16)	3.35
31637	Volume control and power switch (R8, S1)	1.50

CHASSIS ASSEMBLIES
MODEL M-60 (RC-357K)

STOCK No.	DESCRIPTION	Unit List Price
13002	Capacitor—12 mmfd. (C1)	.35
31729	Capacitor—43.5 mmfd., temp. comp. (C12)	.35
30904	Capacitor—100 mmfd. (C14, C15, C16, C17)	.25
13894	Capacitor—390 mmfd. (C21)	.35
14497	Capacitor—680 mmfd. (C30)	.40
33584	Capacitor—.005 mfd. (C19, C22)	.25
30626	Capacitor—.0075 mfd. (C25)	.30
14393	Capacitor—.01 mfd. (C2)	.30
4937	Capacitor—.01 mfd. (C20)	.25
32787	Capacitor—.05 mfd. (C8, C9)	.20
30882	Capacitor—.05 mfd. (C13)	.20
4839	Capacitor—0.1 mfd. (C29)	.30
12741	Capacitor—0.5 mfd. (C27)	.30
33803	Capacitor—Electrolytic, 2 sections 10 mfd. each (C23, C24)	1.05
32363	Capacitor—470 mfd. (C10, C18)	.30
31596	Clip—Spring clip to hold oscillator coil	.02
33664	Coil—Antenna coil (L2, L3)	1.35
31977	Coil—Antenna filter (L1)	.45
31595	Coil—Oscillator coil (L6, L7)	1.35
31600	Coil—R.F. coil—less shield (L4, L5)	1.15
11765	Lamp—Dial lamp	.15
30641	Lead—"A" lead	.30
30540	Resistor—100 ohms, ½ watt (R15, R16)	.20
13428	Resistor—150 ohms, ½ watt (R3)	.20
30499	Resistor—470 ohms, ½ watt (R12)	.20
6134	Resistor—1,200 ohms, 1 watt (R13)	.22
12695	Resistor—15,000 ohms, ½ watt (R14)	.20
13998	Resistor—22,000 ohms, ½ watt (R2)	.20
13477	Resistor—27,000 ohms, 1 watt (R5)	.22
12454	Resistor—33,000 ohms, ½ watt (R7)	.20
12286	Resistor—56,000 ohms, ½ watt (R4)	.20
14983	Resistor—330,000 ohms, ½ watt (R10)	.20
12285	Resistor—470,000 ohms, ½ watt (R1, R11)	.20
12201	Resistor—1.5 meg., ½ watt (R6)	.20
13601	Resistor—10 meg., ½ watt (R9)	.20

STOCK No.	DESCRIPTION	Unit List Price
3584	Ring—R.F. coil retaining ring	.03
31639	Socket—Dial lamp socket	.25
31319	Socket—Tube socket	.25
13686	Socket—Vibrator socket	.20
30902	Transformer—First i-f transformer (L8, L9, C14, C15)	1.90
31593	Transformer—Second i-f transformer (L10, L11, C16, C17)	1.95
31597	Transformer—Vibrator power transformer (T1, L15, C26)	4.85
13688	Vibrator—Plug-in vibrator complete (L16)	3.35
31638	Volume control and power switch (R8, S1)	1.50

MODELS M-50, M-60 SPEAKER ASSEMBLIES

STOCK No.	DESCRIPTION	Unit List Price
	(Speaker 84391-1)	
30782	Cone—Speaker cone and voice coil (L12)	1.20
30781	Speaker—Complete	4.40
30783	Transformer—Output transformer (T2)	1.45
	(Speaker 84391-3)	
31771	Cone—Speaker cone and voice coil (L12)	1.25
31770	Speaker—Complete	4.00
31772	Transformer—Output transformer (T2)	1.20

MODEL M-60.
TUNING UNIT ASSEMBLIES

STOCK No.	DESCRIPTION	Unit List Price
33667	Button—Push button	.20
31605	Condenser—3-gang variable (C3, C4, C5, C6, C7, C11)	3.60

MODEL M-50

STOCK No.	DESCRIPTION	Unit List Price
33666	Button—Push button	.15
31766	Coil—Antenna coil—less shield (L2)	1.05
31604	Condenser—2-gang variable (C3, C4, C11)	2.55

MODELS M-50, M-60

STOCK No.	DESCRIPTION	Unit List Price
31614	Cord—Variable condenser drive cord	.10
31725	Drum—Indicator drum assembly	.40
31610	Drum—Variable condenser drive cord drum	.40
31612	Gear—Variable condenser drive gear sector—fastens on cam shaft	.60
33665	Mechanism—Comprising 5 push arms, cams, cam plate, and mounting bracket assembled—less variable condenser	7.00
31606	Pulley—Indicator drum pulley	.20
31607	Pulley—Pulley for indicator drum bracket	.10
13471	Ring—Retaining ring for antenna coil	.03
4389	Screw—No. 6-32 x 3/16-in. set screw for pulley, Stock No. 31606	.03
31613	Screw—No. 8-32 x ¼-in. set screw for gear, Stock No. 31612	.02
31611	Screw—No. 8-32 x ¼-in. set screw for drum, Stock No. 31610	.02
31609	Shaft—Station selector knob shaft	.20
31615	Spring—Variable condenser drive cord tension spring	.02
30585	Spring—Push button arm tension spring	.05
2917	Washer—"C" washer to hold knob shaft	.03
31608	Washer—"C" washer to hold pulley, Stock No. 31607	.01

MISCELLANEOUS ASSEMBLIES

STOCK No.	DESCRIPTION	Unit List Price
4289	Body—Fuse holder body for ammeter lead	.03
5025	Capacitor—Generator capacitor	.45
33668	Case—Receiver case only	5.30
4291	Clip—Spring clip for amateur lead	.06
31456	Covers—8-protective celluloid covers for call letter markers	.08
33670	Dial—Dial scale and holder	.60
4286	Ferrule—Bushing and ferrule for fuse holder	.03
5023	Fuse—15 amp.	.08
4290	Insulator—Insulating sleeve for fuse holder	.02
7766	Lead—Ammeter lead complete with clip and fuse holder	.40
31589	Markers—One set call letter markers for push buttons	.35
33669	Mounting—Complete set mounting brackets, strap, washers, screws, bolts, and nuts	.85
31660	Plate—Name plate	.40
31646	Spring—Retaining spring for knobs	.02
4284	Spring—Spring for fuse holder	.03
5024	Suppressor—Distributor suppressor	.40
4285	Washer—Insulating washer for fuse holder	.02

First Edition

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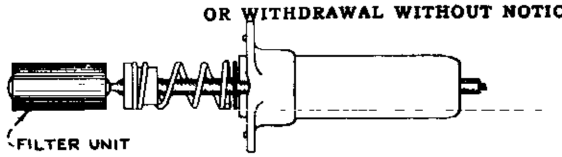
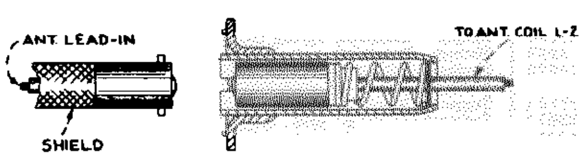
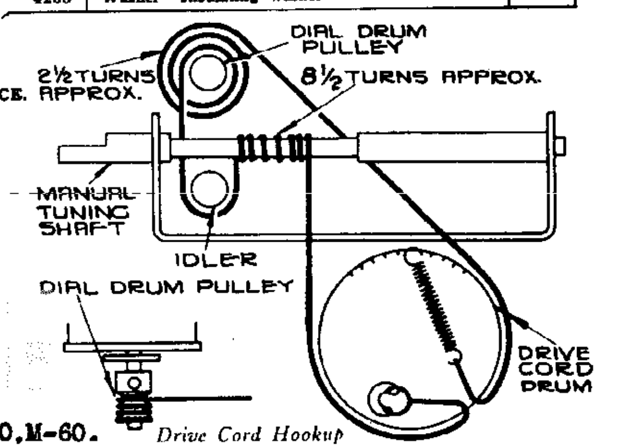




Antenna Filter



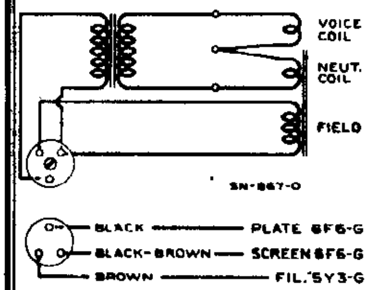
MODELS M-50, M-60.

Drive Cord Hookup

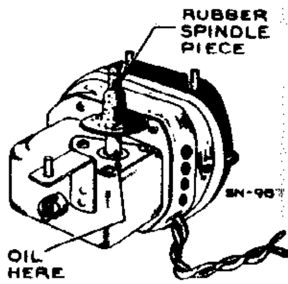
MODEL U50, Chas. RC-414C
Speaker Connections

RCA MFG. CO., INC.

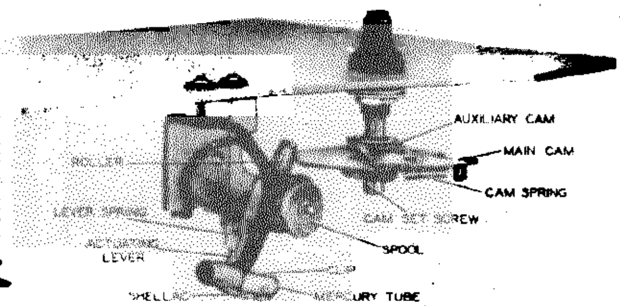
Switch Mechanism, Parts



Connections and Colors of Speaker and Cable



Phonograph Motor



Switch Mechanism
(Shown with pickup in rest position)

Replacement Parts

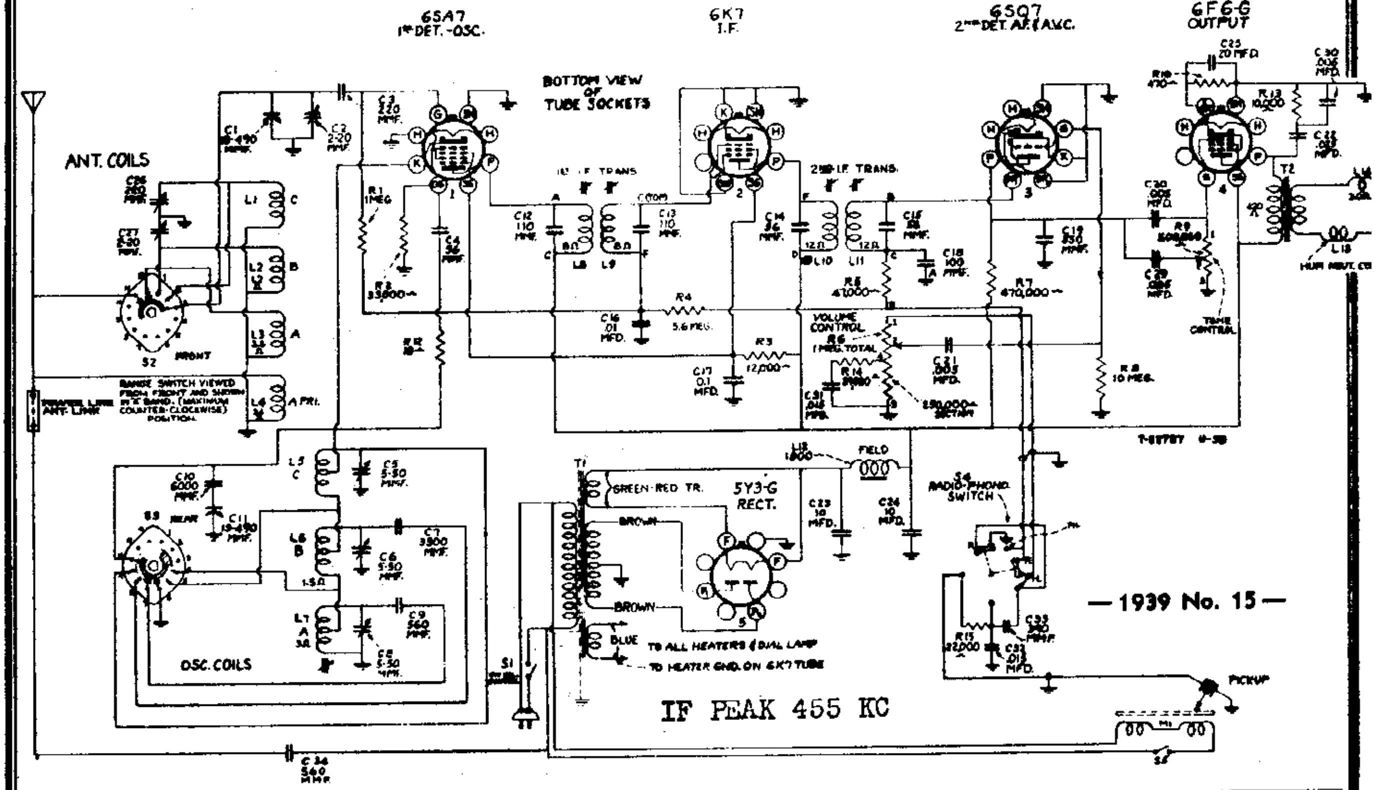
Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

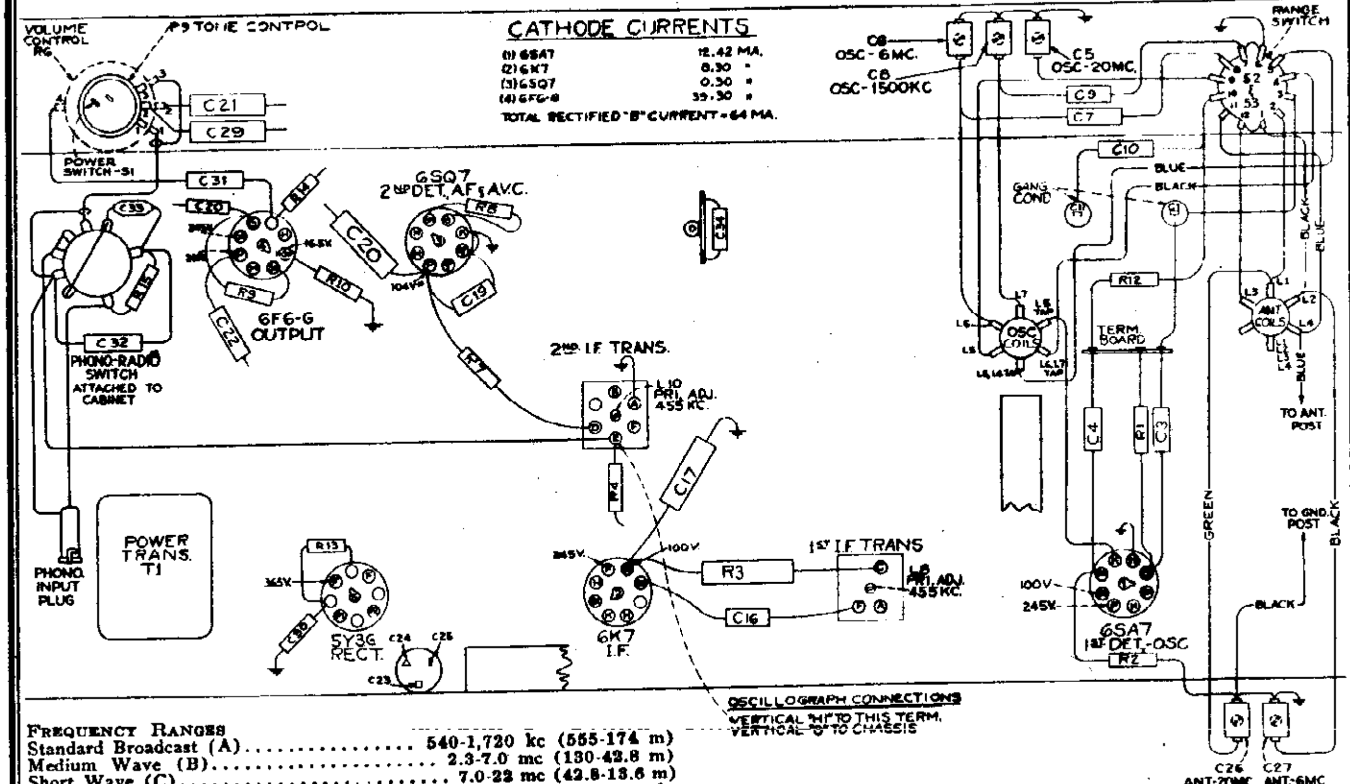
STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC—414—C)	
32834	Bracket—Drive bracket and 1 pulley assembled	.25
33411	Bracket—Drive bracket and 3 pulleys assembled	.65
12581	Cap—Top shield cap for i-f transformer	.25
32830	Capacitor—2-gang trimmer, 2-20 mmfd. each section (C26, C27)	.40
32829	Capacitor—3-gang trimmer, 5-60 mmfd. each section (C5, C6, C8)	.55
12723	Capacitor—56 mmfd. (C4)	.35
30949	Capacitor—56 mmfd. (C14, C15)	.25
14262	Capacitor—109 mmfd. (C12, C13)	.30
32238	Capacitor—110 mmfd. (C18)	.30
30232	Capacitor—220 mmfd. (C3)	.35
12952	Capacitor—330 mmfd. (C19)	.35
13894	Capacitor—390 mmfd. (C33)	.35
12537	Capacitor—560 mmfd. (C9, C34)	.35
31403	Capacitor—3300 mmfd. (C7)	.60
31405	Capacitor—6000 mmfd. (C10)	.75
33584	Capacitor—.005 mfd. (C30)	.25
4838	Capacitor—.005 mfd. (C20, C21, C29)	.25
14393	Capacitor—.01 mfd. (C16)	.30
11315	Capacitor—.015 mfd. (C31, C32)	.20
4870	Capacitor—.025 mfd. (C22)	.20
4839	Capacitor—0.1 mfd. (C17)	.30
32240	Capacitor—Electrolytic, 2 sections 10 mfd., 400 V., and one section 20 mfd., 25 V. (C23, C24, C25)	1.45
32821	Coil—Antenna coil (L1, L2, L3, L4)	1.35
32824	Coil—Oscillator coil (L5, L6, L7)	1.00
32817	Condenser—2-gang variable tuning (C1, C2, C11)	2.60
33409	Control—Volume control, tone control, and power switch (R6, R9, S1)	3.00
32713	Core—Adjustable core and stud for oscillator coil	.35
32835	Drum—Drive cord drum with set screw	.55
11891	Lamp—Dial lamp—Mazda No. 44	.17
30868	Plug—2-contact female motor cable plug	.35
5119	Plug—3-contact female speaker cable plug	.25
13088	Resistor—10 ohms, ¼ watt (R12)	.20
30681	Resistor—470 ohms, 1 watt (R10)	.22
3078	Resistor—10,000 ohms, ½ watt (R13)	.20
31389	Resistor—12,000 ohms, 3½ watts (R3)	.50
13998	Resistor—22,000 ohms, ¼ watt (R15)	.20
12454	Resistor—33,000 ohms, ¼ watt (R2)	.20
12266	Resistor—39,000 ohms, ¼ watt (R14)	.20
5132	Resistor—47,000 ohms, 1/10 watt (R5)	.15
12285	Resistor—470,000 ohms, ¼ watt (R7)	.20
13730	Resistor—1 meg., ¼ watt (R1)	.20
11668	Resistor—5.6 meg., ¼ watt (R4)	.20
13601	Resistor—10 meg., ¼ watt (R8)	.20
14343	Retainer—Retaining ring to hold tuning knob shaft	.03
32848	Screw—No. 8-32 square head set screw for drum	.03
33412	Shaft—Tuning knob shaft	.20
31365	Socket—Dial lamp socket (insulated)	.30
31251	Socket—Octal base tube socket	.25
31418	Spring—Drive cord tension spring	.05
33413	Switch—Radio-Record switch (S4)	.75
33410	Switch—Range switch (S2, S3)	1.00
14376	Transformer—First i-f transformer (L8, L9, C12, C13)	2.45
32825	Transformer—Second i-f transformer (L10, L11, C14, C15, C13, R5)	2.50
33112	Transformer—Power transformer 105-125 volts, 50-60 cycle (T1)	4.30
	PICKUP AND ARM ASSEMBLIES	
33216	Arm—Pickup arm—less crystal, needle screw, and cable	2.20
33218	Base—Pickup arm mounting base and pivot shaft	1.00
33217	Crystal—Pickup crystal cartridge and needle screw	3.75
33114	Damper—Viscoloid damper for pickup armature	.15
31160	Screw—Pickup needle screw	.12
	MOTOR ASSEMBLIES	
32650	Field—Motor field coils and laminations, 110 volts, 50 cycle	5.10
32336	Field—Motor field coils and laminations, 110 volts, 60 cycle	5.10
33220	Motor—105-125 volts, 50 cycles—less mounting plate (M1)	11.25
33219	Motor—105-125 volts, 60 cycles—less mounting plate (M1)	10.75
33361	Shaft—Turntable spindle shaft and gear—50 cycle	1.40
33360	Shaft—Turntable spindle shaft and gear—60 cycle	1.40
	AUTOMATIC SWITCH ASSEMBLIES	
33221	Cam—Cam assembly comprising main and auxiliary cams, hub, and set screws	.65
32864	Lever—Actuating lever with roller and mercury tube clip	.45
14195	Screw—No. 10-32 x 5/16 cone pointed set screw for cam hub	.05
32869	Screw—No. 10-32 x 5/16 set screw for cam hub	.01
32868	Spring—Actuating lever tension spring	.05
32867	Spring—Cam tension spring	.05
32865	Support—Switch support and terminal board	.40
32866	Switch—Mercury tube with leads (S5)	1.75
31608	Washer—"C" washer for actuating lever shaft	.01
	SPEAKER ASSEMBLIES (84604-1)	
33408	Cone—Speaker cone and voice coil (L14)	2.10
5118	Plug—3-contact male for speaker	.25
33222	Speaker complete	6.65
33407	Transformer—Output transformer (T2)	2.00
	MISCELLANEOUS ASSEMBLIES	
10290	Cap—Ventilating cap	.25
31464	Damper—Damper plate and rubber sleeve for spindle	.30
32837	Dial—Dial scale (glass)	.65
33415	Escutcheon—Dial scale escutcheon	.80
11771	Foot—Cabinet foot	.02
33416	Frame—Dial frame, support, color plate, and mounting brackets—less pointer and carriage, and dial scale	1.40
32633	Handle—Carrying handle	.90
13065	Hinge—Cabinet lid hinge	.22
11865	Holder—Needle cord holder	.30
33417	Indicator—Dial scale pointer and carriage	.35
33468	Knob—Radio-Record switch knob	.15
33506	Knob—Range switch knob (small)	.25
33470	Knob—Tone control and switch knob (small dual)	.20
33505	Knob—Tuning knob (large)	.30
33471	Knob—Volume control knob (large dual)	.25
33223	Mounting—Complete set motor mounting screws, washers, and spacers	.30
31054	Mounting—Pickup arm mounting cushion, washers, and nut	.15
30870	Plug—2-contact male for motor leads	.35
31048	Plug—2-contact male plug for phono. cable	.15
32846	Rod—Indicator slide rod	.25
33418	Spring—Indicator tension spring	.02
30330	Spring—Retaining spring for tone control knob	.03
4982	Spring—Retaining spring for tuning knob	.05
14270	Spring—Retaining spring for volume control, range switch, or radio-record switch knob	.05
33364	Support—Cabinet lid support (LH)	.50
33673	Support—Pickup arm support	.25
33414	Turntable	1.55

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

RCA MFG. CO., INC.

MODEL U50, Chas. RC-414C
Schematic, Voltage
R-F Chassis Wiring





FREQUENCY RANGES		
Standard Broadcast (A)	540-1,720 kc	(555-174 m)
Medium Wave (B)	2.3-7.0 mc	(130-42.8 m)
Short Wave (C)	7.0-22 mc	(42.8-13.6 m)
INTERMEDIATE FREQUENCY	455 kc	

ALL HEATERS 6.3V.A.C., EXCEPT 5Y3G, 5.0V.A.C.

SH-897 RC-414C U-50

BOTTOM VIEW - REAR OF CHASSIS

First Edition

R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ± 20% with 117-volt a-c supply.

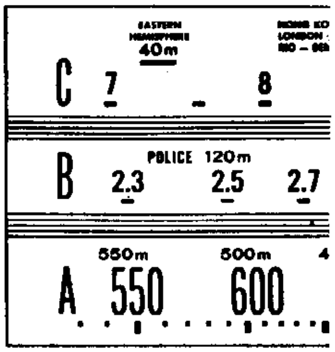
***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODEL U50, Chas. RC-414C
Socket, Trimmers, Dial Data
Alignment, Phono. Data

RCA MFG. CO., INC.

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



Tube Complement

(1) RCA-6SA7....... First Detector-Oscillator
(2) RCA-6K7............... I-F Amplifier
(3) RCA-6SQ7......... Second Det., A.V.C., and A-F Amplifier
(4) RCA-6F6-G.............. Power Output
(5) RCA-5Y3-G.................... Rectifier

Pilot Lamp (1)........
Mazda No. 44, 6.3 volts, 0.25 amp.

Power Output Rating
Undistorted........................ 2.0 watts
Maximum........................ 3.6 watts

Power Supply Ratings
Rating A.. 105-125 volts, 50-60 cycles, 105 watts

Loudspeaker (84604-1)
Type.................. 8-inch electrodynamic
Voice Coil Impedance.. 3.3 ohms at 400 cycles

Calibration Scale On Indicator-Drive-Cord Drum.—In most cases it will not be necessary to remove the chassis from the dial scale for alignment, allowing the dial scale to be used for calibration. However, if alignment is made with the receiver chassis removed, the calibration scale attached to the rear of the drum which is mounted on the front shaft of the gang condenser must be used. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 135° mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held in place by one set-screw, which must be securely tightened when the drum is in the correct position.

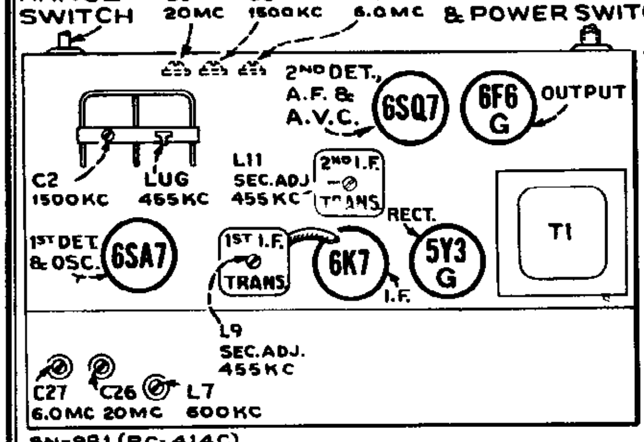
Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

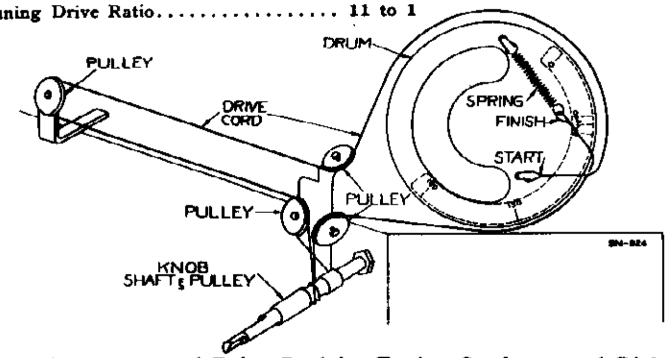
Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" Band quiet point between 550-750 kc	L10 and L11 (2nd I.F. trans.)
2	Tuning condenser stator (osc.) in series with .01 mfd. **	455 kc		L8 and L9 (1st I.F. trans.)
3	Antenna lead in series with 200 mmfd.	600 kc	600 kc (33°) "A" Band	L7†
4		1,500 kc	1,500 kc (152.4°) "A" Band	C2 (ant.) C8 (osc.)
5	Repeat steps 3 and 4			
6	Antenna lead in series with 400 ohms	20 mc	20 mc (155.4°) "C" Band	C5 (osc.) * C26 (ant.)
7		6 mc	6 mc (149°) "B" Band	C6 (osc.) * C27 (ant.)
8	Antenna lead in series with 200 mmf.	1,500 kc	1,500 kc (152.4°) "A" Band	C8 (osc.)

* Use minimum capacity peak if two peaks can be obtained
† Rock gang condenser slightly while adjusting L7.
** Make test-oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.
Note.—Oscillator tracks 455 kc above signal on all bands.



SN-981 (RC-414C)

Tuning Drive Ratio.................. 11 to 1



Arrangement of Drive Cord for Tuning Condenser and Dial Indicator. Drum Shown with Gang at Maximum Capacity

Phonograph Mechanism:

The phonograph motor is a self-starting, constant-speed induction type. It should be lubricated every six months by applying a few drops of light machine oil to the spindle bearing and oil hole.

The motor spindle is tapered, and a conical rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

A metal washer is placed on the spindle under the rubber piece. The washer has ears on the under side which fit over a pin that projects through the spindle.

The motor switch is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1½ inches from the center line of the spindle shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.

Power-Line Antenna:

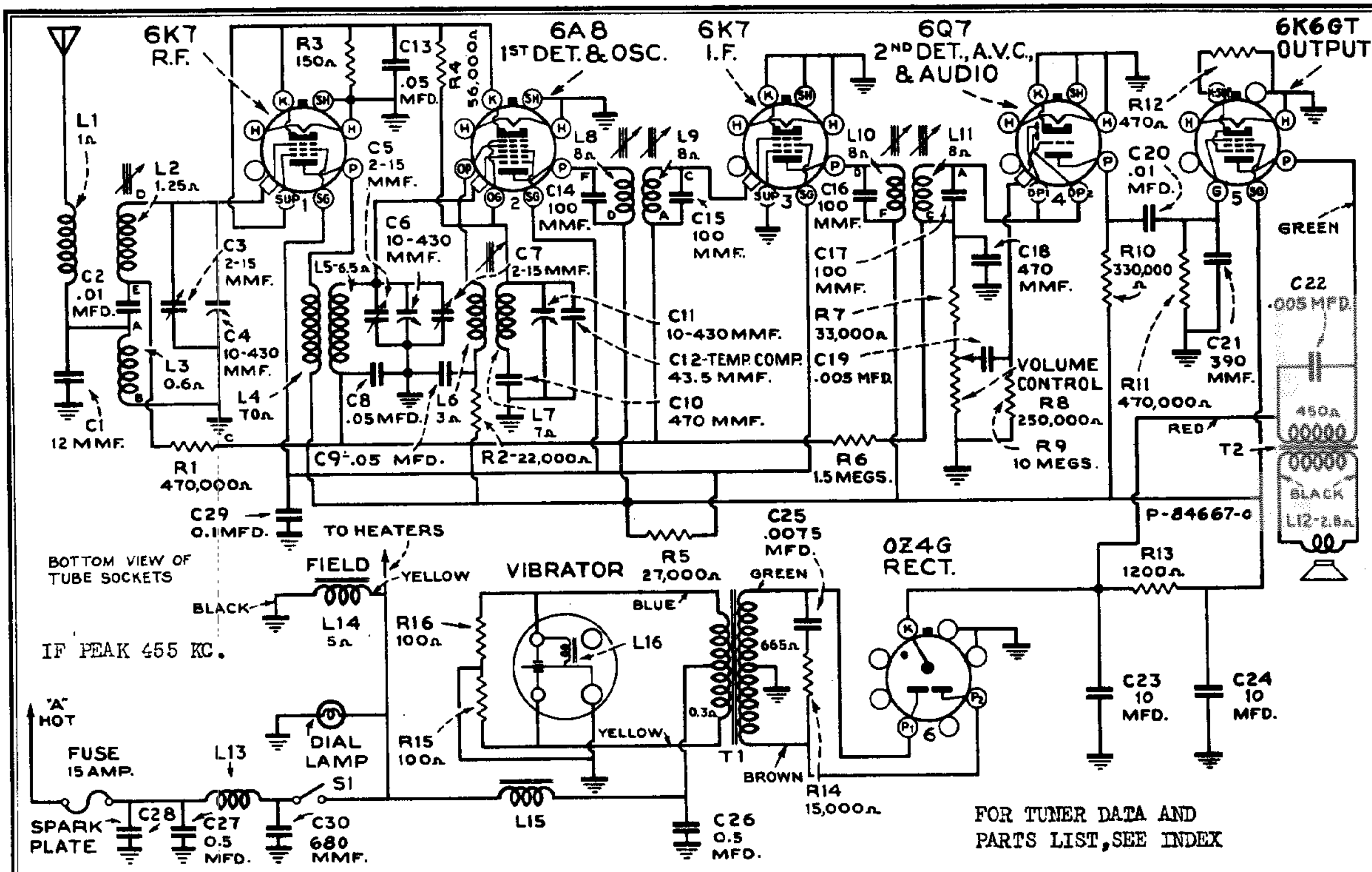
At the back of the motorboard is a terminal board for antenna and ground connections. When it is desired to use the power line antenna, a jumper should be placed across the two outside binding-posts, thus connecting the antenna input of the receiver through a capacitor to the power line. The center binding-post is for the ground connection. When an external antenna is used, it should be connected to the post marked "ANT"

Precautionary Lead Dress:

1. Lead from 2nd I-F transformer to volume control should be kept close to the chassis and dressed against front apron.
2. C-10 should be dressed away from the antenna section of the variable condenser (C-1).

RCA MFG. CO., INC.

MODEL M60, Chas. RC-357K
Schematic



FOR TUNER DATA AND PARTS LIST, SEE INDEX

—1939 No. 23—

FREQUENCY RANGE.... 550-1,550 kc

Dial Lamp. 6-8 volts, 0.2 amp., Mazda 51

POWER SUPPLY RATING

Supply Voltage.......... 6.3 volts
Current Drain........ 6.5 amperes
Fuse Protection......... 15 ampere

POWER OUTPUT

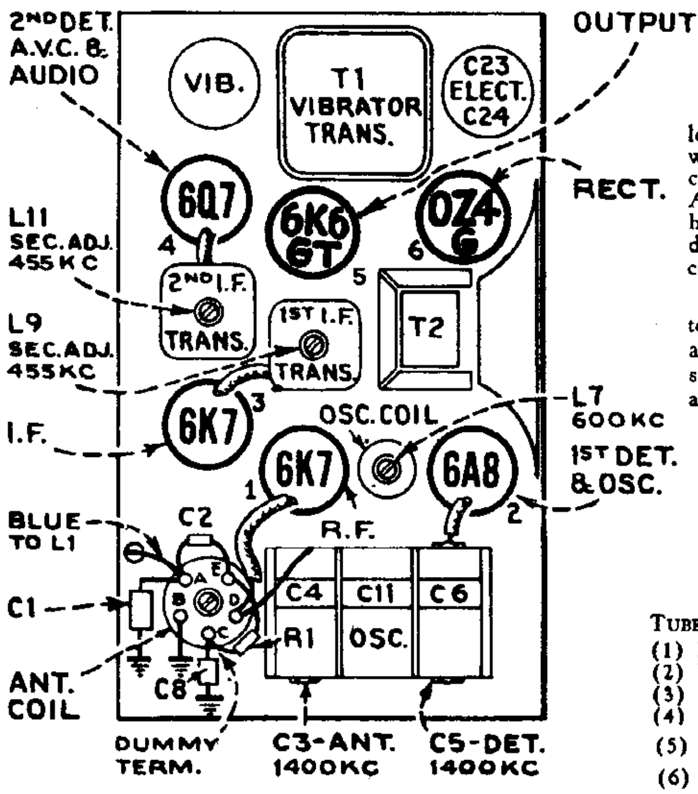
Type.................. Pentode
Undistorted............. 2.0 watts
Maximum............... 3.5 watts

LOUDSPEAKER

Type........... Electrodynamic
Size.................. 5 inches
Voice-Coil Impedance.... 3.2 ohms at 400 cycles

MODEL M60, Chas. RC-357K
Chassis Wiring, Socket
Trimmers
Voltage

RCA MFG. CO., INC.



Top View of Chassis

General Description

Model M60 is a six-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading "Push Button Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

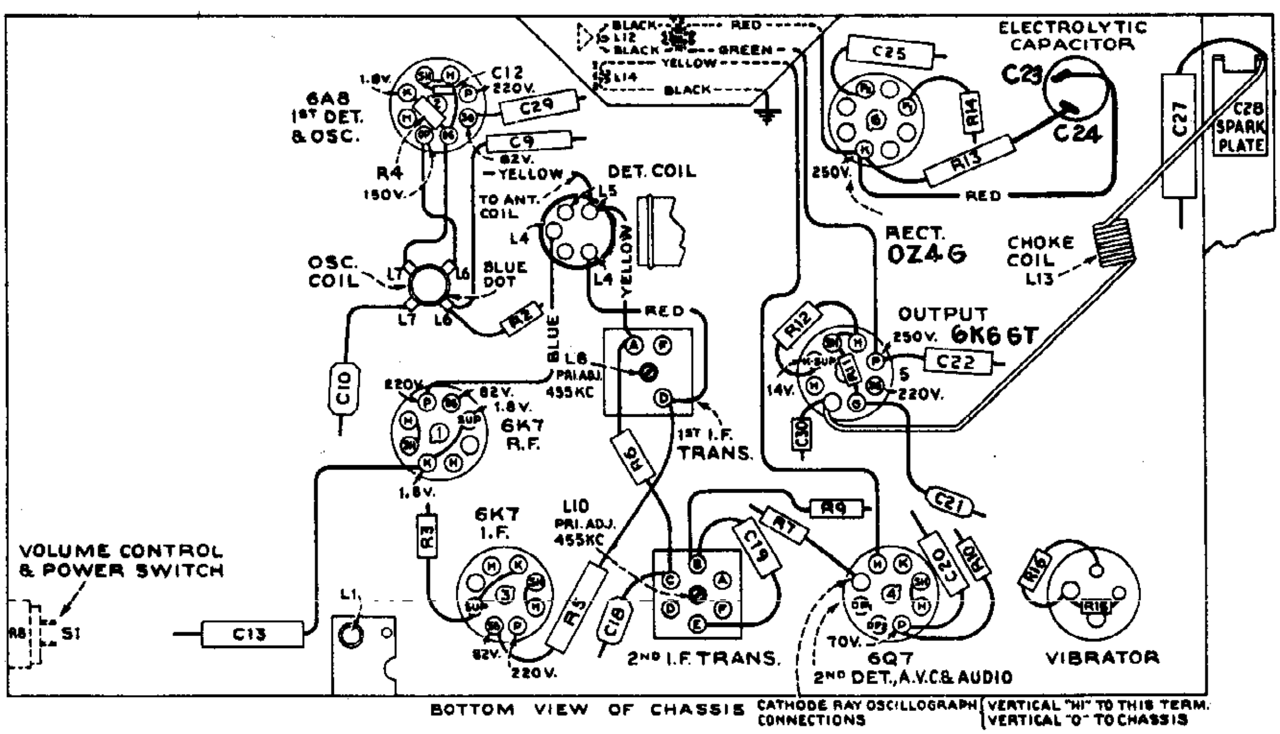
Loudspeaker.—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with ambroid cement after adjustment has been completed.

Alignment Frequencies

I-F	455 kc
Antenna	1,400 kc
R-F	1,400 kc
Oscillator	600 kc

Tubes and Functions

(1) RCA-6K7 .... R-F Amplifier
(2) RCA-6A8 .... First Detector—Oscillator
(3) RCA-6K7 .... I-F Amplifier
(4) RCA-6Q7 .. Second Detector, A-F Amplifier and A.V.C.
(5) RCA-6K6GT .... Output
(6) RCA-0Z4G .... Rectifier



BOTTOM VIEW OF CHASSIS — CATHODE RAY OSCILLOGRAPH CONNECTIONS { VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS

Bottom View of Parts and Socket Voltages

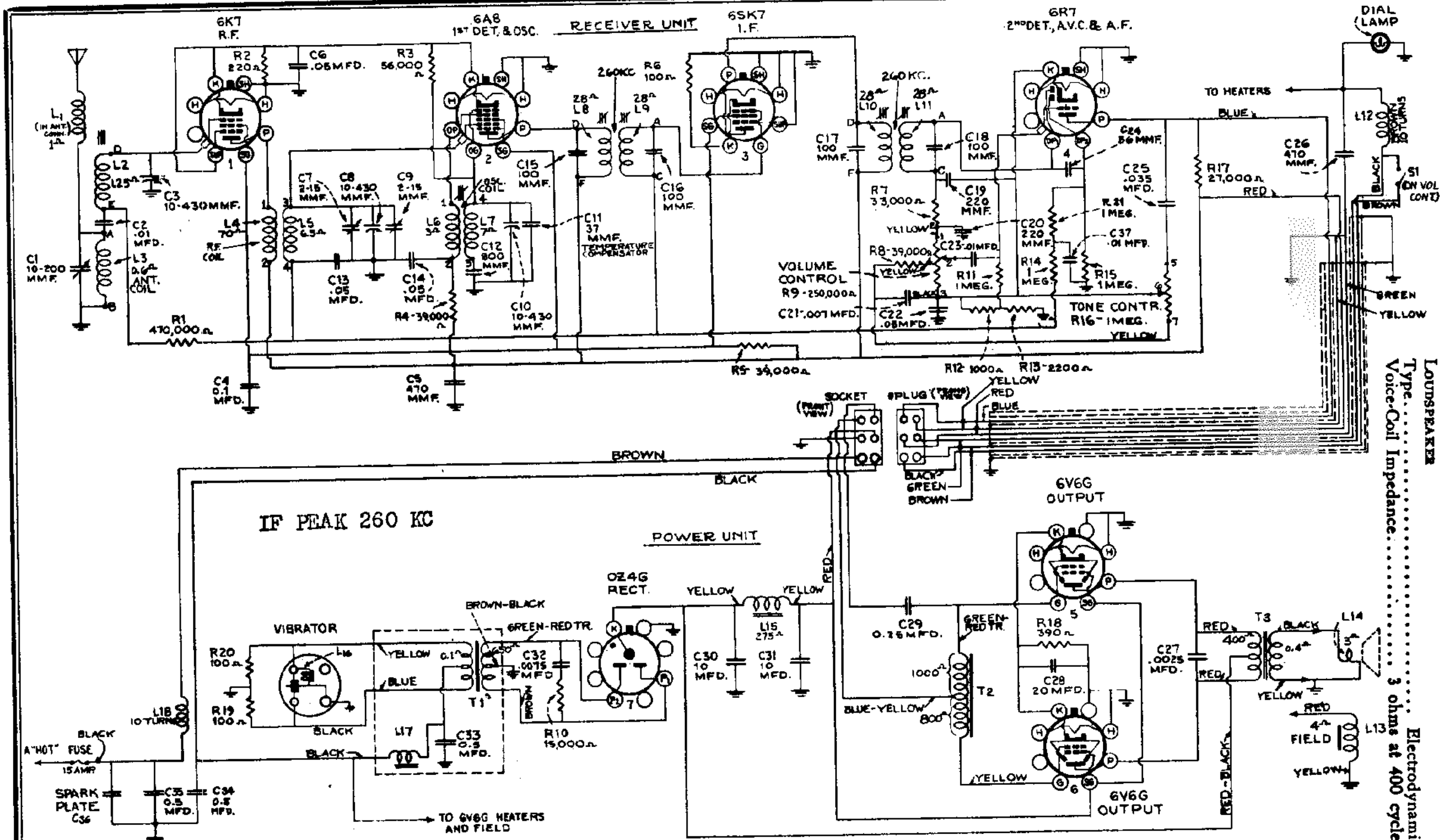
(Measured at 6.3 volts battery supply—Volume control minimum—No signal input—)

To duplicate the conditions under which the above voltages were measured requires a 1,000-ohm-per-volt d-c meter having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the indicated voltage value. Each value should hold within ± 20% when the receiver is normally operative at its rated battery voltage.

MODEL M70, Chas. RC-394
Schematic

RCA MFG. CO., INC.

Loudspeaker
Type .... Electrodynamic
Voice-Coil Impedance .... 3 ohms at 400 cycles



Power Supply Rating
Supply Voltage .... 6.3 volts
Current Drain .... 8.7 amperes
Fuse Protection .... 15 ampere
Pilot Lamp... Mazda No. 51, 6-8 volts, 0.2 ampere

Power Output Ratings
Maximum .... 8 watts
Undistorted .... 6 watts

Automobile Receiver
—1939 No. 12—

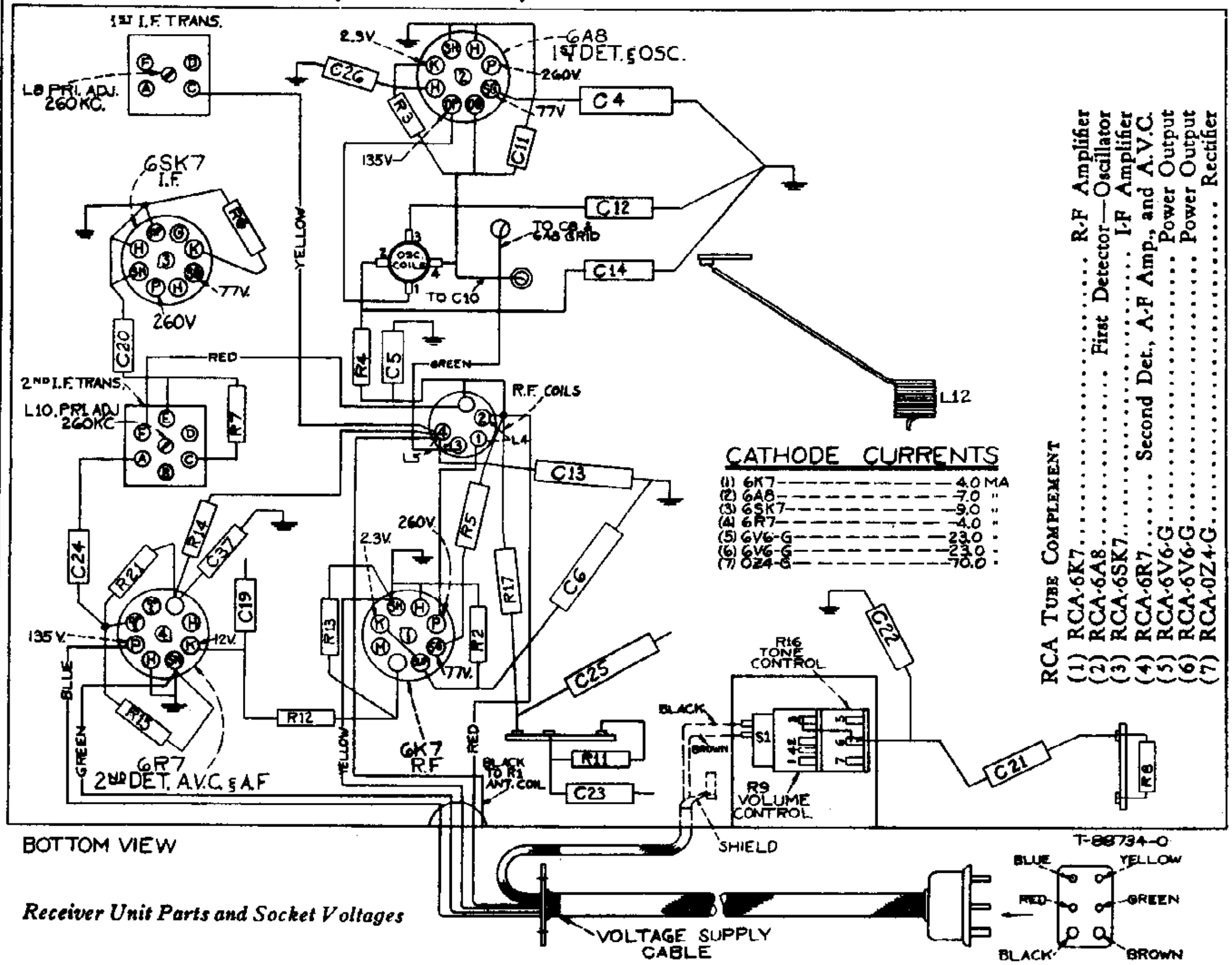
Tuning Range .... 550 to 1,550 kc
Intermediate Frequency ... 260 kc

MODEL M-70
Chassis No. RC-394

Model M-70 consists of a 7-tube, superheterodyne automobile receiver and an eight-inch electrodynamic loudspeaker built in two separately housed components. A small tuning unit for mounting under the instrument panel contains four tubes, while the cylindrical loudspeaker housing for firewall mounting contains three tubes. Design features include an R-F amplifier stage; antenna filter and antenna trimmers; magnetite core antenna, oscillator and I-F transformers; delayed automatic volume control; combined high- and low-frequency tone control; compensated volume control; true tone fidelity; five push button tuning; full-vision, edge-lighted glass dial; illuminated station call letters and a push-pull beam power output stage.

MODEL M70, Chas. RC-394
Voltage, Chassis Wiring
Tuner Data

RCA MFG. CO., INC.



Receiver Unit Parts and Socket Voltages

RECEIVER CASE DIMENSIONS .... Height, 2½ inches; Width, 5⅞ inches; Depth, 9¼ inches

SPEAKER CASE DIMENSIONS .... Diameter, 9½ inches; Depth, 5 inches

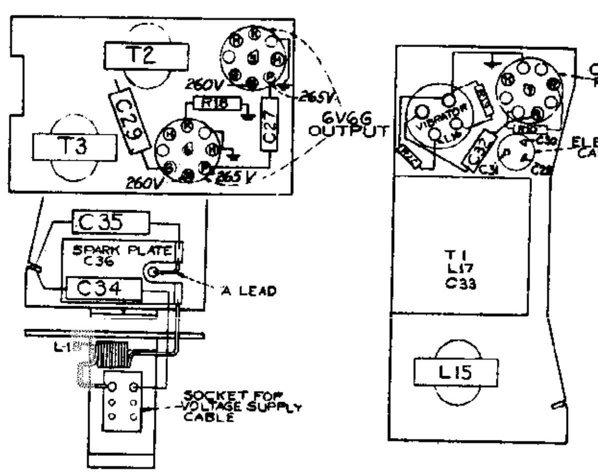
OPERATING CONTROLS ..... (Left)—(Plastic Knob) Power-Volume; (Wing Knob) Tone; (Center)—Five Station Push Buttons; (Right)—Manual Tuning; Ratio 7½ - 1.

WEIGHT .... Net, 20 pounds; Shipping, 22 pounds

Adjustment of Push-Button Mechanism

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.

1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissor gear, as shown in the illustration.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus correct adjustment prevents the rotation of the gang being limited by the rocker plates touching the frame.
3. The drive cord should have 6½ turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord-tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off of the drive cord.



Power Unit Parts and Socket Voltages

RCA MFG. CO., INC.

Alignment Procedure

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output signal as low as possible to avoid a-v-c action.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are as follows: Vertical "Hi" to terminal "C" on 2nd I-F transformer; vertical "0" to chassis.

Output Meter.—Connect the output meter across the speaker voice-coil and turn the receiver volume control to maximum (fully clockwise) and tone control to middle of range.

Dial Calibration.—Rotate the gang condenser to its full-mesh (maximum-capacity) position and then adjust dial scale so that the pointer is aligned to the last calibration mark at the low-frequency end of the scale.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid (No. 4 pin) in series with .01 mfd.	260 kc	No Signal 550-750 kc	L10 and L11 (2nd I-F Trans.)
2	6A8 Det. grid cap in series with .01 mfd.	260 kc		L8 and L9 (1st I-F Trans.)
3 †	* Ant. connector in series with 60 mmfd.	600 kc	600 kc	L7 (osc.)
4 †	* Ant. connector in series with 60 mmfd.	1,400 kc	1,400 kc signal	C7 (det.) C1 (ant.)
5 †	* Ant. connector in series with 60 mmfd.	600 kc	600 kc (rock)	L7 (osc.)
6 †	* Ant. connector in series with 60 mmfd.	1,400 kc	1,400 kc signal	C7 (det.) C1 (ant.)**

* **Note 1.**—This 60 mmfd. capacitor must be inserted at the antenna connector of the receiver. The lead from the test oscillator to the 60 mmfd capacitor may be shielded if desired, but no shielding should be used between capacitor and antenna connector.

† **Note 2.**—These adjustments should be made with unit enclosed in its shielded case, through holes provided for adjustment purposes.

** **Note 3.**—Final adjustment of C1 must be made after the receiver has been installed and the antenna connected. See "Antenna Circuit."

Antenna Circuit

It is very important that these instructions be followed when installing the M-70 receiver.

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from the antenna filter L-1 to the antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mmf., the capacitor added should be approximately 500 mmf. The insulated running board type having an approximate capacity of 550 mmf. will require a capacitor of approximately 150 mmf. Cars using an insulated steel top of approximately 3,500 mmf will require a series capacitor of 150 mmf.

After installation and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer C-1 for maximum signal output. This trimmer is accessible by removing plug button near antenna jack on top of receiver. If a maximum (peak) signal output cannot be obtained in the range of the antenna trimmer, the effective capacity should be checked and compensated for by varying series capacity as described above.

Loudspeaker

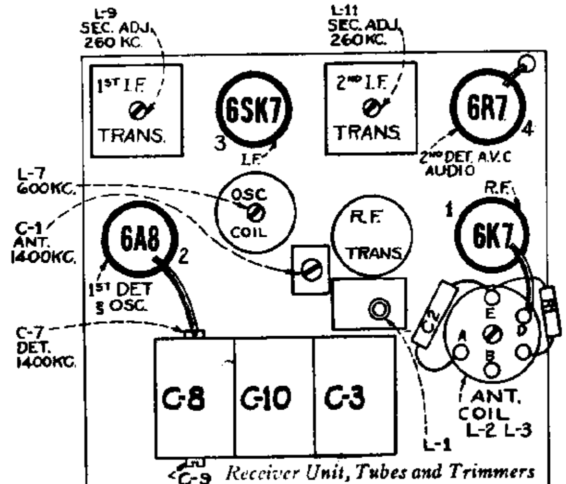
The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting away the front dust cover. A new cover should be cemented in place upon completion of the adjustment.

Push Button Adjustment

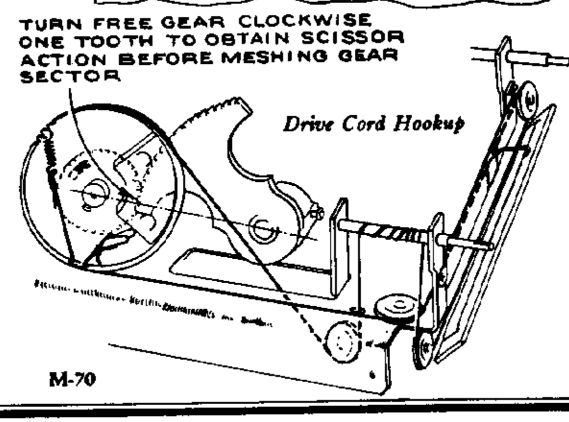
The push buttons should be adjusted for five favorite stations after the receiver is installed and operating.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.
3. With station accurately tuned in, press the first push button fully in and then gently release so as not to jar mechanism.
4. Tighten the push button securely with fingers. Do not force with pliers.
5. Proceed in same manner to adjust the other four push buttons.



Receiver Unit, Tubes and Trimmers

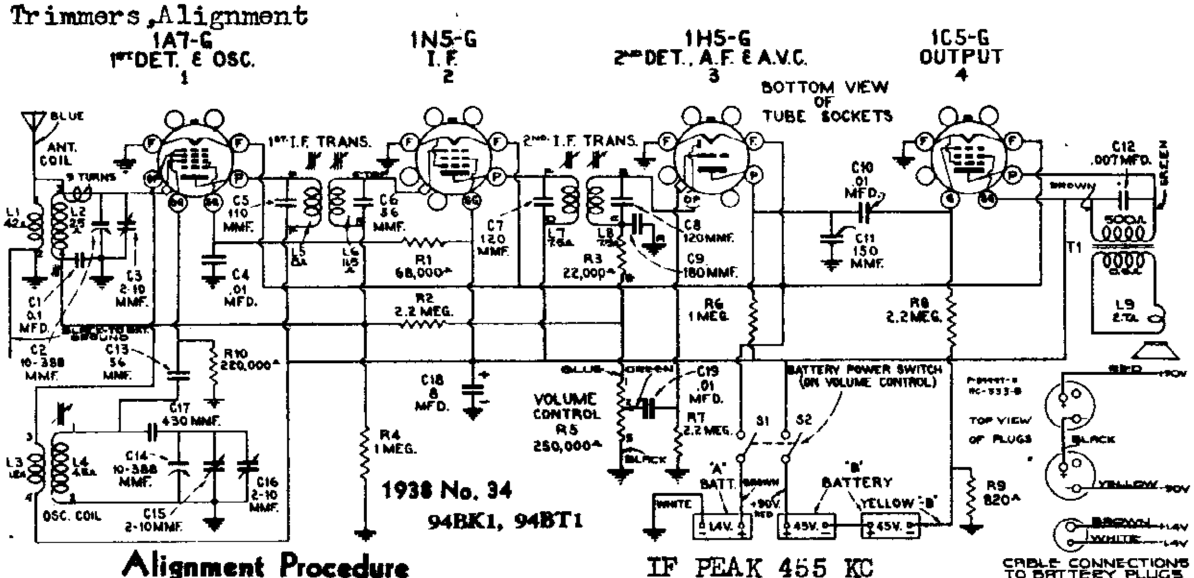


Drive Cord Hookup

M-70

MODELS 94BK1, 94BT1
Chassis RC-333B
Schematic, Voltage, Socket
Trimmers, Alignment

RCA MFG. CO., INC.



IF PEAK 455 KC

Alignment Procedure

Cathode-ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

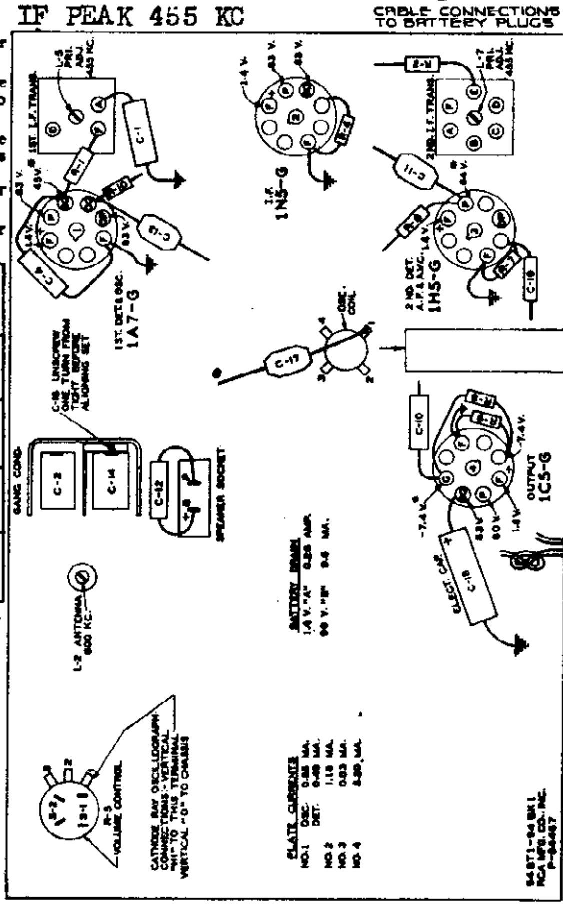
Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	1N5-G I-F grid cap, in series with 0.01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F transformer)
No. 2	1A7-G 1st-det. grid cap, in series with 0.01 mfd.	455 kc		L5 and L6 (1st I-F transformer)
No. 3	Antenna lead, in series with 200 mmfd.	600 kc	600 kc	L4 (oscillator) L2 (antenna)
No. 4	Antenna lead, in series with 200 mmfd.	1,500 kc	1,500 kc	C15† (oscillator) C3 (antenna)

† Trimmer C16 on gang condenser should be unscrewed one complete turn from tight, before adjusting C15.

Precautionary Lead Dress

1. Red lead from second i-f transformer to screen terminal of 1N5-G must be dressed close to and along edge of chassis.
2. Twisted green wire from antenna coil to gang must be 9 turns and kept clear of rotor.
3. Blue and green leads to volume control must be dressed close to chassis and between gang and front apron.



* NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured value will be lower, depending on the voltmeter loading.
Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with rated battery voltage.

Socket Voltages, and Location of Parts

FOR PARTS LIST, SEE INDEX

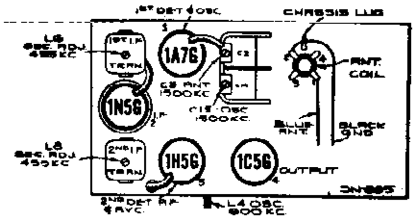
Electrical and Mechanical Specifications

POWER OUTPUT
Undistorted .... 0.115 watt
Maximum .... 0.280 watt

LOUDSPEAKER
Type .... Permanent Magnet Dynamic
Diameter .... 94BK1, 6 inches; 94BT1, 5 inches
Voice Coil Impedance .... 3 ohms at 400 cycles

	Height	Width	Depth
Cabinet Dimensions (94BT1)	12⅝ in.	10⅝ in.	6⅝ in.
Cabinet Dimensions (94BK1)	37¼ in.	22 in.	10¼ in.
Chassis Base Dimensions	2 in.	9⅝ in.	5⅝ in.
Over-all Chassis Height			6 in.

Weight (94BT1) .... 7⅝ lbs. net; 10¼ lbs. shipping
Weight (94BK1) .... 26¼ lbs. net; 39¼ lbs. shipping
Operating Controls .... (1) Power Switch—Volume; (2) Tuning
Tuning Drive Ratio .... 8 to 1
Frequency Range .... 540 to 1,720 kc
RF Alignment Frequencies .. 600 kc (osc., ant.), 1,500 kc (osc., ant.)
Intermediate Frequency .... 455 kc



Tube and Trimmer Locations

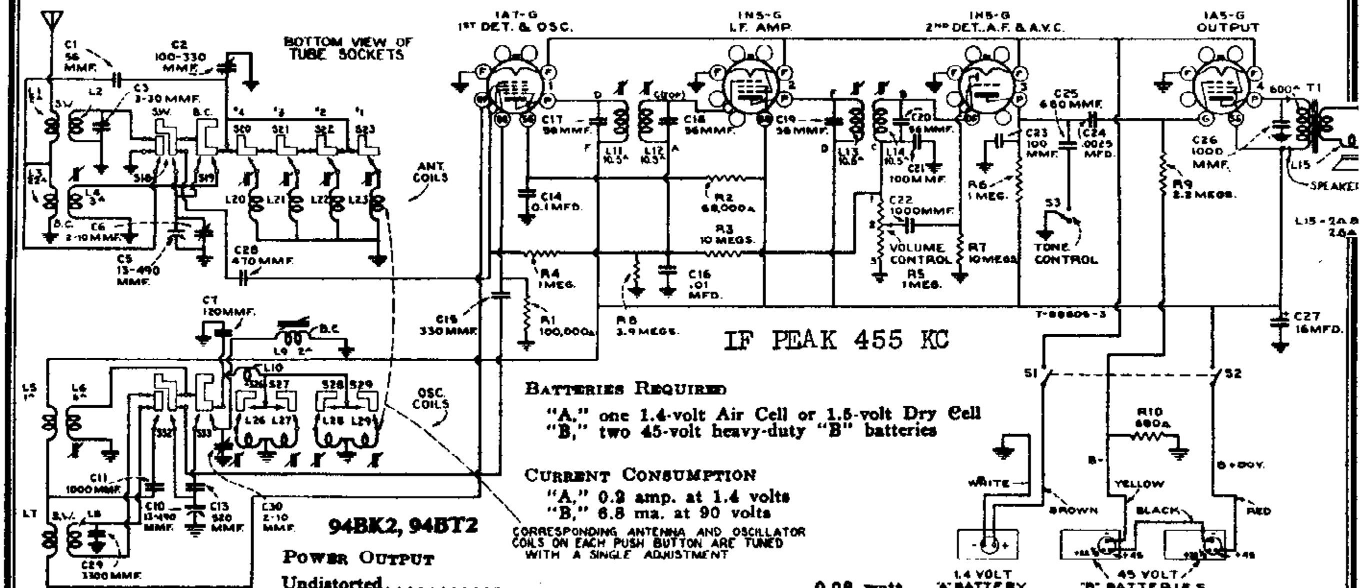
CURRENT CONSUMPTION
"A" at 1.4 volts, 0.26 amp.
"B" at 90 volts, 9.8 ma.

BATTERIES REQUIRED
"A," one 1.4-volt Air Cell or 1.5-volt Dry Cell.
"B," two 45-volt heavy duty "B" batteries.

Schematic, Voltage
Chassis Wiring

RCA MFG. CO., INC.

MODELS 94BK2, 94BT2
Chassis RC-390



Batteries Required

"A," one 1.4-volt Air Cell or 1.5-volt Dry Cell
"B," two 45-volt heavy-duty "B" batteries

Current Consumption

"A," 0.2 amp. at 1.4 volts
"B," 6.8 ma. at 90 volts

Power Output

Undistorted.......... 0.08 watt
Maximum.......... 0.18 watt

—1938 No. 39—

	Model 94BK2	Model 94BT2
Height	37½ inches	10⅝ inches
Width	22 inches	20-13/16 inches
Depth	10 inches	9⅝ inches
Net Weight	40½ pounds	15½ pounds
Shipping Weight	53½ pounds	19 pounds
Chassis Base Dimensions	8 inches x 11½ inches x 5 inches	
Over-all Height of Chassis	7⅝ inches	
Tuning Drive Ratio	12 to 1	

The 94BK2 is a console model; the 94BT2 a table model. Each of these receivers is a low-drain, battery-operated superheterodyne. The design features include gang-tuned push button coils for single control electric tuning adjustments; magnetite-core i-f transformers and "A" band r-f coils; automatic volume control; and permanent magnet dynamic speaker. Push button electric tuning is provided for four favorite broadcast stations; two additional push-buttons provide dial tuning for "Standard-broadcast" and "Short-wave" bands.

Loudspeaker

Type.......... Permanent Magnet Dynamic
Diameter.......... 94BK2, 8 inches; 94BT2, 6 inches
Voice Coil Impedance (at 400 cycles).......... 94BK2, 3 ohms; 94BT2, 2.2 ohms

Frequency Ranges

Standard Broadcast ("A" Band).......... 540—1,720 kc
Short Wave ("C" Band).......... 5.8—15.4 mc
Four Electric Tuning Positions.......... 550—1,500 kc

One station between approximately 550— 950 kc (Button No. 1)
One station between approximately 610—1,090 kc (Button No. 2)
One station between approximately 750—1,370 kc (Button No. 3)
One station between approximately 845—1,500 kc (Button No. 4)

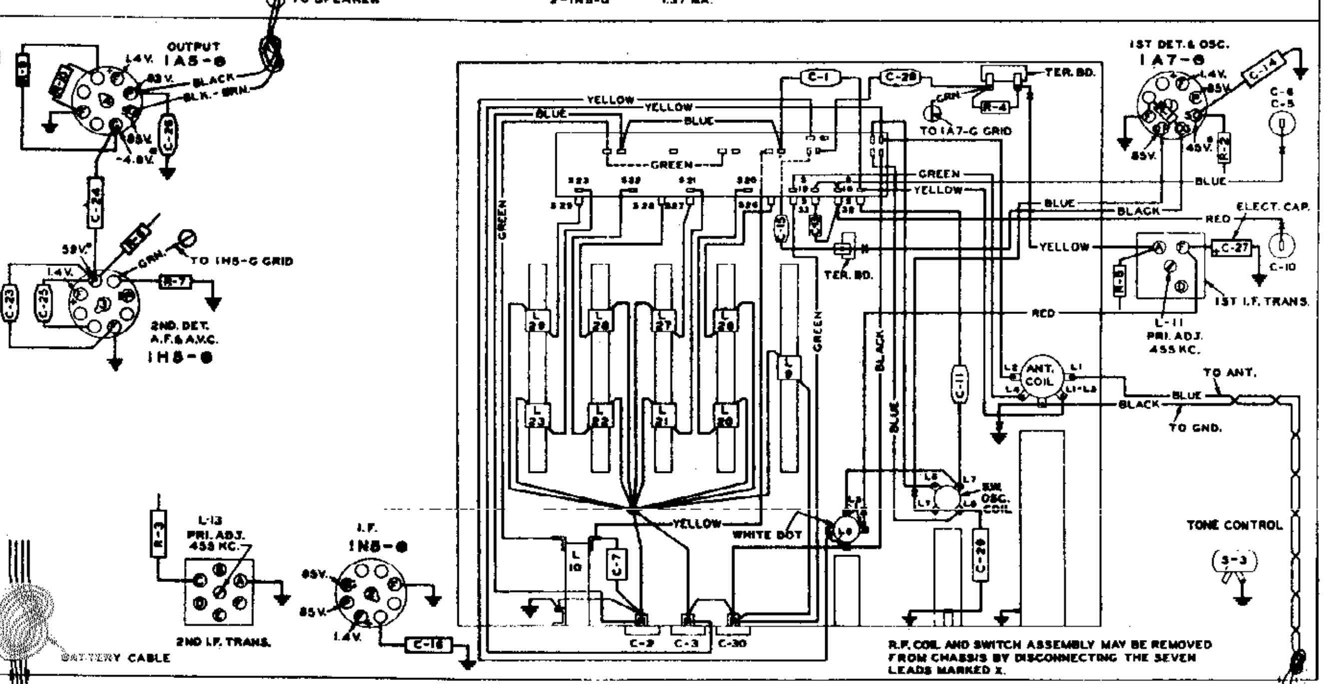
Intermediate Frequency.......... 455 kc

OSCILLOGRAPH CONNECTIONS
VERTICAL "HI" TO THIS TERMINAL
VERTICAL "O" TO CHASSIS

PLATE CURRENTS

1-1A7-G	OSC.	1.20 MA.
	DET.	.49 MA.
2-1N5-G		1.37 MA.
3-1H5-G		.026 MA.
4-1A5-G		3.02 MA.

BATTERY DRAIN
"A" - 0.2 AMP. AT 1.4 VOLTS
"B" - 6.8 MA. AT 90 VOLTS



BOTTOM VIEW - REAR OF CHASSIS

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured value will be lower, depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with rated battery voltage.

MODELS 94BK2,94BT2
Chassis RC-390
Socket,Trimmers,Alignment
Drive Cord Data,Lead Dress

RCA MFG. CO., INC.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the chassis drawing.

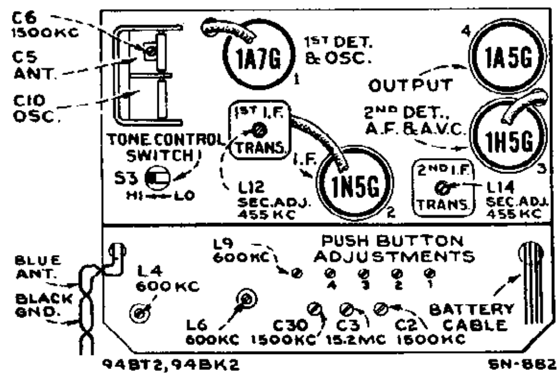
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment".



Tube and Trimmer Locations

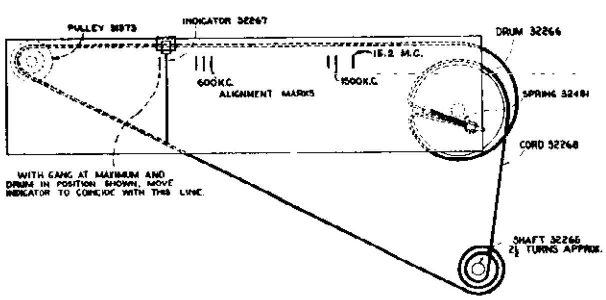
Steps	Connect the High Side of Test Oscillator to:	Tune Test Oscillator to:	Push Button	Turn Radio Dial to:	Adjust for Maximum Peak Output:
1	1N5-G I-F grid cap in series with .01 mfd.	455 kc	B.C. (5)	No Signal between 550—750 kc.	L13 and L14 (2nd I-F Trans.)
2	1A7-G Det. grid cap in series with .01 mfd.	455 kc	B.C. (5)		L11 and L12 (1st I-F Trans.)
3	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	No. 4		L20-L26 (No.4 Push Button Adj.) C2 (ant.)
4	Antenna Lead (blue) in series with 200 mmfd.	600 kc	No. 1		L23-L29 *(No. 1 Push Button Adj.) L6 (osc.)
5	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	No. 4		L20-L26 (No. 4 Push Button Adj.) C2 (ant.)
6	Antenna Lead (blue) in series with 200 mmfd.	600 kc	No. 1		L23-L29 *(No. 1 Push Button Adj.) L6 (osc.)
7	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (5)	1,500 kc Cal. Mark	C30 (osc.) C6 (ant.)
8	Antenna Lead (blue) in series with 200 mmfd.	600 kc	B.C. (5)	600 kc Cal. Mark	L9 (osc.) L4 (ant.)
9	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (5)	1,500 kc Cal. Mark	C30 (osc.) C6 (ant.)
10	Antenna Lead (blue) in series with 300 ohms	15.2 mc	S.W. (6)	Signal Near 15.2 mc Cal. Mark†	**C3 (ant.)
11	Follow the "Adjustments for Electric Tuning."				

* Adjust L23—L29 (No. 1 push button adjustment) and L6 **at the same time**, rocking in for maximum signal.

** Use maximum capacity peak if two peaks can be obtained, rock in for maximum signal. A weaker signal (image) should be received about one-quarter inch to the left on the dial plate.

† If two signals are received, set the dial to the higher frequency (right hand) position.

Note: The oscillator tracks 455 kc above the signal on all bands. After the receiver has been installed and the antenna connected, it is sometimes advisable to make a slight change in the adjustment of the antenna trimmer, C2. In most cases it is desirable to make this adjustment while receiving a station on No. 4 push button. However, if a station received on one of the other buttons is especially weak, it may be advisable to make the adjustment while receiving the weak station on this button.



Dial Drive Hookup and Alignment Marks

Precautionary Lead Dress

1. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.

2. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.

3. Leads to push button coils must be dressed close to the coils.

4. Red and blue leads to gang condenser must be dressed away from chassis.

5. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.

RCA MFG. CO., INC.

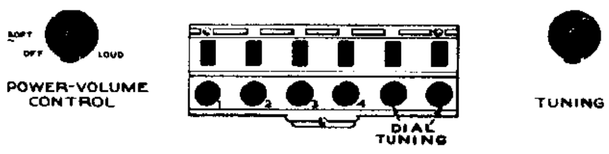
MODELS 94BK2, 94BT2
Chassis RC-390
Tuner Data, Parts

Adjustments for Electric Tuning

These models have six push buttons. The right-hand button connects the receiver for dial tuning on the "Short-wave" band, the next button connects for dial tuning on the "Standard-broadcast" band, and the other four buttons are for electric tuning of four different stations in the standard-broadcast band. Each station button connects separate oscillator and antenna coils which are tandem-tuned by ganged magnetite cores, and may be adjusted for the desired stations. Use a small screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the four desired stations, arranged in order from low to high frequencies.



Location of Controls

2. Push in the broadcast dial-tuning button (second from right), and manually tune in the first station on the list.
3. Push in station button No. 1 (left-hand) and adjust No. 1 push button adjustment to receive this station. Turn the adjusting screw all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust for each of the remaining three stations in the same manner. (Clockwise adjustment of the screw tunes the circuits to lower frequencies.)
5. After installation, and with antenna properly connected, readjust C2 as outlined in Note under "Alignment Procedure."

Miscellaneous Service Data

To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

The push button switch and coil assembly may be removed from the chassis by removing two screws from the front apron, one from the rear apron, removing the 1A7-G grid connector from the grid cap, and disconnecting the seven leads indicated on the Wiring Diagram.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	RECEIVER ASSEMBLIES	
32259	Capacitor—3-section variable trimmer capacitor 2-10, 3-30, 100-330 mmfd. (C30, C3, C2)	.65
30949	Capacitor—56 mmfd. (C17, C18, C19, C20)	.25
12723	Capacitor—56 mmfd. (C1)	.35
30904	Capacitor—100 mmfd. (C21)	.25
12720	Capacitor—100 mmfd. (C23)	.35
12724	Capacitor—120 mmfd. (C7)	.35
12952	Capacitor—330 mmfd. (C15)	.35
30433	Capacitor—470 mmfd. (C28)	.35
32269	Capacitor—520 mmfd. (C13)	.40
14498	Capacitor—680 mmfd. (C25)	.45
12635	Capacitor—1,000 mmfd. (C11, C22, C26)	.50
4881	Capacitor—3,300 mmfd. (C29)	.60
5107	Capacitor—.0025 mfd. (C24)	.20
14393	Capacitor—.01 mfd. (C16)	.30
4839	Capacitor—0.1 mfd. (C14)	.30
31323	Capacitor—16 mfd. (C7)	.65
32254	Coil—Broadcast oscillator coil (L9)	.95
32258	Coil—Antenna coil (L1, L2, L3, L4)	1.20
32260	Coil—Short wave oscillator coil (L7, L8)	.70
32256	Coil—Push button osc. series coil (L10)	.60
32250	Coil—Push button ant. and oscillator coil (L23, L29)	1.15
32251	Coil—Push button ant. and oscillator coil (L22, L28)	1.10
32252	Coil—Push button ant. and oscillator coil (L21, L27)	1.10
32253	Coil—Push button ant. and oscillator coil (L20, L26)	1.10
32257	Coil—Push button osc. shunt coil (L5, L6)	.65
32249	Condenser—2-gang variable condenser (C5, C6, C10)	2.70
32268	Cord—Drive cord	.30
12800	Core—Variable core and stud for antenna coil No. 32258	.35
32266	Drum—Variable condenser drive drum	.45
32267	Indicator—Dial scale pointer	.25
32208	Plug—2-prong male for battery cable	.20
5119	Plug—3-contact female for speaker cable	.25
12827	Plug—3-prong male for battery cable	.20
31373	Pulley—Drive cord pullley	.08
14887	Retainer—Tuning knob shaft retainer or drive cord pulley retaining washer	.01
12262	Resistor—680 ohms, ½ watt (R10)	.20
13715	Resistor—68,000 ohms, ½ watt (R2)	.20
14560	Resistor—100,000 ohms, ½ watt (R1)	.20
13730	Resistor—1 meg., ½ watt (R4, R6)	.20
12679	Resistor—2.2 meg., ½ watt (R9)	.20
13167	Resistor—3.9 meg., ½ watt (R8)	.20
13601	Resistor—10 meg., ½ watt (R3, R7)	.20

STOCK No.	DESCRIPTION	Unit List Price
4669	Screw—No. 8-32 square head set screw from drum	.03
32261	Screw—Push button oscillator coil adjustment screw and mounting nut	.03
32265	Shaft—Tuning knob shaft	.25
32149	Shield—Tube shield	.20
31251	Socket—Tube socket	.25
32481	Spring—Drive cord tension spring	.05
12007	Spring—Retaining spring for oscillator coil adjustment screw	.02
32255	Switch—Push button switch (S18, S19, S20, S21, S22, S23, S26, S27, S28, S29, S32, S33)	2.95
30953	Switch—Tone control switch (S3)	.45
32263	Transformer—First I-F transformer (L11, L12, C17, C18)	2.30
32264	Transformer—Second I-F transformer (L13, L14, C19, C20, C21)	2.50
32262	Volume control and power switch (R5, S1, S2)	1.50
	SPEAKER ASSEMBLIES (84307-2) Model 94BT2	
32271	Cone—Speaker cone and voice coil (L15)	1.70
5118	Plug—3-contact male for speaker	.25
32270	Speaker complete	6.00
32272	Transformer—Output transformer (T1)	1.65
	SPEAKER ASSEMBLIES (84477-1) Model 94BK2	
32274	Cone—Speaker cone and voice coil (L15)	1.80
5118	Plug—3-contact male for speaker	.25
32273	Speaker complete	7.00
32272	Transformer—Output transformer (T1)	1.65
	MISCELLANEOUS ASSEMBLIES	
32279	Button—Push button	.06
31935	Clip—Spring clip to hold dial scale	.10
32276	Dial—Dial scale (glass)	.60
32277	Escutcheon—Dial scale escutcheon and crystal	1.10
32278	Escutcheon—Push button escutcheon	.70
31355	Knob—Station selector or volume control knob	.12
32281	Marker—"Broadcast" marker tab	.02
32067	Marker—Push button call letter markers	.35
32280	Marker—"Short Wave" marker tab	.02
14267	Screw—Chassis mounting screw and washer (4 required), Model 94BT2	.04
30467	Screw—Chassis mounting screw and washer (4 required), Model 94BK2	.05
14270	Spring—Retaining spring for knob	.05

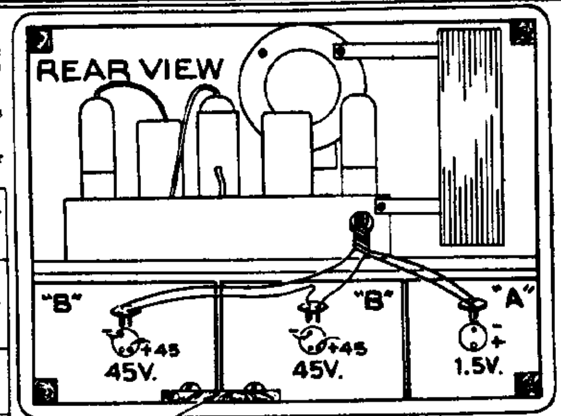
ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

MODELS 94BP61, 94BP62, 94BP64, 94BP66, 94BP80, 94BP81, Chassis RC-407 — RCA MFG. CO., INC. — Schematic, Voltage, Alignment, Socket, Trimmers, Batt. Data, Parts

	Height	Width	Depth
Cabinet Dimensions (inches)	9½	13½	6½

Weight—(Net) less batteries .... 6 pounds
With batteries .... 12½ pounds

Tuning Drive Ratio .... 10 to 1



REMOVE THIS BLOCK-PLACE BATTERIES IN CABINET AS INDICATED

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-407)	
13057	Capacitor—60 mmfd.	.35
12488	Capacitor—250 mmfd.	.35
12952	Capacitor—300 mmfd.	.35
5107	Capacitor—.0025 mfd.	.20
4838	Capacitor—.005 mfd.	.25
32787	Capacitor—.05 mfd.	.30
4839	Capacitor—0.1 mfd.	.30
33303	Capacitor—Electrolytic, 8 mfd.	.50
33055	Coil—Oscillator coil	.70
33080	Condenser—2-gang variable tuning	2.25
32634	Cord—Drive cord	.10
32946	Drum—Drive cord drum	.35
33300	Loop—Complete antenna loop	1.80
32208	Plug—2-contact plug for battery cable	.20
32641	Plug—3-contact male plug for battery cable	.10
14076	Resistor—820 ohms, ½ watt	.20
13715	Resistor—68,000 ohms, ¼ watt	.20
12264	Resistor—220,000 ohms, ¼ watt	.20
13730	Resistor—1 meg., ¼ watt	.20
12679	Resistor—2.2 meg., ¼ watt	.20
13601	Resistor—10 meg., ¼ watt	.20
33305	Shaft—Tuning knob shaft and bushing	.25
32595	Shield—Tube shield—less cap	.15
32537	Socket—Tube socket	.20
30585	Spring—Drive cord spring	.06
33296	Spring—Drive drum retaining spring	.06
33301	Transformer—First i-f transformer	1.20
33302	Transformer—Second i-f transformer	1.40
33304	Volume control and switch	1.50
	SPEAKER ASSEMBLIES (39128-1)	
33058	Speaker complete	4.00
33062	Transformer—Output transformer	1.30
	MISCELLANEOUS ASSEMBLIES	
33310	Dial—Glass dial scale	.30
33311	Escutcheon—Dial scale escutcheon	.45
33006	Feet—Cabinet feet	.03
33376	Handle—Carrying handle—Models 94BP61 94BP62, 94BP64	.55
33377	Handle—Carrying handle—Model 94BP66	.55
33306	Knob—Black tuning knob—Model 94BP66	.15
33308	Knob—Black volume control knob—Model 94BP66	.25
32671	Knob—Tan tuning knob—Models 94BP61, 94BP64, 94BP80	.15
33309	Knob—Tan volume control knob—Models 94BP61, 94BP64, 95BP80	.25
32895	Knob—Walnut tuning knob—Models 94BP62, 94BP81	.15
33307	Knob—Walnut volume control knob—Models 94BP62, 94BP81	.25
33312	Nut—Speed nut to mount dial	.02
31646	Spring—Knob retaining spring	.02

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Frequency Range .... 550-1,720 kc
Intermediate Frequency .... 455 kc

BATTERIES REQUIRED
"A," one 1.5 volt dry plug-type "A," 2½-in. x 2½-in. x 4-in. (Eveready No. 742 or equivalent)
"B," two 45 volt dry plug-type "B," 2½-in. x 4-in. x 5½-in. (Eveready No. 762 or equivalent)

CURRENT CONSUMPTION
"A," 0.24 ampere—"B," 9.0 milliamperes

POWER OUTPUT
Undistorted .... 0.10 watt
Maximum .... 0.21 watt

LOUDSPEAKER
Type .... 4-inch permanent-magnet dynamic
Voice-coil Impedance .... 2 ohms at 400 cycles

Alignment Procedure

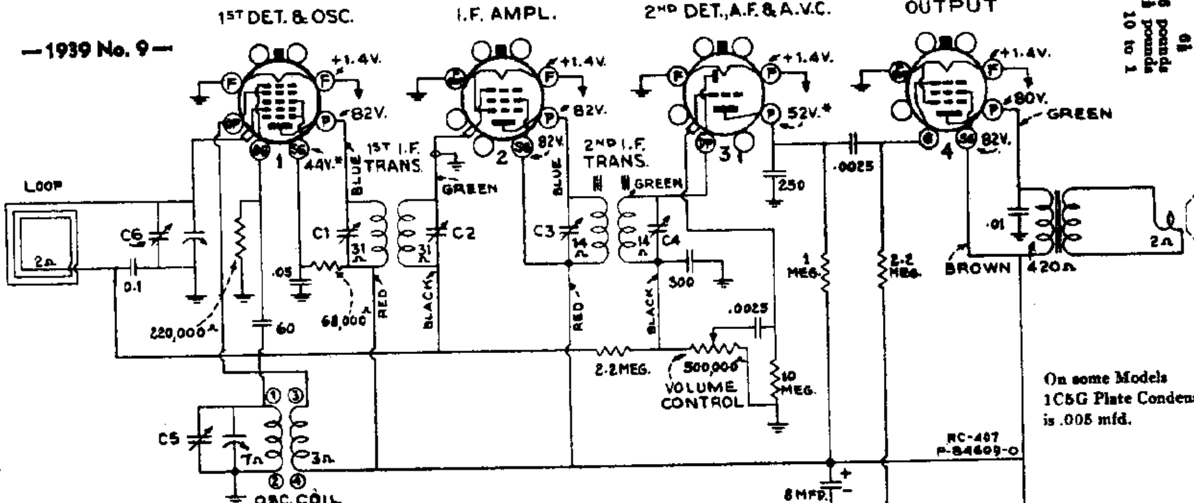
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1A7G 1st-Det. grid cap, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna coil loop by means of one turn of wire placed near loop	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

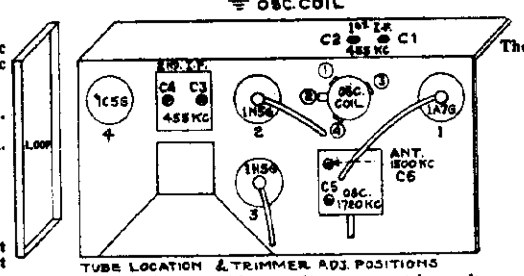
—1939 No. 9—



On some Models 1C5G Plate Condenser is .005 mfd.

The following models comprise the 94BP1 Series—all contain the No. RC-407 chassis.

94BP61 Dark Brown
94BP62 Tan
94BP64 Light Brown
94BP66 Gray
94BP80 Brown Leather
94BP81 Black Leather



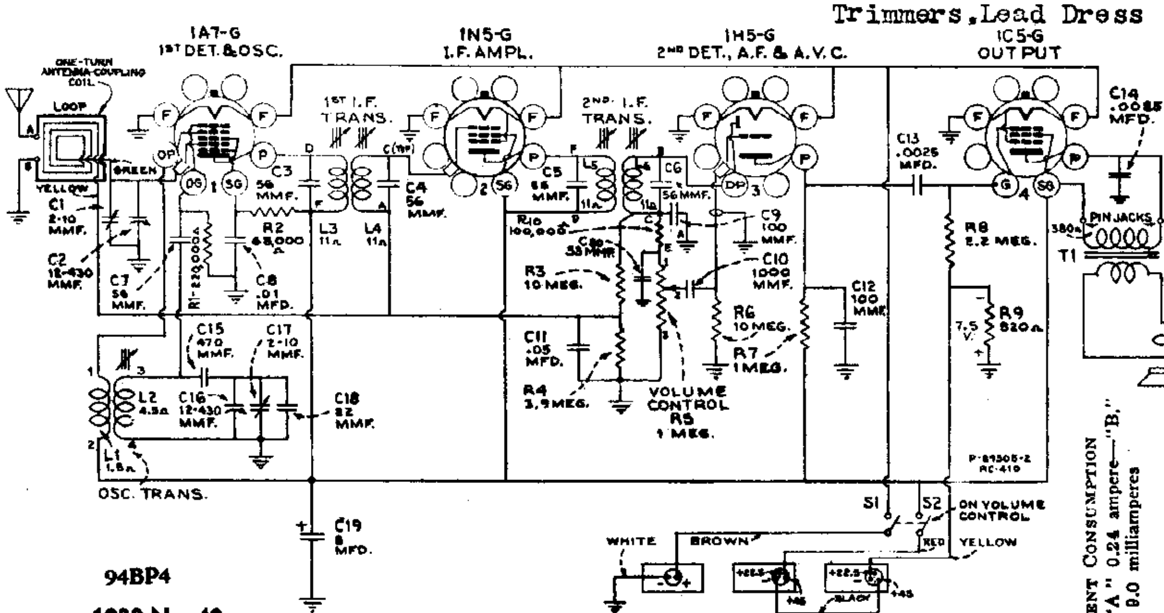
TUBE LOCATION & TRIMMER ADJ. POSITIONS

Note: Values with star (*) are operating voltages. Values not starred are actual measured voltages. Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately ± 20% with rated battery voltage.

RCA MFG. CO., INC.

MODEL 94BP4, Chassis RC-410
Schematic, Voltage, Alignment
Chassis Wiring, Socket
Trimmers, Lead Dress

Frequency Range.......... 550-1,580 kc
Intermediate Frequency.......... 455 kc



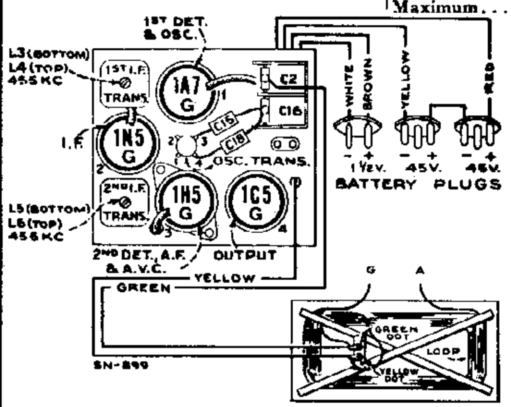
94BP4

—1938 No. 40—

Current Consumption
"A" 0.24 ampere—"B," 9.0 milliamperes

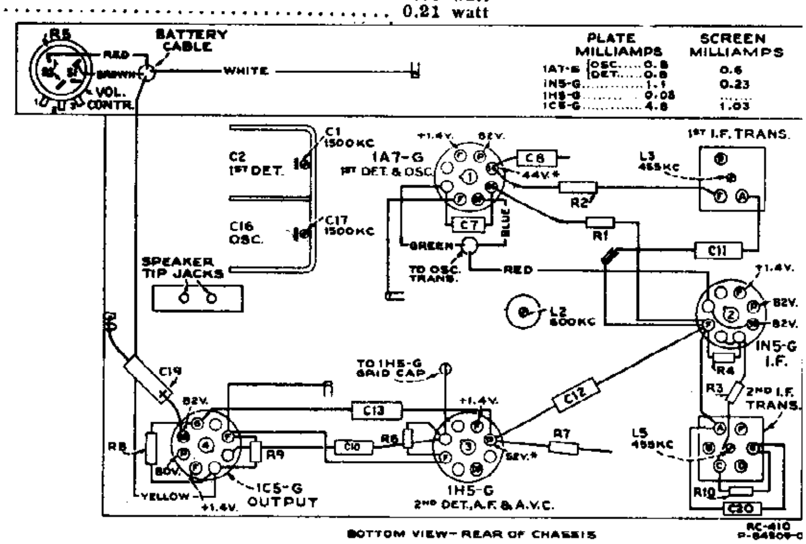
Batteries Required
"A," one 1.5 volt dry plug-type "A," 2½-in. x 2½-in. x 4-in. (No. 742)
"B," two 45 volt dry plug-type "B," 2½-in. x 4-in. x 5½-in. (No. 732)

Power Output
Undistorted.......... 0.10 watt
Maximum.......... 0.21 watt



Tube Location

Note: Values with star (*) are operating voltages. Values not starred are actual measured voltages. Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately ± 20% with rated battery voltage.



R-F Wiring Diagram and Socket Voltages

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Precautionary Lead Dress.—

1. Dress speaker leads down to chassis.
2. The green lead from the loop to the antenna section of the gang should be dressed between the output and detector tube shields and pulled toward the far corner of the loop by means of the rubber band.
3. The spiral shield on the 1st-A.F. grid lead should be brought as close as possible to the grid cap.
4. Leads to the high side and tap of the volume control should be dressed down to the chassis and away from the output tube plate lead.

Antenna.—An antenna and ground may be connected to "A" and "G" at bottom of cabinet. If total length of antenna and lead-in is more than 150 feet, connect a 300 mmf capacitor in series with lead-in.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1N5-G grid cap, in series with .001 mfd.	455 kc	Quiet point between 550-750 kc	L5 and L6 (2nd I-F transformer)
2	1A7-G grid cap, in series with .001 mfd.	455 kc		L3 and L4 (1st I-F transformer)
3	Assemble chassis and batteries in correct position in cabinet, and fasten rear cover (loop) in place while making the following adjustments, which are accessible through holes in the bottom of the cabinet.			
4	Antenna terminal, in series with 200 mfd. Connect low side of test-osc. to "G" term.	1500 kc	1500 kc*	C17 (osc.) C1 (ant.)
5		600 kc	600 kc*	L2 (osc.) Rock in
6	Repeat steps 4 and 5.			

* Use bottom of "1" in "150" for 1500 kc calibration point, and use center of "0" in "60" for 600 kc calibration point.

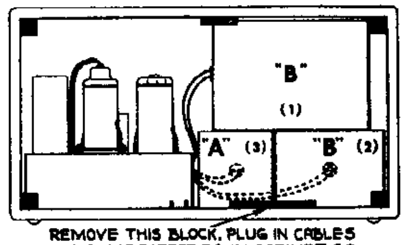
MODELS 94BK1, 94BT1
Chassis RC-333B
MODEL 94BP4, Chassis RC-410
Parts List

RCA MFG. CO., INC.

Model 94BP4

Specifications and Replacement Parts

Battery Arrangement



REMOVE THIS BLOCK, PLUG IN CABLES AND PLACE BATTERIES IN CABINET AS SHOWN, IN THE ORDER INDICATED. REPLACE CLAMPING BLOCK.

LOUDSPEAKER
Type.......................... 5-inch permanent-magnet dynamic
Voice-coil Impedance.................. 2.2 ohms at 400 cycles

	Height	Width	Depth
Cabinet Dimensions (inches)..............	7¾	14	8¼
Chassis Base Dimensions (inches)..........	2	7½	5¾

Over-all Chassis Height.................................. 6½ inches
Weight—Shipping weight, less batteries.............. 12½ pounds
Net weight, with batteries.................. 16 pounds
Tuning Drive Ratio................................ 8 to 1

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-410)	
32592	Bracket—Dial bracket	.15
12607	Cap—Shield cap for first i.f. transformer	.20
12581	Cap—Shield cap for second i.f. transformer	.25
32598	Cap—Shield cap for 1H5G	.06
32596	Cap—Tube shield cap	.06
14021	Capacitor—22 mmfd. (C18)	.35
12948	Capacitor—33 mmfd. (C20)	.35
30949	Capacitor—56 mmfd. (C3, C4, C5, C6)	.25
12723	Capacitor—56 mmfd. (C7)	.35
30904	Capacitor—100 mmfd. (C9)	.25
12720	Capacitor—100 mmfd. (C12)	.35
30433	Capacitor—470 mmfd. (C15)	.35
12635	Capacitor—1,000 mmfd. (C10)	.50
5107	Capacitor—.0025 mfd. (C13, C14)	.20
14393	Capacitor—.01 mfd. (C8)	.30
4886	Capacitor—.05 mfd. (C11)	.20
32187	Capacitor—8 mfd., 150 volts (C19)	.65
32148	Coil—Oscillator coil (L1, L2)	.90
32591	Condenser—2-gang variable (C1, C2, C16, C17)	2.50
32634	Cord—Condenser and pointer drive cord	.10
32593	Dial—Dial scale	.55
30701	Drum—Drive cord drum	.40
32605	Indicator—Dial indicator pointer	.30
32208	Plug—2-contact male for "A" leads	.20
32641	Plug—3-contact male for "B" leads	.10
14076	Resistor—820 ohms, ½ watt (R9)	.20
13715	Resistor—68,000 ohms, ½ watt (R2)	.20
14560	Resistor—100,000 ohms, ½ watt (R10)	.20
12264	Resistor—220,000 ohms, ½ watt (R1)	.20
13730	Resistor—1 meg., ½ watt (R7)	.20

STOCK No.	DESCRIPTION	Unit List Price
12679	Resistor—2.2 meg., ½ watt (R8)	.20
13167	Resistor—3.9 meg., ½ watt (R4)	.20
13601	Resistor—10 meg., ½ watt (R3, R6)	.20
14887	Retainer—Tuning knob shaft retainer	.01
4669	Screw No. 8-32 x ⅛ set screw for drum, Stock No. 30701	.03
32609	Shaft—Dial pointer shaft and pulley	.15
32597	Shaft—Tuning knob shaft	.15
32595	Shield—Tube shield—less cap	.15
31251	Socket—Tube socket	4.10
30956	Socket—2-contact female	.30
14191	Spring—Condenser drive cord spring	.04
30631	Spring—Pointer drive cord spring	.03
32263	Transformer—First i.f. transformer (L3, L4, C3, C4)	2.30
32264	Transformer—Second i.f. transformer (L5, L6, C5, C6, C9)	2.50
32594	Volume control and switch (R5, S1, S2)	1.50
	MISCELLANEOUS ASSEMBLIES	
32602	Bezel—Dial bezel and crystal	1.20
32163	Cone—Speaker cone and voice coil (L7)	2.20
32600	Escutcheon—Knob escutcheon	.35
32603	Grille—Speaker grille and screen	.20
32633	Handle—Carrying handle	.90
11610	Knob—Volume control or tuning knob	.30
32604	Loop—Antenna loop complete	3.10
32601	Retainer—Knob escutcheon retainer	.05
32162	Speaker complete	5.30
11349	Spring—Knob retaining spring	.05
32164	Transformer—Output transformer (T1)	1.15

94BK1, 94BT1

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	RECEIVER ASSEMBLIES	
12629	Capacitor—56 mmfd. (C6)	.35
12723	Capacitor—56 mmfd. (C13)	.35
14262	Capacitor—110 mmfd. (C5)	.30
12404	Capacitor—120 mmfd. (C7, C8)	.30
12725	Capacitor—150 mmfd. (C11)	.35
14712	Capacitor—180 mmfd. (C9)	.30
30433	Capacitor—430 mmfd. (C17)	.35
5148	Capacitor—.007 mfd. (C12)	.20
14393	Capacitor—.01 mfd. (C4, C10, C19)	.30
4839	Capacitor—0.1 mfd. (C1)	.30
32187	Capacitor—8 mfd. (C18)	.65
32150	Coil—Antenna coil (L1, L2)	1.15
32148	Coil—Oscillator coil (L3, L4)	.90
32147	Condenser—2-gang variable tuning condenser (C2, C3, C14, C15, C16)	2.40
30877	Cord—Drive cord	.20
30905	Core—Adjustable core for I.F. transformers	.35
32186	Dial—Dial scale, plate, and brackets assembled	.55
30701	Drum—Tuning condenser drive cord drum with set screw	.40
14635	Indicator—Station selector indicator pointer	.20
32208	Plug—2-prong male plug for battery cable	.20
12827	Plug—3-prong male plug for battery cable	.20
14076	Resistor—820 ohms, ½ watt (R9)	.20
14284	Resistor—22,000 ohms, 1/10 watt (R3)	.15
13715	Resistor—68,000 ohms, ½ watt (R1)	.20
12264	Resistor—220,000 ohms, ½ watt (R10)	.20
13730	Resistor—1 meg., ½ watt (R4, R6)	.20
12679	Resistor—2.2 meg., ½ watt (R2, R7, R8)	.20
14887	Retainer—Retainer for knob shaft	.01

STOCK No.	DESCRIPTION	Unit List Price
30952	Shaft—Station selector knob shaft	.25
32149	Shield—Tube shield	.20
11196	Socket—Tube socket	.25
30956	Socket—Speaker socket	.30
14191	Spring—Drive cord tension spring	.04
14261	Transformer—First I.F. (L5, L6, C5, C6)	2.05
14308	Transformer—Second I.F. (L7, L8, C7, C8, C9, R3)	2.90
30947	Volume control and on-off switch (R5, S1, S2)	1.50
	SPEAKER ASSEMBLIES Model 94BT1 (Speaker 84226-3)	
32163	Cone—Speaker cone and voice coil (L9)	2.20
32162	Speaker—Complete	5.30
32164	Transformer—Output transformer (T1)	1.15
	SPEAKER ASSEMBLIES Model 94BK1 (Speaker 84145-2)	
30973	Cone—Speaker cone and voice coil (L9)	2.25
30972	Speaker—Complete	6.30
30974	Transformer—Output transformer (T1)	1.90
	MISCELLANEOUS ASSEMBLIES	
30975	Crystal—Station selector celluloid crystal	.45
31355	Knob—Tuning or volume control knob	.12
30308	Screw—Chassis mounting screw and washer—(94BT1 only) 4 required	.07
30467	Screw—Chassis mounting screw and washer—(94BK1 only) 4 required	.05
14270	Spring—Retaining spring for knob	.05

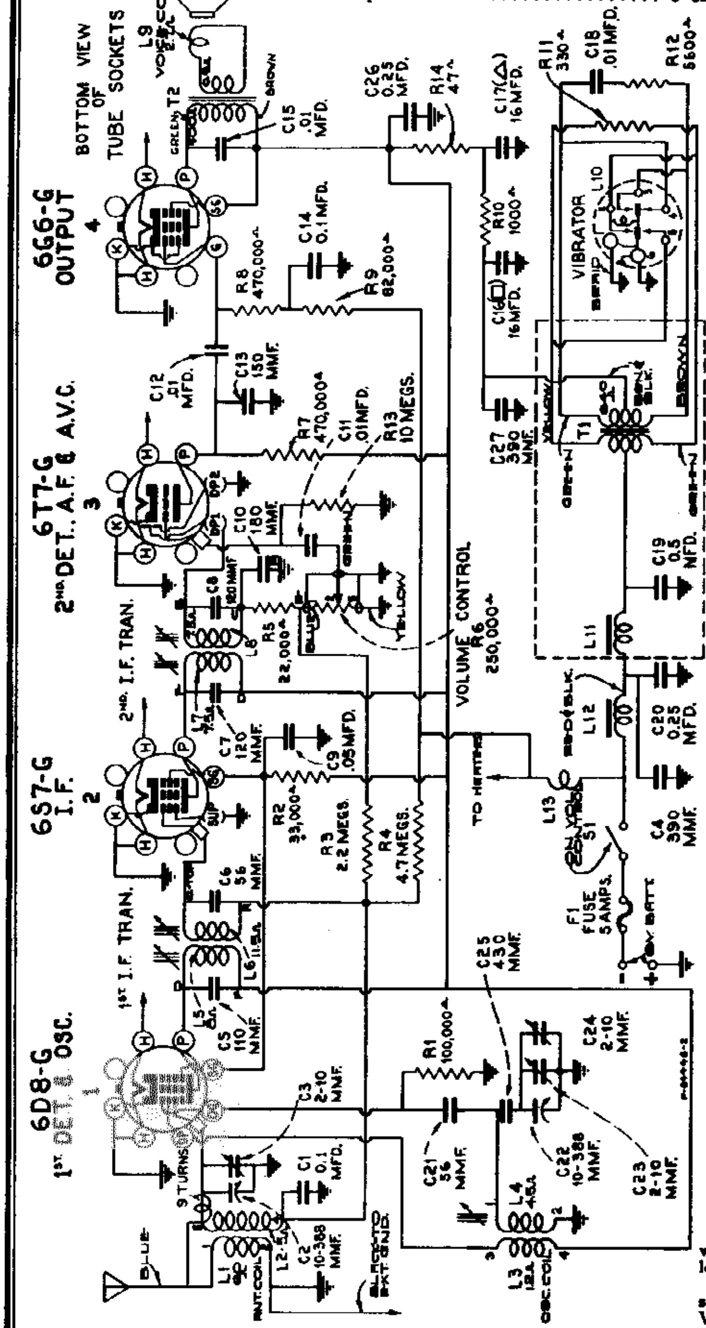
ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

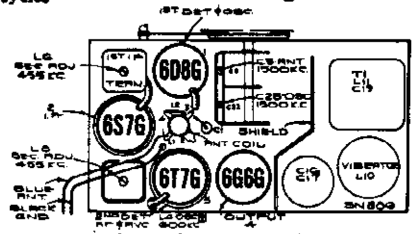
MODEL 94BT61, Chassis RC-333(
Schematic, Voltage, Alignment
Socket, Trimmers,
Chassis Wiring

RCA MFG. CO., INC.

—1938 No. 35—

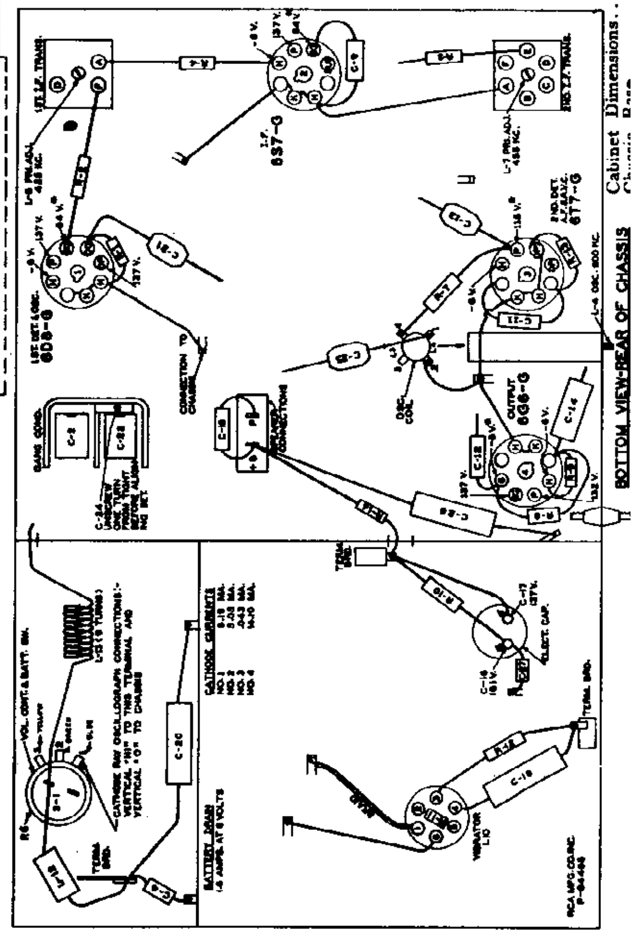
Loudspeaker
Type .... 5-inch Permanent Magnet Dynamic
Voice-coil Impedance .... 3 ohms at 400 cycles





Tube and Trimmer Locations

Cabinet Dimensions.. Height 12⅞ in. Width 10⅜ in. Depth 6⅞ in.



Socket Voltages and Location of Parts

* **NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with the set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with 6 volts "A."

Frequency Range .... 540 to 1,720 kc
R-F Alignment Frequencies .... 600 kc (osc.), 1,500 kc (osc., ant.)
Intermediate Frequency .... 455 kc

Cathode-ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Battery Required
6-volt Storage "A" Battery.

Current Consumption
At 6 volts, 1.6 amperes.

Power Output (6 volts "A")
Undistorted .... 0.45 watt
Maximum .... 0.8 watt

Alignment Procedure

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	6S7-G I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F transformer)
No. 2	6D8-G 1st-det. grid cap, in series with .01 mfd.	455 kc		L5 and L6 (1st I-F transformer)
No. 3	Antenna lead, in series with 200 mmfd.	600 kc	600 kc	L4 (oscillator)
No. 4	Antenna lead, in series with 200 mmfd.	1,500 kc	1,500 kc	C23† (oscillator) C3 (antenna)

† Adjust C24 on gang condenser to one complete turn from tight before adjusting C23.

RCA MFG. CO., INC.

MODELS 96BK6 and 96BT6

Chassis No. RC-392 Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the chassis drawing.

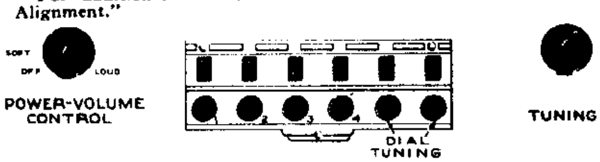
Output Meter Alignment.—If this method is used, connect the output meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

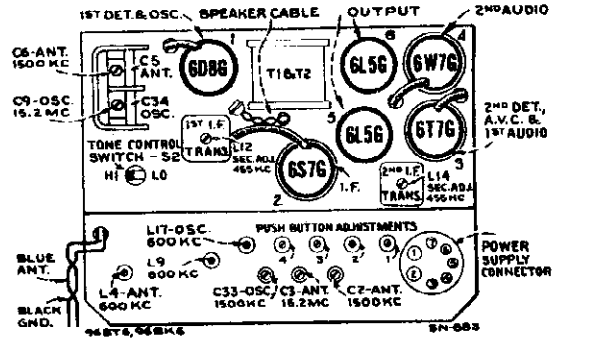
Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment."



Location of Controls



Tube and Trimmer Locations

Miscellaneous Service Data

To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

The push button switch and coil assembly may be removed from the chassis by removing two screws from the front apron, one from the rear apron, removing the 6D8-G grid connector from the grid cap, and disconnecting the seven leads indicated on the Wiring Diagram.

MODEL 94BT61 Chassis No. RC-333-C

Precautionary Lead Dress

1. Capacitors C20 and C26 must be grounded with as short a lead as possible. C4 and C27 are soldered direct (no leads).

2. The "A" supply choke (L13) must be dressed clear of chassis. The H.V. secondary leads (brown and green), C18, and R12 must be dressed clear of the chassis and away from other leads.

3. The H.V. secondary mid-tap (brown-black) lead, and the brown lead from L13 to 6G6-G filament must be dressed close to the chassis and away from other parts.

4. The lead from the antenna coil (L1 and L2) to the gang must be 9 turns and kept clear of the rotor.

5. The I-F plate lead (blue) must be dressed close along edge of chassis.

6. R10 must be wired with body as close to terminal board as possible.

Battery Charger Connections.—The positive side of the 6-volt "A" circuit is connected to the receiver chassis, and the chassis is normally grounded. If the charger has a ground on the negative side, the ground should be removed, or changed to the positive. Do not change the length of the leads from the receiver to the battery.

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	RECEIVER ASSEMBLIES	
30959	Cable—Battery cable complete	1.35
30967	Cable—Shielded volume control cable	.45
12581	Cap—Second I.F. transformer shield cap	.25
12629	Capacitor—56 mmfd. (C6)	.35
12723	Capacitor—56 mmfd. (C21)	.35
14262	Capacitor—110 mmfd. (C5)	.30
12404	Capacitor—120 mmfd. (C7, C8)	.30
12725	Capacitor—150 mmfd. (C13)	.35
14712	Capacitor—180 mmfd. (C10)	.30
13894	Capacitor—390 mmfd. (C4, C27)	.35
30433	Capacitor—430 mmfd. (C25)	.35
14393	Capacitor—.01 mfd. (C11, C12, C15)	.30
4937	Capacitor—.01 mfd. (C18)	.25
30882	Capacitor—.05 mfd. (C9)	.20
30899	Capacitor—0.1 mfd. (C1, C14)	.30
30965	Capacitor—0.25 mfd. (C20, C26)	.30
32152	Capacitor—Comprising 2 sections each 15 mfd. (C16, C17)	1.05
30968	Coil—"A" filter choke coil (L12)	.55
30950	Coil—Antenna coil (L1, L2)	1.10
32148	Coil—Oscillator coil (L3, L4)	.90
32147	Condenser—2-gang variable tuning condenser (C2, C3, C22, C23, C24)	2.40
30877	Cord—Drive cord	.20
30905	Core—Adjustable core for I.F. transformers	.35
14289	Clips—Battery clips—1 marked "+" and 1 unmarked	.30
32186	Dial—Dial scale, plate, and brackets assembled	.55
30701	Drum—Tuning condenser drive cord drum with set screw	.40
5140	Fuse—Battery cable fuse (F1)	.10
14635	Indicator—Station selector indicator pointer	.20
12848	Resistor—47 ohms, ½ watt (R14)	.20
8063	Resistor—330 ohms, ½ watt (R11)	.20
30152	Resistor—1,000 ohms, 1 watt (R10)	.22
30734	Resistor—5,600 ohms, ½ watt (R12)	.20

STOCK No.	DESCRIPTION	Unit List Price
14284	Resistor—22,000 ohms, 1/10 watt (R5)	.15
12454	Resistor—33,000 ohms, ½ watt (R2)	.20
14023	Resistor—82,000 ohms, ½ watt (R9)	.20
14560	Resistor—100,000 ohms, ½ watt (R1)	.20
12285	Resistor—470,000 ohms, ½ watt (R7, R8)	.20
12679	Resistor—2.2 meg., ½ watt (R3)	.20
30271	Resistor—4.7 meg., ½ watt (R4)	.20
13601	Resistor—10 meg., ½ watt (R13)	.20
14887	Retainer—Retainer for knob shaft	.01
30952	Shaft—Station selector knob shaft	.25
3682	Shield—Tube shield	.22
31251	Socket—Tube socket	.25
30956	Socket—Speaker socket	.30
14312	Socket—Vibrator socket	.25
14191	Spring—Drive cord tension spring	.04
14261	Transformer—First I.F. transformer (L5, L6, C5, C6)	2.05
14308	Transformer—Second I.F. transformer (L7, L8, C7, C8, C10, R5)	2.90
32151	Transformer—Vibrator transformer (T1, L11 C19)	4.10
14309	Vibrator—Plug in vibrator (L10)	4.25
30958	Volume control and on-off switch (R6, S1)	1.50
	SPEAKER ASSEMBLIES (Speaker 84226-3)	
32163	Cone—Speaker cone and voice coil (L9)	2.20
32162	Speaker complete	5.30
32164	Transformer—Output transformer (T2)	1.15
	MISCELLANEOUS ASSEMBLIES	
30975	Crystal—Station selector celluloid crystal	.45
31355	Knob—Tuning or volume control knob	.12
30308	Screw—Chassis mounting screw and washer—4 required	.07
14270	Spring—Retaining spring for knob, Stock No. 31355	.05

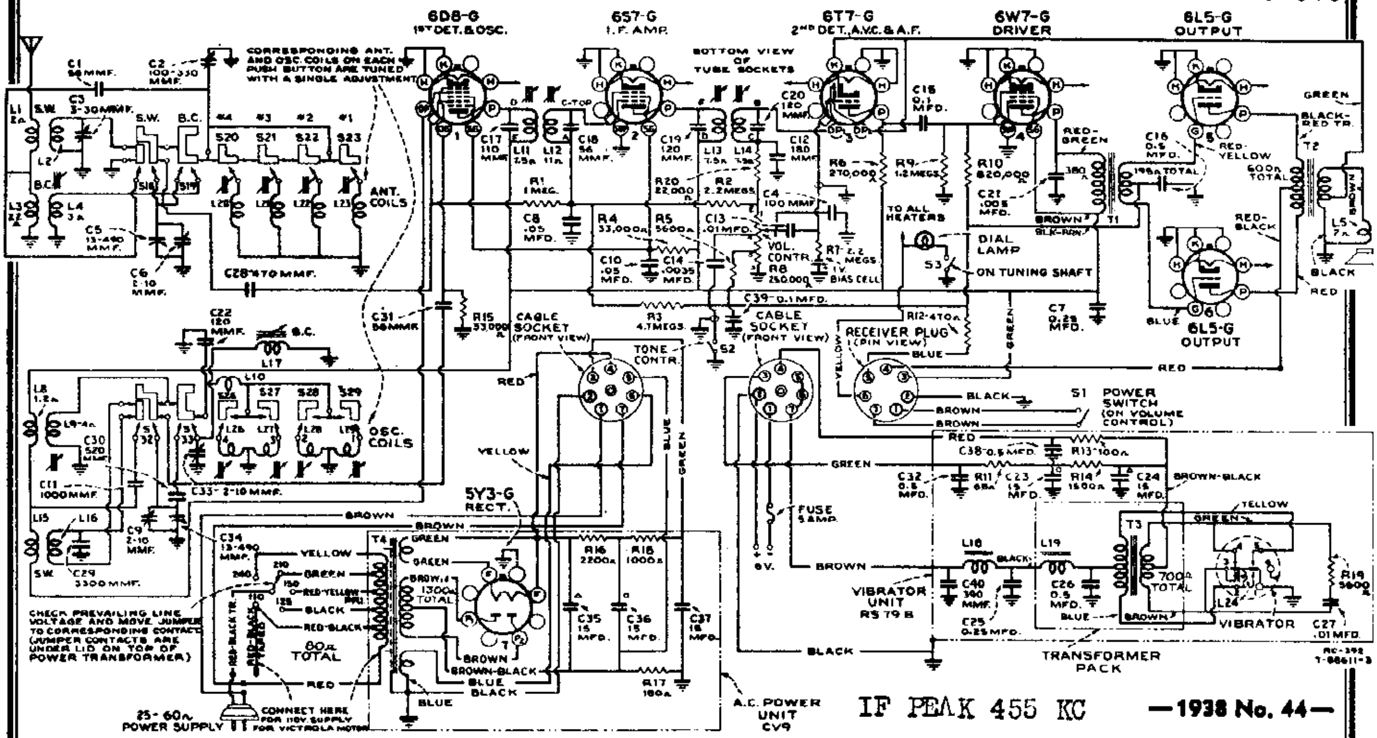
Over-all Chassis Height . . . . 6¾ in.
Weight . . . . 11½ lbs. net, 14 lbs. shipping

Operating Controls . . . . . . (1) Power Switch—Volume; (2) Tuning
Tuning Drive Ratio . . . . 8 to 1

Schematic, Tuner Data

RCA MFG. CO., INC.

MODELS 96BK6, 96BT6
Chassis RC-392
MODEL CV-9 A-C S.P.U.



IF PEAK 455 KC

—1938 No. 44—

Schematic Circuit Diagram for Models 96BK6, 96BT6 and CV-9 A-C Power Unit

Frequency Ranges

Standard Broadcast ("A" Band)	540—1,720 kc
Short Wave ("C" Band)	5.8—18 mc
Four Electric Tuning Positions	550—1,500 kc
One station between approximately 550— 950 kc (Button No. 1)	
One station between approximately 610—1,090 kc (Button No. 2)	
One station between approximately 750—1,370 kc (Button No. 3)	
One station between approximately 845—1,500 kc (Button No. 4)	
Intermediate Frequency	455 kc

Power Supply Ratings

With CV-9 a-c power supply unit:
100-130/140-160/195-250 volts, 25-60 cycles, 45 watts

With RS-79B d-c power supply unit:
6.3 volts; total current drain 1.85 amps.

Power Output

	Undistorted	Maximum
With a-c power unit	2.2 watts	3.5 watts
With d-c power unit	1.7 watts	2.2 watts

Loudspeaker

Type	Permanent Magnet Dynamic
Voice Coil Impedance	2.2 ohms at 400 cycles
Diameter	96BK6, 8 inches; 96BT6, 6 inches

	Model 96BT6	Model 96BK6
Height	10½ inches	39½ inches
Width	20¾ inches	26 inches
Depth	9⅝ inches	12⅝ inches
Net Weight	17½ pounds	21 pounds
Shipping Weight	46 pounds	61 pounds
Chassis Base Dimensions	3 inches x 11½ inches x 5 inches	
Over-all Height of Chassis	7⅛ inches	
Tuning Drive Ratio	12 to 1	

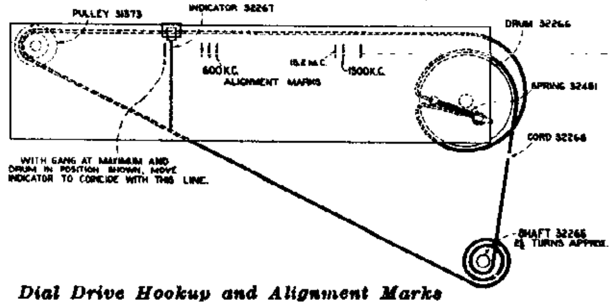
The 96BK6 is a console model, the 96BT6 a table model. Each of these receivers is a super-sensitive, six-tube superheterodyne.

Adjustment for Electric Tuning

These models have six push buttons. The right-hand button connects the receiver for dial tuning on the "Short-wave" band, the next button connects for dial tuning on the "Standard-broadcast" band, and the other four buttons are for electric tuning of four different stations in the standard-broadcast band. Each station button connects separate oscillator and antenna coils which are tuned by ganged magnetite cores, and may be adjusted for the desired stations. Use a small screw-driver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use the regular antenna for all adjustments.

The procedure is as follows:

1. Make a list of the four desired stations, arranged in order from low to high frequencies.
2. Push in the broadcast dial-tuning button (second from right), and manually tune in the first station on the list.
3. Push in station button No. 1 (left-hand) and adjust No. 1 push button adjustment to receive this station. Turn the adjusting screw all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust for each of the remaining three stations in the same manner. (Clockwise adjustment of the screw tunes the circuits to lower frequencies.)
5. After installation, and with antenna properly connected, re-adjust C2 as outlined in note under "Alignment Procedure."



Dial Drive Hookup and Alignment Marks

Power Supply Units

The receiver chassis has a seven-prong male plug for connection to the power-supply unit. Both a-c and d-c power supply units are available, as listed under "Power Supply Ratings." The receivers are shipped with a d-c power unit for use with a 6-volt supply. If an a-c unit is desired, it must be purchased separately as Model CV-9.

If no receiver chassis is available the a-c unit (CV-9) may be tested for proper operation by connecting a 6,500-ohm, 10-watt resistor between terminals 2 and 4 on the cable socket, and shorting terminals 1 and 7. With one voltmeter prod on terminals 2 (ground) the following readings should be obtained: terminal 3, + 200 volts d.c.; terminal 4, + 200 volts d.c.; terminal 5, —5.9 volts d.c.; terminal 6, 6.5 volts a.c. Values should be within ± 20% with rated supply voltage.

Precautionary Lead Dress.—

1. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.
2. Leads to push button coils must be dressed close to the coils.
3. Red and blue leads to gang condenser must be dressed away from chassis.
4. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.
5. Bias cell must be installed with carbon disc connected to chassis.
6. Leads from power switch to connector plug must be dressed away from other leads.
7. Parts under push button coils must be dressed down away from them.
8. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.

MODELS 96BK6, 96BT6
Chassis RC-392

RCA MFG. CO., INC.

Alignment, Voltage
Chassis Wiring

Steps	Connect the High Side of Test Oscillator to:	Tune Test Oscillator To:	Press Push Button:	Turn Radio Dial to:	Adjust for Maximum Peak Output:
1	6S7-G I-F grid cap in series with .01 mfd.	455 kc	B.C. (No. 5)	No Station Point between 550—750 kc.	L13 and L14 (2nd I-F Trans.)
2	6D8-G Det. grid cap in series with .01 mfd.	455 kc	B.C. (No. 5)		L11 and L12 (1st I-F Trans.)
3	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	No. 4		L20-L26 (No. 4 Push Button Adj.) C2 (ant.)
4	Antenna Lead (blue) in series with 200 mmfd.	600 kc	No. 1		L23-L29 * (No. 1 Push Button Adj.) L9 (osc.)
5	Repeat steps 3 and 4 until maximum signal is obtained.				
6	Unscrew C9 (osc.) to minimum capacity.				
7	Antenna Lead (blue) in series with 200 mmfd.	600 kc	B.C. (No. 5)	600 kc Calibration Mark	L17 (osc.) ** L4 (ant.)
8	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (No. 5)	1,500 kc Calibration Mark	C33 (osc.) C6 (ant.)
9	Repeat steps 7 and 8 until maximum signal is obtained.				
10	Antenna Lead (blue) in series with 300 ohms	15.2 mc	S.W. (No. 6)	15.2 mc Calibration Mark	C9 (osc.) † C3 (ant.) ††
11	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (No. 5)	1,500 kc Calibration Mark	C33 (osc.)
12	Follow the "Adjustments for Electric Tuning."				

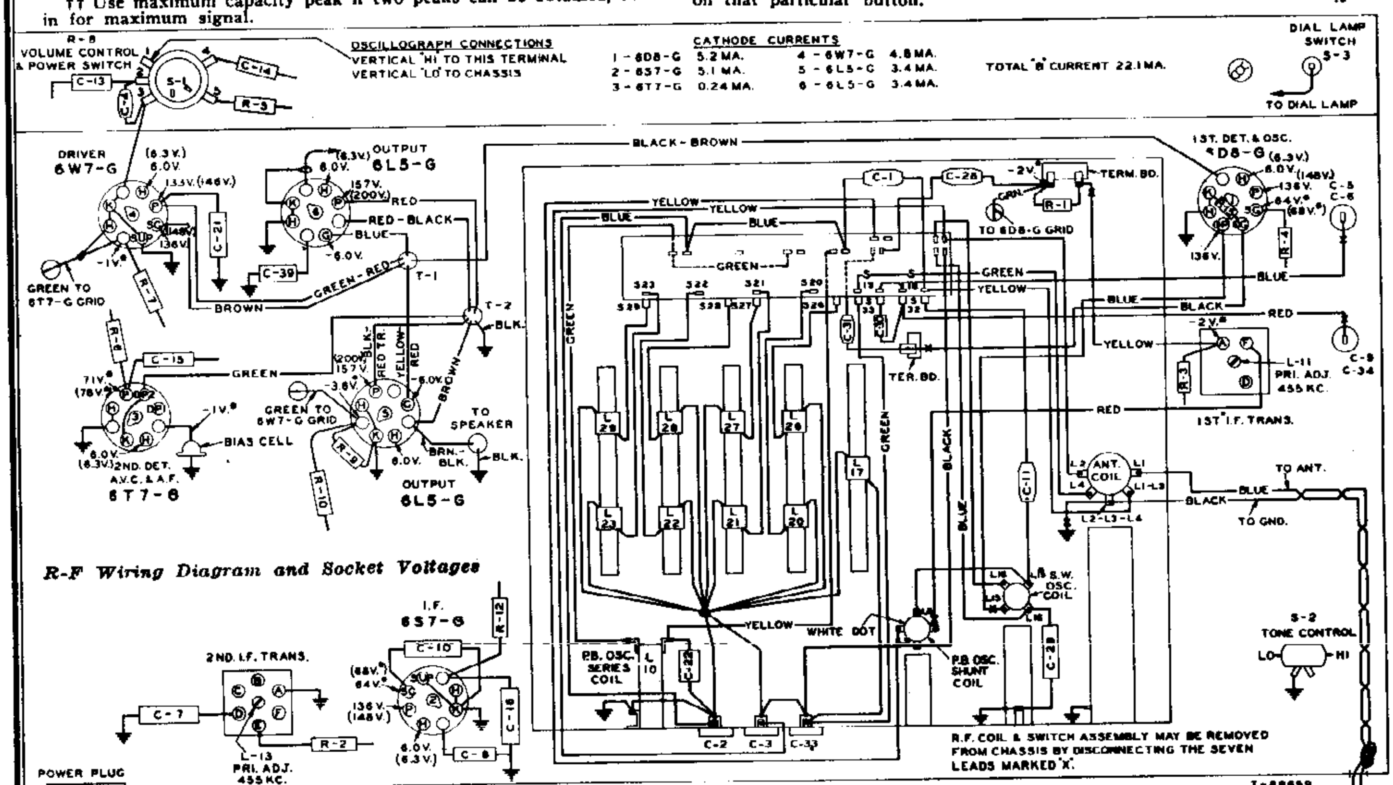
* Adjust L23-L29 (No. 1 push button adjustment) and L9 at the same time, rocking in for maximum signal.

** Turn L17 adjusting screw all the way out, then turn in slowly until a peak is reached. If two peaks can be obtained the lower inductance setting (screw out) should be used.

† Use minimum capacity peak if two peaks can be obtained. A weaker signal (image) should be received about one quarter inch to the left on the dial plate.

†† Use maximum capacity peak if two peaks can be obtained, rock in for maximum signal.

Note: The oscillator tracks 455 kc above the signal on all bands. After the receiver has been installed and the antenna connected, it is advisable to make a slight change in the adjustment of the antenna trimmer, C2. In most cases it is desirable to make this adjustment while receiving a station on No. 4 push button. However, if a station received on one of the other buttons is especially weak, it may be advisable to make the adjustment while receiving the weak station on that particular button.



R-F Wiring Diagram and Socket Voltages

BOTTOM VIEW - REAR OF CHASSIS

Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with rated supply voltage.

* Note: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured values will be lower, depending on the voltmeter loading.

Bracketed voltages ( ) refer to operation with CV-9 a-c power unit.

MODELS 96BK6, 96BT6
MODELS 96E2, 96K5, 96K6, 96T7, 97K2, 97T2
Parts Lists

RCA MFG. CO., INC.

Models 96E2 96K5 96K6 96T7 97K2 97T2

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
14517	Board—Antenna ground terminal board	.25
30752	Bracket—Magic Eye bracket and holder—Models 97T2 and 97K2	.25
32670	Bracket—Dial color plate and lamp brackets	.75
32684	Cable—Indicator drive cable	.90
30766	Cap—Magic Eye cap	.15
12110	Cap—Tube shield cap	.14
31400	Capacitor—Triple adjustable trimmer two sections 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25)	.60
12722	Capacitor—18 mmfd. (C1)	.35
32456	Capacitor—Antenna trimmer capacitor bank (C31, C32, C33, C34, C35, C36)	1.40
12946	Capacitor—33 mmfd. (C3)	.35
12720	Capacitor—100 mmfd. (C42)	.35
14262	Capacitor—109 mmfd. (C5, C6)	.30
12724	Capacitor—120 mmfd. (C12)	.35
12404	Capacitor—120 mmfd. (C7, C8)	.30
14712	Capacitor—180 mmfd. (C37)	.30
30433	Capacitor—470 mmfd. (C2)	.35
32492	Capacitor—630 mmfd. (C24)	.40
31436	Capacitor—750 mmfd. (C26)	.40
31403	Capacitor—3300 mmfd. (C22)	.60
31405	Capacitor—6000 mmfd. (C27)	.75
5107	Capacitor—.0025 mfd. (C13)	.30
4838	Capacitor—.005 mfd. (C14, C17)	.25
14393	Capacitor—.01 mfd. (C10)	.30
4839	Capacitor—0.1 mfd. (C18, C39)	.30
11316	Capacitor—.015 mfd. (C11)	.30
4886	Capacitor—.05 mfd. (C9)	.20
32485	Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41)	1.75
31382	Clip—Oscillator coil and core mounting clip	.04
32493	Coil—Antenna coil—A, B, and C bands (L1, L2, L3, L43)	1.35
31951	Coil—Oscillator coil—A, B, and C bands (L4, L5, L6, L7, L8, L9)	1.40
31383	Coil—Oscillator coil—A band (L41, L42)	.30
32487	Coil—Oscillator coil—A band (L39, L40)	.35
31385	Coil—Oscillator coil—A band (L37, L38)	.30
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30)	2.85
32668	Control—Volume control, tone control, and on-off switch (R6, R13, S3)	3.00
32534	Cord—Indicator pointer and variable condenser drum drive cord	.10
30905	Core—Adjustable core and stud for i-f transformer	.35
31388	Core—Adjustable core and stud for oscillator coil Stock Nos. 31383 and 31385	.15
18800	Core—Adjustable core and stud for oscillator coil Stock No. 32487	.35
31372	Drum—Variable condenser drive cord drum and calibrator dial	.85
32552	Indicator—Dial pointer and clip	.30
11891	Lamp—Dial or Electric Tuning indicator lamp	.17
5045	Plug—4-contact female plug for speaker cable	.30
31373	Pulley—Indicator drive cord pulley	.08
14671	Resistor—33 ohms, ½ watt (R11)	.20
31388	Resistor—390 ohms, 1 watt (R12)	.22
31389	Resistor—12,000 ohms, wire wound, 5 watts (R14)	.50
30151	Resistor—15,000 ohms, 1 watt (R17)	.22
14284	Resistor—22,000 ohms, 1/10 watt (R4)	.15
12738	Resistor—47,000 ohms, ½ watt (R7)	.20
12454	Resistor—33,000 ohms, ½ watt (R2)	.20
14560	Resistor—300,000 ohms, ½ watt (R10)	.20
11392	Resistor—220,000 ohms, 1/10 watt (R5)	.15
12199	Resistor—270,000 ohms, ½ watt (R3)	.20
12286	Resistor—470,000 ohms, ½ watt (R9)	.20
12913	Resistor—1 meg., 1/10 watt (R16) Models 97T2 and 97K2	.15
13730	Resistor—1 meg., ½ watt (R1)	.20
12679	Resistor—2.2 meg., ½ watt (R8)	.20
14343	Retainer—Retaining spring for station selector knob shaft	.03
14367	Retainer—Drive cord pulley retainer	.01
4669	Screw—No. 8-32 square head set screw for drum Stock No. 31372	.03
32671	Shaft—Station selector knob shaft and pulley	.36
31199	Shield—Electric tuning lamp shield	.04
31364	Socket—Dial lamp socket	.26
31365	Socket—"Electric Tuning" indicator lamp insulated socket Model 97T2 and 97K2	.30
13871	Socket—Magic Eye socket (Models 97T2 and 97K2)	.45
31251	Socket—Octal base tube socket	.25
14273	Socket—Pickup socket	.25
31416	Spring—Indicator, or drum drive cord tension spring	.05

STOCK No.	DESCRIPTION	Unit List Price
32669	Switch—Range switch (S1, S2)	1.10
31370	Switch—Station selector push-button switch (S4, S5, S32, S33, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45)	3.85
30902	Transformer—First i-f transformer (L10, L11, C5, C6)	1.80
14283	Transformer—Second i-f transformer (L12, L13, C7, C8, C37, R4, R5)	3.80
31445	Transformer—Power transformer 100-120 volts, 25-60 cycle (T1)	7.80
31380	Transformer—Power transformer 100-120 volts, 50-60 cycle (T1)	4.75
31446	Transformer—Power transformer 100-130, 140-160, 200-250 volts, 50-60 cycle (T1)	6.05
	SPEAKER ASSEMBLIES (84302-4) Model 96T7	
32918	Cone and Voice Coil assembly complete with metal housing	2.40
32919	Field Coil Complete	1.30
32920	Output Transformer	1.45
31302	Plug—4-contact male for speaker	.25
	SPEAKER ASSEMBLIES (84306-1) Models 96T7 and 97T2	
31448	Cone—Speaker cone and voice coil (L14)	1.40
31462	Speaker—Complete	4.00
31444	Transformer—Output transformer (T2)	1.95
	SPEAKER ASSEMBLIES (RL-79-1) Model 97T2	
32907	Cap—Cone center dust cap	.02
32906	Coil—Hum neutralizing coil	.25
33077	Coil—Speaker field coil	1.20
32934	Cone—Cone and voice coil assembly	1.66
31302	Plug—4-prong male speaker plug	.25
33078	Speaker—Speaker complete	5.60
32905	Transformer—Output transformer (T2)	1.35
	SPEAKER ASSEMBLIES (RL-63H-3) Model 96E2	
31325	Cap—Speaker cone center dust cap	.05
11469	Coil—Hum neutralizing coil (L17)	.30
18012	Coil—Speaker field coil (L18)	2.90
31310	Cone—Speaker cone and voice coil (L16)	1.75
31302	Plug—4-contact male plug for speaker	.25
31324	Speaker complete	10.45
14355	Transformer—Output transformer (T2)	2.00
	SPEAKER ASSEMBLIES (RL-70H-1) Models 96K5 and 97K2	
31325	Cap—Dust cap for cone center	.05
18012	Coil—Field coil (L16)	2.90
11469	Coil—Hum neutralizing coil (L15)	.30
31276	Cone—Speaker cone and voice coil (L14)	1.75
31302	Plug—4-contact male plug	.25
31593	Speaker—Speaker complete	9.25
14358	Screw—Screw, washer, and lockwasher to hold core in yoke	.04
14365	Transformer—Output transformer (T2)	2.00
14357	Washer—Spring washer to hold field coil	.06
	MISCELLANEOUS ASSEMBLIES	
31397	Button—Push button	.15
31456	Cover—8-protective covers for push button markers	.08
32673	Dial—Dial scale and crystal (glass)	.80
32672	Escutcheon—Dial escutcheon and dial—less buttons—Models 96K5, 96E2, and 96T7	3.40
32674	Escutcheon—Dial escutcheon and dial—less buttons—Models 97K2 and 97T2	3.85
31366	Knob—Range switch knob	.12
14359	Knob—Station selector knob	.20
31391	Knob—Tone control knob	.15
30773	Knob—Volume control knob	.15
31589	Marker—1 set station call letter markers	.35
31458	Marker—"Dial Tuning" push button marker	.01
31457	Marker—"Victrola" push button marker	.01
11810	Screw—Chassis mounting screws, washers and lockwashers. Models 96K5, 97K2 and 96E2 (3 required)	.05
31390	Screw—Chassis mounting screws, washers and lockwashers Models 96T7 and 97T2. (Sufficient for one chassis)	.10
4982	Spring—Retaining spring for knob Stock No. 14359	.05
14279	Spring—Retaining spring for knob Stock Nos. 30773 and 31355	.05
30330	Spring—Retaining spring for knob Stock No. 31391	.03

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

96BK6, 96BT6

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
32259	Capacitor—3-section trimmer bank 2-10, 3-30, 100-330 mmfd. (C33, C3, C2)	.65
12839	Capacitor—56 mmfd. (C13)	.35
12723	Capacitor—56 mmfd. (C1, C31)	.35
30408	Capacitor—100 mmfd. (C4)	.35
14262	Capacitor—110 mmfd. (C17)	.30
12464	Capacitor—120 mmfd. (C19, C20)	.30
32370	Capacitor—120 mmfd. (C22)	.50
14712	Capacitor—180 mmfd. (C12)	.30
30433	Capacitor—470 mmfd. (C28)	.35
32369	Capacitor—520 mmfd. (C30)	.40
12635	Capacitor—1,000 mmfd. (C11)	.50
4881	Capacitor—3,300 mmfd. (C29)	.60
30303	Capacitor—.0035 mfd. (C14)	.40
4838	Capacitor—.005 mfd. (C21)	.25
14393	Capacitor—.01 mfd. (C13)	.30
4886	Capacitor—.05 mfd. (C8, C10)	.20
4839	Capacitor—.1 mfd. (C15, C38)	.30
30986	Capacitor—.25 mfd. (C7)	.30
12741	Capacitor—.5 mfd. (C16)	.20
31581	Cell—1 volt bias cell	.25
32267	Coil—Push button osc. shunt coil (L8, L9)	.65
32254	Coil—Broadcast oscillator coil (L17)	.95
32258	Coil—Antenna coil (L1, L2, L3, L4)	1.20
32266	Coil—"C" band oscillator coil (L15, L16)	.70
32256	Coil—Push button osc. series coil	.60
32263	Coil—Push button antenna and oscillator coil (L20, L26)	1.10
32252	Coil—Push button antenna and oscillator coil (L21, L27)	1.10
32251	Coil—Push button antenna and oscillator coil (L22, L28)	1.10
32260	Coil—Push button antenna and oscillator coil (L23, L29)	1.16
32365	Condenser—2-gang variable condenser (C5, C6, C9, C34)	2.70
32362	Contact—Dial lamp spring contact (S3)	.10
12004	Core—Variable core and stud for I.F. transformers	.15
12800	Core—Variable core and stud for antenna coil	.35
32268	Cord—Drive cord	.30
32266	Drum—Variable condenser drive drum	.45
31580	Holder—Bias cell holder	.15
32267	Indicator—Dial scale pointer	.25
31480	Lamp—Dial lamp	.20
14404	Plug—7-prong plug—mates with socket on supply cable	.35
31373	Pulley—Drive cord pulley	.08
30546	Resistor—470 ohms, ½ watt (R12)	.20
13714	Resistor—5,600 ohms, ½ watt (R5)	.20
14284	Resistor—22,000 ohms, 1/10 watt (R20)	.15
12654	Resistor—33,000 ohms, ½ watt (R4, R15)	.20
12199	Resistor—270,000 ohms, ½ watt (R6)	.20
30983	Resistor—820,000 ohms, ½ watt (R10)	.20
13730	Resistor—1 meg., ½ watt (R1)	.20
30208	Resistor—1.2 meg., ½ watt (R9)	.20
12679	Resistor—2.2 meg., ½ watt (R2, R7)	.20
30271	Resistor—4.7 meg., ½ watt (R3)	.26
14357	Retainer—Drive cord pulley retaining washer	.01
32261	Screw—Push button oscillator coil adjustment screw and mounting nut	.03
3993	Screw—No. 4-32 x ⅛ square head set screw for switch collar	.06
4669	Screw—No. 8-32 square head set screw from drive drum	.03
32265	Shaft—Tuning knob shaft and retainer	.25
3682	Shield—Detector tube shield	.22
3950	Shield—Oscillator tube shield	.26
31365	Socket—Dial lamp socket	.30
5119	Socket—8-contact speaker cable socket	.25
31251	Socket—8-contact tube socket	.25
32487	Spring—Drive cord tension spring	.06
32255	Switch—Push button switch (S18, S19, S20, S21, S22, S23, S26, S27, S28, S29, S32, S33)	2.95
30953	Switch—Tone control switch (S2)	.45

STOCK No.	DESCRIPTION	Unit List Price
32366	Transformer—Driver and output transformer pack (T1, T2)	5.26
14261	Transformer—First I.F. transformer (L11, L12, C17, C18)	2.05
14308	Transformer—Second I.F. transformer (L13, L14, C12, C19, C20, R20)	2.90
32367	Volume Control and Power Switch (R8, S1)	2.00
	SPEAKER ASSEMBLIES Model 96BT6 (Speaker 84307-3)	
32326	Cone—Speaker cone and voice coil	1.76
5118	Plug—3-prong male plug	.25
32325	Speaker—Complete	6.00
	SPEAKER ASSEMBLIES Model 96BK6 (Speaker 84477-2)	
32328	Cone—Speaker cone and voice coil	1.90
5118	Plug—3-prong male plug	.25
32327	Speaker—Complete	6.95
	VIBRATOR POWER UNIT ASSEMBLIES (RS-79B)	
13894	Capacitor—390 mmfd. (C40)	.25
4937	Capacitor—.01 mfd. (C27)	.35
12464	Capacitor—.25 mfd. (C25)	.30
30587	Capacitor—0.5 mfd. (C32, C36)	.36
32159	Capacitor—Capacitor-15-15 mfd. Electrolytic (C23, C24)	1.65
14289	Clip—Battery clip for cable	.30
31794	Coil—Choke coil (L18)	.66
6516	Connector—Fuse connector	.20
5140	Fuse—5 ampere	.10
14281	Resistor—68 ohms, ½ watt (R11)	.20
14439	Resistor—100 ohms, ½ watt (R13)	.20
3153	Resistor—1,500 ohms, 1 watt (R14)	.22
30734	Resistor—5,600 ohms, ½ watt (R19)	.20
4786	Socket—6-prong socket for plug-in vibrator unit	.25
14409	Socket—7-contact female socket for vibrator cable	.45
32371	Transformer—Vibrator transformer (T3, L19, C26)	4.25
14309	Vibrator—(L24)	4.25
	A.C. POWER UNIT ASSEMBLIES Model CV-9	
32223	Capacitor—15 mfd. (C37)	1.00
32222	Capacitor—2-sections 15 mfd. each (C35, C36)	1.30
14409	Plug—7-contact female plug for power out cable	.45
30645	Resistor—180 ohms, ½ watt (R17)	.20
4887	Resistor—1,000 ohms, ½ watt (R18)	.20
13486	Resistor—2,200 ohms, 1 watt (R16)	.22
31261	Socket—Tube socket	.25
32221	Transformer—Power transformer 100-130, 140-160, 195-250 volts, 25-60 cycles (T4)	7.05
	MISCELLANEOUS ASSEMBLIES	
32279	Button—Station selector push button	.05
31835	Clip—Spring clips to hold dial	.10
32372	Dial—Station selector dial scale	.65
32277	Escutcheon—Dial bezel and crystal	1.10
32278	Escutcheon—Push button bezel	.70
31713	Knob—Tuning knob	.30
31355	Knob—Volume control knob	.12
32281	Marker—Push button marker for broadcast band	.02
32280	Marker—Push button marker for short wave band	.02
32067	Marker—One set station call letter markers	.35
12993	Screw—Set screw for knob, Stock No. 31713	.02
14267	Screw—Chassis mounting screw assembly—Model 96BT6 only	.04
30467	Screw—Chassis mounting screw assembly—Model 96BK6 only	.05
14270	Spring—Spring for knob, Stock No. 31355	.05

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE

MODELS 96E2, 96K5, 96K6, 96T7
Chas. RC-351L; 97K2, 97T2
Chassis RC-351K

RCA MFG. CO., INC.

Alignment, Socket, Trimmers
Tuner Adjustments

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

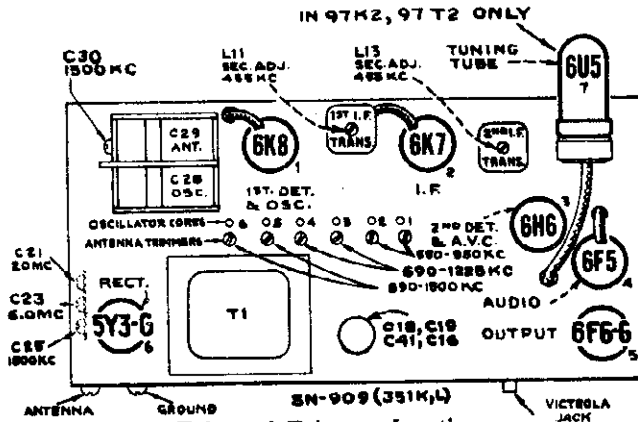
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum. — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.



Tube and Trimmer Locations

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the left-hand end mark, and gang condenser fully meshed.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

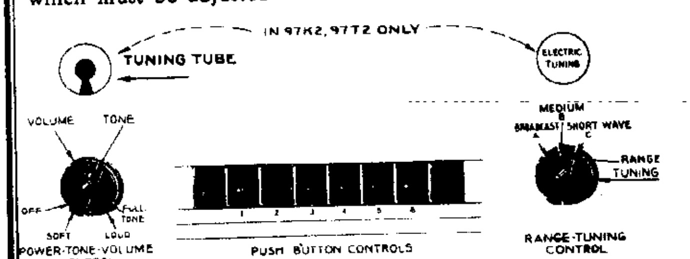
Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 200 mmf.	600 kc	600 kc (150.5°) "A" band	L9
4		1,500 kc	1,500 kc (28°) "A" band	C25 (osc.) C30 (ant.)
5	Repeat steps 3 and 4.			
6	Antenna Terminal, in series with 400 ohms	6 mc	6 mc (26.5°) "B" band	C23 (osc.)*
7		20 mc	20 mc (22°) "C" band	C21 (osc.)*
8	Follow "Adjustments for Electric Tuning."			

* Use **minimum** capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.

Note.—Oscillator tracks 455 kc above signal on all bands.

ADJUSTMENTS FOR ELECTRIC TUNING

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.



Location of Controls

The left-hand push button is a Victrola-Attachment switch. The right-hand push button is for dial tuning.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Schematic, Lead Dress

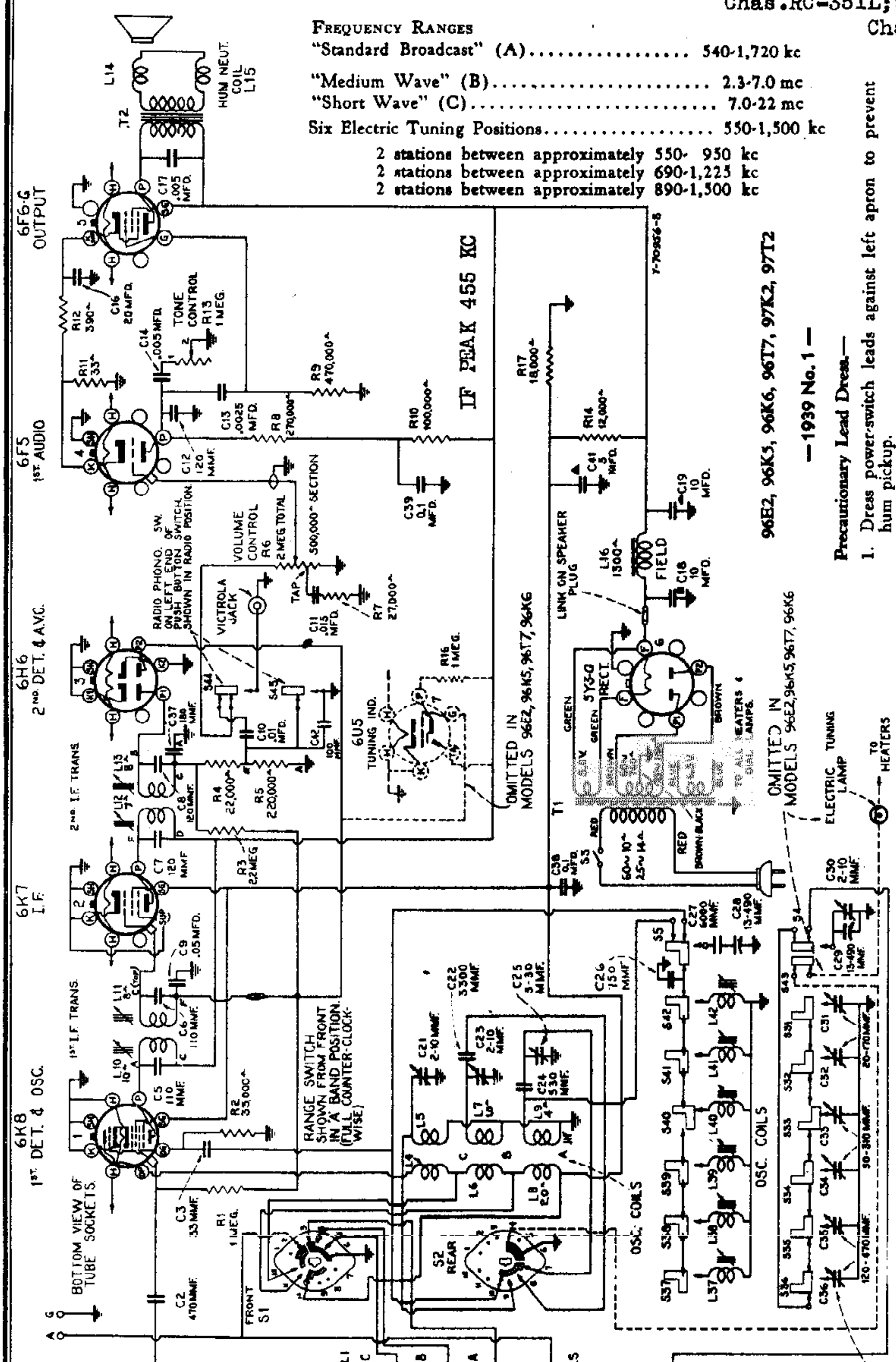
RCA MFG. CO., INC.

MODELS 96E2, 96K5, 96K6, 96T7
Chas. RC-351L; 97K2, 97T2
Chassis RC351K

Frequency Ranges

"Standard Broadcast" (A)	540-1,720 kc
"Medium Wave" (B)	2.3-7.0 mc
"Short Wave" (C)	7.0-22 mc
Six Electric Tuning Positions	550-1,500 kc

2 stations between approximately 550- 950 kc
2 stations between approximately 690-1,225 kc
2 stations between approximately 890-1,500 kc



96E2, 96K5, 96K6, 96T7, 97K2, 97T2

—1939 No. 1—

Precautionary Lead Dress.—

1. Dress power-switch leads against left apron to prevent hum pickup.
2. Dress R1 away from front of chassis.
3. Electric-tuning lamp leads must be dressed in front of range switch.
4. Dress lead from L5 to range switch away from other leads.
5. Dress leads away from antenna coil.
6. Dress other parts and leads away from R14, as it becomes heated.

Power Output	96T7, 97T2	96E2, 96K5, 96K6, 97K2
Undistorted	2.0 watts	2.5 watts
Maximum	4.0 watts	4.5 watts

Power Supply Rating

Rating A	105-125 volts, 50-60 cycles, 80 watts
Rating B	105-125 volts, 25-60 cycles, 80 watts
Rating C	100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

MODELS 96E2, 96K5, 96K6, 96T7 Chassis RC-351L | RCA MFG. CO., INC. | 97K2, 97T2, Chas. RC351K R-F Chassis Wiring, Data

LOUDSPEAKER

Type .... Electrodynamic
Voice-coil impedance 84308-1, 84308-4, RL63H-3, RL70H-1.. 2.2 ohms, RL79-1.......... 3.4 ohms.......... at 400 cycles
Pilot Lamps (1 on Models 96K5, 96K6, 96E2, 96T7) (2 on Models 97K2, 97T2).......... Mazda No. 47, 6.3 volts, .15 amp.

Loudspeaker.—Centering of the loudspeaker voice coil is accomplished in the usual manner with three narrow celluloid or paper feelers after first removing the front dust cover. A dust cover should be cemented in place with ambroid upon completion of adjustment.

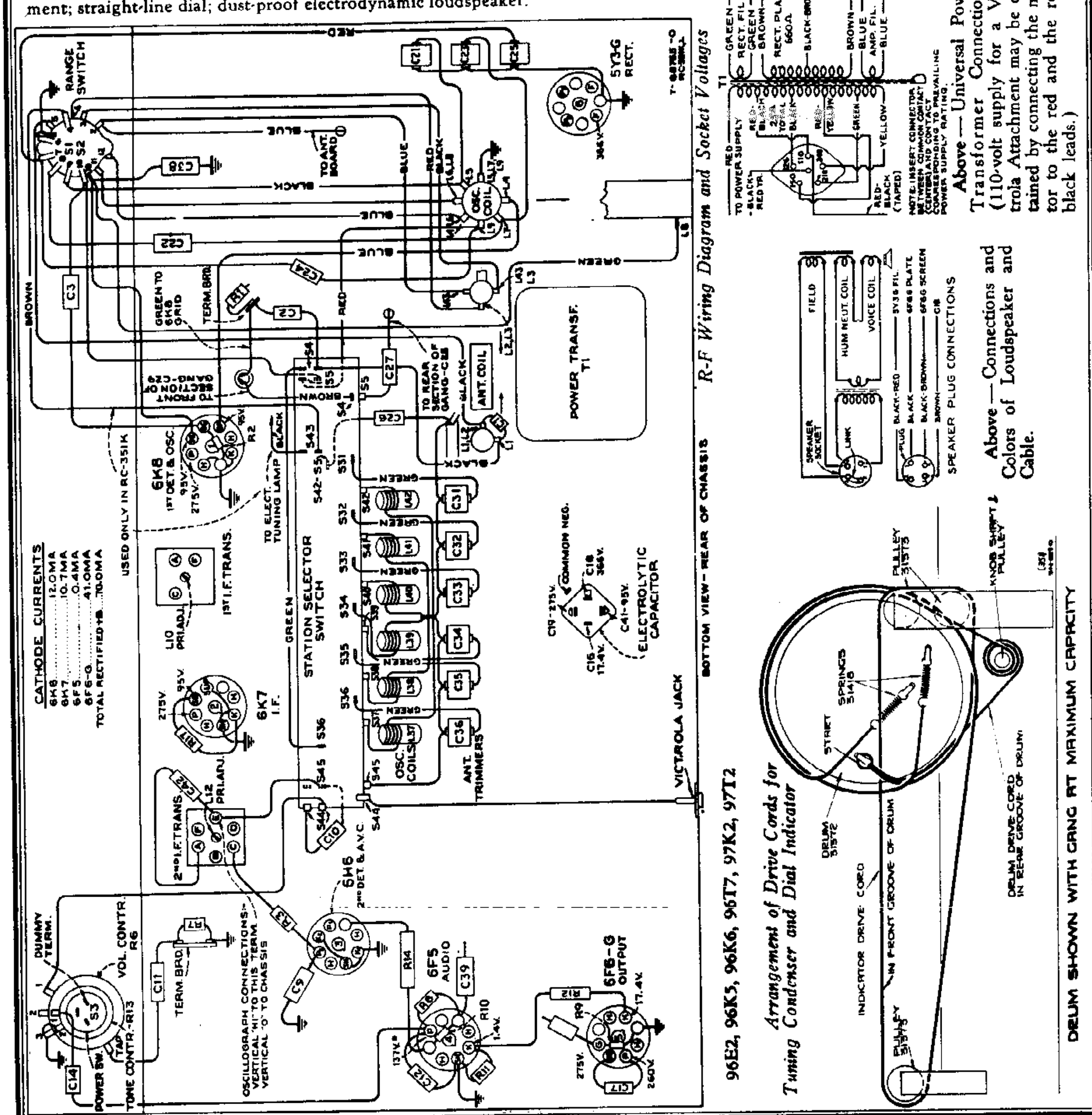
The seven-tube models have a "Magic Eye" tuning tube and illuminated indicator to show when the set is being operated on electric tuning. All models have electric tuning for six stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core "A" band oscillator coil; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; aural-compensated volume control; high-frequency tone control; jack and switch for Victrola attachment; straight-line dial; dust-proof electrodynamic loudspeaker.

Victrola Attachment.—A jack is provided on the rear of the chassis for connection to a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

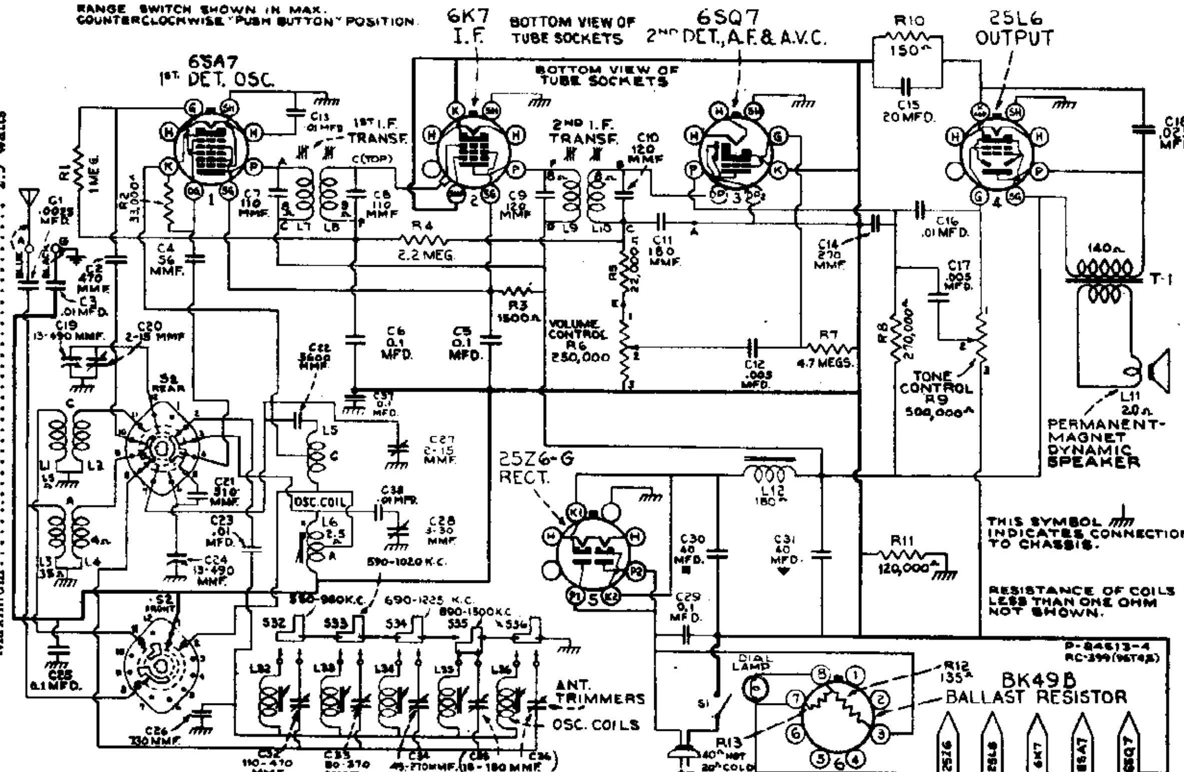
*** NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.



Schematic, Voltage
R-F Chassis Wiring

RCA MFG. CO., INC.

MODELS 96T4, 96T5, Chas. RC-399
96T6, Chassis RC-399A

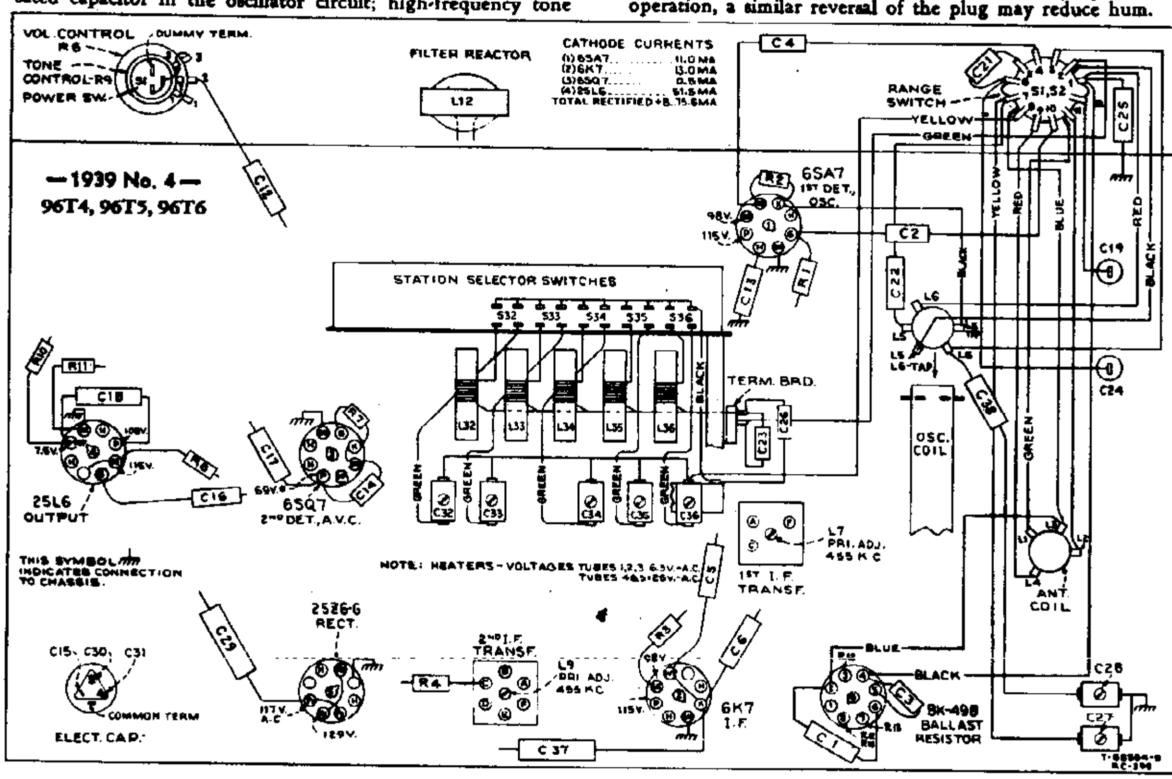


All models have electric tuning for five stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; high-frequency tone control; straight-line dial; dust-proof permanent magnet dynamic loudspeaker.

Power Supply Polarity.—On d-c operation, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the position of the plug. On a-c operation, a similar reversal of the plug may reduce hum.

—1939 No. 4—
96T4, 96T5, 96T6



BOTTOM VIEW—REAR OF CHASSIS

R-F Wiring Diagram and Socket Voltages

Measurements made to low-side of volume control unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117 volt a-c supply.

*** Note:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

A-C Rating .... 105-125 volts, 25-60 cycles, 60 watts
D-C Rating .... 105-125 volts, direct current, 60 watts
Power Output Rating
Undistorted .... 1.5 watts
Maximum .... 2.5 watts
Frequency Ranges
"Standard Broadcast" (A) .... 540-1,720 kc
"Short Wave" (C) .... 5.8-18.0 mc
Intermediate Frequency .... 455 kc
Pilot Lamp .... Mazda 47, 6.3 volts, 0.15 amp.
Loudspeaker
Type .... Permanent Magnet Dynamic
Diameter .... 96T4, 5: 5 inch—96T6: 6 inch
V.C. Impedance .... 2 ohms at 400 cycles

MODELS 96T4, 96T5, Chassis RC-399
96T6, Chassis RC-399A
Alignment, Socket, Trimmers
Tuner, Lead Dress, Drive Data

RCA MFG. CO., INC.

Mechanical Specifications

Models	96T4	96T5	96T6
Height (inches)	9½	9½	11¼
Width (inches)	12	12	15⅞
Depth (inches)	6⅛	6⅛	6$\frac{15}{16}$
Net Weight (pounds)	11	11	14
Shipping Weight (pounds)	13	13	17
Chassis Base Dimensions	11$\frac{5}{16}$-in. wide, 5-in. deep, 2⅞-in. high		
Over-all Chassis Height	8 inches		
Tuning Drive Ratio	8 to 1		

Alignment Procedure

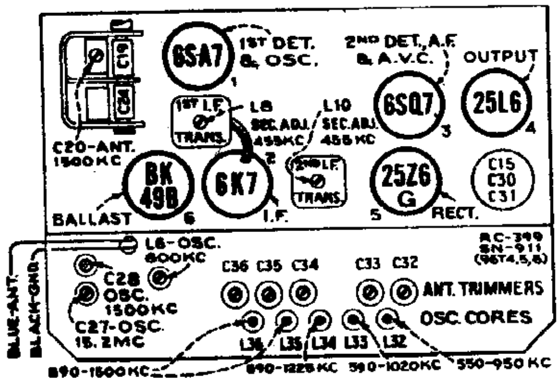
Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the black lead and keep the output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc. have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

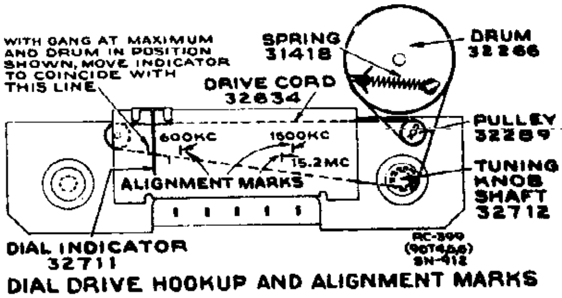


Tube and Trimmer Locations

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L9 and L10 (2nd I-F Trans.)
2	Tuning condenser Stator (osc.) in series with .01 mfd.	455 kc		L7 and L8 (1st I-F Trans.)
3	Antenna Lead (Blue), in series with 200 mmf.	1,500 kc	1,500 kc (Cal. Mark) "A" Band	C28 (osc.) C20 (ant.)
4	Antenna Lead (Blue), in series with 200 mmf.	600 kc	600 kc (Cal. Mark) "A" Band	L6 (osc.)
5	Repeat steps 3 and 4.			
6	Antenna Lead (Blue), in series with 400 ohms	15.2 mc	15.2 mc (Cal. Mark) "C" Band	C27 (osc.)*
7	Follow "Adjustments for Electric Tuning."			

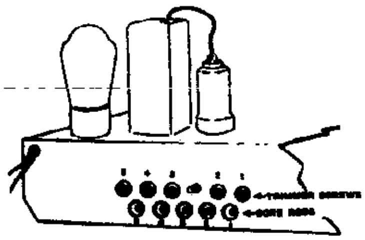
* Rock gang slightly while peaking C27, and use minimum capacity peak if two peaks can be obtained on C27.

Note.—Oscillator tracks 455 kc above signal on both bands.



Dial-Indicator and Drive Mechanism

Refer to "Alignment Procedure" for explanation of the "calibration marks" shown in this drawing.



Push-Button Adjustments

No. 1—Approximately 550-950 kc.
No. 2—Approximately 590-1,020 kc.
No. 3—Approximately 690-1,225 kc.
Nos. 4, 5—Approximately 890-1,500 kc.

Removing Push-Button Assembly.—The push-button assembly is held to the chassis by two nuts on the front apron and may be quickly and easily swung out for convenient access to the sockets and other parts. No unsoldering is required, as flexible leads are used for all connections from the chassis to the assembly.

Miscellaneous Service Data

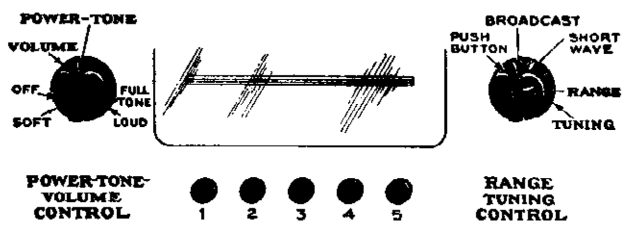
Precautionary Lead Dress.—

1. Volume control lead from 2nd I.F. transformer (E) should be dressed down on chassis.
2. A.C. leads to ballast tube should be dressed away from volume control lead on 2nd I.F. transformer.
3. Coupling condensers C2 and C4 should be dressed away from chassis.

MODELS 96T4, 96T5, Chas. RC-399
96T6, Chassis RC-399A
Tuner Adjustments, Parts

RCA MFG. CO., INC.

96T4, 96T5, 96T6



Location of Controls

Adjustments for Electric Tuning

These models have five push buttons for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Turn Range Control Knob to "Broadcast" position and tune in station No. 1 (560 kc in example) by Manual Dial Tuning, for reference.
3. Push in station-button No. 1 and turn Range Selector to "PB" position. Adjust No. 1 oscillator core (L32) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer (C32) for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)

6. Make a final careful adjustment of the oscillator cores and antenna trimmers, using one or two feet of wire as an antenna to ensure sharp peaking.

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC399—Models 96T4 and 96T5) (RC399A—Model 96T6)	
32544	Ballast—Ballast resistor tube — type BK49B (R12, R13)	.80
31379	Capacitor—Dual trimmer, comprising one 3-30 mmfd. and one 2-10 mmfd. sections (C27, C28)	.40
12723	Capacitor—56 mmfd. (C4)	.35
14262	Capacitor—109 mmfd. (C7, C8)	.30
12404	Capacitor—120 mmfd. (C9, C10)	.30
14712	Capacitor—180 mmfd. (C11)	.30
12488	Capacitor—270 mmfd. (C14)	.35
30433	Capacitor—470 mmfd. (C2)	.35
12537	Capacitor—560 mmfd. (C21)	.35
32714	Capacitor—730 mmfd. (C26)	.45
13895	Capacitor—5,600 mmfd. (C22)	.70
5107	Capacitor—.0025 mfd., 700 volts (C1)	.20
4838	Capacitor—.005 mfd., 1,000 volts (C12, C17)	.25
14393	Capacitor—.01 mfd., 300 volts (C3, C13, C16, C23, C38)	.30
4870	Capacitor—.025 mfd., 400 volts (C18)	.20
4839	Capacitor—0.1 mfd., 400 volts (C5, C6, C25, C29, C67)	.30
32708	Capacitor—Electrolytic, comprising two 40 mfd., and one 20 mfd. sections (C15, C30, C31)	1.35
32705	Capacitor—Push button trimmer capacitor bank (C32, C33, C34, C35, C36)	1.20
31382	Clip—Push button coil mounting clip	.04
32706	Coil—Antenna coil (L1, L2, L3, L4)	1.25
32707	Coil—Oscillator coil (L5, L6)	.95
31385	Coil—Push button oscillator coil — less core 550-950 KC. (L32)	.30
32704	Coil—Push button oscillator coil — less core 590-1,020 KC. (L33)	.35
32340	Coil—Push button oscillator coil — less core 690-1,225 KC. (L34)	.35
31383	Coil—Push button oscillator coil — less core 890-1,500 KC. (L35, L36)	.30
32249	Condenser—2-gang variable (C19, C20, C24)	2.70
31413	Control — Volume control, tone control, and power switch (R6, R9, S1)	3.00
32634	Cord—Drive cord	.10
31386	Core—Core and stud for coil, Stock Nos. 31383, 31385, and 32704	.15
30846	Core—Core and stud for coil, Stock No. 32340	.30
32713	Core—Core and stud for oscillator coil, Stock No. 32707	.35
32266	Drum—Condenser drive cord drum	.45
32711	Indicator—Dial indicator pointer	.20
31480	Lamp—Dial lamp socket	.20
32710	Plate—Dial color plate and pointer track	.30
5119	Plug—3-contact female for speaker cable	.25
32289	Pulley—Indicator drive cord pulley	.10
32709	Reactor—Filter reactor (L12)	1.40
30880	Resistor—150 ohms, ½ watt (R10)	.20
14499	Resistor—1,500 ohms, ¼ watt (R3)	.20
14284	Resistor—22,000 ohms, 1/10 watt (R5)	.15
12454	Resistor—33,000 ohms, ¼ watt (R2)	.20
13734	Resistor—120,000 ohms, ¼ watt (R11)	.20
12199	Resistor—270,000 ohms, ¼ watt (R8)	.20
13730	Resistor—1 meg., ¼ watt (R1)	.20
12679	Resistor—2.2 meg., ¼ watt (R4)	.20
30271	Resistor—4.7 meg., ¼ watt (R7)	.20
32544	Resistor—Ballast resistor tube—type BK49B (R12, R13)	.80
30340	Retainer—Pulley retaining clip	.02
14343	Retainer—Tuning knob shaft retaining ring	.03
4669	Screw—No. 8-32 x ¼ square head set screw for drum	.03
32712	Shaft—Tuning knob shaft and pulley	.20
31365	Socket—Dial lamp socket	.30
31251	Socket—Octal base tube socket	.25
31418	Spring—Drive cord tension spring	.05
32703	Switch—Push button switch (S32, S33, S34, S35, S36)	2.25
32702	Switch—Range switch (S2)	1.15
14376	Transformer—First i.f. transformer (L7, L8, C7, C8)	2.45
14308	Transformer—Second i.f. transformer (L9, L10, C9, C10, C11, R5)	2.90
32544	Tube—Ballast resistor tube — type BK49B (R12, R13)	.80
	SPEAKER ASSEMBLIES (84226-4) Models 96T4 and 96T5	
32716	Cone—Speaker cone and voice coil in housing (L11)	1.80
32715	Speaker—Complete	6.70
32717	Transformer—Output transformer (T1)	1.40
	SPEAKER ASSEMBLIES (84307-4) Model 96T6	
32719	Cone—Speaker cone and voice coil in housing (L11)	2.00
5118	Plug—3-contact male plug for speaker	.25
32718	Speaker—Speaker complete	6.00
32720	Transformer—Output transformer (T1)	1.45
	MISCELLANEOUS ASSEMBLIES	
31428	Button—Push button and spring	.06
31487	Clip—Spring clip to hold dial scale	.12
31095	Cover—One set protective covers for call letter markers	.10
32722	Dial—Glass dial scale	.45
31667	Escutcheon—Dial escutcheon (no crystal)	.55
31355	Knob—Range switch knob	.12
31391	Knob—Tone control knob	.15
14359	Knob—Tuning knob	.20
30773	Knob—Volume control knob	.15
30991	Markers—One set station call letter markers	.40
32721	Spring—Push button spring	.02
14270	Spring—Retaining spring for range switch or volume control knob	.05
30330	Spring—Retaining spring for tone control knob	.03
4982	Spring—Retaining spring for tuning knob	.05

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

MODELS 96X1 to 96X4,Chas.RC-400 RCA MFG. CO., INC.
96X11 to 96X14,Chas.RC-400A
MODEL U-104,Chassis RC-345H
Parts Lists

MODELS 96X-1, -2, -3, -4 and -11, -12, -13, -14

Chassis No. RC-400 and RC-400A

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
32999	Back—Cardboard back for cabinet	.10
32544	Ballast—Ballast resistor type BK49B	.80
32530	Button—Ivory push button for 96X11, 96X12 and 96X14	.15
32528	Button—Walnut push button for 96X13	.15
X-580	Cabinet for 96X1 (net)	3.10
X-581	Cabinet for 96X2 (net)	3.10
X-582	Cabinet for 96X3 (net)	3.35
X-583	Cabinet for 96X4 (net)	5.60
X-644	Cabinet for 96X11 (net)	2.90
X-585	Cabinet for 96X12 (net)	2.90
X-645	Cabinet for 96X13 (net)	3.00
X-646	Cabinet for 96X14 (net)	5.20
32531	Coil—Antenna coil	.75
32532	Coil—Oscillator coil	1.00
31379	Condenser—Trimmer, one 3-30 mmfd. and one 2-10 mmfd. sections (C5, C7)	.40
14079	Condenser—6.8 mmfd	.35
13057	Condenser—60 mmfd	.35
12488	Condenser—250 mmfd	.35
31399	Condenser—4,700 mmfd	.85
31480	Lamp—Dial lamp	.20
31589	Marker—1 set push button call letter markers	.35
32810	Mechanism—Push button tuning mechanism comprising push arms, cam plate, frame, and mounting bracket assembled—Models 96X11, 96X12, 96X13, 96X14	5.40
32538	Pulley—Condenser drive pulley and gear—Models 96X11, 96X12, 96X13 and 96X14	.65
32541	Pulley—Condenser drive pulley—Models 96X1, 96X2, 96X3, 96X4	.35
31606	Pulley—Indicator drum pulley	.20
32544	Resistor—Ballast resistor type BK49B	.80
14439	Resistor—100 ohms, ¼ watt	.20
32535	Resistor—120 ohms, wire wound	.20
14499	Resistor—1,500 ohms, ¼ watt	.20
12454	Resistor—33,000 ohms, ¼ watt	.20
12412	Resistor—47,000 ohms, ¼ watt	.20
12284	Resistor—220,000 ohms, ¼ watt	.20
12285	Resistor—470,000 ohms, ¼ watt	.20
12679	Resistor—2.2 meg., ¼ watt	.20
13601	Resistor—10 meg., ¼ watt	.20

STOCK No.	DESCRIPTION	Unit List Price
4858	Condenser—.01 mfd	.25
5196	Condenser—.035 mfd	.20
4886	Condenser—.05 mfd	.20
4839	Condenser—0.1 mfd	.30
32548	Condenser—Electrolytic, one 12 mfd. and one 20 mfd. sections	.65
32536	Condenser—Variable tuning condenser	2.40
31456	Cover—1 set protective covers for push button markers	.08
32539	Cord—Condenser drive cord	.10
32540	Cord—Dial drive cord	.10
32526	Dial—Black dial scale for 96X2 and 96X12	.35
32527	Dial—Ivory dial scale for 96X4 and 96X14	.35
32525	Dial—Walnut dial scale for 96X1, 96X3, 96X11 and 96X13	.35
32290	Gear—Sector gear fastens on cam shaft of tuning mechanism—Models 96X11, 96X12, 96X13, 96X14	.50
32542	Indicator—Dial indicator drum	.50
32522	Knob—Ivory knob for 96X1, 96X2, 96X4, 96X11, 96X12, 96X14	.15
32520	Knob—Tan knob for 96X3 and 96X13	.15
31482	Screw—No. 8-32 set screw for condenser drive pulley or sector gear	.03
32510	Screw—Push button cam locking screw—Models 96X11, 96X12, 96X13, 96X14	.10
32547	Shaft—Tuning knob shaft	.15
32543	Socket—Dial lamp socket and bracket	.20
32537	Socket—Tube socket	.20
31616	Spring—Drive cord tension spring	.02
30585	Spring—Push button lever spring—Models 96X11, 96X12, 96X13, 96X14	.06
31646	Spring—Retaining spring for knobs	.02
32546	Switch—Band change switch	.65
32533	Transformer—First i.f. transformer	1.00
32534	Transformer—Second i.f. transformer	.90
32545	Volume control and power switch	1.50
	SPEAKER ASSEMBLIES (84202-3)	
31202	Cone—Speaker cone and voice coil	1.30
31201	Speaker complete	3.95
31203	Transformer—Output transformer	1.00

MODEL U-104

Chassis No. RC-345H

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-345H)	
31198	Ballast—Ballast resistor tube (R7, R8)	.80
4287	Body—Connector body for dial lamp connector	.02
30883	Capacitor—300 mmfd. (C9)	.35
12635	Capacitor—1,100 mmfd. (C19)	.50
4838	Capacitor—.005 mfd., 1,000 V. (C18)	.25
4858	Capacitor—.01 mfd., 500 V. (C17)	.25
14393	Capacitor—.01 mfd., 300 V. (C1, C8, C10)	.30
11315	Capacitor—.015 mfd., 400 V. (C11)	.20
30938	Capacitor—.025 mfd. (C15)	.20
30899	Capacitor—0.1 mfd., 200 V. (C4)	.30
4839	Capacitor—0.1 mfd., 400 V. (C12)	.30
12484	Capacitor—0.25 mfd., 350 V. (C20, C16)	.30
31323	Capacitor—16 mfd., 150 V. (C13, C14)	.65
30875	Coil—Antenna coil (L1, L2)	1.10
30876	Coil—R.F. coil (L3, L4)	1.10
31195	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6)	2.50
14086	Cord—Power cord	.65
32634	Cord—Variable condenser drive cord	.10
31200	Dial—Station selector dial scale and plate assembly	.40
4286	Ferrule—Ferrule for dial lamp connector	.03
4340	Lamp—Pilot lamp	.17
31193	Lead—Antenna lead	.50
30868	Plug—2-contact female motor cable plug	.35
31196	Pointer—Station selector indicator pointer	.25
31198	Resistor—Ballast resistor tube (R7, R8)	.80
30880	Resistor—150 ohms, ¼ watt (R6)	.20
13734	Resistor—120,000 ohms, ¼ watt (R10)	.20
12285	Resistor—470,000 ohms, ¼ watt (R4)	.20
13730	Resistor—1 megohm, ¼ watt (R5)	.20
12679	Resistor—2.2 megohms, ¼ watt (R3)	.20
13601	Resistor—10 megohms, ¼ watt (R9)	.20
31197	Shaft—Indicator pointer shaft and pulley	.10
31251	Socket—8-contact tube socket	.25
14171	Socket—Lamp socket assembly	.40
4284	Spring—Spring for dial lamp connector	.03
31096	Switch—Phono. switch (S2)	1.20
31198	Tube—Ballast resistor tube (R7, R8)	.80
32209	Volume Control—(Phono.) (R11)	1.00
31966	Volume Control—Volume control power switch (R1, S1)	1.50
4285	Washer—Insulating washer for dial lamp connector	.02

STOCK No.	DESCRIPTION	Unit List Price
	PICKUP AND ARM ASSEMBLIES	
32226	Base—Pickup arm pivot shaft and base assembly	.65
4286	Bushing—Bushing and ferrule insert for connector cap	.03
4288	Cap—Pickup cable connector cap	.03
31050	Crystal—Pickup crystal and needle screw	3.75
32227	Pickup arm and crystal complete—less mounting, Stock No. 31054	6.70
12589	Screw—Pickup needle screw	.15
	MOTOR ASSEMBLIES	
9841	Motor—110-volt, 60-cycle—complete with mounting (M1)	6.50
31034	Motor—110-volt, 50-cycle—less mounting (M1)	8.90
31037	Rotor—Turntable and rotor lamination assembly—complete for 50-cycle operation	4.55
31036	Rotor—Turntable and rotor lamination assembly—complete for 60-cycle operation	4.55
31043	Stator—Stator assembly—complete with coils and laminations for 50-cycle operation	2.50
31042	Stator—Stator assembly—comprising coils and laminations for 60-cycle operation	2.50
	SPEAKER ASSEMBLIES (84202-3)	
31202	Cone—Speaker cone (L5)	1.30
31201	Speaker—Speaker complete	3.95
31203	Transformer—Output transformer (T1)	1.00
	MISCELLANEOUS ASSEMBLIES	
31205	Crystal—Station selector dial crystal	.20
30863	Knob—Station selector or power switch knob	.15
31054	Mounting—Pickup arm rubber mounting, washer, and nut	.15
30870	Plug—2-contact male plug for motor leads	.35
14267	Screw—Chassis mounting screw	.04
31053	Screw—Motor mounting screw assembly complete	.30

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Schematic, Voltage, Socket
Trimmers, Alignment, Data

RCA MFG. CO., INC.

MODELS 96X1 to 96X4 inc.
Chassis RC-400
96X11 to 96X14 inc.
Chassis RC-400A

Without Push-Button Tuning

96X-1 Walnut Finish — **96X-2** Black Finish — **96X-3** Walnut and Ivory Finish — **96X-4** Ivory Finish

With Push-Button Tuning

96X-11 Walnut Finish — **96X-12** Black Finish — **96X-13** Walnut and Ivory Finish — **96X-14** Walnut Finish

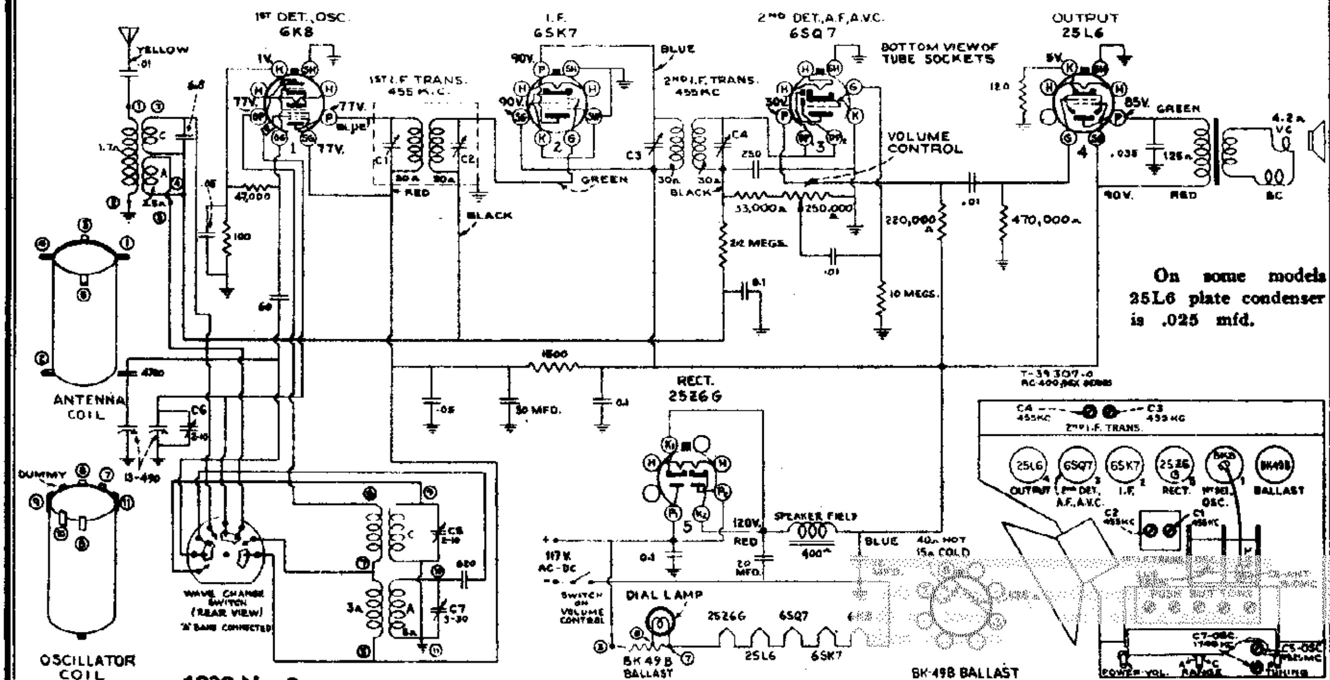
Electrical and Mechanical Specifications

Frequency Ranges
"Standard Broadcast" (A) (left) .... 540-1,720 kc
"Short Wave" (C) (right) .... 5,800-18,000 kc

Tube Complement
(1) RCA-6K8 .... 1st.-Detector—Oscillator
(2) RCA-6SK7 .... I-F Amplifier
(3) RCA-6SQ7 .... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 .... Power Output
(5) RCA-25Z6G .... Half-Wave Rectifier
(6) RCA-BK-49B .... Ballast
Pilot Lamp .... Mazda No. 47, 6.3 volts, 0.15 amp.

Power Supply Ratings
A-C Rating .... 105-125 volts, 50-60 cycle, 50 watts
D-C Rating .... 105-125 volts, direct current, 50 watts
Intermediate Frequency .... 455 kc
Power Output (125 volts, 60 cycle supply)
Undistorted 1.5 watts—Maximum .... 2.0 watts
Loudspeaker Type 84202-3 .... 5-inch Electrodynamic
Cabinet Dimensions....H. 7¼ inches W. 11¼ inches D. 7⅛ inches
Weights (net) 96X1, 2, 3, 4—8¼ lbs. .. 96X11, 12, 13, 14—9¼ lbs.
Tuning Drive Ratio .... 8 to 1

25 Cycle Operation.—For 25 cycle operation change filter condensers to 40-40 mfd.



—1939 No. 3—

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Dial Setting.—To set dial indicator drum, turn tuning condensers fully clockwise and then counter-clockwise.

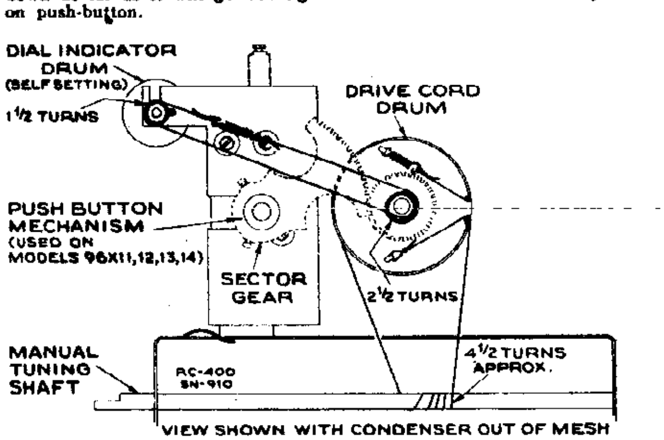
Push-button Adjustments.—Remove bakelite button and loosen screw two turns with a screwdriver or coin. Tune in the desired station by means of the right-hand control knob. Press push lever down as far as it will go and tighten screw. Release lever and put on push-button.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.†	455 kc	Quiet point between 550-750 kc	C1, C2, C3, C4 (1st and 2nd I-F transformer)
2	Antenna lead (yellow) in series with 400 ohms	19.25 mc	Full clockwise (out of mesh) "C" band	C5* (osc.)
3	Same as step 2	15.0 mc	15.0 mc Test oscillator signal	C6** (ant.) See Note No. 1
4	Antenna lead in series with 200 mmf condenser	1,745 kc	Full clockwise (out of mesh) "A" band	C7 (osc.)

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly and check to determine that C5 has been adjusted to the correct peak by tuning to approximately 14.09 mc, where a weaker signal should be received.
† Make test oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.

Note No. 1.—Accurately tune receiver to the 15.0 mc test oscillator signal. This signal will appear twice (14.09 and 15.0 mc) as dial is turned. Use the higher frequency setting of the tuning condensers (gang furthest out of mesh).

Note No. 2.—Oscillator tracks 455 kc above signal on all bands.



DRIVE CORD HOOKUP

MODEL 97K, Chassis RC-351F
RC-351F"M", RC-351F"R"
Specifications, Calibration Scale

RCA MFG. CO., INC.

MODEL 97K

CHASSIS No. RC-351F, RC-351F "M", RC-351F "R"

Electrical Specifications

FREQUENCY RANGES
"Standard Broadcast" (A) .... 540-1,720 kc   "Short Wave" (C) .... 5.8-18.0 mc
Six Electric Tuning Positions .... 550 to 1,500 kc
Two stations between approximately 550- 950 kc
Two stations between approximately 680-1,180 kc (RC-351F)
Two stations between approximately 690-1,225 kc (RC-351F "M," RC-351F "R")
Two stations between approximately 890-1,500 kc

Intermediate Frequency .... 455 kc

RCA TUBE COMPLEMENT
(1) RCA-6K8 .... First Detector-Oscillator
(2) RCA-6K7 .... Intermediate-Frequency Amplifier
(3) RCA-6H6 .... Second Detector and A.V.C.
(4) RCA-6F5 .... Audio Voltage Amplifier
(5) RCA-6F6-G .... Audio Power Output
(6) RCA-5Y3-G .... Full-Wave Rectifier
(7) RCA-6U5 .... Tuning Indicator

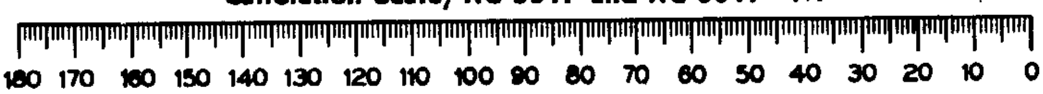
Pilot Lamps (2) .... Mazda No. 47, 6.3 volts, 0.15 amp.

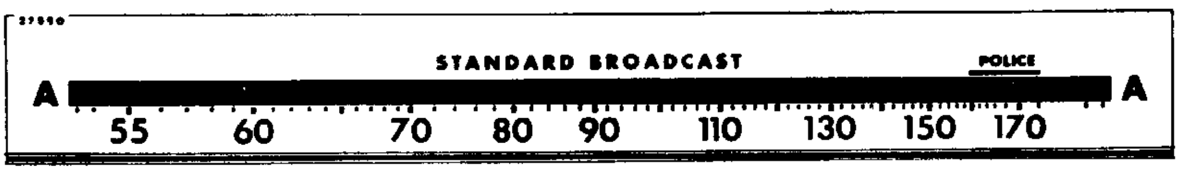
POWER SUPPLY RATINGS
Rating A .... 105-125 volts, 50-60 cycles, 80 watts
Rating B .... 105-125 volts, 25-60 cycles, 80 watts
Rating C .... 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

POWER OUTPUT
Undistorted .... 2.5 watts
Maximum .... 4.5 watts

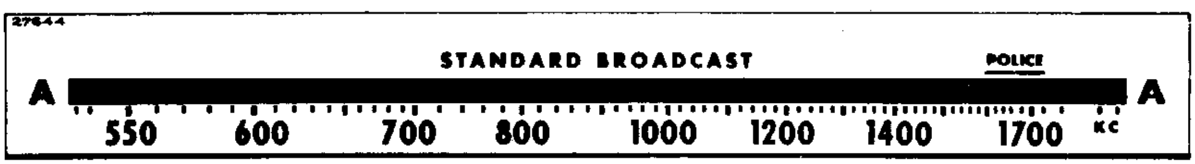
LOUDSPEAKER
Type .... 12-inch, electrodynamic
Voice Coil Impedance at 400 cycles .... 2.2 ohms

Calibration Scale, RC-351F and RC-351F "M"





The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the lower calibration to the same point on the upper calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band in RC-351F and RC-351F "M."



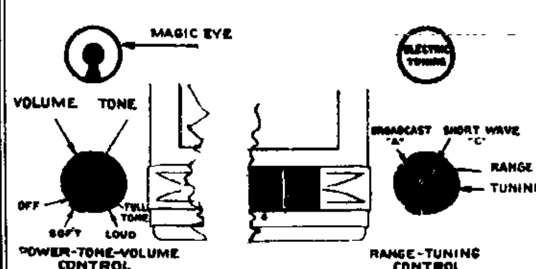
In RC-351F "R," 27.4° corresponds to 1,500 kc, and 15° corresponds to 18 mc.

General Description

This receiver employs a two-band superheterodyne circuit which is operated either manually or by electric tuning on standard broadcast, and includes foreign short-wave, aircraft, police, and amateur stations on the short-wave band.

There are three different productions of Model 97K, conveniently identified by rear chassis stamping as RC-351F, RC-351F "M," and RC-351F "R."

Features of design include magnetite-core adjusted i-f transformers and "Electric Tuning" oscillator coils; jack and switch for Victrola attachment; aural-compensated volume control; continuously variable tone-control; automatic volume control; dust-proof electrodynamic speaker; and straight-line dial.

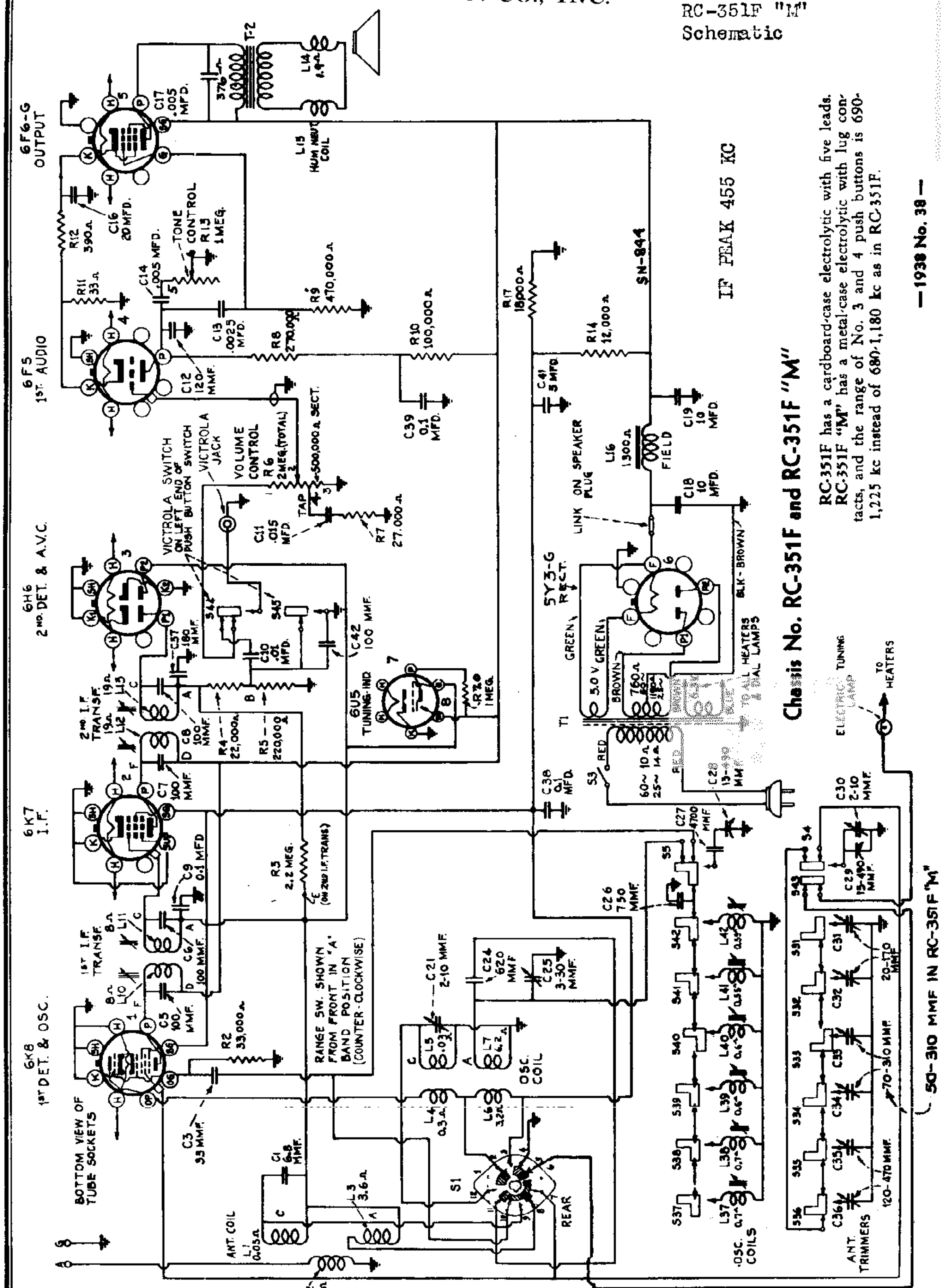


Precautionary Lead Dress.—(1) Dress 110-volt leads away from audio wiring. (2) All leads in vicinity of antenna and oscillator coils must be dressed away from the coils. (3) Electric Tuning lamp leads from push-button switch must be dressed against front apron. (4) Keep speaker leads away from Victrola jack. (5) Lead from C19 in electrolytic (RC-351F "R") must be dressed around left-end of push-button switch, and against chassis base. (6) The leads across back of chassis in RC-351F must be dressed under the electrolytic capacitor to prevent approaching the Victrola jack.

Victrola Attachment.—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

RCA MFG. CO., INC.

MODEL 97K, Chas. RC-351F
RC-351F "M"
Schematic



MODEL 97K, Chas. RC-351F, RC-351F "M"
Voltage, Chassis Wiring
Transformer, Speaker Data

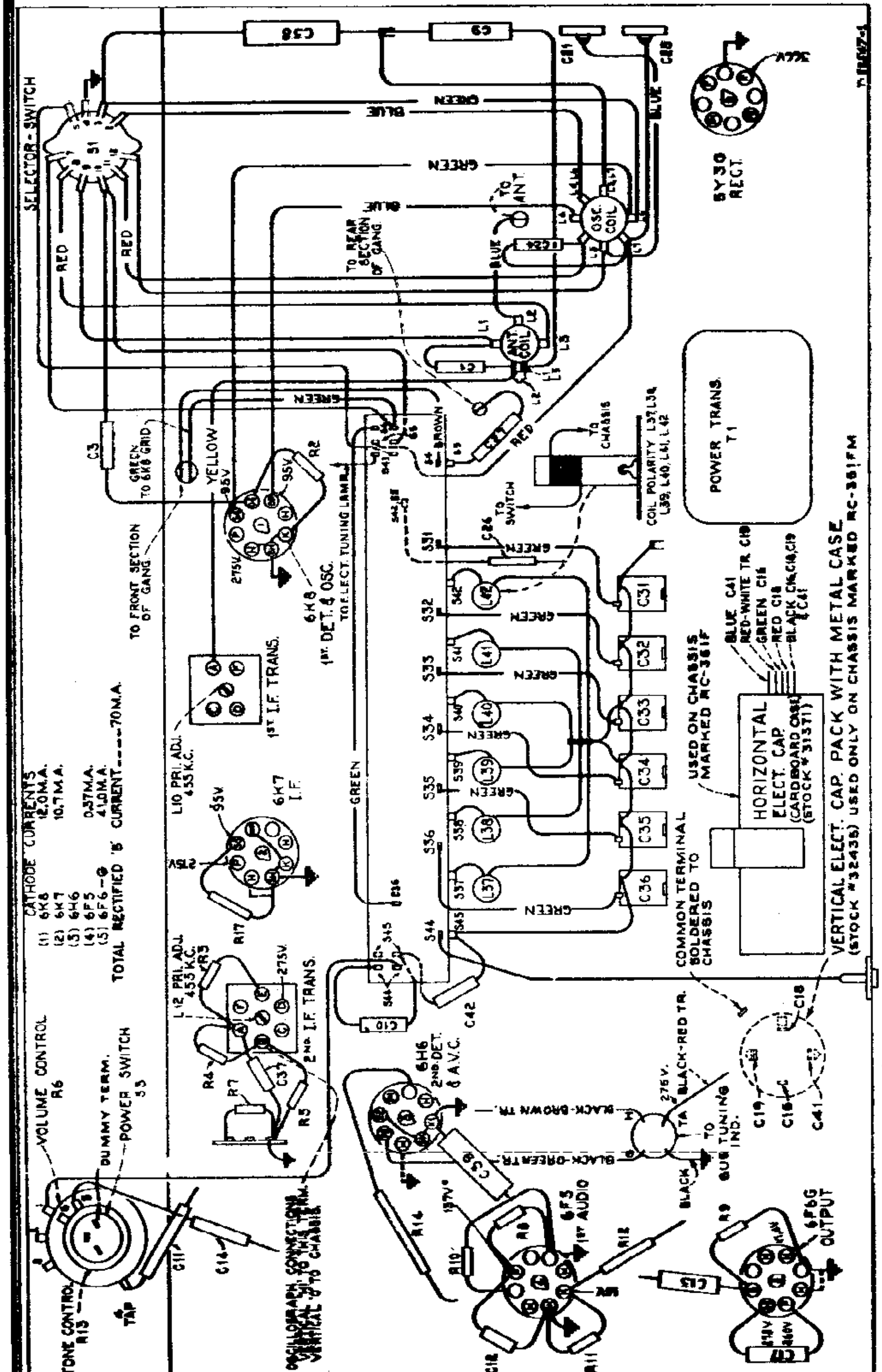
RCA MFG. CO., INC.

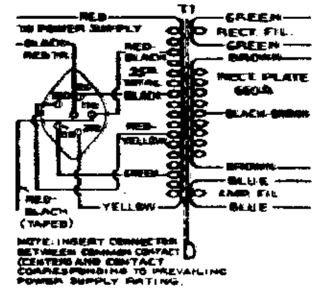
Chassis No. RC-351F and RC-351F "M"

R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading.

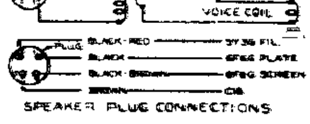




Above.—Universal Power Transformer Connections. 110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.

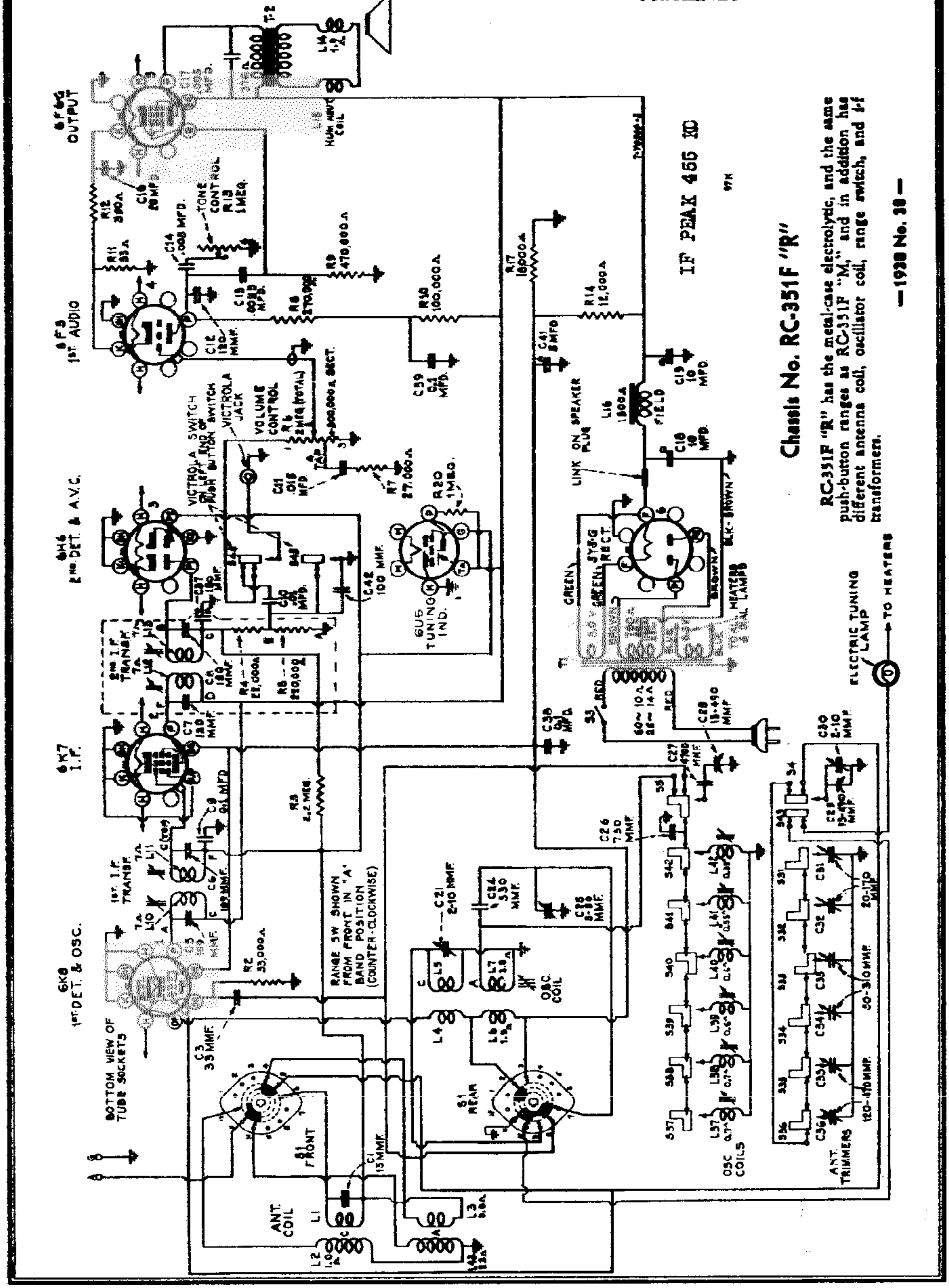
Mechanical Specifications

Height (inches)	41
Width (inches)	27 3/8
Depth (inches)	14 1/2
Net Weight (pounds)	54 1/2
Shipping Weight (pounds)	69
Chassis Base Dimensions	13 inches x 6 1/2 inches x 2 1/2 inches
Overall Chassis Height	6 inches
Tuning Drive Ratio	12:1



Above.—Connections and Colors of Loudspeaker and Cable.

RCA MFG. CO., INC. MODEL 97K, Chas. RC-351F "R"
Schematic



MODEL 97K, Chas. RC-351F "R"
Voltage, Chassis Wiring
Transformer, Speaker Data

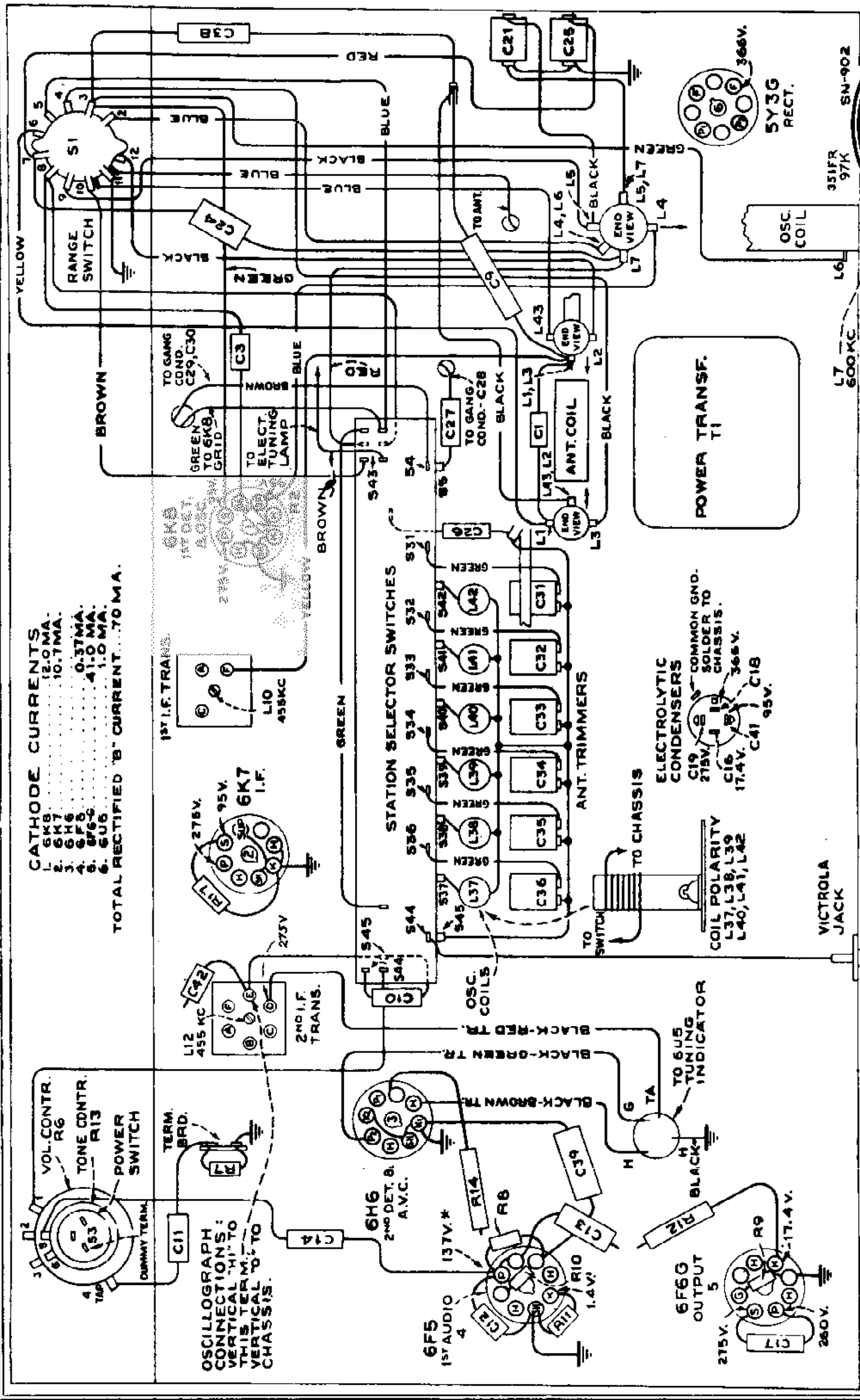
RCA MFG. CO., INC.

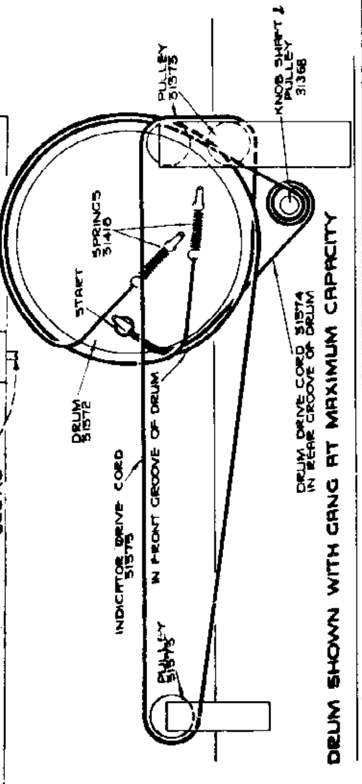
Chassis No. RC-351F "R"

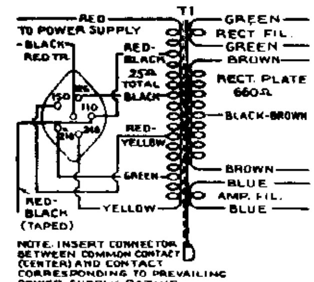
R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

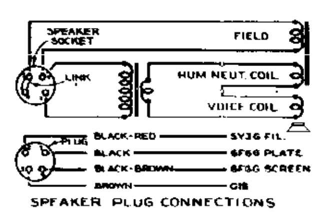
*** NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading.







Above.—Universal Power Transformer Connections. 110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.



Above.—Connections and Colors of Loudspeaker and Cable.

RCA MFG. CO., INC.

MODEL 97K,Chassis RC-351F, RC-351F "M",RC-351F "R"
Alignment,Socket,Trimmers Tuner Adjustments

ALIGNMENT PROCEDURE

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

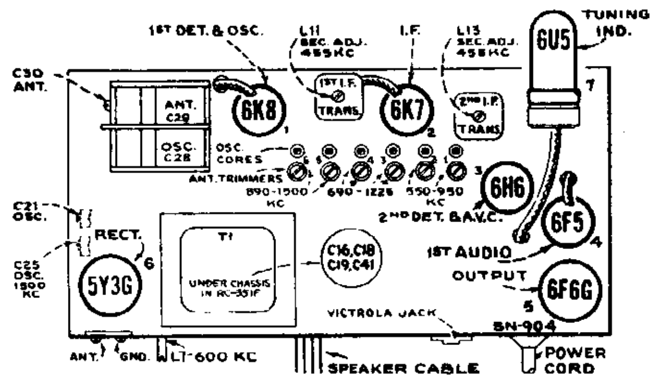
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum. — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.



* In RC-351F, push buttons 3 and 4 cover 680-1,180 kc.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

RC-351F and RC-351F "M"

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 400 ohms	15.2 mc	15.2 mc (33.5°) "C" band	C21* (osc.) C30** (ant.)
4	Antenna Terminal, in series with 200 mmf.	1,500 kc	1,500 kc (28°) "A" band	C25 (osc.)
5	Follow "Adjustments for Electric Tuning."			

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly while adjusting C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 40.5° (14.29 mc), where a weaker signal should be received.
Note.—Oscillator tracks 455 kc above signal on both bands.

RC-351F "R"

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal in series with 200 mmf.	1,500 kc	1,500 kc (27.4°) "A" band	C25 (osc.) C30 (ant.)
4	Antenna Terminal, in series with 200 mmf.	600 kc	600 kc (148°) "A" band	L7 (osc.)
5	Repeat steps 3 and 4.			
6	Antenna Terminal, in series with 400 ohms	18 mc	18 mc (15°) "C" band	C21 (osc.)*
7	Follow "Adjustments for Electric Tuning."			

* Rock gang slightly while peaking C21, and use minimum-capacity peak if two peaks can be obtained on C21.
Note.—Oscillator tracks 455 kc above signal on both bands.

ADJUSTMENTS FOR ELECTRIC TUNING

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Use one or two feet of wire as an antenna to ensure sharp peaking.
3. Push in the dial-tuning button, and manually tune in the first station on the list.
4. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
5. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

6. Adjust for each of the remaining five stations in the same manner.
7. Make a final readjustment of the magnetite-cores.

MODEL 97K, Chassis RC-351F, RC-351F "M", RC-351F "R"

Parts List

RCA MFG. CO., INC.

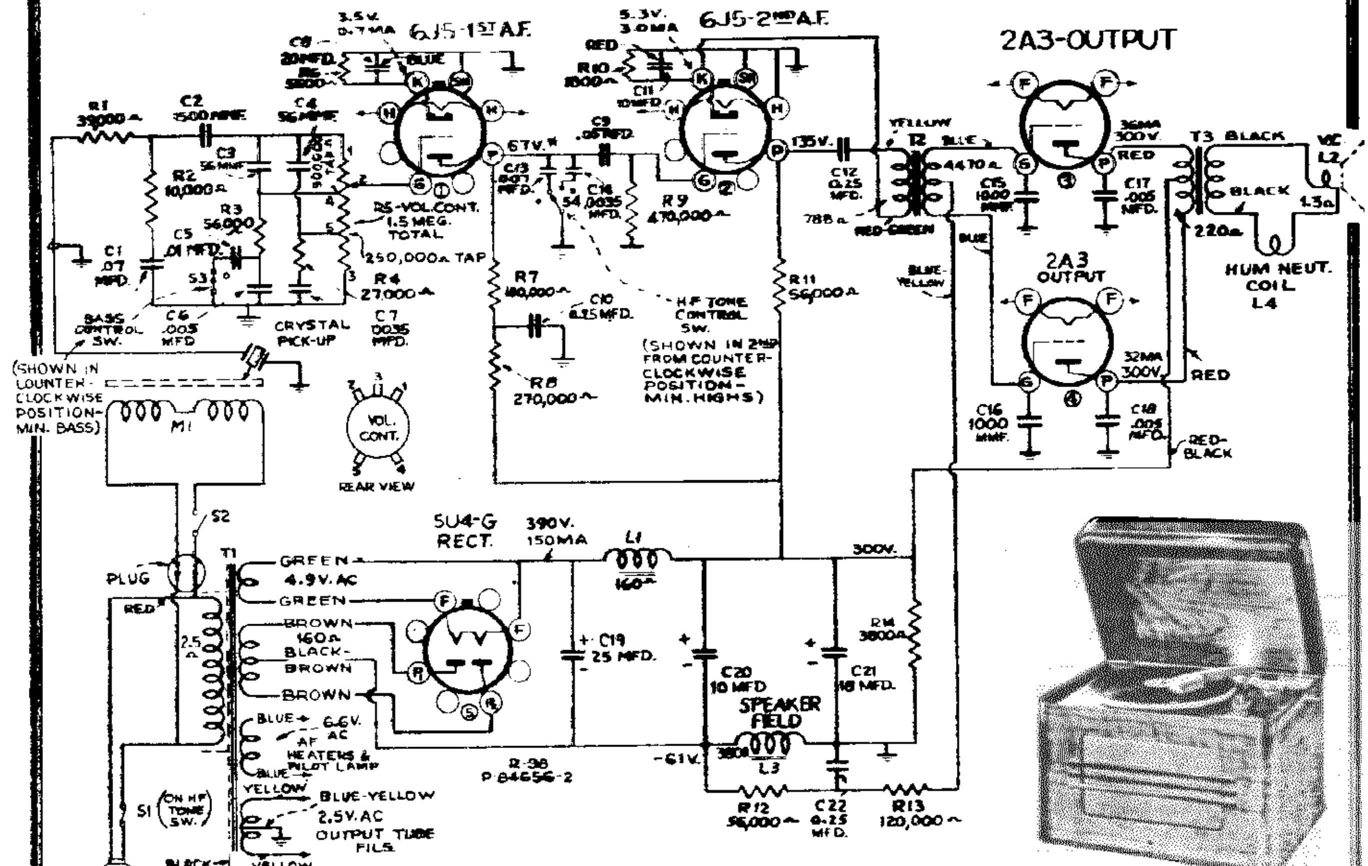
Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-351F, RC-351F "M," and RC-351F "R")	
30752	Bracket—Magic Eye mounting bracket	.25
14517	Board—Antenna—ground terminal board	.25
12110	Cap—Tube shield cap	.14
31379	Capacitor—Dual trimmer 2-10 mmfd. and 3-30 mmfd. (C21, C25)	.40
14079	Capacitor—6.8 mmfd. (C1) use in RC-351F and RC-351F "M" only	.35
12896	Capacitor—15 mmfd. (C1) used in RC-351F "R" only	.35
31387	Capacitor—Antenna coil trimmer capacitor bank, (C31, C32, C33, C34, C35, and C36) used in RC-351F only	1.30
32486	Capacitor—Antenna coil trimmer capacitor bank, (C31, C32, C33, C34, C35, and C36) used in RC-351F "M" and RC-351F "R" only	1.40
12948	Capacitor—33 mmfd. (C3)	.35
12720	Capacitor—100 mmfd. (C42)	.35
30904	Capacitor—100 mmfd. (C5, C6, C7, C8) used in RC-351F and RC-351F "M" only	.25
14262	Capacitor—100 mmfd. (C5 and C6) used in RC-351F "R" only	.30
12404	Capacitor—120 mmfd. (C7 and C8) used in RC-351F "R" only	.30
12724	Capacitor—120 mmfd. (C12)	.35
13003	Capacitor—180 mmfd. (C37) mounted under chassis in RC-351F and RC-351F "M" only	.35
14712	Capacitor—180 mmfd. (C37) mounted in 2nd I-F transformer in RC-351F "R" only	.30
32492	Capacitor—530 mmfd. (C24) in RC-351F "R" only	.40
31381	Capacitor—620 mmfd. (C24) in RC-351F and RC-351F "M" only	.45
31435	Capacitor—750 mmfd. (C26)	.40
31398	Capacitor—4,700 mmfd. (C27)	.65
5107	Capacitor—.0025 mfd. (C13)	.20
4838	Capacitor—.005 mfd. (C14, C17)	.25
14393	Capacitor—.01 mfd. (C10)	.30
11315	Capacitor—.015 mfd. (C11)	.20
4839	Capacitor—0.1 mfd. (C9, C38, C39)	.30
31371	Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41) (cardboard case type, mounted horizontally and used in RC-351F only)	2.25
32485	Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41) (metal case type, mounted vertically and used in RC-351F "R" and RC-351F "M" only)	1.75
31382	Clip—Oscillator coil and core mounting clip	.04
31378	Coil—Antenna coil, "A" and "C" bands (L1, L2, L3) mounted vertically and used in RC-351F and RC-351F "M" only	1.10
32488	Coil—Antenna coil, "A" and "C" bands (L1, L2, L3, L43) mounted horizontally and used in RC-351F "R" only	1.40
31377	Coil—Oscillator coil, "A" and "C" bands (L4, L5, L6, L7) mounted vertically (no magnetite core) and used in RC-351F and RC-351F "M" only	1.70
32489	Coil—Oscillator coil, "A" and "C" bands (L4, L5, L6, L7) mounted horizontally (with magnetite core) and used in RC-351F "R" only	.90
31383	Coil—Push-button oscillator coil (L41, L42)	.30
31384	Coil—Push-button oscillator coil (L39, L40) used in RC-351F only	.30
32487	Coil—Push-button oscillator coil (L39, L40) used in RC-351F "M" and "R"	.35
31385	Coil—Push-button oscillator coil (L37, L38)	.30
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30)	2.65
31366	Control—Volume control, tone control, and on-off switch (R6, R13, S3)	3.00
31375	Cord—Indicator pointer drive cord	.30
31374	Cord—Variable condenser drum drive cord	.15
30905	Core—Adjustable core and stud for i-f transformer	.35
31386	Core—Adjustable core and stud for oscillator coils Stock Nos. 31383, 31384, 31385, 32487	.15
12800	Core—Adjustable core and stud for oscillator coil Stock No. 32489	.35
31372	Drum—Variable condenser drive cord drum and calibrator dial	.65
31480	Lamp—Dial lamp	.20
5040	Plug—4-contact female plug for speaker cable	.30
31373	Pulley—Drive cord pulley	.08
14671	Resistor—33 ohms, ½ watt (R11)	.20
31388	Resistor—390 ohms, 1 watt (R12)	.22
31389	Resistor—12,000 ohms, wire-wound, 5 watts (R14)	.50
30151	Resistor—18,000 ohms, 1 watt (R17)	.22
14284	Resistor—22,000 ohms, 1/10 watt (R4)	.15
12738	Resistor—27,000 ohms, ½ watt (R7)	.20
12454	Resistor—33,000 ohms, ½ watt (R2)	.20
14560	Resistor—100,000 ohms, ½ watt (R10)	.20
11398	Resistor—220,000 ohms, 1/10 watt (R5) used in RC-351F "R"	.15
12264	Resistor—220,000 ohms, ½ watt (R5) used in RC-351F and RC-351F "M"	.20
12199	Resistor—270,000 ohms, ½ watt (R8)	.20
12295	Resistor—470,000 ohms, ½ watt (R9)	.20
12013	Resistor—1 meg., 1/10 watt (R20)	.15
12679	Resistor—2.2 meg., ½ watt (R3)	.20
14343	Retainer—Retaining spring for station selector knob shaft	.03
14887	Retainer—Drive cord pulley retainer	.01
4669	Screw—No. 8-32 square head set screw for drum Stock No. 31372	.03
31368	Shaft—Station selector knob shaft and pulley	.30
31418	Spring—Indicator, or drum drive cord tension spring	.05
31364	Socket—Dial lamp socket	.20
31365	Socket—Electric tuning indicator lamp socket (insulated)	.30
13871	Socket—Magic Eye socket	.45
14278	Socket—Pickup socket	.25
31251	Socket—Tube socket	.25
31367	Switch—Range switch (S1) used in RC-351F and RC-351F "M" only	1.05
32490	Switch—Range switch (S1) used in RC-351F "R" only	1.10
32498	Switch—Station selector push-button switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45)	3.85
30902	Transformer—1st I-F transformer (L10, L11, C5, C6) used in RC-351F and RC-351F "M" only	1.90
14376	Transformer—1st I-F transformer (L10, L11, C5, C6) used in RC-351F "R" only	2.45
30903	Transformer—2nd I-F transformer (L12, L13, C7, C8) used in RC-351F and RC-351F "M" only	1.80
14283	Transformer—2nd I-F transformer (L12, L13, C7, C8, C37, R4, R5) used in RC-351F "R" only	3.80
31445	Transformer—Power transformer 100-120 volts, 25-60 cycle (T1)	7.80
31390	Transformer—Power transformer 100-120 volts, 50-60 cycle (T1)	6.35
31446	Transformer—Power transformer 100-130/140-160/195-250 volts, 50-60 cycle (T1)	8.05
	SPEAKER ASSEMBLIES (RL-70-F3)	
13966	Cap—Dust cap for cone center	.03
12012	Coil—Field coil (L12)	2.90
11469	Coil—Hum neutralizing coil (L14)	.30
31275	Cone—Speaker cone and voice coil (L13)	1.75
31302	Plug—4-contact male plug	.25
31306	Speaker—Speaker complete	10.95
14358	Screw—Screw, washer, and lockwasher to hold core in yoke	.04
31301	Transformer—Output transformer (T2)	1.70
14357	Washer—Spring washer to hold field coil	.06
	MISCELLANEOUS ASSEMBLIES	
12038	Band—Rubber band for "Magic Eye"	.02
31397	Button—Station selector push button	.15
31456	Cover—8 protective covers for push button markers	.08
31396	Dial—Dial scale (glass) used in RC-351F and RC-351F "M" only	.95
32356	Dial—Dial scale (glass) used in RC-351F "R" only	.70
31395	Escutcheon—Station selector escutcheon—less dial scale and push buttons	1.15
31407	Escutcheon—"Magic Eye" or "Electric Tuning" indicator escutcheon	.25
31392	Indicator—Station selector indicator pointer	.30
31355	Knob—Range switch knob	.12
14359	Knob—Station selector knob	.20
31391	Knob—Tone control knob	.15
30778	Knob—Volume control knob	.15
31688	Marker—Station call letter markers for push buttons	.35
31458	Marker—"Dial Tuning" marker for push button	.01
31457	Marker—"Victrola" marker for push button	.01
31393	Screen—Station selector dial color screen and light diffuser	.40
4982	Spring—Retaining spring for knob Stock No. 14359	.05
14270	Spring—Retaining spring for knob Stock Nos. 31355 and 30773	.05
30330	Spring—Retaining spring for knob Stock No. 31391	.03
31394	Stop—Indicator pointer slide stop	.08

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

RCA MFG. CO., INC.

MODEL R-98, Chassis RS-77
Schematic, Voltage, Socket
Speaker Connections



— 1939 No. 20 —

* **NOTE:** Values with star are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

RCA Tube Complement

(1)	RCA-6J5	1st Audio Amplifier
(2)	RCA-6J5	2nd Audio Amplifier
(3)	RCA-2A3	Power Output
(4)	RCA-2A3	Power Output
(5)	RCA-5U4-G	Rectifier

Power Supply Rating

A .... 105-125 volts, 50-60 cycles, 175 watts
A-6 .... 105-125 volts, 60 cycles, 175 watts

Power Output

Undistorted .... 12 watts
Maximum .... 18.5 watts

Loudspeaker

Type .... Eight-Inch Electrodynamic
Voice Coil Impedance .... 1.3 ohms at 400 cycles

Motor Board

Motor .... Self-starting Induction
Turntable Speed .... 78 r.p.m. (adjustable)

Pickup

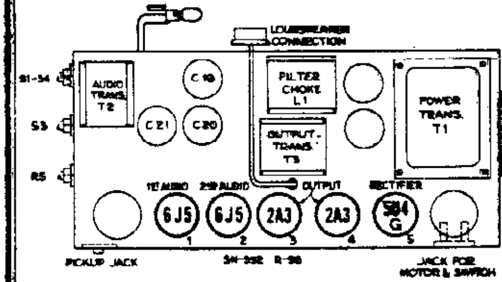
Type .... Crystal
Impedance .... 100,000 ohms at 1,000 cycles

Cabinet Dimension.................... Height 14¼ inches.................... Width 19⅞ inches.................... Depth 14 inches
Chassis Base Dimensions.................... Height 2⅞ inches.................... Width 16¼ inches.................... Depth 7⅞ inches
Weight (Shipping) ....54 pounds.................... Weight (Net)....................47½ pounds

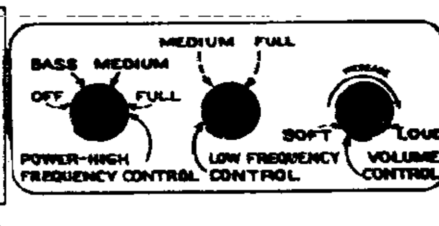
General Description and Service Data

The model R-98 Victrola consists of a crystal pickup, a five tube audio amplifier, a eight inch dust-proof electrodynamic speaker, and a motor turntable mechanism all combined in a hinged-top, table type walnut veneer cabinet. This instrument will reproduce records up to 12-inches in size.

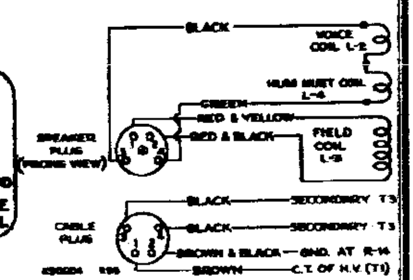
The crystal pickup unit is securely sealed in a metal casing, for protection against extreme changes in atmospheric conditions. If failure occurs, a new replacement crystal unit should be installed.



Top View, Showing Location of Parts



Location of Controls



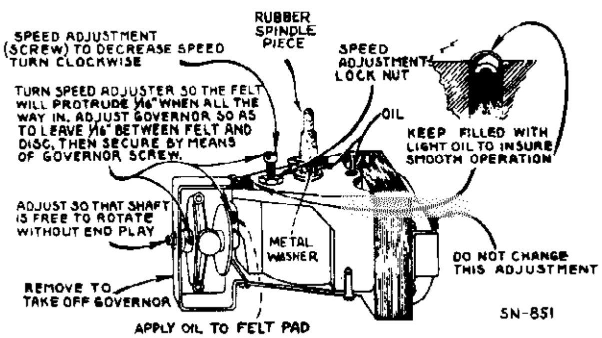
Connections of Loudspeaker and Cable

MODEL R-98, Chassis RS-77
Motor Data, Switch Assembly
Parts List

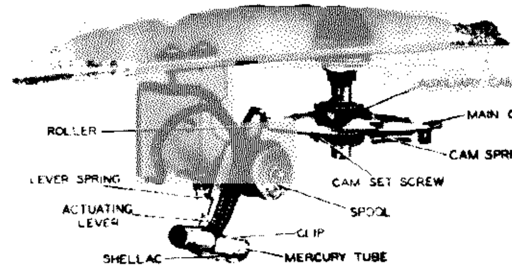
RCA MFG. CO., INC.

RCA Victor MODEL R-98 (Chassis No. RS-77)

Five-Tube, A-C, Electric Victrola (Phono. only)



Motor Lubrication and Adjustments



Mercury Switch Assembly
(Shown with pickup in rest position)

Adjust main cam so that switch trips into the "off" position when needle is 1¾ inches from the center line of motor spindle.

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	AMPLIFIER ASSEMBLIES	
12723	Capacitor—56 mmfd. (C3, C4)	.35
12635	Capacitor—1,000 mmfd. (C15, C16)	.50
31033	Capacitor—1,500 mmfd. (C2)	.35
30303	Capacitor—.0035 mfd. (C7, C14)	.40
4838	Capacitor—.005 mfd. (C6, C17, C18)	.25
5148	Capacitor—.007 mfd. (C13)	.20
4937	Capacitor—.01 mfd. (C5)	.25
32787	Capacitor—.05 mfd. (C9)	.20
14626	Capacitor—.07 mfd. (C1)	.25
12484	Capacitor—0.25 mfd. (C10, C12, C22)	.30
11203	Capacitor—Electrolytic, 10 mfd (C20)	1.15
14273	Capacitor—Electrolytic, one 10 mfd., and one 20 mfd. sections (C8, C11)	1.10
11496	Capacitor—Electrolytic, 18 mfd. (C21)	1.35
14531	Capacitor—Electrolytic, 25 mfd. (C19)	1.55
33396	Control—H.F. tone control and switch (S1, S4)	1.00
33397	Control—L.F. tone control (S3)	.45
5040	Plug—Speaker cable plug	.30
12466	Reactor—Filter reactor (L1)	4.20
12194	Resistor—1,800 ohms, ¼ watt (R10)	.20
33482	Resistor—voltage divider, 3,800 ohms (R14)	.75
13714	Resistor—5,600 ohms, ¼ watt (R6)	.20
14559	Resistor—10,000 ohms, ¼ watt (R2)	.20
12738	Resistor—27,000 ohms, ¼ watt (R4)	.20
12266	Resistor—39,000 ohms, ¼ watt (R1)	.20
12286	Resistor—56,000 ohms, ¼ watt (R12) (R3)	.20
17440	Resistor—56.000 ohms, 1 watt (R11)	.22
14560	Resistor—100,000 ohms, ¼ watt (R7)	.20
13734	Resistor—120,000 ohms, ¼ watt (R13)	.20
12199	Resistor—270,000 ohms, ¼ watt (R8)	.20
12285	Resistor—470,000 ohms, ¼ watt (R9)	.20
4794	Socket—Tube socket—4-prong	.25
32537	Socket—Tube socket—8-prong	.20
14275	Socket—2 contact female for motor power	.25
14274	Socket—2 contact female for pickup input	.25
13964	Transformer—Driver transformer (T2)	3.70
33405	Transformer—Output transformer (T3)	3.85
14271	Transformer—Power transformer, 105-120 volts, 50-60 cycles	7.95
33398	Volume Control (R5)	1.50
	PICKUP AND ARM ASSEMBLIES	
33399	Arm—Pickup arm less crystal cartridge, cable, and base and pivot arm	1.60
33400	Base—Pickup arm base and pivot shaft	1.00
32885	Cable—Pickup arm cable and plug	.25
31156	Crystal—Pickup crystal cartridge and screw	4.25
31160	Screw—Pickup needle screw	.12
	MOTOR ASSEMBLIES	
31617	Bracket—Governor end bearing bracket less bearing screw for 50 and 50-60 cycle motors	.30
31619	Coil—Field coils and laminations for 50-60 cycle motor	7.80

STOCK No.	DESCRIPTION	Unit List Price
31618	Coil—Field coils and laminations for 60 cycle motor	5.50
11703	Governor—Governor complete for 50-60 cycle motor	3.05
31623	Governor—Governor complete for 60 cycle motor	2.80
31462	Motor—105-125 volts, 50-60 cycle	20.20
31461	Motor—105-125 volts, 60 cycle	17.35
31616	Screw—Rotor bearing screw and nut for 60 and 50-60 cycle motor	.25
31620	Screw—Speed regulator screw and nut for 60 and 50-60 cycle motor	.20
31621	Shaft—Turntable spindle and gear for 60 and 50-60 cycle motor	1.90
31622	Washer—one felt and one metal thrust washer for turntable spindle	.10
32914	Weight—Governor weight and spring for 50-60 cycle motor	.30
32912	Weight—Governor weight and spring for 60 cycle motor	.25
	AUTOMATIC SWITCH ASSEMBLIES	
32863	Cam—Cam assembly comprising main and auxiliary cams, hub, and set screws	.65
32864	Lever—Actuating lever with roller and mercury tube clip	.45
14195	Screw—No. 10-32 x 5/16 cone pointer set screw for cam hub	.05
32869	Screw—No. 10-32 x 5/16 set screw for cam hub	.01
32868	Spring—Actuating lever tension spring	.05
32867	Spring—Cam tension spring	.05
32865	Support—Switch support and terminal board	.40
32866	Switch—Mercury tube with leads (S2)	1.75
31608	Washer—"C" washer for actuating lever shaft	.01
	SPEAKER ASSEMBLIES (84613-1)	
33648	Cone—Cone assembled with voice coil, center suspension and rim gasket	1.75
5039	Plug—4-prong male connector for reproducer	.30
33490	Speaker complete (No Output Transformer)	5.50
	MISCELLANEOUS ASSEMBLIES	
13103	Cap—Pilot lamp bullseye	.15
33403	Cup—New needle cup	.30
9848	Cup—Used needle cup and pickup arm support	.75
31464	Damper—Turntable damper sleeve and plate	.30
11771	Foot—Cabinet foot	.02
13085	Hinge—Cabinet lid hinge	.22
31355	Knob—Volume control, or tone control knob	.12
33402	Mounting—Motor mounting screws, washers, and spacers	.40
14805	Plug—Plug for motor leads	.20
31155	Spring—Coil spring for used needle cup lid	.04
14270	Spring—Retaining spring for knobs	.05
31164	Support—Cabinet lid support	.45
33401	Turntable	2.30

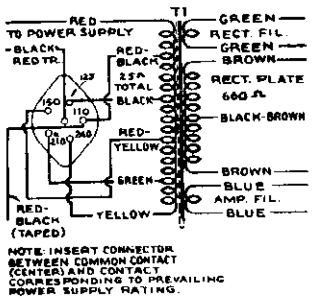
ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

First Edition

Printed in U. S. A.

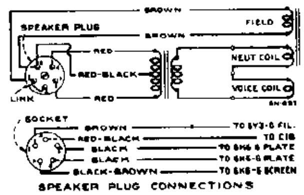
RCA MFG. CO., INC.

MODELS 98T, 98K2, Chas. RC-386A
Schematic, Socket, Trimmers
Transformer, Speaker, Data



UNIVERSAL TRANS. CONNECTIONS

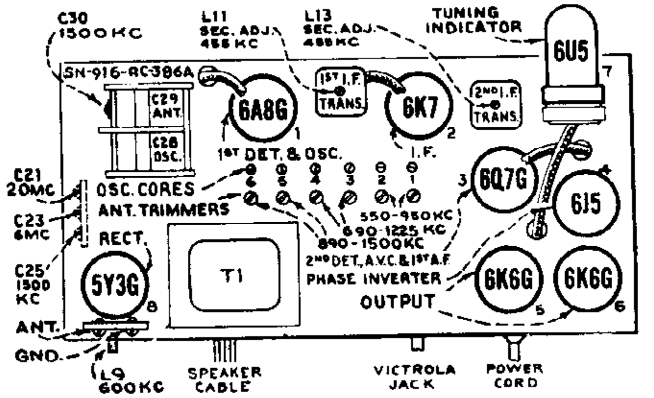
Above—Universal Power Transformer Connections. (110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.)



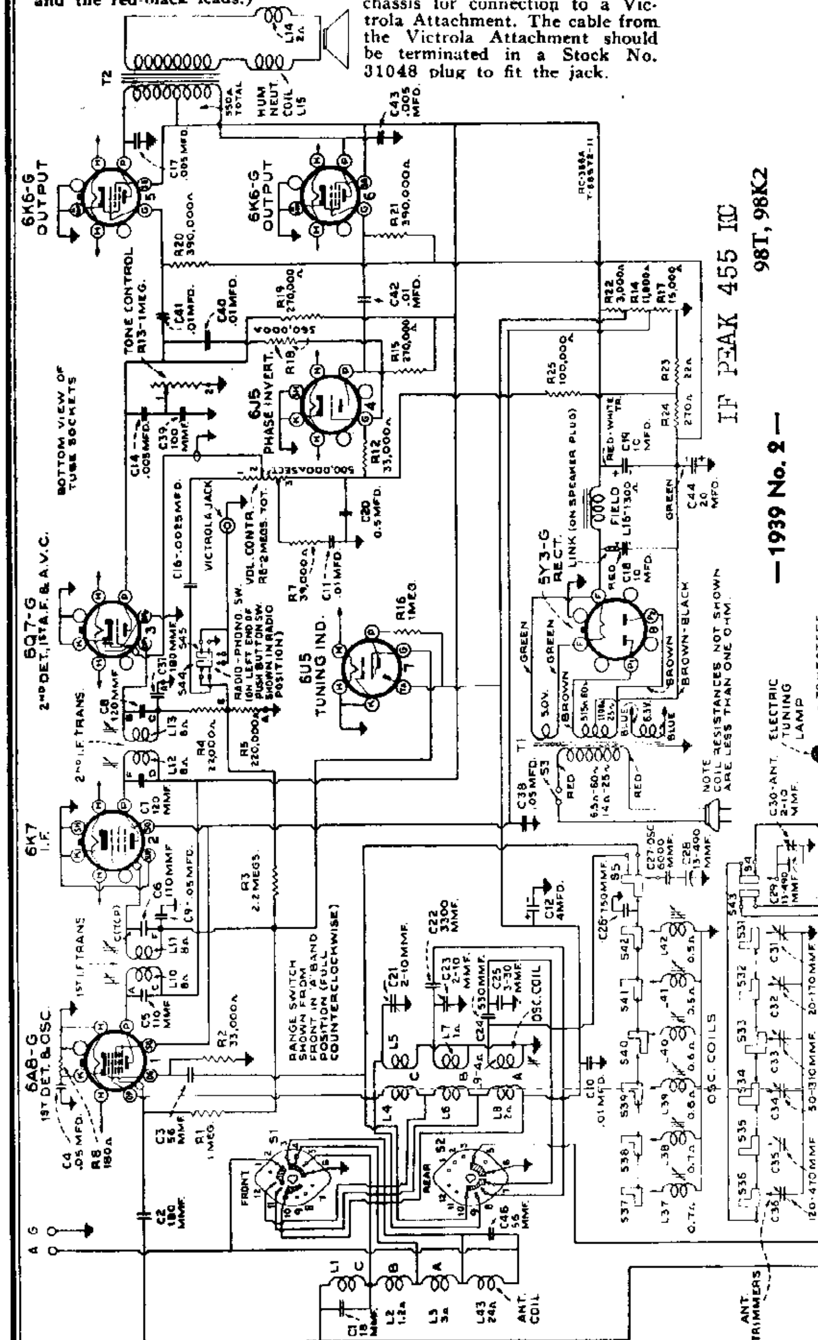
Connections and Colors of Loudspeaker and Cable

Loudspeaker.—The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting away the front dust cover. A new cover should be cemented in place upon completion of the adjustment.

Victrola Attachment.—A jack is provided on the rear of the chassis for connection to a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.



Tube and Trimmer Locations



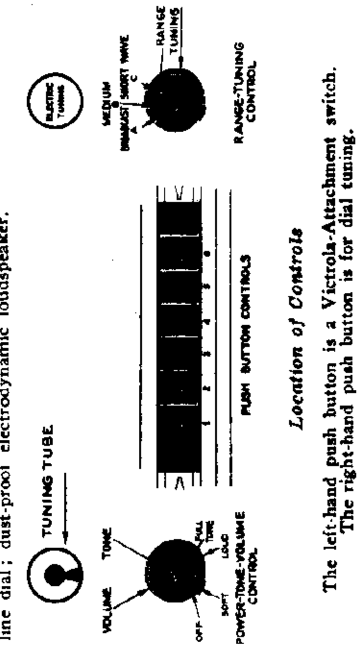
IF PEAK 455 KC

98T, 98K2

—1939 No. 2—

The 98T is a table model; the 98K2 a console model. Both models have a "Magic Eye" tuning tube and illuminated indicator to show when the set is being operated on electric tuning. All models have electric tuning for six stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; aural-compensated volume control; high-frequency tone control; jack and switch for Victrola attachment; straight-line dial; dust-proof electrodynamic loudspeaker.



Location of Controls

The left-hand push button is a Victrola-Attachment switch.
The right-hand push button is for dial tuning.

Frequency Ranges

"Standard Broadcast" (A)	540-1,720 kc
"Medium Wave" (B)	2.3-7 mc
"Short Wave" (C)	7-22 mc
Six Electric Tuning Positions	550-1,500 kc
2 stations between approximately 550- 950 kc (Buttons 1 and 2)	
2 stations between approximately 690-1,225 kc (Buttons 3 and 4)	
2 stations between approximately 890-1,500 kc (Buttons 5 and 6)	
Intermediate Frequency	455 kc

Power Supply Ratings

A	105-125 volts, 50-60 cycles, 115 watts
B	105-125 volts, 25-60 cycles, 115 watts
C	100-130/140-160/200-250 volts, 40-60 cycles, 115 watts

Power Output

Undistorted	5 watts
Maximum	5.5 watts

Loudspeaker

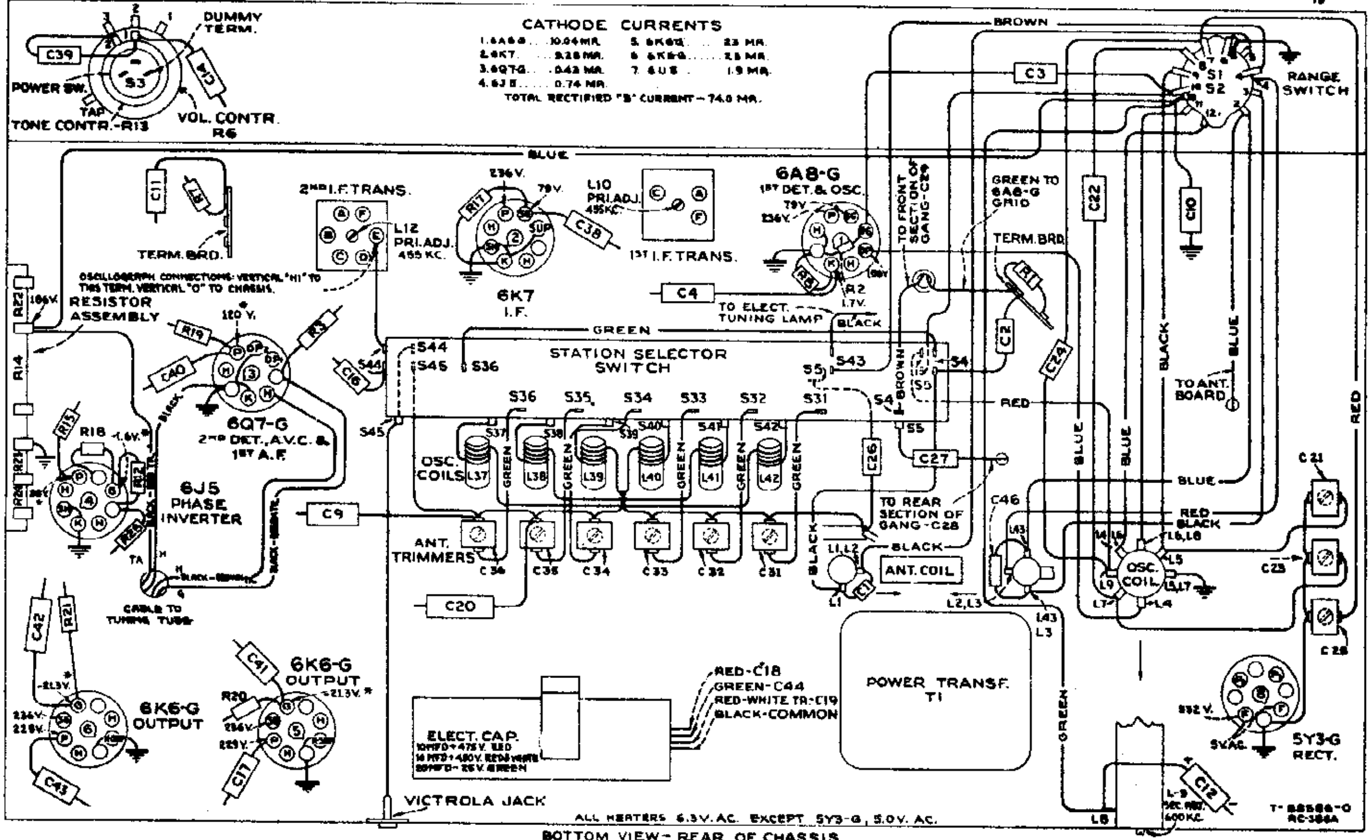
Type	Electrodynamic
Diameter	98T, 6 inches; 98K2, 12 inches
Voice Coil Impedance	2.2 ohms at 400 cycles

	Model 98T	Model 98K2
Height	12¼ inches	42 inches
Width	18⅝ inches	27½ inches
Depth	9⅞ inches	15½ inches
Net Weight	21 pounds	55 pounds
Shipping Weight	28 pounds	73 pounds

Chassis Base Dimensions	13 in. x 6¾ in. x 2¼ in.
Over-all Chassis Height	6½ inches
Tuning Drive Ratio	12 to 1

MODELS 98T, 98K2, Chas. RC-386A
Voltage, Chassis Wiring
Alignment, Drive Data

RCA MFG. CO., INC.



R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ± 20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

Alignment Procedure

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed ⅛-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

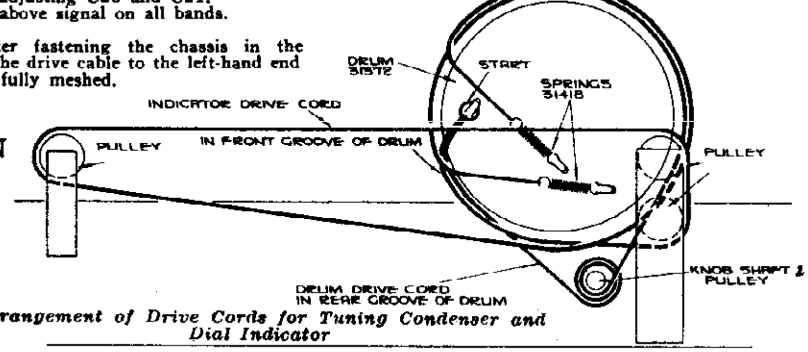
Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

*Use minimum capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.
Note.—Oscillator tracks 455 kc above signal on all bands.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, move the dial indicator on the drive cable to the left-hand end mark on dial, with gang condenser fully meshed.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio-dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Transformer)
2	6A8G det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Transformer)
3	Antenna Terminal, in series with 200 mmf.	600 kc	600 kc (150.5°) "A" band	L9
4		1,500 kc	1,500 kc (28°) "A" band	C25 (osc.) C30 (ant.)
5	Repeat steps 3 and 4.			
6	Antenna Terminal, in series with 400 ohms.	6 mc	6 mc (26.5°) "B" band	C23 (osc.)*
7		20 mc	20 mc (22°) "C" band	C21 (osc.)*
8	Follow "Adjustments for Electric Tuning."			

FOR DIAL CALIBRATION
SEE INDEX



Arrangement of Drive Cords for Tuning Condenser and Dial Indicator

DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

MODELS 98T, 98K2, Chas. RC-386A
RCA MFG. CO., INC. Tuner Adjustments, Parts List

Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. **Adjust for each of the remaining five stations in the same manner.**
6. **Make a final careful adjustment of the oscillator cores and antenna trimmers.**

Precautionary Lead Dress.—

1. Dress red leads from power transformer to power switch (S3), in corner of chassis and away from volume control terminals.
2. Dress brown lead from push-button switch to gang over end of switch, and away from C27 and bus between S5 and range switch.
3. Leads to C27 must be as short as possible.
4. Blue lead from range switch to oscillator coil must be as short as possible and dressed away from other leads. All leads should be dressed away from antenna coil.
5. Leads across back of chassis must be dressed under electrolytic away from Victrola jack.
6. Parts and leads should be dressed away from R22-R14 as it becomes heated.
7. Leads from oscillator coil to trimmers must be dressed away from coil.
8. Green lead from S4 to range switch must be clear of other leads and away from front edge of chassis.

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-386-A)	
30752	Bracket—Magic eye bracket and clip	.25
14517	Board—"Antenna"—"Gnd" terminal board	.25
30766	Cap—Rubber cap for magic eye	.15
32142	Capacitor—Dry electrolytic capacitor comprising two 10 and one 20 mfd. sections (C18, C19, C44)	1.90
31400	Capacitor—Mica trimmer capacitor comprising two sections of 2-10 mmfd. and one section of 3-30 mmfd. (C21, C23, C25)	.50
32486	Capacitor—Trimmer capacitor bank for push button switch (C31, C32, C33, C34, C35, C36)	1.40
12722	Capacitor—18 mmfd. (C1)	.35
12723	Capacitor—56 mmfd. (C3, C46)	.35
30406	Capacitor—100 mmfd. (C39)	.35
14262	Capacitor—109 mmfd. (C5, C6)	.30
12404	Capacitor—120 mmfd. (C7, C8)	.30
14712	Capacitor—180 mmfd. (C37)	.30
30232	Capacitor—180 mmfd. (C2)	.35
32492	Capacitor—530 mmfd. (C24)	.40
31435	Capacitor—750 mmfd. (C26)	.40
4881	Capacitor—3300 mmfd. (C22)	.60
31405	Capacitor—6000 mmfd. (C27)	.75
5107	Capacitor—.0025 mfd., 700 volts (C16)	.20
4838	Capacitor—.005 mfd., 1000 volts (C14, C17, C43)	.25
4858	Capacitor—.01 mfd., 500 volts (C10, C40 C41, C42)	.25
14393	Capacitor—.01 mfd., 300 volts (C11)	.30
30882	Capacitor—.05 mfd., 200 volts (C4, C9, C38)	.20
30867	Capacitor—.5 mfd., 200 volts (C20)	.30
32145	Capacitor—4 mfd. (C12)	.70
31382	Clip—Coil and core mounting clip for push button switch	.04
32493	Coil—Antenna coil (L1, L2, L3, L43)	1.35
31951	Coil—Oscillator coil (L4, L5, L7, L9)	1.40
31385	Coil—Push button oscillator coil 550 to 950 kc. (L37, L38)	.30
32487	Coil—Push button oscillator coil 690 to 1225 kc. (L39, L40)	.35
31383	Coil—Push button oscillator coil 890 to 1500 kc. (L41, L42)	.30
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30)	2.65
32668	Control—Volume control, tone control and power switch (R6, R13, S3)	3.00
32634	Cord—Variable condenser drive or pointer indicator cord	.10
12800	Core and Stud for oscillator coil Stock No. 31951	.35
31372	Drum—Variable condenser drive cord drum	.65
32552	Indicator—Indicator pointer assembly	.20
11891	Lamp—Dial or electric tuning indicator lamp	.17
32670	Plate—Dial color plate (Metal)	.75
31373	Pulley—Pointer drive cord pulley (¾ in. dia.)	.08
30545	Resistor—180 ohms, ½ watt (R8)	.20
5114	Resistor—15,000 ohms, 1 watt (R17)	.22
14284	Resistor—22,000 ohms, 1/10 watt (R4)	.15
12464	Resistor—33,000 ohms, ½ watt (R2, R12)	.20
12266	Resistor—39,000 ohms, ½ watt (R7)	.20
14560	Resistor—100,000 ohms, ½ watt (R25)	.20
11398	Resistor—220,000 ohms, 1/10 watt (R5)	.15
12199	Resistor—270,000 ohms, ½ watt (R15, R19)	.20
13479	Resistor—390,000 ohms, ½ watt (R20, R21)	.20
12486	Resistor—560,000 ohms, ½ watt (R18)	.20
13730	Resistor—1 meg., ½ watt (R1)	.20
12013	Resistor—1 meg., 1/10 watt (R16)	.15
12679	Resistor—2.2 meg., ½ watt (R3)	.20
32143	Resistor—Voltage divider tapped at 22 ohm, 270 ohm, 3000 ohm, 11,000 ohm. (R14, R22, R23, R24)	.90
14887	Retainer—Retainer for pointer indicator drive cord pulley	.01
14343	Retainer—Retaining ring for tuning knob shaft	.03
4669	Screw—No. 8-32 set screw for variable condenser drive cord drum	.03
32671	Shaft—Tuning drive shaft and pulley	.35
31199	Shield—Dial lamp shield	.04
3682	Shield—Tube shield	.22
31364	Socket—Dial lamp socket	.20
31365	Socket—Insulated socket for electric tuning indicator lamp	.30
13871	Socket—Magic eye socket	.45
31251	Socket—Octal base tube socket	.25
14278	Socket—Phonograph input socket	.25
12493	Socket—Speaker cable socket	.30
31418	Spring—Coil tension spring for variable condenser or pointer drive cord	.05
32498	Switch—Push button selector switch (S4, S5, S37, S38, S39, S40, S41, S42, S43, S36, S35, S34, S33, S32, S31, S44, S45)	3.85
32669	Switch—Range switch (S1, S2)	1.10
14376	Transformer—First i.f. transformer (L10, L11, C5, C6)	2.45
14283	Transformer—Second i.f. transformer (L12, L13, C7, C8, C37, R4, R5)	3.80
31445	Transformer—Power transformer, 110 volt, 25/60 cycle (T1)	7.80
32144	Transformer—Power transformer, 110 volt, 50/60 cycle (T1)	4.75
31446	Transformer—Power transformer, 110-125-150-210-240 volts 40/60 cycle (T1)	8.05
	SPEAKER ASSEMBLIES (RL-70H-5) MODEL 98K2	
13866	Cap—Dust cap for cone center	.03
12012	Coil—Field coil (L16)	2.90
11469	Coil—Neutralizing coil (L15)	.30
31275	Cone—Speaker cone and voice coil (L14)	1.75
31539	Plug—5-contact male plug for speaker	.25
32146	Speaker complete	12.10
14534	Transformer—Output transformer (T2)	3.85
14357	Washer—Spring washer to hold field coil securely	.06
	SPEAKER ASSEMBLIES (84308-3) MODEL 98T	
32689	Coil—Speaker field coil (L16)	3.35
32688	Cone—Cone and voice coil mounted and centered on housing (L14)	1.85
31539	Plug—5-contact plug or speaker	.25
32687	Speaker—Speaker complete	5.80
32690	Transformer—Output transformer (T2)	1.45
	MISCELLANEOUS ASSEMBLIES	
31397	Button—Station selector push button	.15
31456	Covers—8 Protective covers for push button markers	.08
32673	Dial—Station selector glass dial	.60
32674	Escutcheon—Station selector escutcheon — less push buttons	3.85
31355	Knob—Range switch knob	.12
31391	Knob—Tone control knob	.15
14359	Knob—Tuning knob	.20
30773	Knob—Volume control knob	.15
31458	Marker—"Dial Tuning" push button marker	.01
31457	Marker—"Record Player" push button marker	.01
31589	Marker—Station markers	.35
30330	Spring for tone control knob	.03
4982	Spring for tuning knob	.05
14270	Spring for volume control or range switch knob	.05

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MODEL R-100
Victrola Attachment
Motor Data, Tone Compensation
Parts List

RCA MFG. CO., INC.

RCA Victor Model R-100 Victrola Attachment

Motor Data

Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs, it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make sure that the leather and steel washers are arranged in proper sequence, as shown in the drawings.)
3. Motor not properly fastened in cabinet.
4. Burrs on poles of motor or stator.
5. Slight eccentricity of rotor or spindle.
6. Loose laminations of the stator.
7. Improper horizontal alignment of the rotor and stator (pertaining only to the type motor shown in **Figure 1**). Correct horizontal alignment is as shown in the motor assembly drawing. The position of the stator is raised or lowered by adding or removing washers below the leather washer. In the type motor shown in Figure 2, no adjustment is necessary because correct horizontal alignment is provided by the design of the motor.

The damper spring must fit without binding or chattering, in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. Any binding in the washers or stator bearing which prevents the movement of the stator may cause speed variations in the motor. The damper spring must exert equal force in restoring the stator to its mid-position when the stator is deflected manually in either direction.

Tone Compensation

Because of the widely varying frequency characteristics of various types of audio amplifiers with which the R-100 may be used, it may be desirable in some cases to make refinements in the pickup circuit of the R-100 to compensate for the characteristics of the amplifier. The following circuits show means of making such refinements.

In Figure 3, R1 controls the low-frequency response; larger values of R1 give increased lows. For maximum low-frequency response, remove R1. R2 controls pickup output, smaller values of R2 giving increased output. C1 controls high-frequency response; to increase highs, increase C1.

Where a decrease in high-frequency response may be desired (for example, as an aid in reducing "needle scratch" on worn records), the circuit in Figure 4 is applicable. In this circuit, C2 acts as loading on the pickup and is also a controlling factor on the high-frequency response. Smaller values of C2 give more pickup output and also more highs. R3 gives a sharper high-frequency reduction; increasing R3 decreases highs.

The suggested values shown in **Figures 3 and 4** should serve as a basis from which slight alterations may be made to suit individual cases.

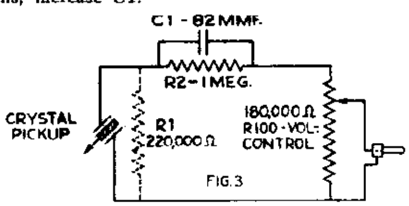


FIG. 3

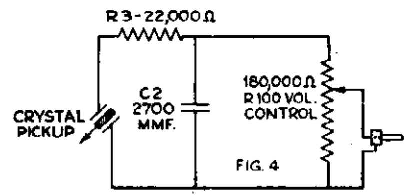


FIG. 4

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	PICKUP AND ARM ASSEMBLIES	
33121	Arm—Pickup arm complete—less crystal cartridge	1.75
33124	Base—Pickup arm base and pivot shaft	.80
33122	Crystal—Pickup crystal cartridge and needle screw	4.35
33123	Damper—Viscoloid damper for pickup armature.	.15
33529	Screw—Pickup needle screw	.15
	MOTOR ASSEMBLIES (see figure 1)	
31045	Base—Motor support, damper, and bearing cup assembly	.80
31046	Bearing—Rotor bearing—50 and 25 cycle	.70
33353	Cap—Turntable spindle cap (rubber)	.10
33357	Coil—Motor field coil—105-120 volts, 25 cycle.	.60
31918	Coil—Motor field coil—105-120 volts, 50 cycle.	.70
31917	Coil—Motor field coil, 105-120 V., 60 cycle.	.70
31040	Cushion—One seat rubber cushion for turntable mounting	.25
31047	Cushion—Rubber cushion for rotor bearing	.15
33941	Frame—Rotor frame and spindle—60 cycle	
33641	Lamination—Rotor lamination—60 cycle	1.30
33358	Lamination—Stator laminations—25 cycle	1.30
33354	Lamination—Stator laminations—less coil 50 cycle	1.00
33355	Motor—105-120 volts, 25 cycle	11.75
33351	Motor—105-120 volts, 50 cycle	7.65
33940	Motor—105-120 V., 60 cycle	
32075	Ring—Lead ring for turntable—25 cycle	1.85
33041	Ring—Retaining ring and washer for spindle cap	.06
33356	Rotor—Rotor frame, laminations, and spindle shaft assembled—25 cycle	2.55
33352	Rotor—Rotor frame, laminations, and spindle shaft assembled—50 cycle	2.45
31036	Rotor—Turntable and rotor lamination for 60 cycle operation	4.55
31042	Stator—Stator assembly comprising coils and laminations for 60 cycle operation	2.50
32076	Turntable—Finished turntable plate only—25 cycle	1.40
31039	Turntable—Finished turntable plate only—50 cycle	.95
4083	Washer—Leather washer	.02
33348	Washers—Leather and metal washers for stator bearing	.10
14231	Washer—Metal spacing washer	.02
32074	Weight—One upper and one lower weight for stator—25 cycle (2 each required)	.65
	MOTOR ASSEMBLIES (see figure 2)	
33345	Cap—Turntable spindle cap (rubber) 60 cycle	.15
33346	Coil—Motor field coil—105-120 volts, 60 cycle.	.65
31040	Cushion—One set rubber cushion for turntable mounting	.25
33350	Frame—Motor support frame and bearing cup	.45
33349	Hanger—Rubber hanger for mounting motor	.10
33347	Lamination—Stator laminations and bearing—less field coils—60 cycle	1.05
33343	Motor—105-120 volts, 60 cycle	6.95
33041	Ring—Retaining ring and washer for spindle cap	.06
33344	Rotor—Rotor frame, laminations, and spindle shaft assembled—60 cycle	2.45
31039	Turntable—Finished turntable plate only—60 cycle	.95
33348	Washers—Leather and metal washers for stator bearing	.10
	MISCELLANEOUS ASSEMBLIES	
31051	Foot—Cabinet foot	.04
3961	Knob—Volume control and switch knob	.10
32500	Mounting—Pickup arm mounting comprising one rubber cushion, 1 washer, and 1 snap ring	.15
31048	Plug—2-contact male plugs for output cable	.15
33359	Volume control and switch R1, S1	1.50

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Printed in U. S. A.

First Edition

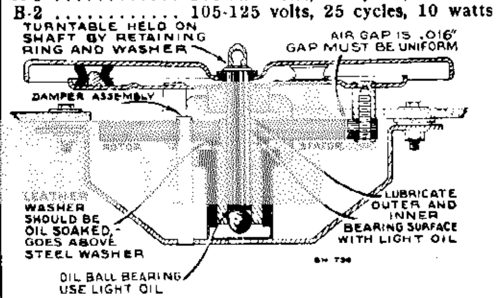
Motor, Pick-up Details
Receiver Connections

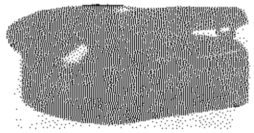
RCA MFG. CO., INC.

MODEL R-100
Victrola Attachment

Electrical and Mechanical Specifications

MOTOR
78 r.p.m. .... Synchronous (Manual Starting)
POWER SUPPLY RATINGS
A-6 .... 105-125 volts, 60 cycles, 10 watts
A-5 .... 105-125 volts, 50 cycles, 10 watts
B-2 .... 105-125 volts, 25 cycles, 10 watts





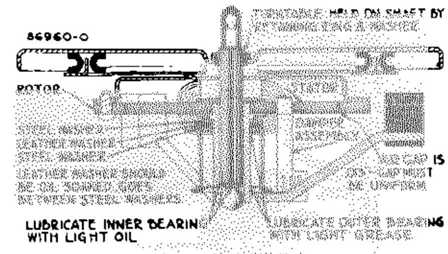
At Left—Fig. 1

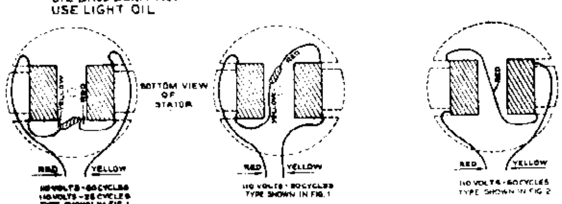
At Right—Fig. 2

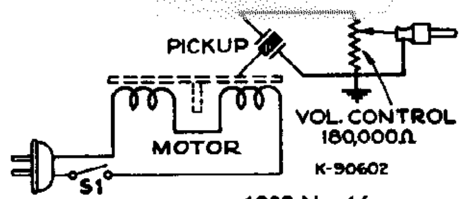
Lower Left—Motor Coil Connections

Lower Right—R-100 Schematic Diagram

CRYSTAL PICKUP
Impedance......... 100,000 ohms at 1,000 cycles
Average Output Voltage .... 1½ Volts at 1000 cycles across 250,000 ohms load
Cabinet Dimensions .... 5½ x 8¾ x 12 inches
Weight .... 6½ lbs. (net), 7 lbs (shipping)







—1939 No. 16—

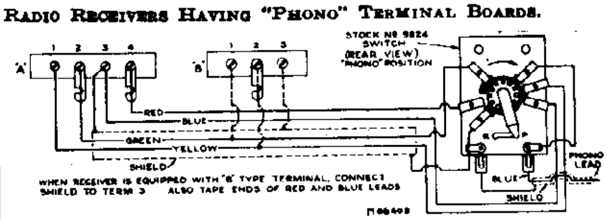
Connecting Victrola Attachment to Radio Receivers

Methods of connecting the Victrola Attachment to various types of audio systems are given in the accompanying text and illustrations. Also included are the model numbers of the various RCA receivers to which the particular method applies. The data given requires that an RCA Stock No. 9824 Radio-Phono switch be used for switching from radio to phonograph, as desired. For ease in connecting the "phono" lead to the Stock No. 9824 switch, the male plug on the end of the lead should be removed by unsoldering or by cutting it off.

1939 RCA Radios of the "90" Series:

Plug male connector on the end of the "phono" lead into the female connector on the receiver chassis. Push or turn the "Phono" switch to "Phono" position, and operate the Victrola Attachment according to instructions.

Radio Receivers Having "Phono" Terminal Boards.



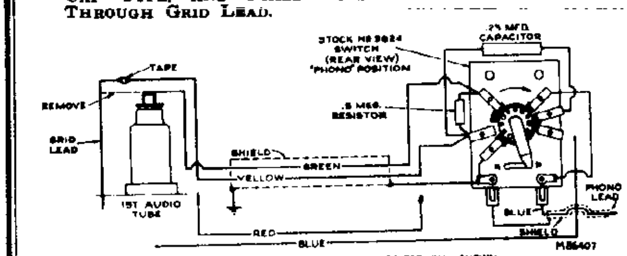
RCA Radio Receivers to which the above illustration applies: 5T1, 5T4, 5T5, 5T6, 5T7, 5T8, 6T5, 8T2, 8T11, 8K11, 85T5, 86E, 86K, 86T, 86T1, 86T4, 86K7, 86T44, 87K, 87T, 87K1, 87K2, 87T2, 88K, 810K, 810K1, 810T, 810T4, 811K, 812K, 813K, 816K, 811T.

For following Receivers, Yellow lead should go on Terminal No. 1, Green lead on Terminal No. 2: 6K2, 6T2, 6K3, 6T10, 7T1, 7K1, 85T8, 86T8, 87T1, 86T2, 86T6, 6K10.

Insulate shield of switch wires from chassis, on following RCA Receivers: 5T, 6T, 6K, 6K1, 7T, 7K, 7X, 8T, 8K, 86X4, 87EY, 87X, 87Y, 8T10, 7X1, 8K1.

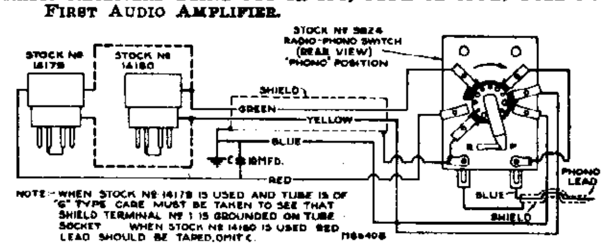
Receivers having a Four Terminal Board: 9K, 9T, 9K1, 9K2, 9K3, 9K10, 10T, 10K, 10K1, 13K, 15K. Reverse Red and Blue leads to Terminal Board of C9-6, T9-9, T8-16, C8-17.

Radio Receivers Whose First Audio Tube is of The Grid Cap Type, and Fixed Bias for Tube is Obtained Through Grid Lead.



In general, the Victrola Attachment must be used with radio receivers having at least two stages of high-gain audio amplification. The output of the Victrola Attachment should be connected to the input of the first audio tube, and at the same time the output of radio receiver portion of the chassis should be shorted or opened, to prevent radio signals being heard while the Victrola Attachment is in operation.

Radio Receivers Using 6C5 or 6J5, 6C5G or 6J5G, Tube For First Audio Amplifier.



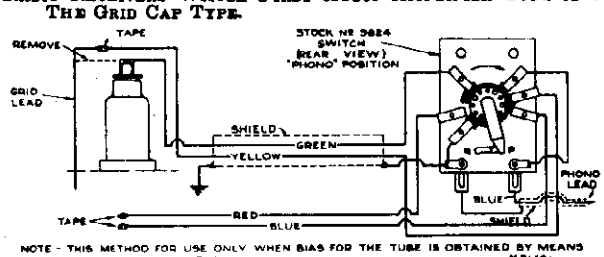
Stock No. 14179 Adaptor opens grid circuit, and inserts 2,70 ohm resistor in cathode of 6C5 or 6J5 tubes, for bias on Phono reproduction.

Stock No. 14180 Adaptor opens grid circuit of 6C5 or 6J5 tube

Stock No. 14180 Adaptor necessary for RCA: C11-1, C13-2, T10-1, C11-3, C13-3.

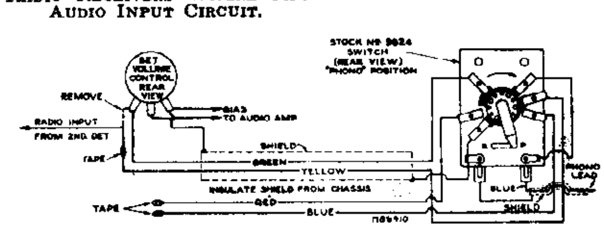
Stock No. 14179 Adaptor necessary for RCA: C15-3, C15-4.

Radio Receivers Whose First Audio Amplifier Tube is of The Grid Cap Type.



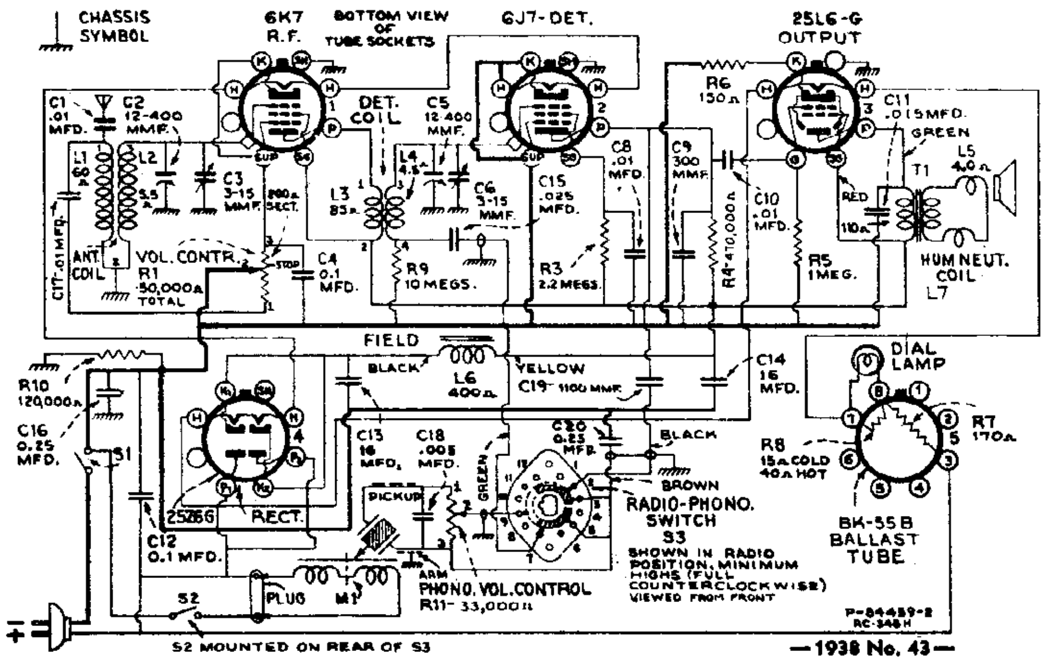
RCA Receivers for which above method applies: 125, 128, 128E, 224E, 225, 226, T6-1, C6-2, T6-9, T7-5, C7-6, T7-12, C7-1, T8-14, C8-15, T8-18, C8-19, C8-20, C9-4, T9-10.

Radio Receivers Where the Volume Control is in The Audio Input Circuit.



MODEL U-104
Chassis RC-345H
Schematic, Voltage
Chassis Wiring
Alignment Procedure

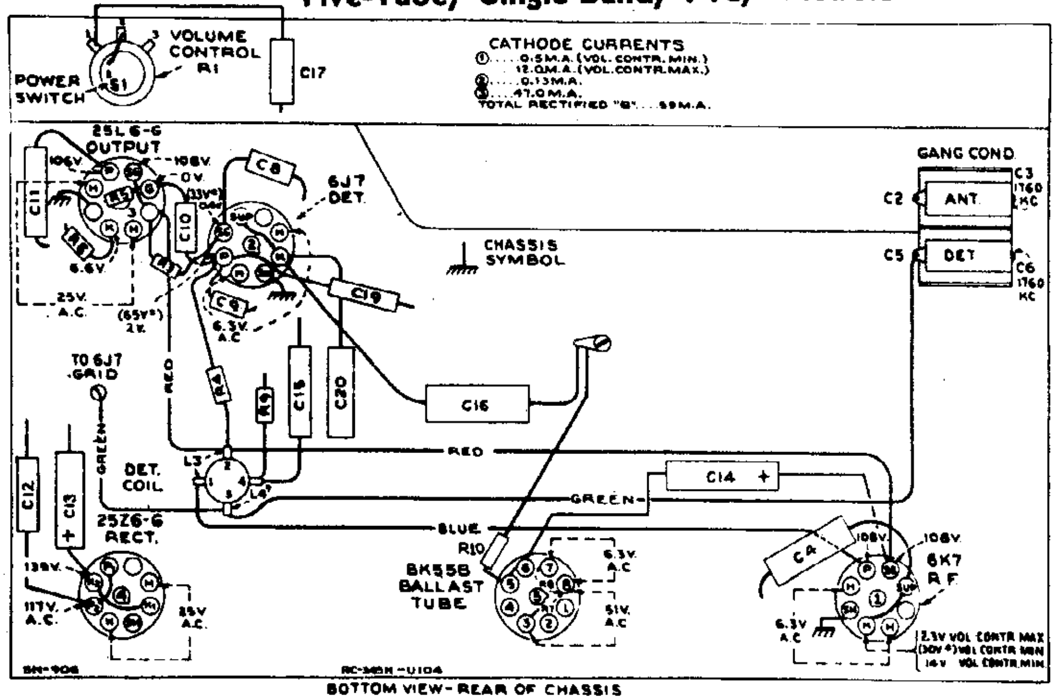
RCA MFG. CO., INC.



—1938 No. 43—

Five-Tube, Single-Band, AC, Victrola

U-104



R-F Wiring Diagram and Socket Voltages
Measurements made to common negative line, unless otherwise specified

* Note: Values with star (*) are **operating** voltages. Values not starred are actual **measured** voltages.

Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, 250, and 500 volts. (Use nearest range above the specified measured voltage.)

Values should hold within approximately ± 20% for 117 volt 60 cycle supply.

Frequency Range: 540-1,720 kc
Alignment Frequency: 1,760 kc (ant., det.)

Power Output (125-volt, 60-cycle supply)
Undistorted: 1.0 watt
Maximum: 1.5 watts

Loudspeaker
Type: 5-inch Electrodynamic
Voice-Coil Impedance: 5 ohms at 400 cycles

Phonograph: Synchronous (manual starting)

Records: 10-inch and 12-inch, 78 r.p.m.
Pickup: Crystal, 100,000 ohms at 1,000 c.p.s.
Average Output of Pickup: 1½ volts at 1,000 c.p.s. across ¼-meg. load

Dial Lamp: Mazda No. 40, 6.3 volts, .15 amp.

Power Supply Ratings
A-5: 105-125 volts, 50 cycles, 60 watts
A-6: 105-125 volts, 60 cycles, 60 watts

Alignment Procedure

Reel up the antenna wire, and connect the high side of test-oscillator through an 80-mmfd. capacitor to the antenna terminal on the antenna transformer. Connect low side of oscillator to receiver chassis through a 0.1-mfd. capacitor. Turn gang condenser to minimum (full out), tune oscillator to 1,760 kc, connect an output meter across the voice coil, and turn volume control to maximum.

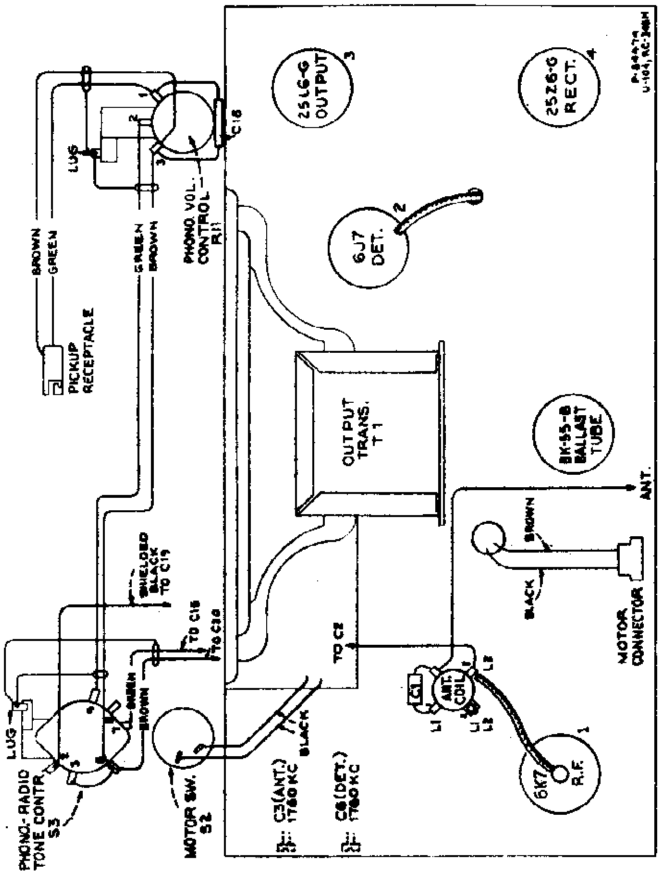
Adjust the two trimmers (C3 and C6) on side of gang condenser for maximum output, using lowest possible output from test-oscillator.

Turn pointer, while holding tuning knob, so that the pointer is horizontal and pointing to low-frequency end when the gang condenser is at maximum. Check pointer adjustment on a station.

Keep antenna roll and lead clear of chassis during alignment.

RCA MFG. CO., INC.

MODEL U-104
Chassis RC-345H
Chassis Wiring, Lead Dress
Pick-up, Phono. Data

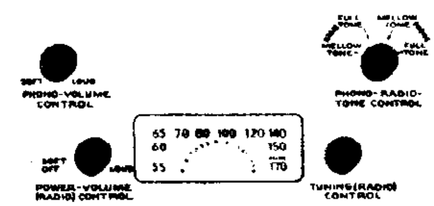


Precautionary Lead Dress

1. Dress power cord and line bypass C12 away from detector coil.
2. Plate lead from 6K7 to detector coil must be dressed close to chassis and run through center of chassis.
3. Green lead from detector coil to gang must be dressed clear of other leads.
4. Green lead from antenna coil to C17 must be dressed against front apron.
5. Dress all heater leads close to base.
6. Yellow lead from cathode 6K7 to volume control must be dressed against chassis, under gang condenser and against front apron.

Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

Antenna.—The set is equipped with a 25-foot antenna. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100- to 200-mmfd. capacitor in series with the lead-in.

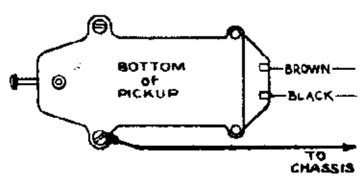


	Height	Width	Depth
Cabinet Dimensions (inches)	9	12¼	9⅝
Chassis Base (inches)	2½	9	5¼

Overall Chassis Height (inches) 6
Weight .... 16 lbs. (shipping)
Tuning Drive Ratio .... 1 to 1

PHONOGRAPH SERVICE DATA

U-104



Pickup Connections

The motor is started by turning the phono-radio tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

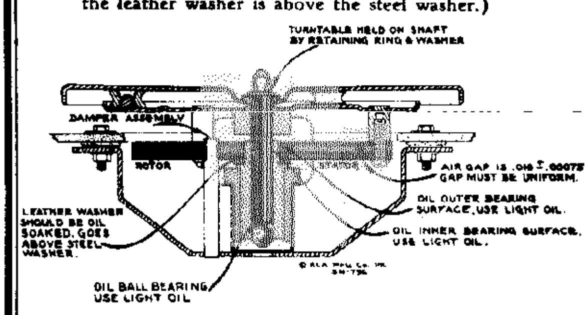
1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.
5. **The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of, the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.**

Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

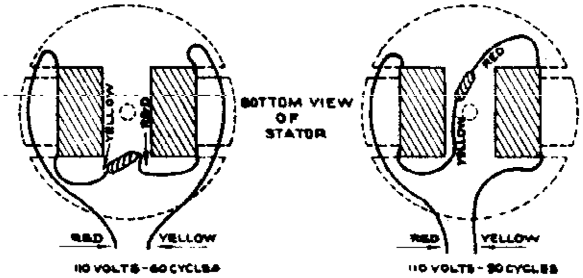
Rotor Adjustment.—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

Lubrication.—Oiling points are indicated in the diagram.

On Phonograph Operation, turn the radio volume control to minimum, and tune to a quiet point on the dial.



Cross Section of Motor Assembly
This drawing shows the lubrication points



Motor Coil Assembly and Connections
D-C resistance of each coil (for 110 volts, 50 and 60 cycles) is approximately 82 ohms

MODEL U-115
Chassis RC-348E
Parts List

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-348E)	
32136	Cable—Shielded cable and female plug for phonograph input	$0.35
12723	Capacitor—56 mmfd. (C4)	.35
30904	Capacitor—100 mmfd. (C7, C8, C9, C10)	.25
12725	Capacitor—150 mmfd. (C35)	.35
13003	Capacitor—180 mmfd. (C12)	.35
12488	Capacitor—270 mmfd. (C32)	.35
31435	Capacitor—750 mmfd. (C25)	.40
4838	Capacitor—.005 mfd. (C15, C26, C30)	.25
14393	Capacitor—.01 mfd. (C13, C14)	.30
4870	Capacitor—.025 mfd. (C34)	.20
4886	Capacitor—.05 mfd. (C11)	.20
30899	Capacitor—0.1 mfd. (C1, C31)	.30
31424	Capacitor—Comprising 2 sections 8 mfd. each (C16, C17) (This type has leads)	1.65
32342	Capacitor—Comprising 2 sections 10 mfd. each (C16, C17) (This type has terminals)	1.20
31382	Clip—Oscillator coil and core mounting clip	.04
32338	Coil—Antenna coil (L1, L2)	.85
31098	Coil—Oscillator coil (L3, L4)	.85
31422	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6, C33)	2.70
32355	Control—Volume control, tone control and power switch	3.00
30877	Cord—Indicator drive cord	.20
30905	Core—Adjustable core and stud for i-f transformers	.35
31386	Core—Adjustable core and stud for oscillator coils	.15
31421	Drum—Variable condenser drive cord drum	.45
31420	Indicator—Station selector indicator pointer	.10
11891	Lamp—Dial lamp	.17
31419	Plate—Dial color plate	.12
30868	Plug—2-contact female plug for motor power leads	.35
31373	Pulley—Indicator drive cord pulley	.08
31425	Resistor—Voltage divider—comprising one 22-ohm, one 18,000-ohm, one 8,200-ohm and one 3,900-ohm sections (R3, R11, R12, R15)	.90
31388	Resistor—390 ohms, 1 watt (R9)	.22
14559	Resistor—10,000 ohms, ¼ watt (R17)	.20
12738	Resistor—27,000 ohms, ¼ watt (R10)	.20
12286	Resistor—56,000 ohms, ¼ watt (R2)	.20
3252	Resistor—100,000 ohms, ¼ watt (R19)	.20
13734	Resistor—120,000 ohms, ¼ watt (R16)	.20
12199	Resistor—270,000 ohms, ¼ watt (R7)	.20
30963	Resistor—820,000 ohms, ¼ watt (R18)	.20
12679	Resistor—2.2 meg., ¼ watt (R4)	.20
13601	Resistor—10 meg., ¼ watt (R6)	.20
14887	Retainer—Pulley retainer	.01
14350	Screw—No. 8-32 square-head set screw for drum, Stock No. 31421	.03
31364	Socket—Dial lamp socket	.20
31251	Socket—Tube socket	.25
31418	Spring—Indicator drive cord tension spring	.05
31414	Switch—Push button station selector switch (S12, S13, S14, S15, S16, S17, S20, S21, S22, S23, S24, S25)	3.05
30902	Transformer—First i-f transformer (L5, L6, C7, C8)	1.90
30903	Transformer—Second i-f transformer (L7, L8, C9, C10)	1.80
31574	Transformer—Power transformer, 100-120 volts, 25-60 cycle (T1)	9.20
31380	Transformer—Power transformer, 100-120 volts, 50-60 cycle (T1)	6.35
31575	Transformer—Power transformer, 100-120 and 200-240 volts, 50-60 cycle (T1)	8.35
	MOTOR ASSEMBLIES * (Motor No. 84430)	
32176	Bearing—Rotor thrust bearing screw and nut	.25
32175	Field—Motor field coils and laminations	4.95
32135	Motor—105-125 volts, 60 cycle	12.60
32177	Shaft—Turntable spindle shaft and fibre gear	1.55
	(Motor No. 84484-2, 3, or 4)	
32336	Field—Motor field coils and laminations, 110 volts, 60 cycle (For Motor 84484-2)	5.10
32650	Field—Motor field coils and laminations, 110 volts, 50 cycle (For Motor 84484-3)	5.10
32652	Field—Motor field coils and laminations, 110 volts, 25 cycle (For Motor 84484-4)	6.90
32558	Motor—105-125 volts, 60 cycle (84484-2)	10.50
32637	Motor—105-125 volts, 50 cycle (84484-3)	11.20
32638	Motor—105-125 volts, 25 cycle (84484-4)	12.80
32337	Shaft—Turntable spindle shaft and fibre gear—60 cycle (For Motor 84484-2)	1.40
32651	Shaft—Turntable spindle shaft and fibre gear—50 cycle	1.30
32653	Shaft—Turntable spindle shaft and fibre gear—25 cycle	1.30
	PICKUP AND ARM ASSEMBLIES	
31212	Base—Pickup arm pivot shaft, trip lever, and mounting base assembly	.95
32138	Cable—Shielded cable and male plug for pick-up arm	.20
31050	Crystal—Pickup crystal and needle screw	3.75
32137	Pickup and arm complete	7.00
12539	Screw—Pickup needle screw	.15
	SPEAKER ASSEMBLIES	
31443	Cone—Speaker cone and voice coil (L9)—for Speaker No. 84327-1	1.40
31663	Speaker complete (No. 84327-1)	4.95
31477	Transformer—Output transformer (T2) (For Speaker No. 84327-1)	1.00
32586	Cone—Speaker cone and voice coil for Speaker No. 84327-3	2.40
32587	Coil—Speaker field coil for Speaker No. 84327-3	2.45
32588	Transformer—Output transformer for Speaker No. 84327-3	1.45
	MISCELLANEOUS ASSEMBLIES	
14803	Brake—Automatic brake complete	2.95
31428	Button—Station selector switch push button	.06
31487	Clip—Spring clip to hold dial	.12
31464	Damper—One rubber cap for motor spindle, and one metal damper plate	.30
31429	Dial—Station selector glass dial	.40
31095	Disc—10 protective discs for call letter markers	.10
31667	Escutcheon—Tuning dial escutcheon	.55
32140	Hinge—Cabinet lid hinge	.25
31355	Knob—Station selector or radio-record switch knob (small)	.12
31391	Knob—Tone control and power switch knob (small)	.15
30773	Knob—Volume control or station selector knob (large)	.15
30991	Markers—Push button call letter markers	.40
31054	Mounting—Pickup arm rubber mounting, washers, and nut	.15
32139	Mounting—Motor mounting spacers, washers, and screw—sufficient for one motor	.25
30870	Plug—2-contact male plug for motor leads	.35
14270	Spring—Retaining spring for knob, Stock Nos. 30773 and 31355	.05
30330	Spring—Retaining spring for knob, Stock No. 31391	.03
30100	Springs—Tension springs for automatic brake—one long and one short	.08
32141	Support—Cabinet lid support	.40
14804	Switch—Automatic brake switch (S26)	.60
12647	Switch—Radio-Record switch (S27)	.75
31463	Turntable	1.50

* Motor No. 84430 is type that mounts from below motorboard. Motor No. 84484 is type that mounts from top of motorboard through a cutout.

TRIMMER CAPACITOR BANK AND ELECTRIC-TUNING OSCILLATOR COILS
(Refer to Electrical Specifications for frequency ranges)

DESCRIPTION	Chassis Stamped RC-348E		Chassis Stamped RC-348E "MOD"		Chassis Stamped RC-348E "M"	
	Stock No.	Unit List Price	Stock No.	Unit List Price	Stock No.	Unit List Price
Capacitor—Trimmer capacitor bank (C20, 21, 22, 23, and 24)	31416	$1.20	32066	$1.30	32339	$1.20
Coil—Oscillator coil (L12)	31415	.30	31415	.30	31415	.30
Coil—Oscillator coil (L13)	31384	.30	31415	.30	31415	.30
Coil—Oscillator coil (L14)	31384	.30	31384	.30	32340	.35
Coil—Oscillator coil (L15)	31383	.30	31383	.30	31383	.30
Coil—Oscillator coil (L16)	31383	.30	31383	.30	31383	.30

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Schematic, Chassis Wiring, Trimmers, Voltage Socket Transformer Data

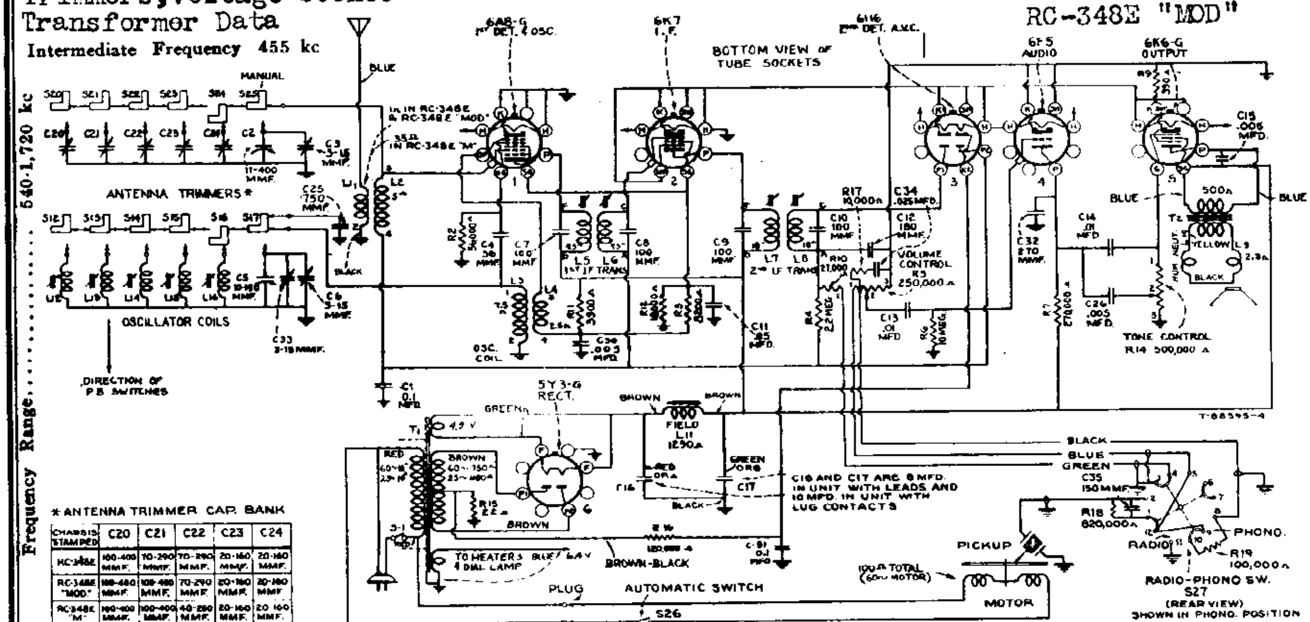
RCA MFG. CO., INC.

MODEL U-115
Chassis RC-348E, RC-348E "M"
RC-348E "MOD"

Intermediate Frequency 455 kc

Frequency Range.......... 540-1,720 kc

Pilot Lamp (1).......... Mazda 44, 6.3 volts, .25 amp.



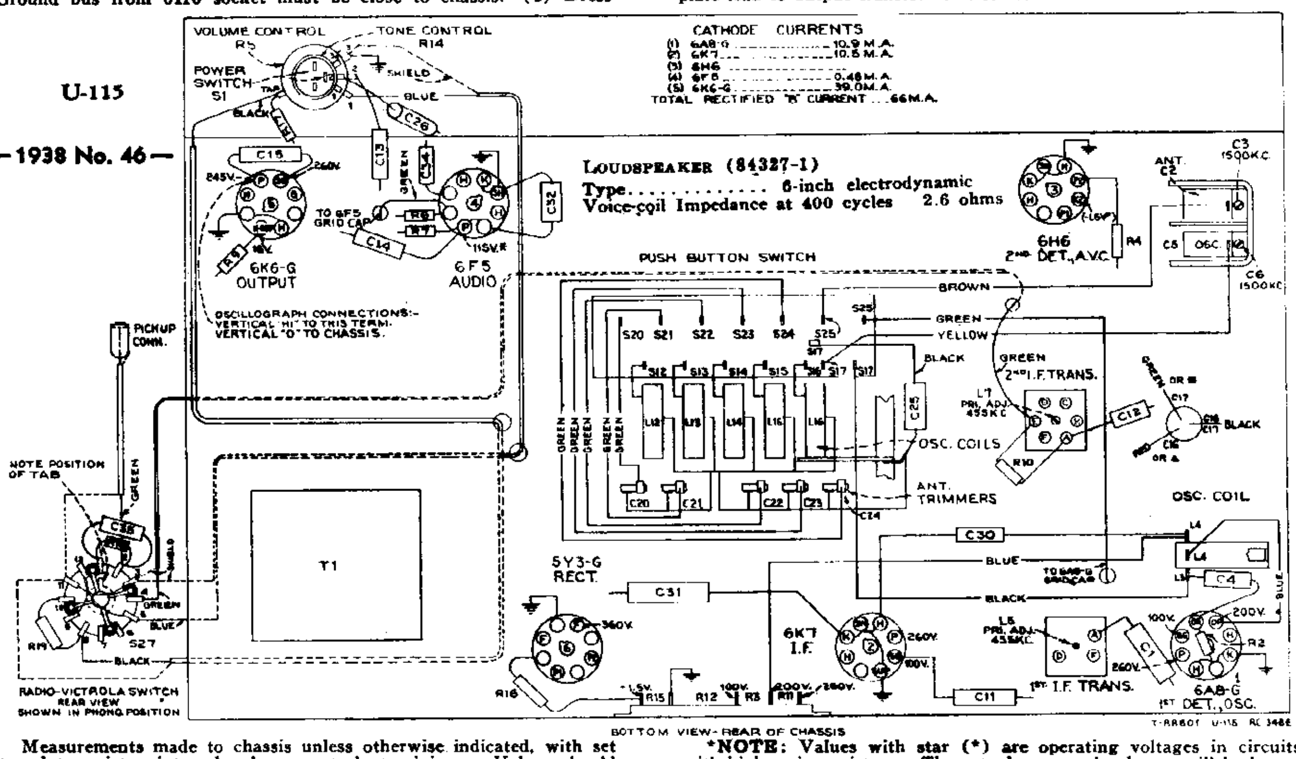
* ANTENNA TRIMMER CAP. BANK

CHASSIS STAMPED	C20	C21	C22	C23	C24
RC-348E	100-400 MMF.	70-290 MMF.	70-290 MMF.	20-160 MMF.	20-160 MMF.
RC-348E "MOD"	100-480 MMF.	100-480 MMF.	70-290 MMF.	20-160 MMF.	20-160 MMF.
RC-348E "M"	100-400 MMF.	100-400 MMF.	40-250 MMF.	20-160 MMF.	20-160 MMF.

Precautionary Lead Dress.—(1) Dress green lead from antenna coil to switch away from the chassis and gang. (2) Dress lead from 2nd I.F. transformer to volume control away from other leads. (3) Ground bus from 6H6 socket must be close to chassis. (4) Dress leads away from oscillator coil adjustment screws. (5) Dress power transformer primary leads toward left-hand end of chassis. (6) Dress plate lead to output transformer close to chassis.

U-115

—1938 No. 46—



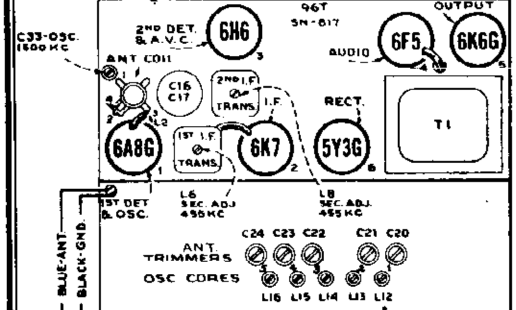
CATHODE CURRENTS
(1) 6A8-G .... 10.9 M.A.
(2) 6K7 .... 10.5 M.A.
(3) 6H6 ....
(4) 6F5 .... 0.48 M.A.
(5) 6K6-G .... 39.0 M.A.
TOTAL RECTIFIED "B" CURRENT ... 66 M.A.

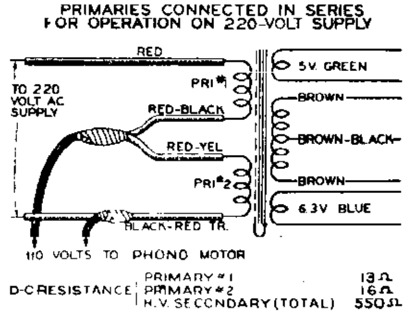
Loudspeaker (84327-1)
Type.............. 6-inch electrodynamic
Voice-coil Impedance at 400 cycles 2.6 ohms

BOTTOM VIEW—REAR OF CHASSIS

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

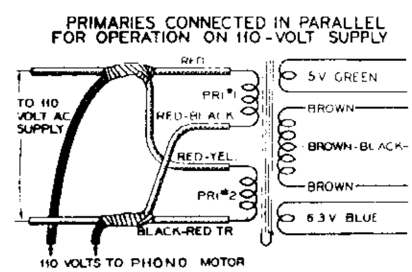
***NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.





PRIMARIES CONNECTED IN SERIES FOR OPERATION ON 220-VOLT SUPPLY

D-C RESISTANCE: PRIMARY #1 13 Ω; PRIMARY #2 16 Ω; H.V. SECONDARY (TOTAL) 550 Ω



PRIMARIES CONNECTED IN PARALLEL FOR OPERATION ON 110-VOLT SUPPLY

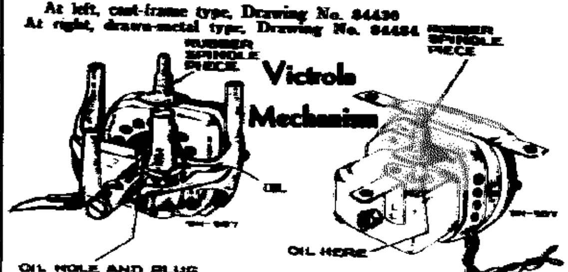
MODEL U-115
Chassis RC-348E, RC-348E "M", RC-348E "MOD"

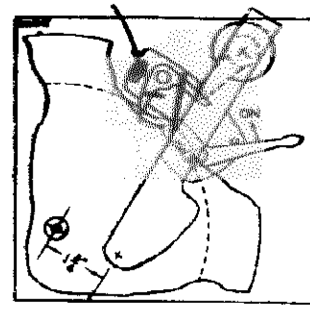
RCA MFG. CO., INC.

Alignment, Phono. Data
Tuner Adjustments

Motors Used in Model U-115

At left, cast-frame type, Drawing No. 84430
At right, drawn-metal type, Drawing No. 84484





The crystal pickup is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

The phonograph motor is a self-starting constant-speed induction type. Two styles of motor are employed: One style (drawing No. 84430) has a cast frame and mounts from below the motorboard. The other style (drawing No. 84484) has a drawn metal case, and mounts from top of motorboard through a cutout. The two types are shown in the accompanying illustrations.

Motor Lubrication.—Apply a few drops of light machine oil to the spindle bearing and oil hole every six months.

The motor spindle is tapered, and a conical rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

A metal washer is placed on the spindle under the rubber piece. The washer has ears on the under side which fit over a pin that projects through the spindle.

The automatic stop should be adjusted so that the lever will snap to the "off" position when the pickup needle is 1¾ inches from the center line of the spindle.

Power Supply Ratings

A-6 .... 105-125 volts, 60 cycles, 100 watts
A-5 .... 105-125 volts, 50 cycles, 100 watts
B-2 .... 105-125 volts, 25 cycles, 100 watts
C-6. 105-125, 200-250 volts, 60 cycles, 100 watts
C-5. 105-125, 200-250 volts, 50 cycles. 100 watts

POWER-TONE-VOLUME * CONTROL — 1 2 3 4 5 — TUNING CONTROL

Push Button Ranges:	RC-348E	RC-348E "MOD"	RC-348E "M"
Button No. 1 (left)	550-900 kc	550-900 kc	550-900 kc
Button No. 2	650-1,000 kc	550-900 kc	550-900 kc
Button No. 3	650-1,000 kc	650-1,000 kc	690-1,225 kc
Button No. 4	850-1,500 kc	850-1,500 kc	850-1,500 kc
Button No. 5	850-1,500 kc	850-1,500 kc	850-1,500 kc

Calibration Marks. — The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

Drum and Dial Indicator Adjustment.—As the first step in r-f alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointing directly down as shown in the drawing. With the drum in this position, and the gang at maximum, move the dial indicator along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, loosen the drum set-screw (which is accessible through a slot in the bottom of the cabinet), turn the drum slightly so that the indicator is at this mark, and then tighten the set-screw.

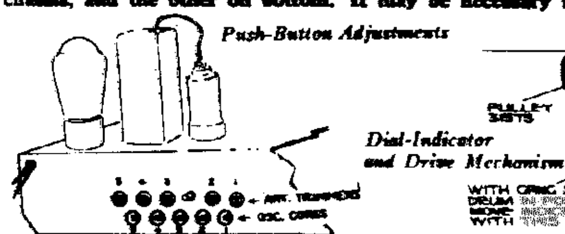
After completion of alignment, seal the i-f core-adjustment screws with household cement.

For additional details, refer to booklet, "RCA Victor Receiver Alignment."

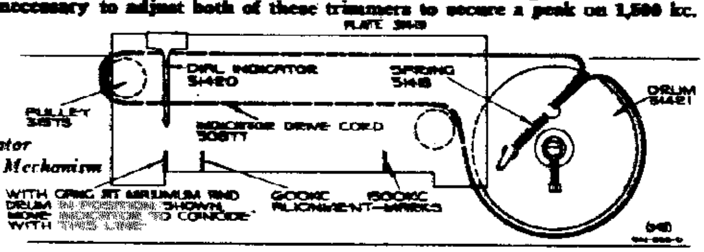
Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	465 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Trans.)
2	6A8-G grid cap, in series with .01 mfd.	465 kc		L5 and L6 (1st I-F Trans.)
3	Antenna lead (blue) in series with 200 mmf.	1,500 kc	1,500 kc calibration mark.	C6 (osc.)* C3 (ant.)
4	Follow "Adjustments for Electric Tuning."			

* The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.

Push-Button Adjustments



Dial-Indicator and Drive Mechanism



DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

Adjustments for Electric Tuning

These models have six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

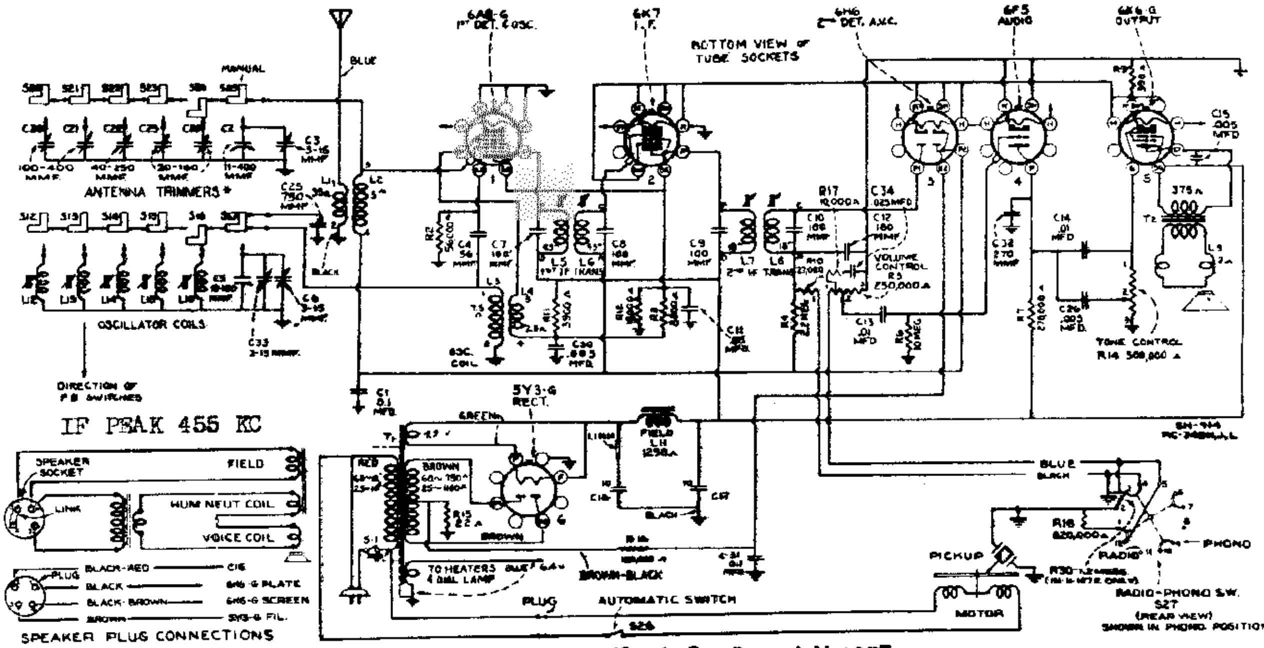
1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning (right-hand) button, and manually tune in the first station on the list.
3. Push in station-button No. 1 (left-hand) and adjust No. 1 oscillator core (L12) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer (C20) for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)

6. Make a final careful adjustment of the oscillator cores using one or two feet of wire as an antenna.

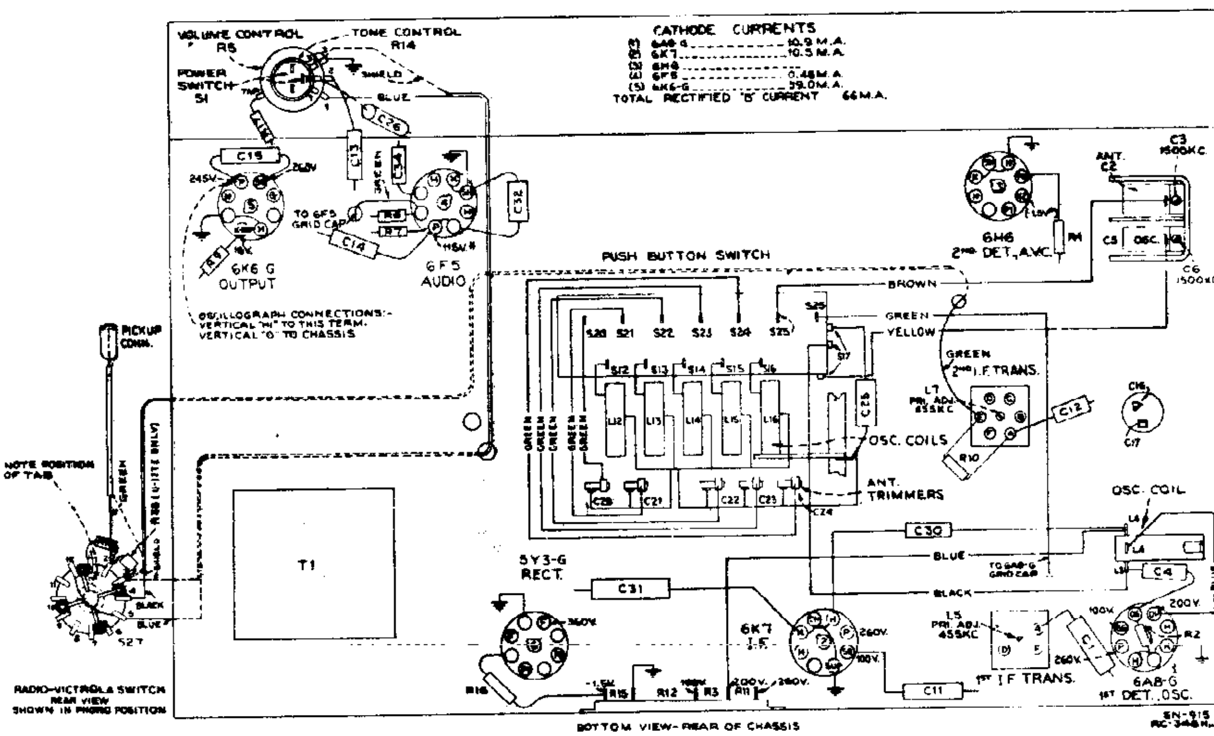
RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
U-123 (Single Band) Ch. RC-348H
U-127E, Chassis RC-348L
Schematic, Chassis Wiring
Voltage



U-121, U-123 (Single-Band), and U-127E

Precautionary Lead Dress.—(1) Dress green lead from antenna coil to switch away from the chassis and gang. (2) Ground bus from 6H6 socket must be close to chassis. (3) Dress leads away from oscillator coil adjustment screws. (4) Dress power transformer primary leads toward left-hand end of chassis. (5) Dress plate lead from output tube close to chassis.



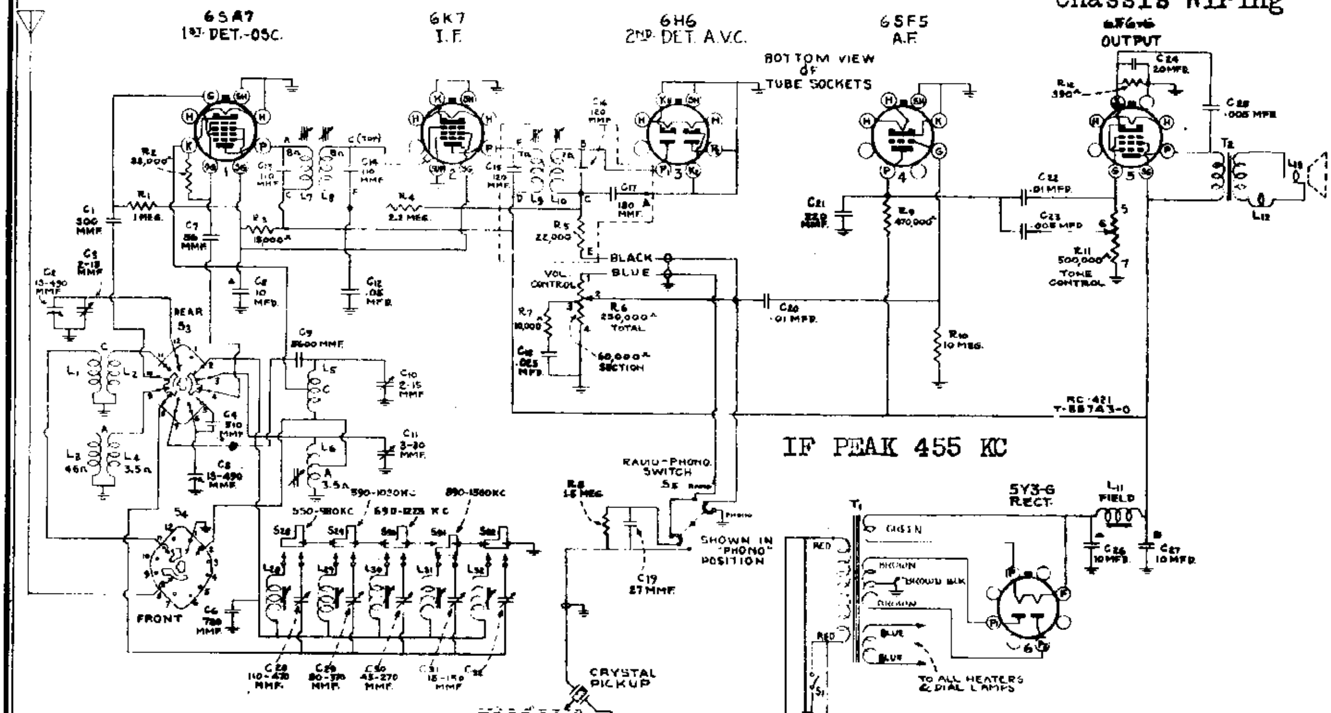
Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

* **NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODEL U-123 (2 Bands)
Chassis RC-421

RCA MFG. CO., INC.

Schematic, Voltage
Chassis Wiring

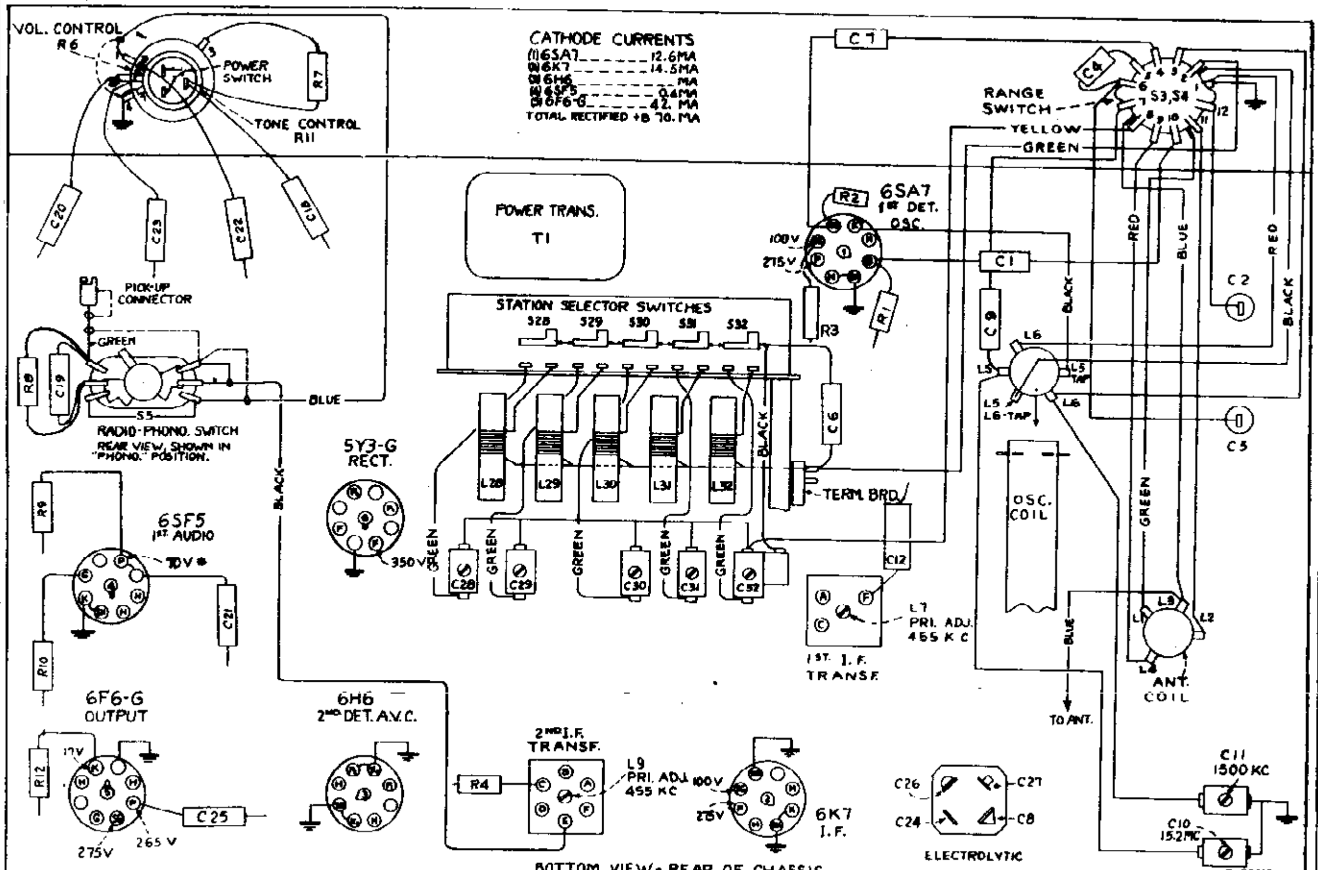


RANGE SWITCH SHOWN FROM FRONT IN "PUSH-BUTTON" POSITION (COUNTER-CLOCKWISE)

88743
RC-421 (Two-Band Model U-123)

Note the following additional d-c resistances: Voice-coil, 2 ohms; primary of output transformer, 375 ohms; 60-cycle power transformer, primary 9 ohms, secondary 735 ohms.

Precautionary Lead Dress.—Dress the oscillator grid condenser (C7) away from chassis. Leads along back of chassis must be dressed in corner of chassis and away from contact "E" of 2nd i-f transformer. Keep a-c leads against end of chassis. Dial drum must be 5/32-inch from front apron.



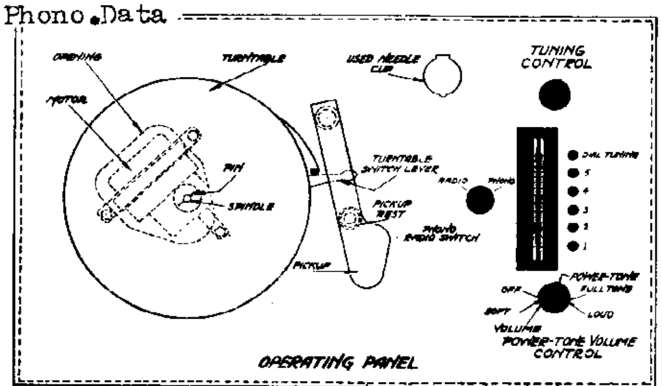
Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

* **NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

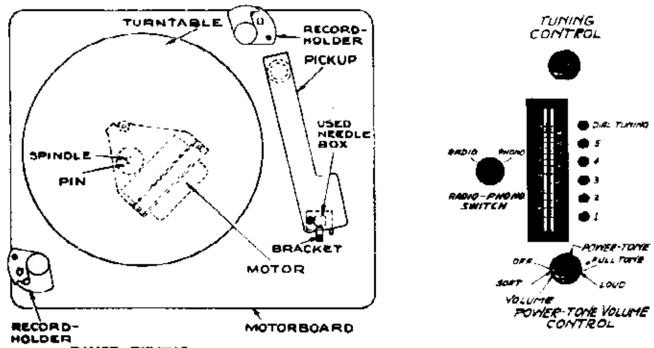
U-127E, Chassis RC-348L
Alignment, Socket, Trimmers
Phono. Data

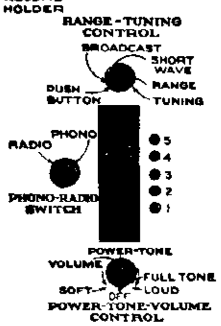
RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
U-123, Ch. RC-348H, RC-421



Operating Controls, Model U-121

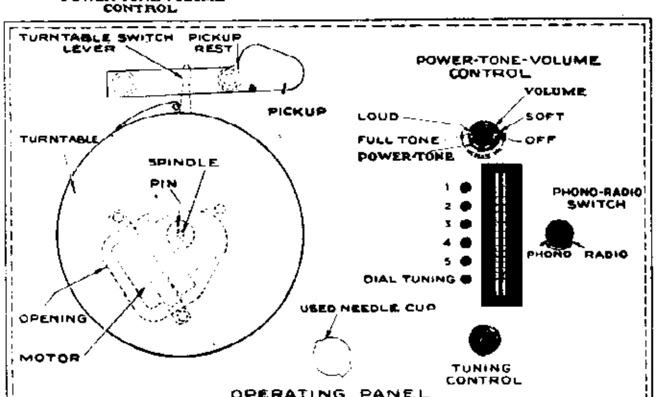




Operating Controls, Model U-123

Above—Radio controls for single-band U-123 (RC-348H).

At left—Radio controls for double-band U-123 (RC-421).



Operating Controls, Model U-127E

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing. Turn the receiver volume control to maximum.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

Drum and Dial Indicator Adjustment.—As the first step in r-f alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointing directly down (RC-348 series) and up for RC-421. With the drum in this position, and the gang at maximum, move the dial indicator along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, move the pointer the required distance along the cord.

RC-348J, RC-348H, and RC-348L

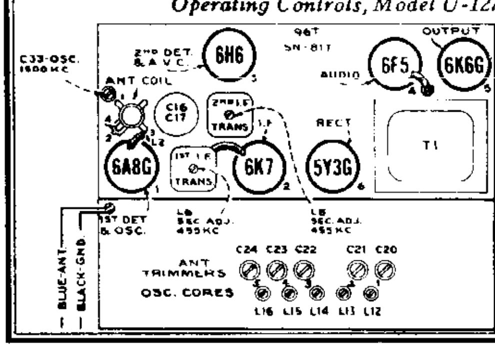
Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Trans.)
2	6A8-G grid cap, in series with .01 mfd.	455 kc		L5 and L6 (1st I-F Trans.)
3	Antenna lead (blue) in series with 200 mmf.	1,500 kc	1,500 kc calibration mark	C6 (osc.)* C3 (ant.)
4	Follow "Adjustments for Electric Tuning."			

* The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.

RC-421 (Two-band Model U-123)

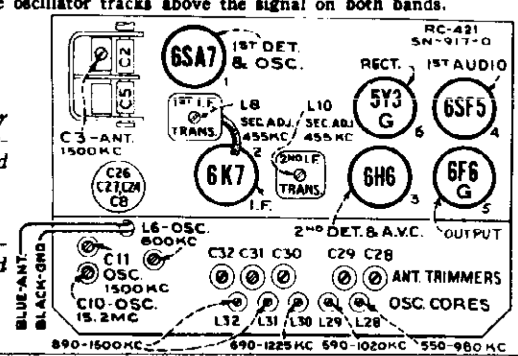
Steps	Connect the high side of test.-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L9 and L10 (2nd I-F trans.)
2	Stator of ant. section of gang	455 kc		L7 and L8 (1st I-F trans.)
3	Antenna lead, in series with 200 mmf.	600 kc	600 kc calibration mark	L6 (osc.)
4		1,500 kc	1,500 kc calibration mark	C11 (osc.) C3 (ant.)
5	Repeat steps 3 and 4.			
6	Antenna lead, in series with 400 ohms	15.2 mc	15.2 mc calibration mark	C10 (osc.)*
7	Follow "Adjustments for Electric Tuning."			

* Rock gang for maximum output while adjusting C10.
Note.—The oscillator tracks above the signal on both bands.



At left—Tube and trimmer location for single-band chassis, RC-348J, RC-348H, and RC-348L.

At right—Tube and trimmer location for double-band chassis RC-421.



MODELS U-121,Ch.RC-348J U-123,Ch.RC-348H,RC-421 U-127E,Chassis RC-348L

RCA MFG. CO., INC.

Automatic Record Changer

Automatic Record Changer Adjustments,Notes

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

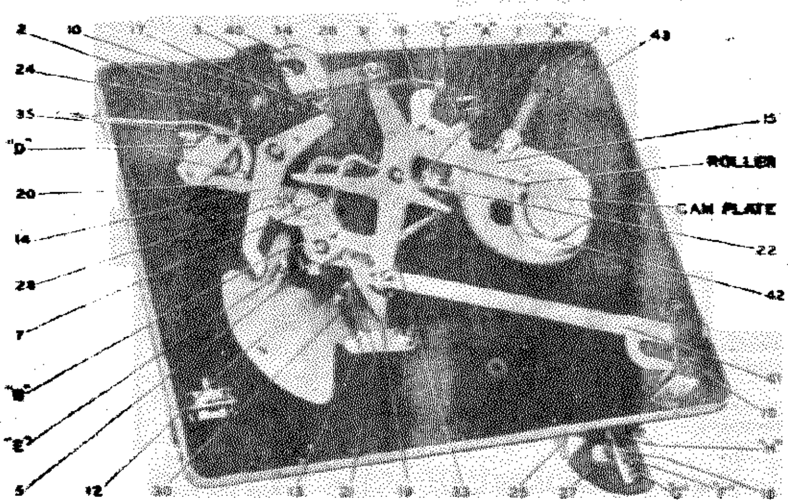
The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.



NOTE: Numbers refer to parts—letters refer to adjustments

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D."

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "21" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H."

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

Apply a few drops of light machine oil to the motor spindle bearing and oil hole adjacent to the spindle bearing. The oil hole has a screw plug.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10 and 12 inch records —Make complete adjustments "D" and "E."
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34."

Specifications, Tuner Data
Record Changer Details

RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
U-123, Ch. 348H, RC-421
U-127E, Ch. RC-348L

Electrical and Mechanical Specifications

Radio features include: Magnetite-core electric-tuning oscillator coils and magnetite-core i-f transformers; automatic volume control; automatic bass compensation; continuously-variable high-frequency tone control; temperature-stabilized capacitors in oscillator circuit; electro-dynamic loudspeaker; straight-line dial and electric tuning for five stations in the broadcast range.

Frequency Range .... 540-1,720 kc
RC-421 also has a short-wave band of .... 5.8-18.0 mc

Push Button Ranges (RC-348J, 348H, and 348L)
Two stations between approximately 550- 980 kc
One station between approximately 690-1,225 kc
Two stations between approximately 850-1,500 kc

Push Button Ranges (RC-421)
One station between approximately 550- 980 kc
One station between approximately 590-1,020 kc
One station between approximately 690-1,225 kc
Two stations between approximately 890-1,500 kc

Tube Complement
(1) RCA-6A8-G (6SA7 in RC 421) ..... First-Detector, Oscillator
(2) RCA-6K7 .... Intermediate-Frequency Amp.
(3) RCA-6H6 .... Second-Detector, A.V.C.
(4) RCA-6F5 (6SF5 in RC-421) .... Audio Voltage Amplifier
(5) RCA-6K6-G (6F6-G in RC-421) .... Power Output
(6) RCA-5Y3-G .... Full-Wave Rectifier

Power Output (RC-348J, 348H, and 348L)
Undistorted .... 2 watts, Maximum .... 4 watts

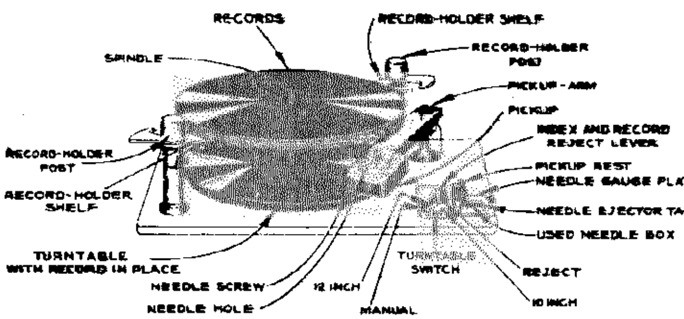
Power Output (RC-421)
Undistorted .... 2.5 watts, Maximum .... 4.5 watts

Power Supply Ratings
A-4 .... 105-125 volts, 60 cycles, 100 watts total
A-5 .... 105-125 volts, 50 cycles, 100 watts total
B-2 .... 105-125 volts, 25 cycles, 100 watts total
C-4 .... 105-125/210-250 volts, 60 cycles, 100 watts total
C-5 .... 105-125/210-250 volts, 50 cycles, 100 watts total

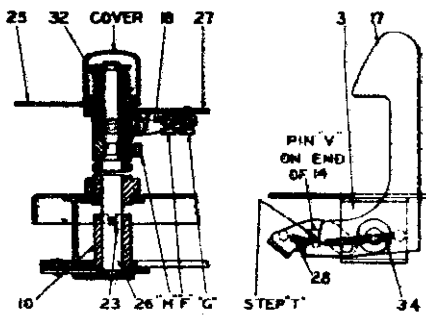
	U-121	U-123 (RC-348H)	U-123 (RC-421)	U-127E
Loudspeaker (electrodynamic)	RL-70F-3	RL-70F-3	RL-70H-6	RL-63H-5
Diameter	12-inch	12-inch	12-inch	8-inch
Voice-Coil Impedance at 400 cycles	2.2 ohms	2.2 ohms	2.2 ohms	2.2 ohms

Cabinet Dimensions:	U-121	U-123	U-127E
Height (inches)	34	34	25¾
Width (inches)	25¾	30¾	28
Depth (inches)	18¾	17	16¾
Weight (net) pounds	56	74	52
Weight (shipping) pounds	73	94	71

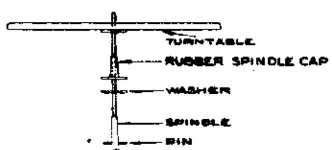
Chassis Base Dimensions .... 3 inches x 11¾ inches x 5 inches
Over-all Chassis Height .... 6½ inches
Tuning Drive Ratio .... 6 to 1



Top View of Automatic Record Changer



Details of Record Shelf Posts, and Locating Lever Assemblies



Turntable Assembly (All Models)

The crystal pickup is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

The phonograph motor is a self-starting constant-speed induction type.

Motor Lubrication (Models U-121 and U-127E).—Apply a few drops of light machine oil to the spindle bearing and oil hole every six months. The oil hole is located in the motor casting, adjacent to the spindle bearing, and has a screw plug.

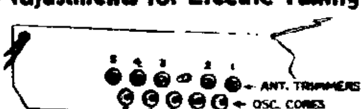
The automatic stop (Models U-121 and U-127E) should be adjusted so that the lever will snap to the "off" position when the pickup needle is 1¾ inches from the center line of the spindle.

Models U-121 and U-127E have a non-automatic Victrola mechanism, with crystal pickup, automatic stop, and self-starting constant-speed motor.
Model U-123 has an automatic Victrola mechanism which permits playing seven 12-inch or eight 10-inch records in succession. It has a crystal pickup and constant-speed self-starting motor.

Adjustments for Electric Tuning

Push-Button Ranges in RC-348J, 348H, and 348L
(Single-Band Receivers)

No. 1 and 2 ... Approximately 550- 980 kc
No. 3 .... Approximately 690-1,225 kc
No. 4 and 5 ... Approximately 850-1,500 kc



Push-Button Ranges in RC-421
(Two-Band Model U-123)

No. 1 .... Approximately 550- 980 kc
No. 2 .... Approximately 590-1,020 kc
No. 3 .... Approximately 690-1,225 kc
Nos. 4, 5 ...... Approximately 890-1,500 kc

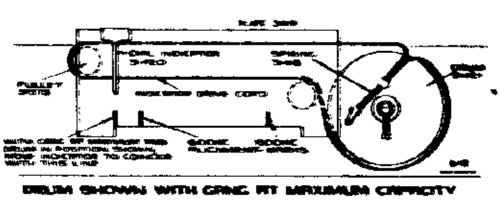
These models have six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. **Make a list of the five desired stations, arranged in order from low to high frequencies.**
2. **Push in the dial-tuning button, and manually tune in the first station on the list.**
3. Push in station-button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)

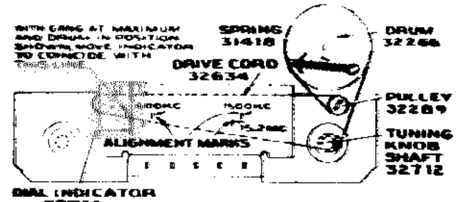
6. Make a final careful adjustment of the oscillator cores using one or two feet of wire as an antenna.



Dial Mechanism

←— RC-348J, 348H, and 348L

—→ RC-421



Replacement Parts Models U-121, U-123 (Single-Band), and U-127E

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (U121-RC348J) (U123-RC348H, Single-Band) (U127E-RC348L)	
32339	Capacitor—Capacitor bank for push button switch assembly (C20, C21, C22, C23, C24)	1.20
12723	Capacitor—56 mmfd. (C4)	.35
30904	Capacitor—100 mmfd. (C7, C8, C9, C10)	.25
13003	Capacitor—180 mmfd. (C12)	.35
12488	Capacitor—270 mmfd. (C32)	.35
31435	Capacitor—750 mmfd. (C25)	.40
4838	Capacitor—.005 mfd., 1,000 volts (C15, C26, C30)	.25
14393	Capacitor—.01 mfd. (C13, C14)	.30
4870	Capacitor—.025 mfd., 400 volts (C34)	.20
30882	Capacitor—.05 mfd., 200 volts (C11)	.20
30899	Capacitor—0.1 mfd., 200 volts (C1, C31)	.30
32342	Capacitor—10-10 mfd. electrolytic capacitor (C16, C17)	1.20
31382	Clip—Coil and core clip for push button oscillator coils	.04
32338	Coil—Antenna coil (L1, L2)	.85
31098	Coil—Oscillator coil (L3, L4)	.85
31415	Coil—Push button oscillator coil, 550 to 980 KC. (L12, L13)	.30
32340	Coil—Push button oscillator coil, 690 to 1,225 KC. (L14)	.35
31383	Coil—Push button oscillator coil, 850 to 1,500 KC. (L15, L16)	.30
31422	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6, C33)	2.70
32355	Control—Volume and tone control and power switch (R5, R14, S1)	3.00
32634	Cord—Drive cord	.10
31386	Core—Core and stud assembly for push button oscillator coils	.15
31421	Drum—Tuning drive drum and hub	.45
11891	Lamp—Dial lamp	.17
32136	Lead—Phonograph input shielded lead and connector (U-121 and U-123)	.35
32908	Lead—Phonograph input shielded lead and socket (U-127E only)	.40
31419	Plate—Dial color plate	.12
30868	Plug—2-contact female for motor leads	.35
31420	Pointer—Dial indicator pointer	.10
31373	Pulley—Tuning indicator drive pulley	.08
31388	Resistor—390 ohms, 1 watt (R9)	.22
14559	Resistor—10,000 ohms, ¼ watt (R17)	.20
12738	Resistor—27,000 ohms, ¼ watt (R10)	.20
12286	Resistor—56,000 ohms, ¼ watt (R2)	.20
13734	Resistor—120,000 ohms, ¼ watt (R16)	.20
12199	Resistor—270,000 ohms, ¼ watt (R7)	.20
30963	Resistor—820,000 ohms, ¼ watt (R18)	.20
30208	Resistor—1.2 meg., ¼ watt (R30) (U127E only)	.20
12679	Resistor—2.2 meg., ¼ watt (R4)	.20
13601	Resistor—10 meg., ¼ watt (R6)	.20
31425	Resistor—Voltage divider resistor tapped at 22 ohms, 18,000 ohms, 8,200 ohms, and 3,900 ohms (R15, R12, R3, R11)	.90
14887	Retainer—Indicator drive pulley retainer	.01
31482	Screw—No. 8 square head set screw for drive drum	.03
5040	Socket—4-contact socket for speaker cable	.30
31364	Socket—Dial lamp socket	.20
31251	Socket—Octal base tube socket	.25
31418	Spring—Drive cord tension spring	.05
31414	Switch—Selector switch for push button switch assembly (S20, S21, S22, S23, S24, S25, S12, S13, S14, S15, S16, S17)	3.05
30902	Transformer—First i.f. transformer (L5, L6, C7, C8)	1.90
30903	Transformer—Second i.f. transformer (L7, L8, C9, C10)	1.80
31445	Transformer—Power transformer, 110 volts, 25-60 cycle (T1)	7.80
31380	Transformer—Power transformer, 110 volts, 50-60 cycle (T1)	4.75
31575	Transformer—Power transformer, 110-220 volts, 50-60 cycle (T1)	8.35
	PICKUP AND ARM ASSEMBLIES Model U-121 and U-127E	
31212	Base—Pickup arm pivot shaft, trip lever, and mounting base assembly	.95
32138	Cable—Shielded cable and male plug for pickup arm	.20
31050	Crystal—Pickup crystal and needle screw	3.75
32137	Pickup and arm complete	7.00
12539	Screw—Pickup needle screw	.15
	PICKUP AND ARM ASSEMBLIES Model U-123 (Single-Band)	
31162	Cable—Pickup arm lift cable and clips	.15
32885	Cable—Pickup arm output cable	.25
31156	Crystal—Pickup crystal cartridge and needle screw	4.25
32884	Pickup and arm complete	7.45
31160	Screw—Pickup needle screw	.12
31161	Shaft—Pickup pivot arm and shaft assembly	.45
	MOTOR ASSEMBLIES Model U-121 and U-127E	
31464	Damper—Comprising 1 rubber spindle sleeve and 1 metal damper plate	.30
32652	Field—Motor coils and laminations, 105-120 volts, 25-cycle	6.90
32650	Field—Motor coils and laminations, 105-120 volts, 50-cycle	5.10
32336	Field—Motor coils and laminations, 105-120 volts, 60-cycle	5.10
32638	Motor—105-120 volts, 25-cycle	12.80
32637	Motor—105-120 volts, 50-cycle	11.20
32558	Motor—105-120 volts, 60-cycle	10.50
30870	Plug—2-contact male for motor leads	.35
32653	Shaft—Turntable shaft and gear for 25-cycle motor	1.30
32651	Shaft—Turntable shaft and gear for 50-cycle motor	1.30
32337	Shaft—Turntable shaft and gear for 60-cycle motor	1.40
	MOTOR ASSEMBLIES Model U-123	
32956	Coil—Field coil and laminations for 25-cycle motor	7.15
32955	Coil—Field coil and laminations for 50-cycle motor	5.90
32954	Coil—Field coil and laminations for 60-cycle motor	5.35
32960	Gear—Motor spindle gear and pin	.75
32873	Motor—Motor complete, 25-cycle, 110 volts AC.	15.95
32872	Motor—Motor complete, 50-cycle, 110 volts AC.	13.75
32871	Motor—Motor complete, 60-cycle, 110 volts, AC.	13.25
30870	Plug—2-prong male plug—used on motor leads	.35
32959	Spindle—Turntable spindle complete with metal pinion and fibre gear for 25-cycle motor	2.90
32958	Spindle—Turntable spindle complete with metal pinion and fibre gear for 50-cycle motor	2.90
32957	Spindle—Turntable spindle complete with metal pinion and fibre gear for 60-cycle motor	2.90
32875	Switch—Motor control switch	.30
	MOTORBOARD ASSEMBLIES Model U-121 and U-127E	
14803	Brake—Automatic brake and switch	2.95
31464	Damper—Comprising one rubber spindle sleeve, and one metal damper plate	.30
30870	Plug—2-contact male for motor leads	.35
32610	Rest—Rubber rest for pickup arm	.10
30100	Springs—One set of springs for automatic brake	.08
32743	Switch—Radio-Record switch (S27)	.95
14804	Switch—Switch only for automatic brake (S26)	.60
31463	Turntable—Record turntable	1.50
	MOTORBOARD ASSEMBLIES Model U-123	
31149	Base—Tone arm mounting base	.35
32876	Board—Motorboard complete with all riveted and welded posts and brackets — less operating mechanisms	6.50
14209	Bumper—Main lever rubber bumper (1)	.08
9848	Cup—Used needle cup, rest, and lid complete	.75
32877	Escutcheon—Index escutcheon	.40
31151	Guide—Pickup lift cable guide (coil spring, 80T 2-in. large) (2)	.10
31150	Mounting—Pickup arm base rubber mounting complete	.45
31155	Spring—Needle cup lid tension spring	.04
	OPERATING MECHANISM Model U-123	
31134	Bracket — Pickup locating lever mounting bracket (3)	.30
32878	Cam—Cam and drive gear (42)	2.80
6808	Clutch—Trip lever friction clutch assembly (5)	.35
31129	Cover—Cap for top of record post	.45
32883	Damper—Motor spindle rubber drive sleeve and metal damper plate	.30
31116	Finger—Trip lever friction finger assembly (7)	.45
32879	Gear—Rack gear for front left-hand record post (41)	.60
32880	Gear—Rack gear for rear right-hand record post (40)	.55
31121	Gear—Record post gear (10)	.90
31123	Guide—Main lever spring guide (11)	.40
31114	Lever—Index lever assembly (12)	.75
31137	Lever—Index lever tension spring lever (13)	.30
31138	Lever—Locating lever and pawl assembly (14)	.70
31113	Lever—Main lever assembly (15)	1.35

MODELS U-121, Ch. RC-3[illegible]
U-123, Ch. RC-348H, RC-421
U-127E, Ch. RC-348L
Parts List

RCA MFG. CO., INC.

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Replacement Parts (cont'd) Models U-121, U-123 (Single-Band), and U-127E

STOCK No.	DESCRIPTION	Unit List Price
31140	Lever—Pickup lift cable lever and spring assembly (16)	.55
31135	Lever—Pickup locating lever assembly (17)	.85
31130	Lever—Record separator elevating lever complete with adjustment screws (18)	.80
31132	Lever—Trip detaining lever (19)	.30
31116	Lever—Trip lever assembly (20)	1.85
31131	Lever—Trip regulator lever (21)	.25
31133	Pawl—Trip pawl assembly (22)	.80
31124	Pin—Record post drive pin (23)	.04
14207	Roller—Pickup lift cable roller and bracket assembly (24)	.55
31118	Screw—Cone pointed set screw for trip lever hub or record post shell	.08
4563	Screw—Pickup lift cable screw and nuts	.04
31117	Screw—Special screw to adjust friction clutch tension (B)	.03
31126	Separator—Record separator knife (25)	.75
31122	Shaft—Record separator post shaft (26)	.40
31125	Shelf—Record post shelf assembly (27)	1.25
3676	Spring—Cam pawl tension spring on main gear (12 turns, .190-in. O.D., 4-3/64-in. lg.)	.04
32682	Spring—Main lever tension spring (43) (18 turns, .6-in. O.D., 3-in. lg.)	.05
14190	Spring—Pickup locating lever short spring or locating lever pawl tension spring (28) (16 turns, .180-in. O.D., 19/32-in. lg.)	.08
31136	Spring—Index lever tension spring (30) (25 turns, .190-in. O.D., 15/16-in. lg.)	.05
3666	Spring—Pickup lift cable tension spring (31) (20 turns, .195-in. O.D., 1-in. lg.)	.04
31127	Spring—Record separator pressure spring (32) (8 turns, 5/8-in. O.D., 3/4-in. lg.)	.02
14191	Spring—Trip detaining lever tension spring (33) (15 turns, .190-in. O.D., 3/4-in. lg.)	.04
31875	Spring—Pickup locating lever tension spring (34) (14 turns, .220-in. O.D., 27/32-in. lg.)	.04
32436	Spring—Locating lever tension spring (35) (16 turns, .182-in. O.D., 21/32-in. lg.)	.05
32881	Turntable complete	2.00
31128	Washer—"C" washer for top of record post	.04
	SPEAKER ASSEMBLIES (RL-70F3) Models U-121 and U-123 (Single-Band)	
13866	Cap—Dust cap for cone center	.03
12012	Coil—Field coil (L16)	2.90
11469	Coil—Hum neutralizing coil (L15)	.30
31275	Cone—Speaker cone and voice coil (L14)	1.75
31302	Plug—4-contact male plug	.25
31300	Speaker—Speaker complete	10.95
14358	Screw—Screw, washer, and lockwasher to hold core in yoke	.04
31301	Transformer—Output transformer (T2)	1.70
14357	Washer—Spring washer to hold field coil	.06
	SPEAKER ASSEMBLIES (RL-63H6) Model U-127E	
14356	Board—3-contact speaker terminal board	.15
13866	Cap—Cone center dust cap	.25
12012	Coil—Field coil	2.90
11469	Coil—Hum neutralizing coil	.30
31310	Cone—Speaker cone and voice coil	1.75
31302	Plug—4-contact male plug for speaker	.25
14358	Screw—Screw, washer, and lockwasher to hold core in yoke	.04
31453	Speaker complete	10.25
14355	Transformer—Output transformer	2.00
14357	Washer—Spring washer to hold field coil	.06
	MISCELLANEOUS ASSEMBLIES	
32798	Button—Push button	.10
13103	Cap—Pilot lamp cap (bullseye) (For Model U-123 only)	.15
31487	Clip—Spring clip to mount dial scale	.12
31095	Cover—One set protective discs for call letter markers	.10
32742	Dial—Glass dial scale (For Models U-121 and U-123)	.45
31429	Dial—Glass dial scale (For Model U-127E only)	.40
31103	Hinge—Cabinet lid hinge (For Model U-127E only)	.50
32562	Holder—Needle card holder (For Model U-121 only)	.35
31391	Knob—Tone control knob	.15
31355	Knob—Dummy or radio-record switch knob	.12
30773	Knob—Volume control or tuning knob	.15
30991	Marker—One set station call letter markers	.40
31054	Mounting—Pickup arm rubber mounting, washers, and nuts (For Model U-121 and U-127E only)	.15
32870	Screen—Phonograph compartment lamp screen (For Model U-123 only)	1.00
31470	Spring—Motorboard mounting springs, bolts, and washers (For Model U-123 only) (4 required)	.10
32721	Spring—Retaining spring for push button	.02
30330	Spring—Retaining spring for tone control knob	.03
14270	Spring—Retaining spring for tuning, volume control, or switch knob	.05
11831	Support—Cabinet lid support (For Model U-121 only)	1.85
31478	Support—Cabinet lid support (For Model U-123 only)	2.20
30946	Support—Cabinet lid support (For Model U-127E only)	.60
32743	Switch—Radio-Record switch (For Model U-123 only)	.95
31667	Escutcheon—Dial scale escutcheon	.55
32799	Escutcheon—Push button escutcheon	.50
30698	Hinge—Cabinet lid hinge (For Models U-121 and U-123)	.95

Replacement Parts Model U-123 (Two-Band)

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-421) Model U-123 (Two Band)	
32136	Cable—Phono. input cable and socket	.35
31379	Capacitor—Dual trimmer—comprising one 3-30 mmfd. and one 2-10 mmfd. sections (C10, C11)	.40
13605	Capacitor—27 mmfd. (C19)	.35
12723	Capacitor—56 mmfd. (C7)	.35
14262	Capacitor—109 mmfd. (C13, C14)	.30
12404	Capacitor—120 mmfd. (C15, C16)	.30
14712	Capacitor—180 mmfd. (C17)	.30
30232	Capacitor—220 mmfd. (C21)	.35
12952	Capacitor—300 mmfd. (C1)	.35
30608	Capacitor—510 mmfd. (C4)	.35
32714	Capacitor—730 mmfd. (C6)	.45
13895	Capacitor—5,600 mmfd. (C9)	.70
4838	Capacitor—.005 mfd. (C23, C25)	.25
4937	Capacitor—.01 mfd. (C20, C22)	.25
4870	Capacitor—.025 mfd. (C18)	.20
32787	Capacitor—.05 mfd. (C12)	.20
33014	Capacitor—Electrolytic—comprising three 10 mfd. and one 20 mfd. sections (C8, C24, C26, C27)	1.90
32705	Capacitor—Push button trimmer capacitor bank (C28, C29, C30, C31, C32)	1.20
31382	Clip—Push button coil mounting clip	.04
32706	Coil—Antenna coil (L1, L2, L3, L4)	1.25
32707	Coil—Oscillator coil (L5, L6)	.95
31385	Coil—Push button oscillator coil—less core, 550-950 kc (L28)	.30
32704	Coil—Push button oscillator coil—less core, 690-1,020 kc (L29)	.35
32340	Coil—Push button oscillator coil—less core, 690-1,225 kc (L30)	.35
31383	Coil—Push button oscillator coil—less core, 890-1,500 kc (L31, L32)	.30
32249	Condenser—2-gang variable (C2, C3, C5)	2.70
32355	Control—Volume control, tone control, and power switch (R6, R11, S1)	3.00
32634	Cord—Drive cord	.10
31386	Core—Core and stud for coil, Stock Nos. 31383, 31385, and 32704	.15
30846	Core—Core and stud for coil, Stock No. 32340.	.30
32713	Core—Core and stud for oscillator coil, Stock No. 32707	.35
32266	Drum—Condenser drive cord drum	.45
32711	Indicator—Dial indicator pointer	.20
31480	Lamp—Dial lamp socket	.20
32710	Plate—Dial color plate and pointer track	.30
5119	Plug—3-contact female for speaker cable	.25
30868	Plug—Motor cable plug	.35
32289	Pulley—Indicator drive cord pulley	.10
12261	Resistor—390 ohms, 1 watt (R12)	.20
14559	Resistor—10,000 ohms, ½ watt (R7)	.20
33489	Resistor—15,000 ohms, 2.5 watt (R3)	.55
14284	Resistor—22,000 ohms, 1/10 watt (R5)	.15
12454	Resistor—33,000 ohms, ½ watt (R2)	.20
12285	Resistor—470,000 ohms, ½ watt (R9)	.20
13730	Resistor—1 meg., ½ watt (R1)	.20
12201	Resistor—1.5 meg., ½ watt (R8)	.20
12679	Resistor—2.2 meg., ½ watt (R4)	.20
13601	Resistor—10 meg., ½ watt (R10)	.20
30340	Retainer—Pulley retaining clip	.02
14343	Retainer—Tuning knob shaft retaining ring	.03
4669	Screw—No. 8-32 x ⅛ square head set screw for drum	.03
32712	Shaft—Tuning knob shaft and pulley	.20
31319	Socket—Octal base tube socket	.25
31418	Spring—Drive cord tension spring	.05
32703	Switch—Push button switch (S28, S29, S30, S31, S32)	2.25
33113	Switch—Radio record switch (S5)	.65
32702	Switch—Range switch (S3, S4)	1.15
14376	Transformer—First i.f. transformer (L7, L8, C13, C14)	2.45
14308	Transformer—Second i.f. transformer (L9, L10, C15, C16, C17, R5)	2.90
33112	Transformer—Power transformer—105-125 volts, 50-60 cycle (T1)	4.30
	PICKUP AND ARM ASSEMBLIES	
33096	Arm—Pickup arm complete—less crystal cartridge, needle screw, and cable	2.60
31162	Cable—Pickup arm lift cable and clips	.15
32885	Cable—Output cable and plug	.25
31156	Crystal—Pickup crystal cartridge and needle screw	4.25
33114	Damper—Viscoloid damper for crystal armature	.15
31160	Screw—Pickup needle screw	.12
31161	Shaft—Pickup pivot arm and shaft assembly	.45
	SPEAKER ASSEMBLIES (RL-70H6) Model U-123 (Two Band)	
31825	Cap—Dust cap for cone center	.05
11469	Coil—Hum neutralizing coil (L12)	.30
33116	Coil—Speaker field coil (L11)	2.10
31275	Cone—Speaker cone and voice coil (L13)	1.75
5118	Plug—3-prong male for speaker	.25
33115	Speaker—Speaker complete	10.55
14358	Screw—Screw, washer, and lockwasher to hold core in yoke	.04
31301	Transformer—Output transformer (T2)	1.70
14357	Washer—Spring washer to hold field coil	.06
	MISCELLANEOUS ASSEMBLIES	
32798	Button—Push button	.10
13103	Cap—Pilot lamp cap (bullseye)	.15
31487	Clip—Spring clip to mount dial scale	.12
31095	Cover—One set protective discs for call letter markers	.10
33117	Dial—Glass dial scale	.50
31667	Escutcheon—Dial scale escutcheon	.55
33118	Escutcheon—Push button escutcheon	.50
30698	Hinge—Cabinet lid hinge	.95
31391	Knob—Tone control knob	.15
31355	Knob—Tuning or radio-record switch knob	.12
14359	Knob—Radio-record switch knob	.20
30773	Knob—Volume control knob	.15
30991	Marker—One set station call letter markers	.40
32870	Screen—Phonograph compartment lamp screen	1.00
31470	Spring—Motorboard mounting springs, bolts, and washers (4 required)	.10
32721	Spring—Retaining spring for push button	.02
30330	Spring—Retaining spring for tone control knob	.03
14270	Spring—Retaining spring for tuning, volume control, or switch knob	.05
4982	Spring—Retaining spring for radio-record switch knob	.05
31478	Support—Cabinet lid support	2.20

MOTOR ASSEMBLIES, MOTORBOARD ASSEMBLIES, and OPERATING MECHANISM

Model U-123 (Two Band)

Same as in Single-Band U-123

MODEL U-125,Ch.RC-386
Alignment,Tuner Data

RCA MFG. CO., INC.

ALIGNMENT PROCEDURE

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum. — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6A8-G det. grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 300 ohms	20 mc	20 mc (23°) "C" band	C21* (osc.) C30** (ant.)
4	Antenna Terminal, in series with 300 ohms	6 mc	6 mc (33°) "B" band	C23 (osc.)†
5	Antenna Terminal, in series with 200 mmf.	1,500 kc	1,500 kc (28½°) "A" band	C25 (osc.)
6	Follow "Adjustments for Electric Tuning"			

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly and use maximum capacity peak if two peaks can be obtained with C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 28° (19.09 mc), where a weaker signal (image) should be received.

† Use minimum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by tuning to approximately 51° (5.09 mc), at which point a weaker signal (image) should be received.

Note.—Oscillator tracks 455 kc above signal on all bands.

ADJUSTMENTS FOR ELECTRIC TUNING

This model has eight push-buttons. The front button is the Victrola switch. The rear button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

Use one or two feet of wire as an antenna to ensure sharp peaking.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from front) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

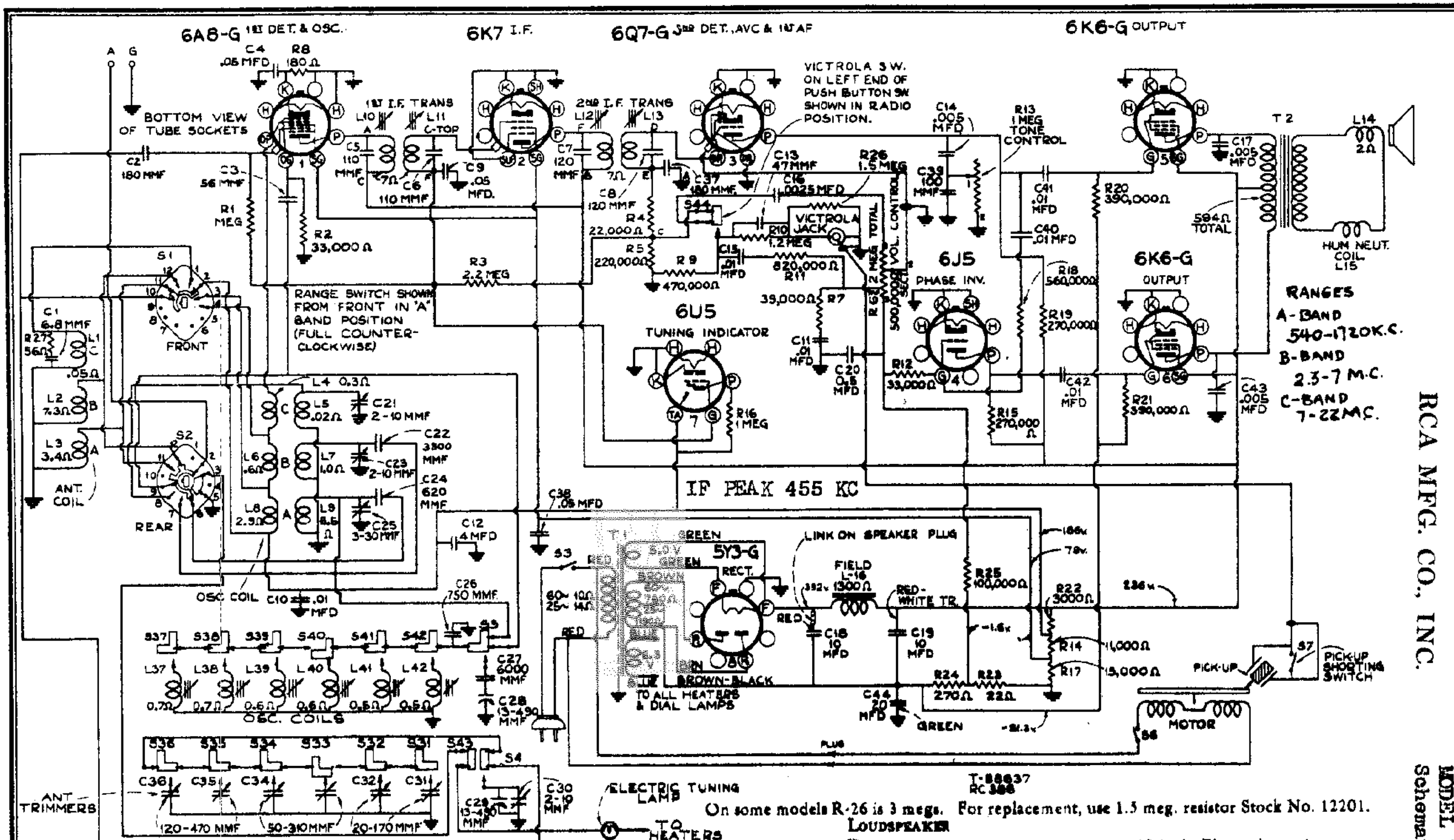
Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Precautionary Lead Dress.—

1. Dress red leads from power transformer to power switch (S3), in corner of chassis and away from volume control terminals.
2. Dress brown lead from push-button switch to gang over end of switch, and away from C27 and bus between S5 and range switch.
3. Leads to C27 must be as short as possible.
4. Blue lead from range switch to oscillator coil must be as short as possible and dressed away from other leads. All leads should be dressed away from antenna coil.
5. Leads across back of chassis must be dressed under electrolytic away from Victrola jack.
6. Parts and leads should be dressed away from R22-R14 as it becomes heated.
7. Leads from oscillator coil to trimmers must be dressed away from coil.
8. Green lead from S4 to range switch must be clear of other leads and away from front edge of chassis.

RCA MFG. CO., INC.

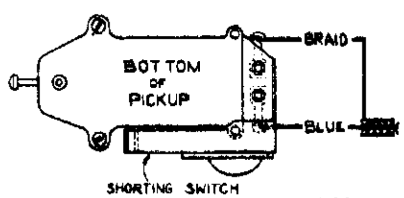


On some models R-26 is 3 megs. For replacement, use 1.5 meg. resistor Stock No. 12201.

Pilot Lamps (4)........1 Mazda 44, 6.3 volts, 0.25 amp.;
3 Mazda 47, 6.3 volts, 0.15 amp.

Power Output
Undistorted.. 5 watts
Maximum.. 5.5 watts

Six Electric Tuning Positions..................550-1,500 kc
2 stations between approximately 550- 950 kc (Buttons 1 and 2)
2 stations between approximately 680-1,180 kc (Buttons 3 and 4)
2 stations between approximately 890-1,500 kc (Buttons 5 and 6)



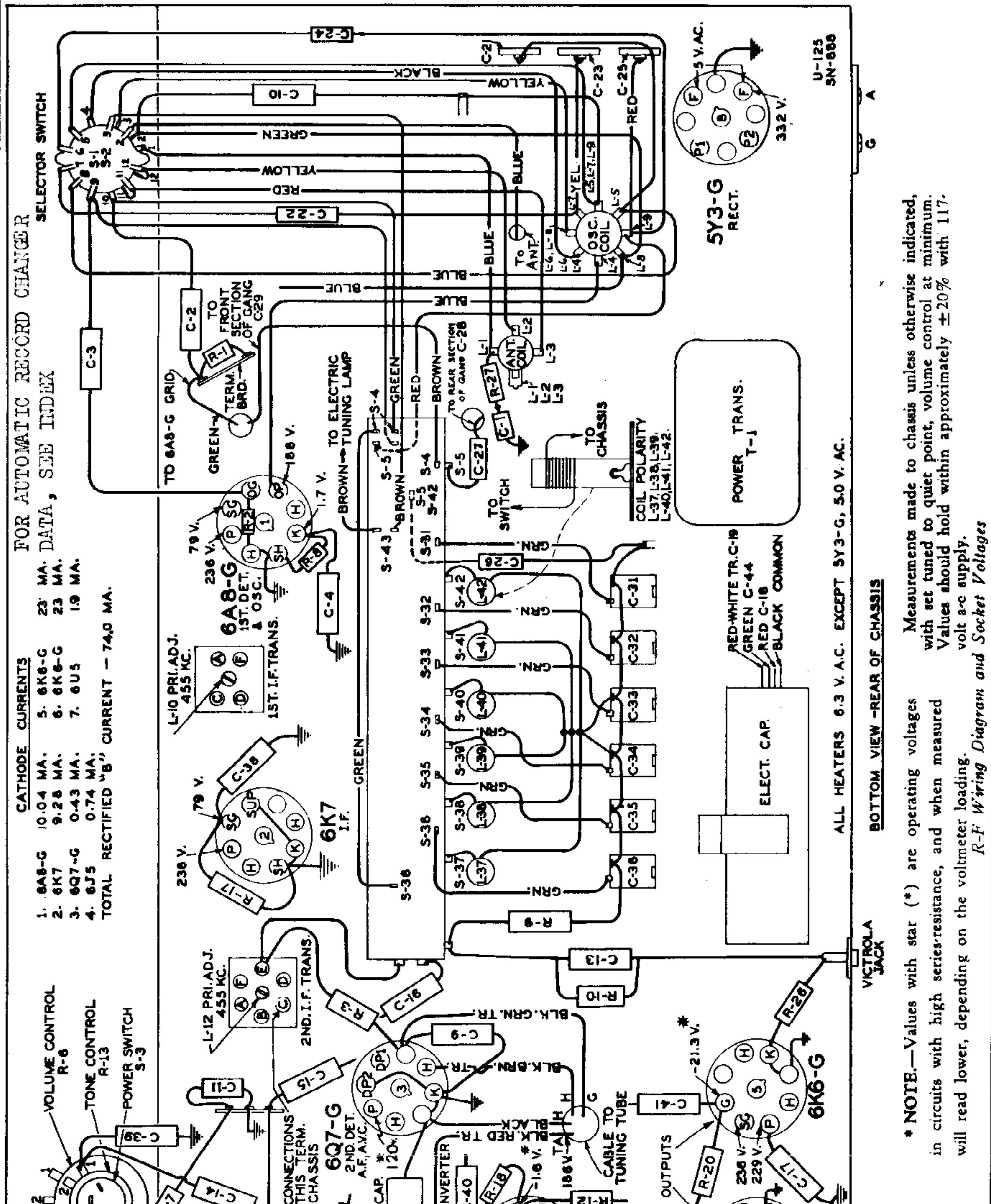
Loudspeaker
Type.......................... 12-inch Electrodynamic
Voice Coil Impedance.............. 2.2 ohms at 400 cycles

Pickup
Type.. Crystal
Impedance................ 100,000 ohms at 1,000 cycles
Average Output.................. 1.5 volts at 1,000 cycles across 500,000 ohm load

Phonograph
Type.. Automatic
Record Capacity.............. Eight 10-inch or seven 12-inch
Turntable Speed.................... 78 r.p.m., adjustable

MODEL U-125, Ch. RC-386
Chassis Wiring, Voltage

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODEL U-125, Ch. RC-386
Parts List

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	RECEIVER ASSEMBLIES	
14517	Board—Antenna ground terminal board	.25
30752	Bracket—Magic Eye mounting bracket	.25
31400	Capacitor—Triple adjustable trimmer two sections 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25)	.50
14079	Capacitor—6.8 mmfd. (C1)	.35
31387	Capacitor—Antenna coil trimmer capacitor bank 20-470 mmfd. (C31, C32, C33, C34, C35, C36)	1.30
13141	Capacitor—47 mmfd. (C13)	.35
12723	Capacitor—56 mmfd. (C3)	.35
12720	Capacitor—100 mmfd. (C39)	.35
14262	Capacitor—110 mmfd. (C5, C6)	.30
12404	Capacitor—120 mmfd. (C7, C8)	.30
13003	Capacitor—180 mmfd. (C2)	.35
14712	Capacitor—180 mmfd. (C37)	.30
31381	Capacitor—620 mmfd. (C24)	.45
31436	Capacitor—750 mmfd. (C26)	.40
4881	Capacitor—3,300 mmfd. (C22)	.60
31405	Capacitor—6,000 mmfd. (C27)	.75
5107	Capacitor—.0025 mfd. (C16)	.20
4838	Capacitor—.005 mfd. (C14, C17, C43)	.25
4858	Capacitor—.01 mfd. (C10, C40, C41, C42)	.25
14393	Capacitor—.01 mfd. (C11, C15)	.30
30882	Capacitor—.05 mfd. (C4, C9, C38)	.20
30867	Capacitor—0.5 mfd. (C20)	.30
32145	Capacitor—4 mfd. (C12)	.70
32142	Capacitor—Comprising two 10 mfd., one 20 mfd. sections (C18, C19, C44)	1.90
31382	Clip—Oscillator coil and core mounting clip	.04
31402	Coil—Antenna coil—A, B, and C bands (L1, L2, L3)	1.15
31401	Coil—Oscillator coil—A, B, and C bands (L4, L5, L6, L7, L8, L9)	2.00
31383	Coil—Oscillator coil—A band (L41, L42)	.30
31384	Coil—Oscillator coil—A band (L39, L40)	.30
31385	Coil—Oscillator coil—A band (L37, L38)	.30
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30)	2.65
31366	Control—Volume control, tone control, and on-off switch (R6, R13, S3)	3.00
31375	Cord—Indicator pointer drive cord	.30
31374	Cord—Variable condenser drum drive cord	.15
30905	Core—Adjustable core and stud for i-f transformer	.35
31386	Core—Adjustable core and stud for oscillator coil, Stock Nos. 31383, 31384, and 31385	.15
31372	Drum—Variable condenser drive cord drum and calibration dial	.65
11891	Lamp—Phono. compartment lamp	.17
31480	Lamp—Dial and "Electric Tuning" lamp	.20
30868	Plug—2-contact female plug for motor cable	.35
5040	Plug—4-contact female plug for speaker cable	.30
31373	Pulley—Drive cord pulley	.08
32143	Resistor—Voltage divider comprising one 11,000-ohm, one 3,000-ohm, one 22-ohm, and one 270-ohm sections (R14, R22, R23, R24)	.90
13220	Resistor—56 ohms, ½-watt (R27)	.20
30545	Resistor—180 ohms, ½-watt (R8)	.20
5114	Resistor—15,000 ohms, 1-watt (R17)	.22
14284	Resistor—22,000 ohms, 1/10-watt (R4)	.15
12454	Resistor—33,000 ohms, ½-watt (R2, R12)	.20
12266	Resistor—39,000 ohms, ½-watt (R7)	.20
14560	Resistor—100,000 ohms, ½-watt (R25)	.20
11398	Resistor—220,000 ohms, 1/10-watt (R5)	.15
12199	Resistor—270,000 ohms, ½-watt (R15, R19)	.20
13479	Resistor—390,000 ohms, ½-watt (R20, R21)	.20
12285	Resistor—470,000 ohms, ½-watt (R9)	.20
12486	Resistor—560,000 ohms, ½-watt (R18)	.20
30963	Resistor—820,000 ohms, ½-watt (R11)	.20
12013	Resistor—1 meg., 1/10-watt (R16)	.15
13730	Resistor—1 meg., ½-watt (R1)	.20
30208	Resistor—1.2 meg., ½-watt (R10)	.20
12201	Resistor—1.5 meg., ½-watt (R26)	.20
12679	Resistor—2.2 meg., ½-watt (R3)	.20
14343	Retainer—Retaining spring for station selector knob shaft	.03
14887	Retainer—Drive cord pulley retainer	.01
4669	Screw—No. 8-32 square head set screw for drum, Stock No. 31372	.03
31368	Shaft—Station selector knob shaft and pulley	.30
3682	Shield—Tube shield	.22
30868	Socket—2-contact female socket for motor power cable	.35
12493	Socket—5-contact female socket for speaker cable	.30
13871	Socket—Magic Eye socket	.45
14278	Socket—Pickup input socket	.25
31251	Socket—Tube socket	.25
31418	Spring—Indicator or drum drive cord tension spring	.05
31398	Switch—Range switch (S1, S2)	1.25
31370	Switch—Station selector push-button switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44)	3.85

STOCK No.	DESCRIPTION	Unit List Price
14376	Transformer—First i-f transformer (L10, L11, C5, C6)	2.45
14283	Transformer—Second i-f transformer (L12, L13, C7, C8, C37, R4, R5)	3.80
31445	Transformer—Power transformer 105-125 volts, 25-60 cycles (T1)	7.80
31446	Transformer—Power transformer 100-130/140-160/200-250 volts, 50-60 cycles (T1)	8.05
32144	Transformer—Power transformer 105-125 volts, 50-60 cycles (T1)	4.75
	SPEAKER ASSEMBLIES (RL-70H-5)	
13866	Cap—Dust cap for cone center	.03
12012	Coil—Field coil (L16)	2.90
11469	Coil—Neutralizing coil (L15)	.30
31275	Cone—Speaker cone and voice coil (L14)	1.75
31539	Plug—5-contact male plug for speaker	.25
32146	Speaker complete	12.10
14534	Transformer—Output transformer (T2)	3.85
14357	Washer—Spring washer to hold field coil securely	.06
	MOTORBOARD ASSEMBLIES	
31149	Base—Tone arm mounting base	.35
31152	Board—Record changer base complete with all welded and riveted posts and bearings—less all operating parts	7.90
14209	Bumper—Main lever rubber bumper (1)	.08
9848	Cup—Used needle cup, rest, and lid complete	.75
31148	Escutcheon—Index escutcheon	.40
31151	Guide—Pickup lift cable guide (Coil spring, 80T 2-in. large) (2)	.10
31150	Mounting—Pickup arm base rubber mounting complete	.45
31155	Spring—Needle cup lid tension spring	.04
	OPERATING MECHANISM	
31134	Bracket—Pickup locating lever mounting bracket (3)	.30
31144	Cam—Cam and gear assembly (4)	2.80
6808	Clutch—Trip lever friction clutch assembly (5)	.35
31146	Coupling—Motor coupling complete with turntable drive gear, rubber strips, motor coupling, and drive arm (6)	1.80
31129	Cover—Cap for top of record post	.45
31116	Finger—Trip lever friction finger assembly (7)	.45
31119	Gear—Long arm and rack gear for front left-hand record post (8)	.60
31120	Gear—Short arm and rack gear for rear right-hand record post (9)	.55
31121	Gear—Record post gear (10)	.90
31123	Guide—Main lever spring guide (11)	.40
31114	Lever—Index lever assembly (12)	.75
31137	Lever—Index lever tension spring lever (13)	.30
31138	Lever—Locating lever and pawl assembly (14)	.70
31113	Lever—Main lever assembly (15)	1.35
31140	Lever—Pickup lift cable lever and spring assembly (16)	.55
31135	Lever—Pickup locating lever assembly (17)	.85
31130	Lever—Record separator elevating lever complete with adjustment screws (18)	.80
31132	Lever—Trip detaining lever (19)	.30
31115	Lever—Trip lever assembly (20)	1.85
31131	Lever—Trip regulator lever (21)	.25
31133	Pawl—Trip pawl assembly (22)	.80
31124	Pin—Record post drive pin (23)	.04
14207	Roller—Pickup lift cable roller and bracket assembly (24)	.55
31118	Screw—Cone pointed set screw for trip lever hub or record post shelf	.06
4563	Screw—Pickup lift cable screw and nuts	.04
14195	Screw—Set screw for flexible coupling	.05
31117	Screw—Special screw to adjust friction clutch tension	.03
31126	Separator—Record separator knife (25)	.75
31122	Shaft—Record separator post shaft (26)	.40
31125	Shelf—Record post shelf assembly (27)	1.25
31141	Spindle—Turntable spindle shaft and spring	1.40
3676	Spring—Cam pawl tension spring on main gear (12 turns, .190-in. O.D., 43/64-in. lg.)	.04
14190	Spring—Pickup locating lever short spring or locating lever pawl tension spring (28) (16 turns, .180-in. O.D., 19/32-in. lg.)	.08
31145	Spring—Main lever tension spring (29) (18 turns, 9/16-in. O.D., 3-in. lg.)	.05
31136	Spring—Index lever tension spring (30) (25 turns, .190-in. O.D., 15/16-in. lg.)	.05
3666	Spring—Pickup lift cable tension spring (31) (20 turns, .195-in. O.D., 1-in. lg.)	.04
31127	Spring—Record separator pressure spring (32) (8 turns, ⅜-in. O.D., ¾-in. lg.)	.02
14191	Spring—Trip detaining lever tension spring (33) (15 turns, .190-in. O.D., ½-in. lg.)	.04
31875	Spring—Pickup locating lever tension spring (34) (14 turns, .220-in. O.D., 27/32-in. lg.)	.04

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE

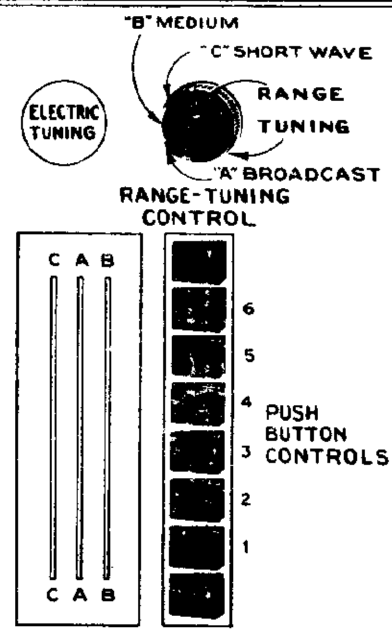
MODEL U-125, Ch. RC-386
Socket, Trimmers,
Speaker Connections
Drive Cord Data, Transformer Data
Parts List

RCA MFG. CO., INC.

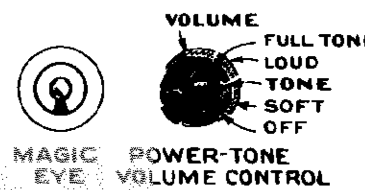
REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION	Unit List Price
32436	Spring—Locating lever tension spring (35) (18 turns, .182-in. O.D., 21/32-in. lg.)	.05
31142	Spring—Turntable spindle spring	.03
31147	Strip—Complete set of rubber strips for flexible coupling	.40
31139	Turntable Assembly—less spindle	3.35
31128	Washers—"C" washer for top of record post	.04
31143	Washers—Turntable thrust washers (1 steel, 1 bronze, 1 felt)	.15
	MOTOR ASSEMBLIES	
11703	Governor—Motor speed governor (M1)	3.05
31448	Motor—105-125 volts, 25 cycles (M1)	23.70
31163	Motor—105-125 volts, 50-60 cycles (M1)	20.50
31157	Motor—105-125 volts, 60 cycles (M1)	17.75
30870	Plug—2-contact male plug for motor power cable	.35
31447	Screw—Complete set of motor mounting screws, washers, and spacers—for 25 cycle models only	.40
31158	Screw—Complete set of motor mounting screws, washers, and spacers—for 50-60 cycle models only	.25
14206	Switch—Motor toggle switch (S6)	.90
	PICKUP AND ARM ASSEMBLIES	
31162	Cable—Pickup arm lift cable and clips	.15
31156	Crystal—Pickup crystal cartridge and needle screw	4.25
31159	Pickup and arm complete	7.45
31160	Screw—Pickup needle screw	.12
31161	Shaft—Pickup pivot arm and shaft assembly	.45
	MISCELLANEOUS ASSEMBLIES	
12038	Band—Rubber band for Magic Eye	.02
31397	Button—Station selector push-button	.15
13103	Cap—Pilot light jewel	.15
31456	Cover—8-protective covers for push-button markers	.08
31541	Cushion—Motor plate mounting cushions and clamps sufficient for one instrument	.50
31591	Dial—Station selector dial scale	.75
31407	Escutcheon—Magic Eye or Electric Tuning indicator escutcheon	.60
31395	Escutcheon—Tuning dial escutcheon only, less push-buttons and dial scale	1.15
30698	Hinge—Cabinet lid hinge	.95
31543	Indicator—Electric Tuning indicator disc	.25
31392	Indicator—Indicator pointer, carriage, and clip	.30
31355	Knob—Range switch knob	.12
14359	Knob—Station selector knob	.20
31391	Knob—Tone control knob	.15
30773	Knob—Volume control knob	.15
31460	Marker—"Dial Tuning" marker for push-button	.04
31459	Marker—"Victrola" marker for push-button	.04
31590	Markers—Station call letter markers	.40
31393	Screen—Dial color screen	.40
31760	Screen—Phono. compartment lamp screen	.20
11210	Screw—Chassis mounting screws, washers, and lockwashers	.05
31470	Springs—Motorboard suspension top spring, bottom spring, screw, and lockwasher (4 reqd.)	.10
4982	Spring—Retaining spring for knob Stock No. 14359	.05
14270	Spring—Retaining spring for knob Stock Nos. 30773 and 31355	.05
30330	Spring—Retaining spring for knob Stock No. 31391	.03
31478	Support—Cabinet lid support	2.20

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE



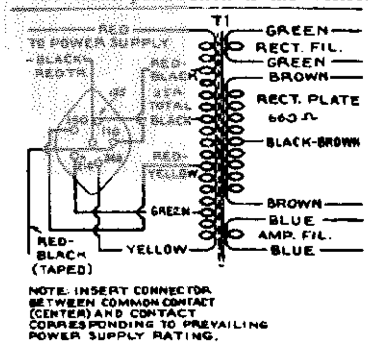
RANGE-TUNING CONTROL



MAGIC EYE

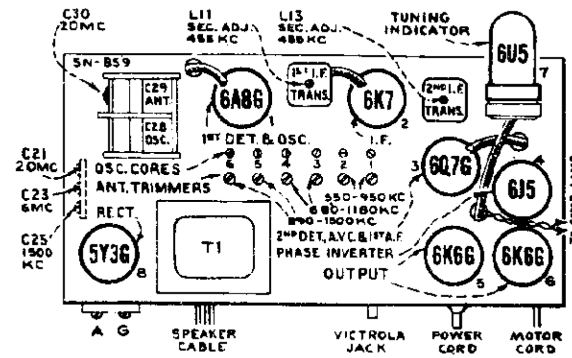
POWER-TONE VOLUME CONTROL

The rear push-button is for dial tuning
The front push-button is the Victrola switch



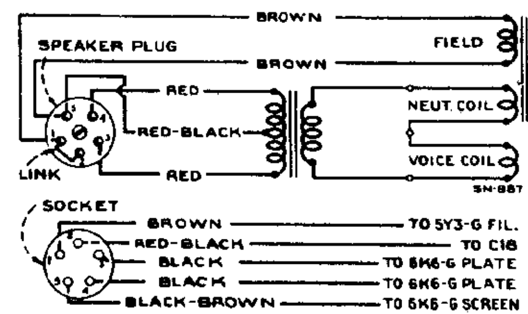
UNIVERSAL TRANS. CONNECTIONS

(110-volt supply for the Victrola motor is obtained by connecting the motor to the red and the red-black leads.)



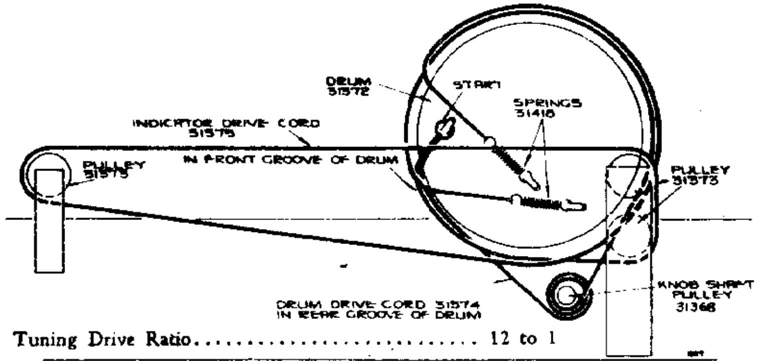
POWER SUPPLY RATINGS

A-6	105-125 volts,	60 cycles,	115 watts
A	105-125 volts,	50-60 cycles,	115 watts
B-2	105-125 volts,	25 cycles,	115 watts
C-6	100-130/140-160/200-250 volts,	60 cycles,	115 watts
C	100-130/140-160/200-250 volts,	50-60 cycles,	115 watts



SPEAKER PLUG CONNECTIONS

Connections and Colors of Loudspeaker and Cable



Tuning Drive Ratio........................ 12 to 1

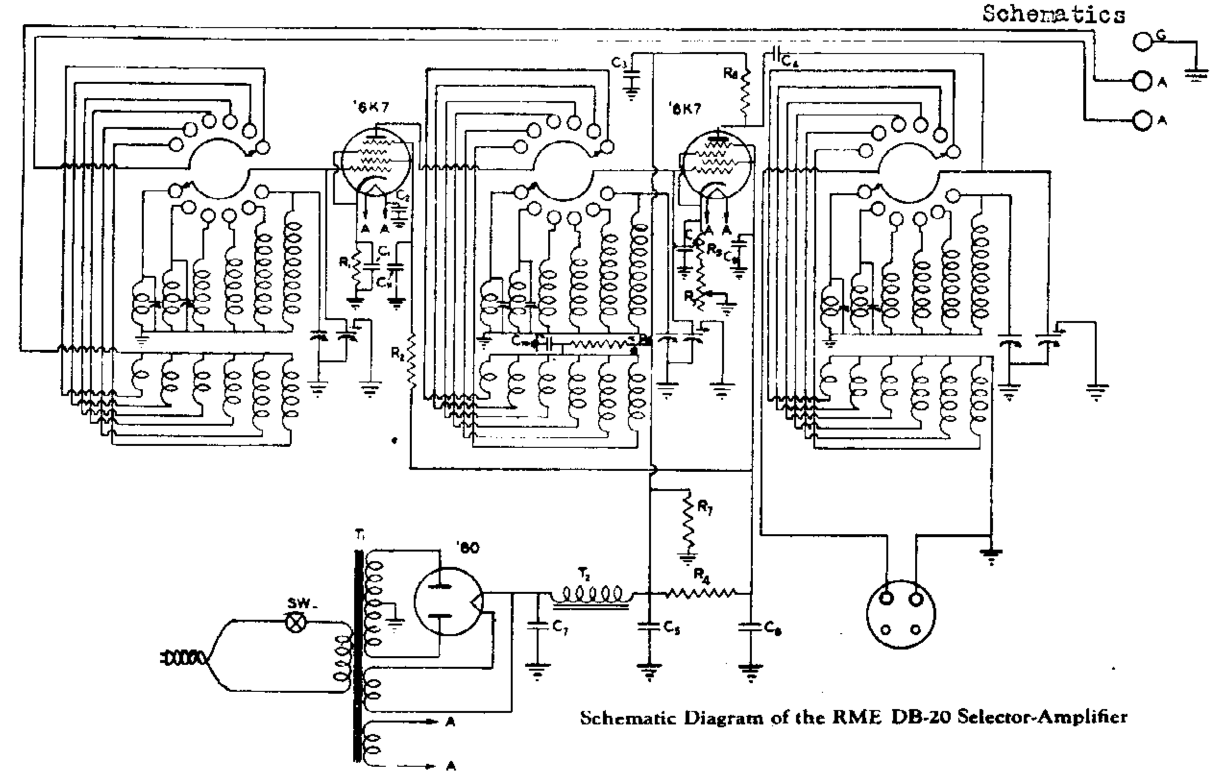
DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

Arrangement of Drive Cords for Tuning Condenser and Dial Indicator

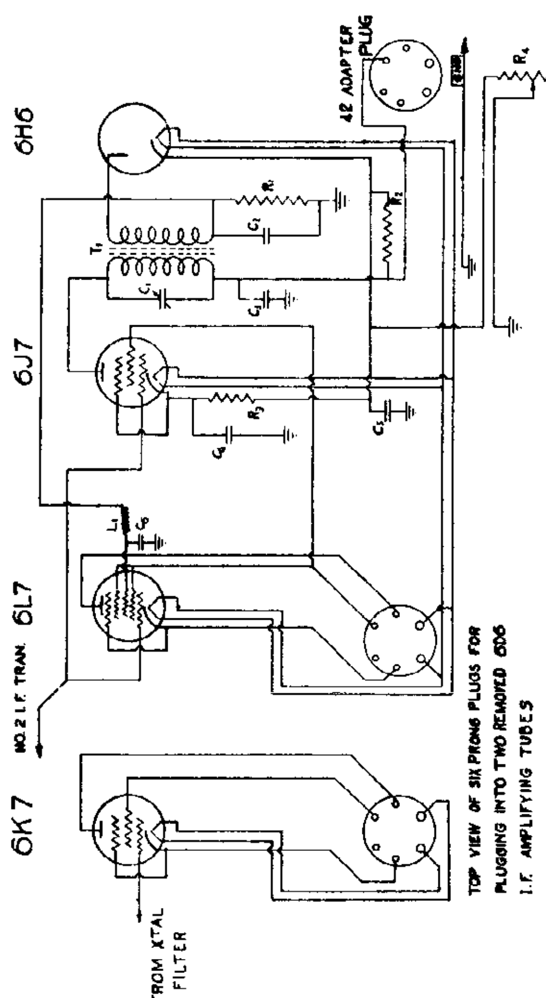
MODEL RME DB-20
Amplifier Schematic

RADIO MFG. ENGINEERS, INC.

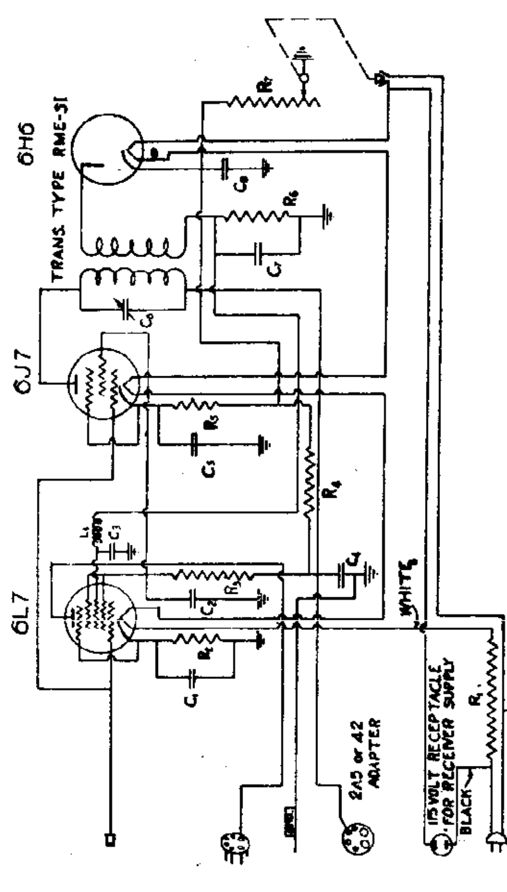
MODEL RME LS-1
MODEL RME LS-2
Noise Suppressors
Schematics



Schematic Diagram of the RME DB-20 Selector-Amplifier



Schematic Diagram of the RME LS-1 Noise Suppressor



Schematic Diagram of the RME LS-2 Noise Suppressor

MODEL RME 69
Socket, Trimmers
Controls

RADIO MFG. ENGINEERS, INC.

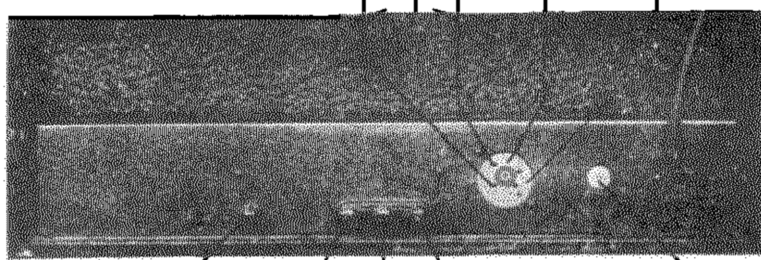


FIG. 3

FOR SCHEMATIC SEE VOLUME VII.

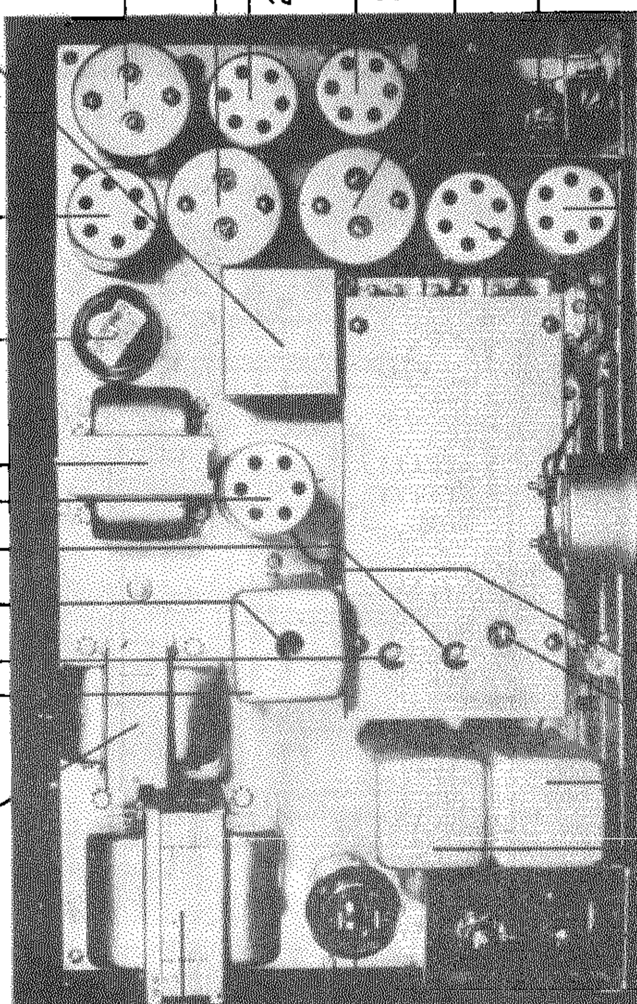
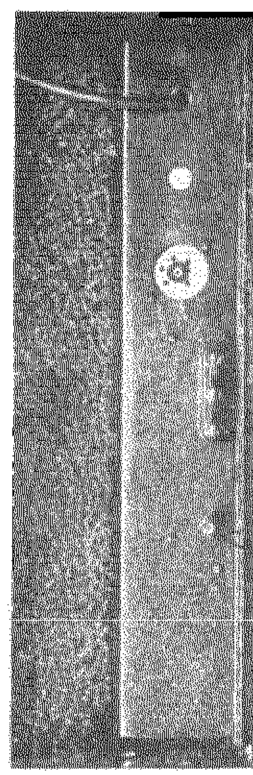


FIG. 4



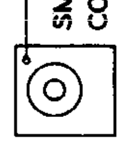


FIG. 6

MODEL RME 69
Chassis, Trimmers
Panel View

RADIO MFG. ENGINEERS, INC.

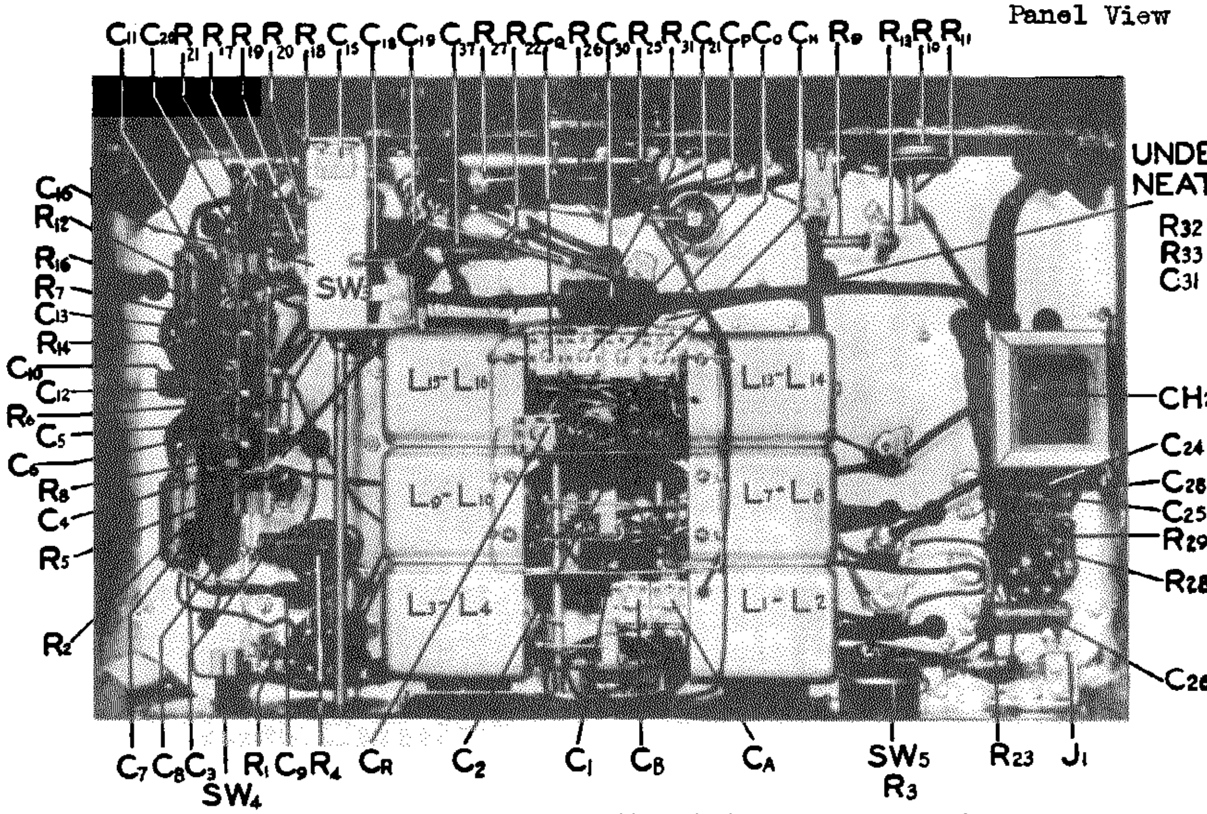


Fig. 11A

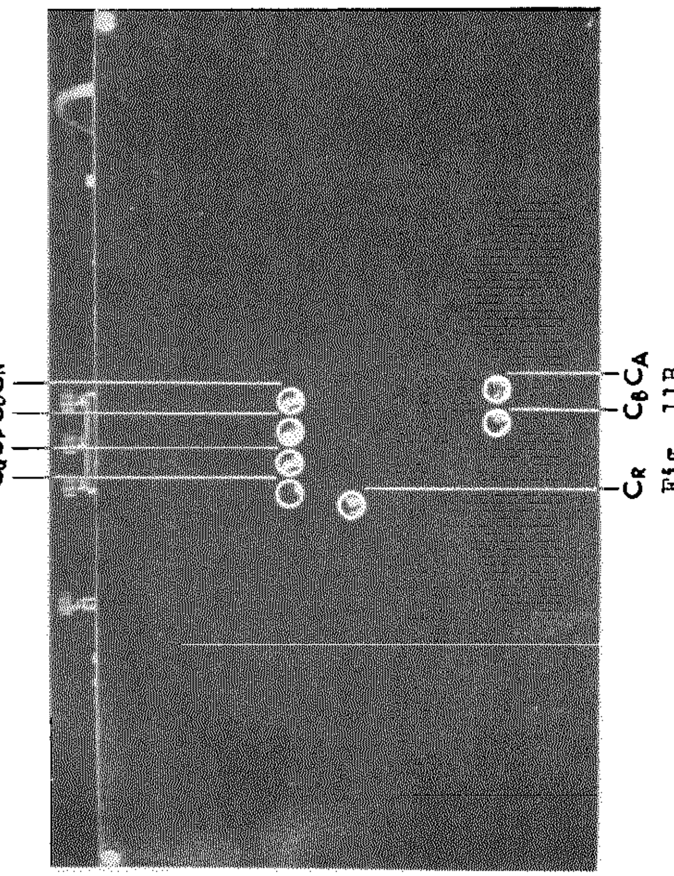


Fig. 11B

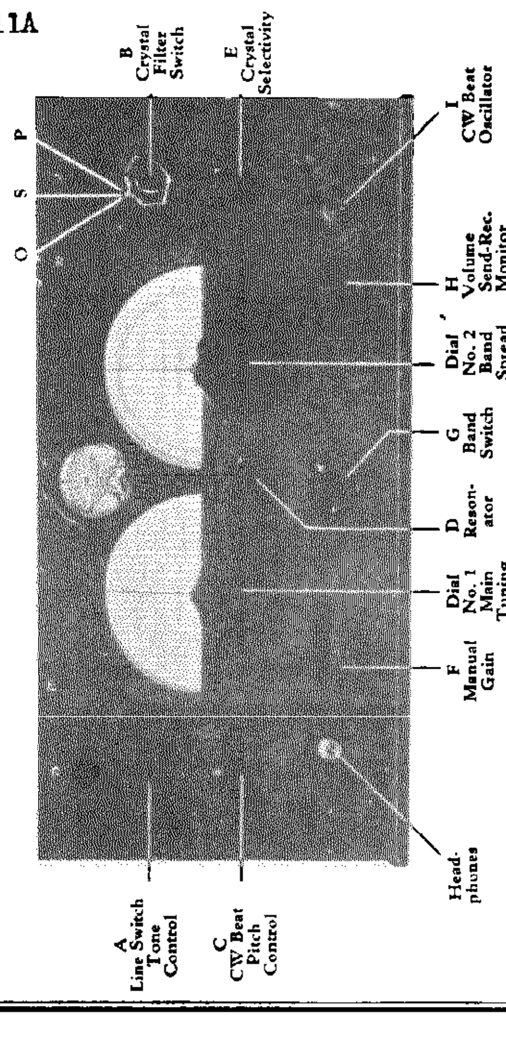


Fig. 2A. Front Panel Layout of the Standard RME-69, AC Model.

RADIO MFG. ENGINEERS, INC.

SERVICE NOTES FOR THE RME-69 RECEIVER

ALIGNMENT

One of the first evidences of misalignment in a receiver is low over-all gain of the receiver. In the RME-69 Receiver this is evidenced by low meter readings on signals which were formerly capable of producing higher meter readings. Due to the tremendous gain available in the audio system of the RME-69 Receiver, a misalignment due to loss of gain may not be noticed if the condition of the receiver is judged by audio output, since it may be possible to turn the volume control to the maximum output position and still obtain high values of audio output. Misalignment, however, does not affect the circuits of the audio amplifier and has solely to do with the intermediate frequency amplifier and, to some extent, the radio frequency amplifiers. Principal among the contributions to low gain is the part which the intermediate frequency amplifier plays in providing over-all sensitivity and selectivity of a satisfactory order.

Misalignment of the radio frequency section (principally that part of the section which is made up of the high frequency oscillator) is the control of the receiver calibration. This also is susceptible to certain outside influences which can cause variations to such a degree that the stated calibration of the receiver is changed to other values. However, this effect is not a common effect and usually the calibration of the receiver, unless tampered with by inexperienced hands, will remain very close to its stated value indefinitely.

This loss of gain when occurring in the radio frequency section of the receiver is usually due to the fact that the oscillator has been grossly misaligned so that it is apparent in the frequency calibration of the receiver. In other words, it might well be said that a loss of sensitivity in the receiver occurring simultaneously with a wide-spread condition of off calibration might indicate the fact that the loss of gain is caused by misalignment of the radio frequency section of the receiver.

On the other hand, if the gain of the receiver is low, but the calibration is correct, it might be said without hesitation that the most probable cause for the low gain is the misalignment of the intermediate frequency amplifiers relative to the trimming condensers of the intermediate frequency amplifier transformers.

It is for the purpose of realignment of these intermediate frequency transformers that the following test procedure is outlined. IMPORTANT NOTE. It is essential that the 465 KC intermediate signal which is used for realignment of the intermediate frequency amplifier is not set according to any arbitrary calibration on the test oscillator itself since it has been found that commercial test oscillators for service work vary considerably, at least to an extent which will not permit proper alignment of a communication type receiver in which is installed a quartz filter. It is therefore better if no test oscillator is had, since a broadcast station of constant signal strength will furnish adequate test signal for alignment of the intermediate frequency amplifier, using the quartz filter for establishing the proper IF frequency as indicated in the following procedure.

The meter on the RME-69 receiver affords an excellent method of indicating the peak alignment of each of the transformers. The location of the three intermediate frequency amplifier transformers, T-3, T-4, and T-5 is given on Figure 4 of the illustrated sheet attached. The two padding condensers located in each of these transformers and accessible through apertures in the top of the shields can also be seen.

OUTLINE OF PROCEDURE FOR CORRECT ALIGNMENT OF THE INTERMEDIATE FREQUENCY AMPLIFIER TRANSFORMERS OF THE RME-69 RECEIVER.

The intermediate frequency amplifiers in the RME-69 Receiver are designed for a frequency of 465 KC. Since these receivers are always supplied with a quartz crystal filter, it is essential that the intermediate frequency amplifier transformers be accurately aligned with the crystal frequency. Crystals are supplied in frequencies slightly at variance from the above stated value of intermediate frequency by an amount not greater than one kilocycle plus or minus 465 KC. Rather therefore than align the intermediate frequency amplifier stages of the RME-69 to a set frequency of 465, it is essential that the alignment be done in conjunction with the quartz filter so that alignment of the intermediate frequency amplifier is achieved at the frequency of the filter. This is done as follows and when the process as herein outlined is followed accurately, maximum results will be obtained. The use of any other process of a general type will produce inferior results.

The first step in the alignment procedure is to tune in a broadcast station, preferrably in the low frequency portion of the broadcast band. The signal should be one of medium signal strength so that the R meter indicates a signal level of R9 or slightly less. If no station of this amplitude is available but a stronger station is available, a reduction in the efficiency of the antenna by the connection of a short wire to the antenna post may help to bring the signal strength as indicated down to R9. Usually between 550 and 800 KC in most any territory a station can be received at most any time for this test and adjustment.

When the station has been chosen, let us assume that its frequency is 700 KC, the next step is to slightly detune the main tuning control so that the frequency reads approximately 715 or 720 KC. This of course will tune the station out. It does not necessarily have to be the frequency mentioned or the exact frequency of detune, but the general procedure is to tune the main tuning control slightly higher than the chosen station so that it may be brought back to resonance by decreasing the scale reading of the band-spread control. This is done merely to provide vernier tuning.

With the station chosen and resonated on the band-spread scale, the crystal filter is switched to the series position which is the middle position of the three available. The band-spread scale is then adjusted with respect to the signal so

RADIO MFG. ENGINEERS, INC.

that a maximum meter reading is obtained. This procedure is one which requires patience and accuracy of adjustment since the receiver is ultra sharp with the crystal filter in and there will be one definitely sharp peak indicating crystal resonance. The receiver should be tuned to this peak and left on it during all adjustments to be made regarding the intermediate frequency amplifier.

When this peak has been tuned to and the meter is at maximum reading, a small standard intermediate frequency trimmer tool of the insulated screw-driver type should be used. Then the control "E", Figure 2A, should be set so that the condenser it adjusts is set at 50% mesh. Then, without particular attention to a course of procedure in tuning, any transformer may be adjusted at any particular time, the important factor being that they all be adjusted so that the R meter is brought to and left at a maximum meter reading. Usually this adjustment will not require very much turning of the adjustment screws. A good procedure to follow is to start with the No. 1 transformer and align in sequence No. 2 and No. 3. All adjustments should be made as before mentioned so that the meter reading is maximum.

It is advisable from time to time to make sure that the signal is still adjusted to peak resonance of the crystal by slightly varying the adjustment of the band-spread control. When this procedure has been completed as outlined and all transformers have been adjusted and left at maximum meter reading, the intermediate frequency amplifier of the receiver is in peak adjustment and the crystal aligned with it for maximum effectiveness in filter action.

RME-69 RECEIVER INTERMEDIATE FREQUENCY AMPLIFIER ALIGNMENT WITH SILENCER INSTALLED

The general procedure for alignment of the intermediate frequency amplifier as described above also applies to receivers in which the LS-1 silencer has been installed. Preliminary adjustment as above described should be made with the silencer threshold control set at maximum clockwise position, of rotation. When the intermediate frequency transformers have been aligned as outlined, the silencer transformer may be peaked by turning the band switch to No. 6 band on the receiver and tuning in and resonating the frequency band around 30 megacycles so that the receiver is sensitive at that point. Then under conditions of automobile ignition interference the silencer control should be set to maximum counter-clockwise rotation position and the small screw accessible through the hole in the noise rectifier transformer located on the silencer auxiliary chassis should be adjusted for a minimum response, of the interference noise. This insures accurate alignment of the noise amplifying system with that of the intermediate frequency, a condition which must necessarily exist for efficient silencer action.

After the intermediate frequency amplifier has been aligned as per the instructions under the article concerning intermediate frequency transformer alignment, a check of the phasing of the crystal filter should be made. Tune in a broadcast station, preferably on the low frequency end of Band 1. Then tune the main tuning control slightly to the high frequency side of it, say 10 KC or more higher in frequency than the selected station.

Then resonate the station again by means of the band-spread control. Next set the crystal switch to the series position as indicated on Figure 2A by the position "S" on control "B". Now vary the band-spread control as may be required to produce peak reading of the signal on the R meter by resonating with the crystal resonance peak.

With this setting achieved, vary the dial Number 1 slightly higher and slightly lower by five kilocycles as can be approximated by the calibration of the dial (one half division each way since one division is representative of 10 kilocycles) and notice the drop in the R meter reading. The drop so achieved by varying the setting of Dial 1 five kilocycles above and below the selected signal should be productive of an R meter drop of 40 db. or greater. In other words, if the signal when resonated produces an R meter reading of 60 db. on the R meter scale, setting the dial Number 1 five kilocycles higher in frequency than the frequency of the signal being used should make the R meter fall to 20 db. or less. Similarly, setting the dial Number 1 five kilocycles lower in frequency than the station being used, the R meter should again fall from 60 db. on the scale to 20 db. or less. Should it fail to do this, the phasing condenser (C-1, figure 4) should be adjusted and a test made as just described by five kilocycle above and below adjustment of Dial 1 until the proper variation in the R meter is achieved.

It will be found that the condenser C-1 will usually run at a very low value of capacity, very close to its minimum capacity adjustment. Therefore only slight turning of this condenser will be productive of changes which materially affect the attenuation of the crystal filter. It is usually found that this condenser is not required to be adjusted since it holds its setting very well over long periods of time. The procedure just outlined gives the proper method for checking the phasing and adjusting when necessary.

ALIGNMENT OF RADIO FREQUENCY SECTION OF THE RME-69 RECEIVER

Alignment of the radio frequency section of the receiver will affect principally the calibration of the receiver. Within certain limits this of course will also affect the sensitivity. A small variation in frequency (up to 2%) will not materially reduce the sensitivity of the receiver although they of course will show up as variations in the calibration as indicated by the required setting of the main tuning dial indicator. Correction for any variation in calibration can be made by following the suggestions outlined below.

Band 1 includes the frequencies between 550 and 1500 KC. For band one there are two frequency adjustments for adjusting the indicator to proper calibration. One of these, C_s, is adjusted as indicated on Figure 4 through the top of the shield can just in the rear of the main tuning condenser assembly. Just in front of this aperture and on the main tuning condenser assembly is C_t which is used to adjust the

RADIO MFG. ENGINEERS, INC.

frequency for the high frequency end of Band 1. The procedure is this: Put the main tuning indicator to a position so that the main tuning condensers are fully meshed. The pointer of the main tuning control should then be set at maximum left end of scale so that the pointer falls just below the line above the numbers indicating the various channels. In this respect it will partially cover the top half of the numerals indicating the different tuning bands on this scale. In other words, the line which borders the semi-circular scale at the extreme counter-clockwise position should rest on the top edge of the pointer as it is turned to maximum counter-clockwise rotation and the condenser plates are at full mesh.

The next step is to choose a station or a signal of accurately known frequency, around 700 KC, and set the main indicator to the frequency of the signal which is going to be used for the test. For example: There is a station available with fairly good signal strength or a test oscillator is available which can ACCURATELY be set at 700 KC. If the receiver indicator on the main tuning dial is set at 700, and the receiver is considerably out of calibration of course the signal will not be received. However, leave the indicator at the correct frequency of the signal being used for the test and set the band-spread control to a reading of 180 on the dial at which position it has no material effect on the tuning circuits of the receiver and permits the calibration of the main tuning dial to indicate accurately the frequency of setting.

Then by means of condenser C_s (Figure 4) accessible through the trimming hole in the oscillator shield can for Band 1, adjust until the signal is brought in with the pointer set at the proper frequency. Then choose a signal at about 1200 or 1300 kilocycles, and set the main tuning dial indicator to the correct frequency for that signal and bring the signal in on that setting with trimmer C_t. It will then be necessary to return to the former frequency setting of 700 KC to make sure that the variation of C_t has not made some slight change in the setting for the lower frequency calibration point and it may be necessary to readjust C_s slightly again. Then in order to make certain of the accuracy of both settings return to the frequency chosen between 1200 and 1300 KC and if necessary, slightly readjust C_t again. After several checks on each frequency, it will be found that the calibration can be made satisfactorily.

Calibrations on the higher frequency bands are controlled for Bands 2, 3, 4, 5, and 6 by the trimmers C_r, C_q, C_p, C_o, C_n, (Figure 11-B) respectively. High side beat is used on all frequencies in the RME-69 Receiver which means that all of the condensers C_r, C_q, C_p, C_o, C_n, must be set to the lowest capacity setting which will provide a beat and the proper calibration for the frequencies in the respective bands. Calibration frequencies used are as follows:

Band 2: 2 megacycles and 3 megacycles.
Band 3: 4 megacycles, 5 megacycles, 6 megacycles.
Band 4: 7 megacycles, 9 megacycles, 11 megacycles, 13 megacycles.
Band 5: 14 megacycles, 15 megacycles, 17 megacycles.
Band 6: 30 megacycles.

After the calibration has been made accurately on all of the frequencies, or if the receiver has been found to be accurately set insofar as its calibration is concerned on all frequencies, the trimmers C_b and C_a have a distinct effect upon the RF grid circuits for bands 5 and 6 respectively. They are adjusted as follows: With a steady incoming signal on between 14 and 15 megacycles and the most effective setting of the control "D" for signal in that region, and with the antenna connected, the condensor C_b is adjusted for maximum meter reading. With these same conditions existing on 30 megacycles, with the band switch set on band 6 and the antenna connected, C_a is adjusted for maximum response on a given steady signal. All other trimming and adjusting is done manually by means of control "D", Figure 2-A, and is a variable RF amplifier and detector grid padder which can be critically adjusted for peak resonance at any frequency it is desired to tune to.

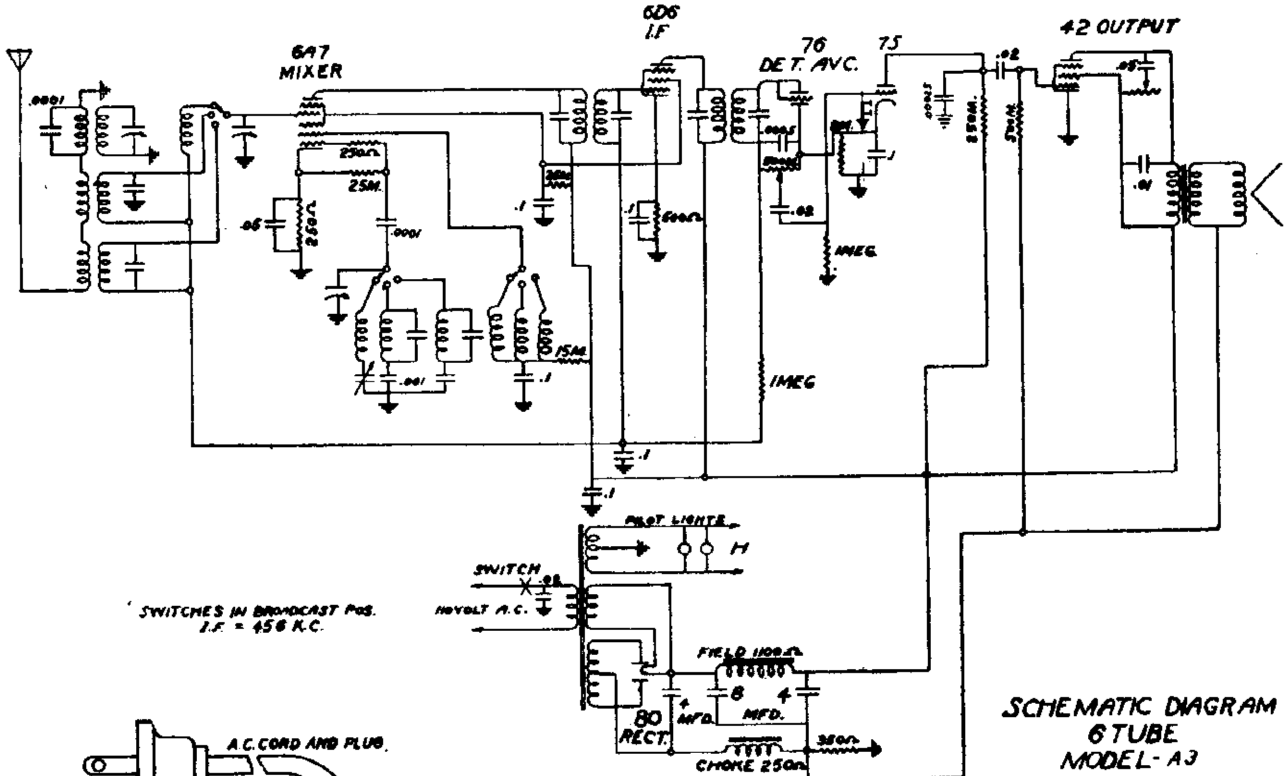
It is of importance to note the setting of the condenser C_c (Figure 4). This is the antenna coupling condenser used when the receiver is set to Band 1. It as well as condenser "C" (Figure 4) should be set to practically its minimum capacity in order to provide constant alignment and proper coupling to the antenna when using Band 1. Excessive capacity in the condenser C_c will cause misalignment of the RF amplifier and hence promiscuous beating of harmonically related broadcast frequencies to the effect that a number of whistling tones will be received on the high frequency end of the broadcast band. Excessive capacity on C will somewhat contribute to the same result but will, more than that, reduce the sensitivity on the broadcast band. When the receiver leaves the factory, they are set at a very small capacity and should not be set at any other capacity or material reduction in the efficiency of operation will be produced.

Whenever the receiver is gone over for alignment, it is well to remove the dust cover from the condenser assembly and inspect the permanence of position of the rotor plates of the ganged condenser controlled by the knob "D". This is located between the two main variable condensers and is located underneath the dust cover which is removable by unscrewing the four acorn nuts holding it down on the condenser assembly. Some times the rotors become loosened and misplaced angularly with respect to each other. They should always be adjusted so that the rotors are at full mesh at the same time. Any slight angular displacement of one rotor with respect to the other will materially reduce the sensitivity of the receiver and destroy the preselection, thereby reducing the image frequency rejection and also the sensitivity, especially on the high frequency bands.

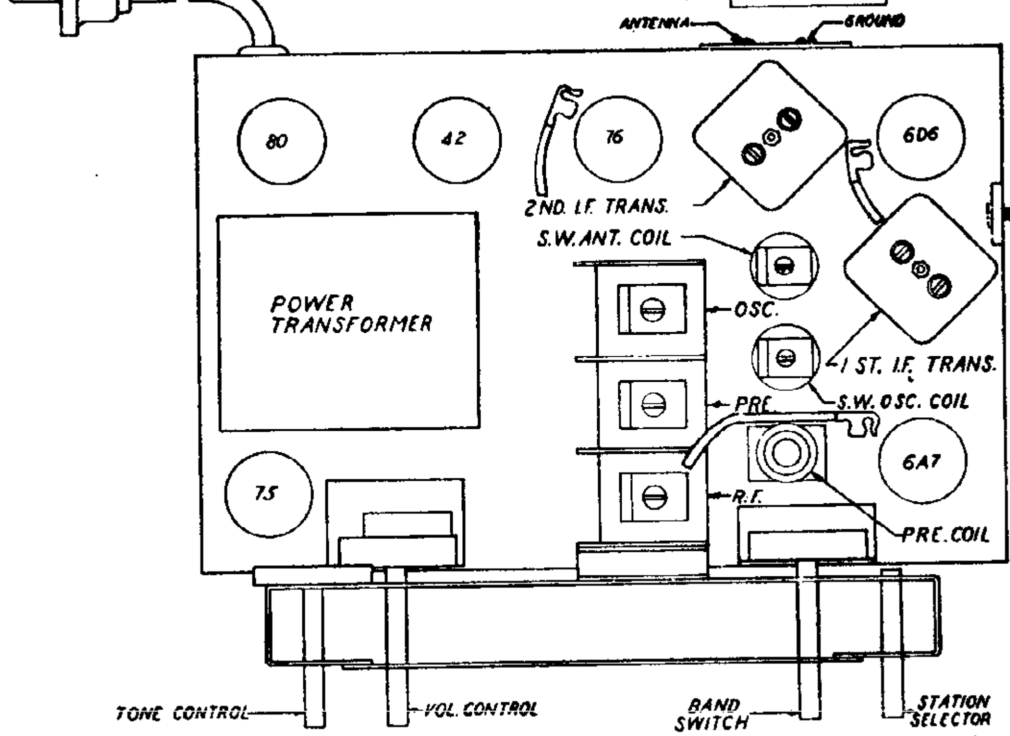
The padders C_b and C_a (Figure 11-B) materially contribute to the image signal rejection on the bands 5 and 6. Special care should therefore be taken in the adjustment of these condensers when the receiver is aligned.

MODEL A3
Schematic, Socket
Trimmers, Alignment

RADIO PRODUCTS CORP.



SCHEMATIC DIAGRAM
6 TUBE
MODEL- A3



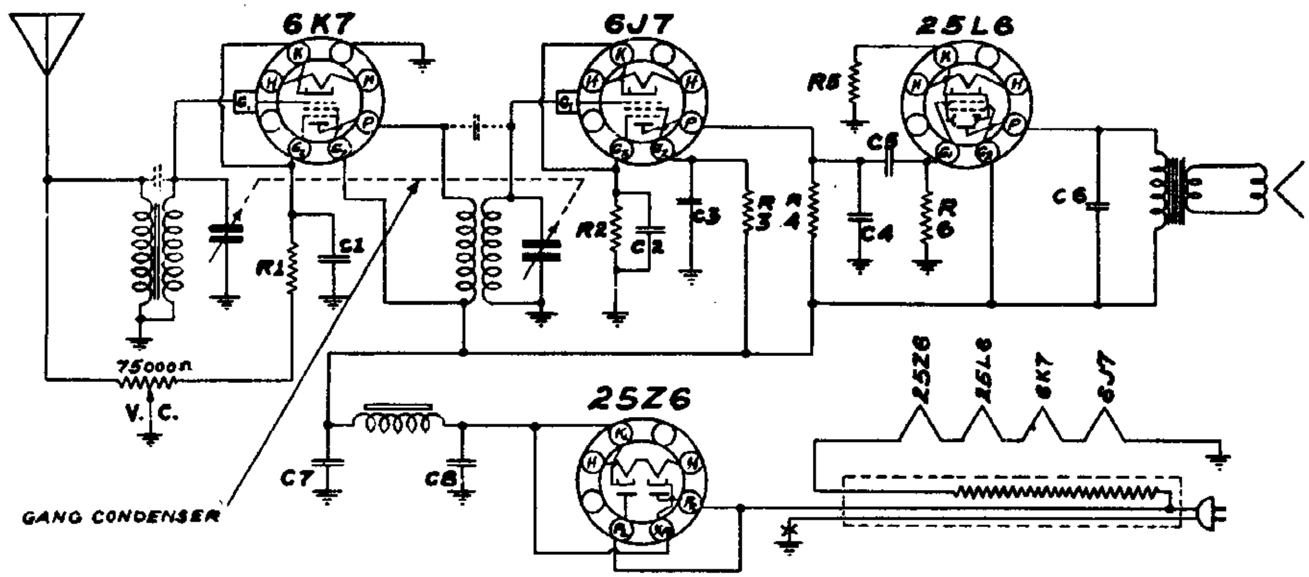
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME VIII.

FREQUENCY RANGES AND ALIGNMENT FREQUENCIES;-

BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT. to maximum peak of 1400 KC, then pad the oscillator circuit at 600 KC while rocking gang condenser.
SHORT WAVE - 5800 to 15200 KC - Adjust the OSC and ANT. trimmers to maximum peak of 14000 KC. No padding required.
POLICE - 1700 to 5000 KC - Adjust the ANT. coil trimmer to a maximum peak of 4000 KC. No other adjustments are reqüired.

MODEL 4H
Schematic, Socket
Trimmers, Alignment

RADIO PRODUCTS CORP.



CAPACITORS

No	MFD.	TYPE	No	MFD.	TYPE
C1	.1	200V.	C5	.01	400V.
C2	.25	200V.	C6	.02	400V.
C3	.1	200V.	C7	10.0	ELECT.
C4	.00025	MICA	C8	30.0	ELECT.

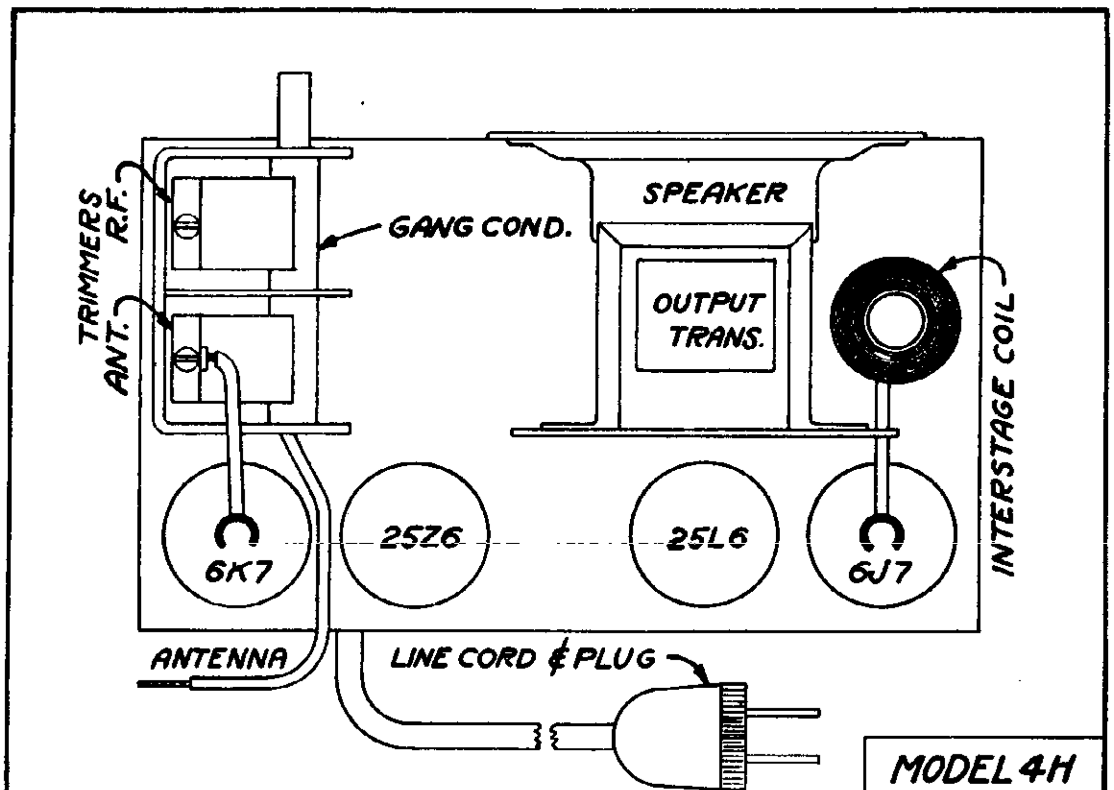
RESISTORS

No	OHMS	WATTS	No	OHMS	WATTS
R1	250	1/4	R4	500,000	1/2
R2	25,000	1/4	R5	110	1/2
R3	2,000,000	1/4	R6	500,000	1/4

RESISTANCE OF LINE CORD 173 OHMS

SCHEMATIC DIAGRAM
MODEL 4H

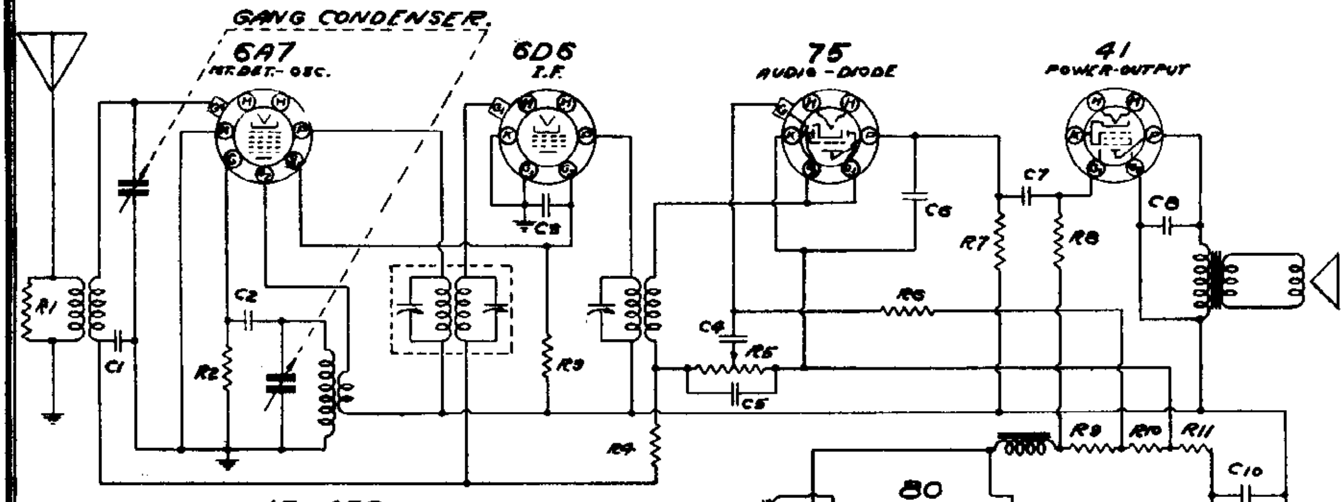
4 TUBE T.R.F. RECEIVER, RANGE 535-1730 KILOCYCLES.
POWER SUPPLY: AC(60 CYCLE) OR DC, 105-125 VOLTS.
CAUTION: DO NOT USE A GROUND ON THIS RECEIVER.
ALIGN AT 1400 KC THROUGH 100 MMF. CONDENSER.



MODEL 4H

MODEL 5F
Schematic
Alignment
MODEL 5G
Schematic

RADIO PRODUCTS CORP.



IF = 456

CAPACITORS

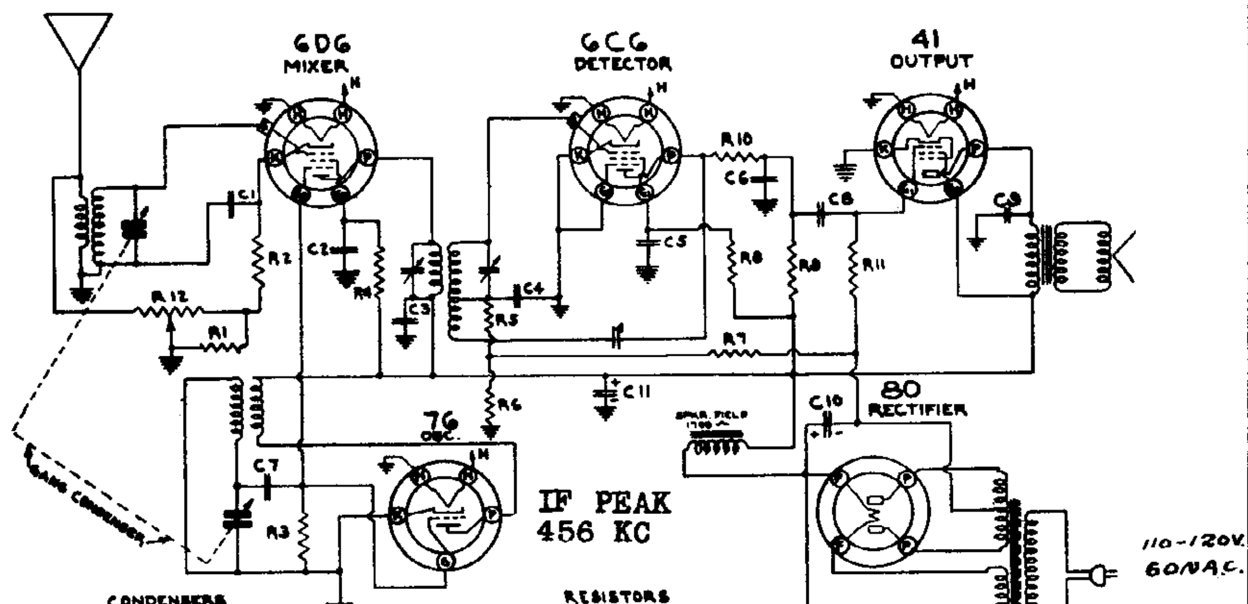
No	MFD.	VOLTS-SPL.
1	.1	200
2	.0001	MICA
3	.1	400
4	.01	400
5	.00025	MICA
6	.00025	MICA
7	.01	400
8	.01	400
9	8	300 ELECT.
10	8	300 ELECT.

RESISTORS

No	OHMS	WATTS
1	15000	1/4
2	50000	"
3	15000	"
4	2000000	"
5	500000	VOL. CONT.
6	2000000	1/4
7	200000	"
8	500000	"
9	225 } ±10%	1/2
10	40 } ±10%	1/2
11	170 } ±10%	1/2

RANGE 535-1730 K.C.

FOR ALIGNMENT OF MODEL 5F, SEE THAT FOR MODEL 4A, PAGE 9-1



IF PEAK
456 KC

CONDENSERS

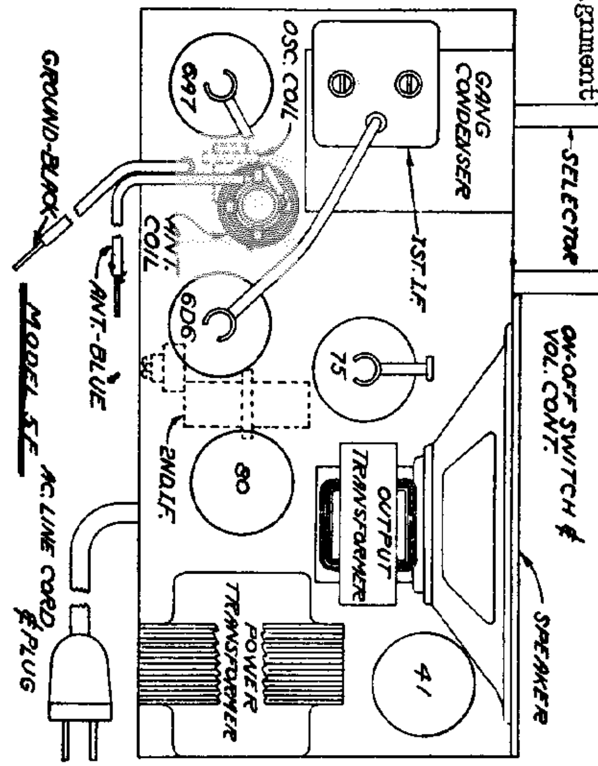
NO.	CAPACITY	TYPE
C1	.02 MFD.	400 V.
C2	.02 MFD.	400 V.
C3	.05 MFD.	400 V.
C4	.1 MFD.	200 V.
C5	.01 MFD.	400 V.
C6	.0005 MFD.	MICA
C7	.0001 MFD.	MICA
C8	.01 MFD.	400 V.
C9	.002 MFD.	400 V.
C10	8.0 MFD.	300 V. ELECTROLYTIC
C11	8.0 MFD.	300 V. ELECTROLYTIC

RESISTORS

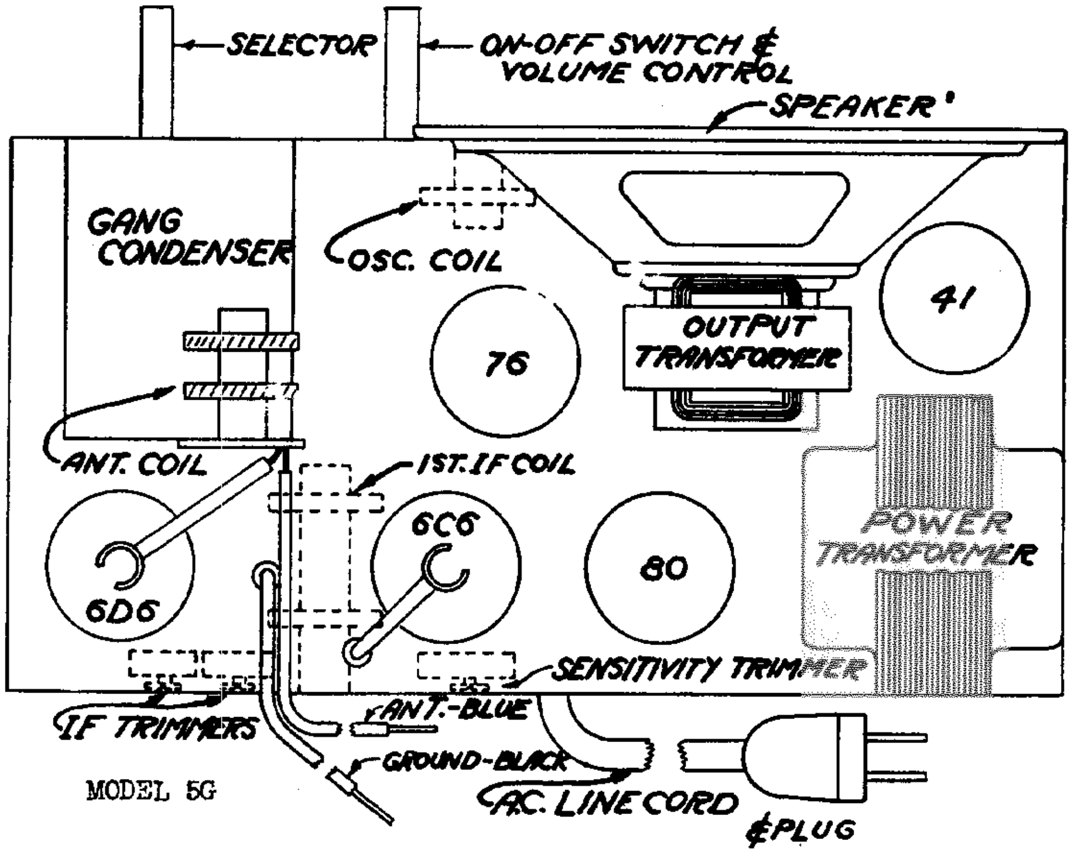
NO.	RESIST-OHMS	WATTS
R1	50,000	1/8
R2	600±10%	1/8
R3	50,000	1/4
R4	20,000	1/4
R5	1,000,000	1/4
R6	30±10%	1/8
R7	300±10%	1/4
R8	2,000,000	1/4
R9	500,000	1/4
R10	5000	1/4
R11	500,000	1/8
R12	50,000	VOL. CONTROL

SCHEMATIC DIAGRAM
MODEL 5 G

RADIO PRODUCTS CORP.



MODEL 5F



MODEL 5G

ALIGNMENT DATA AND SERVICING

Connect the signal generator through a .1 mfd. condenser to the grid of the 6D6 tube. Connect an output meter across the voice coil of the speaker. Set the generator to 456 K.C. and align the I.F. transformer for maximum reading on the output meter. Set the sensitivity control about ¼ turn counter-clockwise from the point where the whistles start and re-align the I.F.

Feed the generator through a 100 mmf. condenser to the antenna lead of the receiver. Set the generator to 1400 K.C. Turn the dial of the radio to 1400 K.C. Align the oscillator and antenna trimmers on the gang condenser for maximum output on the meter.

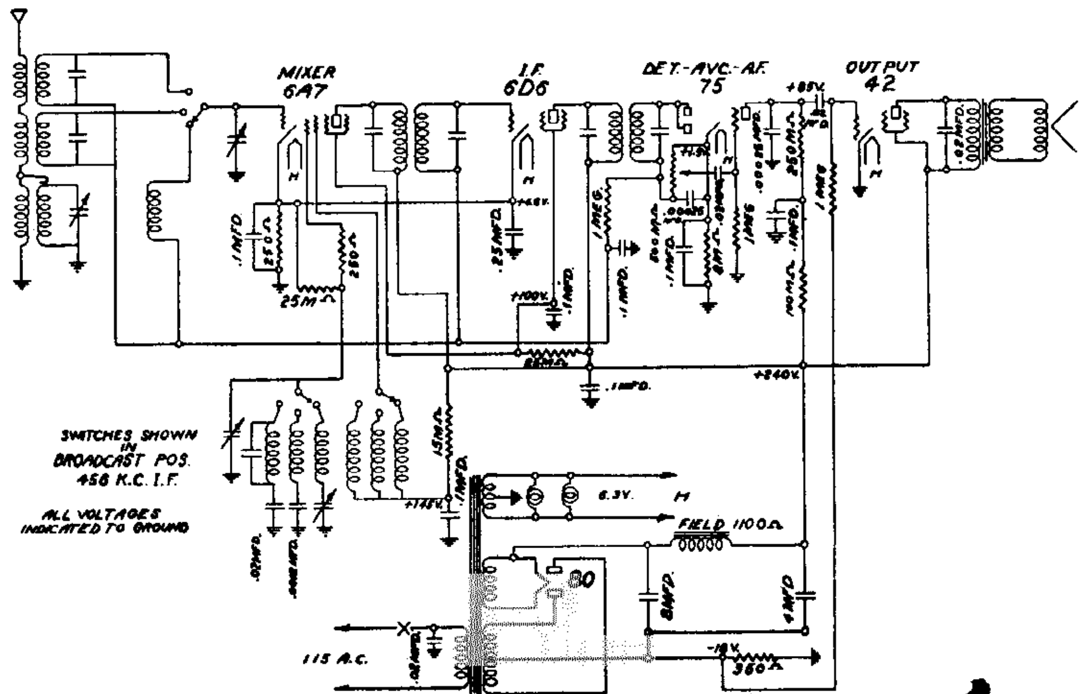
ADJUSTMENT OF SENSITIVITY CONTROL

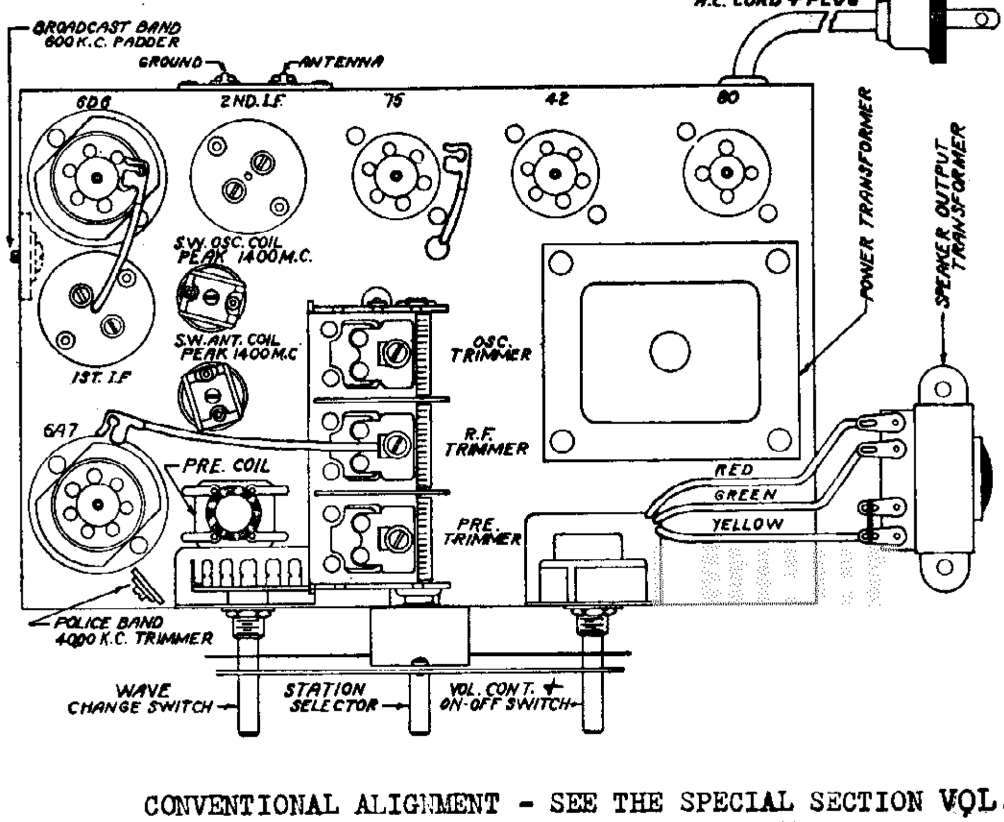
The sensitivity control is accessible from the rear of the cabinet, (see layout) and takes the form of a trimmer condenser, which may be adjusted with a small screw driver or knife blade. This control is adjusted at the factory to give normal sensitivity for a set of this type; and in most locations there will be no need for re-adjustment. However, in rural areas where signal strength is low, the gain of the receiver can be increased by three or four times by turning the trimmer in the following manner:

1. Tune in a station.
2. Increase sensitivity by turning trimmer in a clockwise direction until the station signal is distorted by a whistle.
3. Turn trimmer slowly counter-clockwise until whistle ceases. This is the point of maximum sensitivity.
4. Tune in several stations. If some of these signals still whistle, the sensitivity must be again retarded slightly.

MODEL X8
Schematic, Voltage, Socket
Trimmers, Alignment

RADIO PRODUCTS CORP.





CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION VOL. VIII

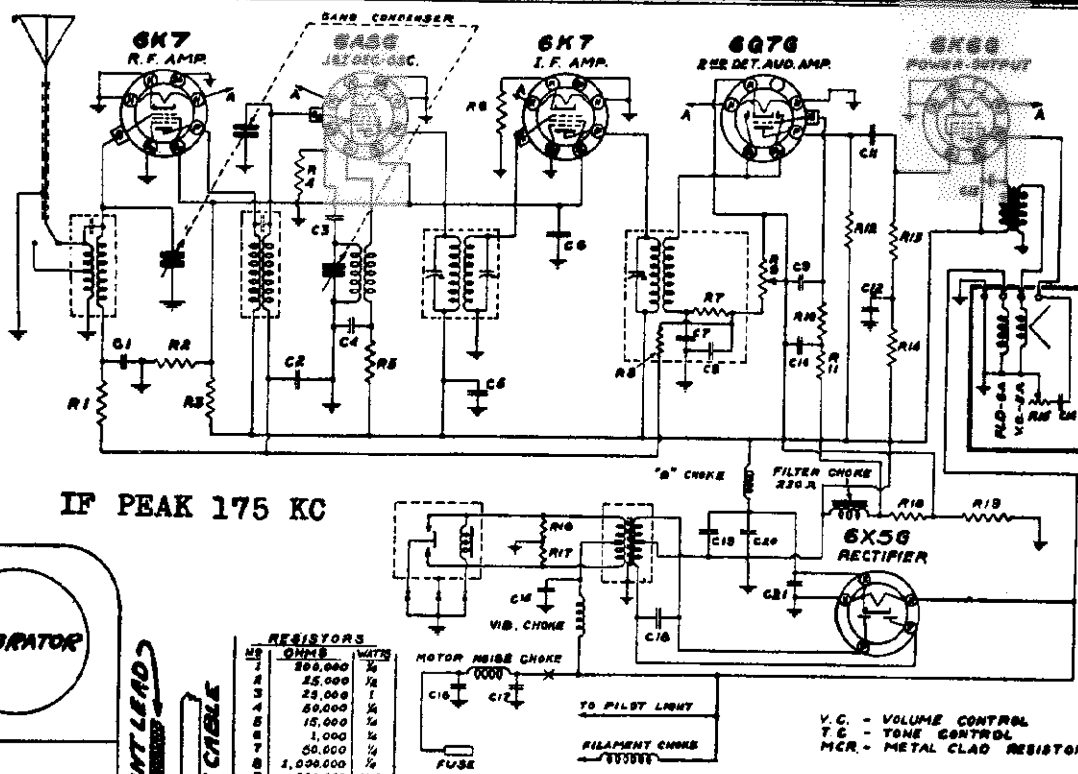
FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT trimmers to a maximum peak of 1400 KC, then pad the Oscillator circuit at 600 KC while rocking gang condenser.

SHORTWAVE - 5800 to 15200 KC - Adjust the OSC and ANT trimmers to a maximum peak of 14000 KC. No padding required.

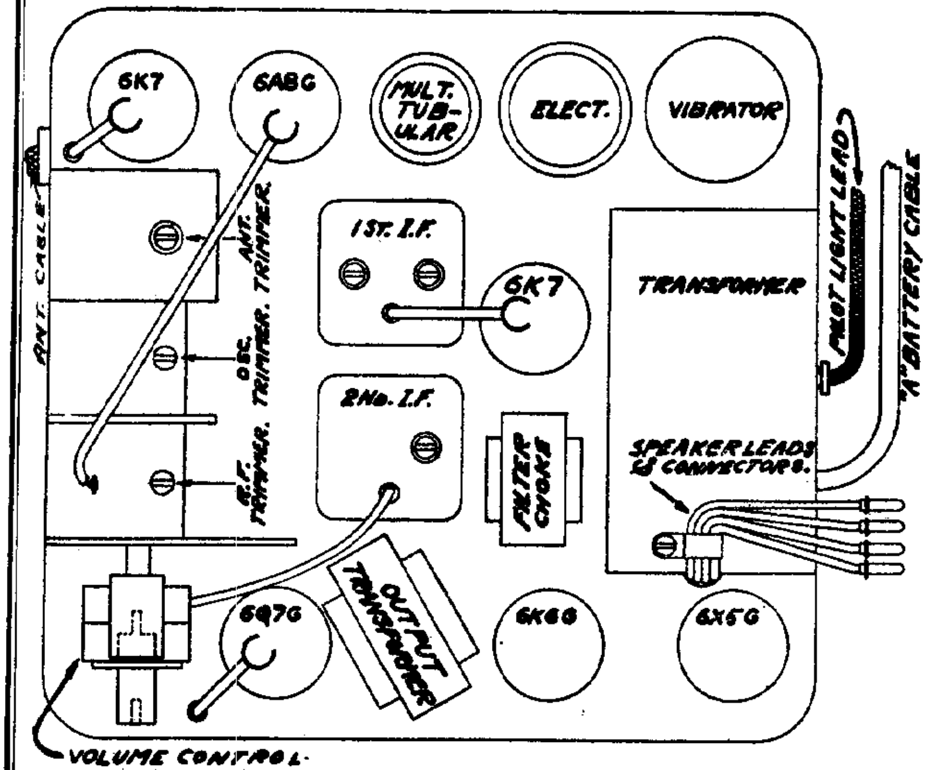
POLICE - 1700 to 5000 KC - Adjust the ANT coil trimmer to a maximum peak of 4000 KC. No other adjustments required.

RADIO PRODUCTS CORP.

R.F. ALIGNMENT. Adjust the test oscillator to 1550 K.C. and connect the output to the antenna through a .00005 mfd. mica condenser to give the equivalent of a low capacity average auto antenna. When this adjustment is made, the signal must be introduced into the receiver through the shielded lead supplied with the receiver. The plug should be inserted to conform with the "Low Capacity" position. (See Figure 1). Set the gang condenser to minimum and adjust the ascillator trimmer to peak. (Center section of gang condenser). The next step is to set the test oscillator and receiver to 1400 K.C. and adjust the front and rear trimmers of the gang condenser to peak. The rear section of the gang condenser tunes the antenna amplifier stage (6K7 tube), and the front condenser section tunes the detector grid coil of the 6A8G tube.

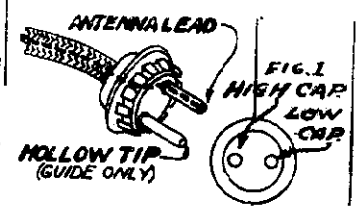


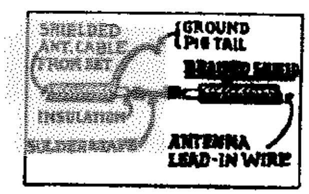
IF PEAK 175 KC



RESISTORS		
NO	OHMS	WATTS
1	100,000	1/4
2	25,000	1/2
3	25,000	1
4	50,000	1/4
5	15,000	1/4
6	1,000	1/4
7	50,000	1/4
8	1,000,000	1/4
9	500,000	V.C.
10	2,000,000	1/4
11	500,000	1/4
12	200,000	1/4
13	500,000	1/4
14	100,000	1/4
15	100,000	T.C.
16	50	1
17	50	1
18	30	MCR
19	50	MCR

CONDENSERS		
NO	CAP. MFD.	W.V.
1	.05	400
2	.05	400
3	.0001	MICA
4	.1	400
5	.1	400
6	.1	400
7	.00025	MICA
8	.00025	MICA
9	.01	400
10	.1	400
11	.01	400
12	.05	400
13	.005	400
14	.05	400
15	.5	[illegible]
16	.003	MICA
17	.005	MICA
18	.0075	1600
19	8 (ELECT)	350
20	8 (ELECT)	350
21	.01	400

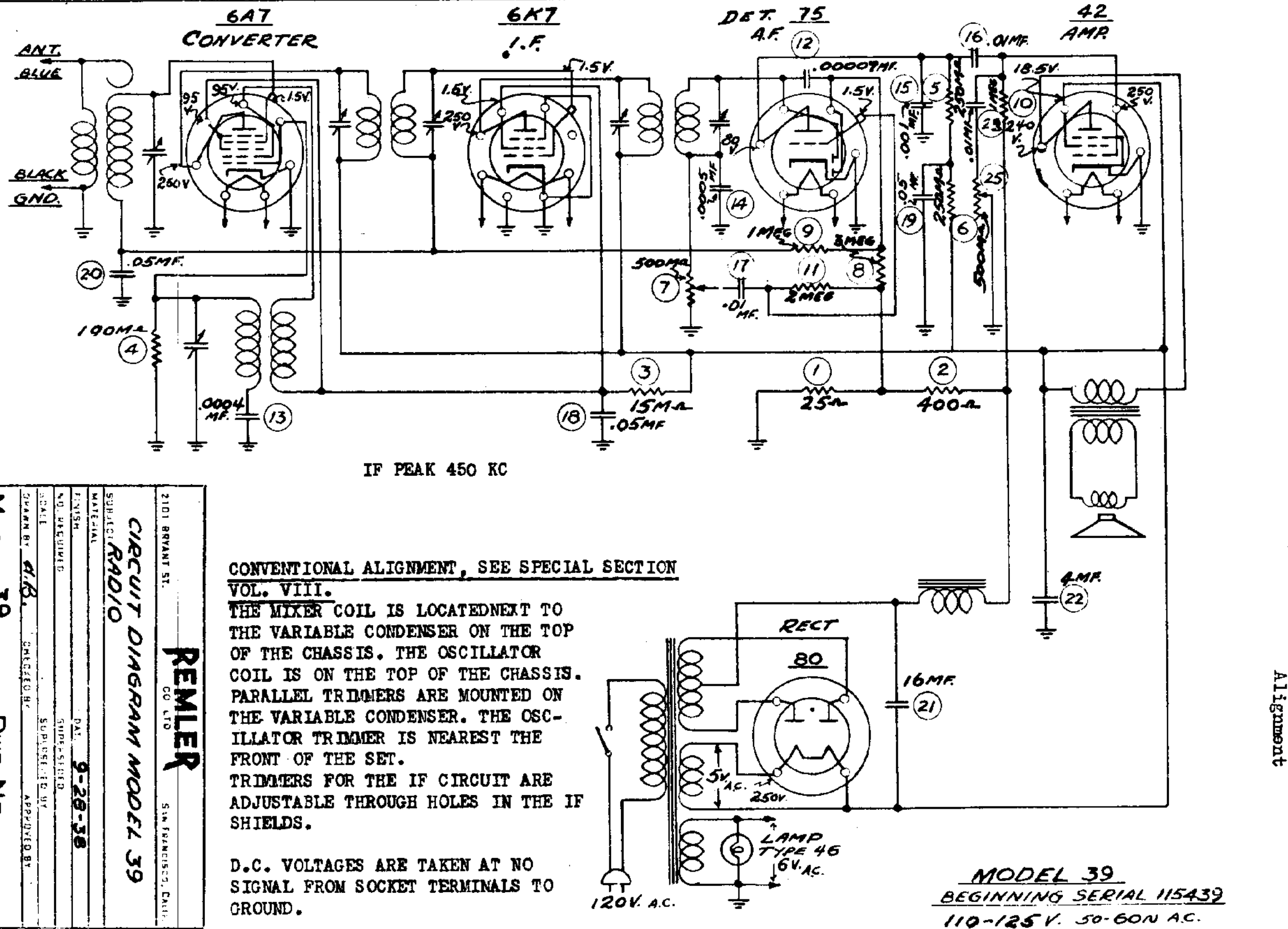




I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output to the grid of the first detector tube, 6A8G, through a .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

REMLER COMPANY, LTD.

MODEL 39, Above Ser. 115439
Schematic, Voltage
Alignment



CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

THE MIXER COIL IS LOCATEDNEXT TO THE VARIABLE CONDENSER ON THE TOP OF THE CHASSIS. THE OSCILLATOR COIL IS ON THE TOP OF THE CHASSIS. PARALLEL TRIMMERS ARE MOUNTED ON THE VARIABLE CONDENSER. THE OSCILLATOR TRIMMER IS NEAREST THE FRONT OF THE SET.
TRIMMERS FOR THE IF CIRCUIT ARE ADJUSTABLE THROUGH HOLES IN THE IF SHIELDS.

D.C. VOLTAGES ARE TAKEN AT NO SIGNAL FROM SOCKET TERMINALS TO GROUND.

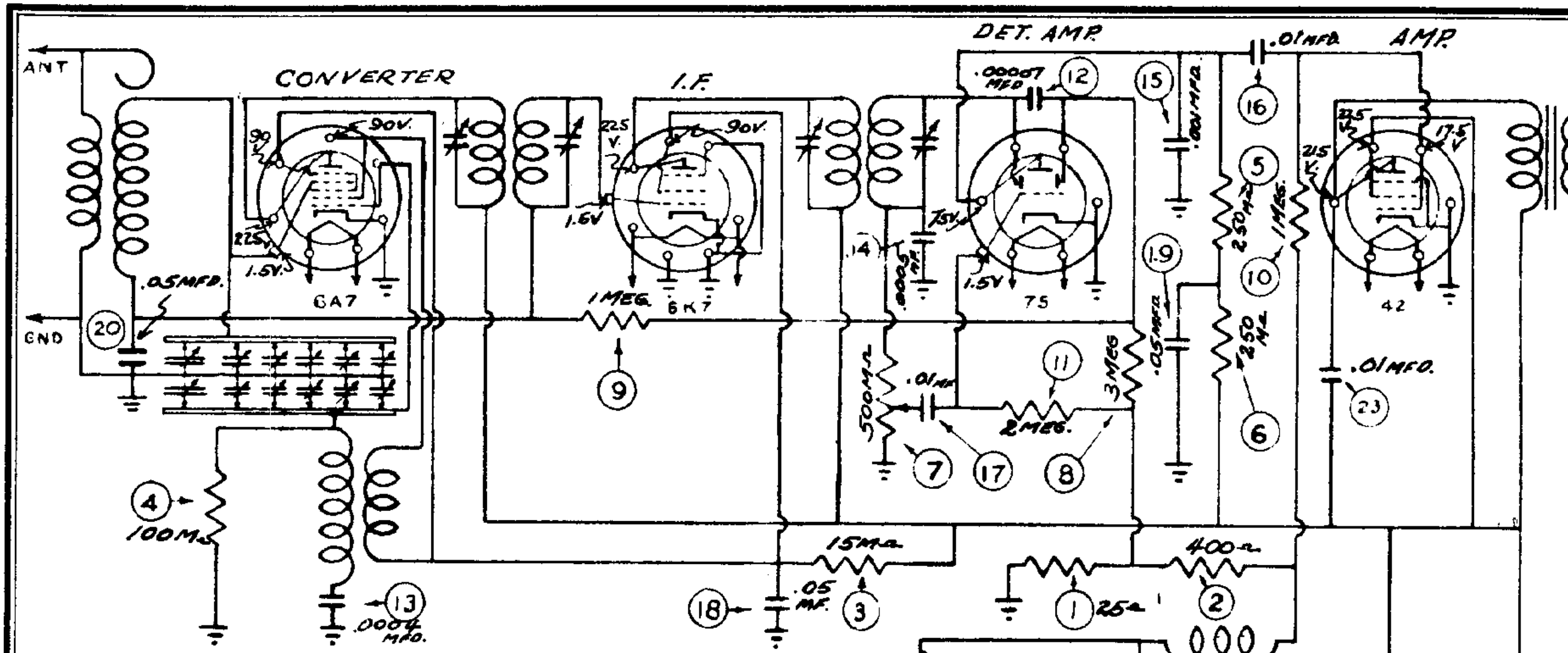
MODEL 39
BEGINNING SERIAL 115439
110-125V. 50-60~ A.C.

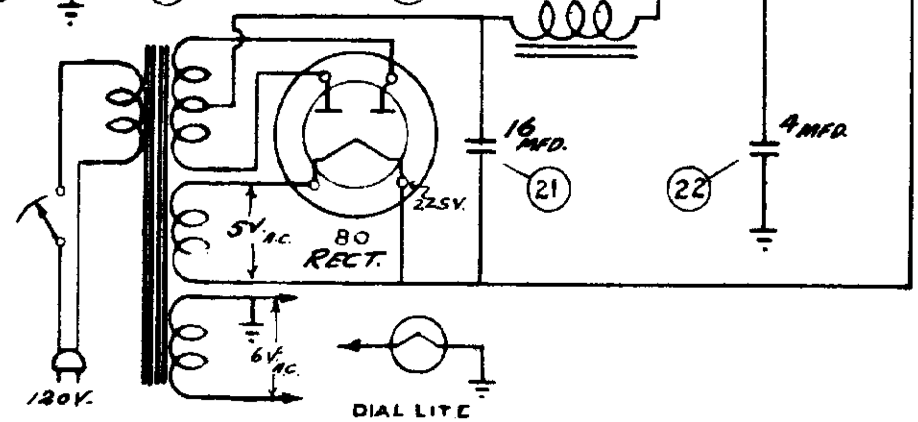
REMLER CO. LTD
2101 BRYANT ST. SAN FRANCISCO, CALIF.

CIRCUIT DIAGRAM MODEL 39
SUBJECT RADIO
MATERIAL
FINISH
DATE 9-28-38
NO. REQUIRED
SUPERSEDED
SCALE
SUPERSEDED BY
DRAWN BY A.B.
CHECKED BY
APPROVED BY
MOD. 39
DWG. NO.

MODEL 55, Above Ser. 114626
Schematic, Voltage, Alignment

REMLER COMPANY, LTD.





IF PEAK 450 KC

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII
THE MIXER COIL IS LOCATED NEXT TO THE VARIABLE CONDENSER ON THE TOP OF THE CHASSIS. THE OSCILLATOR COIL IS ON THE INSIDE OF THE CHASSIS. PARALLEL TRIMMER CONDENSERS ARE MOUNTED ON THE VARIABLE CONDENSER. THE OSCILLATOR TRIMMER IS NEAREST THE FRONT OF THE SET.

TRIMMERS FOR THE I.F. CIRCUIT ARE LOCATED ON THE BACK OF THE CHASSIS.

PUSH BUTTONS: TRIMMERS FOR THE PUSH BUTTON CIRCUITS ARE ACCESSIBLE THROUGH A SLOT IN THE BOTTOM OF THE CABINET, THESE TRIMMERS HAVE THE FOLLOWING APPROXIMATE TUNING RANGES: -#1 GROUP, 520-850 KC; #2 GROUP, 520-850 KC; #3 GROUP, 620-1075 KC; #4 GROUP 680-1075 KC; #5 GROUP 975-1500 KC.

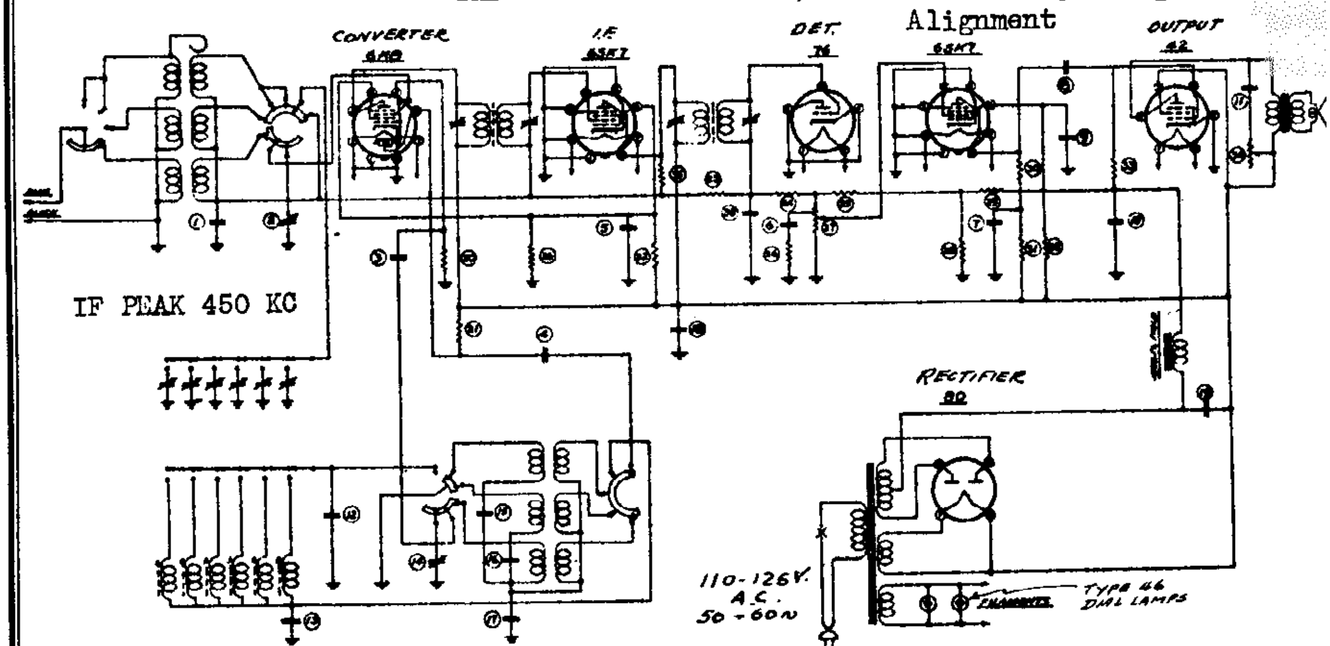
VOLTAGE READINGS TAKEN FROM SOCKET TERMINALS TO GROUND WITH NO SIGNAL.

REMLER CO. LTD.
2101 BRYANT ST. SAN FRANCISCO, CALIF.

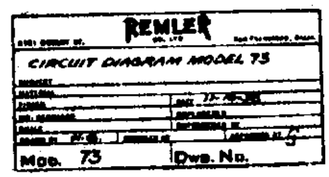
MODEL 55
Beginning Serial No. 114626
110-125 50-60~ A.C.

MODEL 73

REMLER COMPANY, LTD. Schematic, Voltage, Tuner Alignment



NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1	.05 MFD. COND. 600 V.	11	.05 MFD. COND. 600 V.	20	[illegible]	[illegible]	[illegible]
2	[illegible] MMFD. VAR. COND.	12	800 MMFD. COND.	21	[illegible]	[illegible]	[illegible]
3	.25 [illegible] COND.	13	1000 MMFD. COND.	22	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	23	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	500 Ω [illegible] W. RESISTOR	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] POTENTIOMETER		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] RESISTOR		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		



SETTING UP PUSH BUTTONS:-

The push button set up may be changed as follows:

The selection of stations should be arranged with the location of the lowest frequency station on the extreme left button. A resonance indicator or output meter will aid in making the adjustments. With the band switch on "BC", tune in the desired station with the selector, depress the button and turn the band switch to "A". Now with a screwdriver adjust the trimmer on the top of the chassis nearest the back and adjacent to the speaker. When the desired station is tuned in adjust the trimmer nearest the front panel for maximum volume. Now turn the band switch to "BC" to check the adjustment. Proceed with the next lower frequency station for the next set of trimmers with the band switch on "A".

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL.VIII.

The mixer coil is located on the right side of the variable condenser and the oscillator coil on the left side. Trimmers for oscillator and mixer coils are adjustable through holes in the coil supports.

The broadcast trimmers are at the top, the medium wave in the middle and the short wave nearest the bottom of the support.

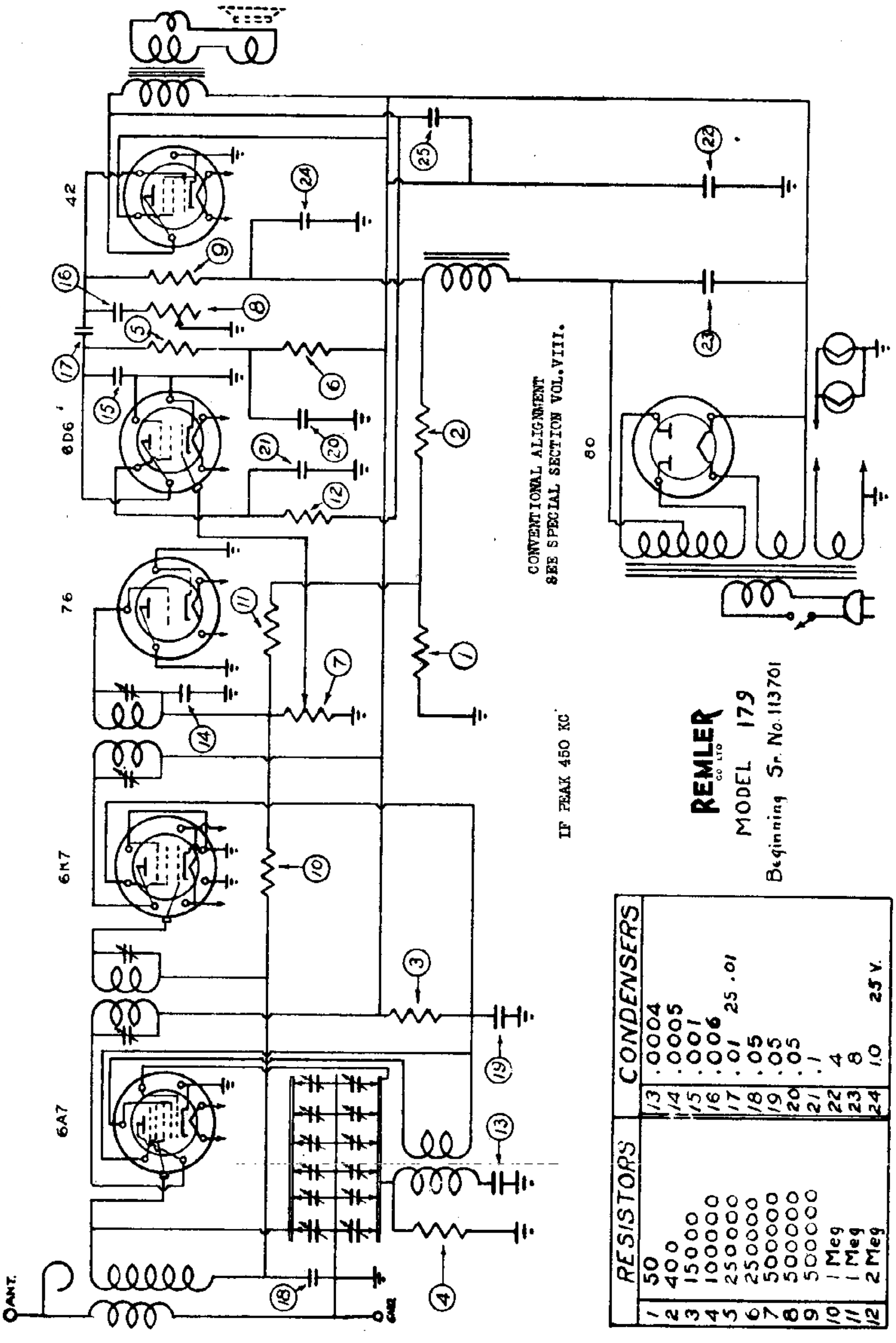
Trimmers for the I.F. transformers are accessible through openings in the top of the I.F. transformer shields.

VOLTAGE READINGS A.C. voltages:- Line 120 volts; Heaters-6volts; Rectifier filament-5 volts.

D.C. voltages (Taken with no signal from ground to points indicated) 80 Rectifier filament--250 volts; 42 plate--235 volts; 42 Screen--250 volts; 42 bias--20 volts; 6SK7----audio plate 60,---audio screen 10, I.F. plate 250,---I.F. screen 100,---and I.F. bias 2.5 volts; 6K8-----plate 250,---oscillator plate 90,---screen 100, and bias supply 2.5 volts.

MODEL 179
Above Ser.113701
Schematic, Alignment

REMLER COMPANY, LTD.

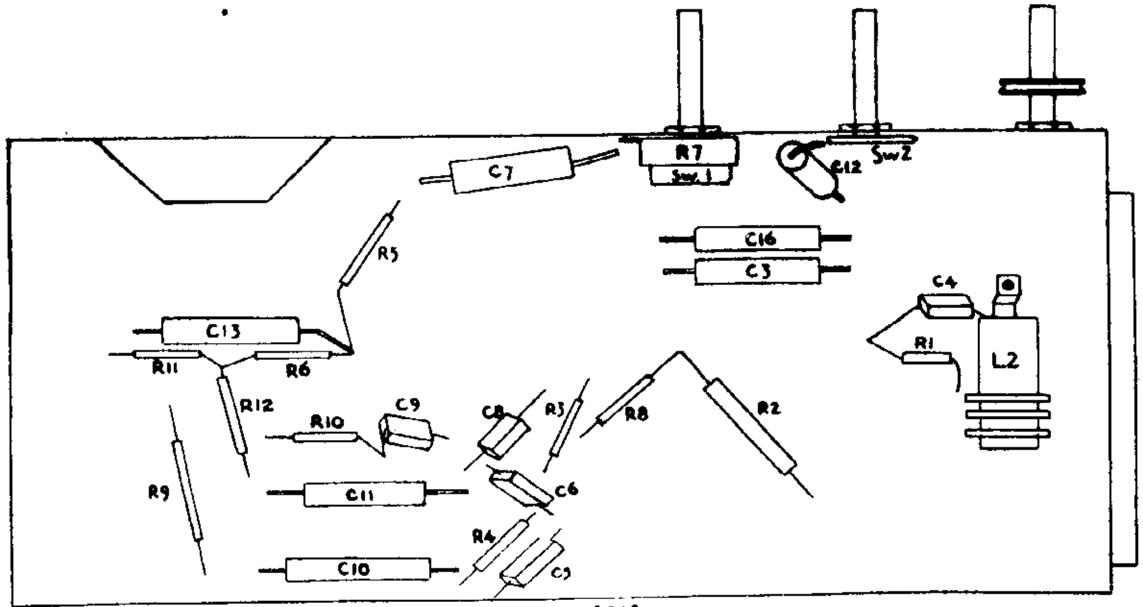


RESISTORS		CONDENSERS	
1	50	13	.0004
2	400	14	.0005
3	15000	15	.001
4	100000	16	.006
5	250000	17	.01 25 .01
6	250000	18	.05
7	500000	19	.05
8	500000	20	.05
9	500000	21	.1
10	1 Meg	22	4
11	1 Meg	23	8
12	2 Meg	24	1.0 25 V.

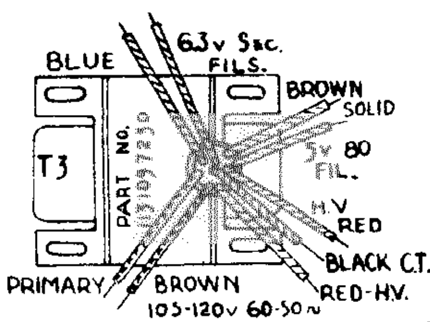
Schematic, Voltage
Chassis, Color Code

SEARS-ROEBUCK & CO.

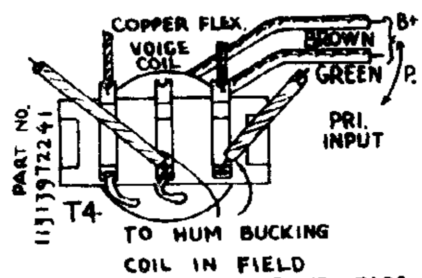
MODEL 3972
Chassis 113.972



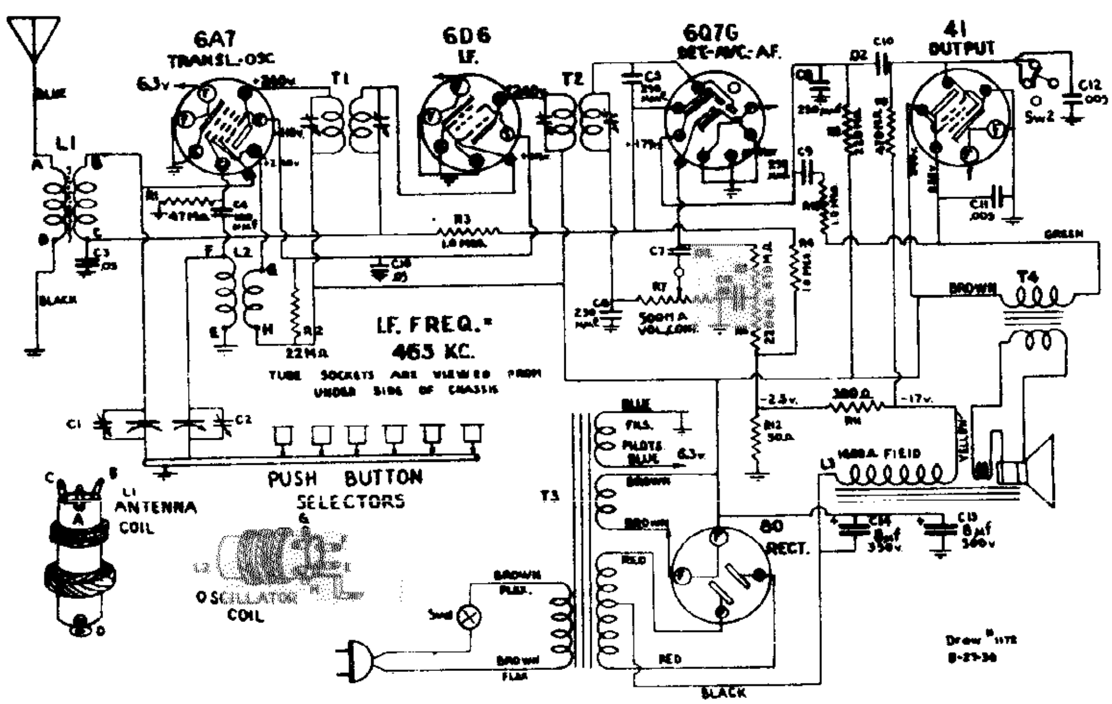
LOCATION OF PARTS UNDER CHASSIS



COLOR CODE-POWER TRANS LEADS



COLOR CODE OUTPUT TRANS. LEADS



MODEL 3972
Ch.113.972
Alignment, Socket
Trimmers

SEARS-ROEBUCK & CO.

GENERAL INFORMATION & SERVICE HINTS

Should it be necessary to remove the chassis from the cabinet it is important when reassembling the receiver that the selector knob not be pushed on the shaft so far that it will exert pressure on the front of the cabinet, as any friction at this point will cause difficulty in operating the push buttons.

Should there be instances where it is difficult to set the push buttons accurately on a station it is very possible that the trouble is caused by a slight burr on the end of the screw insert in the push button knob; remove the push button in question and remove the burr that might be on the end of the screw.

57 RL 132
SEPT. 8, 1938

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
6A7 . . . . Translator-Oscillator
6D6 . . . . IF
6Q7G . . . . .AVC, detector, 1st audio
41 . . . . Output
80 . . . . Rectifier

POWER SUPPLY:
105 - 120 Volts, 50-60 Cycle A.C. . . . . 47 Watts

FREQUENCY RANGE:
Broadcast . . . . 540-1750 KC

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer
Broadcast.	1400 KC	1400 KC

INTERMEDIATE FREQUENCY . . . . 465 KC

POWER OUTPUT:
Type . . . . Single Pentode
Undistorted . . . . 2.25 Watts
Maximum . . . . 3.2 Watts

LOUD SPEAKER:
Type. . . . . Dynamic
Size. . . . . 5 inch
Field resistance. . . . . 1600 ohms

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob. . "On-Off" switch and Volume
2. Center knob. . . . . Tone Control
3. Right knob . . . . . . .Station Selector

CONTROL OPERATION:
Turning right: Power on: Volume increase
Turning right: . . . . . . Bass, Treble
Tuning ratio: 1:1

SILVERTONE
5 TUBE BROADCAST BAND SUPERHETERODYNE
MODEL 3972
FACTORY IDENTIFICATION NUMBER - 113.972

AUTOMATIC TUNING CONTROL ADJUSTMENT

Tune the receiver dial to any desired station, choose the push button which you wish to control this station. Unscrew the push button one full turn, then depress the button as far as it will go, with the button in this position turn it until tight. The chosen station may always be received by depressing this button.

Remove call letter disc of station from list supplied and insert in button.

Insert celluloid disc.

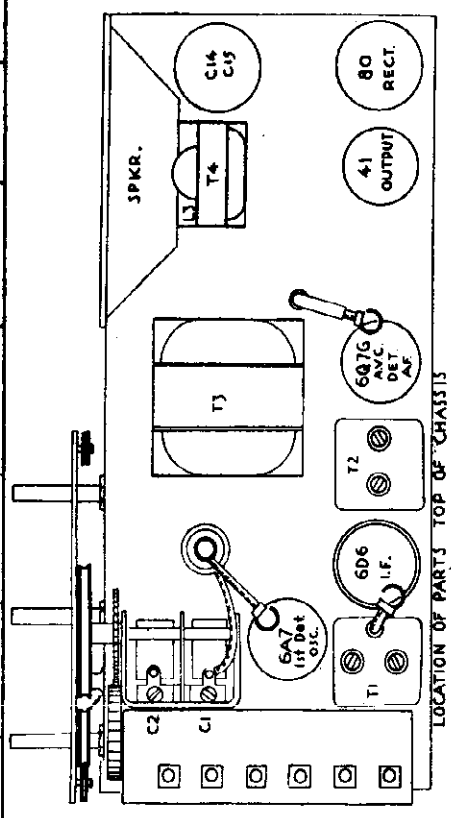
In a like manner select a station for each of the other buttons and make necessary adjustments for each station.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 1.1 volts
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value in series with generator output . . . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation. 30%, 400 cycles
Position of volume control. . . . . Fully clockwise
Position of tone control. . . . . Clockwise
Position of Dial Pointer with variable fully closed . . . . . Over first heavy line below 550 kc

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROX. MICROVOLTS
Open	465 kc.	.1 mfd.	6A7 Grid	T2, T1	IF Output IF Input	100
1400 kc.	1400 kc.	.0002 mfd.	Ant. Lead	C2, C1	Oscillator Translator	50



LOCATION OF PARTS TOP OF CHASSIS

SEARS-ROEBUCK & CO.

MODELS 4608A,4609A,4628A
4629A,4638A,4639A,4648A
4649A,4728A,4748A
Chassis 101.472X
Schematic,Voltage,Socket
Trimmers,Chassis

JULY 5, 1938

POWER SUPPLY:
"A" Battery (4½ volt dry) . . 1 - #5032P
"A" Battery (4 volt storage). 1 - #5049
"B" Batteries . . . . 2 - #5131P

"A" Drain . . . . .0.3 amperes
"B" Drain . . . . 14 ma

FREQUENCY RANGES:

Band "A"	540-1780 kc
Band "P"	1760-6300 kc
Band "F"	5975-18500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "P"	5 mc	5 mc	Fixed
Band "F"	--	15 mc	Fixed

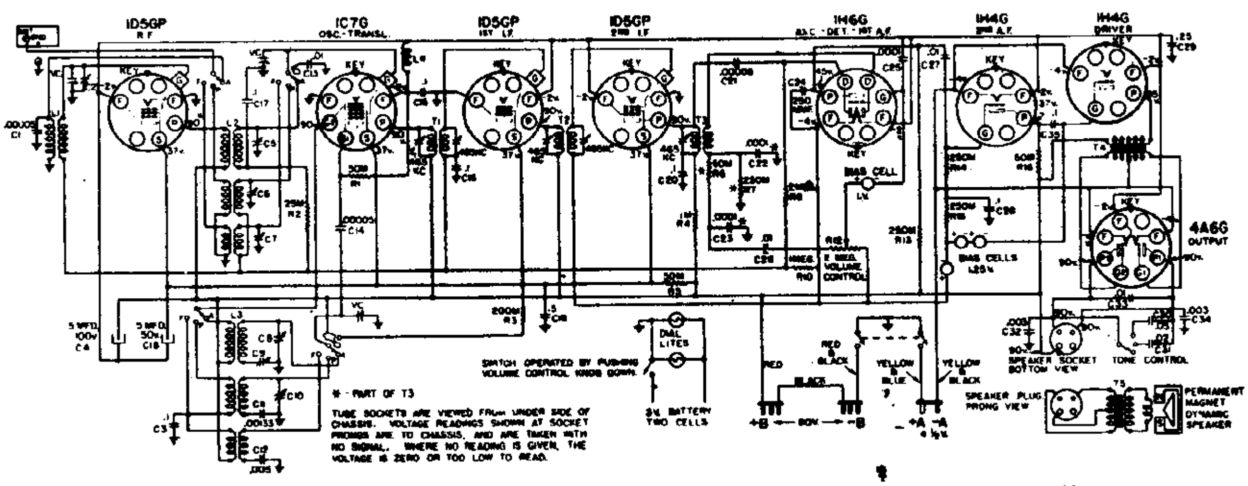
INTERMEDIATE FREQUENCY . . . . 465 kc

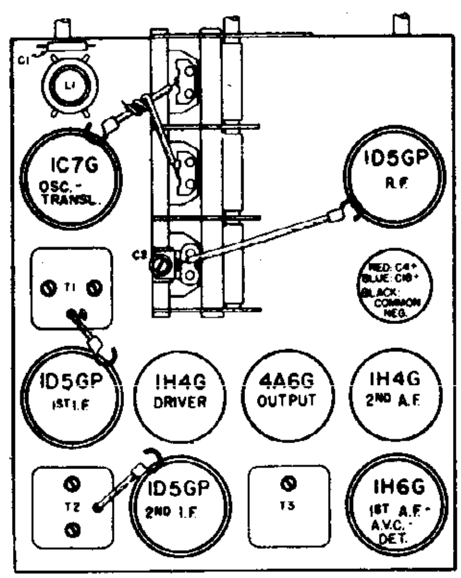
POWER OUTPUT:
Type . . . . Class "B"
Undistorted . . . . 0.45 watts
Maximum . . . . 0.9 watts

LOUD SPEAKER:
Type . . . . Permanent Magnet Dynamic
Size . . . . 5 and 8 inch

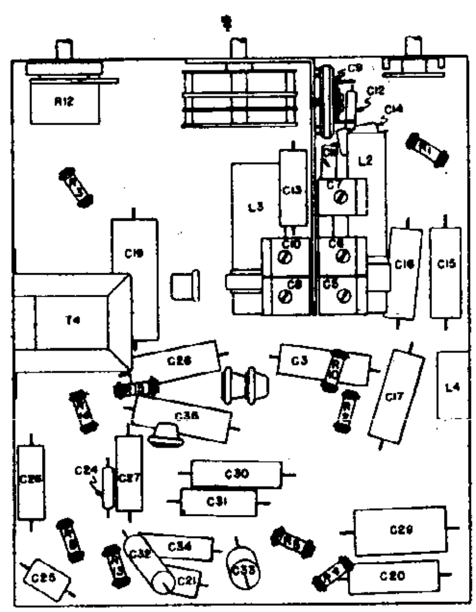
OPERATING FEATURES:
Three position Tone Control
Automatic Volume Control
"On-Off" Indicator
Flash-O-Light Dial Illumination
Short Wave Stations marked on dial
Wave Band Indicator

CHASSIS FEATURES:
Number RF stages . . . One on Broadcast Band
Number IF stages . . . . Two
Number condensers in gang . . . Three
Antenna . . . . Conventional
Plugs attached to battery cable





LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4608A, 4609A, 4628A
4629A, 4638A, 4639A, 4648A
4649A, 4728A, 4748A
Chassis 101.472X

SEARS-ROEBUCK & CO.

MODEL 4700
Chassis 104.235
Alignment, Notes

MODEL 4700. CHASSIS 104.235. **ALIGNMENT PROCEDURE**

PRELIMINARY:

Output meter connections . . . . Across load speaker voice coil
Output meter readings to indicate 1 watt . . . . 1.9 volts
Average sensitivity microvolts for 1 watt output . . . . See chart below
Generator ground lead connection . . . . Receiver Chassis
Dummy antenna value to be put in series with generator output . . . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of volume control . . . . Fully clockwise
Cover must be on case when making R. F. adjustments.

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connections	Adjustment Symbol	Circuit Adjusted	Approx. Microvolts
No Signal 550-750 KC	456 KC	.001 Mfd.	6K7 grid	C-10 C-9	2nd IF Trans.	3500
No Signal 550-750 KC	456 KC	.001 Mfd.	6A8 grid	C-8 C-7	1st IF Trans.	35
1580 KC	1580 KC	.0001 Mfd.*	Ant. Lead	C-5	Osc.	20
600 KC	600 KC	.0001 Mfd.*	Ant. Lead	C-2	Ant.	15
1400 KC	1400 KC	.0001 Mfd.*	Ant. Lead	C-6	Ant.	15
600 KC	600 KC	.0001 Mfd.*	Ant. Lead	C-2 **	Ant.	15

IMPORTANT ALIGNMENT NOTES

*Make the generator connection to the receiver through a shielded lead having not more than 50 MMF. (.00005) capacity. If a series condenser has been employed as outlined in the first paragraph under "General Information and Service Hints" the dummy antenna should be the same as the antenna itself.

**Readjust C-2 after installation as outlined under "Antenna Matching in "Service Hints". Each step of the Alignment Procedure should be repeated in order to afford greater accuracy. Always keep the output from the signal generator at its lowest possible value to prevent any possible AVC action.

Alignment Adjustment screws are shown in Figures 3 and 4.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment can be made only at high frequencies. A fixed padder is used in series with the return of the oscillator coil secondary. Oscillator coil inductance is preadjusted at factory.

Values shown under "Microvolts" are only approximate.

Dial Adjustments:

Rotate dial completely to the right. Then rotate dial completely to the left. Now dial will be set properly.

If controls operate with too much difficulty it indicates that the control cables are bent too sharply. This should be avoided.

CAUSES AND REMEDIES FOR UNUSUAL NOISE CONDITIONS

If after making proper installation of receiver, you encounter noises you cannot eliminate refer to RL's Nos. 2, 6, 40, 41, 72, 75, 117, for suggestions and remedies.

ELIMINATING WHISTLE AT 900 TO 920 KC:

In localities where a strong 910 KC station is in operation, a whistle may be experienced at 900 to 920 KC. This whistle is due to a beat between the second harmonic (910 KC) of the 456 KC I. F. and the 910 KC station. Such a condition can be corrected by changing the I. F. frequency to a higher or lower value until the whistle disappears. However, the I. F. amplifier should not be shifted to a frequency higher than 465 KC nor lower than 445 KC but should be as close to 456 KC as possible.

If the I. F. frequency is changed, it will be necessary to realign the rest of the receiver as described under "Alignment Procedure".

Antenna Matching:

An antenna padder condenser is used to match antenna capacities up to 500 MMF. If, in the installation this padder is not effective, it is because the capacity of the antenna is over 500 MMF. In that case a fixed capacity of .0005 MFD. or less should be connected in series with the antenna. The location of the antenna adjustment is found on Fig.5.

MODELS 4608A, 4609A, 4628A, 4629A, 4638A, 4639A, 4648A, 4649A
4728A, 4748A. CHASSIS 101.472X

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.4 volts
Average sensitivity in microvolts for 50 milliwatts output . . . . See chart below
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Connection of generator ground lead . . . . Receiver chassis
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully on
Position of Tone Control . . . . Fully clockwise
Position of Dial Pointer . . . . . To fall on end line of scale (low frequency end). Loosen dial drum set screws and rotate drum if necessary. Tighten set screws after pointer is properly set.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	6 mc	465 kc	.1 mfd.	1C7G Grid	T3,T2,T1	IF	20
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8,C5,C2	Osc.,Transl., Antenna	7
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	7
"P"	5 mc	5 mc	400 ohms	Ant. Term.	C10,C6	Oscillator Translator	10
"P"	15 mc	15 mc	400 ohms	Ant. Term.	C7	Translator	15

IMPORTANT ALIGNMENT NOTES

Note that the IF must be adjusted with the Wave Band Switch in the "P" position.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the signal generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment. As the receiver sensitivity is increased through alignment, the output from the generator should be decreased to compensate.

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

1. Left knob . . . . . "On-Off" Switch; Volume; Flash-O-Light.
2. Center lower knob . . . . . Wave Band Switch
3. Center upper knob . . . . . Station Selector
4. Right knob . . . . . . Tone Control

CONTROL OPERATION:

Turning right: Power on; Volume increase; Pushing down: Flash-O-Light
Turning right: "A", "P", "P"
Tuning Ratio: 30:1
Turning right: "LO", "MED", "HI"

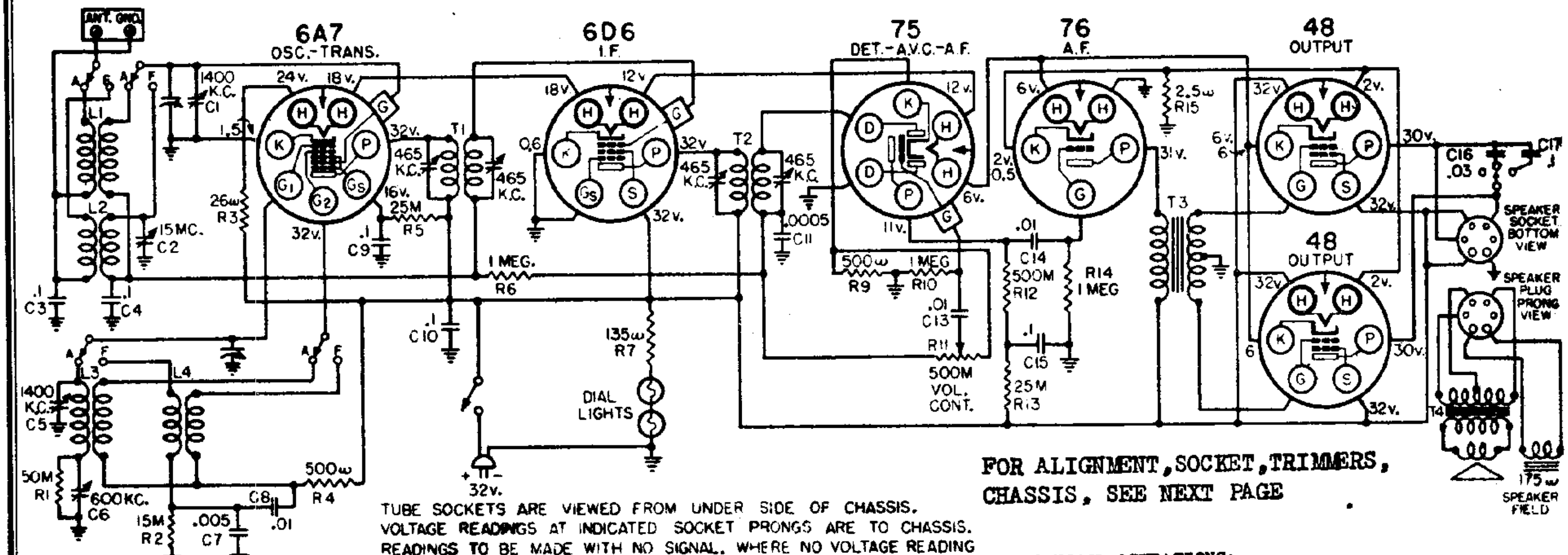
SUBJECT: CIRCUIT REVISIONS TO REDUCE BATTERY DRAIN

Later production of chassis number 101.472(described in RL 46)is identified as 101.472X. As will be seen from the Wiring Diagram in this supplement, the circuit has been revised and tube changes made. The two 1J6G output tubes have been replaced by a 1H4G driver tube and a 4A6G output tube. These changes reduce the "A" battery drain from .5 amperes to .3 amperes, and reduce the "B" drain from 23 ma. to 15 ma.

The Parts List, Locations of Parts Diagrams, and Wiring Diagram follow. Be sure to mention chassis identification number 101.472X when ordering parts for this chassis.

MODELS 4612A, 6162
Chassis 101.533
Schematic, Voltage

SEARS-ROEBUCK & CO.



FOR ALIGNMENT, SOCKET, TRIMMERS, CHASSIS, SEE NEXT PAGE

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
READINGS TO BE MADE WITH NO SIGNAL. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
FIGURES AT CATHODE ARE CATHODE CURRENT IN MILLIAMPERES.

CONTROL OPERATIONS:
Turning right: . . . . . Volume Increase
Turning right: . . . . . . "AM", "FOR"

Tuning ratio: 17:1

Turning right: ON, HI, MED, LO

POWER SUPPLY:
All models available . . . . 32 volts, DC; 45 Watts

FREQUENCY RANGES:
Band "AM" . . . . 540-1750 kc
Band "FOR" . . . . 5.5-18.5 mc

ALIGNMENT FREQUENCIES:

	Ant-Transl. Trimmer	Oscil. Trimmer	Oscil. Padder
Band "AM"	1750 kc	1400 kc	600 kc
Band "FOR"	15 mc	--	Fixed

OPERATING CONTROLS:
1. Left knob . . . . Volume
2. Next to left knob . . . Wave Band Switch
3. Next to right knob . . . . Station Selector
4. Right knob . . . . . Tone Control

INTERMEDIATE FREQUENCY . . . . 465 kc

CABINET SOURCES: . . . . D,J

POWER OUTPUT:
Type . . . . Push-Pull
Undistorted . . . . 0.15 watts
Maximum . . . . 0.32 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 8" and 8"
Field coil resistance . . . . 175 ohms
Field coil voltage drop . . . 32 volts

OPERATING FEATURES:
Tone Control . . . . 3 Position
Automatic Volume Control

CHASSIS FEATURES:
Number IF stages . . . One
Antenna . . . Conventional
Push-Pull Output

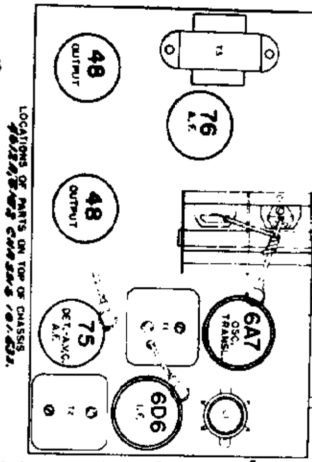
57 RL 135

SEPT. 14, 1938

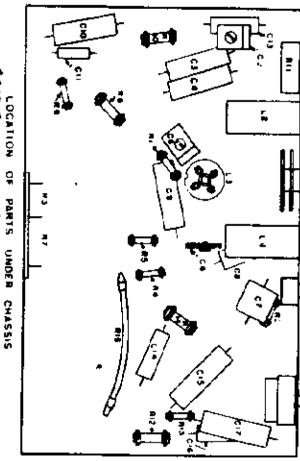
CHASSIS 101.505, 101.505X
101.506, 101.507, 101.509
101.512, 101.513, 101.527

SEARS-ROEBUCK & CO.

101.528, 101.533
Alignment, Notes



LOCATIONS OF PARTS ON TOP OF CHASSIS
4612A, 6162 CHASSIS 101.533.



LOCATION OF PARTS UNDER CHASSIS
4612A, 6162 CHASSIS 101.533.

USE OF ALIGNMENT TABLE BELOW:- FOR TRIMMER LOCATIONS FOR ALL MODELS, SEE INDEX.

MODELS INDICATED AS 4612A INCLUDES MODELS 6162, CHASSIS 101.533.
.. .. ..4632A " .. 4633A, 6014, 6015, 6044, 6045, 6064, 6144, 6164., CHASSIS 101.505 OR 101.505X.
.. .. .. 6005 .. .. 6071, 6076, 6171, 6176., CHASSIS 101.507.
.. .. .. 6016 .. .. 6017, 6046, 6047, 6146., CHASSIS 101.512.
.. .. .. 6022 .. .. 6122, 6132., CHASSIS 101.509.
.. .. .. 6023 .. .. 6123., CHASSIS 101.506.
.. .. .. 6072 .. .. 6077, 6172., CHASSIS 101.513.
.. .. .. 6073 .. .. 6173., CHASSIS 101.528.
.. .. .. 6125 .. .. CHASSIS 101.527.

FOR ALL MODELS, ALIGN EACH SUCESSIVE TRIMMER AS INDICATED. IN SOME MODELS, ALIGNMENT FREQUENCIES DIFFER; IN THESE CASES THE MODELS ARE SHOWN IN THE "WAVE BAND SWITCH POSITION" COLUMN. WHERE NO TRIMMER IS SHOWN FOR ADJUSTMENT, THE SET IS NOT ALIGNED AT THAT FREQUENCY.

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts, Models 4612A, 6073 - .32 volt; 6005 - .29 volt; 4632A - .38 volt; 6016, 6072 - .37 volt.
Output meter reading to indicate 500 milliwatts, Models 6125 - 1.17 volts; 6022 - 1.22 volts; 6023 - 1.23 volts.
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Average sensitivity in microvolts for 500 milliwatts output, Models 6022, 6072, 6125, 6023; for 50 milliwatts output, Models 4612, 6016, 6073, 6005; for 15 milliwatts output, Model 4632A . . . . See chart below
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . Hi
Position of Dial Pointer with variable fully closed . . . . . Horizontal
(To fall along second ornamental horizontal line) Model 4632A; (To fall along first heavy black line below 550 kc.) Models 4612A, 6005, 6016, 6022, 6023, 6072, 6073, 6125.

ELIMINATING WHISTLE AT 930 KC: MODELS 4632A, 6005, 6016, 6022, 6023, 6072, 6125.

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GEN. FREQ.	DUMMY ANT1	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN) MODELS 4612A	4632A	6005	6016	6022	6023	6072	6073	6125	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS MODELS 4612A	4632A	6005	6016	6022	6023	6072	6073	6125
"A"	CLOSED	465KC	.1MFD.	6072, 6016, 4632A } 1C7G GRID; 6022, 6125, 6023 } 6J8G GRID; 6073 > 6D8G GRID		T2,T1	T2T1	T2T1	T2T1	T2T1	T2T1	T2T1	T2T1	IF OUTPUT IF INPUT		100	58	115	150	125	90	--	115
"A" (4612A)	550KC	465KC	.1MFD	6A7 GRID	T2,T1									I F	40								
"A"	600Kc	465KC	.0002MFD.	ANT. TERM.		C1*	C1*	C1*	C1*	C2*	C1*	C1*	C1*	WAVE TRAP	-	-	-	-	-	-	-	-	-
"A" (4612A)	OPEN	1750KC	.0002MFD.	ANT.TERM.	C5									OSC.	50								
"A" 6072, 6022	FULLY OPEN	1730KC	.0002MFD.	ANT.TERM.					C7		C8			OSC.					95		80		
"A"	1400KC	1400KC	.0002MFD.	ANT.TERM.	C1	C5,C3	C6C2	C3	C2	C9C3	C2		C5C2	OSC.-TRANS.	25	60	40	30	70	30	55		45
"A" (6016)	1730KC	1730KC	.0002MFD.	ANT.TERM.				C5						OSC.				40			•		
"A" (6073)	1500KC	1500KC	.0002MFD.	ANT.TERM.								C5C2		OSC.-TRANS.								40	
"A"	600KC ROCK	600KC	.0002MFD.	ANT.TERM.	C6	C7	C7	C7	C8	C10	C7	C6	C9	PADDER	15	40	30	35	60	30	40	30	30
"F" 4612A, 6023, 6073, 6125, 6022	15MC ROCK	15MC	400 OHMS	ANT. TERM.	C2		C3		C8	C5		C3	C4	TRANS.	35				60	45		45	100
"F"	16MC ROCK	16MC	400 OHMS	ANT.TERM.		C4	C4	C4			C3			TRANS.		70	50	40			50		
"F" (4612A)	6 MC	6 MC	400 OHMS	ANT.TERM.										--	70								

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 465 kc is known, the generator should be adjusted to the frequency of that station instead of to 465 kc.

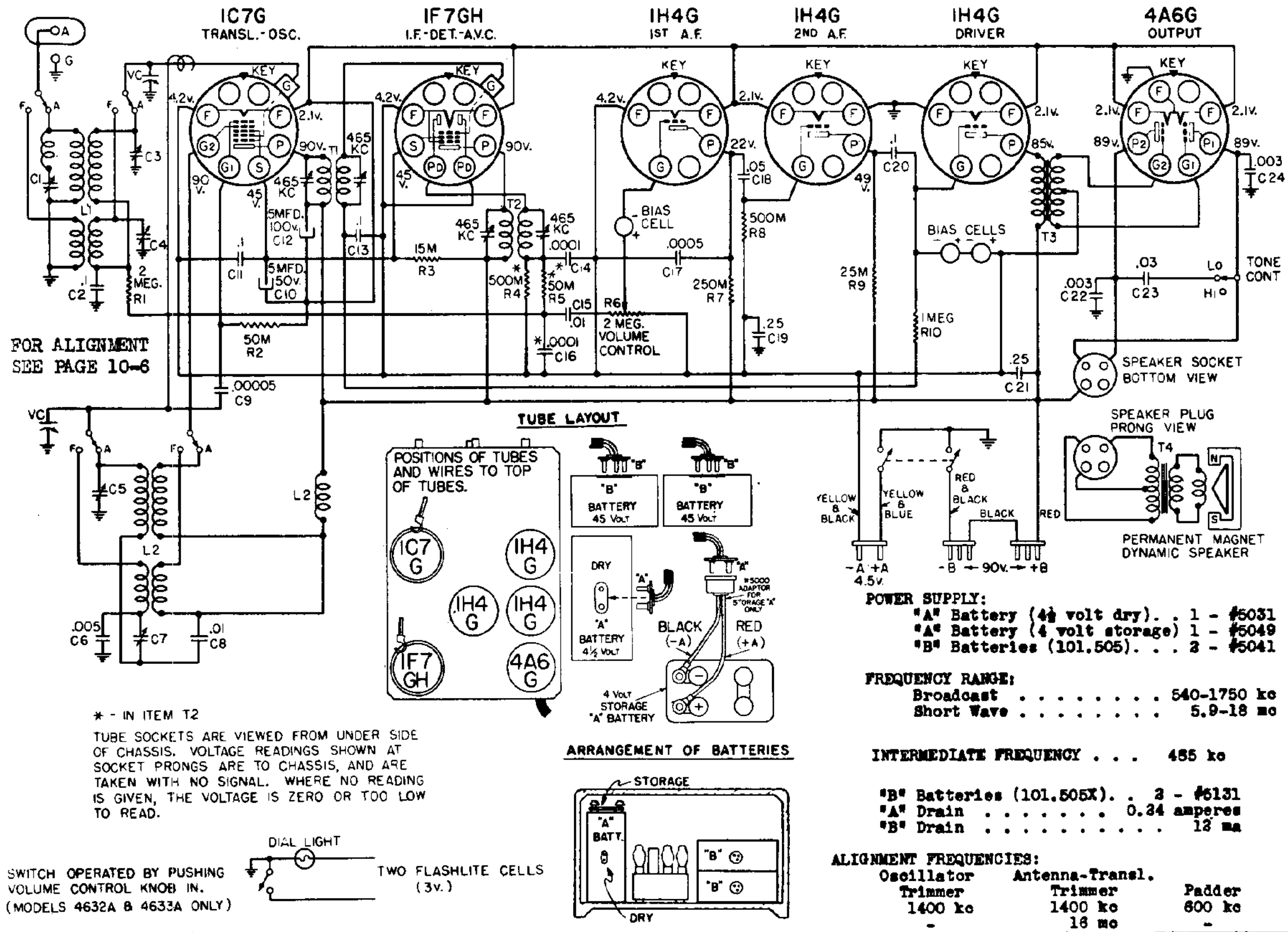
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

MODELS 4632A,4633A,6014,6015
6044,6045,6064,6144,6164
Chassis 101.505,101.505X
Schematic,Voltage,Socket

SEARS-ROEBUCK & CO.

APRIL 15, 1938



FOR ALIGNMENT SEE PAGE 10-6

* - IN ITEM T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

SWITCH OPERATED BY PUSHING VOLUME CONTROL KNOB IN. (MODELS 4632A & 4633A ONLY)

POWER SUPPLY:
"A" Battery (4½ volt dry). . 1 - #5031
"A" Battery (4 volt storage) 1 - #5049
"B" Batteries (101.505). . . 2 - #5041

FREQUENCY RANGE:
Broadcast . . . . 540-1750 kc
Short Wave . . . . 5.9-18 mc

INTERMEDIATE FREQUENCY . . . 455 kc

"B" Batteries (101.505X). . 2 - #6131
"A" Drain . . . . 0.34 amperes
"B" Drain . . . . 12 ma

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc
-	18 mc	-

MODELS 4632A,4633A,6014
6015,6044,6045,6144,6164
6064 Ch.101.505,101.505X
Socket,Chassis,Notes

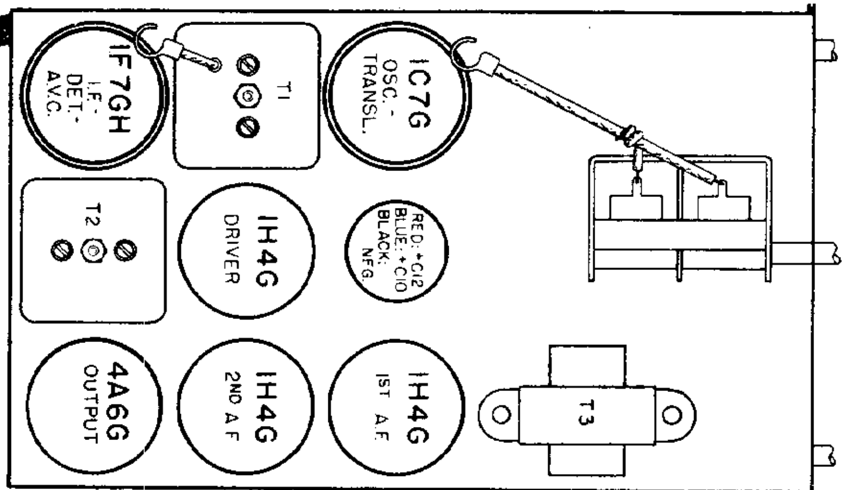
SEARS-ROEBUCK & CO.

MODELS 4667,4767,4777,
4798.Chassis 101.498
Tuner Condensers,Drive

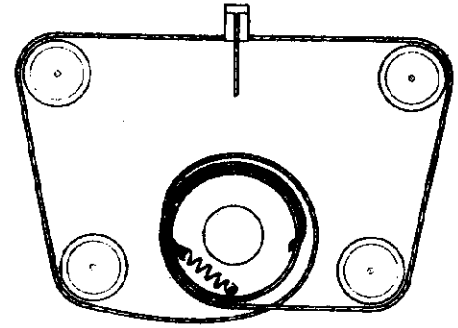
MODELS 4667,4767,4777,4798, CHASSIS 101.498.

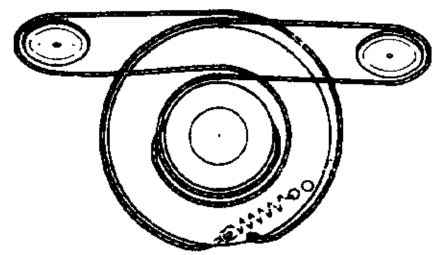
OPERATING CONTROLS:
1. Left knob . . "On-Off" switch and Volume
2. Lower center knob . . . Wave Band Switch
3. Upper center knob . . . . Station Selector
4. Right knob . . . . . Tone Control

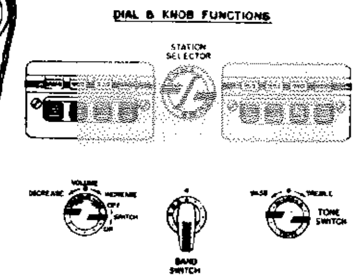
CONTROL OPERATION:
Turning right: Power on; Volume increase
Turning right: Push Button Tuning, "A" "P", "P"
Tuning ratio: 32:1
Turning right: "LO", "MEDIUM", "HI"

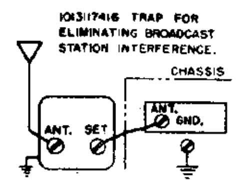


LOCATIONS OF PARTS ON TOP OF CHASSIS.

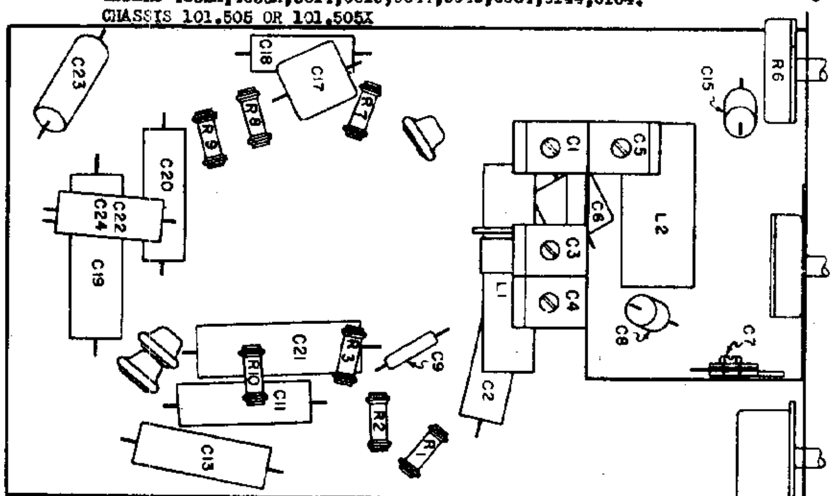




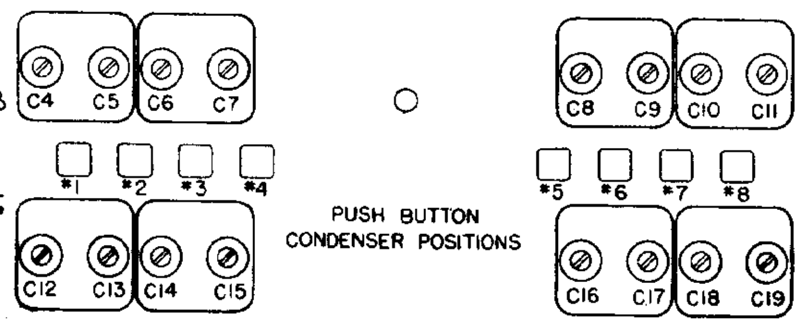




MODELS 4632A,4633A,6014,6015,6044,6045,6064,6144,6164.
CHASSIS 101.505 OR 101.505X



LOCATIONS OF PARTS UNDER CHASSIS.



PUSH BUTTON CONDENSER POSITIONS

DIFFERENCES BETWEEN 101.505 AND 101.505X:

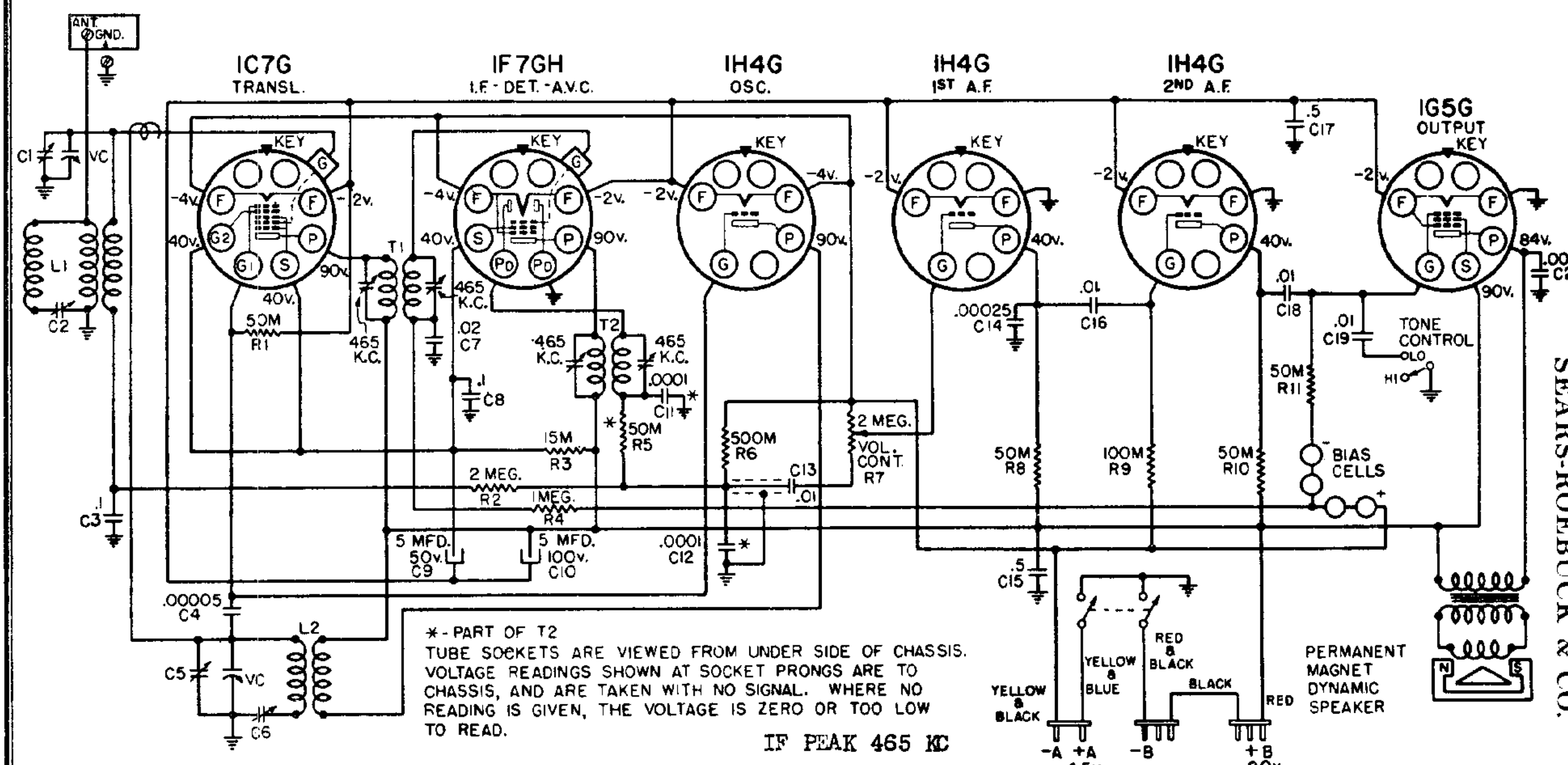
The Model 101.505X incorporates the Dial FLASH-O-LITE feature. Pushing the Volume Control knob in will cause the dial to become illuminated. Two flash-light cells provide the battery for the dial lamp.

POWER OUTPUT:
Type . . . . Class "B"
Undistorted . . . . 0.4 watts
Maximum . . . . 0.8 watts

LOUD SPEAKER:
Type . . . . PM Dynamic
Size . . . . 6 and 8 inch

MODELS 4644A, 4645A
Chassis 101.504
Schematic, Voltage
Socket

SEARS-ROEBUCK & CO.



*-PART OF T2

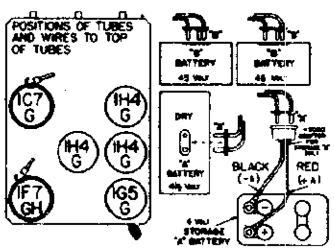
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IF PEAK 465 KC

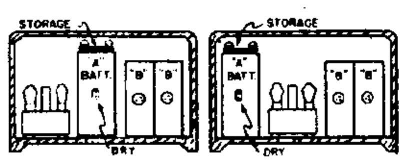
57 RL 90

MARCH 9, 1938

TUBE LAYOUT



ARRANGEMENT OF BATTERIES



POWER OUTPUT:
Type . . . . Single Pentode
Undistorted . . . . 0.35 watts
Maximum . . . . 0.4 watts

LOUD SPEAKER:
Type . . . . P.M. Dynamic
Size . . . . 6 inch

FREQUENCY RANGE:
Broadcast . . . . 540-1750 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc

INTERMEDIATE FREQUENCY . . . . 465 kc

MODELS 4644A, 4645A
Socket, Chassis
Alignment

SEARS ROEBUCK & CO.

MODELS 6010, 6040
MODELS 6052, 6053
MODELS 6054, 6055
Alignment

MODELS 4644A, 4645A CHASSIS 101.504; 6010, 6040 CHASSIS 101.519; 6052, 6053 CHASSIS 101.525; 6054-5 CHASSIS 101.532.
USE OF TABLE: ONLY ONE MODEL FOR EACH CHASSIS IS SHOWN IN TABLE BELOW, FOR EXAMPLE 4644A INDICATES CHASSIS 101.504 AND MODEL 4645A.

- Output meter connections, Models 4644A, 6010, 6052 ---------------------- Across loud speaker voice coil.
  Model 6054-5 ---------------- 4000 ohm Weston meter, across speaker terminals.
- Output reading to indicate 50 milliwatts, Models 4644A, 6010, 6052 ------------------------------0.37 volts.
  Model 6054-5 --9.40 volts.
- Generator Ground lead connection---Receiver chassis.
- Dummy antenna value to be in series with generator output ---------------------------- See chart below.
- Connection of generator output lead-- See chart below.
- Generator modulation--30%, 400 cycles.
- Approximate average sensitivity in microvolts for 50 milliwatts output----------------- See chart below.
- Position of volume control---Fully On.
- Position of Tone control, Models 4644A, 6010, 6052---"HI".

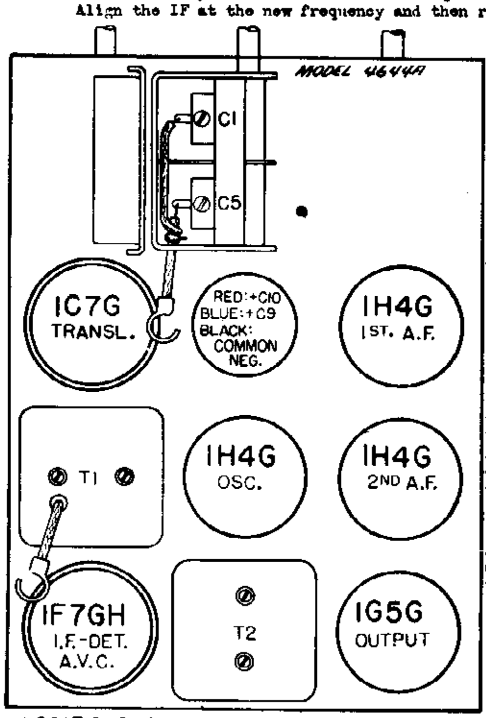
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN) MODELS 4644A	6010	6052	6054-5	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS MODELS 4644A	6010	6052	6054-5
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2,T1	T2,T1	T2,T1	T2,T1	IF	160	185	225	---
600 kc	465 kc *	.0002 mfd.	Antenna Term.	C2*	C16*	C2*	C16*	IF Wave Trap	---	---	---	- -
Fully open	1730 kc	.0002 mfd.	Ant. Clip		C4			Oscillator		90		
1400 kc **	1400 kc	.0002 mfd.	Antenna Term	C5,C1	C1	C6,C1	C1,C4	Oscillator Translator	66	70	115	110
600 kc (rock)	600 kc	.0002 mfd.	Antenna Term	C6	C5	C6	C5	Padder	33	70	80	80

*The generator should be adjusted to give high output. The trimmer should be adjusted for minimum output meter reading instead of usual maximum output meter reading. If the frequency of an interfering code station near 465 kc is known, the generator should be adjusted to that frequency instead of 465 kc.

**Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

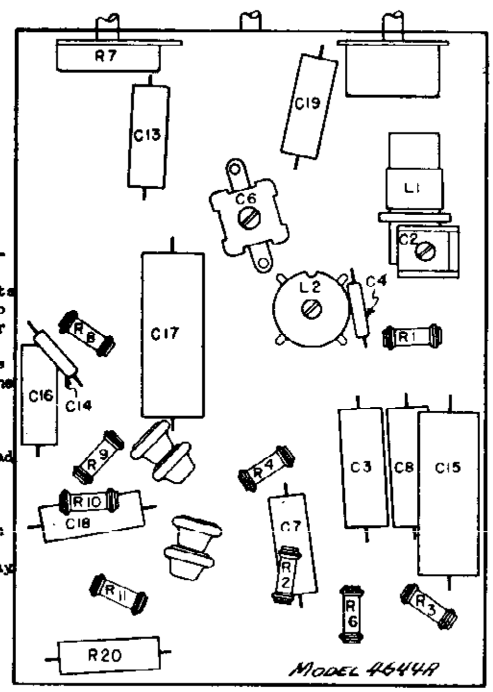
The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.
Values shown under "Microvolts" are only approximate.

ELIMINATING WHISTLE AT 930 KC: MODELS 4644A, 6052, 6054-5, 6010.
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.
Determine at what point between 900 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near to 465 kc as possible.
Align the IF at the new frequency and then realign the rest of the receiver as described.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 4644A, 4645A; Chassis 101.504
The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. "B" batteries should be replaced when the voltage of each battery has dropped to 34 volts, under load. The life rating of the various size batteries, given are for an average use of three hours a day



LOCATIONS OF PARTS UNDER CHASSIS

Schematic, Voltage
Changes for Jacks

SEARS-ROEBUCK & CO.

MODELS 4667, 4677, 4767, 4777
4798 Chassis 101.498

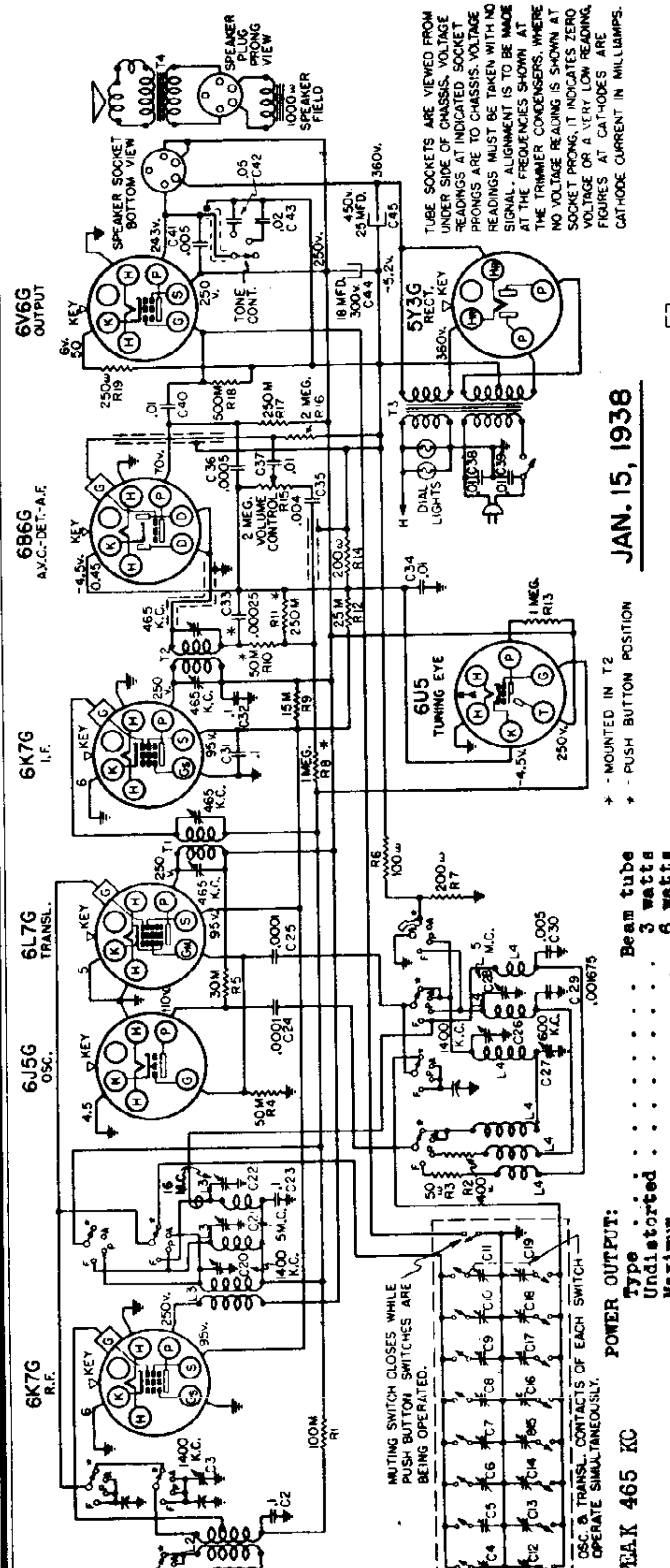
POWER SUPPLY:
All models available . . . . 105-125 volts, 50-60 cycle, 75 watts
All models available . . . . 125-125 volts, 25 cycle, 75 watts

FREQUENCY RANGES:
Band "A" . . . . 540-1750 kc
Band "P" . . . . 2150-6300 kc
Band "F" . . . . 6-18.2 mc

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 6", 8", 12"
App. field coil resistance .. 1000 ohms
App. field coil voltage drop . . . 110 volts

INTERMEDIATE FREQUENCY
465 kc

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGE READINGS MUST BE TAKEN WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS, WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPS.

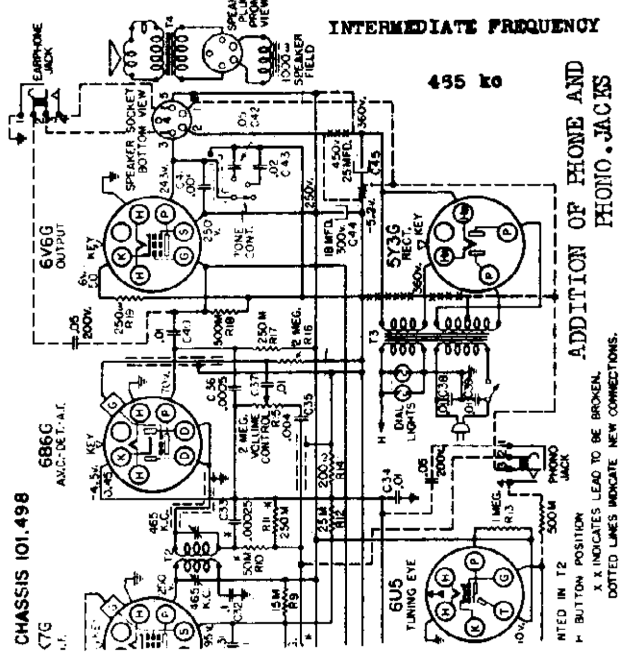


JAN. 15, 1938

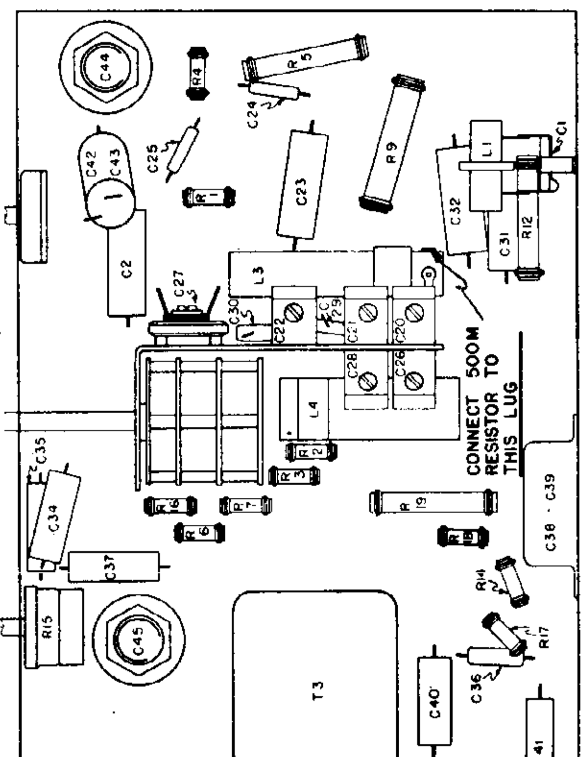
CHASSIS 101.498

POWER OUTPUT:
Type . . . . Beam tube
Undistorted . . . . 3 watts
Maximum . . . . 6 watts

IF PEAK 465 KC



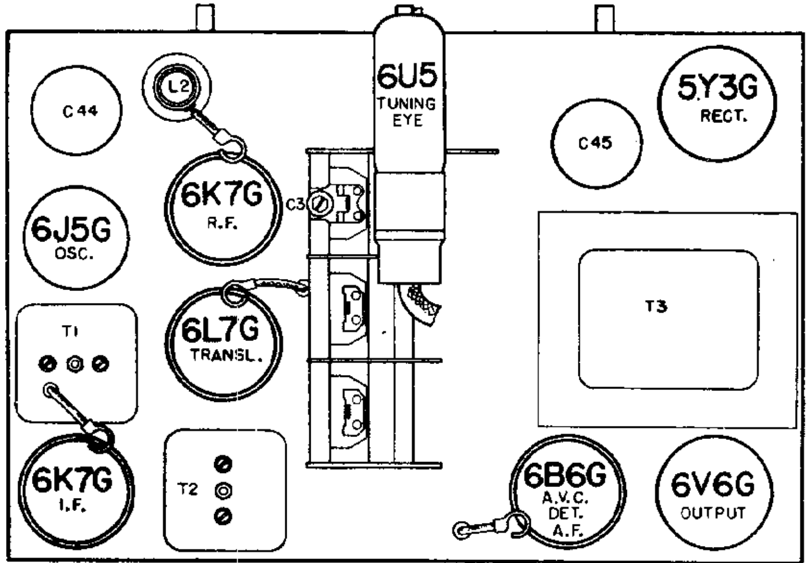
ADDITION OF PHONE AND PHONO. JACKS



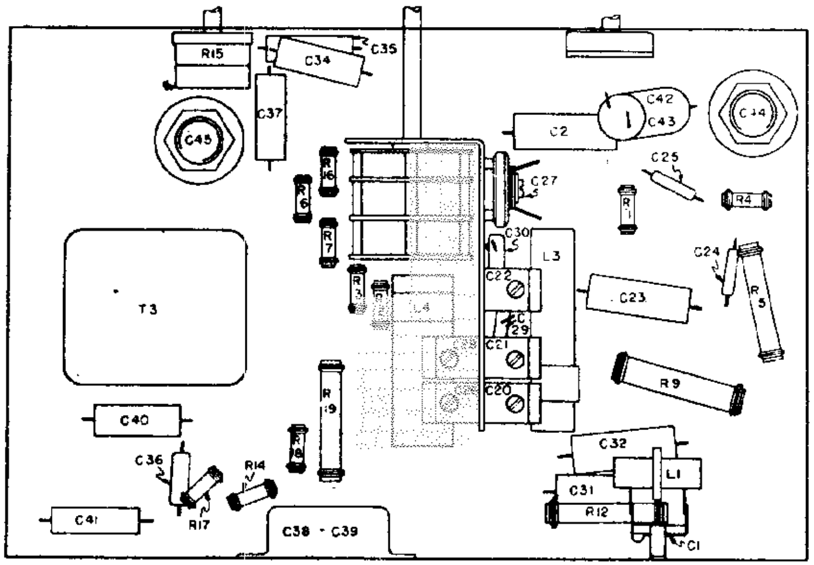
LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4667,4677,4767
4777,4798.Ch.101.498
Socket,Trimmers,Chassis
Alignment,Transformer

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection	Across voice coil leads
Output meter reading to indicate .5 watts output	1.04 volts
Approximate microvolts input for .5 watts output	See chart below
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	Fully clockwise
Position of Dial Pointer when variable is fully meshed	To fall on center of large square block at 550 kc end of dial.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	Closed	465 kc	.1 mfd.	6L7G Grid	T2, T1	IF Output IF Input	105
"A"	Closed	465 kc *	.0002 mfd.	Ant. Term.	C1 *	IF Trap	-
"A"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C26,C20, C3	Oscillator Transl.,RF	11
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C27	Padder	18
"P"	6 mc	6 mc	400 ohms	Ant. Term.	C28	Oscillator	70
"P"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C21	Translator	70
"F"	16 mc (rock)	16 mc	400 ohms	Ant. Term.	C22	Translator	60

IMPORTANT ALIGNMENT NOTES

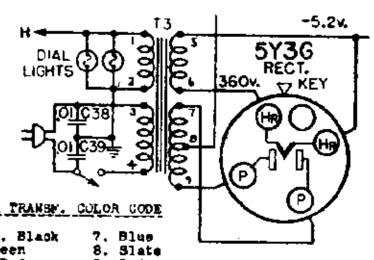
* If the frequency of an interfering code station is known, the generator should be adjusted to that frequency instead of to 465 kc. The trap should be adjusted to give minimum output meter deflection instead of the usual maximum reading.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is necessary to repeat the entire alignment procedure step by step in the original order to secure proper alignment. Perfect alignment is not possible with one adjustment of the trimmers.

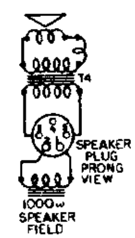
Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under, "Microvolts", are only approximate.



POWER TRANSF. COLOR CODE

1-2-3. Black
4. Green
5-6. Red
7. Blue
8. Slate
9. Red



SPEAKER PLUG COLOR CODE

1. Black
2. Yellow
3. Brown
4. Blank
5. Green

GENERAL INFORMATION & SERVICE HINTS

INSTRUCTIONS FOR SETTING UP PUSH BUTTON STATIONS:

1. Remove the two escutcheons that enclose the push buttons. Remove the celluloid call letter holders. A label will be seen telling what frequency (kilocycle) stations can be set up on each button. Each button can be used for only ONE station in its frequency range.

2. Turn the Wave Switch knob to the "American" position and use the tuning knob to tune in the station chosen for #1 button. Then turn the Wave Band switch to the Push Button position, and push button #1 all the way in.

3. It will be seen that there are two adjusting screws for each button, an upper one and a lower one. Using a screw driver, turn the lower adjusting screw for #1 button until #1 station is tuned in as accurately as possible, as indicated by the Tuning Eye. If, during the adjustment, you obtain a strong Tuning Eye indication, but do not hear your station, turn the upper adjusting screw one or two turns to the right and then proceed with the lower screw adjustment. To check whether you are adjusting to the correct station, turn the Wave Switch knob back to the "American" position momentarily.

4. After the best possible setting of the lower screw has been made, adjust the #1 upper screw right or left to make the slit of the Tuning Eye still narrower.

5. Proceed in the same manner for each button. Be sure the Wave Switch knob is in the "Push Button" position and that you have pushed in the proper button before starting the screw adjustments for that button. The lower screw for each button MUST be adjusted before the upper screw for that button. The Wave Switch knob can be turned back to the "American" position momentarily at any time, to check whether you are adjusting to the correct station.

6. Place the call letters for the chosen stations in the celluloid call letter holders. Be sure to insert the call letters in the proper order so that they will be over the push button for their respective stations. Then replace the celluloid call letter holders and the escutcheons.

THE A.V.C. CIRCUIT:

The diode current of the 6B8G tube, flowing through the 250M ohm resistor, R11, creates a voltage drop across it. This voltage is applied to the control grids of the RF, Translator, and IF tubes to provide AVC.

OSCILLATION:

Be sure the tube shields are making good contact to their base clips. Poor contact may cause oscillation.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to choose the new IF frequency as near to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE". It will also be necessary to readjust any stations set up on the Push Button Tuning Mechanism.

WAVE TRAPS:

A wave-trap, designed to eliminate code interference from ship transmitters, airports or air beacon stations in locations where the receiver is near such transmitters, is built into the receiver. As explained in the alignment procedure, this trap should be tuned to the interfering station in the vicinity of 465 kc.

A wave-trap, designed to eliminate whistles and cross modulation troubles on the broadcast band when the receiver is located comparatively near some powerful broadcast station, is available.

This trap can be ordered under part #1013117416 directly from Sears, Roebuck and Co. Retail Store or Mail Order branch, using Purchase Order Blank form F5284. The retail selling price is $1.20.

Mount the trap to the chassis mounting shelf or to the inside of the cabinet by means of wood screws through the bracket on the trap. It is important to connect a wire from under the head of one of the wood screws to the chassis so that the wave-trap shield becomes grounded to the chassis.

The trap has two terminals marked, "ANT" and "SET". Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

INSTALLATION OF A PHONOGRAPH PICKUP JACK OR AN EARPHONE JACK: FOR CHASSIS 101.498 ONLY

A kit, part #1018117189, can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. The retail selling price is $1.11. This kit contains the necessary parts for installing either a phonograph pick-up jack or an earphone jack. If the customer desires both a phonograph pick-up jack and an earphone jack, it will be necessary to use two kits and to drill an additional hole in the back of the chassis for the additional jack.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack. In addition, changes must be made in the wiring to the speaker socket and the electrolytic condenser. As the Schematic Section shows, these wiring changes and the connections to the jack are as follows:

Disconnect the jumper between prongs 1 and 5 of the speaker socket.

Disconnect the lead from prong 2 of the speaker socket and connect it to prong 5.

Disconnect the leads from prong 1 of the speaker socket and connect them to prong 5.

There is a hole in the front apron of the chassis, between the Tone Control and the right side of the chassis. Mount one of the terminal boards, supplied in the kit, in this hole.

There is an electrolytic condenser just above the terminal board mentioned in the preceding paragraph. Remove the three leads that are soldered to the mounting nut of this condenser and connect them to the terminal board mentioned in the preceding paragraph.

Solder a lead from the mounting nut of the electrolytic, mentioned in the preceding paragraph, to prong #1 of the speaker socket.

The slate colored lead of the power transformer is connected to the mounting nut of the electrolytic condenser mounted next to the volume control. Remove this lead from the condenser mounting nut, lengthen the lead by splicing, and run it to prong #1 of the speaker socket.

Solder a lead from the mounting nut of the electrolytic, mentioned in the preceding paragraph, to prong #2 of the speaker socket.

There is a terminal board mounted under one of the nuts that mount the IF output transformer. Mount the terminal board supplied in the kit under this same nut. Connect the .05 condenser, supplied in the kit, between this new terminal board and terminal #1 of the jack.

Run a lead from the new terminal board to the cathode prong of the 6B6G tube.

There is a two-terminal board mounted on the front of the Wave Switch assembly bracket. Run a lead from the terminal of this board that is nearest the Volume Control to lug #2 of the jack.

Run a lead from lug #3 of the jack to prong #1 of the speaker socket.

Connect the 500M ohm resistor between lug #4 of the jack and the coil terminal shown in the illustration.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal #8 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #3 of the speaker socket.

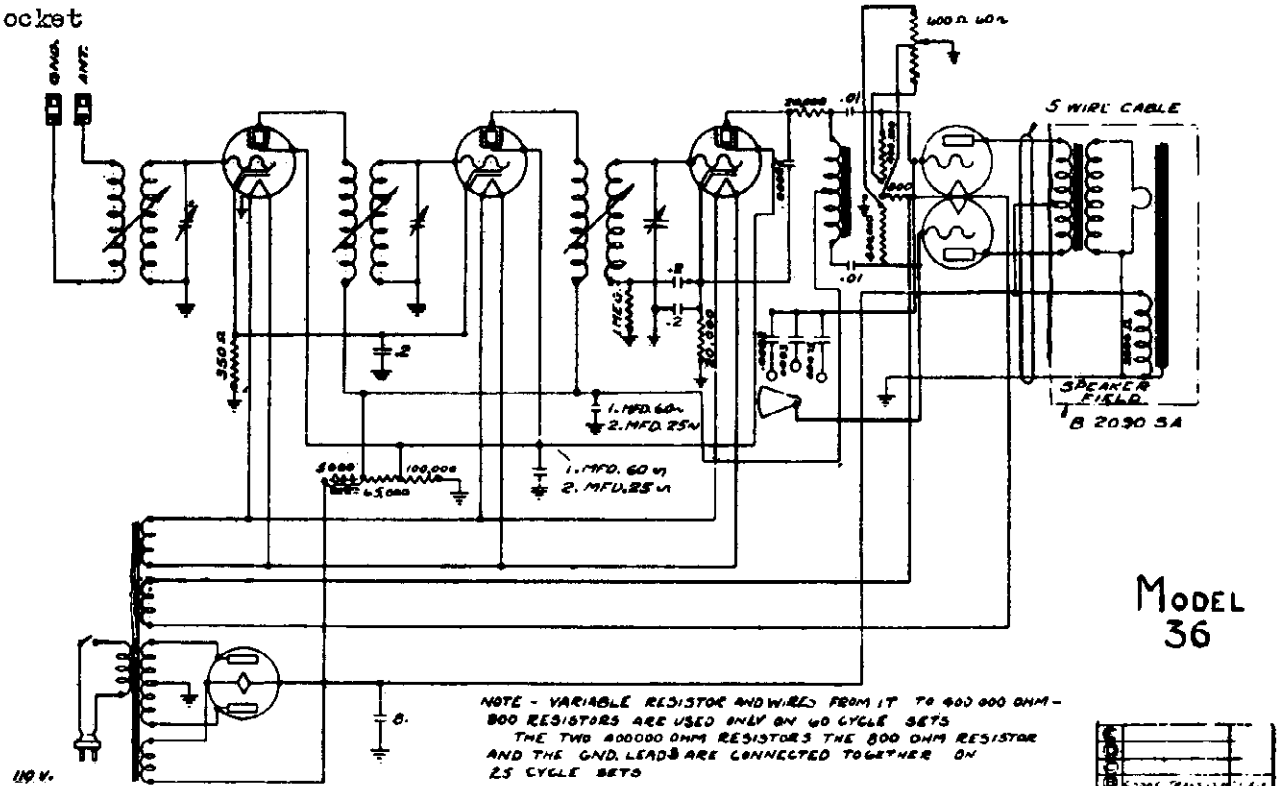
Connect terminal #4 of the jack to terminal #5 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

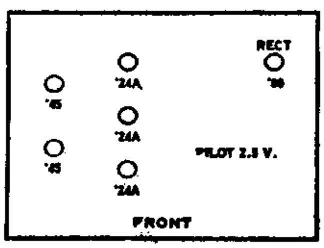
With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.

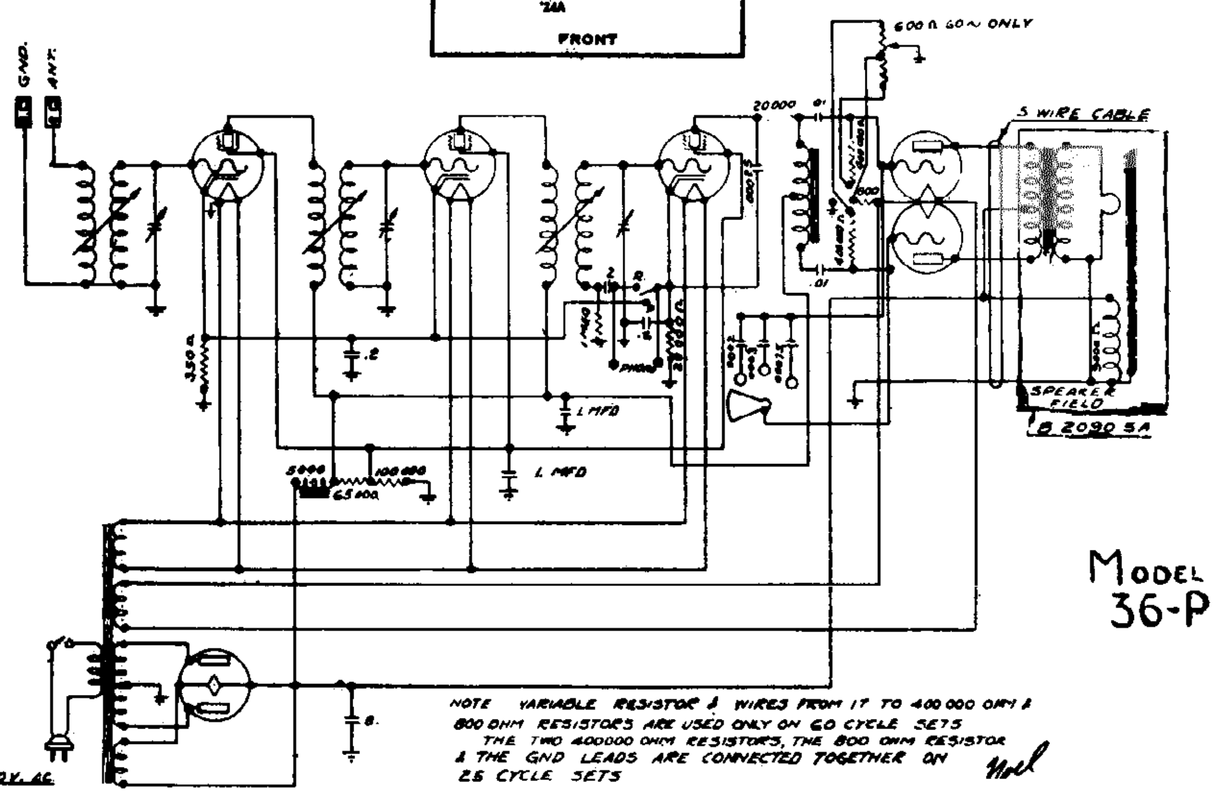
MODEL 36
MODEL 36-P
Schematics
Socket

SEARS-ROEBUCK & CO.



NOTE - VARIABLE RESISTOR AND WIRES FROM IT TO 400 000 OHM - 800 RESISTORS ARE USED ONLY ON 60 CYCLE SETS
THE TWO 400000 OHM RESISTORS THE 800 OHM RESISTOR AND THE GND. LEADS ARE CONNECTED TOGETHER ON 25 CYCLE SETS

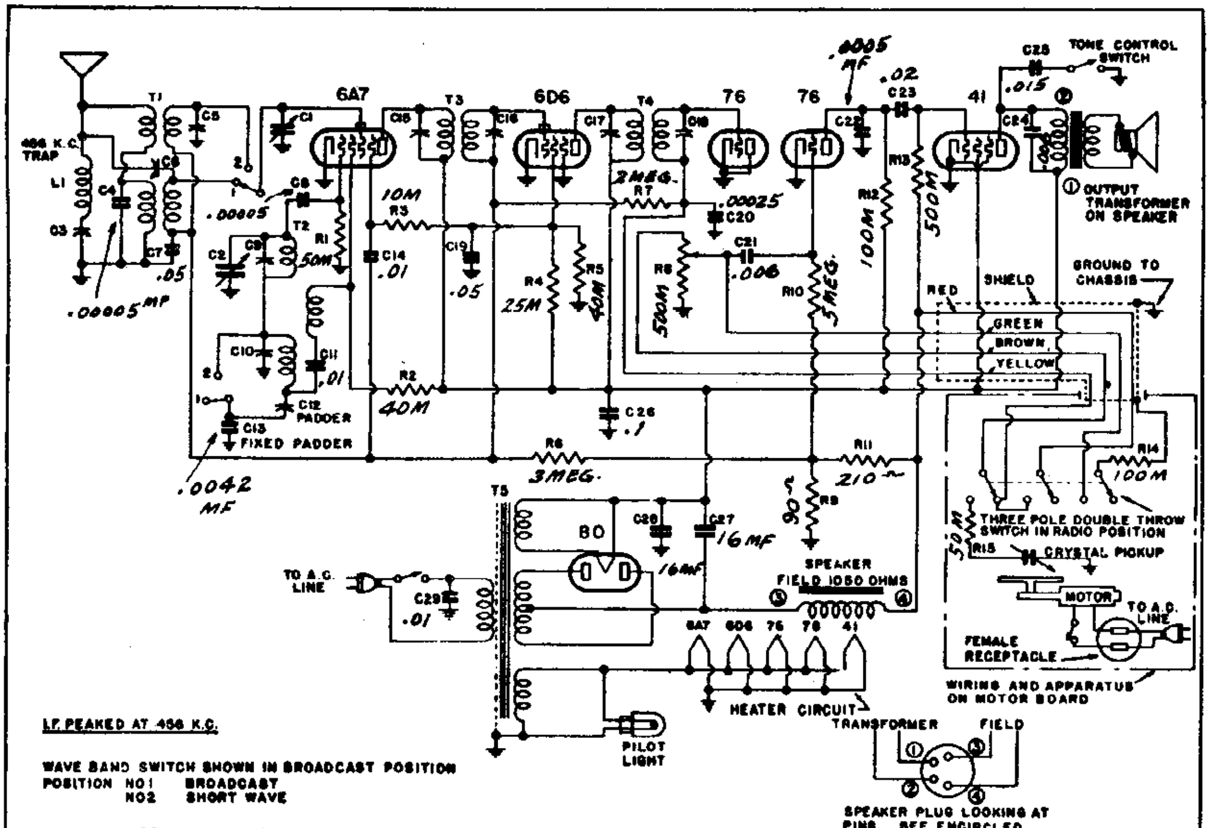




NOTE VARIABLE RESISTOR & WIRES FROM IT TO 400 000 OHM & 800 OHM RESISTORS ARE USED ONLY ON 60 CYCLE SETS
THE TWO 400000 OHM RESISTORS, THE 800 OHM RESISTOR & THE GND LEADS ARE CONNECTED TOGETHER ON 25 CYCLE SETS

SEARS-ROEBUCK & CO.

MODEL 4668, Ch. 103. AR166
Schematic, Voltage



SCHEMATIC DIAGRAM

TUBES AND FUNCTIONS:

- 6A7 . . . . . Translator-Oscillator
- 6D6 . . . . IF
- 76 . . . . AVC - Detector
- 76 . . . . A. F. Amplifier
- 41 . . . . Output
- 80 . . . . Rectifier

POWER SUPPLY:

All models available . . . . 105-125 volts, 60 cycle, 53 watts

FREQUENCY RANGES:

American Band . . . . . 540-1730 KC
Foreign Band . . . . . . 5.7-18.3 MC

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Oscil. Padder
Band "AM"	1600 kc	600 kc
Band "FOR"	16 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 456 kc

POWER OUTPUT:

Type . . . . Pentode
Undistorted . . . . 2.6 watts
Maximum . . . . 3.9 watts

LOUD SPEAKER:

Type . . . . Dynamic
Size . . . . 6"
Field Coil Resistance . . . . 1050 Ohms

OPERATING FEATURES:

Tone Control . . . . Two Point
Automatic Volume Control
Crystal Phonograph Pickup

Voltage Table

6A7	244	82	0	118	6.3 a.c.
6D6	244	85	0	—	6.3 a.c.
76	0	—	0	—	6.3 a.c.
76 a-f	65	—	0	—	6.3 a.c.
41	226	244	0	—	6.3 a.c.

Voltage across speaker field—65.

Voltage at 80 filament to B minus (center-tap of high-voltage winding on power transformer)—325.

The grid bias for all the tubes is developed across the resistors R9 and R11 (see schematic No. 1). The total voltage measured across R9 and R11 should be 15 volts, and is the bias for the 41 tube. The voltage measured across R9 should be 5 volts. To check the bias on the 6A7 and 6D6 tubes, measure the values of resistors R6, R7 and R8 (see schematic).

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

1. Left Knob . . . . . . Wave Change
2. Next to Left Knob . . Tone Control
3. Next to Right Knob. . . . Tuning
4. Right Knob . . . . . Power Switch

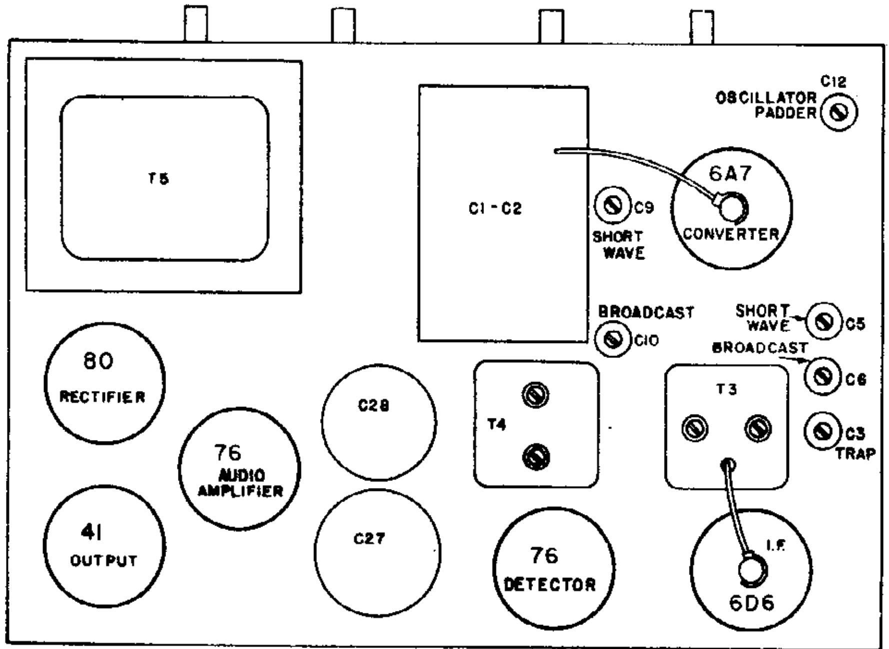
CONTROL OPERATION:

Clockwise "AM" . . Anti-Clockwise "FOR"

Ratio 12:1
Turn Right: Power On; Volume Increase

MODEL 4668, Ch. 103. AR166
Socket, Trimmers
Alignment

SEARS-ROEBUCK & CO.



LOCATION OF PARTS TOP OF CHASSIS

57 RL 75
FEB. 16, 1938

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across speaker voice coil

Output meter reading to indicate .050 watt.
(Meter on 50 V. scale or higher) . . . . 18.7 volts

Average sensitivity in microvolts for .050 watts output . . . . See chart below

Dummy antenna value to be in series with generator output . . . . See chart below

Connection of generator output lead . . . . See chart below

Connection of generator ground lead . . . . To chassis

Generator modulation . . . . App. 30% - 400 cycles

Position of volume control . . . . Fully clockwise

Position of tone control . . . . Fully clockwise

Position of dial pointer with variable fully meshed . . . . Horizontal

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED IN ORDER SHOWN	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
B.C.	160	456	.02 mfd.	6A7 Grid	C15, C16 C17, C18	I. F.	50
B.C.	160	456	.0002 mfd.	Ant. Lead	C3	Wave trap	Trim. for minimum response
S.W.	16	16 mc.	400 ohm	Ant. Lead	C9, C5	Osc., R. F.	17
B.C.	60 (rock)	600 kc.	.0002 mfd.	Ant. Lead	C12	Osc.	10
B.C.	160	1600	.0002 mfd.	Ant. Lead	C10, C6	Osc., R.F.	12

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

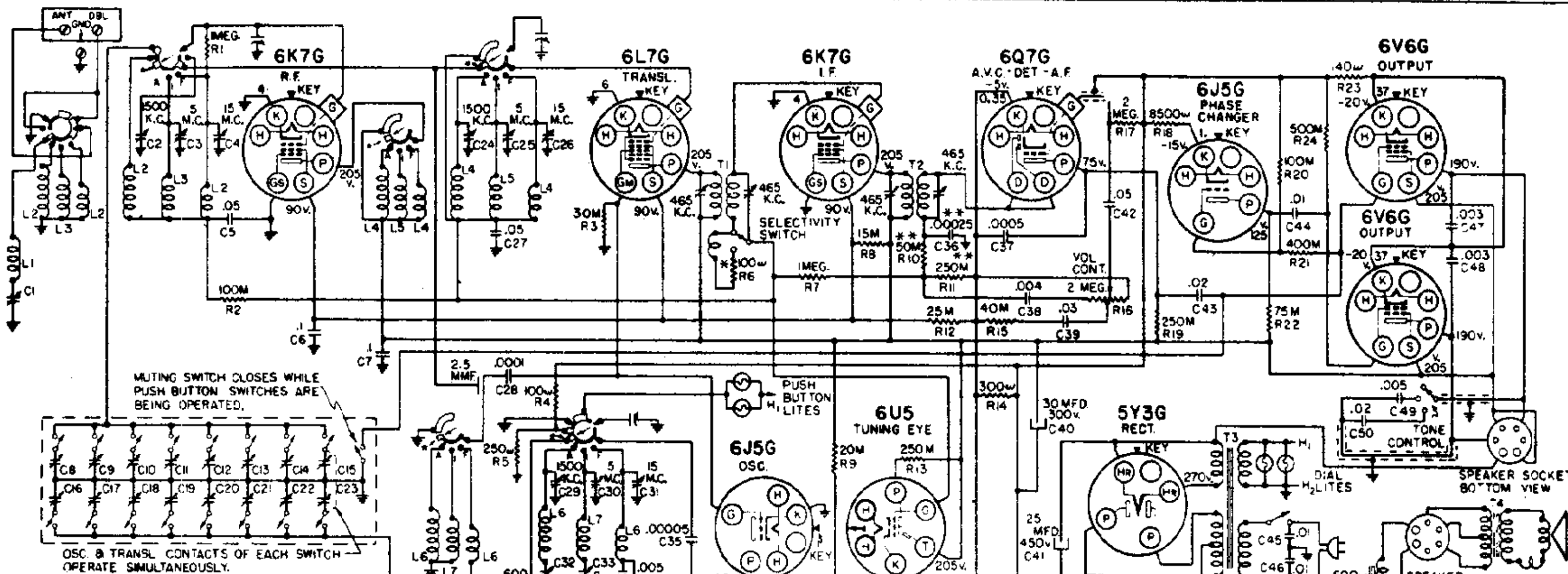
It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

MODELS 4681,4761
Chassis 101.499
Schematic, Voltage
Color Code

SEARS-ROEBUCK & CO.



IF PEAK 465 KC

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
* PART OF T1 • PUSH BUTTON TUNING POSITION
** PART OF T2

JAN. 19, 1938

FOR TUNER DATA SEE PAGE 10-13

FREQUENCY RANGES:
American Band . . . . 540-1800 kc
Intermediate Band . . . 1760-6050 kc
Foreign Band . . . . 5.9-18.1 mc

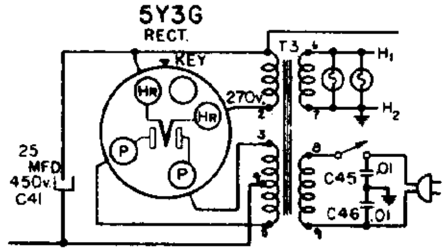
INTERMEDIATE FREQUENCY . . . . 465 kc

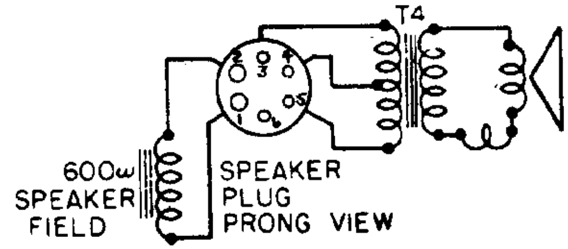
POWER OUTPUT:
Type . . . . Push-Pull (Beam Tubes)
Undistorted . . . . 6 watts
Maximum . . . . 10 watts

LOUD SPEAKER:
• Type . . . . Dynamic
Size . . . . 10" and 12"
App. field coil resistance . . 600 ohms
App. field coil voltage drop . . . 65 volts

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "AM"	1500 kc	1500 kc	600 kc
Band "INT"	5 mc	5 mc	2 mc
Band "FOR"	15 mc	15 mc	Fixed





POWER TRANSF. COLOR CODE
1,2,3-Red 5-Blue
4-Slate 6,7,8-Black
9-Green

SPEAKER PLUG COLOR CODE
1. Black 4. Red
2. Yellow 5. Green
3. Brown 6. Blank

POWER SUPPLY:
All models available . . . . 105-125 volts, 50-60 cycle, 95 watts
All models available . . . . 105-125 volts, 25 cycle, 100 watts

MODELS 4681,4781
Chassis 101.499

SEARS-ROEBUCK & CO.

Phone, Phono. Jacks
Installation, Schematic

INSTALLATION OF A PHONOGRAPH PICKUP JACK OR AN EARPHONE JACK:

A kit, part #1016117189, can be ordered from Colonial Radio Corporation, 354 Rano Street, Buffalo, N. Y. The retail selling price is $1.11. This kit contains the necessary parts for installing either a phonograph pick-up jack or an earphone jack. If the customer desires both a phonograph pick-up jack and an earphone jack, it will be necessary to use two kits and to drill an additional hole in the back of the chassis for the additional jack.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack.

Disconnect the jumper that is between prongs #1 and #4 of the speaker socket and move the lead on prong #1 to prong #4.

Locate the electrolytic condenser mounted alongside of the power transformer. A green lead runs from the anode (center terminal) of this electrolytic to prong #3 of the speaker socket. Transfer the connections of this lead from the anode to the cathode (mounting nut) of the electrolytic and from prong #3 to prong #1 of the speaker socket.

There is a jumper between the cathodes of the two electrolytics. Disconnect this jumper. Run a jumper between the anodes of the two electrolytics.

There is a four-terminal board mounted under the nut that holds the IF output transformer. Run a lead from the terminal nearest the speaker socket on this board to prong #3 of the speaker socket.

Run a lead from lug #1 of the jack to the cathode of the 6Q7G tube.

Connect the .05 mfd. condenser from lug #2 of the jack to the blank prong (3rd one clockwise from the locating pin when viewed from the underside) of the 6K7G tube socket.

Run a lead from lug #3 of the jack to the coil terminal shown in the illustration.

Connect the 500M ohm resistor, supplied in the kit, between lug #4 of the jack and prong #1 of the speaker socket.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

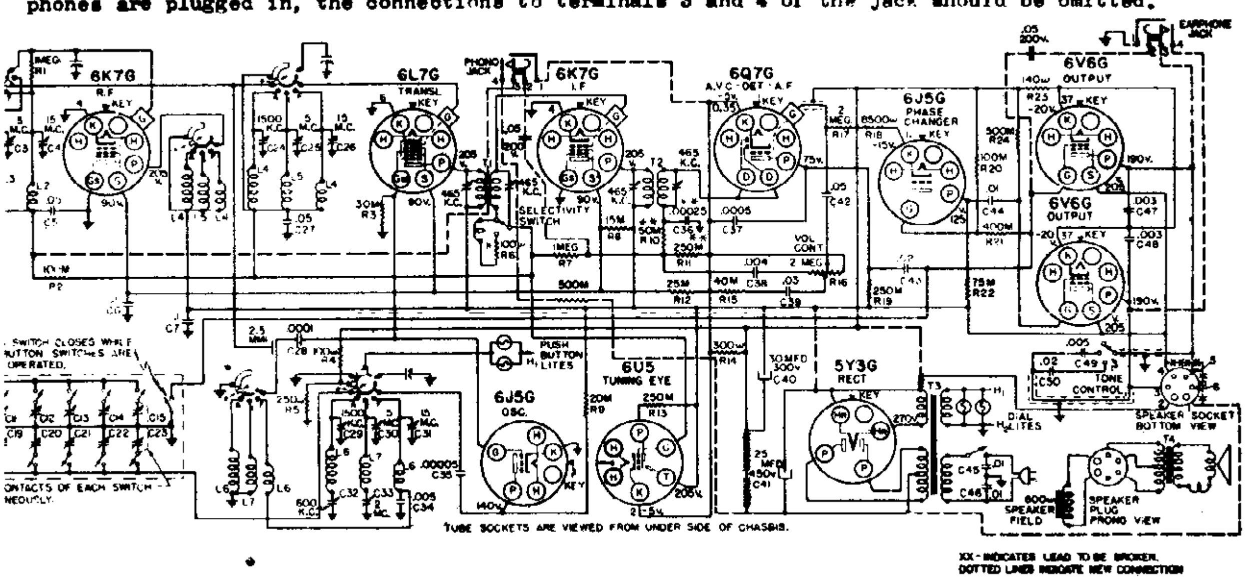
Connect the .05 condenser from terminal #2 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #5 of the speaker socket.

Connect terminal #4 of the jack to terminal #3 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

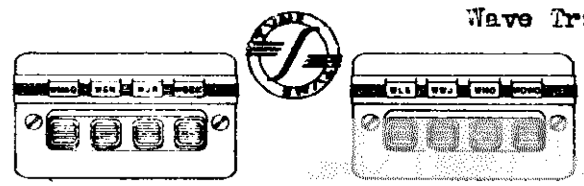
With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.



MODELS 4681,4781
Chassis 101.499
Chassis ,Antenna
Wave Trap Data

SEARS-ROEBUCK & CO.

1. Left knob . . "On-Off" switch and Volume
2. Next to left knob . . . Wave Band switch and Push Button Tuning
3. Center knob . . . . Tuning
4. Next to right knob . . Selectivity
5. Right knob . . . . Tone Control

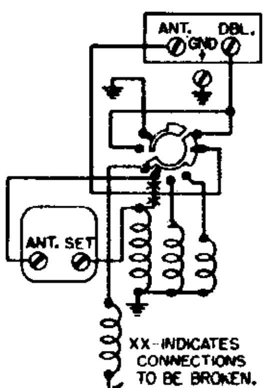


DIAL & KNOB FUNCTIONS

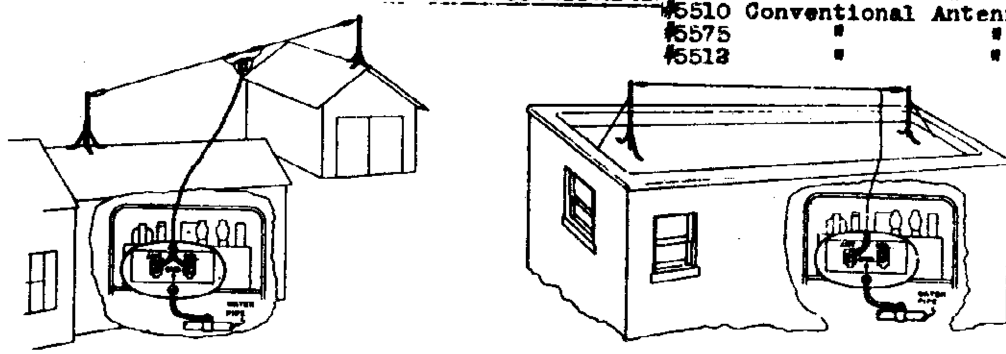
The trap has two terminals marked, "ANT" and "SET". If a conventional antenna is being used (not a doublet), the trap will be connected as follows. Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

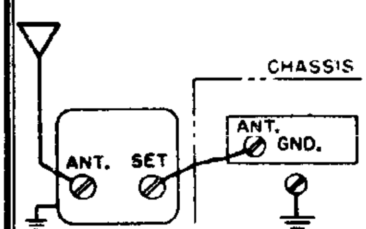
If a doublet antenna is installed with the receiver, the trap must be connected between the antenna lug of the broadcast antenna coil primary and the Wave Switch. Remove the lead between the antenna lug of the primary and the wave switch. Connect the "ANT" terminal of the trap to the wave switch lug. Connect the "SET" terminal of the trap to the antenna coil lug. See Illustration below.

ANTENNA CONNECTIONS #5567 Doublet Antenna
#5510 Conventional Antenna
#5575 " "
#5512 " "

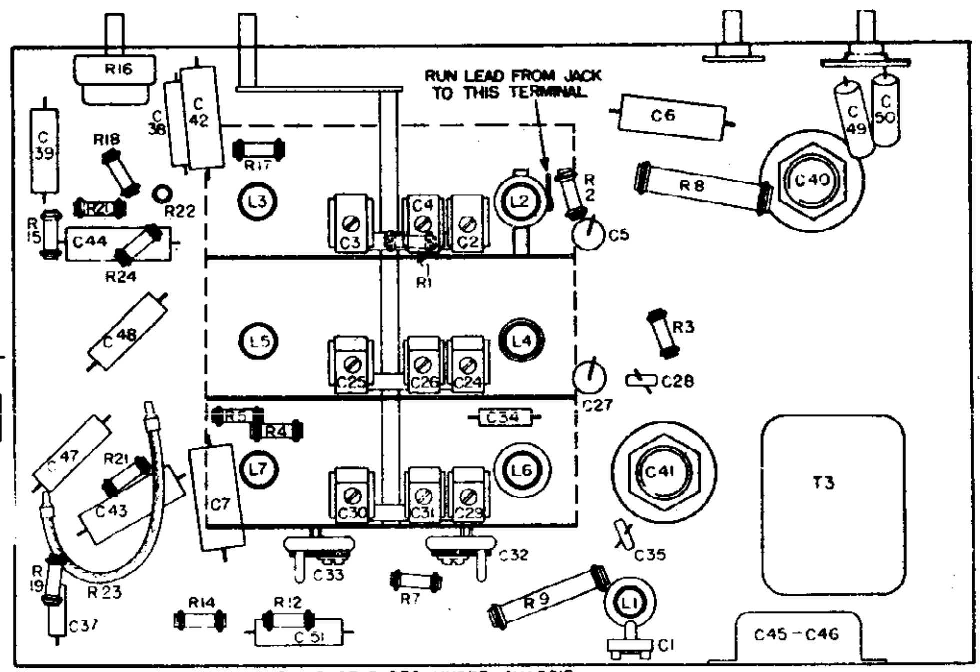


WAVE TRAP CONNECTIONS WHEN DOUBLET ANTENNA IS BEING USED.





1013117416 TRAP FOR ELIMINATING BROADCAST STATION INTERFERENCE.



LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4681,4781
Chassis 101,499
Socket,Trimmers
Alignment,Chassis

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across speaker voice coil
Output meter reading to indicate .5 watts output . . . . 1.31 volts
Approximate average sensitivity in microvolts for .5 watts output . . . . . . See chart below
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Connection of generator ground lead . . . . To chassis
Generator modulation . . . . 30%, 400 cycles
Position of volume control . . . . Fully clockwise
Position of tone control . . . . Fully clockwise
Position of selectivity control . . . . Sharp
Position of dial pointer with variable fully closed . . . . To fall on last calibration mark at 550 kc end of AMERICAN band.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"INT"	1.8 mc	465 kc	.1 mfd.	6L7G Grid	T2, T1	IF	70
"AM"	Closed	465 kc *	.0002 mfd.	Ant. Term.	C1 *	IF trap	-
"AM"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C29, C24, C2	Oscillator, Transl., RF	30
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C32	Padder	18
"INT"	5 mc	5 mc	400 ohms	Ant. Term.	C30	Oscillator	-
"INT"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C25, C3	Translator, RF	5
"INT"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C33	Padder	15
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C31	Oscillator	-
"FOR"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C26, C4	Transl., RF	5

IMPORTANT ALIGNMENT NOTES

* If the frequency of an interfering code station is known, the generator should be adjusted to that frequency instead of to 465 kc. The trap should be adjusted to give minimum output meter deflection instead of the usual maximum reading.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

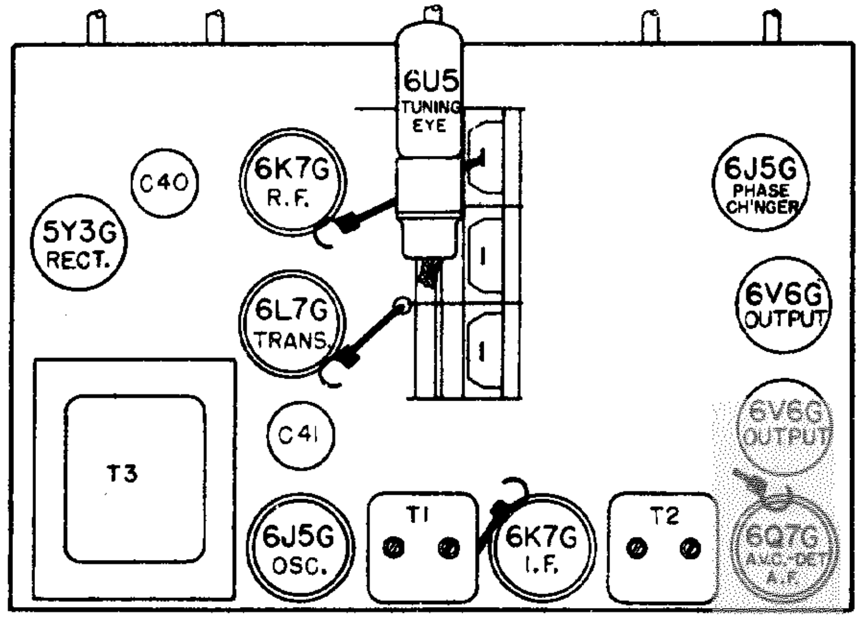
It is necessary to repeat the entire alignment procedure step by step in the original order to secure proper alignment. Perfect alignment is not possible with one adjustment of the trimmers.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

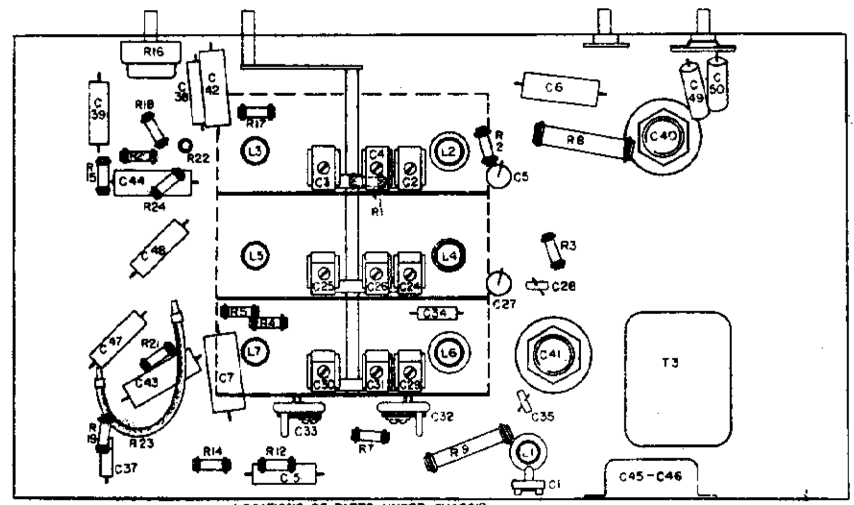
The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

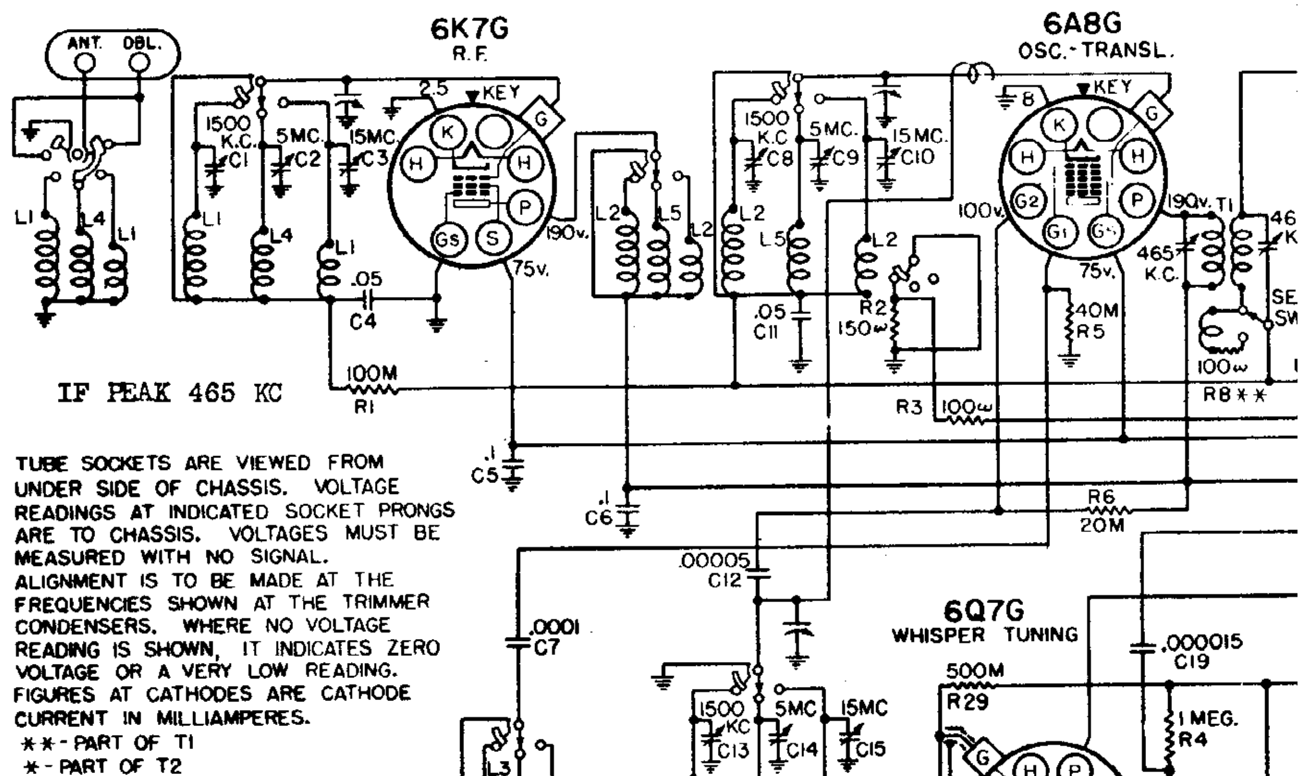
No connection should be made to the doublet terminal on the antenna connection block.



LOCATION OF PARTS ON TOP OF CHASSIS.



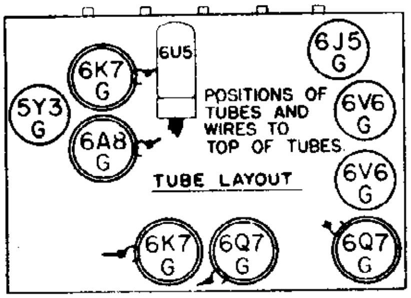
LOCATIONS OF PARTS UNDER CHASSIS



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

** - PART OF T1

* - PART OF T2



POWER SUPPLY:
All models available 105-125 volts, 50-60 cycle, 85 watts
All models available 105-125 volts, 25 cycle, 90 watts

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "AM"	1500 kc	1500 kc	600 kc
Band "INT"	5 mc	5 mc	2 mc
Band "FOR"	15 mc	15 mc	Fixed

FREQUENCY RANGES:
- American Band . . . . . . 540-1800 kc
- Intermediate Band . . . . .1760-6100 kc
- Foreign Band . . . . 5.9-18.2 mc

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
- Type . . . . . Push-Pull (Beam Tubes)
- Undistorted . . . . 6 watts
- Maximum . . . . 10 watts

LOUD SPEAKER:
- Type . . . . Dynamic
- Size . . . . 6", 8", 10", 12"
- Field coil resistance . . . . 600 ohms
- App. field coil voltage drop . . . 60 volts

OPERATING FEATURES:
- Tone Control . . . . Three point
- Selectivity Control . . . . Two point
- Lo-Noise Control
- Automatic Volume Control
- Roll Over dial with only one scale visible at a time.
- Automatic Tuning Dial

CHASSIS FEATURES:
- Number RF stages . . . . One
- Number IF stages . . . . One
- Antenna . . . Doublet or Conventional
- Line Noise Filter Condensers
- Tuning Eye
- Dual Tuning Ratio
- Provision for Phonograph Pick-Up Connections

MECHANICAL SPECIFICATIONS

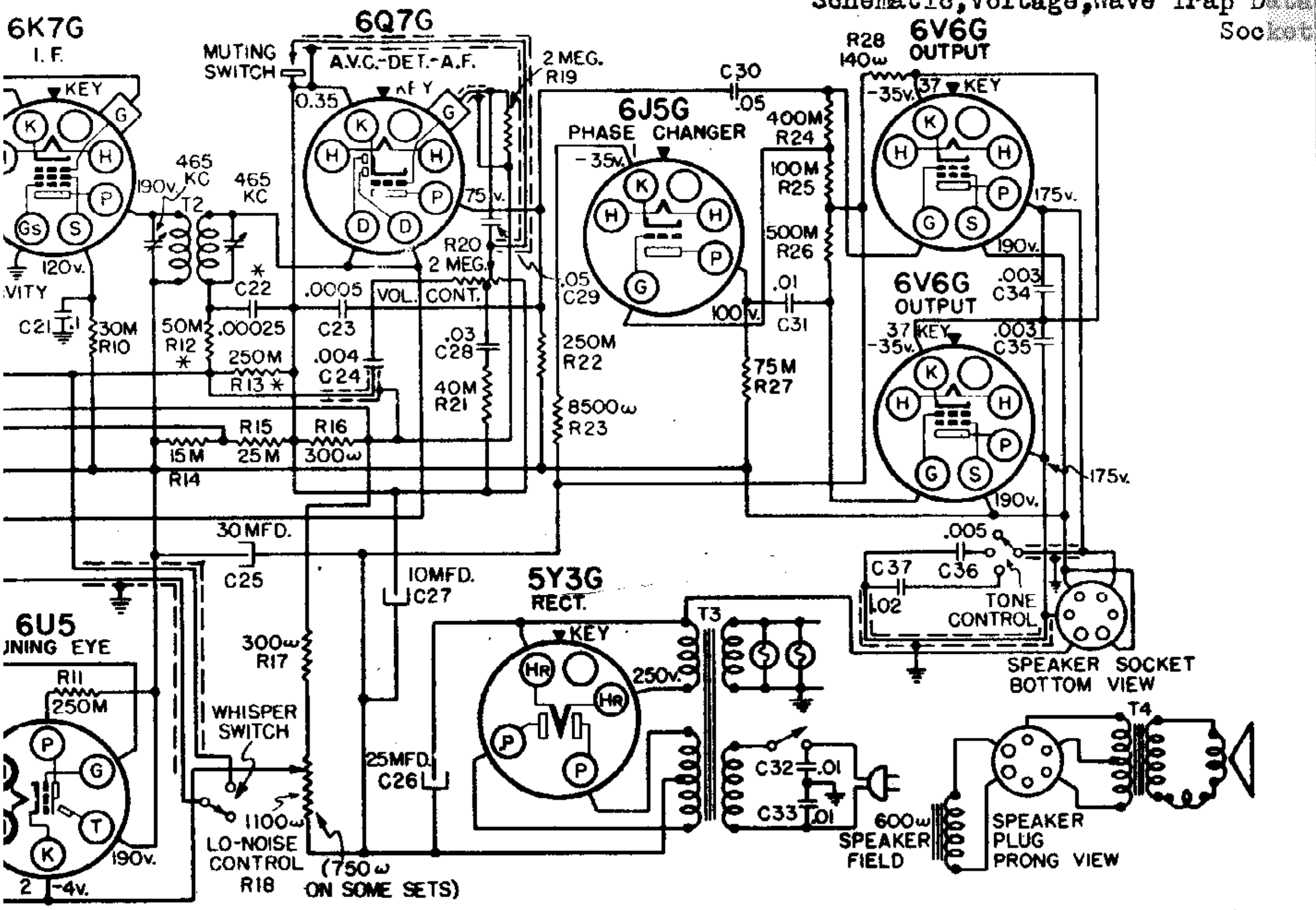
OPERATING CONTROLS:
1. Left knob . . "On-Off" switch and Volume
2. Next to left knob . . . Wave Band Switch
3. Center knob . . . . .Tuning
4. Next to right knob. Inner: Selectivity. Outer: Lo-Noise.
5. Right knob . . . . . Tone Control

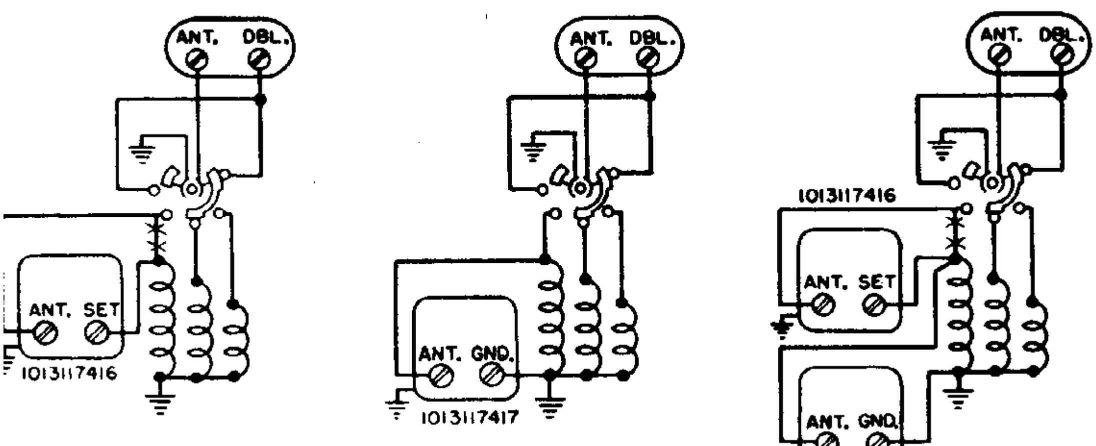
CONTROL OPERATION:
- Turning right: Power on; volume increase
- Turning right: American, Intermediate, Foreign
- Tuning ratio: 6:1; 30:1
- Turning right, inner: Sharp, Broad.
- Turning right, outer: Normal, Lo-Noise.
- Turning right: "LO", "MEDIUM", "HI"

FO

CK & CO.

MODEL 4786, Chassis 100.196
Schematic, Voltage, Wave Trap Data
Socket

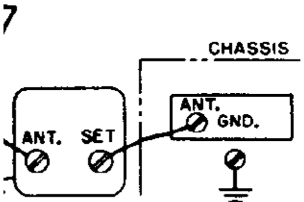




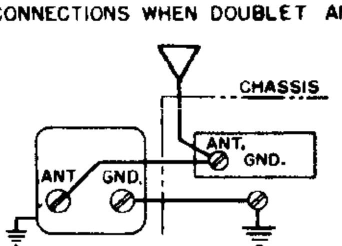
X X- INDICATES CONNECTION TO BE BROKEN.
WAVE TRAP CONNECTIONS WHEN DOUBLET ANTENNA IS BEING USED

57 RL 69
DEC. 10, 1937

7

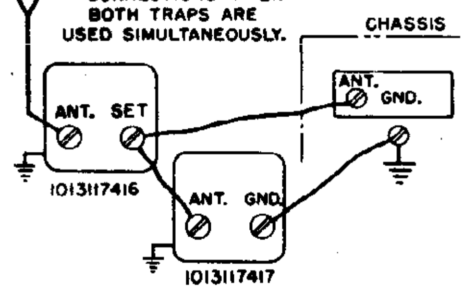


1013117416 TRAP FOR ELIMINATING BROADCAST STATION INTERFERENCE.



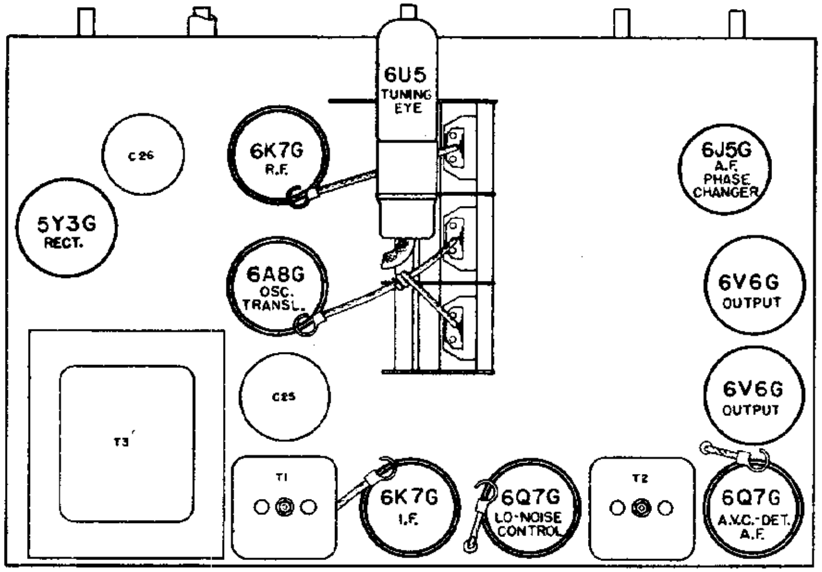
1013117417 TRAP FOR ELIMINATING CODE INTERFERENCE.

CONNECTIONS WHEN BOTH TRAPS ARE USED SIMULTANEOUSLY.

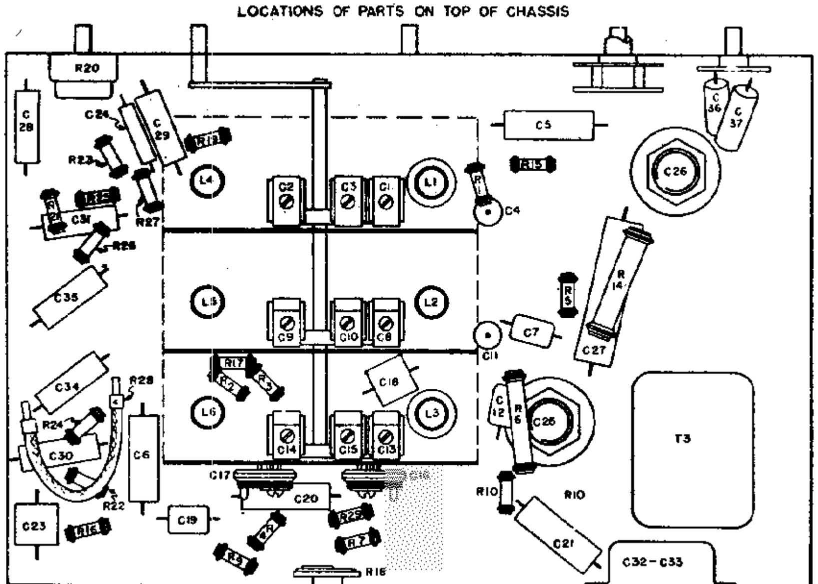


TOMATIC TUNING DIAL, SEE INDEX

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across speaker voice coil
Output meter reading to indicate .5 watts output	1.31 volts
Approximate average sensitivity in microvolts for .5 watts output	See chart below
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of volume control	Fully clockwise
Position of tone control	Fully clockwise
Position of selectivity control	Sharp
Position of Lo-Noise control	Normal
Position of dial pointer with variable fully closed	To fall on last calibration mark at 550 kc end of AMERICAN band.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"INT"	1.8 mc	465 kc	.1 mfd.	6A8G Grid	T2, T1	IF	5200
"AM"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C13, C8, C1	Oscillator, Transl., RF	35
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C16	Padder	20
"INT"	5 mc	5 mc	400 ohms	Ant. Term.	C14	Oscillator	-
"INT"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C9, C2	Translator, RF	3
"INT"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C17	Padder	8
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C15	Oscillator	-
"FOR"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C10, C3	Translator, RF	10

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the AVC action of the set from interfering with accurate alignment.

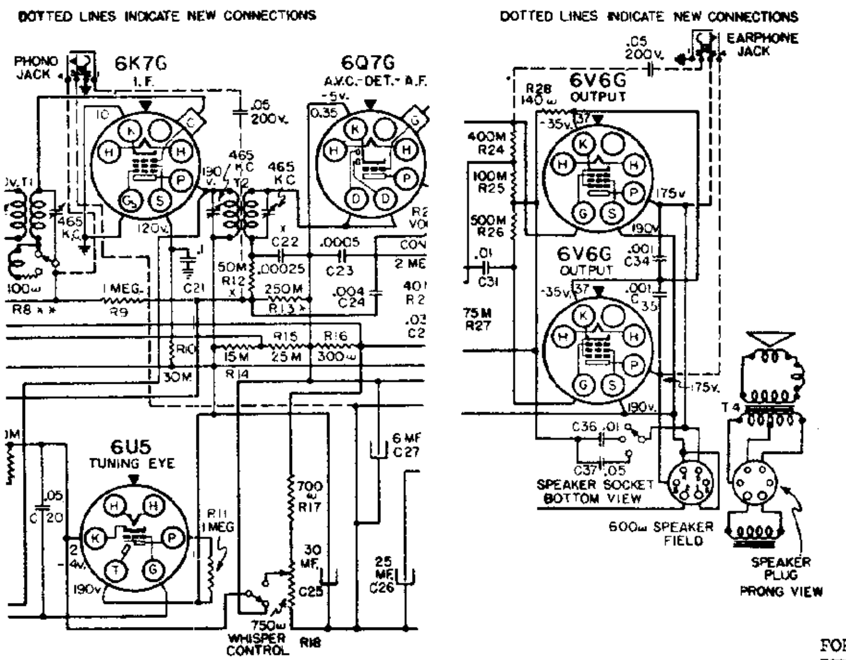
The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

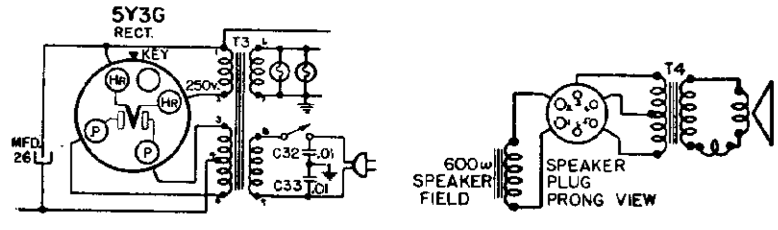
Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

No connection should be made to the doublet terminal on the antenna connection block.

MODEL 4786
Chassis 100.196
Jacks Installation
Wave Trap, Color Code

SEARS-ROEBUCK & CO.





POWER TRANSFORMER COLOR CODE

1,2-Red-Yellow
3-Red
4-Slate
5-Blue
6,7-Black-Yellow
8-Black
9-Green

SPEAKER PLUG COLOR CODE

1-Black
2-Yellow
3-Brown
4-Red
5-Green
6-Blank

WAVE TRAPS:

Two wave-traps are available and can be ordered directly from source 101; using Purchase Order Blank Form F5864. The retail selling price is $1.20.

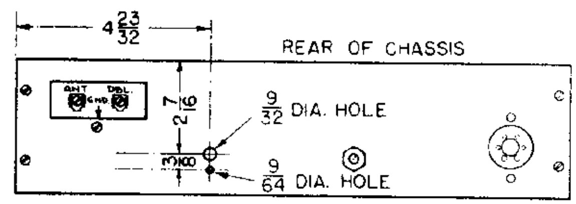
Part #1013117417 wave-trap is designed to eliminate code interference from ship transmitters, airports or air beacon stations, in locations where the receiver is near such transmitters. This trap operates in the vicinity of 465 kc.

Part #1013117416 wave-trap is designed to eliminate whistles and cross modulation troubles that occur when the receiver is located comparatively near some powerful broadcast station.

It is possible to use both traps simultaneously if conditions make this necessary.

The trap can be mounted within the chassis by drilling the holes shown in the following illustration. It will be necessary to remove the bracket from the trap in order to mount it in the chassis. An alternative method of mounting is to screw the trap to the chassis mounting shelf by means of wood screws through the bracket. If the trap is not mounted on the chassis, it is important to connect a wire from under the head of one of the wood screws to the chassis so that the wave-trap shield becomes grounded to the chassis.

FOR AUTOMATIC TUNING DIAL, SEE INDEX.



If a conventional antenna is being used with the receiver, the traps are to be connected as described in the next two paragraphs and the illustration that follows them.

The part #1013117417 trap, for code interference elimination, has two terminals marked "ANT" and "GND". Connect a wire between the "ANT" terminal of the trap and the "ANT" terminal of the chassis. Connect a wire between the "GND" terminal of the trap and the "GND" terminal of the chassis. The antenna and ground connections to the receiver remain as they were, the trap being connected across them. The trap should be adjusted to minimum response from the interfering station.

Part #1013117416 trap, for broadcast station interference elimination, has two terminals marked, "ANT" and "SET". Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

If a doublet antenna is installed with the receiver, the antenna terminal of the 1013117417 trap must be connected to the antenna lug of the broadcast band antenna coil primary inside the chassis. The 1013117416 trap must be connected between the antenna lug of the broadcast antenna coil primary and the wave switch. Remove the lead between the antenna lug of the primary and the wave switch. Connect the antenna terminal of the trap to the wave switch lug. Connect the set terminal of the trap to the antenna coil lug. See next illustration.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack.

Connect the .05 condenser between lug #1 of the jack and the plate prong of the 6Q7 tube socket that is just above the LO-NOISE control rheostat.

Connect lug #2 of the jack to ground.

There is a terminal board mounted under the IF Input transformer. Connect the terminal on this board nearest the back of the chassis to lug #3 of the jack.

Connect lug #4 of the jack to the LO-NOISE control rheostat.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal #2 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #6 of the speaker socket.

Connect terminal #4 of the jack to terminal #3 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.

MODELS 4610,4669,4769
4789,Chassis 101,482
Automatic Tuner Data

SEARS-ROEBUCK & CO.

MODEL 4786
Chassis 100,196

THE AUTOMATIC TUNING DIAL:

The method of setting up the Automatic Tuning Dial follows in detail. In some cases frequency drift due to ageing of the parts with time will make it necessary to reset the Automatic Tuning dial buttons, particularly the ones for the high frequency end of the broadcast scale. After they have been reset once it is seldom necessary to reset them again although in some cases further ageing and drifting does occur, making a second resetting necessary.

THE FIXED BUTTON, IDENTIFIED BY A RED CAP, CANNOT BE ADJUSTED TO ANY STATION. DO NOT TAMPER WITH THE ADJUSTMENT OF THIS BUTTON.

Approx. Kilocycle Range of Button #1	Approx. Kilocycle Range of Button #2	Approx. Kilocycle Range of Button #3	Approx. Kilocycle Range of Button #4	Approx. Kilocycle Range of Button #5	Approx. Kilocycle Range of Button #6	Approx. Kilocycle Range of Button #7	Approx. Kilocycle Range of Button #8	Approx. Kilocycle Range of Button #9	Approx. Kilocycle Range of Button #10	Approx. Kilocycle Range of Button #11

Make a list of the stations you want to set up on the AUTOMATIC TUNING dial. Mark down the frequency of the stations as well as their call letters. Arrange the stations in the order of their frequency. That is, the one of lowest frequency first, next higher frequency second, etc.

IF TWO OR MORE OF YOUR SELECTED STATIONS FALL WITHIN ONE BUTTON ADJUSTMENT, YOU MUST REVISE YOUR LIST OF STATIONS SO THAT ONLY ONE STATION WILL BE ASSIGNED TO A BUTTON.

To proceed with the setting up, turn the Selectivity Control knob to the SHARP position. See Fig. 7. (This knob must be turned to the SHARP position only for setting up the stations on the AUTOMATIC TUNING dial. After stations have been set up they may be tuned in with the knob in either the BROAD or SHARP positions.

If you select fewer than eleven stations so that there is no station in one or more of the frequency sections the button for that section will be left unadjusted. (84)

Pull the large knob, marked "TUNE", off of its shaft. See Fig. 7A.

Unscrew the four screws and remove the round AUTOMATIC TUNING plate. See Fig. 8. The mechanism will then appear as in Fig. 9. Note the numbering of the buttons.

Unlock the AUTOMATIC TUNING mechanism by pushing the stud to the left as shown by the forefinger and the arrow in Fig. 10. There will be a definite click and the studs will move about 3/16" to the edge of the slot. (You will find that the stud can also be pushed in. This is normal.) It takes quite a bit of pressure to move the stud so that it is necessary to hold the mechanism firmly with one hand, as shown.

Tune in the first station on your selected list. (The first station is the one of lowest frequency.) This can be done by rotating the center tuning shaft as shown in Fig. 11. (Be sure the Wave Band Switch is turned to the AMERICAN position.)

In the Illustration a 580 kc station has been chosen as an example. Note that the dial pointer is at approximately 580 kc on the Roll Over dial, the Tuning Eye shows the station as being tuned and that button #1 is in position to be adjusted. Your station for button #1 may be any station between 540 kc and approximately 580 kc since this is the frequency range of this button.

The key (see Fig. 12), has a hole at one end. This end is the handle. Insert the other end of the key into button #1. Push the button all the way in by means of the key and turn the button. You will find that the button can be turned in either direction but that it cannot be turned for more than one-half a circle. See Fig. 13.

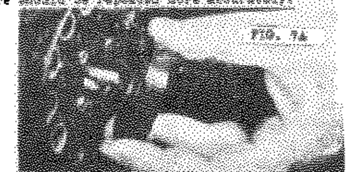
If button #1 cannot be pushed in far enough to allow it to turn, it will be necessary to remove the hairpin clip from the red button. Then proceed to adjust button #1 as described in the following paragraph, being very careful not to turn the red button. The red button will go in slightly when adjusting button #1 but will return to its original position when #1 button is released after completing its adjustment. Replace the hairpin clip on the red button. This removal of the hairpin clip from the red button may be necessary only when adjusting button #1 or button #11. It will not be necessary when adjusting any of the other buttons.

There is a notch in the outer edge of the button that will tell you in what direction to turn the button. The button should be turned so that the notch would fall on an imaginary line drawn straight down from the center of the AUTOMATIC TUNING dial. When the notch reaches this point you will find that further rotation of the button will cause the entire AUTOMATIC TUNING mechanism to turn and will also cause the pointer to move on the Roll Over dial. Carefully turn the key so that your #1 station will be tuned in exactly. The station cannot be heard while the button is pushed in by means of the key, so that the Tuning Eye must be used for precise tuning as described in paragraph 18. When the dark portion at the bottom of the Tuning Eye is narrowest, the station is tuned in exactly even though the Roll Over dial pointer may not be exactly at 550 kc. See Fig. 14.

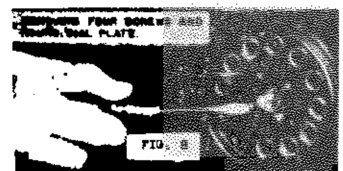
If the "Log" lists two buttons (#1 or #8) for the station you have selected, you may find that even when button #1 is turned as far as possible its notch does not quite come to the imaginary center line of the dial and that the station cannot be tuned in with button #1. You must then choose a different station for button #1 and the station you chose originally will be set up on button #8. If you have no other station for button #1, turn the button so that its notch is about midway in its range as shown by button #8 in Fig. 13. This will keep it from interfering with the adjustment of adjacent buttons. This procedure must be followed for all those stations that have two button numbers listed in the "Log".

LO-NOISE AND SELECTIVITY CONTROL

FIG. 7



PULLING KNOB STRAIGHT OFF OF TUNING SHAFT.



APPEARANCE OF MECHANISM AFTER REMOVAL OF ROUND DIAL PLATE. NOTE ELEVEN NUMBERED BUTTONS AND ONE FIXED BUTTON THAT IS NOT NUMBERED.

FIG. 9

UNLOCKING DIAL MECHANISM.

FIG. 10

FIG. 11

TUNING IN #1 STATION WITH CENTER SHAFT.

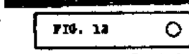


FIG. 12

KEY FOR ADJUSTING BUTTONS

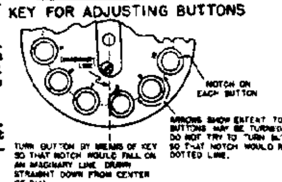
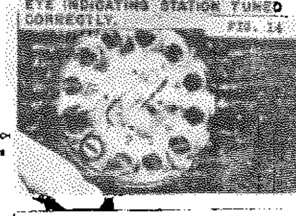


FIG. 13

NOTE NARROWED SLOT OF TUNING EYE INDICATING STATION TUNED CORRECTLY.

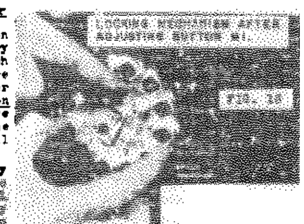


TUNING IN #1 STATION WITH KEY.

NOTE NARROWED SLOT OF TUNING EYE INDICATING STATION TUNED CORRECTLY.

REMOVING KEY AFTER ADJUSTING BUTTON #1.

Leave the receiver turned on for about half an hour to heat up before adjusting the AUTOMATIC TUNING mechanism. This will insure accurate and permanent settings.



MECHANISM HELD FROM TURNING. BE CAREFUL NOT TO PUSH IN BUTTONS WHILE HOLDING.

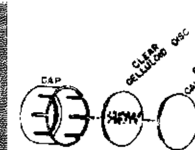
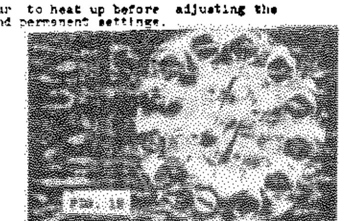


FIG. 17



CAP WITH CALL LETTERS IN PLACE ON BUTTON #1.

MODEL 4786, Ch. 100.196
MODELS 4610, 4669, 4769
4789. Ch. 101.482

SEARS-ROEBUCK & CO.

Automatic Tuner Data
Part 2

After the AUTOMATIC TUNING dial button has been adjusted properly and the mechanism locked as described, you are ready to insert the cap with the station's call letters. If you purchased your radio from a Sears' Retail Store proceed as follows:

RETAIL STORE MODELS:

Push out the disc containing the call letters of your selected #1 station. Place one of the clear celluloid discs into one of the metal caps and then place the disc with your station call letters in the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 17.

Push the cap into place on the button for your station. See Fig. 18. Be sure the cap is put on so that the letters are upright and can be read easily.

Again unlock the dial mechanism by moving the stud to the left as shown by the forefinger and arrow in Fig. 20. As before, the mechanism must be held firmly with one hand, being careful not to push in any of the buttons, while unlocking the mechanism.

MAIL ORDER MODELS.

Tune in the second station on your selected list. This can be done by rotating the center tuning shaft as shown in Fig. 21. In the Illustration a 590 kc station has been chosen as an example. Note that the dial pointer is at approximately 590 kc on the Roll Over dial, the Tuning Eye shows the station as being tuned and that button #2 is in position to be adjusted. Your station for button #2 may be any station between approximately 550 kc and 590 kc since this is the frequency range for button #2. See Fig. 19.

Insert the key (Fig. 12) into button #2. Push the button all the way in by means of the key and turn the button. As before, you will find that the button can be turned in either direction but that it cannot be turned for more than one-half a circle. See Fig. 13.

There is a notch in the outer edge of the button that will tell you in what direction to turn the button. The button should be turned so that the notch would fall on an imaginary line drawn straight down from the center of the AUTOMATIC TUNING dial. When the notch reaches this point you will find that further rotation of the button will cause the entire AUTOMATIC TUNING mechanism to turn and will also cause the pointer to move on the Roll Over dial. Carefully turn the key so that your #2 station will be tuned in exactly. The station cannot be heard while the button is pushed in by means of the key, so that the Tuning Eye must be used for precise tuning as described. When the dark portion at the bottom of the Tuning Eye is narrowest, the station is tuned in exactly even though the Roll Over dial pointer may not be exactly at 590 kc. See Fig. 22.

Carefully pull out the key allowing the button to snap back into position. If the button sticks when you try to pull the key out, shake it slightly and it should snap out. See Fig. 23. The button must be out before proceeding to the next step. When the button is out, it must not be pushed in again until the mechanism has been locked as described in the following paragraph.

Lock the mechanism by moving the stud to the right as indicated by the forefinger and arrow in Fig. 24. Note that one hand is holding the mechanism at the outer edge of the buttons so that they are not pushed in accidentally.

You can check the accuracy of your setting of the button by turning the round AUTOMATIC TUNING mechanism about an inch or so, so that your station is no longer tuned in. Then push #2 button that you have just adjusted all the way in with your finger and turn the mechanism so that the button is carried toward the bottom point of the AUTOMATIC TUNING dial until it reaches its stop. Then remove your finger from the button and your station will be tuned in. Now see if it can be tuned any more exactly by rotating the center shaft as illustrated in Fig. 21. Use the Tuning Eye to determine exactness of tuning. If you find that you can tune the station in more exactly by means of the center shaft than by means of the AUTOMATIC TUNING dial button, it indicates that you have not adjusted the button carefully enough and the procedure should be repeated more accurately.

After the AUTOMATIC TUNING dial button has been adjusted properly and the mechanism locked as described, you are ready to insert the cap with the station's call letters. If you purchased your radio from a Sears' Retail Store proceed as follows:

RETAIL STORE MODELS:

Push out the disc containing the call letters of your selected #2 station. Place one of the clear celluloid discs into one of the metal caps and then place the disc with your station call letters in the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 25.

Push the cap into place on the button for your station. See Fig. 26. Be sure the cap is put on so that the letters are upright and can be read easily.

MAIL ORDER MODELS:

The same perforated paper sheet with station call letters and the clear celluloid discs are provided as for Retail Store Models. Because the call letter sheets are perforated, this is the easiest method. However, if you wish the station call letters to be illuminated, the perforated paper sheet and the clear celluloid discs will not be used. Instead, the cellophane sheet with station call letters and the colored celluloid discs will be used. It will be necessary to cut out the call letters of your selected station, using a scissors and cutting around the outline of the printed circle. Place one of the unprinted colored celluloid discs in one of the metal caps, then the cut-out cellophane disc with your station call letters, and then another colored celluloid disc in the cap. See Fig. 27. Then place the cap into position on the button.

Proceed in the same manner with each of the other stations on your selected list. Always unlock the mechanism before attempting to adjust any of the buttons. Be careful not to push in and turn any of the adjusted buttons while the mechanism is in the unlocked position. Always be sure to lock the mechanism before putting on the cap with the station call letters. Otherwise, the button might be turned while the cap is being pushed on, upsetting the adjustment.

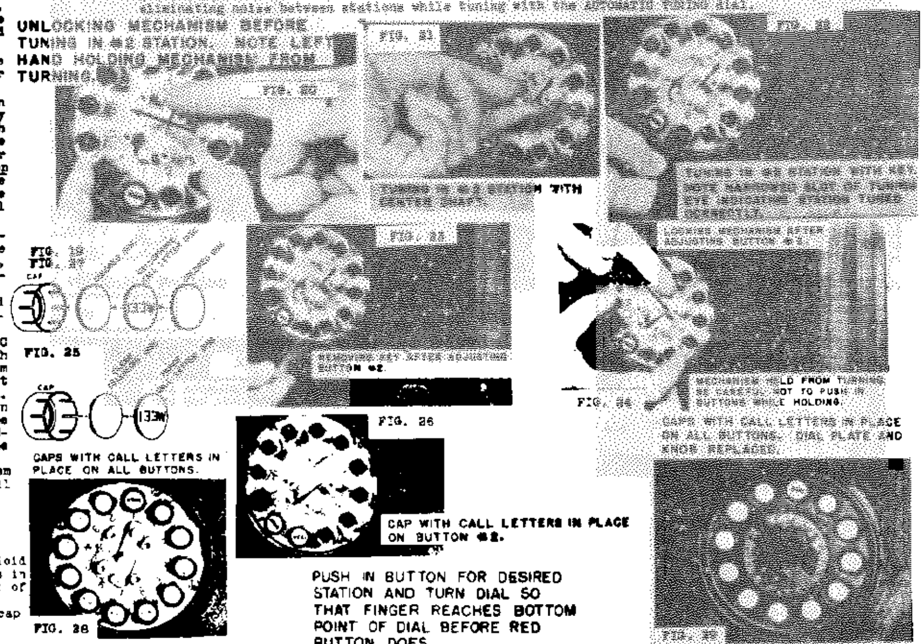
If there is no broadcast station on your selected list for button #11, this button can be used for "POLICE" stations. If the button is adjusted when the Roll Over dial pointer is set to about 1650 kc, various POLICE stations will be heard at this setting. However, if there is a particular POLICE transmitter to which you wish to adjust the button, tune in the station and adjust button #11 in the same manner as was done for broadcast stations.

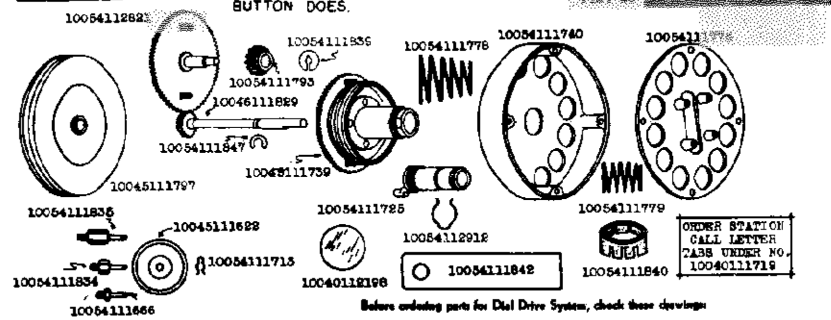
When all of the buttons have been adjusted and the caps put on them, the mechanism will appear as in Fig. 28. If you have selected fewer than 11 stations, not all of the buttons will be adjusted. A cap with the discs should be put on the unadjusted button but instead of using a disc with printed station call letters use one of the discs that has a printed star.

Replace the round AUTOMATIC TUNING dial plate, using the four screws. If there was a paper washer behind the plate, put it back in place before screwing on the plate. Then push the knob back onto its shaft. Notice that the shaft has a flat side and that the hole in the knob is correspondingly shaped, so that the two have to be fitted together properly before the knob can be pushed onto the shaft. See Fig. 29.

OPERATION:

To tune in any of the stations that have been set up on the AUTOMATIC TUNING dial, merely push in the button with the station's call letters and turn the dial until the button clicks into place at the bottom of the dial. The dial must always be turned in such direction that the button with your finger on it will reach the bottom point of the dial before the red button does. In other words, when you place your finger on a button for a desired station, turn the dial so that the red index button follows your finger rather than having your finger follow the red index button. The radio will be reduced in volume when the button is pushed in, eliminating noise between stations while tuning with the AUTOMATIC TUNING dial.





Before ordering parts for Dial Drive System, check these drawings.

Automatic Tuner Data
Part 3

SEARS-ROEBUCK & CO.

MODEL 4786,Ch.100.196
MODELS 4610,4669,4769
4789,Ch. 101.482

JULY 15, 1937

SUBJECT: READJUSTING THE AUTOMATIC TUNING DIAL STOP BUTTON TO MAKE IT POSSIBLE TO SET UP DESIRED STATIONS, THAT ARE CLOSE IN FREQUENCY, ON ADJACENT BUTTONS.

By referring to ranges it will be seen that WMAQ, 670 kc, would be set up on button #4. WGN, 720 kc, would be set up on button #4 or #5. WBBM, 770 kc, would be set up on button #5. Since these three stations come within the frequency range of only two of the buttons, the customer would ordinarily have to give up one of the three stations for AUTOMATIC TUNING.

It is possible, however, to change the setting of the "fixed" button and make it possible to set up three such stations, close together in frequency, on three separate buttons.

The method of doing this is as follows:

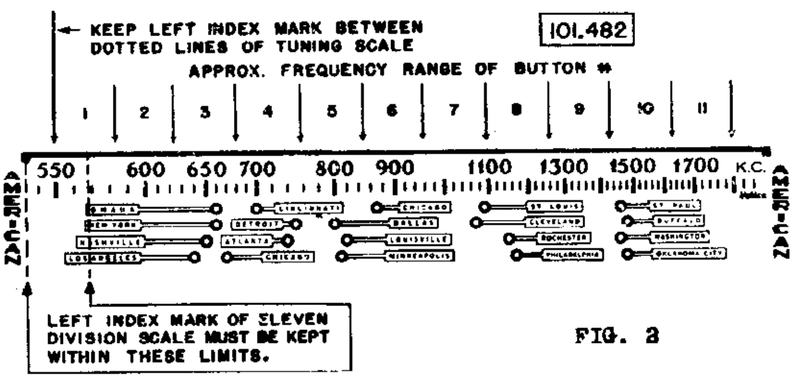


FIG. 2

FIRST:-
Make a full size reproduction of button frequency ranges on a suitable paper or cardboard,- an eleven division scale, one division for each button range as illustrated.

SECOND:-
Likewise make a full size reproduction of the AMERICAN band on suitable paper or cardboard.

Make a light pencil mark on the reproduction of the tuning scale at the frequency of each of the eleven desired stations. Then lay the eleven division scale against the reproduction of the tuning scale and move the eleven division scale to such a position that each of the pencil marked positions for the eleven desired stations will fall within the range of a different button. However, the eleven division scale can only be moved so that its left index mark comes between the dotted lines of the reproduction of the tuning scale, as shown in Fig. 2. In Fig. 2 it will be seen that by moving the eleven division scale to the point shown, WMAQ will be within the range of button #3; WGN will be within the range of button #4; and WBBM will be within the range of button #5.

When a position of the eleven division scale is found that will allow the eleven desired stations to fall within the range of separate buttons, carefully note at what point on the reproduction of the dial scale the left index mark of the eleven division scale comes. In the illustration for stations WMAQ, WGN, and WBBM, the index mark is just about opposite 550 kc on the dial scale. (Fig. 2).

Remove the chassis from its cabinet. Leave the AUTOMATIC TUNING dial escutcheon off.

Turn the AUTOMATIC TUNING dial to its stop so that the variable is fully meshed. Now move the pointer along its drive cable to the point on the dial that corresponds exactly to the position of the left index mark of the eleven division scale, as described in the preceding paragraph. As can be seen by inspection, the pointer is pinched onto the drive cable and it will be necessary to pry this pinching open slightly so that the pointer can be moved along the cable. The AUTOMATIC TUNING dial must be kept turned all the way to the left to its stop during the operation of moving the pointer. After the pointer has been moved to its new position it should be pinched onto the cable again so that it cannot slip.

Loosen the set screw that holds the variable condenser drive drum to the variable condenser shaft.

Unlock the AUTOMATIC TUNING dial mechanism by moving the studs counter-clockwise. Pull out the "hair pin" clip that will be found on the unnumbered stop button. This button can then be pushed in and turned the same as the other eleven numbered buttons. Push in the unnumbered button and turn it to such position that when the AUTOMATIC TUNING dial mechanism is turned to its limit the pointer will be at its original stop at the left end of the dial. Then lock the mechanism by rotating the studs clockwise. (Be careful not to push in button #1 while the unnumbered button is pushed in as this may jam the mechanism. If this should happen the mechanism can be freed by pushing in the stop latch, as will be seen by inspection.) Replace the "hair pin" clip on the unnumbered button.

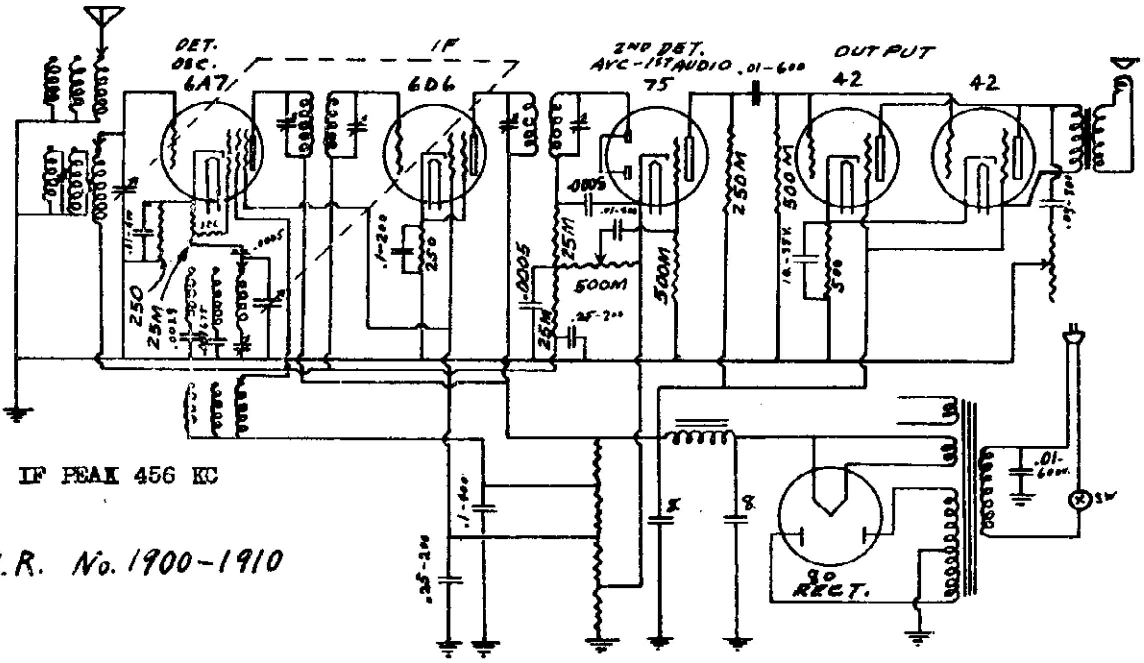
With the mechanism turned all the way to the left to its stop and with the dial pointer at its left limit on the dial, fully mesh the variable condenser by turning the movable plates with the fingers. Then re-tighten the set screw that holds the condenser drive drum to the variable condenser shaft.

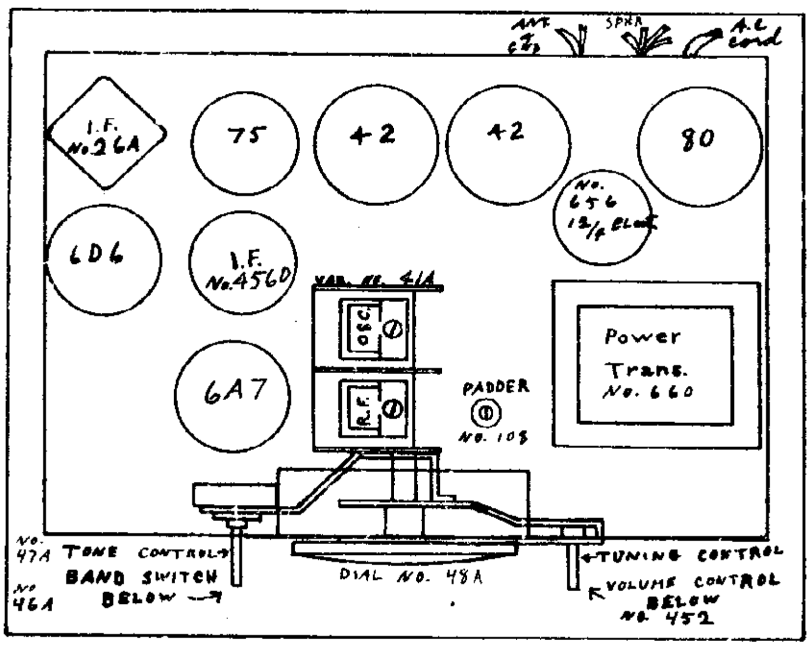
The eleven desired stations can then be set up on the eleven adjustable buttons in accordance with the instructions.(SEE PRECEEDING PAGES). The new frequency ranges for the buttons will be determined by holding the eleven division scale against the reproduction of the tuning scale, with the left index mark of the eleven division scale at the proper point between the dotted lines on the reproduction of the Tuning dial scale.

MODELS 1900,1910
Schematic, Socket

Trimmers, Alignment

SEARS-ROEBUCK & CO.





ALIGNMENT

1- Apply 456 KC note to control grid of 6A7 and peak IF trans. for max. gain.
2- Apply 4000 KC note to antenna wire; set band switch to 2nd band and align trimmer on oscillater section of variable condenser to track with 4000 KC on dial.
3- Turn Band switch to Broadcast band; apply 1500 KC note to antenna wire, adjust trimmer on RF section of variable condenser for maximum gain.
4- Apply 600 KC note to antenna, adjust padder condenser for maximum gain, swinging condenser back and forth across 600 KC signal.
5- Check 1400 KC signal for alignment.
6-Turn band switch to 2nd band; check 4000 KC signal for alignment and adjust trimmer on antenna coil for greatest gain at 4000 KC.
7-Turn band switch to last band and adjust trimmer on antenna coil for greatest noise on 12 megacycles.

RECEIVER RANGE - THREE WAVE BANDS

540 - 1720 kilecycles; 1720 - 5000 kilecycles; 5.5 - 16 megacycles

SEARS-ROEBUCK & CO.

MODEL 4796, Ch. 126.201
Schematic, Voltage

		Radio Only	Total
POWER SUPPLY RATING	105-125 volts, 60 cycles	75 watts	105 watts

FREQUENCY RANGES:
- American Band . . . . 540-1720 kc
- Foreign Band . . . . 5.8-18 mc

ALIGNMENT FREQUENCIES:
- Band "F" . . . . 15 mc(osc.,det.)
- Band "A" . 600 kc(osc.), 1500 kc(osc.)

INTERMEDIATE FREQUENCY . . . . 460 kc

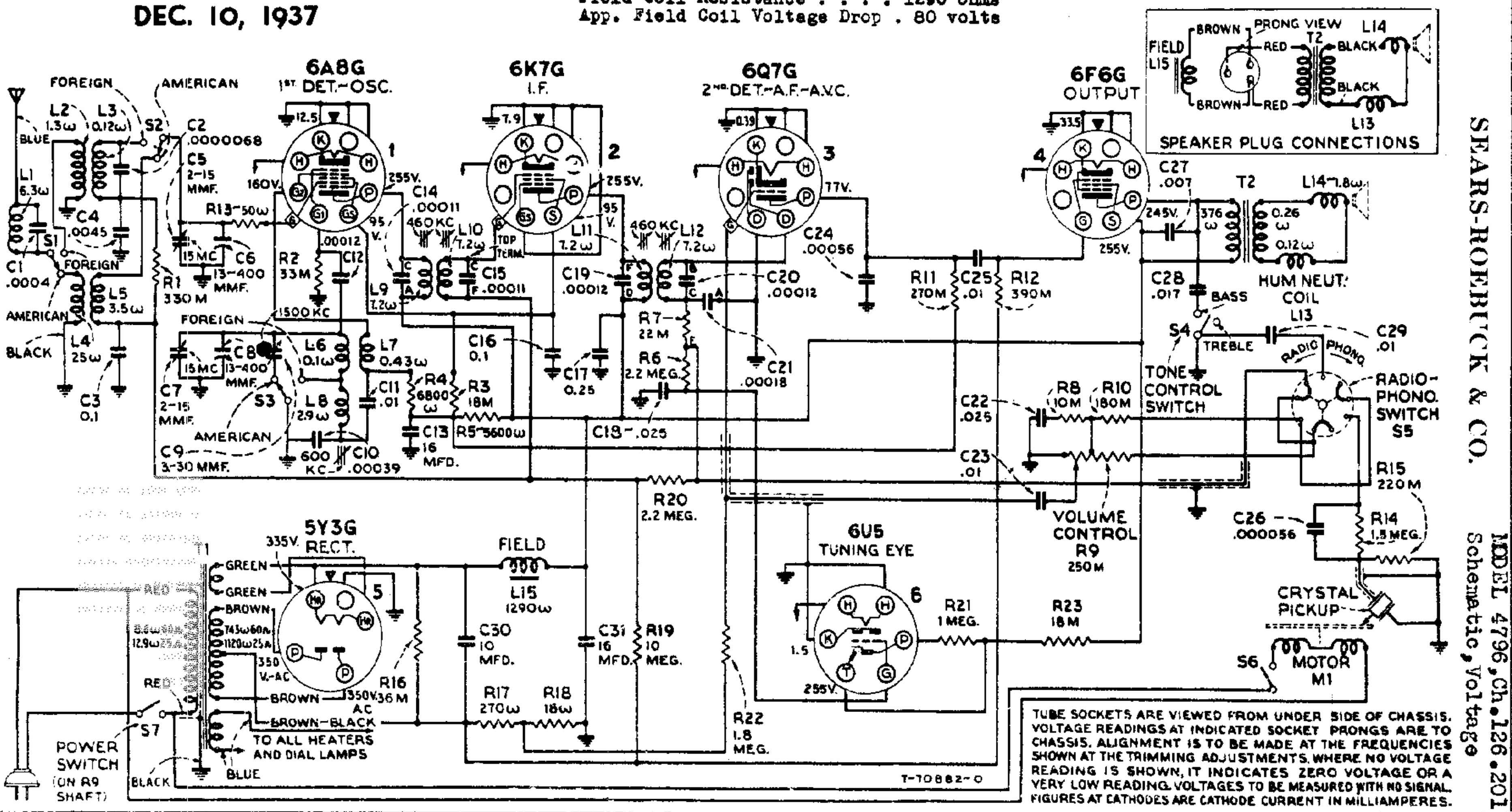
POWER OUTPUT:
- Type . . . . Pentode
- Undistorted . . . . 2.5 watts
- Maximum . . . . 4.5 watts

LOUDSPEAKER:
- Type . . . . Electrodynamic
- Size . . . . 12 inches
- V.C. Impedance 2.25 ohms at 400 cycles
- Field Coil Resistance . . . . 1290 ohms
- App. Field Coil Voltage Drop . 80 volts

OPERATING FEATURES:
- Phonograph-Radio operation
- Automatic Phonograph Mechanism with self-starting, governor-type motor
- Two-point Tone Control
- Automatic Volume Control

PHONOGRAPH:
- Type . . . . Automatic-Manual
- Record Capacity . . . . . Eight 10-inch
- Turntable Speed . . . . 78 R.P.M.
- Type of Pickup . . . . Crystal
- Pickup Impedance . . . 75,000 ohms at 1000 cycles

DEC. 10, 1937



MODEL 4796, Ch. 126.201
Alignment, Data

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across speaker voice coil

Output meter reading to indicate 1.0 watt output . . . . 1.5 volts

Approximate average sensitivity in microvolts for 1.0 watt output . . . . . See chart below

Dummy antenna value to be inserted in series with generator output . . . . . See chart below

Connection of generator output lead . . . . See chart below

Connection of generator ground lead . . . . To chassis

Generator modulation . . . . 30%, 400 cycles

Position of Radio-Phono. switch . . . . Counter-clockwise

Position of Volume Control . . . . Fully clockwise

Position of Tone Control . . . . Fully clockwise

Position of Dial Pointer with variable tuning condenser fully closed . . . . To fall on last calibration mark at 540 Kc end of "American" band.

WAVE-BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	No signal 550-750 kc	460 kc	.001 mfd.	6K7-G Grid	L11,L12	2nd I-F Trans.	15,000
"AM"	No signal 550-750 kc	460 kc	.001 mfd.	6A8-G Grid	L9,L10	1st I-F Trans.	200
"FOR"	15 mc	15 mc	300 ohms	Ant. Lead (blue)	C7**	"FOR" Osc.	-
"FOR"	15 mc (rock)	15 mc	300 ohms	Ant. Lead (blue)	C5*	"FOR" Det.	50
"AM"	1500 kc (rock)	1500 kc	.0002 mfd.	Ant. Lead (blue)	C9	"AM" Osc.	-
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Lead (blue)	L8	"AM" Osc.	89
"AM"	1500 kc (rock)	1500 kc	.0002 mfd.	Ant. Lead (blue)	C9	"AM" Osc.	97

IMPORTANT ALIGNMENT NOTES

**Use maximum capacity peak if two peaks can be obtained.

*Use minimum capacity peak if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the a-v-c action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment in any other band. Grid cap leads should remain in place during alignment.

Values shown under, "Microvolts," are only approximate.

CHASSIS FEATURES:
No. I-F stages . . . . One
Antenna . . . . Doublet or Conventional
Tuning Eye
Line Noise Electrostatic Transformer Shield

Aural-Compensated Radio and Phonograph Volume Control
Fixed Wave-Trap
Magnetite-Core Adjusted IF Transformers and "American" Band Low-Frequency Oscillator Tracking

GENERAL INFORMATION AND SERVICE HINTS

ELIMINATING WHISTLE AT 920 KC:

A whistle due to a beat between the second harmonic (920 kc) of the 460 kc I.F., and a 920 kc signal may be experienced. In localities where the 920 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the I-F frequency of the receiver.

Determine at what point between 890 kc and 950 kc the whistle will be least objectionable. Dividing this frequency by two will give the new I-F frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 905 kc would not be objectionable, the I.F. should be re-aligned at 905/2 or 452.5 kc. Try to select the new I-F frequency as close as possible to 460 kc.

An interfering whistle may also be caused by two stations having a frequency difference equal to the I-F frequency (460 kc) of the receiver and will be evidenced by a whistle appearing when the receiver is tuned to either of the stations. It may be further localized by tuning the receiver to each of these stations and then stopping the oscillator in each case, by grounding the oscillator stator section of the variable tuning condenser C8 to chassis. If the whistle, in each case, still persists, it is being caused by the beat between these two stations and may be corrected by shifting the I-F frequency, of the receiver, to a frequency other than the difference frequency of the two local or strong signals (stations).

The I-F amplifier should not be shifted to a frequency higher than 475 kc, nor lower than 445 kc, but should be as close to 460 kc as possible.

Align the I.F. at the new frequency and then re-align the rest of the receiver as described under "ALIGNMENT PROCEDURE."

AUTOMATIC RECORD MECHANISM:

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated in this booklet.

It is important, when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and broken parts may result. Application of oil to the felt pad which rubs against the motor governor disc will insure smooth operation.

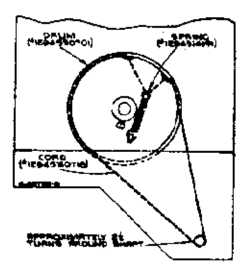
CAUTION.--Do not leave records stacked on record-holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

LOUDSPEAKER:

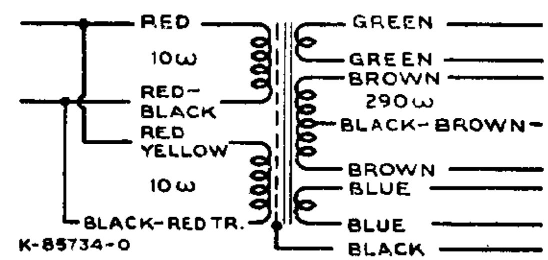
Centering of the loudspeaker is made in the usual manner with three, narrow-paper feelers, after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

DIAL POINTER AND CONDENSER DRIVE HOOK-UP:

The drive hook-up for the dial pointer and the variable condenser is illustrated.



DIAL DRIVE HOOKUP

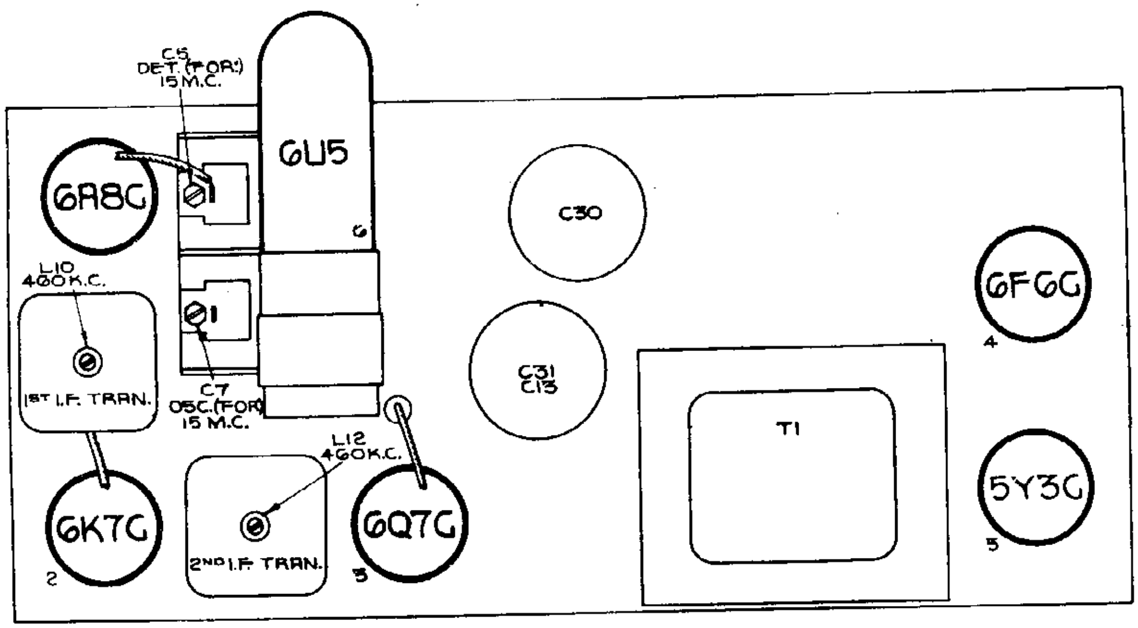


CONNECTIONS FOR 110 VOLT, 60 CYCLE REPLACEMENT POWER TRANSFORMER (1261030607)

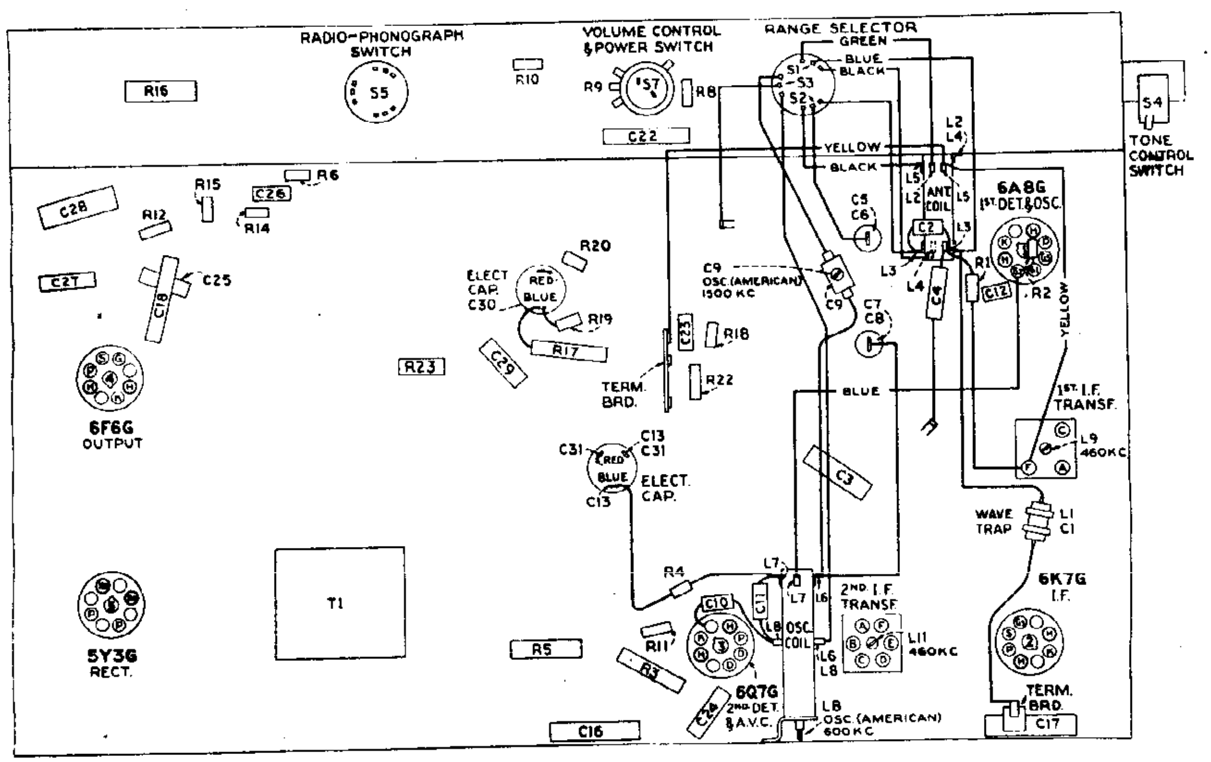
SEARS-ROEBUCK & CO.

MODEL 4796, Ch. 126.201
Socket, Trimmers
Chassis

OPERATING CONTROLS:	CONTROL OPERATION:
RADIO PANEL:	
1. Left knob . . "Radio-Phono." Switch	Turning right: Radio; Phonograph
2. Next to left knob . "On-Off" Switch and Volume	Turning right: Power on; Volume Increase
3. Center knob . . . Wave-Band Switch	Turning right: "American," "Foreign"
4. Next to right knob . . . . Tuning	Tuning ratio: 10 to 1
5. Right knob . . . . . Tone Control	Turning right: Bass, Treble
PHONO. COMPARTMENT:	
6. Turntable Switch	Toggle: Phono. Motor "On-Off"
7. Index Lever	Front 10" Automatic or Manual Operation Rear . . . . . . 12" Manual Operation
8. Record Ejector	Pushing to Left Rejects When "Index Lever" is in 10" Position



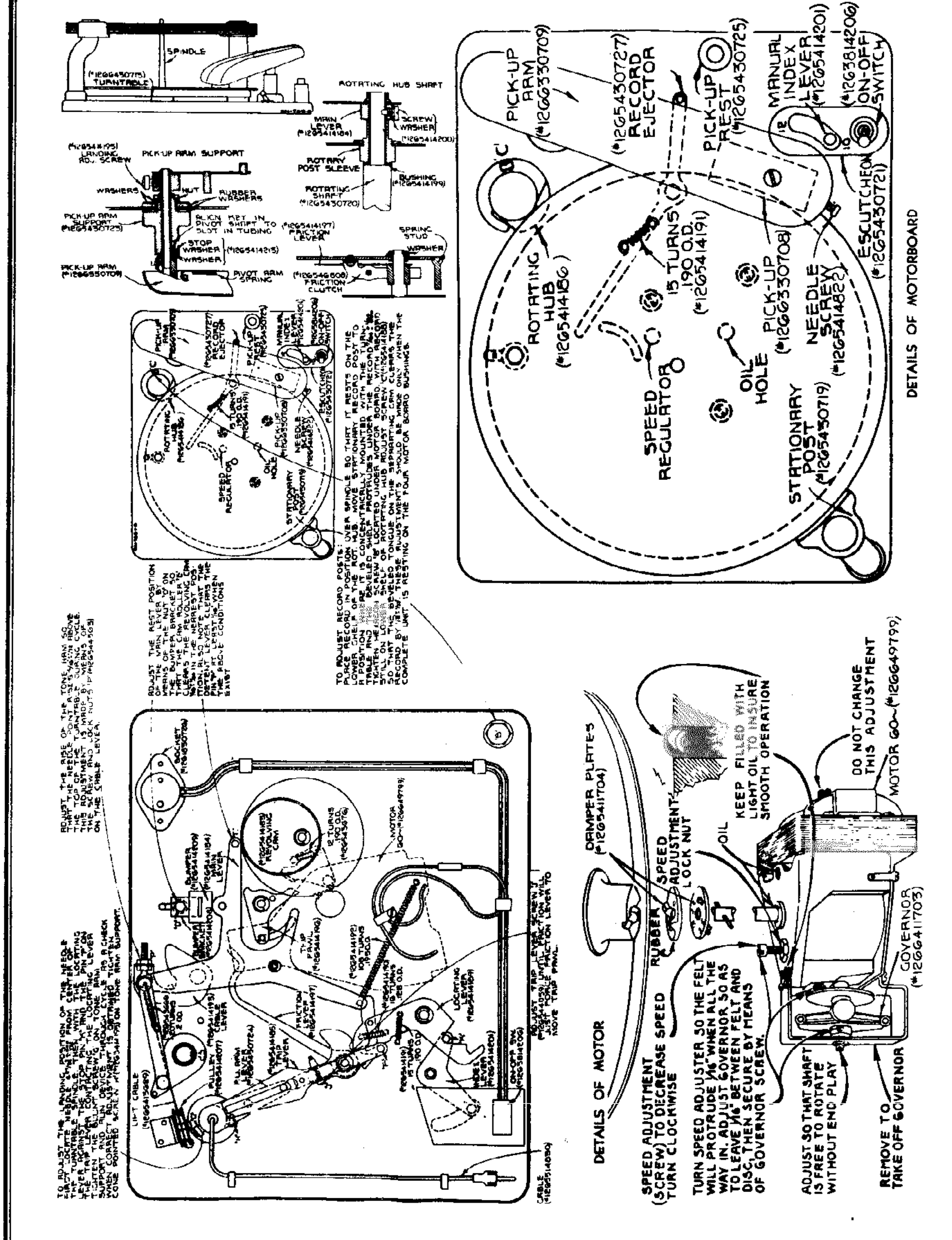
LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS TOP OF CHASSIS



LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS BOTTOM OF CHASSIS

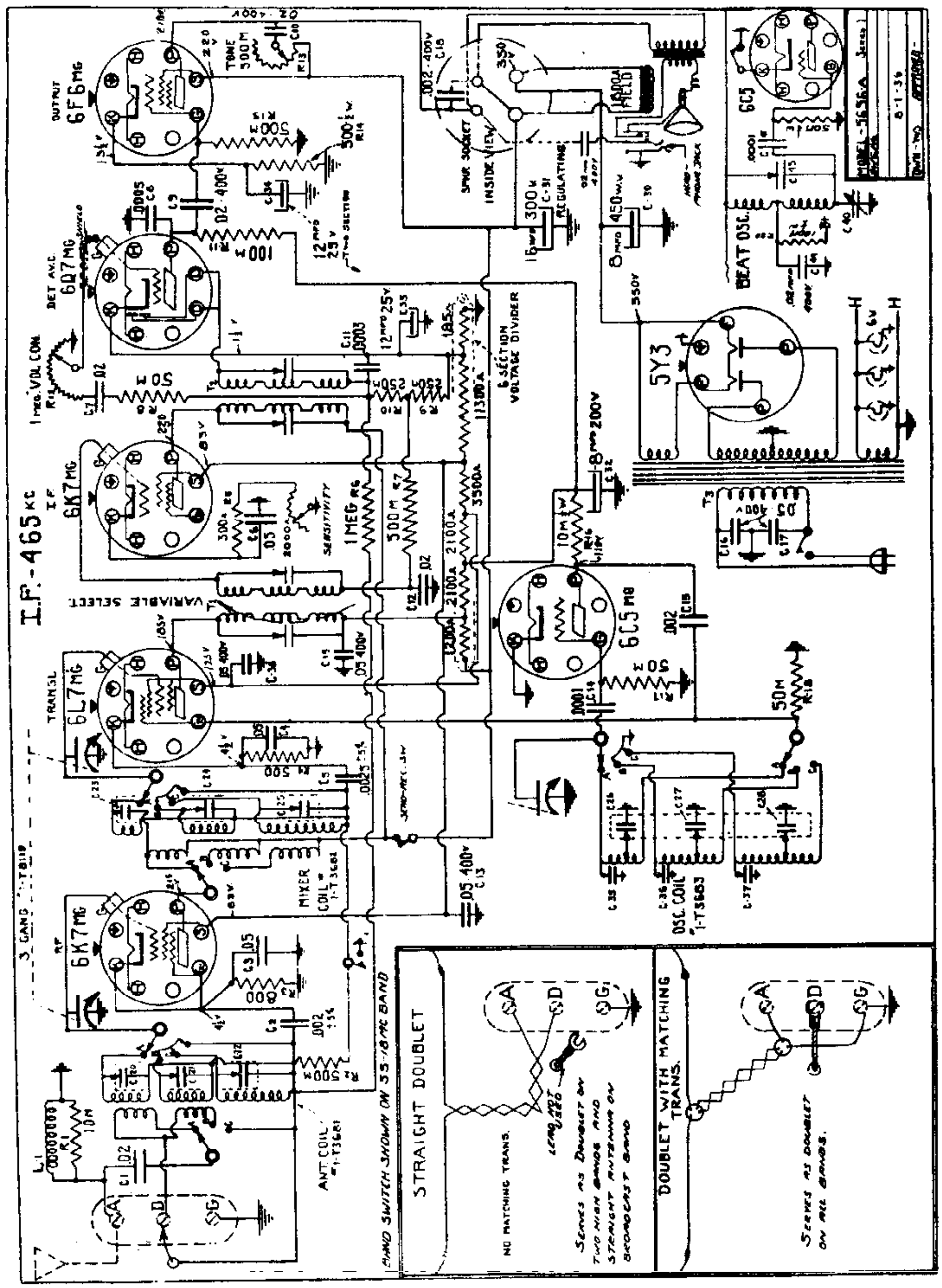
MODEL 4796, Ch. 126.201
Phono. Wiring, Details

SEARS-ROEBUCK & CO.



MODEL 5656A
Schematic, Voltage

SEARS-ROEBUCK & CO.



USE ONLY WITH ALTERNATING CURRENT

UNLESS OTHERWISE SPECIFIED ON BACK OF CHASSIS, THIS RECEIVER IS FOR USE WITH 105 TO 120 VOLT ALTERNATING CURRENT, ONLY.

MODEL 5731
Moto-Matic Tuner
Part 128.15600

SEARS-ROEBUCK & CO.

For MODELS 6000,6001
Ch.101.495X,101.496X
MODELS 6100,6101
Ch.101.495,101.496
Details,Schematics,Data

ELECTRICAL SPECIFICATIONS

Power Supply . . . . 5 to 8 volts D.C. Starting current . . 6 amps. for 1 second
No current used while at rest Returning current. . 5 amps.for 2 seconds

GENERAL INFORMATION AND SERVICE HINTS

MOUNTING MOTO-MATIC TUNER:

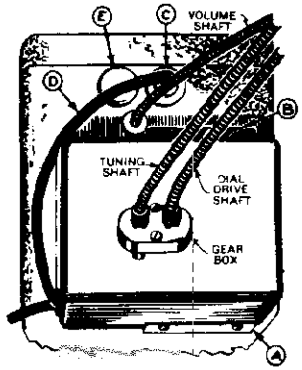


FIG. 1

Fasten mounting brackets A and B to receiver with four #8-32 machine screws and lockwashers.

Determine the angular position of key in variable condenser drive fitting that is located directly under the tuning cable opening in the radio case. Lower Moto-matic tuner into place between mounting brackets and rotate shaft on Moto-matic tuner so that slot has the same angular position as the key on variable condenser drive fitting. When lowered all the way into place no play should exist between key on variable condenser drive fitting and the slot on Moto-matic shaft. This is very important, and if there is play it should be corrected by lightly pinching together the slot on Moto-matic shaft.

Fasten tuner with four #8-32 machine screws and lockwashers. Remove plug button C as shown in Fig. 1 and plug in power lead.

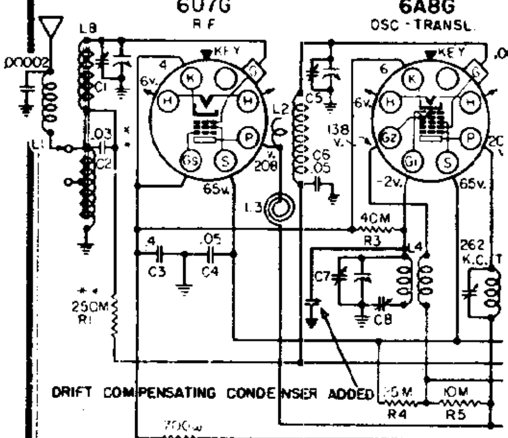
NOTE: Check worm gear on the gang condenser for slippage of the clutch which is provided, as this will cause the tuner to tune inaccurately. This gear should not slip except when the condenser plates are all the way open or all the way closed when the worm is rotated in the direction to open or close the plates.

SUBJECT: ADDITION OF A DRIFT COMPENSATING CONDENSER TO MAINTAIN ACCURACY OF STATION TUNING.

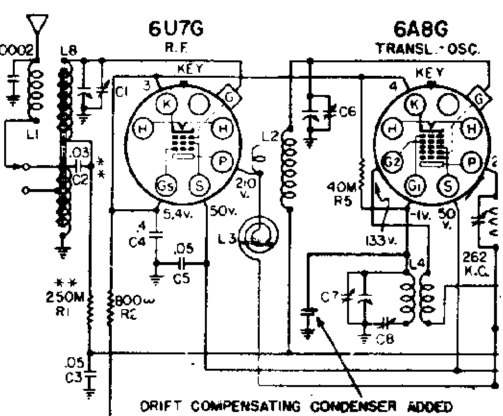
A drift compensating condenser, to eliminate frequency drift of the receiver as it warms up, is available from source 101. This condenser is connected across the oscillator trimmer as shown by the Schematic sections in this Supplement.

AUGUST 25, 1938

CHASSIS 101.496 & 101.496X



CHASSIS 101.495 & 101.495X



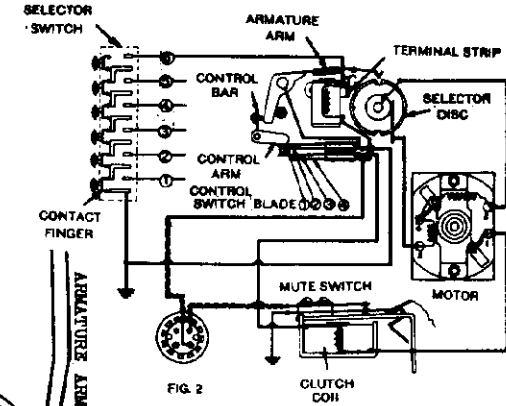


FIG. 2

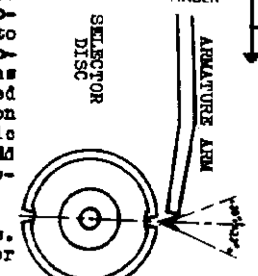


FIG. 6

ANGULAR ADJUSTMENT
OF THE ARMATURE ARM "V":

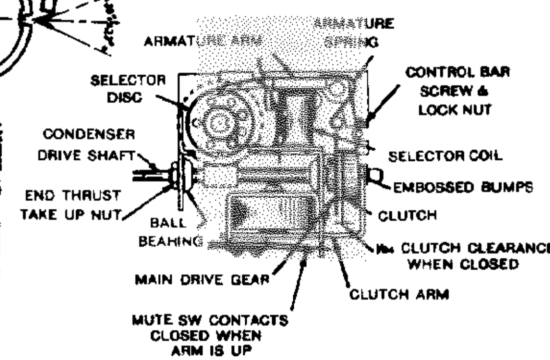


FIG. 4

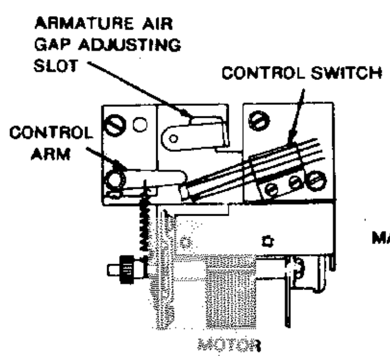


FIG. 5

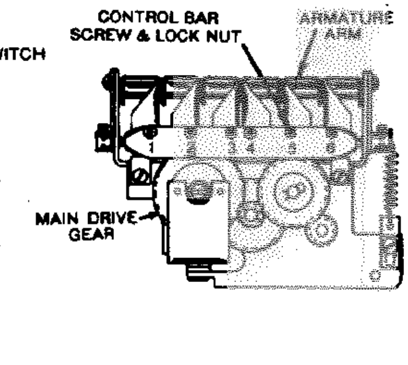


FIG. 3

ALIGNING MOTO-MATIC WITH RECEIVER:

Gear box and flexible drive shaft and dial drive shaft can be placed into the tuner temporarily so that the receiver and tuner can be aligned on the bench. Turn the free end of the flexible drive shaft clockwise until a stop is felt. Rotate in opposite direction until a stop is felt. Turn clockwise again so that the stop is again felt. This will cause the worm gear on the gang condenser to slip at the end which is short on travel and automatically correct itself after rotating as specified above. It is best to have the top cover off the receiver while doing this to ascertain that the condenser goes through 180 degrees when the shaft is rotated eight complete turns.

HOW TO SET UP STATIONS:

To set button for a certain station, have the receiver in operation and hold down button until tuner stops running. Now tune in the desired station manually, continuing to hold button down until station comes in accurately. Release button and this station is set to this particular button. After station is once set up it is not necessary to hold button down to tune automatically; only a momentary push is required. Mechanism will go through the complete operating cycle when once started. To set the other five buttons repeat for each button as outlined above.

HOW THE TUNER OPERATES:

The Moto-Matic tuner is a mechanical electro device actuated by an electric motor to speedily and accurately tune an automobile radio receiver. This device functions in the following manner:

ADJUSTMENT OF CONTROL SWITCH:

CAUTION: Do not adjust control switch unless accuracy adjustment of control bar (see instructions above) has failed to produce correct operation of the unit.

The purpose of the control switch is to open the circuit to the motor magnetic clutch and selector coils when the armature arm falls down into the slot of the selector disc. Opening of this circuit is used when setting up a selector disc to a station by the fact that the armature arm is down in the "V" slot. This holds the selector disc stationary while the shaft slips when tuning manually for a station setting.

The timing of the control switch is adjusted individually for each armature arm by screwing in or out the control bar adjustment screw as outlined under "Accuracy Adjustment of Control Bar". With the unit connected to 6 volts depress the selector switch button and hold down until motor stops running. With selector switch button held down, the armature arm should be at rest at the bottom of the "V" of selector disc. (See Figs. 4 & 5). The control arm (Fig. 2) should lift just high enough (.020") to open control switch contacts. If contacts do not open when the armature arm falls in slot it will be necessary to screw in the control bar adjustment screw. When adjusted properly the control switch will open when armature arm falls in slot and will not open when armature arm comes down on the edge of selector disc. If this adjustment is made improperly so that the armature arm just drops slightly into the selector disc slot, the unit will not tune accurately, due to the fact that armature arm will not hold down long enough. It is important that the armature arm falls practically all the way into the "V" slot of the selector disc before the control switch opens in order to obtain maximum accuracy.

To check switch operation disconnect power source. By hand press down the armature arm against the edge of the selector disc. (Be sure you have rotated each selector disc to a position away from the slot). Check each armature arm. The switch should not open nor should the fibre control arm move, as this would decrease contact pressure. If the control arm moves or the switch opens, readjust that particular control bar adjustment screw until there is no motion when the armature arm is riding on the edge of the selector disc. Now rotate selector disc until armature arm drops into the slot without play in the selector disc slot when rotated slightly. Now both switch contacts should open with about .020" clearance between points.

If you are troubled with rocking or bucking when making the initial accuracy adjustment, check for the parallel movement or opening of the control switch. By moving the fibre control arm (see Fig. 5) by hand so the control switch contacts open, make certain that they open and close simultaneously

By referring to Fig. 2 it may be seen that the #2 blade controls the selector coil, the #4 blade the motor and magnetic clutch. It is desirable to give the #2 blade a very slight lead in opening over the #4 blade. Adjustment can be made with a pair of long nose pliers, being sure to bend only the #2 or #4 blade. Never adjust the #1 or #3 blade, as these must always move parallel to each other.

When a selector switch button is depressed the contact finger opens the common circuit to the other buttons and closes the circuit to the selector coil, which pulls down the armature arm and closes the contact to the terminal strip. (See Fig. 2). The contact holds the selector coil circuit closed so that when pressure on the button of the selector switch is released the cycle will complete itself, the armature being held down on the selector disc which completes the circuit to one of the fields of the motor and through the clutch coil. The half of selector disc that is common to the shaft causes the motor to rotate in a clockwise direction, viewing the motor from the pinion end. The other half of the selector disc will give counter clockwise rotation. Through the reduction gearing the selector disc shaft is driven in the direction of whichever half of the selector disc the armature arm makes contact with. The selector shaft rotates until the formed end of armature arm falls into the "V" groove on the selector disc. This moves the control bar and control arm which opens the control switch. The control switch opens the motor and clutch coil circuits, and immediately resets for the next selection. The Motomatic drive shaft has revolved to the proper point which rotated the gang condenser to the angular position of the station setting. When setting a selector disc to a station the formed end of the armature arm is held down into the "V" groove of the selector disc by holding a selector switch button down, which holds the armature down in the "V" slot of the selector disc, although the control switch is open. This keeps the motor from running and the clutch from closing while manually tuning to set up a station on any button.

ACCURACY ADJUSTMENT OF CONTROL BAR ADJUSTING SCREWS FULLY MOUNTED IN CAR OR ON BENCH

Improvement of accuracy is sometimes necessary after installation due to additional springy torque load added by the control head cables, which are sometimes laid in an "S" bend to make a satisfactory mounting in the car. These complicated cable bends must be avoided as much as possible for good accuracy. A complete kit of adjusting tools is provided for this work and consists of the following:

1 - Double end socket wrench in combination with screw driver.
1 - Dummy cover with opening for access to accuracy adjusting screws and bushing for holding cable in place.
1 - .004 x 3/8 x 6 shim for adjusting armature and selector coil clearance gap. See parts list for ordering this material.

It is suggested that a complete assembly and accuracy check be made on the bench approximating the cable bends as they would be in the car. The check should not be made until the set has warmed up for about 20 to 30 minutes.

(1) Remove cover of Moto-matic unit, the side which is away from the radio. Two small screws at each end are to be removed and the cover will pry off easily.

(2) Replace with dummy cover and connect control head to bushing and lay cables as they would be in the car installation.

Before making any accuracy adjustments determine by trial whether or not the inaccuracy is being caused by the tuning control cables. If there are severe bends in the cables there will be a certain amount of spring that will tend to detune the station after an automatic selection has been made. Make sure that the complete installation is made with as few bends in the control cables as possible. If necessary shorten the tuning cables rather than having them kinked or pushed into small clearances.

After you have eliminated the possibility of inaccuracy due to the above, the following procedure should be followed closely:

(3) Set up a station at 1000 KC or higher, using one distantly located, or use your oscillator with low input. Hold down the station button which is set up and use the double-ended adjusting wrench with screw driver insert. Place over adjusting screw and locknut on the control bar. (The proper screw can be found by pressing the selector switch button several times and noting which armature moves. (See Fig. 3 for location with respect to switch.) DO NOT APPLY ANY PRESSURE TO CONTROL BAR ADJUSTING SCREW WHILE MAKING THE FOLLOWING ADJUSTMENT. Back off the adjusting screw very slowly 1/4 turn or more, while holding down the button, (a rubber band around the selector switch will serve to hold down the button to which the adjustment is being made) until the clutch pulls up with a click. (See Fig. 1). Now turn back or to the right until clutch drops back or open. Turn further to the right about 1/8 turn.

Lock up locknut; holding screw steady to prevent further turning. Remove rubber band. Make tuning check by rotating manually the condenser a short distance from resonance on both sides of the signal. In each case push the button setup for adjustment and check for accuracy by listening to quality of signal received, or use an output meter if signal generator is used.

Repeat for the rest of the buttons, using the same frequency setting.

If unit rocks back and forth while making the above adjustments it is due to one or two reasons. First - it is necessary that the control switch operates as outlined in the paragraphs under "Adjustment of Control Switch". Second - the armature arm must not strike the pole piece of the control magnet before it falls entirely into the "V" of the selector disc. The correction for this difficulty is also outlined in the paragraphs under "Adjustment of Control Switch".

Inaccuracy in station selection or inability to make accuracy adjustments due to rocking while making these adjustments will exist if the armature arm will not allow the "V" end to seat properly in the selector disc slot. This is caused by the armature pad striking against the coil core. For the correction of this use the following method:

You will find a small rectangular slot directly in line with the selector coil pole tops at the end of the frame. (See Fig. 5). This opening is used for checking air gap clearance to the armature pad and pole face. The minimum distance is .0035", maximum .0075", and must be checked by using a shim .004" thick which can be cut from a sheet of brass or bronze 3/8" wide x 6" long, furnished in the kit. Any greater gap than .0075" will cause setting up troubles at a low voltage of 5 volts at the battery.

If the armature does not fall entirely into the "V" slot of the selector disc when the .004 shim is inserted between armature pads and pole pieces, bend the armature at the point marked "X" (Fig. 4) until armature "V" seats properly all the way into "V" slot of selector disc.

The 5 volt check for setting up stations checks the ability of the armature arm to hold into the slot. To make this check connect a 6 volt battery charger with an output of 10 amperes or more that is adjustable up to 10 amperes. Connect two cells (4 volts) and allow charger to raise the voltage to 5 volts. Connect a volt meter across battery terminals and make this test when voltage is at 5 volts while the selector button is held down. The armature arm should not slip out during this test while setting up a station. This also checks that you have the proper gap between armature pad and core face of selector coil.

MODEL 5731
Moto-Matic Tuner
Part 128.15600

SEARS-ROEBUCK & CO.

Adjustments, Part 2
Parts List

TENSION ADJUSTMENT OF SELECTOR DISCS:

On one end of the selector disc cam shaft will be found two 3/8" nuts that determine the tension of the selector discs. These are permanently adjusted at the factory and should not require any attention. If readjustment is necessary, loosen the locknut. Tighten or loosen, whichever is necessary, the adjustment nut until the armature arm will hold and turn the selector disc when the selector coil is energized by 5 volts. Tighten the lock nut. The purpose of this adjustment is to keep the selector disc as tight as possible and still loose enough so that the armature arm will not be forced out of the "V" slot when setting up a station.

Angular Adjustment of the Armature Arm "V":-

The angular position of the sides of the "V" of the armature arm is correct when the angle of each side is the same with respect to the radius of the selector disc. (See Fig. 6). Too much angle will cause a slipping out of the armature arm when setting up a station. Under certain conditions not enough angle will cause the armature arm to stick. Any adjustments to the angles of the armature arm "V" should be made carefully with a pair of long nose pliers. Sticking armature arms may be caused by a burr on the face of the armature arm "V" that is cut into the metal by the edge of the groove of the selector disc slot. This burr may be removed by carefully filing this surface with a fine file.

IMPROPER ALIGNMENT OF CONDENSER DRIVE SHAFT WITH WORM DRIVE FITTING ON VARIABLE CONDENSER:

On earlier production the mounting bracket holes were too small to allow for production variations. If trouble is experienced with the mounting of the unit to the receiver case or it is found necessary to center the condenser drive shaft with respect to the worm drive fitting, re-drill the mounting holes of the brackets with a 3/16" drill.

Remove the cover of the receiver and mount the motomatic tuner making sure the condenser drive shaft is centered in the worm drive fitting on the variable condenser.

MAGNETIC CLUTCH ARM ADJUSTMENT:

There may be an occasional complaint or observation of a chattering or skipping of the Motomatic tuner clutch when under full load. This is caused by the engaging pins not being engaged deep enough into the main driving gear. Press the clutch down by hand over the top of the coil and note if the clearance of 1/64" exists from clutch flange to clutch face proper. (See Fig. 1). If gap is greater remove clutch arm and bend angle closer to clutch outside face. This arm is made of soft annealed steel and bends easily. Replace and check; several trials may be necessary.

After making magnetic clutch adjustments it may be necessary to readjust the stop located above clutch so that clutch motion from the engaged position to the disengaged position can be held at a minimum. NOTE: When clutch is disengaged it is important that the clutch pins do not drag when tuning manually.

Sticking open of clutch when a button is depressed may be caused by many misadjustments. First - the clutch arm may be warped during the process of bending so that the embossed bumps do not ride on the outside edge of the clutch face. Correct this by rebending clutch arm. Second - it is imperative that both embossed bumps on the underside of the clutch arm apply an equal pressure to the clutch face while engaging clutch. Check this by depressing clutch arm and measuring a predetermined clearance with the .004" shim supplied with kit. In other words compare the spacing of the embossed bumps from the clutch face. Correct any differences by bending slightly the forked section of the clutch arm.

SELECTOR SWITCH:

Failure of tuner to operate may lie in the selector switch. Remove back plate and place jumper wire from the first terminal on the end where lead enters switch case to the red wire terminal. This should cause tuner to operate on #1 button. Now repeat, going to the red to blue, blue to brown, etc. wire terminals. Each one of these should operate an armature arm. Doing this will give a check as to whether the contact finger from the preceding button is making contact when button is out. See schematic wiring diagram. If tuner operates in this manner the individual contact fingers are not making contact when button is depressed. Remedies for the above are as follows:

First - it may be necessary to bend contact fingers so that good connection is made. Second - The selector switch case may be bulged in the center. This can be corrected by placing a strap across both sides.

The selector switch plunger back up plate may become loosened, in which case it will be necessary to push back in place and put a wood wedge between this plate and switch case.

CONDENSER DRIVE SHAFT END PLAY:

The condenser drive shaft (Fig. 4) should not have any lateral or axial play. If some does exist, it can be taken out by bending back the end play adjusting nut lockwasher tabs and taking up on the nut until no play is felt and no additional torque required to turn shaft.

HOW TO ORDER PARTS FOR THIS MOTO-MATIC TUNER - IDENTIFICATION NUMBER 128.15600

1. Use Purchase Order Form 5284.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER and DESCRIPTION for each part ordered, as given in this parts list, regardless of number printed on part itself. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) The IDENTIFICATION NUMBER, which is 128.15600. This number is found inside the top cover of the unit.

Authorized Replacement Parts for this model may be obtained from any Sears, Roebuck and Co. Retail Store or Mail Order branch. Always give part numbers and the chassis identification number.

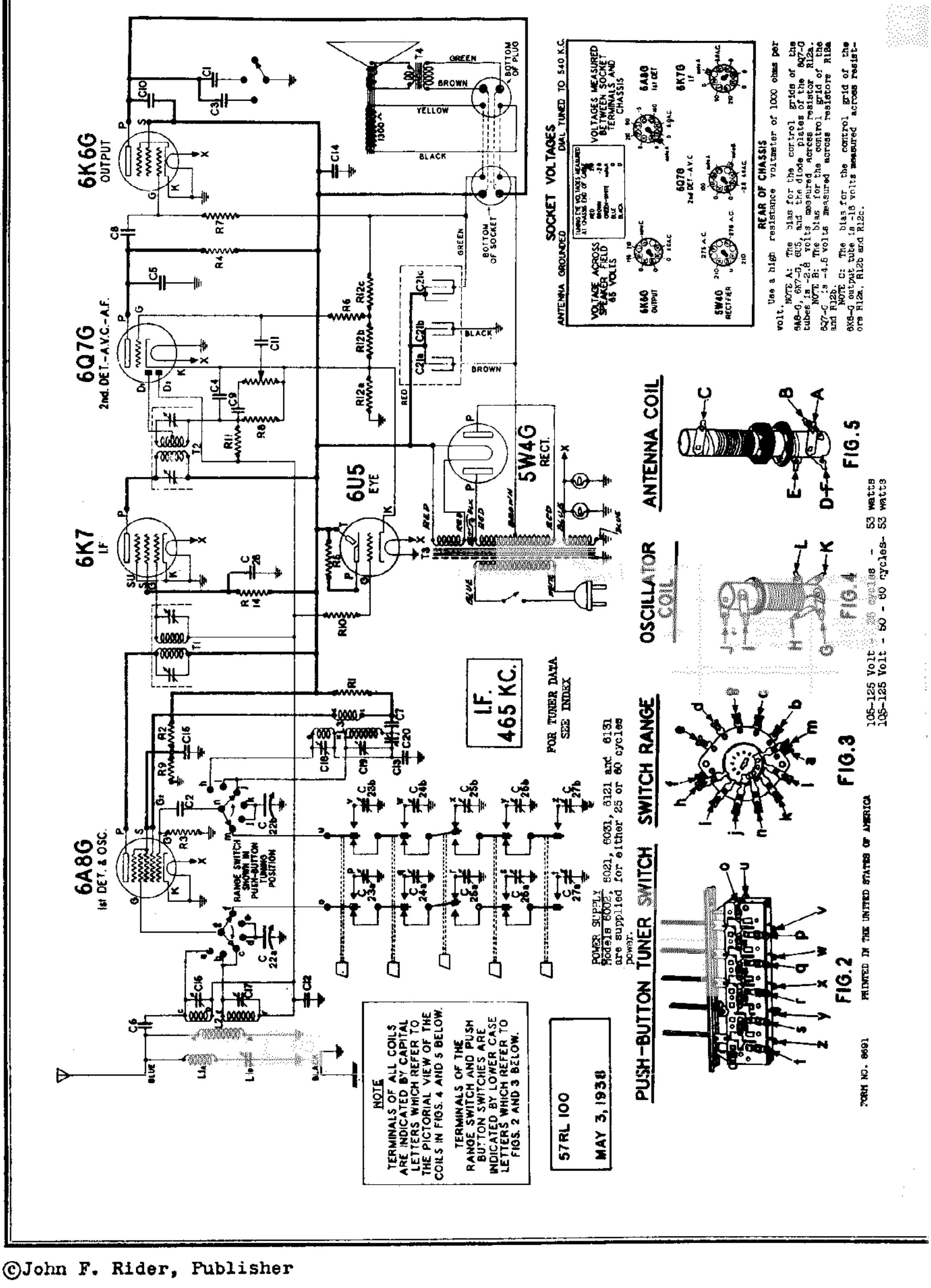
PARTS LIST-SOURCE NO. 128

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
A	12815252	Armature Shaft	.10
	12815427	Armature Shaft Bearing	.06
A1	12815543	Armature Stop Shaft	.05
A2	12815549	Armature Arm R.H.	.25
A2	12815695	Armature Arm L.H.	.25
	12815560	Armature Spring	5 for .05
	12815428	Case Mounting Bracket (Large)	.20
	12815429	Case Mounting Bracket (Small)	.18
	12815236	Clutch Coil	.65
C2	12815612	Clutch Pivot Bracket	.11
	12815412	Clutch Sleeve and Pin Assembly	.43
	12815250	Clutch Throwout Spring	.02
	12815333	Control Switch	.81
C3	12815940	Control Bar Screw	3 for .05
	12815799	Control Bar Nut	3 for .05
C1	12815370	Control Bar	.07
	12815420	Control Bar Collar	.11
	12815497	Control Arm Tension Spring Adjusting Bracket	.06
C	12815580	Control Arm and Bushing Assembly	.20
	12815544	Control Arm Tension Spring	.05
	12815263	Cover (Set Side)	.21
	12815582	Cover and Bushing Assembly (Tuning Side)	.47
	12815555	Intermediate Gear Assembly	.50
	12815648	Intermediate Idler Gear Retainer Spring (2 required)	.06
	12815552	Motor and Pinion Assembly	6.25
	12815426	Motor Pinion	.23
	12815576	Muting Switch	.40
	12815577	Mounting Bracket, Worm Shaft, Worm and Idler Assembly	4.20
	12815471	Power Lead and Plug Assembly	.87
	12815592	Selector Switch and Lead Assembly	4.00
	12815602	Selector Switch Back Cover	.06
	12815839	Selector Switch Steering Column Strap (2 required)	.10
	12815606	Selector Switch Mounting Bracket (2 Required)	.09
	12815609	Selector Switch Oval Head Mounting Screw (2 Required)	.15
	12815608	Selector Switch Plunger and Contact Finger Assembly	.17
	12815256	Selector Switch Push Button	.07
	12815853	Selector Switch Lead	.94
	12815260	Selector Switch Plunger Spring	3for .05
	12815264	Selector Switch Case	.75
	12815495	Selector Coil Assembly Mounting Clip	.05
	12815303	Selector Coil Assembly (6)	2.50
	12815547	Selector Disc and Shaft Assembly	3.50
	12815559	Shaft Bearing and Stop Pin Assembly	.18
	12815615	Station Call Letter Tab Retaining Plate	.20
	12815585	Station Call Letter Tab Retaining Plate Screw (3 required)	.04
	12815616	Station Call Letter Tabs	.23
	12815796	Selector Coil Terminal Strip Assembly	.34
	12815797	Selector Coil Terminal Strip Clamping Lug	3 for .05
	12815367	Terminal Strip Stud	.07
	12815485	Terminal Strip Assembly	.36
	12815597	Terminal Strip Torque Spring	.10
	12816522	Moto-Matic Tuner Adjusting Kit (Order into stock at No Selling) - 85¢ each Cost.	

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SEARS-ROEBUCK & CO.

MODELS 6002,6021,6031
6121,6131.Ch.100.195
Schematic,Voltage



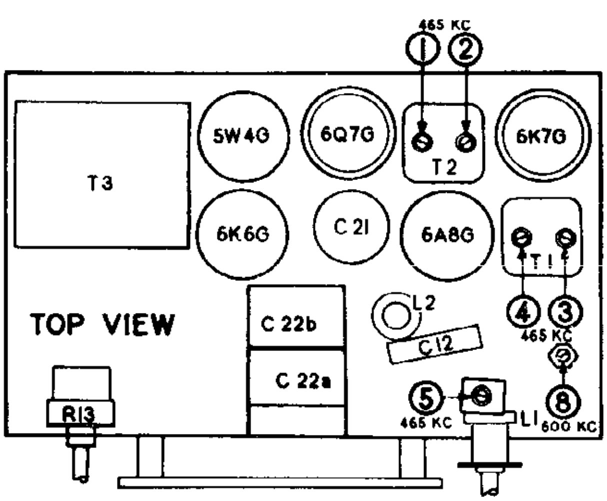
POWER OUTPUT
Type..Pentode
Undistorted...1.8 watts
Maximum...3.5 watts

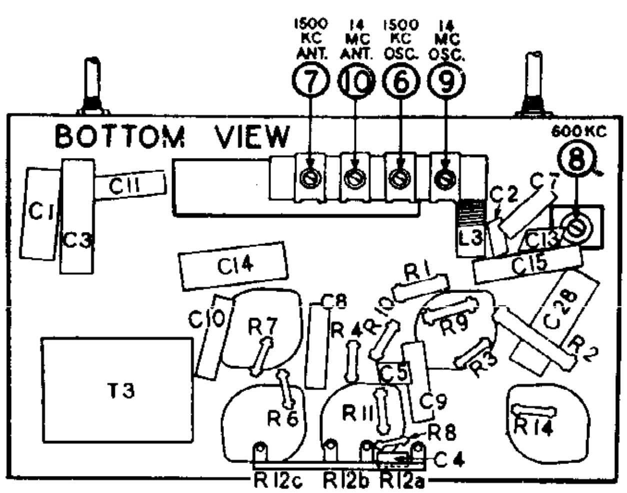
ALIGNMENT PROCEDURE

Before attempting to align the receiver check to see that the dial pointer is in a horizontal position when the gang condenser is in full mesh. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full mesh position.

Output meter connections--Across voice coil leads
Output meter reading to indicate 0.2 watt output----------------------------------0.835 volts
Average sensitivity in microvolts for 0.2 watt output----------------------------See chart below
Connection of Generator Ground---Receiver chassis
Dummy Antenna in series with Generator Output Lead-------------------------------See chart below
Connection of Generator Output Lead---See chart below
Generator modulation--30%, 400 cycles
Position of volume control--Maximum clockwise

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	SENSITIVITY MICRO-VOLTS	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	AMERICAN "AM" (Center)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2 3-4	2nd I.F. 1st I.F.	65	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	AMERICAN "AM" (Center)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	-	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	AMERICAN "AM" (Center)	1500 KC	6	"AMERICAN" OSCILLATOR (Shunt)	-	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	AMERICAN "AM" (Center)	TUNE TO 1500 KC GENERATOR SIGNAL	7	"AMERICAN" ANTENNA	40	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	600 KC	AMERICAN "AM" (Center)	TUNE TO 600 KC GENERATOR SIGNAL	8	"AMERICAN" OSCILLATOR (Series Pad)	30	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN "FOR" (Counter-clockwise)	14 MC	9	"FOREIGN" OSCILLATOR (Shunt)	-	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR RE-ALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN "FOR" (Counter-clockwise)	14 MC	10	"FOREIGN" ANTENNA	30	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.





SEARS-ROEBUCK & CO.

MODELS 6002,6021,6031
6121,6131.Ch.100.196
MODEL 6157 Ch.100.198
Parts Lists

Model 6157 Chassis 100.198

PARTS LIST-SOURCE NO. 100

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ELECTRICAL PARTS

Part Number	Schematic Location	Description	Selling Price Each
10031112796	L1	Coil - Wave trap (with trimmer)	$ .50
10028113295	L2	Coil - Antenna (broadcast)	1.20
10028113296	L3	Coil - R.F. (broadcast)	1.30
10028113297	L4	Coil - Oscillator (broadcast)	.48
10028113298	L5	Coil - Antenna (police)	.50
10028113301	L6	Coil - Antenna (short wave)	.52
10028113412	L7	Coil - Oscillator (police)	1.20
10028113607	L8	Coil - Oscillator (short wave)	.52
1001983539	C1-C2	Condenser - mica 260 mmfd.	.20
1001983783	C3-C4-C5	Condenser - mica, 110 mmf. (10%)	.20
1001985061	C6	Condenser - mica 51 mmfd.	.15
	C7	Condenser - paper .02 mfd. 400 volt	.25
	C8	Condenser - paper .004 mfd.400 volt	.25
	C9-C10	Condenser - paper .01 mfd. 400 volt	.25
	C11-C12 C13	Condenser - paper .05 mfd. 200 volt	.25
	C14	Condenser - paper .1 mfd. 300 volt	.25
	C15-C16	Condenser - paper .1 mfd. 400 volt	.25
	C17	Condenser - paper .004 mfd.750 volt	.24
1002069937	C18	Condenser - elect. 30 mfd. 460 volt	1.60
10020110377	C19	Condenser - elect. 10 mfd. 35 volt	.80
	C20-C21 C22	Condenser - paper .05 mfd. 400 volt	.13
10019112426	C23	Condenser - mica 1650 mmfd. (3%)	.30
10019112427	C24	Condenser - mica 4050 mmfd. (3%)	.40
10020113261	C25	Condenser - elect. 30 mfd. 450 volt	1.40
10017113319	C26-C27 C28	Condenser - trimmer - 3 section	.54
10017113320	C29-C30 C31	Condenser - trimmer - 3 section	.54
10017113346	C32	Condenser - padding	.38
10016114650	C33-C34 C35	Condenser - variable gang	5.95
10017114697	C36 to C47	Trimmer condenser strip - for push buttons	2.98
1005465321		Connector - Ground	.01
10049110629		Lamp - 6.3 volt - .25 amps.	.15
	R1-R2 R3-R4	Resistor - carb. 47,000 ohms ¼ W.	.12
	R5-R6-R7 R8-R9-R10	Resistor - carb. 220,000 ohms ¼ W.	.12
	R11-R12	Resistor - carb. 1 meg. 1/4 watt	.12
	R13	Resistor - carb. 4700 ohm 1/4 watt	.12
	R14	Resistor - carb. 470,000 ohms ¼ W.	.12
	R15	Resistor - carb. 100,000 ohms ¼ W.	.12
	R16	Resistor - carb. 15,000 ohms 1 watt	.15
	R17	Resistor - carb. 4700 ohms ¼ W.(10%)	.12
	R18	Resistor - carb. 2200 ohms 1/4 watt	.12
10023110596	R19	Resistor - carb. 15000 ohms 3 watts	.25
	R20	Resistor - carb. 10,000 ohms 1 watt	.25
10023112956	R21	Resistor - carb. 220000 ohm ¼W.(10%)	.12
10023112992	R22	Resistor - carb. 39000 ohm ¼W.(10%)	.12
10021114662	R23-R24	Resistor - Bias Strip Section R23 - 240 ohms Section R24 - 35 ohms	.46
10024114651	R25	Volume control & off-on switch (1 megohm)	1.10
R-10058115037		Speaker - dynamic 10 inch	9.95
R-10057114733		Cone and voice coil for R-10058115 037 speaker)	2.76
10038114652		Switch - for push buttons	3.70
10038114141		Switch - radio phono (D.P.D.T.)	.44
10037114649		Range switch	2.10
10054111581		Terminal strip - phono	.13
10033114665	T1	Transformer - 1st I.F.	1.44
10034114667	T2	Transformer - 2nd I.F.	1.44
10013114663	T3	Transformer - output	1.96
10010114668	T4	Transformer - power 117 V. 60 C.	6.72
10011114758	T4	Transformer - power 117 V. 25 C.	9.98*

DIAL & MISCELLANEOUS PARTS

Part Number	Description	Selling Price Each
10054114728	Band Indicator Slide and strip	$ .30
10045114032	Bracket & Pulley Assembly - right hand	.34
10045114034	Bracket & Pulley Assembly - left hand	.34
10054113442	Bracket - for tuning eye	.16
10054113149	Button - for push button tuner	.08
10055114088	Cable & Plug - for tuning eye	.60
10053114360	Cap - for tube shield	.06
10045114042	Clamp - for dial scale	.10
10054112745	Clip - coil mounting (osc. & ant.)	.01
10054112798	Clip - for mtg. wave trap coil	.01
10054114031	Collar - for band switch shaft	.10
1005485321	Connector - ground	.01
10045113178	Cord - band indicator (28" required)(supplied in 4 ft. lengths)	.30
10054111302	Cord - dial drive 6 or 50 ft. lgths. Per Ft.	.05
10054111973	Cushion rubber rest for back of chassis	.06
10045114036	Dial mtg. plate	.45
10045114048	Dial pointer & slide	.20
10042114600	Dial Scale - glass	.84
10045113338	Drum - dial drive	.54
10044114623	Escutcheon - for dial	2.40
10044113135	Escutcheon - for eye	.25
10044114624	Escutcheon - around push buttons	1.28
10054113207	Gear - pinion on auxiliary range sw. shaft	.25
10054113347	Gear - on range switch shaft	.20
10039114727	Knob - for range switch	.19
10040114726	Knob - for tuning	.19
10040114725	Knob - for volume control	.19

Models 6002, 6021, 6031, 6121, 6131, Chassis 100.196

PARTS LIST-SOURCE NO. 100

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ELECTRICAL PARTS

Part Number	Schematic Location	Description	Selling Price Each
10031112796	$L1_a$-$L1_b$	Coil - Wave Trap (with trimmer)	$ .50
10028113011	L2	Coil - Ant.-broadcast & short-wave	1.20
10013113015	L3	Coil Assembly - oscillator	1.00
	C1	Condenser - paper .02 mfd. 600 volt	.35
1001985061	C2	Condenser - mica 51 mmfd.	.15
	C3	Condenser - paper .04 mfd. 600 volt	.35
1001983539	C4-C5	Condenser - mica 250 mmfd.	.20
1001985454	C6	Condenser - mica 11 mmf.	.15
	C7-C8-C9	Condenser - paper .01 mfd. 400 volt	.25
	C10	Condenser - Ceramic tube .006 mfd. 600 volt	.25
	C11-C12	Condenser - paper .05 mfd. 200 volt	.25
1001928587	C13	Condenser - mica .0042 mfd.	.35
	C14	Condenser - paper .1 mfd. 400 volt	.25
	C15	Condenser - paper .1 mfd. 200 volt	.25
10017112893	C16-C17 C18-C19	Condenser - trimmer (4 section)	.60
10017112799	C20	Condenser - padder (530 to 630 mmfd)	.36
10020112883	$C21_a$-$C21_b$ $C21_c$	Condenser - electrolytic (dry) (Section A - 8 mfd. - 400 volt) (Section B - 4 mfd. - 400 volt) (Section C - 4 mfd. - 400 volt)	1.80
10016112888	$C22_a$-$C22_b$	Condenser - variable gang	2.90
10017112890	$C23_a$-$C23_b$ $C24_a$-$C24_b$	Condenser - dual push button trimmer (1100 KC to 1700 KC)	.36
10017112891	$C25_a$-$C25_b$	Condenser - dual push button trimmer (770 KC to 1350 KC)	.45
10017112892	$C26_a$-$C26_b$ $C27_a$-$C27_b$	Condenser - dual push button trimmer (550 KC to 1000 KC)	.50
	C28	Condenser - paper .1 mfd. 400 volt	.25
10057113409-U		Cone - voice coil assem. (10057-115019-U Speaker)	1.60
10057113410-U		Cone - voice coil assem. (10057-115020-U Speaker)	1.85
10049110629		Lamp - 6.3 volt - .25 amps	.15
	R1	Resistor - carb. 10,000 ohms ½ watt	.15
	R2	Resistor - carb. 15,000 ohms 1 watt	.15
	R3	Resistor - carb. 47,000 ohms ¼ watt	.12
	R4	Resistor - carb.220,000 ohms ¼ watt	.12
	R5-R6	Resistor - carb. 1 megohm 1/4 watt	.12
	R7	Resistor - carb.470,000 ohms ¼ watt	.12
	R8	Resistor - carb.220,000 ohms ¼ watt	.12
	R9	Resistor - carb. 22,000 ohms ½ watt	.12
	R10	Resistor - carb. 2.2 meg. 1/4 watt	.15
	R11	Resistor - carb. 3.3 meg. 1/4 watt	.12
10021112789	$R12_a$-$R12_b$ $R12_c$	Resistor - (Section A - 55 ohms) (Section B - 30 ohms) (Section C - 240 ohms)	.40
	R14	Resistor - carb. 68,000 ohms ¼ watt	.12
10058115019-U		Speaker - dynamic 6"	5.30
10058115020-U		Speaker - dynamic 8"	7.70
10037112868		Switch - range	.96
10038112869		Switch Assembly - for push buttons	2.90
10038112870		Switch - Tone Control	.40
10033112884	T1	Transformer - 1st I.F.	1.20
10035113496	T2	Transformer - 2nd I.F.	1.25
10010112887	T3	Transformer - power 117 V.-60 cycle	3.50
10010113473	T3	Transformer - power 117 V.-25 cycle	5.00
10013113406-U	T4	Transformer - output for 10013115020-U or 10013115019-U speaker	1.20
10024112889	R13	Volume Control - 500,000 ohms with off-on switch	.90

DIAL DRIVE & MISCELLANEOUS PARTS

Part Number	Description	Selling Price Each
10054113149	Button - for push button tuner	$ .08
10018113130	Cable & Plug - for tuning eye	.55
10054112745	Clip - coil mounting (osc. & ant.)	.01
10054112798	Clip - wave trap coil mtg.	.01
10054113019	Clip - dial scale retaining	.01
10054111302	Cord - dial drive 6 or 50 ft. lgths. Per Ft.	.05
10054112233	Drum & Bushing - for dial drive	.35
10044113146	Escutcheon - for dial	.64
10044113147	Escutcheon - for push buttons	.48
10044113148	Escutcheon - for tuning eye	.20
10059113378	Instruction Book - Model 100.195	.10
10039113131	Knob - Tone Control	.12
10039113132	Knob - Range switch	.12
10039113133	Knob - Volume control	.14
10039113134	Knob - Tuning	.14
10054113138	Mtg. Plate & Bracket - for dial	.42
10054110496	Plug - Speaker (4 prong)	.12
10041113183	Pointer - dial	.12
1005481145	Retaining Ring - for drive shaft Per C	.50

MODELS 6003, 6004, 6024
6034, 6124, 6134
Chassis 101.510

SEARS-ROEBUCK & CO.

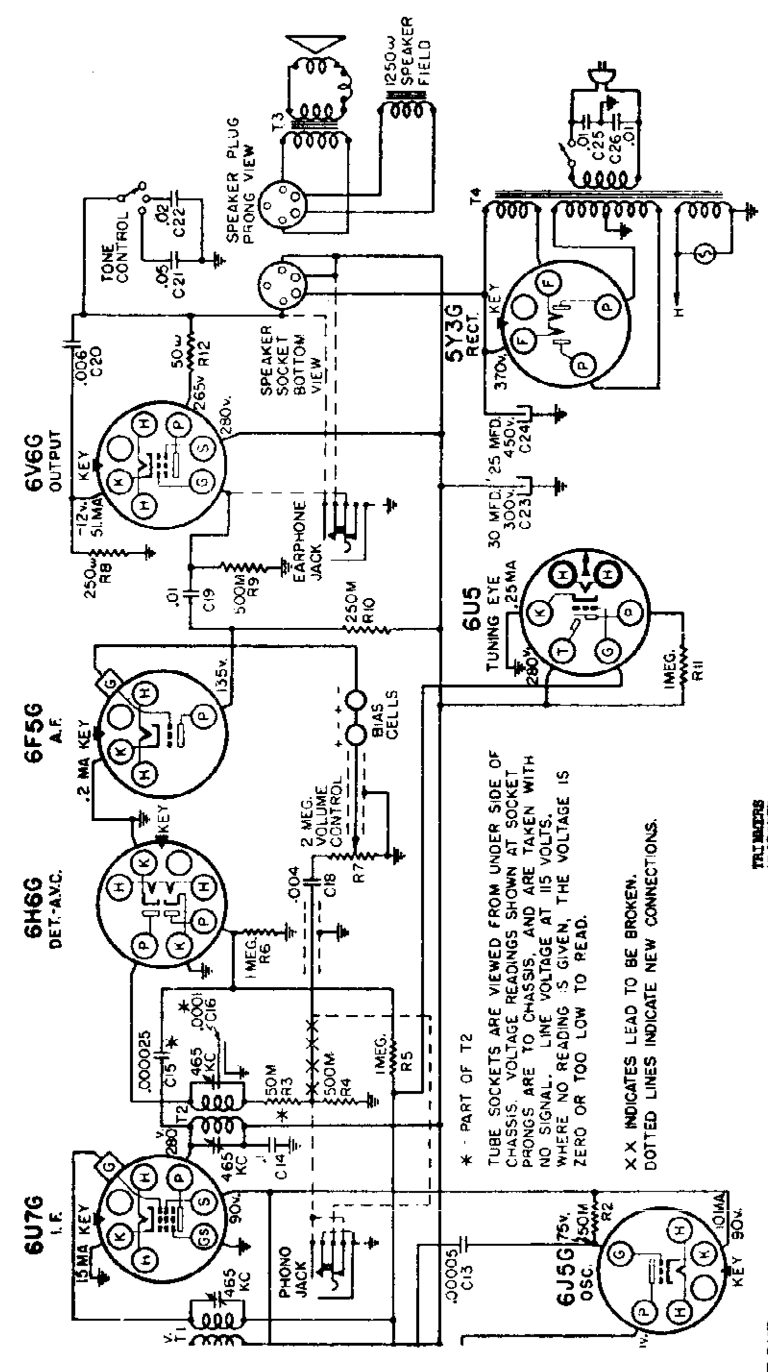
Jacks Installation
Schematic
Alignment

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

Part number 1013119531 Jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101. Retail selling price is 79¢.

The schematic section on the back of this sheet shows the connections.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.



WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	6A8G Grid	T2, T1	IF Output IF Input	90
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C5	Translator	50
"SPOR"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C7* C8	Oscillator Translator	80
"AM"	Fully open	1730 kc	.0002 mfd.	Ant. Term.	C8	Oscillator	90
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C3, C2	Transl., Ant.	75
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	80

IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

"Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

ALIGNMENT PROCEDURE

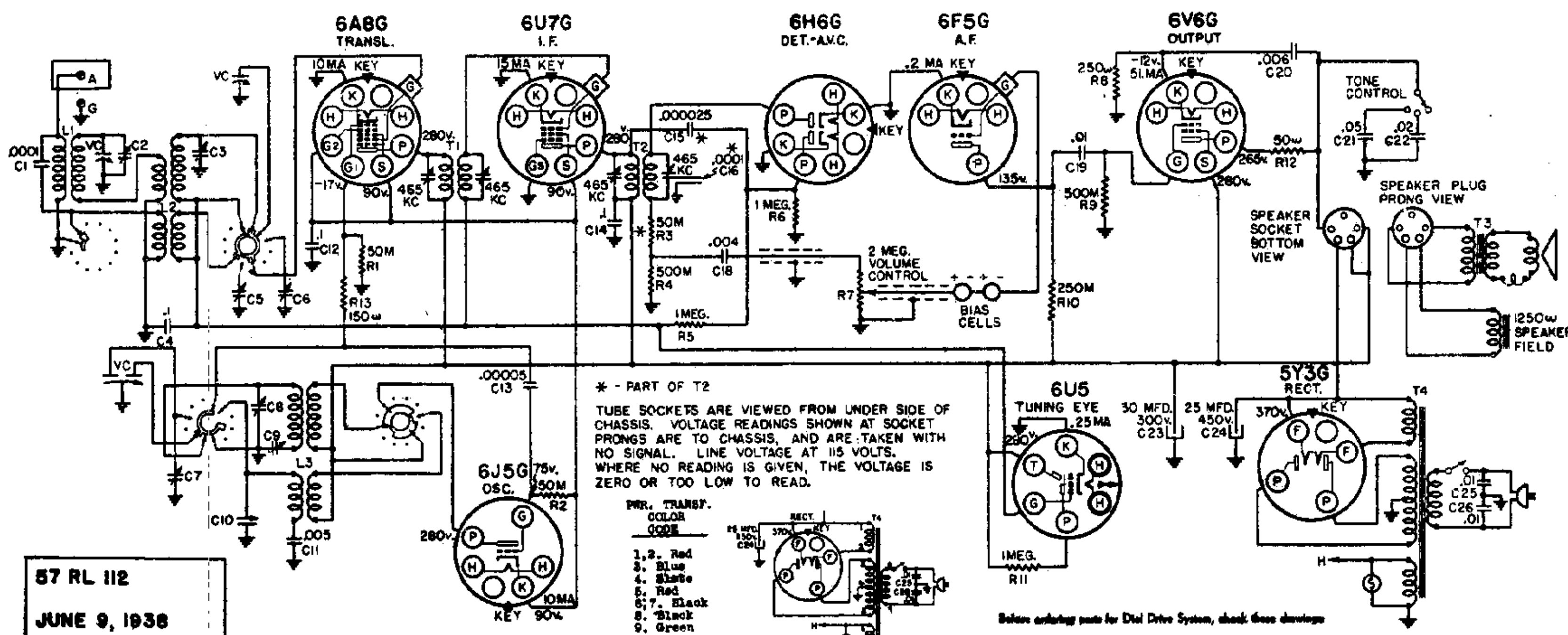
PRELIMINARY:

Output meter connection . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 0.85 volts
Average sensitivity in microvolts for 500 milliwatts output . . . . See chart below
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . .See chart below
Connection of generator output lead . . . . .See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Tone Control . . . . HI
Position of Dial Pointer with variable fully closed . . . . Center of block to left of 550 kc calibration mark.

Schematic, Voltage
Drive Data

SEARS-ROEBUCK & CO.

MODELS 6003, 6004, 6024
6034, 6124, 6134
Chassis 101.510



* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

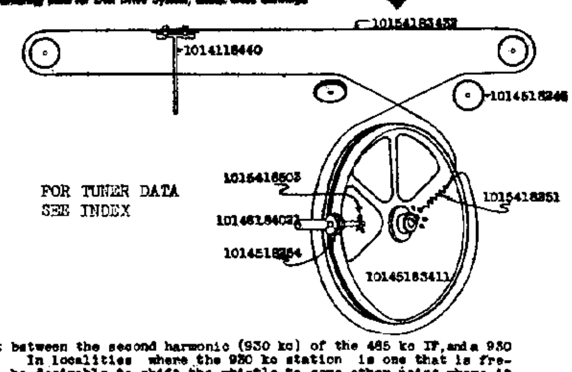
PWR. TRANSF. COLOR CODE

1, 2. Red
3. Blue
4. Slate
5. Red
6, 7. Black
8. Black
9. Green

57 RL 112

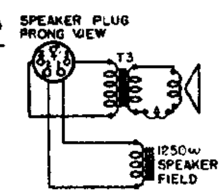
JUNE 9, 1938

Below ordering parts for Dial Drive System, check these drawings



SPEAKER PLUG COLOR CODE

1. Black
2. Yellow
3. Brown
4. Blank
5. Green



FOR TUNER DATA SEE INDEX

POWER SUPPLY:
All models available . . . . 105-125 volts, 50-60 cycle, 75 watts
All models available . . . . 105-125 volts, 25 cycle, 90 watts

FREQUENCY RANGES:
Band "AM" . . . . 540-1730 kc
Band "SW" . . . . 5.95 mc-18.3 mc
Band "9" . . . . 9.4 mc-9.7 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1730 kc	1400 kc	600 kc
Band "SW"	--	15 mc	Fixed
Band "9"	9.55 mc	9.55 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . 4 Watts
Maximum . . . . 7.5 Watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 6 and 8 inch
Field coil resistance . . . . 1250 Ohms
App. field coil voltage drop . . . . 90 volts

OPERATING FEATURES:
Tone Control . . . . Three Position
Automatic Volume Control
Spread Band Tuning
Push Button Tuning (8 button)

CHASSIS FEATURES:
Preselector on band "AM"
Antenna . . . . Conventional
Tuning Eye

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Upper left knob . . . . Volume
2. Lower left knob . . . . On-off switch & tone
3. Lower right knob . . . . Band switch
4. Upper right knob . . Station Selector

CONTROL OPERATION:
Turning right: . . . . Volume increase
Turning right: . . . "HI", "MED", "LO"
Turning right: . . . "AM", "SW", "9"
Tuning ratio: 13:1

ELIMINATING WHISTLE

AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

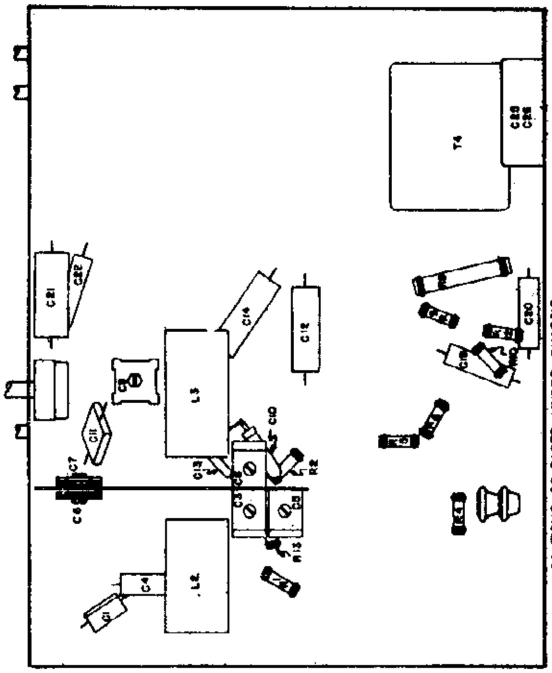
Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as close as possible to 465 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under "ALIGNMENT PROCEDURE".

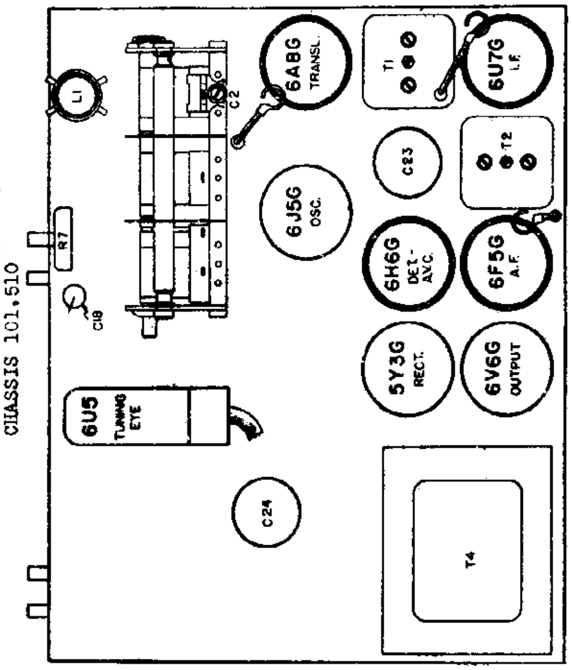
MODELS 6003,6004,6024
6034,6124,6134
Chassis 101.510

SEARS-ROEBUCK & CO.

MODELS 6005,6071,6076
6171,6176.Ch.101.507
Socket,Trimmers,Chassis



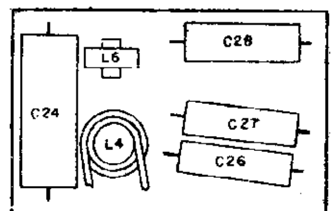
LOCATIONS OF PARTS UNDER CHASSIS.
MODELS 6003,6004,6024,6034,6124,6134
CHASSIS 101.510



LOCATIONS OF PARTS ON TOP OF CHASSIS.

SILVERTONE BATTERY CHARGERS AVAILABLE:

The customer should be told about the SILVERTONE GAS-O-POWER and the SILVERTONE SUPER AIR-CHARGER. Either of these units provides an economical means of keeping the storage battery charged. The customer should be informed of the advisability of frequent hydrometer testing of the storage battery to prevent it from becoming too low in charge. A battery that is allowed to run too low before re-charging will not have as long a life as one that is re-charged more frequently.



LOCATIONS OF PARTS UNDER POWER SUPPLY

LOUD SPEAKER:
Type . . . . PM Dynamic
Size . . . . 6"

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . .25 watts
Maximum . . . . .5 watts

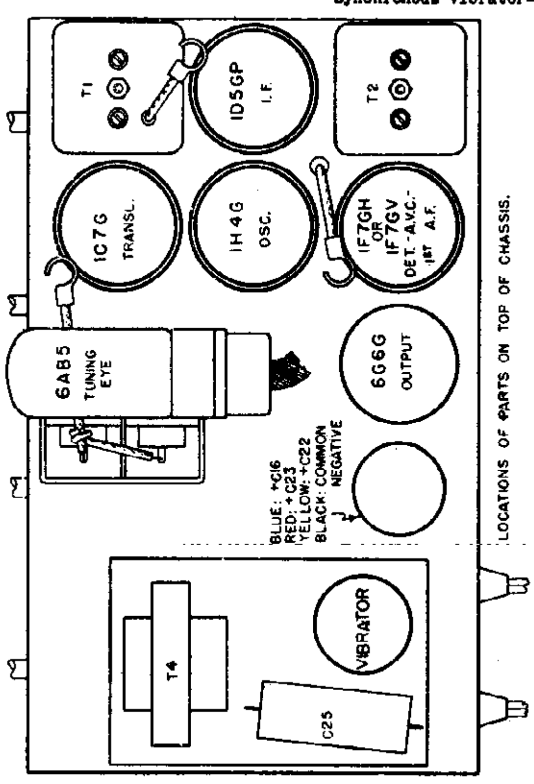
CHASSIS FEATURES:
Number of IF stages . . . . One
Number condenser in gang . . . . . . Two
Antenna . . . . Conventional
Tuning Eye
Built-in IF Wave Trap
Synchronous Vibrator-Rectifier

MODELS 6005, 6071, 6076
6171, 6176 CHASSIS 101.507

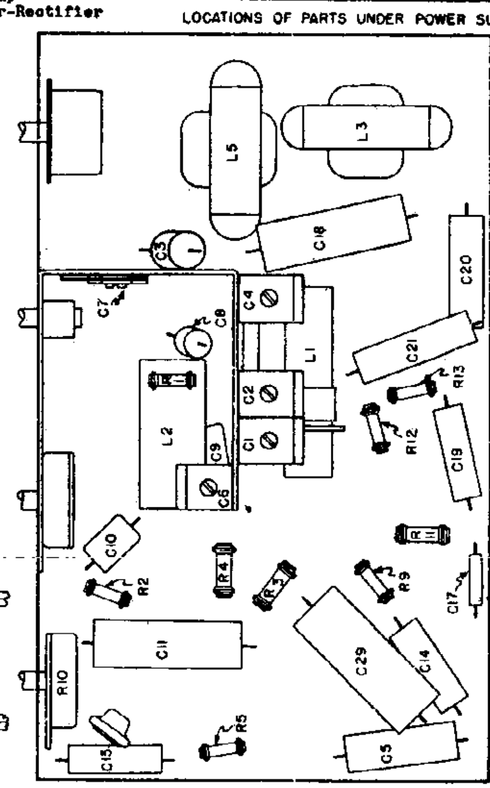
OPERATING FEATURES:
Tone Control . . . . Two position
Automatic Volume Control

OPERATING CONTROLS:
1. Left knob . . . . . . Volume Control
2. Next to left knob . . . Wave Switch
3. Next to right knob . . . . Station Selector
4. Right knob . . . . . On-Off Switch and Tone Control

CONTROL OPERATION:
Turning right: Volume increase
Turning right: "A", "B"
Tuning ratio: 13:1
Turning right: On, "HI"; "LO"



LOCATIONS OF PARTS ON TOP OF CHASSIS.

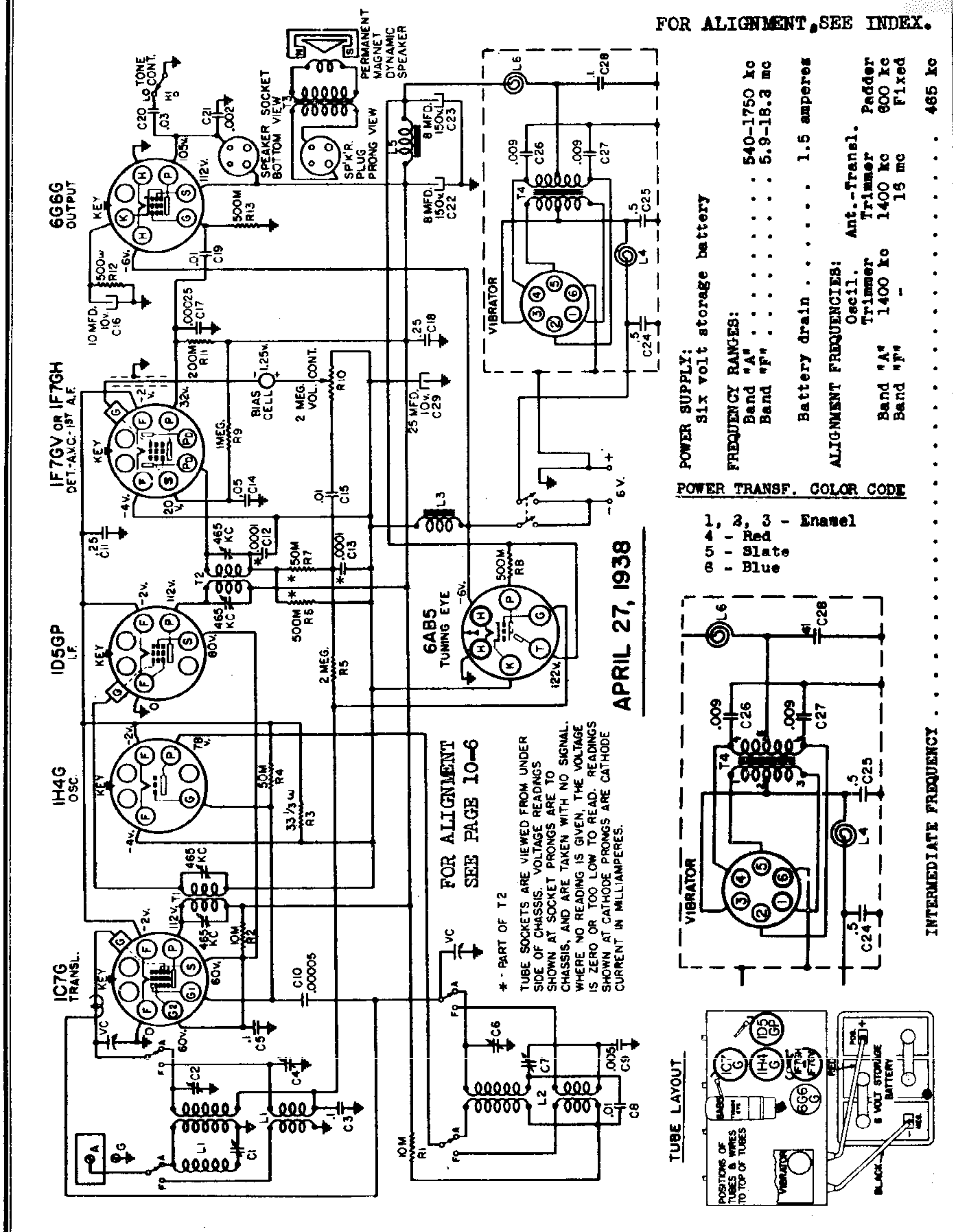


LOCATIONS OF PARTS UNDER CHASSIS.

SEARS-ROEBUCK & CO.

MODELS 6005, 6071, 6076
6171, 6176. Ch. 101. 507
Schematic, Voltage
Socket

FOR ALIGNMENT, SEE INDEX.



POWER SUPPLY:
Six volt storage battery

FREQUENCY RANGES:
Band "A" . . . . 540-1750 kc
Band "F" . . . . 5.9-18.3 mc

Battery drain . . . . . . 1.5 amperes

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	-	18 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER TRANSF. COLOR CODE

1, 2, 3 - Enamel
4 - Red
5 - Slate
6 - Blue

SEARS-ROEBUCK & CO.

MODELS INDICATED AS 6008 INCLUDES MODELS, 6009, 6018, 6019, 6048, 6048, 6068, 6069, 6148, 6168, CHASSIS 101.524.
" " " 6074 " " , 6079. CHASSIS 101.515.
" " " 6036 " " , 6136. CHASSIS 101.511.
" " " 6038 " " , 6138. CHASSIS 101.517.
" " " 6140 " " , CHASSIS 101.534.

FOR LOCATION OF TRIMMERS SEE INDEX.

Output meter connection ....Across loud speaker voice coil.
Output meter reading to indicate 50 milliwatts, MODEL 6008, 6074, 0.37 volts, to indicate 500 milliwatts, MODELS 6036, 6140, 0.96 volts; for MODEL 6038, 1.06 volts.
Approximate microvolts input for 50 milliwatts output:-
For Models , 6008, 6074 see chart below.
For 500 milliwatts output, for Models 6036, 6038, 6140,--see chart below.
Generator ground lead connection...................receiver chassis.
Dummy antenna value to be in series with generator output ......see chart below.
Connection of generator output lead ....see chart below.
Generator modulation .... 30% ,400 cycles.
Position of volume control............................ Fully clockwise.
Position of tone control ....HI.
Position of dial pointer with variable fully closed ....Center of block to left of 550 kc calibration mark.

MODEL 6008.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	1070 Grid	T3, T2, T1	IF Output IF Interstage IF Input	16
"AM"	600 kc	465 kc*	.0002 mfd.	Ant. Term.	C8*	Wave Trap	--
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	15
"SFCR"	9.56 mc	9.55 mc	400 ohms	Ant. Term.	C6, C5	Osc., Transl.	20
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C7, C1	Osc., Transl.	15
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	15

MODEL 6074

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	6060 Grid	T2, T1	IF Output IF Input	75
"AM"	600 kc	465 kc*	.0002 mfd.	Ant. Term.	C1*	Wave Trap	--
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	50
"SFCR"	9.56 mc	9.55 mc	400 ohms	Ant. Term.	C7** C5	Oscillator Translator	65
"AM"	Fully open	1720 kc	.0002 mfd.	Ant. Term.	C10	Oscillator	75
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C2	Translator	45
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C11	Padder	35

MODELS 6008, 6074. IMPORTANT ALIGNMENT NOTES

The alignment must be done in the sequence given.

*The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 465 kc is known, the generator should be adjusted to the frequency of that station instead of to 465 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

MODEL 6036

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	6A8G Grid	T2, T1	IF Output IF Input	--
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C5	Translator	25
"9"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C11* C8	Oscillator Translator	40
"11"	11.8 mc	11.8 mc	400 ohms	Ant. Term.	C10* C7	Oscillator Translator	35
"15"	15 mc	15 mc	400 ohms	Ant. Term.	C9* C6	Oscillator Translator	35
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C15, C4, C1	Osc, Transl, RF	35
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C16	Padder	40

MODEL 6038.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	6A8G Grid	T3, T2, T1	IF Output, IF Interstage, IF Input	--
"SW"	18 mc	18 mc	400 ohms	Ant. Term.	C29*	Oscillator	--
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C11, C4	Translator, RF	10
"9"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C28* C12 C3	Oscillator Translator RF	20
"11"	11.7 mc	11.7 mc	400 ohms	Ant. Term.	C27* C13 C2	Oscillator Translator RF	12
"15"	14.9 mc	14.9 mc	400 ohms	Ant. Term.	C26* C14 C1	Oscillator Translator RF	10
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C30 C10 C5	Oscillator Translator RF	15
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C31	Padder	40

MODEL 6140.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	6A8G Grid	T2, T1	IF Output IF Input	90
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C6	Translator	60
"9FCR"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C7* C6	Oscillator Translator	80
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8, C3, C2	Osc, Trans, Ant.	75
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	80

MODELS 6036, 6038, 6140. IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

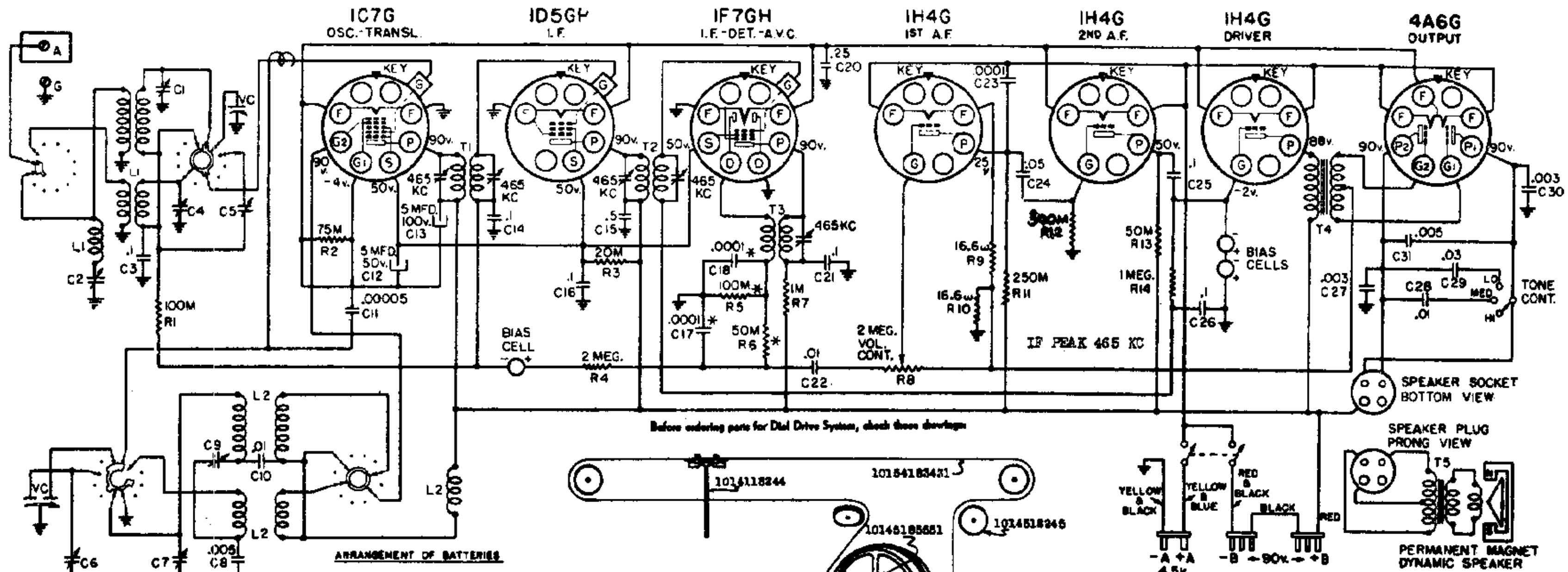
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

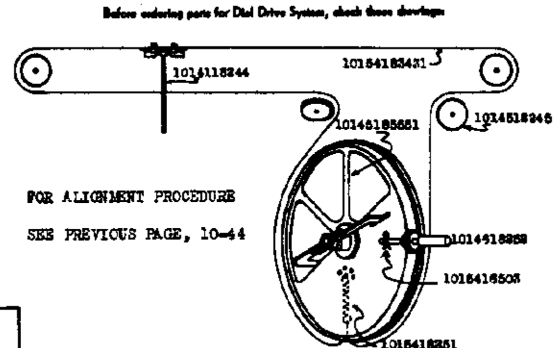
Schematic, Socket, Trimmers
Drive Data, Notes

SEARS ROEBUCK & CO.

MODELS 6008, 6009, 6018
6019, 6048, 6049, 6068, 6069
6148, 6168 Chassis 101.524



Before ordering parts for Dial Drive System, check these drawings.

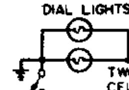


FOR ALIGNMENT PROCEDURE

SEE PREVIOUS PAGE, 10-44

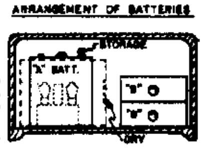
* - PART OF T3

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.



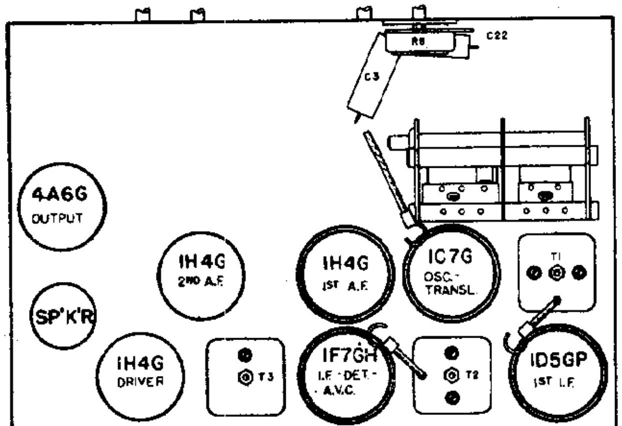
SWITCH OPERATED BY PUSHING VOLUME CONTROL KNOB IN.

USE No. 5000 ADAPTOR WITH 4-VOLT STORAGE "A" BATTERY ONLY



POWER SUPPLY:

"A" Battery (4½ volt dry)	1 - #5033P
"A" Battery (4 volt storage)	1 - #5049
"B" Batteries	2 - #5131P
"A" Drain	0.3 amperes
"B" Drain	15 ma



LOCATIONS OF PARTS ON TOP OF CHASSIS.

FREQUENCY RANGES:

Broadcast	540-1730 kc
Short Wave	5.95 mc-18.3 mc
Spread Band	9.4 mc-9.7 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "SW"	--	15 mc	Fixed
Band "9"	9.55 mc	9.55 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:

Type	Class "B"
Undistorted	0.5 watts
Maximum	0.8 watts

LOUD SPEAKER:

Type	PM Dynamic
Size	6 and 8 inch

57RL108

JUNE 16, 1938

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example. If it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near as possible to 465 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

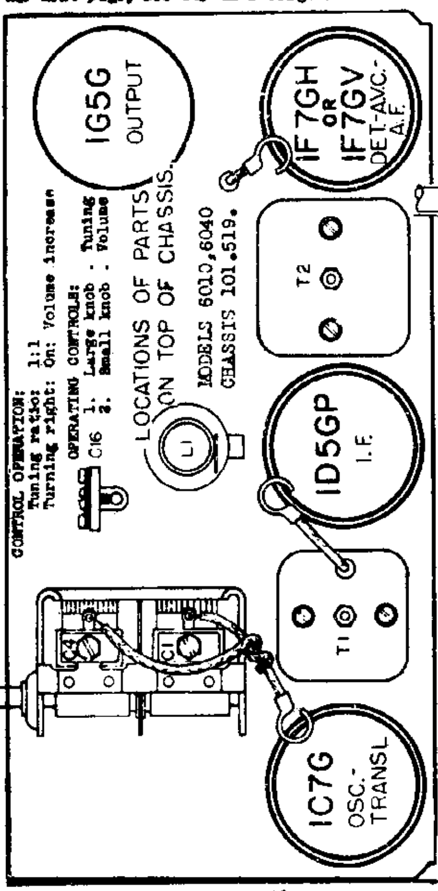
MODELS 6008,6009,6018
6019,6048,6049,6068,6069
6148,6168.Ch. 101.524
Chassis Layout,Data

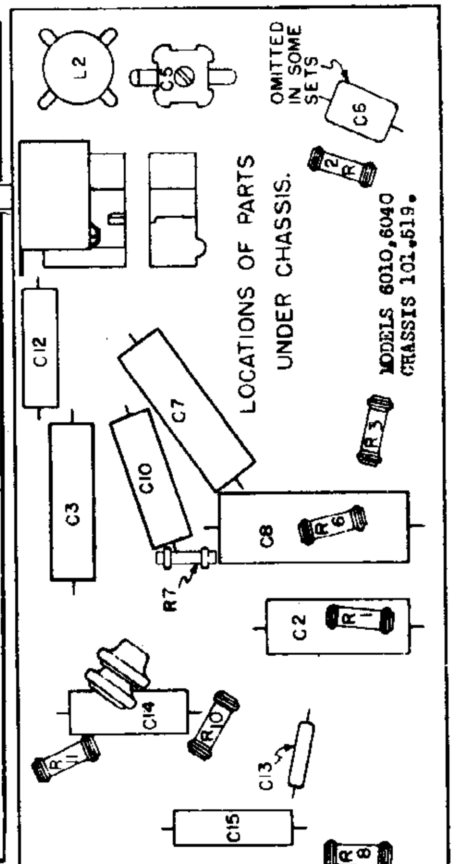
SEARS-ROEBUCK & CO.

MODELS 6010,6040,Ch.101.519
Socket,Trimmers,Chassis
Notes

BATTERY REPLACEMENT:

The dry 4½ volt "A" battery should be replaced when its voltage drops to 3.4 volts,under load. The 67½ volt "B" battery should be replaced when the voltage of the battery has dropped to 45 volts, under load. The life rating of the various size batteries, given on the next page, are for an average use of three hours a day.





THE "A" SUPPLY:

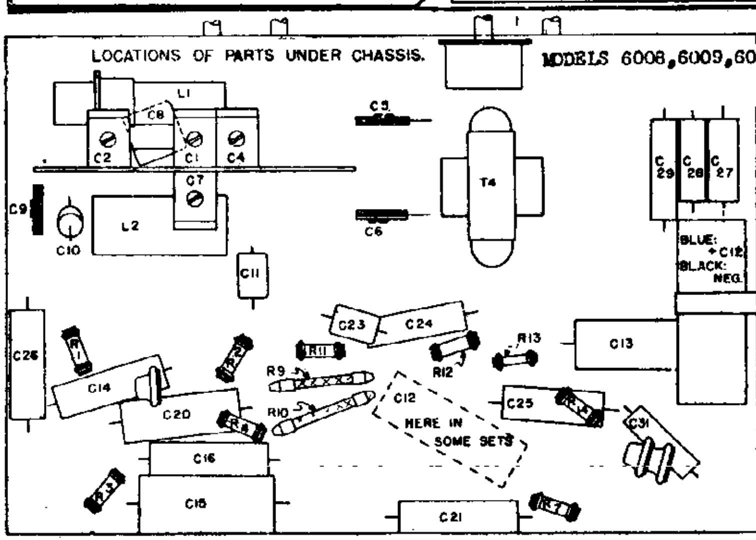
These models may be used with either a 4½ volt dry "A" battery or a 4 volt storage "A" battery. Catalog #6000 adaptor is necessary to make the connection between the "A" plug and the terminals of the storage battery.

THE FILAMENT CIRCUIT:

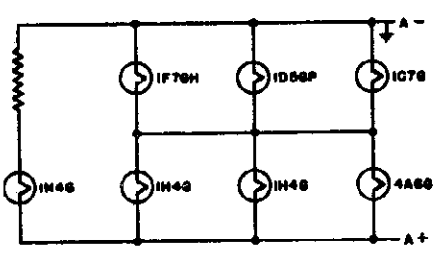
Since the tubes have two volt filaments and the "A" supply is four volts,a series parallel arrangement is used for the filament circuit. Accordingly, if any tube burns out, its companion tube will not light either. The full "A" voltage will appear across the filament terminals of the burnt out tube.

THE AVC CIRCUIT:

Diode current of the 1F7GH tube, flowing through the 500M ohm resistor, R5, creates a voltage drop across it. This voltage is applied to the control grid of the 1C7G tube to provide AVC.



MODELS 6008,6009,6018,6019,6048,6049,6068,6069,6148,6168.
CHASSIS 101.524.



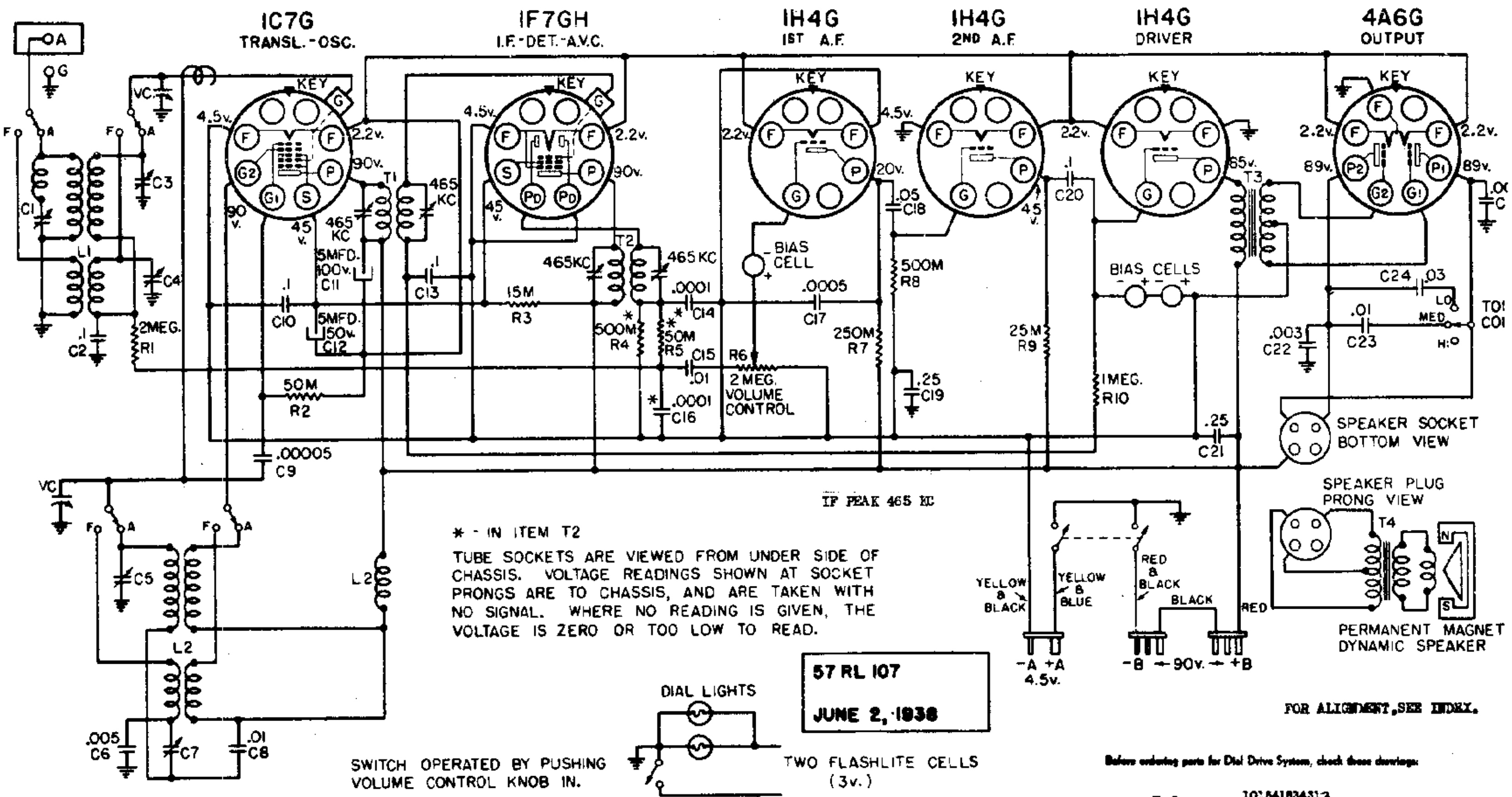
THE FILAMENT CIRCUIT:

Since the "A" supply is four volts and the tube filaments are rated at two volts, a series parallel arrangement is used for the filament circuit. A simplified diagram is shown below. If any one tube burns out (except the 1H4G first AF), the filament voltage and current of the other tubes will be affected.

A Catalog #6000 adaptor must be used on the "A" cable plug when a storage "A" battery is used. The owner should be warned not to attempt the use of a six volt automobile storage battery. Only a four volt storage "A" battery should be used.

SEARS-ROEBUCK & CO.

MODELS 6016, 6017, 6046, 6047, 6146. Ch. 101.512
Schematic, Voltage
Drive Data



ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:

1C7G	Oscillator-Translator	1H4G	Second AF
1F7GH	IF-Detector-AVC	1H4G	Driver
1H4G	First AF	4A6G	Output

POWER SUPPLY:

"A" Battery (4½ volt dry)	1 - #5031	"A" Drain	0.24 ampere
"A" Battery (4 volt storage)	1 - #5049	"B" Drain	.12 ma
"B" Batteries	2 - #5041		

FREQUENCY RANGES:

Broadcast	540-1730 kc
Short Wave	5.9-18.5 mc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc
-	16 mc	-

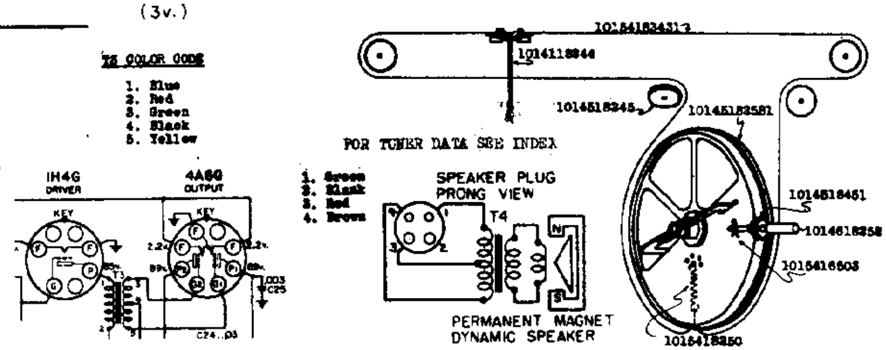
INTERMEDIATE FREQUENCY . . . . . 465 kc

T3 COLOR CODE

1. Blue
2. Red
3. Green
4. Black
5. Yellow

FOR ALIGNMENT, SEE INDEX.

Before ordering parts for Dial Drive System, check these drawings:

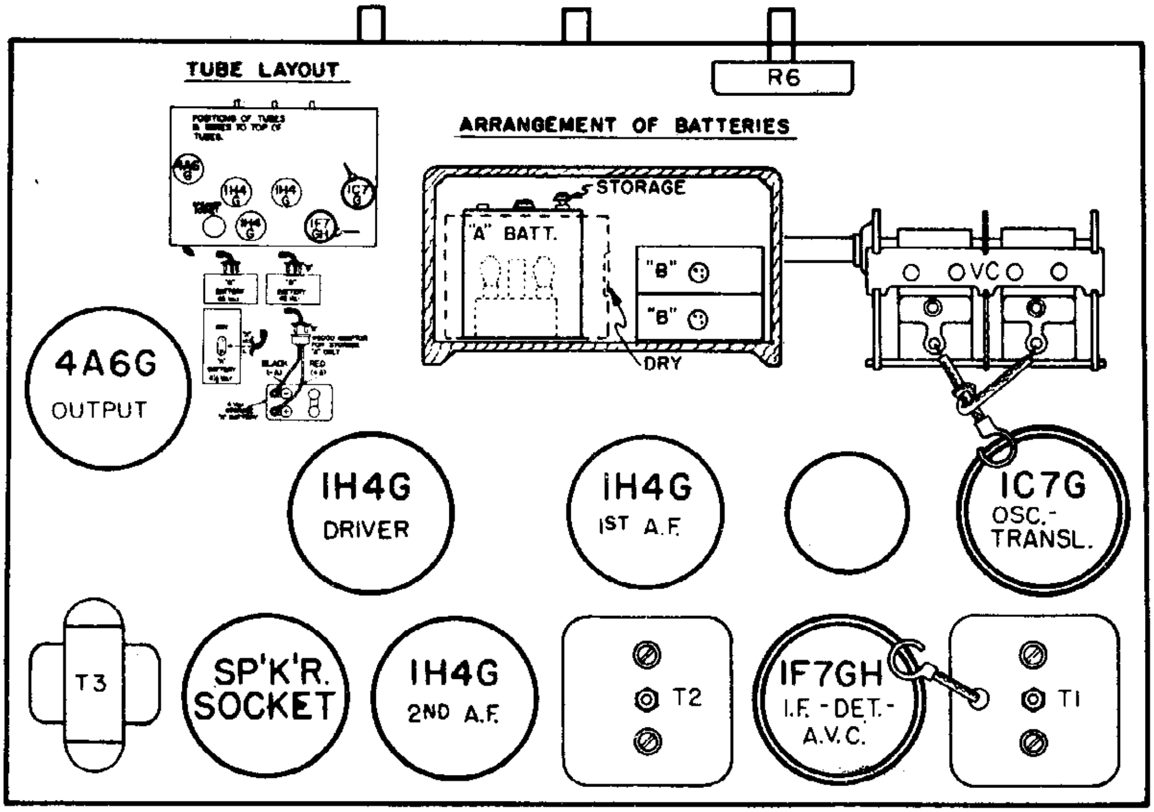


T4 COLOR CODE

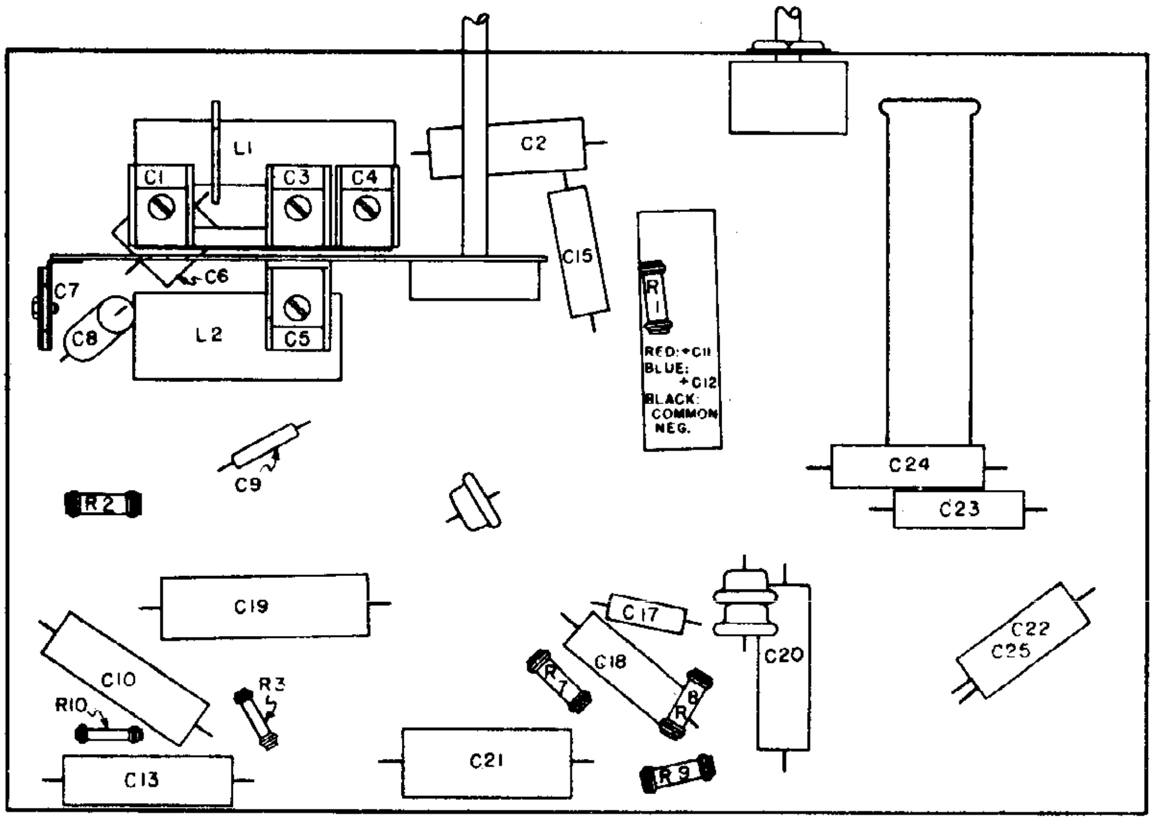
1. Green
2. Black
3. Red
4. Brown

MODELS 6016,6017,6046
6047,6146 Ch. 101.512
Socket,Trimmers,Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS.

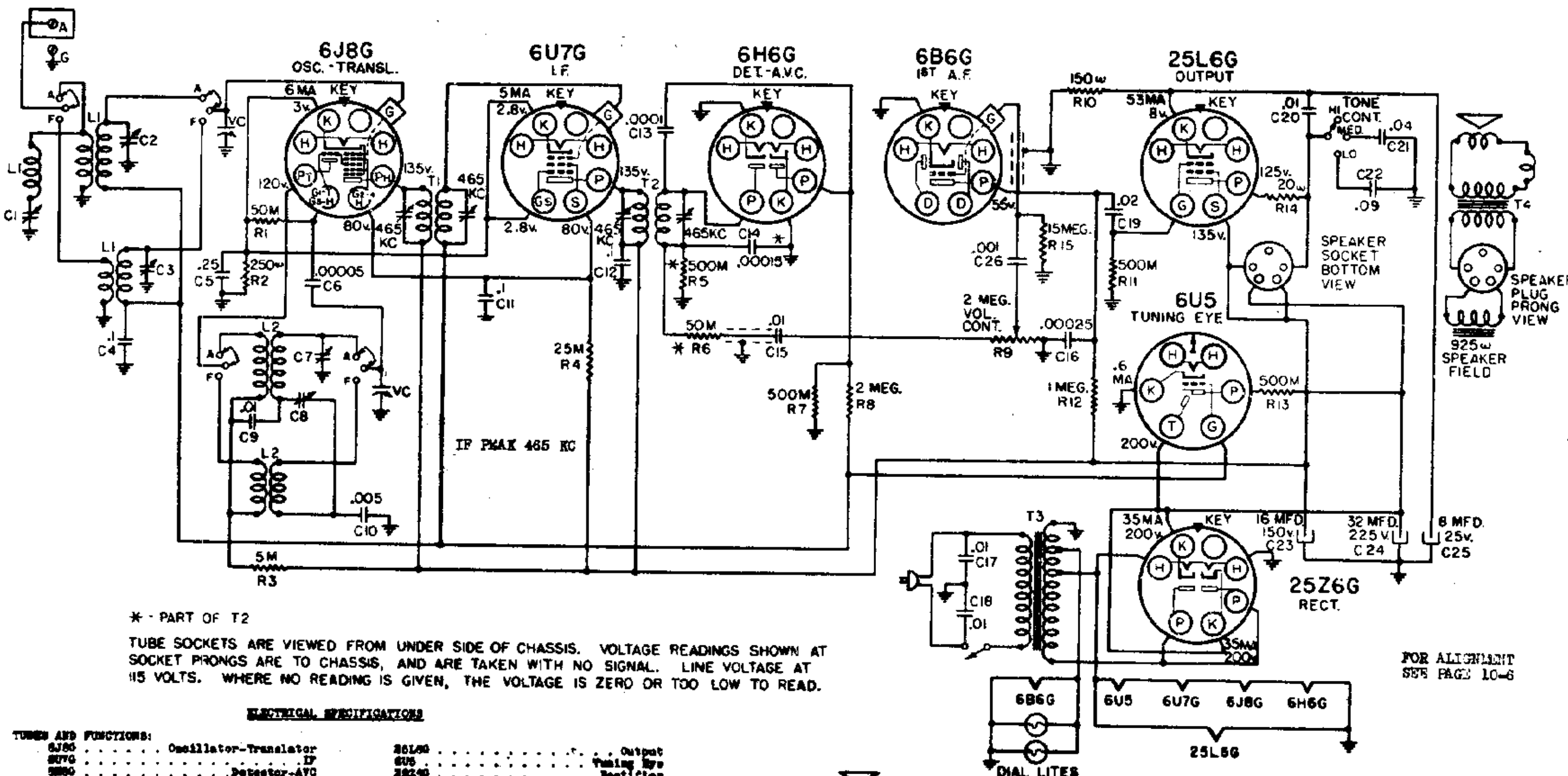
POWER OUTPUT:
Type . . . . Class "B"
Undistorted . . . . 0.4 watts
Maximum . . . . 0.8 watts

OPERATING FEATURES:
Tone control . . . . Three position
Automatic Volume Control
"On-Off" indicator
Dial FLASH-O-LITE
Push Button Tuning

LOUD SPEAKER:
Type . . . . PM Dynamic
Size . . . . 6"

MODELS 6022,6122,613
Chassis 101.509
Schematic,Voltage
Drive Data

SEARS-ROEBUCK & CO.



* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

THE AVC CIRCUIT:

The diode current of one of the 6H6G diode plates, flowing through the 500M ohm resistor, R7, creates a voltage drop across it. This voltage is applied to the control grids of the translator and IF tubes to provide AVC.

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
- 6J8G . . . . . . Oscillator-Translator
- 6U7G . . . . . . IF
- 6H6G . . . . . . Detector-AVC
- 6B6G . . . . . . First AF
- 25L6G . . . . . . Output
- 6U5 . . . . . . Tuning Eye
- 25Z6G . . . . . . Rectifier

POWER SUPPLY:
- All models available . . . . . . .105-125 volts, 50-60 cycle, 56 watts
- All models available . . . . . . .105-125 volts, 25 cycle, 50 watts

FREQUENCY RANGES:
- Band "AM" . . . . . . 540 kc-1730 kc
- Band "FOR" . . . . . . 5.9 mc-18.5 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "FOR"	--	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . . . 465 kc

POWER OUTPUT:
- Type . . . . . . Beam Tube
- Undistorted . . . . . . 1.75 watts
- Maximum . . . . . . 3.00 watts

LOUD SPEAKER:
- Type . . . . . . Dynamic
- Size . . . . . . 6 and 8 inch
- Field coil resistance . . . 925 ohms

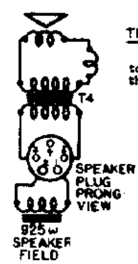
OPERATING FEATURES:
- Tone Control . . . . . Three position
- Automatic Volume Control
- Push Button Tuning (6 button)

CHASSIS FEATURES:
- Built-in IF Wave Trap
- Number of IF Stages . . . . . . One
- Antenna . . . . . . Conventional
- Tuning Eye

MECHANICAL SPECIFICATIONS

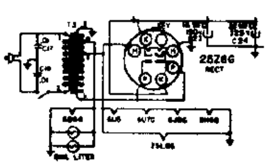
OPERATING CONTROLS:
1. Upper left knob . . . . . . Volume
2. Lower left knob . . . . Band Switch
3. Lower right knob. . "On-Off" Switch, and Tone
4. Upper right knob. . Station Selector

CONTROL OPERATION:
- Turning right: . . . . Volume increase
- Turning right: . . . . "AM" "FOR"
- Turning right: . . . . "HI", "MED","LO"
- Tuning Ratio: 10:1

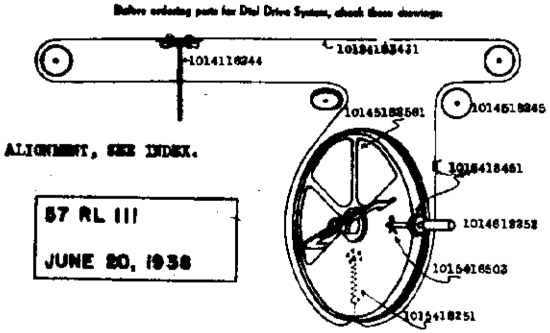


SPEAKER PLUG COLOR CODE
1. Yellow
2. Black
3. Brown
4. Blank
5. Green

PWR. TRANSF COLOR CODE
1. Black
2. Green
3. Slate
4. Blue
5. Yellow
6. Red



Before ordering parts for Dial Drive System, check these drawings

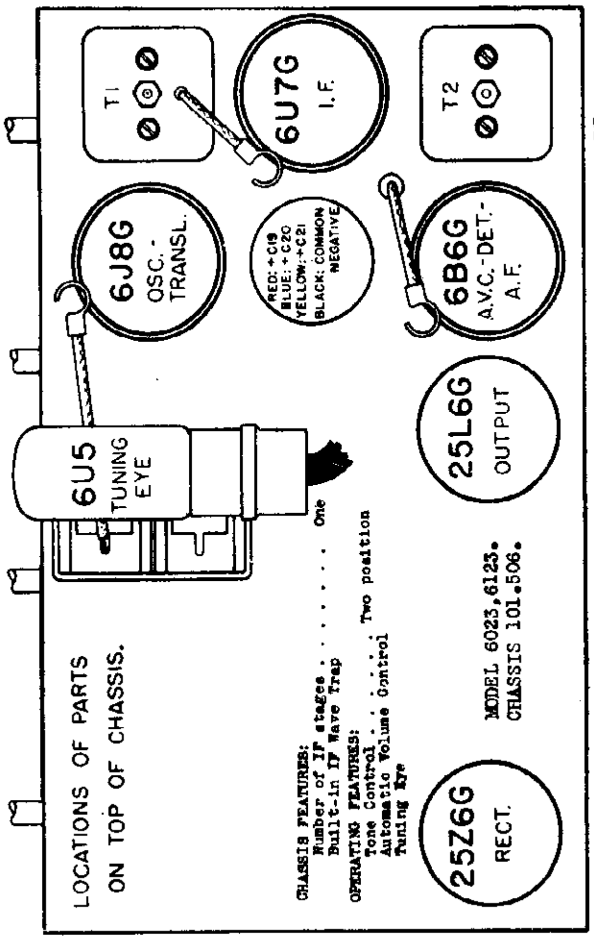


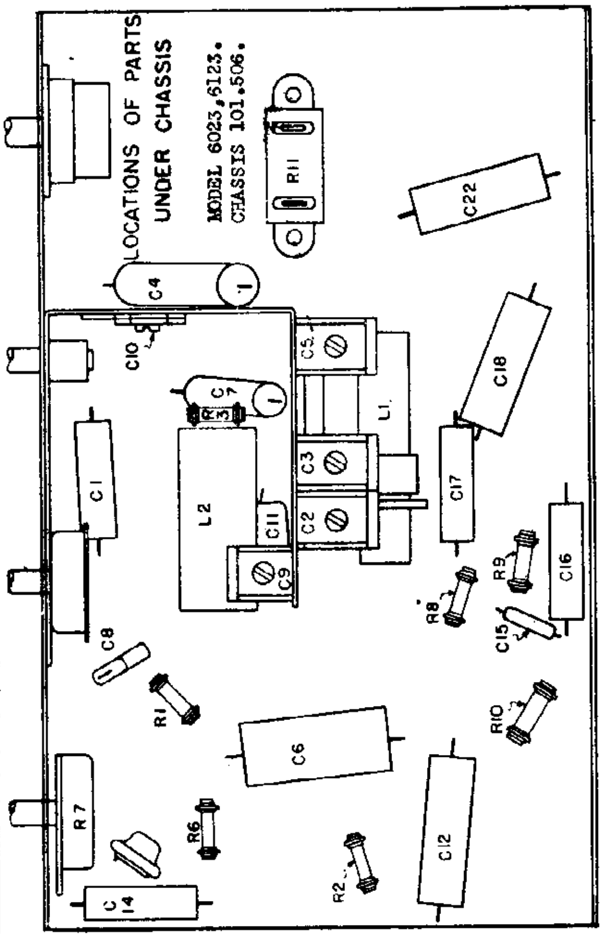
FOR ALIGNMENT, SEE INDEX.

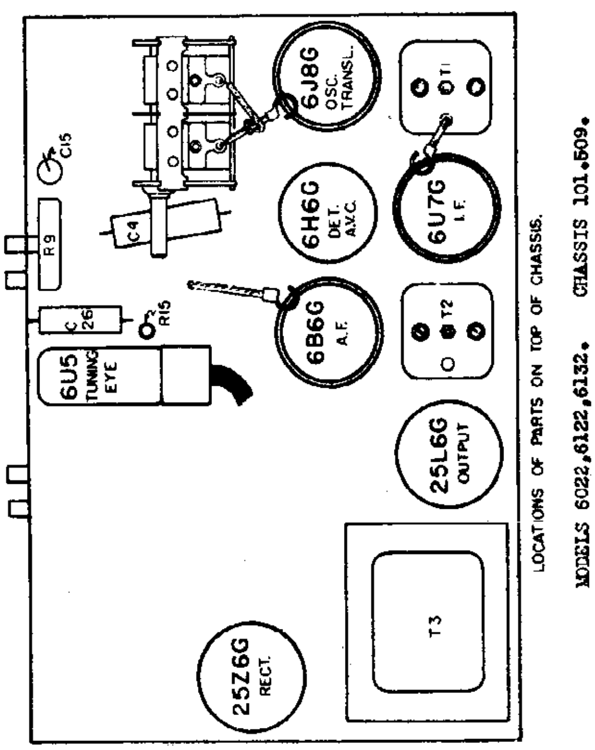
57 RL 111
JUNE 20, 1938

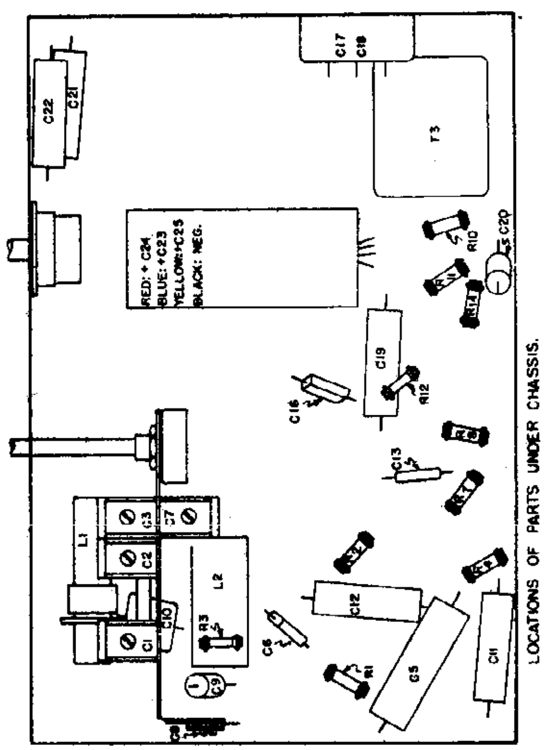
MODELS 6022,6122,6132
Chassis 101.509
MODELS 6023,6123
Chassis 101.506
Socket,Trimmers,Chassis

SEARS-ROEBUCK & CO.





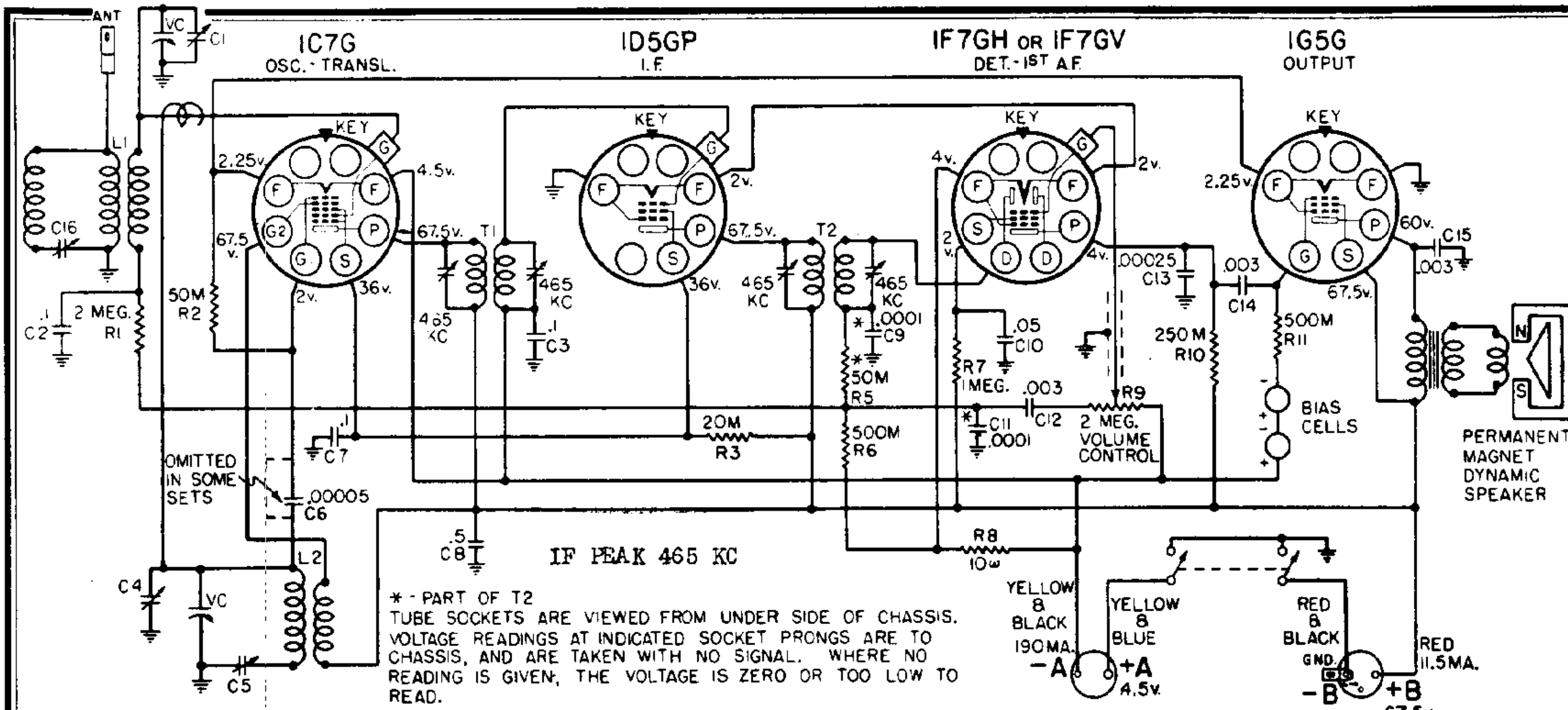




MODELS 6010,6040,Ch.101.519
Schematic,Voltage,Socket
Trimmers,Change

SEARS-ROEBUCK & CO.

57 RL 105
MAY 18, 1938

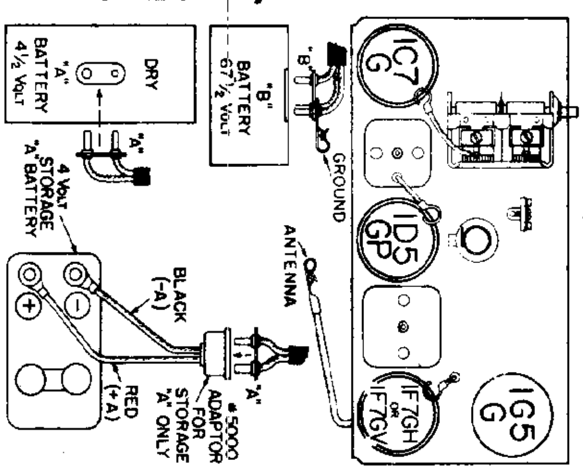


IF PEAK 465 KC

* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

FOR ALIGNMENT, SEE PAGE 10-10

TUBE LAYOUT



POWER SUPPLY:
"A" Battery (4½ volt dry) . . 1 - #5030
"A" Battery (4 volt storage). 1 - #5049
"B" Battery . . . . .1 - #5040
"A" Drain . . . . 0.18 amperes
"B" Drain . . . . 13.5 ma

FREQUENCY RANGE:
Broadcast . . . . 540-1730 kc

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1730 kc	1400 kc	600 kc

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type . . . . Single Pentode
Undistorted . . . . .125 watts
Maximum . . . . .35 watts

LOUD SPEAKER:
Type . . . . P.M. Dynamic
Size . . . . 5 inch

OPERATING FEATURES:
Calibrated tuning knob
Automatic Volume Control

CHASSIS FEATURES:
Number IF stages . . . . One
Built-in Wave Trap
Plugs attached to battery cable

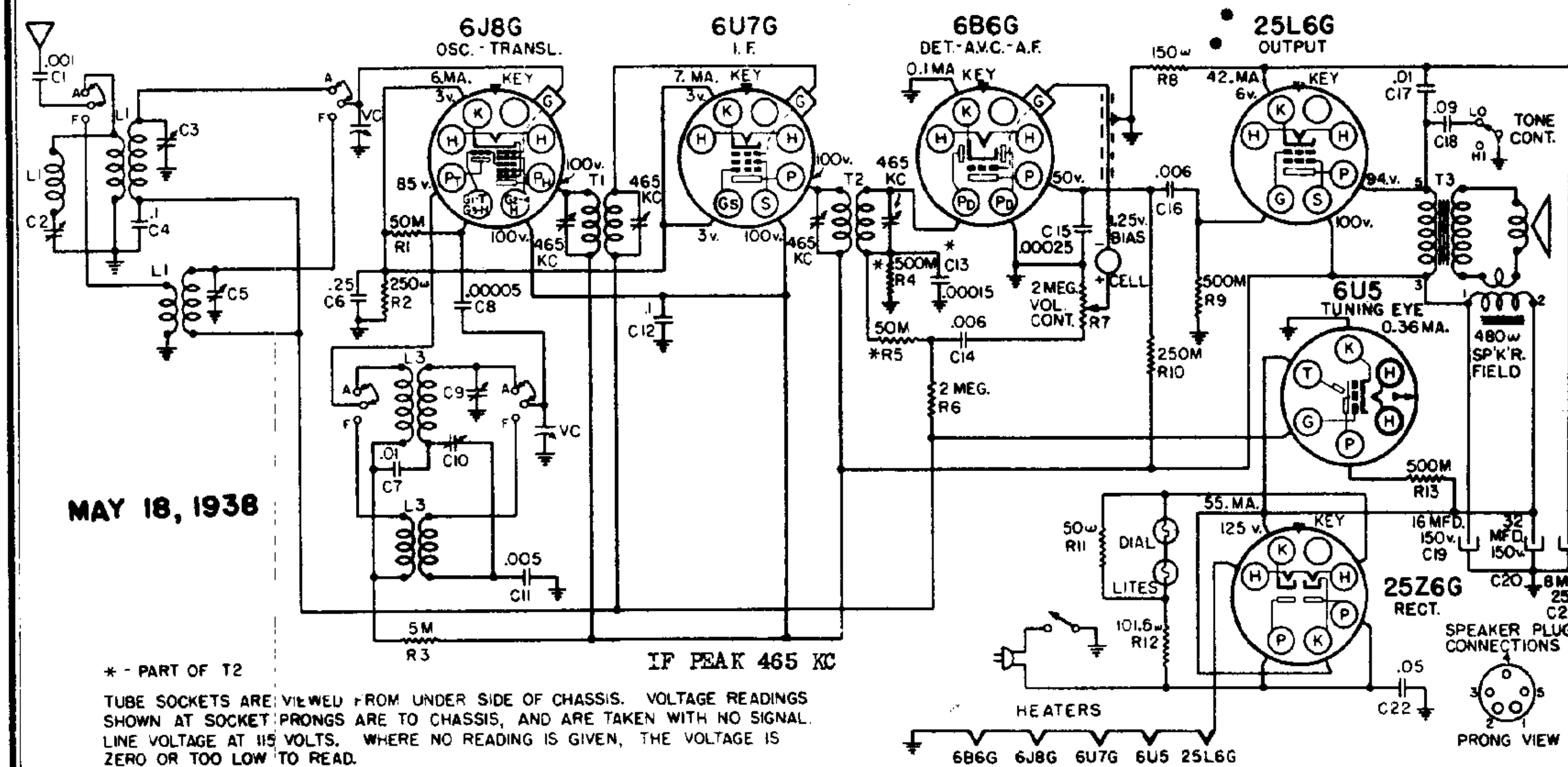
OMISSION OF C6:

It has been found that C6 is not necessary; that a direct connection from the oscillator coil to the 1C7G tube is permissible. Accordingly, C6 was omitted from later production.

MODELS 6023,6123,Ch.101.506
Schematic,Voltage,Notes

SEARS ROEBUCK & CO.

OPERATING CONTROLS:
1. Left knob . . . . .Volume
3. Next to left knob . . . Wave Band Switch
3. Next to right knob . . . .Station Selector
4. Right knob . . . ."On-off" switch and tone



* - PART OF T2

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FOR ALIGNMENT, SEE INDEX.

POWER SUPPLY:
All models available . . . . .105-135 volts, 50-60 cycle, or DC, 50 watt

FREQUENCY RANGES:
Band "A" . . . . 540-1750 kc
Band "F" . . . . 5.9-18.2 mc

ALIGNMENT FREQUENCIES:

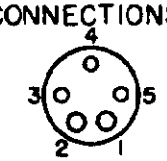
	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	--	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 455 kc

POWER OUTPUT:
Type . . . . Beam
Undistorted . . . . 1.4 watt
Maximum . . . . 3 watt

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . .6"
Field coil resistance . . . . 480 ohms
App. field coil voltage drop . . . 35 volts

SPEAKER PLUG CONNECTIONS



PRONG VIEW

SPEAKER PLUG CONNECTIONS

1. Yellow
3. Black
3. Brown
4. Blank
5. Green

CONTROL OPERATION:
Turning right: Volume increase

Turning right: "A", "F"

Tuning ratio: 13:1

Turning right: "ON", "HI", "LO".

POWER SUPPLY AND HEATER CIRCUIT:

All of the tube heaters are connected in series. Accordingly, if any one tube burns out the others will not light. The full line voltage will appear across the heater terminals of the burnt out tube.

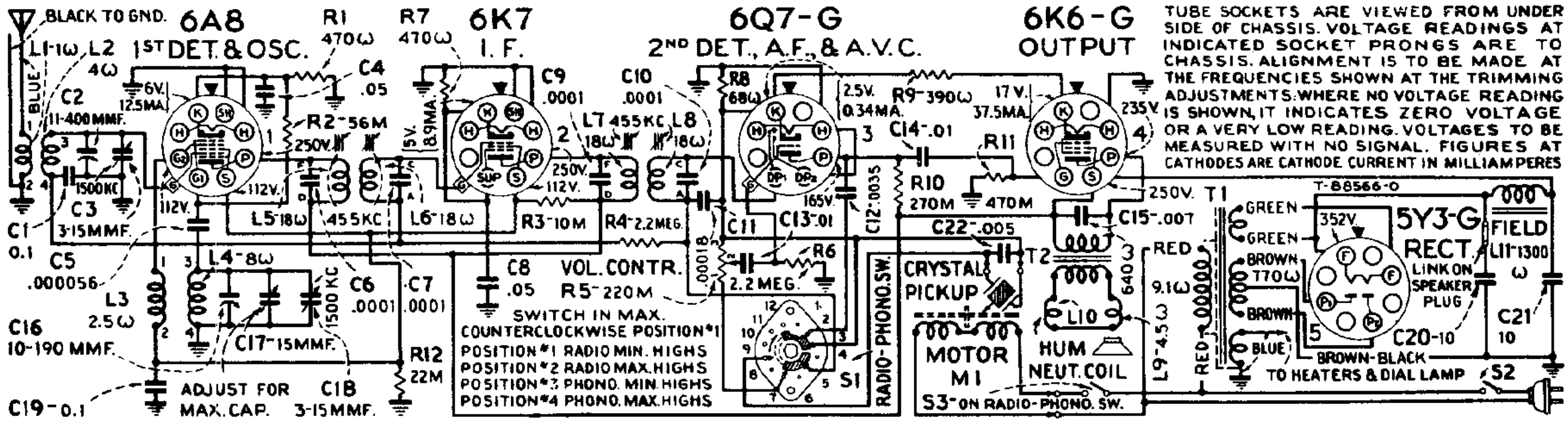
Under certain conditions, the chassis may be above ground potential by an amount equal to the line voltage. Accordingly, appropriate precaution should be taken when working on the chassis.

Motor, Pick-up Wiring
Alignment

SEARS-ROEBUCK & CO.

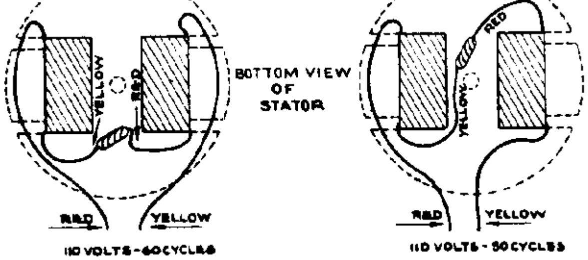
MODEL 6028
Chassis 126.204
Schematic, Voltage
Speaker Wiring

JULY 20, 1938

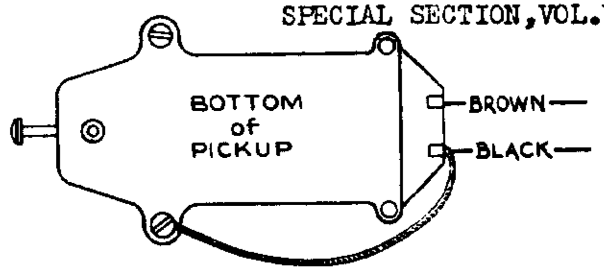


IF PEAK 455 KC

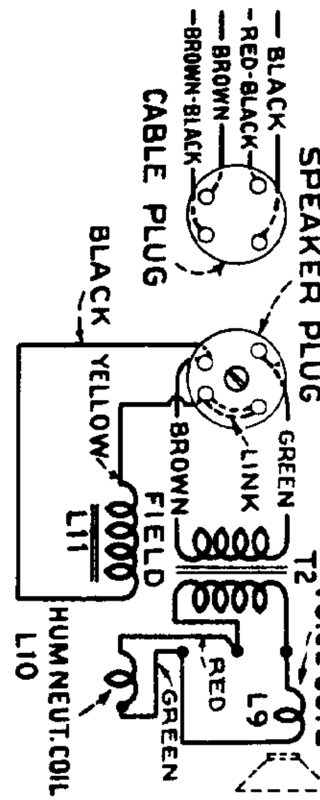
CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION, VOL. VIII



MOTOR COIL WIRING



PICKUP CONNECTIONS



LOUDSPEAKER WIRING

Dial lamp.................6.3 volts, 0.25 ampere

POWER SUPPLY RATINGS AVAILABLE.........105-125 volts, 60 cycles, 80 watts
..........105-125 volts, 50 cycles, 80 watts

FREQUENCY RANGE:
Broadcast.......................... 540-1,720 kc

ALIGNMENT FREQUENCY:
Broadcast................... 1,500 kc (osc., ant.)

INTERMEDIATE FREQUENCY.......................... 455 kc

POWER OUTPUT:
Type.............................. Pentode
Undistorted.......................... 2.0 watts
Maximum.......................... 3.5 watts

LOUDSPEAKER:
Type...................... 5-inch electrodynamic
V.C. Impedance............ 5 ohms at 400 cycles
Field Coil Resistance.............. 1,300 ohms
App. Field Coil Voltage Drop.......... 100 volts

PHONOGRAPH:
Type.............................. Manual
Turntable Speed................... 78 R.P.M.
Type of Pickup...................... Crystal
Pickup Impedance..... 80,000 ohms at 1,000 cycles

Loudspeaker:

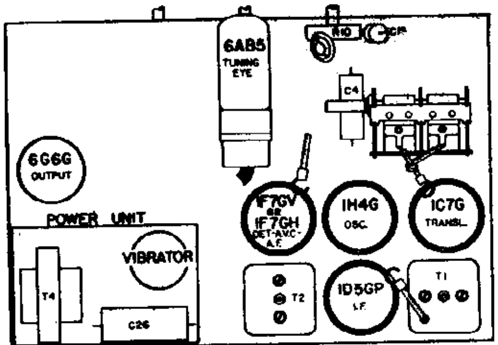
Centering of the loudspeaker voice-coil is made in the usual manner with three, narrow-paper feelers, after first removing the front dust-cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid after adjustment has been completed.

MODEL 6028, Ch. 126.204
Motor Details, Trimmers
Chassis Wiring, Socket

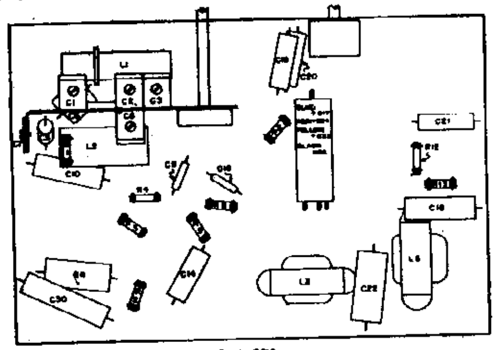
SEARS-ROEBUCK & CO.

MODELS 6072, 6077, 6172
Chassis 101.513
Socket, Trimmers, Chassis

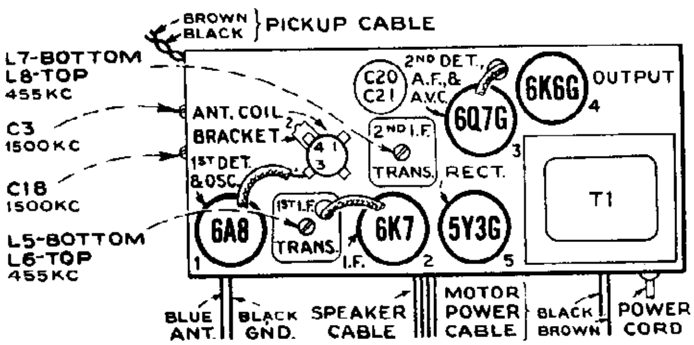
MODELS 6072, 6077, 6172. CHASSIS 101.513.

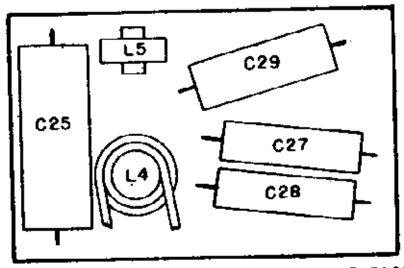


LOCATIONS OF PARTS ON TOP OF CHASSIS.

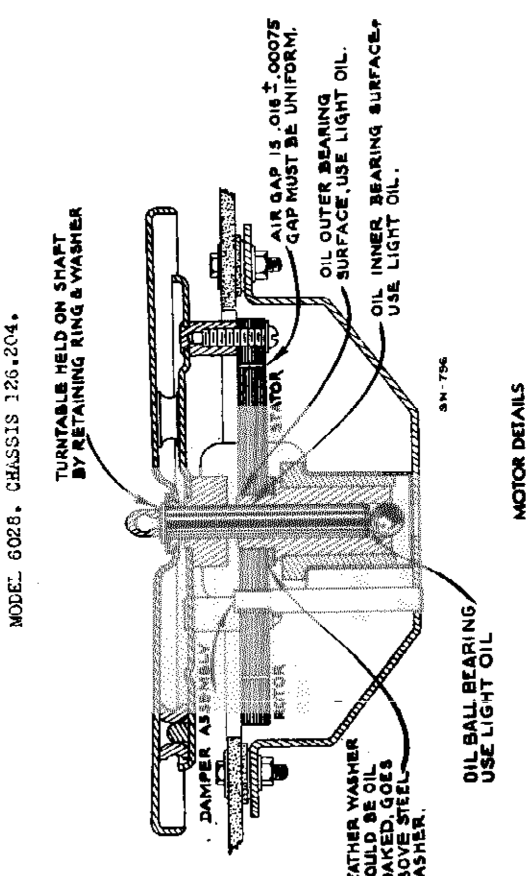


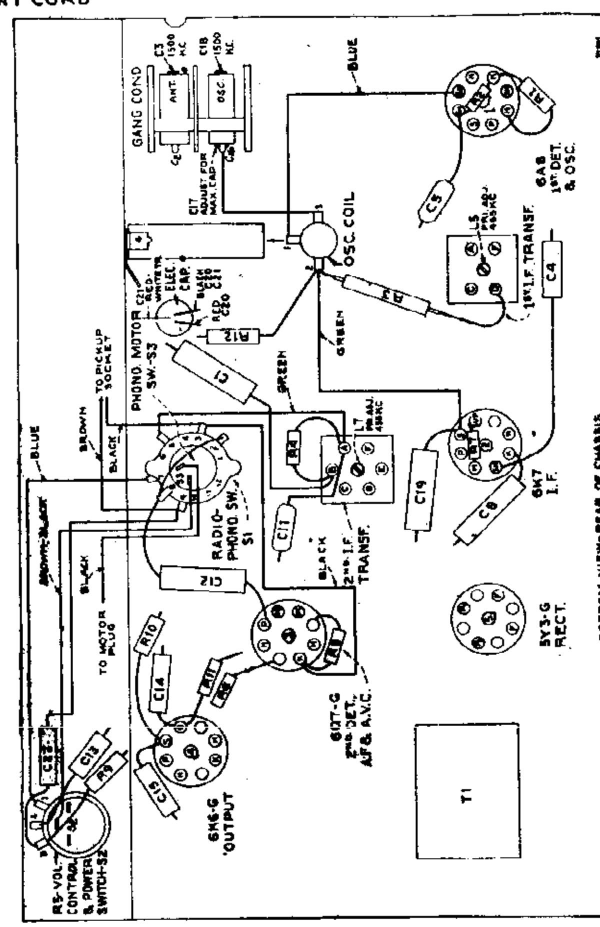
LOCATIONS OF PARTS UNDER CHASSIS.





LOCATIONS OF PARTS UNDER POWER PACK.





ALIGNMENT PROCEDURE

PRELIMINARY: MODEL 6038, 6138 CHASSIS 101.517.

Output meter connections .... Across speaker voice coil
Output meter reading to indicate 1.0 watt output .... 1.25 volts
Approximate average sensitivity in microvolts for 1.0 watt output .... See chart below
Dummy antenna value to be inserted in series with generator output .... See chart below
Connection of generator output lead .... See chart below
Connection of generator ground lead .... To chassis
Generator modulation .... 30%, 400 cycles
Position of Volume Control .... Fully clockwise
Position of Radio-Phono Switch .... Second position from left
Position of Dial Pointer with variable tuning condenser fully closed .... To coincide with horizontal lines on dial

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
Low End	455 kc	.001 mfd.	6K7 Grid	L7, L8	2nd I-F Trans.	15,000
Low End	455 kc	.001 mfd.	6A8 Grid	L5, L6	1st I-F Trans.	270
1,500 kc	1,500 kc	.0002 mfd.	Ant. Lead (Blue)	C18*, C3	Osc., Ant.	25

IMPORTANT ALIGNMENT NOTES

* Trimmer C17, on opposite side of gang condenser from C18, should be screwed clockwise for maximum capacity before adjusting C18.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the a-v-c action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Remove the dummy antenna used for alignment at any other frequency. Grid cap leads should remain in place during alignment.

Values shown under "Microvolts" are only approximate.

Eliminating Whistle at 910 KC:

A whistle, due to a beat between the second harmonic (910 kc) of the 455 kc I.F., and a 910 kc signal may be experienced. In localities where the 910 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the i-f frequency of the receiver.

Determine at what point between 880 kc and 940 kc the whistle will be least objectionable. Dividing this frequency by two will give the new i-f frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the I.F. should be realigned at 915/2 or 457.5 kc. Try to select the new i-f frequency as near to 455 kc as possible.

Align the I.F. at the new frequency and then realign the rest of the receiver as described under "ALIGNMENT PROCEDURE"

Phonograph Motor:

Starting.—The phonograph motor switch (S3) is turned "on" in the two phonograph positions of the Radio-Phono switch; and it is turned "off" in the two radio positions. To start the phonograph motor, turn the Radio-Phono switch to one of the two phonograph positions, which applies power to the motor, and then give the motor a clockwise twirl with the hand.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

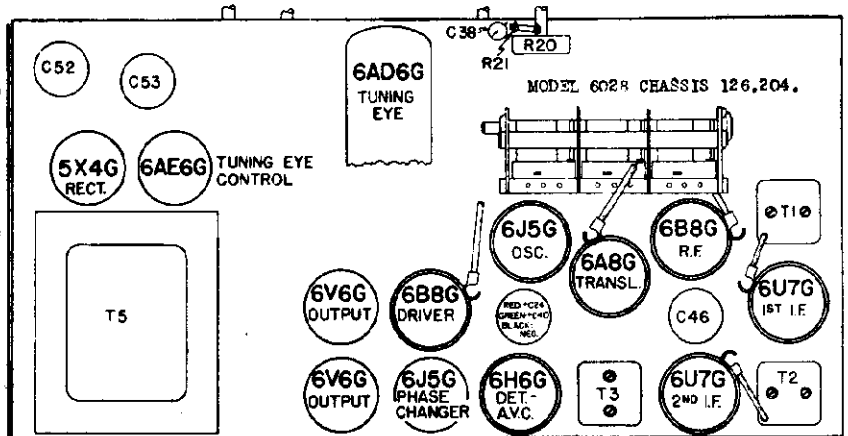
Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rotor Adjustment.—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of the rotor must be flush with the top of the stator; add additional steel washers beneath the stator if necessary.

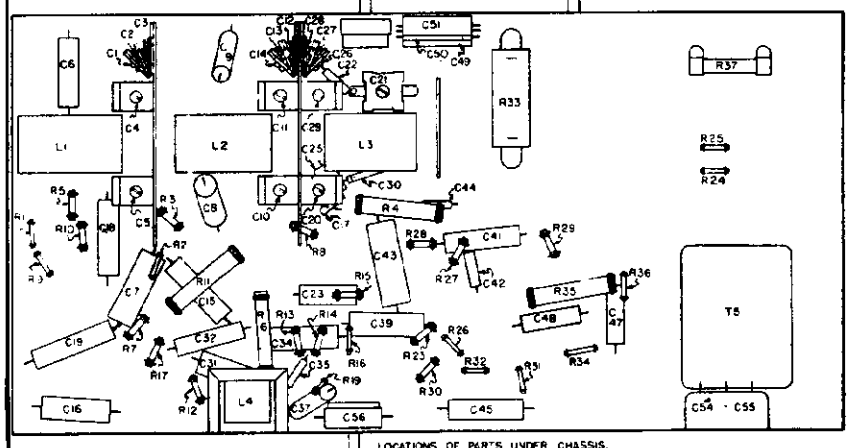
Lubrication.—Oiling points are indicated on "Details of Motor".

OPERATING FEATURES:
- Phonograph-Radio operation
- Manual-starting, synchronous-type motor
- Two-point Tone Control
- Automatic Volume Control

CHASSIS FEATURES:
- No. I-F Stages .... One
- Antenna .... Doublet or Conventional
- Line Noise Electrostatic Transformer Shield
- Magnet e-Core Adjusted I-F Transformers



LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

ELIMINATING WHISTLE AT 930KC:

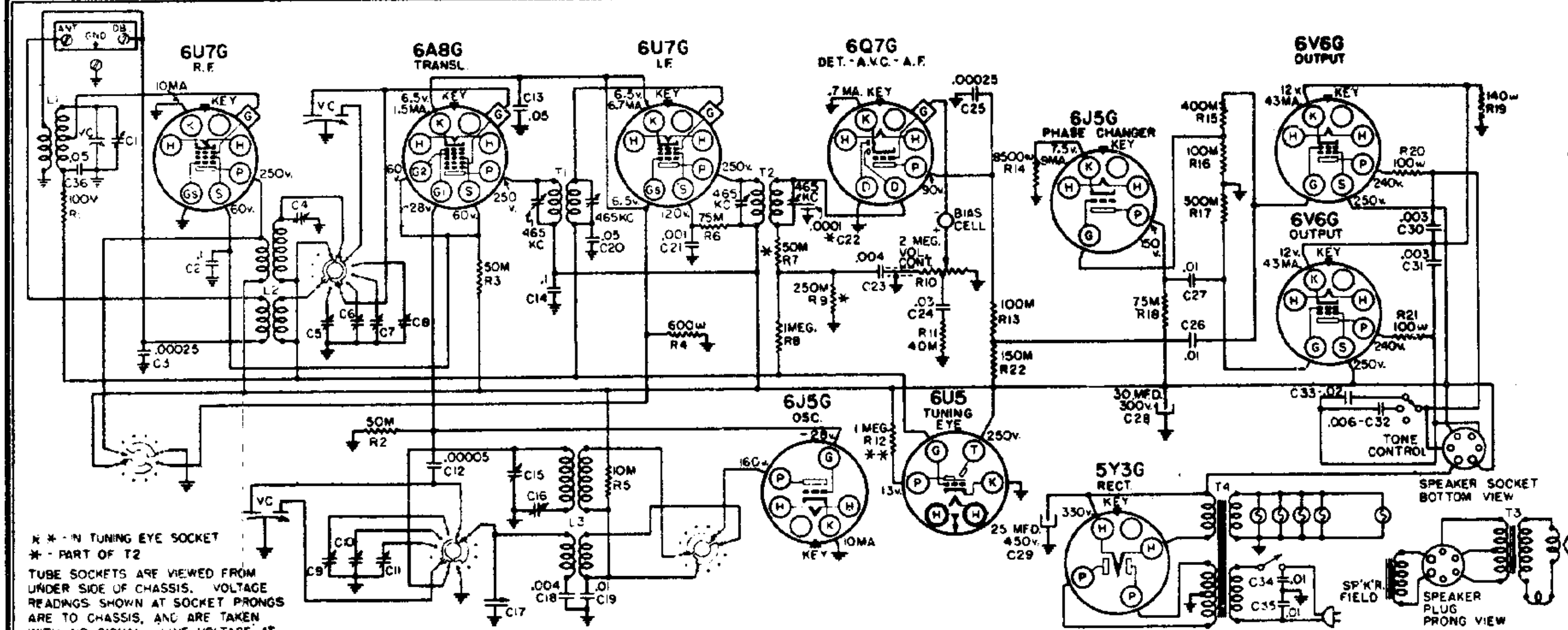
A whistle, due to a beat between the second harmonic (930 kc)of the 455 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 930 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as close to 455 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

MODELS 6036, 6136
Chassis 101.511
Schematic, Voltage
Color Code, Data

SEARS-ROEBUCK & CO.



$\ast\ast$ - IN TUNING EYE SOCKET
$\ast$ - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHEN NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS TAKEN WITH WAVE SWITCH IN BROADCAST POSITION.

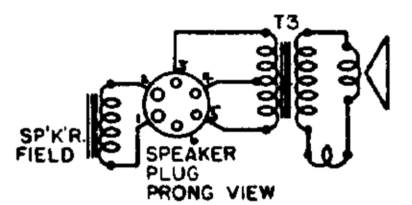
IF PEAK 465 KC

JULY 1, 1938

FOR ALIGNMENT
SEE PAGE 10-44

SPEAKER PLUG COLOR CODE

1. Black
3. Yellow
3. Brown
4. Red
5. Green
6. Blank



POWER SUPPLY:
All models available . . . . 105-125 volts, 50-60 cycle, 102 watts
All models available . . . . 105-125 volts, 25 cycle, 115 watts

FREQUENCY RANGES:

Band "AM" . .	540-1750 kc
Band "SW" . .	5.95-18.3 mc
Band "9"	9.4-9.7 mc
Band "11" . .	11.5-12.1 mc
Band "15" . .	14.3-15.4 mc

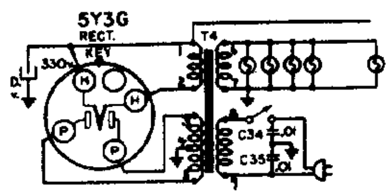
ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	500 kc
Band "SW"	--	15 mc	Fixed
Band "9"	9.55 mc	9.55 mc	Fixed
Band "11"	11.7 mc	11.8 mc	Fixed
Band "15"	15 mc	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 455 kc

PWR. TRANSF. COLOR CODE

1, 2. Red
3. Red
4. Slate
5. Blue
8, 7. Black
8. Green
9. Black



POWER OUTPUT:
Distorted . . . . 6 watts
Type . . . . Push pull beam tubes
Maximum . . . . .10 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 10 and 12 inch
Field coil resistance . . . . 600 ohms
App. field coil voltage drop . . 95 V.

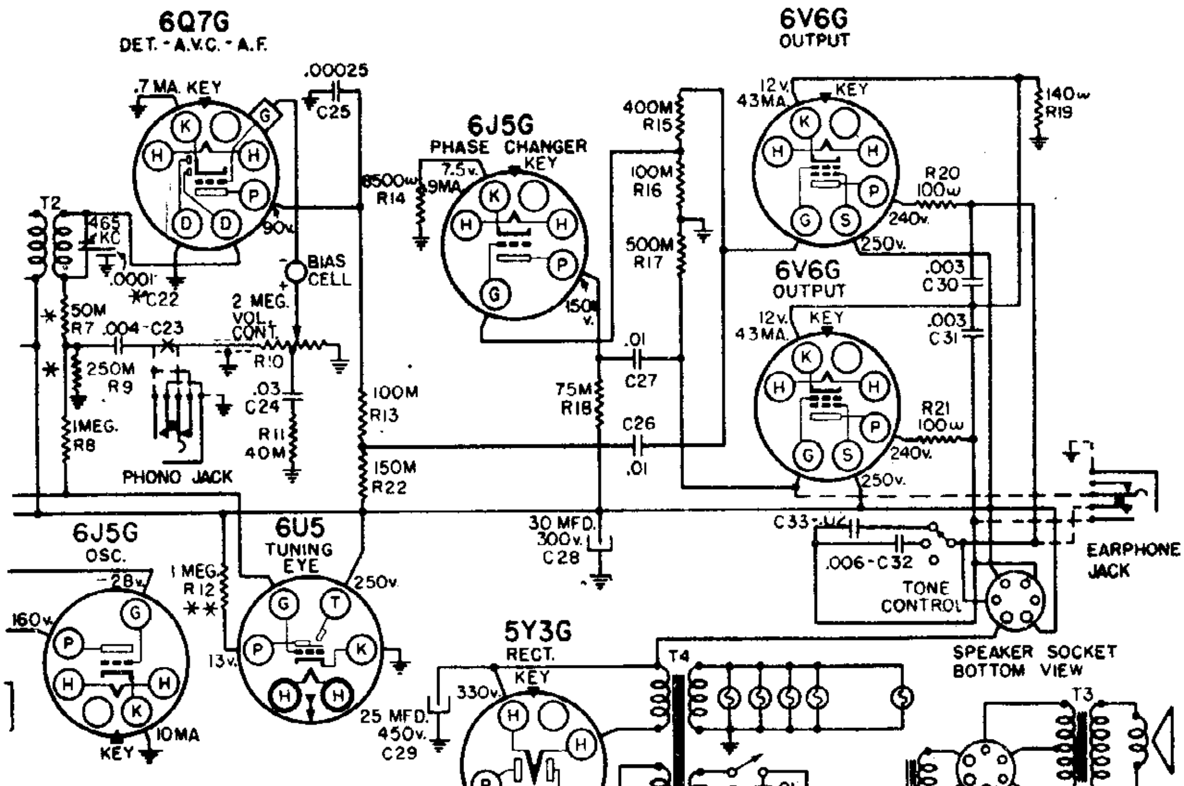
SEARS-ROEBUCK & CO.

MODELS 6036, 6136
Chassis 101.511
Phone, Phono. Jacks
Drive Data, Notes

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

Part number 1015119531 jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.



X INDICATES LEAD TO BE BROKEN.
DOTTED LINES INDICATE NEW CONNECTIONS.

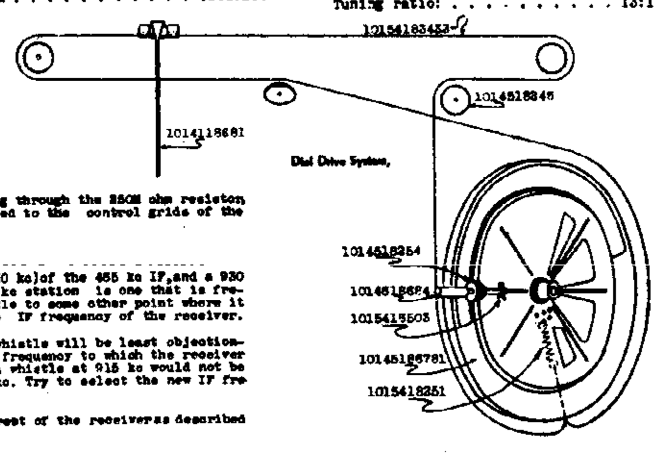
CHASSIS FEATURES:
Number RF stages . . One (on Band "AM")
Number IF stages . . . . One
Tuning Eye
Number condensers in gang . . . . Three
Antenna . . . . Doublet

CONTROL OPERATION:
Turning right: . . . . Volume increase
Turning right: . . "ON", "HI", "MED", "LO"

Turning right: "AM", "SW", "9", "11", "15"
Tuning ratio: 13:1

OPERATING FEATURES:
Tone Control . . . . Three position
Automatic Volume Control
Three Spread Bands
Push Button Tuning (8 button)
Band Indicator

OPERATING CONTROLS:
1. Upper left knob . . . . Volume
2. Lower left knob . . . "On-Off" Switch and Tone
3. Lower right knob. . Wave Band Switch
4. Upper right knob. . Station Selector



Dial Drive System,

THE AVC CIRCUIT:

The diode current of one of the 6Q7G diode plates, flowing through the 250M ohm resistor R9, creates a voltage drop across it. This voltage is applied to the control grids of the RF, translator, and IF tubes, to provide AVC.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

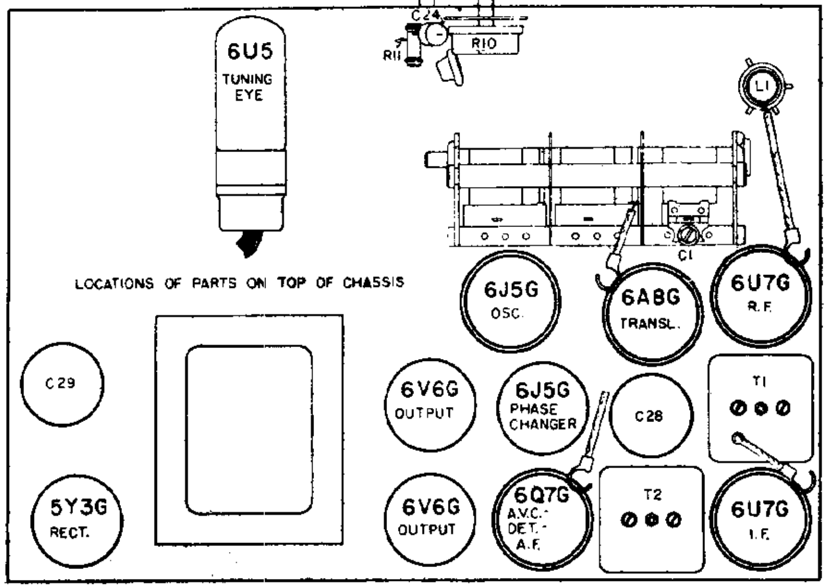
Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near as possible to 465 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

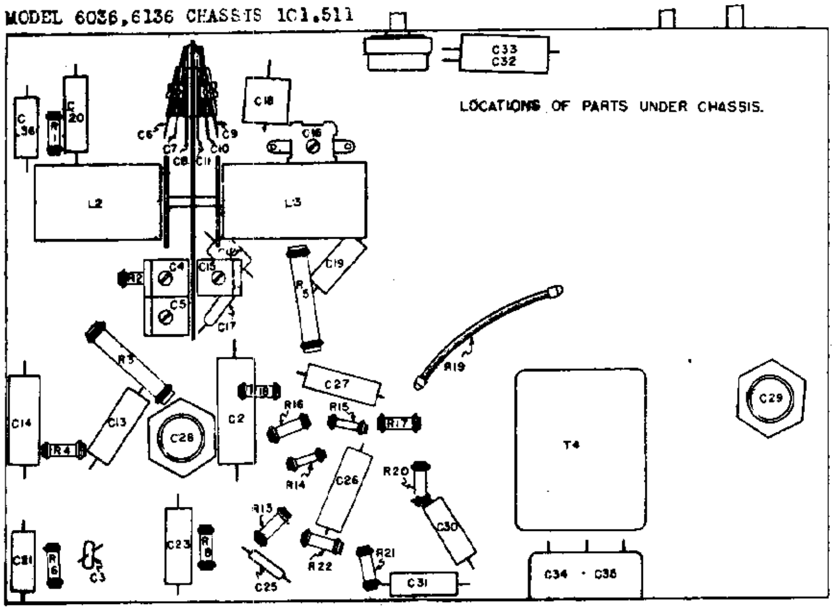
MODELS 6036,6136
Chassis 101.511
Socket,Trimmers
Chassis,Tuner Data

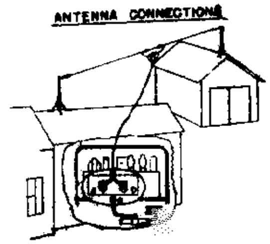
SEARS-ROEBUCK & CO.

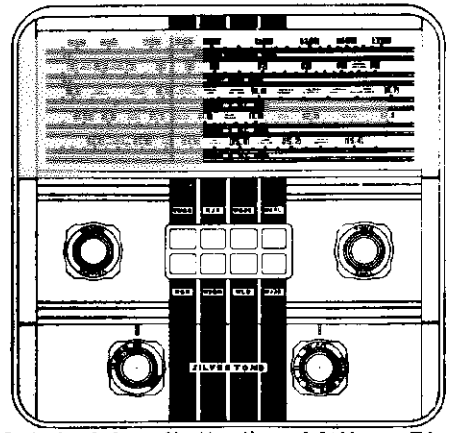
CHASSIS 101.509, 101.510, 101.512, 101.513, 101.515, 101.517, 101.524, 101.534
Tuner Data



MODEL 6036,6136 CHASSIS 101.511







TUNER DATA FOR CHASSIS:- 101.509,101.510,101.512, 101.513,101.515,101.517, 101.524,and 101.534.

PUSH BUTTON TUNING

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is advisable, but not necessary, to arrange the stations in the order of their frequency (kilocycles); that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, Short Wave stations that can be tuned in on the "9", "11", or "15" mc bands can be set up for push button tuning. The stations selected must give strong and reliable reception. The Band Switch knob must be turned to the proper position for the stations selected.

2. Pull the volume control and tuning knobs off of their shafts. Remove the snap-in buttons that were covered by the knobs. The escutcheon (the plate through which the push buttons protrude) can then be removed. Be careful not to lose the snap-in buttons.

3. Replace the tuning knob on its shaft. Push the knob in and turn it so that the dial pointer comes to the left end of the dial. A key will be found in the Instruction Leaflet envelope. Engage this key with the slotted shaft that is between the tuning knob and the push buttons. Unlock the mechanism by pushing the shaft in and unscrewing it(turn counterclockwise as far as it will go. Do not force it. About 5 turns is sufficient to loosen it completely. (A screw driver can be used for unlocking the mechanism instead of the key supplied.) Then remove the key.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly, as indicated by the tuning eye. Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button. Then let go of the push button, making sure not to turn the tuning knob until you have let go of the button. (Turning the knob while the button is pushed in would spoil the accuracy of the adjustment.)

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button and then the tuning knob. Proceed in the same manner for the other stations on your list.

6. When all of the stations have been set up, push the tuning knob in and turn it so that the dial pointer comes to the right end of the dial. Then lock the mechanism by securely tightening (turning clockwise) the slotted shaft, using the key supplied or a screw driver.

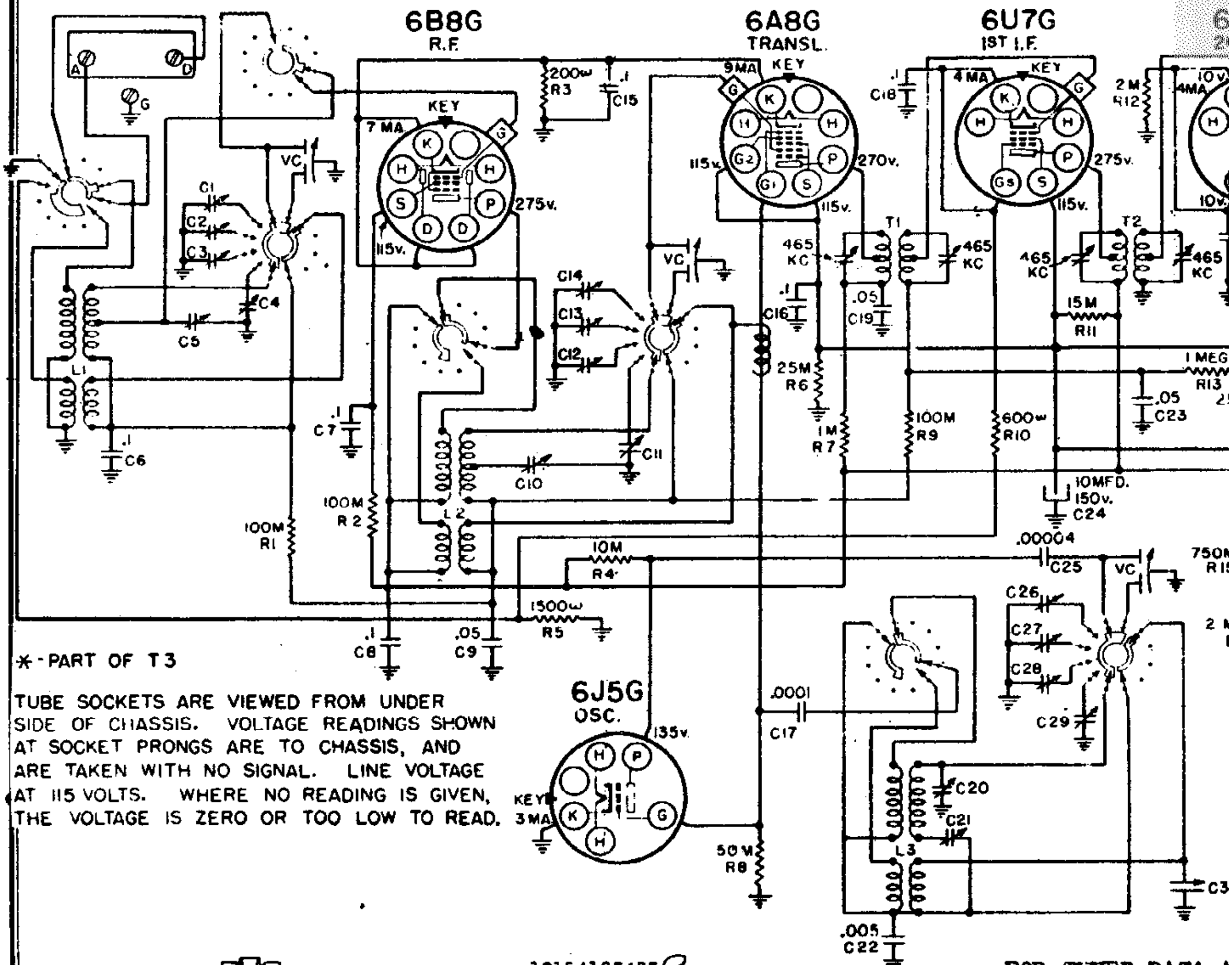
7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the celluloid holders at the back of the escutcheon. Be sure to insert the call letters so that they are opposite their respective push buttons. Then replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the call letter holder in their proper position.

OPERATION:

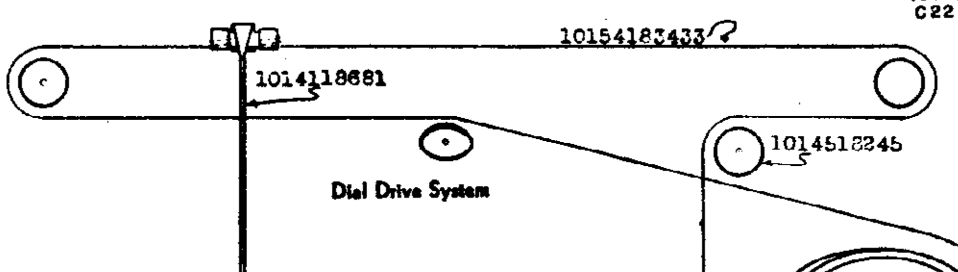
Push the button, indicated for your desired station, all the way in. Your station then will be tuned in. If you have selected short wave stations for push button tuning, be sure the band switch is turned to the proper band. The button will remain part way in, indicating what station is tuned in, until you push another button or the tuning knob.

WIRING DIAGRAM FOR SILVERTONE CHA



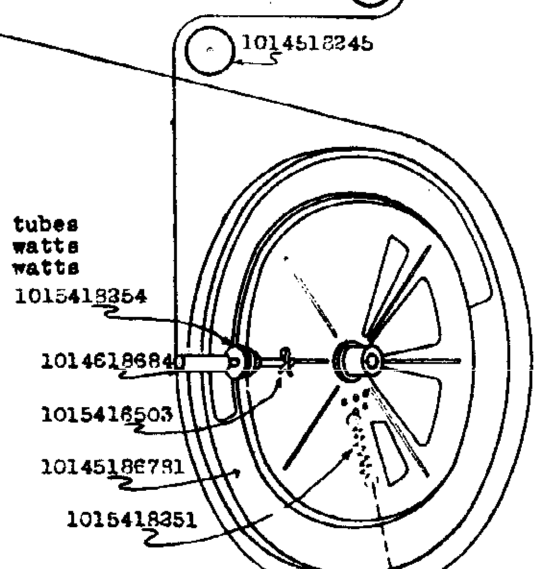
*-PART OF T3

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.



Dial Drive System

FOR TUNER DATA A
ALIGNMENT, SEE IN



FREQUENCY R
Band "
Band "
Band "
Band "
Band "

POWER OUTPUT:
Type . . . . Push pull beam tubes
Undistorted . . . . 8.5 watts
Maximum . . . . 13 watts

POWER SUPPLY:
All models available
105-135 volts, 50-60 cycle, 145 watts
105-135 volts, 25 cycle, 150 watts

LOUD SPEAKE
Type .
Size .
Field
App. f

SPEAKER PLUG COLOR CODE
1. Black
2. Yellow
3. Brown
4. Red
5. Green
6. Blank

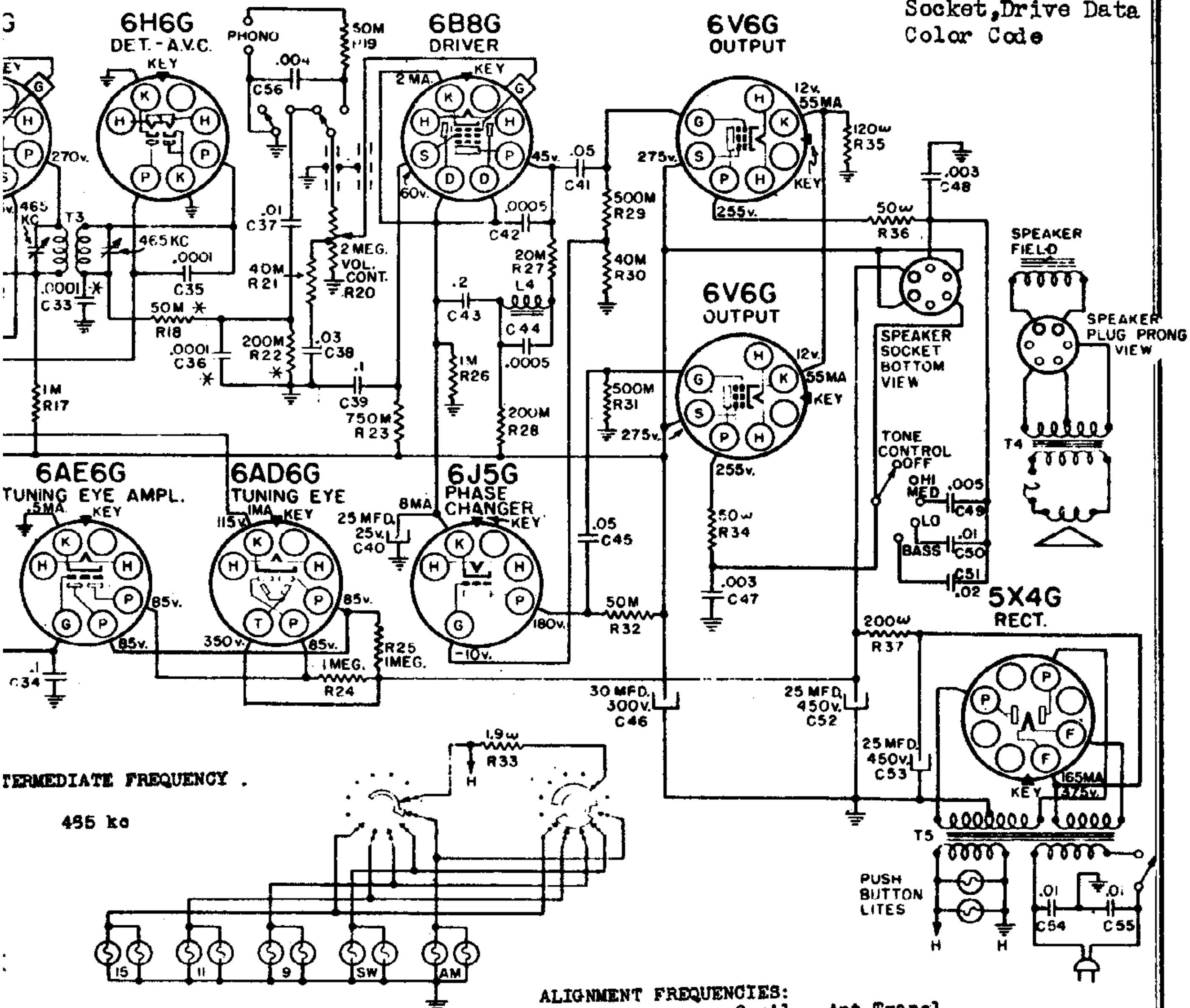
57 RL 119

JUNE 27, 1938

MODELS 6038,6138
Chassis 101.517
Schematic, Voltage
Socket, Drive Data
Color Code

ICK & CO.

S 101.517



TERMEDIATE FREQUENCY .

455 kc

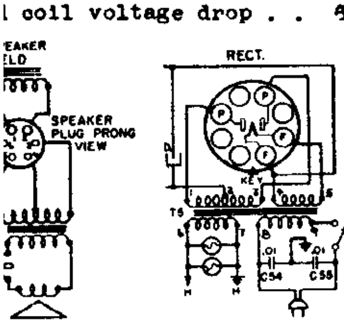
S:

. . . . 543-1750 kc
. . . . 5.9 mc-18.1 mc
. . . . 9.4 mc-9.7 mc
. . . . 11.5 mc-12.1 mc
. . . . 14.6 mc-15.8 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "SW"	18 mc	15 mc	Fixed
Band "9"	9.55 mc	9.55 mc	Fixed
Band "11"	11.7 mc	11.7 mc	Fixed
Band "15"	14.9 mc	14.9 mc	Fixed

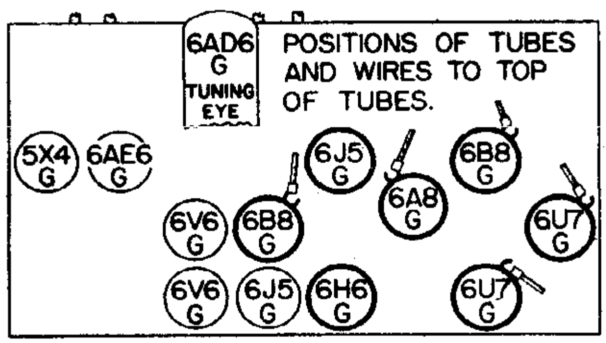
. . . . Dynamic
. . . . 12 inch
resistance . . . . . 480 ohms
coil voltage drop . . 65 V.



PWR. TRANSF COLOR CODE

1. Red
2. Slate
3. Blue
4,5. Red
6,7. Black
8. Black
9. Green

TUBE LAYOUT

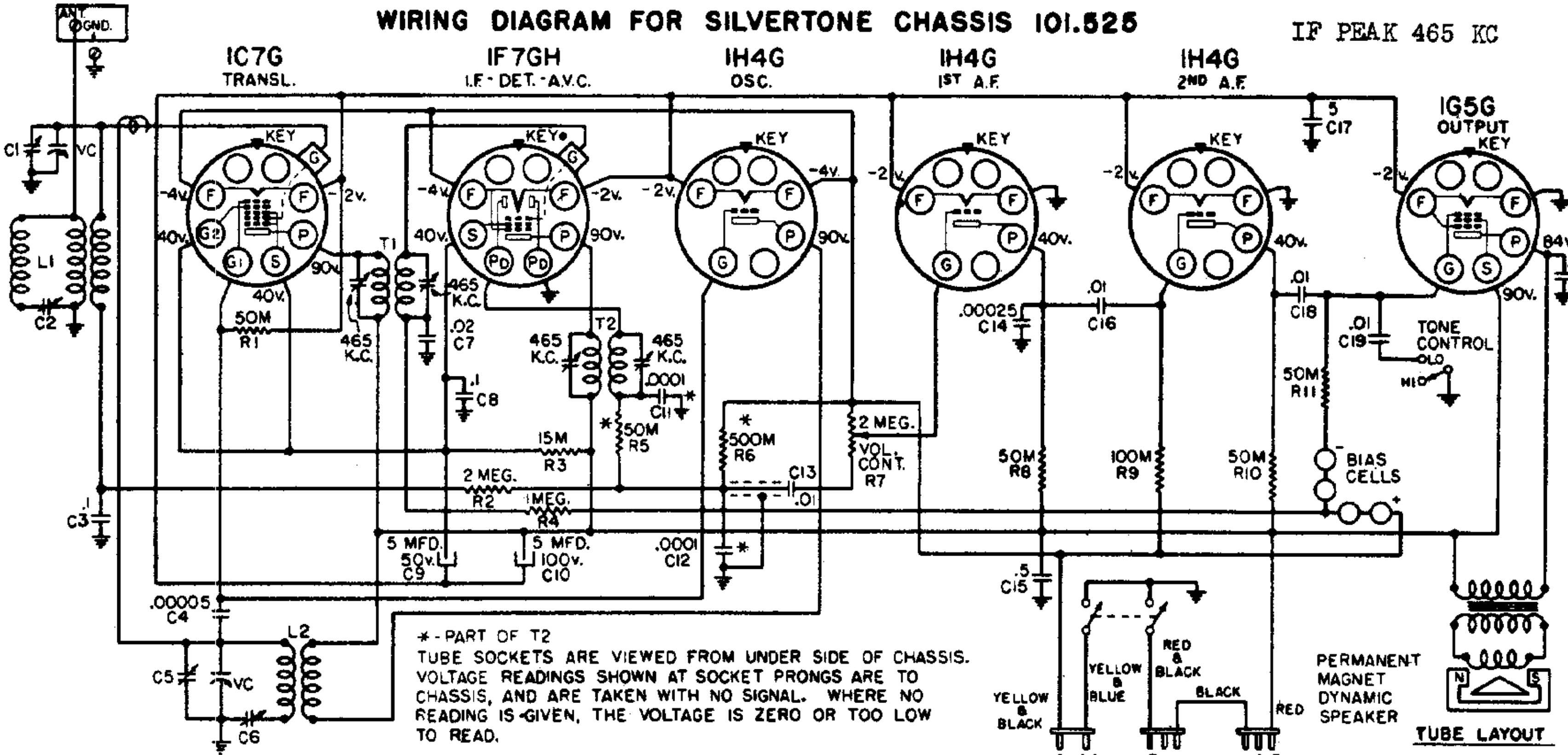


Schematic, Voltage
Socket, Data

SEARS-ROEBUCK & CO.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.525

IF PEAK 465 KC



*-PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

FOR ALIGNMENT, SEE PAGE 10-10

POWER SUPPLY:
"A" Battery (4½ volt dry) . . . 1 - #5030
"A" Battery (4 volt storage) 1 - #5049

FREQUENCY RANGE:
Broadcast . . . . 540-1750 kc

INTERMEDIATE FREQUENCY . . . . 465 kc

"B" Batteries . . . . 3 - #5140
"A" Drain . . . . 0.24 amperes
"B" Drain . . . . 18 ma

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1400 kc	1400 kc	600 kc

POWER OUTPUT:
Type . . . . Single Pentode
Undistorted . . . . 0.35 watts
Maximum . . . . 0.4 watts

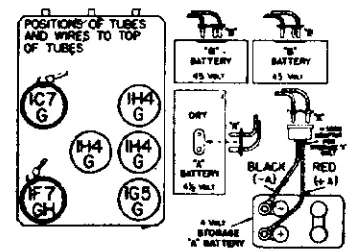
CHASSIS FEATURES:
Number IF stages . . . . One
Built-in Wave Trap
Plugs attached to battery cable

OPERATING FEATURES:
Tone Control . . . . Two position.
Automatic Volume Control
"On-Off" indicator
Push Button Tuning (4 button)

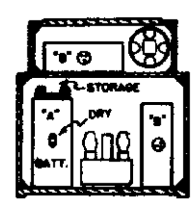
LOUD SPEAKER:
Type . . . . PM Dynamic
Size . . . . 6 inch

FOR TUNER DATA SEE INDEX

TUBE LAYOUT



ARRANGEMENT OF BATTERIES



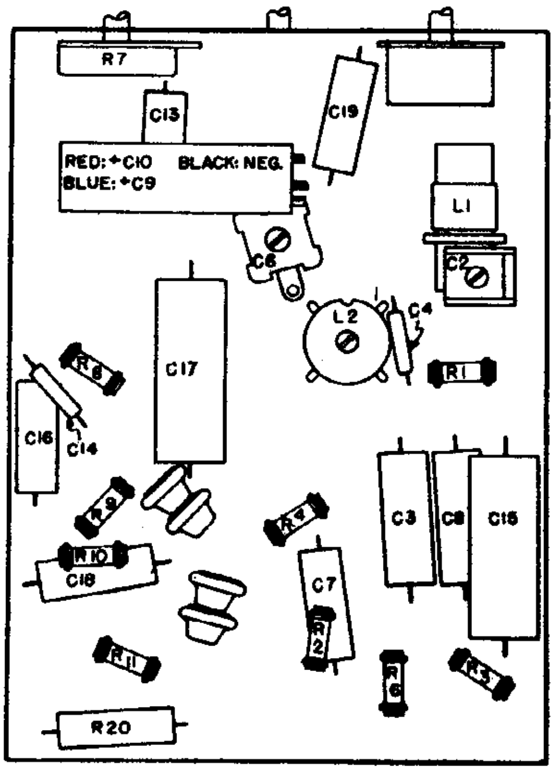
JUNE 13, 1938

MODELS 6052,6053
Chassis 101.525
Socket,Trimmers
Chassis

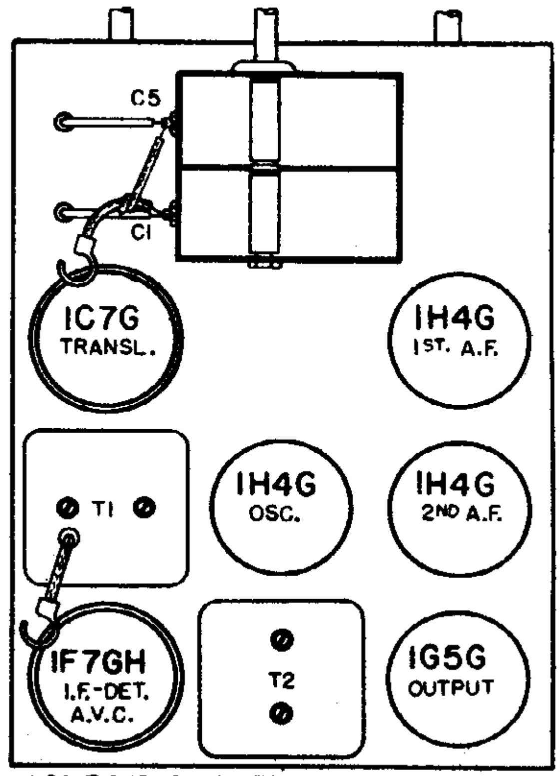
SEARS-ROEBUCK & CO.

MODELS 6052,6053.
CHASSIS 101.525.

MODELS 6110,6111
Chassis 101.508
Socket,Trimmers
Chassis,Alignment



LOCATIONS OF PARTS UNDER CHASSIS

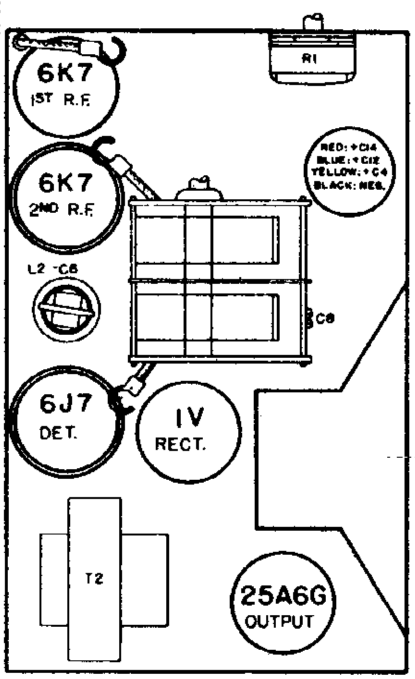


LOCATIONS OF PARTS ON TOP OF CHASSIS.

ALIGNMENT PROCEDURE:

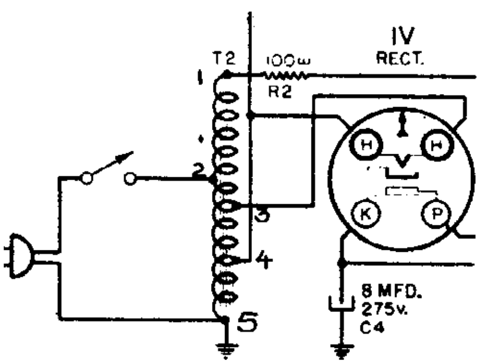
FOR CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. V111 INDEX

Either a broadcast station of about 1400 kc or a signal generator can be used for alignment. The chassis must be taken out of the cabinet for alignment of the trimmer, C8. The volume control setting should be reduced so that the signal is just audible in order to facilitate accuracy of adjustment. This set has no AVC so that a strong input signal may be used.



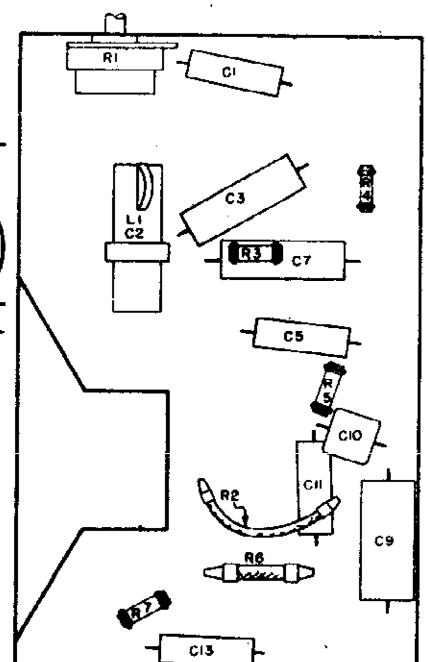
LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 6110, 6111
Chassis 101.508



PWR. TRANSF.
COLOR CODE

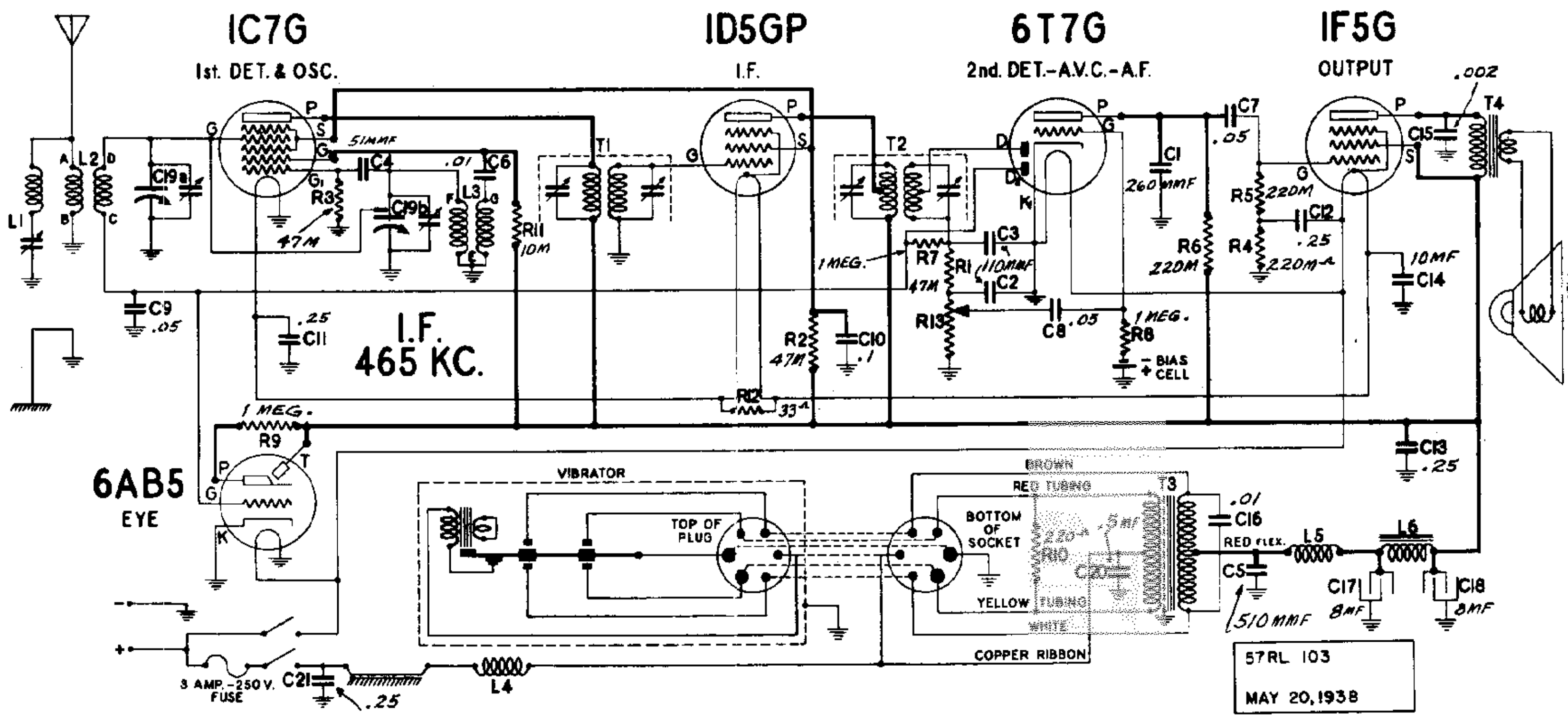
1. Red
2. Green
3. Yellow
4. Blue
5. Black

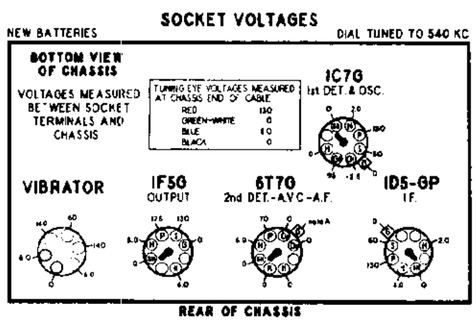


LOCATIONS OF PARTS UNDER CHASSIS.

SEARS-ROEBUCK & CO.

MODELS 6070, 6170
Chassis 100.189
Schematic, Voltage
Coils





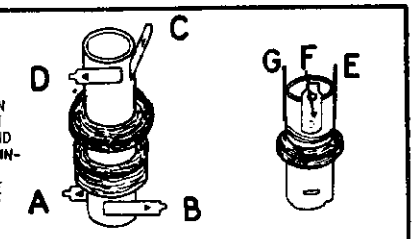
Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6T7-G tube is -1.0 volt supplied by a bias cell. Due to the high resistance of the cell the voltmeter will indicate only a fraction of a volt.

IMPORTANT: The bias for the control grid of the 1D5-GP tube is -2.0 volts measured across the filament of the 1C7-G tube. The bias for the control grid of the 1F5-G tube is -4.0 volts measured from the low side of the 1F5-G tube filament to ground.

FORM NO. 8725 PRINTED IN U.S.A.

NOTE:
TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS AT THE RIGHT ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.



ANTENNA COIL   OSCILLATOR COIL

POWER SUPPLY
All models available....................6 volt - 1.3 Amp.
"B" supply vibrator....................Synchronous; plug-in type

FREQUENCY RANGE
537 to 1730 KC.

ALIGNMENT FREQUENCY
1500 KC.

INTERMEDIATE FREQUENCY....................465 KC.

POWER OUTPUT
Type....................Pentode
Undistorted....................0.31 Watts
Maximum....................0.55 Watts

OPERATING FEATURES
Fidelity Range....................50-5000 Cycles
Volume Stabilizer....................A.V.C. System
Number of I.F. Stages....................One

LOUD SPEAKER
Type....................Perm. Magnet Dynamic
Size....................5"

CHASSIS FEATURES
Number of Cond. in Gang....................Two
Antenna....................Conventional
465 KC. Wave Trap

MODELS 6070,6170
Chassis 100.189
Socket,Trimmers
Chassis,Alignment

SEARS-ROEBUCK & CO.

MODEL 7225,Ch.110.255
Alignment

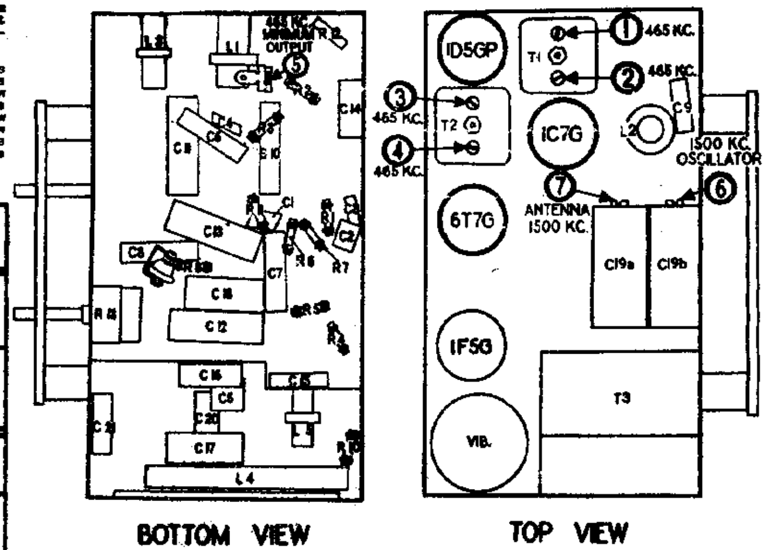
Model 6070, 6170 Chassis 100.189

ALIGNMENT PROCEDURE

Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial scale when the gang condenser is in full mesh. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full-mesh position.

Output meter connections------Across voice coil leads
Output meter reading to indicate 0.05 watt output------0.5 volts
Average sensitivity in microvolts for 0.05 watt output------See chart below
Connection of Generator Ground------Receiver chassis
Dummy Antenna in series with Generator Output Lead------See chart below
Connection of Generator Output Lead------See chart below
Generator modulation------30%, 400 cycles
Position of volume control------Maximum clockwise

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	SENSITIVITY MICRO-VOLTS	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 1C7-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1st I.F.	800	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	2nd I.F.		
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	-	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL	1500 KC	1500 KC	6	OSCILLATOR	-	ADJUST TRIMMER TO BRING IN SIGNAL
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	ANTENNA	50	ADJUST FOR MAXIMUM OUTPUT.



ALIGNMENT PROCEDURE

Model 7225 Chassis 110.255

Output Meter Connections . . . . Across Primary Output Transformer
Output Meter reading to indicate 0.050 watt
For Weston Type 571 Output Meter on 15 volt scale . . . . 9 volts
Average sensitivity in MV for .05 watts output . . . . see chart below
Dummy antenna value in series with generator output . . . . 100 MMFDS
Connection of generator ground lead . . . . To Chassis
Generator modulation . . . . App. 30% at 400 cycles
Position of volume control . . . . Fully clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
**	456 KC	Grid 6D6	T7*,T6,T8 T7,T6,T8	I.F.	4600
**	456 KC	Grid 6A7	T4,T5	I.F.	60
600 KC (Rock)	600 KC	Ant.	P	Osc.	16
1500 KC	1500 KC	Ant.	T3,T2	Osc.,R.F.	20
600 KC	456 KC	Ant.	T1	wave trap	***

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

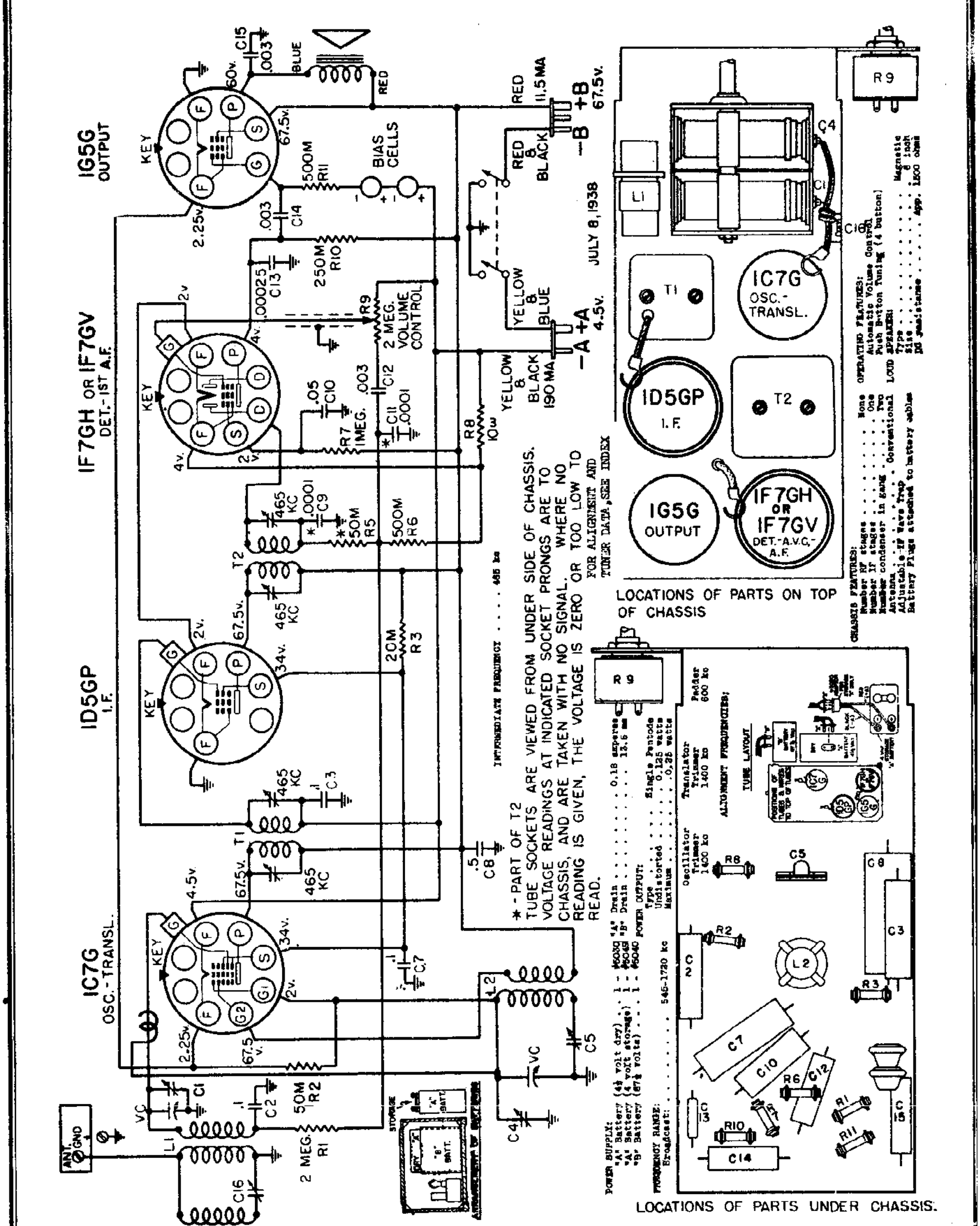
Values shown under "Microvolts" are only approximate.

**Short oscillator section of variable condenser.
Second I.F. alignment must be done twice to secure flat top tuning.
***Adjust trimmer for minimum signal response with maximum signal input.
*First time T7 is misaligned about one turn by loosening center screw.

Socket, Trimmers
Chassis

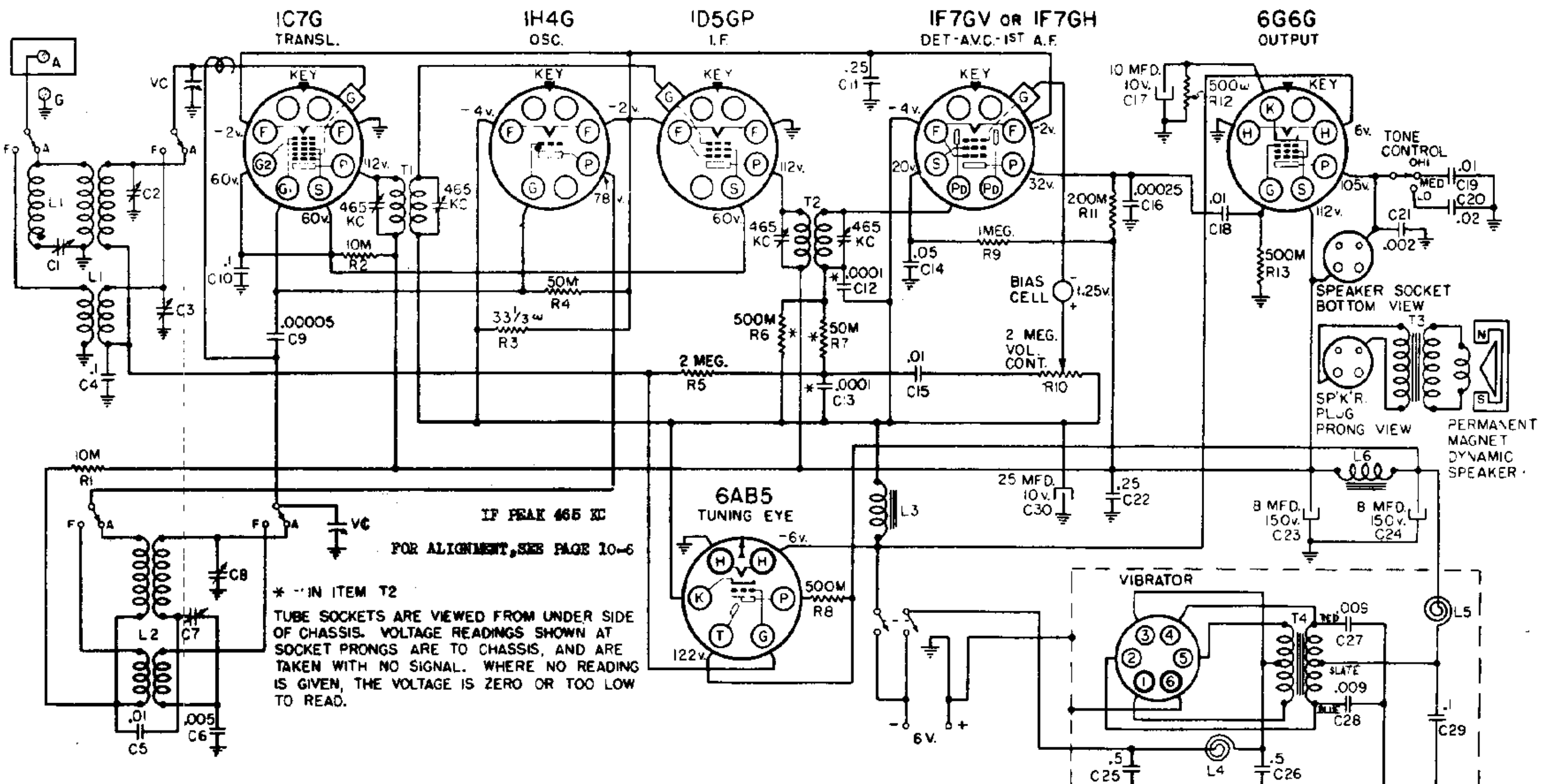
SEARS-ROEBUCK & CO.

MODELS 6054, 6055
Chassis 101.532
Schematic, Voltage



MODELS 6072, 6077, 6172
Chassis 101.513
Schematic, Voltage

SEARS-ROEBUCK & CO.



IF PEAK 465 KC

FOR ALIGNMENT, SEE PAGE 10-6

* - IN ITEM T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

FOR ALIGNMENT, SEE INDEX.

57 RL 116
JUNE 15, 1938

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
- 1C7G . . . . .Translator
- 1H4G . . . . .Oscillator
- 1D5GP . . . . IF
- 1F7GV or 1F7GH . . . . Detector-AVC-AF
- 6G6G . . . . .Output
- 6AB5 . . . . .Tuning Eye

POWER SUPPLY:
Six volt storage battery

Battery drain . . . . 1.5 amperes

FREQUENCY RANGES:
- Band "AM" . . . . 540-1730 kc
- Band "FOR" . . . . 5.9-18.2 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1730 kc	1400 kc	600 kc
Band "FOR"	--	16 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
- Type . . . . Pentode
- Undistorted . . . . 0.25 Watts
- Maximum . . . . 0.5 Watts

LOUD SPEAKER:
- Type . . . . PM Dynamic
- Size : . . . . 6 and 8 inch

OPERATING FEATURES:
- Tone Control . . . . . Three position
- Automatic Volume Control
- Push Button Tuning (6 button)

CHASSIS FEATURES:
- Number IF stages . . . . One
- Number condensers in gang . . . . Two
- Antenna . . . . Conventional
- Tuning Eye
- Synchronous Vibrator-Rectifier
- Built-in IF Wave Trap

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Upper left knob . . . . .Volume
2. Lower left knob . . . . Band Switch
3. Lower right knob . ."On-Off" Switch and Tone
4. Upper right knob . . . . . .Station Selector

CONTROL OPERATION:
- Turning right: . . . . Volume increase
- Turning right: . . . . "AM", "FOR"
- Turning right: . ."ON", "HI", "MED", "LO"
- Tuning ratio: 10:1

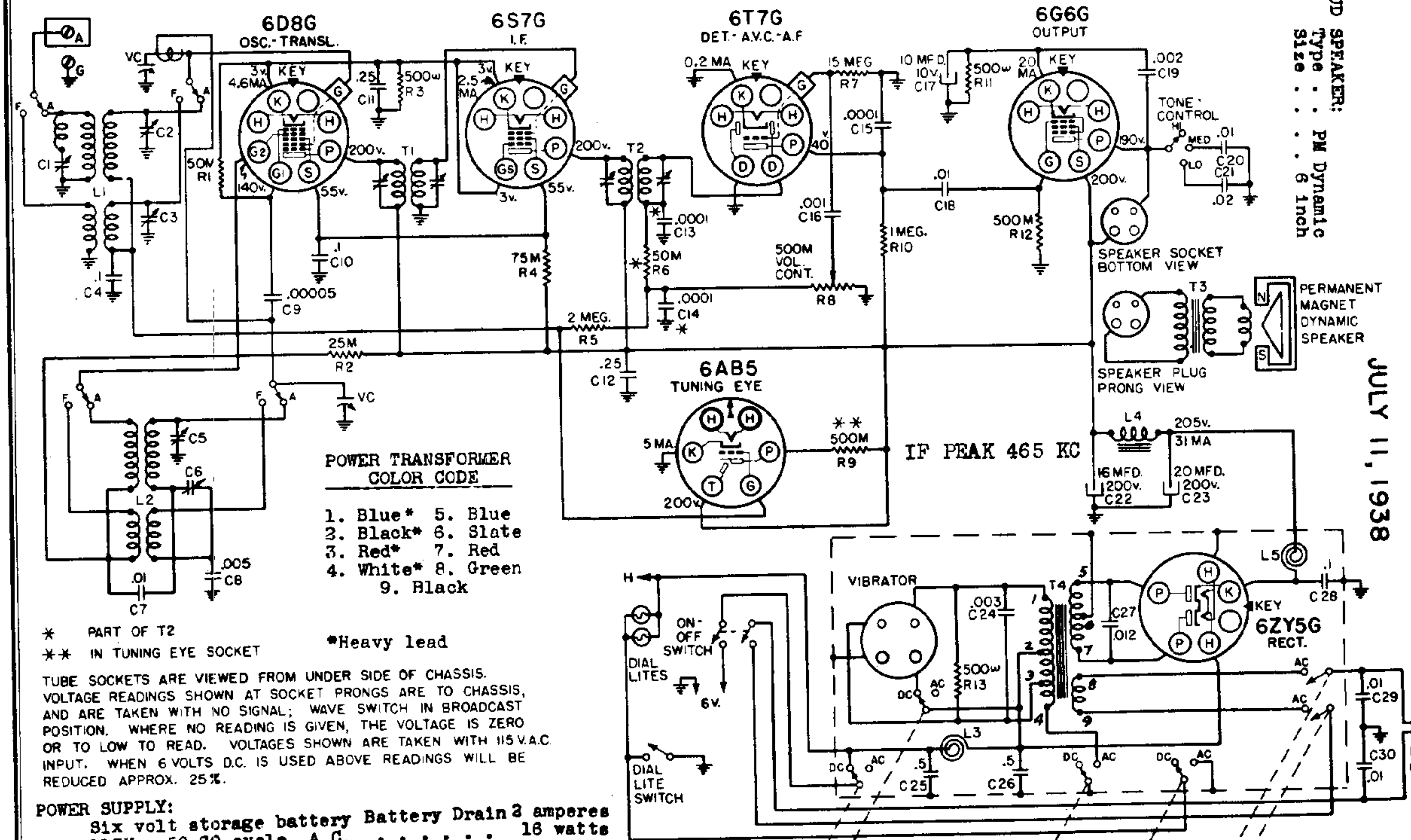
SEARS-ROEBUCK & CO.

MODELS 6073,6173,Ch.101.528
Schematic,Voltage

JULY 11, 1938

FOR ALIGNMENT, SEE INDEX.

LOUD SPEAKER:
Type . . PM Dynamic
Size . . . . 6 inch



POWER TRANSFORMER COLOR CODE

1. Blue* 5. Blue
2. Black* 6. Slate
3. Red* 7. Red
4. White* 8. Green
9. Black

*Heavy lead

* PART OF T2
** IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TO LOW TO READ. VOLTAGES SHOWN ARE TAKEN WITH 115 V.A.C. INPUT. WHEN 6 VOLTS D.C. IS USED ABOVE READINGS WILL BE REDUCED APPROX. 25%.

POWER SUPPLY:
Six volt storage battery Battery Drain 3 amperes
115V., 50-60 cycle, A.C. . . . . . . 16 watts

FREQUENCY RANGES:
Band "AM" . . . . 545-1730 kc
Band "FOR" . . . . . 6-18 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1500 kc	1500 kc	600 kc
Band "FOR"	--	15 mc	Fixed

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . 0.35 watts on A.C.; 0.25 watts on D.C.
Maximum . . . . . .0.5 watts on A.C.; 0.4 watts on D.C.

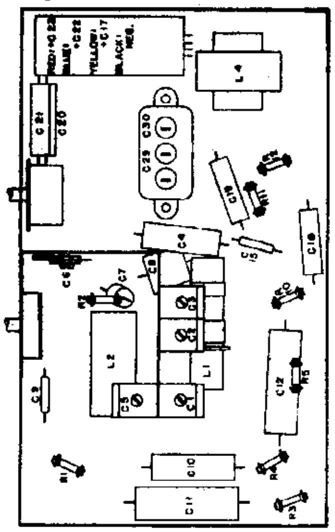
INTERMEDIATE FREQUENCY. . . . . .465 kc

MODELS 6073,6173
Chassis 101.528
Socket,Trimmers,Chassis

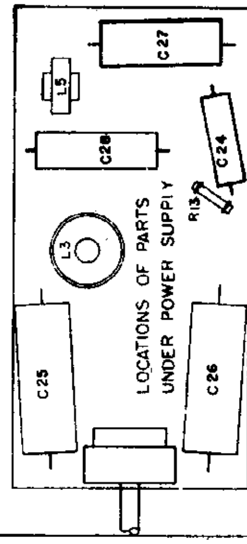
SEARS-ROEBUCK & CO.

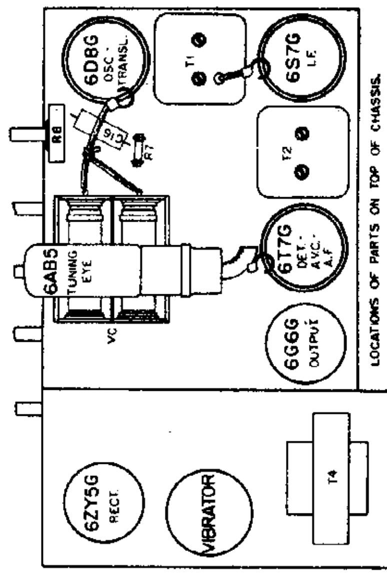
MODEL 6101,Ch.101.496
Socket,Trimmers,Chassis
Antenna Coil,Trimmers

MODELS 6073,6173. CHASSIS 101.528.

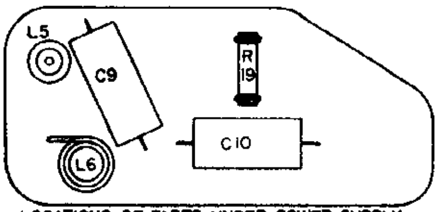


LOCATION OF PARTS UNDER CHASSIS.





LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER POWER SUPPLY
USE INSULATED TYPE RESISTORS FOR REPLACEMENT
WHERE USED ORIGINALLY

MODEL 6101. CHASSIS 101.496.

ANTENNA MATCHING:

Two separate adjustments are provided for matching the receiver to the particular car antenna. One adjustment consists of two taps on the antenna coil. The second adjustment is a trimmer, C1, on the variable condenser. It is accessible through a hole in the bottom cover of the receiver case. These adjustments are to be made as follows:

THE TAPPED ANTENNA COIL:

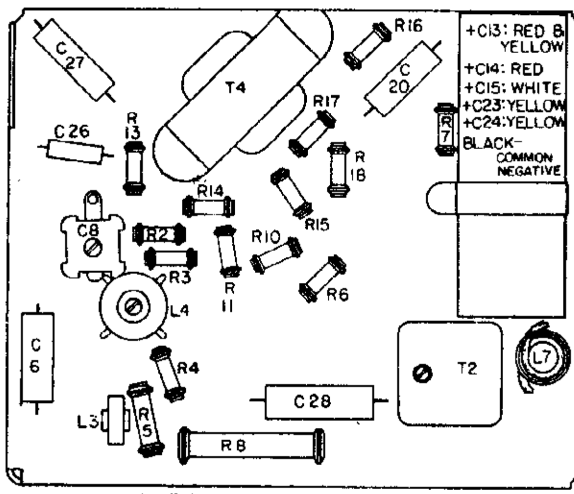
The adjustment of the tapped antenna coil should be made before installing the receiver on the car. Removal of the bottom cover of the receiver will reveal a terminal board mounted in the antenna coil shield can. The variable condenser plates must be closed for it to be seen. This terminal board has four jack holes, only two of which are used. These two are marked with the numerals "1", "2". The sets are shipped with the plug in hole #2.

THE ANTENNA TRIMMER ADJUSTMENT.

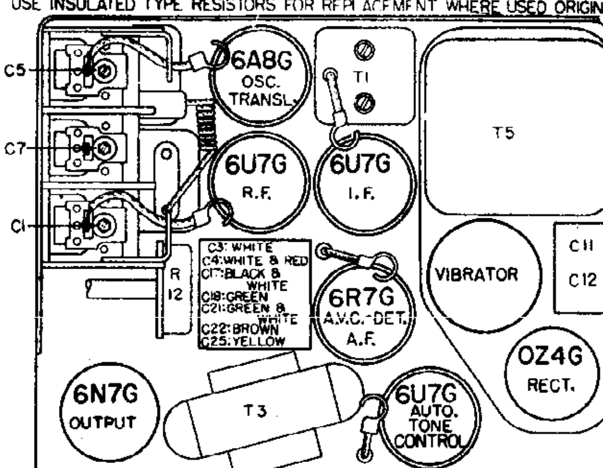
With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw (accessible through the hole in the bottom cover) to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the car's antenna may be such that the other antenna tap adjustment should be used.

The plug position should be changed to hole #1 if a WHIP type aerial, such as Catalog #6582, or any other aerial of less than 125 mmf. capacity is used.

CHASSIS FEATURES:
Automatic Tone Control
Number RF stages . . . . One
Number IF stages . . . . One
Number condensers in gang . . . . Three
Antenna filter
Tapped antenna coil for matching antenna capacity.
Variable antenna trimmer
Non-synchronous vibrator
Provision for combined Tone and Sensitivity control unit accessory.
Provision for Push Button Automatic Motor Tuner Accessory.
Provision for Auxiliary Speaker.



LOCATIONS OF PARTS UNDER CHASSIS
USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY



LOCATIONS OF PARTS ON TOP OF CHASSIS

SEARS-ROEBUCK & CO.

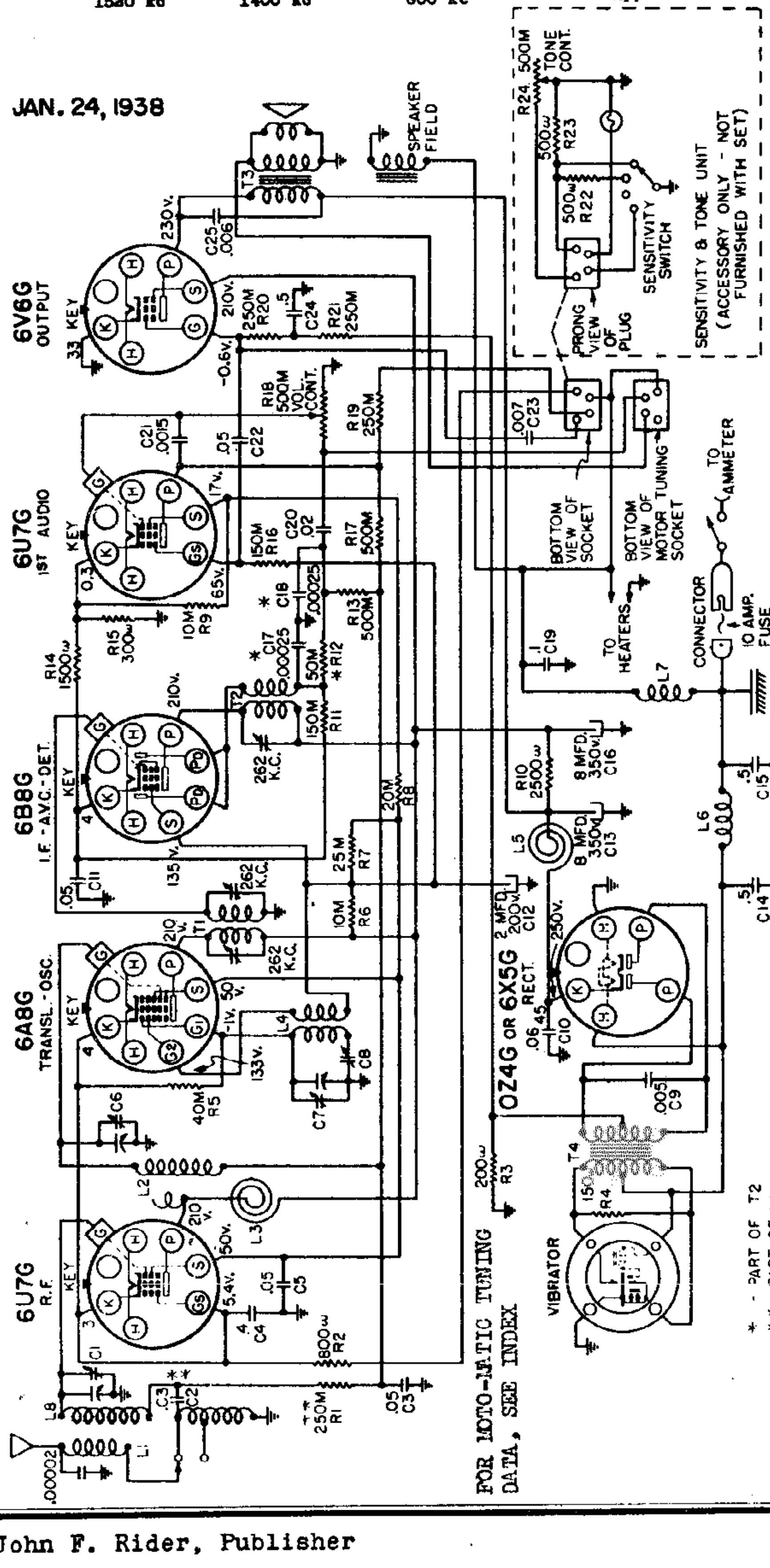
MODEL 6100, Ch. 101.495
Schematic, Voltage
Color Codes

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Ant.-Translator Trimmer	Padder
1520 kc	1400 kc	600 kc

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 8"
Approximate field resistance. . 4 ohms

JAN. 24, 1938



FOR MOTO-MATIC TUNING DATA, SEE INDEX

* - PART OF T2
** - PART OF L1

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERES.

IF PEAK 262 KC

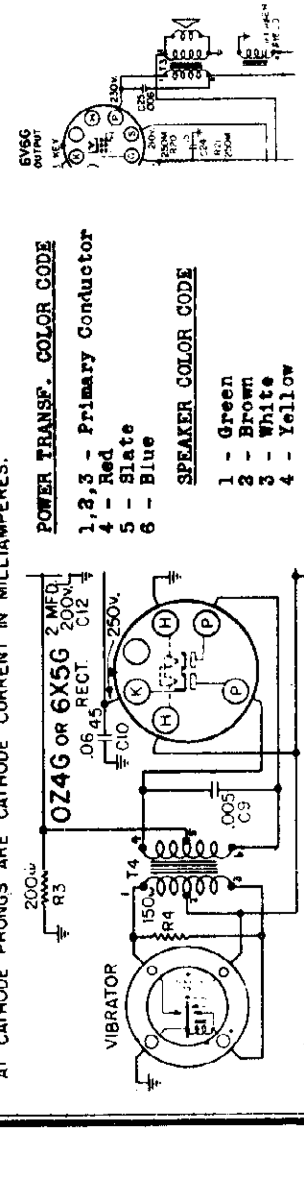
POWER SUPPLY:
"A" . . . . 6 volt, Automobile storage battery.
"B" . . . . Vibrator-Rectifier

"A" Drain . . . . 7 amperes
"B" Drain . . . . 54 ma

FREQUENCY RANGE:
Broadcast . . . . 540-1520 kc

INTERMEDIATE FREQUENCY . . . . . . 262 kc

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . 3.5 watts
Maximum . . . . 6 watts



POWER TRANSF. COLOR CODE

1,2,3 - Primary Conductor
4 - Red
5 - Slate
6 - Blue

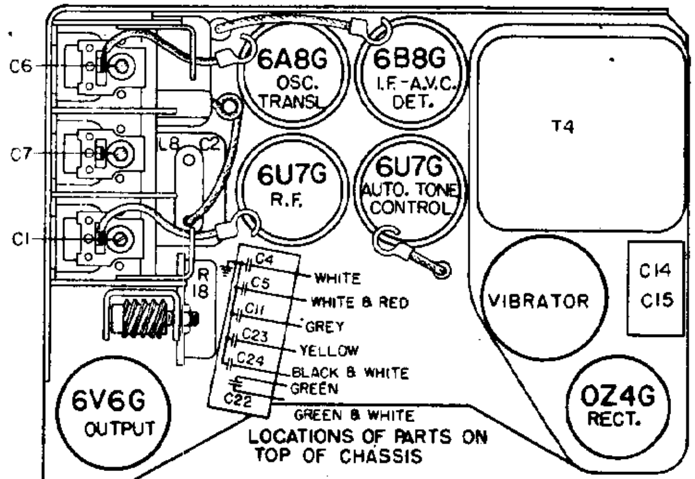
SPEAKER COLOR CODE

1 - Green
2 - Brown
3 - White
4 - Yellow

MODEL 6100,Ch.101.495
Socket,Trimmers,Chassis
Alignment

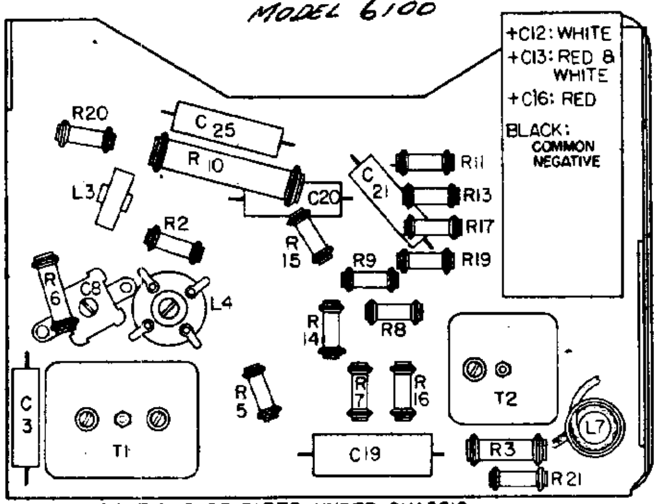
SEARS-ROEBUCK & CO.

MODEL 6101,Ch.101.496
Alignment



LOCATIONS OF PARTS ON TOP OF CHASSIS

MODEL 6100



LOCATIONS OF PARTS UNDER CHASSIS
USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY

THE ANTENNA TRIMMER ADJUSTMENT:

With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw (accessible through the hole in the bottom cover) to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the car's antenna may be such that the other antenna tap adjustment should be used.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across loud speaker voice coil
Output meter reading to indicate 1 watt . . . Model 6101-1.05 volts, Model {6101-.65 volts, 6100-.89 volts
Average sensitivity microvolts for 1 watt output . . . . See chart below
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully on
Position of Antenna Tap . . . . #3 hole
The chassis must be in its case although the covers may be removed during the alignment procedure.

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS Model 6100	6101
Closed	262 kc	.1 mfd.	6A8G Grid	T2, T1	IF	600	600
Fully Open	1520 kc	.0002 mfd.	Antenna Conn.	C7	Oscillator, Trimmer	1.5	1.0
1400 kc	1400 kc	.0002 mfd.	Antenna Conn.	*C1, C8	Antenna, Translator	1.5	1.0
600 kc (rock)	600 kc	.0002 mfd.	Antenna Conn.	C8	Padder	2.8	2.0

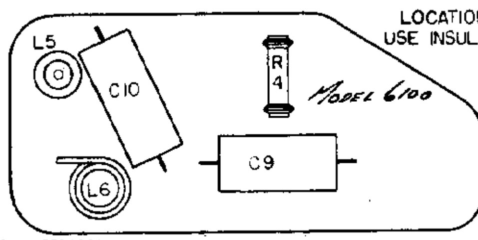
*MODEL 6101 – C1, C5

IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



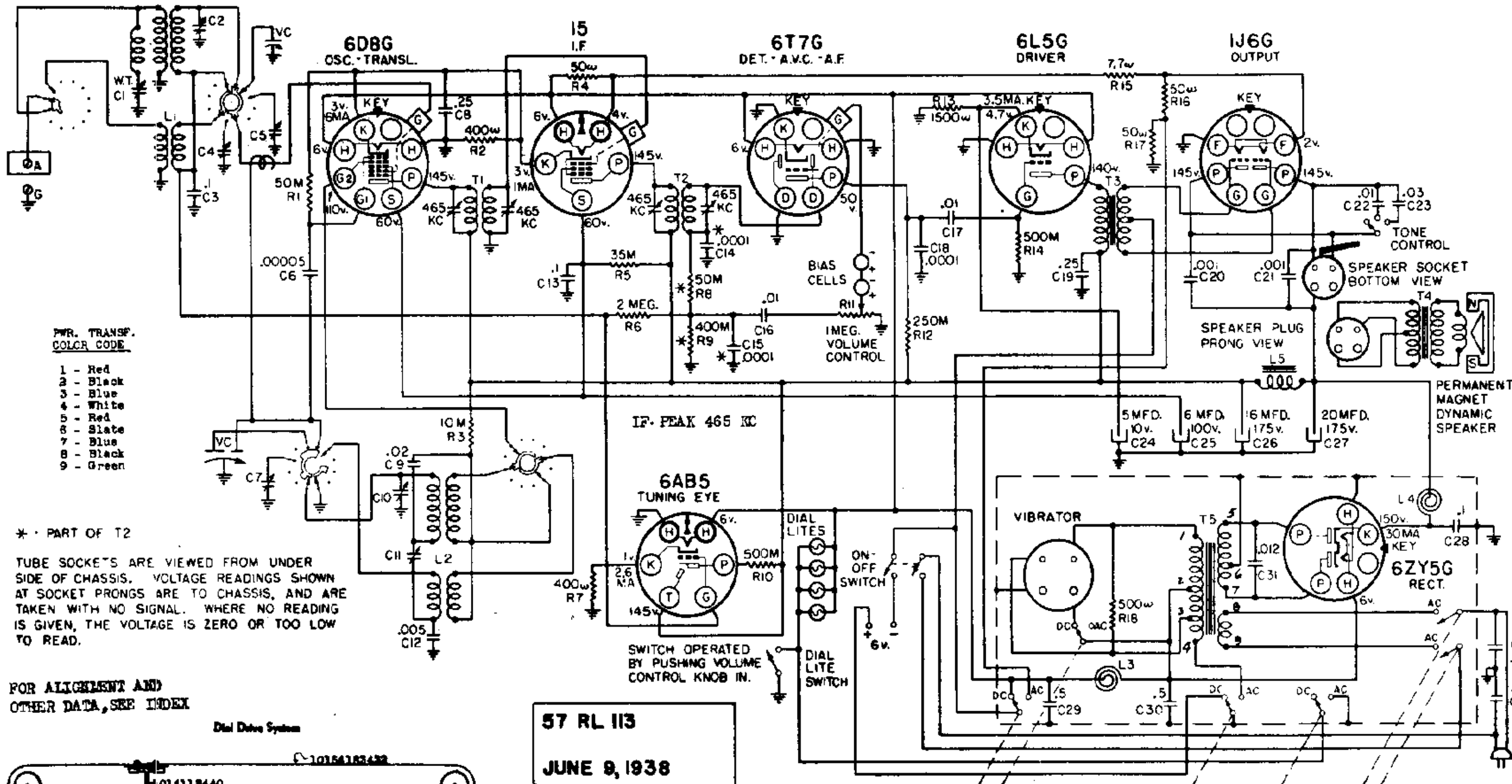
LOCATIONS OF PARTS UNDER POWER SUPPLY
USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY

CHASSIS FEATURES:
- Automatic Tone Control
- Number RF stages . . . . One
- Number IF stages . . . . One
- Number condensers in gang . . . Three
- Antenna filter
- Tapped antenna coil for matching antenna capacity.
- Variable antenna trimmer
- Non-synchronous vibrator
- Provision for combined Tone and Sensitivity control unit accessory.
- Provision for Push Button Automatic Motor Tuner Accessory.
- Provision for Auxiliary Speaker.

OPERATING FEATURES:
Automatic Volume Control

MODELS 6074,6079
Chassis 101.515
Schematic,Voltage
Drive Data

SEARS-ROEBUCK & CO.



PWR. TRANSF. COLOR CODE

1 - Red
2 - Black
3 - Blue
4 - White
5 - Red
6 - Slate
7 - Blue
8 - Black
9 - Green

* - PART OF T2

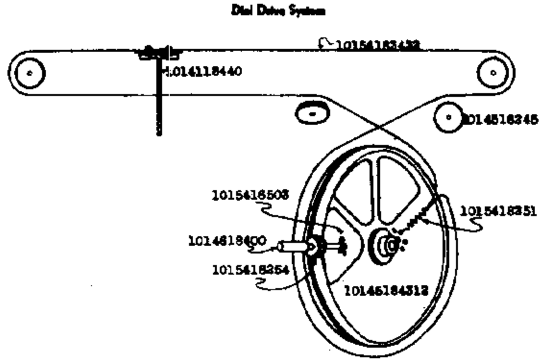
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

FOR ALIGNMENT AND OTHER DATA, SEE INDEX

57 RL 113

JUNE 9, 1938

Dial Drive System



POWER SUPPLY:
Six volt storage battery — Battery Drain . . . . 2.1 amperes
115 volt, 50-60 cycle, A.C. . . . . 20 watts

FREQUENCY RANGES:
Band "AM" . . . . 540-1730 kc
Band "SW" . . . . 5.6-18.2 mc
Band "9" . . . . 9.4-9.7 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1730 kc	1400 kc	600 kc
Band "SW"	--	15 mc	Fixed
Band "9"	9.55 mc	9.55 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type — Class "B"
Undistorted . . . . . 1.5 watts on A.C.; 0.9 watts on D.C.
Maximum . . . . 2.5 watts on A.C.; 1.5 watts on D.C.

LOUD SPEAKER:
Type . . . . PM Dynamic
Size . . . . 6 and 8 inch

MODEL 6101, Ch. 101.496
Schematic, Voltage
Color Code

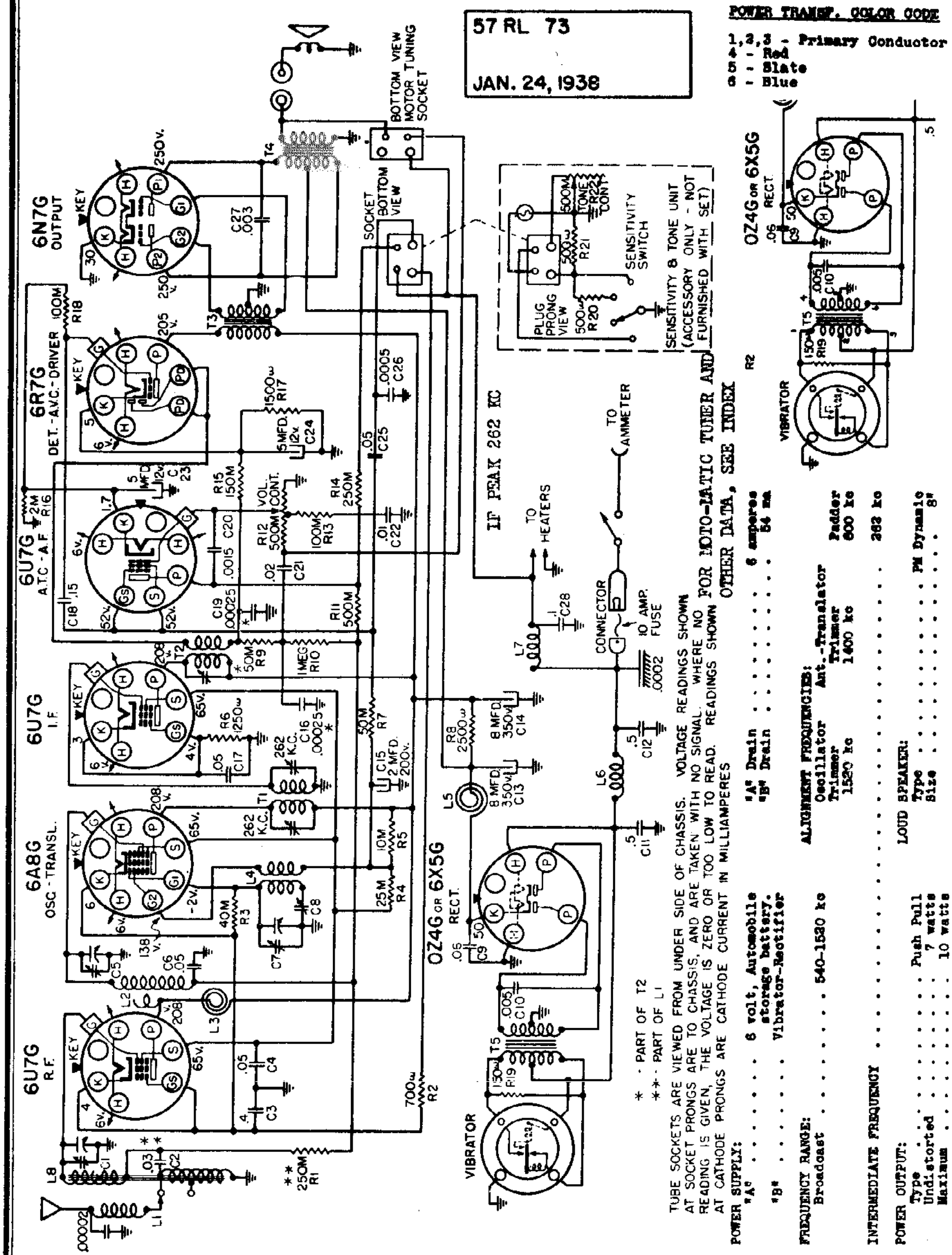
SEARS-ROEBUCK & CO.

57 RL 73

JAN. 24, 1938

POWER TRANSF. COLOR CODE

1,2,3 - Primary Conductor
4 - Red
5 - Slate
6 - Blue



FOR MOTO-MATIC TUNER AND OTHER DATA, SEE INDEX

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERES

POWER SUPPLY:
"A" . . . . 6 volt, Automobile storage battery. "A" Drain . . . . 6 amperes
"B" . . . . Vibrator-Rectifier "B" Drain . . . . 54 ma.

FREQUENCY RANGE:
Broadcast . . . . 540-1530 kc

ALIGNMENT FREQUENCIES:
Oscillator Trimmer 1520 kc; Ant.-Translator Trimmer 1400 kc; Padder 600 kc

INTERMEDIATE FREQUENCY . . . . 262 kc

POWER OUTPUT:
Type . . . . Push Pull
Undistorted . . . . 7 watts
Maximum . . . . 10 watts

LOUD SPEAKER:
Type . . . . PM Dynamic
Size . . . . 8"

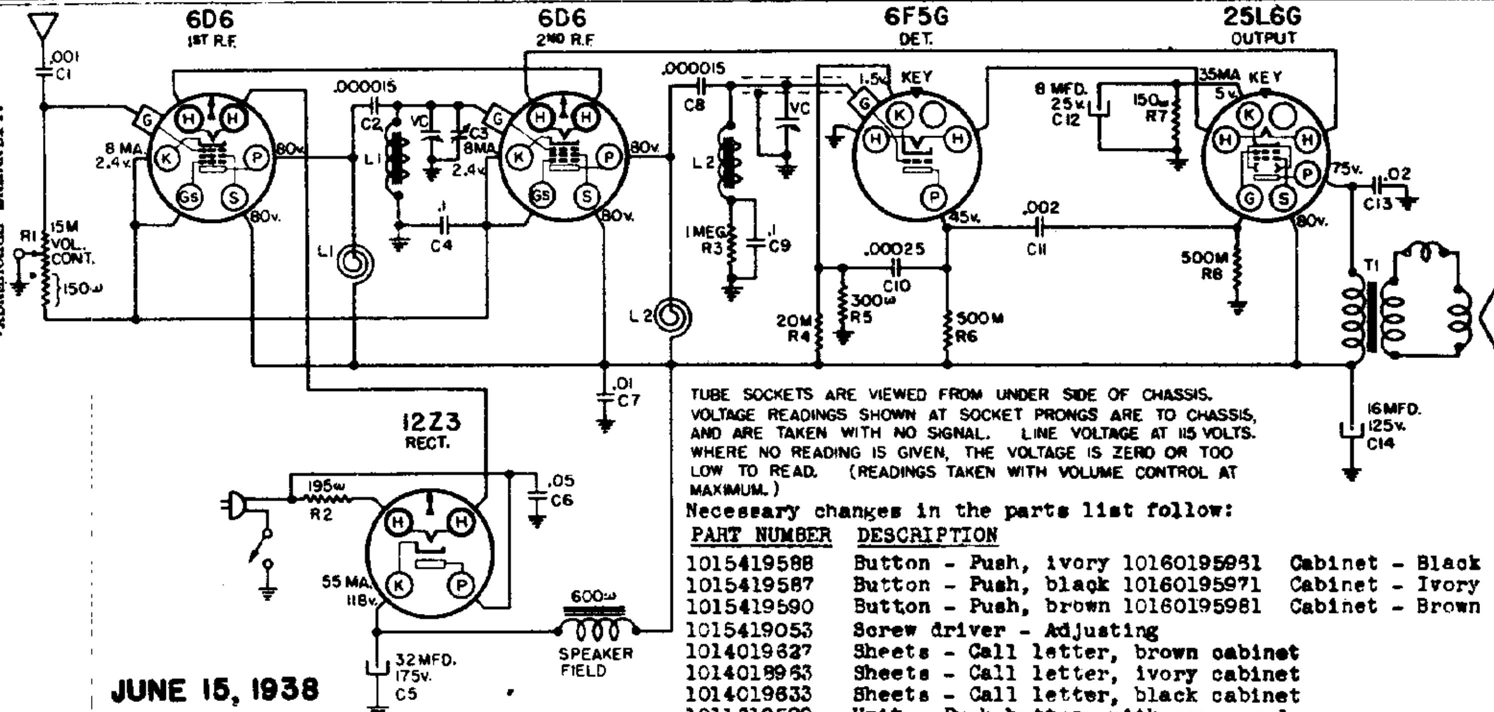
Schematic, Voltage, Alignment
Tuner Changes

SEARS-ROEBUCK & CO.

MODELS 6102, 6102A, 6103, 6103A
6105, 6105A. Chassis 101.526,
101.526-1

PUSH BUTTON TUNING:

Push buttons are set up in the following manner: Unlock the button by turning it counter-clockwise. Push the button all the way in. While holding it in, tune in the desired station. Then, with the button still pushed in, lock it by turning it clockwise. The station's call letters are to be put in the recess in the front of the button.



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. (READINGS TAKEN WITH VOLUME CONTROL AT MAXIMUM.)

JUNE 15, 1938

Necessary changes in the parts list follow:

PART NUMBER	DESCRIPTION		
1015419588	Button - Push, ivory	10160195951	Cabinet - Black
1015419587	Button - Push, black	10160195971	Cabinet - Ivory
1015419590	Button - Push, brown	10160195981	Cabinet - Brown
1015419053	Screw driver - Adjusting		
1014019627	Sheets - Call letter, brown cabinet		
1014018963	Sheets - Call letter, ivory cabinet		
1014019633	Sheets - Call letter, black cabinet		
1011619599	Unit - Push button, with var. cond.		
1013919608	Knob - Volume, brown		
1013919609	Knob - Tuning, brown		

FREQUENCY RANGE:
Broadcast . . . . 540-1730 kc

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . 0.85 watts
Maximum . . . . 1.5 watts

OPERATING CONTROLS:
1. Small knob: . . . . . "On-Off" Switch and Volume
2. Large knob: . . . . Station Selector

CONTROL OPERATION:
Turning right: . . . . Volume increase

Tuning ratio: . . . . Direct

CHASSIS FEATURES:
Attached antenna

OPERATING FEATURES:
Push Button Tuning (4 button)

ALIGNMENT FREQUENCY:
1500 kc

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 5 inch
Field coil resistance . . . . 600 ohms
App. field coil voltage drop . . . 40 volts

ALIGNMENT PROCEDURE

The receiver need not be taken out of the cabinet for alignment.

Either a broadcast signal of about 1500 kc should be tuned in or else a signal generator, connected through a .0003 mfd. condenser to the set's antenna, should be used.

Tune in the signal and adjust the trimmer (accessible through the hole in the bottom of the cabinet) for maximum loud speaker response. This can be done most accurately, if the volume control setting is reduced to give low volume level. (This set has no AVC.) The variable should be rocked a degree or two during the adjustment. An insulated screw driver should be used, since the chassis may be above ground potential as explained previously.

SUBJECT: CHANGES IN PUSH BUTTON MECHANISM.

Chassis embodying these changes have the identification number 101.526-1. The suffix letter "A" also has been added to the catalog number.

The design of the push button tuning mechanism has been changed somewhat. Stations are set up as follows:

Pull the push buttons off of their levers. Using the small screw driver supplied, unscrew the push button screw two or three turns. With screw and lever pushed in firmly, tune in the desired station. Then securely tighten the screw. Check the accuracy of the setting by pushing the lever to get the station and then seeing if the station can be still more accurately tuned with the tuning knob. If necessary, repeat the adjustment to obtain a more accurate setting. Punch out the station's call letters from the sheet, insert then in the recess in the front of the button, cover them with the clear celluloid disc, and replace the button. Proceed in the same manner for the remaining buttons.

MODELS 6102,6102A,6103
6103A,6105,6105A
Chassis 101.526,101.526-1
Socket,Chassis

SEARS-ROEBUCK & CO.

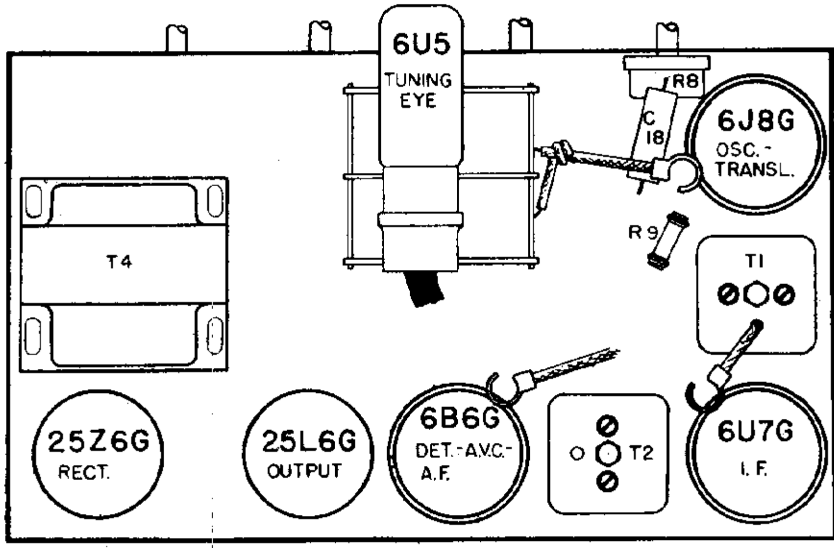
MODEL 6125,Ch.101.527
Socket,Trimmers,Chassis
Notes

THE ANTENNA: MODEL 6125. CHASSIS 101.527.

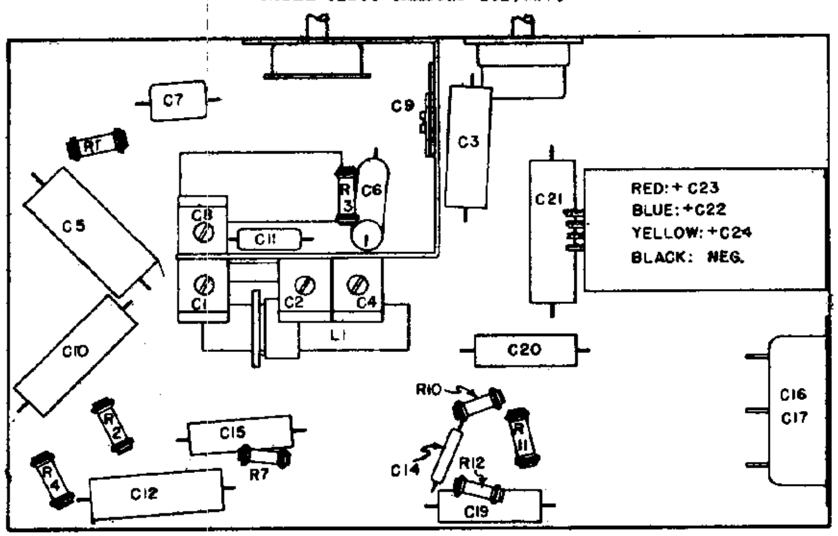
An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna leadin.

THE FILAMENT CIRCUIT:

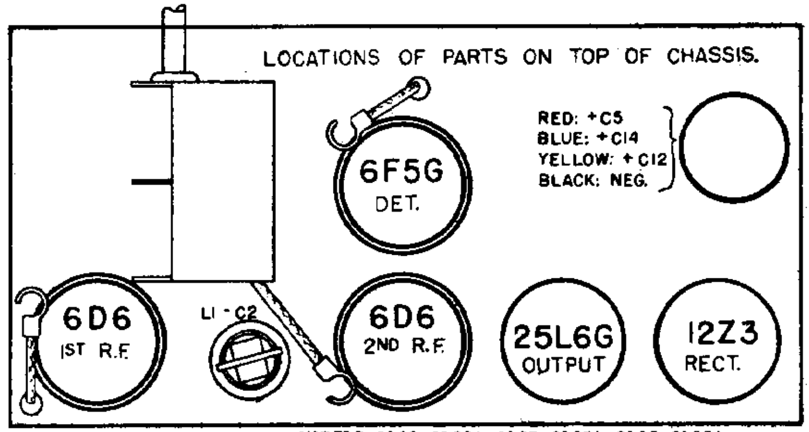
All of the tubes are connected in series. Accordingly, if any one tube burns out, the others will not light. The full line voltage will appear across the heater prongs of the burnt out tube. The power cord contains a resistor, in series with the tube heaters, and it is normal for the cord to become warm during operation.



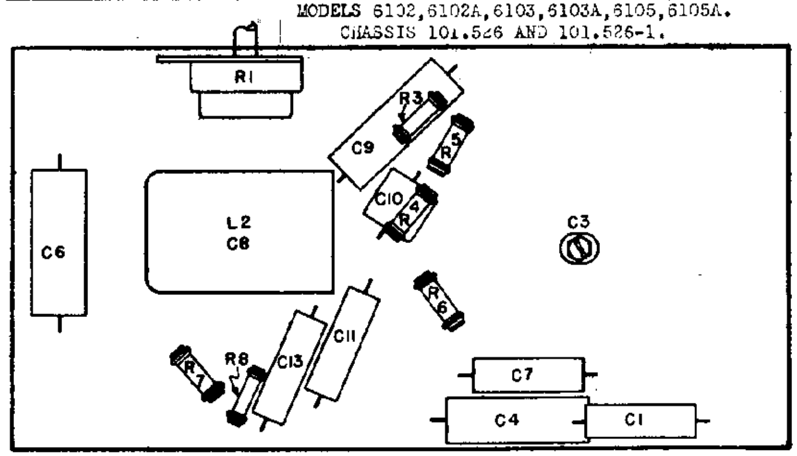
LOCATIONS OF PARTS ON TOP OF CHASSIS.
MODEL 6125. CHASSIS 101.527.



LOCATIONS OF PARTS UNDER CHASSIS.



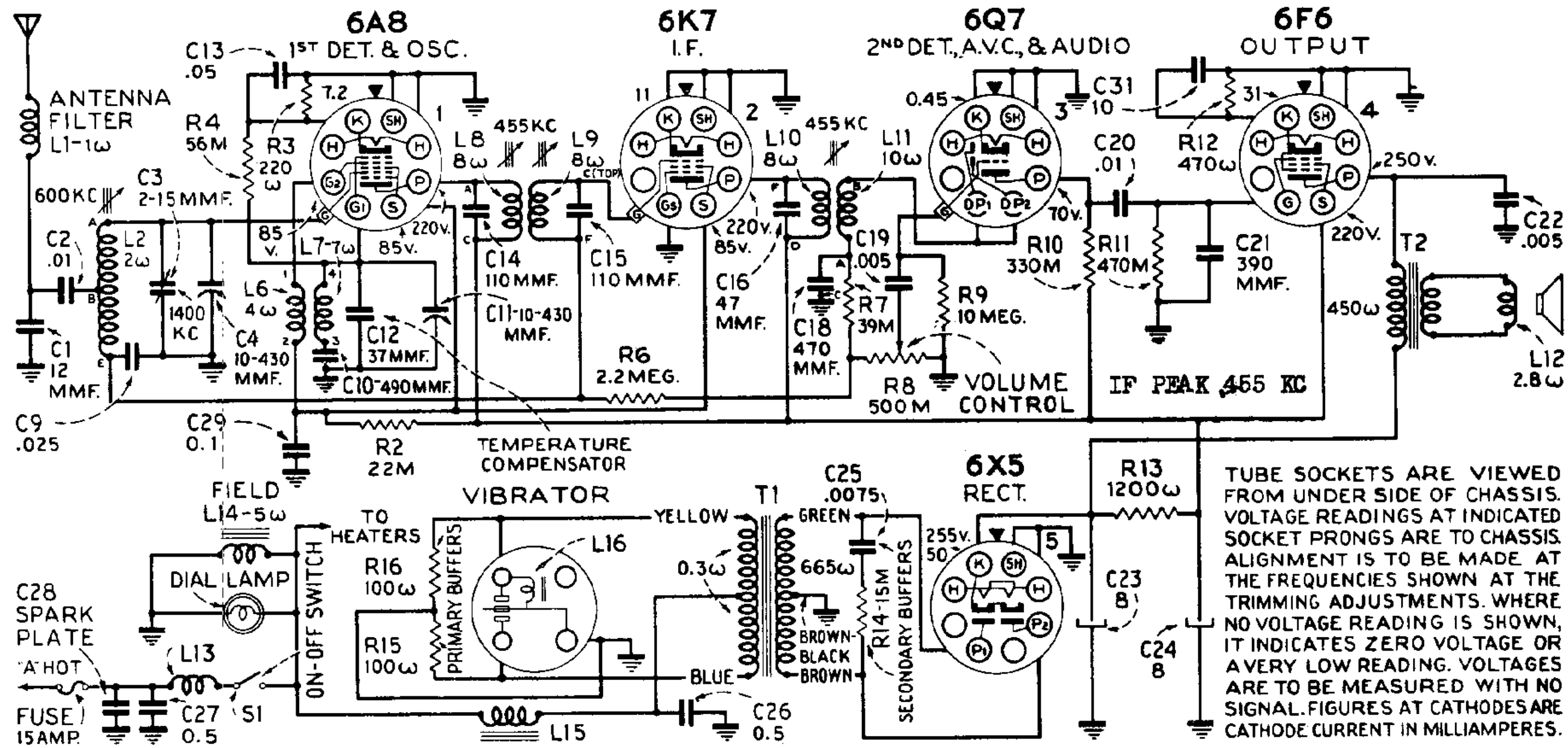
MODELS 6102,6102A,6103,6103A,6105,6105A.
CHASSIS 101.526 AND 101.526-1.



LOCATIONS OF PARTS UNDER CHASSIS.

MODEL 6104, Ch. 126.203
Schematic, Voltage
• Data

SEARS-ROEBUCK & CO.



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES ARE TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

FREQUENCY RANGE .... 550-1,550 kc

POWER OUTPUT:
- Type .... Pentode
- Undistorted .... 2.1 watts
- Maximum .... 4.1 watts

POWER SUPPLY:
- "A" .... 6.3 volt Auto Storage Battery
- "B" .... Non-Synchronous Vibrator
- Current Drain .... 6.75 amps.

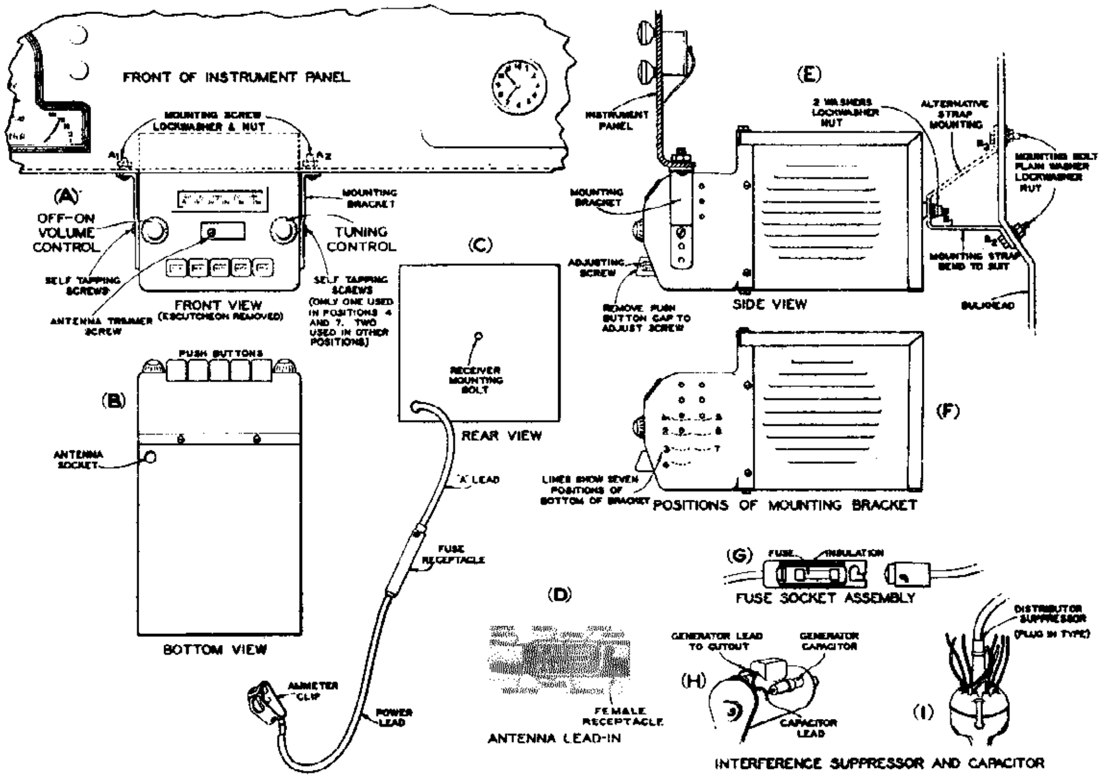
ALIGNMENT FREQUENCIES:
- I-F .... 455 kc
- Ant. .... 600 and 1,400 kc
- Oscl. .... No Adjustment

LOUDSPEAKER:
- Type .... Electrodynamic
- Size .... 5 inches
- V.C. Impedance .... 3.2 ohms at 400 cycles
- Field Coil Resistance .... 5 ohms
- App. Field Coil Voltage Drop .... 6 volts

JUNE 30, 1938

MODEL 6104, Ch. 126.203
Tuner Assembly, Data

SEARS-ROEBUCK & CO.



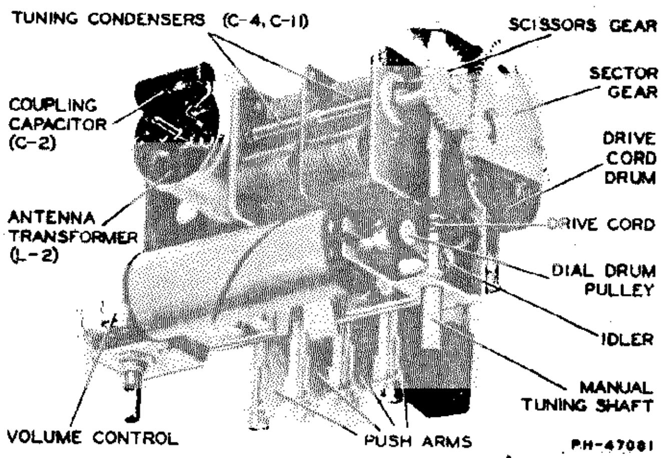


FIGURE 1—PUSH BUTTON AND MANUAL TUNING ASSEMBLY

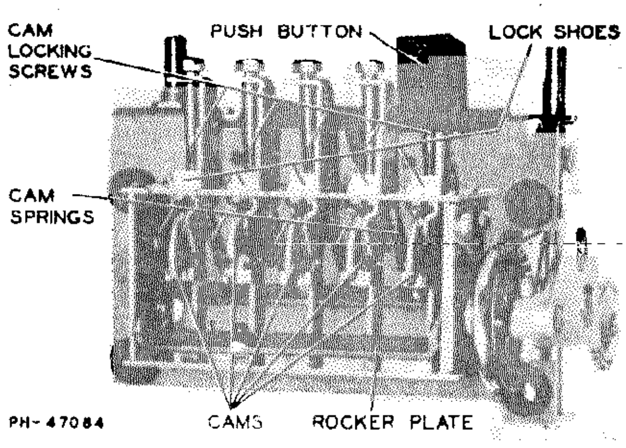


FIGURE 2—BOTTOM VIEW OF PUSH BUTTON MECHANISM

Push Button Tuning Mechanism:

The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft —(See Figures 1 and 2.) The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

The cams (Figure 2) which determine the stop points for each button are mounted on the push arms and are locked in place by the locking screws and lock-shoes, which press firmly against the cams when the locking screws are tightened. *Care should be used when locking screws are tightened not to use excessive force as the threads may become damaged or stripped.*

Adjustments for Push Button Tuning are very easily made. To adjust a push button for any station proceed as follows:

(1) Pull the push button off the push arm.
(2) Loosen the cam locking screw one-half turn.
(3) Using the Dial Tuning Control tune in the station.
(4) Press the push arm in as far as it will go and accurately retune station.
(5) With the push button still held down, tighten cam locking screw.
(6) Replace the push button.

With the locking screw tight, the cam is locked in position and when the button is pushed in, the cam pressure causes the rocker plate to assume the position that tunes in the desired station (See Figure 2.)

Manual Tuning Dial:

A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. Figure 6 shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.

MODEL 6104, Ch. 126.203
Chassis Wiring, Socket
Trimmers, Alignment, Data

SEARS-ROEBUCK & CO.

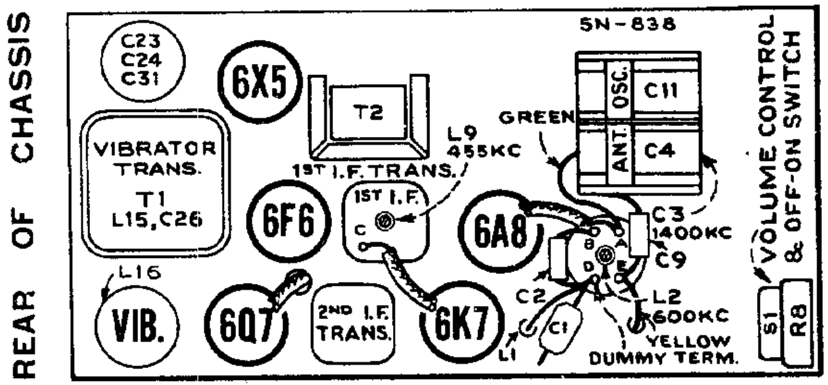


FIGURE 3—LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON TOP OF CHASSIS

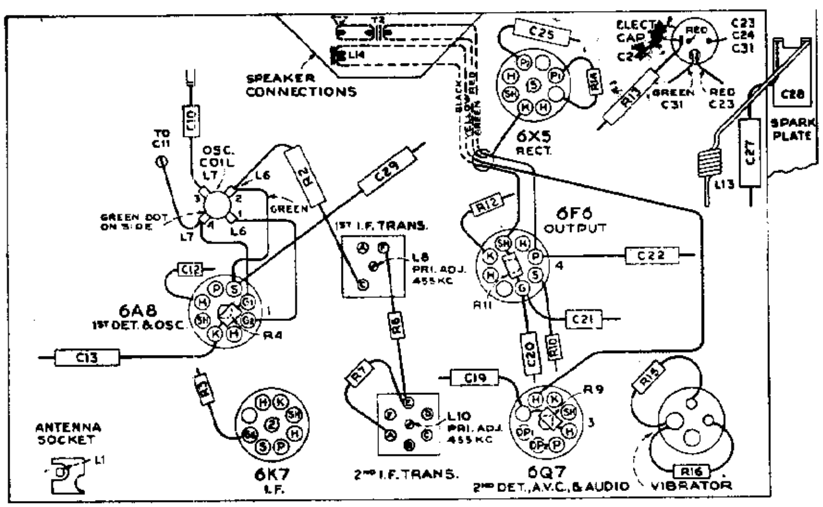


FIGURE 4—LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON BOTTOM OF CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections.......... Across speaker voice coil
Output meter readings to indicate 1 watt.......... 1.8 volts
Generator ground lead connections.......... To chassis
Dummy antenna value to be in series with generator output.......... See chart below
Connection of generator output lead.......... See chart below
Generator modulation.......... 30%, 400 cycles
Position of Volume Control.......... Fully clockwise
Chassis must be in its case with front end removed, when aligning R-F circuit.

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connections	Adjustment Symbol	Circuit Adjusted	Approx. Microvolts
No Signal 550-750 kc	455 kc.	.001 mfd.	6K7 Grid	L-10	2nd I.F. Trans.	3,500
No Signal 550-750 kc	455 kc	.001 mfd.	6A8 Grid	L-8, L-9	1st I.F. Trans.	35
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3	Ant.	3
600 kc	600 kc	.0001 mfd. †	Ant. Lead	L-2	Ant.	9
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3*	Ant.	3

NOTE: No oscillator alignment adjustments are required in this receiver.

IMPORTANT ALIGNMENT NOTES

† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit" in "Service Hints."

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment is not required in this receiver at either end of the band; the oscillator coil is pre-adjusted for inductance in the factory.

Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case.

Values shown under "Microvolts" are only approximate.

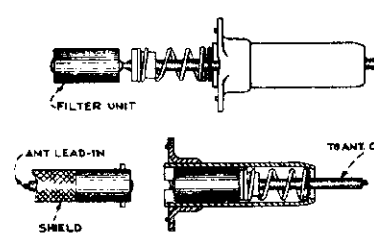


FIGURE 5—ANTENNA FILTER

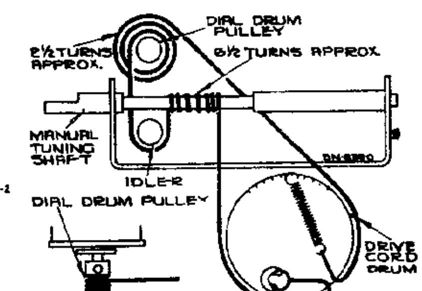


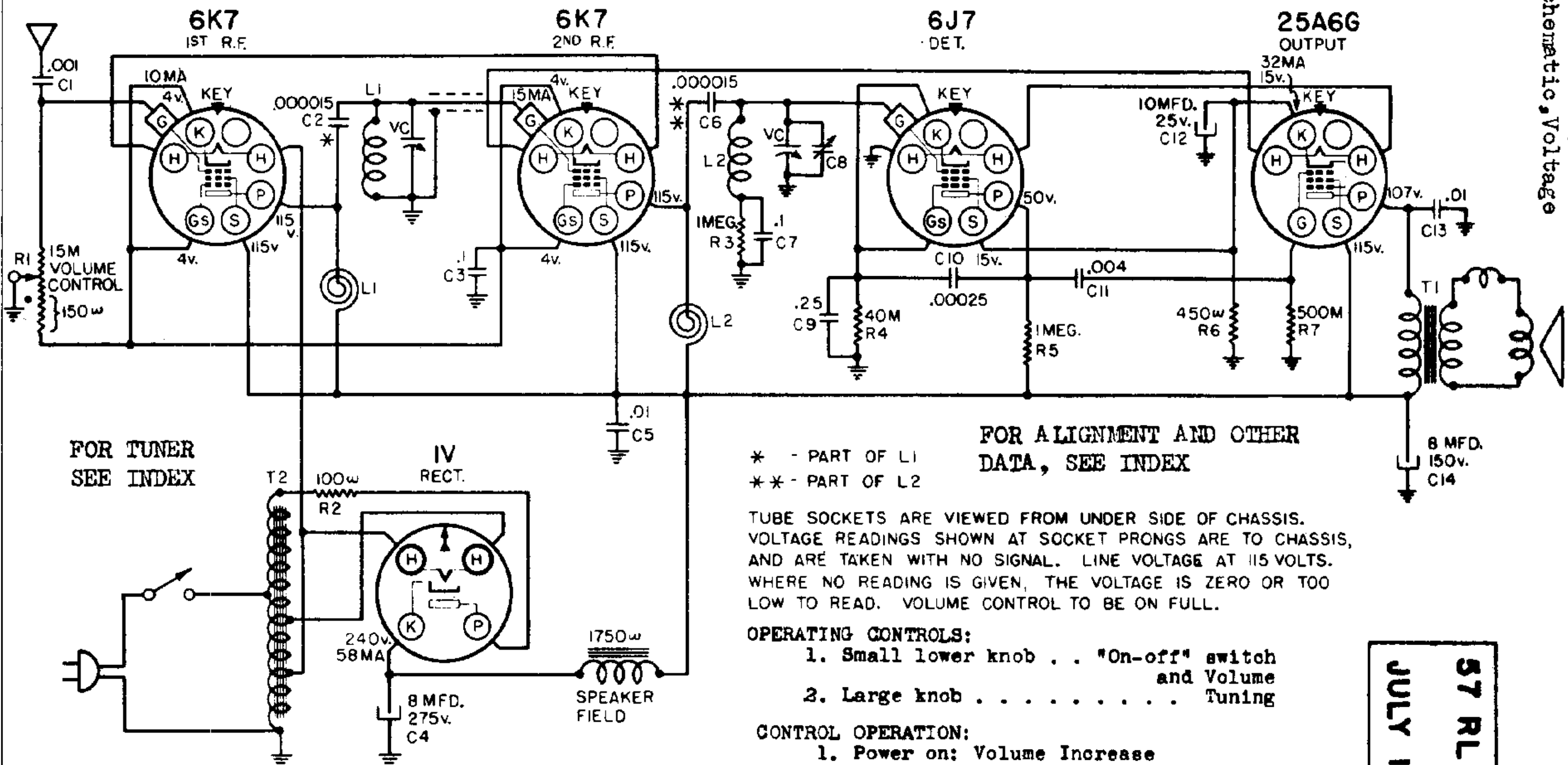
FIGURE 6—DRIVE CORD HOOKUP

MODELS 6110,6111
Chassis 101.508
Schematic,Voltage

SEARS-ROEBUCK & CO.

57 RL 122

JULY 1, 1938



FOR TUNER
SEE INDEX

* - PART OF L1
** - PART OF L2

FOR ALIGNMENT AND OTHER
DATA, SEE INDEX

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.

OPERATING CONTROLS:
1. Small lower knob . . "On-off" switch and Volume
2. Large knob . . . . Tuning

CONTROL OPERATION:
1. Power on: Volume Increase

3. Tuning ratio: . . . . Direct

POWER SUPPLY:
All models available . . . . 105-135 volts, 50-60 cycles, 34 watts

FREQUENCY RANGE: . . . . 545-1730 kc

ALIGNMENT FREQUENCY: . . . . 1400 kc

OPERATING FEATURES:
Push button tuning (6 button)
Frequency calibrated tuning knob

CHASSIS FEATURES:
Number of RF stages . . . . Two
Number condensers in gang . . . . Two
Antenna . . . . Attached

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . 0.85 watts
Maximum . . . . 1.6 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 5"
Field coil resistance . . . 1750 ohms

SEARS ROEBUCK & CO.

MODELS 6112,6113,6118
Chassis 101.521
Schematic,Voltage,Tuner
Socket,Chassis

ALIGNMENT PROCEDURE:

Either a broadcast station of about 1400 kc or a signal generator can be used for alignment. The chassis must be taken out of the cabinet for alignment of the trimmer, C8. The volume control setting should be reduced so that the signal is just audible in order to facilitate accuracy of adjustment. This set has no AVC so that a strong input signal may be used.

CHASSIS FEATURES:

- Number of RF stages . . . . Two
- Number condensers in gang . . . . . Two
- Antenna . . . . Attached
- Underwriters' Approval

LOUD SPEAKER:

- Type . . . Dynamic
- Size . . . 5"
- Field coil resistance . . . 1750 ohms

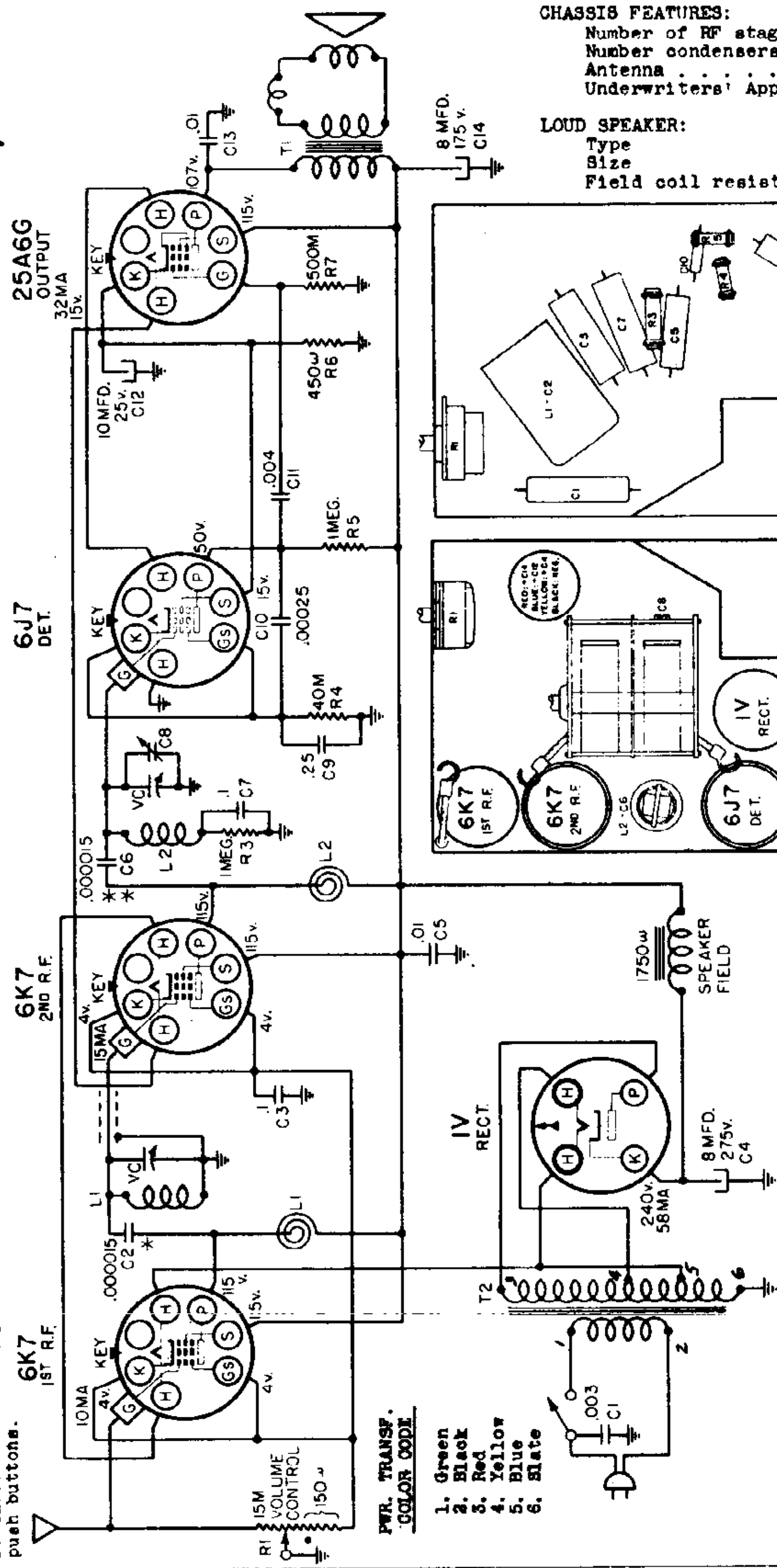
ADJUSTING THE PUSH BUTTONS:

Unlock the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune in the desired station while the button is held in firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Lock the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recess in each button. Cover the call letters with the clear celluloid discs, supplied. Be careful not to drop the call letter tabs inside the receiver when inserting them in the push buttons.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.

* - PART OF L1
** - PART OF L2

OCT. 6, 1938



PWR. TRANSF. COLOR CODE

1. Green
2. Black
3. Red
4. Yellow
5. Blue
6. Slate

LOCATIONS OF PARTS UNDER CHASSIS.

LOCATIONS OF PARTS ON TOP OF CHASSIS.

OPERATING FEATURES:
Push button tuning (6 button)
Frequency calibrated tuning knob

POWER OUTPUT:
- Type . . . . Pentode
- Undistorted . . . . 0.85 watts
- Maximum . . . . 1.6 watts

POWER SUPPLY:
All models available . . . . 105-125 volts, 50-60 cycles, 40 watts

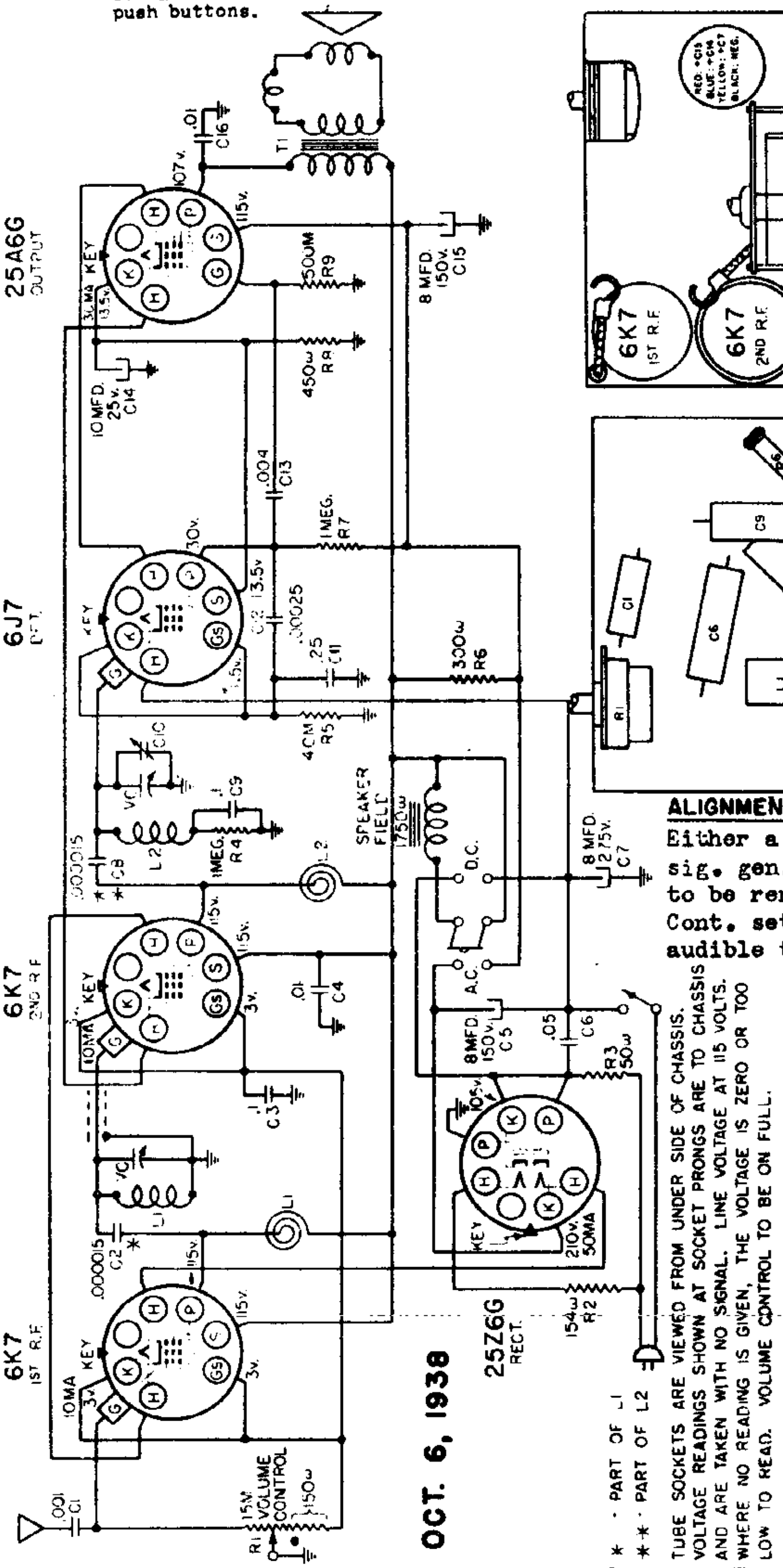
FREQUENCY RANGE: . . . . 545-1730 kc ALIGNMENT: . . . . 1400 kc

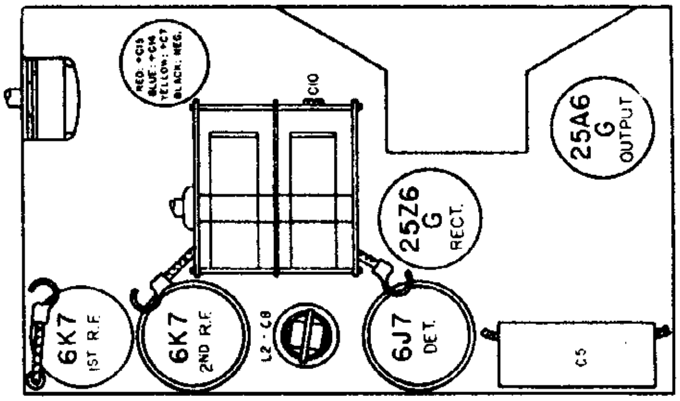
MODELS 6114,6115,Ch.101.522
Schematic,Voltage,Chassis
Socket,Alignment,Tuner

SEARS-ROEBUCK & CO.

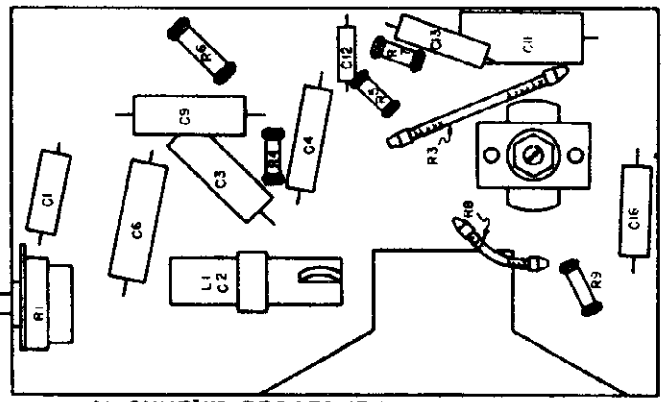
ADJUSTING THE PUSH BUTTONS:

Unlock the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune in the desired station while the button is held in firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Lock the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recess in each button. Cover the call letters with the clear celluloid discs, supplied. Be careful not to drop the call letter tabs inside the receiver when inserting them in the push buttons.





LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

ALIGNMENT PROCEDURE:

Either a BC Station of about 1400KC or a sig. gen. can be used for align. Chassis to be removed for C8 trimmer align. Volume Cont. setting be reduced so signal is just audible to facilitate accurate adj.

This set has no AVC so that a strong input signal may be used.

OCT. 6, 1938

* · PART OF L1
** · PART OF L2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 5"
Field coil resistance . . . . . . 1750 ohms

POWER SUPPLY:
All models available
105-135 volts, DC or 25-80 cycle AC, 50 watts.

ALIGNMENT: . . . . 1400 kc

FREQUENCY RANGE: 545-1730 kc

OPERATING FEATURES:
Push button tuning (3 button)
Frequency calibrated tuning knob

POWER OUTPUT:
Type . . . . Pentode
Undistorted . . . . 0.85 watts on AC
0.45 watts on DC
Maximum . . . . 1.8 watts on AC
1.1 watts on DC

MODELS 6054,6055 .
MODEL 7225
Tuner Data

SEARS-ROEBUCK & CO.

MODEL 6125,Chassis 101.527
Schematic,Voltage,Tuner

POWER SUPPLY: 105-125 volts, 50-60 cycle, 50 watts

OPERATING CONTROLS:
1. Upper left knob . . . . .Volume.
2. Lower left knob . . .Wave Band Switch
3. Lower right knob . . ."On-Off" Switch and Tone
4. Upper right knob . . Station Selector

CONTROL OPERATION:
Turning right: . . . . Volume increase
Turning right: . . . . . . "AM", "SW"
Turning right: . . ."ON", "HI", "LO"

Tuning ratio: 4:1

FOR ALIGNMENT, SEE INDEX.

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "SW"	--	15 mc	Fixed

FREQUENCY RANGES:
Band "AM" . . . . 540-1730 kc
Band "SW" . . . . 5.9 mc-18.2 mc

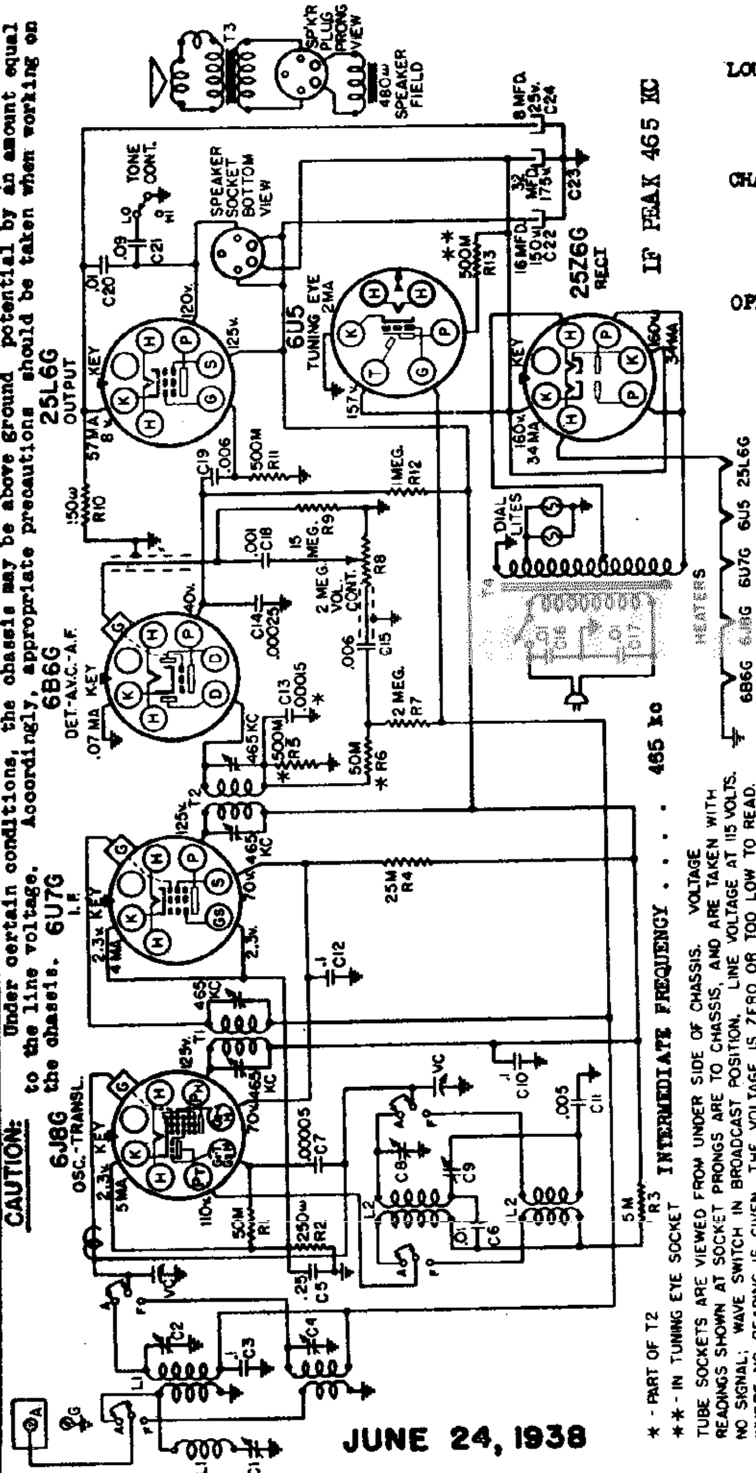
POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . 1.75 watts
Maximum . . . . 3 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 6 and 8 inch
Field coil resistance . . . . 480 ohms

CHASSIS FEATURES:
Number IF stages . . . . One
Number condensers in gang . . . . Two
Antenna . . . . Conventional
Built-in IF Wave Trap

OPERATING FEATURES:
Tone Control . . . . Two position
Automatic Volume Control
Push Button Tuning (5 button)
Tuning Eye

CAUTION: Under certain conditions, the chassis may be above ground potential by an amount equal to the line voltage. Accordingly, appropriate precautions should be taken when working on the chassis.



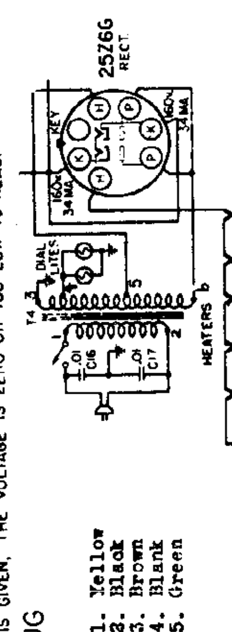
IF PEAK 465 KC

INTERMEDIATE FREQUENCY . . . . 465 kc

* - PART OF T2
** - IN TUNING EYE SOCKET

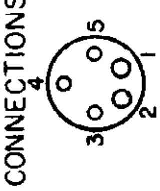
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION, LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

PWR. TRANSF. COLOR CODE
1. Green
2. Black
3. Slate
4. Yellow
5. Blue
6. Red



PUSH BUTTON TUNING

SPEAKER PLUG CONNECTIONS
1. Yellow
2. Black
3. Brown
4. Blank
5. Green



PRONG VIEW

SETTING UP:

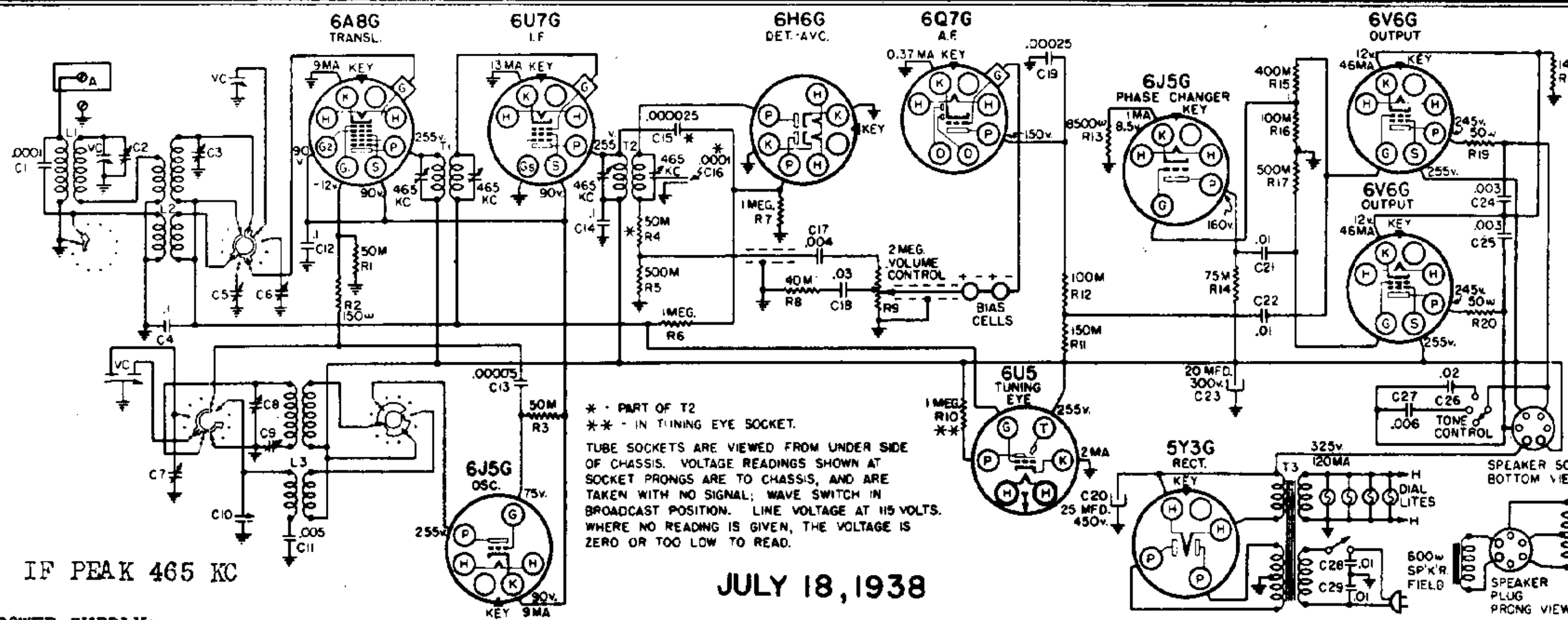
Unscrew (turn counter-clockwise) the push button two or three turns. (Use a penny in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it in firmly and at the same time tune in your desired station. With your station tuned in, lock the adjustment by tightening the push button knob (turn clockwise). Hold the button in while tightening it. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

JUNE 24, 1938

MODEL 6140, Ch. 101.534
MODELS 6152, 6153
Chassis 101.537
Schematic, Voltage
Color Code, Notes

SEARS-ROEBUCK & CO.

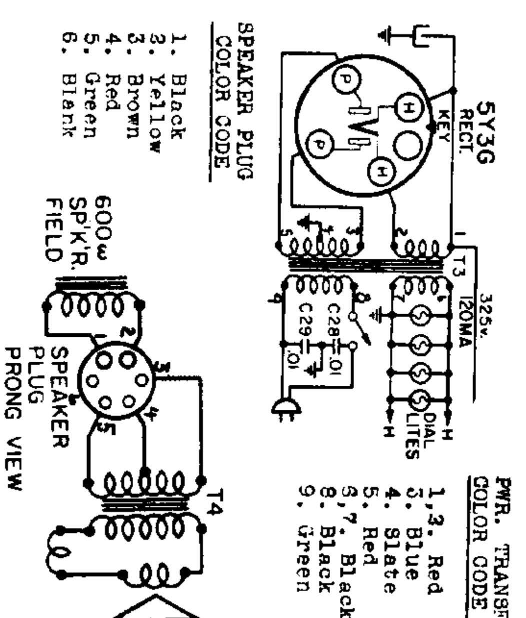


* - PART OF T2
** - IN TUNING EYE SOCKET.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IF PEAK 465 KC

JULY 18, 1938



PWR. TRANSF. COLOR CODE
1,3. Red
3. Blue
4. Slate
5. Red
6,7. Black
8. Black
9. Green

SPEAKER PLUG COLOR CODE
1. Black
2. Yellow
3. Brown
4. Red
5. Green
6. Blank

POWER SUPPLY:
All models available . . . . 105-135 volts, 50-60 cycle, 105 watts
All models available . . . . 105-135 volts, 25 cycle, 120 watts

FREQUENCY RANGES:
Band "AM" . . . . 540-1730 kc
Band "SW" . . . . 5.95 mc-18.3 mc
Band "9" . . . . 9.4 mc-9.7 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "SW"	--	15 mc	Fixed
Band "9"	9.55 mc	9.55 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type . . . . Push pull beam tubes
Undistorted . . . . 6 watts
Maximum . . . . 10 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size Model 6140 . . . . 12 inch
Size Models 6152, 6153 . . . 10 inch
Field coil resistance . . . . 600 ohms
App. field coil voltage drop . . . 70 volts

OPERATING FEATURES:
Tone Control . . . . . . Three position
Automatic Volume Control
Spread Band Tuning
Push Button Tuning (8 button)

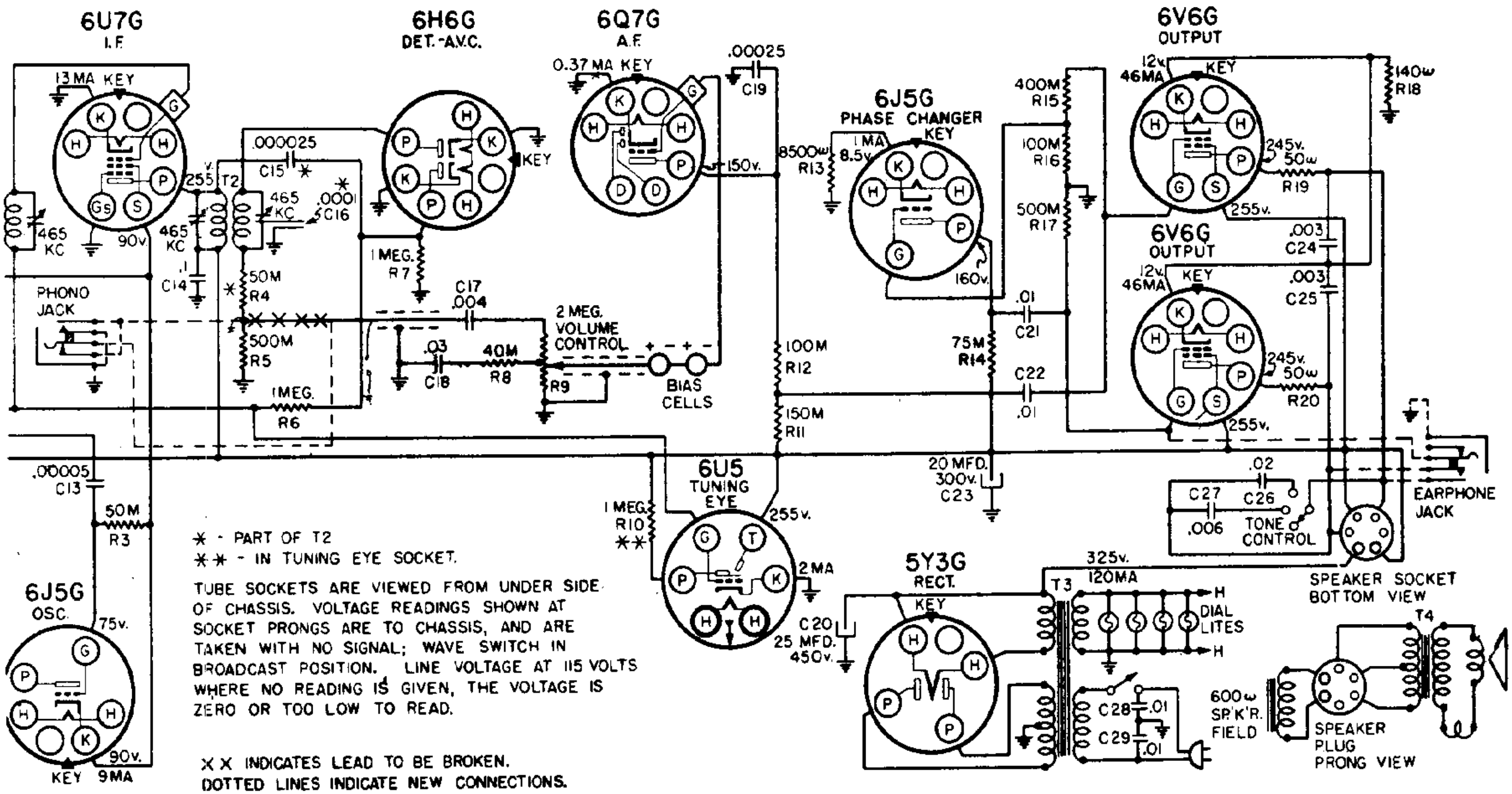
CHASSIS FEATURES:
Preselector on band "AM"
Antenna . . . . Conventional
Tuning Eye

OPERATING CONTROLS:
1. Upper left knob . . . . Volume
2. Lower left knob . . "On-off" switch & Tone
3. Lower right knob . . . . Band switch
4. Upper right knob . . Station Selector

CONTROL OPERATION:
Turning right: . . . . Volume increase
Turning right: . . . . "HI", "MED", "LO"
Turning right: . . . . "AM", "SW", "9"
Tuning ratio: 13:1

SEARS-ROEBUCK & CO.

MODEL 6140, Ch. 101.534
MODELS 6152, 6153
Chassis 101.537
Phone, Phono, Jacks Data



DIAL LIGHT REPLACEMENT:

The lamps that illuminate the push button call letters are made accesible for replacement by removing the push button escutcheon.

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

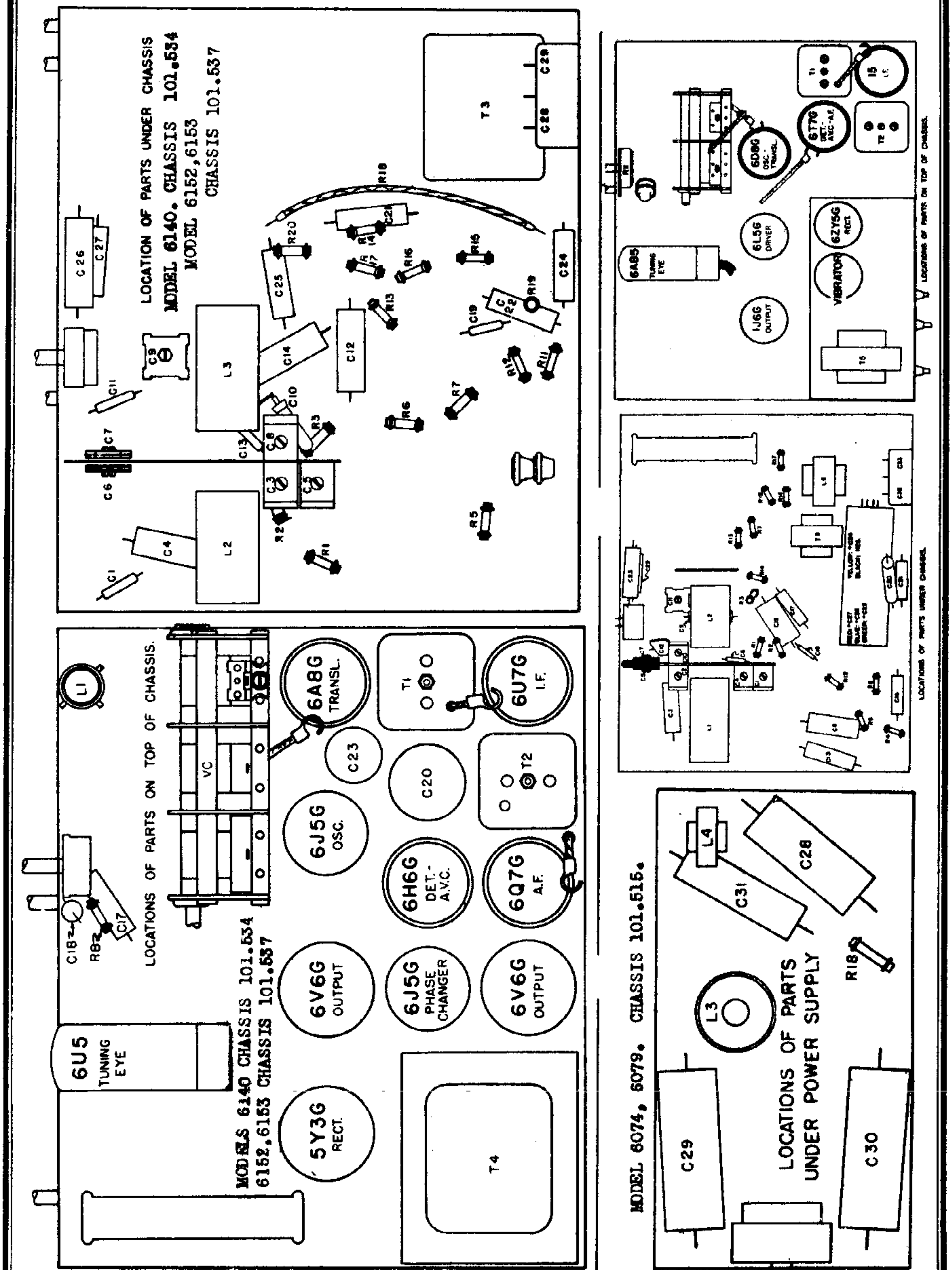
Part number 1016119531 jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101.

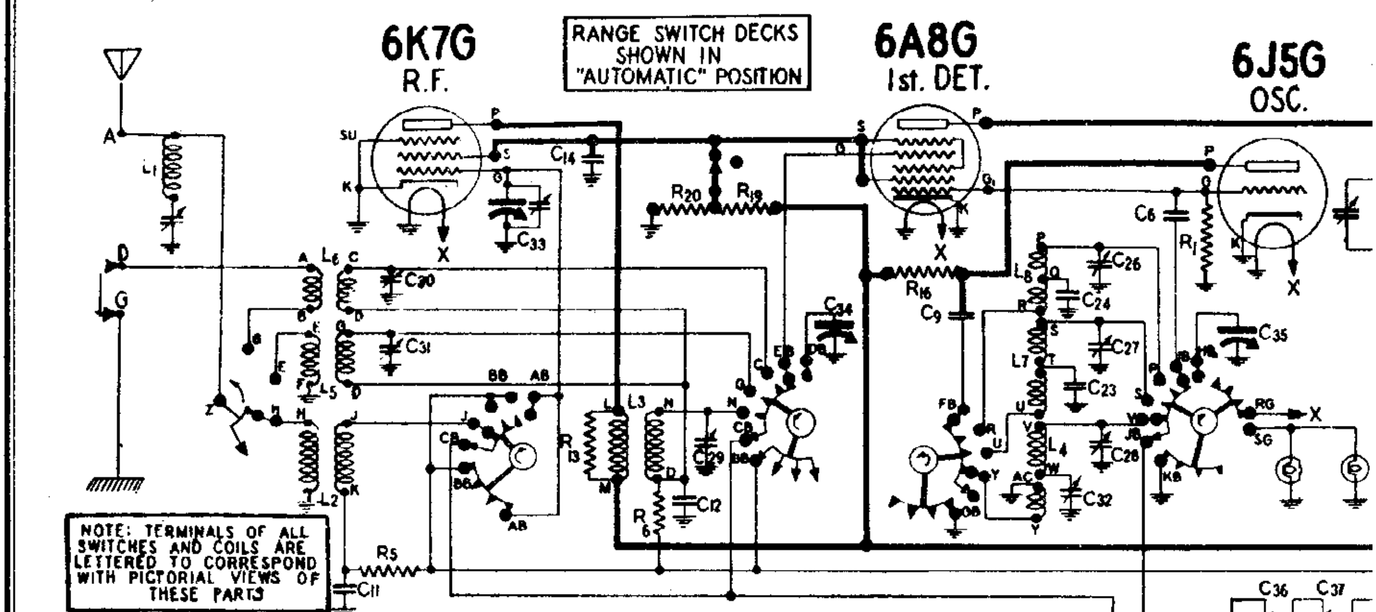
If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.

MODELS 6074,6079,Ch.101.515
MODEL 6140,Chassis 101.534

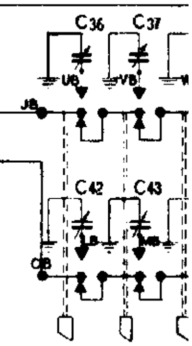
SEARS-ROEBUCK & CO.

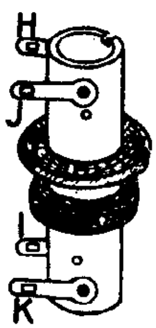
MODELS 6152,6153,Ch.101.537
Socket,Trimmers,Chassis



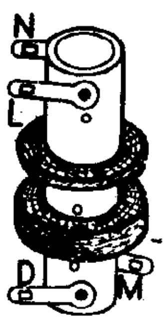


NOV. 7, 1938

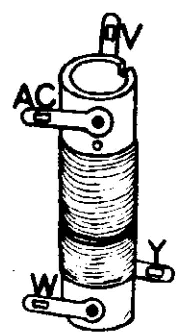




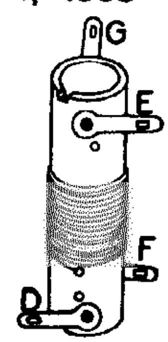
113295
BROADCAST
ANTENNA COIL



113296
BROADCAST
R.F. COIL

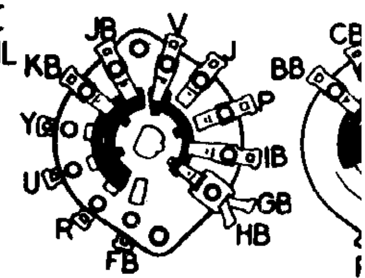


113297
BROADCAST
OSCILLATOR
COIL



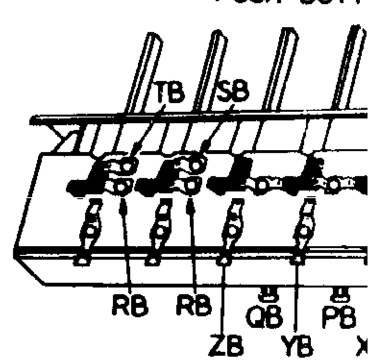
113298
INTERMEDIATE
ANTENNA COIL

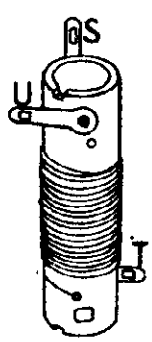
FRONT VIEW O



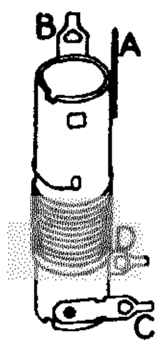
FRONT DECK
MID

PUSH-BUTT

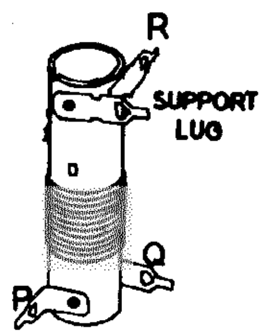




113412
INTERMEDIATE
OSCILLATOR
COIL



113301
FOREIGN
ANTENNA COIL



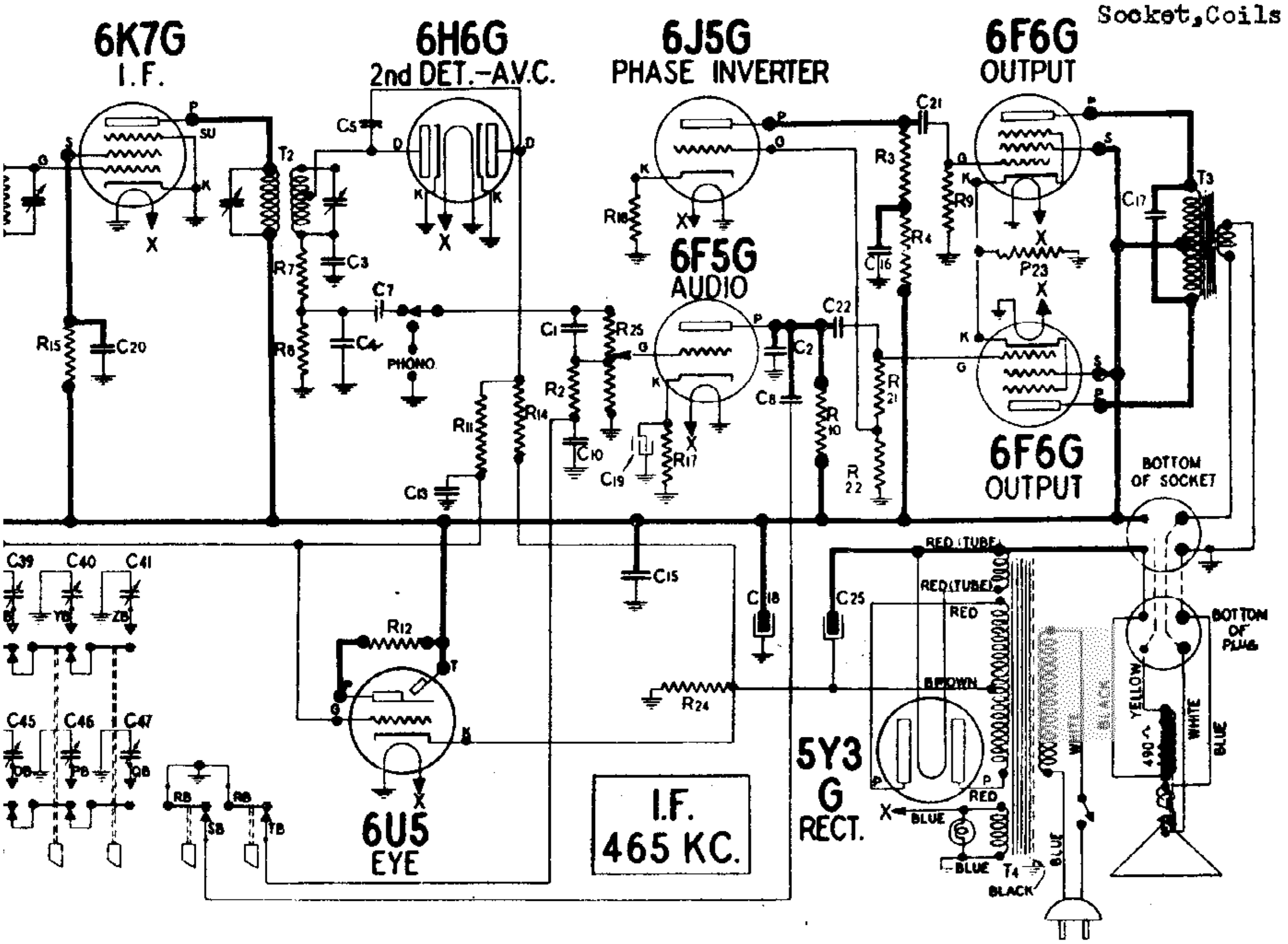
113607
FOREIGN
OSCILLATOR
COIL

INTERMEDIATE FREQUENCY...............................465 KC.

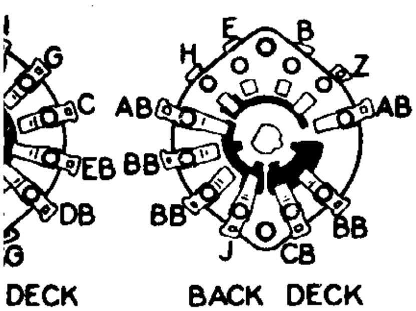
POWER OUTPUT
Type...................................Push-Pull Pentodes
Undistorted..................................... 6 watts
Maximum.. 10 watts

CK & CO.

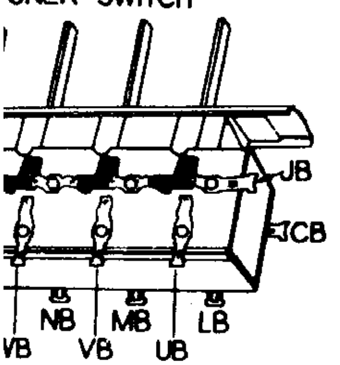
MODEL 6157,Chassis 100.198
Schematic,Voltage,Switches
Socket,Coils



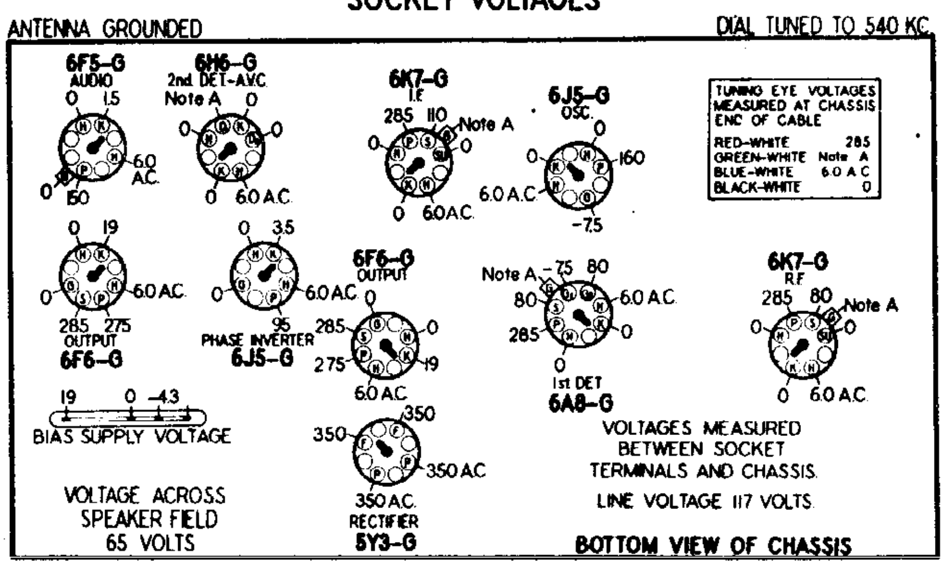
ANGE SWITCH DECKS.



TUNER SWITCH



SOCKET VOLTAGES



REAR OF CHASSIS

Use high resistance voltmeter of at least 1000 ohms per volt.

The bias on the control grids of the 6A8-G, 6U5 and 6K7-G and the delay voltage on the diode plate (D1) of the 6H6-G is -4.3 volts, measured across resistor R24

SEARS-ROEBUCK & CO.

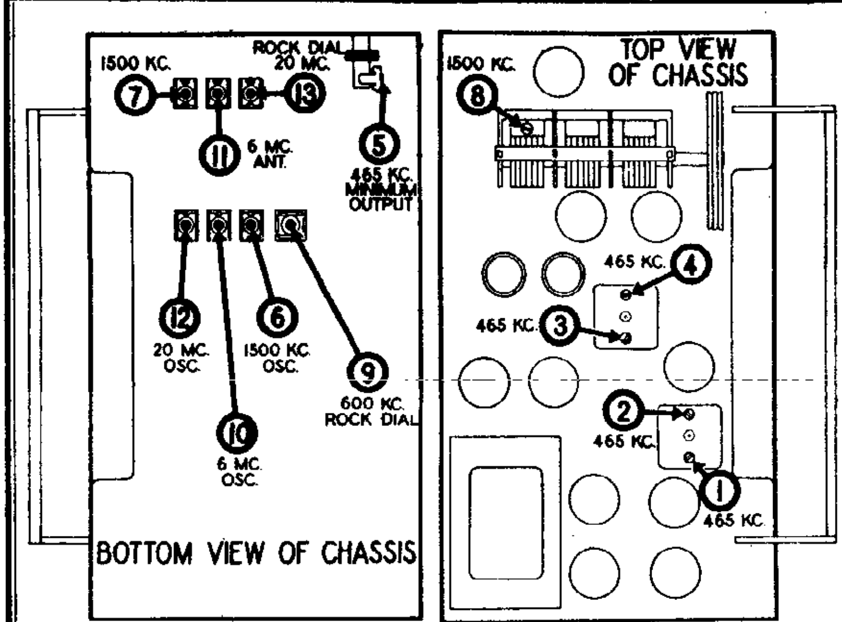
MODEL 6157,Ch. 100.19
Alignment,Trimmers

ALIGNMENT PROCEDURE

Before attempting to align the receiver, see that the dial pointer is correctly set. With the gang condenser in f mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is o necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the poin properly set, then retighten the set screw.

Output meter connections------------------------------Across voice coil le
Output meter reading to indicate 0.5 watt output------------------------------1.325 vo
Average sensitivity in micorvolts for 0.5 watt output------------------------------See chart be
Connection of Generator Ground------------------------------Receiver chas
Dummy antenna in series with Generator Output Lead------------------------------See chart be
Connection of Generator Output Lead------------------------------See chart be
Generator modulation------------------------------30%, 400 cyc
Position of volume control------------------------------Maximum clockw

DUMMY ANT IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	SENSITIVITY MICROVOLTS	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	7000	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1ST I.F.	150	
200 MMFD. CONDENSER	ANTENNA TERMINAL	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP		ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL.
200 MMFD. CONDENSER	ANTENNA TERMINAL	1500 KC	BROADCAST	1500 KC	6	BROADCAST OSCILLATOR (SHUNT)		ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. CONDENSER	ANTENNA TERMINAL	1500 KC	BROADCAST	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST DETECTOR	30	ADJUST FOR MAXIMUM OUTPUT.
					8	BROADCAST ANTENNA	6	
200 MMFD. CONDENSER	ANTENNA TERMINAL	600 KC	BROADCAST	TUNE TO 600 KC GENERATOR SIGNAL	9	BROADCAST OSCILLATOR (SERIES)	5	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	6 MC	10	INTERMEDIATE OSCILLATOR		ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE I PROPER PEAK WAS OBTAINED BY TUNING IN IMAG AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPE REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHE OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	TUNE TO 6 MC GENERATOR SIGNAL	11	INTERMEDIATE ANTENNA	30	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	20 MC	12	FOREIGN OSCILLATOR		ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE I PROPER PEAK WAS OBTAINED BY TUNING IN IMAG AT APPROX. 19.1 MC. IF IMAGE DOES NOT APP REALIGN AT 20 MC WITH TRIMMER SCREW FARTHE OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	TUNE TO 20 MC GENERATOR SIGNAL	13	FOREIGN ANTENNA	65	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREAS OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED



POWER SUPPLY
Model 6157 can be supplied for operation from either 25 or 60 cycle power supplies.

105-125 volt - 25 cycles - 110 watts
105-125 volt - 50 - 60 cycles - 110 watts

ALIGNMENT FREQUENCIES
20 MC.; 6 MC.; 1500 KC.; 600 KC.

FREQUENCY RANGES
Broadcast Band..........540 to 1730 KC.
Intermediate Band..........2.2 to 7.0 MC.
Foreign Band..........6.8 to 22.5 MC.

MODEL 6157, Ch. 100.198
Tuner Data, Drive Data

SEARS-ROEBUCK & CO.

MODELS 6002, 6021, 6031
6121, 6131, Ch. 100.195
Tuner Data

HOW TO SET UP AND USE YOUR PUSH BUTTON TUNER.

SET-UP PRELIMINARY

A. Be sure that your set is connected to a good antenna system.

B. Turn on the set and allow it to operate at least one quarter hour before setting-up the push buttons.

C. Make a list of station call letters for six nearby powerful broadcast stations for which you wish to set up the buttons. Arrange the stations in your list in the order of their frequency. That is, the station of lowest frequency will be first; the next higher second, and etc. Refer to the radio log furnished with this receiver and you will be able to determine the correct frequency of the desired stations. After you have marked down the frequencies on your chart alongside of the station call letters and arranged them in their proper order, number them 3, 4, 5, 6, 7 and 8 respectively. Check each frequency using Figs. 1 & 2. If each frequency falls within the range of its button, proceed as outlined in the following paragraphs.

A typical list of stations and the buttons that would be used to set them up is shown below:-

Station Call Letters	Frequency	Button No.
WMAQ	670 KC.	3
WLW	700 KC.	4
WGN	720 KC.	5
WENR-WLS	870 KC.	6
WHO	1000 KC.	7
Police(State)	1640 KC.	8

D. Notice in Fig. 1 that buttons 1 and 2 are for use as tone control buttons. Buttons 3 to 8 inclusive are to be set-up for automatic station selection. Also notice that stations with a frequency between 540 KC and 920 can be set-up on buttons 3, 4 and 5. Stations with a frequency assignment between 630 and 1490 KC may be up on button 6 and 7. Button No. 8 may be used for setting up a station between 720 KC and 1700 KC. There can be only one station on your list that has a frequency rating between 1490 KC and 1700 KC and it must be set-up on button No. 8. However, on the same button it is possible to set-up a station whose frequency is as low as 720 KC.

E. Remove the escutcheon around the push buttons by taking out the six screws holding it to the cabinet. This will bring into view the six pairs of adjustment screws, each pair of which is used to tune in a station that you wish to set-up on a particular button.

F. SET-UP PROCEDURE

1. Turn the band switch (right hand knob) to the right (clockwise) until the word "BROADCAST" appears in the lower opening in the dial scale. Then using the tuning knob (center) tune in the station.

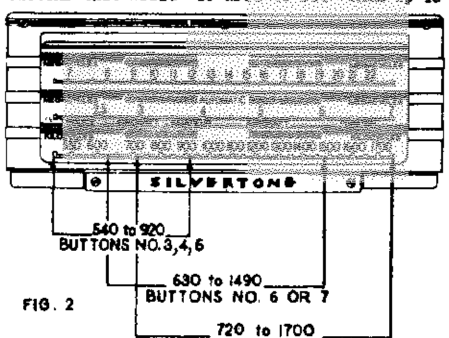


FIG. 2

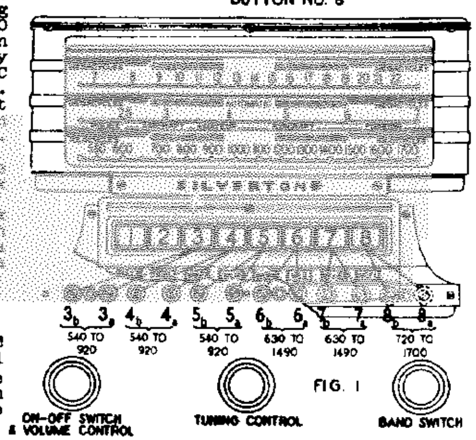


FIG. 1

2. Now turn the band switch to the extreme clockwise position until the word "AUTOMATIC" appears in the dial opening.

3. Push in the button to which you wish to set up the station (See Fig. 1).

4. Use a small screw driver and insert it in the "a" screw for that button (see Fig. 1).

5. Rotate the screw back and forth slowly until the program previously heard is heard again. If trouble is experienced in getting the station, turn the volume control to the right. NOTE: Be sure that you adjust this particular screw until the sides of the tuning eye "shadow" are closest together.

If you are not successful in tuning in the station by turning the "a" screw back and forth, carefully re-read paragraphs "C" and "D", and repeat procedure 1, 2, 3, 4 and 5.

Check to see if you have the proper station by changing the band switch from "Automatic" to "Broadcast" and vise versa.

6. Now insert the screw driver in the "b" screw for that button (see Fig. 1) and turn it to the left or right until the program is received with maximum volume. The correct setting for this screw is when the sides of the tuning eye "shadow" are closest together.

7. Re-adjust the "a" and "b" screws slightly while the band switch is in the "Automatic" position until the sides of the tuning eye "shadow" are closest together.

8. Set-up buttons 4, 5, 6, 7 and 8 following steps 1 to 7 inclusive.

G. Call letter tabs and celluloid windows are supplied with your receiver. The tabs are used to label the six push buttons set-up for stations. The celluloid tabs are supplied as a perforated sheet which is to be broken into eight sections. Select the proper call letter tabs from station call letter sheets supplied.

H. Place the call letter tabs in back of the celluloid window and insert them in their respective slots in the push button estucheon.

I. Replace the escutcheon with its six retaining screws.

REPLACING THE POINTER DRIVE CORD

1. Tie one end of 51" of special dial cord (part number 111302) to the spring, which is attached to Lug H.

2. Thread the free end of the cord through hole A in drum C. (threading from the inside of the drum out) See Fig. 3.

3. After pulling the cord through hole A, make one half turn around the drum C in a clockwise direction (viewed from the front) using the front groove in the drum.

4. Continuing, draw the cord up around the back of pulley F to pulley G. From this point continue across to pulley D and around to pulley E.

5. Go over pulley E and down to the bottom of the front groove on drum C. Continue up around the drum to hole B.

6. Draw the cord through hole B and tie it to the end of the tension spring in such a manner that when the spring is clipped on to lug H it will be extended to about 1 1/8" long.

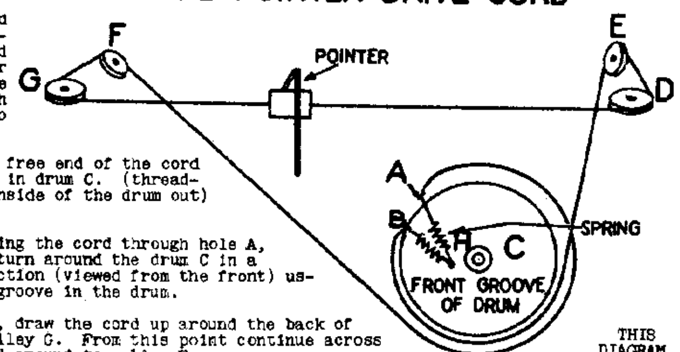


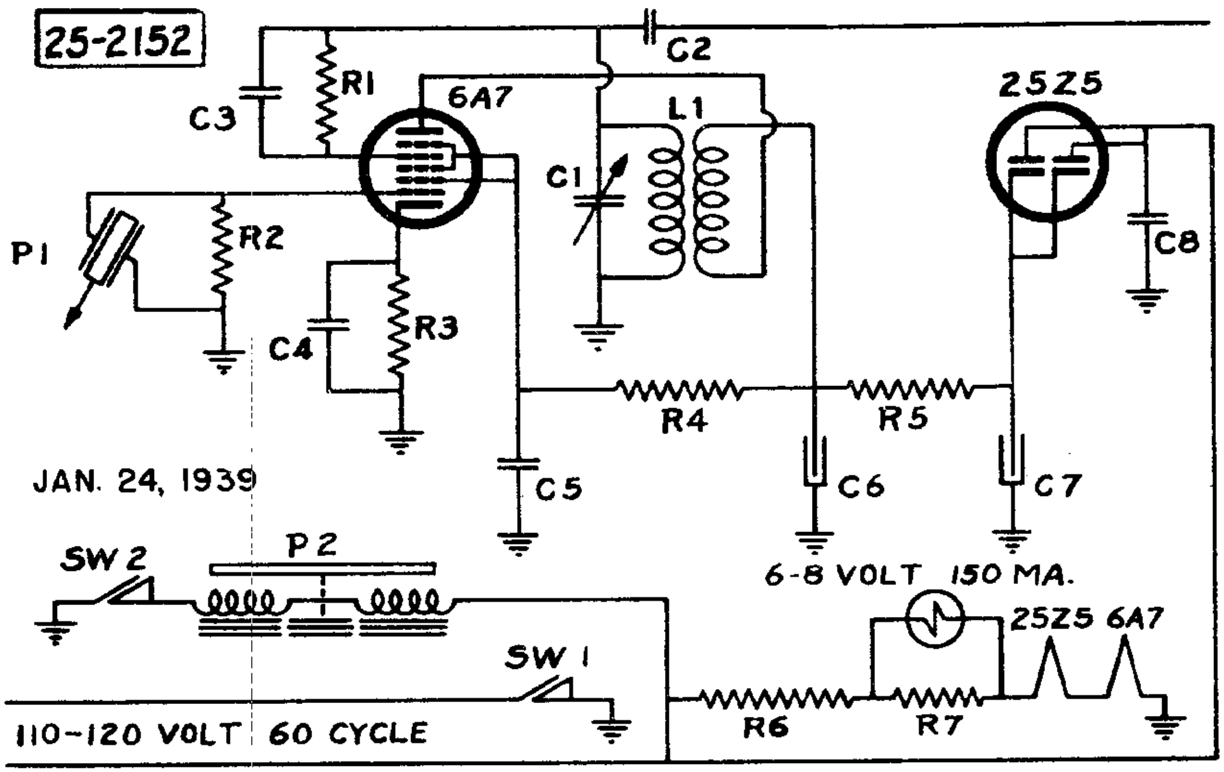
FIG. 3

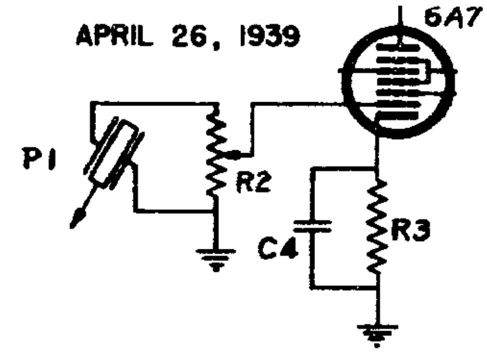
THIS DIAGRAM SHOWS POINTER DRIVE CORD ONLY

SEARS-ROEBUCK & CO.

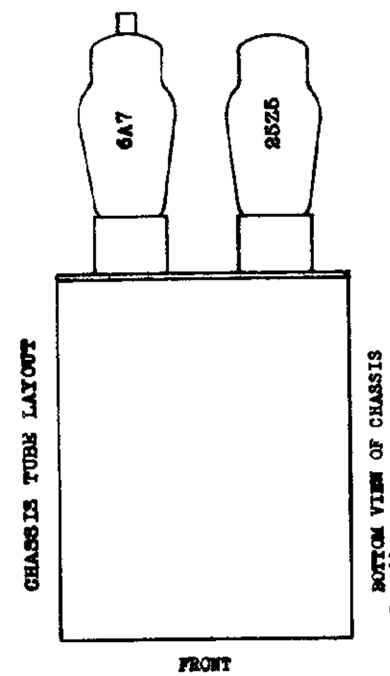
MODEL 6226, Chassis 134.802
Wireless Record Player
Schematic, Notes
Chassis 134.802-1
Schematic Changes, Notes

SCHEMATIC DIAGRAM FOR CHASSIS NO. 134.802





CHASSIS 134.802-1



SUBJECT: ADDITION OF VOLUME CONTROL WITH A "MASTER" SWITCH.

There has been effected a change to further promote the satisfaction to be derived from this equipment by the incorporation of a volume control with the "Master" switch control.

To place the volume control in a position for easier operation, the "Master" switch has been placed on the right hand side of the equipment, the "Motor" switch taking up its position on the left hand side of the equipment.

To place the equipment in operation, the right hand switch marked "Master" should be turned on and advanced to the limit of its clockwise turn, which will place the volume control "Full-on". Slightly to the left of the right hand control will be noticed a small metal cap. This should be pried up with the screw driver furnished to gain entrance to the tuning control, instead of making this adjustment from the bottom as directed — then the usual procedure should be gone through as indicated under "Set Up Procedure".

The volume control can now be set at a level indicated by the satisfaction of the user. Turning the control to the right increases volume, turning it to the left decreases volume.

MODEL 6226, Ch. 134.802
Operating, Set-up Data
Parts Lists

SEARS-ROEBUCK & CO.

ELECTRICAL SPECIFICATIONS

TUBE COMPLEMENT:
6A7 . . . . Modulator-Oscillator
25Z5 . . . . Rectifier

POWER SUPPLY:
Model 6226 is supplied for operation from 105 to 125 volts, 60 Cycles AC only.

25 Cycle and 50 Cycle units are available by special order.

Power Consumption . . . . 50 Watts

FREQUENCY RANGE:
The frequency range is 750 to 540 kilocycles

POWER OUTPUT:
The power output of this unit is arranged so that it can be operated at distances of 20 to 30 feet from the receiver.

OPERATING FEATURES:

Fidelity ranges . . . 50 to 6,000 cycles.

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left hand knob . . . . "Master" switch
2. Right hand knob . . . "Motor" switch

CONTROL OPERATION:
Turning #1 control to right connects power supply to transmitting unit and makes available power supply to the motor. Turning #2 switch to right connects power supply to motor. #1 switch should not be turned off during operation or changing records, and the table should be stopped when changing records by turning switch #2 to the left.

The Model No. 6226, carrying identification No. 134.802, is so designed that it has a tuning range of 750 to 540 kilocycles. This range is selected on the lower part of the broadcast band and is ample in latitude because in any geographical location there will be found a space somewhere in this latitude of frequency where a powerful carrier does not exist and satisfactory operation may be had by tuning the equipment to this frequency. This section of the broadcast band is chosen because there are more cleared channels in this part of the frequency band than in the higher part of the band.

This wireless remote record player is designed to not be connected to any additional antenna and during times when there is high atmospheric interference or where entire freedom from heterodyne whistle cannot be effected by operating the player with its normal antenna array, it may be more closely connected with the receiver with which it is being operated by connecting a wire to the lead that is seen to protrude from the 110 plug and wrapping this two or three turns around the antenna lead to the receiver. This will not in any way interfere with the operation of the radio receiver.

The circuit network used in the wireless remote record player is of conventional design in so far as the oscillator circuit is concerned, however the modulator circuit is unique in that modulation occurs on the electron stream before it is acted upon by any of the tube elements associated with the oscillator circuit. This prevents, among other things, frequency modulation which gives rise to distortion if its extent be great. The percentage modulation is chosen so that, using a moderate tone needle, it will vary from approximately 20% on low amplitude records to as high as 80% on very high amplitude recording. In the general sense it is impossible for the oscillator to become more than 100% modulated. Distortion arising from high amplitude passages is associated with the arm and should be remedied by using a soft, long needle.

There are two switch controls on the equipment so that the "Master" switch may be turned on and left in this position, and the power supply will continue to be connected to the oscillator unit. This results in the carrier created by the oscillator always maintaining quiet operation in the receiver due to the fact that the AVC of the receiver is operating to maintain a low sensitivity of that device and hence occasional atmospheric disturbances will not be heard. If the carrier were interrupted during record changing, the automatic volume control would cease to operate in the receiver, bringing up very high background noise which would not promote the satisfaction of the user.

When distortion is apparent in the output of this device, it will probably be caused by a defective tube, a defective arm, or a worn-out needle. First of all, the quality of the needle should be investigated, then a tube, known to give distortionless operation in the wireless remote record player, should be inserted and last of all, the crystal cartridge in the arm should be replaced.

SET UP PROCEDURE

A. Set up the equipment not more than 20 feet from some point of the antenna system of the radio set with which it is going to be operated.

B. Turn on the radio receiver and allow time for the tubes to come to operating temperature. Tune through the frequency spectrum between 750 and 540 kilocycles and locate a channel which is quiet and on which you do not hear broadcasting.

C. Turn the "Master" switch of your wireless remote record player to the right hand position, select a record and place it on the table, and place the tone arm in normal position. Pull the record player forward on the table, exposing the large hole in the bottom of the player. After turning "Motor" switch on and starting table, insert the screw driver provided through this hole and adjust the trimming condenser located directly above until the carrier is heard to be received by the radio receiver. This adjustment should be made very carefully and the record player should be tuned back and forth across the channel to which the radio receiver is tuned until it is absolutely centered and the music issuing from the radio receiver of good quality. Many times a final tuning of the receiver a small amount will result in more nearly correct tuning.

D. After the above adjustment has been made, all subsequent operation is taken care of at the radio receiver, such as adjusting tone control, volume control, and when it is again desired to operate the record player, it will be heard in the same place on the scale of the receiver to which it has now become adjusted.

E. In changing records, operate only the right hand control. The pilot light will illuminate the record sufficiently so that no other light is required for replacing records or changing needles, and the motor can be stopped or started by the use of this one control.

Good results will not be obtained unless needles are changed regularly.

The quality of the tone response will be in proportion to the goodness of the radio receiver, and for full tone response a good console set should be used.

It is essential that the wave channel selected for operation of the record player should be practically free from radio signal.

If difficulty is experienced in finding a cleared channel, or if severe atmospheric static is present, these faults can be overcome by moving the record player closer to the radio set or its antenna, even to the extent of attaching a wire to the end of the antenna which protrudes from the attachment cord and placing the other end of this wire one turn around your antenna lead to the set. Do not make any direct connection, however.

A few types of phonograph records, including some symphonic reproductions, give a very heavy signal when used with medium or loud needles, and better results can be secured with these records by the use of soft tone needles.

In the case of old phonograph records made prior to the use of electrical recording, a low signal volume is sometimes available and this can be corrected by the use of loud or extra loud needles.

Authorized Replacement Parts for this model may be obtained from any Sears, Roebuck and Co. Retail Store or Mail Order branch. Always give part numbers and the chassis identification number.

PART NO.	SCHEMATIC LOCATION	DESCRIPTION	SELLING PRICE EACH
13472031		Bumper, Rubber	.04
13471471		Button, Cabinet Snap	.04
134152003		Clamp, Cord	.01
134152002		Clip, Cord	.04
134162002		Clip, Pilot Socket Mounting	.01
134172223	L1	Coil Assembly, Oscillator	.57
134782034	C1	Condenser, Trimmer, 40-240 Mmfd.	.20
	C2	Condenser, .00001 Mfd. Mica	.14
	C3	Condenser, .00005 Mfd. Mica	.11
	C4 & C5	Condenser, .1 Mfd. 200 Volt	.11
	C6	Condenser, 8 Mfd. 150 W. V.	.45
	C7	Condenser, 16 Mfd. 150 W. V.	.50
	C8	Condenser, .1 Mfd. 200 Volt	.11
134202005		Cord, 110 Volt & Antenna	1.20
13482140		Case Assembly, Cabinet	3.70
13482141		Case Bottom, Cabinet	.90
134232017		Cup, Needle	.08
134232019		Cartridge, Crystal	6.00
13434903		Feet, Rubber	.08
134402038		Knob, Walnut "Master"	.09
134402039		Knob, Walnut "Motor"	.09
13445349		Lamp, Pilot, Mazda #T-46	.12
134482009		Nut, Pickup Arm Mtg.	.08
134512051		Plate, Bottom, for Pickup Head	.20
134512052		Plate, Turn Table Clutch	.10
134522080	P1	Phono Pickup Arm Assembly	6.50
134522081	P2	Phono Motor Assembly, 60 Cycle AC 110-120 V. with 9" Turn Table	8.52
134522086		Phono Motor Assembly, 50 Cycle AC 110-120 V. with 9" Turn Table	8.92
134522099		Turn Table, 9"	1.12
134522081		Phono Motor, 60 Cycle AC 110-120 Volt	7.50
	R1	Resistor, 10,000 Ohm 1/4 Watt	.15
	R2	Resistor, 250,000 Ohm 1/4 Watt	.15
	R3	Resistor, 1,000 Ohm 1/4 Watt	.15
	R4 & R5	Resistor, 5,000 Ohm 1/4 Watt	.15
134532021	R6 & R7	Resistor, 278 Ohm 25 Watt tapped at 26 Ohm 2.34 Watt.	.58
134552004		Rest, Arm	.20
134552003		Ring, Rubber Locking	.05
13462819		Socket, 6 prong	.12
13462824		Socket, 7 prong	.12
134622049		Socket Assembly, Pilot Light	.25
134662021	SW1	Switch, Line "Off-On"	.43
134662021	SW2	Switch, Motor "Off-On"	.43
134732035		Washer, Pickup Arm Mtg.	.01
134732037		Washer, Motor Mtg.	.05
134732038		Washer, Shouldered Rubber Motor Mtg.	.05
134732039		Washer, Plain Rubber Motor Mtg.	.05
134732040		Washer, Turn Table Rubber Clutch	.05

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

The following parts have been added to this model IDENTIFICATION NO. 134.802-1

PART NO.	SCHEMATIC LOCATION	DESCRIPTION	SELLING PRICE
134192013	R2 & S1	Volume Control & Off-and-On Switch	.75
134662023	S2	Motor Off-On Switch (Interchangeable with 134662021)	.45

The following parts are not used in the 134.802-1:

PART NO.	SCHEMATIC LOCATION	DESCRIPTION
134662021	S1	Line Off-On Switch
134662021	S2	Motor Off-On Switch
	R2	Resistor, 250,000 Ohm 1/4 Watt

SEARS ROEBUCK & CO.

MODELS 6195,6196,6197
Chassis 109.216
Schematic,Voltage
Socket,Trimmers
Alignment

ALIGNMENT PROCEDURE

Either a broadcast signal between 1400 and 1500 KC may be used.

The antenna of the receiver should be extended as in normal use. Tune in a station between 1400 and 1500 KC. and adjust the trimmers on top of the variable condenser for maximum signal.

If a signal generator is used, extend the antenna as described above, run a wire from the generator parallel to, but insulated from the antenna. Set the generator at 1720 KC. Turn the variable condenser all the way to the right (minimum capacity). Tune in the signal from the generator with the trimmer on the front section of the variable condenser. Set the generator at about 1400 KC. Tune in the signal and adjust the trimmer on the rear section of the variable condenser for maximum signal.

The signal generator method is most satisfactory and should always be used when available.

CAUTION:
Under no condition should a ground be attached to this receiver, also no grounded object should be allowed to come in contact with the chassis.

POWER SUPPLY:
105-125 volts, 50-60 cycle or D. C. 43 Watts on 117 volt line.

FREQUENCY RANGE:
Broadcast and other services 540 to 1720 KC.

ALIGNMENT FREQUENCIES:
1720 and 1500 KC.

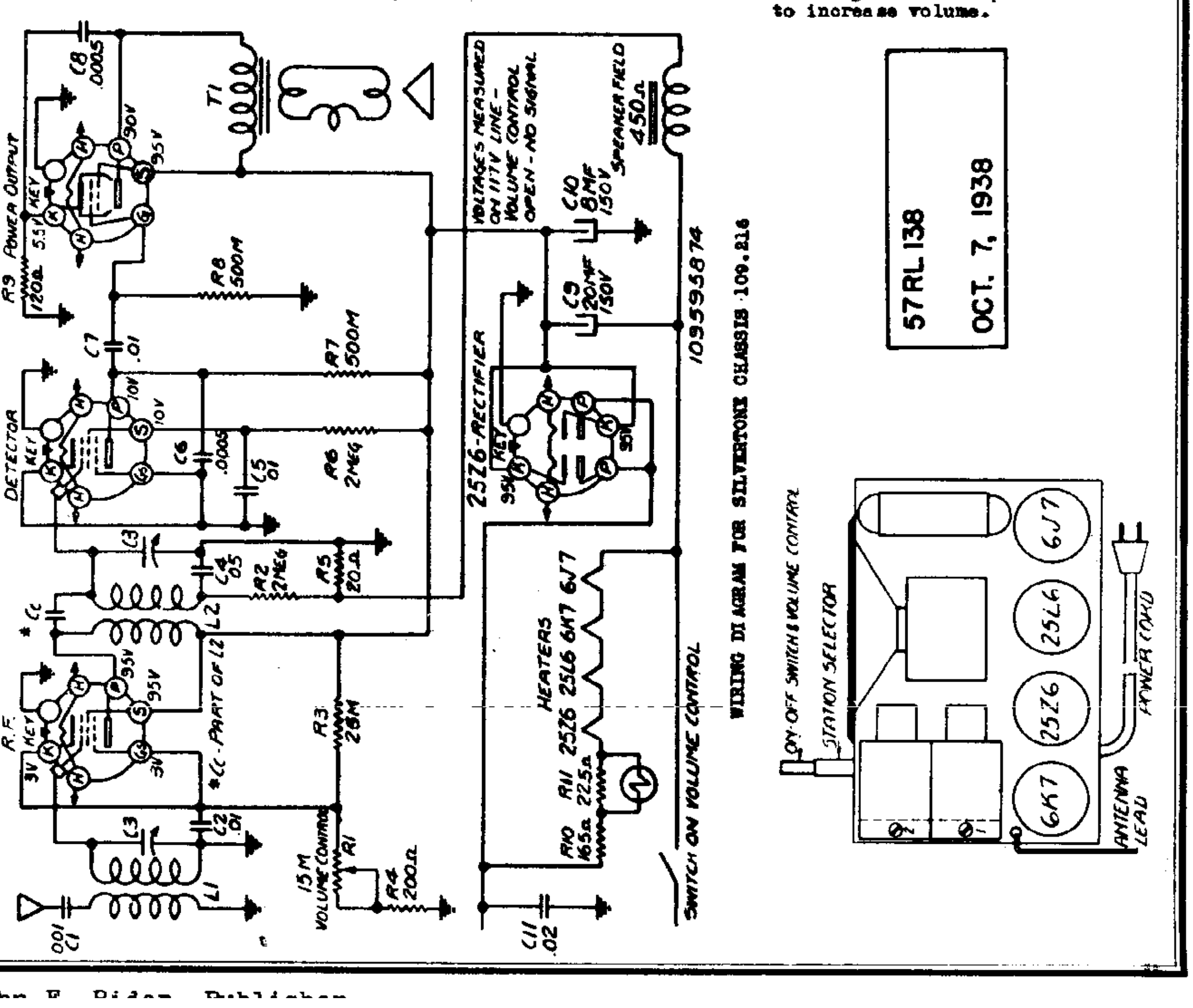
POWER OUTPUT:
Type.............................Beam Power
Undistorted..........................1 Watt
Maximum...........................2.0 Watts

LOUD SPEAKER:
Type......................Dynamic
Size.............................3½"
Field Resistance.......450 Ohms

MECHANICAL SPECIFICATIONS

CONTROLS:
Upper Knob..........................Tuning
Lower Knob.....Volume control,On-Off Switch

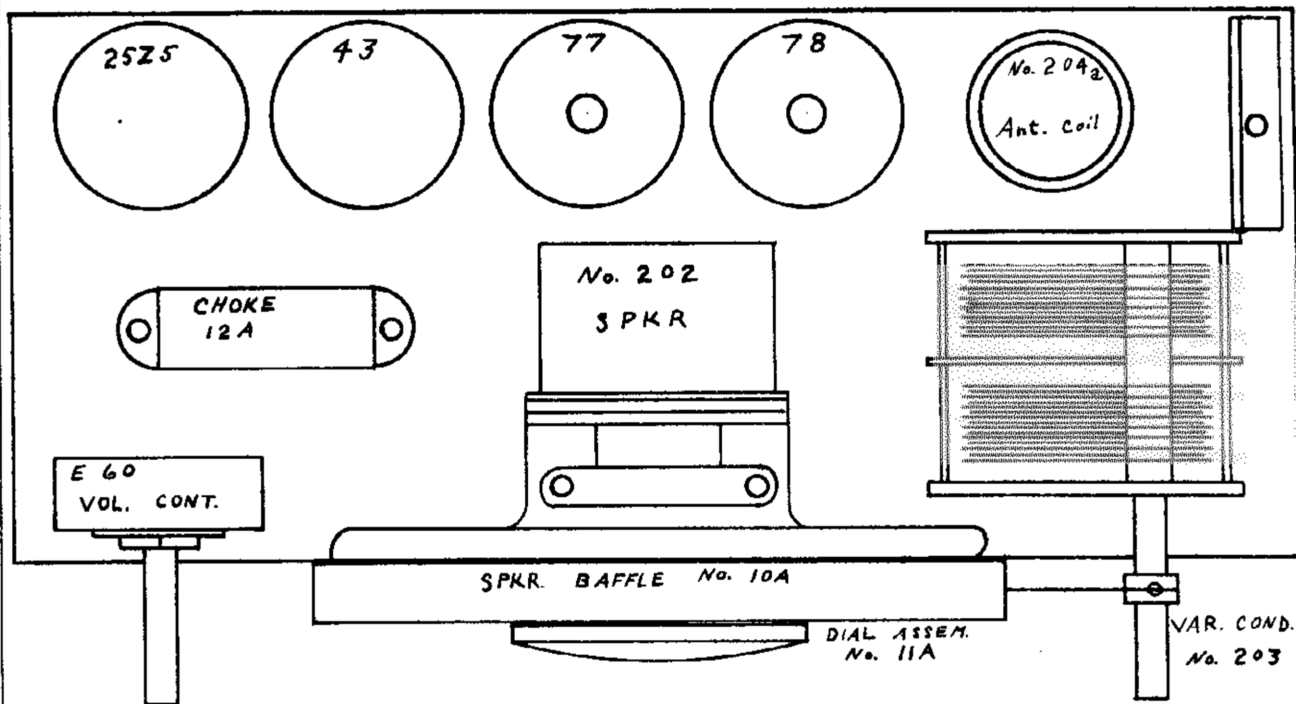
CONTROL OPERATION:
Direct Drive
Turn right to turn power on and to increase volume.

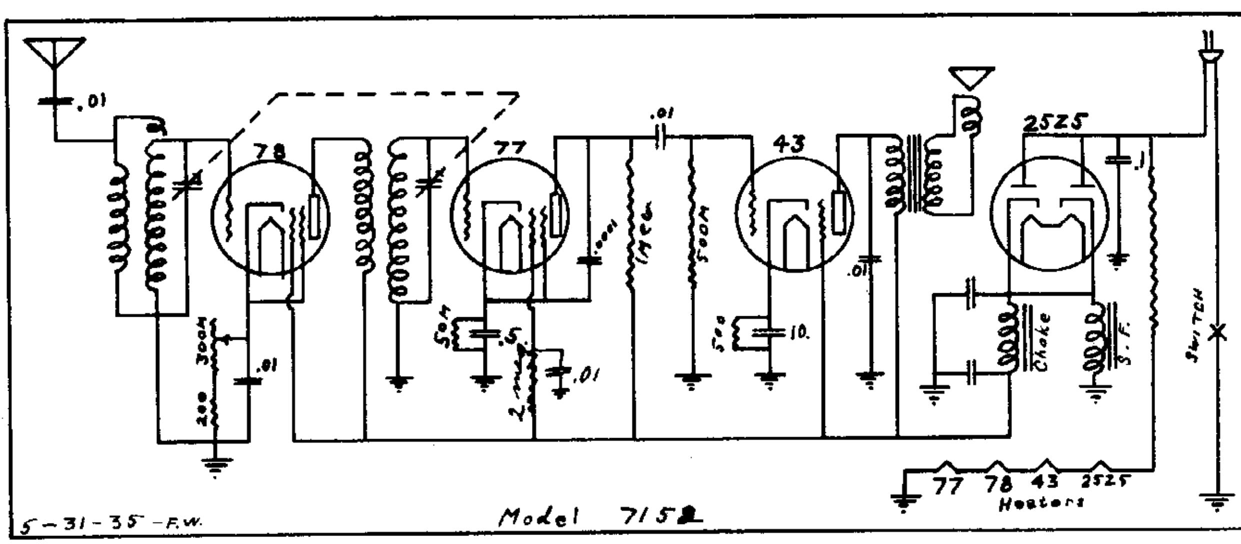


MODEL 7152
Schematic, Socket
Voltage

SEARS-ROEBUCK & CO.

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII





SOCKET VOLTAGES

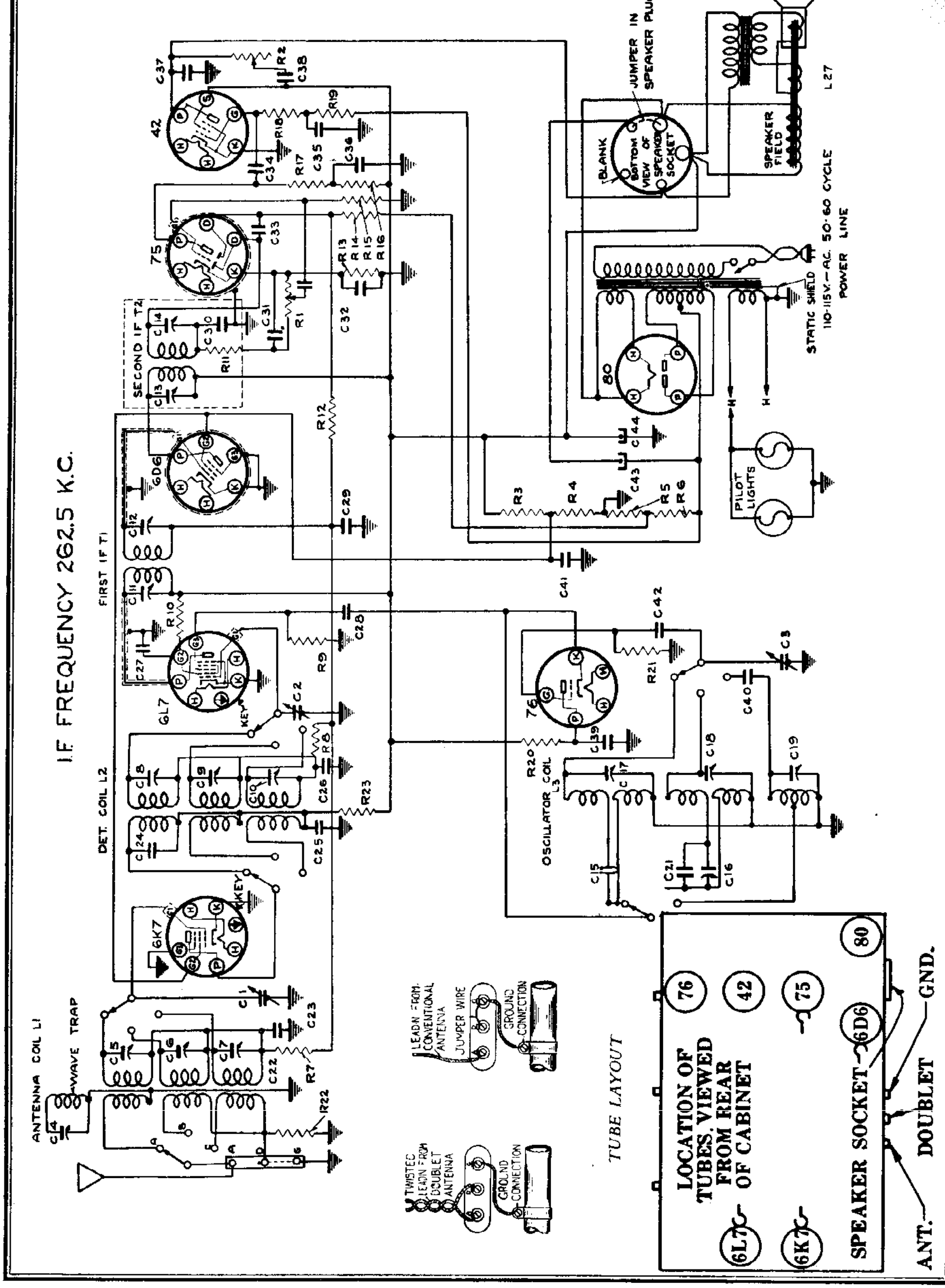
TUBE	POSITION	EF	EK	EG2	EG3	EP
78	RF	6.3	2.1	110	2.1	108
77	Det.	6.3	1.4	14	1.4	18
43	PR. OUTPUT	25	16	110	-	100

Line voltage 115 Volts - Voltage control all the way up
All voltages taken with 1000 ohms per volt D.C. meter except heaters. From points indicated to ground.

F - Filament   K - Cathode   G2 - Screen Grid
G3 - Suppressor grid   P - Plate

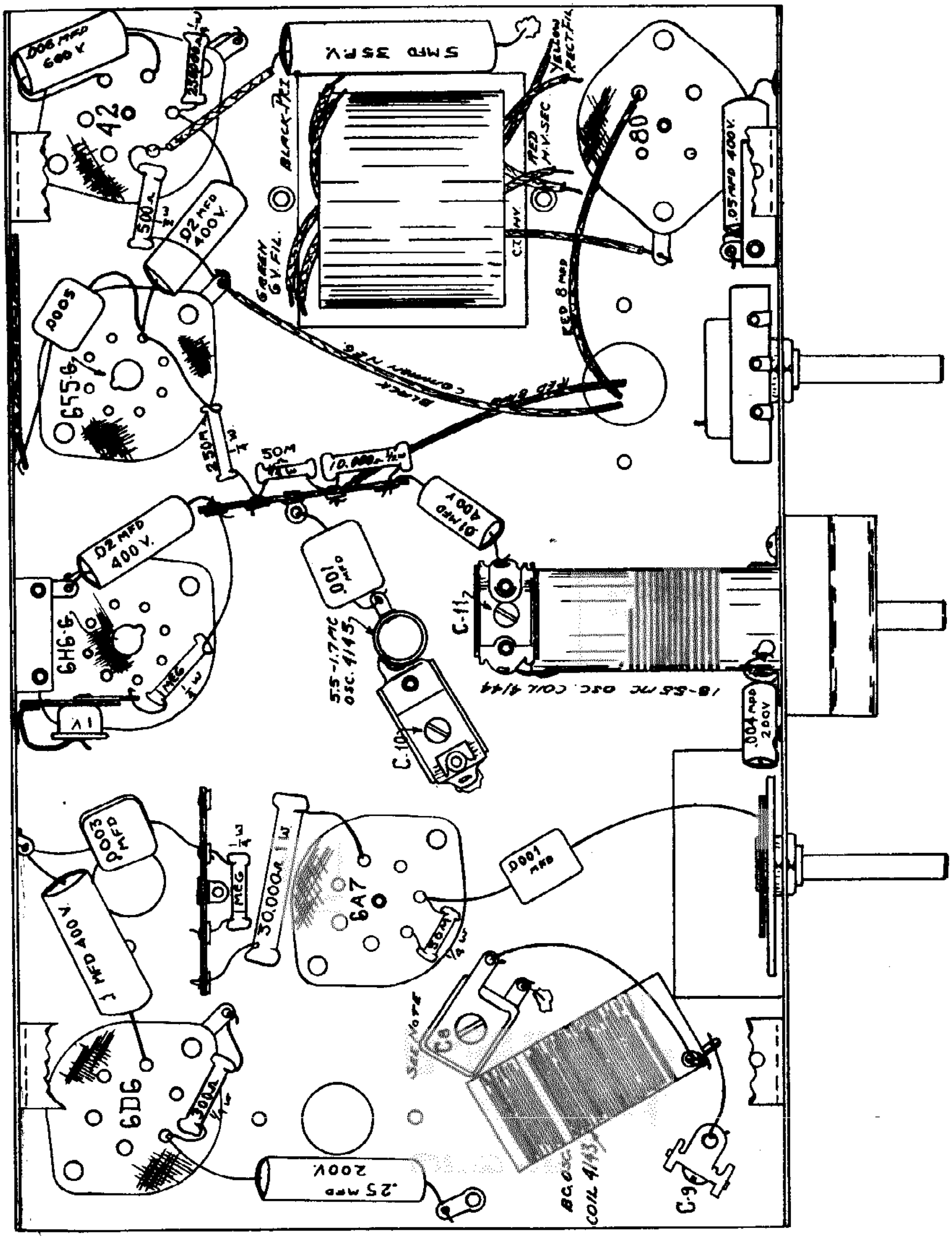
SEARS ROEBUCK & CO.

MODELS 7170, 7170A
Schematic, Socket



MODEL 7171
Chassis Wiring

SEARS-ROEBUCK & CO.



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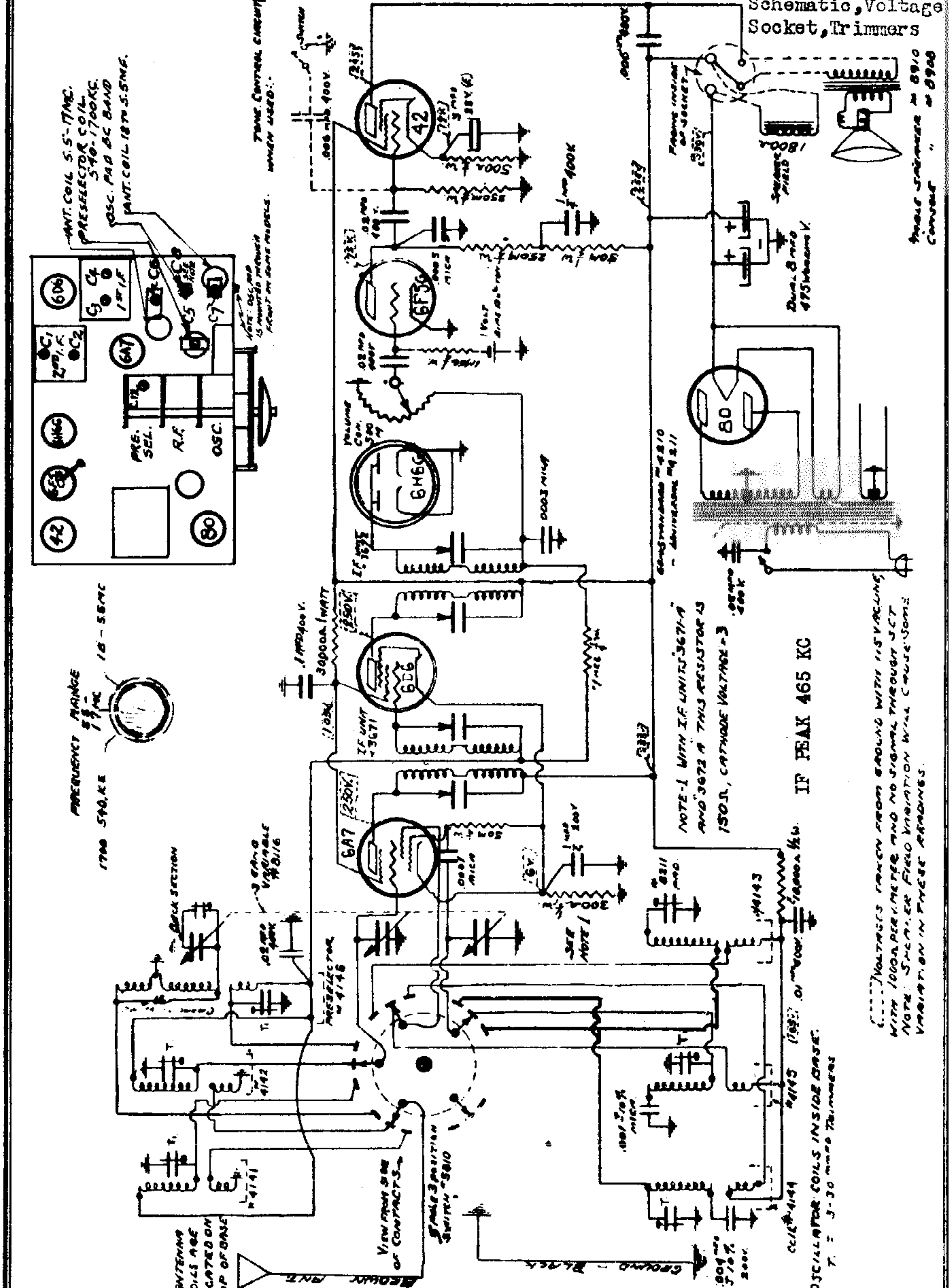
MODEL 7171
Schematic, Voltage
Socket, Trimmers



MODEL 7171
Alignment

SEARS-ROEBUCK & CO.

THE ALIGNMENT PROCEEDURE

The following alignment instructions are given with the assumption that the service station has an oscillator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be 0 to 3 volt AC meter connected across the voice coil of the speaker or preferably an output meter connected in the plate circuit of the 42 power tube in series with an 8 MFD paper condenser.

I THE I.F. STAGES

The I.F's are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6A7 tube.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers number C1, C2, C3, C4. (See pictorial diagram).

The sensitivity of the I.F. stages will be 40 microvolts or better.

Always use as low an output as possible from the test oscillator in making the various adjustments.

II ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the condenser shaft to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can be easily lined up by loosening the set screw behind the dial card in the drive hub.

1. Set the test oscillator to 17 megacycles.

2. Turn wave band switch all the way to right for highest S.W. band, and set dial hand to 17 M.C.

3. Peak trimmer condenser C-11 of the oscillator coil (See pictorial 6-2) to resonance with 17 M.C. fed into antenna.

4. Peak Ant. coil trimmer C-7 at same setting to 17 M.C.

III SHORT WAVE BAND 1.7 TO 5.5 M.C.

1. Turn wave switch to middle position.

2. Set dial hand to 5 megacycles on the 1.7 to 5.5 M.C. inner scale.

Peak oscillator trimmer C-10 to 5 M.C. from test oscillator. And Ant. coil trimmer C-6 to same frequency.

<u>NOTE:</u> After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

<u>EXAMPLE:</u> The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 M.C.

Increase oscillator signal by "opening up" the alternator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

IV THE BROADCAST BAND

1. Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale).

2. Peak oscillator trimmer C-9 to 1400 KC., the Antenna preselector C-12 (variable condenser trimmer) to 1400 KC, and trimmer C-5 to 1400 KC.

3. Set dial hand to 550 KC and adjust oscillator padding condenser C-8 to 550 KC.

4. Recheck dial at 1400 KC as in number (1) and (2).

5. Points in the middle of the dial may be checked and if necessary the plates of the front section of variable condenser may be bent for alignment.

V NOTES.

1. Seal all trimmers after their final adjustment.

2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.

3. Refer to the schematic for the voltages at the tube sockets.

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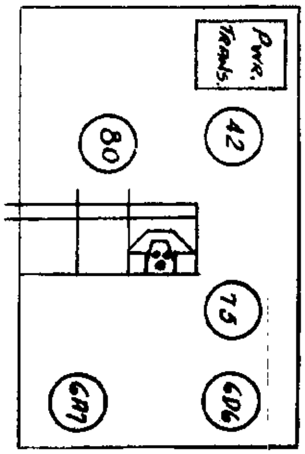
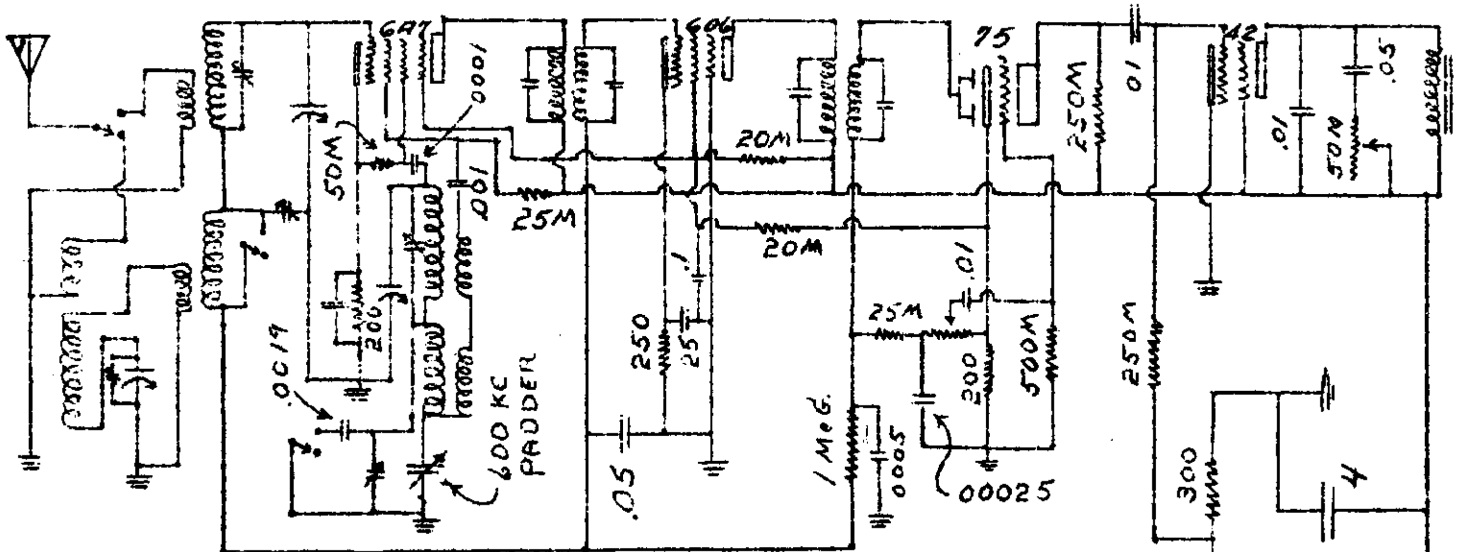
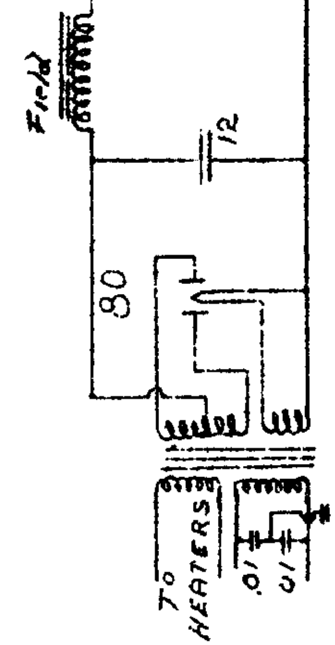






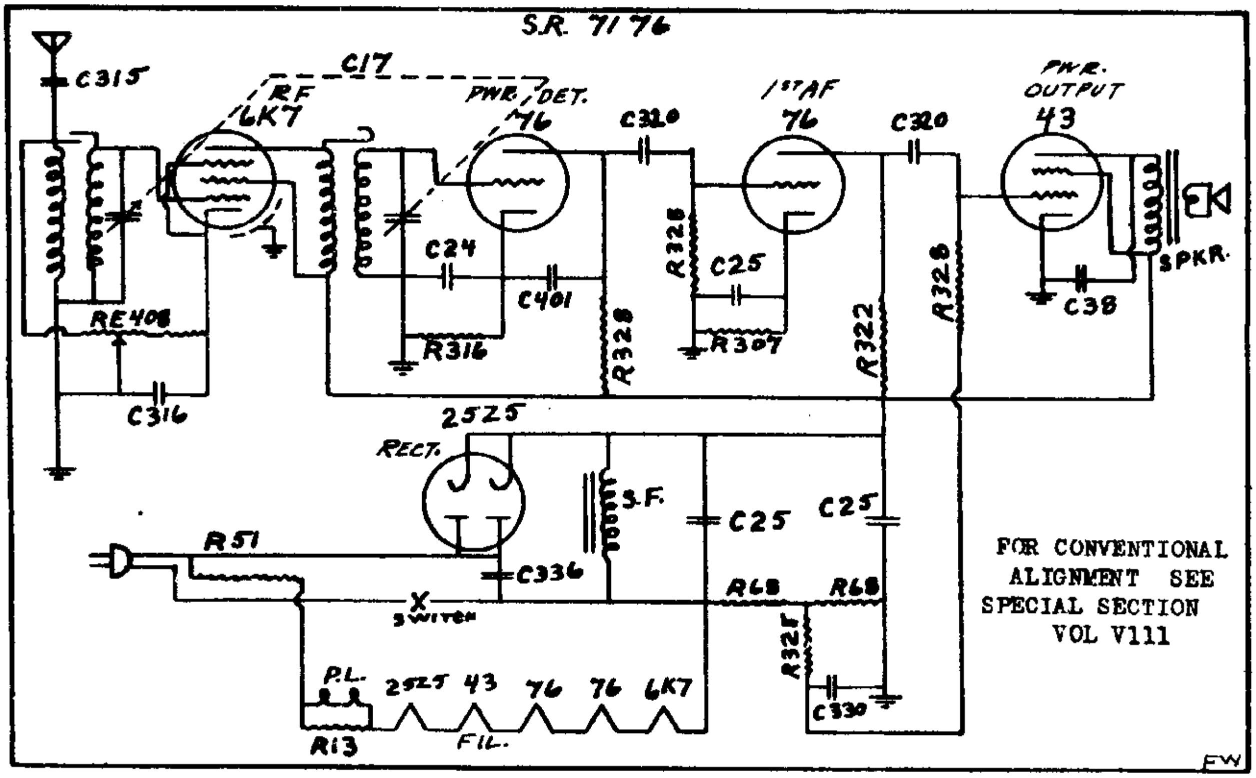
ALIGNMENT PROCEDURE

CONNECT SIGNAL GENERATOR	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL TUNED TO	RECEIVER WAVE BAND SWITCH AT	TRIMMER	OUTPUT SIGNAL
6A7 Grid	456 KC			All I.F.	Max.
Antenna	6. MC	6. MC	SW	Oscillator*1	Max.
Antenna	" "	" "	"	SW antenna*2	Max.
Note: SW low frequency padder, not to be adjusted, but must oscillate at 2.5 MC.					
Antenna	1720 KC	1720 KC	BC	BC Oscillator*3 to 1720 KC	Max.
Antenna	1720 KC	1720 KC	BC	Antenna *4 to 1720 KC	Max.
Antenna	600 KC	600 KC	BC		Max.
Antenna	1720 KC (Recheck 1720 KC alignment for maximum output)				

*1- Located under chassis near electrolytic condenser.
*2- " on top of chassis near dial.
*3- " under chassis near outer edge.
*4- " on top of chassis near IF transformers.

MODEL 7176
Schematic, Socket, Trimmers
Alignment

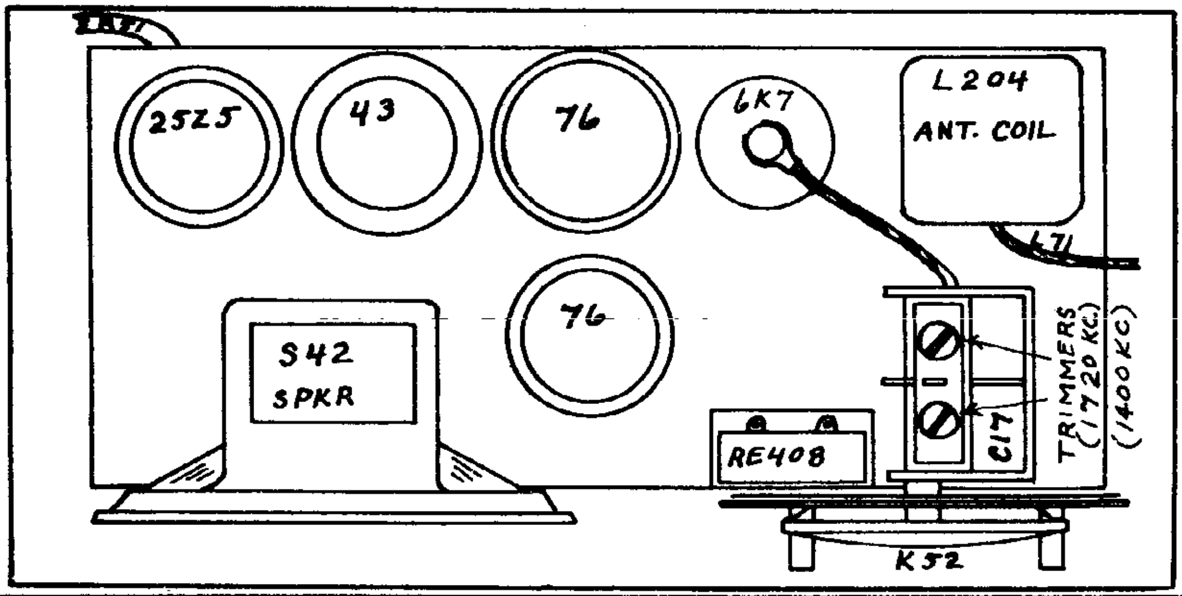
SEARS-ROEBUCK & CO



LEGEND

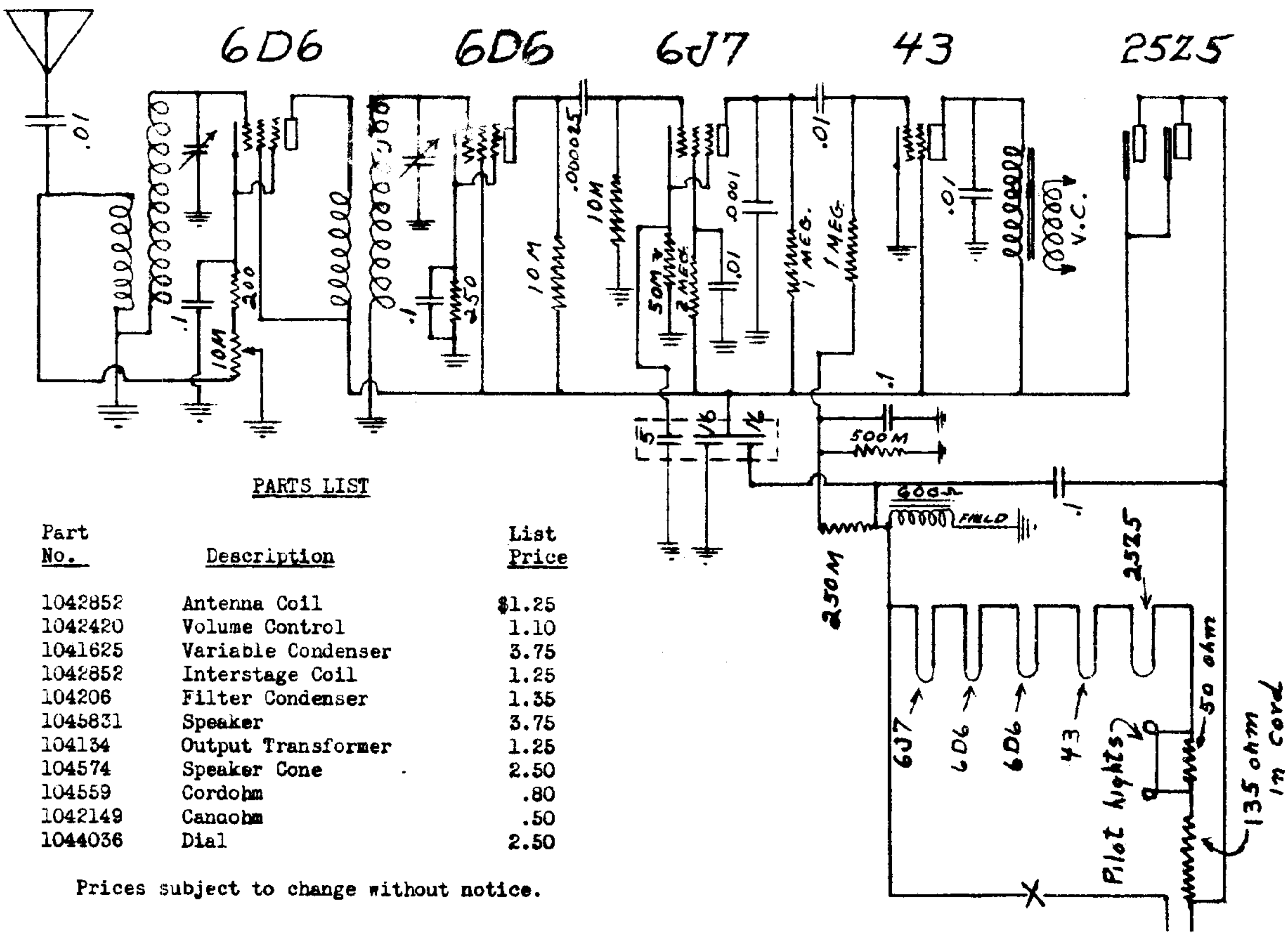
C17 - 360 MMF. Var. Cond.
C24 - 5 MFD. 35V. Elect.
C25 - 16-8-5 MFD
C38 - .005 MFD. 800V.
C315 - .01 MFD. 200V
C316 - .01 MFD. 400V
C320 - .02 MFD. 200V
C330 - .05 MFD. 200V
C336 - .1 MFD. 400V
C401 - .0001 Mica

R13 - 50 OHMS.
R51 - 135 OHM. Cordohm
R68 - 400 OHMS
R307 - 2,500 OHMS
R316 - 15,000 OHMS
R322 - 50,000 OHMS
R328 - 1 MEG.
RE408- 300,000 OHM Vol. Cont.
P.L. - Pilot Lights
S.L. - Speaker Field



MODEL 7177
Schematic

SEARS-ROEBUCK & CO.



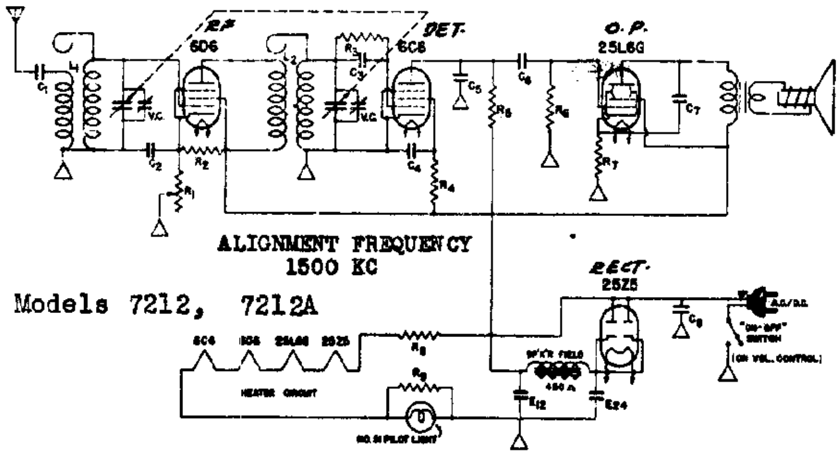
PARTS LIST

Part No.	Description	List Price
1042852	Antenna Coil	$1.25
1042420	Volume Control	1.10
1041625	Variable Condenser	3.75
1042852	Interstage Coil	1.25
104206	Filter Condenser	1.35
1045831	Speaker	3.75
104134	Output Transformer	1.25
104574	Speaker Cone	2.50
104559	Cordohm	.80
1042149	Canaohm	.50
1044036	Dial	2.50

Prices subject to change without notice.

MODEL 7211, Ch. 110.7211
MODELS 7212, 7212A
Chassis 110.7212
Schematics, Socket, Trimmers
Alignment

SEARS-ROEBUCK & CO.



ALIGNMENT FREQUENCY
1500 KC

Models 7212, 7212A

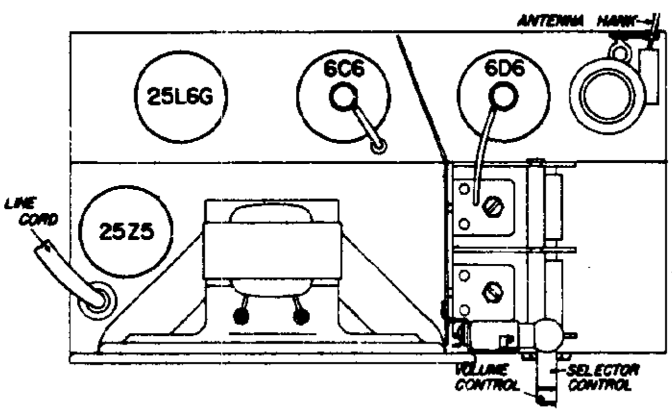
R_1 -	25,000	OHM	VOL. CONTROL	
R_2 -	35,000	"	1/6	WATT
R_3 -	6,000,000	"	"	"
R_4 -	6,000,000	"	"	"
R_5 -	1,000,000	"	"	"
R_6 -	500,000	"	"	"
R_7 -	180	"	1	"
R_8 -	185	"	IN LINE CORD	
R_9 -	31	OHM	3	WATT

L_1 - ANTENNA COIL
L_2 - RF. COIL

E_{12} - 12 MFD 160 V.W.
E_{24} - 24 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

C_1 -	.005	- 400 V.
C_2 -	.02	200 V.
C_3 -	.005	- 400 V.
C_4 -	.02	- 200 V.
C_5 -	.00025	- MICA
C_6 -	.02	- 200 V.
C_7 -	.01	- 400 V.
C_8 -	.1	- "



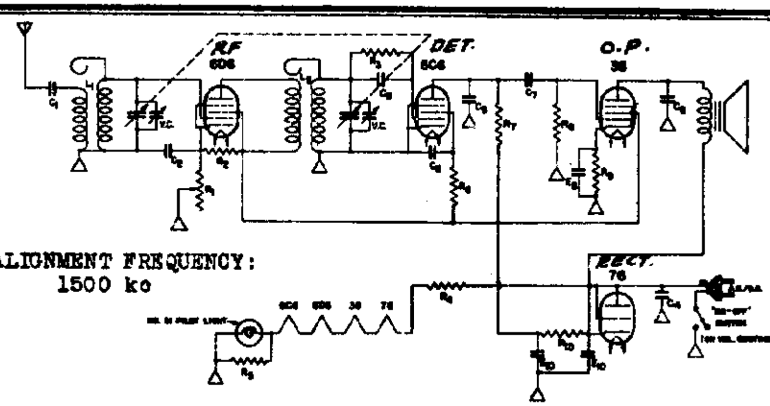
CONVENTIONAL
ALIGNMENT
SEE
SPECIAL
SECTION
VOL. VIII

POWER SUPPLY:
All models 105-125 volts, 50-60 cycle or DC, 40 watts

FREQUENCY RANGE:
Broadcast . . . . 540-1470 KC

POWER OUTPUT:
Type . . . . Beam Power
Undistorted . . . . 1 watt
Maximum . . . . 1.5 watts

APRIL 7, 1938



ALIGNMENT FREQUENCY:
1500 kc

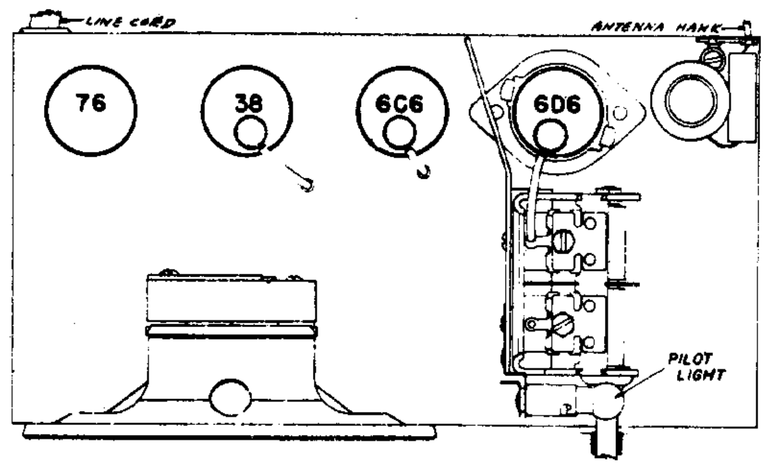
Model 7211

R_1 -	50,000	OHM	VOL. CONTROL	
R_2 -	50,000	"	1/4	WATT
R_3 -	3,000,000	"	"	"
R_4 -	200	"	IN LINE CORD	
R_5 -	31	"	3	WATT
R_6 -	5,000,000	"	1/4	"
R_7 -	1,000,000	"	"	"
R_8 -	750,000	"	"	"
R_9 -	1,000	"	"	"
R_{10} -	2,700	"	"	"

L_1 - ANTENNA COIL
L_2 R.F. COIL

E_9 - 8 MFD. 25 W.V.
E_{10} 10 " 150 "

C_1 -	.05	400 V.
C_2 -	.05	200 V.
C_3 -	.005	400 V.
C_4 -	.05	"
C_5 -	.02	200 V.
C_6 -	.00025	MICA
C_7 -	.02	200 V.
C_8 -	.006	400 V.



POWER SUPPLY:
All models 105-125 volts, 25-60 cycle or DC, 35 watts

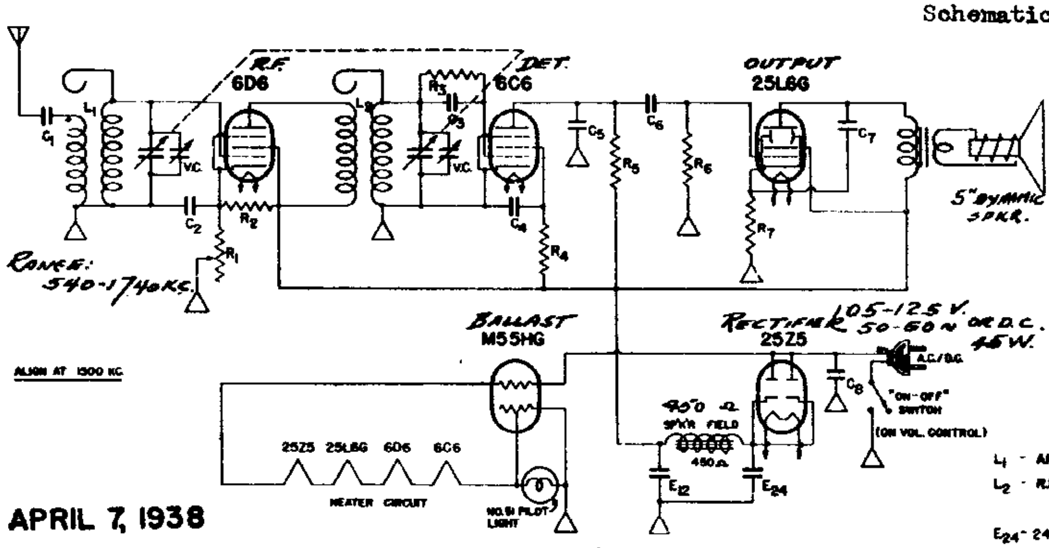
FREQUENCY RANGE:
Broadcast . . . . 540-1700 kc

POWER OUTPUT:
Type . . . . Single Pentode
Undistorted . . . . .3 watts
Maximum . . . . .6 watts

APRIL 7, 1938

SEARS ROEBUCK & CO.

MODEL 7213, Ch. 110.7213
Schematic, Socket, Trimmers
MODEL 7214, Ch. 110.7214
Schematic



C_1	.005	- 400 V.	
C_2	.02	- 200 V.	
C_3	.005	- 400 V.	
C_4	.02	200 V	
C_5	.0001	- MICA	
C_6	.02	- 200 V	
C_7	.01	- 400 V.	
C_8	.1	- 400 V	

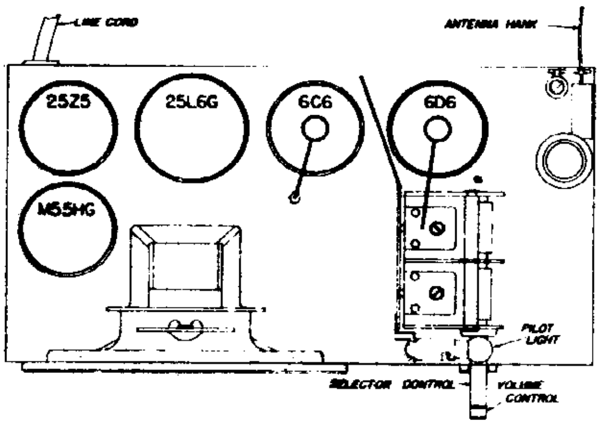
L_1 - ANTENNA COIL
L_2 - R.F. COIL

E_{24} - 24 MFD 150 V.W.
E_{12} - 12 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

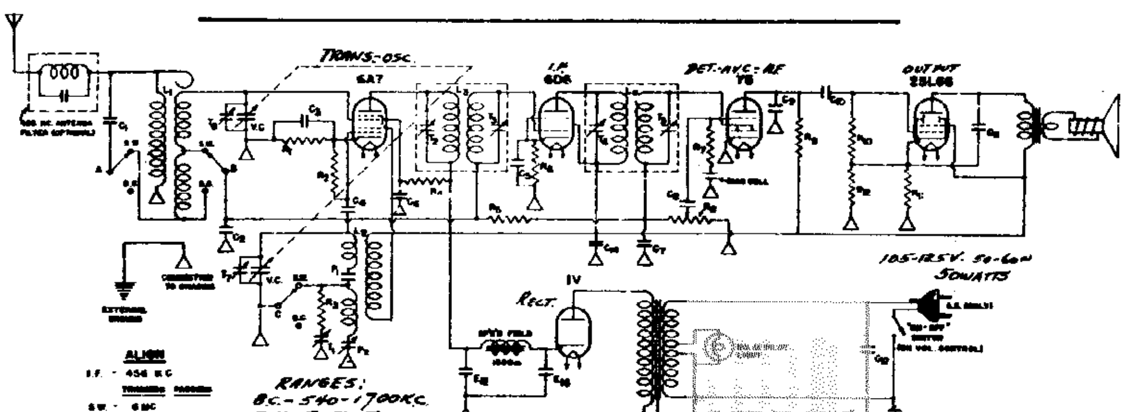
R_1	25,000	OHM	VOLUME	CONTROL
R_2	35,000	"	1/4	WATT
R_3	6,000,000	"	"	"
R_4	6,000,000	"	"	"
R_5	1,000,000	"	"	"
R_6	500,000	"	"	"
R_7	150	"	1/2	"

APRIL 7, 1938



MODEL 7213
CHASSIS 110.7213

POWER OUTPUT:
Type . . . . Beam Power
Undistorted . . . . 1.2 watts
Maximum . . . . 1.6 watts



ALIGN
I.F. - 456 KC
S.W. - 6 MC
B.C. - 1500 KC. 600 KC

R_1 -	400	OHM	1/4	WATT
R_2 -	50,000	"	"	"
R_3 -	60	"	"	"
R_4 -	35,000	"	"	"
R_5 -	3,000,000	"	"	"
R_6 -	400	"	"	"
R_7 -	750,000	"	"	"
R_8 -	500,000	"	VOL. CONTROL	
R_9 -	500,000	"	1/4	WATT
R_{10} -	500,000	"	"	"
R_{11} -	300	"	1/2	"
R_{12} -	600 TO 900	"	1/4	"

SWITCHES A,B,C, 3 POLE DOUBLE THROW WAVE BAND SWITCH

L_1 - COMBINATION ANTENNA COIL
L_2 - COMBINATION OSCILLATOR COIL
L_3 - 456 KC. INPUT I.F.
L_4 - 456 KC. OUTPUT I.F.

P_1 - 1360 MMF. MICA PADDER
P_2 - 700 MMF. MAX. PADDER

E_{12} - 12 MFD. 150 V.W.
E_{16} - 16 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

T_1 - 3-35 MMF. TRIMMER

C_1 -	.005	-	400 V.
C_2 -	.05	-	200 V.
C_3 -	.05	-	"
C_4 -	.0001	-	MICA
C_5 -	.05	-	200 V.
C_6 -	.02	-	200 V.
C_7 -	.00025	-	MICA
C_8 -	.02	-	400 V.
C_9 -	.00025	-	MICA
C_{10} -	.02	-	200 V.
C_{11} -	.01	-	600 V.
C_{12} -	.1	-	400 V
C_{13} -	.05	-	"
C_{14} -	.02	-	200 V.

MODEL 7214
CHASSIS 110.7214

APRIL 7, 1938

POWER OUTPUT:
Type . . . . Beam Power
Undistorted . . . . 1.75 watts
Maximum . . . . 2.5 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 5"
Field Resistance . . . . . 1500 ohms

MODEL 7214, Ch. 110.7214
Socket, Trimmers, Alignment
MODEL 7215, Ch. 110.7215
Tuner, Alignment

SEARS-ROEBUCK & CO.

MODEL 7214

FACTORY IDENTIFICATION NO. 110.7214

ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter connections . . . . Across output transformer
Output meter reading to indicate 0.050 watt
For Weston type 571 output meter on 15 volt scale . . . . 9 volts
Average sensitivity in MV for .05 watts output . . . . See chart below
Dummy antenna value in series with generator output . . . . 100 Mmfds.
Connection of generator ground lead . . . . To chassis
Generator modulation . . . . App. 30% at 400 cycles
Position of volume control . . . . Fully clockwise

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"SW"	5 MC	456 KC	6A7 Grid	T2, T3, T4, T5	IF	140
"SW"	6 MC	6 MC	Ant. lead	T7, T8	Osc., R.F.	30
"BC"	600 (Rock)	600 KC	Ant. lead	P2	Osc.	30
"BC"	1500	1500 KC	Ant. lead	T1	Osc.	45

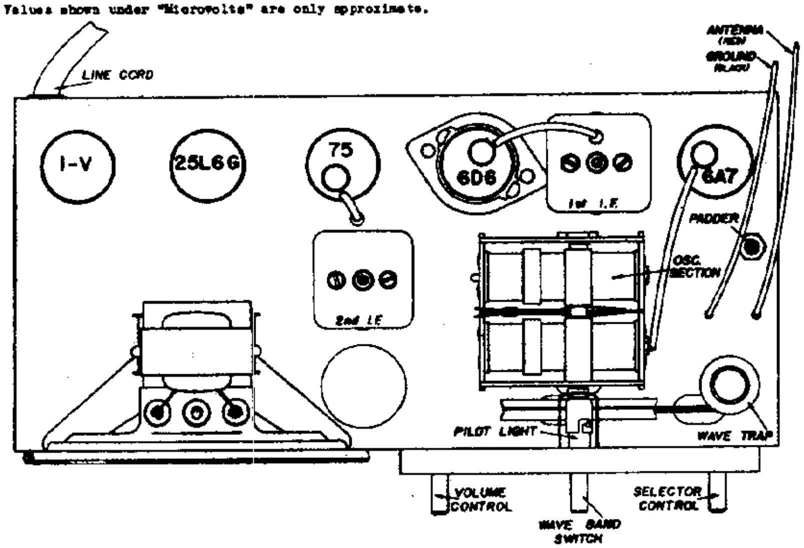
IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.



TUBE SOCKET LOCATIONS

MODEL 7215

FACTORY IDENTIFICATION NO. 110.7215

AUTOMATIC TUNING CONTROL ADJUSTMENT

This radio leaves the factory with the push button unset, and the user will have to make the necessary adjustments for setting the buttons.

The following is the procedure to be followed in making the adjustments for each station.

Note: Before attempting to set buttons read through the ENTIRE PROCEDURE VERY CAREFULLY.

1. Decide on station you wish to receive.
2. From the radio section of your daily newspaper find the transmitting frequency in kilocycles of the stations.
3. Refer to the diagram underneath cabinet and see which set of adjustment screws will have a tuning range that includes the frequency of the station desired. This is the pair of screws to be adjusted for this particular station. The ranges are listed under each pair of adjustment screws.
4. From the same diagram, after finding where the proper pair of adjustment screws are located, trace dotted line connecting these screws to one of the push buttons. This is the button which, after the adjustments are completed, will tune in the station.
5. Push button located by paragraph 4 "IN".
6. Turn volume control knob on full (to the extreme right) and adjust screw marked "O" until desired station is heard. If when making this adjustment, a number of stations can be brought in as the screw is turned and it is doubtful which station is the correct one, press button No. 6 (Manual Tuning) "IN" and move dial pointer by turning station selector knob to the number on the dial that corresponds to the frequency of the station. (The number on the dial must be multiplied by ten to give the frequency in kilocycles). Listening to the program being broadcast will identify the station when adjusting screw "O".
7. Adjust screw marked "A" for maximum volume, retarding the volume control and readjusting if necessary. This completes the adjustments for this particular station.
8. Cut out name of station from list supplied and insert in button.
9. Insert celluloid disc.
10. In a like manner select a station for each of the other buttons and make necessary adjustments for each station.

ALIGNMENT PROCEDURE

Output Meter Connections . . . . Across Primary Output Transformer
Output Meter reading to indicate 0.050 watt
For Weston Type 571 Output Meter on 15 volt scale . . . . 9 volts
Average sensitivity in MV for .05 watts output . . . . See chart below
Dummy antenna value in series with generator output . . . . 100 MMFDS
Connection of generator ground lead . . . . To chassis
Generator modulation . . . . App. 30% at 400 cycles
Position of volume control . . . . Fully clockwise

PUSHBUTTON SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Manual	**	456 KC	Grid 6D6	T9*, T8, T10	I.F.	5000
	**	456 KC	Grid 6A7	T9, T8, T10 T6, T7	I.F.	120
	600 (Rock)	600 KC	Ant.	P	Osc.	25
	1500	1500	Ant.	T12, T11	Osc. R.F.	22

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

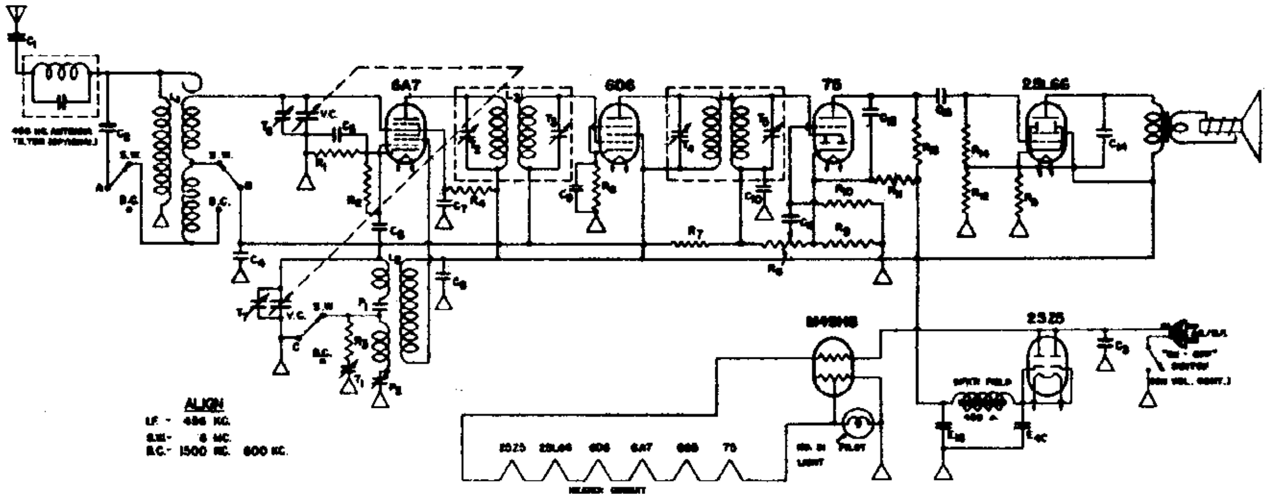
Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

**Short oscillator section of variable condenser.
Second I.F. alignment must be done twice to secure flat top tuning.
*First time T9 is about one turn misaligned by loosening center screw.

MODEL 7220, Ch. 110.7220
Schematic, Notes

SEARS-ROEBUCK & CO.



R_1 -	600	OHM	1/4	WATT
R_2 -	50,000	"	"	"
R_3 -	25	"	"	"
R_4 -	35,000	"	"	"
R_5 -	150	"	1/2	"
R_6 -	400	"	1/4	"
R_7 -	3,000,000	"	"	"
R_8 -	500,000	"	VOL. CONTROL	
R_9 -	200	"	1/2	WATT
R_{10} -	750,000	"	"	"
R_{11} -	25,000	"	"	"
R_{12} -	600 to 800	"	"	"
R_{13} -	500,000	"	"	"
R_{14} -	500,000			

SWITCHES A,B,C - 3 POLE DOUBLE THROW WAVE BAND SWITCH

L_1 - COMBINATION ANTENNA COIL
L_2 - COMBINATION OSCILLATOR COIL
L_3 - 456 K.C. INPUT I.F.
L_4 - 456 K.C. OUTPUT I.F.

P_1 - 1380 MMF. MICA PADDER
P_2 - 700 MMF. MAX. PADDER

E_{16} - 16 MFD. 150 V.W.
E_{40} - 40 " " "

V.C - 410 MMF. MAX. VARIABLE COND.

T_1 - 3-35 MMF. TRIMMER

C_1 -	.005	- 400 V.
C_2 -	.005	- "
C_3 -	.1	- 400 V.
C_4 -	.05	- 200 V.
C_5 -	.05	- "
C_6 -	.0001	- MICA
C_7 -	.02	- 200 V.
C_8 -	.02	- 200 V.
C_9 -	.05	- "
C_{10} -	.00025	- MICA
C_{11} -	.02	- 200 V.
C_{12} -	.00025	- MICA
C_{13} -	.02	- 200 V.
C_{14} -	.01	- 400 V.

ELECTRICAL SPECIFICATIONS

APRIL 7, 1938

TUBES AND FUNCTIONS:
- 6A7 . . . . Translator-Oscillator
- 6D6 . . . . IF
- 75 . . . . AVC, detector, 1st audio
- 25L6G . . . . Output
- 25Z5 . . . . Rectifier
- M49HG . . . . Ballast tube

POWER SUPPLY:
All models available . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGES:
- Broadcast . . . . 540-1700 KC
- Short Wave . . . . 2150-7200 KC

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Oscil. Padder
Broadcast	1500 KC	600 KC
Short Wave	6 MC	Fixed

POWER OUTPUT:
- Type . . . . Beam Power
- Undistorted . . . . .8 watts
- Maximum . . . . 1.5 watts

LOUD SPEAKER:
- Type . . . . Dynamic
- Size . . . . 5"
- Field resistance . . . . 450 ohms

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
- Left Knob . . "On-Off" switch, volume control
- Center Knob . . . . Wave change switch
- Right Knob . . . . Tuning

CONTROL OPERATION:
Turning right; power on; volume increase
Left Foreign; right Broadcast.

Under certain conditions, the chassis may be above ground potential. Do not allow any grounded object to come into contact with the chassis while the line cord is plugged in. Also, be careful when working on the chassis out of its cabinet, to avoid shocks.

If the power supply is DC, the power cord plug must be in its receptacle in the proper way. If the receiver does not operate after being turned on for a minute, reverse the polarity by removing the power cord plug from its receptacle and turning it half way around before re-inserting it in the receptacle.

MODEL 7220, Ch. 110.7220
MODEL 7226, Ch. 110.880
Socket, Trimmers
Alignment

SEARS-ROEBUCK & CO.

MODEL 7220 CHASSIS 110.7220

ALIGNMENT PROCEDURE

Output Meter Connections . . . . Across primary of output transformer
Output meter reading to indicate 0.050 watt
For Weston type 571 output meter on 15 volt scale . . . . .9 volts
Average sensitivity in MV for .05 watts output . . . . See chart below
Dummy antenna value in series with generator output . . . . 100 MMFDS.
Connection of generator ground lead . . . . To chassis
Generator modulation . . . . App. 30% at 400 cycles
Position of volume control . . . . Fully clockwise

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
SW	5 MC	456 KC	6A7 Grid	T2,T3,T4,T5	I.F.	70
SW	6 MC	6 MC	Ant. lead	T7,T6	Osc., R.F.	45
BC	600 (Rock)	600 KC	Ant. lead	P2	Osc.	12
BC	1500	1500 KC	Ant. lead	T1	Osc.	18

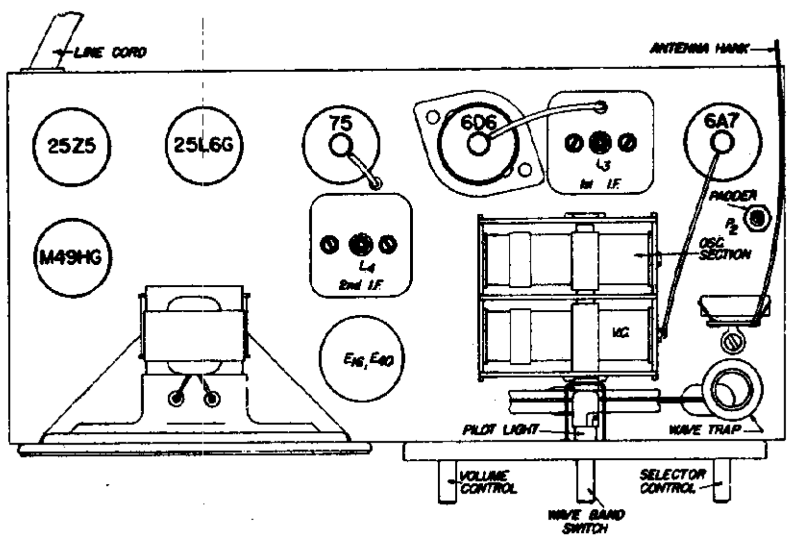
IMPORTANT ALIGNMENT NOTES

Where indicated by the word "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.



TUBE SOCKET LOCATIONS

MODEL 7226 CHASSIS 110.880

ALIGNMENT PROCEDURE

Output Meter Connections . . . . Across Primary Output Transformer
Output meter reading to indicate 0.05 watt . . . .
For Weston Type 571 Output meter on 15 volt scale . . . . 9 volts
Average sensitivity in MV. for .05 watt output . . . . See chart
Dummy antenna value in series with generator output . . . . 100 mmfds.
Connection of generator ground lead . . . . To chassis
Generator modulation . . . . App. 30% @ 400 cycles
Position of volume control . . . . Fully clockwise
Position of tone control . . . . Fully clockwise

Position of Dial Pointer	Generator Frequency	Generator Connection	Trimmers Adjusted	Trimmer Function	Approximate Microvolts
**	456 KC	Grid 6D6	T7*, T6, T8 T7, T6, T8	I.F.	2500
**	456 KC	Grid 6A7	T4, T5	I.F.	37
600 KC (Rock)	600 KC	Ant.	P	Osc.	20
1500 KC	1500 KC	Ant.	T2, T3	Osc., R. F.	15
600 KC	456 KC	Ant.	T1	Wave Trap	***

IMPORTANT ALIGNMENT NOTES

Where indicated by the word "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the test oscillator at its lowest possible value, As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

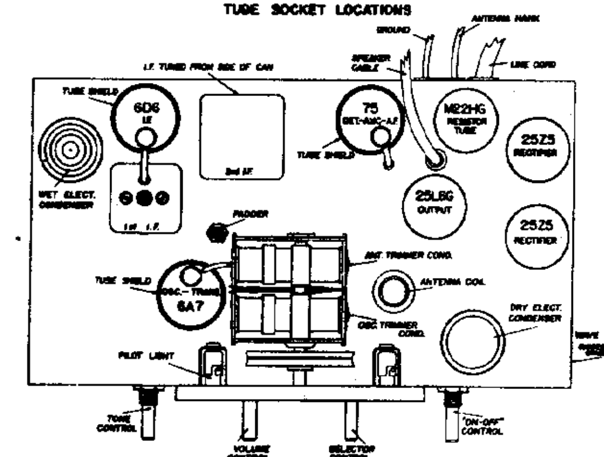
Values shown under "Microvolts" are only approximate.

*First time T7 is misaligned about one turn by loosening center screw.

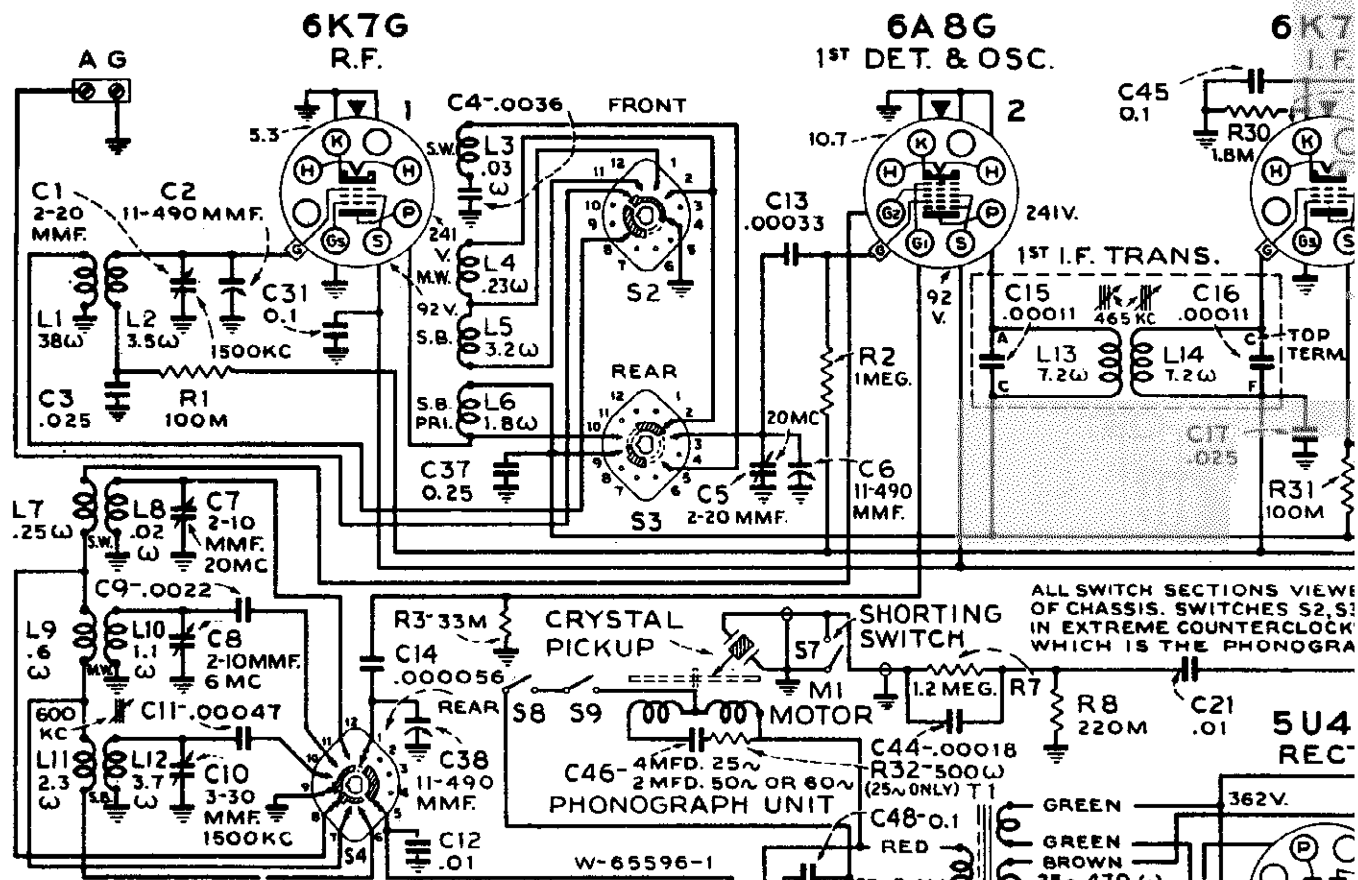
**Short oscillator section of variable condenser.

***Wave trap is aligned to secure minimum output with maximum signal input.

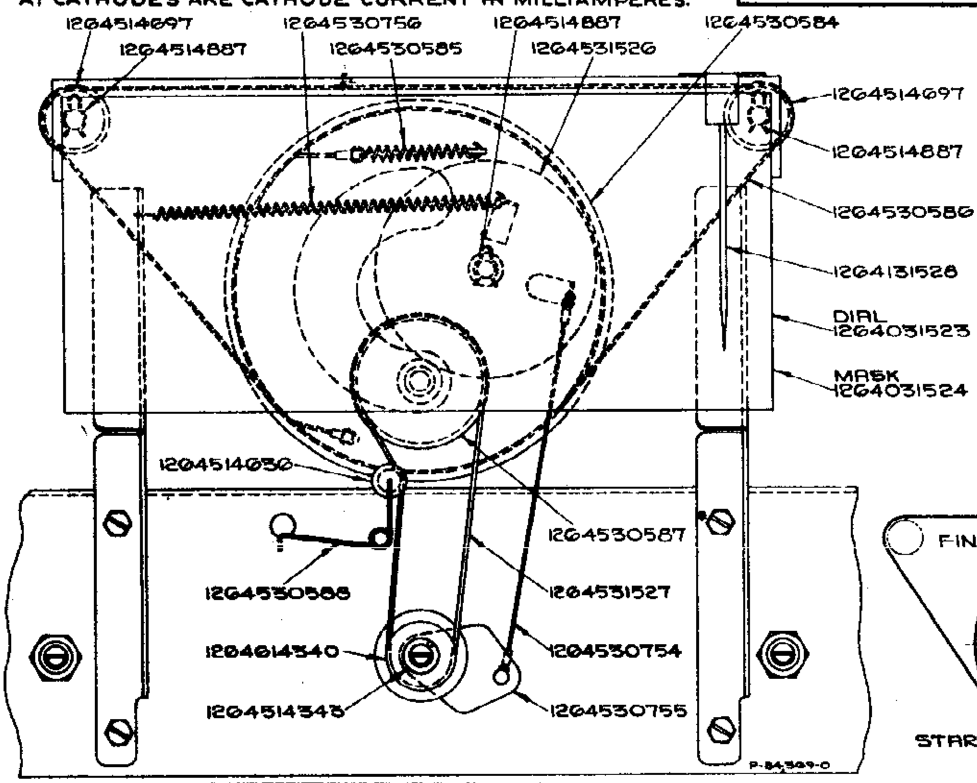
TUBE SOCKET LOCATIONS



TUBE SOCKET LOCATIONS



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

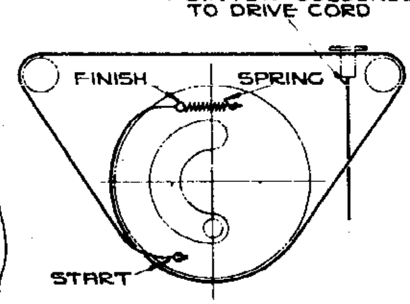


DIAL DRIVE SYSTEM

AND POINTER DRIVE HOO

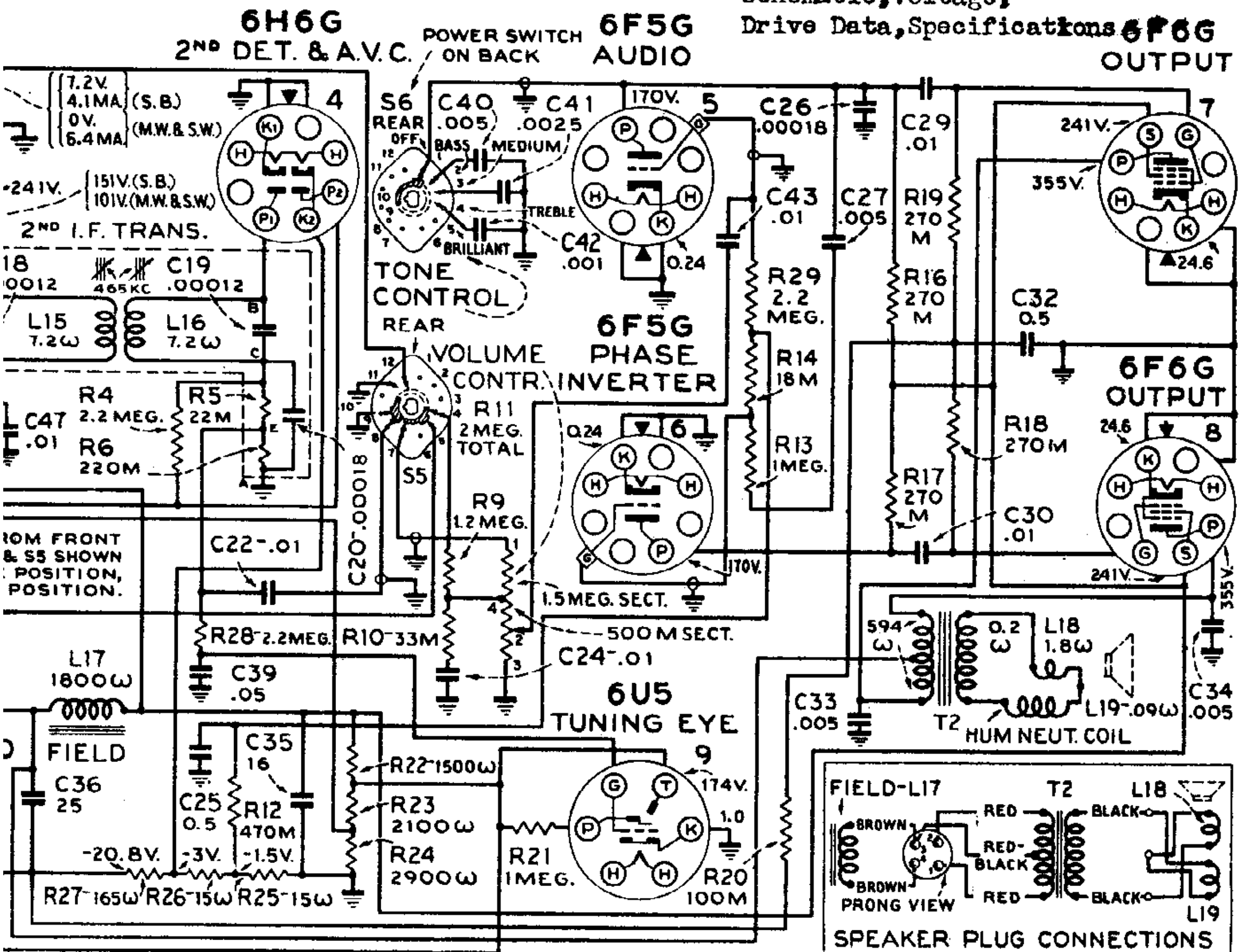
57 RL 106

MAY 27, 1938



CK & CO.

MODEL 7221, Chassis 126.202
Schematic, Voltage,
Drive Data, Specifications



In cases where the customer objects to "boominess," the following circuit change may be made to minimize low-frequency response.

Change condenser C43 to .001 mfd., or in the most stubborn cases to .0001 mfd.
Add a 2 megohm resistor across the crystal pickup circuit connecting it from junction of pickup cable, C44, and R7 to chassis. This will reduce low-frequency response.

Mount the speaker away from the baffle by about 1/4" to 3/8".

POWER SUPPLY RATINGS AVAILABLE	Radio Only	Total
105-125 volts, 60 cycles	120 watts	150 watts
105-125 volts, 50 cycles	120 watts	155 watts
105-125 volts, 25 cycles	120 watts	150 watts

FREQUENCY RANGES:
- Standard Broadcast (S.B.) .... 540—1,720 kc
- Medium Wave (M.W.) .... 2.3—7.5 mc
- Short Wave (S.W.) .... 7.5—22 mc

ALIGNMENT FREQUENCIES:
- Band "S.W." .... 20 mc (osc., ant.)
- Band "M.W." .... 6 mc (osc.)
- Band "S.B." .... 1,500 kc (osc., ant.), 600 kc (osc.)

INTERMEDIATE FREQUENCY .... 465 kc

POWER OUTPUT:
- Type .... Push-Pull Pentode
- Undistorted .... 10 watts
- Maximum .... 12 watts

OPERATING FEATURES:
- Phonograph-Radio operation
- Automatic Phonograph Mechanism with self-starting, synchronous-type motor
- Four-point Tone Control
- Automatic Volume Control

PHONOGRAPH:
- Type .... Automatic—Manual
- Record Capacity .... Eight 10-inch or Seven 12-inch
- Turntable Speed .... 78 R.P.M.
- Type of Pickup .... Crystal
- Pickup Impedance ...... 80,000 ohms at 1000 cycles

LOUDSPEAKER:
- Type .... Electrodynamic
- Size .... 12 inches
- V.C. Impedance .... 2.25 ohms at 400 cycles
- Field Coil Resistance .... 1,800 ohms
- App. Field Coil Voltage Drop .... 115 volts

CHASSIS FEATURES:
- No. R-F stages (Band "S.B.") .... One
- No. I-F stages .... One
- Antenna .... Doublet or Conventional
- Tuning Eye
- Line Noise Electrostatic Transformer Shield
- Aural-Compensated Volume Control
- Magnetite-Core Adjusted I-F Transformers and Band "S.B." Low-Frequency Oscillator Tracking

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections .... Across speaker voice coil
Output meter reading to indicate 1.0 watt output .... 1.5 volts
Approximate average sensitivity in microvolts for 1.0 watt output .... See chart below
Dummy antenna value to be inserted in series with generator output .... See chart below
Connection of generator output lead .... See chart below
Connection of generator ground lead .... To chassis
Generator modulation .... 30%, 400 cycles
Position of Volume Control .... Fully clockwise
Position of Tone Control .... Fully clockwise
Position of Dial Pointer with variable tuning condenser fully closed .... To fall on last calibration mark at 540 kc end of "Standard Broadcast" band

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
"M.W."	Low End	465 kc	.001 mfd.	6K7-G I-F Grid	L15, L16	2nd I-F Trans.	7,600
"M.W."	Low End	465 kc	.001 mfd.	6A8-G Grid	L13, L14	1st I-F Trans.	130
"S.W."	20 mc	20 mc	400 ohms	Ant.	C7	Osc. **	——
"S.W."	20 mc (rock)	20 mc	400 ohms	Ant.	C5	Ant.	45
"M.W."	6 mc	6 mc	400 ohms	Ant.	C8	Osc. *	45
"S.B."	1,500 kc	1,500 kc	.0002 mfd.	Ant.	C10, C1	Osc. Ant.	——
"S.B."	600 kc (rock)	600 kc	.0002 mfd.	Ant.	L12	Osc.	6
"S.B."	1,500 kc	1,500 kc	.0002 mfd.	Ant.	C10, C1	Osc. Ant.	3

IMPORTANT ALIGNMENT NOTES

** Use maximum capacity peak if two peaks can be obtained.

* Use minimum capacity peak if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the a-v-c action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment in any other band. Grid cap leads should remain in place during alignment.

Values shown under, "Microvolts," are only approximate.

Eliminating Whistle at 930 KC

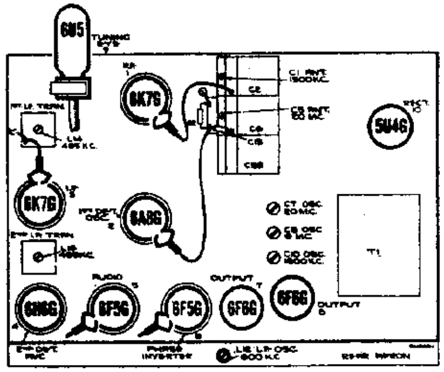
A whistle due to a beat between the second harmonic (930 kc) of the 465 kc I-F, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the I-F frequency of the receiver.

Determine at what point between 900 and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new I-F frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 910 kc would not be objectionable, the I-F should be re-aligned at 910/2 or 455 kc. Try to select the new I-F frequency as close as possible to 465 kc.

An interfering whistle may also be caused by two stations having a frequency difference equal to the I-F frequency (465 kc) of the receiver and will be evidenced by a whistle appearing when the receiver is tuned to either of the stations. It may be further localized by tuning the receiver to each of these stations and then stopping the oscillator, in each case, by grounding the oscillator stator section of the variable tuning condenser C38 (rear section) to chassis. If the whistle, in each case, still persists, it is being caused by the beat between these two stations and may be corrected by shifting the I-F frequency of the receiver to a frequency other than the difference frequency of the two local or strong signals (stations).

The I-F amplifier should not be shifted to a frequency higher than 480 kc, nor lower than 450 kc, but should be as close to 465 kc as possible.

Align the I-F at the new frequency and then re-align the rest of the receiver as described under "ALIGNMENT PROCEDURE."



Automatic Record Changer Mechanism

Under normal operating conditions, service requirements on this mechanism should be negligible. Occasionally, however, certain adjustments may be necessary. It is important to refrain from forcing the mechanism if there is a tendency to bind or jam, when operating or adjusting, since bent levers and possibly broken parts may result.

Record Changer Adjustments.—Mount motor-board on a level support. Remove turntable and cover at right of turntable. Adjustment locations are designated on motor-board illustrations as A, B, etc. The adjustments are explained under corresponding symbols below. Perform adjustments in the following order:

A.—Trip rod "A" should be engaged in "Switch Lever" slot. Adjust trip rod "A" to obtain about ⅛ of an inch clearance from motor-board.

B.—Adjust "B" to the position shown.

C.—With "Index Lever" in "Manual" position, "Pickup Arm" rotated to extreme left, and switch tripped to open contacts "C," adjust contact points "C" by bending the stiff contact arm until points are opened 10 to 30 thousandths of an inch.

D.—With "Index Lever" in "Manual" position, release set screw "D" and force "Manual Index Finger" as far as it will go towards "Trip Pawl Stop Pin." Tighten set screw.

E.—Adjust at "E" to provide approximately 1/32 of an inch between outer end of "Link Slot" and screw when rubber "Bumper" is in contact with stop bracket.

F. and G.—Remove rubber silencer at "F" and adjust "F" and "G" so ejector tip "F" is in line with "Spindle." Longitudinal movement, with respect to "Ejector Arm," may be effected by loosening hex. head at "F." Lateral movement of "Ejector Arm" may be effected by adjustment "G."

H.—Adjust "H" so under side of pickup head can be raised 2⅜ inches above motor-board.

J.—Adjust screw "J" until friction will just force "Trip Finger" to move "Trip Pawl" when "Index Lever" is in "12" inch position.

N.—Adjust needle pressure by turning screw under center of "Pickup Arm" so that a force of 72 grams (2.5 ounces) is required to lift needle from record. Hook scale under needle screw to measure force.

K.—Adjustment "N" must be performed prior to this adjustment. With a 12-inch record on turntable, turn on "Motor Switch," place "Index Lever" to "12" position and adjust "K" so that "Cable" tension will allow needle to lower slowly on start of record at completion of eject cycle. Turn "Motor Switch" off after eject cycle is completed and check to see that "Cable" is slightly loose when "Pickup Arm" is moved against "Spindle." Replace turntable and put a needle in "Pickup."

L.—Adjust "L" so needle will drop into center of smooth portion at the start of a 12-inch record when "Index Lever" is in "12" inch position and "Pickup Arm" is to extreme right.

M.—Loosen three screws "M" and rotate "Spacer" until pointer on "Spacer" is in line with screw to right of "Pickup Arm."

P.—Adjust turntable height by insertion or removal of thrust washers at "P" so ejector tip "F" will not eject bottom 12-inch record but will eject second from bottom record.

Q.—Adjust position of shorting switch at "Q" so switch closes when needle is just outside a 12-inch record.

R.—Adjust screw "R" upward just enough so that with one record on turntable and ejector tip "F" resting on record surface, there is 1/32 of an inch clearance between screw "R" and "Ejector Arm."

Record Changer Service Hints.—A general perusal of the following possible troubles which may be experienced with this mechanism, together with the adjustment or adjustments to be applied for same, will enable one to ascertain that which pertains to the instrument at hand:

1.—"Ejector Arm" goes through normal cycle but does not eject records. Adjust "F" and "G." See that "Spindle" slides freely.

2.—Ejects bottom record. Lower turntable by removing thrust washers at "P."

3.—Ejects records properly down to second from bottom of pile. Raise turntable by placing thrust washers at "P."

4.—Eject cycle does not start after needle reaches eccentric groove. Adjust "J" (turn screw clockwise).

5.—Eject cycle starts before eccentric record groove is reached. Adjust "J" (turn screw counter-clockwise). Set "Index Lever" to "12" inch or "10" inch position after starting to play record. Do not jar motor-board during automatic operation.

6.—Lateral movement of "Pickup Arm" has no control over starting and stopping. Adjust clearance of rod "A." See that rod "A" engages in slot of "Switch Lever."

7.—Fails to eject top record of a pile because "Ejector Arm" strikes record in returning to center at end of eject cycle. Adjust screw "R" upward to provide greater incline so that roller in "Ejector Arm" will roll back during cycle.

8.—Pickup strikes record during eject cycle. Adjust "K" and "H."

9.—Starts playing record several grooves in from beginning or needle misses record entirely. Adjust "L."

10.—Needle falls on smooth portion at start of record but does not move into playing groove. Adjust "M." Check to see that motor-board is level.

11.—Automatic stop does not operate after needle reaches eccentric groove. Adjust "B" and "C."

12.—Motor does not re-start when "Pickup" is returned to rest position. Adjust "C." See that switch mechanism parts move freely and springs are functioning.

13.—Starts eject cycle although set for "Manual" operation. Adjust "D."

14.—Noise in loudspeaker while changing needles. Clean "Shorting Contact" and adjust "Q."

15.—"Wow" in record reproduction.—Instrument should be warmed to about 65° F. Ejector tip should be centered and free to rotate (adjustments "F" and "G"). There should be no solid particles on gear teeth or in grease; no tendency to bind. Turntable plate should be in dynamic balance and "Spindle" should be straight. Proper lubrication is important.

Lubrication.—The motor gear-box should be re-greased periodically from one to two years depending on usage of the automatic mechanism. Clean the motor gear-box thoroughly before re-greasing. Apply about a level tablespoonful of good, clean, gear grease having uniform viscosity over wide temperature ranges and good clinging quality. This should be placed on the worm and fibre gears only. Approximately every six months, put medium motor oil (S.A.E. No. 30) in the rotor and spindle bearing oil holes. Do not allow grease or heavy oil to accumulate in these bearings. Cover the main gear and cam of the automatic mechanism with a light grease. Any good household oil, such as Cross Country General Purpose oil, is suitable for the ejector-tip "F" bearing.

Loudspeaker:

Centering of the loudspeaker voice-coil is made in the usual manner with three, narrow-paper feelers, after first removing the front dust-cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

MODEL 7221, Ch. 126.202
Chassis Wiring

SEARS-ROEBUCK & CO.

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

RADIO PANEL:

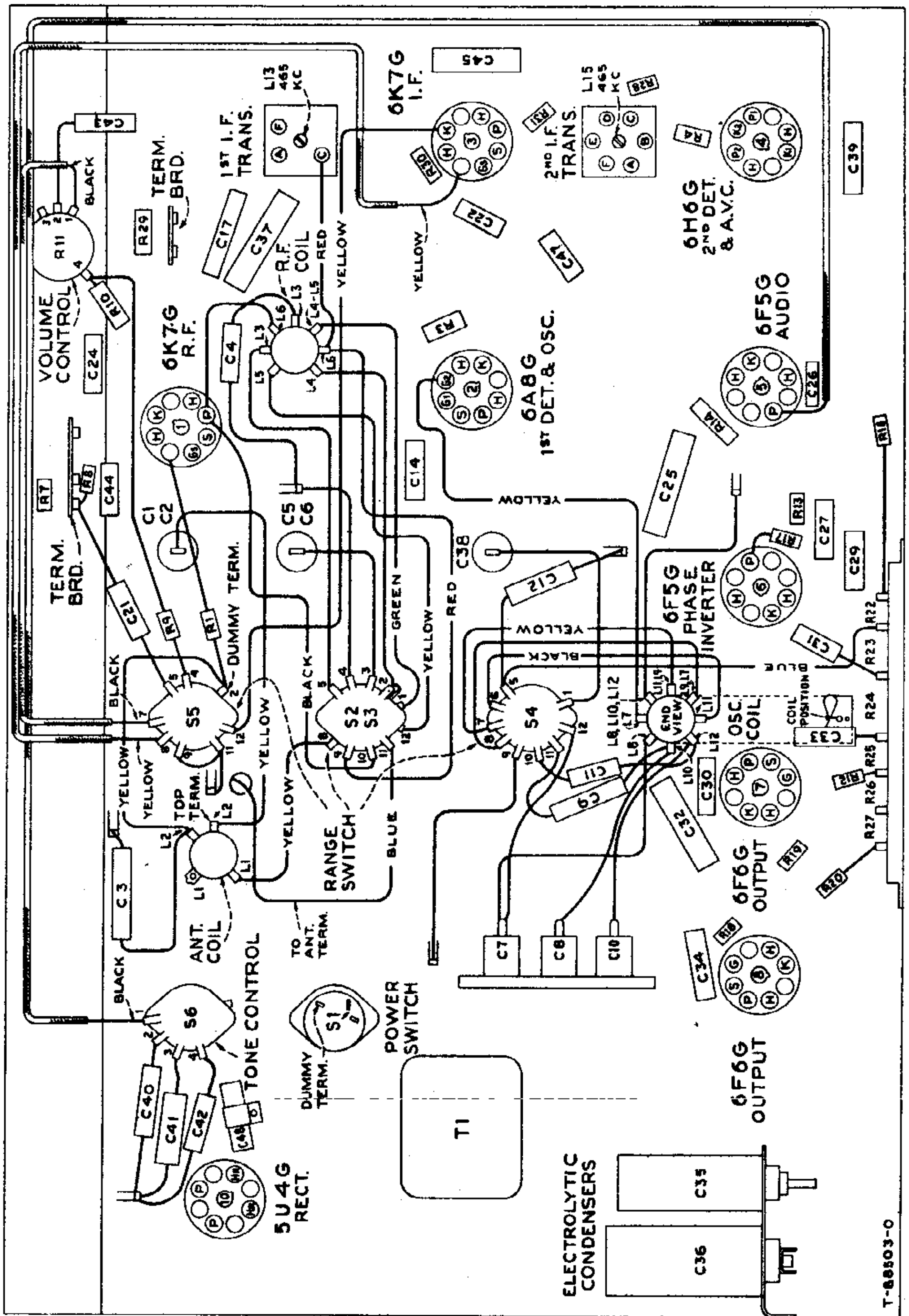
1. Rear Knob........ Radio or Phonograph Volume
2. Center Knob (large)................. Tuning
   Center Knob (small) Phonograph and Wave-Band Switch
3. Front Knob......... "On-Off" Switch and Tone

PHONOGRAPH COMPARTMENT:

4. Turntable Switch...........................
5. Index Lever.................................

CONTROL OPERATION:

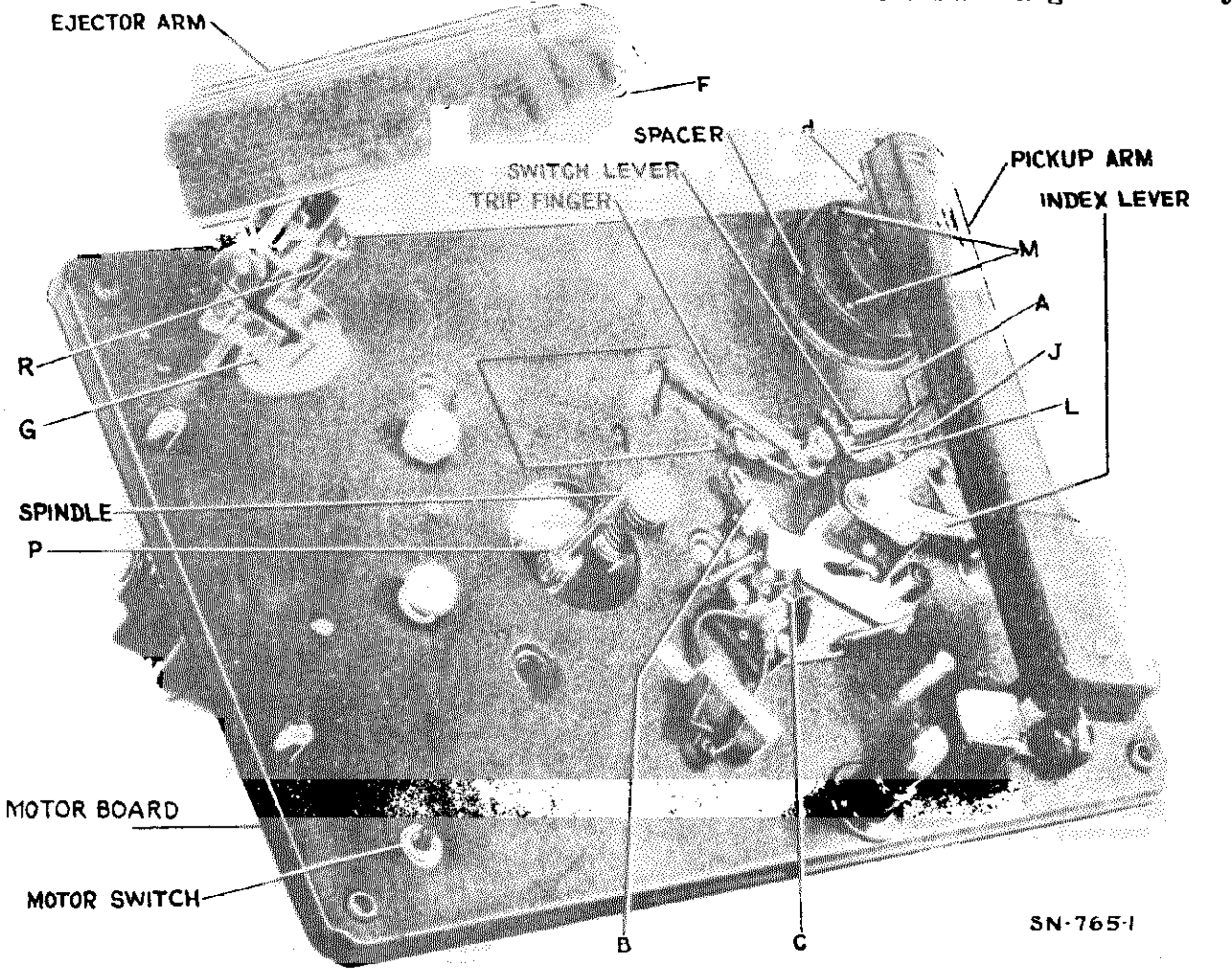
Turning right.................. Volume Increase
Tuning ratio............................ 20 to 1
Turning right..... "Phonograph"; "Standard Broadcast"; "Medium Wave"; "Short Wave"
Turning right......... Power on—Bass; Medium; Treble; Brilliant
Toggle.............. Phonograph Motor "On-Off"
Front, Manual; Center, 12-inch Automatic; Rear, 10-inch Automatic

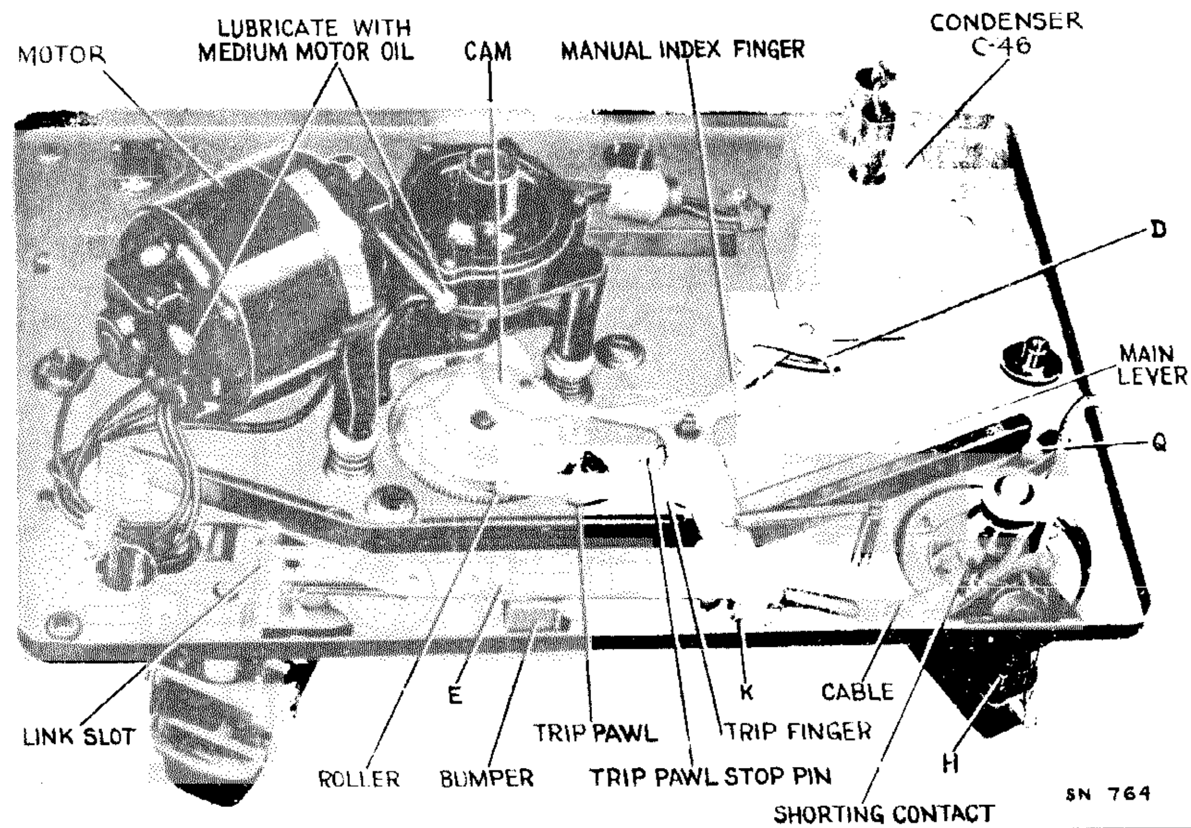


LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON BOTTOM OF CHASSIS INCLUDING RANGE SWITCH AND COIL CONNECTIONS

SEARS-ROEBUCK & CO.

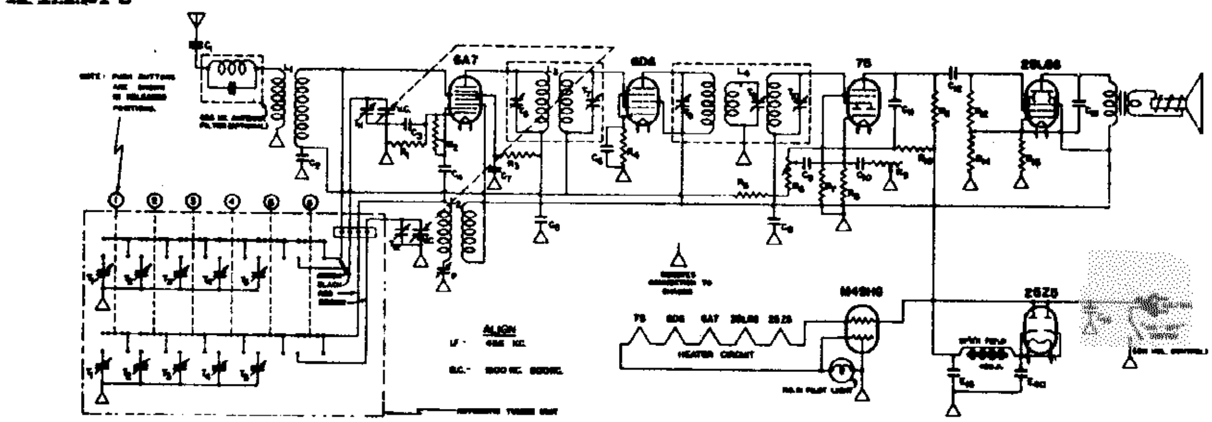
MODEL 7221,Ch. 126.202
Record Changer Assembly





MODEL 7215, Ch. 110.7215
Schematic, Socket, Tuner
Trimmers

SEARS-ROEBUCK & CO.



R_1 -	400	OHM	1/4	WATT
R_2 -	50,000	"	"	"
R_3 -	25,000	"	"	"
R_4 -	400	"	"	"
R_5 -	5,000,000	"	"	"
R_6 -	500,000	"	VOL. CONTROL	
R_7 -	750,000	"	1/4	WATT
R_8 -	200	"	1/2	"
R_9 -	350,000	"	TONE CONTROL	
R_{10} -	25,000	"	1/4	WATT
R_{11} -	500,000	"	"	"
R_{12} -	500,000	"	"	"
R_{13} -	150	"	"	"
R_{14} -	400 to 600	"	"	"

L_1 - ANTENNA COIL
L_2 - OSCILLATOR COIL
L_3 - 456 K.C. INPUT I.F.
L_4 - 456 K.C. TRIPLE TUNED OUTPUT I.F.

P - 700 MMF. MAX. PADDER

E_{16} - 16 MFD. 150 V.W.
E_{40} 40 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

T_1 - 180 - 450 MMF.
T_2,T_3 - 100 - 300 MMF.
T_4 - 60 - 300 MMF.
T_5 - 50 - 140 MMF.

C_1 -	.006	-	400 V.
C_2 -	.05	-	600 V.
C_3 -	.05	-	200 V.
C_4 -	.0001	-	MICA
C_5 -	.02	-	200 V.
C_6 -	.25	-	"
C_7 -	.02	-	"
C_8 -	.00025	-	MICA
C_9 -	.02	-	200 V.
C_{10} -	.006	-	600 V.
C_{11} -	.00025	-	MICA
C_{12} -	.02	-	200 V.
C_{13} -	.01	-	400 V.
C_{14} -	.1	-	"

POWER SUPPLY:
All models available . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:
Broadcast . . . . 540-1700 KC

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Oscil. Padder
Broadcast	1500 KC	600 KC

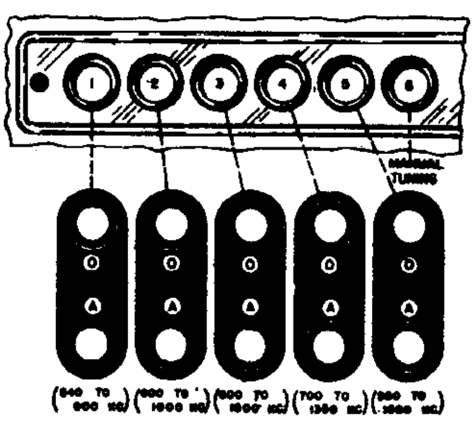
POWER OUTPUT:
Type . . . . Beam Power
Undistorted 1.2
Maximum 1.6

LOUD SPEAKER.
Type . . . . Dynamic
Size . . . . 5"
Field resistance . . . . 450 ohms

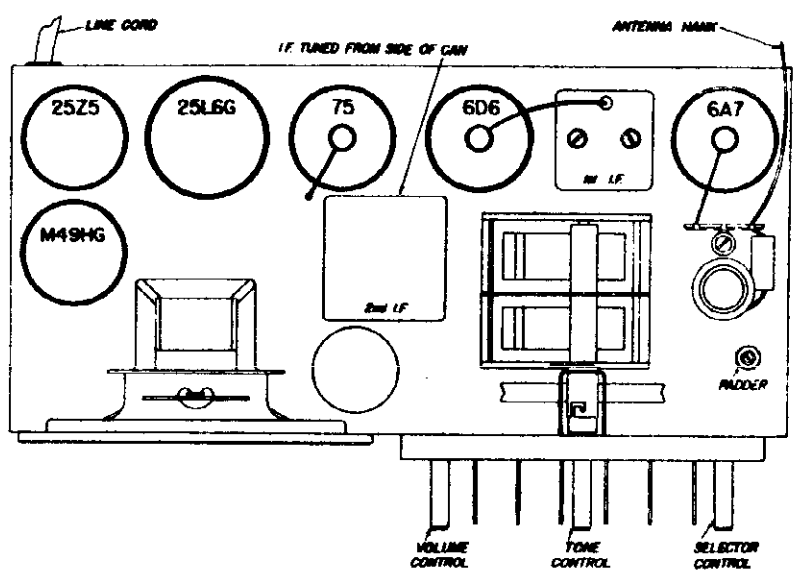
AUTOMATIC TUNING CONTROL:

There are six buttons on the front panel. Five of them can be set so that by simply pushing the button marked with the station's call letters, any of five different broadcast stations can be received.

The sixth button is used to cut out the automatic tuning and convert the set for use with the regular dial and manual tuning.



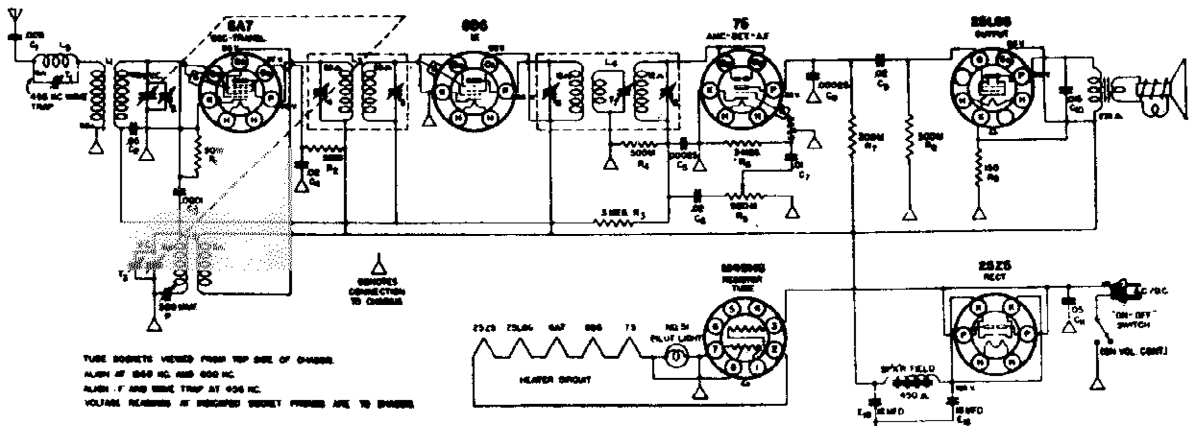
AUTOMATIC TUNING ADJUSTMENTS



APRIL 7, 1938

SEARS-ROEBUCK & CO.

MODEL 7225, Ch. 110.255
Schematic, Socket
Trimmers, Voltage, Alignment



FOR TUNER, SEE INDEX

POWER SUPPLY:
All models available . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:
Broadcast . . . . 540-1740 KC

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Oscil. Padder
Broadcast	1500 KC	600 KC

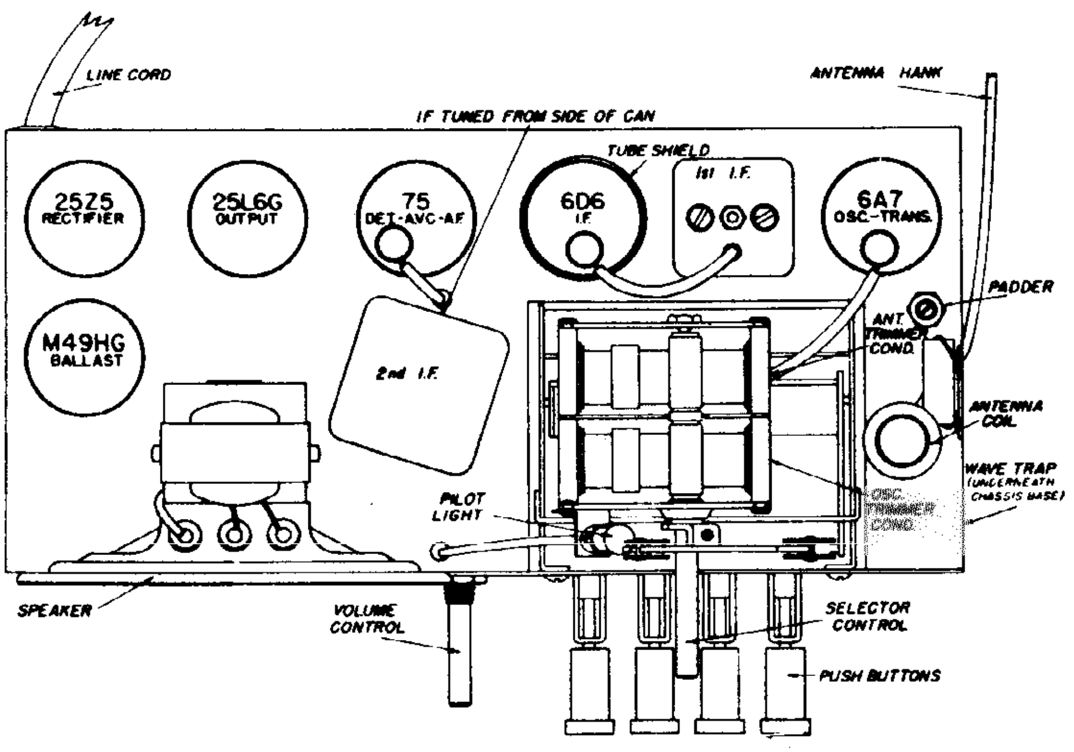
POWER OUTPUT:
Type . . . . Beam Power
Undistorted . . . . 1.
Maximum 1.6

LOUD SPEAKER:
Type. . . . . Dynamic
Size . . . . 5"
Field resistance . . . . . . 450 ohms

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
Left knob, "On-Off" switch, volume control
Upper Right Knob . . . . tuning

CONTROL OPERATION:
Turning right; power on; vol. increase



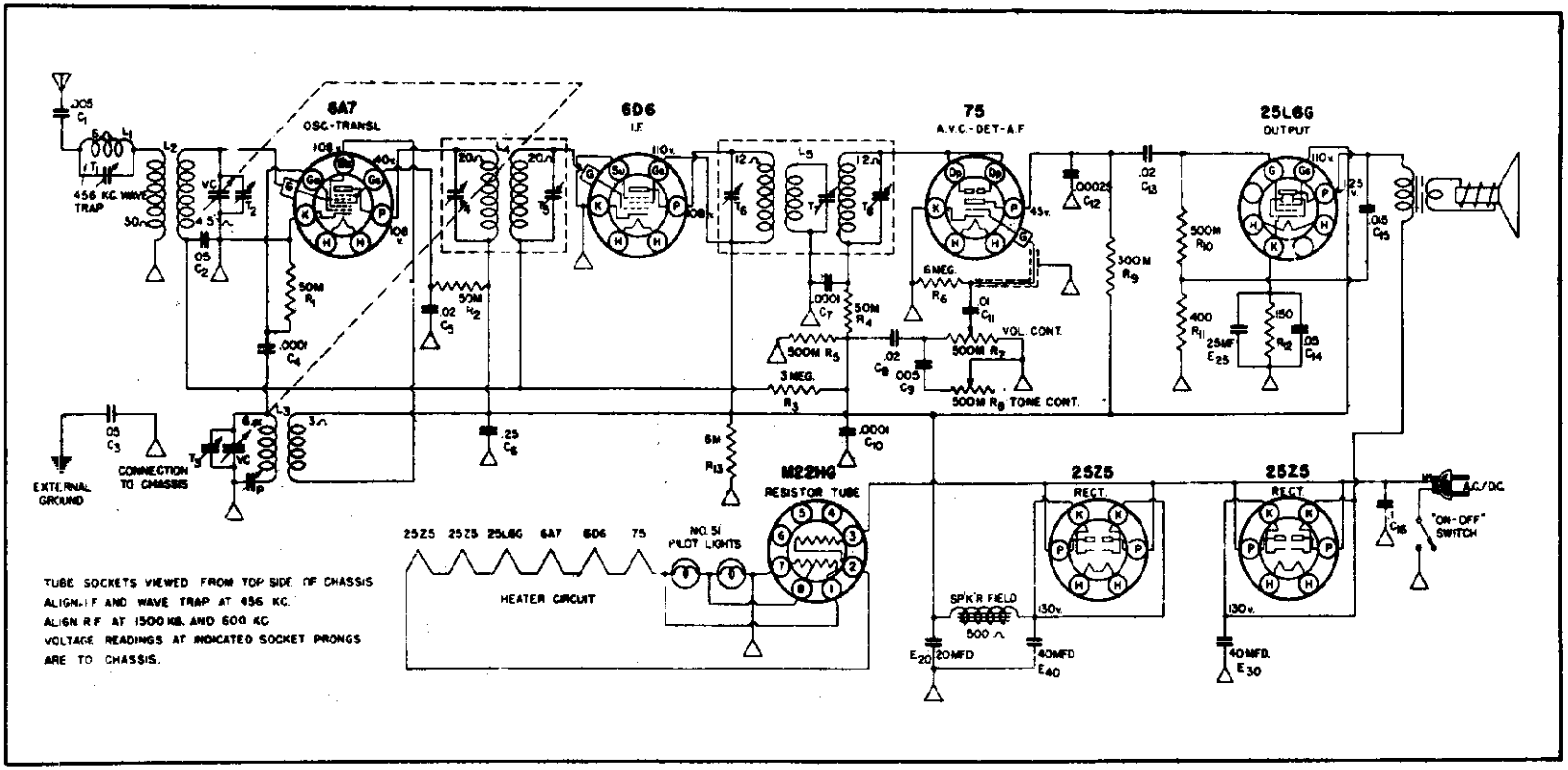
57RL109 JUNE 16, 1938

MODEL 7226, Ch. 110.880
Schematic, Voltage
Alignment

SEARS-ROEBUCK & CO.

57RL 121

JULY 11, 1938



POWER SUPPLY:
All models available . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:
Broadcast . . . . 540-1740 KC

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Oscil. Padder
Broadcast	1500 KC	600 KC

POWER OUTPUT:
Type . . . . Beam Power
Undistorted . . . . 1.7 Watts
Maximum. . . . . 2.7 Watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 8"
Field Resistance . . . . 500 ohms

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
Left Knob . . . . Tone control
Left Center . . . . Volume control
Right Center. . . . . Selector control
Right Knob. . . . . "On-Off" switch

CONTROL OPERATION:
Turning right; mellow to brilliant
Turning right; volume increase
Turning right; power on

THE GROUND:

In noisy locations, it may be desirable to connect the black lead in rear of chassis to a water pipe or radiator. This may eliminate much of the interference.

CAUTION: Do not connect a ground wire directly to the chassis; otherwise harm will result.

MODEL "Automatic Tune" Wheel Dial Assembly, Details, Notes For MODELS 78B, 78BE, 82A, 82AE, 86AE, 91B, 95B

SENTINEL RADIO CORP.

SERVICE NOTES for "AUTOMATIC-TUNE" WHEEL DIAL

USED WITH MODELS 78B, 78BE, 82A, 82AE, 86AE, 91B AND 95B

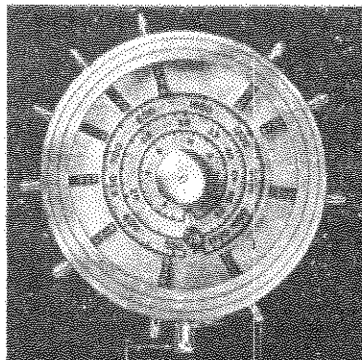


FIG. 1

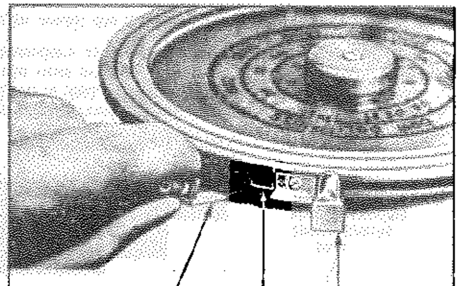


FIG. 3

While an "AUTOMATIC-TUNE" tab may be set for distant weak stations, better results will be obtained if the stations selected for "AUTOMATIC-TUNE" are strong nearby or local stations.

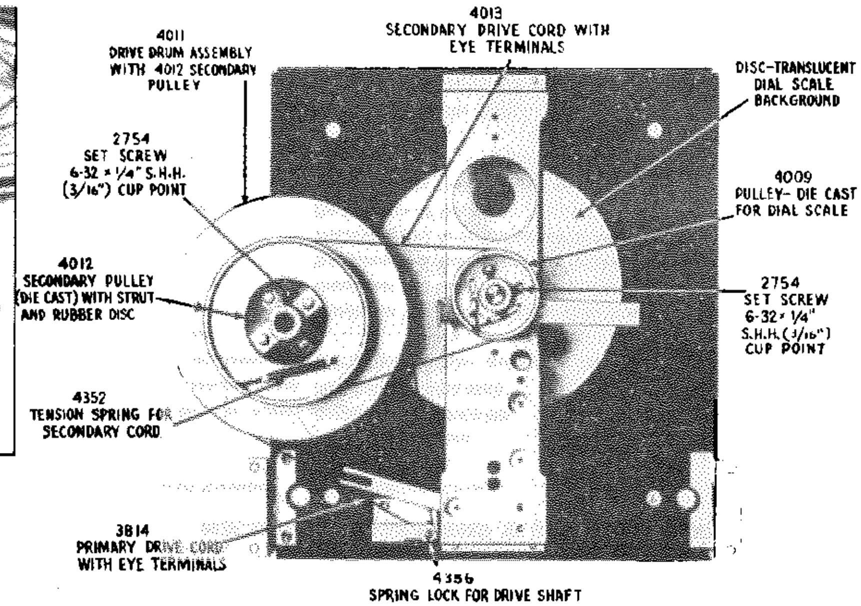
AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC-TUNE", OBTAIN THE FREQUENCIES USED AND CALL LETTERS OF THESE STATIONS AND SET STATION TABS BY:

1. Lay station call letter tab sheet on flat surface and with a razor or sharp knife cut out desired station tab by cutting around black edges of each desired tab.
2. To illustrate the proper setting of station paper strip and metal tab holder the receiver is shipped from the factory with a station tab properly set for Station WGN 720 kilocycles.
   Carefully note that the station call letter tab appears directly below the 720 kilocycle calibration on the face of the dial and that the knurled tab is firmly screwed down on slotted tab rail. If Station WGN is not one of the selected stations or if a tab is to be set for a station which operates on a frequency less than 720 kilocycles, remove WGN celluloid envelope and station call letter paper strip by:
   (a) Loosen tab holder by grasping knurled end of metal tab with finger tips and turn one or two turns to the left.
   (b) Slide the metal holder tab to square notch in dial tab rail—adjacent to permanently attached tab stop—and pull outward on tab until it is pulled free from tab holder rail.
   (c) Slide the celluloid envelope out of the metal tab frame.
3. PLACE EACH SELECTED STATION CALL LETTER PAPER STRIP INSIDE OF CELLULOID ENVELOPE BY:
   (a) Hold celluloid envelope with curved end upward.
   (b) Place station call letter paper strip inside of celluloid envelope with printed call letters upward.
4. INSERT CELLULOID ENVELOPE INTO A METAL TAB FRAME BY:
   (a) Hold curved end of celluloid envelope towards metal knurled tab holder and insert celluloid into metal frame.
   (b) Gently push celluloid inward until curved end of envelope touches edge of celluloid envelope tab frame.
   (c) Arrange tabs in numerical order according to station frequency.
5. SET THE METAL TAB HOLDERS ON DIAL BY: (See Fig. 3)
   (a) Set the first metal tab holder for the station that broadcasts on the lowest frequency—least number of kilocycles—and then set the next station tab for the selected station operating on the next lowest frequency, continuing on in this way until a tab has been set for all of the selected stations.
   (b) Carefully tune in the station which broadcasts on the lowest frequency—least number of kilocycles.
   (c) Insert celluloid envelope between edge of dial and metal face plate—Lightly press nut on end of knurled tab into square notch in slotted dial rail—then slide tab holder along rail until the knurled tab is underneath the indicator stop on the dial at which point station call letter strip will appear directly below the indicator line on the face of the dial.
   (d) Tighten tab holders as much as possible without moving dial by turning knurled tab to the right—then swing dial so knurled tab is away from indicator stop on the dial and firmly tighten so that it cannot move on the dial rail. DO NOT USE PLIERS TO TIGHTEN.

REPLACING No. 4000 DIAL GLASS SCALE ASSEMBLY

As it requires special tools to properly set part No. 4005 shaft assembly on part No. 4000 glass scale—we will ship all orders for No. 4000 glass scales with the No. 4005 shaft assembled on the glass scale.

DIAL MECHANISM



WHEN INSTALLING PART No. 4000 GLASS ASSEMBLY WITH No. 4005 SHAFT ATTACHED carefully follow procedure in order given:

(a) Insert No. 4005 shaft into main bushing attached to the cadmium plated bracket on back of dial face.

b) Place steel spacer washer and brass tension spring in order named over end of No. 4005 shaft.

(c) Place the small die cast primary pulley No. 4009 on shaft—do not tighten No. 2754 set screws.

(d) Loosen the two set screws in brass spacer collar on the No. 4005 shaft.

(e) Adjust brass spacer collar—by sliding collar on shaft—so that there will be approximately 1/8" clearance between the bottom of metal tab holder and the face plate. Firmly retighten brass collar and No. 2754 die cast pulley set screws. Failure to provide proper clearance will result in scratches on dial face and the dial mechanism will not operate freely.

TO INSTALL No. 3814 PRIMARY DRIVE CORD:

(a) Looking at back of dial, wrap dial cord twice around No. 4355 drive shaft in CLOCKWISE direction.

(b) Hook No. 3462 tension spring into loops at end of dial cord.

NEVER LOOSEN THE FOUR SCREWS THAT HOLD THE CADMIUM PLATED BRACKET TO DIAL FACE—OTHERWISE THE MAIN BUSHING WILL BE THROWN OUT OF CENTER.

MODEL "Automatic Tune"
Wheel Dial
Installation, Details, Parts

SENTINEL RADIO CORP.

TO INSTALL No. 4013 SECONDARY DRIVE CORD:

The dial mechanism picture shows and refers to eye terminals on drive cord—these were used in early production. Loops made by knots in the cords are now used to attach cord to lugs in the No. 4009 die cast pulley and to the No. 4352 & 3462 tension springs.

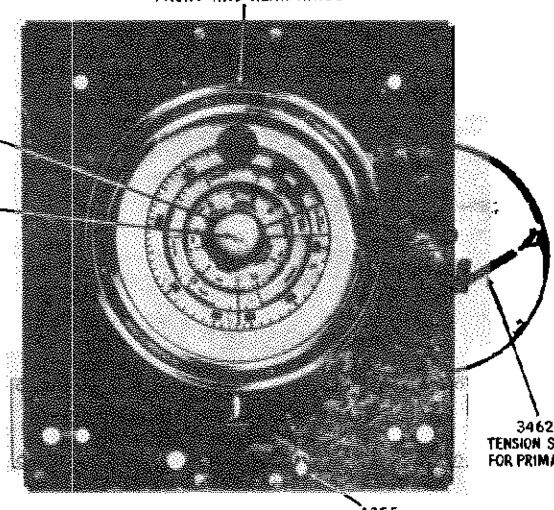
(a) Looking at the front of the dial rotate dial scale COUNTER-CLOCKWISE until dial stop is reached.

(b) Loosen the two No. 2754 set screws in small die cast pulley No. 4009.

(c) Looking at front of dial turn the small die cast pulley so that the cut out in pulley will be towards the left and approximately in line with the upper edge of the dial light bracket. This bracket which is only used in six volt battery and 110 volt AC models is shown mounted on the cadmium plated dial face plate bracket in dial mechanism picture.

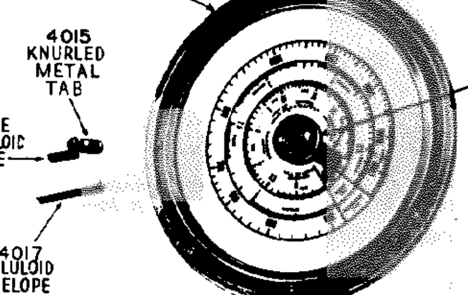
(d) Hook No. 4352 tension spring in dial cord loop.

(e) Turn No. 4011 drum so that the hole in the No. 4012 large die cast pulley—through which the secondary drive cord is pulled—is towards the top of face plate. This will bring the hole approximately in line with the left hand edge (looking at back of dial) of face plate.



(f) Take long end of No. 4013 secondary drive cord—measured from knot at spring to end of cord—then looking at the front of dial, wrap cord one complete turn CLOCK WISE around the No. 4009 small die cast pulley. The other end of the cord (short end) is placed on bottom half of secondary and primary die cast pulleys.

(g) Firmly tighten No. 2754 set screws in small die cast pulley.



COMPLETE WHEEL DIAL ASSEMBLY LESS ESCUTCHEON

Part No.	Part Name	Description	List Price
•205	Dial Assembly	Used With Model 78B Complete Assembly Less Escutcheon	$12.75
206	Dial Assembly	Used With Model 78BE Complete Assembly Less Escutcheon	12.75
207	Dial Assembl	Used With Model 82A Complete Assembly Less Escutcheon	12.75
201	Dial Assembly	Used With Model 82AE & 86AE Complete Assembly Less Escutcheon	12.75
204	Dial Assembly	Used With Model 91B & 95B Complete Assembly Less Escutcheon	12.25

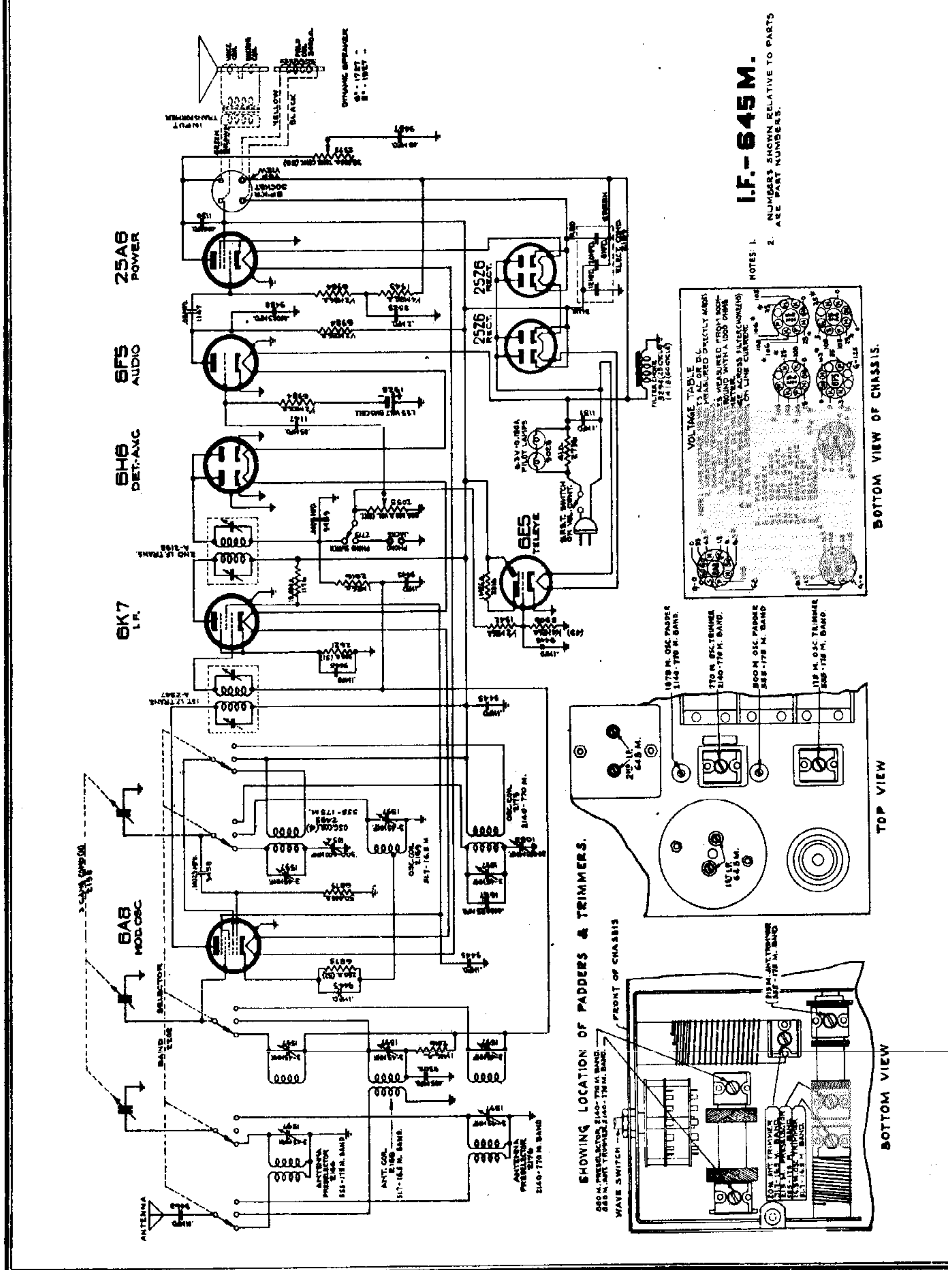
MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

Part No.	Part Name	Description	List Price
4016	Celluloid Envelope	Station Call Letter Cover	.05
3814	Cord	Primary Drive Cord	.15
4013	Cord	Secondary Drive Cord	.15
3995	Band Indicator Assem.	For Model 78BE-78B-91B-95B	.75
3992	Band Indicator Assem.	For Model 82AE-82A-86AE	.75
4011	Drive Drum Assem. with	4012 Secondary Pulley and Rubber Disc Couple	1.25
4355	Drive Shaft		.12
4027	Disc	Translucent Dial Scale Background for Model 78BE	.50
3984	Disc	Translucent Dial Scale Background for Model 82AE & 86AE	.55
4024	Disc	Translucent Dial Scale Background for Model 82A	.55
4029	Disc	Translucent Dial Scale Background for Model 91B, 95B & 78B	.50
3771	Escutcheon	For Cabinet—All Models	1.00
4017	Frame	Metal Holder for Celluloid Envelope	.05
4040	Hub Cap		.15
4015	Knurled Tab		.05
4009	Pulley	Dial Scale Drive (Die Cast)	.45
4000	Scale	Calibrated Glass Scale With 4005 Shaft Assem.	2.75
8071	Screw	For Hub Cap 3-48 x 1/4" O.H.I.M.	.005
2754	Screw	For Pulley 6-32 x 1/4" S.H.H. Cup Point	.01
4356	Spring Lock	For Drive Shaft	.01 net
4352	Spring Tension	For Secondary Cord	.07
3462	Spring Tension	For Primary Cord	.07

Prices are subject to change without notice.

MODEL 56U
Schematic, Voltage
Socket, Trimmers

SENTINEL RADIO CORP.



MODEL 56U
MODEL 67L
MODELS 68B,68BE
Alignment

SENTINEL RADIO CORP.

Model 56U Eight Tube AC-DC Superheterodyne Receiver

ALIGNING I. F. STAGE AT 645 METERS:

(a) Connect the high side of the test oscillator output to the control grid of the 6A8 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver base through a .2 Mfd. condenser.
(b) Set test oscillator frequency to 645 meters (this must be accurate).
(c) Peak each of the second I. F. transformer trimmers.
(d) Peak each of the first I. F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 16.5-51.7 METER BAND:

(a) Connect the high output side of the test oscillator through a 400 ohm resistor to receiver antenna lead and the low side to the set ground through a .02 Mfd. condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop, (complete in mesh), at which point the dial needle must be exactly even with the last line at the high wave length end of the dial calibration. If the dial needle does not point exactly to the last line, move needle to correct position.
(c) Place the band selector switch for operation on the 16.5-51.7 meter band, tune receiver dial and set test oscillator frequency to EXACTLY 16.5 meters. Then tune in the 16.5 METER SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 16.5 METER OSCILLATOR TRIMMER.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE RIGHT PEAK IS USED FOR ALIGNING THE RECEIVER AT 16.5 METERS. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the SECOND PEAK which is the proper one to use is tuned in. If the trimmer is screwed down only to the point where the first peak is received, the incorrect peak will be tuned in.
(d) Tune the receiver dial and set test oscillator frequency to EXACTLY 20 METERS. Adjust 20 meter antenna trimmer for maximum 20 meter test signal sensitivity.

ALIGNING 175-555 METER BAND:

(a) Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mfd. condenser, place the band selector switch for operation on the 175-555 meter band, tune receiver dial and set test oscillator frequency to EXACTLY 175 METERS. BRING IN THE 175 METER TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 175 METER OSCILLATOR TRIMMER.
(b) Set test oscillator frequency and receiver dial to EXACTLY 215 METERS. Adjust 215 meter preselector and antenna trimmers for maximum 215 test oscillator signal sensitivity.
(c) Tune receiver dial and set test oscillator frequency to approximately 500 meters. While rocking gang condenser slightly to right and left adjust 500 meter oscillator padder for maximum sensitivity.

ALIGNING 770-2140 METER BAND:

(a) Place band selector switch for operation on the 770 to 2140 meter band, and set test oscillator frequency and receiver dial to EXACTLY 770 METERS. BRING IN 770 METER TEST SIGNAL TO MAXIMUM OUTPUT WITH 770 METER OSCILLATOR TRIMMER.
(b) Tune receiver dial and set test oscillator frequency to EXACTLY 880 METERS. Adjust 880 meter antenna and preselector trimmers for maximum 880 meter test signal response.
(c) Set receiver dial and test oscillator frequency to approximately 1875 meters. Then while rocking gang condenser slightly to right and left adjust 1875 meter padding condenser for maximum sensitivity.

Model 67L
Six Tube Superheterodyne Receiver

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. condenser DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

ADJUSTING 465 KILOCYCLE WAVE TRAP:

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.
(b) Set test oscillator frequency to EXACTLY 465 kilocycles and adjust the 465 K.C. wave trap trimmer condenser mounted on and accessible through hole in rear of chassis for MINIMUM 465 kilocycle signal response.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Adjust band selector switch for operation on 1720-540 kilocycle band and leave test oscillator lead connected to receiver antenna lead through the .00025 Mfd. series condenser.
(b) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles.
(c) Adjust 1720 K. C. oscillator trimmer to bring in 1720 kilocycle test oscillator signal to maximum output.
(d) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(e) Adjust 1400 K.C. antenna trimmer for maximum sensitivity.
(f) Set receiver dial and test oscillator frequency to approximately 600 kilocycles.
(g) While rocking gang condenser slightly to right and left adjust 600 K.C. padder for maximum sensitivity.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator lead series condenser with a 400 ohm resistor. Adjust band selector switch for operation on 6.3 to 2.3 megacycle band, and tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
(b) Adjust 6.3 M.C. oscillator trimmer to bring in 6.3 megacycle test oscillator signal to maximum output.
(c) Tune receiver dial and set test oscillator frequency to 5.8 megacycles, and while rocking gang condenser slightly to right and left adjust 5.8 M.C. antenna trimmer for maximum sensitivity.
(d) No adjustment is required at low frequency end of this band as a fixed oscillator pad is used.
To assure more accurate trimmer setting repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

Model 68B-68BE—Three Band Superheterodyne Receiver

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

ALIGNING 1720-535 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(b) Remove test oscillator lead from grid of 6A7 tube and connect to receiver antenna lead through a .00025 Mfd. series condenser.
(c) Adjust band selector switch for operation on the 1720-535 kilocycle band.
(d) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. preselector and antenna trimmers for maximum sensitivity.
(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

ALIGNING 1.8-5.8 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
(b) Adjust band selector switch to 1.8-5.8 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.8 megacycles. Bring in 5.8 megacycle test signal to maximum output by adjusting 5.8 M.C. oscillator trimmer.
(c) Tune receiver dial and test oscillator frequency to EXACTLY 5 megacycles, and adjust 5 M.C. antenna trimmer for maximum sensitivity.

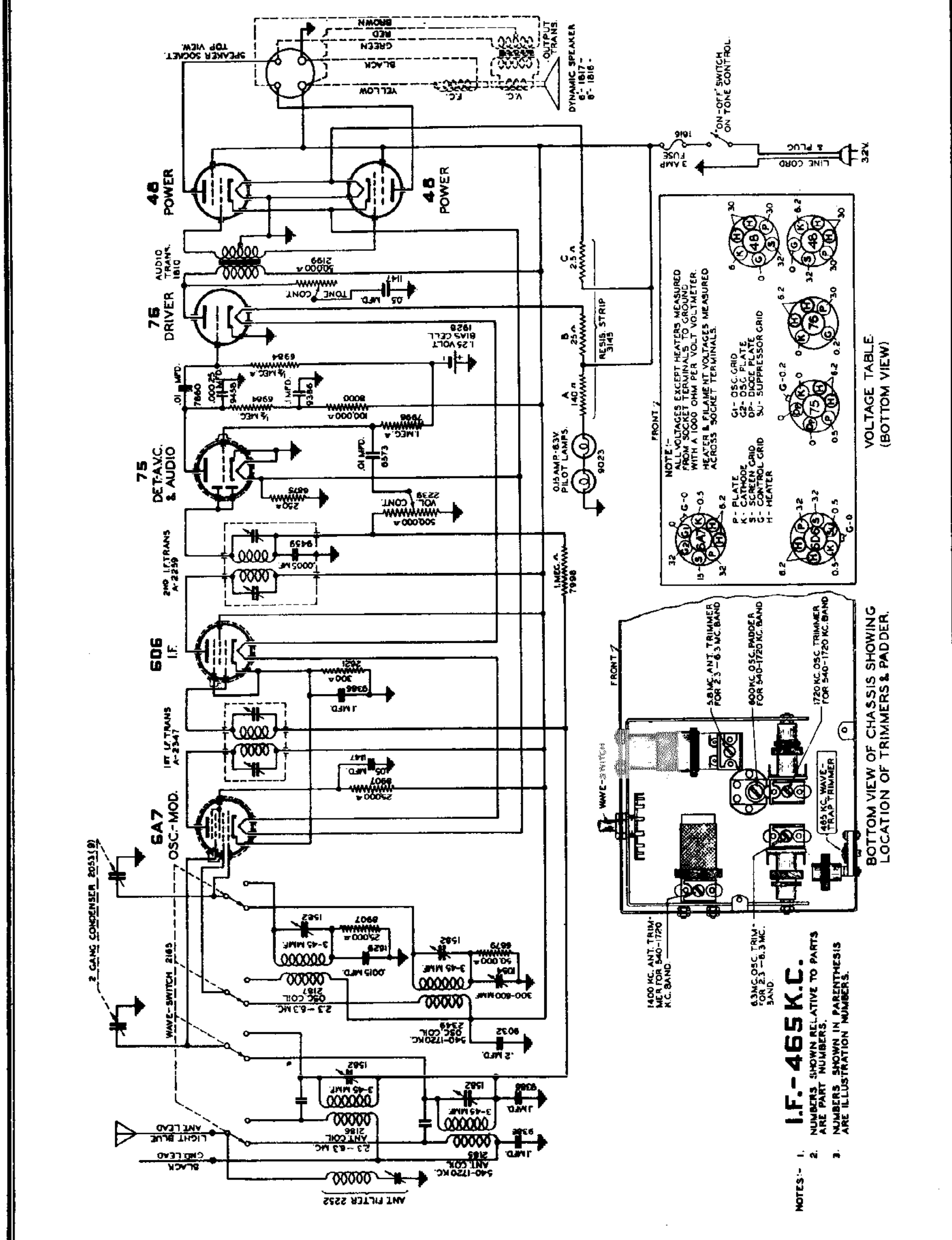
ALIGNING 5.8-18.3 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.8-18.3 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 18 megacycles.
(b) Adjust 18 M.C. oscillator trimmer to bring in 18 megacycle test signal to maximum output.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST PEAK which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 17 megacycles. Then vary the receiver dial slightly to the right and left of 17 megacycles, and if the fundamental peak was used in aligning at 18 megacycles the test oscillator signal will be heard at approximately 17 megacycles on the receiver dial.
(c) Tune receiver dial and set test oscillator frequency to EXACTLY 15 megacycles.
(d) Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

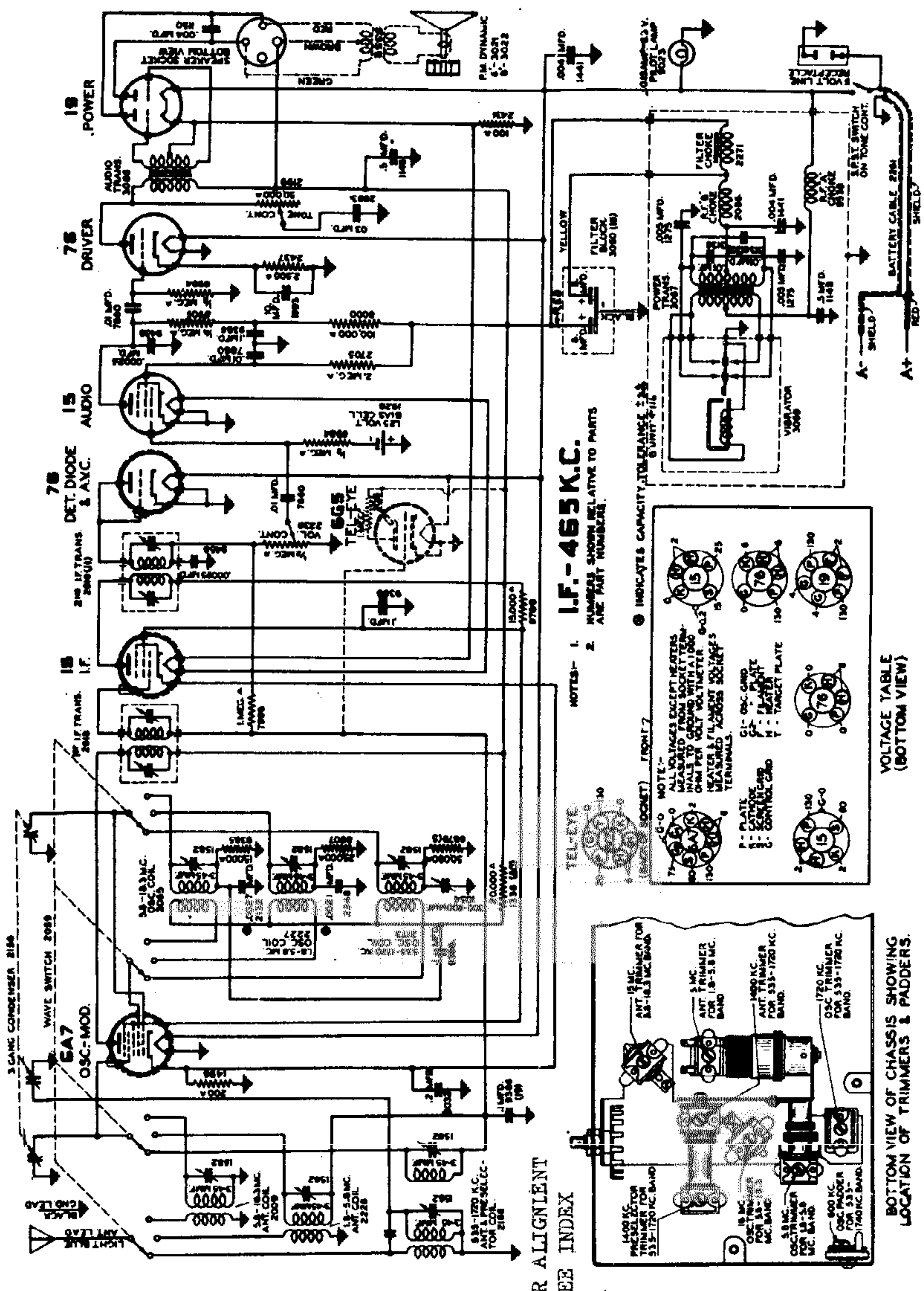
SENTINEL RADIO CORP.

MODEL 67L
Schematic, Voltage
Socket, Trimmers



MODELS 68B, 68BE
Schematic, Voltage
Socket, Trimmers

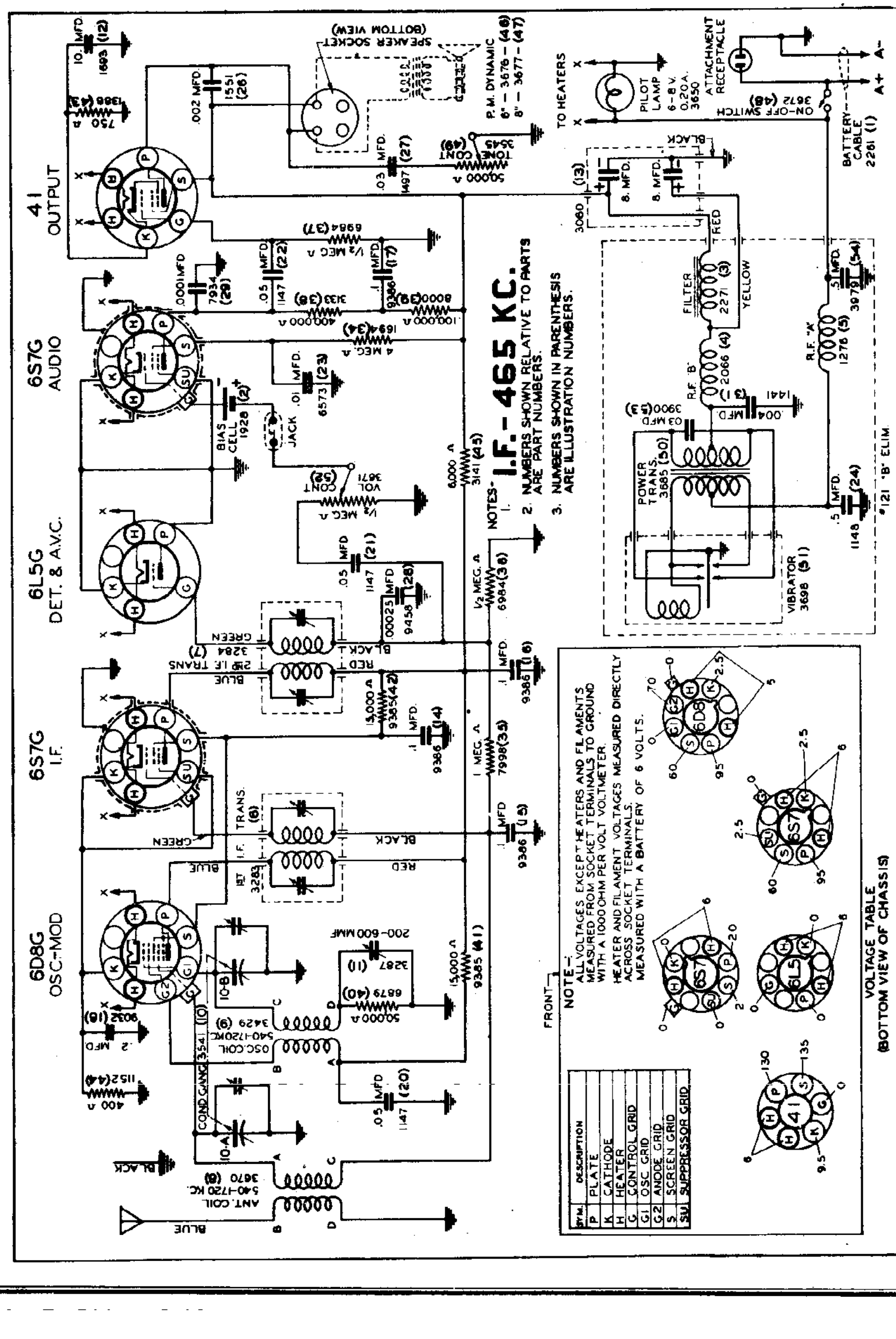
SENTINEL RADIO CORP.



FOR ALIGNENT SEE INDEX

SENTINEL RADIO CORP.

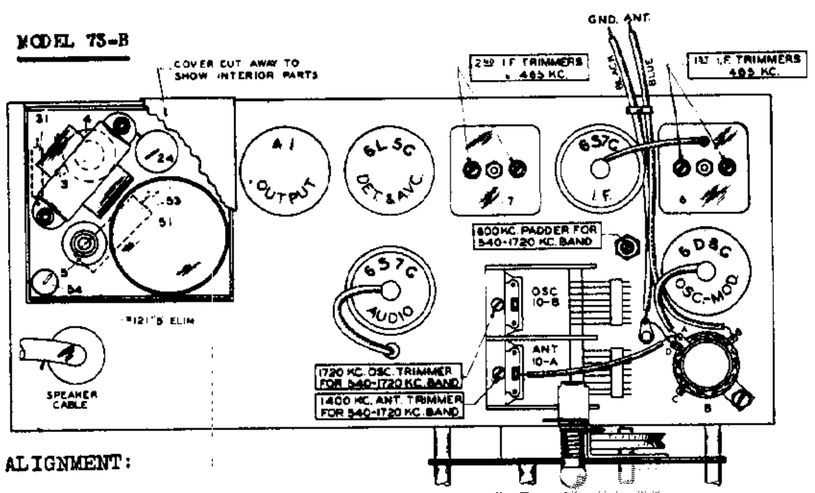
MODEL 73B
Schematic, Voltage
Socket



MODEL 73B
MODEL 80B
Alignment, Trimmers
Chassis

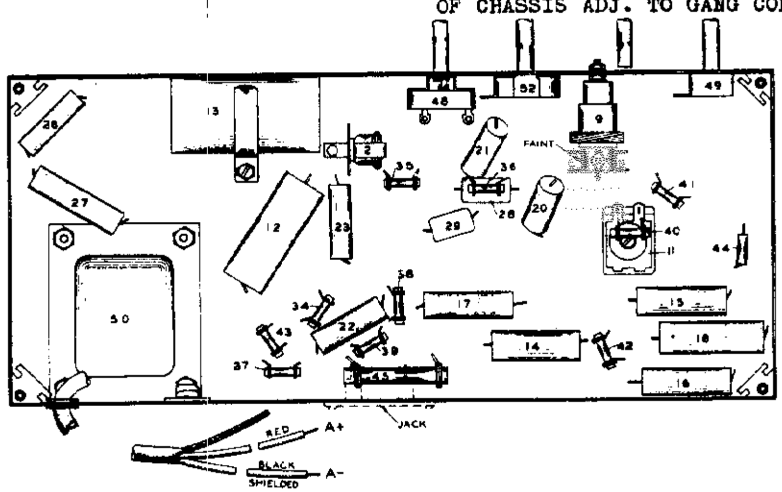
SENTINEL RADIO CORP.

MODEL 73-B

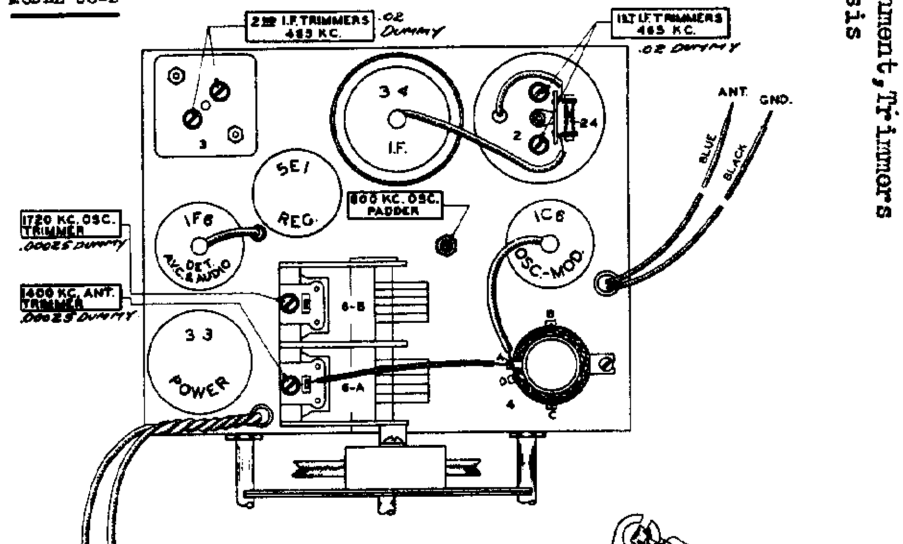


ALIGNMENT:

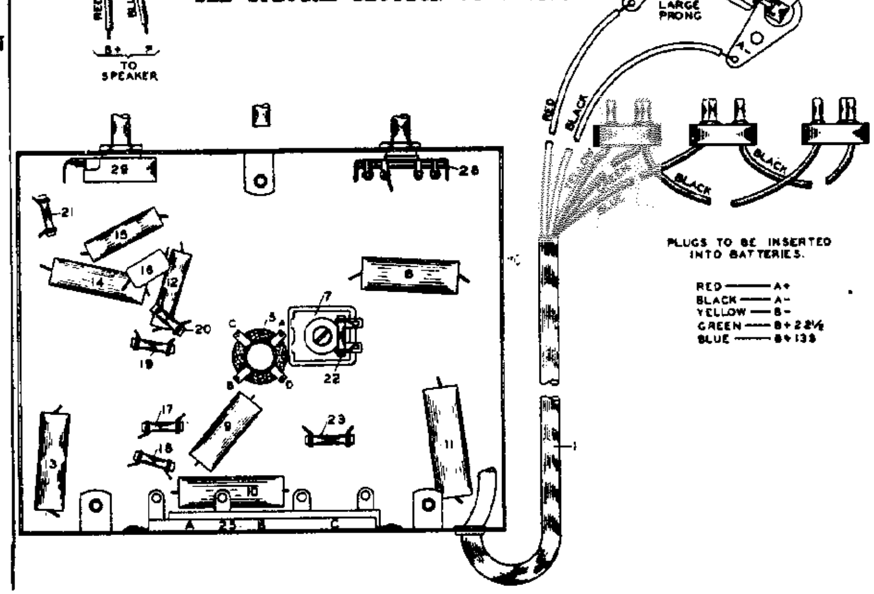
DUMMY ANTENNA UNIT	CONNECT TO	SIG.GEN. FREQ.	TUNING COND.POS.	TRIMMER TO BE ADJUSTED.
.02MFD.	6D8G GRID CAP	456 KC	---	2nd IF TRANSFORMER.
..	..	..	----	1st .. .. .
.0025 MFD.	ANT. POST	1720 KC	MAXIMUM CAP	TOP OF OSC. SECTION OF GANG CONDENSER.
..	..	1400 KC	..	TOP OF (FRONT) ANT. SECTION OF GANG CONDENSER.
..	..	600 KC	..	OSC. PAD. HOLE IN TOP OF CHASSIS ADJ. TO GANG COND.



MODEL 80-B

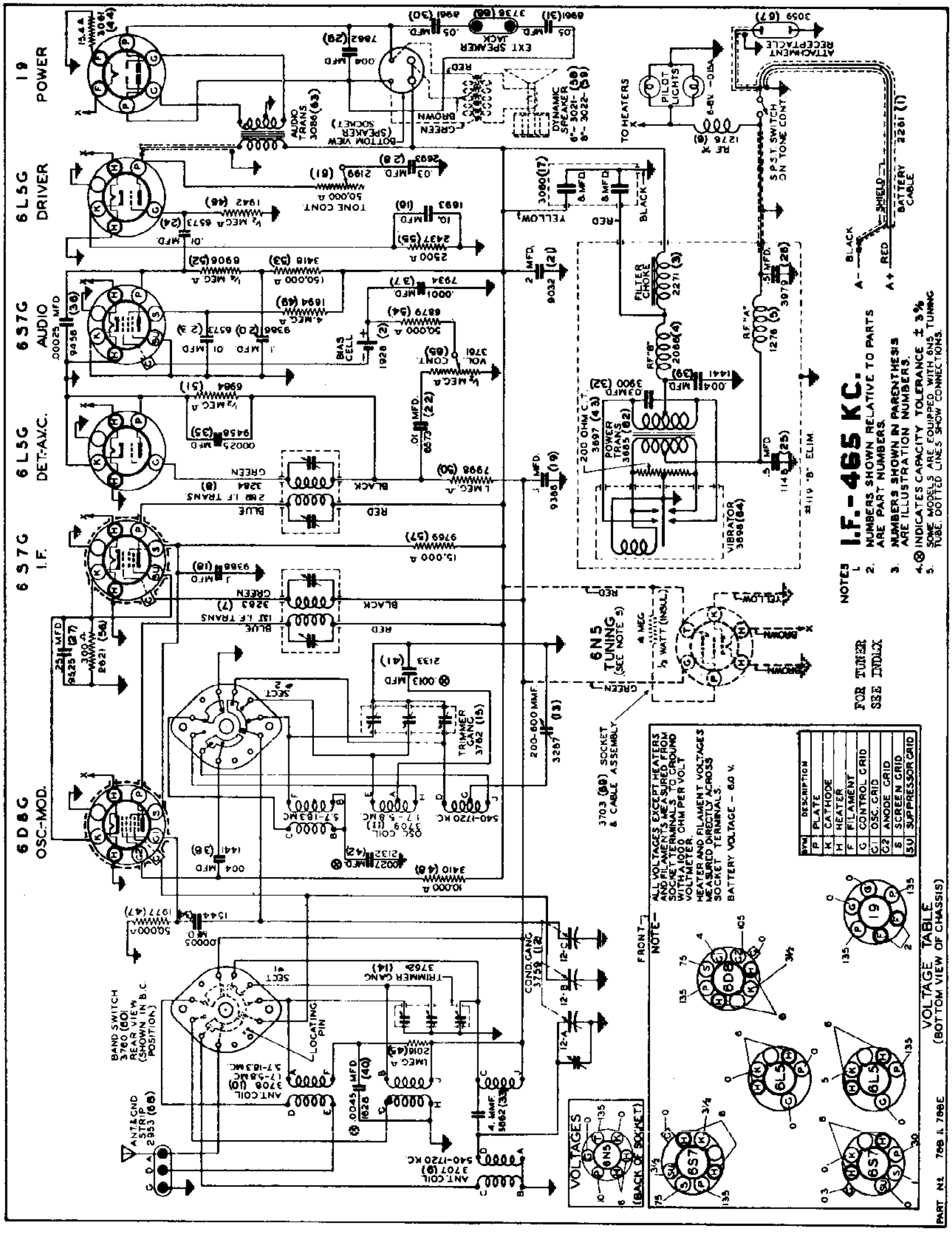


CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.



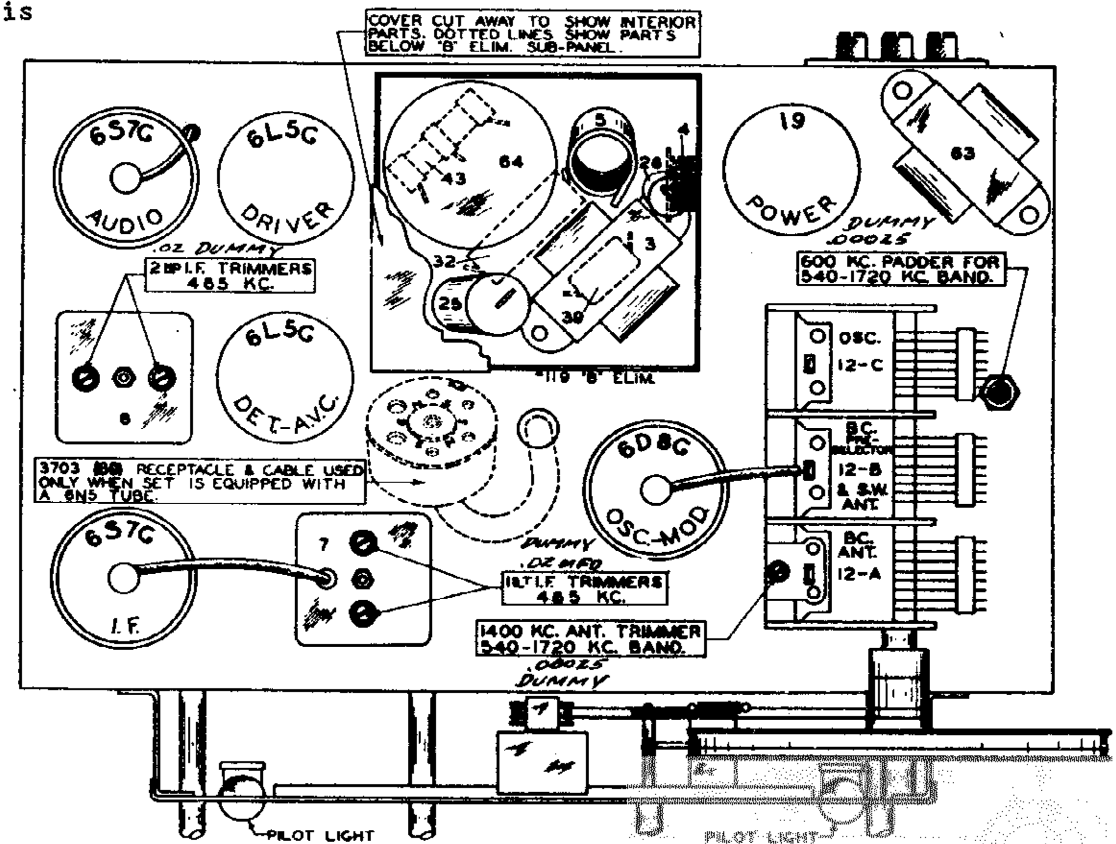
MODELS 78B, 78BE
Schematic, Voltage
Socket

SENTINEL RADIO CORP.

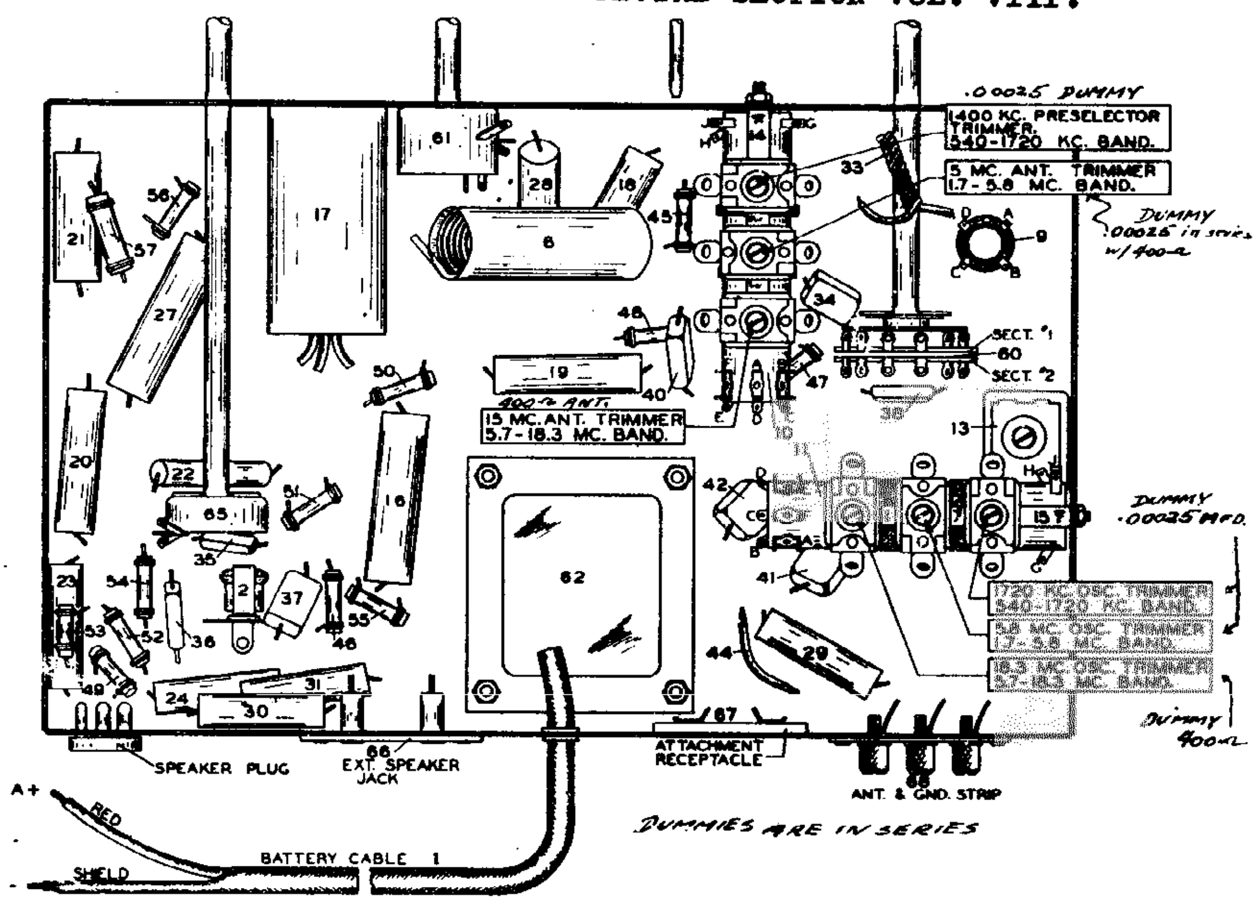


MODELS 78B, 78BE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

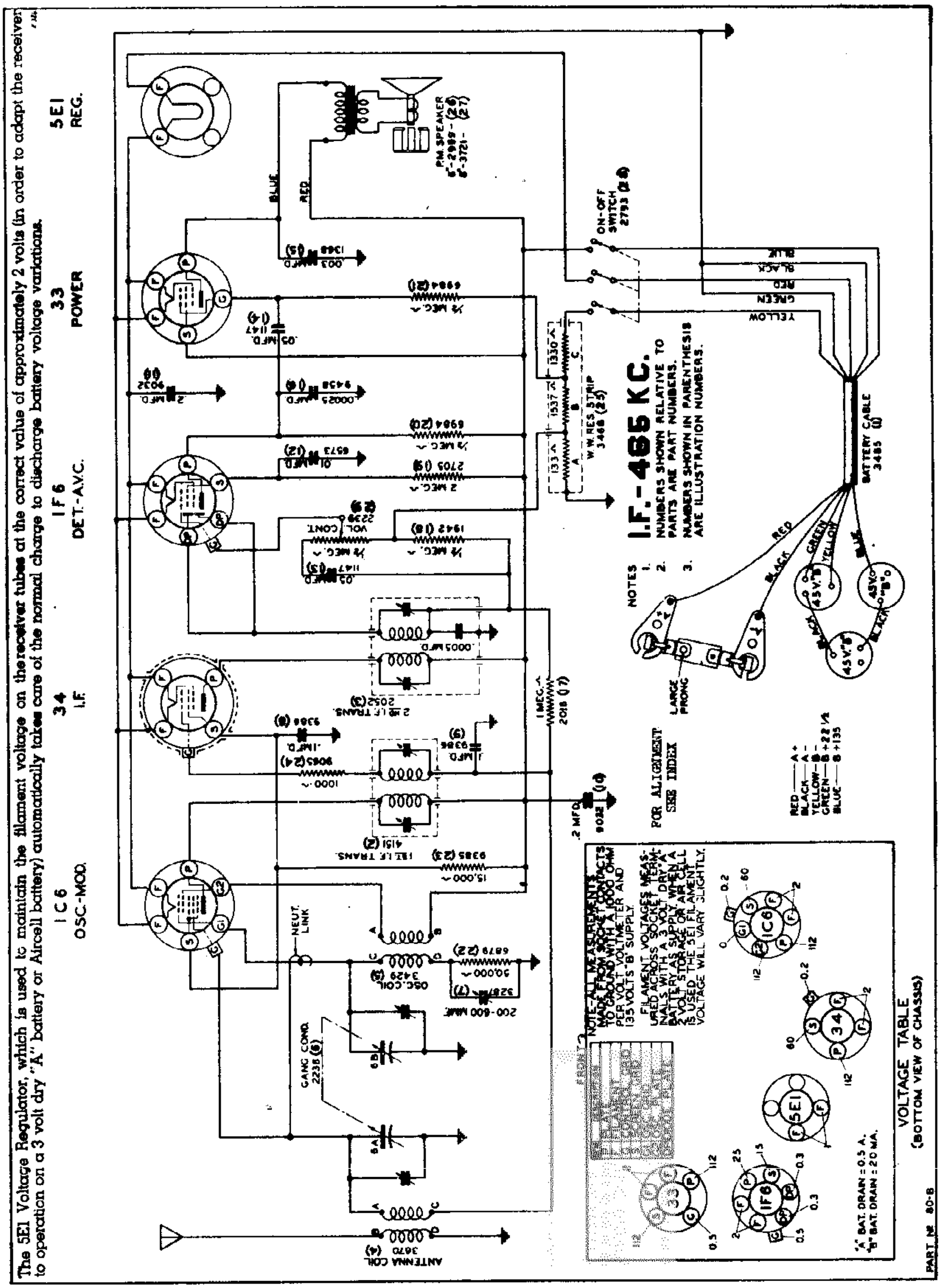


CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



SENTINEL RADIO CORP.

MODEL 80B
Schematic, Voltage
Socket



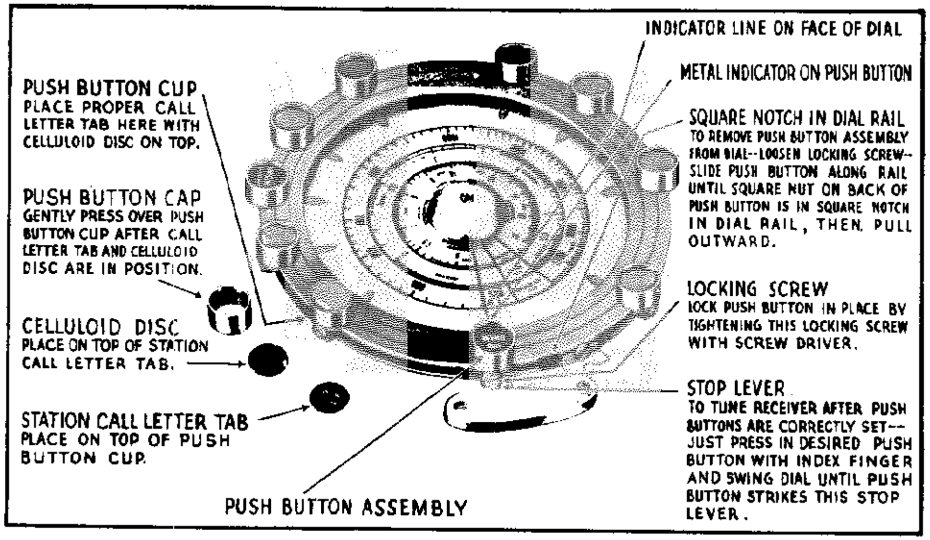
MODEL Push Button Dial Assembly, Instructions Parts List

SENTINEL RADIO CORP.

For MODELS 78B, 78BE 82A, 82AE, 86AE, 91B, 95B

SERVICE NOTES for PUSH BUTTON DIAL

FOR OTHER ASSEMBLIES SEE "AUTOMATIC TUNE" WHEEL DIAL ASSEMBLIES.



FROM ONE TO TEN STATIONS OPERATING ON FREQUENCIES SEPARATED BY FORTY KILOCYCLES OR MORE MAY BE AUTOMATICALLY TUNED BY PROPERLY SETTING PUSH BUTTONS.

IT IS A SIMPLE MATTER TO "AUTOMATIC TUNE" AFTER THE STATION PUSH BUTTONS HAVE BEEN PROPERLY SET - JUST PLACE INDEX FINGER INTO THE PUSH BUTTON HAVING CALL LETTERS OF THE DESIRED STATION PUSHING INWARD—THEN SWING DIAL UNTIL DIAL STOPS, AT WHICH POINT THE DESIRED STATION SHOULD BE PROPERLY TUNED IN AND THE METAL INDICATOR ATTACHED TO THE PUSH BUTTON SHOULD POINT TO THE INDICATOR LINE ON FACE OF DIAL. If reception is slightly distorted—which may be particularly noticeable when tuning weak stations—retune for maximum clarity by using conventional tuning knobs.

WHILE A PUSH BUTTON MAY BE SET FOR DISTANT WEAK STATIONS, BETTER RESULTS WILL BE OBTAINED IF THE STATIONS SELECTED FOR AUTOMATIC PUSH BUTTON TUNING ARE STRONG NEARBY OR LOCAL STATIONS.

AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC PUSH BUTTON TUNE" OBTAIN THE FREQUENCY USED AND CALL LETTERS OF THESE STATIONS AND SET PUSH BUTTONS BY:

To illustrate the proper installation and setting of the Push Buttons, the receiver is shipped from the factory with a Push Button properly set for station WGN, Chicago, 720 kilocycles. If station WGN is not one of the selected stations, remove call letters by:

a. Grasp cap section of Push Button between fingers and gently pull outward until it is clear of dial.

b. Carefully remove the station call letter tab and celluloid disc.

SET STATION PUSH BUTTON BY:

a. Gently press desired round paper station call letter tabs out of station tab sets.

b. Always set the first push button for the desired station that broadcasts on the lowest frequency—the least number of kilocycles—and then set the next push button for the selected station operating on the next lowest frequency, continuing on in this manner until a Push Button has been set for all of the desired stations.

c. Loosen Push Button locking screw and remove cups on all Push Buttons by grasping cap between fingers and gently pulling outward—then remove celluloid discs.

d. Carefully tune in the station which broadcasts on the lowest frequency—least number of kilocycles.

e. Slide the Push Button nearest to the low frequency end of dial scale—without moving dial—until metal indicator attached to Push Button is exactly even with the indicator line on the face of the dial,—then with a small screw driver firmly lock Push Button in place by tightening Push Button locking screw.

f. Place printed paper station call letter tab, having call letters of station tuned in—on top of Push Button cup, then—place celluloid protective disc on top of this and gently press Push Button cap firmly down over Push Button cup.

g. Next set a Push Button for the desired station operating on the next lowest frequency in the same manner as above and continue on in this way until all the Push Buttons have been properly set.

AFTER THE TEN PUSH BUTTONS HAVE BEEN PROPERLY SET THEY WILL NOT REQUIRE FURTHER ATTENTION — EXCEPT WHEN MOVED FROM THEIR POSITION OR WHEN AN ADDITIONAL TAB IS INCLUDED WHICH WOULD DISTURB THE POSITION OF THE OTHER TABS.

PARTS LIST

COMPLETE PUSH BUTTON DIAL ASSEMBLY LESS ESCUTCHEON

Part No.	Part Name	Description	List Price
211	Dial Assembly	Used With Model 78B Complete Assembly Less Escutcheon	$12.75
212	Dial Assembly	Used With Model 78BE Complete Assembly Less Escutcheon	12.75
208	Dial Assembly	Used With Model 82A Complete Assembly Less Escutcheon	12.75
209	Dial Assembly	Used With Model 82AE & 86AE Complete Assembly Less Escutcheon	12.75
210	Dial Assembly	Used With Model 91B & 95B Complete Assembly Less Escutcheon	12.25

MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

Part No.	Part Name	Description	List Price
4047	Cap	Push Button	.15
4046	Celluloid Disc	Station Call Letter Cover	.05
3814	Cord	Primary Drive Cord	.15
4013	Cord	Secondary Drive Cord	.15
4041	Cup Assembly	Push Button—With Clip and Compression Spring	.15
3995	Band Indicator Assem.	For Model 78BE-78B-91B-95B	.75
3992	Band Indicator Assem.	For Model 82AE-82A-86AE	.75
4011	Drive Drum Assem. with	4012 Secondary Pulley and Rubber Disc Coupler	1.25
4355	Drive Shaft		.12
4027	Disc	Translucent Dial Scale Background for Model 78BE	.50
3984	Disc	Translucent Dial Scale Background for Model 82AE & 86AE	.55
4024	Disc	Translucent Dial Scale Background for Model 82A	.55
4029	Disc	Translucent Dial Scale Background for Model 91B, 95B & 78B	.50
3771	Escutcheon	For Cabinet—All Models	1.00
4040	Hub Cap		.15
4009	Pulley	Dial Scale Drive (Die Cast)	.45
4039	Plate	Slide Stop	.10
4000	Scale	Calibrated Glass Scale With 4005 Shaft Assem.	2.75
8071	Screw	For Hub Cap 3-48 x 1/4" O.H.I.M.	.005
2754	Screw	For Pulley 6-32 x 1/4" S.H.H. Cup Point	.01
4037	Slide Stop	Push Button Stop	.10
4356	Spring Lock	For Drive Shaft	.01 net
4352	Spring Tension	For Secondary Cord	.07
3462	Spring Tension	For Primary Cord	.07

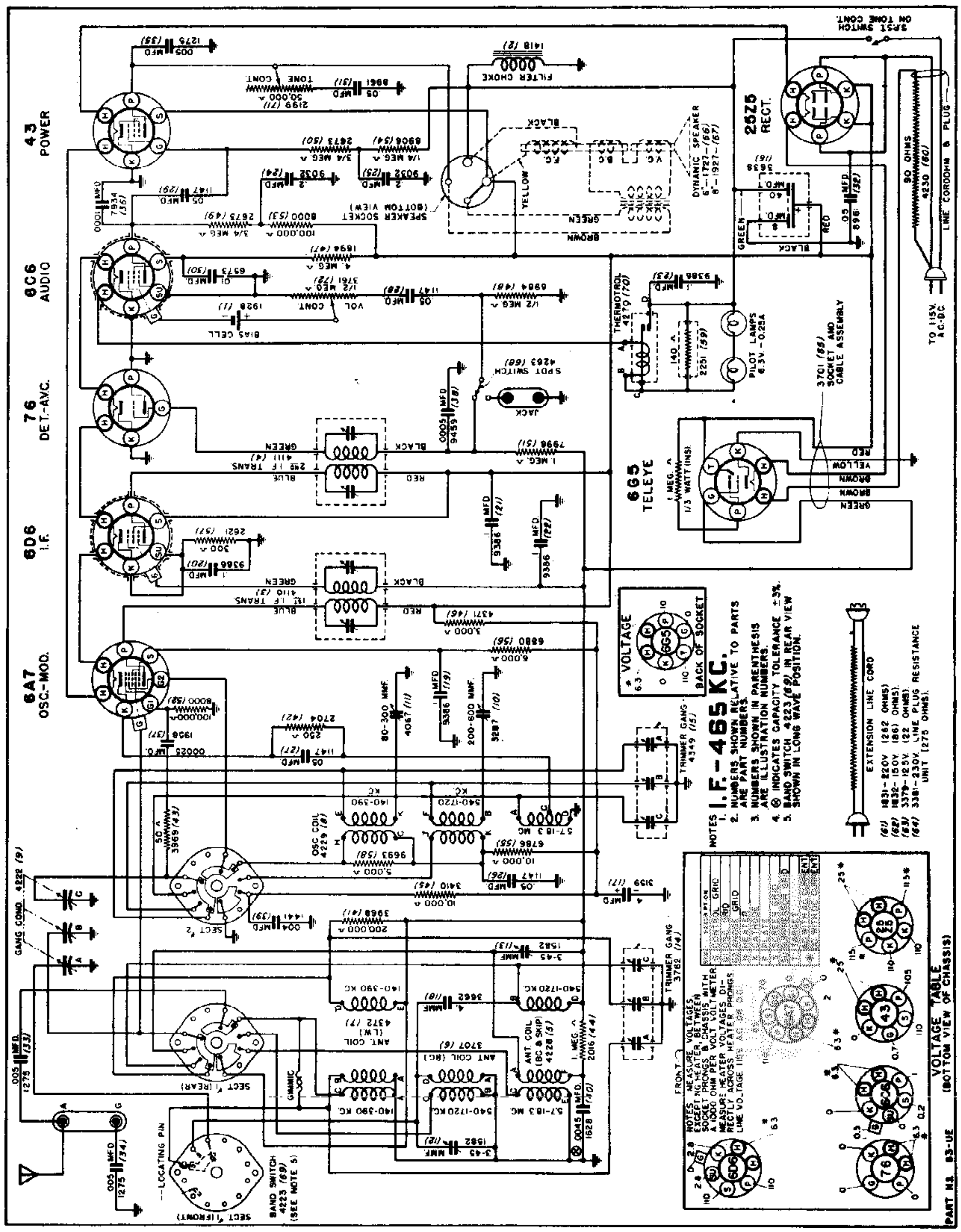
Prices are subject to change without notice.

When ordering parts be sure to mention part number and order all parts from:

Printed in U.S.A.

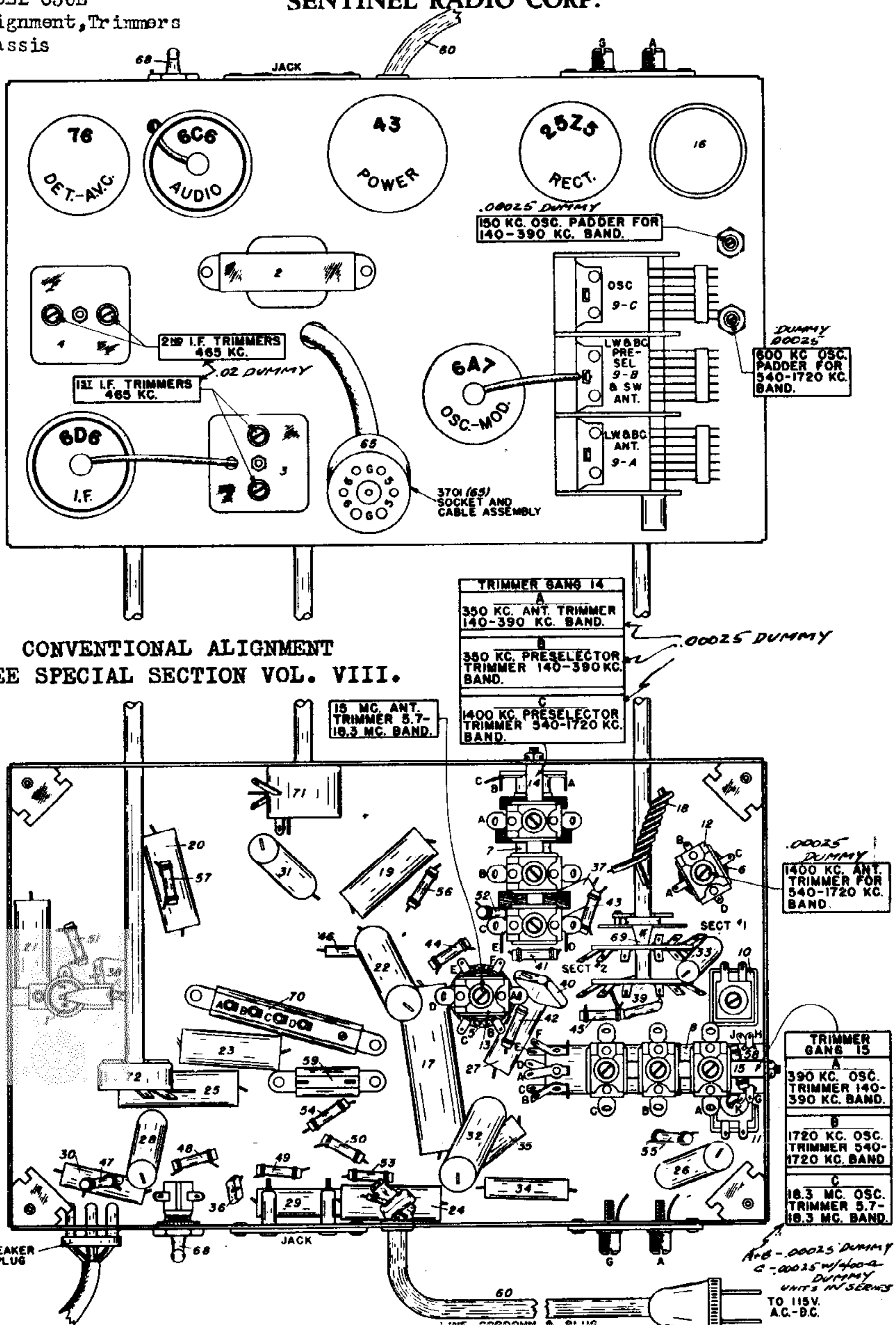
MODEL 83UE
Schematic ,Voltage
Socket

SENTINEL RADIO CORP.



MODEL 83UE
Alignment, Trimmers
Chassis

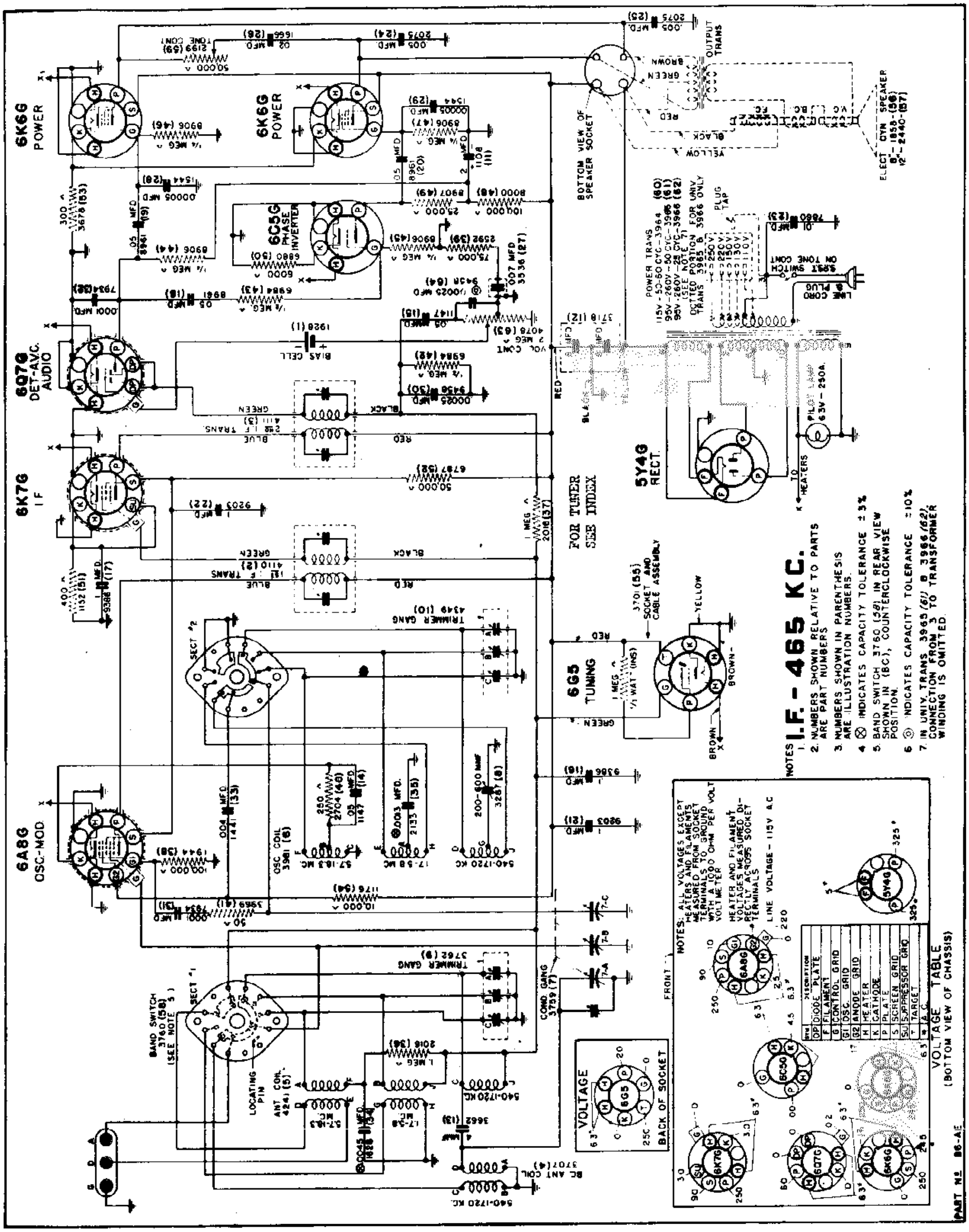
SENTINEL RADIO CORP.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

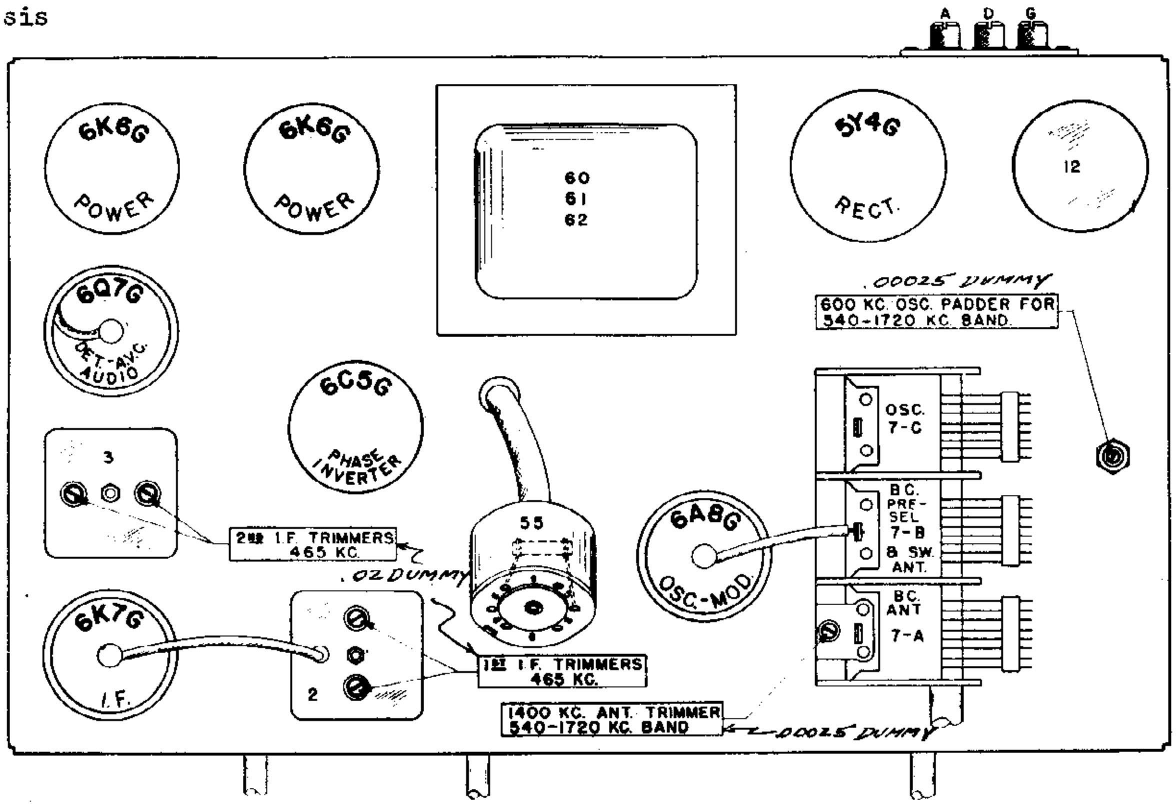
MODEL 86AE
Schematic, Voltage
Socket

SENTINEL RADIO CORP.

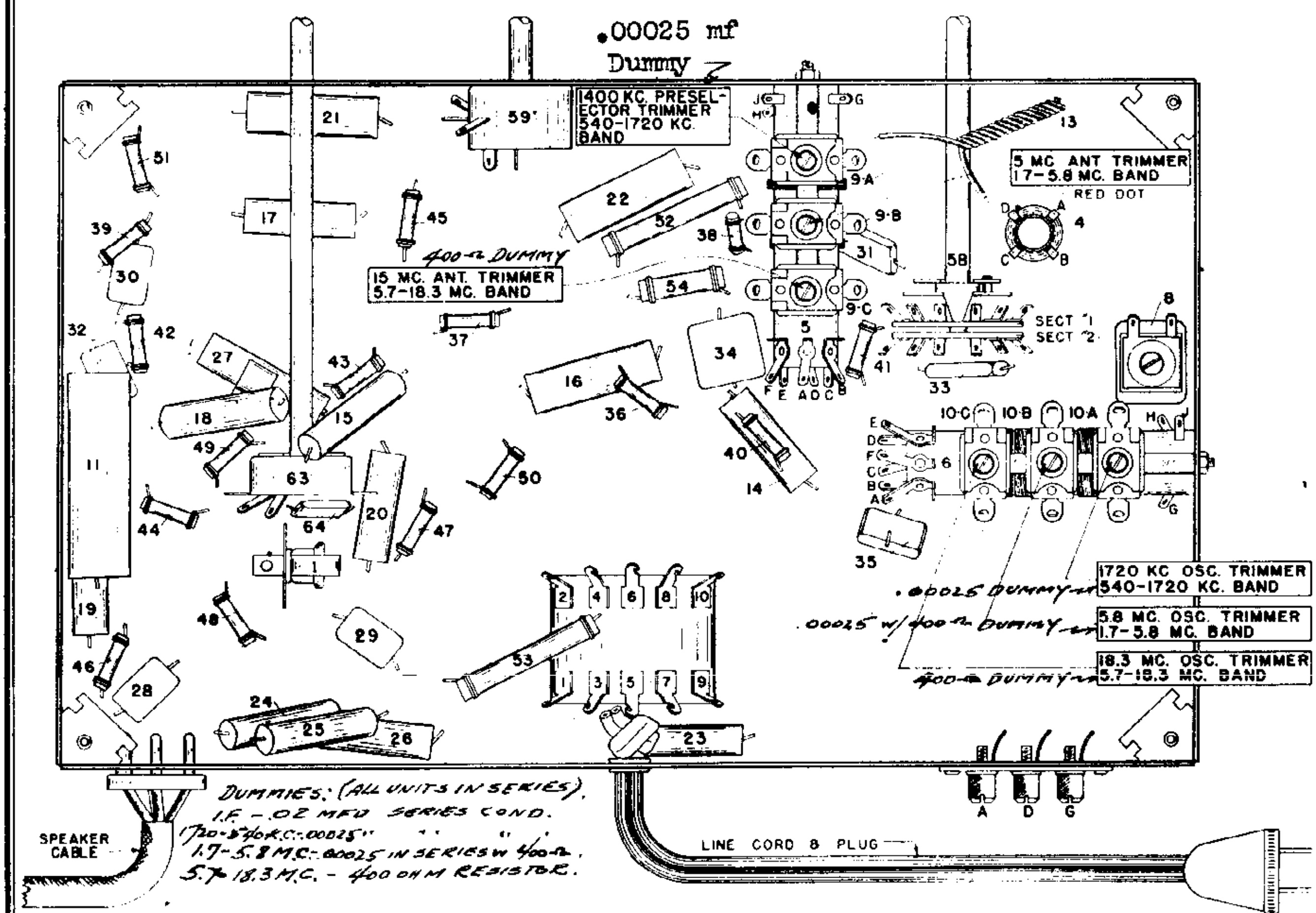


MODEL 86AE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

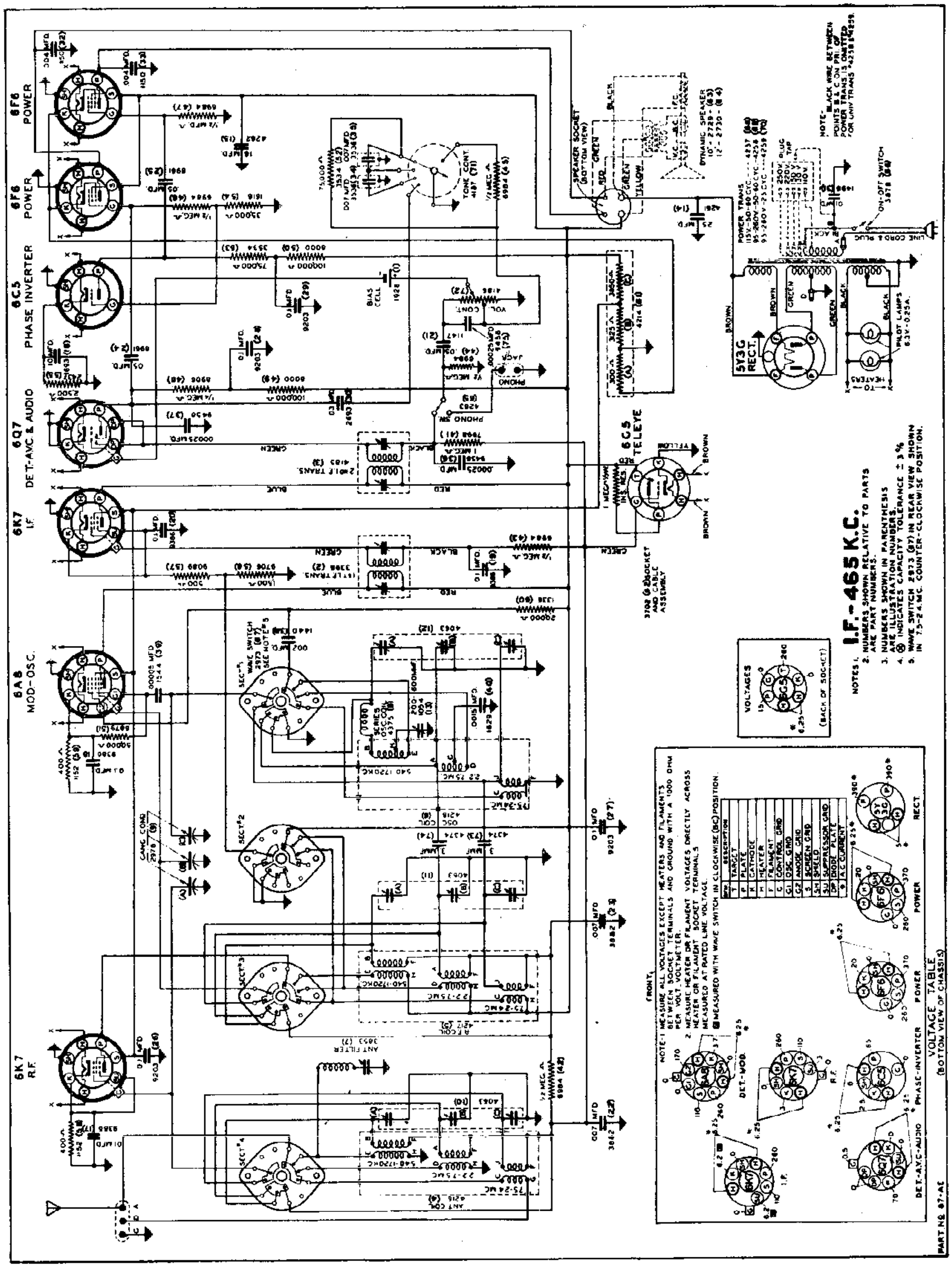


CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



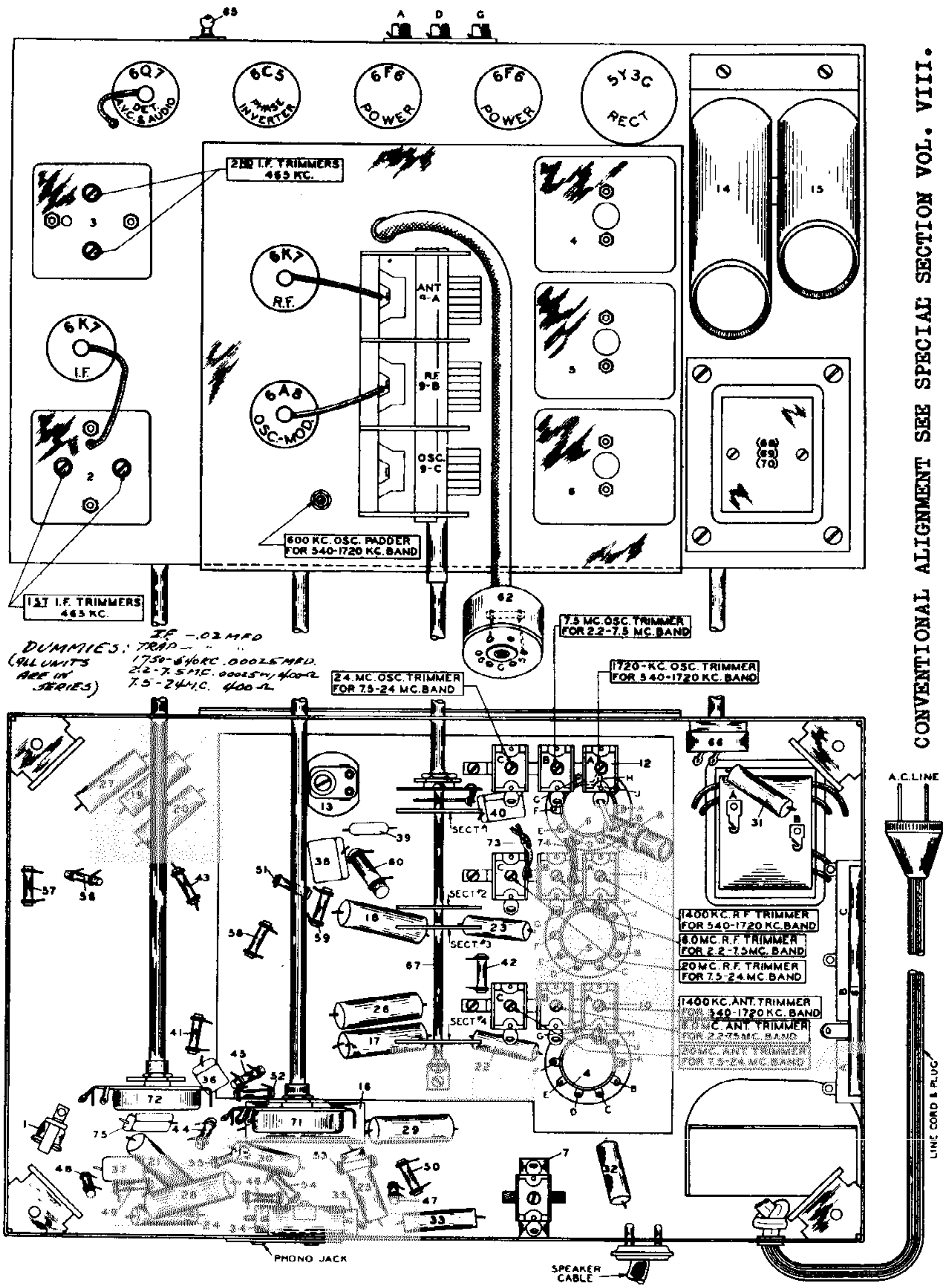
MODEL 87AE
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



MODEL 87AE
Alignment, Trimmers
Chassis

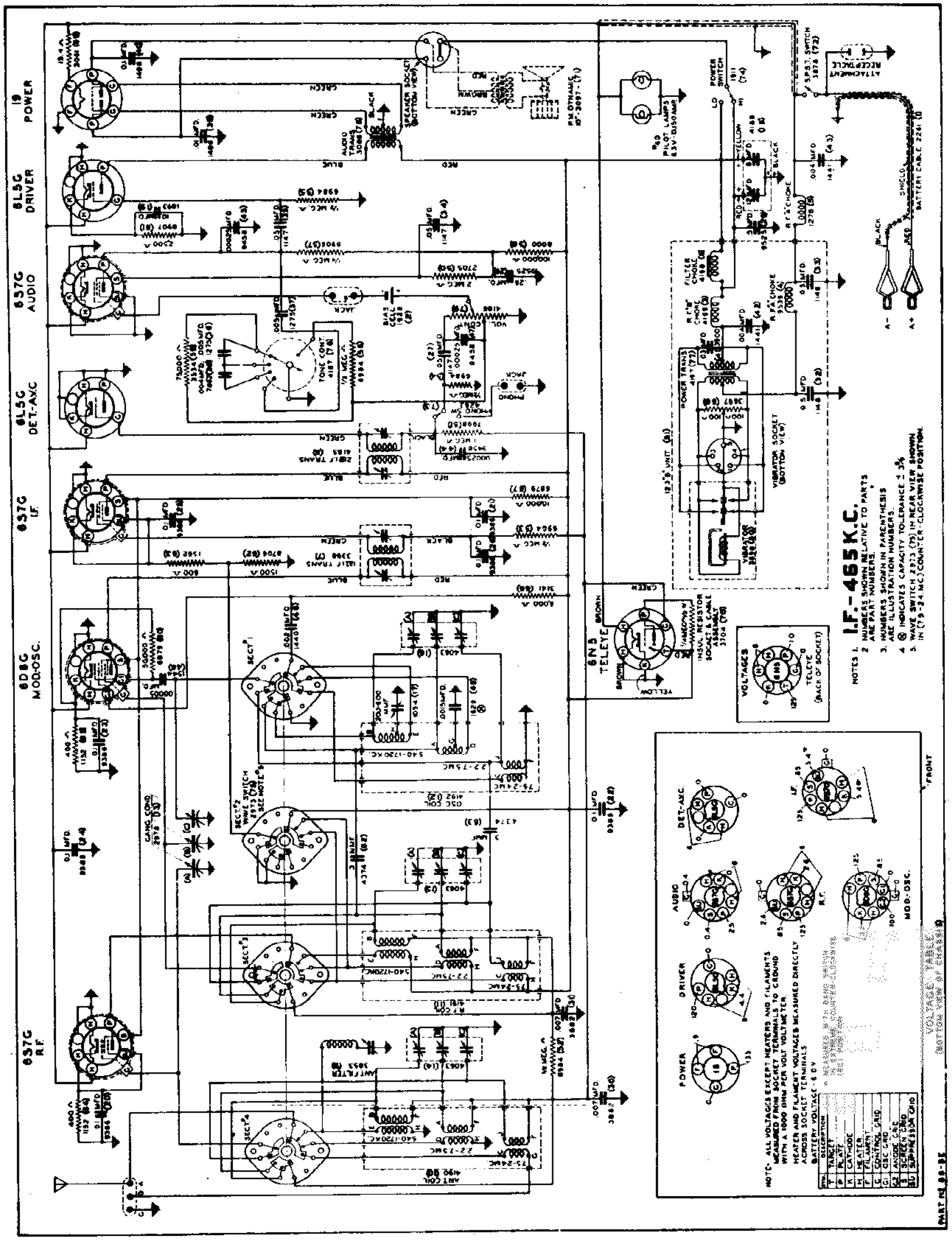
SENTINEL RADIO CORP.



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

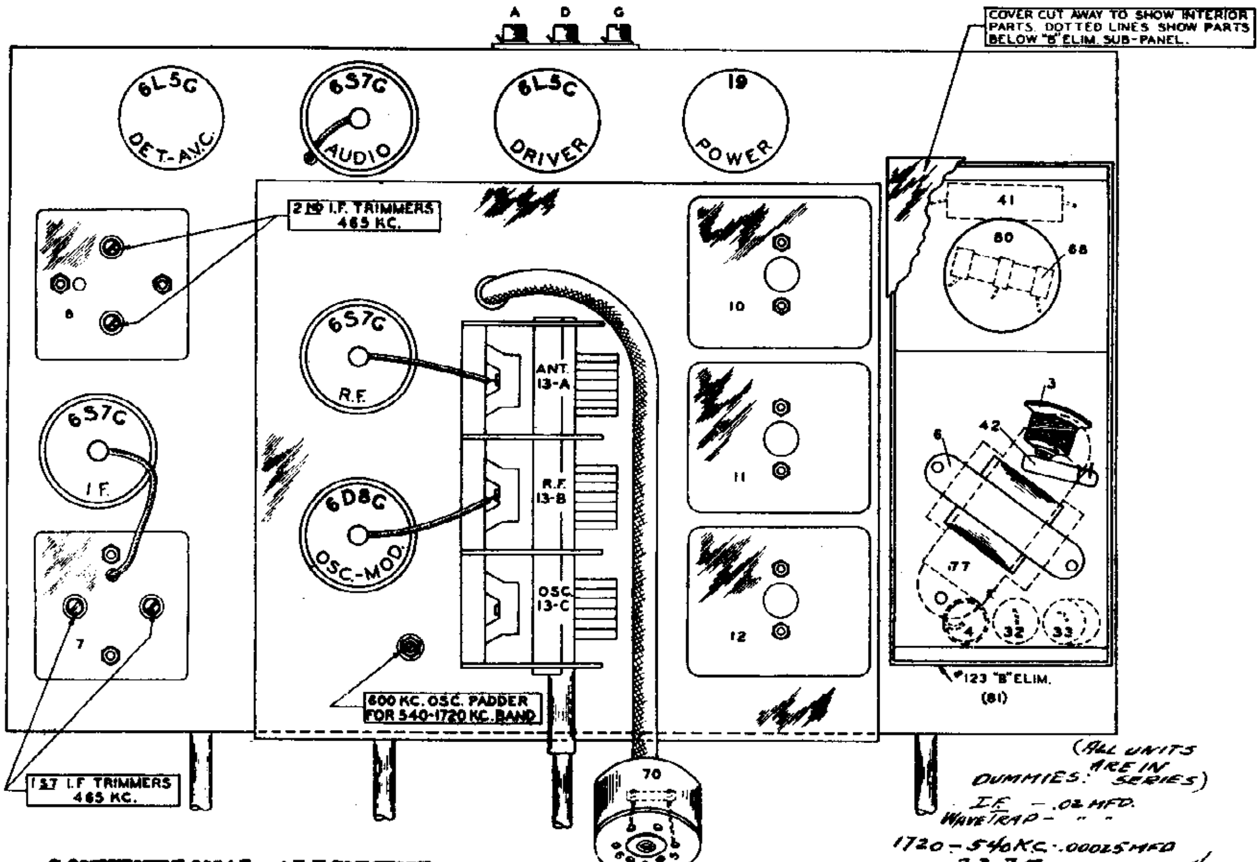
SENTINEL RADIO CORP.

MODEL 88BE
Schematic, Voltage
Socket



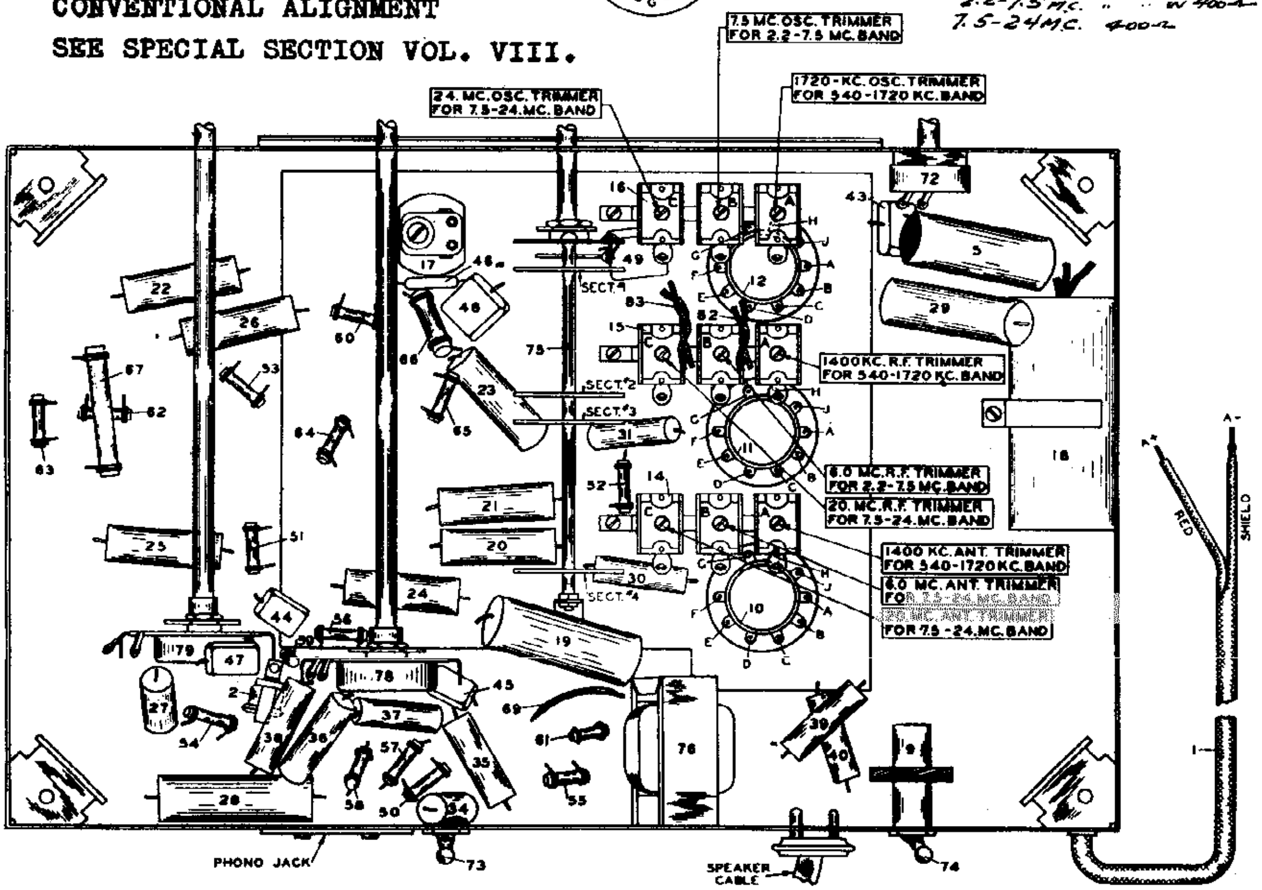
MODEL 88BE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.



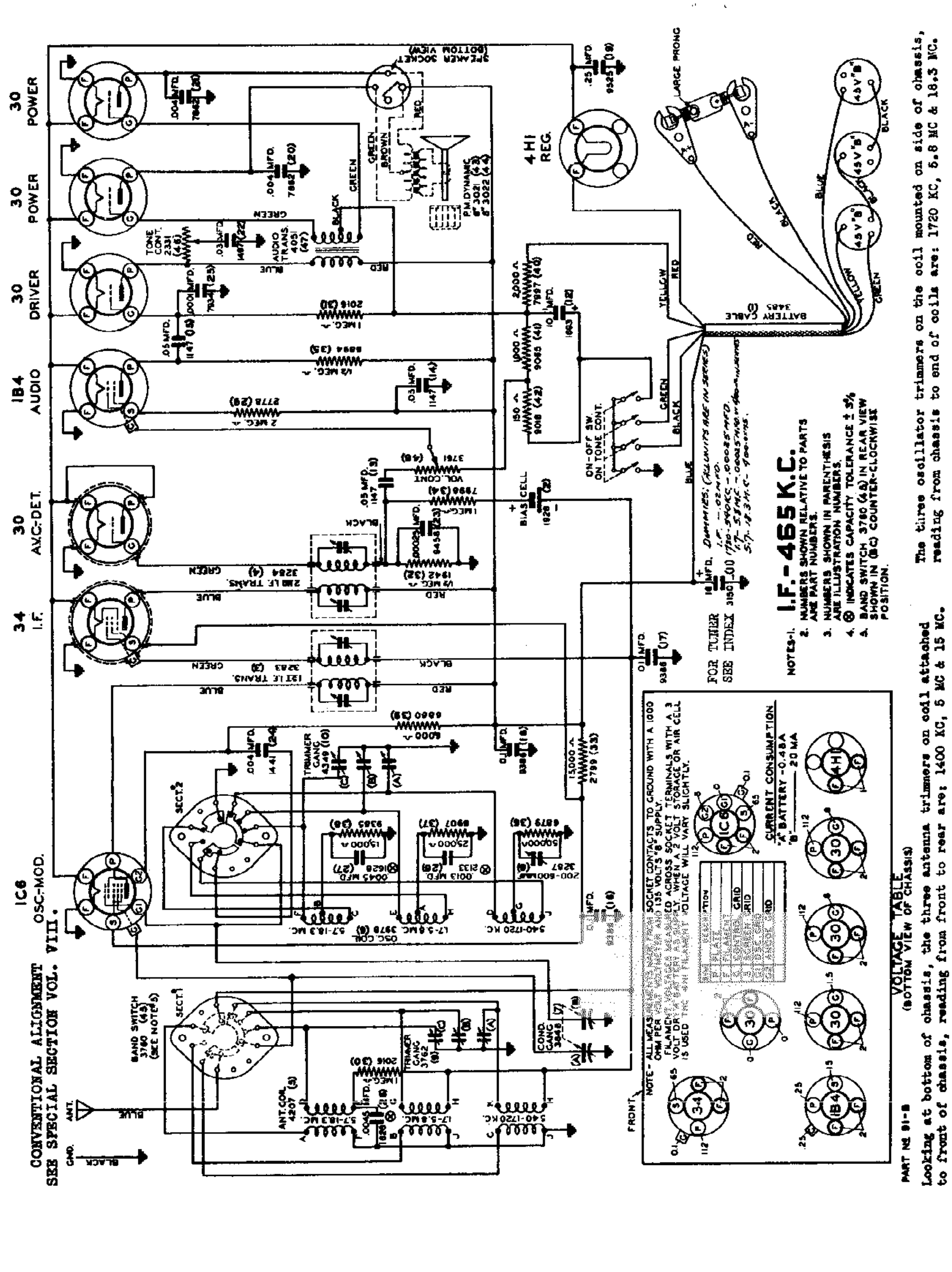
(All units are in series)
Dummies:
I.F. — .02 MFD.
Wave trap — " "
1720 – 540 KC. .00025 MFD
2.2 – 7.5 MC. " " w 400Ω
7.5 – 24 MC. 400Ω

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.



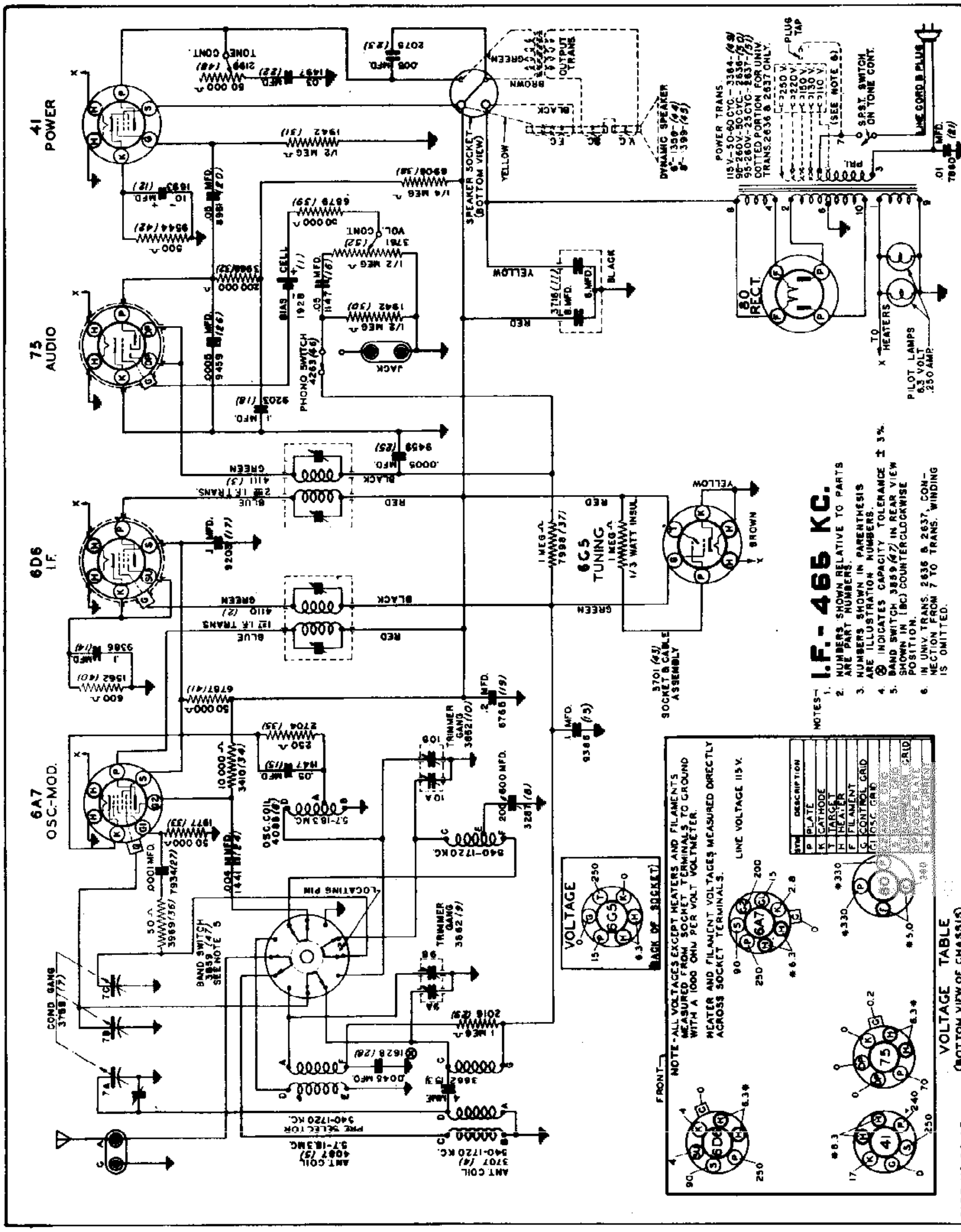
SENTINEL RADIO CORP.

MODEL 91B
Schematic, Voltage
Socket, Alignment



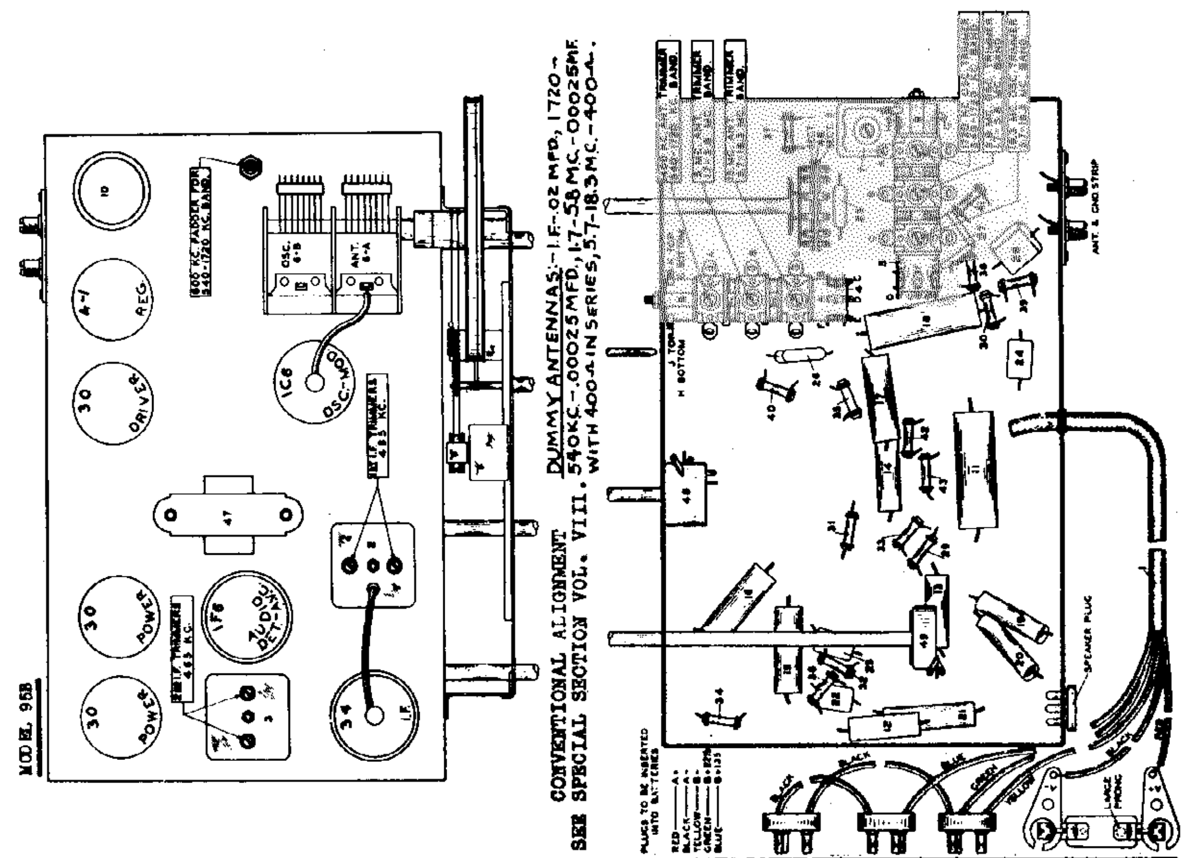
MODEL 92AE
Schematic, Voltage
Socket

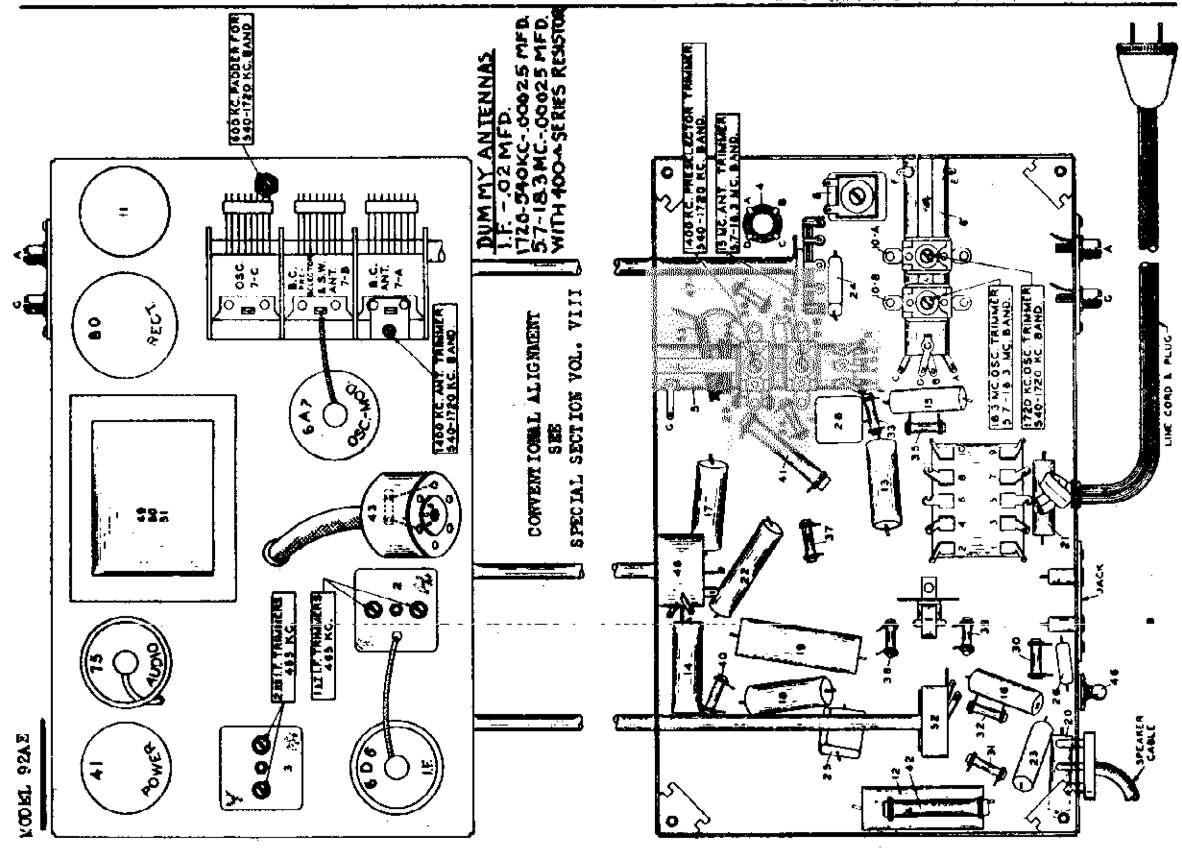
SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

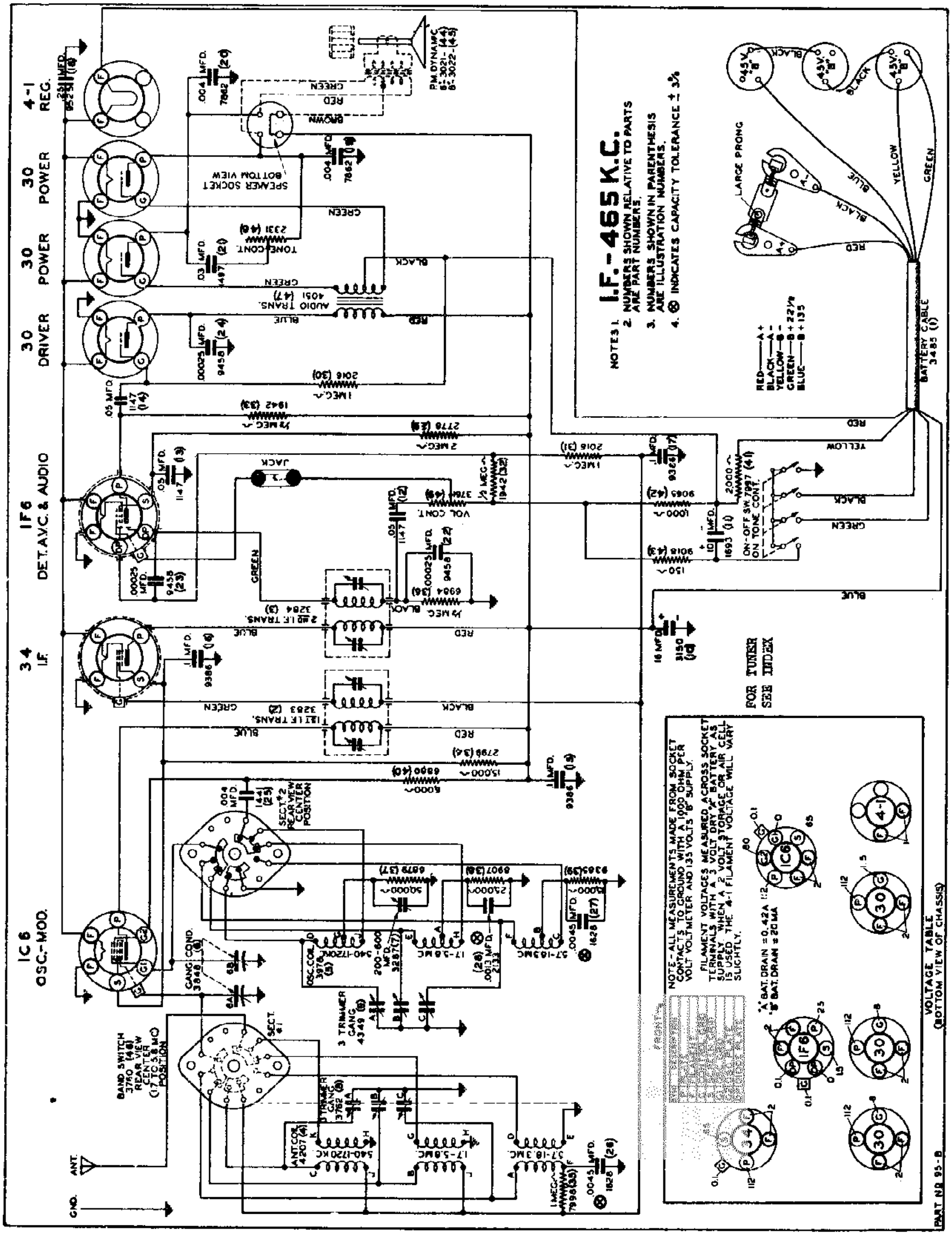
MODEL 92AE
MODEL 95B
Alignment, Trimmers
Chassis





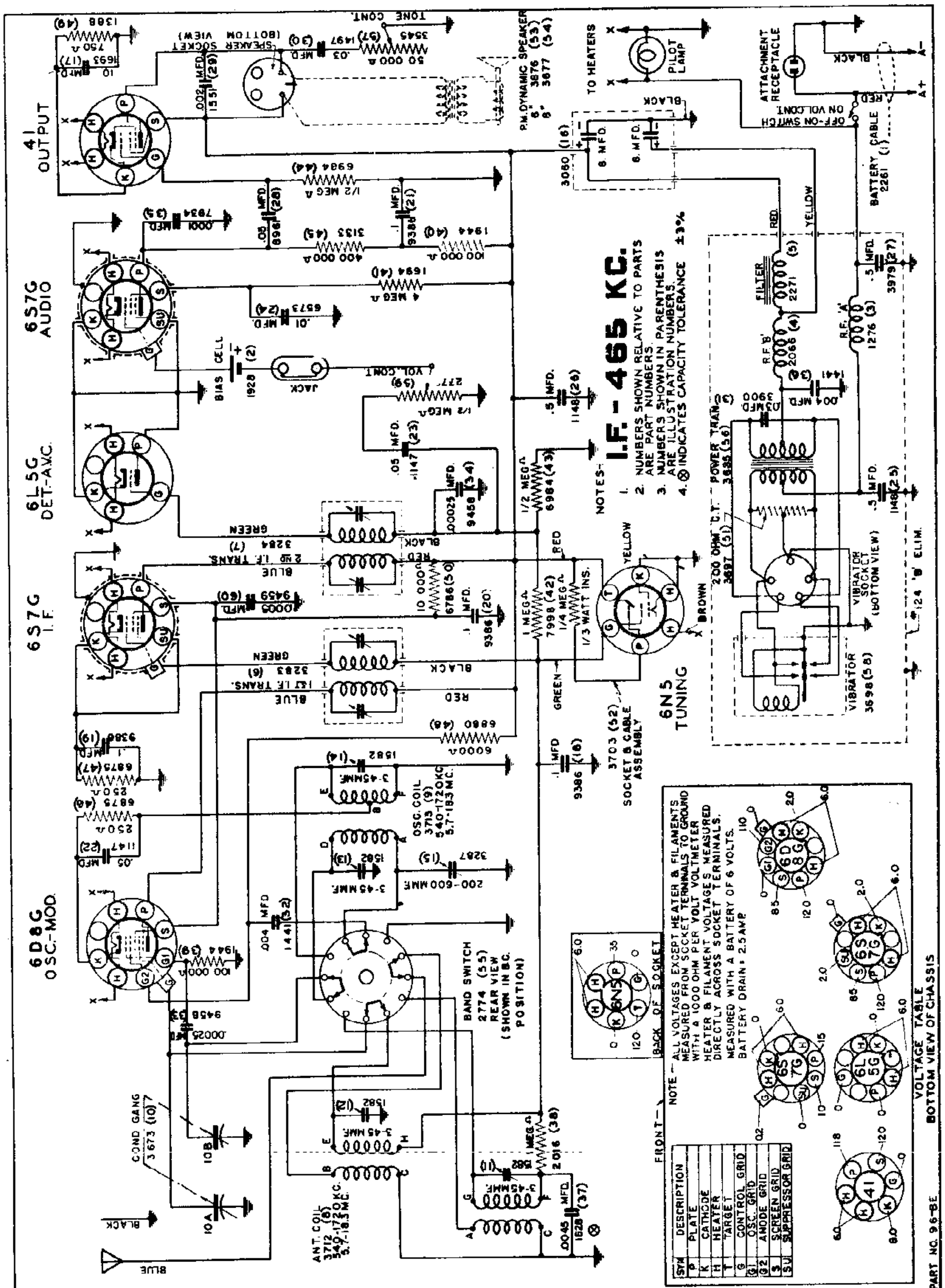
MODEL 95B
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 96BE
Schematic, Voltage
Socket



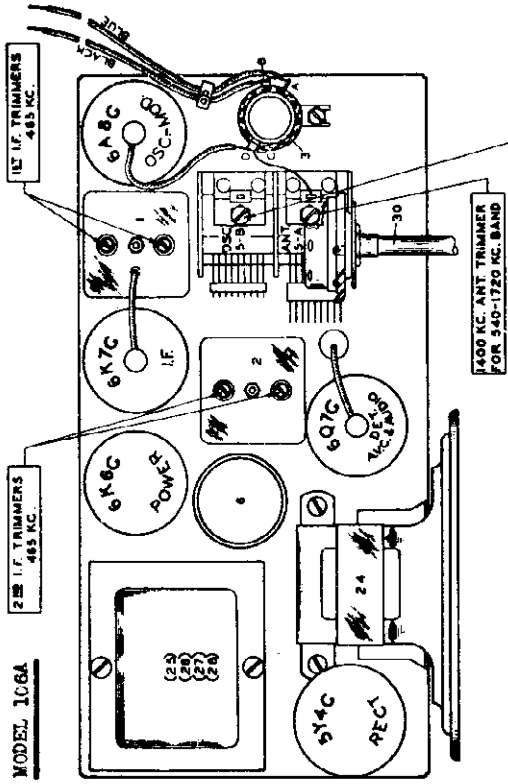
SYM	DESCRIPTION
P	PLATE
K	CATHODE
H	HEATER
T	TARGET
G	CONTROL GRID
G1	OSC. GRID
G2	ANODE GRID
S	SCREEN GRID
SU	SUPPRESSOR GRID

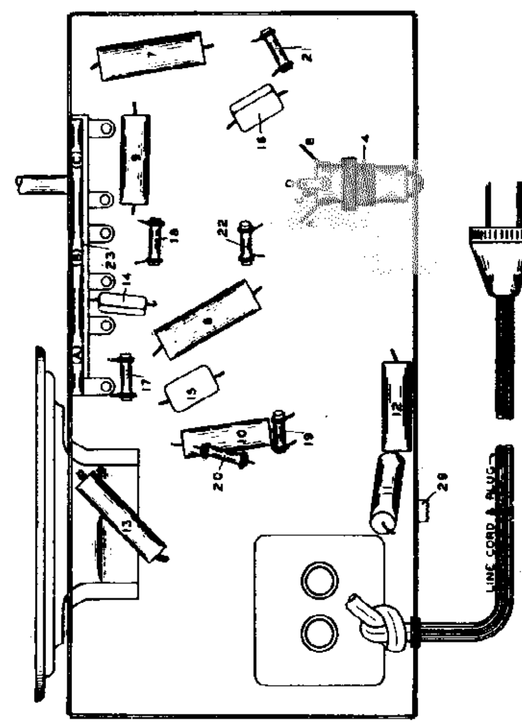
MODEL 96BE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

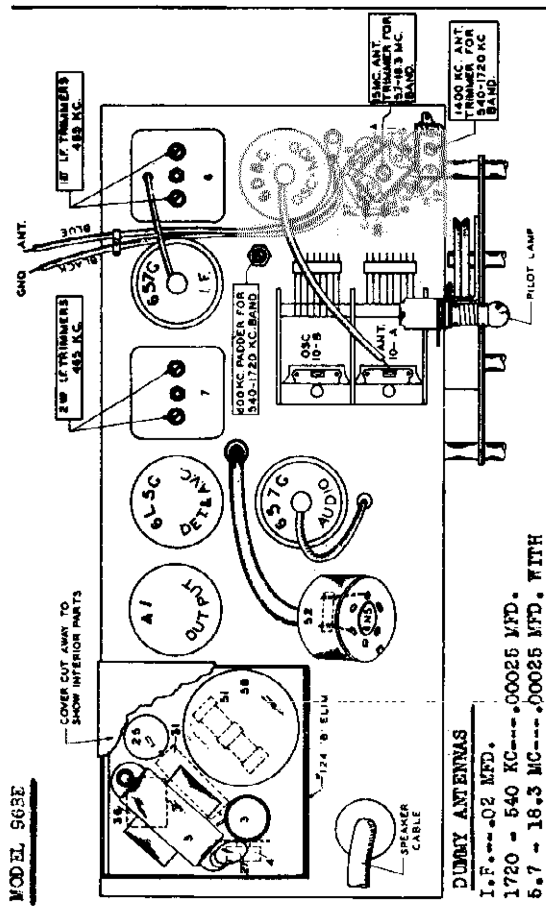
MODEL 106A
Trimmers, Chassis

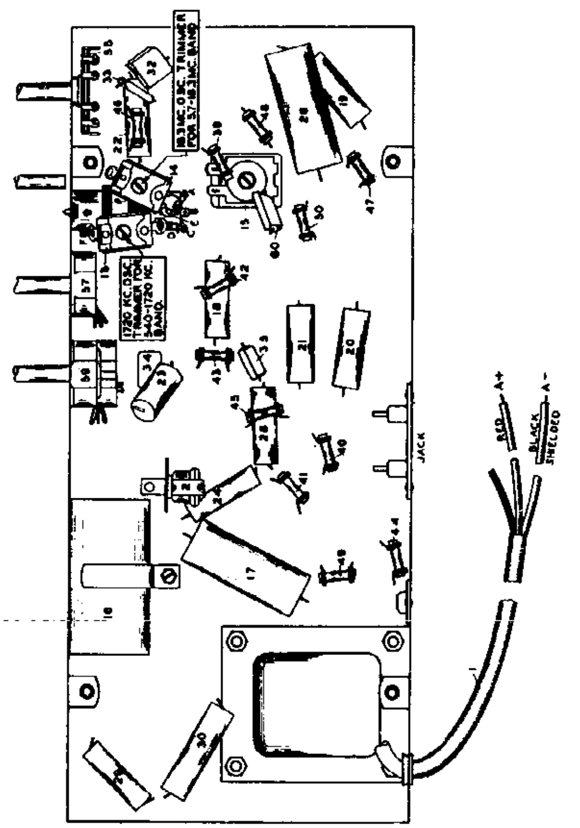
MODEL 106A





MODEL 96BE



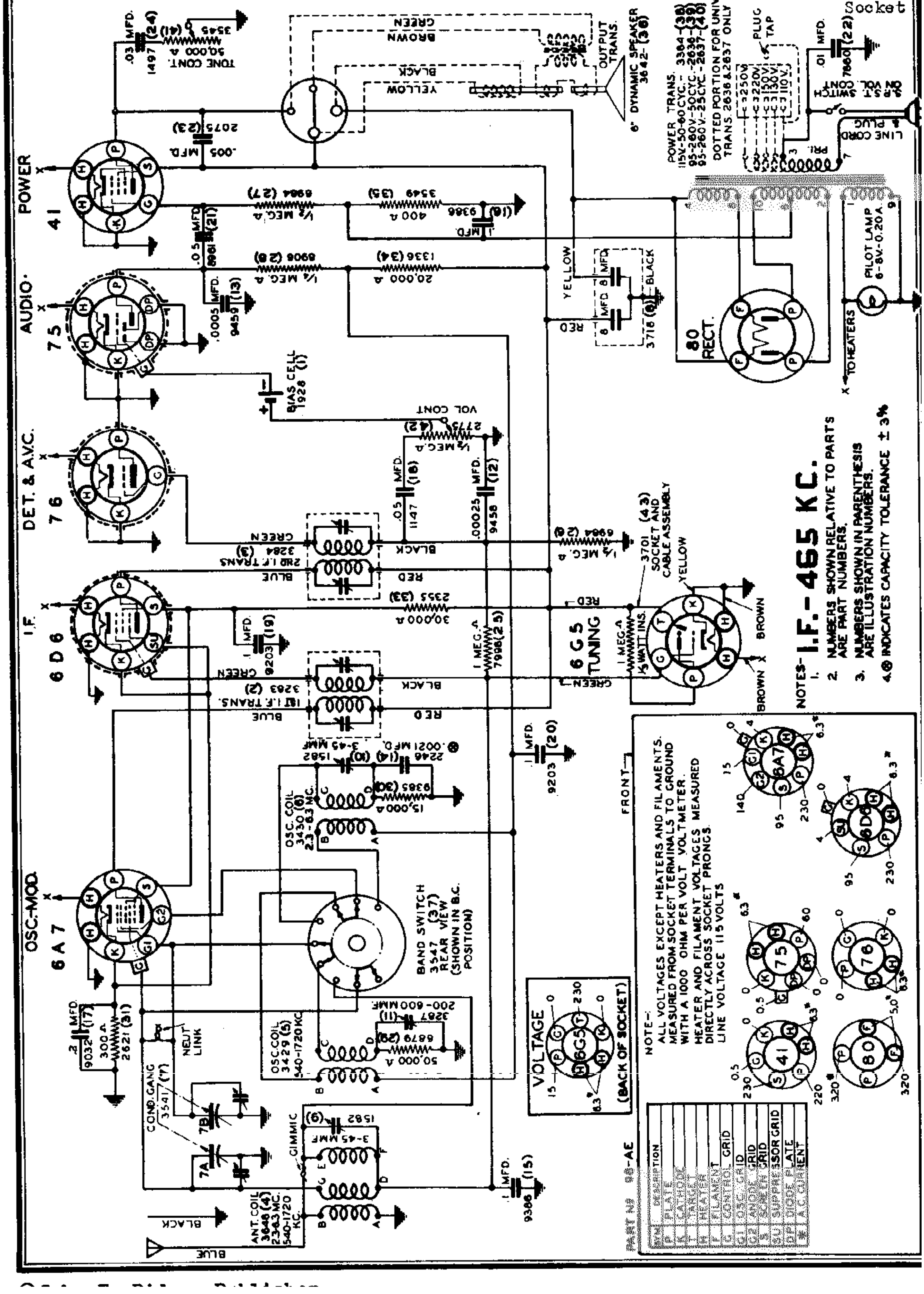


DUMMY ANTENNAS
I.F.---.02 MFD.
1720 - 540 KC---.00025 MFD.
5.7 - 18.3 MC---.00025 MFD. WITH
400 OHM SERIES RESISTOR.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

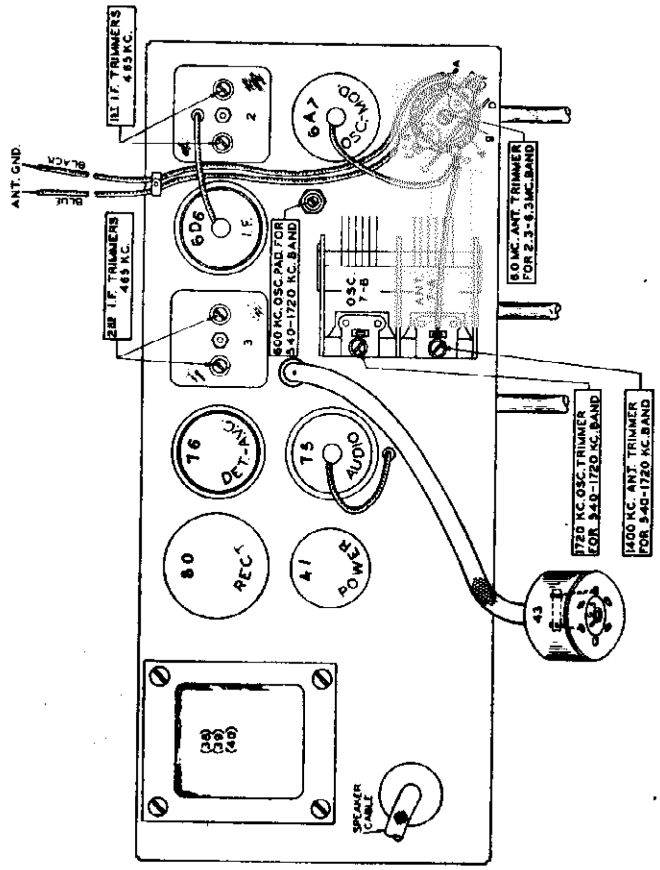
MODEL 98AE
Schematic, Voltage
Socket

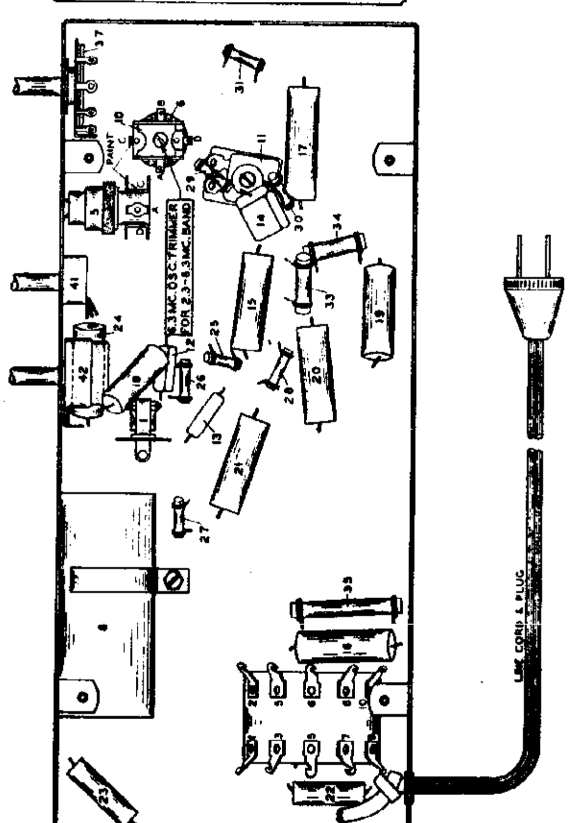
SENTINEL RADIO CORP.



MODEL 98AE
Trimmers, Chassis
Alignment

SENTINEL RADIO CORP.





ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.

(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.

(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.

(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. Test oscillator antenna lead series condenser with a 400 ohm resistor.

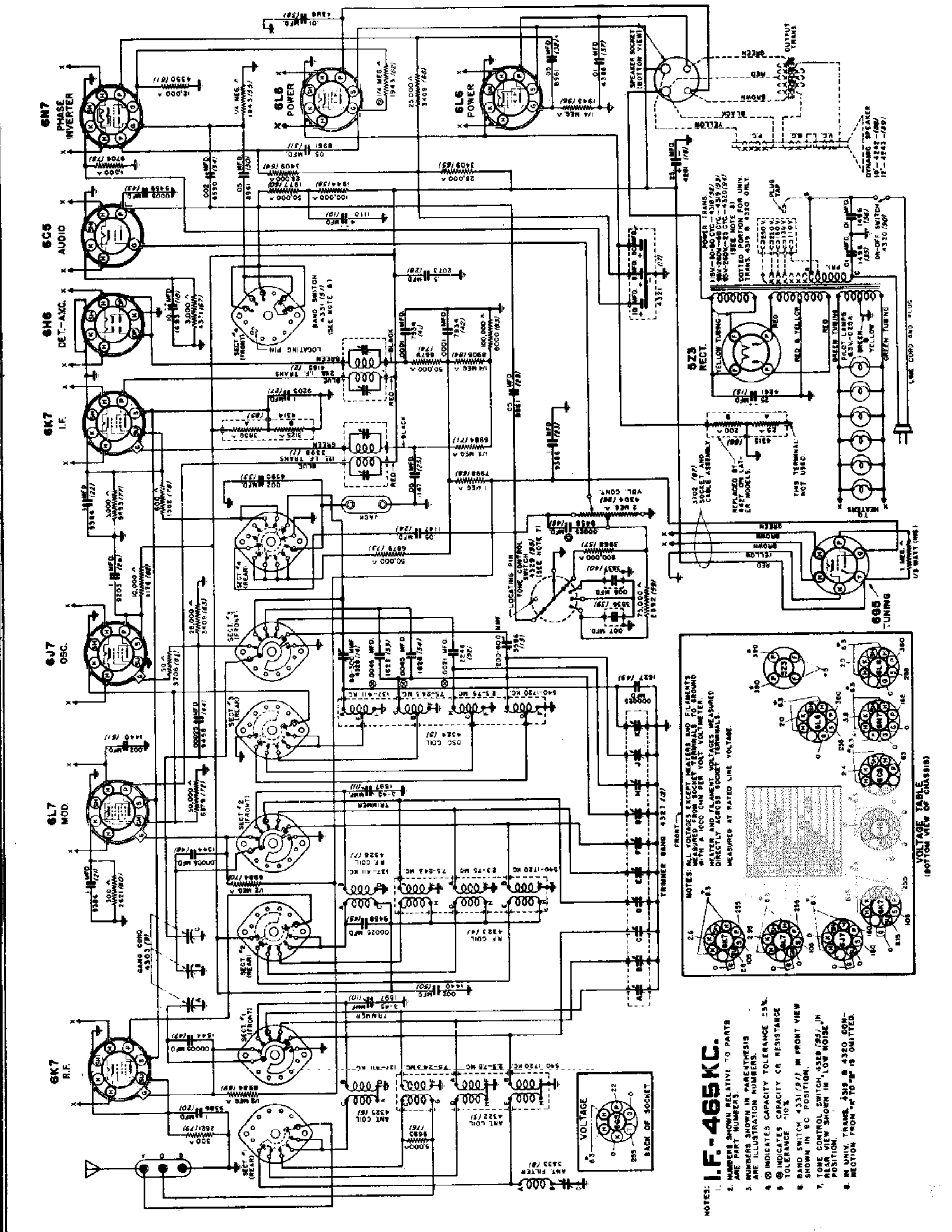
(b) Adjust band selector switch for 2.3-6.3 megacycles band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.

(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer on top of coil located underneath chassis.

(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer which is mounted on coil located on top of chassis for maximum sensitivity.

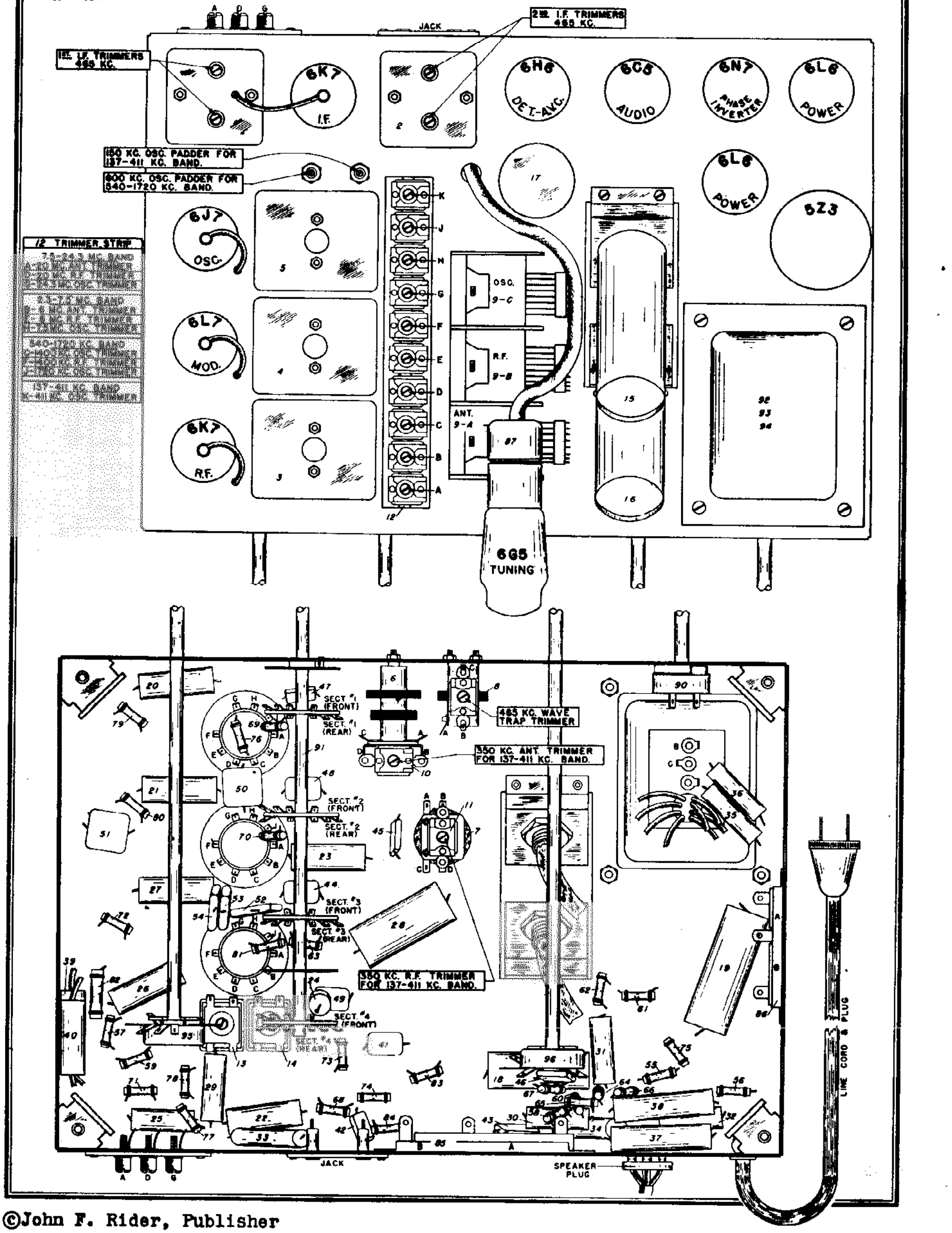
SENTINEL RADIO CORP.

MODEL 99AE
Schematic, Voltage
Socket



MODEL 99AE
Trimmers
Chassis

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 99AE
MODELS 144X,144XE
MODELS 149A,149AE,159AE
Alignment

SENTINEL-ERLA MODEL 99AE

ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMER AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground post. Connect the other lead of the test oscillator to the grid cap of the 6L7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ADJUSTING 465 KILOCYCLE WAVE TRAP:

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna "A" post and the low side to the set ground.

(b) Set test oscillator frequency to EXACTLY 465 kilocycles and adjust 465 kilocycle wave trap trimmer condenser for MINIMUM 465 kilocycle signal response.

ALIGNING 137-411 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(b) Leave test oscillator lead connected to receiver antenna "A" post through a .00025 Mfd. series condenser.

(c) Adjust band selector switch for operation on 137-411 kilocycle band, tune receiver dial and set test oscillator frequency to EXACTLY 411 kilocycles.

(d) Bring in 411 kilocycle test signal to maximum output by adjusting 411 K.C. (K) oscillator trimmer.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 350 kilocycles. Adjust 350 K.C. antenna and R.F. trimmers for maximum sensitivity.

(f) Tune receiver dial and set test oscillator frequency to approximately 150 kilocycles—then while rocking gang condenser slightly to right and left adjust 150 kilocycle oscillator padder for maximum sensitivity.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Leave .00025 Mfd. condenser in series with test oscillator lead. Adjust band selector switch for operation on the 1720-540 kilocycle band.

(b) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles. ADJUST 1720 KILOCYCLE OSCILLATOR TRIMMER (J) TO BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. antenna (C) and R.F. (F) trimmers for maximum sensitivity.

(d) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

ALIGNING 2.3-7.5 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator lead series condenser with a 400 ohm carbon resistor.

(b) Adjust band selector switch to 2.3-7.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 7.5 megacycles—then adjust 7.5 megacycle oscillator (H) trimmer for maximum 7.5 megacycle test signal output.

(c) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles—adjust 6 M.C. antenna (B) and R.F. (E) trimmers for maximum sensitivity.

ALIGNING 7.5-24.3 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 7.5-24.3 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 24.3 megacycles.

(b) Adjust 24.3 M.C. oscillator trimmer (G) to bring in 24.3 megacycle test signal to maximum output.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 24.3 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST PEAK which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 24.3 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 24.3 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 23.3 megacycles. Then vary the receiver dial slightly to the right and left of 23.3 megacycles and if the fundamental peak was used in aligning at 24.3 megacycles the test oscillator signal will be heard at approximately 23.3 megacycles on the receiver dial.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 20 megacycles.

(d) Adjust 20 M.C. antenna (A) and R.F. (D) trimmers for maximum 20 megacycle test signal response.

To assure most accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

MODELS 144X,144XE,149A,149AE, and 159AE.

ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: Turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

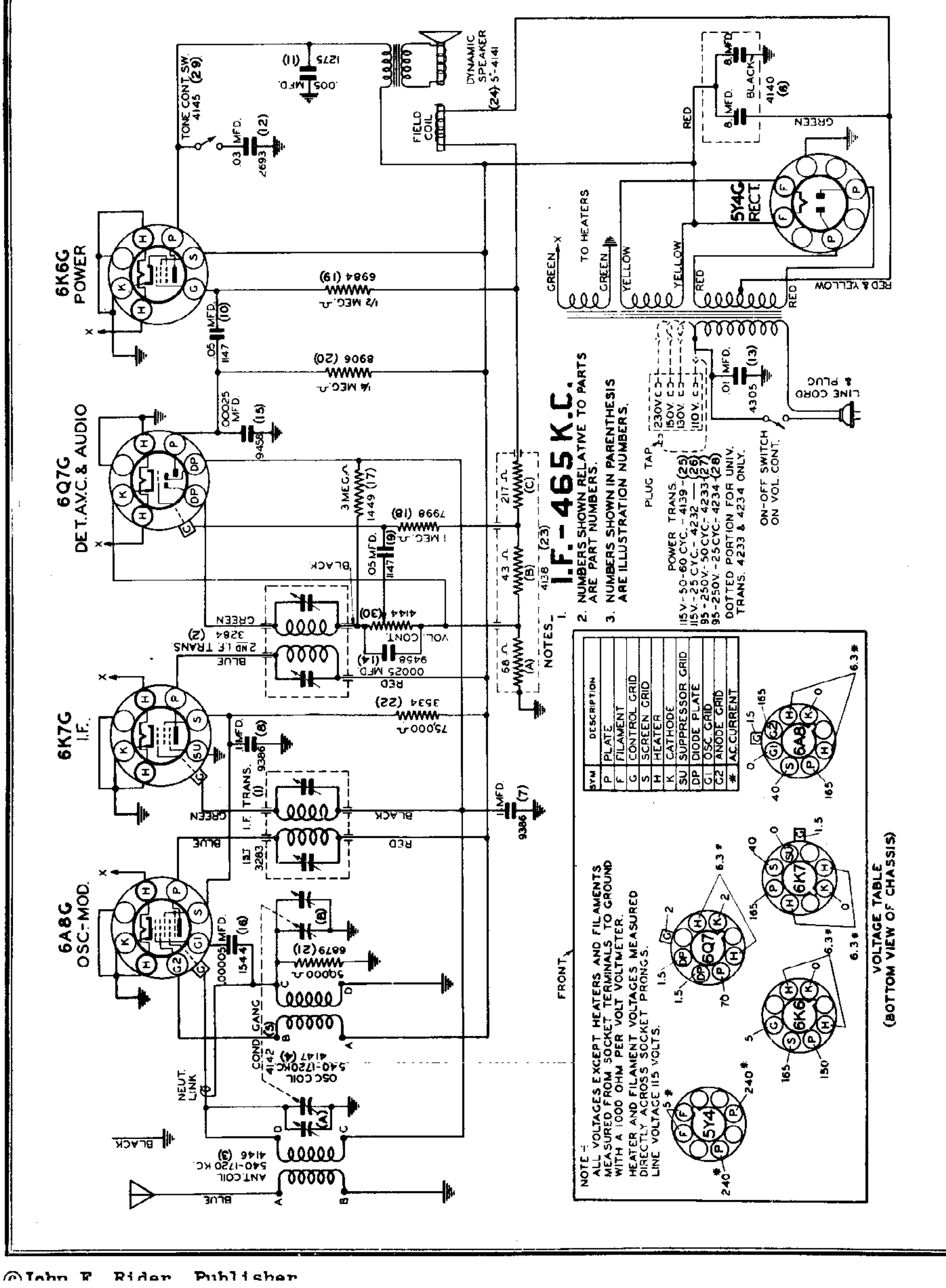
Have ground lead of test oscillator attached to chassis.

Place band switch for operation on		Set receiver dial to	TEST OSCILLATOR: Adjust test oscillator frequency to	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of	TEST OSCILLATOR: Attach output of test oscillator to	Refer to parts layout diagram for location of trimmers mentioned below and:
I.F. alignment use any band position		Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High side to *grid cap of 6D8G tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C.	1	Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2	Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1400 K.C. antenna trimmer for maximum output.
	3	Approximately 600 K.C.	Approximately 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.8 to 18.1 M.C. BAND	1	Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2	Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 15 M.C. antenna trimmer for maximum output.

* grid cap of 6A7 tube. MODELS 149A,149AE, and 159AE

MODEL 106A
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

SENTINEL-ERLA MODEL 107AE

ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS AND PADDING CONDENSER WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) PLACE BAND SELECTOR SWITCH FOR 1720-540 K.C. OPERATION. PRESS IN MANUAL PUSH-BUTTON AND set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
(b) Adjust band selector switch for 2.3-6.3 megacycle band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer.
(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer for maximum sensitivity.

MODEL 106A

FOR TRIMMER LOCATIONS AND CHASSIS, SEE INDEX

THIS RADIO IS DESIGNED SO THAT IT MAY BE PLACED IN A HORIZONTAL OR UPRIGHT POSITION. AS THE OPERATION AND PERFORMANCE OF THE RECEIVER IS THE SAME IN EITHER POSITION, IT IS A MATTER OF PERSONAL PREFERENCE AS TO WHICH POSITION TO USE.

The approximate position on the dial that any nine stations will be tuned in may be quickly determined—by pressing a paper tab having the station call letters into the round depressions on the front of the cabinet.

THE STATIONS SELECTED MUST OPERATE ON A FREQUENCY 40 KILOCYCLES OR MORE APART, OTHERWISE IT WILL BE IMPOSSIBLE TO PLACE THE CALL LETTER TABS IN THEIR PROPER POSITION IN CABINET DEPRESSIONS.

While it will be found that only the approximate location will be indicated, the station call tabs properly located will be an extremely helpful tuning aid.

To set the proper station call letter tabs into the cabinet depressions proceed as follows:

(a) Determine which nine stations call letters you wish to have on the cabinet—press call letter tabs out of the call letter sheets provided.
(b) Carefully tune in the selected station that broadcasts on the lowest frequency—the least number of kilocycles.
(c) Place a little mucilage or celluloid on back of paper tab. Press the paper call letter tab—so that the printed call letters of the station tuned in are at the same angle as the printing on the dial—into the round depression on the cabinet front that is nearest to the dial pointer. By placing call letter tab on angle the call letter can easily be read with cabinet in either a horizontal or upright position.
(d) Tune in the next selected station having the next lowest station frequency, pressing the call letter for this station into the round cabinet depression nearest to the dial pointer needle—continuing on in this way until station call letters have been placed into all nine cabinet depressions.

After the station call letters are set it will be a simple matter to determine the approximate dial position of any of these stations—just rotate tuning knob until dial pointer needle points to station call letter of desired station. It must be remembered that only the approximate tuning location will be indicated by the dial pointer needle—each station must be correctly tuned in by ROTATING THE TUNING CONTROL KNOB UNTIL A STATION IS TUNED IN WITH GREATEST CLARITY.

ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A8G tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

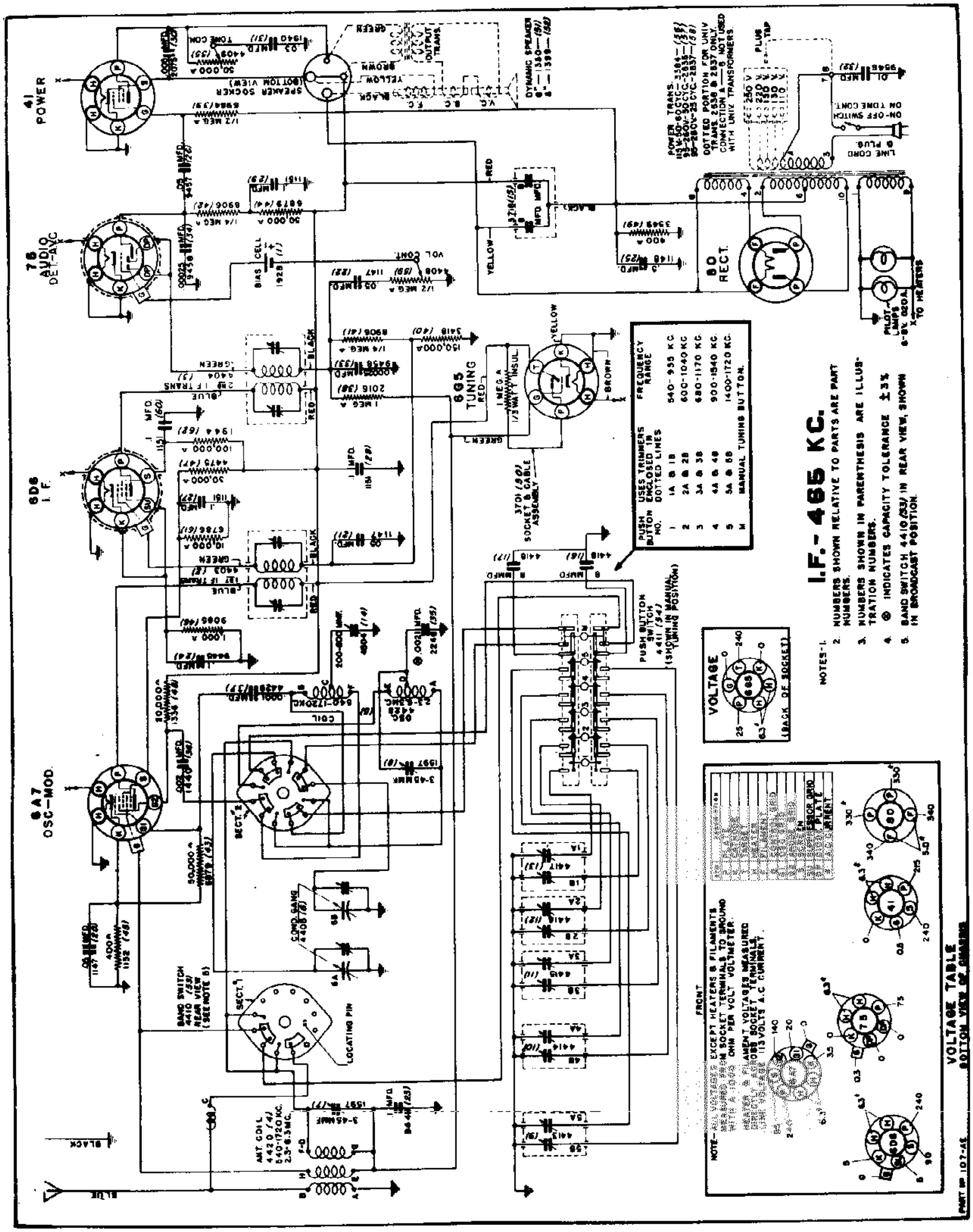
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Remove test oscillator lead from grid of 6A8G tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

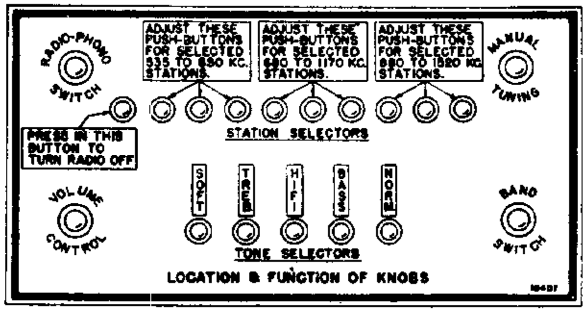
MODEL 107AE
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

Sentinel Model 145AE



PUSH-BUTTON ADJUSTMENT

Nine stations operating in the 1500-540 kilocycle band may be automatically push button tuned by properly setting each station selector push button.

AS THE PUSH BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATIONS BE SURE TO SET EACH ONE.

Before Attempting to Set Push Buttons Be Sure to:

(a) Have aerial which will be used with the radio attached to the receiver when setting push buttons.
(b) Operate radio at least 15 minutes before adjusting push buttons.
(c) Obtain transmitter frequency—number of kilocycles—and call letters of the nine stations you wish to push button tune from radio log or newspaper radio station list.

Adjust Push Buttons for Selected Stations by:

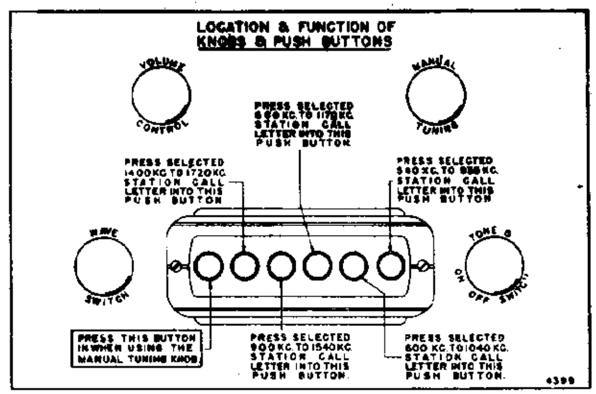
(a) Rotate band switch knob to the NEXT TO MAXIMUM RIGHT HAND POSITION—540-1730 KILOCYCLE BAND MANUAL TUNING POSITION.
(b) Using regular manual tuning knob carefully tune in one of the selected stations whose transmitter frequency is somewhere between 535-880 kilocycles. Make a mental note of the kind of program on this station, so that when push button is adjusted for this particular station (as instructed in paragraph (e)) it will be easy to recognize the station by the type of program being transmitted.
(c) Rotate band switch knob to maximum right hand position.
(d) Press in one of the three push buttons marked 535-880 kylocycles on diagram.
NOTE: STATION MAY DISAPPEAR BE DISTORTED OR IN SOME INSTANCES ANOTHER STATION MAY BE HEARD.
(e) GRASP END OF PUSH BUTTON JUST PRESSED IN AND BY SLOWLY TURNING THIS BUTTON CAREFULLY TUNE IN THE SELECTED 535-880 KILOCYCLE STATION THAT WAS PREVIOUSLY TUNED IN WITH MANUAL CONTROL.
Slowly—turn first in one direction, then if the wanted station is not heard turn in opposite direction. WATCH TUNING EYE AND ADJUST SO THAT THE TWO OPEN ENDS OF THE GREEN INVERTED "V" ON THE TUNING EYE ARE CLOSEST TOGETHER—AT WHICH POINT THE SIGNAL WILL BE HEARD WITH GREATEST VOLUME AND CLEAREST TONE.
(f) Press station call letter of the station just tuned in out of call letter sheet supplied and insert into depression adjacent to push button just adjusted.
(g) After the first 535-880 kilocycle push button has been properly set, the other eight push buttons should be adjusted in the same manner preferably in the following order:
1. Set remaining two push buttons marked 535-880 kilocycles on diagram for any two stations operating between 535-880 kilocycles.
2. The three push buttons marked 680-1170 kilocycles on diagram should be adjusted for any three selected stations operating between 680 and 1170 kilocycles.
3. Adjust the three push buttons marked 880-1520 kilocycles on diagram for any three selected stations operating between 880 and 1520 kilocycles.

IMPORTANT

For Manual Tuning the Band Switch must be in next to maximum right hand position. When adjusting Push Buttons or when Push Button tuning after Push Buttons have been set, Band Switch must be in maximum right hand position.

Sentinel Model 107AE

INSTRUCTIONS FOR INSTALLING AND OPERATING "AUTOMATIC PUSH BUTTON"



Five stations operating in the 1720-540 kilocycle broadcast band may be "AUTOMATIC PUSH-BUTTON" tuned by properly setting the ten trimmer screws accessible through holes in the back of the chassis.

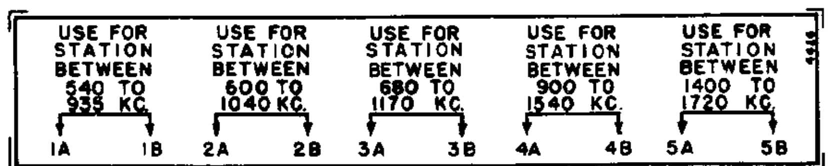
AS THE PUSH-BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATION BE SURE TO SET THEM BY:

(a) It is important to have the aerial, which will be used with the set, attached to the radio when adjusting the trimmers.
(b) BE SURE TO OPERATE THE SET AT LEAST ONE-HALF HOUR BEFORE ADJUSTING TRIMMERS. If set is not thoroughly warmed up when trimmers are adjusted, the trimmers may shift position after they become warm resulting in poor tone, weak signal, and excessive background noise.
(c) FOR BEST RESULTS SET PUSH-BUTTONS FOR LOCAL OR STRONG, NEARBY STATIONS ONLY. Obtain the transmitter frequency—number of kilocycles—and call letters of the stations you wish to "Push-Button" tune.
(d) Place band selector switch for operation on 1720-540 kilocycle band.
(e) Press in "MANUAL" tuning button—see diagram.
(f) If is advisable that if a station is selected whose transmitter frequency is somewhere between 540-935 kilocycles that the two trimmers marked "540-935 K.C." on paper label attached to back of chassis be adjusted first.
(g) Using "MANUAL" tuning knob carefully tune in selected station whose transmitter frequency is between 540-935 kilocycles.
(h) Press in push-button marked "540-935 K.C."—see diagram.
NOTE: STATION SIGNAL WILL DISAPPEAR, OR MAY BE DISTORTED, AND IN SOME INSTANCES ANOTHER STATION MAY BE HEARD.
(i) With a small screw driver carefully tune in the selected 540-935 kilocycle station by slowly adjusting trimmer 1A—then adjust trimmer 1B for maximum volume. BE SURE TO WATCH TUNING EYE AND ADJUST TRIMMERS SO THAT THE TWO OPEN ENDS OF THE GREEN INVERTED "V" ON THE TUNING EYE ARE CLOSEST TOGETHER. AT THIS POINT THE SIGNAL WILL BE HEARD WITH GREATEST VOLUME AND CLEAREST TONE.
(j) Moisten gummed back of selected 540-935 KC stations paper tab and press into round depression in 540-935 KC push-button.
(k) After trimmers 1A and 1B have been properly set for the selected station operating between 540-935 kilocycles, adjust other trimmers in the same manner and in the following order.
(l) Set trimmers 2A and 2B for selected station operating between 600-1040 kilocycles.
(m) Adjust trimmers 3A and 3B for the selected station operating between 680-1170 kilocycles.
(n) Set trimmers 4A and 4B for selected station operating between 900-1540 kilocycles.
(o) Adjust trimmers 5A and 5B for selected station operating between 1400-1720 kilocycles.

AS THE TRIMMERS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED IT IS IMPORTANT THAT THE PROPER TRIMMERS BE USED.

It may be noticed that the transmitter frequency—number of kilocycles—of a selected station falls within the range of more than one group of trimmers. Generally the transmitter frequency of the selected station will fall well within the minimum and maximum range of one set of trimmers—this is the right group of trimmers to use—and somewhere near the minimum or maximum end of the other set of trimmers. For example, if a selected station transmitter frequency is 600 kilocycles it would be possible to use trimmers marked "1A and 1B" or trimmers marked "2A and 2B." Trimmers marked 2A and 2B should not be used because they would have to be loosely adjusted, which is objectionable because TRIMMERS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED. Inasmuch as 600 kilocycles falls well within the minimum-maximum range of trimmers marked "1A and 1B," these should be used instead.

In some instances it may be necessary after the set is operated for a period of time to reset the trimmers as they may drift due to heat, humidity, etc.



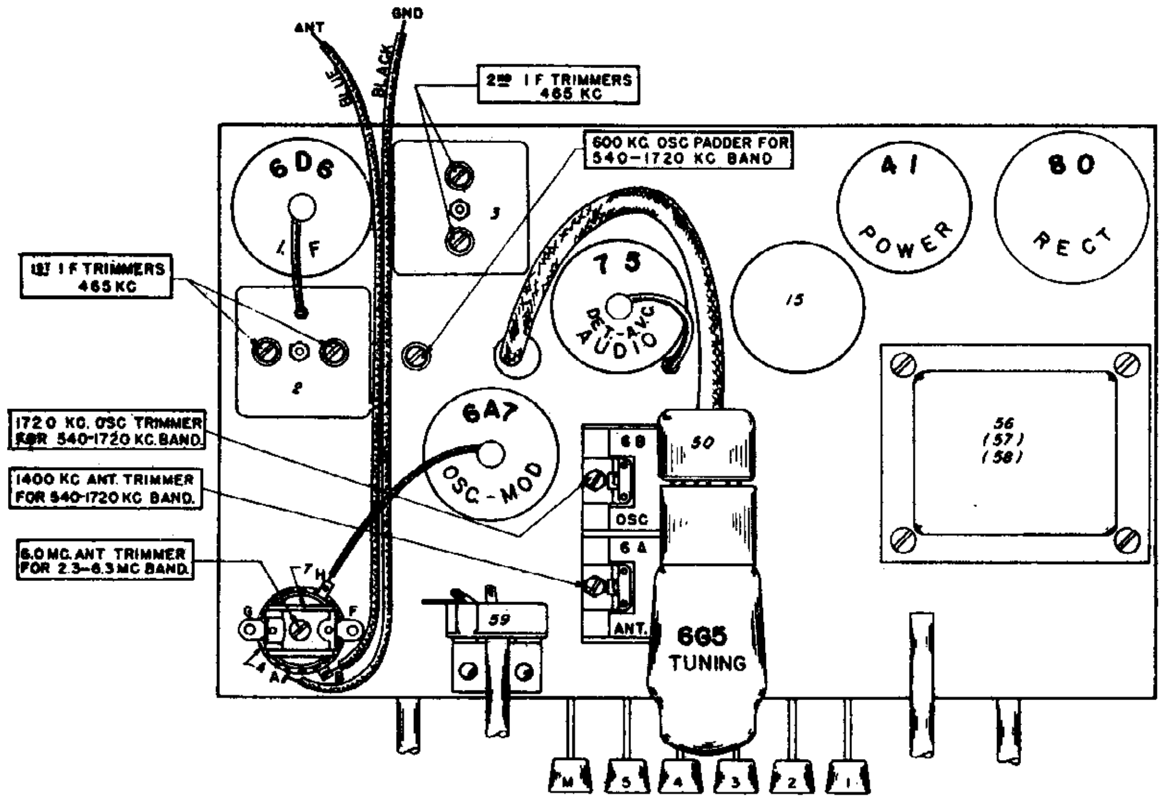
This diagram, which is similar to the one attached to the back of chassis over trimmer holes, shows the minimum-maximum range of the five groups of trimmers.

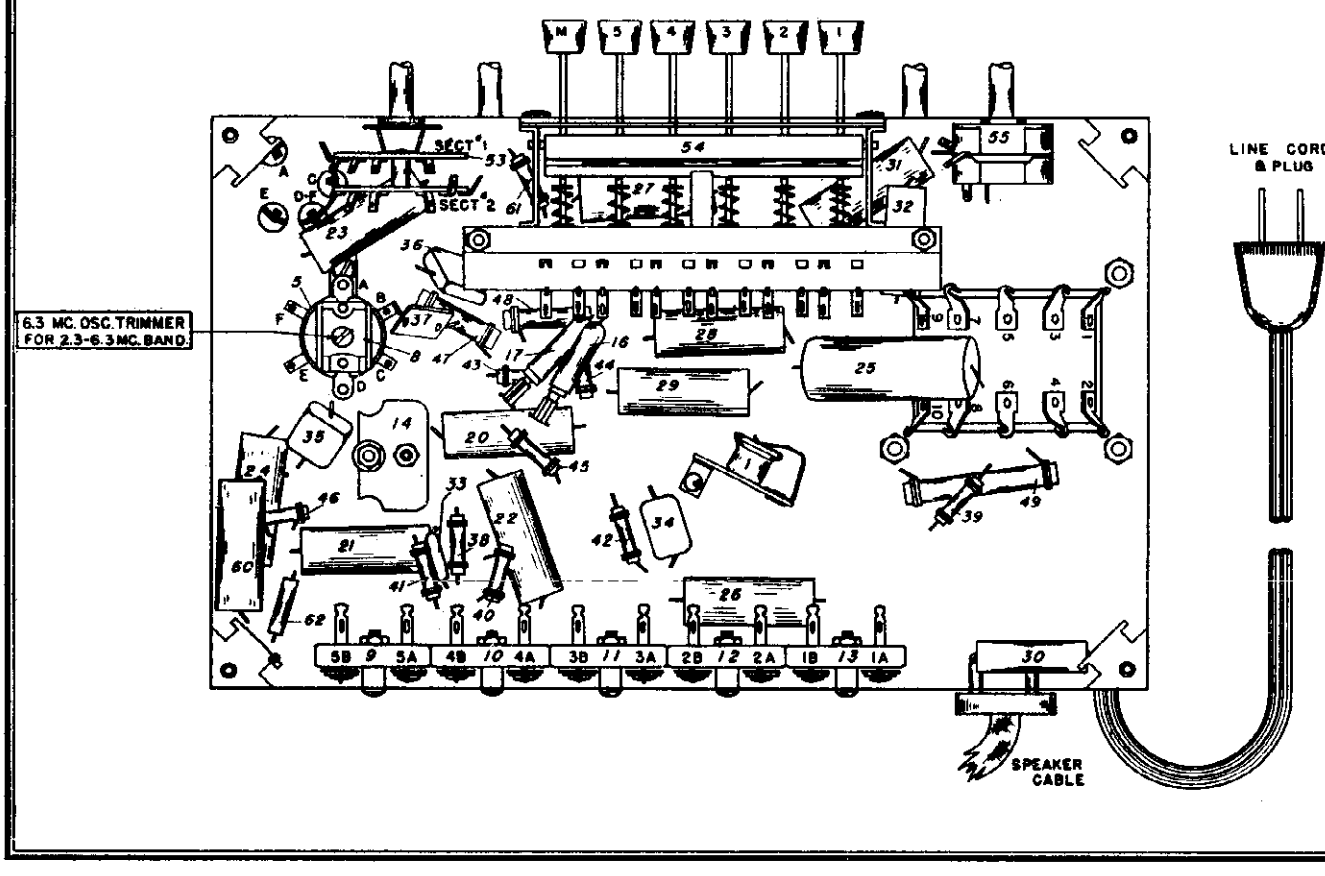
IMPORTANT: WHEN LISTENING TO STATIONS ON BROADCAST BAND, THE "MANUAL PUSH BUTTON" OR ONE OF THE OTHER "PUSH BUTTONS" MUST BE PUSHED IN—OTHERWISE NO STATION WILL BE HEARD. DO NOT PRESS IN MORE THAN ONE "PUSH BUTTON" AT ONE TIME—IF MORE THAN ONE "PUSH BUTTON" IS PRESSED INWARD ONLY THE HIGHEST FREQUENCY STATION WILL BE HEARD.

MODEL 107AE

Trimmers, Chassis

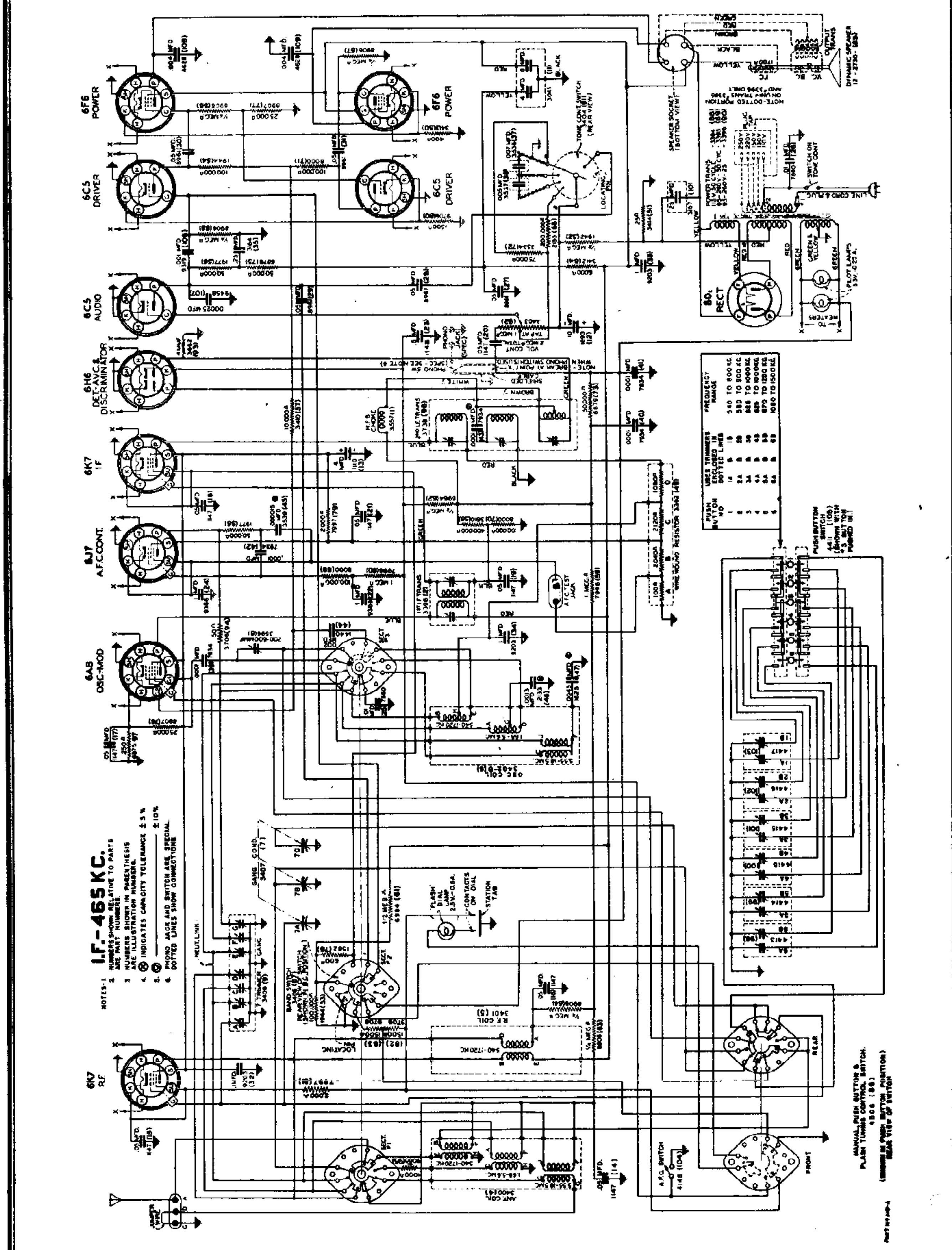
SENTINEL RADIO CORP.





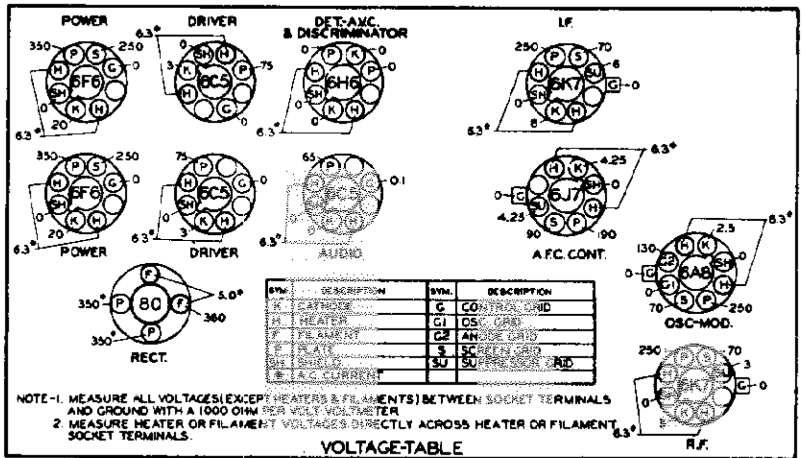
SENTINEL RADIO CORP.

MODEL 110A
Schematic



MODEL 110A
Socket, Voltage
Alignment

SENTINEL RADIO CORP.



BOTTOM VIEW OF CHASSIS

ALIGNMENT PROCEDURE:

SHOULD REALIGNMENT BE NECESSARY, THERE ARE SEVERAL PRECAUTIONS THAT MUST BE CAREFULLY OBSERVED, THESE ARE:

1. Do not align set until it has reached normal operating temperature. Place the receiver in operation at least 15 minutes before attempting to realign the set.

2. The importance of using the proper type of test equipment and FOLLOWING THE ALIGNMENT PROCEDURE EXACTLY AS GIVEN CANNOT BE TOO STRONGLY EMPHASIZED—failure to do so will result in low sensitivity, poor selectivity, incorrect dial calibration, distortion and unsatisfactory operation of the automatic frequency control.

3. It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device and a double scale milliammeter—0 to 1 M. A. and 0 to 5 M.A. be used.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Place automatic frequency control knob in the middle A.F.C. "off" position.

(b) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A8 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(c) Set test oscillator to EXACTLY 465 kilocycles and turn volume control on full.

(d) Remove shields held in position by snap fasteners over A.F.C. test jack and over trimmer screw holes in the first and second I.F. transformer shield cans.

(e) Peak second I.F. transformer trimmers for maximum 465 kilocycle output by adjusting the two trimmers accessible through the two top holes in the second I.F. transformer shield can. DO NOT TOUCH DISCRIMINATOR (BOTTOM) SCREW.

(f) Peak each of the first I.F. transformer trimmers for maximum 465 kilocycle signal output.

ALIGNING DISCRIMINATOR CIRCUIT:

(a) Place switch underneath push button plate assembly (above gang condenser) in A.F.C. "on" position. Leave test oscillator set to EXACTLY 465 KILOCYCLES and connect to grid of 6A8 tube through a .02 Mfd. Condenser—insert lead of double scale 0 to 1 and 0 to 5 milliammeter into A.F.C. test jack located on top of chassis adjacent to the 6J7 tube. To avoid possibility of damaging the meter should one of the milliammeter leads short to the metal chassis,

ALWAYS TURN OFF RECEIVER WHEN INSERTING OR REMOVING MILLIAMMETER LEADS FROM A.F.C. TEST JACK.

(b) Short out A.F.C. mute switch by grounding the second from the left (looking at the front of the chassis) of the four lugs mounted on top of the dial assembly. The proper lug to ground is indicated in the "Note X" on chassis top parts view.

(c) Turn receiver on, place A.F.C. switch knob in left position and if meter needle jumps off scale adjust output of test oscillator until an approximate 2 M.A. deflection is obtained on the 0 to 5 milliammeter scale.

(d) Place band selector switch for operation on 1720-540 K.C. broadcast band—and set receiver dial somewhere near 1000 kilocycles at a point where no station is heard.

(e) Rotate A.F.C. switch knob from maximum left hand to middle position and note whether the milliammeter reading changes as the position of the A.F.C. switch is changed. No change in reading indicates probable proper discriminator trimmer adjustment, while a noticeable change indicates improper discriminator trimmer adjustment.

(f) IMPORTANT: DO NOT ADJUST DISCRIMINATOR TRIMMER UNLESS IT IS ABSOLUTELY NECESSARY. Place A.F.C. switch in middle position and note milliammeter reading, then place A.F.C. switch in maximum left hand position. With A.F.C. switch in maximum left hand position, CAREFULLY ADJUST DISCRIMINATOR TRIMMER UNTIL MILLIAMMETER READING IS EXACTLY THE SAME IN BOTH POSITIONS.

NOTE: As the discriminator trimmer screw is screwed in (increasing capacity) the milliammeter reading should decrease and as the discriminator trimmer is unscrewed (decreasing capacity) the milliammeter reading should increase. IF WHEN ADJUSTING THE DISCRIMINATOR TRIMMER THE MILLIAMMETER READING DOES NOT SHARPLY INCREASE OR DECREASE AS THE TRIMMER IS ADJUSTED EVEN AFTER SEVERAL TURNS OF THE TRIMMER SCREW, THIS DOES NOT INDICATE PROPER BALANCING BUT DOES INDICATE INCORRECT ADJUSTMENT AND THE DISCRIMINATOR TRIMMER SHOULD BE SET TO ABOUT ½ CAPACITY AND THE ADJUSTMENT OF THE DISCRIMINATOR TRIMMER MADE ALL OVER AGAIN.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line, move needle to correct position.

(b) Remove test oscillator lead from grid of 6A8 tube and connect to receiver "A" antenna post through a .00025 Mfd. condenser.

(c) Place A.F.C. control knob in middle A.F.C. "off" position. Adjust band selector switch for operation on the 1720-540 kilocycle band.

(d) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. R.F. and antenna trimmers for maximum sensitivity.

(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

ALIGNING 1.68-5.6 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.

(b) Adjust band selector switch to 1.68-5.6 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.6 megacycles. Bring in 5.6 megacycle test signal to maximum output by adjusting 5.6 M. C. oscillator trimmer.

(c) Tune receiver dial and test oscillator frequency to EXACTLY 5 Megacycles and adjust 5 M.C. antenna trimmer for maximum sensitivity.

ALIGNING 5.55-18.5 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.55-18.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 18.5 megacycles.

(b) Adjust 18.5 M.C. oscillator trimmer to bring in 18.5 megacycle test signal to maximum output.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.5 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.5 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18.5 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 17.5 megacycles. Then vary the receiver dial slightly to the right and left of 17.5 megacycles, and if the fundamental peak was used in aligning at 18.5 megacycles the test oscillator signal will be heard at approximately 17.5 megacycles on the receiver dial.

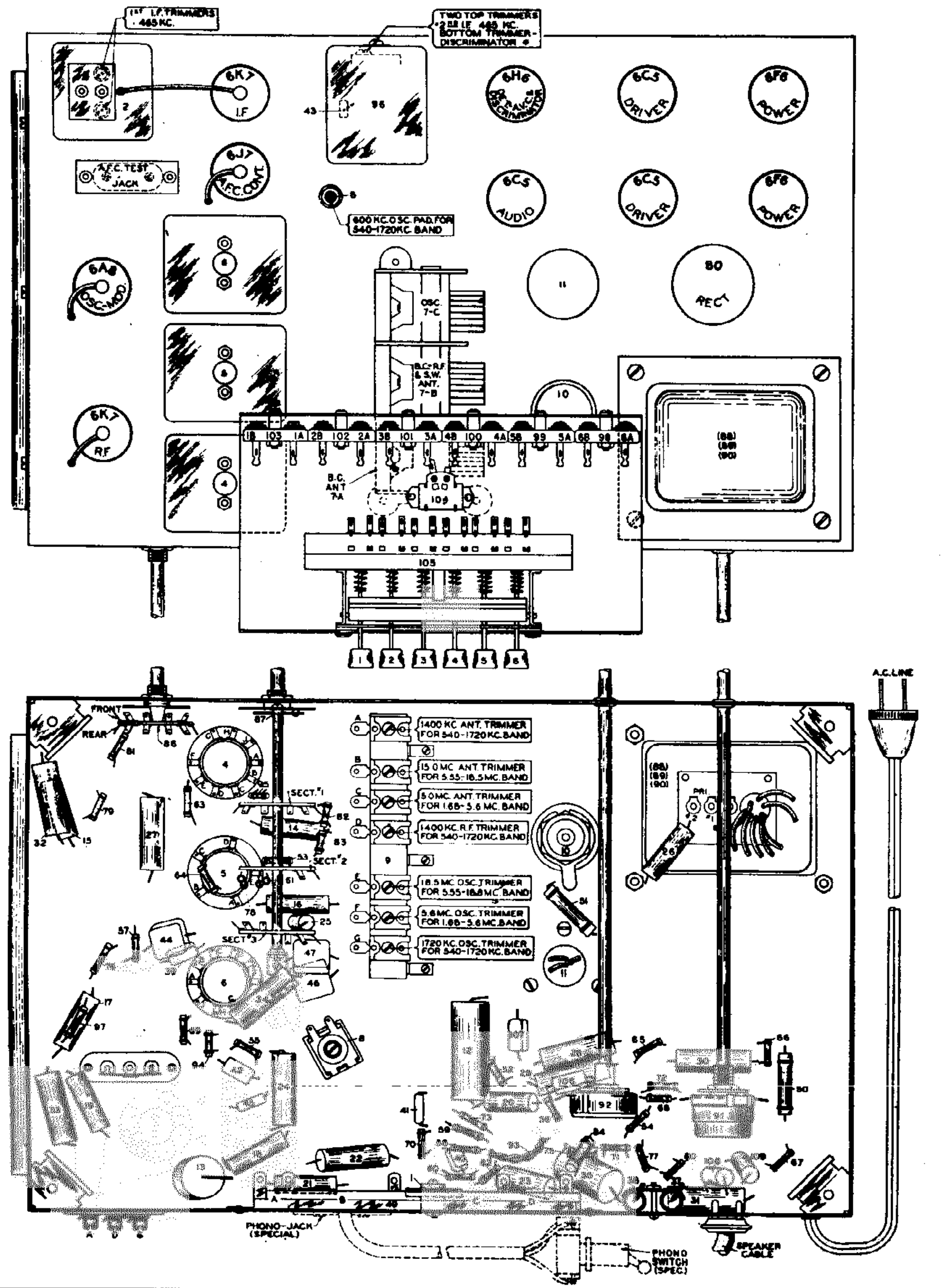
(c) Tune receiver dial and set test oscillator frequency to EXACTLY 15 megacycles.

Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

To assure more accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

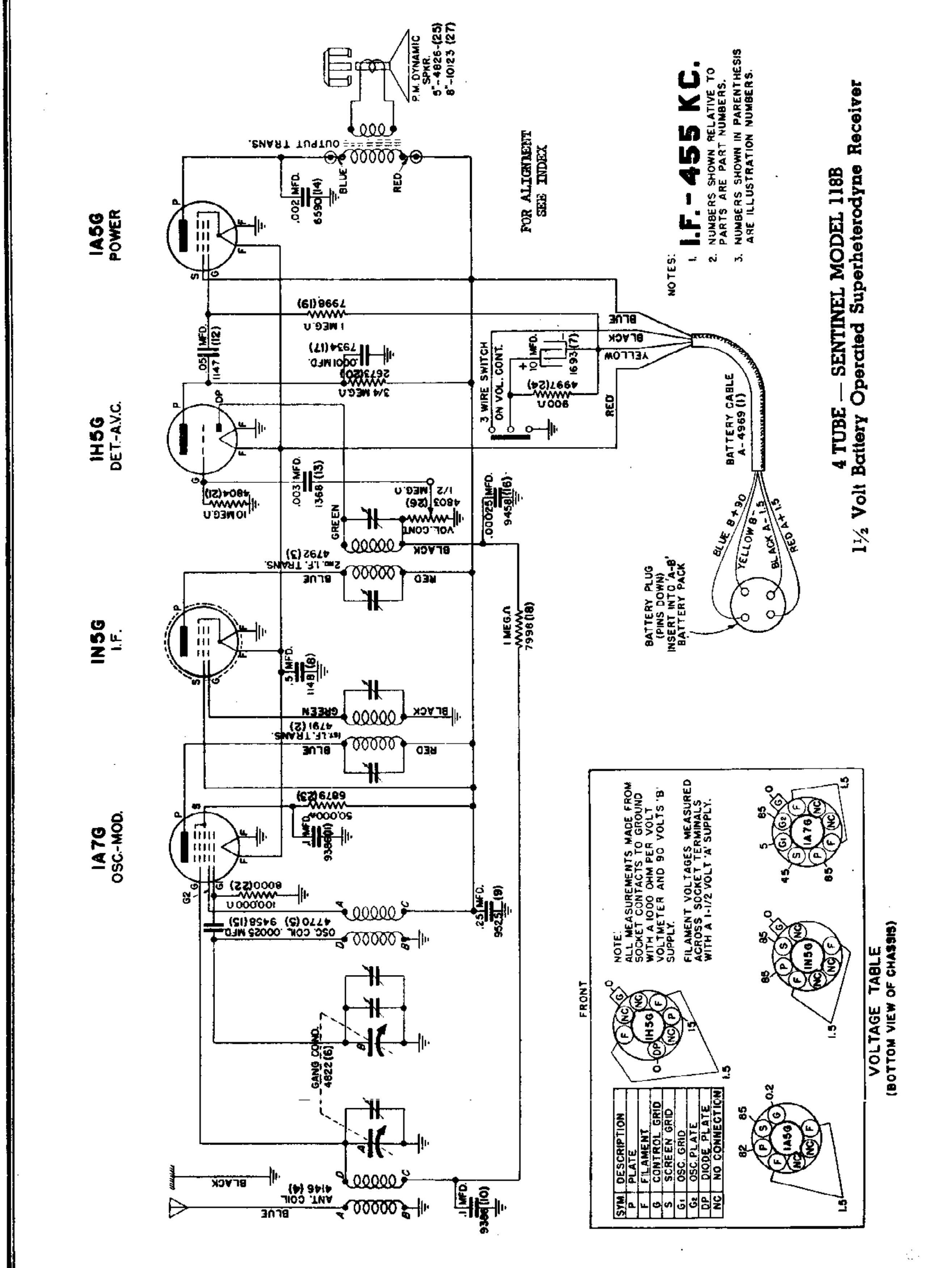
SENTINEL RADIO CORP.

MODEL 110A
Trimmers
Chassis



MODEL 118B
Schematic, Voltage
Socket

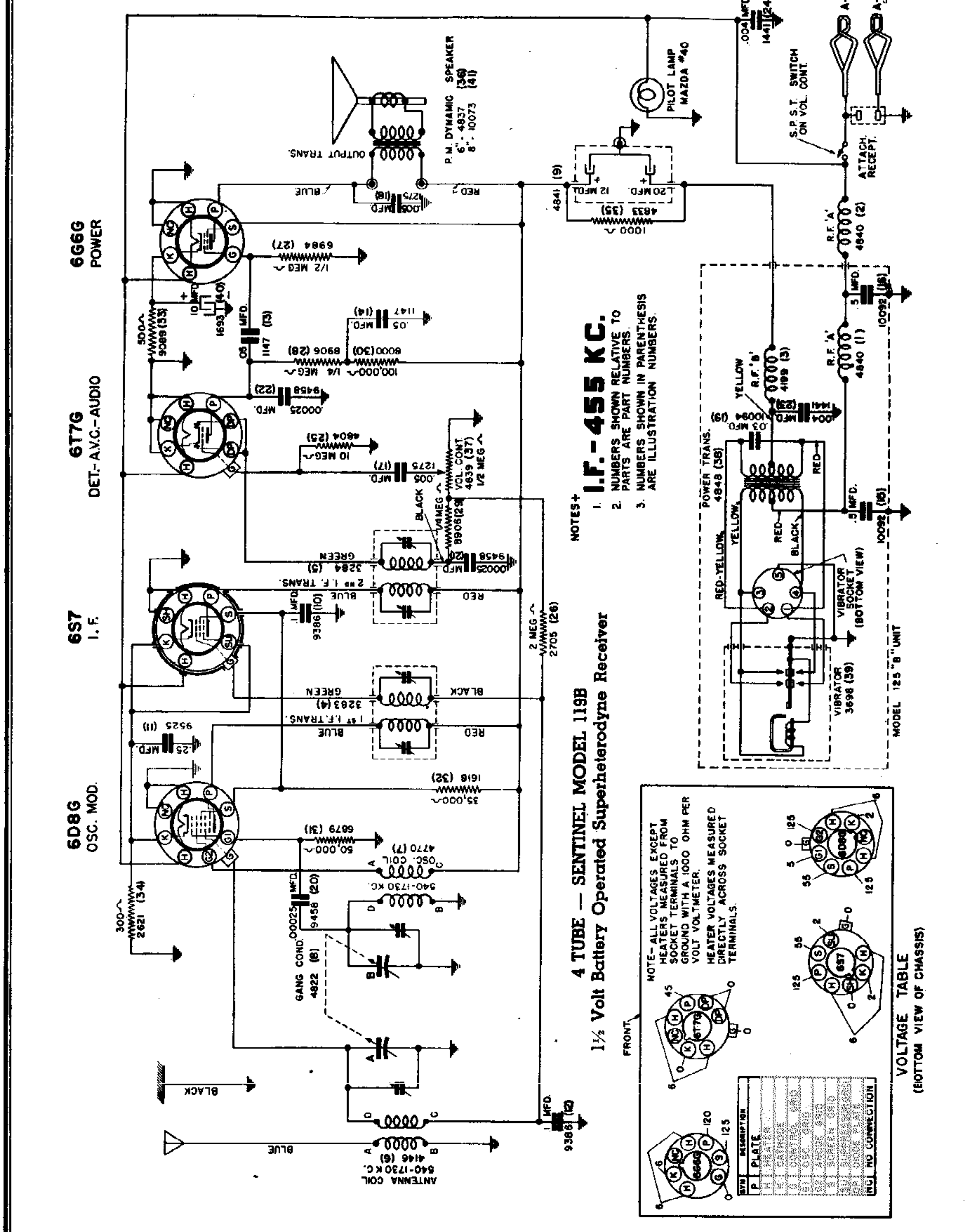
SENTINEL RADIO CORP.



SYM	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G_1	OSC. GRID
G_2	OSC. PLATE
DP	DIODE PLATE
NC	NO CONNECTION

MODEL 119B
Schematic, Voltage
Socket

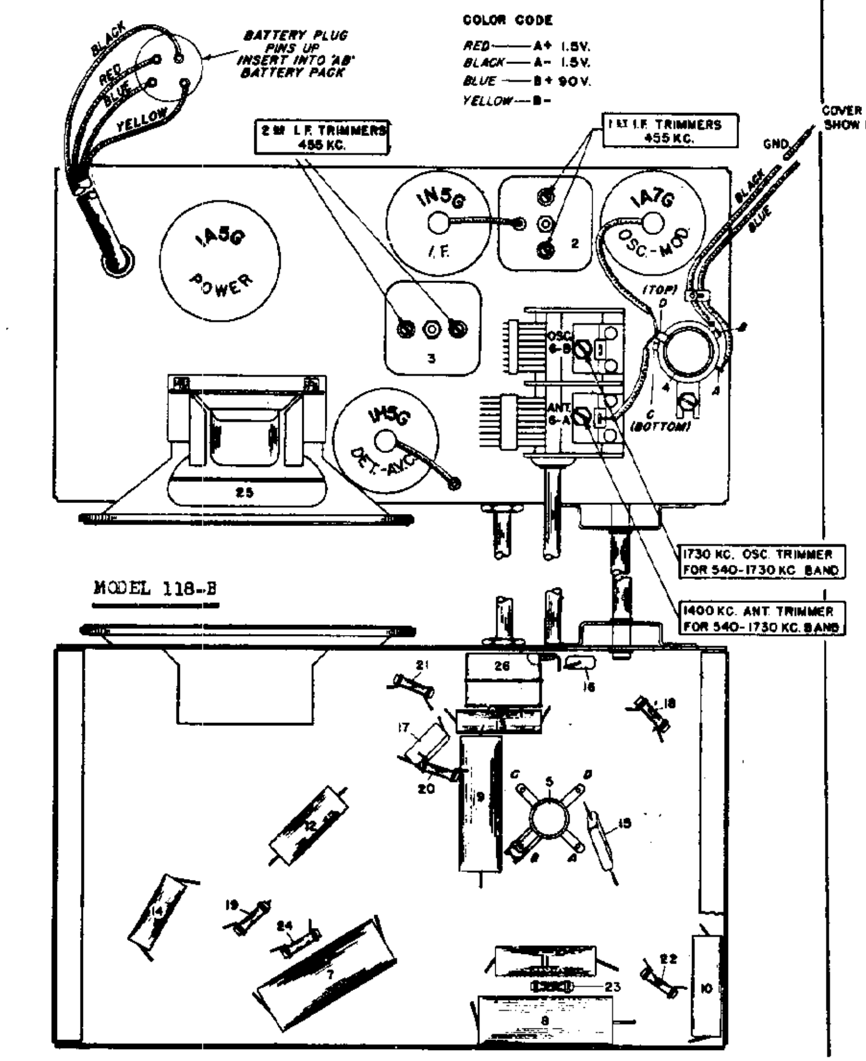
SENTINEL RADIO CORP.



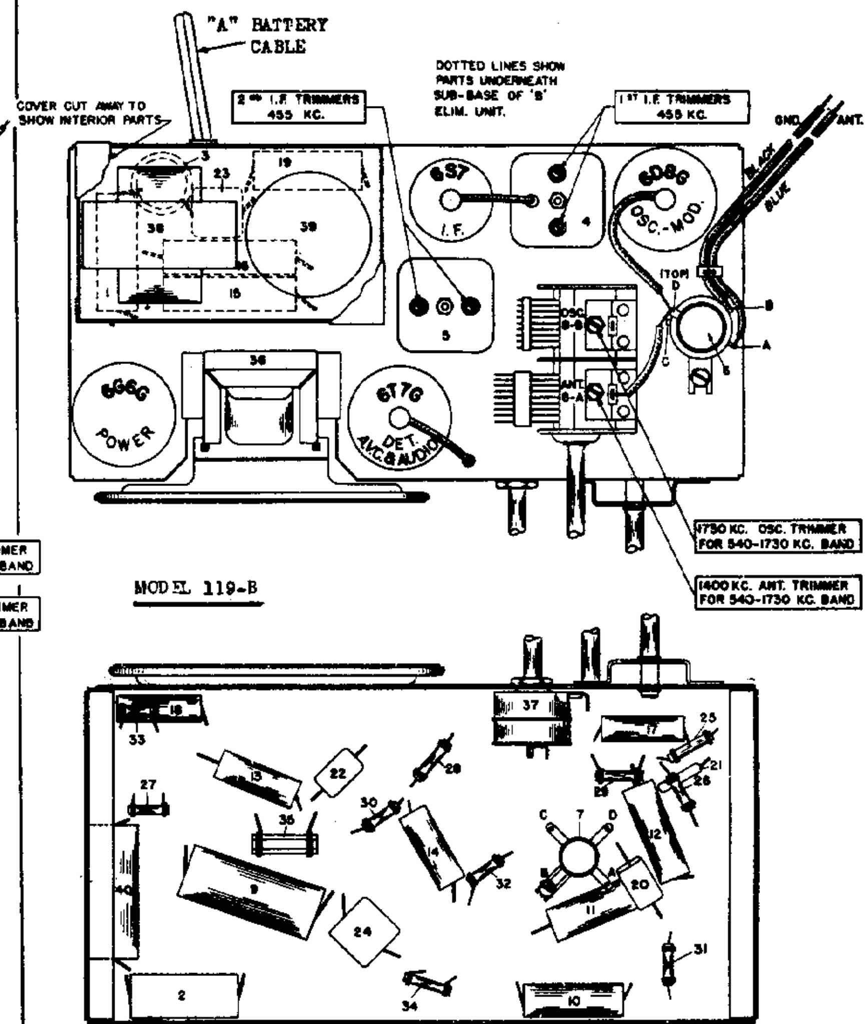
MODEL 118B
MODEL 119B
Alignment,Trimmers
Chassis

SENTINEL RADIO CORP.

ALIGNMENT:-I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 1A7G TUBE--DO NOT REMOVE GRID CAP--ADJUST IF TRIMMERS TO MAXIMUM OUTPUT AT 1730 KC THROUGH .00025 MFD. CONDENSER TO RECEIVER ANTENNA (BLUE) LEAD,ADJUST OSCILLATOR TRIMMER TO MAXIMUM. AT 1400 KC ANT. TRIMMER TO MAX

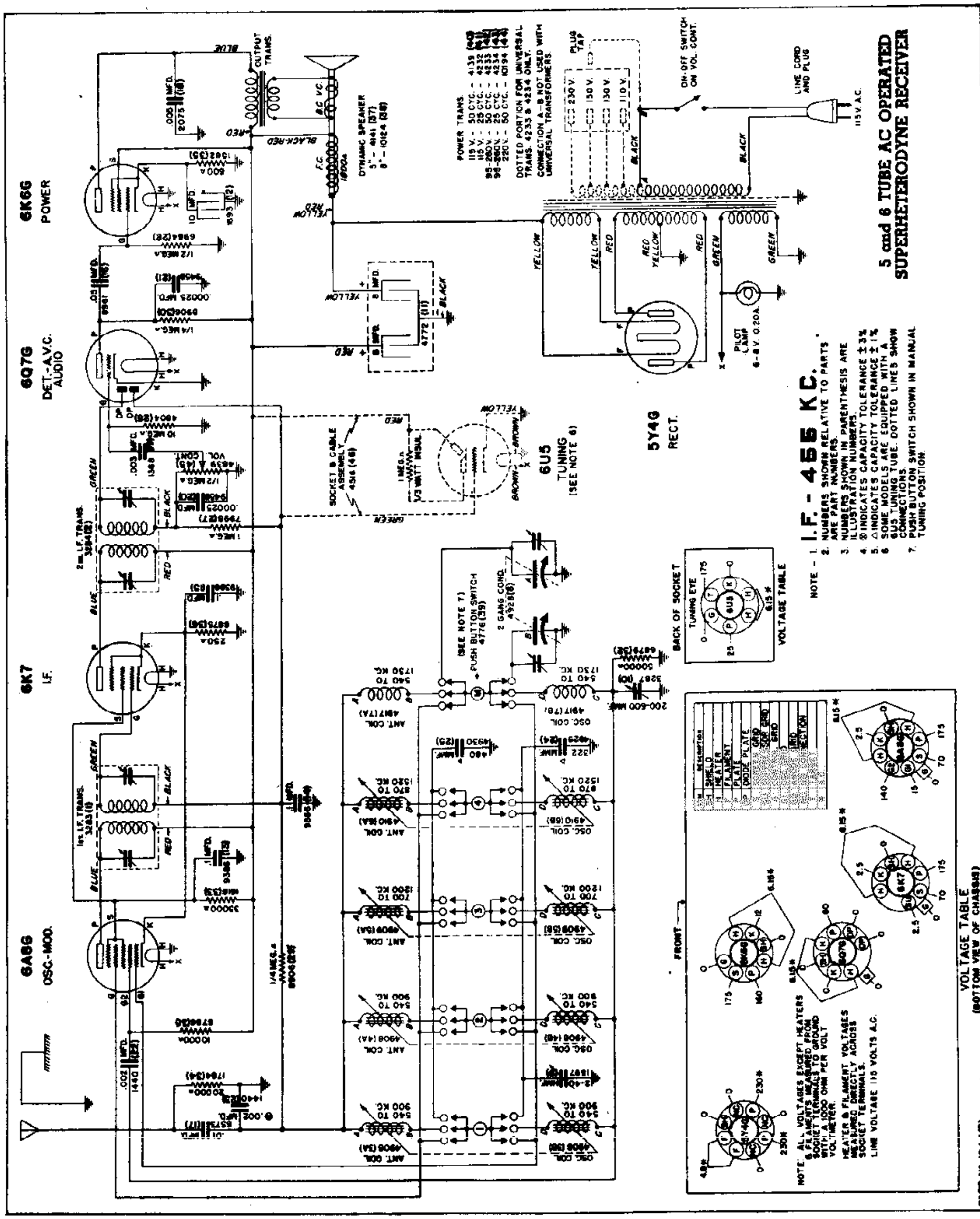


ALIGNMENT:- I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 6D8G TUBE--DO NOT REMOVE CAP-- ADJUST IF TRIMMERS TO MAXIMUM OUTPUT. AT 1730 KC THROUGH .00025 MFD. CONDENSER TO RECEIVER ANTENNA (BLUE) LEAD,ADJUST OSCILLATOR TRIMMER TO MAX. AT 1400 KC, ANTENNA TRIMMER TO MAX.



SENTINEL RADIO CORP.

MODELS 124A, 124AE
Schematic, Voltage
Socket



MODELS 124A, 124AE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

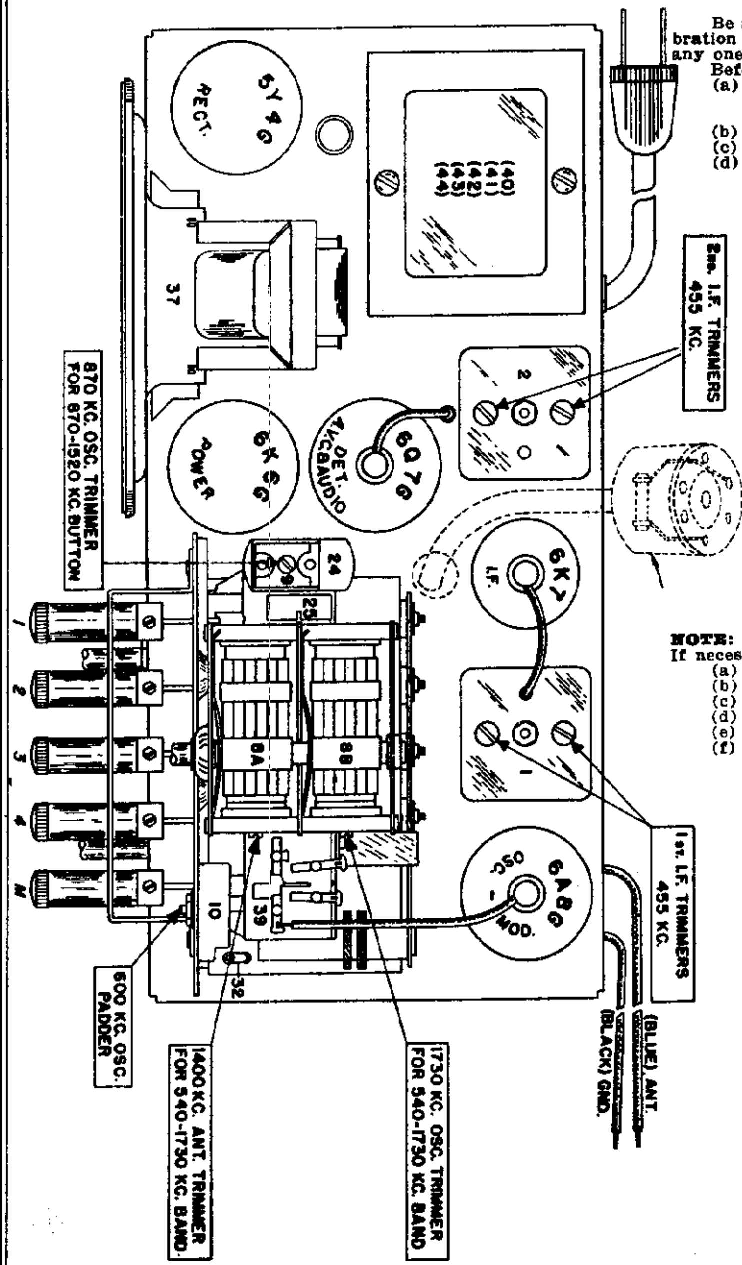
Before starting alignment:

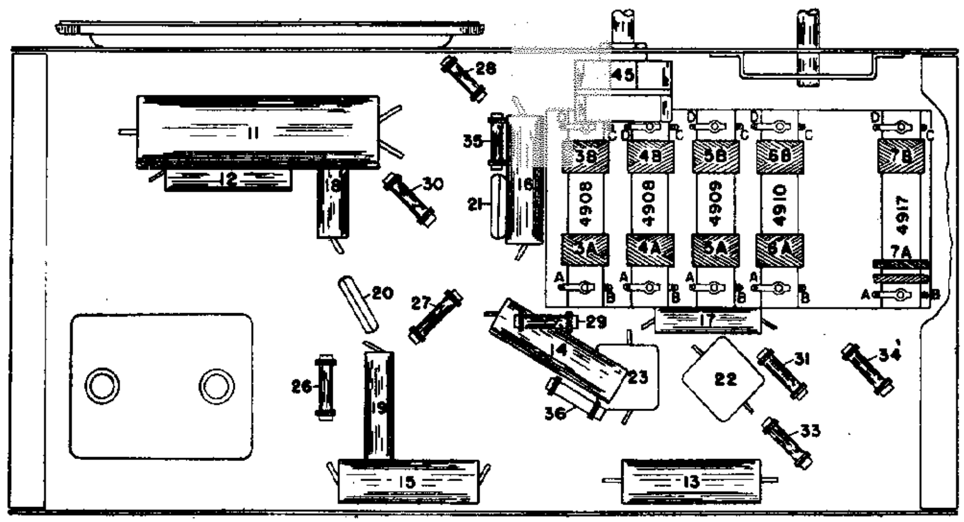
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.
(d) Press in manual tuning button.

Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
Any point where no interfering signal is received	455 K. C.	.02 MFD. Condenser	High side to grid terminal of 6A8G tube. DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
(1) Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
(2) Exactly 1400 K. C.	Approx. 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead	Adjust 1400 K. C. antenna trimmer for maximum output.
(3) Approx. 600 K. C.	Approx. 600 K. C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum response.

NOTE: 870 K.C. oscillator trimmer need be adjusted only if 870-1520 K.C. Push Button does not tune from 870 to 1520 K.C. If necessary to adjust, proceed by:

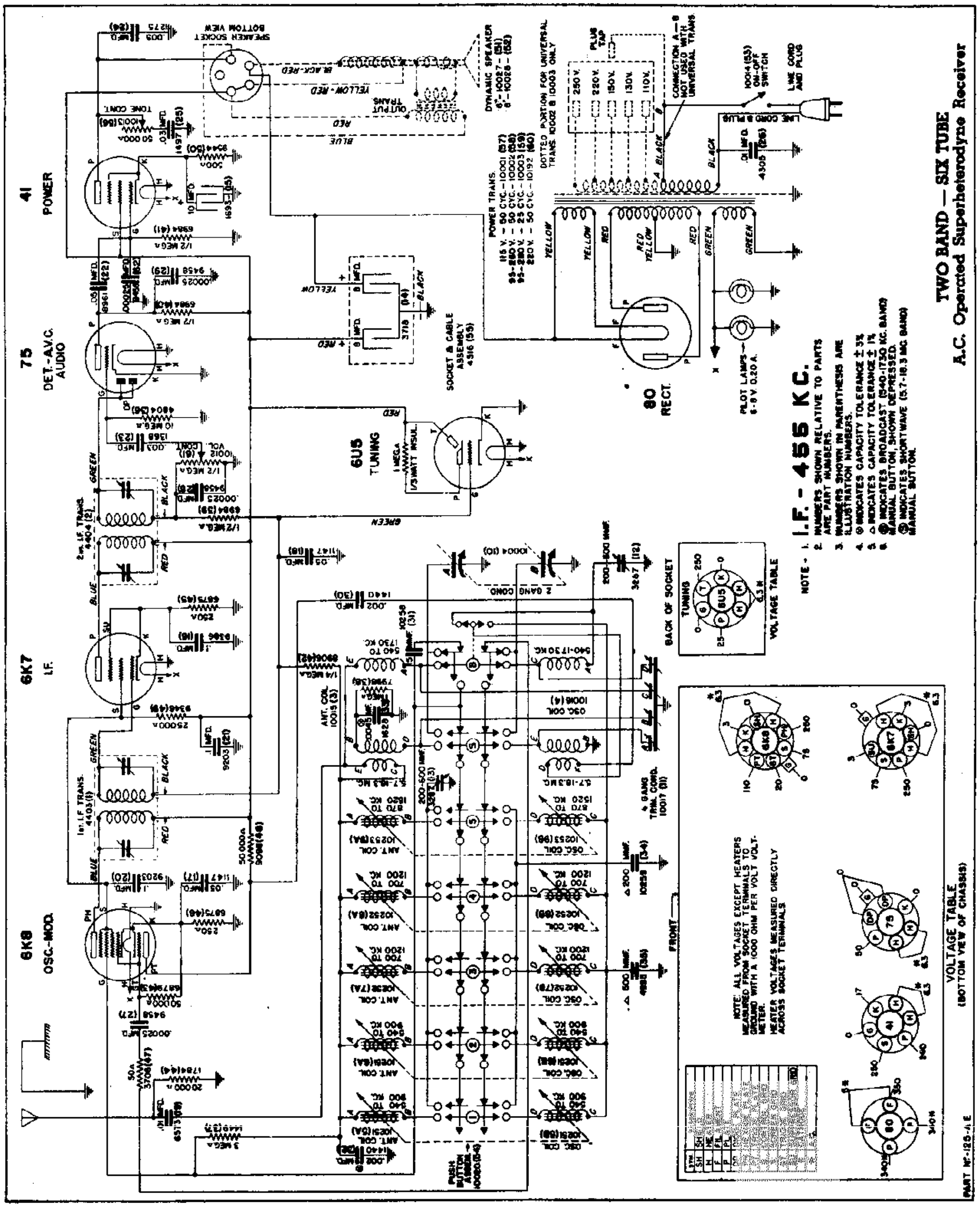
(a) Attach test oscillator to set antenna and ground leads.
(b) Set test oscillator to exactly 850 K.C.—with attenuator adjusted for maximum signal output.
(c) Press in 870-1520 K.C. push button.
(d) Adjust 870-1520 K.C. oscillator push button to bring in 850 K.C. test signal to maximum output & leave in this position.
(e) Reset test oscillator frequency to exactly 870 K.C.
(f) Adjust 870 K.C. oscillator trimmer to bring in 870 K.C. test oscillator signal to maximum output.





MODEL 125AE
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



MODELS 142A, 142AE
MODEL 143L
Alignment

SENTINEL RADIO CORP.

MODEL 125AE
Alignment, Trimmers
Chassis

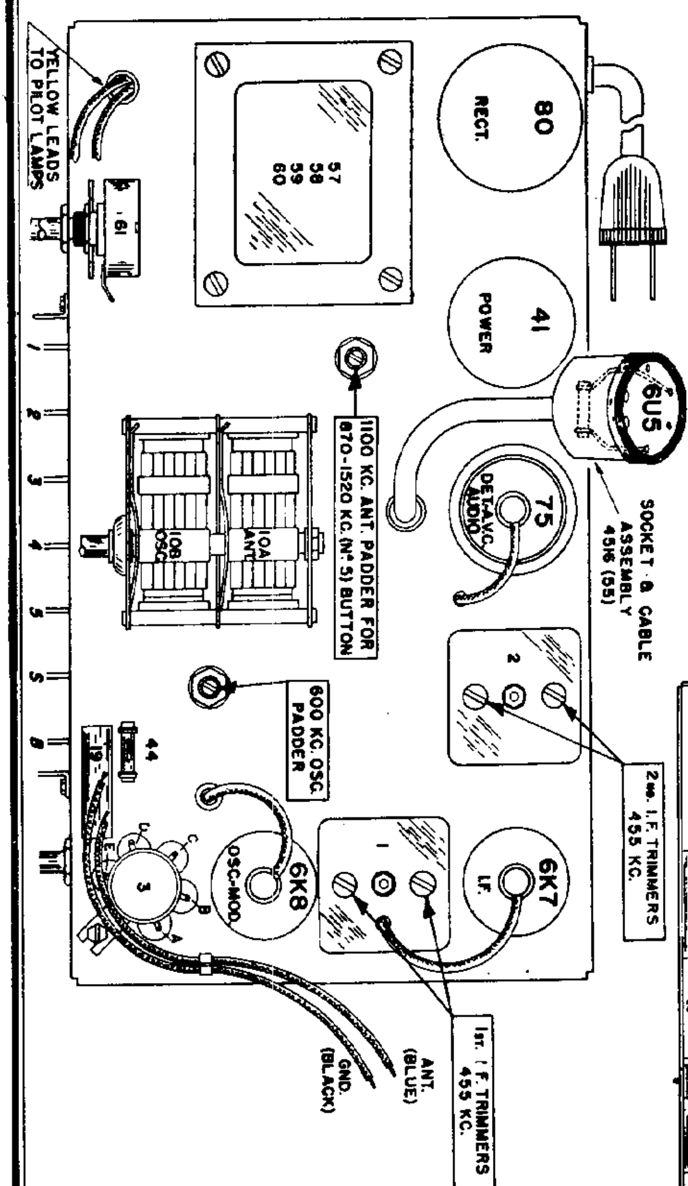
ALIGNMENT PROCEDURE IN TABULATED FORM

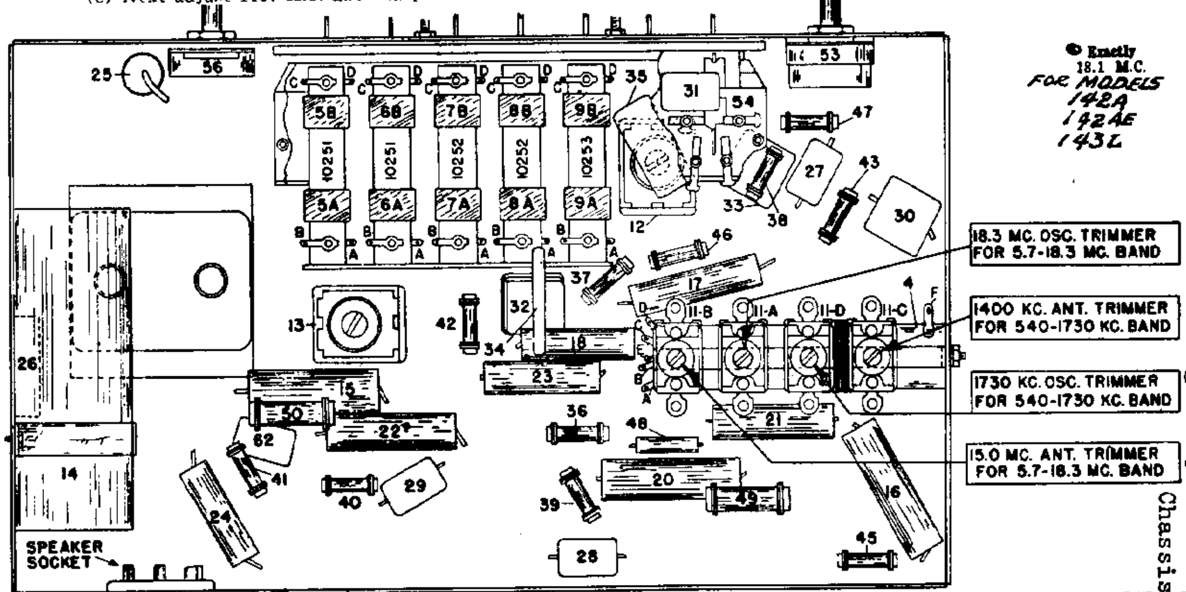
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.
(d) Push in manual push button.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I.F. alignment use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	(3) Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.7 to 18.3 M.C. Band	(1) ● Exactly 18.3 M.C.	● Exactly 18.3 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust ● 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	(2) Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.

NOTE: (125AE ONLY)
1100 K.C. antenna padder for 870-1520 K.C. (No. 5) pushbutton need be adjusted only if there is an appreciable change in volume when same station is push button and manual tuned.
Should there be a great difference adjust 1100 K.C. antenna padder by:
(a) Attach test oscillator to set antenna and ground leads with .00025 dummy ant. load.
(b) Screw any two push buttons—except 870-1520 K.C. (No. 5) push button—all the way in—and the other two push buttons all the way out.
(c) Set test oscillator to exactly 1100 K.C.
(d) Press in 870-1520 K.C. push button and adjust this button for maximum test signal response.
(e) Next adjust 1100 K.C. antenna padder for maximum 1100 K.C. test oscillator signal response.

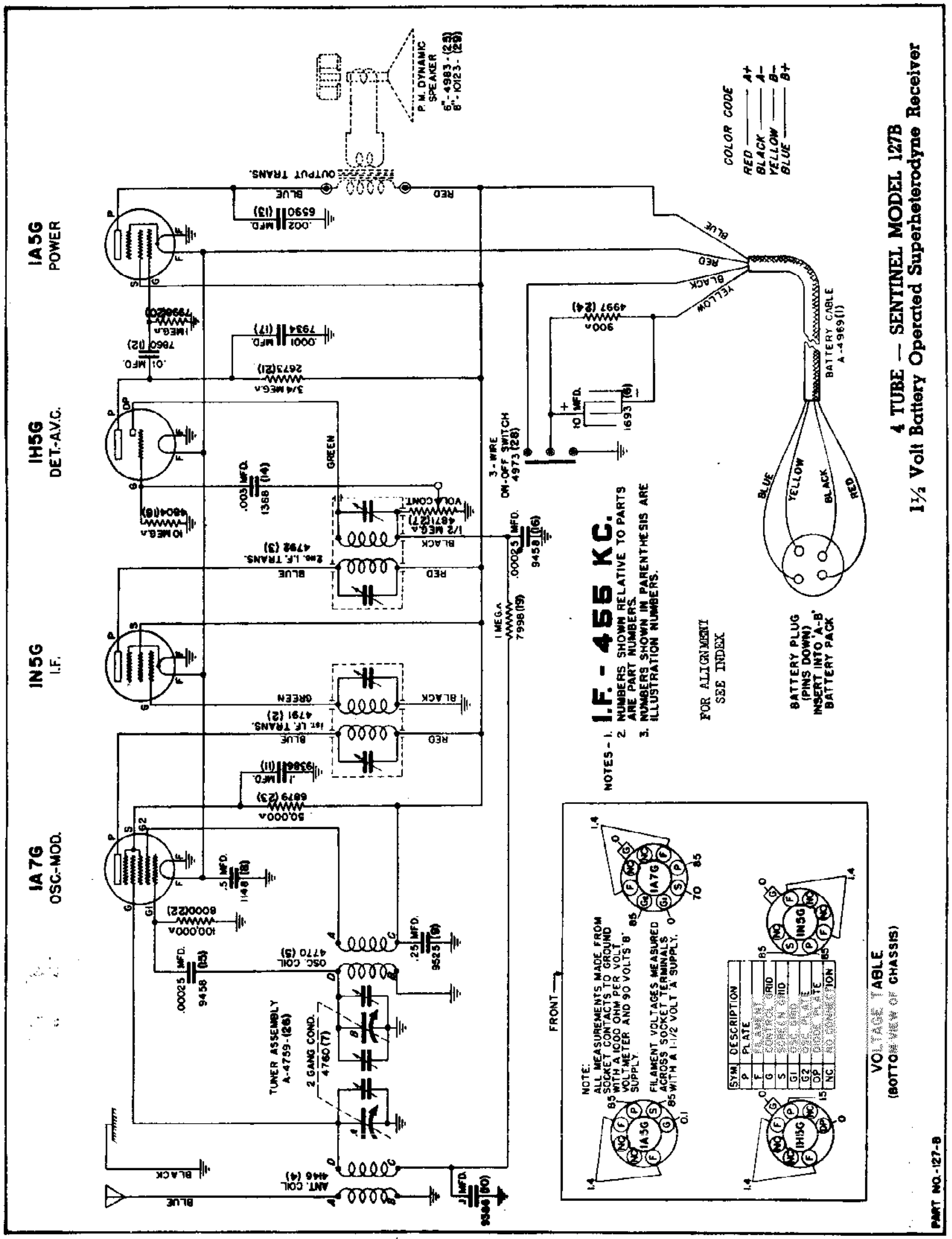
● Exactly 18.1 M.C. FOR MODELS 142A 142AE 143L





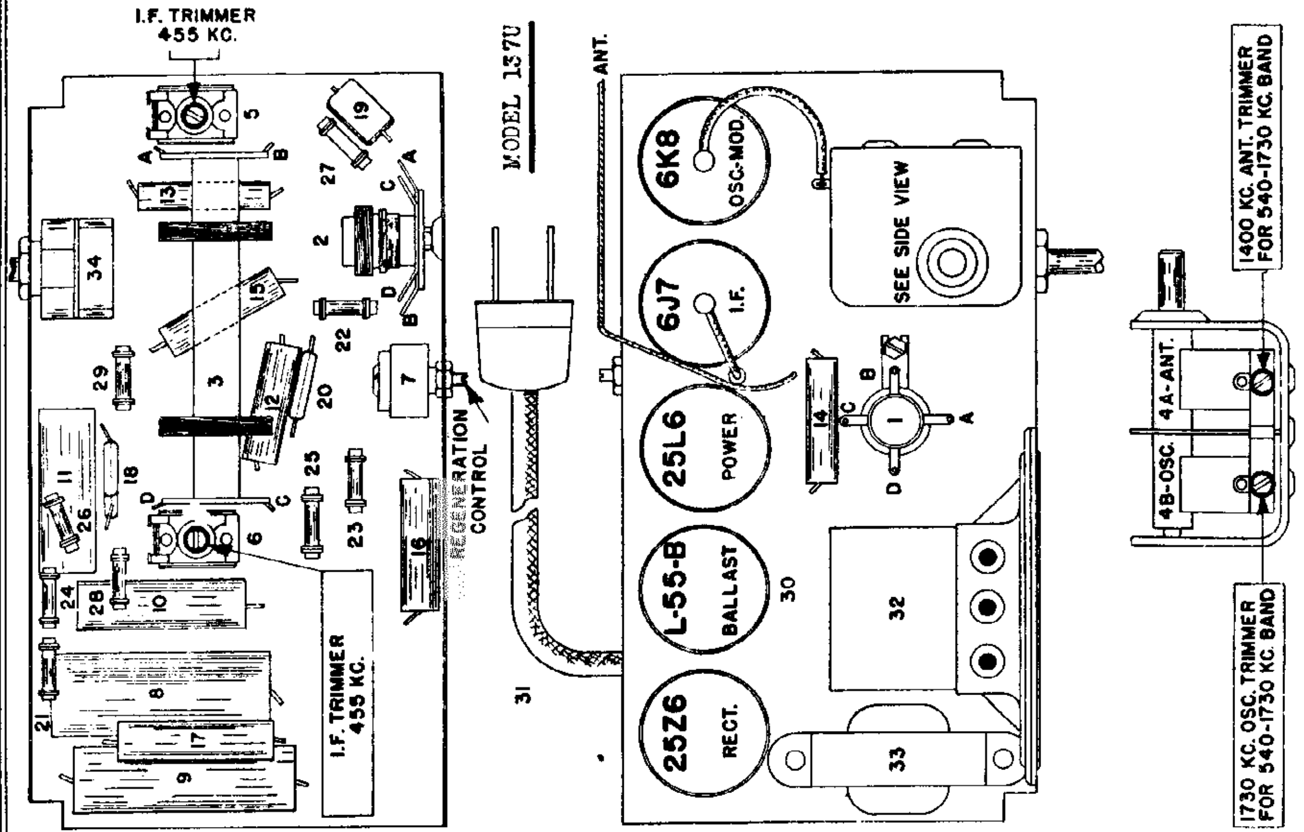
SENTINEL RADIO CORP.

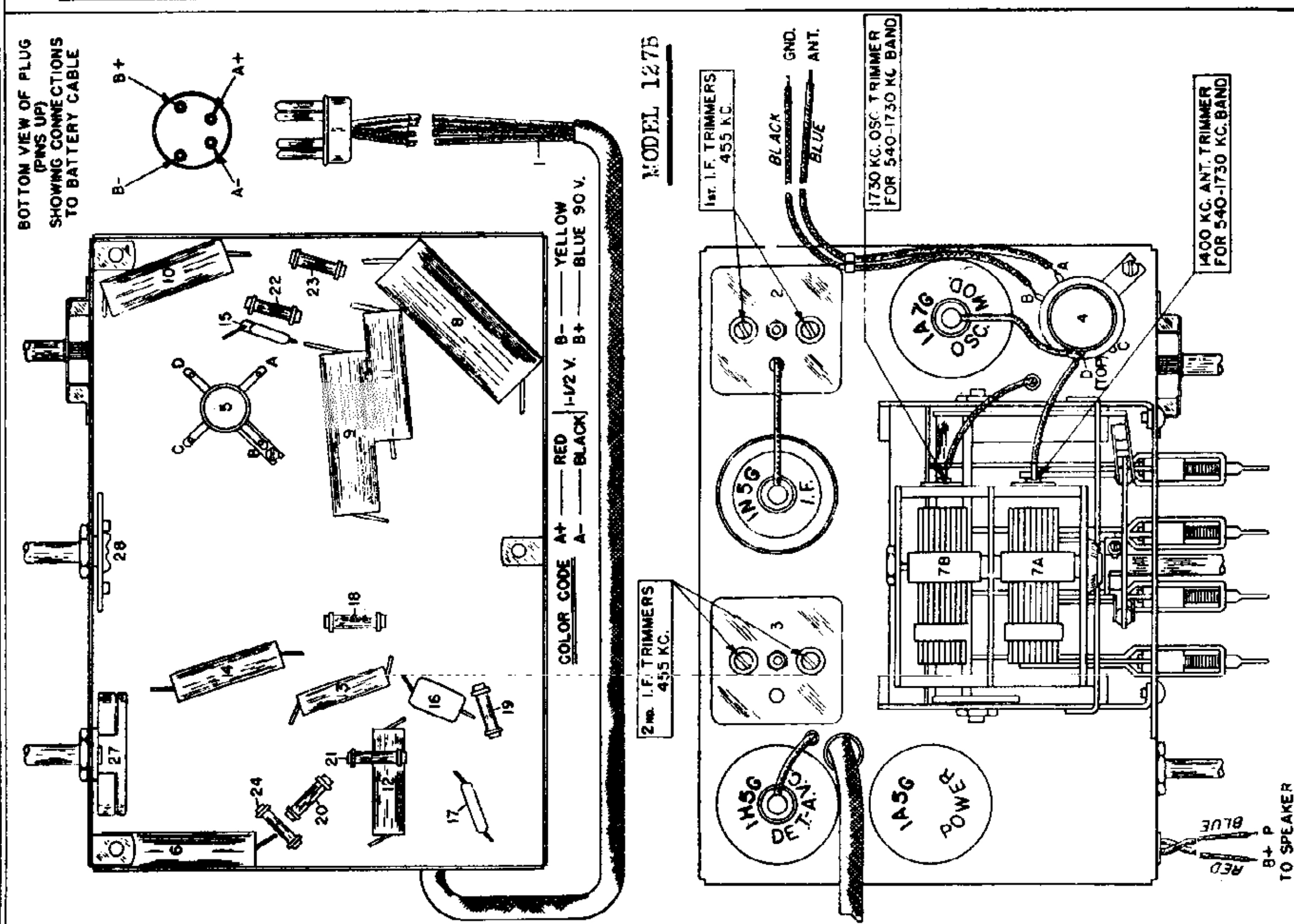
MODEL 127B
Schematic, Voltage
Socket



MODEL 127B
MODEL 137U
Trimmers
Chassis

SENTINEL RADIO CORP.

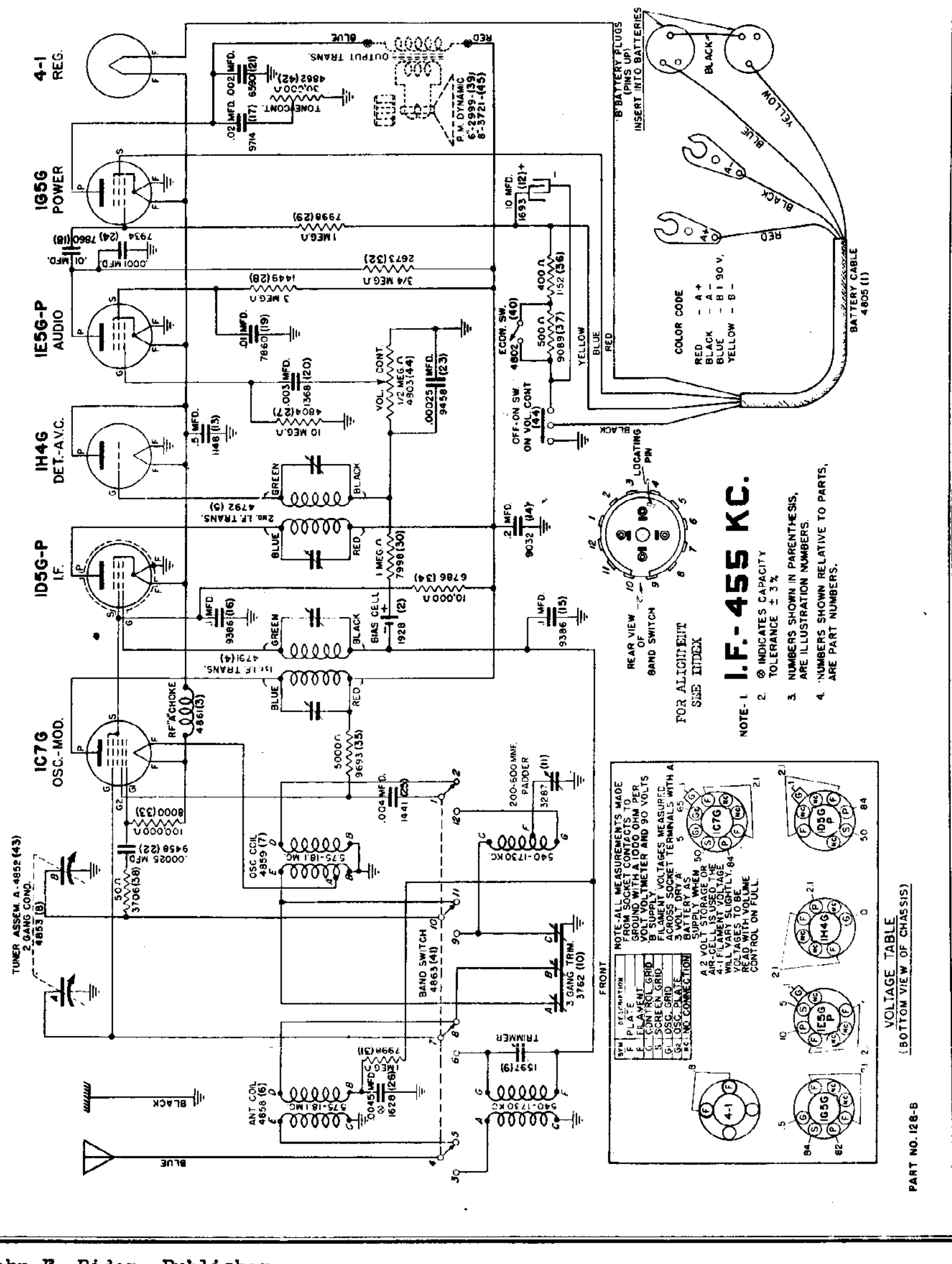




SENTINEL RADIO CORP.

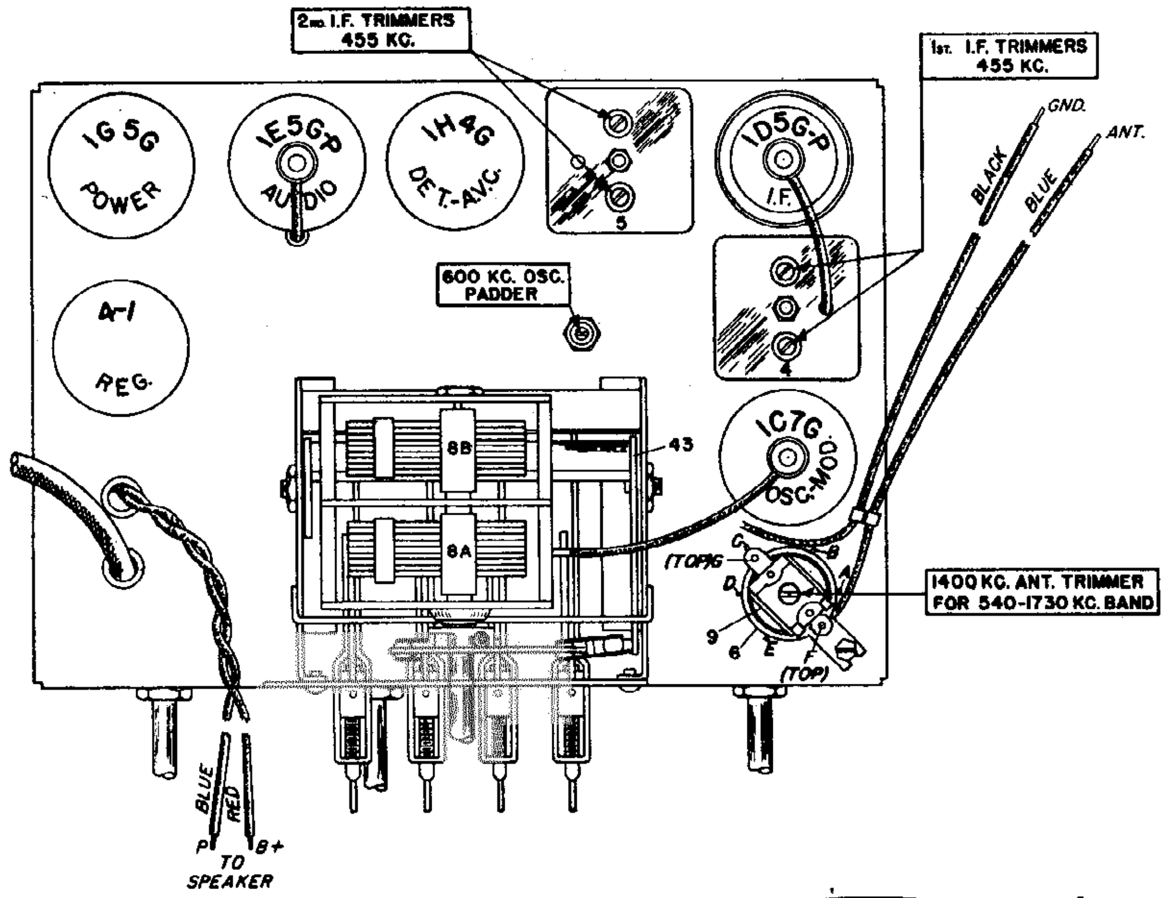
MODEL 128B
Schematic, Voltage
Socket

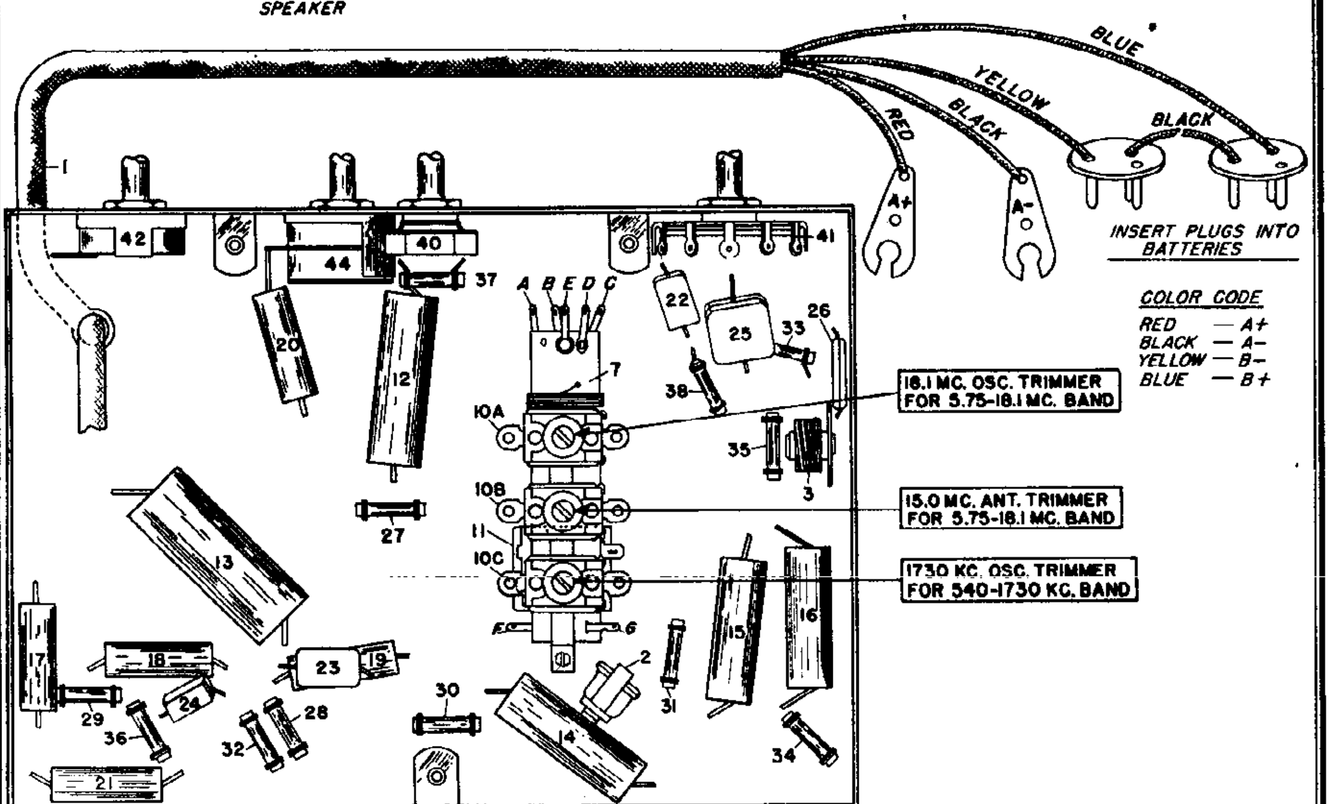
TWO BAND—SIX TUBE INCLUDING BALLAST TUBE
2 Volt Battery Operated Superheterodyne Receiver



MODEL 128B
Trimmers
Chassis

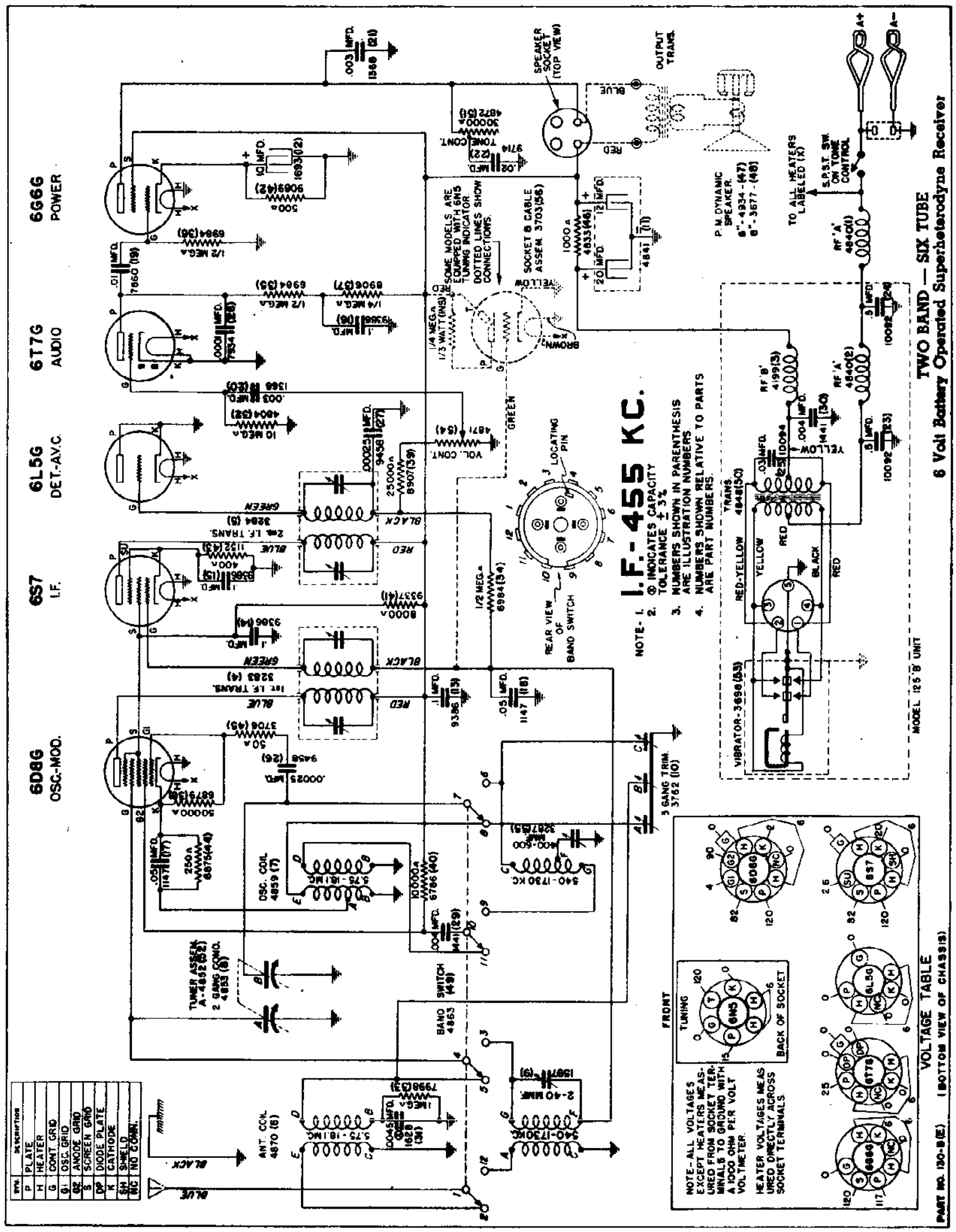
SENTINEL RADIO CORP.





SENTINEL RADIO CORP.

MODELS 130B, 130BE
Schematic, Voltage
Socket

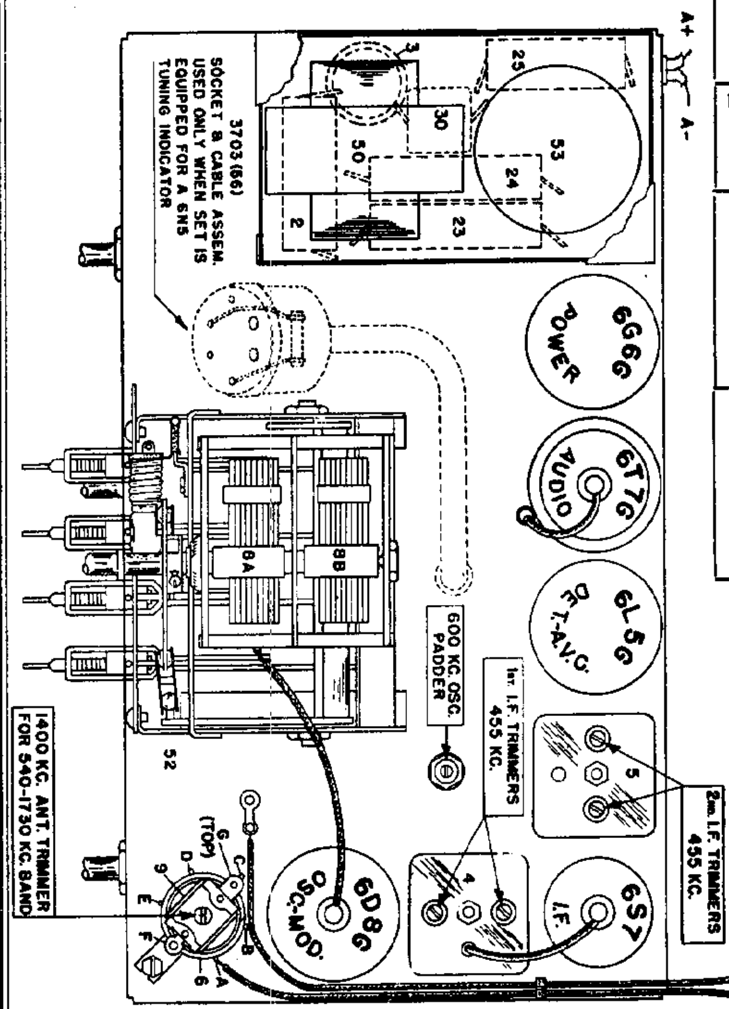


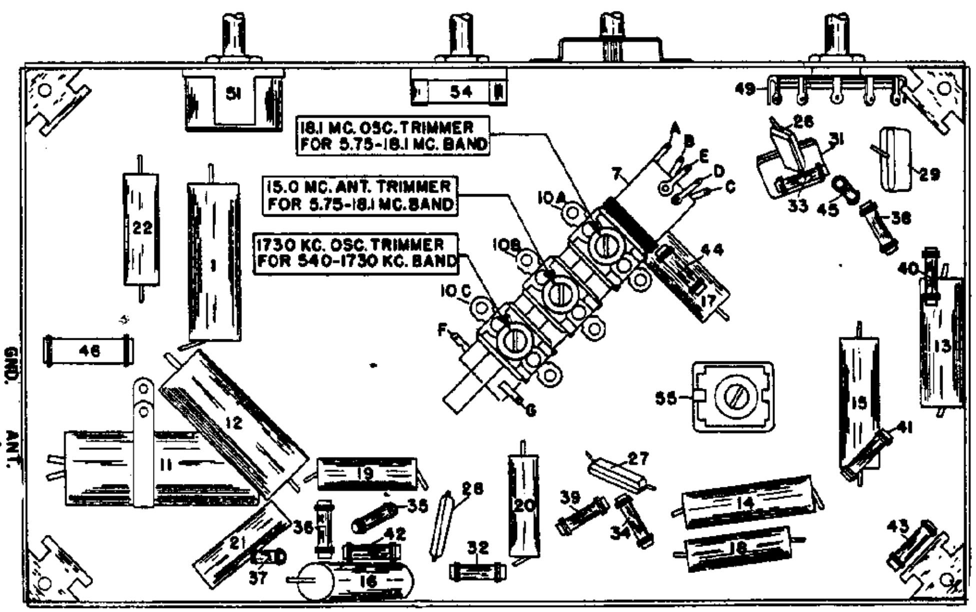
MODELS 130B, 130BE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE IN TABULATED FORM

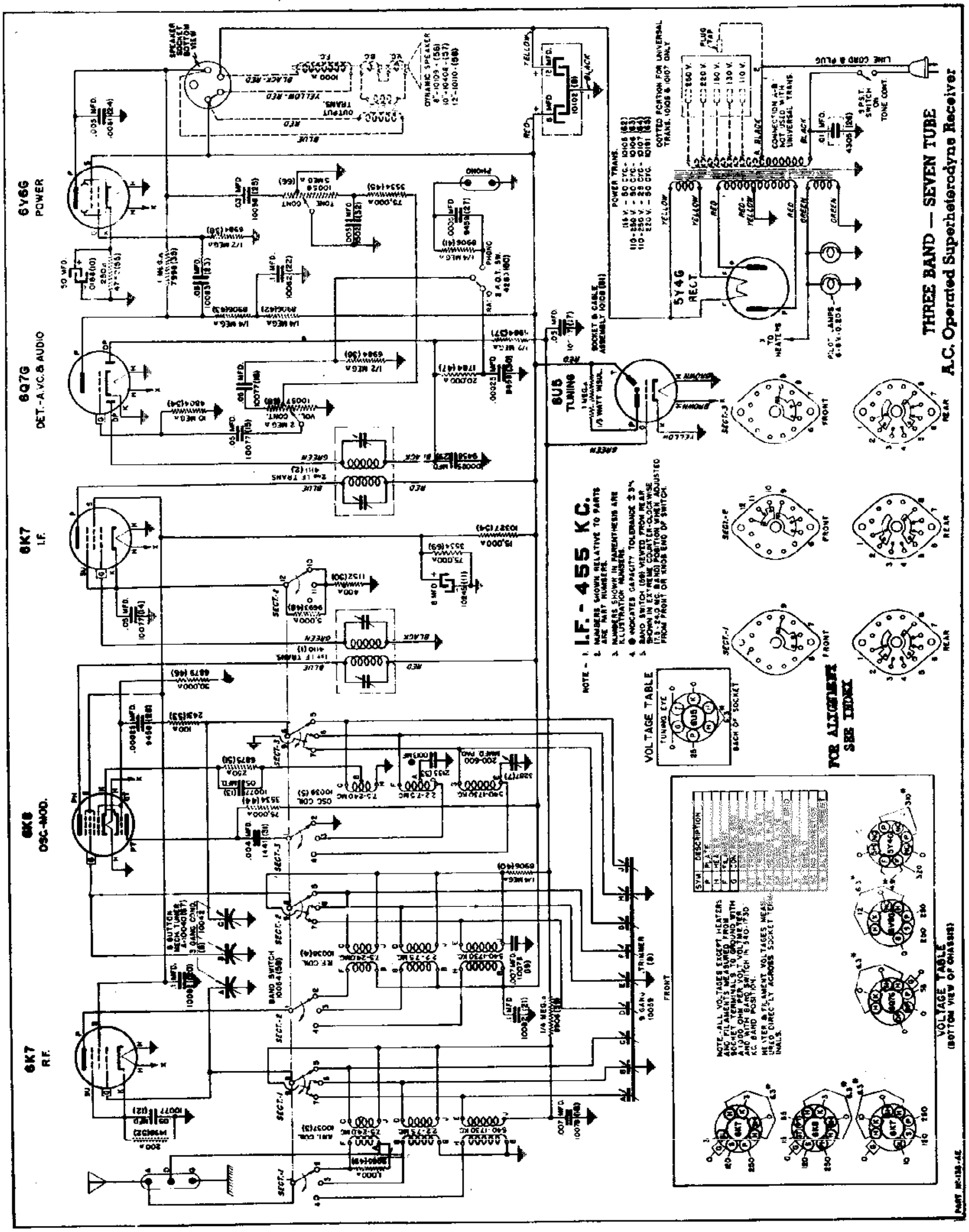
Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I.F. ALIGNMENT use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6D8G tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 TO 540 K.C. BAND	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	(3) Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.75 TO 18.1 M.C. BAND	(1) Exactly 18.1 M.C	Exactly 18.1 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	(2) Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.





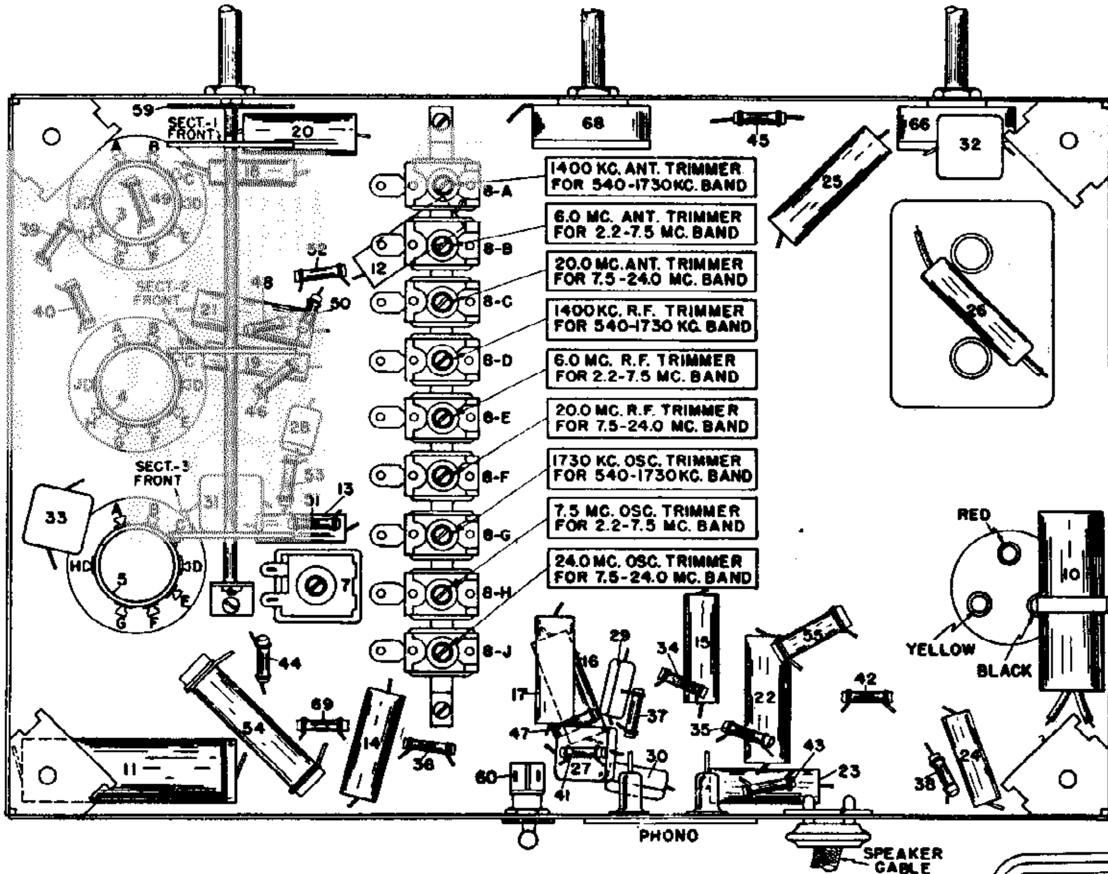
SENTINEL RADIO CORP.

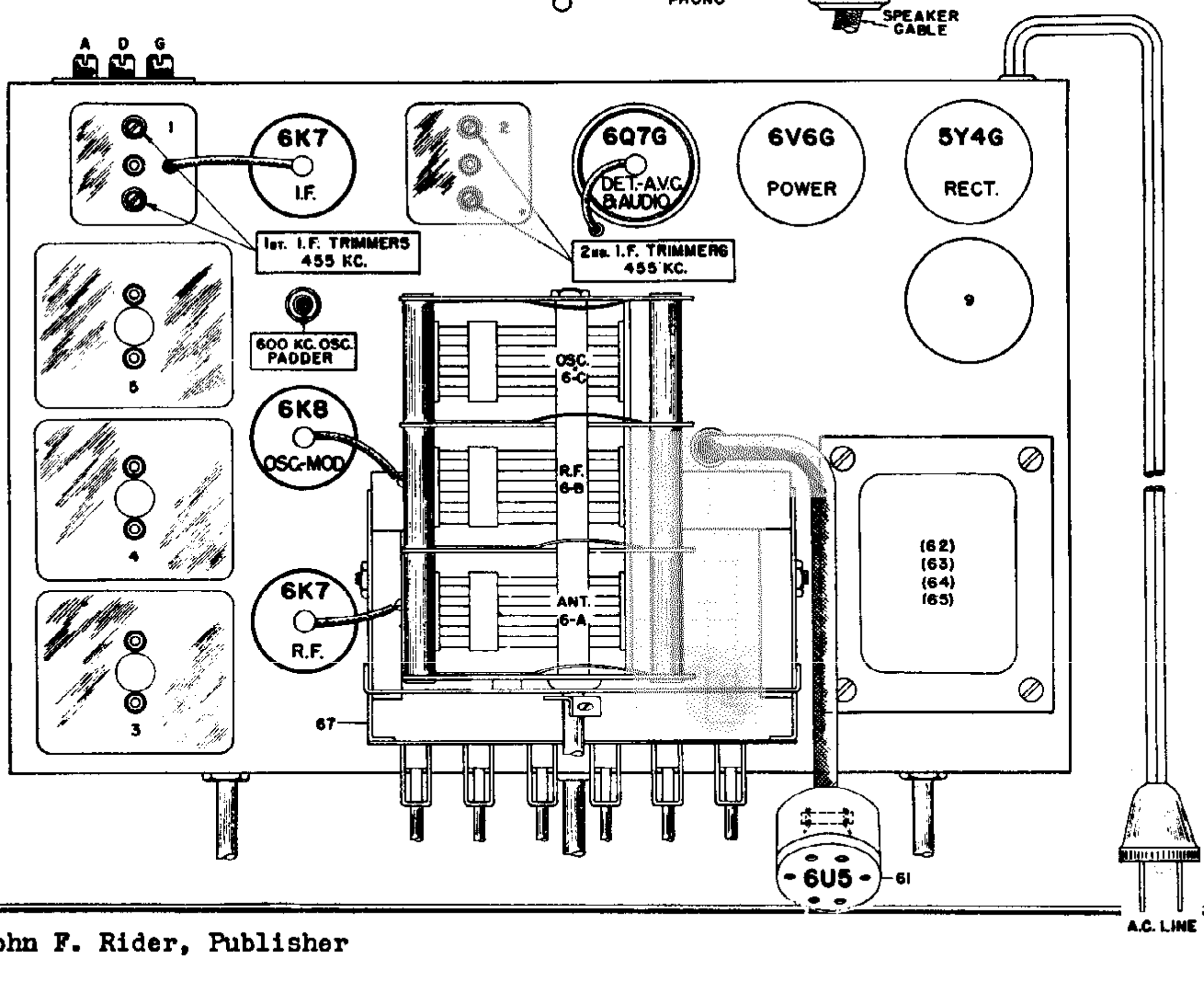
MODEL 138AE
Schematic, Voltage
Socket



MODEL 138AE
Trimmers
Chassis

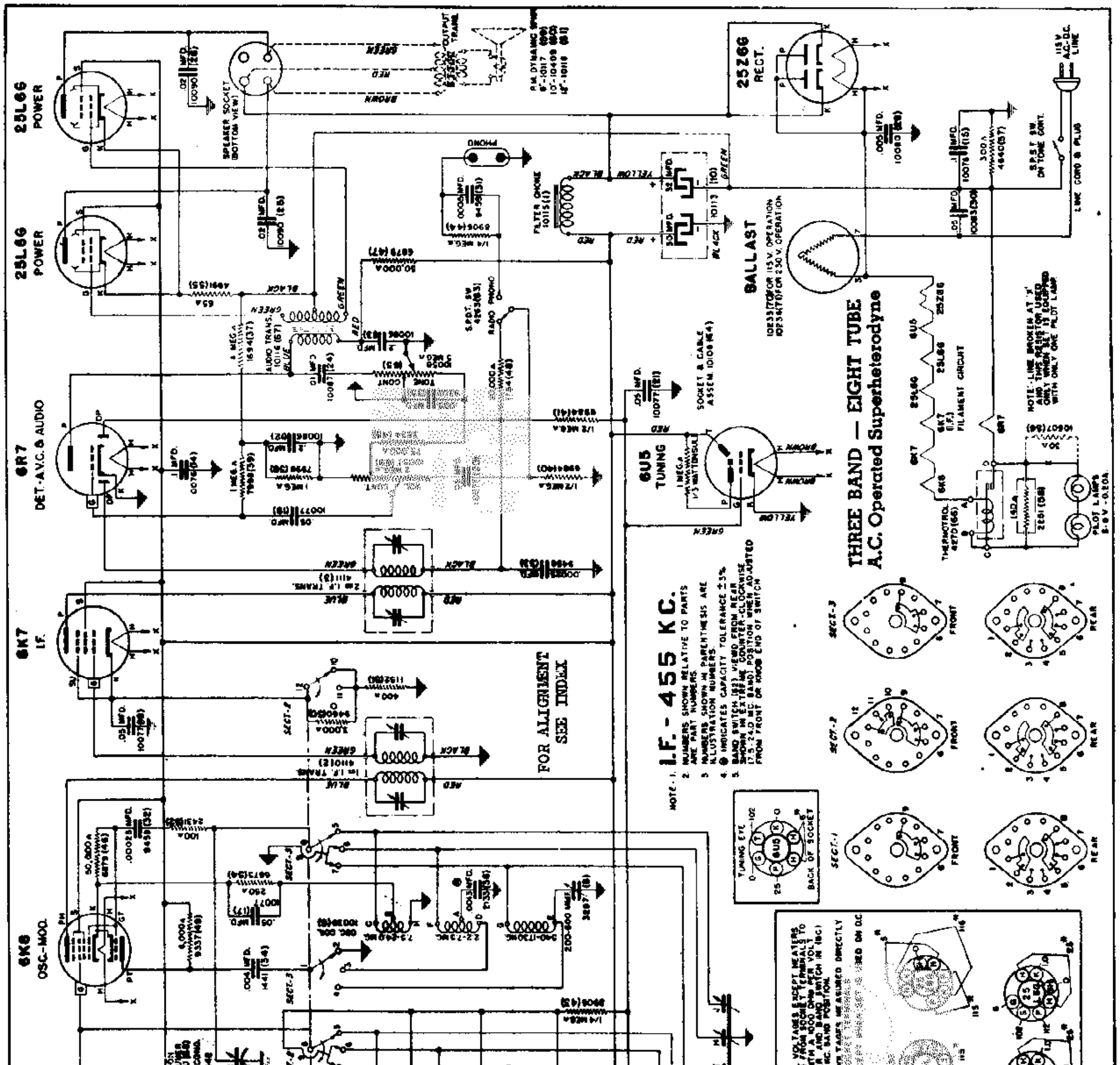
SENTINEL RADIO CORP.





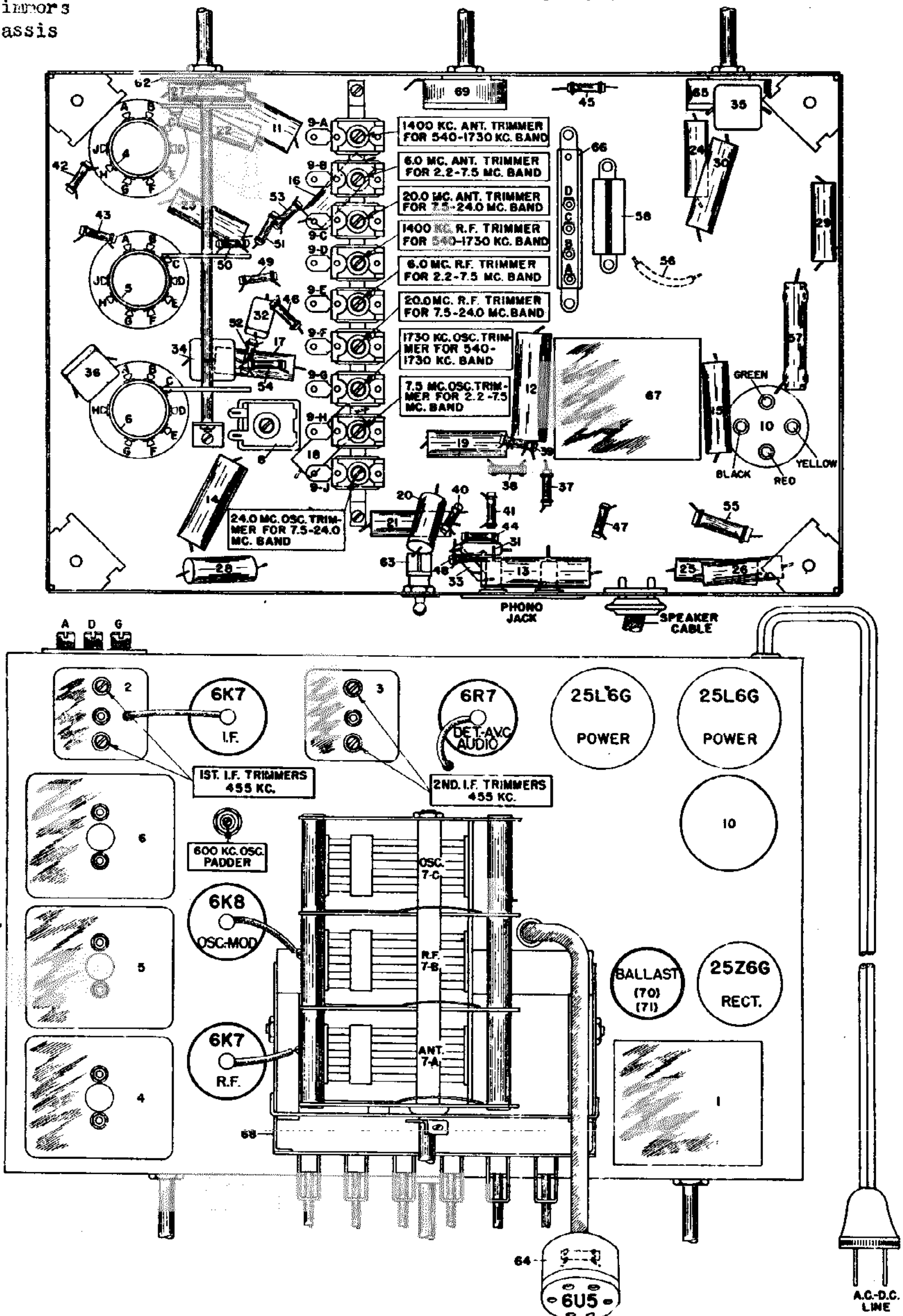
SENTINEL RADIO CORP.

MODEL 139UE
Schematic, Voltage
Socket



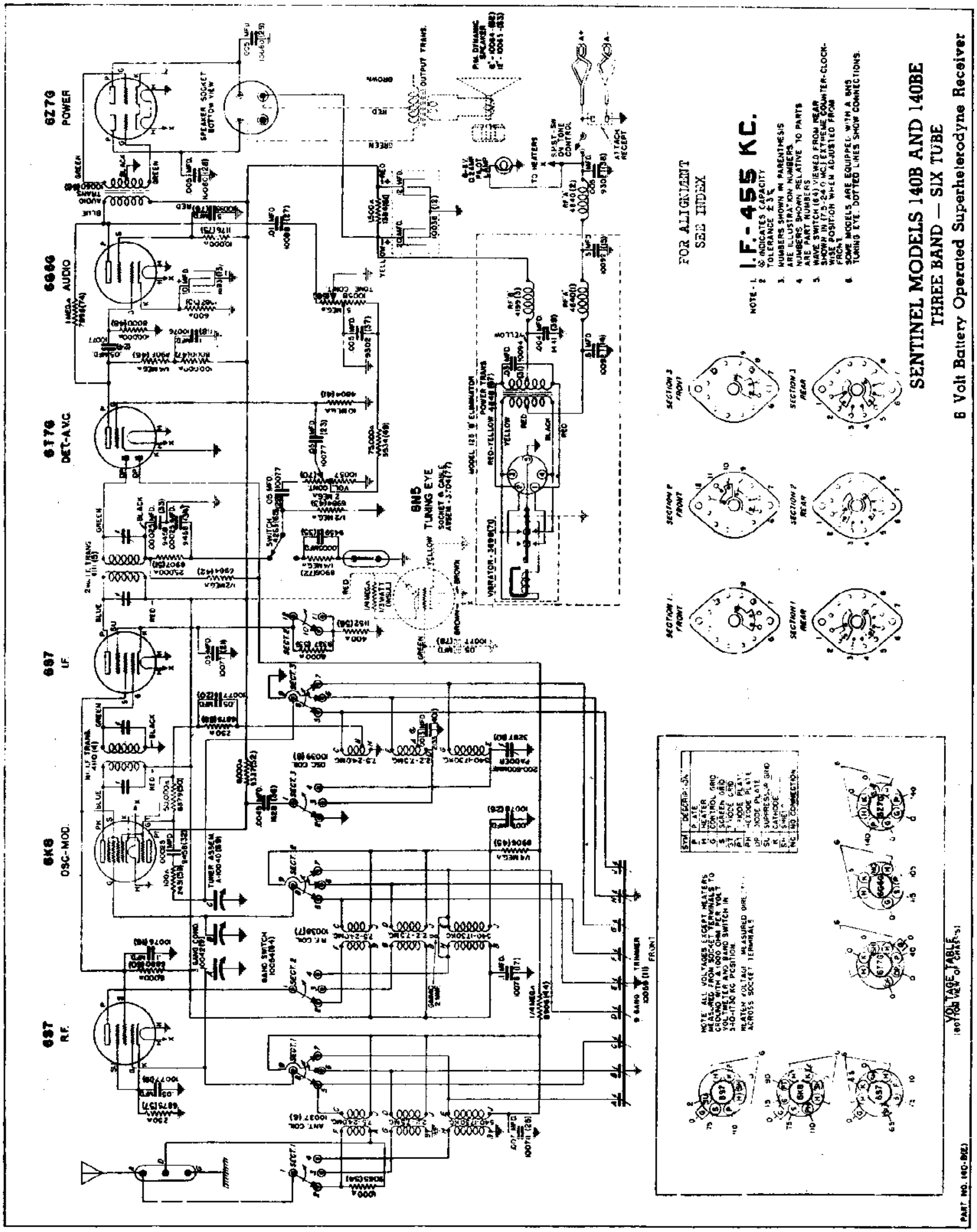
MODEL 139UE
Trimmers
Chassis

SENTINEL RADIO CORP.



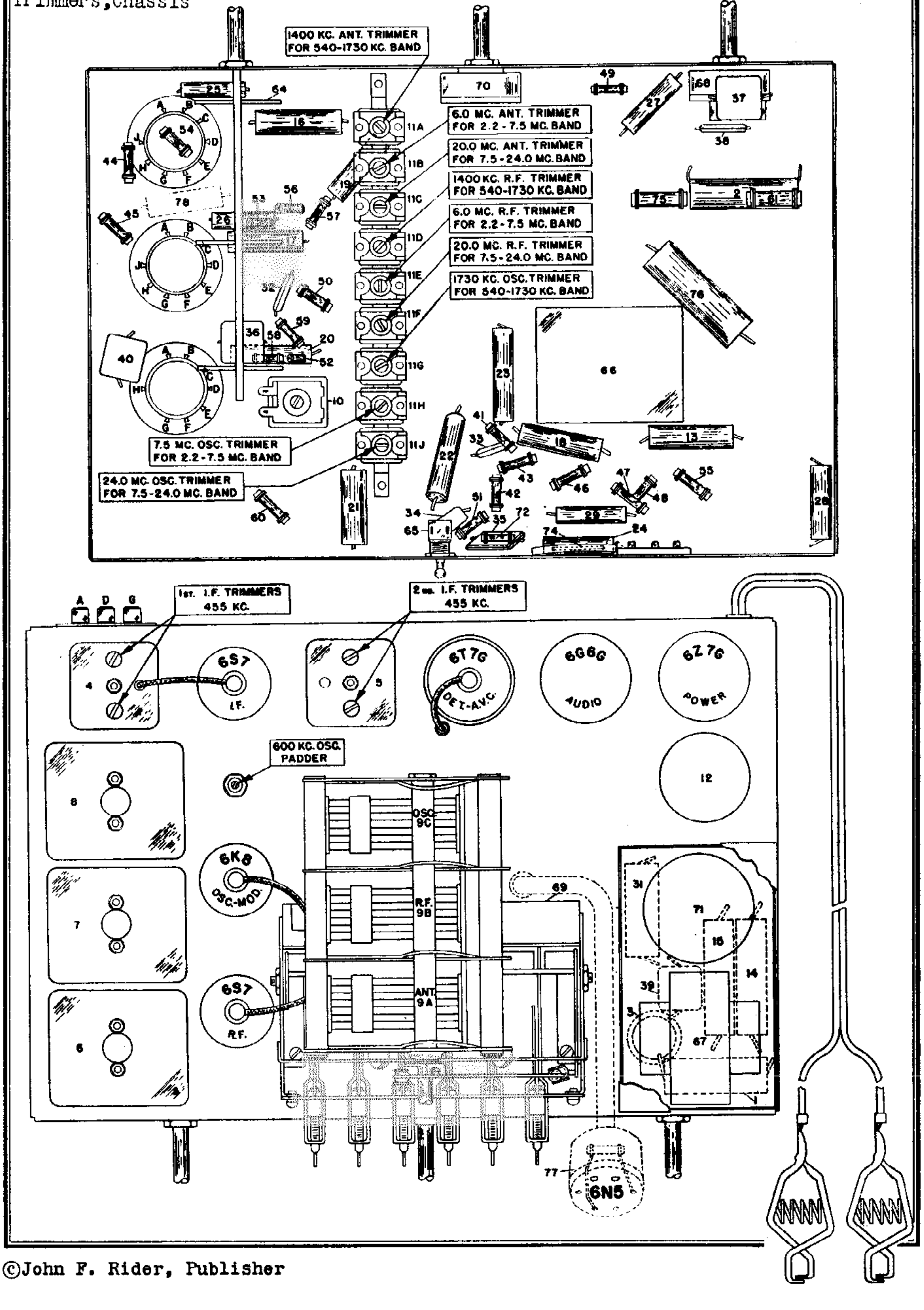
SENTINEL RADIO CORP.

MODELS 140B, 140BE
Schematic, Voltage
Socket



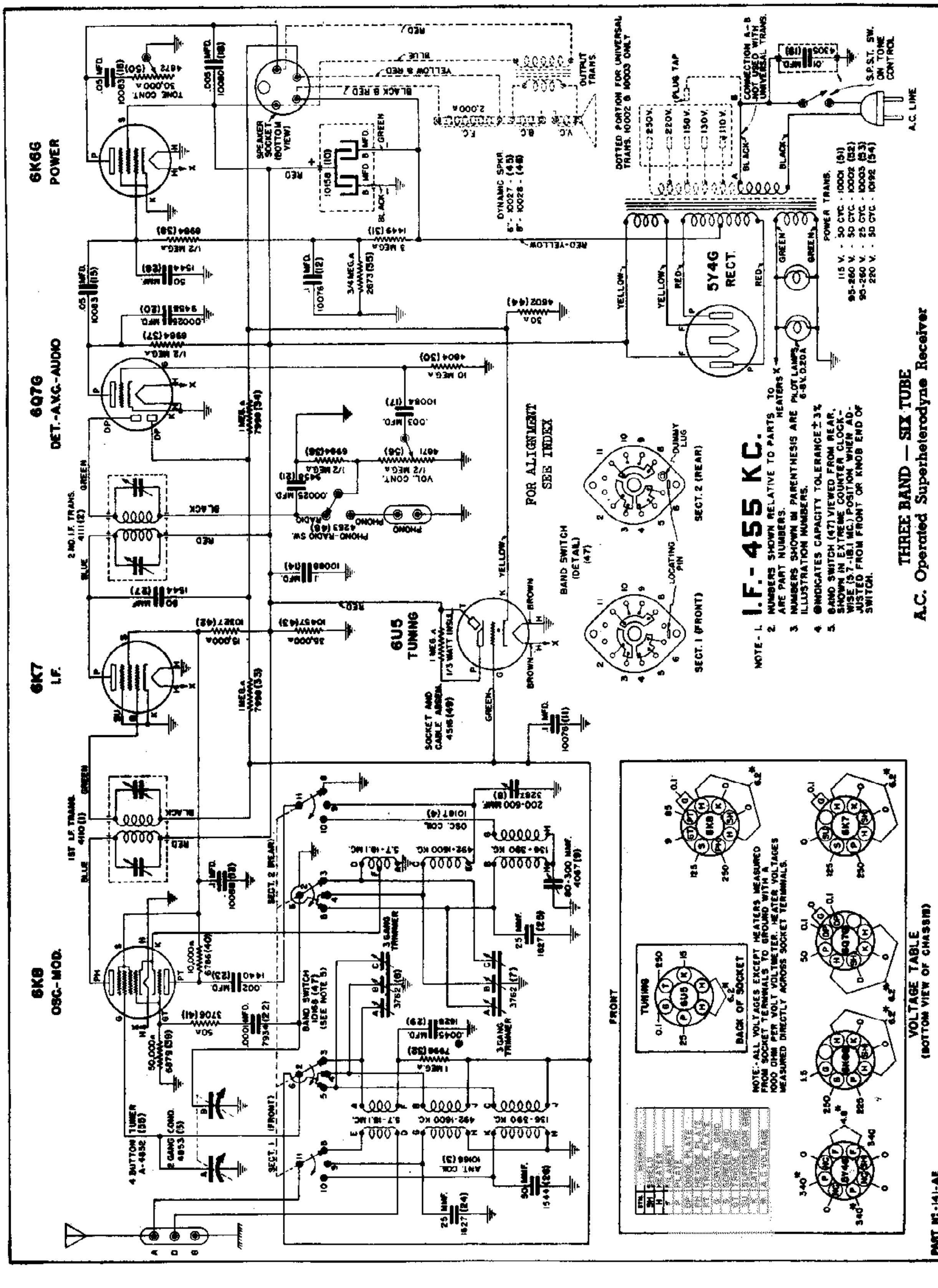
MODELS 140B,140BE
Trimmers,Chassis

SENTINEL RADIO CORP.



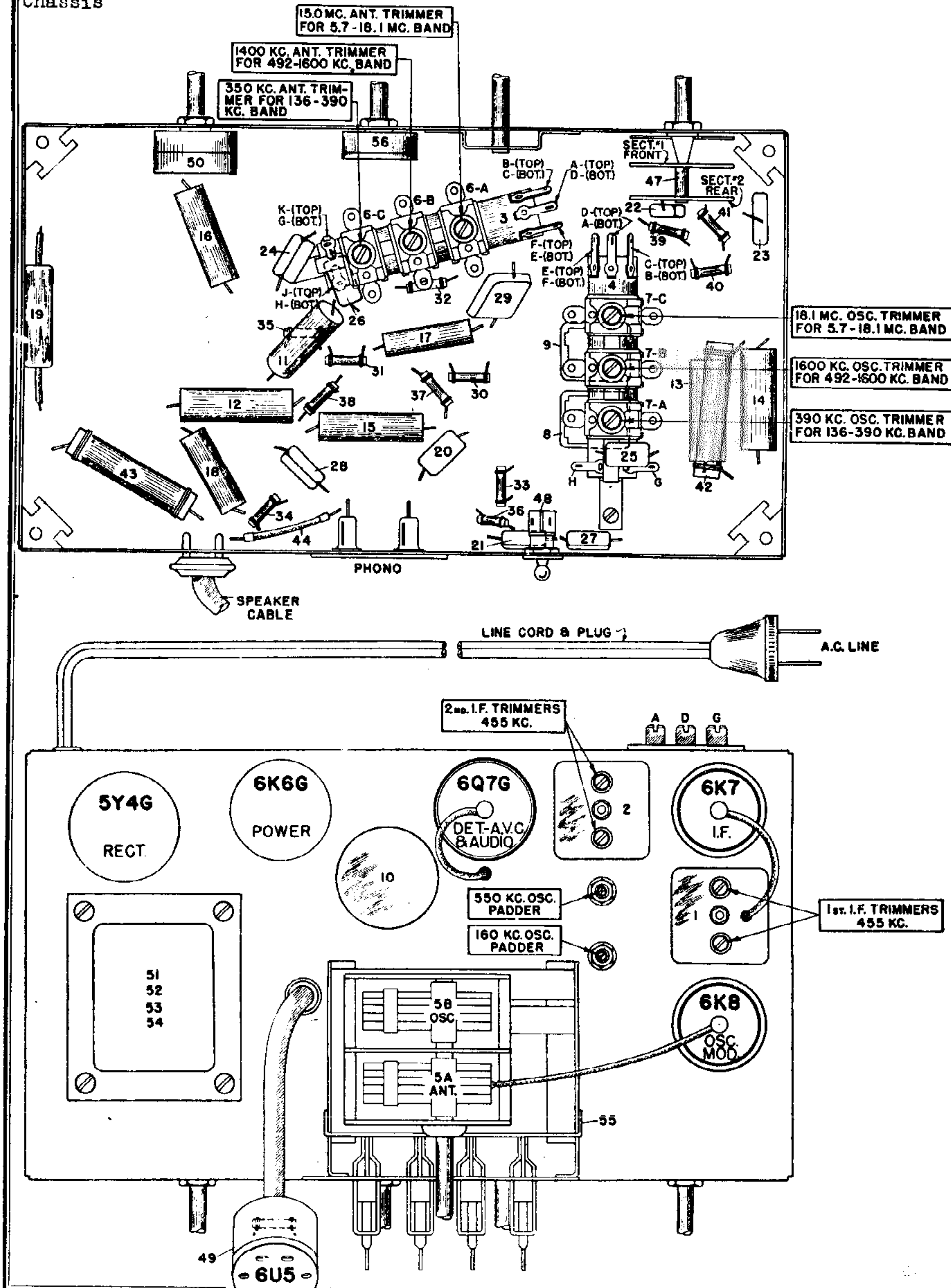
SENTINEL RADIO CORP.

MODEL 141AE
Schematic, Voltage
Socket

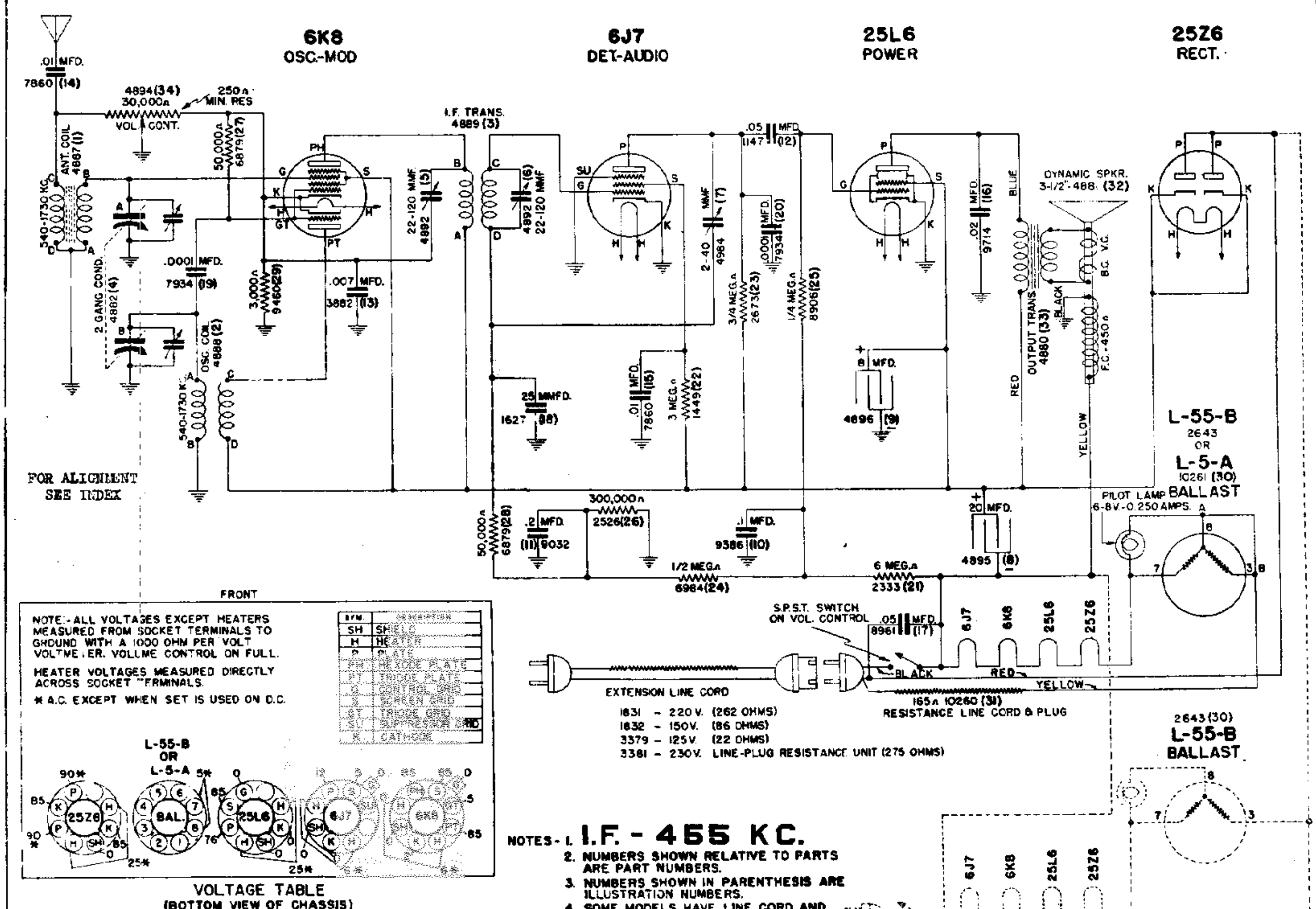


MODEL 141AE
Trimmers
Chassis

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.



NOTES - 1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. SOME MODELS HAVE LINE CORD AND PLUG LESS RESISTANCE. DOTTED LINES SHOW CONNECTIONS.

Filament and Ballast Tube Connections shown in dotted lines on bottom of circuit diagram illustrates connections used in first production run.

To lower heat dissipated in set the resistor line cord (No. 31) was used in late production runs of this radio.

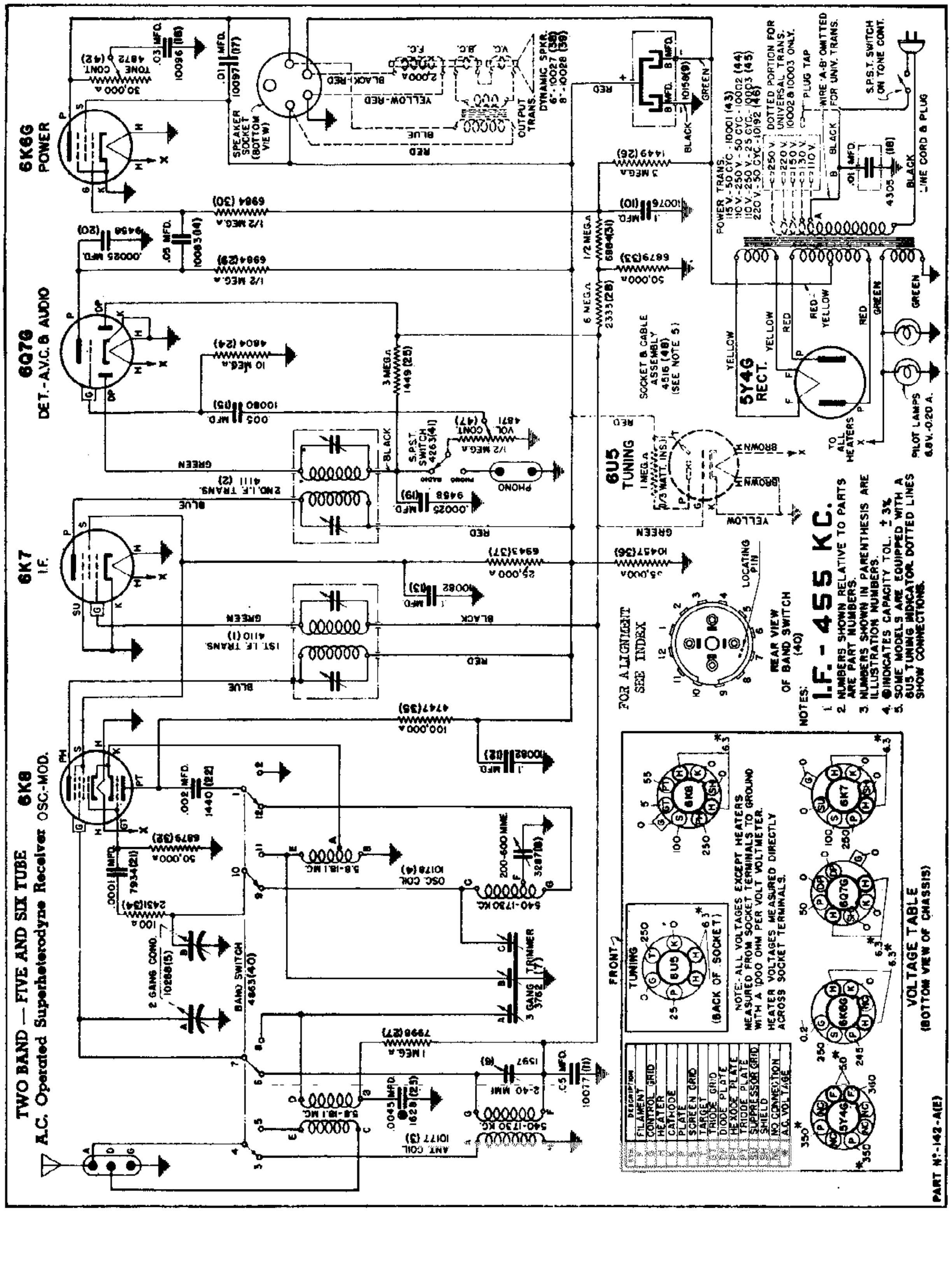
SENTINEL MODEL 137U

5 tube A. C. - D. C. Operated Superheterodyne Receiver

PART Nº-137-U

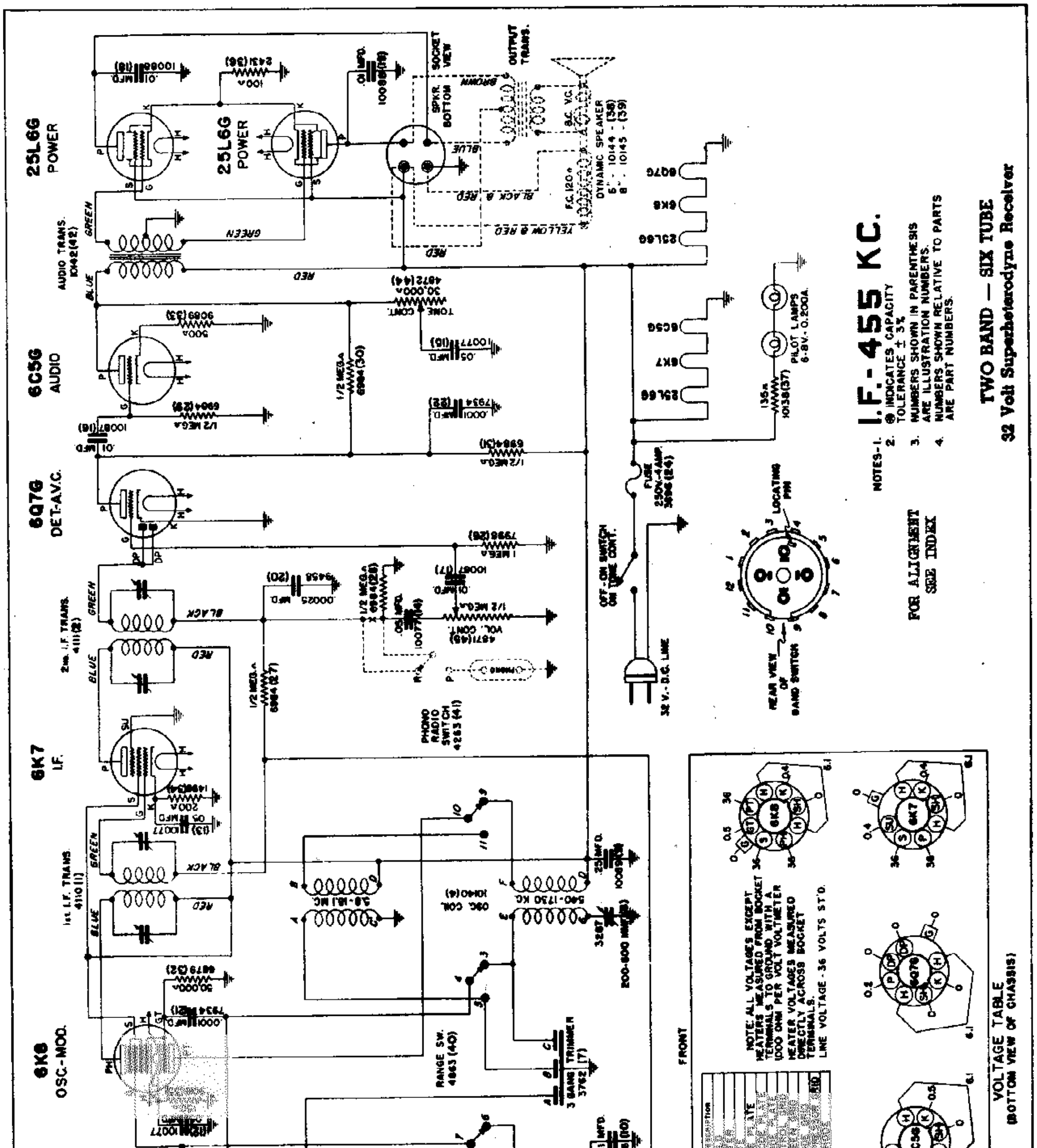
MODELS 142A, 142AE
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



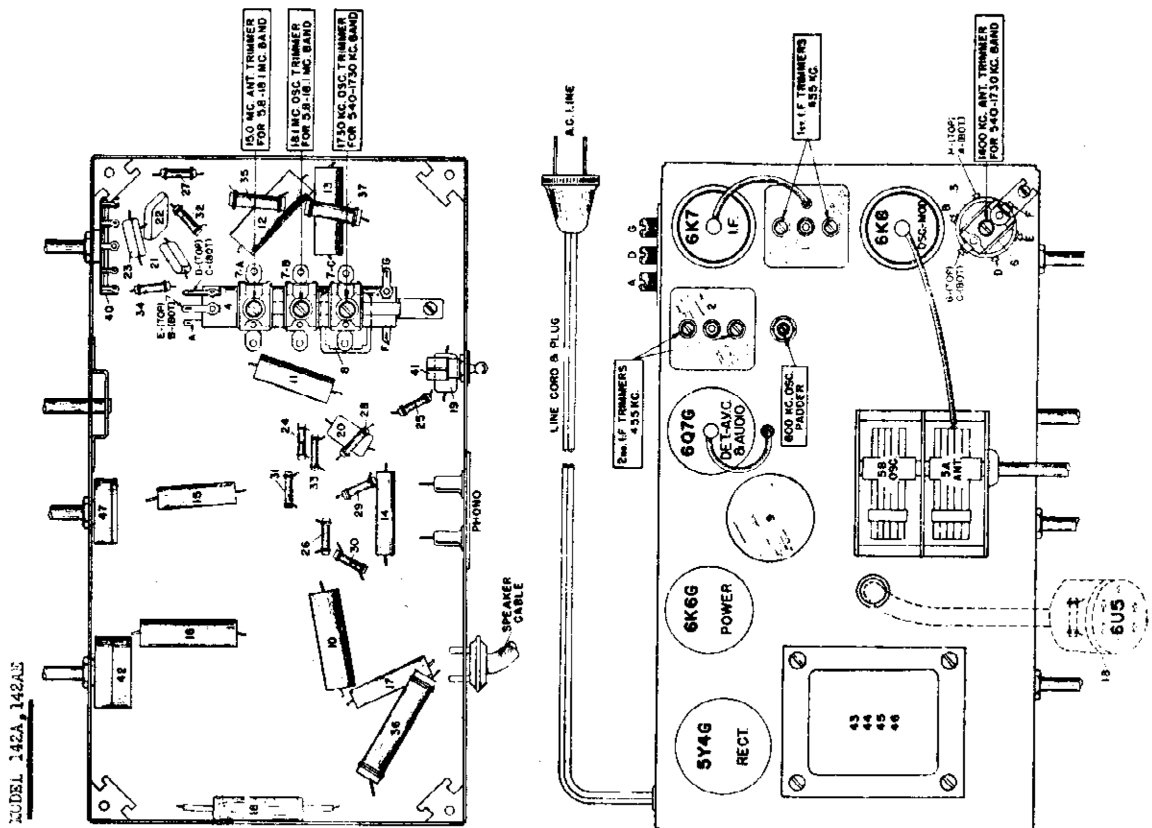
MODEL 143L
Schematic, Voltage
Socket

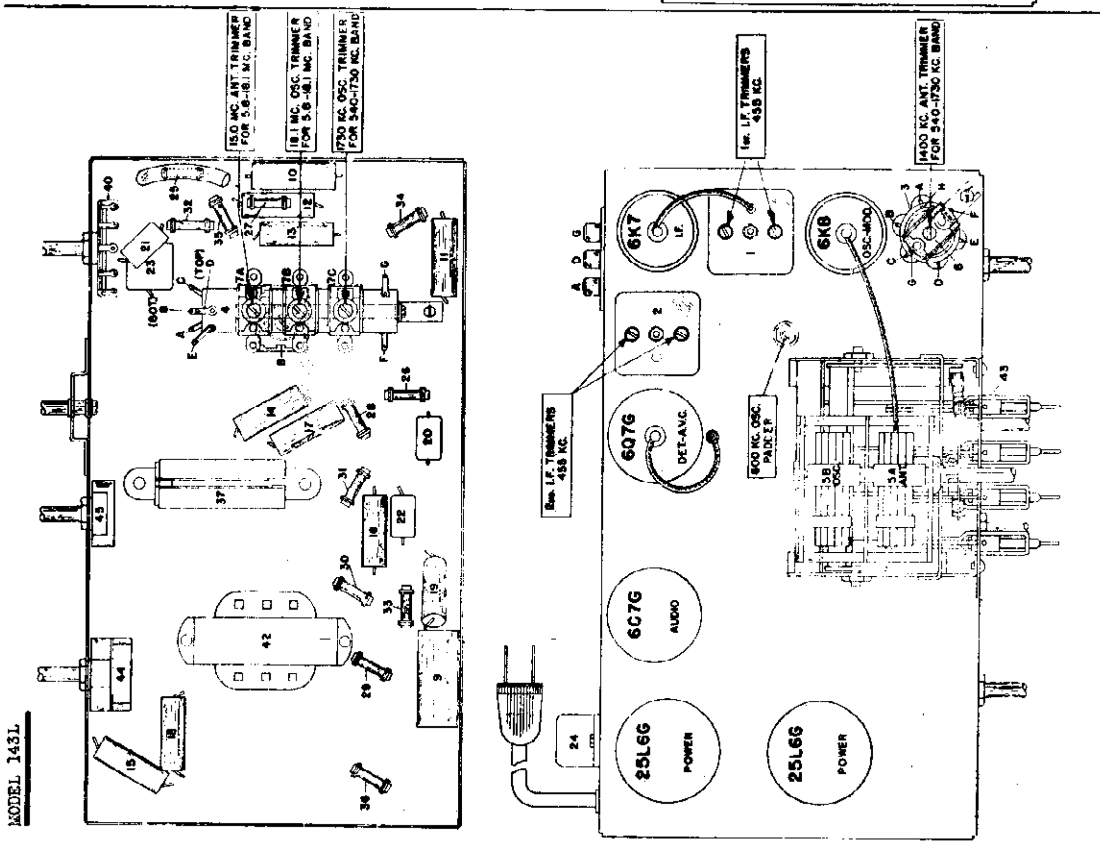
SENTINEL RADIO CORP.



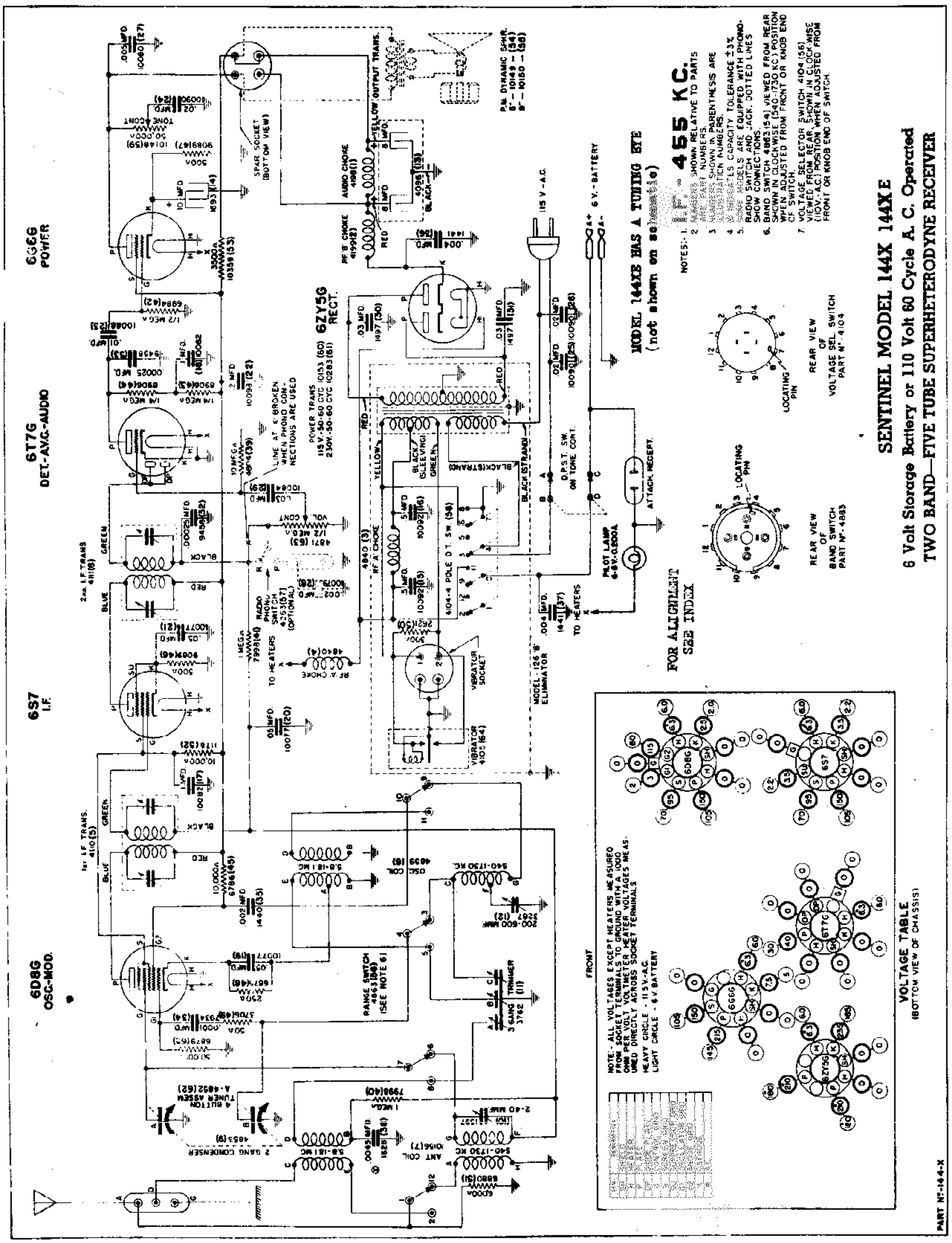
MODELS 142A, 142AE
MODEL 143L
Trimmers, Chassis

SENTINEL RADIO CORP.



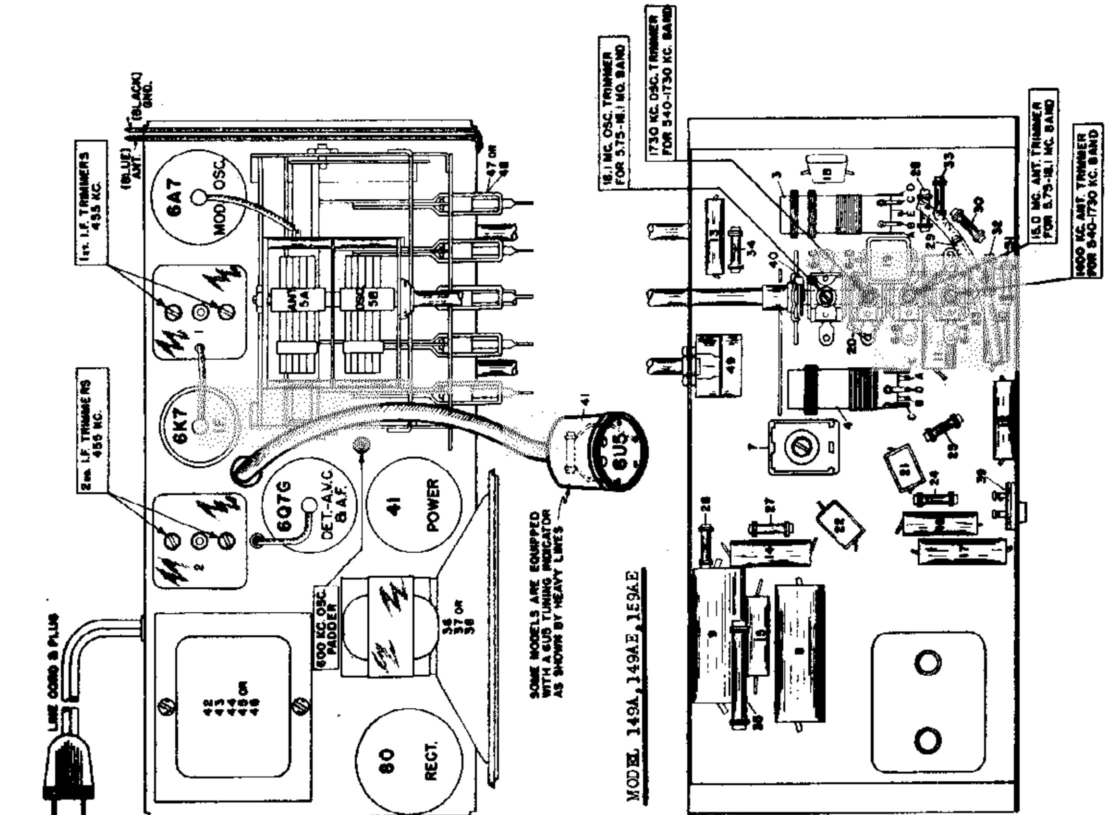


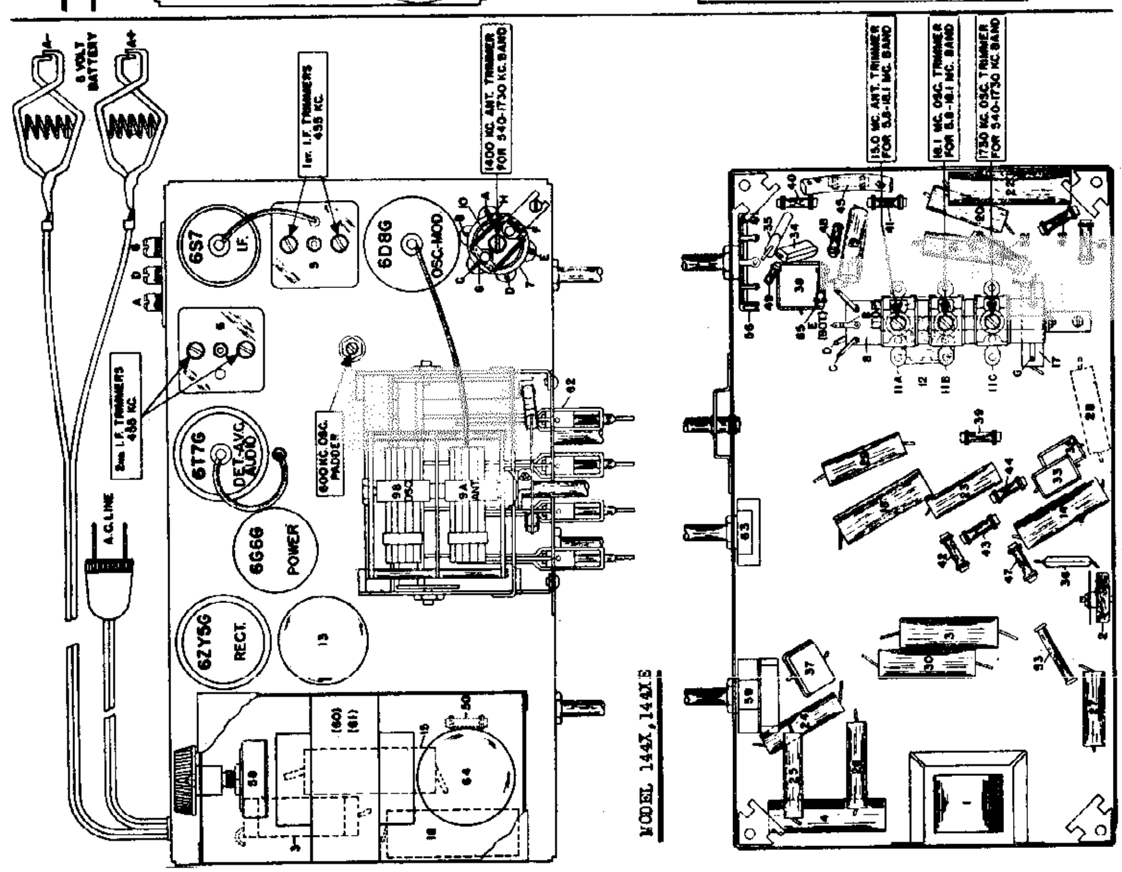
SENTINEL RADIO CORP.



MODELS 144X, 144XE
MODELS 149A, 149AE, 159AE
Trimmers, Chassis

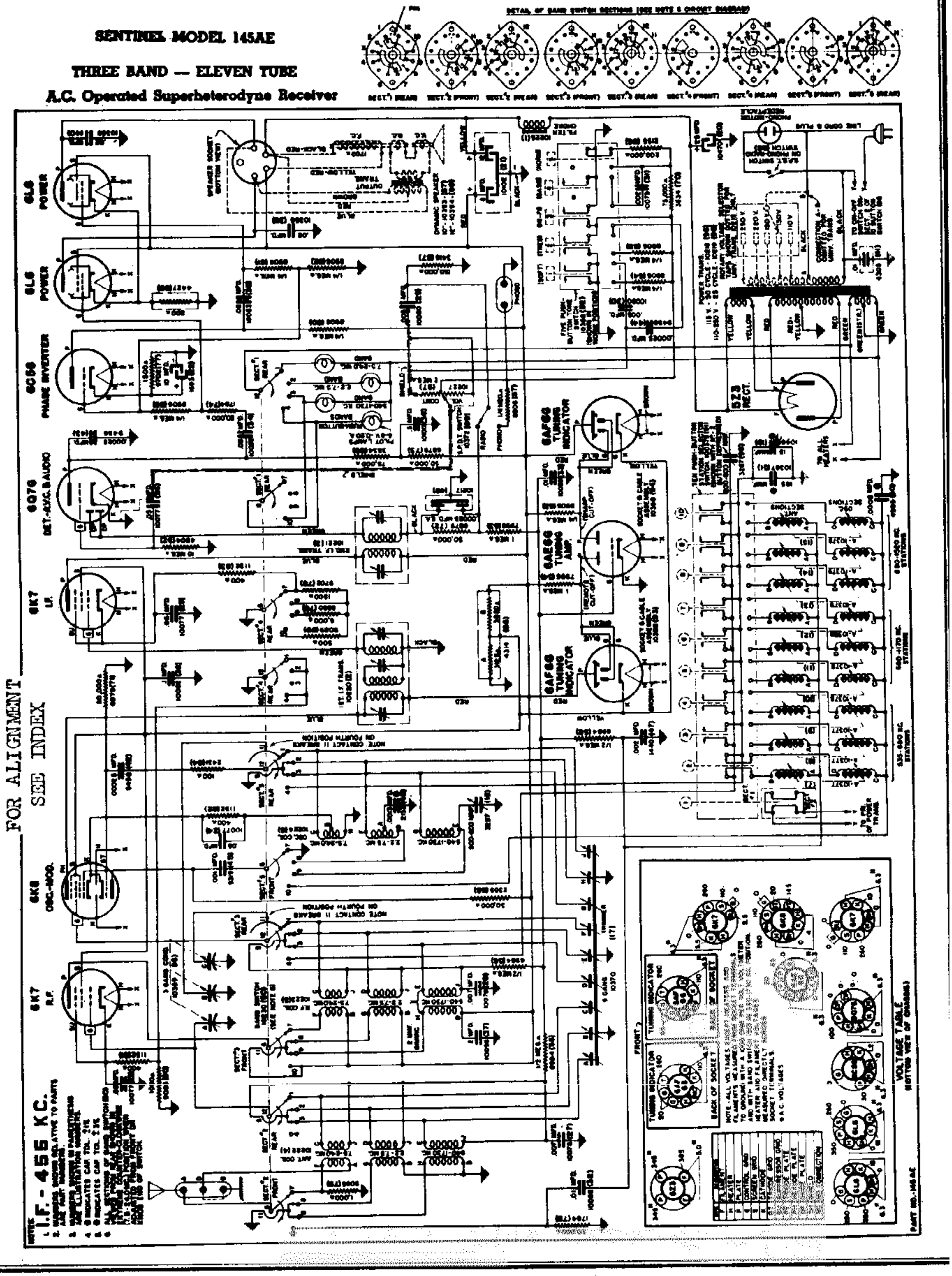
SENTINEL RADIO CORP.





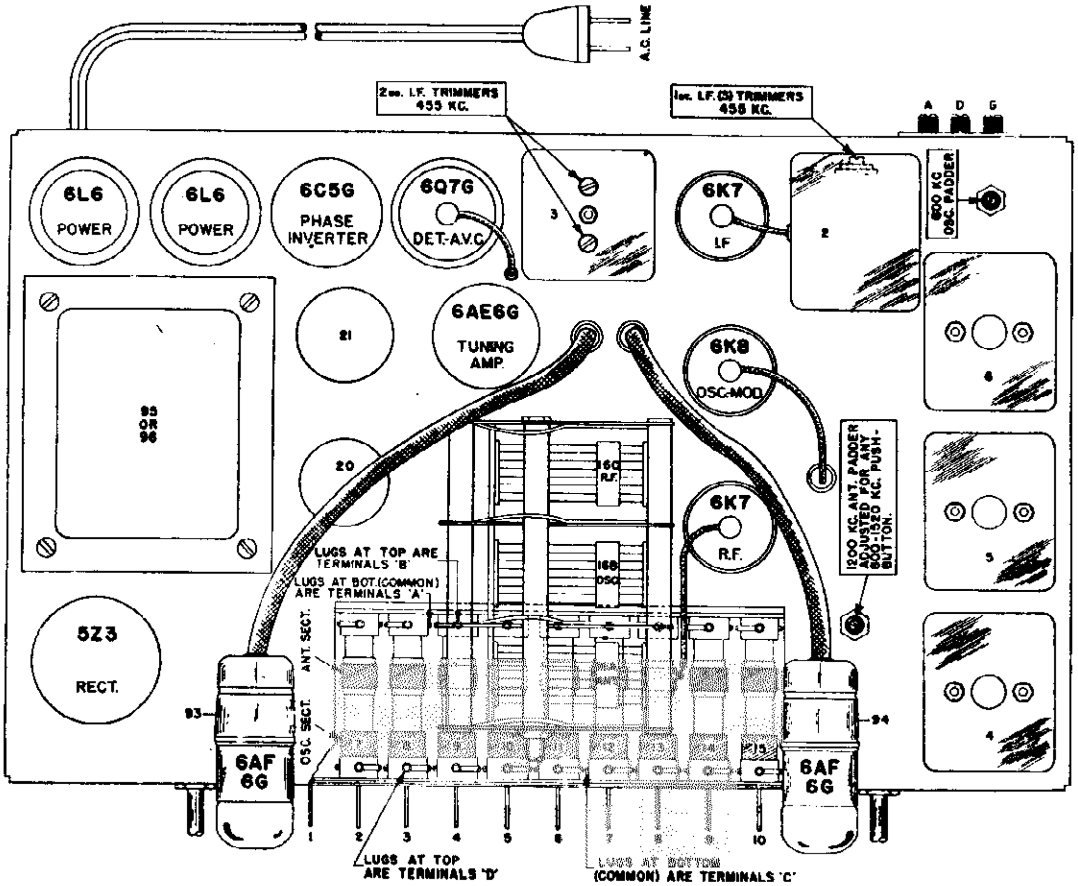
MODEL 145AE
Schematic, Voltage
Socket

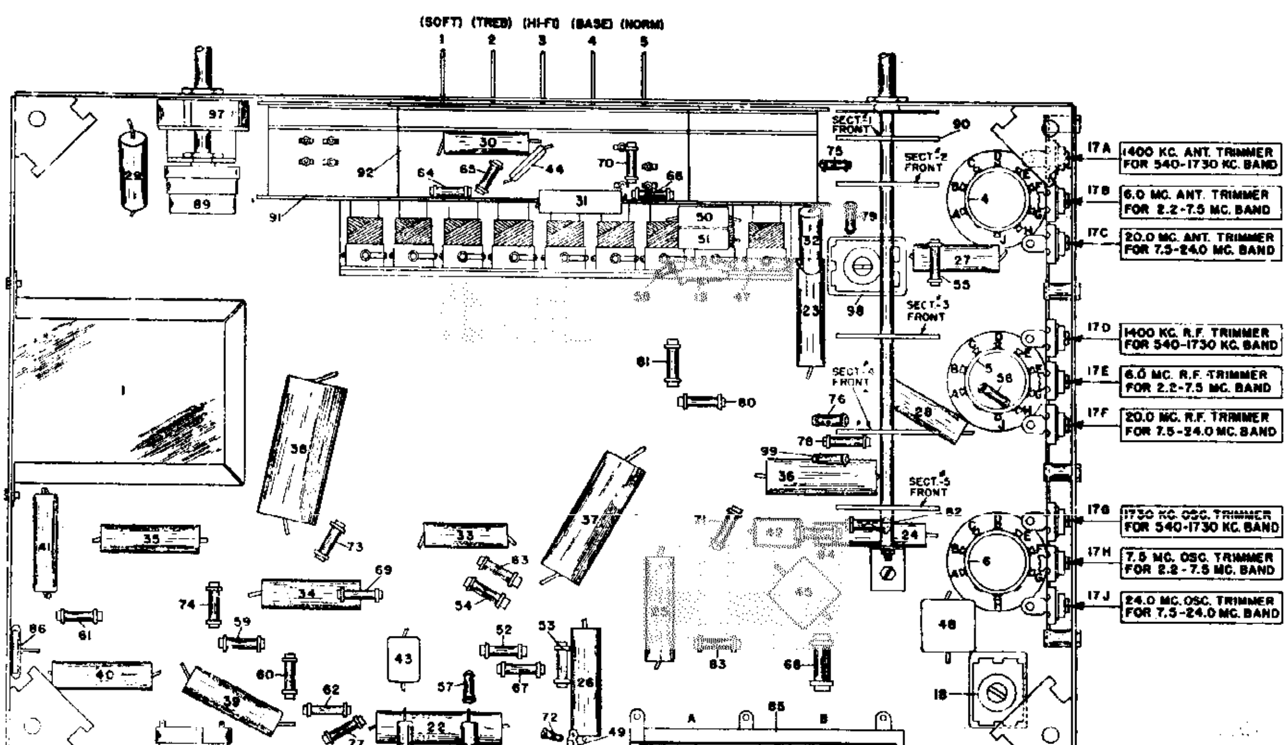
SENTINEL RADIO CORP.



MODEL 145AE
Trimmers
Chassis

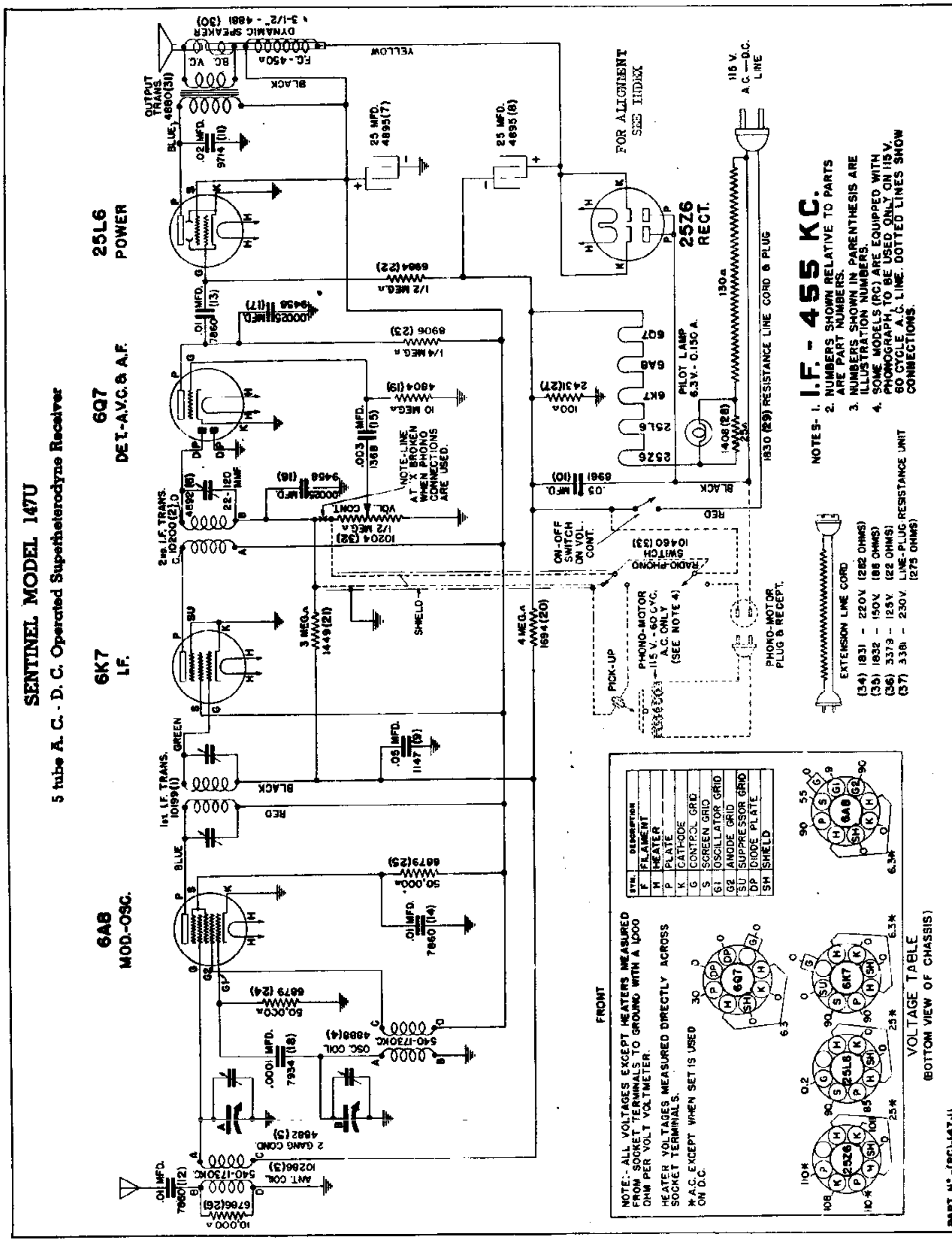
SENTINEL RADIO CORP.





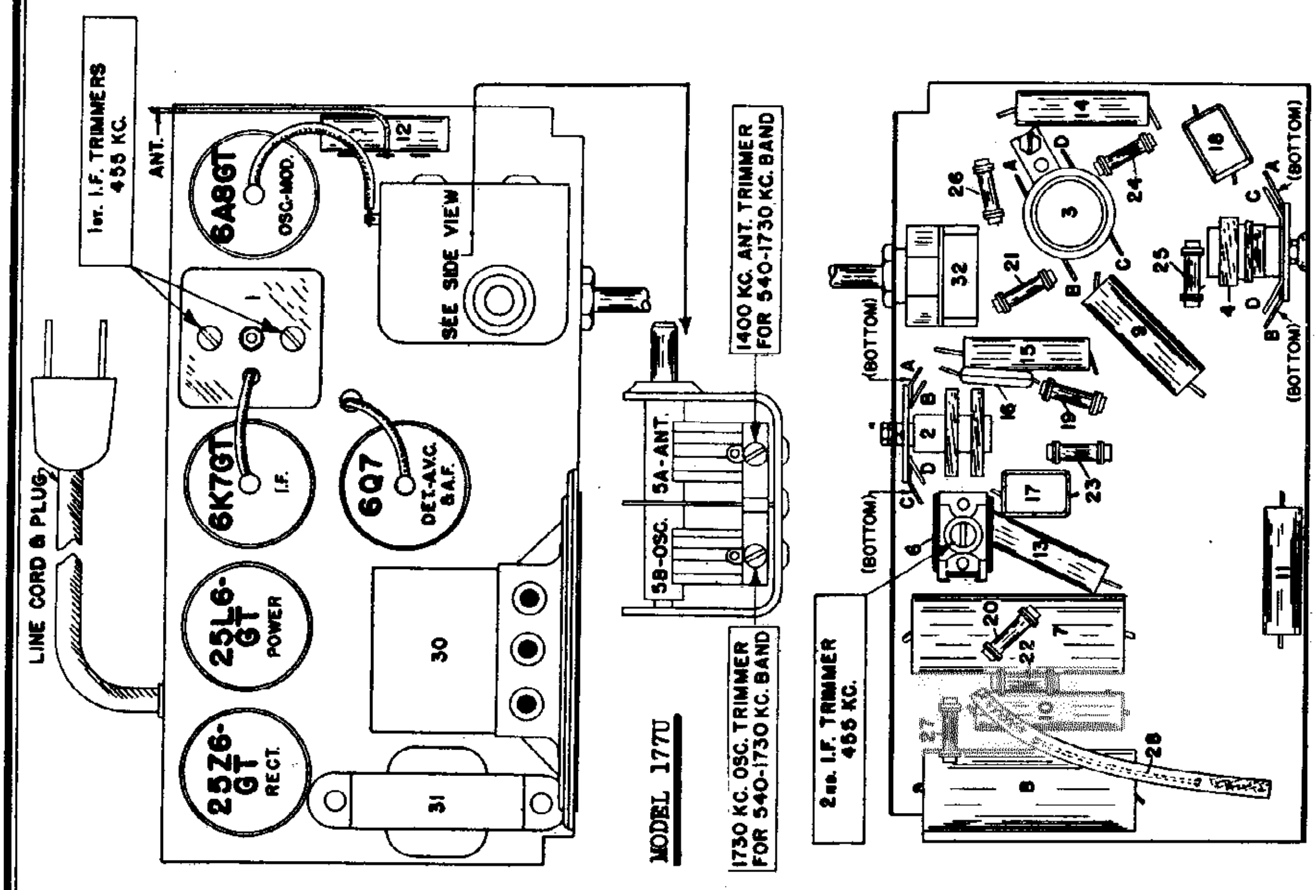
MODEL 147U
Schematic, Voltage
Socket

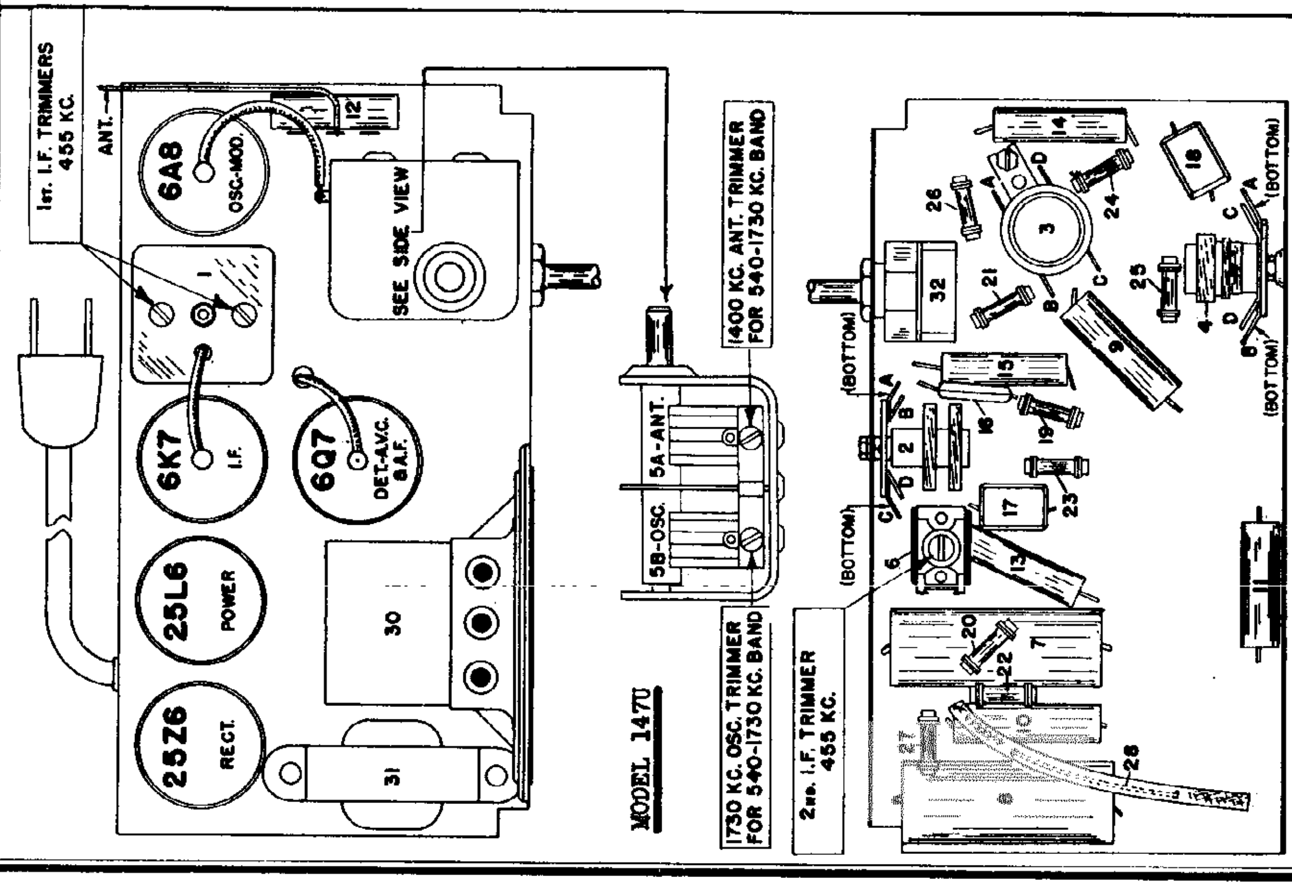
SENTINEL RADIO CORP.



MODEL 147U
MODEL 177U
Trimmers, Chassis

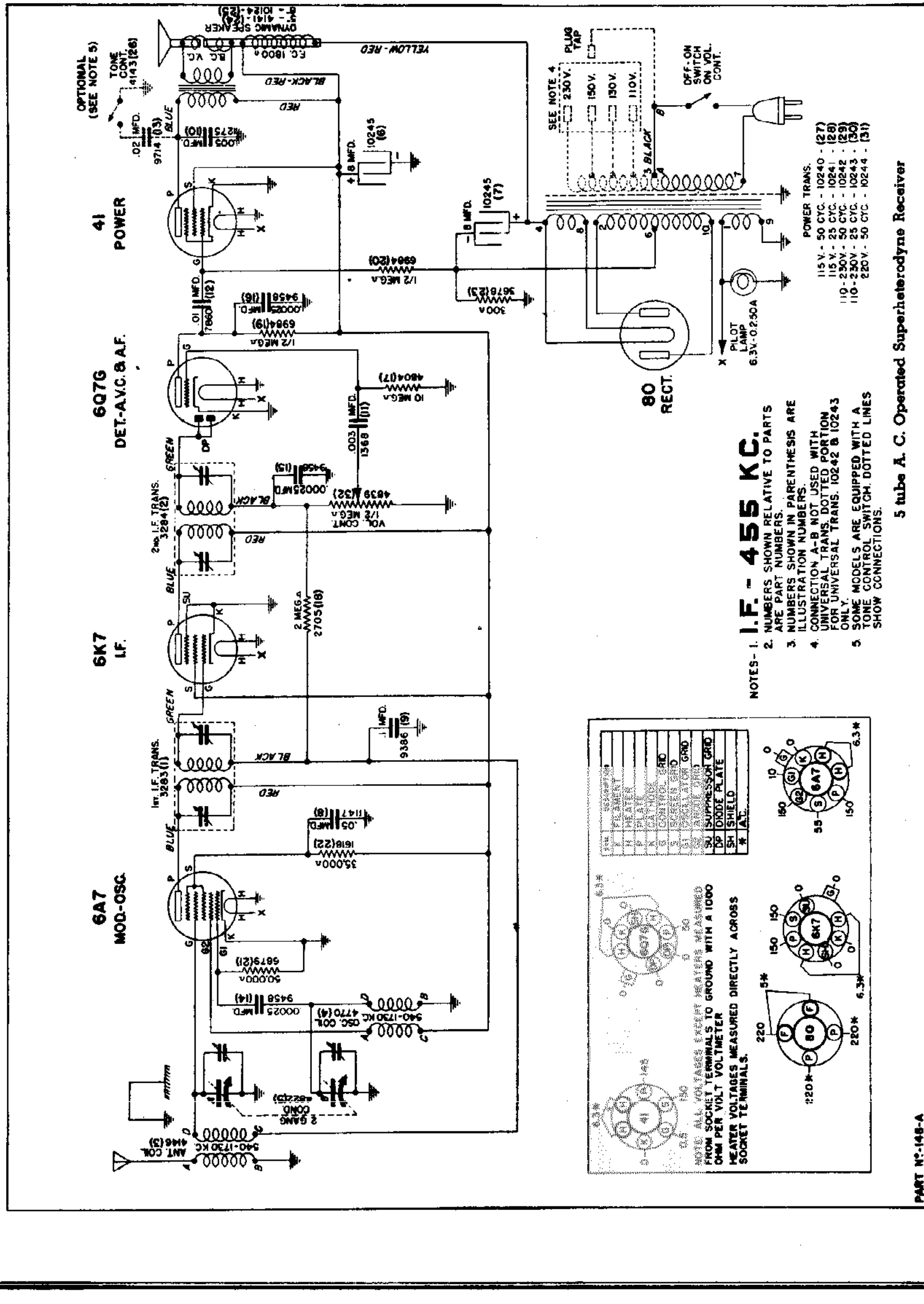
SENTINEL RADIO CORP.





SENTINEL RADIO CORP.

MODEL 148A
Schematic, Voltage
Socket



MODEL 148A
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

MODEL 151BL
Alignment

ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

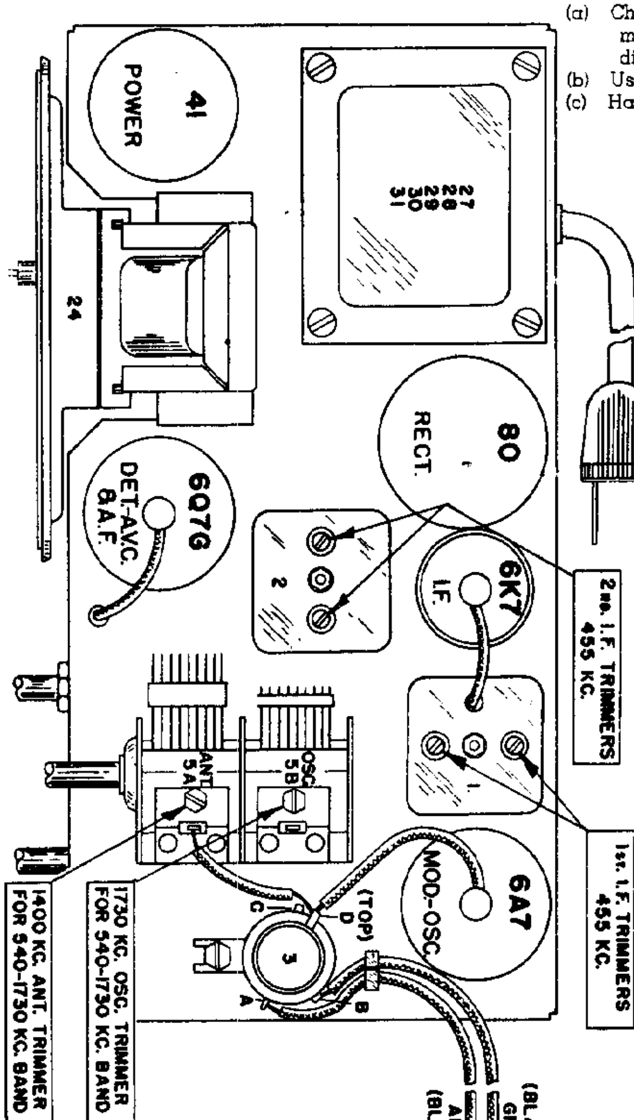
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

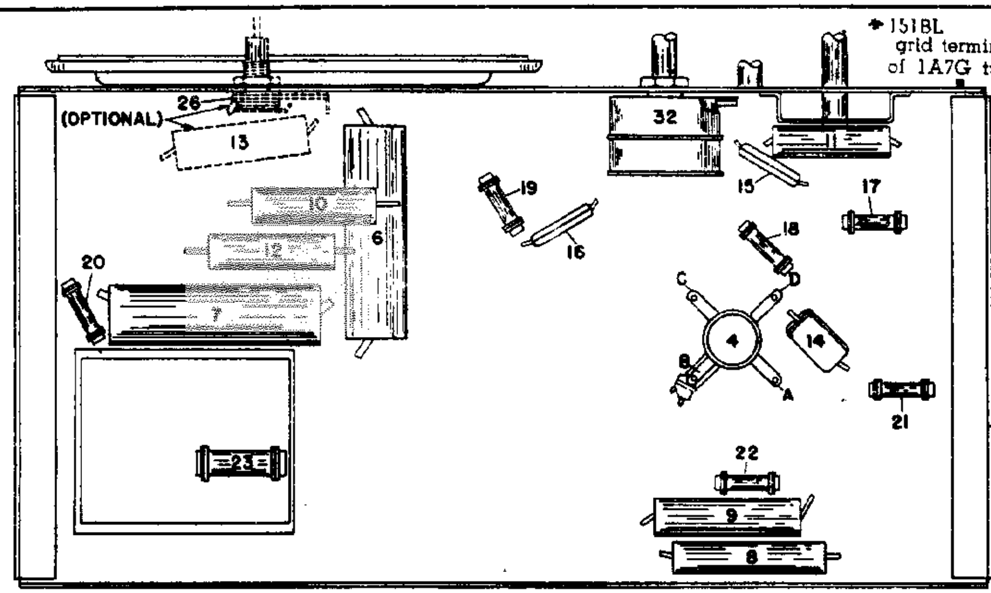
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

	Set receiver dial to:	TEST OSCILLATOR — Adjust test oscillator frequency to:	TEST OSCILLATOR — Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR — Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
	I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to * grid terminal of 6A7 tube DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
1	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD condenser	Receiver blue antenna lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
2	Exactly 1400 K. C.	Exactly 1400 K. C.	.00025 MFD condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.

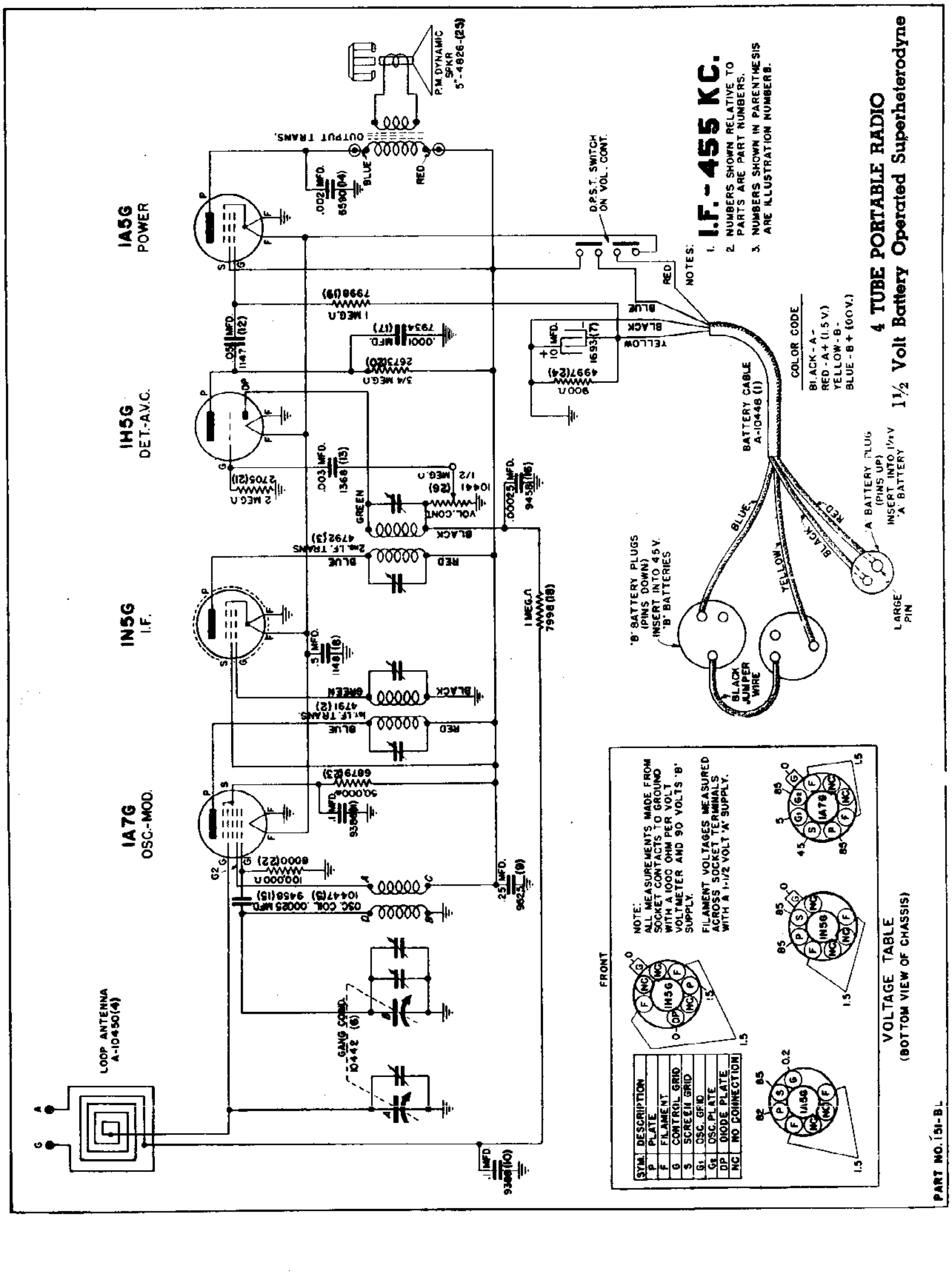
* 151BL grid terminal of 1A7G tube





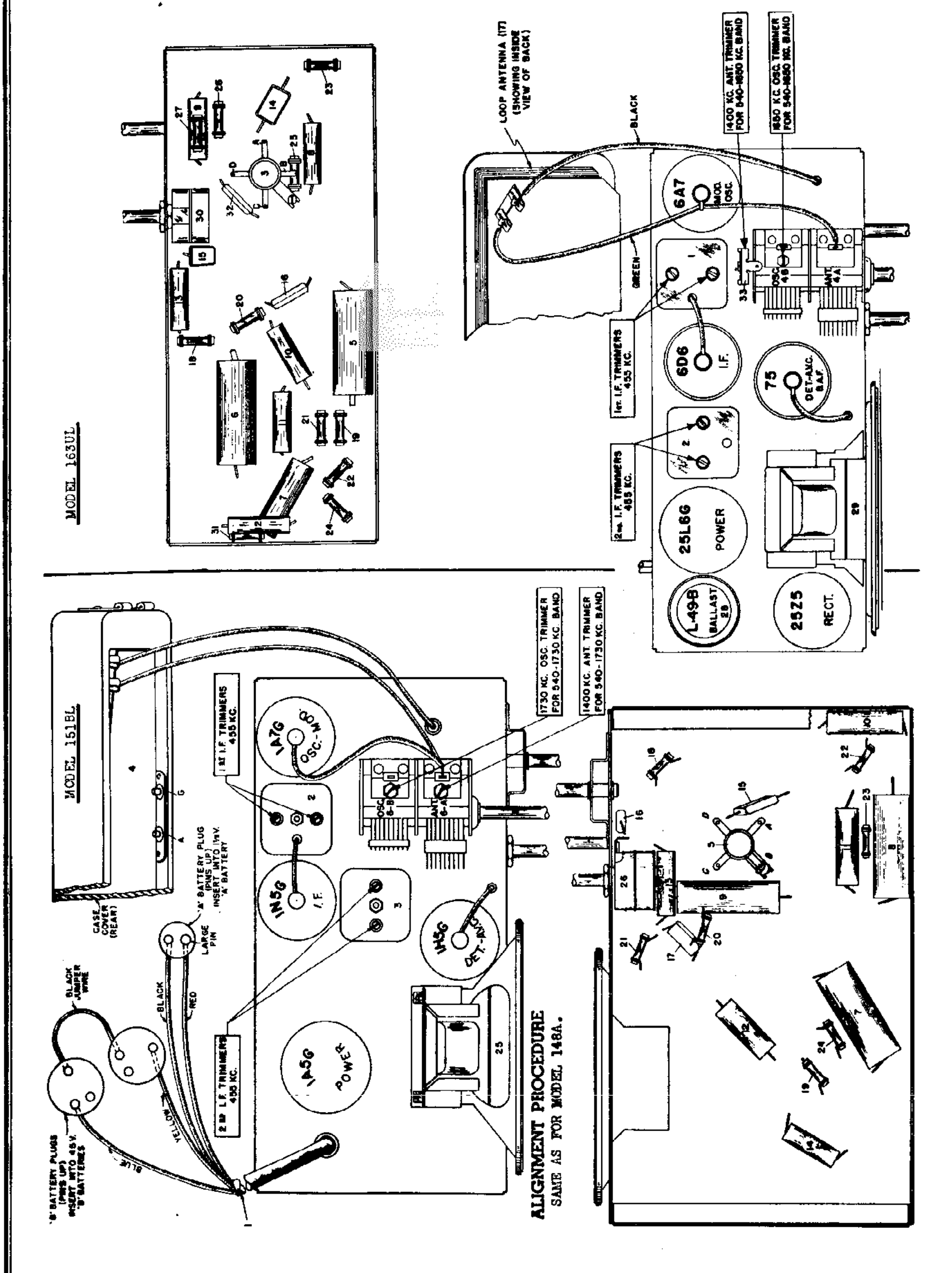
SENTINEL RADIO CORP.

MODEL 151BL
Schematic, Voltage
Socket



MODEL 151BL
MODEL 163UL
Trimmers,Chassis

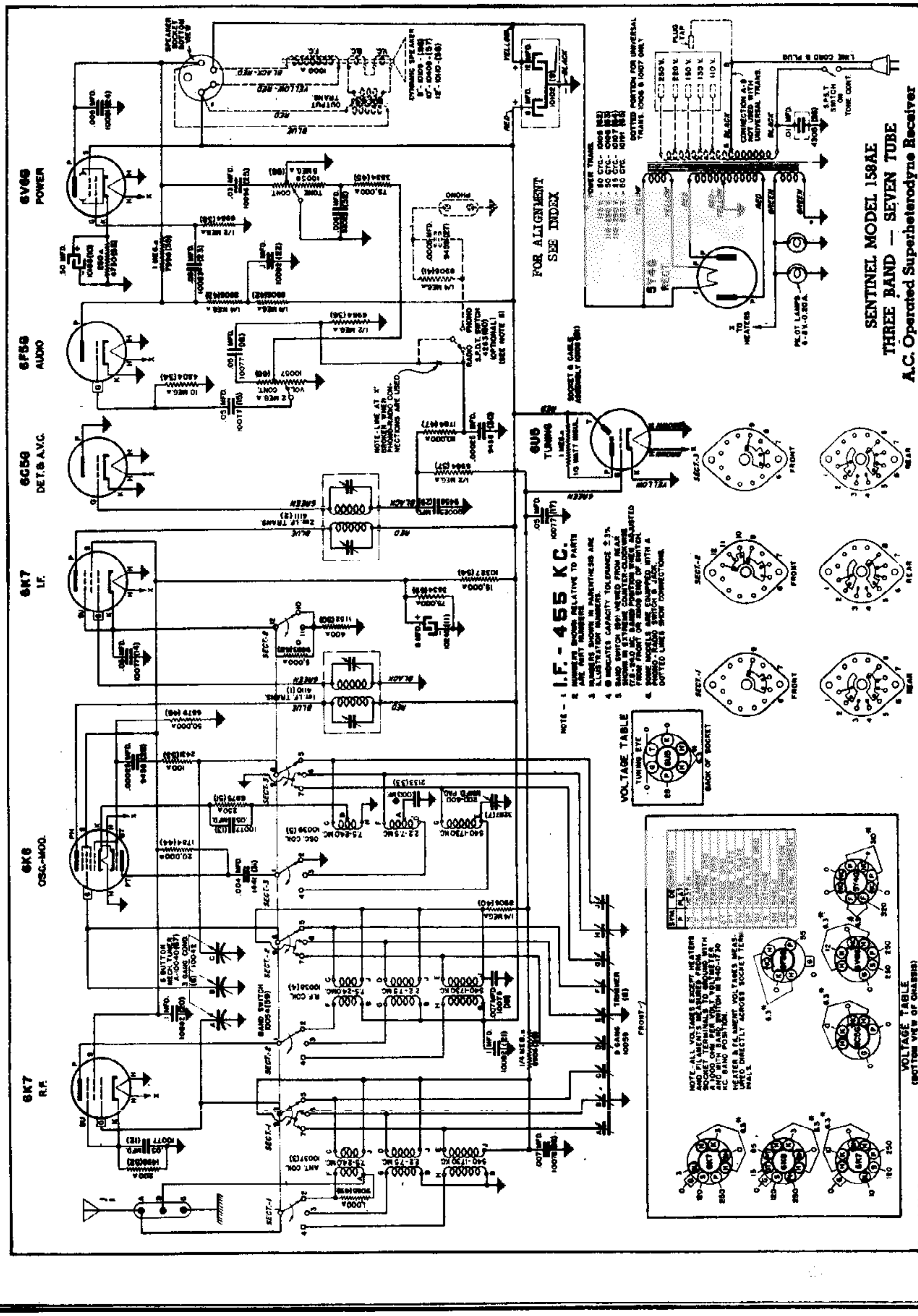
SENTINEL RADIO CORP.



ALIGNMENT PROCEDURE
SAME AS FOR MODEL 148A.

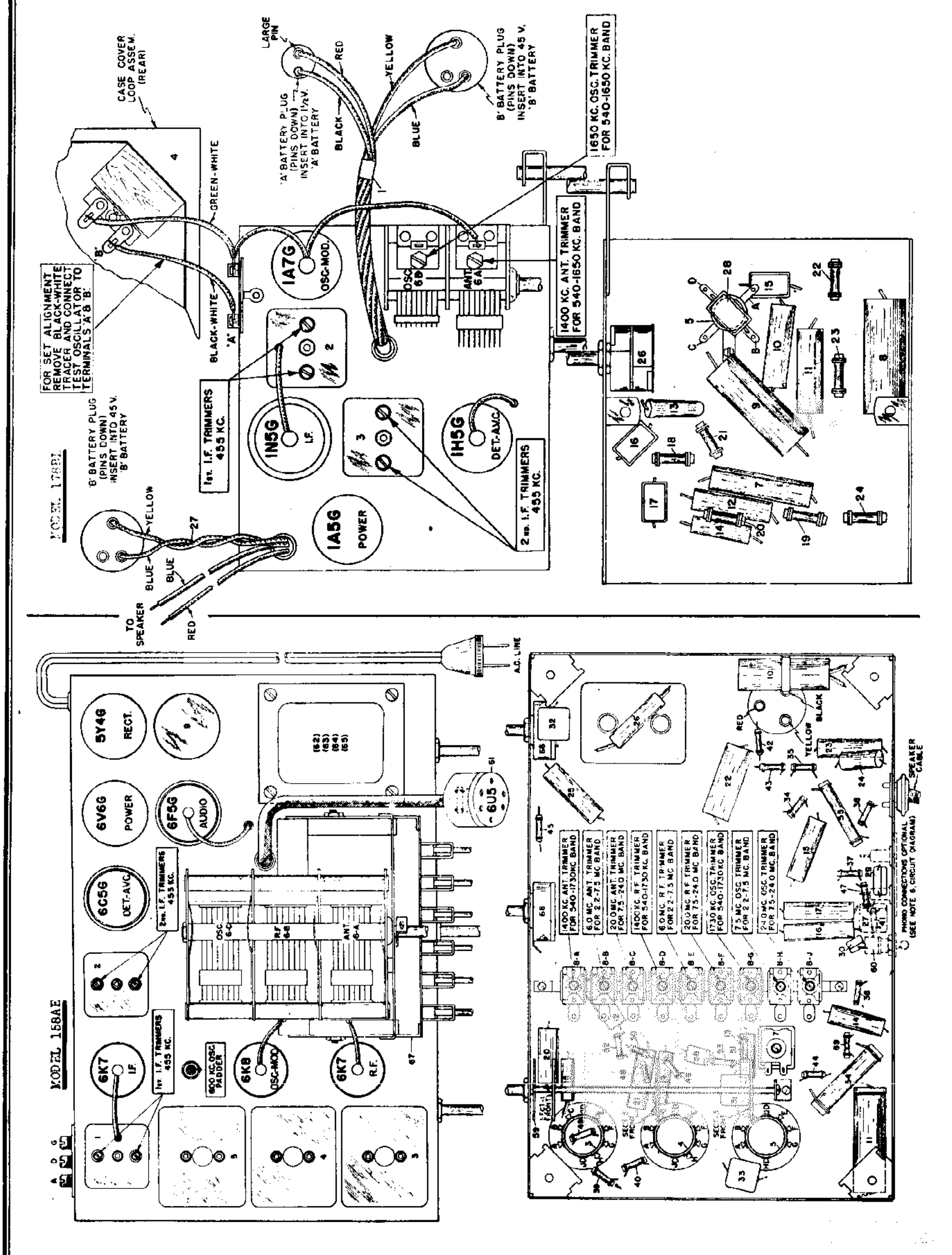
MODEL 158AE
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



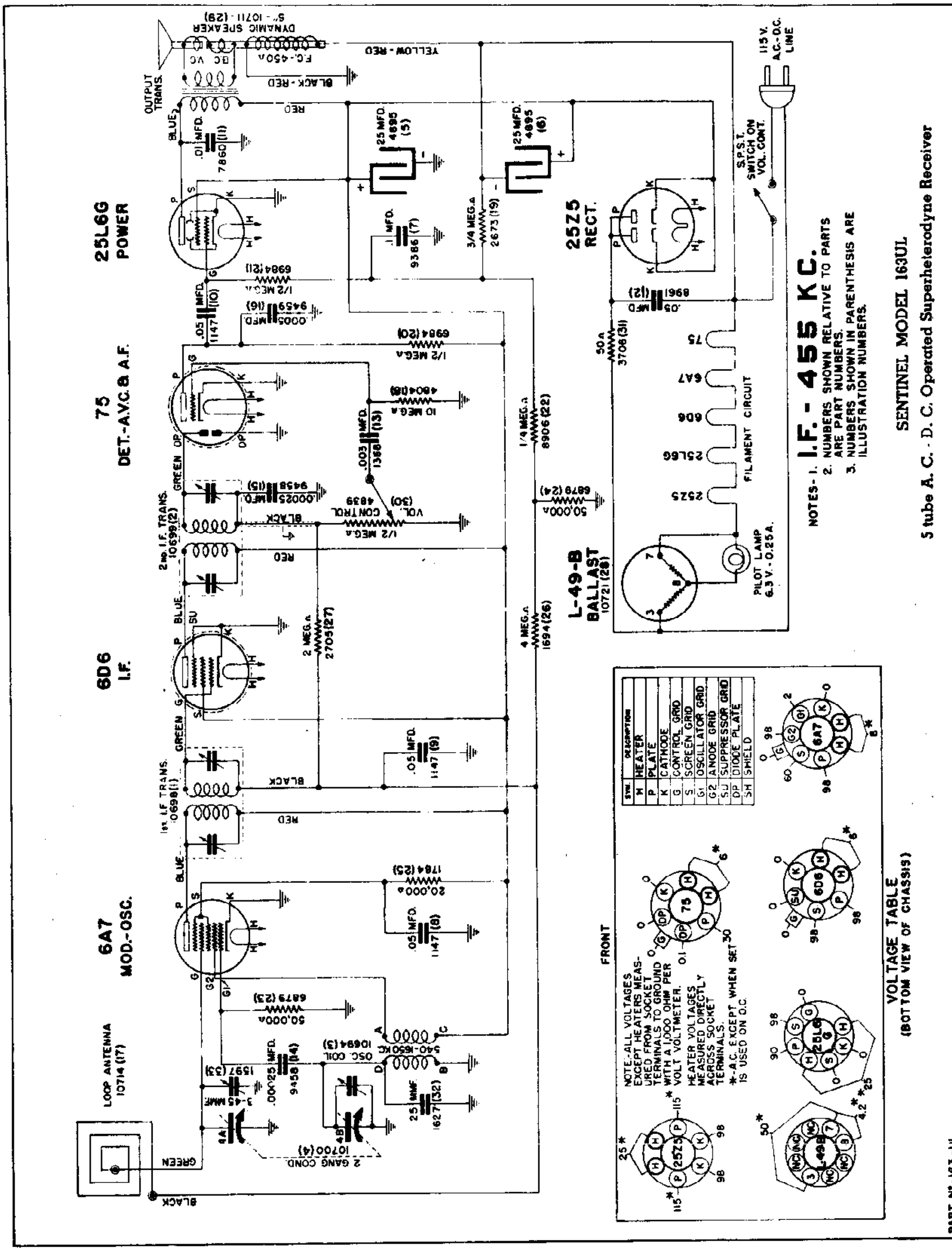
MODEL 158AE
MODEL 178BL
Trimmers,Chassis

SENTINEL RADIO CORP.



MODEL 163UL
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



MODEL 163UL
Alignment
MODEL 167U
Socket, Trimmers
Chassis

SENTINEL RADIO CORP.

MODEL 178BL
Alignment

ALIGNMENT PROCEDURE IN TABULATED FORM

Before starting alignment, check tuning dial adjustment by: **turn gang condenser until plates touch maximum capacity stop (completely in mesh)** at which point the dial indicator **must be exactly even with the last line at the low frequency end of the dial calibration.** If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

MODEL 163UL

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, place test oscillator in series with set loop by:

1. Remove the black with white tracer wire used to connect loop antenna to Fahenstock clip on chassis.
2. Attach test oscillator to terminals marked "A" and "B" on parts layout diagram.

IMPORTANT—No condenser should be in series with generator leads.

Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below—and:
I. F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to grid terminal of 1A7G tube Low side to chassis DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
(1) Exactly 1650 K. C.	Exactly 1650 K. C.	None	Attach in series with "A" and "B" Loop Terminals	Adjust 1650 K. C. oscillator trimmer for maximum output.
(2) Approx. 1400 K. C.	Exactly 1400 K. C.	None	Attach in series with "A" and "B" Loop Terminals	Adjust 1400 K. C. antenna trimmer for maximum output.

MODEL 178BL

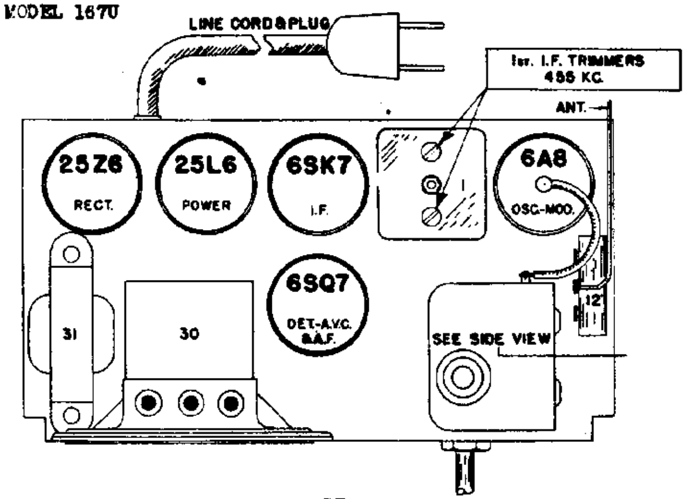
IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS IT WILL BE IN WHEN THE SET IS IN THE CABINET AND THE BACK ATTACHED.

When adjusting 1650 K.C. oscillator trimmer and 1400 K.C. antenna trimmer, couple test oscillator to set loop by placing lead from high side of test oscillator on top of or near set loop. Be sure that neither the loop or test oscillator lead moves during alignment.

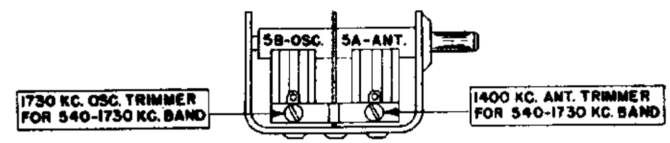
DO NOT ATTACH LOW SIDE OF TEST OSCILLATOR TO RECEIVER—LEAVE UNCONNECTED.

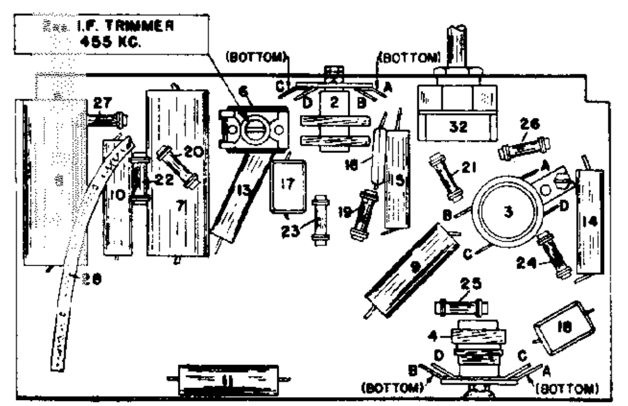
Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below—and:
I. F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to grid terminal of 6A7 tube DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
(1) Exactly 1650 K. C.	Exactly 1650 K. C.	None	Lay lead on top of or close to loop	Adjust 1650 K. C. oscillator trimmer for maximum output.
(2) Approx. 1400 K. C	Exactly 1400 K. C.	None	Lay lead on top of or close to loop	Adjust 1400 K. C. antenna trimmer for maximum output.

MODEL 167U



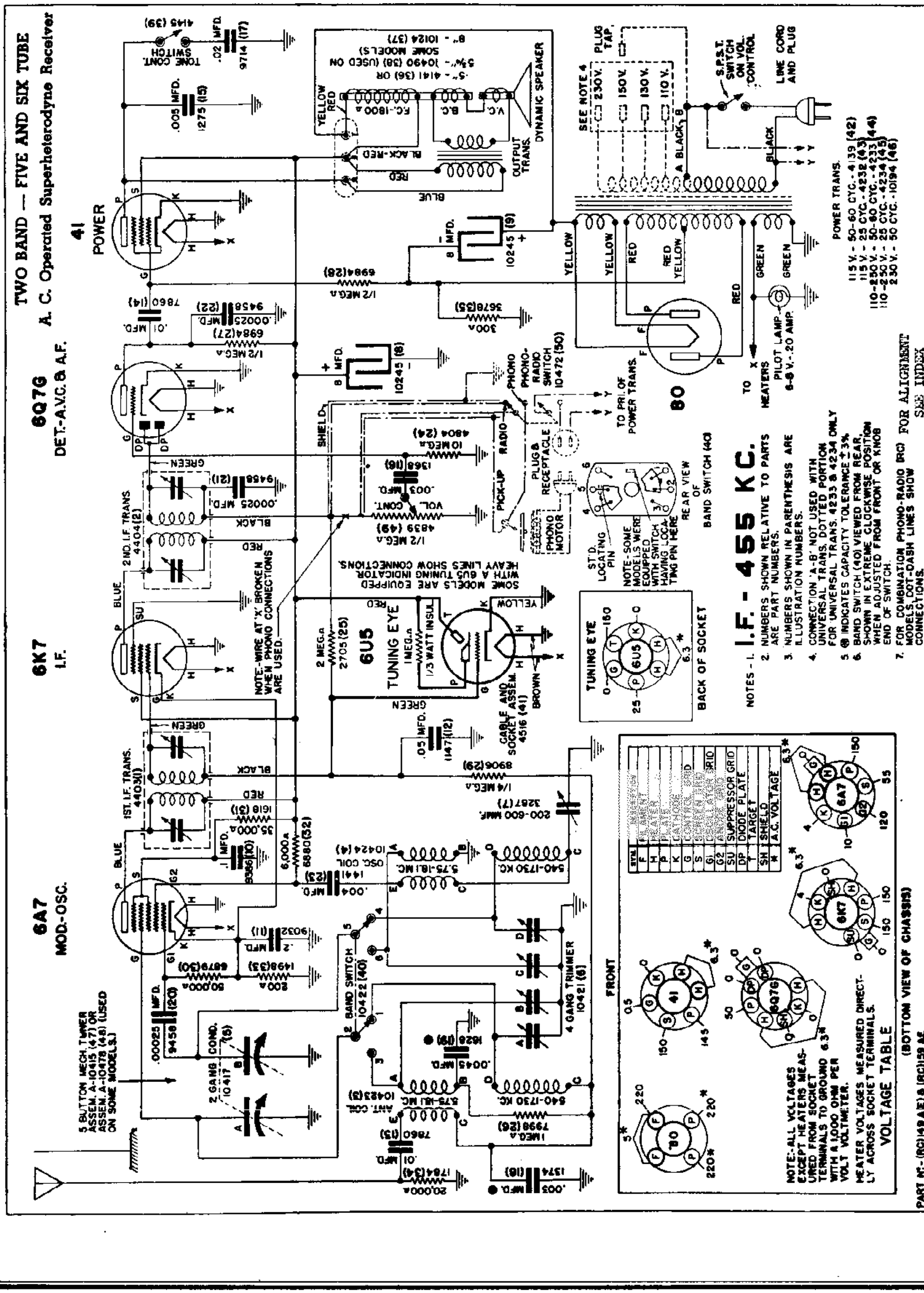
ALIGNMENT PROCEDURE
SEE INDEX.





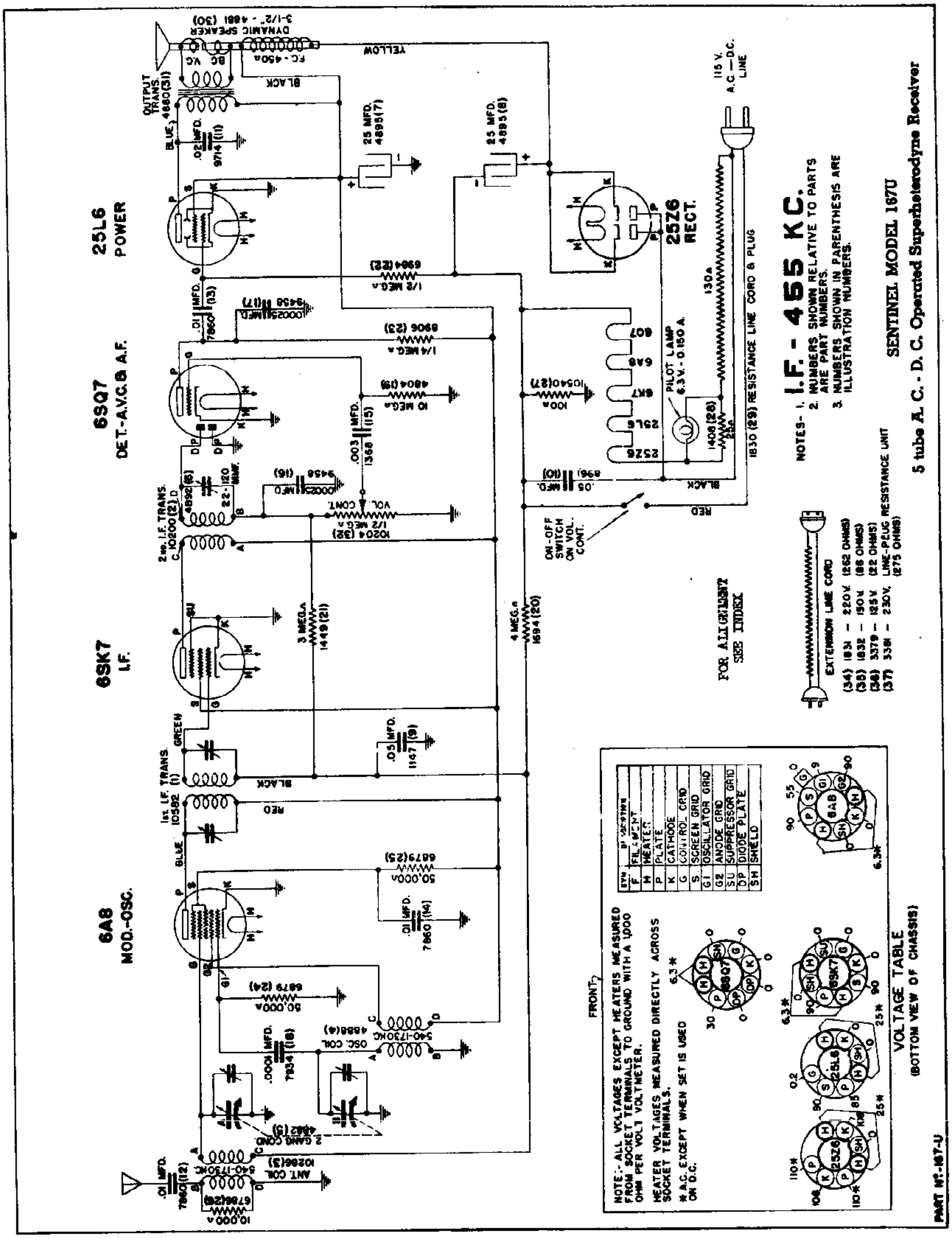
SENTINEL RADIO CORP.

MODELS 149A, 149AE, 159AE
Schematic, Voltage
Socket



MODEL 167U
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



MODEL 127B MODEL 128B
MODEL 137U MODEL 138AE
MODEL 139UE MODELS 140B,140BE

SENTINEL RADIO CORP.

MODEL 141AE MODEL 147U
MODEL 145AE MODEL 158AE
MODEL 167U MODEL 177U

Alignment

Sentinel Models 127B,137U,147U,167U,and 177U.

ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to gang condenser frame.

Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below—and:
Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to grid terminal of 1A7G tube (1A7G) DO NOT REMOVE CAP. 6A8 (137U,147U,167U,177U (6A7?))	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
1 Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD condenser	Receiver blue antenna lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
2 Exactly 1400 K. C.	Exactly 1400 K. C.	.00025 MFD condenser	Receiver blue antenna lead	Adjust 1400 K. C. antenna trimmer for maximum output.

Sentinel Model 128B

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: Turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below and:
I.F. alignment use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 1C7G tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C.	1 Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2 Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1400 K.C. antenna trimmer for maximum output.
	3 Approximately 600 K.C.	Approximately 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.7 to 18.1 M.C. BAND	1 Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 15 M.C. antenna trimmer for maximum output.

Sentinel Model 141AE

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. ALIGNMENT use any band position	Any point where no interfering signal is received	[illegible]	[illegible]	High side to grid cap of 6K8 tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1600 TO 492 K.C. BAND	(1) Exactly 1600 K.C.	[illegible]	[illegible]	Receiver blue antenna lead	Adjust 1600 K.C. oscillator trimmer for maximum output.
	(2) Approx. 1400 K.C.	[illegible]	[illegible]	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	(3) Approx. 550 K.C.	[illegible]	[illegible]	Receiver blue antenna lead	While rocking gang condenser adjust 550 K.C. oscillator padder for maximum output.
136 TO 390 K.C. BAND	(1) Exactly 390 K.C.	[illegible]	[illegible]	Receiver blue antenna lead	Adjust 390 K.C. oscillator trimmer for maximum output.
	(2) Approx. 350 K.C.	[illegible]	[illegible]	Receiver blue antenna lead	Adjust 350 K.C. antenna trimmer for maximum output.
	(3) Approx. 160 K.C.	160 K.C.	condenser	Receiver blue antenna lead	While rocking gang condenser adjust 160 K.C. oscillator padder for maximum response.
5.7 TO 18.1 M.C. BAND	(1) Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	(2) Approx. 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.

ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

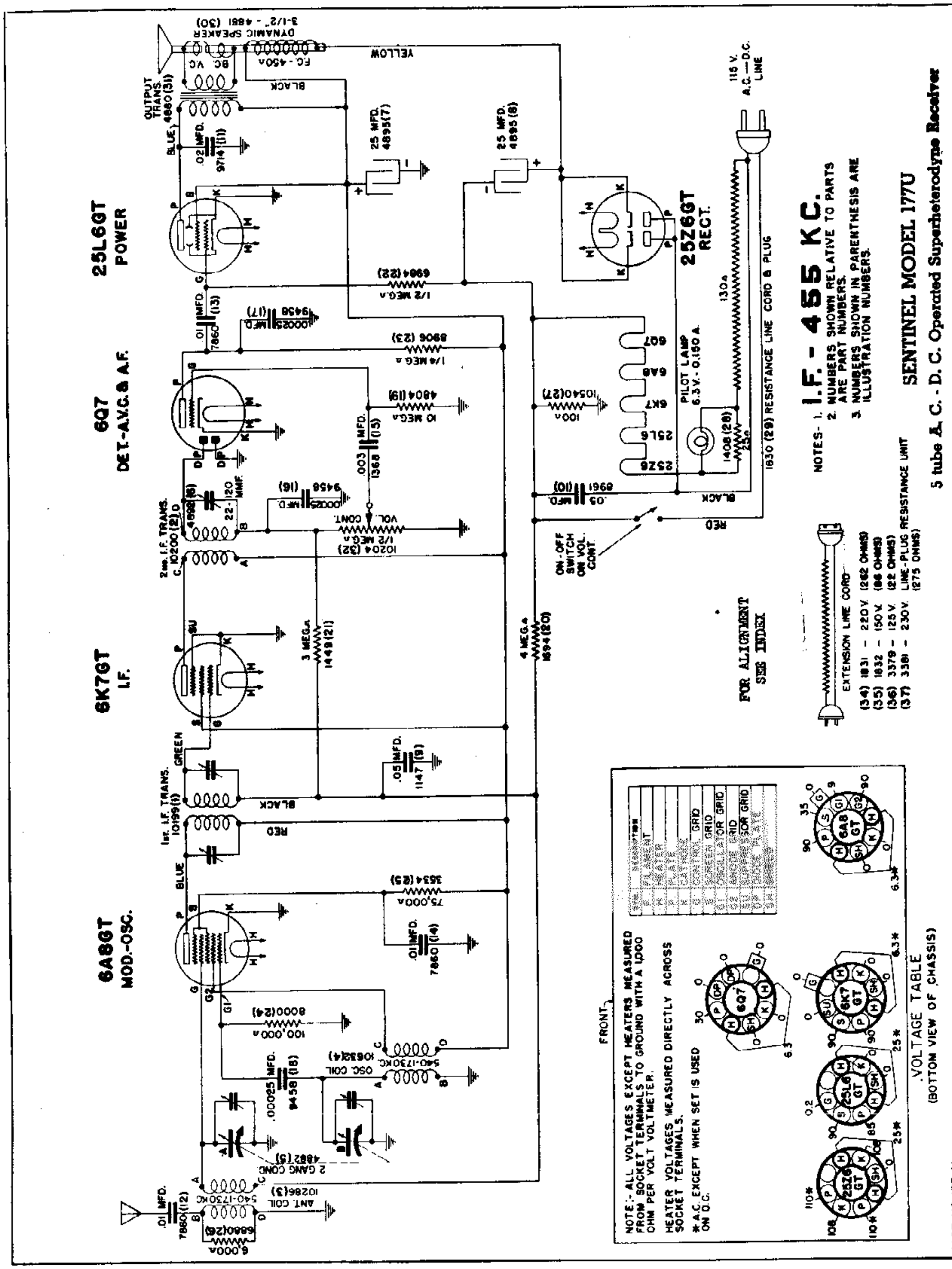
(c) Have ground lead of test oscillator attached to chassis.

Models 138AE, 139UE, 140B, 140BE, 145AE and 158AE

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I.F. ALIGNMENT use any band position	Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 TO 540 K.C. BAND	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver antenna lead	While rocking gang condenser adjust 1400 K.C. antenna and R.F. trimmers for maximum output.
	(3) Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna lead	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.2 TO 7.5 M.C. BAND	(1) Exactly 7.5 M.C.	Exactly 7.5 M.C.	400 Ohm carbon resistor	Receiver antenna lead	Adjust 7.5 M.C. oscillator trimmer for maximum output.
	(2) Exactly 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna lead	While rocking gang condenser adjust 6 M.C. antenna and R.F. trimmers for maximum output.
7.5 TO 24 M.C. BAND	(1) Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna lead	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	(2) Approx. 20 M.C.	Exactly 20 M.C.	400 Ohm carbon resistor	Receiver antenna lead	While rocking gang condenser adjust 20 M.C. antenna and R.F. trimmers for maximum output.

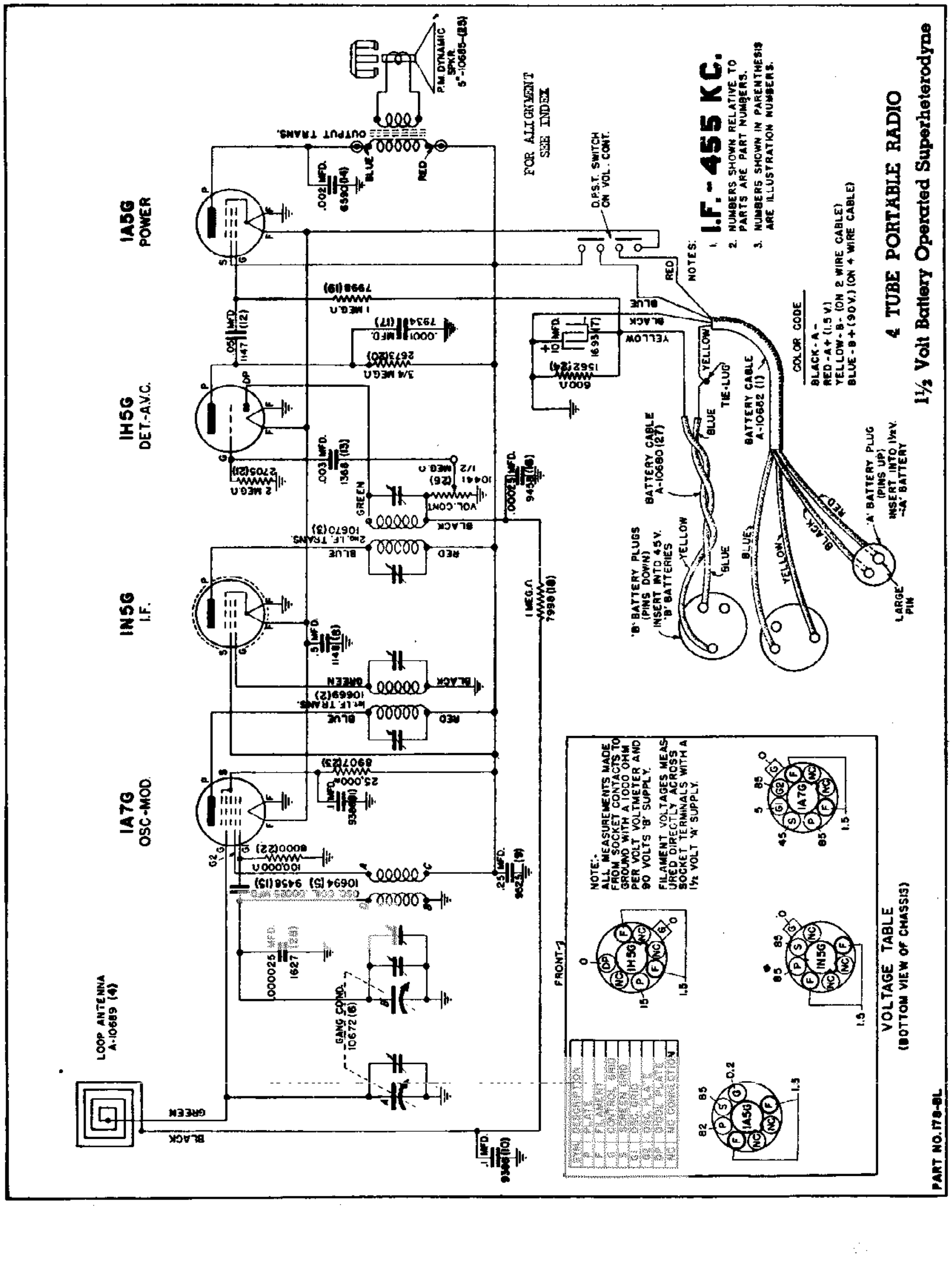
MODEL 177U
Schematic, Voltage
Socket

SENTINEL RADIO CORP.



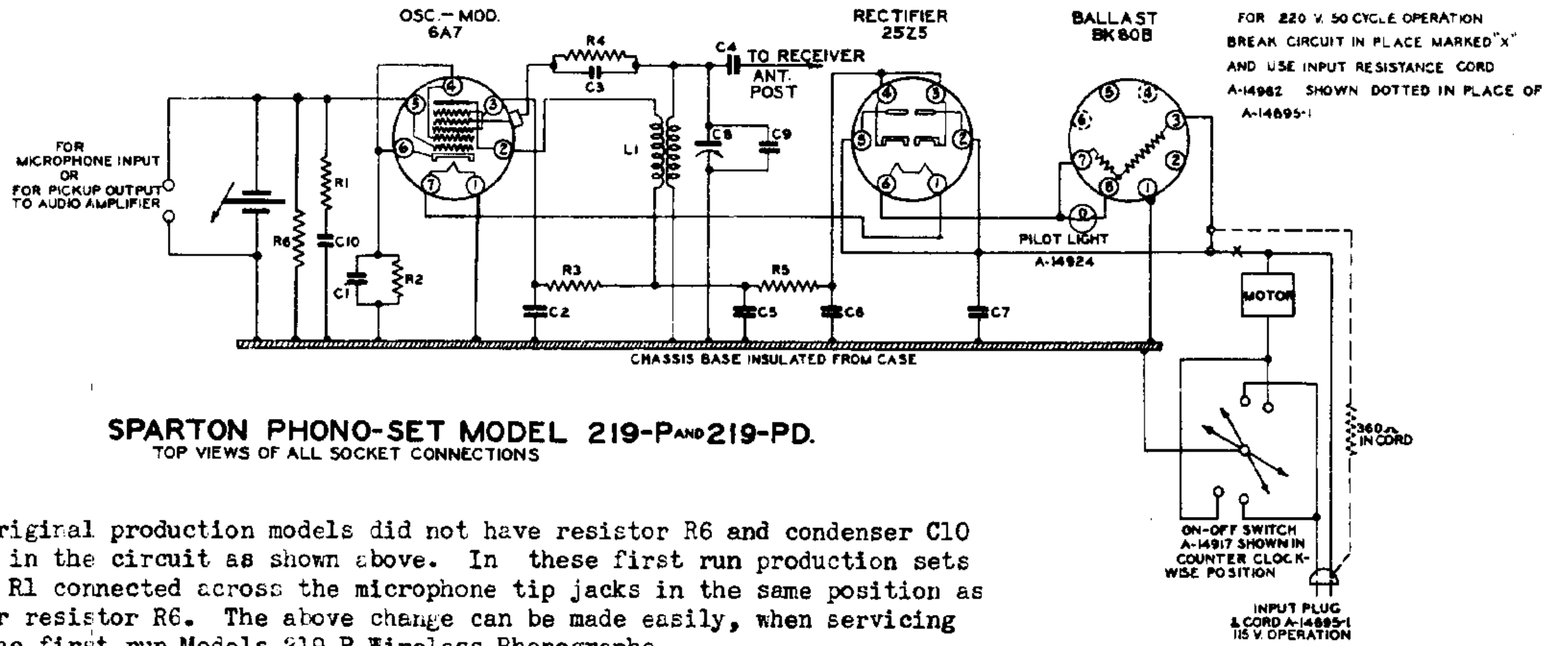
SENTINEL RADIO CORP.

MODEL 178BL
Schematic, Voltage
Socket



MODELS 219-P,219-PD
Wireless Phonograph
Schematic,Voltage
Adjustments,Changes

SPARKS WITHINGTON CO.



SPARTON PHONO-SET MODEL 219-P AND 219-PD.
TOP VIEWS OF ALL SOCKET CONNECTIONS

NOTE: Original production models did not have resistor R6 and condenser C10 included in the circuit as shown above. In these first run production sets resistor R1 connected across the microphone tip jacks in the same position as shown for resistor R6. The above change can be made easily, when servicing any of the first run Models 219-P Wireless Phonographs.

The SPARTON Wireless Phonograph Models 219-P and 219-PD are shipped from the factory for operation at approximately 1550 kilocycles.

This frequency may be changed by adjusting a trimmer condenser which is reached through the hole in the bottom of the chassis. An insulated shaft screwdriver should be used. Turning the screw clockwise lowers the frequency and turning the screw counter-clockwise increases the frequency. The normal range of adjustment is from approximately 1200 kilocycles to approximately 1700 kilocycles.

110 V. 60 CYCLE MOTOR	C-3140	MODEL 219-P
110 V. 50 CYCLE MOTOR	C-3140-1	
110 V. 40 CYCLE MOTOR	C-3140-2	
110 V. 25 CYCLE MOTOR	C-3140-3	
220 V 50 CYCLE MOTOR	C-3140-4	
110 V. 60 CYCLE MOTOR	C-3154-	MODEL 219-PD.
110 V. 50 CYCLE MOTOR	C-3154-1	
110 V. 40 CYCLE MOTOR	C-3154-2	
110 V. 25 CYCLE MOTOR	C-3154-3	
220 V 50 CYCLE MOTOR	C-3154-4	

C1	.1 MFD. 200V.	C-3202-38C
C2	.1 MFD. 200V.	C-3202-38C
C3	50 MMFD. MICA	C-720-343
C4	10 MMFD. MICA	C-720-367
C5	10 MFD 150V. ELECT.	A-14927-1
C6	15 MFD. 150V. ELECT.	
C7	.1 MFD. 200V.	C-3202-38C
C8	95-470 MMFD. MICA TRIM.	A-14911-3A
C9	75 MMFD.	A-14922
C10	.006 MFD. 400V.	C-3204-68C
R1	33,000 Ω .25 W.	C-2795-80B
R2	820 Ω .25 W.	C-2795-61B
R3	10000 Ω .25 W.	C-2795-74B
R4	10000 Ω .25 W.	C-2795-74B
R5	4700 Ω .5 W.	C-2796-70C
R6	180000 Ω .25W.	C-2795-89B
L1	OSCILLATOR COIL	A-14826-1

VOLTAGE CHART

Line Voltage: 115 volts
Control Switch in Center Position

Antenna Not Connected.
Microphone Not Connected.

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A7	Oscillator-Modulator	0	120	80	4.5	0	4.5	6.3*	-	0
25Z5	Rectifier	6.3*	117*	150	150	117*	31.3*	-	-	-
BK-80B	Ballast	0	-	117*	-	-	-	31.3*	37*	-

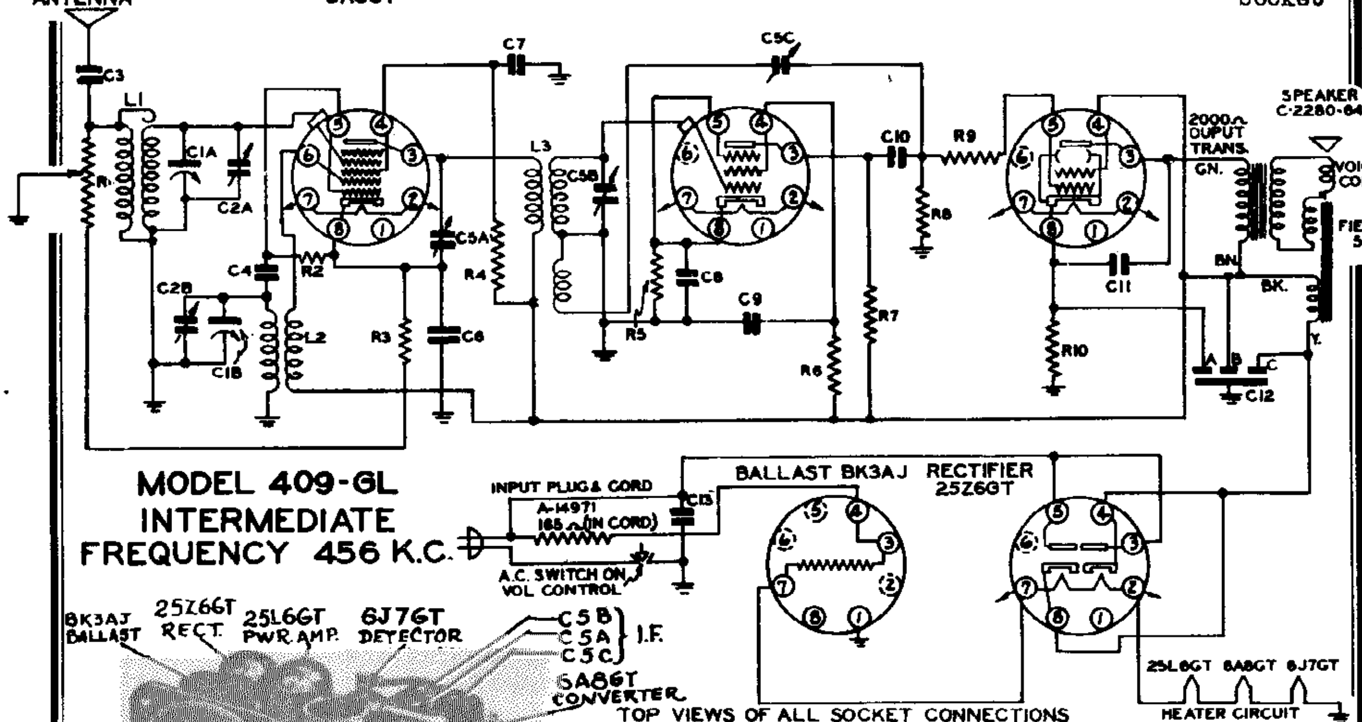
Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

(Original) Effective November 1, 1938

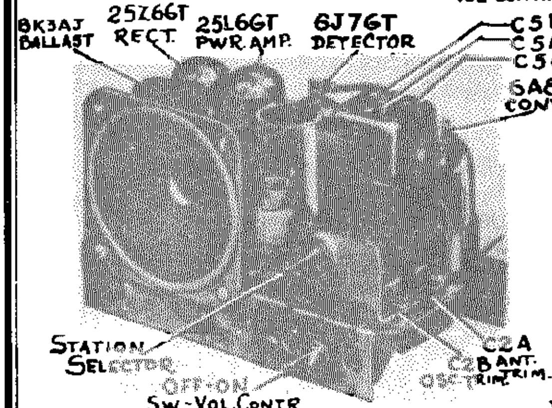
MODEL 409-GL
Schematic

SPARKS WITHINGTON CO.

Trimmers, Alignment
Voltage
Socket



MODEL 409-GL
INTERMEDIATE FREQUENCY 456 K.C.



C1A&B	VARIABLE CONDENSER	B-7288
C2A&B	ON VARIABLE CONDENSER	
C3	.001 MFD. 400 V.	C-3204-2C
C4	50 MMF. MICA	C-720-343
C5AB&C	I.F. TRIMMER	A-14792
C6	.01 MFD. 200 V.	C-3202-76C
C7	.05 MFD. 200 V.	C-3202-28C
C8	10 MFD. 25 V.	A-14782-2
C9	.01 MFD 200 V.	C-3202-20C
C10	.01 MFD. 200 V.	C-3202-20C
C11	.02 MFD. 400 V.	C-3204-78C
C12AB&C	20-25-25 MFD. ELECT.	A-14972
C13	.05 MFD. 400 V.	C-3204-28C

R1	VOL. CONTROL & SWITCH	A-12708-A1
R2	56000 Ω .25 W.	C-2795-83B
R3	390 Ω .25 W.	C-2795-57B
R4	39000 Ω .25 W.	C-2795-81B
R5	27000 Ω .25 W.	C-2795-79B
R6	6.2 MEGOHM .25 W.	C-2795-250B
R7	560 000 Ω .25 W.	C-2795-95B
R8	560 000 Ω .25 W.	C-2795-95B
R9	100000 Ω .25 W.	C-2795-86B
R10	150 Ω .5 W.	C-2796-52C
L1	B.C. ANT. COIL	A-14974
L2	B.C. OSC. COIL	A-14975
L3	I.F. TRANS.	A-12989-5

VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected†

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A8GT	Converter	0	11*	115	42	-2.8	115	5*	1.8	0
6J7GT	Detector	0	5.8*	**	**	**	115	0	**	0
25L6GT	P.O.	0	54*	105	115	0	0	7*	7.2	-
25Z6GT	Rectifier	0	58*	115*	146*	115*	0	54*	146*	-
BK5AJ	Ballast	0	0	62*	62*	0	0	58*	0	-

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.
**Cannot be measured accurately with 1000 ohms per volt voltmeter.

† A regular outside antenna 50 feet in length excluding lead-in and 25 to 50 feet in height should be used for best results with this model.

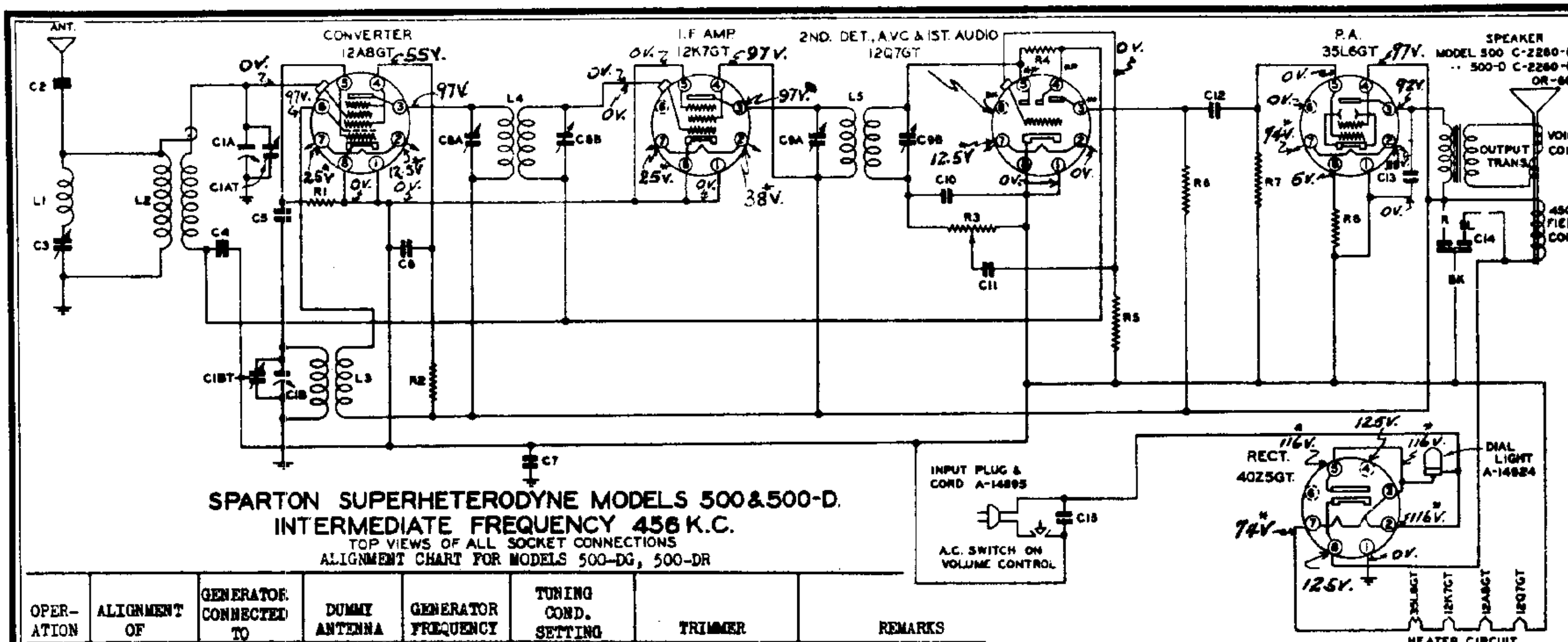
ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last mark on scale when condenser plates are flush)*						
2	(Back off, i.e. turn counterclockwise, regeneration cond. C5C "red spot" before I.F. is aligned)						
3	I.F.	6A8GT	.1 mf.	456 K.C.	Open	C5A, B	
4	(Adjust C5C "red spot" turning in clockwise until greatest sensitivity is obtained. If oscil. occurs, turn out C5C until oscil. stops)						
5	Broadcast Band	Ant.	200 mmf.	1500 KC	1500 KC	C2B Osc.	Peak accurately
6						C2A Ant.	Peak accurately
7	(Check calibration and sensitivity at 600 KC, 1000 KC, 1500 KC)						
8	(Connect set to regular antenna and check reception of stations. Readjust C5C if set howls or oscillates on strong signals. Then recheck sensitivity)						

*Model 409-GL chassis may be completely aligned without removing from cabinet.

SPARKS WITHINGTON CO.

MODELS 500DG, 500DR, 500W
500BV, 500BW
Schematic, Voltage, Socket
Trimmers, Alignment



SPARTON SUPERHETERODYNE MODELS 500 & 500-D.
INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

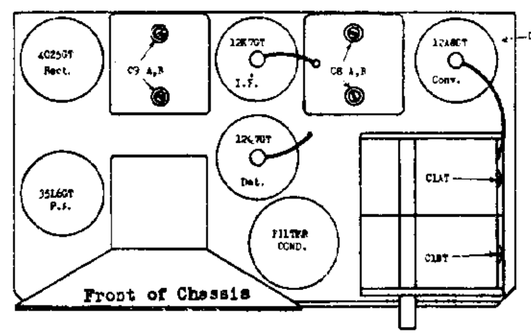
ALIGNMENT CHART FOR MODELS 500-DG, 500-DR

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	On Deluxe Models set pointer parallel to horizontal lines with condenser plates fully meshed.						
2	I.F.	12A8GT Grid Cap	200 mmf.	456 KC	Open	C9 A&B	2nd I.F.
						C8 A&B	1st I.F.
3	Rejector	Ant.	200 mmf.	456 KC	Closed	C3	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1500 KC	1500 KC	C1BT Osc.	Peak at max.
						C1AT Ant.	Peak at max.
5	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)						
6	(Check operations 1 to 5 inclusive)						

ALIGNMENT CHART FOR MODELS 500-W, 500-BV, 500-BW

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	12A8GT Grid Cap	200 mmf.	456 KC.	Open	C9 A&B	2nd I.F.
						C8 A&B	1st I.F.
2	Rejector	Ant.	200 mmf.	456 KC	Closed	C3	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1700 KC	Open	C1BT Osc.	Peak at max.
				1500 KC	1500 KC	C1AT Ant.	Peak at max.
4	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)						
5	(Check operations 1 to 4 inclusive)						

Notes: Voltage and resistance readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.
* AC volts.
**Cannot be measured with Weston Selective Analyzer No. 665, Type 2.
Line Voltage: 117 volts AC   Position of Volume Control: Full with Antenna Disconnected
Voltage of each socket prong to Prong No. 1 of Type 12Q7GT



C1A&1B	VAR. COND.	MODEL 500	B-7288-1
		MODEL 500-D	B-7288-2
C1AT	B.C. ANT. TRIMMER	ON B-7288 COND.	
C1BT	B.C. OSC. TRIMMER	ON B-7288 COND.	
C2	.001 MFD. 400V.		C-3204-55C
C3	I.F. REJECTOR TRIMMER		A-14058-2
C4	.05 MFD. 200V.		C-3302-84A
C5	50 MMF. MOLDED		C-720-372
C6	.05 MFD. 200V.		C-3302-84A
C7	.15 MFD. 400V.		C-3204-95U
C8	NO.1 I.F. TRIMMER		B-7200-GG
C9	NO.2 I.F. TRIMMER		B-7200-GN
C10	500 MMF. MOLDED		C-720-316
C11	.01 MFD. 200V.		C-3302-20A
C12	.01 MFD. 200V.		C-3202-20C
C13	.03 MFD. 400V.		C-3304-80A
C14	25-25 MFD. ELECT.		A-15124
C15	.01 MFD. 400V.		C-3304-20A

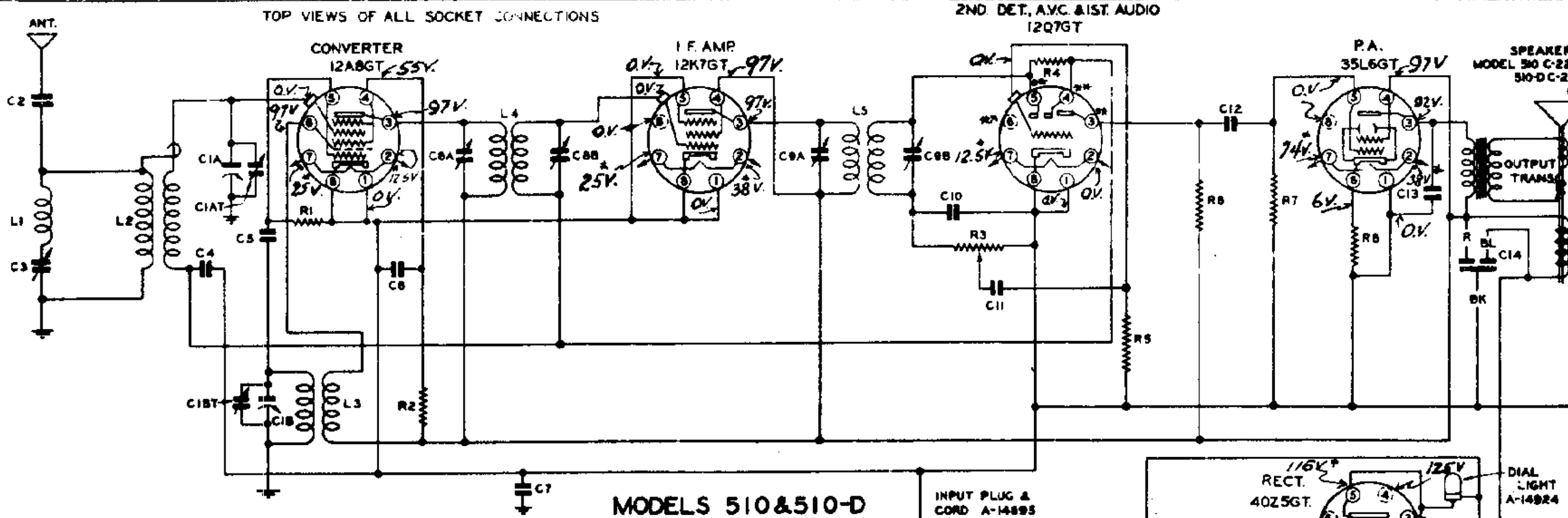
R1	56,000 Ω .25W.		C-2795-63B
R2	72,000 Ω .25W.		C-2795-73B
R3	500,000 OHM V.C. & SW.	MODEL 500	A-15129
		MODEL 500-D	A-15129-1
R4	1.8 MEGOHM .25W.		C-2795-101B
R5	5.6 MEGOHM .25W.		C-2795-107B
R6	270,000 Ω .25W.		C-2795-91B
R7	560,000 Ω .25W.		C-2795-95B
R8	150 Ω .5W.		C-2795-52C

L1	I.F. REJECTOR COIL	A-14718-1
L2	B.C. ANTENNA COIL	A-14974-1
L3	B.C. OSC. COIL	A-14975
L4	NO.1 I.F. COIL	A-12084-32
L5	NO.2 I.F. COIL	A-12084-17

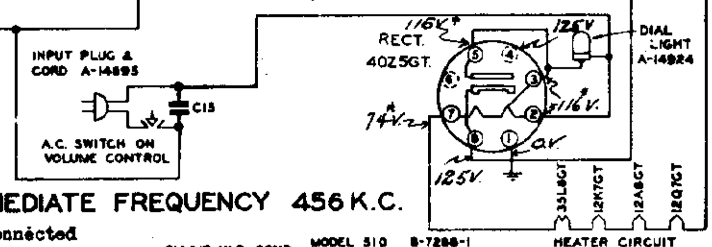
(Original) Effective May 1, 1939

MODELS 510DG, 510DR, 510W
510BV, 510BW
Schematic, Voltage, Socket
Trimmers, Alignment

SPARKS WITHINGTON CO.



MODELS 510&510-D



Notes: Voltage and resistance readings are for schematic diagram
Allow 15% + or - on all measurements.
Always use meter scale which will give greatest deflection within scale limits.
All measurements made with Weston Selective Analyzer No. 665, Type 2.
* AC volts.
**Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

INTERMEDIATE FREQUENCY 456 K.C.

Line Voltage: 117 volts AC

Position of Volume Control: Full with Antenna Disconnected

Voltage of each socket prong to Prong No. 1 of Type 12Q7GT

ALIGNMENT CHART FOR MODELS 510-DG, 510-DR

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	On Deluxe Models set pointer parallel to horizontal lines with condenser plates fully meshed.						
2	I.F.	12A8GT Grid Cap	200 mmf.	456 KC	Open	C9 A&B	2nd I.F.
						C8 A&B	1st I.F.
3	Rejector	Ant.	200 mmf.	456 KC	Closed	C3	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1500 KC	1500 KC	C1BT Osc.	Peak at max.
						C1AT Ant.	Peak at max.
5	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)						
6	(Check operations 1 to 5 inclusive)						

ALIGNMENT CHART FOR MODELS 510-W, 510-BV, 510-BW

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	12A8GT Grid Cap	200 mmf.	456 KC.	Open	C9 A&B	2nd I.F.
						C8 A&B	1st I.F.
2	Rejector	Ant.	200 mmf.	456 KC	Closed	C3	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1700 KC	Open	C1BT Osc.	Peak at max.
				1500 KC	1500 KC	C1AT Ant.	Peak at max.
4	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)						
5	(Check operations 1 to 4 inclusive)						

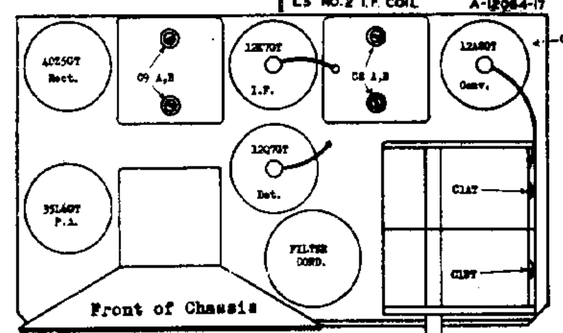
(Original) Effective May 1, 1939

C1A&1B VAR. COND. MODEL 510 B-7288-1
MODEL 510-D B-7288-2

C1AT B.C. ANT. TRIMMER } ON B-7288 COND.
C1BT B.C. OSC. TRIMMER }

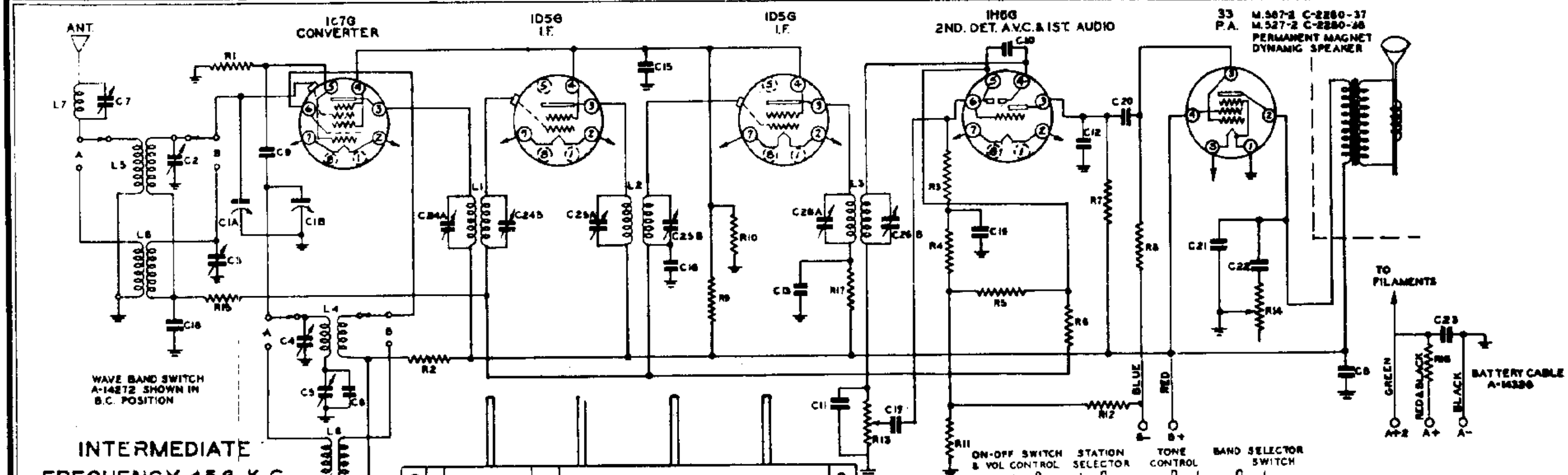
C2	.001 MFD 400V.	C-3204-58C
C3	I.F. REJECTOR TRIMMER	A-14066-2
C4	.05 MFD. 200V	C-3202-84C
C5	50 MMF. MOLDED	C-720-372
C6	.05 MFD. 200V.	C-3202-84C
C7	.15 MFD. 400V.	C-3204-95C
C8	NO.1 I.F. TRIMMER	B-7200-GG
C9	NO.2 I.F. TRIMMER	B-7200-GN
C10	500 MMF. MOLDED	C-720-316
C11	.01 MFD. 200V.	C-3202-20C
C12	.01 MFD. 200V.	C-3202-20C
C13	.03 MFD. 400V.	C-3204-80C
C14	25-25 MFD. ELECT.	A-15093
C15	.01 MFD. 400V.	C-3204-20C

R1	56,000 ~ .25W.	C-2795-[illegible]
R2	22,000 ~ .25W.	C-2795-[illegible]
R3	500,000 OHM V.C. & SW. MODEL 510	A-15129
	MODEL 510-D	A-15129-1
R4	1.8 MEGOHM .25W.	C-2795-101B
R5	5.6 MEGOHM .25W.	C-2795-107B
R6	270,000 ~ .25W.	C-2795-[illegible]
R7	560,000 ~ .25W.	C-2795-95B
R8	150 ~ .5W.	C-279[illegible]-52C
L1	I.F. REJECTOR COIL	A-14716-1
L2	B.C. ANTENNA COIL	A-14874-1
L3	B.C. OSC. COIL	A-14875
L4	NO.1 I.F. COIL	A-12064-12
L5	NO.2 I.F. COIL	A-12064-17

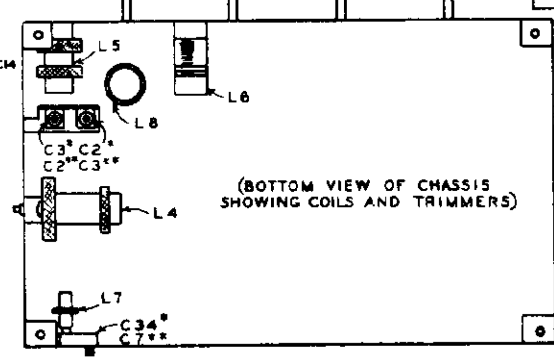


SPARKS WITHINGTON CO.

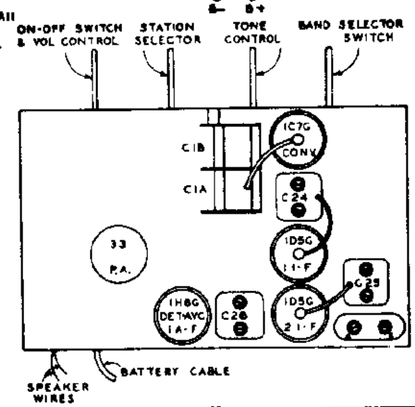
MODELS 527-2, 587-2
Schematic, Voltage, Socket
Trimmers



INTERMEDIATE FREQUENCY 456 K.C.

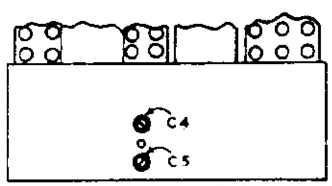


* MODELS 537-6 & 587-6
** MODELS 527-2 & 587-2



C1A&B	VARIABLE CONDENSER	B-6776
C2	B.C. ANT. TRIMMER	A-12334
C3	S.W. ANT. TRIMMER	
C4	B.C. OSC. TRIMMER	A-14288
C5	B.C. OSC. PADDER	
C6	.00025 MFD. MOLDED	C-720-324
C7	I.F. REJECTOR TRIMMER	A-12834-1
C8	8 MFD. 200V. ELECT.	A-14273
C9	.00005 MFD. MOLDED	C-720-315
C10	.0001 MFD. MOLDED	C-720-325
C11	.00025 MFD. MOLDED	C-720-324
C12	.00025 MFD. MOLDED	C-720-327
C13	.5 MFD. 200V.	C-720-104
C14	.1 MFD. 200 V	C-720-60
C15	.5 MFD 200 V.	C-720-104
C16	.05 MFD. 100 V.	C-720-58
C17	.05 MFD. 100V.	C-720-58
C18	.1 MFD. 100V.	C-720-62
C19	.1 MFD. 100V.	C-720-62
C20	.05 MFD. 200 V.	C-720-52
C21	.001 MFD. 400 V.	C-720-138
C22	.03 MFD. 600 V.	C-720-43
C23	1 MFD 100 V.	C-720-102
C24	NO. 1 I.F. TRIMMER	A-14375
C25	NO. 2 I.F. TRIMMER	A-14375
C26	NO. 3 I.F. TRIMMER	A-14375
R1	47,000 Ω .25 W.	C-2795-82B
R2	10,000 Ω .5 W.	C-2796-74A
R3	470,000 Ω .25 W.	C-2795-94B
R4	220,000 Ω .25 W.	C-2795-90B
R5	470,000 Ω .25 W.	C-2795-94B
R6	1 MEGOHM .25 W.	C-2795-96B
R7	220,000 Ω .25 W.	C-2795-90B
R8	470,000 Ω .25 W.	C-2795-94B
R9	18,000 Ω 1 W.	C-2797-78A
R10	56,000 Ω 1 W.	C-2797-83A
R11	150 Ω .5 W.	C-2796-52A
R12	380 Ω .5 W.	C-2796-57A
R13	VOLUME CONTROL & A.C. SWITCH	A-14274
R14	TONE CONTROL	A-12867
R15	5600 Ω .25 W.	C-2795-71B
R16	.5 OHMS WIREWOUND	B-5243-43
R17	4700 Ω .25 W.	C-2795-70B
L1	NO. 1 I.F. COIL	A-12084-14
L2	NO. 2 I.F. COIL	A-12084-14
L3	NO. 3 I.F. COIL	A-12084-15
L4	B.C. OSC. COIL	A-2055-7
L5	B.C. R.F. COIL	A-12056-4
L6	S.W. OSC. COIL	A-12062-11
L7	I.F. REJECTOR COIL	A-12886-3
L8	S.W. R.F. COIL	A-12061-5

FOR ALIGNMENT
SEE INDEX



MODEL 527-2 & 587-2

VOLTAGE CHART

"A" Battery Voltage: 2 volts
"B" Battery Voltage: 135 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

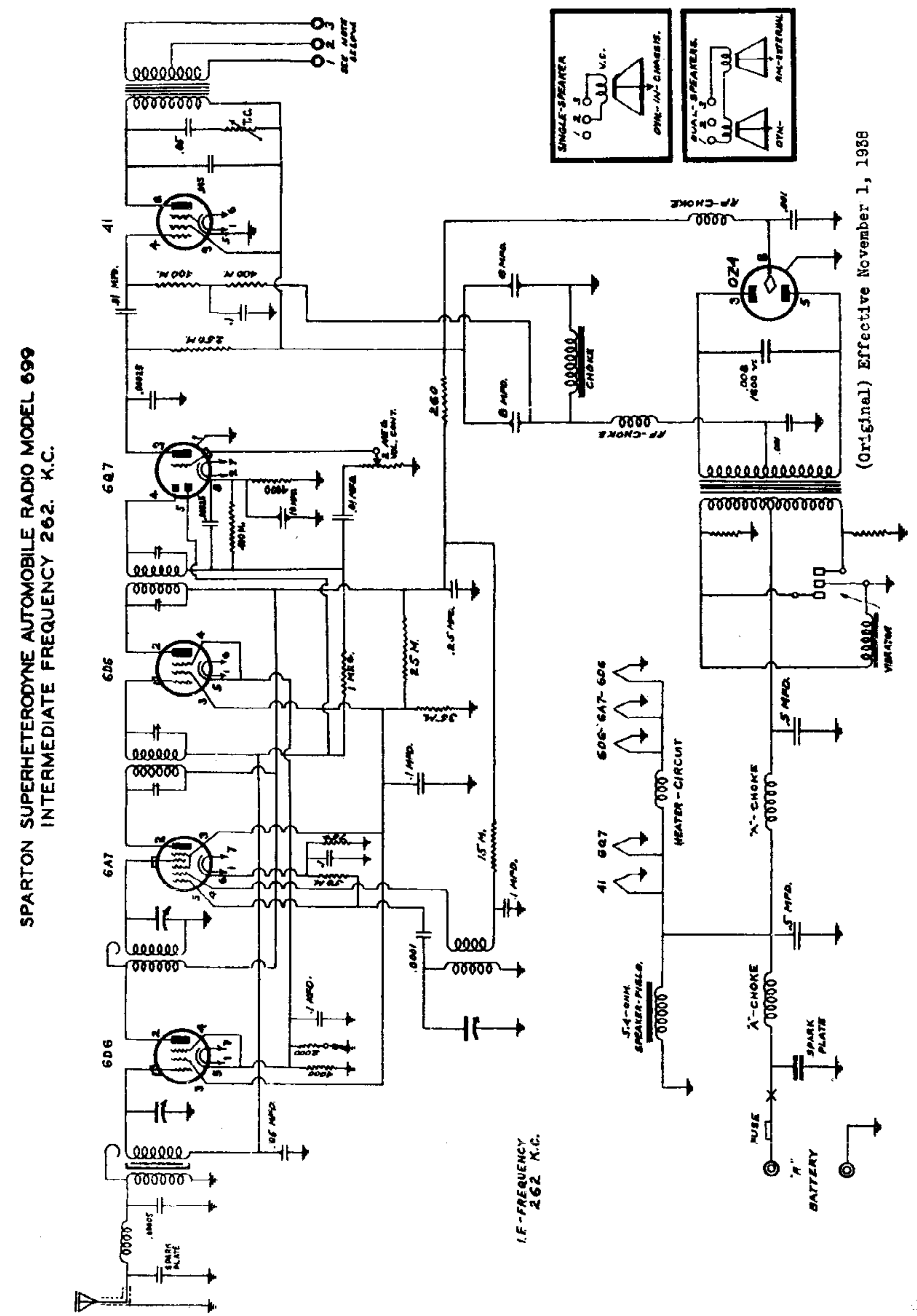
Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
1C7G	Converter	-	0	115	64	0	110	2	-	*
1D5G	First I-F Ampligier	-	0	113	56	0	-	2	-	*
1D5G	Second I-F Amplifier	-	0	111	56	0	-	2	-	*
1H6G	Det-AVC-1st A-F Amplifier	-	2	111	*	*	*	0	-	-
33	Power Amplifier	2	120	*	120	0	-	-	-	-

Notes: Voltage readings are for schematic diagram shown on page 2. Allow 15% + or- on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.
* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

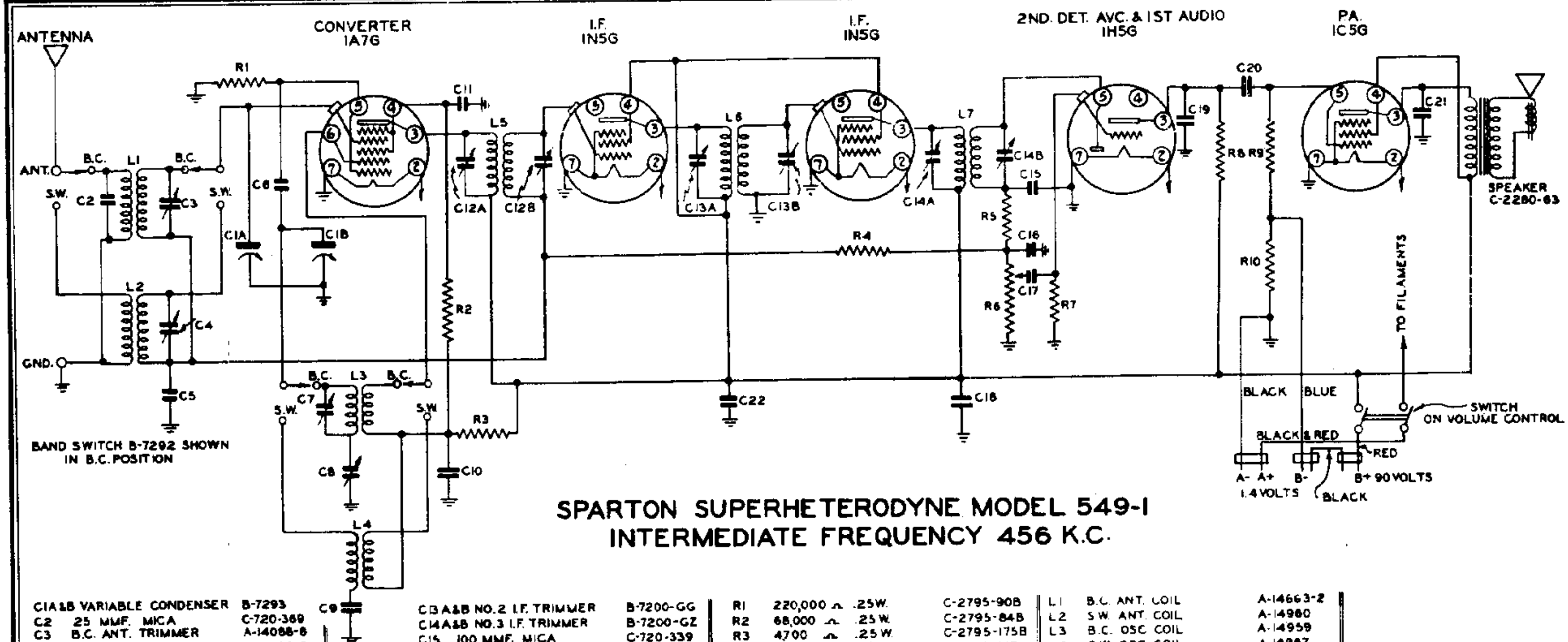
(ORIGINAL) EFFECTIVE DEC 28, 1936

MODEL 699
Schematic
Speaker Connections

SPARKS WITHINGTON CO.



SPARKS WITHINGTON CO.



SPARTON SUPERHETERODYNE MODEL 549-1
INTERMEDIATE FREQUENCY 456 K.C.

C1A&B	VARIABLE CONDENSER	B-7293
C2	25 MMF. MICA	C-720-369
C3	B.C. ANT. TRIMMER	A-14088-6
C4	S.W. ANT. TRIMMER	A-14088-8
C5	.05 MFD. 200V.	C-3202-140C
C6	100 MMF. MICA	C-720-339
C7	B.C. OSC. TRIMMER	A-14088-8
C8	B.C. OSC. PADDER	A-14911-4A
C9	2870 MMF. MICA	C-720-370
C10	8 MFD. 150 V. ELECT.	A-14958
C11	.05 MFD. 200V.	C-3202-28C
C12A&B	NO.1 I.F. TRIMMER	B-7200-GG
C13A&B	NO.2 I.F. TRIMMER	B-7200-GG
C14A&B	NO.3 I.F. TRIMMER	B-7200-GZ
C15	100 MMF. MICA	C-720-339
C16	100 MMF. MICA	C-720-339
C17	.001 MFD. 400V.	C-3204-114C
C18	8 MFD. 150V.	A-14958
C19	100 MMF. MICA	C-720-339
C20	.001 MFD. 400V.	C-3204-114C
C21	.001 MFD. 1000V.	C-3210-114C
C22	.1 MFD. 200V.	C-3202-38C

R1	220,000 Ω	.25W.	C-2795-90B
R2	68,000 Ω	.25W.	C-2795-84B
R3	4700 Ω	.25W.	C-2795-175B
R4	270,000 Ω	.25W.	C-2795-91B
R5	51,000 Ω	.25W.	C-2795-200B
R6	100,000 Ω	VOLUME CONT.	A-14957
R7	10 MEG. Ω	.25W.	C-2795-110B
R8	1 MEG. Ω	.25W.	C-2795-98B
R9	2.2 MEG.	.25W.	C-2795-102B
R10	820 Ω	.25W.	C-2795-157B

L1	B.C. ANT. COIL	A-14663-2
L2	S.W. ANT. COIL	A-14960
L3	B.C. OSC. COIL	A-14959
L4	S.W. OSC. COIL	A-14987
L5	NO.1 I.F. COIL	A-12064-14
L6	NO.2 I.F. COIL	A-12064-31
L7	NO.3 I.F. COIL	A-12064-24

VOLTAGE CHART

Condition of "A" Battery - Good (1.5 volts) Position of Volume Control: Full with Antenna Disconnected
Condition of "B" Battery - Good (90 volts) Position of Band Selector Switch: Broadcast Band

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1A7G	Converter	80	1.4	80	30	*	70	0	69	*
1N5G	1st I.F. Amp.	*	1.4	78	80	0	-	0	0	0
1N5G	2nd I.F. Amp.	0	1.4	78	80	0	0	-	0	0
1H5G	2nd Det.-AVC-1st Audio	0	1.4	*	0	-.1	-	0	-	0
1C5G	Power Amp.	0	1.4	78	80	0	7.5	0	-	0

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.
*Cannot be accurately measured with Model 665 Weston analyzer.

(Original) Effective Feb. 1, 1939

MODEL 549-1
Alignment, Socket, Trimmers
MODEL 699
Voltage, Alignment

SPARKS WITHINGTON CO.

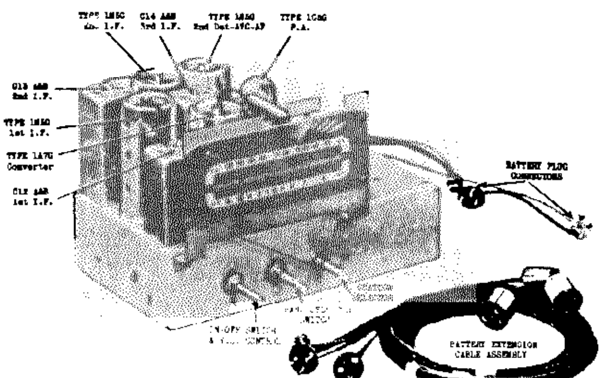
Model 549-1

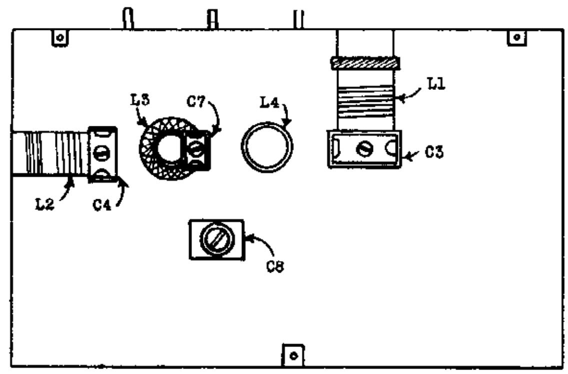
ALIGNMENT

Sparton Superheterodyne

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer to end of scale with tuning condenser gang closed)							
2	I.F.	1A7G Grid	.1 mf.	456 KC	BC	Open	C14 A,B	3 I.F. Transformer
							C13 A,B	2 I.F. Transformer
							C12 A,B	1 I.F. Transformer
3	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C7 Osc.	Peak accurately
							C3 Ant.	Peak accurately
4				600 KC	BC	600 KC	C8 Pad.	Rock C1A&B for max. output
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 600 KC, 900 KC, and 1500 KC)							
7	SW Band	Ant.	*	18 MC	SW	18 MC	C4 Ant.	**
8	(Check calibration and sensitivity at 6 MC and 18 MC)							
9	(Check operations 1 to 8 inclusive)							

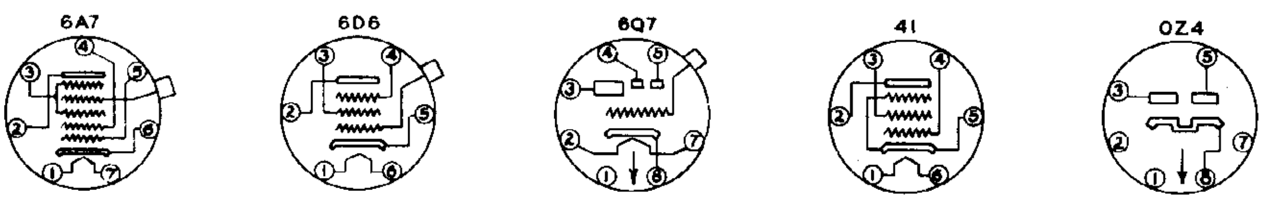
* 200 mmf. condenser and 100 ohm non-inductive resistor in series.
** Rock tuning control around 18 MC while adjusting this trimmer, and make sure that the signal is peaked on the fundamental rather than on the image.





CHASSIS DIAGRAM (Bottom View)

Sparton Superheterodyne Model 699



VOLTAGE CHART

Battery Voltage: 6.3 volts   Position of Volume Control: Full with Antenna Disconnected

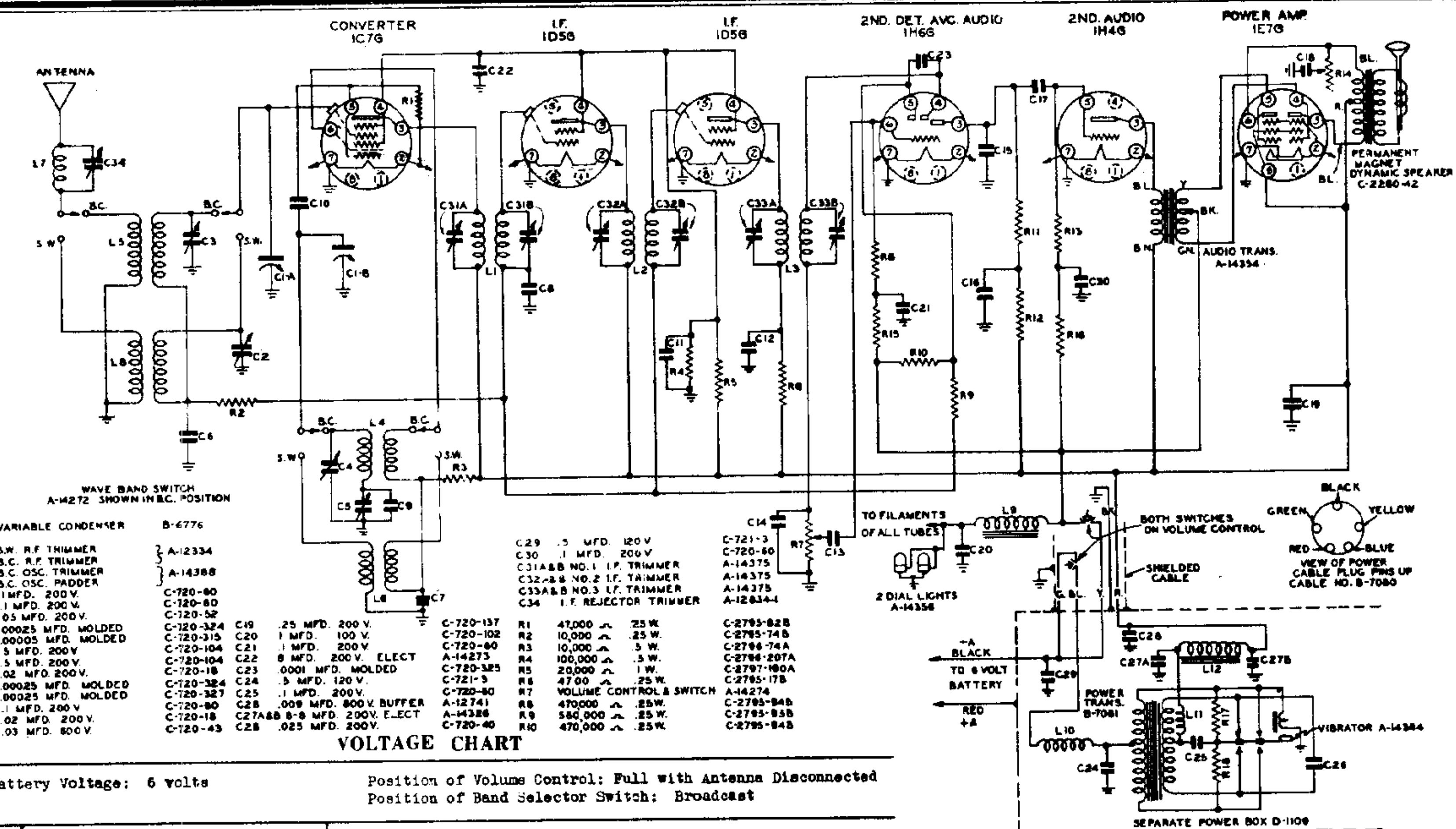
Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6D6	R.F. Amp.	0	200	75	6.2*	6.2*	5.5	-	-	0
6A7	Converter	5.5	200	75	105	-1.5	5	0	-	0
6D6	I.F.	0	200	75	6.2*	6.2*	5.5	-	-	0
6Q7	2nd Det. AVC 1st Audio	0	0	7.2	.1	.1	.1	5.5	1.2	0
41	P.A.	5.6	195	200	-.3	0	0	-	-	-
OZ4	Rectifier	0	0	290**	0	290**	0	0	205	-

*Or 8.6 volts depending on position of sensitivity switch.
**AC volts.

ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	6A7 Grid	.1 mf.	262	Closed	2 trimmers	2nd I.F.
						2 trimmers	1st I.F.
2	Broad. Osc.	Ant.	250 mmf.	1580	Open	Osc.	Adj. to max.
3	Broad. Ant. & R.F.	Ant.	250 mmf.	1400	1400	Ant.	Adj. to max.
						R.F.	Adj. to max.
4	Check sensitivity at 1000 KC and 600 KC.						
5	Check operations 1 to 4 inclusive.						

SPARKS WITHINGTON CO.



SPARTON SUPERHETERODYNE MODEL 637-6&687-6
INTERMEDIATE FREQUENCY 456 K.C.

C1-A&B	VARIABLE CONDENSER	B-6776
C2	S.W. R.F. TRIMMER	A-12334
C3	B.C. R.F. TRIMMER	A-12334
C4	B.C. OSC. TRIMMER	A-14388
C5	B.C. OSC. PADDER	A-14388
C6	.1 MFD. 200 V.	C-720-80
C7	.1 MFD. 200 V.	C-720-80
C8	.05 MFD. 200 V.	C-720-52
C9	.00025 MFD. MOLDED	C-720-324
C10	.00005 MFD. MOLDED	C-720-315
C11	.5 MFD. 200 V.	C-720-104
C12	.5 MFD. 200 V.	C-720-104
C13	.02 MFD. 200 V.	C-720-18
C14	.00025 MFD. MOLDED	C-720-324
C15	.00025 MFD. MOLDED	C-720-327
C16	.1 MFD. 200 V.	C-720-80
C17	.02 MFD. 200 V.	C-720-18
C18	.03 MFD. 600 V.	C-720-43
C19	.25 MFD. 200 V.	C-720-137
C20	1 MFD. 100 V.	C-720-102
C21	.1 MFD. 200 V.	C-720-80
C22	8 MFD. 200 V. ELECT	A-14273
C23	.0001 MFD. MOLDED	C-720-325
C24	.5 MFD. 120 V.	C-721-3
C25	.1 MFD. 200 V.	C-720-80
C26	.009 MFD. 800 V. BUFFER	A-12741
C27A&B	8-8 MFD. 200 V. ELECT	A-14326
C28	.025 MFD. 200 V.	C-720-40
C29	.5 MFD. 120 V.	C-721-3
C30	.1 MFD. 200 V.	C-720-80
C31A&B	NO. 1 I.F. TRIMMER	A-14375
C32A&B	NO. 2 I.F. TRIMMER	A-14375
C33A&B	NO. 3 I.F. TRIMMER	A-14375
C34	I.F. REJECTOR TRIMMER	A-12834-1
R1	47,000 Ω .25 W.	C-2795-82B
R2	10,000 Ω .25 W.	C-2795-74B
R3	10,000 Ω .5 W.	C-2796-74A
R4	100,000 Ω .5 W.	C-2796-207A
R5	20,000 Ω 1 W.	C-2797-180A
R6	4700 Ω .25 W.	C-2795-17B
R7	VOLUME CONTROL & SWITCH	A-14274
R8	470,000 Ω .25 W.	C-2795-94B
R9	560,000 Ω .25 W.	C-2795-95B
R10	470,000 Ω .25 W.	C-2795-94B
R11	270,000 Ω .25 W.	C-2795-91B
R12	270,000 Ω .25 W.	C-2795-91B
R13	470,000 Ω .25 W.	C-2795-94B
R14	TONE CONTROL	A-12987
R15	470,000 Ω .25 W.	C-2795-94B
R16	220,000 Ω .25 W.	C-2795-90B
R17	150 Ω .5 W.	C-2796-8A
R18	150 Ω .5 W.	C-2796-8A
L1	NO. 1 I.F. COIL	A-12084-14
L2	NO. 2 I.F. COIL	A-12084-14
L3	NO. 3 I.F. COIL	A-12084-15
L4	B.C. OSC. COIL	A-12055-7
L5	B.C. R.F. COIL	A-12056-4
L6	S.W. OSC. COIL	A-12062-11
L7	I.F. REJECTOR COIL	A-12666-3
L8	S.W. R.F. COIL	A-12061-6
L9	CHOKE COIL	A-14353
L10	R.F. CHOKE COIL	A-14351
L11	R.F. CHOKE COIL	A-12666-1
L12	FILTER CHOKE	A-12597

VOLTAGE CHART

"A" Battery Voltage: 6 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
1C7G	Converter	-	0	112	60	.05 †	107	2	-	.05 †
1D5G	First I-F Amplifier	-	0	112	47	-	-	2	-	.06 †
1D5G	Second I-F Amplifier	-	0	108	48	-	-	2	-	.05 †
1H6G	Det-AVC-1st A-F Amplifier	-	0	.2	0	.04 †	*	2	-	-
1H4G	Second A-F Amplifier	-	0	112	-	*	-	2	-	-
1E7G	Power Amplifier	-	-	122	5.2	5.2	122	2	122	-

Notes: Voltage readings are for schematic diagram shown on back of this page. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits, except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.
† 1 volt D-c scale

(ORIGINAL) EFFECTIVE DEC 28, 1936

MODELS 527-2,587-2
Alignment
MODELS 637-6,687-6
Alignment,Socket,Trimmers

SPARKS WITHINGTON CO.

Note: For proper alignment of these chasses, the procedure should be followed in the same order as given.

The dial pointer should be exactly parallel with the horizontal line of the dial scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the two small set screws directly back of the diffusion disc and dial drum, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, then tighten the set screws.

IMPORTANT: Alignment of these models should not be attempted unless the voltage is maintained by a fully charged 6-volt storage battery.

A. Alignment of Intermediate-Frequency Stages

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

2. Turn the band selector switch to the broadcast position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

3. Connect "antenna" of test oscillator to grid cap of Type 1C7G converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 1E7G tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator being used in the alignment procedure.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers which are reached from the top of the chassis.

Note: Care should be taken when adjusting the I-F stages in order to insure proper and accurate adjustment.

6. Disconnect "antenna" lead of test oscillator from grid cap of converter tube Type 1E7G and connect to the antenna terminal of the chassis.

7. Tune test oscillator to a frequency of 456 kilocycles and adjust condenser C34*(reached from back of the chassis) to a point where the output of the receiver is at an absolute minimum. *C7 in Models 527-2, 587-2

Note: This condenser is the adjustment for the code rejector circuit and must be very carefully adjusted if best performance of the receiver is to be expected.

B. Alignment of Broadcast Band

1. Connect 150 mmf. dummy antenna in series with the antenna lead, tune test oscillator and receiver to a frequency of 1500 kilocycles and adjust condensers C4 (broadcast band oscillator trimmer) and C3*(broadcast antenna trimmer) reached from the bottom of the chassis.
*C2 in Models 527-2, 587-2

2. Tune test oscillator and receiver to 600 kilocycles and adjust condenser C5 (broadcast oscillator padder) reached from the front of the chassis.

3. Retune test oscillator and receiver to 1500 kilocycles and check adjustments of condenser C4 and condenser C5.* Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles. *C2 in Models 527-2, 587-2

C. Alignment of Short-Wave Band

1. Turn the band selector switch to the short wave or "foreign" band.

2. Remove the 150 mmf. condenser from the test oscillator "antenna" lead and replace with a 400 ohm non-inductive resistor dummy antenna.

3. Tune test oscillator and receiver to a frequency of 15,000 kilocycles (15 megacycles) and adjust condenser C2*(short-wave antenna trimmer) reached from the bottom of the chassis. *C3 in Models 527-2, 587-2.

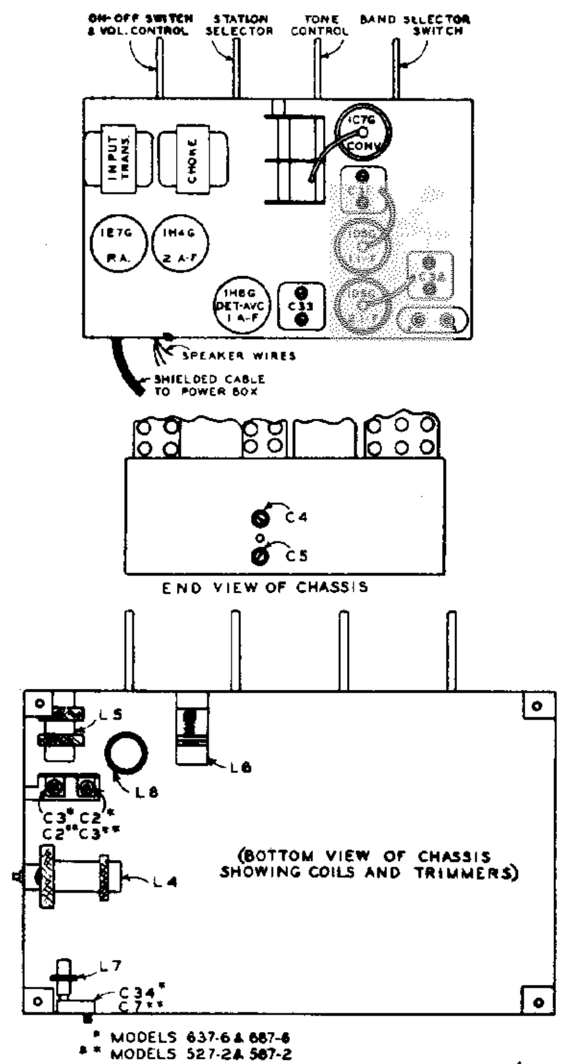
Caution: On this band care must be taken to adjust this condenser to the fundamental of the 15 megacycle signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condenser for that band has probably been adjusted to the image instead of to the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector of the receiver to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore, a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

Note: There are no other trimmers for the short-wave or foreign band.

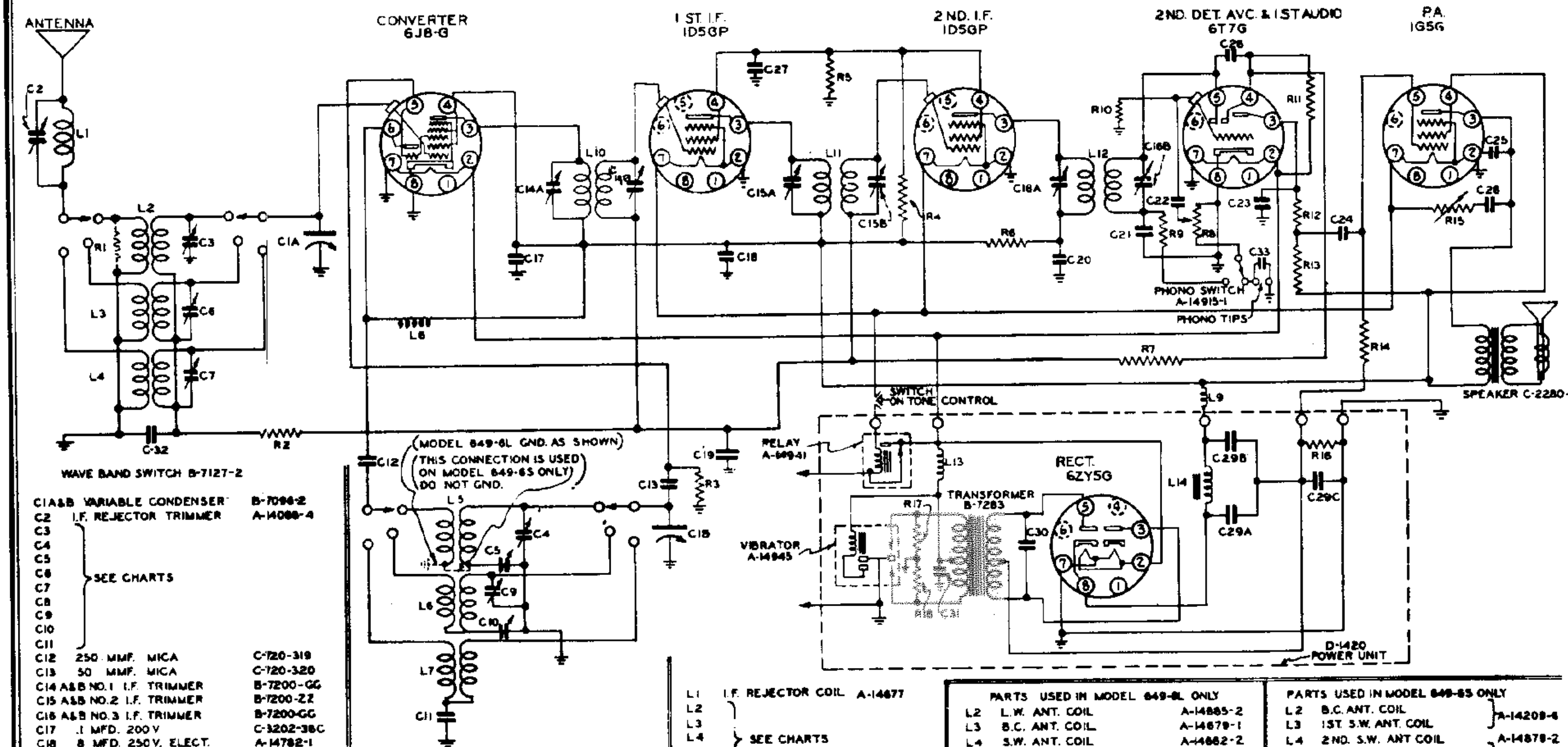
Important: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.



* MODELS 637-6 & 687-6
** MODELS 527-2 & 587-2

SPARTON SUPERHETERODYNE MODELS 649-6S & 649-6L
INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS



C1A&B	VARIABLE CONDENSER	B-7096-2
C2	I.F. REJECTOR TRIMMER	A-14088-4
C3	SEE CHARTS	
C4	SEE CHARTS	
C5	SEE CHARTS	
C6	SEE CHARTS	
C7	SEE CHARTS	
C8	SEE CHARTS	
C9	SEE CHARTS	
C10	SEE CHARTS	
C11	SEE CHARTS	
C12	250 MMF. MICA	C-720-319
C13	50 MMF. MICA	C-720-320
C14 A&B	NO.1 I.F. TRIMMER	B-7200-GG
C15 A&B	NO.2 I.F. TRIMMER	B-7200-ZZ
C16 A&B	NO.3 I.F. TRIMMER	B-7200-GG
C17	.1 MFD. 200 V	C-3202-38C
C18	8 MFD. 250 V. ELECT.	A-14782-1
C19	.05 MFD. 200 V.	C-3202-84C
C20	.05 MFD. 200 V.	C-3202-28C
C21	250 MMF. MICA	C-720-319
C22	.05 MFD. 200 V.	C-3202-28C
C23	250 MMF MICA	C-720-319
C24	.05 MFD. 200 V	C-3202-28C
C25	.003 MFD. 400 V.	C-3204-118C
C26	.03 MFD. 400 V.	C-3204-136C
C27	.1 MFD. 200 V.	C-3202-38C
C28	250 MMF. MICA	C-720-319
C29	16-10-20 ELECT.	A-14942
C30	.009 MFD. 800 V. BUFFER	C-3208-74C
C31	1 MFD. 120 V.	C-3203-56B
C32	.05 MFD. 200 V.	C-3202-84C
C33	.003 MFD. 200 V.	C-3202-82C

R1	SEE CHARTS	
R2	27 000 Ω .25 W.	C-2795-79B
R3	56 000 Ω .25 W.	C-2795-83B
R4	39 000 Ω .5 W.	C-2796-197C
R5	56 000 Ω .5 W.	C-2796-201C
R6	4700 Ω .25 W.	C-2795-70B
R7	560 000 Ω .25 W.	C-2795-95B
R8	250 000 Ω VOL. CONTROL	A-14075-A1
R9	56 000 Ω .25 W.	C-2795-83B
R10	5.6 MEGOHM .25 W.	C-2795-107B
R11	1 MEGOHM .25 W.	C-2795-96B
R12	180 000 Ω .25 W	C-2795-89B
R13	180 000 Ω .25 W.	C-2795-89B
R14	560 000 Ω .25 W.	C-2795-95B
R15	250 000 Ω TONE CONTROL	A-14778
R16	510 Ω .5 W.	C-2796-152C
R17	56 Ω .5 W.	C-2796-47C
R18	56 Ω .5 W.	C-2796-47C

L1	I.F. REJECTOR COIL	A-14677
L2	SEE CHARTS	
L3	SEE CHARTS	
L4	SEE CHARTS	
L5	SEE CHARTS	
L6	SEE CHARTS	
L7	SEE CHARTS	
L8	OSC. PLATE CHOKE	A-14881-1
L9	B+ HASH CHOKE	A-14718-2
L10	NO. 1 I.F. COIL	A-12084-14
L11	NO. 2 I.F. COIL	A-12084-2
L12	NO. 3 I.F. COIL	A-12084-15
L13	A HASH CHOKE	A-14944
L14	FILTER CHOKE	A-12597

PARTS USED IN MODEL 649-6L ONLY

L2	L.W. ANT. COIL	A-14885-2
L3	B.C. ANT. COIL	A-14679-1
L4	S.W. ANT. COIL	A-14882-2
L5	L.W. OSC. COIL	A-14886-2
L6	B.C. OSC. COIL	A-14213-7
L7	S.W. OSC. COIL	A-14213-7
R-1	12 000 Ω .25 W.	C-2795-75B
C-3	L.W. ANT. TRIMMER	A-14517-5
C-4	L.W. OSC. TRIMMER	A-14517-5
C-5	L.W. OSC. PADDER	A-14517-5
C-6	B.C. ANT. TRIMMER	A-14088-5
C-7	S.W. ANT. TRIMMER	A-14088-5
C9	B.C. OSC. TRIMMER	B-7199-CY
C10	B.C. OSC. PADDER	B-7199-CY
C11	3100 MMF. MICA	C-720-362

PARTS USED IN MODEL 649-6S ONLY

L2	B.C. ANT. COIL	A-14209-6
L3	1ST. S.W. ANT. COIL	A-14209-6
L4	2ND. S.W. ANT COIL	A-14878-2
L5	B.C. OSC. COIL	A-14213-8
L6	1ST. S.W. OSC. COIL	A-14213-8
L7	2ND. S.W. OSC. COIL	A-14880-2
R1	NOT USED	
C-4	B.C. OSC. TRIMMER	B-7199-CY
C-5	B.C. OSC. PADDER	B-7199-CY
C-8	NOT USED	A-14200
C-9	1ST. S.W. TRIMMER OSC.	A-14200
C3	B.C. ANT. TRIMMER	A-14199-4
C6	1ST. S.W. ANT. TRIMMER	A-14199-4
C7	2ND. S.W. ANT. TRIMMER	A-14199-4
C10	1ST. S.W. PAD. .00114 MOLDED	C-720-366
C11	2ND. S.W. PAD. .00381 MOLDED	C-720-353

MODELS 649-6L, 649-6S
Voltage, Socket, Chassis

SPARKS WITHINGTON CO.

Sparton Superheterodyne Models

649-6L 649-6S

VOLTAGE CHART

Battery Condition: Good
Battery Voltage: 6.3 volts

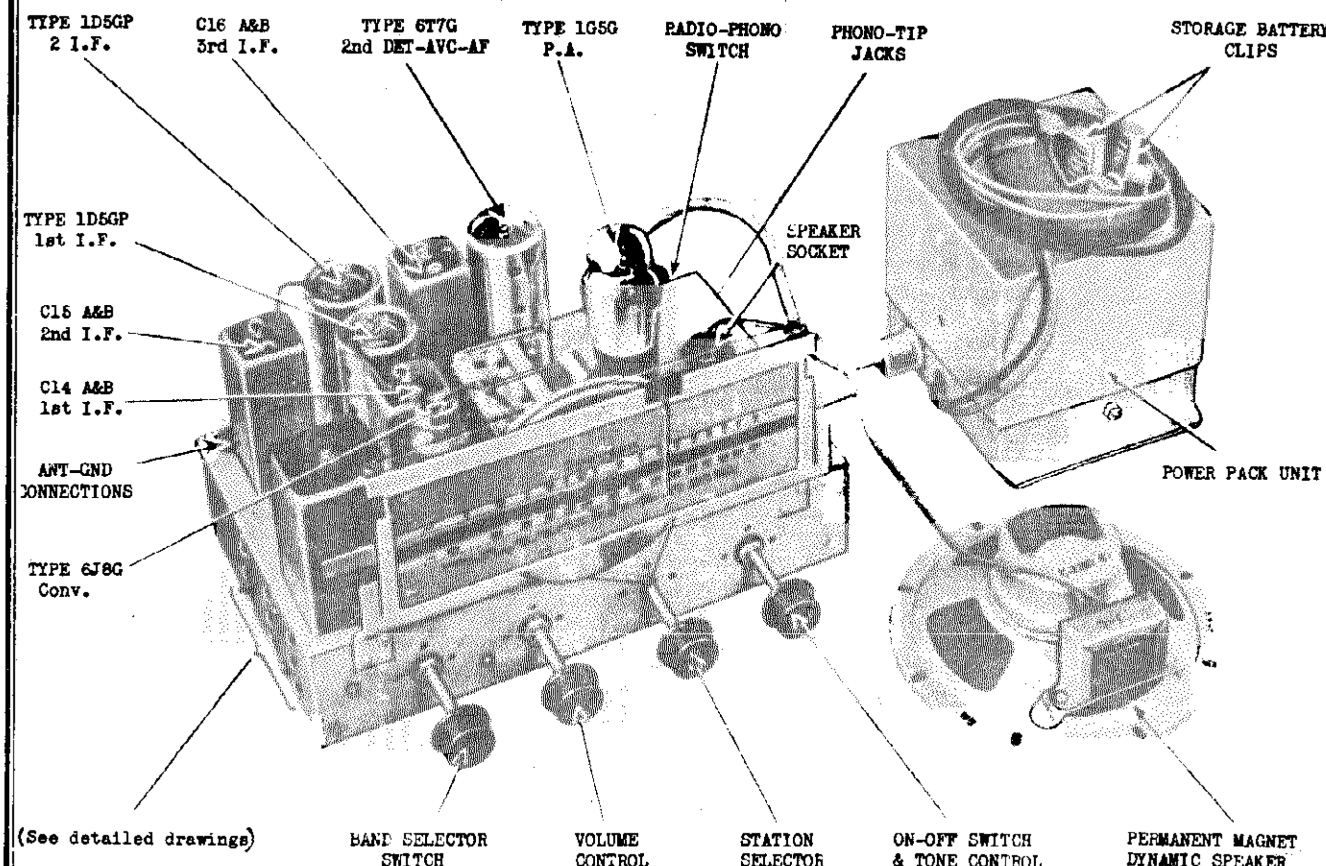
Position of Volume Control: Full with Antenna Disconnected
Band Selector Switch: Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6J8G	Converter	0	6.2	140	140	-14	140	0	0	.14
1D5GP	1st I-F Amp.	0	0	140	49	140	-	2.4	0	.2
1D5GP	2nd I-F Amp.	0	2.4	130	49	0	-	0	0	.2
6T7G	Det-AVC-1st A.F.	0	0	3.6 A	-2 B	-2 B	-	6.2	0	.02
1G5G	Power Amplifier	0	0	133	138	-1 C	-	2.4	0	-
6ZY5G	Rectifier	0	6.3	180*	0	180*	6	0	150	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are - DC voltages.

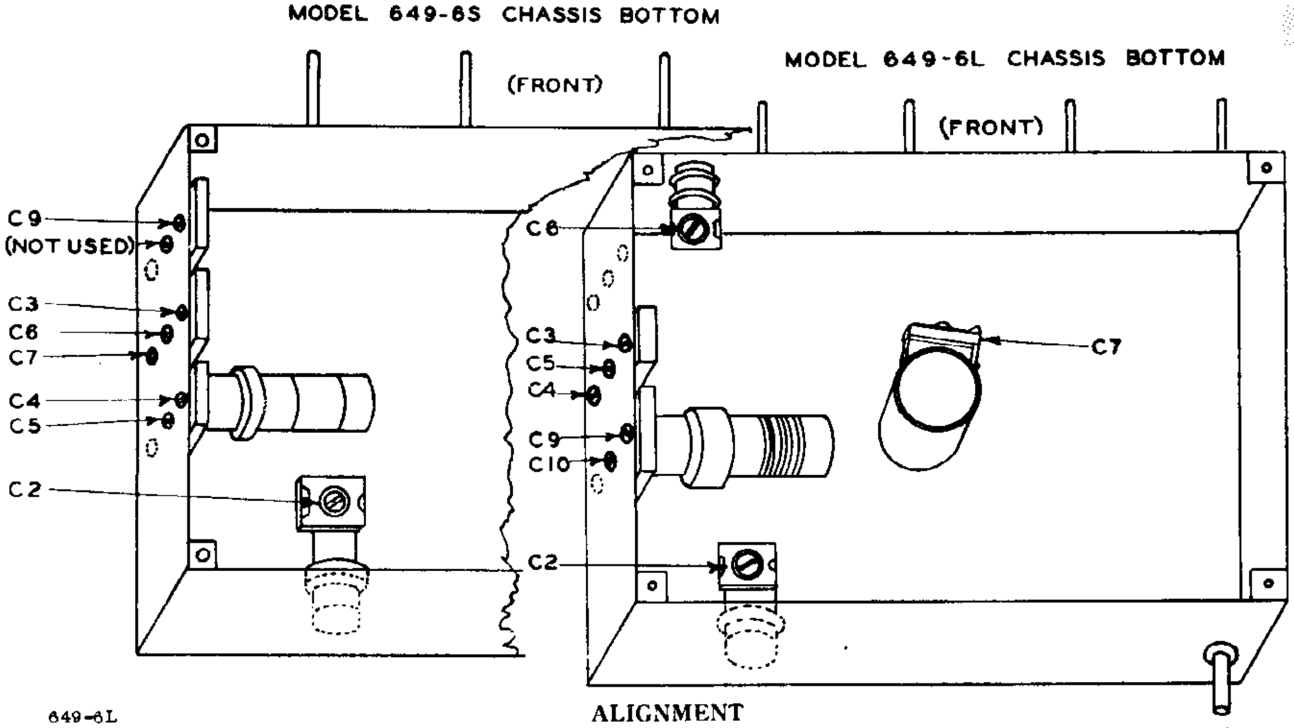
*AC

A - 10 V. Scale B - 25 V. Scale C - 1 V. Scale



SPARKS WITHINGTON CO.

MODELS 649-6L, 649-6S
Alignment, Trimmers



649-6L

ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last calibrated mark below 550KC)							
2	I.F.	6J8G Grid Cap	.1 mf.	456 KC	BC	(Open)	C16 A&B C15 A&B C14 A&B	3rd I.F.T. 2nd I.F.T. 1st I.F.T.
3	Rejector	Ant.	200 mmf.	456 KC	BC	(Open)	C2	Adj. to minimum
4	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C9 Osc. C6 Ant.	
5				600 KC	BC	600 KC	C10 Pad.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	Long-Wave Band	Ant.	200 mmf.	400 KC	LW	400 KC	C4 Osc. C3 Ant.	
9				150 KC	LW	150 KC	C5 Pad.	
10	(Repeat operation 8)							
11	(Repeat operations 8, 9 and 10 if necessary, to insure accurate alignment)							
12	(Check calibration and sensitivity at 150 KC, 260 KC and 400 KC)							
13	Short Wave Band	Ant.	*	18 MC	SW	18 MC	~~C8 Osc.~~ C7 Ant.	Rock dial
14	(Check calibration and sensitivity at 6 MC, 15 MC and 18 MC)							

* 200 mmf. condenser and 100 ohm non-inductive resistor in series.

649-6S

ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last calibrated mark below 550 KC)							
2	I.F.	6J8G Grid Cap	.1 mf.	456 KC	BC	(Open)	C16 A&B C15 A&B C14 A&B	3rd I.F.T. 2nd I.F.T. 1st I.F.T.
3	Rejector	Ant.	200 mmf.	456 KC	BC	(Open)	C2	Adj. to minimum
4	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C4 Osc. C3 Ant.	
5				600 KC	B.C.	600 KC	C5 Pad.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC, & 1500 KC)							
8	1st short wave Band	Ant.	*	7.0 MC	1 SW	7.0 MC	C9 Osc. C6 Ant.	
9	(Check calibration and sensitivity at 2.5 MC, 4.0 MC & 7.0 MC)							
10	2nd SWband	Ant.	*	21.0 MC	2 SW	21.0 MC	C7 Ant.	**
11	(Check calibration and sensitivity at 7.0 MC, 15 MC & 21 MC)							

* 200 mmf. condenser and 100 ohm non-inductive resistor in series.
** Rock dial while trimming.

If dial reading is off calibration, some adjustment may be made by moving the oscillator condenser lead toward or away from the chassis base plate.

MODELS 1068,1068X
1078,1078X
MODELS 1268,1288P
MODEL 1089
MODEL 1288LXP

SPARKS WITHINGTON CO.

MODEL 1568 MODEL 8618
Selectronne Tuner
Trimmers,Adjustments

HOW TO ADJUST THE SPARTON SELECTRONNE

MODELS 1068,1268,1568 ETC. AND 8618.
NOTE:- Each paragraph refers to all Models unless otherwise indicated.

Unless the 6H6G Discriminator tube is removed when the Selectronne is adjusted, automatic frequency control will prevent correct trimmer adjustments, with the result that unsatisfactory reception of stations may occur. With the 6H6G Discriminator tube left in the socket, automatic frequency control action will bring in the station and close the Viso-Glo before the trimmers have been completely adjusted.

2. Remove the Selectronne escutcheon plate from the front of the cabinet by means of the two screws. This exposes the steel plate with the slots for holding the station call letter tabs.

(MODELS 1068,1268,1568 ETC. ONLY)
3. The six buttons of the Selectronne are arranged in three groups according to frequency limits - 540 to 900 kc., 700 to 1300 kc. and 1000 to 1500 kc. (See illustration also back cover of Selectronne box). The six tabs corresponding to the six broadcast stations which have been chosen must be arranged in the steel plate so that the frequency (kilocycle) of each station will be included in the frequency limits of the proper group.

For example: A station having a frequency of 610 kc. should be placed in the 540 to 900 kc. group; a station at 950 should be placed in the 700 to 1300 kc. group, etc.

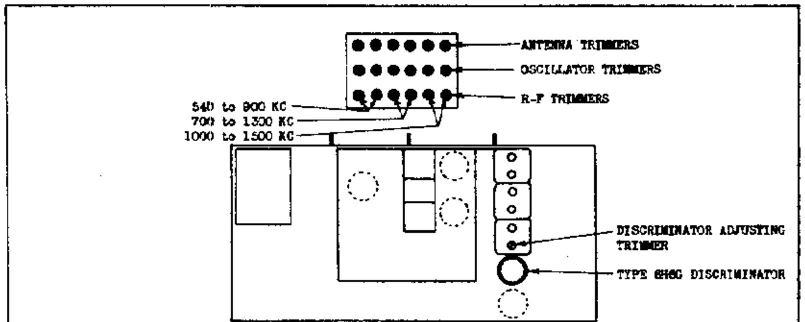
(MODEL 8618 ONLY)
3. The six buttons of the Selectronne are arranged in three groups according to frequency limits - 540 to 750 kc., 700 to 1250 kc. and 1100 to 1500 kc. (See illustration also back cover of Selectronne box). The six tabs corresponding to the six broadcast stations which have been chosen must be arranged in the steel plate so that the frequency (kilocycle) of each station will be included in the frequency limits of the proper group.

(MODEL 8618 ONLY)
For example: A station having a frequency of 610 kc. should be placed in the 540 to 750 kc. group; a station at 950 should be placed in the 700 to 1250 kc. group, etc.

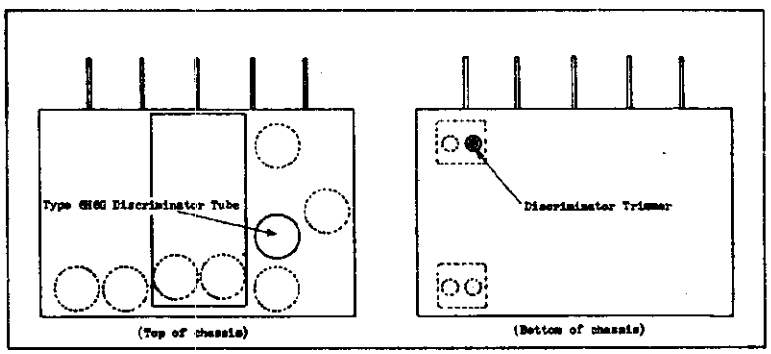
Note: Each group has considerable overlap to allow for the selection of six stations which may have frequency allocations comparatively close together.

4. Remove type 6H6G tube (Discriminator) from chassis (see illustration).

5. Adjust Selectronne trimmers for each one of the six stations as follows:



MODELS 1068, 1268, 1568, ETC.



CHASSIS DIAGRAM OF MODEL 8618

(A) Three trimmers are provided for each one of the six stations. They are reached through the three holes arranged in rows one above the other in the back cover of the Selectronne.

(B) Tune in the station in the usual way using manual tuning, watching the Viso-Glo so that the station will be perfectly "tuned in".

(MODEL 1068,1268,1568 ETC. ONLY)
(C) Push in the band selector switch knob. This will extinguish the dial lights and illuminate the Selectronne Indicator, showing that the Selectronne is now connected.

(MODEL 8618 ONLY)
(C) Turn the band selector switch knob to the extreme left (counter clockwise) to the automatic (Selectronne) position.

(D) Push in the Selectronne button which corresponds to the station just tuned in.

(E) Now from the back of the cabinet, with an ordinary screw-driver adjust the oscillator trimmer (center hole) in the row corresponding to the proper station, until the same station that was tuned in manually is heard. This station may be heard faintly until the remaining trimmers have been adjusted.

It is important that the <u>same station</u> is heard with this adjustment and not some other network station carrying the same program. Screw this trimmer to the right or left until the station is loudest.

Care should be taken in turning the adjusting screws so that they will not become disengaged from the trimmers by being turned out too far.

(MODEL 1068,1268,1568 ETC. ONLY)
(F) In the same manner adjust first the R.F. trimmer (bottom hole) and then the antenna trimmer (top hole) to this same station.

Note: Perfect adjustment of these trimmers is easily obtained by removing the Viso-Glo tube and socket from its clamp and turning the tube toward the back of the cabinet so that every adjustment of the trimmers may be watched in the Viso-Glo. Perfect adjustment is obtained when further turning of the trimmers will not result in any smaller shaded area between the green light sections of the Viso-Glo.

(MODEL 8618 ONLY)
(F) In the same manner adjust to this same station.

(MODEL 8618 ONLY)
NOTE: No Viso-Glo tube is supplied with this model. However, the chassis is wired for, and equipped with, a socket at the back of the chassis, for using a Type 6E5. Operation of this tube will be more easily observed if an extension cable and socket (or right-angle adapter) is used when making tuning adjustments.

(MODEL 8618 ONLY)
(G) Re-adjust the oscillator trimmer (bottom hole) while watching the Viso-Glo to see if the shaded area can be made smaller.

(MODEL 1068,1268,1568 ETC ONLY)
(G) Re-adjust the oscillator trimmer (center hole) while watching the Viso-Glo to see if the shaded area can be made smaller.

(MODEL 1068,1268,1568 ETC. ONLY)
(H) Check the above adjustments by pulling the band switch knob <u>out</u> and without touching the manual tuning controls, observe if the Viso-Glo shows any difference in the amount of shaded area in the tube as compared to the shaded area with the band switch knob <u>pushed in</u>. If the shaded area is larger with the band switch <u>pushed in</u>, readjust the Selectronne trimmers until the shaded area is equal to that obtained with the Band Switch knob pulled out.

6. Repeat the procedure in paragraph 5 for each of the six stations.

7. When all trimmers have been properly adjusted, replace Viso-Glo tube and socket in clamp, replace type 6H6G Discriminator tube and attach Selectronne escutcheon plate to front of cabinet.

8. Any of the six stations to which the SPARTON Selectronne has been adjusted, may now be instantly received simply by pushing the Selectronne button for the desired station with the Band Switch knob pushed in; that is, in the automatic position.

(MODEL 1068,1268 1568 ETC ONLY)
Note: In case all six of the buttons should become depressed through improper manipulation of the Selectronne, simply reach into the Selectronne box (from the back of the cabinet) through the side next to the Viso-Glo, and apply a slight pressure of the fingers under the latching bar which runs across the frame work in front of the trimmer box. This will immediately release all buttons.

(MODEL 8618 ONLY)
NOTE: In case all six of the buttons should become depressed through improper manipulation of the Selectronne, simply apply a slight extra pressure of the fingers to any one of the buttons. This will immediately release all buttons.

WARNING - <u>Never attempt to adjust the Selectronne with the 6H6G Discriminator tube in the socket.</u>

Unless the 6H6G Discriminator tube is removed when the Selectronne is adjusted, automatic frequency control will prevent correct trimmer adjustments, with the result that unsatisfactory reception of stations may occur. With the 6H6G Discriminator tube left in the socket, automatic frequency control action will bring in the station and close the Viso-Glo before the trimmers have been completely adjusted.

<u>IMPORTANT</u>

<u>Always check the discriminator circuit to see if it is in proper adjustment and adjust it if necessary before adjusting the Selectronne.</u>

TO CHECK THE ADJUSTMENT OF THE DISCRIMINATOR CIRCUIT, turn the automatic frequency control (A.F.C.) knob to the "Off" position. Tune in manually a strong station which will nearly close the Viso-Glo. Turn the A.F.C. knob to the "On" position. WATCH THE VISO-GLO. Repeat the procedure from "Off" to "On" several times. The Viso-Glo should show the same position. If there is any variation in the Viso-Glo, it is an indication that the Discriminator circuit is out of adjustment and must be adjusted before any attempt is made to adjust any station on the Selectronne.

IMPORTANT: The Type 6H6G Discriminator tube must be <u>in</u> its socket when adjusting the discriminator circuit, and <u>out</u> of its socket when adjusting the Selectronne trimmers.

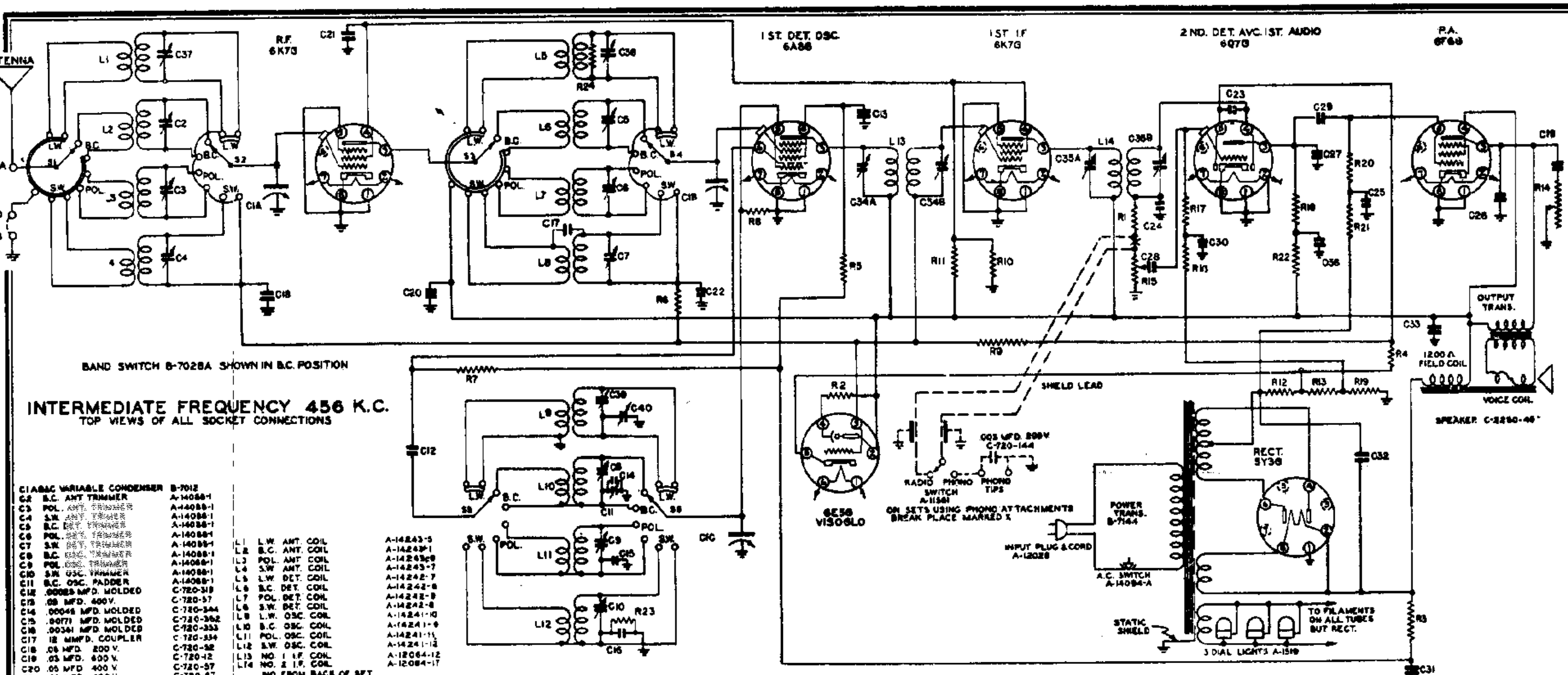
TO ADJUST THE DISCRIMINATOR CIRCUIT, it is necessary to remove the chassis from the cabinet. Place the A.F.C. knob in the "Off" position and manually tune in a strong station so that the Viso-Glo closes as much as possible. <u>Then switch the A.F.C. knob to the "On" position.</u> Using an insulated (bakelite) screw-driver, turn the Discriminator circuit trimmer (see diagram on front of sheet) very slightly one way or the other until the Viso-Glo closes as far as possible. Then switch the A.F.C. knob to the "Off" position again. The Viso-Glo should show the same position. If it does not, adjust more accurately.

CAUTION - <u>The blade of the screw driver positively must be an insulated (bakelite) one.</u>

WARNING - <u>Do not attempt to adjust the other trimmers. Only adjust the one shown in the diagram as "Discriminator Trimmer".</u>

JUNE 1938

SPARKS-WITHINGTON CO.



INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS

C1 A,B&C	VARIABLE CONDENSER	B-7012
C2	B.C. ANT TRIMMER	A-14088-1
C3	POL. ANT. TRIMMER	A-14088-1
C4	S.W. ANT. TRIMMER	A-14088-1
C5	B.C. DET. TRIMMER	A-14088-1
C6	POL. DET. TRIMMER	A-14088-1
C7	S.W. DET. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	S.W. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14088-1
C12	.00025 MFD. MOLDED	C-720-319
C13	.05 MFD. 400 V.	C-720-57
C14	.00046 MFD. MOLDED	C-720-344
C15	.00171 MFD. MOLDED	C-720-362
C16	.00361 MFD. MOLDED	C-720-353
C17	12 MMFD. COUPLER	C-720-334
C18	.05 MFD. 200 V.	C-720-52
C19	.03 MFD. 600 V.	C-720-12
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.00025 MFD. MOLDED	C-720-319
C24	.0001 MFD. MOLDED	C-720-325
C25	.1 MFD. 100 V.	C-720-62
C26	.003 MFD. 600 V.	C-720-153
C27	.00025 MFD. MOLDED	C-720-319
C28	.01 MFD. 200 V.	C-720-20
C29	.05 MFD. 400 V.	C-720-57
C30	.1 MFD. 100 V.	C-720-62
C31	25 MFD. 350 V. ELECT.	A-14403
C32	6 MFD. 450 V. ELECT.	A-14073
C33	30 MFD. 300 V. ELECT.	A-14072
C34 A&B	NO. 1 I.F. TRIMMER	A-14404
C35 A&B	NO. 2 I.F. TRIMMER	A-14399
C36	.1 MFD. 400 V.	C-720-61
C37	L.W. ANT. TRIMMER	A-14088-1
C38	L.W. DET. TRIMMER	A-14088-1
C39	L.W. OSC. TRIMMER	A-14088-1
C40	L.W. OSC. PADDER	A-14088-3

L1	L.W. ANT. COIL	A-14243-5
L2	B.C. ANT. COIL	A-14243-1
L3	POL. ANT. COIL	A-14243-8
L4	S.W. ANT. COIL	A-14243-7
L5	L.W. DET. COIL	A-14242-7
L6	B.C. DET. COIL	A-14242-6
L7	POL. DET. COIL	A-14242-9
L8	S.W. DET. COIL	A-14242-8
L9	L.W. OSC. COIL	A-14241-10
L10	B.C. OSC. COIL	A-14241-9
L11	POL. OSC. COIL	A-14241-11
L12	S.W. OSC. COIL	A-14241-12
L13	NO. 1 I.F. COIL	A-12064-12
L14	NO. 2 I.F. COIL	A-12064-17
	NO. FROM BACK OF SET	
S1	ANT. PRI. SECTION	
S2	ANT. SEC. SECTION	
S3	DET. PRI. SECTION	
S4	DET. SEC. SECTION	
S5	OSC. PLATE SECTION	
S6	OSC. GRID SECTION	

R1	56,000 Ω .25 W.	C-2795-83B
R2	1 MEGOHM .25 W.	C-2795-98B
R3	10,000 Ω 1 W.	C-2797-74A
R4	1 MEGOHM .25 W.	C-2795-98B
R5	30,000 Ω .5 W.	C-2796-194A
R6	100,000 Ω .25 W.	C-2795-25B
R7	22,000 Ω .5 W.	C-2796-78C
R8	56,000 Ω .25 W.	C-2795-83B
R9	470,000 Ω .25 W.	C-2795-94B
R10	27,000 Ω 1 W.	C-2797-79A
R11	22,000 Ω 2 W.	C-2798-78A
R12	200 Ω 2 W.	C-2798-142A
R13	8 Ω .25 W.	B-7103-6
R14	1 MEGOHM TONE CONTROL	A-12957-A
R15	250,000 Ω VOL. CONTROL	A-14075-A
R16	1 MEGOHM .25 W.	C-2795-98B
R17	560,000 Ω .25 W.	C-2795-95B
R18	270,000 .25 W.	C-2795-91B
R19	36 Ω .25 W.	C-2795-124B
R20	270,000 Ω .25 W.	C-2795-91B
R21	270,000 Ω .25 W.	C-2795-91B
R22	100,000 Ω .25 W.	C-2795-25B
R23	86,000 Ω .25 W.	C-2795-24B
R24	100,000 Ω .25 W.	C-2795-86B

Sparton Superheterodyne Model 728-X

(Original) Effective Jan. 2, 1938

VOLTAGE CHART

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6K7G	R.F.	0	0	250	100	0	-	6.1	0	-1.
6A8G	1st Det. Osc.	0	0	250	109	-22	148	6.1	0	-.2
6K7G	1st I.F.	0	0	250	100	0	-	6.1	0	-.2
6Q7G	2nd Det. AVC - 1st Audio	0	0	52	-.2	-.2	-	6.1	0	-.2
6F6G	P.A.	0	0	260	250	-.4	-	6.1	0	-
5Y3	Rect.	0	330*	-	310*	-	310*	-	330*	-
6E5	Viso-Glo	6.1	1.9	-2.2	250	-3.3	0	-	-	-

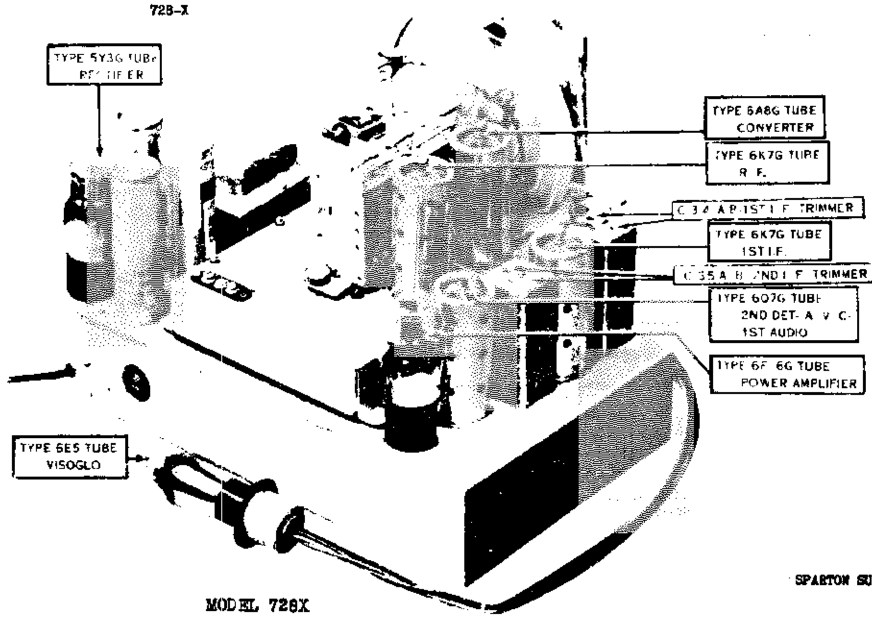
Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

MODEL 728X
Alignment, Trimmers
Socket, Chassis

SPARKS WITHINGTON CO.

MODEL 1089
Socket, Trimmers, Chassis

SPARTON SUPERHETERODYNE MODEL 728-X



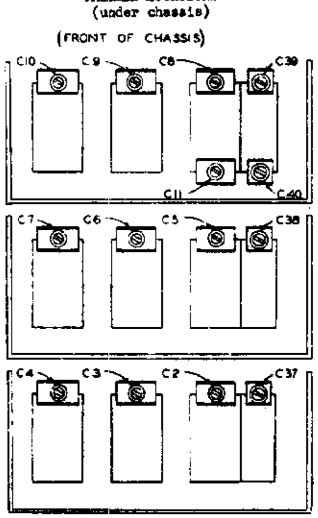
MODEL 728X ALIGNMENT (see note)

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C35A C35B C34A C34B	2nd I.F. Trans. 1st I.F. Trans.
2	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc. C5 RF C2 Ant.	
3		Ant.	200 mmf.	600	BC	600	C11 Pad	*
4	(Repeat operation 2)							
5	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
6	Long Wave Band	Ant.	200 mmf.	400	L.W.	400	C39 Osc. C38 RF C37 Ant.	
7		Ant.	200 mmf.	150	L.W.	150	C40 Pad	*
8	(Repeat operation 6. Also repeat operations 6, 7 and 8 if necessary)							
9	1st short wave band	Ant.	100 ohm 200 mmf. series	7 MC.	1st S.W.	7 MC.	C9 Osc. C6 RF C3 Ant.	
10	(Check for calibration and sensitivity at 2.5 MC. and 7 MC.)							
11	2nd short wave band	Ant.	100 ohm 200 mmf. series	21 MC.	2nd S.W.	21 MC.	C10 Osc. C7 RF C4 Ant.	Rock dial slightly while adjusting
12	(Check calibration and sensitivity at 8 MC. and 21 MC.)							
13	(Check operations 1 to 12 inclusive)							

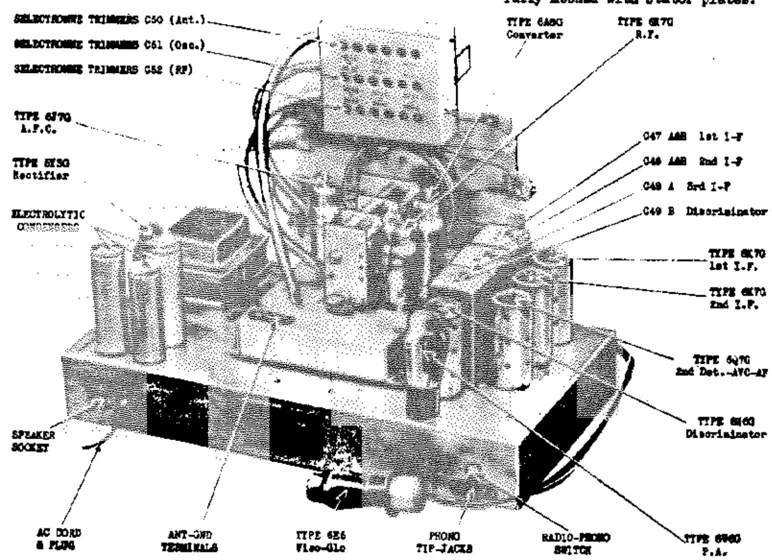
*Rock variable condenser slightly while adjusting for maximum output.

NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.

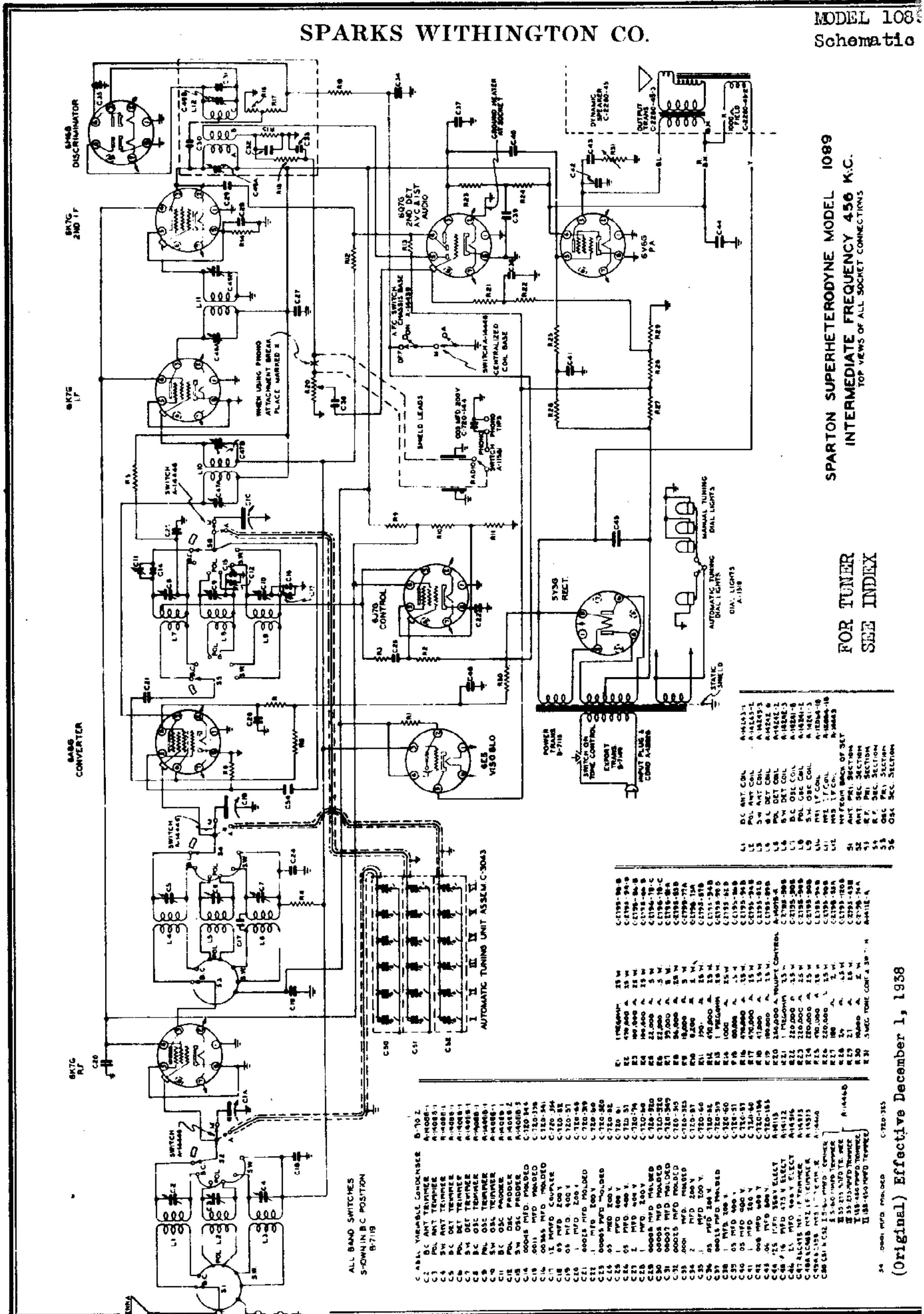
MODEL 728X
TRIMMER LOCATIONS
(under chassis)
(FRONT OF CHASSIS)



SPARTON SUPERHETERODYNE MODEL 1089



SPARKS WITHINGTON CO.



MODEL 1089
Voltage, Alignment
Trimmers

SPARKS WITHINGTON CO.

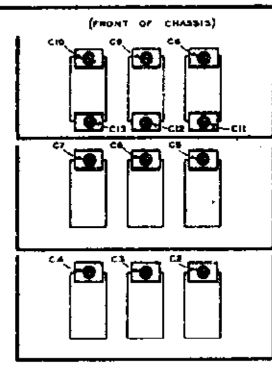
Viso-Glo tube in socket
AFC Switch "OFF"

ALIGNMENT (see note)

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C47 A,B	1st I.F. Trans.
							C48 A,B	2nd I.F. Trans.
							C48 A	3rd I.F. (Pri.)
2	Discrim.	Conv. Grid	.1 mf.	456	BC	Open	C49 B	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
4		Ant.	200 mmf.	600	BC	600	C11 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity 1500 KC, 900 KC and 600 KC) *							
7	1st Short Wave	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
8		Ant.	200 mmf.	1.95 MC.	1st S.W.	1.95 MC.	C12 Pad	
9	(Repeat operation 7)							
10	(Check calibration and sensitivity at 6 MC. and 1.95 MC.)							
11	2nd Short-Wave Band	Ant.	100 ohm 200 mmf. series	18 MC.	2nd S.W.	18 MC.	C10 Osc.	Rock dial slightly while adjusting
							C7 R.F.	
							C4 Ant.	
12		Ant.		6 MC.	2nd S.W.	6 MC.	C13 Pad	
13	(Repeat operation 11)							
14	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
15	(Check operations 1 to 14 inclusive)							

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.



TRIMMER LOCATIONS (under chassis)

VOLTAGE CHART

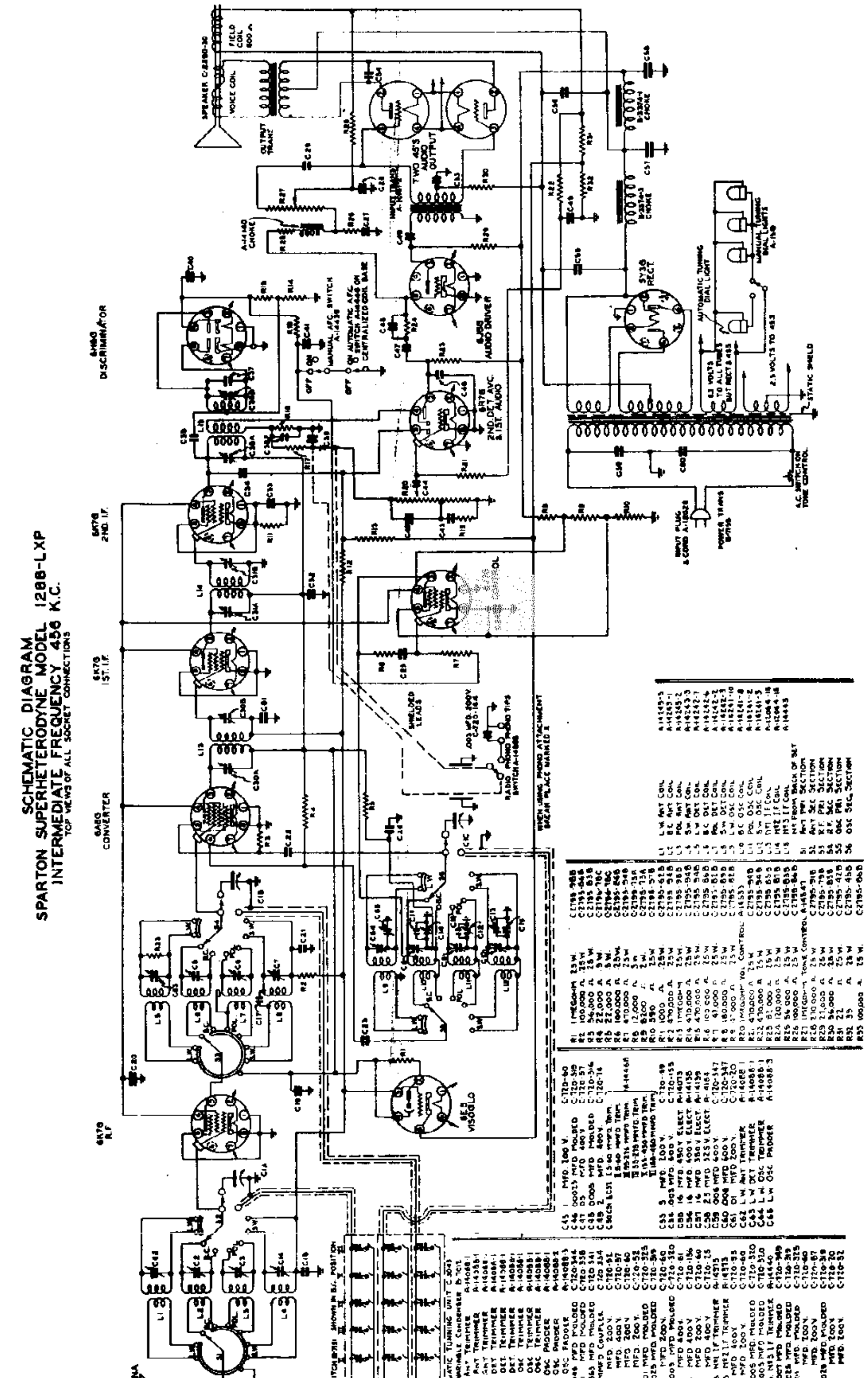
Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6K7G	R.F.	0	0	300	75	0	–	6.3	0	–.2
6A8G	Converter	0	0	300	91	–5.5	135	6.3	0	–.2
6K7G	I.F.	0	0	300	75	0	–	6.3	0	–2.6
6K7G	2nd I.F.	0	0	300	75	4	–	6.3	4.1	0
6H6G	Discriminator	0	0	.5	0	.5	–	6.3	0	–
6J7G	A.F.C.	0	0	300	85	4.5	–	6.3	4.4	0
6Q7G	2nd Det. AVC-1st audio	0	0	100	–.2	–.1	–	6.3	0	0
6V6G	P.A.	0	0	275	290	.5	.6	6.3	0	–
5Y3G	Rect.	–	350*	–	350*	–	350*	–	350*	–
6E5	Viso-Glo	6.3	50	–3	280	–4	0	–	–	–

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or – on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

SPARKS WITHINGTON CO.



FOR TUNER SEE INDEX

NOTE: THE VOLTAGE DATA AND CHASSIS LAYOUT OF MODEL 1268 APPLY ALSO TO MODEL 1288 LXP FOR WHICH SEE INDEX

MODEL 1288LXP
Alignment, Trimmers
MODEL 1867
Socket Layout

SPARKS WITHINGTON CO.

SPARTON SUPERHETERODYNE MODEL
1288-LXP

ALIGNMENT

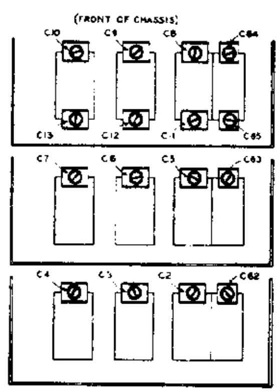
OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C50 A,B C31 A,B C36A	1st I.F. Transformer 2nd I.F. Transformer 3rd I.F. Trans. (Pri.)
2	Discrim.	Conv. Grid	.1 mf.	456	BC	Open	C36B	Adjust for minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc. C5 RF C2 Ant.	
4		Ant.	200 mmf.	600	BC	600	C11 Pad	**
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) *							
7	Long Wave Band	Ant.	200 mmf.	400	L.W.	400	C64 Osc. C63 RF C62 Ant.	
8		Ant.	200 mmf.	150	L.W.	150	C65 Pad	**
9	(Repeat operation 7. Also repeat operations 7, 8 and 9 if necessary.							
10	1st Short-Wave Band	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc. C6 RF C3 Ant.	
11		Ant.	200 mmf.	1.95 MC.	1st S.W.	1.95 MC.	C12 Pad	
12	(Repeat operation 10)							
13	(Check calibration and sensitivity at 6 MC and 1.95 MC)							
14	2nd Short Wave Band	Ant.	100 ohm 200 mmf. series	18 MC.	2nd S.W.	18 MC.	C10 Osc. C7 RF C4 Ant.	**
15		Ant.		6 MC.	2nd S.W.	6 MC.	C13 Pad	
16	(Repeat operation 14)							
17	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
18	(Check operations 1 to 18 inclusive)							

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

** Rock variable condenser slightly while adjusting for maximum output.

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

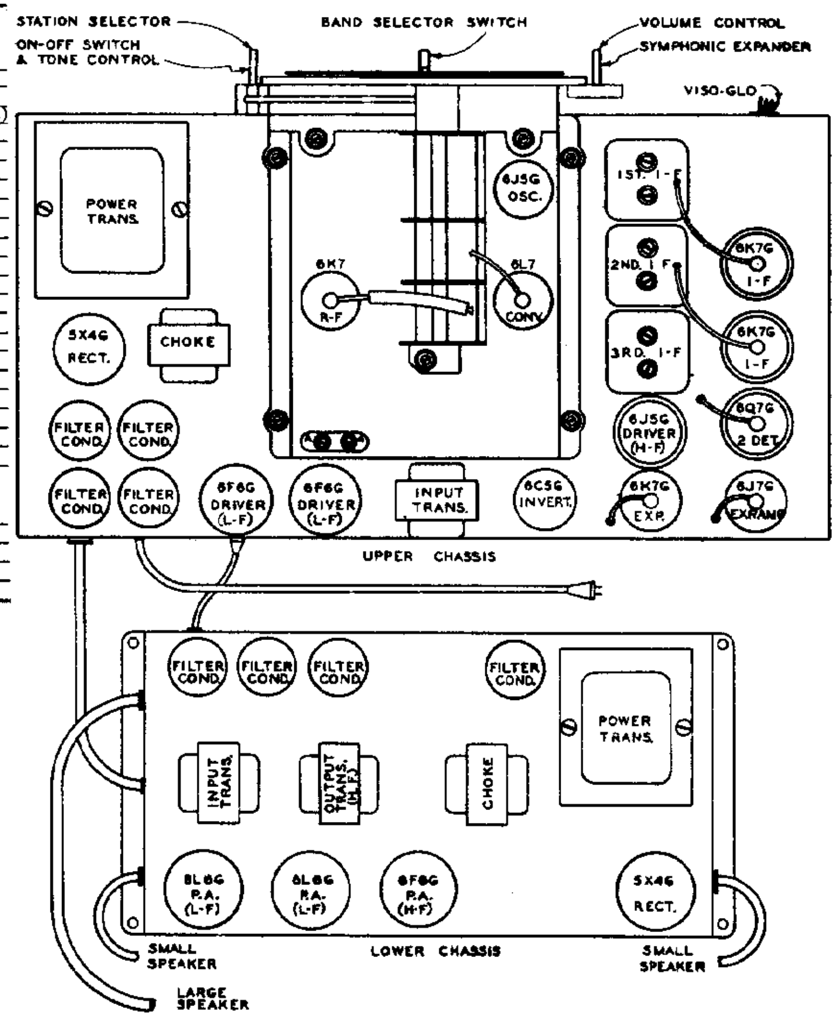
(Original) Effective Jan. 2, 1938



TRIMMER LOCATIONS
(under chassis)

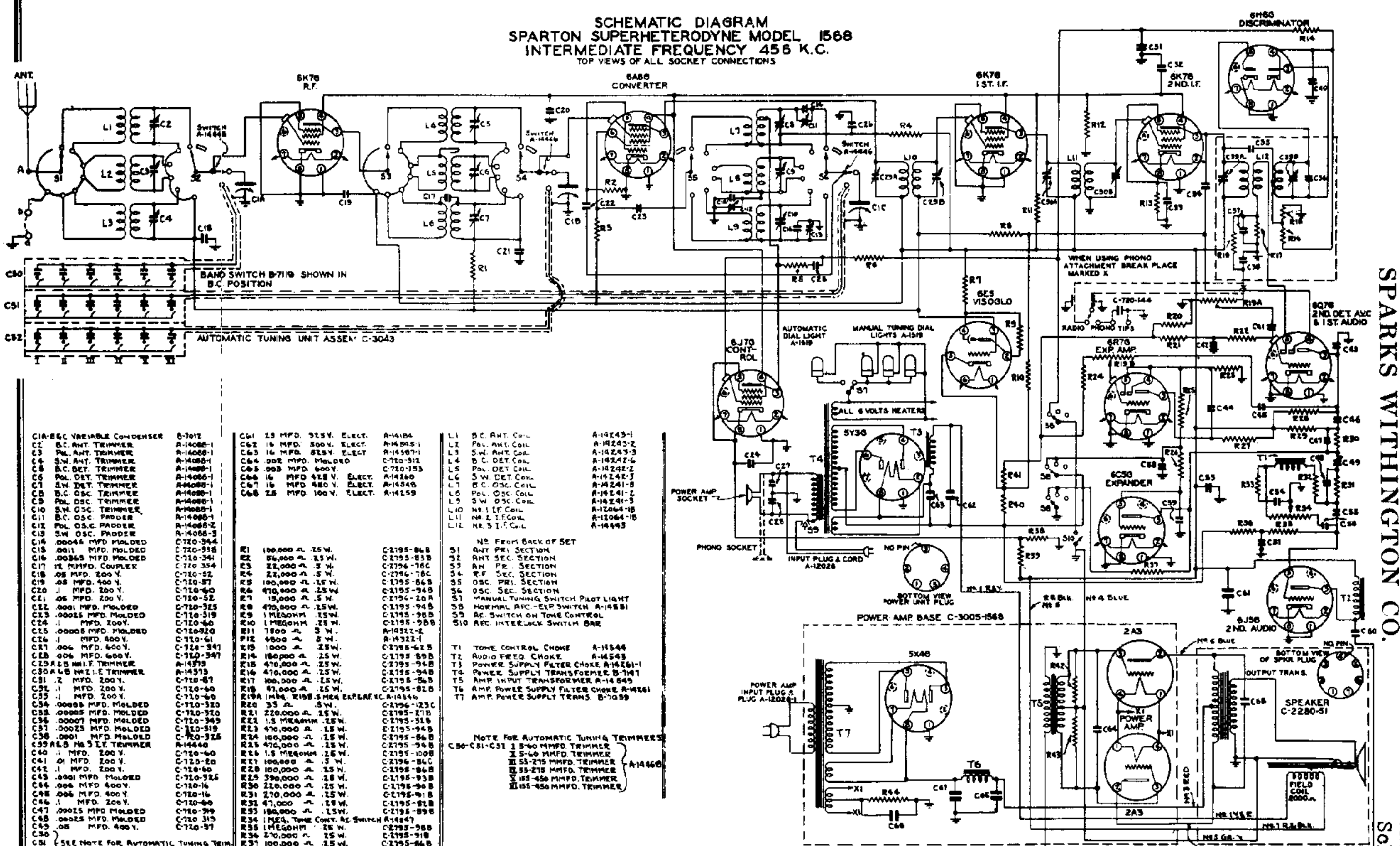
Model 1867

CHASSIS DIAGRAM



SPARKS WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 1568
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS



C1A-B&C	VARIABLE CONDENSER	B-7012
C2	B.C. ANT. TRIMMER	A-14088-1
C3	POL. ANT. TRIMMER	A-14088-1
C4	S.W. ANT. TRIMMER	A-14088-1
C5	B.C. DET. TRIMMER	A-14088-1
C6	POL. DET. TRIMMER	A-14088-1
C7	S.W. DET. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	S.W. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14088-1
C12	POL. OSC. PADDER	A-14088-2
C13	S.W. OSC. PADDER	A-14088-3
C14	.00046 MFD MOLDED	C-720-344
C15	.0011 MFD. MOLDED	C-720-338
C16	.00365 MFD. MOLDED	C-720-341
C17	12 MMFD. COUPLER	C-720-354
C18	.05 MFD. 200 V.	C-720-52
C19	.05 MFD. 400 V.	C-720-57
C20	.1 MFD. 200 V.	C-720-60
C21	.05 MFD. 200 V.	C-720-52
C22	.0001 MFD. MOLDED	C-720-325
C23	.00025 MFD. MOLDED	C-720-319
C24	.1 MFD. 200 V.	C-720-60
C25	.00005 MFD. MOLDED	C-720-320
C26	.1 MFD. 400 V.	C-720-61
C27	.006 MFD. 600 V.	C-720-347
C28	.006 MFD. 600 V.	C-720-347
C29 A&B	No. 1 I.F. TRIMMER	A-14313
C30 A&B	No. 2 I.F. TRIMMER	A-14313
C31	.2 MFD. 200 V.	C-720-67
C32	.1 MFD. 200 V.	C-720-60
C33	.1 MFD. 200 V.	C-720-60
C34	.00005 MFD. MOLDED	C-720-320
C35	.00005 MFD. MOLDED	C-720-320
C36	.00007 MFD. MOLDED	C-720-349
C37	.00025 MFD. MOLDED	C-720-319
C38	.0001 MFD. MOLDED	C-720-325
C39 A&B	No. 3 I.F. TRIMMER	A-14440
C40	.1 MFD. 200 V.	C-720-60
C41	.01 MFD. 200 V.	C-720-20
C42	.1 MFD. 200 V.	C-720-60
C43	.0001 MFD. MOLDED	C-720-325
C44	.006 MFD. 400 V.	C-720-16
C45	.006 MFD. 400 V.	C-720-16
C46	.1 MFD. 200 V.	C-720-60
C47	.00025 MFD. MOLDED	C-720-319
C48	.00025 MFD. MOLDED	C-720-319
C49	.05 MFD. 400 V.	C-720-57
C50, C51, C52	SEE NOTE FOR AUTOMATIC TUNING TRIM.	
C53	.2 MFD. 400 V.	C-720-74
C54	.001 MFD. 400 V.	C-720-136
C55	.05 MFD. 200 V.	C-720-52
C56	.006 MFD. 400 V.	C-720-16
C57	.1 MFD. 200 V.	C-720-60
C58	.1 MFD. 200 V.	C-720-64
C59	.4 MFD. 200 V.	C-720-158
C60	.2 MFD. 400 V.	C-720-74
C61	25 MFD. 325 V. ELECT.	A-14184
C62	16 MFD. 500 V. ELECT.	A-14545-1
C63	16 MFD. 525 V. ELECT.	A-14567-1
C64	.002 MFD. MOLDED	C-720-312
C65	.003 MFD. 600 V.	C-720-153
C66	16 MFD 425 V. ELECT.	A-14260
C67	16 MFD 450 V. ELECT.	A-14548
C68	25 MFD. 100 V. ELECT.	A-14259

R1	100,000 Ω .25 W.	C-2195-86B
R2	56,000 Ω .25 W.	C-2195-83B
R3	22,000 Ω .5 W.	C-2196-78C
R4	22,000 Ω .5 W.	C-2196-78C
R5	100,000 Ω .25 W.	C-2195-86B
R6	470,000 Ω .25 W.	C-2195-94B
R7	15,000 Ω .5 W.	C-2196-20A
R8	470,000 Ω .25 W.	C-2195-94B
R9	1 MEGOHM .25 W.	C-2195-98B
R10	1 MEGOHM .25 W.	C-2195-98B
R11	7500 Ω 3 W.	A-14322-2
R12	4800 Ω 5 W.	A-14322-1
R13	1000 Ω .25 W.	C-2195-62B
R14	180,000 Ω .25 W.	C-2195-89B
R15	470,000 Ω .25 W.	C-2195-94B
R16	470,000 Ω .25 W.	C-2195-94B
R17	100,000 Ω .25 W.	C-2195-86B
R18	47,000 Ω .25 W.	C-2195-82B
R19A	1 MEG. R19B .5 MEG. EXP. & AFC.	A-14546
R20	33 Ω .5 W.	C-2196-123C
R21	220,000 Ω .25 W.	C-2195-27B
R22	1.5 MEGOHM .25 W.	C-2195-31B
R23	470,000 Ω .25 W.	C-2195-94B
R24	100,000 Ω .25 W.	C-2195-86B
R25	470,000 Ω .25 W.	C-2195-94B
R26	1.5 MEGOHM .25 W.	C-2195-100B
R27	100,000 Ω .5 W.	C-2196-86C
R28	100,000 Ω .25 W.	C-2195-86B
R29	390,000 Ω .25 W.	C-2195-93B
R30	220,000 Ω .25 W.	C-2195-90B
R31	270,000 Ω .25 W.	C-2195-91B
R32	47,000 Ω .25 W.	C-2195-82B
R33	180,000 Ω .25 W.	C-2195-89B
R34	1 MEG. TONE CONT. AC SWITCH	A-14547
R35	1 MEGOHM .25 W.	C-2195-98B
R36	270,000 Ω .25 W.	C-2195-91B
R37	100,000 Ω .25 W.	C-2195-86B
R38	350 Ω 5 W.	C-2196-56A
R39	25,000 Ω .5 W.	A-14322-3
R40	82 Ω .5 W.	C-2196-135C
R41	27 Ω .25 W.	C-2195-121B
R42	150,000 Ω .25 W.	C-2195-26B
R43	150,000 Ω .25 W.	C-2195-26B
R44	700 Ω 7 W.	A-14263

L1	B.C. ANT. COIL	A-14243-1
L2	POL. ANT. COIL	A-14243-2
L3	S.W. ANT. COIL	A-14243-3
L4	B.C. DET. COIL	A-14242-6
L5	POL. DET. COIL	A-14242-2
L6	S.W. DET. COIL	A-14242-3
L7	B.C. OSC. COIL	A-14241-8
L8	POL. OSC. COIL	A-14241-2
L9	S.W. OSC. COIL	A-14241-3
L10	No. 1 I.F. COIL	A-12064-18
L11	No. 2 I.F. COIL	A-12064-18
L12	No. 3 I.F. COIL	A-14445

No. FROM BACK OF SET

S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	AN. PR. SECTION
S4	R.F. SEC. SECTION
S5	OSC. PRI. SECTION
S6	OSC. SEC. SECTION
S7	MANUAL TUNING SWITCH PILOT LIGHT
S8	NORMAL AFC.-EXP. SWITCH A-14551
S9	AC. SWITCH ON TONE CONTROL
S10	AFC. INTERLOCK SWITCH BAR

T1	TONE CONTROL CHOKE	A-14544
T2	AUDIO FREQ. CHOKE	A-14543
T3	POWER SUPPLY FILTER CHOKE	A-14261-1
T4	POWER SUPPLY TRANSFORMER	B-7147
T5	AMP. INPUT TRANSFORMER	A-14549
T6	AMP. POWER SUPPLY FILTER CHOKE	A-14261
T7	AMP. POWER SUPPLY TRANS.	B-7059

NOTE FOR AUTOMATIC TUNING TRIMMERS

C50-C51-C52
I 5-40 MMFD. TRIMMER
II 5-40 MMFD. TRIMMER
III 55-215 MMFD. TRIMMER
IV 55-215 MMFD. TRIMMER
V 185-450 MMFD. TRIMMER
VI 185-450 MMFD. TRIMMER
A-14460

FOR TUNER
SEE INDEX

(Original) Effective Jan. 2, 1938

MODEL 1568
Alignment, Voltage
Socket, Trimmers, Chassis

SPARKS WITHINGTON CO.

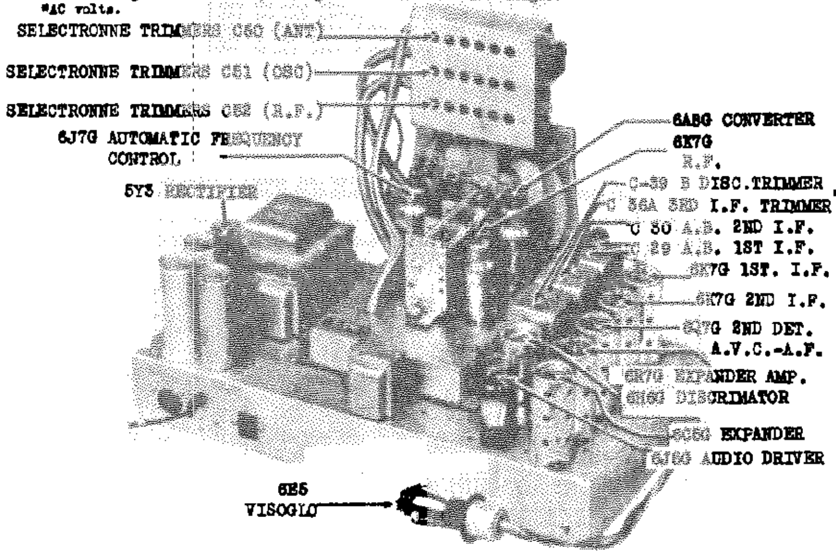
Sparton Superheterodyne Model 1568

VOLTAGE CHART

Line Voltage: 115 volts   Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6K7G	R-F	0	0	250	86	0	-	6	0	-.2
6A8G	Converter	0	0	250	86	-7	140	6	0	-.2
6J7G	AFC-Control	0	0	225	86	4	0	6	4	0
6K7G	1st. I-F	0	0	250	86	0	-	6	0	-3
6K7G	2nd. I-F	0	0	250	86	4	-	6	4	0
6H6G	Discriminator	0	0	0	0	0	0	6	0	-
6Q7G	1st. Audio Det-AVC	0	0	145	0	0	-3	6	0	-.1
6J5G	Audio driver	0	0	250	-	.1	.1	6	0	-
6R7G	Expander Amplifier	0	0	56	0	0	.1	6	0	-.1
6C5G	Expander	0	0	3.5	.1	.1	20	6	0	-
5X3G	Rectifier	0	400*	-	400*	-	400*	-	400*	-
6E5	Viso-Glo	0	20	-.1	245	4	6	-	-	-
(2) 2A3	Power Amplifier	60	350	0	60	-	-	-	-	-
5X4G	Rectifier	-	-	350*	-	350*	-	370*	370*	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.



CHASSIS ILLUSTRATION

SPARTON SUPERHETERODYNE MODEL
1568

ALIGNMENT See Note:

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C29 A,B	1st I.F. Trans.
							C30 A,B	2nd I.F. Trans.
							C39 A	3rd I.F. (Pri.)
2	Discrim.	Conv. Grid	.1 mf.	456	BC	Open	C39 B	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
4		Ant.	200 mmf.	600	BC	600	C11 Pad	**
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) *							
7	1st Short-Wave Band	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
8		Ant.	200 mmf.	1.95 MC.	1st S.W.	1.95 MC.	C12 Pad	**
9	(Repeat operation 7)							
10	(Check calibration and sensitivity at 6 MC. and 1.95 MC.)							
11	2nd Short-Wave Band	Ant.	100 ohm 200 mmf. series	18 MC.	2nd S.W.	18 MC.	C10 Osc.	Rock dial slightly while adjusting
							C7 RF	
							C4 Ant.	
12		Ant.		6 MC.	2nd S.W.	6 MC.	C13 Pad	**
13	(Repeat operation 11)							
14	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
15	(Check operations 1 to 14 inclusive)							

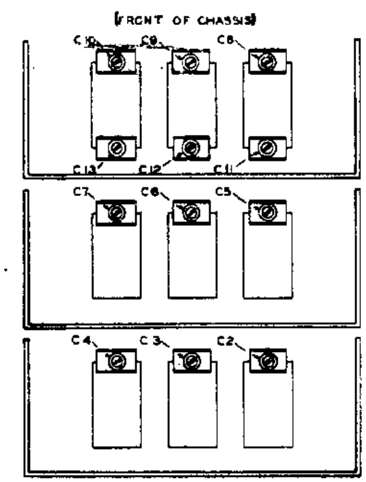
* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

** Rock variable condenser slightly while adjusting for maximum output.

NOTE: Expander "OFF"
AFC Switch "OFF"
Viso-Glo Tube in Socket

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

(FRONT OF CHASSIS)



TRIMMER LOCATIONS
(under chassis)

Early, Late Productions
Voltage

SPARKS WITHINGTON CO.

MODEL 1867
Below Ser. 000751
Schematic Changes

(SERIAL NO. 000001 to 000750 INCLUSIVE)

The Schematic Diagram for the SPARTON Models 1867 (Serial Numbers 000001 to 000750 inclusive) is the same as shown except for the three general circuit changes as noted below:

(1) Change in Tone Control circuit as in Fig. 1.

(2) Change in Cathode Resistor Network of Type 6F6G High Frequency Power Amplifier as in Fig. 2.

(3) Change in Bias Resistor of Type 6K7G 1st. I-F Amplifier.

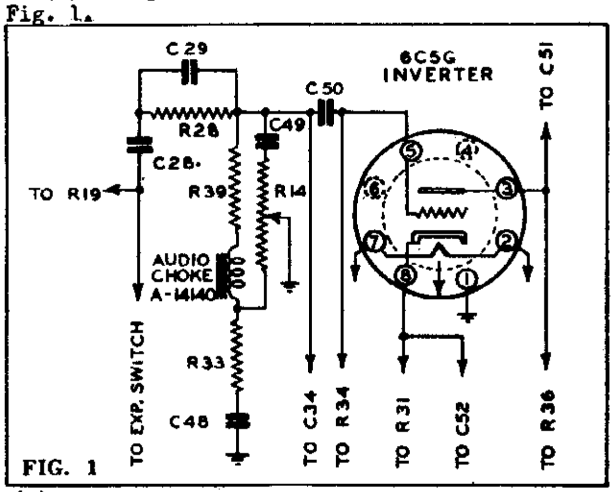


FIG. 1

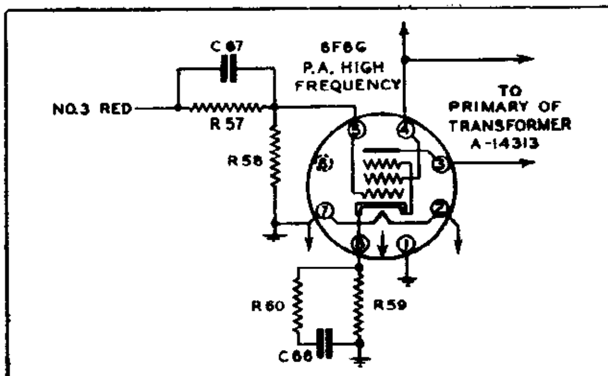


FIG. 2

(1) DETAILS OF TONE CONTROL to conform to schematic

Resistor R39	(27000 ohms .25 w.)	removed
Resistor R33	(100000 ohms .25 w.)	removed
Audio choke	(A-14140)	removed
Resistor R65	(180000 ohms .25 w.)	added
Resistor R66	(470000 ohms .25 w.)	added
Condenser C85	(.02 mf. 200 v.)	added

(Change in circuit as in Fig. 1)

(2) DETAILS OF RESISTOR NETWORK change in Cathode of Type 6F6G High Frequency Power Amplifier:

Resistor R60 (180 ohms .25 w.) removed.

(3) DETAILS OF BIAS RESISTOR change in Type 6K7G 1st. I-F Amplifier:

Substitute R56 1200 ohm .5 w. resistor (C-2796-63C) in place of 10000 ohm .5 w. resistor (C-2796-74C).

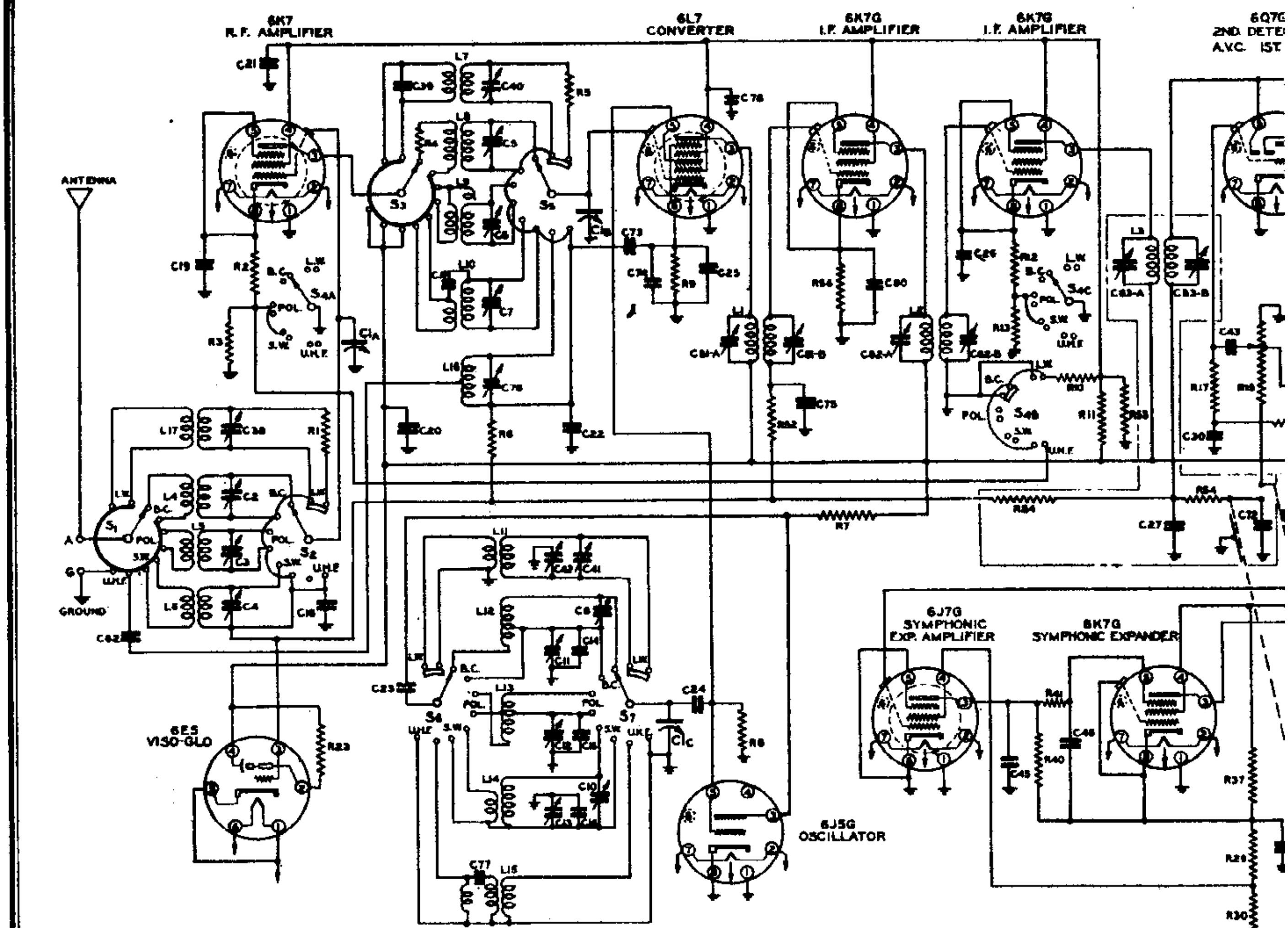
VOLTAGE TABLE FOR EARLY AND LATE MODELS

Line Voltage: 110 volts
Symphonic Expander Control: Off
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7	R-F Amplifier	0	6	272	117	0	-	0	0	0
6L7	Converter	0	6	260	140	-35	0	0	0	0
6J5G	Oscillator	0	6	260	0	0	0	0	0	-
6K7G	First I-F Amplifier	0	6	270	110	0	0	0	0	0
6K7G	Second I-F Amplifier	0	6	280	121	0	0	0	0	0
6Q7G	Det-AVC-First A-F Amplifier	0	6	[2] 200	0	0	0	0	0	0
6J7G	Expander Amplifier	0	6	[3] .9	[4] 16	0	0	0	0	0
6K7G	Symphonic Expander	0	6	[3] 1.2	97	[3] .25	90	0	92	90
6C5G	Inverter	0	6	233	265	0	0	0	0	-
6J5G	Driver (High Frequency)	0	6	235	0	0	0	0	0	-
(2)6F6G	Driver (Low Frequency)	0	6	250	250	0	0	0	13	-
5X4G	Rectifier (Upper Chassis)	0	0	375	0	375	0	[1] .02	[1] 5.2	-
6E5	Viso-Glo	6	[3] 1.4	0	265	0	0	-	-	-
6F6G	Power Amplifier (High Frequency)	0	0	280	280	0	0	6.3	0	-
(2)6L6G	Power Amplifier (Low Frequency)	0	0	395	305	0	0	6.3	[4] 16.5	-
5X4G	Rectifier (Lower Chassis)	0	0	380	0	380	0	[1] 5.2	[1] .1	-

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

[1] 10 volts A-C [2] 250 volts D-C [3] 5 volts D-C [4] 25 volts D-C



(ORIGINAL) EFFECTIVE NOV 28.1936

SCHEMATIC DIAGRAM CHANGES

(SERIAL NO'S. 000751 AND UP)

The following changes, which should be made in the Model 1867 schematic diagram are effective Nov. 30, 1936, and are included in all SPARTON Model 1867 chasses with serial numbers above 000750.

1. Replace condenser C49 Part No. C-720-152 (.005 mf. 200v.), by Part No. C-720-144 (.003 mf. 200v.). This condenser connects from ground to the mid-point between the tone control (R14) and resistor R65.

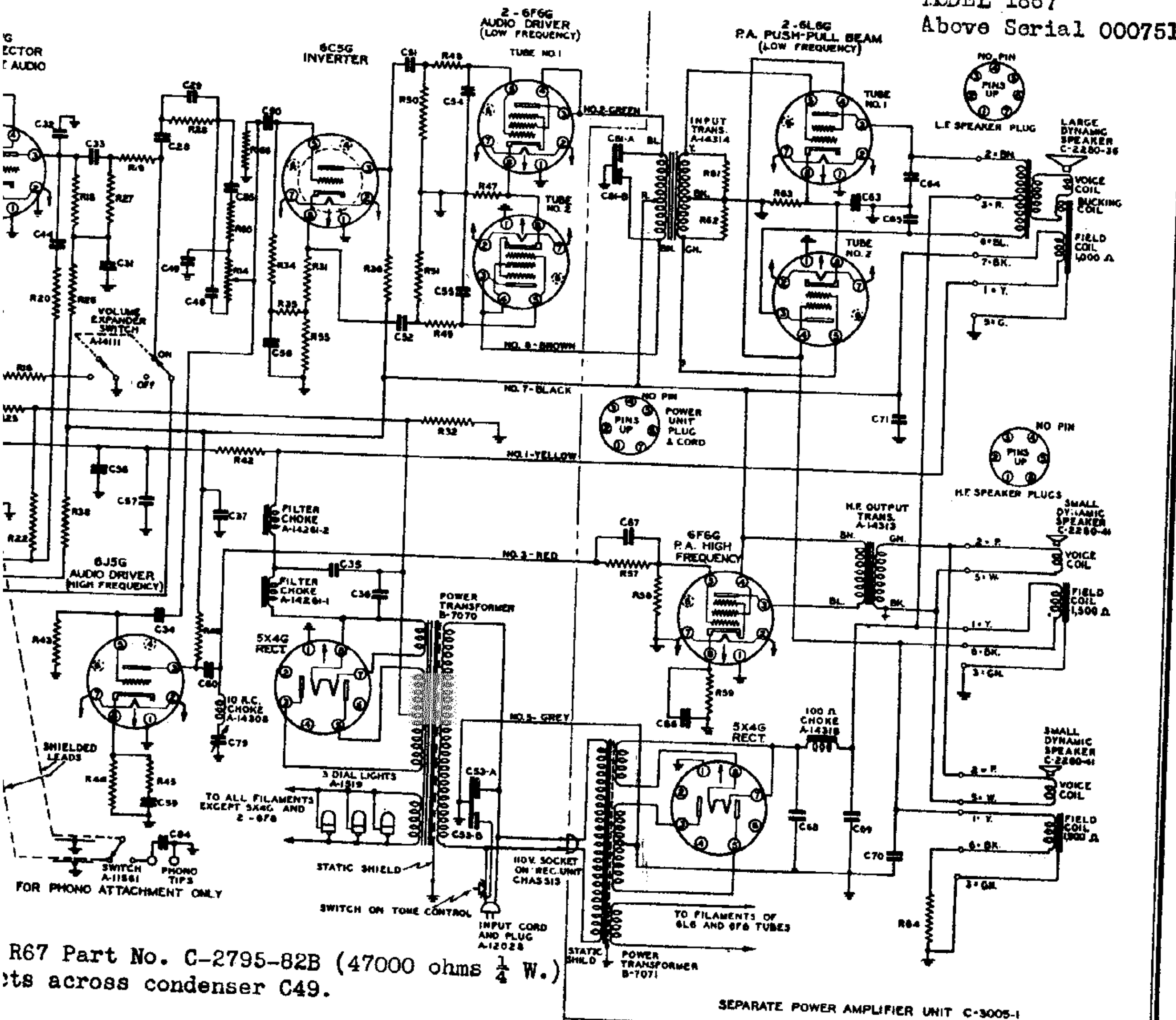
2. Add resistc
This resistor conr

3. Replace res
by resistor Part N
tor is in the cath
tube.

C1-A,B,C	VARIABLE CONDENSER	B-7012
C2	B.C. ANTENNA TRIMMER	A-14088-1
C3	P.B. " "	A-14088-1
C4	S.W. " "	A-14088-1
C5	B.C. DETECTOR TRIMMER	A-14088-1
C6	P.B. " "	A-14088-1
C7	S.W. " "	A-14088-1
C8	B.C. OSCILLATOR TRIMMER	A-14088-1
C10	S.W. " "	A-14088-1
C11	B.C. " PADDER	A-14088-1
C12	P.B. " "	A-14088-2
C13	S.W. " "	A-14088-3
C14	.00045 MFD. MICA	C-720-344
C15	.0011 MFD. MICA	C-720-338
C16	.00365 MFD. MICA	C-720-341
C17	COUPLER 12 MMFD.	A-10896
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.003 MFD. MICA	C-720-328
C24	.00005 MFD. MICA	C-720-343
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MICA	C-720-325
C28	.05 MFD. 400 V.	C-720-57
C29	.00025 MFD. MICA	C-720-319
C30	.1 MFD. 100 V.	C-720-62
C31	.1 MFD. 400 V.	C-720-61
C32	.00025 MFD. MICA	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.001 MFD. 200 V.	C-720-142
C35	16 MFD. 425 V. ELECTROLYTIC	A-14315
C36	16 MFD. 475 V. "	A-14310-1
C37	16 MFD. 350 V. "	A-14139
C38	L.W. ANTENNA TRIMMER	A-14088-1
C39	.00025 MFD. MICA	C-720-319
C40	L.W. DETECTOR TRIMMER	A-14088-1
C41	L.W. OSCILLATOR TRIMMER	A-14088-1
C42	L.W. " PADDER	A-14088-3
C43	.025 MFD. 200 V.	C-720-40
C44	.006 MFD. 600 V.	C-720-17
C45	.3 MFD. 200 V.	C-720-81
C46	.2 MFD. 200 V.	C-720-87
C47	.5 MFD. 200 V.	C-720-104
C48	.001 MFD. 400 V.	C-720-138
C49	.005 MFD. 200 V.	C-720-152
C50	.01 MFD. 200 V.	C-720-20
C51	.05 MFD. 400 V.	C-720-46
C52	.05 MFD. 400 V.	C-720-46
C53	.006-.006 MFD. 600 V.	C-720-150
C54	.01 MFD. 200 V.	C-720-147
C55	.01 MFD. 200 V.	C-720-147
C56	.5 MFD. 200 V.	C-720-104
C57	25 MFD. 325 V. ELECTROLYTIC	A-14184
C58	.1 MFD. 400 V.	C-720-61
C59	.3 MFD. 200 V.	C-720-148
C60	.0025 MFD. 400 V.	C-720-149
C61	.025-.025 MFD. 600 V.	C-720-141
C62	.0001 MFD. MICA	C-720-339
C63	50 MFD. 50 V. ELECTROLYTIC	A-14306
C64	.015 MFD. 600 V.	C-720-140
C65	.015 MFD. 600 V.	C-720-140
C66	.5 MFD. 200 V.	C-720-151
C67	.00025 MFD. MICA	C-720-319
C68	16 MFD. 475 V. ELECTROLYTIC	A-14310
C69	25 MFD. 425 V. "	A-14305
C70	16 MFD. 350 V. "	A-14139
C71	.1 MFD. 600 V.	C-720-139
C72	.0001 MFD. MICA	C-720-325
C73	.05 MFD. 100 V.	C-720-58
C74	.00025 MFD. MICA	C-720-324
C75	.1 MFD. 200 V.	C-720-64
C76	U.H.F. DET. TRIMMER	A-14088-3
C77	.000025 MFD. MICA	C-720-342
C78	.00025 MFD. MICA	C-720-324
C79	10 K.C. CHOKE TRIMMER	A-12834-3
C80	.1 MFD. 100 V.	C-720-62
C81-A,B	NO.1 I.F. TRIMMER	A-14373
C82-A,B	NO.2 I.F. TRIMMER	A-14373
C83-A,B	NO.3 I.F. TRIMMER	A-14375
C84	.003 MFD. 200 V. (PHONO SETS ONLY)	C-720-144
C85	.02 MFD. 200 V.	C-720-145

R1	100 Ω	.1 W.
R2	270 Ω	.25 W.
R3	1,000 Ω	.25 W.
R4	2,200 Ω	.1 W.
R5	100 Ω	.1 W.
R6	100,000 Ω	.25 W.
R7	22,000 Ω	.5 W.
R8	33,000 Ω	.25 W.
R9	560 Ω	.25 W.
R10	22,000 Ω	.5 W.
R11	10,000 Ω	3. W.
R12	270 Ω	.25 W.
R13	470 Ω	.25 W.
R14	1 MEGOHM TONE CONTROL	
R15	500,000 Ω VOLUME CONTROL	
~~R16~~	~~56,000 Ω~~	~~.25 W.~~
R17	1 MEGOHM	.25 W.
R18	270,000 Ω	.25 W.
R19	100,000 Ω	.25 W.
R20	1 MEGOHM	.25 W.
R22	470,000 Ω	.25 W.
R23	1 MEGOHM	.25 W.
R24	1 MEGOHM	.25 W.
R25	470,000 Ω	.25 W.
R26	56,000 Ω	.25 W.
R27	680,000 Ω	.25 W.
R28	120,000 Ω	.25 W.
R29	8,200 Ω	1. W.
R30	1,800 Ω	.5 W.
R31	4,700 Ω	.25 W.
R32	15 Ω	.25 W.

MODEL 1867
Above Serial 000751



R67 Part No. C-2795-82B (47000 ohms $\frac{1}{4}$ W.)
ts across condenser C49.

stor R56 Part No. C-2795-63C (1200 ohms $\frac{1}{4}$ W.)
C-2795-74C (10000 ohms $\frac{1}{4}$ W.). This resis-
e circuit of the Type 6K7G 1st. I-F Amplifier

SWITCH SECTIONS

NO. FROM BACK OF SET
- S1 ANT. PRIMARY
- S2 ANT. SECONDARY
- S3 R.F. PRIMARY
- S4-A, S4-B, S4-C BIAS AND SCREEN VOLTAGE
- S5 R.F. SECONDARY
- S6 OSC. PRIMARY
- S7 OSC. SECONDARY

1794-50B
795-55B
5-62B
4-66B
4-30B
5-25B
6-78C
6-80B
5-59B
6-78C
9-74A
5-55B
5-36B
07
10
5-63B
5-98B
6-91B
5-28B
5-96B
4-94B
5-98B
5-98B
4-94B
9-63B
6-96B
8-67B
7-181A
1-165A
1-70B
1-115B

R34	1 MEGOHM	.25 W.	C-2795-31B
R35	470,000 Ω	.25 W.	C-2795-94B
R36	47,000 Ω	.25 W.	C-2795-82B
R37	780 Ω	.25 W.	C-2795-156B
R38	15,000 Ω	2. W.	C-2798-187A
R40	470,000 Ω	.25 W.	C-2795-94B
R41	1 MEGOHM	.25 W.	C-2795-98B
R42	2,400 Ω	2. W.	C-2798-168A
R43	1 MEGOHM	.25 W.	C-2795-31B
R44	1,000 Ω	.25 W.	C-2795-62B
R45	470 Ω	.25 W.	C-2795-58B
R46	18,000 Ω	1. W.	C-2797-77A
R47	300 Ω	1. W.	C-2797-146A
R48	47,000 Ω	.25 W.	C-2795-82B
R49	47,000 Ω	.25 W.	C-2795-82B
R50	100,000 Ω	.25 W.	C-2795-86B
R51	100,000 Ω	.25 W.	C-2795-86B
R52	100,000 Ω	.25 W.	C-2795-25B
R53	47,000 Ω	1. W.	C-2797-23A
R54	56,000 Ω	.25 W.	C-2795-83B
R55	47,000 Ω	.25 W.	C-2795-82B
R56	Ω	.5 W.	C-2796-
R57	100,000 Ω	.25 W.	C-2795-86B
R58	100,000 Ω	.25 W.	C-2795-86B
R59	470 Ω	1. W.	C-2797-58A
R61	47,000 Ω	.25 W.	C-2795-23B
R62	47,000 Ω	.25 W.	C-2795-23B
R63	220 Ω	5. W.	A-14322
R64	5,000 Ω	15 W CANDOHM	A-14309
R65	180,000 Ω	.25 W.	C-2785-89B
R66	470,000 Ω	.25 W.	C-2795-94B

L1	NO. 1 I.F. COIL	A-12064-2
L2	NO. 2 I.F. COIL	A-12064-2
L3	NO. 3 I.F. COIL	A-14254
L4	B.C. ANTENNA COIL	A-14243-1
L5	P.B. " "	A-14243-2
L6	S.W. " "	A-14243-3
L7	L.W. DETECTOR COIL	A-14242-4
L8	B.C. " "	A-14242-1
L9	P.B. " "	A-14242-2
L10	S.W. " "	A-14242-3
L11	L.W. OSCILLATOR "	A-14241-4
L12	B.C. " "	A-14241-1
L13	P.B. " "	A-14241-7
L14	S.W. " "	A-14241-6
L15	U.H.F. " "	A-14241-5
L16	U.H.F. DETECTOR COIL	A-14242-5
L17	L.W. ANTENNA "	A-14243-4

SPARTON SUPERHETERODYNE MODEL 1867
INTERMEDIATE FREQUENCY 456 K.C.

(FOR MODEL 1867 SERIAL NO'S. 000751 AND UP)

MODEL 1867
Alignment
Trimmers

SPARKS WITHINGTON CO.

STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given. The dial pointer should be exactly parallel with the horizontal line of the kilocycle scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the set screw holding the pointer, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, then tighten the set screw.

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast position (with white diamond illuminated) and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to the grid cap of Type 6L7 converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6L6G Low-Frequency power output tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn tone control to low note (bass) position.

(6) Turn expander control to "off" position.

(7) Turn volume control of receiver on full and adjust I-F trimmers C81, C82 and C83 which are reached from the top of the chassis. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of converter tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune receiver and test oscillator to a frequency of 1500 kilocycles and adjust the following condensers in the order given:

C8 - Oscillator trimmer
C5 - R-F trimmer
C2 - Ant. trimmer

(3) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C11 (oscillator padder).

(4) Retune test oscillator and receiver to 1500 kilocycles and check the adjustments of condensers C8, C5 and C2.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

NOTE: The operation of the expansion circuit may be checked at this point as follows:

(6) Tune test oscillator and receiver to 1500 kilocycles.

(7) Turn volume control of receiver to low volume position, and turn attenuator of test oscillator so that oscillator is delivering maximum output.

(8) Turn expander switch on. Watch output meter carefully and turn volume control of receiver to a point where about half scale deflection is obtained. The output reading should continue to increase for a few moments after the receiver volume control has stopped turning.

C. Alignment of 10 KC. Filter

NOTE: The purpose of this filter circuit is to eliminate the 10,000 cycle note caused by the beating of any two stations operating simultaneously on adjacent channels. It is very important that this filter circuit be adjusted to exactly 10,000 cycles, otherwise the very purpose of the filter is defeated.

(1) Connect output meter from plate of Type 6F6G high-frequency power output tube to ground.

(2) Connect lead from audio oscillator to grid cap of Type 6Q7G 2nd det. tube.

(3) Turn receiver volume control to the off position and set tone control to give a convenient deflection on the output meter.

(4) Adjust condenser C79 (mounted directly in back of the Antenna Coil Section shield) so that minimum deflection of the output meter is obtained.

D. Alignment of Long-Wave Band

(1) Turn the band selector switch to the long wave position (yellow diamond illuminated).

(2) Tune test oscillator and receiver to 545 kilocycles and adjust the following condensers in the order given:

C41 - Oscillator trimmer
C40 - R-F trimmer
C38 - Ant. trimmer

(3) Tune test oscillator and receiver to 150 kilocycles and adjust condenser C42 (oscillator padder).

(4) Retune test oscillator and receiver to 545 kilocycles and check the adjustments of condensers C41, C40 and C38.

E. Alignment of 1st. Short-Wave Band

(1) Turn band selector switch to the 1st short-wave band (red diamond illuminated).

(2) Tune test oscillator and receiver to 6 megacycles and adjust the following condensers in the order given:

C9 - Oscillator trimmer
C6 - R-F trimmer
C3 - Ant. trimmer

(3) Tune test oscillator and receiver to 1.95 megacycles and adjust condenser C12 (oscillator padder).

(4) Retune test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C6 and C3.

F. Alignment of 2nd Short-Wave Band

(1) Connect the 100 ohm non-inductive dummy antenna resistor in series with the 200 mmf. condenser connected between the test oscillator "antenna" lead and the grid cap of the 6L7 converter tube.

(2) Turn the band selector switch to the 2nd short-wave band (blue diamond illuminated).

(3) Tune test oscillator and receiver to 18 megacycles and adjust the following condensers in the order given:

C10 - Oscillator trimmer
C7 - R-F trimmer
C4 - Ant. trimmer

(4) Tune test oscillator and receiver to 6 megacycles and adjust condenser C13 (oscillator padder).

(5) Retune test oscillator and receiver to 18 megacycles and check adjustments of condensers C10, C7 and C4.

IMPORTANT: To obtain the best sensitivity at 18 megacycles on this band, the dial should be turned back and forth slightly while adjusting the antenna and R.F. trimmers.

CAUTION: On this band care must be taken to adjust the various condensers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15 megacycles or 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15 megacycle signal.

G. Alignment of Ultra High-Frequency Band

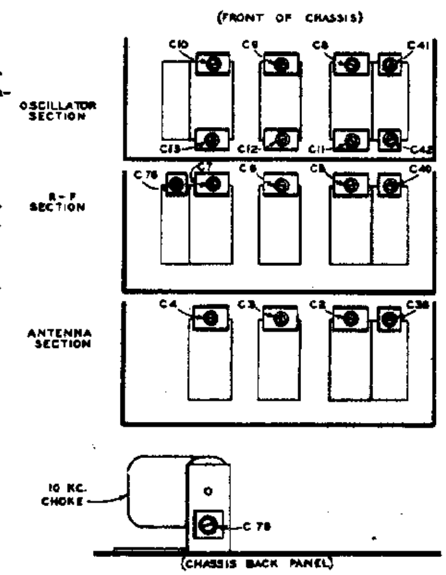
(1) Turn the band selector switch to the ultra high frequency band (tan diamond illuminated).

(2) Tune test oscillator and receiver to 50 megacycles and adjust condenser C76 (R-F trimmer).

(3) Check operation of receiver at 20 megacycles.

(Condenser C76 is the only adjustment in the ultra high frequency band).

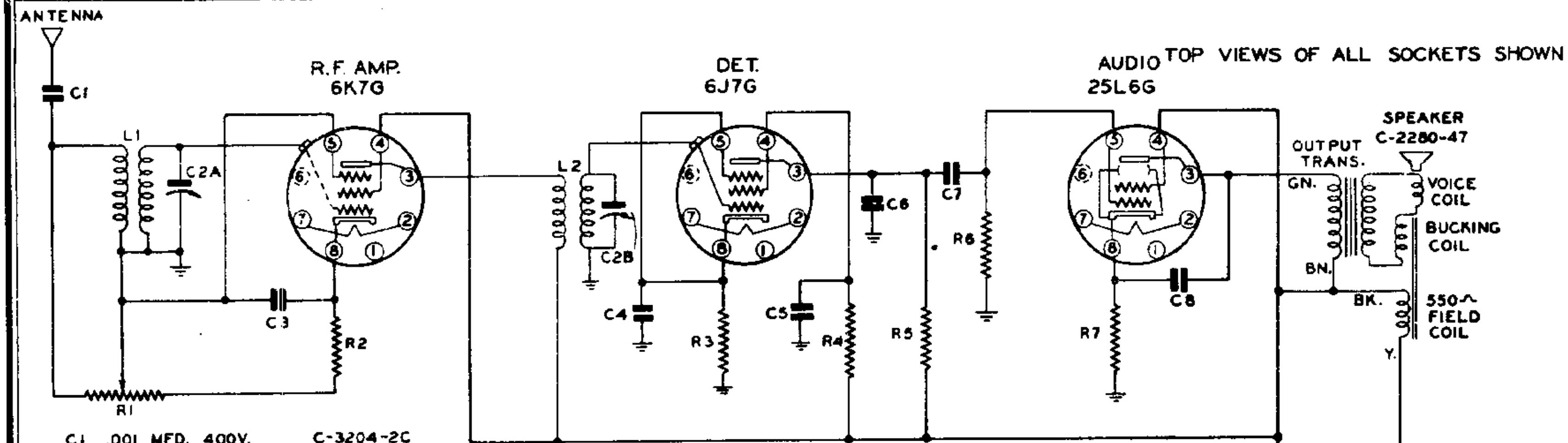
CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

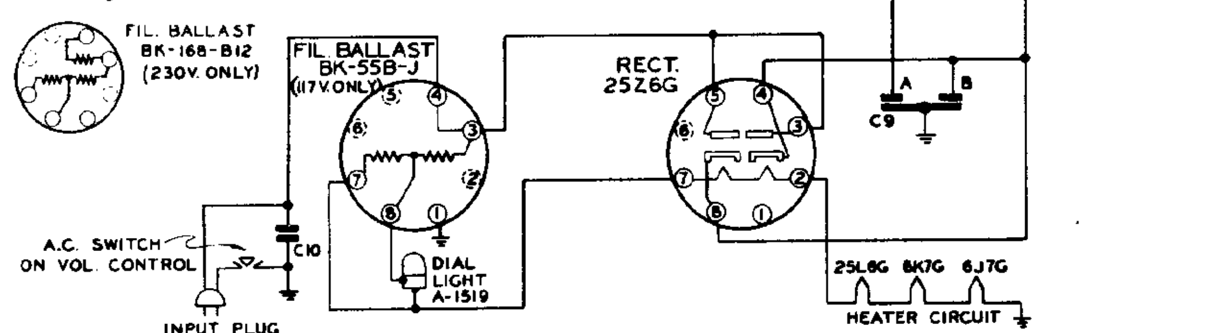


TRIMMER LOCATIONS
SPARTON MODEL 1867

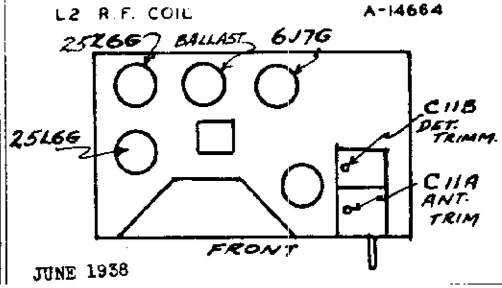
MODEL 5008
Schematic, Voltage
Alignment, Trimmers
Socket

SPARKS WITHINGTON CO.





C1	.001 MFD. 400V.	C-3204-2C
C2A&B	VARIABLE COND.	B-7187
C3	.02 MFD. 200V.	C-3202-22C
C4	10 MFD. 25V.	A-14782
C5	.01 MFD. 200V.	C-3202-20C
C6	250 MMFD. MICA	C-720-324
C7	.003 MFD. 200V.	C-3202-6C
C8	.03 MFD. 400V.	C-3204-80C
C9	25-25 MFD. 200V.	A-14691
C-10	.05 MFD. 400V.	C-3204-28C
R1	50,000 Ω VOL. CONTROL	A-14656-1
R2	330 Ω .25W.	C-2795-56B
R3	27,000 Ω .25W.	C-2795-79B
R4	6.2 MEGOHM .25W.	C-2795-250B
R5	560000 Ω .25W.	C-2795-95B
R6	560000 Ω .25W.	C-2795-95B
R7	150 Ω .5W.	C-2795-52C
L1	ANTENNA COIL	A-14663
L2	R.F. COIL	A-14664



VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6K7G	R.F.	0	6	102	102	0	-	0	3	0
6J7G	Det.	0	12	2.5	0	.3	-	6	1.3	0
25L6G	Power Amp.	0	36	90	102	0	-	12	7	-
25Z6G	Rect.	0	60	115	134	115	-	36	134	-
BK55B-J	Ballast	0	-	115	115	-	0	55	60	-

ALIGNMENT

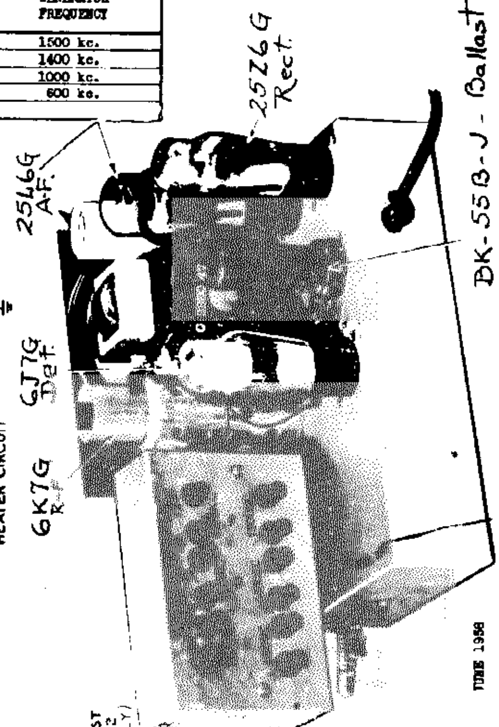
OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer on horizontal lines at end of scale with condenser closed)						
2	Broadcast Band	Ant.	200 mmf.	1500	1500	C11 A	
						C11 B	
3	(Check calibration and sensitivity at 1000 kc. and 600 kc.)						
4	(Check operations 1 to 3 inclusive)						

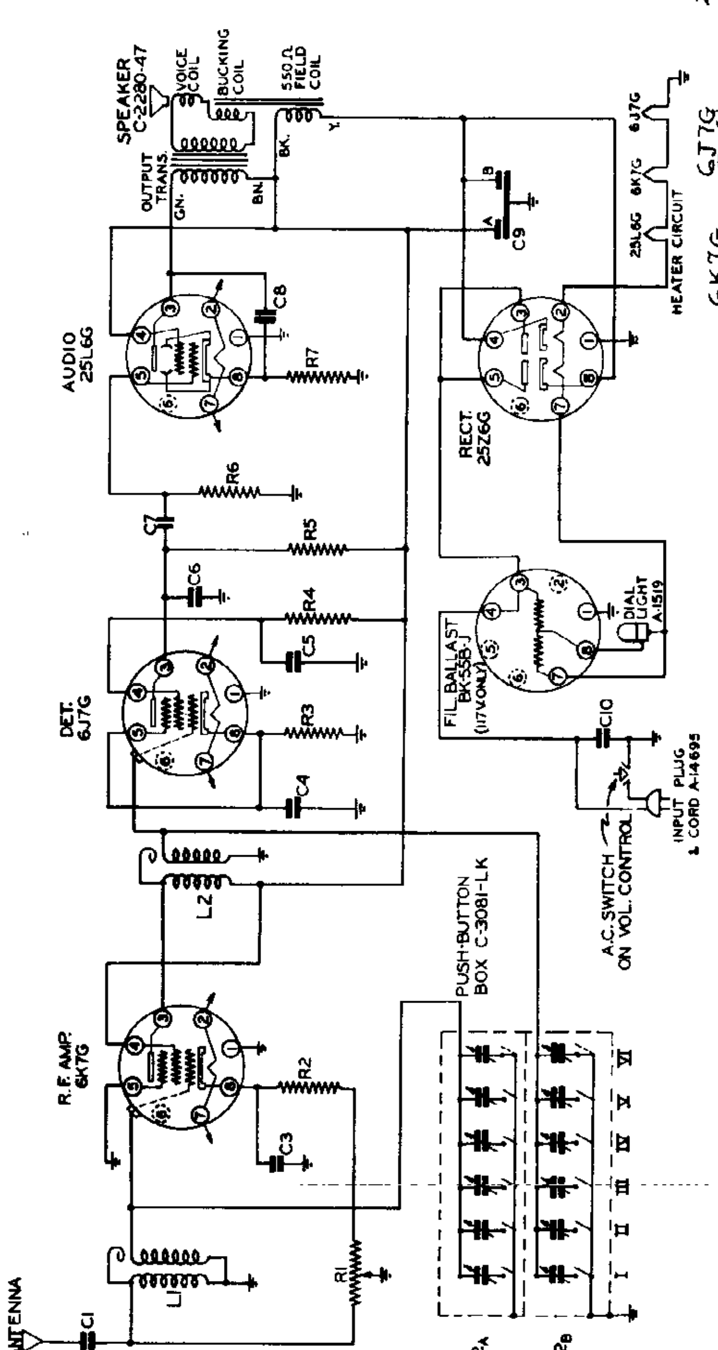
MODEL 5018
Schematic, Voltage
Alignment, Chassis

SPARKS WITHINGTON CO.

ALIGNMENT

OPER-ATION	ALIGNMENT OF TRIMMERS	PUSH BUTTON NO.	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY
1	R.F. & Det.	1	Ant.	200 mmf.	1500 kc.
2	R.F. & Det.	2	Ant.	200 mmf.	1400 kc.
3	R.F. & Det.	3 or 4	Ant.	200 mmf.	1000 kc.
4	R.F. & Det.	5 or 6	Ant.	200 mmf.	600 kc.
5	(Check operations 1 to 4 inclusive)				





C1 .001 MFD. 400 V. C-3204-2C
C2-A&B PUSH-BUTTON TRIMMERS
I-II 75-350 MMF. TRIM. B-7199-SSK
III-IV 35-290 MMF. TRIM. B-7199-GGK
V-VI 12-140 MMF. TRIM. B-7199-AAK
C3 .02 MFD. 200 V. C-3202-22C
C4 10 MFD. 25 V. A-14782
C5 .01 MFD. 200 V. C-3202-20C
C6 250 MMF. MOLDED C-720-324
C7 .003 MFD. 200 V. C-3202-6C
C8 .03 MFD. 400 V. C-3204-80C
C9-A&B 25-25 MFD. ELECT. A-14691
C10 .05 MFD. 400 V. C-3204-28C

R1 50,000 Ω VOL. CONTROL A-14656
R2 330 Ω .25 W. C-2795-58B
R3 27,000 Ω .25 W. C-2795-79B
R4 6.2 MEGOHM .25 W. C-2795-250B
R5 510,000 Ω .25 W. C-2795-224B
R6 560,000 Ω .25 W. C-2795-95B
R7 150 Ω .5 W. C-2796-52C

L1 ANTENNA COIL A-14663
L2 R.F. COIL A-14664

VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6K7G	R.F.	0	6	102	102	0	-	0	3	0
6J7G	Det.	0	12	2.5	0	.5	-	6	1.5	0
25L6G	Power Amp.	0	56	90	102	0	-	12	7	-
25Z6G	Rect.	0	60	115	134	115	-	56	134	-
BK55B-J	Ballast	0	-	115	115	-	0	55	60	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

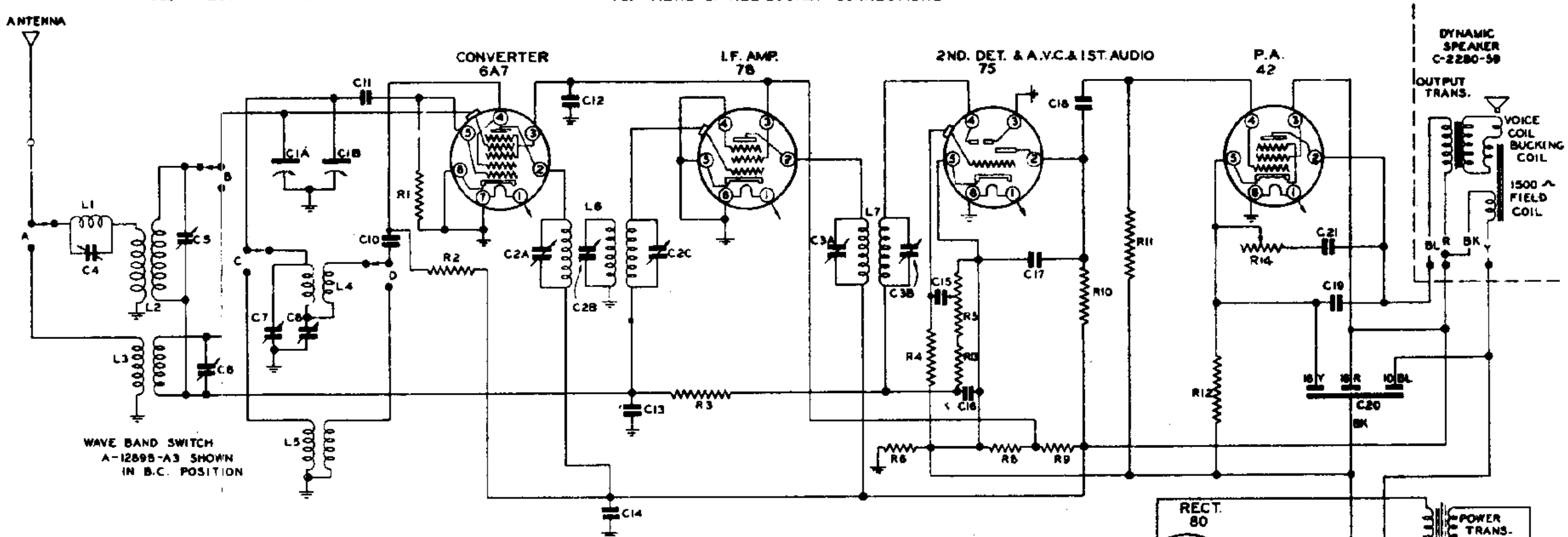
MODEL 5218
Schematic, Voltage
Trimmers

SPARKS WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 5218
INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

FOR OTHER DATA SEE INDEX



C1A&B VARIABLE CONDENSER — B-7229
C2A B&C NO. 1 I.F. TRIMMER — A-14792
C3A&B NO. 2 I.F. TRIMMER — B-7200-GN
C4 I.F. REJECTOR TRIMMER — A-14088-4
C5 B.C. ANT. TRIMMER — A-14088-5
C6 S.W. ANT. TRIMMER — A-14088-5
C7 B.C. OSC. TRIMMER, C8 B.C. OSC. PADDER — B-7199-AY
C10 .001 MFD. 400V. — C-3204-2C
C11 50 MMFD. MOLDED — C-720-320
C12 .1 MFD. 200V. — C-3202-38C

C13 .05 MFD. 200V — C-3202-28C
C14 .1 MFD. 400V. — C-3204-38C
C15 .02 MFD. 200V. — C-3202-22C
C16 250 MMFD. MOLDED — C-720-324
C17 250 MMFD. MOLDED — C-720-324
C18 .05 MFD. 400V. — C-3204-28C
C19 .003 MFD. 600V. — C-3206-62C
C20 16-10-16 MFD. ELECT. — A-14780
C21 .03 MFD. 600V. — C-3206-80C

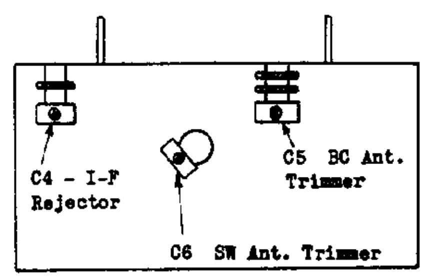
R1 58,000 Ω .25W. — C-2795-83B
R2 22,000 Ω .5W. — C-2796-78C
R3 1 MEGOHM .25W. — C-2795-98B
R4 4.7 MEGOHM .25W. — C-2795-106B
R5 500,000 Ω VOL. CONTROL — A-14779
R6 180 Ω .25W. — C-2795-53B
R8 27,000 Ω 1W. — C-2797-79A
R9 33,000 Ω 3W. — C-2799-80A
R10 270,000 Ω .25W. — C-2795-91B
R11 680,000 Ω .25W. — C-2795-30B
R12 680 Ω 1W. — C-2797-60A
R13 58,000 Ω .25W. — C-2795-83B
R14 TONE CONTROL & SW. — A-14778

L1 I.F. REJECTOR COIL — A-14677
L2 B.C. ANT. COIL — A-14679-1
L3 S.W. ANT. COIL — A-14682-1
L4 B.C. OSC. COIL, L5 S.W. OSC. COIL — A-14213-2A
L6 NO. 1 I.F. COIL — A-14794
L7 NO. 2 I.F. COIL — A-12064-17

Line Voltage: 116 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
		Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
6A7	Converter	6.2	252	17	225	-4.5	0	0	-	0
78	I.F. Amp.	6.2	252	17	0	0	0	-	-	0
75	2nd Det. AVC-Audio	6.2	65	0	-.2	-.3	0	-	-	-.2
42	P.A.	6.2	240	238	0	22	0	-	-	-
80	Rectifier	370	300	300	370	-	-	-	-	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are DC voltages.



TRIMMER LOCATIONS UNDER CHASSIS

MODEL 5218
Alignment, Tuner
MODELS 6218, 7618
Voltage, Alignment
Tuner

SPARKS WITHINGTON CO.

HOW TO ADJUST THE SPARTON SELECTRONNE IN THE MODELS

5218 6218 7618

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. Remove the Selectronne escutcheon plate from the front of the cabinet by means of the two screws and insert the station call letter tabs. Any tab may be used for any button, but it is usually more convenient for the operator if the tabs are arranged in sequence so that the tab for the lowest frequency station (station having lowest number of kilocycles (K.C.)) will be at the extreme left.

3. Using a small screwdriver or other tool that will fit the slot in the end of the button, push the button in as far as it will go and turn to the right or left until the dial pointer has moved to the desired station frequency. Be sure the button is pushed all the way in and the station is tuned in accurately.

4. Repeat the procedure in paragraph 3 for each of the remaining five buttons.

5. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.

6. Replace Selectronne escutcheon.

7. Any of the six stations to which the SPARTON Selectronne has been adjusted may now be received simply by pushing the Selectronne button for the desired station.

Model 6218, 7618

VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A7	Converter	6.1	230	60	150	-9	0	0	-	0
78	I.F. Amp.	6.1	230	60	0	0	0	-	-	0
75	2nd Det. AVC-Audio	6.1	37	0	-.5	-1.5	0	-	-	-.7
76	Driver	6.1	250	0	10	0	-	-	-	-
6AC5G	P.A.	0	0	225	0	10	0	6.1	-	-
80	Rectifier	325	270	270	325	-	-	-	-	-
6E5	Viso-Glo	6.1	50	.2	230	3	0	-	-	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
The Viso-Glo 6E5 is not used on Model 6218.

Models 5218; 6218, 7618.

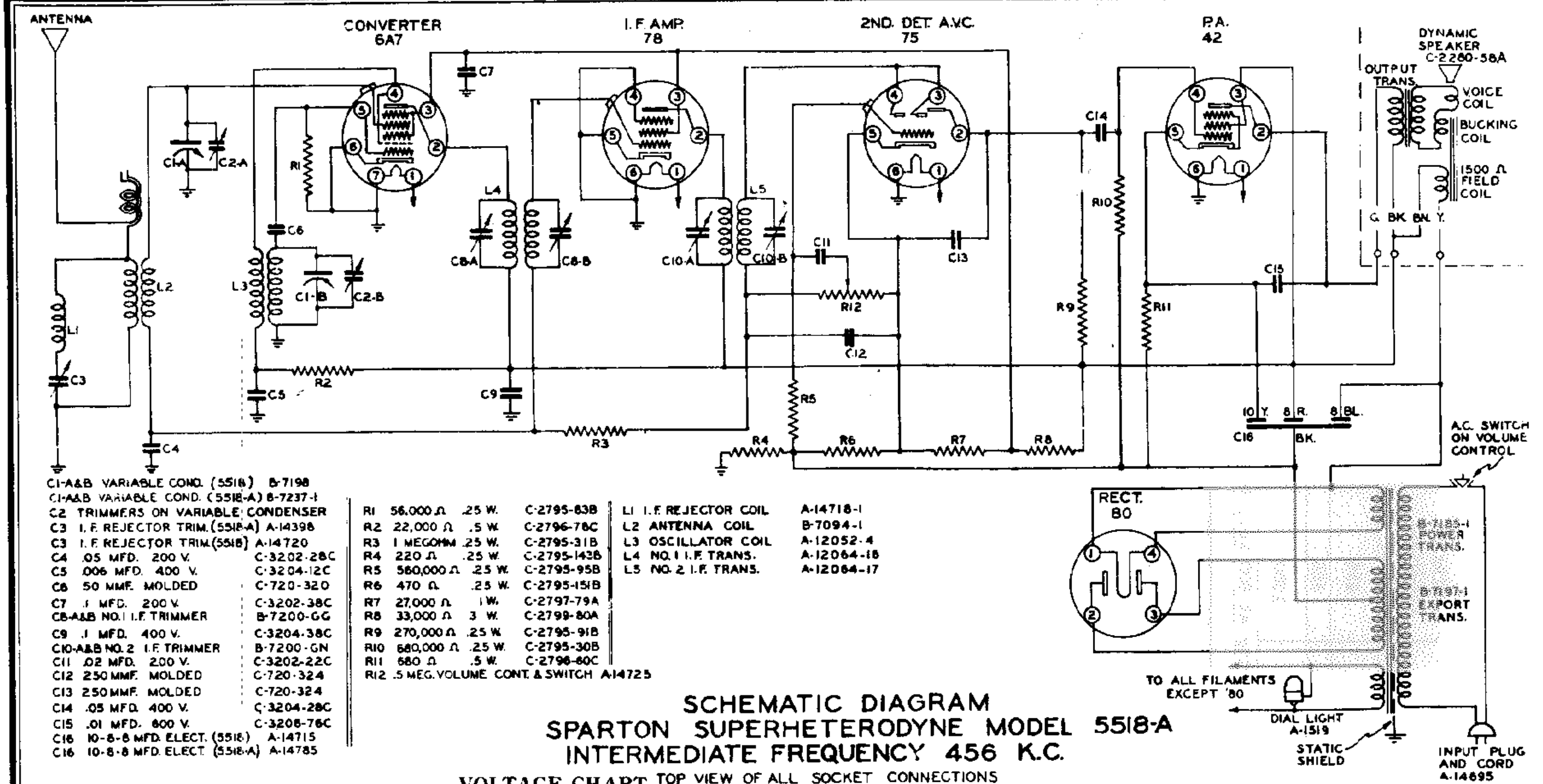
ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last mark on scale when condenser plates are flush)							
2	I.F.	6A7 Grid	.1 mf.	456 KC	BC	Open	C5A,B;C2A,B,C	Adjust to approx. peak
3							C2B (Transfer)	Detune by tightening ½ t.
4							C5A,B;C2A,C	Peak accurately
5							C2B	Peak accurately*
6	Rejector	Ant.	200 mmf.	456 KC	BC	Open	C4	Adjust to minimum
7	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C7 BC osc trim	Peak accurately
8							C5 BC anttrim	Peak accurately
9				600 KC	BC	600 KC	C8 BC osc pad.	Peak accurately
10	(Repeat operations 7 and 8)							
11	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
12	S.W. Band	Ant.	*	18 MC	SW	18 MC	C6 SW ant trim	**
13	(Check calibration and sensitivity at 6.0 MC and 18 MC)							
14	(Check operations 1 to 13 inclusive)							

*100 ohm non-inductive resistor and 200 mmf. condenser in series.
**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.

MODELS 5518, 5518A, 5518AX
Schematic, Voltage

SPARKS WITHINGTON CO.



C1-A&B VARIABLE COND. (5518) B-7198
C1-A&B VARIABLE COND. (5518-A) B-7237-1
C2 TRIMMERS ON VARIABLE CONDENSER
C3 I.F. REJECTOR TRIM. (5518-A) A-14398
C3 I.F. REJECTOR TRIM. (5518) A-14720
C4 .05 MFD. 200 V. C-3202-28C
C5 .006 MFD. 400 V. C-3204-12C
C6 50 MMF. MOLDED C-720-320
C7 .1 MFD. 200 V. C-3202-38C
C8-A&B NO. 1 I.F. TRIMMER B-7200-GG
C9 .1 MFD. 400 V. C-3204-38C
C10-A&B NO. 2 I.F. TRIMMER B-7200-GN
C11 .02 MFD. 200 V. C-3202-22C
C12 250 MMF. MOLDED C-720-324
C13 250 MMF. MOLDED C-720-324
C14 .05 MFD. 400 V. C-3204-28C
C15 .01 MFD. 600 V. C-3206-76C
C16 10-8-8 MFD. ELECT. (5518) A-14715
C16 10-8-8 MFD. ELECT. (5518-A) A-14785

R1 56,000 Ω .25 W. C-2795-83B
R2 22,000 Ω .5 W. C-2796-78C
R3 1 MEGOHM .25 W. C-2795-31B
R4 220 Ω .25 W. C-2795-143B
R5 560,000 Ω .25 W. C-2795-95B
R6 470 Ω .25 W. C-2795-151B
R7 27,000 Ω 1 W. C-2797-79A
R8 33,000 Ω 3 W. C-2799-80A
R9 270,000 Ω .25 W. C-2795-91B
R10 680,000 Ω .25 W. C-2795-30B
R11 680 Ω .5 W. C-2796-60C
R12 .5 MEG. VOLUME CONT. & SWITCH A-14725

L1 I.F. REJECTOR COIL A-14718-1
L2 ANTENNA COIL B-7094-1
L3 OSCILLATOR COIL A-12052-4
L4 NO. 1 I.F. TRANS. A-12064-18
L5 NO. 2 I.F. TRANS. A-12064-17

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 5518-A
INTERMEDIATE FREQUENCY 456 K.C.

VOLTAGE CHART TOP VIEW OF ALL SOCKET CONNECTIONS

Line Voltage: 115 volts — **Position of Volume Control: Full with Antenna Disconnected**

Tube	Function	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
		Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
6A7	Converter	6.2	250	69	170	-12	0	0	-	0
78	I.F. Amp.	6.2	250	69	0	0	0	0	-	0
75	2nd Det. AVC	6.2	89	-1.4	-1.4	-1.4	0	0	-	1.1
42	Power Amp.	6.2	225	250	0	17	0	0	-	-
80	Rectifier	350	300	300	350	-	-	-	-	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

NOTE: Model 5518 has 6 push-buttons only -- no manual tuning. Models 5518A and 5518AX have 4 push-buttons and manual tuning. The same chassis is used in all three models with the exceptions as noted in the parts list.

JUNE 1938

MODELS 5518,5518A
5518AX

SPARKS WITHINGTON CO.

Alignment,Chassis,Trimmers
MODELS 5518A,5518AX
Tuner Data

ALIGNMENT

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to end of scale with condenser gang closed)						
2	I.F.	6A7 Grid	.1 mf.	456	Closed	C10 A,B	(2nd I.F.)
						C8 A,B	(1st I.F.)
3	Rejector	Ant.	150 mmf.	456	Closed	C3	Adjust to min.
4	Broadcast Band	Ant.	150 mmf.	1500	1500	C2 A Ant.	
						C2 B Osc.	
5	(Check for dial reading and sensitivity at 600 kc., 1000 kc.)						
6	(Check operations 1 to 5 inclusive)						

1. Select four favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. The tabs should be inserted in the ends of the knobs. For convenience it is recommended that the call letter tabs be arranged in sequence so that the tab for the station having the highest frequency (greatest number of kilocycles (k.c.)) will be at the extreme left. This, however, is not vital, since the Selectronne will operate with any arrangement of the tabs.

3. TO ADJUST SELECTRONNE BUTTONS, loosen selected button by turning one-half turn to left (counter-clockwise). Push this loosened button in as far as it will go, and while in this position, tune in manually the station desired or indicated by tab in end of this loosened button. Then, with the button still pushed in as far as it will go, tighten by turning button to the right (clockwise) until it can be tightened no more.

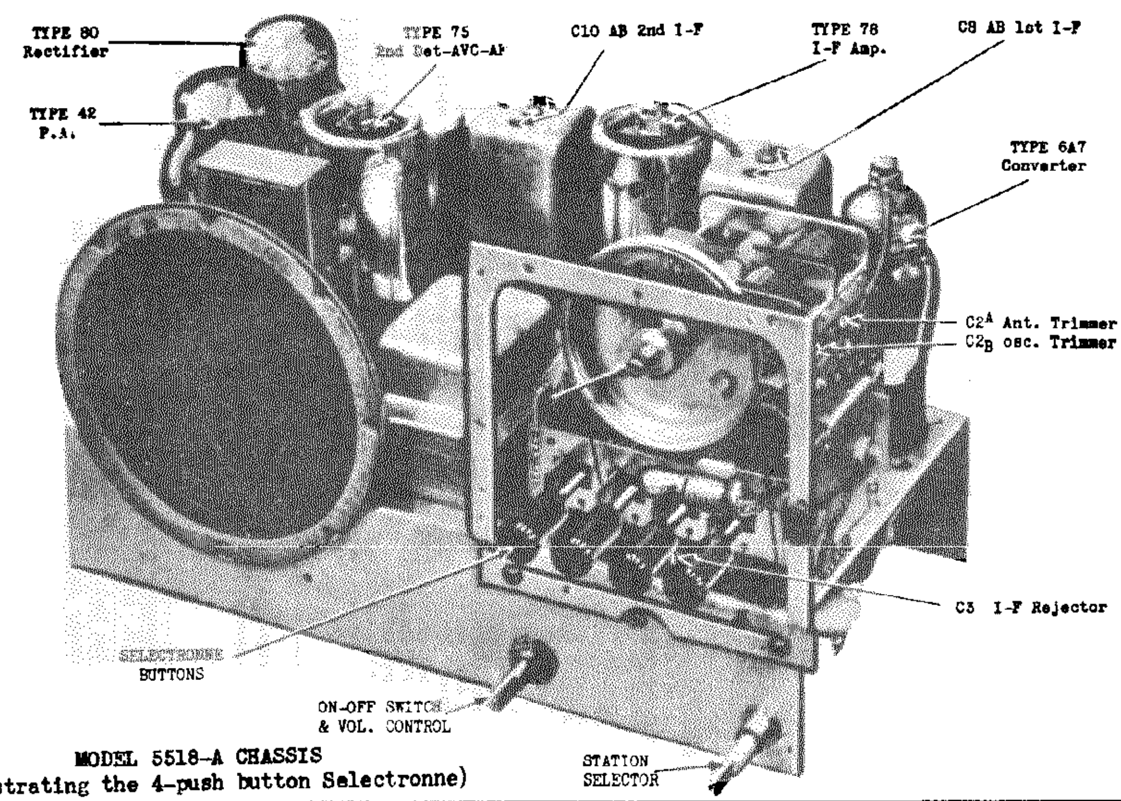
Be sure the station is tuned in accurately when pushed in button is tightened.

4. Repeat the procedure in paragraph 3 for each of the remaining three buttons and stations.

5. Be sure the Selectronne buttons have been tightened firmly.

6. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned in properly.

7. Any of the four stations to which the SPARTON Selectronne has been adjusted may now be instantly received simply by pushing the Selectronne Button for the desired station.



MODEL 5518-A CHASSIS
(Illustrating the 4-push button Selectronne)

SPARKS WITHINGTON CO.

MODEL 5028
Schematic, Voltage, Trimmers
Socket, Alignment

R1 50 000 Ω VOL. CONTROL A-14656-1
R2 390 Ω .25 W. C-2795-57B
R3 56000 Ω .25 W. C-2795-83B
R4 39,000 Ω .25 W. C-2795-81B
R5 27000 Ω .25 W. C-2795-79B
R6 560000 Ω .25 W. C-2795-95B
R7 6.2 MEGOHM .25 W. C-2795-250B
R8 560 000 Ω .25 W. C-2795-95B
R9 56000 Ω .25 W. C-2795-83B
R10 150 Ω .5 W. C-2796-52C

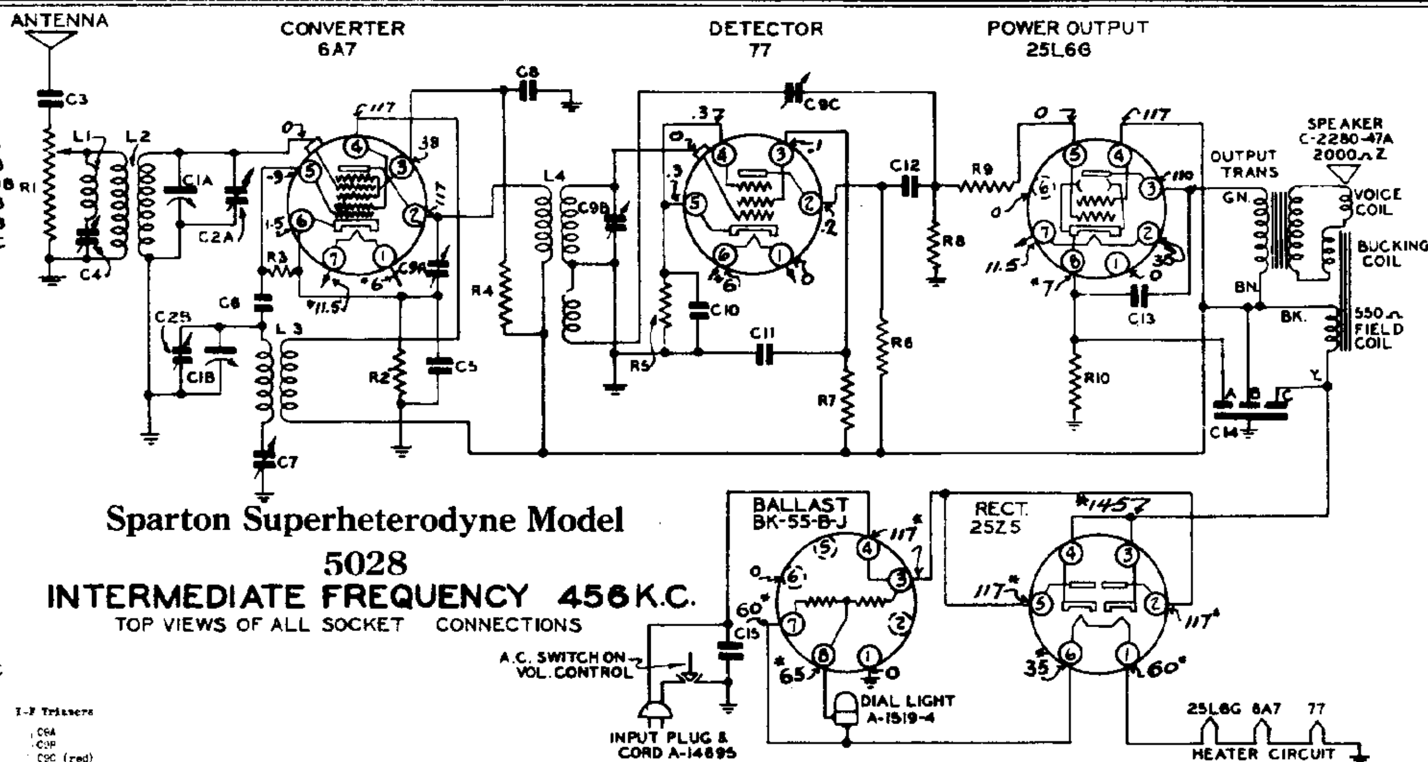
L1 I.F. REJECTOR COIL A-14718-1
L2 ANT. COIL A-14863-1
L3 OSC. COIL A-12052-5
L4 NO. 1 I.F. COIL A-12989-4

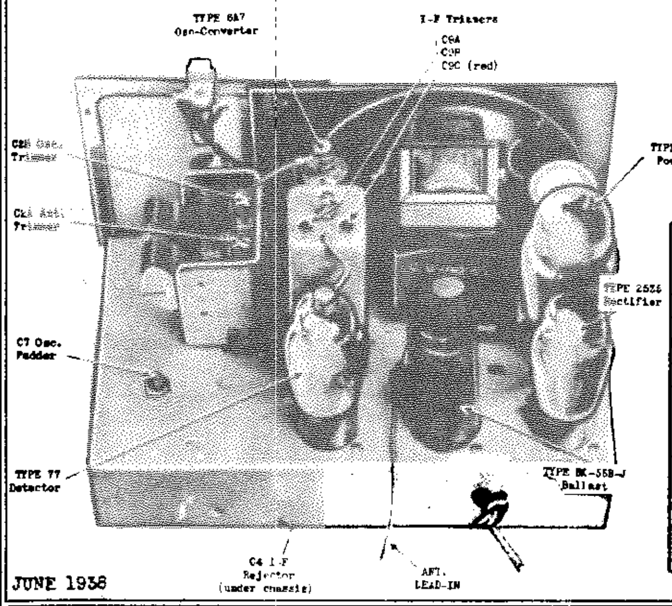
C1A&B VARIABLE CONDENSER, C2A&B ON VARIABLE COND. B-7187
C3 .001 MFD. 400V. C-3204-2C
C4 I.F. REJECTOR TRIM. A-14398
C5 .01 MFD. 200V. C-3202-76C
C6 50 MMFD. MOLDED C-720-343
C7 OSC. PADDER A-14911-3A
C8 .05 MFD. 200V. C-3202-28C
C9AB&C I.F. TRIMMER A-14792
C10 10 MFD. 25V. A-14782
C11 .01 MFD. 200V. C-3202-20C
C12 .05 MFD. 200V. C-3202-28C
C13 .02 MFD. 400V. C-3204-78C
C14AB&C 20-25-25 MFD. ELECT. A-14907
C15 .05 MFD. 400 V. C-3204-28C

Sparton Superheterodyne Model 5028

INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS





Notes: Voltage readings are for schematic diagram. Voltage of Socket Prongs to Gnd.
Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
Unless designated otherwise, voltages are + DC voltages. Allow 15% + or - on all measurements.
*AC volts.
Line Voltage: 117 volts Position of Volume Control: Full with Antenna Disconnected

ALIGNMENT

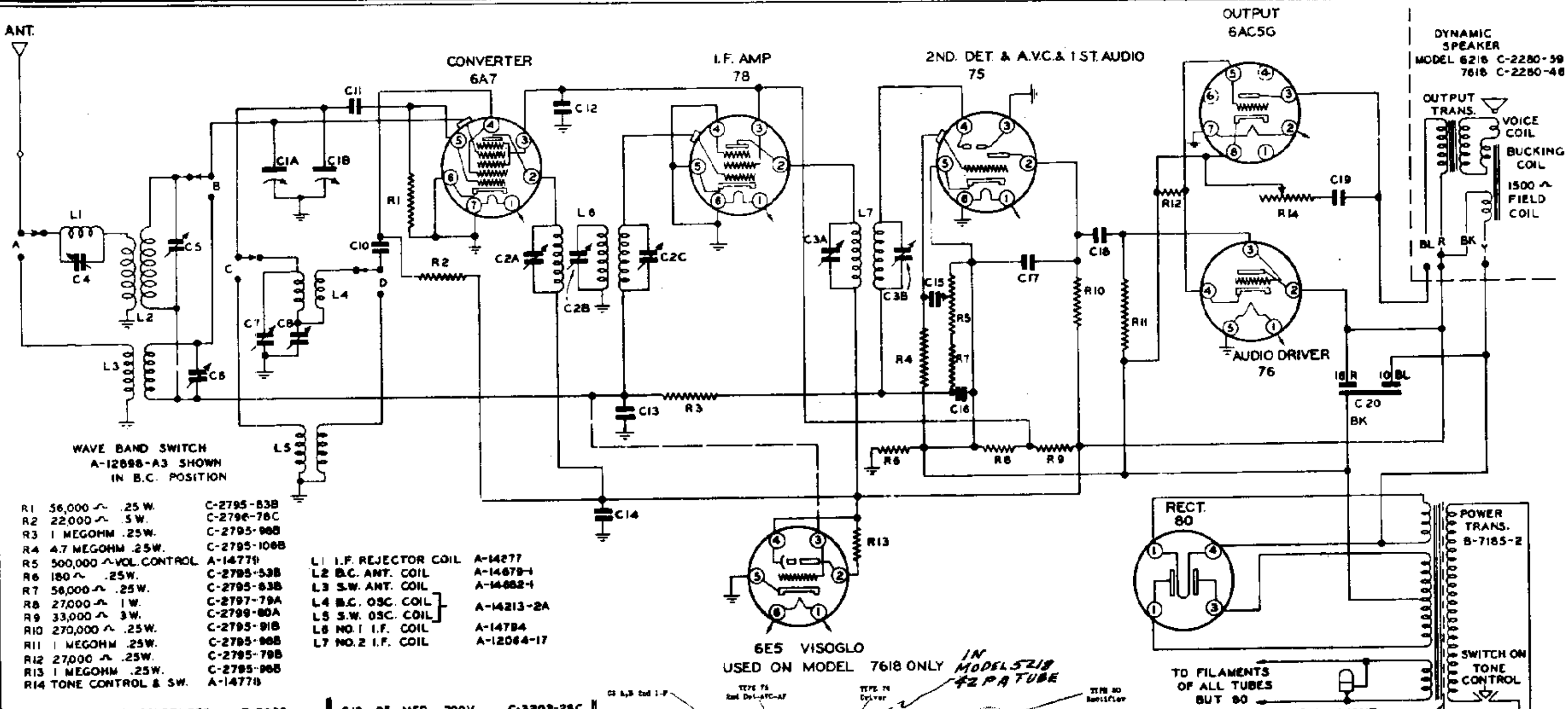
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer at horizontal lines at end of scale with condenser closed)							
2	(Back off, i.e., turn counter-clockwise, regeneration cond. C9C "red spot" before I.F. is aligned)							
3	I.F.	6A7 grid	.1 mf.	456 KC	*	Open	C9 A,B	
4	(Adjust C9C "red spot", turning in clockwise until oscil. occurs, turn out C9C until oscil. stops)							
5	Rejector	Ant.	200 mmf.	456 KC	*	Open	C4	Adjust to minimum
6	Broadcast Band	Ant.	200 mmf.	1500 KC	*	1500 KC	C2B Osc. C1B Ant.	
7				600 KC	*	600 KC	C7 Pad.	
8	(Repeat operation 6)							
9	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
10	(Connect set to regular antenna and check reception of stations. Readjust C9C if set howls or oscillates on strong signals. Then recheck sensitivity)							

* This model has Broadcast Band only.

MODELS 6218,7618
Schematic, Trimmers
Socket, Chassis

SPARKS WITHINGTON CO.

MODEL 5218
Chassis

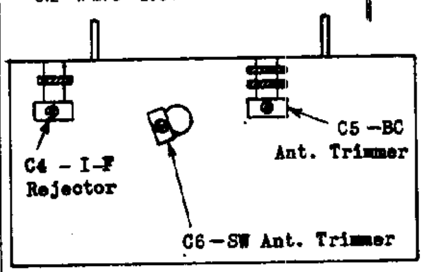


R1	56,000 ^ .25 W.	C-2795-83B	
R2	22,000 ^ .5 W.	C-2796-76C	
R3	1 MEGOHM .25W.	C-2795-98B	
R4	4.7 MEGOHM .25W.	C-2795-106B	
R5	500,000 ^ VOL. CONTROL	A-14779	
R6	180 ^ .25W.	C-2795-53B	
R7	56,000 ^ .25W.	C-2795-83B	
R8	27,000 ^ 1W.	C-2797-79A	
R9	33,000 ^ 3W.	C-2799-80A	
R10	270,000 ^ .25W.	C-2795-91B	
R11	1 MEGOHM .25W.	C-2795-98B	
R12	27,000 ^ .25W.	C-2795-79B	
R13	1 MEGOHM .25W.	C-2795-98B	
R14	TONE CONTROL & SW.	A-14778	

L1	I.F. REJECTOR COIL	A-14277
L2	B.C. ANT. COIL	A-14679-1
L3	S.W. ANT. COIL	A-14682-1
L4	B.C. OSC. COIL	A-14213-2A
L5	S.W. OSC. COIL	A-14213-2A
L6	NO. 1 I.F. COIL	A-14794
L7	NO. 2 I.F. COIL	A-12064-17

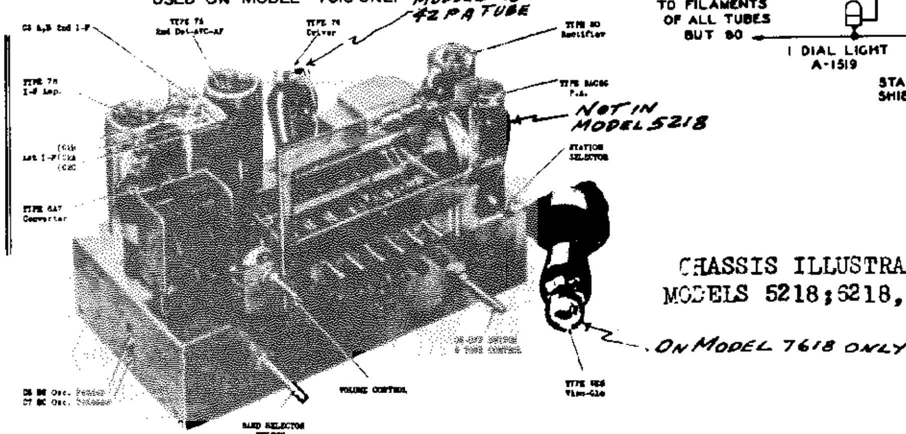
C1A&B	VARIABLE CONDENSER	B-7229
C2AB&C	NO. 1 I.F. TRIMMER	A-14792
C3A&B	NO. 2 I.F. TRIMMER	B-7200-GN
C4	I.F. REJECTOR TRIMMER	A-14088-4
C5	B.C. ANT. TRIMMER	A-14088-5
C6	S.W. ANT. TRIMMER	A-14088-5
C7	B.C. OSC. TRIMMER	B-7199-AY
C8	B.C. OSC. PADDER	B-7199-AY
C10	.001 MFD. 400V.	C-3204-2C
C11	50 MMFD MOLDED	C-720-320
C12	.1 MFD. 200V.	C-3202-38C

C13	.05 MFD. 200V.	C-3202-28C
C14	.1 MFD. 400V.	C-3204-38C
C15	.02 MFD. 200V.	C-3202-22C
C16	250 MMFD. MOLDED	C-720-324
C17	250 MMFD. MOLDED	C-720-324
C18	.05 MFD. 400V.	C-3204-28C
C19	.03 MFD. 600V.	C-3206-80C
C20	16-10 MFD. ELECT.	A-14789



TRIMMER LOCATIONS UNDER CHASSIS

FOR OTHER DATA
SEE INDEX



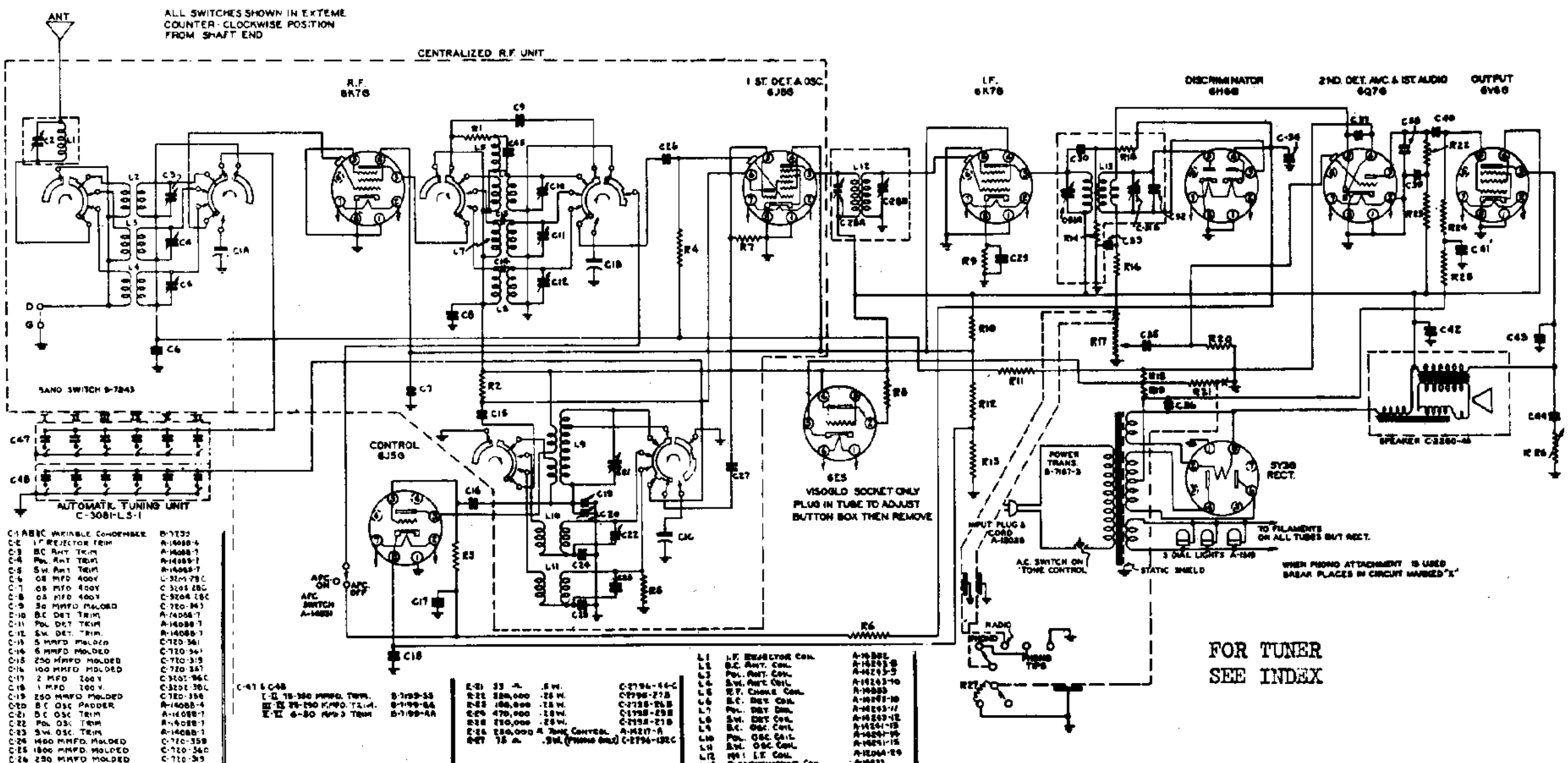
CHASSIS ILLUSTRATION FOR
MODELS 5218; 6218, 7618.

JUNE 1938

SPARTON SUPERHETERODYNE MODELS 6218 & 7618
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS

SPARKS WITHINGTON CO.

MODEL 8618
Schematic, Voltage



FOR TUNER
SEE INDEX

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 8618
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS

JUNE 1938

Line Voltage: 120 volts
Band Selector Switch - Broadcast

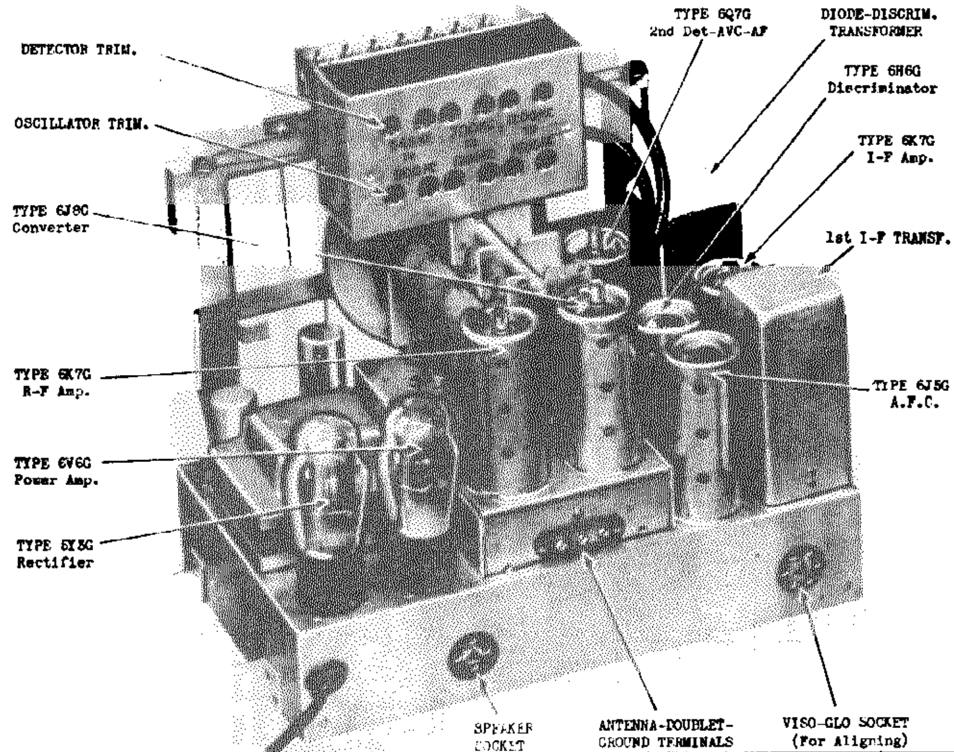
Position of Volume Control: Full with Antenna Disconnected
AFC Switch - OFF

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6K7G	R-F Amp.	0	0	295	110	0	-	6.2	0	0
6J8G	Converter	0	0	295	110	-2	160	6.2	0	0
6K7G	I-F Amp.	0	0	295	110	0	-	6.2	5	0
6H6G	Discriminator	0	0	.2	0	.2	-	6.2	0	-
6J5G	AFC (Control	0	0	195	0	0	-	6.2	15	-
6Q7G	2nd Det-AVC-AF	0	0	16	0	0	-	6.2	0	0
6V6G	Power Amp.	0	0	270	295	-1	-	6.2	0	-
5Y3G	Rectifier	[illegible]	380	-	380	-	380	-	380	-

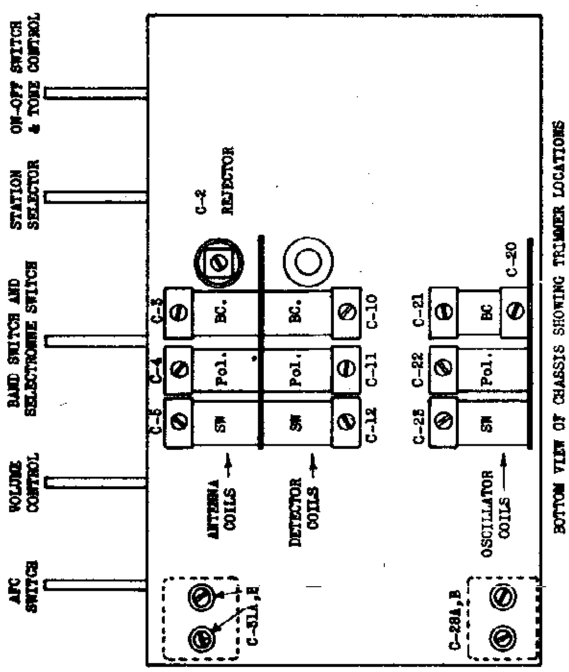
Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

MODEL 8618
Alignment, Socket
Trimmers, Chassis

SPARKS WITHINGTON CO.



CHASSIS ILLUSTRATION



BOTTOM VIEW OF CHASSIS SHOWING TRIMMER LOCATIONS

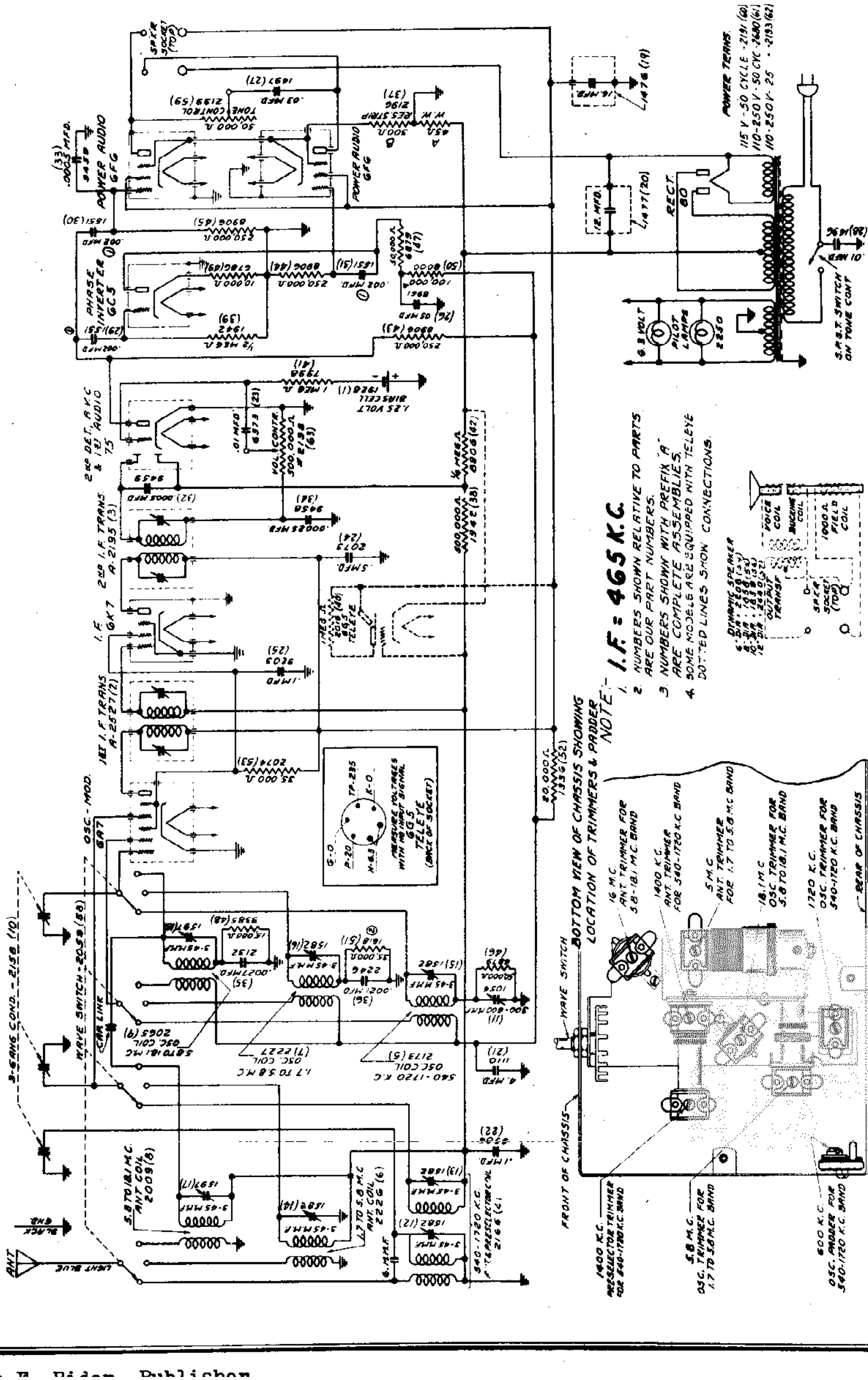
ALIGNMENT

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer to last mark below 550 KC with tuning condenser plates flush)							
2	I.F.	6J8 Grid	.1 mfd.	456	BC	Open	C28,31(A,B)	Adjust to max. AFC off.
3	Rejector	Ant.	200 mmf.	456	BC	Closed	C-2	Adjust to minimum.
4	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C21 Osc. C10 RF C-3 Ant.	
5				600	BC	600	C20 Pad.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	(Check operation of AFC circuit*)							
9	Police Band	Ant.	100 ohm 200 mmf. series	5 MC.	Police	5 MC.	C22 Osc. C11 RF C4 Ant.	
10	(Check calibration and sensitivity at 1.9 MC., 4.0 MC. and 5 MC.)							
11	Short Wave Band	Ant.	100 ohm 200 mmf. series	15 MC.	S.W.	15 MC.	C23 Osc. C12 RF C5 Ant.	
12	(Check calibration and sensitivity at 6.0 MC., 9.0 MC. and 15 MC.)							

*Check operation of AFC circuit by connecting generator to grid cap of 6J8 and tune generator and receiver to 1500 KC. Increase generator signal so that Viso-Glo just closes. Tune accurately with AFC switch "OFF". Now snap AFC switch "ON" and note the sensitivity as indicated on the Viso-Glo. If the sensitivity changes, the AFC (Discriminator) is not properly aligned and should be touched up (trimmer C-31B) until the AFC switch can be snapped "ON" and "OFF" without any change on the Viso-Glo.

SPIEGEL INC.

MODEL 134, Chassis 46A
Schematic, Trimmers



MODEL 134, Chassis 46A
Alignment, Voltage, Socket
Tuning Eye Notes

SPIEGEL INC.

ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. Amplifier particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

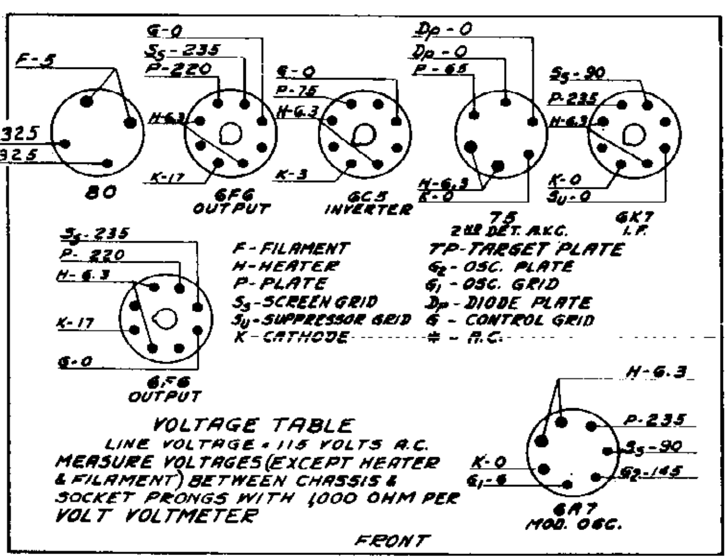
1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

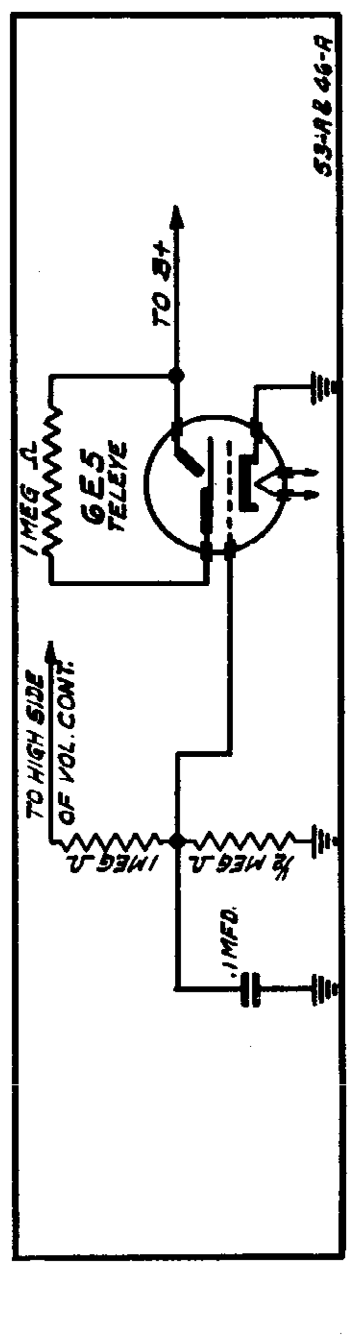
1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.1 MEGACYCLES.

   Tune in the 18.1 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.1 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER at 18.1 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.1 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.1 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.1 megacycles, and if the fundamental peak was used in aligning at 18.1 megacycles the test oscillator signal will be heard at approximately 17.1 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.1 megacycle oscillator trimmer must be properly re-adjusted.
3. With band selector switch set for operation on 5.8 to 18.1 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES. Adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.
4. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES. BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.
5. With the band selector switch set for operation on the 1.7 to 5.8 megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna trimmer for maximum 5 megacycle signal sensitivity.
6. Replace the 400 ohm resister in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, tune receiver dial, and set test oscillator frequency to EXACTLY 1720 KILOCYCLES. NEXT BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
7. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
8. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.



BOTTOM VIEW OF CHASSIS

Some of these model receivers were equipped with "Teleye" the cathode ray visual tuning indicator. A 6E5 tube was used in early production models, which was replaced by a 6G5 tube in later production. The parts and connections shown in the dotted lines on the complete circuit diagram are used only when a 6G5 "Teleye" tube is incorporated in the receiver. The diagram below shows 6E5 tube connections.

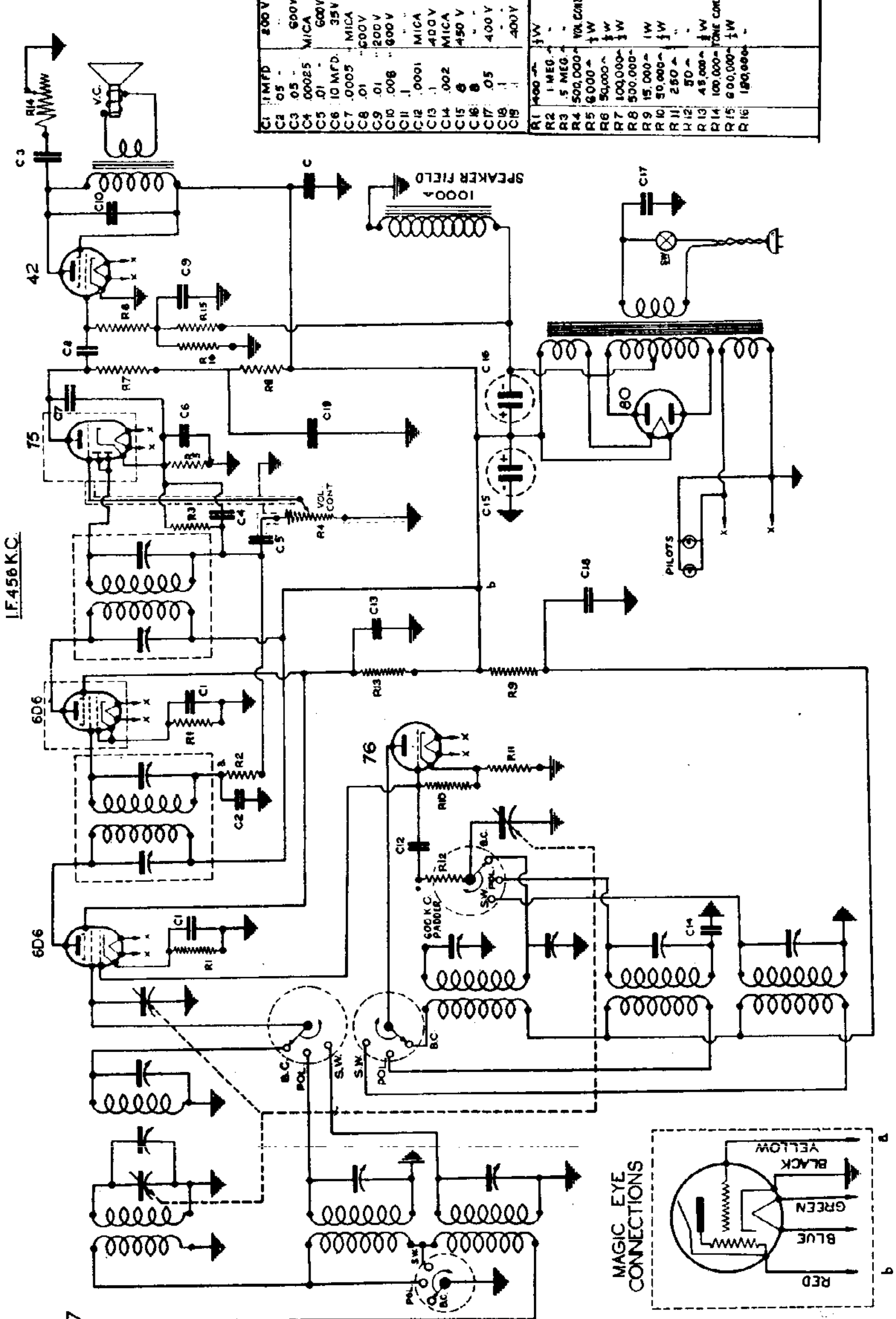


SPIEGEL INC.

MODELS 160,180,184,6500,6504
6518,6546,6550,6562,6564
Chassis 603 (1936)
Schematic

C1	.1 MFD	200V
C2	.05 "	"
C3	.05 "	600V
C4	.00025 "	MICA
C5	.01 "	600V
C6	10 MFD.	35V
C7	.0005 "	MICA
C8	.01 "	600V
C9	.01 "	200V
C10	.008 "	600V
C11	.1	"
C12	.0001	MICA
C13	.1	400V
C14	.002	MICA
C15	8	450V
C16	8	"
C17	.05	400V
C18	.1	"
C19	.1	400V

R1	400Ω	1/2W
R2	1 MEG.Ω	"
R3	.5 MEG.Ω	"
R4	500,000Ω	VOL.CONT.
R5	6000Ω	1/2W
R6	50,000Ω	1/2W
R7	100,000Ω	1/2W
R8	500,000Ω	
R9	15,000Ω	1W
R10	50,000Ω	1/2W
R11	250Ω	"
R12	50Ω	"
R13	45,000Ω	1/2W
R14	100,000Ω	TONE CONT.
R15	600,000Ω	1/2W
R16	190,000Ω	"



MODELS 160, 180, 184, 6500, 6504
6518, 6546, 6550, 6562, 6564
Chassis 603 (1936)
Alignment, Socket, Trimmers

SPIEGEL INC.

MODELS 178, 6708, 6754
Chassis 15 (1936)
Alignment

MODELS 178, 6708, 6754 (1936) Chassis 15

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align. The I.F. transformer nearest the type (30) diode detector has only one trimmer, (single tuned) and should be the first adjustment. Next adjust the center I.F. transformer, which has two trimmers (double tuned) for maximum output; then adjust the two trimmers on the input I.F. transformer (double tuned) for peak.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the broadcast oscillator trimmer to peak. (See drawing for location.) After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the preselector circuit. Then adjust the Broadcast Band R. F. trimmer to peak. This trimmer aligns the grid or input circuit of the 1C6 tube, (See drawing for position of Broadcast R. F. trimmer). Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the B. C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. (For location of B.C. padding condenser see drawing.) Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band.

FOREIGN BAND ALIGNMENT

The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers marked and illustrated in the drawing as S.W. oscillator and S.W. trimmer. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator).
Then proceed to adjust these two trimmers for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band.
Note: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way), otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

POLICE BAND

In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.
Set the receiver pointer to 4000 KC (also test oscillator) and adjust the Police Band oscillator circuit trimmer to peak.
After this has been carefully done, the next step is to adjust the Police Band antenna trimmer to peak.
Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser.
Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.
If it is found that in returning to 4000 KC the pointer is accurately on scale, no further adjustment should be necessary (in this recheck). If the pointer is found off scale, it may be corrected and put on scale by readjustment of the police band oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.
Important: The adjustment, the Police Band Oscillator Trimmer, Police Band Antenna Trimmers and Police Band Padding Trimmers are the only three adjustments required in aligning this band.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

P109	1st & 2nd I. F. Transformer
P529	Tube Shield, Small
P392	A Battery Cord
P402	Vibrator Unit
P411	500 Ohm Filter Choke
P451	Tube Shield, Large
P458	R. F. Choke
P457	A. Choke
P581	Type 30 Tube Socket
P583	Type 34 Tube Socket
P584	Type 1C6 Tube Socket
P587	Type 19 Tube Socket
P686	Single Tuned I. F. Transformer
P682	Osc Coil
P708	Gang Condohm
P718	Input Audio Transformer
P787	1 Ohm Condohm
P768	R. F. Choke Coil
P769	R. F. Choke Coil B
P807A	Escutcheon Plate With Glass
P845	Speaker Socket
P854	Transformer With Brackets
P848	Dual 8 MFD. Elec. Condenser
P873	Speaker Plug
P878	5" Permanent Magnet Speaker
P860	8" Permanent Magnet Speaker
P1026	Tone Control
P1039	Large Knob
P1040	Small Knob
P1128	3 Gang Variable Condenser
P1130	Tilt Dial Complete
P1131	Volume Control With Switch
P1135	2 Gang Wave Switch
P1138	Broad Cast Oscillator Coil
P1137	Pre-Selector Coil
P1140	3 Gang Trimmer Condenser
P617	Padding Condenser
P1139	1600 MMF Padding Condenser
P1164	6 Volt .15 AMP. Pilot Light
P278	1,000 Ohm Resistor ¼ Watt
P138	250 Ohm Resistor ¼ Watt
P137	500,000 Ohm Resistor ¼ Watt
P182	1 Megohm Resistor ¼ Watt
P188	25,000 Ohm Resistor ¼ Watt
P180	5,000 Ohm Resistor ¼ Watt
P417	50,000 Ohm Resistor ¼ Watt
P142	.10-200V Condenser
P147	.00025 Mica Condenser
P148	.05-200V Condenser
P385	.01-400V Condenser
P338	.02-200V Condenser
P395	.50-10V Condenser
P490	.0001 Mica Condenser
P1079	.01-1600V Condenser
P673	.001 Mica Condenser
P394	.05-400V Condenser
	STRAIGHT DIAL MODEL
P1162	Volume Control
P1058	Tone Control
P1163	Wave Switch
P1164	Straight Dial CPT
P906A	Escutcheon Plate

MODELS 160, 180, 184, 6500, 6504, 6518, 6546,
6550, 6562, 6564,
MODEL 603, (1936)

In case of faulty operation of the receiver, first make sure that the antenna and ground are in good condition and properly attached to the receiver. Then determine if any of the tubes are faulty. In case of trouble within the receiver itself, the circuit diagram shown on the opposite page will be useful to the service man in locating and correcting the trouble.

I. F. Alignment:

Connect a test oscillator or signal generator through a .1 mfd. condenser to the grid of the 6D6 tube and set the oscillator to 456 KC. Use an output meter connected to the speaker if possible, to obtain the most accurate adjustments. Peak each I. F. stage to maximum response, reducing the output of the oscillator as far as possible for final adjustments.

R. F. Alignment:

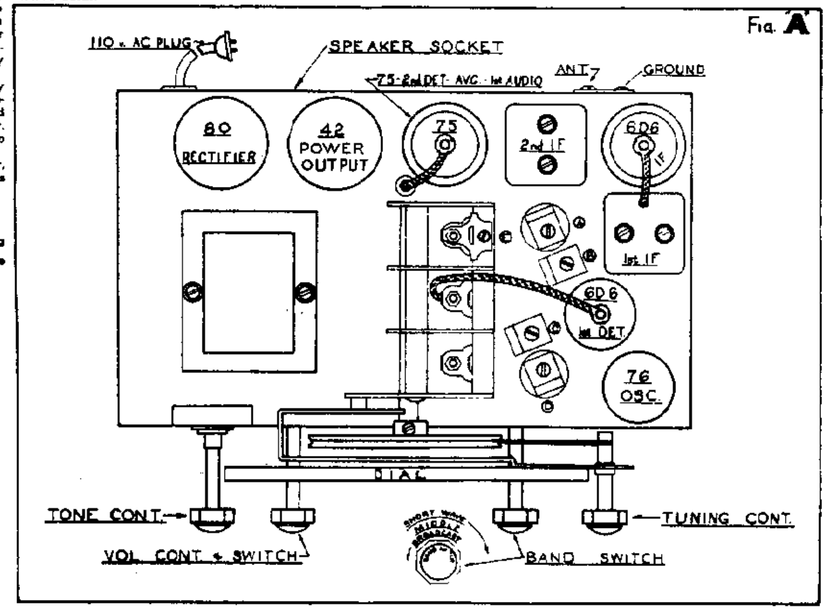
With test oscillator set at 1400 KC, feed this signal into the antenna lead of the receiver through a .00025 condenser. With band switch in broadcast position, set the dial pointer to 1400 KC.

Adjust the broadcast oscillator trimmer (the small trimmer attached to the coil located approximately in front of the range switch) to peak at 1400 KC. Next adjust the trimmer on the preselector (this coil is mounted in the center at the front of the chassis). Then adjust the one trimmer on top of the gang condenser.

Now set the test oscillator to 600 KC. Adjust the broadcast padder condenser (the ceramic-base condenser adjustable through the right hand end of the chassis) in this manner: Move the dial slowly and repeatedly back and forth across the signal while adjusting the padder. Adjust for maximum gain.

Now set the range switch to middle wave band. Adjust the test oscillator to 4000 KC, and set the dial to 400 KC. Adjust the two trimmers located on the tops of the two short wave coils, on top of the chassis, for maximum gain.

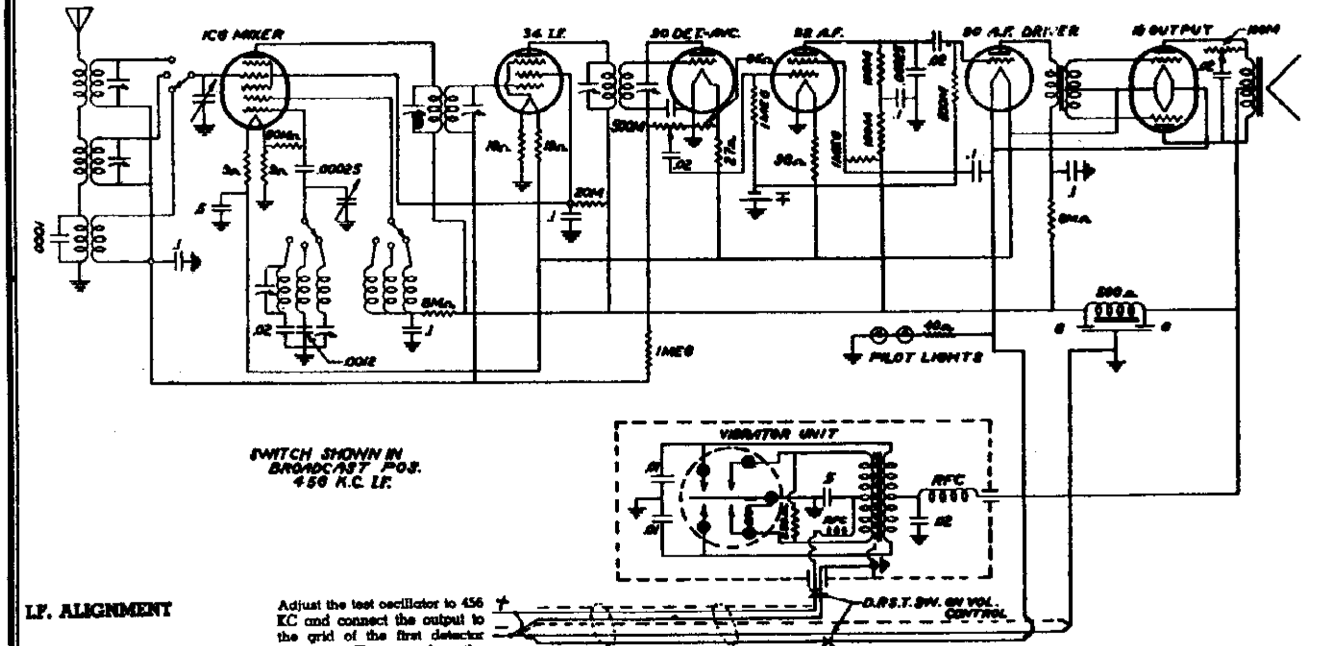
Now set the range switch to the short wave position, adjust the test oscillator to 15 megacycles. Turn the dial to read 15 megacycles. Adjust for maximum gain the two trimmers located at the bases of the short wave coils.



Schematic, Socket, Trimmers Alignment

SPIEGEL INC.

MODELS 102, 104, 112, 114, 124 172, 6750, 6752 Chassis Z4



I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 1C6 tube and in front of the first I.F. transformer. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT

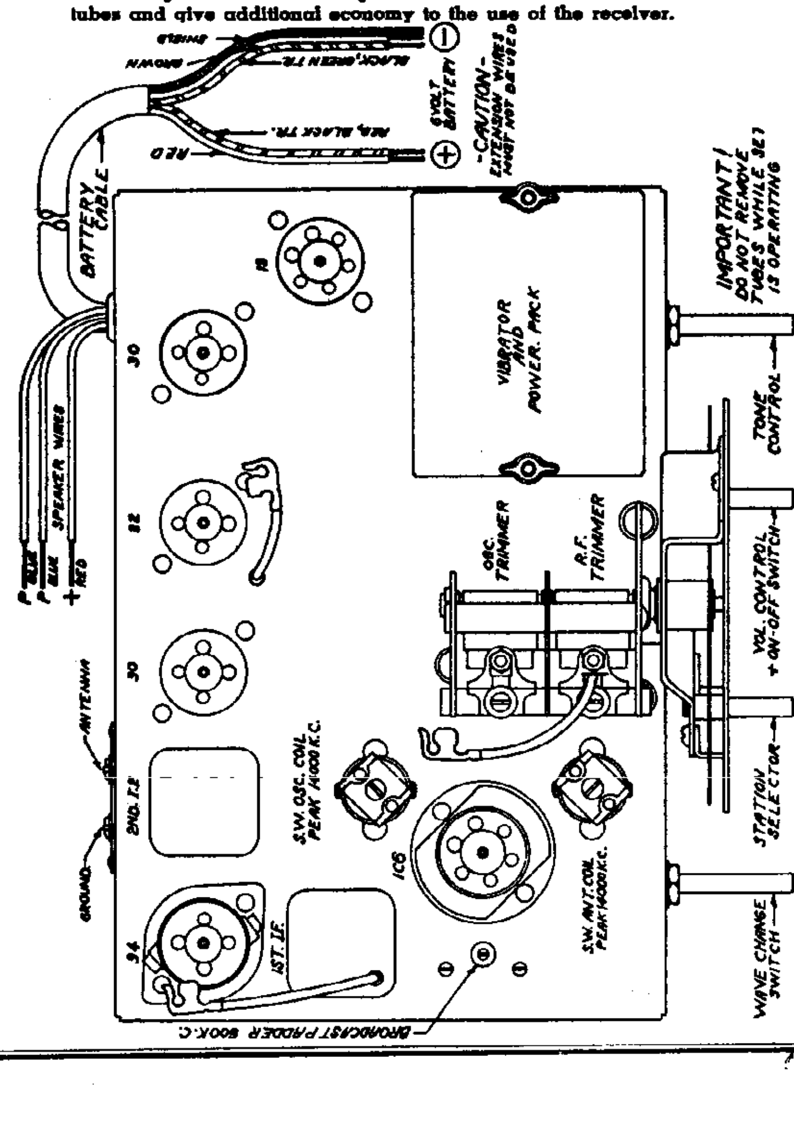
The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and alongside the front section of the gang condenser. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND ALIGNMENT

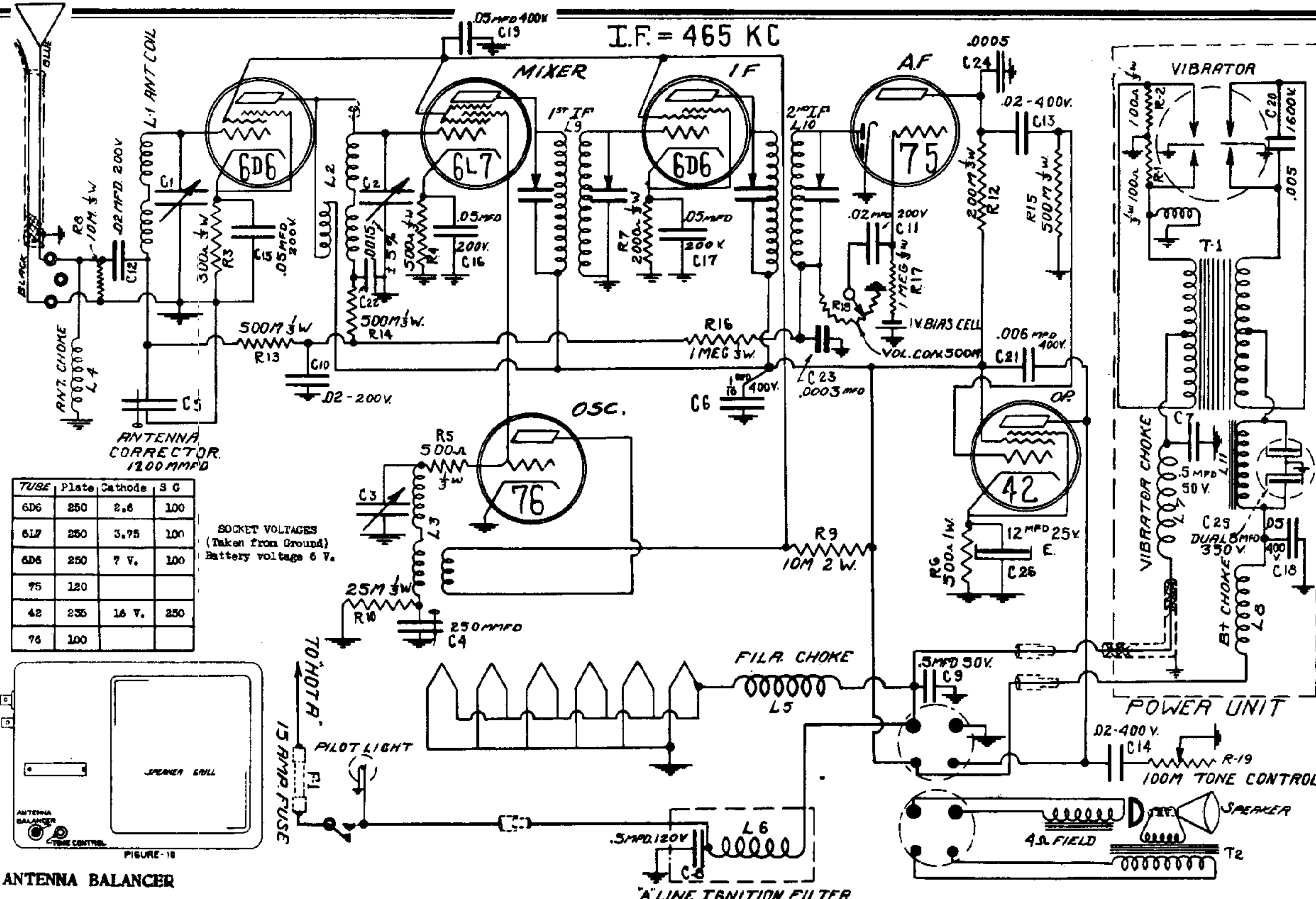
There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary. Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil. **Important:** This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.



MODEL 169, Chassis H1
Schematic, Voltage
Alignment

SPIEGEL INC.



TUBE	Plate	Cathode	S G
6D6	250	2.6	100
6L7	250	3.75	100
6D6	250	7 V.	100
75	120		
42	235	16 V.	250
76	100		

SOCKET VOLTAGES
(Taken from Ground)
Battery voltage 6 V.

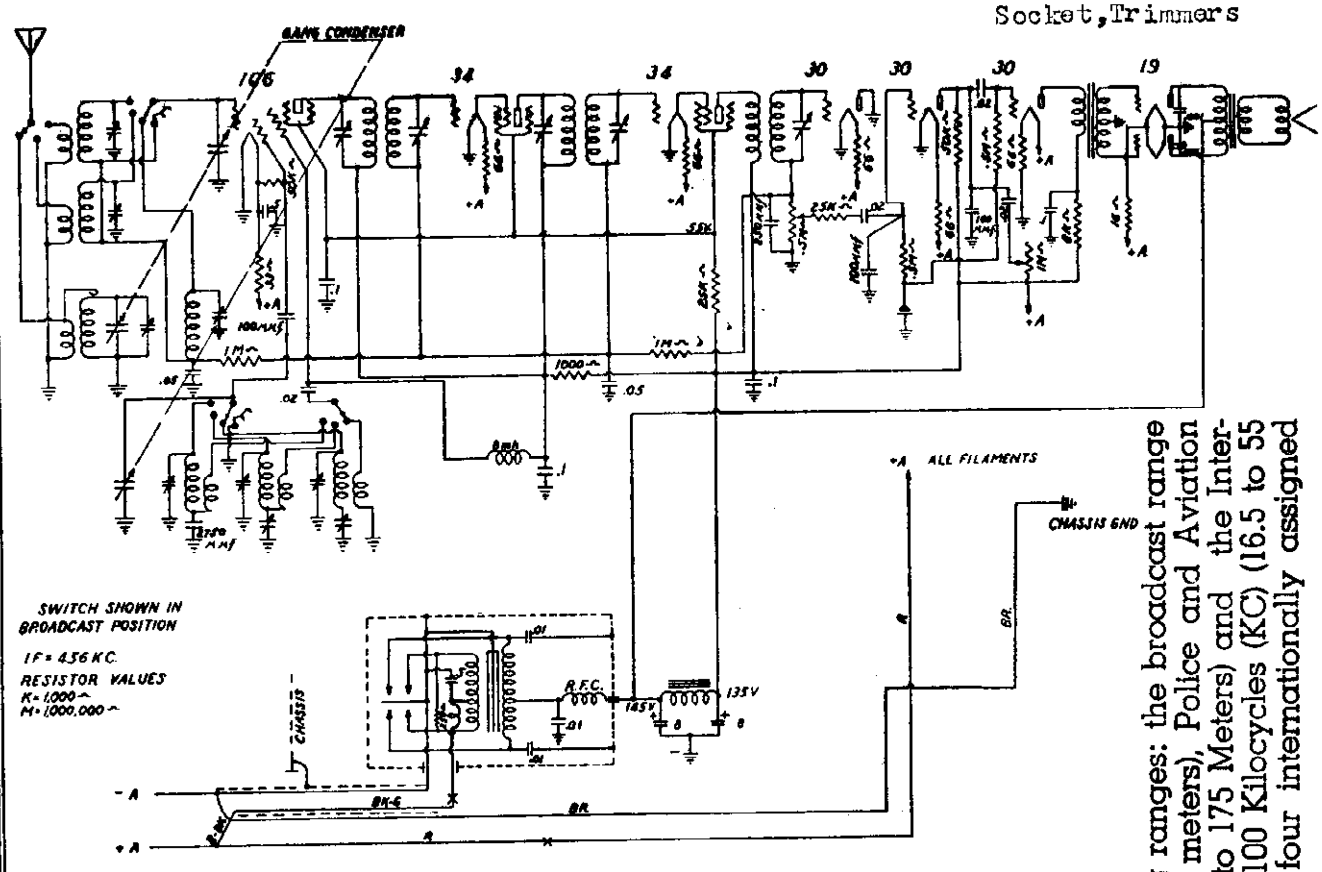
FIGURE-10

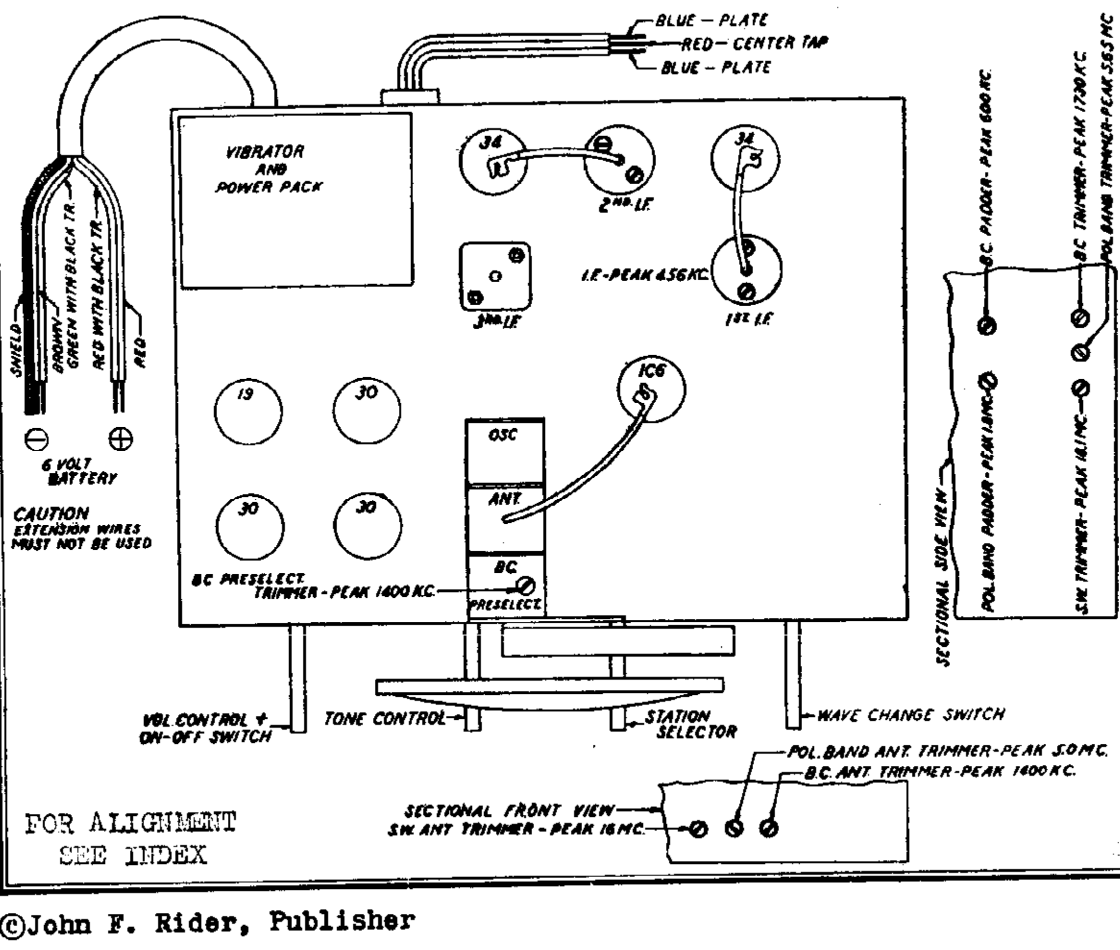
ANTENNA BALANCER

First, tune in a weak station at or very near to 600 KC on the dial. Second, without changing any other control, insert a small screw driver into the antenna balancer screw shown in Figure 10 and turn it either to the left or right until the volume of the station is at its maximum point.

MODELS 178, 6708, 6754
Chassis M5 (1936)
Schematic, Voltage
Socket, Trimmers

SPIEGEL INC.



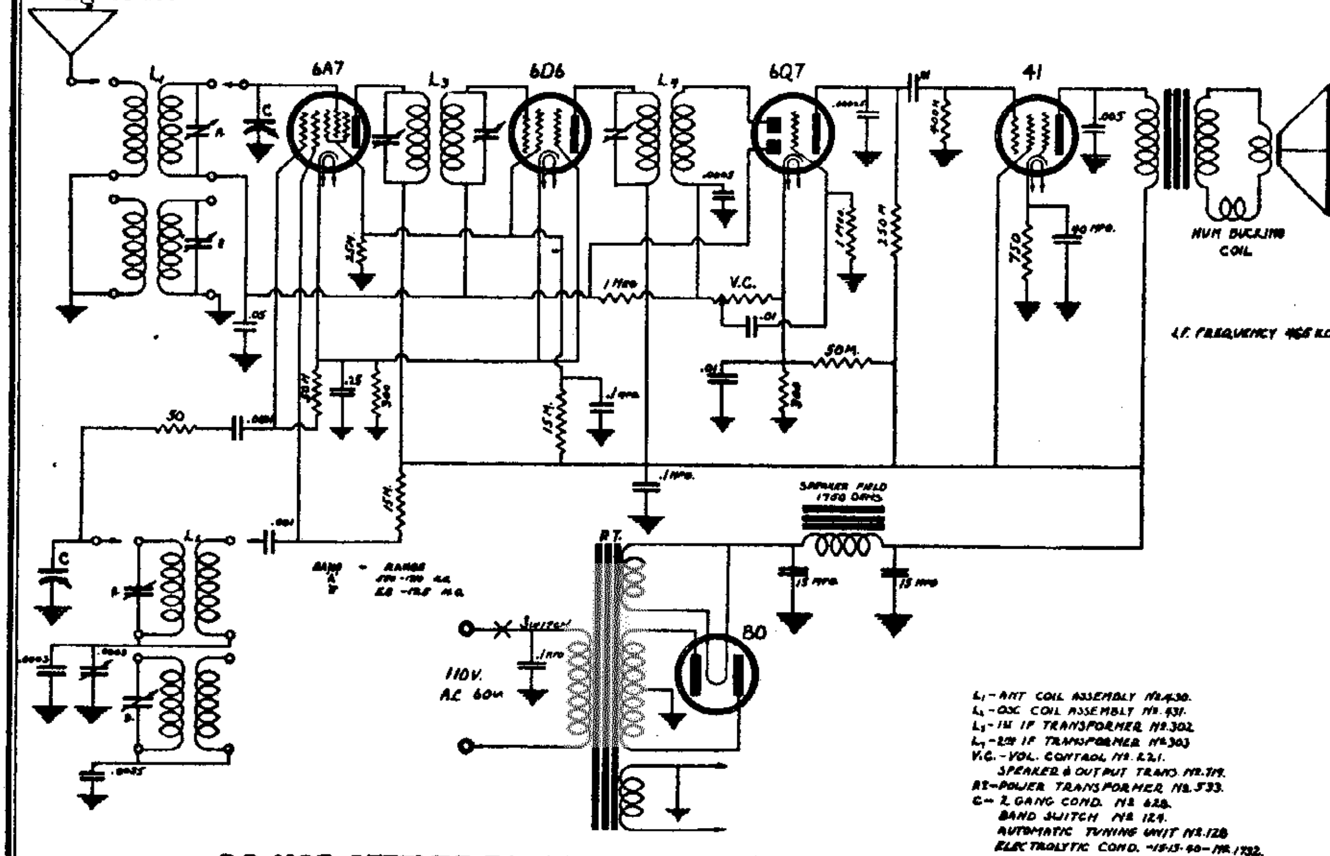


This receiver is designed to operate over three tuning ranges: the broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5500 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5500 to 18,100 Kilocycles (KC) (16.5 to 55 meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

FOR ALIGNMENT SEE INDEX

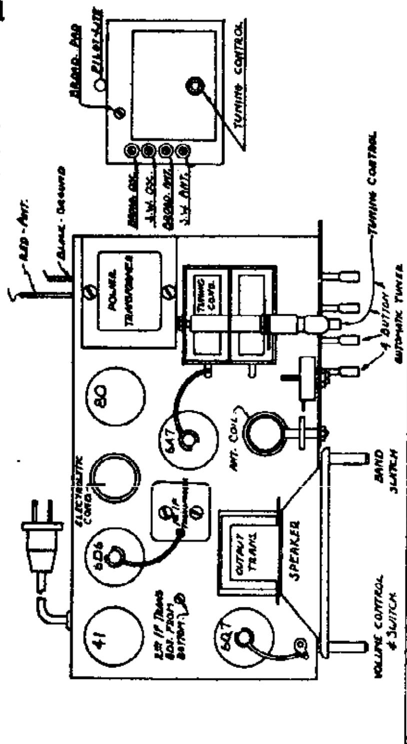
MODELS 1002, 1003, Chassis 219
Schematic, Socket, Trimmers
Alignment

SPIEGEL INC.



DO NOT ATTEMPT TO OPERATE THIS RECEIVER ON DIRECT CURRENT (D.C.) OR ANY OTHER VOLTAGE OR CYCLE AS PERMANENT INJURY TO THE SET WILL RESULT.

This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C. The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meter bands.



ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: **Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.**

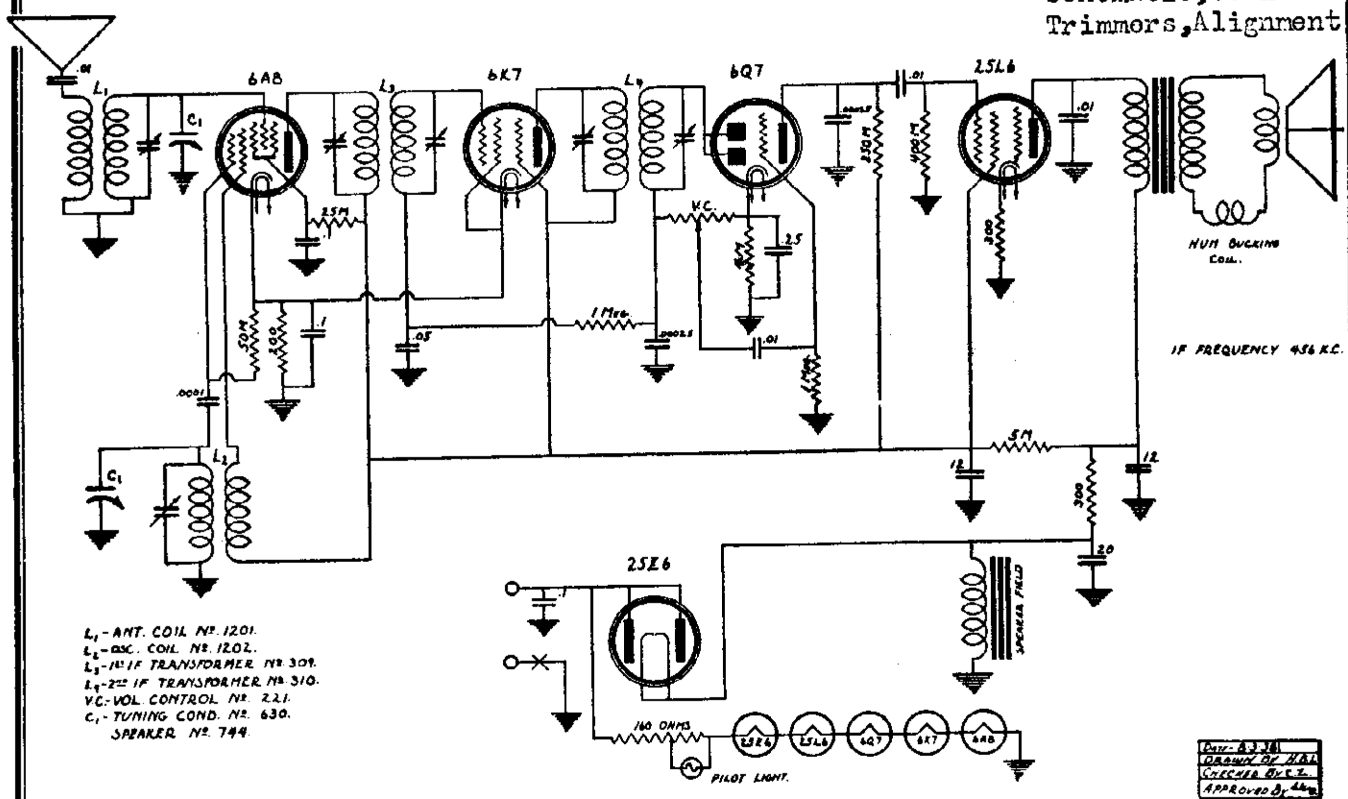
BROADCAST BAND: **Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the** *broadcast padding* **condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.**

SHORT WAVE: **Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.**

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

SPIEGEL INC.

MODELS 1010,1011
Chassis 216
Schematic,Socket
Trimmers,Alignment

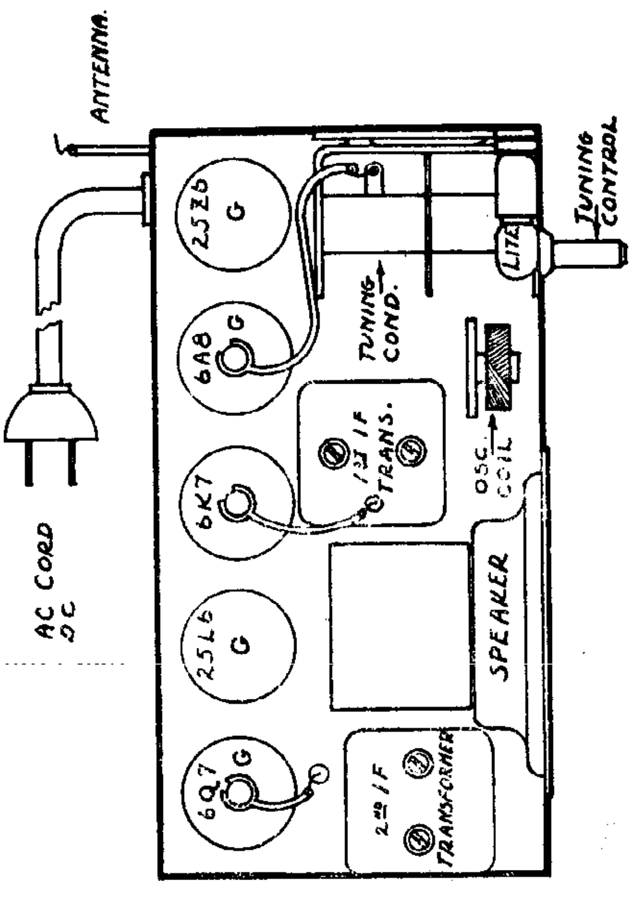


INSTALLATION: For operation on 110-120 volts, 60 cycle A.C. or D.C. power supply.

ALIGNMENT: All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

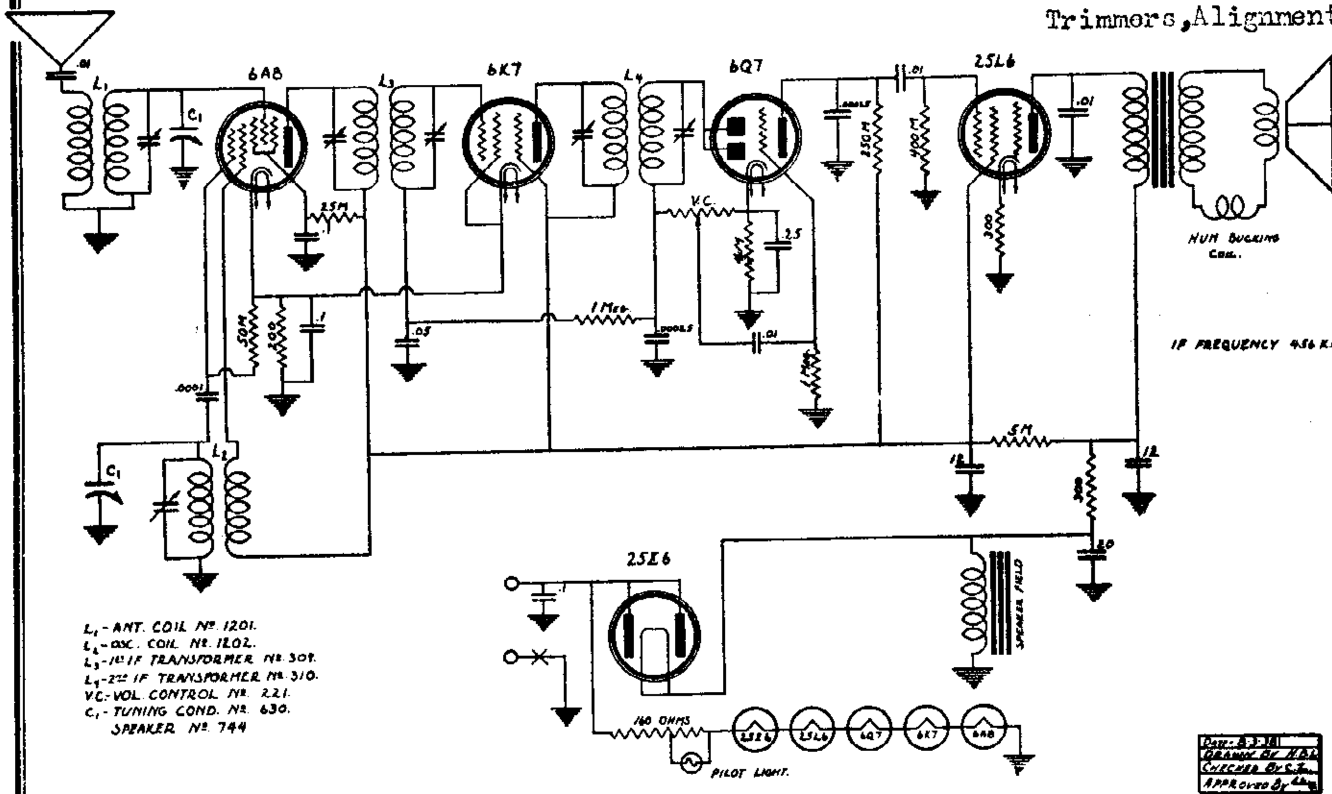
INTERMEDIATE FREQUENCY: Set oscillator to 456 KC. Feed this to the grid of the pentagrid (6A8) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the antenna and oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC and check for alignment.



MODELS 1010,1011
Chassis 216
Schematic,Socket
Trimmers,Alignment

SPIEGEL INC.

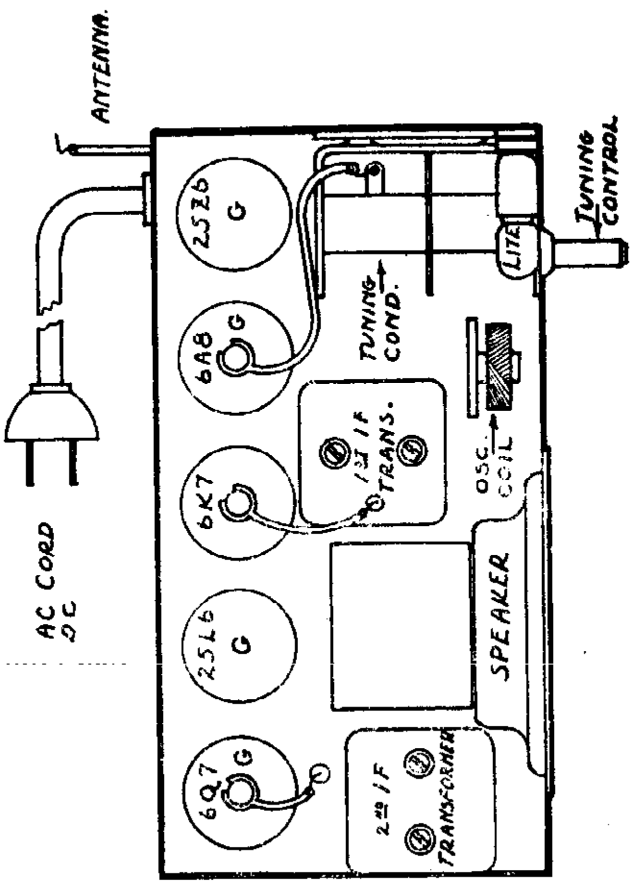


INSTALLATION: For operation on 110-120 volts, 60 cycle A.C. or D.C. power supply.

ALIGNMENT: All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 456 KC. Feed this to the grid of the pentagrid (648) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the antenna and oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC and check for alignment.

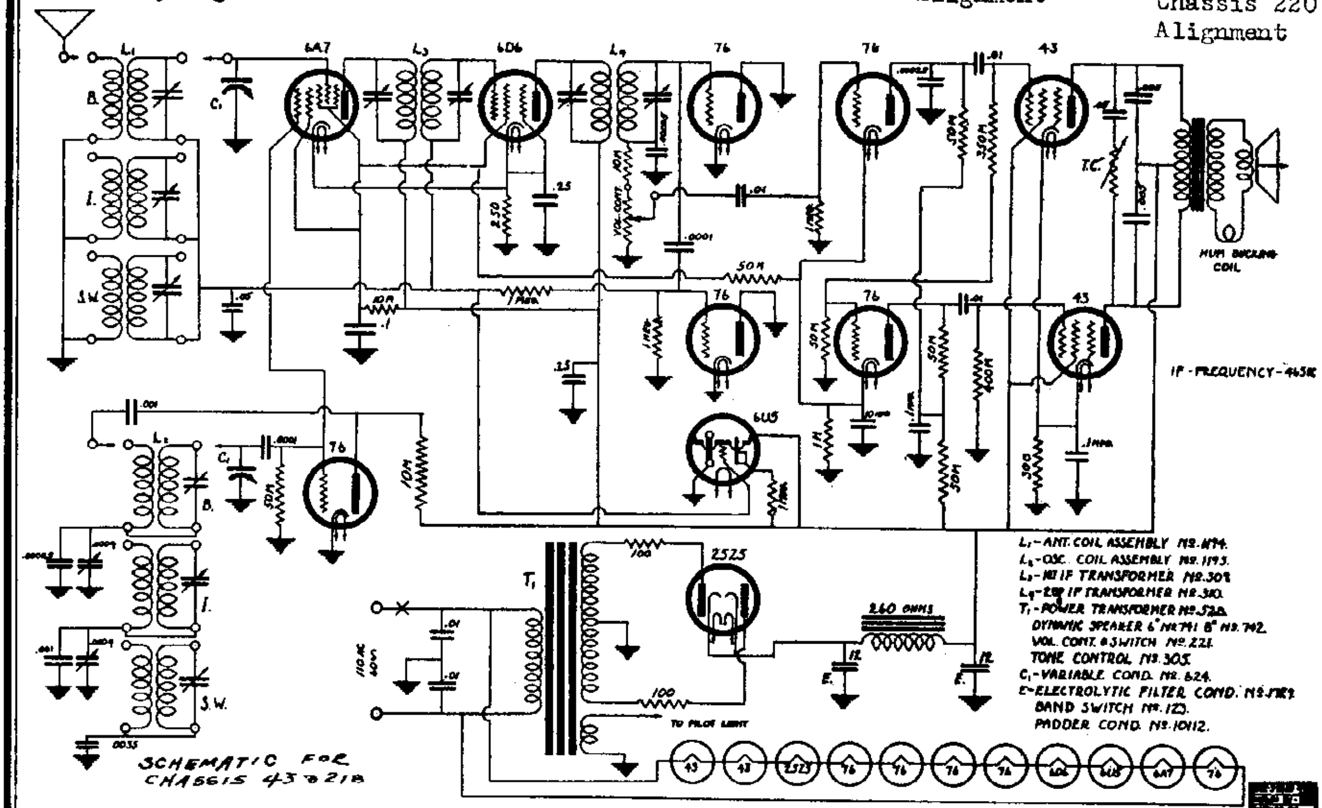


MODELS 2066, 2067, 2068
Chassis 43
Schematic, Alignment

SPIEGEL INC.

MODELS 1052, 1053, Chassis 218
Schematic, Socket, Trimmers
Alignment

Chassis 220
Alignment



SWITCH POSITION	BAND	RANGE IN KILOCYCLES
Left	Broadcast	540— 1710 KC
Center	Intermediate	1710— 5800 KC
Right	Short Wave (foreign)	5800—17500 KC

FOR CHASSIS 43 SOCKET LAYOUT SEE INDEX.

ALIGNMENT: The alignment of this receiver (CHASSIS 43, 218, 220) should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

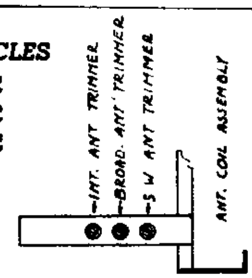
INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the (6A7) tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

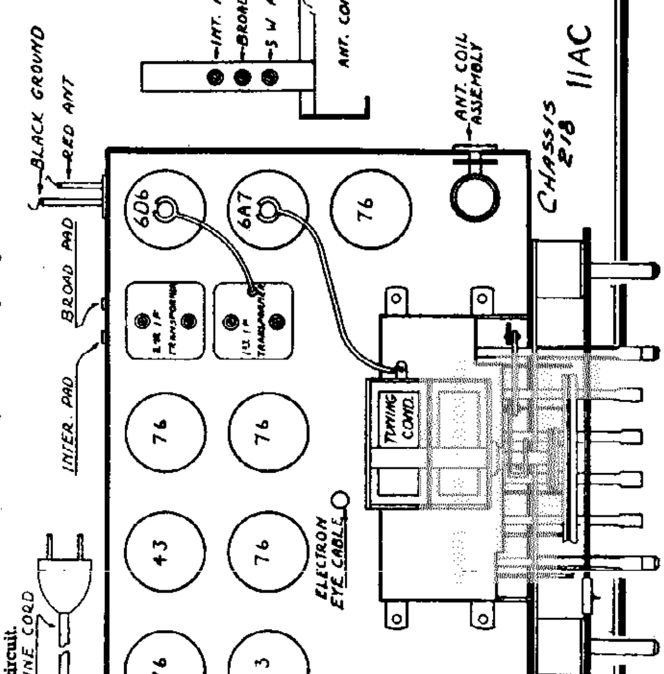
BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

INTERMEDIATE BAND: For a dummy antenna use a .0002 mfd. mica condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 5100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output. Re-set oscillator and set dial to approximately 1800 KC. Slowly increase or decrease the intermediate padding condenser while tuning back and forth across the signal with the station selector control until the maximum reading is obtained on the output meter. Re-check the 5100 KC adjustment.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.





11AC

SPIEGEL INC. MODELS 1100 to 1103 inc.Ch. 202
MODELS 1150 to 1153 inc.Ch.212
Schematic,Alignment

Automatic Tuner Dual Range
6 Volt Superheterodyne

This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C. The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meter bands.

ALIGNMENT DATA

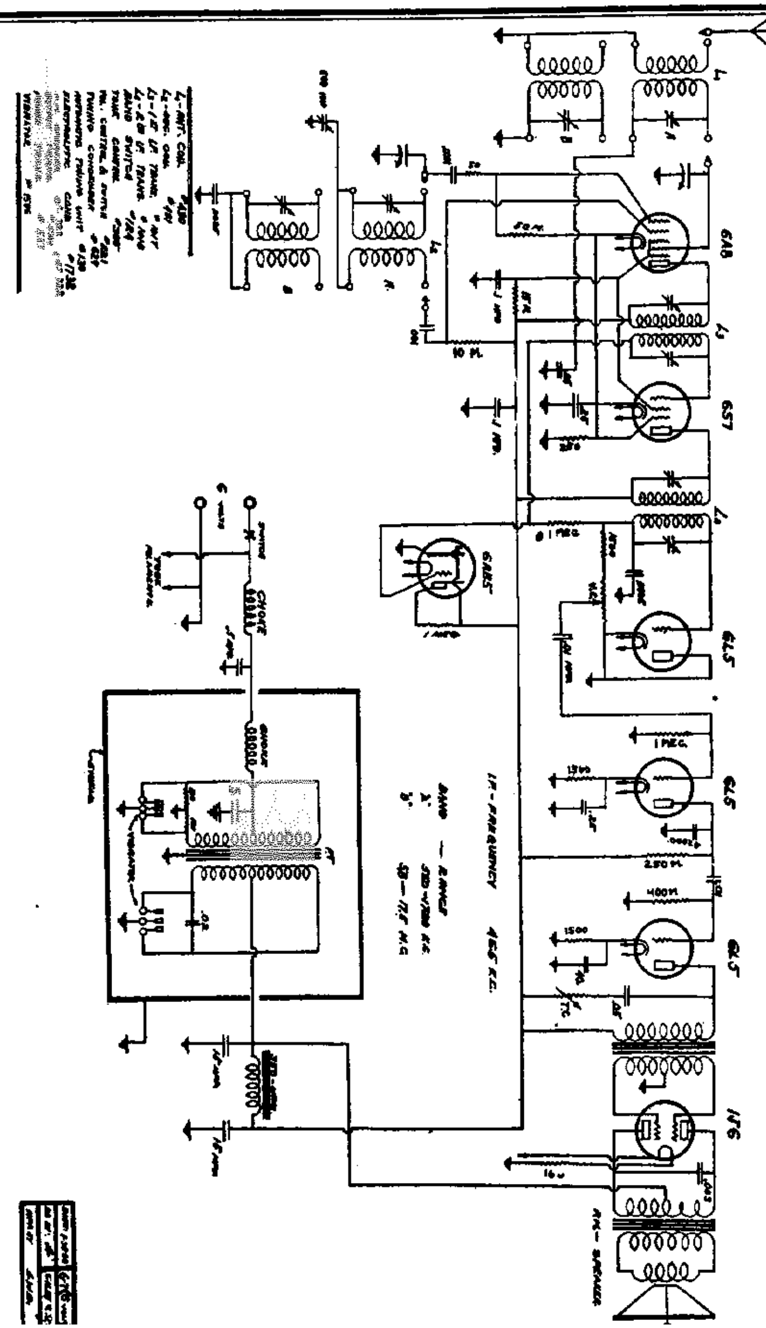
The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

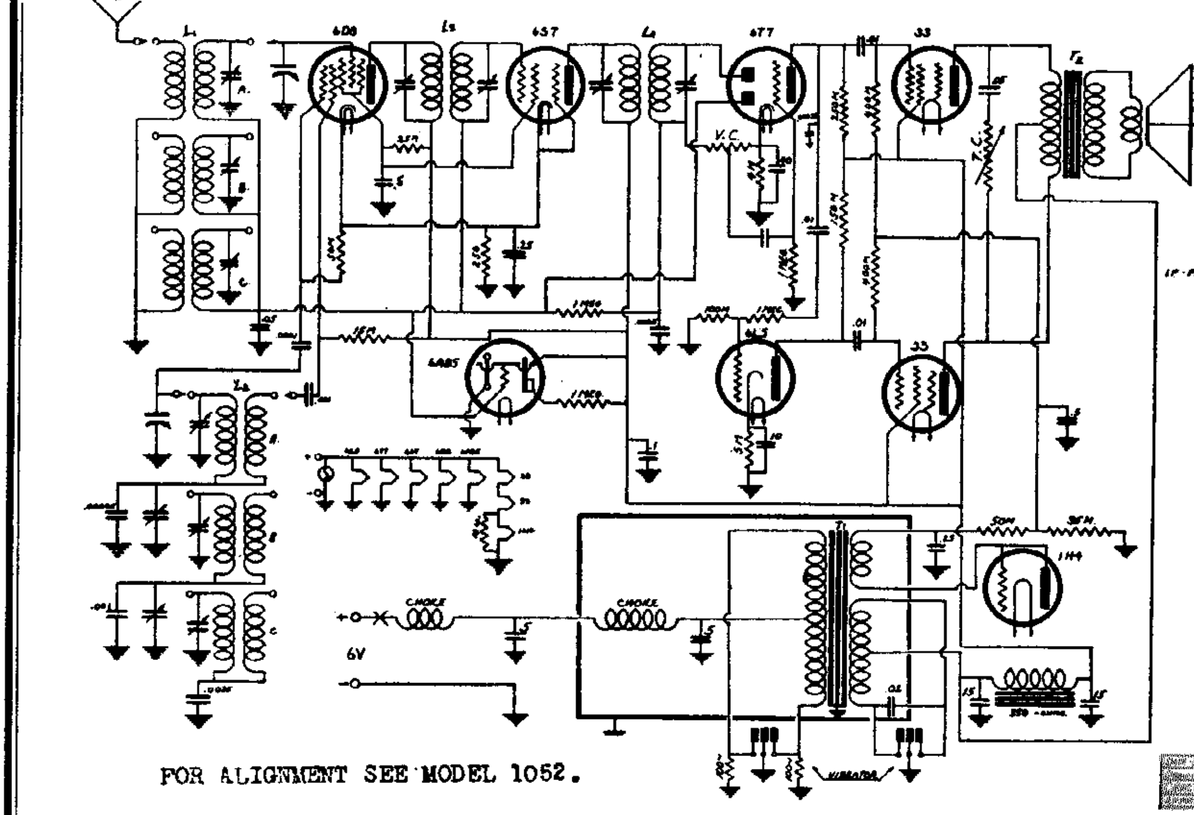
SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.



MODELS 1104 to 1107 inc.
1154 to 1157 inc.Ch.220
Schematic,Socket,Trimmers
MODELS 2066,2067,2068 Chassis 43
Socket,Trimmers

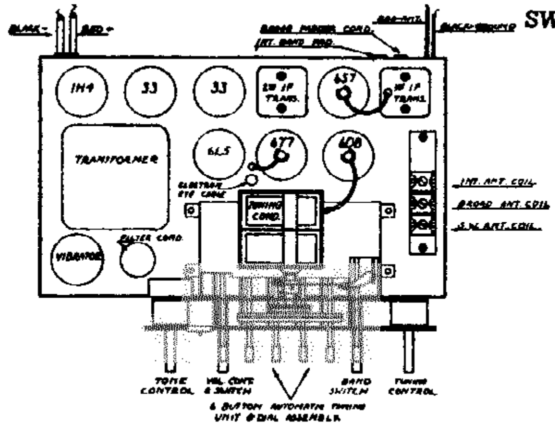
SPIEGEL INC.



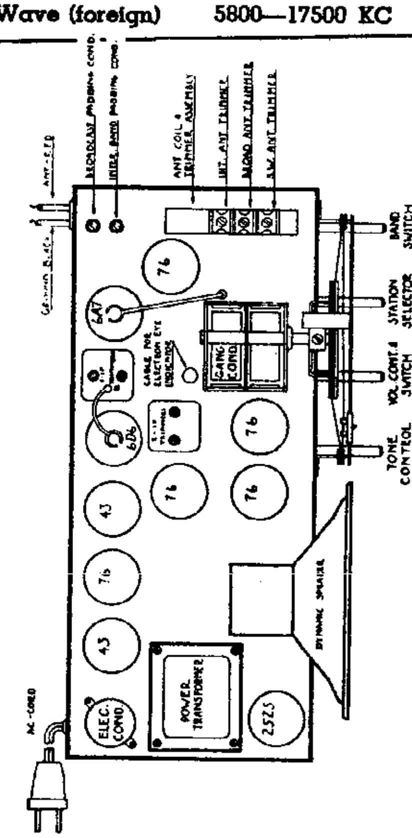
MODELS

1104
1105
1106
1107
1154
1155
1156
1157

FOR ALIGNMENT SEE MODEL 1052.

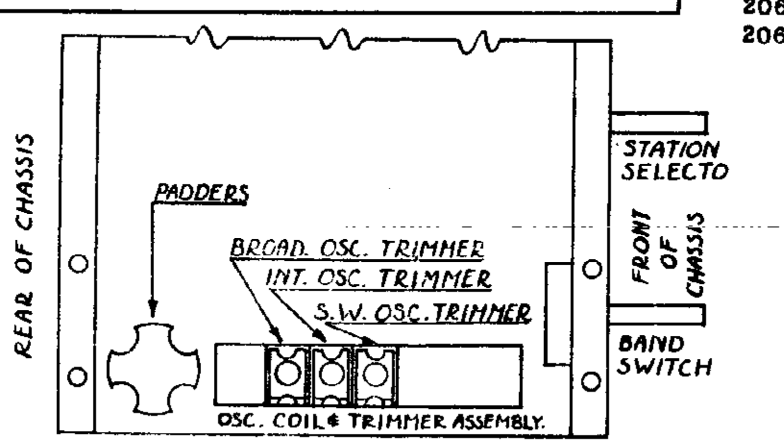


SWITCH POSITION	BAND	RANGE IN KILOCYCLES
Left	Broadcast	540— 1710 KC
Center	Intermediate	1710— 5800 KC
Right	Short Wave (foreign)	5800—17500 KC



MODELS

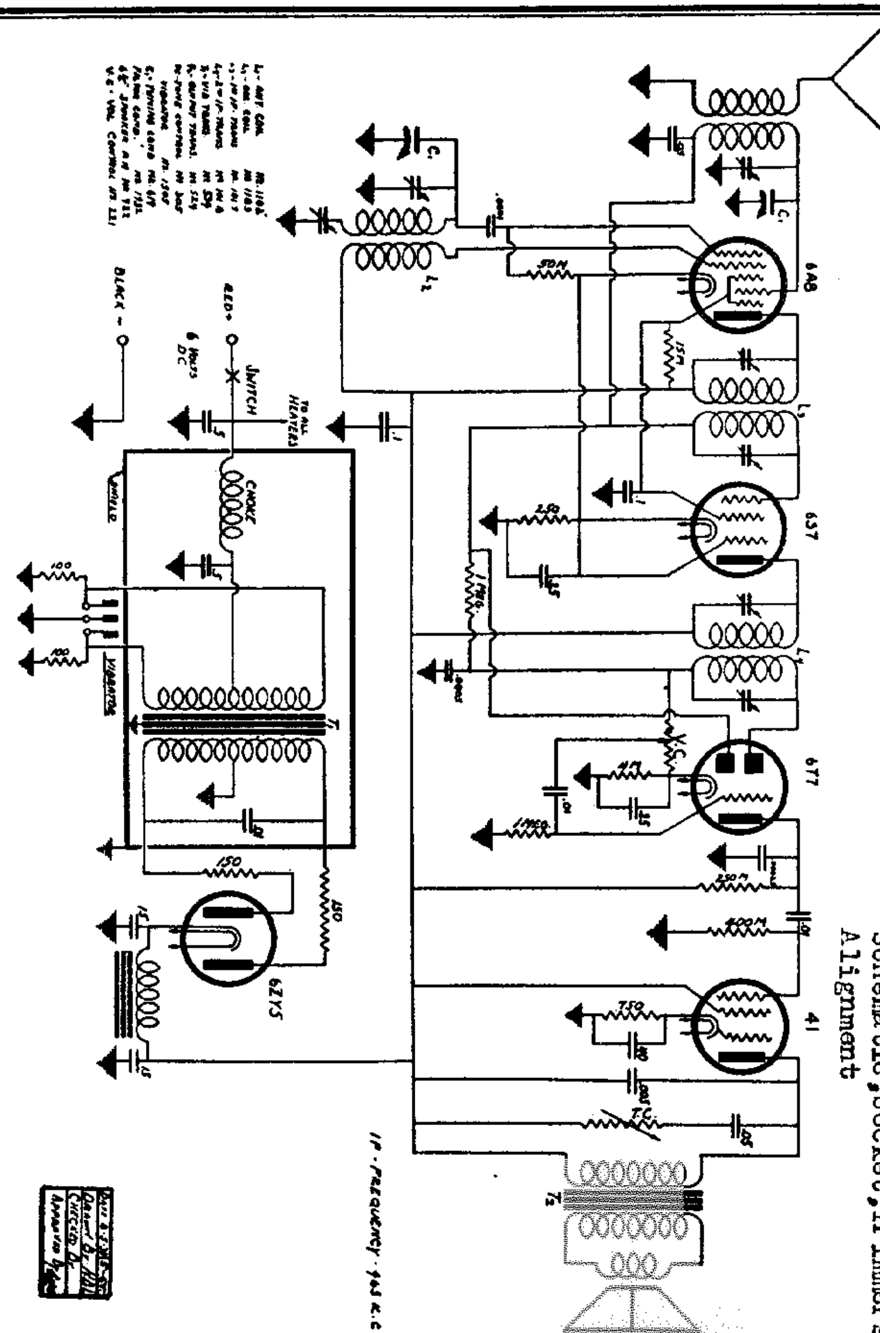
2066
2067
2068



BOTTOM VIEW OF CHASSIS:

MODELS 1108 to 1111 inc.
Chassis 211
Schematic, Socket, Trimmers
Alignment

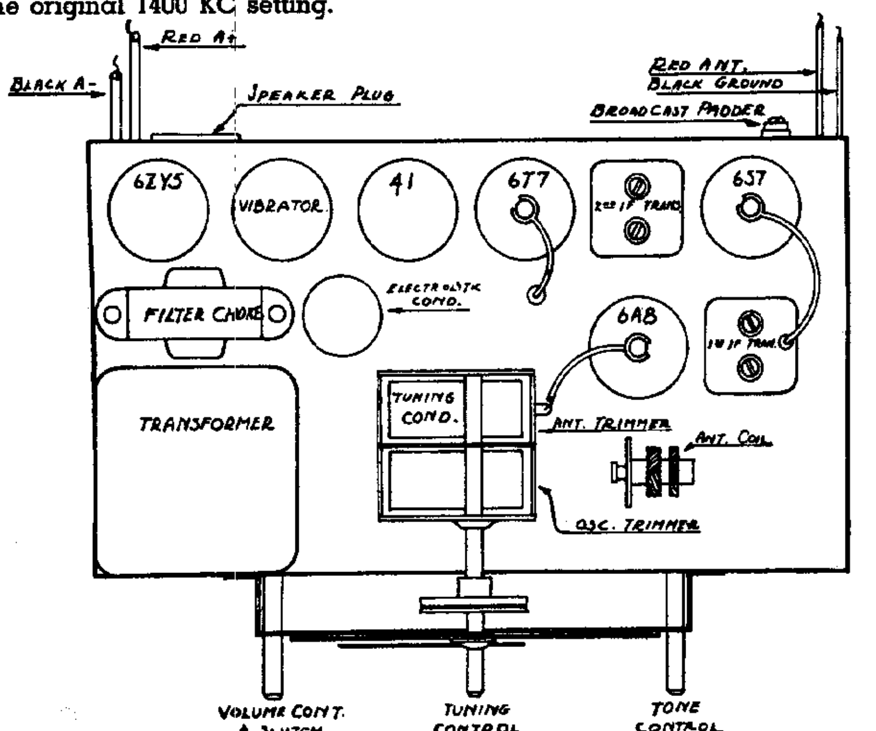
SPIEGEL INC.



All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

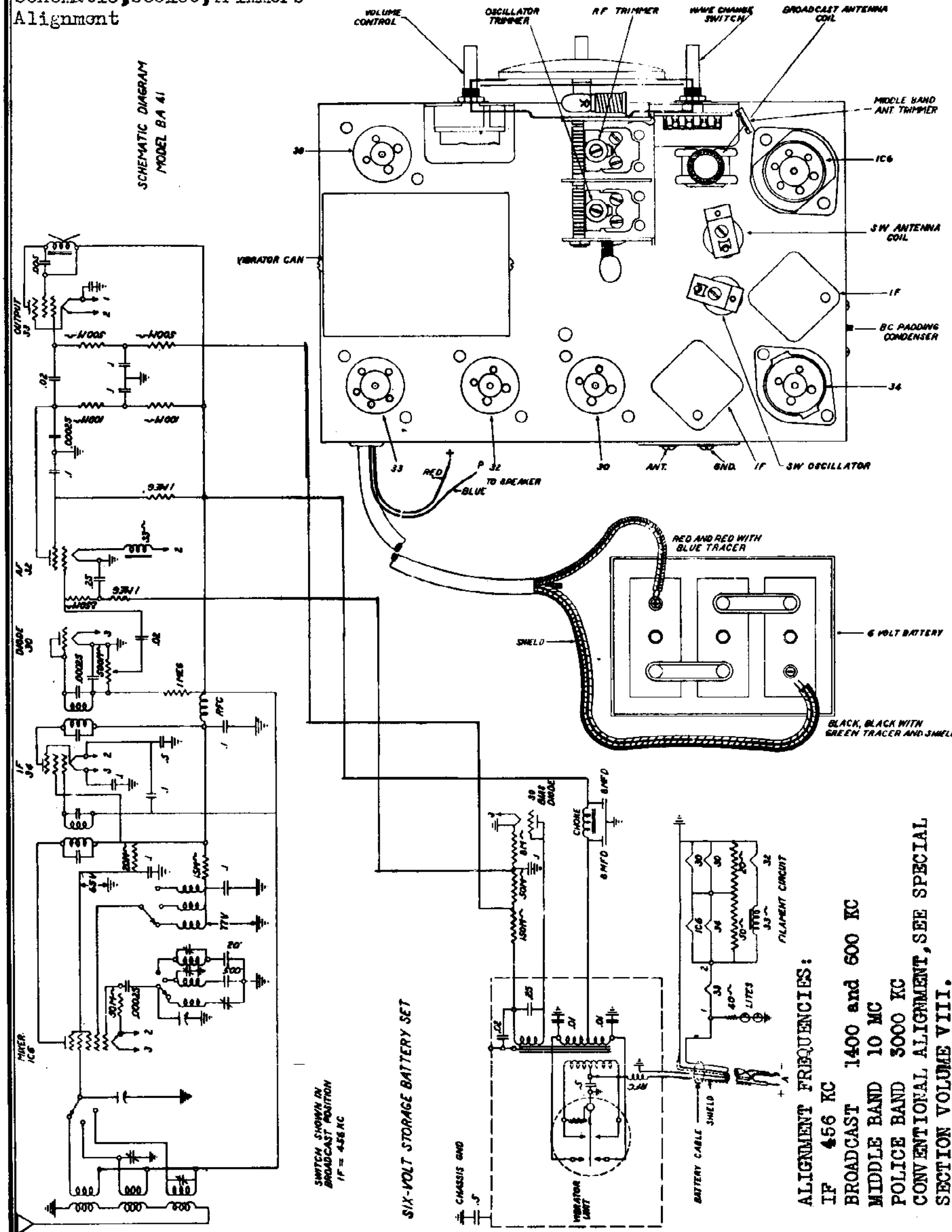
INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Reset the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.



MODELS 1901,1907,1911,1921
1932,1955,1957,1961,1981
Chassis X6,BA41
Schematic,Socket,Trimmers
Alignment

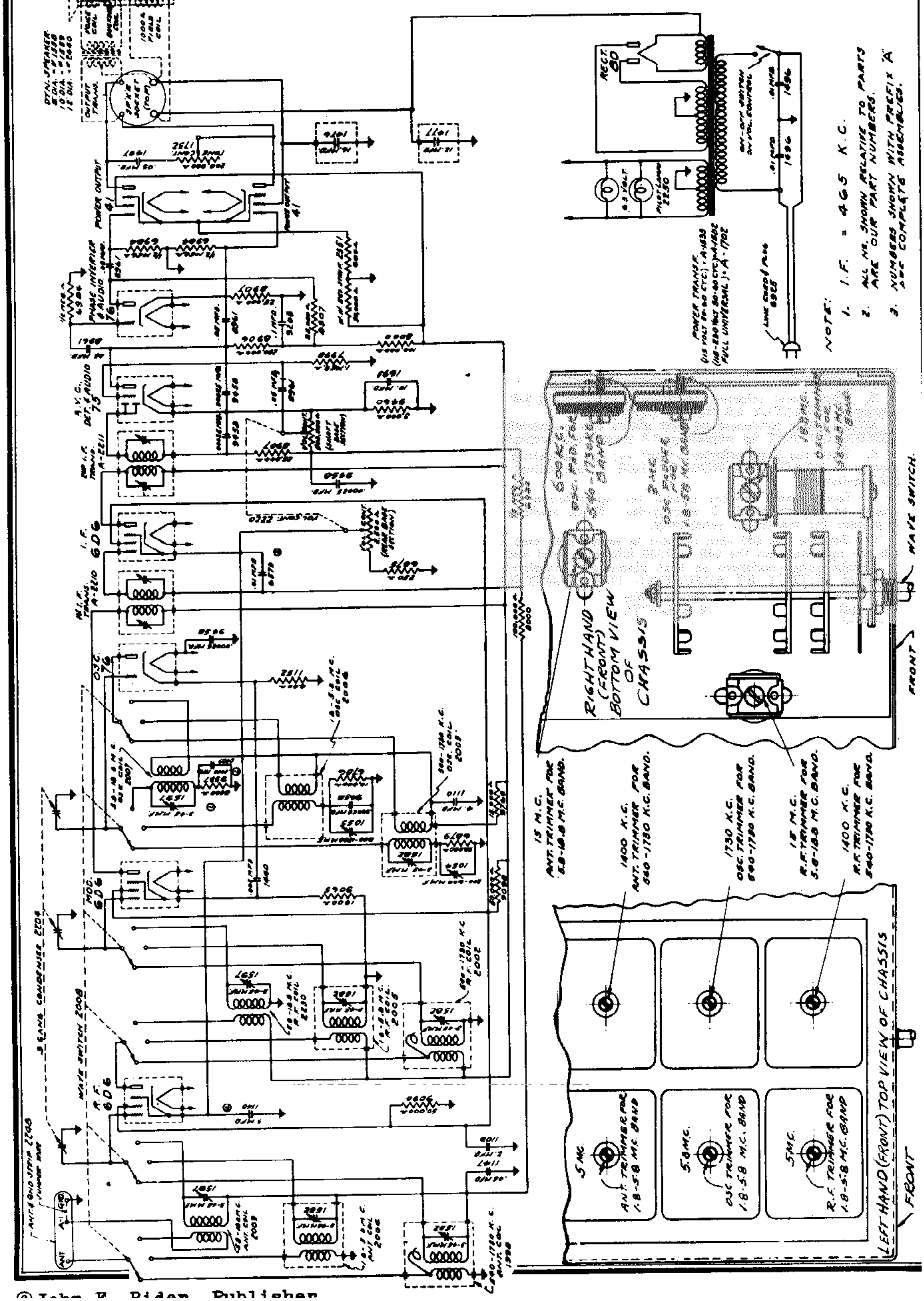
SPIEGEL INC.



ALIGNMENT FREQUENCIES:
IF 456 KC
BROADCAST 1400 and 600 KC
MIDDLE BAND 10 MC
POLICE BAND 3000 KC
CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOLUME VIII.

MODELS 1903,1960,Chassis 14A
Schematic,Trimmers

SPIEGEL INC.



MODELS 1903,1960,Chassis 14A
Alignment,Voltage

SPIEGEL INC.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis and inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left front corner of the receiver) will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.8 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.8 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillation trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.8 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.8 megacycles. Then vary the receiver dial slightly to the right and left of 17.8 megacycles, and if the fundamental peak was used in aligning at 18.8 megacycles the test oscillator signal will be heard at approximately 17.8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.8 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.8 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antenna and R.F. trimmers to maximum 15 megacycle signal sensitivity.

4. Leave band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial and set the test oscillator frequency to approximately 6 megacycles. While rocking gang condenser slightly to right and left adjust 6 megacycle oscillator padder for maximum sensitivity.

5. Place band selector switch for operation on 1.8 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

6. With the band selector switch set for operating on 1.8 to 5.8 Megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna and R.F. trimmers for maximum 5 megacycle signal sensitivity.

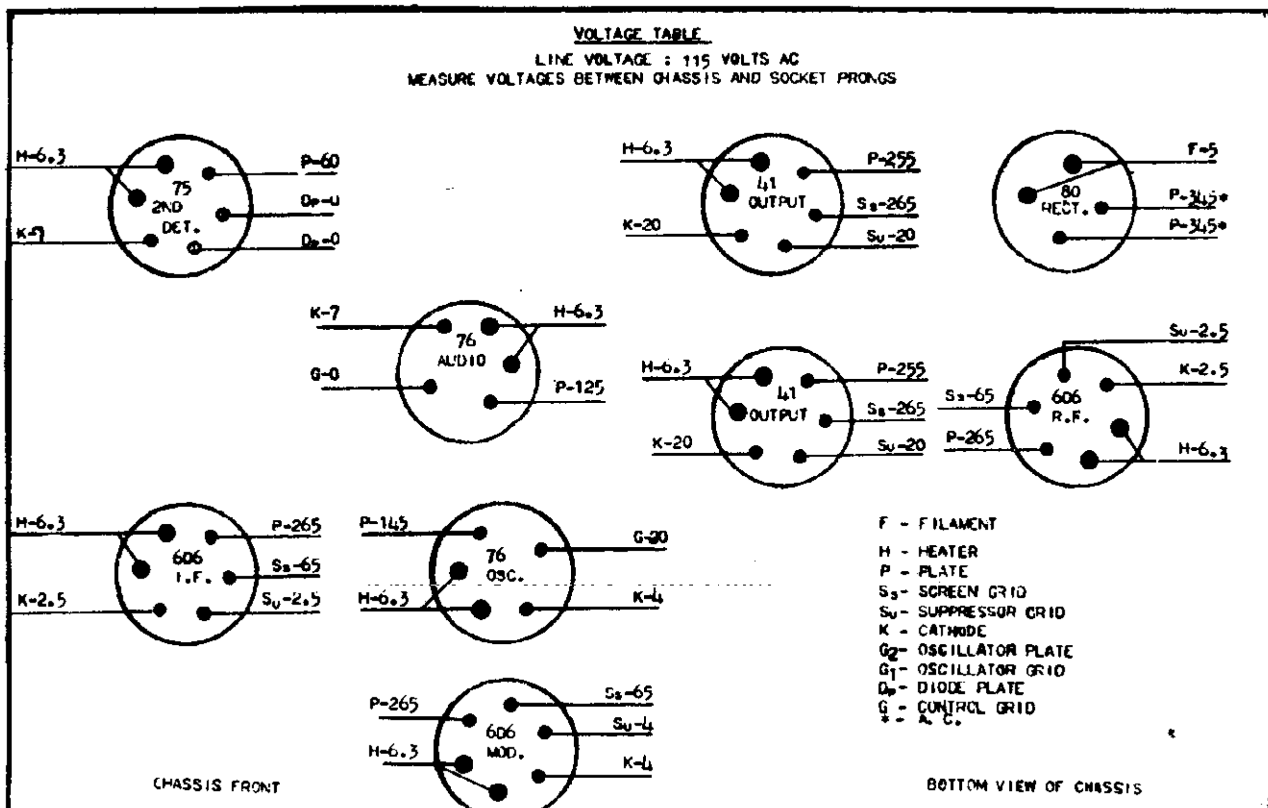
7. Leave band selector switch for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to approximately 2 megacycles. While rocking gang condenser slightly to right and left adjust 2 megacycle oscillator padder for maximum sensitivity.

8. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1730 kilocycle band and set test oscillator frequency to EXACTLY 1730 KILOCYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1730 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1730 KILOCYCLE OSCILLATOR TRIMMER.

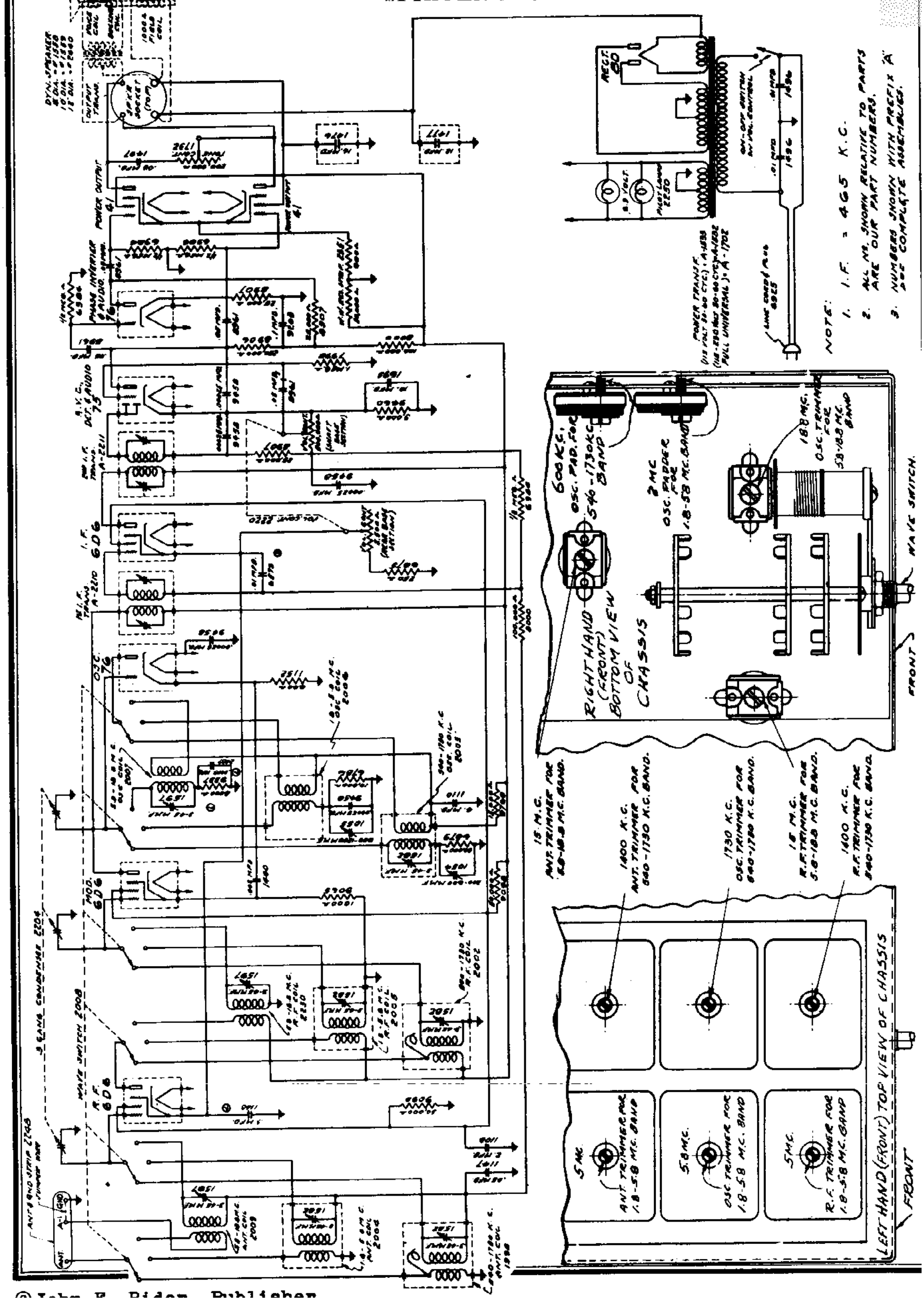
9. With band selector switch placed for operation on the 540 to 1730 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycles R. F. and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

10. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.



MODELS 1903, 1960, Chassis 14A
Schematic, Trimmers

SPIEGEL INC.



MODELS 1903,1960,Chassis 14A
Alignment,Voltage

SPIEGEL INC.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis and inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left front corner of the receiver) will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.8 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.8 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillation trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.8 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.8 megacycles. Then vary the receiver dial slightly to the right and left of 17.8 megacycles, and if the fundamental peak was used in aligning at 18.8 megacycles the test oscillator signal will be heard at approximately 17.8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.8 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.8 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antenna and R.F. trimmers to maximum 15 megacycle signal sensitivity.

4. Leave band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial and set the test oscillator frequency to approximately 6 megacycles. While rocking gang condenser slightly to right and left adjust 6 megacycle oscillator padder for maximum sensitivity.

5. Place band selector switch for operation on 1.8 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

6. With the band selector switch set for operating on 1.8 to 5.8 Megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna and R.F. trimmers for maximum 5 megacycle signal sensitivity.

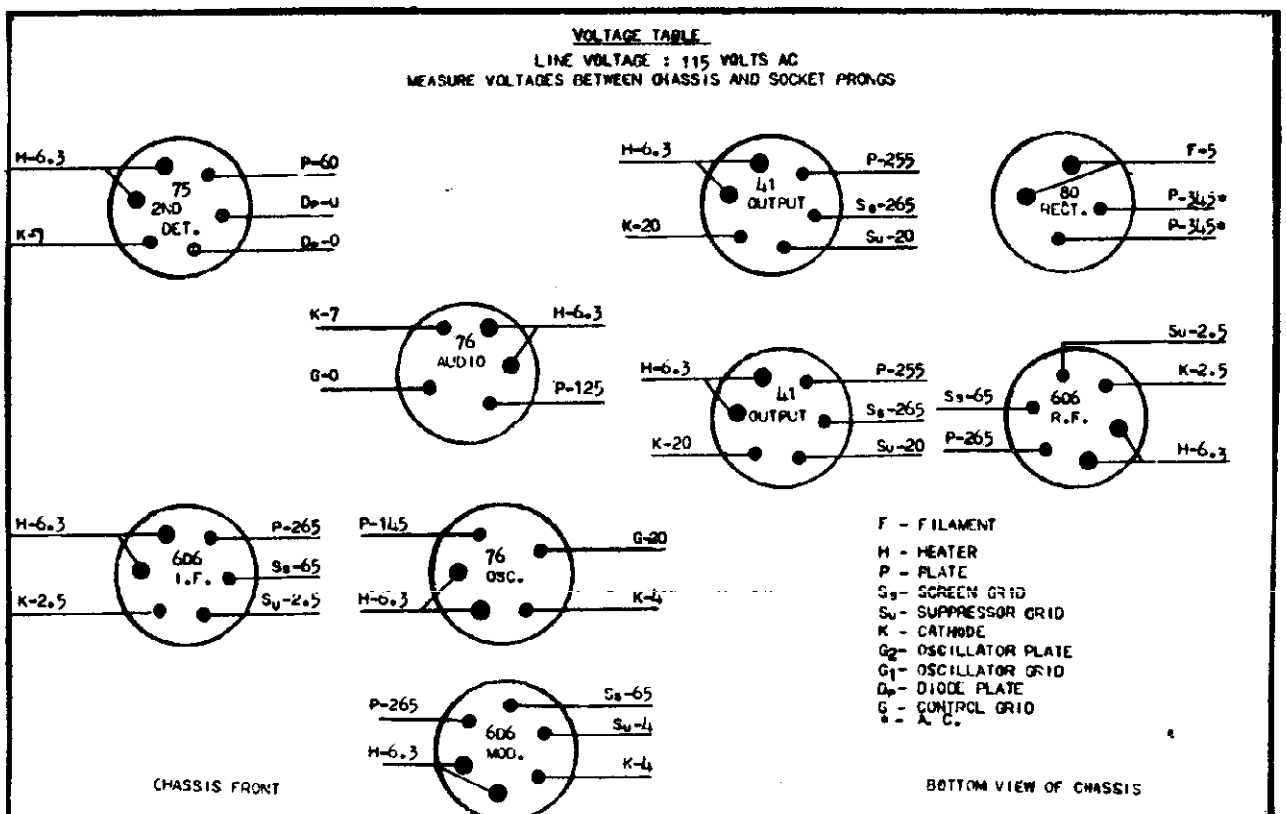
7. Leave band selector switch for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to approximately 2 megacycles. While rocking gang condenser slightly to right and left adjust 2 megacycle oscillator padder for maximum sensitivity.

8. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1730 kilocycle band and set test oscillator frequency to EXACTLY 1730 KILOCYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1730 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1730 KILOCYCLE OSCILLATOR TRIMMER.

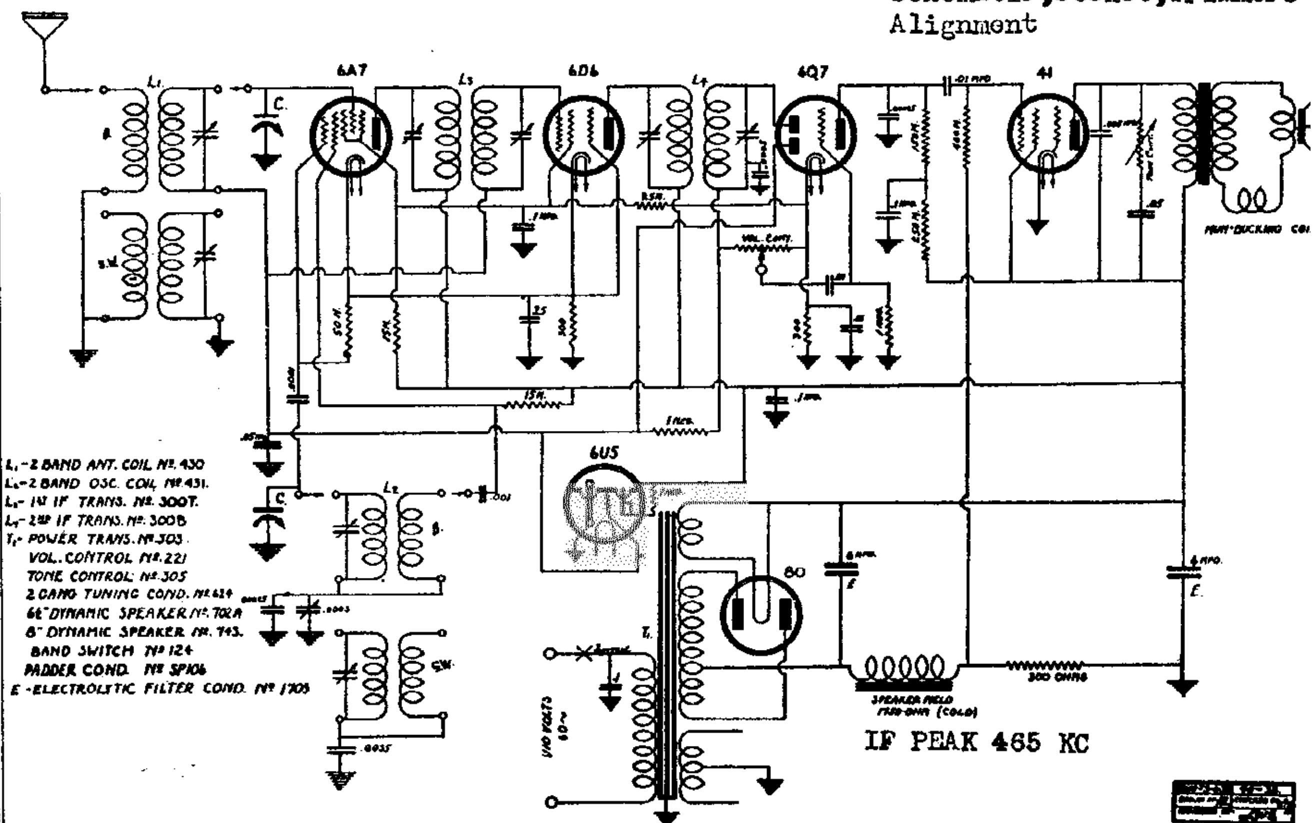
9. With band selector switch placed for operation on the 540 to 1730 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycles R. F. and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

10. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.



SPIEGEL INC.

MODELS 2000,2001,2050,2051
2008,2009,2018,2019
Chassis 40
Schematic,Socket,Trimmers
Alignment



ALIGNMENT DATA

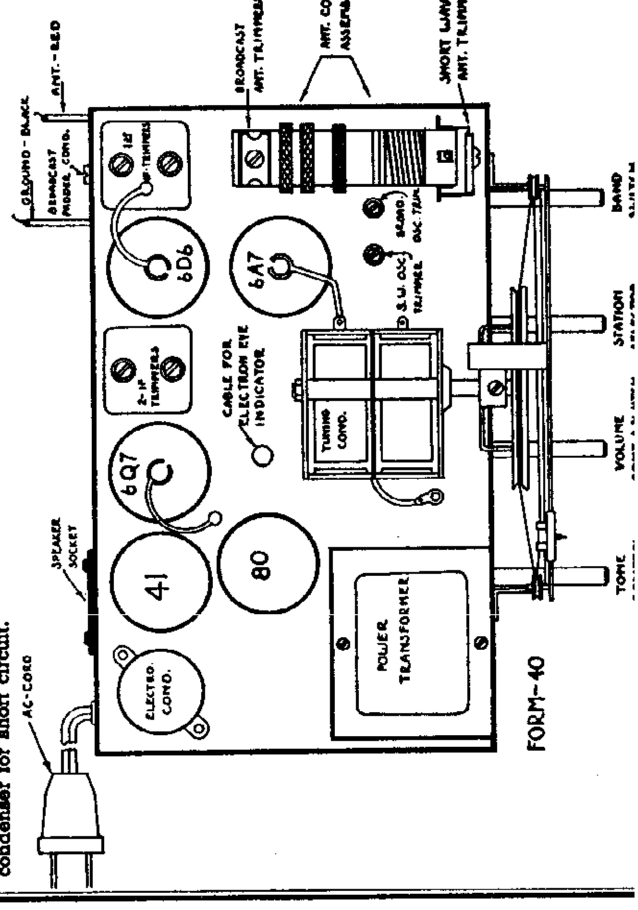
The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.



MODELS 2000,2001,2050,2051
2008,2009,2018,2019
MODELS 2064,2065,4014,4064
4066 (1937)

SPIEGEL INC.

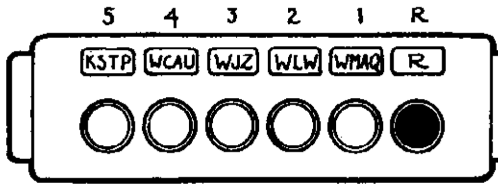
MODELS 2070,2071,4076 (1937)
Tunor Data

MODELS 2000, 2001, 2050, 2051, 2008, 2009, 2018, 2019 Chassis 40

Push Button Station Selector

ADJUSTMENT

The five stations wanted should be decided upon as this will determine which button must be used. Button number 1 as indicated in figure one is used for stations whose transmitting frequencies are between 920 K.C. and 1500 K.C. (as shown on the dial). Buttons 2 and 3 for stations whose frequencies are between 750 and 1400 K.C. Button number 4 for stations whose frequency is from 590 to 1150 and button 5 for those stations whose frequencies are between 540 and 1000 K.C.



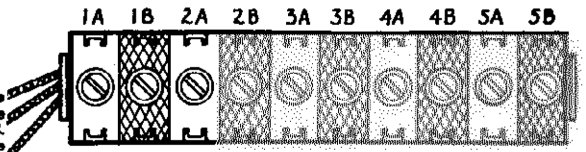
FRONT VIEW FIGURE I
Fig. 1

If a desired station falls in the range of button 1, tune the radio to this station with the colored button on the push button control panel pressed in (this button releases the automatic tuner and provides for manual tuning of the receiver.)

Press in button 1 and with a screw driver turn adjusting screw 1B as shown in figure 2 until this same station is heard, then turn screw 1A until the station is heard with maximum volume as indicated by the closing of the electric eye on the front panel. Carefully re-adjust 1A and 1B again for maximum volume.

DO NOT FORCE the screws as the threads may be sheared and rendered useless. This may happen if you do not observe what range the station falls into, and thus use the wrong push button.

Proceed with button 2 in a similar way, first pressing in the manual tuning button and tuning to the desired station then pressing button 2 and adjusting screws 2B and 2A to the same program. Buttons 3, 4, and 5 are adjusted in a similar manner using screws 3B and 3A for the third button; 4B and 4A for the fourth button, etc.



CONNECTIONS TO CHASSIS. REAR VIEW FIGURE 2
Fig. 2

NOTE:—In some models the odd color release button is located to the extreme left instead of to the right as indicated in figure one. Thus if the release button is to the extreme left the adjustment screws in figure 2 are reversed. Reading from left to right they become 5B-5A-4B-4A etc.

CAUTION

It is important that the adjustments be carefully made otherwise the reception of the radio station will be distorted and lacking in volume. In some instances it is advisable to re-adjust all the screws a few days after the initial setting to compensate for any drift due to room temperature, humidity, etc.

OPERATION

For manual tuning, press the release button and proceed to tune stations in the usual manner with the station selector knob.

Do not attempt to press more than one button at a time as this will not tune any additional stations. Although this will not in any way injure the unit, it may result in the radio receiver squealing and having excessive interference.

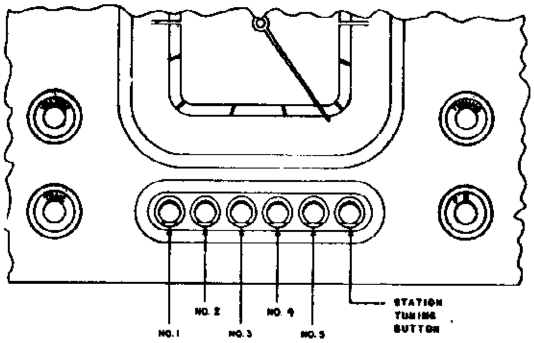
To operate the automatic station tuning control it is only necessary to press in any one of the five station tuning buttons. This automatically disengages the manual tuning control from the electrical circuit. Thus it is possible to leave the dial tuned to any station and yet use the automatic push button station selector.

THE ODD COLORED RELEASE BUTTON SHOULD ALWAYS BE IN WHENEVER THE REGULAR TUNING KNOB IS USED TO SELECT THE STATIONS.

Station Call Letters may be inserted in the spaces provided and can be changed at will.

MODELS 2064, 2065, 4014, 4064, 4066 (1937) Chassis 745
MODELS 2070, 2071, 4076 (1937) Chassis 1105

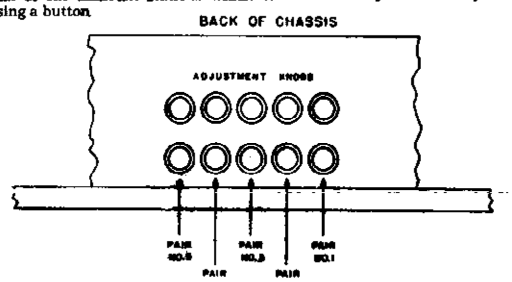
FRONT OF CABINET



PUSH BUTTONS

If desired the tuning dial may be left set to a station which is not set up on one of the buttons. The "Dial Tuning" button will then tune in this station when it is pressed. This will give an extra Instamatic tuned station, making a total of six different stations which can be instantly tuned in by simply pressing a button.

BACK OF CHASSIS



The approximate frequency coverage of each of the "Instamatic" control buttons is as follows:

1—Stations between 540 and 1000 KC.
2—Stations between 540 and 1000 KC.
3—Stations between 750 and 1200 KC.
4—Stations between 750 and 1200 KC.
5—Stations between 1000 and 1500 KC.

INSTAMATIC TUNING

The purpose of Instamatic tuning is to give the user instant, automatic tuning of any one of a selection of favorite broadcast stations. The control buttons are conveniently located just below the tuning dial. Pushing in any button will release any other button which happens to be already in. After the Instamatic tuning feature has been properly adjusted, this will instantly and automatically tune in the station selected by this button.

Before attempting to adjust or use Instamatic tuning, the "Installation" and "Operation" instructions must be carefully followed. When the receiver is operating satisfactorily using the tuning dial with the "Dial Tuning" button pressed in, the Instamatic feature may be easily adjusted by carefully following these instructions.

Located on the back of the chassis is a row of five pair of small bakelite adjustment knobs. Each pair of these knobs controls the tuning of the station for the Instamatic button which is in the same relative position.

With the receiver operating with the "Dial Tuning" button in and the wave switch on broadcast position, turn the tuning knob to the left until the 540 KC end of the band has been reached. Then turn the tuning knob to the right until a station, for which it it desired to have Instamatic tuning, is heard. Press in the Button No. 1. This is the button at the left hand end of the row. Reach around to the back of the receiver and turn upper knob of the Pair No. 1 until the same program is heard. Unless the wrong knob is being turned, several different stations will be heard during this procedure. If necessary to check that the same program is now tuned in, the "Dial Tuning" button may again be pressed. In this way it can be determined that the same station is tuned in with the Instamatic button as when the "Dial Tuning" button is in. If it is not the same station the adjustment knob should be turned again and these operations repeated until the same program is heard when either of these two buttons is pressed.

The bottom adjustment knob of the first pair is now turned until the station is heard the best. Both top and bottom knobs may then be adjusted to exact tuning by watching the magic eye and adjusting until the two edges of the green section are as close together as it is possible to get them.

The first Instamatic button is now properly adjusted for the station which was tuned in on the dial and the station's call letters may be pushed out of the station list, moistened on the back, and pressed into the hollow end of the button.

With the "Dial Tuning" button pressed in, the tuning knob is again turned to the right until the next station for which Instamatic tuning is wanted, is tuned in. The adjustment process for this station is the same as before, except that Button No. 2 and Pair No. 2 adjustment knobs are used. Proceeding in this way all five of the buttons may be properly adjusted for the stations desired.

It must be remembered that the "Dial Tuning" button must be pressed in whenever it is desired to tune in stations with the tuning knob, regardless of which wave band is in use. It must also be remembered that the wave switch must be in the broadcast position when Instamatic tuning is being used.

SPIEGEL INC.

MODELS 2060,2061,4056,4074
Chassis 16R
Socket,Trimmers,Tuner Data
Alignment

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner. The electric tuner is made up of three integral units:

PUSH BUTTON SWITCH The push button switch consists of one (1) white button (extreme left), and eight (8) brown buttons whose numerical sequence is reckoned from left to right. The white button is provided for converting the set from automatic electric push button tuning to manual knob tuning. The brown buttons are provided for automatic electric tuning.

SELECTOR MECHANISM The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

ELECTRIC MOTOR The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch and a silent gear train. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the white button; tune in the station of the lowest frequency, using the station selector knob. Now hold the white button in and press in button number one (1), next to the white button. (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call block and insert into the window directly above button number one (1). Now release button number one (1) by pressing the white button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two (2). Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call into the window of button number two (2).

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. NOTE: In the window above the white button insert the word "OFF" found in the call letter sheet.

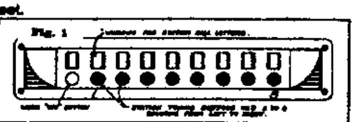


Fig. 1

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the white button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. Note: Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above. If by chance all of the buttons are pressed in, they may be released by pressing any one button all the way in.

To change from electric tuning to manual selecting, simply press in the white button. When the white button is in, the set may be tuned as a conventional receiver. Note: If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast the station last selected by button will automatically tune in by itself.

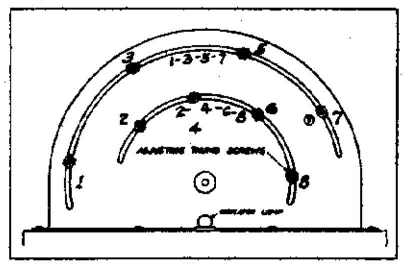
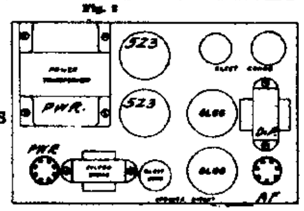
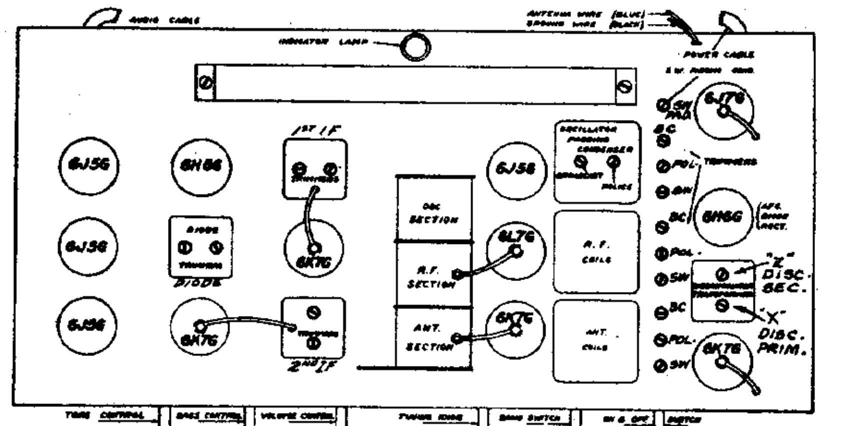


Fig. 2

POWER CHASSIS



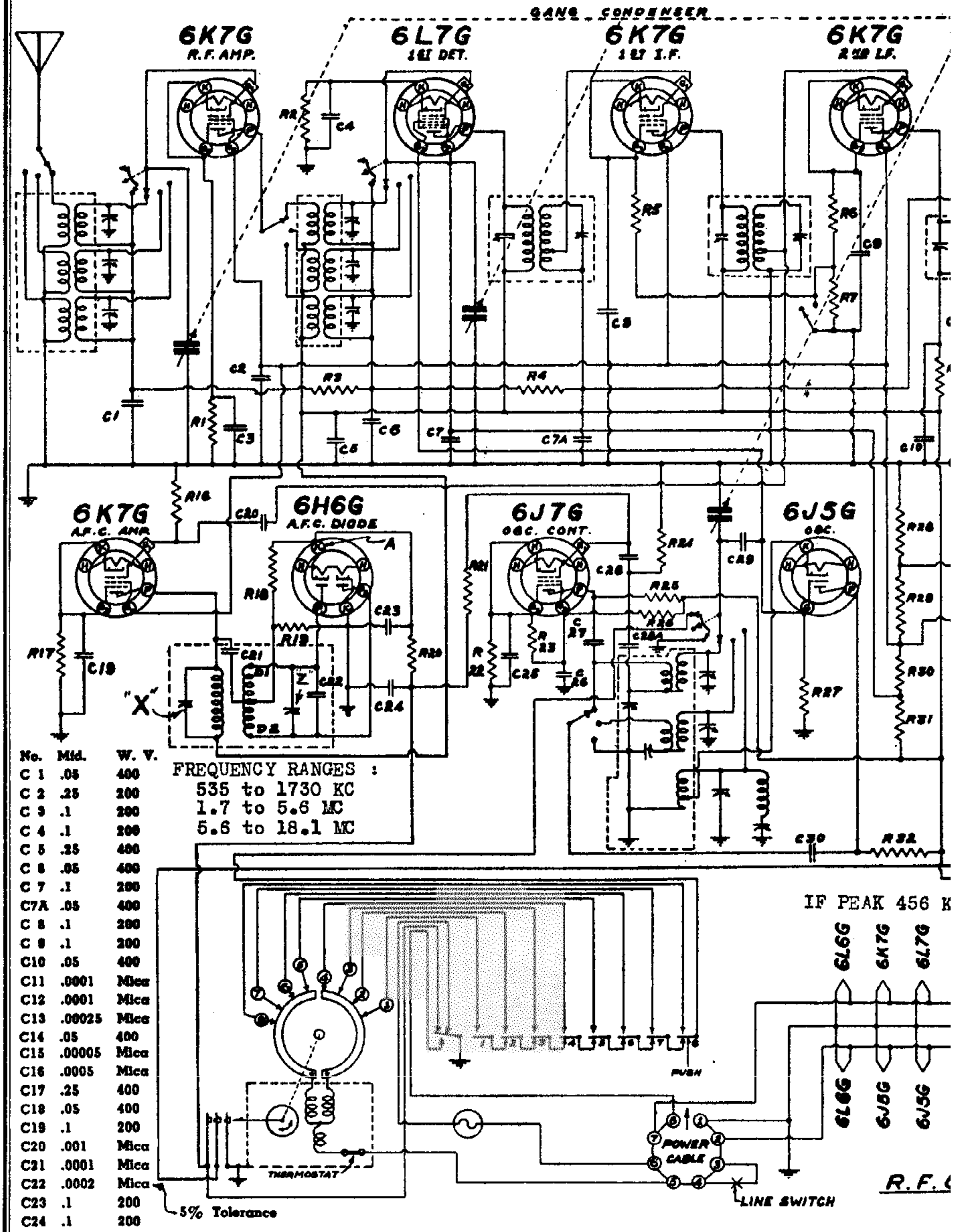


I.F. ALIGNMENT - Generator at 456 KC, connected to control grid of 6L7 thru .05 MFD condenser, align 1st, 2nd, and Diode transformer trimmers to peak. Connect a 0-200 microammeter between the ungrounded cathode of the 6H6 AFC diode rectifier, and ground. The Cathode indicated as point "A" in the schematic. Place a 100 MMFD condenser across the secondary of the discriminator transformer. These terminals are indicated as points "D1" and "D2" on the schematic. The condenser is used to detune the secondary circuit during the following primary adjustment : The primary is tuned by impressing an IF signal on the signal grid of the 6L7 and adjusting the trimmer marked "X" on the schematic and the chassis layout, to give a maximum meter indication. Signal strength should be approximately 100000 micro volts for the adjustment. With reduced signal strength repeat the adjustments of the entire I.F. system, for maximum sensitivity. The volume control should be on full for all adjustments. Without disturbing the generator or any of the other adjustments, the trimmer "Z" ("Disc. Sec.) should be adjusted as follows :Remove the 100 MMFD condenser from across the discriminator secondary, increase the generator signal to approximately 100,000 micro volts, with volume control turned down to limit audio output, slowly turn the trimmer "Z" until a sudden sharp drop in current occurs the meter will now probably read in reverse and off scale. Reverse trimmer adjustment bringing meter reading to zero. Used only a non-metallic screw driver. It is sometimes convenient to use an offset of "remote zero" setting of the micro ammeter in making the adjustments so that zero current setting is higher on the scale. After the current has been brought to zero by the above described method the I.F. alignment and discriminator tuning is completed, and R.F. alignment may be accomplished.

BROADCAST BAND - Generator at 1730 KC, connected to the antenna thru a 200 MMFD condenser, variable condenser at minimum, peak oscillator trimmer. Generator at 1400 KC, tuning in signal, peak the RF and antenna trimmers. Generator at 600 KC, while rocking variable condenser, peak the oscillator padding condenser.

POLICE BAND - Generator at 5600 KC, connected to antenna thru 400 Ohm resistor, variable condenser at minimum, peak oscillator trimmer. Generator at 5000 KC, tune in signal, peak RF and antenna trimmers. Generator at 1800 KC, while rocking variable across signal, pad the oscillator circuit for maximum response.

SHORTWAVE BAND - Generator at 18100 KC, gang condenser at minimum, peak oscillator trimmer. Generator at 16000 KC, locate signal on receiver, peak RF and antenna trimmers. Generator at 6000 KC. while rocking variable across signal, peak SW padding condenser.



No.	Mfd.	W. V.
C 1	.05	400
C 2	.25	200
C 3	.1	200
C 4	.1	200
C 5	.25	400
C 6	.05	400
C 7	.1	200
C7A	.05	400
C 8	.1	200
C 9	.1	200
C10	.05	400
C11	.0001	Mica
C12	.0001	Mica
C13	.00025	Mica
C14	.05	400
C15	.00005	Mica
C16	.0005	Mica
C17	.25	400
C18	.05	400
C19	.1	200
C20	.001	Mica
C21	.0001	Mica
C22	.0002	Mica
C23	.1	200
C24	.1	200

5% Tolerance

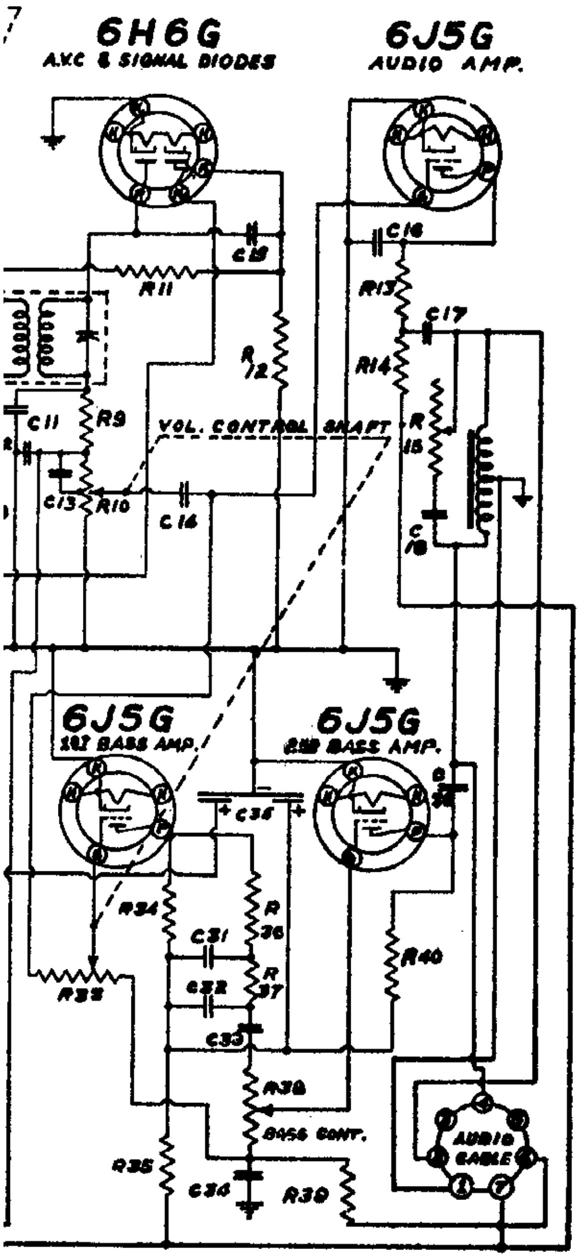
FREQUENCY RANGES :
535 to 1730 KC
1.7 to 5.6 MC
5.6 to 18.1 MC

EL INC.

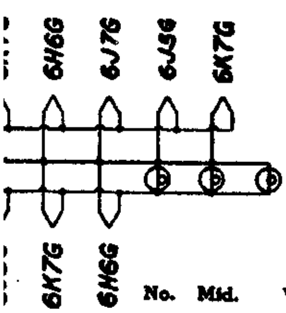
MODELS 2060,2061,4056,4074
Chassis 16R
Schematic

No.	Ohms	Watts	
R 1	750	¼	10% Tolerance
R 2	700	¼	10% Tolerance
R 3	250,000	¼	
R 4	250,000	¼	
R 5	750	¼	10% Tolerance
R 6	750	¼	10% Tolerance
R 7	600	¼	10% Tolerance
R 8	5,000	¼	
R 9	20,000	¼	
R10	250,000	Volume Control	
R11	1 Meg.	¼	
R12	1 Meg.	¼	
R13	7,000	¼	10% Tolerance
R14	25,000	¼	
R15	250,000	Tone Control	
R16	2 Meg.	¼	
R17	750	¼	10% Tolerance
R18	500,000	¼	
R19	500,000	¼	
R20	2 Meg.	¼	
R21	500,000	¼	
R22	1,100	¼	5% Tolerance

No.	Ohms	Watts	
R23	25,000	½	10% Tolerance
R24	350	¼	10% Tolerance
R25	25,000	¼	
R26	35,000	1	
R27	50,000	¼	
R28	450	¼	10% Tolerance
R29	2,400	Sections of Met ' Clad Resistor	
R30	2,250		
R31	2,260		
R32	25,000	1	
R33	500,000	Bass Control (Section)	
R34	25,000	¼	
R35	10,000	¼	
R36	10,000	¼	
R37	20,000	¼	
R38	500,000	Bass Control (Section)	
R39	500,000	Bass Control (Section)	
R40	25,000	Bass Control (Section)	
R41	31	Sections of Metal Clad Resistor	
R42	150		
R43	15,000	2	



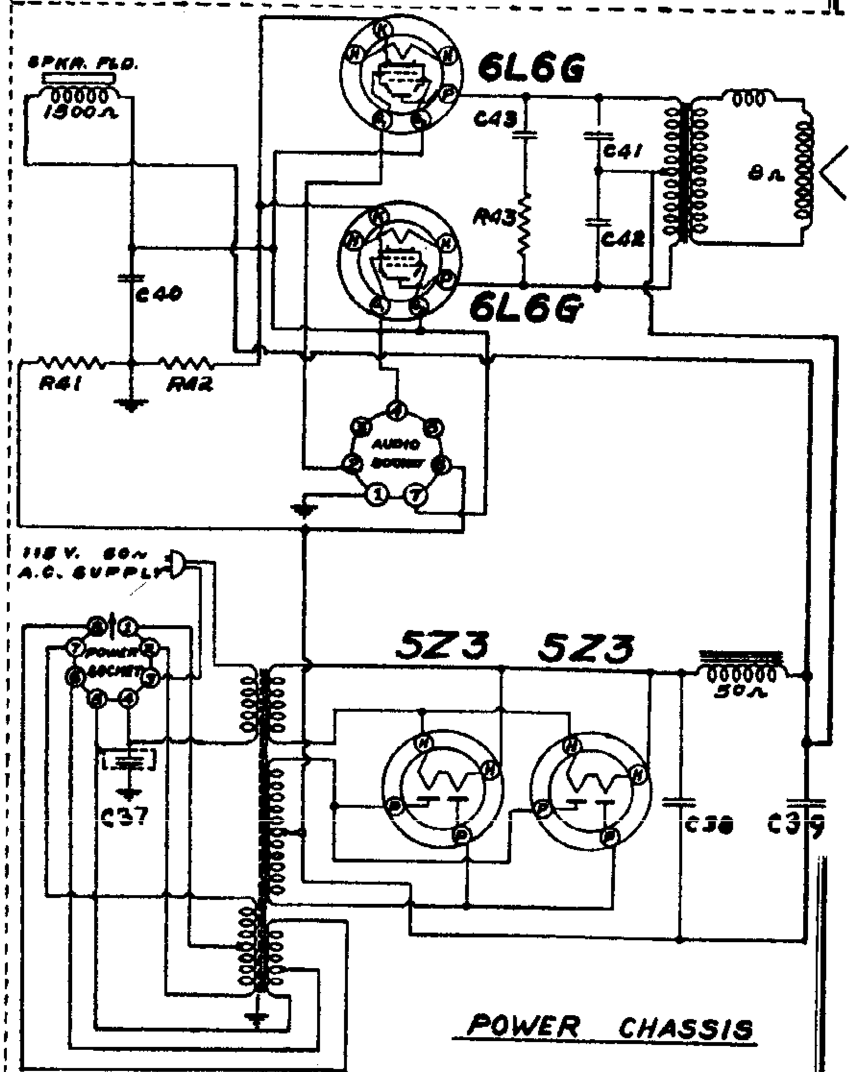
MODEL 16R



No.	Mfd.	W. V.
C25	.1	200
C26	.1	200
C27	.002	600
C28	.001	Mica
C29	.0001	Mica

No.	Mfd.	W. V.	
C30	.002	Mica	
C31	.05	Mica	
C32	.1	400	
C33	.1	400	
C34	.25	200	
C35	4	100	Dry Electrolytic
	4	250	
C36	.25	400	
C37	.02	600	
C38	25.	450	Wet Electrolytic
C39	12.	450	
C40	25.	300	
C41	.002	600	
C42	.002	600	
C43	.01	1000	

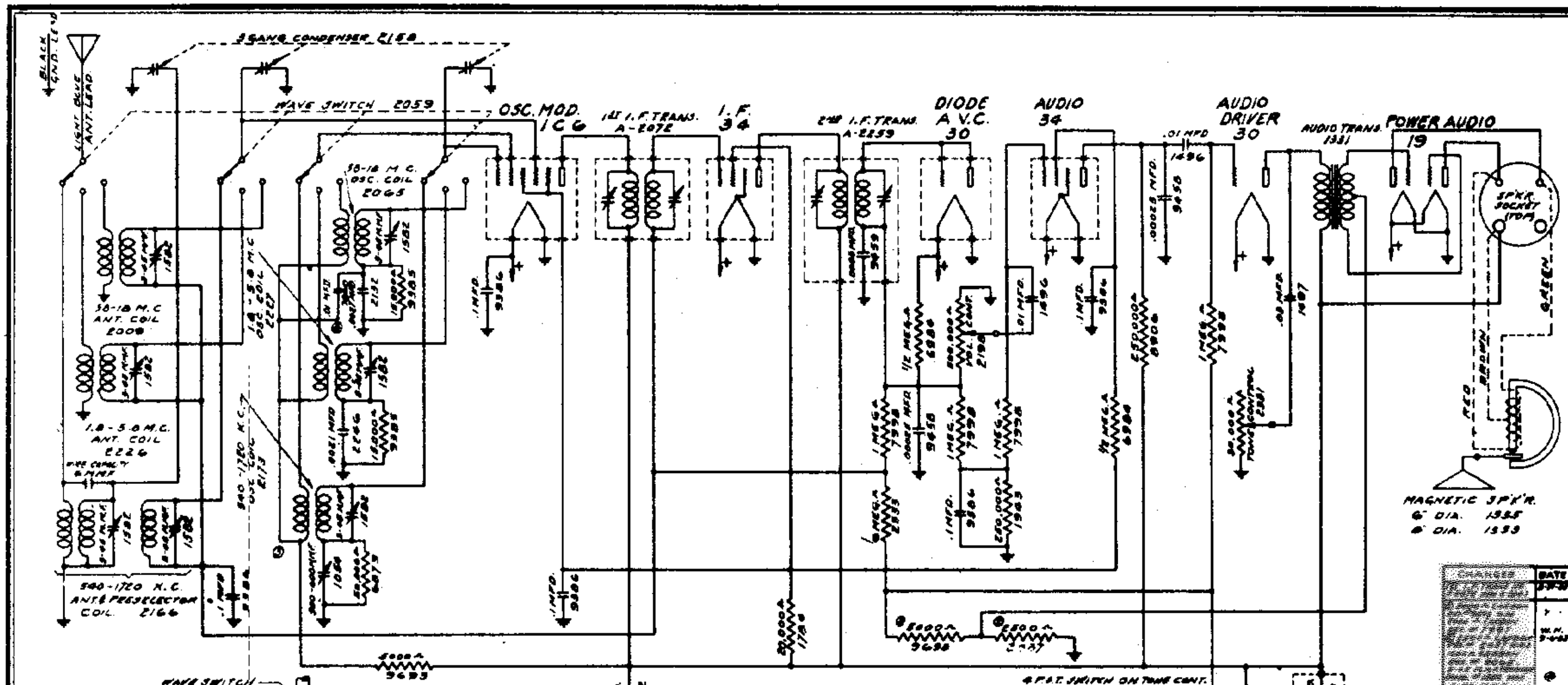
ASSIS

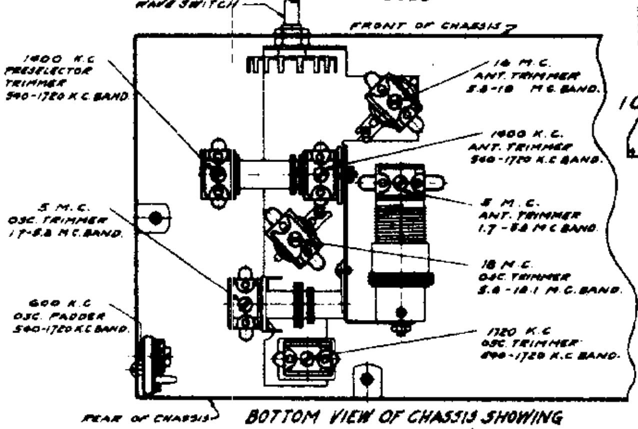


POWER CHASSIS

MODELS 1906, 1954
Chassis 39B
Schematic, Trimmers
Alignment

SPIEGEL INC.





BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS.

NOTE

1. I.F. = 465 K.C.
2. Numbers shown relative to parts are our part numbers.
3. Numbers shown with prefix "A" are complete assemblies.

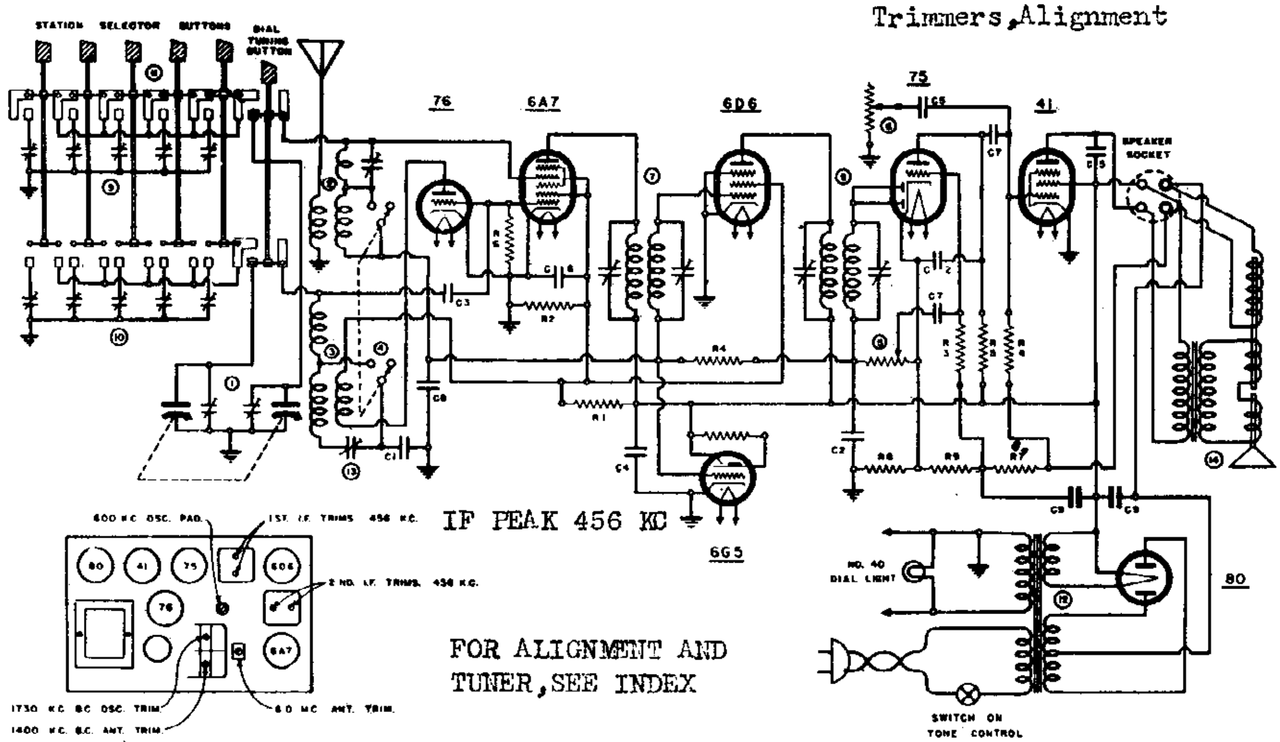
FREQUENCY RANGE -
1720 to 540 KC
1.7 to 5.8 MC
5.8 to 18.1 MC

CONVENTIONAL ALIGNMENT
see special section VOL. VIII.

ALIGNMENT - Peak I-F trimmers at 465 KC. After all adjustments have been made on receiver, adjust wave trap to 465 KC peak. BROADCAST - Dial and generator to 1720 KC, adjust oscillator trimmer to peak. Dial and generator to 1400 KC, adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. SHORT WAVE POLICE BAND - Dial and generator to 5 MC, peak oscillator trimmer, adjust antenna trimmer to maximum peak. SHORTWAVE FOREIGN BAND - Dial and generator to 18 MC, peak the oscillator trimmer, then shift dial and generator to 16 MC and peak the antenna trimmer. NOTE - Rock the variable condenser during padding adjustment on broadcast band. No padding required on other bands.

SPIEGEL INC.

MODELS 2064, 2065, 4014, 4064
4066 Chassis 745 (1937)
Schematic, Voltage, Socket
Trimmers, Alignment



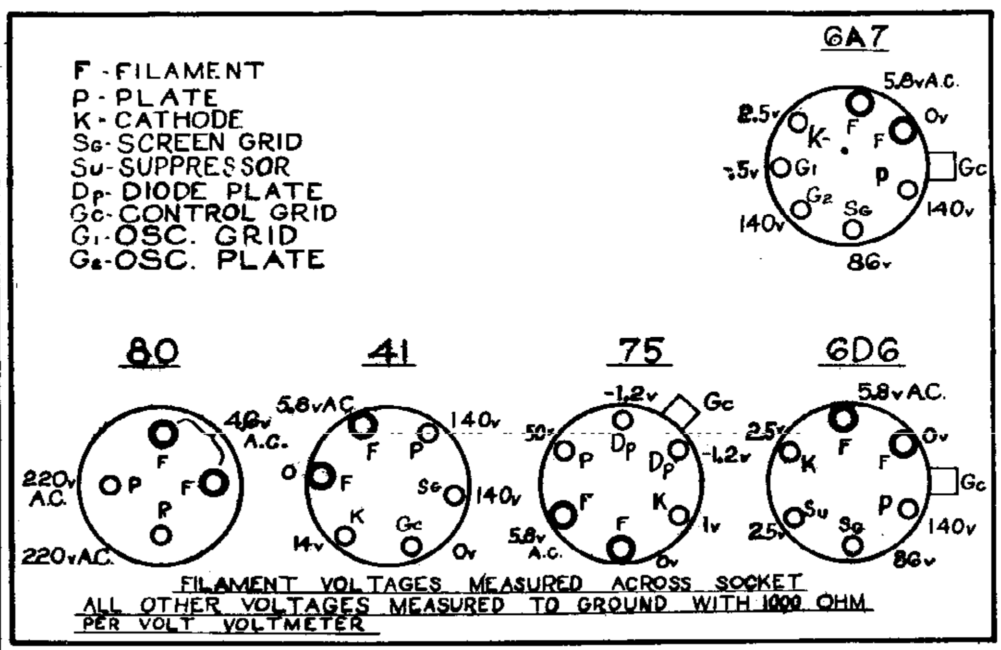
FOR ALIGNMENT AND
TUNER, SEE INDEX

PART NO.		DESCRIPTION
R1	60-152	6000 OHM 2W. CARBON RES.
R2	6117	25,000 - 1/2W - -
R3	6020	2 MEG - 1/3W - -
R4	6018	500,000 - - - -
R5	6024	250,000 - - - -
R6	6028	40,000 - - - -
R7	60-100	200 OHM 1W WIRE WOUND -
R8	60-101	50 - 1/2W - - -
R9	60-104	20 - - - - -

PART NO.		DESCRIPTION
C1	15-101	.00149 MFD. MICA COND. ±5%
C2	1504	.00025 - - -
C3	1503	.00005 - - -
C4	1602	1 MFD. 600V TUBULAR COND.
C5	1651	.004 - - -
C6	1607	.05 - 400V. - -
C7	1603	.01 - - - -
C8	1622	.05 - 200V. - -
C9	18-213	DUAL 8 MFD. 300V. ELECTROLYTIC

PART NO.		DESCRIPTION 745
1	19-113	2 GANG CONDENSER
2	10-173	ANT. COIL
3	10-147	OSC. COIL
4	69-108	WAVE SWITCH
5	24-105	VOLUME CONTROL
6	26-106	TONE CONTROL WITH SWITCH
7	10-201	1ST I.F. TRANSFORMER
8	10-202	2 ND. I.F. "
9	20-106	ANT. TRIMMER STRIP
10	20-107	OSC. - -
11	69-113	PUSH BUTTON SWITCH
12	80-137	POWER TRANSFORMER
13	20-100	OSC. PADDING COND.
14		[illegible]

SOCKET VOLTAGES



DESCRIPTION

This receiver is a 7 tube alternating current operated superheterodyne.

The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I. F. amplifier, a 75 as A. V. C. and audio rectifier and audio voltage amplifier, a 41 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.

This receiver is made to cover 2 tuning bands, the standard broadcast band which ranges from 1730 K.C. to 535 K.C. and the middle or police band which has a frequency range of from 6.4 M.C. to 2.1 M.C.

MODELS 2070,2071,4076
Chassis 1105
Schematic,Voltage
Socket

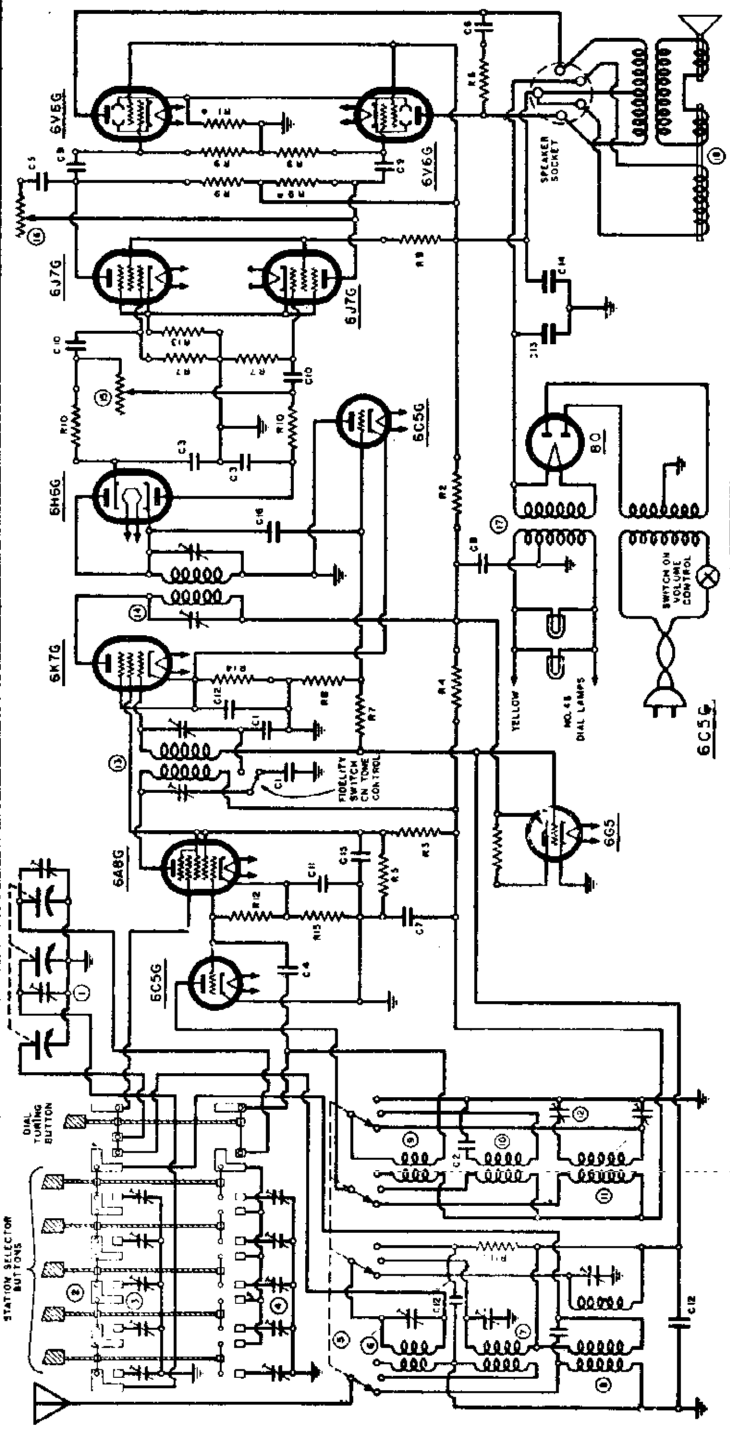
SPIEGEL INC.

DESCRIPTION

This receiver is an 11 tube alternating current operated superheterodyne.

The tubes used are a 6C5G oscillator, a 6A8G modulator, a 6K7G I.F. amplifier, a 6C5G A.V.C. rectifier, a 6H6G detector, a pair of 6J7G audio amplifiers, a pair of 6V6G power amplifiers, an 80 rectifier, and a 6G5 tuning indicator or magic eye.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C., to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 19 M.C. to 5.0 M.C.

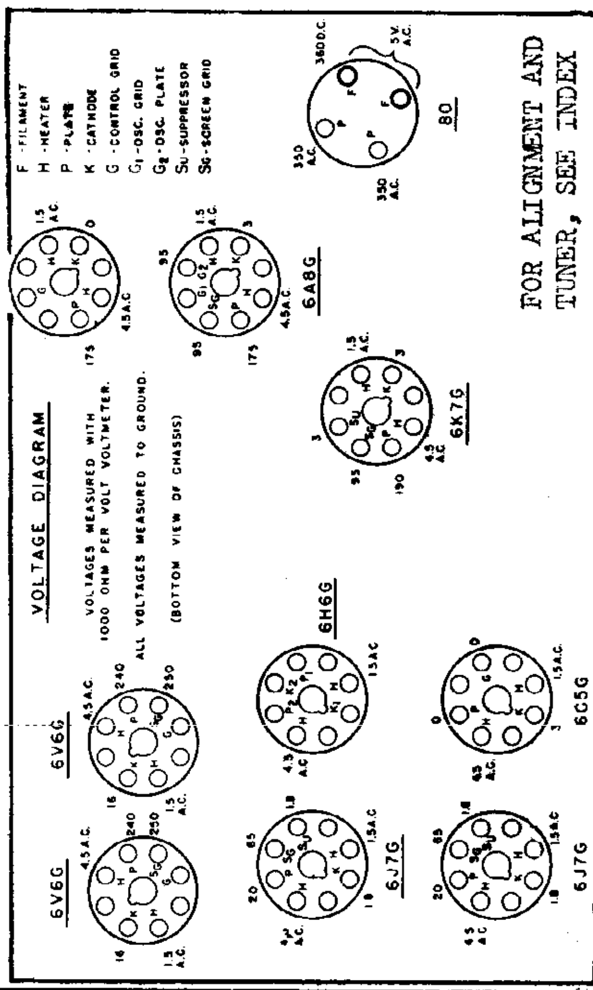


PART NO.		DESCRIPTION	
R1	60-444	250	OHM 2W. WIRE WOUND RES.
R2	60-143	3,000	" 1/2 W. CARBON RES.
R3	6209	5000	" 1W. "
R4	6206	1000	" " "
R5	6117	25,000	" 1/2W. "
R6	6108	10,000	" " "
R7	6017	1.0	MEGOHM 1/3W. "
R8	6018	500,000	OHM " "
R9	6024	250,000	" " "
R10	60-453	110,000	" " " ±5%
R11	6026	100,000	" " "
R12	6025	50,000	" " "
R13	6003	600	" " "
R14	6015	300	" " "
R15	6012	250	" " "

PART NO.		DESCRIPTION	
C1	15-107	.002	MFD. MICA CONDENSER ±1%
C2	15-104	.0011	" " "
C3	1501	.0001	" " "
C4	1510	.000025	" "
C5	1604	.01	" 600V. TUBULAR COND.
C6	16-104	.003	" " " "
C7	1616	.25	" 400V. " "
C8	1601	.1	" " " "
C9	1607	.05	" " " "
C10	1605	.02	" " " "
C11	1600	.1	" 200V. " "
C12	1622	.05	" " " "
C13	18-214	16.0	" 450V. WET ELECTROLYTIC
C14	18-215	12.0	" 350V. " "
C15	18-216	8.0	" 200V DRY "
C16	1503	.000050	" MICA CONDENSER

	PART NO.	DESCRIPTION 1105
1	19-121	3 GANG CONDENSER
2	69-115	6 BUTTON PUSH BUTTON SWITCH
3	20-106	ANT TRIMMER STRIP
4	20-107	OSC " "
5	69-107	WAVE SWITCH
6	10-183	S.W. ANT. COIL
7	10-182	POL. " "
8	10-179A	B.C. ANT & PRESELECTOR COIL
9	10-184	S.W. OSC. COIL
10	10-181	POL " "
11	10-180	B.C. " "
12	20-100	B.C. OSC PAD
13	10-206	1ST. I.F. TRANS
14	10-207	2ND. " "
15	24-115	VOLUME CONTROL WITH SWITCH
16	26-112	TONE CONTROL
17	80-141	POWER TRANS.
18		SPEAKER

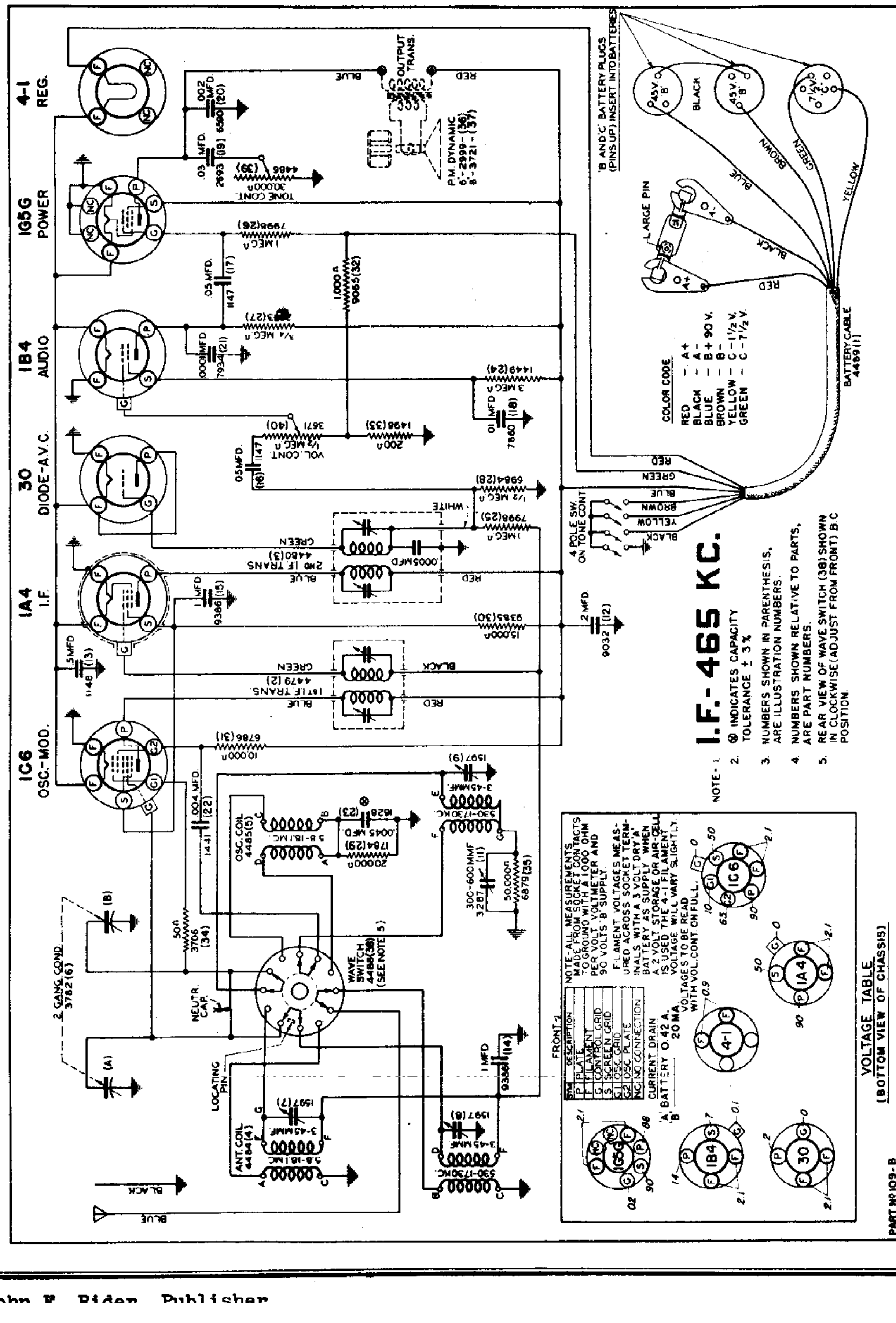
IF PEAK 456 KC



FOR ALIGNMENT AND TUNER, SEE INDEX

SPIEGEL INC.

MODELS 2100 to 2103 inc.,
2150 to 2153 inc.
Chassis 109B
Schematic, Voltage, Socket



MODELS 2100 to 2103 inc.
2150 to 2153 inc.
Chassis 109B
Alignment, Trimmers, Chassis

SPIEGEL INC.

MODELS 2112, 2113, 2120
2121 Chas. 90B
2108 to 2111
Chassis 1090B
Alignment

ALIGNMENT PROCEDURE:

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, low battery voltage, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

THE TRIMMER AND PADDING CONDENSER WILL BE REFERRED TO BY THEIR FUNCTION, AS SHOWN IN PARTS DIAGRAM.

ALIGNING I.F STAGE AT 465 KILOCYCLES:

(a) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid of the 1C6 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 KILOCYCLES and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

ALIGNING 1730-530 KILOCYCLE BAND:

(a) **Check tuning dial adjustment by turning** gang condenser until plates touch maxi**mum capacity stop (completely in mesh)**, at which point the dial needle must be **exactly even with the** last line at the low frequency end of the dial calibration. If **the dial needle does** not point exactly to the last line move needle to correct position.

(b) Remove test oscillator lead from grid of 1C6 tube and connect to receiver antenna lead through a .00025 Mfd. series condenser.

(c) Adjust band selector switch for operation on the 1730-530 kilocycle band.

(d) Set test oscillator frequency and receiver dial to EXACTLY 1730 kilocycles. Turn chassis on end and adjust 1730 kilocycle oscillator trimmer for maximum 1730 kilocycle test oscillator signal sensitivity.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles and adjust 1400 K. C. antenna trimmer for maximum sensitivity.

(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum sensitivity.

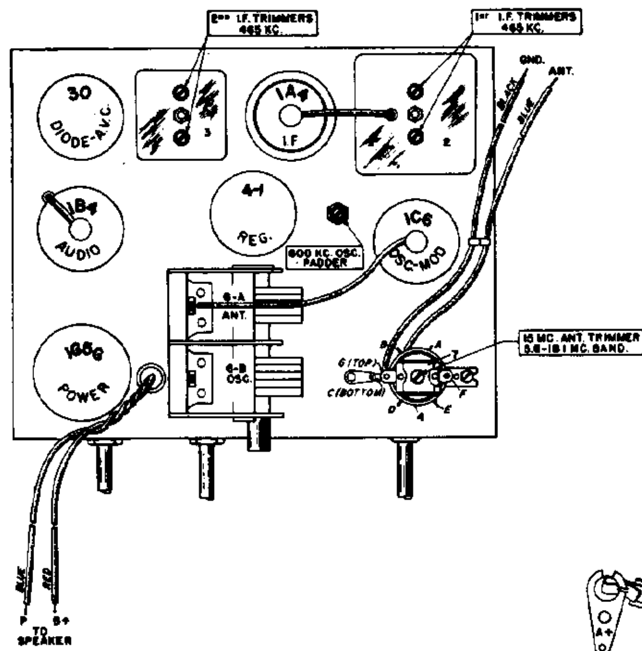
ALIGNING 5.8-18.1 MEGACYCLE BAND:

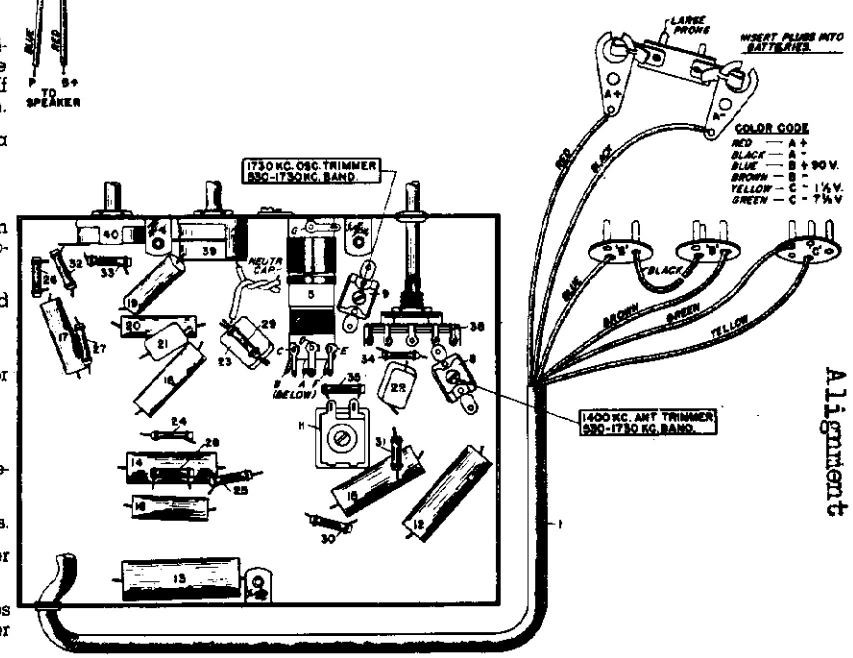
(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor, and place band selector switch for operation on 5.8-18.1 megacycle band.

(b) Tune receiver dial and set test oscillator frequency to approximately 15 megacycles.

(c) Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

To assure more accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

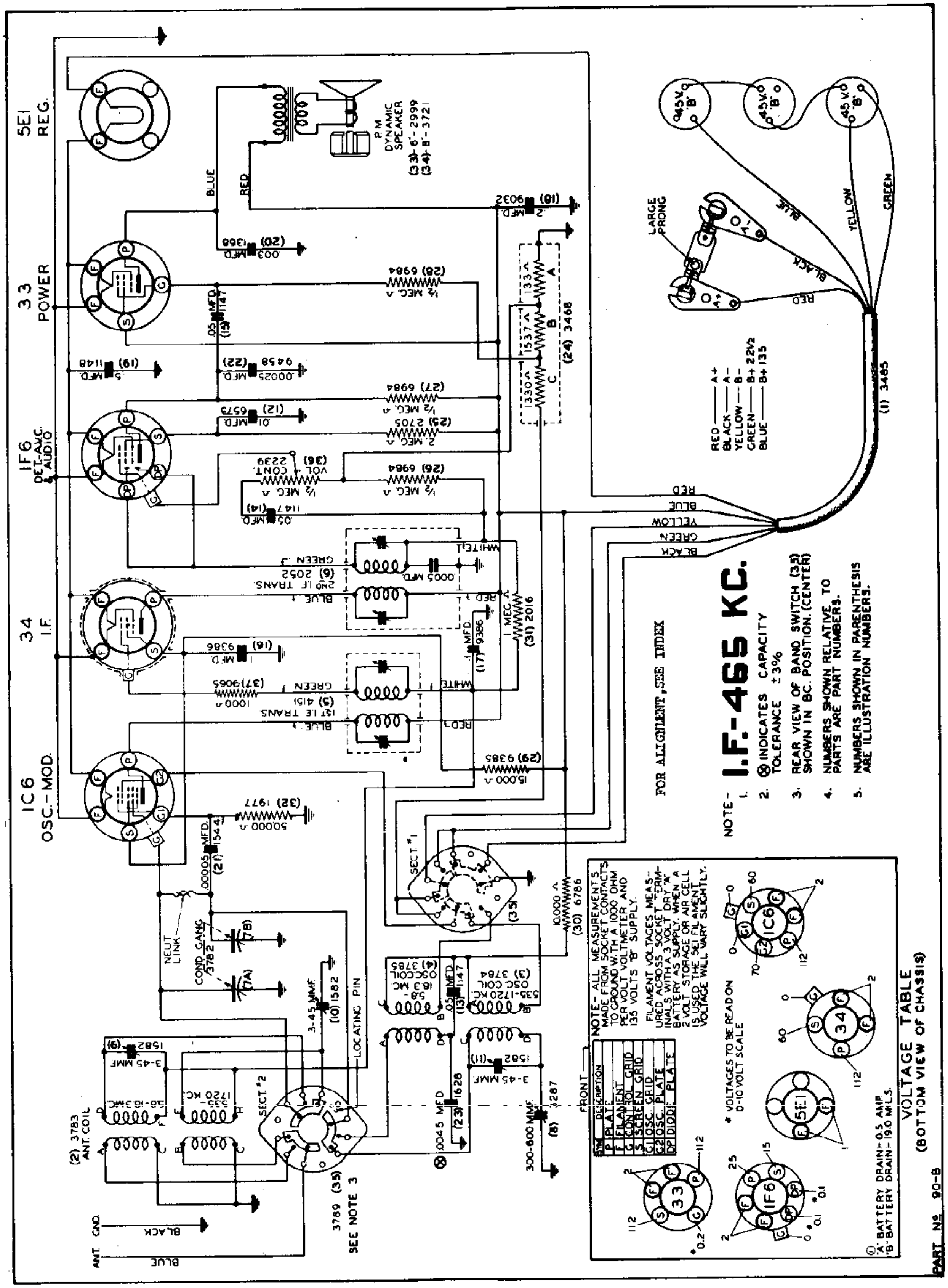




Schematic, Voltage, Socket

SPIEGEL INC.

MODELS 2112, 2113, 2120, 2121 Chassis 90B
2108 to 2111 Chassis 1090B



MODELS 2112, 2113, 2120, 2121
2108 to 2111 incl.
Socket, Trimmers, Chassis

SPIEGEL INC.

MODELS 2070, 2071, 4076
MODELS 4004, 4052
MODEL 4068
Alignment

MODELS 2070 - 2071 - 4076 , 4004 - 4052 , 4068.

ALIGNMENT PROCEDURE

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Press in the dial Tuning button. Models 2070, 2071, 4076 and 4068.

Connect the signal generator to the grid cap of the 6A7 tube through a 1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the signal generator connected to the grid cap of the 6A7, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 15.0 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.

Set the wave switch on broadcast position, turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

grid cap of the 6A8G tube Models 2070, 2071, and 4076.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

MODELS 2064 - 2065 - 4014 - 4064 - 4066.

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

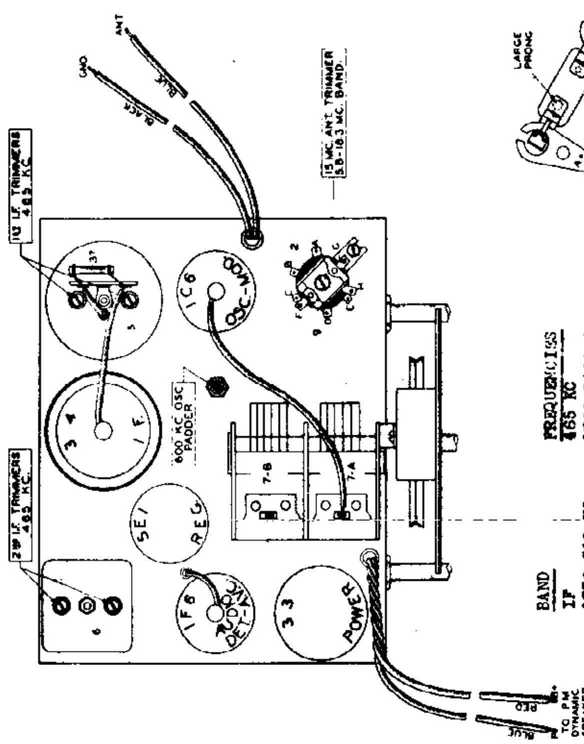
Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position, press in the dial tuning button and set the dial to about 1000 K.C. Then feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

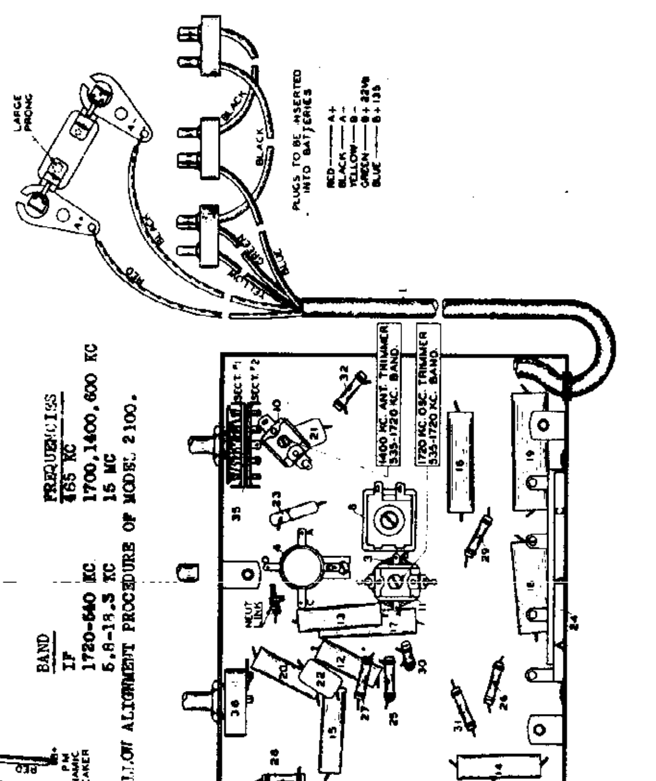
The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave trimmer to maximum output.

MODELS 2112, etc. Chassis 908
MODELS 2108, etc. Chassis 1090B



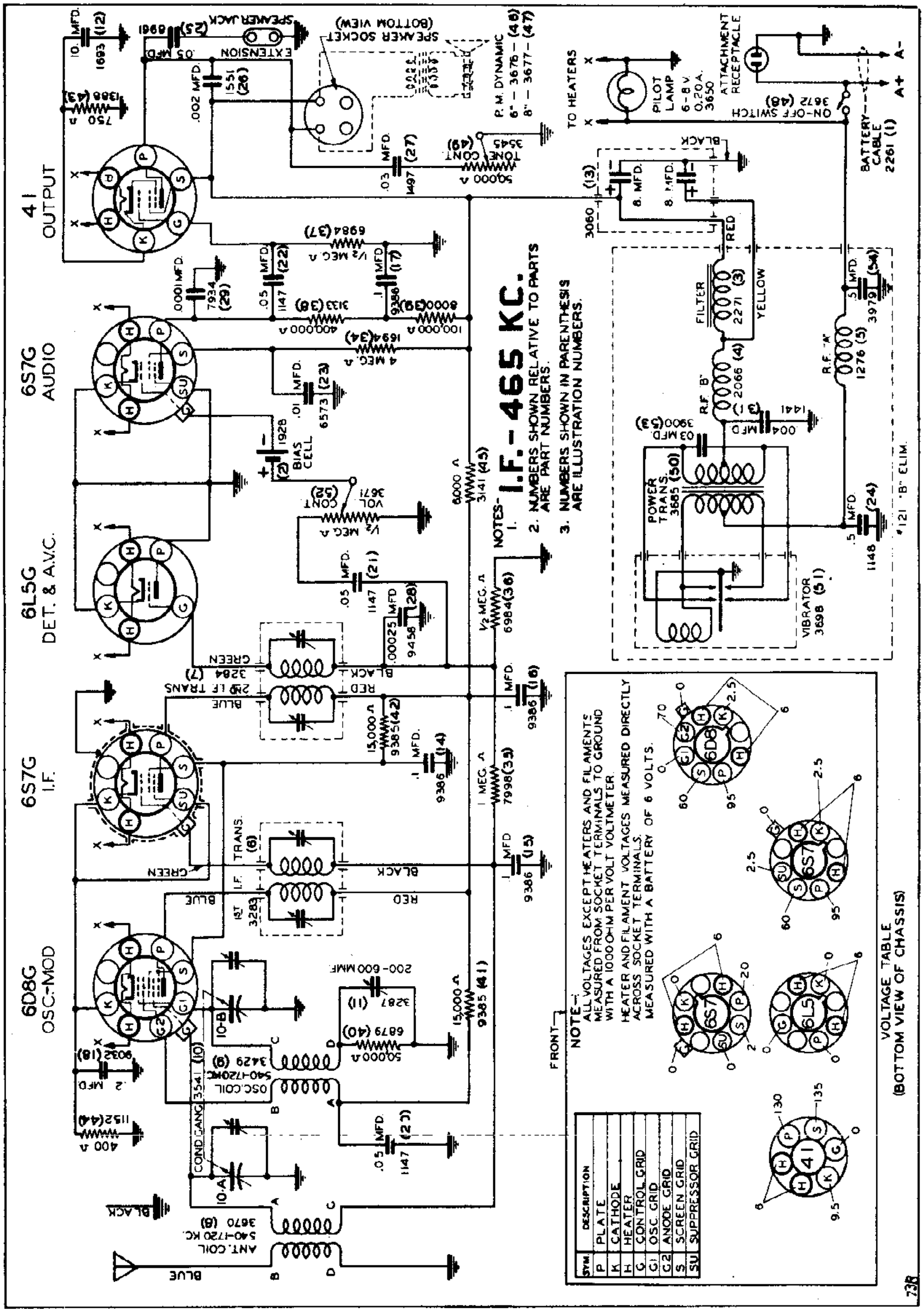
BAND	FREQUENCIES
IF	465 KC
1720-540 KC	1700, 1400, 600 KC
5.8-18.3 KC	15 MC

FOLLOW ALIGNMENT PROCEDURE OF MODEL 2100.



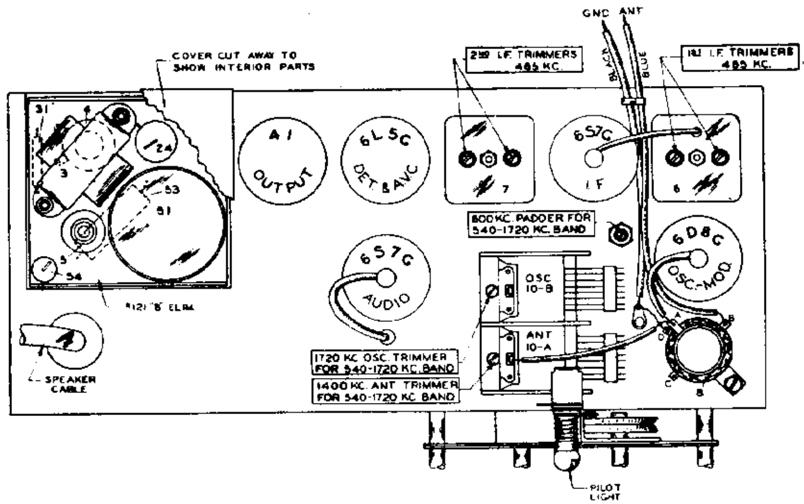
MODELS 2222 to 2229 inc.
Chassis 73B
Schematic, Voltage

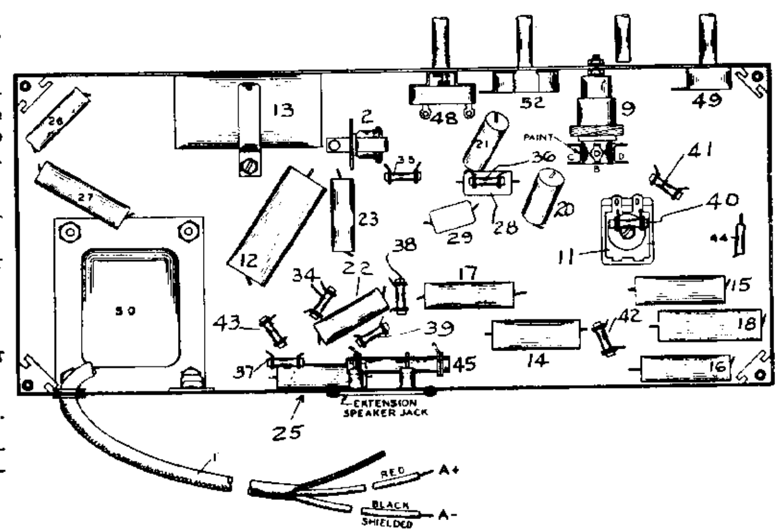
SPIEGEL INC.



MODELS 2222 to 2229 inc.
Chassis 73B
Socket, Trimmers, Chassis
Alignment

SPIEGEL INC.





Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, improperly connected or low battery, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the No. 6D8G modulator tube through a .02 Mfd. condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times, always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING ANTENNA AND OSCILLATOR CIRCUIT:

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.

(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.

(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the condenser is the oscillator section.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.

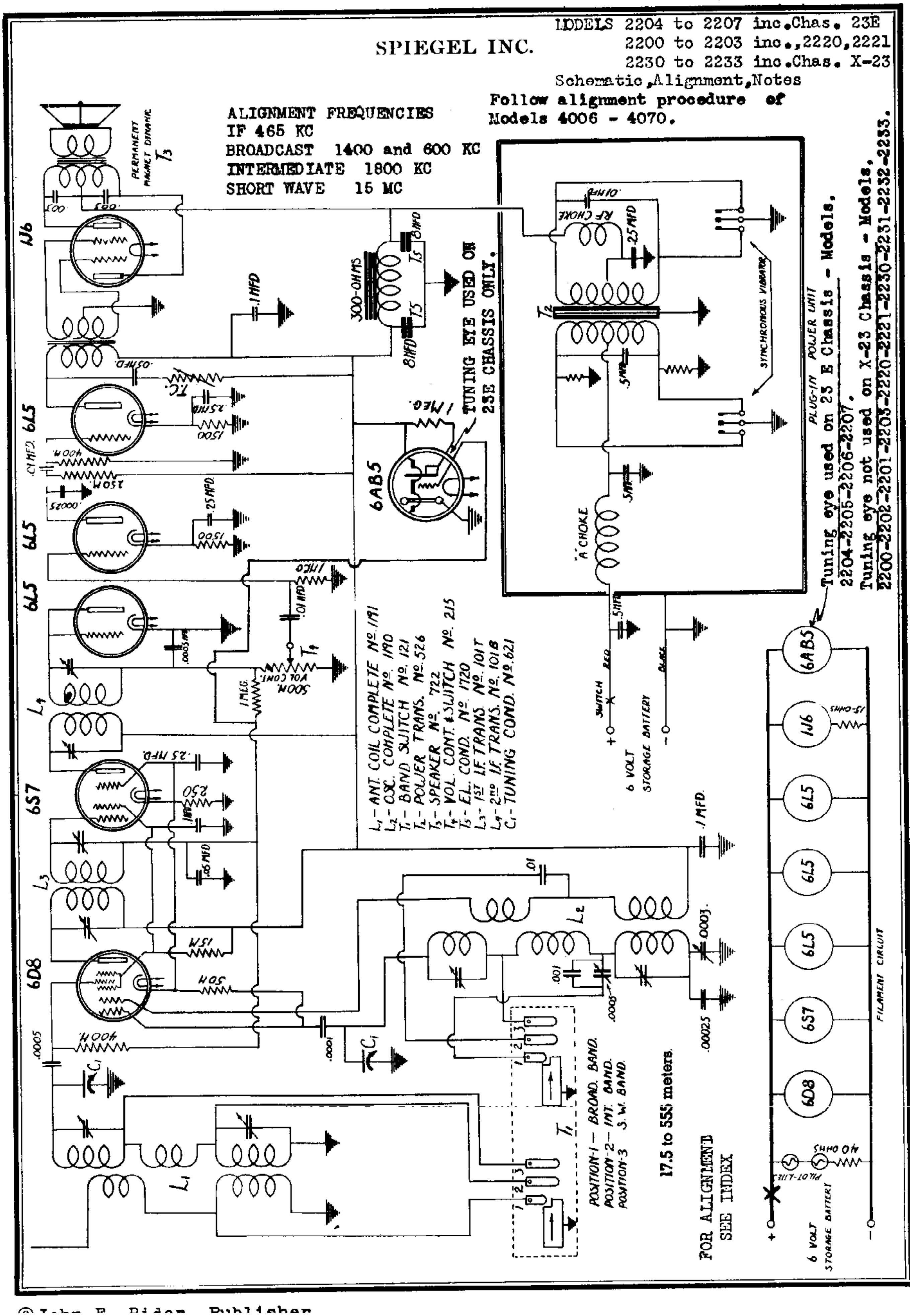
(h) While rocking the tuning condenser back and forth adjust 600 K.C. oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

SPIEGEL INC.

MODELS 2204 to 2207 inc. Chas. 23E
2200 to 2203 inc., 2220, 2221
2230 to 2233 inc. Chas. X-23
Schematic, Alignment, Notes

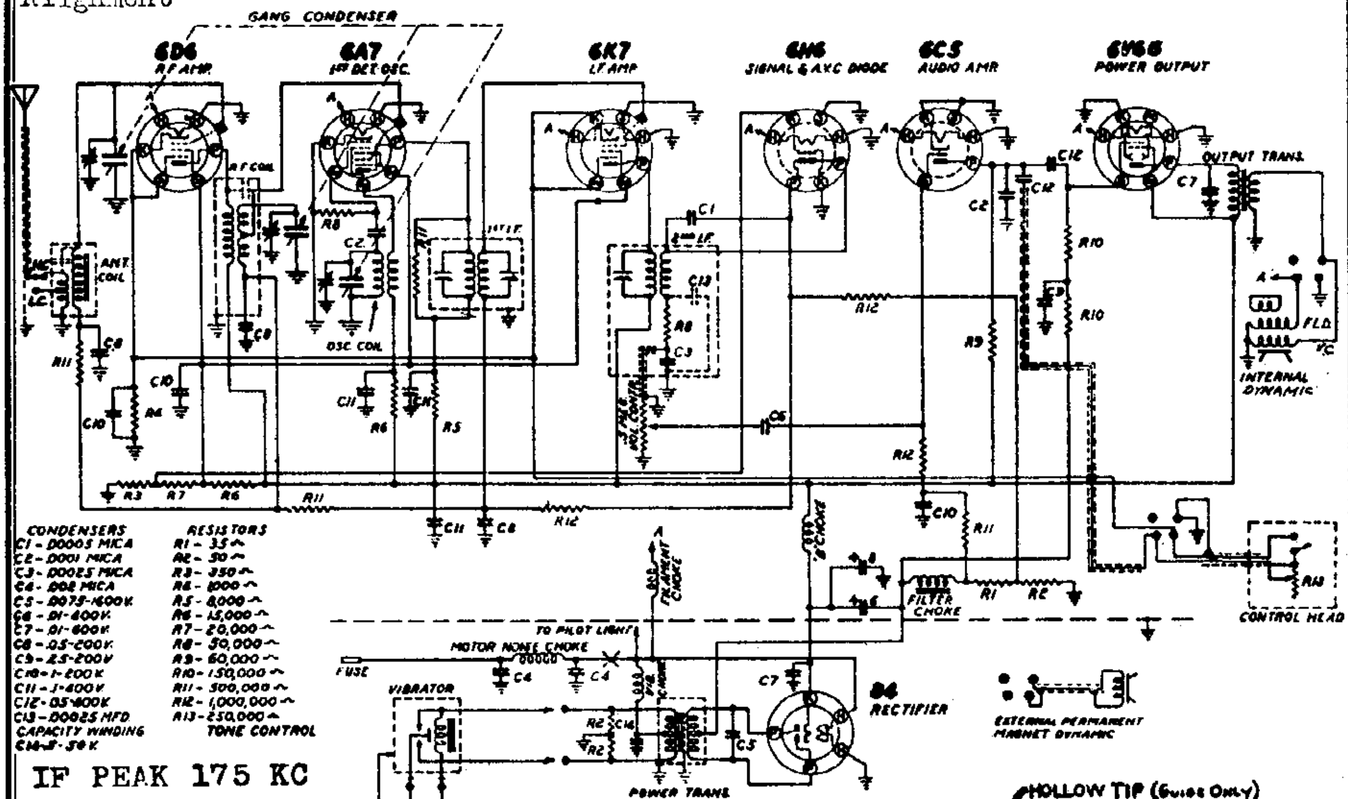
Follow alignment procedure of Models 4006 - 4070.

ALIGNMENT FREQUENCIES
IF 465 KC
BROADCAST 1400 and 600 KC
INTERMEDIATE 1800 KC
SHORT WAVE 15 MC

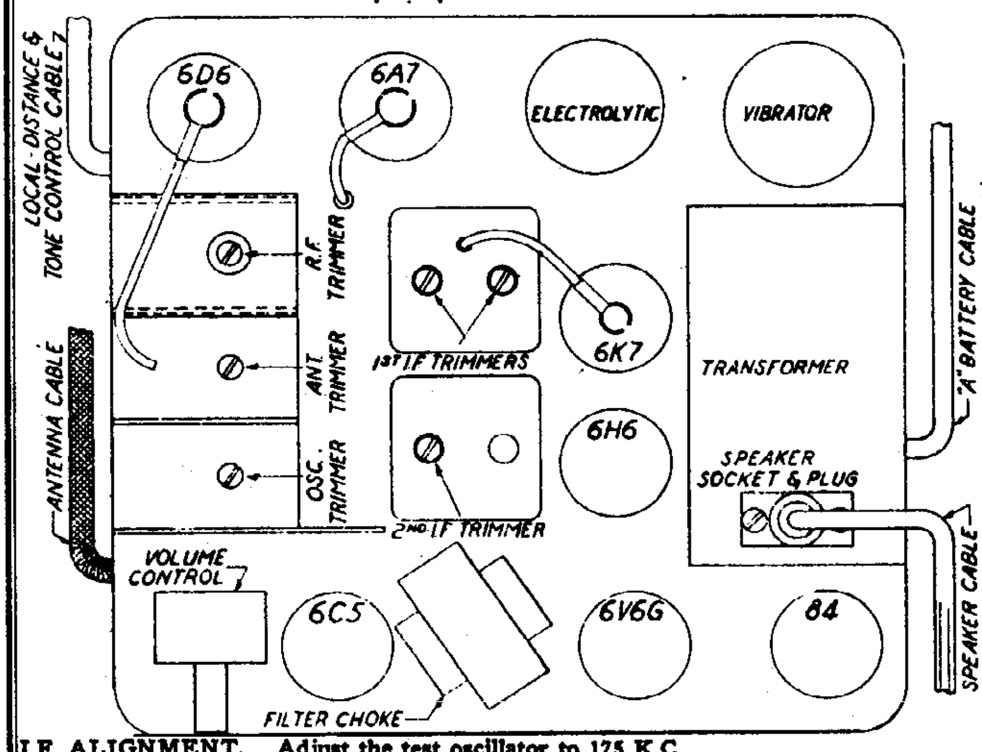


MODELS 2302,2303 Chas.78-780
Schematic,Socket,Trimmers
Alignment

SPIEGEL INC.



IF PEAK 175 KC



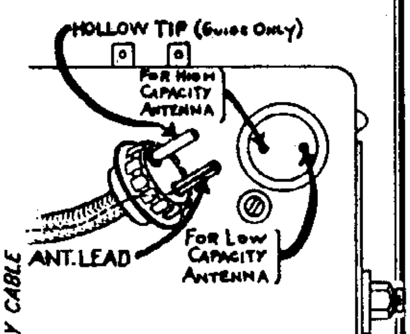
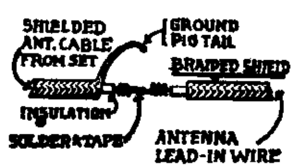


FIG. 17



7-Tube Auto Radio—
78-780 Chassis

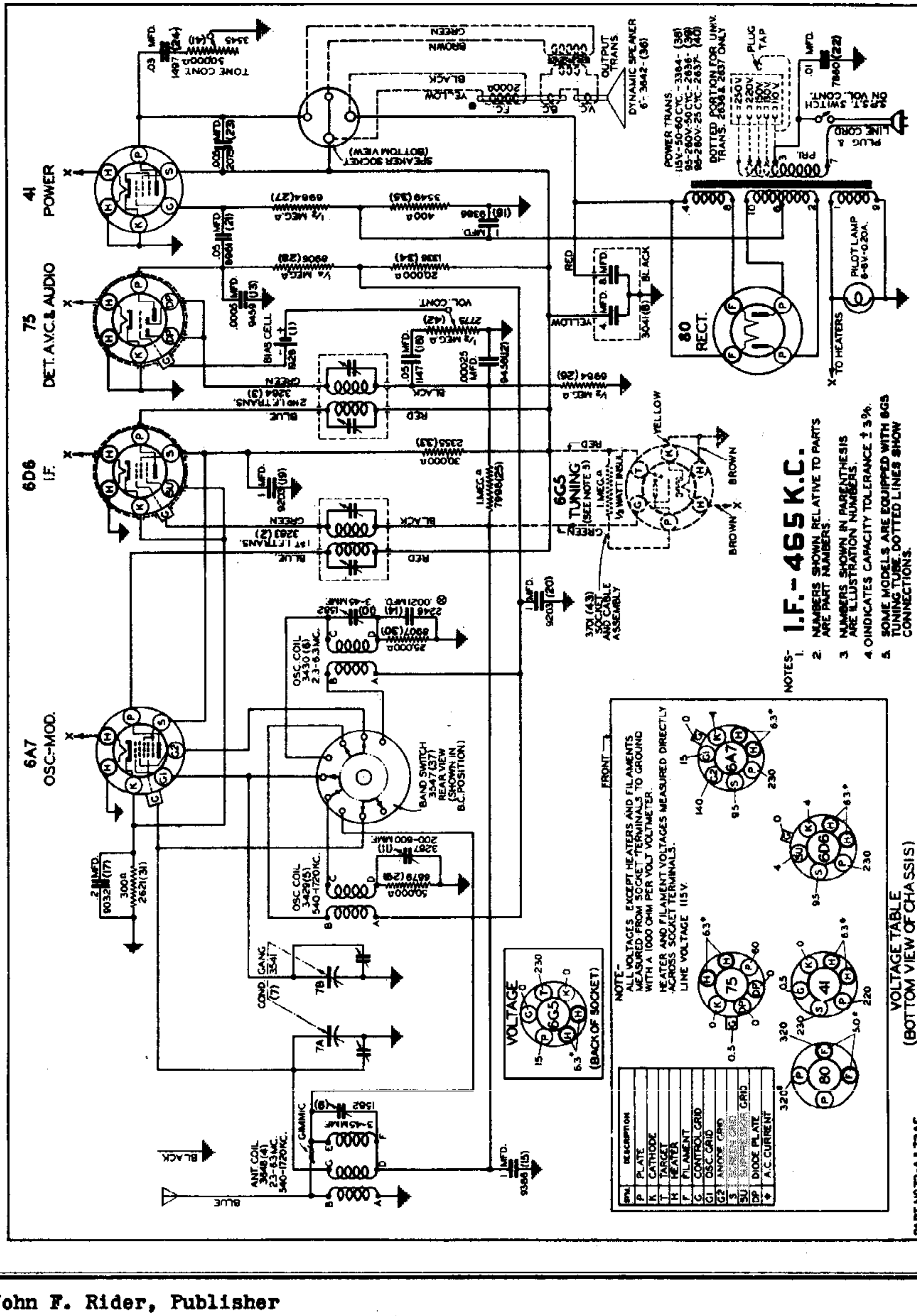
I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

SPIEGEL INC.

MODELS 4002,4050,502
Chassis 1072AE
Schematic,Voltage



MODELS 4002,4050,5020
Chassis 1072AE

SPIEGEL INC.

Socket,Trimmers,Chassis
Alignment

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

Peak IF at 465 KC. Connect oscillator at 6A7 grid cap. Use .02 mfd. series condenser, DO NOT REMOVE GRID CAP. Peak second and first IF trimmers.

1720-540 KC Band.

Connect oscillator to antenna lead through .00025 mfd. series condenser.

Gang condenser at maximum capacity, calibrate dial so needle falls on last line in this position.

Set oscillator signal at 1720 KC, tune dial to 1400 KC. Trim osc. sect. of gang condenser to maximum output.

With signal generator at 1400 KC, trim antenna section of gang condenser for maximum output.

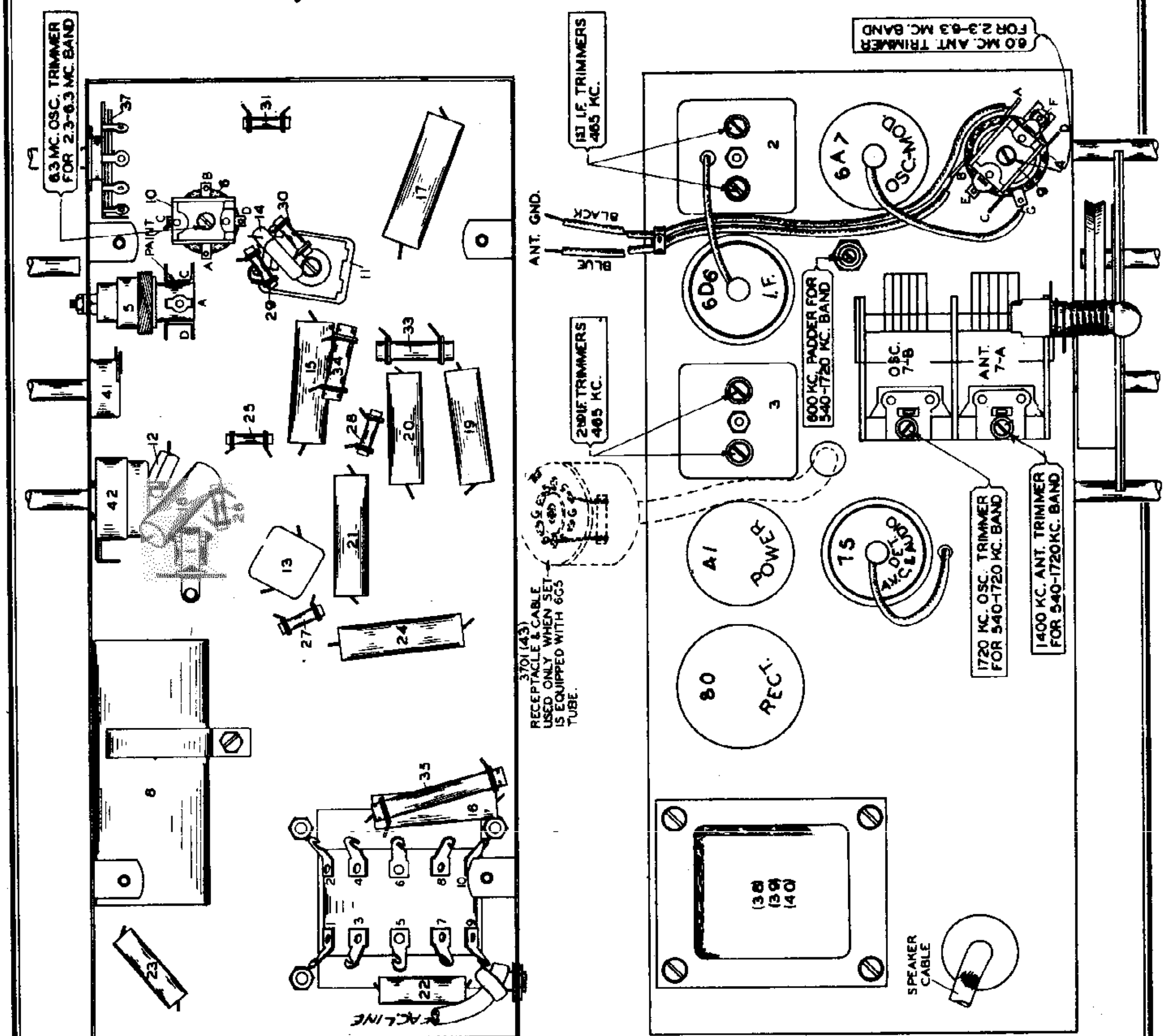
Now adjust 600 KC padder for maximum signal while rocking condenser.

2.3-6.3 MC Band

Signal at 6.3 MC through 400 ohm and .00025 mfd. dummy to antenna lead.

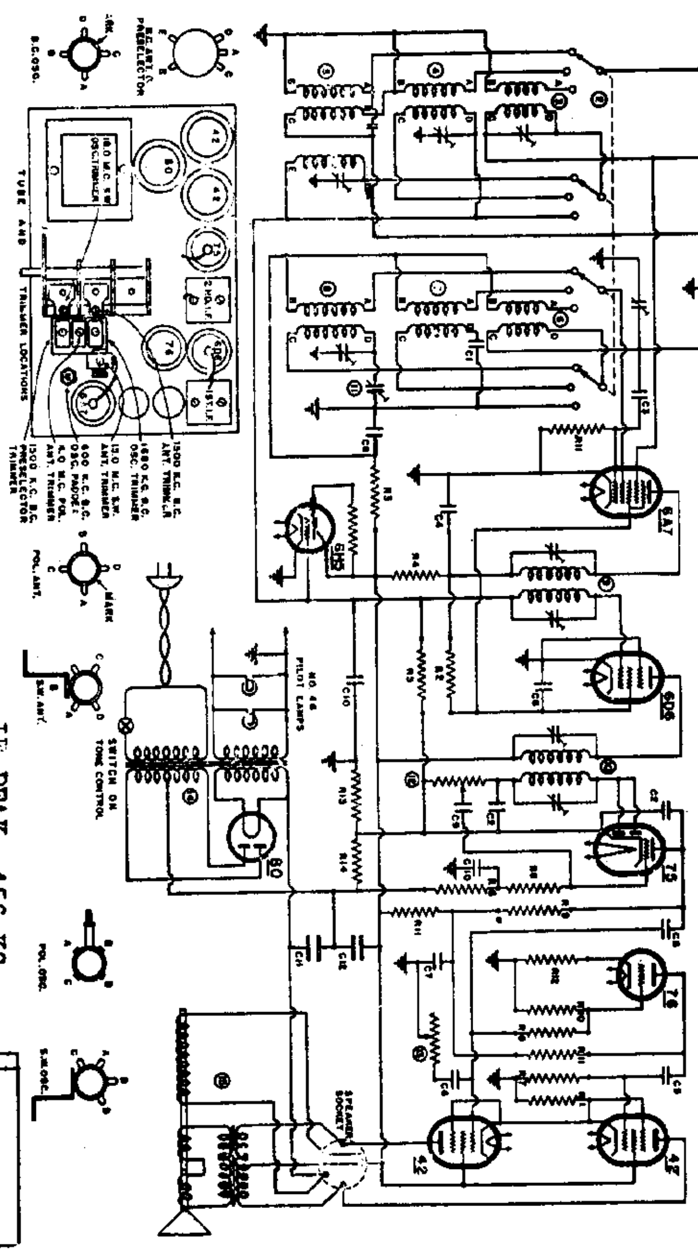
Band switch in 2.3-6.3 MC position. Adjust 6.3 MC osc. trimmer to maximum output.

Tune dial to 6 MC. Signal at 6 MC. Adjust 6 MC antenna trimmer for maximum sensitivity.



SPIEGEL INC.

MODELS 4004,4052
Chassis 871
Schematic,Socket,Trimmers
Voltage,Alignment



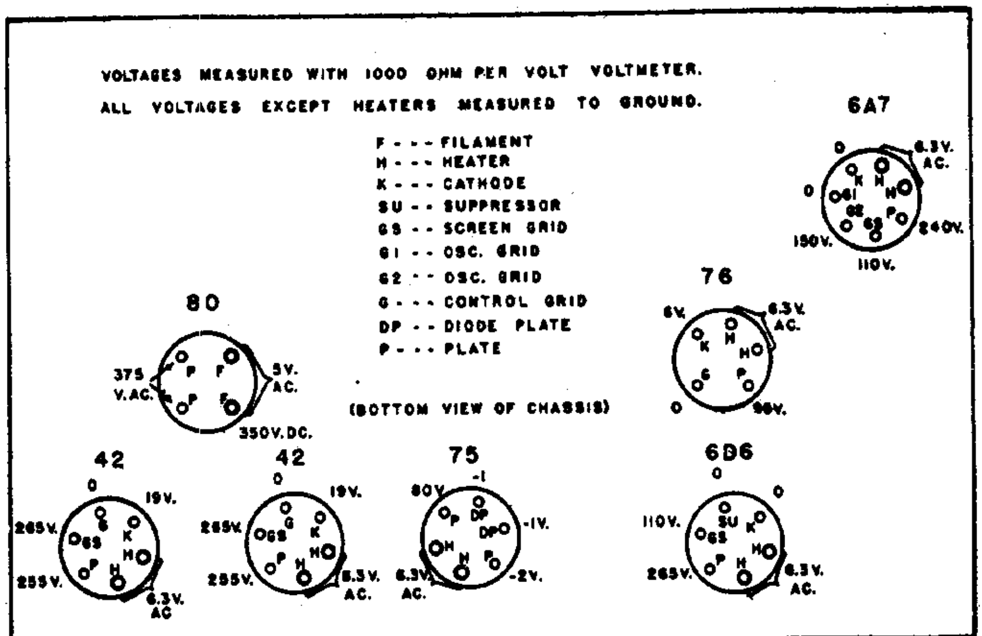
IF PEAK 456 KC

DESCRIPTION

This receiver is an 8 tube alternating current operated superheterodyne.

The tubes used are a 6A7 as oscillator modulator, a 6D6 as I.F. amplifier, a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 76 as audio phase inverter, an 80 as a power rectifier, a 6H5 as tuning indicator and two type 42 tubes as push pull audio power amplifiers.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.



CONVENTIONAL ALIGNMENT,SEE SPECIAL SECTION VOL.VIII

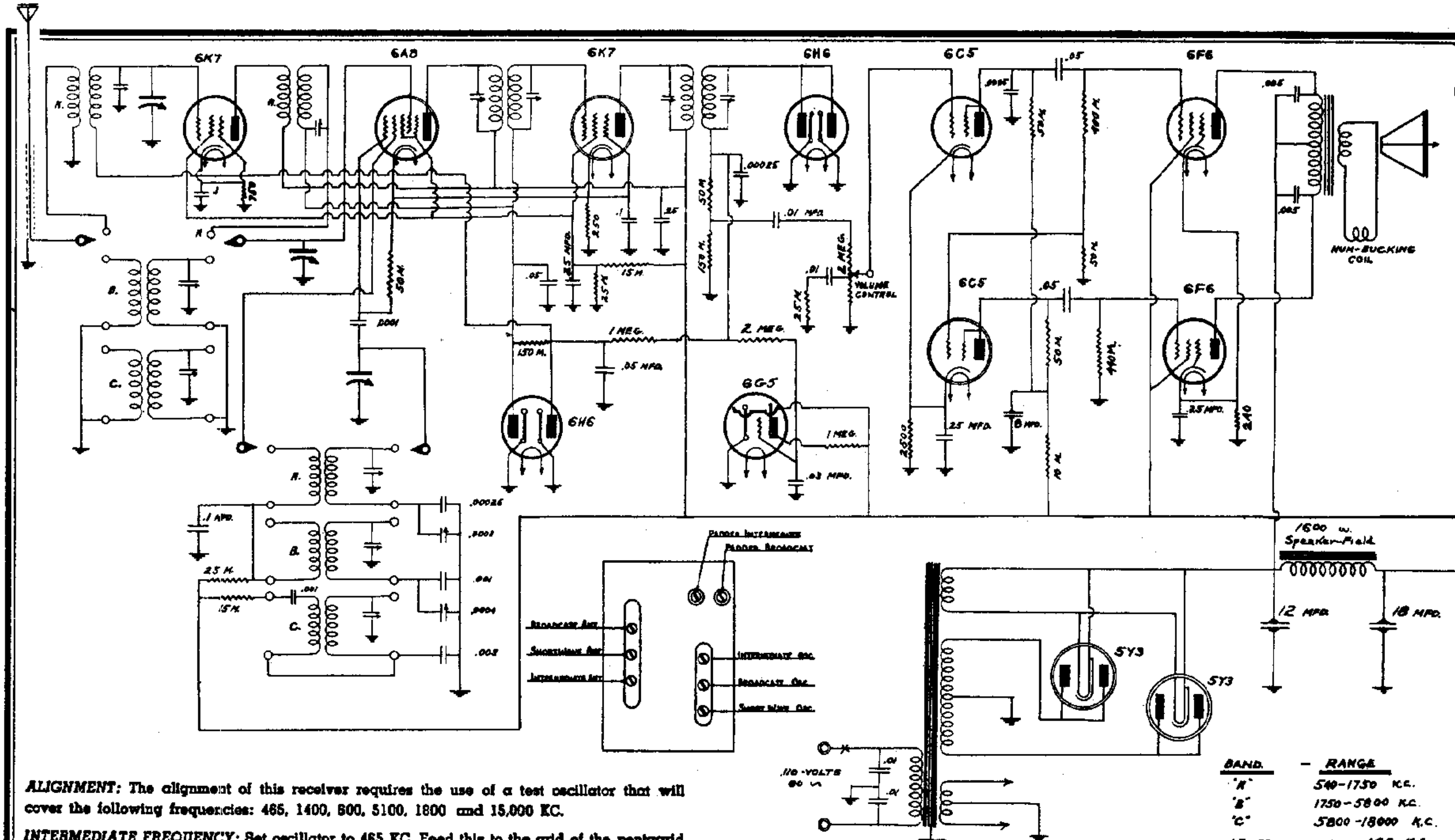
	PART NO.	DESCRIPTION
R1	60-123	350 OHM 1 WATT CARBON RES. 10%
R2	6811	15,000 - 1 - - -
R3	6180	20,000 - 1/2 - - -
R4	6115	1000 - - - - -
R5	6080	2 MEG - 1/3 - - -
R6	6017	1 " - - - - -
R7	6019	500,000 - - - - -
R8	60-124	350,000 - - - - - 5%
R9	6024	250,000 - - - - -
R10	60-125	110,000 - - - - - 5%
R11	6025	50,000 - - - - -
R12	6018	5000 - - - - -
R13	60-104	20 - 1/2 - WIRE - 5%
R14	60-126	16 - - - - - 5%

	PART NO.	DESCRIPTION
C1	15-102	.0009 MFD. MICA CONDENSER 5%
C2	1504	.00025 - - -
C3	1503	.00005 - - -
C4	1502	.1 MFD. 600 VOLT PAPER CONDENSER
C5	1548	.03 - - - - -
C6	1551	.004 - - - - -
C7	1616	.25 - 400 - - -
C8	1601	.1 - - - - -
C9	1605	.02 - - - - -
C10	1622	.05 - 200 - - -
C11	18-202	10.0 - 400 - ELECTROLYTIC COND.
C12	18-201	12.0 - 300 - - -

	PART NO.	DESCRIPTION
1	19-106	3 GANG VARIABLE CONDENSER
2	69-107	BAND SWITCH
3	10-132	SHORT WAVE ANTENNA COIL
4	10-135	POLICE BAND ANTENNA COIL
5	10-137	B.C. ANT. & PRESELECTOR COIL
6	10-133	SHORT WAVE OSCILLATOR COIL
7	10-136	POLICE BAND OSCILLATOR COIL
8	10-134	B.C. OSCILLATOR COIL
9	10-130	1 ST. I.F. TRANSFORMER
10	10-131	2 ND. I.F. TRANSFORMER
11	20-100	B.C. OSC. PADDING CONDENSER
12	24-105	VOLUME CONTROL
13	26-106	TONE CONTROL WITH SWITCH
14	80-120	POWER TRANSFORMER
15		SPEAKER

MODELS 4006, 4070, Chas. 12AC
Schematic, Alignment, Trimmers
MODELS 2204 to 2207, 2200 to 2203, 2230 to 2233 inc. 2220, 2221
Alignment Procedure

SPIEGEL INC.



BAND.	– RANGE
'A'	540-1750 K.C.
'B'	1750-5800 K.C.
'C'	5800-18000 K.C.
I.F.-FREQUENCY	– 465 K.C.

ALIGNMENT: The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies: 465, 1400, 600, 5100, 1800 and 15,000 KC.

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

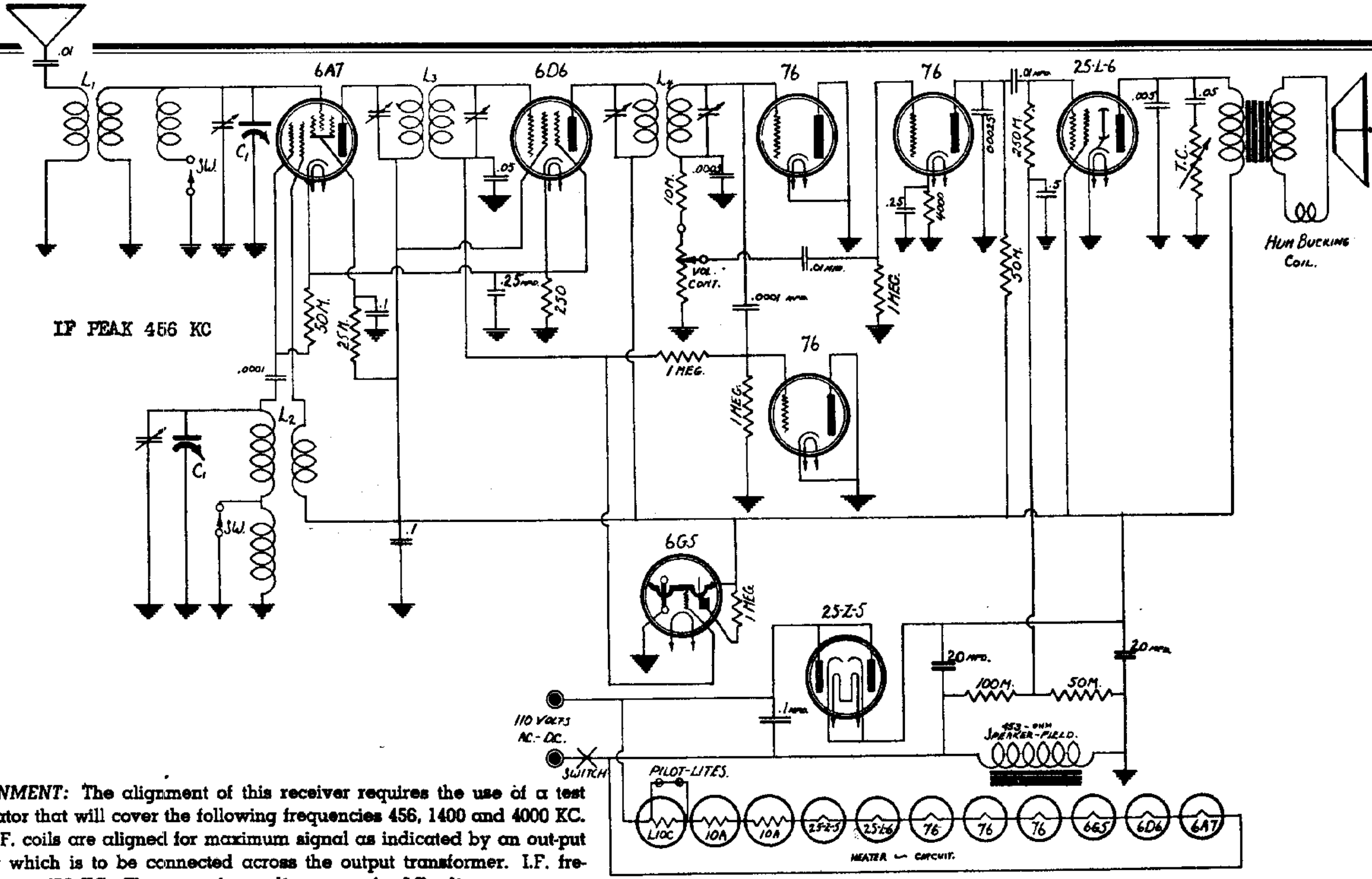
BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Adjust trimmer (underneath chassis) on R.F. coil for greatest output. Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

INTERMEDIATE BAND: For a dummy antenna use a .0002 mfd. mica condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 5100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output. Re-set oscillator and set dial to approximately 1800 KC. Slowly increase or decrease the intermediate padding condenser while tuning back and forth across the signal with the station selector control until the maximum reading is obtained on the output meter. Re-check the 5100 KC adjustment.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

MODEL 4010, Chassis 11X
Schematic, Alignment

SPIEGEL INC.



IF PEAK 456 KC

ALIGNMENT: The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies 456, 1400 and 4000 KC. The I.F. coils are aligned for maximum signal as indicated by an out-put meter which is to be connected across the output transformer. I.F. frequency is 456 KC. There are four adjustments for I.F. alignment.

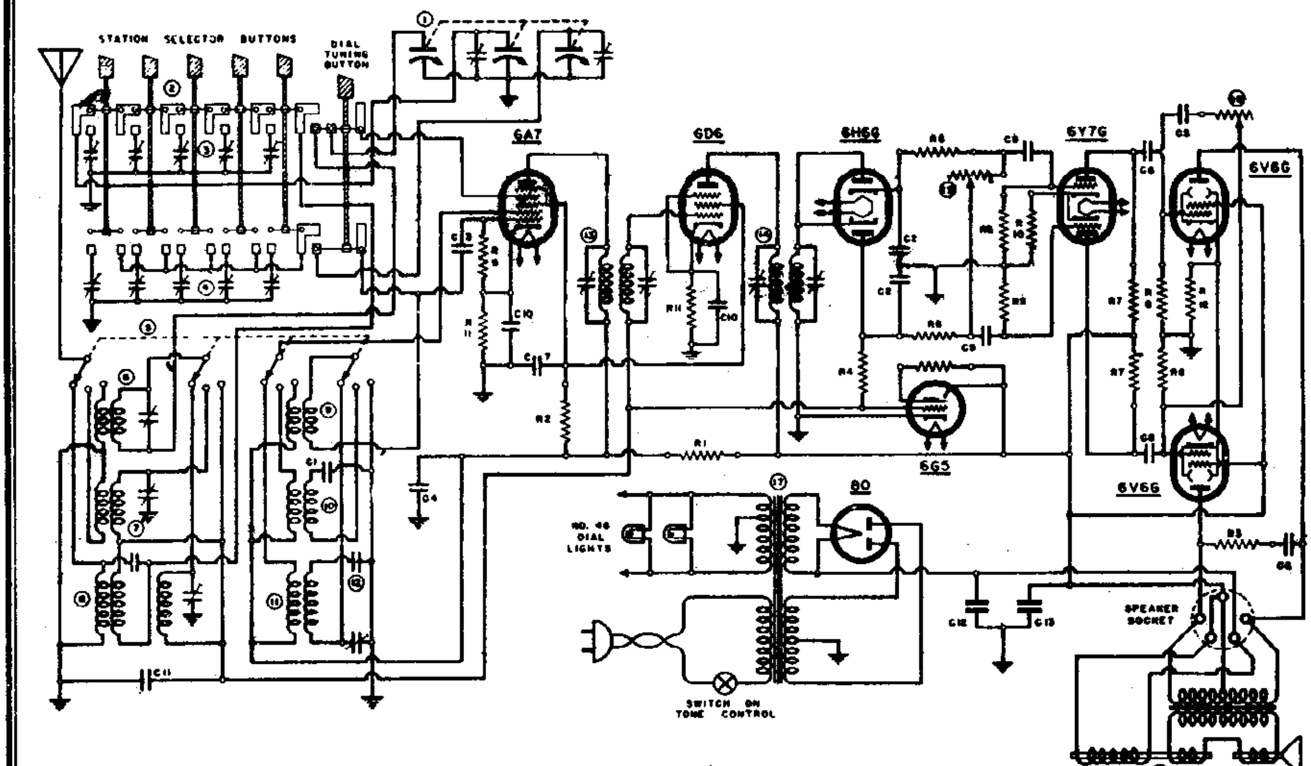
To align broadcast band it is only necessary to align receiver at 1400 KC because of the initial setting at the factory. A 200 mmfd. condenser is necessary for a dummy antenna. This is inserted in series with the test oscillator and the antenna connection of the radio receiver. Set oscillator and pointer on dial to 1400 KC and adjust the two trimmer condensers on the tuning condenser for maximum output. Turn Band Switch to Short Wave position. Feed a 4000 KC signal from the test oscillator and check receiver.

L_1 - ANT. COIL (COMPLETE) No. 1188.
L_2 - OSC. COIL (COMPLETE) No. 1189.
L_3 - 1-INTERMEDIATE FREQ. TRANS. No. 310.
L_4 - 2-INTERMEDIATE FREQ. TRANS. No. 309.
VOLUME CONTROL No. 215.
T.C. - TONE CONTROL No. 309 A.
DYNAMIC SPEAKER No. 735.
C_1 - TUNING COND. No. 622.
SW. - BAND SWITCH No. 119.

Date -	No.
DRAWN BY - H.B.L.	
CHECKED BY - L.J.	
APPROVED BY -	

MODEL 4068, Chassis 885
Schematic, Voltage, Socket

SPIEGEL INC.



PART NO		DESCRIPTION				
R1	60-143	3000	OHM	1 1/2W	CARBON	RES
R2	6221	20,000	"	1W	"	"
R3	60-114	10,000	"	1/2W	"	"
R4	6020	2 MEG	"	1/3W	"	"
R5	6017	1 "	"	"	"	"
R6	6018	300,000	"	"	"	"
R7	6024	250,000	"	"	"	"
R8	60-125	110,000	"	"	"	" ±5%
R9	6025	50,000	"	"	"	"
R10	6053	1000	"	"	"	"
R11	6012	250	"	"	"	"
R12	60-144	250 OHM	2W.	WIRE	WOUND	"

PART NO		DESCRIPTION				
C1	15-106	.0011	MFD.	MICA	CONDENSER	±5%
C2	1504	.00025	"	"	"	
C3	1503	.00005	"	"	"	
C4	1602	1	MFD.	600V.	TUBULAR	CONDENSER
C5	1611	.006	"	"	"	"
C6	1609	.002	"	"	"	"
C7	1601	.1	"	400V	"	"
C8	1607	.05	"	"	"	"
C9	1603	.02	"	"	"	"
C10	1600	1	"	200V.	"	"
C11	1622	.05	"	"	"	"
C12	16-202	10	"	400V.	WET	ELECTROLYTIC
C13	16-201	12	"	300V.	"	

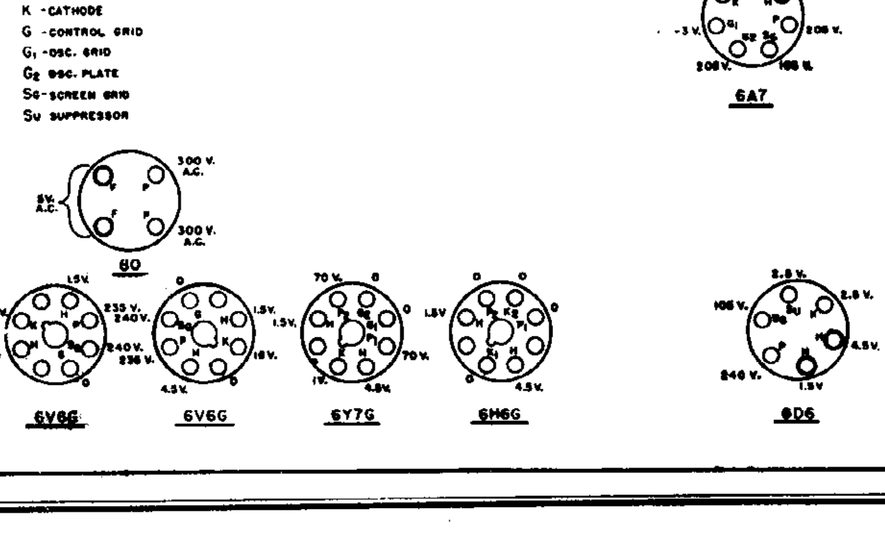
	PART NO.	DESCRIPTION 885
1	19-121	3 GANG CONDENSER
2	68-115	PUSH BUTTON SWITCH
3	20-106	ANT. TRIMMER STRIP
4	20-107	OSC. " "
5	69-107	WAVE SWITCH
6	10-184	S.W. ANT. COIL
7	10-182	POL. " "
8	10-173A	B.C. ANT. & PRESELECTOR COIL
9	10-183	S.W. OSC. COIL
10	10-181	POL. " "
11	10-180	B.C. " "
12	20-100	B.C. OSC. PAD. CONS.
13	10-201	1ST. I.F. TRANSFORMER
14	10-202	2ND. " "
15	24-113	VOLUME CONTROL
16	26-110	TONE CONTROL WITH SWITCH
17	80-126	POWER TRANSFORMER
18		SPEAKER

IF PEAK 456 KC

VOLTAGE DIAGRAM

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
ALL VOLTAGES MEASURED TO GROUND.
(BOTTOM VIEW OF CHASSIS)

F - FILAMENT
H - HEATER
P - PLATE
K - CATHODE
G - CONTROL GRID
G_1 - OSC. GRID
G_2 OSC. PLATE
Sc - SCREEN GRID
Su SUPPRESSOR



DESCRIPTION

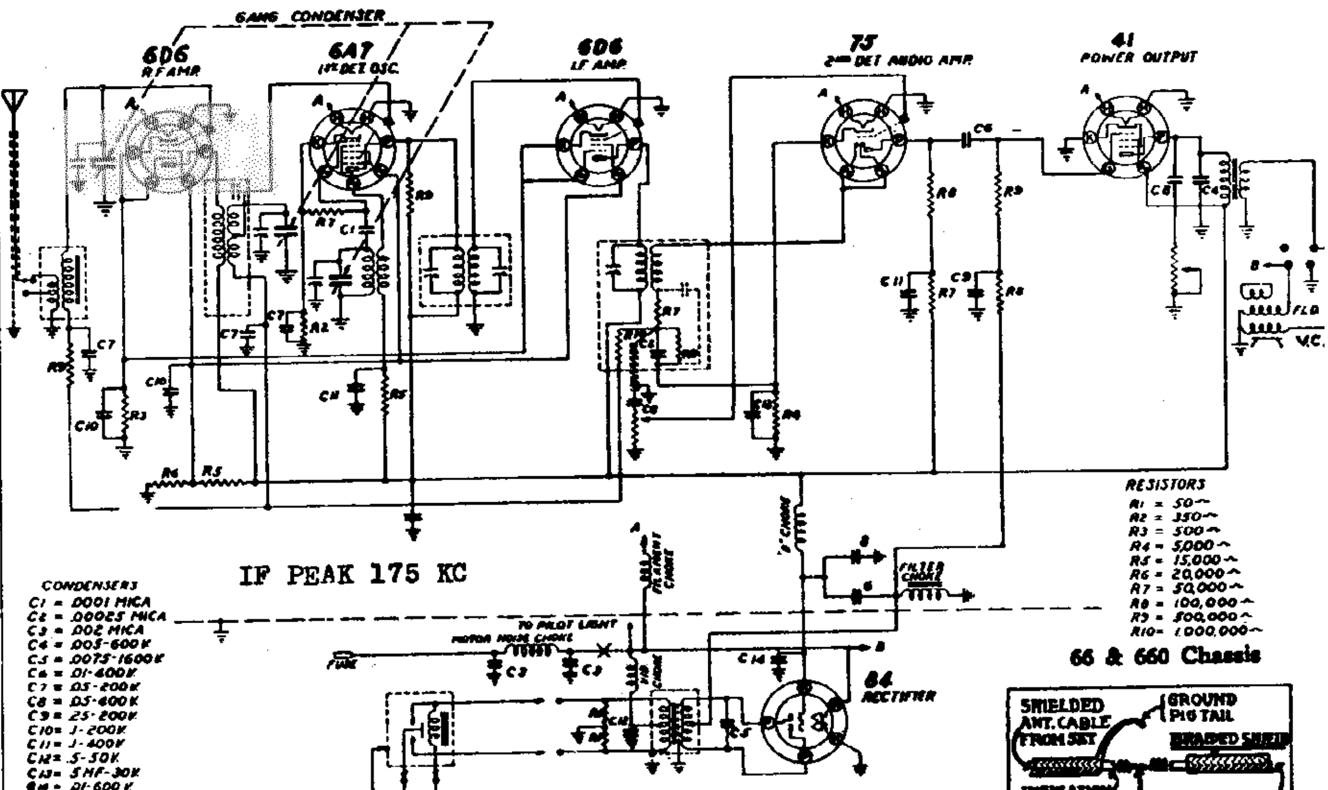
This receiver is an 8 tube alternating current operated superheterodyne.

The tubes used are a 6A7 as oscillator modulator, a 6D6 as I.F amplifier, a 6H6G as A.V.C. and audio rectifier, a 6Y7G as audio voltage amplifier, an 80 as a power rectifier, a 6G5 as tuning indicator and two type 6V6G tubes as push pull audio power amplifiers.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 19 M.C. to 5.0 M.C.

MODEL 4210, Chassis 66, 660
Schematic, Socket, Trimmers
Alignment, Connections

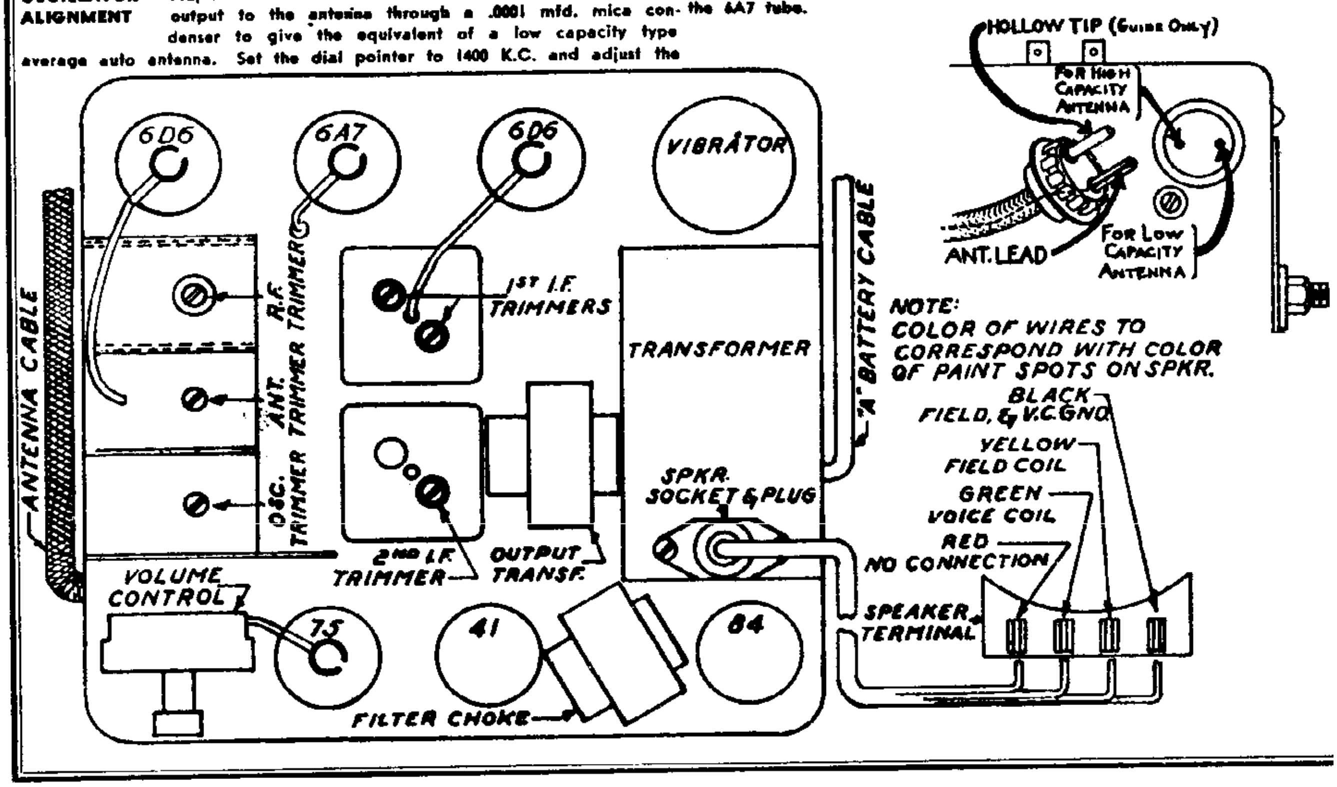
SPIEGEL INC.



I.F. ALIGNMENT Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

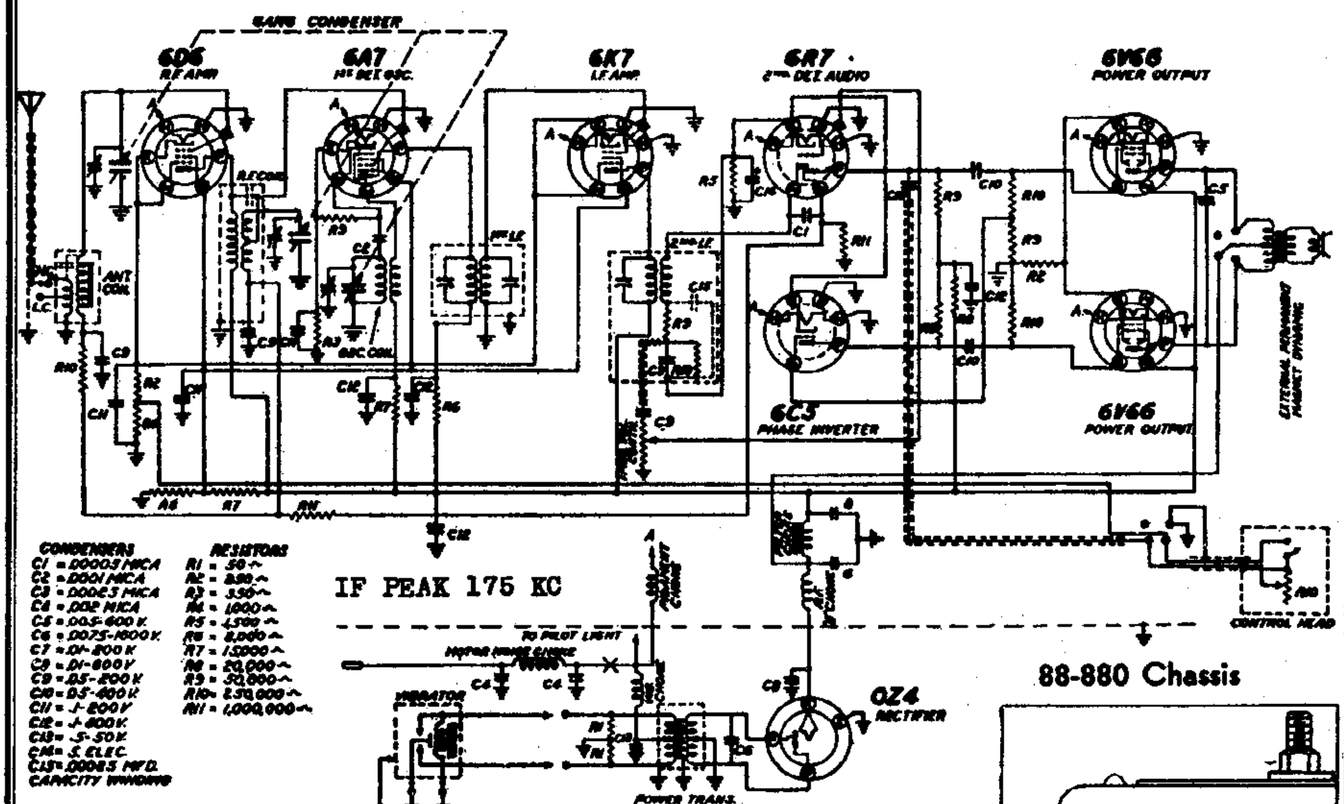
OSCILLATOR ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the R.F. antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

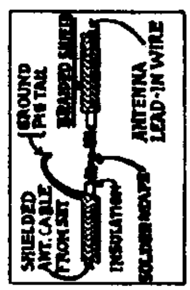


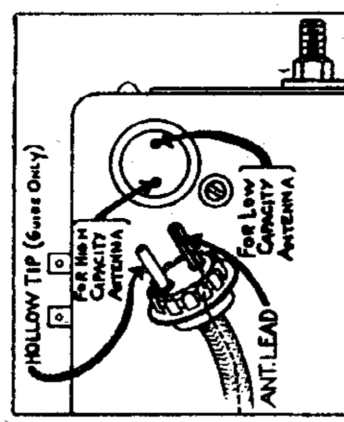
MODEL 4212, Chassis 88-880
Schematic, Socket, Trimmers
Alignment, Connections

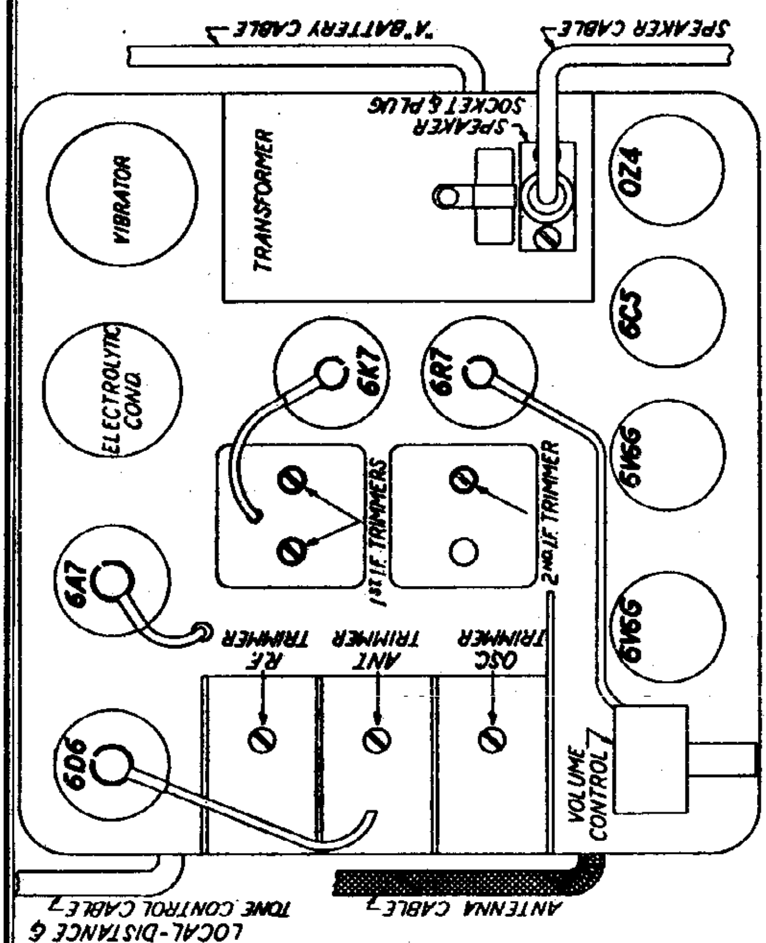
SPIEGEL INC.



88-880 Chassis







ALIGNMENT DATA

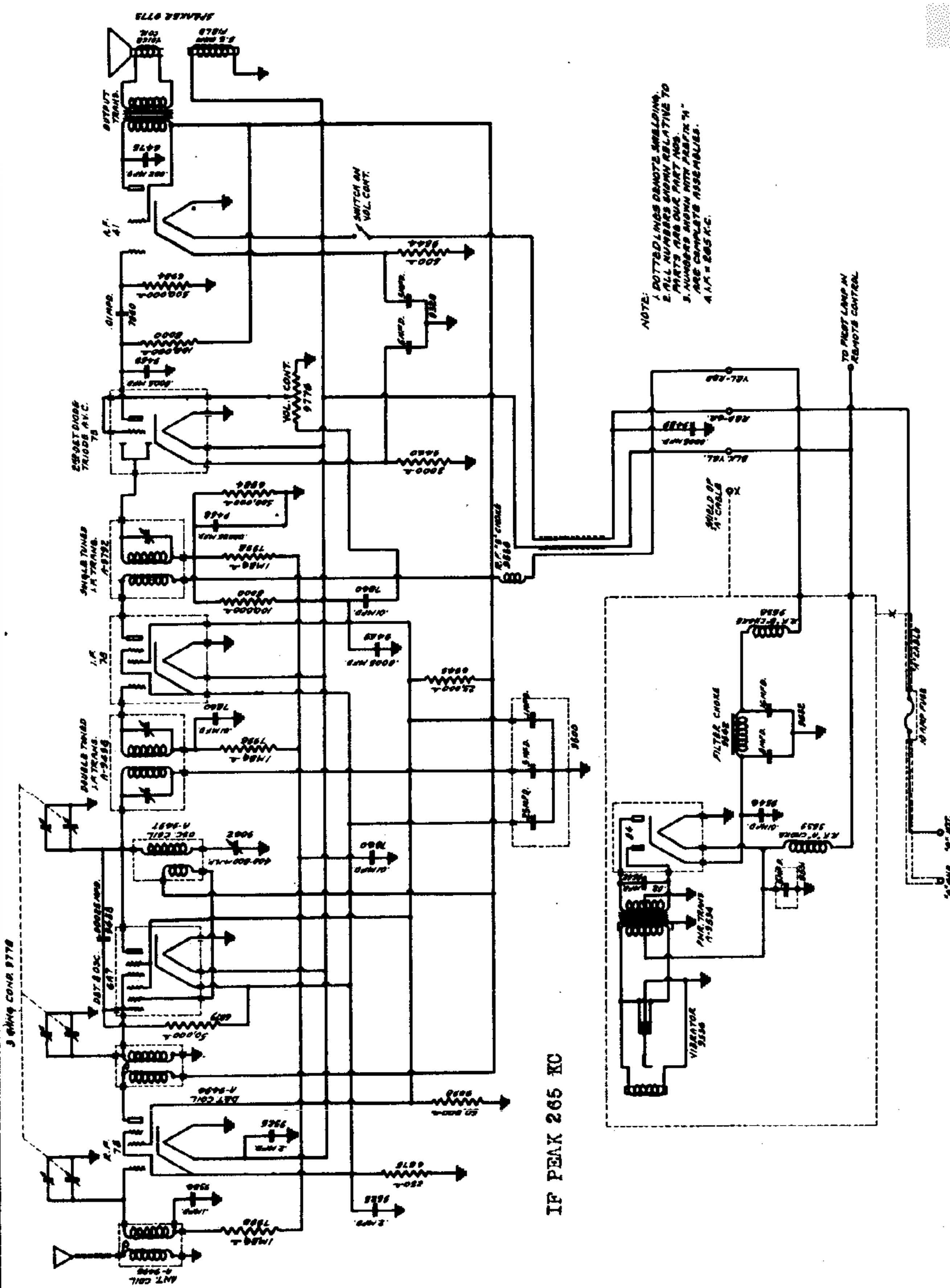
I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

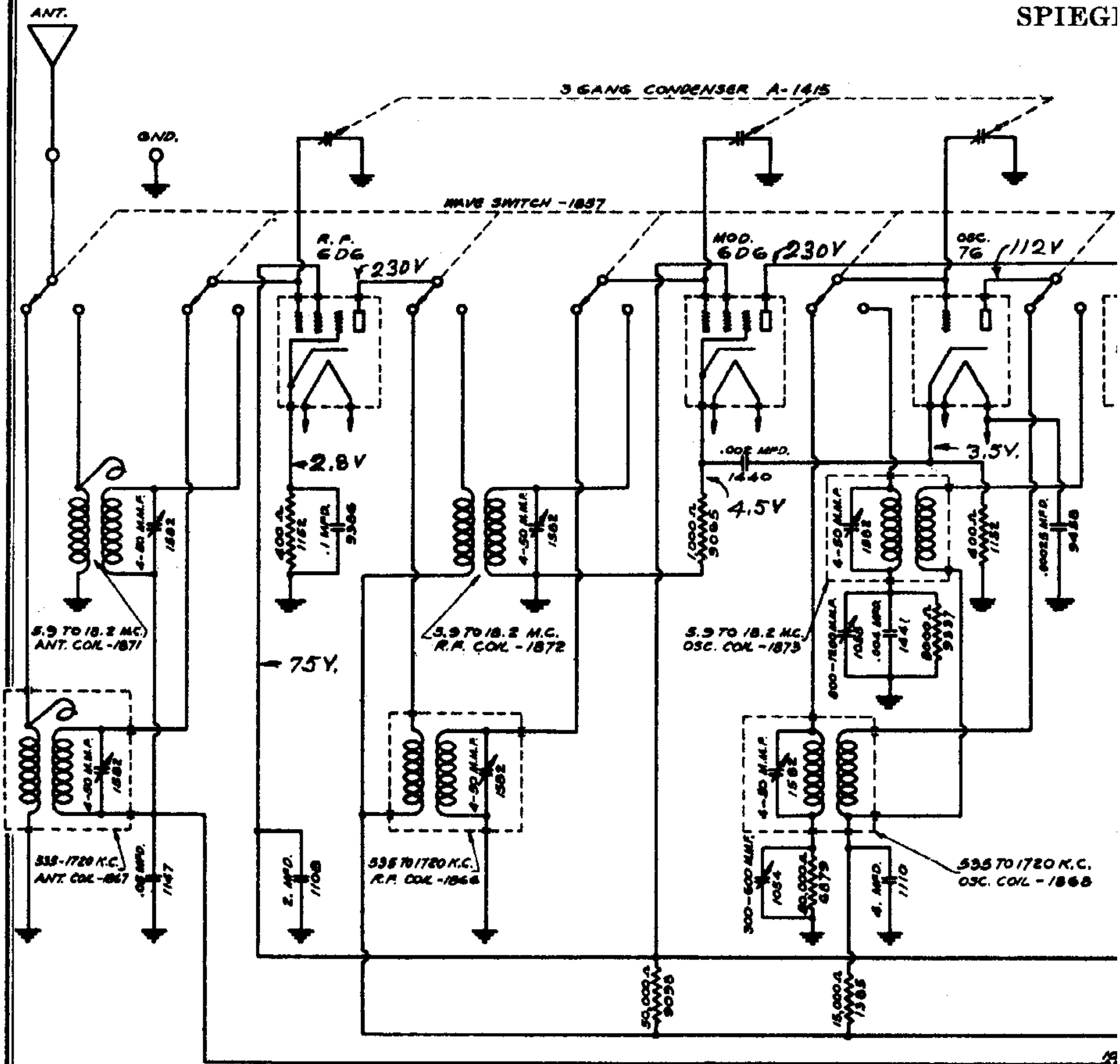
OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

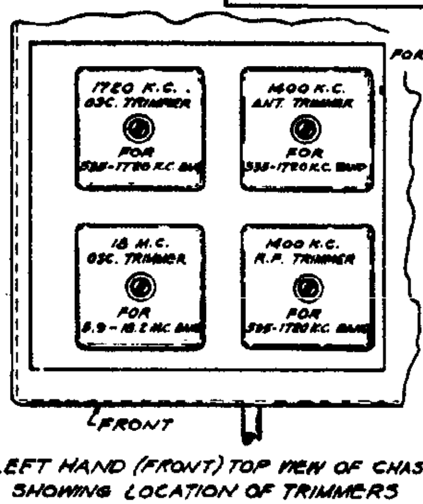
R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

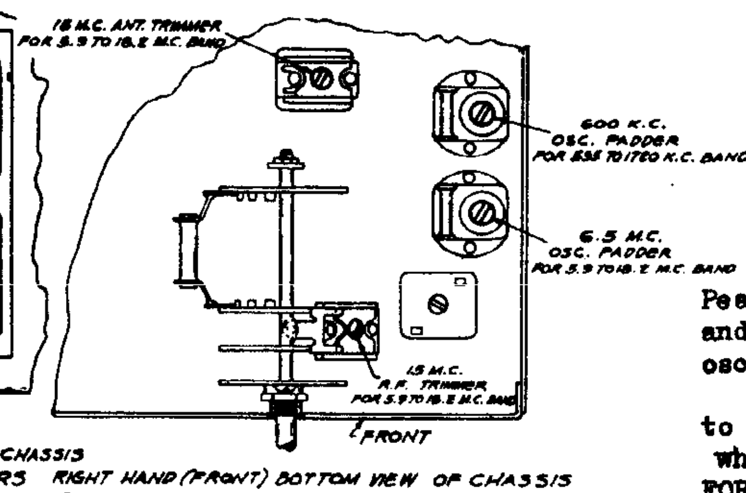
MODEL 4519 Auto
Chassis 603 (1934)
Schematic

SPIEGEL INC.









LEFT HAND (FRONT) TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS

RIGHT HAND (FRONT) BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS

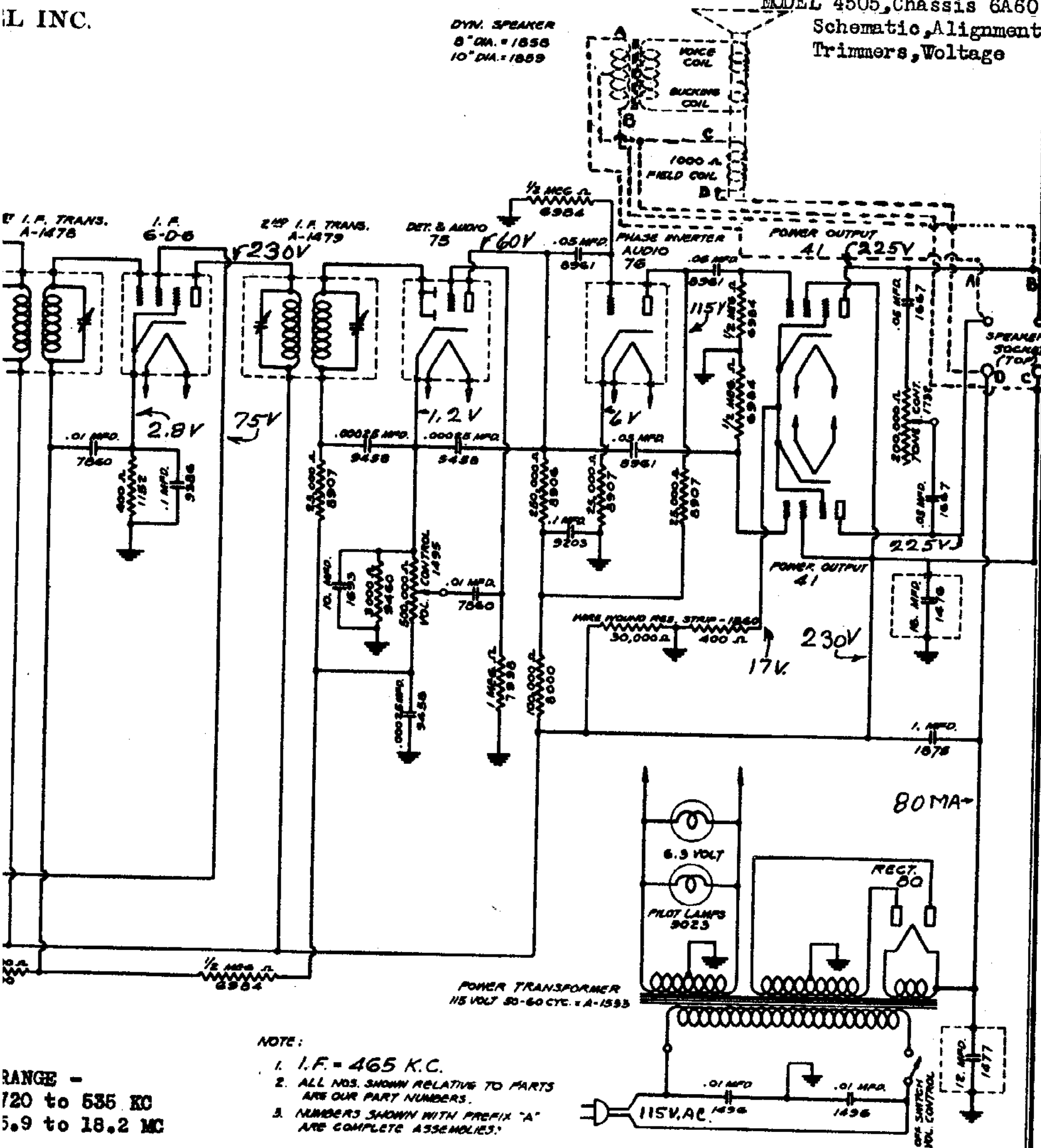
FREQUENC

CONVENTIONAL
Peak I-F trimmers
and generator to
oscillator circui

to peak. Dial and
while rocking th
FOREIGN band osci

L INC.

MODEL 4505, Chassis 6A60
Schematic, Alignment
Trimmers, Woltage



RANGE -
720 to 535 KC
5.9 to 18.2 MC

ALIGNMENT - SEE SPECIAL SECTION. VOL. VIII.
: 465 KC. BROADCAST - Dial and trimmer to 1720 KC, peak oscillator trimmer. Dial
00 KC, peak antenna and R-F trimmers. Dial and generator at 600 KC, pad the
for maximum peak, while rocking the variable gang condenser.
FOREIGN - Dial and generator at 18 MC, adjust the oscillator trimmer
nerator to 15 MC, adjust the R-F and antenna trimmers to maximum sensitivity
variable condenser across the signal. Dial and generator at 6.5 MC, pad the
ator circuit to maximum peak while rocking the variable condenser

MODEL 4519 Auto
Chassis 603 (1934)
Voltage, Alignment

SPIEGEL INC.

TUBE VOLTAGE

Type of Tube	Position of Tube	Fil. Volts	Plate Volts	Cathode Volts	Screen Volts	Grid No.1	Grid No.2	Grid No.3	Grid No.5
78	Radio Frequency	6	225	4	92				
6A7	Oscillator & Modulator	6	225	4		6.2	225	92	92
78	Intermediate Frequency	6	225	4	92				
75	2nd Detector Diode & AVC	6	135	1.5					
41	Output	6	218	15	225				
84	Rectifier	6	260*	235					

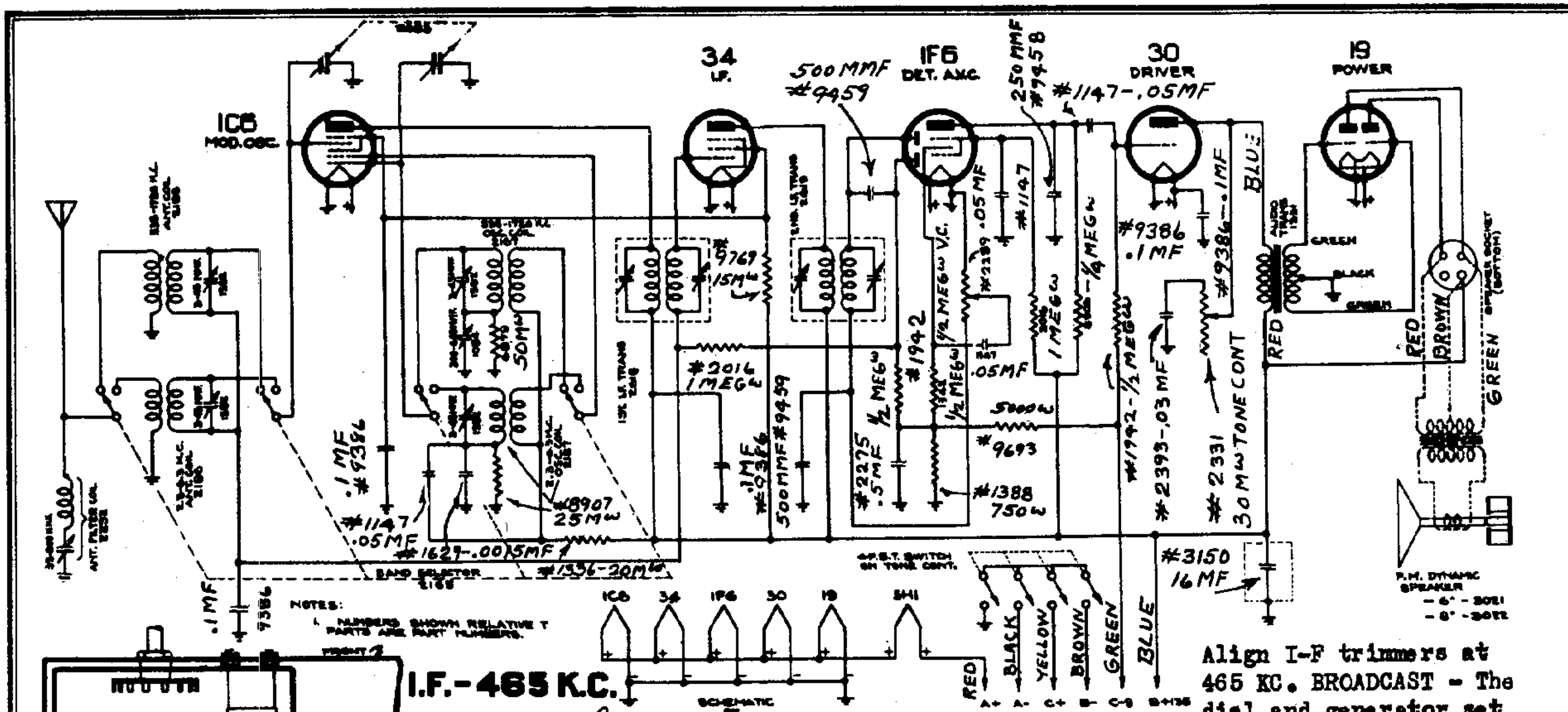
* A.C. each plate
Total "A" current - 6.2 amperes.

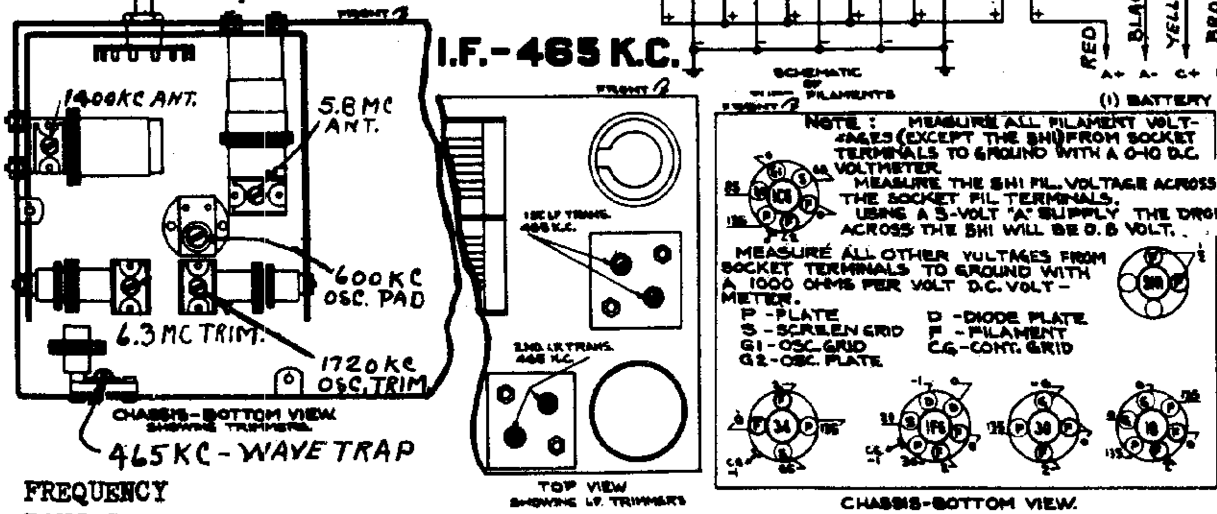
INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tun the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the test oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I.F. can, one section of which is adjusted by turning the brass hex nut and other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if the antenna, R.F. or oscillator coil have been replaced it will be necessary to realign the variable condensers. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis nearest the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will detune the receiver. Three holes should be made in the shield to correspond with the hole provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the shield is properly grounded to the receiver chassis. NOTE: When the receiver and "B" unite is removed from the set housing be sure to set the receiver on top of the "B" unit, otherwise considerable R.F. and audio hash will be encountered. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the set oscillator to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the test oscillator to 1500 K. C. Next, BRING THIS SIGNAL IN BY ADJUSTING THE VARIABLE CONDENSER OSCILLATOR SECTION TRIMMER. Looking at the front of the receiver, the variable condenser trimmers are mounted on the left side of the set on the variable condenser and reading from the bottom up the trimmers are, oscillator, R.F. and antenna. After the oscillator section has been properly peaked, adjust the antenna and R.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted at 1500 K.C. tune the receiver to 600 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator padding condenser which is located on the lefthand side to the rear of the chassis, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the padding condenser is accessible through the small hole in the side of the set housing. It may be necessary to turn the variable condenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is correctly followed the receiver will now track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.

MODELS 5106,5110
Chassis 65B
Schematic, Voltage
Trimmers, Socket
Alignment

SPIEGEL INC.



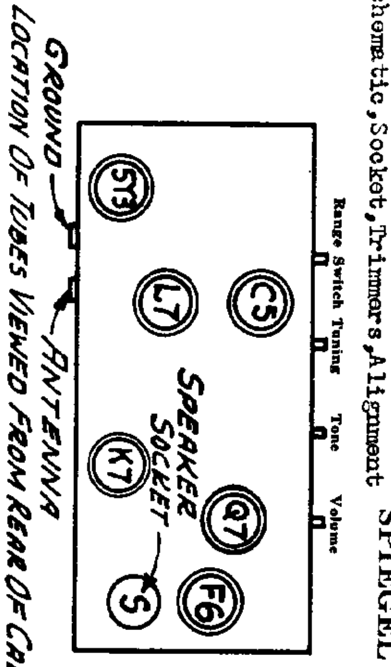


Align I-F trimmers at 465 KC. BROADCAST - The dial and generator set at 1720 KC, peak oscillator trimmer, then shift dial and generator to 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad oscillator circuit to peak. SHORTWAVE - Dial and generator to 6.3 MC, peak Oscillator trimmer. Dial and generator to 5.8 MC, peak antenna trimmer. No padding of oscillator circuit is required on the short wave band. When padding the BROADCAST oscillator rock variable condenser. Adjust wavetrap to 465 KC. Repeat all adjustments.

FREQUENCY RANGES -
1720 to 535 KC
2.3 to 6.3 MC

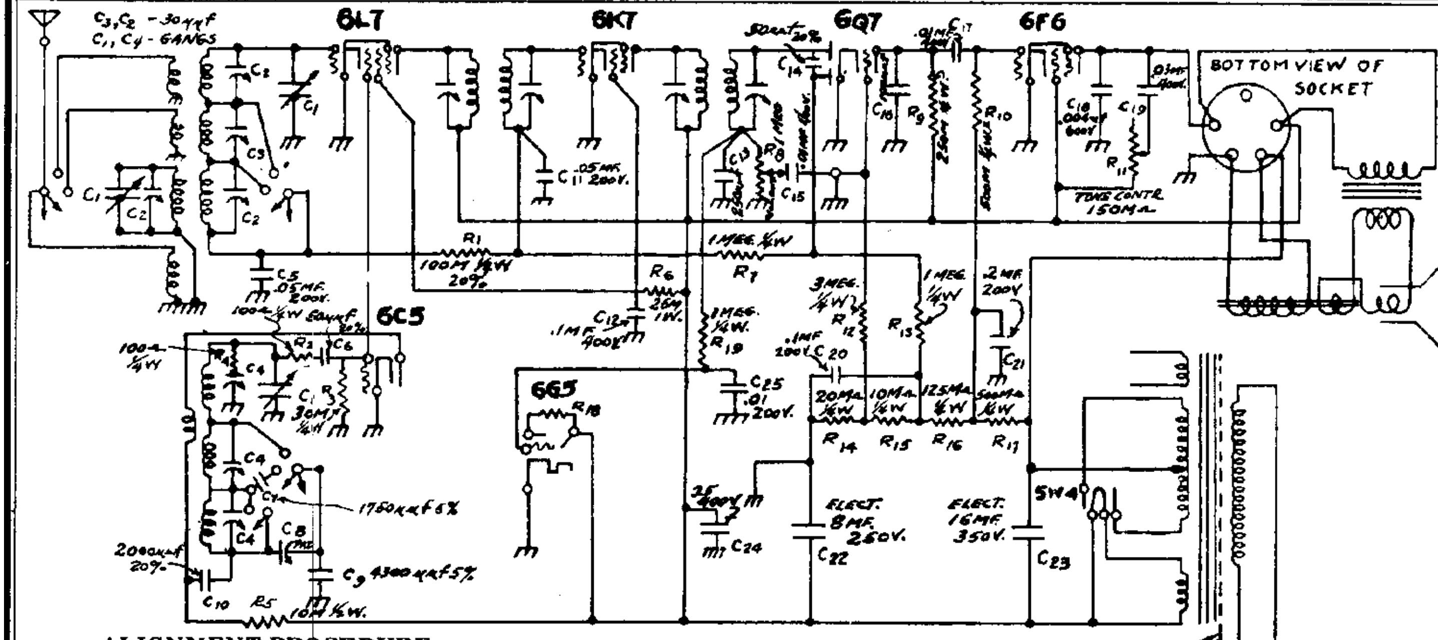
MODELS 6502, 6552, Chas. 7AC
Schematic, Socket, Trimmers, Alignment

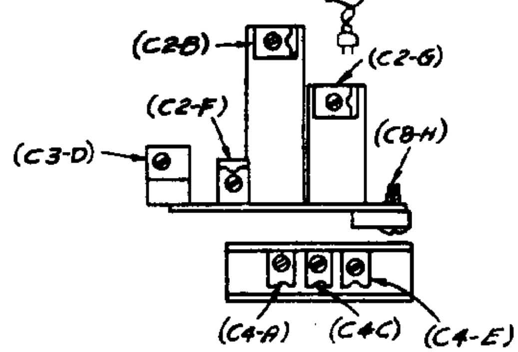
SPIEGEL INC.



LOCATION OF TUBES VIEWED FROM REAR OF CABINET.

TUNING CONTROLS AND TUBE SOCKET GUIDE





TRIMMER LAYOUT

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

IF ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.
3. Adjust IF alignment screws of second IF transformer adjacent to 6F6 power tube to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.
4. Adjust alignment of first IF transformer, (directly behind tuning condenser) to maximum output as described above.
5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first, in the order indicated.

FOREIGN BAND 5.7 TO 18.5 MEGACYCLES

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor set oscillator at 16 megacycles.
2. Set the dial scale to 16 megacycles and adjust the oscillator trimmer condenser (C4-A) to resonance using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C2-B) to maximum response, rocking the gang condenser back and forth a degree or two to obtain proper maximum.

POLICE OR MIDDLE BAND 1.75 TO 5.8 MEGACYCLES

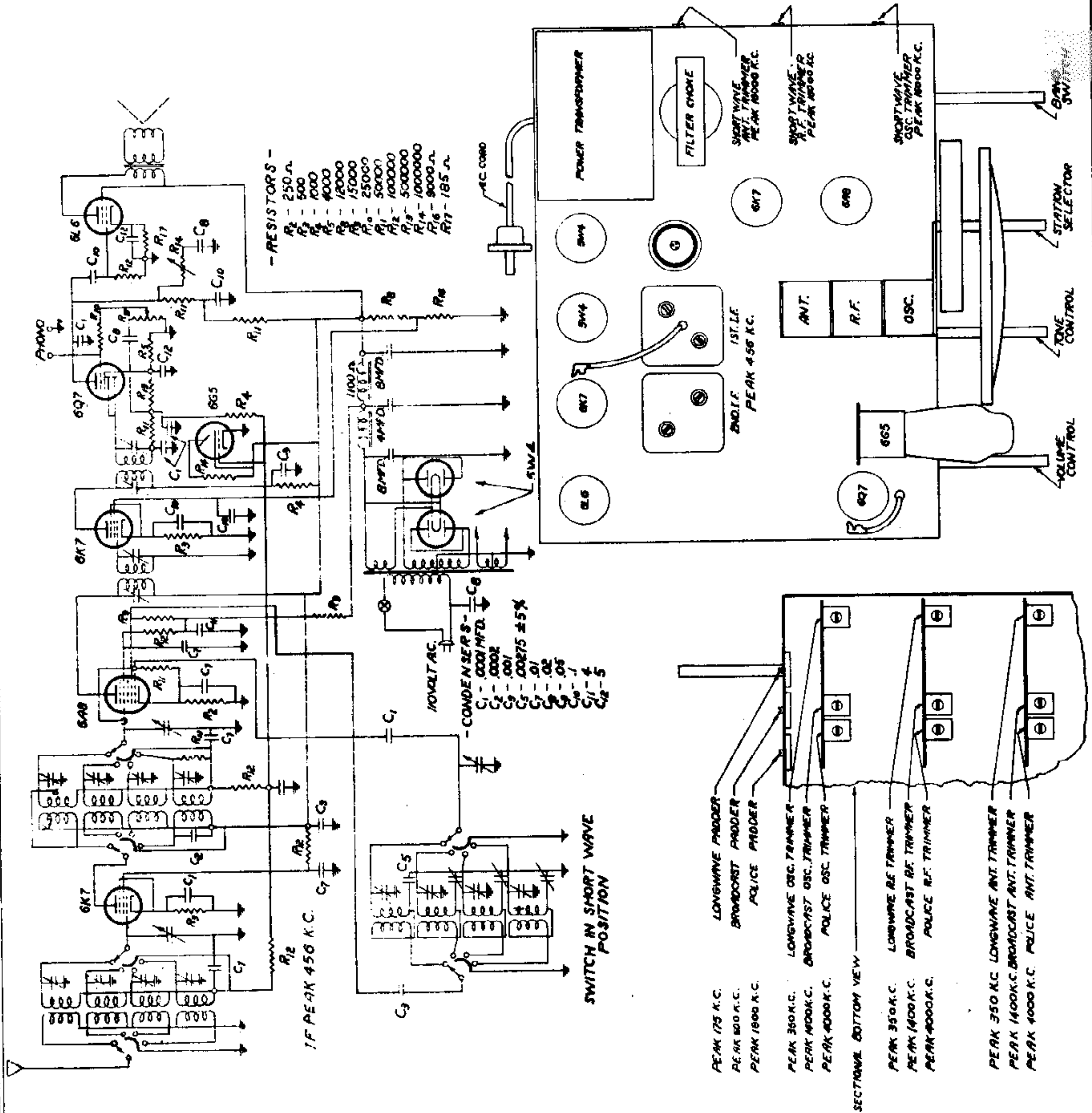
1. With the test oscillator connected as above set the oscillator and dial to 5.5 megacycles.
2. Adjust oscillator trimmer condenser (C4-C) for maximum response using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C3-D) to maximum response rocking the gang condenser as described above.

BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to antenna and ground through a 200 Mfd. condenser set oscillator and receiver dial to 1600 kilocycles.
2. Adjust broadcast oscillator trimmer (C4-E) to obtain maximum response.
3. Adjust antenna circuit trimmer (C2-F) for maximum output.
4. Adjust preselector trimmer (C2-G) for maximum output.
5. Set test oscillator and dial to 600 kilocycles and tune in the signal, then adjust broadcast band padding condenser (C8-H) for maximum output. This padder is mounted on the aluminum coil deck near the panel and is adjusted through a hole provided in the back of the chassis pan. Rock the condenser back and forth a degree or two in order to obtain proper maximum.
6. Repeat the 1600 KC adjustments described above for greater accuracy.

MODELS 6506,6554,Chas. AM3

SPIEGEL INC. Schematic,Socket,Trimmers,Alignment

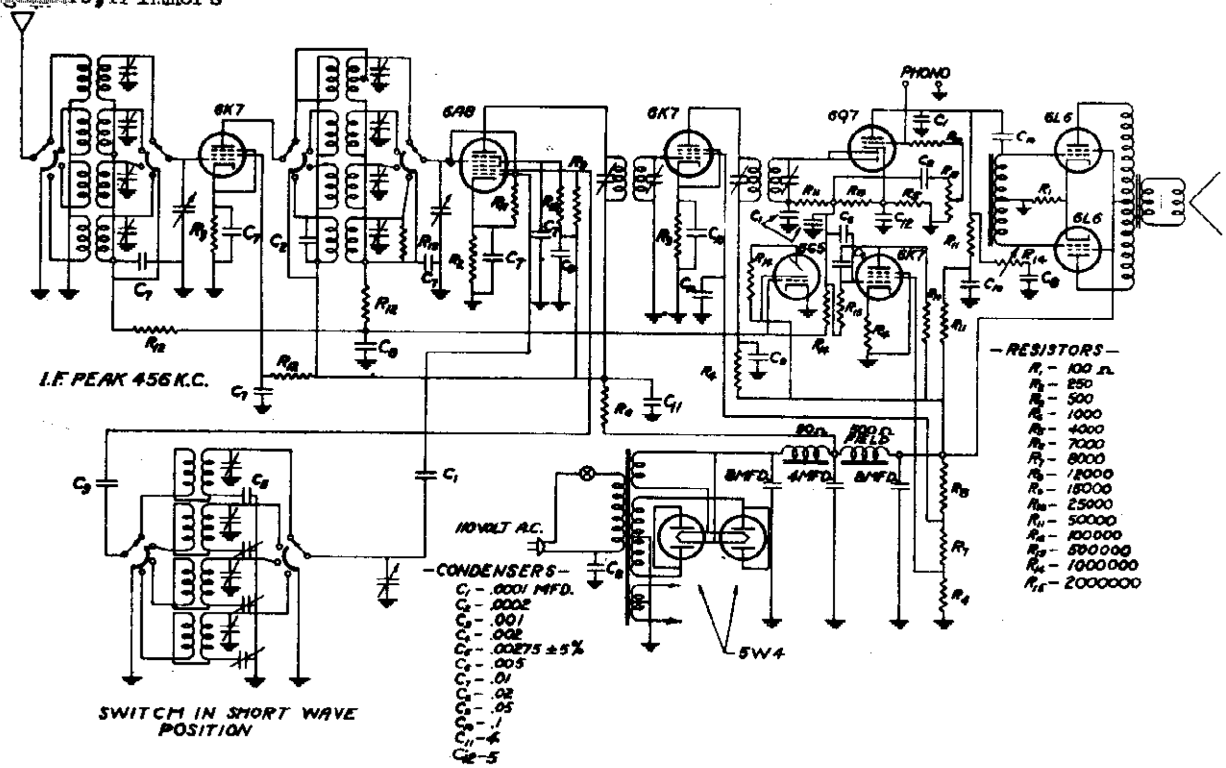


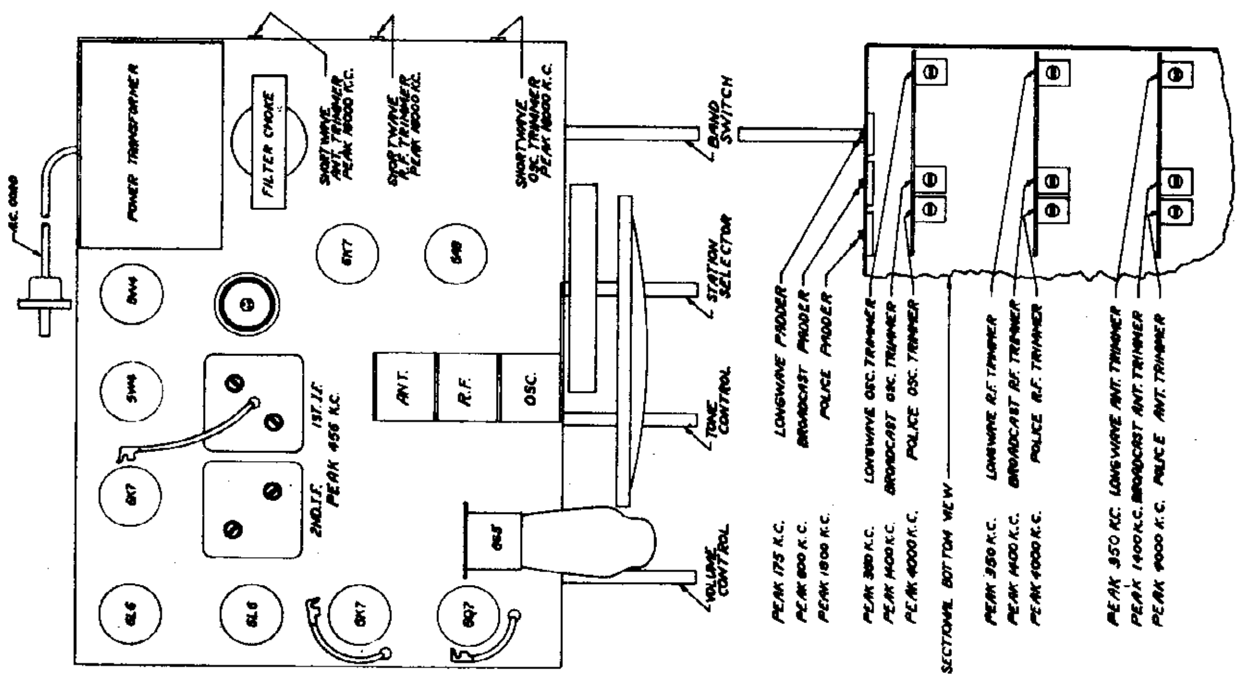
This radio receiver is designed for operation on standard American broadcasts, Police, Amateur, aviation, ships, foreign and U. S. governmental time and weather broadcasts. This vast coverage in radio entertainment and utility is divided into four parts or bands indicated on the tuning dial and the wave band indicating device.

The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated from 150 to 375 K.C. (2000 to 800 meters) and covers the range necessary for receiving governmental time and weather reports. The second band from the center is for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The third band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The fourth band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39 and 49 meter channels.

MODELS 6508,6556,Chas. AM6
Schematic,Socket
Alignment,Trimmers

SPIEGEL INC.

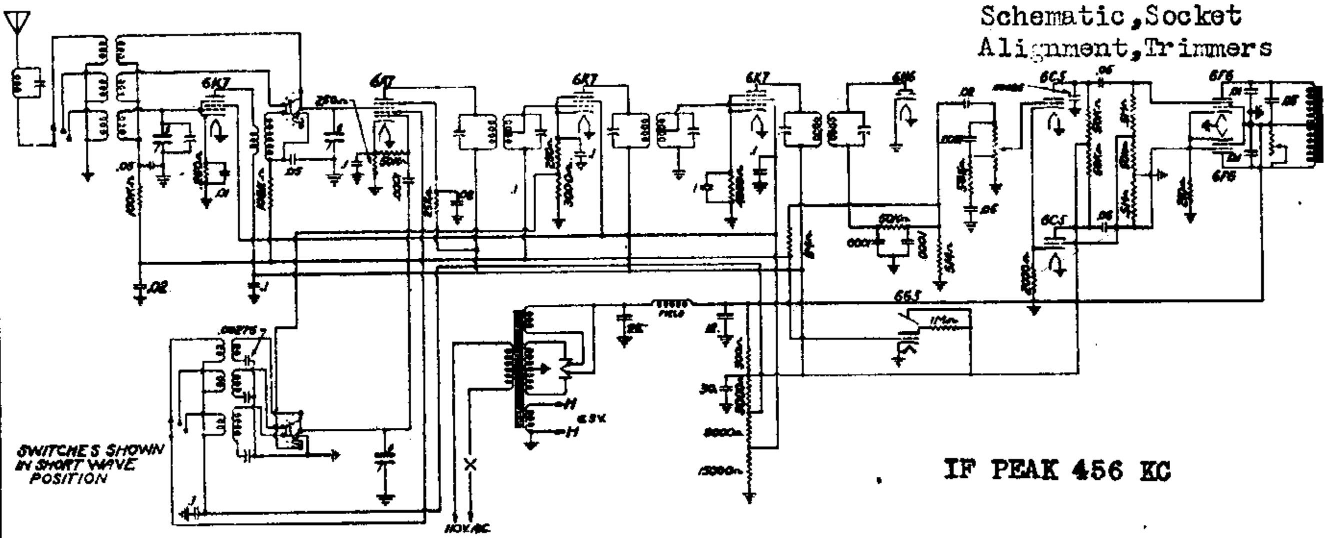


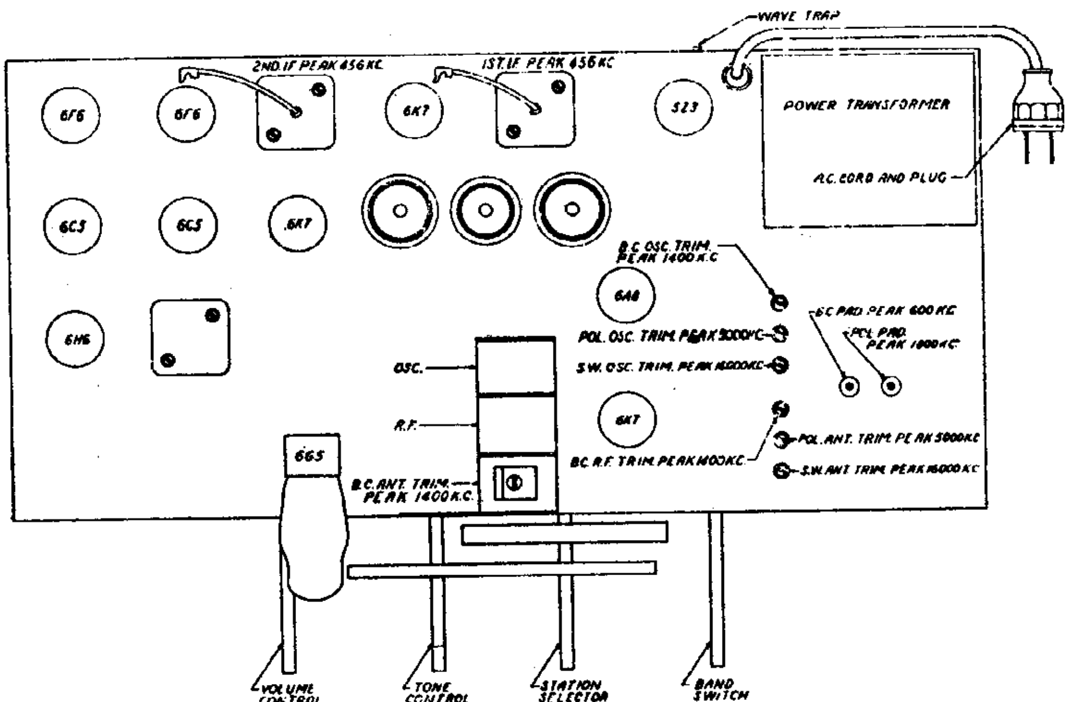


The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated from 150 to 375 K.C. (2000 to 800 meters) and covers the range necessary for receiving governmental time and weather reports. The second band from the center is for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The third band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The fourth band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39 and 49 meter channels.

SPIEGEL, INC.

MODELS 5054,5062,6570
6580,6582,6590
Chassis AM7
Schematic,Socket
Alignment,Trimmers





ALIGNMENT

IF trimmer adj. at 456 KC through .05 or .1 mf dummy condenser.

BC osc. trimmer and ant. trimmer adj. at 1400 KC through .001 mf dummy. Padder at 600 KC. Recheck at 1400 KC.

Foreign Band: Through .0001 mf dummy, adj. at 14000 KC both the S.W. oscillator and S.W. trimmers. Check for image frequency at 13100 KC for proper weaker signal.

Police Band: Through 400 ohm resistor .0001 mf cond. series dummy, adjust osc. trimmer and ant. trimmer at 4000 KC. Padder adj. 1800 KC. Recheck at 4000 KC.

Wave Trap: At rear of chassis near grd. & ant.post adj. wave trap screw at 456 KC.

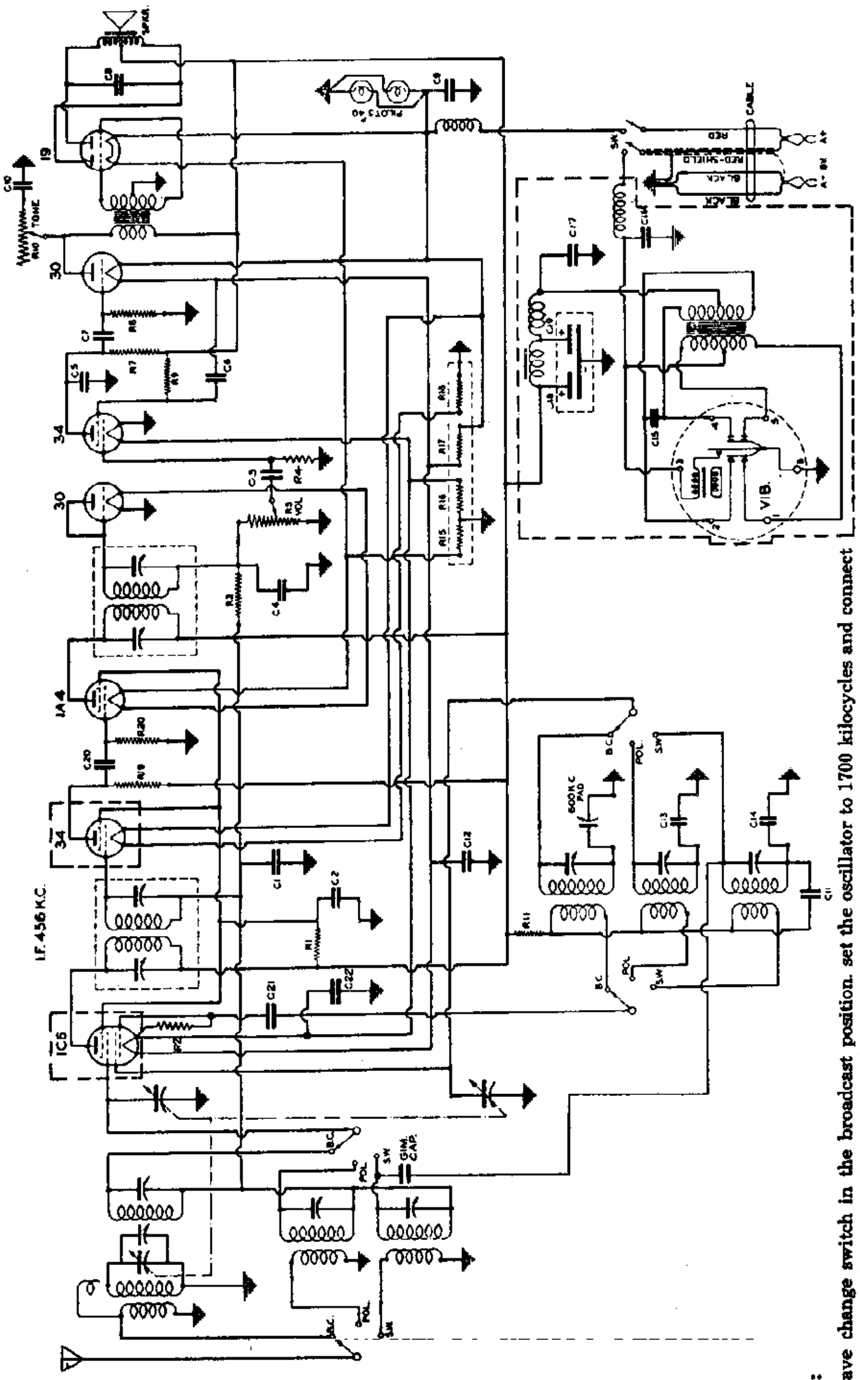
Dial Calibration - Government & Weather Reports - 150 to 375 KC.
Broadcast 550 to 1700 KC.
Police, Amateur, Aircraft & Ships 1700 to 5400 KC.
Short Wave 5.5 to 18 megacycles.

MODELS 5256,5260,6760,6770
6776 Chassis 700
Schematic,Socket,Alignment

SPIEGEL INC.

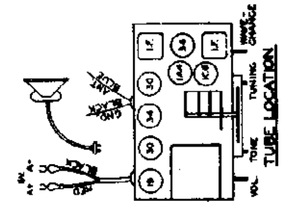
I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.



7-Tube, 6-Volt Battery Operated Superheterodyne

LEGEND				
R1	25M OHMS	C1	.1	MFD.
R2	50M	C2	.1	
R3	1MEG	C3	.01	
R4	1MEG	C4	.00025	
R5	500M	C5	.0005	
		C6	.1	
R7	100M	C7	.05	
R8	500M	C8	.006	
R9	1MEG	C9	.1	
R10	50M	C10	.03	
R11	5M	C11	.001	
		C12	.1	
		C13	.0015	
		C14	.0027	
R15	20	C15	.0075	
R16	333	C16	.5	
R17	333	C17	.01	
R18	66.6	C18	8.	
R19	25M	C19	8.	
R20	250M	C20	.001	
		C21	.0001	
		C22	.1	



TUBE LOCATION

R. F. Alignment:

With the wave change switch in the broadcast position. set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust the antenna trimmer located on rear section of variable condenser. Adjust 1st detector trimmer under the chassis across preselector. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

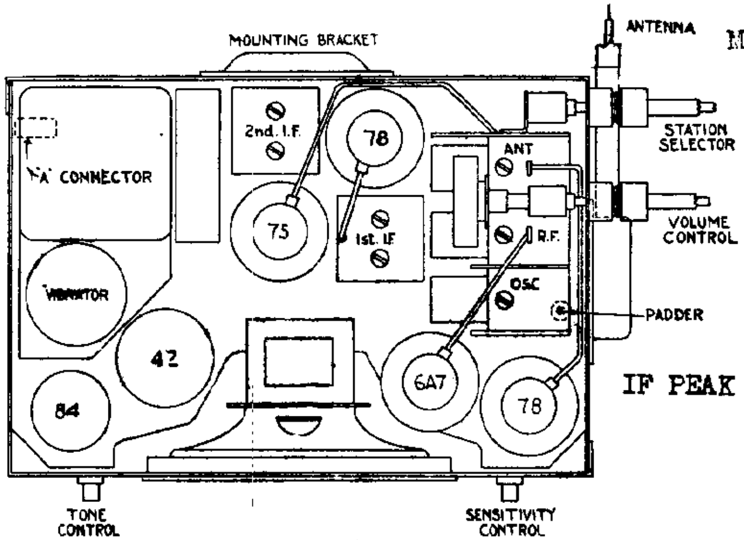
For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. Set test oscillator to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.

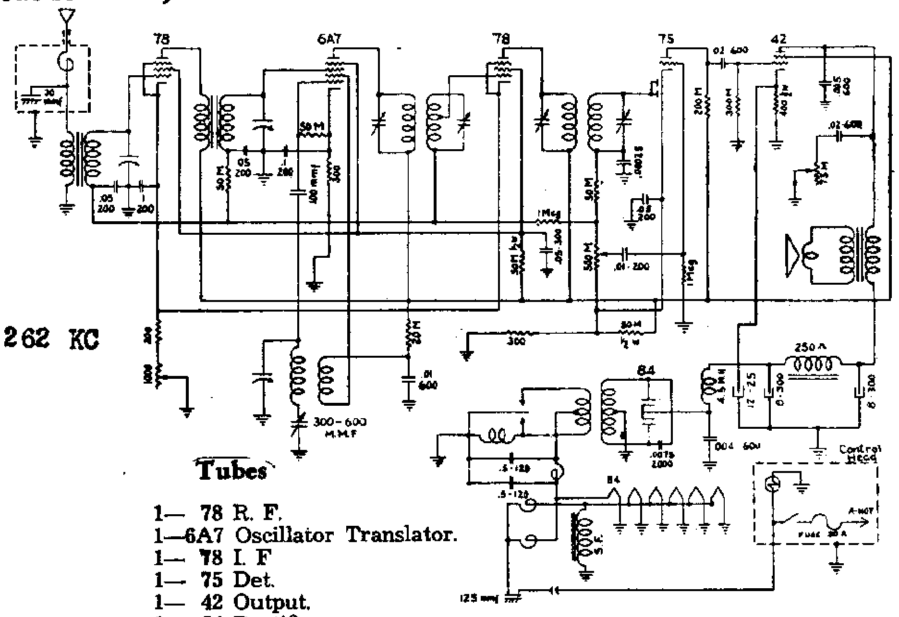
MODELS 6512,6542,6566
Chassis 14-142ES
Schematics,Socket,Trimmers
Alignment

SPIEGEL INC.

MODELS 6805 to 6808 inc
6815 to 6818 inc.6836
Chassis 14-112S



Models 6805, etc.



IF PEAK 262 KC

Tubes

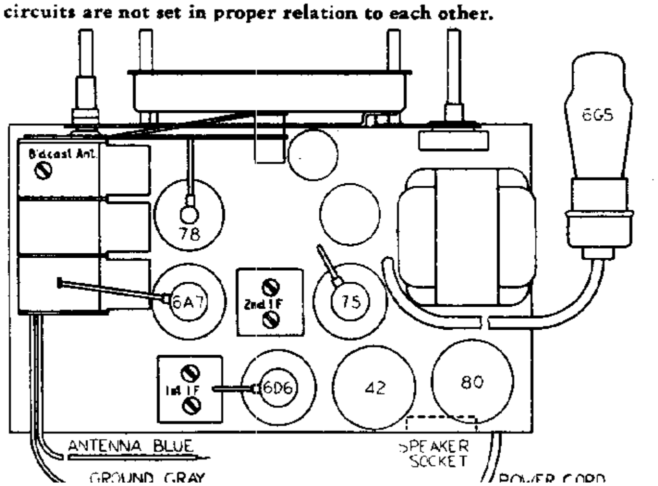
1— 78 R. F.
1—6A7 Oscillator Translator.
1— 78 I. F
1— 75 Det.
1— 42 Output.
1— 84 Rectifier.

ALIGNMENT FREQUENCIES:

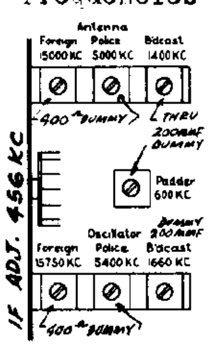
IF	262 KC	thru .1mf dummy
OSC.	1570 KC	thru .00025 mf dummy
Ant. & RF	1400 KC	" "
PADDER	600 KC	" "

FOR CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOL. V111

procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.

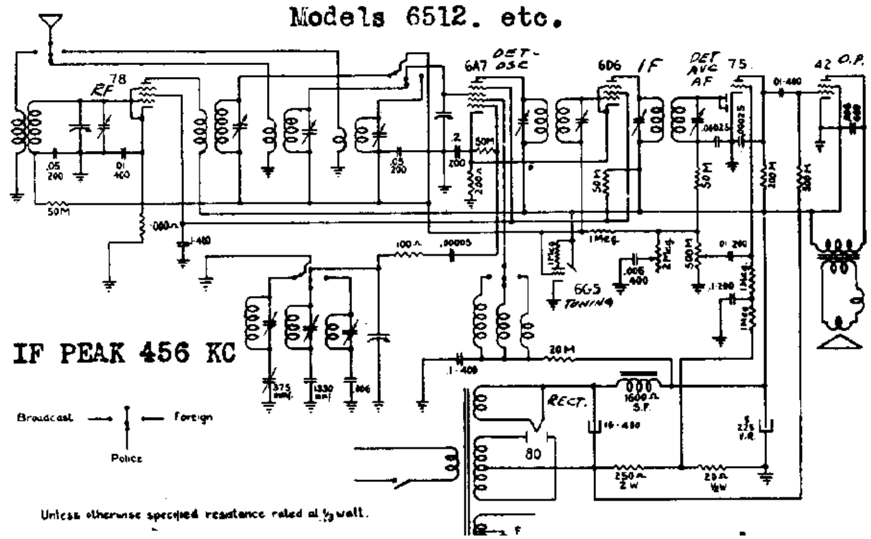


Alignment
Frequencies



TRIMMER ADJUSTMENT

Models 6512. etc.

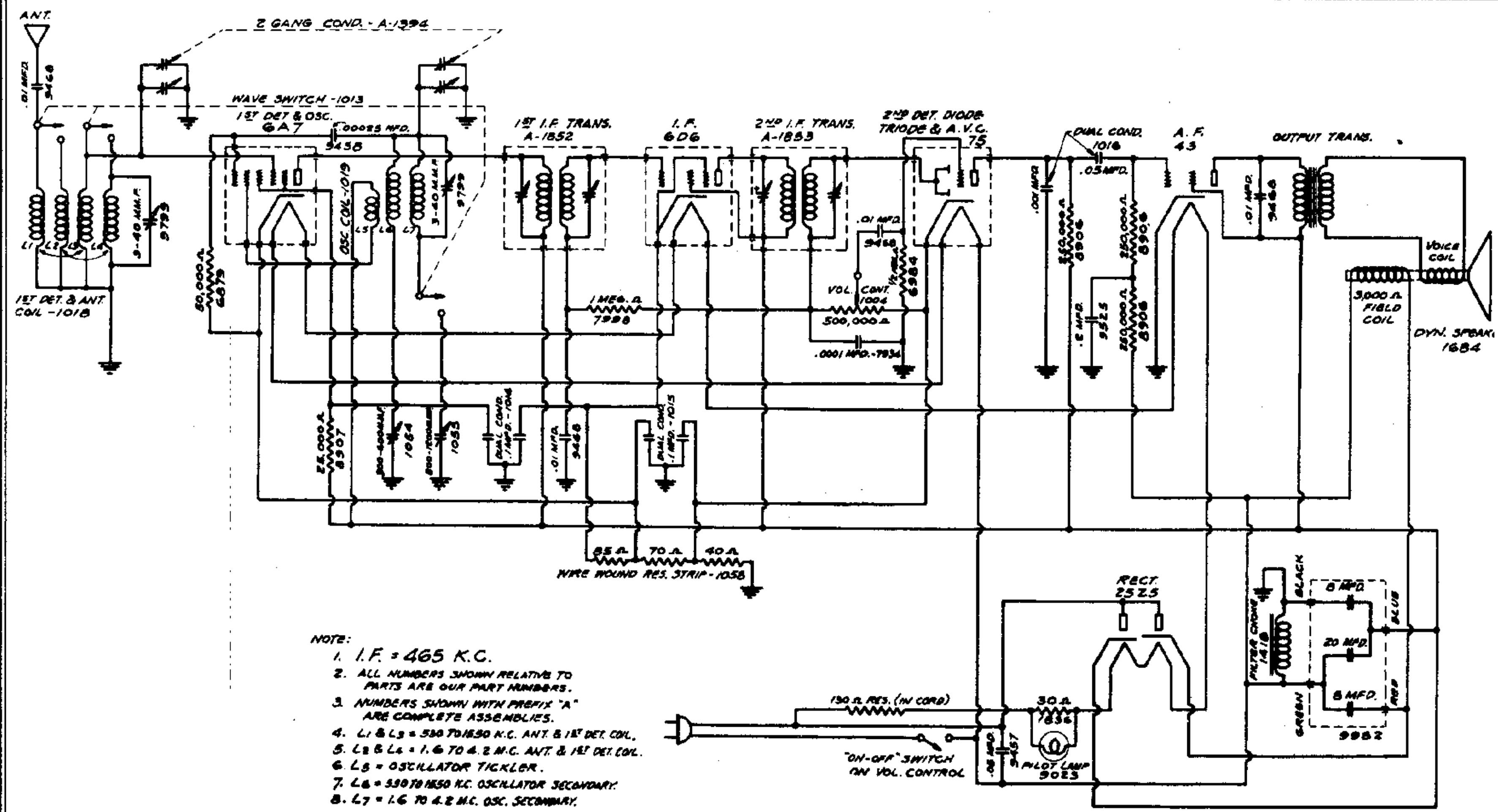


IF PEAK 456 KC

Unless otherwise specified resistance rated at ½ watt.

MODEL 9907, Chassis 5258
Schematic, Voltage
Alignment

SPIEGEL INC.



NOTE:
1. I.F. = 465 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. L_1 & L_3 = 530 TO 1650 K.C. ANT. & 1ST DET. COIL.
5. L_2 & L_4 = 1.6 TO 4.2 M.C. ANT. & 1ST DET. COIL.
6. L_5 = OSCILLATOR TICKLER.
7. L_6 = 530 TO 1650 K.C. OSCILLATOR SECONDARY.
8. L_7 = 1.6 TO 4.2 M.C. OSC. SECONDARY.

TWO BAND
FIVE TUBE AC/DC SUPERHETERODYNE
1550-540 Kilocycles
1.5- 4.8 Megacycles

CONVENTIONAL ALIGNMENT:
ALIGNMENT FREQUENCIES
IF 465 KC (Leave grid cap disconnected
BROADCAST 1400 KC, 600 KC.
SHORT WAVE 1700 KC, 3.4 MC.
Align in order given, - check
SEE SPECIAL SECTION VOL. VIII.

VOLTAGE TABLE
Line Voltage : 115

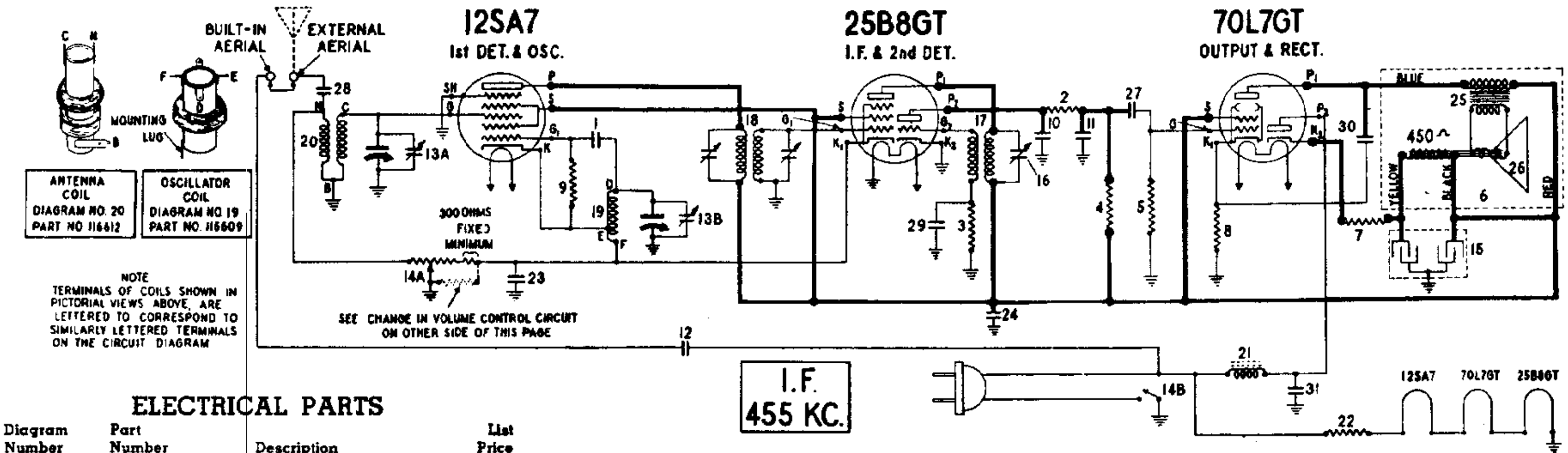
TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO. 2	GRID NO. 3 and 5
6A7	Modulator and Oscillator	6	105	60	1.8	100	60
6D6	I. F. Amplifier	6	105	105	2.7		
75	2nd Det.Diode,Triode & AVC	6	40*		.5		
43	Output	24	100	105	18**		
25Z5	Rectifier	24					

* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

STEWART-WARNER CORP.

MODEL A6, Air Pal,
Chassis 07-31
Schematic, Voltage, Socket



ELECTRICAL PARTS

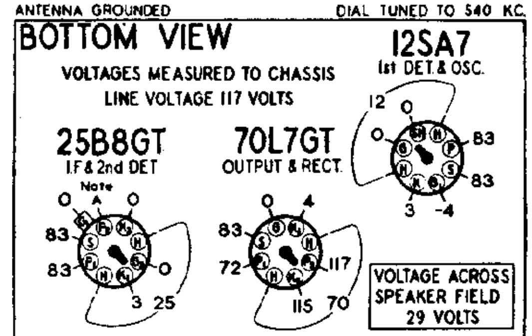
Diagram Number	Part Number	Description	List Price
1	83783	Condenser—mica 110 mmf.	$0.20
2	110566	Resistor—carbon 33,000 ohms ¼ watt.	.12
3-4-5	112971	Resistor—insulated 470,000 ohms ¼ watt	.15
6	R-115053	Speaker—dynamic 3"	4.00
7	116013	Resistor—wire wound 50 ohms 1 watt.	.18
8	116064	Resistor—insulated 100 ohms (10%) ½ watt	.14
9	116066	Resistor—insulated 68,000 ohms (10%) ¼ watt	.12
10-11-12	116224	Condenser—mica 260 mmfd. 500 volt.	.15
13A-13B	116578	Condenser—2 gang	2.50
14A-14B	116579	Volume control—20,000 ohms, with switch	1.10
15	116587	Condenser—electrolytic 20-20 mfd. 150 volt	.95
16	116599	Trimmer condenser (2nd I.F.)	.15
17	116603	Transformer—2nd I.F.	.70
18	116605	Transformer—1st I.F.	.80
19	116609	Coil—oscillator	.34
20	116612	Coil—antenna	.60
21	116616	R. F. Choke coil	.32
22	116618	Resistor—65 ohms (10%), 2 W., w. w.	.20
23-24	116625	Condenser—.1 mfd. 600 volt	.25
25	R-116633	Transformer—output for R-115053 speaker	1.50
26	R-116635	Cone & Voice coil assembly for R-115053 speaker	1.45
27	116640	Condenser—.01 mfd. 600 volt	.15
28	116647	Condenser—.004 mfd. 600 volt	.15
29	116819	Condenser—.05 mfd. 600 volt	.20
30-31	116893	Condenser—.02 mfd. 600 volt	.15

MISCELLANEOUS PARTS

Part Number	Description	List Price
116637	Cabinet—(walnut)	$2.65
116657	Cabinet (sprayed ivory) for 07-313	2.65
112745	Clip—coil mounting	.01
116576	Insulator—fibre for base (inside)	.04
116716	Insulator—fibre for base (outside)	.06
116532	Knob—volume control (red)	.18
116533	Knob—tuning (red)	.18
116886	Knob—volume control (ivory)	.24
116887	Knob—tuning (ivory)	.24
116584	Rubber foot for bottom of cabinet	.02
116629	Screw—No. 8-32x1⅛ Bind. H.M.S.	.01
116630	Screw—No. 8-32x1½ Bind. H.M.S.	.01
116583	Terminal Strip (for antenna)	.12
116592	Tube shield	.10

SOCKET VOLTAGES

VOLUME CONTROL SET AT MAXIMUM VOLUME POSITION
ANTENNA GROUNDED DIAL TUNED TO 540 KC.



REAR OF CHASSIS

NOTE A: Due to the high resistance of resistor No. 4, only a small voltage will be read on a meter having a resistance of 1000 ohms per volt.

May 26, 1939

MODEL A6, Air Pal
Chassis 07-31
Alignment, Trimmers
Antenna Notes, Change

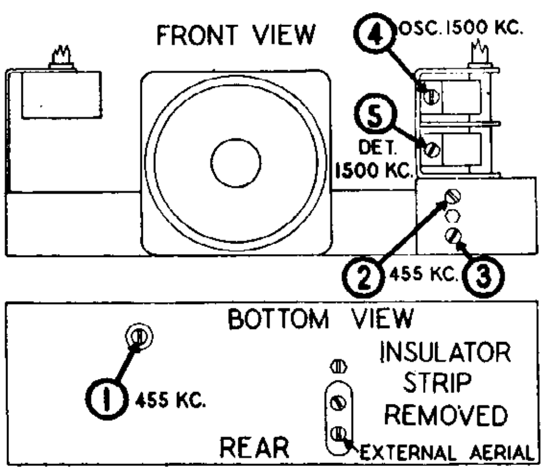
STEWART-WARNER CORP.

ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Solder the output meter leads from output plate (P) to screen (S) of the 7OL7GT tube (See voltage chart). The leads must be soldered since the bottom cover must be replaced during alignment. The output meter leads can be brought through the power cord opening.
2. Connect the ground lead of the signal generator through a .25 mfd. condenser to some portion of the chassis in the VICINITY OF THE GANG CONDENSER.
3. Remove the connector between the antenna terminals on the bottom of the set.
4. Turn the volume control to the maximum volume position and keep it in this position while aligning.
5. The tuning knob should be adjusted so that the nick which appears on the outer part of the knob is accurately centered and points away from the chassis when the gang condenser is in full mesh.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on bottom gang condenser	455 KC	Any point where it does not affect signal	1	2nd I.F.	Adjust for maximum output. Then repeat adjustment. (If the set oscillates, see precautions under heading "I. F. Oscillation".)
				2-3	1st I.F.	
200 MMFD. Mica Condenser	Antenna Terminal on bottom (Terminal nearest back of chassis)	1500 KC	1500 KC	4	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal on bottom (Terminal nearest back of chassis)	1500 KC	Tune to 1500 KC Generator Signal	5	Broadcast Antenna	Adjust for maximum output.



CHANGE IN VOLUME CONTROL CIRCUIT

On early releases of this model, a volume control was used which required a 4700 ohm resistor connected as shown by the dotted lines in the circuit diagram. In later production sets, a volume control with a different taper was used so the 4700 ohm resistor was not required. This later volume control carries the same part number.

When replacing a control using the resistor with a later type control, the connections are the same but the 4700 ohm resistor is omitted. Only the new controls are carried in stock by Stewart-Warner.

I. F. OSCILLATION

When aligning this set, I. F. oscillation may be encountered if the following precautions are not observed:

1. Keep the bottom cover plate on during alignment.
2. Keep the signal generator leads as far from the chassis as possible in order to prevent unnecessary feed-back.
3. Connect the ground lead of the signal generator through a .25 mfd. condenser to some part of the chassis in the VICINITY OF THE GANG CONDENSER.
4. Keep the orange lead of the volume control away from the 2nd I.F. transformer. Separating this lead from the others surrounding it at the base of the 25B8GT tube will also help.

BUILT-IN ANTENNA SYSTEM

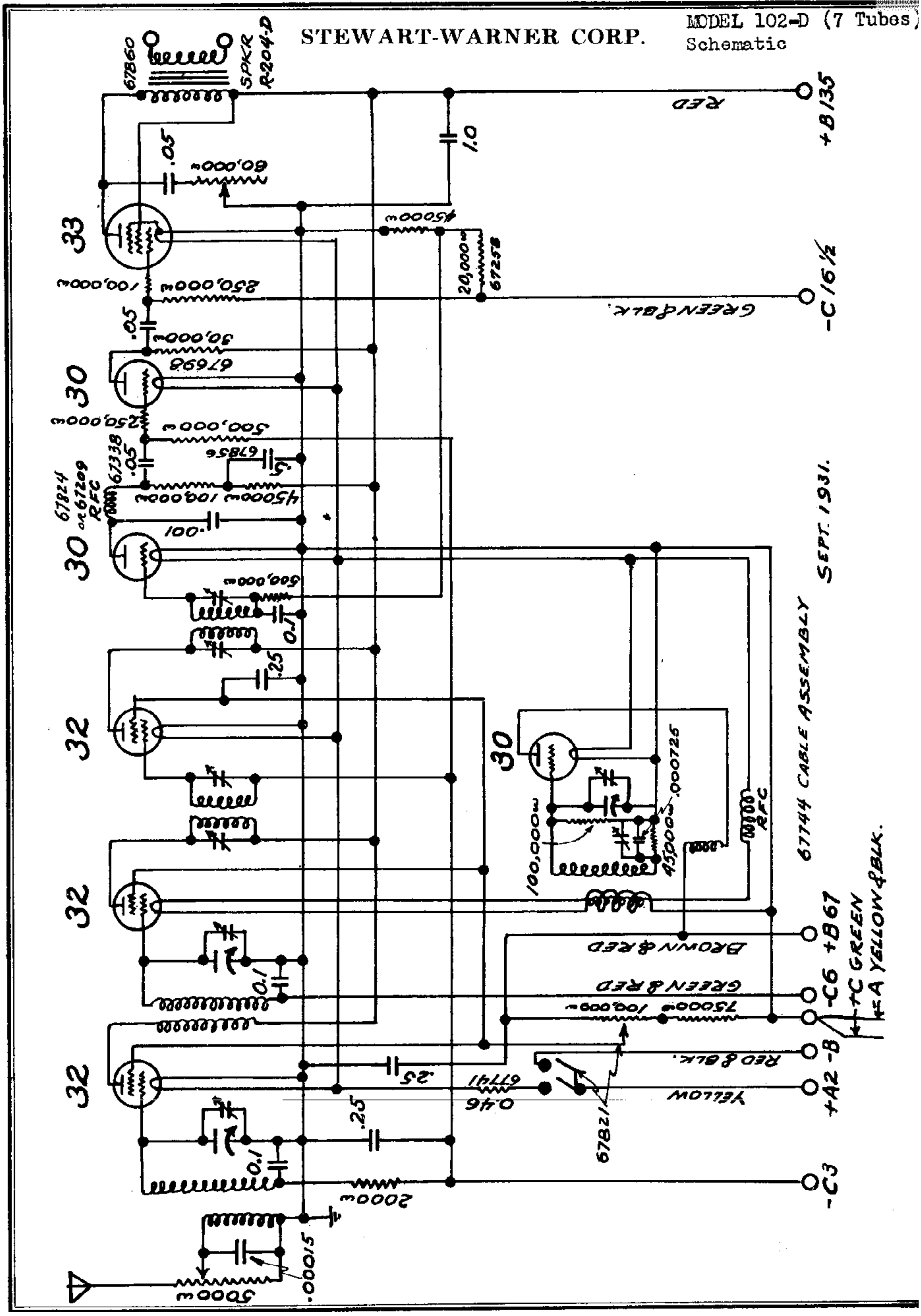
The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when the terminals on the bottom of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting these terminals and connect an external antenna to the terminal marked "External Aerial." This is the terminal nearest the back of the set.

The Built-In Antenna Condenser No. 12 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 21 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent condenser No. 31 from by-passing the signal voltage picked up by the power line. It also prevents feed-back into the antenna circuit of radio frequency energy generated in the set itself.

When aligning this receiver, the jumper connecting the antenna terminals on the bottom of the set should be removed. This will prevent picking up signals which might interfere with the alignment procedure.

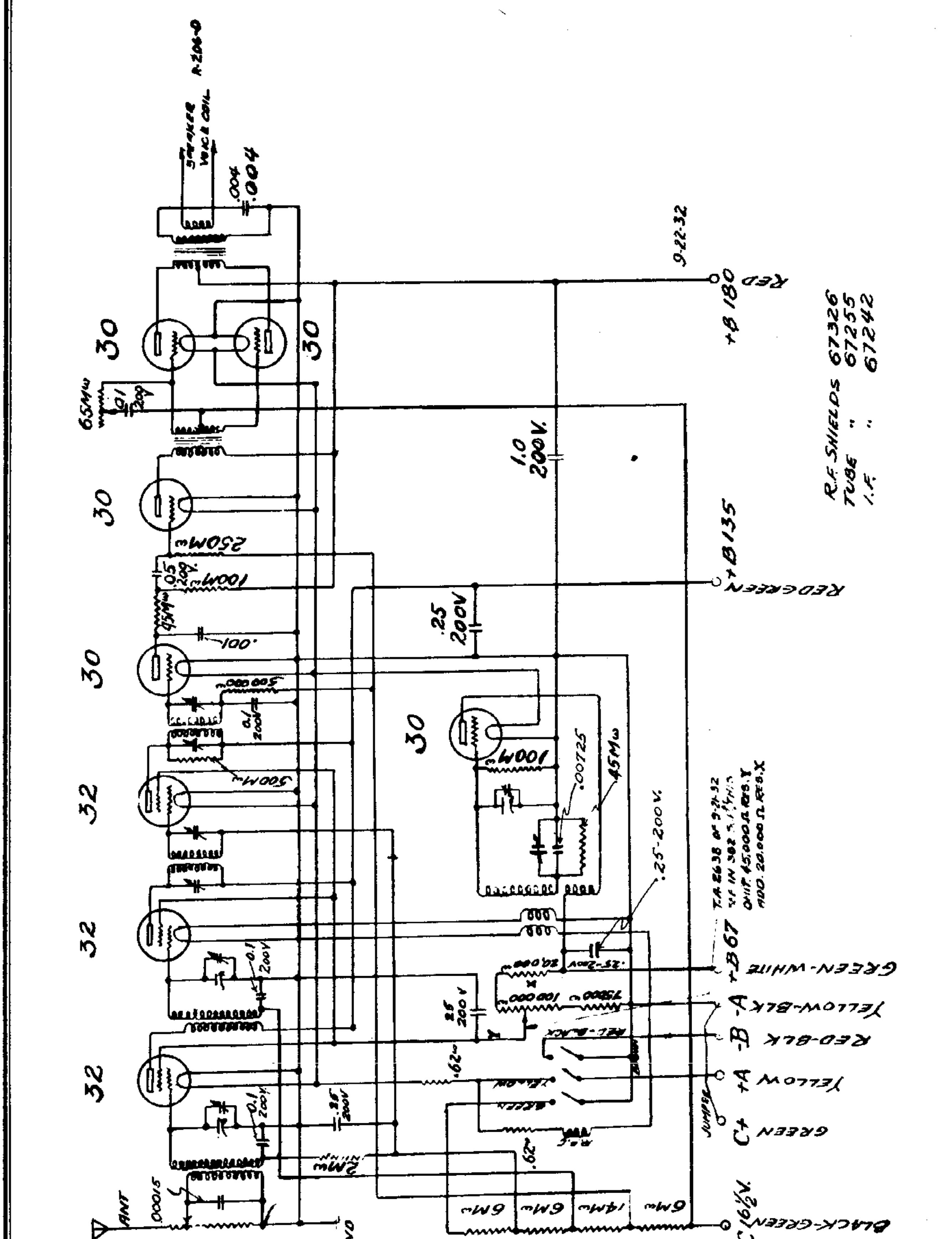
STEWART-WARNER CORP.

MODEL 102-D (7 Tubes)
Schematic



MODEL 102-D (8 Tubes)
Schematic

STEWART-WARNER CORP.



Tuner Data, Notes, Parts

STEWART-WARNER CORP.

MODELS 91-1111 to 91-1119
98-1111 to 98-1119
910-1111 to 910-1119
Drive Cord Data.

Chassis Model	Used in Receiver Models	Voltage	Frequency
91-111	91-111 to 91-1119	117	60 cycles
98-111	98-111 to 98-1119	117	25 cycles
910-111	910-111 to 910-1119	100-240	60 cycles

These chassis are 11 tube, Electric Push-Button Tuning, Superheterodyne receivers. The tuning ranges are 535 to 1730 KC, 2.2 to 7.0 MC, and 8.6 to 22.5 MC.

Incorporated in each chassis is a ruggedly constructed Electric Push-Button Tuner Unit, which was primarily designed to give long-life and consistent accuracy of tuning. Aside from the automatic tuning system this receiver incorporates several features described in the following paragraph which the service man should carefully read as they may aid him in rapidly locating the source of trouble.

VARIABLE SELECTIVITY: Two degrees of selectivity can be obtained by proper use of the first push-button labelled "Manual". When the button is in the "out" position the tuning of the receiver will be broad. With this button in the "in" position the tuning will be sharp. Broadening is accomplished by inserting a resistor and coil in series with the secondary of the first I. F. transformer. The series coil is mutually coupled into the primary of the same I.F. transformer thereby causing a flattening of the overall selectivity.

AUDIO SYSTEM: The audio voltage developed across the diode load resistor is fed to the volume control which in turn couples, the desired amount of this audio voltage to the control grid of the 5K7 1st audio tube. The output of this stage is coupled to one of the 6V6-G output tubes. Also a portion of the output of the 6K7 is coupled through a voltage divider network consisting of resistors No. 44, 81 and 82 to the control grid of the 6Q7-G. This tube acts as the phase inverter and its output drives the other 6V6-G output tube. A mute switch connected across the control grids of the two 6V6-G output tubes is utilized to silence the receiver while the automatic tuning unit is in operation. This is accomplished by placing the mute switch on the back of the tuner motor. When the motor starts to operate the rotor pulls into the magnetic field of the stator, which causes the end of the motor shaft to push against the mute switch and close its contacts.

TYPICAL TROUBLES AND THEIR SYMPTOMS.

1. SYMPTOM: When electric tuner button is depressed pointer travels to end of dial and motor hums.
   REMEDY: Black and brown leads from motor to contactor drum are connected in reverse. Reverse connections at motor terminals.

2. SYMPTOM: When either the second or third button from the left or right end of the Magic Keyboard is depressed the dial pointer will travel to the end of the dial and the motor will hum.
   REMEDY: This is caused by misalignment of contactor drum and gang condenser. Release set screw holding drum in place on shaft, and close the gang condenser completely. Place a slider contactor at each extremity of the slider bridge. Now set the contactor drum so that the division between the two sections (POINT "X" IN FIG. 1) is just below the contactor which you set at the extreme left end of the bridge (viewed from rear). The contactor on the extreme right of the bridge will now fall on point just above the dead spot indicated by the white arrow on the drum. NOTE: The contactor on each extreme end must contact the same section of the contact drum or the drum is incorrectly set. After the setting has been performed retighten the set screw.

3. SYMPTOM: Tuner fails to operate.
   REMEDY: (1) The small black set-up switch on the back of the tuner must be in the left hand position.
   (2) Overload thermostat on motor will open when temperature of motor reaches dangerous value (approx. 95° C). Thermostat will close automatically when motor cools down.

REMOTE CONTROL UNIT

This Stewart-Warner radio is designed to permit tuning from a remote point such as your armchair or any point within 20 ft. of the receiver cabinet. A special "Remote Tuner Kit" part No. 113600 is available to adapt your receiver for remote control. It can be purchased from any Stewart-Warner Dealer, Distributor, or from Stewart-Warner Corporation, Chicago, Illinois. This accessory kit consists of a remote control unit incorporating eight push buttons and a remote volume control. The unit is connected by a flat flexible cable to an eleven prong plug, which fits into a corresponding socket at the left rear of the receiver chassis. Following are the instructions for installation of the remote control unit:

1. Turn off the radio set.
2. Remove the wire connector which joins the two holes adjoining the white dot on the eleven hole socket. IMPORTANT: If at any time you decide to discontinue the use of the remote control unit, remove the plug and reinsert this wire connector in the two holes adjoining the white dot. Failure to replace the connector will make the set inoperative.
3. Insert the remote control plug in its socket and locate the remote control unit at some convenient point within 20 ft. of the set. The connecting cable may be placed beneath the rug, or along the floor.
4. PRESS IN THE "REMOTE" BUTTON (#10) on the Magic Keyboard and the The unit is now ready for operation.

HOW TO SET UP THE PUSH BUTTONS

1. Be sure that your set is first connected to a good antenna system.
2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.
3. Make a list of eight nearby stations which you wish to tune in with automatic tuning buttons. Be sure to select nearby powerful stations, since weak stations will generally give poor results. Arrange the list so that the lowest frequency station appears first then the next lowest frequency, continuing in this manner until stations are in numerical order. The frequency of your local stations may be obtained from your newspaper or radio call magazine.

Only buttons No. 2 to No. 9 are used for automatic tuning. IT IS IMPERATIVE THAT THESE BUTTONS BE SET-UP IN THE FOLLOWING ORDER: Button No. 2 must be set to tune in the station whose frequency is lowest in your list of eight stations. Button No. 3 must be set to tune in the station next higher in frequency. Continue to follow this procedure until Button No. 9 will be set to tune in the station whose frequency is highest in your list.

The actual setting up of the buttons is done as follows:

4. Place the small black "set-up switch" button which appears on the back of the chassis, in the right hand position. (See label on back of chassis.) LEAVE THIS SWITCH BUTTON IN THIS POSITION UNTIL ALL BUTTONS HAVE BEEN SET UP.
5. Push in the "Manual" button and use the tuning knob to tune in the station (lowest frequency on your list) that you have selected for Button No. 2. Be sure to tune in station correctly using the "Tuning Eye". The correct tuning point is indicated when the two open ends of the inverted "V" shaped shadow in the "Tuning Eye" are closest together.
6. PUSH IN BUTTON No. 2. The lamp mounted on the back of the chassis just to the right of the selector drum will be illuminated when the button is depressed. (See Fig. 1.)

NOTE: If the lamp does not light up when the switch is in this position, it indicates that Button No. 2 is already correctly set to the desired station and no further adjustment need be made for this button.

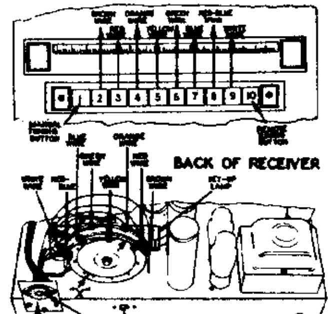


FIG. 1.

7. Locate the contactor corresponding to Button No. 2. This contactor has a BROWN lead attached to it, (see Fig. 1 or label on back of the chassis for the color of the wire associated with each button) and is the extreme right hand contact on the inner circle of the semi-circular bridge, when viewed from rear of chassis. Loosen the knurled nut on this contactor (not more than one-half turn.) - Then slide this contactor along the bridge to the point indicated by the white arrowhead on the side of the round drum. When this point is reached, the lamp will go out. If the contactor is moved farther than the point at which the lamp extinguishes, the lamp will again be illuminated. Move the contactor back and forth between the two points. Then tighten the knurled nut as tightly as possible, with the finger. The lamp should still be out after tightening the contactor. If it is not, the contactor must be reset.
8. The set-up for Button No. 2 is now complete.
9. Set-up the remaining seven buttons in a similar manner. The contactors for the buttons can be identified as follows: (See Fig. 1 or label on back of chassis.)

Button No. 2 - Brown Lead	Button No. 6 - Green Lead
Button No. 3 - Red Lead	Button No. 7 - Blue Lead
Button No. 4 - Orange Lead	Button No. 8 - Red-Blue Lead
Button No. 5 - Yellow Lead	Button No. 9 - White Lead

10. AFTER ALL BUTTONS HAVE BEEN SET-UP YOU MUST PLACE THE SMALL BLACK SET-UP SWITCH BUTTON IN THE LEFT HAND POSITION (white dot showing) OTHERWISE THE ELECTRIC TUNER MOTOR WILL NOT OPERATE. (See label on back of chassis just below this switch.) This re-connects the motor and enables you to tune to any of the eight selected stations by pushing the proper button.
11. To use the "Magic Keyboard" it is only necessary to push the button for the station you desire.
12. The "Magic Keyboard" push buttons may also be used on the Foreign or Intermediate bands. However, on these bands we recommend that, rather than setting a button to a station, you set the button to some particular location on the dial where foreign, police, aircraft or amateur stations are frequently received. Attempts to set buttons to short-wave stations are not recommended due to the extreme sharpness of tuning on these bands.
13. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing the tab slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

REPLACING THE ROLLER DIAL DRIVE CORD

1. Tie a tension spring, part number 113177, to one end of about 30" of special dial cord part No. 111302.
2. Tie a large knot in the cord, 6¼" from the tension spring.
3. Turn the range switch to the Short Wave position -- all the way counterclockwise. Pulley A on the range switch shaft should be in the position shown in Fig. 2.
4. Place the knot on the cord in slot B.
5. With the long free end of the cord (not the end with the spring attached), take 1½ turns clockwise around pulley A, then thread the end up through hole C back of pulley D and up to the front of pulley E.
6. Turn pulley E until the slot F is up as shown in the figure. Now, with the free end of the cord wind clockwise; 1½ turns around E, out through slot F, 1 turn around G, back through slot F, and 1½ turns around E.
7. Bring the cord down back of pulley H and leave it hang for the time being.
8. With the end of the cord to which the tension spring is attached, take 1½ turns counterclockwise around pulley A, (when viewed from the right end) and then bring the cord up through hole C.
9. Tie the free end of the cord hanging over pulley H, to the upper end of the tension spring. The spring should be extended so it is approximately 1½" long when the tension in the cord system is equalized.

If the Short Wave scale on the dial is not in the proper position under the pointer, loosen the set screw in hub G, rotate the dial scale to the proper position and tighten the set screw.

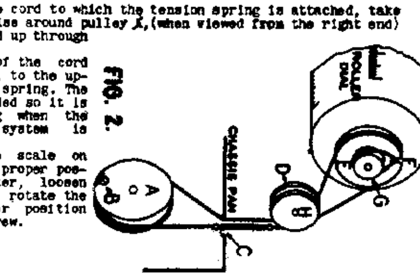


FIG. 2.

DIAL AND MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
87558	Washer - embossed (for mtg. elect.)	$ .05
85078	Terminal Strip - G.D.A.	.20
85321	Connector - Ground	.01
85427	Socket - octal base (standard)	.16
85827	Set Screw - 8/32 square head	.02
86348	Eyelet - for dial cord - Per dz.	.05
89748	Washer - (paper) for back of knobs	.005
110496	Plug - speaker (4 prong)	.12
110501	Socket - 4 prong (for speaker)	.16
110629	Washer - flat steel, for mtg. chassis	.01
111065	Sleeve - felt for tuning eye	.03
111302	Cord - dial drive 6 or 50 ft. lgths. Per Ft.	.05
112745	Clip - coil mounting (osc. & ant.)	.01
112798	Clip - for mtg. wave trap coil	.01
112874	Screw - #10 X 1-1/8 chassis mtg.	.01
112876	Screw - P.B. escutcheon mtg. #3 X 3/8	.01
112879	Screw - eye escutcheon mtg. #2 X 3/8	.03
113019	Clip - dial scale retaining	.01
113025	Socket - octal base (with special ground)	.15
113041	Knob - Push-on	.10
113077	Shield - tube	.15
113102	Push button only	.08
113135	Escutcheon - for eye	.25
113177	Spring - dial cord tension	.09
113189	Tab - celluloid - for push button - Per dz.	.09
113201	Semi-circular bridge-for "set-up" contacts	.60
113206	Pulley - on auxiliary range switch shaft	.40
113207	Gear - pinion on aux. range switch shaft	.25
113208	Dial End Cup - right side	.14
113233	Disc & Bushing - on back of gang for electric tuner	1.60
113260	Pointer - dial	.14
113267	Contact & Spring Assem.-for elect. tuner	.32
113283	Cable - for tuning eye	.30
113288	Shaft - auxiliary, for range switch	.15
113321	Tabs - station call letters (4 sheets) (brown) - Per set	.40

PART NUMBER	DESCRIPTION	LIST PRICE
113340	Socket - dial lamp	[illegible]
113347	Gear - on range switch shaft	.40
113348	Bracket - dial (R.H.)	.32
113349	Bracket - dial (L.H.)	.32
113352	Pulley - right end of roller dial shaft	.16
113353	Dial End Cup - left side	2.40
113356	Escutcheon - for roller dial	1.00
113357	Escutcheon - around push buttons	.56
113402	Drum - dial cord drive	.20
113404	Socket - for "set-up" lamp	[illegible]
113406	Socket - 11 prong (for remote control) supplied with mtg. plate	.38
113431	Dial Scale - celluloid cell	1.50
113442	Bracket - for tuning eye	.16
113443	Knob - with gold stripe (for range switch)	.10
113463	Rubber Bushing - chassis mtg.	.03
113482	Light Shield - cardboard (over push button)	.08
113511	Gear - fibre (on motor)	1.30
113629	Cap - cover for back of remote control socket	.16

REMOTE CONTROL UNIT PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
94	113600	Remote Control Unit	12.00
95A-95B	113644	Switch - two section (in remote control unit)	4.20
96	113646	Volume Control - (35,000 ohms) on remote control unit	.75
	113650	Case - for remote control unit	1.20
	113651	Push Button - for remote control unit	.08
97	113653	Plug - 11 prong (for remote control unit)	.48
	113673	Cable - for remote control unit (20 ft.)	9.00
	113656	Tabs - station call letters (for remote control unit only)	.45

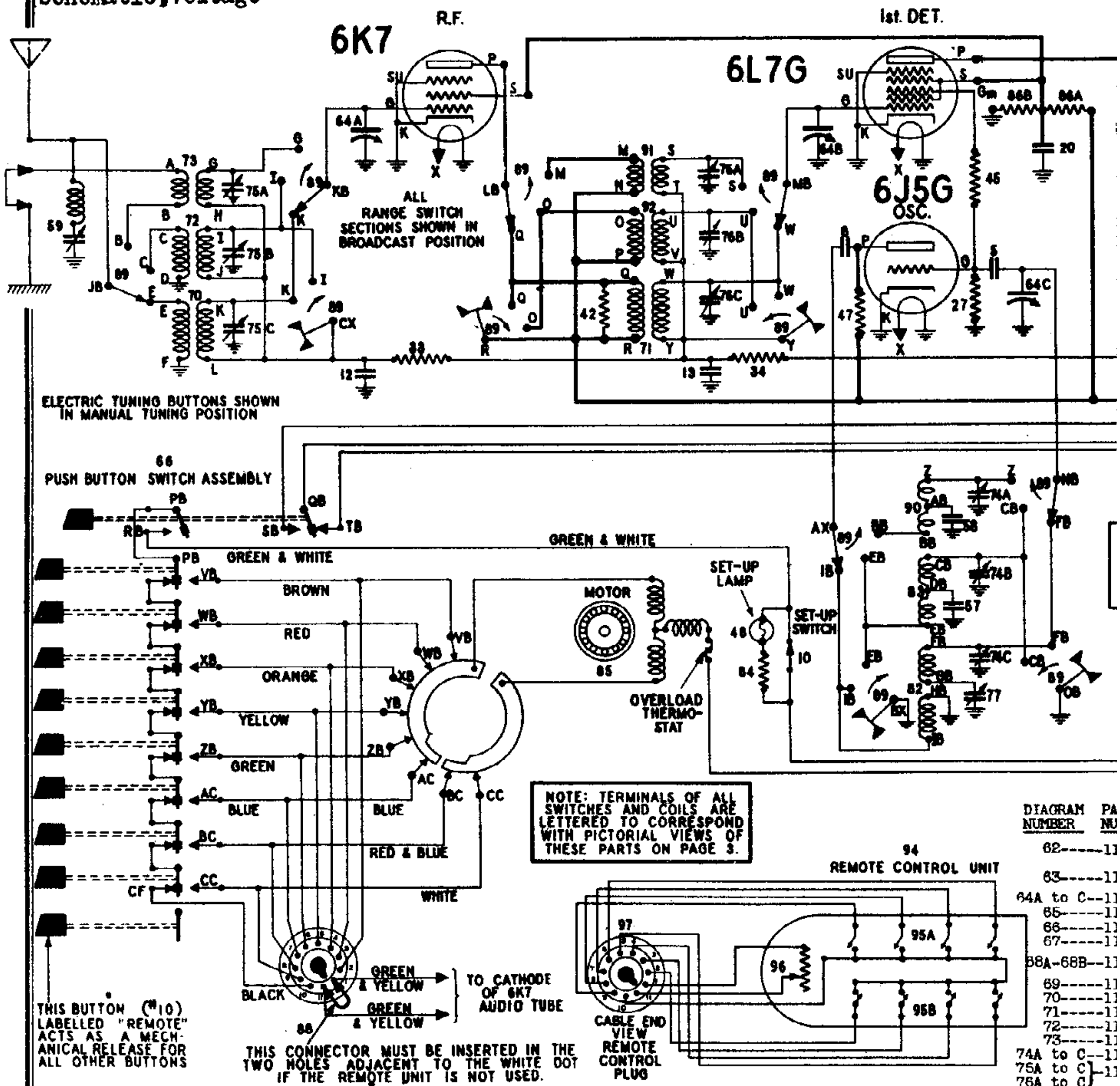
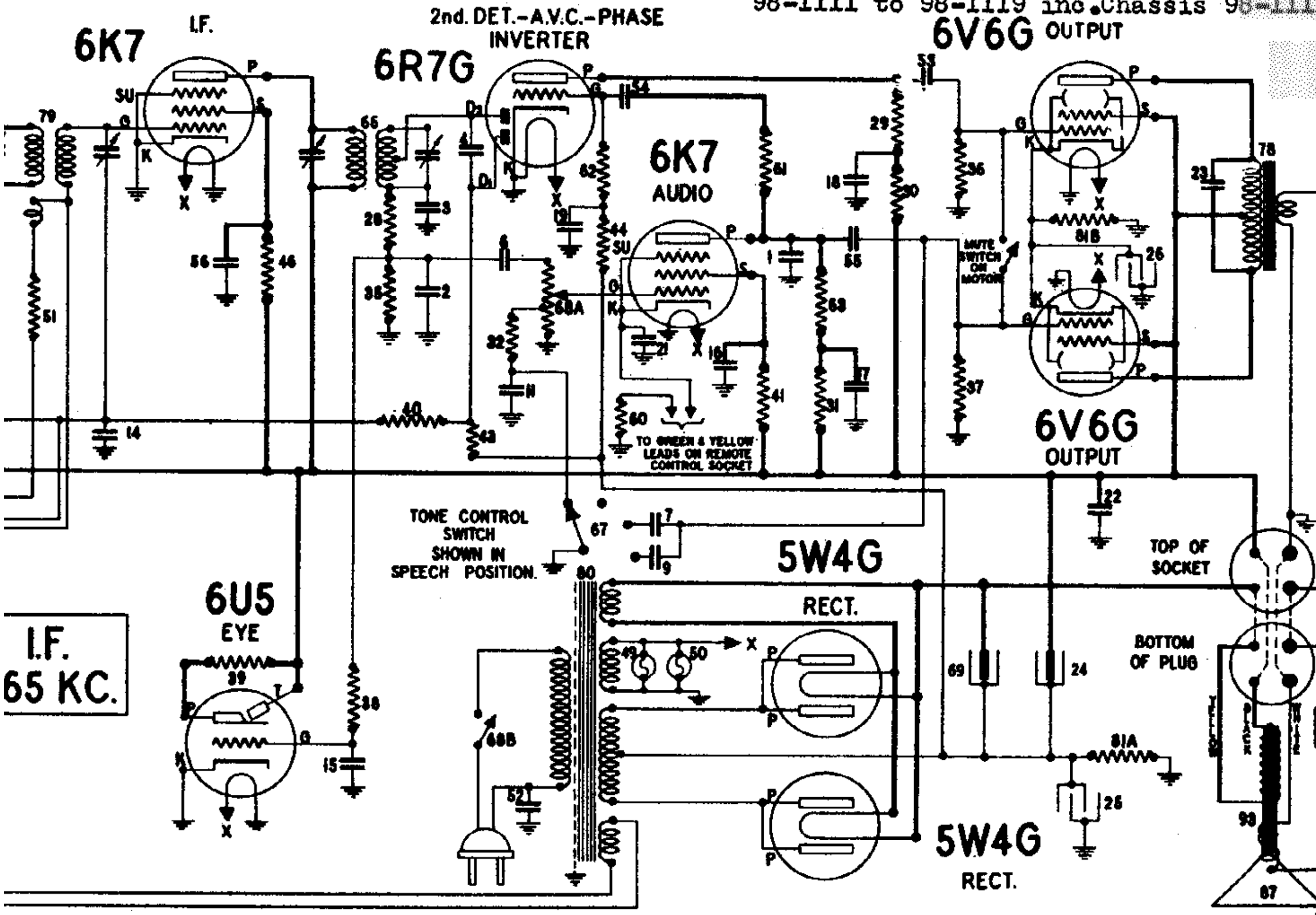


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	$ .20
2-3-4	83783	Condenser - mica 110 mmf.	.20
5	85061	Condenser - mica 51 mmfd.	.15
6	88026	Condenser - paper .02 mfd. 400 V.	.25
7	88029	Condenser - paper .004 mfd. 400V.	.25
8-9	88030	Condenser - paper .01 mfd. 400 V.	.25
10	88054	Switch - for set.up	.30
11	88165	Condenser - ceramic tube .006 mfd. 600 volt	.25
12-13-14-15	88189	Condenser - paper .05 mfd. 200 V.	.25
16-17-18	88191	Condenser - paper .1 mfd. 300 V.	.25
19	88990	Condenser - paper .5 mfd. 150 V.	.36
20	89421	Condenser - paper .1 mfd. 200 V.	.25
21	89532	Condenser - paper .25 mfd. 200 V.	.32
22	89643	Condenser - paper .25 mfd. 300 V.	.40
23	89826	Condenser - paper .004 mfd. 750V.	.24
24	89937	Condenser - elect. 30 mfd. 450 V.	1.60
25-26	110377	Condenser - elect. 10 mfd. 25 V.	.80
27-28-29-30-31-32	110552	Resistor - carb. 47,000 ohms ¼ W.	.12
33-34-35-36-37	110553	Resistor - carb. 220,000 ohms ¼ W.	.12
38-39-40-41	110554	Resistor - carb. 1 meg. 1/4 watt	.12
42	110557	Resistor - carb. 4,700 ohm 1/4 W.	.12
43-44	110559	Resistor - carb. 470,000 ohms ¼ W.	.12
45	110560	Resistor - carb. 100 ohm ¼ watt	.12
46	110564	Resistor - carb. 100,000 ohm ¼ W.	.12
47	110568	Resistor - carb. 15,000 ohm 1 W.	.15
48-49-50	110629	Lamp - 6.3 volt - .25 amps.	.15
51	110975	Resistor - W.W. 33 ohm 1/2 watt	.12
52	111214	Condenser - paper .01 mfd. 600 V.	.24
53-54-55-56	111252	Condenser - paper .05 mfd. 400 V.	.13
57	112426	Condenser - mica 1650 mmfd. (3%)	.30
58	112427	Condenser - mica 4050 mmfd. (3%)	.40
59	112796	Coil - wave trap (with trimmer)	.50
60	112955	Resistor - carb. 1000 ohms 1/4 watt (10%)	.12
61	112956	Resistor - carb. 220,000 ohms 1/4 watt (10%)	.12

DIAGRAM NUMBER	PA NU
62	11
63	11
64A to C	11
65	11
66	11
67	11
68A-68B	11
69	11
70	11
71	11
72	11
73	11
74A to C	11
75A to C, 76A to C	11
77	11
78	11
79	11
80	11
81A-81B	11
82	11
83	11
84	11
85	11
86A-86B	11
87	R-11
88	11
89	11
90	11
91	11
92	11
93	R-11

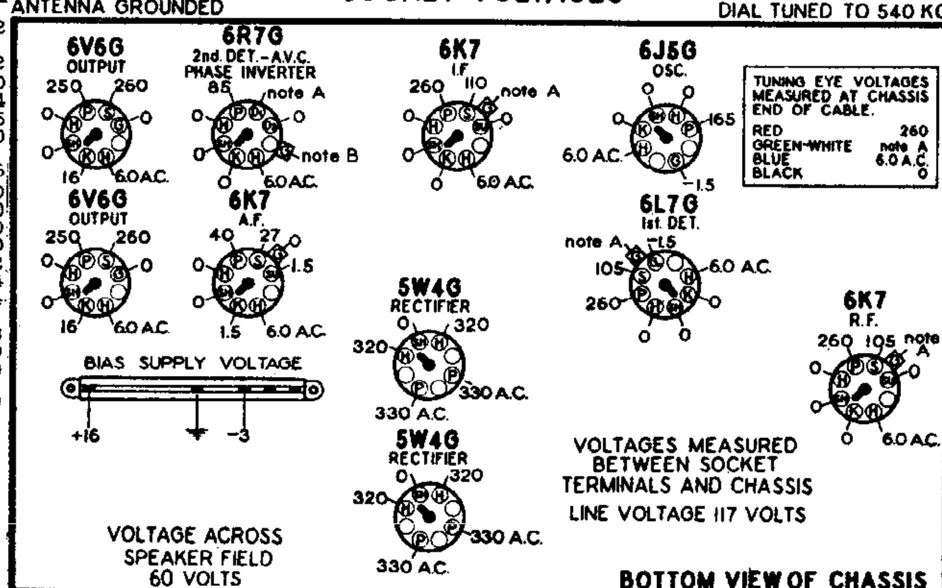
MODELS 91-1111 to 91-1119 inc. Chassis 91-111
98-1111 to 98-1119 inc. Chassis 98-111

RNER CORP.



R	DESCRIPTION	LIST PRICE
8-	Resistor - carb. 18,000 ohms 1/4 watt (10%)	.12
9-	Resistor - carb. 120,000 ohms 1/4 watt (10%)	.12
9--	Condenser - variable gang	6.80
29--	Transformer - 2nd I. F.	1.64
6--	Push-Button Switch Assem.	3.75
7--	Switch - Tone control	.70
8-	Volume Control - 250,000 ohms with off-on switch	.95
1--	Condenser - elect. 30 mfd. 450 V.	1.40
5--	Coil - antenna (B.C.)	1.20
6--	Coil - R. F. (B.C.)	1.30
8--	Coil - antenna (Police)	.50
1--	Coil - antenna (S.W.)	.52
9--	Condenser - trimmer - 3 section	.54
0--	Condenser - trimmer - 3 section	.54
6--	Condenser - padding	.38
1--	Transformer - output	2.90
2--	Transformer - 1st I.F.	2.40
4-	Transformer - power 117 volt 60 cycle	9.00
9-	Resistor - Bias Strip Section A - 20 ohms Section B - 200 ohms	.38
1--	Coil - oscillator (B.C.)	.50
2--	Coil - oscillator (Police)	1.20
0--	Resistor - candohm 90 ohms	.26
0-	Motor - for electric tuning (supplied with tuning shaft & gear)	7.80
9-	Resistor - Bleeder Section A - 6800 ohms Section B - 5600 ohms	.92
2-	Cone - voice coil for R-115018 speaker	2.10
9-	Connector Link - for remote control plug	.01
9--	Switch - range	2.10
7--	Coil - oscillator (S.W.)	.52
3--	Coil - R.F. (S.W.)	.60
9--	Coil - R.F. (Police)	.50
3--	Speaker - dynamic 12"	10.00

SOCKET VOLTAGES



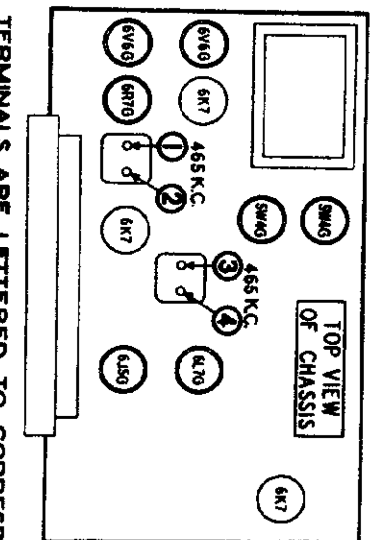
REAR OF CHASSIS

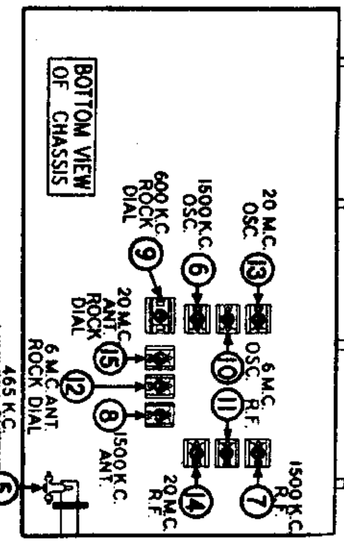
Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7-G, 6K7-R.F., 6K7 I.F. and the di ode plate (D) of the 6R7-G tubes is -3.0 volts measured across resistor 81A.

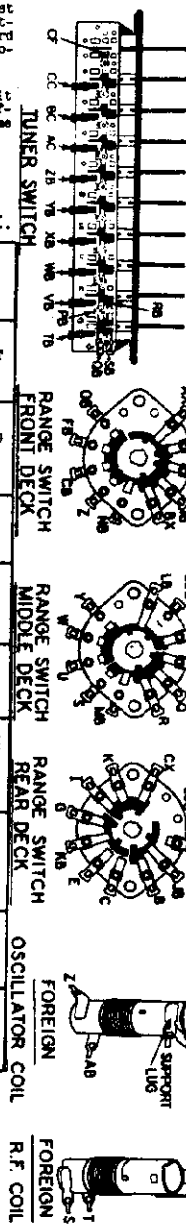
NOTE B: The bias for the control grid of the audio section of the 6R7-G is -3.0 volts measured across resistor 81A.

MODELS 91-1111 to 91-1119 98-1111 to 98-1119 STEWART-WARNER CORP. 910-1111 to 910-1119 Alignment, Trimmers, Coils





ALL TERMINALS ARE LETTERED TO CORRESPOND WITH THE SIMILARLY LETTERED TERMINALS SHOWN ON THE CIRCUIT DIAGRAM. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTERS.



ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC. are required.

1 Connect the output meter across the voice coil or across the two plates of the two 6V6-G output tubes, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2 Connect the ground lead of the signal generator to the "G" post on the antenna terminal strip at the rear of the chassis, or to the metal chassis.
The ground and doublet terminals on the antenna terminal strip must be connected together throughout the alignment procedure.

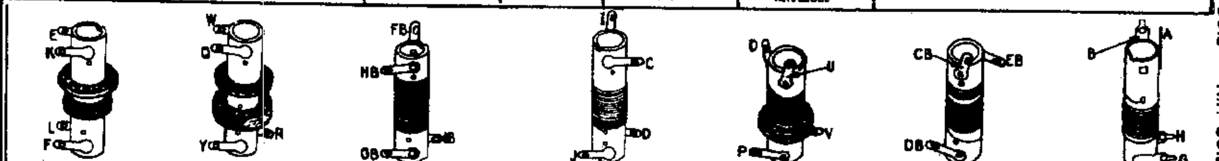
3 With the gang condenser in full mesh set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser to full mesh with the pointer properly set, then retighten the set screw.

4 Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. IMPORTANT:- If the remote control unit is plugged in, be sure that its volume control is also in the maximum volume position.

-IMPORTANT-

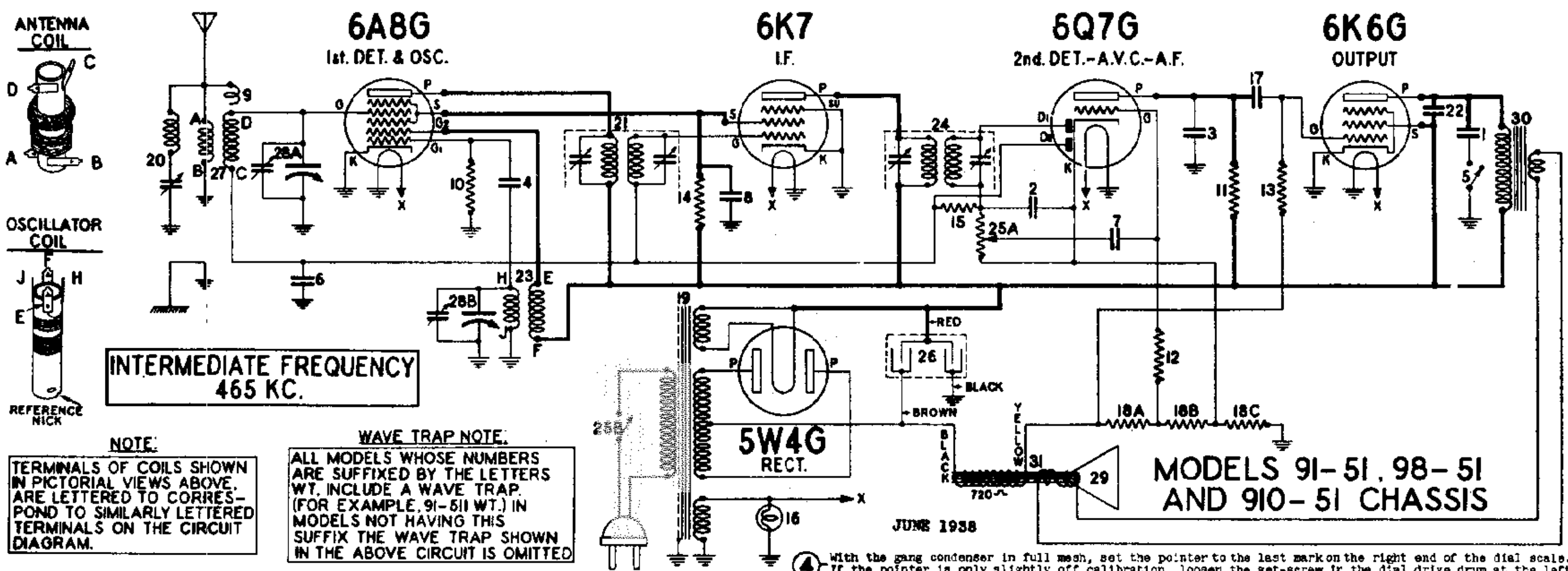
THE FIRST PUSH-BUTTON ON THE LEFT, LABELLED "MANUAL" MUST BE PUSHED IN WHEN ALIGNING. FAILURE TO PUSH IN THIS BUTTON WILL MAKE CORRECT ALIGNMENT IMPOSSIBLE.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION (INDICATED BY ROLLER DIAL)	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6L7-G TUBE	465 KC.	BROADCAST (CLOCKWISE)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1ST I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (CLOCKWISE)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (CLOCKWISE)	1500 KC.	6	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (CLOCKWISE)	TUNE TO 1500 KC. GENERATOR SIGNAL	7	BROADCAST R. F.	ADJUST FOR MAXIMUM OUTPUT.
					8	BROADCAST ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (CLOCKWISE)	TUNE TO 600 KC. GENERATOR SIGNAL	9	BROADCAST OSCILLATOR (SERIES PAD)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC.	INTERMEDIATE (CENTER)	6 MC.	10	INTERMEDIATE (POLICE) OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC.	INTERMEDIATE (CENTER)	TUNE TO 6 MC. GENERATOR SIGNAL	11	INTERMEDIATE R. F.	ADJUST FOR MAXIMUM OUTPUT
					12	INTERMEDIATE ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC.	FOREIGN (COUNTER-CLOCKWISE)	20 MC.	13	FOREIGN OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC.	FOREIGN (COUNTER-CLOCKWISE)	TUNE TO 20 MC GENERATOR SIGNAL	14	FOREIGN R. F.	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
					15	FOREIGN ANTENNA	



BROADCAST ANTENNA COIL | BROADCAST R.F. COIL | BROADCAST OSCILLATOR COIL | INTERMEDIATE ANTENNA COIL | INTERMEDIATE R.F. COIL | INTERMEDIATE OSCILLATOR COIL | FOREIGN ANTENNA COIL

910-511 to 910-519 STEWART-WARNER CORP. MODELS 91-511 to 91-51
Chassis 910-51 Chassis 91-51
Schematic, Trimmers, Alignment 98-511 to 98-51
Chassis 98-51



INTERMEDIATE FREQUENCY
465 KC.

NOTE:
TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.

WAVE TRAP NOTE:
ALL MODELS WHOSE NUMBERS ARE SUFFIXED BY THE LETTERS WT. INCLUDE A WAVE TRAP. (FOR EXAMPLE, 91-511 WT.) IN MODELS NOT HAVING THIS SUFFIX THE WAVE TRAP SHOWN IN THE ABOVE CIRCUIT IS OMITTED

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

(1) Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the black (ground) wire or the chassis.

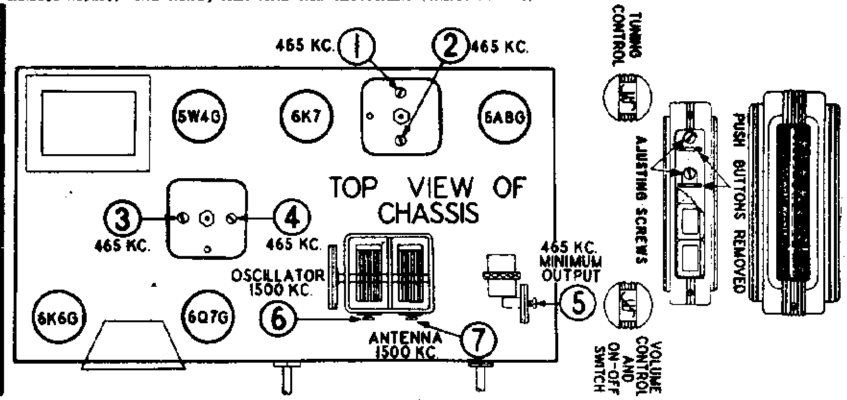
(3) Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4) With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

CHASSIS HAVING MODEL NUMBERS WHICH INCLUDE THE LETTERS "WT" AS A SUFFIX, HAVE A WAVE TRAP AS SHOWN ON THE CIRCUIT DIAGRAM. CHASSIS HAVING MODEL NUMBERS WITHOUT THAT SUFFIX DO NOT HAVE A WAVE TRAP. FOR EXAMPLE: MODEL 91-51 WT HAS A WAVE TRAP: MODEL 91-51 DOES NOT HAVE A WAVE TRAP.

ALIGNMENT OF CHASSIS HAVING WAVE TRAPS IS TO BE CARRIED OUT ACCORDING TO THE FOLLOWING TABLE. WHEN ALIGNING CHASSIS WITHOUT WAVE TRAPS, OMIT WAVE TRAP ADJUSTMENT (TRIMMER NO. 5) IN THE FOLLOWING TABLE.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1st I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	2nd I.F.	
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.



MODELS 91-511 to 91-519
98-511 to 98-519
910-511 to 910-519

STEWART-WARNER CORP.

MODELS 97-521 to 97-529
Tuner, Drive Cord Data

Voltage, Socket, Tuner, Drive Cord

Chassis Model	Used In Receiver Models	Voltage	Frequency
91-51	91-511 to 91-519	117	60 cycles
98-51	98-511 to 98-519	117	25 cycles
910-51	910-511 to 910-519	100-240	50-133

These chassis are 5 tube, single band push-button tuning superheterodyne receivers. The tuning range is 540 to 1725 KC. The intermediate frequency is 465 KC.

Incorporated in each chassis is a four-button mechanical push-button tuner unit. These push buttons may be set to any station desired by the method described below under "How To Set Up The Push-Button Tuner".

The accuracy of tuning when using the push-button tuner, depends to a large extent upon the amount of "play" in the moving parts of this system. In cases where slight inaccuracy in tuning occurs check the following points:

1. Check to see that the button is correctly set to the station. If not, reset the button.
2. The tension must be maintained between the two sections of the anti back-lash gear on the left side of the unit in order that it functions properly--both anti back-lash springs must be in place in the gear and compressed slightly.
3. Note the small adjusting lug over the push-button shafts at the point where they slide into the tuner. The lug is held in place by a hex-head screw. These lugs should be adjusted for a minimum amount of "play". In other words the push-button shaft must have a minimum of movement in a vertical direction.

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to a good antenna system:
2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.
3. Select the four nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Any button may be set to any desired station.
4. Pull off the entire button cap by grasping the button and pulling outward on it. When the button is removed, a round head adjusting screw will be exposed to view.
5. Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).
6. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, grasp the tuning knob and tune in the desired station. Then retighten the adjusting screw, turning clockwise until reasonably tight.

   WARNING: Do not attempt to turn the screw until it reaches a definite stop. Merely turn until you meet with appreciable resistance. To turn further may result in damage to the mechanism.
7. The set-up for this button is now complete. Replace the push button by pushing it on firmly.
8. Set up the three remaining buttons in a similar manner.
9. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.
10. To use your push-button tuner it is only necessary for you to push in the button labeled with the call-letters of the desired station. Be sure that you push the button all the way in.

HOW TO REPLACE THE DIAL CORD

TO THREAD THE GANG CONDENSER DRIVE CORD PROCEED AS FOLLOWS:

1. Close the gang condenser. The set screw in the drum, Fig. 1, must be on the top side.
2. Take 19 inches of cord, double it in the middle and stick the loop end through eyelet A, Fig. 1, on the drum. Tie tension spring L to this loop end, inside of the drum.
3. Take one of the free ends of the cord; carry it down around the back of the drum and over the front of pulley B.
4. Thread the end of the cord down through hole C in the tuning shaft and pull through the slack in the cord.
5. Take a half turn around the shaft clockwise (when facing the unit.
6. Thread the end of the cord down through hole D in the tuning shaft and pull through the slack in the cord.
7. Place an eyelet (part number 86348) on the end of the cord, close to the shaft, and squeeze it on so that the cord is taut. Then tie a large knot in the cord up close to the eyelet.
8. Take the other end of the cord, run it down the front of the drum and to the shaft. Make SIX turns clockwise around the tuning shaft. These six turns should be placed on the shaft between holes C and E.
9. Thread the end of the cord down through hole E and up through hole F in the tuning shaft and pull through the slack.
10. Place an eyelet on the end of the cord and squeeze as in step 8. Then tie a large knot in the cord up close to the shaft so the cord cannot slip back through the hole.
11. Hook the tension spring in place in the drum. This will take up any remaining slack in the cord.

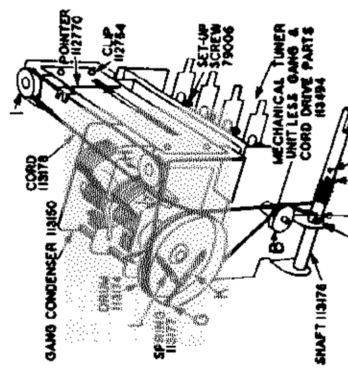
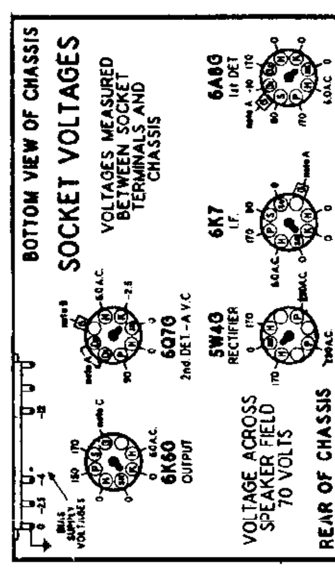


FIG. 1

TO THREAD THE DIAL POINTER DRIVE CORD PROCEED AS FOLLOWS:

1. Close the gang condenser and thread one end of the cord through eyelet G.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum.
4. Carry the end of the cord on around the drum and thread eyelet G.
5. Tie both ends extending through eyelet G to tension spring K. In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push-button operate too hard because of overloading.
6. Set the dial pointer to the last dial division mark on the right and clip it to the cord. (Be sure the gang condenser is closed before clipping the pointer to the cord.)

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	83007	Condenser - paper .02 mfd. 600 V.
2-3	83539	Condenser - mica 250 mmfd.
4	85061	Condenser - mica 51 mmfd.
5	88054	Switch - Tone Control
6-7	88189	Condenser - paper .05 mfd. 200 V.
8	88191	Condenser - paper .1 mfd. 300 V.
9	110510	Condenser - wire 3 mmfd.
10	110552	Resistor - carb. 47,000 ohms ¼ W.
11	110553	Resistor - carb. 220,000 ohms ¼W.
12	110554	Resistor - carb. 1 meg. 1/4 watt
13	110559	Resistor - carb. 470,000 ohm ¼ W.
14	110566	Resistor - carb. 33,000 ohms ¼ W.
15	110580	Resistor - carb. 3.3 meg. 1/4 W.
16	110829	Lamp - 6.3 volt - .25 amps.
17	111252	Condenser - paper .05 mfd. 400 V.
18A - 18C	112740	Resistor - Wire Wound (Section A - 217 ohms; Section B - 43 ohms; Section C - 66 ohms)
19	112751	Transformer - Power 117 V. 60 C.
	113532	Transformer - Power 117 V. 25 C.
	113523	Transformer - Power 100 to 240 volt 50 to 133 cycles
20	112798	Coil - Wave trap (with trimmer)
21	112803	Transformer - 1st I.F.
22	113035	Condenser - ceramic tube .006 mfd. 600 volt
23	113042	Coil - oscillator
24	113047	Transformer - 2nd I.F.
25A - 25B	113049	Volume Control - 500,000 ohms with off-on switch
26	113096	Condenser - elect. 8-8 mfd. 350 V.
	113536	Condenser - elect. dual 8-8 mfd. 350 volt (for model 910-51 only)
27	113097	Coil - Antenna
28A - 28B	113150	Condenser - variable gang
29	U-113239	Cone - voice coil assembly for U-115008 Spkr.
30	U-113240	Transformer - output for U-115008 speaker
31	U-115008	Speaker - Dynamic (5 inch)
	2694	Screw-wood chassis mtg. #8 X 5/8" (models 91-513; 98-513 & 910-513) Per C
	77223	Washer - Chassis mtg. (for models 910-513; 98-513; 91-513)
	79006	Screw - #8-32 X 7/8 Fil. Hd. Mach. (for setting up push button
	81145	Retaining Ring - for drive shaft Per C
	85040	Screw - #6 Hex. Hd. for mtg. adjusting washer Per C
	85299	Screw - chassis mtg. #10 X 3/8" (for models 910-513; 98-513 & 91-513
	85427	Socket - octal base (standard)
	85815	Spring - between gear sections
	86348	Eyelet - for dial cord Per doz.
	89748	Washer - (paper) for back of knobs
	110829	Washer - flat steel, for mtg. chassis
	112745	Clip - coil mtg. (osc. & ant.)
	112762	Pulley - dial cord drive (at left side)
	112764	Clip - dial scale retaining
	112765	Scale - dial
	112770	Pointer - dial
	112776	Celluloid cover - over dial face
	112798	Clip - for mtg. wave trap coil
	112871	Cup washer for mtg. models 91-513; 98-513 & 910-513
	112872	Screw - chassis mtg. #8 X 1¼ O.H. (models 98-513; 910-513 & 91-513)
	112874	Screw - #10 X 1-1/8 chassis mtg.
	112878	Screw - escutcheon mtg. #2 X 3/8 (models 91-514; 98-514, 910-514)
	112879	Screw - escutcheon mtg. #2 X 3/8
	112914	Escutcheon - dial
	113022	Knob - Round Volume or Tuning
	113025	Socket - octal base (with special ground)
	113062	Escutcheon - for dial (models 91-514; 98-514 & 910-514)
	113063	Escutcheon - for push buttons
	113064	Escutcheon - for push buttons (models 91-514; 98-514 & 910-514)
	113093	Socket - for dial lamp
	113103	Push Button
	113124	Speaker Grille Bar - (chrome plate) (for models 91-514; 98-514 & 910-514)
	113125	Speaker Grille Support Track (for models 91-514; 98-514 & 910-514)
	113138	Knob - octagon - volume or tuning
	113156	Gear - & bushing assembly for dial drive
	113169	Spring - for key return
	113170	Adjusting lug - for button shafts
	113171	Bracket - for dial & condenser mtg.
	113174	Dial Drum - and pinion assembly
	113176	Shaft - dial drive
	113177	Spring - dial cord tension
	113178	Cord - for dial drive (38" req.) supplied in 4 ft. lengths
	113189	Tab - celluloid - for push button - Per doz.
	113232	Mtg. plate - for spade models 91-513; 98-513 & 910-513
	113321	Tabs - station call letters (4 sheets) (brown) Per set
	113322	Tabs - station call letters (4 sheets) (black) Per set
	113494	Mechanical Tuner assembly - keys and housing only



DIAL TUNED TO 540 KC
ANTENNA GROUNDED

Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7, and the diode plates of the 6Q7-G tubes is -2.5 volts measured across resistor 18C.

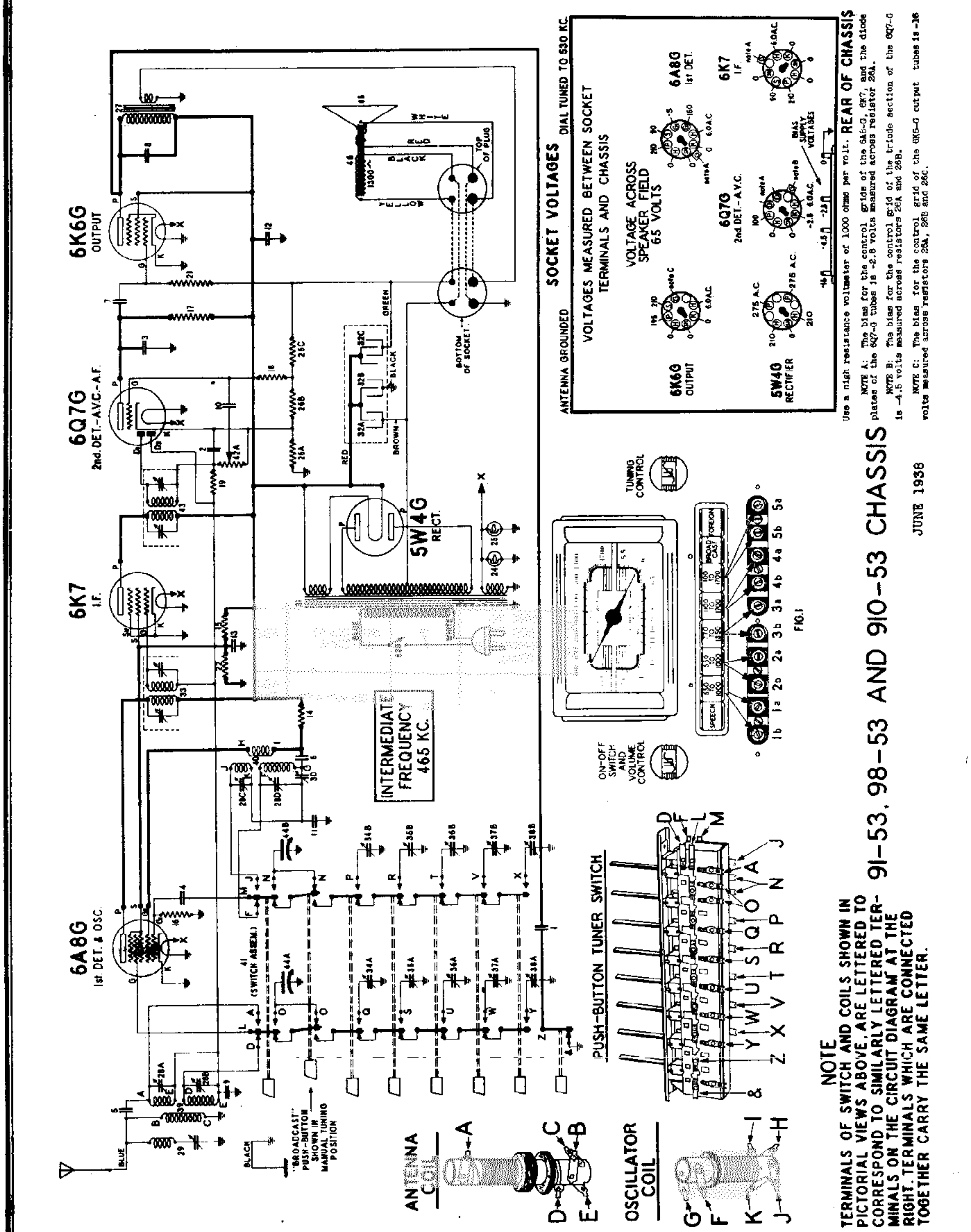
NOTE B: The bias for the control grid of the triode section of the 6Q7-G is -4 volts measured across resistors 18B and 18C.

NOTE C: The bias for the control grid of the 6K6-G output tubes is -12 volts measured across resistors 18A, 18B and 18C.

910-531 to 910-539
Chassis 910-53
Schematic, Voltage, Socket
Tuner Switch, Coils

STEWART-WARNER CORP.

MODELS 91-531 to 91-539
Chassis 91-53
98-531 to 98-539
Chassis 98-53



MODELS 91-531 to 91-539
Chassis 91-53
98-531 to 98-539
Chassis 98-53
910-531 to 910-539
Chassis 910-53
Alignment,Trimmers

STEWART-WARNER CORP.

Chassis Model	Used In Receiver Models	Voltage	Frequency
91-53	91-531 to 91-539	117	60 cycles
98-53	98-531 to 98-539	117	25 cycles
910-53	910-531 to 910-539	100-240	50-133

These chassis are 5-tube, two band, push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1725 KC and 5.4 to 15.4 MC. The I. F. is 465 KC.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

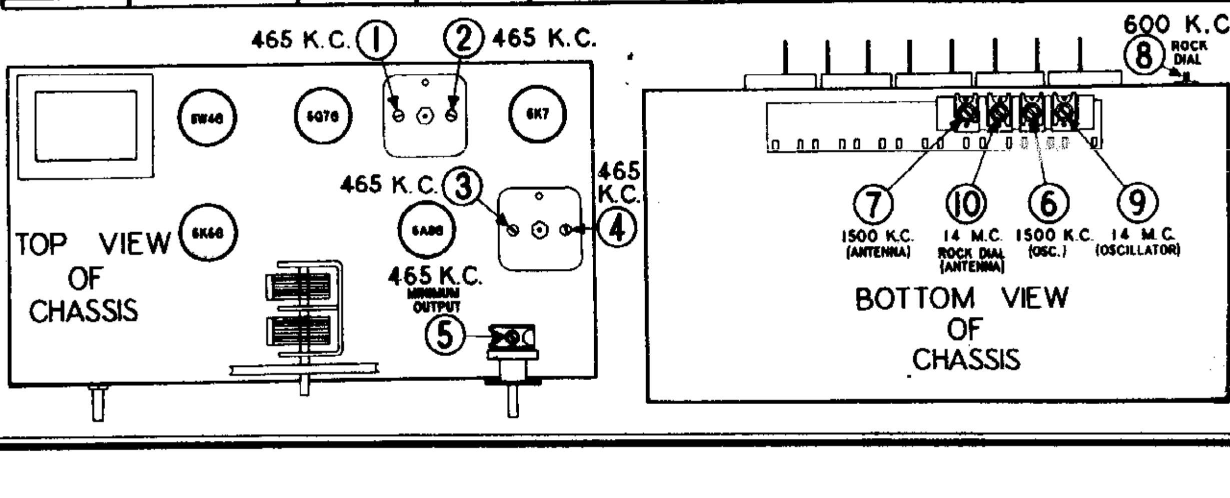
(1) Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the black (ground) wire or the chassis.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4) With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	BROADCAST BUTTON PUSHED IN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2 3-4	2nd I.F. 1st I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	BROADCAST BUTTON PUSHED IN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	BROADCAST BUTTON PUSHED IN	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	BROADCAST BUTTON PUSHED IN	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	600 KC	BROADCAST BUTTON PUSHED IN	TUNE TO 600 KC GENERATOR SIGNAL	8	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN BUTTON PUSHED IN	14 MC	9	FOREIGN OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN BUTTON PUSHED IN	14 MC	10	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



STEWART-WARNER CORP.

MODELS 91-531 to 91-539
98-531 to 98-539
910-531 to 910-539

Tuner Data, Parts List

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the set is connected to a good antenna system.

2. Turn on the set and allow it to operate for at least one-half hour before setting up the push buttons.

3. Make a list of the five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, as indicated in Fig. 1.

Each of the buttons on the Push-Button Tuner has a definite operating range, as shown in Fig. 1; therefore, it is imperative that you select a station which is in the operating range of a button before attempting to set up that button for the particular station. AS THE TRIMMER SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. For example, suppose you want to set a button to station WLW whose frequency is 700 KC. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 1 and No. 2 whose range is 550 to 1000 KC. Therefore, either of these buttons may be set to WLW.

4. Remove the escutcheon surrounding the push-buttons by taking out the five screws holding it to the cabinet. This will expose to view ten trimmer adjustment screws each pair of which is used to set a button for a station.

5. Push in the button which is labelled "Broadcast" and use the tuning knob to bring in the station that you desire on button No. 1. This is done so that you may identify the station by hearing its program.

6. Push in button No. 1 (See Fig. 1). You will note that when this button is pushed in, your station will probably not be heard. Using a small screw - driver, insert it in the second screw from the left (oscillator trimmer No. 1a, Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again heard. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR TRIMMER SCREW (1a) TO THE POINT WHERE THE STATION IS HEARD WITH THE LEAST HISS OR DISTORTION AND NOT TO THE POINT OF GREATEST VOLUME. It is advisable that you turn the trimmer screw in and out so that it will tune across the station several times, in order that you may be sure that you have located this correct point. Now insert the screw-driver in the first trimmer screw on the left (antenna trimmer No. 1b, Fig. 1). Adjust this screw until the program is received with the maximum volume. Reduce the volume as necessary. Now go back to trimmer screw No. 1a and see if any improvement in reception can be made by adjusting it. Also repeat this operation for trimmer screw No. 1b.

NOTE: Trimmer screws indicated by letter "a" are oscillator trimmers. Trimmer screws indicated by letter "b" are antenna trimmers.

In some instances it may be found necessary after the set has been operated for a month or more, to readjust the push-button trimmers to compensate for a slight drift due to extreme climatic changes.

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

Part Number	Tuning Range	List Price
112942	1100 to 1700 KC.	$ 0.36
112943	770 to 1350 KC.	.45
112944	550 to 1000 KC.	.50

To make the change proceed as follows:

1. Remove the chassis from the cabinet.

2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.

3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

7. Set up button No. 2 for the selected station in a similar manner, using trimmer screws No. 2a and No. 2b. Proceed to set the remaining buttons in the same manner.

8. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with the receiver. The printed paper tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83217	Condenser - paper .04 mfd. 600 volt	.35
2-3	83539	Condenser - mica 260 mmfd.	.20
4	85061	Condenser - mica 51 mmfd.	.15
5	85454	Condenser - mica 11 mmf.	.15
6-7	88030	Condenser - paper .01 mfd. 400 volt	.25
8	88185	Condenser - ceramic tube .006 mfd. 600 volt	.25
9-10	88189	Condenser - paper .05 mfd. 200 volt	.25
11	08587	Condenser - mica .0042 mfd.	.35
12	88682	Condenser - paper .1 mfd. 400 volt	.25
13	89421	Condenser - paper .1 mfd. 200 volt	.25
14	110550	Resistor - carbon 10,000 ohms ½ W.	.15
15	110551	Resistor - carbon 15,000 ohms 1 W.	.15
16	110552	Resistor - carbon 47,000 ohms ½ W.	.12
17	110553	Resistor - carbon 220,000 ohms ½ W.	.12
18-19	110554	Resistor - carbon 1 meg. 1/4 watt	.12
21	110559	Resistor - carbon 470,000 ohms ½ W.	.12
22	110562	Resistor - carbon 22,000 ohms ½ W.	.12
24-25	110629	Lamp - 6.3 volt - .25 amps.	.15
26A - 26B, 26C	112789	Resistor - (Section A - 55 ohms) (Section B - 30 ohms) (Section C - 240 ohms)	.40
27	112790	Transformer - output	1.26
28A - 28B, 28C - 28D	112792	Condenser - trimmer (4 section)	.60
29	112796	Coil - wave trap (with trimmer)	.50
30	112799	Condenser - padder (530-630 mmfd.)	.36
31	112800	Transformer - power 117 V. 50-60 C.	3.40
	112823	Transformer - power 100-240 volt - 50-133 cycle	6.50
	112836	Transformer - power 117 V. 25 cycle	5.00
32A - 32C	112802	Condenser - electrolytic (dry) (Section A - 8 mfd. 400 volt) (Section B - 4 mfd. 400 volt) (Section C - 4 mfd. 400 volt)	1.80
33	112803	Transformer - 1st I.F.	1.20
34A - 34B, 35A - 35B	112942	Condenser - dual push button trimmer (1100 KC to 1700 KC)	.36
36A - 36B	112943	Condenser - dual push button trimmer (770 KC to 1350 KC)	.45
37A - 37B, 38A - 38B	112944	Condenser - dual push button trimmer (550 KC to 1000 KC)	.60
39	113011	Coil - ant. - broadcast-short-wave	1.20
40	113015	Coil Assembly - oscillator	1.00
41	113021	Push Button Switch Assembly	4.20
42A - 42B	113024	Volume Control (500,000 ohm) (with switch)	.90
43	113047	Transformer - 2nd I.F.	1.10
44A - 44B	113126	Condenser - variable gang	2.50
45	R-113243	Cone - voice coil assembly for R-115009 speaker	1.50
	U-113344	Cone - voice coil assembly for U-115015 speaker	1.80
46	R-115009	Speaker - dynamic (6 inch)	3.50
	U-115015	Speaker - dynamic (8 inch)	6.00

PART NUMBER	DESCRIPTION	
81145	Retaining Ring - for drive shaft — Per C	.60
85040	Screw - #6 Hex. Head (self-tapping) - Per C	.35
85427	Socket - octal base	.15
89748	Washer - (paper) for back of knobs	.006
110496	Plug - speaker (4 prong)	.12
110501	Socket - 4 prong (for speaker)	.16
110829	Washer - flat steel, for mtg. chassis	.01
111302	Cord - dial drive 8 or 50 ft. lgths. Per Ft.	.05
111357	Spring - drive cord tension	.03
111855	Shield Base - for tube shields	.02
112233	Drum and Bushing - for dial drive	.35
112745	Clip - coil mounting (osc. & ant.)	.01
112747	Nut - #6-32 Hex.	.01
112786	Scale - dial	.68
112874	Screw #10 X 1-1/8 Chassis Mtg.	.01
112945	Shaft - tuning	.10
113019	Clip - dial scale retaining	.01
113022	Knob - for controls	.10
113025	Socket - octal base (with special ground)	.15
113030	Escutcheon - dial	1.24
113039	Dial - mtg. plate and bracket	.38
113040	Light Shield - cardboard (between button holes and dial frame)	.06
113077	Shield - tube	.15
113102	Push Button - only	.06
113106	Escutcheon Plate - for trimmer screws	.84
113114	Pointer - dial	.12
113144	Socket - for dial lamp	.22
113189	Tab - celluloid - for push button — Per doz.	.09
113321	Tabs - station call letters (4 sheets) (brown)	.40
113323	Tab - trimmer range (550 to 1000) Per doz.	.09
113324	Tab - trimmer range (770 to 1350) Per doz.	.09
113325	Tab - trimmer range (1100 to 1700) Per doz.	.09
113326	Tab - "Speech" — Per doz.	.09
113327	Tab - "Broadcast" — Per doz.	.09
113328	Tab - "Foreign" — Per doz.	.09
113544	Screws - escutcheon mtg. #2 X 3/8	.03
113545	Screws - P.B. escutcheon mtg. #3 X 3/8	.01
113556	Shield - for pilot light	.07

MODELS 1471 to 1479
Chassis R-147
MODELS 1481 to 1489
Chassis R-148
Hum Elimination

STEWART-WARNER CORP.

1937 Models
Speaker Cone Replacements

HUM ELIMINATION IN THE MODEL R-147 CHASSIS November 28, 1936

FOR RESIDUAL HUM: (Between-station hum)

1. Remove the .5 mfd. condense , part number 88990, connected from chassis, to the mounting nut of the . put electrolytic condenser (the one nearest the power transformer). Replace the .5 mfd. condenser with a 10 mfd. 25 volt electrolytic condenser, our part number 89053. The positive terminal of this condenser must be connected to the chassis. This change should always be made in combination with the following one, since either change may increase the hum if made alone.
2. Locate the 210,000 ohm resistor connected from the plate of the 6C5 tube to one of the 5Z4 socket terminals.
   (a) Disconnect the end of this resistor going to the 5Z4 socket.
   (b) Connect the added 51,000 ohm resistor in series with the disconnected end of the above 210,000 ohm resistor and the lug on the 5Z4 socket from which it was unsoldered.
   (c) Connect the added .25 mfd. condenser from chassis to the junction of the above two resistors.
3. Remove the twisted green and brown wires connecting to the tone control and replace them with the shielded twisted pair supplied by Stewart-Warner. Ground the shield at both ends. Route the shielded wire so that the shielding does not ground the mounting nut on the electrolytic condenser nearest the power transformer.
4. Separate the single green volume control wire from the power transformer and the A.C. leads.
5. In all cases of either residual or modulation hum, tighten down the power transformer mounting screws after the set is hot.
6. Early production sets did not have the resistance-capacity filter consisting of the 260,000 ohm resistor and the .1 mfd. condenser in the grid circuit of the 6F5 . In these early sets a 1.1 megohm resistor was connected from the 6F5 grid to the bias resistor network. The later sets used a 760,000 ohm resistor connected from the grid to the filter resistor and condenser. If you are working on any of the early sets which do not have the filter, you should add a 260,000 ohm, 1/4 watt resistor in series with the end of the 1.1 megohm grid resistor which connects to the bias network. Then connect a .1 mfd., 150 volt condenser from chassis to the junction of the 260,000 ohm and 1.1 megohm resistors.

FOR MODULATION HUM: (On stations only) - Make this change even though no modulation hum is heard in the shop.

1. Replace the .1 mfd. screen-grid by-pass condenser, diagram No. 28, connected to the 6A8 socket with the .5 mfd., 150 volt by-pass condenser, part number 88990 which was disconnected from the mounting nut of the input electrolytic condenser.

IMPORTANT

If there is still too much hum after making the above changes be sure to check for defective tubes.

The following material is required for this work:

1 - 89532 - .25 mfd. 200 volt Tubular Paper Condenser
1 - 89053 - 10 mfd., 25 volt Electrolytic Condenser
1 - 83060 - 51,000 ohm ½ watt Carbon Resistor
1 - Special Shielded Tone Control Cable

HUM ELIMINATION IN THE MODEL R-148 CHASSIS December 4, 1936

FOR MODULATION HUM: (On stations only) Make this change even though no modulation hum is heard in the shop.

1. Remove the .1 mfd., 150 volt condenser connected to the screen grid circuit of the 6K7 R.F. tube.
2. Replace it with a .5 mfd., 150 volt paper condenser, our part number 88990.

FOR RESIDUAL HUM: (Between-station hum)

1. Locate the red-blue wire running from the 5V4G socket heater terminal to the speaker socket.
   (a) Disconnect one end of the wire and re-route the wire along the back of the chassis so that it is at least two inches above the 6H6 and 6C5 sockets when the chassis is upside down. Re-connect the wire.
2. The blue and black twisted wire supplied by Stewart-Warner should be placed along the front of the chassis so it can be used to connect the heater terminals of the 6K7 R.F. and the 6L6 sockets. First connect the black wire to the grounded heater terminal of the 6K7 R.F. socket (the heater terminal near the front of the chassis) and the blue wire to the hot heater terminal of the same socket. The other end of the black wire must be connected to the grounded heater terminal of the 6L6 nearest the front of the chassis and the other end of the blue wire must be connected to the hot heater terminal of the other 6L6 socket (the one nearest the 6C5).
3. Remove the input audio transformer mounting screw nearest the front of the set. Rotate the transformer around its other mounting screw until the free end is toward the rear of the chassis. There is a hole in the chassis at the proper point to mount the transformer by means of the small machine screw, lock-washer and nut. Pull the transformer leads away from the tube sockets.
   Sometimes an intermediate position of the transformer will result in less hum but this necessitates drilling either one or two new mounting holes.
4. Tighten down the power transformer mounting bolts preferably when the set is hot.

SPEAKER CONE REPLACEMENT IN 1937 RADIO MODELS

We can now supply replacement cones which can be installed without special tools in all 1936-1937 Stewart-Warner speakers including staked spider models with the exception of some of the small five inch speakers. In describing the replacement of the cones we are dividing the various speaker models into three general groups as follows:

(A) - 8 and 12 INCH SPEAKERS WITH SPIDERS STAKED TO THE POLE PIECE

In order to facilitate the replacement of the cones in our 8 and 12 inch speakers with the spiders staked to the center of the pole piece, we will furnish special cones which can be installed without any special tools or equipment as described under "INSTALLING NEW CONES".

These cones have spiders fastened to the outside of the voice coils. The spiders are mounted on the speaker shells by means of screws. The necessary holes are already punched in the shell. The special cones are supplied complete with the necessary gaskets and mounting hardware under the part numbers in the table shown on page two of this bulletin.

(B) - SPEAKERS HAVING SPIDERS MOUNTED WITH SCREWS

The cones in these speakers can be replaced in the conventional manner as described later in this bulletin under "INSTALLING NEW CONES". The correct part numbers are tabulated below.

(C) - FIVE INCH SPEAKERS WITH SPIDERS STAKED TO THE POLE PIECE

Speakers in this group cannot be satisfactorily repaired without special equipment and therefore must be returned to the factory for repair. If the cone is damaged or if the speaker is out of the warranty the cost of replacing the cone will be the price of the cone plus a fifty cent labor charge. We will assume no transportation charges under these conditions.

INSTRUCTIONS FOR INSTALLING NEW CONES

1. In staked spider models cut the old cone around the outer edge and break the spider away from the washer under which it is mounted. This washer should be left in place. In models having the spider fastened with screws, remove the screws and then cut out the cone around the outer edge. Remove the cone, voice coil and spider assembly and clean away all traces of the old cone and cement where the cone was cemented to the frame.
2. Clean any particles from the air gap.
3. Spread an even coat of quick drying household or speaker cement over the face of the speaker frame. If two complete cardboard gaskets are packed with the cone put the thin one on the frame and cover it with cement. If only one complete gasket is enclosed it should be applied later as described in paragraph 8.
4. Set the replacement cone in place with the voice coil in the air gap. Make sure that the holes in the spider mounting line up with the holes in the speaker shell.
5. (a) In the R-247-A, R-258-D and R-266-A speakers, place the small spacing bushings between the spider and the shell. Insert the screws through the shell, spacers and spider, then put on the lock washers and screw the nuts on loosely.
   (b) In other speakers place the small brackets, Part No. 89028, over the spider mounting bracket with the ends in the slots in the shell, and place the mounting screws through the holes in the shell and screw them into the brackets. Leave the screws loose.
6. Insert three or four thin shims in the inside air gap to keep the voice coil centered.
7. Firmly press down the edges of the cone.
8. Cement the thick cardboard gasket to the edge of the cone, then lay the speaker on its face until the cement is thoroughly dry.
9. Tighten the spider mounting screws, and then remove the thin shims from the air gap.
10. Make sure that the voice coil is centered by pressing in on the cone near the outer edge and listening for evidence of rubbing. If the voice coil is rubbing, the spider mounting screws should be loosened and the voice coil centered so it does not rub.
11. Solder the flexible voice coil leads to the proper terminals.

REPLACEMENT CONE PART NUMBERS

(FOR ALL 1936-1937 SPEAKER MODELS)

Speaker Model	Receiver Model	Replacement Cone part number	List Price of Replacement Cone
R-234-D	1611D, 1621D	Magnetic - Replace speaker	
R-235-D	1625D	Magnetic - Replace speaker	
R-243-A	1421	(Early production-spider fastened with screw, order cone #88100) (Late production-with staked spider-return to factory for repair)	
R-244-A	1425	88133	2.00
R-245-A	1601	88528	2.10
R-246-A	1441, 1671	Return to factory for repair	
R-247-A	1451, 1461, 1695, 1721, & 1731	110433	1.36
R-248-A	1455, 1465, 1725, 1735	110461	2.60
R-253-A	1475, 1706, 1709	110461	2.60
R-254-A	1485	89014	2.25
R-255-A	1495	89167	2.50
R-256-A	1495	89193	2.40
R-257-D	1631D, 1641D	89428	1.75
R-258-D	1635D, 1645D	110434	1.35
R-262-A	1499-P	89193	2.40
R-263-A	1499-P	89263	1.80
R-265-A	1685	89553	1.75
R-266-A	1471-X, 1701-X	110434	1.35
R-267-A	1691, 1751-X	89428	1.75
89966	1711	Return to factory for repair	

MODELS 91-611 to 91-619
98-611 to 98-619
910-611 to 910-619
Alignment, Trimmers, Tuner

STEWART-WARNER CORP.

MODELS 91-621 to 91-629
98-621 to 98-629
910-621 to 910-629
Tuner Data

Chassis Model	Used in Receiver Models	Voltage	Frequency
91-61	91-611 to 91-619	117	60 cycles
98-61	98-611 to 98-619	117	25 cycles
910-61	910-611 to 910-619	100-240	50-133

These chassis are 6 tube, three band, push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1720 KC, 2.2 to 7.0 MC and 6.7 to 23 MC.

Incorporated in each chassis is a six-button tuner switch. Push-button tuning is obtained by substituting pre-set trimmers for the variable gang condenser. The push-button tuner switch provides a simple, rapid method of affecting this substitution.

When employing push-button tuning, the band switch must be in the Automatic ("A") position. This connects the tuner switch and disconnects the gang condenser, so that rotation of the Tuning Control will have no effect on the tuning.

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to a good antenna system.

2. Turn on the set and allow it to operate at least one-half hour before setting up the push-buttons.

3. Make a list of the frequencies of six nearby stations to which you wish to set-up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, as indicated in Fig. 1.

Each of the buttons on your Push-Button Tuner has a definite operating range, as shown in Fig. 1, therefore, it is imperative that you select a station whose frequency is in the operating range of a button before attempting to set-up that button for the particular station. AS THE ADJUSTING SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. The frequencies of your local stations may be obtained from your newspaper or radio call magazine. For example, suppose you want to set a button to station WLW whose frequency is 700 kilocycles. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 1 or No. 2, whose range is 550 to 1000 KC. Therefore either button No. 1 or No. 2 can be used for the automatic tuning of WLW.

4. Remove the escutcheon around the push-buttons by taking out the five screws holding it to the cabinet. This will expose to view twelve adjusting screws, each pair of which is used to tune a button to its correct station.

5. Turn the band switch knob (Lower right) to the position in which the small "hump" on the knob will point to the letter "B" (Broadcast) on the cabinet. Now using the tuning knob (Upper right), tune in the station you desire to set to button No. 1. This is done so that you may identify the station by hearing its program.

6. Now turn the band switch knob until the "hump" points to the letter "A" (Automatic) on the cabinet. The word "Automatic" will appear illuminated in the upper right corner of the dial. You will note as the knob is turned to this position your station will not be heard. Now push in the first button on the left (No. 1 Fig. 1). Using a small screw-driver, insert it in the second screw from the left (No. 1a in Fig. 1) Rotate the screw SLOWLY until the program that you had previously tuned in manually is again heard. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (1a) TO THE POINT WHERE THE TWO OPEN ENDS OF THE GREEN COLORED INVERTED "V" IN THE "TUNING EYE" ARE CLOSEST TOGETHER. It is advisable that you turn the screw in and out so that it will tune across the station several times in order that you may be sure that you have located this correct tuning point.

7. Next insert the screw-driver in the first screw on the left (No. 1b Fig. 1) and turn until the program is received with maximum volume, and the correct position is indicated by the ends of the inverted "V" in the "Tuning Eye" being closest together. Now go back to trimmer screw No. 1a and see if any improvement in reception can be made by adjusting it. Also repeat this operation for screw No. 1b.

NOTE: Trimmer screws indicated by letter "a" are oscillator trimmers. Trimmer screws indicated by letter "b" are antenna trimmers.

8. Set up button No. 2 for the selected station in a similar manner, using screws No. 2a and 2b, and proceed to set up the remaining buttons in the same fashion.

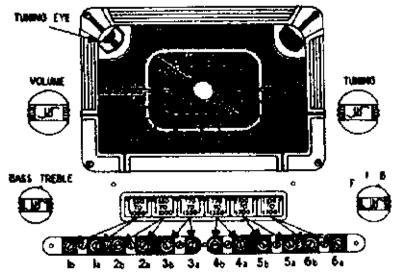


FIG. I

9. Label each button with the call letters of the stations you have selected, using the call letter tabs and celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing them slightly, allowing the tab to snap into place. The celluloid cover tab should be flexed in a similar manner and placed over the paper tab.

IMPORTANT

In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may drift due to heat, humidity, etc.

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

Part Number	Tuning Range	List Price
112942	1100 to 1700 KC.	$ 0.38
112943	770 to 1350 KC.	.45
112944	560 to 1000 KC.	.50

To make the change proceed as follows:

1. Remove the chassis from the cabinet.

2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.

3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

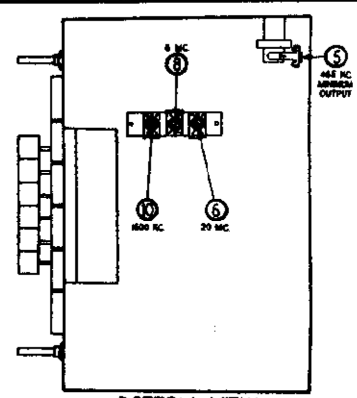
(1) Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the black (ground) wire or the chassis.

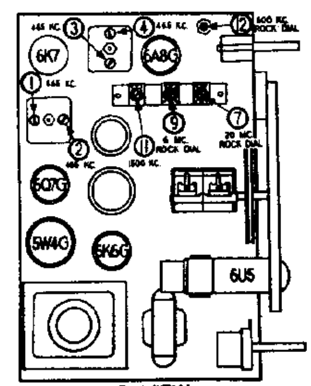
(3) Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4) With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

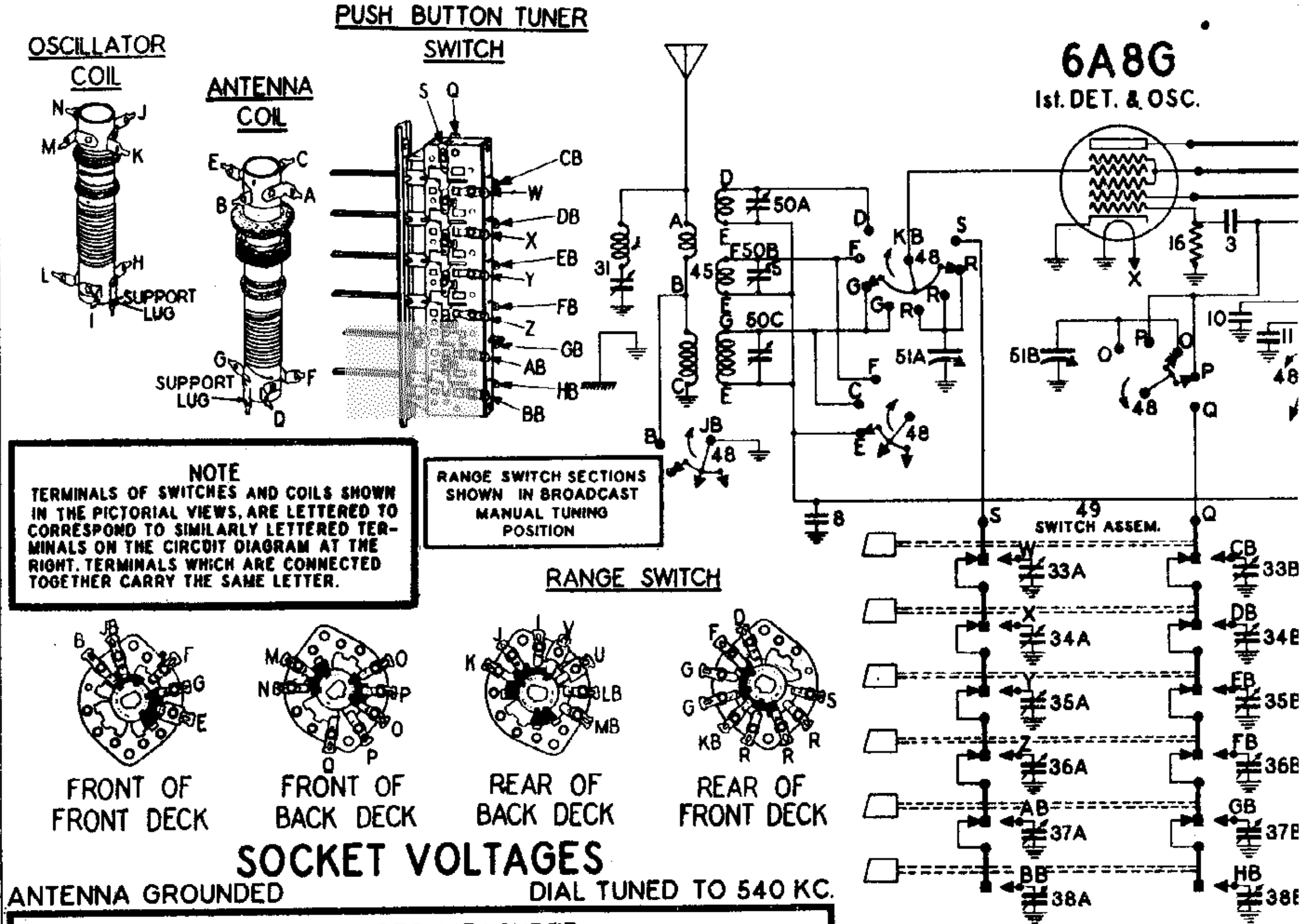
DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	BROADCAST "B"	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2nd I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1st I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC	BROADCAST "B"	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN "F"	20 MC	6	FOREIGN OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN "F"	20 MC	7	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING [illegible] MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE "I"	6 MC	8	INTERMEDIATE OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE "I"	TUNE TO 6 MC GENERATOR SIGNAL	9	INTERMEDIATE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC	BROADCAST "B"	1500 KC	10	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC	BROADCAST "B"	TUNE TO 1500 KC GENERATOR SIGNAL	11	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC	BROADCAST "B"	TUNE TO 600 KC GENERATOR SIGNAL	12	BROADCAST OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETURNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



BOTTOM VIEW

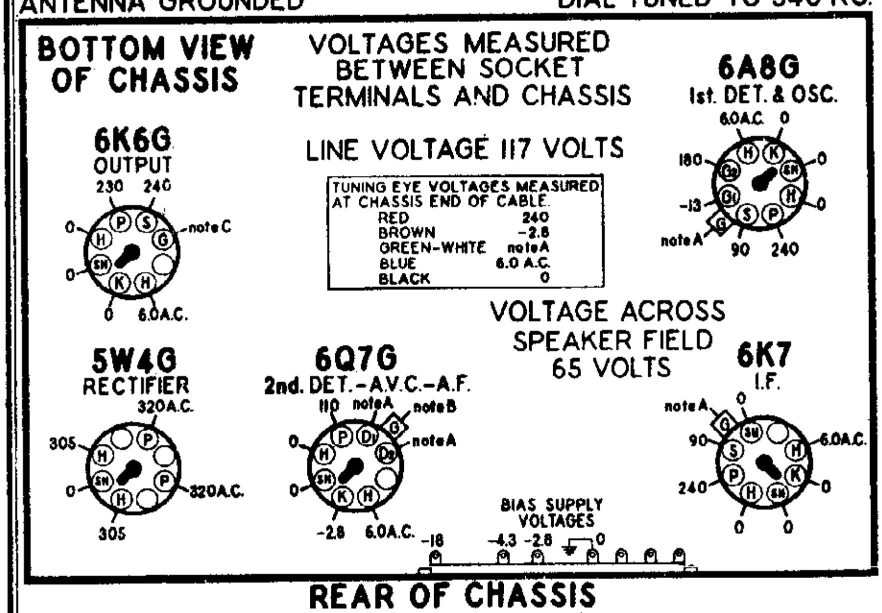


TOP VIEW



SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.



Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7, 6U5, and the diode plates of the 6Q7-G tubes is -2.8 volts measured across resistor 40C.

NOTE B: The bias for the control grid of the triode sections of the 6Q7-G is -4.3 volts measured across resistor 40B and 40C.

NOTE C: The bias for the control grid of the 6K6-G output tubes is -18 volts measured across resistor 40A, 40B and 40C.

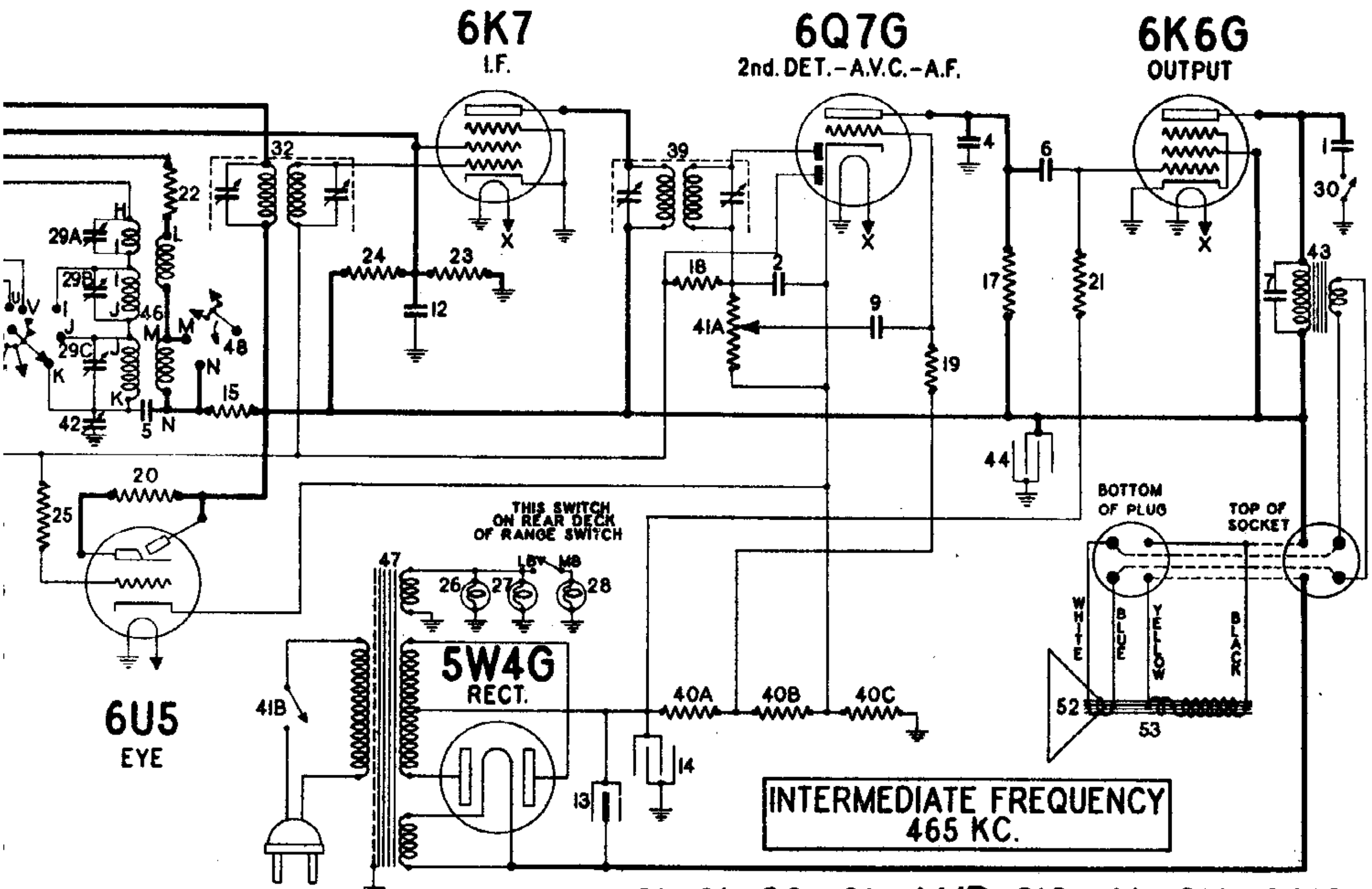
JUNE 1938

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1	83217	Condenser - paper .04 mf
2	83539	Condenser - mica 260 mmf
3	85061	Condenser - mica 51 mmfd.
4	85394	Condenser - mica 510 mmf.
5-6	88030	Condenser - paper .01 mf
7	88185	Condenser - ceramic tube 600 volt
8-9	88189	Condenser - paper .05 mf
10	88473	Condenser - mica .00123
11	88681	Condenser - mica .00255
12	89421	Condenser - paper .1 mfd.
13	89937	Condenser - elect. 30 mf
14	110377	Condenser - elect. 10 mf
15	110550	Resistor - carb. 10,000
16	110552	Resistor - carb. 47,000
17	110553	Resistor - carb.220,000
18-19-20	110554	Resistor - carb. 1 meg.
21	110559	Resistor - carb.470,000
22	110560	Resistor - carb. 100 ohm
23	110561	Resistor - carb. 15,000
24	110568	Resistor - carb. 15,000
25	110570	Resistor - carb. 2.2 meg
26-27-28	110629	Lamp - 6.3 volt - .25 am
29A to 29C	112072	Condenser - trimmer - 3
30	112793	Switch - tone control
31	112796	Coil - wave trap (with t
32	112803	Transformer - 1st I.F.
33A - 33B, 34A - 34B	112942	Condenser - dual push bu trimmer (1100 KC to 1
35A - 35B, 36A - 36B	112943	Condenser - dual push bu trimmer (770 KC to 13
37A - 37B, 38A - 38B	112944	Condenser - dual push bu trimmer (550 KC to 10

T-WARNER CORP.

MODELS 91-611 to 91-619,Chassis 91-61
98-611 to 98-619,Chassis 98-61
910-611 to 910-619,Chassis 910-61
Schematic,Voltage,Socket,Coils



91-61, 98-61 AND 910-61 CHASSIS

	LIST PRICE
. 600 V.$	.35
.--------	.20
---------	.15
---------	.25
. 400 V.	.25
.006 mfd.	.25

. 200 V.	.25
fd. (3%)	.25
fd. (3%)	.30
200 V.-	.25
. 450 V.	1.60
. 25 V.-	.80
hms ½ W.	.15
hms ¼ W.	.12
hms ¼ W.	.12
/4 watt-	.12
hms ¼ W.	.12
1/4 watt	.12
hm 2 W.-	.30
hm 1 W.-	.15
1/4 watt	.15
.--------	.15
ection--	.45
---------	.40
immer)--	.50
---------	1.20
ton 00 KC)--	.36
ton 0 KC)---	.45
ton 0 KC)---	.50

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
39	113047	Transformer - 2nd I.F.	1.10
40A to 40C	113057	Resistor - Metal Clad: Section A - 160 ohms 1 watt; Section B - 25 ohms ½ watt; Section C - 40 ohms ½ watt	.48
41A - 41B	113062	Volume Control - (500,000 ohms with switch)	.92
42	113063	Condenser - padder	.36
43	113064	Transformer - output	1.70
44	113066	Condenser - elect. 8 mfd. 450 V.	.98
45	113068	Coil - antenna	.94
46	113071	Coil - oscillator	1.20
47	113078	Transformer - power 117 volt (50-60 cycle)	4.00
47	113639	Transformer - power 117 volt (25 cycle	6.00
48	113083	Switch - range	1.80
49	113084	Push Button Switch Assembly	3.00
50A to 50C	113095	Condenser - trimmer (3 section)	1.25
51A - 51B	113250	Condenser - variable gang	3.00
52	R-113342	Cone - voice coil assem. for R-115011 speaker	1.80
53	R-115011	Speaker - dynamic 8 inch	8.00

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
67568	Washer - embossed (for mtg. elect.)	$ .05
81145	Retaining Ring - for drive shaft------Per C	.50
85427	Socket - octal base (standard)	.15
85785	Terminal strip - antenna - ground	.15
88810	Bushing - rubber; for chassis mtg.	.93

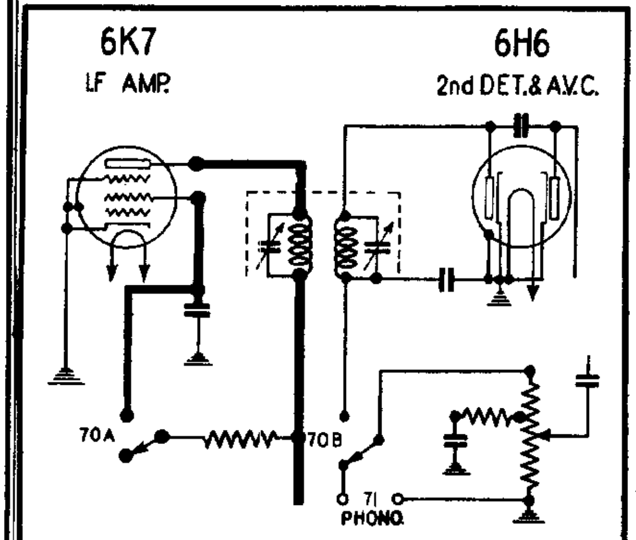
PART NUMBER	DESCRIPTION	LIST PRICE
89746	Washer - (paper) for back of knobs	.005
110496	Plug - speaker (4 prong)	.12
110501	Socket - 4 prong (for speaker)	.18
110829	Washer - flat steel, for mtg. chassis	.01
111085	Sleeve - felt for tuning eye	.03
111302	Cord - dial drive 6 or 50 ft.lgths.Per ft.	.05
111357	Spring - drive cord tension	.03
111855	Shield Base - for tube shields	.02
112233	Drum & Bushing - for dial drive	.35
112798	Clip - for mtg. wave trap coil	.01
112874	Screw #10 X 1 1/8 chassis mtg.	.01
112876	Screw - P.B. escutcheon mtg. #3 X 3/8	.01
112879	Screw - eye escutcheon mtg. #2 X 3/8	.03
113019	Clip - dial scale retaining	.01
113025	Socket - octal base (with special ground)	.15
113040	Light Shield - cardboard (between button holes and dial frame	.06
113041	Knob - push on	.10
113077	Shield - tube	.15
113080	Shaft - dial drive	.12
113086	Bracket - dial frame & light	.34
113089	Scale - dial	1.20
113093	Socket - for dial lamp	.18
113098	Escutcheon - dial	1.50
113099	Escutcheon - push button	1.44
113101	Pointer	.18
113102	Push Button - only	.08
113105	Knob - Push on	.10
113130	Cable & Plug - for tuning eye	.55
113189	Tab - celluloid - for push button--Per dz.	.09
113321	Tabs - station call letters(4 sheets) (brown)------Per set	.40
113323	Tabs - trimmer range (550 to 1000)-Per dz.	.09
113324	Tab - trimmer range (770 to 1350)	.01
113326	Tab - trimmer range (1100 to 1700)	.01

STEWART WARNER CORP.

Phonograph Connections
Universal Transformer Data

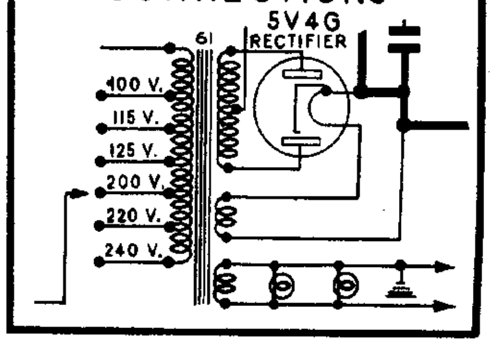
FOR OTHER SERVICING DATA ON THESE MODELS, SEE INDEX

SUPPLEMENTARY SERVICE DATA
MODELS R-146-X, R-147-X, AND R-147-P.

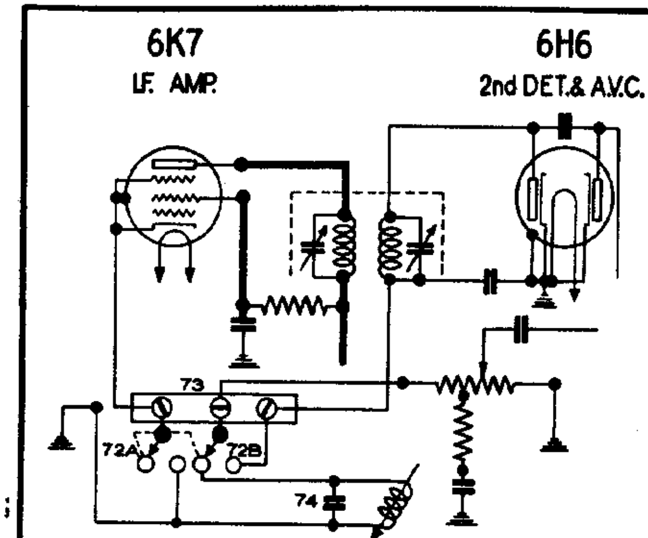


MODEL R 146 X & R 147 X PHONOGRAPH CONNECTIONS

POWER TRANSFORMER CONNECTIONS



UNIVERSAL TRANSFORMER USED WITH MODELS R-146-X ; R-147-X ; AND R-147-P.



MODEL R 147 P PHONOGRAPH CONNECTIONS

The diagrams on this sheet show the phonograph and universal power transformer connections for the R-146-X, R-147-X and R-147-P chassis. Since these chassis are otherwise identical with the models R-146 and R-147, only additional parts for these models are listed to the right. All other parts and service data will be found in the R-146 or R-147 service manual.

POWER TRANSFORMERS AND FUSES

Since the models R-146-X, R-147-X and R-147-P can be operated on a range of line voltages ranging from 100 to 240 volts different fuses must be used for different voltages. Proper values for different voltages are listed below.

MODEL	100 - 125 VOLTS		200 - 240 VOLTS	
	PART NUMBER OF FUSE	CURRENT RATING OF FUSE	PART NUMBER OF FUSE	CURRENT RATING OF FUSE
R-146-X	38841	1 Amp.	88055	3/4 Amp.
R-147-X	89002	1.5 Amp.	38841	1 Amp.
R-147-P	89002	1.5 Amp.	38841	1 Amp.

SPEAKERS AND OUTPUT TRANSFORMERS

The R-266-A 8-inch dynamic speaker is used with model R-1471-X, and the R-253-A 12-inch dynamic speaker is used with model R-1475-X. Please note that these speakers require different output transformers. Speakers and output transformers are listed below for the models R-146-X, R-147-X and R-147-P respectively.

MODEL	SPEAKER		OUTPUT TRANSFORMER
	PART NO.	SIZE	PART NO.
R-1461-X	R-247-A	8-inch	88529
R-1465-X	R-248-A	12-inch	88796
R-1471-X	R-266-A	8-inch	89622
R-1475-X	R-253-A	12-inch	88870
R-1479-P	R-253-A	12-inch	88870

ADDITIONAL PARTS USED ON

MODELS R-146-X, R-147-X and R-147-P

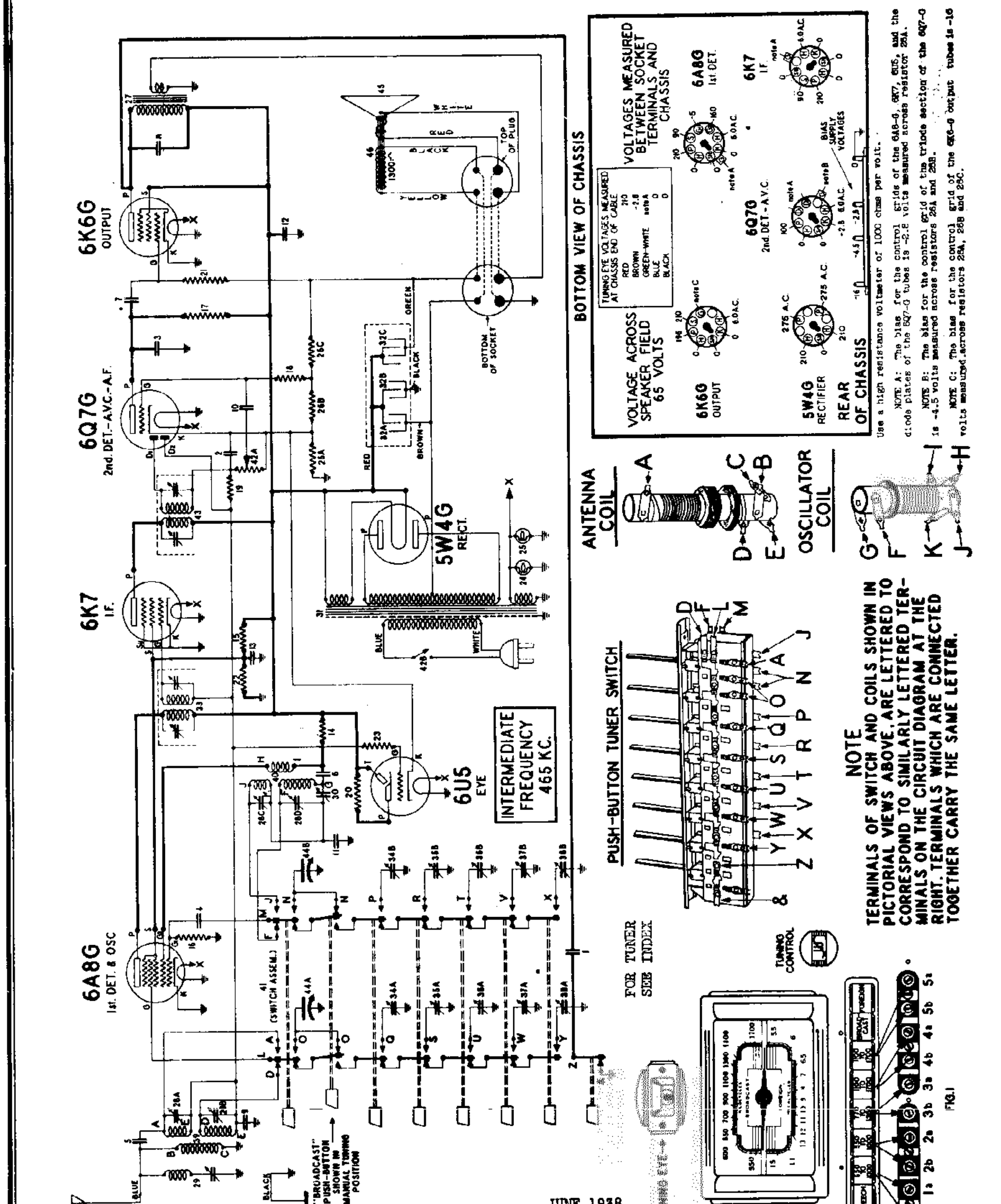
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	38841	Fuse, 1 ampere (to be used on models specified in above note)	$ .10
70A-70B	84404	Phonograph toggle switch (used on R-146-X, R-147-X)	1.10
73	84412	Phonograph Terminal Strip (used on R-147-P)	.03
72A-72B	84568	Phonograph toggle switch (used on R-147-P)	1.50
74	85440	.00351 mfd. mica condenser (used on R-147-P)	.40
1	88055	Fuse, 3/4 ampere (used with model R-146-X)	.12
58	88529	Output transformer (used with model R-1461-X)	2.00
58	88796	Output transformer (used with model R-1465-X)	2.50
58	88870	Output transformer (used with models R-1475-X and R-1479-P)	2.50
63	89002	Fuse, 1.5 ampere (used on model R-147-X and R-147-P)	.10
61	89303	Universal power transformer 100 to 240 volts, 25 to 133 cycles (used with R-146-X)	12.00
	89432	Tuning eye escutcheon (used with R-1471-X)	.60
61	89433	Universal power transformer 100 to 240 volts, 25 to 133 cycles (used with R-147-X and R-147-P)	13.00
58	89622	Output transformer for R-266-A speaker (used on R-1471-X)	2.10
71	89709	Phonograph terminal strip (used on R-146-X and R-147-X)	.15
69	R247A	8-inch dynamic speaker (used on R-1461-X)	9.00
69	R248A	12-inch dynamic speaker (used on R-1465-X)	11.50
69	R253A	12-inch dynamic speaker (used on R-1475-X and R-1479-P)	11.00
69	R266A	8-inch dynamic speaker (used on R-1471-X)	9.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 91-621 to 91-629
Chassis 91-62
98-621 to 98-629
Chassis 98-62

STEWART-WARNER CORP.

910-621 to 910-629
Chassis 910-62
Schematic, Voltage, Socket
Tuner Switch, Coils



91-62. 98-62 AND 910-62 CHASSIS

MODELS 91-621 to 91-629
98-621 to 98-629
910-621 to 910-629

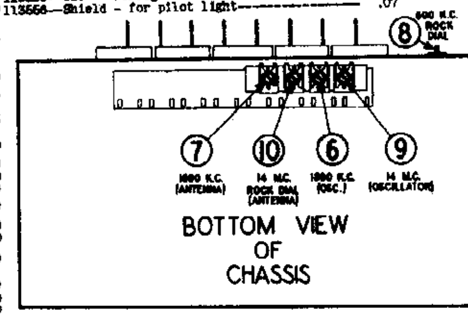
STEWART-WARNER CORP.

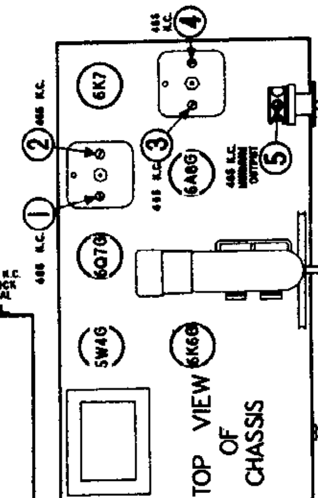
Alignment, Trimmers, Parts

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83217	Condenser - paper .04 mfd. 600 volt	.35
2-3	83539	Condenser - mica 250 mmfd.	.20
4	85061	Condenser - mica 51 mmfd.	.15
5	85454	Condenser - mica 11 mmf.	.15
6-7	88030	Condenser - paper .01 mfd. 400 volt	.25
8	88185	Condenser - ceramic tube .006 mfd. 600 volt	.25
9-10	88189	Condenser - paper .05 mfd. 200 volt	.25
11	88587	Condenser - mica .0042 mfd.	.35
12	88682	Condenser - paper .1 mfd. 400 volt	.25
13	89421	Condenser - paper .1 mfd. 200 volt	.25
14	110550	Resistor - carbon 10,000 ohms ½ W.	.15
15	110551	Resistor - carbon 15,000 ohms 1 W.	.15
16	110552	Resistor - carbon 47,000 ohms ½ W.	.12
17	110553	Resistor - carbon 220,000 ohms ½ W.	.12
18-19-20	110554	Resistor - carbon 1 meg. 1/4 watt	.12
21	110559	Resistor - carbon 470,000 ohms ½ W.	.18
22	110562	Resistor - carbon 22,000 ohms ½ W.	.12
23	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
24-25	110629	Lamp - 6.3 volt - .25 amps.	.16
26A - 26B 26C	112789	Resistor - (Section A - 55 ohms) (Section B - 30 ohms) (Section C - 240 ohms)	.40
27	112790	Transformer - output	1.26
28A - 28B 28C - 28D	112792	Condenser - trimmer (4 section)	.80
29	112798	Coil - wave trap (with trimmer)	.50
30	112799	Condenser - padder (530 - 630 mmfd.)	.36
31	112800	Transformer - power 117 V. 50-60 C.	3.40
	112823	Transformer - power 100-240 volt - 50-133 cycle	6.50
	112836	Transformer - power 117 V. 25 cycle	5.00
32A - 32C	112802	Condenser - electrolytic (dry) (Section A - 8 mfd. 400 volt) (Section B - 4 mfd. 400 volt) (Section C - 4 mfd. 400 volt)	1.60
33	112803	Transformer - 1st I.F.	1.20
34A - 34B 35A - 35B	112942	Condenser - dual push button trimmer (1100 KC to 1700 KC)	.36
36A - 36B	112943	Condenser - dual push button trimmer (770 KC to 1350 KC)	.45
37A - 37B 38A - 38B	112944	Condenser - dual push button trimmer (550 KC to 1000 KC)	.60
39	113011	Coil - ant. - broadcast-short-wave	1.20
40	113015	Coil Assembly - oscillator	1.00
41	113021	Push Button Switch Assembly	4.20
42A - 42B	113024	Volume Control (500,000 ohm) (with switch)	.80
43	113047	Transformer - 2nd I.F.	1.10
44A - 44B	113126	Condenser - variable gang	2.50
45	R-113243	Cone - voice coil assembly for R-115009 speaker	1.50
	R-113342	Cone - voice coil assembly for R-115011 or R-115014 spkrs.	1.60
46	R-115009	Speaker - dynamic (6 inch)	3.50
	R-115014	Speaker - dynamic (8 inch)	7.00

PART NUMBER	DESCRIPTION	LIST PRICE
111357	Spring - drive cord tension	.05
111855	Shield Base - for tube shields	.02
112233	Drum and Bushing - for dial drive	.35
112745	Clip - coil mounting (osc. & ant.)	.01
112747	Nut - #6-32 Hex.	.01
112786	Scale - dial	.68
112874	Screw #10 X 1-1/8 Chassis Mtg.	.01
112876	Screw - P.B. escutcheon mtg. #3 X 3/8	.01
112879	Screw - escutcheon mtg. #2 X 3/8	.03
112945	Shaft - tuning	.10
113019	Clip - dial scale retaining	.01
113022	Knob - for controls	.10
113025	Socket - octal base (with special ground)	.15
113030	Escutcheon - dial	1.24
113039	Dial - mtg. plate and bracket	.38
113040	Light Shield - cardboard (between button holes and dial frame)	.06
113077	Shield - tube	.15
113102	Push Button - only	.08
113106	Escutcheon Plate - for trimmer screws	.64
113114	Pointer - dial	.12
113127	Bracket & Clip - for tuning eye	.25
113130	Cable & Plug - for tuning eye	.55
113136	Escutcheon - for eye	.25
113144	Socket - for dial lamp	.22
113189	Tab - celluloid - for push button - Per doz.	.09
113321	Tabs - station call letters (4 sheets) (brown)	.40
113323	Tab - trimmer range (550 to 1000) - Per doz.	.09
113324	Tab - trimmer range (770 to 1350) - Per doz.	.09
113325	Tab - trimmer range (1100 to 1700) Per doz.	.09
113326	Tab - "Speech" - Per doz.	.09
113327	Tab - "Broadcast" - Per doz.	.09
113328	Tab - "Foreign" - Per doz.	.09
113556	Shield - for pilot light	.07
81148	Retaining Ring - for drive shaft - Per C	.50
85040	Screw - #6 Hex. Head (self-tapping) - Per C	.35
85427	Socket - octal base	.15
89746	Washer - (paper) for back of knobs	.005
110496	Plug - speaker (4 prong)	.18
110501	Socket - 4 prong (for speaker)	.18
110829	Washer - flat steel, for mtg. chassis	.01
111085	Sleeve - felt for tuning eye	.05
111302	Cord - dial drive 6 or 50 ft. lgths. Per ft.	.05

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.





Chassis Model	Used In Receiver Models	Voltage	Frequency
91-62	91-621 to 91-629	117	60 cycles
98-62	98-621 to 98-629	117	25 cycles
910-62	910-621 to 910-629	100-240	50-133

These chassis are 6-tube, two band push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1725 KC and 5.4 to 15.4 MC. The I. F. is 465 KC.

Incorporated in each chassis is an eight-button tuner switch. The first button on the left, labelled "Speech," is a tone control. The two buttons on the right, labelled "Broadcast" and "Foreign", are used for band change. The other five buttons are for push-button tuning.

Push-button tuning is secured by substituting pre-set trimmers for the variable gang condenser. The push-button tuner switch provides a simple, rapid method for effecting this substitution.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

(1) Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the black (ground) wire or the chassis.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

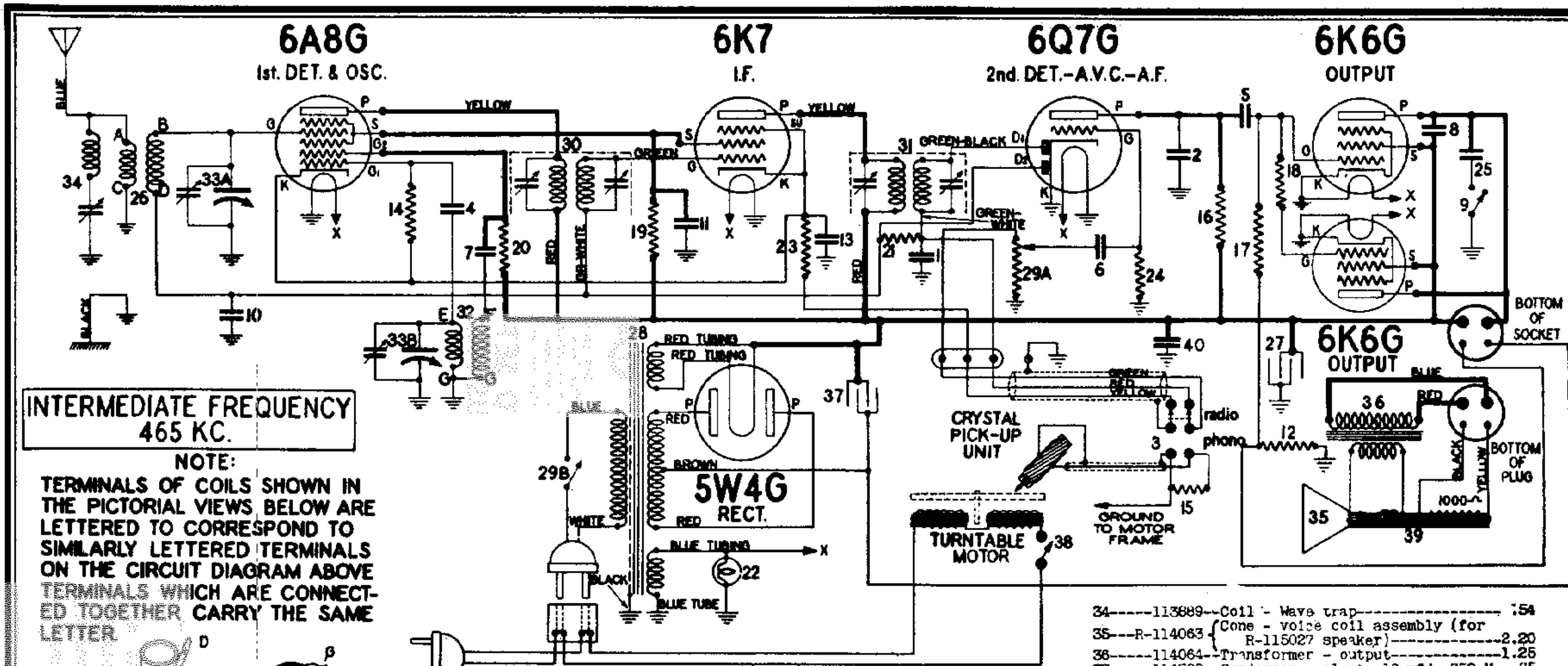
(4) With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	BROADCAST BUTTON PUSHED IN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2nd I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1st I.F.	
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	BROADCAST BUTTON PUSHED IN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	BROADCAST BUTTON PUSHED IN	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	BROADCAST BUTTON PUSHED IN	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	600 KC	BROADCAST BUTTON PUSHED IN	TUNE TO 600 KC GENERATOR SIGNAL	8	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN BUTTON PUSHED IN	14 MC	9	FOREIGN OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR RE-ALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN BUTTON PUSHED IN	14 MC	10	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

910-641 to 910-649
Chassis 910-64
Schematic, Voltage, Socket
Coils, Notes

STEWART-WARNER CORP.

MODELS 91-641 to 91-649
Chassis 91-64
98-641 to 98-649
Chassis 98-64



INTERMEDIATE FREQUENCY
465 KC.

NOTE:
TERMINALS OF COILS SHOWN IN THE PICTORIAL VIEWS BELOW ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.

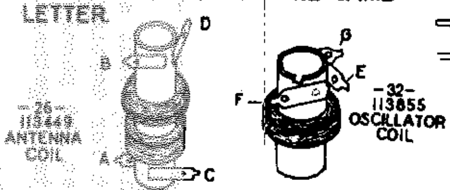
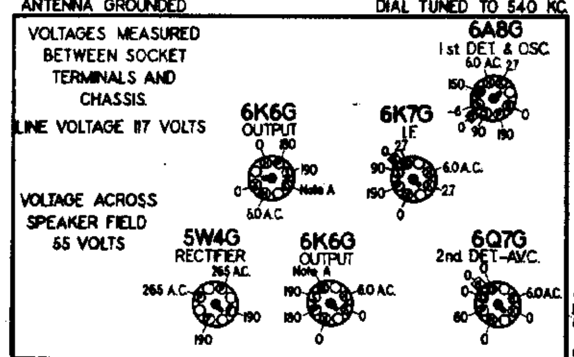


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	84566	Switch-"Phono Radio"-D.P.D.T.	1.50
4	85061	Condenser - mica 51 mmfd.	.15
5-6	86026	Condenser - paper .02 mfd. 400 V.	.25
7-8	86030	Condenser - paper .01 mfd. 400. V.	.25
9	86054	Switch - tone control	.30
10	86189	Condenser - paper .05 mfd. 200 V.	.25
11	86191	Condenser - paper .1 mfd. 300 V.	.25
12	86462	Resistor - W.W. 270 ohm 1 W. (10%)	.15
13	89532	Condenser - paper .25 mfd. 200 V.	32
14-15	110552	Resistor - carb. 47000 ohm ¼ watt	.12
16	110553	Resistor - carb. 220000 ohm ¼ W.	.12
17	110559	Resistor - carb. 470000 ohm ¼ W.	.12
18	110560	Resistor - carb. 100 ohms 1/4 W.	.12
19	110566	Resistor - carb. 33000 ohms ¼ W.	.12
20	110569	Resistor - carb. 10000 ohms ¼ W.	.12
21	110580	Resistor - carb. 3.3 meg. ¼ watt	.12
22	110629	Lamp - 6.3 volt - .25 amps.	.15
23	112974	Resistor - carb. 220 ohm ½W.(10%)	.15
24	112975	Resistor - carb. 10 meg. 1/4 watt	.12
25	113034	Condenser - paper .04 mfd. 600 volt (substitute 83217)	.15
26	113449	Coil - antenna	.78
27	113808	Condenser - elect. 8 mfd. 300 V.	.66
28	113813	Transformer - power 117V. - 60C.	5.00
29A - 29B	113852	Volume control - 500,000 ohm (with switch)	.96
30	113853	Transformer - 1st I.F.	1.25
31	113854	Transformer - 2nd I.F.	1.20
32	113855	Coil - Oscillator	.48
33A - 33B	113869	Condenser - gang	3.30
34	113889	Coil - Wave trap	.54
35	R-114063	Cone - voice coil assembly (for R-115027 speaker)	2.20
36	114064	Transformer - output	1.25
37	114329	Condenser - elect. 16 mfd. 350 V.	.66
38	114437	Toggle Switch - phono power off-on switch	.76
39	R-115027	Speaker - dynamic (6 inch)	4.90
40	88191	Condenser - paper .1 mfd. 300 V.	.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.



REAR OF CHASSIS

The triode section of the 6Q7G tube utilizes a circuit arrangement which gives a minimum of distortion and excellent gain with zero bias on the grid. At high signal levels, this circuit gives less distortion than if the tube is operated with a fixed bias. The proper operation of this circuit depends largely on the high resistance of the grid resistor, No. 24 in the circuit diagram. This resistor is rated at 10 megohms. Do not substitute any lower value since this would increase distortion and decrease amplification.

November 15, 1938

Use a high resistance voltmeter of at least 1000 ohms per volt.
NOTE A: The bias for the control grids of the 6K6-G tubes is -15 volts measured across resistor number 12.

MODELS 91-641 to 91-649
98-641 to 98-649
910-641 to 910-649

STEWART-WARNER CORP.

Alignment, Trimmers
Phono. Data, Tuner Data

ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1500 KC. are required.

1- Connect the output meter across the voice coil or between the plate of either of the 6K6G tubes and ground through a .1 mfd. condenser. (these tubes are connected in parallel, not push-pull). The connection will depend upon the type of meter. (The more sensitive type should be connected across the voice coil.)

2- Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.

3- Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.

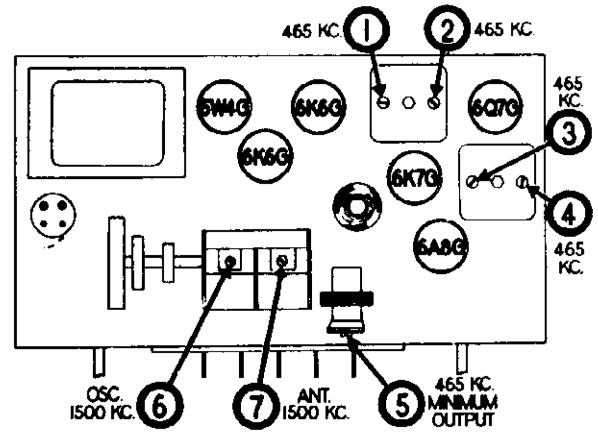
4- With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is only slightly off calibration, loosen the set screw in the pointer cord drive drum, which is the outer drum on the left hand side of the gang condenser and with the gang condenser in full mesh turn the drum until the pointer is in the correct position. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last division on the left end of the dial scale. Hold the pointer in place and check to see if the gang condenser is still fully meshed, then tighten the pointer clip being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE (Do not remove grid clip)	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1—2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3—4	1ST I.F.	
200 MMFD. MICA CONDENSER	ANTENNA LEAD	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	6	BROADCAST OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.

DIAL AND MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
112745	Clip - coil mounting (osc. & ant.)	.01
112798	Clip - for mtg. wave trap coil	.01
113178	Cord - band indicator (28" required) (supplied in 4 ft. lengths)	.30
113882	Condenser - drive drum & pinion gear	.70
113884	Dial drive drum and hub	.42
113812	Dial Frame & Pulley Assembly	.54
114321	Dial Scale	.50
113861	Dial Scale Retainer	.03
113755	Escutcheon - dial	.40
113756	Escutcheon - push button	.32
113156	Gear - and bushing assembly for dial drive	.22
113022	Knob - round - volume or tuning	.10
113170	Adjusting Lug - for button shafts	.01
110496	Plug - speaker (4 prong)	.12
113856	Pointer	.06
112762	Pulley - dial cord drive (at left side)	.04
113762	Push Button	.04
113880	Push Button Tuner Unit Assembly	4.60
81145	Retaining Ring - for drive shaft -- Per C	.50
113463	Rubber Bushing - motor mtg.	.03
113672	Rubber Grommet (on tuning shaft)	.02
85040	Screw-#6 Hex.Hd. for mtg. adjusting washer -- Per C	.35
112874	Screw - #10 X 1 1/8 chassis mtg.	.01
112879	Screw - escutcheon mtg. #2 X 3/8	.03
114431	Screw #6-40 X 7/8 - for setting up buttons	.01
85827	Set Screw - 8/32 square head	.02
113860	Shaft - tuning	.08
113875	Socket - for dial lamp	.15
110501	Socket - 4 prong (for speaker)	.16
113025	Socket - octal base (with special ground)	.15
85427	Socket - octal base (standard)	.15
113177	Spring - dial cord tension	.09
85815	Spring - between gear sections	.01
113169	Spring - for key return	.01
114041	Tabs - station call letters	.35
84412	Terminal strip - phono	.03
110829	Washer - flat steel - for mtg. chassis	.01
89746	Washer - (paper) for back of knobs	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.



PHONOGRAPH CONNECTIONS

This receiver is equipped with a phonograph turntable and a crystal pickup unit for phonograph operation. The phonograph turntable motor is wired directly to the line cord. A socket is inserted in parallel with this power supply line into which is plugged the short power cord from the radio chassis.

The crystal pickup unit is switched into the audio amplifier section of the radio by means of a double pole double throw switch located in the top panel. With this switch in the phonograph position the receiver volume control is disconnected from the low side of the 2nd I.F. transformer and connected across the crystal pickup unit. The radio frequency section of the receiver is at the same time silenced by the opening of the cathodes of the 6A8G and 6K7G tubes.

The connections to the phonograph unit are made at the terminal strip located on the back of the radio chassis. IMPORTANT: If the receiver chassis is removed from the cabinet for test, you must put a jumper wire between the two outside terminals of this terminal strip. Also the center terminal must be grounded to the chassis.

HOW TO SET-UP AND USE THE PUSH BUTTON TUNER.

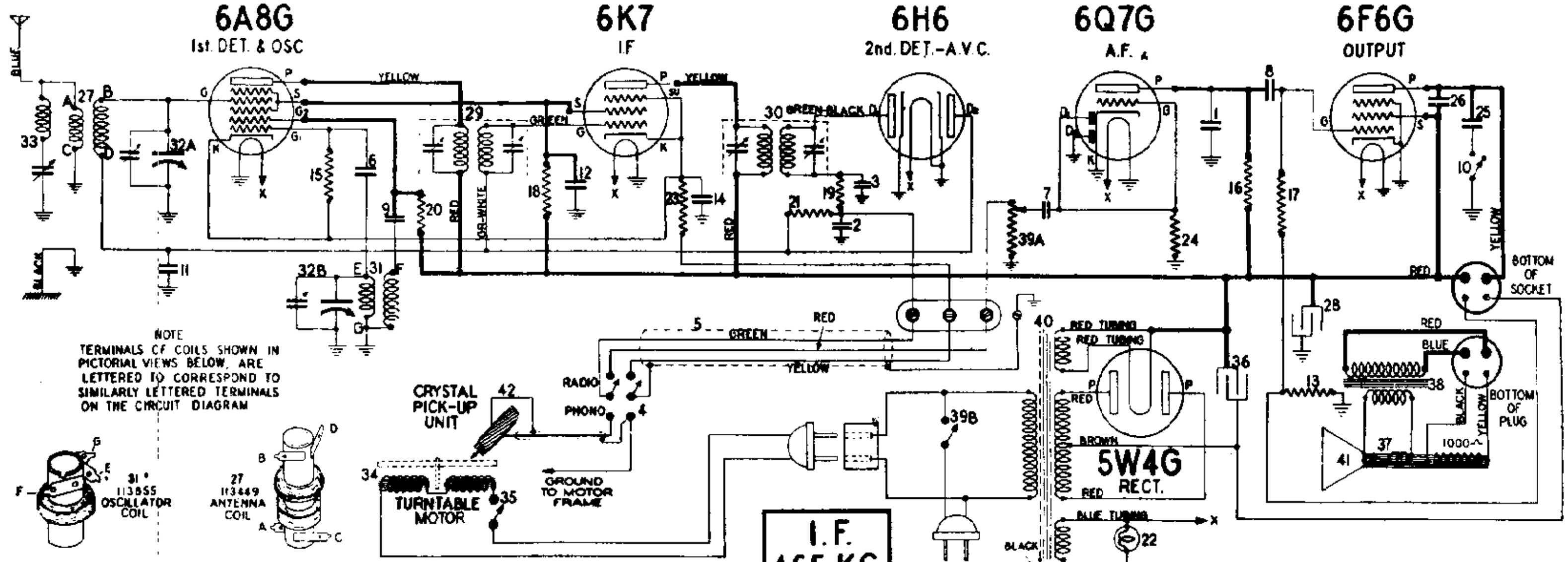
1. Connect receiver to good antenna system.
2. Remove escutcheon surrounding push buttons.
3. Select five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give better results when tuned manually. Any button may be used for a station on any part of the dial.
4. Loosen the screw at the side of the push button shaft (about one turn counter-clockwise will be sufficient).
5. Keep the screw driver inserted in the screw slot and push against the screw. At the same time tune in the station using the tuning knob. YOU MUST PUSH AGAINST THE SCREW DRIVER DURING THE ENTIRE TIME THAT YOU ARE TUNING. Be sure that you tune in the station to the point where the program is heard with the least hiss and deepest tone, and not to the point of greatest volume.
   Now, still pushing against the screw driver, retighten the screw, turning it to the right (clockwise) until it is REASONABLY TIGHT. To turn further may result in damage to the mechanism.
6. The set up for this button is now complete. Set-up the remaining buttons in the same manner and replace the escutcheon.

TESTING When the phonograph pickup leads are disconnected as this model chassis is removed from the cabinet for testing, the set will not operate unless the proper connections are made at the phonograph terminal strip. The two outside terminals must be connected together and the center terminal must be grounded to the chassis.

STEWART-WARNER CORP. MODEL 91-648, Chassis 91-64 (With "S" stamped on chassis)

Schematic, Voltage, Socket

THIS APPLIES ONLY TO THE 91-648 RECEIVER IDENTIFIED BY THE LETTER S STAMPED ON BACK OF CHASSIS.



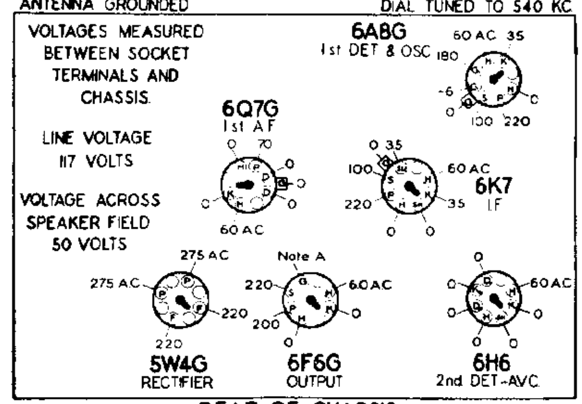
ELECTRICAL PARTS LIST

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica 260 mmfd.	$0.20
2-3	83783	Condenser—mica 110 mmf.	.20
4	84566	Switch—"phono-radio" D.P.D.T.	1.50
5	84572	Cable—Shielded for Phono. Pickup	.60
6	85061	Condenser—mica 51 mmfd.	.15
7-8	88026	Condenser—paper .02 mfd. 400 Volt	.25
9	88030	Condenser—paper .01 mfd. 400 Volt	.25
10	88054	Switch for tone control	.30
11	88189	Condenser—paper .05 mfd. 200 Volt	.25
12	88191	Condenser—paper .1 mfd. 300 Volt	.25
13	88462	Resistor—W. W. 270 ohms 1 W. 10%	.15
14	89532	Condenser—paper .25 mfd. 200 Volt	.32
15	110552	Resistor carbon 47,000 ohms ¼ W.	.12
16	110553	Resistor carbon 220,000 ohms ¼ W.	.12
17	110559	Resistor carbon 470,000 ohms ¼ W.	.12
18-19	110566	Resistor—carbon 33,000 ohms ¼ W.	.12
20	110569	Resistor—carbon 10,000 ohms ¼ W.	.12
21	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
22	110629	Dial bulb—6.3 volt .25 amps.	.15
23	112974	Resistor—carbon 220 ohms ¼ W. (10%)	.15
24	112975	Resistor—carbon 10 meg. ¼ watt	.12

Diagram Number	Part Number	Description	List Price
25	113034	Condenser—paper .04 mfd. 600 volt	$0.15
26	113035	Condenser—paper .006 mfd. 600 V.	.14
27	113449	Antenna coil	.78
28	113808	Condenser—electrolytic 8 mfd. 350 V.	.66
29	113853	Transformer—1st I.F.	1.25
30	113854	Transformer—2nd I.F.	1.20
31	113855	Coil—oscillator	.48
32A-32B	113869	Condenser—gang	3.30
33	113889	Coil—wave trap	.54
34	114400	Phono. motor & turntable	10.50
35	114437	Toggle Switch—phono. power off-on switch	.75
36	114972	Condenser—elect. 16 mfd. 450 V.	.78
37	U-115048	Speaker—dynamic 6"	5.40
38	U-116212	Output transformer for U-115048 speaker	1.50
39A-39B	116274	Volume control 500,000 ohms with switch	.96
40	116283	Transformer—power 110 V 60 C.	3.50
41	U-116296	Cone & voice coil assembly for U-115048 speaker	1.70
42	116300	Phono. pickup head	7.50

SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC



REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 6F6G tube is —13.5 volts measured across resistor number 13.

MODEL 91-648, Ch. 91-64
(With "S" stamped on chassis) STEWART-WARNER CORP.
Alignment, Trimmers, Tuner
Phono. Connections

THIS APPLIES ONLY TO THE 91-648 RECEIVER IDENTIFIED BY THE LETTER S STAMPED ON BACK OF CHASSIS.

ALIGNMENT PROCEDURE

FOR ALIGNMENT, an output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground through a .1 mfd. condenser. The connection will depend upon the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.
3. Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, the pointer should be at the last dial division at the left end of the dial scale. With the gang condenser in this position the set screw on the large drum should be nearly straight down.
5. IF YOU DISCONNECT THE PHONOGRAPH PICK-UP CABLE, PUT A JUMPER BETWEEN THE TWO OUTSIDE TERMINALS OF THE TERMINAL STRIP, AND GROUND THE CENTER TERMINAL TO CHASSIS.

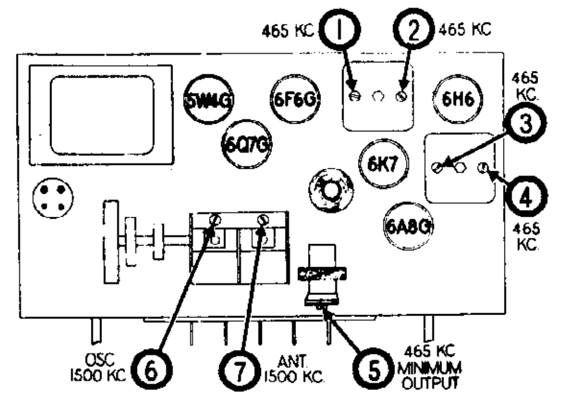
Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 Mfd. Condenser	Control Grid of 6A8G Tube (Do not remove grid clip)	465 KC	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
				3-4	1st I.F.	
400 Ohm Carbon Resistor	Antenna Lead	465 KC	Any Point Where It Does Not Affect the Signal	5	Wave Trap	Adjust for Minimum Output Using Strong Generator Signal.
400 Ohm Carbon Resistor	Antenna Lead	1500 KC	1500 KC	6	Broadcast Oscillator	Adjust for Maximum Output.
400 Ohm Carbon Resistor	Antenna Lead	1500 KC	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for Maximum Output.

DIAL AND MISCELLANEOUS PARTS

Part No.	Description	List Price
113170	Adjusting Lug for Push Button shaft	$0.01
112745	Clip—for coil mtg.	.01
112798	Clip for wave trap coil mtg.	.01
89912	Clip—Grounding for Tube Base	.02
113178	Cord—dial drive (supplied in 4 ft. lengths)	.30
113882	Drive drum (small) and Pinion Gear for gang condenser	.70
113884	Dial drive drum and hub (large)	.42
113812	Dial Frame and Pulley Assembly	.54
114321	Dial scale	.50
113861	Dial Scale Retainer Clip	.03
113755	Escutcheon for dial	.40
113756	Escutcheon for push buttons	.32
113022	Knob	.10
114320	Mechanical Push Button Mechanism, complete	7.50
84571	Needle Cup for Phonograph	.10
110496	Plug for speaker	.12
113856	Pointer—dial	.06
113762	Push Buttons	.04
116165	Receptacle for 2 prong plug for phono. motor	.50
81145	Retaining Clip for tuning shaft ... Per C	.50
114598	Rubber tube for tuning shaft	.01
85040	Screw—for mtg. adjusting lug No. 6x¼ Hex. Hd.	.35
112874	Screw—chassis mtg. No. 10x1⅛"	.01
114431	Screw—for setting up push buttons No. 6-40x⅞	.01
114914	Screw—for mtg. escutcheon, Phillips head ... Per doz.	.15
116185	Screw—for push button escutcheon mtg. No. 2x⅜	.01
116423	Screw—Needle, for head	.01
85827	Set Screw—No. 8-32 Square Head	.02
113860	Shaft—tuning	.08
88164	Shield Cap	.06
88161	Shield, tube ... Per section	.08
89911	Shield—Base	.04
85427	Socket—octal base (standard)	.15
113025	Socket—octal base (with special ground)	.15
110501	Socket for speaker plug	.16
113875	Socket—for dial lamp	.15
113169	Spring—return for push buttons	.01
113177	Spring for dial cord tension	.09
114041	Tabs—station call letters	.35
84412	Terminal Strip—phono.	.03
116410	Turntable	2.00
116530	Washer for back of knob paper	.005
110829	Washer—for chassis mtg.	.01

PHONOGRAPH CONNECTIONS

This receiver is equipped with a phonograph turntable and a crystal pickup unit for phonograph operation. The crystal pickup unit is switched into the audio amplifier section of the radio by means of a double-pole double-throw switch adjacent to the turntable. With this switch in the phonograph position (marked P) the receiver volume control is disconnected from the low side of the 2nd I.F. transformer and connected across the crystal pickup unit. The radio frequency



section of the receiver is at the same time silenced by the opening of the cathodes of the 6A8G and 6K7 tubes.

The connections to the phonograph unit are made at the terminal strip located on the back of the radio chassis. **IMPORTANT: If the receiver chassis is removed from the cabinet for test, you must put a jumper wire between the two outside terminals of this terminal strip. Also the center terminal must be grounded to the chassis.**

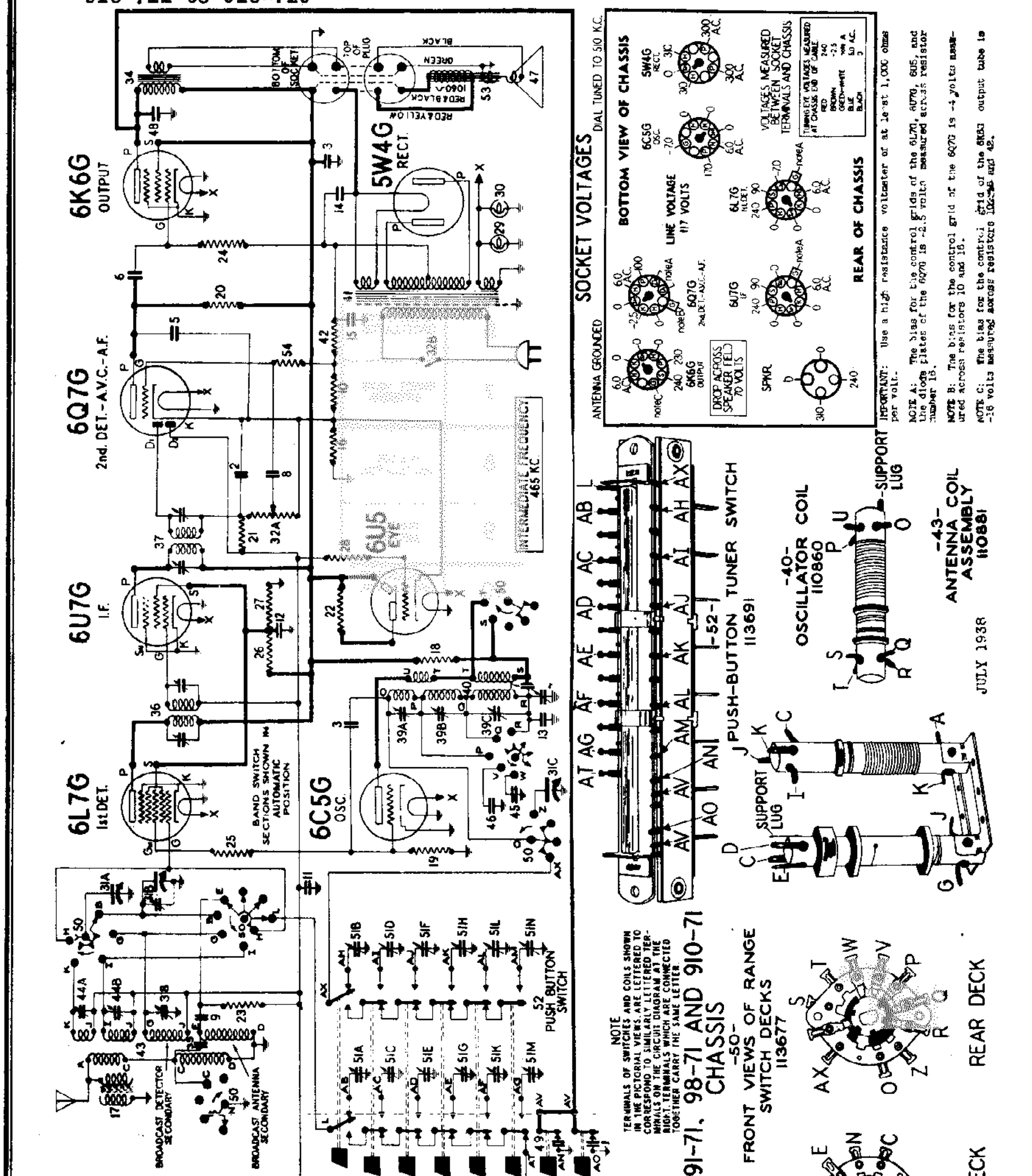
HOW TO SET UP AND USE THE PUSH BUTTON TUNER

1. Connect receiver to good antenna system and operate for fifteen minutes, then remove escutcheon surrounding push buttons.
2. Select five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give better results when tuned manually. Any button may be used for a station on any part of the dial.
3. Loosen the screw at the side of the push button shaft (about one turn counter-clockwise will be sufficient). Keep the screw driver inserted in the screw slot and push against the screw. At the same time carefully tune in the station using the tuning knob. YOU MUST PUSH AGAINST THE SCREW DRIVER DURING THE ENTIRE TIME THAT YOU ARE TUNING.
   Now, still pushing against the screw driver, retighten the screw, turning it to the right (clockwise) until it is REASONABLY TIGHT. To turn further may result in damage to the mechanism.
4. The setup for this button is now complete. Set up the remaining buttons in the same manner and replace the escutcheon

MODELS 91-711 to 91-719
Chassis 91-71
98-711 to 98-719
Chassis 98-71
910-711 to 910-719

STEWART-WARNER CORP.

Chassis 910-71
Schematic, Voltage, Coils
Tuner Switch, Notes



Chassis Model	Used in Receiver Models	Voltage	Frequency
91-71	91-711 to 91-719	117	60 cycles
98-71	98-711 to 98-719	117	25 cycles
910-71	910-711 to 910-719	100-240	50-133

These chassis are 8 tube, three band, push button tuning superheterodyne receivers. The tuning ranges are 525 to 1760 KC; 1.7 to 5.6 MC: and 5.3 to 18.1 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push button switch provides a simple rapid method of effecting this substitution.

It should be noted that this receiver utilizes a special preselector stage when operated on Manual Tuning for the broadcast band. When the band switch is in the automatic position the secondary of the broadcast antenna coil is connected to the grid of the 6L7G tube and the push button trimmers are shunted across this secondary for tuning of the antenna stage. The broadcast detector coil is disconnected from the circuit when the band switch is in the automatic position.

MODELS
91-711 to 91-719
98-711 to 98-719

STEWART-WARNER CORP.

910-711 to 910-719
Alignment, Trimmers

ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 16.0 MC. are required.

1- Connect the output meter across the voice coil or between the plate of the 6K6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

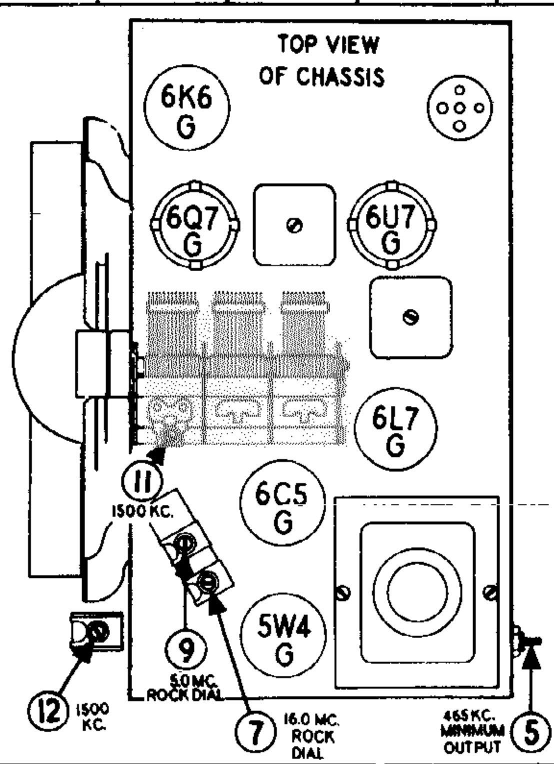
2- Connect the ground lead of the signal generator to the chassis of the receiver.

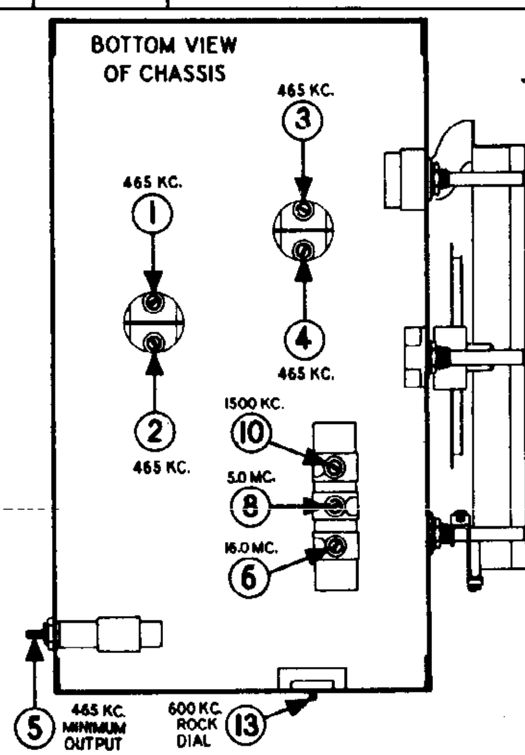
3- Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4- With the gang condenser in full mesh set the pointer on the last scale division on the low frequency end of the dial. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT: THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GEN. OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7G TUBE	465 KC.	BROADCAST (MANUAL TUNING)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT
					3-4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (MANUAL TUNING)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT WAVE (Counter-clockwise)	16 MC.	6	SHORT WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT WAVE (Counter-clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	7	SHORT WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE	5.0 MC.	8	POLICE OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE	TUNE TO 5.0 MC. GENERATOR SIGNAL	9	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (MANUAL TUNING)	1500 KC.	10	BROADCAST OSCILLATOR (Shunt)	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (MANUAL TUNING)	TUNE TO 1500 KC. GEN. SIG.	11	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
					12	DETECTOR	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (MANUAL TUNING)	TUNE TO 600 KC. GENERATOR SIGNAL	13	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.





STEWART-WARNER CORP.

MODELS 91-711 to 91-719
98-711 to 98-719
910-711 to 910-719

Tuner Data, Drive Cord Data
Parts

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to the customers antenna and that the push button trimmers are set-up using this antenna (not the antenna in the service shop) otherwise the antenna trimmer will be incorrectly aligned.

2. Turn the set on and allow it to operate at least one-quarter hour before setting up the push buttons.

3. Make a list of six nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results, also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS AS INDICATED IN FIG. 1.
   Each of the buttons on your Push Button Tuner has a definite operating range, as shown in Fig. 1; therefore it is imperative that you select a station which is in the operating range of a button before attempting to set up that button for the particular station. AS THE TRIMMER SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER TRIMMER SCREWS ARE USED. The frequency of your local stations may be obtained from your newspaper or radio call magazine. For example, suppose you want to set a button to station WLW whose frequency falls within the operating range of buttons No. 3 or No. 4, whose range is 550 to 1000 kilocycles. IT SHOULD BE NOTED THAT WHENEVER IT IS POSSIBLE TO USE BUTTONS, HAVING DIFFERENT RANGES, TO SET TO A GIVEN STATION, THE CORRECT BUTTON TO USE WILL BE THAT ONE FOR WHICH THE TRIMMER SCREWS ARE NOT TOO LOOSELY SET. "DRIFTING" IS A DIRECT RESULT OF LOOSE TRIMMER SCREWS AND THEREFORE SUCH SETTINGS OF TRIMMER SCREWS SHOULD BE AVOIDED IF POSSIBLE.

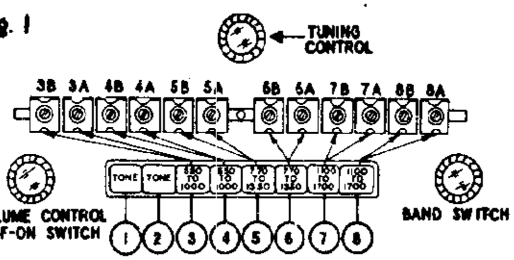
4. Remove the escutcheon surrounding the push buttons by taking out the five screws holding it to the cabinet. This will expose to view twelve trimmer adjusting screws, which are used to set each button to its correct station.

5. Turn the band switch to the BROADCAST MANUAL TUNING POSITION (position next to the extreme clockwise setting). Then use the tuning knob to bring in the station that you desire to set to button No. 3. This is done so that you may identify the station by hearing its program.

6. Now turn the band switch to the AUTOMATIC POSITION (extreme clockwise). You will note as this is done your station will not be heard.

7. Push in button No. 3 and turn your volume control to the maximum clockwise position.

fig. 1



8. Using a small screw driver, insert it in the second screw from the left (No. 3a in Fig. 1). Rotate the screw SLOWLY until the program that you had previously tuned in manually is again heard. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (3a) TO THE POINT WHERE THE TWO OPEN ENDS OF THE GREEN COLORED INVERTED "V" SHAPED SHADOW IN THE TUNING EYE ARE CLOSEST TOGETHER. It is advisable that you turn the trimmer screw in and out so that it will tune across the station several times in order that you may be sure that you have located this correct tuning point.

9. Now insert the screw driver in the first trimmer screw on the left (No. 3b Fig. 1) and turn until the program is received with maximum volume, and the correct position is indicated by the ends of the inverted "V" in the tuning eye being closest together. Now go back to trimmer screw No. 3a and see if any improvement in reception can be made by adjusting it. Also repeat this operation for trimmer screw No. 3b.

10. Set up button No. 4 for the selected station in a similar manner, using trimmer screws No. 4a and No. 4b. The remaining buttons can all be set-up in the same fashion.

11. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

12. In some instances it may be necessary, after the set is operated for a month or more, to reset the trimmers as they may drift due to heat, humidity, etc.

HOW TO REPLACE THE DIAL CORD

Before attempting to replace the dial cord, fully mesh the gang condenser. The holes in drum A should be in the top position as shown in the diagram above.

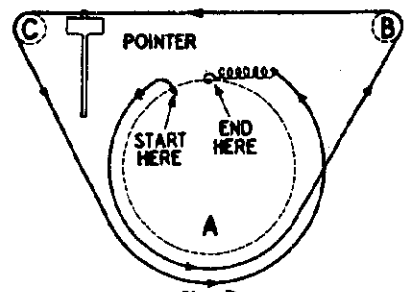


fig. 2

The pointer drive cord should be 33 inches or more in length. Place one end of the cord through the left hole in drum; then knot the end. Run the free end of the cord down around the drum and up to pulley B. Continue over pulley B to pulley C, then down to drum A. Bring the cord up around drum A. Tie the cord to the end of the tension spring so that the spring will be extended to about 1-1/8 inches, when hooked to the slot in the drum. Now place the pointer on its track so that it points to the last scale division on the low frequency end of the dial, then clip it to the cord.

DIAL DRIVE AND MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
37449	Screw - 8 X 3/8" Self Tapping (for dial brackets)	.03
37568	Washer - embossed (for mtg. electrolytic)	.05
81086	Cord - dial drive (35" lengths) — Per Ft.	.05
81089	Spring - for tightening drive rope	.10
85427	Socket - octal base (standard)	.15
85785	Terminal Strip - antenna - ground	.15
88161	Shield - tube (short section)	.08
88162	Shield - tube (long section)	.08
88164	Shield Cap - tube, grid type	.06
88810	Rubber Mounting Bushing	.03
89746	Washer - (paper) for back of knobs	.005
89911	Shield - tube base	.04
89912	Clip - grounding, for tube base	.02
110496	Plug - speaker (4 prong)	.12
110501	Socket - 4 prong (for speaker)	.16
110627	Socket - dial lamp	.12
110679	Knob - tuning	.20
110690	Drum - and disc assembly	.48
110693	Bracket - dial support (R.H.)	.25
110694	Bracket - dial support (L.H.)	.25
110707	Frame - dial; with scale complete	1.70
110711	Scale - dial	.85
110715	Shaft - dial drive (with brkt. & indic. assem.)	1.00
110785	Pointer - dial	.14
110817	Speed nut - retainer for escutcheon to cabinet	.01
110829	Washer - flat steel, for mtg. chassis	.01
110830	Screw - #10 X 1 for chassis mtg.	.03
111030	Escutcheon - with glass window	1.30
111085	Sleeve - felt for tuning eye	.03

PART NUMBER	DESCRIPTION	LIST PRICE
112879	Screw - escutcheon mtg. #2 X 3/8	.03
113040	Light Shield - cardboard (between button holes and dial frame	.06
113102	Push Button - (See 113717 for special tone button)	.08
113189	Tab - Celluloid - for push button — Per dz.	.09
113321	Tabs - station call letters (4 sheets) (brown) — Per set	.40
113323	Tab - Trimmer range (550 to 1000) — Per dz.	.09
113324	Tab - Trimmer range (770 to 1350)	.01
113325	Tab - Trimmer range (1100 to 1700)	.01
113692	Escutcheon - around push buttons	1.10
113694	Cable & Plug - for tuning eye	.74
113717	Push button for tone control only	.10

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83007	Condenser - paper .02 mfd. 600 volt	.35
2	83539	Condenser - mica 250 mmfd.	.20
3	85061	Condenser - mica 51 mmfd.	.15
4	85285	Condenser - padding	.40
5	85394	Condenser - mica 510 mmf.	.25
6	88026	Condenser - paper .02 mfd. 400 volt	.25
7	88030	Condenser - paper .01 mfd. 400 volt	.25
8-9	88189	Condenser - paper .05 mfd. 200 volt	.25
10	88465	Wire Wound Resistor 25 ohms ½ watt	.15
11	88534	Condenser - paper .05 mfd. 150 volt	.25
12	89421	Condenser - paper .1 mfd. 200 volt	.25
13	89564	Condenser - mica 345 mmfd. (3%)	.40
14	89937	Condenser - elect. 30 mfd. 450 volt	1.60
15	110377	Condenser - elect. 10 mfd. 25 volt	.80
16	110534	Resistor - wire wound 40 ohm ½ watt	.12
17	110536	Coil - wave trap	1.02
18	110550	Resistor - carbon 10,000 ohms ½ W.	.15
19	110552	Resistor - carbon 47,000 ohms ½ W.	.12
20	110553	Resistor - carbon 220,000 ohms ½ W.	.12
21-22	110554	Resistor - carbon 1 meg. 1/4 watt	.12
23-24	110559	Resistor - carbon 470,000 ohms ½ W.	.12
25	110560	Resistor - carbon 100 ohm 1/4 watt	.12
26	110561	Resistor - carbon 15,000 ohms 2 W.	.30
27	110562	Resistor - carbon 22,000 ohms ½ W.	.12
28	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
29-30	110629	Lamp - 6.3 volt - .25 amps.	.15
31A to C	110743	Condenser - variable gang	4.50
32A-32B	110766	Volume Control - 1 meg. (with on-off switch)	.90
33	110768	Condenser - elect. 8 mfd. 450 volt	1.25
34	110789	Transformer - output	1.65
35	110850	Condenser - wire - 7 mmf.	.18
36	110851	Transformer - 1st I.F.	1.85
37	110853	Transformer - 2nd I.F.	1.65
38	110854	Condenser - trimmer (single section)	.24
39A to C	110859	Condenser - trimmer (3 section for osc. coil)	.65
40	110860	Coil - osc. (less trimmers)	1.40
41	110862	Transformer - power (115 V. 60 cycle)	5.00
41	112076	Transformer - power (115 V. 25 cycle)	7.50
42	110872	Resistor - wire wound 160 ohms 1 W.	.12
43	110881	Coil - assembly (antenna & preselector) with trimmers	.90
44A-44B	110882	Condenser - trimmer (2 section for ant. coil	.44
45	110906	Condenser - mica .00332 mfd. (3%)	.40
46	110907	Condenser - mica 960 mmfd. (3%)	.30
47	110945	Cone - and voice coil assem. (for R-279A spkr.)	1.80
48-49	111214	Condenser - paper .01 mfd. 800 volt	.24
41	112076	Transformer - power (115 V. 25 cycle)	7.50
50	113677	Range Switch	1.20
51A to N	113690	Trimmer condenser for push button complete assembly	2.75
52	113691	Push button switch (8 keys)	4.20
53	R-279-A	Speaker - dynamic 10 inch	8.00
54	110554	Resistor - carbon 1 meg. 1/4 watt	.12

MODELS 91-811 to 91-819
Chassis 91-81
98-811 to 98-819
Chassis 98-81
910-811 to 910-819
Chassis 910-81
Tuner Data,
Drive Cord Data

STEWART-WARNER CORP.

CHASSIS MODEL	USED IN RECEIVER MODELS	VOLTAGE	FREQUENCY
91-81	91-811 to 91-819	117	60 cycles
98-81	98-811 to 98 819	117	25 Cycles
910-81	910-811 to 910-819	100-240	50-133

These chassis are 8 tube, three band, push button tuning superheterodyne receivers. The tuning ranges are 530 to 1730 KC, 2.2 to 7.0 MC and 6.8 to 22.5 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push-button switch provides a simple rapid method of effecting this substitution.

It should be noted that the R.F. stage in this receiver operates only on the Broadcast Band. When the band switch is in the "Automatic", "Intermediate" or "Foreign" positions this R.F. stage is not utilized.

A feature of this set is the special push pull output stage. Instead of using a push-pull input transformer or a separate phase inverter tube the phase inversion is accomplished as follows. One of the 6K6G output tubes has a 3,300 ohm load resistor in its screen circuit across which is built up an audio voltage which is 180 electrical degrees out of phase with respect to the input grid voltage. This phase inverted voltage obtained across the screen resistor is now applied to the grid of the other output tube in this push-pull output combination. NOTE: It can be readily seen from the above explanation that if the 6K6G output tube, from which the phase inversion voltage is obtained, is removed from the set or becomes defective, it will be impossible for any signal to be heard in the speaker.

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the customer has an adequate antenna system and that the push button trimmers are set-up using this antenna (not the antenna in the service shop) otherwise the antenna trimmer will be incorrectly aligned.
2. Turn on the set and allow it to operate at least one quarter-hour before setting up the push buttons.
3. Make a list of the frequencies, of six nearby stations to which you wish to set-up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, as indicated in Fig. 1.

Each of the buttons on your Push Button Tuner has a definite operating range, as shown in Fig. 1, therefore, it is imperative that you select a station whose frequency is in the operating range of a button before attempting to set-up that button for the particular station.

AS THE ADJUSTING SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. The frequencies of your local stations may be obtained from your newspaper or radio call magazine. For example, suppose you want to set a button to station WLW whose frequency is 700 kilocycles. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 3 or No. 4, whose range is 550 to 1000 KC. Therefore either button No. 3 or No. 4 can be used for the automatic tuning of WLW.

IT SHOULD BE NOTED THAT WHENEVER IT IS POSSIBLE TO USE TWO BUTTONS, HAVING DIFFERENT RANGES, TO SET TO A GIVEN STATION, THE CORRECT BUTTON TO USE WILL BE THAT ONE FOR WHICH THE TRIMMER SCREWS ARE NOT TOO LOOSELY SET. "DRIFTING" IS A DIRECT RESULT OF LOOSE TRIMMER SCREWS AND THEREFORE SUCH SETTINGS OF TRIMMER SCREWS SHOULD BE AVOIDED IF POSSIBLE.

4. Remove the escutcheon around the push-button by taking out the six screws holding it to the cabinet. This will expose to view twelve adjusting screws, each pair of which is used to tune a button to its correct station. The trimmers associated with each button are shown in Figure 1.

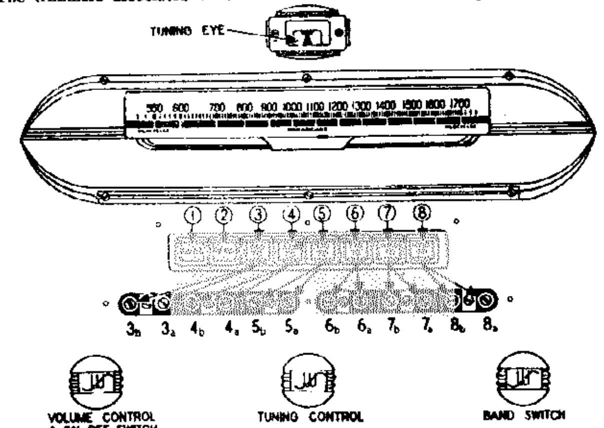


Fig. 1

5. Turn the band switch control (Right hand knob) clockwise until the BROADCAST SCALE appears on the roller dial. Then using the tuning knob (center) tune in the station you desire to set to button No. 3. This is done so that you may identify the station by hearing its program.
6. Now turn the band switch knob to the extreme clockwise position (The words "MAGIC KEYBOARD" will now appear in the dial scale opening). You will note when this switch is turned the station tuned in will not be heard.
7. Now push in the third button from the left (No. 3 in Fig. 1). Using a small screw driver insert it in the second screw from the left (No. 3a in Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again tuned in. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (3a) TO THE POINT WHERE THE TWO OPEN ENDS OF THE INVERTED "V" SHADOW IN THE "TUNING EYE" ARE CLOSEST TOGETHER. It is advisable that you turn the screw in and out so that it will tune across the station several times in order that you may be sure that you have located this correct tuning point.
8. Next insert the screw-driver in the first screw on the left (No. 3b Fig. 1) and turn it until the program is received with maximum volume. The correct position is indicated by the ends of the inverted "V" in the "Tuning Eye" being closest together. Now go back to screw No. 3a and see if any improvement in the reception can be made by adjusting it. Also repeat this operation for screw No. 3b.
9. Set up button No. 4 for the selected station in a similar manner, using screws No. 4a and 4b, and proceed to set up the remaining buttons in the same fashion, always tuning in the station initially with the "a" screw for that particular button.
10. Label each button with the call letters of the station you have selected using the call letter tabs and celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing them slightly and then allowing the tab to snap into place. The celluloid cover tab should be flexed in a similar manner and placed over the paper tab.

IMPORTANT

11. In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may change their setting due to heat, humidity, etc.

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

Part Number	Tuning Range	List Price
112942	1100 to 1700 KC.	\$0.36
112943	770 to 1350 KC.	.45
112944	550 to 1000 KC.	.50

To make the change proceed as follows:

1. Remove the chassis from the cabinet.
2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.
3. Unsolder the leads from the four terminals on the back of this dual trimmer.
4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.
5. From the above list select a dual trimmer which will cover the desired range.
6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

REPLACING THE ROLLER DIAL DRIVE CORD

1. Tie a tension spring, part number 113177, to one end of about 30" of special dial cord part No. 111302.
2. Tie a large knot in the cord, 6¼" from the tension spring.
3. Turn the range switch to the Short Wave position—all the way counterclockwise. Pulley A on the range switch shaft should be in the position shown in Fig. 2.
4. Place the knot on the cord in slot B.
5. With the long free end of the cord (not the end with the spring attached), take 1½ turns clockwise around pulley A, then thread the end up through hole C back of pulley D and up to the front of pulley E.
6. Turn pulley E until the slot F is up as shown in the figure. Now, with the free end of the cord wind clockwise; 1½ turns around E, out through slot F, 1 turn around G, back through slot F, and 1¼ turns around E.
7. Bring the cord down back of pulley H and leave it hang for the time being.
8. With the end of the cord to which the tension spring is attached, take 1½ turns counterclockwise around pulley A, (when viewed from the right end) and bring the cord up through hole C.
9. Tie the free end of the cord hanging over pulley H, to the upper end of the tension spring. The spring should be extended so it is approximately 1½" long when the tension in the cord system is equalized.

If the Short Wave scale on the dial is not in the proper position under the pointer, loosen the set screw in hub G, rotate the dial scale to the proper position and tighten the set screw.

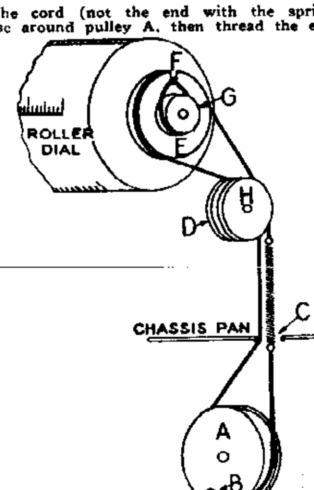
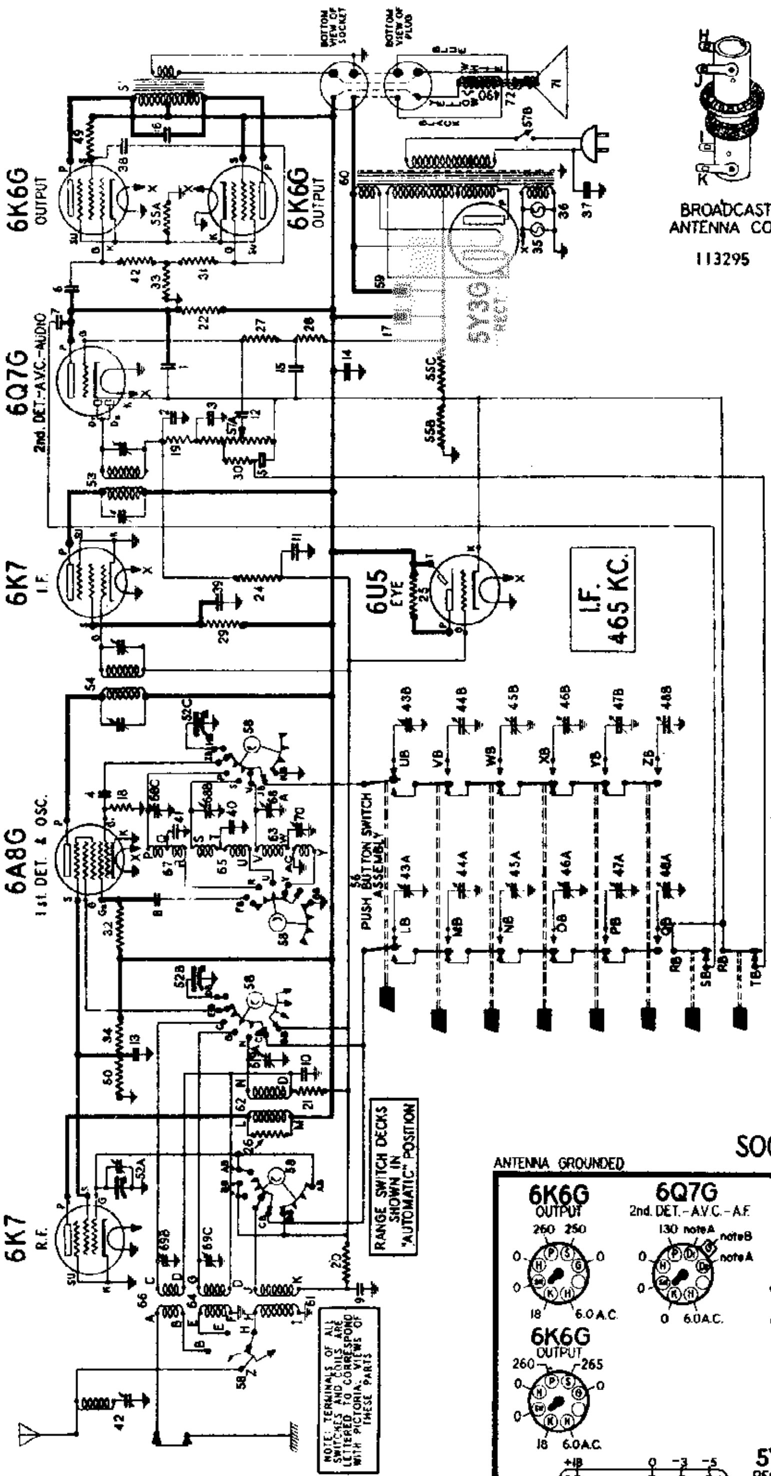


Fig. 2

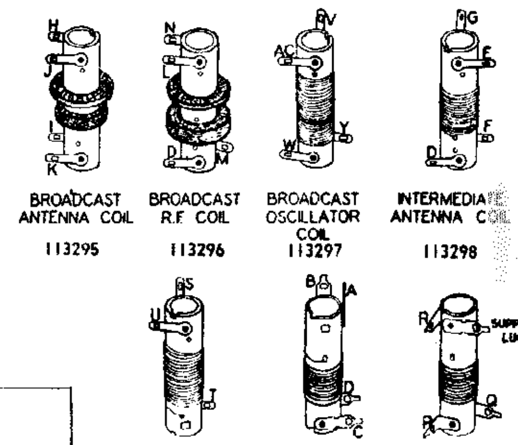
MODELS 91-811 to 91-819
98-811 to 98-819
910-811 to 910-819

STEWART-WARNER CORP.

Schematic, Voltage, Socket
Tuner Switch, Coils



91-81, 98-81 AND 910-81 CHASSIS



BROADCAST ANTENNA COIL 113295

BROADCAST R.F. COIL 113296

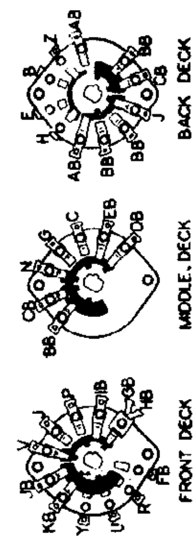
BROADCAST OSCILLATOR COIL 113297

INTERMEDIATE ANTENNA COIL 113298

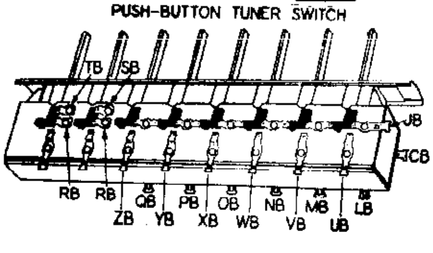
INTERMEDIATE OSCILLATOR COIL 113299

FOREIGN ANTENNA COIL 113301

FOREIGN OSCILLATOR COIL 113302

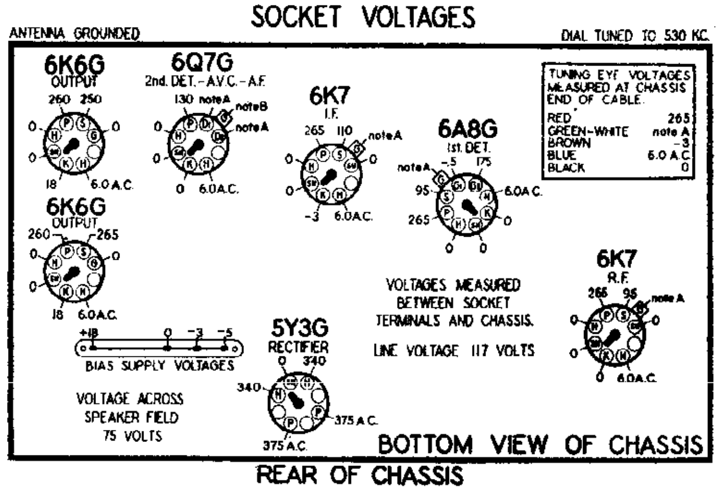


FRONT VIEW OF RANGE SWITCH DECKS



PUSH-BUTTON TUNER SWITCH

SOCKET VOLTAGES



REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

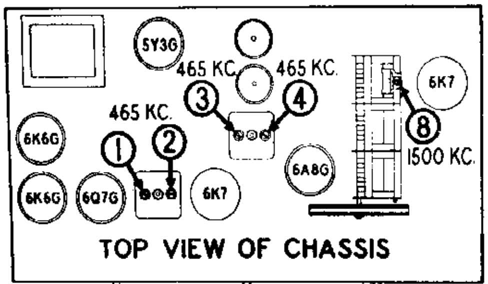
NOTE A: The bias for the control grids of the 6A8-G, 6K7 R. F., 6K7 I. F., 6U5 and the diode plates of the 6Q7-G tubes is -3 volts measured across resistor 55B.

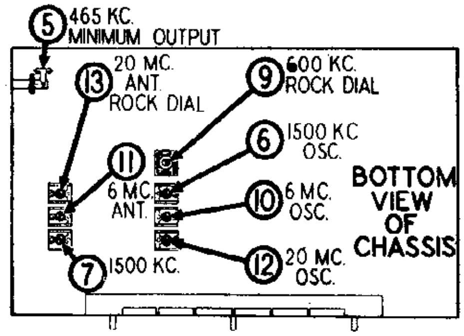
NOTE B: The bias for the control grid of the triode section of the 6Q7-G tube is -5 volts measured across resistors 55B and 55C.

MODELS 91-811 to 91-819
98-811 to 98-819
910-811 to 910-819

STEWART-WARNER CORP.

Alignment, Trimmers, Parts





FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

(1) Connect the output meter across the voice coil or across the plates of the 6K6G output tubes depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.

(4) With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser to full mesh with the pointer properly set, then retighten the set screw.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position (Indicated by Roller Dial)	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Control Grid of 6A8-G Tube	465 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Antenna Terminal	465 KC	Broadcast	Any Point Where It Does Not Affect the Signal	5	Wave Trap	Adjust for Minimum Output. Using a Strong Generator Signal.
400 OHM Carbon Resistor	Antenna Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
400 OHM Carbon Resistor	Antenna Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	7	Broadcast Detector	Adjust for Maximum Output.
					8	Broadcast Antenna	
400 OHM Carbon Resistor	Antenna Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Antenna Terminal	6 MC	Intermediate	6 MC	10	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 5.1 MC. If Image does not appear, Realign at 6MC. with Trimmer. Screw farther Out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal	6 MC	Intermediate	Tune to 6 MC Generator Signal	11	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Antenna Terminal	20 MC	Foreign	20 MC	12	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was obtained by Tuning in Image at Approx. 19.1 MC. If Image does not appear Realign at 20MC with Trimmer Screw farther Out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal	20 MC	Foreign	Tune to 20 MC Generator Signal	13	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is obtained.

DIAL AND MISCELLANEOUS PARTS

Part No.	Description	List Price
67568	Washer—embossed (for mtg. electrolytic)	$0.05
85066	Terminal Strip—G.D.A.	.20
85321	Connector—Ground	.01
85427	Socket—octal base (standard)	.15
85827	Set Screw—8/32 square head	.02
88348	Eyelet—for dial cord ... Per doz.	.05
89746	Washer—(paper) for back of knobs	.005
110496	Plug—speaker (4 prong)	.12
110501	Socket—4 prong (for speaker)	.16
110829	Washer—flat steel, for mtg. chassis	*.$0.01
111085	Sleeve—felt for tuning eye	.03
111302	Cord—dial drive 6 or 50 ft. lengths ... Per ft.	.05
111855	Shield Base—for tube shields	.02
112874	Screw—No. 10 x 1⅛ chassis mtg.	.01
112876	Screw—P. B. escutcheon mtg. No. 3 x ⅜	.01
112879	Screw—eye escutcheon mtg. No. 2 x ⅜	.03
113019	Clip—dial scale retaining	.01
113025	Socket—octal base (with special ground)	.15
113040	Light Shield—cardboard (between button holes and dial frame)	.06
113041	Knob—push on	.10
113077	Shield—tube	.15
113102	Push Button—only (See 113717 for Tone Button)	.08
113135	Escutcheon—for eye	.25
113177	Spring—dial cord tension	.09
113189	Tab—celluloid—for push button ... Per doz.	.09
113205	Thrust Plate—for tuning shaft	.02
113206	Pulley—on auxiliary range switch shaft	.40
113207	Gear—pinion on auxiliary range switch shaft	.25
113208	Dial End Cup—right side	.14
113260	Pointer—dial	.14
113281	Shaft—tuning	.12
113282	Cable and Plug—for tuning eye	.66
113284	Shaft—auxiliary, for range switch	.12
113300	Dial Scale—(celluloid roll)	1.45
113321	Tabs—station call letters (4 sheets) (brown) Per set	.40
113323	Tab—trimmer range (550 to 1000) ... Per doz.	.09
113324	Tab—trimmer range (770 to 1350)	.01
113325	Tab—trimmer range (1100 to 1700)	.01
113338	Drum—dial drive	.54
113340	Socket—dial lamp	.22
113347	Gear—on range switch shaft	.20
113348	Bracket—dial (R.H.)	.40
113349	Bracket—dial (L.H.)	.32
113352	Pulley—Right End of Roller Dial Shaft	.20
113353	Dial End Cup—left side	.16
113354	Escutcheon—dial	2.50
113355	Escutcheon—around push-buttons	1.00
113442	Bracket—for tuning eye	.15
113463	Rubber Bushing—chassis mtg.	.03
113717	Tone Control Push Button (with nick)	.10
113718	Celluloid Window (for escutcheon)	.85

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica 260 mmfd.	$ 0.20
2-3	83783	Condenser—mica 110 mmf.	.20
4	85061	Condenser—mica 51 mmfd.	.15
5-6	88026	Condenser—paper .02 mfd. 400 volt	.25
7	88029	Condenser—paper .004 mfd. 400 volt	.25
8	88030	Condenser—paper .01 mfd. 400 volt	.25
9-10-11-12	88189	Condenser—paper .05 mfd. 200 volt	.25
13-14	88682	Condenser—paper .1 mfd. 400 volt	.25
15	89421	Condenser—paper .1 mfd. 200 volt	.25
16	89826	Condenser—paper .004 mfd. 750 volt	.24
17	89937	Condenser—elect. 30 mfd. 450 volt	1.60
18-19	110552	Resistor—carb. 47,000 ohms ¼ watt	.12
20-21-22-23	110553	Resistor—carb. 220,000 ohms ¼ watt	.12
24-25	110554	[illegible]g. ¼ watt	.12
26	110557	[illegible] ohm ¼ watt	.12
27-28	110559	[illegible]00 ohm ¼ watt	.12
29	110564	[illegible]00 ohm ¼ watt	.12
30-31	110565	[illegible]0 ohm ¼ watt	.12
32	110568	[illegible]0 ohm 1 watt	.15
33	110578	[illegible]0 ohm ¼ watt	.12
34	110596	[illegible] ohm 3 watt	.25
35-36	110629	[illegible] amps	.15
37	111214	[illegible] mfd. 600 volt	.24
38-39	111252	[illegible] mfd. 400 volt	.13
40	112426	[illegible] mmfd. (3%)	.30
41	112427	[illegible] mmfd. (3%)	.40
42	112796	[illegible] trimmer)	.50
43A-43B, 44A-44B	112942	[illegible] Push Button trimmer [illegible]00 KC)	.36
45A-45B, 46A-46B	112943	[illegible] Button trimmer [illegible]0 KC)	.45
47A-47B, 48A-48B	112944	[illegible] Button Trimmer [illegible]0 KC)	.50
49	112952	[illegible]hm ¼ watt	.10
50	112954	[illegible] ohm 1 watt	.16
51	113192	[illegible]	2.10
	113667	Transformer—output (for model 910-81)	2.40
52A to 52C	113216	Condenser—gang	6.50
53	113229	Transformer—2nd I. F.	1.64
54	113237	Transformer—1st I. F.	1.20
55A to 55C	113251	Resistor—wire wd. Sec. A, 240 ohms; Sec. B, 26 ohms; Sec. C, 18 ohms	$0.42
56	113253	Push Button Switch Assem.	3.80
57A-57B	113254	Volume Control—250,000 ohms (with switch)	.94
58	113255	Switch—range	2.10
59	113261	Condenser—elect. 30 mfd. 450 volt	1.40
60	113271	Transformer—power 117 V. 60 cycle	6.00
	113662	Transformer—power 117 V. 25 cycle	10.50
	113670	Transformer—power 100-240 V. 50-133 cycles)	12.00
61	113295	Coil—antenna (B.C.)	1.20
62	113296	Coil—R.F. (B.C.)	1.30
63	113297	Coil—oscillator (B.C.)	.48
64	113298	Coil—antenna (police)	.50
65	113299	Coil—oscillator (police)	.44
66	113301	Coil—antenna (S.W.)	.52
67	113302	Coil—oscillator (S.W.)	.55
68A to 68C	113319	Condenser—trimmer—3 section	.54
69A to 69C	113320	Condenser—trimmer—3 section	.54
70	113346	Condenser—padding	.38
71	R-113482	Coil—voice coil for R-115016 spkr.	2.10
60	113662	•Transformer—power 117 volt 25 cycle	10.50
51	113667	Transformer—output (for model 910-81)	2.40
60	113670	Transformer—power 100-240 volt 50-133 cycles	12.00
72	R-115016	Speaker—dynamic 12 inch	10.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

STEWART-WARNER CORP.

MODELS 91-821 to 91-829
98-821 to 98-829
910-821 to 910-829
Alignment, Trimmers
Antenna Data

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1.5 MC are required.

1 — Connect the output meter across the voice coil or, in series with .1 mfd. condenser, from the plate of the 6L6-G output tube to ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2 — Connect the ground lead of the signal generator to the "G" post on the antenna terminal strip at the rear of the chassis, or to the metal chassis. The ground and antenna terminals on the antenna terminal strip must be connected together throughout the alignment procedure.

3 — Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

DUMMY ANT IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	PUSH IN PUSH BUTTON	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC.	PUSH IN ANY BUTTON EXCEPT NO. 1 OR 10	1-2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT THEN REPEAD ADJUSTMENT
				3-4	1ST I.F.	
200 MMFD. CONDENSER	ANTENNA TERMINAL	465 KC.	#9 (TRIMMER #9a & 9b TUNED TO APPROXIMATELY 600 KC.)	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.

-IMPORTANT-

RE-TUNE PUSH-BUTTON TRIMMERS TO STATIONS AS RE-ALIGNING THE I.F. STAGES MAY HAVE CAUSED DETUNING OF THE STATIONS TO WHICH THE BUTTONS WERE SET.

DESCRIPTION OF ANTENNA CIRCUIT AND ITS FUNCTIONS

Since the antenna circuit of this receiver differs radically from the conventional type, a detailed explanation of the functions of the various sections of this special circuit, and the reasons for the above alignment procedure is given below.

The purposes of this antenna circuit are (1) to transfer the incoming station signal, with maximum gain, to the grid of the first detector tube, (2) to reduce to a minimum, code interference or other undesired signals in the vicinity of the intermediate frequency (465 KC.) (3) to reduce to a minimum the response of image signals. The three coils which perform these functions are wound on a single form and are indicated by No. 65a, No. 65b and No. 65c in the figure at the lower right.

The primary circuit of this antenna system consists of an antenna in series with condenser No. 6, the condenser and coil combination between points E and D, the section of coil 65b between points D and A and the two condensers Nos. 63 and 45 to ground. The resistor No. 35 is shunted directly across this antenna primary circuit and its purposes will be covered later.

The secondary circuit consists of the two parallel condensers Nos. 63 and 45 which are in series with the section of the antenna coil between points A and B, also in series with the coil and condenser combination between points B and C, and the antenna section of the push button trimmer condenser No. 55b. The Secondary circuit is tuned to resonance with the incoming station signal, by the push button trimmer condenser No. 55b.

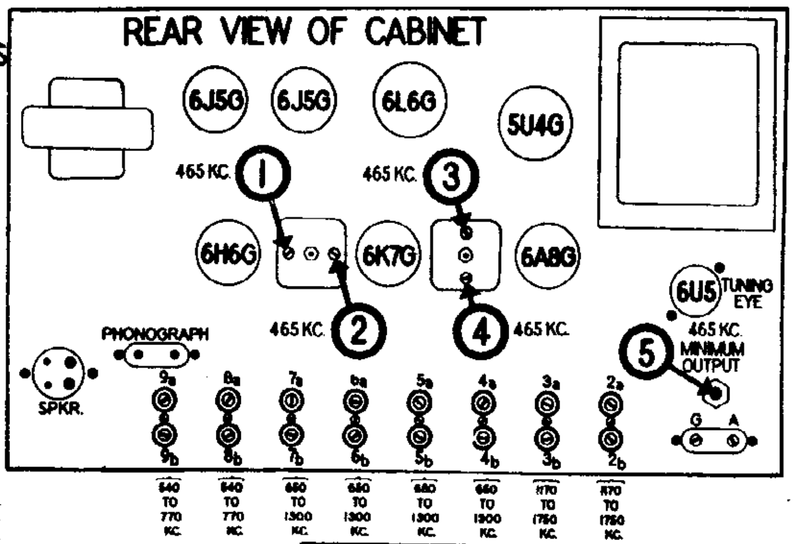
Reduction of image response is accomplished with the aid of the section No. 65c of the antenna coil. This section of the antenna coil acts as a wave trap resonated 930 KC higher than the signal. It is a part of a series resonant circuit made up of the 65c section of the coil and the push button trimmer condenser #55b. This circuit will be approximately resonant to the image signals AT ALL TIMES and will effectively reduce image interference caused by code or police stations operating at the high frequency end of the broadcast band. The purpose of condenser No. 48 is to cause this image reduction circuit to "track" properly.

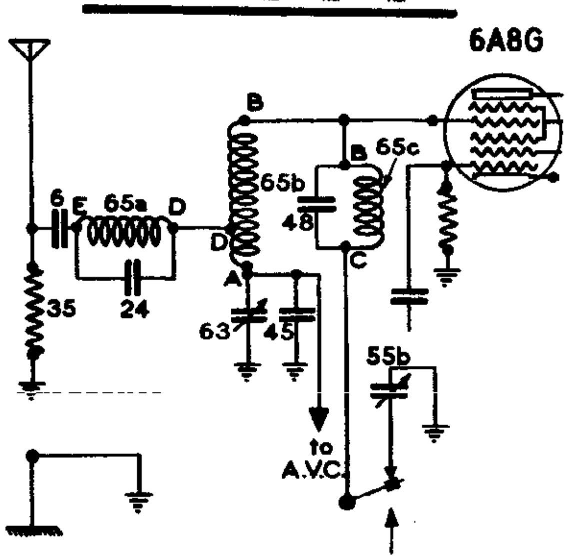
The wave trap circuit for reduction of 465 KC code signals is composed of the section DA of coil 65b which is in series with condensers No. 63 and 45 (condenser No. 63 is trimmer No. 5 in the above alignment chart). It should be noted that coil section D-A is inductively coupled to the B-D section of the coil and is considered a part of the wave trap circuit. Trimmer condenser No. 63 is adjusted for minimum output with a 465 KC incoming signal at the antenna. At minimum output the voltage developed across coil A-B will be balanced out by the voltage developed across condensers No. 63 and 45 which is 180° out of phase with the voltage developed across the coil. Therefore, it will be seen that any 465 KC interference signals will only develop a very very small voltage between the control grid of the 6A8-G and ground thus effectively eliminating 465 KC code interference.

The 65a section of the antenna coil between points E and D when considered in series with section D-A and condenser 63 and 45, has a resonant peak at 600 KC. The purpose of this circuit being to increase the gain of the receiver on the low end of the Broadcast band. Condenser No. 24 which is shunted across coil section 65a has for its purpose the reduction of image responses from signals in the vicinity of 2.5 MC.

Condenser No. 6 is a direct current blocking condenser which keeps the bias voltage and the voltage developed by the A.V.C. system from being shorted out to ground by resistor No. 35. Resistor No. 35 was shunted across the primary antenna circuit for two reasons: (1) to make the overall sensitivity of the receiver more uniform and (2) to eliminate detuning effects in the secondary antenna circuit when different types of antenna systems are used with this receiver.

REAR VIEW OF CABINET





Schematic, Voltage
Socket, Tuner Switch

STEWART WA

ELECTRICAL PARTS

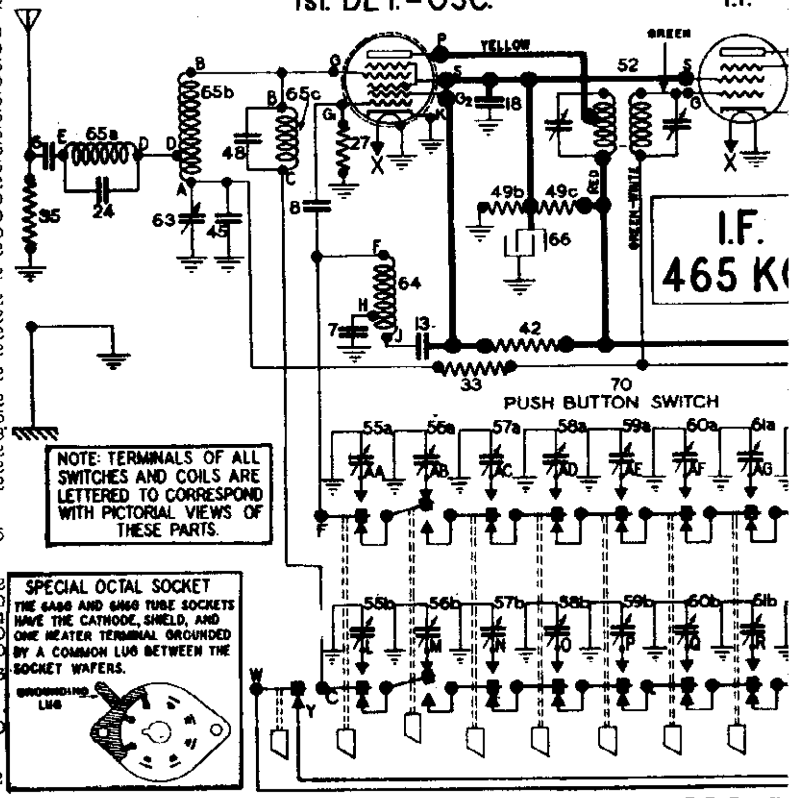
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 280 mmfd.	.20
2-3-4-5	83783	Condenser - mica 110 mmf.	.20
6	83784	Condenser - mica .0011 mfd.	.25
7	84371	Condenser - mica .0004 mfd. 10%	.20
8	85061	Condenser - mica 51 mmfd.	.15
9-10-11-12	88026	Condenser - paper .02 mfd. 400 volt	.25
13-14-15	88030	Condenser - paper .01 mfd. 400 volt	.25
16	88191	Condenser - paper .1 mfd. 300 volt	.25
17-18	89421	Condenser - paper .1 mfd. 200 volt	.25
19	89532	Condenser - paper .25 mfd. 200 volt	.32
20	89643	Condenser - paper .25 mfd. 300 volt	.40
21	89937	Condenser - elect. 30 mfd. 450 volt	1.60
22-23	110377	Condenser - elect. 10 mfd. 25 volt	.80
24	110510	Condenser - wire 3 mmfd.	.12
25-26 27-28	110552	Resistor - carb. 47,000 ohms ¼ watt	.12
29-30-31	110553	Resistor - carb. 220,000 ohms ¼ watt	.12
32-33-34	110554	Resistor - carbon 1 megohm 1/4 watt	.12
35	110557	Resistor - carb. 4,700 ohms 1/4 watt	.12
36	110559	Resistor - carb. 470,000 ohms ¼ watt	.12
37-38-39 40-41	110564	Resistor - carb. 100,000 ohms ¼ watt	.12
42	110592	Resistor - carb. 22,000 ohms 1 watt	.12
43-44	110629	Lamp - 6.3 volt - .25 amps.	.15
45	111122	Condenser - mica 3,580 mmfd. (3%)	.48
46	112182	Resistor - wire wound 27 ohm ¼ watt	.12
47	112961	Resistor - carb. 2,700 ohm 1/4 watt	.12
48	113886	Condenser - mica .0002 mfd. (3%)	.22
49A to 49D	113895	Resistor - Bleeder Section A - 1500 ohms Section B - 2800 ohms Section C - 2800 ohms Section D - 170 ohms	1.15
50	113896	Transformer - output	1.92
51	113939	Filter Choke	2.10
52	113941	Transformer - 1st I.F.	1.54
53	113946	Transformer - 2nd I.F.	1.50
54	113948	Transformer - power 117 V.50-60 C.	9.20
55A-55B 56A-56B	113953	Condenser - trimmer (1170 to 1350KC)	.46
57A-57B 58A-58B 59A-59B 60A-60B	113954	Condenser - trimmer(650 to 1300 KC)	.60
61A-61B 62A-62B	113955	Condenser - trimmer (540 to 770 KC)	.82
63	113956	Condenser - padder	.34
64	113957	Coil - oscillator	.42
65A-65B-65C	113959	Coil - antenna	1.10
66	113961	Condenser - elect. 10 mfd. 200 volt	.80
67	113962	Condenser - elect. 10 mfd. 450 volt	.72
68	113963	Condenser - elect. 16 mfd. 350 volt	.88
69	113965	Condenser - elect. 16 mfd. 450 volt	1.04
70	113966	Switch - push button	5.40
71	113967	Volume control	.84
72	113968	Switch - tone control	.66
73	J-114138	Cone - voice coil assembly for J-115029 speaker	2.90
74	J-115029	Speaker - dynamic (10 in.)	8.90

DIAL & MISCELLANEOUS PARTS.

PART NUMBER	DESCRIPTION	LIST PRICE
114451	Cabinet Leg - Front	1.00
114452	Cabinet Leg - Rear	1.00
112745	Clip for coil mounting	.01
114297	Escutcheon - for push buttons	1.60
114211	Knobs - for volume or tone	.16
110496	Plug - Speaker (4 prong)	.12
113651	Push button	.08
114096	Screw - chassis mtg. #10-32 X 1¼	.02
112879	Screw - escutcheon mtg. #2 X 3/8	.03
113077	Shield - tube	.15
81834	Socket - 6 prong	.10
110501	Socket - 4 prong (for speaker)	.16
114223	Socket - dial lamp	.18
114611	Socket - octal base (standard)	.16
114612	Socket - octal base (with special ground)	.15
114250	Tabs - station call letters	.55
85785	Terminal strip - antenna - ground	.15
89709	Terminal strip - phono	.15
67568	Washer - embossed (for mtg. electrolytic)	.05
110829	Washer - flat steel, for mtg. chassis	.01
89746	Washer - (paper) for back of knobs)	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

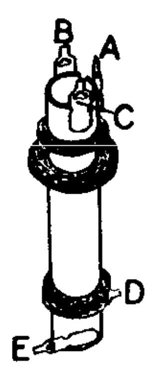
MODELS 91-82, 98-82 AND 910-82 CHASSIS



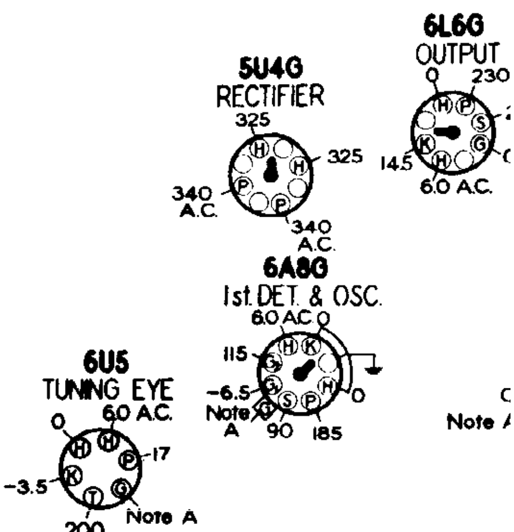
SOCKE

64
113957
OSCILLATOR
COIL

65A-65B-65C
113959
ANTENNA
COIL



ANTENNA GROUNDED



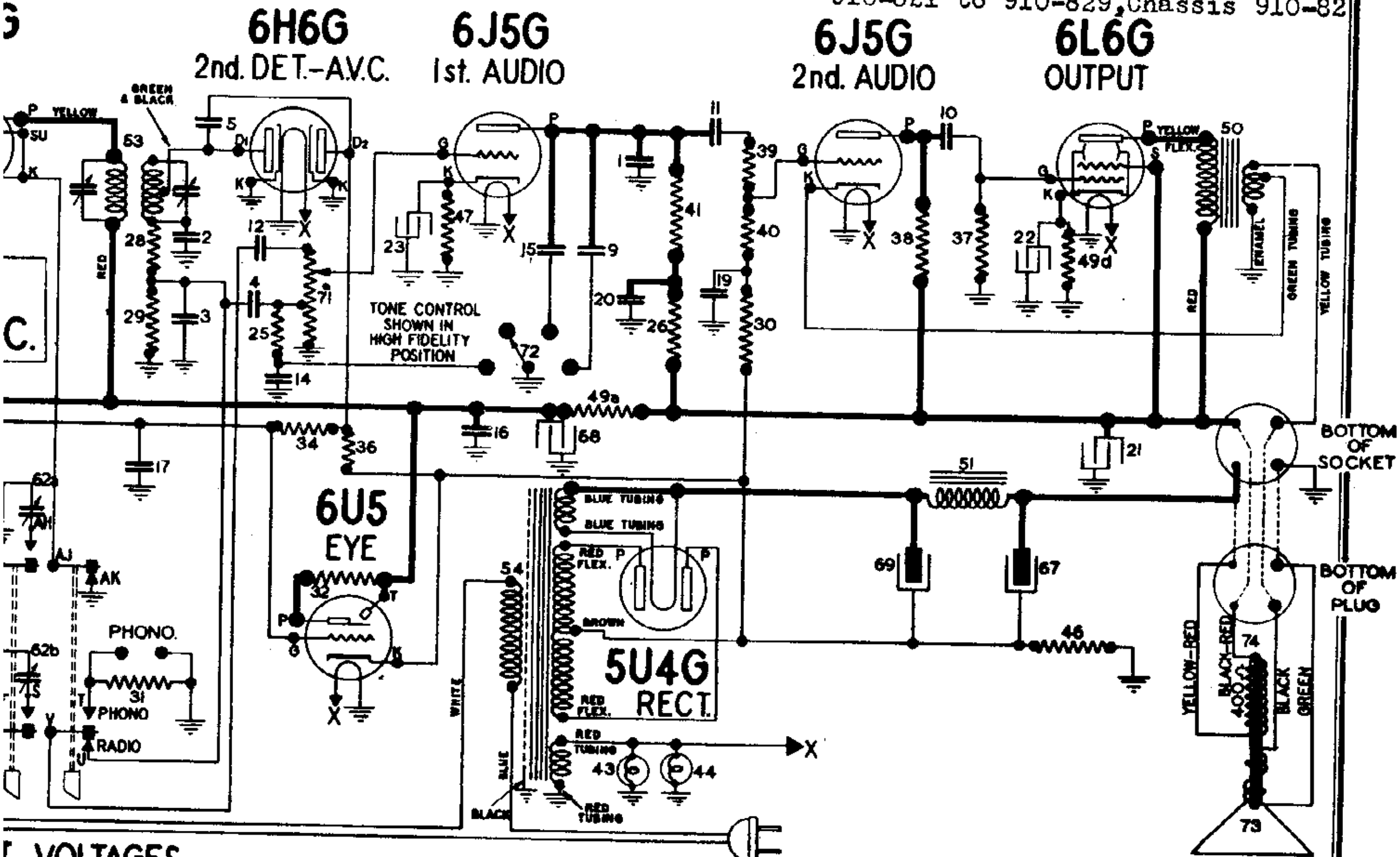
VOLTAGE ACROSS
SPEAKER FIELD
55 VOLTS

Use a high resistance voltmeter of at least 1

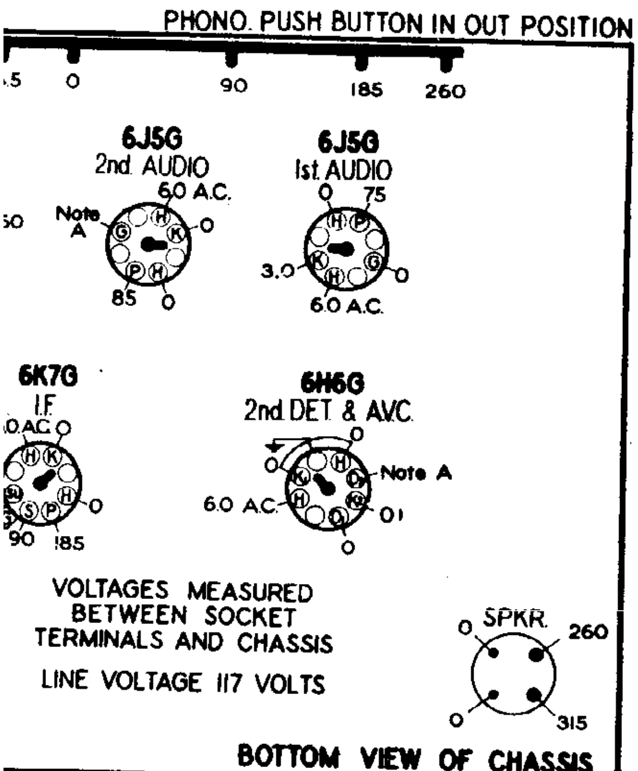
NOTE A: The bias for the control grids of th
plate of the 6W6-G tubes is -3.5 volts measur

ARNER CORP.

MODELS 91-821 to 91-829,Chassis 91-82
98-821 to 98-829,Chassis 98-82
910-821 to 910-829,Chassis 910-82

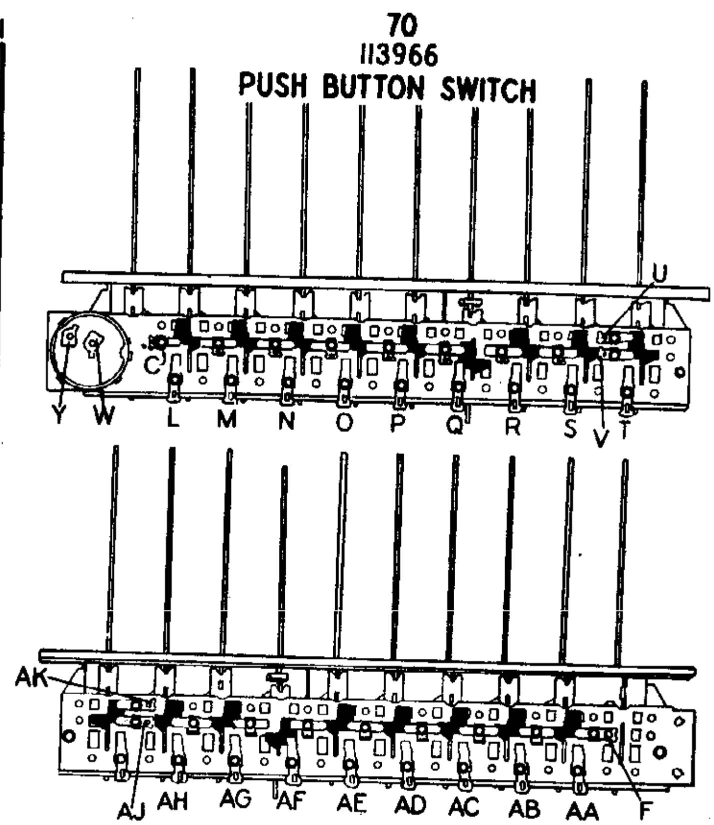


T VOLTAGES



) ohms per volt.

J5-G 2nd audio, 6A8-G, 6K7-G, 6U5, and the diode across resistor No. 46.



MODELS 91-821 to 91-829
98-821 to 98-829
910-821 to 910-829
Tuner Data, Phono., Notes

STEWART WARNER CORP.

Chassis Model	Used in Receiver Models	Voltage	Frequency
91-82	91-821 to 91-829	117	60 cycles
98-82	98-821 to 98-829	117	25 cycles
910-82	910-821 to 910-829	100-240	50-133

These chassis are 8 tube single band push button tuning superheterodyne receivers. The tuning range covered by the eight tuning buttons is 540 to 1750 kilocycles. These receivers also incorporate the new Peri-dynamic speaker system which is an exclusive Stewart-Warner feature and was designed for the express purpose of giving you the ultimate in tone quality and high fidelity reception.

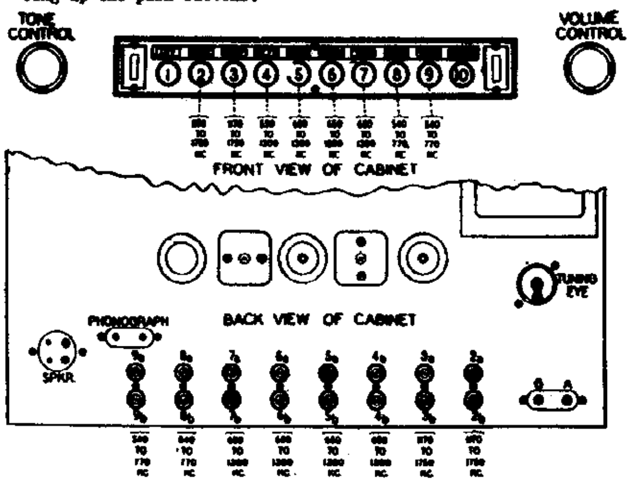
For greatest ease and simplicity in tuning, these chassis are provided with eight push buttons (Nos. 2 to 9 in Fig. 1). These buttons automatically tune in the stations for which they are labelled. Two other buttons are provided on the keyboard (Nos. 1 and 10 in Fig. 1). Button No. 1 is pushed in only WHEN IT IS DESIRED TO TURN THE RECEIVER OFF. Button No. 10 is pushed in when you desire to use the phonograph pick up. TO TURN THE RECEIVER ON MERELY PUSH ANY ONE OF THE BUTTONS FROM NO. 2 TO 9.

HOW TO SET UP THE PUSH BUTTONS.

The push buttons of your radio receiver are not previously set to stations at the factory. Therefore, unless your dealer has already set and labelled the various push buttons, it will be necessary to make the following adjustments before any stations can be received by using these buttons, proceed as outlined below:

1. Be sure that your set is connected to a good antenna system.

2. Turn on the set at least one quarter hour before setting up the push buttons.



3. Make a list of the frequencies of eight nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.

4. Each of the buttons on your push button tuner has a definite tuning range, as shown in Fig. 1 (both back and front view of cabinet.) It is imperative that, in setting up the buttons, you select stations whose frequency is in the indicated tuning range of that button. The correct frequencies of your local stations may be obtained from your newspaper or radio call magazine. EXAMPLE: This example illustrates the proper way to select a station to be set to a particular button. Suppose you want to set station WLW, whose frequency is 700 KC., to some button on your receiver. Referring to Fig. 1 will show that this frequency falls within the operating range of Buttons No. 4, 5, 6 and 7. Therefore any of these buttons may be used to set up this station. Failure to select the proper button will result in the incorrect setting of the trimmer adjusting screw and will also cause "drifting".

5. Place the receiver in such a position that the back of the cabinet is readily accessible. Refer to Fig. 1 (showing the back of the cabinet.) In the figure, the eight pairs of trimmer adjusting screws are numbered to correspond to the numbers of push buttons shown in the front view of Fig. 1. These screws are used to tune the receiver to the station selected for each button.

6. Push in Button No. 2. Then insert a screw driver in Trimmer Screw No. 2a and turn this screw to the left or right until the desired station is heard. The point at which the screw will be correctly set will be indicated when the open ends of the "V" shadow in the tuning eye are closest together. If the station cannot be heard, advance the volume control. By having available a daily radio log from your newspaper, you can identify the station by knowing what its scheduled program is.

7. Now insert the screw driver in Trimmer Screw No. 2b and turn it to the right or left until the open ends of the "V" shaped shadow in the tuning eye are closest together. Now re-check the setting of Trimmer Screw No. 2a using the tuning eye shadow to indicate the correct setting.

8. The set-up for Button No. 2 is now complete.

9. Push in Button No. 3 and set up trimmers. No. 3a and 3b to the desired station in a similar manner.

10. Set up the remaining six buttons using their corresponding trimmer screws.

11. Call letter tabs are supplied with your receiver, with which to label the various push buttons. Select the tabs bearing the call letters of the stations to which you have set the buttons, moisten them on their gummed side, and insert them in their proper place in the escutcheon openings above the push buttons.

12. In some instances it may be necessary, after the set is operated for a month or more, to re-set the trimmer adjusting screws as they may change their setting due to heat and humidity. Changes in the setting of the trimmer screws will cause poor tone quality.

USE OF THE TUNING EYE.

The tuning eye is located at the rear of the chassis (as shown in Fig. 1) and should be used when setting up the push buttons to the various stations. Its purpose is to indicate visually the exact point at which the receiver is correctly tuned to a station. Any station is correctly tuned in when the two open ends of the "V" shadow in the tuning eye are closest together. On strong signals the ends will come together - on weaker stations, they will be more separated. REGARDLESS OF WHETHER YOU ARE TUNING IN A STRONG OR A WEAK STATION, THE TRIMMER SCREWS SHOULD ALWAYS BE ADJUSTED TO THE POINT WHERE THE ENDS OF THE "V" IN THE EYE ARE CLOSEST TOGETHER.

NOTE: This tuning eye should be removed from its socket in the chassis after the push buttons have all been set-up. Failure to remove this tube may result in buzzing or rattling sounds such as described below under "Rattles and Buzzes".

CONNECTING A PHONOGRAPH PICK-UP UNIT.

The connections to your receiver from a high impedance pick-up unit are made to the terminal strip on the back of the chassis (see Fig. 1, back view, for this terminal strip labelled "PHONOGRAPH"). The two leads from the phonograph pick-up unit are connected to the two terminals on this strip. In case hum is encountered when using this unit, reverse the connections to this terminal strip. If the hum persists, make sure that the receiver has a ground wire connected to it as described under "GROUND CONNECTIONS."

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON.

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

Part Number	Tuning Range	List Price
113953	1170 to 1750 KC.	.46
113954	650 to 1300 KC.	.60
113955	540 to 770 KC.	.62

To make the change proceed as follows:

1. Remove the chassis from the cabinet.

2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.

3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

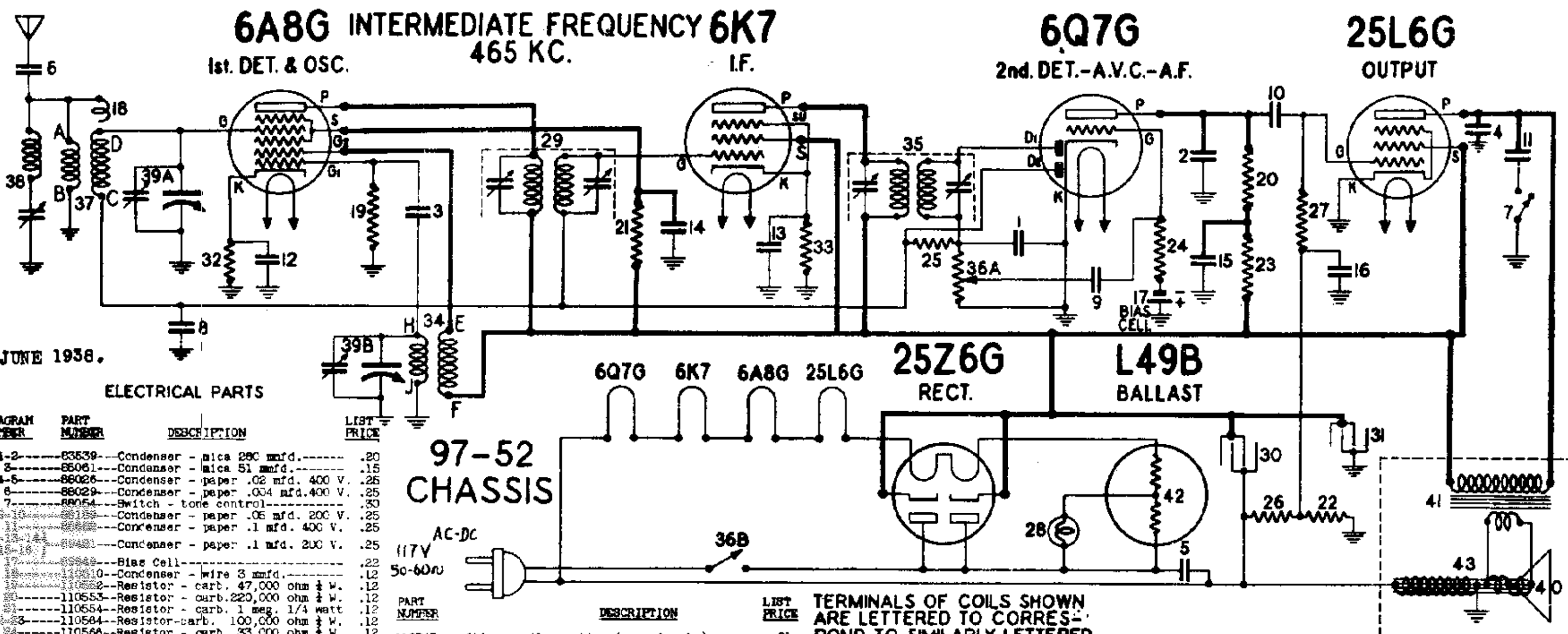
The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

RATTLES & BUZZES.

If during normal operation, buzzing or rattling sounds are heard in the receiver, they will in all probability originate in one or more of the sources listed in this paragraph. These rattles or buzzes generally occur with the tone control in the bass position and with the volume control advanced to a fairly loud level. Check the following for probable sources of noise.

(1) Loose tube shields. See that shields are properly located, and making good mechanical contact with tube shield base.
(2) Loose elements in any of the tubes. This applies especially to the 6U5 tuning eye tube. This tube should be removed from the chassis after the buttons have been set-up.
(3) Loose escutcheon or cabinet parts. Check for mechanical vibration of any parts not securely fastened.

STEWART-WARNER CORP.



JUNE 1938.

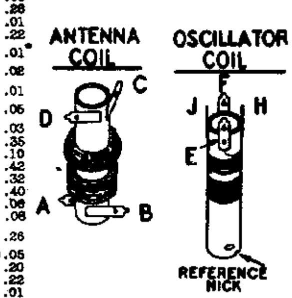
ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 280 mmfd.	.20
3	85061	Condenser - mica 51 mmfd.	.15
4-5	88026	Condenser - paper .02 mfd. 400 V.	.25
6	88029	Condenser - paper .004 mfd. 400 V.	.25
7	88054	Switch - tone control	.30
[illegible]	[illegible]	Condenser - paper .05 mfd. 200 V.	.25
[illegible]	[illegible]	Condenser - paper .1 mfd. 400 V.	.25
[illegible]	[illegible]	Condenser - paper .1 mfd. 200 V.	.25
17	[illegible]	Bias Cell	.22
[illegible]	[illegible]0	Condenser - wire 3 mmfd.	.12
[illegible]	[illegible]2	Resistor - carb. 47,000 ohm ½ W.	.12
[illegible]	110553	Resistor - carb. 220,000 ohm ½ W.	.12
[illegible]	110554	Resistor - carb. 1 meg. 1/4 watt	.12
[illegible]3	110564	Resistor-carb. 100,000 ohm ½ W.	.12
24	110566	Resistor - carb. 33,000 ohm ½ W.	.12
25	110580	Resistor - carb. 3.3 meg. ½ W.	.12
26-27	110584	Resistor - carb. 330,000 ohm ½ W.	.12
28	110629	Lamp - 6.3 volt - .25 amps	.15
29	112803	Transformer - 1st I.F.	1.20
30-31	112898	Condenser - elect. 16 mfd. 150 V.	.50
32-33	112951	Resistor - carb. 400 ohms ½ watt	.12
34	113042	Coil - oscillator	.45
35	113047	Transformer - 2nd I.F.	1.10
36A - 36B	113049	Volume Control - 500,000 ohms with off on switch	1.00
37	113097	Coil - Antenna	.74
38	113119	Coil - wave trap (with trimmer)	.50
39A - 39B	113150	Condenser - variable gang	3.00
40	R-113241	Cone - voice coil assem. for R-115012 speaker	1.25
41	R-113343	Transformer - output for R-115-012 speaker	1.00
42	113365	Ballast Resistor (tube) L-49-B	.50
43	R-115012	Speaker - Dynamic 5 inch	4.12

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
2694	Screw - wood, chassis mtg. #8 X 5/8" (model 97-523) Per C	.80
77223	Washer - chassis mtg. (model 97-523)	.01
79006	Screw - #6-32 X 7/8 Fil. Hd. Mach. (for setting up push button	.01
81145	Retaining Ring - for drive shaft Per C	.50
85040	Screw - #6 Hex. Hd. for mtg. adjusting washer Per C	.35
85299	Screw - chassis mtg. #10 X 3/8" (for models 97-523)	.02
85427	Socket - octal base (standard)	.15
85815	Spring - between gear sections	.01
88348	Eyelet - for cord drive Per dz.	.05
89746	Washer - (paper) for back of knobs	.005
110829	Washer - flat steel, for mtg. chassis	.01
112745	Clip - coil mounting (osc. & ant.)	.01
112782	Pulley - dial cord drive (at left side)	.04
112784	Clip - dial scale retaining	.01
112785	Scale - dial	.24
112770	Pointer - dial	.08
112776	Celluloid Cover - over dial face	.28
112798	Clip - for mtg. wave trap coil	.01
112847	Socket - for dial lamp	.22
112871	Cup washer - for mtg. model 97-523	.01
112872	Screw - chassis mtg. #8 X 1¼ O.H. (model 97-523)	.02
112874	Screw - #10 X 1-1/8 chassis mtg.	.01
112878	Screw - escutcheon mtg. #2 X 3/8 (model 97-524)	.06
112879	Screw - escutcheon mtg. #2 X 3/8	.03
112914	Escutcheon - dial	.35
113022	Knob - round - volume or tuning	.10
113052	Escutcheon - for dial (model 97-524)	.42
113053	Escutcheon - for push buttons	.32
113054	Escutcheon - for push buttons (model 97-524)	.40
113103	Push Button - (Walnut)	.06
113104	Push Button Only - (Black)	.08
113124	Speaker Grille Bar - (Chrome Plate) (model 97-524)	.26
113125	Speaker Grille Support Track (model 97-524)	.05
113138	Knob - octagon - volume or tuning	.20
113156	Gear - & bushing assembly for dial drive	.22
113169	Spring - for key return	.01
113170	Adjusting Lug - for button shafts	.01
113171	Bracket - for dial & condenser mtg.	.64
113175	Shaft - dial drive	.18
113177	Spring - dial cord tension	.09
113178	Cord - for dial drive (36" req.) supplied in 4 ft. lengths	.30
113189	Tab - celluloid - for push button-Per dz.	.09
113232	Mtg. Plate - for spade model 97-523	.34
113321	Tabs - station call letters (4 sheets) (Brown) Per set	.40
113322	Tabs - station call letters (4 sheets) (Black) Per set	.40
113494	Mechanical Tuner Assembly - keys and housing only	3.00

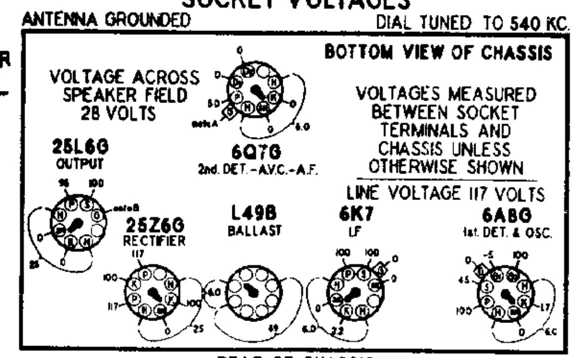
TERMINALS OF COILS SHOWN ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.



SOCKET VOLTAGES

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.



REAR OF CHASSIS

MODELS 97-521 TO 97-529

FOR PUSH BUTTON AND DRIVE CORD DATA, SEE CHASSIS 91-51.

NOTE A: The bias for the control grid of the 6Q7-G tube is -1.0 volt, supplied by the bias cell. Due to the high resistance of the cell, the voltmeter will indicate only a fraction of a volt.

NOTE B: The bias for the control grid of the 25L6-G output tube is -10 volts measured across resistor 22.

MODELS 97-521 to 97-529
Chassis 97-52
Alignment, Trimmers

STEWART WARNER CORP.

Chassis Model	Used In Receiver Models	Voltage
97-52	97-521 to 97-529	117 volts A.C. or D.C.

This chassis is a 5 tube, single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-49-B ballast resistor tube. The tuning range of this receiver is 540 to 1725 KC. The intermediate frequency is 465 KC.

Incorporated in each chassis is a four-button mechanical push-button tuner unit. These push buttons may be set to any station desired by the method described below under "How To Set Up The Push-Button Tuner".

The accuracy of tuning when using the push-button tuner, depends to a large extent upon the amount of "play" in the moving parts of this system. In cases where slight inaccuracy in tuning occurs check the following points:
1. Check to see that the button is correctly set to the station. If not, reset the button.
2. The tension must be maintained between the two sections of the anti back-lash gear on the left side of the unit in order that it functions properly--both anti back-lash springs must be in place in the gear and compressed slightly.
3. Note the small adjusting lug over the push-button shafts at the point where they slide into the tuner. The lug is held in place by a hex-head screw. These lugs should be adjusted for a minimum amount of "play" In other words the push-button shaft must have a minimum of movement in a vertical direction.

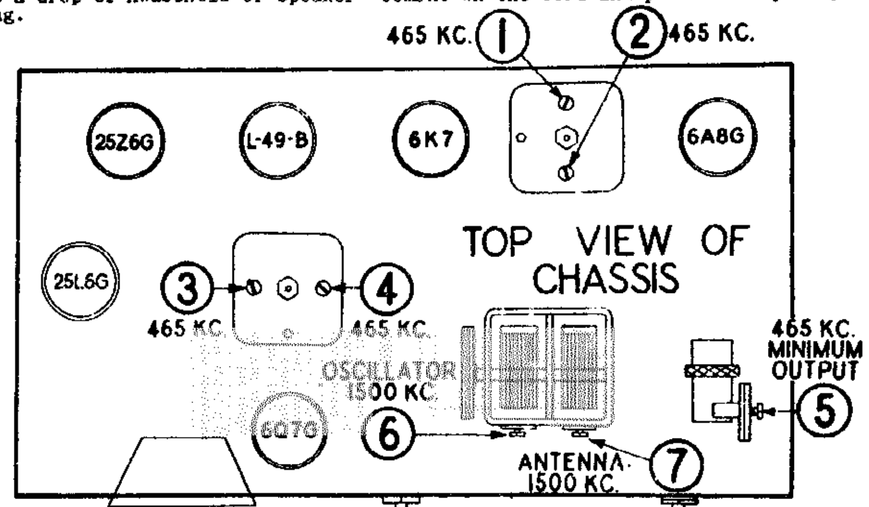
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

(1) Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4) With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

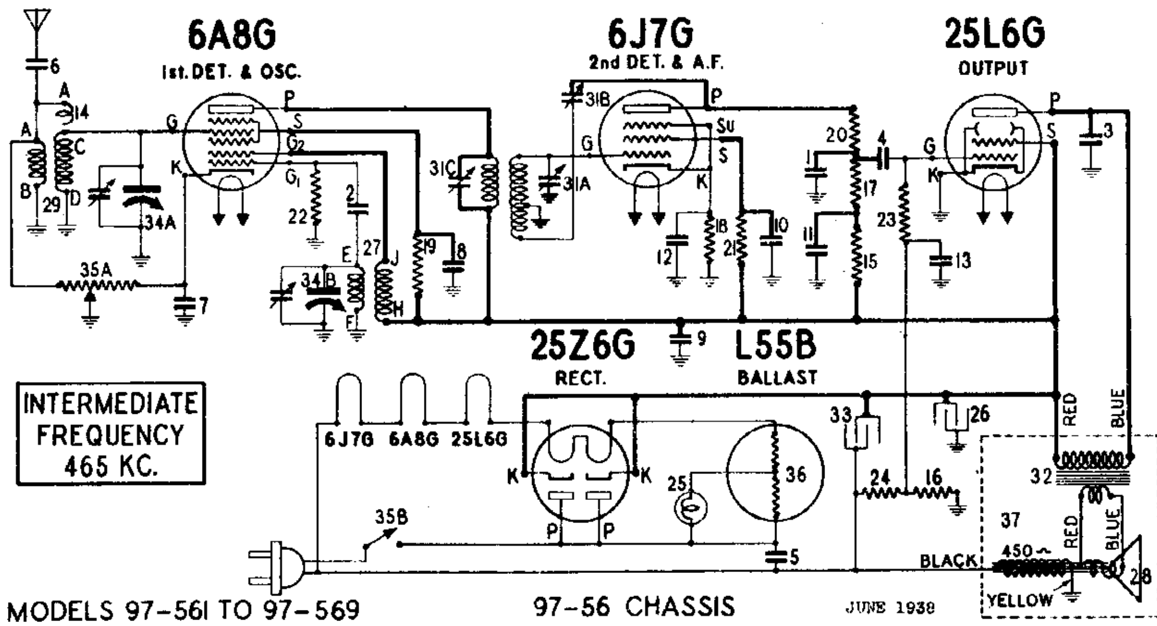


DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1st I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	2nd I.F.	
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON. RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.

Schematics, Voltage, Socket

STEWART-WARNER CORP.

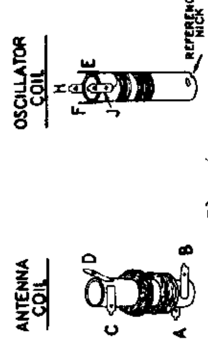
MODELS 97-561 to 97-569 Chassis 97-56
97-561S to 97-569S Chassis 97-56S



MODELS 97-561 TO 97-569 — 97-56 CHASSIS

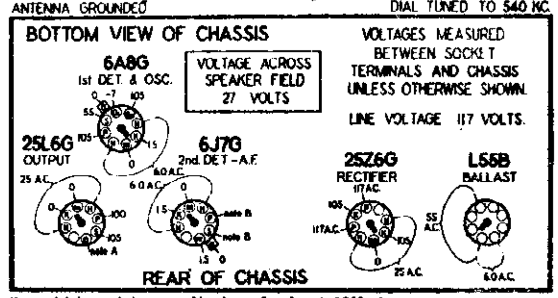
NOTE

TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS BELOW ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.



	Antenna coil	Oscillator coil
97-56-S.	DIAGRAM NO. 35, PART NO. 113744	DIAGRAM NO. 26, PART NO. 113042
97-56	DIAGRAM NO. 29, PART NO. 113274	DIAGRAM NO. 27, PART NO. 113042

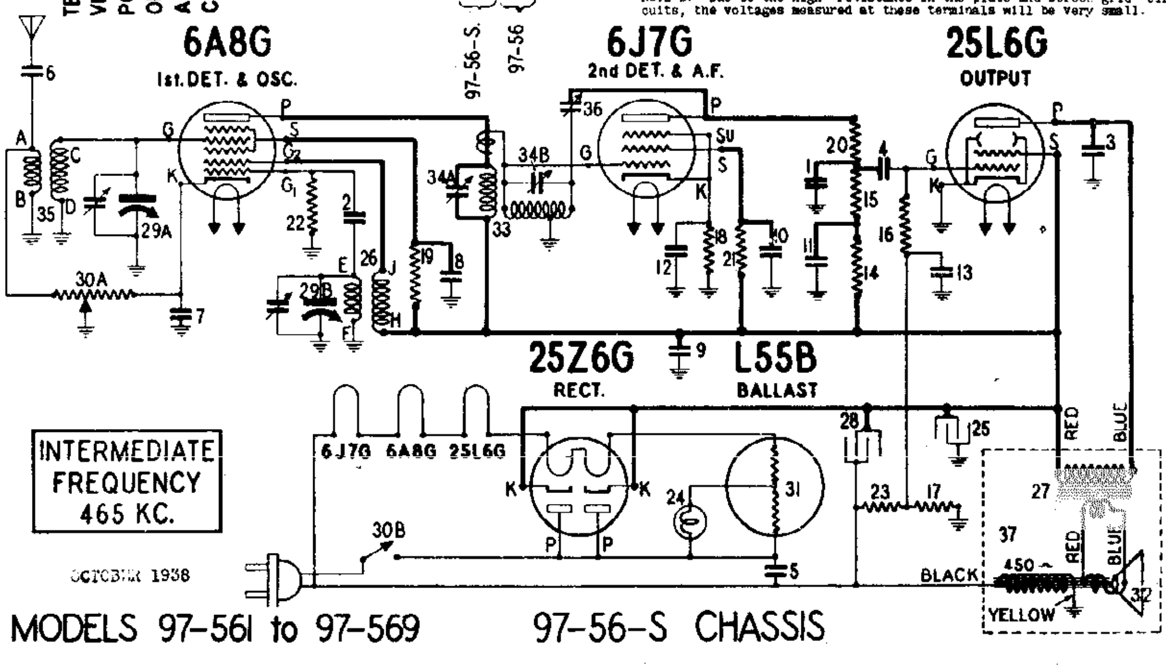
SOCKET VOLTAGES CHASSIS 97-56, 97-56-S.
ANTENNA GROUNDED — DIAL TUNED TO 540 KC.



Use a high resistance voltmeter of a least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 25L6G output tube is -6.0 volts. Due to the high resistance in this grid circuit the voltage measured will be extremely small.

NOTE B: Due to the high resistance in the plate and screen grid circuits, the voltages measured at these terminals will be very small.



MODELS 97-561 to 97-569 — 97-56-S CHASSIS

MODELS 97-561 to 97-569
97-561S to 97-569S
Tuner Data, Alignment
MODELS 97-571 to 97-579
Tuner Data

STEWART WARNER CORP.

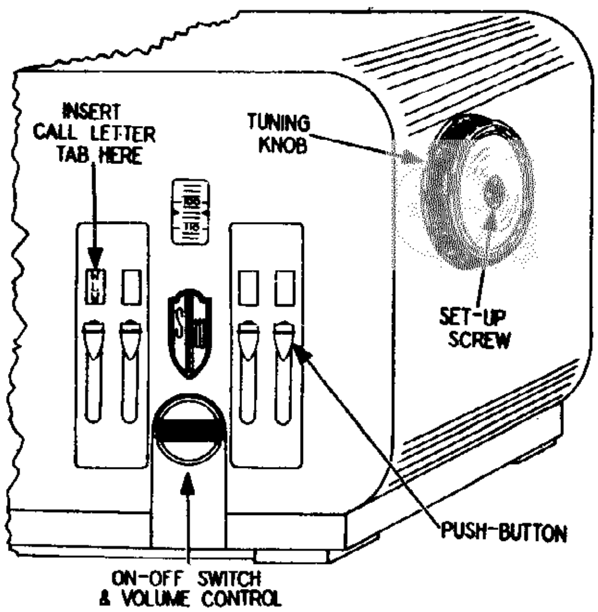
CHASSIS 97-56, 97-56S AND 97-57

HOW TO SET UP THE PUSH-BUTTON TUNER.

1. Be sure that your set is connected to a good antenna system.

2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.

3. Select the four nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Any button may be set to any desired station.



4. The large tuning knob at the side of your set has a screw located in the center. Grasp this tuning knob firmly and then using a screw-driver or a coin turn the screw counter-clockwise not more than two whole turns. (When viewed from the side of the cabinet.)

5. Push down any one of the four buttons that you wish to set to a station. Be sure to push the button all the way down, otherwise the setting will be incorrect.

6. Holding the push-button down firmly, turn the tuning knob until the station you desire is tuned in. Tune in strong nearby stations for best results. Be sure to tune in the stations correctly by tuning to the point where the program is heard with the least hiss or distortion and not to the point of greatest volume.

7. Release the push button that you have just set up. WARNING: Do not attempt to use any button until you have completed the set-up of all four buttons. Do not re-tighten the set-up screw until all buttons have been set-up.

8. Proceed to set-up the next button by pushing down on the button firmly and tuning in the desired station, using the tuning knob. The rest of the buttons should be set-up in a similar manner.

9. After all of the buttons have been set-up YOU MUST RE-TIGHTEN THE SCREW IN THE TUNING KNOB; OTHERWISE ALL SETTINGS OF THE BUTTONS WILL BE DESTROYED. GRASP THE KNOB FIRMLY AND THEN USE A SCREW DRIVER OR A COIN TO TIGHTEN THE SCREW SECURELY.

10. The push buttons should now be labelled with their proper call letters. The call letter sheets are supplied with your receiver. The individual call letter tab should be moistened on its gummed side and stuck to the small square in the cabinet panel just above the push button.

97-56 CHASSIS ONLY

THE INTERMEDIATE FREQUENCY AMPLIFIER.

This 97-56 chassis employs one stage of intermediate frequency amplification. The intermediate frequency transformer is adjusted to 465 KC and is tuned in the usual manner. In addition to the two trimmers used in tuning the windings to their proper frequency, this transformer has mounted on it an additional trimmer condenser which is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of the 6J7-G tube. This signal is introduced into the 6J7-G grid circuit through a coupling coil, which is a part of the secondary coil. This regeneration increases the amplification and selectivity obtainable from this stage, and makes the performance of this set comparable to that which is obtained from a set employing an additional I.F. transformer.

When aligning the intermediate frequency amplifier, the output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube in the customary manner. The primary and secondary windings are tuned by adjusting Trimmer Screws No. 1 and No. 2 until a maximum deflection is obtained on the output meter. If the set has a tendency to oscillate when adjusting these trimmer screws, turn Trimmer Screw No. 5 to the left (counter-clockwise) until the oscillation ceases. The signal generator is next coupled to the antenna lead, and Trimmers No. 3 and No. 4 are aligned for maximum output, using a generator frequency of 1500 KC. Now connect the set to the CUSTOMER'S antenna and tune in a station on the low frequency end of the dial. The regeneration control, Trimmer No. 5 is now adjusted to give maximum output of the set, consistent with good stability and tone quality. After changing the setting of Trimmer No. 5 it is necessary to re-adjust Trimmers No. 1 and No. 2, as their setting will be found to have changed slightly. The output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube through a .1 mfd. condenser and Trimmers No. 1 and No. 2 adjusted, as was done previously.

A-C OPERATION

When the set is used on alternating current, all D-C potentials are supplied by a 25Z6G rectifier tube and its associated filter circuit. The tube is connected for half-wave rectification of the A-C supply.

If any hum is noticed when the set is used on A-C, reversing the power plug in the receptacle will sometimes reduce the hum level. When the set has not been used for some time, or the filter condensers have been replaced, a slight hum may be audible when the set is first turned on. This hum may not clear up immediately upon reversal of the power plug. However, it will probably be eliminated after approximately five minutes operation by which time the anode plates of the electrolytic capacitors in the filter system will have reformed.

D-C OPERATION

If the set fails to operate after allowing time for the tubes to reach their normal operating temperatures, reverse the power plug in the receptacle. When the set is used on direct current, the 25Z6G rectifier tube and the filter system remains in the circuit and serve two purposes. If the power cord should be plugged in with incorrect polarity, the 25Z6G tube protects the filter condensers from damage. On correct D-C polarity the 25Z6G tube passes the D-C and the filter circuit aids in smoothing the supply voltage, thus minimizing line noises.

97-56-S CHASSIS ONLY

I.F. TRANSFORMER & REGENERATION CONTROL

This 97-56-S chassis employs only one intermediate frequency transformer, the windings of which are capacitively coupled. The two trimmers used to tune the primary and secondary of this transformer are mounted on the transformer assembly, and are accessible from the rear of the chassis. Also associated with this intermediate frequency transformer is an additional trimmer condenser, which is accessible through a hole in the rear of the chassis. This condenser is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of the 6J7-G tube. This signal is introduced into the 6J7-G grid circuit through a coupling coil, which is a part of the secondary coil. The regeneration obtained increases the amplification and selectivity obtainable from the intermediate frequency transformer, and makes the performance of this set comparable to that which is obtained from a set employing an intermediate frequency stage.

ADJUSTMENT OF REGENERATION CONTROL.

IF DISTANT STATIONS COME IN WITH INSUFFICIENT VOLUME: Through the opening near the bottom of the center of the back of the cabinet; you will see an adjusting screw. Using a non-metallic instrument (a piece of wood whittled in the shape of a screw driver will serve the purpose), turn this screw to the left (counter-clockwise). As you turn counter-clockwise the volume will be increased up to a certain point at which the set will begin to squeal. Turn the screw back until the squeal just disappears and good tone quality is obtained.

IF THE RECEIVER HOWLS OR SQUEALS: Using the same screw mentioned above and a non-metallic instrument (a piece of wood whittled in the shape of a screw driver will serve the purpose) turn the screw clockwise very, very slightly until the squeal or howl ceases.

MODELS 97-561 to 97-569
97-561S to 97-569S
Alignment, Trimmers

STEWART WARNER CORP.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

(1)- Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2)- Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.

(3)- Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

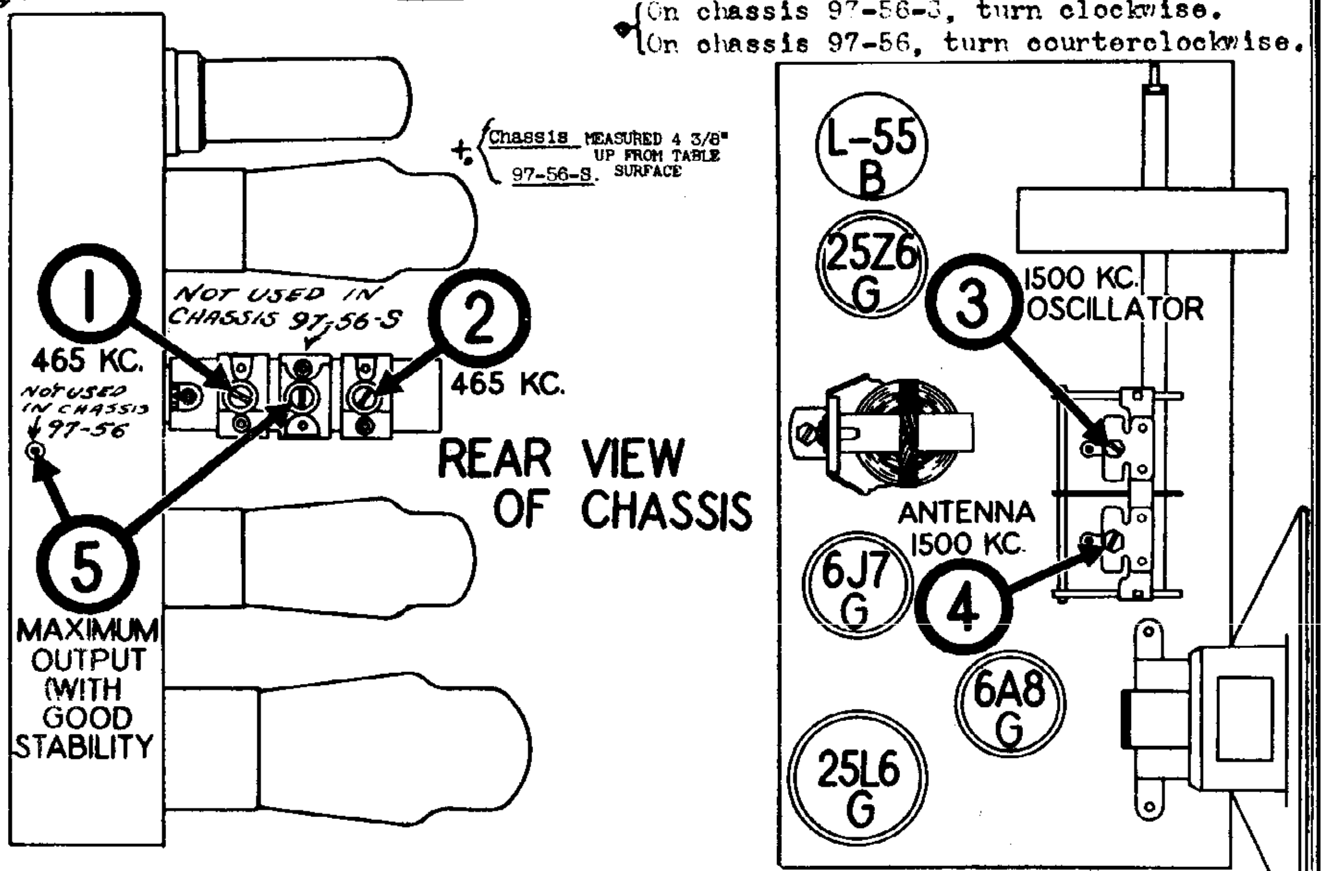
(4)- With the gang condenser in full mesh, set the indicator to the last mark on the top end of the dial scale. If the pointer is only slightly off calibration, it may be possible to slip the dial drum just enough to correct for this slight mis-calibration. If the dial is several divisions off calibration, loosen the set screw on the condenser shaft. Then grasp the end of the tuning shaft and turn the dial until the last division of the scale is directly under the indicator, when the gang is in full mesh. Then retighten the set-screw.

+(4)- TO CALIBRATE THE DIAL:- Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which connects the gang condenser shaft with the tuning unit. Holding the gang in full mesh turn the dial until the last dial division (just below 55) on the low frequency end is exactly 4 3/8 inch above the table surface. Now retighten the set screw in the coupler collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. IF OSCILLATION OCCURS TURN REGENERATION CONTROL TRIMMER #5 ONE-QUARTER ◆TURN
200 MMFD. CONDENSER	ANTENNA LEAD (BLUE WIRE)	1500 KC	+ 1500 KC	3	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. CONDENSER	ANTENNA LEAD (BLUE WIRE)	1500 KC	TUNE TO 1500 KC GEN. SIG.	4	BROADCAST ANTENNA (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
CONNECT RECEIVER TO CUSTOMERS ANTENNA OR TO A 50 MMFD. MICA CONDENSER IN SERIES WITH THE SIGNAL GENERATOR.		TUNE IN A WEAK SIGNAL ON THE LOW FREQUENCY END OF THE DIAL. A WEAK SIGNAL IS REQUIRED SO THAT VOLUME CONTROL MAY BE SET TO MAXIMUM VOLUME POSITION.		5	REGENERATION CONTROL	ADJUST TRIMMER TO GIVE MAXIMUM OUTPUT, CONSISTENT WITH GOOD STABILITY AND TONE QUALITY.
✱ .1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.

✱ THIS ADJUSTMENT MUST AGAIN BE MADE AFTER THE REGENERATION CONTROL TRIMMER HAS BEEN SET.

◆ On chassis 97-56-S, turn clockwise.
On chassis 97-56, turn counterclockwise.



MODELS 97-561 to 97-569
97-561S to 97-569S STEWART-WARNER CORP.
Parts Lists

97-56 CHASSIS

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	.20
2	83783	Condenser - mica 110 mmf.	.20
3-4-5	88026	Condenser - paper .02 mfd. 400 volt	.25
6	88029	Condenser - paper .004 mfd. 400 volt	.25
7-8-9-10-11	89421	Condenser - paper .1 mfd. 200 volt	.25
12-13	89532	Condenser - paper .25 mfd. 200 volt	.32
14	110510	Condenser - wire 3 mmfd.	.12
15-16	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
17	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
18	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
19	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
20	110569	Resistor - carbon 10,000 ohm 1/4 watt	.12
21	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
22	110578	Resistor - carbon 68,000 ohm 1/4 watt	.12
23	110584	Resistor - carbon 330,000 ohm 1/4 watt	.12
24	110591	Resistor - carbon 680,000 ohm 1/4 watt	.12
25	110629	Lamp - 6.3 volt - .25 amps.	.15
26	112898	Condenser - electrolytic 16 mfd. 150 volt	.50
27	113042	Coil - oscillator	.45
28	R-113241	Cone - voice coil assem. for R-115013 spkr.	1.25
29	113274	Coil - antenna	.65
30	113275	Transformer - I.F. (with trimmer)	1.44
31A to 31C	113278	Condenser - trimmer (3 section for I.F.)	.46
32	R-113343	Transformer - output for R-115013 spkr.	1.00
33	113472	Condenser - electrolytic 40 mfd. 150 volt	.56
34A - 34B	113478	Condenser - variable gang	3.20
35A - 35B	113501	Volume Control-20,000 ohms with on-off switch	.92
36	113506	Ballast Resistor - L55B	.65
37	R-115013	Speaker - dynamic 5 inch	4.75

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
83624	Screw - Self Tapping 8 X 1/4 for mounting I.F. transformer	$ .01
85427	Socket - tube, 8 prong	.15
85827	Set Screw - 8/32 square head	.02
112745	Clip - coil mounting (osc. & ant.	.01
113500	Mechanical Tuner Unit - less tenite tips for push buttons	3.90
113504	Collar - Coupling (between tuner unit and gang cond. shaft)	.08
113510	Tip - for push button (walnut)	.05
113529	Tip - for push button (ivory)	.06
113530	Knob - tuning (walnut)	.25
113531	Knob - tuning (ivory)	.30
113537	Screw for tuning knob & set-up	.18
113543	Socket - dial lamp	.18
113550	Tabs - station call letters	.28
113557	Key - for push button tuner (left hand)	.24
113558	Clutch Spring - for tuner (on cam shaft)	.04
113559	Spring - for key return	.02
113560	Dial Scale - Celluloid Strip	.22
113572	Key - for push button (right hand)	.24
113573	Knob - Volume (walnut)	.18
113574	Knob - Volume (ivory)	.18

Chassis Model	Used in Receiver Models	Voltage
97-56	97-561 to 97-569	117 volts A.C. or D.C.

This chassis is a 5 tube single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-55-B ballast resistor tube. The tuning range of the receiver is 540 to 1720 KC.

IMPORTANT: In cases where it is found that the push-button tuner does not tune in stations correctly due to extreme sharpness in tuning it is only necessary to back off (turn counter clockwise) the regeneration control trimmer (#6) slightly. This will make tuning broader and will result in more accurate tuning when using the push button tuner.

97-56-S CHASSIS

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	.20
2	83783	Condenser - mica 110 mmf.	.20
3-4-5	88026	Condenser - paper .02 mfd. 400 volt	.25
6	88029	Condenser - paper .004 mfd. 400 volt	.25
7-8-9-10-11	89421	Condenser - paper .1 mfd. 200 volt	.25
12-13	89532	Condenser - paper .25 mfd. 200 volt	.32
14	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
15-16	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
17	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
18	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
19	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
20	110569	Resistor - carbon 10,000 ohm 1/4 watt	.12
21	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
22	110578	Resistor - carbon 68,000 ohm 1/4 watt	.12
23	110584	Resistor - carbon 330,000 ohm 1/4 watt	.12
24	110629	Lamp - 6.3 volt-.25 amps.	.15
25	112898	Condenser - electrolytic 16 mfd. 150 volt	.50
26	113042	Coil - oscillator	.45
27	R-113343	Transformer - output for R-115013 speaker	1.00
28	113472	Condenser - electrolytic 40 mfd. 150 volt	.56
29A - 29B	113478	Condenser - variable gang	3.20
30A - 30B	113501	Volume control-20,000 ohms with on-off switch	.92
31	113506	Ballast Resistor - L55B	.65
32	R-113737	Cone - voice coil assem. for R-115025 speaker	1.90
33	113738	Transformer - I.F. (with trimmer)	1.26
34A - 34B	113743	Condenser - trimmer (2 section for I.F.)	.30
35	113744	Coil - antenna	.72
36	113745	Condenser - trimmer (regen. control)	.28
37	R-115025	Speaker - dynamic - 5" (sub. R-115013)	4.80

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
83624	Screw - self tapping 8 X 1/4 for mounting I.F. transformer	.01
85427	Socket - tube, 8 prong	.15
85827	Set screw - 8/32 square head	.02
88161	Shield Tube - (short section)	.08
88162	Shield Tube - (long section)	.08
88164	Shield Cap - tube, grid type	.06
89911	Shield - Tube, base	.04
89912	Clip - grounding, for tube base	.02
112745	Clip - coil mounting (osc. & ant.)	.01
113500	Mechanical Tuner Unit - less tenite tips for push buttons	3.90
113504	Collar - Coupling (between tuner unit and gang condenser shaft)	.08
113537	Screw for tuning knob & set-up	.18
113543	Socket - dial lamp	.18
113548	Felt Pad - behind push buttons	.01
113550	Tabs - station call letters	.28
113557	Key-for push button tuner (left hand)	.24
113558	Clutch spring - for tuner (on cam shaft)	.04
113559	Spring - for key return	.02
113560	Dial Scale - celluloid strip	.22
113572	Key - for push button (right hand)	.24
113582	Dial Window - celluloid	.12
113636	Screw - #6 X 3/4" for chassis mtg.	.01
113638	Screw - Back cover retaining	.01
113699	Screw - #6 X 1" for chassis mtg.	.01

Chassis Model	Used in Receiver Models	Voltage
97-56-S	97-561 to 97-569	117 Volts A.C. or D.C.

This chassis is a 5 tube single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-55-B ballast resistor tube. The tuning range of the receiver is 540 to 1720 KC.

IMPORTANT: In cases where it is found that the push-button tuner does not tune in stations correctly due to extreme sharpness in tuning it is only necessary to turn the regeneration control trimmer (#6) slightly clockwise. This will make tuning broader and will result in more accurate tuning when using the push button tuner.

97-56-S

KNOBS AND PUSH-BUTTONS

WHEN ORDERING GIVE COLOR AS WELL AS PART NUMBER

COLOR	COLOR NUMBER	PUSH BUTTON	TUNING KNOB	VOLUME KNOB
Walnut	--	113510	113530	113573
Ivory	--	113529	113531	113574
Navy Blue	#30	113785	113786	113787
Orange	#74	113777	113778	113779
White	--	113763	113764	113765
Gold	#73	113796	113797	113798
Old Gold	#45	113805	113806	113807
Burnt Orange	#76	113823	113824	113825
Black	#20	113832	113833	113834
Gray	#24	113841	113842	113843
Red	#61	113911	113912	113913
Yellow	#72	113920	113921	113922
Blue	#38	114124	114125	114126

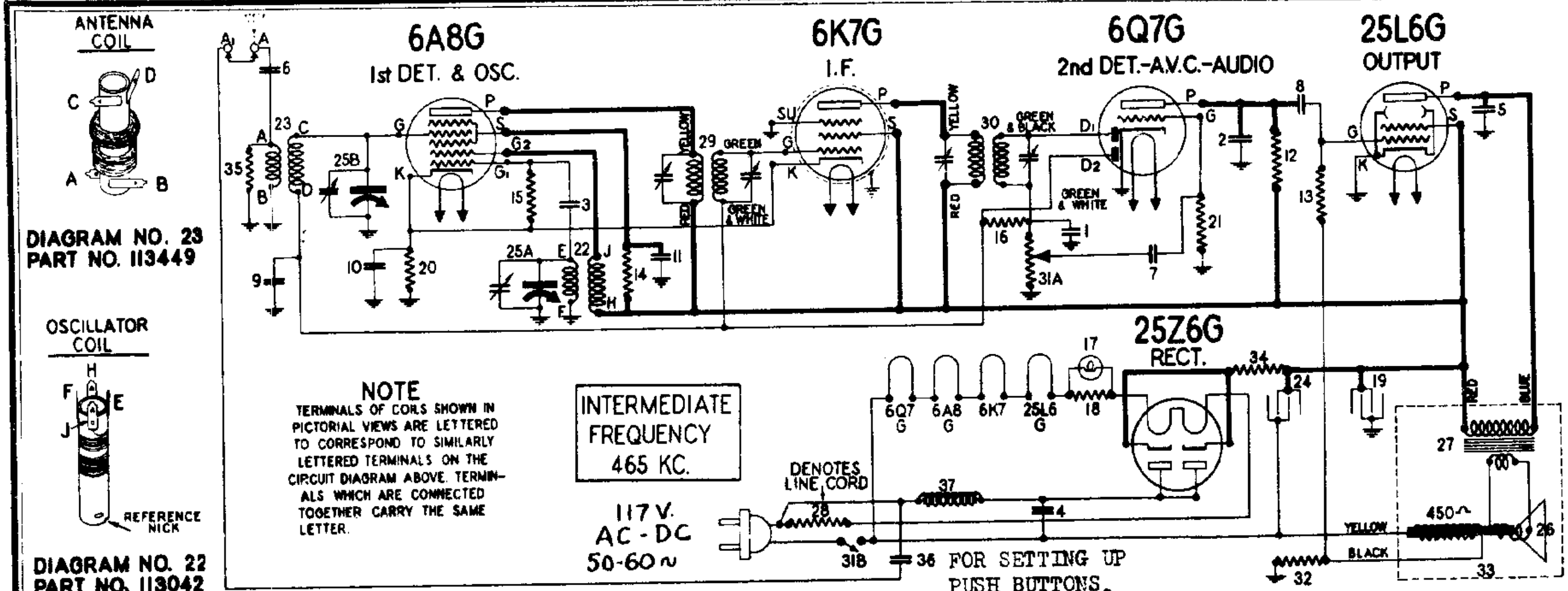
PUSH BUTTON & CONTROL KNOB PRICES

DESCRIPTION	COLOR	LIST PRICE
Tuning Knob	Walnut only	.25
Tuning Knob	Ivory only	.30
Tuning Knob	All other colors	.40
Volume Knob	Walnut or Ivory	.18
Volume Knob	All other colors	.22
Push Button	Walnut or Ivory	.05
Push Button	All other colors	.09

Prices subject to change without notice.

MODELS 97-571 to 97-579
Chassis 97-57
Schematic, Voltage
Socket, Changes

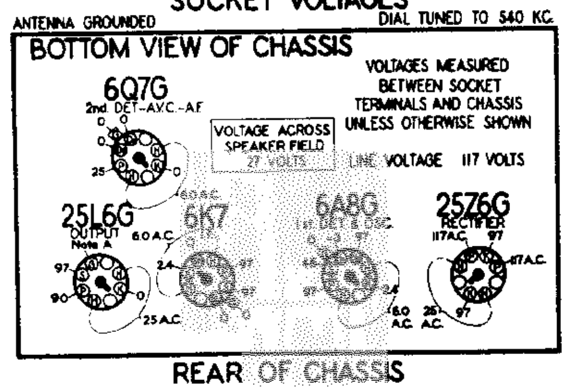
STEWART-WARNER CORP.



FEBRUARY 1939.

MODELS 97-571 to 97-579
97-57 CHASSIS

SOCKET VOLTAGES



Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A:- The bias for the control grid of the 25L6-G tube is -6.7 volts, measured across resistor number 32.

CIRCUIT CHANGE

Resistor No. 18 connected in parallel with the dial bulb has been changed to a 3 watt molded wire wound resistor, Part No. 116479. This size is being used in place of the original 1/2 watt rating, to prevent failure of the resistor if the dial bulb burns out. The 3 watt resistor should be used for replacement in all cases.

TUBE CHANGE

A small percentage of these chassis was equipped with 6K7 metal I.F. tubes but most of them are using the 6K7G glass tube. Because of shield requirements, these tubes cannot be used interchangeably. In other words, a metal tube must be used to replace a metal tube, while in a chassis originally equipped with a glass I.F. tube, a glass tube must be used as a replacement.

CORRECTING OSCILLATION & SQUEALING

If a "squeal" develops with the volume control fairly well advanced, separate the 6Q7G grid lead and the speaker wires as much as possible by pulling the grid lead to the side of the 6Q7G nearest the variable condenser.

If there is a loud heterodyne whistle when tuning in stations, the I.F. stage may be oscillating. If this happens, move the lead from the 6A8G cathode to the 6Q7G cathode as close to the chassis and as far from other wires as possible. If necessary, connect a .05 mfd. 200 volt condenser to one of the above cathode terminals which does not already have such a condenser connected directly to it.

MODELS 97-571 to 97-579
Alignment, Trimmers, Parts
Antonna Notos

STEWART WARNER CORP.

MODELS 97-571 to 97-579 CHASSIS 97-57

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

(1)—Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

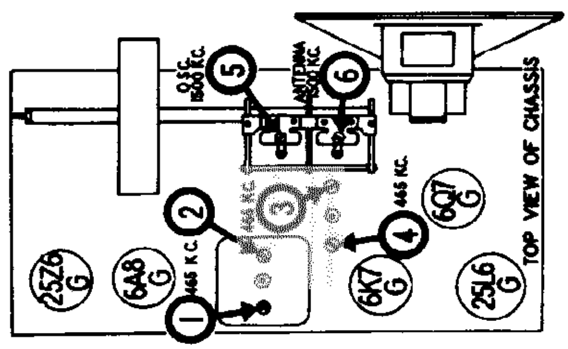
(2)—Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.

(3)—Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4)—**TO CALIBRATE THE DIAL:-** Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which connects the gang condenser shaft with the tuning unit. Holding the gang in full mesh turn the dial until the last dial division (just below 55) on the low frequency end is exactly 4 3/8 inch above the table surface. Now retighten the set screw in the coupler collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

DUMMY ANT IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. MICA CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT
				3-4	2ND I. F.	
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	5	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	6	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	83783	Condenser - mica, 110 mmf.	.20
4	111252	Condenser - paper .05 mfd. 400 V.	.13
5	88026	Condenser - paper .02 mfd. 400 V.	.25
6	88029	Condenser - paper .004 mfd. 400 V.	.25
7-8	88030	Condenser - paper .01 mfd. 400 V.	.25
9-10	88189	Condenser - paper .05 mfd. 200 V.	.25
11	89421	Condenser - paper .1 mfd. 200 V.	.25
12	110553	Resistor - carb. 220,000 ohms ½ W.	.12
13	110559	Resistor - carb. 470,000 ohms ½ W.	.12
14	110566	Resistor - carb. 33,000 ohms ½ W.	.12
15	110578	Resistor - carb. 68,000 ohms ½ W.	.12
16	110580	Resistor - carb. 3.3 meg. 1/4 watt	.12
17	110629	Lamp - 6.3 volt - .25 amps.	.15
18	110975	Resistor - W. W. 33 ohms ½ W.(10%)	.12
19	112898	Condenser - elect. 16 mfd. 150 V.	.50
20	112974	Resistor - carb. 220 ohm ½ W.(10%)	.15
21	112975	Resistor - carbon 10 meg. 1/4 watt	.12
22	113042	Coil - oscillator	.45
23	113449	Coil - antenna	.78
24	113472	Condenser - elect. 40 mfd. 150 V.	.56
25A - 25B	113478	Condenser - variable gang	3.20
26	R-114061	Cone - voice coil assembly (for R-115039 speaker)	1.50
27	R-114062	Transformer - output	1.20
28	114797	Power cord - (series resistance 143 ohms) Brown	.98
28	114951	Power Cord - (series resistance 143 ohms) Ivory	1.00
29	114802	Transformer - 1st I.F.	1.10
30	114804	Transformer - 2nd I.F.	.85
31A - 31B	114814	Volume control 1 megohm with off-on switch	.96
32	114815	Resistor - W.W. 110 ohms ½ W.(10%)	.14
33	R-115039	Speaker - dynamic 5 inch	3.95
34	116013	Resistor - W.W. 50 ohms 1 watt	.18
35	110569	Resistor - carb. 10,000 ohms ½ W.	.12
36	116224	Condenser - mica 260 mmfd. 500 V.	.15
37	116232	R. F. Choke	.48



KNOBS & PUSH BUTTONS

WHEN ORDERING GIVE COLOR AS WELL AS PART NUMBER

COLOR	PUSH BUTTON	TUNING KNOB	VOLUME KNOB
IVORY	113529	113531	113574
LITE WALNUT	114710	114711	114712
METALLIC BLUE	116132	116133	116134
METALLIC GREEN	116137	116138	116139
METALLIC RED	116141	116142	116143

PUSH BUTTON & CONTROL KNOB PRICES

COLOR	PUSH BUTTON	TUNING KNOB	VOLUME KNOB
IVORY	.05	.30	.18
LITE WALNUT	.05	.26	.18
METALLIC COLORS	.09	.40	.22

PART NUMBER	DESCRIPTION	LIST PRICE
112745	Clip - coil mounting (osc. & ant.)	.01
89912	Clip - grounding, for tube base	.02
113558	Clutch Spring - for tuner (on cam shaft)	.04
113504	Collar - Coupling (between tuner unit and gang condenser shaft)	.06
65321	Connector - for Internal Antenna	.01
113560	Dial Scale - celluloid strip	.22
113582	Dial Window - celluloid	.12
113567	Key - for push button tuner (left hand)	.24
113572	Key - for push button tuner (right hand)	.24
113500	Mechanical Tuner Unit - less tenite tips for push buttons	3.90

PART NUMBER	DESCRIPTION	LIST PRICE
113699	Screw - #6 X 1" for chassis mounting	.01
113537	Screw - for tuning knob (antique bronze)	.18
113538	Screw - for tuning knob (chrome head)	.14
112865	Shield - base; for tubes	.03
88165	Shield Cap - for tubes (plain)	.06
112864	Shield - for tubes	.08
88161	Shield Tube - (short section)	.08
85427	Socket - octal base (standard)	.15
113543	Socket - dial lamp	.18
113559	Spring - for key return	.02
113550	Tabs - station call letters	.28
116223	Terminal Strip - A - A_1	.12

BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and A_1 on the back of the chassis are connected together. In cases where noises are excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A_1 and connect an external antenna to terminal A.

In some locations, due to peculiar power line conditions, hum or noise may be excessive when the Built-In Antenna is used. In such cases reverse the power line plug. If this doesn't correct the condition, remove the connector between A and A_1 on the back of the chassis, and connect an external antenna to A.

1851W to 1859W
Alignment

STEWART WARNER CORP.

MODELS 1851 to 1859
1851A to 1859A
1851B to 1859B

The model R-185 chassis, is all tube, three band, automatic tuning, superheterodyne receiver. It has an intermediate frequency of 465 KC. and tuning range of 525 KC. to 18,100 KC. The circuit is of the latest design incorporating such refinements as a special high efficiency R.F. unit, automatic frequency control, reactance dimmer, tuning indicator, and iron core I.F. transformers.

ALIGNMENT EQUIPMENT & PROCEDURE

(1)—Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial when the gang condenser is in full mesh. Also when the gang condenser is in full mesh the stop pin on the left side of the tuner should be resting against the back stop. If after examination it is found that the gang is in full mesh and the stop pin is against the back stop, but the pointer is set to the wrong position, it will only be necessary to loosen the set screw on the dial drive gear at the left side of the mechanism; then grasp the large drum on the same side of the tuner and turn it until the pointer is set correctly. Now retighten the set screw on the gear being careful to see that the gear is meshing properly.

On the other hand if the stop pin does not rest against the back stop with the gang condenser in full mesh, loosen the set screw on the gang condenser side of the flexible coupler. Then turn the tuning knob until the stop pin rests against the back stop on the tuner. Now retighten the set screw in the flexible coupler and proceed to set the pointer to its correct position by the method described in the previous paragraph.

(2)—Connect the output meter across the two plates of the two 6V6 power output tubes or across the voice coil of the speaker, depending on the type of meter. The more sensitive type should be connected across the voice coil.

(3)—Connect the ground lead of the signal generator to the chassis and leave it there throughout the entire alignment procedure.

(4)—Turn the volume control to the maximum volume position.

(5)—Keep the Ground and Doublet connections on the antenna terminal strip connected together throughout the entire alignment procedure.

TYPE OF DUMMY ANT. IN SERIES WITH SIG.GEN.	POINT TO CONNECT OUTPUT OF SIGNAL GENERATOR.	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER (see diag. next page)	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7 TUBE	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	2ND I.F.	
					5	3RD I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.*	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	6	WAVE TRAP	Adjust for minimum output using a strong generator signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	1500 KC.	7	BROADCAST OSCILLATOR (Shunt)	Adjust trimmer to bring in signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	TUNE TO 1500 KC. GENERATOR SIGNAL	8	BROADCAST DETECTOR	Adjust for maximum output.
					9	BROADCAST ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Counter-clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	10	BROADCAST OSCILLATOR (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	5 MC.	12	POLICE OSCILLATOR (Shunt)	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 4.1 MC. If image does not appear realign at 5 MC. with trimmer screw farther out. Recheck image.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	TUNE TO 5 MC. GENERATOR SIGNAL	13	POLICE DETECTOR	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					14	POLICE ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	15	SHORT-WAVE OSCILLATOR (Shunt)	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 15.1 KC. If image does not appear realign at 16.KC. with trimmer screw farther out. Recheck image.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	16	SHORT-WAVE DETECTOR	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					17	SHORT-WAVE ANTENNA	

IMPORTANT: ALLOW RECEIVER TO WARM UP 15 MINUTES BEFORE ALIGNING. SEE THAT NONE OF THE PUSH BUTTONS ARE DEPRESSED WHEN ALIGNING.

THE AFC MUST NOW BE ALIGNED.

A.F.C. ALIGNMENT.

IMPORTANT: The following adjustment must be made after every re-adjustment of the I.F. and broadcast band trimmers.

The A.F.C. Discriminator should be adjusted as follows:

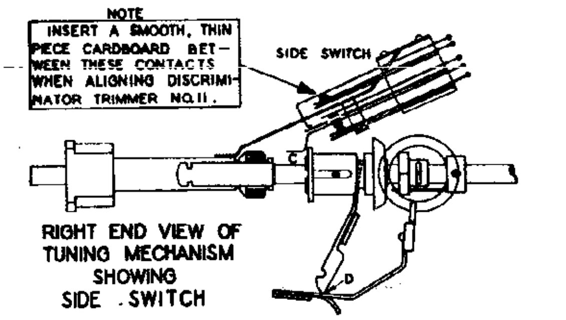
1. Be sure no buttons are depressed. Loosely couple the output of the signal generator to the 6L7 control grid by clipping the signal generator output lead to the insulation on the control grid wire, or connect to the grid clip through a 50 mmfd. mica condenser. BE SURE THE RANGE SWITCH IS IN THE BROADCAST (COUNTER-CLOCKWISE) POSITION.
2. Adjust the signal generator to resonance with I.F. system by tuning the signal generator dial for maximum output meter deflection. Be sure that the receiver dial is at some point where it has no tuning effect on the generator signal. Switch off the modulation.
3. With the signal generator connected and operating as in #2, connect antenna and manually tune in powerful local station in region of 1000 KC. or lower. (Avoid stations around 930 KC. which might beat with second harmonic of test oscillator.)
4. Adjust receiver tuning dial to obtain zero beat between the test oscillator and the incoming signal. (A very slight adjustment is all that is required. Be careful not to tune off signal.)
5. Refer to the figure on the right. It is now necessary to open the A.F.C. contacts & allow it to function. This may be done by placing a piece of smooth cardboard between the A.F.C. contacts as shown in the figure. Be careful not to bend or malform the switch in any way.
6. Now, adjust the secondary of the discriminator transformer (Trimmer #11) to restore zero beat. NOTE: This trimmer should be adjusted to the point where the frequency of the beat note increases rapidly if the trimmer is turned in either direction. Other zero beat points may be found with the trimmer all the way in or all the way out, but these settings are incorrect.

If this operation has been performed correctly, the opening or closing of the A.F.C. contacts on the side switch by inserting or removing the cardboard, should not change the beat note by more than a slight rumble.

NOTE:- Where a second signal generator is available step #3 above may be varied as follows:

Connect second signal generator (set at about 1000 KC.) to antenna and tune in its signal. Switch off modulation and proceed as before.

This method is somewhat preferable to the first as the zero beat setting is more easily determined when both signals are unmodulated.

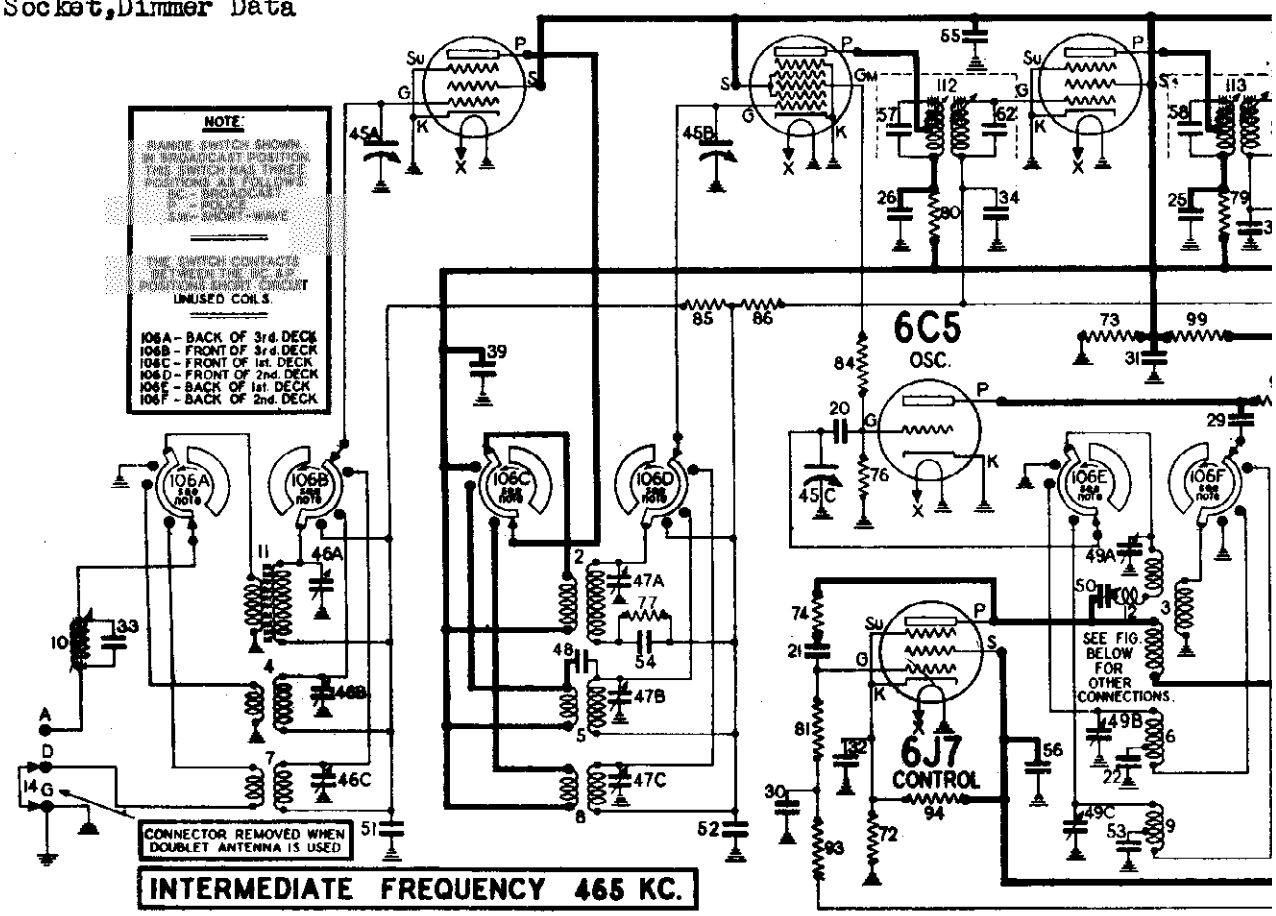


RIGHT END VIEW OF TUNING MECHANISM SHOWING SIDE SWITCH

Chassis R-185B
1851W to 1859W
Chassis R-185W
Schematic, Voltage, Socket, Dimmer Data

STEWART-

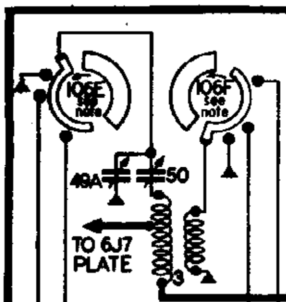
R-185 CHASSIS (RECEIVER MODELS 1851 TO 1859)



INTERMEDIATE FREQUENCY 465 KC.

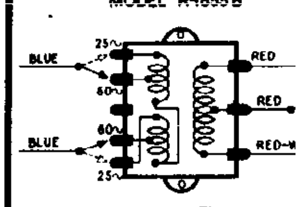
DIAGRAM NUMBER	DESCRIPTION	LIST PRICE
1	111330--Choke - filter (for model R-185-A and R-185-B)	$1.50
	112330--Choke - filter (model R-185-W only)	1.50
2	111056--Coil - R. F. (broadcast)	1.25
3	111057--Coil - oscillator (broadcast)	1.05
4	111058--Coil - antenna (police)	.60
5	111059--Coil - R. F. (police)	1.00
6	111060--Coil - oscillator (police)	1.00
7	111062--Coil - antenna (short wave)	.90
8	111063--Coil - R. F. (short wave)	.90
9	111064--Coil - oscillator (short wave)	.85
10	111079--Coil - wave trap	1.20
11	111103--Coil - antenna (broadcast)	1.82
12	111488--Coil - compensating inductance	.38
13	112103--Coil - reactance dimmer (60 cycle only)	2.50
	112204--Coil - reactance dimmer (25 to 60 cycle) for model R-185-B only)	3.25
	112328--Coil - reactance dimmer (for model R-185-W only)	2.70
14	85321--Connector - ground	.01
15-16-17-18	85783--Condenser - mica, 110 mmf.	.20
19	83976--Condenser - shielded .012 mfd. 1000 volt	.40
20	85061--Condenser - mica, 51 mmfd.	.15
21	85394--Condenser - mica, 510 mmf.	.25
22	85467--Condenser - mica, 1370 mmfd. (3%)	.30
23	88028--Condenser - paper .02 mfd. 400 volt	.25
24	88029--Condenser - paper .004 mfd. 400 volt	.25
25-26-27 28-29	88030--Condenser - paper .01 mfd. 400 volt	.25
30	88046--Condenser - paper .1 mfd. 150 volt	.25
31	88191--Condenser - paper .1 mfd. 300 volt	.25
32	88193--Condenser - paper .25 mfd. 150 volt	.35
33	88205--Condenser - mica, 2100 mmfd.	.35
34-35	88534--Condenser - paper .05 mfd. 150 volt	.25
36-37	88680--Condenser - electrolytic 8 mfd. 450 volt	.95
38-39-40	88682--Condenser - paper .1 mfd. 400 volt	.25
41	[illegible] volt	1.60
42-43	110377--Condenser - electrolytic 10 mfd. 25 volt	.60
	112113--Condenser - elec. 10 mfd. 50 volt (for model 185-W only)	.65
45A to 45C	111073--Condenser - variable gang	6.25
46A to 46C 47A to 47C	111078--Condenser - trimmer (3 section) for R.F. or antenna (all bands)	.75
48	111080--Condenser - 3 mmfd. (wire)	.10
49A to 49C	111089--Condenser - trimmer (3 section) for oscillator (all bands)	.75
50	111115--Condenser - pad (single section)	.83
51-52	111117--Condenser - low loss .05 mfd. 150 volt	.35
53	111122--Condenser - mica, 3580 mmfd. (3%)	.48
54	111123--Condenser - mica, 7750 mmfd. (5%)	.85
55-56	111298--Condenser - electrolytic 4 mfd. 200 volt	.75
	112457--Condenser - electrolytic 4 mfd. 200 volt (used on model R-185-W only)	.80
57-58	111342--Condenser - mica, 200 mmfd. (5%)	.18
59	111346--Condenser - mica, 2000 mmfd. 1000 volt	.22
60A - 60B	111384--Condenser - shielded (Section A - .02 mfd. - 600 volt) (Section B - .03 mfd. - 600 volt)	.85
61A - 61B	111466--Condenser - elect. Dual 10 mfd. 25 volt	.65
62-63-64-65	111575--Condenser - mica, 220 mmfd. (5%)	.20
66-67-68-69	110629--Lamp - 6.3 V. .25 amps.	.15
70	110911--Lamp - dimmer reactor 2.5 volt .5 amp.	.15
71	111380--Motor - 6 volt - 60 cycles	4.40
	112354--Motor - 6 volt - 25 to 60 cycles	6.50
72	88450--Resistor - wire wound 150 ohm 1/2 watt	.12
73	110551--Resistor - carbon 15,000 ohm 1 watt	.15
74-75-76	110552--Resistor - carbon 47,000 ohm 1/4 watt	.12
77	110553--Resistor - carbon 220,000 ohm 1/4 watt	.12
78	110554--Resistor - carbon 1 megohm 1/4 watt	.12
79-80	110557--Resistor - carbon 4,700 ohm 1/4 watt	.12
81-82-83	110559--Resistor - carbon 470,000 ohm 1/4 watt	.12
84	110560--Resistor - carbon 100 ohm 1/4 watt	.12
85-86-87-88	110564--Resistor - carbon 100,000 ohm 1/4 watt (20%)	.12
89	110565--Resistor - carbon 22,000 ohm 1/4 watt	.12
90	110573--Resistor - carbon 2,200 ohm 1/4 watt	.12
91	110577--Resistor - carbon 3,300 ohm 1/4 watt	.12
92	110578--Resistor - carbon 68,000 ohm 1/4 watt	.12
93	110580--Resistor - carbon 3.3 megohm 1/4 watt	.12
94	110582--Resistor - carbon 12,000 ohm 1 watt	.15
95	110583--Resistor - carbon 4,700 ohm 1/2 watt	.12
96	110592--Resistor - carbon 22,000 ohm 1 watt	.12
97	110593--Resistor - carbon 18,000 ohm 3 watt	.20
98	110594--Resistor - carbon 390,000 ohm 1/4 watt	.12
99	110595--Resistor - carbon 12,000 ohm 3 watt	.20
100A - 100B	111358--Resistor - volume control (1 meg.) (with off-on switch)	1.40
101	111515--Resistor - wire wound 27 ohm 1/2 watt (5%)	.12
102	111638--Resistor - wire wound 200 ohm 2 watt (5%)	.18
	111111--R.F. unit - coils, range switch, gang and trimmers complete	25.00
103	R-282--Speaker - dynamic 12 inch	8.75
104	111490--Cone - voice coil assem. for R-292 Splr.	2.50
105A - 105B	84404--Switch - phono toggle	1.10
106A - 106F	111077--Switch - range	3.30
107	111218--Switch - for reactance dimmer	.28
108	111351--Switch - tone control	.60
109	111674--Switch - multiple contact (above tuning shaft)	.95
110	112564--Switch - at rear	1.25
111	89709--Terminal Strip - phono (for model 185-W only	.15
112	111338--Transformer - 1st I.F.	2.70
113	111675--Transformer - 2nd I.F.	2.00
114	111340--Transformer - I.F. discriminator	2.70
115	111334--Transformer - output (for models R-185-A or R-185-B)	2.50
	112329--Transformer - output (for model R-185-W)	2.75
116	111447--Transformer - power 115 volt - 60 cycle	8.00
	112176--Transformer - power 115 volt - 25 cycle	11.00
	112300--Transformer - power 100 to 240 volt 50 to 133 cycles	11.00
117	111331--Transformer - impedance coupler (for models R-185-A or R-185-B)	2.10
	112331--Transformer - impedance coupler (for models R-185-W only)	2.35
118	112633--Plug - for mechanism connecting (8 prong)	.20
119	112630--Socket & Bracket - for electrical connections to mechanism	.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



NOTE.
IN SOME SETS THE BROADCAST OSCILLATOR COIL IS WIRED AS SHOWN HERE.

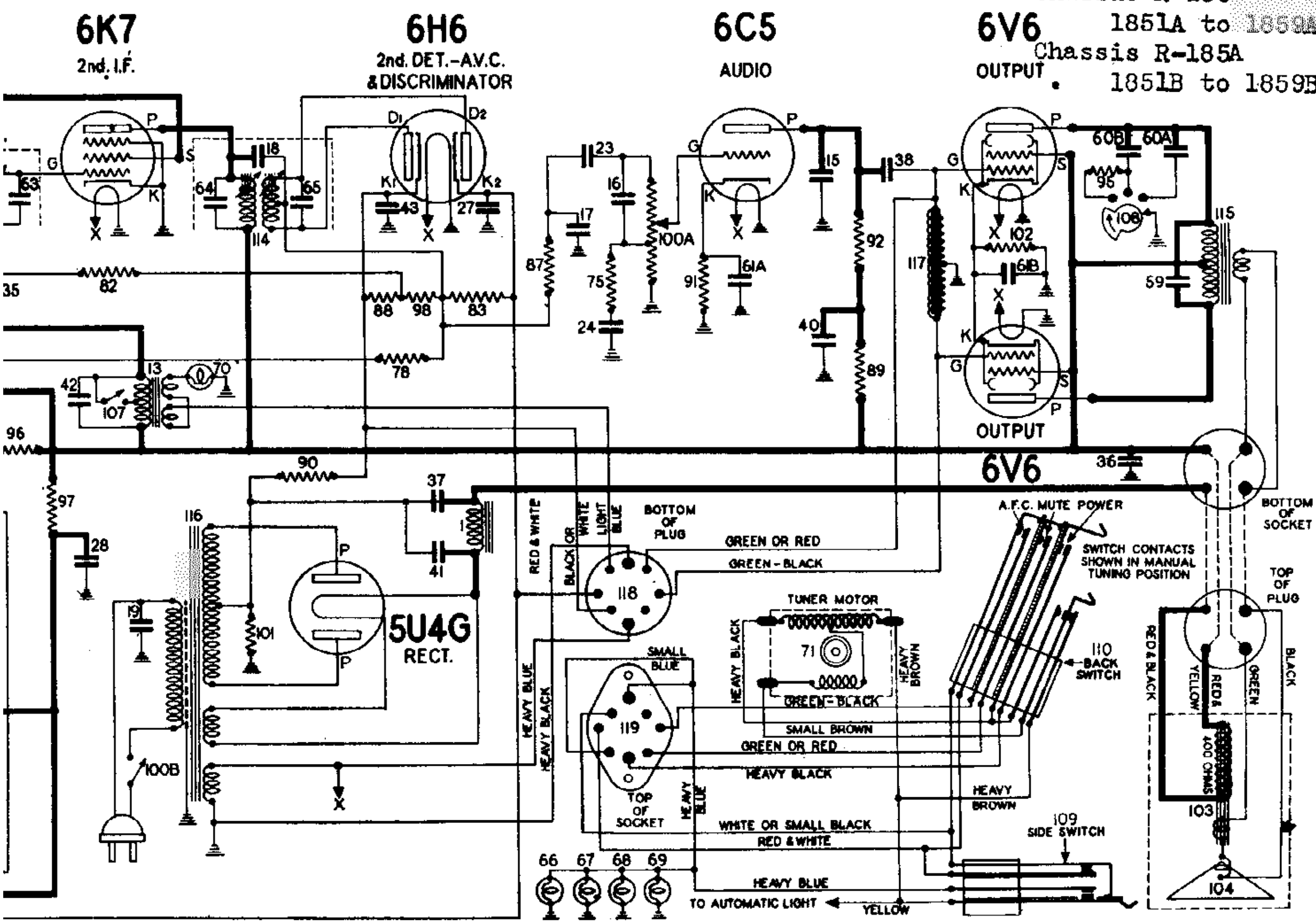
REACTANCE DIMMER CONNECTI
FOR UNIVERSAL 25 to 60 CYC
MODEL R-1855B



TOP VIEW

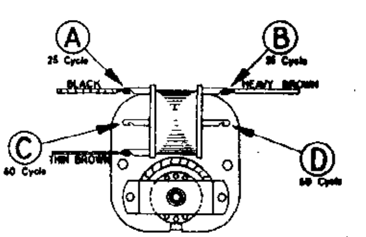
MODELS 1851 to 1859
Chassis R-185
1851A to 1859A
Chassis R-185A
1851B to 1859B

WARNER CORP.

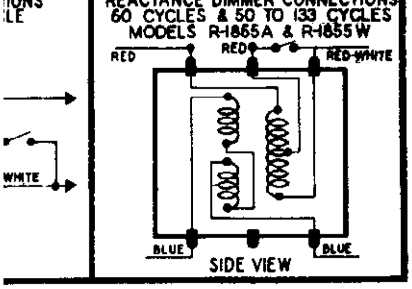


CONNECTIONS FOR UNIVERSAL TUNER MOTOR USED ON 25 TO 80 CYCLE MODELS.

25 to 42 CYCLE OPERATION	42 to 80 CYCLE OPERATION
CONNECT BLACK WIRE TO A AND BROWN WIRE TO B	CONNECT BLACK WIRE TO C AND BROWN WIRE TO D



REACTANCE DIMMER CONNECTIONS 60 CYCLES & 50 TO 133 CYCLES MODELS R-1855A & R-1855W

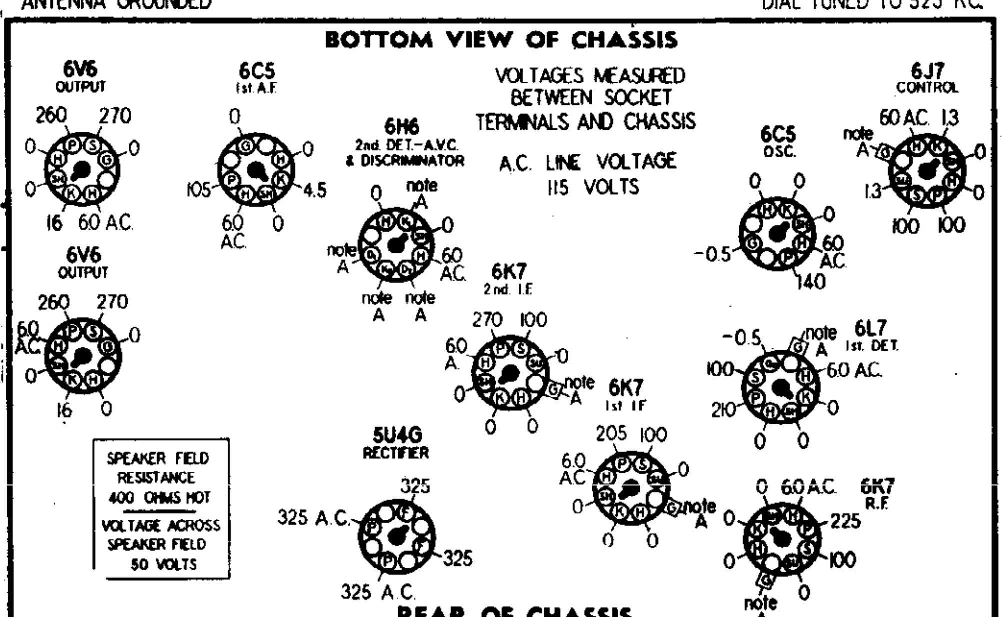


SOCKET VOLTAGES

DECEMBER 1937

ANTENNA GROUNDED

DIAL TUNED TO 525 KC.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7 1st Det., 6K7 R.F., 6K7 1st I.F. and 6K7 2nd I.F. tubes, also the voltage on the 6H6 diodes and cathodes and the control grid of the 6J7, is -3.6 volts measured across resistor number 101.

MODELS 1851 to 1859
1851A to 1859A

STEWART-WARNER CORP.

1851B to 1859B
1851W to 1859W

Trimmers, Phono. Data
"Magic Keyboard" Data
Parts List

TESTING THE A.F.C. SYSTEM.

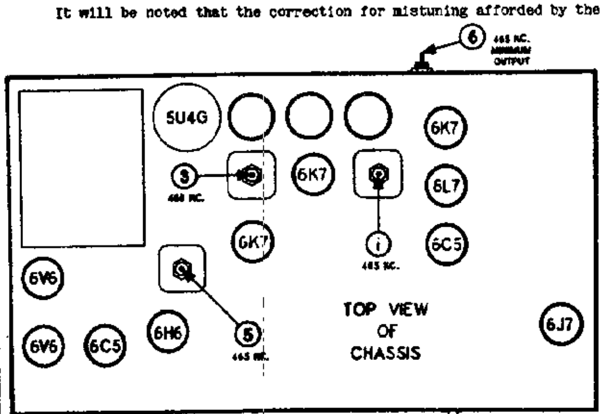
Connect the antenna and tune in a powerful local station. Remove the cardboard that you placed between the A.F.C. contacts on the side switch when aligning. The A.F.C. is now off.

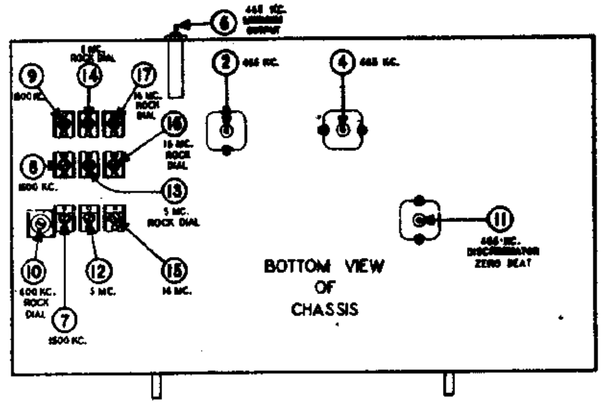
Next, detune the receiver dial until the music or speech becomes somewhat distorted. Now place a piece of smooth cardboard between the A.F.C. contacts on the side switch as shown in the illustration on the bottom of the previous page. This allows A.F.C. to function and it should improve the quality of the program.

Similarly detune the receiver dial in the opposite direction, with the cardboard removed from between the A.F.C. contacts (contacts closed). Then place the cardboard between the contacts again and check for improved quality of reception.

It will be noted that the correction for mistuning afforded by the A.F.C. system is not as marked at stations near the low frequency end of the dial scale as it is at the higher broadcast frequencies. This is characteristic of A.F.C. systems. However, if opening the A.F.C. contacts on the side switch (by inserting the piece of cardboard between the contacts) has no effect on the signal, or if it corrects for mistuning in one direction only, check the receiver as follows:

1. Re-align I.F., broadcast band, and discriminator trimmers.
2. Check all the tubes in the receiver. Defective 6H6 and 6J7 tubes, also the R.F., 1st Detector, and I.F. tubes may cause poor A.F.C. action.
3. If the above procedure fails to remedy the defect in A.F.C. action, check the entire A.F.C. circuit itself for possible troubles.





HOW TO SET-UP THE "MAGIC KEYBOARD"

SELECTING THE PROPER STATIONS: When setting up the "Magic Keyboard" select powerful nearby stations. Avoid weak or fading stations.

LABELLING THE PUSH BUTTONS: Call letter labels are supplied with each set. To label any button remove the cap of the push button, BY PULLING ON THE TOP END. Remove the black cardboard disc, and insert the call letter tab. IN REPLACING THE CAP START AT THE BOTTOM AND PRESS ON THE TOP.

STEP BY STEP PROCEDURE:

1. Connect a good outside aerial to the receiver and allow the receiver to operate for 20 minutes before setting-up.

2. Pull off the large tuning knob. As this knob is removed another small "set-up" knob on the same shaft will appear partly hidden behind the panel face.

3. Pull out this set-up knob AS FAR AS IT WILL GO.

4. Rotate the set-up knob clockwise. After dial pointer reaches the end of the dial scale continue to turn the knob clockwise until you have forced it to a definite stop. This last twist unlocks the cams.

5. Push any button you wish to set to a station. The tuner will operate and carry the pointer to some new point on the dial scale.

6. Tune the receiver to the desired station with the metal set-up knob. TUNE CAREFULLY AND WATCH THE "REACTANCE DIMMER" FOR THE POINT OF MINIMUM ILLUMINATION SO THAT THE RECEIVER WILL BE CORRECTLY TUNED TO THE STATION.

7. Push in the next button you want to set up for a station. This automatically completes the setting up of the previous station, and causes its button to pop out. Do not push in any buttons that are already set up and which you do not wish to change, since pushing a button with the cams unlocked will shift its setting.

8. Tune in the station for the button that is now depressed.

9. Set-up other buttons as desired in the same manner, that is, push in the button, tune in the station, then push in the next button.

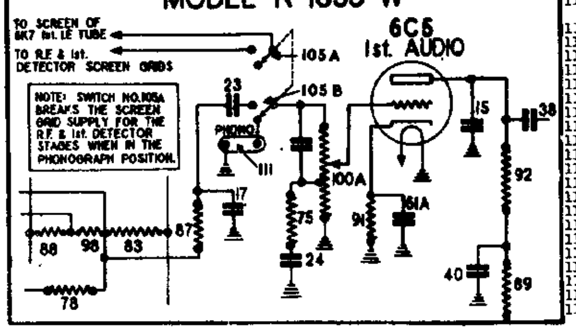
10. To release the last button grasp the set-up knob on the station selector shaft and push it in until the last button is released. Then pull the knob out again.

11. Turn the set-up knob to the LEFT (Counter-clockwise). CONTINUE TO TURN THE KNOB TO THE LEFT even after the pointer reaches the end of the dial scale. FORCE THE KNOB COUNTER-CLOCKWISE TO A DEFINITE STOP.

12. Push the "set-up" knob back into the cabinet again and replace the large tuning knob.

13. Your "Magic Keyboard" is now ready for operation.

PHONOGRAPH CONNECTIONS FOR MODEL R-1855-W



DIAL DRIVE & MISCELLANEOUS PARTS.

FOR A COMPLETE PARTS LIST SEE THE SPECIAL "MAGIC KEYBOARD"

Wherever the word RIGHT or LEFT appears in the following list, it is understood that you are standing in front of the receiver.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

PART NUMBER	DESCRIPTION	LIST PRICE
111930	Band Indicator - and frame assembly	$ .40
112858	Belt - for range switch drive	.06
111261	Bolt - chassis mtg. (#14 X 1-1/4)	.03
111260	Bushing - rubber (for chassis mtg.)	.06
111892	Bushing - hard rubber, mystic mechanism mtg. to chassis	.02
111858	Clip - for pulley retaining	.01
110782	Cord - for band ind. (2 ft. required) Per Ft.	.04
111302	Cord - dial drive (6 ft. lengths)	.30
111226	Escutcheon - for dial (with glass)	3.00
111227	Escutcheon - around push button opening	1.20
111865	Frame - dial, with scale	2.50
111496	Knob - tuning or volume	.20
111497	Knob - range or tone	.20
111197	Lever - for band indicator (on shaft)	.12
111370	Link & Lever - for range sw. drive (used in early production)	.20
112633	Plug - for mechanism connecting (6 prong)	.20
110496	Plug - speaker (4 prong)	.12
111659	Pointer - for dial, with slider	.18
111622	Pulley - dial cord drive	.35
111630	Pulley & Bracket - for band indicator	.10
112628	Pulley - on range switch shaft under chassis	.20
84214	Retaining Ring - for dial drum shafts	.02
89637	Retaining Spring - for retaining escut. to cabinet	.01
111228	Scale - dial	1.20
110716	Screw - band indicator pivot	.03
111116	Screw - #5 X 5/8, mystic mechanism mtg.	.02
85827	Set Screw - 8/32 square head	.08
111403	Set Screw - 8/32, fluted head	.12
112138	Set Screw - 8/32 slotted head	.03
111373	Shaft - for range switch	.08
85427	Socket - octal base	.15
110501	Socket - 4 prong (for spkr.)	.16
110627	Socket - dial lamp & automatic lamp	.12
111008	Socket - reactance dimmer lamp	.12
112630	Socket & Bracket - for elect. conn. to mech.	.75
111232	Spring - torsion for band indicator	.05
111862	Spring - drive cord tension	.03
112490	Spring - in flexible coupler	.02
111676	Stud - lower left idler pulley	.10
112667	Stud - for pulley mtg. (for top pulleys)	.10
112005	Tabs - station call letters (6 sheets)	.60
85066	Terminal Strip - G.D.A.	.20
89709	Terminal Strip - Phono.	.15
87568	Washer - embossed (for mtg. electrolytic cond.)	.05
89746	Washer - (paper) for back of knobs	.005
89027	Washers - spring for range shaft	.01
111262	Washer - flat steel mtg. (15/16" O.D.)	.02

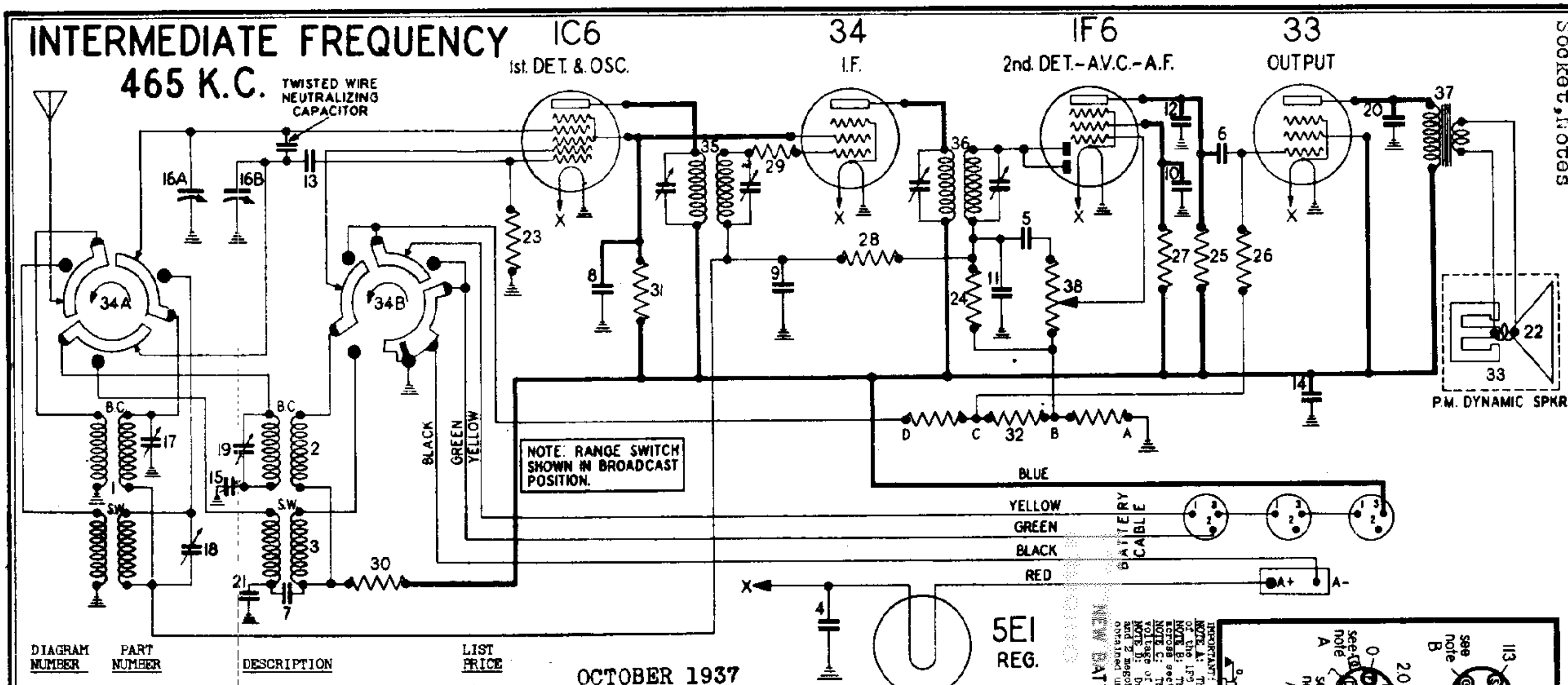
"MAGIC KEYBOARD" PARTS LIST

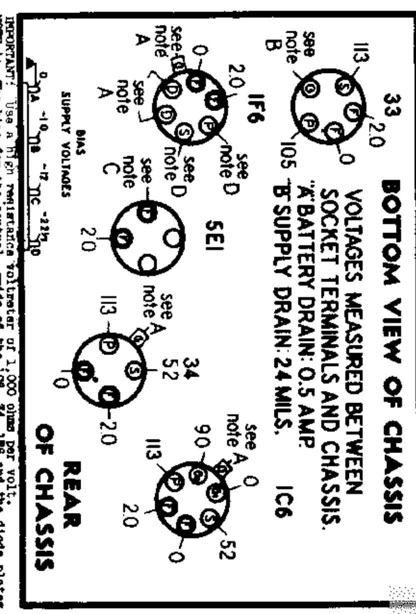
FOR A COMPLETE PARTS LIST SEE THE SPECIAL "MAGIC KEYBOARD"

PART NUMBER	DESCRIPTION	LIST PRICE
112727	Mystic Mechanism - complete with all dials - ready to mount on chassis	$60.00
111350	Mystic Mechanism only, less dial frame assembly	35.00
112428	Button Body - for tuner	.10
112545	Button Cap - for push button	.06
111878	Button Window - celluloid for push button	.01
112547	Button Reinforcing Disc - for push button	.01
111633	Button Retaining Spring - inside push button	.02
111577	Button Spring - in push button	.005
111576	Button Washer - in push button	.005
112563	Cam - bakelite - less operating arm	.10
111148	Clutch - bushing, spring and gear	.55
111137	Drive Ring - rubber	.05
111380	Motor - 6 volt 60 cycles	4.40
112354	Motor - 6 volt, 25 to 60 cycles	5.50
112738	Plug - with cable for tuner connections	.75
111138	Spring - horseshoe shaped on clutch	.02
111674	Switch Side - multiple contact (above tuning shaft)	.95
112564	Switch Back - (multiple contact)	1.25
112521	Tip - adjustable for key stop and kickout arm	.06
112483	Wrench - for fluted hd. set screws #6	.07
112484	Wrench - for fluted hd. set screws #8	.07
117468	Spring Benders	.75

Schematic, Voltage
Socket, Notes

STEWART-WARNER CORP.





IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE A: The bias for the control grids of the 1C6, 34, 1F6 and the diode plates of the 1F6 is -1.0 volt measured across section AB of resistor number 32.
NOTE B: The bias for the control grid of the 33 output tube is -12 volts measured across section AC of resistor number 32.
NOTE C: This voltage will vary between 2 and 3 volts depending upon the terminal voltage of the A battery.
NOTE D: Due to the high resistance in these circuits (1/2 megohm in the plate and 2 megohms in the screen) only a slight deflection of the voltmeter will be obtained unless a vacuum tube voltmeter is used.

NEW BATTERIES DIAL TUNED TO 540 KC.

SOCKET VOLTAGES

OCTOBER 1937

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	112207	Coil - antenna, broadcast & S.W.	$.95
2	112208	Coil - oscillator, broadcast	.95
3	112209	Coil - oscillator, S.W.	.95
4	83429	Condenser - paper .5 mfd. 300 volt	.55
5-6-7	83437	Condenser - paper .05 mfd. 200 volt	.30
8-9	83974	Condenser - paper .1 mfd. 200 volt	.25
10	88030	Condenser - paper .01 mfd. 200 volt	.25
11	81155	Condenser - mica 500 mmf.	.25
12	81157	Condenser - mica 250 mmfd.	.30
13	88173	Condenser - mica 50 mmf.	.20
14	89962	Condenser - paper .2 mfd. 200 volt	.23
15	112048	Condenser - padding (300-800 mmfd.)	.60
16A-16B	112212	Condenser - variable gang	4.00
17-18-19	112213	Condenser - trimmer (3-45 mmfd.)	.25
20	112214	Condenser - paper .003 mfd. 400 volt	.25
21	112215	Condenser - mica .0045 mfd.	.50
22	112221	Cone - voice coil assem. for 6" spkr.	1.90
	112222	Cone - voice coil assem. for 8" spkr.	2.05
23	66022	Resistor - carbon 50,000 ohms 1 watt	.18
24-25-26	67262	Resistor - carbon 1/2 meg. 1/4 watt	$.12
27	67302	Resistor - carbon 2 meg. 1/2 watt	.25
28	67939	Resistor - carbon 1 meg. 1/2 watt	.25
29	81727	Resistor - carbon 1,000 ohms 1/4 w.	.20
30	83285	Resistor - carbon 10,000 ohms 1/2 w.	.25
31	112051	Resistor - carbon 15,000 ohms 1/3 w.	.15
32	112216	Resistor - wire wound (Sect. AB - 130 ohms; Sect. BC - 1540 ohms; Sect. CD - 1330 ohms)	.75
33	112217	Speaker - P.M. Dynamic, 6 inch (1901)	7.50
	112218	Speaker - P.M. Dynamic, 8 inch (1906)	9.00
34A-34B	112219	Switch - range	1.35
35	112210	Transformer - 1st I.F.	2.00
36	112211	Transformer - 2nd I.F.	2.00
37	112223	Transformer - output (for 6" spkr.)	1.60
	112569	Transformer - output (for 8" spkr.)	2.00
38	112220	Volume control - 1/2 meg.	.95

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

R-190-D CHASSIS MODELS 1901 to 1909

CIRCUIT DESCRIPTION

The Model R-190-D chassis is a five tube battery receiver using "A" and "B" batteries. The standard superheterodyne circuit which this receiver employs includes automatic volume control and a class A single pentode output system. The tuning range covers the standard broadcast range from 540 to 1720 KC. and the popular short wave bands from 5.7 to 18.3 MC. Automatic volume control is accomplished by supplying the filtered A.V.C. voltage to the control grids of both the 1C6 and 34 tubes.

An unusual arrangement of a combined off-on switch and range switch is also utilized in the circuit of this receiver. The action of this switch is as follows: 1. In the extreme counter-clockwise position the receiver is turned off with both the "A" and "B" supply circuits open. 2. With the switch in the middle position the "A" and "B" supplies are connected and the antenna and oscillator coils for the broadcast band are now in circuit to permit tuning on that band. 3. In the extreme clockwise position the receiver will

MODELS 1901 to 1909
Chassis R-190D
Alignment, Trimmers
Battery Connections

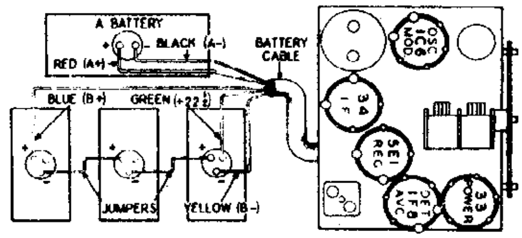
STEWART-WARNER CORP.

POWER SUPPLY & BATTERY CONNECTIONS

The power supply of this receiver consists of three "B" batteries and one "A" battery. No "C" battery is needed as the first 22-1/2 volts of the "B" battery supply serves as a "C" battery. Proper intermediate bias voltages are secured from the tapped candohm resistor number 32

The +22-1/2 volt tap on the "B" battery is the negative connection for the plate supply and it is connected to "A-" and ground. This allows a maximum plate supply voltage of 113-1/2 volts with fresh batteries.

The "A" supply may be a 2-1/2 volt Air Cell, a 3 volt dry battery, or a 2 volt storage battery since the filaments of all tubes in the receiver are supplied through a type 5E1 voltage regulator tube. The purpose of this tube is to maintain a safe filament voltage with battery voltages ranging from 2 to 3 volts. The voltage drop across the tube will decrease as the battery voltage decreases thus maintaining nearly a constant filament potential.



If a 2 volt storage cell is to be used and the tubes in the receiver are not new it is desirable to remove the 5E1 voltage regulator tube and replace it by a plug which merely shorts out the two large terminals of the 5E1 tube socket. This plug may be made up by removing the base of an old 4 prong tube and connecting the two large pins together with a piece of wire. BE CAREFUL NOT TO CONNECT ANYTHING TO EITHER OF THE SMALL PINS OR THE OTHER TUBES MAY BE BURNED OUT.

In order to simplify connections to the batteries, plugs are provided and the method of connection to the batteries is shown in the diagram on the right.

ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 16 MC. are required.

① Connect the output meter across the voice coil or between the plate of the 33 tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

② Connect the ground lead of the signal generator to the chassis of the receiver.

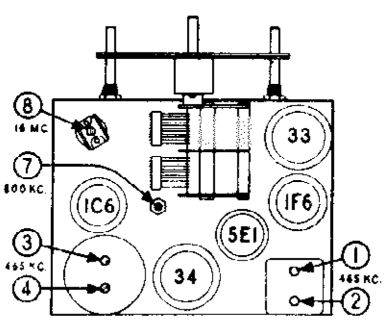
③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

④ With the gang condenser in full mesh set the pointer on the horizontal black line below 540 KC. on the dial.

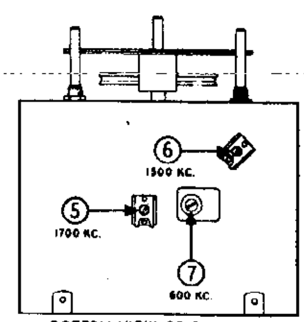
⑤ Using a bakelite screw driver proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 34 TUBE (Do not remove grid clip)	465 KC.	BROADCAST (Center Position)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 2	2ND. I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	DITTO	CONTROL GRID OF 1C6 TUBE (Do not remove grid clip)	DITTO	DITTO	DITTO	3 4	1ST. I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2. SEE NOTE A BELOW.
C	400 OHM CARBON RESISTOR	ANTENNA LEAD	1700 KC.	DITTO	1700 KC.	5	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
D	DITTO	DITTO	1500 KC.	DITTO	TUNE TO 1500 KC. GENERATOR SIGNAL	6	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
E	DITTO	DITTO	600 KC.	DITTO	TUNE TO 600 KC. GENERATOR SIGNAL	7	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
F	DITTO	DITTO	16 MC.	SHORT-WAVE (Clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	8	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

NOTE A: Now repeat adjustment of trimmers 3 and 4 again for greater sensitivity. This may cause oscillation. If oscillation occurs repeat steps A and B and disregard the adjustment mentioned in this note, i.e., after adjusting 1 and 2, do not repeat adjustment of 3 and 4. Important: Please note that in repeating step A, the signal generator must be connected to the 34 control grid. In step B, the connection is to the 1C6 grid.



TOP VIEW OF CHASSIS



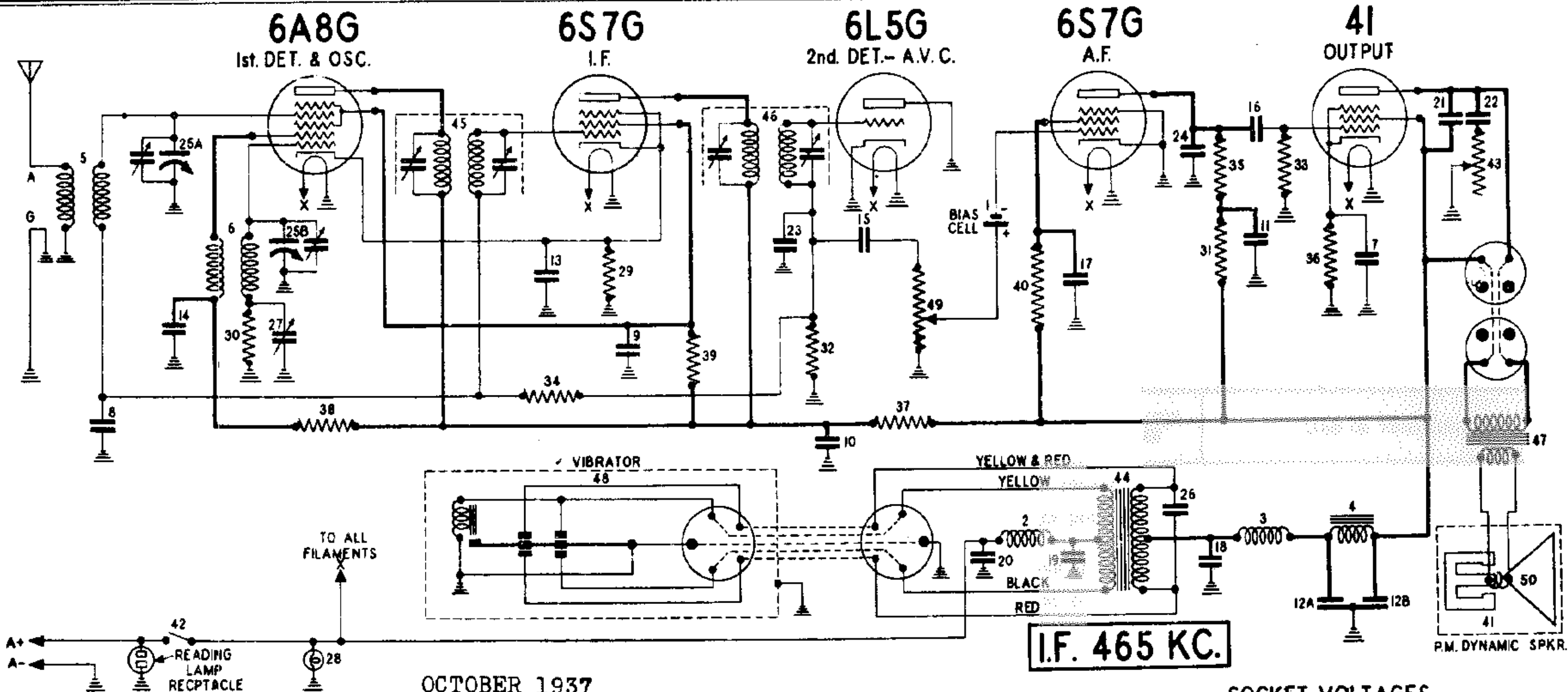
BOTTOM VIEW OF CHASSIS

DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
112206	Cable - battery (with plugs)	$ .90
112224	Dial - complete assembly	2.70
112067	Escutcheon - with window	1.75
112226	Knob - tuning	.25
112227	Knob - volume and range switch	.25
112228	Plug - "B" battery (3 prong)	.15
112229	Plug - "A" battery (2 prong)	.12
112230	Pointer - dial	.35
112225	Scale - dial	1.00

Schematic, Voltage Socket

STEWART-WARNER CORP.



OCTOBER 1937

MODELS 1911 to 1919

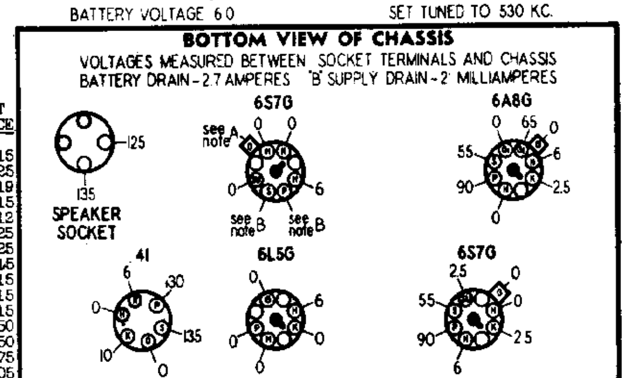
R-191-D CHASSIS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	89849	Cell - bias (1.25 volt)	$ .22
2	112041	Choke - R.F. ("A" supply)	.60
3	112042	Choke - R.F. ("B" supply)	.50
4	112043	Choke - filter	1.40
5	112044	Coil - antenna	1.00
6	112045	Coil - oscillator	1.00
7	89053	Condenser - electrolytic 10 mfd. 25 volt	.92
8-9 10-11	83974	Condenser - paper .1 mfd. 200 volt	.25
12A-12B	110804	Condenser - electrolytic (Sect. A 8 mfd. 200 volt) (Sect. B 8 mfd. 200 volt)	1.60
13	89962	Condenser - paper .2 mfd. 200 volt	.23
14-15-16	83437	Condenser - paper .05 mfd. 200 volt	.30
17	88030	Condenser - paper .01 mfd. 400 volt	.25
18	84200	Condenser - mica .004 mfd.	.50
19-20	83429	Condenser - paper .5 mfd. 300 volt	.55
21	83436	Condenser - paper .002 mfd. 800 volt	.25
22	84850	Condenser - paper .03 mfd. 600 volt	.25
23	81157	Condenser - mica 250 mmfd.	.30
24	81158	Condenser - mica 100 mmf.	.25
25A-25B	112046	Condenser - variable gang	4.00
26	112047	Condenser - buffer .03 mfd. 800 volt	.25
27	112048	Condenser - padding (300-600 mmf.)	.60

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
28	84058	Lamp - pilot 6.3 volt .2 amp.	$ .15
29	67981	Resistor - carbon 400 ohm 1/4 watt	.25
30	89959	Resistor - carbon 50,000 ohm 1/4 watt	.19
31	67260	Resistor - carbon 100,000 ohm 1/4 watt	.15
32-33	67262	Resistor - carbon 1/2 meg. 1/4 watt	.12
34	67939	Resistor - carbon 1 megohm 1/2 watt	.25
35	67851	Resistor - carbon 400,000 ohm 1/4 watt	.25
36	112049	Resistor - carbon 750 ohm 1/3 watt	.15
37	112050	Resistor - carbon 6,000 ohm 1/2 watt	.15
38-39	112051	Resistor - carbon 15,000 ohm 1/3 watt	.15
40	112052	Resistor - carbon 4 megohm 1/3 watt	.15
41	112053	Speaker - P.M. dynamic (6 inch) R-1911-D	8.50
	112054	Speaker - P.M. dynamic (8 inch) R-1915-D	9.50
42	112055	Switch - on-off (S.P.S.T.)	.75
43	112056	Tone control - 50,000 ohms	1.05
44	112057	Transformer - power	3.50
45	112058	Transformer - 1st I.F.	2.00
46	112059	Transformer - 2nd I.F.	2.00
47	112060	Transformer - output for 6 inch spkr.	1.70
	112570	Transformer - output for 8 inch spkr.	2.00
48	111129	Vibrator - synchronous	4.50
49	112061	Volume control - 1/2 megohm	.90
50	112221	Cone - voice coil assem. for 6" spkr.	1.30
	112222	Cone - voice coil assem. for 8" spkr.	2.05

SOCKET VOLTAGES

BATTERY VOLTAGE 6.0 SET TUNED TO 530 KC.



REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6S7-G A.F. tube is 1.0 volt supplied by the bias cell. Due to the high resistance of the cell, the voltmeter will only indicate a fraction of a volt.

NOTE B: Because of the high resistance in the plate and screen circuits of the 6S7-G A.F. tube only a slight deflection of the voltmeter

MODELS 1911 to 1919
Chassis R-191D

STEWART-WARNER CORP.

Alignment, Trimmers
Circuit Data

CIRCUIT DESCRIPTION

The model R-191-D chassis is a six volt battery powered superheterodyne receiver. It has an intermediate frequency of 465 KC. and the tuning range is from 540 to 1720 KC.

The incoming signal picked up by the antenna is induced in the tuned secondary of the antenna coil and impressed on the control grid of the 6A8G first detector and oscillator tube. The oscillator circuit is tuned to a frequency 465 KC. higher than that of the incoming signal, and the resultant 465 KC. output is amplified in the I.F. stage, using a 6S7G tube. The amplified I.F. voltage is impressed on the grid of the 6L5G second detector tube. The plate of the 6L5G tube is grounded and the grid acts as the plate of a linear diode detector and A.V.C. source. The direct current voltage developed across the 1/2 megohm diode load resistor is used as A.V.C. voltage and applied to the control grids of the 6A8G and 6S7G (I.F.) tubes through a resistance capacity filter system. Self bias is obtained across the cathode resistor 29 to maintain bias at all times.

The potentiometer type volume control 49 serves as a continuously variable voltage divider of the audio voltage developed. Any portion of the audio voltage can be applied to the control grid of the 6S7G A.F. tube. It should be noted that the bias for the 6S7G A.F. tube is obtained from a bias cell. The 6S7G A.F. tube is resistance coupled to the 41 power output tube. Grid bias for the output tube is obtained across the cathode resistor 36.

The continuously variable resistor type tone control regulates the high note content of the audio output.

All tube heaters are connected directly to the six volt supply circuit. "B" voltage is supplied by a synchronous full wave vibrator (48). The complete "B" supply, consisting of vibrator, power transformer, chokes and condensers, is housed in a metal shield to eliminate interference. R.F. filter chokes in the power supply input and output circuit prevent interference from getting into the "A" and "B" leads.

ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1800 KC. are required.

1 — Connect the output meter between the plate of the 41 tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

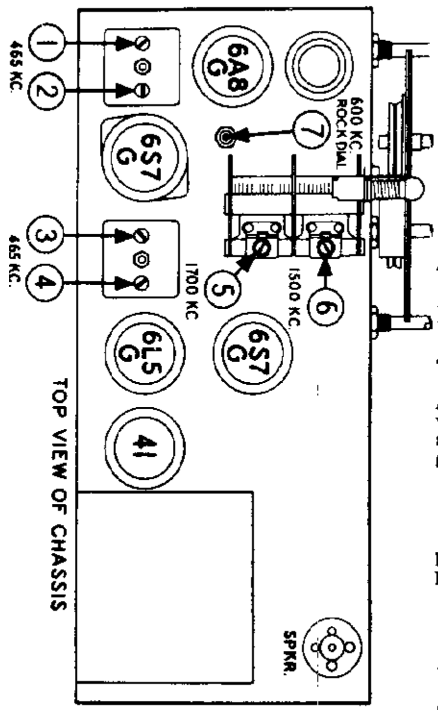
2 — Connect the ground lead of the signal generator to the chassis of the receiver.

3 — Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.

4 — With the gang condenser in full mesh set the pointer on the black horizontal line below 550 KC. on the dial.

5 — Proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	3 4	2ND I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2.
C	250 MMF. CONDENSER	ANTENNA LEAD	1700 KC.	1700 KC.	5	OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
D	250 MMF. CONDENSER	ANTENNA LEAD	1500 KC.	TUNE TO 1500 KC. GENERATOR SIGNAL	6	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
E	250 MMF. CONDENSER	ANTENNA LEAD	600 KC.	TUNE TO 600 KC. GENERATOR SIGNAL	7	OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



TOP VIEW OF CHASSIS

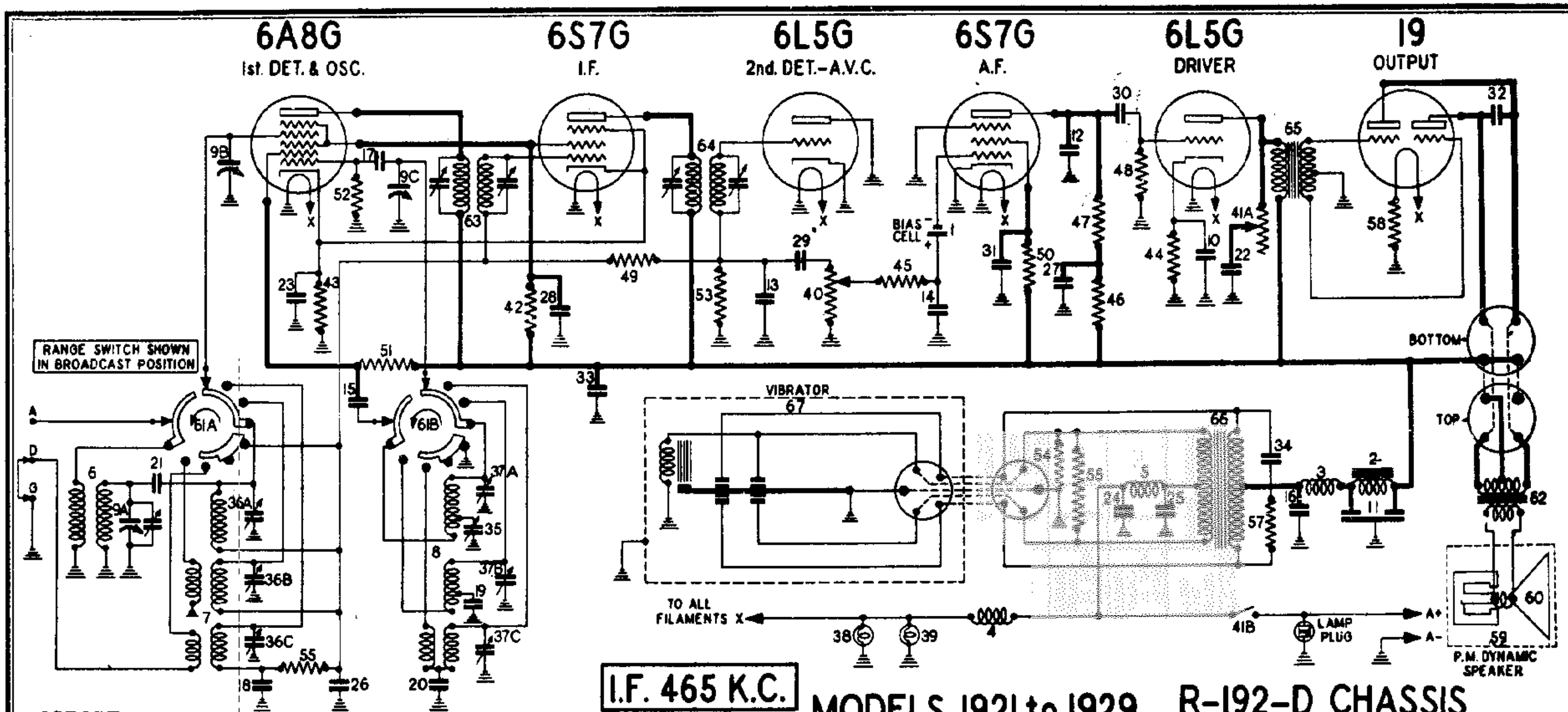
DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
112064	Cable - battery	$1.40
112065	Dial - complete assembly	2.50
112067	Escutcheon - with window	1.75
112068	Knob - all controls	.25
110782	Cord - for dial drive (2 ft.)	.10
112066	Scale - dial (riveted to support)	.80
111357	Spring - drive cord tension	.03
112069	Shield - for vibrator and "B" supply	1.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Schematic, Voltage
Socket

STEWART-WARNER CORP.



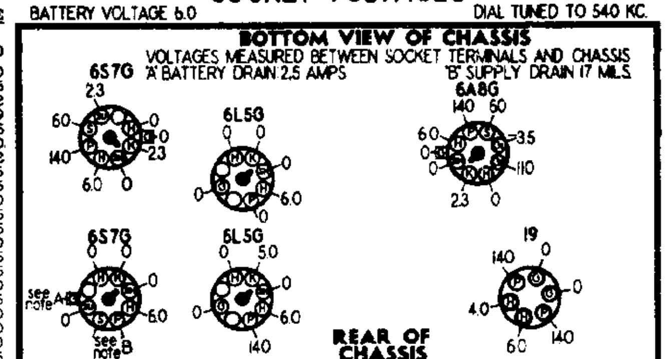
I.F. 465 K.C.

MODELS 1921 to 1929

R-192-D CHASSIS

SOCKET VOLTAGES

BATTERY VOLTAGE 6.0 DIAL TUNED TO 540 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6S7G A.F. tube is -1.0 volt supplied by the bias cell. Due to the high resistance of the cell, the voltmeter will indicate only a fraction of a volt.

NOTE B: Because of the high resistance of the plate and screen circuits of the 6S7G A.F. tube only a ight deflection of the voltmeter will be obtained.

OCTOBER 1937

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	89849	Cell - Bias (1.25 volt)	$ .22
2	112043	Choke - filter	1.40
3	112042	Choke - R.F. ("B" supply)	.50
4-5	112041	Choke - R.F. ("A" supply)	.60
6	112239	Coil - antenna (Broadcast)	1.50
7	112240	Coil - antenna (Police and Short Wave)	1.25
8	112241	Coil - oscillator	1.25
9A-9B-9C	112242	Condenser - gang	5.85
10	110377	Condenser - electrolytic 10 mfd. 25 volt	.80
11	112244	Condenser - elec. dual 8 mfd. 150 volts	1.70
12-13	81157	Condenser - mica 250 mmfd.	.30
14	81158	Condenser - mica 100 mmfd.	.25
15-16	84200	Condenser - mica .004 mfd.	.50
17	88173	Condenser - mica 50 mmfd.	.20
18	112215	Condenser - mica 4500 mmfd.	.50
19	112245	Condenser - mica 1300 mmf.	.35
20	112246	Condenser - mica 2700 mmf.	.35
21	112261	Condenser - mica 4 mmf.	.15
22	84350	Condenser - paper .03 mfd. 800 volt	.25
23	67297	Condenser - paper .25 mfd. 200 volt	.40
24-25	83429	Condenser - paper .5 mfd. 200 volt	.55
26-27-28	63974	Condenser - paper .1 mfd. 200 volt	.25
29-30-31	68030	Condenser - paper .01 mfd. 400 volt	.25
32	83011	Condenser - paper .004 mfd. 400 volt	.30
33	89962	Condenser - paper .2 mfd. 200 volt	.23
34	112047	Condenser - buffer .03 mfd. 800 volt	.25
35	112048	Condenser - padder (200-500 mmfd.)	.60
36A to C, 37A to C	112243	Condenser - trimmer (3 section)	1.70
38-39	83278	Lamp - dial 6.3 volt	.15
40	112255	Resistor - volume control 1/2 megohm	1.05
41A-41B	112253	Resistor - tone control 50,000 ohms (with "on-off" switch)	$1.20
42	84241	Resistor - carbon 31,000 ohms 1/2 watt	.20
43	83293	Resistor - carbon 300 ohms 1/4 watt	.25
44	84236	Resistor - carbon 2500 ohms 1/2 watt	.12
45	89959	Resistor - carbon 50,000 ohms 1/4 watt	.19
46	81361	Resistor - carbon 150,000 ohms 1/2 watt	.25
47	81161	Resistor - 250,000 ohms 1/2 watt	.20
48	67262	Resistor - carbon 1/2 meg. 1/4 watt	.12
49	67939	Resistor - carbon 1 meg. 1/2 watt	.25
50	112052	Resistor - carbon 4 megohm 1/3 watt	.15
51	81152	Resistor - 10,000 ohms 1/4 watt	.20
52	66022	Resistor - carbon 50,000 ohms 1 watt	.25
53	81509	Resistor - carbon 500,000 ohms 1/2 watt	.35
54	84129	Resistor - wire wound 100 ohms 1/2 watt	.20
55	67939	Resistor - carbon 1 megohm 1/2 watt	.25
56	84868	Resistor - wire wound 300 ohms 1/2 watt	.15
57	112550	Resistor - carbon 3,000 ohms 1 watt	.20
58	112248	Resistor - wire wound 15.4 ohms 1 watt	.25
59	112250	Speaker - dynamic 6 inch-Model 1921-D	7.50
	112251	Speaker - dynamic 8 inch-Model 1925-D	8.50
60	112263	Cone - voice coil (6" speaker)	1.90
	112264	Cone - voice coil (8" speaker)	2.05
61A-61B	112252	Switch - range	1.50
62	112262	Transformer - output (6" speaker)	1.70
	112571	Transformer - output (8" speaker)	1.70
63	112058	Transformer - 1st I.F.	2.00
64	112059	Transformer - 2nd I.F.	2.00
65	112254	Transformer - push-pull input	2.00
66	112057	Transformer - power	3.50
67	111126	Vibrator - synchronous	4.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

STEWART-WARNER CORP.

MODEL R-192-D CHASSIS (RECEIVER MODELS 1921 to 1929)

The model R-192-D is a six volt battery powered superheterodyne receiver. The circuit employed includes automatic volume control and a push pull class B output system.

The 6L5G second detector is connected as a diode, the plate being grounded and the control grid acting as a diode plate. "B" voltage is supplied by a synchronous full-wave vibrator.

ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18 MC. are required.

1 — Connect the output meter across the plates of the 19 tube, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

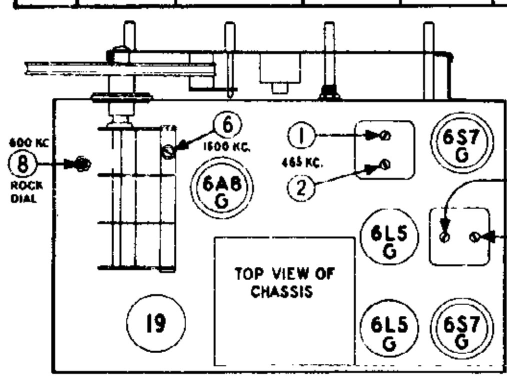
2 — Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.

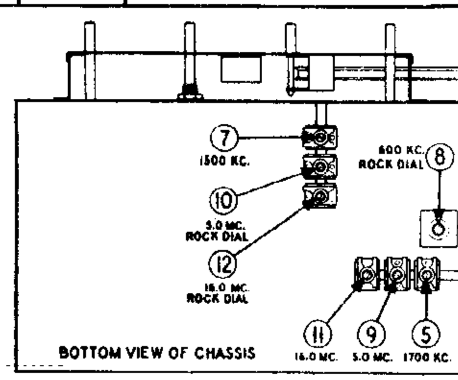
3 — Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.

4 — With the gang condenser in full mesh set the pointer on the black horizontal line below 550 KC. on the dial.

5 — Proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	BROADCAST Clockwise	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	BROADCAST Clockwise	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	3 4	2ND. I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2.
C	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1700 KC.	BROADCAST Clockwise	1700 KC.	5	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
D	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST Clockwise	TUNE TO 1500 KC. GEN.SIG.	6	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
E	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST Clockwise	TUNE TO 1500 KC. GEN.SIG.	7	BROADCAST 1ST DET.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMER 6.
F	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST Clockwise	TUNE TO 600 KC. GENERATOR SIGNAL	8	BROADCAST OSCILLATOR Series Pad	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
G	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	9	POLICE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
H	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	10	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
I	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE Counter-clockwise	16.0 MC.	11	SHORT-WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
J	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE Counter-clockwise	TUNE TO 16 MC. GENERATOR SIGNAL	12	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.





DIAL DRIVE & MISCELLANEOUS PARTS

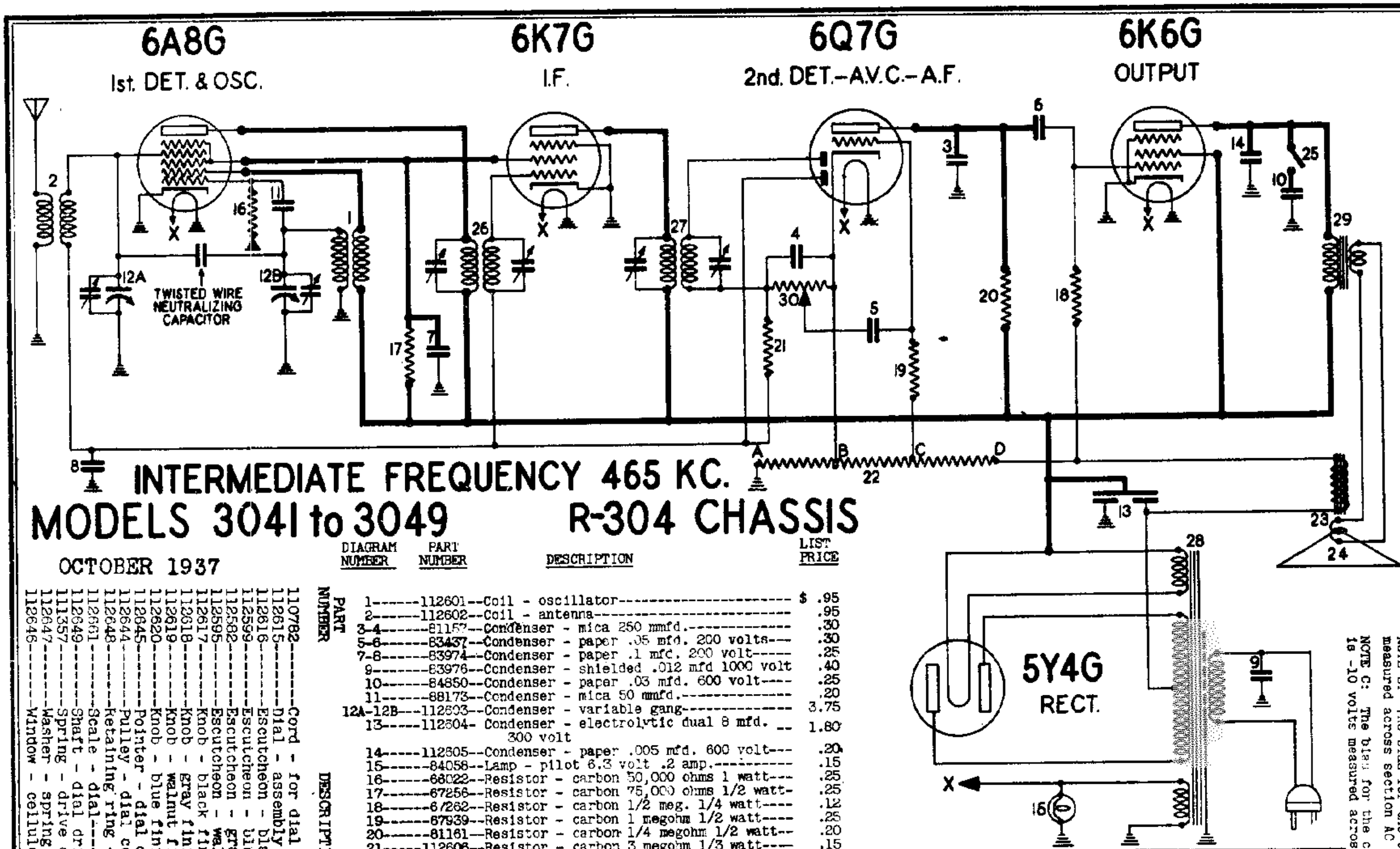
PART NUMBER	DESCRIPTION	LIST PRICE
112651	Arm - for band indicator drive	$ .25
112064	Cable - battery	1.40
110782	Cord - for band indicator (2 ft.)	.10
112257	Dial - complete mechanism	7.50
112259	Escutcheon - with celluloid	2.80
112226	Knob - all controls	.25
112652	Link - for band indicator	.06
89170	Plug - for extension lamp	.15
112260	Pointer - for dial	.30
112653	Retaining ring - for drive shaft	.05

PART NUMBER	DESCRIPTION	LIST PRICE
112258	Scale - dial	$1.50
112654	Shaft - for pointer	.10
112655	Shaft - dial drive	.10
112069	Shield - for vibrator & "B" supply	1.50
89263	Socket - dial lamp	.10
111357	Spring - drive cord tension	.03
112256	Terminal strip - G.D.A.	.35
112657	Pulley - for pointer drive (on pointer shaft)	.30
112656	Drum - & flexible coupler	1.20

Schematic, Voltage Socket

STEWART-WARNER CORP.

The model R-304 chassis is a five tube superheterodyne receiver. It has an intermediate frequency of 465 KC. and a tuning range from 540 to 1720 KC.



INTERMEDIATE FREQUENCY 465 KC.

MODELS 3041 to 3049 R-304 CHASSIS

OCTOBER 1937

SOCKET VOLTAGES

VOLUME CONTROL ON FULL DIAL TUNED TO 540 KC

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8G, 6K7G and the diode plates of the 6Q7G is -2.0 volts measured across section AB of resistor number 22.

NOTE B: The bias for the control grid of the 6Q7G is -3.5 volts measured across section AC of resistor number 22.

NOTE C: The bias for the control grid of the 6K6G output tube is -10 volts measured across section AD of resistor number 22.

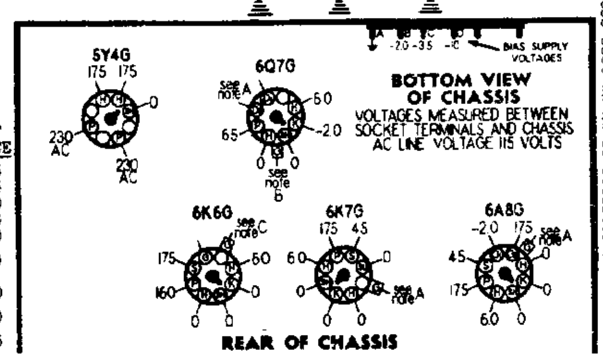


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	112601	Coil - oscillator	$ .95
2	112602	Coil - antenna	.95
3-4	81157	Condenser - mica 250 mmfd.	.30
5-6	83437	Condenser - paper .05 mfd. 200 volts	.30
7-8	83974	Condenser - paper .1 mfd. 200 volt	.25
9	83976	Condenser - shielded .012 mfd 1000 volt	.40
10	84850	Condenser - paper .03 mfd. 600 volt	.25
11	88173	Condenser - mica 50 mmfd.	.20
12A-12B	112603	Condenser - variable gang	3.75
13	112604	Condenser - electrolytic dual 8 mfd. 300 volt	1.80
14	112605	Condenser - paper .005 mfd. 600 volt	.20
15	84058	Lamp - pilot 6.3 volt .2 amp.	.15
16	68022	Resistor - carbon 50,000 ohms 1 watt	.25
17	67256	Resistor - carbon 75,000 ohms 1/2 watt	.25
18	67262	Resistor - carbon 1/2 meg. 1/4 watt	.12
19	67939	Resistor - carbon 1 megohm 1/2 watt	.25
20	81161	Resistor - carbon 1/4 megohm 1/2 watt	.20
21	112606	Resistor - carbon 3 megohm 1/3 watt	.15
22	112607	Resistor - wire wound (Section AB - 63 ohms; Section BC - 43 ohms; Section CD - 217 ohms)	.85

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
23	112608	Speaker - dynamic 5 inch	5.25
24	112659	Cone - and voice coil for 5 inch spkr.	1.25
25	112613	Switch - tone control	.30
26	112058	Transformer - 1st I.F.	2.00
27	112059	Transformer - 2nd I.F.	2.00
28	112609	Transformer - power 115 volt 50-60 cycle	4.00
	112612	Transformer - power 95 to 260 volt 25 to 133 cycle	9.00
29	112660	Transformer - output	1.50
30	112614	Volume control - 500,000 ohms (with off-on switch)	1.25

PART NUMBER	DESCRIPTION	LIST PRICE
110782	Cord - for dial drive (6 ft.)	$ .25
112615	Dial - assembly complete	2.95
112616	Escutcheon - black-(R-3041)	.55
112599	Escutcheon - blue-(R-3044)	.55
112582	Escutcheon - gray-(R-3042)	.55
112595	Escutcheon - walnut-(R-3043)	.55
112617	Knob - black finish-(R-3041)	.20
112618	Knob - gray finish-(R-3042)	.20
112619	Knob - walnut finish-(R-3043)	.20
112620	Knob - blue finish-(R-3044)	.20
112645	Pointer - dial drive	.35
112644	Pulley - dial cord drive	.30
112648	Retaining ring - for drive shaft	.02
112661	Scale - dial	.40
112649	Shaft - dial drive	.35
111357	Spring - drive cord tension	.02
112647	Washer - spring type	.06
112646	Window - celluloid	.45

MODELS 3041 to 3049
Chassis R-304, R-304A

STEWART-WARNER CORP.

Alignment, Trimmers
Drive Cord Data, Notes

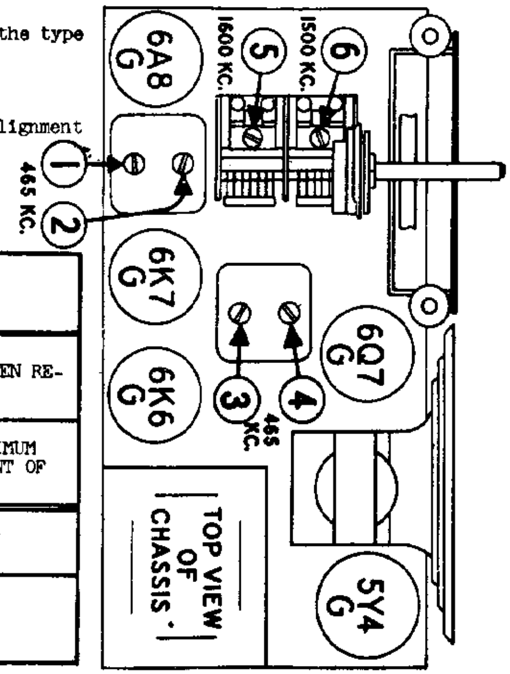
ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1600 KC. are required.

1. Connect the output meter between the plate of the 6K6G tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer to the 540 KC. division on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	3 4	2ND I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2.
C	400 OHM CARBON RESISTOR	ANTENNA LEAD	1600 KC.	1600 KC.	5	OSCILLATOR	ADJUST TO BRING IN SIGNAL. SEE NOTE BELOW TABLE.
D	400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	TUNE TO 1500 KC. GENERATOR SIGNAL	6	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.

NOTE: The oscillator section of the gang is provided with two trimmers connected in parallel, one on the top (No. 5) and one on the bottom. Normally the bottom trimmer will require no adjustment, but if trimmer No. 5 has to be turned too far out or too far in the bottom trimmer should be adjusted until trimmer No. 5 peaks about half way in.

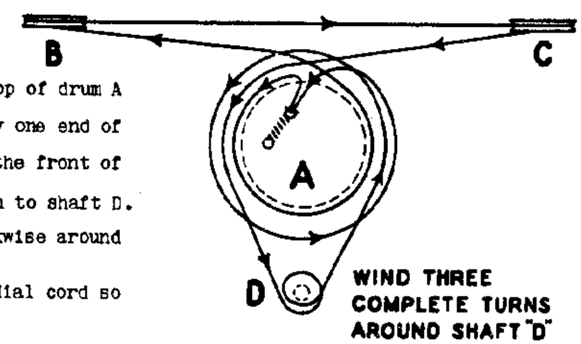


MODELS
3041 to 3049
CHASSIS
R-304,
R-304-A

DIAL CORD INSTALLATION: The dial cord to be used should be approximately 27 inches long.

Open the gang condenser all the way (plates all out) and unclip the tension spring from drum A.

1. Thread both ends of the dial cord through the opening at the top of drum A and tie them to one end of the tension spring.
2. Wind one complete turn counter-clockwise around drum A. (Use only one end of the cord).
3. Run the cord around pulley B from back to front, then across to the front of pulley C.
4. Run the cord around pulley C, over drum A(in back of windings)down to shaft D.
5. Wind three complete turns around shaft D.
6. Run the cord up to drum A and wind one complete turn counter-clockwise around the drum.
7. Fasten the tension spring to the clip inside the drum.
8. With the gang condenser fully closed clip the pointer to the dial cord so that it comes opposite the 540 KC. marking on the dial.



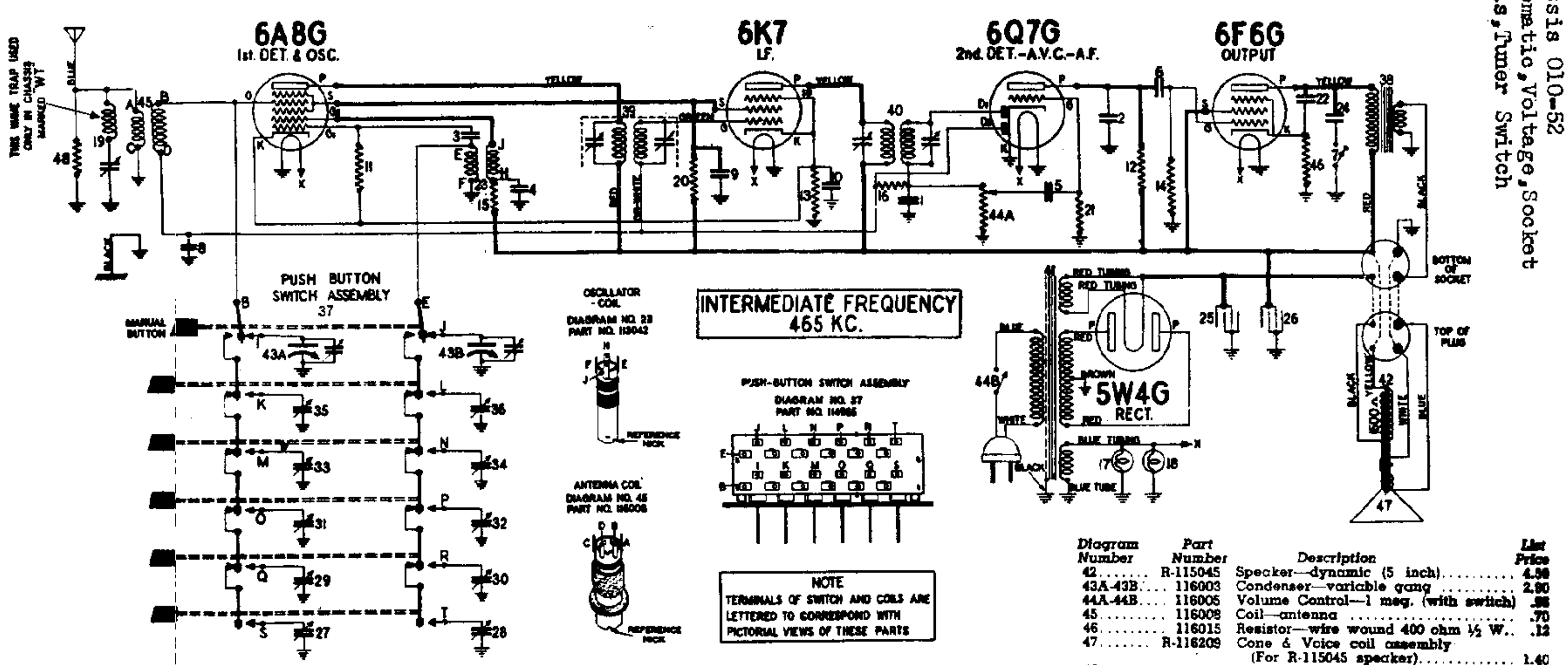
ELIMINATION OF OSCILLATION: Some of the model R-304 receivers may oscillate or "growl" especially when tuned to weak stations or between stations. This oscillation can always be eliminated by connecting a ground to the receiver. However, if the set is to be used without a ground, it can be kept from oscillating by connecting a buffer condenser from one side of the power line to the chassis within the receiver. The condenser should have a capacity of .01 mfd. and a voltage rating of 1000 volts.

Later production receivers are built with such a line buffer condenser to prevent oscillation. Sets using the condenser can be identified by the letter "S" on the back of the chassis also on the packing carton near the serial number.

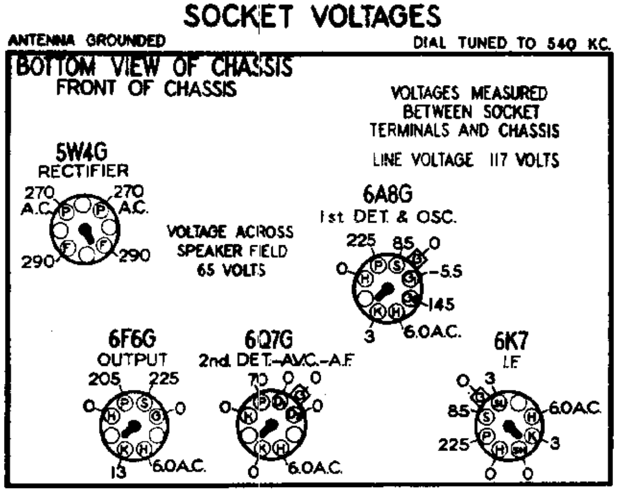
MODELS 01-521 to 01-529
Chassis 01-52

08-521 to 08-529
Chassis 08-52
010-521 to 010-529
Chassis 010-52
Schematic, Voltage, Socket
Coils, Tuner Switch

STEWART-WARNER CORP.



SOCKET VOLTAGES



Use a high resistance voltmeter of at least 1000 ohms per volt.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 250 mmfd.	$0.20
3	85061	Condenser—mica 51 mmfd.	.15
4-5-6	88030	Condenser—paper .01 mfd. 400 volt.	.25
7	88054	Switch—tone control	.30
8	88189	Condenser—paper .05 mfd. 200 volt.	.25
9	88682	Condenser—paper .1 mfd. 400 volt.	.25
10	89532	Condenser—paper .25 mfd. 200 volt.	.32
11	110552	Resistor—carb. 47,000 ohms ¼ watt.	.12
12	110553	Resistor—carb. 220,000 ohms ¼ watt.	.12
13	110556	Resistor—carb. 330 ohms ¼ watt.	.12
14	110559	Resistor—carb. 470,000 ohms ¼ watt.	.12
15	110562	Resistor—carb. 22,000 ohms ½ watt.	.12
16	110580	Resistor—carb. 3.3 meg. ¼ watt.	.12
17-18	110629	Lamp—6.3 volt .25 amp.	.15
19	112796	Wave trap (with trimmer) (Model 01-52 WT only)	.50
20	112960	Resistor—carb. 47,000 ohms ½ watt.	.12
21	112975	Resistor—carb. 10 meg. ¼ watt.	.12
22	113035	Condenser—paper .006 mfd. 600 volt.	.14
23	113042	Coil—oscillator	.45
24	113202	Condenser—paper .02 mfd. 600 volt.	.15
25-26	114258	Condenser—elect. 8 mfd. 450 volts.	.98
27-28-29-30	116501	Push Button Trim. (550 KC to 1000 KC)	.40
31-32-33-34	116502	Push Button Trim. (700 KC to 1400 KC)	.40
35-36	116503	Push Button Trim. (850 KC to 1720 KC)	.40
37	114965	Switch Assembly—for push buttons.	2.85
38	114994	Transformer—output	1.25
39	114996	Transformer—1st I.F.	1.00
40	114997	Transformer—2nd I.F.	.85
41	114999	Transformer—power 117 volt 60 cycle	3.50
42	R-115045	Speaker—dynamic (5 inch)	4.50
43A-43B	116003	Condenser—variable gang	2.80
44A-44B	116005	Volume Control—1 meg. (with switch)	[illegible]
45	116008	Coil—antenna	.70
46	116015	Resistor—wire wound 400 ohm ½ W.	.12
47	R-116209	Cone & Voice coil assembly (For R-115045 speaker)	1.40
48	110569	Resistor—carb. 10,000 ohms ¼ watt.	.12

DIAL & MISCELLANEOUS PARTS

Part No.	Description	List Price
114955	Clamp—for dial cord	$0.01
112745	Clip—for oscillator coil mtg.	.01
112798	Clip—for mtg. wave trap coil	.01
113019	Clip—dial scale retaining	.01
116009	Clip—for antenna coil mtg.	.01
114954	Dial Cord—(19" required) Per Ft.	.03
116006	Dial scale	.22
112233	Drum & Bushing—for dial drive	.35
113146	Escutcheon—for dial	.84
113022	Knobs—for tuning or volume	.10
113138	Mtg. Plate & Bracket for dial	.42
110496	Plug—speaker (4 prong)	.12
114977	Pointer—for dial	.18
113102	Push Button	[illegible]
81145	Retaining ring—for drive shaft Per C	.50
85827	Set Screw—8/32 Square head	.02
112874	Screw—No. 10 x 1⅛ Chassis Mtg.	.01
114914	Screw—Special Head—for mtg. escutcheon Dz.	.15
112945	Shaft—tuning	.10
110501	Socket—4 prong (for speaker)	.16
114876	Socket—octal base	.15
114878	Socket—octal base—with special ground	.15
114980	Socket—for dial lamp	.15
114968	Spring—dial cord tension	.03
113189	Tab—celluloid—for push button Per Dz.	.09
113321	Tabs—station call letters (4 sheets brown) Per Set	.40
116530	Washer—(paper) for back of knobs	.005
110829	Washer—flat steel, for mtg. chassis	.01
111456	Washer—spring washer Per C	.50

MODELS 01-521 to 01-529
08-521 to 08-529
010-521 to 010-529
Alignment, Trimmers, Tuner

STEWART-WARNER CORP.

MODELS 01-531 to 01-539
01-531S to 01-539S
010-531 to 010-539
010-531S to 010-539S
Alignment, Trimmers

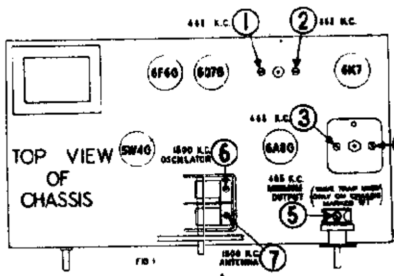
01-52, 08-52 and 010-52 CHASSIS

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil).
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.
5. Push in the "MANUAL" button, and keep it depressed during the entire alignment procedure.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2nd I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	1st I.F.	
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5 USED ONLY ON CHASSIS MARKED "WT"	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.



When setting up buttons, always allow the set to warm up thoroughly so that all parts of the chassis may attain normal operating temperatures. This will minimize frequency drift in the tuned circuits.

Select the most powerful nearby stations for automatic tuning, since weak signals will not give as good results.

Also select stations whose frequencies fall within the range indicated in Fig. 2. It is often possible to set the trimmers to tune in stations falling outside of the indicated frequency ranges, but the trimmers are then too tight or too loose and may not hold their settings.

SETTING UP PUSH BUTTONS

Fig. 2 is a bottom view of the cabinet, showing the station selector trimmer condensers used with the push buttons. The arrows in this diagram indicate the two trimmers for each button.

In setting up a station on any push button, the trimmer marked "a" is the oscillator trimmer and must be adjusted first to tune in the desired station. The trimmer marked "b" is the antenna trimmer, and is to be adjusted until the desired station is heard with the deepest tone.

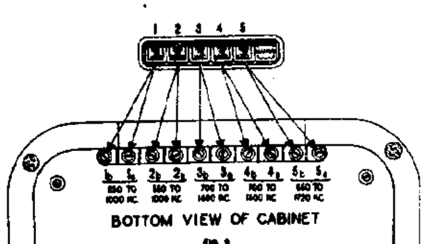


FIG. 2

01-53, 01-53S, 010-53 and 010-53S CHASSIS

ALIGNMENT EQUIPMENT & PROCEDURE

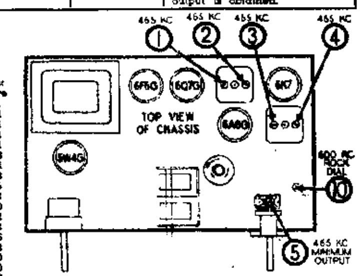
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

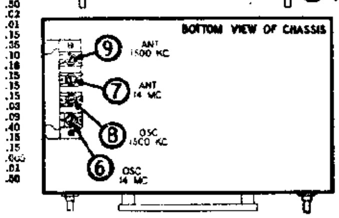
1. Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 6A8-G Tube	465 KC	Broadcast Clockwise	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	465 KC	Broadcast Clockwise	Any Point Where It Does Not Affect The Signal	5	Wave Trap	Adjust for minimum output using a strong generator signal.
400 OHM Carbon Resistor	Antenna Terminal or Antenna Lead	14 MC	Foreign (Counter-Clockwise)	14 MC	6	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 13.1 MC. If image does not appear realign at 14 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Antenna Terminal or Antenna Lead	14 MC	Foreign (Counter-Clockwise)	14 MC	7	Foreign Antenna	Adjust for maximum output. Try to increase output by de-tuning trimmer and returning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	1500 KC	Broadcast Clockwise	1500 KC	8	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	1500 KC	Broadcast Clockwise	Tune To 1500 KC Generator Signal	9	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	600 KC	Broadcast Clockwise	Tune To 600 KC Generator Signal	10	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by de-tuning trimmer and returning receiver dial until maximum output is obtained.

DIAL & MISCELLANEOUS PARTS

Part Number	Description		List Price
114855	Clamp for dial cord		$0.01
112745	Clip—for coil mounting		.01
112788	Clip—for mounting wave trap coil		.01
113019	Clip for dial scale retaining		.01
85321	Connector Link		.01
114854	Dial Cord (19" required)	Per Ft.	.03
114576	Dial scale		.24
116428	Dial Scale (Model 010-538)		.23
112233	Drum & Bushing—for dial drive		.35
113146	Escutcheon for dial		.84
113022	Knob for any control		.10
113138	Mounting Plate & Bracket for dial		.42
110496	Plug speaker (4 prong)		.12
114977	Pointer for dial		.36
113102	Push Button		.08
81145	Retaining Ring for drive shaft	Per C	.50
114148	Rotor for voltage switch on power transformer		.50
85827	Set Screw 8-32 Square Head		.02
112874	Screw—No. 10 x 1⅛ Chassis Mounting		.01
114914	Screw Special head for mounting escutcheon	Per dz.	.15
85040	Screw No. 6 x ¼ S. H. H. S.	Per C	.35
112945	Shaft tuning		.10
110501	Socket 4 prong (for speaker plug)		.16
114876	Socket octal base		.15
114878	Socket octal base (with special ground)		.15
114980	Socket—dial lamp		.15
114968	Spring—dial cord tension		.03
113189	Tab—celluloid (for push button)	Per Dz.	.09
113321	Tabs station call letters (4 sheets)	Per Set	.40
116536	Terminal Strip (G.X.A.) (Model 01-538)		.15
85785	Terminal Strip (G.A.) (Model 010-538)		.15
116530	Washer—paper; behind knob		.005
110829	Washer—flat steel for mounting chassis		.01
111456	Washer—spring washer	Per C	.50

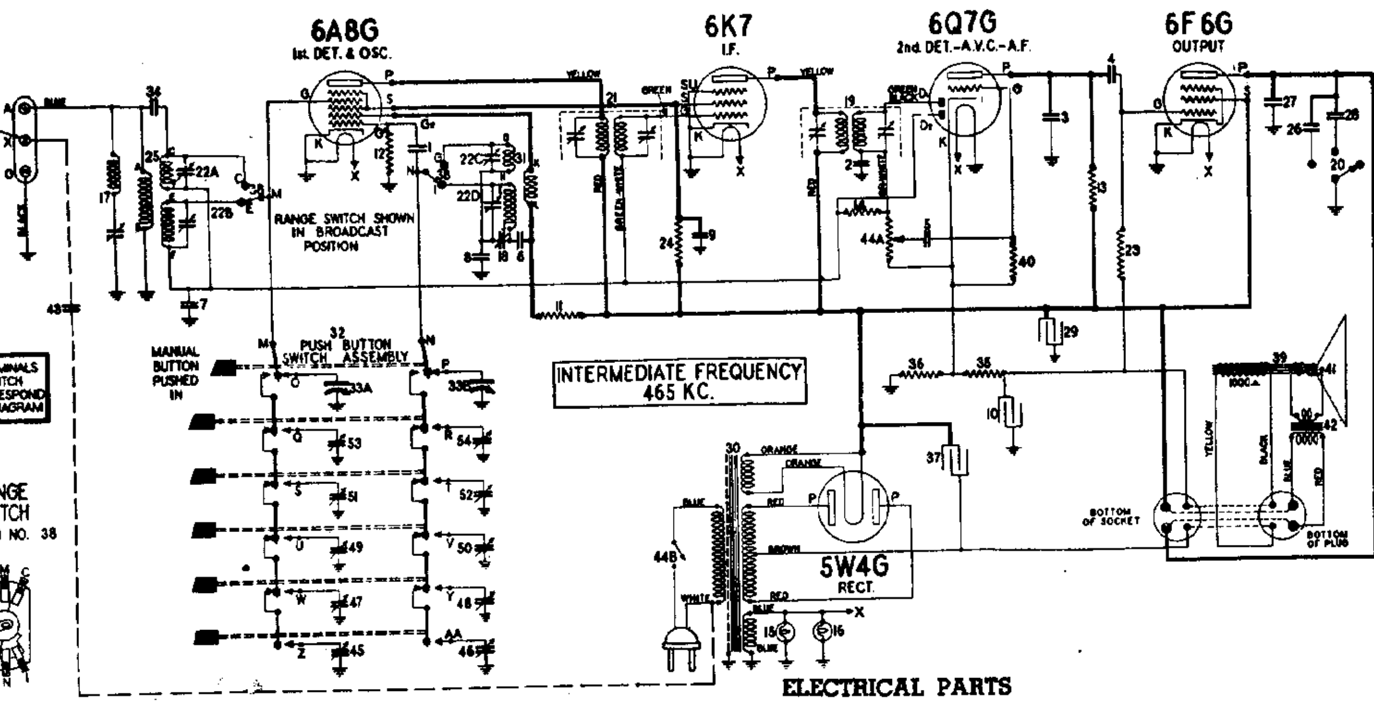




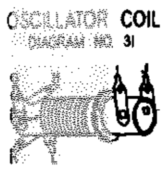
01-531S to 01-539S
Chassis 01-53S
010-531S to 010-539S
Chassis 010-53S
Schematic, Voltage, Socket
Tuner Switch, Coils

STEWART-WARNER CORP.

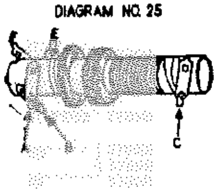
MODELS 01-531 to 01-539
Chassis 01-53
010-531 to 010-539
Chassis 010-53



OSCILLATOR COIL
DIAGRAM NO. 31

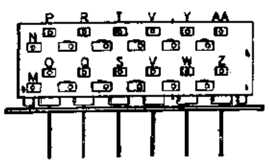


ANTENNA COIL
DIAGRAM NO. 25

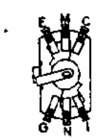


LETTERS ON TERMINALS OF COIL AND SWITCH PICTORIALS CORRESPOND TO LETTERS ON DIAGRAM

PUSH BUTTON TUNER SWITCH
DIAGRAM NO. 32

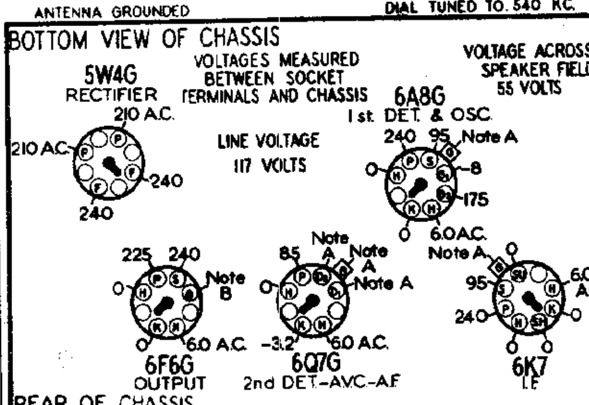


RANGE SWITCH
DIAGRAM NO. 38



SOCKET VOLTAGES

ANTENNA GROUNDED
DIAL TUNED TO 540 KC.



Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7, and 6Q7-G tubes and on the diode plates of the 6Q7-G tube is —3.2 volts measured across resistor 36. **NOTE B:** The bias for the control grid of the 6F6-G tube is —16 volts measured across resistors 35 and 36.

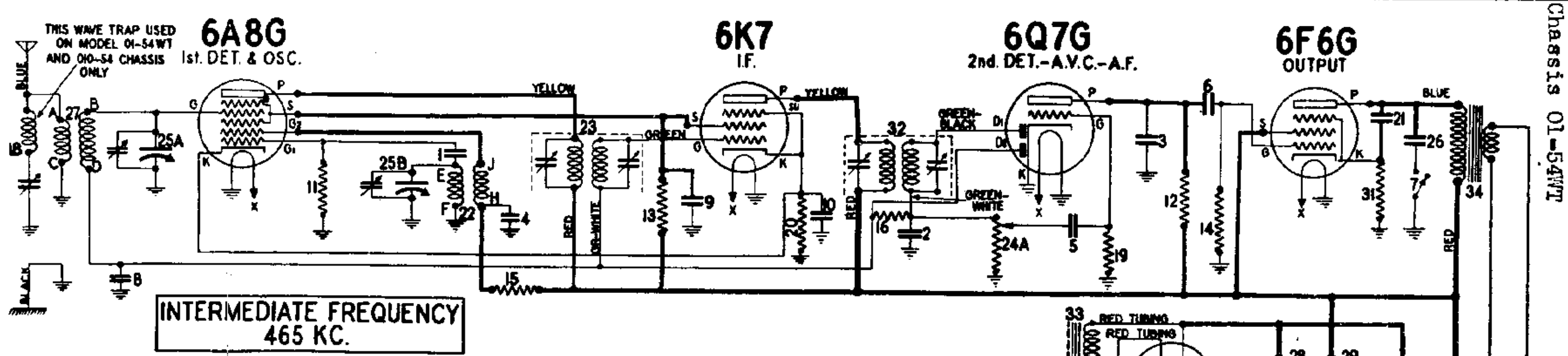
ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	85061	Condenser—mica 51 mmfd.	$0.15
2-3	85394	Condenser—mica 510 mmf.	.25
4	88026	Condenser—paper .02 mfd. 400 volt	.25
5-6	88030	Condenser—paper .01 mfd. 400 volt	.25
7	88189	Condenser—paper .05 mfd. 200 volt	.25
8	88587	Condenser—mica .0042 mfd.	.35
9	88682	Condenser—paper .1 mfd. 400 volt	.25
10	110377	Condenser—electrolytic 10 mfd. 35 volt	.80
	112113	Condenser—electrolytic 10 mfd. 50 V. (Model 010-53 & 010-53S)	.85
11	110550	Resistor—carbon 10,000 ohm ½ watt	.15
12	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
13	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
14	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
15-16	110629	Lamp—dial 6.3 volt .25 amps	.15
10	112113	Condenser-electrolytic 10 mfd. 50 V. (Model 010,53 & 010-53S)	.85
17	112796	Wave trap (with trimmer)	.50
18	112799	Condenser—padder (530 to 630 mmfd.)	.36
19	112804	Transformer—2nd I.F.	1.10
	116362	Transformer—2nd I.F. (Model 010-53S)	1.00
20	112870	Switch—tone control	.40
21	112884	Transformer—1st I.F.	1.20
	116358	Transformer—1st I.F. (Model 010-53S)	1.00
22A to 22D	112893	Condenser—trimmer 4 section	.60
23	112971	Resistor—insulated 470,000 ohms ¼ watt	.15
24	112999	Resistor—carbon 33,000 ohms 1 watt	.20
25	113011	Coil—antenna	1.20
	116421	Coil—antenna (Model 010-53S)	.90
26	113034	Condenser—paper .04 mfd. 600 volt	.15
27	113035	Condenser—paper .006 mfd. 600 volt	.14
28	113202	Condenser—paper .02 mfd. 600 volt	.15
29	114258	Condenser—electrolytic 8 mfd. 450 volt	.98
30	114530	Power transformer 117 volt 60 cycle	3.50
	116352	Power transformer 100-240 V., 40-133 cycles	7.75
31	114959	Coil—oscillator	.75
	116419	Coil—oscillator (Model 010-53S)	.65
32	114965	Switch—for push buttons	2.85
33A-33B	114966	Condenser—variable gang	2.85
	116430	Condenser—gang (Model 010-53S)	2.50
34	114969	Condenser—mica 15 mmfd.	.12
35	114970	Resistor—wire wound 240 ohms 1 watt	.15
36	114971	Resistor—wire wound 60 ohms ½ watt	.12
37	114972	Condenser—electrolytic 16 mfd. 450 volt	.78
38	114988	Switch—range	.60
39	U-115043	Speaker—dynamic (6 in.)	4.50
40	116050	Resistor—insulated 10 meg. ¼ watt	.12
41	U-116211	Cone—assem. (for U-115043 speaker)	1.65
42	U-116212	Output transformer (for U-115043 speaker)	1.50
43	116224	Condenser—mica 260 mmfd. (Model 01-53S)	.15
44A-44B	116236	Volume control, 500,000 ohms, with switch	.96
	116352	Power transformer 100-240 V., 40-133 cycles	7.75
	116358	Transformer—1st I.F. (Model 010-53S)	1.00
	116362	Transformer—2nd I.F. (Model 010-53S)	1.00
	116419	Coil—oscillator (Model 010-53S)	.65
	116421	Coil—antenna (Model 010-53S)	.90
	116430	Condenser—gang (Model 010-53S)	2.50
45-46-47-48	116501	Push Button Trimmer (550 KC to 1000 KC)	.40
49-50-51-52	116502	Push Button Trimmer (700 KC to 1400 KC)	.40
53-54	116503	Push Button Trimmer (850 KC to 1720 KC)	.40

MODELS 01-541 to 01-549
Chassis 01-54
01-541S to 01-549S
Chassis 01-54S
01-541WT to 01-549WT
Chassis 01-54WT

STEWART-WARNER CORP.

08-541 to 08-549
Chassis 08-54
010-541 to 010-549
Chassis 010-54
010-541S to 010-549S
Schematic, Voltage, Socket



INTERMEDIATE FREQUENCY
465 KC.

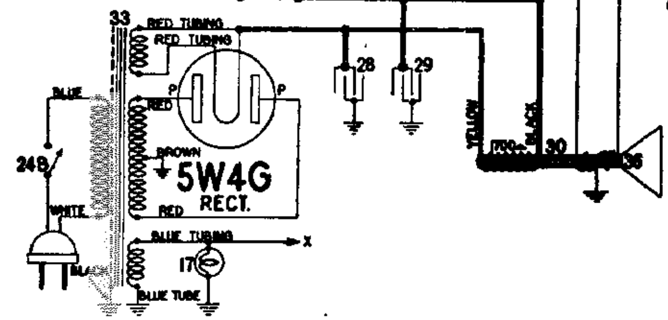


DIAGRAM NO. 22
PART NO. 113042

DIAGRAM NO. 27
PART NO. 113449

NOTE: Terminals of coils shown in pictorial views are lettered to correspond to similarly lettered terminals on the circuit diagram.

ELECTRICAL PARTS

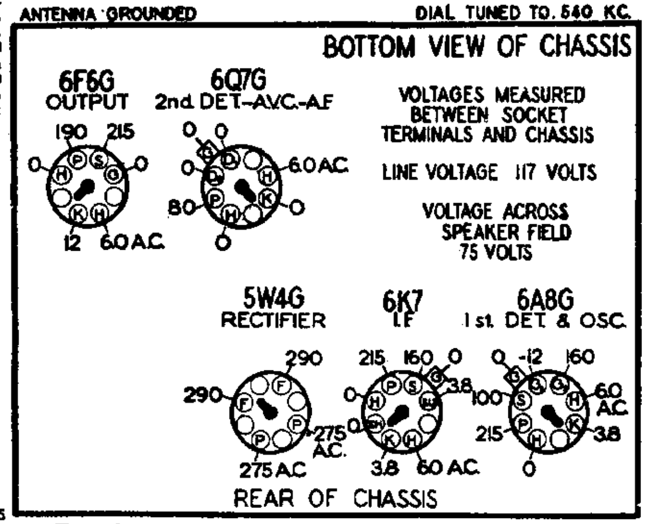
Diagram Number	Part Number	Description	List Price
1	85061	Condenser—mica 51 mmfd.	$0.15
2-3	83539	Condenser—mica 260 mmfd.	.20
4-5-6	88030	Condenser—paper .01 mfd. 400 volt	.25
7	88054	Switch—tone control	.30
8	88189	Condenser—paper .05 mfd. 200 volt	.25
9	88191	Condenser—paper .1 mfd. 300 volt	.25
10	89532	Condenser—paper .25 mfd. 200 volt	.32
11	110552	Resistor—carbon 47,000 ohms 1/4 watt	.12
12	110553	Resistor—carbon 220,000 ohms 1/4 watt	.12
13	110558	Resistor—carbon 33,000 ohms 1/2 watt	.12
14	110559	Resistor—carbon 470,000 ohms 1/4 watt	.12
15	110569	Resistor—carbon 10,000 ohms 1/4 watt	.12
16	110580	Resistor—carbon 3.3 meg. 1/4 watt	.12
17	110629	Lamp—dial 6 volt .25 amp.	.15
18	112796	Wave trap (Models 01-54 WT, 010-54 and 010-54S chassis only)	.50
19	112975	Resistor—carbon 10 meg. 1/4 watt	.12
20	112994	Resistor—carbon 220 ohm 1/4 watt	.12
21	113035	Condenser—ceramic tube .006 mfd. 600 volt	.14
22	113042	Coil—oscillator	.45
23	113048	Transformer—1st I.F.	1.00
23	116425	Transformer—1st I.F. (Model 010-54S only)	1.10
24A-24B	113049	Volume control—500,000 ohms with switch	1.00
25A-25B	113150	Condenser—variable gang	3.00
26	113202	Condenser—paper .02 mfd. 600 volt	.15
27	113449	Coil—antenna	.78
28-29	114258	Condenser—electrolytic 8 mfd. 450 volt	.98
30	U-115047	Speaker—dynamic; 5 inch	4.00
31	116015	Resistor—wire wound 400 ohms 1/2 watt	.12
32	116179	Transformer—2nd I.F.	1.00
32	116426	Transformer—2nd I.F. (Model 010-54S only)	1.05
33	116180	Transformer—power 117 volt 60 cycle	3.75
33	116336	Transformer—power 100-240 volt; 40-133 cycles	7.75
34	U-116304	Transformer—output, for U-115047 speaker	1.50
35	U-116305	Cone & Voice coil—for U-115047 speaker	1.50
33	116336	Transformer—power 100-240 volt; 40-133 cycles	7.75
23	116425	Transformer—1st I.F. (Model 010-54S only)	1.10
32	116426	Transformer—2nd I. F. (Model 010-54S only)	1.05

DIAL & MISCELLANEOUS PARTS

Part No.	Description	List Price
113170	Adjusting Lug—for button shafts	$0.01
113171	Bracket—for dial & condenser mtg.	.64
112776	Celluloid Cover—over dial face	.28
112745	Clip—coil mtg. (Oscillator & antenna)	.01
112764	Clip—dial scale retaining	.01
112798	Clip—for mtg. wave trap	.01
113178	Cord—dial (supplied in 4 ft. lengths)	.30
113174	Dial Drum—and pinion assembly	.44
116175	Dial scale	.30
112914	Escutcheon—dial	.35
113053	Escutcheon—for push buttons	.32
113156	Gear—and bushing assembly for dial drive	.22
113022	Knob—tone & volume control	.10
113494	Mechanical tuner assembly—keys & housing only	3.00
112770	Pointer—dial	.08
112762	Pulley—dial cord drive	.04
113103	Push button (walnut)	.06
114149	Rotor cap for voltage switch on transformer	.50
81145	Retaining Ring—for drive shaft ... Per C	.50
114598	Rubber Tubing—for drive shaft	.01
85040	Screw No. 6 Hex. Hd. for mtg. adjusting washer ... Per C	.35
85827	Set Screw—8/32 Square Head	.02
112874	Screw—No. 10x1 1/8" Chassis Mtg.	.01
114431	Screw—No. 6-40x7/8 for setting up buttons	.01
114914	Screw—Special head for mtg. escutcheon. Per dz.	.15
113176	Shaft—dial drive	.18
112768	Socket—for dial lamp	.15
114876	Socket—octal base	.15
114878	Socket—octal base—with special ground	.15
85815	Spring—between gear sections	.01
113169	Spring—for key return	.01
113177	Spring—dial cord tension	.09
113189	Tab—celluloid for push button ... Per Dz.	.09
113321	Tabs—station call letters (4 sheets) (Brown)	.40
116530	Washer—paper for back of knobs	.005
110829	Washer—flat steel for mtg. chassis	.01

SOCKET VOLTAGES

ANTENNA GROUNDED
DIAL TUNED TO 540 KC.



Use a high resistance voltmeter of at least 1,000 ohms per volt.

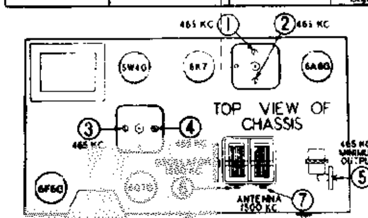
STEWART-WARNER CORP.

01-54, 01-54S, 08-54, 010-54, and 010-54S CHASSIS
ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 Mfd Condenser	Control Grid of 6A8-G Tube	465 KC	Any Point Where It Does Not Affect the Signal	1-2	1st I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
				3-4	2nd I.F	
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	465 KC	Any Point Where It Does Not Affect the Signal	5 Not Used In Chassis Model 01-54	Wave Trap	Adjust for Minimum Output Using A Strong Generator Signal.
200 MMFD Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust Trimmer To Bring In Signal.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Tune To 1500 KC Generator Signal	7	Broadcast Antenna (Shunt)	Adjust for Maximum Output.



HOW TO SET UP PUSH BUTTONS

1. [illegible] set for at least 15 minutes. To [illegible] the button cap by grasping the [illegible]. When the button is removed, [illegible] to view (See Fig. 1). Insert a [illegible] loosen it (about one turn counter-[illegible]
2. [illegible] screw slot. PUSH AGAINST THE [illegible] BUTTON SHAFT IS FORCED [illegible] button is held in this position, [illegible] in the desired station. Then [illegible] turning clockwise until reasonably [illegible]

WARNING: [illegible] turn the screw until it reaches [illegible] until you meet with appreciable [illegible] may result in damage to the [illegible]

HOW TO REPLACE THE DIAL DRIVE CORD

1. Close the [illegible]. The set screw in the drum, Fig. 1, must be on the [illegible].
2. Tie one end of the [illegible] the spring L and thread the other end through hole [illegible] the front of the drum to the tuning shaft. Continue [illegible], then over pulley B and up the rear side of the [illegible].
3. Thread the cord [illegible] and tie the other end to spring L. Tie the cord so [illegible] will be extended to about ¾ inch.

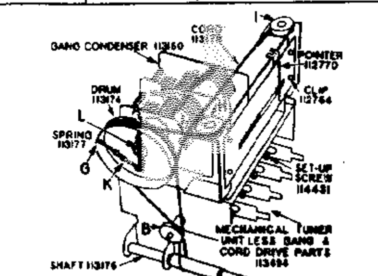


FIG. 1

HOW TO REPLACE DIAL POINTER DRIVE CORD

1. Close the gang condenser and thread one end of the cord through eyelet G and tie it to spring K.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum. Carry the end of the cord on around the drum and thread through eyelet G.
4. Tie both ends extending through eyelet G to tension spring K. IMPORTANT: In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push button operate too hard because of overloading.
5. Be sure the gang condenser is closed, then set the dial pointer to the last dial division mark on the right and clip it to the cord.

01-61, 01-61S, 010-61 and 010-61S CHASSIS
ALIGNMENT EQUIPMENT & PROCEDURE

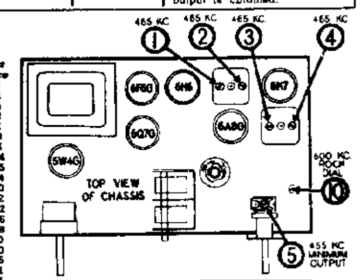
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

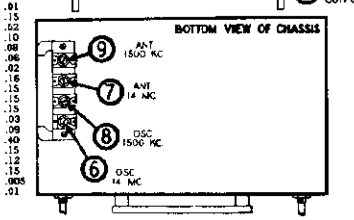
1. Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output To Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 6A8-G Tube	465 KC	Broadcast Clockwise	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I. F.	
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	465 KC	Broadcast Clockwise	Any Point Where It Does Not Affect The Signal	5	Wave Trap	Adjust for minimum output using a strong generator signal.
400 OHM Carbon Resistor	Antenna Terminal or Antenna Lead	14 MC	Foreign (Counter-Clockwise)	14 MC	6	Foreign Oscillator (Shunt)	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 13.1 MC. If image does not appear realign at 14 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Antenna Terminal or Antenna Lead	14 MC	Foreign (Counter-Clockwise)	14 MC	7	Foreign Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	1500 KC	Broadcast Clockwise	1500 KC	8	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	1500 KC	Broadcast Clockwise	Tune To 1500 KC Generator Signal	9	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	600 KC	Broadcast Clockwise	Tune To 600 KC Generator Signal	10	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

DIAL & MISCELLANEOUS PARTS

Part Number	Description		List Price
114955	Clamp for dial cord		$0.01
112745	Clip for coil mounting		.01
112798	Clip for mounting wave trap coil		.01
113019	Clip for dial scale retaining		.01
85321	Connector Link		.01
114954	Dial Cord (19" required)	Per Ft.	.03
114976	Dial scale		.24
116423	Dial scale (Model 010-61S)		.24
112233	Drum & Bushing for dial drive		.35
113146	Escutcheon for dial		.84
113022	Knobs for tuning or volume		.10
113138	Mounting Plate & Bracket for dial		.42
110496	Plug speaker (4 prong)		.12
114977	Pointer for dial		.16
113102	Push Button		.08
81145	Retaining Ring for drive shaft	Per C	.50
114148	Rotor for voltage switch on power transformer		.50
85040	Screw No. 6 Hex. Hd.	Per C	.35
112874	Screw No. 10 x 1¼ Chassis Mounting		.01
114914	Screw Special head for mounting escutcheon	Per dz.	.15
85827	Set Screw 8-32 Square Head		.02
112945	Shaft tuning		.10
88161	Shield for 6Q7G tube (ball section)		.08
86164	Shield cap		.06
89912	Shield Ground clip		.02
110501	Socket 4 prong (for speaker)		.16
114876	Socket—octal base		.15
114873	Socket octal base with special ground		.15
114980	Socket—for dial lamp		.15
114963	Spring—dial cord tension		.03
[illegible]	[illegible]—celluloid—for push button	Per Dz.	.09
[illegible]	[illegible]—station call letters (4 sheets)* (Brown)	Per Set	.40
[illegible]	Terminal Strip G.A. (Model 010-61S)		.15
[illegible]	Terminal Strip phono		.12
[illegible]	Terminal Strip G.X.A. (Model 01-61S)		.15
[illegible]	Washer—(paper) for back of knobs		.005
[illegible]	Washer—flat steel, for mounting chassis		.01

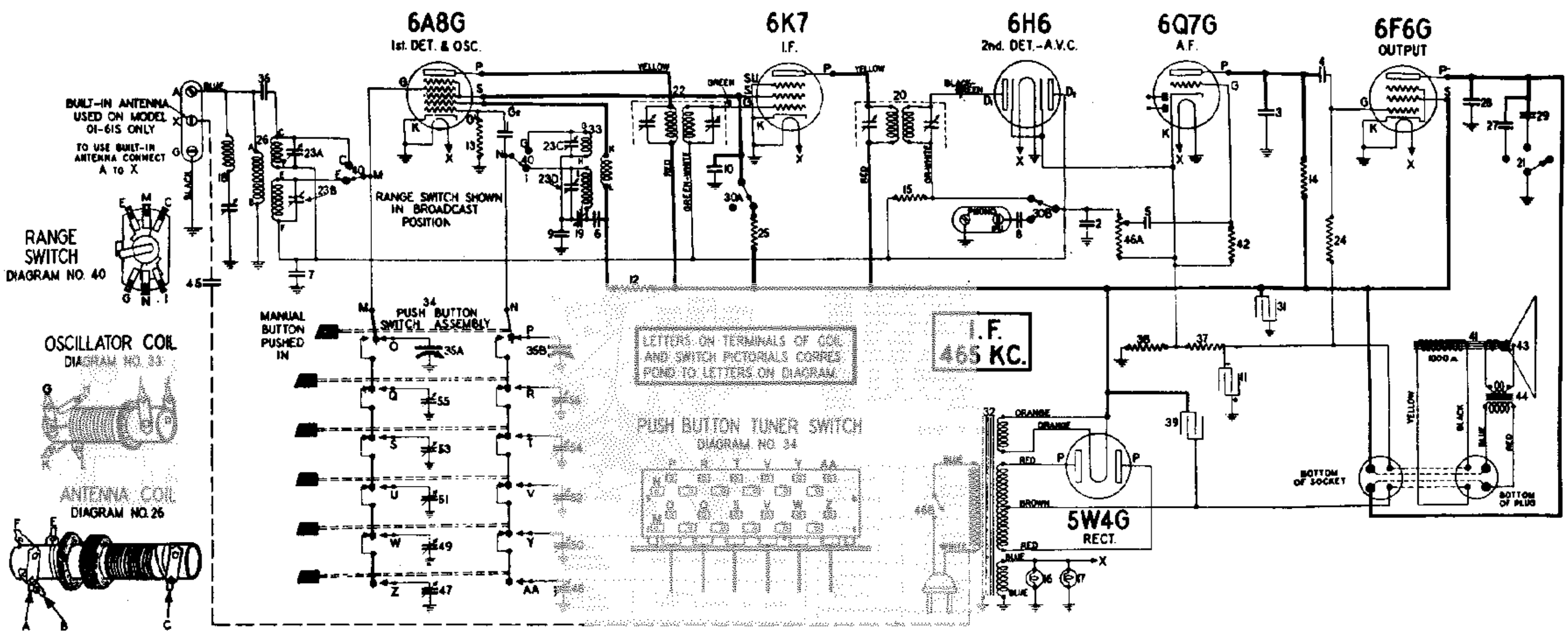




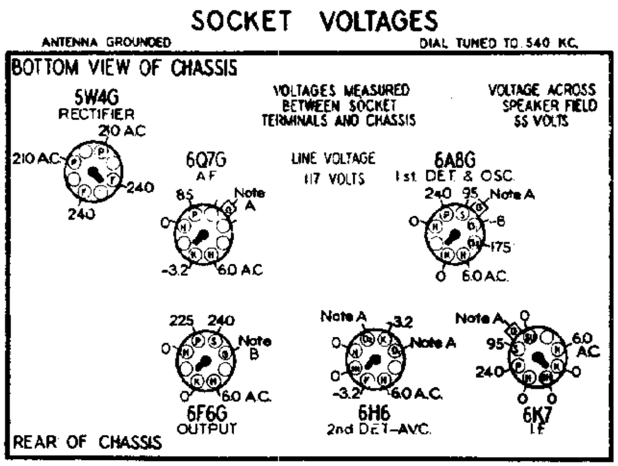
MODELS 01-611 to 01-619
Chassis 01-61
01-611S to 01-619S
Chassis 01-61S
010-611 to 010-619
Chassis 010-61

STEWART-WARNER CORP.

010-611S to 010-619S
Chassis 010-61S
Schematic, Voltage
Socket, Coils



SOCKET VOLTAGES



Use a high resistance voltmeter of at least 1000 ohms per volt.
NOTE A: The bias for the control grids of the 6A8-G, 6K7, and 6Q7-G tubes and on the diode plates of the 6H6 tube is —3.2 volts measured across resistor 38. **NOTE B:** The bias for the control grid of the 6F6-G tube is —16 volts measured across resistors 37 and 38.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	85061	Condenser—mica 51 mmfd.	$0.15
2-3	85394	Condenser—mica 510 mmf.	.25
4	88026	Condenser—paper .02 mfd. 400 volt	.25
5-6	88030	Condenser—paper .01 mfd. 400 volt	.25
7-8	88189	Condenser—paper .05 mfd. 200 volt	.25
9	88587	Condenser mica .0042 mfd.	.35
10	88682	Condenser paper .1 mfd. 400 volt	.25
11	110377	Condenser—electrolytic 10 mfd. 35 volt	.80
	112113	Condenser—electrolytic 10 mfd. 50 volt (Model 010-61 & 010-61S)	.85
12	110550	Resistor—carbon 10,000 ohms ½ watt	.15
13	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
14	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
15	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
16-17	110629	Lamp—6.3 volt—.25 amps	.15
11	112113	Condenser—electrolytic 10 mfd. 50 volt Model 010-61 & 010-61S)	.85
18	112796	Coil—wave trap (with trimmer)	.50
19	112799	Condenser—padder (530 to 630 mmfd.)	.36
20	112804	Transformer—2nd I.F.	1.10
	116362	Transformer—2nd I.F. (Model 010-61S)	1.00
21	112870	Switch—tone control	.40
22	112884	Transformer—1st I.F.	1.20
	116358	Transformer—1st I.F. (Model 010-61S)	1.00
23A to 23D	112893	Condenser—trimmer 4 section	.60
24	112971	Resistor—insulated 470,000 ohms ¼ watt	.15
25	112999	Resistor—carbon 33,000 ohms 1 watt	.20
26	113011	Coil—antenna	1.20
	116421	Coil—antenna (Model 010-61S)	.90
27	113034	Condenser—paper .04 mfd. 600 volt	.15
28	113035	Condenser—paper .006 mfd. 600 volt	.14
29	113202	Condenser—paper .02 mfd. 600 volt	.15
30A-30B	114141	Switch—radio phono (D.P.D.T.)	.44
31	114258	Condenser—electrolytic 8 mfd. 450 volts	.98
32	114530	Power transformer 117 volt 60 cycle	3.50
	116352	Power transformer 100-240 V., 40-133 cycles	7.75
33	114959	Coil—oscillator	.75
	116419	Coil—oscillator (Model 010-61S only)	.65
34	114965	Switch assembly—for push buttons	2.85
35A-35B	114966	Condenser—variable gang	2.85
	116430	Condenser—variable gang (Model 010-61S)	2.50
36	114969	Condenser—mica 15 mmfd.	.12
37	114970	Resistor—wire wound 240 ohms 1 watt	.15
38	114971	Resistor—wire wound 60 ohms ½ watt	.12
39	114972	Condenser—electrolytic 16 mfd. 450 volt	.78
40	114988	Switch—range	.60
41	U-115043	Speaker dynamic 6"	4.50
42	116050	Resistor—insulated 10 meg. ¼ watt	.12
43	U-116211	Cone—assembly (for U-115043 speaker)	1.65
44	U-116212	Output transformer (for U-115043 speaker)	1.50
45	116224	Condenser—260 mmfd. (Model 01-61S)	.15
46A-46B	116236	Volume control—500,000 ohms (with switch)	.96
	116352	Power transformer—100-240 V., 40-133 C.	7.75
	116358	Transformer—1st I.F. (Model 010-61S)	1.00
	116362	Transformer—2nd I.F. (Model 010-61S)	1.00
	116419	Coil—oscillator (Model 010-61S)	.65
	116421	Coil—antenna (Model 010-61S)	.90
	116430	Condenser—variable gang (Model 010-61S)	2.50
47-48-49-50	116501	Push button trimmer (550 KC to 1000 KC)	.40
51-52-53-54	116502	Push button trimmer (700 KC to 1400 KC)	.40
55-56	116503	Push button trimmer (850 KC to 1720 KC)	.40

STEWART-WARNER CORP.

MODELS 01-811 to 01-819
08-811 to 08-819
010-811 to 010-819
Alignment,Trimmers

ALIGNMENT EQUIPMENT & PROCEDURE

ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

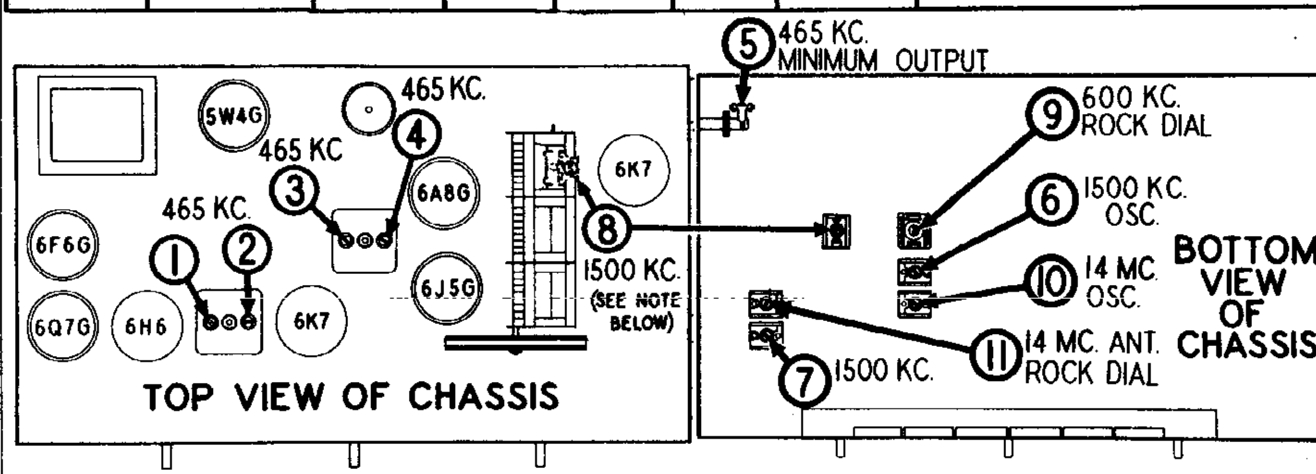
(1) Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground, in series with a .1 mfd. condenser depending upon the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE:- The "G" and "D" terminals on this terminal strip must be connected together.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.

(4) With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 - 2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3 - 4	1ST I.F.	
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL	1500 KC	BROADCAST	1500 KC	6	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL	1500 KC	BROADCAST	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST DETECTOR	ADJUST FOR MAXIMUM OUTPUT.
					8	BROADCAST ANTENNA	
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL	600 KC	BROADCAST	TUNE TO 600 KC GENERATOR SIGNAL	9	BROADCAST OSCILLATOR (SERIES)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	14 MC	FOREIGN	14 MC	10	FOREIGN OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	14 MC	FOREIGN	TUNE TO 14 MC GENERATOR SIGNAL	11	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



NOTE: ON SOME SETS TRIMMER NO. 8 IS LOCATED ON THE REAR SECTION OF THE GANG CONDENSER, WHILE ON OTHERS IT IS LOCATED UNDERNEATH THE CHASSIS.

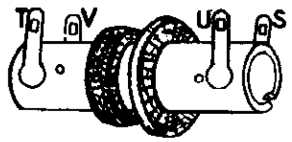


DIAGRAM NO. 41
PART NO. 113295
BROADCAST
ANTENNA COIL

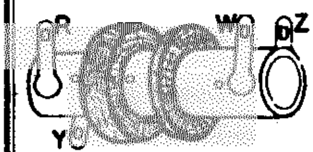


DIAGRAM NO. 42
PART NO. 113296
BROADCAST
R.F. COIL

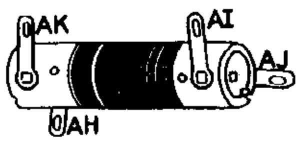


DIAGRAM NO. 43
PART NO. 113297
BROADCAST
OSC. COIL

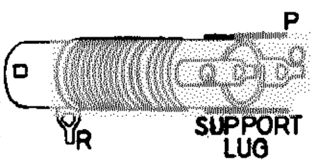


DIAGRAM NO. 49
PART NO. 114893
SHORT WAVE
ANTENNA COIL

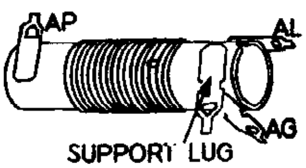


DIAGRAM NO. 48
PART NO. 114892
SHORT WAVE
OSC. COIL

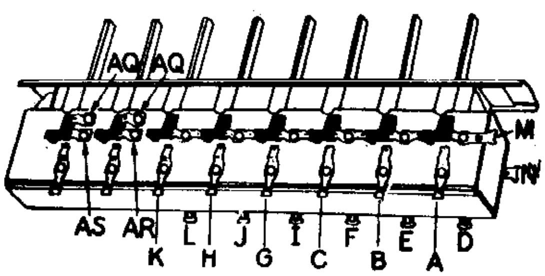
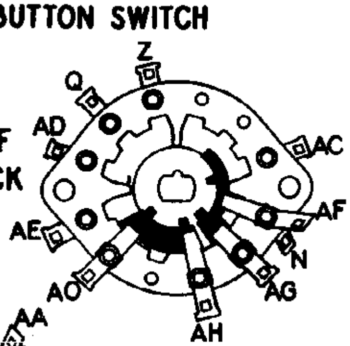


DIAGRAM NO. 52 PART NO. 114920
PUSH BUTTON SWITCH



FRONT OF
FRONT DECK

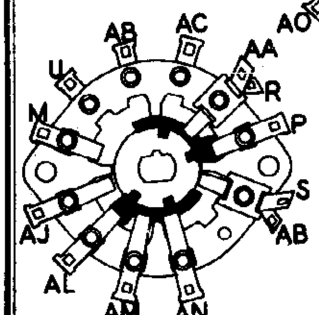
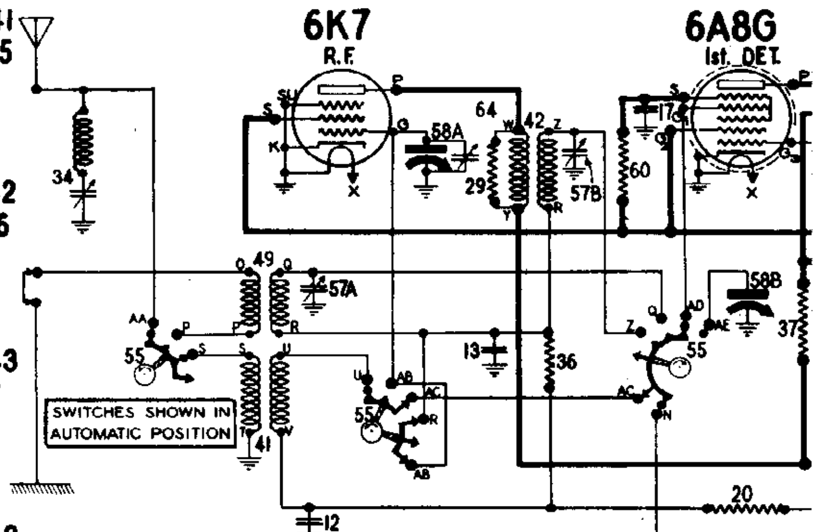


DIAGRAM NO. 55
PART NO. 114929
RANGE SWITCH

FRONT OF
REAR DECK



ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83783	Condenser - mica, 110 mmf.	.20
2	85061	Condenser - mica 51 mmfd.	.15
3-4	85394	Condenser - mica 510 mmf.	.25
5-6-7-8-9	88026	Condenser - paper .02 mfd.400V.	.25
10	88029	Condenser - paper.004 mfd.400V.	.25
11	88030	Condenser - paper .01 mfd.400V.	.25
12-13-14	88189	Condenser - paper .05 mfd.200V.	.25
15	88587	Condenser - mica .0042 mfd.	.35
16-17	88682	Condenser - paper .1 mfd. 400V.	.25
18	89421	Condenser - paper .1 mfd. 200V.	.25
19	110552	Resistor-carb. 47,000 ohms ¼ W.	.12
20-21, 22-23	110553	Resistor - carbon 220,000 ohms 1/4 watt	.12
24-25	110554	Resistor-carb. 1 meg. 1/4 watt	.12
26	110559	Resistor-carb. 470,000 ohms ¼W.	.12
27	110564	Resistor-carb. 100,000 ohms ¼W.	.12
28	110565	Resistor-carb. 22,000 ohms ¼ W.	.12
29	110573	Resistor-carb. 2,200 ohms ¼ W.	.12
30-31	110629	Lamp - 6.3 volt .25 amps	.15
32	111252	Condenser - paper .05 mfd.400V.	.13
33	111346	Condenser - mica 2,000 mmfd. 1000 volt	.22
34	112796	Coil - wave trap(with trimmer)	.50
35	112971	Resistor-insul.470,000 ohm ¼W.	.15
36	112987	Resistor-insul.220,000 ohm ¼W.	.15
37	112997	Resistor - carb.22,000 ohms 1W.	.15
38	112998	Resistor-insul.22,000 ohms 2 W.	.20
39	113229	Transformer - 2nd I.F.	1.64
40	113237	Transformer - 1st I.F.	1.20
41	113295	Coil - antenna (B.C.)	1.20
42	113296	Coil - R.F. (B.C.)	1.30
43	113297	Coil - oscillator (B.C.)	.48
44	113346	Condenser - padding	.38
45	113965	Condenser-elect. 16 mfd.450 V.	1.04
46A - 46B	114141	Switch - radio phono(D.P.D.T.)	.44
47A to 47F	116501	Trimmer Condenser(100-450 mmfd)	.40
47G to 47J	116502	Trimmer Condenser(25-300 mmfd)	.40
47K - 47L	116503	Trimmer Condenser(15-200 mmfd)	.40
48	114892	Oscillator Coil - short wave	.80
49	114893	Antenna Coil - short wave	.80
50	114897	Transformer-power 117 V. 60 C.	4.35
51	114906	Resistor - metal clad: Section A - 190 ohms; Section B - 17 ohms; Section C - 26 ohms	.44
52	114920	Push Button Switch Assembly	3.60
53	114927	Transformer - output	1.50
54A - 54B	114928	Volume control 1 meg. with off-on switch	1.00
55	114929	Range Switch	1.85
56A - 56B, 57A - 57B	114937	Condenser - trimmer 2 sections	.30
58A -B -C	114949	Condenser - variable gang	6.00
59	R-115042	Speaker - dynamic 10"	8.75
60	116059	Resistor-insul. 22,000 ohms ¼W.	.12
61	R-116210	Cone & Voice Coil Assembly for R-115042 Speaker	2.25
62	116262	Condenser-elect. 16 mfd. 450 V.	.78
63	116263	Condenser-elect. 4 mfd. 450 V.	.58
64	113468	Trimmer - Single Section (Used on some sets only)	.15

PUSH
SW

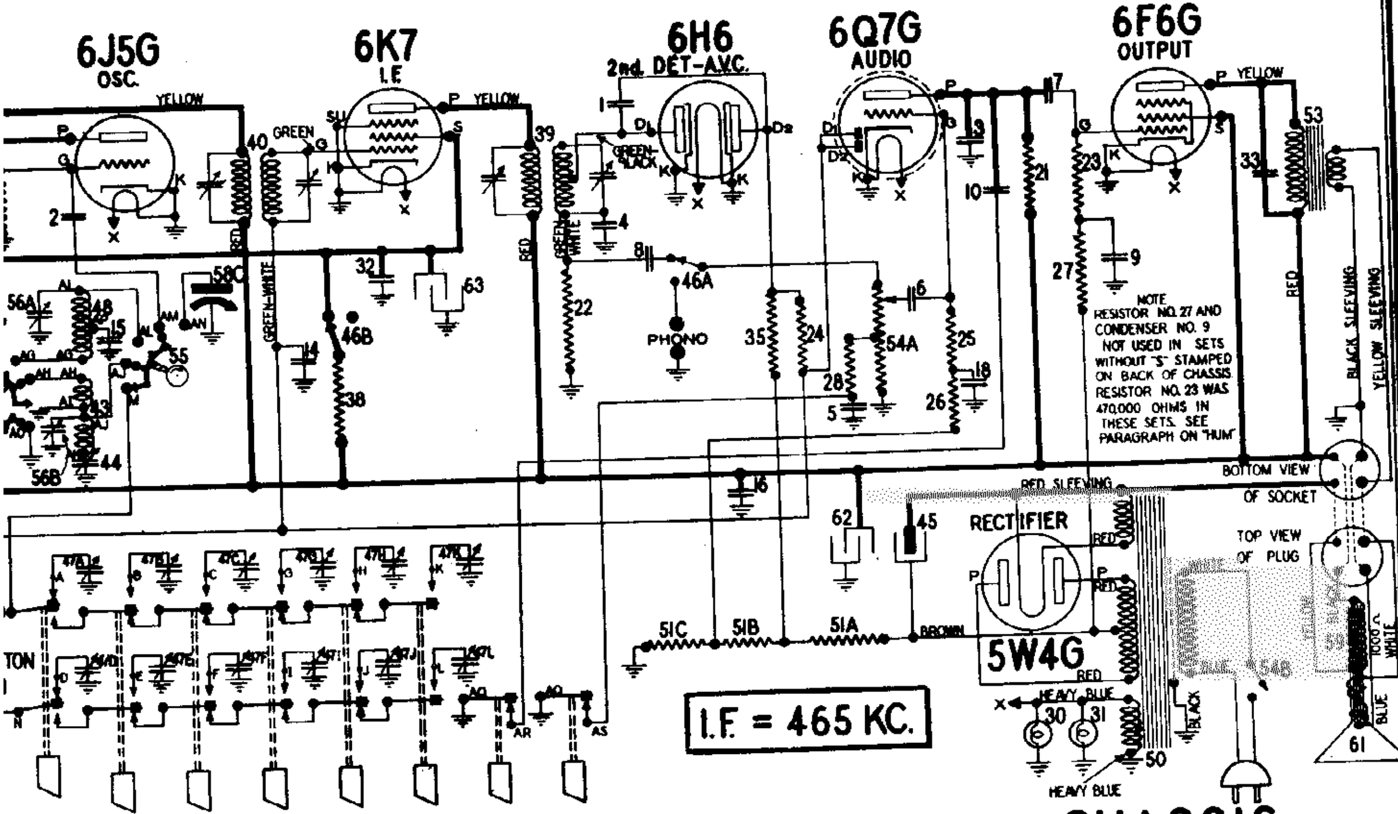
TERMINALS OF SW
PICTORIAL VIEWS
TO SIMILARLY LE

DIAL AN

PART NUMBER	
114032	Bracke
114034	Bracke
114042	Clamp
112745	Clip -
112798	Clip -
85321	Connec
111302	Cord -
114921	Dial
114915	Dial
114922	Dial
113338	Drum -
114912	Escut
114624	Escut
113041	Knob
116335	Knob
110496	Plug -
116302	Point
113149	Push
113463	Rubber
112874	Screw
114914	Screw-
116185	Screw- che
85827	Set S
114025	Shaft
112864	Shiel
112865	Shiel
113094	Socket
114117	Socket
114876	Socket
114878	Socket
110501	Socket
113177	Spring
116311	Tabs -
114698	Tabs -
84407	Termin
85066	Termin
67568	Washer
116530	Washer
110829	Washer

MODELS 01-811 to 01-819, Chassis 01-81
08-811 to 08-819, Chassis 08-81
010-811 to 010-819, Chassis 010-81

ARNER CORP.



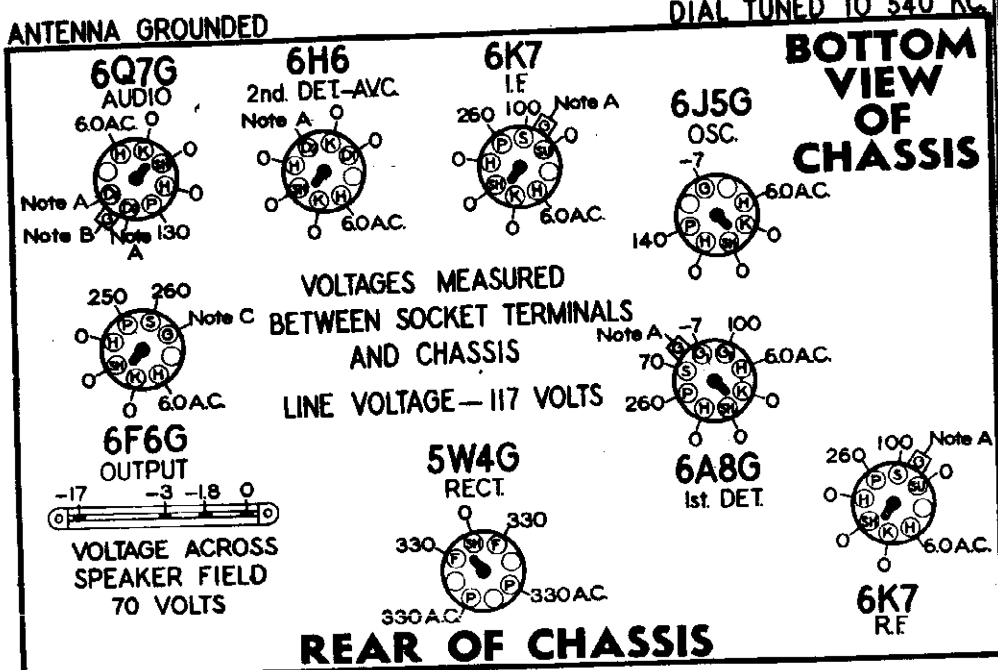
...CHES AND COILS SHOWN IN THE ...RE LETTERED TO CORRESPOND ...RED TERMINALS ON THE CIRCUIT ...GRAM ABOVE.

01-81, 08-81 AND 010-81 CHASSIS

SOCKET VOLTAGES

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.



MISCELLANEOUS PARTS

DESCRIPTION	LIST PRICE
& Pulley Assembly - right hand-	.34
& Pulley Assembly - left hand--	.34
for dial scale	.10
oil mounting	.01
'or mtg. wave trap coil	.01
r - ground	.01
ial drive 6 or 50 ft. lengths ---Per Ft.	.05
k ground - brown suede paper---	.10
. plate	.38
le - glass	.84
ial drive	.54
on for dial	2.25
on for push buttons	1.28
r tuning or volume	.10
r range switch	.15
speaker (4 prong)	.12
& slide assembly	.15
tton	.08
bushing - chassis mtg.	.03
#10 X 1 1/8 chassis mtg.	.01
pecial head-for mtg. escutcheon- ---Per Doz.	.15
2 X 3/8 for push button escut- n mtg.	.01
ew - 8/32 square head	.02
tuning	.18
- for tubes	.03
- base, for tubes	.03
- pilot light assem.	.15
- dial lamp	.18
- octal base	.15
- octal base with spec. ground--	.15
- speaker (4 prong)	.16
- dial cord tension	.09
station call letter sheets ---Per Set	.35
celluloid for push buttons	.03
al Strip - phono	.12
al Strip - G.D.A.	.20
- embossed (for mtg. elect.)----	.05
- (paper) for back of knobs-----	.005
- flat steel, for mtg. chassis--	.01

Use a high resistance voltmeter of at least 1000 ohms per volt.

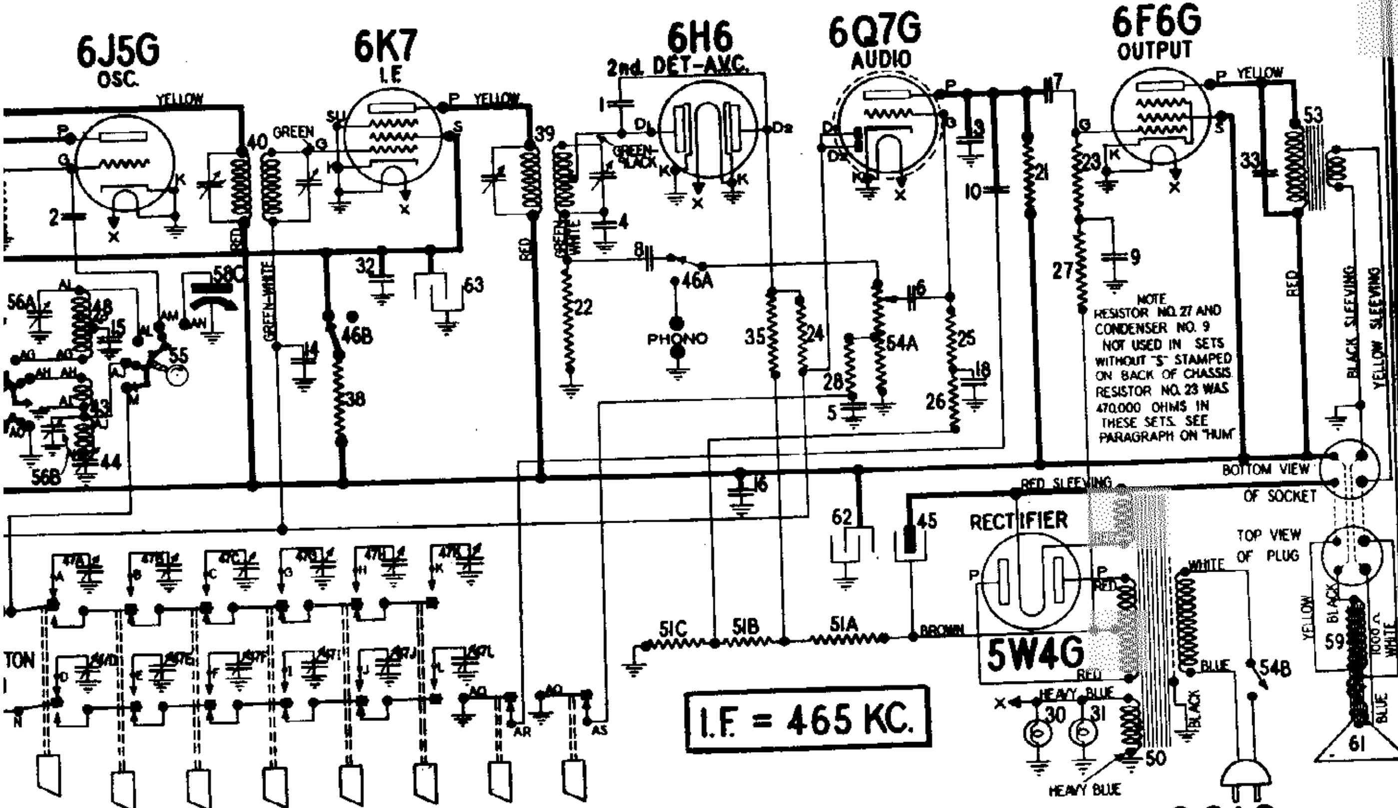
NOTE A: The bias for the 6K7 R.F., 6A8G, 6K7 I.F., Diode Plates D_1 and D_2 of the 6Q7G and Diode Plate D_2 of the 6H6 tube is -3 volts, measured across resistors 51B and 51C.

NOTE B: The bias for the control grid of the 6Q7G tube is -1.8 volts, measured across resistor 51C.

NOTE C: The bias for the control grid of the 6F6G tube is -17 volts, measured across resistors 51A, 51B and 51C.

MODELS 01-811 to 01-819, Chassis 01-81
08-811 to 08-819, Chassis 08-81
010-811 to 010-819, Chassis 010-81

ARNER CORP.

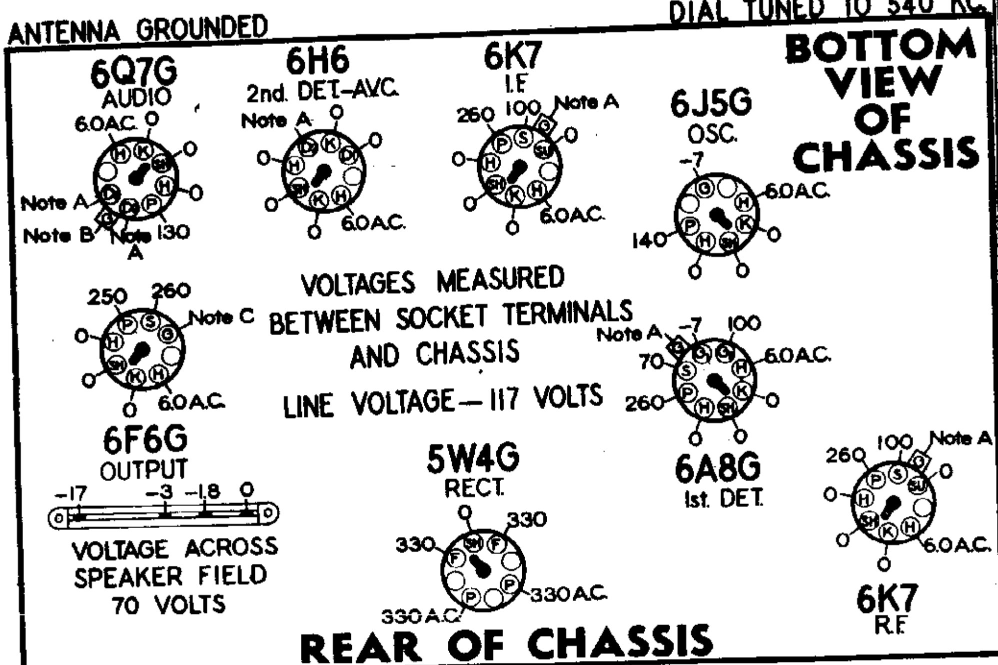


:HES AND COILS SHOWN IN THE
RE LETTERED TO CORRESPOND
RED TERMINALS ON THE CIRCUIT
GRAM ABOVE.

01-81, 08-81 AND 010-81 CHASSIS
SOCKET VOLTAGES

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.



MISCELLANEOUS PARTS

DESCRIPTION	LIST PRICE
& Pulley Assembly - right hand-	.34
& Pulley Assembly - left hand--	.34
for dial scale	.10
oil mounting	.01
'or mtg. wave trap coil	.01
r - ground	.01
ial drive 6 or 50 ft. lengths ----Per Ft.	.05
k ground - brown suede paper	.10
. plate	.38
le - glass	.84
ial drive	.54
on for dial	2.25
on for push buttons	1.28
r tuning or volume	.10
r range switch	.15
speaker (4 prong)	.12
& slide assembly	.15
tton	.08
bushing - chassis mtg.	.03
#10 X 1 1/8 chassis mtg.	.01
pecial head-for mtg. escutcheon- ----Per Doz.	.15
2 X 3/8 for push button escut- n mtg.	.01
ew - 8/32 square head	.02
tuning	.18
- for tubes	.05
- base, for tubes	.03
- pilot light assem.	.15
- dial lamp	.18
- octal base	.15
- octal base with spec. ground--	.15
- speaker (4 prong)	.16
- dial cord tension	.09
station call letter sheets ----Per Set	.35
celluloid for push buttons	.03
al Strip - phono	.12
al Strip - G.D.A.	.20
- embossed (for mtg. elect.)	.05
- (paper) for back of knobs	.005
- flat steel, for mtg. chassis--	.01

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the 6K7 R.F., 6A8G, 6K7 I.F., Diode Plates D_1 and D_2 of the 6Q7G and Diode Plate D_2 of the 6H6 tube is -3 volts, measured across resistors 51B and 51C.

NOTE B: The bias for the control grid of the 6Q7G tube is -1.8 volts, measured across resistor 51C.

NOTE C: The bias for the control grid of the 6F6G tube is -17 volts, measured across resistors 51A, 51B and 51C.

MODELS 01-811 to 01-819
08-811 to 08-819
010-811 to 010-819
Tuner, Drive Cord Data

STEWART-WARNER CORP.

CIRCUIT FEATURES

This chassis is an 8 tube, two band, push button tuning superheterodyne receiver. The tuning ranges are 530 to 1730 KC and 5.5 to 18 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push-button switch provides a simple rapid method of effecting this substitution.

It should be noted that the R.F. stage in this receiver operates only on the Broadcast Band. When the band switch is in the "Automatic", "Intermediate" or "Foreign" positions this R.F. stage is not utilized.

HOW TO SET UP THE PUSH BUTTON TUNER

1. Connect your set to a good antenna system.
2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.
3. Make a list of the frequencies of six nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak stations will generally give better results when tuned manually. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, AS INDICATED IN Fig. 1.

Each of the buttons on your "Magic Keyboard" can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that you select a station whose frequency is in the operating range of a button before attempting to set-up that button for the particular station. IT IS IMPORTANT THAT THE PROPER BUTTONS BE SELECTED AS THE ADJUSTING SCREW SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED. For example, suppose you want to set a button to station KDKA whose frequency is 980 kilocycles. Refer to Fig. 1, which shows that this frequency falls within the operating range of buttons No. 6 or No. 7, whose range is 630 to 1490 KC or of button No. 8 whose range is 720 to 1700 KC. Therefore either buttons No. 6, No. 7 or No. 8 can be used for the automatic tuning of stations KDKA.

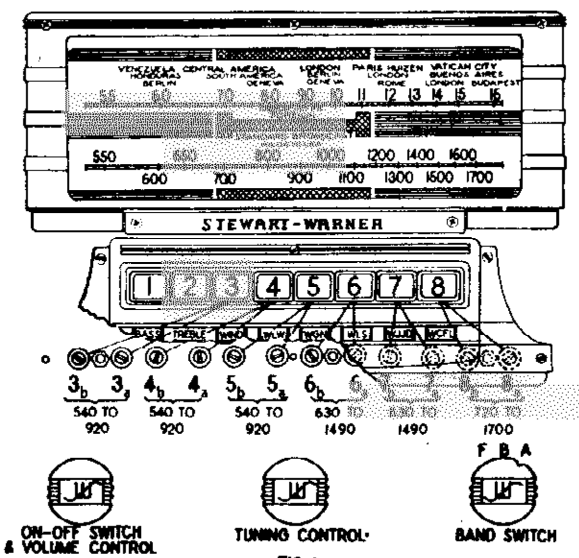


FIG. 1

4. Remove the escutcheon around the push buttons taking out the six screws holding it to the cabinet. This will expose to view six pairs of adjusting screws, each pair of which is used to tune in a station that you wish to set-up on a particular button.
5. Turn the band switch (Right hand knob) to the center (B) position, as indicated by the notch on the band switch knob. Then using the tuning knob (center) tune in the station you desire to set to button No. 3. This is done so that you may identify the station by hearing its program.
6. Now turn the band switch knob to the extreme clockwise position. The notch on the band switch knob will now indicate the "A" (Automatic) position. You will note when this switch is turned, the station previously tuned in will not be heard.
7. Now push in the third button from the left (No. 3 in Fig. 1). Using a small screw driver, insert it in the second screw from the left (No. 3a in Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again tuned in. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (3a) TO THE POINT WHERE THE PROGRAM IS HEARD WITH THE DEEPEST TONE. It is advisable that you turn the screw in and out so that you will tune across the station several times in order that you may be sure you have located the correct tuning point.
8. Next insert the screw driver in the first screw on the left (No. 3b, Fig. 1) and turn it until the program is received with deepest tone. Now go back to screw No. 3a and see if any improvement in the reception can be made by adjusting it. Also repeat this adjustment for screw No. 3b.
9. Set up button No. 4 for the selected station in a similar manner, using screws No. 4a and 4b, and proceed to set up the remaining buttons in the same fashion, always tuning in the station initially with the "a" screw for that particular button.
10. Call letter tabs and celluloid windows are supplied with your receiver. The tabs are used to label the six push buttons set up for stations. The celluloid tabs are supplied as a perforated sheet which is to be broken into eight sections. Select the proper call letter tabs from the station call letter sheets supplied. Place the call letter tab in back of the celluloid window and insert it in its proper slot in the push button escutcheon.
11. Replace the escutcheon with its six retaining screws.

IMPORTANT

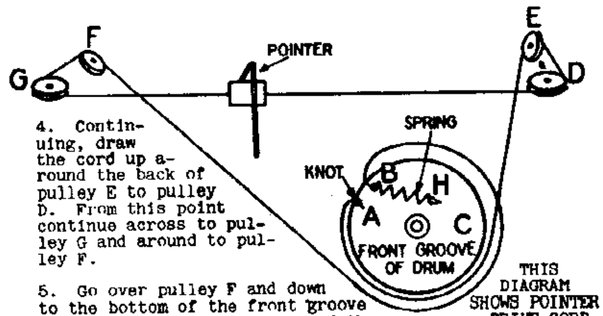
12. In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may change their setting due to heat, humidity, etc.

REPLACING THE DIAL POINTER DRIVE CORD

1. Tie a large knot in one end of about 51" of special dial cord, part No. 111302.

2. Thread the free end of the cord through hole A in drum C (threading from the inside of the drum out) See Fig. 2.

3. After pulling the cord through hole A, make one half turn around the drum C in a counter-clockwise direction (viewed from the front), using the front groove in the drum.



4. Continuing, draw the cord up around the back of pulley E to pulley D. From this point continue across to pulley G and around to pulley F.

5. Go over pulley F and down to the bottom of the front groove on drum C. Continue up around the drum to hole B.

FIG. 2

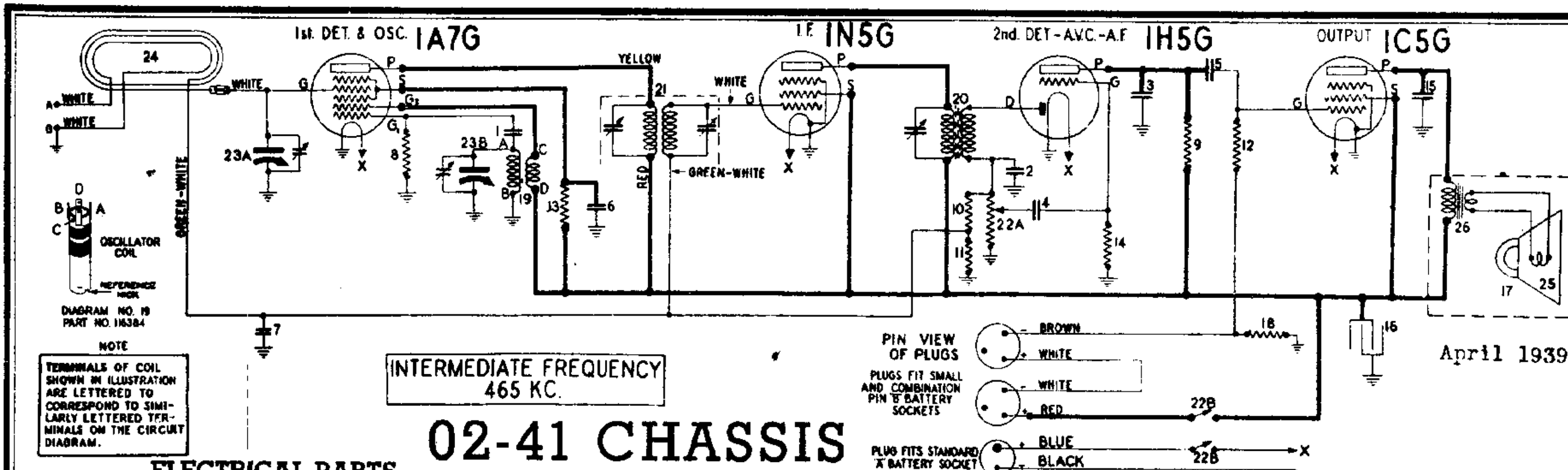
THIS DIAGRAM SHOWS POINTER DRIVE CORD ONLY

6. Draw the cord through hole B and tie it to the end of the tension spring in such a manner that when the spring is clipped on to lug H it will be extended to about 1½" long.

HUM

In some of the first sets produced Resistor No. 23 in the 6F6G grid circuit was 470,000 ohms, also condenser No. 9 and Resistor No. 27 were omitted. The hum level in these sets can be reduced by adding these two parts and Changing Resistor No. 23 to 220,000 ohms. All chassis with this circuit change are stamped with the letter "S" on the back.

STEWART-WARNER CORP.



NOTE
TERMINALS OF COIL SHOWN IN ILLUSTRATION ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.

INTERMEDIATE FREQUENCY
465 KC.

April 1939.

02-41 CHASSIS

ELECTRICAL PARTS

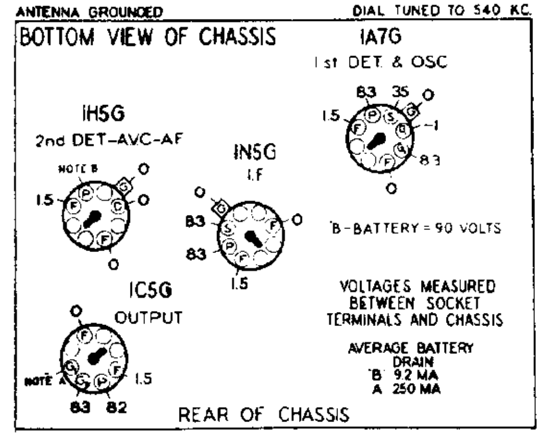
Diagram Number	Part Number	Description	List Price
1-2-3	85061	Condenser—mica 51 mmfd.	$0.15
4-5	88030	Condenser—paper .01 mfd. 400 volt	.25
6-7	88189	Condenser—paper .05 mfd. 200 volt	.25
8	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
9	110554	Resistor—carbon 1 megohm ¼ watt	.12
10-11-12	110570	Resistor—carbon 2.2 meg. ¼ watt	.15
13	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
14	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
15	113035	Condenser—ceramic tube .006 mfd. 600 volt	.14
16	113118	Condenser—electrolytic 8 mfd. 150 volt	.56
17	R-115049	Speaker—P.M. dynamic (5¼")	6.25
18	116061	Resistor—800 ohm ¼ watt 10%	.12
19	116384	Coil—oscillator	.45
20	116385	Transformer—2nd I.F.	.90
21	116386	Transformer—1st I.F.	1.20
22A-22B	116393	Volume control—1 meg. (with on-off switch)	.96
23A-23B	116401	Condenser—variable gang	2.75
24	116437	Loop antenna assembly	1.60
25	R-116461	Cone and voice coil for R-115049 speaker	1.55
26	R-116462	Transformer—output for R-115049 speaker	.90

MISCELLANEOUS PARTS

Part Number	Description	List Price
116399	Cable—for batteries	$0.60
116441	Cabinet	6.25
112745	Clip—coil mounting	.01
113019	Clip—dial scale retaining	.01
113178	Cord—dial (supplied in 4 ft. lengths)	.30
116442	Dial scale	.18
116418	Grille—for speaker	.40
116405	Indicator—on-off	.18
116411	Indicator lever assembly	.09
116416	Knob—for tuning or volume	.12
116488	Nut—No. 8—32 wing nut	.01
116409	Pointer	.05
81145	Retaining ring—for drive shaft.......Per C	.50
116455	Screw—chassis mounting (No. 10x⅜)	.01
85827	Set screw—No. 8-32 square head	.02
116403	Shaft, tuning	.08
116395	Shield—tube	.08
116396	Shield cap—tube	.02
116392	Shield base—tube	.03
114876	Socket—octal base	.15
113169	Spring—for indicator lever	.01
111981	Spring—for dial cord tension	.03
85785	Terminal strip—antenna—ground	.15
84015	Washer—paper, for back of knobs	.01
116414	Window dial	.25

SOCKET VOLTAGES

ANTENNA GROUNDED
DIAL TUNED TO 540 KC.



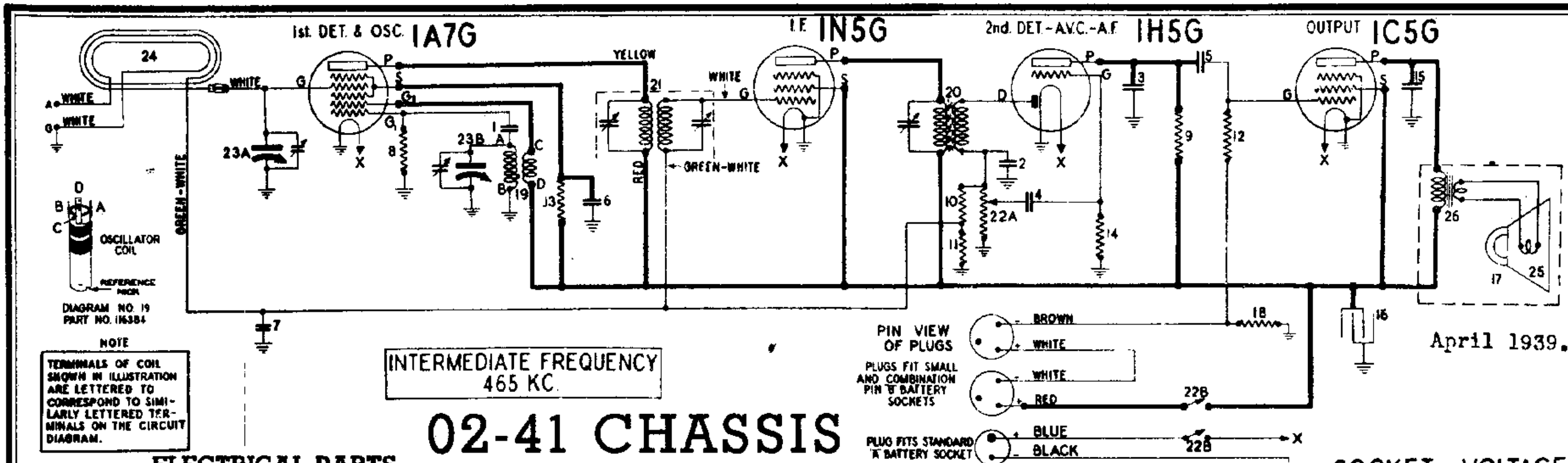
NOTE A: The bias for the control grid of the 1C5G tube is —7.5 volts measured across resistor 18.

NOTE B: Due to the high resistance of plate Resistor No. 9 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

In this receiver,the loop antenna on the back of the cover of the case, takes the place of the usual antenna coil. Thus when the trimmer in this circuit is aligned, the chassis, the loop antenna, and the batteries must be mounted in the cabinet in their correct position.

Holes are provided in the bottom of the case to permit the adjustment of both antenna and oscillator trimmers with the receiver completely assembled. These two adjustments should be made with a signal generator but without an output meter since it is impractical to keep the output meter connected when the back is mounted on the cabinet. That is, the antenna and oscillator trimmers can be adjusted by ear using a signal generator. The I F trimmers must be adjusted with an output meter in the conventional way.

STEWART-WARNER CORP.



April 1939.

02-41 CHASSIS

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
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24	116437	Loop antenna assembly	1.60
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MISCELLANEOUS PARTS

Part Number	Description	List Price
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116441	Cabinet	6.25
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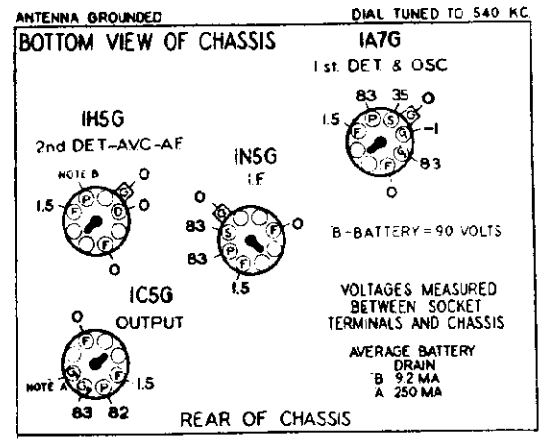
113019	Clip—dial scale retaining	.01
113178	Cord—dial (supplied in 4 ft. lengths)	.30
116442	Dial scale	.18
116418	Grille—for speaker	.40
116405	Indicator—on-off	.18
116411	Indicator lever assembly	.09
116416	Knob—for tuning or volume	.12
116488	Nut—No. 8—32 wing nut	.01
116409	Pointer	.05
81145	Retaining ring—for drive shaft Per C	.50
116455	Screw—chassis mounting (No. 10x⅜)	.01
85827	Set screw—No. 8-32 square head	.02
116403	Shaft, tuning	.08
116395	Shield—tube	.08
116396	Shield cap—tube	.02
116392	Shield base—tube	.03
114876	Socket—octal base	.15
113169	Spring—for indicator lever	.01
111981	Spring—for dial cord tension	.03
85785	Terminal strip—antenna—ground	.15
84015	Washer—paper, for back of knobs	.01
116414	Window dial	.25

SOCKET VOLTAGES



NOTE A: The bias for the control grid of the 1C5G tube is —7.5 volts measured across resistor 18.

NOTE B: Due to the high resistance of plate Resistor No. 9 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

In this receiver, the loop antenna on the back of the cover of the case, takes the place of the actual coil. Thus when the trimmer in this circuit is aligned, the chassis, the loop antenna, and the batteries must be mounted in the cabinet in their correct position.

Holes are provided in the bottom of the case to permit the adjustment of both antenna and oscillator trimmers with the receiver completely assembled. These two adjustments should be made with a signal generator but without an output meter since it is impractical to keep the output meter connected when the back is mounted on the cabinet. That is, the antenna and oscillator trimmers can be adjusted by ear using a signal generator. The I F trimmers must be adjusted with an output meter in the conventional way.

MODELS 02-411 to 02-419
Chassis 02-41
Alignment, Trimmers
Loop, Battery Data

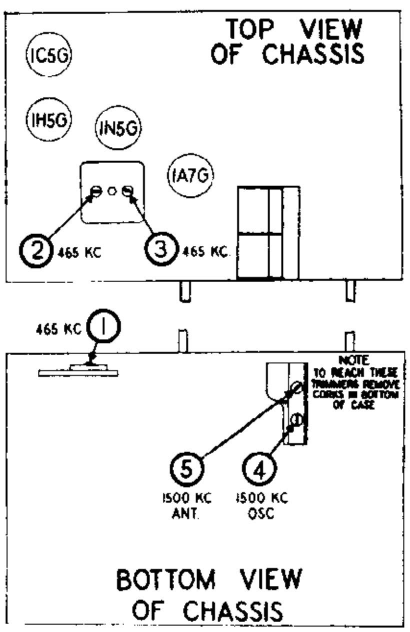
STEWART-WARNER CORP.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 1C5G output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the Ground Terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position while aligning.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 1A7G	465 KC	Any Point Where It Does Not Affect Signal	1	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				2-3	1st I.F.	
Before proceeding further with alignment, disconnect the output meter, and replace chassis, batteries and loop in cabinet, being sure to connect the loop. Using a weak signal from the signal generator, make the following adjustments by ear. The trimmers may be reached through the holes in the bottom of the cabinet by removing corks.						
400 Ohm Carbon Resistor	Antenna Terminal On Bottom Of Cabinet	1500 KC	1500 KC	4	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
400 Ohm Carbon Resistor	Antenna Terminal On Bottom Of Cabinet	1500 KC	Tune To 1500 KC Generator Signal	5	Broadcast Antenna	Adjust for maximum output.



LOOP ANTENNA

A built-in loop antenna is incorporated in this receiver. Due to the directional effect of this type of antenna it will often be possible to increase the signal volume by rotating the entire set.

In some locations it may be desirable to install an external antenna to increase the volume of weak or distant stations. This external antenna should be connected to the screw marked A on the terminal strip located on the bottom of the receiver case. Connect a ground wire to the post marked G on the same terminal strip.

NOTE: You must connect a ground wire to this receiver when using a separate outside aerial, otherwise you will not obtain a satisfactory increase in signal pickup.

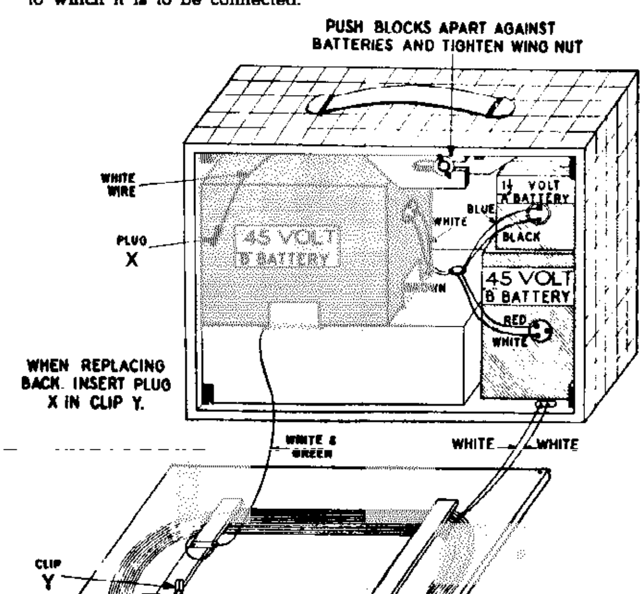
INSTALLATION OF BATTERIES

The following 1½ volt "A" batteries will fit the space provided: Burgess No. 4FAPI, Eveready No. 742, or Ray-O-Vac No. P94A.

"B" batteries of the proper size are Burgess B30PI, Eveready No. 762 and Ray-O-Vac No. 5303.

A plug and clip connection on the loop is provided to facilitate the installation of batteries. Before replacing the back of the cabinet always be sure that this plug is pushed into the clip and that the blocks are holding the batteries firmly in their positions.

Do not permit any of the battery cable plugs to come in contact with the receiver chassis or any battery terminal other than that to which it is to be connected.

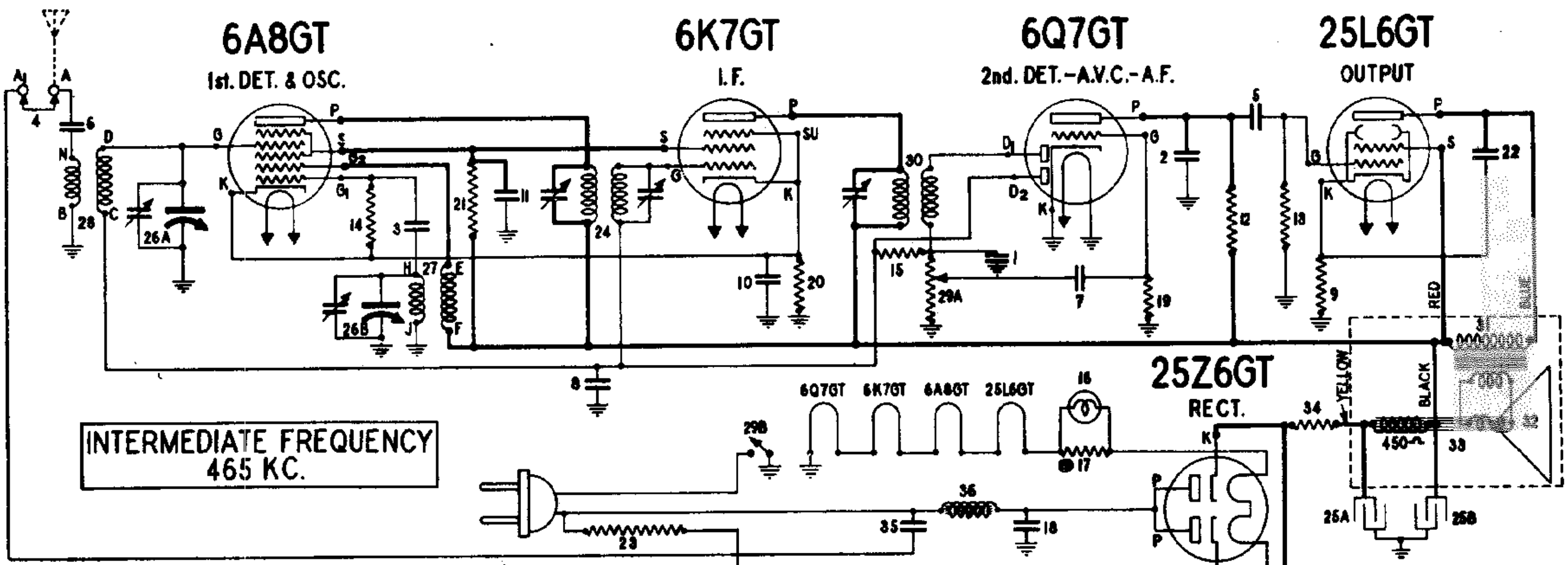


Chassis 07-51S
Schematic, Voltage
Socket, Coils, Changes

STEWART-WARNER CORP.

MODELS 07-511 to 07-519
Chassis 07-51
07-511S to 07-519S

To prevent filter condenser and rectifier tube failure caused by line surges, a 50 ohm resistor is connected in the rectifier cathode circuit.



FEB. 1939.

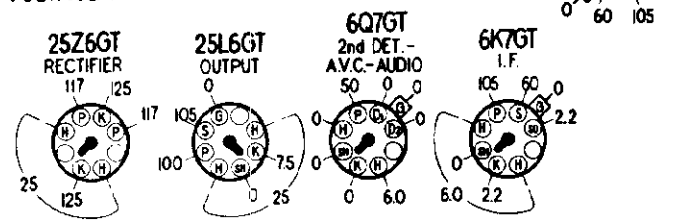
FOR HUM OR NOISE (using built-in antenna)
1. Try reversing power line plug.
2. If not corrected, Remove connector between A and A1, on back of chassis, and connect an external antenna to A.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS UNLESS OTHERWISE SHOWN.

LINE VOLTAGE 117 VOLTS.

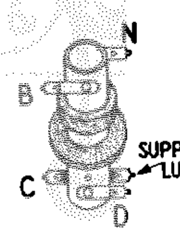
VOLTAGE ACROSS SPEAKER FIELD 20 VOLTS.



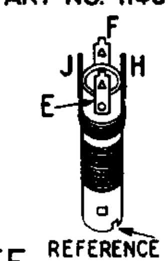
REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of at least 1000 ohms per volt.

ANTENNA COIL
DIAGRAM NO. 28
PART NO. 114873



OSCILLATOR COIL
DIAGRAM NO. 27
PART NO. 114872



NOTE

TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS ABOVE ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	83783	Condenser - mica 110 mmf.	.20
4	85321	Connector - ground	.01
5	88026	Condenser - paper .02 mfd. 400 volt	.25
6-7	88029	Condenser - paper .004 mfd. 400 volt	.25
8	88169	Condenser - paper .05 mfd. 200 volt	.25
9	89278	Resistor - wire wound 140 ohms ½ W.	.12
10-11	89421	Condenser - paper .1 mfd. 200 volt	.25
12	110554	Resistor - carb. 220,000 ohms ¼ watt	.12
13	110559	Resistor - carb. 470,000 ohms ¼ watt	.12
14	110578	Resistor - carb. 68,000 ohms ¼ watt	.12
15	110580	Resistor - carb. 3.3 meg. 1/4 watt	.12
16	110629	Lamp - 6.3 volt - .25 amps.	.15
●17	110975	Resistor - wire wound 33 Ohms ¼W(10%)	.12
18	111252	Condenser - paper .05 mfd. 400 volt	.12
19	112975	Resistor - carbon 10 meg. 1/4 watt	.12
20	112994	Resistor - carbon 220 ohms 1/4 watt	.18
21	112995	Resistor - carb. 15,000 ohms 1/4 W.	
22	114108	Condenser - paper .03 mfd. 750 volt	.25
23	114797	Power cord (dropping resist. 143 ohms -10%) Brown	.98
24	114802	Transformer - 1st I.F.	1.10
25A - 25B	114869	Cond. - dual elect. 16 mfd. 150 V.	
26A - 26B	114870	Condenser variable gang	
27	114872	Oscillator coil	
28	114873	Antenna coil	
29A - 29B	114879	Volume control - 1 meg. with switch	
30	114880	Transformer - 2nd I.F.	
31	R-114885	Transformer-output (for R-115041 spkr)	
	O-116342	Transformer-output (for O-115041 spkr)	
32	R-114886	Cone & Voice Coil (for R-115041 spkr)	
	O-116343	Cone & Voice Coil (for O-115041 spkr)	
33	R-115041	Speaker - dynamic (4 inch)	
34	116013	Resistor - 50 ohms 1 watt	.18
35	116224	Condenser - mica 260 mmfd. 500 volt	
36	116232	R. F. Choke	
31	O-116342	Output transformer for O-115041 spkr.	
32	C-116343	Cone & Voice Coil (for O-115041 spkr.)	

● Resistor No. 17 changed to a 3 watt molded wire-wound resistor, Part 116479 to prevent failure of the resistor if the dial bulb burns out.

MODELS 07-511 to 07-519
07-511S to 07-519S
Alignment, Trimmers
Antenna Notes

STEWART-WARNER CORP.

07-51 CHASSIS

ALIGNMENT PROCEDURE

ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

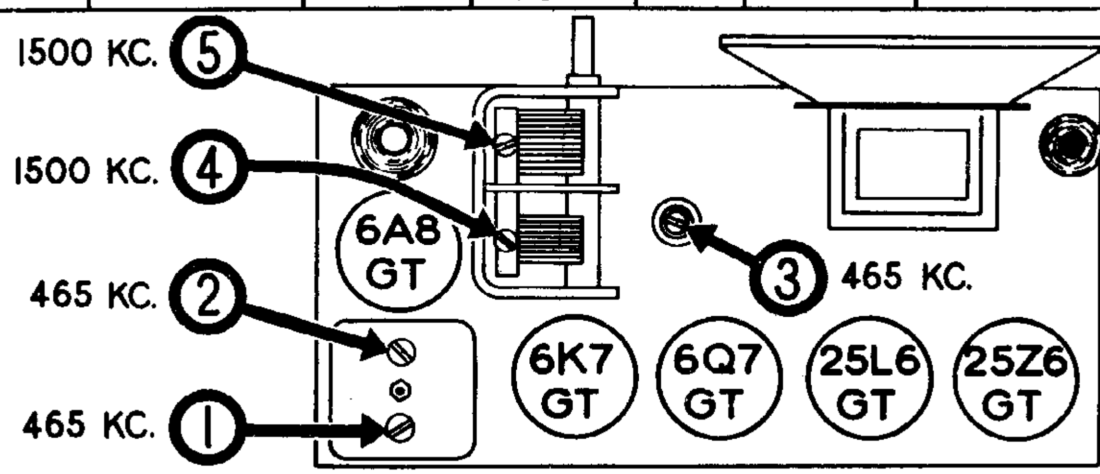
Connect the output meter across the voice coil or between the plate of the 25L6-GT output tube and ground through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.

Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

Remove the connector between Terminals A and A_1.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. MICA CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I. F.	ADJUST FOR MAXIMUM OUTPUT THEN REPEAT ADJUSTMENT
				3	2ND I. F.	
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL (A)	1500 KC	1500 KC	4	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL (A)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	5	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.



BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where Powerful broadcast stations exist. This Built-In Antenna will function when terminals A and A_1 on the back of the chassis are connected together. In cases where noises are excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A_1 and connect an external antenna to terminal A.

Refer to the circuit diagram on the opposite page. Condenser No. 35 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 36 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent feed-back into the antenna circuit, of radio frequency energy generated in the set itself. It also prevents condenser No. 18 from by-passing the signal voltage picked up by the power line.

When aligning this receiver, the jumper connecting terminals A and A_1 should be removed. This will prevent picking up signals which might interfere with the alignment procedure. When the I. F. channel is being aligned, the gang condenser should be set at a point where no interfering signal will be received.

MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
112745	Clip - coil mounting	.01
114876	Socket - octal base	.15
114982	Socket - for dial lamp	.20
116223	Terminal Strip - for antenna (A-A_1)	.12

CABINETS

PART NUMBER	DESCRIPTION	LIST PRICE
114900	Cabinet - ivory (plaskon) for 07-512	5.50
114950	Cabinet - walnut; for 07-511	3.00
116338	Cabinet - sprayed ivory for 07-513	4.25
116339	Cabinet - metallic blue	4.25
116340	Cabinet - metallic red	4.25
116341	Cabinet - metallic green	4.25

CABINET BACKS

PART NUMBER	DESCRIPTION	LIST PRICE
116369	Cabinet back (ivory) for 07-512	.10
116370	Cabinet back (ivory) for 07-512-S	.10
116371	Cabinet back (walnut) for 07-511 & 07-513	.10

TUNING KNOBS

PART NUMBER	DESCRIPTION	LIST PRICE
114973	Knob - tuning (red)	.45
116297	Knob - tuning (ivory)	.40

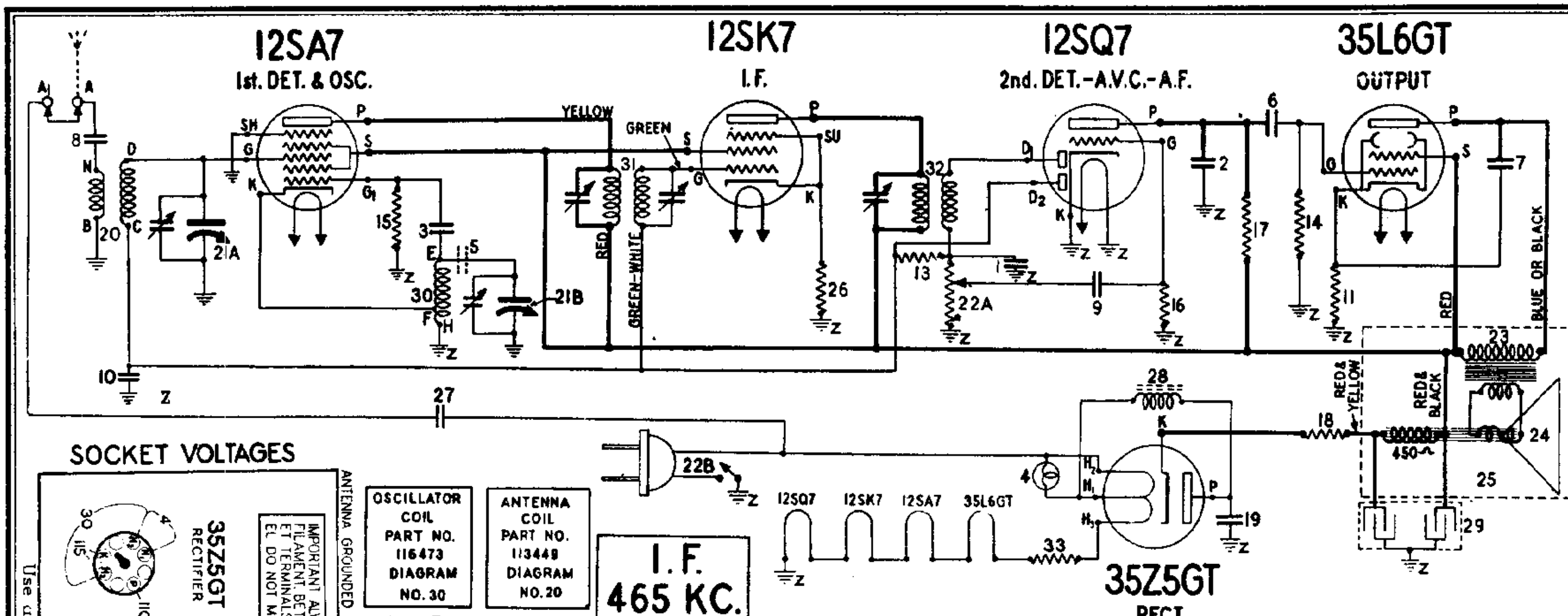
VOLUME KNOBS

PART NUMBER	DESCRIPTION	LIST PRICE
11486[illegible]	Knob - volume (red)	.08
116299	Knob - volume (ivory)	.08

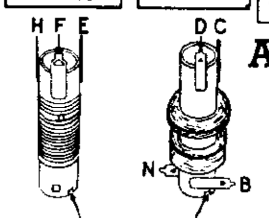
07-551 to 07-559 MODELS 07-511H to 07-519H

STEWART-WARNER CORP Chassis 07-51H

Chassis 07-55
Schematic, Voltage
Socket, Notes



I.F.
465 KC.



OSCILLATOR COIL PART NO. 116473 DIAGRAM NO. 30

ANTENNA COIL PART NO. 113449 DIAGRAM NO. 20

NOTE
TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM

APPLIES ONLY TO CHASSIS STAMPED 07-51H OR 07-55.

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$0.20
3	83783	Condenser—mica. 110 mmf.	.20
4	85296	Lamp—dial 6 to 8 volt .25 amps.	.16
5	88026	Condenser—paper .02 mfd. 400 volt (07-55 only)	.25
6-7	88026	Condenser—paper .02 mfd. 400 volt	.25
8-9	88029	Condenser—paper .004 mfd. 400 volt	.25
10	88189	Condenser—paper .05 mfd. 200 volt	.25
11	89276	Resistor—wire wound 140 ohms ½ watt	.12
	89421	Condenser—paper .1 mfd. 200 volt	.25
13-14	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
15	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
16	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
17	110591	Resistor—carbon 680,000 ohms ¼ watt	.12
18	110975	Resistor—wire wound 33 ohms ½ watt (10%)	.12
19	111252	Condenser—paper .05 mfd. 400 volt	.13
20	113449	Coil—antenna	.78
21A-21B	114870	Condenser—variable gang	2.85
22A-22B	114879	Volume control—1 megohm; with switch	.96
23	R-114885	Transformer—output for R-115041 speaker	1.75
	0-116342	Transformer—output for 0-115041 speaker	1.75
	0-116487	Transformer—output for 0-115050 speaker	1.25
	R-116524	Transformer—output for R-115051 speaker	1.65
24	R-114886	Cone & voice coil assembly for R-115041 & R-115051 speaker	$1.00
	0-116343	Cone & voice coil assembly for 0-115041 & 0-115050 speaker	1.50
25	0-115041	Speaker—dynamic 4" (07-51H)	4.70
	R-115041	Speaker—dynamic 4" (07-51H)	4.70
	0-115050	Speaker—dynamic 4" (07-55)	3.75
	R-115051	Speaker—dynamic 4" (used on some 07-51H)	3.75
26	116062	Resistor—150 ohms ± 20% ¼ watt	.12
27	116224	Condenser—mica 260 mmfd. 500 volt	.15
28	*116232	R. F. Choke	.48
	0-116342	Transformer—output for 0-115041 speaker	1.75
	0-116343	Cone & voice coil assembly for 0-115041 & 0-115050 speaker	1.50
29	116470	Condenser—electrolytic 20-20 mfd. 150 volt	.95
30	116473	Coil—oscillator	.35
31	116474	Transformer—1st I.F.	1.10
32	116475	Transformer—2nd I.F.	1.00
	0-116487	Transformer—output for 0-115050 speaker	1.25
	R-116524	Transformer—output for R-115051 speaker	1.65
33	116527	Resistor—100 ohms ± 10% 3 watt W.W.	.26

GROUNDS MARKED "Z"

07-55 CHASSIS: ALL GROUNDS MARKED "Z" ARE NOT CONNECTED DIRECTLY TO CHASSIS BUT ARE CONNECTED TOGETHER AND GROUNDED TO CHASSIS THROUGH .1 MFD. CONDENSER (PART NO. 89421.

07-51H CHASSIS: GROUNDS MARKED "Z" CONNECTED DIRECTLY TO CHASSIS.

SOCKET VOLTAGES

ANTENNA GROUNDED

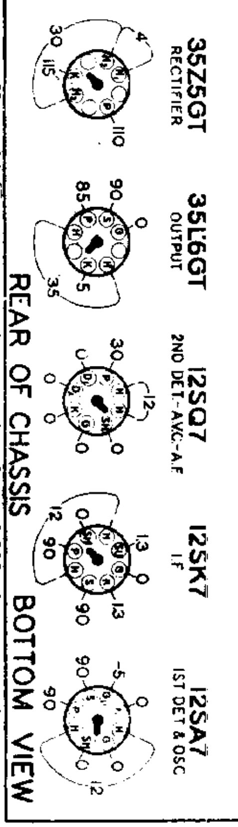
DIAL TUNED TO 540 KC

IMPORTANT ALWAYS MEASURE ALL VOLTAGES, EXCEPT FILAMENT, BETWEEN THIS LUG AND THE TUBE SOCKET TERMINALS ON THE 07-55 CHASSIS. IN THIS MODEL DO NOT MEASURE VOLTAGES TO CHASSIS

VOLUME CONTROL

LINE VOLTAGE 117 VOLTS

VOLTAGE ACROSS SPEAKER FIELD 25 VOLTS



REAR OF CHASSIS BOTTOM VIEW

Use a high resistance voltmeter of at least 1,000 ohms per volt.

MODELS 07-511H to 07-519H
Chassis 07-51H
07-551 to 07-559
Chassis 07-55
Alignment, Trimmers
Antenna Data

STEWART-WARNER CORP.

ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. On the 07-51H, connect the output meter across the voice coil or between the plate of the 35L6GT output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil. THE CONNECTIONS FOR THE 07-55 ARE THE SAME EXCEPT CONNECT THE GROUND LEAD TO THE POINT SHOWN IN FIG. 2 INSTEAD OF TO CHASSIS.
2. When aligning the 07-51H chassis, connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. FOR THE GROUND LEAD CONNECTION TO THE 07-55 CHASSIS, REFER TO "BOTTOM VIEW," FIG. 2.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Remove the connector between Terminals A and A_1.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator To Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Mica Condenser	Trimmer Lug On Front Section Of Variable Condenser	465 KC	1750 KC	1	2nd I.F.	Adjust for Maximum Output, Then Repeat Adjustment.
				2-3	1st I.F.	
200 MMFD. Mica Condenser	Antenna Terminal (A)	1500 KC	1500 KC	4	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (A)	1500 KC	Tune To 1500 KC Generator Signal	5	Broadcast Antenna (Shunt)	Adjust for Maximum Output.

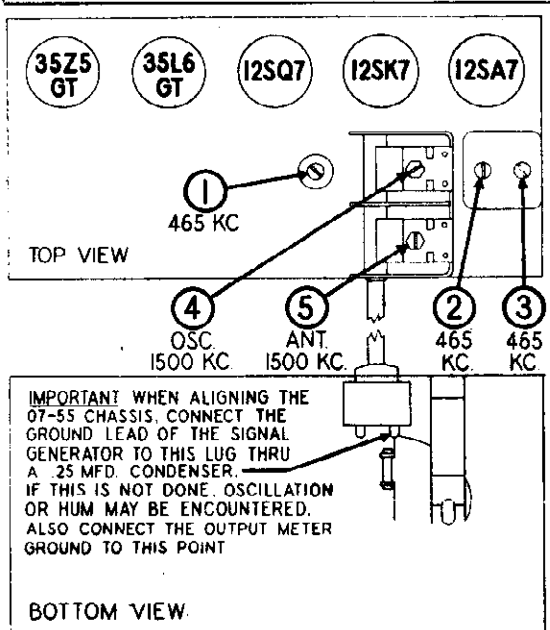


Fig. 2

BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and A_1 on the back of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A_1 and connect an external antenna to terminal A.

The Built-In Antenna Condenser No. 27 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 28 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent condenser No. 19 from by-passing the signal voltage picked up by the power line. It also prevents feed-back into the antenna circuit of radio frequency energy generated in the set itself.

When aligning this receiver, the jumper connecting terminals A and A_1 should be removed. This will prevent picking up signals which might interfere with the alignment procedure.

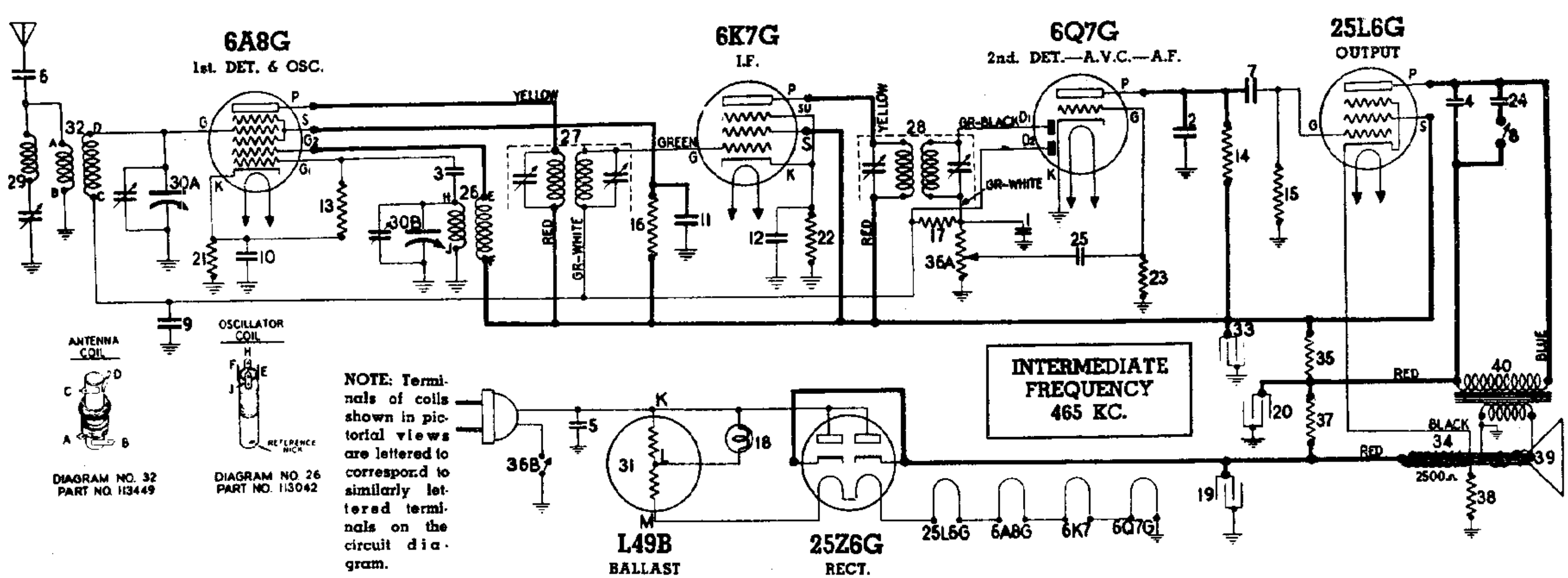
MISCELLANEOUS PARTS

Part No.	Description	List Price
116485	Asbestos Pad-Model 07-55 only	$0.03
116467	Base—Condenser Mounting	.04
116471	Cover for elect. condenser—(07-55) only	.05
116651	Clamp for power cord—(07-55) only	.02
112745	Clip—coil mounting	.01
114982	Socket—for dial lamp	.20
114876	Socket—octal base	.15
85040	Screw—No. 6 Hex. Hd.—Per C	.35
116223	Terminal strip—antenna (A-A_1)	.12
	CABINETS	
116750	Cabinet (wood)—(07-514H) and (07-554)	7.00
116341	Cabinet (metallic green)—(07-513H) (07-553)	2.75
116340	Cabinet (metallic red)—(07-513H) (07-553)	2.75
116339	Cabinet (metallic blue)—(07-513H) (07-553)	2.75
116338	Cabinet (sprayed ivory)—(07-513H) (07-553)	2.75
114950	Cabinet (walnut)—(07-511H) (07-551)	2.00
114900	Cabinet (ivory plaskon)—(07-512H) (07-512H-S) (07-552S) (07-552)	3.40
	CABINET BACK	
116497	Cabinet Back (walnut) (07-511H) (07-513H)	.12
116496	Cabinet Back (ivory) (07-513H) (07-512H)	.12
116481	Cabinet Back (ivory) (07-552S)	.12
116480	Cabinet Back (walnut) (07-551) (07-553)	.12
116477	Cabinet Back (ivory) (07-551) (07-553) (07-552)	.12
	TUNING KNOBS	
116297	Knob—tuning (ivory)—(07-513H) (07-553)	.40
114975	Knob—tuning (walnut)—(07-511H) (07-551) (07-514H)	.45
114973	Knob—tuning (red)—(07-512H) (07-512H-S) (07-513H) (07-553) (07-552) (07-552S)	.45
	VOLUME KNOBS	
116299	Knob—tuning (ivory) (07-513H) (07-553)	.08
114933	Knob—tuning (walnut) (07-511H) (07-514H) (07-551)	.12
114867	Knob—tuning (red) (07-512H-S) (07-512H) (07-513H) (07-552S) (07-552) (07-553)	.08

Schematic, Voltage
Socket

STEWART-WARNER CORP.

MODELS 07-631 to 07-639
Chassis 07-63



ELECTRICAL PARTS

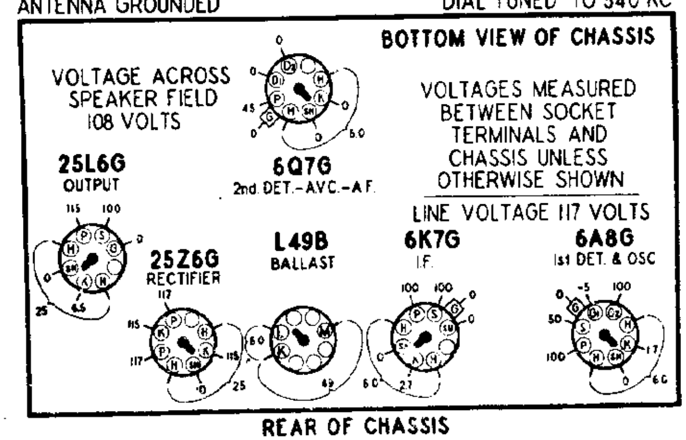
Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser—mica 260 mmfd.	$0.20
3	85061	Condenser—51 mmfd.	.15
4-5	88026	Condenser—paper .02 mfd. 400 volt	.25
6	88029	Condenser—paper .004 mfd. 400 volt	.25
7	88030	Condenser—paper .01 mfd. 400 volt	.25
8	88054	Switch—tone control	.30
9	88189	Condenser—paper .05 mfd. 200 volt	.25
10-11-12	89421	Condenser—paper .1 mfd. 200 volt	.25
13	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
14	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
15	110559	Resistor—carbon 470,000 ohms ¼ watt	.12
16	110566	Resistor—carbon 33,000 ohms ¼ watt	.12
17	110580	Resistor—carbon 3.3 meg. ¼ watt	.12
18	110629	Lamp—6.3 volt .25 amps	.15
19-20	112898	Condenser—electrolytic 16 mfd. 150 v.	.50
21-22	112951	Resistor—carbon 400 ohms ¼ watt	.12
23	112975	Resistor—carbon 10 meg. ¼ watt	.12
24	113034	Condenser—paper .04 mfd. 600 volt	.15
25	113035	Condenser—paper .006 mfd. 600 volt	.14
26	113042	Coil—oscillator	.45
27	113046	Transformer—1st I.F.	1.00
28	113047	Transformer—2nd I.F.	1.10
29	113119	Coil—wave trap (with trimmer)	.50
30A-30B	113150	Condenser—variable gang	3.00
31	113365	Ballast Resistor (tube) L-49-B	.50
32	113449	Coil—antenna	.78
33	113472	Condenser—electrolytic 40 mfd. 150 v.	.56
34	U-115044	Speaker—dynamic 5"	4.80
35	116060	Resistor—carbon 1500 ohms ½ watt	.15
36A-36B	116272	Volume control—1 meg. with switch	.94
37	116275	Resistor—wire wound 50 ohms ½ watt	.15
38	116301	Resistor—wire wound 80 ohms 1 watt	.15
39	U-116306	Cone—voice coil for U-115044 speaker	1.40
40	U-116307	Output transformer for U-115044 spkr.	1.75

DIAL & MISCELLANEOUS PARTS

Part No.	Description	List Price
113170	Adjusting lug—for button shafts	$0.01
113171	Bracket—for dial and condenser mtg.	.64
112776	Celluloid cover—over dial face	.28
112745	Clip—for coil mtg.	.01
112764	Clip—dial scale retaining	.01
112798	Clip—for wave trap mtg.	.01
113178	Cord—dial (supplied in 4 ft. lengths)	.30
113174	Dial Drum—and pinion assembly	.44
116175	Dial scale	.30
113053	Escutcheon—for push buttons	.32
112914	Escutcheon—dial	.35
113156	Gear and Bushing assembly for dial drive	.22
113022	Knob—tone and volume control	.10
113494	Mechanical tuner assembly; keys & housing only	3.00
112770	Pointer—dial	.08
112762	Pulley—dial cord drive	.04
113103	Push button (walnut)	.06
81145	Retaining Ring—for tuning shaft ... Per C	.50
114598	Rubber tube on tuning shaft	.01
85040	Screw—No. 6 x ¼ Hex. Hd. for Mtg. Adjust. Lug	.35
112874	Screw for chassis mtg. 10 x 1⅛"	.01
114431	Screw—No. 6-40 x ⅞" for setting up buttons	.01
114914	Screw special head for mtg. escutcheon .. Per dz.	.15
85827	Set Screw—8-32 square head	.02
113176	Shaft—dial drive	.18
112864	Shield—for tubes	.08
112865	Shield—base; for tubes	.03
112847	Socket—for dial lamp	.22
114876	Socket—octal base	.15
113189	Spring—for key return	.01
113177	Spring—dial cord tension	.09
113189	Tab—celluloid for push button ... Per dz.	.09
113321	Tabs—station call letters for push buttons	.40
116530	Washer—paper for back of knobs	.005
110829	Washer for chassis mtg.	.01

SOCKET VOLTAGES

ANTENNA GROUNDED
DIAL TUNED TO 540 KC



Use a high resistance voltmeter of at least 1,000 ohms per volt.

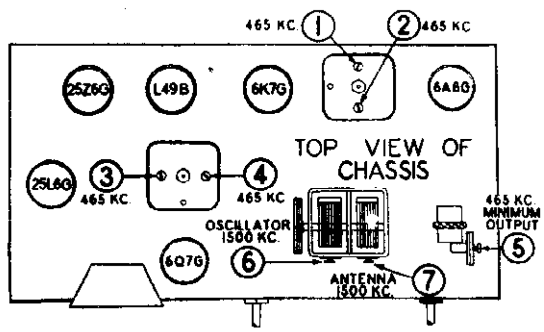
STEWART-WARNER CORP.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.
2. Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Mica Condenser	Control Grid of 6A8-G Tube	465 KC	Any Point Where It Does Not Affect The Signal	1-2	1st I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
				3-4	2nd I.F.	
200 MMFD Mica Condenser	Antenna Lead (Blue Wire)	465 KC	Any Point Where It Does Not Affect The Signal	5	Wave Trap	Adjust for Minimum Output Using a Strong Generator Signal.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust Trimmer to Bring in Signal.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Tune To 1500 KC Generator Signal	7	Broadcast Antenna (Shunt)	Adjust for Maximum Output.



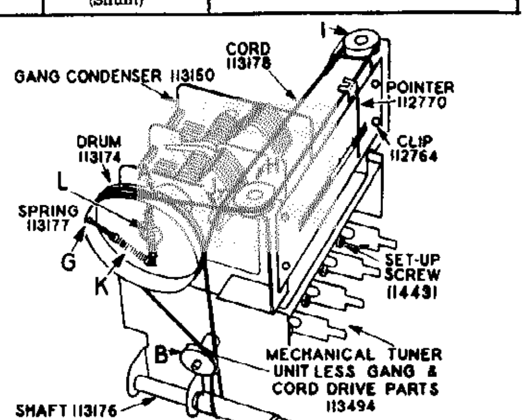


FIG. I

HOW TO SET UP PUSH BUTTONS

1. Before setting up buttons, turn on set for at least 15 minutes. To set up a push button, pull off the button cap by grasping the button and pulling outward on it. When the button is removed, the set-up screw will be exposed to view (See Fig. 1). Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).
2. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, grasp the tuning knob and tune in the desired station. Then retighten the adjusting screw, turning clockwise until reasonably tight.

WARNING: Do not attempt to turn the screw until it reaches a definite stop. Merely turn until you meet with appreciable resistance. To turn further may result in damage to the mechanism.

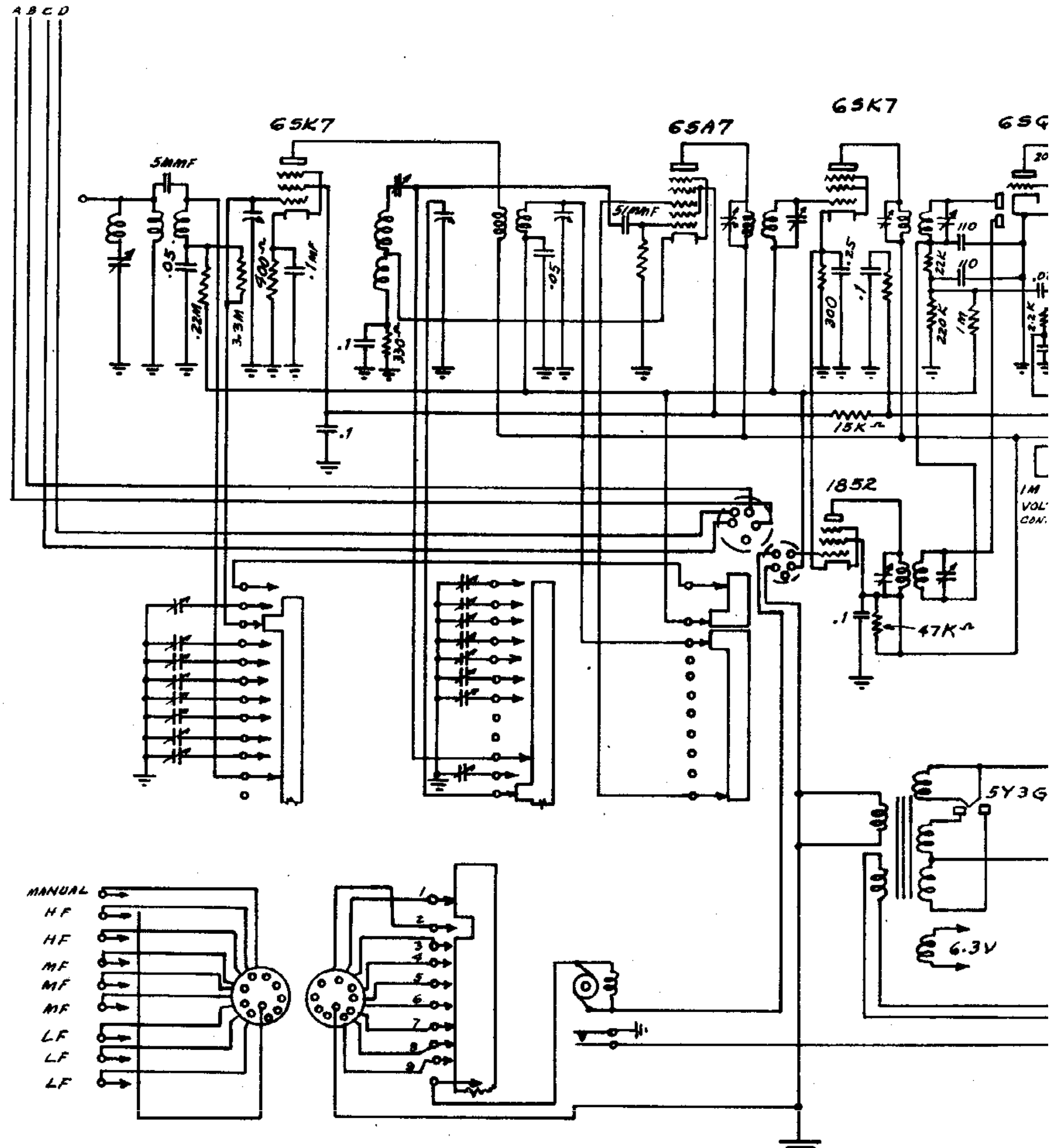
HOW TO REPLACE THE DIAL DRIVE CORD

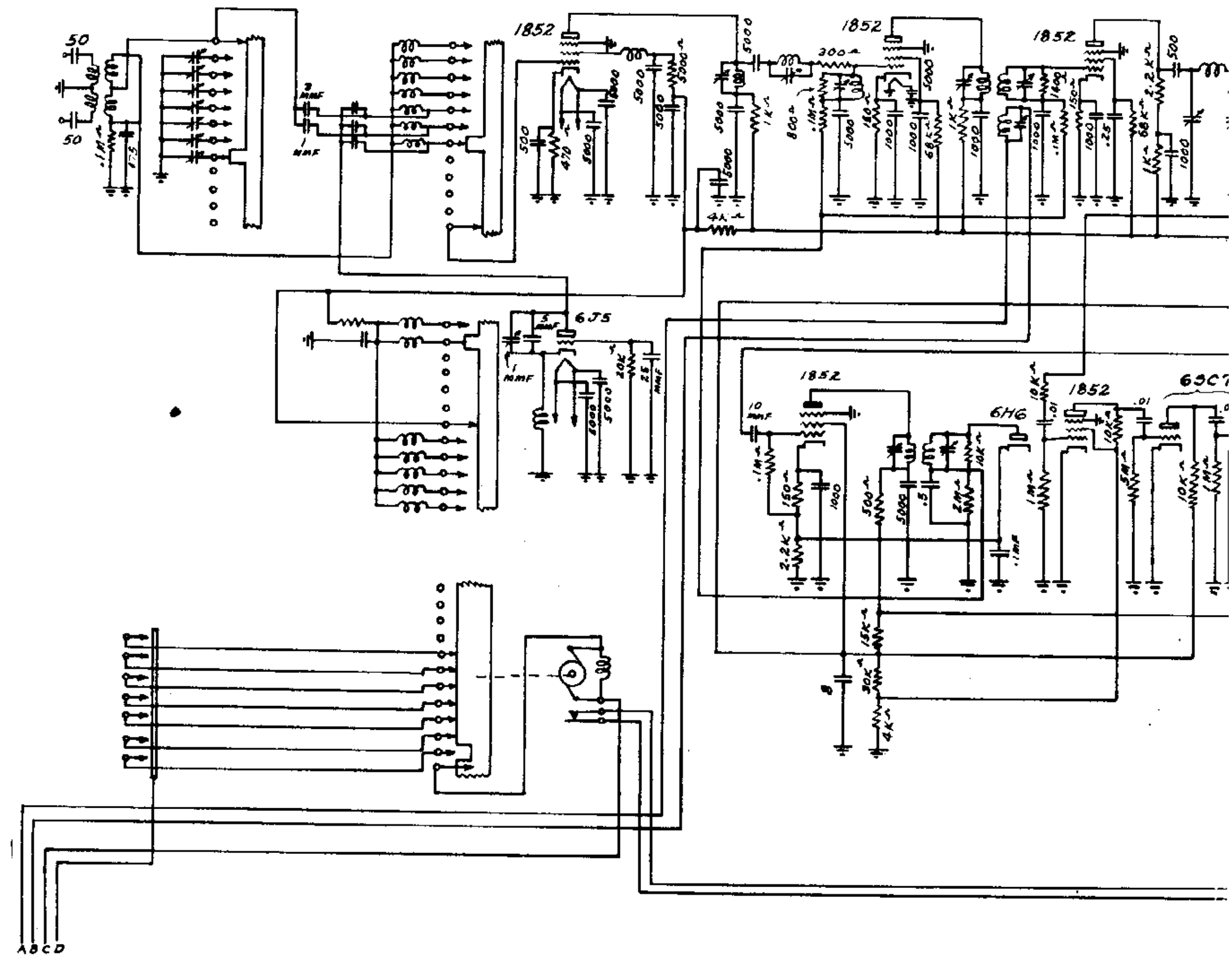
1. Close the gang condenser. The set screw in the drum, Fig. 1, must be on the top side.
2. Tie one end of the dial cord to the spring L and thread the other end through hole A and down the front of the drum to the tuning shaft. Continue around the shaft, then over pulley B and up the rear side of the drum.
3. Thread the cord through hole A and tie the other end to spring L. Tie the cord so that spring L will be extended to about ¾ inch.

HOW TO REPLACE DIAL POINTER DRIVE CORD

1. Close the gang condenser and thread one end of the cord through eyelet G and tie it to spring K.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum. Carry the end of the cord on around the drum and thread through eyelet G.
4. Tie both ends extending through eyelet G to tension spring K.
IMPORTANT: In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push button operate too hard because of overloading.
5. Be sure the gang condenser is closed, then set the dial pointer to the last dial division mark on the right and clip it to the cord

MODEL T-1210
Sound Schematic

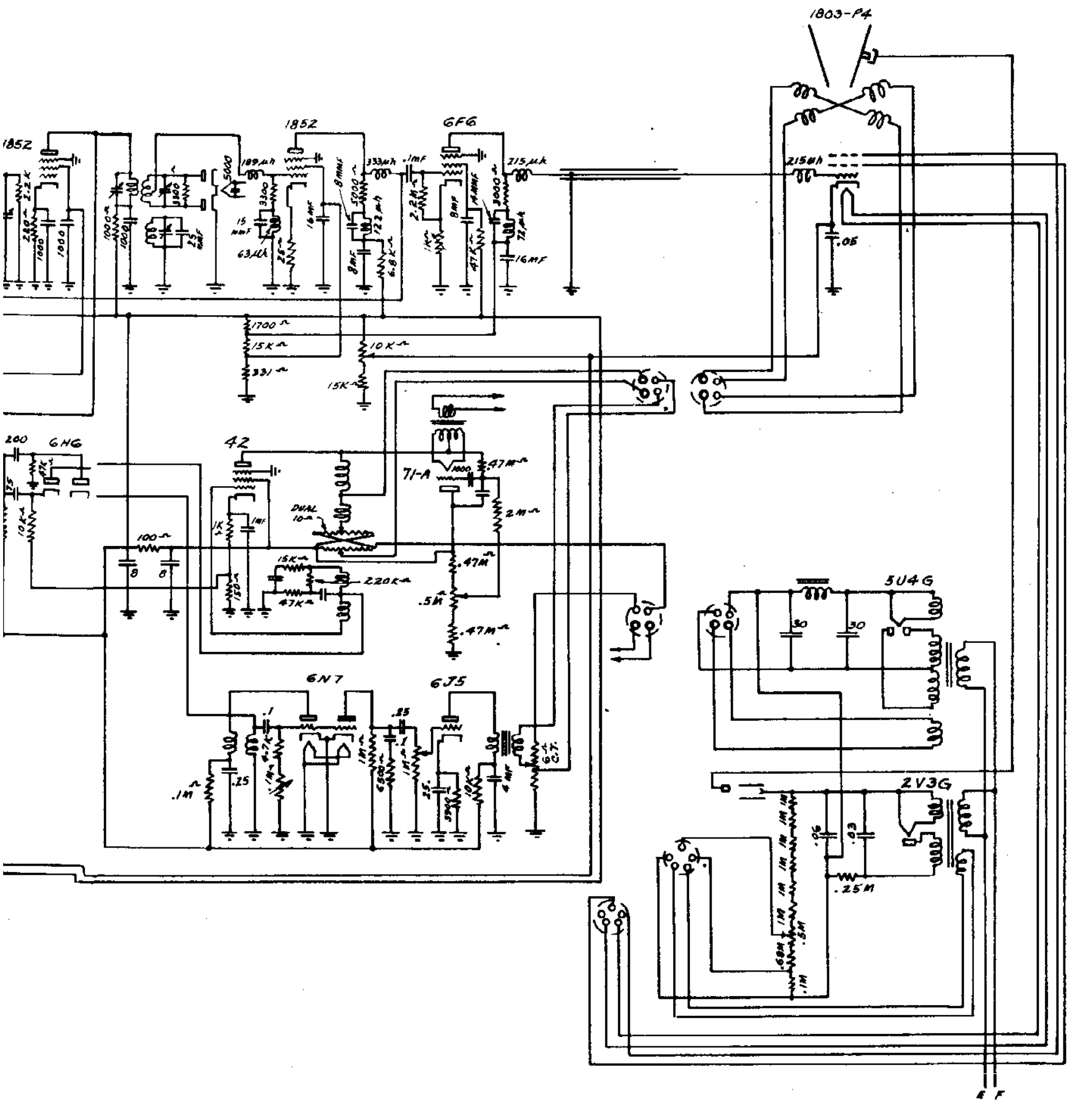




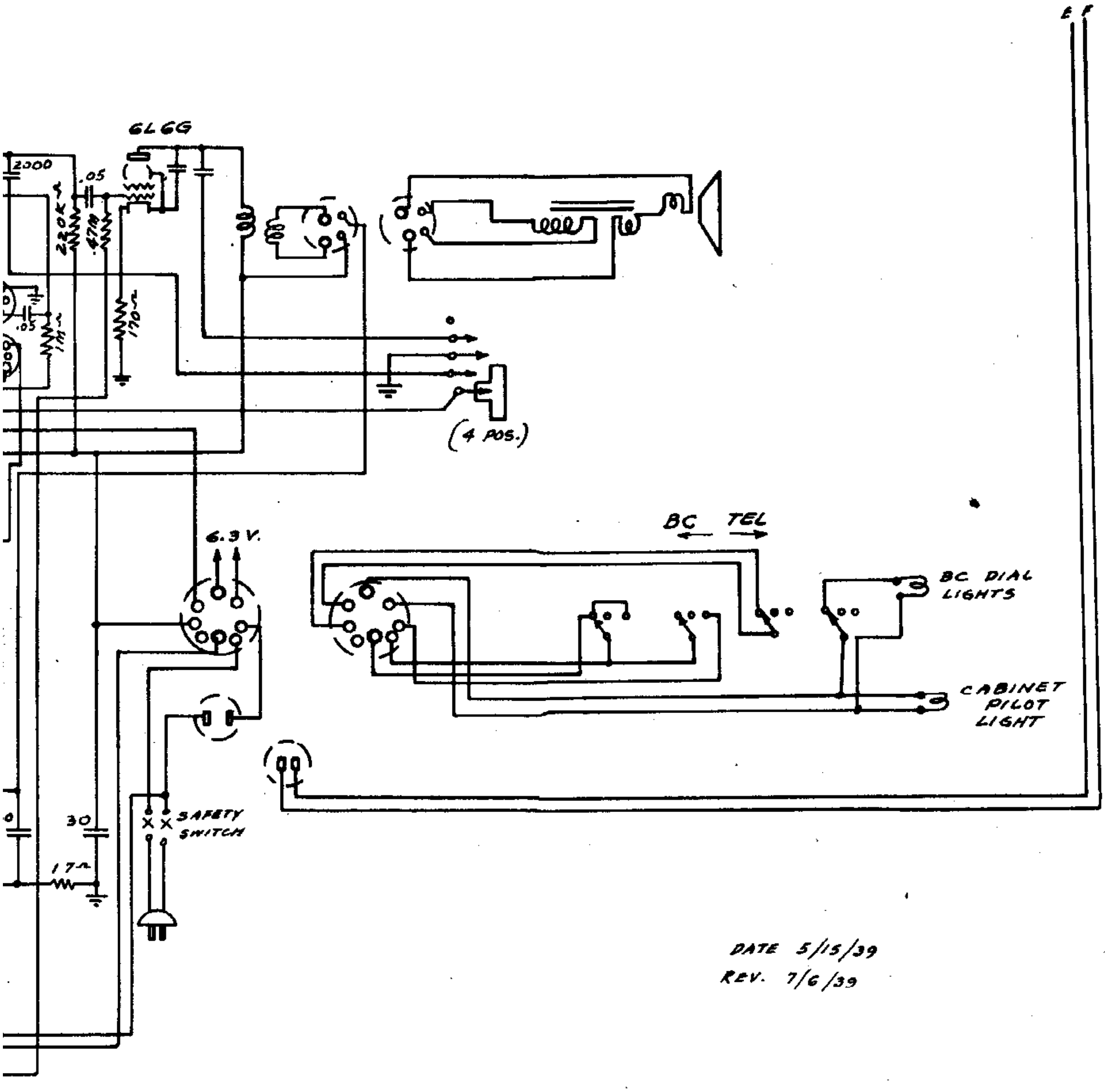
1852
1852
1852
6J5
1852
6H6
1852
6SC7
ABCD

ARNER CORP.

MODEL T-1210
Video Schematic



ARNER CORP.



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STROMBERG-CARLSON TEL. MFG. CO. Schematic

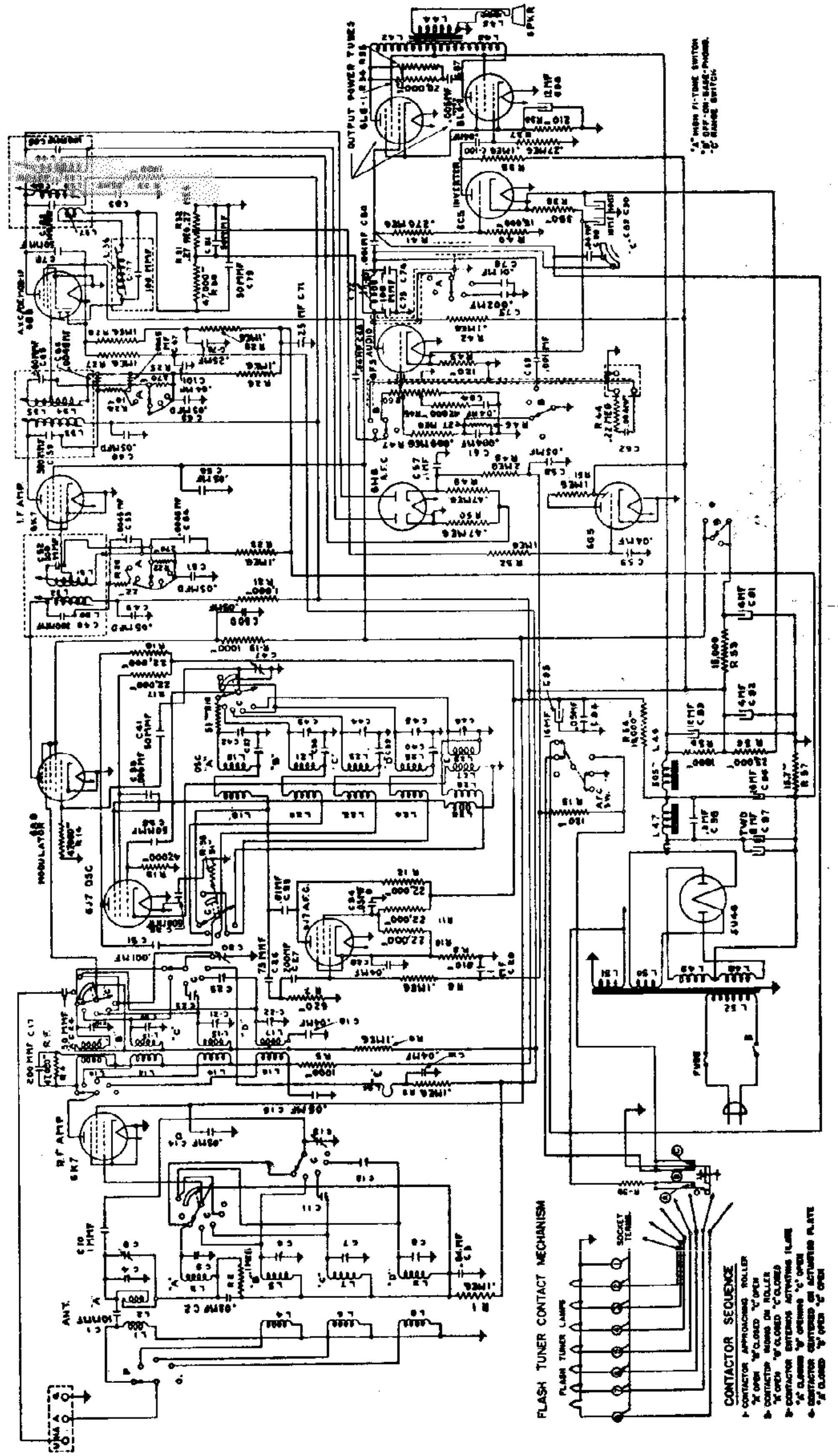


Fig. 2. Schematic Circuit.

APPARATUS SPECIFICATIONS

No. 255-L ---------------------------50 to 60 Cycles; P-27633 Chassis; P-27504 Loud Speaker
No. 255-LB --------------------------25 to 60 Cycles; P-27634 Chassis; P-27504 Loud Speaker

IF PEAK 465 KC

MODELS 255L,255LB
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

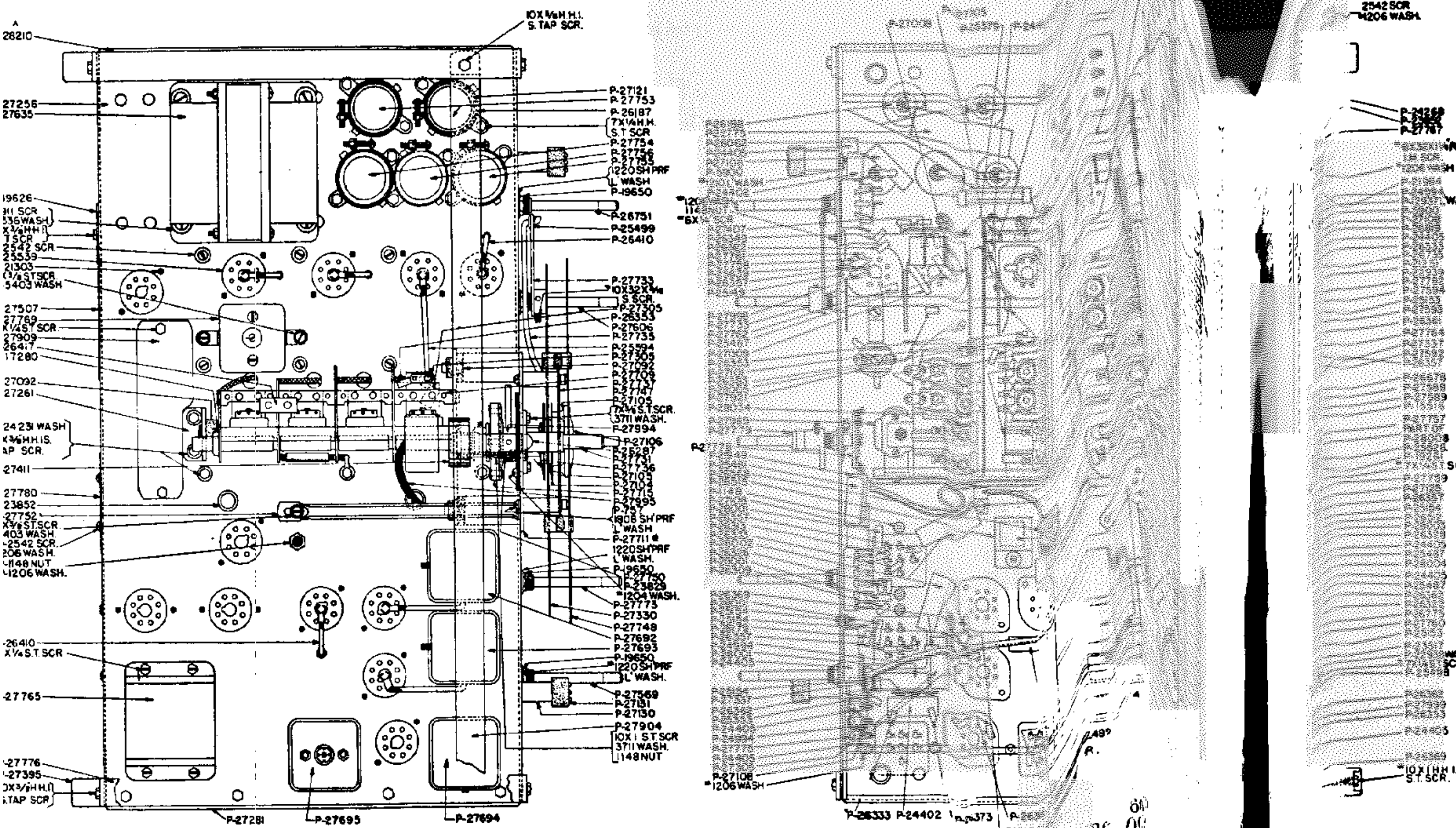


Fig. 6. Chassis Assembly.

Stromberg-Carlson
). 255 Radio Receivers

Type of Circuit............................S..perhetero... ...uency Control
Tuning Ranges............................{ A—530 to 1600 Kc.; ...0 to 11,000 Kc.
D—11,000 to ...,000 Kc.
Number and Types of Tubes............{ 2 No. 6K7, 1 No. 6A8, ... 6H6, 1 No. 6F5
1 No. 6C5, ... 5U4G
Input Voltage Rating.......................................125 Volts A. C.
Power Frequency Rating....................................50 to 60 Cycles
Input Power Rating...145 Watts
Frequency of Intermediate Amplifier......................465 Kilocycles

MODELS 255L, 255LB

Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

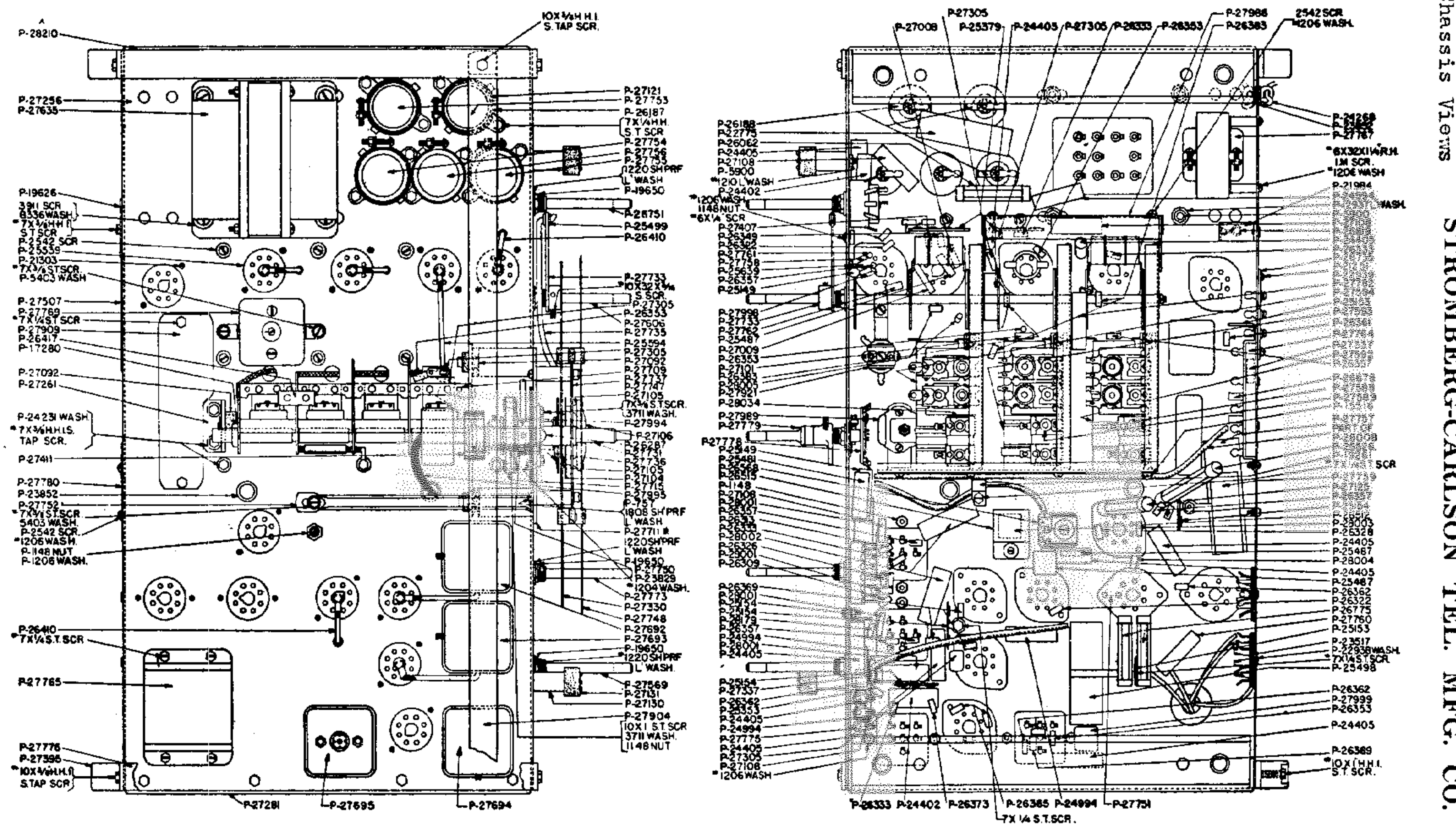


Fig. 6. Chassis Assembly.

Stromberg-Carlson

No. 255 Radio Receivers

Type of Circuit	Superheterodyne with Automatic Frequency Control
Tuning Ranges	A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc. D—11,000 to 22,000 Kc.; E—22,000 to 60,000 Kc.
Number and Types of Tubes	2 No. 6K7, 1 No. 6A8, 2 No. 6J7, 1 No. 6B8, 1 No. 6H6, 1 No. 6F5 1 No. 6C5, 2 No. 6L6, 1 No. 6G5, 1 No. 5U4G
Input Voltage Rating	105 to 125 Volts A. C.
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	145 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

STROMBERG-CARLSON TEL. MFG. CO.

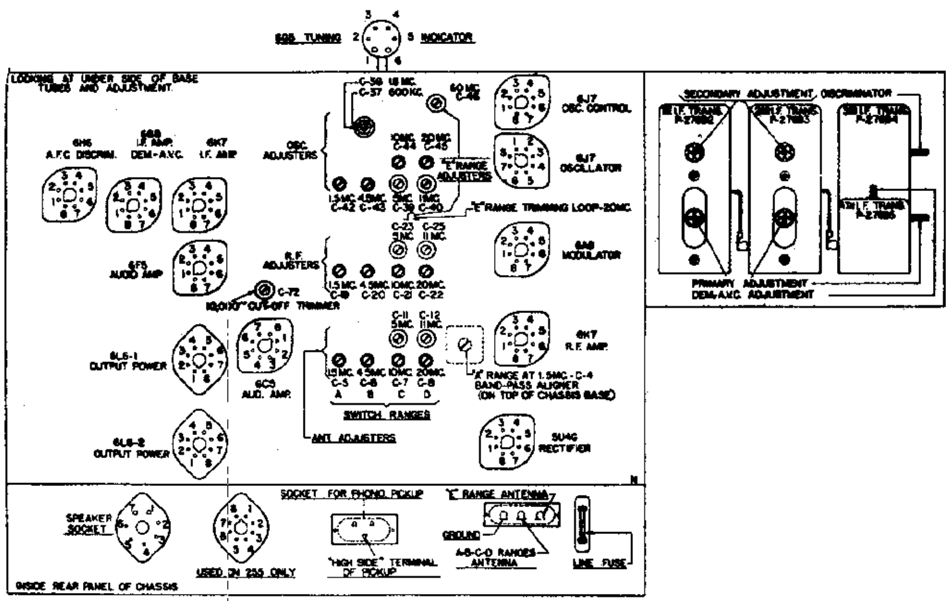


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+230	+90	0	+80	*6.1*	0	2-7	*6.1*
6A8	Modulator	0	0	0	+230	+80	−2.0	+80	*6.1*	0	2-7	*6.1*
6J7	Oscillator	0	0	*6.1*	+60	+180	0	0	0	0	2-7	*6.1*
6J7	Oscillator Control	0	0	0	+190	+110	+5.8	0	*6.1*	+5.8	2-7	*6.1*
6K7	I. F. Amp.	0	0	0	+235	+90	0	0	*6.1*	0	2-7	*6.1*
6B8	I. F. Amp.—Dem.—A. V. C.	0	0	*6.1*	+225	−0.1	−0.1	+90	0	0	2-7	*6.1*
6H6	A. F. C. Discriminator	—	0	0	−0.25	0	−0.2	−0.2	*6.1*	0	2-7	*6.1*
6F5	Audio Amp.	0	0	0	+135	+135	0	0	*6.1*	+1.3	2-7	*6.1*
6C5	Audio Amp.	—	0	0	+100	+135	0	+1.3	*6.1*	+5.2	2-7	*6.1*
6L6 No. 1	Audio Output	—	0	0	+300	+305	0	0	*6.1*	+22	2-7	*6.1*
6L6 No. 2	Audio Output	—	0	0	+300	+305	0	0	*6.1*	+22	2-7	*6.1*
6G5	Tuning Indicator	—	*6.1*	+0.5	−0.2*	+245	0	0	—	—	1-6	*6.1*
5U4G	Rectifier	—	0	+430	—	*395*	—	*395*	—	+430	2-8	*4.8*
Speaker Socket		—	+420	0	0	+430	+430	0	+320	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

CONTINUITY TEST FOR NO. 255 RECEIVER.

ALSO MODEL 250 Nov. 1, 1937.

For making a continuity test on the No. 255 Receivers, use the same test chart and instructions as are used on the No. 250 Receivers with the addition of the following tests for the Flash Tuner Unit:

1. Remove Flash Tuner Lamp Plug from Flash Tuner Lamp Socket. (This socket is located next to the speaker socket on rear of chassis).

2. Operate A.F.C. to "ON" position (This switch is located directly under dial on front of chassis). Operate tuning dial until Finger No. 2 on Flash Tuner Unit makes contact on Switch (See Flash Tuner Sketch on Page 8 of Engineering Data Sheet for the No. 255 Receiver for the correct location of fingers). Read from No. 1 terminal of Flash Tuner Socket to chassis base, reading should be "S". Operate A.F.C. switch to "OFF" position. Reading should be "S"

   Read from No. 2 terminal of Flash Tuner Socket to chassis base, reading should be "O".

   Operate A.F.C. Switch to "ON" position. Read from No. 2 terminal of Flash Tuner Socket to chassis base, reading should be 10".

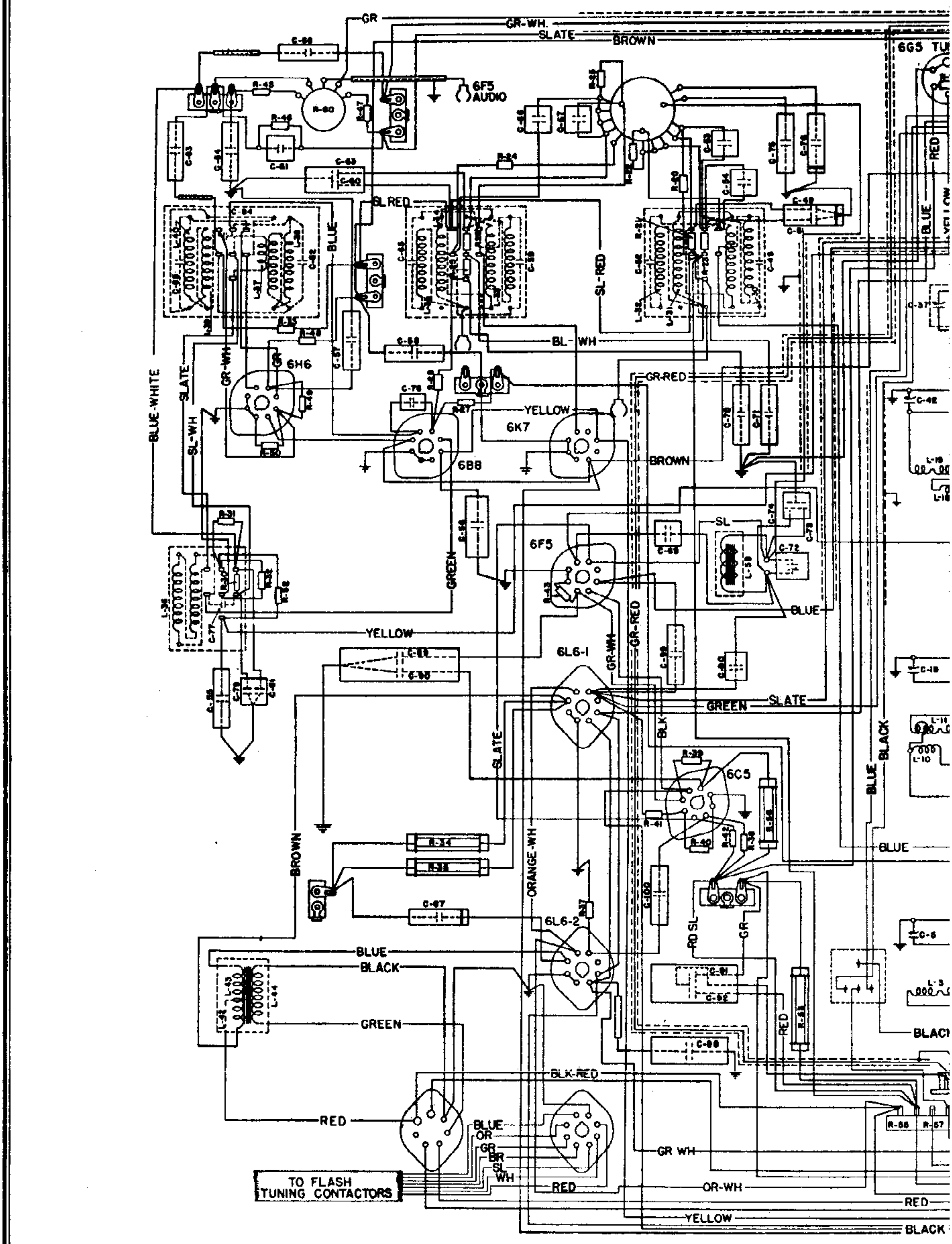
3. Operate tuning dial until Finger No. 3 on Flash Tuner Unit makes contact on switch. Read from No. 3 terminal of Flash Tuner socket to chassis base, reading should be 10".

   Operate A.F.C. switch to "OFF" position. Read from No. 3 terminal of Flash Tuner socket to chassis base, reading should be "O".

4. Proceed in the same manner to test the rest of this circuit.

   Operate the A.F.C. Switch to "ON" position. Operate the tuning dial until the next finger to be tested makes contact on switch. Move the test prong of the meter to the terminal of the Flash Tuner socket which corresponds to the finger to be tested. The readings for each of the contacts should be 10" with A.F.C. Switch operated to "ON" position and "O" with A.F.C. Switch in "OFF" position.

NOTE:
The readings from the Flash Tuner Socket are usually taken from the top of the socket. Therefore, the terminals will be numbered in a counter-clockwise direction.


6F5 AUDIO
6H6
6B8
6K7
6F5
6L6-1
6C5
6L6-2
6G5 TU
GR
GR-WH.
SLATE
BROWN
SL.RED
SL-RED
BL-WH
GR-RED
YELLOW
BLUE
BLUE-WHITE
SL-WH
GR-WH
GREEN
GREEN
SLATE
BLK
ORANGE-WH
BLACK
BLK-RED
RED
OR
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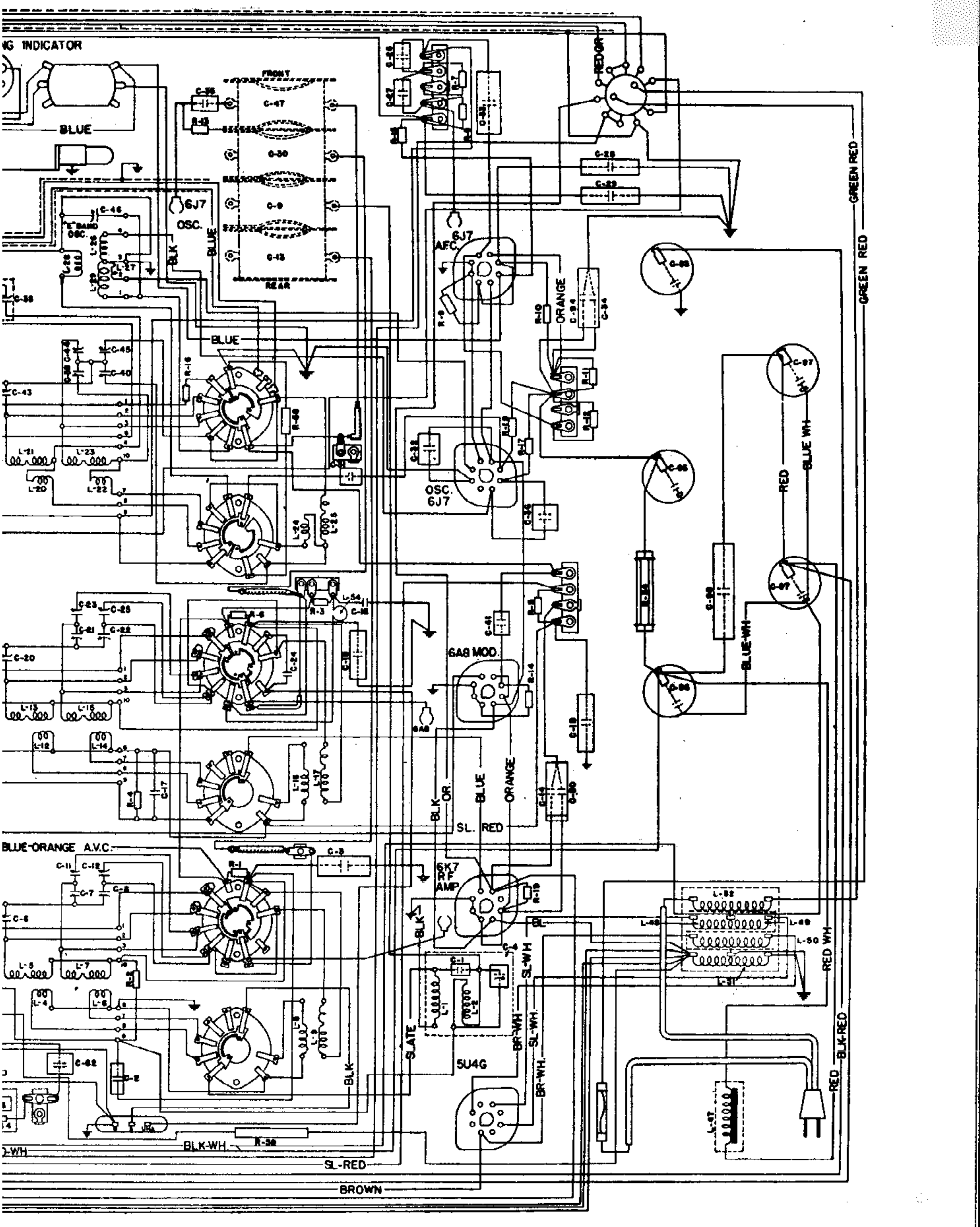
WH
GR WH
OR-WH
RD SL
TO FLASH TUNING CONTACTORS

...LSON TEL. MFG. CO.



MODELS 255L, 255LB
Phonograph Data
Flash Tuner Assembly

STROMBERG-CARLSON TEL. MFG. CO.

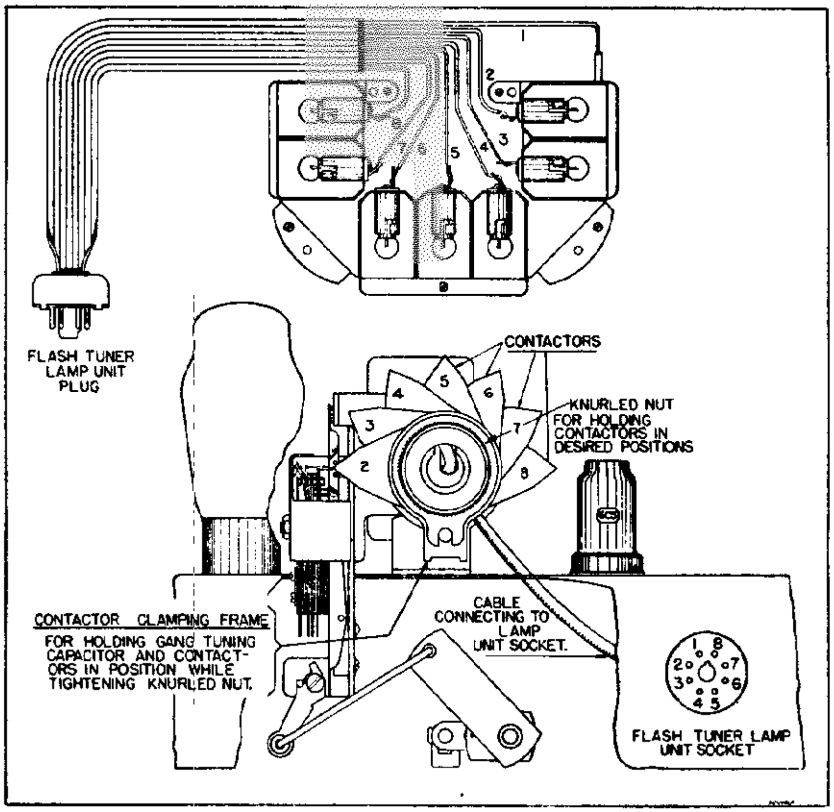


Fig. 4. Showing Flash Tuner Lamp Unit With Escutcheon Plate Removed (Top Figure) and Rear View of Receiver Showing Flash Tuner Mechanism (Bottom Figure).

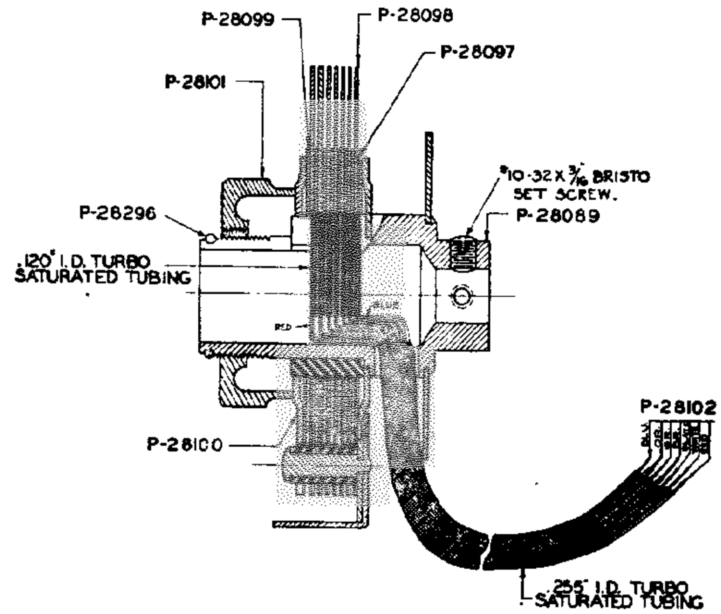


Fig. 5. Section View of Flash Tuner Contactors Assembly.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base, and is wired to the "Off-On-Bass-Phonograph" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

In order to obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit. To attach this instrument to a No. 255 Receiver, it is only necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply plug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug furnished with the receiver and the pick-up. This shielded cable should be of the low capacity type, in order to prevent the excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

STROMBERG-CARLSON TEL. MFG. CO.

ALIGNMENT DATA

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in this receiver is a complex circuit. The first I. F. amplifier is coupled to the second I. F. amplifier through the No. 6K7 tube. The second and third I. F. transformers are coupled through the pentode section of the No. 6B8 tube. The third I. F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. V. C.) with the I. F. signal, while the other network resembles the secondary of a push-pull transformer and constitutes the tuned "Discriminator" circuit. This "Discriminator" network operating into the No. 6H6 tube supplies the characteristic voltage demanded by the oscillator control tube. The fourth I. F. transformer feeds the diode plates of the No. 6B8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control knob to the "Off" position and the "Off-On-Bass" Control knob to its "Normal" position. **Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at the "On" position unless specifically directed in the following paragraphs.**
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycles from the signal generator, using a 0.1 Mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.
3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I. F. Transformers, align the I. F. circuits in the following manner:

   Adjust the third I. F. transformer primary circuit for maximum output.

   Adjust the fourth I. F. transformer circuit for maximum output.

   Adjust the third I. F. transformer "Discriminator" circuit midway between the peaks where maximum output is obtained.

   Adjust the second I. F. transformer secondary circuit for maximum output.

   Adjust the second I. F. primary circuit for maximum output.

   Adjust the first I. F. secondary circuit for maximum output.

   Adjust the first I. F. primary circuit for maximum output.

Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

Check the position of the A. F. C. control knob which should be set to the "off" position. **Before making this circuit adjustment be sure that the I. F. Amplifier is tuned exactly to 465 kilocycles.** With the signal generator still set at a frequency of 465 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 Modulator tube. Now observe the reading of the milliammeter which is connected in series with the cathode of the No. 5J7 oscillator control tube. Rotate the A. F. C. Control knob to the "on" position, and observe whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" to the "on" position. If there is any difference in the milliammeter reading while rotating the Automatic Frequency Control knob to the "off" and "on" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit by means of the screw adjustment located on the third I. F. transformer until the meter reading has the same value regardless of whether the A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained the "Discriminator" circuit of these receivers is properly adjusted.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phonograph" Control knob should also be set for "Normal" operation.

Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the signal generator's output lead for the I. F. alignment with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post marked "U. H. A." located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "D" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminals of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "C" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

Alignment of Aircraft Range (Also referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitor's C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.8 megacycles and adjust the aligning capacitor C-28 and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

Alignment of Standard Broadcast Range (Also referred to "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.

MODELS 255L, 255LB
Alignment, Part 2
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

REPLACEMENT PARTS

Piece Number	Schematic Circuit Designation	Part
21964		Fuse Block Assembly
22775	C66	Capacitor, .4 Mfd.
23017		Tube Socket, 7 Prong
24268		Cord, Power Supply
24314	C1	Capacitor, Type "O", 10 Mmfd.
24402	C29, C57	Capacitor, .1 Mfd.
24405	C3, C16, C18, C28, C55, C64, C65, C39, C100, C101	Capacitor, .04 Mfd.
24539	C84	Capacitor, Type "O", 100 Mmfd.
24994	C15, C34, C38, C53	Capacitor, .05 Mfd.
25140	C35, C76	Capacitor, .01 Mfd.
25461	C78	Capacitor, .002 Mfd.
25467	C31, C60, C86	Capacitor, Type "W", .001 Mfd.
25496	C89, C90	Electrolytic Capacitor, 10 Mfd., 25 Volts; 10 Mfd., 35 Volts
25526	R58	Resistor, Type "F", 15,000 Ohms
25530		Tube Socket, 8 Prong
26062	R54	Resistor, Type "F", 10,000 Ohms
26267		Pilot Lamp
26300	R24	Resistor, Type "E", 10 Ohms
26313	R20	Resistor, Type "E", 82 Ohms
26322	R15, R45	Resistor, Type "E", 150 Ohms
26326	R22, R26	Resistor, Type "E", 270 Ohms
26328	R29	Resistor, Type "E", 390 Ohms
26331	R5, R19, R21, R33	Resistor, Type "E", 1,000 Ohms
26340	R10, R11, R12, R17	Resistor, Type "E", 22,000 Ohms
26355	R4, R13, R14, R30, R40	Resistor, Type "E", 47,000 Ohms
26357	R2, R8, R23, R26, R29, R38, R42	Resistor, Type "E", .1 Megohm
26361	R44	Resistor, Type "E", .22 Megohm
26362	R31, R32, R37, R46	Resistor, Type "E", .27 Megohm
26365	R48, R50	Resistor, Type "E", .41 Megohm
26369	R27, R25, R51, R52	Resistor, Type "E", 1 Megohm
26373	R48	Resistor, Type "E", 2.2 Megohms
26383	R1, R3, R6	Resistor, Type "EI", .1 Megohm
26410		Grid Clip Assembly
27094	L48, L49, L50, L51, L52	Power Transformer (25 to 60 Cycles Chassis)
27643	L8 L9	Antenna Transformer, "D" Range
27644	L16, L17	R. F. Transformer, "D" Range
27645	L24, L25	Oscillator Transformer, "D" Range
27692	L30, L31, L32	First I. F. Transformer
27693	L33, L34, L35	Second I. F. Transformer
27694	L37, L38, L39, L40	Third I. F. Transformer
27695	L36	Fourth I. F. Transformer
27710	C9, C14, C26, C47	Gang Tuning Capacitor
27715		Coupling Assembly (Tuning Drive)
27720		Gear and Bracket Assembly
27728		Spring
27731		Drive Assembly
27732		Mask Assembly
27733		Lever Assembly, Mask Actuator
27735		Rod
27736		Spring Washer
27737		Indicator Frame Assembly
27748		Dial
27761		Tube Socket, 8 Prong
27752		Brace, Dial Support
27753	C97	Electrolytic Capacitor, 8 Mfd., 500 Volts
27754	C96	Electrolytic Capacitor, 16 Mfd., 400 Volts
27755	C93	Electrolytic Capacitor, 16 Mfd., 250 Volts
27756	C95	Electrolytic Capacitor, 16 Mfd., 300 Volts
27757	C91, C92	Electrolytic Capacitor, 4 Mfd., 250 Volts; 4 Mfd., 100 Volts
27758	C88	Capacitor, Type "O", 75 Mmfd.
27759	C98	Capacitor, 12 Mfd., 30 Volts
27760	C87	Capacitor, .005 Mfd., 1,000 Volts
27761	R7	Resistor, Type "E", 820 Ohms
27762	R9	Resistor, Type "EI", 910 Ohms
27764	R39, R56, R57	Resistor, "B" Voltage Divider
27765	L42, L43, L44	Output Transformer
27767	L47	Choke Assembly
27769	L1, L2	Antenna Transformer, "A" Range
27772		Switch Assembly, High Fidelity-Tone Control
27778		Switch, A. F. C.
27779		Crank Arm
27792	C2	Capacitor, .03 Mfd.
27902	C4	Capacitor, H. F. Aligner for "A" Range Antenna Transformer
27914	L56, L57, L58, L59	Oscillator Transformer, "E" Range
27921	C46	Capacitor, Aligner, "E" Range
27964		Shield, "D" and "E" Range Coils
27968	L54	Antenna Transformer Tuning Loop, "E" Range
27969	C27, C28	L. F. Aligners for "A" and "B" Range Oscillators
27994		Pilot Lamp Socket Assembly
27996		Cable Assembly (Tuning Indicator Unit)
27998	C37	Capacitor, Type "O", 200 Mmfd.
27999	C79, C81	Capacitor, Type "WB", 50 Mmfd.
28001	C63, C64, C66, C67	Capacitor, Type "W", .0045 Mfd.
28002	C70, C71	Capacitor, .25 Mfd., 150 Volts
28003	R40	Resistor, Type "E", 15,000 Ohms
28004	R41	Resistor, Type "E", .27 Megohm
28005	R16, R58	Resistor, Type "E", 51 Ohms
28006		Cable Assembly, Phonograph Switch to Phonograph Socket
28034	C39, C40, C42, C43, C44, C45	Capacitors, Aligning
28179	R47	Resistor, Type "EB", 68,000 Ohms
28417	C10	Capacitor (Gimmick)
28512	C73, C74	Capacitor, Two, Type "W", 100 Mmfd.
28515	L53	Coil Assembly (High Frequency Cut-Off Filter)
28531		Socket (Tuning Indicator Tube)
28566	C72	Capacitor (High Frequency Cut-Off Filter)
28678		Socket, Phonograph Unit
30725		Antennas and Ground Binding Posts
30761		Switch Assembly, "Off-On-Bass-Phono" Control
30775	R34, R36	Resistor, Type "F", 20,000 Ohms
30819		Fuse, 5 Amperes
27066	C94	Capacitor, Type "W", .006 Mfd.
27069	C99	Capacitor, Type "2", 500 Mmfd.
27073	C77, C82, C85	Capacitor, 100 Mmfd.
27092		Rubber Bushing
27101	C17	Capacitor, Type "O", 200 Mmfd.
27105		Washer, Felt
27106		Washer, Dial Clamp
27108	C14, C24, C40, C50, C51, C80, C66, C94	Capacitor, Two, .05 Mfd.
27121		Insulating Tube
27125	R50	Resistor, Type "F", 25,000 Ohms
27306	C24, C28, C41, C78	Capacitor, Type "O", 50 Mmfd.
27309	C48, C59, C59, C65	Fixed Capacitor, First I. F. Transformer
27337	C61, C69	Capacitor, Type "W", .004 Mfd.
27407	R18	Resistor, Type "EB", 22,000 Ohms
27411		Clamp Assembly
27504	L45, L46	Loud Speaker
27509	R60	Potentiometer, Volume Control
27506	C5, C6, C7, C8, C11, C12	Capacitors, Aligning
27509	C19, C20, C21, C22, C23, C25	Capacitors, Aligning
27502	L3, L4, L5, L6, L7	Bi-Resonator Coil "A" Range, Antenna Transformer "B" and "C" Ranges
27503	L10, L11, L12, L13, L14, L15	R. F. Transformer, "A", "B", and "C" Ranges
27504	L18, L19, L20, L21, L22, L23	Oscillator Transformer, "A", "B", and "C" Ranges
27600		Range Switch Assembly
27635	L49, L49, L50, L51, L52	Power Transformer (50 to 60 Cycles Chassis)

MISCELLANEOUS PARTS

27800	Knob Assembly (Used on Volume, Range Switch and Off-On-Bass-Phonograph Controls' Shafts)
27801	Knob Assembly (Used on Fidelity and A. F. C. Controls' Shafts)
27804	Knob Assembly (For Rapid Station Selector Control Shaft)
27803	Knob Assembly (For Vernier Station Selector Control Shaft)
27826	Felt Washer (Used on Volume, Fidelity, Range Switch, A. F. C. and Off-On-Bass-Phonograph Controls' Shafts)
27830	Felt Washer (Used on Rapid Station Selector Control Shaft)

3. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

Instructions for Setting Up the A. F. C. Flash Tuning Unit

1. Remove the flash tuner lamp unit escutcheon plate by removing the four screws.
2. Remove the lists of station letters from the P-28420 package assembly which is tacked inside of the cabinet.
3. Remove the seven paper squares on which are printed the words "Tone", "Beauty", "Value", "Action", "Flash", "Tuning", and "Radio" from the square frames located on the rear side of the lamp unit escutcheon plate.
4. Remove the station letters of the seven stations which it is desired to set up in the flash tuning unit from the list of stations. It will be noted that the letters of the stations are printed on partly cut squares to facilitate case in removing the desired letters. Insert one of these seven station letters into each frame of the flash tuner lamp unit. The recommended method of inserting these station letters into the frames of the escutcheon plate is to arrange them according to the frequency of the stations as follows:

   Looking at the front of the escutcheon plate the station having the highest frequency should appear in the top right-hand frame, and then in successive order according to frequency the remaining station letters should be inserted into the other frames; the top left-hand frame containing the station letters of the station having the lowest frequency. In inserting these letters into the frames be sure to have the letters located between two pieces of transparent material.
5. Fasten the escutcheon plate again to the lamp unit by means of the four screws. The receiver is now ready to be operated and the flash unit contactors located on the rear of the chassis base adjusted for the seven favorite stations.
6. Rotate the "On-Off-Bass-Phonograph" Control knob from its complete counter-clockwise position, slightly clockwise from this position which turns the set "on" (indicated by illumination of the dial). Wait a few seconds to reach operating temperature. Check the position of the Automatic Frequency Control knob which should be rotated to the "Off" position, and set the Fidelity Control knob to the "Normal" position. Now carefully tune in the desired station having the highest frequency, watching the tuning indicator so that the receiver will be exactly tuned to this station.
7. After carefully tuning in the desired station rotate the A. F. C. Control knob to the "On" position. Now, noting from Figure 4, the sketch which shows the contactor clamping frame and knurled nut, hold the clamping frame with one hand and loosen the knurled nut with the other hand. Then move the contactor, numbered 2, so that its point is engaged between the two small rollers of the switching mechanism as also shown in Figure 4. When the point is properly engaged between the rollers, the lamp of the lamp unit which is located behind the station letters of the station being tuned in will light. When this condition is obtained, retighten the large knurled nut and at the same time securely hold the gang tuning capacitor and the contactors from rotating by means of the extended portion of the contactor clamping frame. It is extremely important to keep the gang tuning capacitor and the contactors from rotating when tightening the large knurled nut.
8. Now rotate the A. F. C. Control knob to the "off" position and note whether the tuning has been shifted by watching the tuning indicator. If a change is noted it will be necessary to repeat operation No. 7.
9. When no change is noticed after performing the above operations Nos. 7 and 8, the remaining six favorite stations should be set up in the same manner.

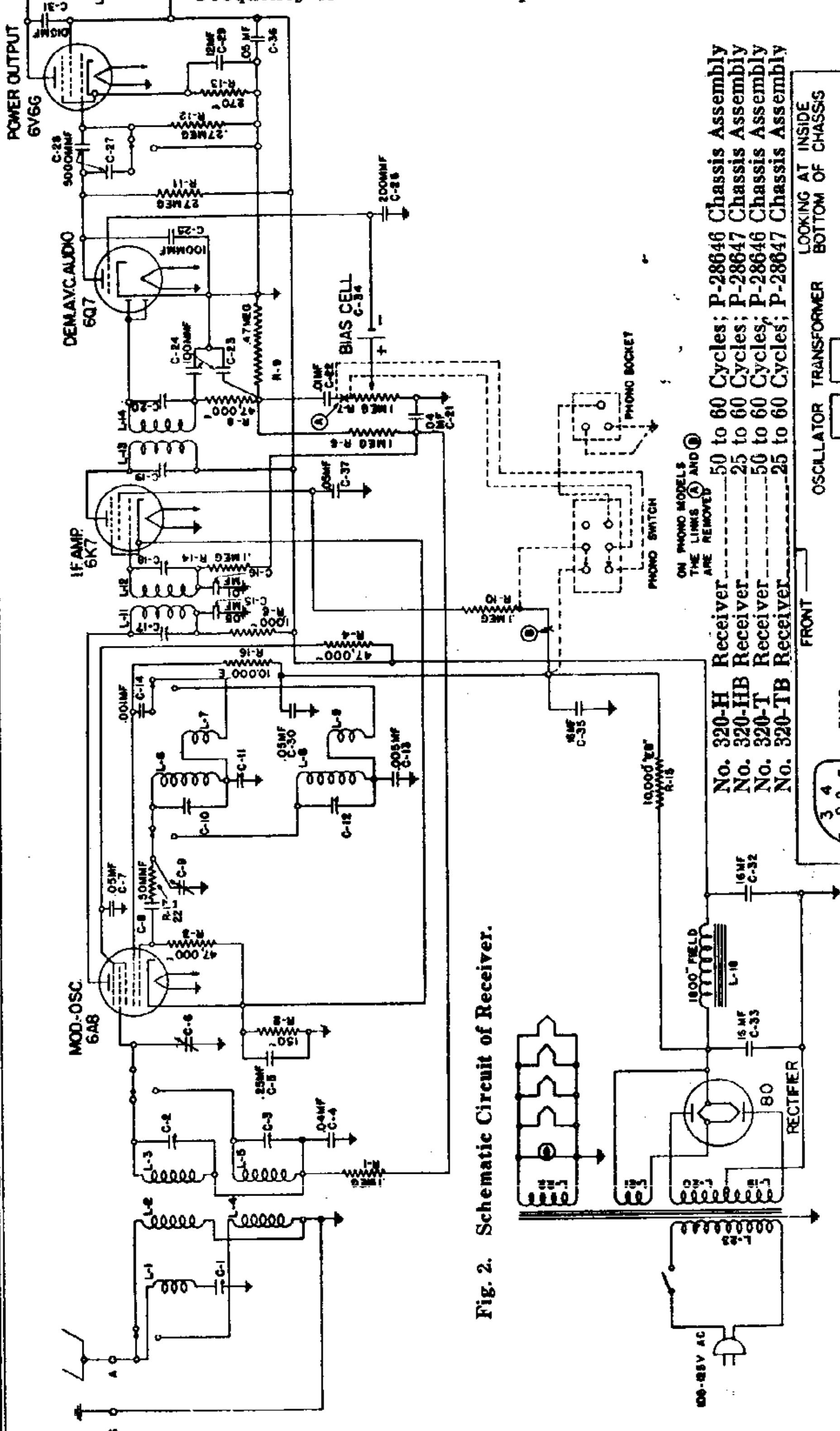
With the A. F. C. flash tuning unit in operation, the receiver will be automatically kept in tune with any one of the seven favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the flash tuning unit, it will be found that the Automatic Frequency Control will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

A. F. C. FLASH TUNER PARTS

24760		Spring Washer.
29046		Lever
29053		Rod for Actuating A. F. C. Switching Mechanism
29054		Lever and Spring Combination
29088		Contactors' Assembly
29097		Contact Disc for Contactor
29098		Contactor
29099		Insulation Disc between Contactors
29102		Blue Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
29102		Orange Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
29102		Green Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
29102		Brown Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
29102		Slate Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
29102		White Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
29102		Red Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
29294		Locking Ring Spring
29323		A. F. C. Switch Cable Assembly
29437	R59	Resistor, Flexible, 10 Ohms

STROMBERG-CARLSON TEL. MFG. CO.

Type of Circuit	Superheterodyne
Tuning Ranges	A—530 to 1700 Kc.; C—5900 to 18,000 Kc.
Number and Types of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6Q7G, 1 No. 6V6G, 1 No. 80
Voltage Rating	105 to 125 Volts, A. C.
Input Power Frequency	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	40 Watts
Frequency of Intermediate Amplifier	455 Kilocycles



No. 320-H Receiver 50 to 60 Cycles; P-28646 Chassis Assembly
No. 320-HB Receiver 25 to 60 Cycles; P-28647 Chassis Assembly
No. 320-T Receiver 50 to 60 Cycles; P-28646 Chassis Assembly
No. 320-TB Receiver 25 to 60 Cycles; P-28647 Chassis Assembly

Fig. 2. Schematic Circuit of Receiver.

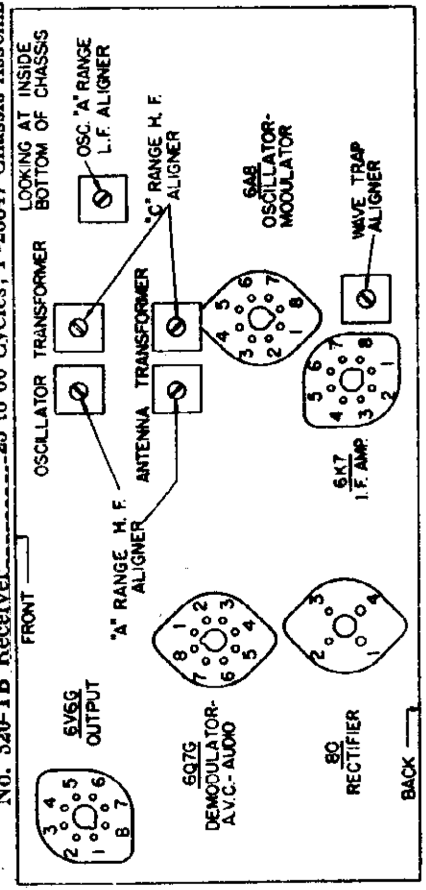
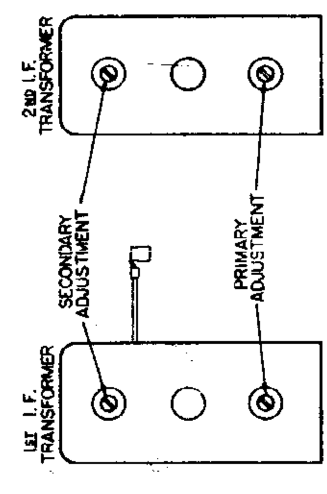


Fig. 1. Terminal Layout



MODELS 320H,320HB
320T,320TB **STROMBERG-CARLSON TEL. MFG. CO.**
Chassis Wiring,Voltage

			Terminals of Sockets								Heater Voltages Between Heater Terminals	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	0	+174	+64	—7.2	+176	*6.1*	+1.8	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+176	+62	+1.8	+210	*6.1*	+1.8	2–7	*6.1*
6Q7G	Dem.—A. V. C. —Audio	0	0	0	+65*	0	0	+65*	*6.1*	0	2–7	*6.1*
6V6G	Audio Output	—	0	0	+167	+176	0	0	*6.1*	+8.2	2–7	*6.1*
80	Rectifier	—	+260	*258*	*258*	+260	—	—	—	—	1–4	*4.8*

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

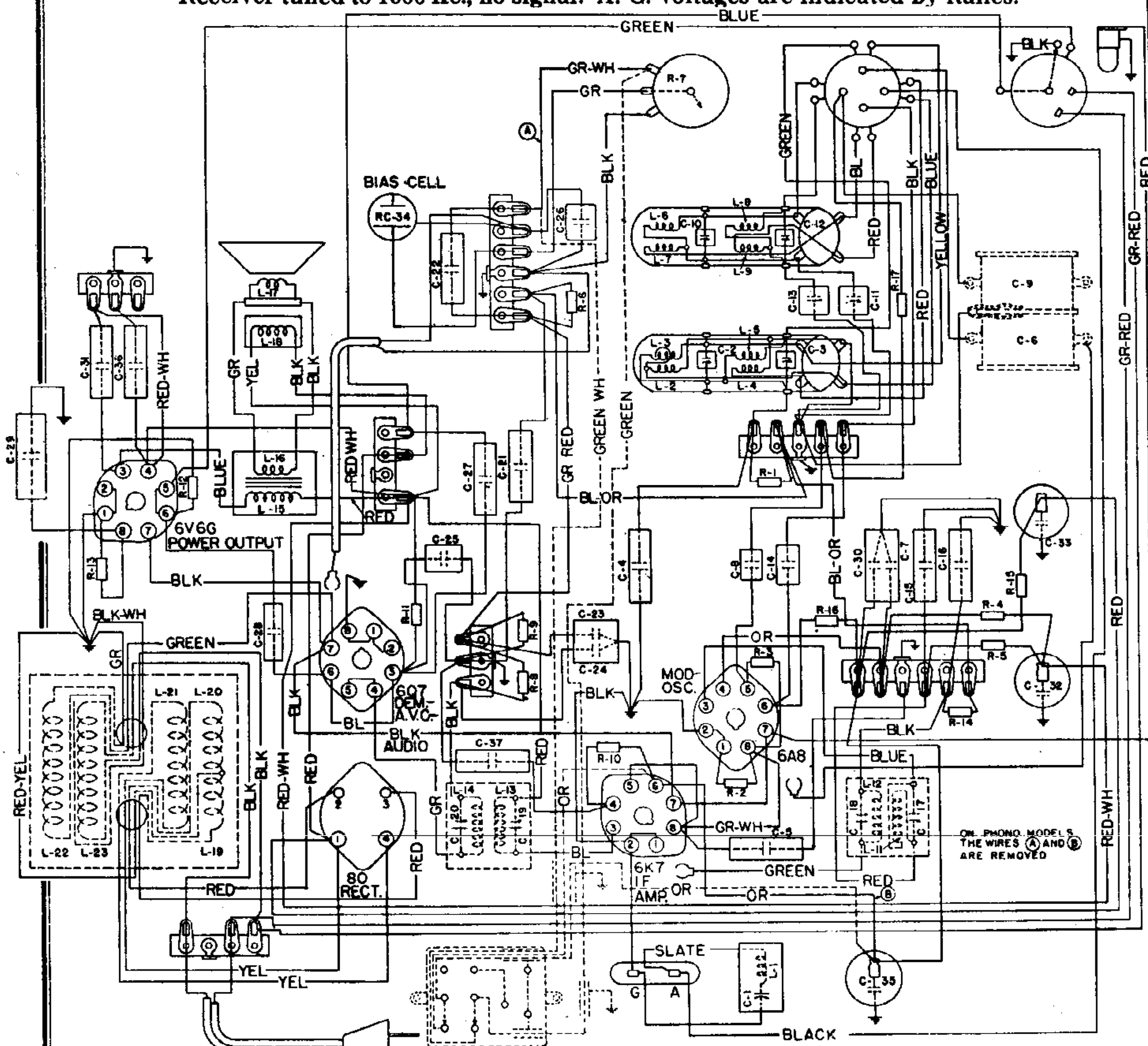


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these alignment adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should center over the inside, lower right-hand border line (line immediately below the .53 megacycle calibration mark on the "Broadcast" scale).

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Rotate the Range Switch control knob to the Standard Broadcast Range position (arrow on knob pointing in direction of letters BR.).

   Set the dial pointer to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position which is the "normal" position. Rotate the Volume control knob to its maximum clockwise position (maximum volume).

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the antenna's "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Range Switch control knob to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" range high frequency aligner for maximum output.
3. Adjust the antenna's "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Range Switch control knob to the Standard Broadcast range position and set the dial pointer to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

In order to obtain reproduction of phonograph records in conjunction with the No. 320 Receiver, the following instructions should be followed:

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-28909 Switch Assembly. The rear of the chassis base of these receivers is already drilled for mounting this switch assembly. Complete instructions on how to install and operate this switch are furnished with each P-28909 Switch Assembly.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If a Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket and pl g of the P-28909 Switch Assembly and the pick-up. This shielded cable should be of the low capacity type, in order to prevent excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-28909 Switch Assembly, and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

REPLACEMENT PARTS

Piece Number	Circuit Designation	Part
17842		Spring Washer
22988		Socket, 4 Prong
24405	C4, C21	Capacitor, .04 Mfd.
24550	C25	Capacitor, Type "O", 100 Mmfd.
24994	C15, C36, C37	Capacitor, .05 Mfd.
25149	C16, C22	Capacitor, .01 Mfd.
25487	C14	Capacitor, Type "W", .001 Mfd.
25539		Socket, 8 Prong
26429	C17, C18, C19, C20	Aligning Capacitors, I. F. Transformers
26061		Switch Assembly, "Off-On-Tone" Control
26096		Cone Assembly, Loud Speaker
26114	R7	Potentiometer, Volume Control
26151	C27, C28	Capacitor, .005 Mfd.
26313	R17	Resistor, Type "E", 22 Ohms
26323	R2	Resistor, Type "E", 150 Ohms
26326	R13	Resistor, Type "E", 270 Ohms
26331	R5	Resistor, Type "E", 1000 Ohms
26345	R16	Resistor, Type "E", 10,000 Ohms
26353	R3, R4, R8	Resistor, Type "E", 47,000 Ohms
26357	R1, R10, R14	Resistor, Type "E", .1 Megohm
26062	R11, R12	Resistor, Type "E", .27 Megohm
26365	R9	Resistor, Type "E", .47 Megohm
26369	R6	Resistor, Type "E", 1 Megohm
26512	C23, C24	Capacitor Assembly, Type "WD" (2-100 Mmfd.
27081	C1	Tuning Capacitor, Wave Trap
27101	C26	Capacitor, Type "O", 200 Mmfd.
27108	C7, C30	Capacitor Assembly (2-.05 Mfd.)
27149	L1	Wave Trap Coil
27170	R15	Resistor, Type "EB", 10,000 Ohms
27305	C8	Capacitor, Type "O", 50 Mmfd.
27538	C13	Capacitor, Type "W", .005 Mfd.
27685	C29	Electrolytic Capacitor, 20 Mfd., 25 Volts
28002	C5	Capacitor, .25 Mfd.
28025		Pilot Lamp
28594	C31	Capacitor, .015 Mfd., 200 Volts, A.C.
28452		Cord (Power Supply)
28454	C33	Electrolytic Capacitor, 16 Mfd., 200 Volts
28455	C32	Electrolytic Capacitor, 16 Mfd., 200 Volts
28456	C35	Electrolytic Capacitor, 16 Mfd., 250 Volts
28660	L2, L3, L4, L5	Coil Assembly, Antenna Transformer
28661	L6, L7, L8, L9	Coil Assembly, Oscillator Transformer
28663	L13, L14	Second I. F. Transformer
28664	L11, L12	First I. F. Transformer
28665	L15, L16	Transformer Assembly, Audio Output
28667	L17, L18	Loud Speaker Assembly
28679	C6, C9	Gang Tuning Capacitor and Bracket Assembly
28685		Range Switch
28692		Tuning Dial
28694		Pilot Lamp Socket Assembly
28695		Dial Pointer
28696	C34	Bias Cell
28787	C11	L. F. Aligning Capacitor ("A" Range)
28805	C3, C10, C12	H. F. Aligning Capacitors, Antenna and Oscillator Transformers
28806	C2	H. F. Aligning Capacitor, Antenna Transformer, "A" Range
28901	L19, L20, L21, L22, L23	Power Transformer (50 to 60 Cycles Chassis)
28902	L19, L20, L21, L22, L23	Power Transformer (25 to 60 Cycles Chassis)
29128		Large Pulley For Dial Drive
29129		Spring for Dial Drive

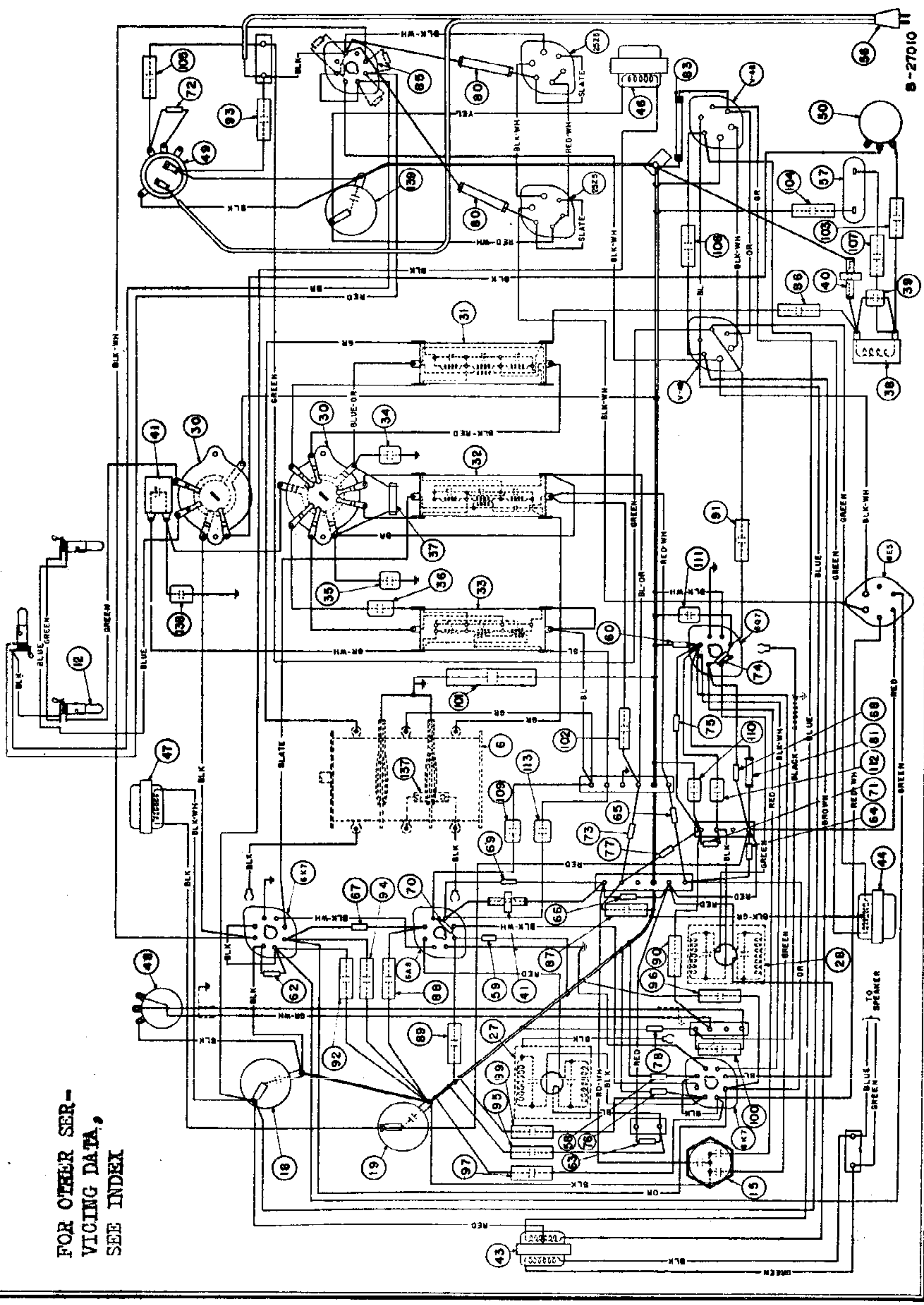
MISCELLANEOUS PARTS

Piece Number		Part
		Black Cord for Drive
27428		Felt Washer (2 Required, Used on Volume and Off-On-Tone Control Shafts)
27630		Felt Washer (Used on Station Selector Control Shaft)
27903		Knob (Used on Station Selector Control Shaft)
28827		Knob (Used on Range Switch Control Shaft)
28843		Knob (Two Required, Used on Volume and Off-On-Tone Control Shafts)

MODELS 127H, 127M
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

No. 127-H ....50 to 60 Cycles........P-26845 Chassis Assembly; P-26887 Loud Speaker
No. 127-M ....50 to 60 Cycles........P-26845 Chassis Assembly; P-26887 Loud Speaker



FOR OTHER SERVICING DATA, SEE INDEX

MODELS 325J, 325JB
325N, 325NB
325S, 325SB
Schematic, Socket
Trimmers

STROMBERG-CARLSON TEL. MFG. CO.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne with Electric Tuning
Tuning Ranges	A—530 to 1700 Kc.; C—5800 to 18,000 Kc.
Number and Type of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6Q7G, 1 No. 6V6G, 1 No. 80
Voltage Rating	105 to 125 Volts
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	42 Watts
Frequency of Intermediate Amplifier	455 Kilocycles

APPARATUS SPECIFICATIONS

No. 325-J	Receiver	50 to 60 Cycles;	P-28816 Chassis Assembly
No. 325-JB	Receiver	25 to 60 Cycles;	P-28817 Chassis Assembly
No. 325-N	Receiver	50 to 60 Cycles;	P-28816 Chassis Assembly
No. 325-NB	Receiver	25 to 60 Cycles;	P-28817 Chassis Assembly
No. 325-S	Receiver	50 to 60 Cycles;	P-28816 Chassis Assembly
No. 325-SB	Receiver	25 to 60 Cycles;	P-28817 Chassis Assembly

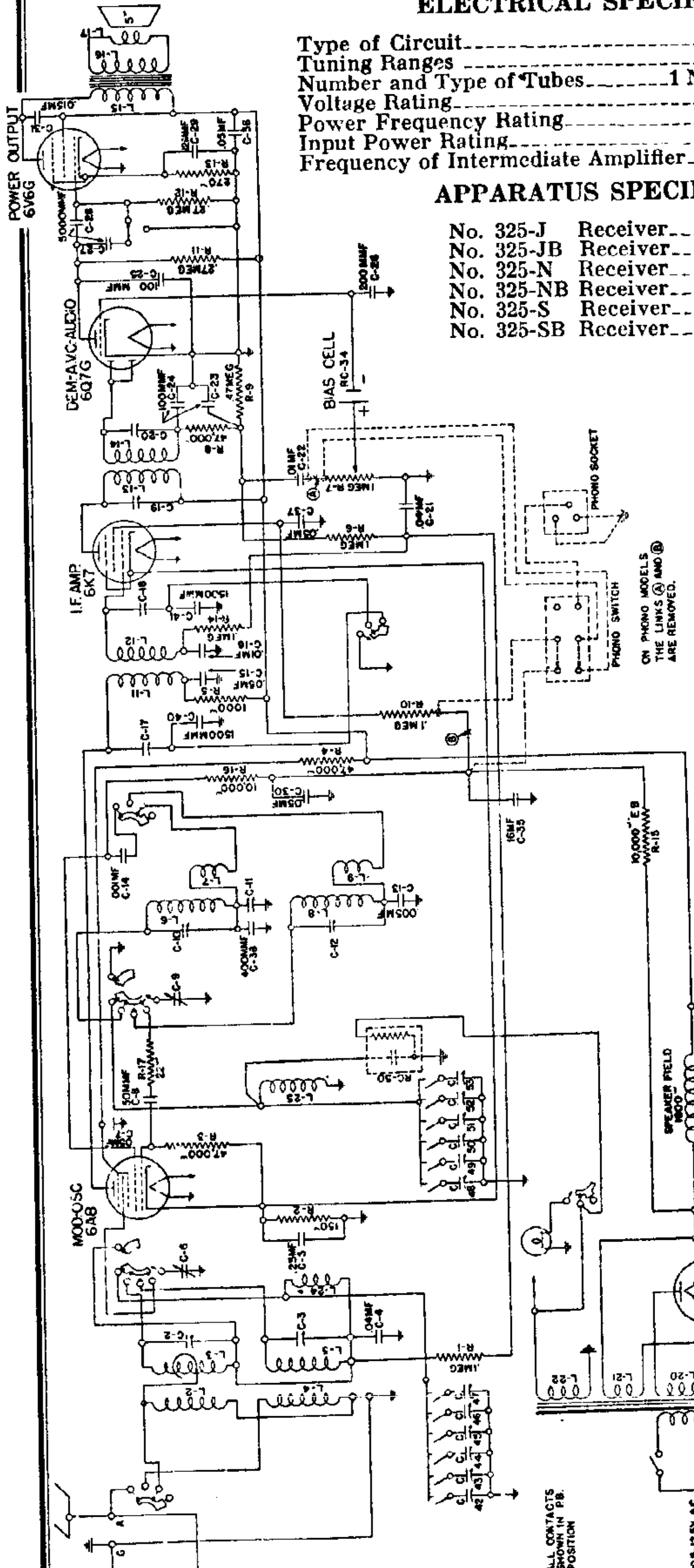


Fig. 2. Schematic Circuit of Receiver.

FOR OTHER DATA SEE INDEX

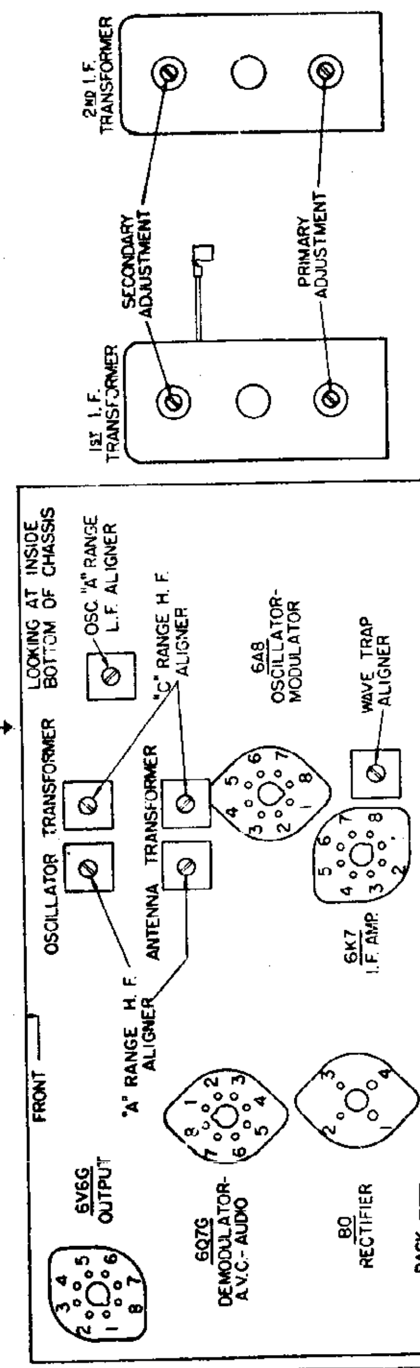


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors

MODELS 325J, 325JB
325N, 325NB
325S, 325SB
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

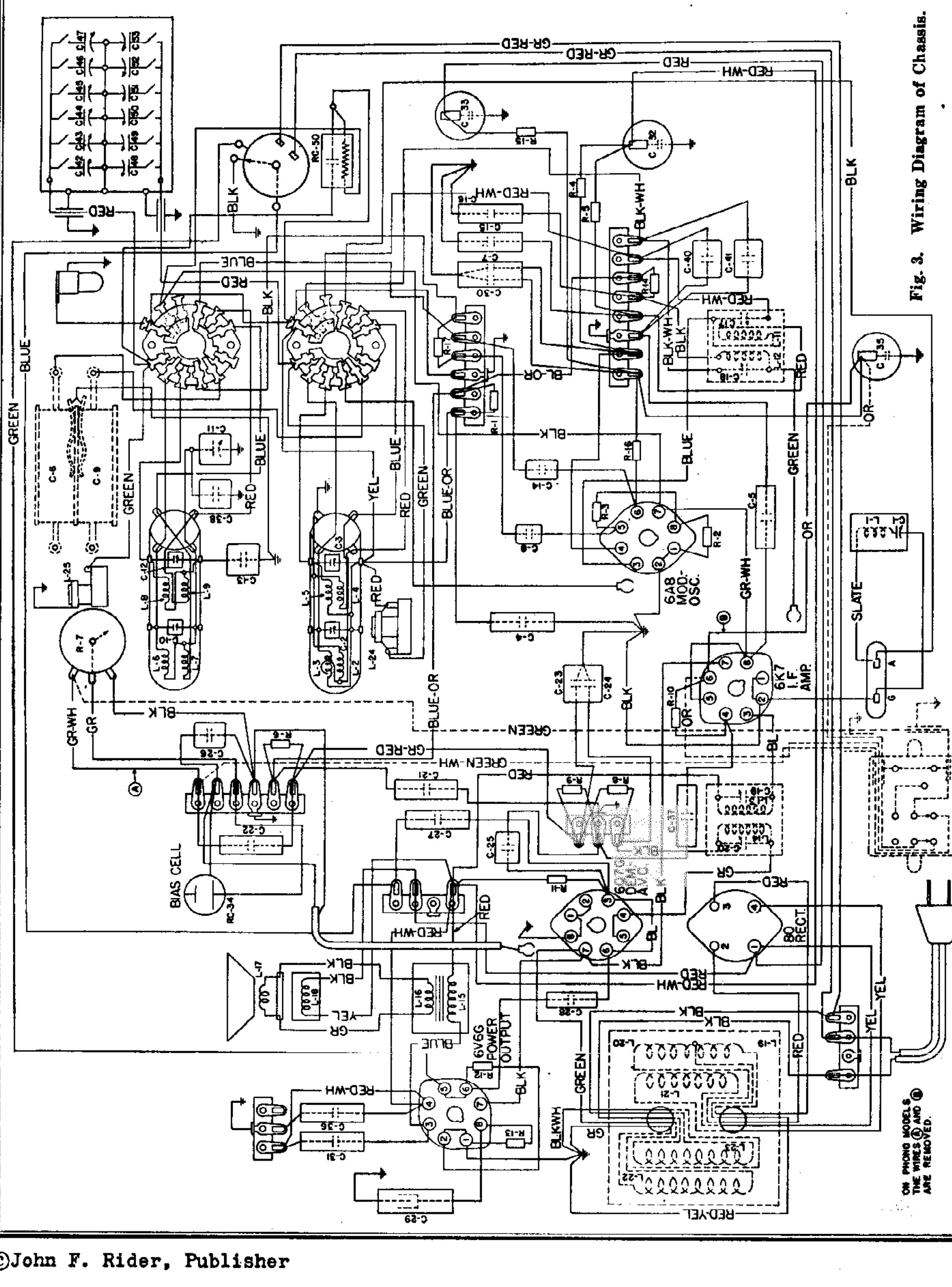


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								Heater Voltages Between Heater Terminals	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	0	+174	+64	−7.2	+176	*6.1*	+1.8	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+176	+62	+1.8	+210	*6.1*	+1.8	2–7	*6.1*
6Q7G	Dem.—A. V. C. —Audio	0	0	0	+65*	0	0	+65*	*6.1*	0	2–7	*6.1*
6V6G	Audio Output	—	0	0	+167	+176	0	0	*6.1*	+8.2	2–7	*6.1*
80	Rectifier	—	+260	*258*	*258*	+260	—	—	—	—	1–4	*4.8*

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no re-adjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these alignment adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Rotate the Electric Tuning and Range Switch control knob to the Standard Broadcast Range position (arrow on knob pointing in direction of letters BR.).

   Set the dial pointer to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position which is the "normal" position. Rotate the Volume control knob to its maximum clockwise position (maximum volume).

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1-microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the antenna's "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Range Switch control knob to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" range high frequency aligner for maximum output.
3. Adjust the antenna's "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the Standard Broadcast range position and set the dial pointer to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

In order to obtain reproduction of phonograph records in conjunction with the No. 325 Receiver, the following instructions should be followed.

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-28909 Switch Assembly. The rear of the chassis base of the receiver is already drilled for mounting this switch assembly. Complete instructions on how to install and operate this switch are furnished with each P-28909 Switch Assembly.

To obtain the best quality of phonograph reproduction from this receiver, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket and plug of the P-28909 Switch Assembly, and the pick-up. This shielded cable should be of the low capacity type, in order to prevent excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-28909 Switch Assembly, and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

MODELS 325
MODELS 335,336
MODELS 340,341
MODELS 345
MODELS 350
Electric Tuning Data

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 335L,335LB
336P,336PB
Alignment,

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"), and that the electric tuning switch, located on the rear of the chassis base is rotated to the "Set-Up" position. When the aligning adjustments have been completed the electric tuning switch should be rotated back to the "Operate" position. Figure 1 shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on the No. 335 receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet.

In making any aligning adjustments of the radio frequency circuits of the No. 336-P Receiver, it will be necessary to remove the chassis from the cabinet. The aligning adjustments for the intermediate frequency circuits of these receivers are easily accessible through the bottom of the cabinet.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to work with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set in its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position, which is the "normal" position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning switch located at the rear of the chassis base, so that the slotted shaft points in the direction of the word "Set-Up" (maximum clockwise rotation). Rotate the Volume control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the antenna's "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" range high frequency aligner for maximum output.
3. Adjust the antenna's "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer to 1000 kilocycles and the Electric Tuning Switch, located on the back of the receiver chassis, to the "Set-Up" position.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

IMPORTANT: When all the aligning adjustments have been completed, it is important that the Electric Tuning Switch (located on the rear of the receiver chassis) be reset to the "Operate" position.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

FOR NO. 335 RECEIVERS ONLY

To equip these receivers for phonograph operation, it will be necessary to purchase and install in the receiver a Stromberg-Carlson, P-29697 Switch Assembly. The rear of the chassis base of these receivers is already drilled for mounting this switch assembly. Complete instructions on how to install and operate this switch are furnished with each P-29697 Switch Assembly.

To obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with this receiver, a Stromberg-Carlson Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket mounted in the P-29697 Switch Assembly and the pick-up. This shielded cable should be of the low capacity type, in order to prevent excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket mounted in the P-29697 Switch Assembly, and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

MODELS 325,335,336,337,340,341,345, AND 350

INSTRUCTIONS FOR SETTING UP THE ELECTRIC TUNING ARRANGEMENT

1. Before proceeding to set up the stations for electric tuning, the radio receiver should be turned "on" for approximately twenty to thirty minutes.
2. Set the Range Switch Control Knob to the manual tuning position for the Standard Broadcast range (arrow on knob pointing in direction of the letters BR.).

   If the particular model is a No. 336-P Receiver, check the position of the "Radio-Phono" control knob. For radio reception this knob should be rotated so that the arrow on the knob points in the direction of the word "Radio".
3. Remove the list of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
4. Remove the two screws which hold the electric tuning escutcheon plate (metal plate). Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the six stars are printed.
5. Remove the five screws which hold the electric tuning escutcheon to the front panel.
6. From the lists of stations, remove the call letters of the six stations which it is desired to set up for electric tuning. These six stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

   CAUTION: Each button adjustment for electric tuning has assigned frequency limits. These limits are designated for each adjustment on the cover plate which covers the electric tuning adjusting capacitors (visible when the electric tuning escutcheon is removed from the cabinet). The six stations should be selected so that the frequency of each station will be within the assigned frequency limits of its associated push button.

   It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these six favorite stations, the following order should be followed:

   Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining five stations into the other five squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

   After the six station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the two screws.

   The tuning adjustments for the six favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:
7. **IMPORTANT:** By aid of a screwdriver, rotate the slotted shaft of the Electric Tuning Switch, which is located at the rear of the chassis base, so that the slotted shaft points in the direction of the word, "Set-up" (maximum clockwise rotation).
8. With the receiver turned "on", and the Range Switch control knob set to the standard broadcast position (arrow on knob pointing in direction of letters BR.), tune the receiver in the conventional manner by means of the station selector knobs to that station having the highest frequency (of the six chosen for setting up in the electric tuning arrangement) and carefully note the program which it is broadcasting. Then, rotate the Range Switch control knob to the electric tuning position (arrow on knob pointing in direction of the small star).
9. With the electric tuning escutcheon still removed from the cabinet, push in the push button rod for the station having the highest frequency (provided, of course, that the station chosen has a frequency which is within the assigned frequency limits for this button). Now, looking in on the electric tuning unit, rotate by means of a small screwdriver, the screw of the oscillator (OSC.) tuning adjustment which is designated 1560 to 1030 kilocycles to the position where the desired station is received.

   In order to check whether the program being received is from the desired station, simply rotate the Range Switch control knob to the manual tuning position (arrow on knob pointing in direction of letters BR.), and with the receiver tuned in manually to the desired station a quick check can be made; then, rotate the Range Switch control knob back to the electric tuning position. Exact resonance with the desired station should be obtained by observing the tuning indicator.

   IMPORTANT: Always use the tuning indicator unit when setting up stations for electric tuning in order to determine when resonance with the desired station is obtained.
10. When the oscillator tuning adjustment has been properly made as mentioned in paragraph 9 above, the screw of the antenna (ANT.) tuning adjustment designated 1560 to 1030 kilocycles should be rotated to the position where exact resonance with the desired station is again obtained by observing the tuning indicator.

    When these adjustments have been properly made, the station having the highest frequency is correctly set up for electric tuning selection.
11. Now proceed to set up the remaining five stations in the same manner as mentioned in Paragraphs 7, 8, 9 and 10 above, proceeding according to the frequency of the remaining stations.
12. **IMPORTANT:** When all of the adjustments have properly been made for the six desired stations, the slotted shaft of the Electric Tuning Switch located on the rear of the chassis base, should be rotated so that the slotted shaft points in the direction of the word, "Operate" (maximum counter-clockwise rotation).

    The electric tuning escutcheon should then be refastened into its position on the cabinet by means of the five special screws.

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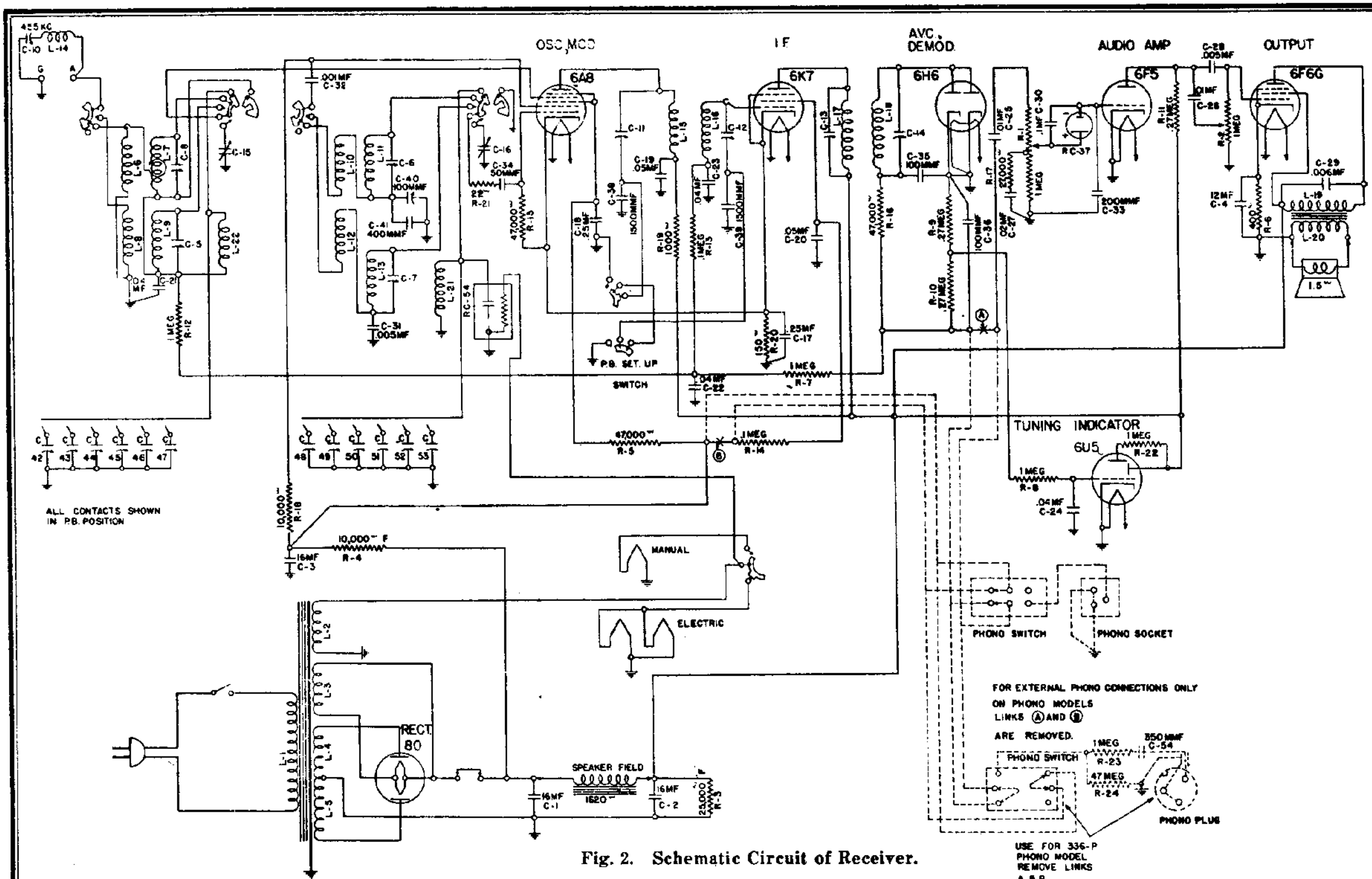

Fig. 2. Schematic Circuit of Receiver.

Type of Circuit ---------- Superheterodyne with Electric Tuning
Tuning Ranges ---------- Range "A", 530 to 1700 Kc.; Range "C", 5900 to 18,000 Kc.
Number and Type of Tubes ---------- 1 No. 6A8; 1 No. 6K7; 1 No. 6H6; 1 No. 6F5; 1 No. 6F6G; 1 No. 6U5; 1 No. 80
Power Supply Voltage ---------- 105 to 125 Volts, A. C.
Power Frequency Rating ---------- 50 to 60 Cycles and 25 to 60 Cycles
Input Power Rating:
Radio Models Only ---------- 65 Watts
Radio Phono Models ---------- 80 Watts

MODELS 335L, 335LB
336P, 336PB STROMBERG-CARLSON TEL. MFG. CO.
Chassis Wiring

No. 335-L Receiver .... 50 to 60 Cycles; P-28818 Chassis Assembly; P-27605 Loud Speaker
No. 335-LB Receiver .... 25 to 60 Cycles; P-28819 Chassis Assembly; P-27605 Loud Speaker
No. 336-P Receiver .... 60 Cycles Only; P-29415 Chassis; P-29439 Phono Unit; P-29464 Loud Speaker
No. 336-PB Receiver .... 25 Cycles Only; P-29416 Chassis; P-29440 Phono Unit; P-29464 Loud Speaker

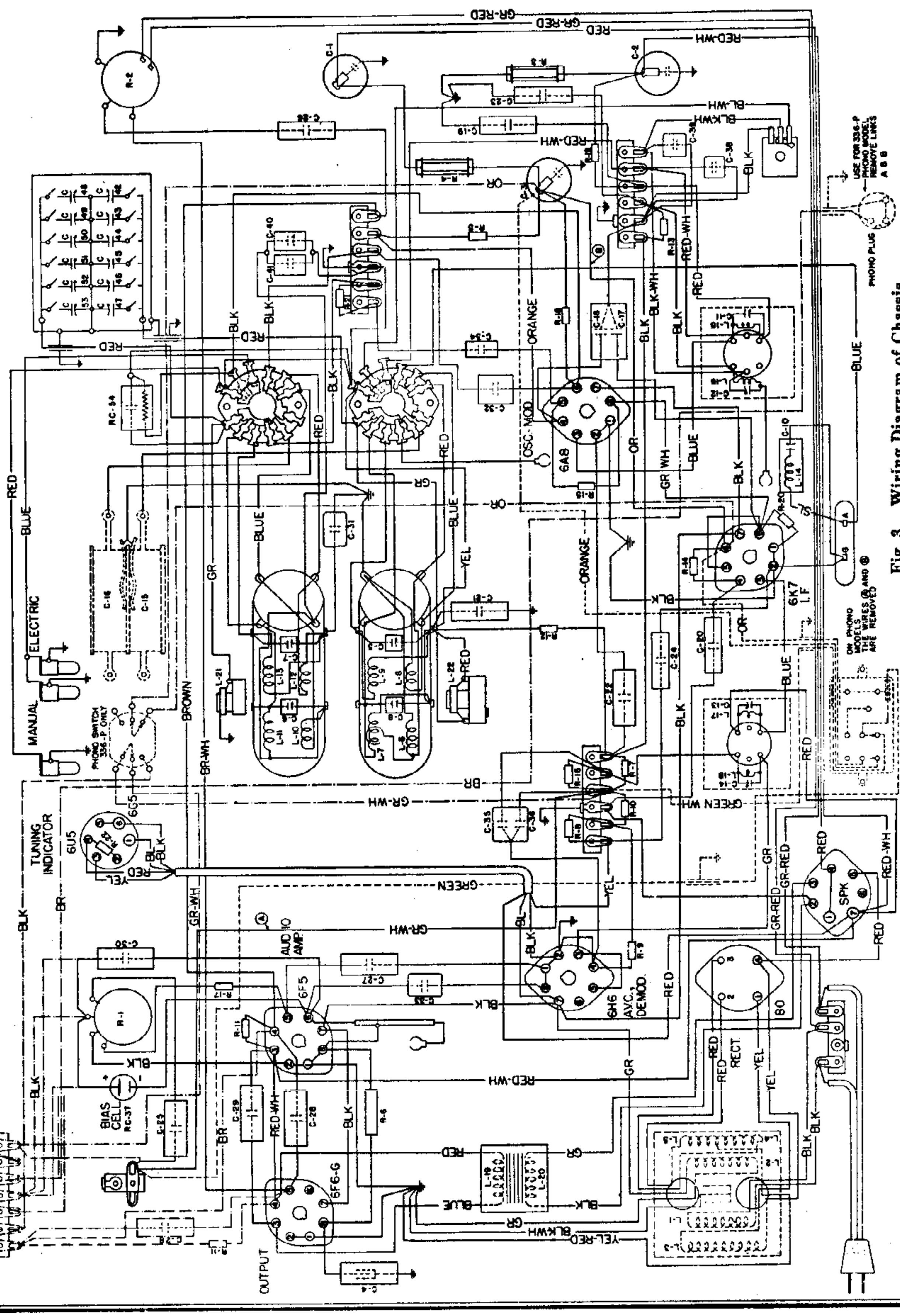

Fig. 3. Wiring Diagram of Chassis.

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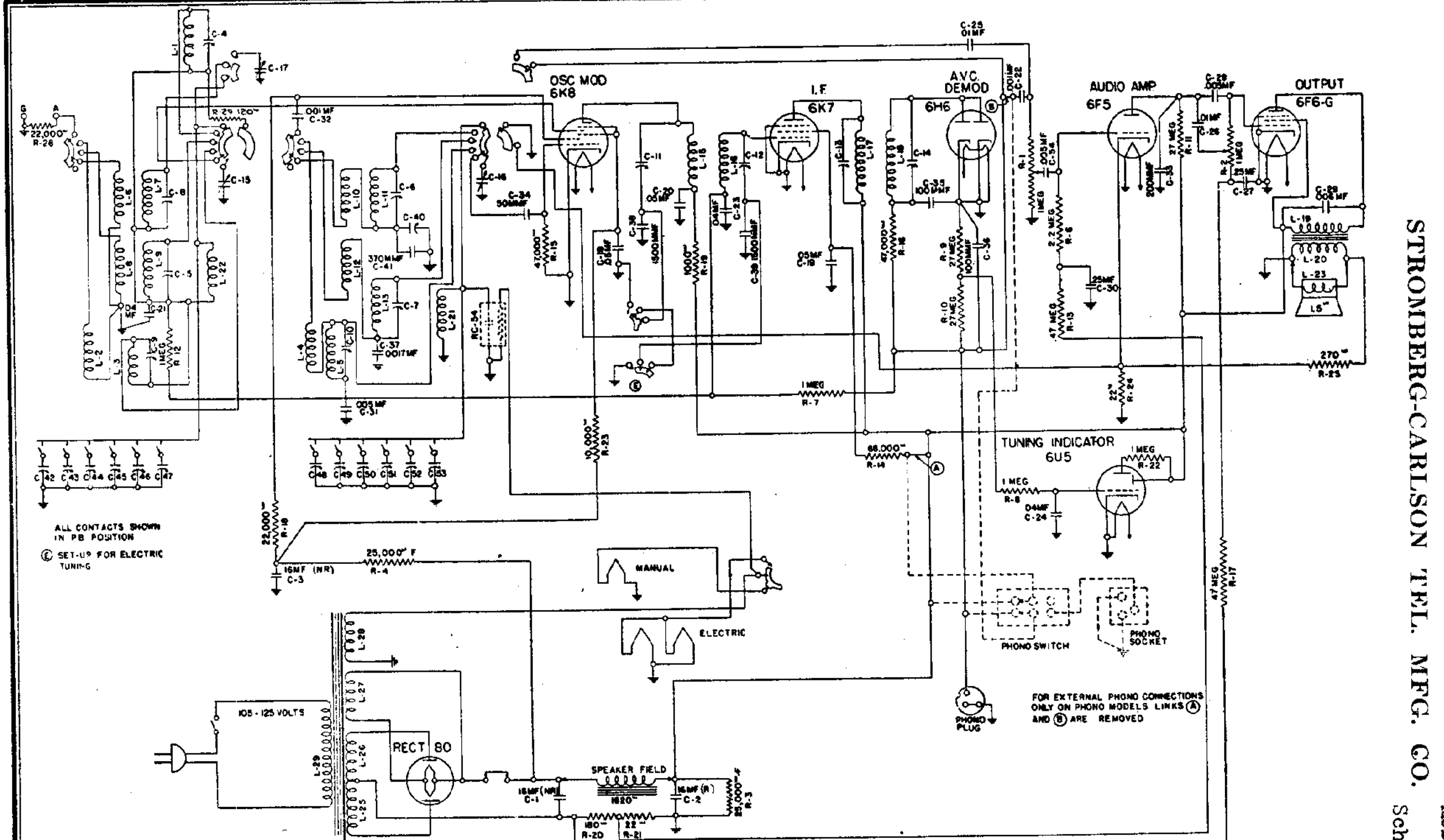

Fig. 2. Schematic Circuit of Receiver.

Type of Circuit	Superheterodyne with Electric Tuning
Tuning Ranges	.53 to 1.7 Mc.; 2.25 to 7.6 Mc.; 7.6 to 23 Mc.
Number and Type of Tubes	1 No. 6K8, 1 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6F6G, 1 No. 6U5, 1 No. 80
Voltage Rating	105 to 125 Volts
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	70 Watts

MODELS 337H, 337HB
337L, 337LB
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

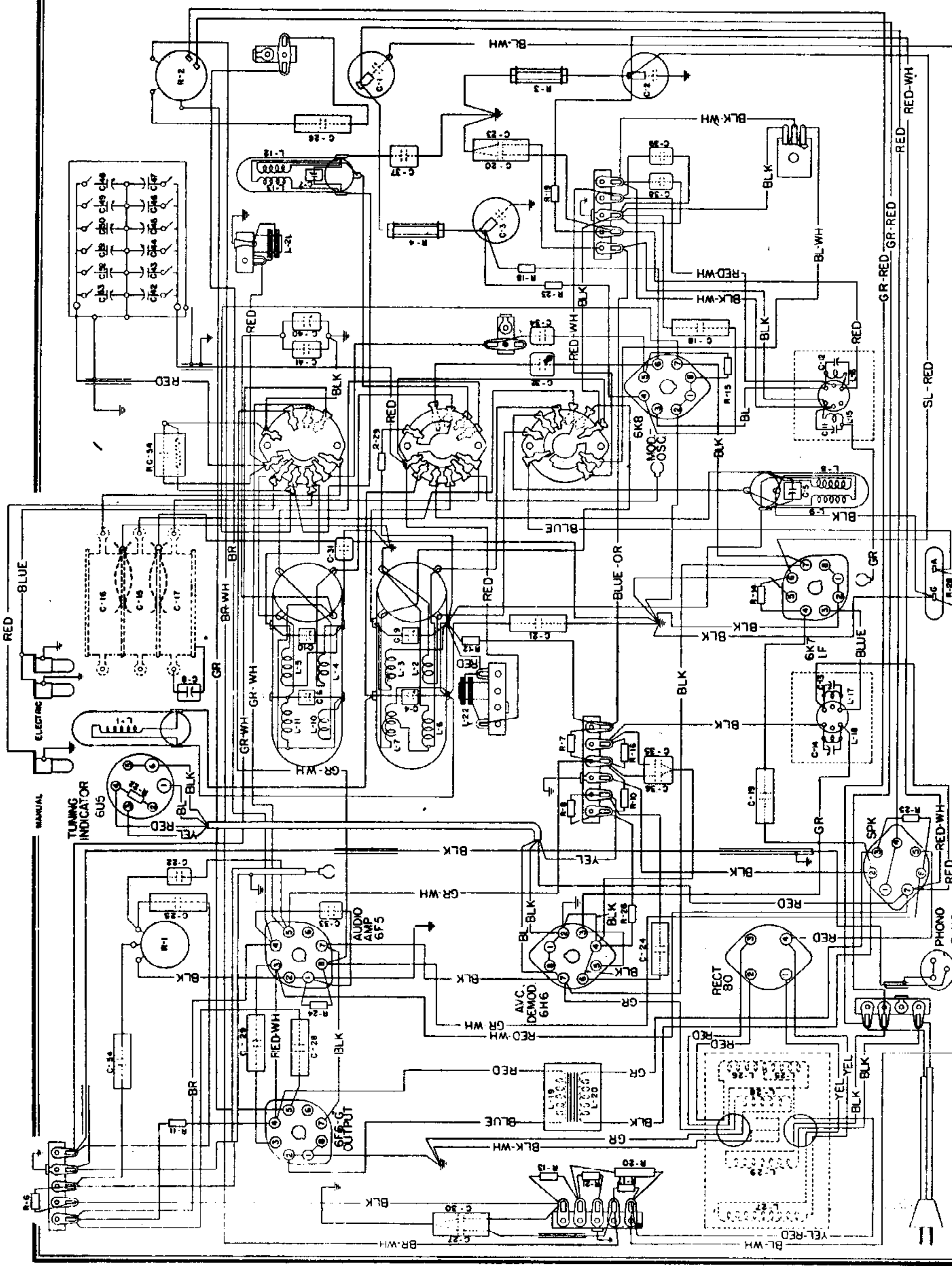

Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

These receivers are equipped with a three-contact phonograph socket, which is connected to the receiver circuit by a short, shielded cable which protrudes from the rear of the chassis base. A three-prong plug is also furnished for connecting the pick-up cable to the phonograph socket.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The Record Player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

In order to prevent radio signals from interfering with the phonograph reproduction, it is necessary to set the station selector at some point in either Short Wave range that is devoid of signals. The Record Player's turntable switch should then be pushed to the "on" position. When the turntable has attained speed, raise the pick-up and lower it gently on to the record so that the needle point enters the outside groove. The volume (sound level) and the tone for phonograph reproduction can be controlled the same as for radio reception, i. e., by means of the "Volume" and "Off-On-Tone" control knobs located on the front panel of the radio receiver.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a shielded cable between the three-prong socket plug and the pick-up. For best reproduction, this shielded cable should be of the low capacity type. The length of this shielded cable should be kept as short as possible. To connect the shielded cable to the three-prong plug, remove the metal cover of the plug and solder the shield of the cable to that prong which is farthest away from the other two prongs; a short connecting wire must also be soldered from this prong to the upper right-hand prong when looking at the rear of the plug, that is, the side opposite to the prong side. The inside wire conductor of the shielded cable should then be soldered to the other terminal of the plug.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

Instructions for Setting Up the Electric Tuning Arrangement

1. Before proceeding to set up the stations for electric tuning, the radio receiver should be turned "on" for approximately twenty to thirty minutes.
2. Set the Range switch control knob to the manual tuning position for the Standard Broadcast range (arrow on knob pointing in direction of the letter "A").
3. Remove the list of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
4. Remove the two screws which hold the electric tuning escutcheon plate (metal plate). Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the six stars are printed.
5. Remove the five screws which hold the electric tuning escutcheon to the front panel.
6. From the lists of stations, remove the call letters of the six stations which it is desired to set up for electric tuning. These six stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

   CAUTION: Each button adjustment for electric tuning has assigned frequency limits. These limits are designated for each adjustment on the cover plate which covers the electric tuning adjusting capaciters (visible when the electric tuning escutcheon is removed from the cabinet). The six stations should be selected so that the frequency of each station will be within the assigned frequency limits of its associated push button.

   It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these six favorite stations, the following order should be followed:

   Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining five stations into the other five squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

   After the six station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the two screws.

   The tuning adjustments for the six favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:

7. IMPORTANT: By aid of a screwdriver, rotate the slotted shaft of the electric tuning switch, which is located at the rear of the chassis base, so that the slot of the shaft points in the direction of the word, "Set-Up" (maximum clockwise rotation).
8. With the receiver turned "on", and the Range Switch control knob set to the standard broadcast position (arrow on knob pointing in direction of letter "A"), tune the receiver in the conventional manner by means of the station selector knobs to that station having the highest frequency (of the six chosen for setting up in the electric tuning arrangement) and carefully note the program which it is broadcasting. Then, rotate the Range Switch control knob to the electric tuning position, arrow on knob pointing in direction of the small star (large star and station letters become illuminated).

Manual or electric tuning for the Standard Broadcast range is easily obtainable by simply rotating the Range Switch control knob so that the arrow on the knob points in the direction of the designation for the desired type of tuning. When manually tuning the receiver in either the Standard Broadcast or Short Wave ranges, the electric tuning arrangement is made inoperative and the dial of the receiver is illuminated. When the Range Switch control knob is set for electric tuning (arrow on Range Switch control knob pointing in direction of the star), the dial illumination ceases and the station letters of the six stations which are set up for electric tuning become illuminated. When manually tuning these receivers or when setting up the six desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letter "A"). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position, which is the "normal" position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up Switch located at the rear of the chassis base, so that the slot of the shaft points in the direction of the word "Set-Up" (maximum clockwise rotation). Rotate the Volume control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6K8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6K8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

CAUTION: Be sure that the Electric Tuning Set-Up Switch is set to the "Set-Up" position.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver's chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the antenna "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Short Wave Range (Also Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 7 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the antenna "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

MODELS 337H, 337HB 337L, 337LB
MODELS 350M, 350MB 350R, 350RB, 350P 350PB, 350V, 350VB

STROMBERG-CARLSON TEL. MFG. CO.

Voltage, Socket Trimmers

APPARATUS SPECIFICATIONS

No. 337-H .... 50 to 60 Cycles; P-[illegible] Chassis Assembly; P-27557 Speaker
No. 337-HB .... 25 to 60 Cycles; P-[illegible] Chassis Assembly; P-27557 Speaker
No. 337-L .... 50 to 60 Cycles; P-[illegible] Chassis Assembly; P-27605 Speaker
No. 337-LB .... 25 to 60 Cycles; P-[illegible] Chassis Assembly; P-27605 Speaker

A special temperature controlled compensating capacitor is used in the oscillator circuit of these receivers when operating the electric tuning arrangement in order to eliminate drift in the oscillator's frequency. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control.

NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K8	Mod., Osc.	0	0	0	+230	+92	−6.5	+73	*6.3*	0	2-7	*6.3*
6K7	I. F. Amp.	0	0	0	+230	+70	—	+230	*6.3*	0	2-7	*6.3*
6H6	Dem., A. V. C.	—	0	0	0	0	0	0	*6.3*	0	2-7	*6.3*
6F5	Audio Amp.	0	0	0	+230	+56	0	0	*6.3*	0	2-7	*6.3*
6F6G	Audio Output	—	0	0	+212	+227	0	—	*6.3*	0	2-7	*6.3*
6U5	Tuning Ind.	—	0	0	+220	0	+45*	*6.3*	—	—	1-6	*6.3*
80	Rectifier	—	+350	*345*	*345*	+350	—	—	—	—	1-4	*4.8*
Speaker Socket		—	+350	0	0	+350	+350	0	+230	—		

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

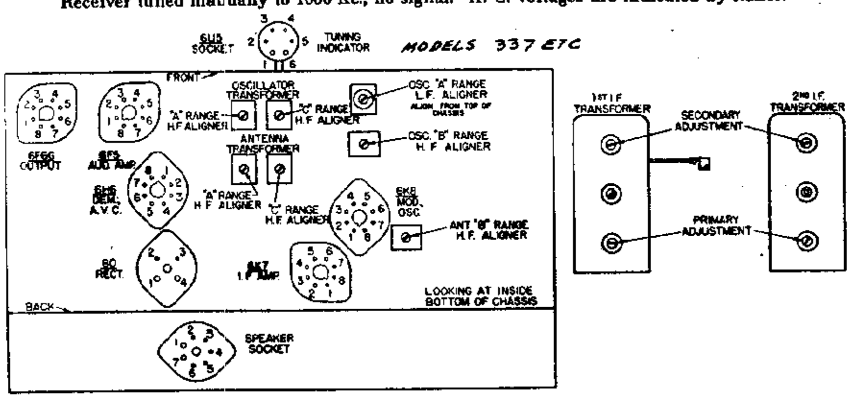

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

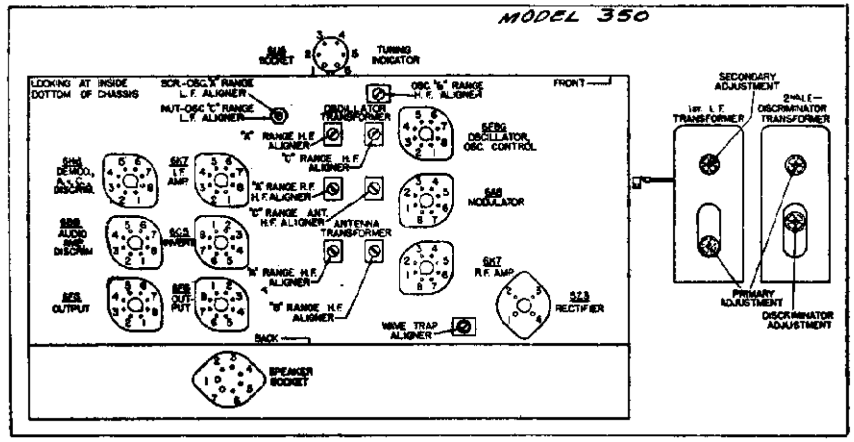

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments for the R. F., I. F. and Discriminator Circuits.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets except the No. 6U5 tube. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used.

MODEL 350

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+205	+99	0	0	*6.2*	0	2-7	*6.2*
6A8	Modulator	0	0	0	+227	+99	−5.9	+99	*6.2*	0	2-7	*6.2*
6F8-G	Oscillator and Oscillator Control	0	0	0	+153	+7.8	−5.9	+152	*6.2*	0	2-7	*6.2*
6K7	I. F. Amp.	0	0	0	+210	+57	0	+57	*6.2*	0	2-7	*6.2*
6H6	Discriminator, Demodulator, A. V. C.	—	0	0	0	0	0	0	*6.2*	0	2-7	*6.2*
6B8	Discriminator, Audio Amp.	0	0	0	+20*	0	0	+38*	*6.2*	0	2-7	*6.2*
6C5	Audio Inv.	—	0	0	+120	+215	0	0	*6.2*	+5.9	2-7	*6.2*
6F6	Audio Output	—	0	0	+300	+308	0	0	*6.2*	+19	2-7	*6.2*
6F6	Audio Output	—	0	0	+300	+308	0	0	*6.2*	+19	2-7	*6.2*
6U5†	Tuning Ind.	—	*6.2*	+19	0	+217	−3	0	—	—	1-6	*6.2*
5Z3	Rectifier	—	+410	*397*	*397*	+410	—	—	—	—	1-4	*4.8*
Speaker Socket		—	+390	0	0	+410	+410	0	+308	—	—	—

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

MODELS 340F, 340FB
340H, 340HB, 340M
340MB, 340V, 340VB
340P, 340PB, 341R
341RB, 341P, 341PB
Schematic

STROMBERG-CARLSON TEL. MFG. CO.

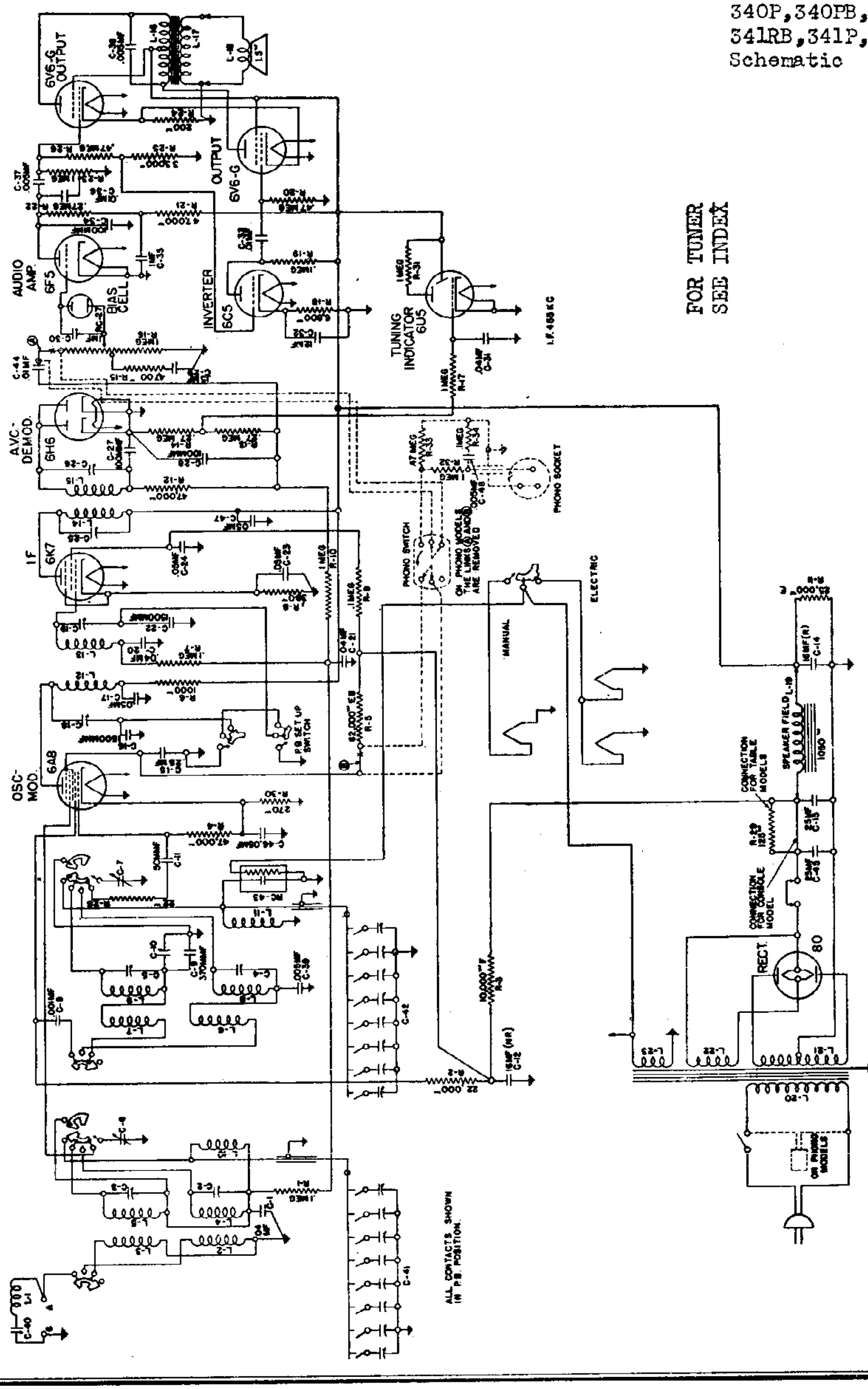

Fig. 2. Schematic Circuit of Receiver.

MODELS 340F, 340FB
340H, 340HB, 340M
340MB, 340V, 340VB
340P, 340PB, 341R
341RB, 341P, 341PB
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

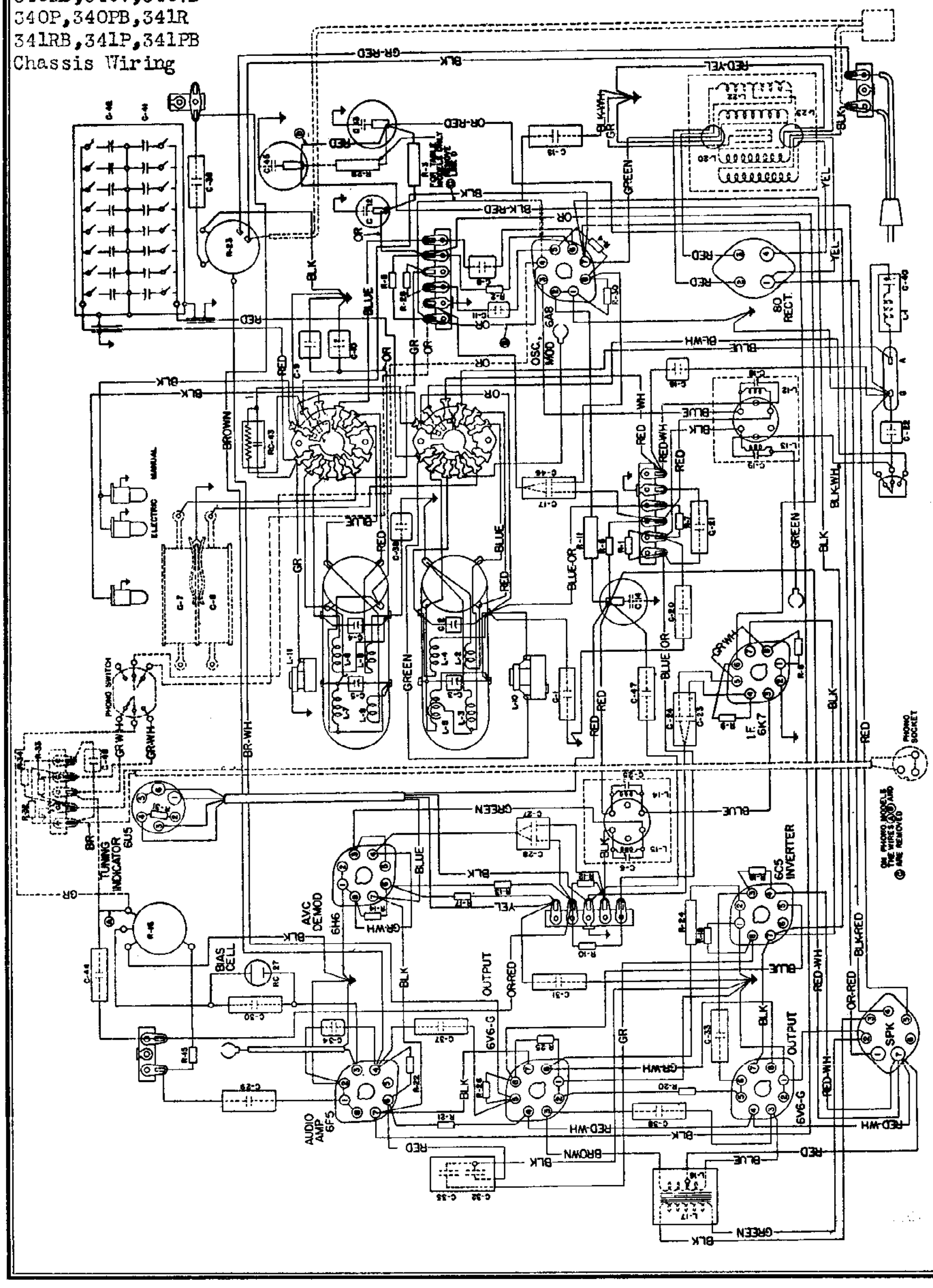

Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

Stromberg-Carlson Nos. 340 and 341 Radio Receivers

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
ROCHESTER, NEW YORK

ELECTRICAL SPECIFICATIONS

Type of Circuit .... Superheterodyne with Electric Tuning
Tuning Ranges .... Range "A", 550 to 1700 Kc.; Range "C", 5900 to 18,000 Kc.
Number and Type of Tubes..1 No. 6A8; 1 No. 6K7; 1 No. 6H6; 1 No. 6F5; 1 No. 6C5; 2 No. 6V6-G; 1 No. 6U5; 1 No. 80
Power Supply Voltage .... 105 to 125 Volts, A. C.
Power Frequency Rating .... 50 to 60 Cycles and 25 to 60 Cycles
Input Power Rating:
Radio Models Only .... 80 Watts
No. 340-P Radio-Phono Model .... 100 Watts
No. 341-P Radio-Phono Model .... 100 Watts
Frequency of Intermediate Amplifier .... 455 Kilocycles

APPARATUS SPECIFICATIONS

No. 340-F Receiver .... 50 to 60 Cycles; P-28961 Chassis Assembly; P-26170 Speaker
No. 340-FB Receiver .... 25 to 60 Cycles; P-28962 Chassis Assembly; P-26170 Speaker
No. 340-H Receiver .... 50 to 60 Cycles; P-28961 Chassis Assembly; P-26170 Speaker
No. 340-HB Receiver .... 25 to 60 Cycles; P-28962 Chassis Assembly; P-26170 Speaker
No. 340-M Receiver .... 50 to 60 Cycles; P-28961 Chassis Assembly; P-26170 Speaker
No. 340-MB Receiver .... 25 to 60 Cycles; P-28962 Chassis Assembly; P-26170 Speaker
No. 340-V Receiver .... 50 to 60 Cycles; P-28961 Chassis Assembly; P-26171 Speaker
No. 340-VB Receiver .... 25 to 60 Cycles; P-28962 Chassis Assembly; P-26171 Speaker
No. 340-P Receiver .... 60 Cycles Only; P-29419 Chassis Assembly; P-26171 Speaker; P-29717 Phono Unit
No. 340-PB Receiver .... 25 Cycles Only; P-29420 Chassis Assembly; P-26171 Speaker; P-29718 Phono Unit
No. 341-R Receiver .... 50 to 60 Cycles; P-29051 Chassis Assembly; P-26170 Speaker
No. 341-RB Receiver .... 25 to 60 Cycles; P-29052 Chassis Assembly; P-26170 Speaker
No. 341-P Receiver .... 60 Cycles Only; P-28968 Chassis Assembly; P-26170 Speaker; P-29443 Phono Unit
No. 341-PB Receiver .... 25 Cycles Only; P-28969 Chassis Assembly; P-26170 Speaker; P-29444 Phono Unit

CIRCUIT DESCRIPTION

These receivers are nine tube, instantaneous "Electric Tuning" superheterodyne receivers employing metal tubes and a highly efficient dynamic speaker. There are two tuning ranges, the frequency limits of each range being listed under the "Electrical Specifications", given above.

The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for instantaneous selection by means of the push buttons. **(Local and other stations that give the best daytime and evening service should be selected.)** To properly set up the electric tuning arrangement for the eight favorite Standard Broadcast stations, read the section, "Instructions for Setting Up the Electric Tuning Arrangement", appearing on page of this book. Manual or electric tuning for the Standard Broadcast range is easily obtainable by simply rotating the Range Switch control knob so that the arrow on the knob points in the direction of the designation for the desired type of tuning. When manually tuning the receiver in either the Standard Broadcast or Short Wave ranges, the electric tuning arrangement is made inoperative and the dial of the receiver is illuminated. When the Range Switch control knob is set for electric tuning (arrow on Range Switch control knob pointing in direction of the star), the dial illumination ceases and the station letters of the eight stations which are set up for electric tuning become illuminated. When manually tuning these receivers or when setting up the eight desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle.

A special temperature controlled compensating capacitor is used in the oscillator circuit of these receivers when operating the electric tuning arrangement in order to eliminate drift in the oscillator's frequency. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control.

In addition to the above features, the No. 340-P Receiver is also equipped with a single record playing phonograph unit, and the No. 341-P Receiver is equipped with an automatic record changer phonograph unit. These phonograph units use a crystal type pick-up in conjunction with a specially equalized circuit.

The chassis used in the table models differ from the chassis used in the console models in that a 125-ohm resistor, R-29, is added in the rectifier filament circuit. In addition, the chassis used in the No. 341 Receivers differs from the chassis used in the No. 340 Receivers in the type of electrolytic filter capacitors which are used. Also, the radio phonograph models are equipped with a radio-phono switch.

The various tubes are used in these receivers as follows: The No. 6A8 tube functions as both the Modulator and Oscillator tube. The No. 6K7 tube is used in the I. F. Amplifier and the No. 6H6 tube is used as both the Demodulator and Automatic Volume Control tube. The No. 6F5 tube is used in the Audio Amplifier and the No. 6C5 tube is used as the Phase Inverter tube of the Audio Amplifier circuit. The two No. 6V6-G tubes are used in the Audio Power Output Stage. The No. 6U5 tube is used for indicating resonance in the tuning indicator system and the No. 80 tube is the Rectifier tube of the Power Supply Unit.

NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Due to the use of the 125-ohm resistor, R-29, in the chassis used in table models, some socket terminals in the voltage table have two listed voltages; the lower voltage being obtained from those chassis which are equipped with this resistor, and the upper voltages are those obtained from chassis not equipped with this resistor.

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6A8	Mod., Osc.	0	0	0	+245 +240	+109	−14	+205	*6.3*	+2.35	2-7	*6.3*
6K7	I. F. Amp.	0	0	0	+250 +244	+109*	0	+290	*6.3*	+3.3	2-7	*6.3*
6H6	Dem., A. V. C.	—	0	0	0	0	0	0	*6.3*	0	2-7	*6.3*
6F5	Audio Amp.	0	0	0	0	+100*	0	+220* +218*	*6.3*	0	2-7	*6.3*
6C5	Audio Inv.	—	0	0	+138* +136*	+250 +244	0	0	*6.3*	+4.8	2-7	*6.3*
6V6-G	Audio Output	—	0	0	+244 +237	+250 +244	0	0	*6.3*	+13.8	2-7	*6.3*
6V6-G	Audio Output	—	0	0	+244 +237	+250 +244	0	0	*6.3*	+13.8	2-7	*6.3*
6U5	Tuning Ind.	—	*6.3*	+139* +135*	0	+250 +244	0	0	—	—	1-6	*6.3*
80	Rectifier	—	+370	372	372	+370	—	—	—	—	1-4	5
Speaker Socket			+370	0	0	+370	+370	0	—	—		

Receiver tuned manually to 1000 kc., no signal. A. C. voltages are indicated by italics.

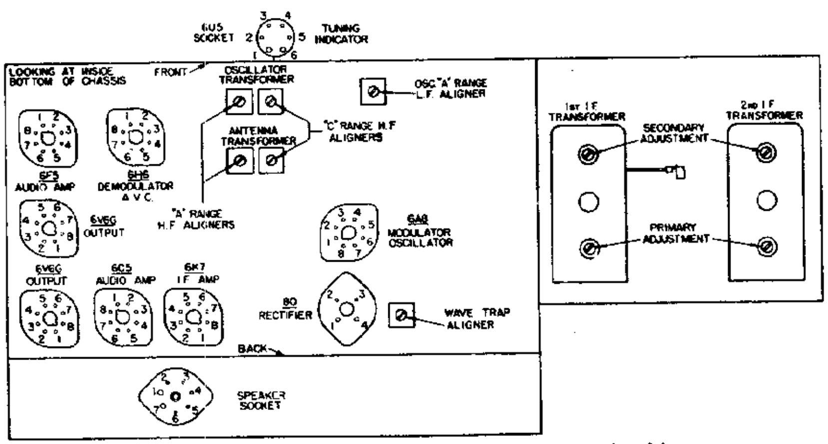

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

MODELS 340F, 340FB 340H, 340HB, 340M 340MB, 340V, 340VB

STROMBERG-CARLSON TEL. MFG. CO.

340P, 340PB, 341R 341RB, 341P, 341PB Alignment

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no re-adjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. **Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"), and that the slotted shaft of the electric tuning set-up switch, located on the rear of the chassis base, points in the direction of the word "Set-Up". When the aligning adjustments have been completed the slotted shaft of the electric tuning set-up switch should be rotated so that the slot points in the direction of the word, "Operate".** Figure 1, shows the location of all the aligning capacitors in these receivers.

Dial Adjustment

Before aligning the circuits of any of these receivers, **the tuning dial must be properly aligned to track with the gang tuning capacitors.** To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. Then, with the gang tuning capacitors in this position, the dial pointer should be placed on the horizontal center line of the dial. **To do this, align the pointer with the short black line located** at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is **455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.**

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position, which is the "normal" position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up switch located at the rear of the chassis base, so that the slotted shaft points in the direction of the word "Set-Up" (max-mum clockwise rotation). Rotate the Volume control knob to its maximum clockwise position (maximum volume).

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. **Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.**

2. Adjust the oscillator's "C" range high frequency aligner for maximum output.

3. Adjust the antenna's "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a **200-micro-microfarad** capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.

2. **Adjust the oscillator's "A" range high frequency aligner for maximum output.**

3. **Adjust the antenna's "A" range high frequency aligner for maximum output.**

4. **Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.**

5. **Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.**

6. **Reset both the test oscillator's frequency and receiver's tuning dial** to 1.5 megacycles and repeat operations **Nos. 2 and 3.**

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer to 1000 kilocycles and the Electric Tuning Set-Up Switch, located on the back of the receiver chassis, to the "Set-Up" position.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a **minimum** indication is obtained on the output meter.

IMPORTANT: When all the aligning adjustments have been completed, it is important that the Electric Tuning Set-Up Switch (located on the rear of the receiver chassis) be re-set to the "Operate" position.

OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS FOR NOS. 340 AND 341 RECEIVERS NOT EQUIPPED WITH A RECORD PLAYING UNIT

In order to obtain reproduction of phonograph records in conjunction with these receivers, the following instructions should be followed.

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-29712 Package Assembly. The rear of the chassis base of the receiver is already drilled for this assembly. Complete instructions on how to install and operate this assembly are furnished with each P-29712 Package Assembly.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket and plug of the P-29712 Package Assembly, and the pick-up. This shielded cable should be of the low capacity type. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-29712 Package Assembly, and the pick-up. The transformer should be located as near to the receiver as possible in which case it will not be necessary to use a shielded cable.

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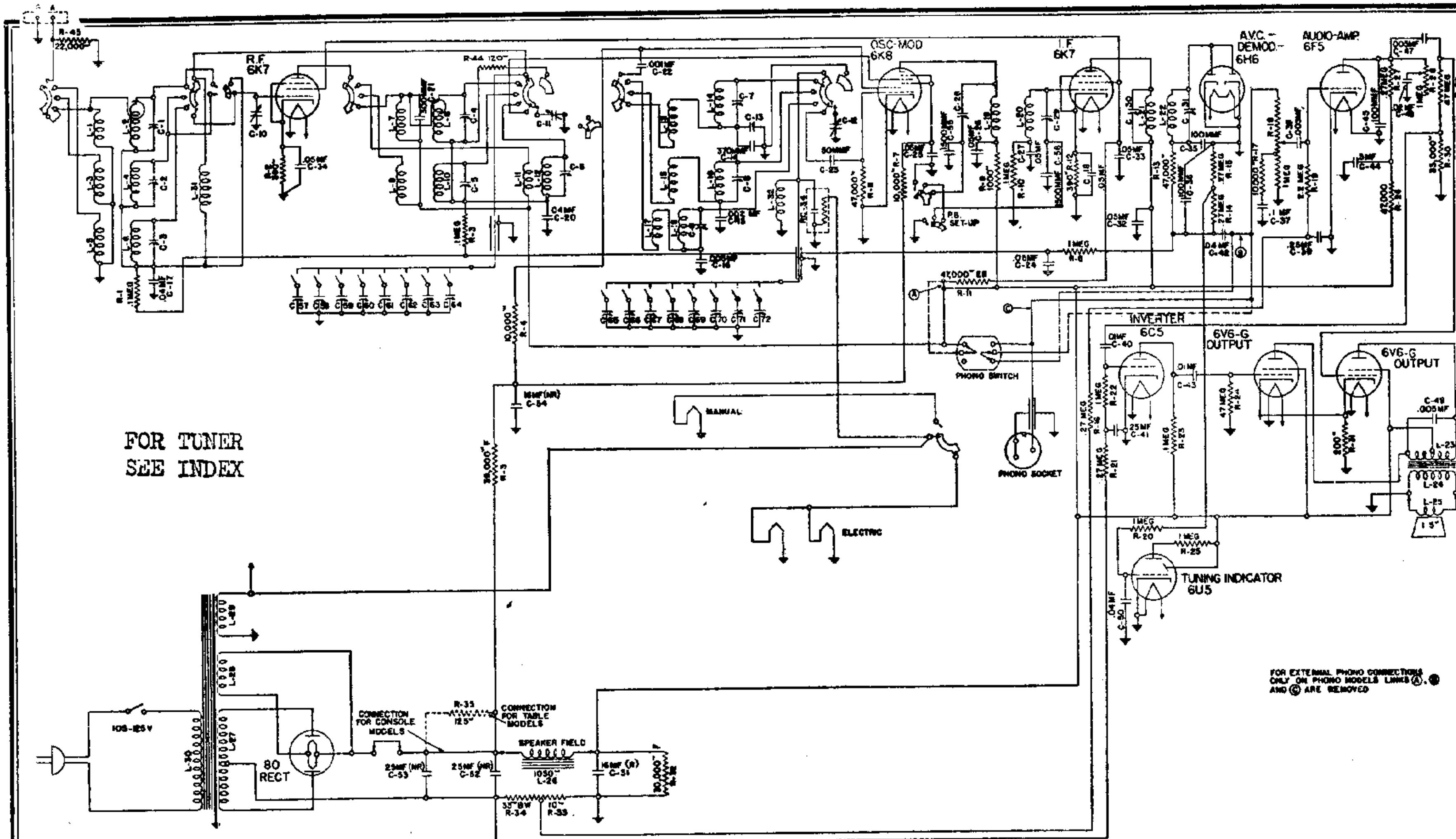


FOR TUNER
SEE INDEX

ELECTRICAL SPECIFICATIONS

Type of Circuit .... Superheterodyne with Electric Tuning
Tuning Ranges .... A—.53 to 1.7 Mc.; B—2.25 to 7.6 Mc.; C—7.6 to 23 Mc.
Number and Type of Tubes ... 1 No. 6K8, 2 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6C5, 2 No. 6V6G, 1 No. 6U5, 1 No. 80
Voltage Rating .... 105 to 125 Volts
Power Frequency Rating .... 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating .... 85 Watts
Frequency of Intermediate Amplifier .... 455 Kilocycles

APPARATUS SPECIFICATIONS

No. 345-F Receiver .... 50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
No. 345-FB Receiver .... 25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker
No. 345-M Receiver .... 50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
No. 345-MB Receiver .... 25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker

MODELS 345F, 345FB
345M, 345MB STROMBERG-CARLSON TEL. MFG. CO.
Chassis Wiring

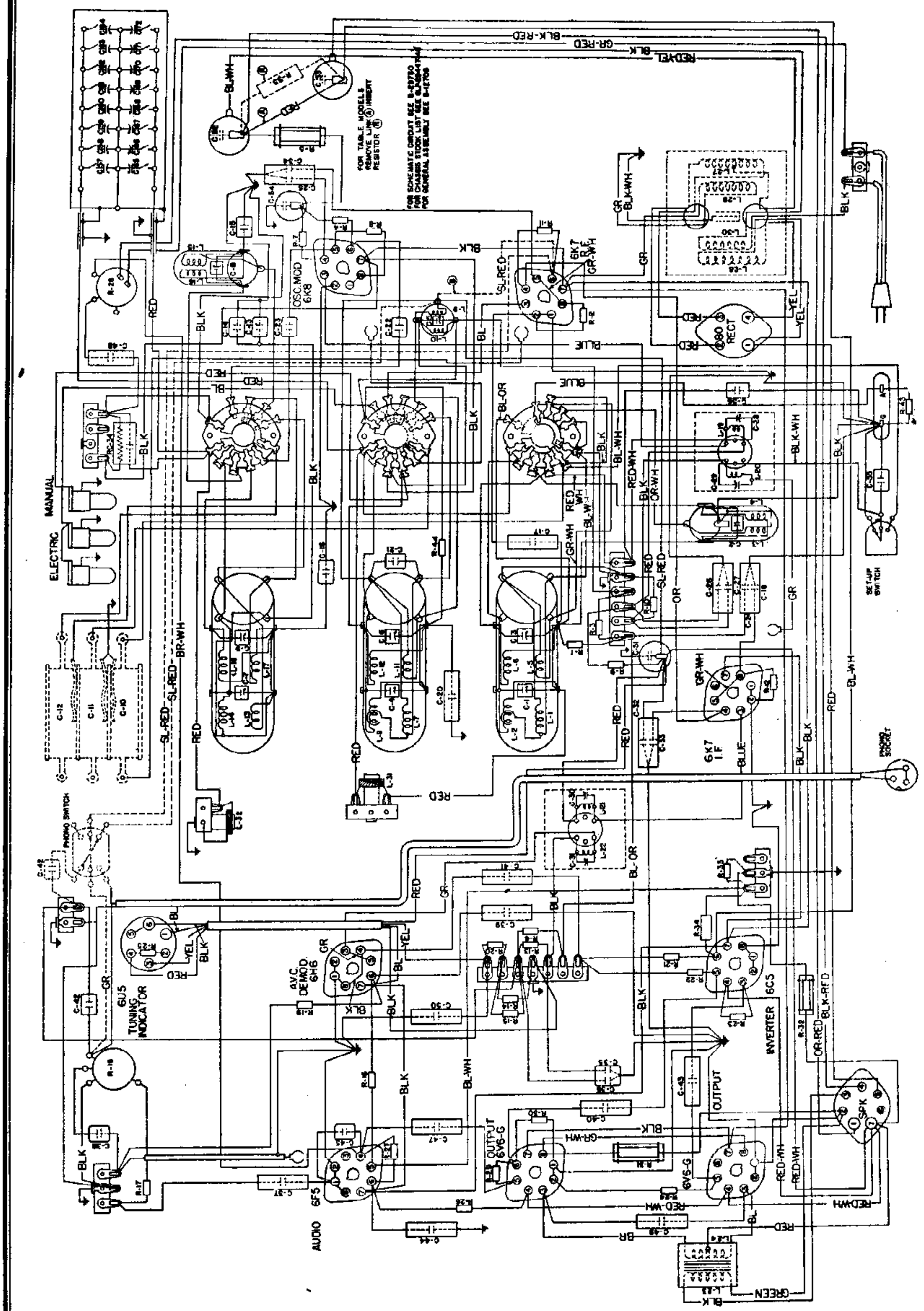


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts A. C.*
6K7	R. F. Amp.	0	0	0	+240	+81	+2.5	+240	*6.3*	+2.5	2–7	*6.3*
6K8	Mod., Osc.	0	0	0	+215	+73	−6.0	+81	*6.3*	0	2–7	*6.3*
6K7	I. F. Amp.	0	0	0	+240	+81	+2.5	0	*6.3*	+2.5	2–7	*6.3*
6H6	Dem., A. V. C.	—	0	0	0	0	0	0	*6.3*	0	2–7	*6.3*
6F5	Audio Amp.	0	0	0	0	+83*	−1.0	+190	*6.3*	0	2–7	*6.3*
6C5	Audio Inv.	—	0	0	+105	+240	+.1	−5.0	*6.3*	0	2–7	*6.3*
6V6G	Audio Output	—	0	0	+235	+240	0	0	*6.3*	+14	2–7	*6.3*
6V6G	Audio Output	—	0	0	+235	+240	0	0	*6.3*	+14	2–7	*6.3*
6U5	Tuning Ind.	—	*6.3*	+20*	+.1	+240	0	0	—	—	1–6	*6.3*
80	Rectifier	—	+370	*360*	*360*	+370	—	—	—	—	1–4	*4.9*
Speaker Socket		—	+370	0	0	+370	+370	0	+240	—	—	—

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no re-adjustments are necessary. However, should it become necessary to make any re-adjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

IMPORTANT: In making any R. F. or I. F. alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any R. F. or I. F. circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response, and that the Electric Tuning Set-Up Switch, located on the rear of the chassis base, is rotated to the "Set-Up" position. When the aligning adjustments have been completed the Electric Tuning Set-Up Switch should be rotated back to the "Operate" position. Figure 1, shows the location of all the aligning capacitors in these receivers.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. Then, with the gang tuning capacitors in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position (arrow on knob pointing in direction of letter "A"). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position. By aid of a screw-driver rotate the slotted shaft of the Electric Tuning Set-Up Switch located at the rear of the chassis base, so that the slot points in the direction of the word "Set-Up". Rotate the Volume control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6K8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6K8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal of the receiver.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

CAUTION: Be sure that the Electric Tuning Set-Up Switch is set to the "Set-Up" position.

Alignment of Short Wave Range, "C"

In aligning the radio frequency circuits for this range, replace the 0.1 microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver's chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the "C" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust the receiver's oscillator "C" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer "C" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.

Alignment of Short Wave Range, "B"

In aligning the radio frequency circuits for this range, use the same artificial antenna (400 ohm resistor) and antenna binding post as was used for aligning the "C" range, and align as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the "B" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 7 megacycles.
2. Adjust the receiver's oscillator "B" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer's "B" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "B" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range, "A"

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer's "A" range H. F. aligner for maximum output.
4. Adjust the antenna "A" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range L. F. aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitors slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillators frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

MODELS 335L, 335LB
336P, 336PB

STROMBERG-CARLSON TEL. MFG. CO.

Voltage, Socket, Trimmers

MODELS 345F, 345FB
345M, 345MB

Socket, Trimmers
Bass Response Data

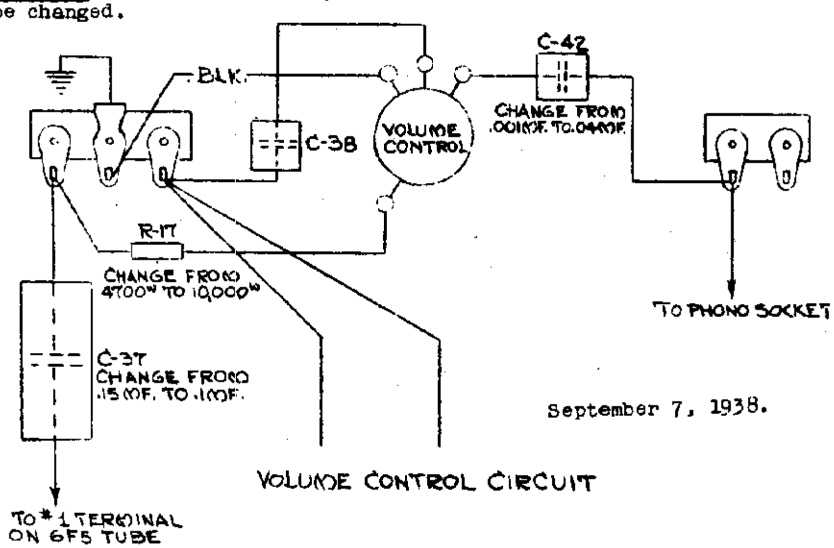
Increasing Bass Reponse Of 345 Receivers

Remove the 4700 ohm resistor (R-17) from the volume control tap and replace with a 10,000 ohm resistor, Pc. 26345.

Remove the .15 mf capacitor (C-37) from the volume control tap and replace with a .1 mf capacitor, Pc. 24402.

Remove the .001 mf capacitor (C-42) from the high side of the volume control and replace with a .04 mf capacitor, Pc. 24405.

Caution: Do not mistake capacitor C-38 for one of the capacitors to be changed.



September 7, 1938.

VOLUME CONTROL CIRCUIT

APPARATUS SPECIFICATIONS

No. 335-L Receiver........50 to 60 Cycles; P-28818 Chassis Assembly; P-27605 Loud Speaker
No. 335-LB Receiver........25 to 60 Cycles; P-28819 Chassis Assembly; P-27605 Loud Speaker
No. 336-P Receiver........60 Cycles Only; P-29415 Chassis; P-29439 Phono Unit; P-29464 Loud Speaker
No. 336-PB Receiver........25 Cycles Only; P-29416 Chassis; P-29440 Phono Unit; P-29464 Loud Speaker

NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

MODEL 335, ETC

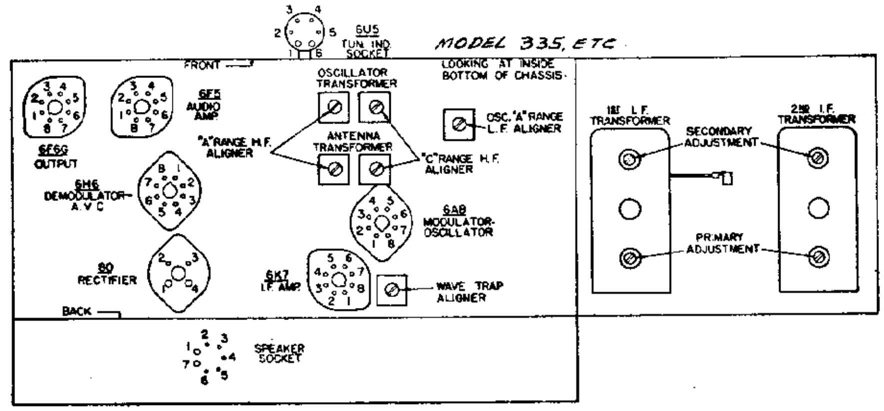
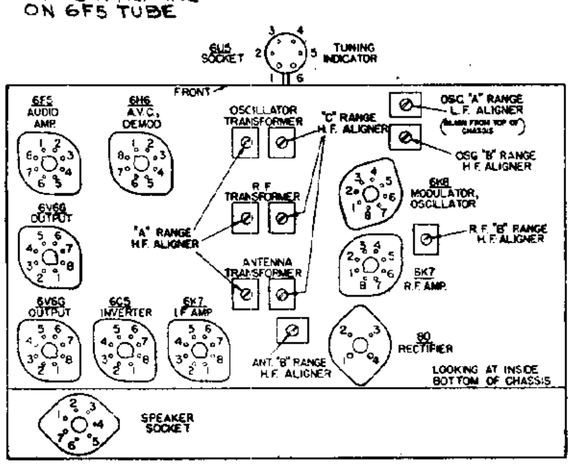


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

Tube	Circuit	Cap	Terminals of Sockets Models 335 etc. 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6A8	Mod., Osc.	0	0	0	+245	+68	−10	+235	*6.2*	+2.8	2-7	*6.2*
6K7	I. F. Amp.	0	0	0	+250	+78	+2.8	+280	*6.2*	+2.8	2-7	*6.2*
6H6	Dem., A. V. C.	—	0	0	0	0	0	0	*6.2*	0	2-7	*6.2*
6F5	Audio Amp.	0	0	0	+250	+56	0	0	*6.2*	0	2-7	*6.2*
6F6G	Audio Output	—	0	0	+235	+250	0	0	*6.2*	+14.5	2-7	*6.2*
6U5	Tuning Ind.	—	*6.2*	+18*	−1.5	+250	0	0	—	—	1-6	*6.2*
80	Rectifier	—	+360	*350*	*350*	+360	—	—	—	—	1-4	*5.0*
Speaker Socket			+360	0	0	+360	+360	0	+250	—		

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.



MODEL 345

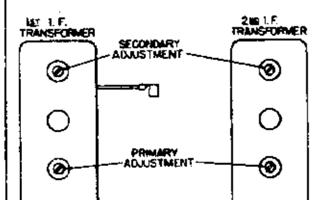
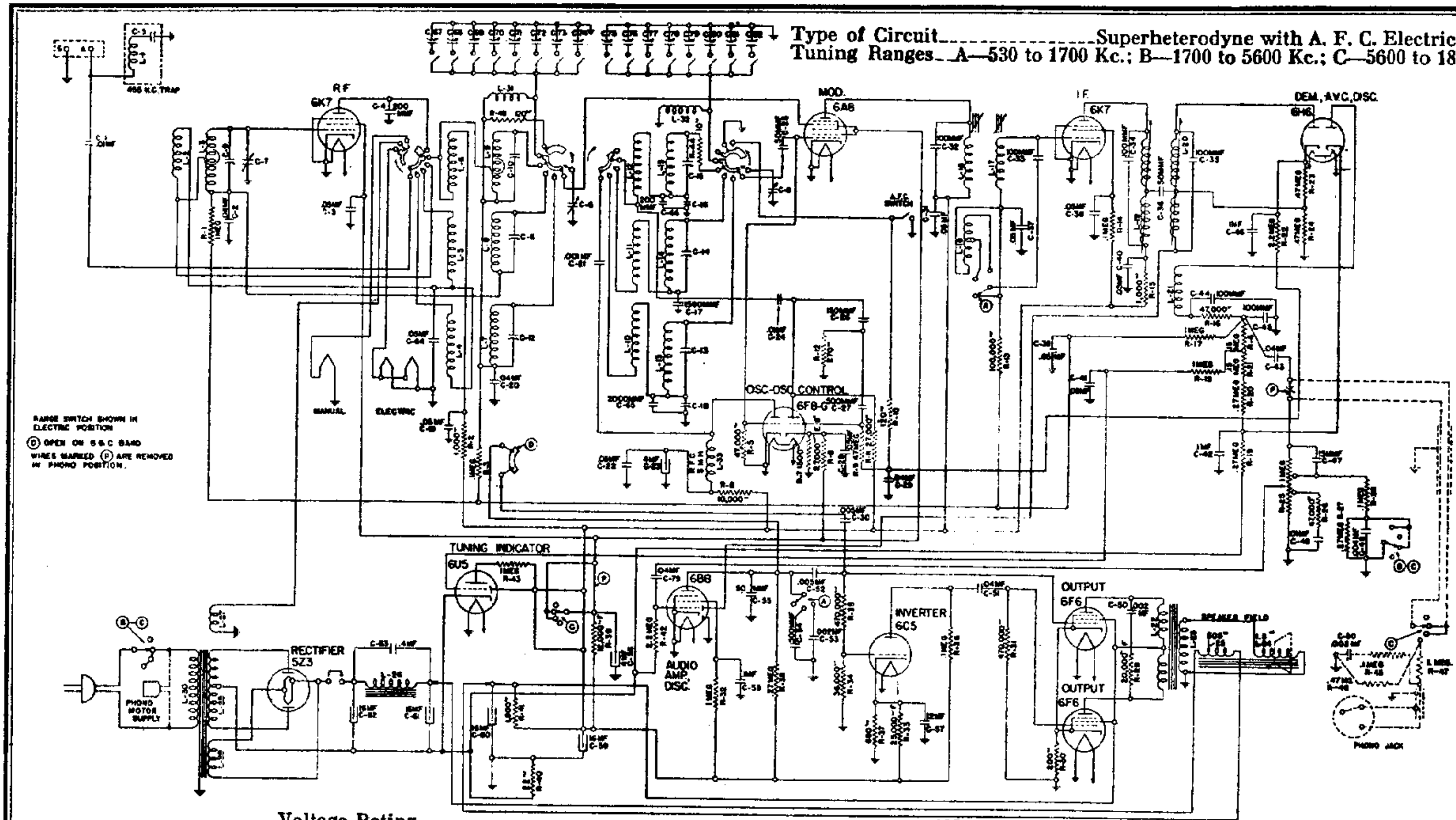


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

STROMBERG-CARLSON TEL. MFG. CO.

Type of Circuit..................Superheterodyne with A. F. C. Electric Tuning
Tuning Ranges...A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.



Voltage Rating..............................105 to 125 Volts, A. C.
Power Frequency Rating..............................See "Apparatus Specifications"
Input Power Rating:
Radio Models Only..............................120 Watts
Radio-Phono. Models..............................140 Watts
Frequency of Intermediate Amplifier..............................455 Kilocycles

APPARATUS SPECIFICATIONS

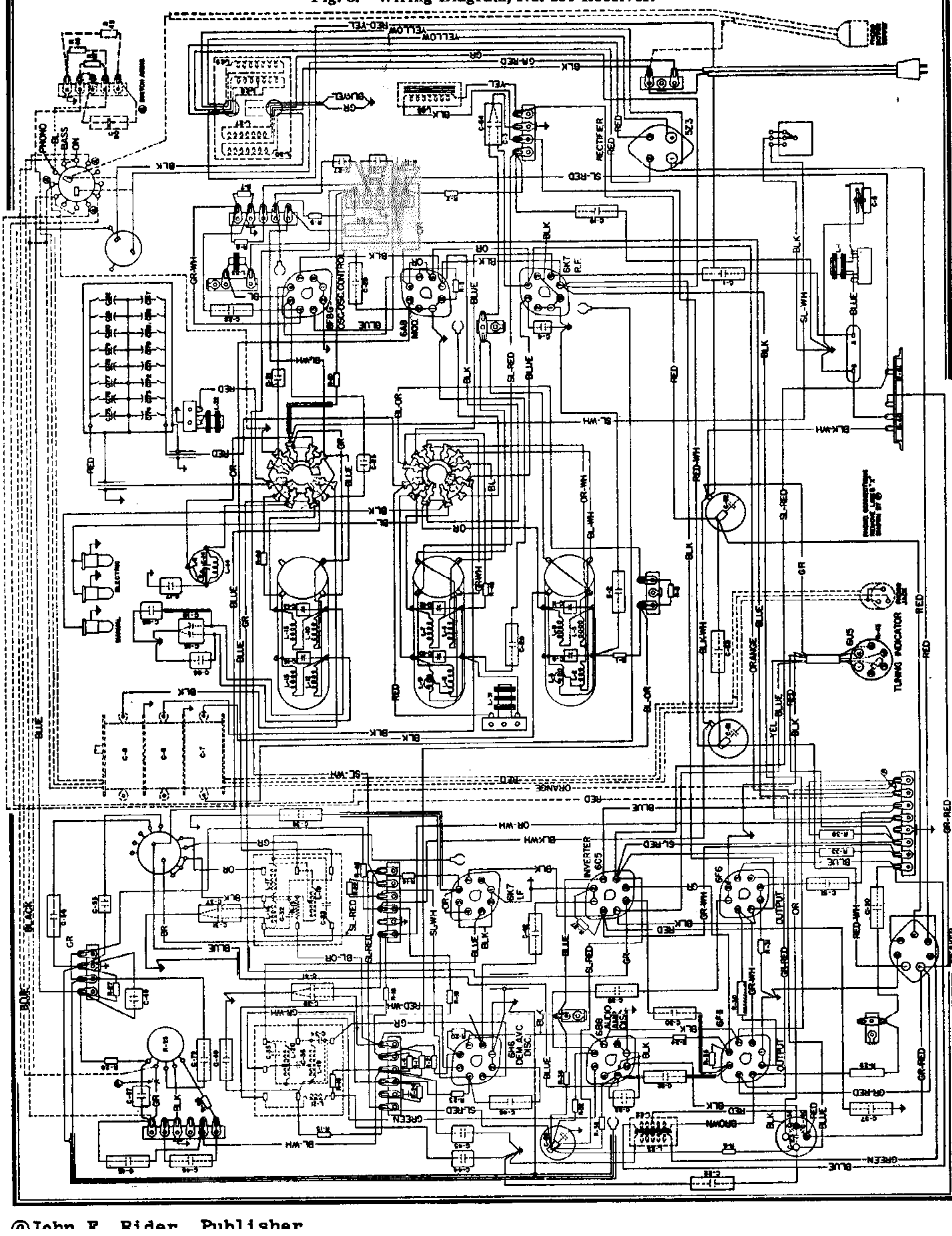
No. 350-M Receiver..............................50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker
No. 350-MB Receiver..............................25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker
No. 350-R Receiver..............................50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker
No. 350-RB Receiver..............................25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker
No. 350-P Receiver..............60 Cycles Only; P-29066 Chassis; P-27504 Speaker; P-29443 Phono. Motor Unit
No. 350-PB Receiver..............25 Cycles Only; P-29067 Chassis; P-27504 Speaker; P-29444 Phono. Motor Unit
No. 350-V Receiver..............................50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker
No. 350-VB Receiver..............................25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker

FOR TUNER
SEE INDEX

MODELS 350M, 350MB
350R, 350RB, 350P
350PB, 350V, 350VB
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

Fig. 3. Wiring Diagram, No. 350 Receiver.



STROMBERG-CARLSON TEL. MFG. CO.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a milliammeter having a range of 0 to 10 milliamperes connected in series with that cathode of the No. 6F8-G tube which is used in the oscillator control circuit by means of an adapter plug inserted between the tube and its socket. The leads to the meter should not be longer than 15", and should be shunted at the socket connections by a capacitor of not less than 0.25 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the Fidelity Control knob is set for the "Normal" position. The "Off-On-Bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Operate the Range Switch of the receiver to the manual tuning, Standard Broadcast range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity control knob to its "Normal" position, and the "Off-On-Bass" control knob to its normal position.

   CAUTION: Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity control knob set at any position other than the "Normal" position and the Range Switch control knob set at the "Electric" tuning position unless specifically directed in the following paragraphs. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with the A. F. C. switch (which is located on rear of the chassis base) set at the "set-up" position.

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.

3. Now, noting from Fig. 1, the alignment adjustments for the First and Second I. F. transformers, align the I. F. circuits in the following order:

   Adjust the Second I. F. transformer primary circuit for maximum output.

   Adjust the First I. F. transformer primary circuit for maximum output.

   Adjust the First I. F. transformer secondary circuit for maximum output.

   Carefully make all of the above adjustments, watching carefully the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

4. To adjust the Discriminator circuit proceed as follows:

   Check the position of the Range Switch control knob which should be set to the manual tuning Standard Broadcast position.

   CAUTION: Before adjusting this circuit be sure that the I. F. amplifier is tuned exactly to 455 kilocycles. With the signal generator still set at a frequency of 455 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 modulator tube. Now, observe the reading of the milliammeter which is connected in series with the cathode of the No. 6F8-G oscillator control tube, and rotate the Range Switch control knob to the "Electric" position, observing whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the Range Switch control knob is rotated from the manual tuning Standard Broadcast to the "Electric" position. If there is any difference in the milliammeter reading while rotating this control knob from the manual tuning Standard Broadcast to the "Electric" position and vice versa, adjust the "Discriminator" circuit by means of the screw adjustment until the meter reading has the same value regardless of whether the Range Switch control knob is rotated to the manual tuning Standard Broadcast or "Electric" position. When this condition is obtained, the Discriminator circuit is properly adjusted.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass" control knob should also be set for "Normal" operation.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 16 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Set the test oscillator's frequency and the receiver's tuning dial to 6 megacycles.
5. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner), and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and the receiver's tuning dial to 16 megacycles and repeat operations Nos. 2 and 3.

Alignment of Medium Wave Range (Also Referred to "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the manual tuning Standard Broadcast "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of gold dot). Set the tuning dial to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

MODELS 235H, 235HB
235L, 235LB

STROMBERG-CARLSON TEL. MFG. CO.

Continuity Test

Continuity test chart for No. 235 Receivers.

Jan. 17, 1938.

1. Test speaker socket with speaker left out.

2. Plug speaker in speaker socket for all other tests.

3. Set A.F.C. Switch on rear of chassis base to "Operate" position for all tests unless otherwise specified.

4. Before making continuity test, disconnect one end of the spring from the Manual-Electric switch lever. Pull Manual-Electric switch lever out for "Manual" operation. Push Manual-Electric switch lever in for "Electric" operation.

A. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 120W.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

B. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 550,000W.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

C. Operating volume control clockwise should read from "S" to 800,000W.

FOR OTHER SERVICING DATA, SEE INDEX

Other tests not shown on chart.

Test from Electric tuning pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "O". Operate Manual-Electric switch to "Electric" position; should read "S".
Test from main dial pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "S". Operate Manual-Electric switch to "Electric" position; should read "O".
Test from Ant. terminal on back of chassis base. Operate range switch to "A" band; should read 8W. Operate range switch to "B" band; should read 1W. Operate range switch to "C" band; should read .5W.
Test from Grd. terminal on back of chassis base; should read "S".
Test from terminals of A.C. plug to chassis base; should read "O".
Test between terminals of AC plug; should read 8W with A.C. switch closed; should read "O" with A.C. switch open.
Test from the Stator Plates of the oscillator section of the variable capacitor (located near front of chassis) to the switch side of the .001 capacitor (located next to the "A" and "B" band series aligner). Operate range switch to "A" band; should read 10W. Operate range switch to "B" band; should read 2W. Operate range switch to "C" band; should read 1W.

			Terminals of Sockets							
Tube	Circuit	Grid Clip	1	2	3	4	5	6	7	8
6-J-5	Osc.Control		S	S	55000W	A	B	30000W	S	2700W
6-A-8	Mod. Osc.	1.8M	S	S	11000W	55000W	55000W	20000W	S	300W
6-K-7	I.F.Amp.	3. M	S	S	12000W	150000W	400W	20000W	S	400W
6-H-6	Discrimin.		S	S	450000W	1. M	450000W	450000W	S	S
6-B-8	Dem. A.V.C.Audio	C	S	S	550000W	S	800000W	800000W	S	270W
6-F-6	Output		S	S	11000W	11000W	900000W	20000W	S	400W
6-U-5	Tuning Ind.		S	1.1M	1.5M	12000W	270W	S		
5-Y-4G	Rectifier		O	O	170W	O	200W	O	12000W	12000W
Spk. Output	Socket Rear of Chas.		300000W	S	S	300000W	O	O	12000W	

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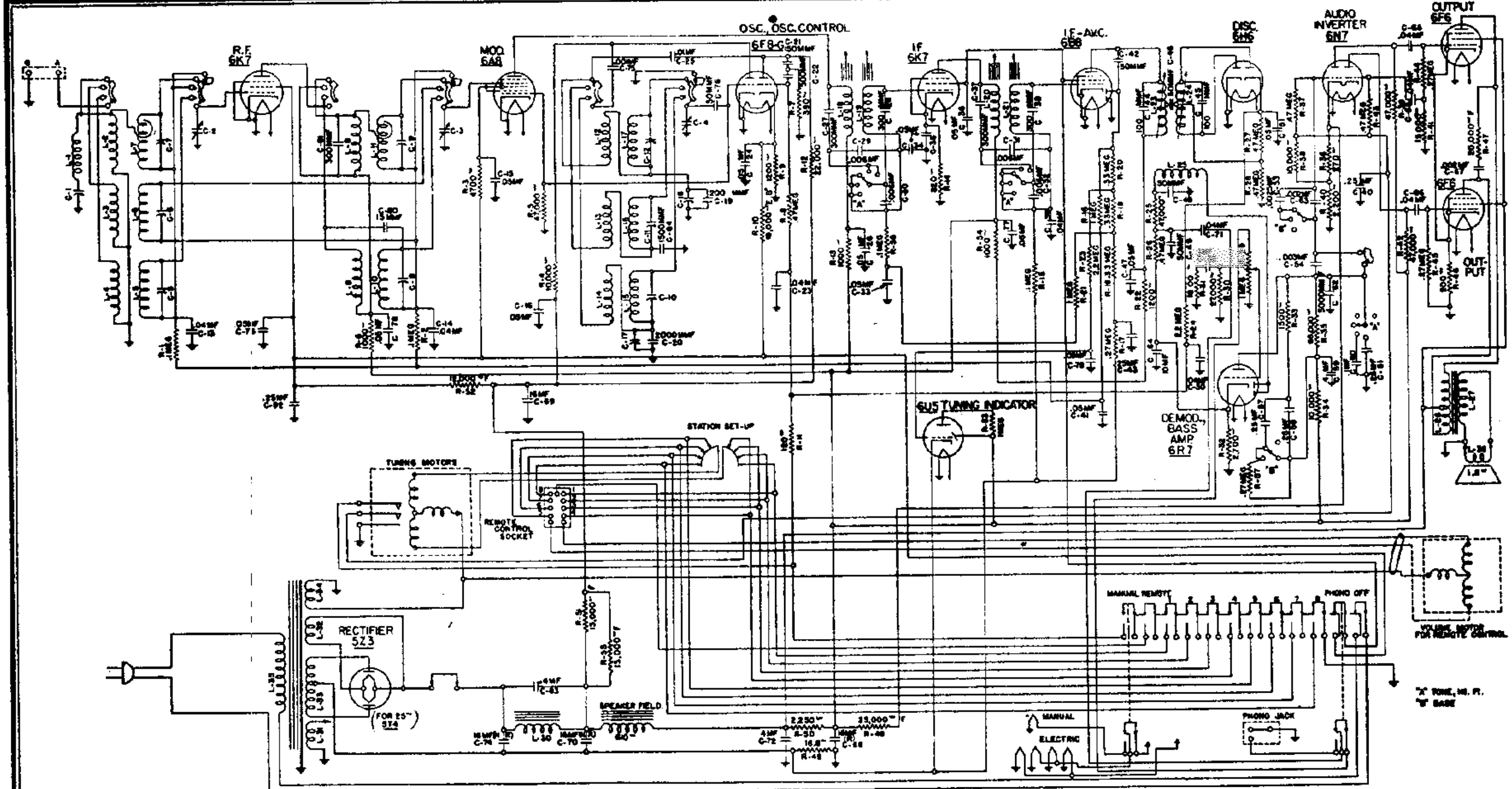

For data on setting up electric tuning system and remote control see Index.

Fig. 2. Schematic Circuit of Receiver.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne with A. F. C. Electric Tuning
Tuning Ranges	A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.
Number and Type of Tubes	2 No. 6K7, 1 No. 6A8, 1 No. 6F8-G, 1 No. 6B8, 1 No. 6H6, 1 No. 6R7, 1 No. 6N7, 2 No. 6F6, 1 No. 6U5, 1 No. 5Z3
Voltage Rating	105 to 125 Volts, A. C.
Power Frequency Rating	See "Apparatus Specifications"
Input Power Rating	140 Watts
Frequency of Intermediate Amplifier	455 Kilocycles

APPARATUS SPECIFICATIONS

No. 360-M Receiver	50 to 60 Cycles; P-29068 Chassis; P-29072 Speaker
No. 360-MB Receiver	25 to 60 Cycles; P-29069 Chassis; P-29072 Speaker

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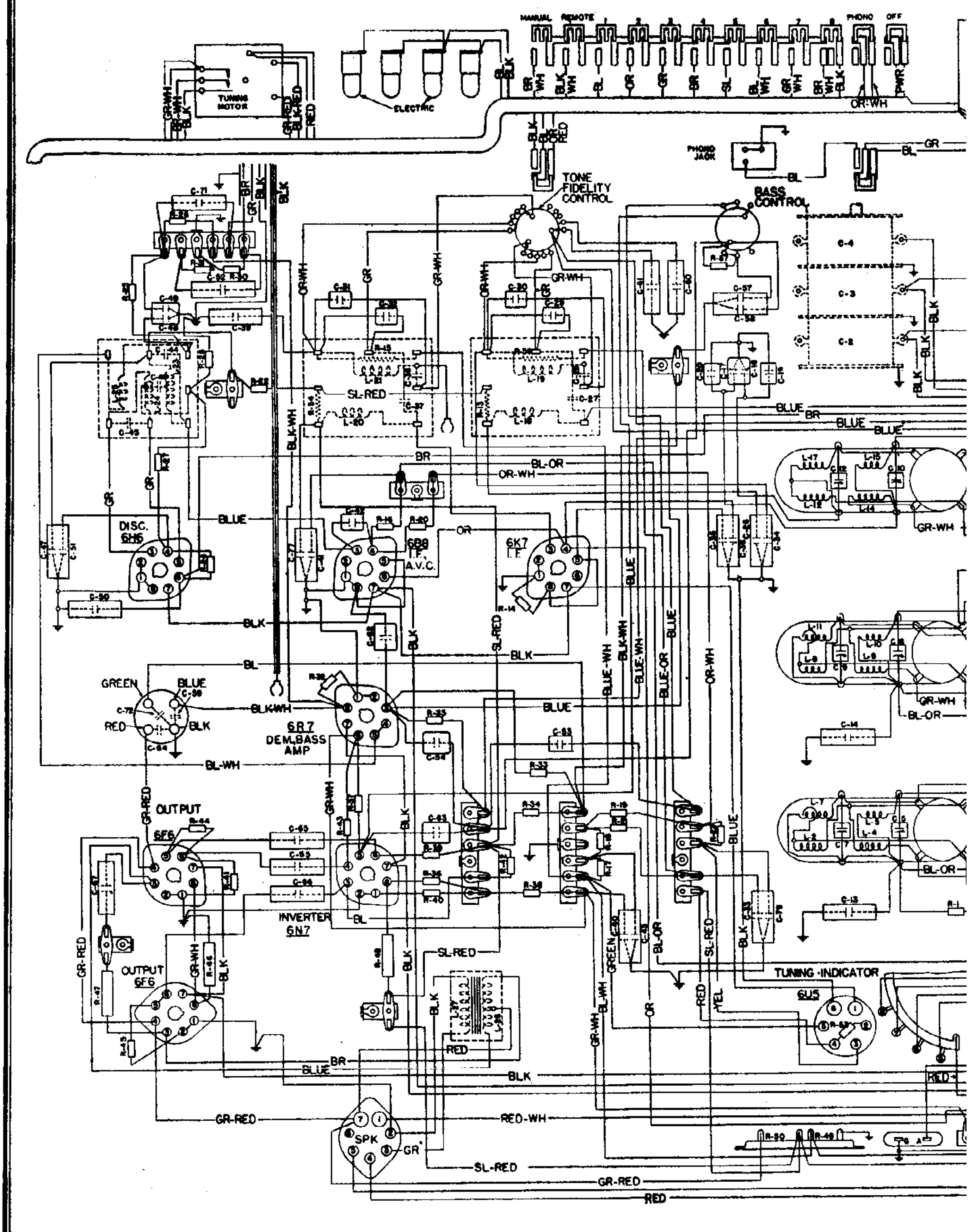

Fig. 3. Wiring Diagram of Chas

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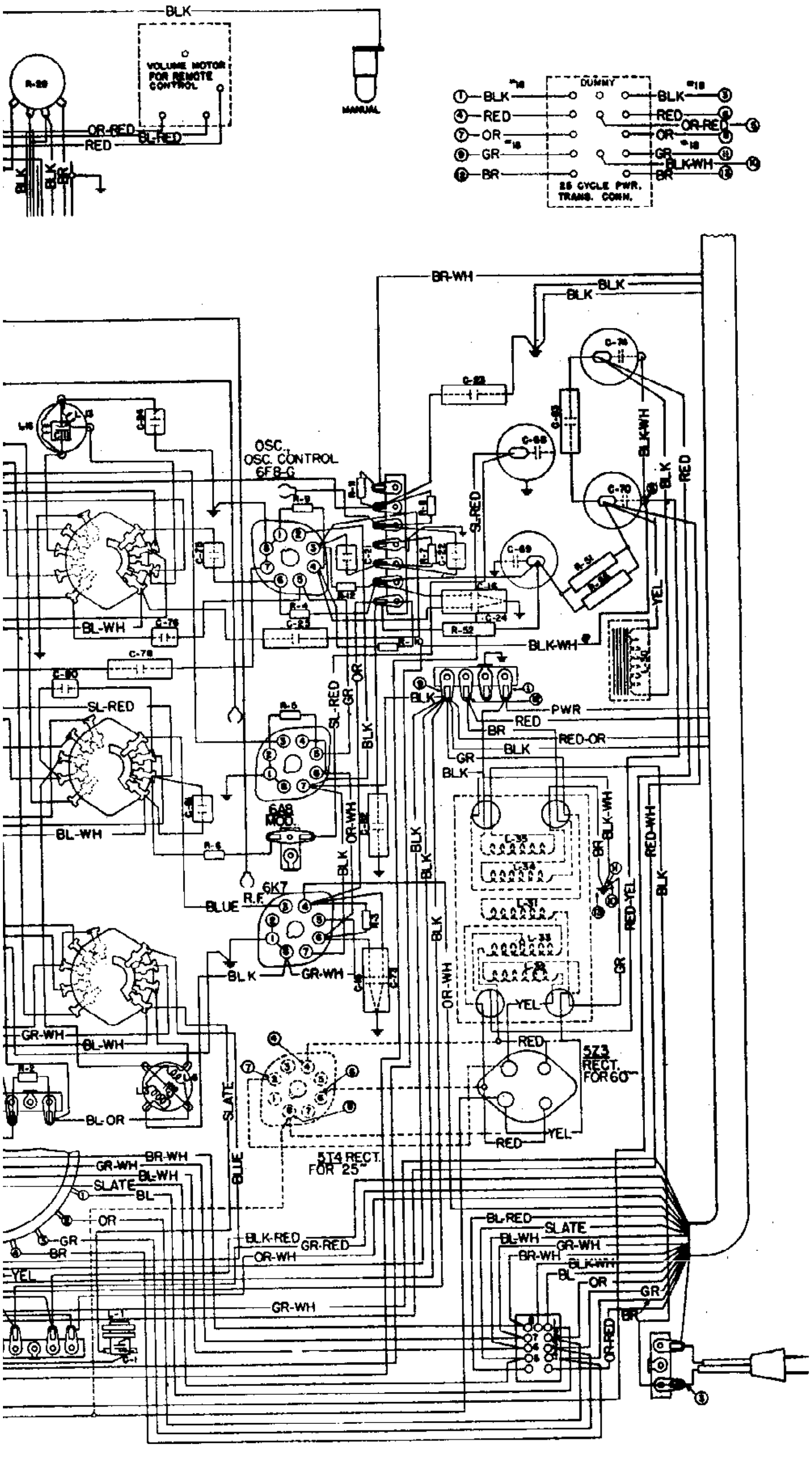

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CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 360 Radio Receivers are twelve tube, "Electric Tuning", adjustable high fidelity receivers with three tuning ranges. The electric tuning circuit combines a highly efficient motor and selector circuit in combination with an automatic frequency control circuit. The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for selection by means of the push buttons (local and other stations that give the best daytime and evening service should be selected).

These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control. A separate "Bass" control is also provided to increase or decrease the response at the lower (bass) audio frequencies if this is desired.

These receivers are also equipped with a special arrangement of the Stromberg-Carlson, Selector dial indicator. This design of dial arrangement enables the operator to easily identify the service and frequency range to which the range switch control knob is set by means of the yellow disc (located at the right-hand edge of the dial), which moves in a vertical direction in conjunction with the rotation of the Range Switch control knob.

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ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

If the above conditions are not obtained, the signal generator should be set to exact resonance with the intermediate frequency amplifier (455 kilocycles) as mentioned in 1 above and the secondary adjustment of the Third I. F. Discriminator transformer should be rotated so zero voltage is indicated on the voltmeter connected across C-51.

Now, adjust the signal generator's frequency a slight amount (approximately 5 kilocycles) each side of 455 kilocycles, noting at the same time the reading of the voltmeter; a decrease in the signal generator's frequency (from 455 kilocycles) should make the voltmeter give an increased reading from zero and an increase in the signal generator's frequency (455 kilocycles) should make the voltmeter give a decreased indication from zero.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, all controls should be set at the positions mentioned for the Intermediate Frequency adjustments.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 16 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
5. Set the test oscillator's frequency and the receiver's tuning dial to 6 megacycles.
6. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and the receiver's tuning dial to 16 megacycles and repeat operations Nos. 2, 3 and 4.

Alignment of Medium Wave Range (Also Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the manual tuning Standard Broadcast "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Range Switch control knob to the Standard Broadcast position (arrow on knob pointing in direction of gold dot). Push the push button located under the designation "Manual On" and set the tuning dial to 1000 kilocycles.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, be sure that the Treble Control knob is set for the "Normal" position. The "bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed otherwise in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be centered over the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a vertical line located beneath the standard broadcast scale, and the other mark is a small triangle located beneath the short wave scale of the dial. If the dial pointer does not center over these two marks, the screw located at the bottom of the dial pointer assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Range Switch of the receiver to the Standard Broadcast range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal positions.

   CAUTION: Never attempt to align the R. F. or I. F. circuits of this receiver with the Treble control knob set at any position other than the "Normal" position. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with any push button other than the one located under the designation "Manual On" pushed in.

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.
3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.-Discriminator transformers, align the I. F. circuits in the following order:

   Secondary of Third I. F.-Discriminator transformer for maximum output.
   Primary of Third I. F.-Discriminator transformer for maximum output.
   Secondary of Second I. F. transformer for maximum output.
   Primary of Second I. F. transformer for maximum output.
   Secondary of First I. F. transformer for maximum output.
   Primary of First I. F. transformer for maximum output.

Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

Adjustment of the Discriminator Circuit

1. Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles.

All controls should be set the same as instructed for the intermediate frequency adjustments. Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the capacitor, C-51. The signal generator should remain connected to the grid of the No. 6A8 modulator tube in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Under these conditions the voltmeter connected across C-51 should read zero.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

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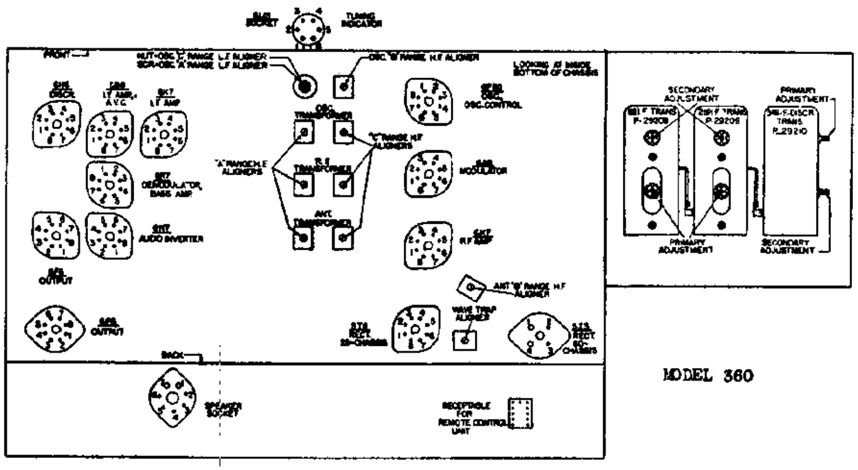

MODEL 360

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used, or when a double asterisk appears the 1000 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+230	+104	0	+82	*6.2*	0	2-7	*6.2*
6A8	Modulator	0	0	0	+227	+82	-8.6**	+82	*6.2*	0	2-7	*6.2*
6F8-G	Oscillator and Oscillator Control	0	0	0	+172	+8.3	-8.6**	+170	*6.2*	0	2-7	*6.2*
6K7	I. F. Amp.	0	0	0	+240	+104	+3.3	0	*6.2*	+3.3	2-7	*6.2*
6B8	I. F. Amp. and A. V. C.	0	0	0	+218	0	0	+104	*6.2*	0	2-7	*6.2*
6R7	Demodulator and Bass Amp.	0	0	0	+100*	0	0	+25*	*6.2*	+3.8	2-7	*6.2*
6H6	Discriminator	—	0	0	0	0	0	0	*6.2*	0	2-7	*6.2*
6N7	Audio Inv.	—	0	0	+160	0	0	+155	*6.2*	+29	2-7	*6.2*
6F6	Audio Output	—	0	0	+312	+320	0	0	*6.2*	+19.5	2-7	*6.2*
6F6	Audio Output	—	0	0	+312	+320	0	0	*6.2*	+19.5	2-7	*6.2*
6U5	Tuning Ind.	—	*6.2*	+12.4	-1.4	+237	-2.8	0	—	—	1-6	*6.2*
5Z3	Rectifier	—	+435	*420*	*420*	+435	—	—	—	—	1-4	*4.8*
Speaker Socket		—	+415	0	0	+440	+440	0	+320	—		
Voltage Across Motor Winding		*22*										

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

MODEL 370

CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 370 Radio Receivers are fourteen tube, "Electric Tuning", adjustable high fidelity receivers with four tuning ranges. The electric tuning circuit combines a highly efficient motor and selector circuit in combination with an automatic frequency control circuit. The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for selection by means of the push buttons (local and other stations that give the best daytime and evening service should be selected). To properly set up the electric tuning arrangement for the eight favorite broadcast stations, read the section, "Instructions for Setting Up Electric Tuning Arrangement"

When manually tuning these receivers or when setting up the eight desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tube; the stronger a received signal the greater the reduction in the size of the aperture.

These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control. A separate "Bass" control is also provided to increase or decrease the response at the lower (bass) audio frequencies if this is desired.

These receivers are also equipped with a special arrangement of the Stromberg-Carlson, Selector dial indicator. This design of dial arrangement enables the operator to easily identify the service and frequency range to which the range switch control knob is set by means of the yellow disc (located at the right-hand edge of the dial), which moves in a vertical direction in conjunction with the rotation of the range switch control knob.

The various tubes are used in these receivers as follows: One No. 6K7 is used in the R. F. Amplifier and the other two are used in the I. F. Amplifier. The No. 6A8 tube is used as the Modulator tube and the No. 6F8-G tube is used for both Oscillator and Oscillator Control tube. One No. 6H6 tube is used as the Demodulator and Automatic Volume Control tube and the other No. 6H6 tube is used in the Discriminator circuit for Automatic Frequency control. The No. 6R7 tube is used in the Bass Amplifier and the No. 6F5 tube is used in the Audio Amplifier. The No. 6C5 tube is used as the Phase Inverter tube of the Audio Amplifier circuit and the two No. 6L6 tubes are used in the Audio Power Output Stage. The No. 6U5 tube is used for indicating resonance in the Tuning Indicator System. The No. 5Z3 tube is the Rectifier tube of the power supply for these receivers designed for operation on a power supply having a frequency of 50 to 60 cycles; models of these receivers designed for operation on a power supply having a frequency of 25 to 60 cycles, use a No. 5T4 tube as the Rectifier tube of the power supply.

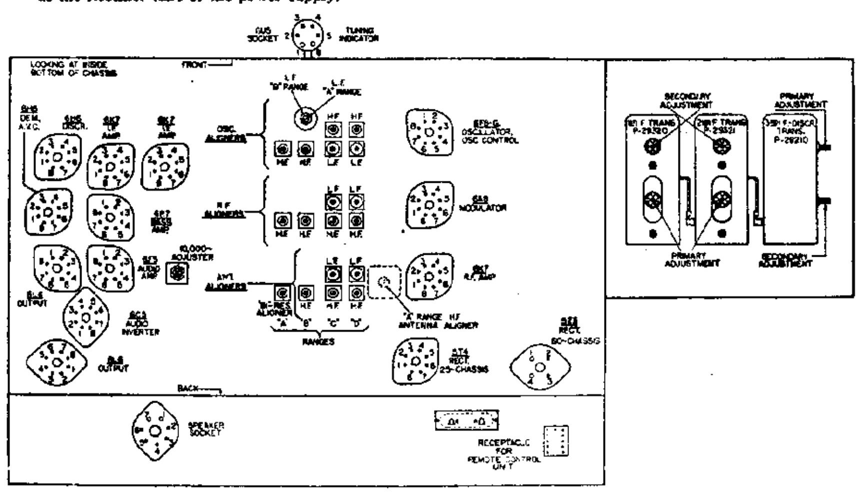

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

MODELS 370M, 370MB

Schematic

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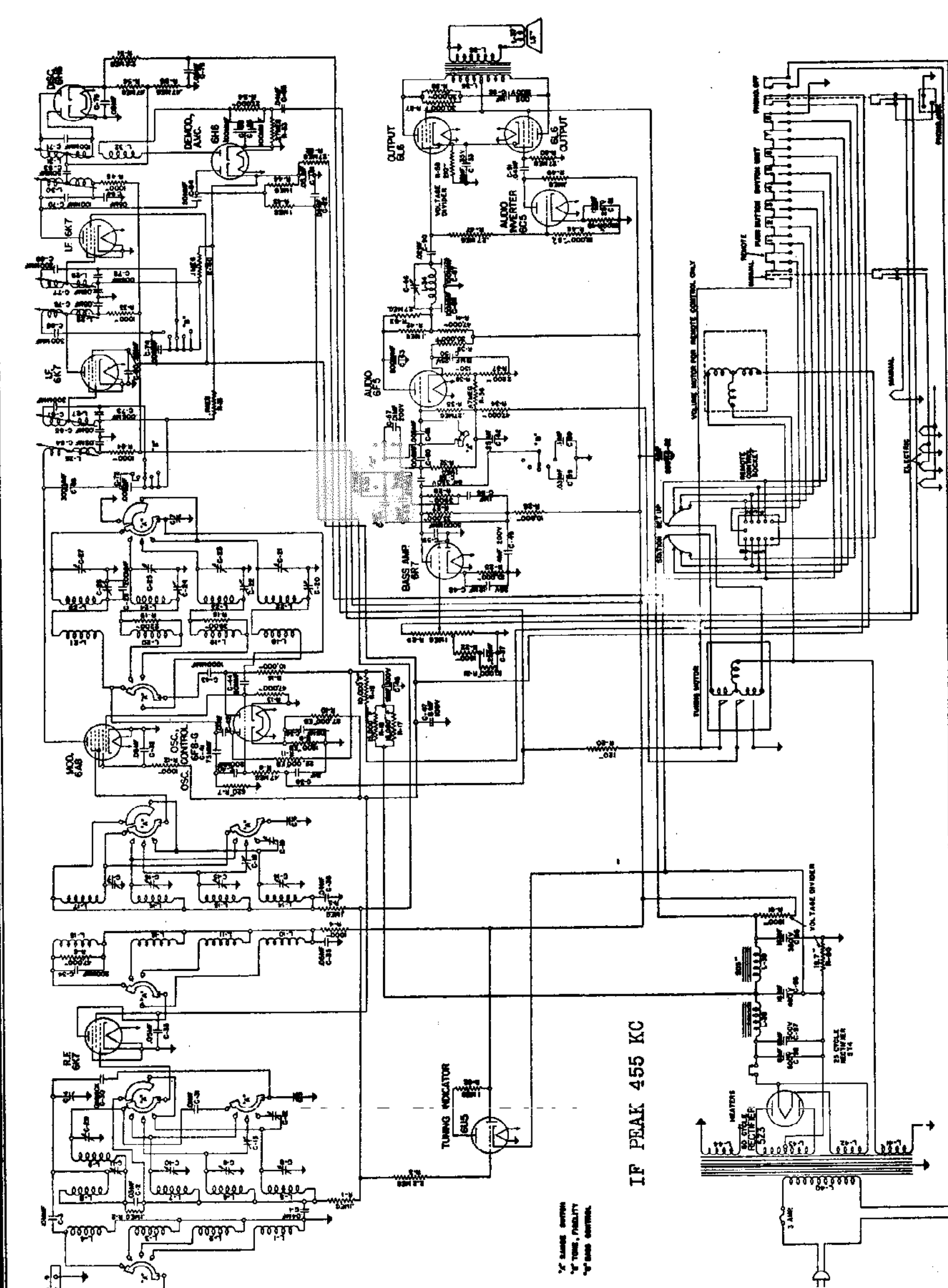

Fig. 2. Schematic Circuit of Receiver.

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ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-21608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, be sure that the Treble Control knob is set for the "Normal" position. The "Bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed otherwise in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for these receivers.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be centered over the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a vertical line located beneath the standard broadcast scale, and the other mark is a small triangle located beneath the short wave scale of the dial. If the dial pointer does not center over these two marks, the screw located at the bottom of the dial pointer assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Range Switch of the receiver to the Standard Broadcast range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal positions.

   CAUTION: **Never attempt to align the R. F. or I. F. circuits of this receiver with the Treble control knob set at any position other than the "Normal" position. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with any push button other than the one located under the designation "Manual On" pushed in.**

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.

3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.-Discriminator transformers, align the I. F. circuits in the following order:

   Secondary of Third I. F.-Discriminator transformer for maximum output.
   Primary of Third I. F.-Discriminator transformer for maximum output.
   Secondary of Second I. F. transformer for maximum output.
   Primary of Second I. F. transformer for maximum output.
   Secondary of First I. F. transformer for maximum output.
   Primary of First I. F. transformer for maximum output.

   Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

Adjustment of the Discriminator Circuit

1. **Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles.**

   All controls should be set the same as instructed for the intermediate frequency adjustments. Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the capacitor, C-79. The signal generator should remain connected to the grid of the No. 6A8 modulator tube in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier **circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube.** Under these conditions the voltmeter connected across the capacitor, C-79, should read zero.

   If the above conditions are not obtained, the signal generator should be set to exact resonance with the intermediate frequency amplifier (455 kilocycles) as mentioned in 1 above, and the secondary adjustment of the Third I. F.-Discriminator **transformer should be rotated so zero voltage is indicated on** the voltmeter connected across the capacitor, C-79.

   Now, adjust the signal generator's frequency a slight amount (approximately 5 kilocycles) each side of 455 kilocycles, noting at the same time the reading of the voltmeter; a decrease in the signal generator's frequency (from 455 kilocycles) should make the voltmeter give an increased reading from zero and an increase in the signal generator's frequency (455 kilocycles) should make the voltmeter give a decreased indication from zero.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, all controls, with the exception of the "Manual Stations" control, should be set at the positions mentioned for the intermediate Frequency adjustments.

Alignment of 11 to 22 Megacycles Short Wave Range (Referred to as "D" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the 11 to 22 megacycles short wave ("D") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 20 megacycles.
2. Adjust the receiver's oscillator "D" range H. F. (high frequency) aligner for maximum output.
3. Adjust the R. F. interstage "D" range H. F. aligner for maximum output.
4. Adjust the antenna "D" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 11 megacycles.
6. Adjust the receiver's oscillator "D" range L. F. (low frequency) aligner for maximum output.
7. Adjust the R. F. interstage "D" range L. F. aligner for maximum output.
8. Adjust the antenna "D" range L. F. aligner for maximum output.
9. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 20 megacycles and repeat operations Nos. 2, 3, and 4.

Alignment of 4.8 to 11 Megacycles Short Wave Range (Referred to as "C" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the 4.8 to 11 megacycles short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 10 megacycles.
2. Adjust the receiver's oscillator "C" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "C" range H. F. aligner for maximum output.
4. Adjust the antenna "C" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 5 megacycles.
6. Adjust the receiver's oscillator "C" range L. F. aligner for maximum output.
7. Adjust the R. F. interstage "C" range L. F. aligner for maximum output.
8. Adjust the antenna "C" range L. F. aligner for maximum output.
9. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 10 megacycles and repeat operations Nos. 2, 3, and 4.

Alignment of Medium Wave Range (Referred to as "B" Range)

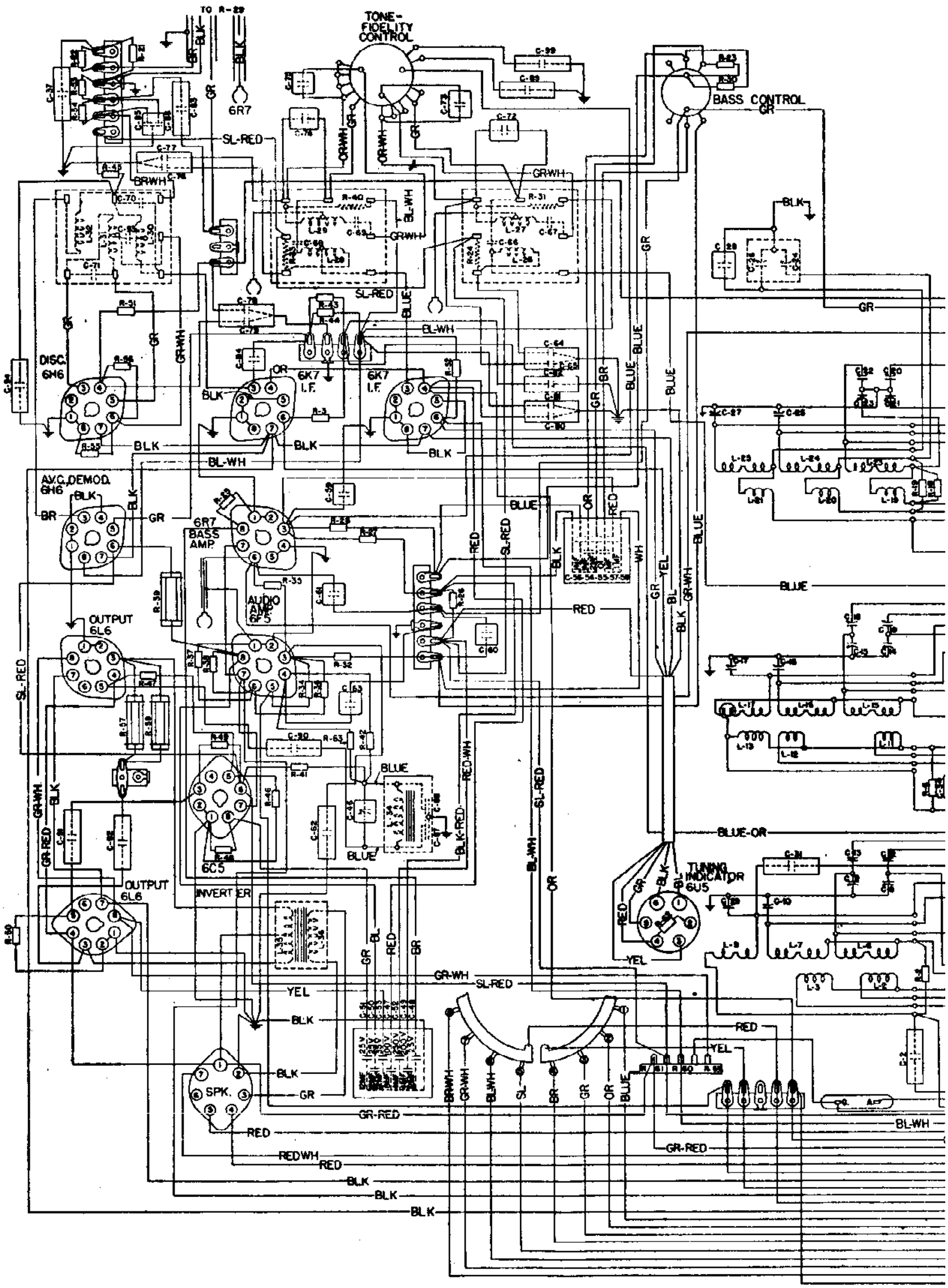
In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short wave ranges.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 4.5 megacycles.
2. Adjust the receiver's oscillator "B" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "B" range H. F. aligner for maximum output.
4. Adjust the antenna "B" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 1.8 megacycles.
6. Adjust the receiver's oscillator "B" range L. F. aligner for maximum output.
7. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 1.4 megacycles and repeat operations Nos. 2, 3, and 4.

Alignment of Standard Broadcast Range (Referred to as "A" Range)

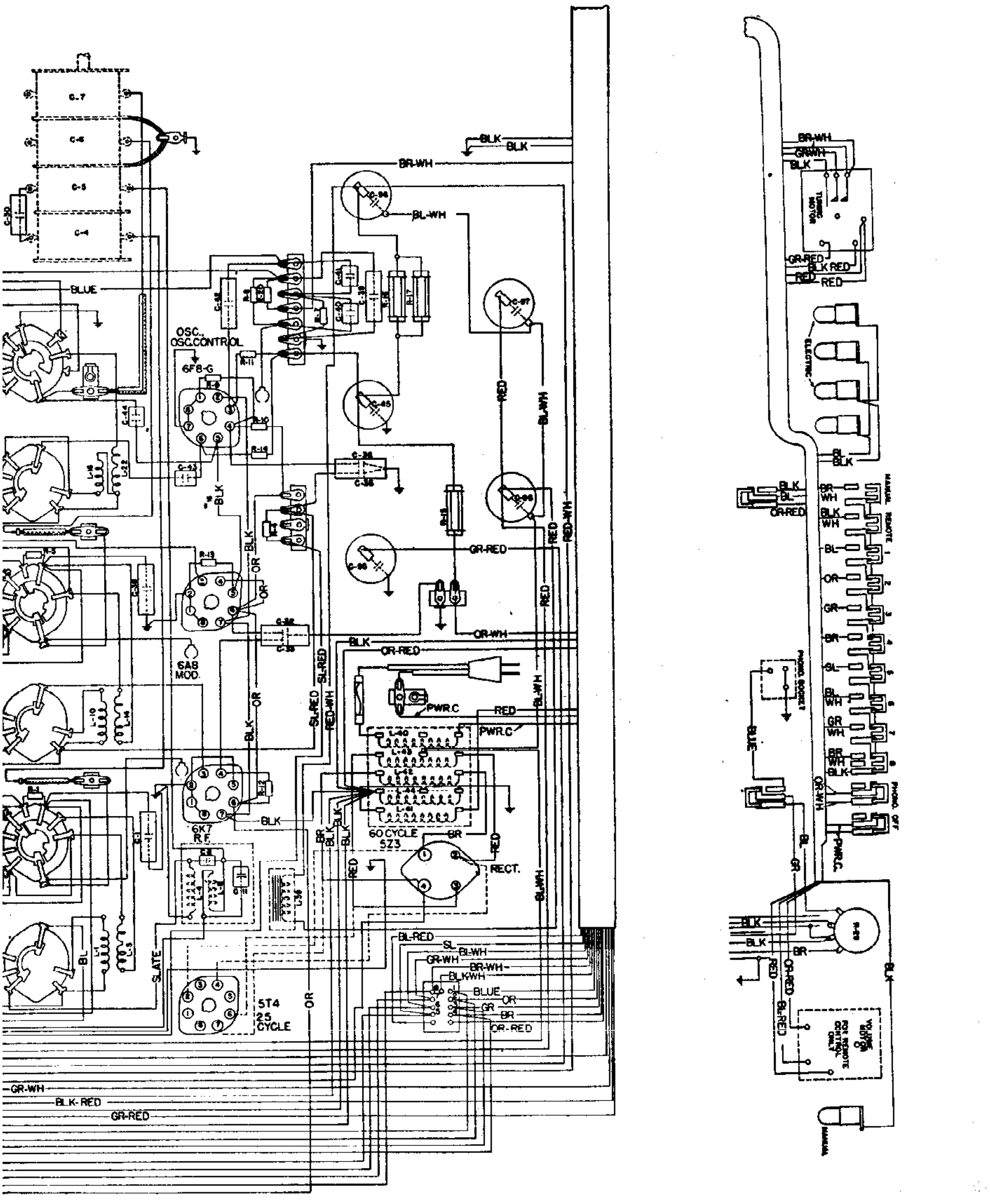
In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

No. 370-M Receiver .... 50 to 60 Cycles; P-29070 Chassis; P-29072 Speaker
No. 370-MB Receiver .... 25 to 60 Cycles; P-29071 Chassis; P-29072 Speaker



TEL. MFG. CO.

Voltage Rating .... 105 to 125 Volts, A. C.
Power Frequency Rating .... See "Apparatus Specifications"
Input Power Rating .... 155 Watts
Frequency of Intermediate Amplifier .... 455 Kilocycles



MODELS 360M,360MB
Tuner Data

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 370M,370MB
Alignment,Part 2
Voltage,Tuner Data

1. Operate the Range Switch on the receiver chassis to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial pointer to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "A" range H. F. aligner for maximum output.
4. Adjust the Bi-Resonator's aligner for maximum output.
5. Adjust the antenna's "A" range H. F. aligner for maximum output.
6. Set the test oscillator's frequency and the receiver's tuning dial pointer to 0.6 megacycles.
7. Adjust the receiver's oscillator "A" range L. F. aligner for maximum output.
8. Reset both the test oscillator's frequency and receiver's tuning dial pointer to 1.5 megacycles and repeat operations Nos. 2, 3, 4, and 5.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

INSTRUCTIONS FOR SETTING UP ELECTRIC TUNING SYSTEM

1. Before proceeding with setting up the eight favorite broadcast stations for electric tuning, it is preferable that the radio receiver be turned "on" for approximately twenty minutes. This is accomplished by simply pushing in the push button immediately below the designation, "Manual On" (indicated by illumination of the dial).
2. Check the position of the "Treble" control knob. When setting up or tuning in stations, this control knob should be set at the "Normal" position (pointer on knob pointing in direction of gold dot).
3. Set the Range switch control knob to the "Broadcast" position (pointer on knob pointing in direction of gold dot).
4. Remove the lists of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
5. Remove the three screws which hold the electric tuning escutcheon plate (metal plate) to the electric tuning escutcheon. Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the eight stars are printed.
6. From the lists of stations, remove the call letters of the eight stations which it is desired to set up for electric tuning. These eight stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

   CAUTION: When setting up these stations it is necessary to see that the separation of these stations on the dial is sufficient to allow adjacent "Adjustable Station Brushes" to be properly located in the adjusting slot.

   It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these eight favorite stations, the following order should be followed:

   Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining seven stations into the other seven squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

   After the eight station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the three screws.

   The tuning adjustments for the eight favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:
7. With the Range switch control knob set to the "Broadcast" position, and the "Manual On" button pushed in, tune the receiver in the conventional manner by means of the "Manual Stations" (Station Selector) control knob to that station having the highest frequency.

   IMPORTANT: When manually tuning in a station, or when setting up a station in the electric tuning system, exact resonance with the desired station should always be obtained by observing the tuning indicator.
8. Facing the rear of the receiver, it will be observed that the commutator assembly located on the rear of the gang tuning capacitor has a calibrated dial and dial pointer. After manually tuning in the favorite broadcast station as mentioned in paragraph 7 above, it will be seen that the commutator dial's pointer also indicates the frequency of the station; now, slide the "Adjustable Station Brush" (which is nearest to the high frequency end of the commutator dial) in the slot until it is directly in line (and centered) with the end of the commutator's dial pointer.
9. Now, in successive order, according to frequency, proceed to set up the remaining seven favorite stations in the same manner as was mentioned in paragraphs 7 and 8 above for the favorite station having the highest frequency.

   When the eight adjustable station brushes have all been set up for the eight stations, the brush nearest to the low frequency end of the commutator's dial should be set at the frequency of the station having the lowest frequency.

6

10. After the eight favorite stations' brushes have all been positioned in the commutator's slot as mentioned in paragraphs 7, 8, and 9 above, loosen about one turn, the clamping screw of the tuning indicator. Remove the tuning indicator unit (with its clamp) from its metal bracket and allow the unit to rest on the chassis base with the end of the tuning indicator tube facing the rear of the receiver.
11. Repeat the operation mentioned in paragraph 7 above, for the favorite station having the highest frequency, being careful to obtain exact resonance with this station by means of the tuning indicator.

    When resonance with this station is obtained, watch the aperture appearing on the target of the tuning indicator tube and push in the button which is located under the station's letters (dial illumination ceases and station letters become illuminated). If the aperture of the tuning indicator changes, move the adjustable station brush slightly in either direction and recheck for resonance by switching back to manual tuning. Repeat this process until the condition is obtained where there is no change in the aperture of the tuning indicator tube when the station is switched from manual to electric tuning.
12. Proceed to check the settings of the adjustable station brushes for the remaining seven chosen stations according to frequency in exactly the same manner as mentioned in 11, above.

    When this has been accomplished, again mount the tuning indicator unit into its proper operating position. This completes the operations necessary for setting up the eight favorite stations.

    IMPORTANT: With the electric tuning system in operation, the receiver will be automatically kept in tune with any one of the eight favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the electric tuning unit, it will be found that the automatic frequency control circuit will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

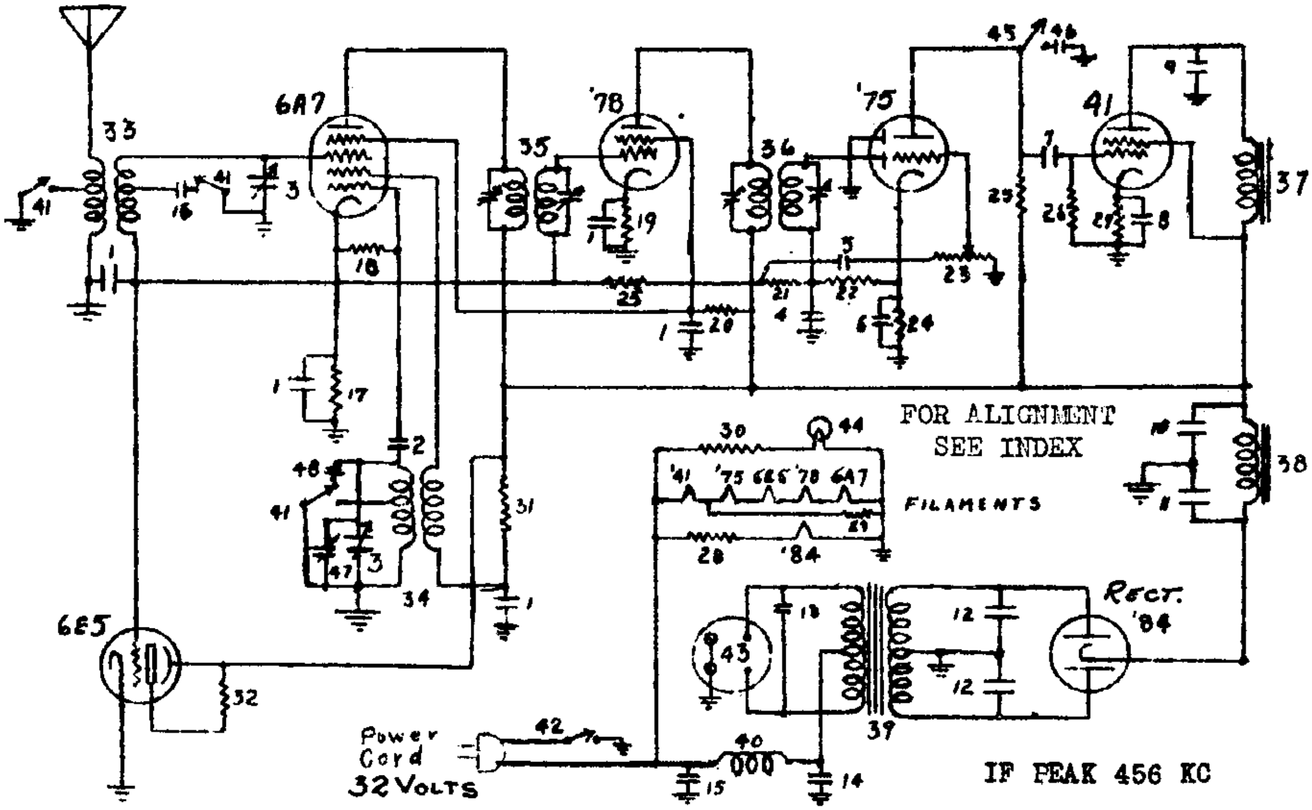
Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+235	+95	0	+95	*6.2*	0	2-7	*6.2*
6A8	Modulator	0	0	0	+240	+95	−6.9	+95	*6.2*	0	2-7	*6.2*
6F8-G	Oscillator and Oscillator Control	0	0	*6.2*	+150	+8.5	−6.9	+165	0	0	2-7	*6.2*
6K7	1st I. F. Amp.	0	0	0	+235	+95	0	−2.6	*6.2*	0	2-7	*6.2*
6K7	2nd I. F. Amp.	0	0	0	+235	+95	0	−2	*6.2*	0	2-7	*6.2*
6H6	Demodulator and A. V. C.	—	0	0	−0.25	0	0	+240	*6.2*	0	2-7	*6.2*
6H6	Discriminator	—	0	0	0	0	0	0	*6.2*	0	2-7	*6.2*
6R7	Bass Amp.	0	0	0	+170	0	0	0	*6.2*	+8	2-7	*6.2*
6F5	Audio Amp.	0	0	0	0	+110	0	+15	*6.2*	+16	2-7	*6.2*
6C5	Audio Inv.	—	0	0	+120	—	0	+240	*6.2*	+5	2-7	*6.2*
6L6	Audio Output	—	0	0	+310	+320	0	—	*6.2*	+23	2-7	*6.2*
6L6	Audio Output	—	0	0	+310	+320	0	—	*6.2*	+23	2-7	*6.2*
6U5	Tuning Ind.	—	*6.2*	+18	−1.25	+235	−2.6	0	—	—	1-6	*6.2*
5Z3	Rectifier	—	+425	*400*	*400*	+425	—	—	—	—	1-4	*4.6*
Speaker Socket		—	+310	0	0	+425	+425	—	+415	—		
Voltage Across Motor Wdg.		20 AC										

Receiver tuned manually to 1000 kc., no signal. A. C. voltages are indicated by italics.

7

L'TATRO MFG. CO.

MODELS EQ-39, FQ-39
Schematic



VOLTAGES --

Plates 6A7, 78, and 41 ... 210 volts.
Plate 75 .... 60 v.
Screen 41 .... 210 v.
Screens 6A7 and 78 .... 65 v.
Anode grid 6A7 .... 160 v.

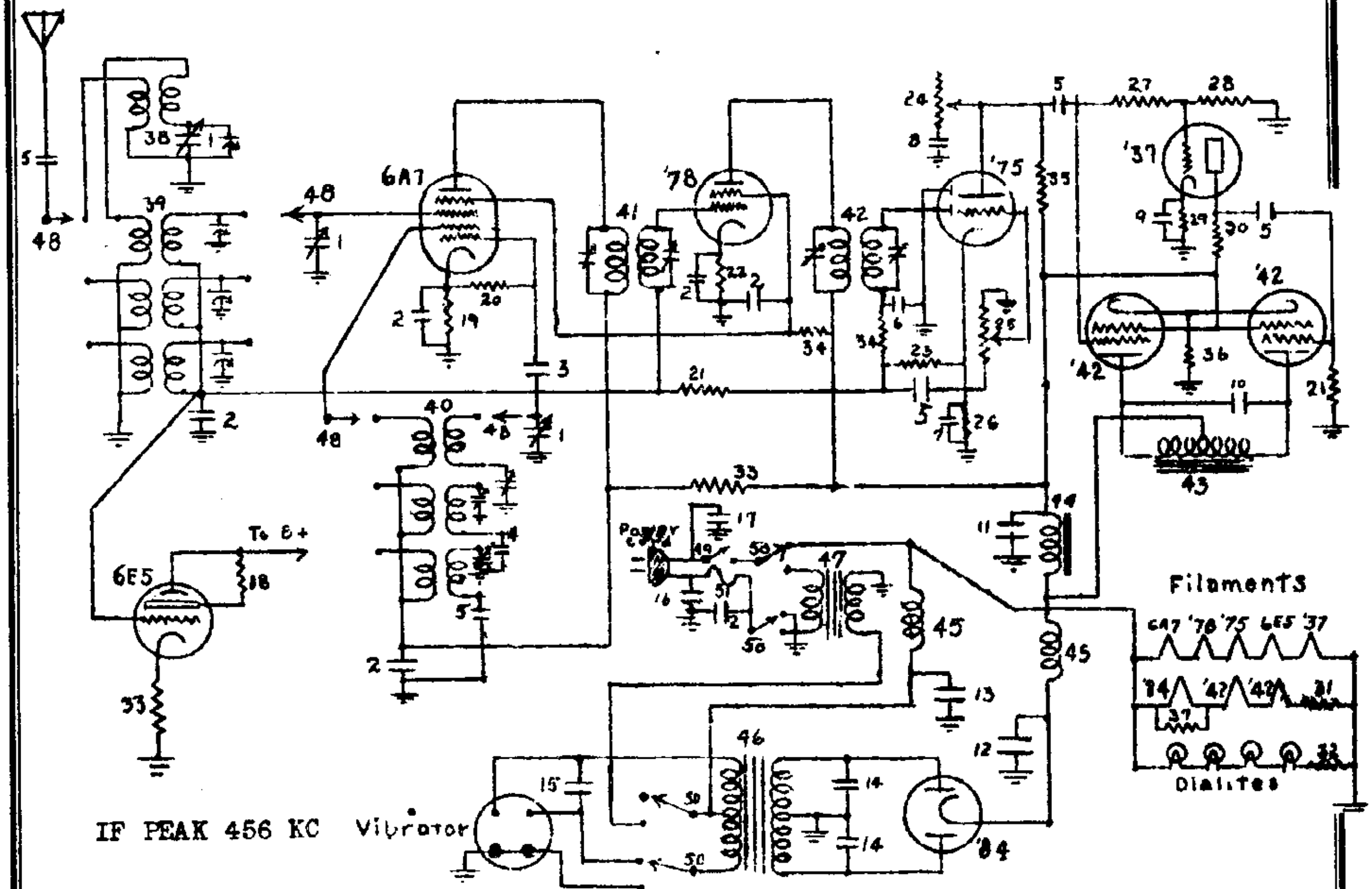
Cathodes (as measured by a 1000 ohm per volt meter)
6A7 and 78 ... . 3 v.
75 .... 1 v.
41 .... 14v.

1	.1 mfd.	17	400 ohms	34	Oscillator coil
2	.0001 mfd.	18	50M ohms	35	I.F. Coil
3	Gang condenser	19	800 ohms	36	I.F. Coil
4	.00025 mfd.	20	50M ohms	37	Speaker
5	.01 mfd.	21	25M ohms	38	Filter choke
6	10 mfd. electr.	22	½ Megohm	39	Power trans.
7	.01 mfd.	23	½ Meg. control	40	R.F. Choke
8	10 mfd. electr.	24	10M ohms	41	Band switch
9	.01 mfd.	25	½ megohm	42	Power switch
10	8 mfd. electr.	26	1 megohm	43	Vibrator
11	16 mfd. electr.	27	650 ohms	44	Pilot light
12	.01 mfd. 1600 v.	28	50 ohms	45	Tone switch
13	. 25 mfd.	29	200 ohms	46	.002 mfd.
14	.5 mfd.	30	160 ohms	47	S.W. Padder
15	20 mfd.	31	10M ohms	48	B.C. Padder
16	.002 mfd.	32	½ megohm		
		33	Antenna coil		

The antenna for the Model EQ (table model) and FQ (console) should be about 100 feet long and as high as possible. No ground connection is necessary. A continuously variable tone control is used in Model FQ

MODELS HQ-39
Schematic

L'TATRO MFG. CO.



-- VOLTAGES---

Plates 6A7, 78, and 42's ...	200 v.	Cathode 6A7	.25 v
Plate 37	50 v.	" 78	2 v.
Plate 75	30 v.	" 75	.5 v
Screens 6A7 and 78	50 v.	" 37	4 v.
		" 42's	15 v.

1	Gang condenser	18	½ megohm	35	½ megohm
2	.1 mfd.	19	53 ohms	36	400 ohms
3	.0001 mica	20	25M ohms	37	33 ohms
4	.002 mfd.	21	½ megohm	38	Preselector coil
5	.01 mfd.	22	800 ohms	39	Antenna coil
6	.0005 mfd.	23	½ megohm	40	Oscillator coil
7	10 mfd. electr.	24	½ meg. control	41	I.F. coil
8	.005 mfd.	26	7500 ohms	42	I.F. coil
9	5 mfd. electr.	27	½ megohm	43	Speaker
10	.0025 mfd.	28	25M ohms	44	Filter choke
11	8 mfd. electr.	29	3500 ohms	45	R.F. choke
12	16 mfd. electr.	30	100M ohms	46	Power trans.
13	.25 mfd.	31	20 ohms	47	Stepdown trans.
14	.02 mfd.	32	50 ohms	48	Band switch
15	.25 mfd.	33	800 ohms	49	Off-on switch
16	1 mfd.	34	50M ohms	50	Power switch
17	.25 mfd.	25	½ meg. control	51	2 amp. fuse

Alignment, Socket Trimmers

L'TATRO MFG. CO.

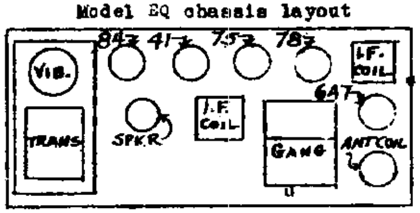
MODELS EQ-39, FQ-39
MODEL HQ-39
MODELS SP-67, TP-67
MODELS AQ-69, BQ-69

ALIGNMENT PROCEDURE

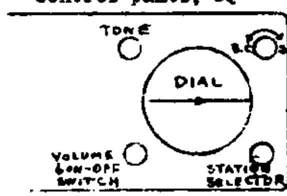
Model EQ-39 and FQ-39

Adjust IF coils to 456 KC.
Switch to shortwave band; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output.
Switch to broadcast band and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on antenna section of the gang condenser.
Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

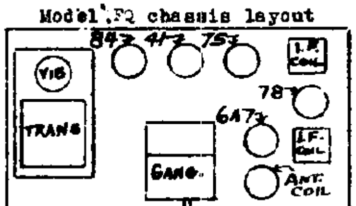
Model EQ chassis layout



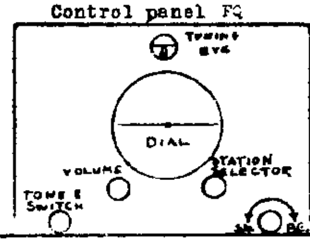
Control panel, EQ



Model FQ chassis layout



Control panel FQ

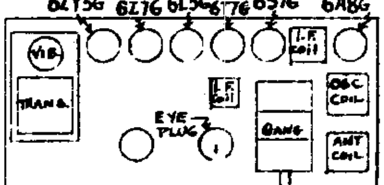


MODELS SP-67, TP-67 --- ALIGNMENT PROCEDURE----

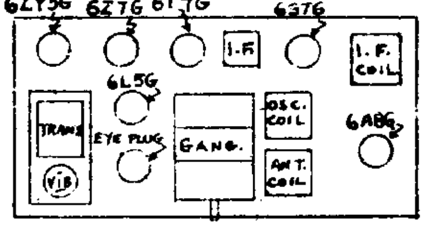
Turn dial to closed gang position to make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust the I.F. coils to 456 KC.
Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmers in antenna and oscillator coils to maximum output.
Switch to police band (middle band) set dial at 5 MC and adjust the second trimmers from the bottom to maximum output.
Switch to broadcast, set dial at 1400 KC and adjust the third trimmers from the bottom. Then adjust the padder located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.

The type 6A8G tube has been found to give better oscillator performance than the 6D8G and is used in present production. The switch which turns the tuning eye and dialites off and on is located on the back of the panel.

Chassis layout SP-67



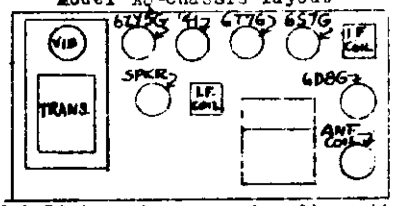
Chassis layout TP-67



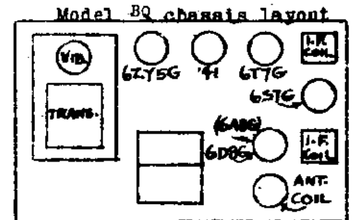
MODELS AQ-69, BQ-69 **ALIGNMENT PROCEDURE**

Adjust IF coils to 456 KC.
Switch to shortwave band ; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output.
Switch to broadcast and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on the antenna section of the gang condenser.
Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

Model AQ chassis layout



Model BQ chassis layout



Model RP has the same circuit as the QP plus a tuning eye. The type 6A8G tube has been found to give better oscillator performance than the 6D8G and is used in all Model RP's except those built in the earlier part of the season.

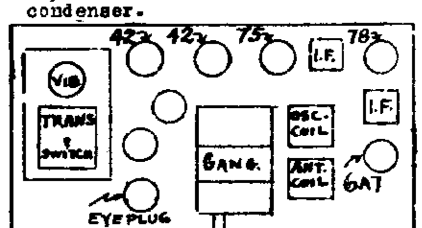
Model HQ-39 may be operated on either 32 volts DC or 110 volts AC. To switch the set for 110 volt operation, the following instructions must be carried out:

1. **Disconnect set from 32 volt line.**
2. **Remove cover from power pack and pull out vibrator.**
3. **Replace cover and fit switch lever back into slot in switch shaft.**
4. **Remove screw holding lever and throw switch to right.**
5. **Reset screw in hole at the right.**

If set is inoperative, check fuse. (2 amp. 250 volt. An ordinary car fuse may be substituted). The fuse protects the set from lightning as well as from line voltage overloads.

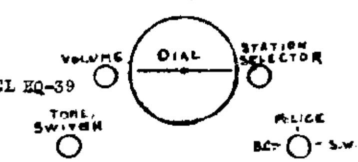
-- **ALIGNMENT PROCEDURE** --

Turn dial to closed gang position and make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust IF coils to 456 KC.
Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmers on antenna and oscillator coils to maximum output.
Switch to police band (middle band) and set dial at 5 MC. Adjust second trimmers from the bottom to maximum output.
Switch to broadcast, set dial at 1400 KC and adjust the third trimmers from the bottom. Then adjust the padder located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.



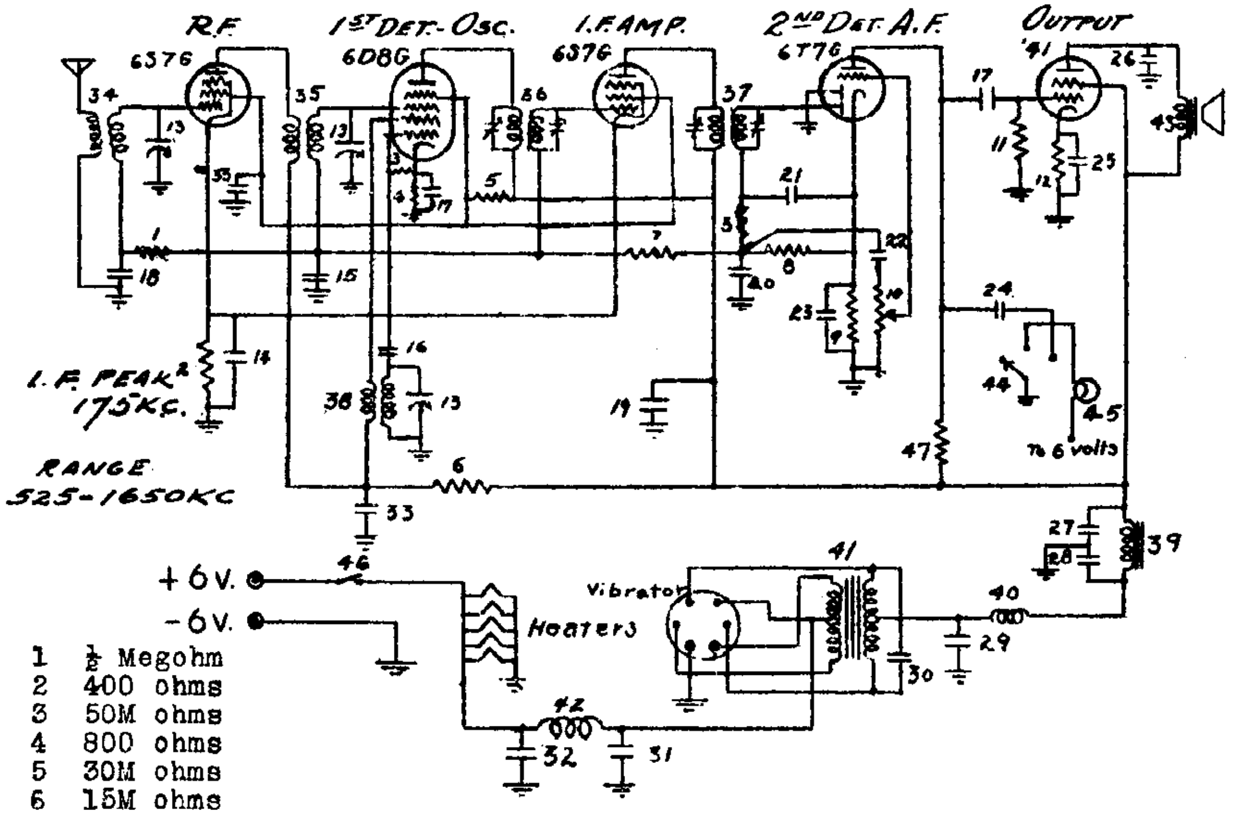
MODEL HQ-39

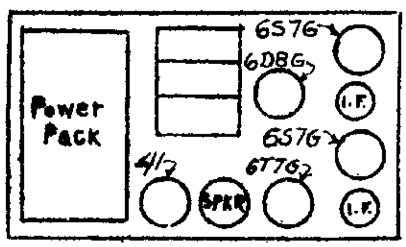
Knob arrangement



MODELS NO-65,OO-65
Schematic, Socket
Trimmers, Alignment

L'TATRO MFG. CO.





1	½ Megohm
2	400 ohms
3	50M ohms
4	800 ohms
5	30M ohms
6	15M ohms
7	1 Megohm
8	½ Megohm
9	15M ohms
10	Volume control
11	1 Megohm
12	650 ohms
13	3 gang cond.
14	.10 mfd.
15	.01 mfd.
16	.0001 mfd.
17	.01 mfd.
18	.01 mfd.
19	.10 mfd.
20	.00025 mfd.
21	.0002 mfd.
22	.025 mfd.
23	10 mfd. electr.
24	.02 mfd.
25	10 mfd electr.
26	.002 mfd.
27	8 mfd. electr.
28	8 mfd. electr.
29	.10 mfd.
30	.005 mfd.
31	.5 mfd.
32	.25 mfd.
33	.05 mfd.
34	Ant. coil
35	Int. coil
36	I.F. coil
37	I.F. coil
38	Osc. coil
39	Filter choke
40	RF Filter choke
41	Power trans.
42	RF choke
43	Speaker
44	Tone-light switch
45	Pilot light
46	Switch (with #10)
47	100M ohms

Alignment procedure

To adjust I.F. coils Oscillator at 175KC to grid of 6D8G tube; adjust I.F. trimmers to maximum output.

To adjust R.F. coils Set oscillator at 1400 KC connect to antenna lead, dial at 1400 KC, adjust oscillator padder located on the rear of the gang condenser, to maximum. Then adjust the two other padders on the gang condenser to maximum output.

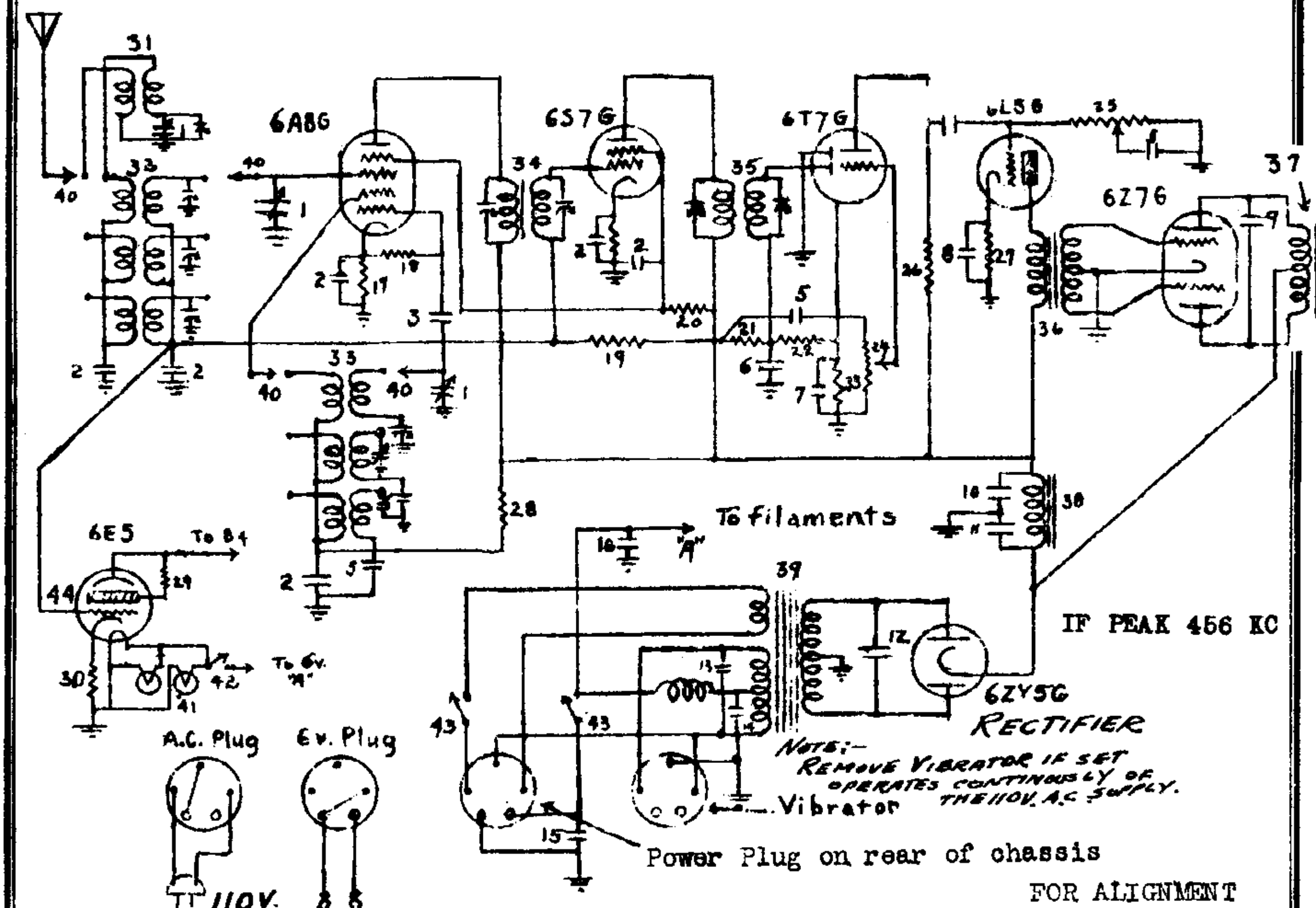
Voltages: (As measured by a 1000 ohm per volt meter)

B + 140 - 150 volts		Cathode voltages	
Anode grid 6D8G	60-70 v.	6S7G's	2 volts
Plate RF 6S7G	60-70 v.	6D8G	2.5 volts
Screens 6D8G & 6S7G	50-60 v.	6T7G	1 volt
		41	11 volts

Voltages on the Model NO(table model) are somewhat lower than the above. Some changes in circuit constants in sets built prior to Aug. 1937, will be found. "Motorboating on this set can be corrected by seperating the grid leads on the gang condenser as far as possible.

MODELS SP-67, TP-67
Schematic

L'TATRO MFG. CO.



IF PEAK 456 KC

FOR ALIGNMENT SEE INDEX

-- VOLTAGES --

Plates 6A8G, 6S7G, 6L5G, 6Z7G and oscillator grid of 6A8G	140 v	Cathodes: 6A8G and 6S7G	1.5 v.
Plate 6T7G	12 v.	6T7G ...	.5 v.
Screens 6A8G and 6S7G	40 v.	6L5G	5 v.

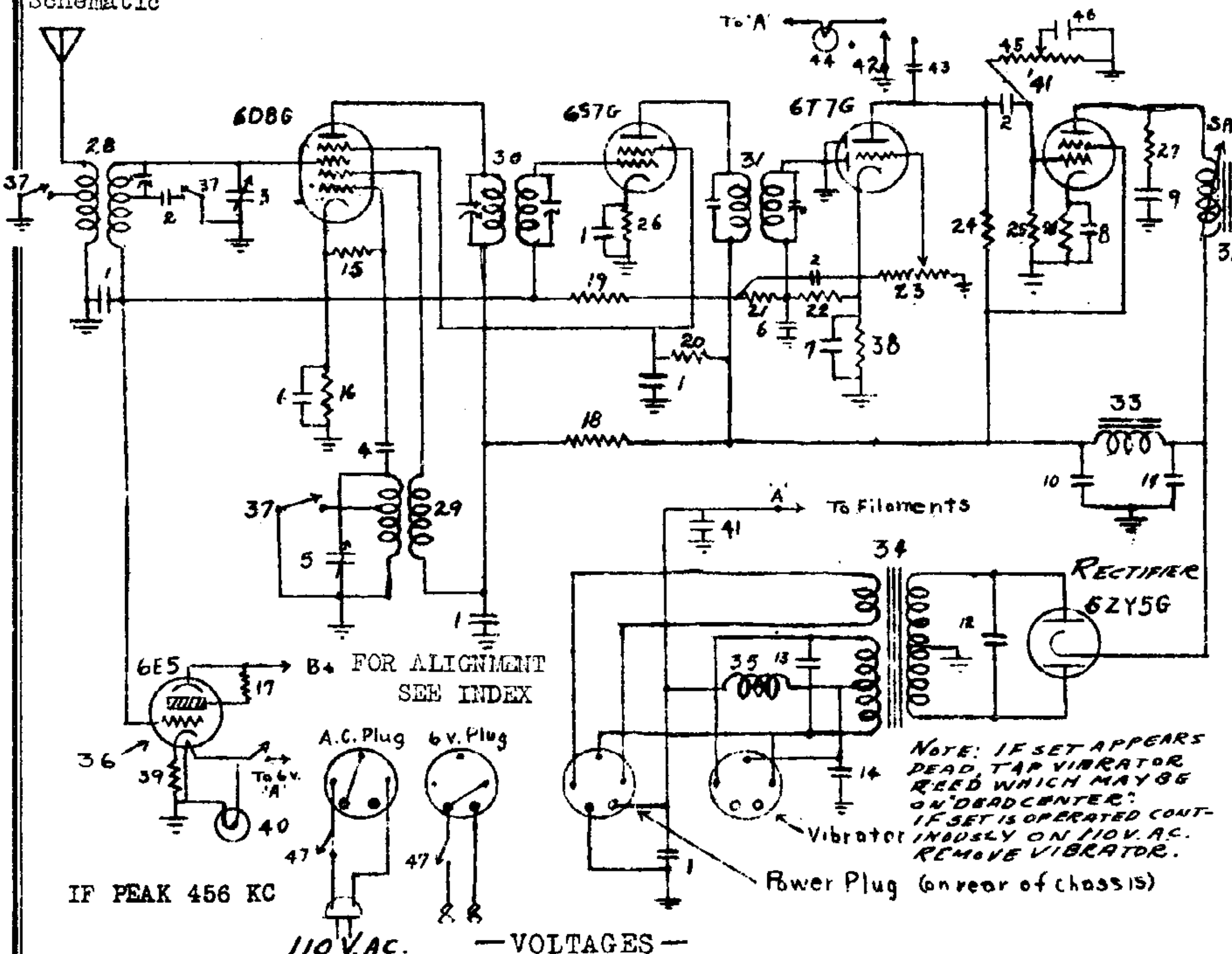
Voltages when set is on AC are higher.

1	Gang condenser	16	.25 mfd.	31	Preselector coil
2	.10 mfd.	17	400 ohms	32	Antenna coil
3	.00025 mfd	18	25M ohms	33	Oscillator coil
4	.002 mfd.	19	1 megohm	34	Iron core I.F.
5	.01 mfd.	20	50M ohm	35	I.F. coil
6	.00025 mfd.	21	25M ohm	36	Input trans.
7	10 mfd. electr.	22	½ megohm	37	Speaker
8	5 mfd. electr.	23	5M ohms	38	Filter choke
9	.0025 mfd.	24	½ meg. control	39	Power trans.
10	8 mfd. electr.	25	Tone control	40	Band switch
11	16 mfd. electr.	26	¼ megohm	41	Pilot lights
12	.005 mfd. 1600 v.	27	1500 ohms	42	Tuning eye and dialite switch
13	10 mfd. electr.	28	10M ohms	43	Power switch
14	.5 mfd.	29	½ megohm.	44	Tuning eye
15	.10 mfd.	30	1500 ohms		

The TP-67 is a console model; the SP-67 is a table model. The antenna should be as high as possible and about 100 feet long. A good ground is essential for good reception. The blue wire from the set is the antenna lead. If the set is to be operated on 110 volts continuously, the vibrator should be removed.

MODELS AQ-69, BQ-69
Schematic

L'TATRO MFG. CO.



—VOLTAGES—

Plates 6D8G, 6S7G, and 41 150 volts
Plate 6T7G 50 volts
Screens 6D8G and 6S7G 50 volts.

Cathode	6D8G	0.5 volt
"	6S7G	1.5 volt
"	6T7G	0.5 volt
"	41	13 volts

When set is on AC, voltages will be somewhat higher.

1	.1 mfd.	18	1500 ohms	35	RF choke
2	.01 mfd.	19	½ Megohm	36	Tuning eye
3	Ant. section of gang	20	50M ohms	37	Band switch
4	.0002 mfd.	21	25M ohms	38	7500 ohms
5	Osc. section of gang	22	½ Megohm	39	650 ohms
6	.0002 mfd.	23	½ Meg. control	40	Pilot light
7	10 mfd electr.	24	½ Megohm	41	.5 mfd.
8	5 mfd. electr.	25	1 Megohm	42	Tone-light switch
9	.002 mfd.	26	800 ohms	43	.0025 mfd.
10	8 mfd. electr.	27	10M ohms	44	Pilot light
11	16 mfd. electr.	28	Ant. coil	45	Tone control
12	.005 mfd. 1600 v.	29	Osc. coil	46	.005 mfd.
13	10 mfd. 50 v.	30	I.F. coil	47	Power switch
14	.5 mfd.	31	I.F. coil	48	Tuning eye and dialite switch
15	50M ohms	32	Speaker		
16	400 ohms	33	Filter choke		
17	½ Megohm	34	Power trans.		

Items 36, 45 and 46 are used in Model BQ only. Items 42, 43 and 44 are used in Model AQ only.

TRANSFORMER CORP. OF AMER.

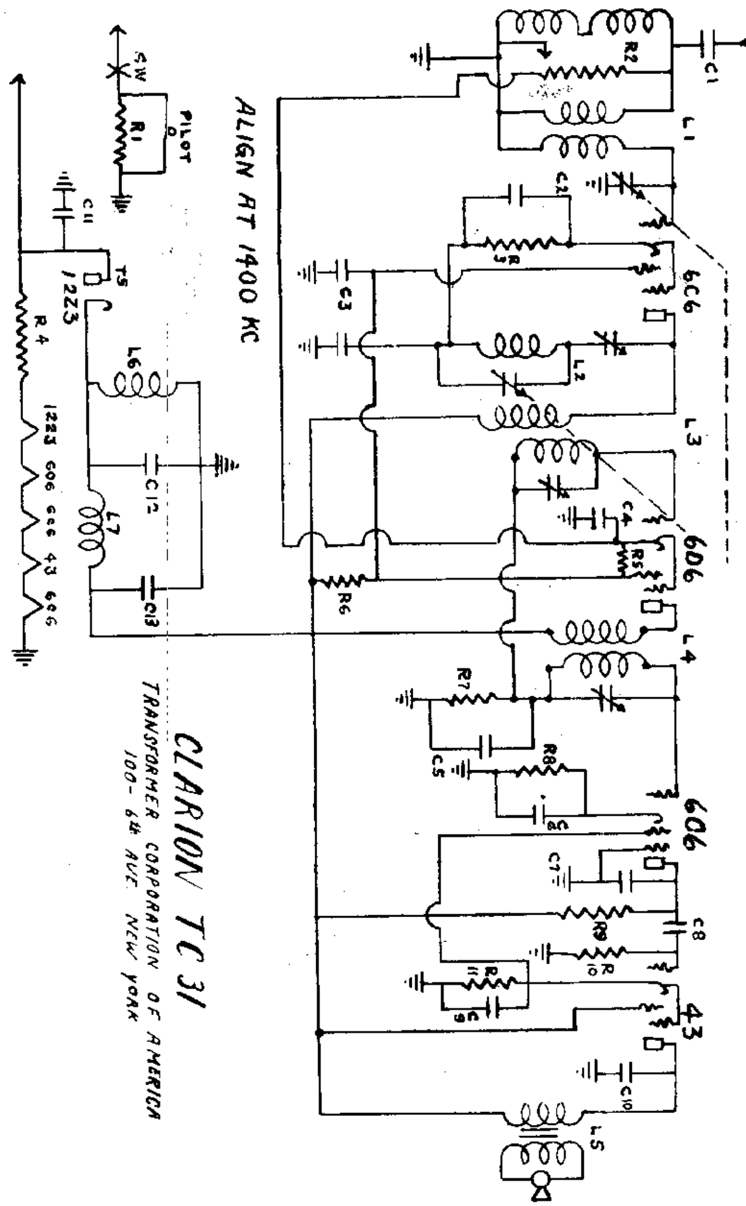
SERVICE SUGGESTIONS

CIRCUIT: The receiver uses a superhet circuit. The tubes used are: type 6C6 as oscillator and modulator, a type 6D6 in the I.F. stage, a type 6C6 as second detector and audio amplifier and a type 43 output tube. The I.F. is 456 K.C.

ALIGNING THE SET: Only in rare cases will it be found necessary to adjust any trimmers. If the volume is low, everything else should be checked before attempting to align the set. The only case where the fault is in the alignment is when both low volume and poor selectivity are present. To align the I.F.: set the test oscillator to 456 K.C. and connect it to the grid of the first 6C6 tube and adjust the upper screw on the first I.F. transformer and the screw on the second I.F. (small round can) for maximum output. Now set the test oscillator to 1400 K.C. The signal should come in between 15 and 20 on the dial. Adjust the two trimmers on the tuning condenser for maximum output. Check at 600 K.C. The lower trimmer on the first I.F. transformer is the oscillator coupling condenser and should not be changed.

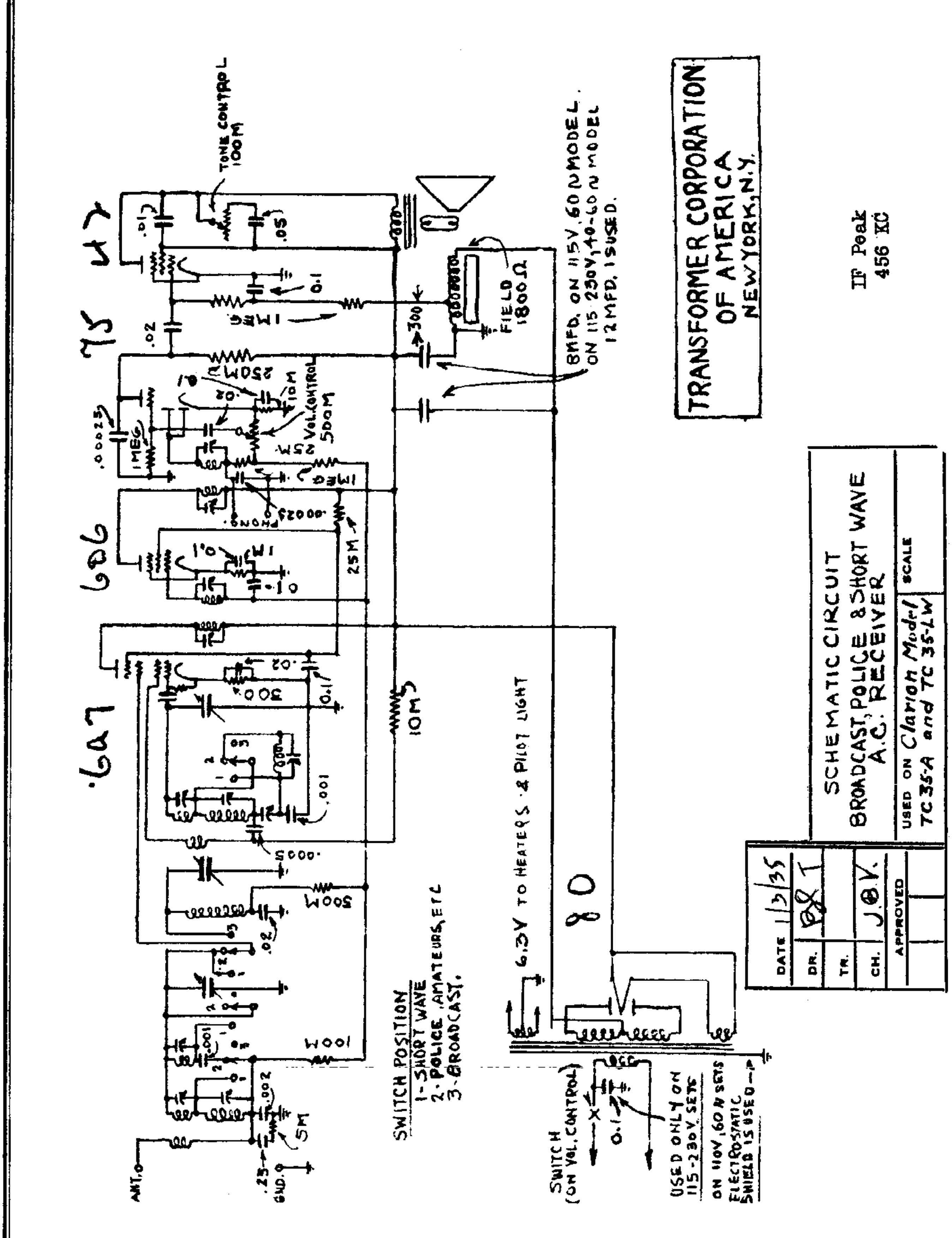
Price and Parts List for Clarion TC-31

Stock No.	Code No.	Description	Price
TPE2010	L1	Antenna Coil	$ .95
TPE2020	L2	Oscillator coil	.95
TPE2030	L3	First I. F.	1.50
TPE2040	L4	Second I. F.	1.50
TPE2050	L5	Speaker Transformer	4.50
TPE2060	L6	Speaker Field	
TPE2070	L7	Choke	1.25
TPE2080	R1	Pilot shunt	.25
TPE2090	R2&SW	Volume control and switch	1.10
TPE2100	R3	7500 ohm carbon resistor	.19
TPE2110	R4	Filament resistor 200 ohms	1.10
TPE2120	R5	50,000 ohm carbon resistor	.19
TPE2130	R6	10,000 ohm carbon resistor	.19
TPE2140	R7	500,000 ohm carbon resistor	.19
TPE2150	R8	25,000 ohm carbon resistor	.19
TPE2160	R9	300,000 ohm carbon resistor	.19
TPE2170	R10	500,000 ohm carbon resistor	.19
TPE2180	R11	750 ohm carbon resistor	.19
TPE2190	C1	.1 mfd. paper condenser	.14
TPE2200	C2	.002 mfd. paper condenser	.14
TPE2210	C3	.1 mfd. paper condenser	.14
TPE2220	C4	.1 mfd. paper condenser	.14
TPE2230	C5	.1 mfd. paper condenser	.14
TPE2240	C6	10 mfd. electrolytic condenser	.70
TPE2250	C7	.001 mfd. paper condenser	.13
TPE2260	C8	.05 mfd. paper condenser	.14
TPE2270	C9	10 mfd. electrolytic condenser	.70
TPE2280	C10	.006 mfd. paper condenser	.15
TPE2290	C11	.05 mfd. paper condenser	.14
TPE2290	C12	16 mfd. electrolytic condenser	.90
TPE2300	C13	8 mfd. electrolytic condenser	.60
TPE2310		1/3 watt carbon resistor any value	.19

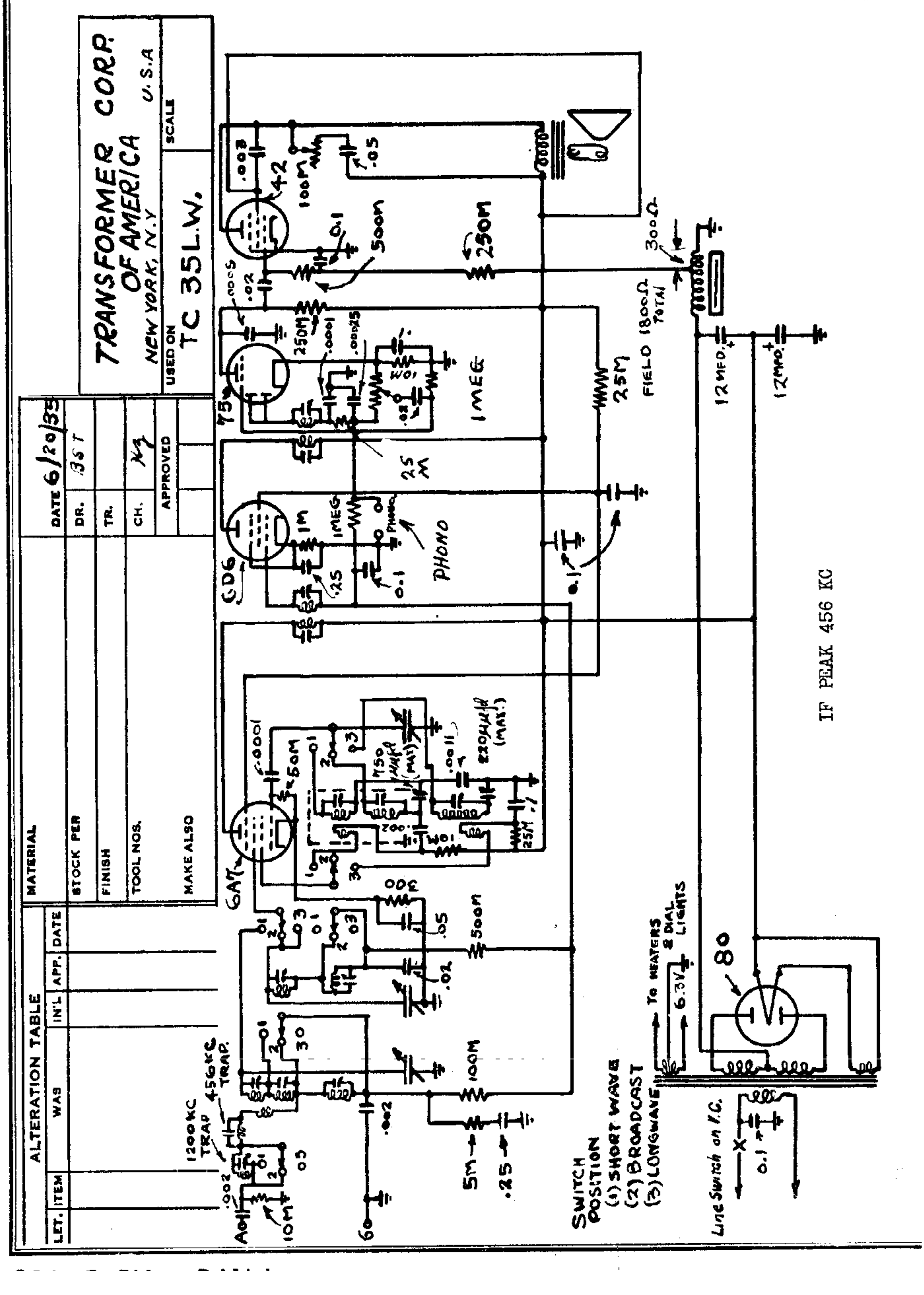


MODELS TC35A
TC35LW, Early
Schematic

TRANSFORMER CORP. OF AMERICA



TRANSFORMER CORP. OF AMERICA



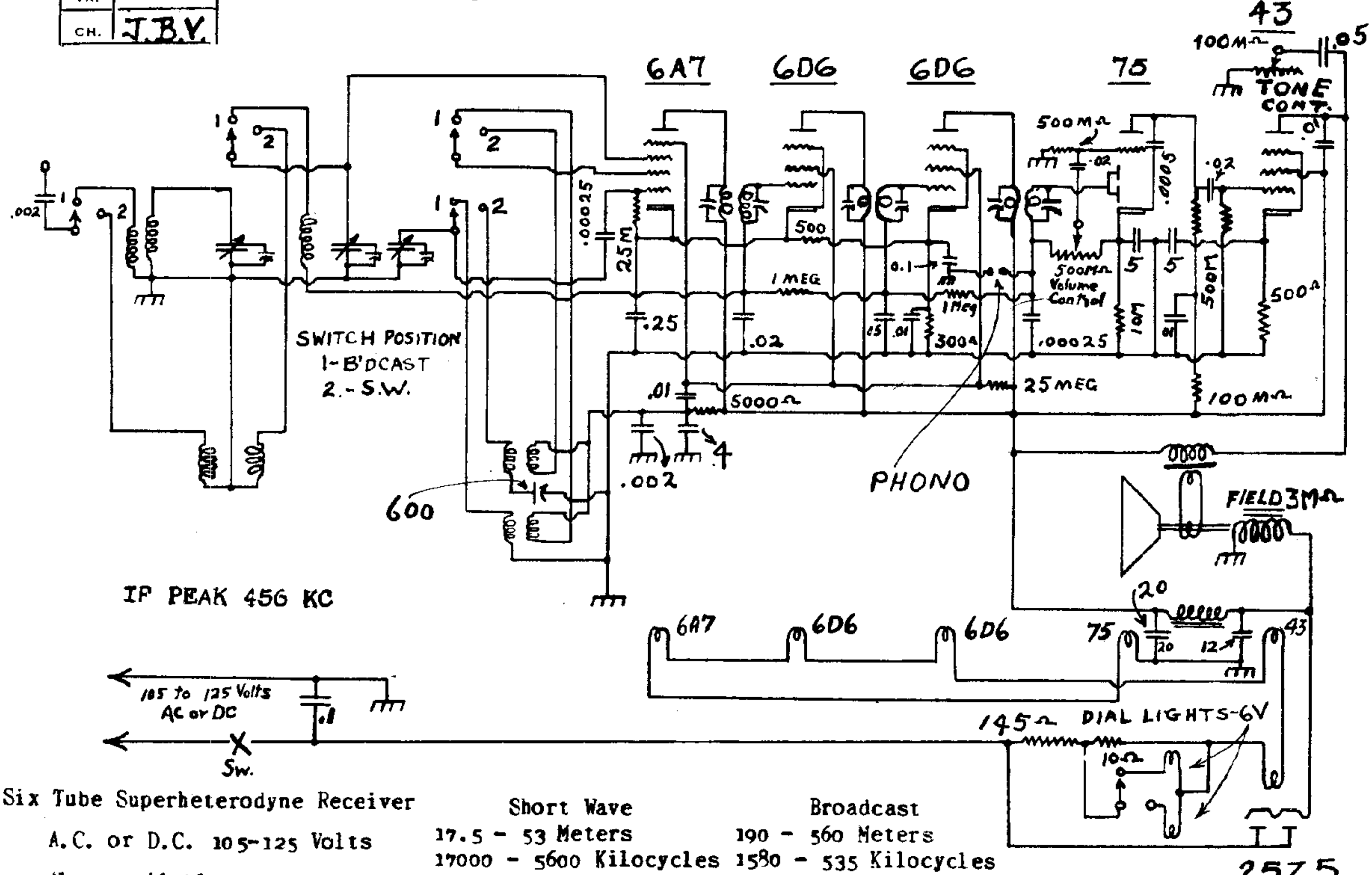
MODEL TC36
Schematic

TRANSFORMER CORP. OF AMERICA

DATE	10-14-34
DR.	JRS.
TR.	
CH.	J.B.V.

VOLTAGE READINGS:

Readings should be taken with volume control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.



IF PEAK 456 KC

Six Tube Superheterodyne Receiver

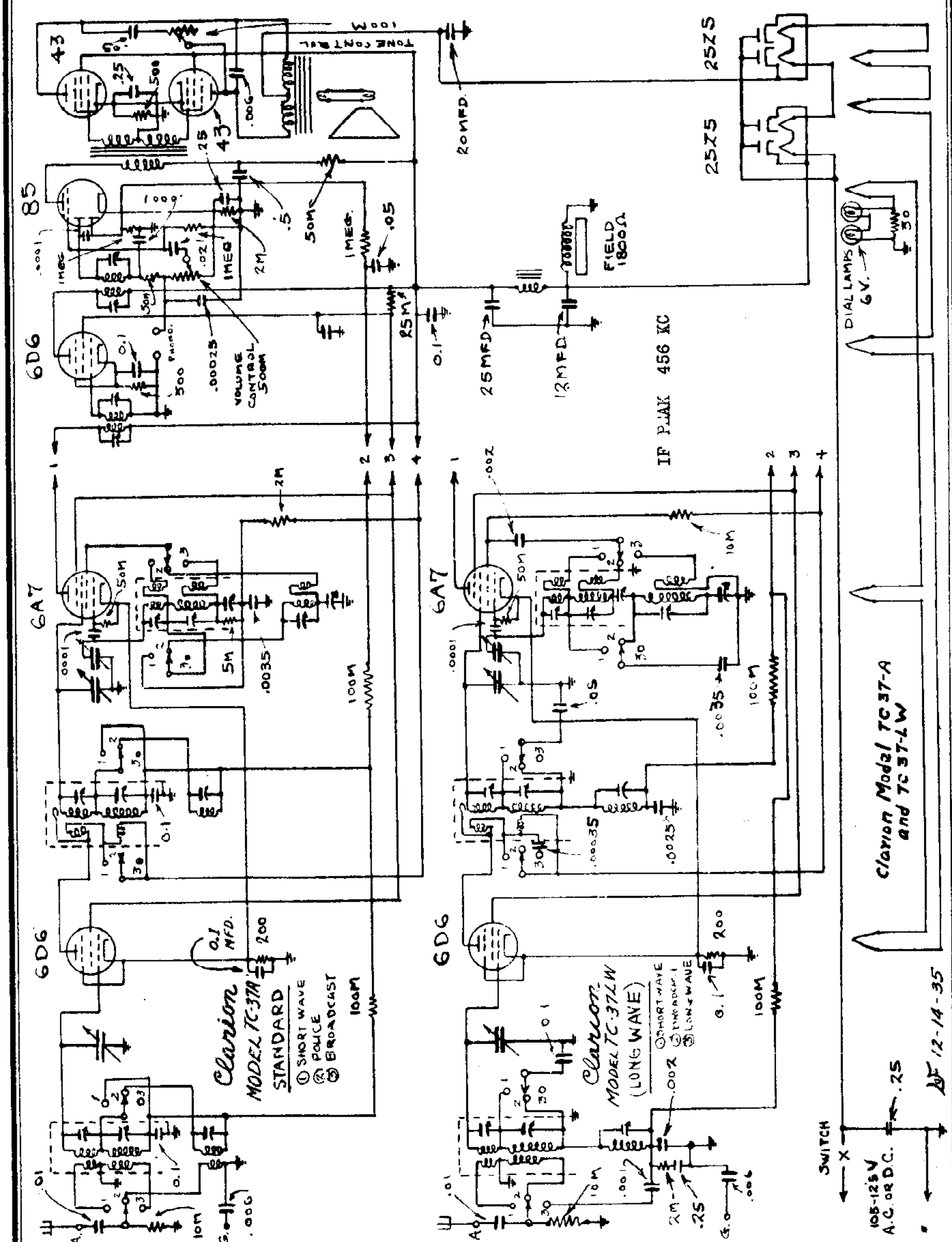
A.C. or D.C. 105-125 Volts

Also available up to 240 V.

Short Wave	Broadcast
17.5 - 53 Meters	190 - 560 Meters
17000 - 5600 Kilocycles	1580 - 535 Kilocycles

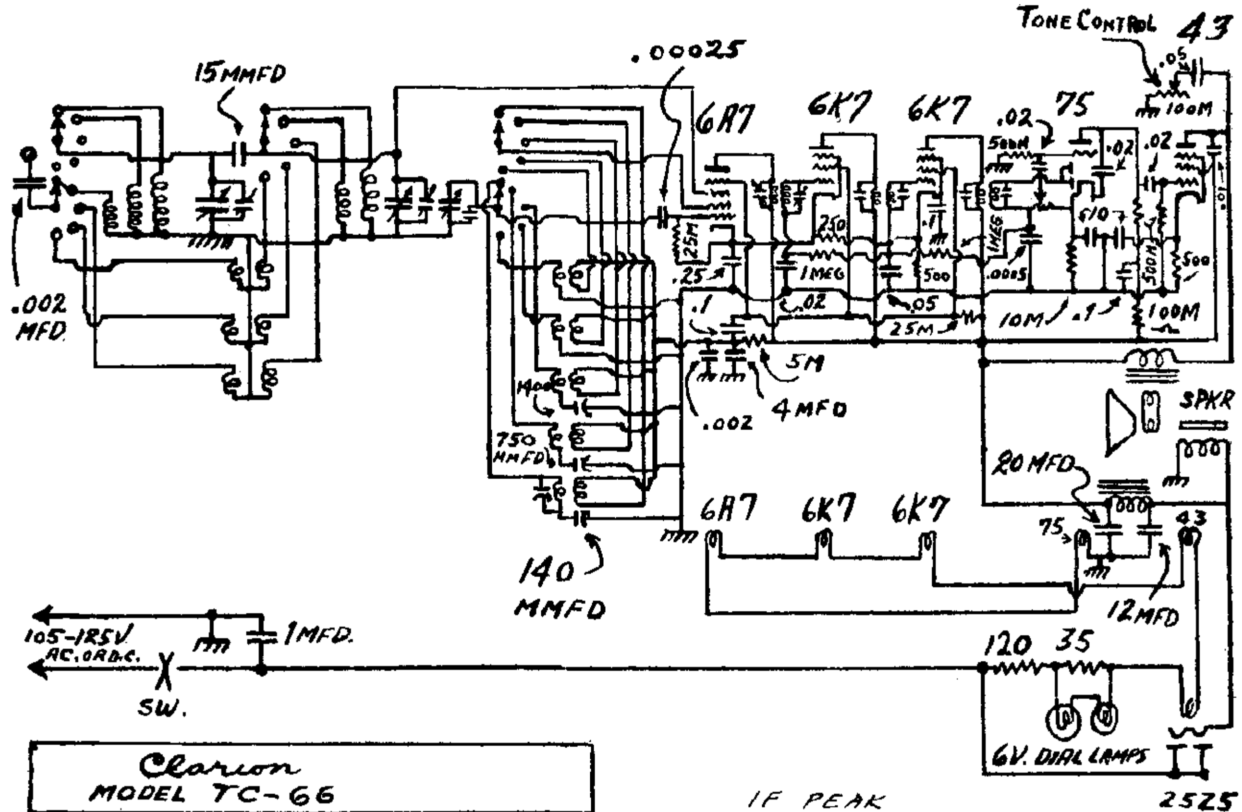
TRANSFORMER CORP. OF AMER.

MODELS TC37A, TC37LW
Schematic



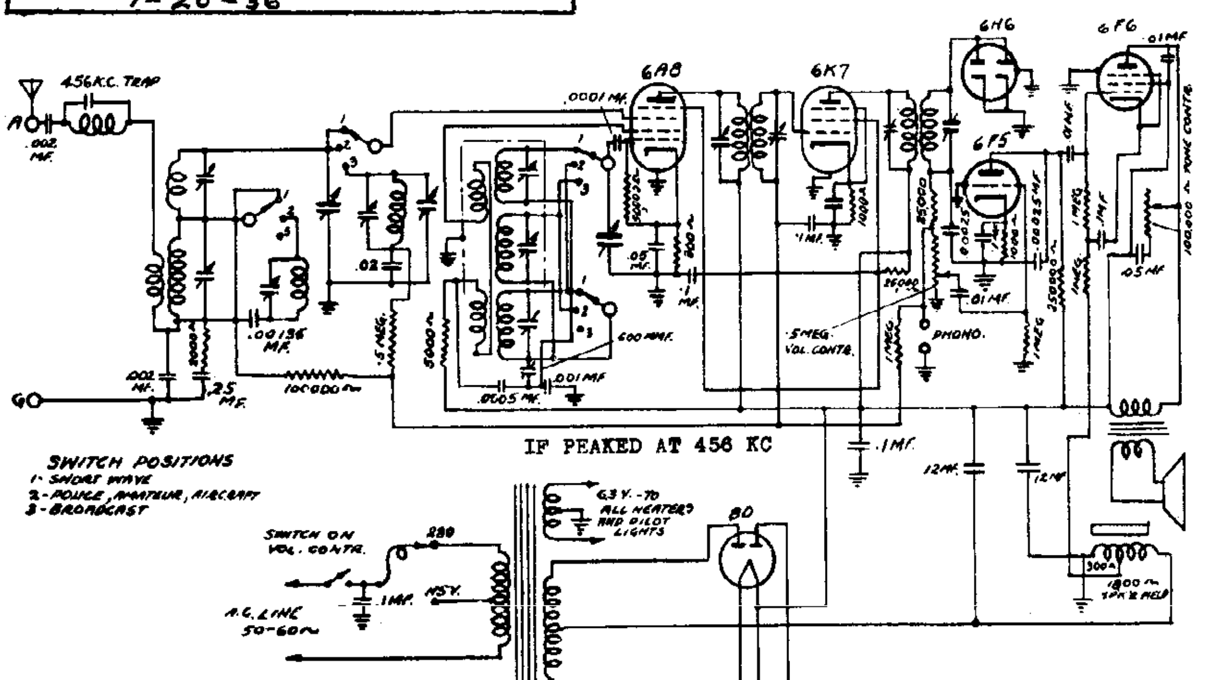
MODEL TC66
MODELS TC75, TC76
Schematics

TRANSFORMER CORP. OF AMER.



Clarion
MODEL TC-66
TRANSFORMER CORPORATION OF AMERICA
100-6TH AVE NEW YORK, N.Y.
1-20-36

IF PEAK
456 KC



IF PEAKED AT 456 KC

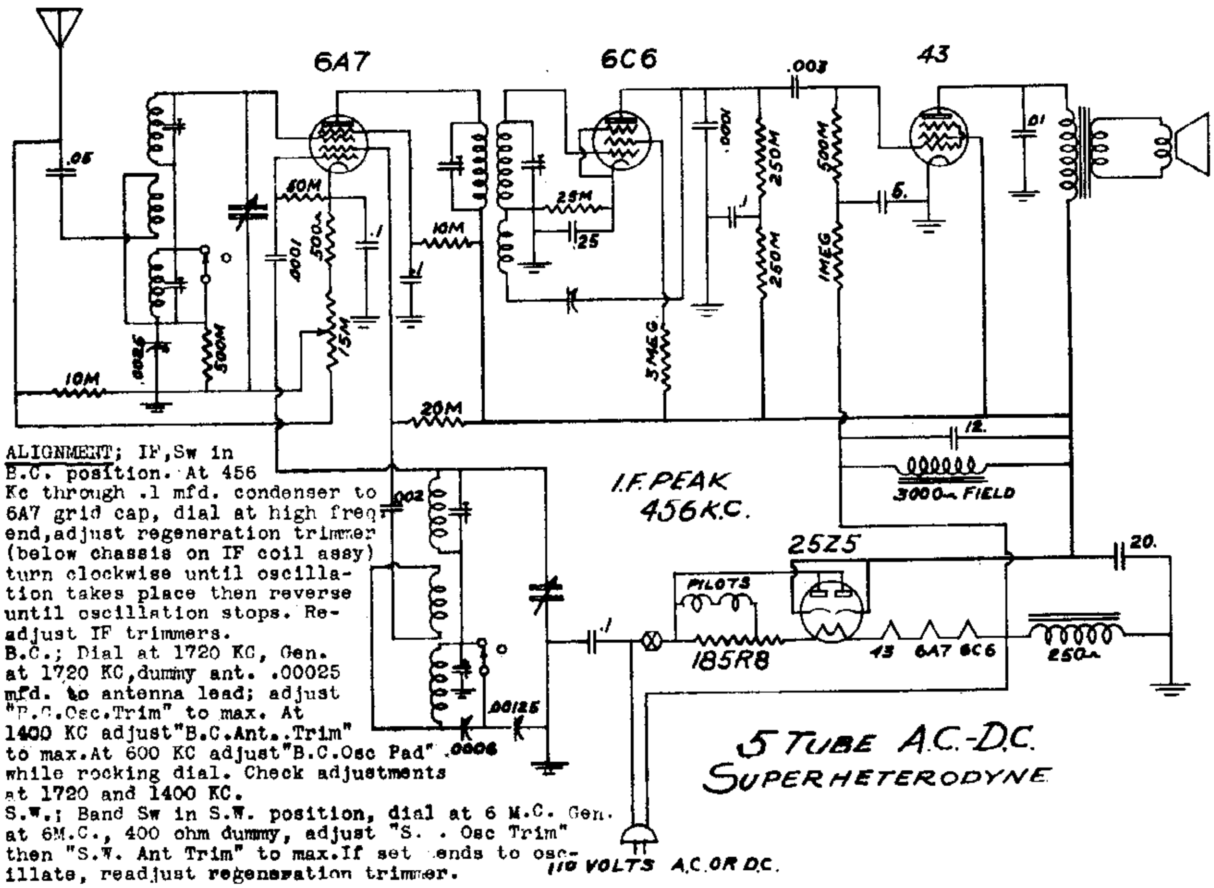
Clarion
MODELS TC-75 & TC-76
6 TUBE 3 BAND A.C. SUPERHETERODYNE

TRANSFORMER CORP. OF AMERICA
100 SIXTH AVE. NEW YORK, N.Y.
DRAWN BY [illegible] 12-14-35

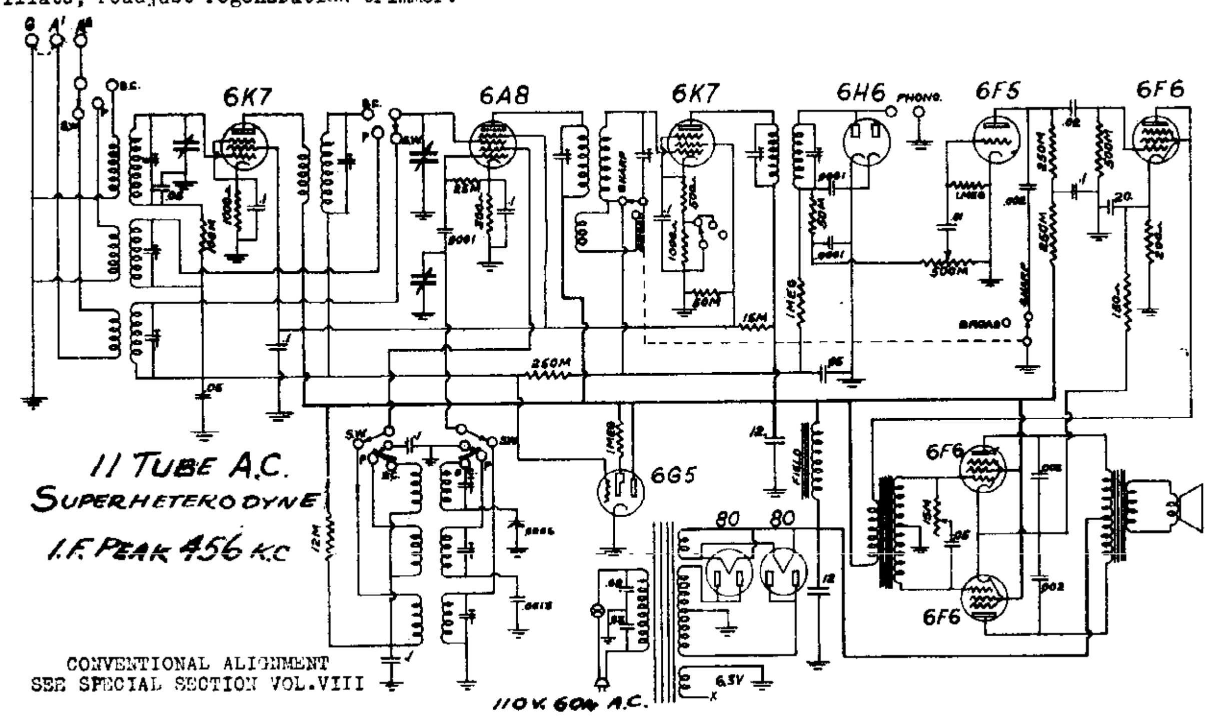
Schematic
Alignment

TRAV-LER RADIO & TELEVISION CORP.

MODEL 5-Tube AC-DC
MODEL 11-Tube A-C
Superhets.



ALIGNMENT; IF, Sw in B.C. position. At 456 Kc through .1 mfd. condenser to 6A7 grid cap, dial at high freq. end, adjust regeneration trimmer (below chassis on IF coil assy) turn clockwise until oscillation takes place then reverse until oscillation stops. Readjust IF trimmers.
B.C.; Dial at 1720 KC, Gen. at 1720 KC, dummy ant. .00025 mfd. to antenna lead; adjust "B.C.Osc.Trim" to max. At 1400 KC adjust "B.C.Ant..Trim" to max. At 600 KC adjust "B.C.Osc Pad" while rocking dial. Check adjustments at 1720 and 1400 KC.
S.W.; Band Sw in S.W. position, dial at 6 M.C. Gen. at 6M.C., 400 ohm dummy, adjust "S. . Osc Trim" then "S.W. Ant Trim" to max. If set tends to oscillate, readjust regeneration trimmer.

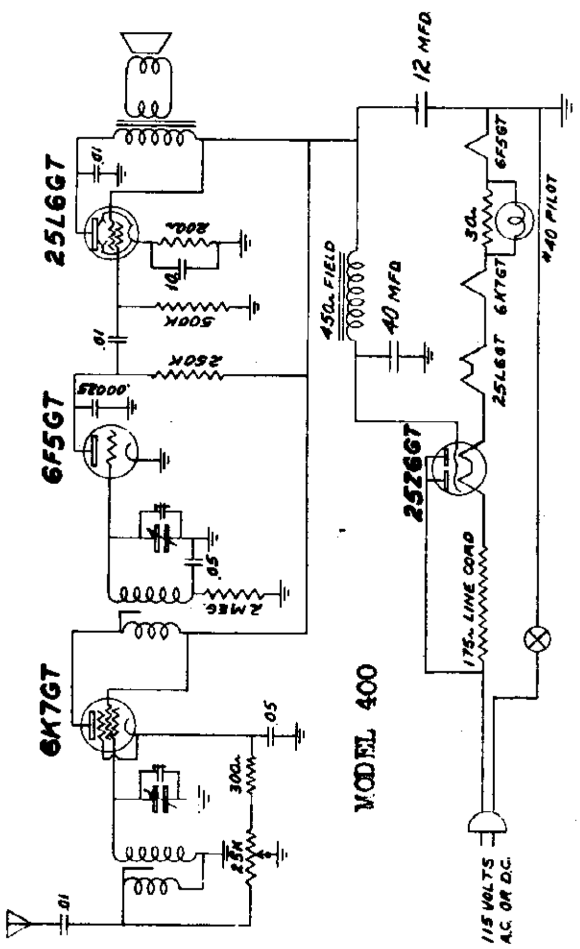


CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL.VIII

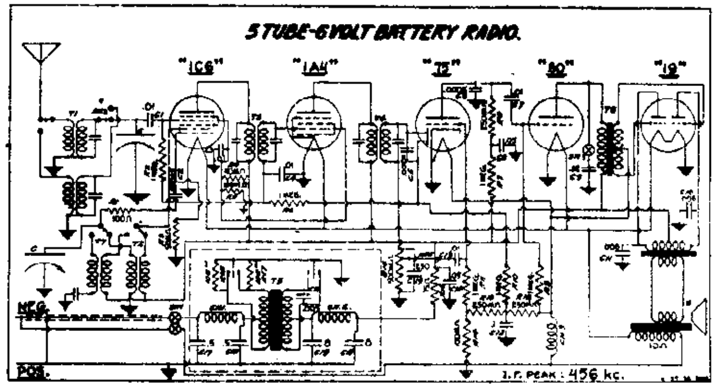
MODEL 5-Tube-6 Volt Batt.
MODEL 400
Schematics, Socket

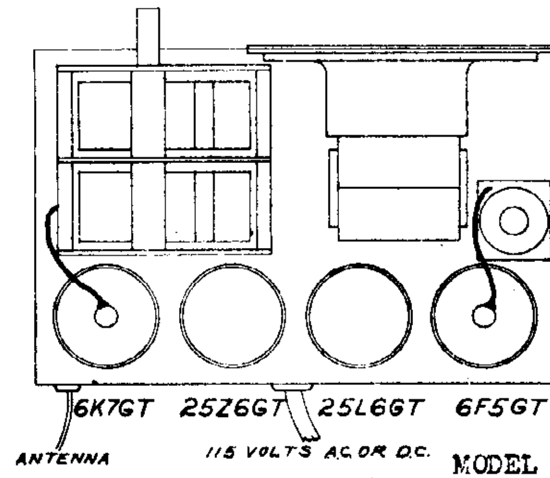
TRAV-LER RADIO & TELEVISION CORP.

MODEL 465M
Socket, Trimmers



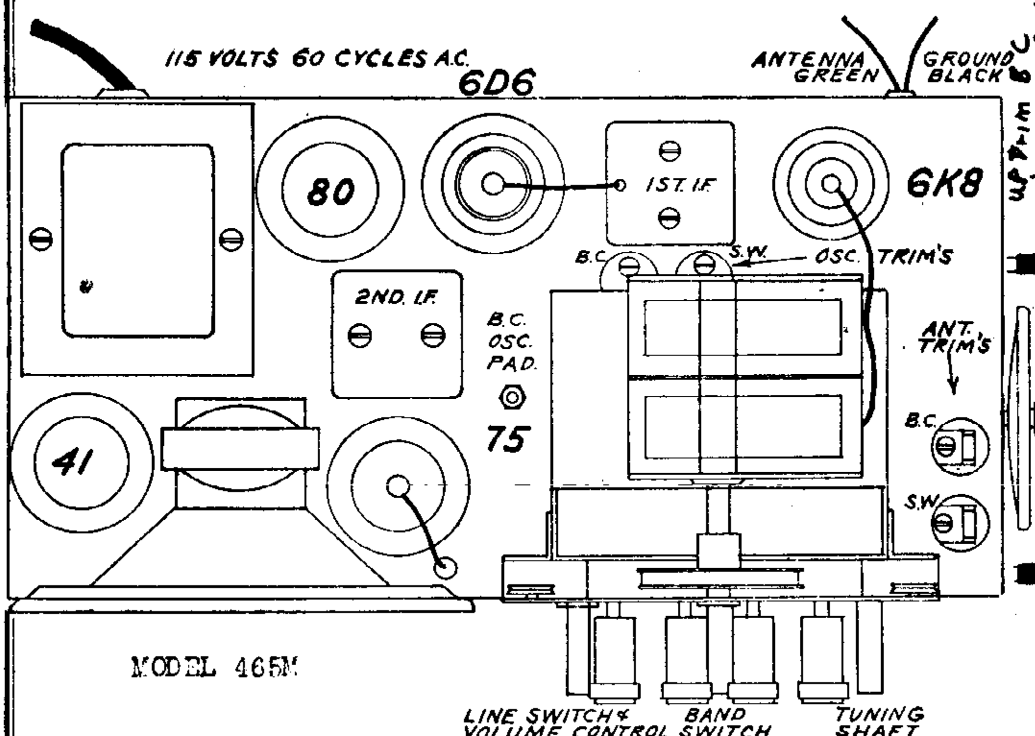
MODEL 400



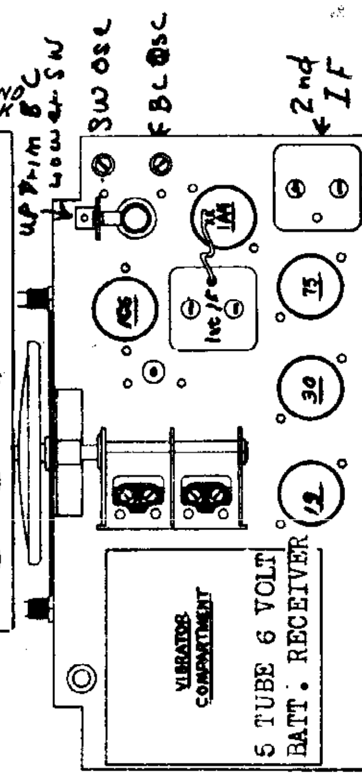


MODEL 400

TUBE LAYOUT



MODEL 465M



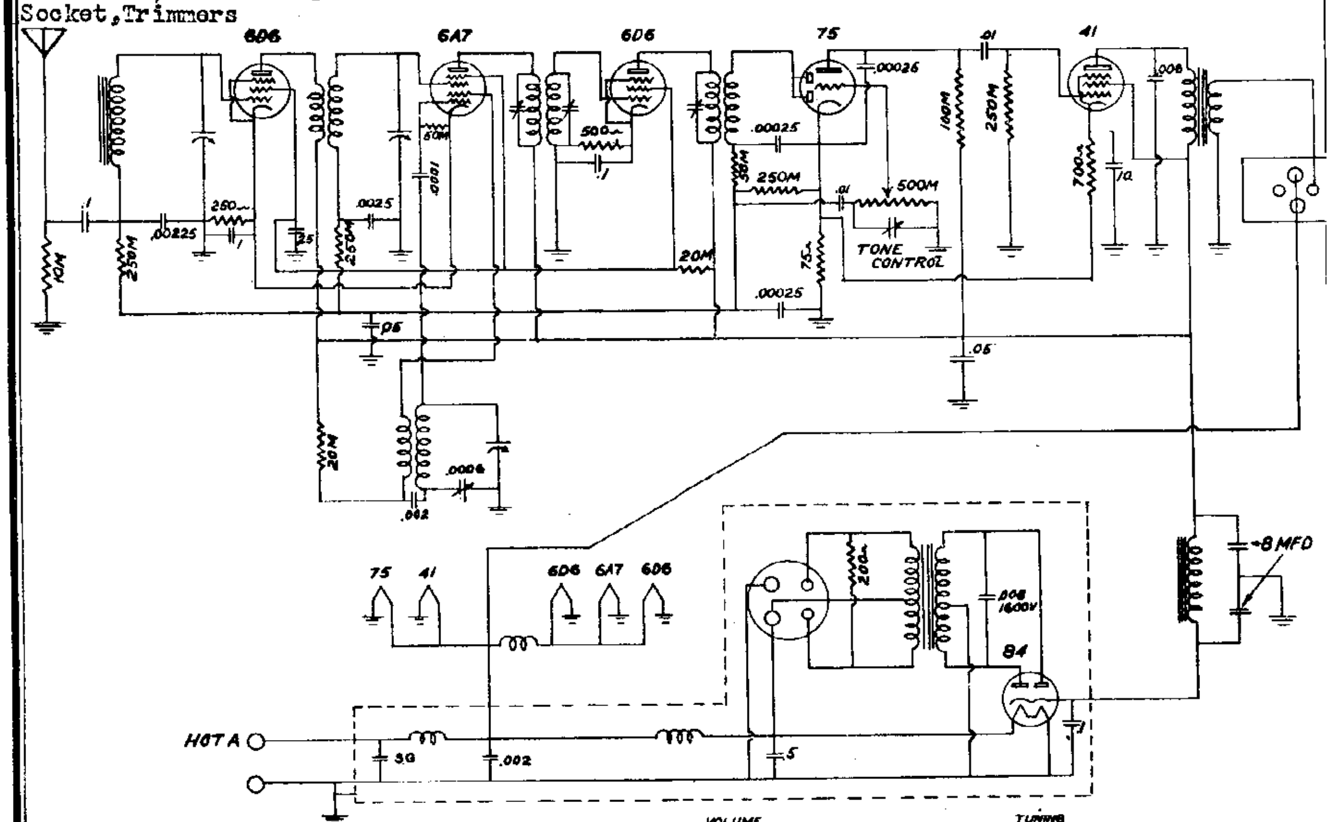
5 TUBE 6 VOLT BATT. RECEIVER

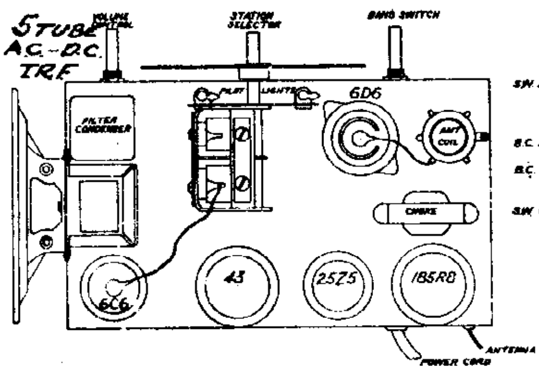
MODEL 5-Tube AC-DC TRF
MODEL 5-Tube AC-DC Superhet
MODEL 11-Tube A-C Superhet.
Socket, Trimmers

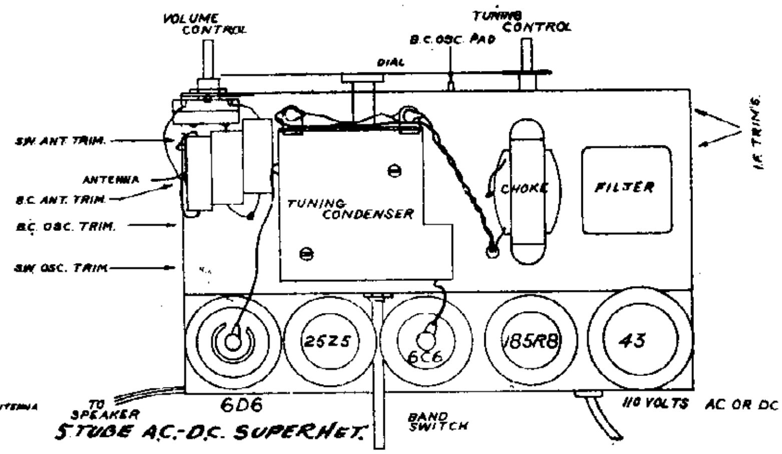
TRAV-LER RADIO & TELEVISION CORP.

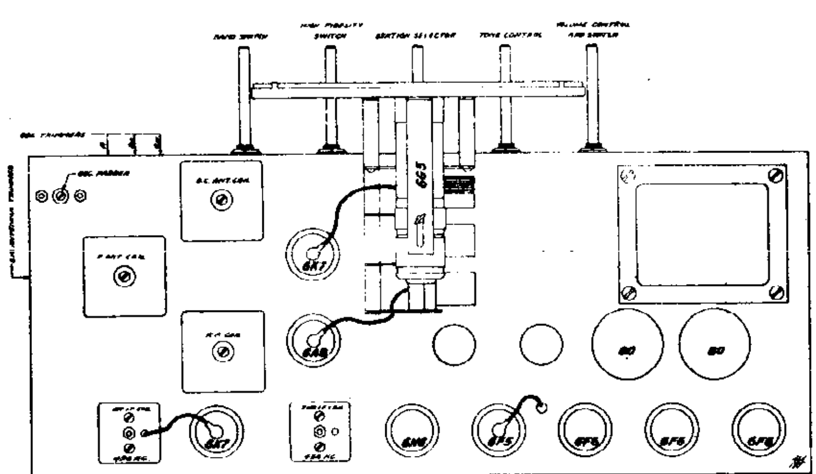
MODEL 6-Tube Auto
Schematic

6 TUBE AUTO SET I.F. = 262 K.C.







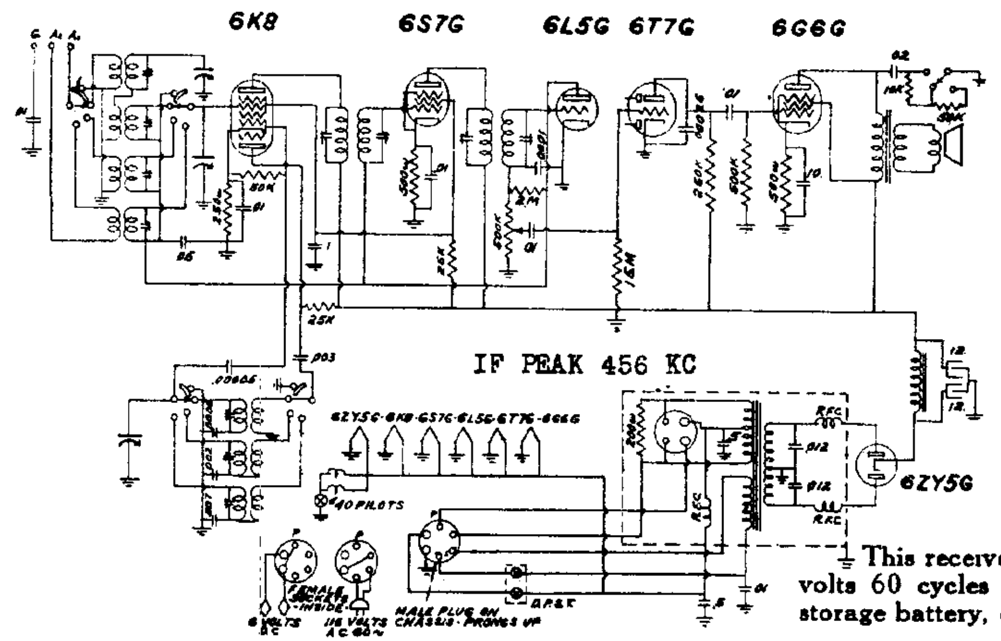


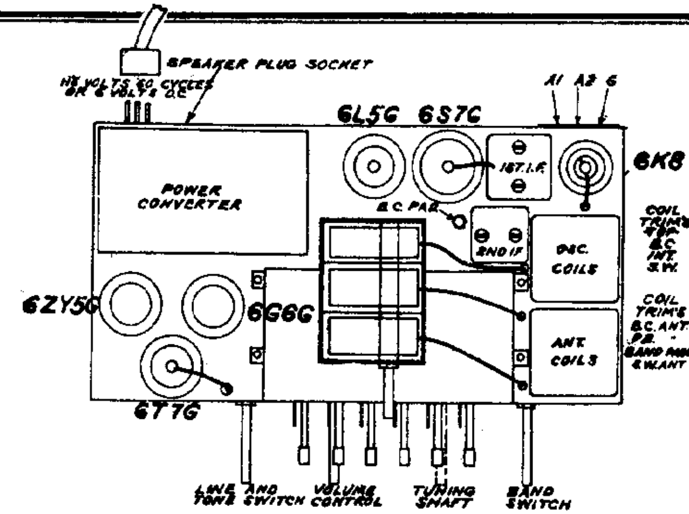
11 TUBE A.C. SUPERHET.

MODEL 6-Tube
Batt. or A-C
MODEL 8-Tube
Batt. or A-C

TRAV-LER RADIO & TELEVISION CORP.

Schematics
Socket
Trimmers

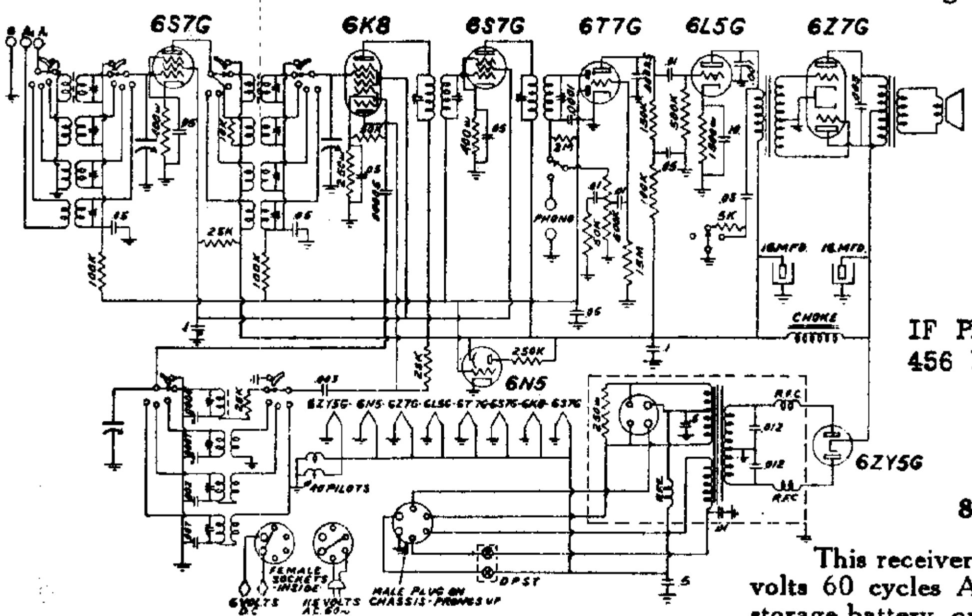




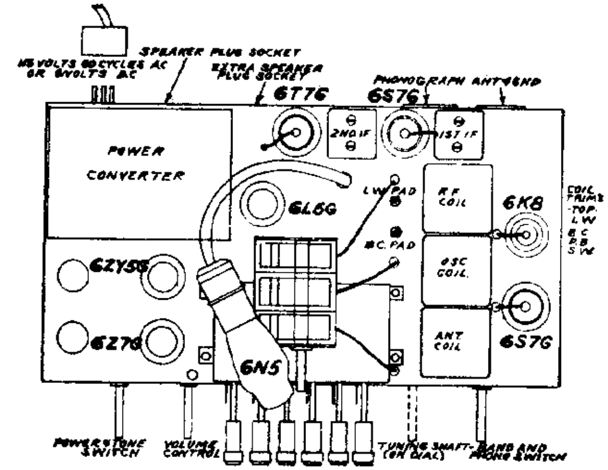
6 Tube Battery or A. C. Operated Receiver

This receiver is designed to operate on a 6 volt storage battery, or 115 volts 60 cycles A. C. **only**. The special model will operate on a 6 volt storage battery, or 220 volts 60 cycle A. C. **only**.

6 and 8 Tube Battery or A.C. Receivers-----For Alignment and Tuner Data, See Index.



IF PEAK
456 KC



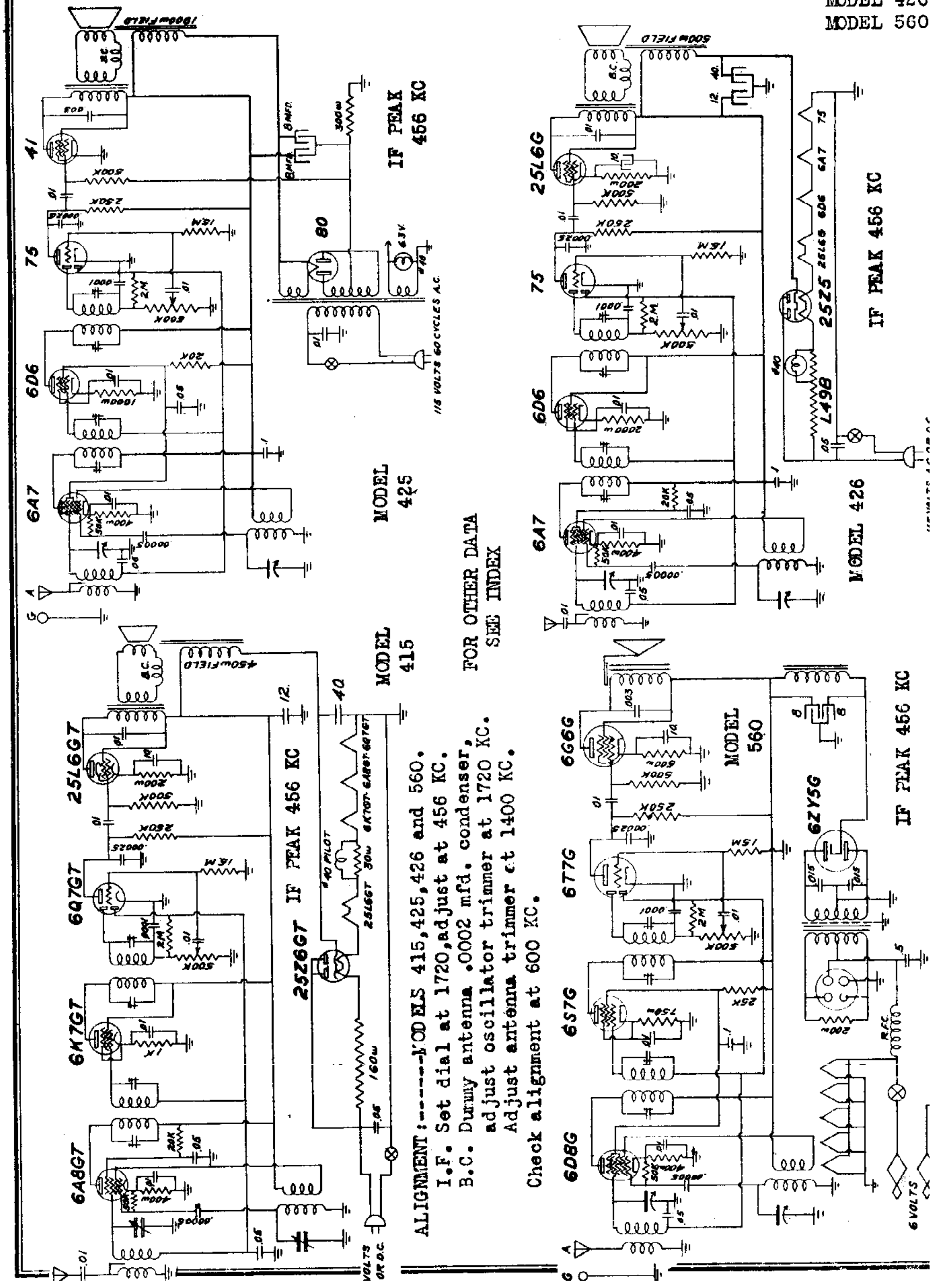
8 Tube Battery or A. C. Operated Receiver

This receiver is designed to operate on a 6 volt storage battery, or 115 volts 60 cycles A. C. **only**. The special model will operate on a 6 volt storage battery, or 220 volts 60 cycle A. C. **only**.

Schematics
Alignment

TRAV-LER RADIO & TELEVISION CORP.

MODEL 415
MODEL 425
MODEL 426
MODEL 560



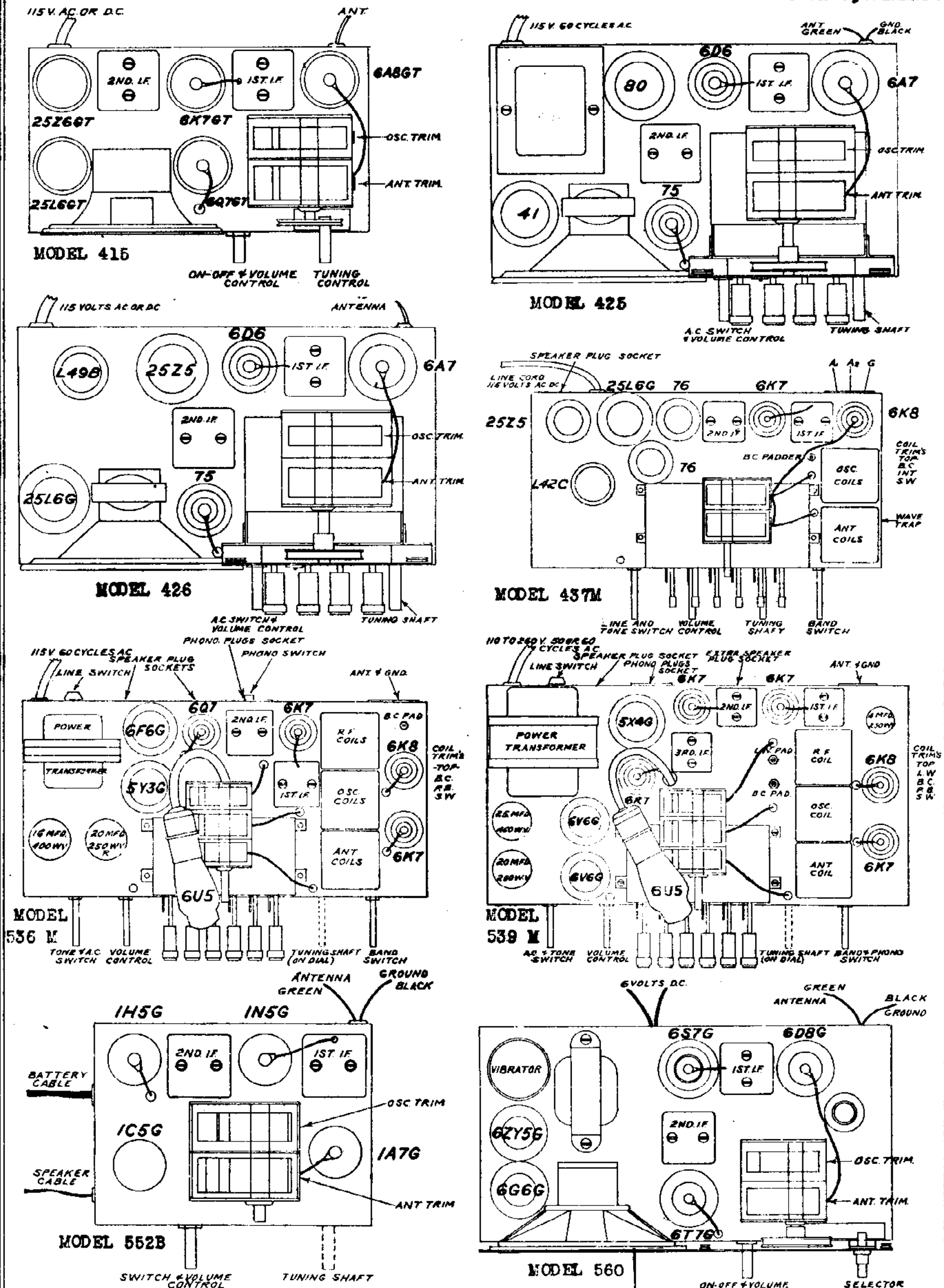
FOR OTHER DATA
SEE INDEX

ALIGNMENT:------MODELS 415,425,426 and 560.
I.F. Set dial at 1720,adjust at 456 KC.
B.C. Dummy antenna .0002 mfd. condenser,
adjust oscillator trimmer at 1720 KC.
Adjust antenna trimmer at 1400 KC.
Check alignment at 600 KC.

MODEL 415 MODEL 437M
MODEL 425 MODEL 536M
MODEL 426 MODEL 539M

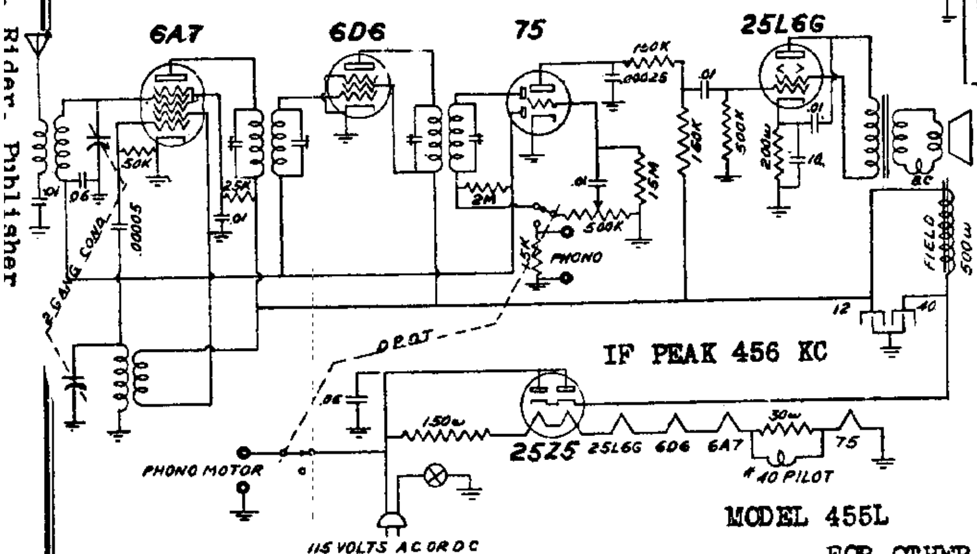
TRAV-LER RADIO & TELEVISION CORP.

MODEL 552B
MODEL 560
Socket, Trimmers



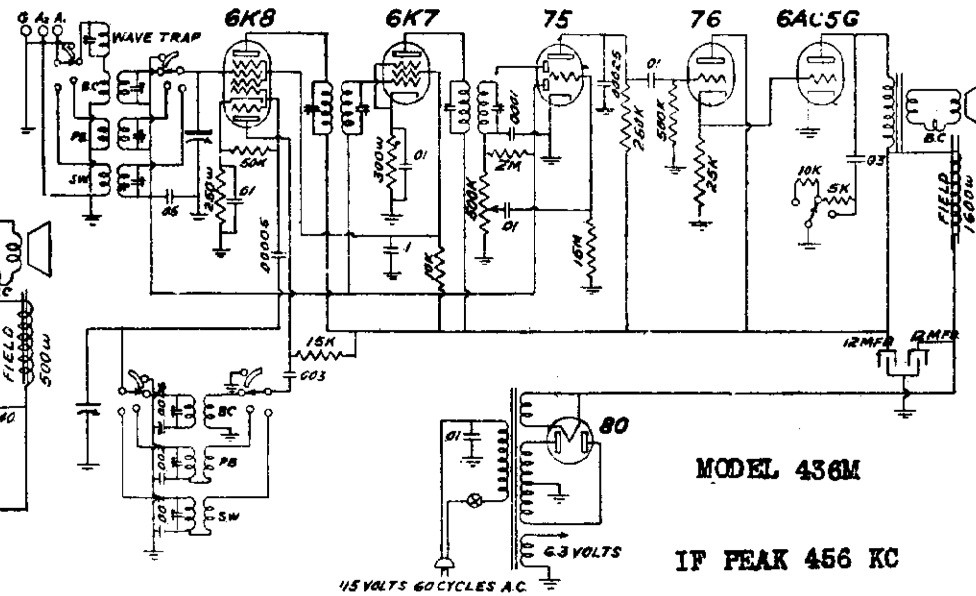
TRAV-LER RADIO & TELEVISION CORP.

MODEL 455L ALIGNMENT:
I.F.--- 456 KC, B.C.Osc. 1720 KC
Antenna 1400 KC, Check at 600 KC.



IF PEAK 456 KC

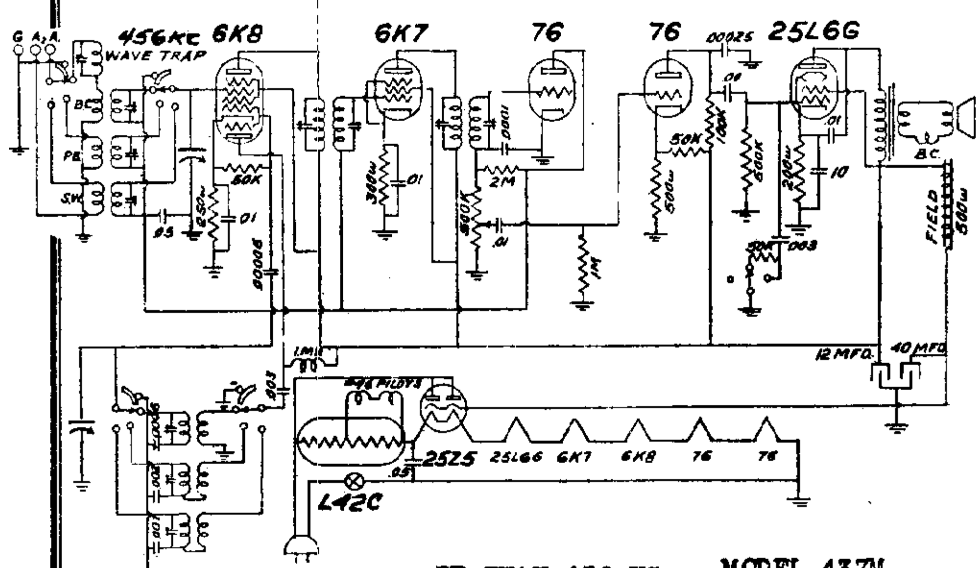
MODEL 455L



MODEL 436M

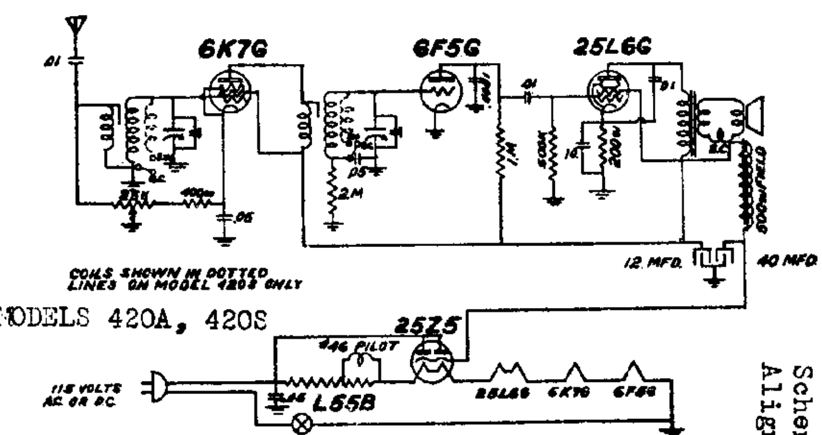
IF PEAK 456 KC

FOR OTHER DATA, SEE INDEX.



IF PEAK 456 KC

MODEL 437M



MODELS 420A, 420S

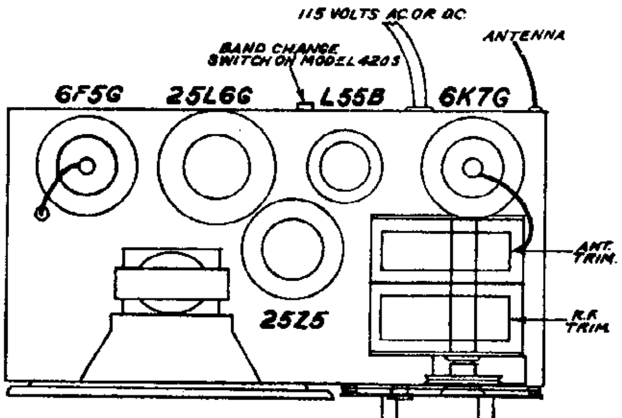
MODEL 420A (1 BAND)
ALIGNMENT:
R.F.Trimmer---1730 KC
Ant.Trimmer---1400 KC
Check at 600 KC

MODEL 420S 2 BAND)
ALIGNMENT:
R.F. Trimmer--- 1560 KC
Ant. Trimmer--- 1400 KC
SW Band--No adjustment.

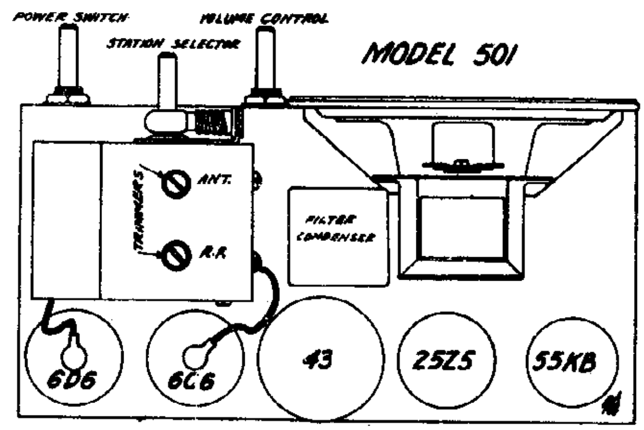
MODEL 501
MODEL A502
Socket, Trimmers

TRAV-LER RADIO & TELEVISION CORP.

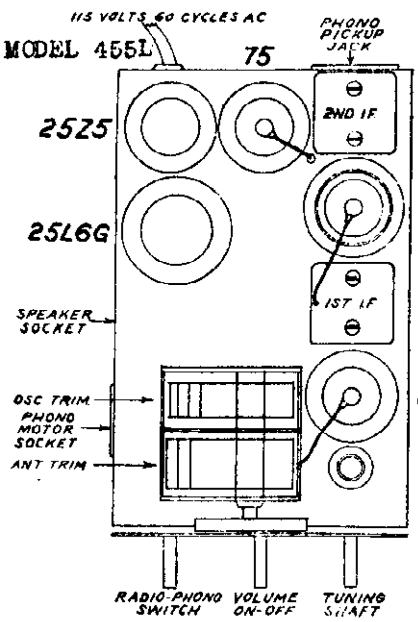
MODELS 420A, 420S
MODEL 436M
MODEL 455L
MODEL 466M

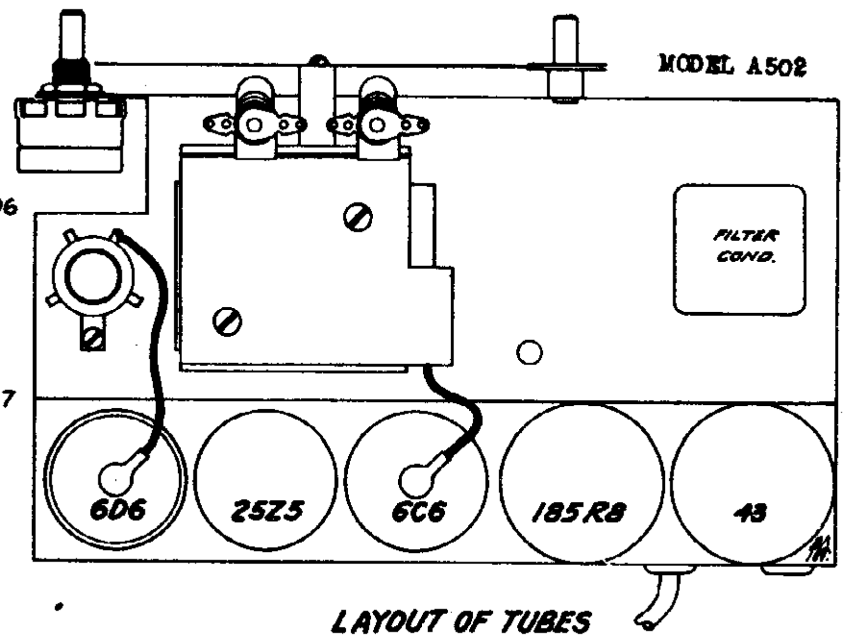


MODEL 420A and 420S

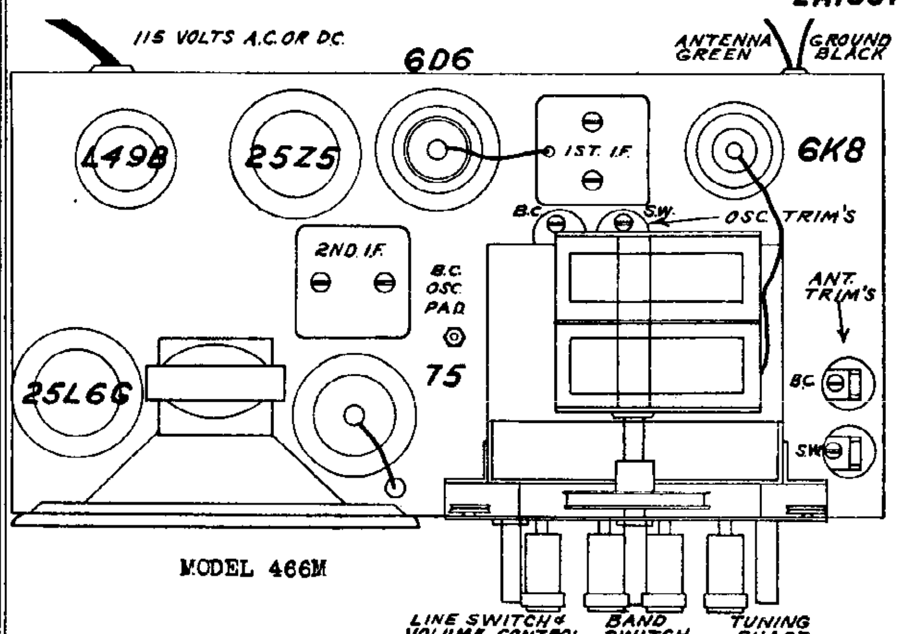


TUBE LAYOUT

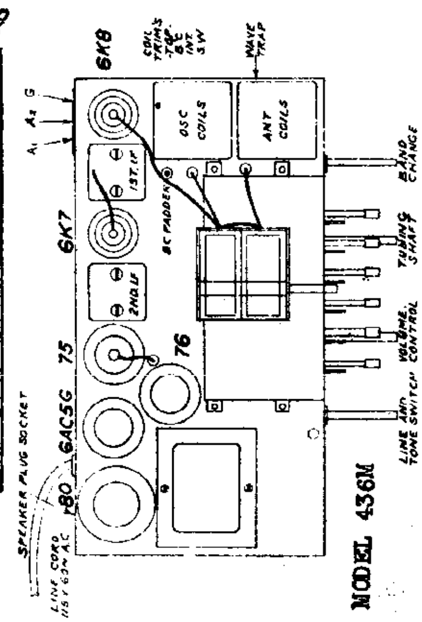




LAYOUT OF TUBES

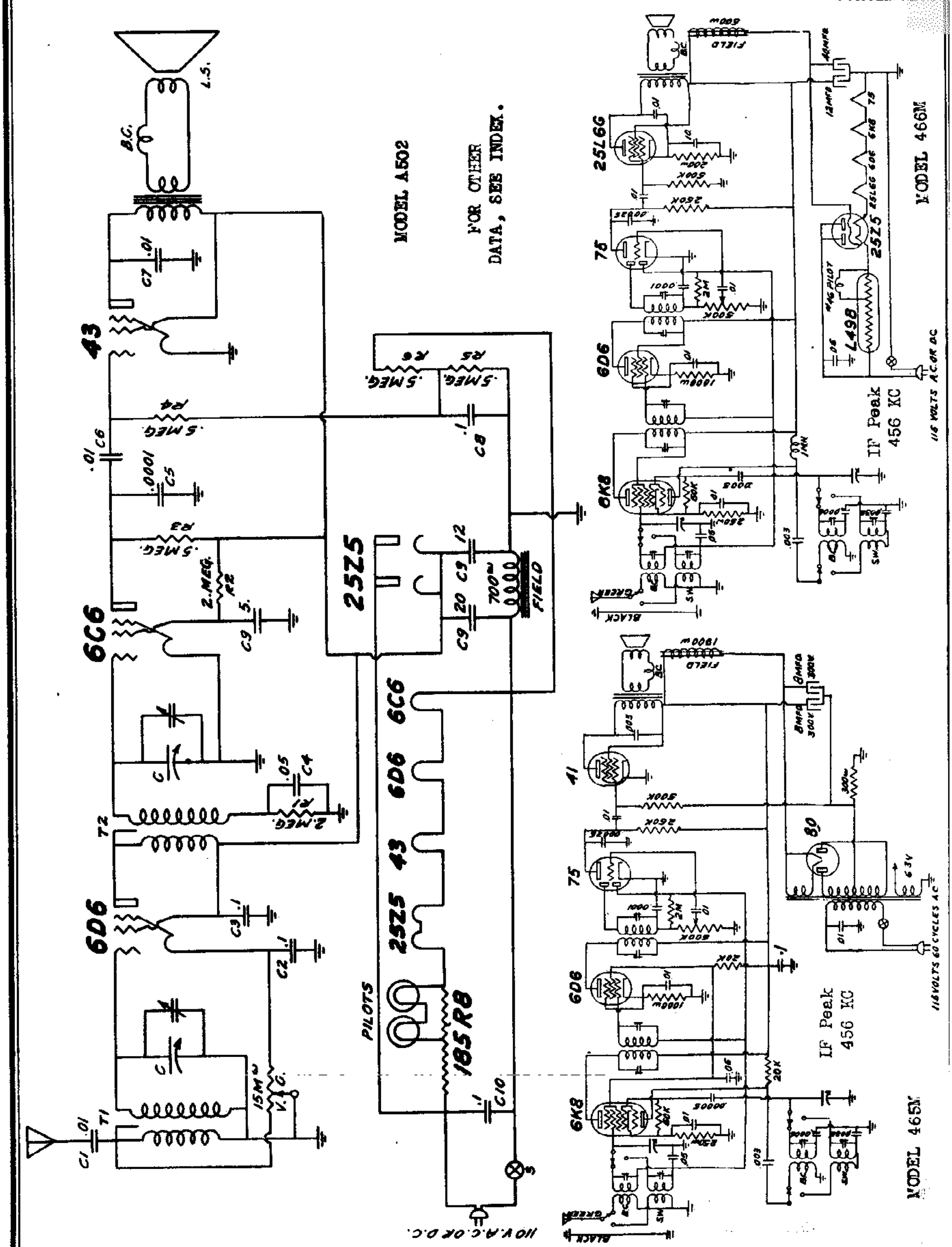


MODEL 466M



MODEL 436M

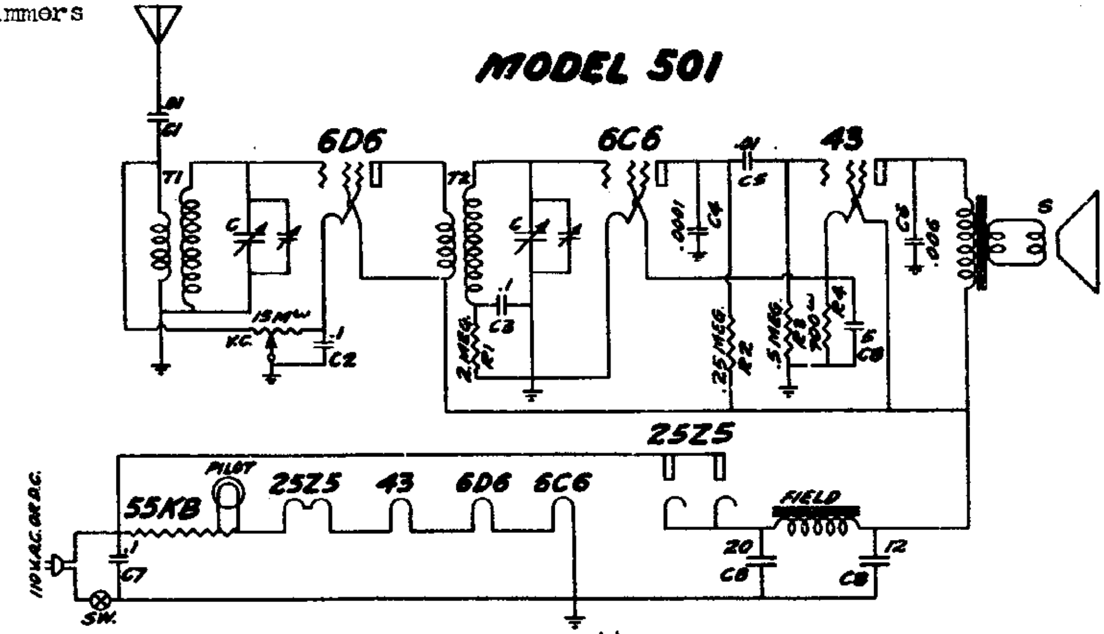
TRAV-LER RADIO & TELEVISION CORP.



MODEL 501
Schematic
MODEL 645E
Schematic, Socket
Trimmers

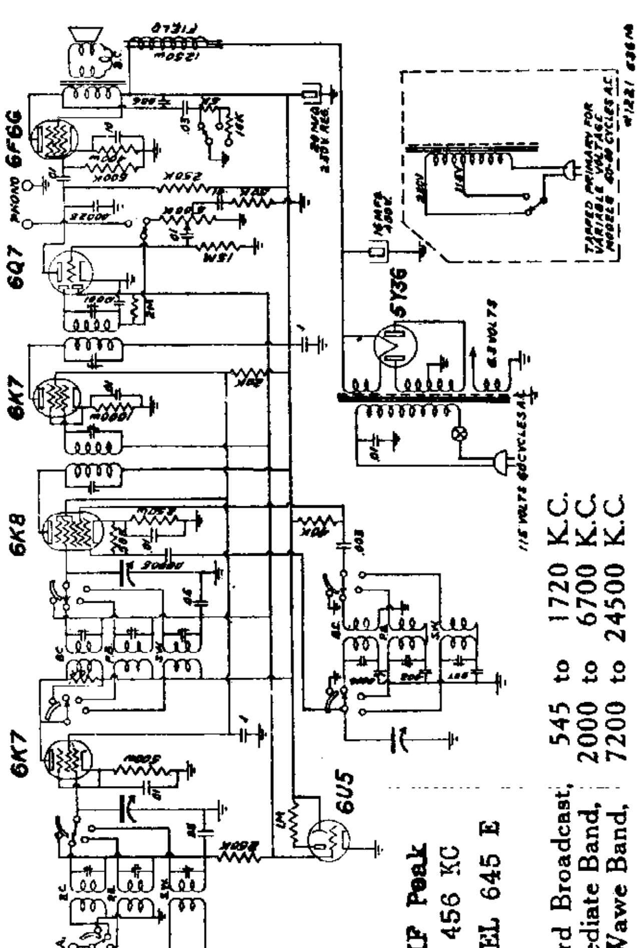
TRAV-LER RADIO & TELEVISION CORP.

MODEL 501



SUPPLY VOLTAGE

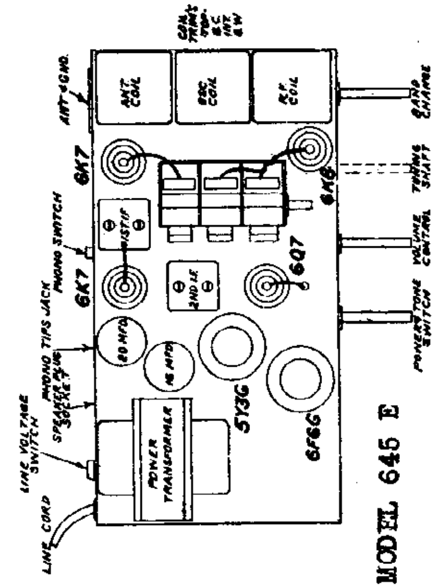
This receiver operates from any 110 volt light socket of any frequency AC or straight DC. When operating on a DC socket, the plug may have to be reversed in the socket to obtain the correct polarity, as it will work only in one position on DC current.



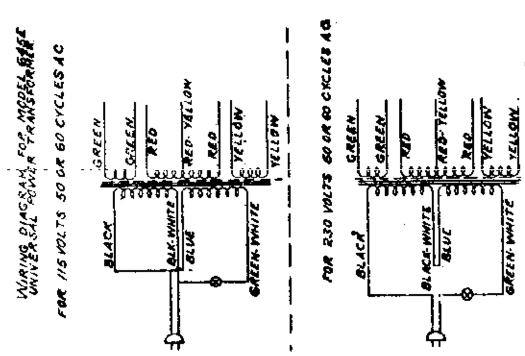
FOR OTHER DATA, SEE INDEX

IF Peak
456 KC
MODEL 645 E

Standard Broadcast,	545	to	1720 K.C.
Intermediate Band,	2000	to	6700 K.C.
Short Wawe Band,	7200	to	24500 K.C.



MODEL 645 E



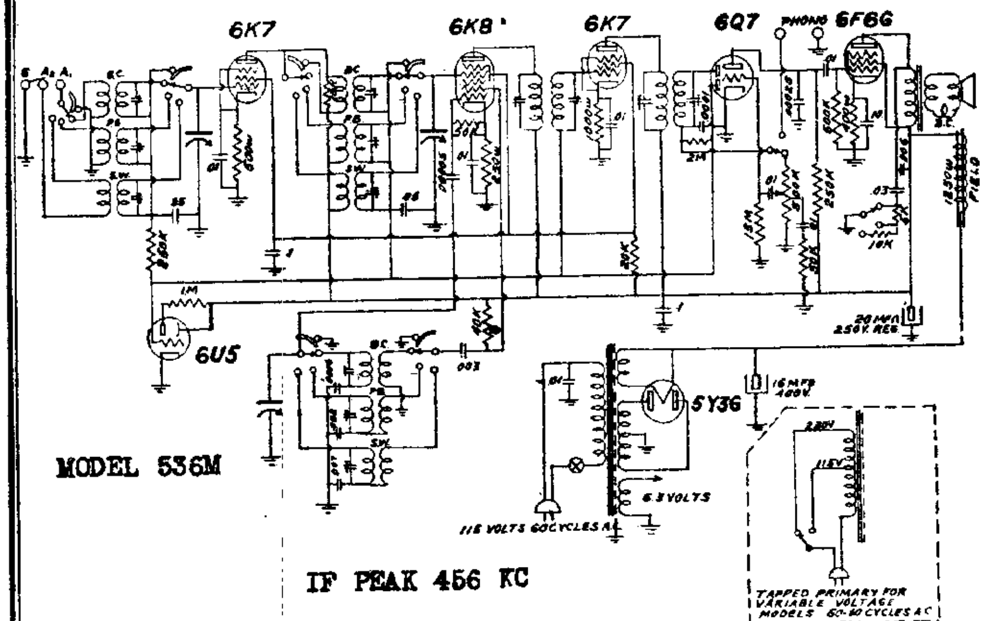
CURRENT SUPPLY

The current supply switch at the rear of the chassis must be set to 115 or 230 volts to correspond to the available current and **should never be changed while that current is being used!** Be absolutely sure this switch is set right before you plug in the radio. If it is set for 115 volts and 230 volts is used, **the transformer will burn out.**

Schematics
Alignment

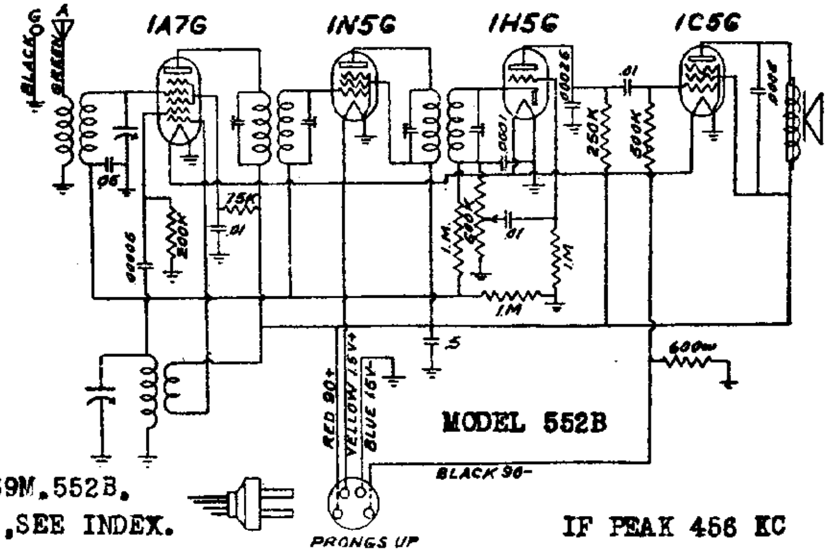
TRAV-LER RADIO & TELEVISION CORP.

ALIGNMENT:-MODELS 536M, 539M, 552B.
I.F. TRIMMERS------- 456 KC.
B.C. OSC. TRIMMERS--1720 KC.
ANT. TRIMMERS---1400 KC.
CHECK ALIGNMENT AT 600 KC.



MODEL 536M

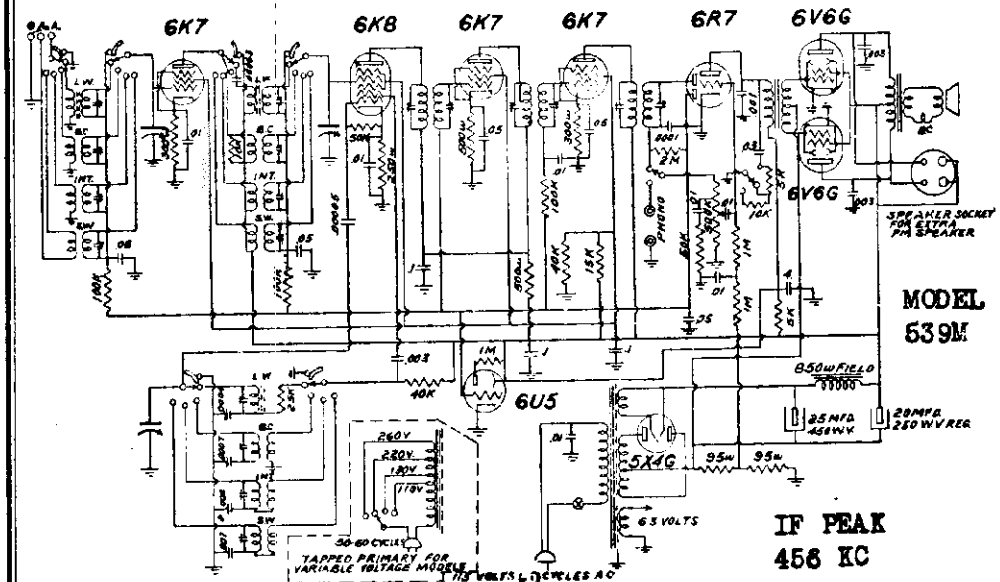
IF PEAK 456 KC



MODEL 552B

MODELS 536M, 539M, 552B.
FOR OTHER DATA, SEE INDEX.

IF PEAK 456 KC



MODEL 539M

IF PEAK 456 KC

SUBSTITUTE POWER SUPPLY FOR ABOVE RECEIVER

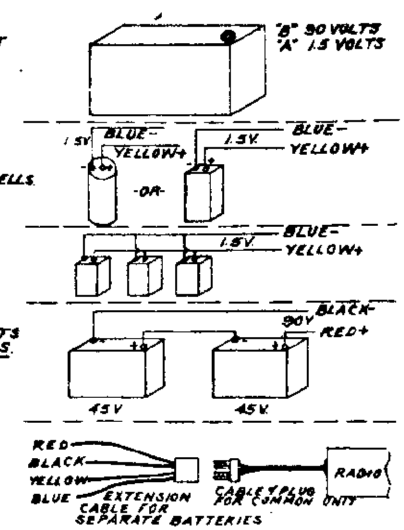
THIS RADIO IS DESIGNED TO OPERATE FROM A SINGLE, COMMON, PLUG-IN UNIT

SUBSTITUTES MAY BE USED

FOR "A" BATTERIES, SINGLE 1.5 VOLT CELLS

OR SEVERAL 1.5 VOLT CELLS MAY BE USED IN PARALLEL CONNECTION.

FOR "B" BATTERIES TWO 45 VOLT UNITS MAY BE USED, CONNECTED IN SERIES.



MODEL 552B

MODEL 6-Tube Auto Voltage, Socket Trimmers, Alignment
MODELS 6-, 8-Tube Batt. or A-C Sets

TRAV-LER RADIO & TELEVISION CORP.

MODELS 436M, 437M
MODELS 465M, 466M
Alignment, Tuner

MODEL 536M
MODEL 645E
MODEL 539M
Alignment
MODELS 425, 426
Tuner Data

ALIGNMENT: 8 TUBE BATTERY OR A.C. and MODEL 539M.

I. F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I.F. trimmers for maximum output, starting with the third I.F. and working back. Decrease the generator output as the speaker output increases.

LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna, to terminal "A1," with the metal strip connected across A2 and G. Set the dial and generator to 362 K.C. and adjust the L.W. oscillator trimmer for maximum output. Align the L.W. RF and ANT trimmers at 320 K.C. Align the L.W. oscillator pad for maximum output at 200 K.C. by adjusting the dial and padder together. Check the alignment again at 320 K.C.

BROADCAST BAND ALIGNMENT

Using the .0002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. Align the RF and ANT trimmers at 1400 K.C. Align the B.C. oscillator padder at 600 K.C. by adjusting the dial and padder together. Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C.
Check for alignment at 2.2 M.C.

SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C., and the R.F. and Antenna trimmers at 22 M.C.
Check for alignment at 8 M.C.

NOTICE

If a Standard All Wave dummy Antenna is available, it should be used in place of the .0002 mfd. condenser, and the 400 ohm resistor.
On all bands the oscillator trimmers are adjusted with the variable condenser full open.

ALIGNMENT; MODELS 6Tube Battery or A.C., 437M, 436M, 466M, 465M, 536M, and 645E.
NOTE, No intermediate band on Models 465M and 466M.

I.F. From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I.F. trimmers for maximum output, decreasing the generator output as the speaker ouput increases.

B.C. 1. Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1720 K.C. and adjust the B.C. oscillator trimmer for maximum output.

2. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. R.F. and ANT. trimmers for maximum output.

3. Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C., and adjust the B.C. oscillator padder for maximum output by adjusting dial and pad together.

Check the alignment again at 1400 K.C.

INT. Connect the signal generator lead thru a 400 ohm resistor as dummy antenna to A1. Set the dial and generator to 6700 K.C. and adjust the P.B. oscillator trimmer for maximum output. Adjust the R.F. and ANT. trimmers at 6000 K.C. and check for alignment at 2200 K.C.

S.W. Still using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. on dial and generator. Adjust the R.F. and ANT. trimmers at 22 M.C. and check for alignment at 8. M.C.

ALIGNMENT: 6 TUBE AUTO RADIO

1. Set variable condenser with rotor plates in open position. Set signal generator to 262 kc., connect generator lead to grid cap of 6A7 using a .1 mfd., condenser as a dummy antenna. Adjust IF trimmers for maximum output, reducing signal generator output as signal increases.

2. Set signal generator to 1620 kc., connecting generator lead to antenna lead on set using a .00025 condenser as dummy antenna. Rotate oscillator trimmer until signal is picked up. Set generator ot 1400 kc., pick up signal by rotating variable condenser then adjust RF and antenna trimmers for maximum signal, reducing generator output as speaker signal increases. Set signal generator to 600 kc., rotate variable condenser to pick up signal then adjust for maximum sensitivity by rotating oscillator padder while rocking variable condenser.

3. Recheck alignment adjustments at 1620 and 1400 kc.

PUSH BUTTONS; MODELS 6 and 8 Tube Battery or A.C., 425, 426, 436M, 437M, 465M and 466M.

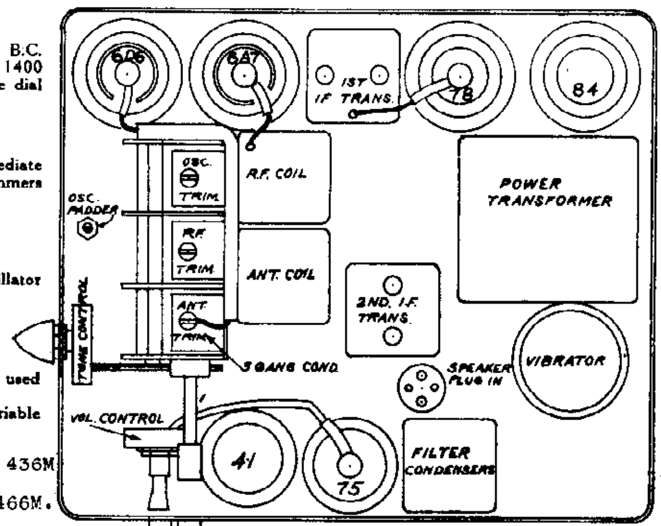
Six Push Button Station Selectors are incorporated in this receiver. Each button may be adjusted to select any station or frequency in the Broadcast Band. To adjust each button, perform the following operations:

1. Tune in a desired station with the Selector knob, watching the eye for the narrowest shadow.
2. Twist the Push button you want set up for this station, to the left about one full turn to loosen the mechanism.
3. Push this Push Button in as far as it will go, while holding the Selector knob firmly so the station will not be detuned.
4. With the Push Button pressed all the way in, twist it to the right until it is tight, and then release it.

Follow this procedure with the other five Push Buttons, setting each for a different station.

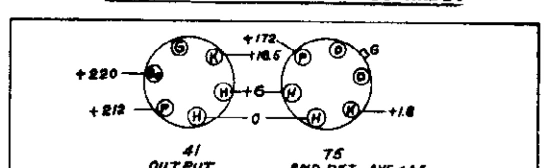
Now, when any button is pushed, the station for which that button is set should become perfectly tuned in. If it is not tuned in perfectly, repeat the above procedure until satisfactory results are obtained.

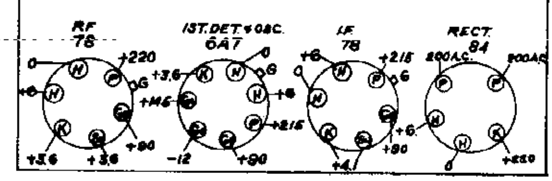
Select the Call Letter Tabs to correspond to the stations the Push Buttons are set up for, and insert them in the places provided above each button.



TUBE LAYOUT
6 Tube AUTO

VOLTAGE DATA 6 TUBE AUTO RADIO





Bottom view of 6-tube auto set showing socket positions and voltages from socket terminals to ground. All voltage measurements taken with volume control at maximum and with no signal applied. Use volt-meter of 1000 ohms per volt.

WESTERN AUTO SUPPLY CO.

Replacement Parts

NOTICE: There is a chassis number label on the chassis base. The chassis number identifies the radio as to chassis, dial, and issue number. When ordering parts or writing, be sure to mention the chassis number.

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

Part No.	Description	List Price
12A310	10" Dynamic Speaker	4.75
	Cone and Voice Coil Assembly for above Speaker	2.00
12A311	12" Dynamic Speaker	6.00
	Cone and Voice Coil Assembly for above Speaker	2.00
12A316	10" Dynamic Speaker	5.40
	Cone and Voice Coil Assembly for above Speaker	2.00

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A953	T1	Antenna Transformer Assembly (Issue No. 1 only)	$1.45
9A994	T1	Antenna Transformer Assembly (Issue No. 2)	1.45
9A954	T2	R.F. Interstage Transformer Assembly	1.40
9A955	T3	Oscillator Coil Assembly "D" Range	.75
9A956	T4	Oscillator Coil Assembly "B" and "C" Range	1.00
9A957	T5	1st I.F. Transformer and Can Assembly	1.40
9A958	T6	2nd I.F. Transformer and Can Assembly	$1.35
53X182	T7	117 Volt, 60 Cycle, Standard Power Transformer	4.00
53X183	T7	117 Volt, 25 Cycle, Standard Power Transformer	4.75
53X184	T7	117 Volt, 40-60 Cycle, Universal Power Transformer	4.15
51X42	T8	Output Transformer	[illegible]
9A939	L1	Wave Trap Coil	[illegible]
9A929	L2	Oscillator Tracking Coil	.45

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage		List Price
C94203	R1	30,000 Ohm	1.0		$0.15
C94253	R2	25,000 Ohm	1.0		.15
A95105	R3	1 Megohm	0.2	(Issue No. 1 only)	.10
A95105	R4	1 Megohm	0.2		.10
[illegible]	R5–R23	[illegible]			[illegible]
[illegible]	R23	500,000 Ohm	0.2	(Issue No. 2)	.10

VARIABLE

Part No.	Code	Resistance	Description	List Price
[illegible]	R16	2 Megohm	Volume Control and On-Off Switch	.80
[illegible]	R19	1 Megohm	Tone and Selectivity Control	.80

CONDENSERS

MISCELLANEOUS

Part No.	Code	Description	List Price
[illegible]	C17	130 mmf. Ceramic	.20
[illegible]	C19	130 mmf. Ceramic (Issue No. 1 only)	.20
[illegible]	C44	240 mmf. Silvered Mica (Issue No. 2)	.20
14A00		3 Gang Condenser less Dial and Drive Assembly (Issue No. 1 only)	2.45
14A08		3 Gang Condenser less Dial and Drive Assembly (Issue No. 2)	2.45

DIAL AND DRIVE ASSEMBLY

No. 9 DIAL

Models using this dial may be identified by the round push buttons used on the tuning unit. The station call letters are mounted in the escutcheon above the buttons.

SEE PARTS Model D705 Issue 1

No. 10 DIAL

Models using this dial may be identified by the rectangular push buttons used on the tuning unit. The station call letter tabs are mounted in the push button.

[illegible]

PHONO ATTACHMENT PARTS

[illegible]

AUTOMATIC TUNING ASSEMBLY

[illegible]

Prices Subject to Change Without Notice.

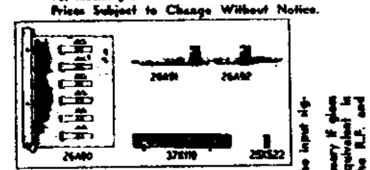


Fig. 8—Issue No. 1 Automatic Tuning Unit Parts Which Differ From Issue No. 2.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Selectivity Control—Sharp Position All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

Signal Generator Frequency Setting	Signal Generator Connection at Radio	Dummy Antenna	Band Switch Setting	Condenser Setting	Adjust Trimmers to Maximum (Unless otherwise specified)
I. F.					
456 KC	Grid of I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C29) & (C30)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C25) & (C26)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	Push Button Position Button No. 1 Depressed		Wave Trap (C2) Adjust for MINIMUM Output
RANGE B					
1830 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C16)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C5) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C12) Rock Rotor—See Note B
RANGE C					
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C4) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Int. Range D (C7) Rock Rotor—See Note B
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C11) Rock Rotor—See Note B

PERMEABILITY TUNING UNIT			Button Depressed (Band Switch in Push Button Position)	Turn Setting Screw to Maximum Output—See Instruction Book	Adjust Coil Position to Maximum Output—See Note C
700 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
700 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
1100 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
1100 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

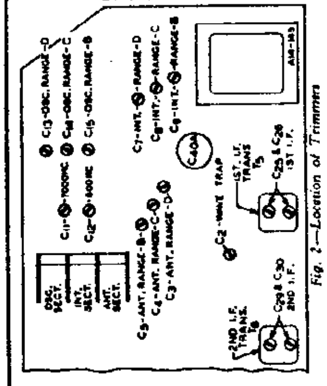


Fig. 2—Location of Trimmers

SPECIFICATIONS

Power Consumption - 70 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 3.0 Watts Undistorted, 4.0 Watts Maximum

Selectivity - 31.5 KC Broad at 1000 times Signal (Sharp)

Sensitivity

B Range (Manual Tuning)	1.0 Microvolt Average
B Range (Automatic Tuning)	1.0 Microvolt Average
C Range	3.0 Microvolts Average
D Range	5.0 Microvolts Average

Intermediate Frequency - - - - - - - 456 KC.

Speaker - - - - - - - - 10" or 12" Dynamic

Tuning Frequency Range

B Range (Manual Tuning)	528 to 1830 KC
C Range (Manual Tuning)	1810 to 6350 KC
D Range (Manual Tuning)	6300 to 22000 KC
Buttons 1 & 2 (Automatic Tuning)	520 to 980 KC
Buttons 3 & 4 (Automatic Tuning)	650 to 1250 KC
Buttons 5 & 6 (Automatic Tuning)	820 to 1600 KC

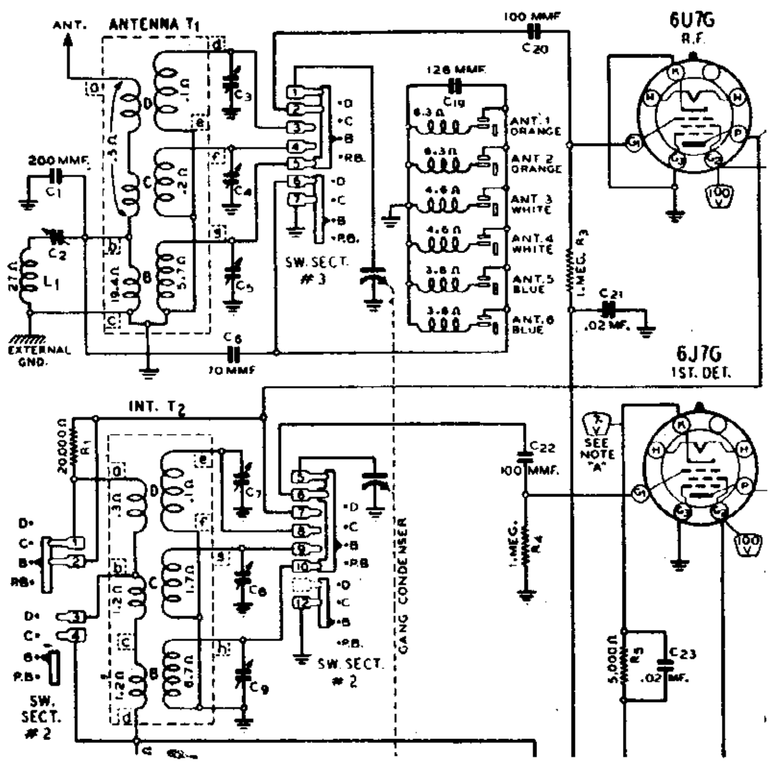
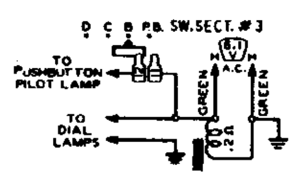
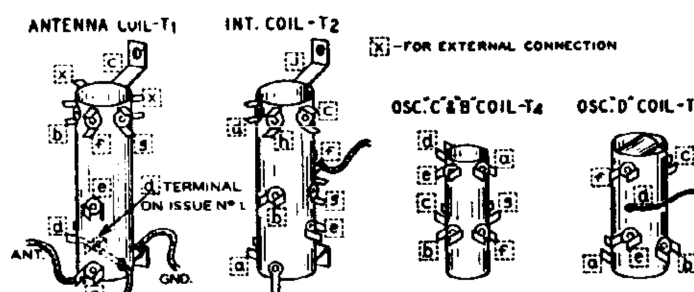


Fig. 4—Partial Schematic Circuit Diagram—Issue No. 1



FOR TUNER DATA SEE INDEX



COIL TERMINALS ISSUE Nº 1 & 2

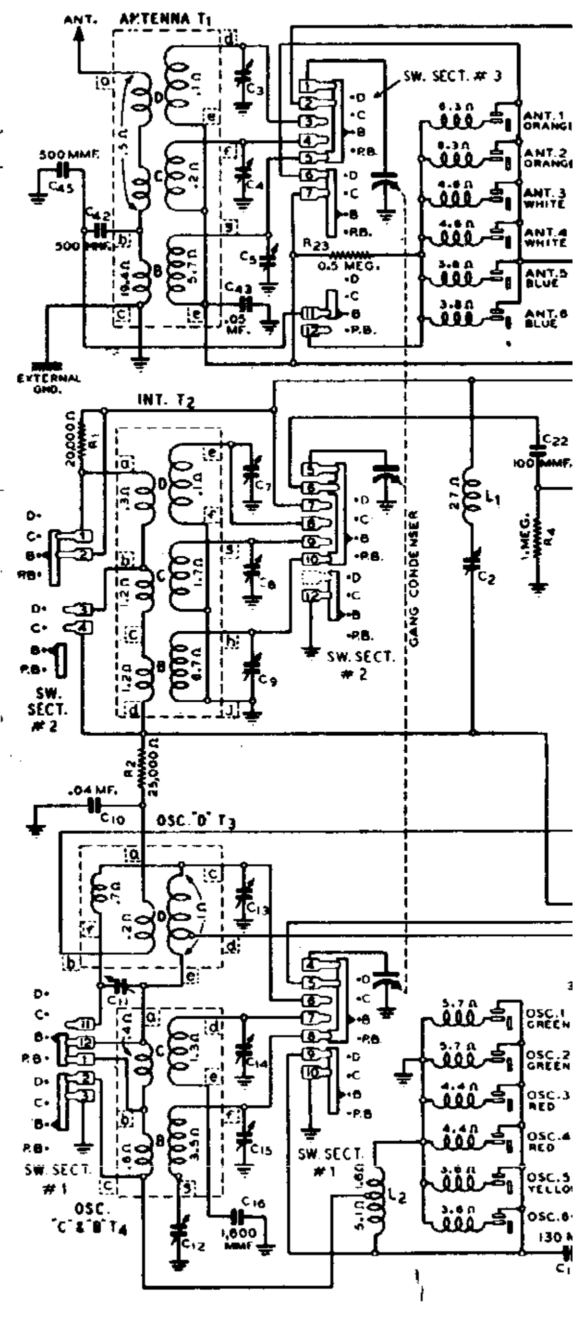
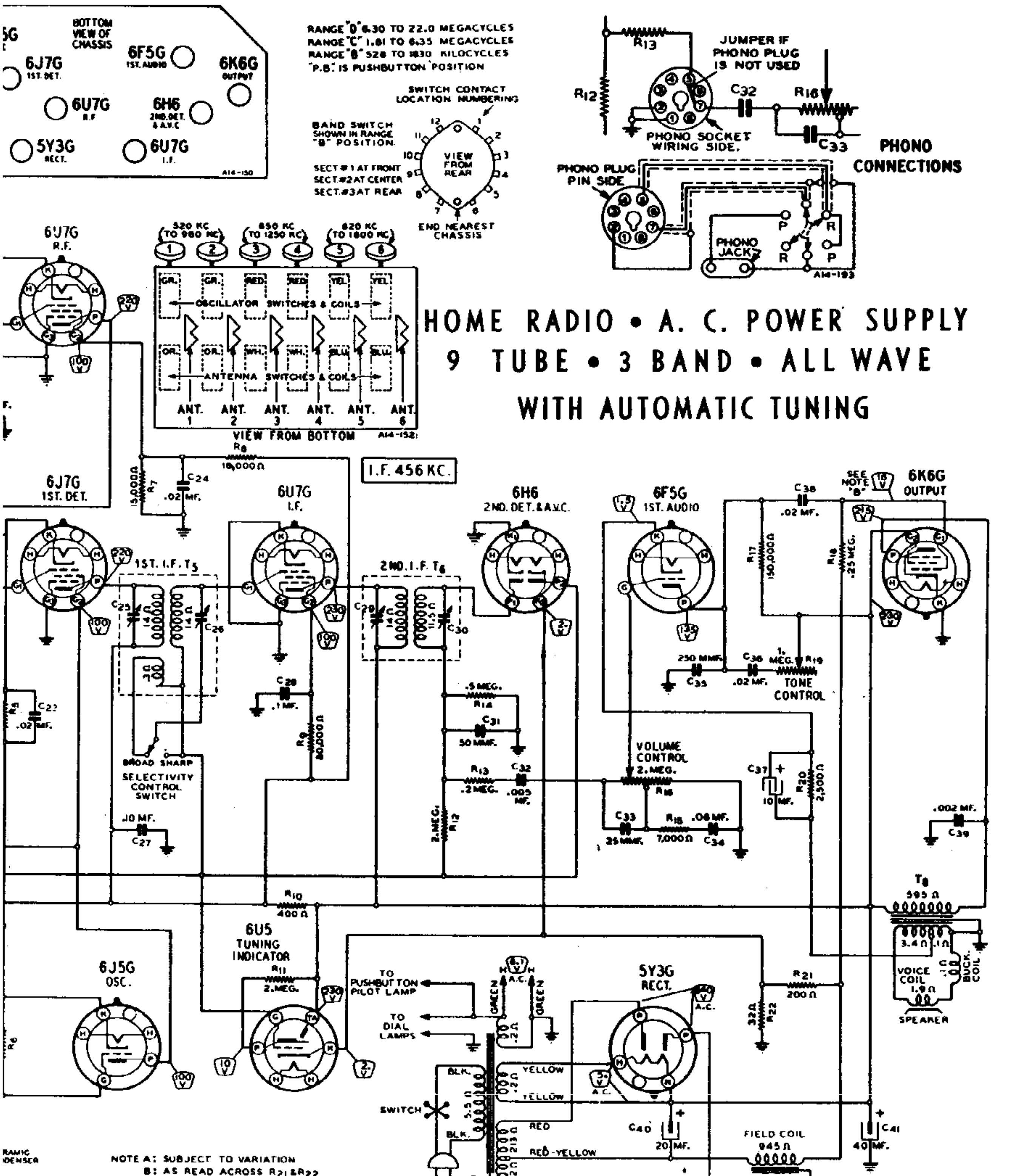


Fig. 3—Sc

MODEL D689
Schematic, Voltage, Coils
Socket, Sensitivity

'TO SUPPLY CO.

HOME RADIO • A. C. POWER SUPPLY
9 TUBE • 3 BAND • ALL WAVE
WITH AUTOMATIC TUNING



Circuit Diagram—Issue No. 2

MAY, 1938

MODEL D689
Circuit, Tuner Data
Changes, Phono. Data

WESTERN AUTO SUPPLY CO.

Circuit

This model is a 3 band A.C. operated radio with a 6 button inductive type automatic tuning system.

A 4 position rotary switch is used to switch the tuning circuits from automatic (push button) tuning to any of the 3 manual tuning ranges (one broadcast and 2 short wave ranges).

In MANUAL TUNING, an R. F. antenna transformer with tuned secondary is used before the 6U7G R. F. tube. The output of this tube is fed through another R. F. transformer with tuned secondary into the 6J7G 1st detector tube. A 6J5G tube functions as a separate oscillator. The antenna, interstage, and oscillator circuits are tuned by sections of the gang condenser.

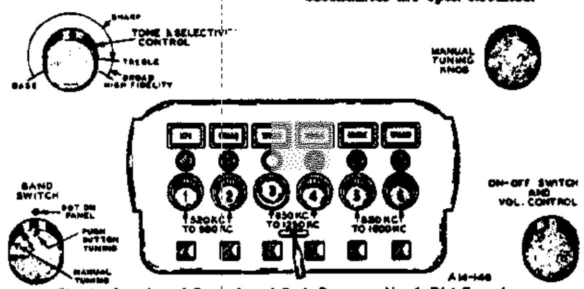


Fig. 1—Location of Controls and Push Buttons—No. 9 Dial Escutcheon

In AUTOMATIC TUNING, the gang condenser is not used. A single tuned circuit is used before the R. F. tube while a stage of resistance coupling is employed between this tube and the 1st detector. The other automatic tuned circuit is the oscillator grid circuit. Tuning of the R. F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil.

The iron cores within the automatic tuning antenna and oscillator coil forms are secured to a brass rod. This rod is moved back and forth by a screw at the front of the radio.

Alignment between the oscillator and antenna automatic tuning coils is obtained by changing the antenna (rear) coil position while the iron core remains stationary.

Now, to describe the connections for one MANUAL TUNING range: Let us assume that the rotary band switch is turned to the range B position. The antenna transformer B band secondary is connected to the R. F. tube grid circuit. The antenna transformer C and D band secondaries are open circuited.

In issue No. 1 sets, if any automatic tuning button is depressed, the automatic tuning antenna coil corresponding to that button is short circuited. In issue No. 2 sets, the connection between the antenna circuit and the automatic tuning antenna coils is open circuited by the band switch.

The interstage transformer B band secondary is connected to the 1st detector tube grid circuit. The interstage transformer C and D band secondaries are open circuited.

The oscillator B band grid coil is connected to the grid circuit of the oscillator tube. The oscillator B band cathode coil is connected to ground. The oscillator C and D band grid coils are open circuited. If any automatic tuning button is depressed, the automatic tuning oscillator coil corresponding to that button is short circuited.

In like manner, to describe the connections for one AUTOMATIC TUNING circuit, assume that the band switch is in the push button position and button number 1 is depressed.

In issue No. 1 sets, the antenna circuit is connected to the R. F. tube grid circuit through the band switch. The antenna circuit is also connected to the antenna No. 1 automatic tuning coil through Ant. 1 switch. The antenna No. 1 coil is tuned by fixed condenser C19.

In issue No. 2 sets, the antenna circuit is connected to the automatic tuning antenna coils through the band switch. The antenna No. 1 automatic tuning coil is connected to the R. F. tube grid circuit through the Ant. 1 switch. Antenna No. 1 coil is tuned by condensers C44 and C45.

In both issues, the connections from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R1 to the B+ circuit. It is also connected through coupling condenser C22 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

The oscillator cathode circuit is connected through the tap on tracking coil L2 to ground. This tracking coil is connected through the band switch to the control grid circuit of the oscillator tube. It is also connected to oscillator No. 1 coil through the Osc. 1 switch. The tracking or oscillator grid coil is tuned by fixed condenser C17 and the inductance of oscillator coil No. 1.

One stage of I. F. amplification is employed using a 6U7G tube. An expander is used in the 1st I. F. transformer for high fidelity reception.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R. F. and I. F. tubes.

Across the volume control resistor R16 is a filter composed of condensers C33 and C34 and resistor R15. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6F5G A. F. tube. The output of this tube is fed through resistance coupling into the 6K6G output tube.

A dynamic reproducer is employed.

Degeneration or negative feedback is used in the audio amplifier. A portion of the voltage developed across the secondary of the output transformer is fed back into the cathode circuit of the 1st audio tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

The power unit uses a 5Y3G full wave rectifier. A 6U5 tuning indicator tube is employed.

General Service Data

Issue Number

The last digit of the number on the chassis number label identifies the radio as to the issue number.

Issue No. 1

Mechanical Assembly—The station button plunger has a length of 6 5/16 inches.

The locking plate for the station button plungers has 2 swivel tabs which fit into slots in the rear bracket of the tuner assembly—See Fig. 8.

Electrical Assembly—The schematic circuit diagram (Fig. 3) is that of issue No. 2 sets. The partial schematic illustration (Fig. 4) shows the sections of the issue No. 1 circuit which differ from the issue No. 2 circuit.

The A. V. C. voltage is applied directly to the R. F. tube grid circuit through a resistor.

Wave trap (L1 and C2) is in the antenna circuit.

Lugs 11 and 12 of band switch section No. 3 are used to connect a pilot lamp when the rotary band switch is in the automatic tuning (push button) position.

Issue No. 2

Mechanical Changes—The station button plunger has a length of 7 5/16 inches.

The locking plate for the station button plungers has been re-designed and now employs 2 side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by 2 screws—See Fig. 7.

Electrical Changes—The schematic circuit diagram (Fig. 3) is that of issue No. 2 sets.

The A. V. C. is fed into the R. F. tube grid circuit through the manual and the automatic tuning antenna coils.

The wave trap is in the R. F. tube plate circuit.

Lugs 11 and 12 of band switch section No. 3 are used to open the connection between the antenna circuit and the automatic tuning antenna coils.

The following changes are made to bring about the change mentioned above in the A. V. C. circuit:

C43 is inserted between the secondary of the antenna transformer and ground to isolate the A. V. C. from ground. C21 is replaced by C43. R23 is added to isolate the automatic tuning coils from the manual tuning coils. C1 is replaced by C42 and C45 in the automatic tuning coil circuit. R3 and C20 are removed from the R. F. tube grid circuit. C19 is replaced by C44 in the automatic tuning coil circuit.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 3. On the top of the chassis base and between the 6H6 and 6F5G tube sockets is a round knockout opening 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made —See Fig. 3.

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

CONDENSERS

TUBULAR

ELECTROLYTIC

MOLDED

TRIMMER

MODEL D705, Issues 1 to 6
Socket, Specifications
Notes

WESTERN AUTO SUPPLY CO.

MODEL D705, Issue 1
Schematic, Voltage

Power Output - - - - - - 8.5 Watts Undistorted, 11.0 Watts Maximum

Selectivity - 32 KC Broad at 1000 times Signal (Sharp)

Sensitivity

B Range (Manual Tuning)	2.0 Microvolts Average
B Range (Automatic Tuning)	2.0 Microvolts Average
C Range	2.0 Microvolts Average
D Range	4.0 Microvolts Average

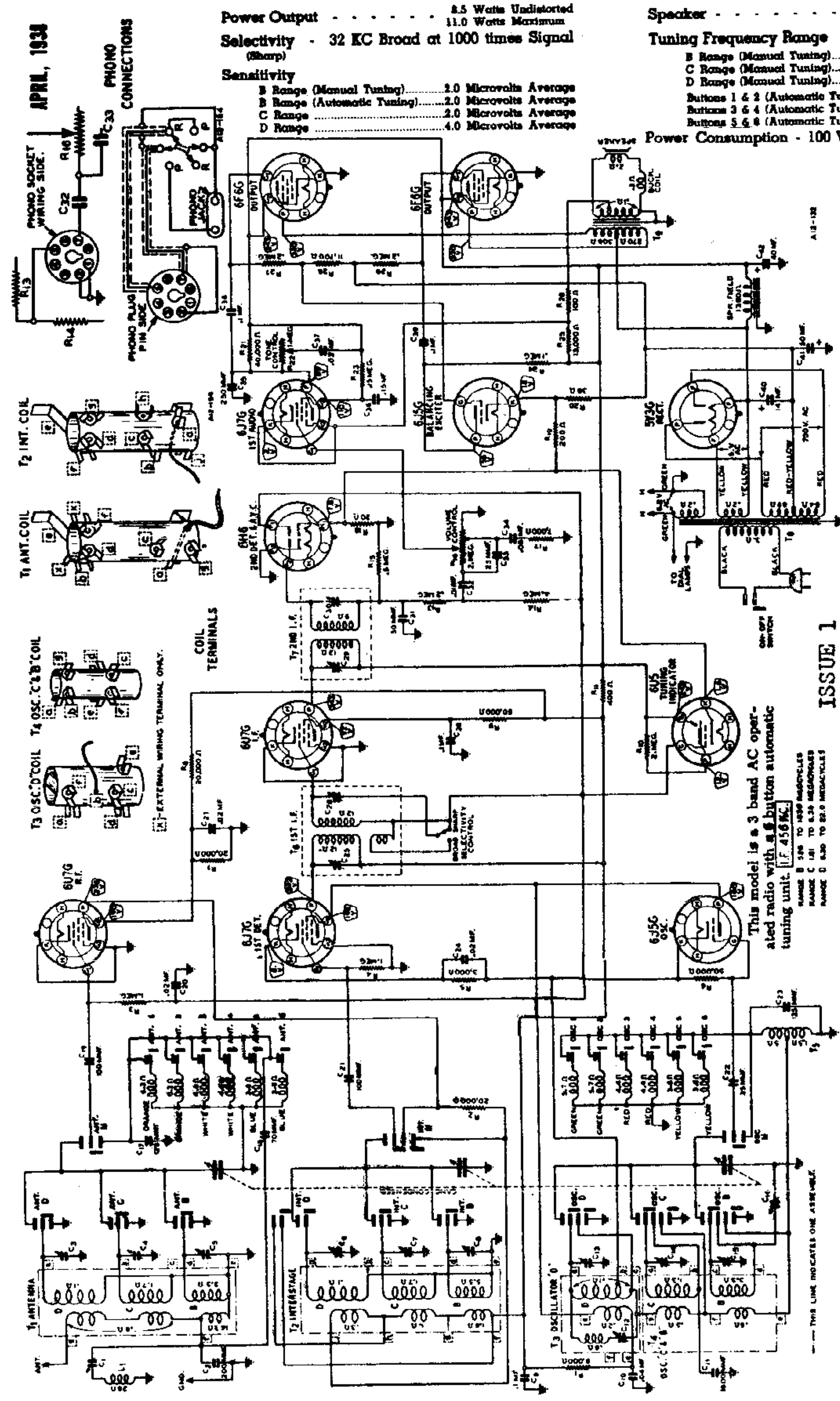
Speaker - - - - - - - - - - 12" Dynamic

Tuning Frequency Range

B Range (Manual Tuning)	528	to	1630 KC
C Range (Manual Tuning)	1610	to	6350 KC
D Range (Manual Tuning)	6800	to	22000 KC
Buttons 1 & 2 (Automatic Tuning)	520	to	980 KC
Buttons 3 & 4 (Automatic Tuning)	650	to	1250 KC
Buttons 5 & 6 (Automatic Tuning)	820	to	1600 KC

Power Consumption - 100 Watts (At 117 volts 60 cycles)

APRIL, 1938



This model is a 3 band AC operated radio with a 6 button automatic tuning unit. I.F. 456 KC.

ISSUE 1

Readings taken with 1000 ohm-per-volt meter.
The voltage between the control grids of the 6J5G balancing exciter and the 6F6G output tubes and ground is 22. This voltage cannot be read at the socket terminal because of the high resistance circuit, but can be read across resistors R18, 19, and 20.

Oscillation on D Band

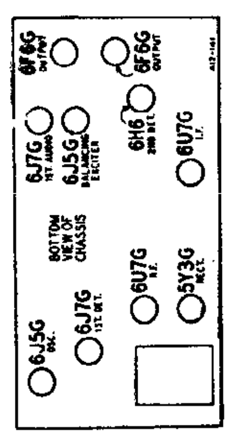
If oscillation is encountered on the D band, change the oscillator grid resistor to 35,000 ohms.

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

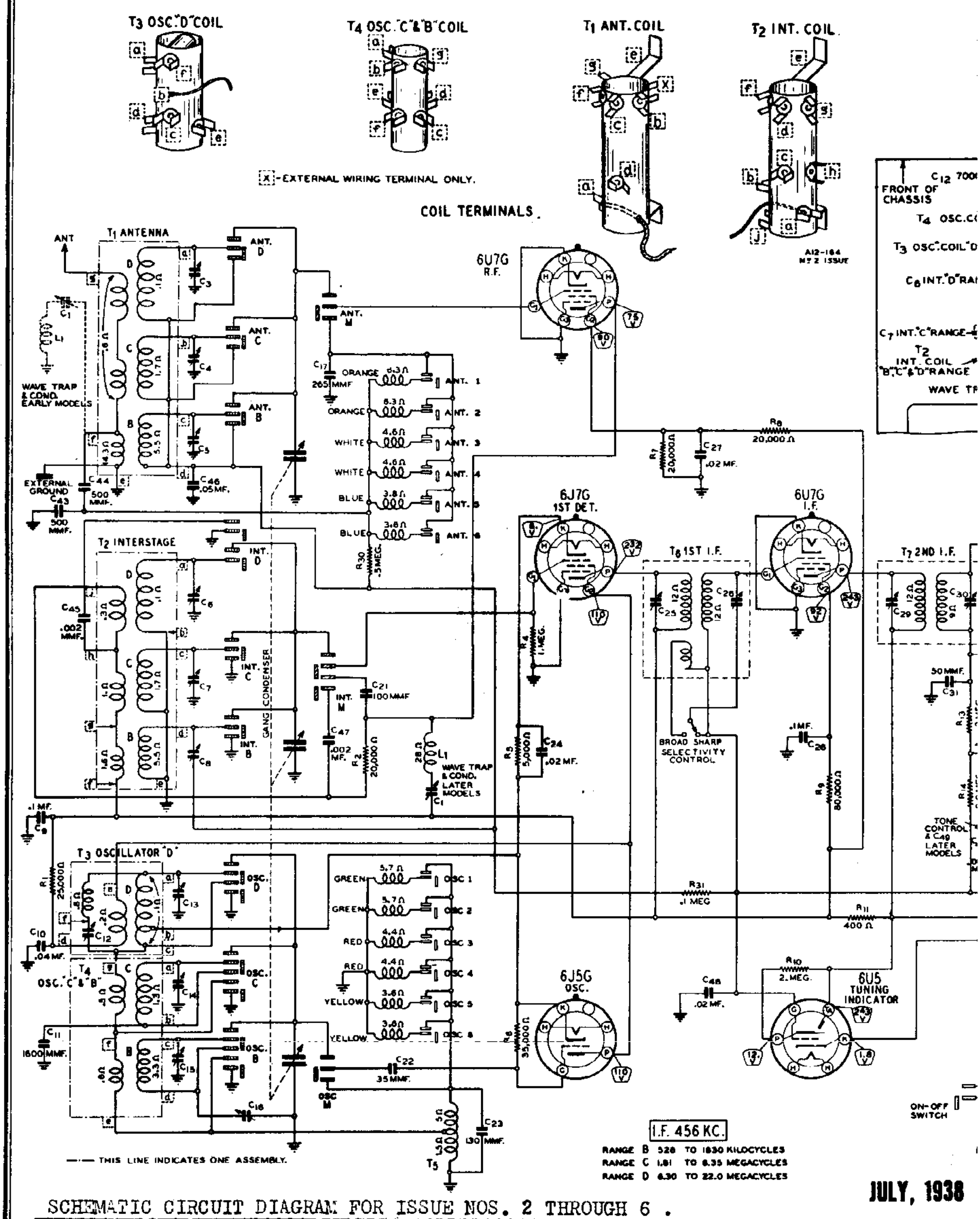
Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.
These voltages are read under the following conditions:
Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.



MODEL D705
Issues 1 to 6 incl.
Distortion Notes

WESTERN A



JULY, 1938

SCHEMATIC CIRCUIT DIAGRAM FOR ISSUE NOS. 2 THROUGH 6 .

MODEL D705
Issues 2 to 6 incl.
Schematic, Voltage, Coils
Trimmers, Changes

ISSUE NUMBER CHANGES

The last digit of the number on the chassis number label identifies the radio as to the issue number.

ISSUE NO. 1

The information (see notes for issue 1) with the exception of the Replacement Parts List and Schematic Circuit Diagram, applies with minor changes to all chassis issues, 1 through 6. The Replacement Parts List and Schematic Circuit Diagram, however, apply only to No. 1 issue chassis.

ISSUE NOS. 2 and 3

MECHANICAL CHANGES -- The station button plunger has a length of 7-3/16 inches.

The locking plate for the station button plungers has been redesigned and now employs two side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by two screws.

FOR THE FOLLOWING ELECTRICAL CHANGES REFER REFER TO SCHEMATIC ON THIS PAGE.

ELECTRICAL CHANGES -- The AVC voltage is fed to the grid of the R.F. tube through the manual and automatic tuning coils. Formerly, it was applied directly to the grid of the R.F. tube through a 1 Megohm resistor.

The operating voltages of several of the tubes have been changed. Correct values are shown on the schematic in this supplement.

ISSUE NOS. 4 and 5

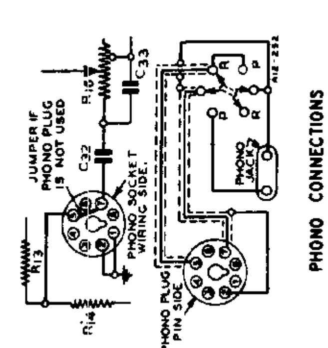
MECHANICAL CHANGES -- The antenna coil (T1) and Wave Trap Coil (L1) have been moved from the top of the chassis base to a position just in back of the band switch underneath the chassis base.

The Wave Trap Trimmer (C1) has been moved from its former position near the 1st I.F. Transformer (T6) to a position near the 6U7G R.F. tube.

ELECTRICAL CHANGES -- The Wave Trap Coil (L1) and Trimmer Condenser (C1) have been removed from the antenna circuit and are now connected in the interstage circuit.

ISSUE NO. 6

ELECTRICAL CHANGES -- The Tone Control, formerly in the 1st audio plate has been put in the diode circuit. A 1 Megohm Tone Control (R22) and a .02 mf. (C37) condenser were used in the audio plate. A 3 Megohm Tone Control (R32) and a .001 mf. (C49) condenser are used in the diode circuit.



PHONO CONNECTIONS

DISTORTION (ALL ISSUES NOS. 1 THROUGH 6)

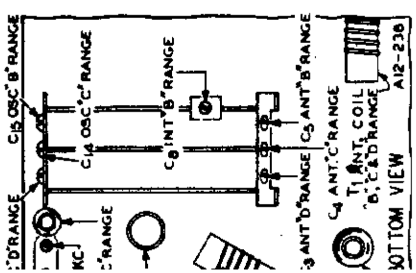
If mushy reproduction is encountered on a medium or strong signal after the radio has been turned on for about ten minutes, it probably is due to grid current in the 6U7G R.F. and I.F. tubes.

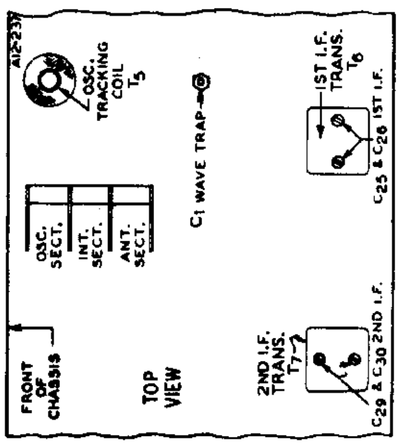
Change the 4 megohm resistor R14 to a 2 megohm resistor and if this does not clear up the reproduction replace either the 6U7G R.F. or I.F. tubes or both of them.

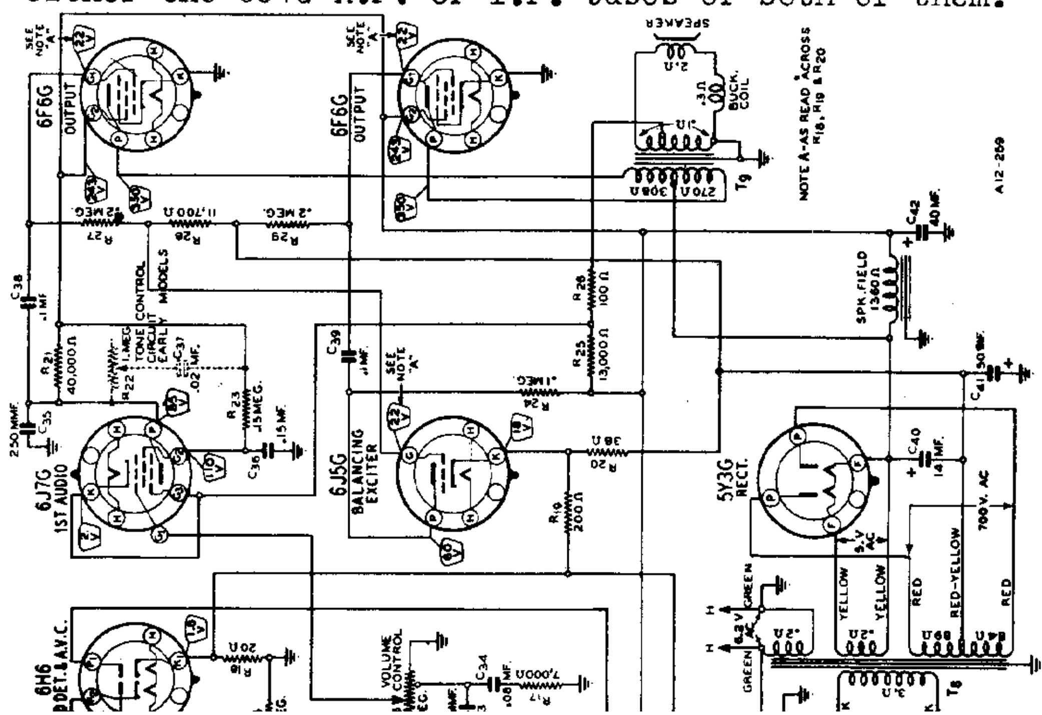
) SUPPLY CO.

HANGES IN LATER PRODUCTION

Mechanical and electrical changes have n made in the later productions, includ- several new dials. Changes and parts ts of Issues 2 to 6 are given herewith.







)CKET LAYOUT: SEE ISSUE NO.1 SOCKET LAYOUT.

MODEL D705, Issues 1 to 6
Alignment, Trimmers

WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BUTTON DEPRESSED	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C29) & (C30)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C25) & (C26)
RANGE B					
1830 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C5) Int. Range B (C8)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C16) Rock Rotor—See Note B
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C	Wave Trap (C1) Adjust for MINIMUM Output
RANGE C					
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C4) Int. Range C (C7)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Int. Range D (C6) Rock Rotor—See Note B
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C12). Rock Rotor—See Note B
PERMEABILITY TUNING UNIT				TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D
700 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
700 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
1100 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
1100 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

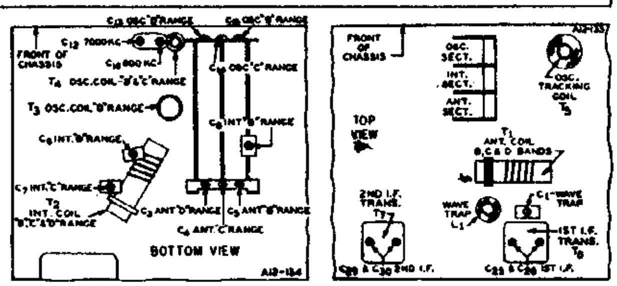


Fig. 1—Location of Trimmers

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

Circuit

Ten buttons are provided on the front panel. Three buttons actuate linear band switches for a broadcast and 2 short wave manual tuning ranges. Six buttons actuate switches which connect fixed tuned circuits for automatic tuning. Depressing any of the 9 band and automatic tuning buttons also turns on the radio. Depressing the 10th button will turn the radio to the off position.

The band switch has 4 arms as shown in Fig. 5, one each for the B, C, and D bands (broadcast, 1st and 2nd short wave, respectively) and one called the "Master" arm. The master arm switches from manual to automatic tuning and vice versa. This arm is actually over the other 3 arms rather than in back of them, as shown in the illustration. Depressing any of the B, C, or D band buttons actuates the arm for that band and also the master arm. The latter is in only when one of the 3 band switch buttons is depressed.

In manual tuning, an R. F. antenna transformer with tuned secondary is used before the 6U7G R.F. tube. The output of this tube is fed through another R. F. transformer with tuned secondary into the 6J7G 1st detector tube. A 6J5G tube functions as a separate oscillator. The antenna, interstage, and oscillator circuits are tuned by sections of the gang condenser.

In automatic tuning, the gang condenser is not used. A single tuned circuit is used before the R. F. tube while a stage of resistance coupling is employed between this tube and the 1st detector. The other automatic tuned circuit is the oscillator grid circuit. Tuning of the R. F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil.

The iron cores within the automatic tuning antenna and oscillator coil forms are secured to a brass rod. This rod is moved back and forth by a screw at the front of the radio.

Alignment between the oscillator and antenna automatic tuning coils is obtained by changing the antenna (rear) coil position while the iron core is held in place on the shaft.

In the schematic, the band switch and the automatic tuning switch are broken into sections each of which is given a name that is, to some extent, descriptive of its location in the circuit. Ant. D, for example, completes the antenna coil D band connections when the D range button is depressed. The location of the Ant. D connections on the band switch is shown in Fig. 5. All of the switches have only 2 positions. In the schematic, they are in the normal or button out position.

Now, to describe the connections for one manual tuning range: Let us assume that the B band button is depressed. The antenna transformer B band secondary is connected to the R. F. tube grid circuit through the Ant. B and Ant. M sections of the B band and master switch arms. The antenna transformer C and D band secondaries are short circuited.

The interstage transformer B band secondary is connected to the 1st detector tube grid circuit through the Int. B and Int. M sections of the switch arms mentioned above. The interstage transformer C band secondary is short circuited and the D band secondary is open circuited.

The oscillator B band grid coil is connected to the grid circuit of the oscillator tube through the Osc. B and Osc. M sections of the same switch arms as mentioned above. The oscillator B band cathode coil is connected to ground through the Osc. B section. The oscillator C and D band grid coils are short circuited.

The permeability tuning coils are open circuited.

In like manner, to describe the connections for one automatic tuning circuit, assume that button number 1 is depressed.

The antenna circuit is connected to the R. F. tube grid circuit through the Ant. M section of the master switch arm. The antenna circuit is also connected to the antenna No. 1 permeability coil through Ant. 1 switch. The antenna No. 1 coil is shunted by fixed condenser C17. The connections from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R2 to the B+ line. It is also connected through coupling condenser C21 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

The oscillator cathode circuit is connected through the tap on tracking coil T5 to ground. This tracking coil is connected through the Osc. M switch section to the control grid circuit of the oscillator tube. It is also connected to oscillator No. 1 coil through the Osc. 1 switch section. The tracking or oscillator grid coil is tuned by fixed condenser C23 and the inductance of oscillator coil No. 1.

One stage of I. F. amplification is employed using a 6U7G tube. An expander is used in the 1st I. F. transformer for high fidelity reception.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R. F. and I. F. tubes.

Across the volume control resistor R16 is a filter composed of condensers C33 and C34 and resistor R17. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7G 1st A. F. tube. The output of this tube is fed through resistance coupling into the 6F6G output tube immediately to the right of it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6J5G balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6G output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

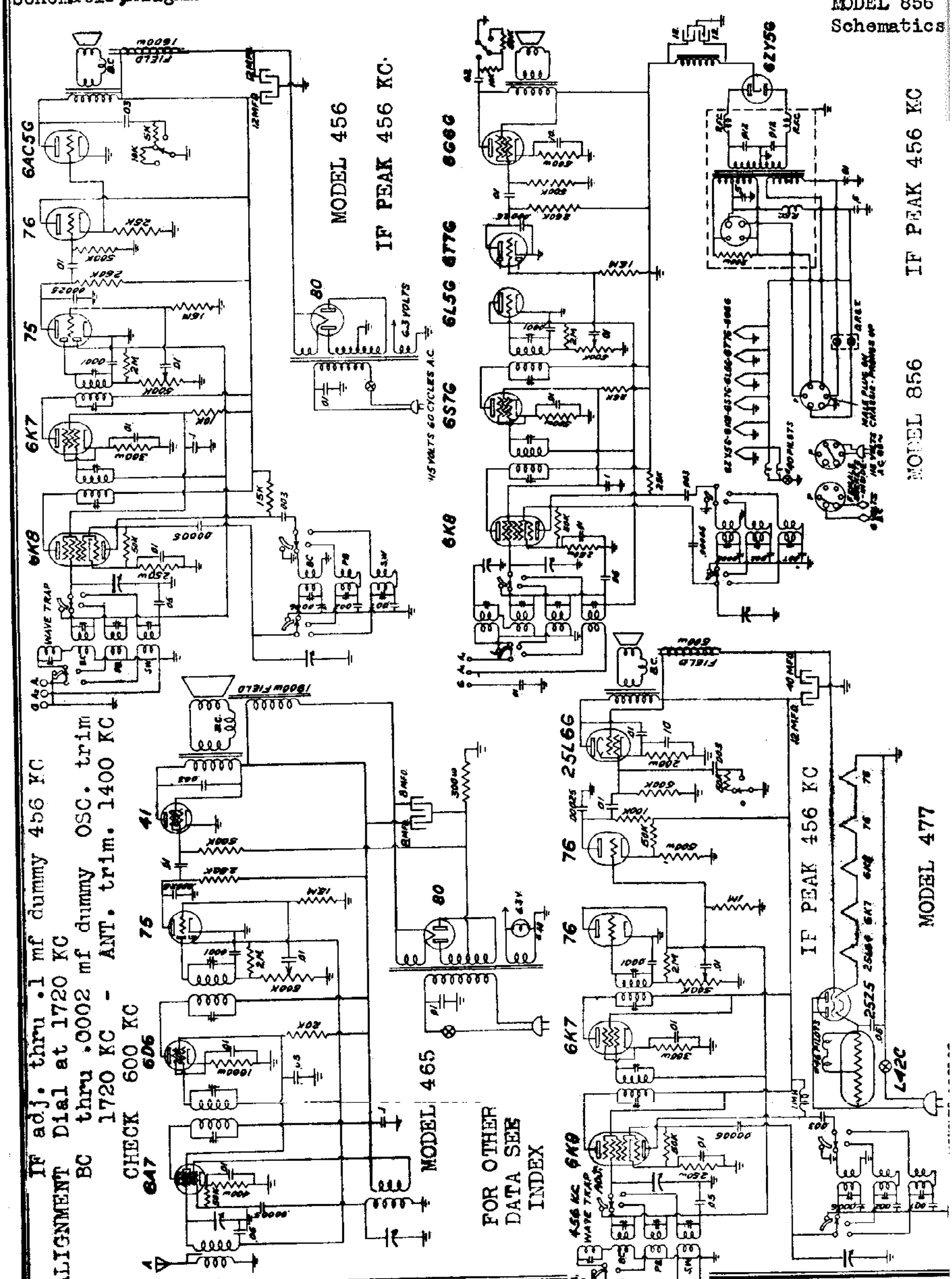
Degeneration or negative feedback is used in the audio amplifier. A portion of the voltage developed across the secondary of the output transformer is fed back into the cathode circuit of the 1st audio tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

The power unit uses a 5Y3G full wave rectifier. A 6U5 tuning indicator tube is employed.

MODEL 465
Schematic, Alignment

ULTRAMAR MFG. CORP.

MODEL 456
MODEL 477
MODEL 856
Schematics

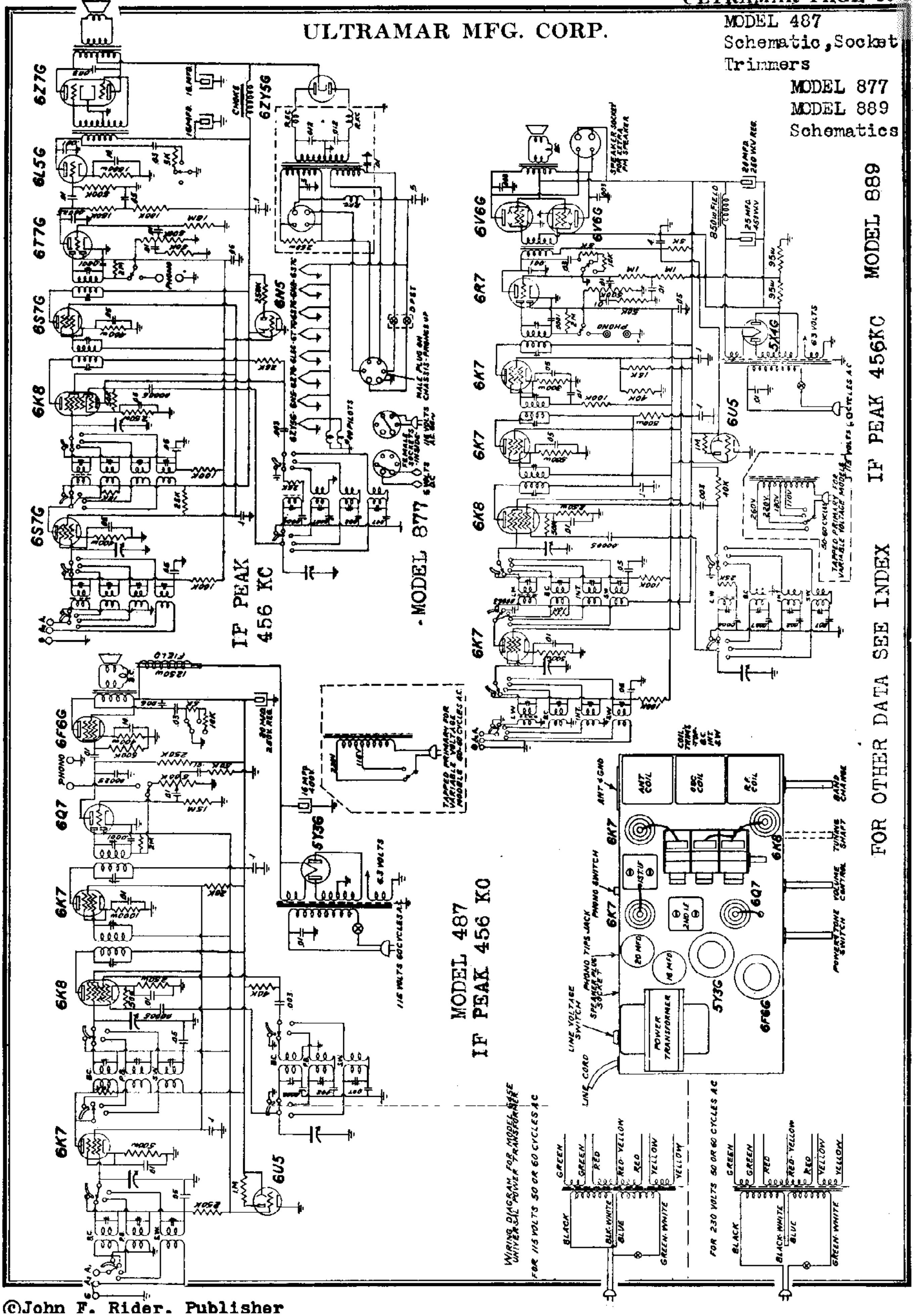


ALIGNMENT IF adj. thru .1 mf dummy 456 KC
Dial at 1720 KC
BC thru .0002 mf dummy OSC. trim
1720 KC - ANT. trim. 1400 KC
CHECK 600 KC

FOR OTHER DATA SEE INDEX

ULTRAMAR MFG. CORP.

MODEL 487
Schematic, Socket
Trimmers
MODEL 877
MODEL 889
Schematics



MODELS 306,316
Schematic,Socket
Trimmers,Alignment
MODEL 487 MODEL 465
Alignment Tuner Data

ULTRAMAR MFG. CORP.

MODEL 456 MODEL 477
MODEL 856 MODEL 877
MODEL 889
Alignment,Tuner

MODELS 877 & 889

TECHNICAL INSTRUCTIONS

A good output meter should be used in all alignment adjustments.

I. F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the radio chassis, and the other thru a .1 mfd. condenser to the grid cap of the 6K8, with the tube's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I. F. trimmers for maximum output, decreasing the generator output as the radio output increases.

LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna, to the "A" terminal, with the metal strip connected across A and G. Set the dial and generator to 362 K. C. and adjust the oscillator trimmer for maximum output. Align the L.W., R.F. and antenna trimmers at 320 K.C.

Align the L.W. oscillator padder at 200 K.C. by adjusting the dial and padder together. Check the alignment again at 320 K.C.

BROADCAST BAND ALIGNMENT

Using the .0002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. for maximum output. Align the R.F. and antenna trimmers at 1400 K.C. Align the B.C. oscillator padder at 600 K.C. by adjusting the dial and padder together. Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

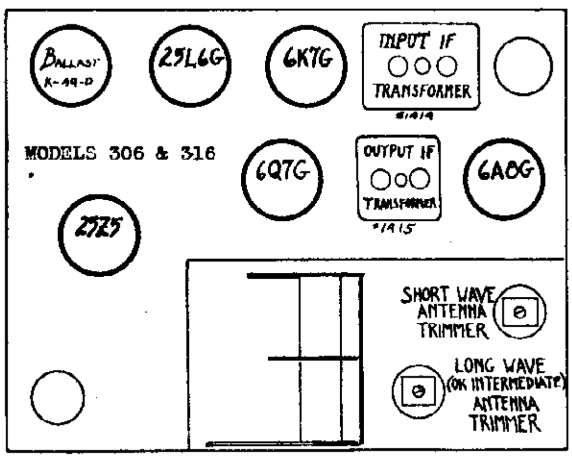
Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C.

Check for alignment at 2.2 M.C.

SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C., and the R.F. and Antenna trimmers at 22 M.C.

Check for alignment at 8 M.C.



MODELS 487, 456, 477, & 856

TECHNICAL INSTRUCTIONS

A good output meter should be used in all alignment adjustments

I. F. ALIGNMENT

From a good signal generator connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8, with the set's grid lead still in place. Set the radio dial to 1720 kilocycles and the signal generator to 456 K.C. With the set's volume control "full on," increase the generator output until the signal is heard in the radio speaker. Adjust I. F. trimmers for maximum output, decreasing the generator output as the speaker output increases.

B. C. ALIGNMENT

1. Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1720 K.C. and adjust the B.C. oscillator trimmer for maximum output.
2. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. R.F. and ANT. trimmers for maximum output.
3. Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C., and adjust the B.C. oscillator padder for maximum output by adjusting dial and pad together.

Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

Connect the signal generator lead thru a 400 ohm resistor as dummy antenna to A1. Set the dial and generator to 6700 K.C. and adjust the P.B. oscillator trimmer for maximum output. Adjust the R.F. and ANT. trimmers at 6000 K.C. and check for alignment at 2200 K.C.

SHORT WAVE ALIGNMENT

Still using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. on dial and generator. Adjust the R.F. and ANT. trimmers at 22 M.C. and check for alignment at 8. M.C.

MODELS 456, 465, 477, 856, 877 & 889

PUSH BUTTON OPERATION

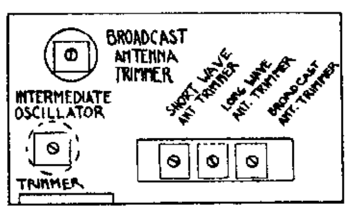
Six Push Button Station Selectors are incorporated in this receiver. Each button may be adjusted to select any station or frequency in the Broadcast Band. To adjust each button, perform the following operations:

1. Tune in a desired station with the Selector knob.
2. Twist the Push Button you want set up for this station, to the left about one full turn to loosen the mechanism.
3. Push this button in as far as it will go, while still holding the Selector knob firmly so the station will not be detuned.
4. With the button pressed all the way in, twist it to the right until it is tight and then release it.

Follow this procedure with the other five buttons, setting each for a different station.

Now, when any Push Button is pressed, the station for which that button is set, should appear perfectly tuned in. If it is not perfectly tuned, repeat the above procedure until satisfactory results are obtained.

Select the Call Letter Tabs to correspond to the stations the buttons are set for, and insert them in places provided above each button.



ALIGNMENT

ALIGN IF TRANSFORMERS AT 465 KILOCYCLES.

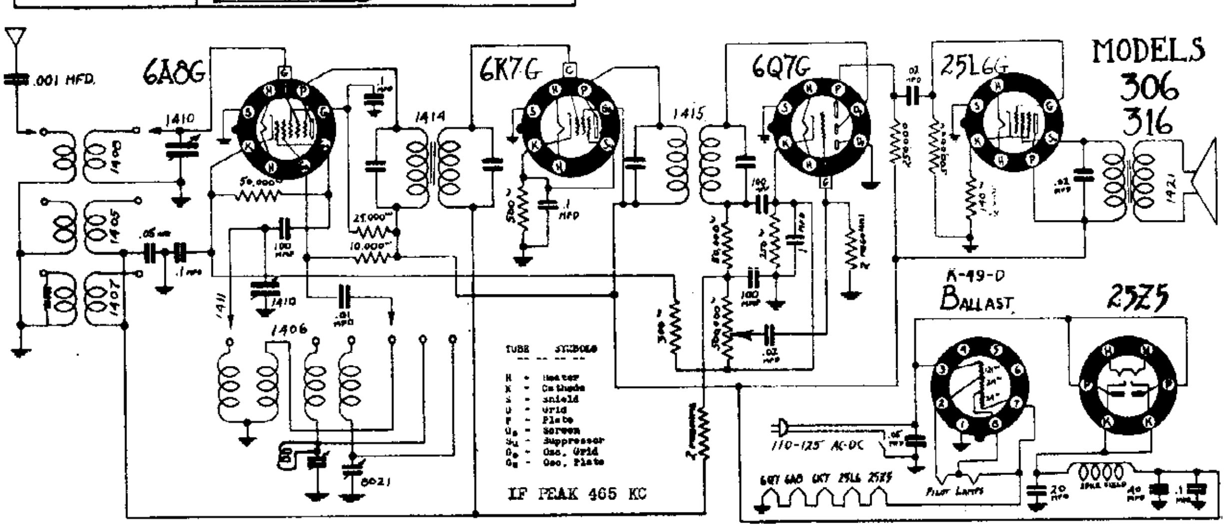
ALIGN BAND B AT 1600 KC - (21½ METERS) - BY ADJUSTING BC ANTENNA AND BC OSCILLATOR TRIMMERS. ADJUST BC PADDER AT 500 METERS.

ALIGN BAND A AT 20 METERS BY ADJUSTING SW ANTENNA AND SW OSCILLATOR TRIMMERS.

ALIGN BAND C FOR MODEL 306 AT 5 MEGACYCLES BY ADJUSTING INTERMEDIATE ANTENNA AND OSCILLATOR TRIMMERS FOR MAXIMUM RESPONSE.

ALIGN BAND C FOR MODEL 316 AT 900 METERS BY ADJUSTING LW ANTENNA AND OSCILLATOR TRIMMERS. ADJUST LW PADDER AT 1800 METERS.

MAKE ALL ADJUSTMENTS FOR MAXIMUM RESPONSE ON OUTPUT METER---USING SIGNAL GENERATOR.



MODEL R663 Delco
Schematic
Voltage

UNITED MOTORS SERVICE, INC.

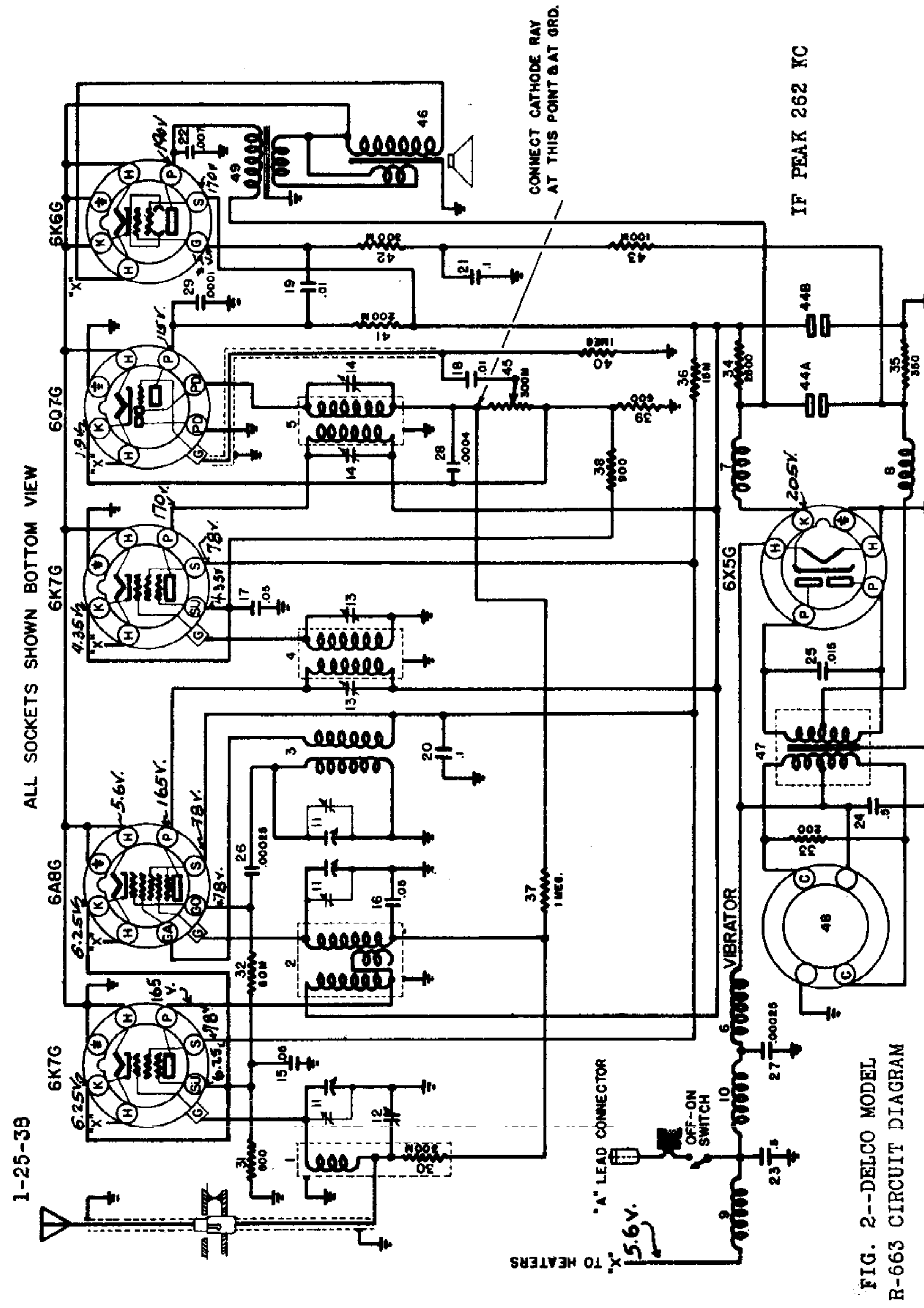


FIG. 2--DELCO MODEL R-663 CIRCUIT DIAGRAM

VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 5.6 AMPERES.
"B" SUPPLY DRAIN APPROX. 35 M.A.

MODEL R663 Delco
Socket, Trimmers
Alignment, Chassis

UNITED MOTORS SERVICE, INC.

MODELS R664 to R669
Alignment

ALIGNMENT FOR MODELS R663, R664, R665, R666, R667, R668, and R669.

NOTE:- FIGURE REFERENCES IN THE TEXT REFER TO FIGURES SHOWN WITH EACH MODEL.

1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect output meter from plate of { 6K6G (R663) / 6F6G (R664) / 6V6G (R665,6,7) / 6H7G (R668,9) } tube to ground.

(c) Set Signal Generator to exactly 262 kilocycles and turn volume control on full.

(d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

(e) Adjust trimmers A-B-C-D through the cut outs on the side of the chassis (Illus. 13 & 14, Fig. 4) carefully for maximum output.
(Model R-664, Illus. 12 & 13 Fig 4)

(f) Repeat adjustments of I-F trimmers A-B-C-D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 1530 Kilocycles

(a) Leave Signal Generator leads connected the same as for I-F adjustments.

(b) Turn tuning condenser plates all the way out and against high frequency stop.

(c) Set Signal Generator to exactly 1530 kilocycles and adjust oscillator trimmer "G" (Fig. 3) on middle section of condenser gang carefully for maximum output.

3. Aligning at 1400 Kilocycles

(a) Remove signal lead of Signal Generator from grid cap of 6A8G tube and connect to antenna terminal of receiver through a .0002 mfd. mica condenser.

(b) Set the Signal Generator to 1400 kilocycles and tune the receiver to this signal.

(c) Adjust the parallel trimmers "F" and "H" (Fig. 3) of the condenser gang carefully for maximum output. Do not disturb the 1530 kilocycle adjustment of the middle section of the condenser gang.

4. Aligning at 600 Kilocycles

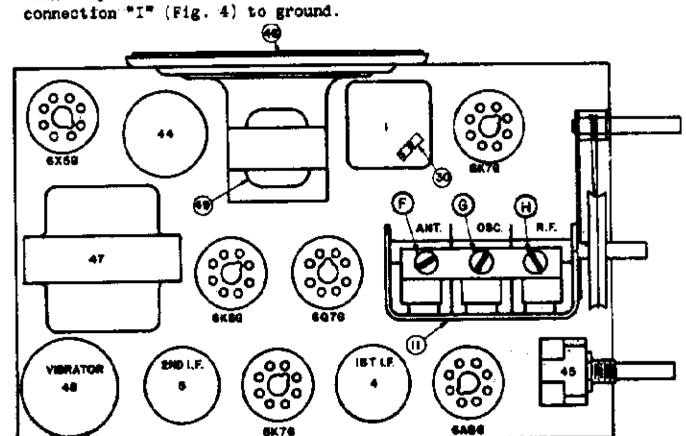
(a) Set Signal Generator to approximately 600 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

(b) Adjust trimmer "E" on Delco Syncro-Tuning condenser (Illus. 12, Fig. 4) located next to antenna receptacle on bottom of chassis, rocking gang condenser plates back and forth through the signal until maximum output is obtained. (It will be necessary to re-adjust this condenser to the car antenna upon installation of the set.) *(Model R664, Illus. 11, Fig 4)*

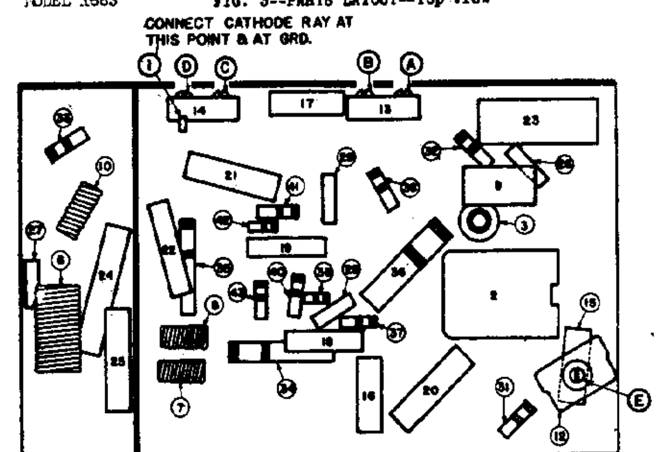
(c) Repeat adjustments made under--"Aligning at 1400 K.C."

5. Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray from connection "I" (Fig. 4) to ground.



MODEL R663 FIG. 3--PARTS LAYOUT--Top View



MODEL R663 FIG. 4--PARTS LAYOUT--Bottom View

MODEL R664 Delco
Schematic
Change

UNITED MOTORS SERVICE, INC.

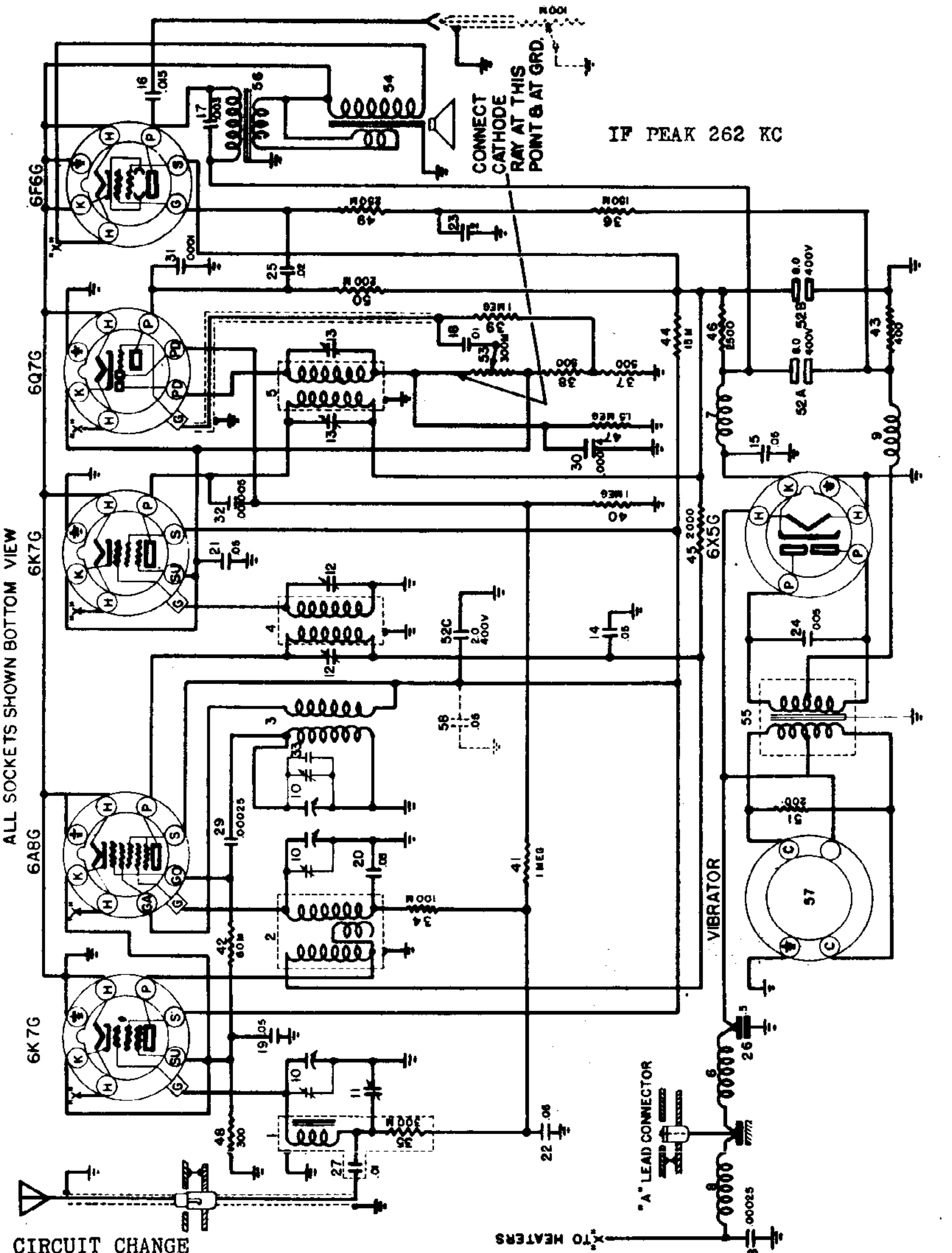


FIG. 2--DELCO MODEL R-664 CIRCUIT DIAGRAM

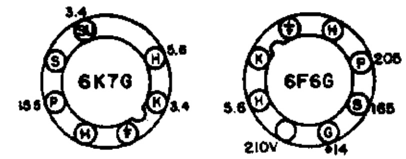
1-10-38

CIRCUIT CHANGE

Some sets were made with the 2 mfd. section of the electrolytic omitted (Illus. #52C) and Illus. #58 .05 mfd. 600 volt tubular condenser added. For replacement of electrolytic in these sets clip the green lead of replacement condenser.

MODELS R664 to R669
Voltages

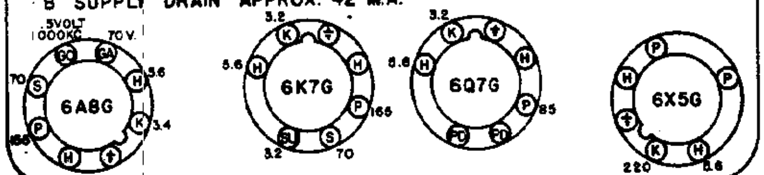
UNITED MOTORS SERVICE INC.



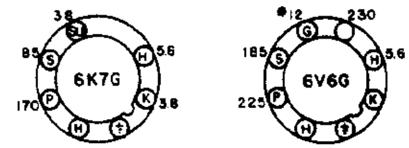
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000-Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.

CURRENT DRAIN WITHOUT SPEAKER 4.9 AMPERES
"B" SUPPLY DRAIN APPROX. 42 M.A.

DELCO R664



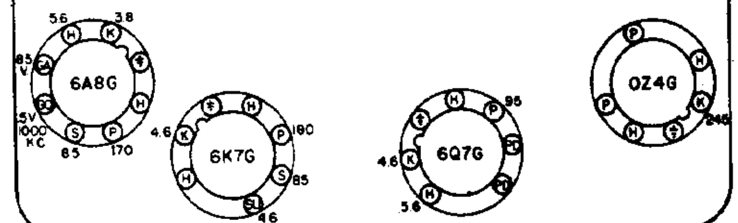
* THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 400 OHM RESISTOR (ILLUS. NO. 43) AND GROUND.



VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000-Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.

CURRENT DRAIN WITHOUT SPEAKER 4.9 AMPERES
"B" SUPPLY DRAIN APPROX. 42 M.A.

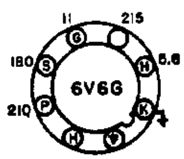
DELCO R665



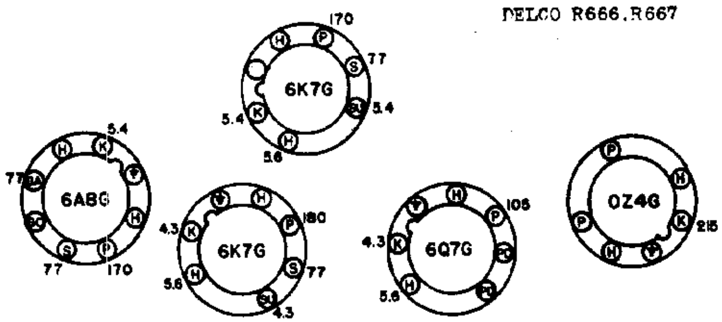
* THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 300 OHM RESISTOR (ILLUS. NO. 50) AND GROUND.

VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000-Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITHOUT SPEAKER 4.9 AMPERES.

"B" SUPPLY DRAIN APPROX. 42 M.A.

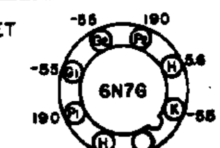


DELCO R666, R667

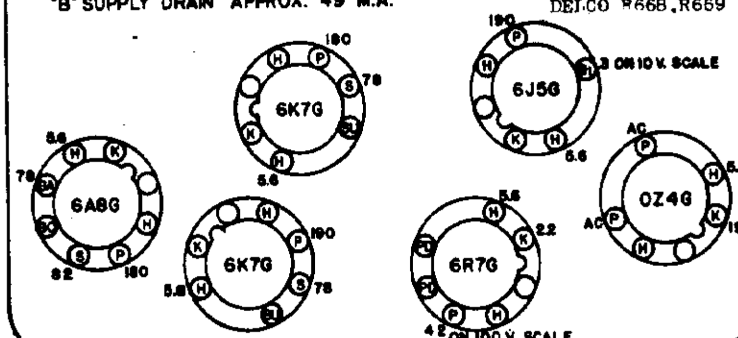


THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 300 OHM RESISTOR (ILLUS. NO. 53) AND GROUND.

VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000-Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITH SPEAKER 7 AMPERES
"B" SUPPLY DRAIN APPROX. 49 M.A.

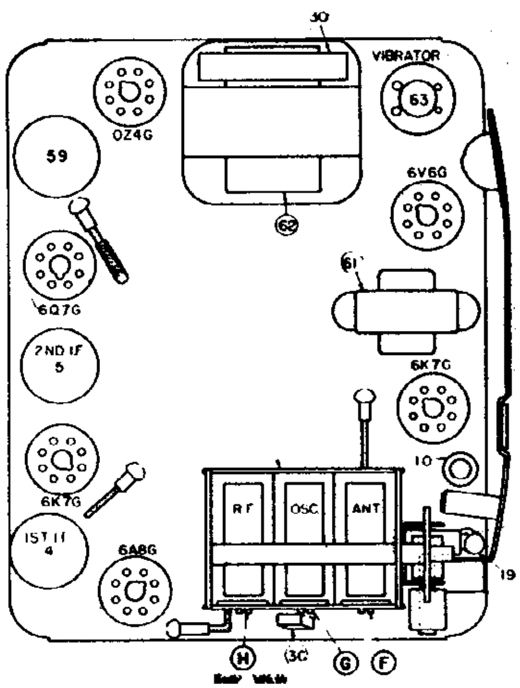


DELCO R668, R669

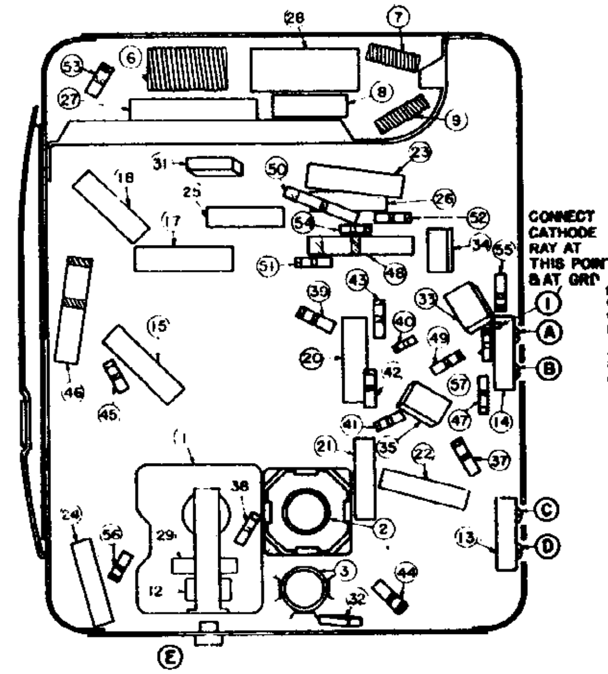


UNITED MOTORS SERVICE, INC.

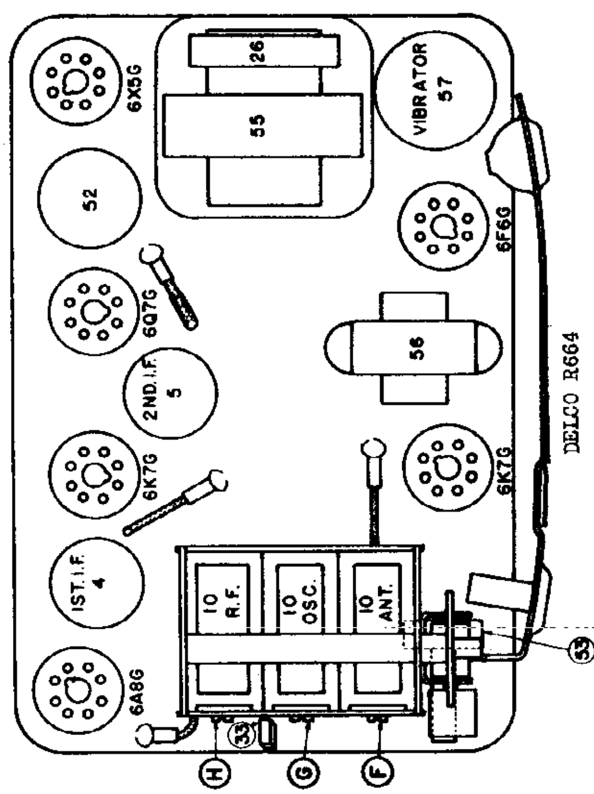
MODEL R664 Delco
MODEL R665 Delco
Socket, Trimmers
Chassis



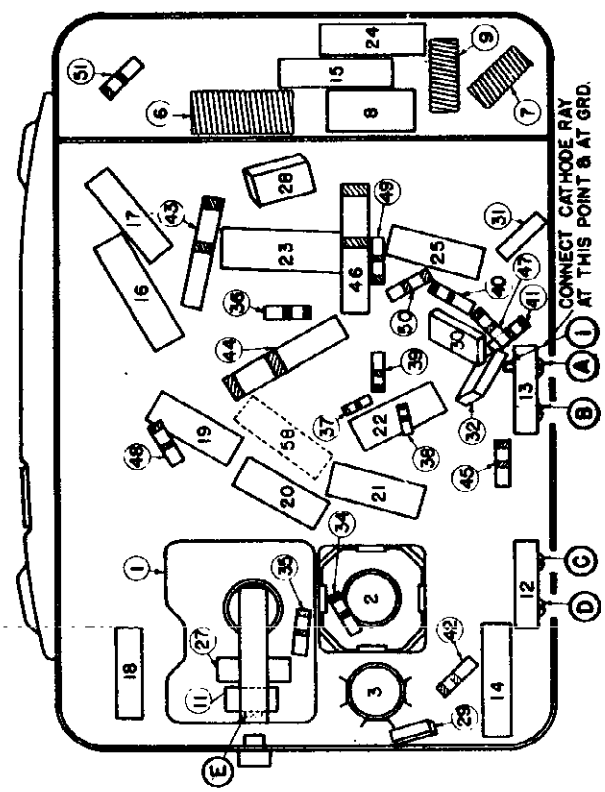
DELCO R665
FIG. 3--PARTS LAYOUT--Top View



DELCO R665
FIG. 4--PARTS LAYOUT--Bottom View



DELCO R664
FIG. 3--PARTS LAYOUT--Top View



DELCO R664
FIG. 4--PARTS LAYOUT--Bottom View

MODEL R665 Delco
Schematic

UNITED MOTORS SERVICE, INC.

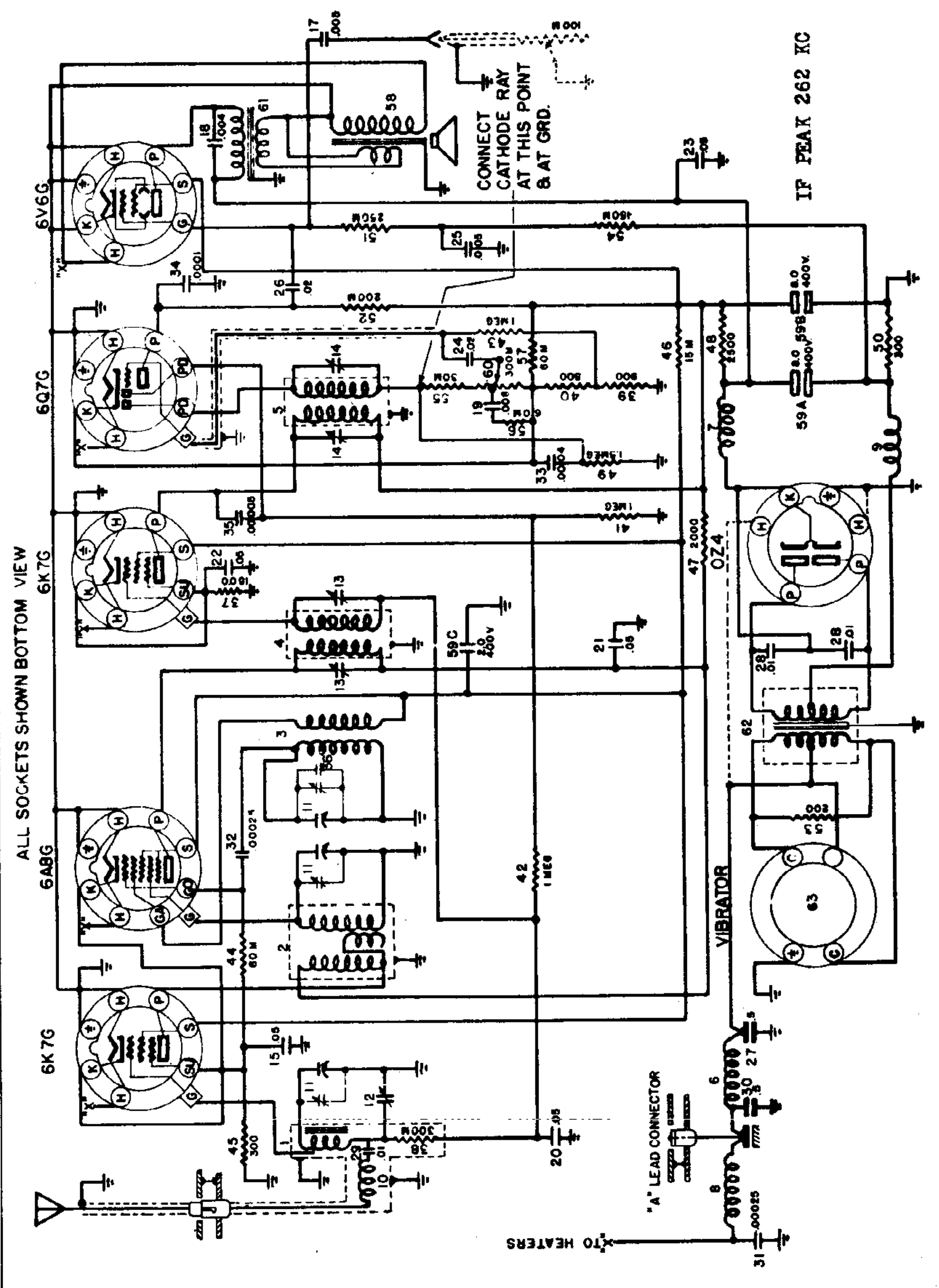


FIG. 2--DELCO MODEL R-665 CIRCUIT DIAGRAM

1-10-38

UNITED MOTORS SERVICE, INC.

MODELS R666,R667 Delco
Schematic,Socket,Change
Trimmers,Chassis

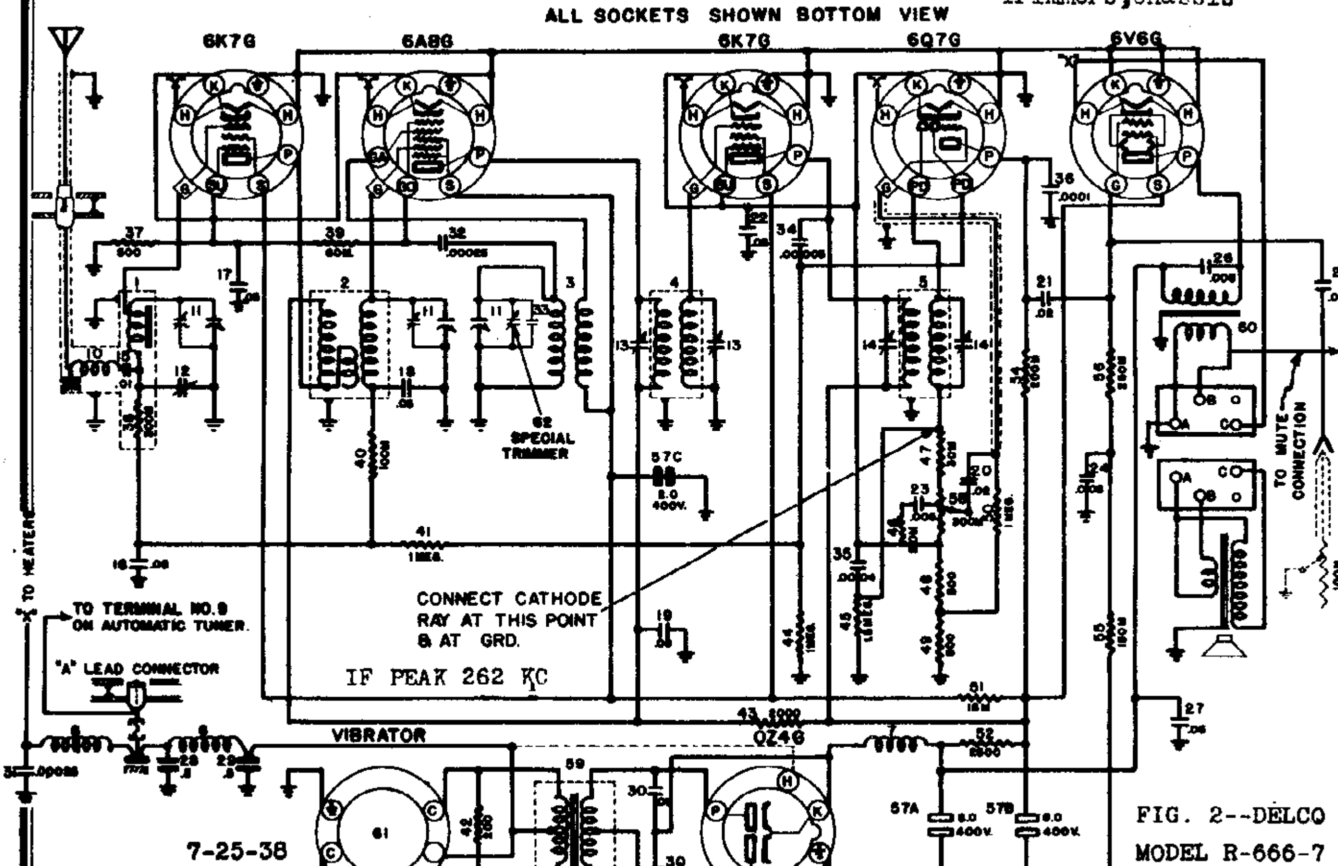


FIG. 2--DELCO
MODEL R-666-7

CIRCUIT CHANGE

Some early sets were made with 300 ohm resistor (Illus. #37). Use 500 ohm number 1211019 for ALL service replacements.

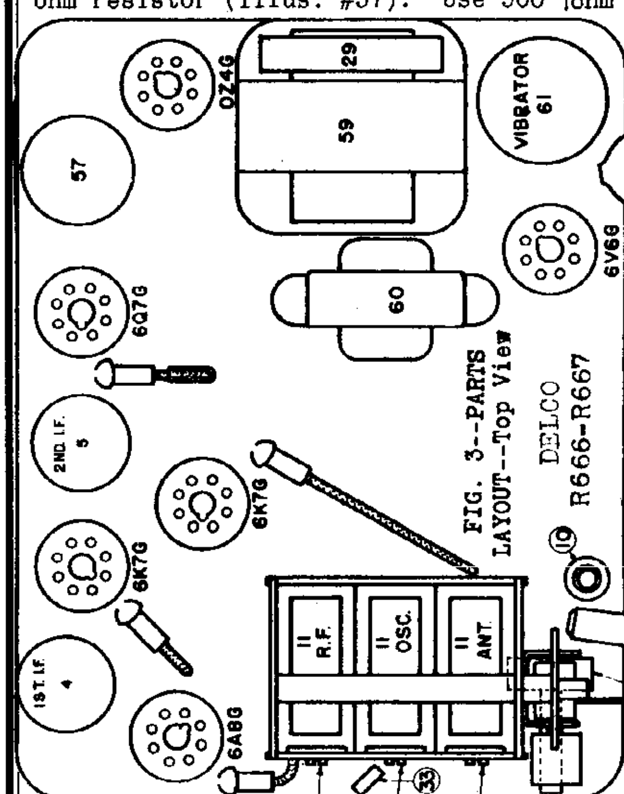


FIG. 3--PARTS
LAYOUT--Top View
DELCO
R666-R667

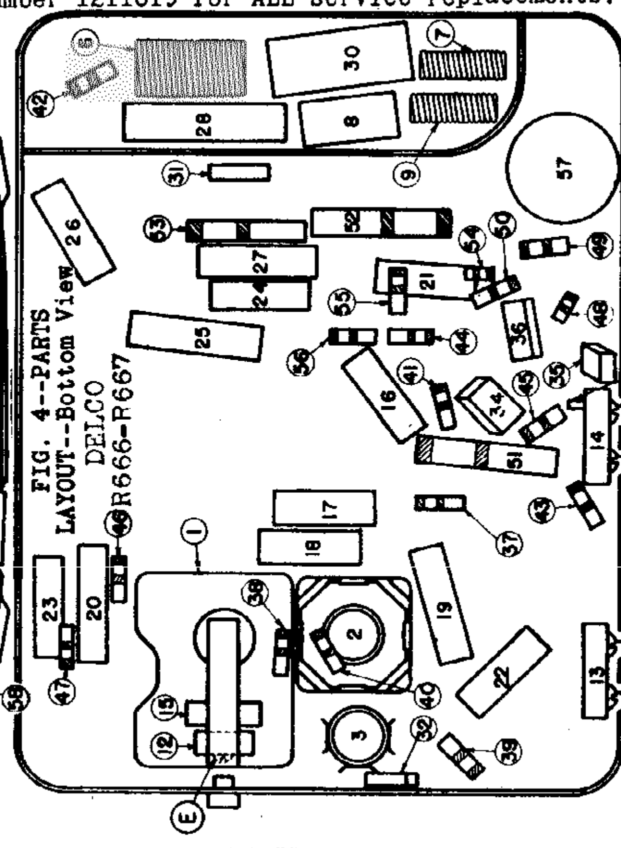


FIG. 4--PARTS
LAYOUT--Bottom View
DELCO
R666-R667

MODELS R667,R669 Delco
Delco-Matic Tuner
Schematic,Parts

UNITED MOTORS SERVICE, INC.

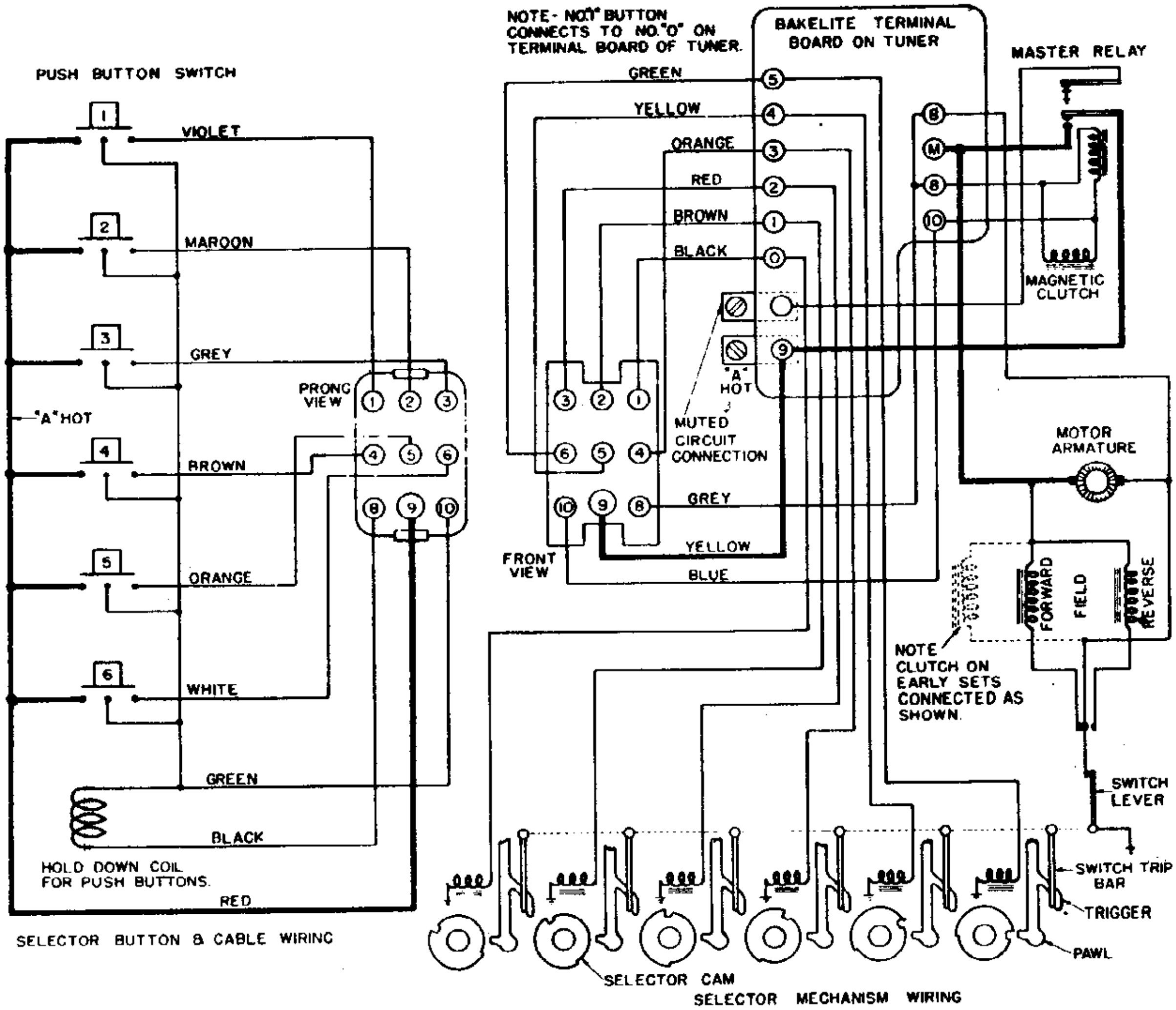


FIG. 1--CIRCUIT DIAGRAM--DELCO-MATIC TUNER

Part No.	Part Name	Description	Part No.	Part Name	Description
*1880010	Switch	Motor reversing	134530	Nut	Pivot screw locking
122159	Screw	Switch mounting	7234957	Gear	Large drive
1880007	Lever	Switch contact assy.	7234768	Washer	Mounting
147460	Screw	Switch lever set screw	7234769	Screw	Mounting
7234714	Bracket	Mounting	7232713	Spacer	Rubber mounting
132892	Screw	Mounting bracket	138530	Washer	#8 int. shakeproof
1880065	Spring	Trip bar	7234745	Shaft	Condenser drive--flex.
7235711	Spring	Pawl	1880122	Control	Push button--complete
1880049	Screw	Long pivot			
1880066	Screw	Short pivot			

* For replacement only on late sets having metal stops between switch contact blades.

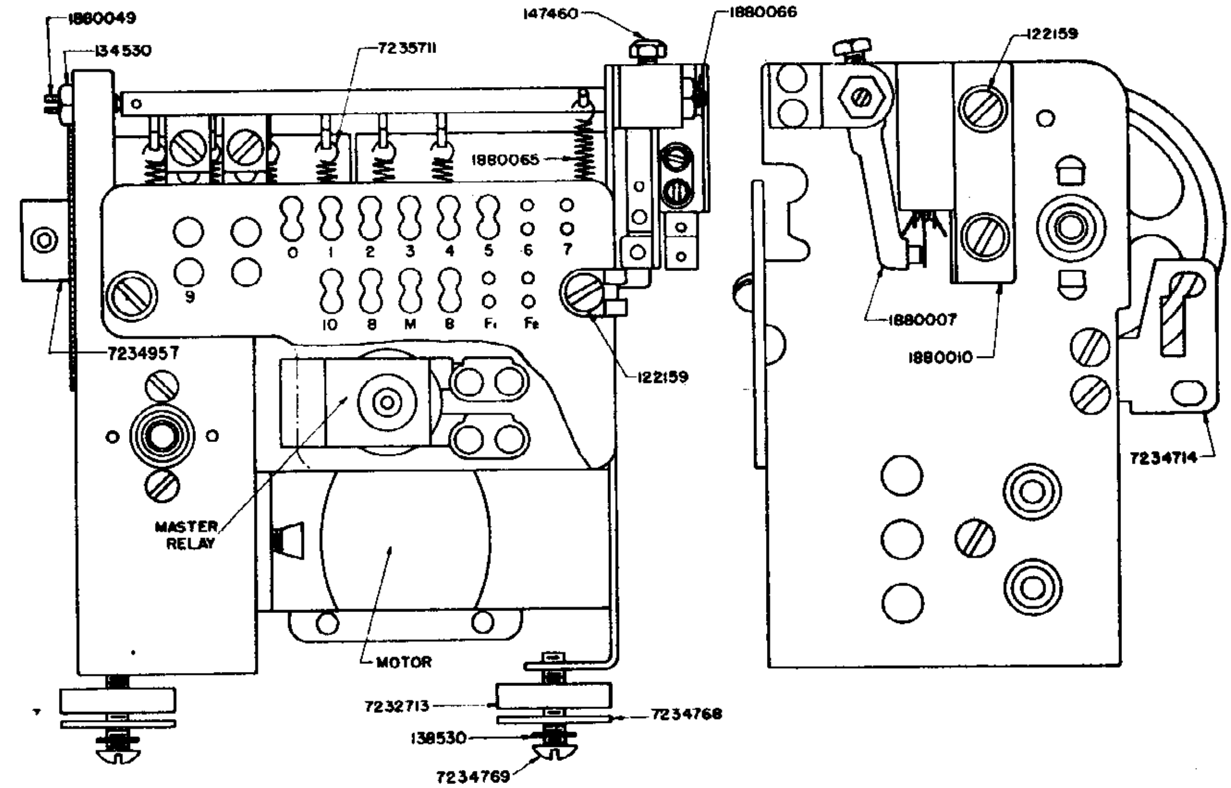


FIG. 2--PARTS LAYOUT--DELCO-MATIC TUNER

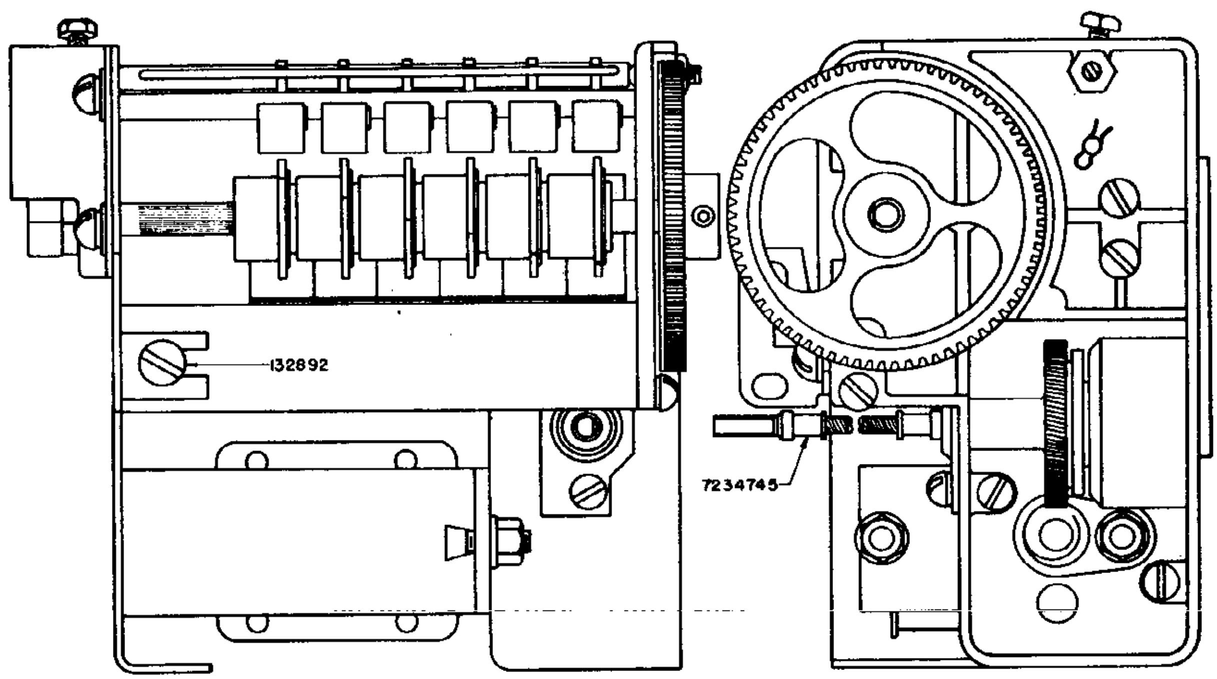


FIG. 3--PARTS LAYOUT--DELCO-MATIC TUNER

MODELS R667,R669
Delco-Matic Tuner
Operating and Service
Notes, Part 1

UNITED MOTORS SERVICE INC.

GENERAL: The Delco Model R-667 is a six tube, two unit auto radio with "Delco-Matic" Flash tuning. The service parts and alignment procedure are identical to the Delco Model R-666.

The Delco Model R-669 is a seven tube, two unit auto radio with "Delco-Matic" Flash tuning. The service parts and alignment procedure are identical to the Delco Model R-668.

SETTING UP "DELCO-MATIC" TUNER

(a) Press a button and allow the selector mechanism to come to rest.

(b) Continue to hold the button down, and tune in the desired station by manual control.

(c) Release button, and set up remaining buttons in the same manner.

When the button is held down after the mechanism has come to rest, the pawl is held in the cam slot, locking the cam in position. The cam is allowed to slip on its shaft during the manual tuning process, by a clutch spring which is a part of the cam shaft assembly.

OPERATION OF "DELCO-MATIC" TUNER

The "Delco-Matic" Tuner is a motor driven mechanical device for tuning in stations quickly and silently by remote push button control. When a button is depressed, a relay coil pulls a corresponding pawl against a selector cam (Fig. 1). At the same time, a hold down coil in the control head holds the button down until the cycle of operation is complete. A trigger on the pawl presses against a switch operating trip rod, which in turn operates the power switch. The degree of movement of the trip rod, which is controlled by a high and low side on the selector cam, determines the direction of motor rotation. When the cam is rotated to a position where the pawl drops into the selector cam slot, the degree of movement of the trip rod opens the ground contact on the power switch which cuts the current to the motor and magnetic clutch and releases all relays.

1. PUSH BUTTON HEAD

The push buttons in the control head complete the circuit for the operation of the hold-down magnet, master relay and the corresponding station selector magnet. The buttons are held down magnetically until released by the "cut-off" switch on the tuner unit, actuated by the station selector pawl dropping into the slot in the selector cam.

2. STATION SELECTOR PAWLS

The station selector pawls are magnetically operated and controlled directly from the contacts in the push-button head. Upon pressing a button in the control head, a circuit is closed, energizing a station selector magnet coil which pulls a corresponding pawl down on a station selector cam. The pawl rides on the cam until it drops into the cam slot and cuts the motor off and releases all relays.

3. STATION SELECTOR CAMS

The station selector cams are circular discs with high and low sides for operation of the motor reversing switch and a stop slot for operation of the motor cut-off switch. Six of these cams are provided on a shaft, each with a friction clutch which allows the cam to be slipped on the shaft in setting the cam on the desired station.

4. REVERSING AND CUT-OFF SWITCH

The reversing and cut-off switch is a combination switch actuated by the trigger on the station selector pawl. The reversing switch causes the motor to run in the right direction for direct to the station tuning and the cut-off switch cuts the motor off when a station is tuned in, and also releases the push-button hold-down magnet and the magnetic clutch.

The forward and reverse positions of the reversing switch are dependent upon whether the station pawl is pulled against the high or low side of the station selector cam. The cut-off switch is actuated when the pawl drops into the cam slot as a station is tuned in.

5. MAGNETIC CLUTCH

The magnetic clutch consists of an electro magnet and two iron discs which are held together magnetically when the field is energized. One of the discs is coupled to the motor and the other to the condenser gang.

The clutch is designed to cut the motor driving power from the tuning condenser gang at the same instant the pawl drops into the cam slot and actuates the motor cut off switch.

6. MASTER RELAY

The master relay is controlled directly from the push-button head and the purpose is to allow the motor current to be fed directly to the motor rather than through the push-button circuits. A set of "mute" contacts are provided along with the "A" power contacts for muting the audio system of the set while the motor is driving the tuning mechanism.

SERVICE PROCEDURE

The logical procedure to employ in servicing the automatic tuner will depend to a large extent upon the nature of the trouble encountered and whether the tuner is partially or totally inoperative. However, in most cases the solution to the trouble will be found by checking the below points in the order named:

1. TUNING CONTROL and CABLE
2. BATTERY VOLTAGE AT TUNER
3. STATION SELECTOR PAWLS
4. PUSH BUTTON HEAD
5. REVERSING AND CUT-OFF SWITCH

The tuning control and tuning cable should be checked along with the battery voltage at the "A" terminal on tuner before removing chassis or push button head from car for servicing on the bench. Make all checks on bench with a tuning control connected to the tuner for proper loading. Detailed procedure for checking the above points is as follows:-

Checking Tuning Control and Cables

In order for the automatic tuner to operate properly it is necessary that the tuning control be free from kinks and binds, so as not to impose an excessive load on the tuner motor. Turn tuning control knob manually and note if drag is excessive or if any kinks or binds are apparent. If trouble is evident, disconnect flexible tuning cable from chassis case bushing and turn tuning knob to determine whether trouble is in set or tuning control. If trouble is in set, a careful check of the large die-cast gears should be made for proper meshing.

Checking Battery Voltage at "A" Terminal on Tuner

The magnets, relays and the motor in the automatic tuner have been designed to operate satisfactorily on voltages as low as 4.5 volts measured at the "A" terminal on the tuner unit with the motor running. Low battery voltages will cause erratic operation of the tuner.

BEFORE ATTEMPTING ANY TUNER REPAIRS, FIRST MEASURE THE "A" VOLTAGE AT THE LARGE "A" TERMINAL ON THE TUNER UNIT WITH THE TUNER MOTOR OPERATING. In order to allow the motor to run long enough to get an accurate reading before it cuts off, set two cams which appear to be working normally at opposite ends of the dial and press corresponding buttons, reading meter carefully while motor is running. If voltage is lower than 4.5 volts, check all connectors and terminals for poor contact. Measure voltage at car ammeter with set load only. This should be 5.5 volts or more.

NOTE: In testing these automatic tuners on UMS Radio Test Panels, it is very important that proper voltage be available for test, otherwise incorrect diagnosis of the trouble will be made. A heavy duty battery and a Power Unit should be used. Also, all connections should be clean and heavy "A" supply leads used for connecting sets to "A" supply terminals. On the #652 Test Panel it is recommended that all automatic tuner tests be made using the power supply terminals on the left side of the panel. This will give a slightly higher "A" voltage to test.

Checking Station Selector Pawls

In most instances a visual inspection will determine if the station selector pawls are operating satisfactorily. A check can be made by simply pressing the push buttons and noting if the corresponding pawls pull down against the selector cam. Failure of the pawl to operate may be caused by excessive spring tension on the pawl spring, open selector magnet circuit or low voltage.

To reduce spring tension on pawl spring, unhook top end of spring with a pair of long nose pliers and stretch spring slightly. Be careful not to stretch spring too far or pawl will have a tendency to stick in the cam slot when a station is tuned in.

Voltage measured at selector magnet coil terminals on bakelite terminal board should not be less than 4.5 volts.

Checking Push Button Head

The push button head is working normally when the following actions take place.

1. Buttons should stay down magnetically when pressed, until station is tuned in or pawl drops in cam slot.
2. Corresponding station pawl in tuner should pull down against cam.
3. Both the button pressed and its corresponding station pawl ~~in the tuner should release when a station is tuned in or when~~ the pawl drops into cam slot.

It should be noted that buttons will not release unless tuner motor is operating and station pawl trips the cut-off switch.

If push button head does not function as covered above and a duplicate head (Part #1880122) is not available for substitution, make complete check of head as follows with push button cable plug disconnected from receiver chassis.

UNITED MOTORS SERVICE, INC.

Delco-Matic Tuner
Service Notes, Part 2

TESTING PUSH BUTTON HEAD

A. MECHANICAL TEST OF PUSH BUTTON HEAD:

(a) Disconnect push button control plug from receiver chassis.

(b) Press buttons down and release slowly. Note if any button or buttons have a tendency to stick or do not extend out the full distance when released. Failure of a button to release to the full extent will cause the station selector pawl to stick in the cam slot when a station is tuned in (See Paragraph "C").

(c) If sticking buttons are encountered, remove the mechanism from the die-cast head, removing the back cover plate and taking out the four round head screws. A small burr on either the small bakelite insulators or the push-button shaft, or in the push button holes in the die-casting or wires touching the button shafts will cause the buttons to stick. Removal of the burrs with fine sandpaper will eliminate this sticking.

NOTE: Do not hold the control head in an inverted position when removing mechanism from case.

B. CHECKING MAGNET FOR HOLD-DOWN

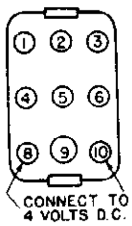


FIG. 5--CONTROL CABLE PLUG
Facing Plug

(a) Remove control cable plug from receiver chassis.

(b) Connect 4 volts D.C. across prongs #8 and #10 as shown.

(c) Press buttons one at a time, interrupting battery circuit to release button after each test.

(d) If none of the buttons will stay down when pressed, make continuity check across prongs #8 and #10 for open circuit in hold down magnet or cable wiring.

(e) If one or two buttons will not stay down when pressed, first check to see if any wires are caught behind button shafts. If not, then remove mechanism from die-cast head and check for excessive spring tension in switch contact springs or the button shaft kick-out spring.

C. CHECKING PUSH BUTTON SWITCH CONTACTS:

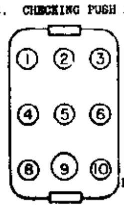


FIG. 6--CONTROL CABLE PLUG
Facing Plug

(a) The switches in the control head start to make contact during the first 1/8" of downward travel. It is, therefore, important that the buttons extend out the full distance when released by the hold down magnet, as covered in the "Mechanical Test of Push-Button Head".

(b) The switch contacts may be checked by applying 4 volts D.C. across the prongs 8 and 9, pressing each button under test, and interrupting the circuit after each test. Check remaining contacts similarly as follows:

Press Button No.	Apply 4 volts D.C. across--
1	Prong #8 and 1
2	" 8 " 2
3	" 8 " 3
4	" 8 " 4
5	" 8 " 5
6	" 8 " 6

It will be noted that if the switch contacts are making proper contact and all preceding checks made, the hold down magnet in the head will be energized as each button is pressed.

Checking the Reversing and Cut-Off Switch

Proper operation of the switch mechanism on the tuner is of vital importance. Erratic action of the tuner due to low battery voltage very often results in the trouble being erroneously diagnosed as switch trouble. It is therefore important that all other points be checked first for possible causes of the trouble before attempting any adjustments to the switching mechanism.

There are four positions of the switch mechanism, "normal", "pawl on high side of cam", "pawl on low side of cam" and "pawl in slot". Figures 7 to 10 illustrate the exact position of the switch contacts in each of the four switch positions. These contacts can be checked visually by observing their

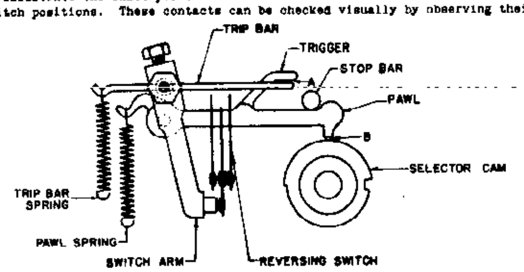


FIG. 7--NORMAL POSITION

action under actual operating conditions or by disconnecting the "A" power and duplicating the position by pressing the pawls down against the cams manually. Before making any adjustments it should first be definitely known that an adjustment is necessary.

In the normal position it will be noted that one set of reversing contacts are closed and that the ground contact on the switch arm is making contact. Also, there should be a slight gap ("A" on Fig. 7) between the trigger and the trip bar to prevent any movement of the switch arm when the pawl is pressed against the high side of the cam.

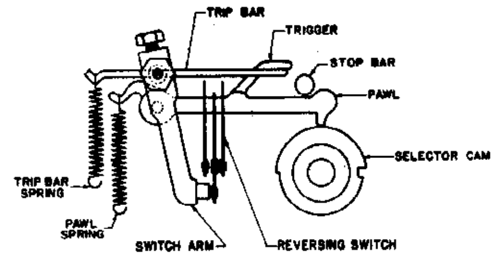


FIG. 8--PAWL ON HIGH SIDE OF CAM

In this position the contacts should be in exactly the same position as in the "normal position". The trigger rests against the trip bar but there should not be sufficient movement of the trip bar to open the normally closed reversing contacts at any point on the high side of the cam.

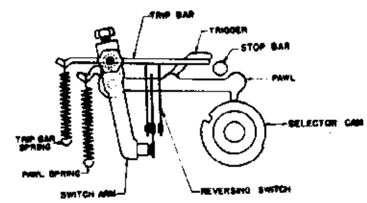


FIG. 9--PAWL ON LOW SIDE OF CAM

In this position the pawl is riding on the low side of the cam and a complete change has taken place in the reversing switch. The set of contacts which were normally closed when the pawl was riding on the high side of the cam have opened and the other set of contacts are now closed. The ground contact on the switch arm remains closed.

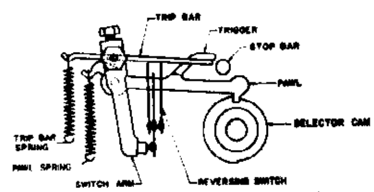


FIG. 10--PAWL IN SLOT

It will be noted in this position that the set of contacts which are closed when the pawl is riding on the low side of the cam remain closed and the ground contact on the switch arm which has remained closed through each of the three previous positions is now open.

SWITCH ADJUSTMENTS

In the case where not more than two or three cams are not working satisfactorily, individual adjustments can be made to the station selector pawls by bending the small trigger arms up or down with a pair of pliers, to obtain proper action of the reversing and cut-off switches.

In making these adjustments it is very important that the triggers be adjusted so that they do not open the reversing contacts normally closed when the pawl is riding on the high side of the cam. Also, there should be a slight gap in the ground contact on the cut-off switch arm when the pawl drops to the bottom of the cam slot. This ground gap should be kept as small as possible, retaining sufficient clearance so that the contacts will remain open when the condenser gang is turned from one end of its travel to the other, with the station pawl holding the cam stationary.

In cases where the switching mechanism does not operate satisfactorily on any cam, a careful check should be made of the switch trip bar to see that it does not move the switch lever when the pawls are pressed against the high side of the cams.

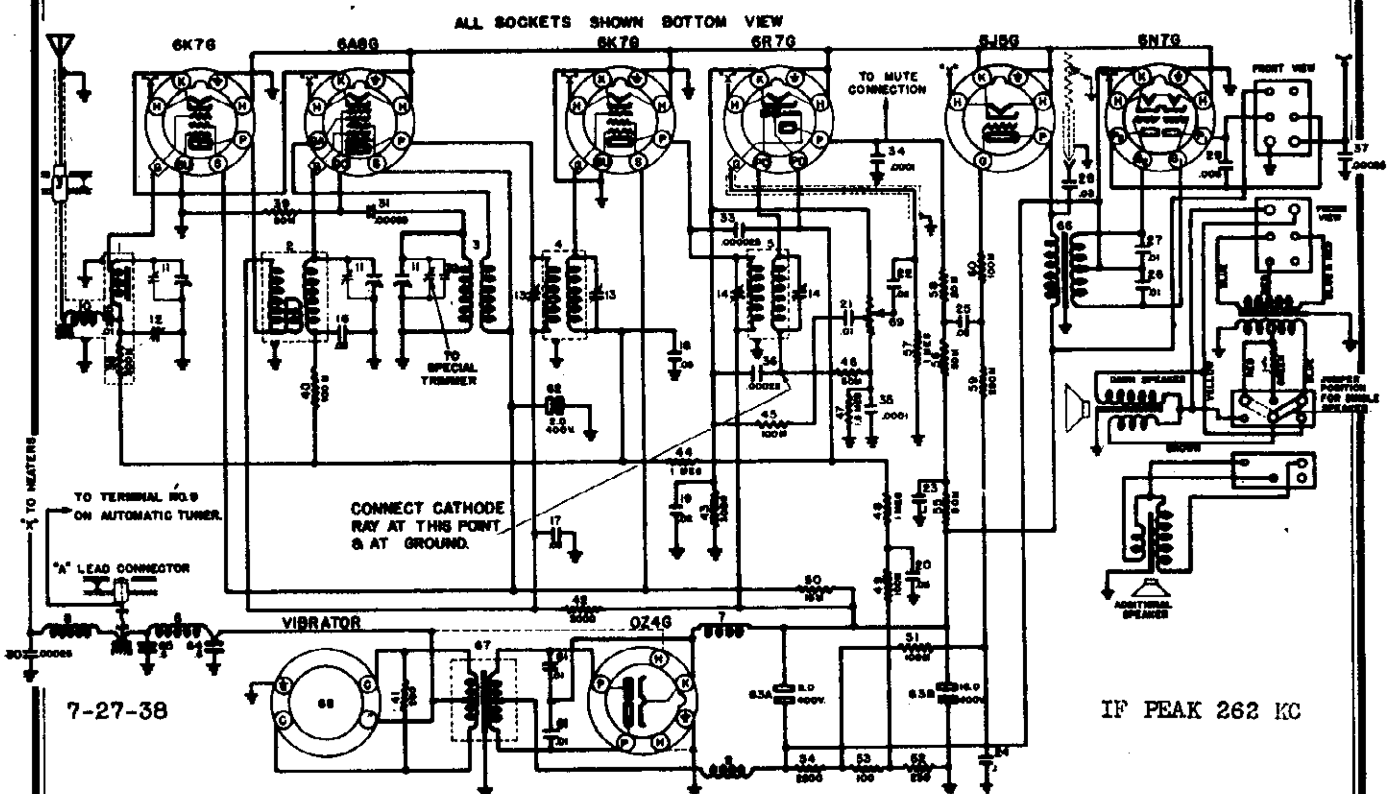
DO NOT CHANGE POSITION OF EITHER THE REVERSING SWITCH OR SWITCH ARM AS SPECIAL EQUIPMENT IS REQUIRED TO OBTAIN ACCURATE ALIGNMENT OF THESE PARTS.

The normal position of the phosphor bronze switch springs with the switch arm pulled back should be as shown in Fig. 10 illustrating the switch position with the pawl in the cam slot.

If a complete test of the tuning mechanism indicates that it cannot be repaired or adjusted as outlined, a replacement of the complete chassis should be made in accordance with Mr. C. D. Wymer's letter of April 11, 1938, Subject--"Service Policy--Delco Auto Radio Models R-667 and R-669 Automatic Tuners".

MODELS R668,R669 Delco
Schematic,Socket
Trimmors,Chassis

UNITED MOTORS SERVICE,INC.



7-27-38

IF PEAK 262 KC

FIG. 2--DELCO MODEL R-668-9 CIRCUIT DIAGRAM

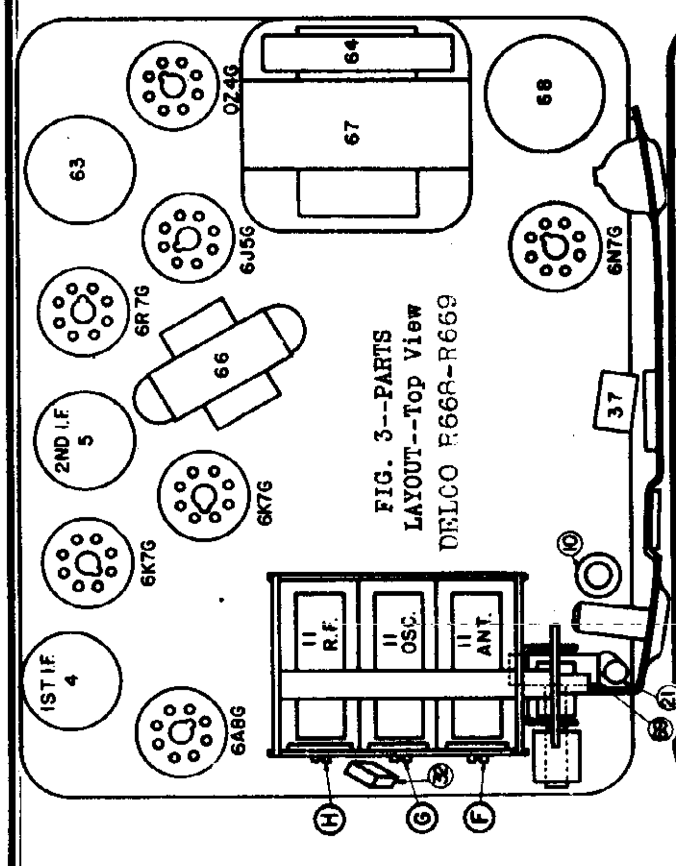


FIG. 3--PARTS LAYOUT--Top View DELCO R668-R669

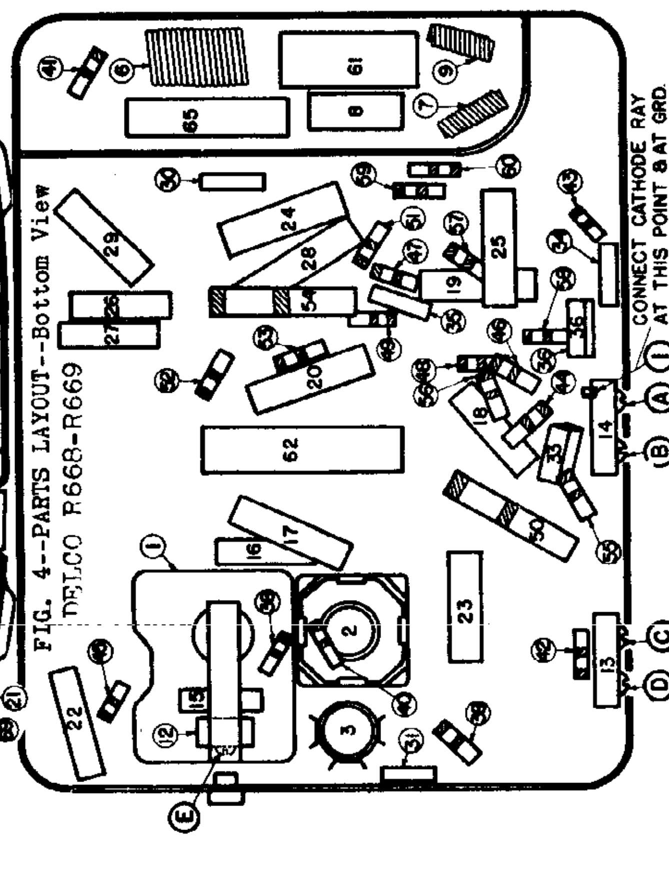
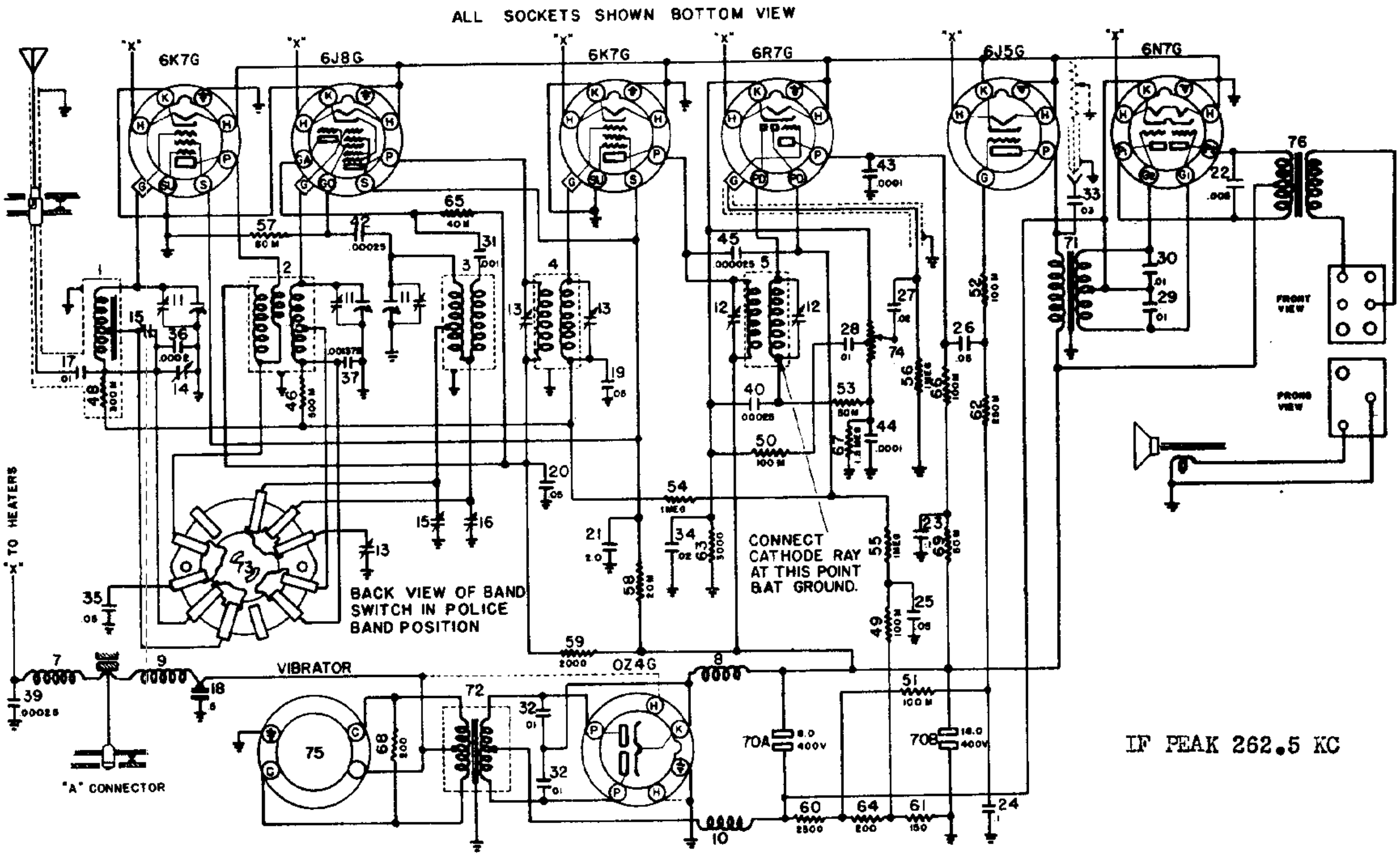


FIG. 4--PARTS LAYOUT--Bottom View DELCO R668-R669

UNITED MOTORS SERVICE, INC.



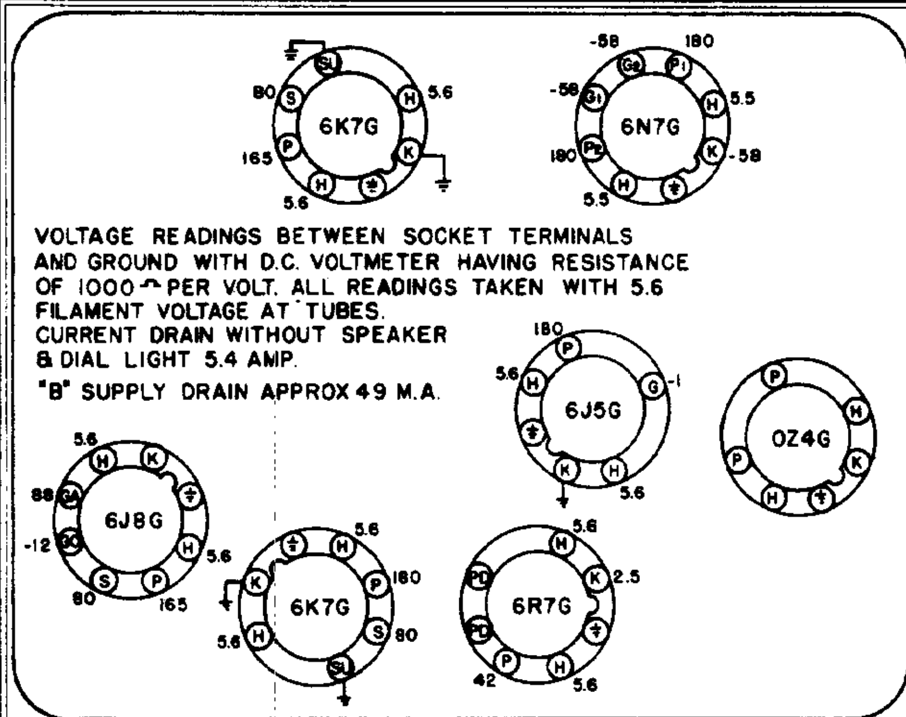
IF PEAK 262.5 KC

FIG. 3--DELCO MODEL R-673 CIRCUIT DIAGRAM

GENERAL: The Delco Model R-673 is a seven tube two unit receiver with short wave and broadcast band. Coverage of short wave band from 5000 kilocycles to 1600 kilocycles, broadcast 1530 kilocycles to 540 kilocycles. Special features such as base compensation, tone control and 6N7G push pull

MODEL R673 Delco
Voltage, Socket
Trimmers, Chassis

UNITED MOTORS SERVICE , INC.



VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITHOUT SPEAKER & DIAL LIGHT 5.4 AMP.
"B" SUPPLY DRAIN APPROX 49 M.A.

FIG. 1--TUBE SOCKET VOLTAGES

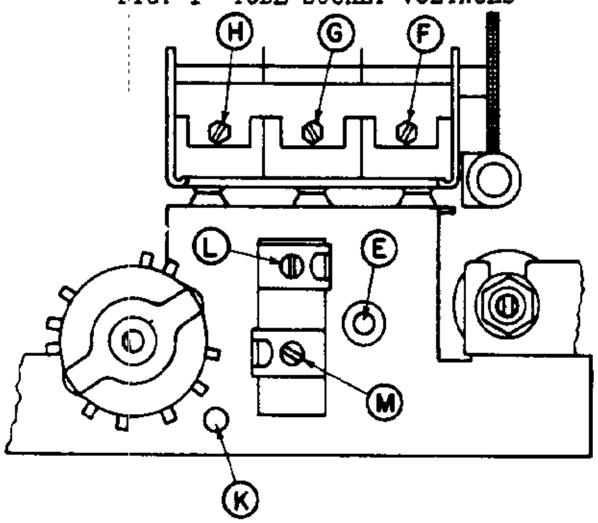
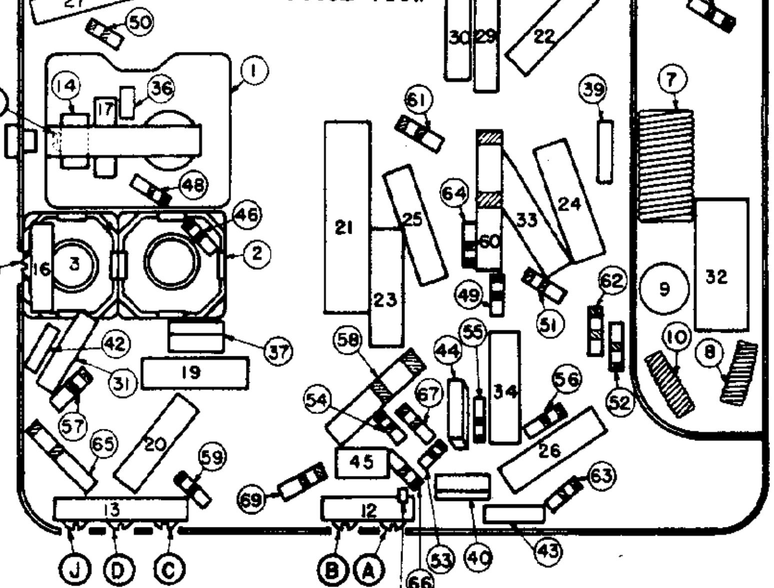


FIG. 2--TRIMMER LOCATIONS

FIG. 5--PARTS LAYOUT
--Bottom View



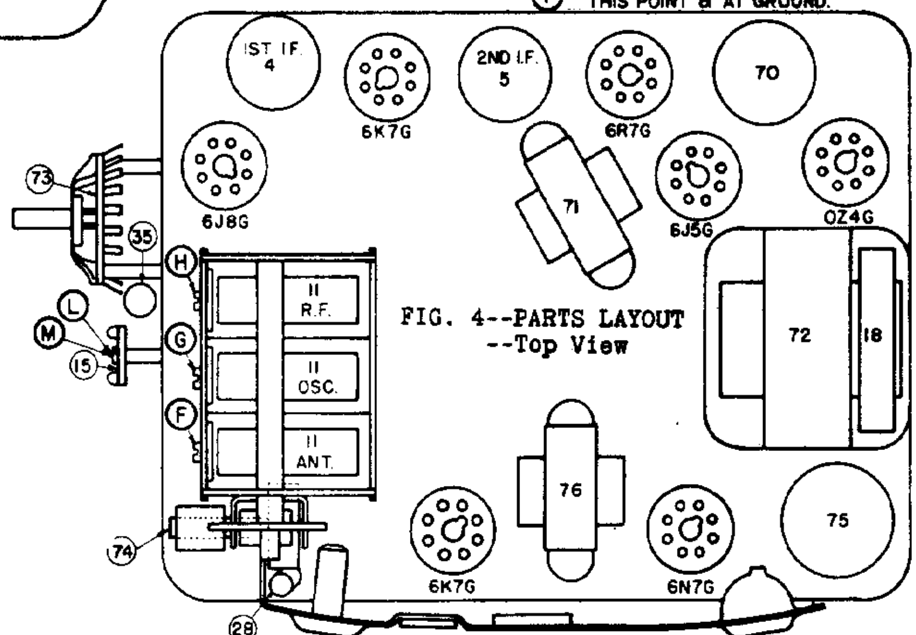


FIG. 4--PARTS LAYOUT
--Top View

UNITED MOTORS SERVICE, INC.

1. Aligning I-F Stages at 262.5 Kilocycles

(a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6J8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect output meter across plates of 6N7G tube.

(c) Set Signal Generator to exactly 262.5 kilocycles and turn volume control on full.

(d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

(e) Adjust trimmers A, B, C & D through the cut-outs on the side of the chassis (Illus. 12 & 13, Fig. 5) carefully for maximum output.

(f) Repeat adjustments of I-F trimmers A, B, C & D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 5000 Kilocycles

(a) Turn band switch to police band (clockwise).

(b) Leave Signal Generator leads connected the same as for I-F adjustments.

(c) Turn tuning condenser plates all the way out and against high frequency stop.

(d) Set Signal Generator to exactly 5000 kilocycles and adjust oscillator trimmer "G" (Fig. 4) carefully for maximum output, being careful to peak the signal received with trimmer screw out at minimum capacity.

3. Aligning at 1530 Kilocycles

(a) Turn band switch to broadcast band (counter clockwise).

(b) Set Signal Generator to 1530 kilocycles and leave the tuning condenser against high frequency stop.

(c) Adjust oscillator trimmer "L" (Fig. 4) for maximum output.

4. Aligning at 600 Kilocycles

(a) Connect Signal Generator leads to 6K7G, R-F grid, leaving the grid clip in place.

(b) Set Signal Generator to 600 kilocycles and tune the receiver to this signal.

(c) Adjust oscillator padder condenser "K" (Fig. 5) rocking gang condenser plates back and forth through the signal until maximum output is obtained.

(d) Remove signal generator lead from 6K7G tube clip and connect to the antenna terminal through a .0002 mfd. condenser.

(e) Adjust antenna series condenser "E" (Fig. 5) for maximum output.

5. Aligning at 1400 Kilocycles

(a) Set Signal Generator at 1400 kilocycles.

(b) Tune set to this signal and adjust R-F trimmer "H" (Fig. 4) and antenna trimmer "M" (Fig. 4) to maximum output.

6. Aligning at 4000 Kilocycles

(a) Turn band switch to police band.

(b) Set Signal Generator to 4000 kilocycles and tune receiver to this signal.

(c) Adjust police band antenna trimmer "F" (Fig. 4) for maximum output.

7. Aligning at 1800 Kilocycles

(a) Set Signal Generator at 1800 kilocycles and tune receiver to this signal.

(b) Adjust oscillator padder condenser "J" (Fig. 5) rocking gang condenser plates back and forth through the signal until maximum output is obtained.

(c) Close gang and check to see if tuning range extends to 1600 kilocycles.

8. Realigning at 1400 Kilocycles

(a) Turn band switch to broadcast band.

(b) Set Signal Generator to 1400 kilocycles.

(c) Tune set to this signal and adjust R-F trimmer "H" and antenna trimmer "M" to maximum output (Fig. 4).

9. Realigning at 600 Kilocycles

(a) Check alignment of antenna series condenser "E" (Fig. 5) for maximum output.

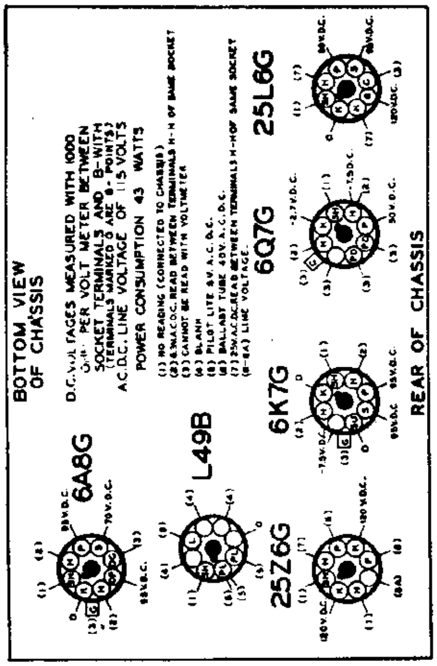
10. Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray from connection "I" (Fig. 3) to ground.

MODELS R1134, R1135
R1139 Delco
Schematic, Voltage

UNITED MOTORS SERVICE, INC.

Socket, Trimmers
Chassis



3-6-39

FIG. 1--TUBE SOCKET VOLTAGES

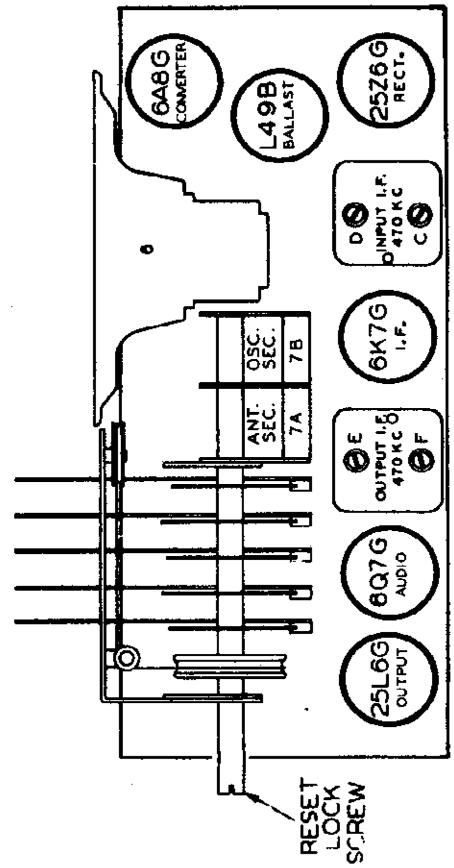


FIG. 3--PARTS LAYOUT--Top View

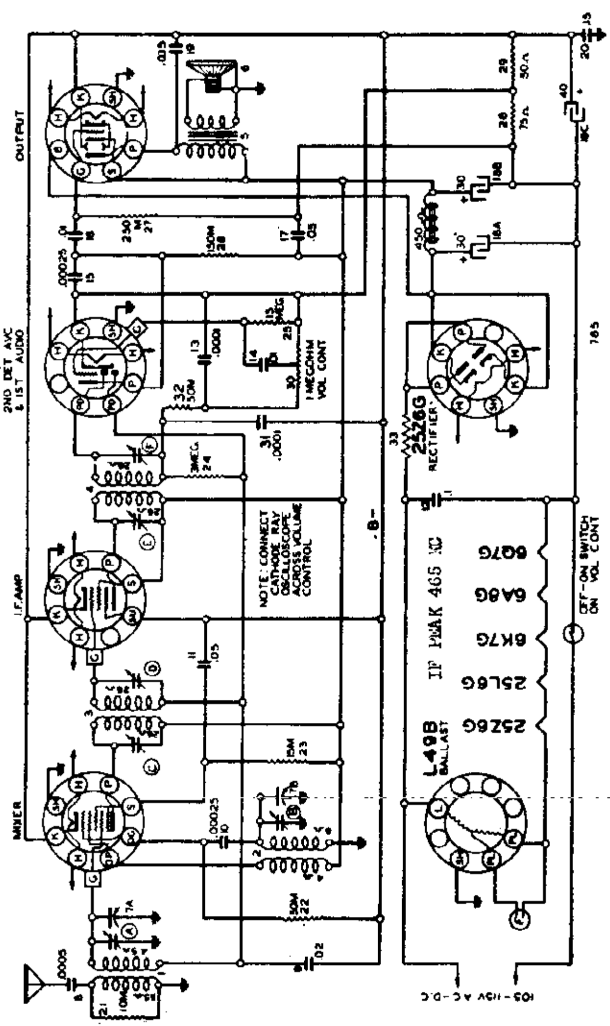


FIG. 2--DELCO MODELS R-1134-35-39 CIRCUIT DIAGRAM

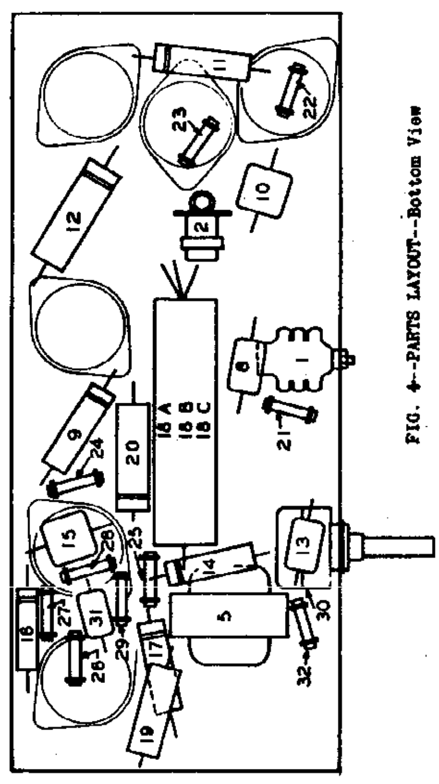


FIG. 4--PARTS LAYOUT--Bottom View

SETTING UP AUTOMATIC TUNING DELCO MODELS R-1134-35-39 HOME RADIO

1. Loosen RESET LOCK SCREW in center of tuning knob.
2. Press any one of the automatic tuner levers all the way down. Stations may be set up in any sequence desired.
3. Hold the lever down firmly and tune set to station desired. When desired station is clearly tuned in, release the lever and follow same procedure until all levers have been set up.
4. Rotate the tuning knob to the right (clockwise) as far as it will turn and firmly tighten RESET LOCK SCREW.

DELCO MODELS R-1134-35-39 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the signal generator in series with a .1 mfd. condenser to B- (pin #8 on 25L6G tube). Connect the signal lead of the signal generator to the grid cap of the 6A8G tube, leaving grid clip in place.

(b) Connect the output meter across the plate (pin 3) and screen (pin 4) of the 25L6G output tube.

(c) Set signal generator to exactly 465 kilocycles and turn volume control on full.

(d) Turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop.
(e) Adjust the trimmers (E-F) on the second I-F coil and then the trimmers on the first I-F coil (C-D Fig. 3) carefully for maximum output.

(f) Repeat adjustments of the four I-F trimmers with as low an output from the signal generator as possible, for more accurate alignment.

2. Aligning at 1720 Kilocycles

(a) Leave ground lead of signal generator connected to B- through a .1 mfd. condenser as before. Connect the signal lead of signal generator through a .0001 mfd. condenser to the antenna terminal.

(b) Turn tuning condenser plates all the way out and against high frequency stop.

(c) Set signal generator to exactly 1720 kilocycles and adjust oscillator trimmer (7B Fig. 3) carefully for maximum output, being careful to peak the signal with trimmer screw out or at minimum capacity.

3. Aligning at 1400 Kilocycles

(a) Set signal generator to 1400 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

(b) Adjust the antenna trimmer (7A Fig. 3) for maximum output. Do not disturb the 1720 kilocycle adjustment of the oscillator trimmer.

DELCO MODEL R-3215 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 455 Kilocycles

(a) Attach the ground lead of the signal generator to the chassis ground post. Connect the other lead to the grid cap of the 6K8 tube through a .02 mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set the signal generator to EXACTLY 455 kilocycles and turn receiver volume control on full.

(c) Peak each of the 2nd I-F coil trimmers, 2A & 2B, (Illus. 2, Fig. 3).

(d) Peak each of the 1st I-F coil trimmers, 1A & 1B, (Illus. 1, Fig. 3).

(e) To assure most accurate trimmer setting repeat above adjustments several times always using lowest possible signal generator output consistent with readable output meter scale deflection.

2. Aligning "American Broadcast" 1730-540 Kilocycle Band

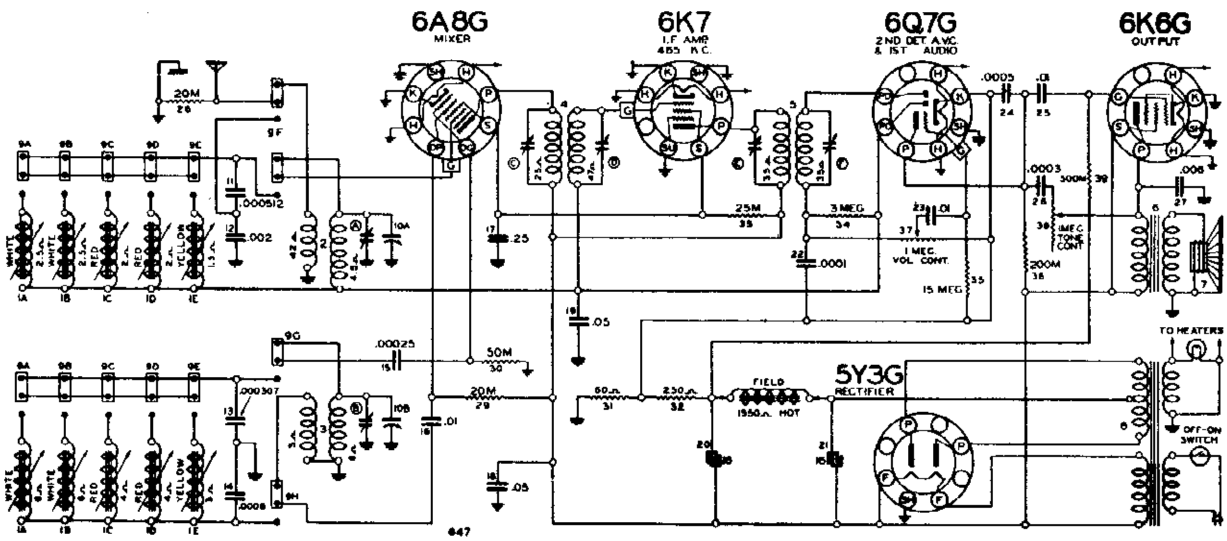
(a) Connect signal generator antenna lead to receiver antenna terminal through a .00025 mfd. condenser, and the other signal generator lead to ground terminal.
(b) Adjust band selector switch for operation on 1730-540 kilocycle band.
(c) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the needle does not point exactly to the last line move needle to correct position.
(d) Set signal generator frequency and receiver dial to EXACTLY 1730 kilocycles, and bring in 1730 kilocycle signal generator signal to maximum output by adjusting 1730 kilocycle oscillator trimmer, (Illus. 7C Fig. 4).
(e) Set signal generator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 kilocycle oscillator padder (Illus. 6, Fig. 3) for maximum output.
(f) padder (Illus. 8, Fig. 3) for maximum signal response.

3. Aligning "Foreign Short Wave" 5.8-18.1 Megacycle Band

(a) Place band selector switch for operation on 5.8-18.1 megacycle band, tune receiver dial and set signal generator frequency to EXACTLY 18.1 megacycles.
(b) Adjust 18.1 megacycle oscillator trimmer (Illus. 7B, Fig 4) to bring in 18.1 megacycle test signal to maximum output. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak is tuned in.
(c) Tune receiver dial and set signal generator frequency to EXACTLY 15 megacycles.
(d) While rocking gang condenser slightly to right and left, adjust 15 megacycle antenna trimmer (Illus. 7A, Fig. 4) for maximum 15 megacycle test signal response.

MODEL R1140 Delco
Schematic, Socket
Trimmers, Chassis

UNITED MOTORS SERVICE, INC.



IF PEAK 465 KC

9-23-38

FIG. 2--DELCO MODEL R-1140 CIRCUIT DIAGRAM

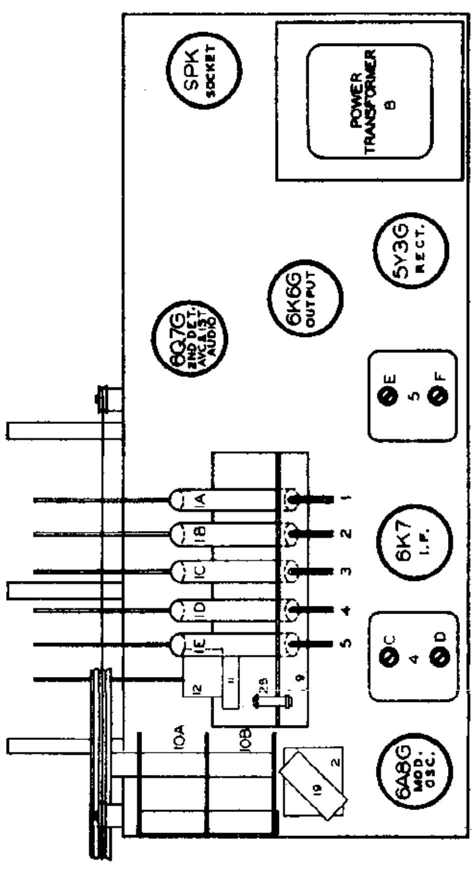


FIG. 3--PARTS LAYOUT--Top View

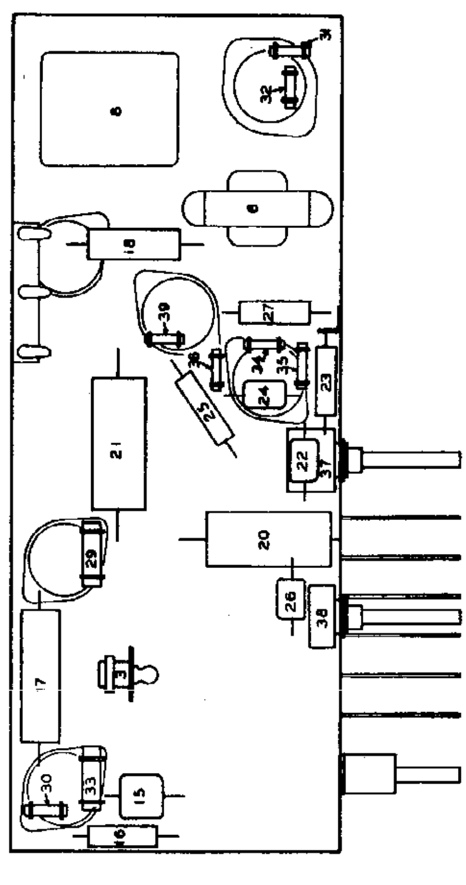


FIG. 4--PARTS LAYOUT--Bottom View

MODEL R1140 Delco
Voltage, Alignment
Tuner Data

UNITED MOTORS SERVICE, INC.

GENERAL: The Delco Model R-1140 is a 5 tube, 110 volt A.C. superheterodyne automatic electric tuning receiver with a 6" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switches which control adjustable permeability tuned coils. Tuning range is from 530 to 1720 kilocycles. Five push buttons are used for automatic tuning, a sixth for switching from automatic to manual tuning.

The function of each button is, left to right:

1. Automatic tuning 530-800 K.C.
2. Automatic tuning 530-800 K.C.
3. Automatic tuning 660-1100 K.C.
4. Automatic tuning 660-1100 K.C.
5. Automatic tuning 975-1560 K.C.
6. Switch-Manual to automatic tuning

SETTING UP AUTOMATIC ELECTRIC TUNING

Setting up the stations is accomplished by means of a single adjustment for each button, accessible from the rear of the chassis.

1. Turn on the set, and allow 15 minutes for the set to "warm up" before setting the station adjustment screws for the push buttons.
2. Press button #6 and tune in the desired station by means of the manual tuning control.
3. Press one of the buttons #1 to #5 which range corresponds to the station frequency and, with a small screw driver adjust screw on back of chassis corresponding to button pressed until the same station is accurately tuned in.
4. Press button #6, changing from "Push Button" to "Dial Tuning" to ascertain that the same program is heard for both.
5. Moisten and insert the call letters of the station on the front of the button.
6. Repeat the operation for the other buttons.

CIRCUIT ALIGNMENT

For alignment purposes, a test scale is stamped on the inside of the dial drum on the condenser shaft. Before starting alignment procedure, turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop and make an indicating mark on the front support bracket in line with the high frequency mark on test scale for future reference.

1. Aligning I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the signal lead of the signal generator to the grid cap of the 6A8G tube through a .1 mfd. condenser, leaving grid clip in place.

(c) Connect the output meter across the plate (pin 3) and screen (pin 4) of the 6K6G output tube.

(d) Press #6 button (Dial Tuning), turn the volume control on full and the tone control to extreme clockwise (treble) position.

(e) Set the signal generator to exactly 465 kilocycles and turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop.

(f) Adjust the trimmers on the second I-F coil (Illus. 5, Fig. 3) and then the trimmers on the first I-F coil (Illus. 4, Fig. 3) carefully for maximum output.

(g) Repeat adjustments of the four I-F trimmers with as low an output from the signal generator as possible, for more accurate alignment.

2. Aligning at 1400 Kilocycles

(a) Connect the signal lead of signal generator through a .0001 mfd. condenser to the antenna terminal. Connect ground lead of signal generator to chassis.

(b) Set signal generator to 1400 kilocycles.

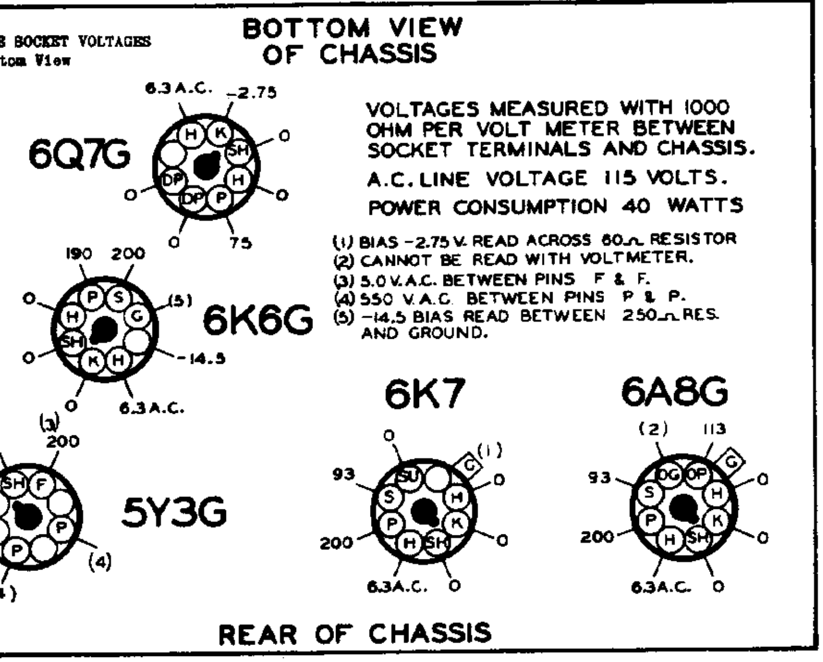
(c) Turn tuning condenser plates until test scale dial is at the 1400 kilocycles position as noted from the reference mark you made on the front support bracket.

(d) Adjust oscillator trimmer (Illus. 10B, Fig. 3) carefully for maximum output, being careful to peak the signal received with trimmer screw out at minimum capacity.

(e) Adjust the antenna trimmer (Illus. 10A, Fig. 3) for maximum output with as low an output from the signal generator as possible, for more accurate alignment.

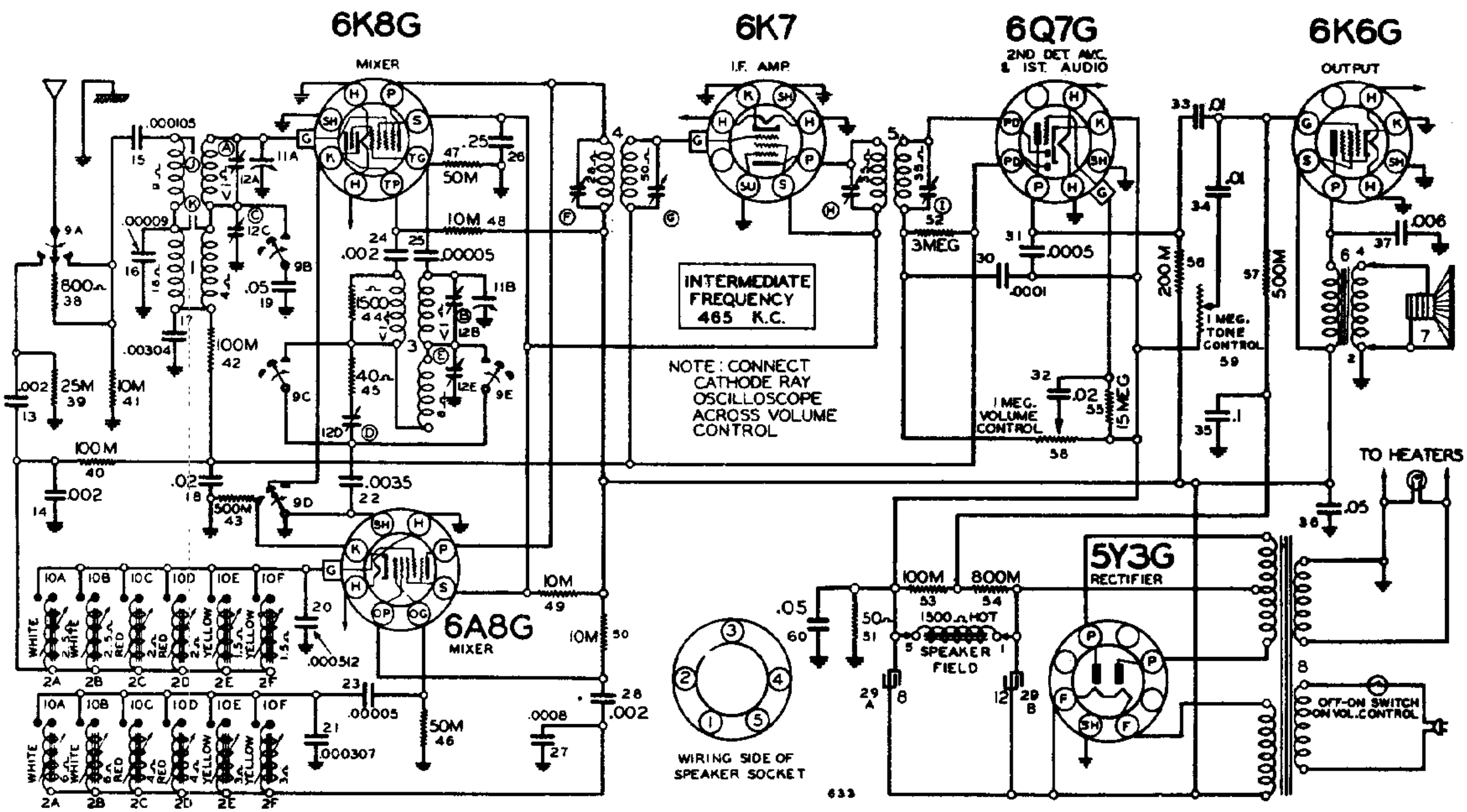
(f) After completing the alignment procedure, the alignment should be checked with the cathode ray oscillograph. Connect the oscillograph across the volume control.

FIG. 1--TUBE SOCKET VOLTAGES
Bottom View



MODEL R1141 Delco
Schematic

UNITED MOTORS SERVICE, INC.



Date: 9-13-38

GENERAL: The Delco Model R-1141 is a six tube, two band superheterodyne receiver with a 6" dynamic speaker. Tuning is accomplished by means of the conventional manual control, or by push button switches which control adjustable permeability tuned coils. The frequency ranges of the push buttons are, left to right:

1. 535 to 820 K.C.
2. 535 to 820 K.C.
3. 720 to 1120 K.C.
4. 720 to 1120 K.C.
5. 1000 to 1560 K.C.
6. 1000 to 1560 K.C.

UNITED MOTORS SERVICE, INC.

MODEL R1141 Delco
Voltage, Socket
Trimmers, Chassis

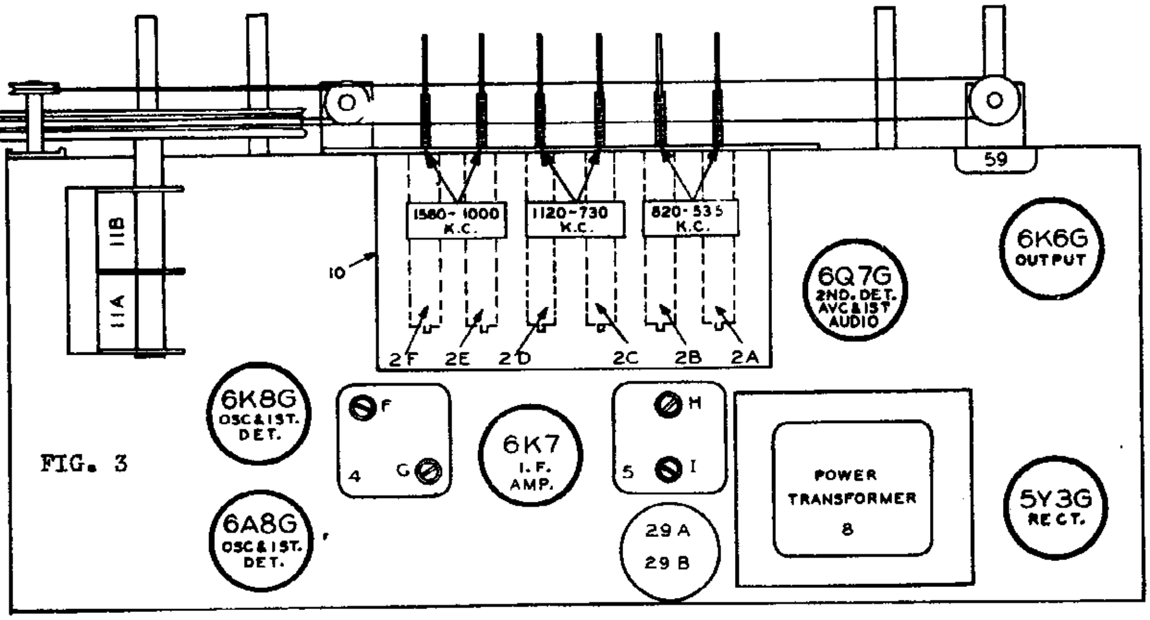


FIG. 3

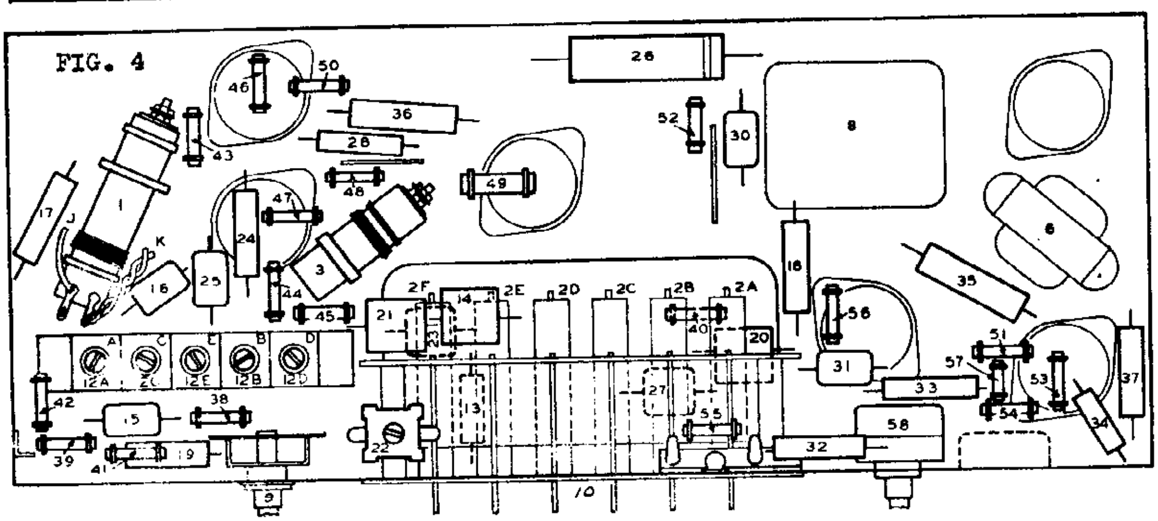
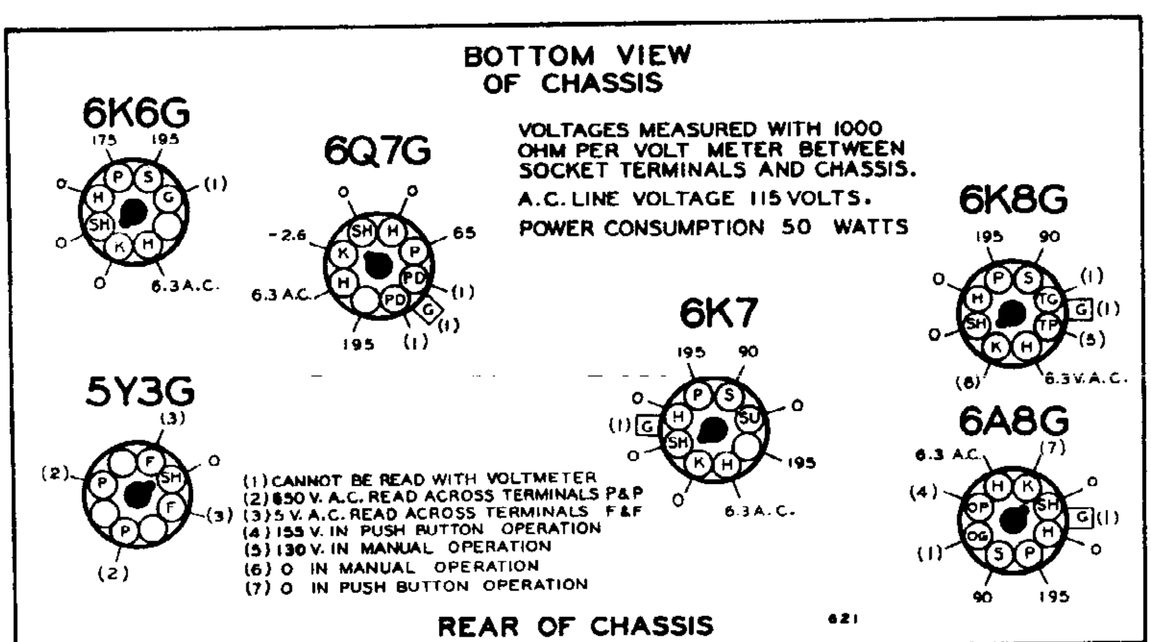


FIG. 4



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 50 WATTS

(1) CANNOT BE READ WITH VOLTMETER
(2) 650 V. A.C. READ ACROSS TERMINALS P & P
(3) 5 V. A.C. READ ACROSS TERMINALS F & F
(4) 155 V. IN PUSH BUTTON OPERATION
(5) 130 V. IN MANUAL OPERATION
(6) 0 IN MANUAL OPERATION
(7) 0 IN PUSH BUTTON OPERATION

REAR OF CHASSIS

621

MODELS R1141,R1142,R1143
Alignment,Tuner
MODEL R1144 Delco
Tuner Data

UNITED MOTORS SERVICE . INC.

MODELS R1141,R1142,R1143 and R1144

SETTING UP AUTOMATIC ELECTRIC TUNING

Setting up the push buttons for pre-selected stations is accomplished by means of a single adjustment for each button, accessible from the front of the cabinet. These screw driver adjustments are made through the small openings in the escutcheon, in which the call letter tabs are placed.

1. Turn the set "on" and set the band change switch to the broadcast manual (center) position and allow about 15 minutes to warm up.
2. Tune in the desired station by means of the manual tuning control.
3. Press one of the buttons which most conveniently covers the frequency of the stations, turn the band change switch to the automatic (left hand) position and, with a small screw driver, adjust the screw directly above the button, until the station is tuned in accurately.
4. Turn the band change switch back to the center position to check the accuracy of the adjustment.
5. Insert the call letters of the station in the opening and cover with the celluloid tab provided.
6. Repeat the operation for the other buttons.

ALIGNMENT FOR MODELS R1141,R1142,and R1143.

NOTE ~~FIGURES REFERENCES IN THE TEXT REFER TO FIGURES SHOWN WITH~~ EACH MODEL.

1. Aligning I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the signal lead of the signal generator to the grid cap of the *6A8G tube through a 1.0 mfd. condenser, leaving the grid clip in place. * 6K8G (R1143)

(c) Connect the output meter across the plate and screen of the 6F6G tube.

(d) Press a button, turn the band change switch to the automatic (left hand) position, volume control on full, and the tone control in the treble position. *R1143 Use #10 Button (Variable Fully open)

(e) Set the signal generator to exactly 465 kilocycles and adjust the trimmers on the second I-F coil (Illus. 5, Fig. 3) and the first I-F coil (Illus. 4, Fig. 3) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter. DO NOT REALIGN THE I-F COILS IN THE MANUAL (CENTER) POSITION (MODEL R1143 ONLY)

(f) After completing the Alignment Procedure, the alignment should be checked with the Model 165 Cathode Ray Oscillograph. Connect the oscillograph across the volume control. *For R1143) Across #40 Cond Fig 2.

2. Aligning at 17 Megacycles

(a) Remove the signal lead of the signal generator from the grid of the *6A8G and connect to the antenna terminal of the receiver through a 400 ohm resistor. * R1143 (6K8G)

(b) *Turn the band change switch to the short wave (right hand) position. *For 1143 - Press #9 Button (S.W.-Manual Tuning)

(c) Set the signal generator to exactly 17 megacycles and rotate the variable section of the condenser gang to indicate 17 megacycles on the test scale.

(d) Adjust the oscillator trimmer condenser (Illus. B, Fig. 4) for maximum output. R1142 - (Illus 12B, Fig 4) R1141, R1143 (Illus. B, Fig 3) - R1143

(e) Adjust the antenna trimmer*(Illus. A, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained. * For Model 1142 See (Illus. 12A, Fig 4)

(f) Increase the signal from the signal generator and check for image frequency response. If the image does not fall at approximately 1630 megacycles, repeat section 2.

3. Aligning at 1735 Kilocycles (MODELS R1141, R1142 ONLY)

(a) Remove the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

3. Aligning at 5 Megacycles MODEL R1143 ONLY

(a) Press #9 button (Intermediate wave--manual tuning).

(b) Set the signal generator to exactly 5 megacycles and rotate the variable section of the condenser gang to indicate 5 megacycles on the test scale.

(c) Adjust the oscillator trimmer condenser (Illus. G, Fig. 3) for maximum output.

(d) Adjust the antenna trimmer condenser (Illus. C, Fig. 3) for maximum output.

4. Aligning at 1690 Kilocycles MODEL R1143 ONLY

(a) Remove the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

(b) Press #10 button (Broadcast--manual tuning).

(c) Turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.

(d) Adjust image trimmer (Illus. E, Fig. 3) two turns up from tight.

(e) Set the signal generator to exactly 1690 kilocycles.

(f) Adjust the oscillator trimmer condenser (Illus. H, Fig. 3) for maximum output.

(b) Turn the band change switch to the broadcast Manual (center) position.

(c) Turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.

(d) Set the signal generator to exactly 1735 kilocycles.

(e) Adjust the oscillator trimmer condenser*(Illus. E, Fig. 4) for maximum output. *For Model R1142 see (Illus 12E, Fig 4)

4. Aligning at 1400 Kilocycles

(a) Set the signal generator to approximately 1400 kilocycles.

(b) Rotate the variable plates of the condenser gang until the signal is tuned in with maximum output.

(c) Adjust the antenna trimmer*(Illus. C, Fig. 4) for maximum output.

5. Aligning at 600 Kilocycles *Model R1141 only For Model R1142 (Illus. 12C, Fig 4) " " R1143 (Illus D, Fig 3)

(a) Set the signal generator to approximately 600 kilocycles.

(b) Rotate the variable plates of the condenser gang until the signal is tuned in. For R1143 - See (Illus F, Fig 3) For R1142 - See (Illus. 12D, Fig 4) For R1141

(c) Adjust the oscillator series condenser (Illus. D, Fig. 4) while rocking the condenser gang back and forth through the signal until maximum output is obtained.

6. Aligning for Image Frequency Response

(a) Set the signal generator at 2100 kilocycles. For R1143 at 1930 KC.

(b) Rotate the variable plates of the condenser gang until the image of this signal is tuned in at 1170 kilocycles. For R1143 at 1000 KC.

(c) Adjust the two-wire capacitor (Illus. K, Fig. 4) by twisting, until a minimum output is obtained. For R1143 - See (Illus E, Fig 3)

NOTE: R1143 is checked only at 1930 KC. Then readjust at 1690 KC.

(d) Set the signal generator at 2630 kilocycles.

(e) Rotate the variable plates of the condenser gang until the image of this signal is tuned in at 1700 kilocycles.

(f) Adjust the single wire capacitor (Illus. J, Fig. 4) by moving it either toward or away from the coil winding until a minimum output is obtained.

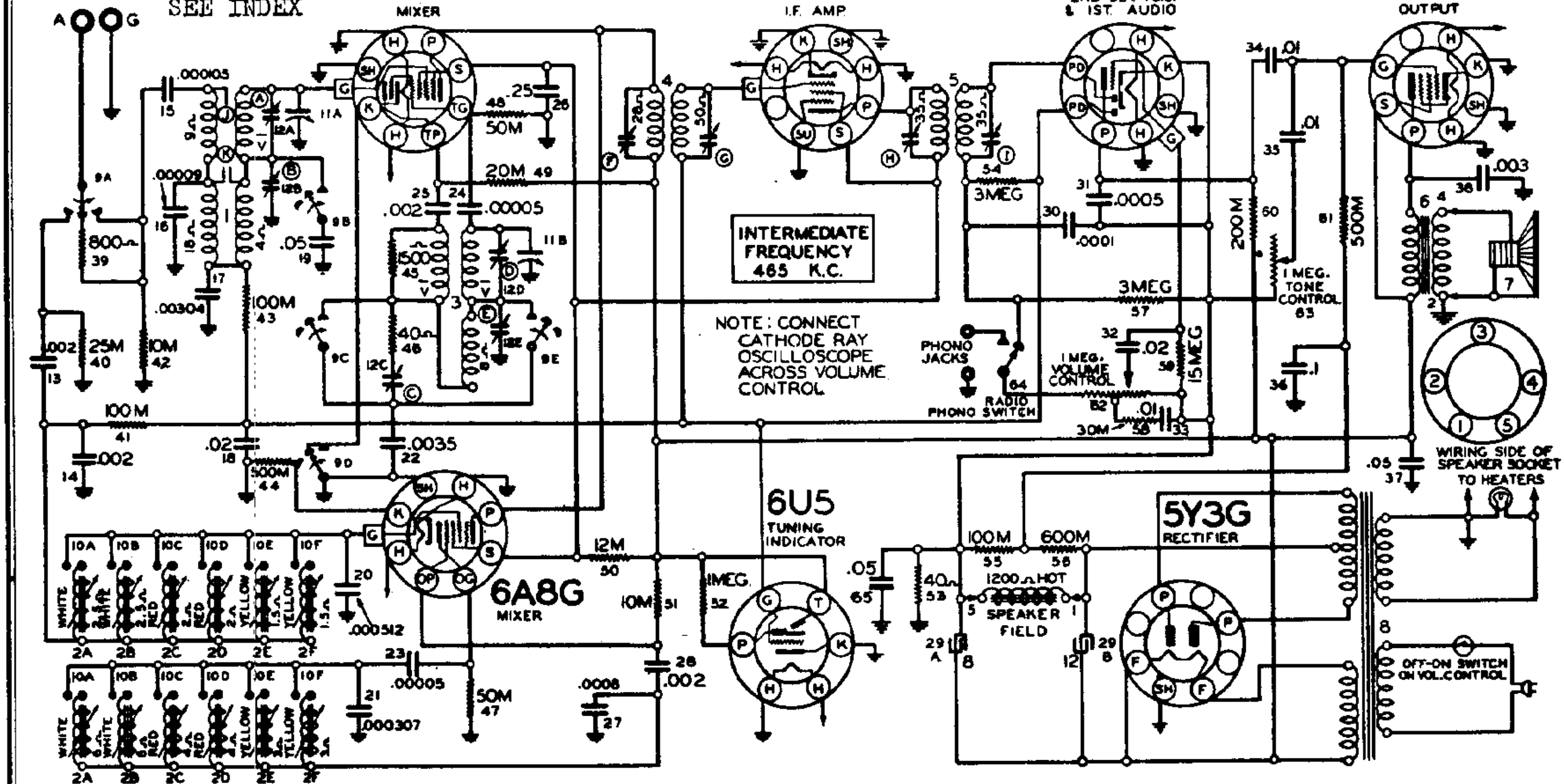
7. Repeat Sections 4 and 5 for Maximum Output

8. Repeat Section 6 for Minimum Output

9. Repeat Section 2 (e) for Maximum Output

UNITED MOTORS SERVICE, INC.

FOR VOLTAGES
SEE INDEX



A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer.

9-8-38

The switch must be in the "radio" position during the alignment procedure

GENERAL: The Delco Model R-1142 is a seven tube, two band superheterodyne receiver with a 10" dynamic speaker. Tuning is accomplished by means of the conventional manual control, or by push button switches which control adjustable permeability tuned coils. The frequency ranges of the push buttons are, left to right:

1. 535 to 820 K.C.
2. 535 to 820 K.C.
3. 730 to 1120 K.C.
4. 730 to 1120 K.C.
5. 1000 to 1560 K.C.
6. 1000 to 1560 K.C.

MODEL R1142 Delco
Socket,Trimmers
Chassis

UNITED MOTORS SERVICE , INC.

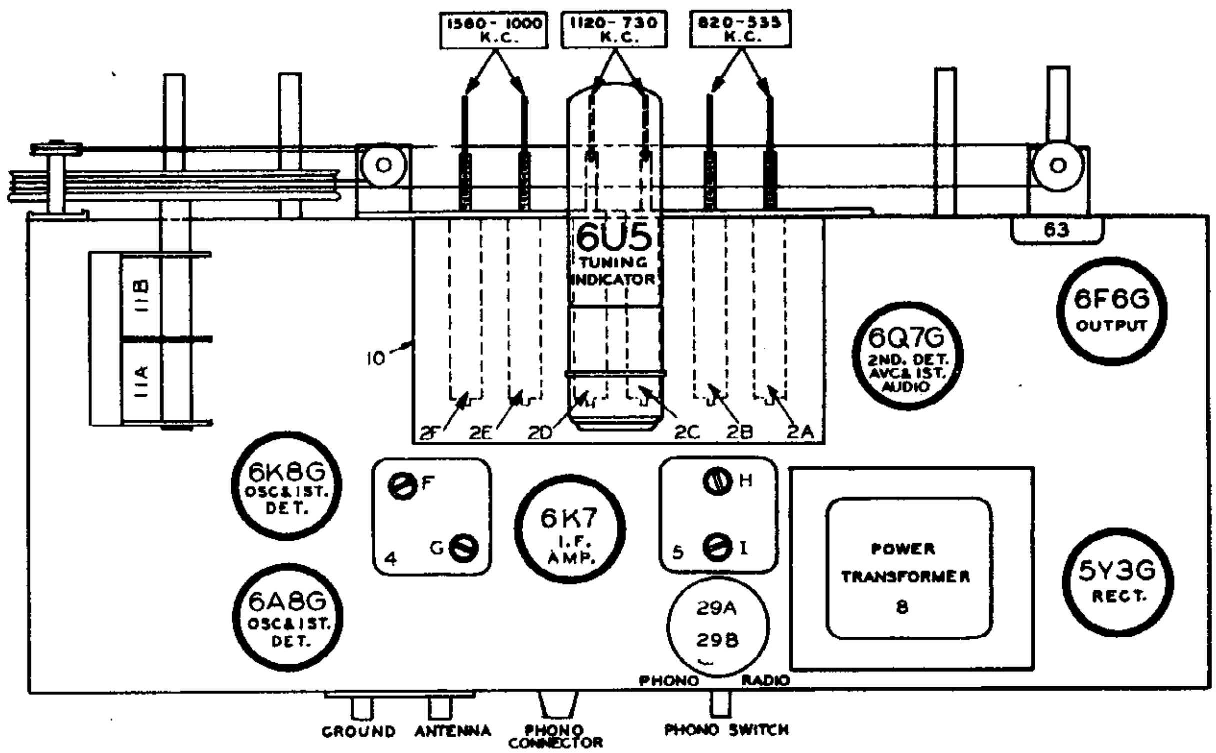


FIG. 3--PARTS LAYOUT--Top View

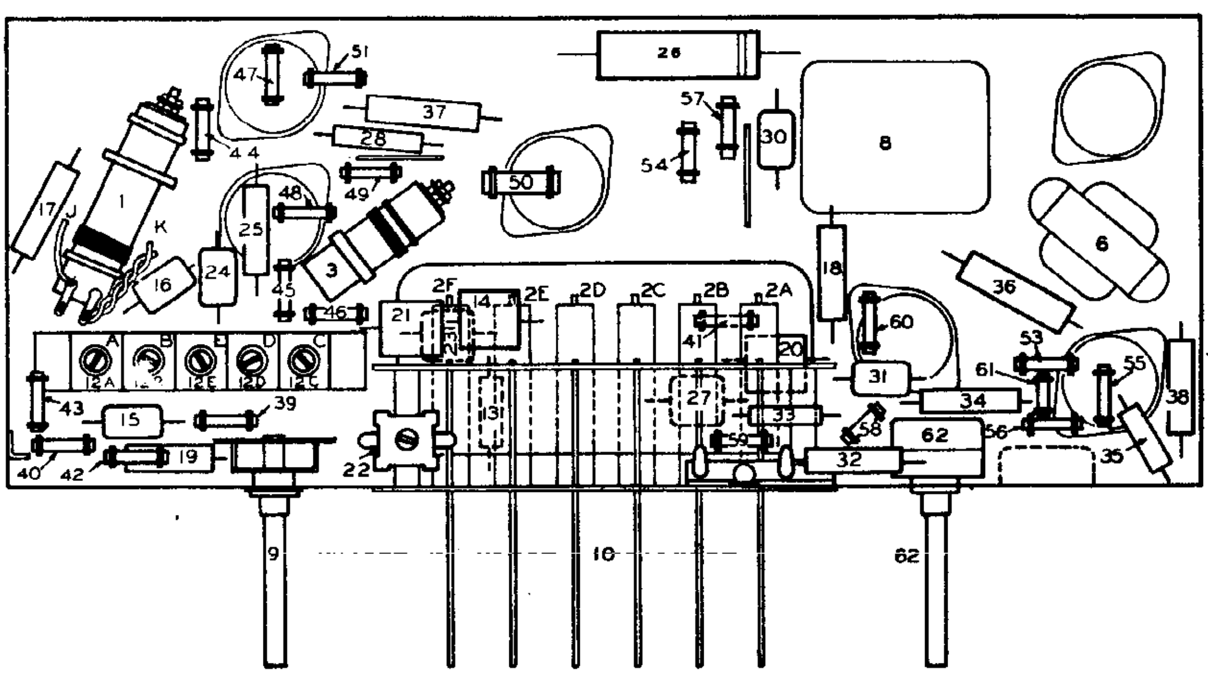


FIG. 4--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE, INC.

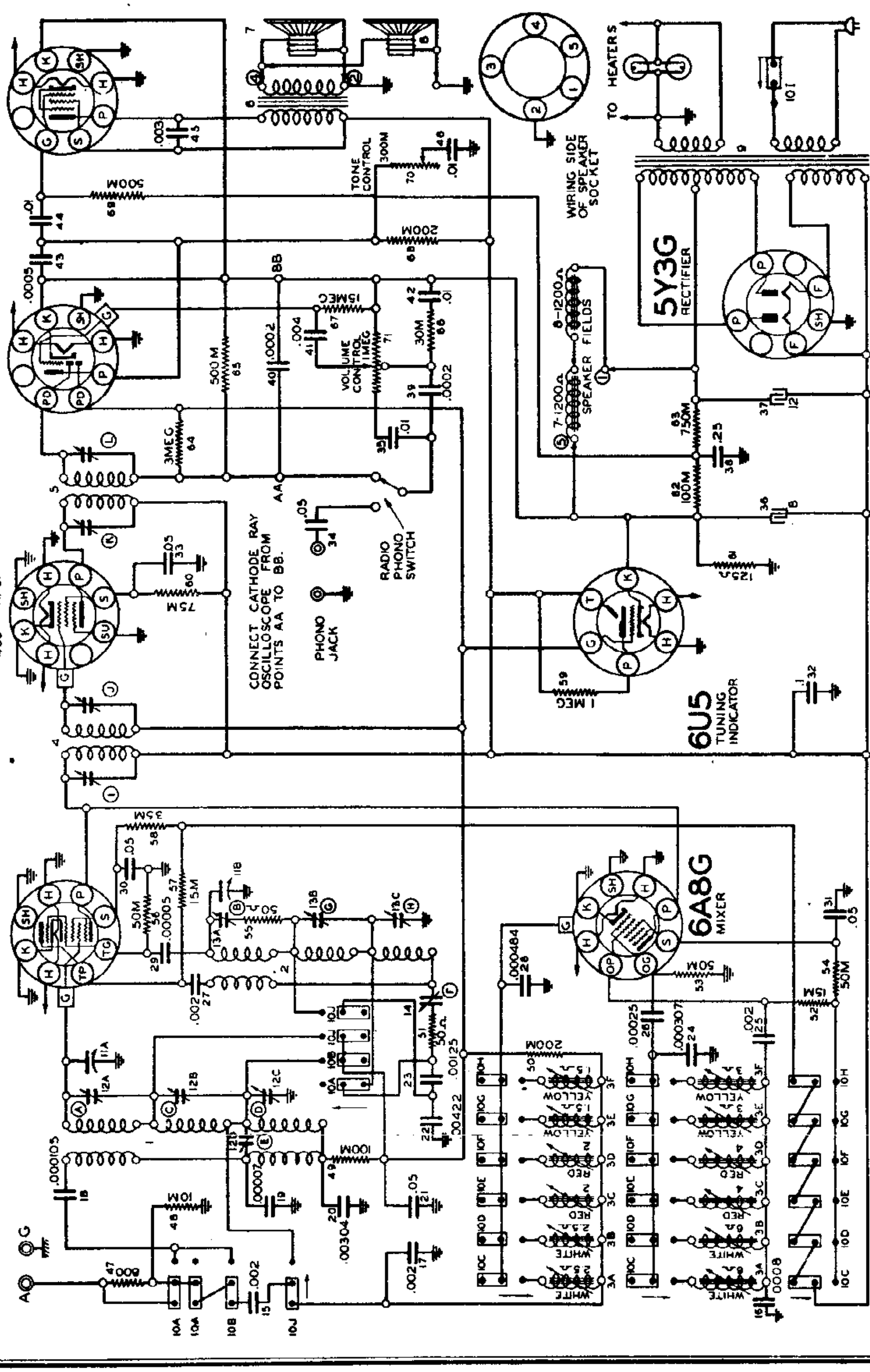


FIG. 2--DELCO MODEL R-1143 CIRCUIT DIAGRAM

IF PEAK 465 KC

FOR ALIGNMENT AND TUNER, SEE INDEX

9-28-38

MODEL R1143 Delco
Socket, Trimmers
Voltage, Chassis

UNITED MOTORS SERVICE, INC.

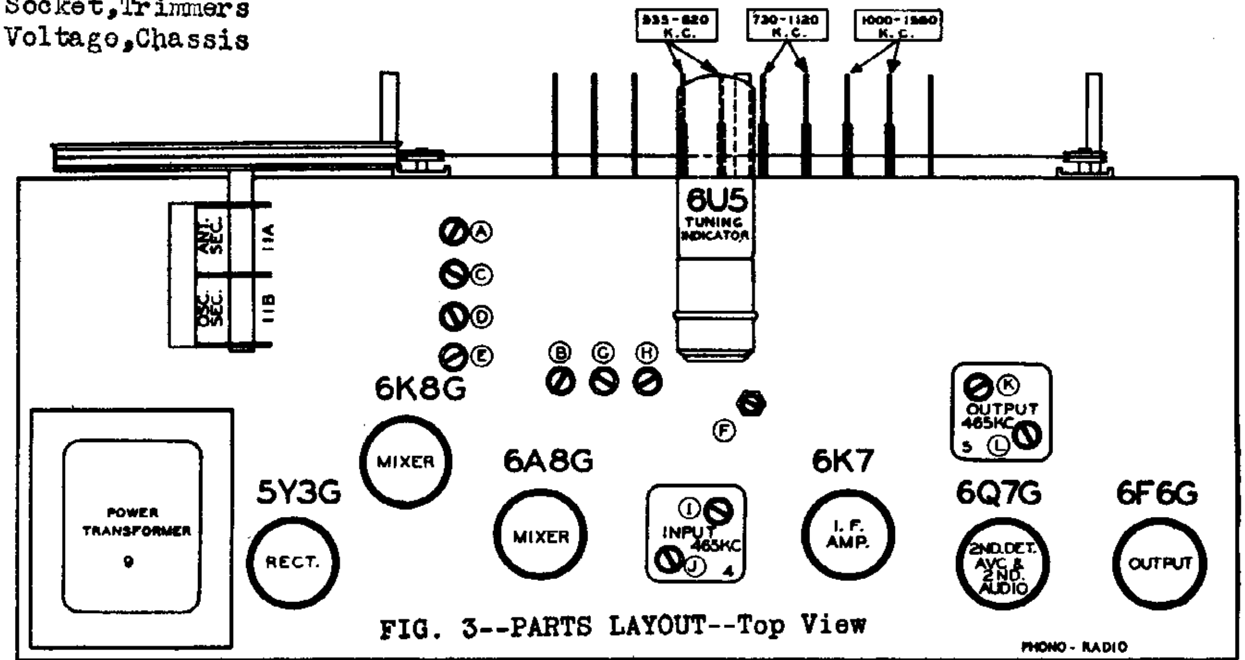


FIG. 3--PARTS LAYOUT--Top View

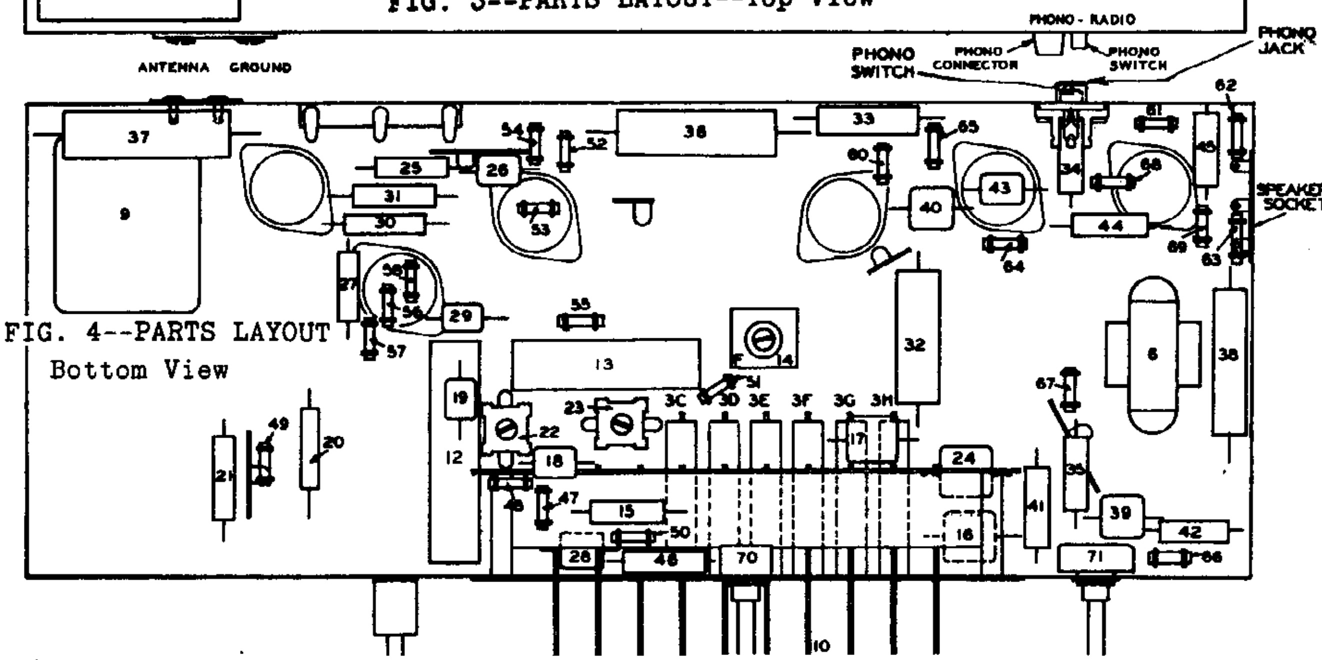


FIG. 4--PARTS LAYOUT
Bottom View

FIG. 1--TUBE SOCKET VOLTAGES

BOTTOM VIEW
OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.

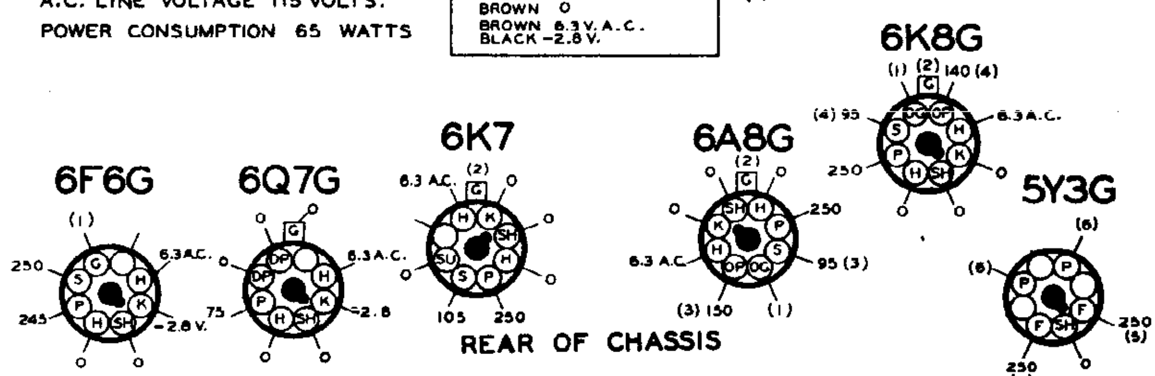
A.C. LINE VOLTAGE 115 VOLTS.

POWER CONSUMPTION 65 WATTS

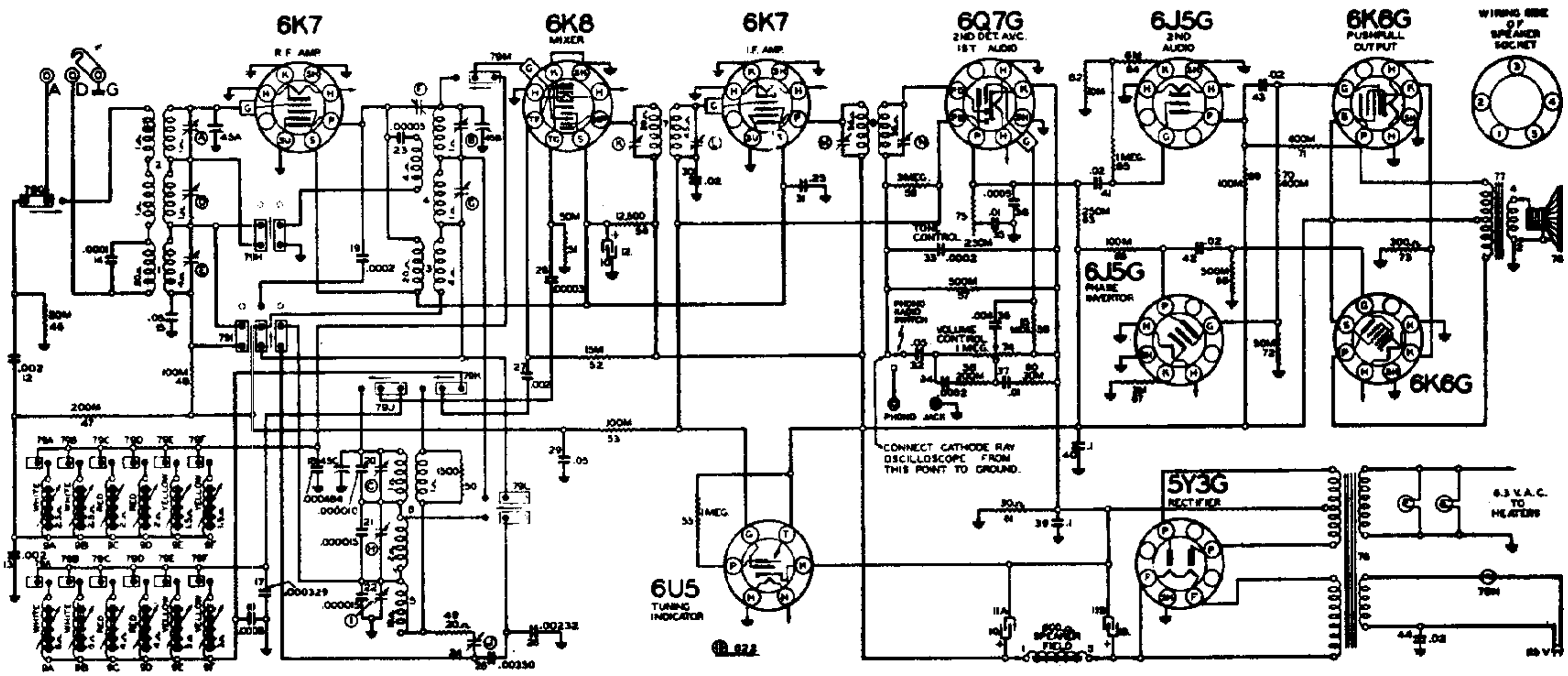
TUNING EYE VOLTAGES AT CHASSIS END OF CABLE.

RED	250 V.
GREEN	0
BROWN	0
BROWN	6.3 V. A.C.
BLACK	-2.8 V.

(1) CANNOT BE READ WITH A VOLT METER
(2) BIAS 2.8V. AS READ ACROSS RESISTOR 61
(3) CAN BE READ ONLY WHEN PUSH BUTTONS 2 TO 7 ARE "IN"
(4) CAN BE READ ONLY WHEN PUSH BUTTONS 8, 9, & 10 ARE "IN"
(5) HEATER VOLTAGE 5.0V. A.C. ACROSS PINS F & F.
(6) 750 V. A.C. AS READ ACROSS PINS P & P.



UNITED MOTORS SERVICE , INC.



FOR TUNER
SEE INDEX

9-2-38

GENERAL: The Delco Model R-1144 is a ten tube, A.C., three band superhetérodyne receiver with a 12" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switches which control adjustable permeability tuned coils. Band switching is accomplished by the same series of switches which are, left to right:

1. Off Switch
2. Broadcast Band (Manual Tuning) 535-1690 K.C.
3. Intermediate Band (Manual Tuning) 1660-5500 K.C.
4. Short Wave Band (Manual Tuning) 5.3 - 18.0 M.C.
5. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
6. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
7. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
8. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
9. Broadcast Band (Automatic Tuning) 520 - 830 K.C.
10. Broadcast Band (Automatic Tuning) 520 - 830 K.C.

A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer. The switch must be in the "radio" position during the alignment procedure.

MODEL R1144 Delco
Socket, Trimmers
Voltage, Chassis

UNITED MOTORS SERVICE INC.

TUBE LAYOUT

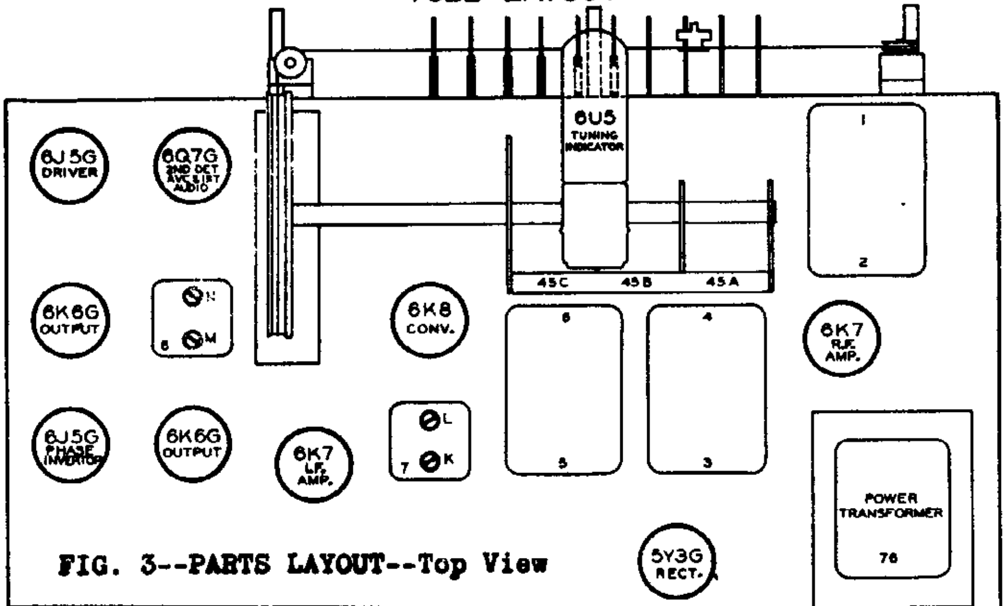


FIG. 3--PARTS LAYOUT--Top View

9-2-38

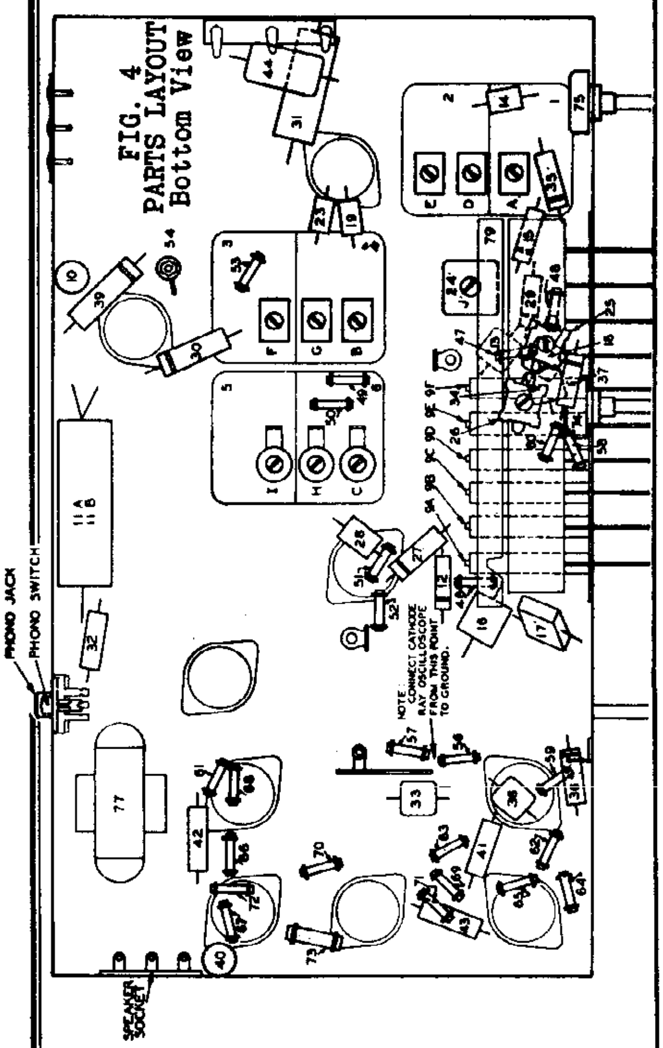
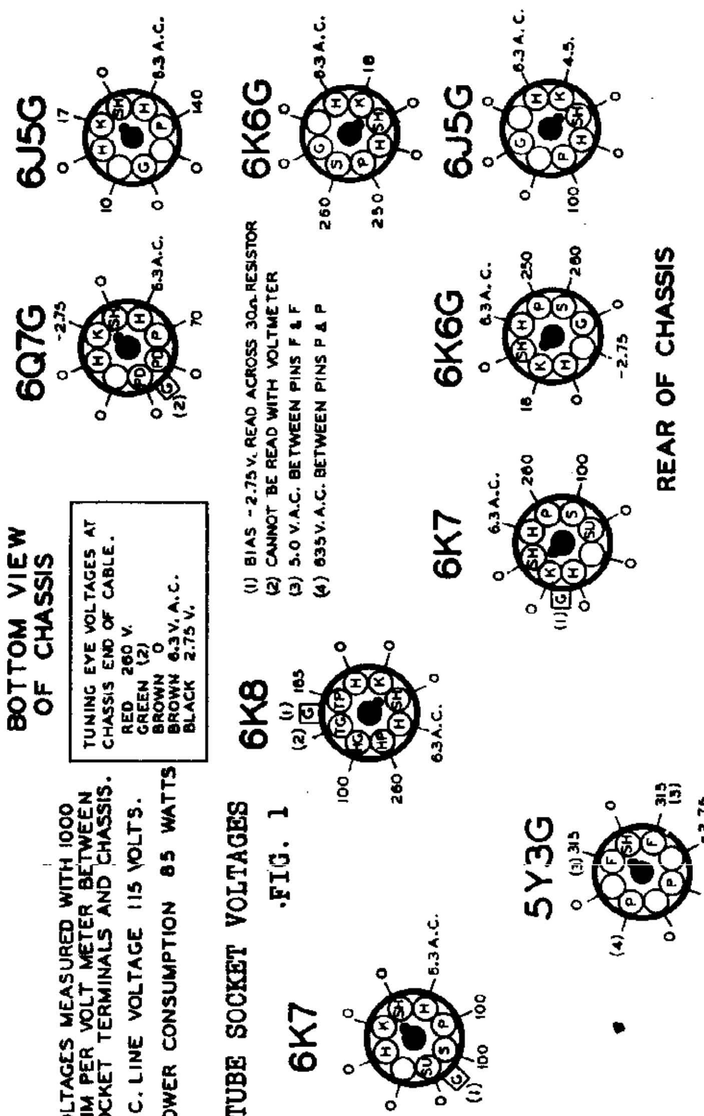


FIG. 4
PARTS LAYOUT
Bottom View



BOTTOM VIEW OF CHASSIS

TUNING EYE VOLTAGES AT CHASSIS END OF CABLE.
RED 260 V.
GREEN (2)
BROWN 0
BROWN 6.3 V.A.C.
BLACK 2.75 V.

(1) BIAS -2.75 V. READ ACROSS 30Ω RESISTOR
(2) CANNOT BE READ WITH VOLTMETER
(3) 5.0 V.A.C. BETWEEN PINS F & F
(4) 635 V.A.C. BETWEEN PINS P & P

REAR OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 85 WATTS

TUBE SOCKET VOLTAGES
FIG. 1

UNITED MOTORS SERVICE, INC.

ALIGNMENT MODEL R1144

1. Aligning I-F Stages at 465 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the signal lead of the signal generator to the grid cap of the 6K8 tube through a .1 mfd. condenser, leaving the grid clip in place.

   (c) Connect the output meter across the plates of the 6K6G tube.

   (d) Press #2 button (Broadcast:Manual), turn the volume control on full and the tone control on treble and turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.

   (e) Set the signal generator to exactly 465 kilocycles and adjust the trimmers on the second I-F coil (Illus. M&M, Fig. 3) and the first I-F coil (Illus. K&L, Fig. 3) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter.

   (f) After completing the Alignment Procedure, the alignment should be checked with the Model 165 Cathode Ray Oscillograph. Connect the oscillograph from point (Fig. 4) to ground.

2. Aligning at 1690 Kilocycles

   (a) Disconnect the signal lead of the signal generator from the grid of the 6K8 and connect to the antenna terminal of the receiver through a .002 mfd. mica condenser.

   (b) With the controls set as before, adjust the broadcast oscillator trimmer for maximum output (Illus. I, Fig. 4).

3. Aligning at 1400 Kilocycles

   (a) Set the signal generator to approximately 1400 kilocycles.

   (b) Rotate the variable section of the condenser gang until the signal is tuned in with maximum output.

   (c) Adjust the antenna trimmer (Illus. E, Fig. 4) and R-F trimmer (Illus. F, Fig. 4) for maximum output.

4. Aligning at 600 Kilocycles

   (a) Set the signal generator to approximately 600 kilocycles.

   (b) Rotate the variable section of the condenser gang until this signal is tuned in with maximum output.

   (c) Adjust the oscillator series condenser (Illus. J, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.

5. Aligning at 17. Megacycles

   (a) Remove the .0002 mfd. condenser and connect the signal lead of the signal generator to the antenna trimmer of the receiver through a 400 ohm resistor.

   (b) Press #4 button (Short Wave Band:Manual).

   (c) Set the signal generator to exactly 17. megacycles and rotate the variable section of the condenser gang to indicate 17. megacycles on the test scale.

   (d) Adjust the oscillator trimmer condenser (Illus. C, Fig. 4) for maximum output.

   (e) Adjust the R-F trimmer condenser (Illus. B, Fig. 4) and antenna trimmer (Illus. A, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.

   (f) Increase the signal output from the signal generator and check for image frequency. If the image does not fall at approximately 1630 megacycles, repeat section 5.

6. Aligning at 5. Megacycles

   (a) Press #3 button (Medium Wave Band:Manual).

   (b) Set the signal generator to exactly 5. megacycles and rotate the variable section of the condenser gang to indicate 5. megacycles on the test scale.

   (c) Adjust the oscillator trimmer condenser (Illus. H, Fig. 4) R-F trimmer (Illus. G, Fig. 4) and antenna trimmer (Illus. D, Fig. 4) for maximum output.

7. Repeat Sections 2, 3 and 4.

ALIGNMENT MODEL R1145

1. Aligning I-F Stages at 465 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the signal lead of the signal generator to the grid cap of the 6K8G tube through a .1 mfd. condenser, leaving the grid cap clip in place.

   (c) Connect the output meter from the plate of the 6AC5G tube to B plus.

   (d) Turn the rotor plates of the gang condenser to a point where no whistles or beat notes are heard.

   (e) Set the signal generator to exactly 465 kilocycles.

   (f) Adjust the trimmers on the first I-F coil (Illus. G & H, Fig. 3) and the second I-F coil (Illus. I & J, Fig. 3) for maximum output.

   (g) After completing the alignment procedure, the alignment should be checked with a cathode ray oscillograph. Connect the oscillograph from the high side of the volume control to ground.

2. Aligning at 1750 Kilocycles

   (a) Remove the signal lead of the signal generator from the grid of the 6K8G and connect to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

   (b) Set the signal generator to exactly 1750 kilocycles.

   (c) Turn the rotor plates of the gang condenser completely out of mesh and against the high frequency stop.

   (d) With the band change switch in the Broadcast position, adjust the oscillator trimmer condenser (Illus. F, Fig. 3) for maximum output.

3. Aligning at 1500 Kilocycles

   (a) Leave the signal generator leads connected as before.

   (b) Set the signal generator to 1500 kilocycles.

   (c) Rotate the variable plates of the gang condenser until this signal is tuned in with maximum output.

   (d) Adjust the antenna trimmer (Illus. A, Fig. 3) for maximum output.

4. Aligning at 600 Kilocycles

   (a) Set the signal generator to 600 kilocycles.

   (b) Rotate the variable plates of the gang condenser until this signal is tuned in with maximum output.

   (c) Adjust the oscillator padder condenser (Illus. C, Fig. 3) while rocking the rotor plates back and forth through the signal until maximum output is obtained.

5. Aligning at 17 Megacycles

   (a) Remove the .0002 mfd. mica condenser coupling the signal generator lead to the antenna terminal of the receiver and replace with a 400 ohm resistor.

   (b) Turn the band change switch to short wave position.

   (c) Set the signal generator to 17 megacycles.

   (d) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.

   (e) Adjust the oscillator trimmer (Illus. E, Fig. 3) and the antenna trimmer (Illus. B, Fig. 3) for maximum output.

6. Aligning at 6 Megacycles

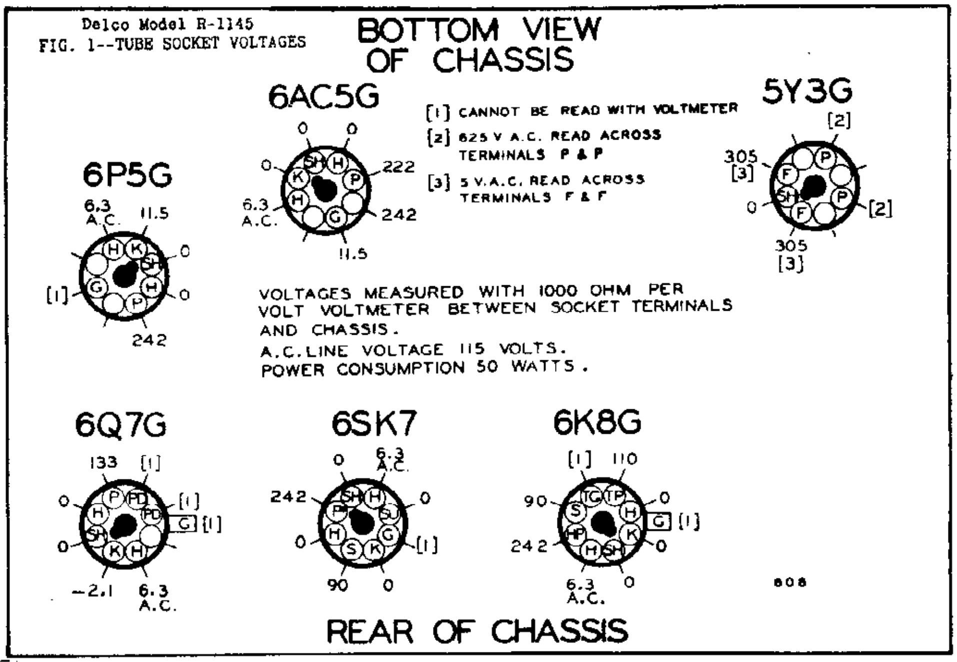
   (a) Set the signal generator to 6 megacycles.

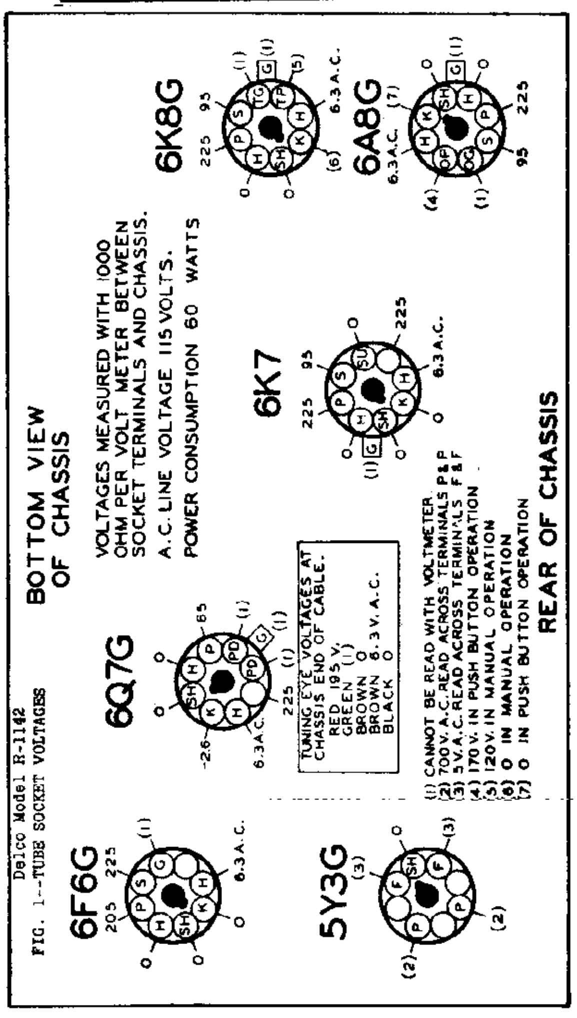
   (b) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.

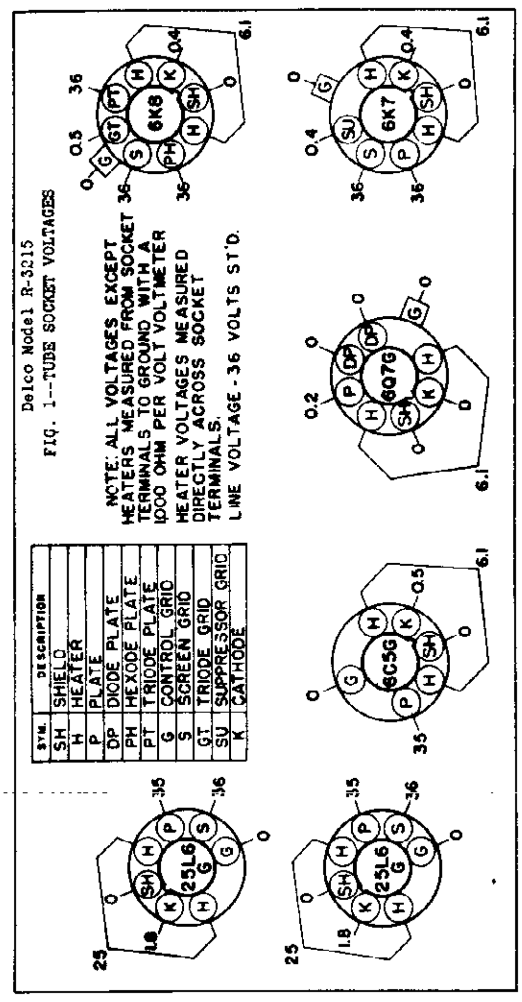
   (c) Adjust the oscillator padding condenser (Illus. D, Fig. 3) while rocking the rotor plates back and forth through the signal until maximum output is obtained.

MODEL R1142 Delco
MODEL R1145 Delco
MODEL R3215 Delco
Voltage

UNITED MOTORS SERVICE INC.







UNITED MOTORS SERVICE ,INC.

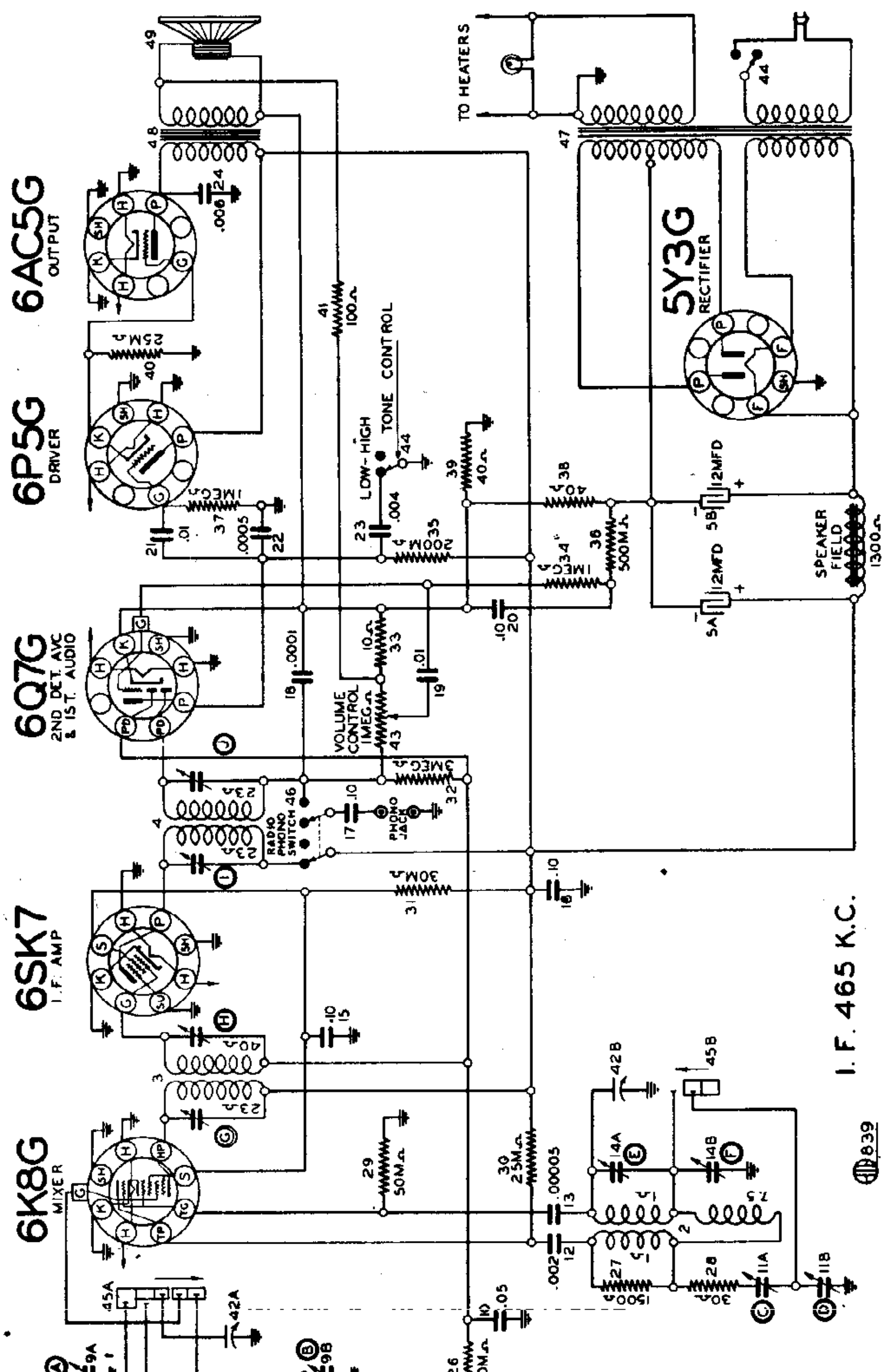


FIG. 2--DELCO MODEL R-1145 CIRCUIT DIAGRAM

Date: 3-24-39

MODEL R1145 Delco
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE, INC.

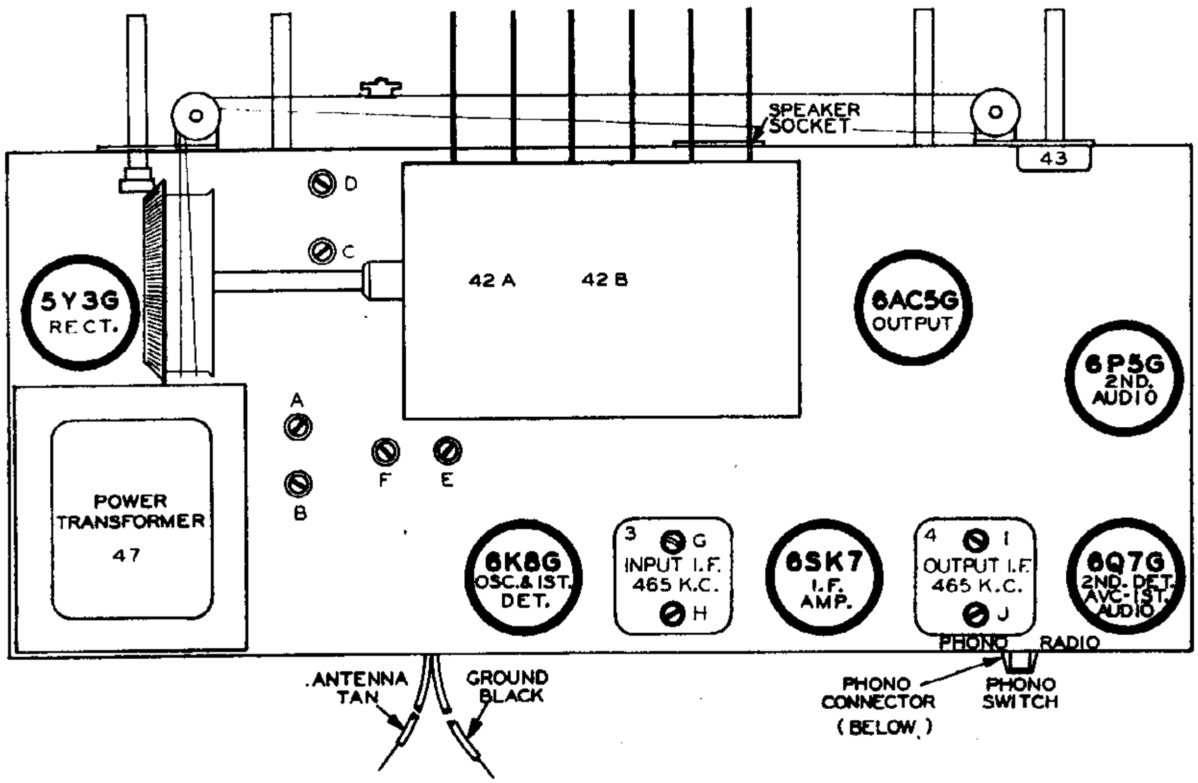


FIG. 3--PARTS LAYOUT--Top View

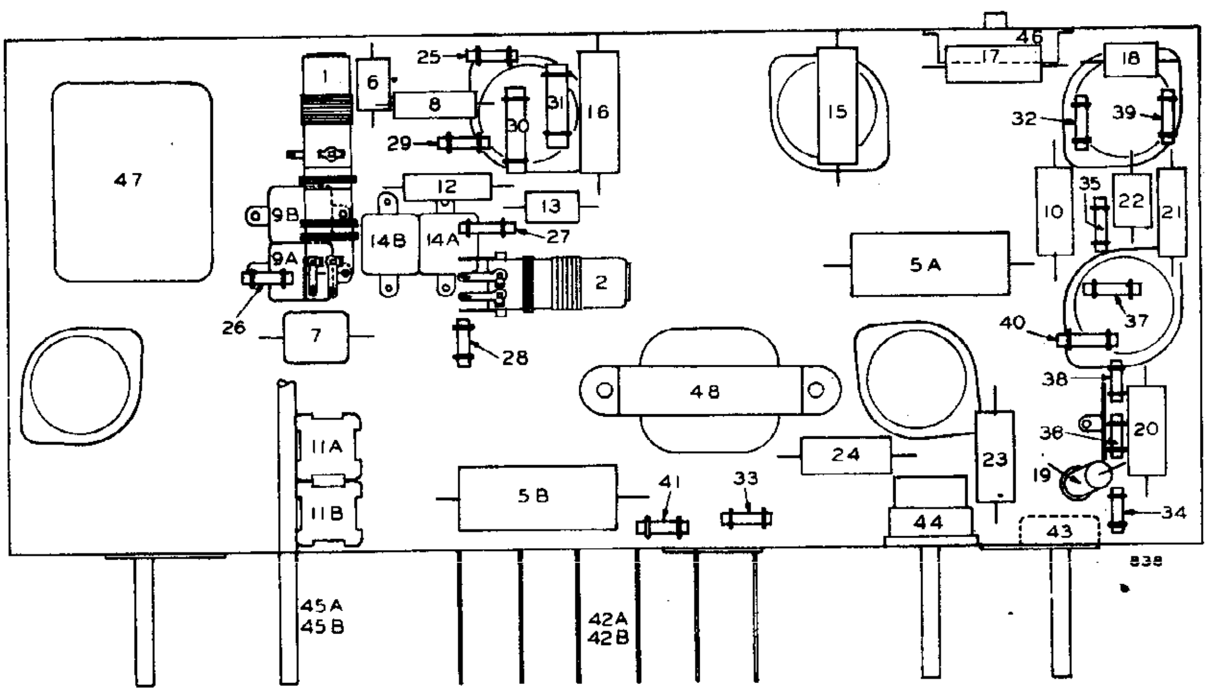
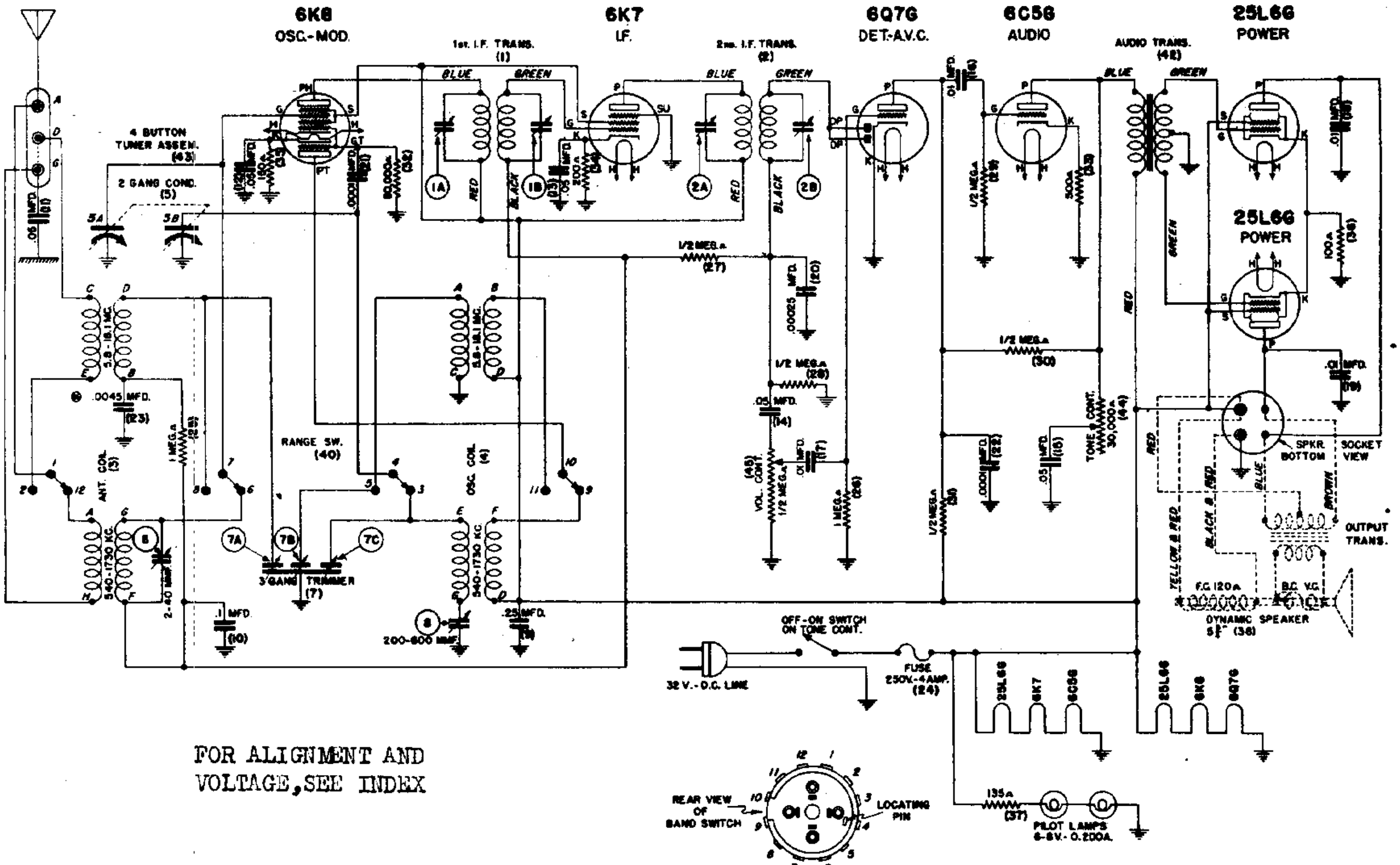


FIG. 4--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE, INC.



FOR ALIGNMENT AND VOLTAGE, SEE INDEX

FIG. 2--DELCO MODEL R-3215 CIRCUIT DIAGRAM

3-24-39

GENERAL: The Delco Model R-3215 is a six tube, two band, 32 volt radio with A.V.C. and tone control.

MODEL R3215 Delco
Socket,Trimmers
Chassis

UNITED MOTORS SERVICE ,INC.

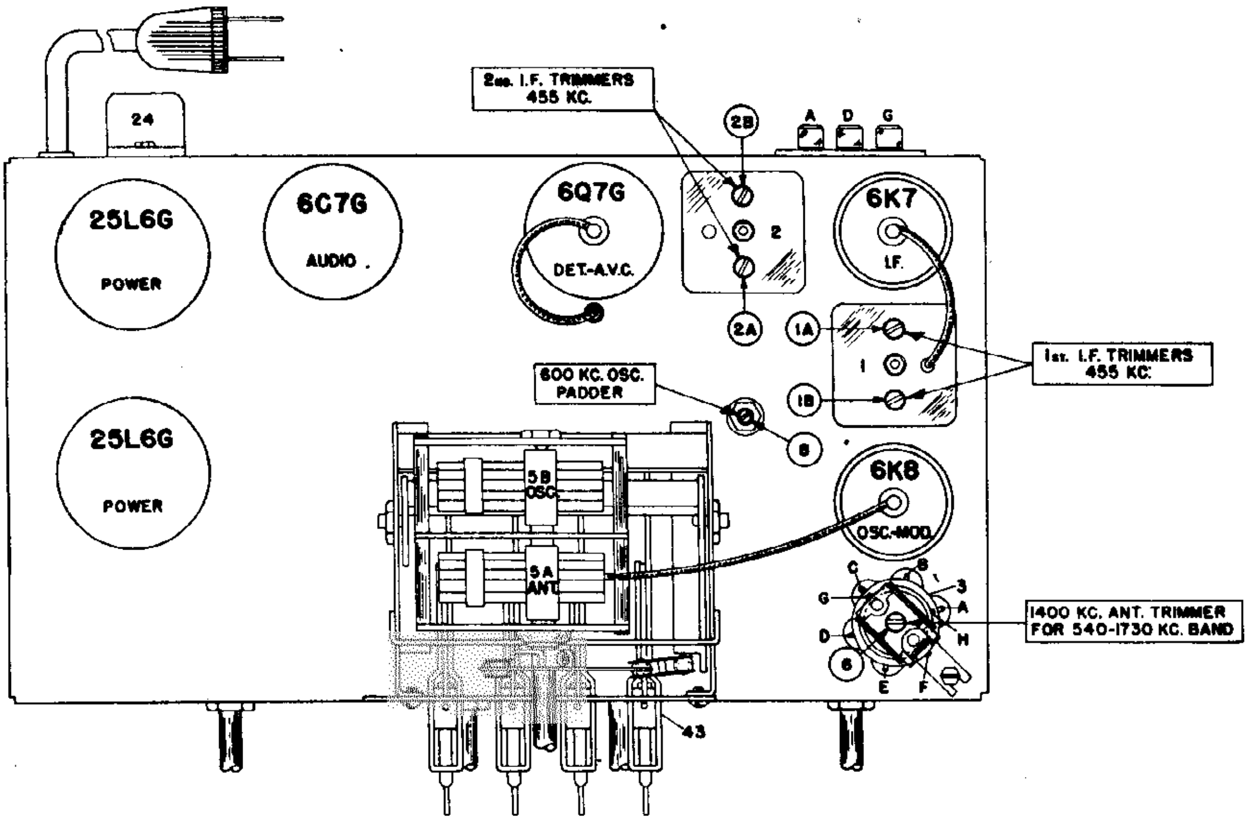
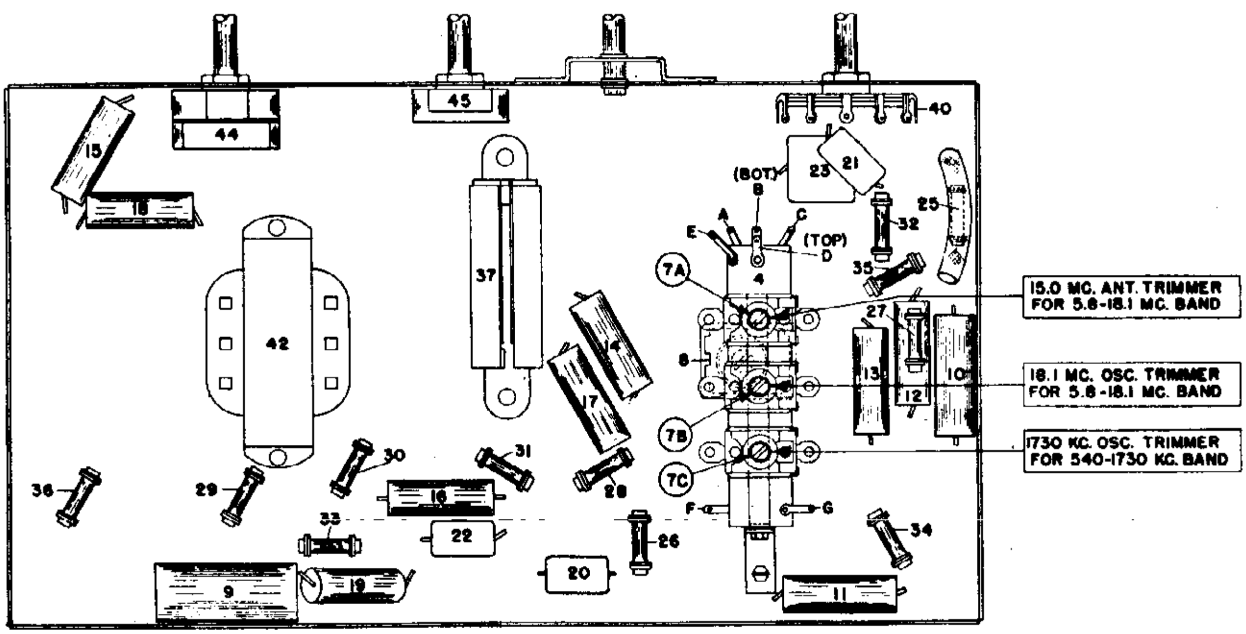


FIG. 3--PARTS LAYOUT--Top View

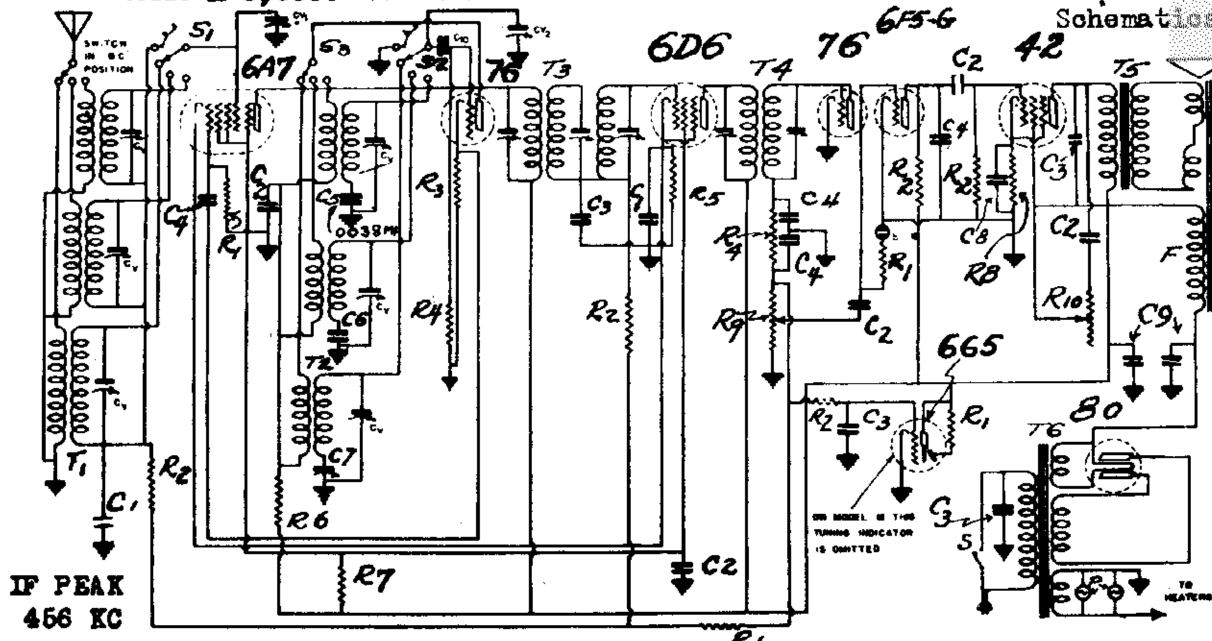


3-24-39

FIG. 4--PARTS LAYOUT--Bottom View

WALGREEN CO.

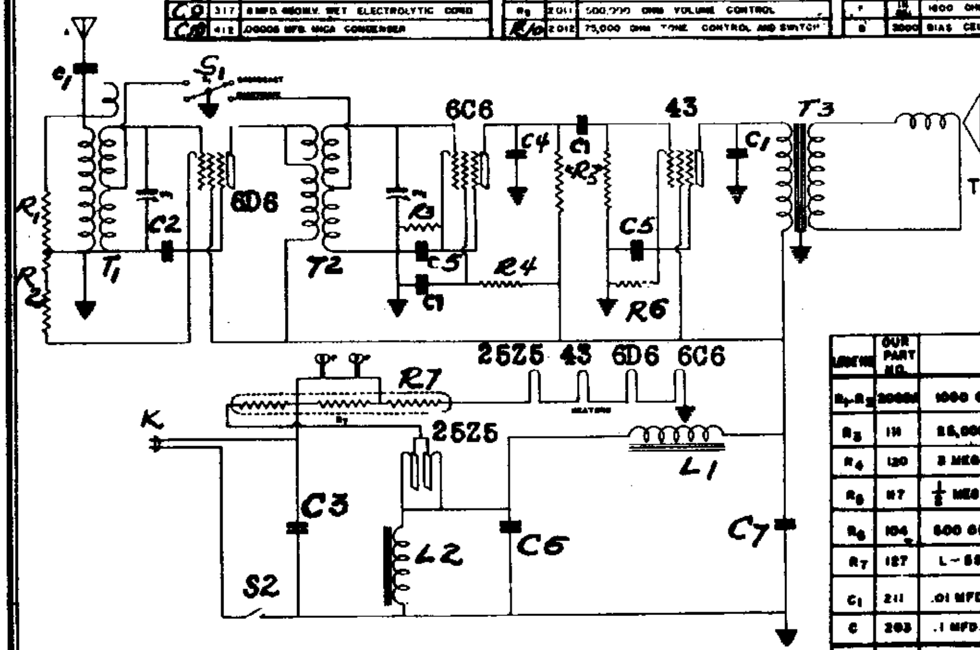
MODELS M-8,800. 8(7) TUBE 3 BAND SUPERHETERODYNE RECEIVER - AC



LEGEND	OUR PART NO.	DESCRIPTION
C1	208	1 MFD - 200V TUBULAR CONDENSER
C2	208	.05 MFD - 400V TUBULAR CONDENSER
C3	2[illegible]	[illegible] MFD - 400V TUBULAR CONDENSER
C4	40[illegible]	.00025 MICA CONDENSER
C5	4[illegible]	.0048 MICA CONDENSER
C6	4[illegible]	.00[illegible] MICA CONDENSER
C7	532	5 PLATE PADDING CONDENSER
C8	300	3-30 MFD. TRIMMER CONDENSERS
C9	36[illegible]	.0 MFD 25 W.V. TUBULAR ELECTROLYTIC COND.
C0	317	8 MFD. 450 W.V. WET ELECTROLYTIC COND
C10	412	.00005 MFD. MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV1 CV2	611	2 Gang VARIABLE CONDENSER
R1	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R2	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R3	105	1,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R4	113	50,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R5	103	250 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R6	111	25,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R7	112	25,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR
R8	133	420 OHMS 2 WATT WIRE WOUND RESISTOR
R9	2011	500,000 OHM VOLUME CONTROL
R10	2012	75,000 OHM TONE CONTROL AND SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
T1	1215	SHIELDED 3 BAND ANTENNA COIL
T2	1406	SHIELDED 3 BAND OSCILLATOR COIL
T3	1500	TRIPLE TUNED I.F. TRANSFORMER
T4	1506	DIODE I.F. TRANSFORMER
T5	IN [illegible]	SPKR TRANSFORMER
T6	1012	POWER TRANSFORMER
S1 S2 S3	1913	2 GANG BAND SWITCH
P	2902	MAZDA #46 PILOT LIGHT
S	—	SWITCH ON TONE CONTROL
F	IN [illegible]	1800 OHM SPEAKER FIELD
B	3000	BIAS CELL



MODEL 30

TWO BAND RECEIVERS *AC-DC* TYPE.

C3	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
C4	401	.00025 MFD. MICA CONDENSER
C5	IN 308	10 MFD. 35 VOLT PEAK ELECTROLYTIC CONDENSER
C6	IN 308	20 MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER
C7	IN 308	10 MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER
T1	1205	TWO BAND ANTENNA TRANSFORMER
T2	1305	TWO BAND INTERSTAGE TRANSFORMER
L2	604	SPEAKER FIELD (2500 OHM)

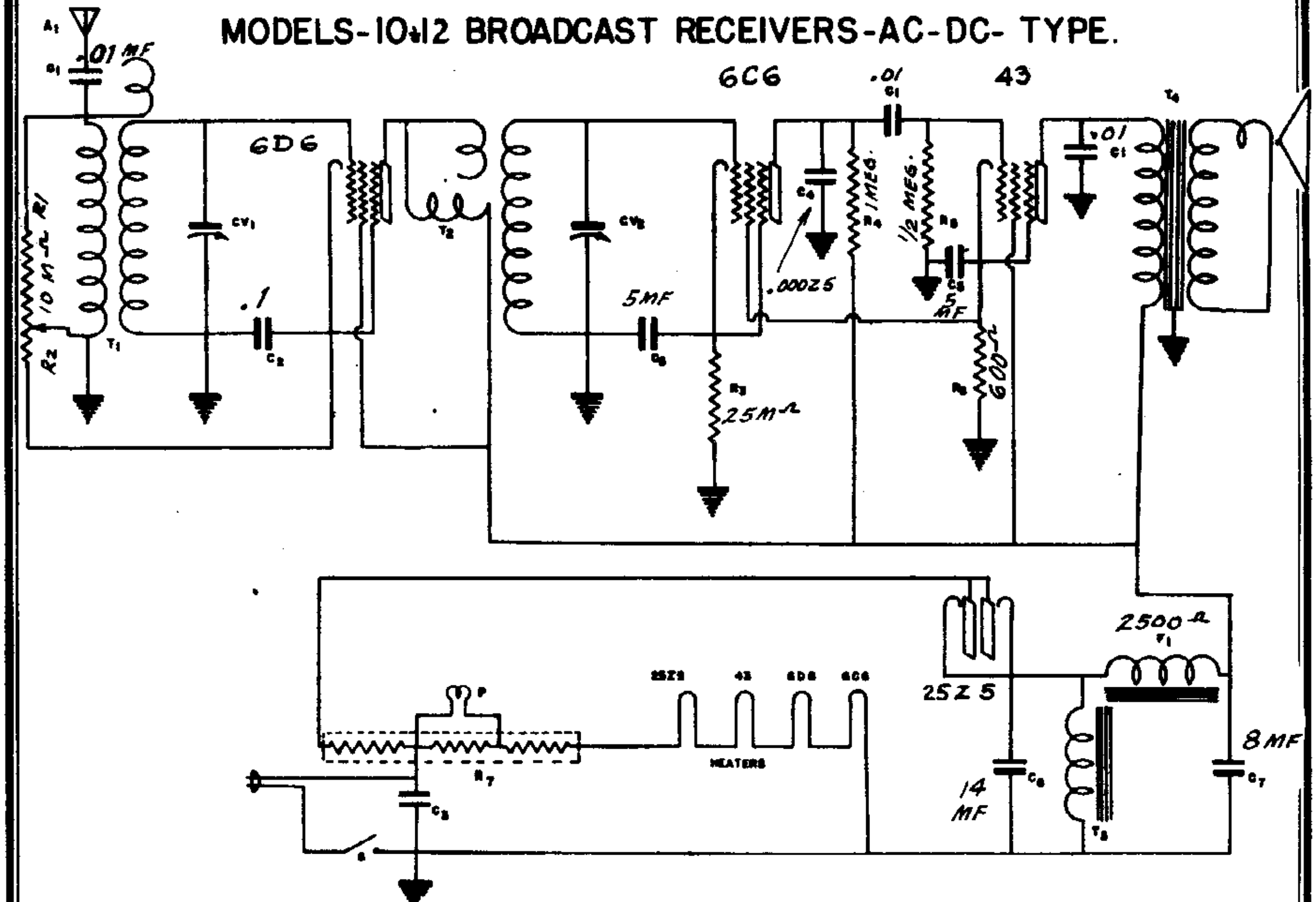
LEGEND	OUR PART NO.	DESCRIPTION
R1-R2	2000	1000 OHM VOLUME CONTROL (275 OHM MIN.)
R3	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R4	120	3 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R5	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R6	104	500 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R7	127	L-55-S2 BALLAST TUBE
C1	211	.01 MFD. 400 VOLT TUBULAR CONDENSER
C	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
T3	604-A	5" DYNAMIC SPEAKER TRANSFORMER
L1	600	IRON CORE FILTER CHOKE
A	1005	20 FEET INDOOR AERIAL
P	2902	MAZDA #46 POLIT LIGHT
S1	1902	BAND SELECTOR SWITCH
S	—	LINE SWITCH ON VOLUME CONTROL
CV1 CV2	601	TWO GANG VARIABLE CONDENSER
K	1800	RUBBER COVERED LINE CORD

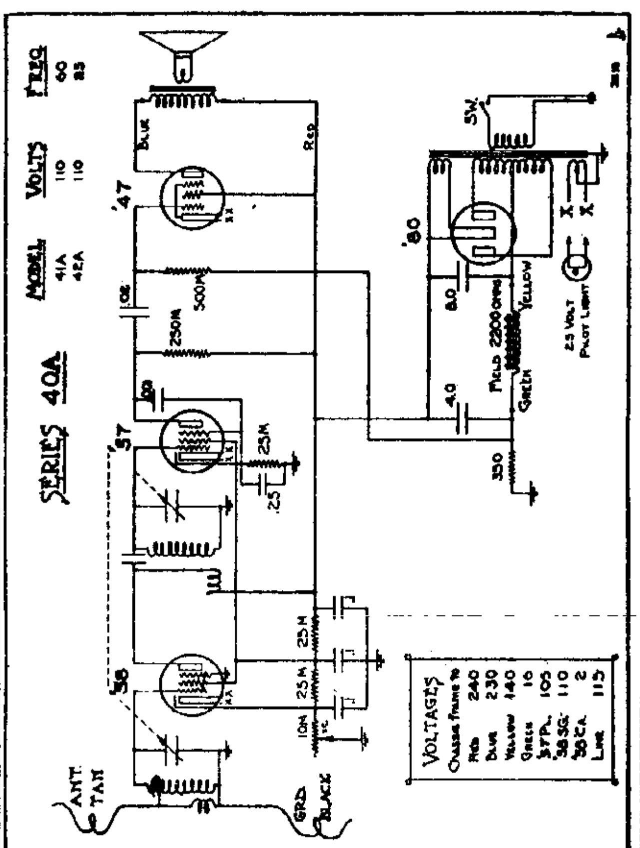
MODELS 10,12
MODELS 41,42

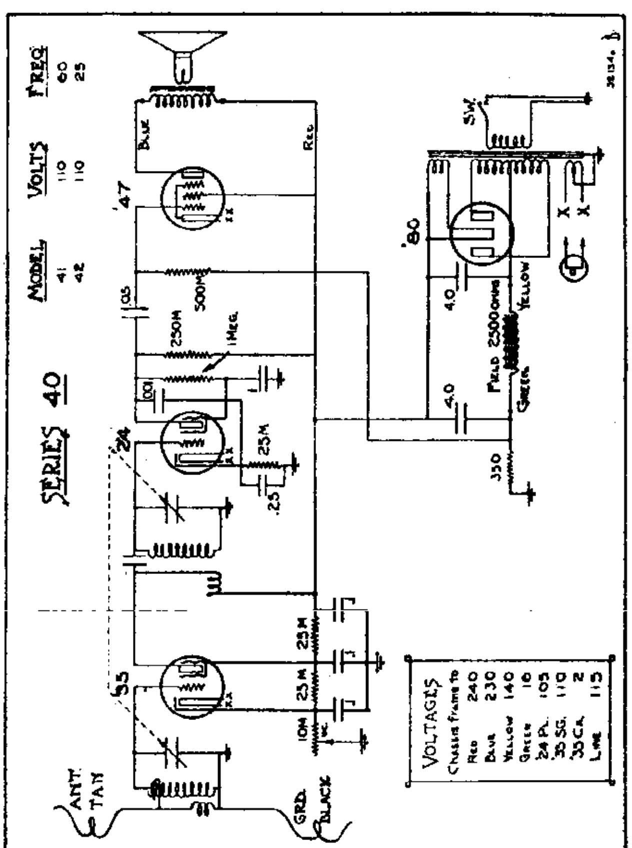
WALGREEN CO.

MODELS 41A,42A
Schematics

MODELS-10&12 BROADCAST RECEIVERS-AC-DC- TYPE.







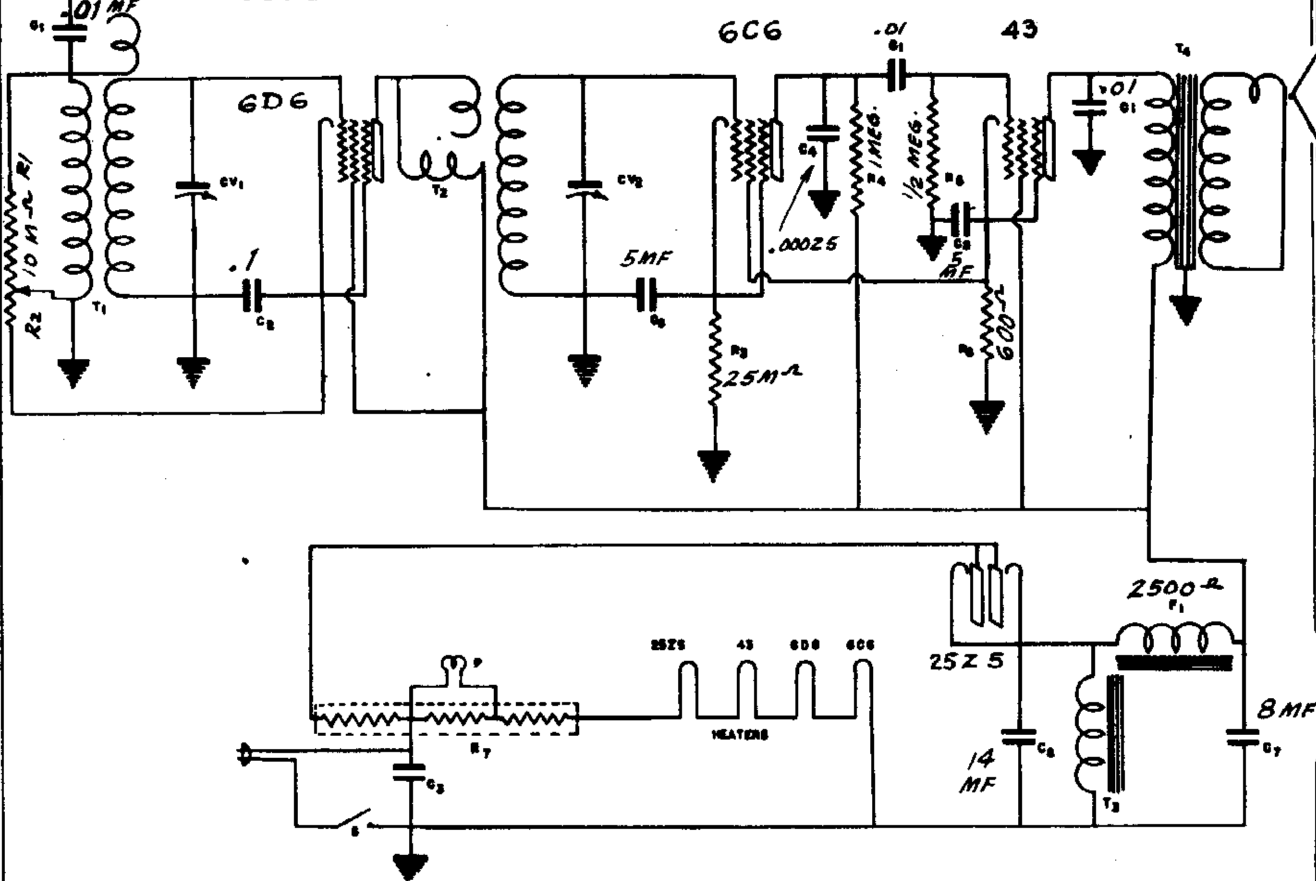
DECIMAL ARE MICROFARADS. WHOLE NUMBERS ARE OHMS.

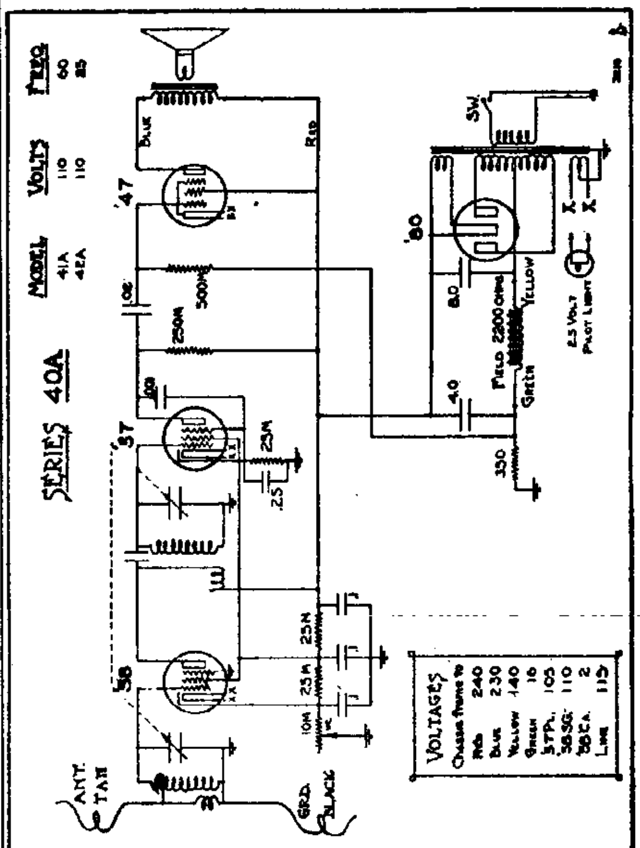
MODELS 10,12
MODELS 41,42

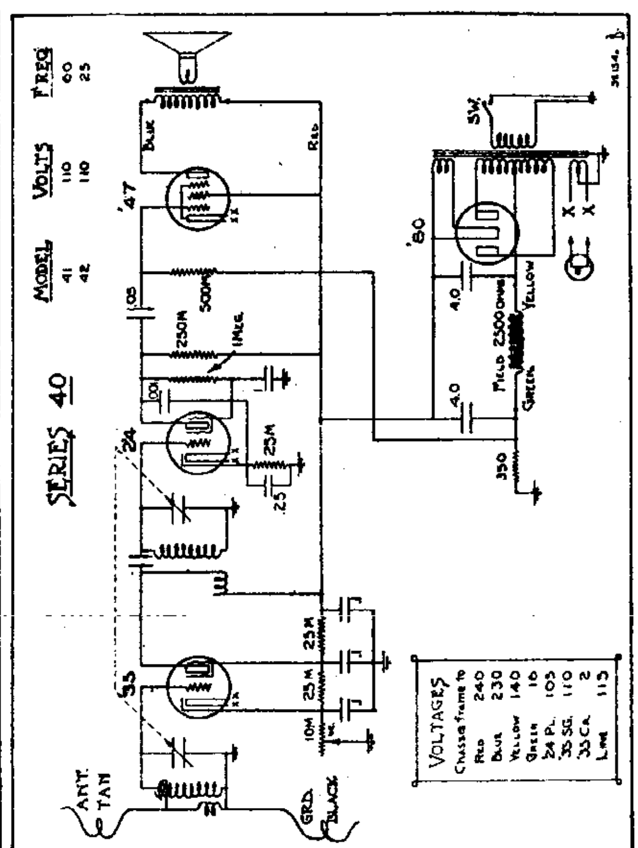
WALGREEN CO.

MODELS 41A,42A
Schematics

MODELS-10&12 BROADCAST RECEIVERS-AC-DC- TYPE.





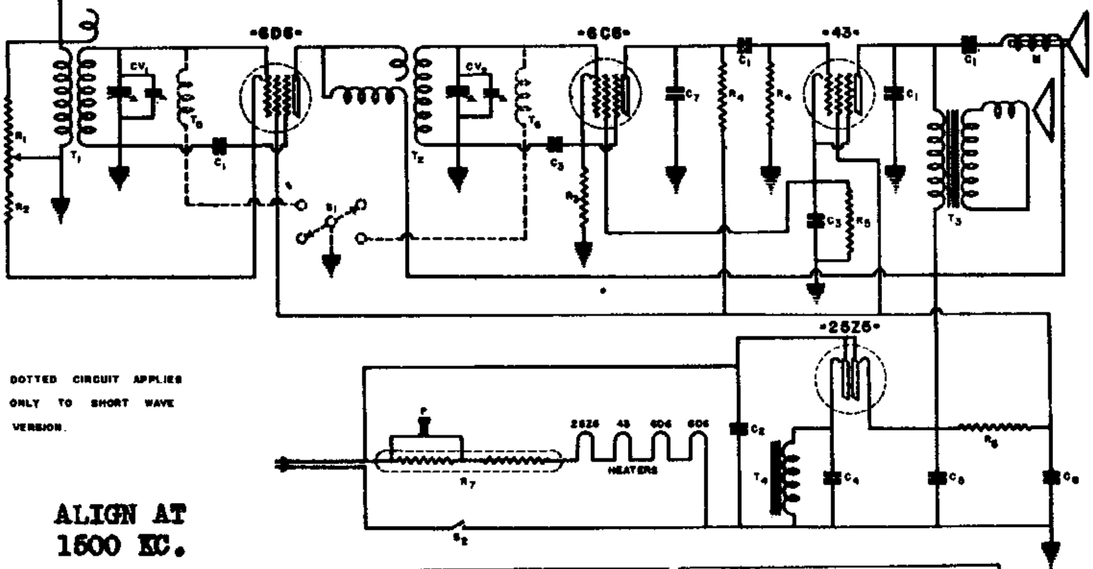


DECIMAL ARE MICROFARADS. WHOLE NUMBERS ARE OHMS.

WALGREEN CO.

5 TUBE TRF TWIN SPEAKER RECEIVER — AC-DC TYPE —

MODEL R - 31 CHASSIS R



DOTTED CIRCUIT APPLIES ONLY TO SHORT WAVE VERSION.

ALIGN AT 1500 KC.

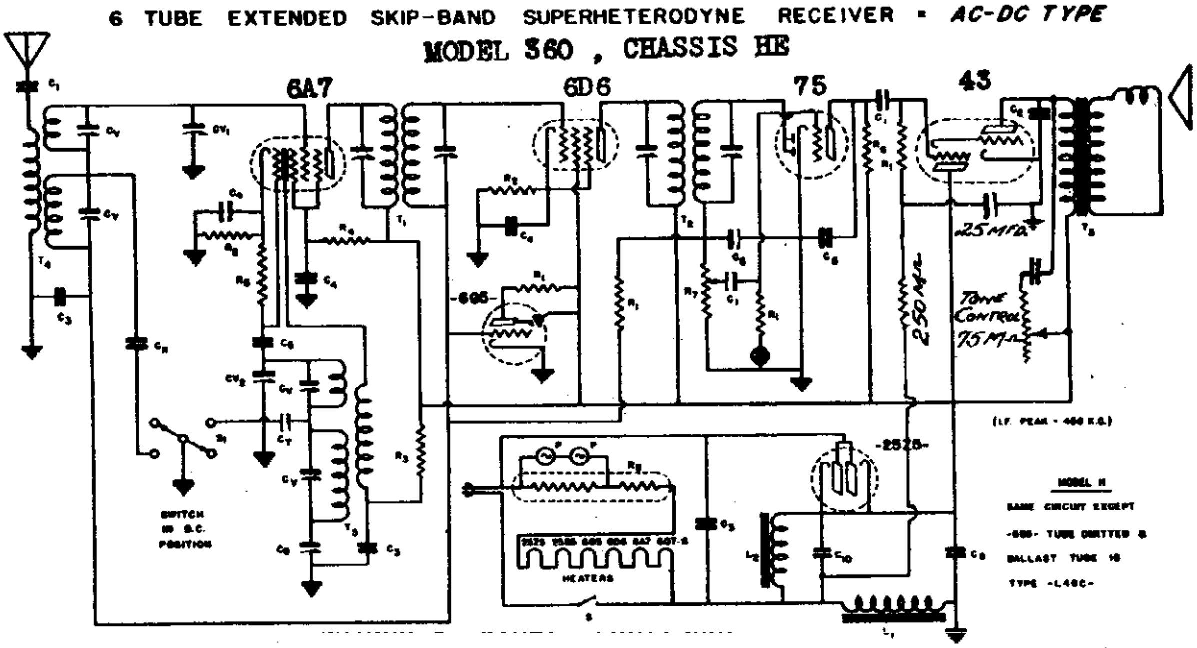
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	117	500,000 OHM ½ WATT CARBON RESISTOR
R_5	104	600 OHM ½ WATT CARBON RESISTOR
R_6	108	8000 OHM ½ WATT CARBON RESISTOR
R_7	2903	L-55-B BALLAST TUBE
P	2802	MAZDA # 46 PILOT LIGHT

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	610	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	IN 316	5MFD. 25W.V. ELECTROLYTIC CONDENSER
C_4	IN 316	4MFD. 150W.V. ELECTROLYTIC CONDENSER
C_5	IN 316	14MFD. 150W.V. ELECTROLYTIC CONDENSER
C_6	IN 316	8MFD. 150W.V. ELECTROLYTIC CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
M	900	MAGNETIC SPEAKER

LEGEND	OUR PART NO.	DESCRIPTION
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1200	ANTENNA COIL
T_2	1300	RF COIL
T_3	IN 810	SPEAKER OUTPUT TRANSFORMER
T_4	IN 810	2500 OHM SPEAKER FIELD
T_5	1612	SHORT WAVE ANTENNA SHUNT
T_6	1612	SHORT WAVE RF SHUNT

6 TUBE EXTENDED SKIP-BAND SUPERHETERODYNE RECEIVER - AC-DC TYPE

MODEL 360 , CHASSIS HE



(I.F. PEAK - 456 K.C.)

MODEL H
SAME CIRCUIT EXCEPT
-6B5- TUBE OMITTED &
BALLAST TUBE IS
TYPE -L49C-

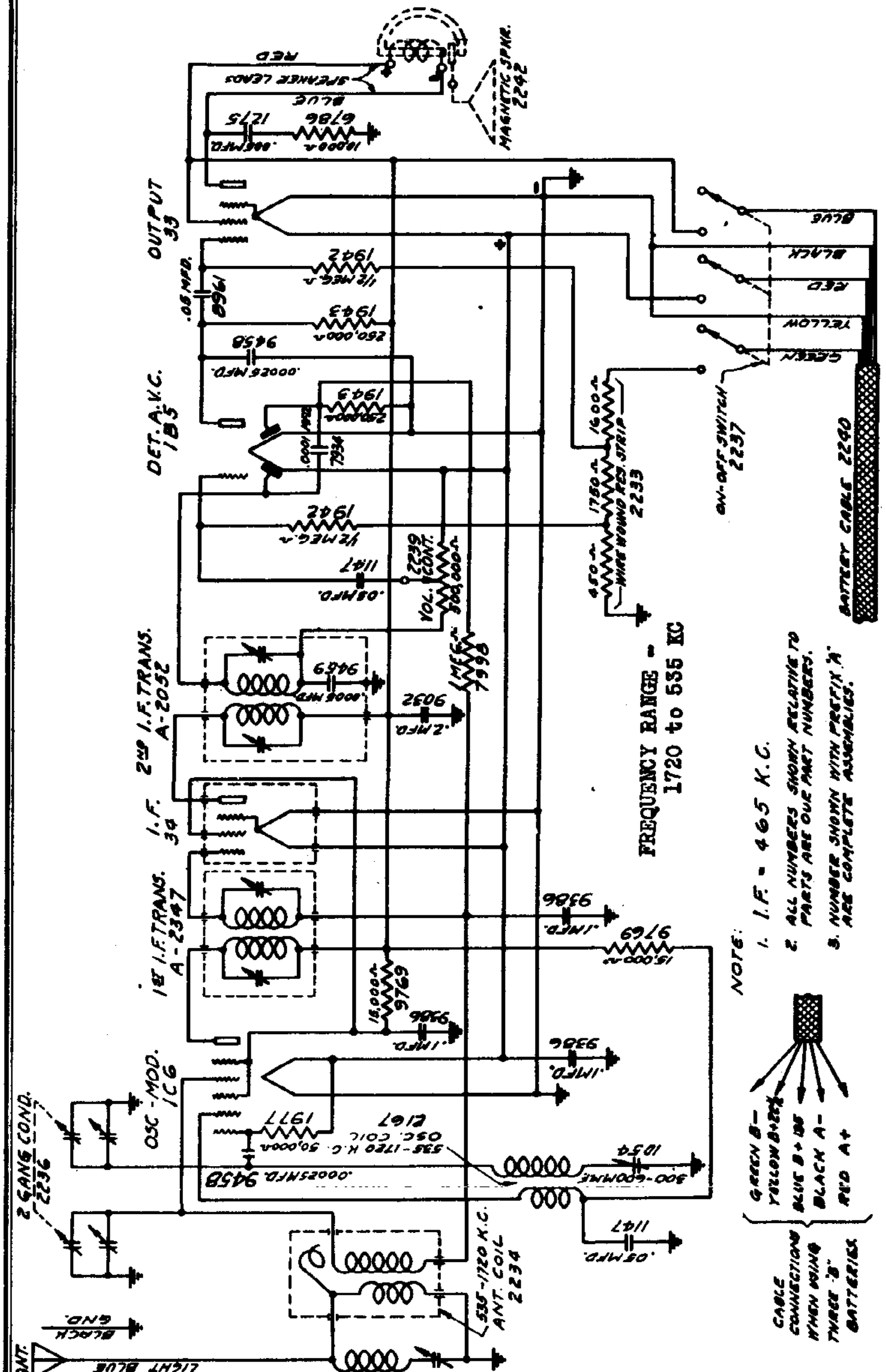
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400V TUBULAR CONDENSER
C_2	206	.05 MFD-400V TUBULAR CONDENSER
C_3	210	.1 MFD-400V TUBULAR CONDENSER
C_4	208	.1 MFD-200V TUBULAR CONDENSER
C_5	400	.0001 MICA CONDENSER
C_6	401	.00025 MICA CONDENSER
C_7	411	.00125 MICA CONDENSER
C_8	507	5 PLATE PADDING CONDENSER
C_9	314	10 MFD 150W.V. ELECTROLYTIC COND.
C_{10}	311	20 MFD 150 W.V. ELECTROLYTIC COND.

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER
R_1	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_2	103	250 OHMS ½ WATT CARBON RESISTOR
R_3	109	10,000 OHMS ½ WATT CARBON RESISTOR
R_4	111	25,000 OHMS ½ WATT CARBON RESISTOR
R_5	113	50,000 OHMS ½ WATT CARBON RESISTOR
R_6	116	250,000 OHMS ½ WATT CARBON RESISTOR
R_7	2009	50,000 OHMS VOLUME CONTROL & SWITCH
R_8	2905	L-49-C BALLAST TUBE (MODEL H)
R_8	2906	L-42-C BALLAST TUBE (MODEL HE)
C	212	.05 MFD - 200 V TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1503	1st I.F. TRANSFORMER
T_2	1506	DIODE I.F. TRANSFORMER (2500 OHMS)
T_3	IN 805	SPEAKER OUTPUT TRANSFORMER
T_4	1210	ANTENNA COIL
T_5	1404	OSCILLATOR COIL
L_1	1101	CHOKE
L_2	IN 805	SPEAKER FIELD (2500 OHMS)
S_1	1914	BAND SELECTOR SWITCH
S	—	SWITCH ON TONE CONTROL
P	2802	MAZDA #46 PILOT LIGHT

MODEL 32B
Schematic
Alignment

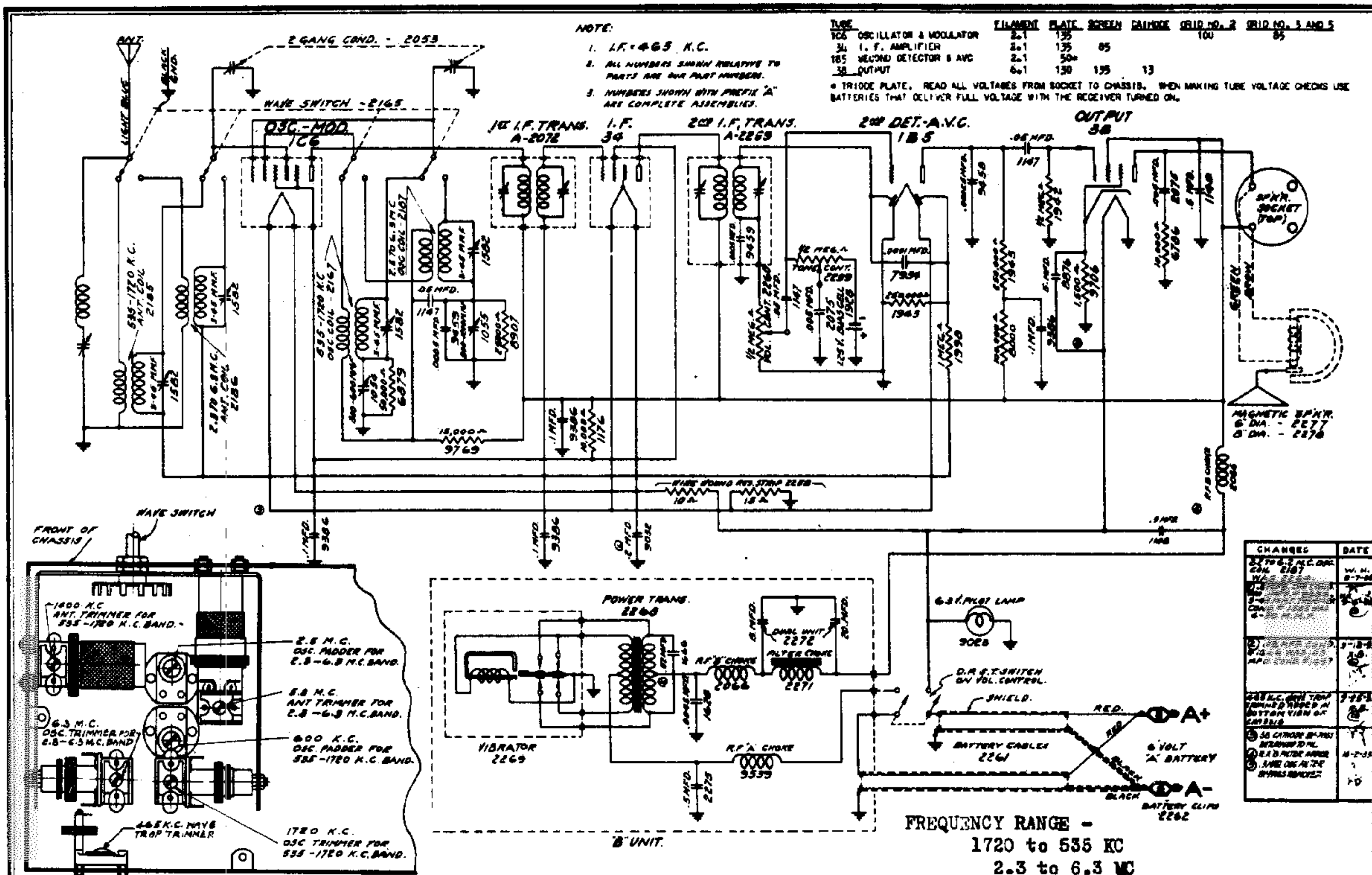
WALGREEN CO.



CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. VIII.
Align I-F trimmers at 465 KC. Dial and generator at 1715 KC, peak oscillator trimmer. Dial and generator at 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad the oscillator trimmer to peak.

MODEL 34B
Schematic, Voltage
Alignment, Trimmers
Changes

WALGREEN CO.



BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS.

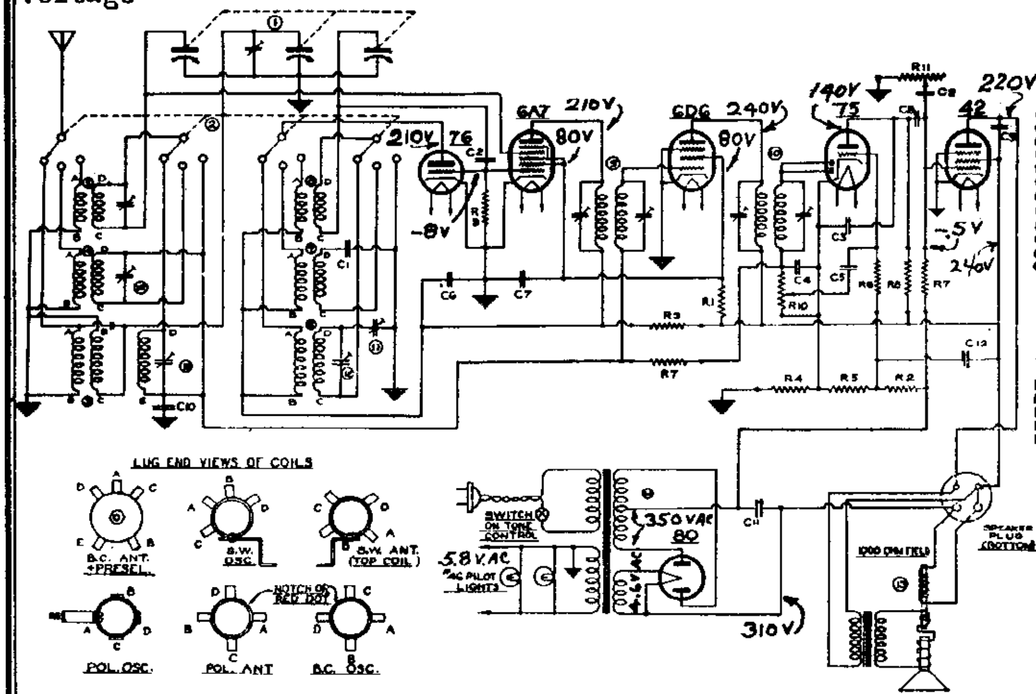
TUBE		FILAMENT	PLATE	SCREEN	CATHODE	GRID NO. 2	GRID NO. 3 AND 5
1C6	OSCILLATOR & MODULATOR	2.1	135			100	85
34	I. F. AMPLIFIER	2.1	135	85			
1B5	SECOND DETECTOR & AVC	2.1	50*				
38	OUTPUT	6.1	130	135	13		

FREQUENCY RANGE -
1720 to 535 KC
2.3 to 6.3 MC

ALIGNMENT - Peak IF trimmers at 465 KC. BROADCAST BAND - Dial and generator to 1720 KC, adjust oscillator trimmer to peak, dial and generator to 1400 KC, then adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. SHORTWAVE BAND - Dial and generator to 6.3 MC, peak oscillator trimmer. Dial and generator to 5.8 MC, adjust antenna trimmer to peak. Dial and generator to 2.5 MC, pad oscillator circuit to peak. Rock variable condenser during padding adjustments. Repeat adjustments for maximum response. Peak wave trap at 465 KC.

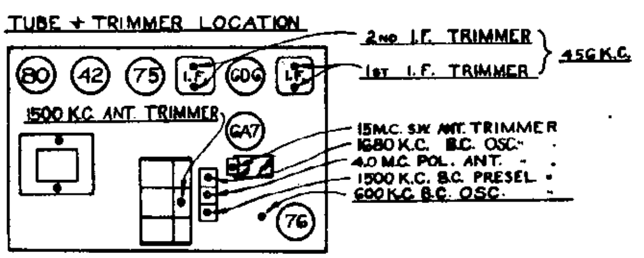
MODEL 166RIS
Schematic, Socket
Trimmers, Alignment
Voltage

WALGREEN CO.



PART	No.	DESCRIPTION
C1	1500C	.0005 MFD. MICA 5%
C2	1503	.00005 " "
C3	1502	.0005 " "
C4	1504	.00025 " "
C5	1605	.02 " 400 V
C6	1602	.1 " 600 V
C7	1601	.1 " 400 V
C8	1648	.03 " 600 V
C9	1651	.004 "
C10	1622	.05 " 200 V
C11	18-202	10.0 ELECTROLYTIC
C12	18-201	12.0 "
R1	9211	15000 OHMS 1W.
R2	60-100	200 " 1W. 5%
R3	6115	1000 " ½W.
R4	60-103	30 " " 5%
R5	60-104	20 " "
R6	6020	2.0MEG " ⅓W
R7	6018	500,000 OHMS ⅓W
R8	6024	250 000 "
R9	6025	50000 "
R10	24-101	500000 VOL. CONTR.
R11	26-101	500 000 TONE CONTR.
1	19-106	GANG
2	69-103	SWITCH
3	10-137	B.C. ANT.+PRESELECTOR COIL
4	10-135	POL. " "
5	10-132	S.W. " "
6	10-134	B.C. OSC. "
7	10-136	POL. " "
8	10-133	S.W. " "
9	1123	1ST I.F.
10	1124	2ND I.F.
11	20-100	B.C. OSC. PADDER
12	20-101	TRIMMER GANG
13		SPEAKER
14	80-105	POWER TRANSF.

TUBE + TRIMMER LOCATION



IF PEAK 456 KC

MODEL No. 166 RIS

DESCRIPTION

This receiver is a 7 tube alternating current operated superheterodyne.

The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I.F. amplifier, a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 42 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.

This receiver is made to cover 3 tuning bands, the broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 20 M.C. to 5.4 M.C.

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or micro-volter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

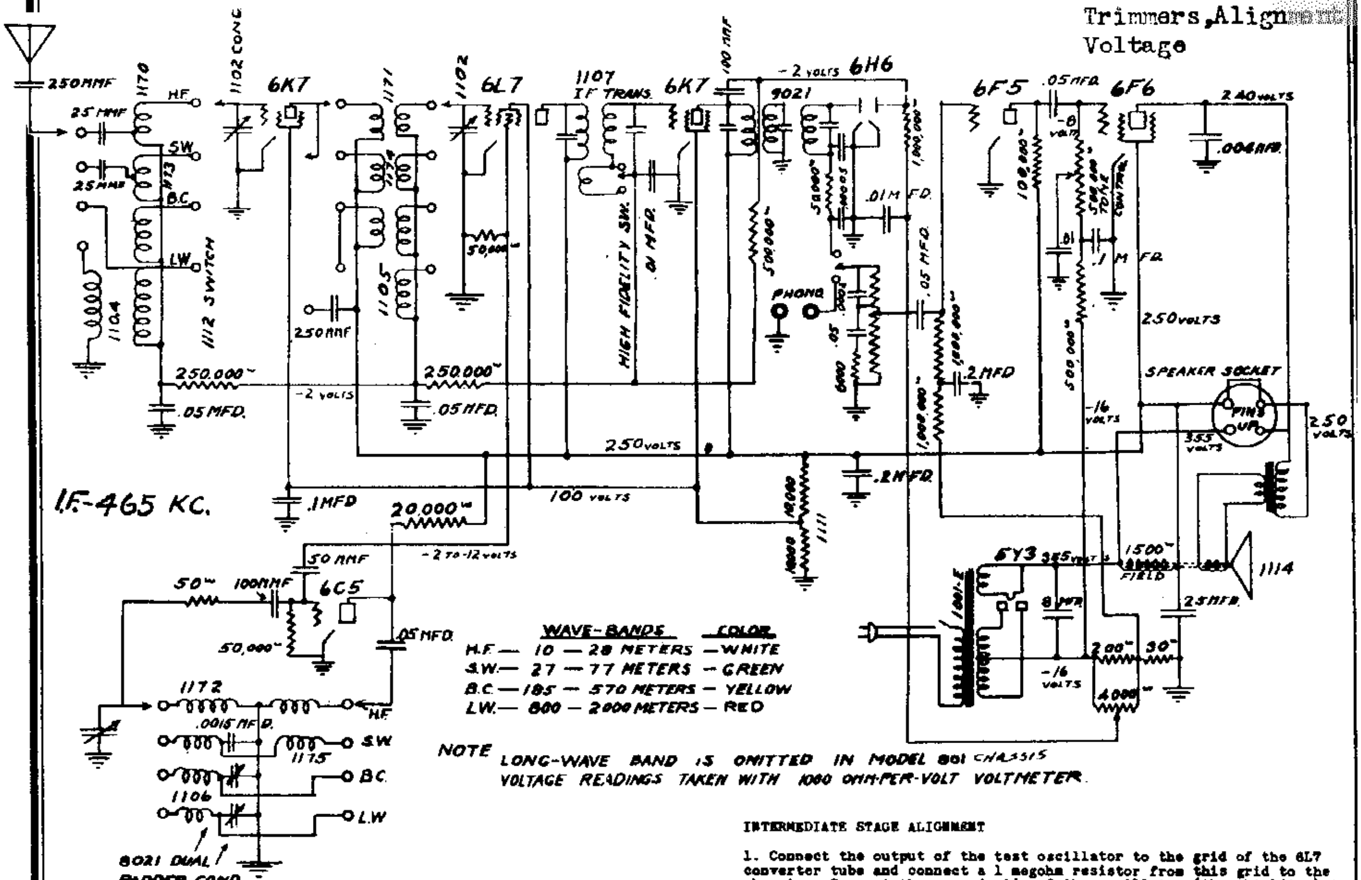
Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output *while tuning the receiver back and forth across the signal* from the generator. This completes the alignment of the broadcast band.

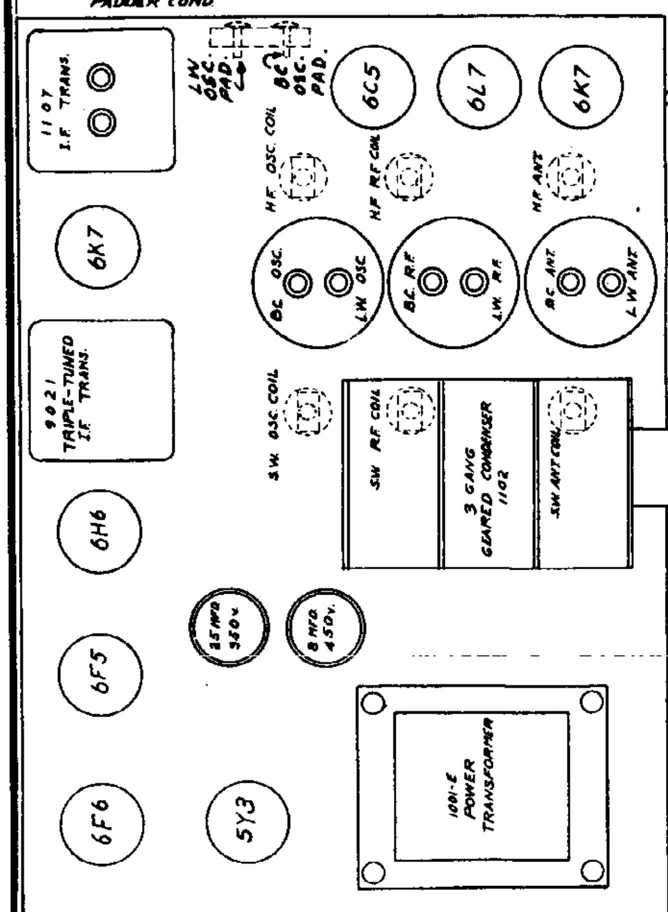
The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

MODEL 308
Chassis 801,802
Schematic, Socket
Trimmers, Alignment
Voltage

WALGREEN CO.





INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6L7 converter tube and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the Calibration chart to obtain the proper setting of the test oscillator.

3. Set the tone control to the left. Align the output intermediate frequency transformer by turning the top screw at the rear of the output I.F. transformer until maximum response is obtained on the output meter. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequecy transformer in the same manner.

ALIGNMENT OF TUNING CIRCUITS

5. Connect the output of the test oscillator to the antenna lead of the receiver through a .00025 M.F.D. condenser and connect the ground side (shielding) to the chassis.

6. Set the wave change switch to the long-wave position (Red). Set the dial and test oscillator to 900 meters. Adjust the long-wave oscillator trimmer until the signal is brought in. If no signal is heard, then adjust the long-wave padder. See diagram of chassis for location of trimmer and padder condensers.

7. Then adjust the long-wave antenna and R.F. trimmers for maximum response. Set the dial and test oscillator to 1800 meters and adjust the long-wave padder for maximum response while rocking the gang condenser. By rocking the gang is meant tuning to a point just above and just below the test oscillator frequency while making some other adjustment. Return to 900 meters and repeat the entire procedure.

8. Set the wave change switch to the broadcast position (Yellow). Set the dial and test oscillator to 214 meters (1400 K.C.) and adjust the B.C. oscillator, R.F. and antenna trimmers till maximum response is obtained. Set the dial and test oscillator to 600 K.C. and adjust the B.C. padder condenser while rocking the gang till maximum response is obtained.

9. Set the wave change switch to the high frequency band (Short-wave Green). Substitute a 400 ohm resistor for the .00025 M.F.D. condenser in the antenna circuit. Set the dial and test oscillator to 30 meters (10 megacycles). Stand the receiver on end and adjust the 30 meter oscillator coil (located to the right of switch when viewed from bottom) till the signal is brought in. Stop at the first peak. Screwing the trimmer down still more will give another peak which is the image and must not be used. To make certain the set is not tuned to the image, set the test oscillator to 11 megacycles and if another signal is received, then the set is correctly tuned. Reset the test oscillator to 30 meters and adjust the R.F. and antenna trimmers for maximum response, while rocking the gang. Set the dial and test oscillator to 75 meters and check for sensitivity.

10. Set the wave-change switch to the ultra-high frequency band (White). Set the test oscillator and dial to 11 meters (27.3 megacycles). Adjust the oscillator trimmer till the signal is brought in. Continue on through to the second peak. The image signal will now be found at 26.3 megacycles if the oscillator trimmer adjustment is correct. Reset the dial to 11 meters and adjust the R.F. and antenna trimmers for maximum response while rocking the gang.

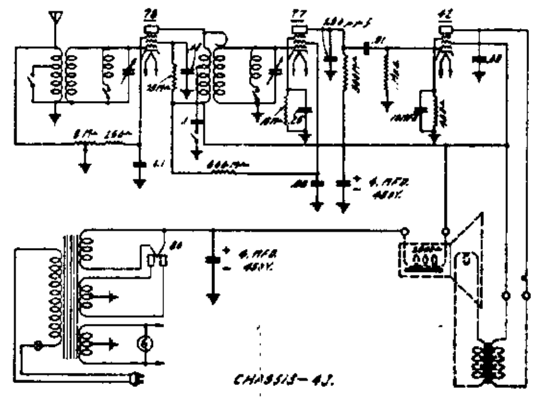
Set the dial and test oscillator to 26 meters and check for sensitivity.

MODEL 400
Schematic, Socket

WALGREEN CO.

MODEL 660 Auto
Schematic, Voltage
Socket, Trimmers

MODEL 400

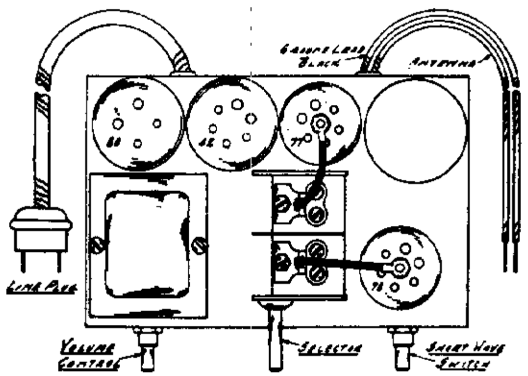


105 to 125 volts. 50-60 cycles. A.C. power supply.

The four tubes used in this set are as follows: 1—No. 280 Full Wave Rectifier; 1—No. 77 Radio Audio Amplifier; 1—No. 78 Detector; 1—No. 42 Audio Amplifier.

Set band switch
in the left-hand position, broadcast stations on frequencies between 550 and 1500 Kilocycles will be received. When the band switch is thrown to the right, stations operating on frequencies ranging from 1500 to 4800 Kilocycles will be heard.

CHASSIS 4J



SERVICE SUGGESTIONS

In changing tubes always remove the plug from light socket. Make sure all tubes are pushed firmly into their proper sockets and that clips are always fastened to caps on tops of tubes.

Be sure that aerial and ground are properly connected. A thirty to fifty-foot aerial is recommended for best operation.

To remove chassis from cabinet, first remove knobs. Then remove four screws from bottom of cabinet holding base. Remove screws holding speaker in cabinet and remove speaker and chassis as a unit.

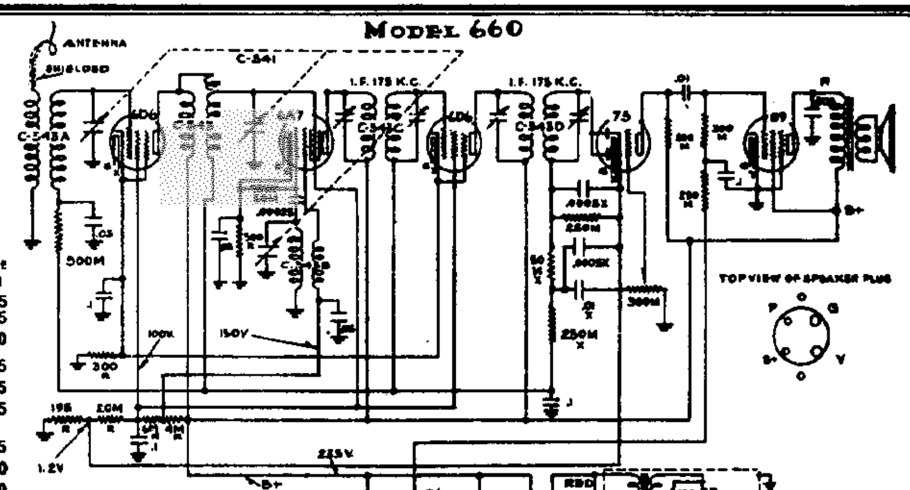
SCHEMATIC CIRCUIT DIAGRAM

MODEL 660 AUTORADIO

PARTS LIST

Part No.	Description	List Price Each
A 660	Battery Cable—Plug Type	1.75
B 104	Cable Shaft Brackets	.35
B 660	Antenna Cable—Plug Type	.80
C 106	Shaft Couplings	.35
C 117	"A" Choke—Small	.25
C 118	"A" Choke—Large	.35
C 144	Dual .1-200 Volt Condenser	.35
C 152	.00025 Mica Condenser	.20
C 155	.0005 Mica Condenser	.20
C 522	.01-400 Volt Condensers	.25
C 531A	Dual .05 Condenser	.30
C 535	Dual .1—200 Volt Condenser	.35
C 541B	3 Gang Condenser	3.75
C 543	R.F. Coil	.80
C 543A	Antenna Coil	.80
C 543B	Oscillator Coil	.70
C 543C	Input I.F. Transformer	1.25
C 543D	Output I.F. Transformer with Parts	2.50
C 547	.1-200 Volt Condenser	.30
C 549	690 Ohm Choke	1.40
C 550	8-8 Mfd. Electrolytic Condenser	2.25
C 551	1 Mfd.—120 Volt Condenser	.35
C 553	.05-200 Volt Condenser	.25
C 554	.5 Mfd. Generator Condenser	.50
R 232A	Special 500M Ohm Resistor Identified with 2 Yellow Dots	.35
R 279	30,995 Ohm Resistor	.60
R 281	100 Ohm Resistor	.20
S 338	18" Volume Control Shaft	1.25
S 339	18" Selector Control Shaft	1.25
S 338S	Special 24" Volume Control Shaft	1.50
S 339S	Special 24" Selector Control Shaft	1.50
V 660	Complete "B" Unit—OAK	8.00
V 603	Volume Control	1.50
660	Remote Control Head Complete Less Shafts	5.00
	20 Ampere Fuses	.18
	Mounting Bolts	.10
	All carbon resistors	.20
	All sockets	.20
	Dynamic speakers	5.00

MODEL 660



DECIMAL ARE MICROFARADS.
WHOLE NUMBER ARE OHMS.
LETTER PREFIXED NUMBERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL.
X - RESISTORS AND CONDENSERS IN I.F. COIL CAN C-543D.
R - RESISTORS IN ONE UNIT - R-279 30,995Ω
Δ - CONDENSERS IN ONE UNIT - C-550
⏚ - CHASSIS GROUND
G - GROUNDED AT ONE COMMON POINT.

IF PEAK 175 KC

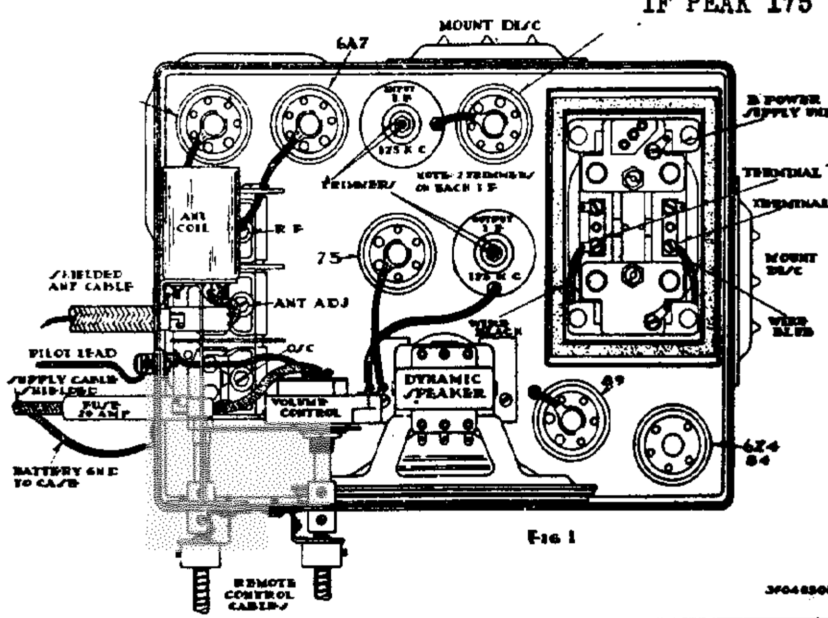


Fig 1

MODEL 401
Schematic,Voltage
Alignment

WALGREEN CO.

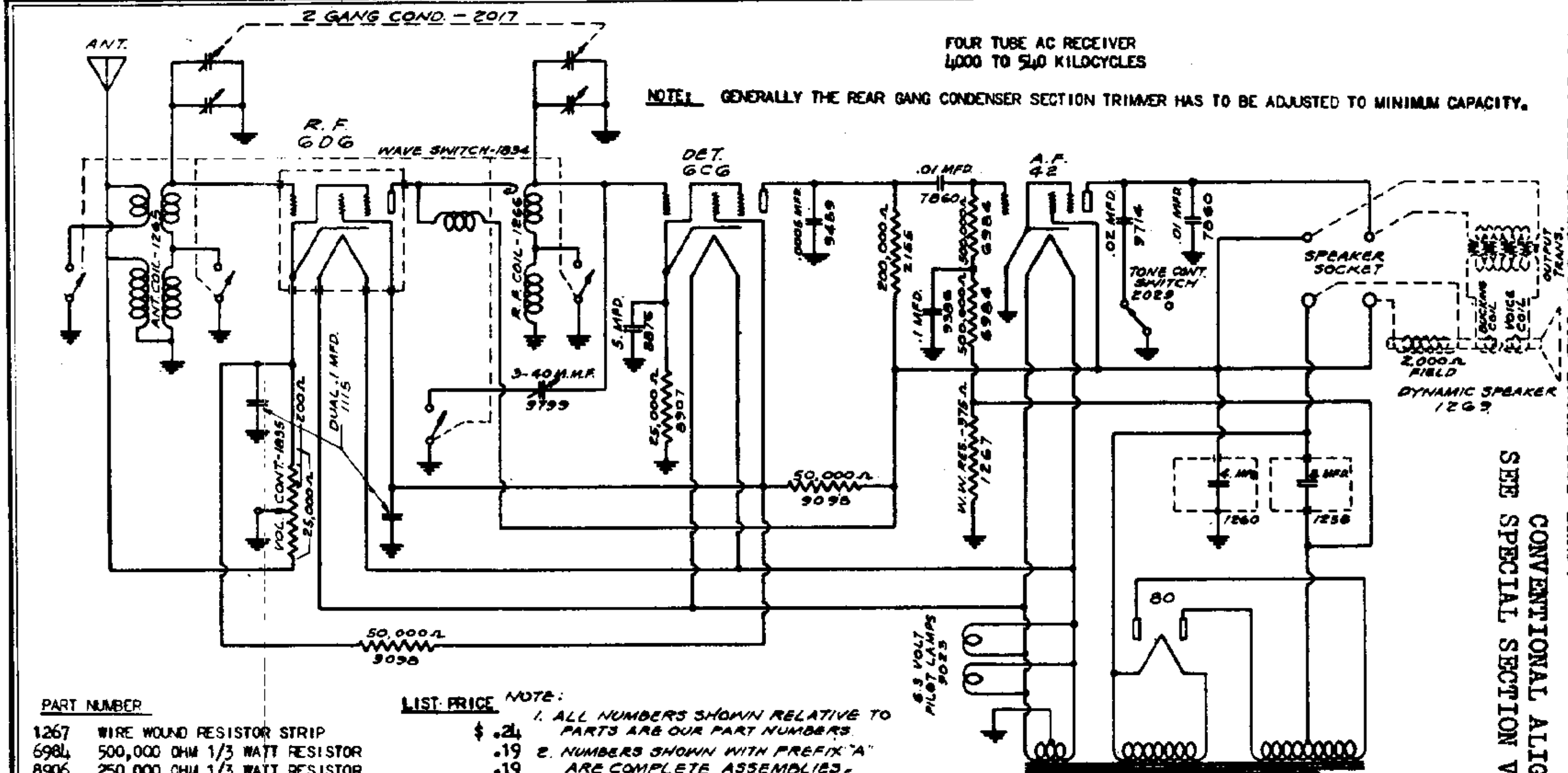
BAND SELECTOR SWITCH

THIS RECEIVER IS DESIGNED FOR TWO FREQUENCY BANDS. BROADCAST BAND FROM 1720 to 540 KC. POLICE,AIRCRAFT AND AMATEUR BAND 1.5 MC. to 4 MC. SWITCH TO LEFT POSITION FOR SHORT WAVE AND TO THE RIGHT FOR THE BROADCAST BAND.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

FOUR TUBE AC RECEIVER
4000 TO 540 KILOCYCLES

NOTE: GENERALLY THE REAR GANG CONDENSER SECTION TRIMMER HAS TO BE ADJUSTED TO MINIMUM CAPACITY.



NOTE:
1. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

PART NUMBER		LIST PRICE
1267	WIRE WOUND RESISTOR STRIP	$ .24
6984	500,000 OHM 1/3 WATT RESISTOR	.19
8906	250,000 OHM 1/3 WATT RESISTOR	.19
9098	50,000 OHM 1/3 WATT RESISTOR	.19
8907	25,000 OHM 1/3 WATT RESISTOR	.19
9459	.0005 MFD. MICA MOULDED CONDENSER	.21
1155	DUAL .1 MFD. 200 VOLT CONDENSER	.35
9386	.1 MFD. 200 VOLT CONDENSER	.19
7860	.01 MFD. 400 VOLT CONDENSER	.17
9714	.02 MFD. 400 VOLT CONDENSER	.18
1740	15/16" KNOB	.22
1739	13/16" KNOB	.22
1269	DYNAMIC SPEAKER	5.25
1265	ANTENNA COIL	$1.27
1266	R. F. COIL	1.27
2017	TWO GANG CONDENSER	2.25
9799	TRIMMER CONDENSER	.15
2105	DIAL ASSEMBLY (SPECIFY REQUIRED NAME)	2.00
1834	WAVE SWITCH	.47
9023	PILOT LIGHT LAMP BULB 6.3 VOLTS	.19
1251	POWER TRANSFORMER	3.20
1258	8 MFD. WET ELECTROLYTIC CONDENSER	1.16
1260	4 MFD. WET ELECTROLYTIC CONDENSER	1.02
8876	5 MFD. DRY ELECTROLYTIC CONDENSER	.85
1835	VOLUME CONTROL	1.15
2029	TONE CONTROL	.36

VOLTAGE TABLE

LINE VOLTAGE : 115
VOLUME CONTROL : FULL ON
WAVE BAND : BROADCAST

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6C6	RADIO FREQUENCY	6	225	85	2
6C6	DETECTOR	6	105*	85	3.5
42	OUTPUT	6	200	225	15**
80	RECTIFIER	4.9			

READ ALL VOLTAGES FROM SOCKET PRONG TO GROUND UNLESS OTHERWISE SPECIFIED. (EXCEPT FILAMENT)

** READ FROM 375 OHM RESISTOR #1267 TO GROUND.

* COMPARATIVE VOLTAGE IS NOT TRUE VOLTAGE APPLIED.

TO ALIGN THE VARIABLE CONDENSER: IT IS IMPORTANT WHEN ALIGNING TO FOLLOW THE PROCEDURE CAREFULLY, OTHERWISE THE RECEIVER WILL LACK SENSITIVITY AND THE DIAL CALIBRATION WILL BE INCORRECT.

1. CONNECT THE HIGH OUTPUT SIDE OF THE OSCILLATOR TO THE RECEIVER ANTENNA LEAD AND THE GROUND TO THE CHASSIS.

2. PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE BROADCAST BAND, TUNE THE RECEIVER TO EXACTLY 1400 KILOCYCLES ON THE DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.

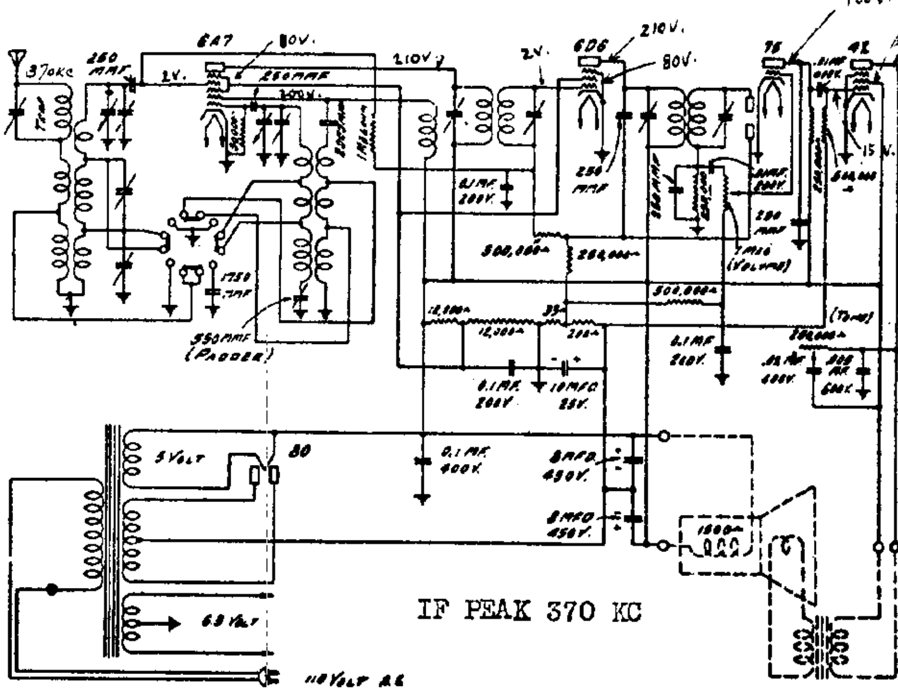
3. SET THE BAND SELECTOR SWITCH FOR OPERATION ON THE SHORT WAVE BAND, TUNE THE RECEIVER DIAL TO EXACTLY 4 MEGACYCLES AND SET THE TEST OSCILLATOR TO THIS FREQUENCY. THEN ADJUST THE TRIMMER CONDENSER MOUNTED ON THE COIL LOCATED UNDERNEATH THE CHASSIS FOR

MODEL 500(2 Bands)
MODEL 500(3 Bands)
Schematic, Voltage
Alignment

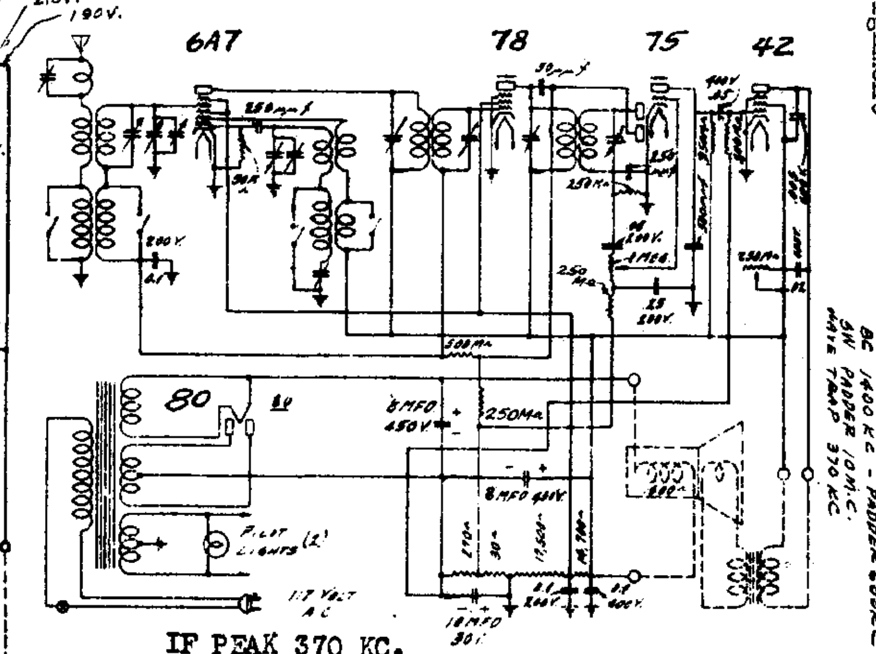
WALGREEN CO.

ALIG. FREQS:-
I.F. = 370 K C
BC 1400 KC - PADDER 600KC.
SW PADDER 10 M.C.
WAVE TRAP 370 KC

AETNA MODEL 500-3 BAND



AETNA MODEL 500 - 2 BAND



To adjust the R. F. circuits: (1) Set pointer on tuning chart to 1400 K. C. with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 K. C. and connect to antenna lead on chassis. (3) Adjust trimmer on the oscillator section of the tuning condenser for maximum reading. (4) Reset dial pointer on receiver and test oscillator to 600 K. C. (5) Adjust 600 K. C. padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment (the 600 K. C. padding condenser is mounted on the base at the left of the tuning condenser). (6) Reset oscillator and tuning pointer on the receiver to 1400 K. C. and readjust trimmer on oscillator section of tuning condenser for maximum reading. (7) Reset dial pointer on receiver and test oscillator to 15 megacycles. (8) Set band change switch in the right hand position. (9) Adjust trimmer on first section of tuning condenser for maximum reading. (10) Reset dial pointer on receiver and test oscillator to 3.6 megacycles. (11) Set band change switch in left hand position. (12) Adjust 3.6 megacycle trimmer condenser for maximum reading (the 3.6 megacycle trimmer is mounted under the chassis and directly in front of the band change switch. (13) Reset dial pointer on receiver and test oscillator to 1400 K. C. (14) Set band change switch in broadcasting position and adjust 1400 K. C. trimmer for maximum reading (the 1400 K. C. trimmer is mounted under the chassis directly over the antenna coil).

Tube Number		Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Tube Socket Voltage Heater or Filament Voltage
6A7	1st Det.	*1.75	92	225	4	6.3
	OSC.	0	0	225	4	6.3
78—I. F.		*1.75	92	225	7	6.3
75—2nd Det.		*1.75	0	**110	.8	6.3
42—2nd Audio		***17	225	212	34	6.3
80—Rect.						

***Voltage from No. 1 terminal on voltage divider to ground using 250 volt scale.

**Voltage from plate to ground using 250 volt scale.

*Voltage from ground to second terminal on voltage divider using 10 volt scale.

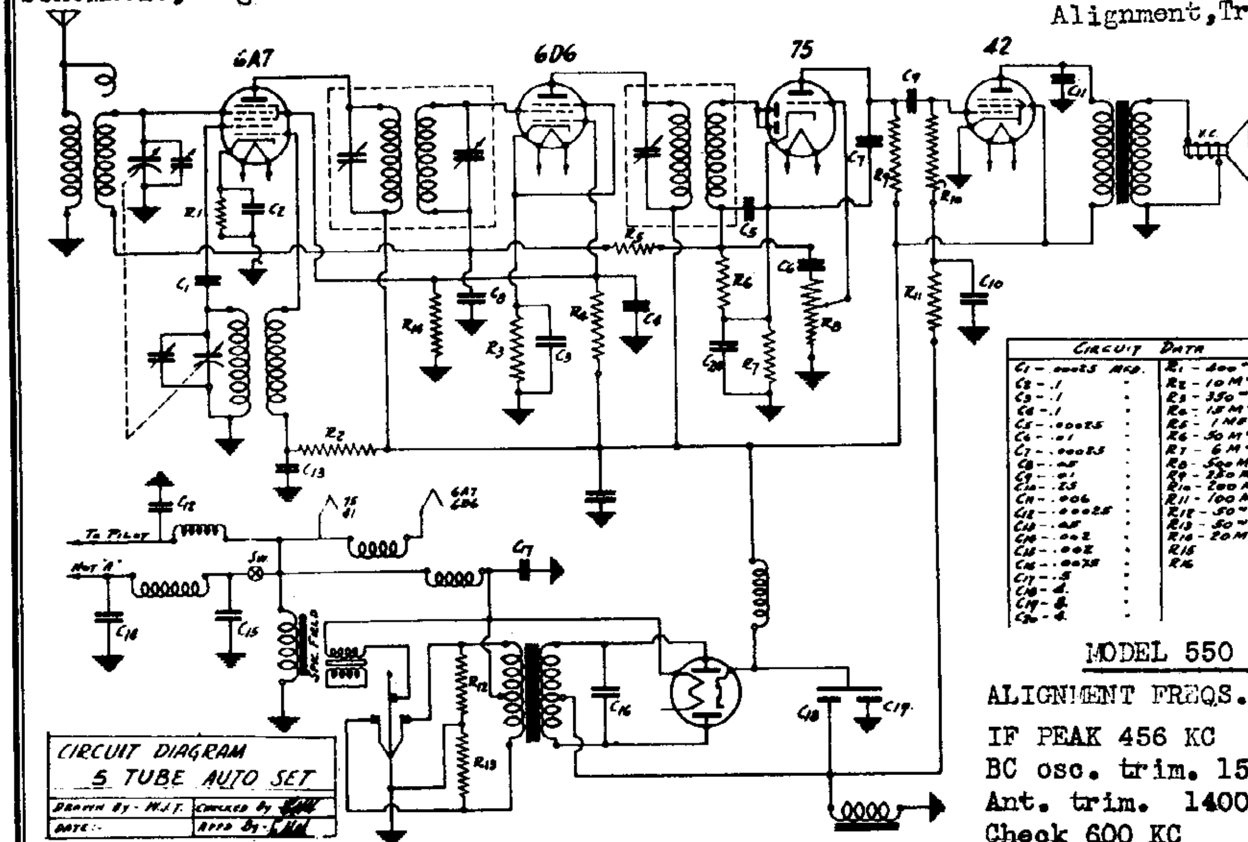
The above voltage readings were taken with 1,000 ohm per volt Volt Meter.

For conventional align. see spec. sect. Vol VIII

MODEL 550 Auto
Schematic, Alignment

WALGREEN CO.

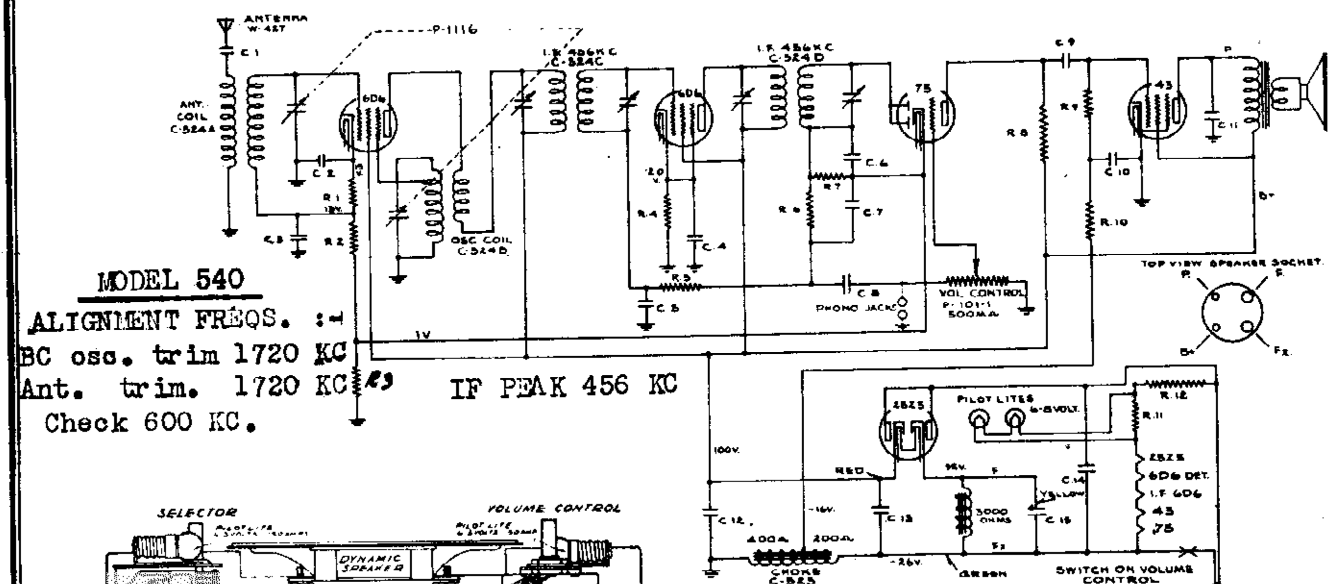
MODEL 540
Schematic, Socket
Alignment, Trimmers



CIRCUIT	DATA
C1 - .00025 MFD.	R1 - 400 Ω
C2 - .1 "	R2 - 10 MΩ
C3 - .1 "	R3 - 350 Ω
C4 - .1 "	R4 - 15 MΩ
C5 - .00025 "	R5 - 1 MEG
C6 - .01 "	R6 - 50 MΩ
C7 - .00025 "	R7 - 6 MΩ
C8 - .05 "	R8 - 500 MΩ
C9 - .01 "	R9 - 250 MΩ
C10 - .25 "	R10 - 200 MΩ
C11 - .006 "	R11 - 100 MΩ
C12 - .00025 "	R12 - 50 Ω
C13 - .05 "	R13 - 50 Ω
C14 - .002 "	R14 - 20 MΩ
C15 - .002 "	R15
C16 - .0025 "	R16
C17 - .5 "	
C18 - 4. "	
C19 - 8. "	
C20 - 4. "	

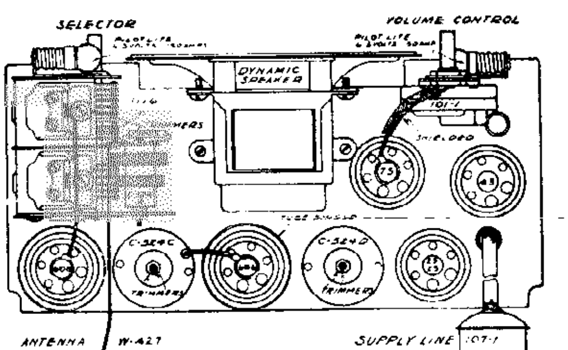
MODEL 550

ALIGNMENT FREQS. :-
IF PEAK 456 KC
BC osc. trim. 1500 KC
Ant. trim. 1400 KC
Check 600 KC



MODEL 540

ALIGNMENT FREQS. :-
BC osc. trim 1720 KC
Ant. trim. 1720 KC
Check 600 KC.
IF PEAK 456 KC



LEGEND

RESISTORS Nº	VALUE	
R. 1 -	300	*
R. 2 -	2M	*
R. 3 -	180	*
R 4 -	250 R-270	
R. 5 -	250M	
R 6 -	50M	
R 7 -	250M	
R. 8 -	100M	
R 9 -	300M	
R 10	250M	
R 11 -	40~300M.A 0 36W P 106-1	
R 12 -	126 IN CORD 107-1	

CONDENSERS Nº	VALUE	
C 1 -	.0005	MICA
C 2 -	.05	200V
C 3 -	.05	200V.
C 4 -	.05	200V
C 5 -	.1	200V
C 6 -	.0005	MICA
C 7 -	.0005	MICA
C 8 -	.01	400V
C 9 -	.01	400V
C 10 -	.1	200V
C 11 -	.025	300
C 12 -	5.0MFD.	C-525D
C 13 -	25.0MFD.	*
C 14 -	.1	400V.
C 15 -	5.0MFD	*

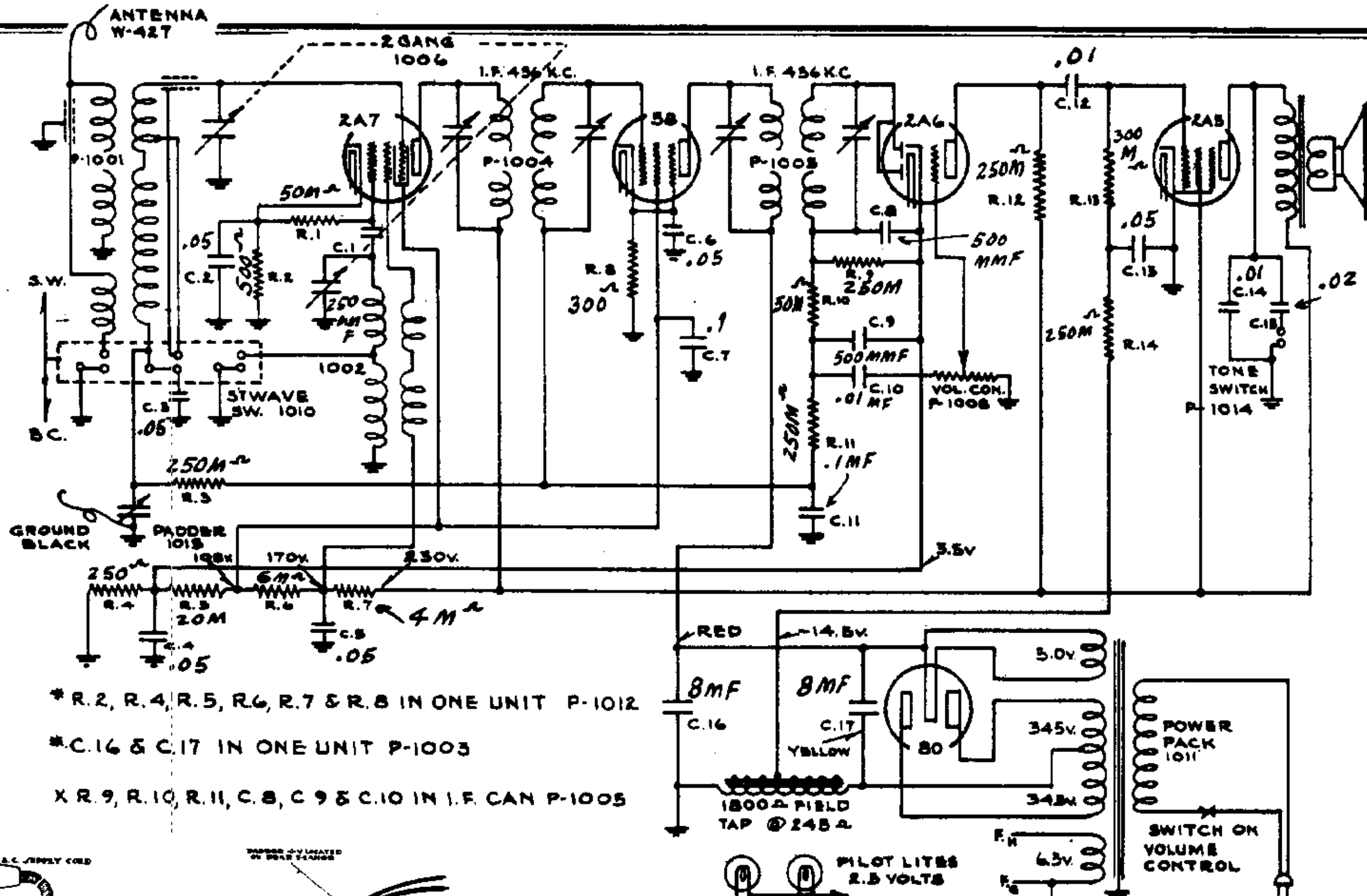
-: NOTE :-
* R 1, R 2 & R 3 IN ONE UNIT PART NUMBER R-268.
* C. 13 AND C. 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A.C. CURRENT

MODEL 550 A-C
Schematic, Socket
Trimmers, Alignment

WALGREEN CO.

105-115 volts alternating current 50-60 cycles - 60 watts.
GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles

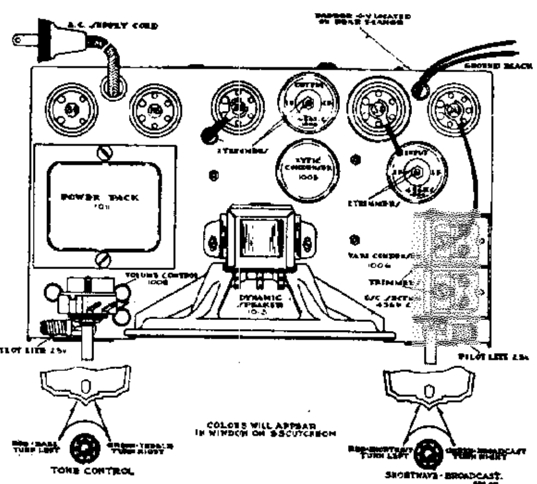
IF PEAK 456 KC



*R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012

*C.16 & C.17 IN ONE UNIT P-1003

X R.9, R.10, R.11, C.8, C.9 & C.10 IN I.F. CAN P-1005



INTERMEDIATE FREQUENCY 456 K. C.

To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 2A7 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser at minimum capacity disconnect antenna wire and connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.

WALGREEN CO.

Service Notes

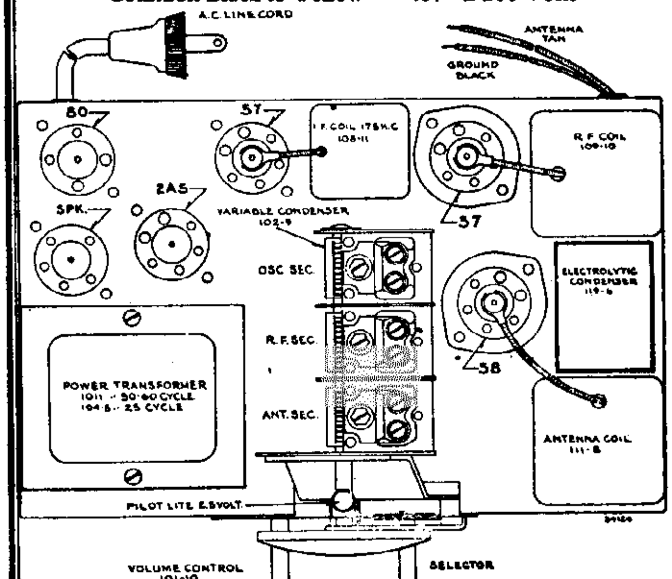
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

Part No. 145-2

Common Black to Brown	—.003	x 600 Volts
Common Black to Green	—.1	x 200 Volts
Common Black to Red	—.1	x 200 Volts
Common Black to Orange	—.25	x 200 Volts
Blue to Blue	—.05	x 400 Volts

Part No. 145-3

Common Black to Brown	—.1	x 200 Volts
Common Black to Green	—.05	x 200 Volts
Common Black to Orange	—.05	x 200 Volts
Common Black to Yellow	—.05	x 200 Volts



Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:
   - (a) Connect an external oscillator adjusted to 175 kilocycles in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.
   - (b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output as excessive input will result in overload and a false resonance point.

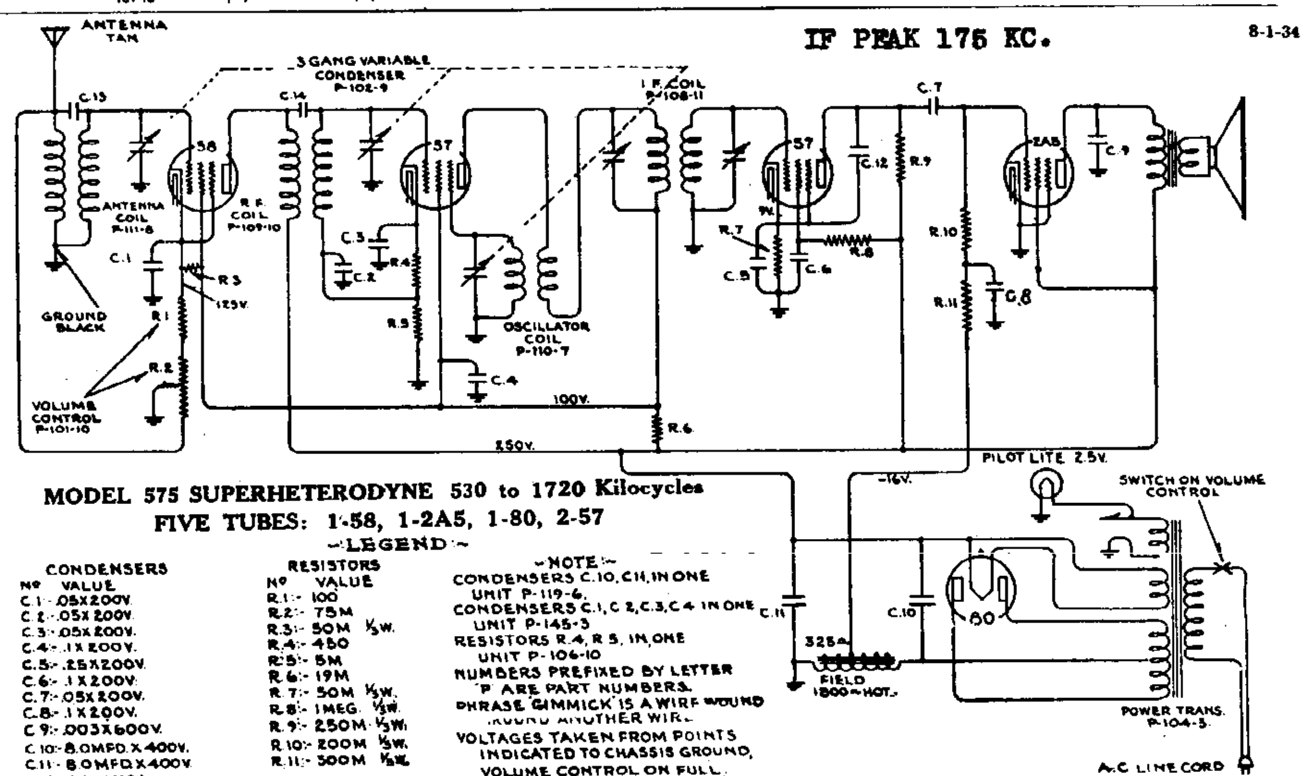
NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.
   - (a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.
   - (b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.
   - (c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

IF PEAK 175 KC.

8-1-34



MODEL 575 SUPERHETERODYNE 530 to 1720 Kilocycles

FIVE TUBES: 1-58, 1-2A5, 1-80, 2-57

~LEGEND~

CONDENSERS

Nº	VALUE
C.1	.05X200V.
C.2	.05X200V.
C.3	.05X200V.
C.4	.1X200V.
C.5	.25X200V.
C.6	.1X200V.
C.7	.05X200V.
C.8	.1X200V.
C.9	.003X600V.
C.10	8.0MFD.X400V.
C.11	8.0MFD.X400V.
C.12	.001 MICA.
C.13	10μμf. GIMMICK
C.14	4μμf. GIMMICK

RESISTORS

Nº	VALUE
R.1	100
R.2	75M
R.3	50M 1/3W.
R.4	450
R.5	5M
R.6	19M
R.7	50M 1/3W.
R.8	1MEG. 1/3W.
R.9	250M 1/3W.
R.10	200M 1/3W.
R.11	500M 1/3W.

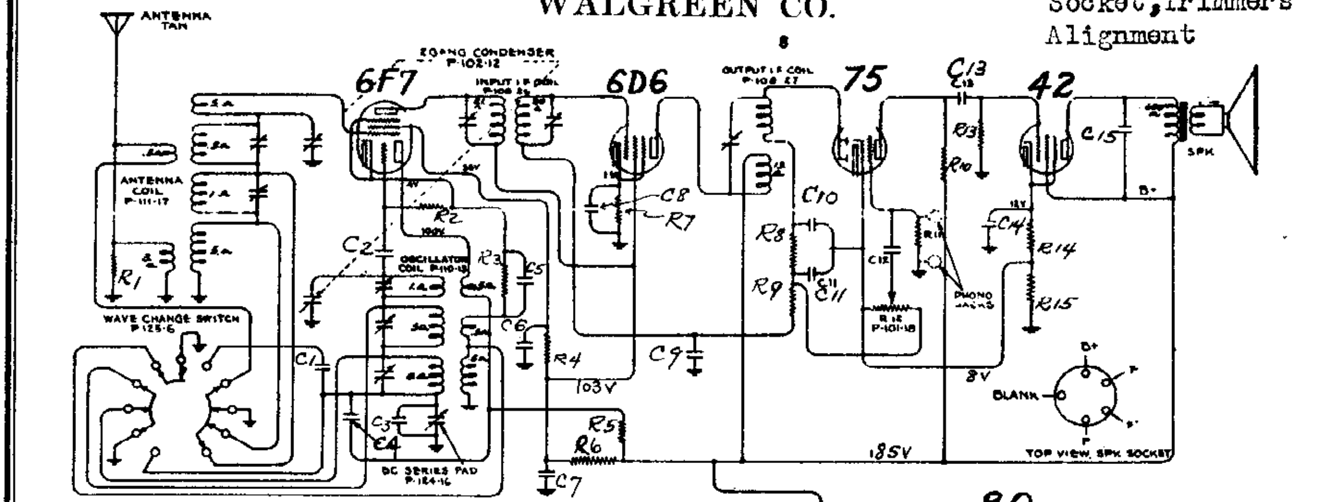
~NOTE~

CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3
RESISTORS R.4, R.5, IN ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.
PHRASE "GIMMICK" IS A WIRE WOUND AROUND ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.

MODEL 585, Series A

WALGREEN CO.

Schematic, Voltage Socket, Trimmers Alignment



LEGEND

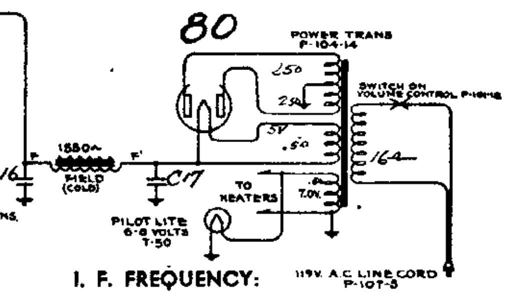
CONDENSERS Nº	VALUE	RESISTORS Nº	VALUE
C.1:-	2870 μμf MICA	R.1:-	800Ω ⅓W.
C.2:-	100 " "	R.2:-	50MΩ "
C.3:-	475 "	R.3:-	700Ω
C.4:-	.1 X 200V	R.4:-	100MΩ "
C.5:-	.1 X 200V.	R.5:-	20MΩ ½W.
C.6:-	.1 X 200V	R.6:-	19MΩ ½W.
C.7:-	.1 X 200V	R.7:-	200Ω
C.8:-	.1 X 200V	R.8:-	50MΩ ⅓W
C.9:-	.1 X 200V.	R.9:-	1MEG "
C.10:-	500 μμf MICA	R.10:-	250MΩ "
C.11:-	500 μμf MICA	R.11:-	2MEG. "
C.12:-	.05 X 200V	R.12:-	500MΩ VOL. CONTROL
C.13:-	.01 X 400V	R.13:-	500MΩ ⅓W.
C.14:-	40 MFD X 25V	R.14:-	500Ω "
C.15:-	.015 X 400V.	R.15:-	35Ω
C.16:-	3.0 MFD X 250V		
C.17:-	4.0 MFD X 300V		

NOTE.
C.7, C.9 ARE IN ONE UNIT P-118-1
C.14, C.16, C.17, ONE UNIT LYTIC P-119-11
R.7, R.14, R.15, ONE UNIT P-106-18

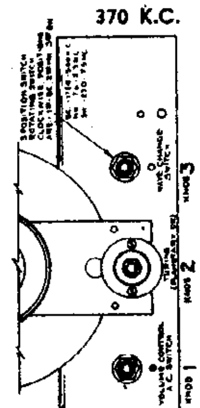
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

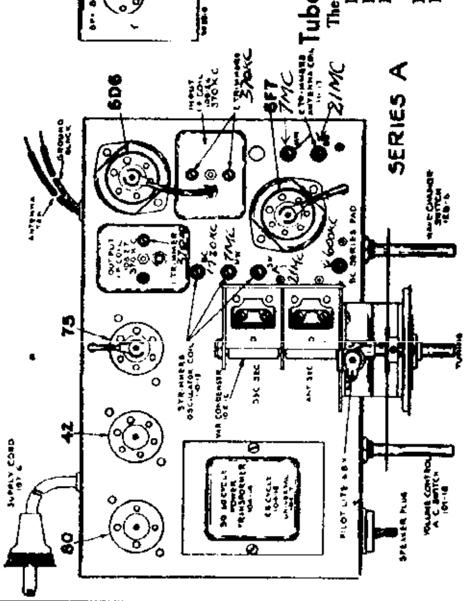
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL

WAVE CHANGE SWITCH P-125-6 - 3 POSITIONS. ROTATING CLKWISE -
1ST POSITION - BC. 1720-540 KC
2ND " - MW. 7.6 - 2.3 MC
3RD " - SW. 23.0 - 7.5 MC
SWITCH SHOWN AT SW POSITION



I. F. FREQUENCY: 370 K.C.





SERIES A

Tubes

The Tube complement of this chassis is as follows:
1 Type 6F7—triode pentode as oscillator and first detector.
1 Type 6D6—remote cut-off pentode as I.F. amplifier.
1 Type 75—duplex diode triode as diode detector, A.V.C. and A.F.
1 Type 42—pentode output tube.
1 Type 80—high vacuum rectifier.

ALIGNING INSTRUCTIONS—

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.
(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
(3) Intermediate and Short Wave Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

SERIES A

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates, entirely out of mesh, adjust the I.F. transformers (adjustments at the top of parts number 108-26 and 108-27—see top view).
   (a) Connect external oscillator in series with I.F. dummy antenna. With external oscillator adjusted to 370 kilocycles, in series with I.F. dummy antenna to the control grid cap of the type 6D6 tube and chassis ground, adjust output I.F. transformer, part number 108-27, to resonance.

   Note: Output I.F. transformer, part number 108-27, has only one adjustment.

   (b) Move generator output clip from grid of 6D6 to grid cap of type 6F7 tube and align input I.F. transformer, part number 108-26, to resonance. NOTE: IT IS EXTREMELY NECESSARY TO ALIGN BOTH I.F. STAGES SEPARATELY.

Broadcast Band Alignment—
(540 - 1720 Kilocycles)

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with broadcast dummy antenna to tan antenna lead and black ground lead, make the following adjustments:
   (a) Set external oscillator to 1720 kilocycles and adjust oscillator trimmer to resonance. This adjustment is the rear adjustment of a group of three located next to the variable condenser.
   (b) Readjust external oscillator to 600 kilocycles and adjust broadcast series pad to resonance by rotating condenser to approximately 600 kilocycles, rocking it slowly to and fro until by adjusting pad maximum output is attained. This adjustment is located at the front of the chassis next to the variable condenser and wave changing switch.
   (c) Check for tracking and sensitivity at 1400 and 1000 kilocycles. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Short Wave Band Alignment—
(7.5 - 23.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave selector switch in the short wave position, extreme right of its rotation, set pointer of dial to 21 megacycles.
   (a) With external oscillator set at 21 megacycles, and connected to the tan antenna lead in series with the short wave dummy and to the black ground lead, adjust the oscillator short wave trimmer until generator signal is picked up. This trimmer is the one closest to the front of the chassis of the group of three trimmers located next to the gang condenser (see top view of chassis).
   (b) Adjust short wave antenna trimmer to resonance. This adjustment is to the right of the 6F7 tube and is the one closest to the front of the chassis (see top view).
   (c) Re-set external oscillator to 9 megacycles and pick up oscillator signal by rotating variable condenser, moving dial pointer. Check for tracking and sensitivity and do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment—
(2.3 - 7.6 Megacycles)

1. With wave selector switch in the center position and with dial pointer set to 7 megacycles, makes the following adjustments:
   (a) With external oscillator set at 7 megacycles and connected in series with the short wave dummy antenna to the tan antenna lead and black ground lead, same as for short wave adjustments, adjust center trimmer of oscillator coil, part number 110-13, until 7 megacycle signal is picked up. This is the center adjustment of a group of three located next to the gang condenser (see top view).
   (b) Adjust antenna trimmer to resonance, this adjustment is the rear of a group of two located at the right of the chassis next to the 6F7 tube (see top view).
   (c) Re-set external oscillator to 2.5 megacycles (2500 kilocycles), pick up signal by rotating condenser and moving dial pointer. Check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before reassembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

Notes

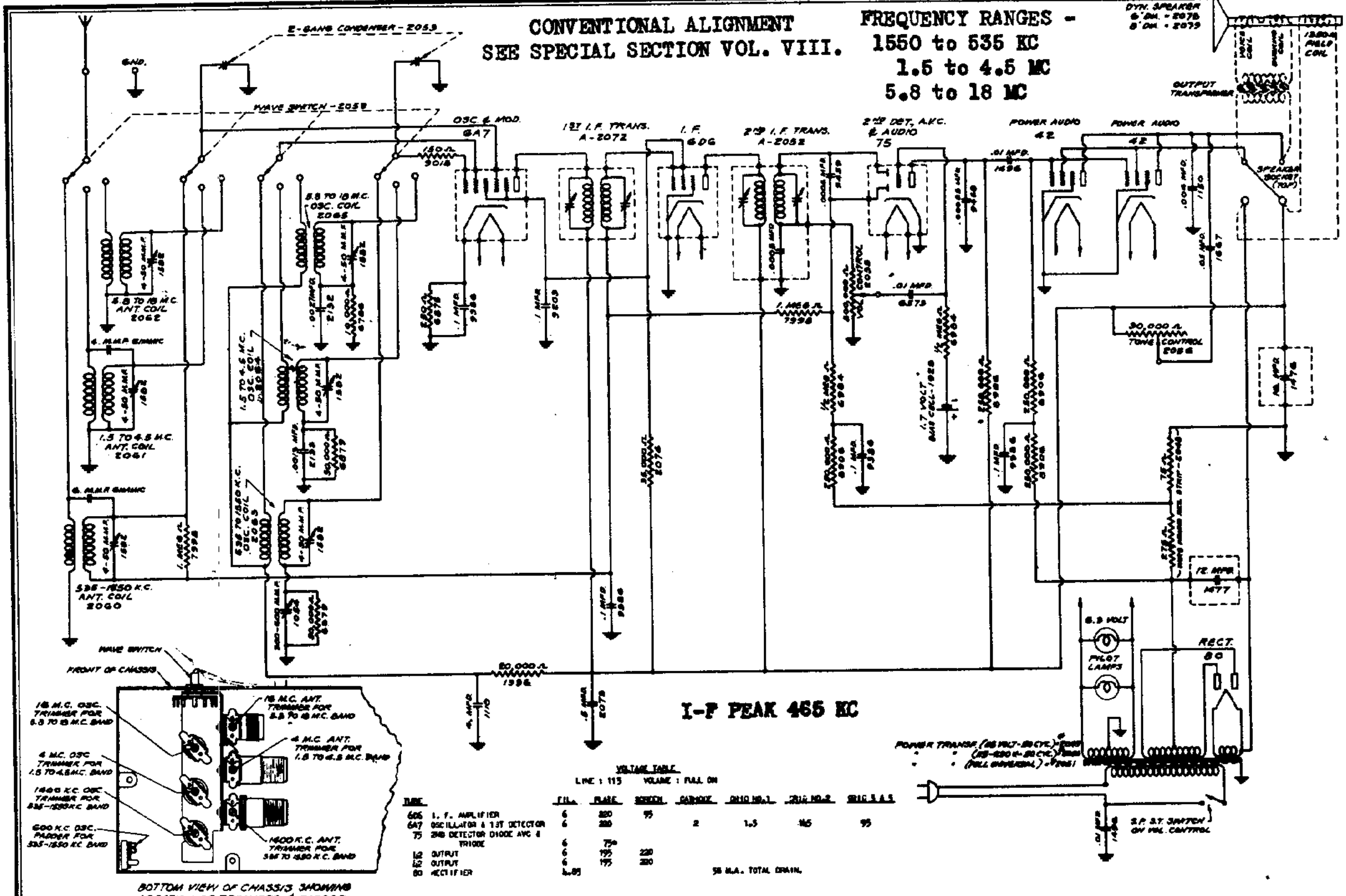
25 Cycle chassis differ from regular 60 cycle and 40 cycle chassis in that a larger electrolytic filter condenser is used. The regular condenser is part number 119-11 and the larger unit for the 25 cycle chassis is part number 119-12.

Part number 106-18, a metal clad resistor, consists of the following sections with resistances and wattages as noted: one, 500 ohms; one, 35 ohms, one, 200 ohms, all 1/3 watt, plus or minus 10%.

WALGREEN CO.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

FREQUENCY RANGES -
1550 to 535 KC
1.5 to 4.5 MC
5.8 to 18 MC



BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER

I-F PEAK 465 KC

VOLTAGE TABLE

LINE : 115 VOLUME : FULL ON

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID 3 & 5
6D6	I. F. AMPLIFIER	6	220	95				
6A7	OSCILLATOR & 1ST DETECTOR	6	220		2	1.5	165	95
75	2ND DETECTOR DIODE AVC & TRIODE	6	75*					
42	OUTPUT	6	195	220				
42	OUTPUT	6	195	220				
80	RECTIFIER	4.85						

58 M.A. TOTAL DRAIN.

Align I-F transformer trimmers to 465 KC. BROADCAST - Dial and generator to 1400 KC, peak the oscillator and antenna trimmers. Dial and generator to 600 KC, pad the oscillator circuit to maximum peak while rocking variable condenser. POLICE - Dial and generator to 4 MC, peak oscillator trimmer and

MODEL 675

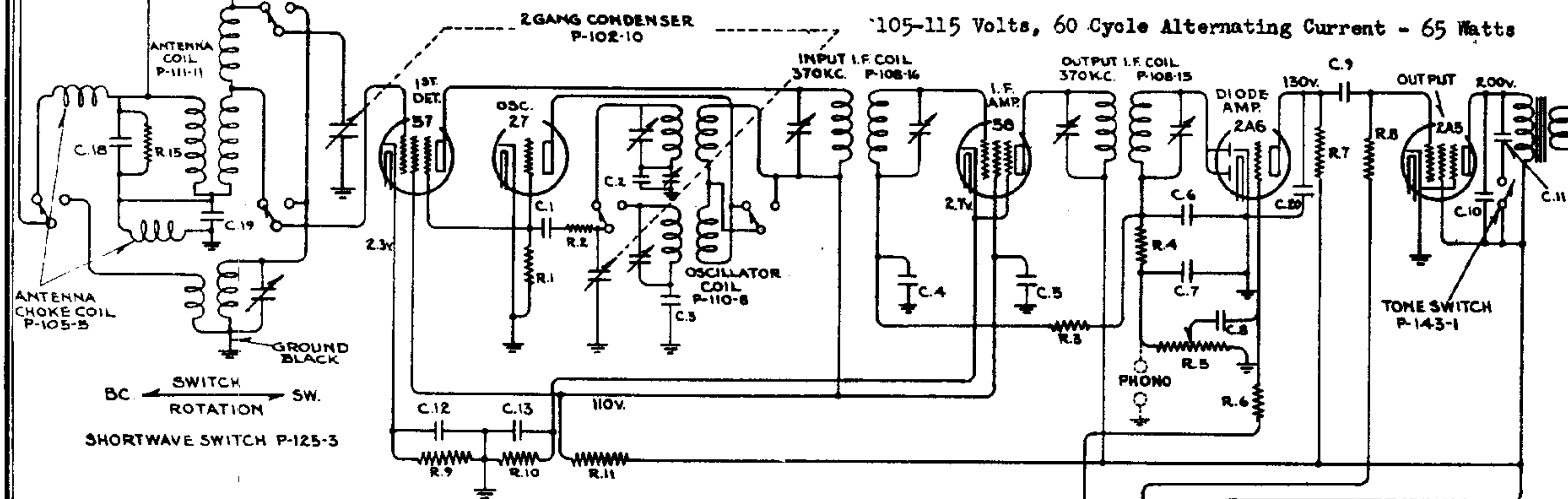
WALGREEN CO.

Schematic, Voltage
Socket, Trimmers
Alignment

CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION VOL. VIII

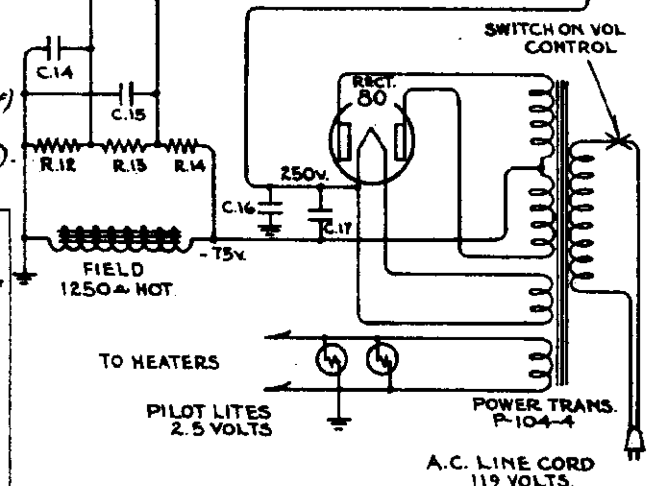
Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts



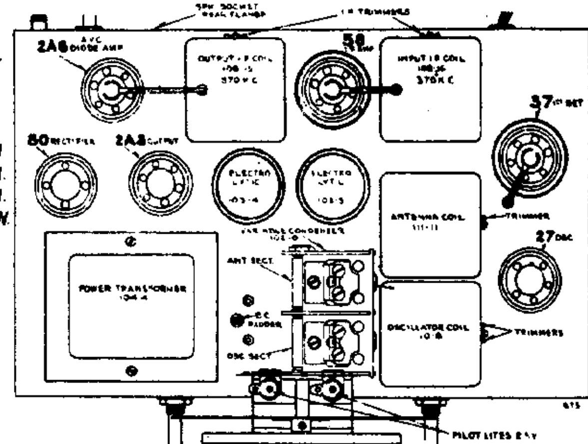
BC. ← SWITCH ROTATION → SW.

SHORTWAVE SWITCH P-125-3



IF PEAK 370 KC.

ALIGN. FREQS:-
IF 370 KC - BC OSC. TRIM. 535 KC (BET. GANG. COND. & PWR TRANSF)
BC OSC. SHUNT TRIM. TO 1712 KC (TOP ADJ. IN OSC. COIL CAN)
SW OSC. SHUNT TRIM. TO 15MC (BOTTOM TRIM. IN COIL CAN)
SW ANT. TRIM. 15 MC



34265

CONDENSERS Nº	VALUE
C.1:-	50 MICA
C.2:-	490 MICA
C.3:-	5M MICA
C.4:-	.05 X 200V.
C.5:-	.05 X 400V.
C.6:-	100 MICA
C.7:-	100 MICA
C.8:-	.05 X 200V.
C.9:-	.05 X 400V.
C.10:-	.003 X 400V.
C.11:-	.02 X 400V.
C.12:-	.1 X 200V.
C.13:-	.1 X 200V.
C.14:-	.25 X 200V.
C.15:-	.25 X 200V
C.16:-	18MFD. 350V. P-103-3
C.17:-	16MFD 400V. P-103-4
C.18:-	120 μμf.
C.19:-	.01 μμf.
C.20:-	.0005 MICA.

RESISTORS Nº	VALUE	
R.1:-	50M.	1/3W.
R.2:-	50	1/3W.
R.3:-	500M	1/3W.
R.4:-	50M	1/3W.
R.5:-	500M	VOLUME CONTROL P-101-11
R.6:-	500M	1/3W.
R.7:-	250M	1/3W.
R.8:-	250M	1/3W.
R.9:-	1000	
R.10:-	275	
R.11:-	13M	
R.12:-	25M	1/3W.
R.13:-	250M	1/3W.
R.14:-	750M	1/3W.
R.15:-	10M	1/3W.

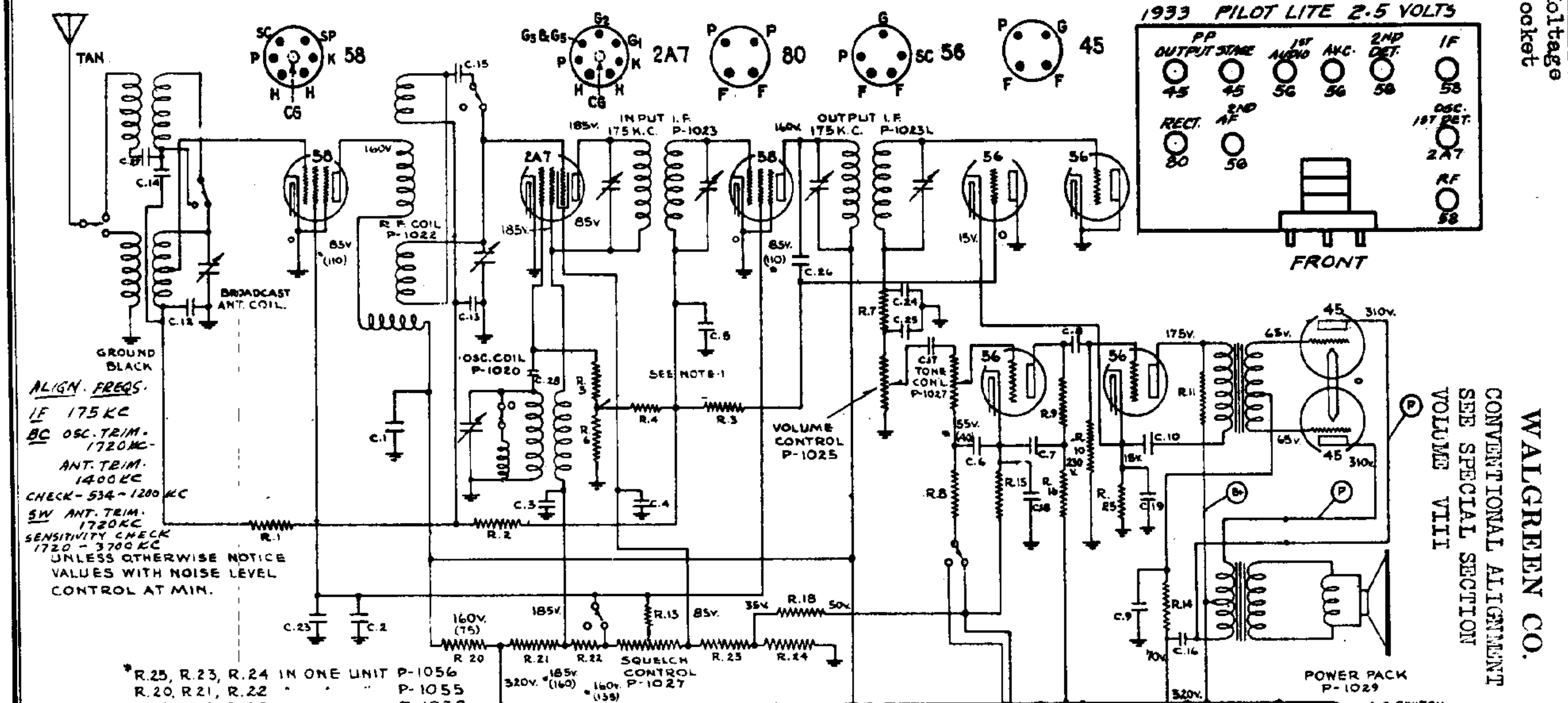
-:NOTE:-
CONDENSERS C.10, C.11 IN DUAL UNIT.
" C.14, C.15 " " "
" C.13, C.4 " " "
RESISTORS R.9, R.10, R.11 IN ONE UNIT P-106-13
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL
RESISTORS, R.3, 4, & 6, CONDENSERS C.6, 7, & 8 ARE IN OUTPUT I.F. CAN, P-108-15

MODEL 105
Schematic
Alignment

WALGREEN CO.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII



ALIGN. FREQS.
IF 175 KC
BC OSC. TRIM. 1720 KC
ANT. TRIM. 1400 KC
CHECK - 534 - 1200 KC
SW ANT. TRIM. 1720 KC
SENSITIVITY CHECK 1720 - 3700 KC

UNLESS OTHERWISE NOTICE VALUES WITH NOISE LEVEL CONTROL AT MIN.

*R.25, R.23, R.24 IN ONE UNIT P-1056
R.20, R.21, R.22 " " " P-1055
C.18, C.19, C.20 " " " P-1038
C.21, C.22 " " " P-1048

LEGEND

RESISTORS

Nº	VALUE		Nº	VALUE	
R.1	250M	1/5 W.	R.14	50M.	1/5 W.
R.2	"	"	R.15	10M.	"
R.3	"	"	R.16	100M.	
R.4	1MEG.	"	R.17	31M.	1/2 W.
R.5	49M.	"	R.18	15M.	1/5 W.
R.6	11M.	"	R.19	1MEG.	"
R.7	50M.	"	R.20	10M.	2.2W. *
R.8	500M.	"	R.21	7M.	3.1W *
R.9	80M.	"	R.22	2M	1/4 W *
R.10	500M.	"	R.23	9M	1/2 W. *
R.11	100M.	"	R.24	6M	*
R.12	500M	"	R.25	12M	1/2 W *
R.13	4M.	1/2 W.			

CONDENSERS

Nº	VALUE		Nº	VALUE	
C.1	.1×200	DUAL	C.15	.003×600	
C.2	.1×200		C.16	.003×600	
C.3	.05×200	DUAL	C.17	.1×200	
C.4	.05×200		C.18	2MF.×50	*
C.5	.05×200		C.19	5MF.×25	*
C.6	.01×400		C.20	5.9×350	*
C.7	.25×200		C.21	8MF.×490	*
C.8	.05×400		C.22	8MF.×490	*
C.9	.25×200		C.23	5MF×135	
C.10	.25×200		C.24	100MMF.	X
C.11	.25×200		C.25	100MMF.	X
C.12	.015×200		C.26	25MMF.	
C.13	.02×200		C.27	250MMF.	
C.14	.003×600		C.28	250MMF.	

NOTE:-(1) WITH GOOD TUBE, WILL MEASURE BETWEEN .5V. TO 1V. ON 10,000 OHM SCALE.

*QAV. IN ( ), QAV CONTROL IN MAX. POSITION.

NUMBERS PREFIXED BY LETTER 'P' ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

MODEL 4154
Schematic, Voltage
Socket, Alignment

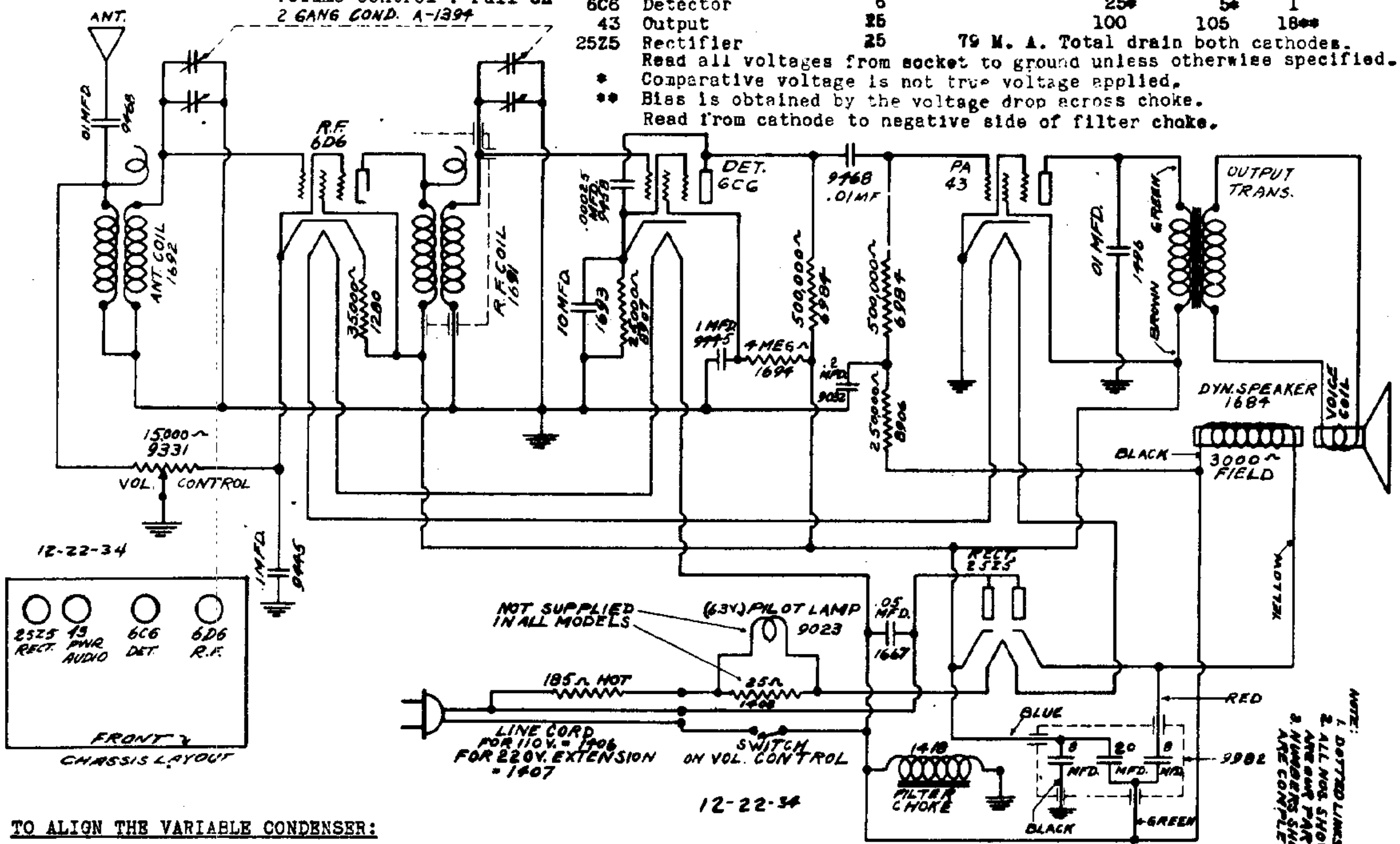
WALGREEN CO.

VOLTAGE TABLE

Line Voltage : 115
Volume Control : Full on

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6D6	Radio Frequency	6	105	105	3.5
6C6	Detector	6	25*	5*	1
43	Output	25	100	105	18**
25Z5	Rectifier	25			

79 M. A. Total drain both cathodes.
Read all voltages from socket to ground unless otherwise specified.
* Comparative voltage is not true voltage applied.
** Bias is obtained by the voltage drop across choke.
Read from cathode to negative side of filter choke.



TO ALIGN THE VARIABLE CONDENSER:

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.

2. Place the band selector switch for operation on the broadcast band, tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to 1400 kilocycles. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.

If the RF and antenna coils are not defective, and if the rotor and stator plates of the gang condenser have not been bent so as to destroy proper spacing, the receiver will correctly track over the entire tuning range.

DESCRIPTION

This receiver is a portable, four (4) tube, battery operated superheterodyne with self-contained loop antenna and batteries.

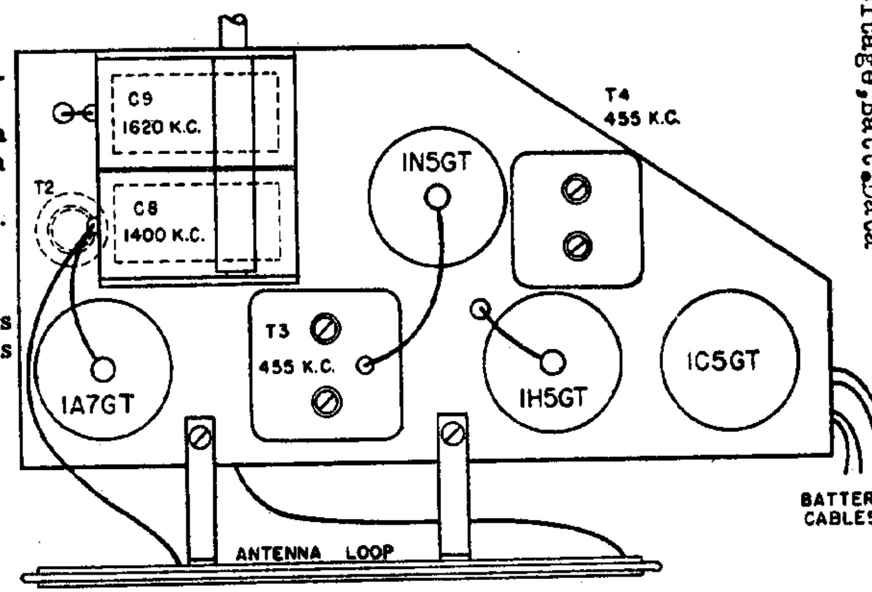
The tubes used are a 1A7GT as an oscillator convertor; a 1N5GT as an I. F. amplifier; a 1H5GT as an A.V.C. detector and audio amplifier; and a 1C5GT as a power output.

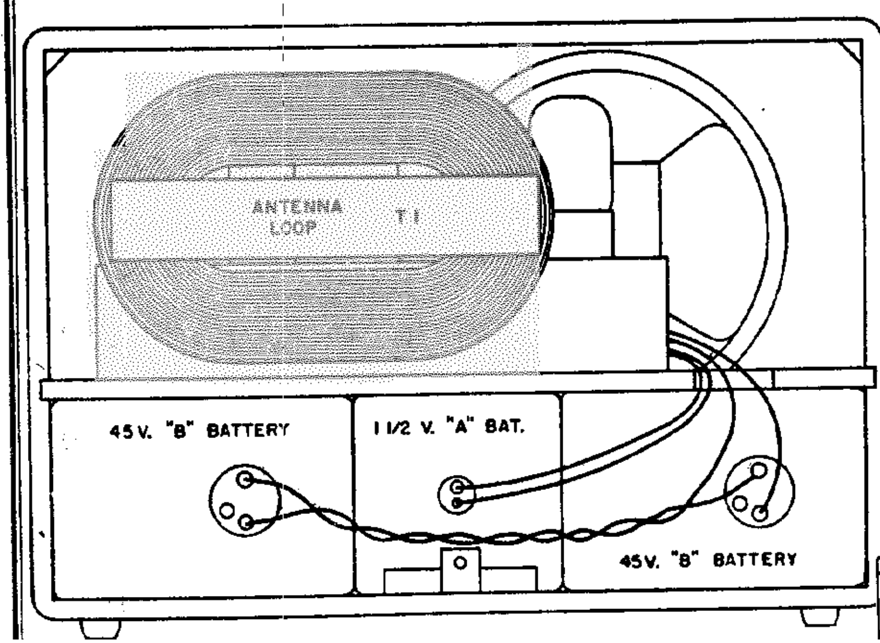
This receiver is made to cover the standard broadcast band from 1620 K.C. to 535 K.C.

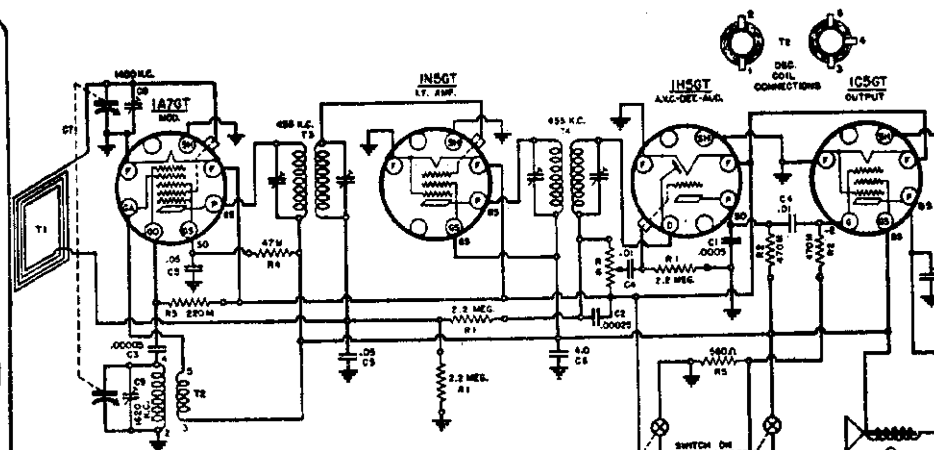
BATTERIES

Listed below are various manufacturers of batteries and their part numbers that may be used to make up the combination of batteries to be used with this receiver.

(Batteries)		Their Part No.
Burgess:	B Battery	B30
	A Battery	4F
Ray-O-Vac:	B Battery	P-5303
	A Battery	P-94A
Ever-Ready:	B Battery	762
	A Battery	742
General:	B Battery	V30B
	A Battery	4F1







TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER COND.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY READINGS ARE IN MICROFARADS.

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 0-40
R1	60-179	2.2 MEGOHM 1/3 WATT RESISTOR	C1	15-112	.0005 MFD. MICA CONDENSER	T1	82-2	ANTENNA LOOP
R2	60-178	470 M OHM " " "	C2	1504	.00025 " " "	T2	10-294	OSCILLATOR COIL
R3	60-180	220 M " " " "	C3	1503	.00008 " " "	T3	10-293	1 ST. I.F. TRANSFORMER
R4	60-177	47 M " " " "	C4	16-121	.01 MFD. 200 V. TUBULAR CONDENSER	T4	10-281	2 ND. "
R5	60-201	340 Ω " " " "	C5	1622	.05 " 200 V. " "	S	78-272	5" SPEAKER
R6	24-138	1 MEGOHM VOLUME CONTROL	C6	16-280	4.0 " 150 W.V. " "			
			C7	18-149	2 GANG VARIABLE COND. ALSO C8 & C9.			

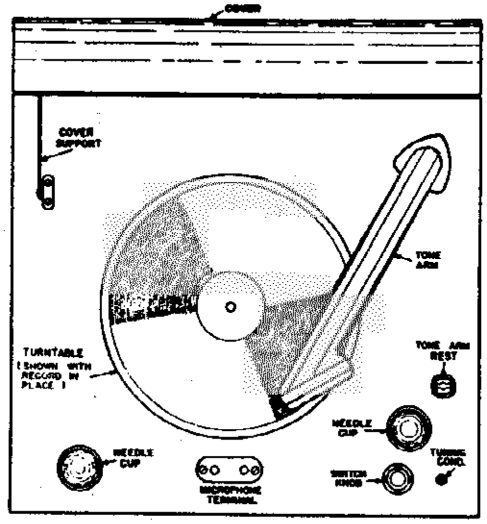
MODEL 9-23
Wireless Record Player
Schematic, Data

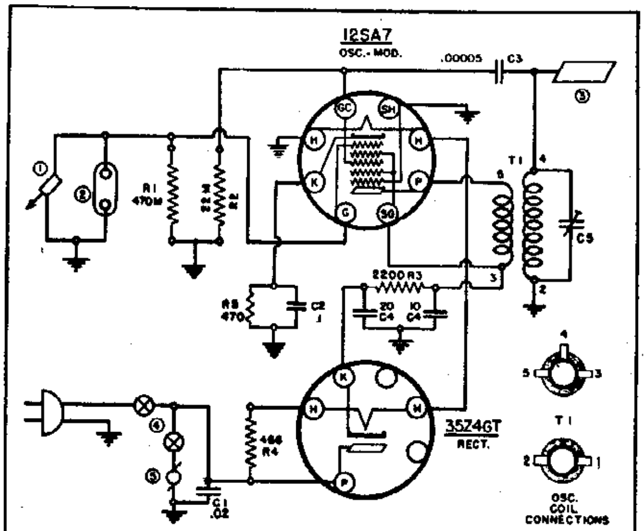
WARWICK MFG. CORP.

ATTACHMENT

There is incorporated in this Phono-Oscillator unit a tip jack terminal strip microphone connection. The microphone is supplied as an attachment and can be purchased under the part No. 79-263 from your dealer. In its attachment to the receiver, plug in the ends of the microphone cord into the tip jacks (see pictorial) and have switch in the first position. That is, in the positon to operate the oscillator but not the phono-motor.

Note:—Be sure to shut off the record player completely when it is not in use by turning the switch to the "off position".





CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 9-23
R1	60-178	470M OHM 1/3 W. RES.	C1	1605	.02 MFD. 400V. TUB. COND.
R2	60-185	22 M " " "	C2	16-115	.1 " 200V. " "
R3	60-234	2200 " " "	C3	1503	.00005 MFD. MICA "
R4	60-231	466 " 10 1/2 W. "	C4	18-241	20 X 10 " 150V. ELECT.
R5	60-216	470 " 1/3 W "	C5	20-119	3 PLATE TRIMMER
1	83-130	PICKUP			
2	12-1	MICROPHONE TERMINAL	T1	10-240	OSCILLATOR COIL
3	82-1	ANTENNA PLATE			
4	69-129	SWITCH (DUAL)	5	59-3	PHONOGRAPH MOTOR

PARTS PRICE LIST

Part No.	DESCRIPTION	Price
83-130	Tone Arm Assem.	$ 8.25
59-3	Motor Assem.	7.00
42-213	Cabinet and Cover Assem.	8.75
12-1	Microphone Jack	.40
79-263	Microphone Supplied as an Attachment.	5.00
69-129	Switch Dual	.75
10-240	Oscillator Trans.	.75
20-119	Trimmer	.25
18-241	Electrolytic Cond. 20x10 mf. 150 V.	1.00
60-231	Res. 466 Ohms	.50

Prices subject to change without notice.

PHONO-OSCILLATOR

DESCRIPTION

This unit is a Two Tube Phono-Oscillator. The tubes used are a 12SA7 as an oscillator and a 35Z4GT as a power rectifier.

This unit should be operated between 1500 K.C. and 1700 K.C. and is so designed that the playing of a record on the unit makes it possible that you receive this same recording from any radio set within a nearby vicinity.

INSTALLATION

This Phono-Oscillator is designed to operate from a 105-130 volt 60 cycle A.C. current supply only; do not connect this to any other source unless so specified. If in doubt about your power supply, your local power company will give you this information.

There are no connections needed between the Radio Receiver and the Phono-Oscillator. The only needed connection is the power supply line cord to an electric outlet.

For best results it would be advisable to use medium or soft needles. They will assure you longer record life and are not as severe on the tone arm as other types of needles.

The tone arm is a sensitive unit and precaution should be taken in handling. It would be injurious to drop or rest the tone arm on the point of the needle. Always use arm rest when the Phono-Oscillator is not in use.

OPERATION

Place the Phono-Oscillator near an electric outlet and within a distance of about 30 feet of the Radio Receiver which you intend to use. Do not set this unit near a radiator or other heater since the cabinet may be damaged.

Attach line cord plug to the nearest outlet.

Adjust your radio receiver to maximum volume and set tuning dial to a point at the high frequency end between 1500 K.C. and 1700 K.C. where minimum interference from outside stations is noticed.

Allowing the Radio Receiver to remain at that adjustment, turn switch knob on the Phono-Oscillator (see pictorial diagram) in a clockwise direction until the first click is noticed. This will turn the oscillator section of the unit on, and about ½ minute should be allowed for tubes to heat up. With a record in the proper position on the turn table turn the same switch knob further toward the right (in a clockwise direction) until another click is heard. This will turn the Phono-Motor on and when the record has reached its proper speed of rotation, set the pick-up arm with its needle lightly upon the record.

The Phono-Oscillator is now operating and if it is not being heard over the radio it will indicate that it is oscillating at a different frequency than that set up on the Radio Receiver. In order to set the oscillator to the same position as the radio receiver there is incorporated a tuning condenser, (see pictorial layout). Turn this condenser with a screw driver in a clockwise rotation, slowly and carefully until the response of the record is picked up by the Radio Receiver. If when turning the tuning condenser as mentioned above you do not get a response after 3 or 4 turns it will indicate that you have gone past the point. It will be necessary to turn in the opposite direction (counter clockwise) until the response is obtained.

In order to get maximum volume and clarity it would be advisable to tune your radio a few degrees one way or the other until the best result is obtained.

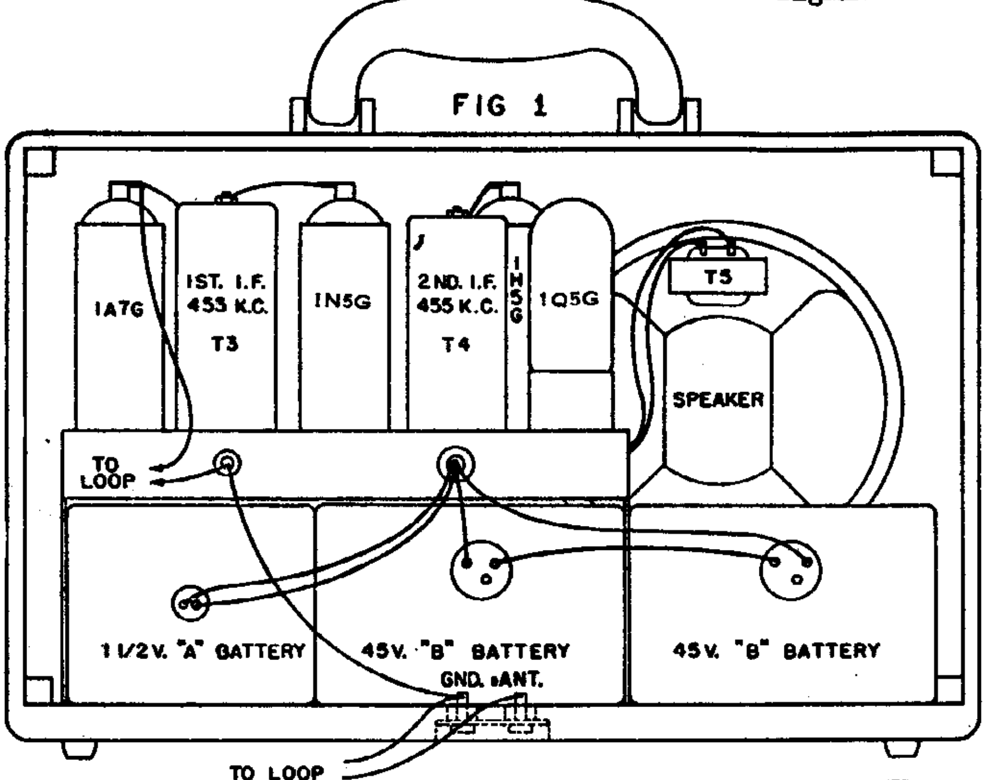
MODELS 9-43,9-45
Schematic,Voltage
Socket,Trimmers
Alignment

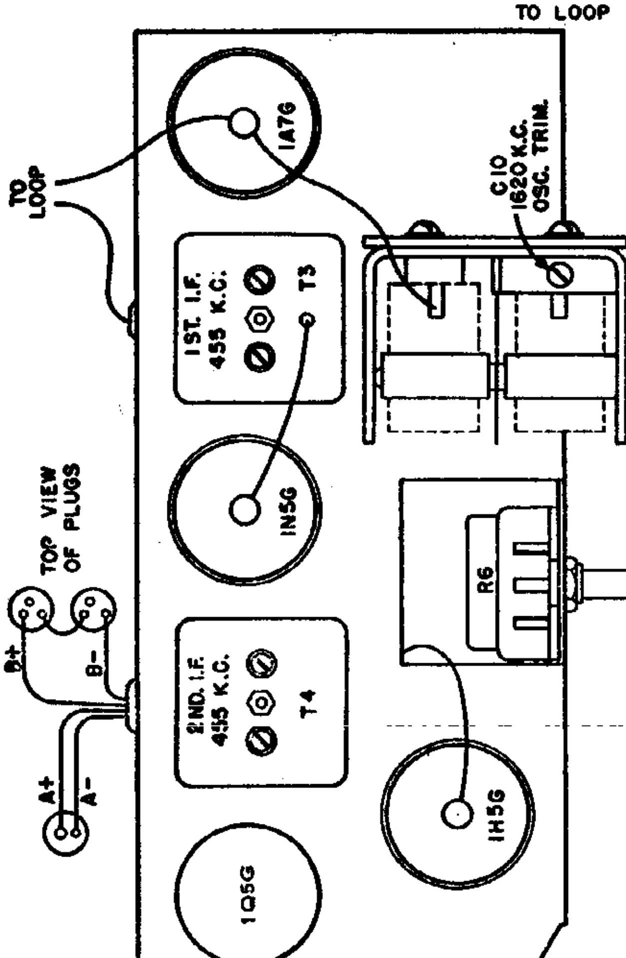
WARWICK MFG. CORP.

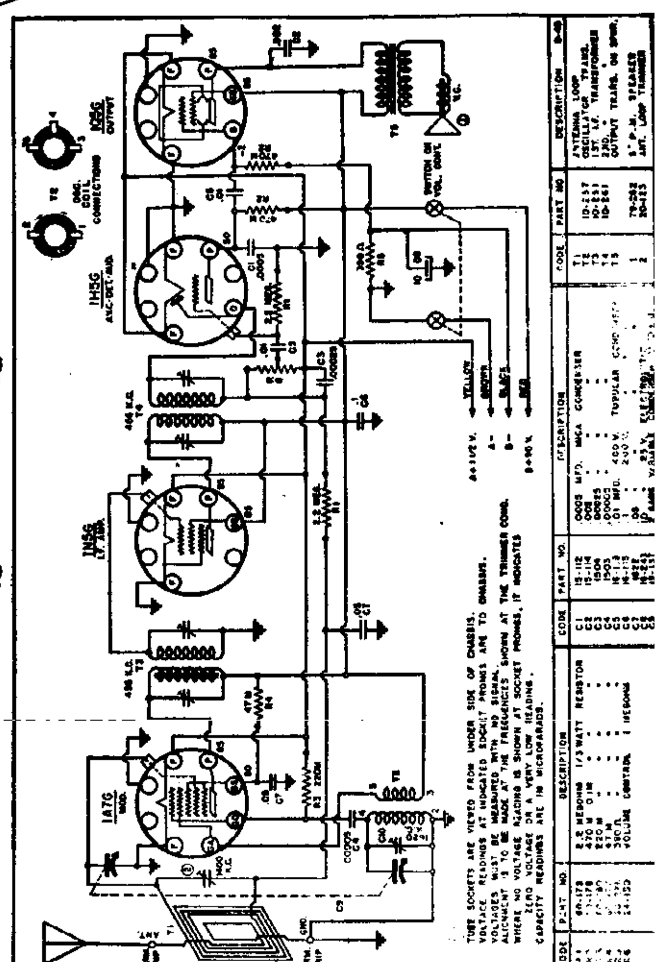
FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL VIII

This receiver is made to cover the standard broadcast band from 1620 K. C. to 535 K. C.

FIG 1



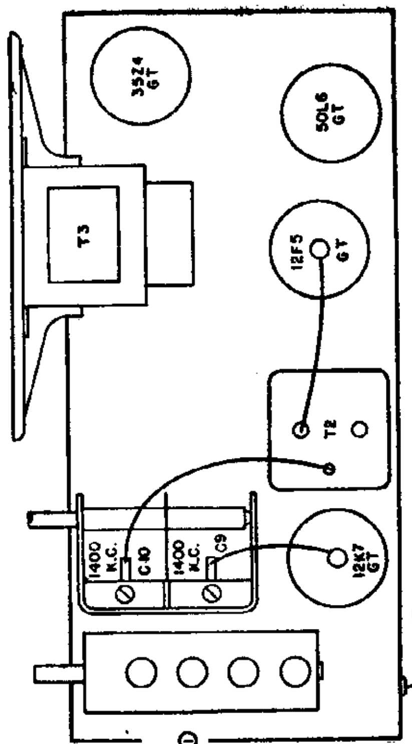




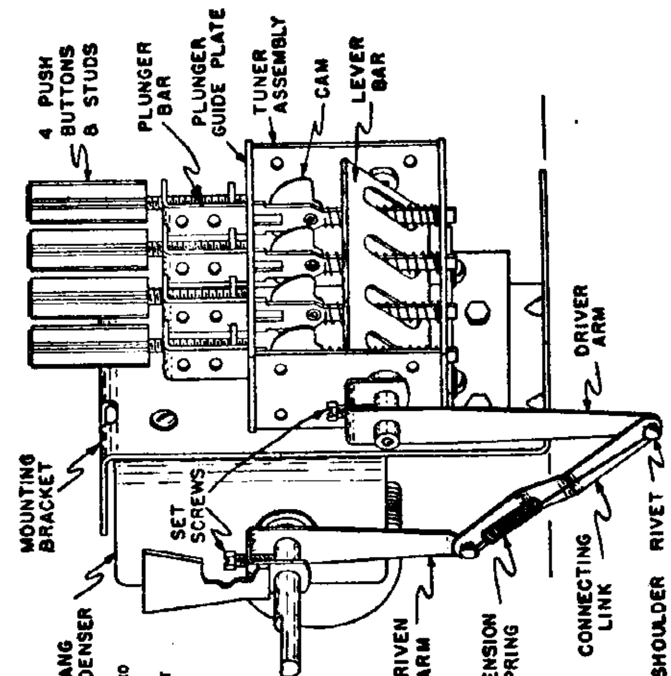
MODEL 9-46
Schematic, Voltage, Socket

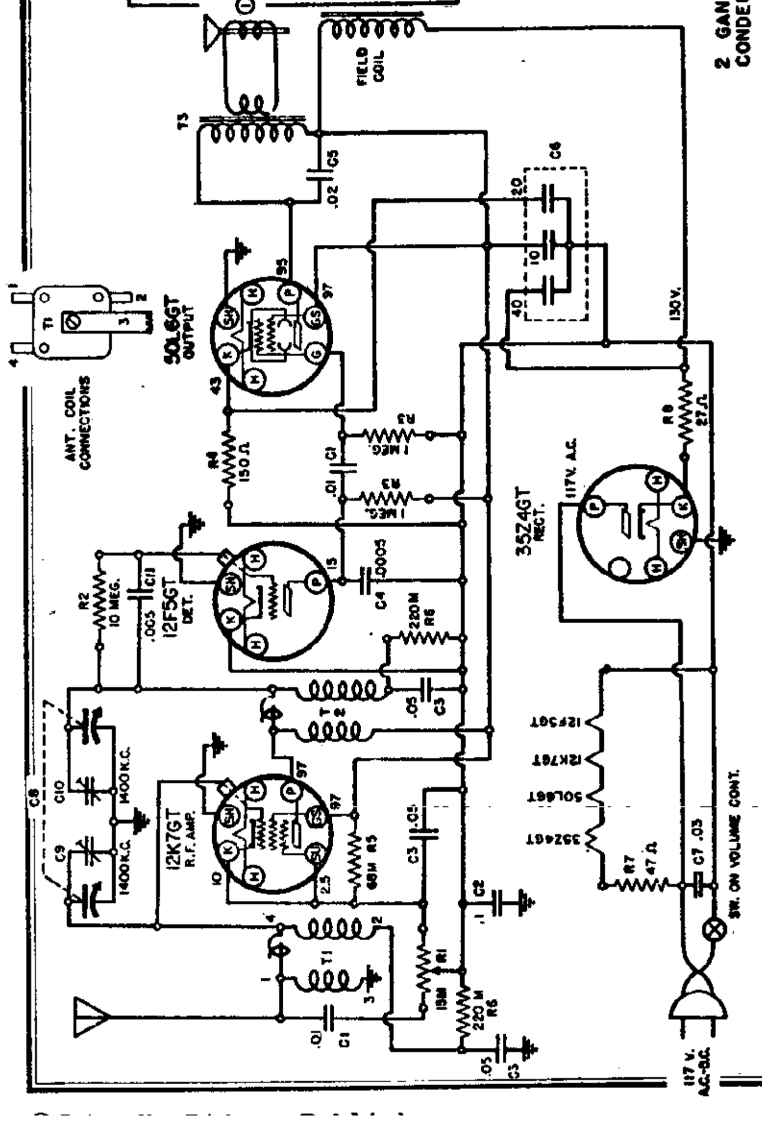
WARWICK MFG. CORP.

Trimmers, Chassis
Tuner



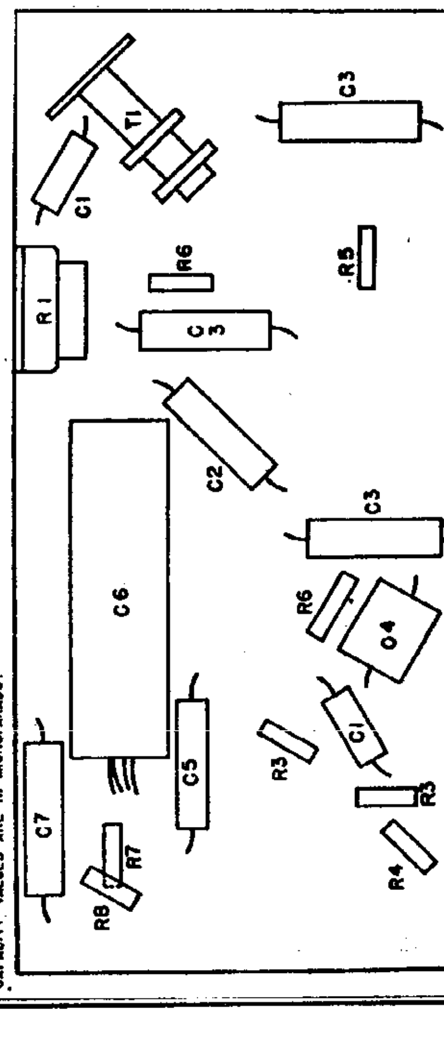
LOCATION OF PARTS ON TOP OF CHASSIS





TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITY VALUES ARE IN MICROFARADS.

WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.



LOCATION OF PARTS UNDER CHASSIS

MODEL 9-58
Alignment, Tuner Data

WARWICK MFG. CORP.

MODEL 9-46
Alignment, Wave Trap Notes
Tuner Data

ALIGNMENT PROCEDURE

Model 9-46

PRELIMINARY

Output Meter Connections	Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt	1.95 Volts
Generator Ground Lead Connection	Receiver Chassis
Dummy Antenna Value to Be in Series with Generator Output	See Chart Below
Connection of Generator Output Lead	See Chart Below
Generator Modulation	30%, 400 Cycles
Position of Volume Control	Fully On

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTIONS	TRIMMER ADJUSTMENT (In Order Shown)	TRIMMER FUNCTION
1400 KC	1400 Kc.	.0002 mfd.	Antenna Conn.	C10	F. Trimmer
1400 KC	1400 KC	.0002 mfd.	Antenna Conn.	C9	Ant. Trimmer

Model 9-58

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTIONS	TRIMMER ADJUSTMENT (In Order Shown)	TRIMMER FUNCTION
Closed	455 Kc.	.1 mfd.	12A8GT	T4-T5	I. F.
Closed	455 Kc.	.0002 mfd.	Antenna Conn.	T1 (Min. Output)	Wave Trap
Fully Open	1700 K.C.	.0002 mfd.	Antenna Conn.	C13	Osc. Trimmer
Fully open	1450 K.C.	.0002 mfd.	Antenna Conn.	C12	Ant. Trimmer

INDEX TABS Model 9-46

Cut the call letters of your four (4) selected stations from the list supplied with your receiver and slip them into the top of the Push-buttons. Arrange the call letters in the buttons with the call letter of the highest frequency station, the one that comes in closest to the number 160 on the tuning knob, toward the rear of the receiver and work progressively toward the front so that the lowest frequency station, the one that comes closest to the number 60 on the tuning knob, would be toward the front.

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, your selected station which is tuned in nearest number 160 on the Station Selector Knob.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of highest frequency and the Call Letter Tab for this station should be in the Push-button nearest the rear of the receiver.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second highest in frequency and the third station set up will be third highest in frequency.

INDEX TABS: Model 9-58

Cut the call letters of your four (4) selected stations from the list supplied with your receiver and slip them into the Tab Holder from the front, with the clear celluloid in front of the call letters, to protect them. Arrange the call letters in the Buttons from right to left. Have the call letters of the lowest frequency station, that is, the station that comes in nearest to the top of the dial scale, at the extreme right-hand button and work progressively to the left so that the highest frequency call letters will be in the extreme left-hand button.

SETTING PUSH-BUTTONS:

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the top of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

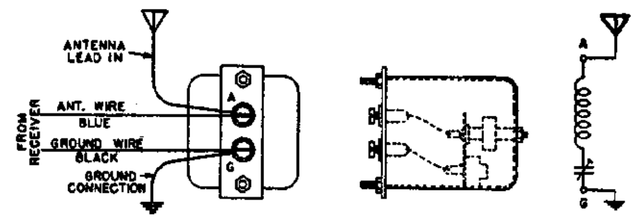
The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner turn the tuning knob to the frequency of the station desired.



Model 9-46

WAVE TRAP:

In localities where particular interference is noticed from code transmitters it would be advisable to attach to the receiver an antenna wave trap. Connect the antenna wire from the receiver (blue lead) and the antenna lead-in from your antenna to the binding post marked "A" on the wave trap. Connect the ground wire of your receiver (black lead) and the ground lead coming from your ground connection to the binding post designated as "G" on the wave trap. This antenna wave trap can be obtained under the part No. 1016310255 as a service part.

This wave trap is supplied tuned to a frequency of 455 K.C. If there is only one interfering station it would be advisable to tune the wave trap to the frequency of the interference. Where there are more than one interference it would be advisable to have the wave trap tuned to a frequency of 455 K.C. to keep the interference at a minimum.

HOW THE AUTOMATIC PUSH-BUTTON TUNER FUNCTIONS: Model 9-46

This unit is mechanically operated by means of a proven cam and lever action, designed to rotate a shaft 90 degrees. Since the variable gang condenser must rotate 180 degrees, a 2 to 1 step up mechanical lever action is incorporated to give full rotation to the gang condenser. Three links are used to transmit the operation of the push-button to the variable gang condenser, one a driver lever or link connected to the tuner shaft, second, a driven lever connected to the gang condenser shaft and third a connecting link, connecting the two levers together mechanically.

The plunger bar that retains the screw type push-buttons, also holds a cam to itself by a shoulder rivet. This cam floats on the rivet proper and is locked into position with a small square plate, floating in the plunger bar. To lock cam into position, screw the push-button knob toward the right (clock-wise). The end of the push-button screw will then force a small square plate known as a brake shoe against the periphery of the cam. The push-button must be tightened firmly after the position of the station selection is determined. To change the setting of the cam, the push-button knob must be loosened by rotating it toward the left (counter-clockwise). When this push-button screw is loosened, it will automatically release the brake shoe from the cam, leaving the cam free to rotate and set its new position to the setting of the lever bar.

If it becomes necessary to realign the tuner in relation to the gang condenser, the following procedure should be followed to assure perfect tuning operation:

1. Slip driver arm on to the tuner shaft and the driven arm on to the variable condenser shaft. Do not tighten set screws.

2. Connect these two lever arms by slipping the connecting link over the heads of the shoulder rivets. This link has a slight offset and precaution should be taken when assembling to see that it is installed in the proper manner as illustrated in the Pictorial. It will be necessary to tilt the link slightly in order to slip it over the head of the shoulder rivets. Then attach spring as shown.

3. In making the final adjustment, that of setting the condenser in relation to the tuner, set the condenser at minimum capacity (opened completely) and the front edge of the lever bar raised as high as possible (see Pictorial). With the lever arms in a vertical position as shown tighten set screws.

It is essential that all set screws be tightened securely so as to prevent a variation from original setting.

If, for some reason, a replacement is necessary for some particular item on the tuner proper, such as a lever bar, cam, plunger bar or brake shoe, it would be advisable to return the complete tuner proper for replacement.

HOW THE AUTOMATIC PUSH-BUTTON TUNER FUNCTIONS: Model 9-58

This unit is mechanically operated by means of a proven cam and lever action, designed to rotate a shaft 90 degrees. Since the variable gang condenser shaft must rotate 180 degrees, a 2 to 1 step up mechanical lever action is incorporated to give full rotation to the gang condenser. Three links are used to transmit the operation of the push-button to the variable gang condenser; first, a driver lever or link connected to the tuner lever bar, (see Pictorial); second, a driven lever arm connected to the gang condenser shaft; and third, a connecting link, connecting the two lever arms together mechanically.

If it becomes necessary to realign the tuner in relation to the gang condenser, the following procedure should be followed to assure perfect tuning operation:

1. Attach driver arm to the lever bar by means of two machine screws, making sure that they are assembled with lockwashers and tightened securely.

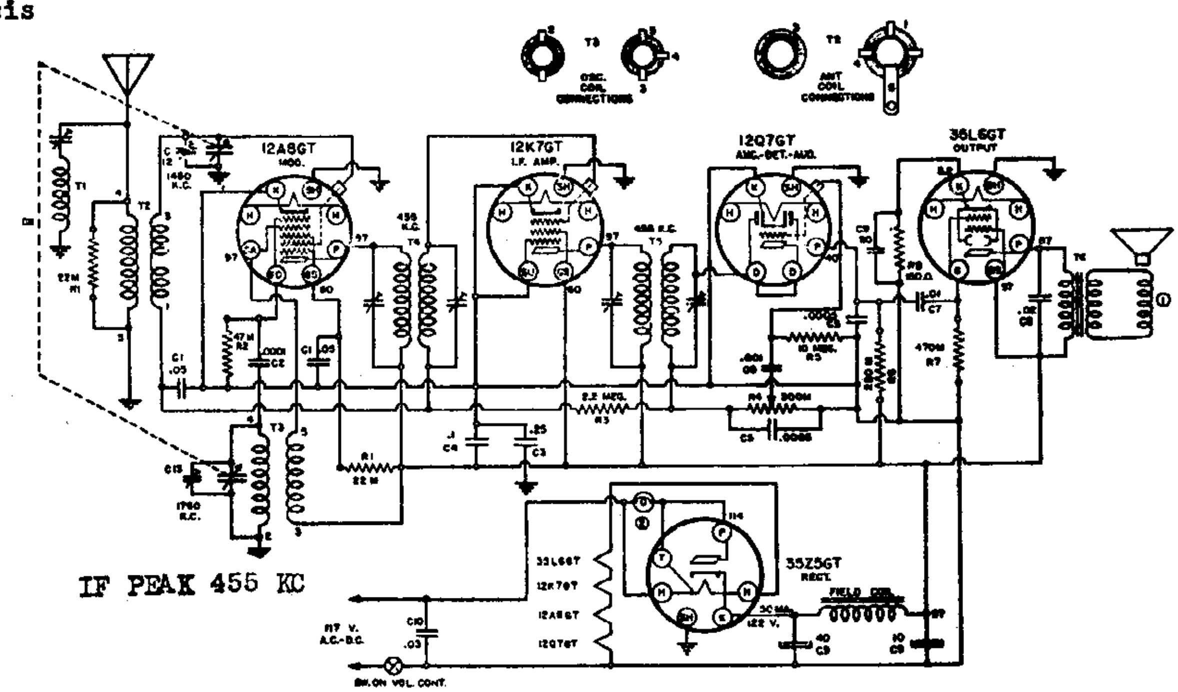
2. Slip the drum assembly, which consists of the drum, drum hub, and the driven arm, over the variable condenser shaft but do not tighten set screws.

3. Connect these two lever arms by slipping the connecting link over the heads of the shoulder rivets. This link has a slight bend (offset) about 1/3 of its length and is to be installed with the shorter end towards the top and the offset towards the rear when looking at it from the drum end. Attach the tension spring between the two shoulder rivets. This spring is incorporated to take up all the unnecessary slack in the drive.

4. In making the final adjustment, that of setting the condenser in relation to the tuner, close the condenser completely to maximum capacity and rotate drum with the left hand in a clock-wise rotation, until the driver arm comes gradually down to within ⅛ of an inch of the variable condenser shaft. When in this position, tighten set screws in the drum hub with the right hand.

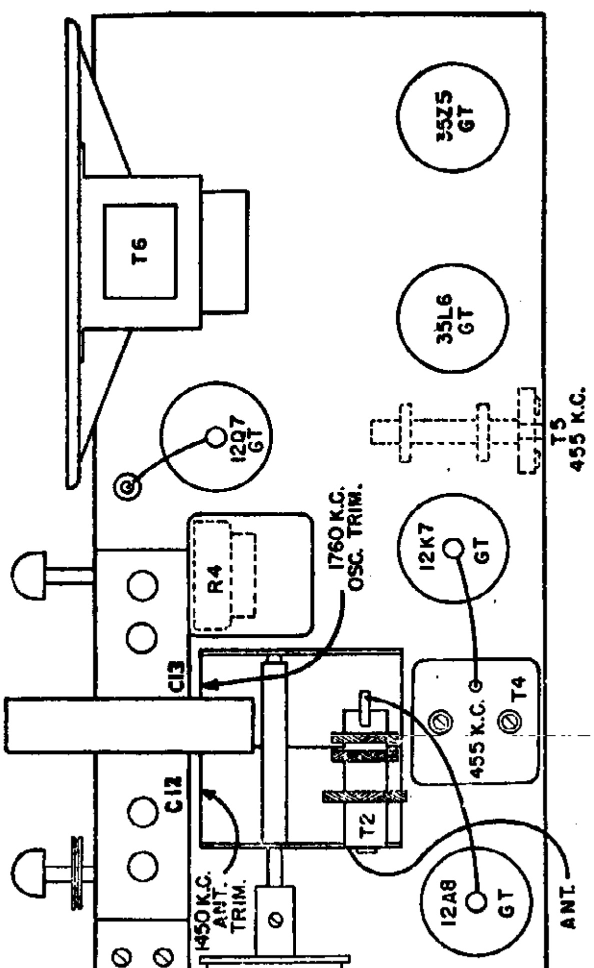
MODEL 9-58
Schematic, Voltage
Socket, Trimmers
Chassis

WARWICK MFG. CORP.

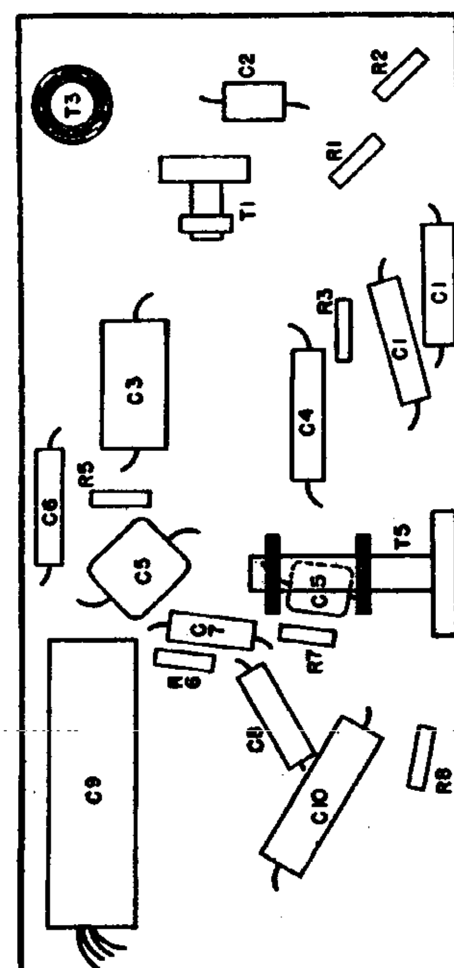


TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITY VALUES ARE IN MICROFARADS.

ALIGNMENT IS TO BE MADE AT THE FREQUENCY, SHOWN AT EACH TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.



LOCATION OF PARTS ON TOP OF CHASSIS

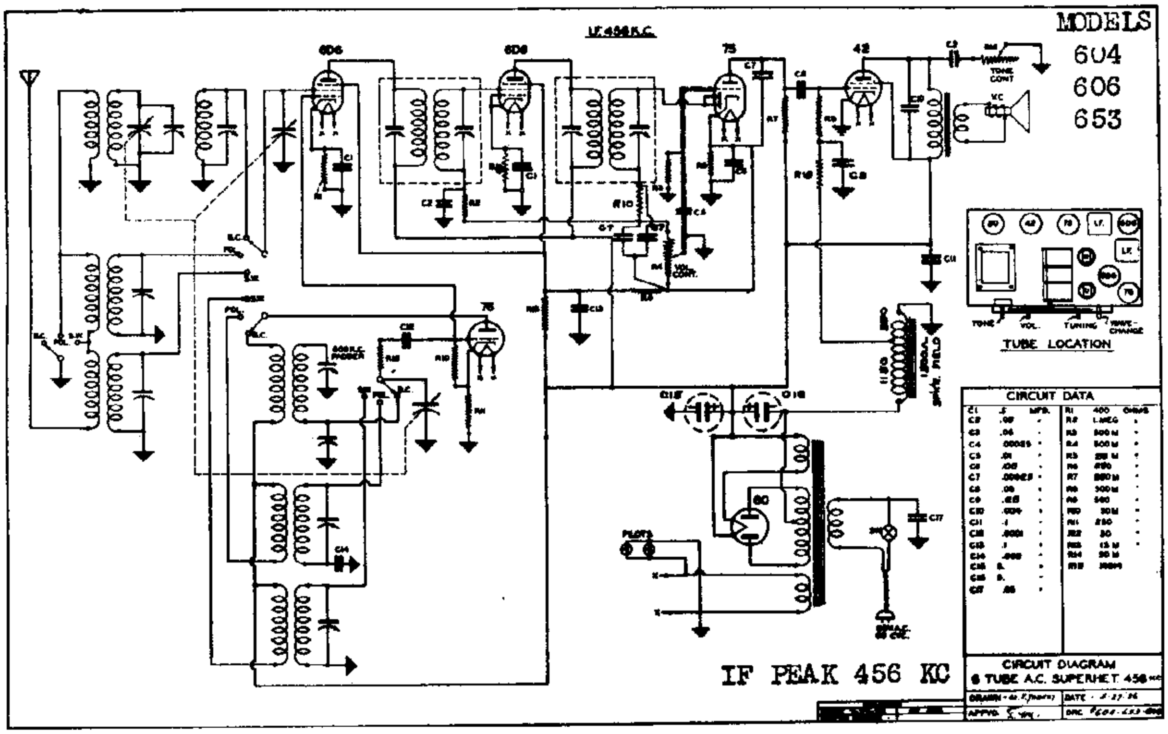


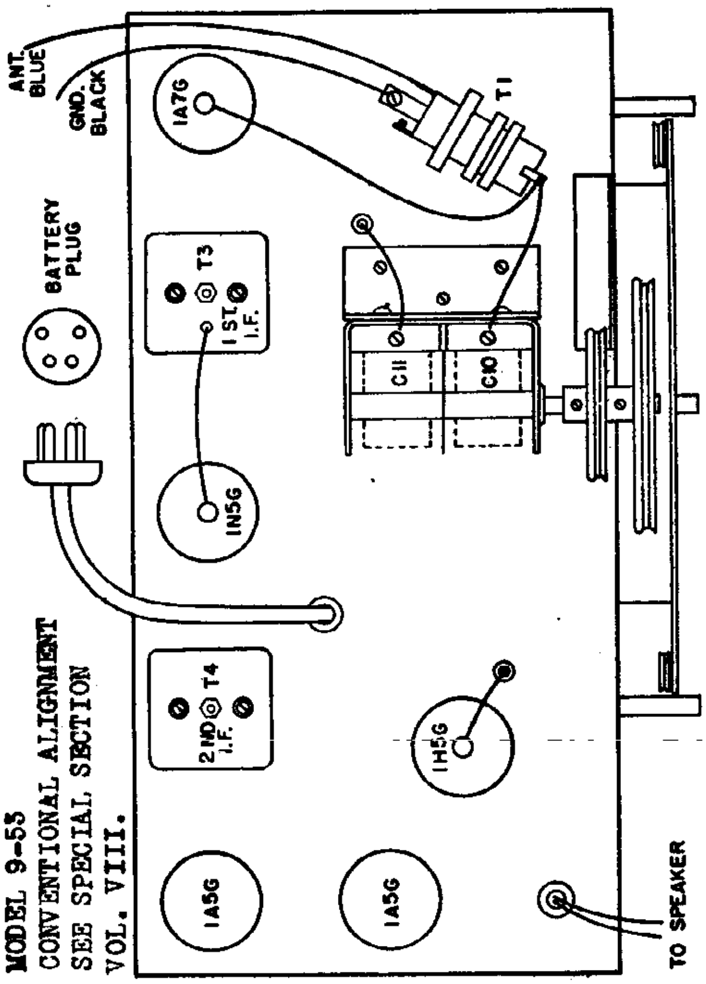
LOCATION OF PARTS UNDER CHASSIS

MODELS 604, 606, 653
Schematic, Socket

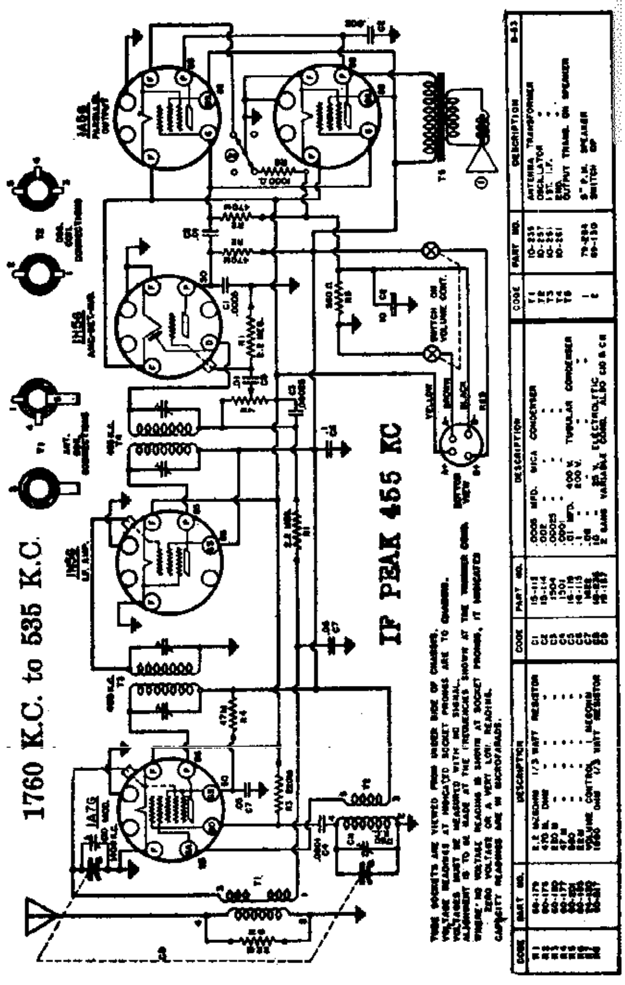
WARWICK MFG. CORP.

MODEL 9-53
Schematic, Voltage, Socket
Trimmers, Alignment



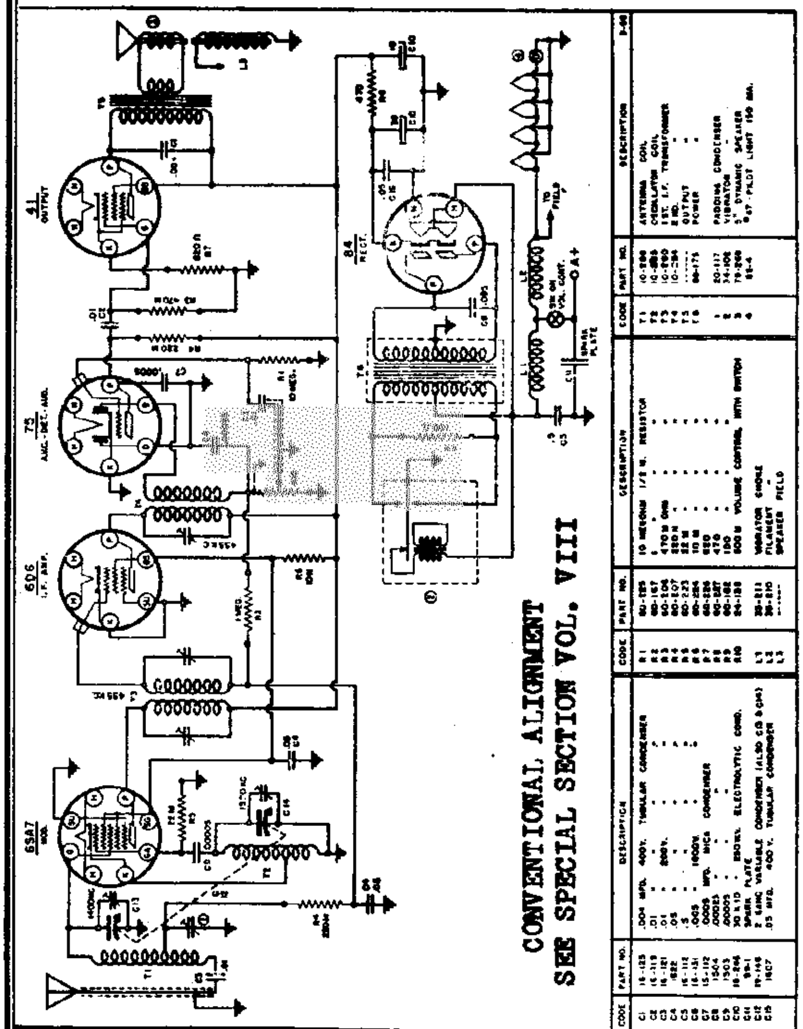


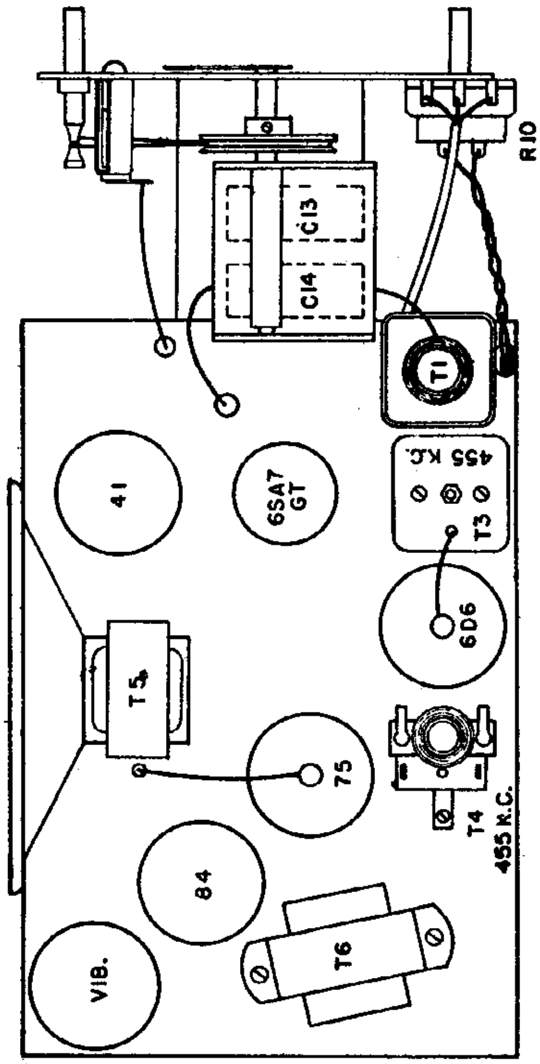
MODEL 9-53
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOL. VIII.



MODEL 9-59 Auto
Schematic, Socket
Trimmers, Alignment

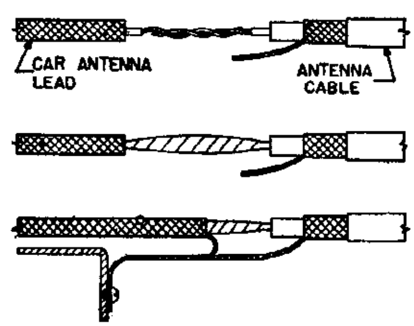
WARWICK MFG. CORP.

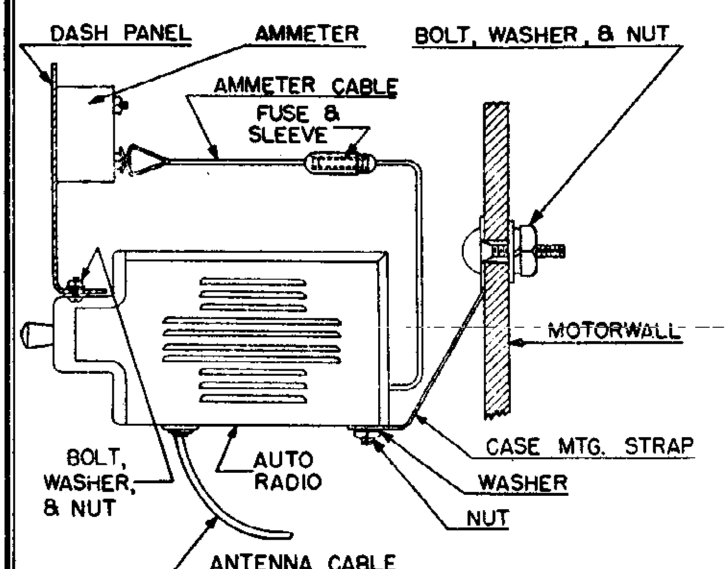


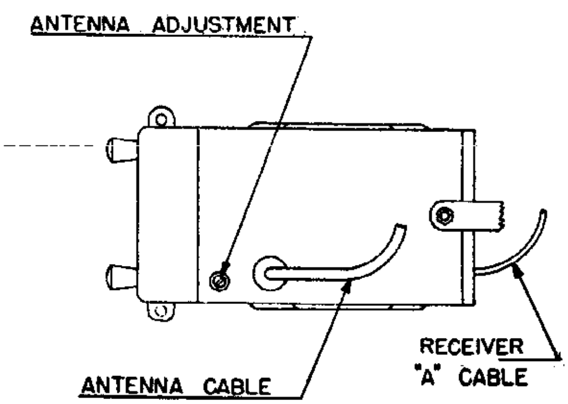


Automobile Receiver

Frequency Range 540-1520 Kilocycles







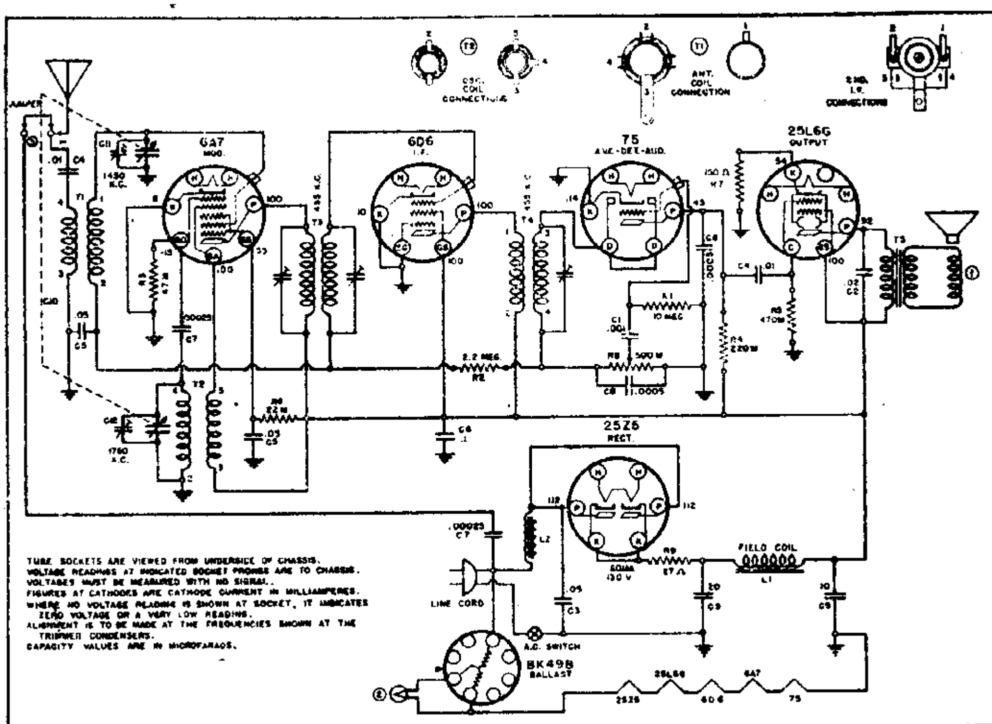
WARWICK MFG. CORP.

MODEL 9-66
Schematic, Voltage
Socket, Trimmers
Alignment

This receiver is a 6-tube AC/DC current operated Superheterodyne.

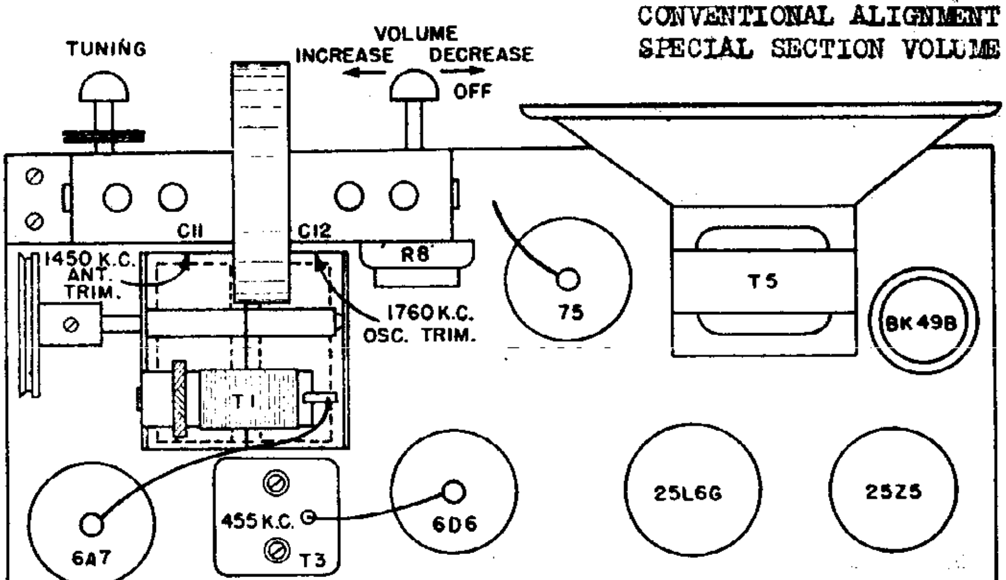
The tubes used are: a 6A7 as an oscillator-converter; a 6D6 as an I. F. amplifier; a 75 as an A.V.C. detector and audio amplifier; a 25L6G as a beam output; a 25Z5 as a power rectifier; and a BK49B as a voltage divider.

This receiver is made to cover from 1750 KC. to 535 KC., which covers the standard broadcast band and the first police band.



CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 9-66
C1	16-124	.001 MFD. 400V. TUBULAR COND.	R1	60-193	10 MEGOHM 1/3W. RESISTOR	T1	10-277	ANTENNA COIL
C2	1605	.02 " " " "	R2	60-179	2.2 " " "	T2	10-246	OSCILLATOR COIL
C3	1607	.05 " " " "	R3	60-179	470M OHM " "	T3	10-278	1ST. I.F. TRANSFORMER
C4	16-121	.01 " 200V. " "	R4	60-180	220 " " "	T4	10-271	2ND. I.F. "
C5	1622	.05 " " " "	R5	60-177	47M " " "	T5	------	OUTPUT " (ON SPEAKER)
C6	16-115	.1 " " " "	R6	60-185	22M " " "			
C7	1504	.00025 MFD. MICA CONDENSER	R7	60-184	150 " " "	L1	------	FIELD COIL (ON SPEAKER)
C8	15-112	.0005 " " "	R8	24-124	500M " VOLUME CONTROL & SW.	L2	33-220	R.F. CHOKE
C9	18-241	20 X 10 " 150 WV. ELECTROLYTIC	R9	60-220	27 " 1/3W. RESISTOR	1	79-206	5" DYNAMIC SPEAKER
C10	19-134	2 GANG VARIABLE COND. ALSO C11 & C12				2	6901	PILOT LIGHT #40
						3	22-117	ANT. TERM.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII



MODELS 9-220 to 9-229 inc
MODEL 542 Late

WARWICK MFG. CORP.

Schematics, Socket, Trimmers

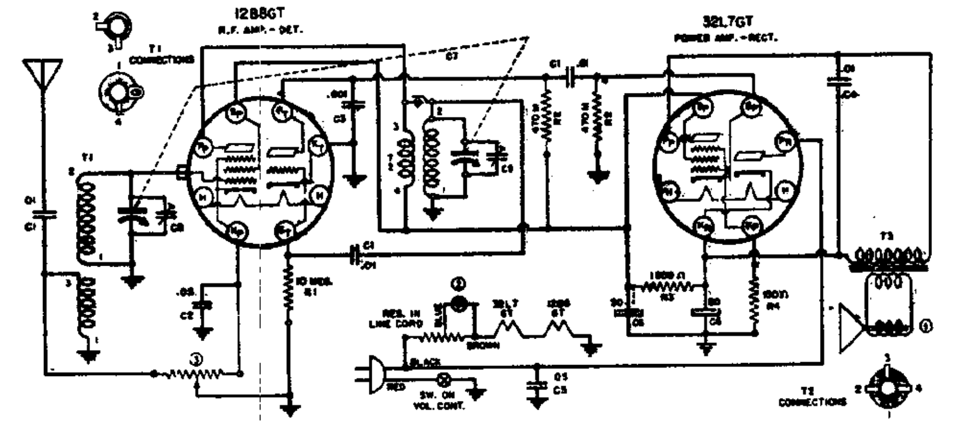
FOR TUNER SEE INDEX

STANDARD BROADCAST RECEIVER

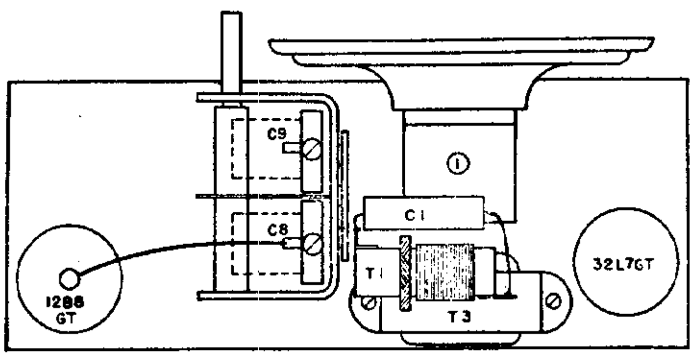
Model No. 9-22 is a 2-tube T.R.F. radio receiver for operation on a 117 Volt A.C. 60 cycle or 117 Volt D.C. supply. The tubes used are a 12B8GT as an R.F. Amplifier and Detector and a 35L7GT as a Power Amplifier and Rectifier.

This receiver covers a frequency range from 540 Kilocycles to 1760 Kilocycles (K.C.).

The scale is calibrated in kilocycles (less the final zero). Standard broadcast stations are listed in kilocyclyes in most station lists.

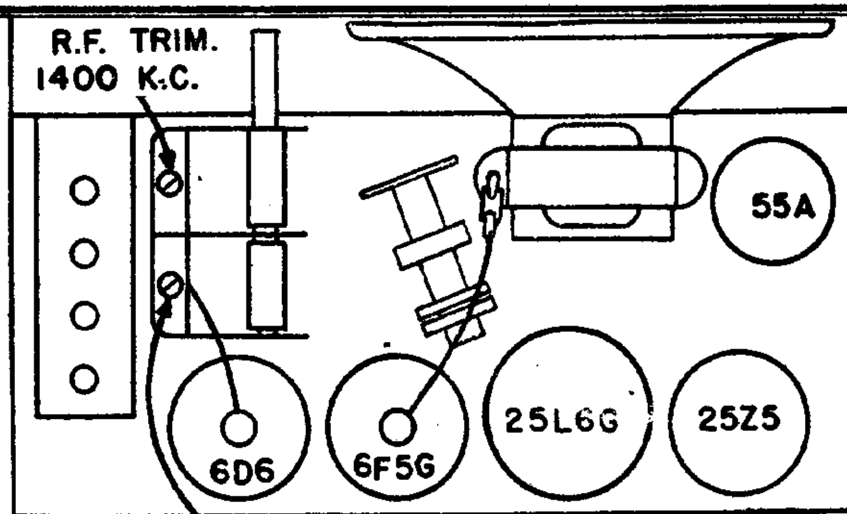


CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 9-22
C1	16-121	.01 MFD. 600V. TUBULAR COND.	R1	60-193	10 MEGOHM 1/3 W RESISTOR	T1	10-288	ANTENNA COIL
C2	1622	.05 " " " "	R2	60-176	470 M OHMS " "	T2	10-289	R.F. COIL "
C3	16-484	.001 " 400V. " "	R3	60-229	1600 " " "	T3	80-174	OUTPUT TRANSFORMER
C4	16-419	.01 " " " "	R4	60-484	150 " " "	1	79-270	P.M. SPEAKER
C5	1607	.05 " " " "				2	-96-4	#47 PILOT LIGHT 150 MA.
C6	16-249	20 X 20 MFD. 150V. ELECTROLYTIC				3	24-134	VOLUME CONTROL WITH SWITCH
C7	19-147	2 GANG VAR. COND. (ALSO C1 & C8)						



LOCATION OF PARTS ON TOP OF CHASSIS

MODEL No. 9-220 to 9-229, Inclusive

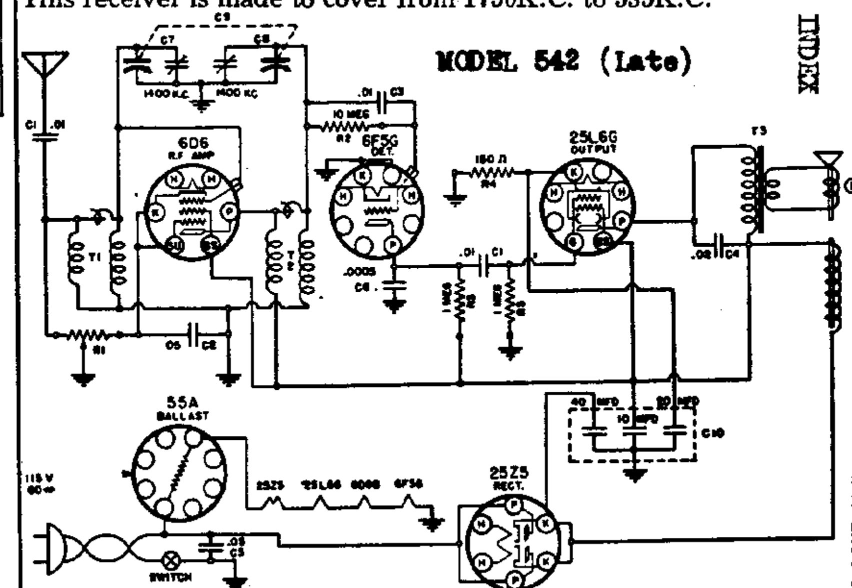


ANT. TRIM. 1400 K.C.

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 542
C1	1604	.01 MFD. 600V. TUBULAR CONDENSER	R1	24-187	VOLUME CONTROL & SWITCH
C2	1622	.05 MFD. 200 V. " "	R2	60-193	10 MEGOHM 1/3 W. RESISTOR
C3	16-119	.01 MFD. 400 V. " "	R3	60-196	1 " " "
C4	16-100	.02 MFD. 600 V. " "	R4	60-194	150 OHMS " "
C5	1607	.05 MFD. 400V. " "			
C6	16-112	.0005 MFD. MICA CONDENSER	T1	10-249	ANTENNA COIL
C7, C8 (C9)	19-135	ANTENNA VARIABLE COND / OSCILLATOR VARIABLE COND.	T2	10-250	R.F. COIL
			T3		OUTPUT TRANSFORMER
C10	10-234	FILTER CONDENSER 40 X 10 MF-400WV 20 MF - 25 WV	1	79-251	SPEAKER

This receiver is a 5 tube AC/DC current operated T.R.F.
This receiver is made to cover from 1750K.C. to 535K.C.

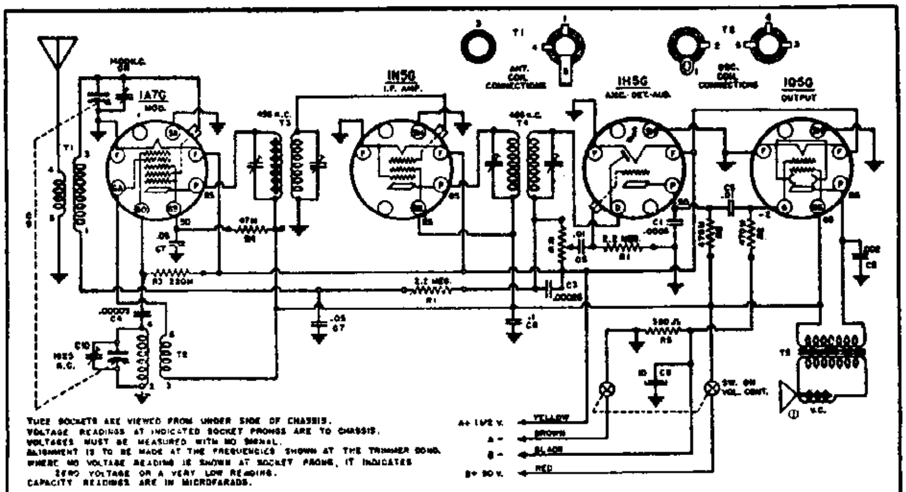
MODEL 542 (Late)



WARWICK MFG. CORP.

MODELS 9-480 to 9-489 inc.
MODELS 9-680 to 9-689 inc.
Schematics, Voltage, Socket
Trimmers, Alignment

CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOLUME VIII



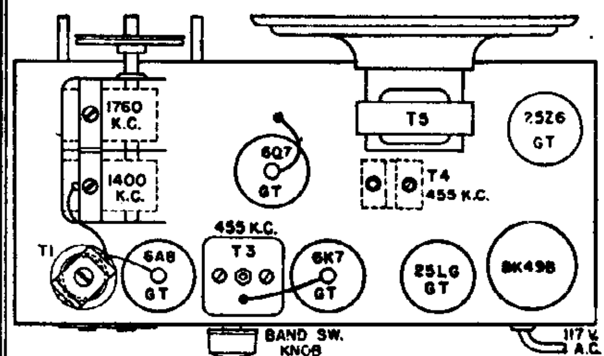
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER SCREWS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY READINGS ARE IN MICROFARADS.

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 9-48
R1	60-173	2.2 MEGOHM 1/3 WATT RESISTOR	C1	15-112	.0003 MFD. MICA CONDENSER	T1	10-235	ANTENNA COIL
R2	60-175	470 M OHM " " "	C2	15-114	.002 " " "	T2	10-232	OSCILLATOR COIL
R3	60-180	220 M " " " "	C3	1904	.00025 " " "	T3	10-251	1 ST. I.F. TRANS.
R4	60-177	47 M " " " "	C4	1903	.00005 " " "	T4	10-261	2 ND. " "
R5	60-221	390 " " " "	C5	16-121	.01 MFD. 200 V. TUBULAR COND.	T5	------	OUTPUT TRANS. ON SPKR.
R6	24-180	VOLUME CONTROL 1 MEGOHM	C6	16-119	.1 " " " "			
			C7	1622	.05 " " " "	1	73-271	5" P.M. SPEAKER
			C8	16-243	10 " 25 V. ELECTROLYTIC			
			C9	19-137	2 GANG VAR. COND. ALSO C10 & C11			

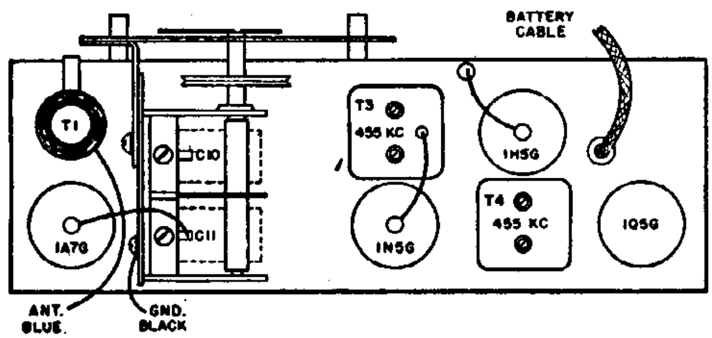
Models 9-480 to 9-489 inclusive

One of the following batteries may be used with this receiver and is to be put inside and towards the rear of the cabinet.

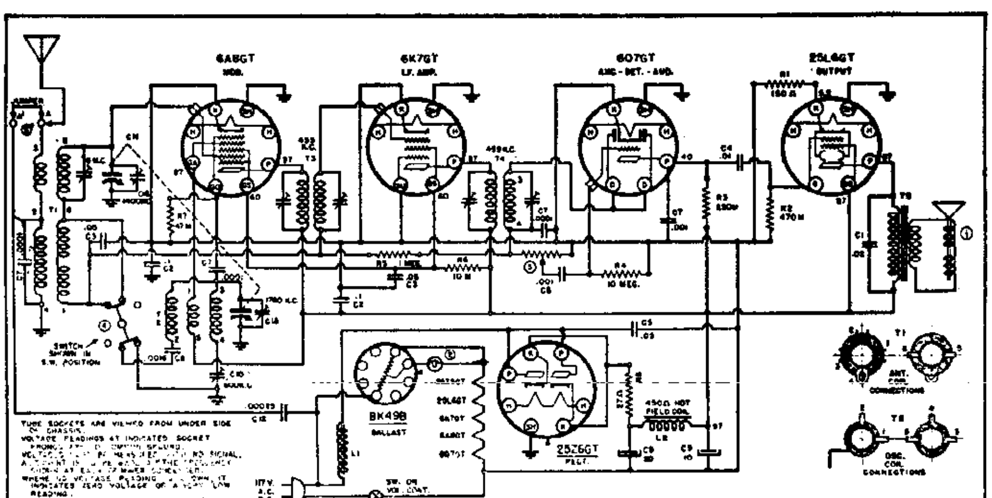
Ray-O-Vac..No."AB" 82
Burgess..No.17G-D60
General..No.6ODL11L



LOCATION OF PARTS ON TOP OF CHASSIS
Models 9-680 to 9-689



LOCATION OF PARTS ON TOP OF CHASSIS
Models 9-480 to 9-489



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS [illegible]
VOLTAGES [illegible] NO SIGNAL.
ALIGNMENT IS [illegible] THE FREQUENCY SHOWN AT EACH TRIMMER SCREW.
WHERE NO VOLTAGE READING [illegible] IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 9-68
C1	16-123	.02 M.D. 200 V. TUBULAR CONDENSER	R1	60-184	150 OHM 1/3 W. RESISTOR	T1	10-268	ANTENNA TRANSFORMER
C2	16-115	.1 " " " "	R2	60-178	470 M. " " "	T2	10-267	OSCILLATOR "
C3	1622	.05 " " " "	R3	60-180	220 M. " " "	T3	10-268	1 ST. I.F. "
C4	16-121	.01 " " " "	R4	60-193	10 MEG. " " "	T4	10-261	2 ND. I.F. "
C5	1667	.05 " 400 V. " "	R5	60-193	1 " " "	T5	------	OUTPUT TRANS. (ON SPKR.)
C6	16-124	.001 " 200 V. " "	R6	60-713	10 M. " " "			
C7	1501	.0001 " MICA CONDENSER	R7	60-177	47 M. " " "	1	78-266	5" DYNAMIC SPEAKER
C8	15-116	.005 " " "	R8	60-220	27 " " "	2	89-4	PILOT LIGHT #47
C9	16-241	20 X 10 MFD. 150 V. ELECTROLYTIC CONDENSER	L1	33-220	R.F. CHOKE	3	24-132	VOLUME CONTROL & SWITCH
C10	20-117	PADDING CONDENSER 300-600 MFD	L2	------	FIELD COIL (ON SPKR.)	4	69-133	BAND SWITCH
C11	19-145	2 GANG VARIABLE CONDENSER ALSO C12 & C13	C12	1904	.00025 MFD MICA CONDENSER	5	22-117	ANT. TERM.

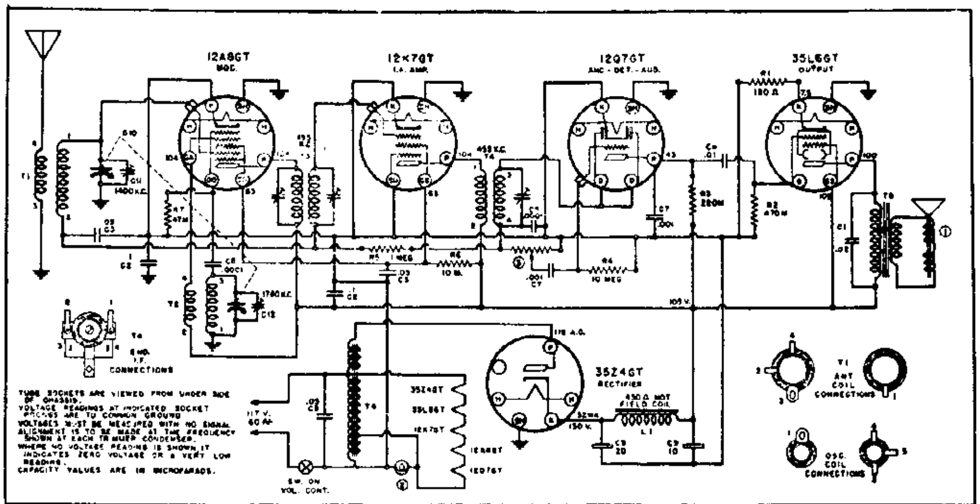
Models 9-680 to 9-689 inclusive

Tuning Ranges:
Broadcast
536 - 1760 KC
Short-Wave
2.35 - 7.4 MC

MODELS 9-550 to 9-559 inc
MODELS 9-670 to 9-679 inc.
Schematics, Voltage, Socket
Alignment, Trimmers

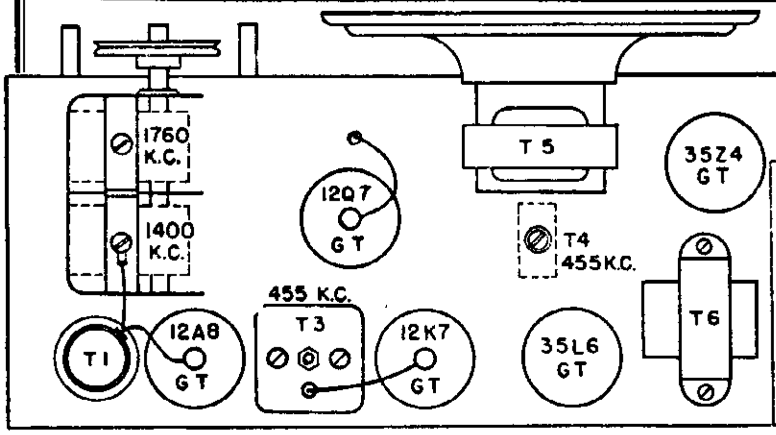
WARWICK MFG. CORP.

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

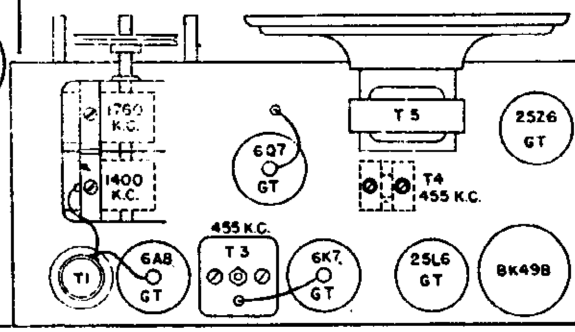


Models
9-550
to
9-559

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 9-55
C1	16-123	.02 MFD. 200 V. TUBULAR CONDENSER	R1	60-184	150 OHM 1/3 W. RESISTOR	T1	10-270	ANTENNA TRANSFORMER
C2	16-115	.1 " " " "	R2	60-178	470 M " " "	T2	10-272	OSCILLATOR "
C3	1622	.05 " " " "	R3	60-180	220 M " " "	T3	10-268	1ST. I.F. "
C4	16-121	.01 " " " "	R4	60-193	10 MEG " " "	T4	10-271	2 ND. I.F. "
C5	1607	.05 " 400 V. " "	R5	60-195	1 " " " "	T5		OUTPUT TRANS. (ON SPKR.)
			R6	60-215	10 M. " " "	T6	80-172	POWER TRANSFORMER
C7	16-124	.001 " 200 V. "	R7	60-177	47 M. " " "			
C8	1601	.0001 " MICA CONDENSER				1	79-266	5" DYNAMIC SPEAKER
C9	16-241	20 X 10 MFD. ELECTROLYTIC COND. 150 V.				2	83-4	PILOT LIGHT #47
C10	16-144	2 GANG VARIABLE CONDENSER ALSO C11 & C12	L1		FIELD COIL (ON SPEAKER)	3	24-152	VOLUME CONTROL & SWITCH

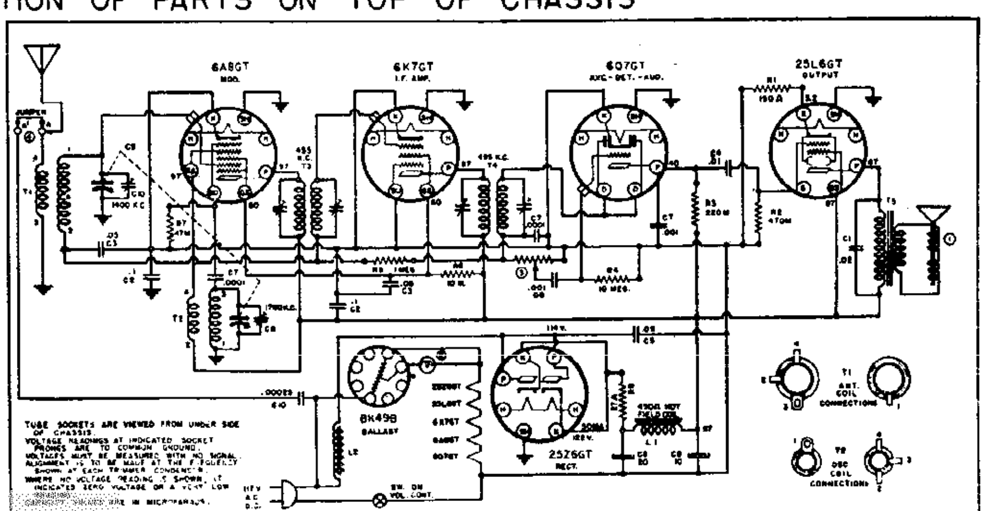


Left: Models 9-550 to 9-559
Below: Models 9-670 to 9-679



LOCATION OF PARTS ON TOP OF CHASSIS

LOCATION OF PARTS ON TOP OF CHASSIS



Models
9-670
to
9-679

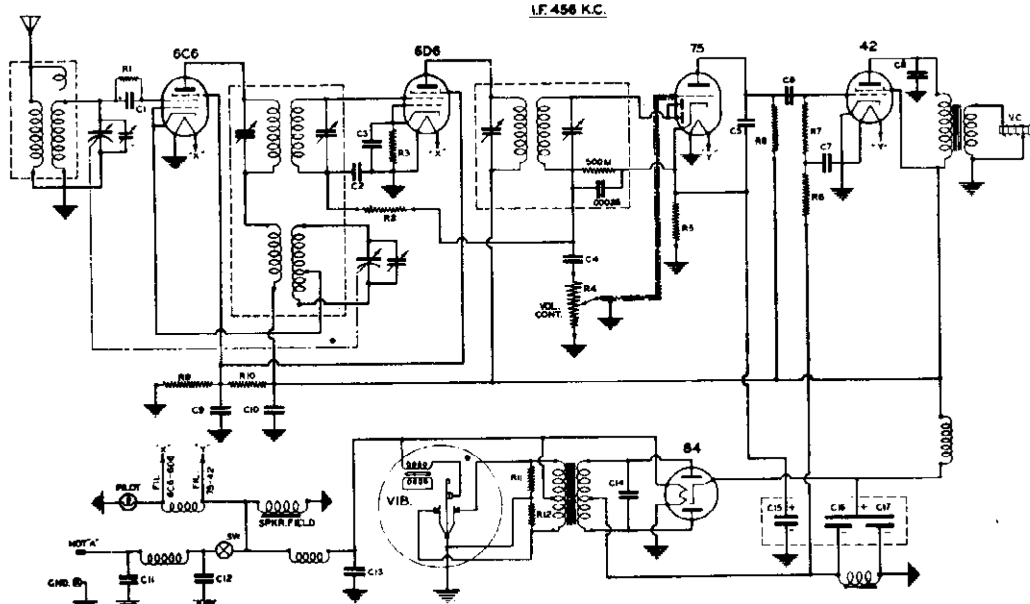
CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 9-67
[illegible]	[illegible]	.02 MFD 200 V TUBULAR CONDENSER	R1	60-184	150 OHM 1/3 W. RESISTOR	T1	10-270	ANTENNA TRANSFORMER
C2	16-115	.1 " " " "	R2	60-170	470 M " " "	T2	10-272	OSCILLATOR "
C3	1622	.05 " " " "	R3	60-180	220 M. " " "	T3	10-268	1ST. I.F. "
C4	16-121	.01 " " " "	R4	60-193	10 MEG " " "	T4	10-281	2 ND. I.F. "
C5	1607	.05 " 400 V. " "	R5	60-195	1 " " " "	T5	-----	OUTPUT TRANS (ON SPKR)
C6	16-124	.001 " 200 V. " "	R6	60-215	10 M. " " "			
C7	1601	.0001 " MICA CONDENSER "	R7	60-177	47 M. " " "	1	79-266	5" DYNAMIC SPEAKER
C8	16-241	20 X 10 MFD. 150 V. ELECTROLYTIC COND.	R8	60-220	27 " " "	2	83-4	PILOT LIGHT #47
C9	16-144	2 GANG VARIABLE CONDENSER, ALSO C10 & C11	L1	------	FIELD COIL (ON SPEAKER)	3	24-152	VOLUME CONTROL & SWITCH
C10	1604	.00025 MFD. MICA CONDENSER	L2	33-220	R.F. CHOKE	4	22-117	ANT TERMINAL

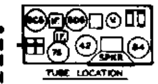
Schematics, Socket Alignment, Trimmers

WARWICK MFG. CORP.

MODEL 401
MODEL 401LW
MODEL 550-C

I.F. 456 K.C.





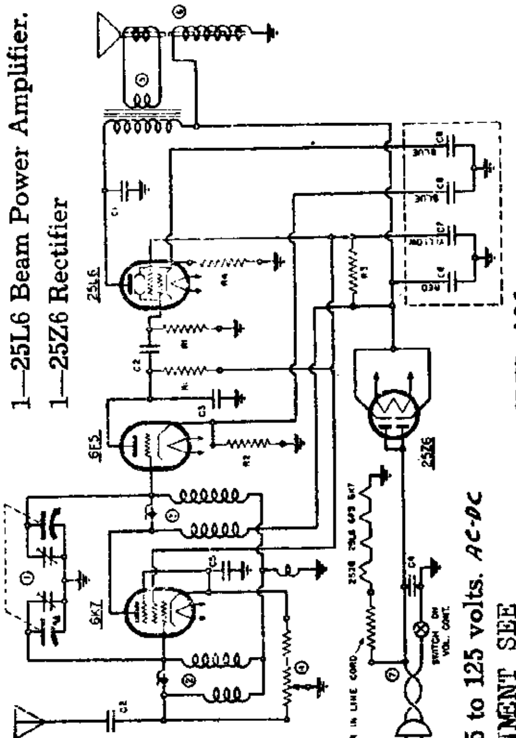
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL VIII.

CIRCUIT DATA		
C1	.00025	MFD.
C2	.05	"
C3	.1	"
C4	.01	"
C5	.00025	"
C6	.01	"
C7	25	"
C8	.004	"
C9	.1	"
C10	.1	"
C11	.002	"
C12	.002	"
C13	.5	"
C14	.0075	"
C15	4	"
C16	4.	"
C17	8	"
R1	500 M	OHMS
R2	1 MEG	"
R3	300	"
R4	1 MEG.	"
R5	5 M	"
R6	250 M	"
R7	250 M	"
R8	100 M	"
R9	25 M	"
R10	20 M	"
R11	50	"
R12	50	"

CIRCUIT DIAGRAM
5 TUBE SUPER AUTO SET.

DRAWN - W.J.ZIMMER	DATE - 5-23-36
APPVD. EMH.	DWG. NO. 550-C

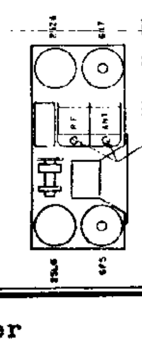
1—6K7 R. F. Amplifier
1—6F5 Detector
1—25L6 Beam Power Amplifier.
1—25Z6 Rectifier



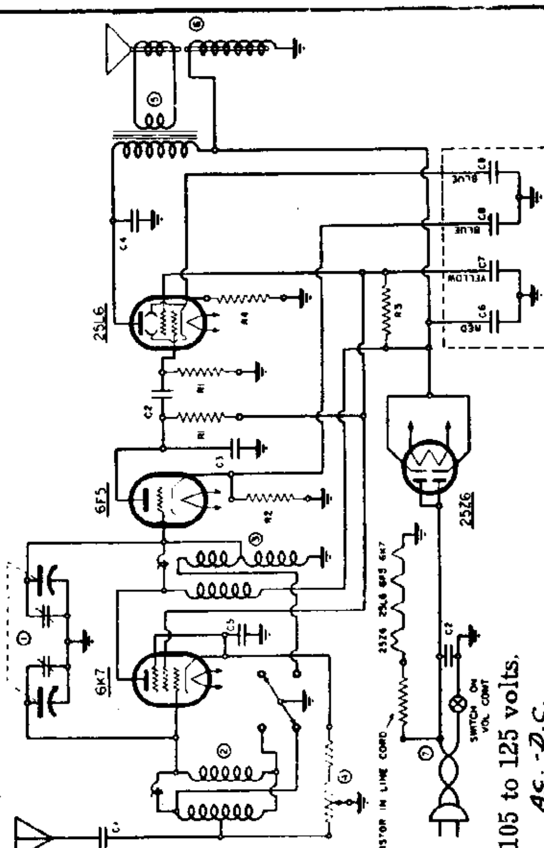
MODEL 401

105 to 125 volts. AC-DC

FOR CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOLUME VIII



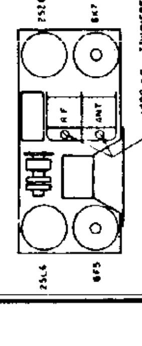
1—6K7 R. F. Amplifier
1—6F5 Detector
1—25L6 Beam Power Amplifier.
1—25Z6 Rectifier



MODEL 401LW

105 to 125 volts.
AC.-D.C.

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII



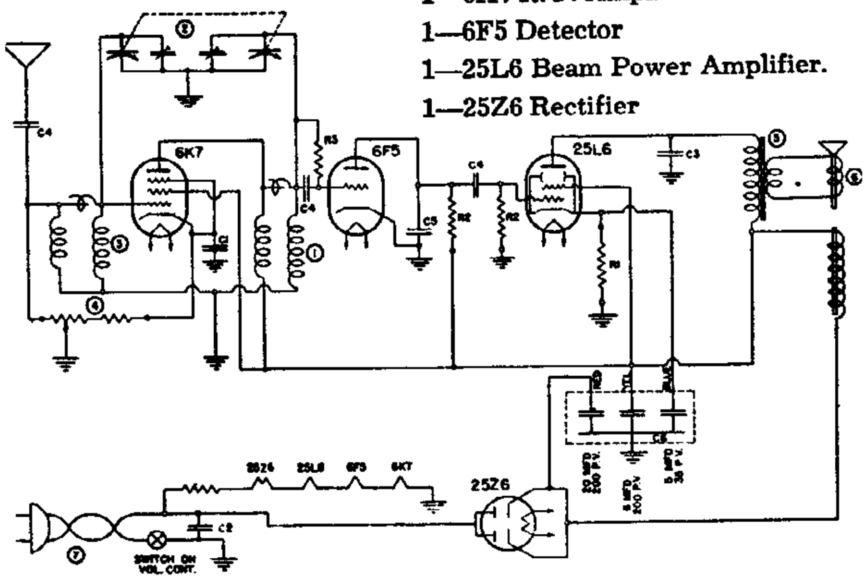
MODEL 404
MODEL 510-C
Schematics, Socket
Alignment, Trimmers

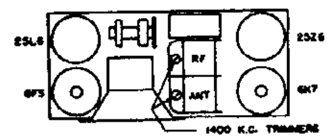
WARWICK MFG. CORP.

MODEL 404

This receiver will operate on either alternating or direct current, from a power supply of 105 to 125 volts. Do not connect it to any other source.

1—6K7 R. F. Amplifier
1—6F5 Detector
1—25L6 Beam Power Amplifier.
1—25Z6 Rectifier



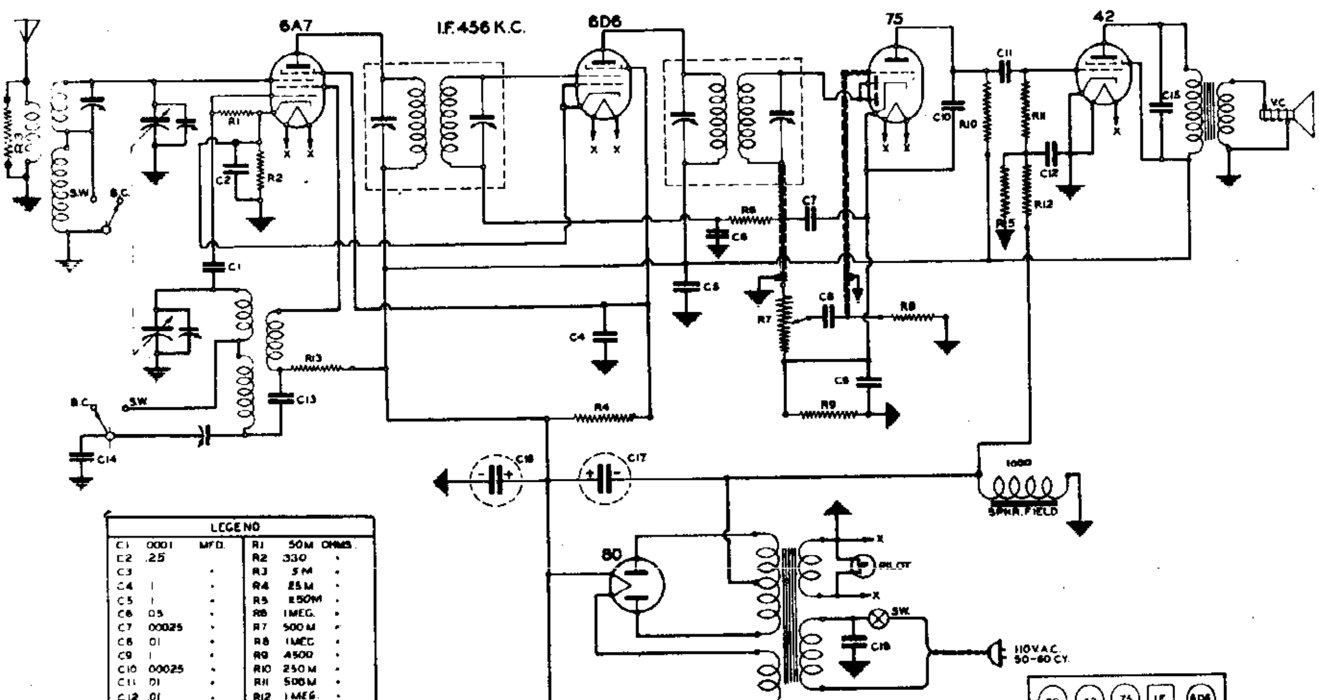


CODE	PART NO.	DESCRIPTION 404
1	10-234	R.F. COIL
2	19-124	2 GANG CONDENSER
3	10-233	ANTENNA COIL
4	24-117	VOLUME CONTROL & SWITCH
5	80-148	OUTPUT TRANSFORMER
6	79-244	SPEAKER
7	23-117	LINE CORD

CODE	PART NO.	DESCRIPTION
R1	60-184	150 OHM 1/2 WATT RESISTOR
R2	60-157	1 MEGOHM 1/2 WATT "
R3	60-183	6.8 MEGOHM 1/2 WATT "
C1	16-109	.05 MFD 200 V TUBULAR CONDENSER
C2	16-107	.05 MFD 400 V " "
C3	16-108	.02 MFD 600 V " "
C4	16-110	.01 " " " "
C5	1604	.00025 MFD MICA CONDENSER
C6	18-230	FILTER CONDENSER

CONVENTIONAL ALIGNMENT: SEE SPECIAL SECTION VOL. VIII.

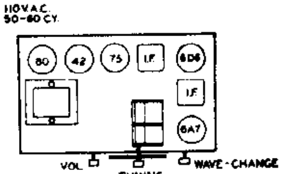
MODEL 510C



LEGEND					
C1	.0001	MFD.	R1	50M	OHMS.
C2	.25		R2	330	"
C3		"	R3	5M	"
C4	1	"	R4	25M	"
C5	1	"	R5	250M	"
C6	.05	"	R6	1MEG.	"
C7	.00025	"	R7	500M	"
C8	.01	"	R8	1MEG	"
C9	1	"	R9	4500	"
C10	.00025	"	R10	250M	"
C11	.01	"	R11	500M	"
C12	.01	"	R12	1MEG.	"
C13	.001	"	R13	10M	"
C14	.002	"			
C15	.004	"			
C16	8	"			
C17	8	"			
C18	.1	"			

CIRCUIT DIAGRAM
5 TUBE A.C. SUPERHET

DRAWN - W. J. [illegible]	DATE - 6-6-36
APPD. [illegible]	DRG. # 510-C

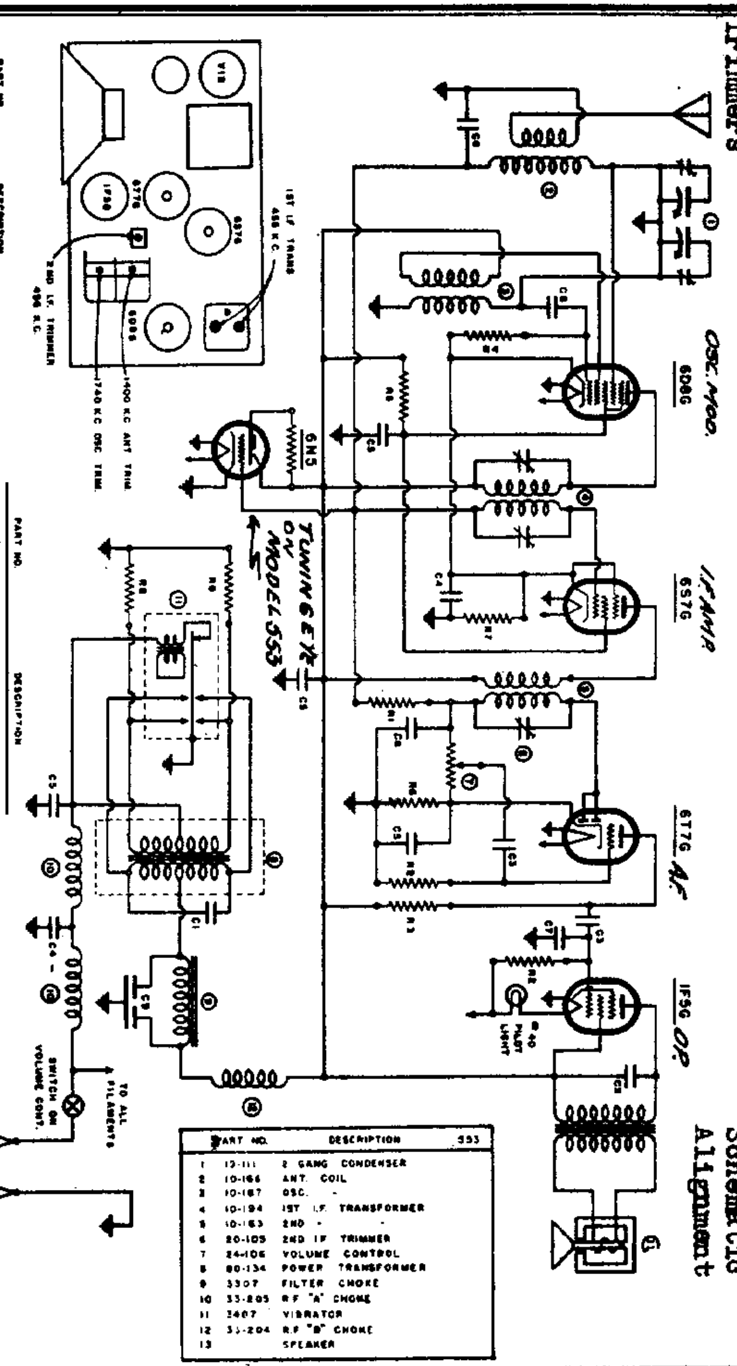


TUBE LOCATION

Voltage, Socket
Trimmers

WARWICK MFG. CORP.

MODELS 453, 553
Schematic
Alignment



PART NO.		DESCRIPTION				
R1	5017	1 MEG	OHM	1/3 W	CARBON	RES.
R2	5016	500,000	"	"	"	"
R3	5024	250,000	"	"	"	"
R4	5025	30,000	"	"	"	"
R5	5022	15,000	"	"	"	"
R6	5023	10,000	"	"	"	"
R7	5013	300	"	"	"	"
R8	5011	100	"	"	"	"

PART NO.		DESCRIPTION				
C1	1612	.008	MFD.	1000V.	TUB.	COND.
C2	1551	.004	"	600V.	"	"
C3	1603	.01	"	400V.	"	"
C4	1614	.25	"	200V.	"	"
C5	1600	.1	"	"	"	"
C6	1622	.05	"	"	"	"
C7	1504	.00025	"	MICA CONDENSER		
C8	1501	.0001	"	"	"	
C9	1545	DUAL 8	"	150V. ELECTROLYTIC		

	PART NO.	DESCRIPTION 553
1	12-111	2 GANG CONDENSER
2	10-166	ANT. COIL
3	10-187	OSC. "
4	10-194	1ST I.F. TRANSFORMER
5	10-183	2ND " "
6	20-105	2ND IF TRIMMER
7	24-106	VOLUME CONTROL
8	80-134	POWER TRANSFORMER
9	3307	FILTER CHOKE
10	33-205	R.F "A" CHOKE
11	3407	VIBRATOR
12	33-204	R.F "B" CHOKE
13		SPEAKER

DESCRIPTION

This receiver is a 4 tube, 6 volt storage battery operated superheterodyne.

The tubes used are 6D86 as oscillator modulator, 6S7G as I.F. amplifier, a 6T7G as A. V. C. and audio rectifier and audio voltage amplifier and a 1F5G as power audio amplifier.

This receiver is made to cover the standard broadcast band, from 1730 K.C. to 535 K.C.

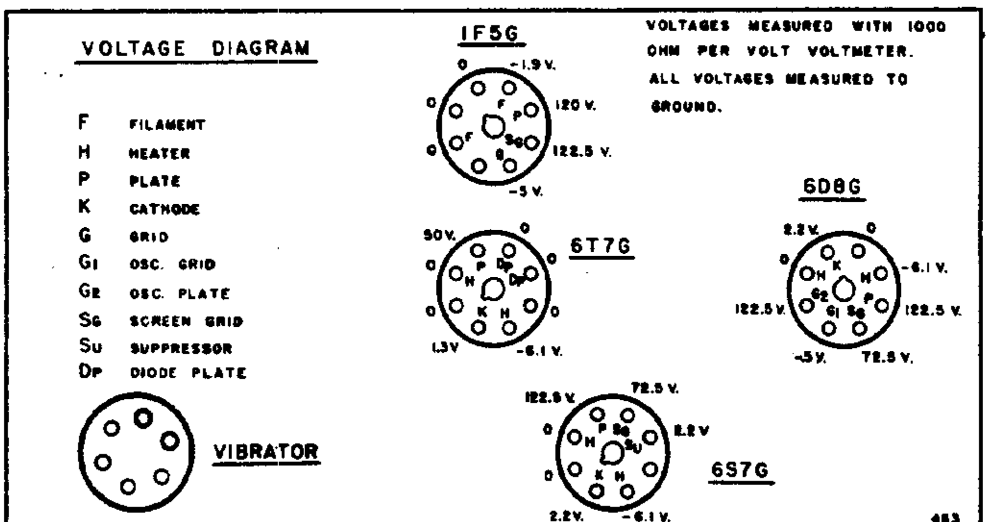
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate and screen pins of the 1F5G tube.

Connect the signal generator to the grid cap of the 6D8G tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C. signal Adjust the first and second I.F. trimmers until the maximum output is obtained. This aligns the I.F.

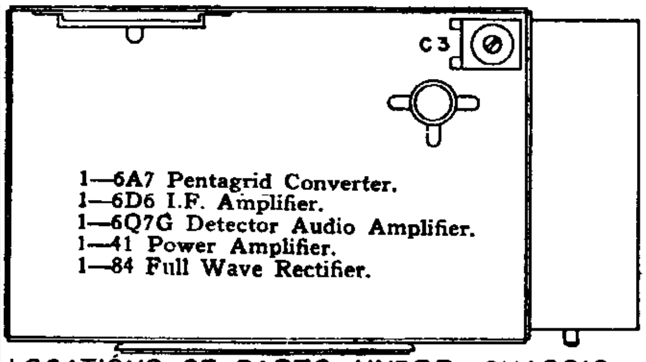
Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.



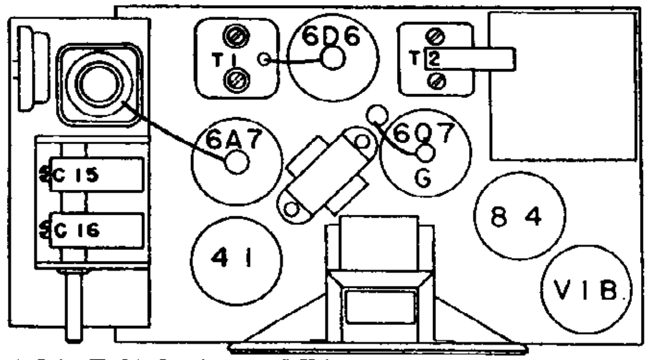
MODELS 559,579 with 150-Cycle Vibrator

WARWICK MFG. CORP.

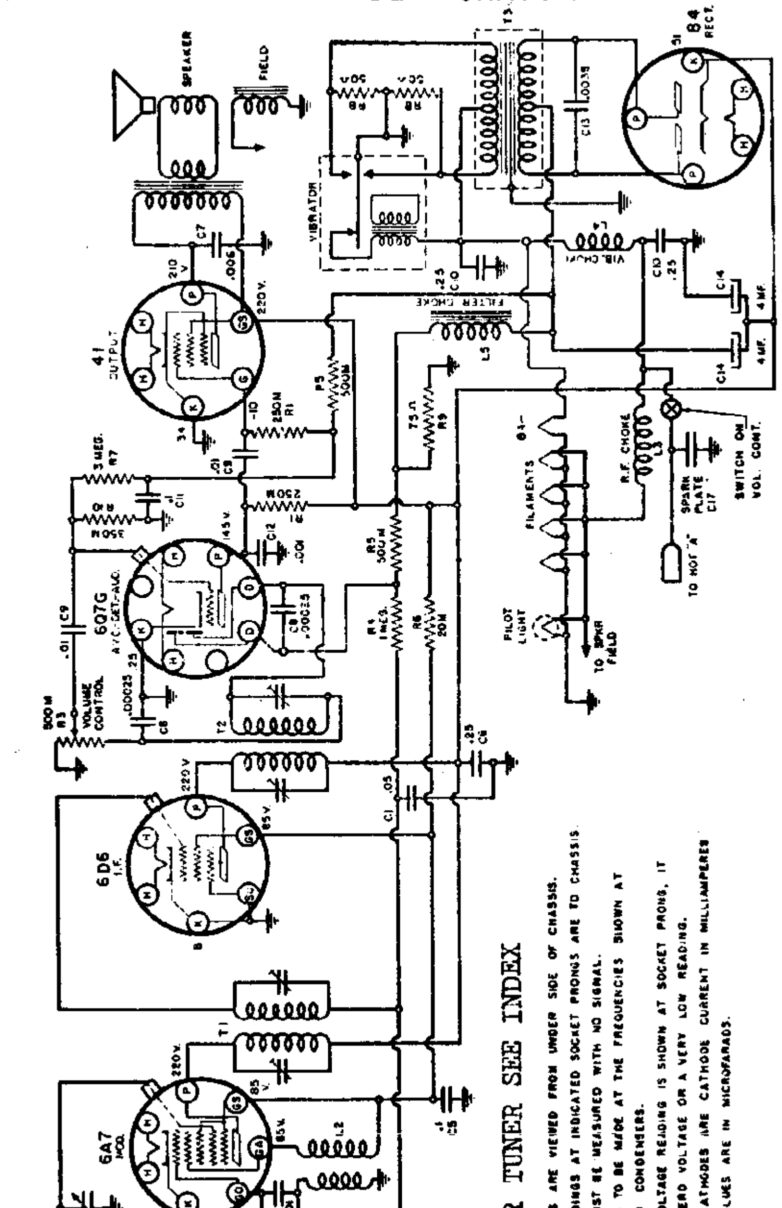
Schematic, Voltage, Socket Trimmers, Alignment



LOCATIONS OF PARTS UNDER CHASSIS



LOCATIONS OF PARTS ON TOP OF CHASSIS



FOR TUNER SEE INDEX

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS.

ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connections.......Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt.......1.85 Volts
Generator Ground Lead Connection.......Receiver Chassis
Dummy Antenna Value to Be in Series with Generator Output.......See Chart Below
Connection of Generator Output Lead.......See Chart Below
Generator Modulation.......30%, 400 Cycles
Position of Volume Control.......Fully On

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connection	Trimmer Adjustments (In Order Shown)	Trimmer Function
Closed	456 KC	.1 mfd.	6A7 Grid	T2, T1	I. F.
Fully Open	1580 KC	.0002 mfd.	Antenna Conn.	C16	Oscillator Trimmer
1400 KC	1400 KC	.0002 mfd.	Antenna Conn.	C15	Antenna Trimmer
600 KC	600 KC	.0002 mfd.	Antenna Conn..	C3	Antenna Padder

The variable condenser should be at 600 k.c. for antenna adjustment.

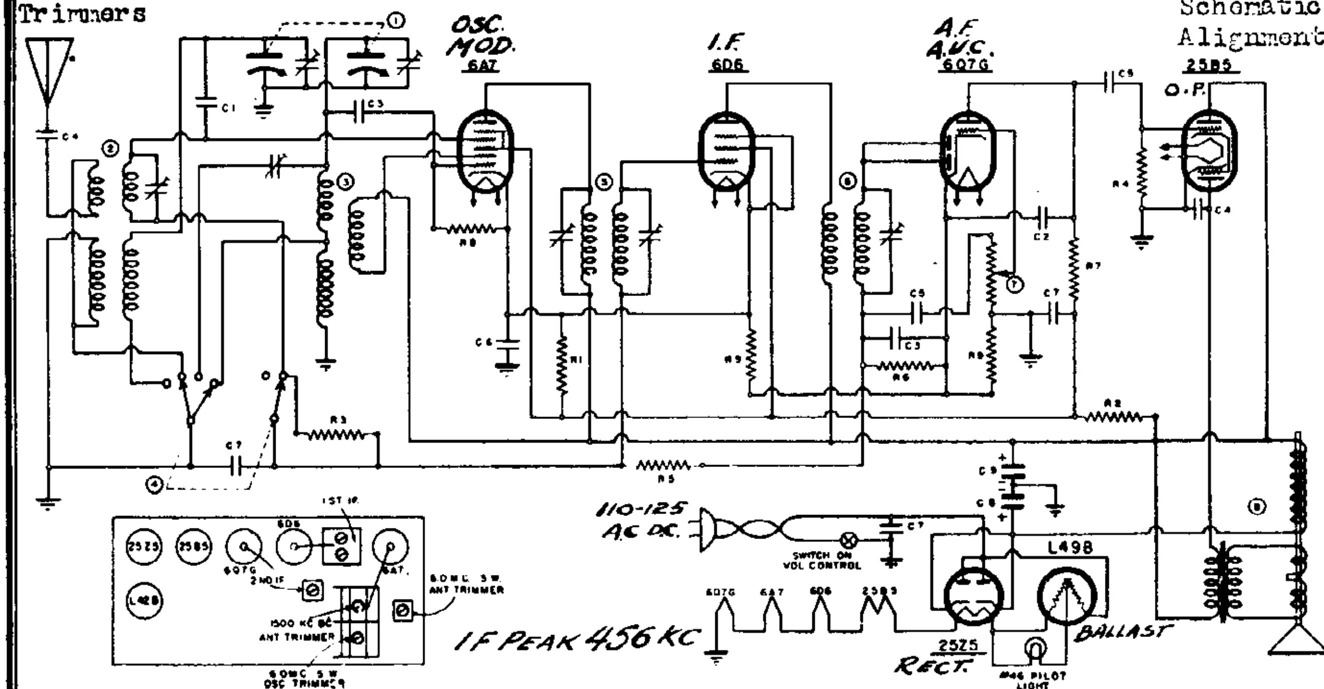
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy. A final adjustment of antenna padder condenser C3 is always made after the receiver is installed in the car, in order to match the car antenna.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.

Voltage, Socket Trimmers

WARWICK MFG. CORP.

MODEL 610 Schematic Alignment



PART NO		DESCRIPTION	PART NO		DESCRIPTION	PART NO		DESCRIPTION 610
R1	6104	5,000 OHM 1/2 WATT CARBON RES	C1	15-105	.00056 MFD MICA CONDENSER ±3%	1	19-114	2 GANG VARIABLE CONDENSER
R2	60-131	3,000 - - - - -	C2	1504	.00025 - - -	2	10-174	ANT COIL
R3	6020	2 MEG - 1/3 - - -	C3	1501	.0001 - - -	3	10-178	OSC COIL
R4	6017	1 M - - - - -	C4	1651	.004 - 600V TUBULAR CONDENSER	4	69-109	WAVE BAND SWITCH
R5	6016	500,000 - - - - -	C5	1603	.01 - 400V - -	5	10-177	1ST IF TRANSFORMER
R6	6024	250,000 - - - - -	C6	1614	.25 - 200V - -	6	10-163	2 ND. IF TRANSFORMER
R7	6056	200,000 - - - - -	C7	1622	.05 - - - -	7	24-106	VOL CONTROL WITH SWITCH
R8	6025	50,000 - - - - -	C8	18-211	30 - - ELECTROLYTIC CONDENSER	8	79-221	DYNAMIC SPEAKER
R9	6009B	50 - - - - - ±10%	C9	18-211	8 - - - -			

The two tuning bands covered are
1720 K.C. to 540 K.C.
6.2 M.C. to 2.28 M.C.

ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

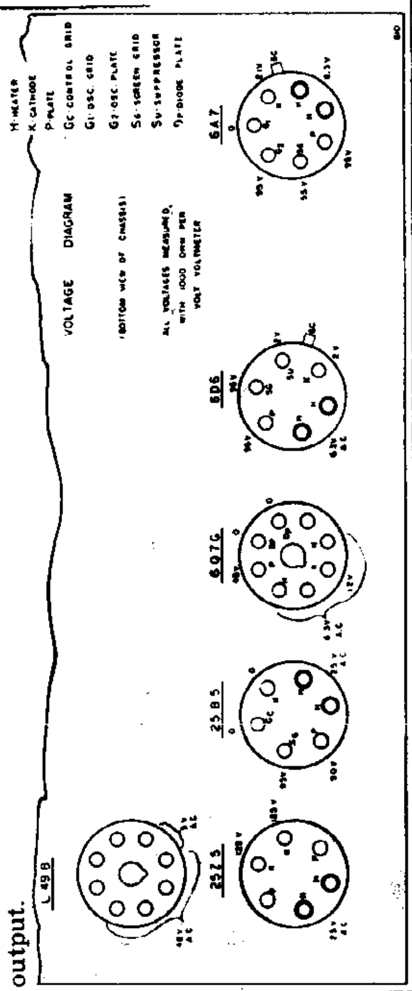
Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the receiver chassis through another .1 M.F. condenser. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Turn the wave switch to the short wave position and set the dial to 6.0 M.C. Feed a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Tune the 6.0 M.C. Oscillator trimmer to give resonance. Two points may be found where this signal can be heard. The correct setting is the one where the trimmer is screwed the loosest. This may also be checked by turning the dial to about 5.0 M.C. where the signal should again be heard.

Then turn the wave switch to broadcast position and turn the dial to the extreme high frequency end. Feed in a 1720 K.C. signal and adjust the broadcast oscillator trimmer, which is located under the receiver at the wave switch, to resonance. Then set the signal generator to 1500 K.C. and tune in this signal on the receiver. Adjust the 1500 K.C. antenna trimmer for maximum output.

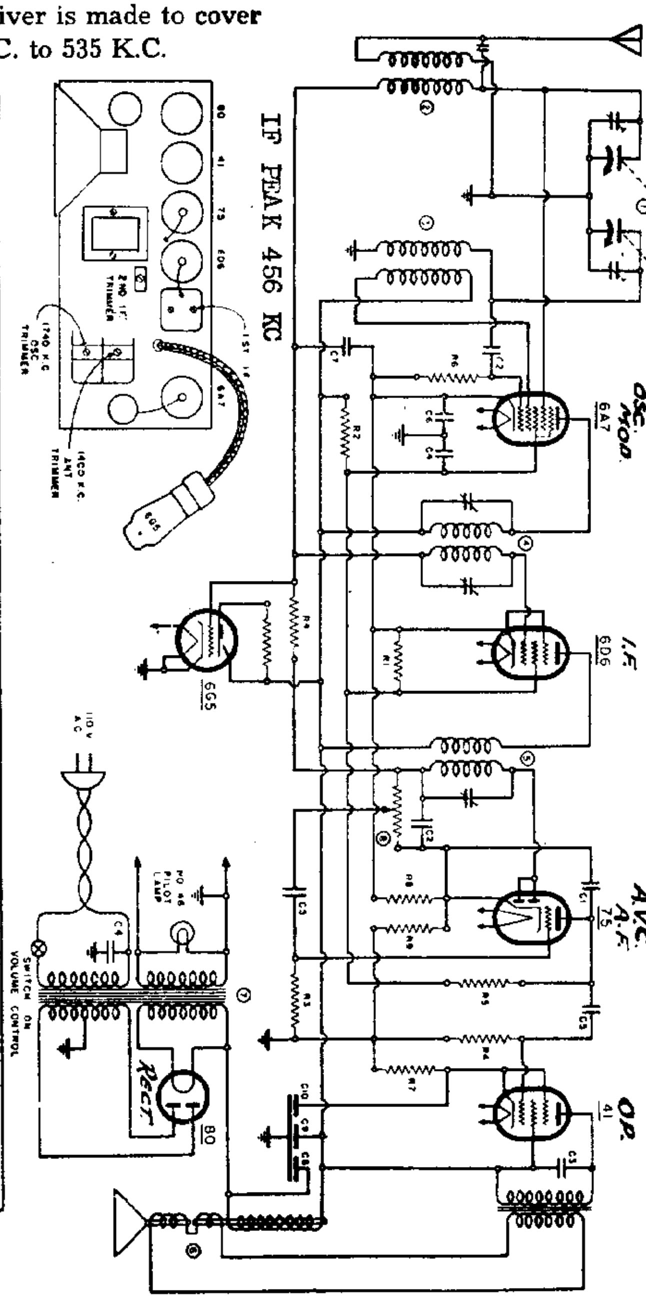
Again turn the wave switch to short wave position and tune in a 6.0 M.C. signal from the generator. Adjust the 6.0 M.C. antenna trimmer to maximum output.



MODEL 629

WARWICK MFG. CORP.

Schematic, Voltage, Socket
Alignment, Trimmers



This receiver is made to cover from 1740 K.C. to 535 K.C.

PART NO		DESCRIPTION					
R1	6117	25,000	OHM	1/2 WATT	CARBON	RES	
R2	6105	10,000	"	"	"	"	
R3	6017	1 MEG.	"	1/3	"	"	
R4	6018	500,000	"	"	"	"	
R5	6056	200,000	"	"	"	"	
R6	6025	50,000	"	"	"	"	
R7	6052	800	"	"	"	"	
R8	50-122	175	"	"	"	"	10%
R9	6009B	30	"	"	"	"	10%

PART NO.		DESCRIPTION				
C1	1504	.00025	MFD.	MICA CONDENSER		
C2	1501	.0001	"	"	"	
C3	1651	.004	"	600 V	PAPER	CONDENSER
C4	1607	.05	"	400 V.	"	"
C5	1603	.01	"	"	"	"
C6	1614	.25	"	200 V.	"	"
C7	1622	.05	"	"	"	"
C8		8.0	"	250V.	ELECTROLYTIC	COND.
C9	18-102	4.0	"	"	"	"
C10		8.0	"	25V.	"	"

PART NO		DESCRIPTION	629
1	19-111	2 GANG VARIABLE CONDENSER	
2	10-166	ANTENNA COIL	
3	10-167	OSCILLATOR COIL	
4	10-162	1ST. IF TRANSFORMER	
5	10-163	2ND. IF TRANSFORMER	
6	75-239	SPEAKER	
7	80-104	POWER TRANSFORMER	
8	24-104	VOLUME CONTROL WITH SWITCH	

ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate and screen pins of output tube, or a low voltage A.C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

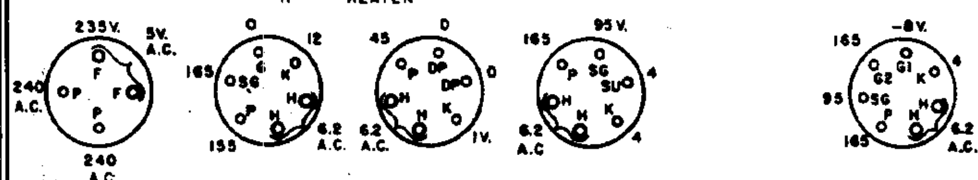
Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
ALL VOLTAGES EXCEPT HEATERS MEASURED TO GROUND.

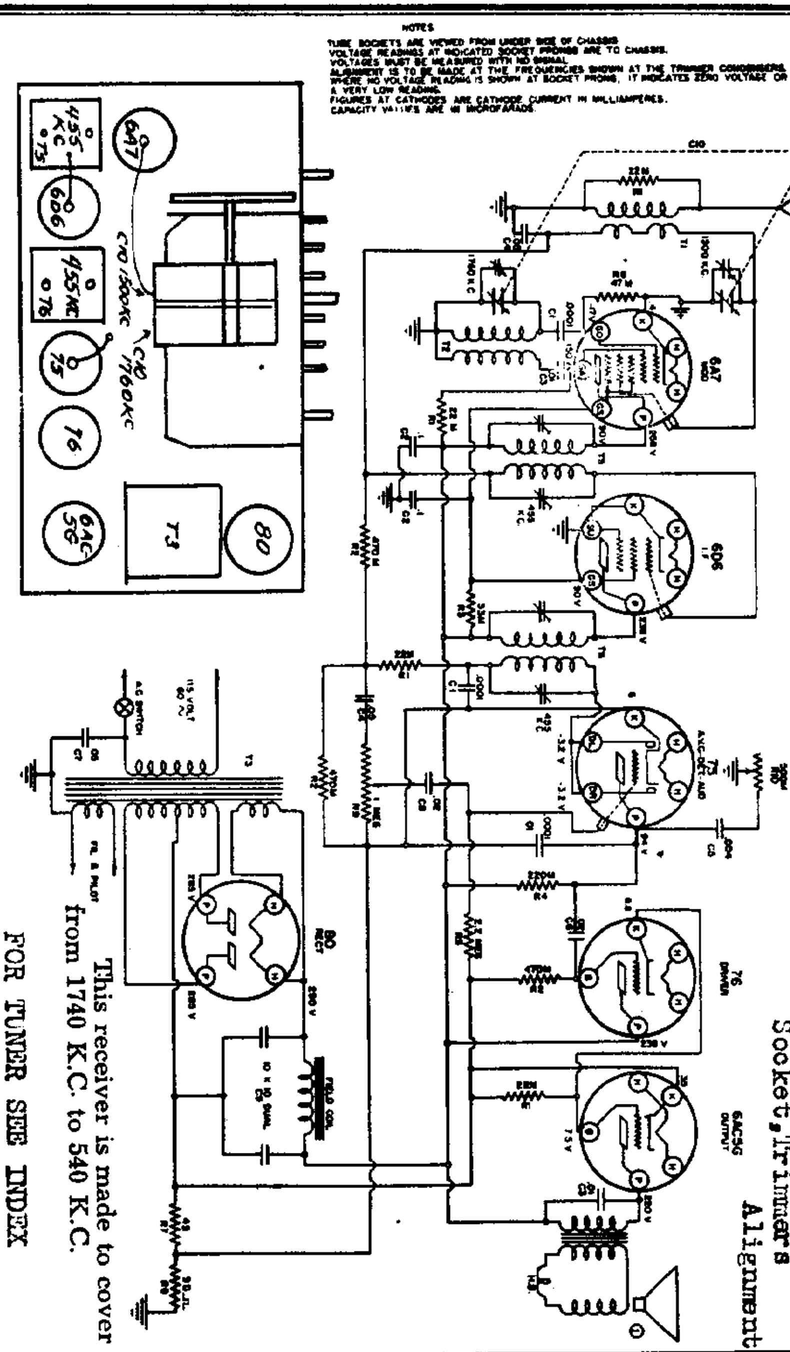
G --- GRID
G1 -- OSCILLATOR GRID
G2 -- OSCILLATOR PLATE
SG -- SCREEN GRID
SU -- SUPPRESSOR GRID
P --- PLATE
DP -- DIODE PLATE
K -- CATHODE
H HEATER

(BOTTOM VIEW OF CHASSIS)



MODELS 648, 648B, 655B
Schematic, Voltage
Socket, Trimmers
Alignment

WARWICK MFG. CORP.



NOTES
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES. CAPACITY VALUES ARE IN MICROFARADS.

This receiver is made to cover from 1740 K.C. to 540 K.C.

FOR TUNER SEE INDEX

ALIGNMENT PROCEDURE

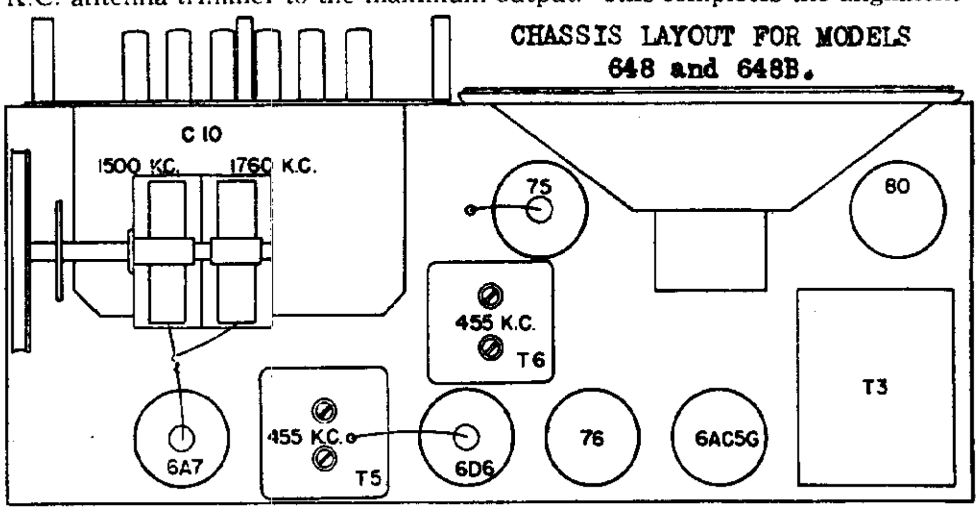
All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. antenna trimmer to the maximum output. This completes the alignment.

CHASSIS LAYOUT FOR MODELS 648 and 648B.



CODE	PART NO	DESCRIPTION
R1	60-185	22M OHM 1/3 WATT RESISTOR
R2	60-178	470M " " " "
R3	60-186	33M " " " "
R4	60-180	220M " " " "
R5	60-179	2.2 MEGOHM 1/3 WATT RESISTOR
R6	60-177	47M OHM 1/3 WATT RESISTOR
R7	60-187	45 " 1/2 " " ±10%
R8	[illegible]	90 " " " " ±10%
R9	24-120	1 MEGOHM VOLUME CONTROL & SW
R10	26-117	500M OHM TONE CONTROL

CODE	PART NO	DESCRIPTION
C1	1501	100 MMF MICA CONDENSER
C2	16-116	.1 MFD 400V TUBULAR CONDENSER
C3	1604	.01 MFD 600V " "
C4	1622	.08 " 200V " "
C5	1451	.004 MFD 600V " "
C6	16-108	.02 " " " "
C7	1607	.05 " 400V " "
C8	16-123	.02 " 200V " "
C9	18-226	10 X 10 MFD 400 W.V. ELECTROLYTIC CONDENSER
C10	19-131	2 GANG VARIABLE CONDENSER

CODE	PART NO	DESCRIPTION
T1	10-235	ANTENNA COIL
T2	10-236	OSCILLATOR COIL
T3	80-139	POWER TRANSFORMER
T5	10-227	1ST I.F. "
T6	10-228	2ND I.F. "
1		SPEAKER

MODEL 654

Schematic, Voltage, Socket

Trimmers, Alignment

WARWICK MFG. CORP.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and high frequency or foreign band which is from 19 M. C. to 5.0 M.C.

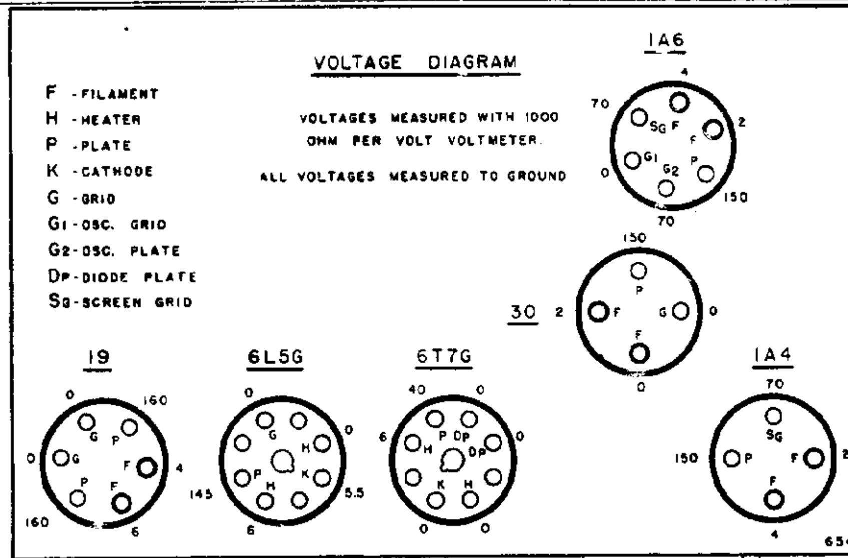
This receiver is a 6 tube, 6 volt storage battery operated superheterodyne.

PART NO	DESCRIPTION
C1 15-106	.0011 MFD MICA CONT ±5%
C2 1504	.00025 " " "
C3 1503	.00005 " " "
C4 1604	.01 MFD 600V TUBULAR COND
C5 1611	.006 " " "
C6 1616	.25 " 400V " "
C7 1601	.1 " " "
C8 1603	.01 " " "
C9 1614	.25 " 200V " "
C10 1600	.1 " " "
C11 1653	.3 " 180V " "
C12 1645	8 " 150V ELECTROLYTIC
C13 16-100	10 " 25V TUB ELECT

PART NO	DESCRIPTION
R1 6106	15,000 OHM 1/2W CARBON RES.
R2 6101	100 " " "
R3 6017	1 MEG " 1/3W "
R4 6018	500,000 " " "
R5 6C24	250,000 " " "
R6 6026	100,000 " " "
R7 6025	50,000 " " "
R8 6006	1500 " " "
R9 6007	200 " " "
R10 60-102	33 1/3 " 1/2W WIRE WOUND RES
R11 6020	2 MEG " 1/3W CARBON RES

PART NO	DESCRIPTION
1 19-121	3 GANG CONDENSER
2 10-179A	BC ANT & PRES COIL
3 10-180	BC OSC. COIL
4 10-182	POL ANT COIL
5 10-181	POL OSC COIL
6 10-183	SW ANT COIL
7 10-184	SW OSC COIL
8 69-107	WAVE SWITCH
9 10-145	1ST IF TRANSFORMER
10 10-146	2ND IF TRANSFORMER
11 4800	BIAS CELL
12 24-105	VOLUME CONTROL
13 24-107	TONE CONT WITH SWITCH

PART NO.	DESCRIPTION 654
14 20-100	BC OSC PAD
15 3313	RF "A" CHOKE
16 33-204	RF "B" CHOKE
17 6010	PP AUDIO TRANS
18 3307	FILTER CHOKE
19 6041	POWER TRANS
20 3407	VIBRATOR
21 23-103	BATTERY CABLE
22	SPEAKER
23	NO. 40 DIAL LIGHT



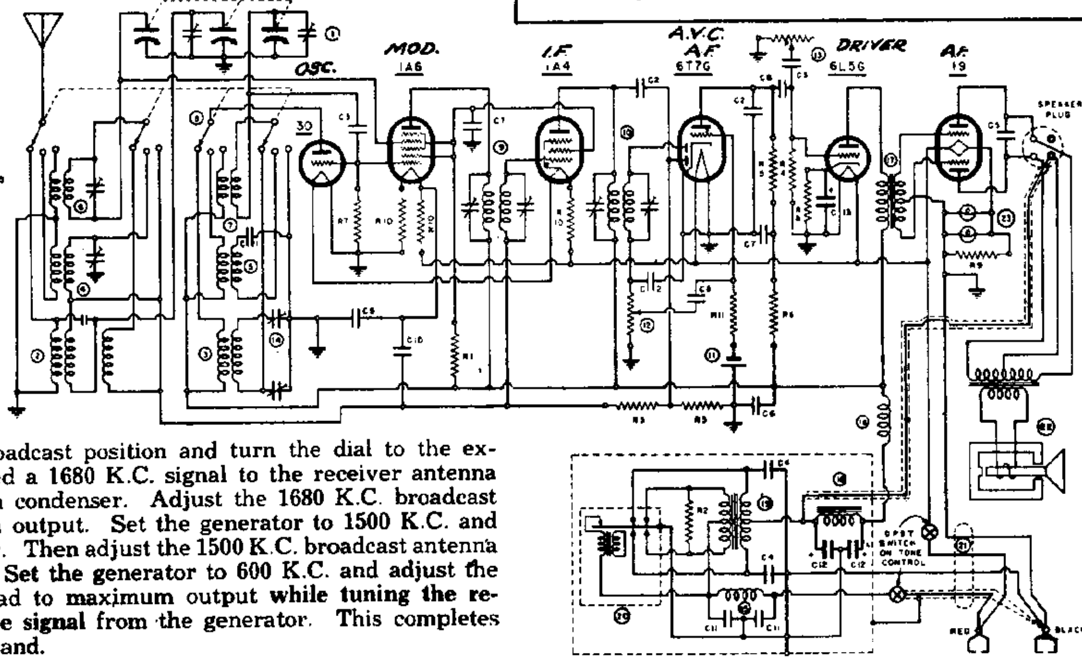
ALIGNMENT PROCEDURE

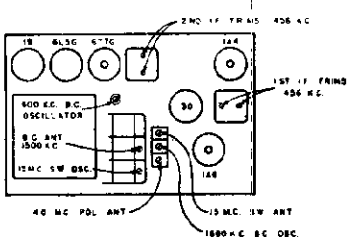
All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 1A6 tube through a 1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the signal generator connected to the grid cap of the 1A6, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 15.0 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.





IF PEAK 456 KC

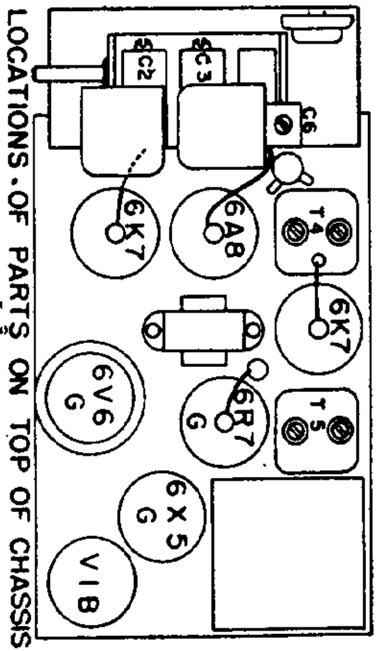
Set the wave switch on broadcast position and turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

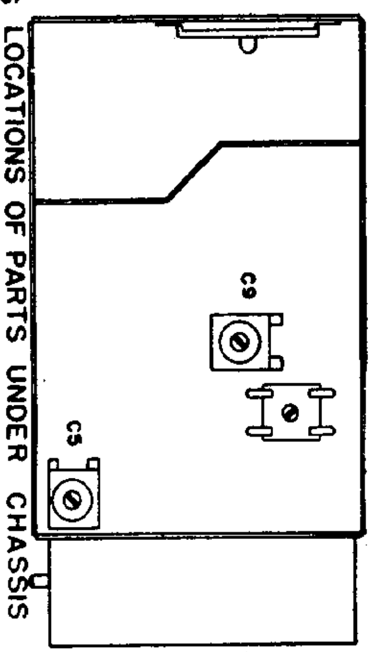
The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

WARWICK MFG. CORP.

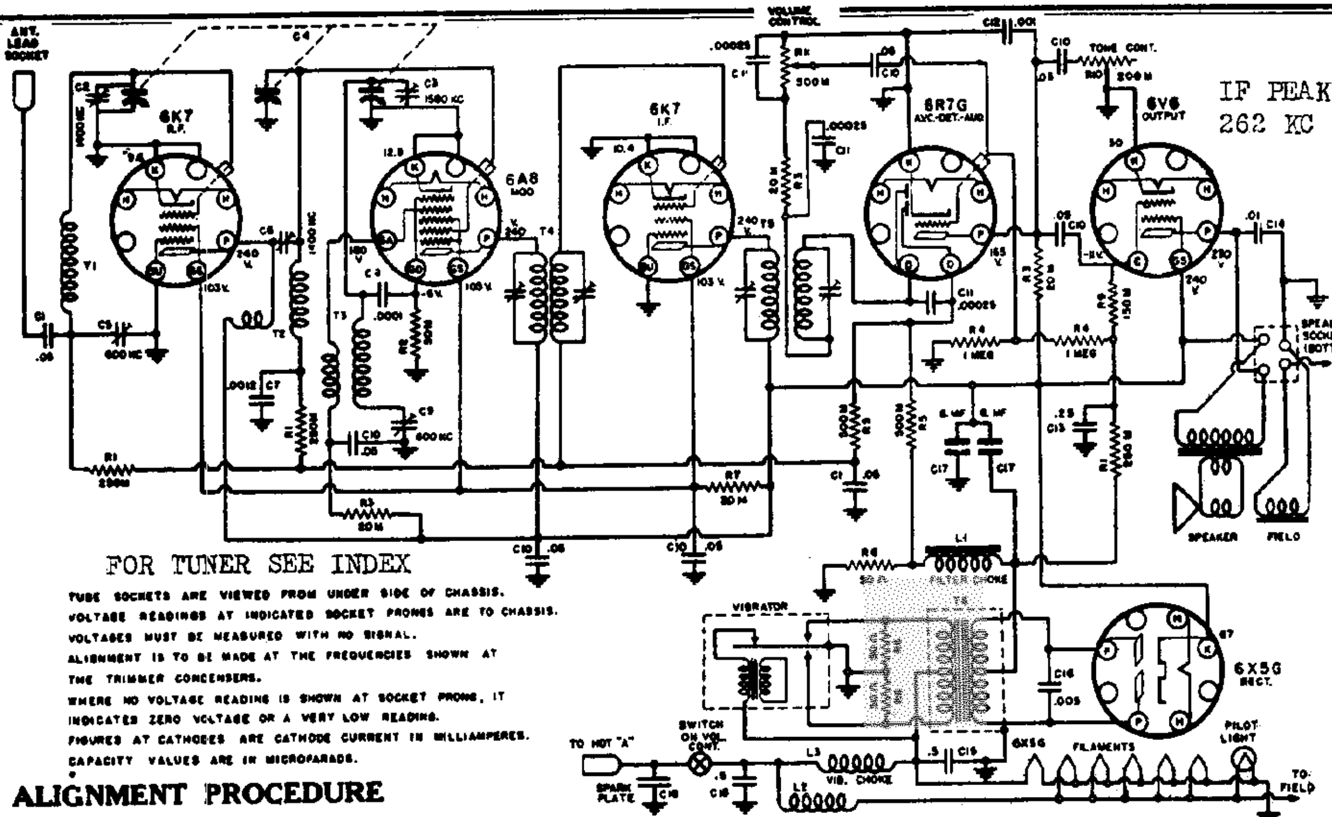
MODEL 659
Schematic, Voltage, Socket
Alignment, Trimmers



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS



FOR TUNER SEE INDEX

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.

ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connections .... Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt .... 1.85 Volts
Generator Ground Lead Connection .... Receiver Chassis
Dummy Antenna Value to Be in Series with Generator Output .... See Chart Below
Connection of Generator Output Lead .... See Chart Below
Generator Modulation .... 30%, 400 Cycles
Position of Volume Control .... Fully On

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connections	Trimmer Adjustment (In Order Shown)	Trimmer Function
Closed	262 KC	.1 mfd.	6A8 Grid	T5, T4	I.F.
Fully Open	1580 KC	.0002 mfd.	Antenna Conn.	C3	Oscillator Trimmer
1400 KC	1400 KC	.0002 mfd.	Antenna Conn.	C2, C6	Ant. & R.F. Trimmer
600 KC (Rock)	600 KC	.1 mfd.	6K7 R.F. Grid	C9	Padder Oscillator
600 KC	600 KC	.0002 mfd.	Antenna Conn.	C5	Padder Antenna

The variable condenser should be rocked back and forth a degree or two while making the 600 K.C. adjustment on oscillator padder only.

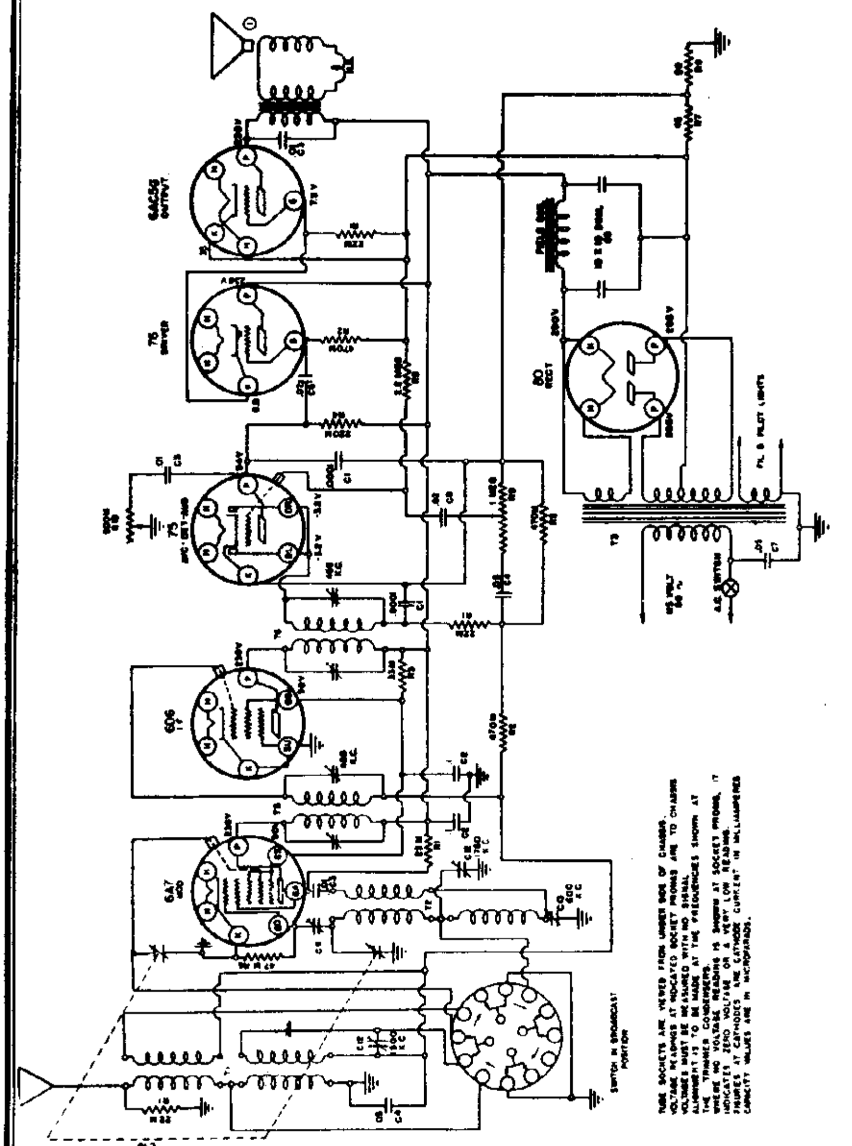
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

A final adjustment of the antenna padder condenser C5 is always made after the receiver is installed in the car, in order to match the car antenna.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.

MODELS 668,668B
Schematic,Voltage,Socket
Alignment,Trimmers

WARWICK MFG. CORP.

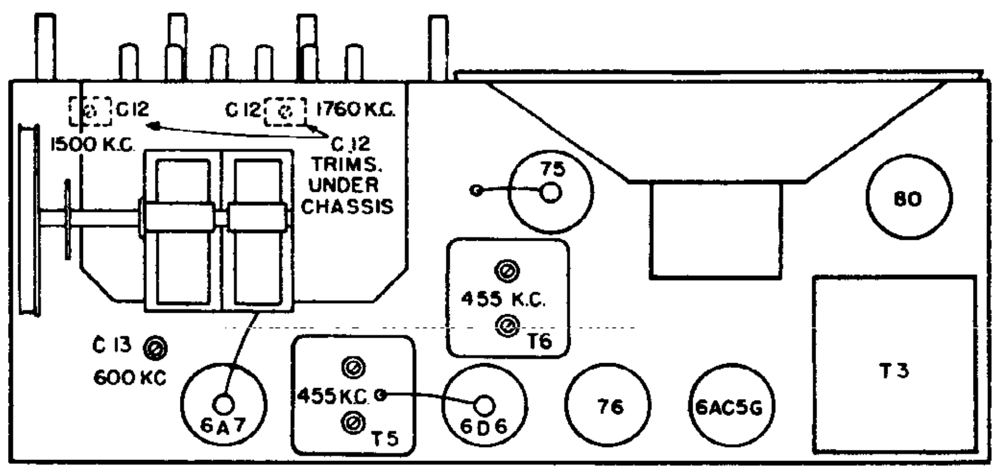


DESCRIPTION

This receiver is a 6-tube alternating current operated superheterodyne.

The tubes used are—a 6A7 as oscillator modulator, a 6D6 as I. F. amplifier, a 75 as A. V. C. and audio rectifier and audio voltage amplifier, a 76 as a direct coupled driver, a 6AC5G as a power audio amplifier, and a 80 as a power rectifier.

This receiver is made to cover two tuning bands—the standard broadcast band which ranges from 1740 KC to 540 KC, and the short wave band which has a freuqency range of from 24 MC to 5.9 MC.



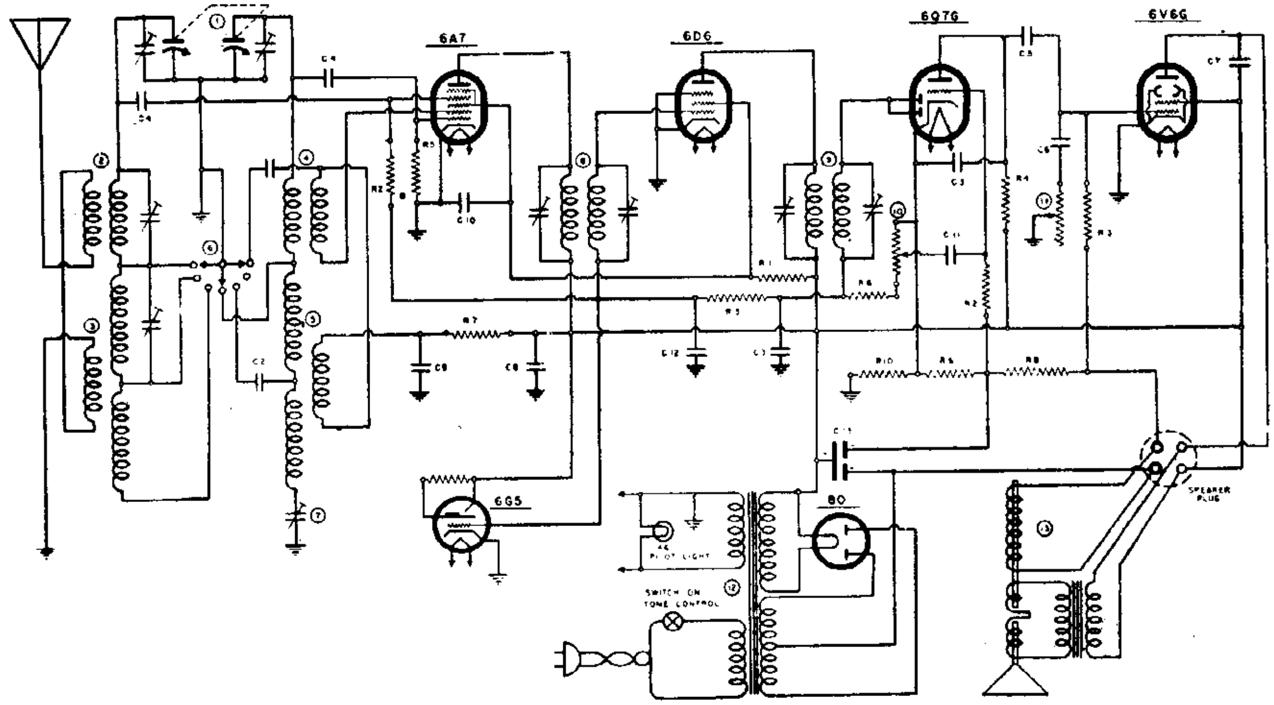
FOR TUNER SEE INDEX

ALIGNMENT

FOLLOW PROCEDURE AS FOR MODEL 648 BUT ALIGN OSC-PAD,(C13 shown on chassis layout above) AT 600 KC as a final adjustment.

WARWICK MFG. CORP.

MODEL 683
Schematic, Voltage, Socket
Trimmers, Alignment



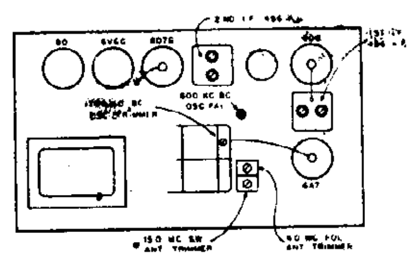
ALIGNMENT

IF Through 0.1 mfd. dummy antenna, adjust trimmers at 456 KC.

BC Adjust osc. trimmer at 1760 KC through 0.0025 dummy. Adjust padders at 600 KC.

POLICE Through 0.00025 mfd. dummy, adjust antenna trimmer at 4 MC.

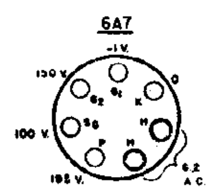
Short Wave Adjust antenna trimmer at 15 MC.

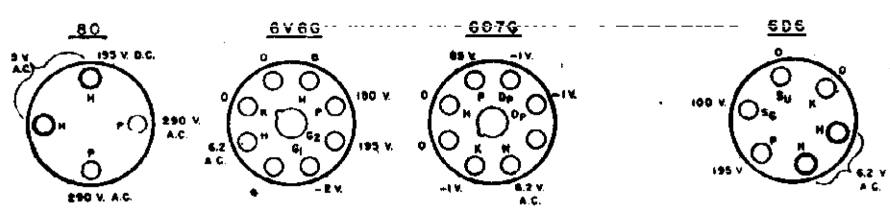


VOLTAGE DIAGRAM

(BOTTOM VIEW OF CHASSIS)
ALL VOLTAGES MEASURED
WITH 1000 OHM PER
VOLT VOLTMETER

- H HEATER
- K CATHODE
- P PLATE
- Gc CONTROL GRID
- G1 OSC. GRID
- G2 OSC. PLATE
- Sg SCREEN GRID
- Su SUPPRESSOR
- Dp DIODE PLATE





683

1	9-119	2 GANG CONDENSER
2	10-126	S.W. ANT COIL
3	10-128	B.C. & POL. ANT COIL
4	10-127	S.W. OSC COIL
5	10-129	B.C. & POL. OSC COIL
6	69-1[illegible]	WAVE BAND SWITCH
7	20-100	B.C. [illegible] PADDING COND
8	10-175	1ST I.F. TRANSFORMER
9	10-176	2ND I.F. TRANSFORMER
10	24-109	VOL CONTROL
11	26-108	TONE CONTROL WITH SWITCH
12	80-137	POWER TRANSFORMER
13		SPEAKER

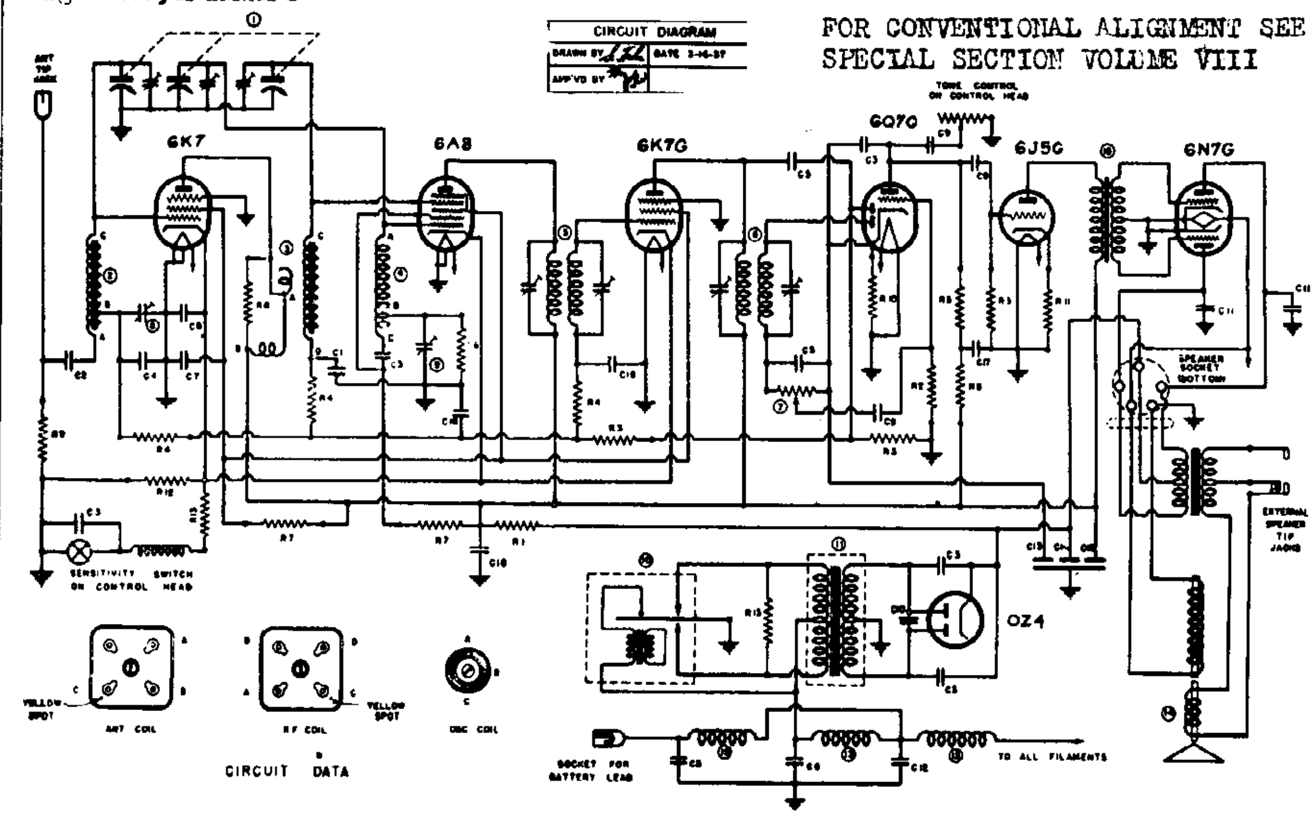
R1	6221	20,000	OHM [illegible] CARBON RES	
R2	6020	2 MEG		
R3	6018	500,000		
R4	6028	250,000		
R5	6028	40,000		
R6	6050	50,000		
R7	602[illegible]	10,000		
R8	60-140	130	1 W	WIRE
R9	60-103	90	1/2 W	
R10	60-126	18		

C1	1509	.002	MFD	MICA CONDENSER
C2	15-100	[illegible]	"	" ±5%
C3	1500	.00025	"	"
C4	1501	.0001	"	"
C5	1504	.01	"	600 V. PAPER COND
C6	1511	.006	"	"
C7	1651	.004	"	"
C8	1616	.25	"	400 V. "
C9	1601-B	.1	"	"
C10	1607	.05	"	"
C11	1603	.01	"	"
C12	1622	.05	"	200 V. "
C13	10-213	8	"	300 V. DUAL ELECTROLYT

MODEL 746
Schematic, Voltage, Socket
Alignment, Trimmers

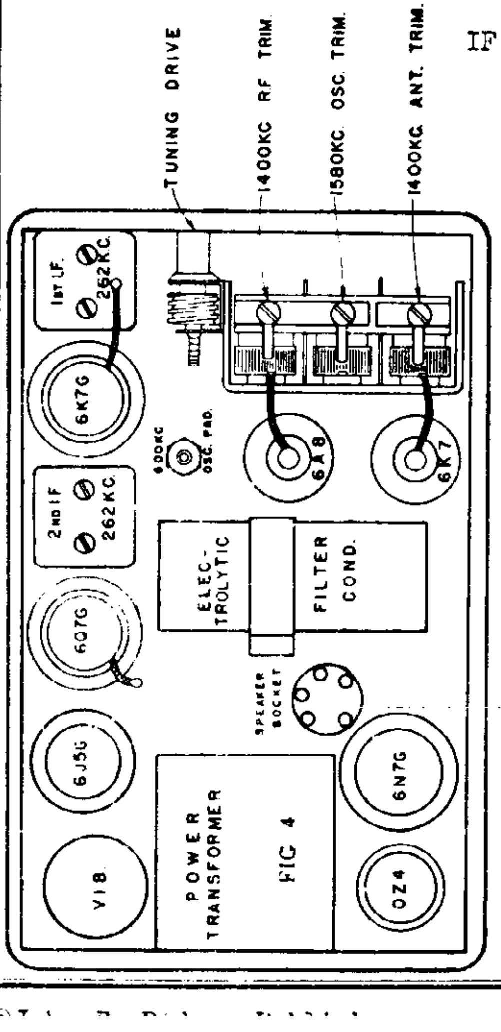
WARWICK MFG. CORP.

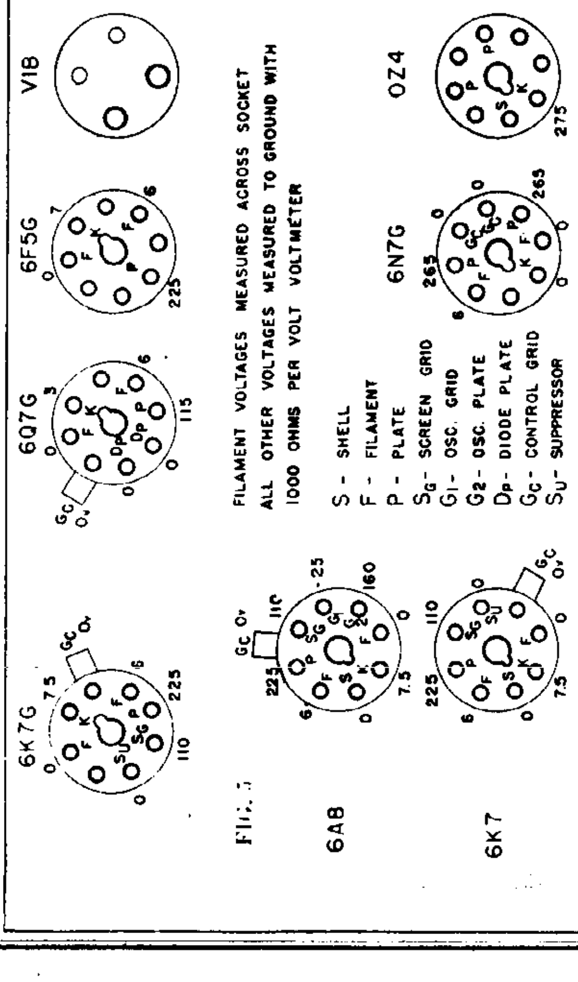
FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII



CIRCUIT DATA

IF PEAK 262 KC



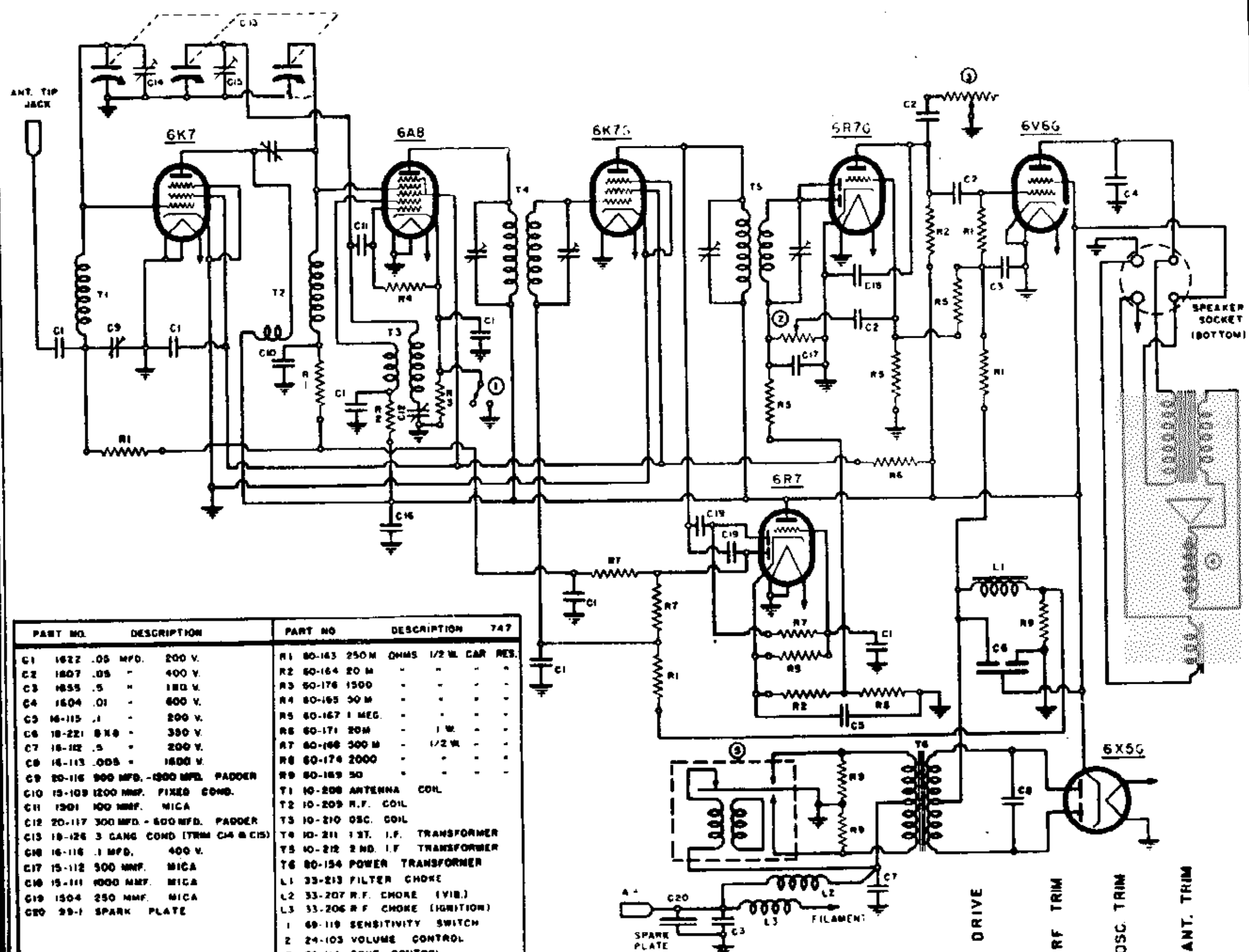


FILAMENT VOLTAGES MEASURED ACROSS SOCKET
ALL OTHER VOLTAGES MEASURED TO GROUND WITH
1000 OHMS PER VOLT VOLTMETER

S - SHELL
F - FILAMENT
P - PLATE
S_G - SCREEN GRID
G_1 - OSC. GRID
G_2 - OSC. PLATE
D_P - DIODE PLATE
G_C - CONTROL GRID
S_U - SUPPRESSOR

WARWICK MFG. CORP.

MODEL 747
Schematic, Voltage, Socket
Alignment, Trimmers



PART NO.	DESCRIPTION
C1	1622 .05 MFD. 200 V.
C2	1807 .05 " 400 V.
C3	1855 .5 " 180 V.
C4	1604 .01 " 600 V.
C5	16-115 .1 " 200 V.
C6	18-221 8X8 " 350 V.
C7	16-112 .5 " 200 V.
C8	16-113 .005 " 1600 V.
C9	20-116 900 MFD. -1900 MFD. PADDER
C10	15-109 1200 MMF. FIXED COND.
C11	1301 100 MMF. MICA
C12	20-117 300 MFD. - 600 MFD. PADDER
C13	18-126 3 GANG COND (TRIM C14 & C15)
C16	16-116 .1 MFD. 400 V.
C17	15-112 500 MMF. MICA
C18	15-111 1000 MMF. MICA
C19	1504 250 MMF. MICA
C20	29-1 SPARK PLATE

PART NO	DESCRIPTION 747
R1	60-163 250 M OHMS 1/2 W. CAR RES.
R2	60-164 20 M " " " "
R3	60-176 1500 " " " "
R4	60-165 50 M " " " "
R5	60-167 1 MEG. " " " "
R6	60-171 20M " 1 W. " "
R7	60-166 300 M " 1/2 W. " "
R8	60-174 2000 " " " "
R9	60-169 50 " " " "
T1	10-208 ANTENNA COIL
T2	10-209 R.F. COIL
T3	10-210 OSC. COIL
T4	10-211 1 ST. I.F. TRANSFORMER
T5	10-212 2 ND. I.F TRANSFORMER
T6	80-154 POWER TRANSFORMER
L1	33-213 FILTER CHOKE
L2	33-207 R.F. CHOKE (VIB.)
L3	33-206 R F CHOKE (IGNITION)
1	69-119 SENSITIVITY SWITCH
2	24-103 VOLUME CONTROL
3	26-114 TONE CONTROL
4	79-242 SPEAKER
5	34-101 VIBRATOR

ALIGNMENT

IF Through 0.1 mfd. dummy antenna, adjust trimmers at 262 KC.

BC Trhough 0.00025 dummy, adjust osc. trimmer at 1580 KG. Adjust antenna trimmer at 1400 KC. Adjust padder at 600 KC. Adjust antenna compensator at 600 KC. for best sensitivity with signal.

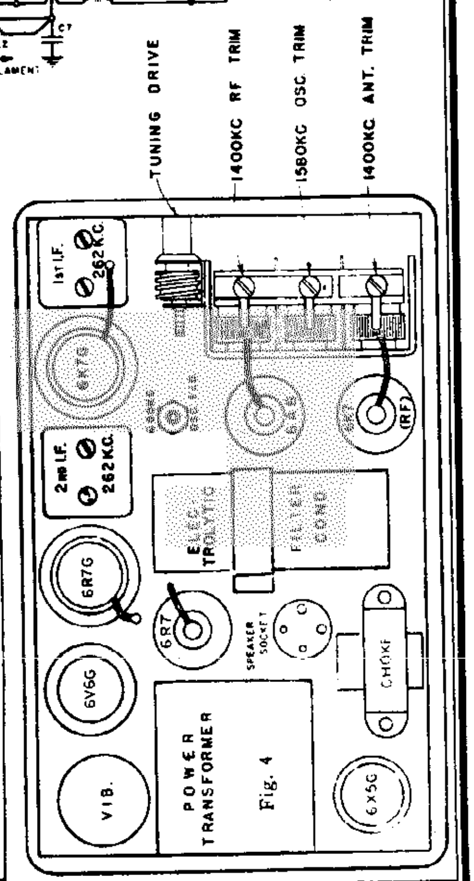


Fig. 4

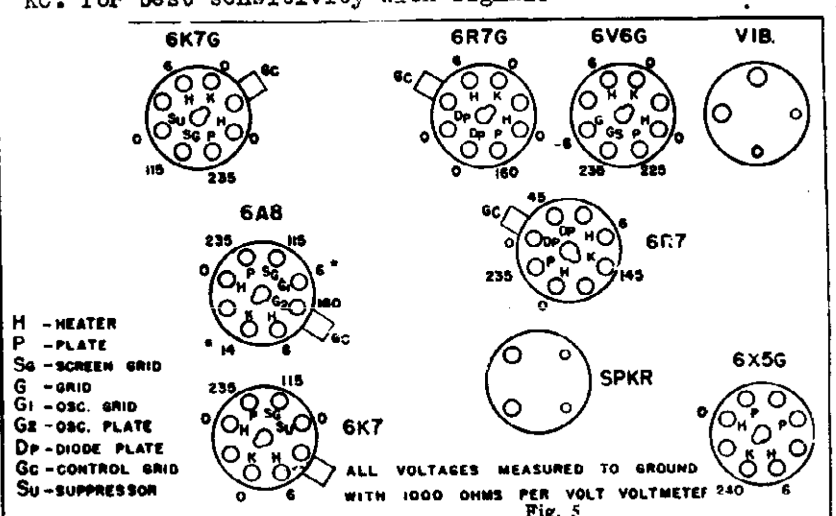


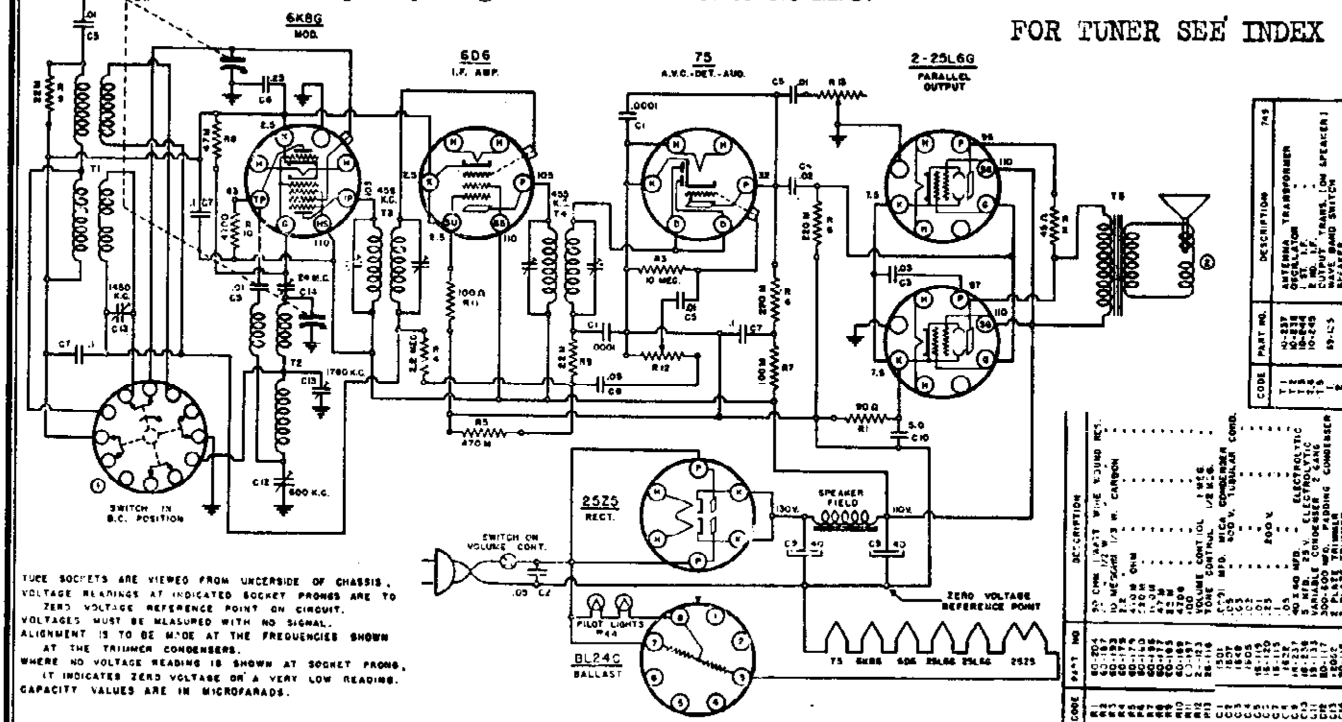
Fig. 5

MODELS 749, 749B Late
Schematic, Voltage, Socket
Alignment, Trimmers

WARWICK MFG. CORP.

This receiver is made to cover two tuning bands, the Standard broadcast band which ranges from 1740 K.C. to 540 K.C. and the short wave band which has a frequency range of from 24 M.C. to 5.9 M.C.

FOR TUNER SEE INDEX



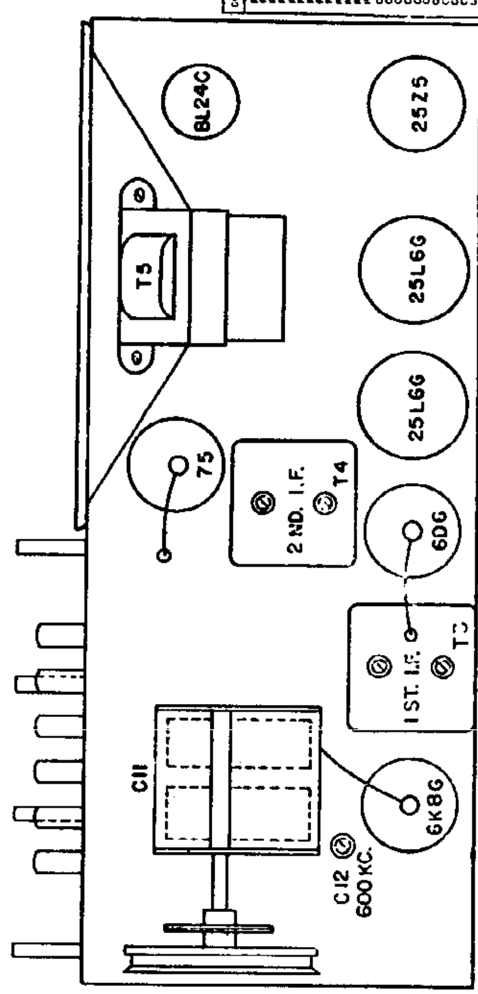
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

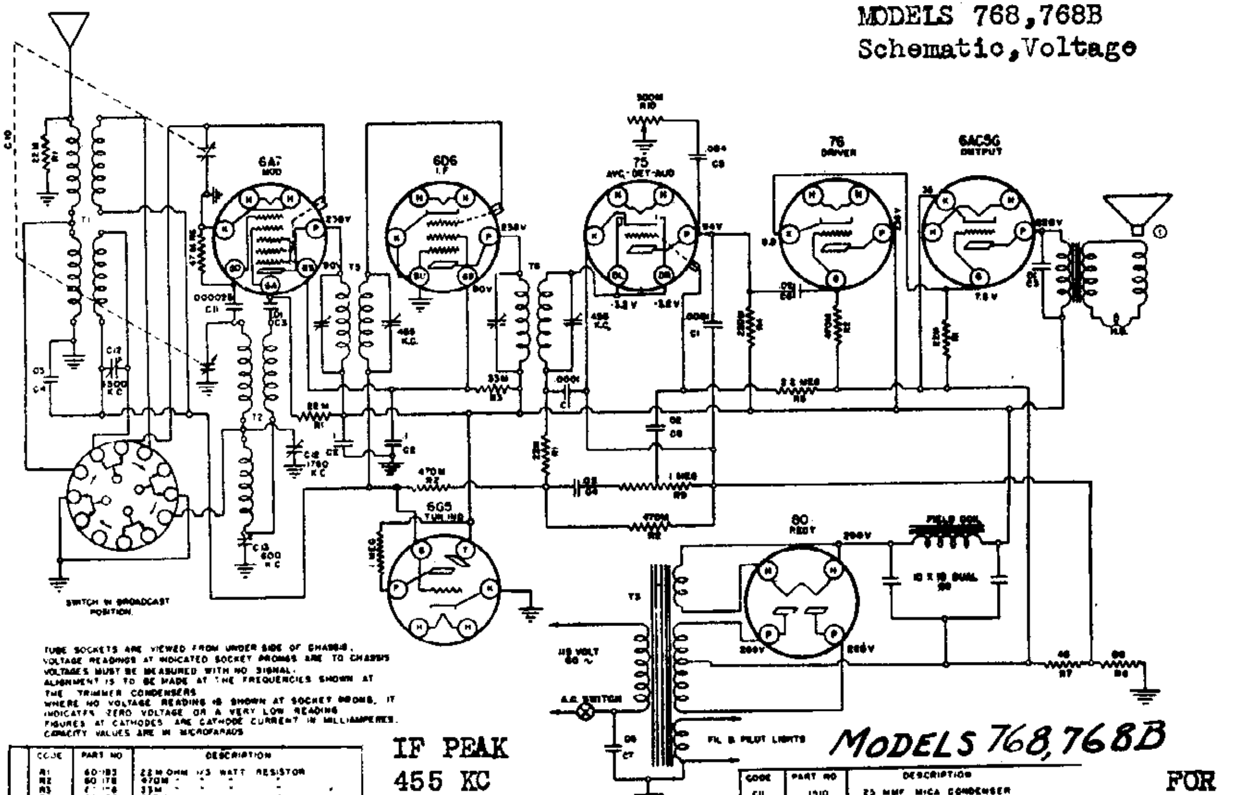
Connect the signal generator to the grid cap of the 6A7 tube through a 1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 MF mica condenser. Adjust the 1760 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. antenna trimmer to the maximum output. Then impress a 600 K.C. signal into the receiver antenna lead and tune in this signal on the receiver. Adjust oscillator padding condenser to the maximum output. For the alignment of the short wave band open variable condenser to minimum capacity. With an impressed signal of 24 M.C. adjust trimmer designated as C14 in schematic diagram for maximum output. Follow through with this procedure several times in order to obtain the best alignment adjustment possible. This completes the alignment.



WARWICK MFG. CORP.

MODEL 761
Schematic, Socket, Trimmers
MODELS 768, 768B
Schematic, Voltage



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS

IF PEAK
455 KC

MODELS 768, 768B

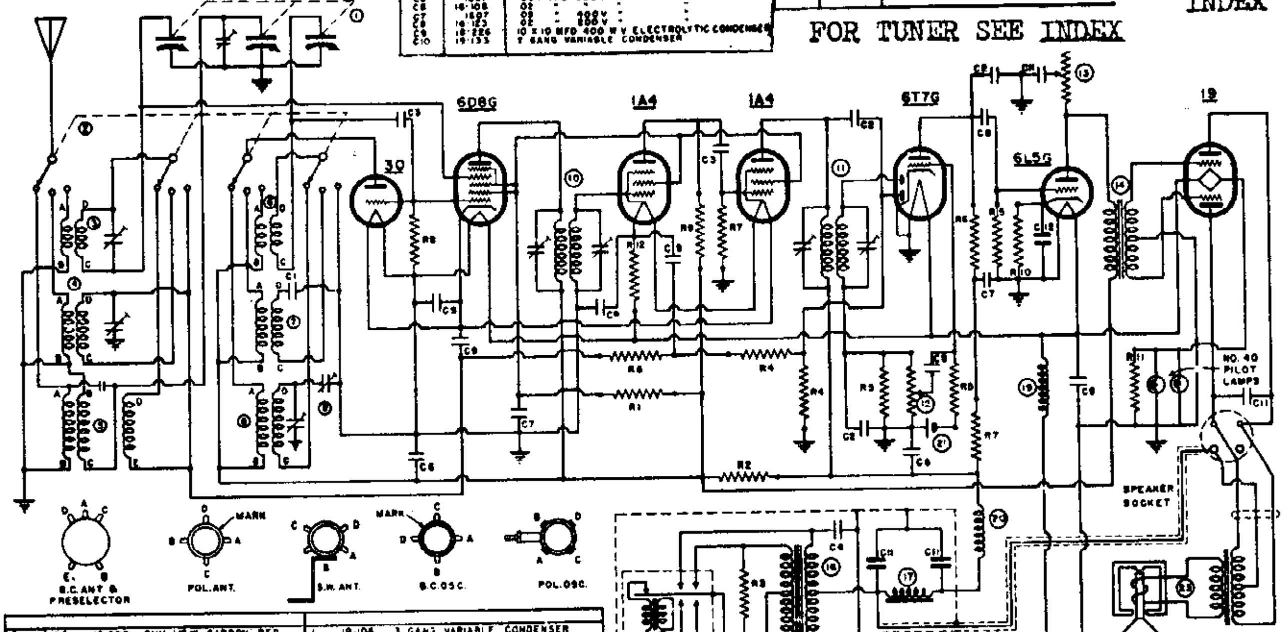
CODE	PART NO	DESCRIPTION
R1	60-183	22 M OHM 1/3 WATT RESISTOR
R2	60-178	470M " " " "
R3	[illegible]	33M " " " "
R4	60-180	220M " " " "
R5	60-5	2.2 MEGOHM 1/3 WATT RESISTOR
R6	60-177	47M OHM 1/3 WATT RESISTOR
R7	60-187	45 " 1/2 " " ±10%
R8	60-186	90 " " " " ±10%
R9	24-173	1 MEGOHM VOLUME CONTROL & SW
R10	26-18	500M OHM TONE CONTROL

CODE	PART NO	DESCRIPTION
C1	1501	100 MMF MICA CONDENSER
C2	16-116	1 MFD 400 V TUBULAR CONDENSER
C3	1604	.01 MFD 600 V " "
C4	1622	.05 " 200 V " "
C5	1631	.004 MFD 600 V " "
C6	16-108	.02 " " " "
C7	1607	.02 " 400 V " "
C8	16-123	.02 " 600 V " "
C9	18-226	10 X 10 MFD 400 W V ELECTROLYTIC CONDENSER
C10	19-133	2 GANG VARIABLE CONDENSER

CODE	PART NO	DESCRIPTION
C11	1510	25 MMF MICA CONDENSER
C12	2057	TRIMMERS 3-30 MFD
C13	20-117	PADDING CONDENSER 300-600 MMFD
T1	10-237	ANTENNA COIL
T2	[illegible]	OSCILLATOR COIL
T3	[illegible]	POWER TRANSFORMER
T5	[illegible]	1ST I F "
T6	[illegible]	2ND I F "
1	75-245	SPEAKER

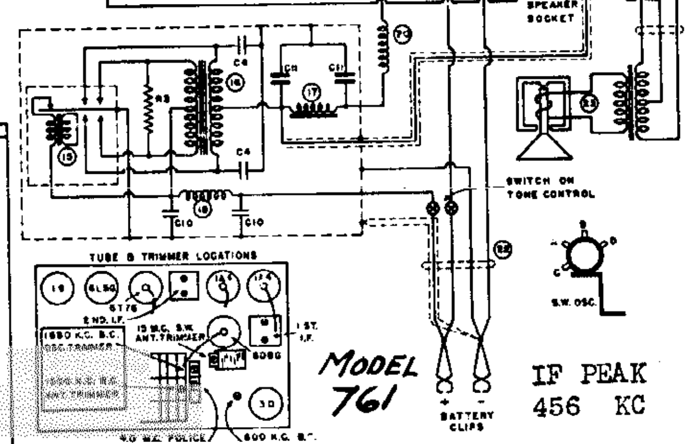
FOR TUNER SEE INDEX

FOR ALIGNMENT SEE INDEX



R1	6105	10,000	OHM	1/2 W.	CARBON	RES.	
R2	6102	400	"	"	"	"	
R3	6101	100	"	"	"	"	
R4	6017	1 MEG	"	1/3W.	"	"	
R5	6018	500,000	"	"	"	"	
R6	6024	250,000	"	"	"	"	
R7	6026	100,000	"	"	"	"	
R8	6025	50,000	"	"	"	"	
R9	6022	15,000	"	"	"	"	
R10	6006	1500	"	"	"	"	
R11	6007	200	"	"	"	"	
R12	60-120	8 OHM	1/2 W.	WIRE	RES.	5%	
C1	1509G	.002	MFD.	MICA	COND.	5%	
C2	1504	.00025	"	"	"		
C3	12108	.000025	"	"	"	10%	
C4	1604	.01	"	PAPER	"	600 V.	
C5	1611	.006	"	"	"	"	
C6	1618	.25	"	"	"	400 V.	
C7	1601	.1	"	"	"	"	
C8	1603	.01	"	"	"	"	
C9	1600	.1	"	"	"	200 V.	
C10	1655	.5	"	"	"	180 V.	
C11	1845	8.0 MFD.	ELECTROLYTIC			160 V.	
C12	18100	10.0	"	"		25 V.	

1	19-106	3 GANG VARIABLE CONDENSER
2	89-103	WAVE BAND SWITCH
3	10-140	S.W. ANTENNA COIL
4	10-135	POLICE BAND ANTENNA COIL
5	10-137	B.C. ANT & PRESELECTOR COIL
6	10-138	S.W. OSCILLATOR COIL
7	10-168	POLICE BAND OSCILLATOR COIL
8	10-134	B.C. OSCILLATOR COIL
9	20-100	B.C. OSC. PADDING CONDENSER
10	10-145	1 ST. I.F. TRANSFORMER
11	10-146	2 ND. I.F. TRANSFORMER
12	24-101	VOLUME CONTROL
13	26-102	TONE CONTROL WITH SWITCH
14	8010	PP INPUT TRANSFORMER
15	3407	VIBRATOR
16	8C41	VIBRATOR POWER TRANSFORMER
17	3307	FILTER CHOKE
18	3313	R.F. "A" CHOKE
19	33-204	R.F. "A" CHOKE
20	3303	R.F. "B" CHOKE
21	4600	BIAS CELL
22	23-103	BATTERY CABLE
23		SPEAKER

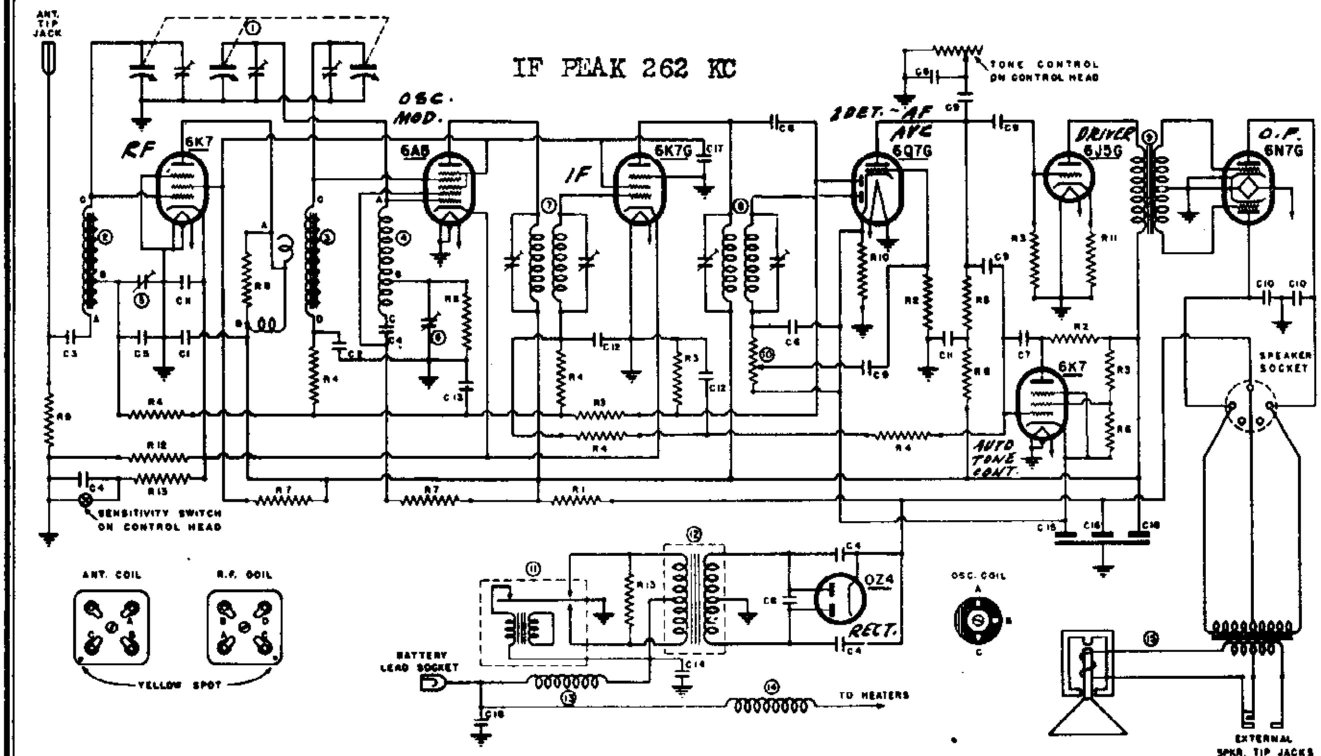


MODEL 761

IF PEAK
456 KC

MODEL 846
Schematic, Socket
Alignment, Trimmers

WARWICK MFG. CORP.



For Conventional Alignment See Special Section Vol. VIII

FREQUENCY CALIBRATION ADJUSTMENT

While a station of known frequency is tuned in, remove the pilot light socket. In the tuning control head, immediately in front of position from which the dial light socket has been removed, will be seen a small screw head. This is the calibration adjustment screw. By turning this screw with a small screw driver, the frequency indicated by the dial may be made to correspond to the frequency of the station tuned in. After adjusting calibration by this means the dial light socket is replaced.

After the receiver is installed the 600 K.C. antenna compensator condenser is adjusted to give best sensitivity while the receiver is tuned to as weak a station as can be heard near 600 K.C. The volume control should be turned full on while making this adjustment.

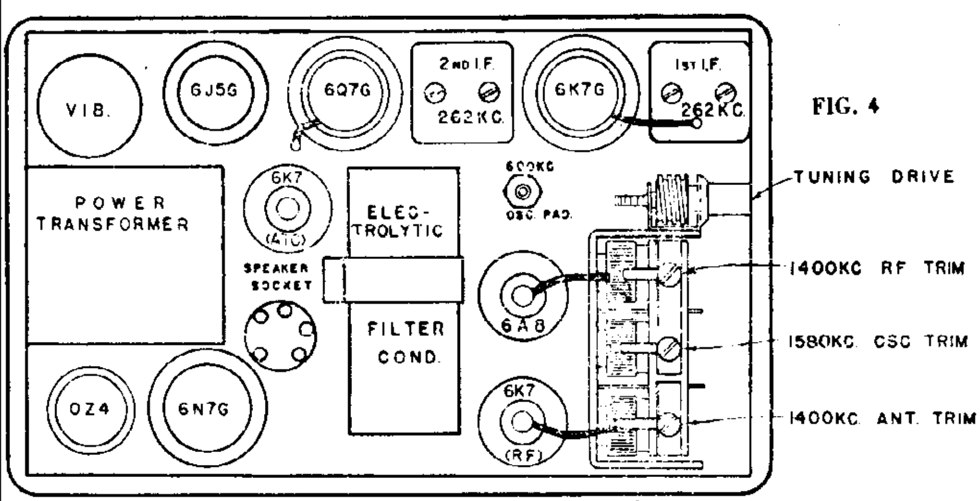


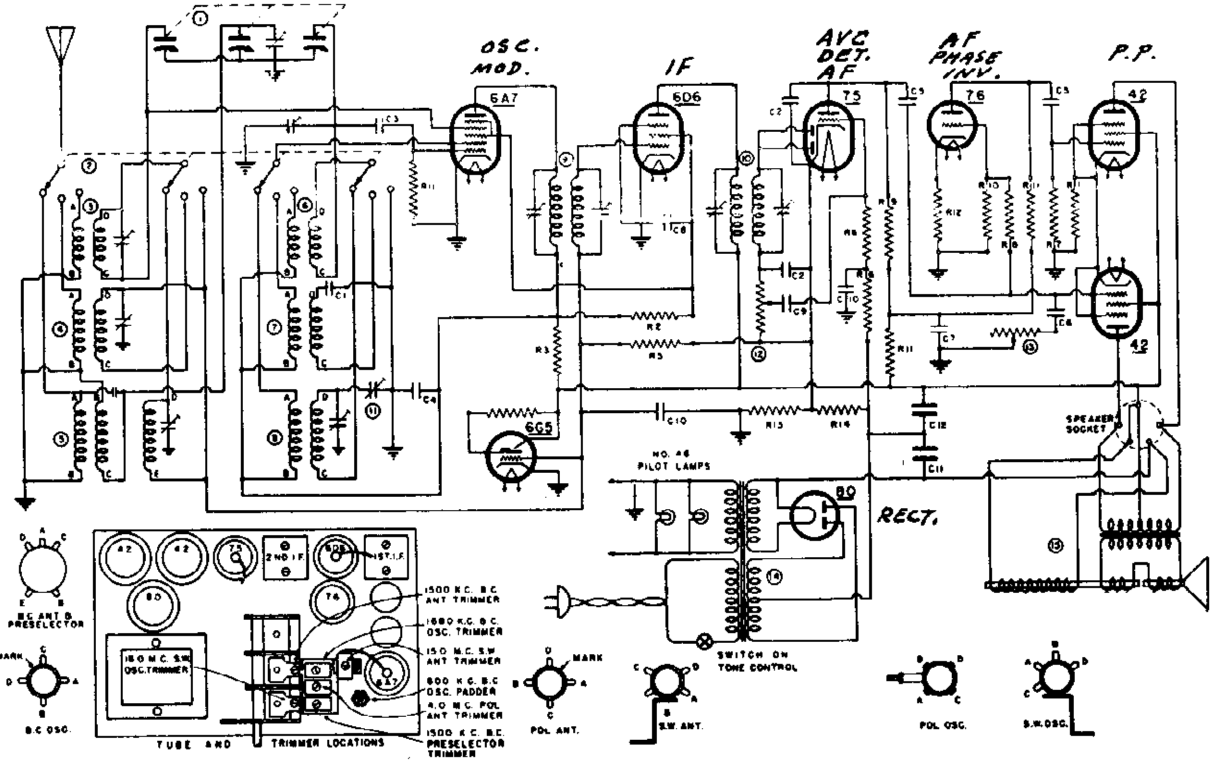
FIG. 4

C1	1509	.004	MICA CONDENSER
C2	1511	.0027	" " 5%
C3	1509	.002	" "
C4	1500	.001	" "
C5	1500C	.001	" "
C6	1504	.00025	" "
C7	1501	.0001	" "
C8	18-102	.008 MFD.	PAPER CONDENSER 1600V
C9	1604	.01	" " " 600V
C10	1631	.004	" " "
C11	1601	.1	" " " 400V
C12	1600	.1	" " " 200V
C13	1622	.05	" " "
C14	1655	.5	" 180V
C15	18-204	4.0	" ELECTROLYTIC CONDENSER
C16		8.0	
C17	18-205	2.0	" " " "
C18	105-1	.00025	SPARK PLATE
R1	60-106	2000	OHM 1 WATT CARBON RES.
R2	60-107	1 MEG	" 1/2 " " "
R3	60-108	300,000	" " " " "
R4	60-109	250,000	" " " " "
R5	60-110	100,000	" " " " "
R6	60-111	50,000	" " " " "
R7	60-113	20,000	" " " " "
R8	60-117	15,000	" " " " "
R9	60-114	10,000	" " " " "
R10	60-129	1800	" " " " "
R11	60-116	800	" " " " "
R12	60-118	400	" " " " "
R13	60-115	200	
1	19-102	3 GANG VARIABLE CONDENSER	
2	10-113	ANTENNA COIL	
3	10-114	R.F. COIL	
4	10-110	OSCILLATOR COIL	
5	20-100	ANTENNA COMPENSATOR CONDENSER	
6	20-100	OSCILLATOR PADDING CONDENSER	
7	10-171	1ST. I.F. TRANSFORMER	
8	10-172	2ND. " "	
9	80-119	P.P. AUDIO INPUT TRANSFORMER	
10	24-103	VOLUME CONTROL	
11	30-100	VIBRATOR	
12	80-111	VIBRATOR POWER TRANSFORMER	
13	33-200	R.F. "A" CHOKE	
14	33-203	" " "	
15	79-217	DYNAMIC SPEAKER	

WARWICK MFG. CORP.

MODEL 872
Schematic, Voltage, Socket
Alignment, Trimmers

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.



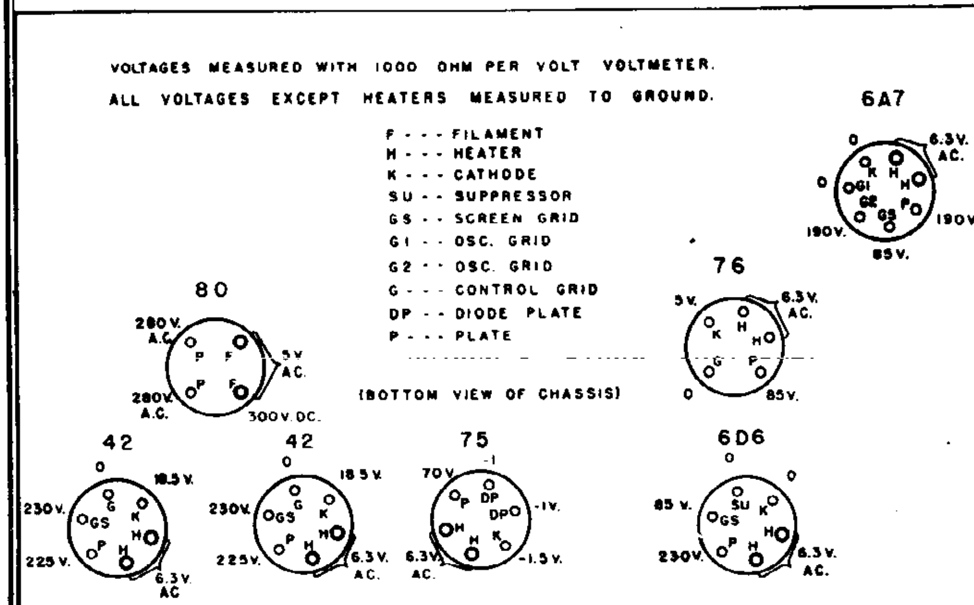
ALIGNMENT

IF Adjust at 456 KC through a 0.1 mfd. condenser.

SW Proper adjustment is loose trimmer setting at 15 MC, as signal is heard at 2 settings. Signal must be heard only at about 14 MC dial setting and not at 16 MC.

BC Adjust oscillator trimmer at 1680 KC through 0.00025 mfd. condenser. Adjust antenna trimmer at 1500 KC. Adjust padder at 600 KC.

Police Adjust antenna trimmer at 4 MC., through 0.00025 condenser.



1	19-116	3 GANG VARIABLE CONDENSER
2	49-107	BAND SWITCH
3	10-183	SHORT WAVE ANTENNA COIL
4	10-182	POLICE BAND ANTENNA COIL
5	10-179	B.C. ANT & PRESELECTOR COIL
6	10-184	SHORT WAVE OSCILLATOR COIL
7	10-181	POLICE BAND OSCILLATOR COIL
8	10-180	B.C. OSCILLATOR COIL
9	10-175	1ST I.F. TRANSFORMER
10	10-176	2 ND. I.F TRANSFORMER
11	20-100	B.C. OSC. PADDING CONDENSER
12	24-105	VOLUME CONTROL
13	24-106	TONE CONTROL WITH SWITCH
14	60-129	POWER TRANSFORMER
15		SPEAKER

R1	60-123	350	OHM	2	WATT	CARBON	RES	10
R2	6211	15,000	-	1	-	-	-	
R3	60-131	3000	-	1/2	-	-	-	
R5	6020	2 MEG	-	1/3	-	-	-	
R6	6017	1 " -	-	-	-	-	-	
R7	6019	500,000	-	-	-	-	-	
R8	60-124	380,000	-	-	-	-	-	5
R9	6024	250,000	-	-	-	-	-	
R10	60-125	110,000	-	-	-	-	-	5
R11	6025	50,000	-	-	-	-	-	
R12	6016	5000	-	-	-	-	-	
R13	60-104	20	-	1/2	-	WIRE	-	5
R14	60-128	16	-	-	-	-	-	5

C1	15-102	.0009	MFD	MICA	CONDENSER	5%	
C2	1504	.00025	-	-	-		
C3	1503	.00005	-	-	-		
C4	1602	1	MFD	600 VOLT	PAPER	CONDENSE	
C5	1648	.03	-	-	-	-	-
C6	1651	.004	-	-	-	-	-
C7	1616	.25	-	400	-	-	-
C9	1605	.02	-	-	-	-	-
C10	1622	.05	-	200	-	-	-
C11	18-202	10.0	-	400	-	ELECTROLYTIC CC	
C12	18-201	12.0	-	300	-	-	

MODEL 761
Alignment
MODELS 768,768B
Alignment, Socket
Trimmers

WARWICK MFG. CORP.

MODELS 542 Late, 559, 579
648, 648B, 655B, 668, 668B
659, 749, 749B, 768, 768B
Tuner Adjustments

PUSH BUTTON TUNING ADJUSTMENTS

MODELS 542 Late, 655B, 668, 668B, 648, 648B, 559, 579, 659, 768, 768B, 946, 749, 749B

After receiver is installed and antenna and ground properly connected, plug line cord into a convenient outlet. Then turn the volume control to about the center of rotation. This will turn the receiver on and put it in an operating condition. Time must be allowed for the tubes to heat up before stations can be tuned in. This time is approximately one-half minute.

The automatic tuning feature of your radio makes it possible to set up 6 favorite American broadcast stations and tune them in quickly with the automatic tuner. Choose stations for push-button operation heard with good volume at all times.

Cut the call letters of your 6 selected stations from the list supplied with your receiver and slip them into the Tab Holder from the top, with the clear celluloid in front of the call letters to protect them. Arrange the call letters in the Tab Holder from right to left. Have the call letters of the lowest frequency station at the extreme right and work progressively to the left so that the highest frequency call letters will be at the extreme left.

Follow the procedure outlined below, in order to adjust the push-buttons properly:

1. By means of the Station Selector Knob tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holders.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of the setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your four selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

Models 768, 768B

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

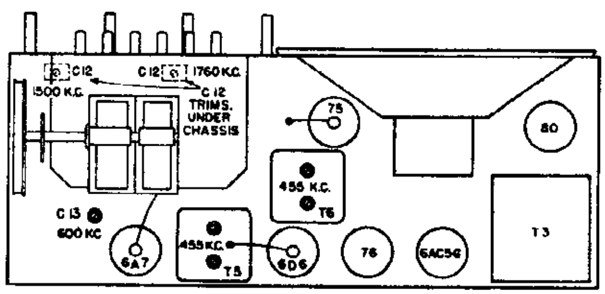
The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 KC oscillator trimmer until maximum output is shown. Set the generator to 1500 KC and tune in this signal on the receiver. Then adjust the 1500 KC antenna trimmer to the maximum output. Then impress a 600 KC signal into the receiver antenna lead and tune in this signal on the receiver. Adjust oscillator padding condenser to the maximum output. Follow through with this procedure several times in order to obtain the best alignment adjustment possible. This completes the alignment.



MODEL 761

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the IA6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna post through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

DESCRIPTION

This receiver is a 7 tube, 6 volt storage battery operated superheterodyne.

The tubes used are a 30 as oscillator, a 6D8G as modulator, two 1A4 tubes as I.F. amplifiers, a 6T7G as A.V.C. and audio rectifier and audio voltage amplifier, a 6L5G as audio driver and a 19 as power audio amplifier.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.

While a ground is not always necessary with receivers which are made to use the lighting mains as a source of power, a battery operated receiver always requires a good ground if best performance and distance reception is expected. A ground may be made to a water supply system or to a galvanized pipe driven into ground that is moist most of the time. The use of a lightning arrestor is very good insurance against damage by lightning. Several types are on the market and may be obtained very easily. Soldering of all antenna and ground lead joints will eliminate any noise which may be caused by loose connections.

The antenna and ground leads connect to the marked binding posts located on the back of the chassis.

A 6 volt storage battery is the only power supply required for this receiver. The yellow battery lead connects to the positive (+) terminal of the battery and the black lead connects to the negative (—) terminal. If these connections are reversed the receiver will not operate and may be seriously damaged if left this way for more than a short time. Never charge the battery while operating the receiver. Attempting to use any other source of power supply will cause serious damage to the receiver.

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODEL A3 Series

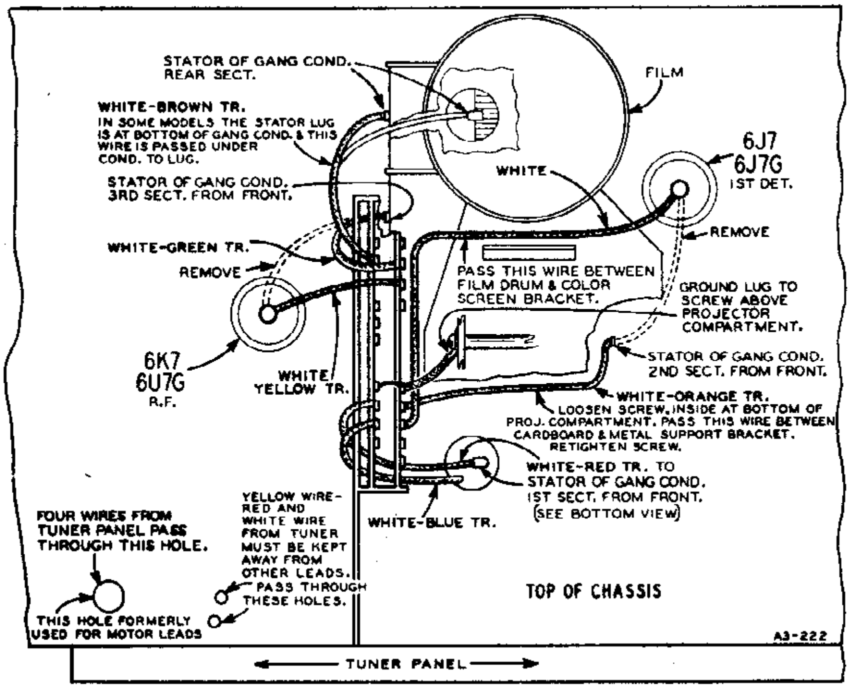


Fig. 3—13 Tube Chassis—Top View

IMPORTANT-DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.

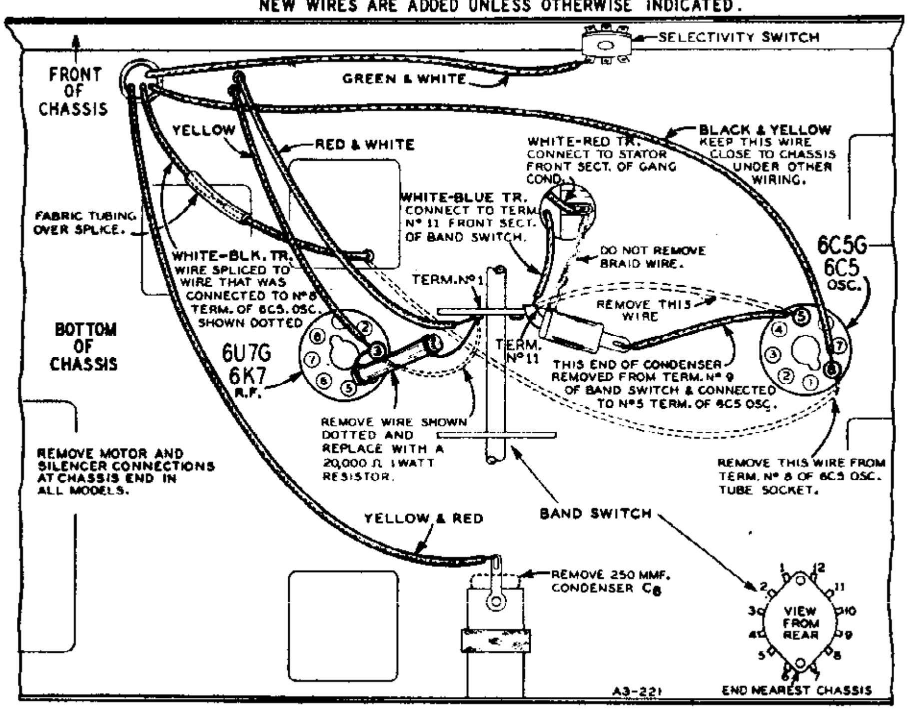


Fig. 4—13 Tube Chassis—Bottom View

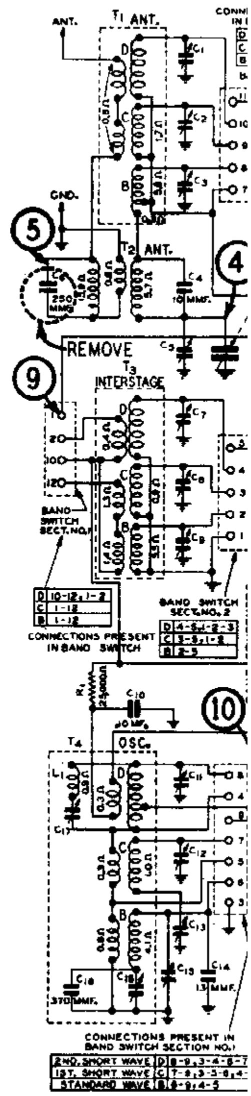


Fig. 5—13 Tul

Instructions for Mounting the New 7 Station Auton Tuning Panel on the 7, 9, 11 and 13 Tube Cha

(REPLACING MOTOR DRIVE PANEL)

New 7 Station Automatic Tuning Panel

There are 8 push buttons. Buttons Nos. 1 to 3 and 5 to 8 are Automatic Tuning Station Buttons. Button No. 4 is the Manual Tuning Button - See Fig.1. When this button is depressed, the radio is in the manual tuning position.

The small buttons above the push buttons are still used for setting the stations. However, with the new panel, this is done by turning the button clockwise or counter-clockwise until the desired station is tuned in.

The aligning screw, shown in Fig. 1, when turned, moves the iron core of the antenna coil for aligning purposes.

Old Parts Used

Use the following parts of the old assembly:

Escutcheon Plate,
Station Buttons and Hairpin Springs,
Setting Buttons,
Glass Screen and Rubber Bands.

The Following New Parts are Supplied

7 Station Automatic Tuning Panel Assembly.

The parts shown in the list at the end of these instructions.

Removing Old Motor Drive Panel from Chassis

Remove the knobs. Two are set screw knobs and three are the push-on type.

Remove the station buttons by pushing down the lower end of the small hairpin spring at the back of the button and, at the same time, pulling the button off the shaft. Remove the setting buttons by pulling them off.

The screws in the wooden support behind the electric drive panel must be unscrewed and the support removed from the cabinet.

Remove the speaker plug from the socket at the back of the chassis and also the tuning eye tube from its clamp bracket. Loosen the screw holding the bottom shield connection to the back of the chassis. Unscrew and remove the shipping bolts and the "L" bolts from beneath the chassis shelf.

The chassis may then be removed.

Remove the old tuning eye tube bracket from the cabinet.

Turn the electric-manual lever to the electric position.

Unsolder the wire to the silencer switch at the chassis end. Also, unsolder the two motor leads at the A. C. terminal strip under the chassis. Early models used a metal shell condenser which was connected at the same terminal strip. Remove this condenser if one is installed.

Take off the collars from the volume and tone control shafts.

Remove the glass screen by taking out the two screws and removing the two brackets.

Remove the four red mounting screws.

The panel can then be pulled straight out from the chassis.

Mounting New Automatic Tuning Panel on the Chassis

Put a piece of insulating tape on the surface of the support casting at the point shown in Fig. 2. This will prevent possible short circuiting of the switch contacts.

Before mounting the new panel on the chassis, cut off any leads not required as shown in the table - Fig. 7. Bring the tuner panel near the chassis and pass the white-blue tracer and white-red tracer leads through the hole in the chassis under the front section of the gang condenser. Turn the gang condenser until the spring clip on the drive drum is at its lowest position - See Fig. 2 lower left. Line up the drive arm on the large panel drive pulley with the spring clip on the gang condenser drive drum. Since the drive arm will line up with the spring clip under two conditions, refer to Fig. 2 lower left for the correct relation of drive cord winding to drive arm.

Spread the spring clip SLIGHTLY with a small screw driver, bringing this screw driver up from beneath the chassis. Then push the panel toward the chassis, lowering it slightly so that the large drive pulley may be brought up in back of the bracket below the projector compartment. Insert the drive arm in the spring clip.

Mount the panel on the chassis using the four mounting screws at the four points shown in Fig.1.

Secure the two braces to the back of the panel as shown in Fig. 2.

Remove the two screws at the top of the lens housing support bracket. Using the two 8-32 X 3/8" screws supplied, secure the back end of the braces in place. When attaching the brace to the tuner switch side of the lens housing bracket, ground the lug of the braided wire under the screw head as illustrated.

Replace the glass screen using clamps, nuts, and lock washers supplied.

Replace the collars on the volume control and tone control shafts.

Wire the panel in the circuit following Figs. 3,4, 9, 10, 15, and 16.

Replace chassis in cabinet reversing procedure followed when removing the chassis. The wooden shipping support is not used.

The electric-manual lever is not used. A cover plate is supplied which covers the opening left by the removal of this lever. This plate is so made that the back portion should fit snugly into the opening in the cabinet. If it does not, file the cabinet until it fits snugly in place.

Then put the tuning knob on the shaft.

Knobs and Cover Plate

The 5 control knobs formerly used with the motor drive panel are also used with the new automatic tuning panel.

The cover plate used under the tuning knob is described in the previous article.

Alignment

After the new panel is installed, realign the chassis using as a guide the alignment procedure given in the service manual for each chassis.

If a definite peak cannot be r
the 1830 KC adjustment on the
compensating condenser C16 i
models, C14 in the 13 tube mod
7 tube model.

If a definite peak cannot be r
the 22,000 KC adjustment on th
back off this trimmer as far a
ceed with the 20,000 KC adjustm

Next align the automatic tuner.
ing system is aligned by turnin
which shifts the position of t
antenna coil while the coil rem

Depress station button No. 1 -
a signal of the frequency sho
ton No. 1. Turn setting button
counter-clockwise until this si
tuned in. Then turn the alig
No. 1 clockwise or counter-cloc
output is obtained.

Follow the same procedure with
station tuning buttons using th
below.

Button No. 1...Aligning F
Button No. 2...Aligning F
Button No. 3...Aligning F
Button No. 5...Aligning F
Button No. 6...Aligning F
Button No. 7...Aligning F
Button No. 8...Aligning F

Mounting New Pan Chassis Equipped Motor Drive P

Chassis equipped with the early
panel may be identified by the
chassis is removed from the
electric-manual lever is in the
all four red mounting screws
Fig. 23. On late models, the
are behind the glass screen and
less this screen is removed -

To mount the new automatic t
early chassis, first, using
the portion of the bracket ass
jector compartment as shown in

Mount the new panel on the ch
bottom mounting screws. Extend
instrument through the center
el mounting holes and place a
extending down from the project

Remove the two lower mounting
the new panel. Drill and tap
two upper 8-32 mounting screws
new panel can then be mounted
mounting screws.

Parts Shipped With 7 Station Automatic Tuning Pan

QUANTITY	ITEM	APPLICATION
1.......	20,000 Ohm Resistor.............	To be used when installing panel and 13 tube chassis only.
2.......	Braces...........................	To secure the panel to top of pro assembly.
4.......	8-32 X 3/8" screws..............	2 used for front end of above bra 2 used for back end of above brac
2.......	#8 Shakeproof Lock Washers......	To secure above brace to panel.
2.......	8-32 Hex Nuts...................	To secure above brace to panel.
2.......	Glass Retainer Clamps...........	To hold the glass screen in place.
2.......	6-32 X 1/4" Round Head Screws...	For above.
2.......	#6 Split Lock Washers...........	For above.
1.......	Circular Cardboard Tab with Words "Manual Tuning" on it.....	To be put into manual switch butto (4th button from left).
1.......	Round Celluloid Tab.............	To be pushed into above mentioned over the cardboard tab.
4.......	8-32 X 1/4" Mounting Screws..... (Heads Red)	To mount panel to chassis.
4.......	#8 Split Lock Washers...........	For above.
1.......	Round Cover Plate...............	To cover opening in front panel of left by removal of the electric-m lever.

NER & CO.

MODEL 7-Station Automatic Tuning Panel
For MODELS A2,A3,A4,A5 Series
Installation Data.Panel View,Details

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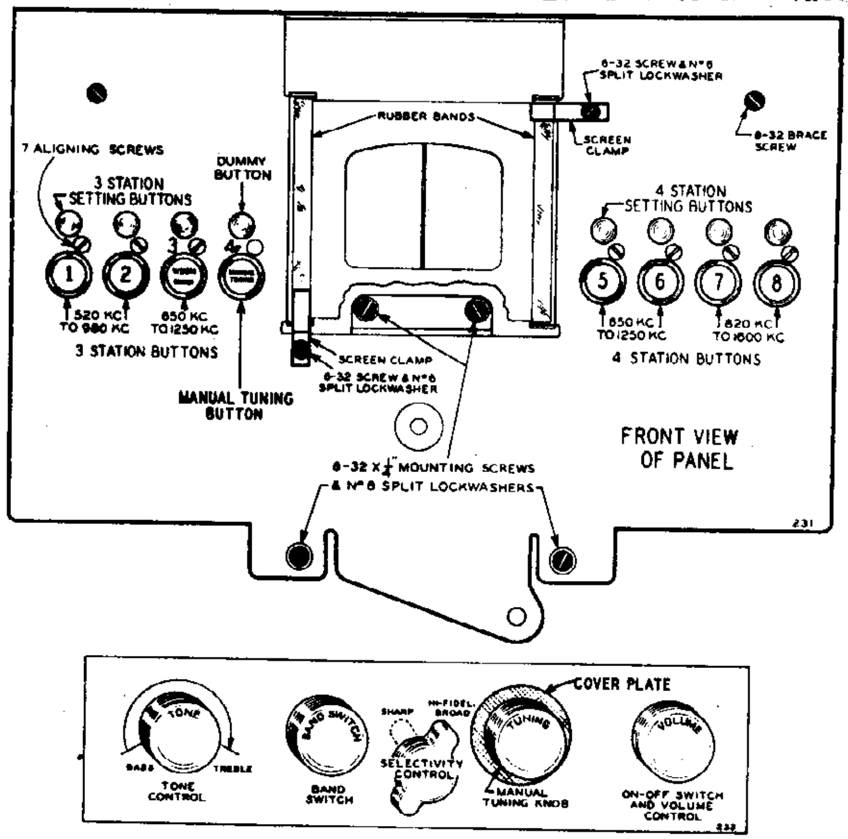


Fig. 1—Automatic Tuning Panel—Front View

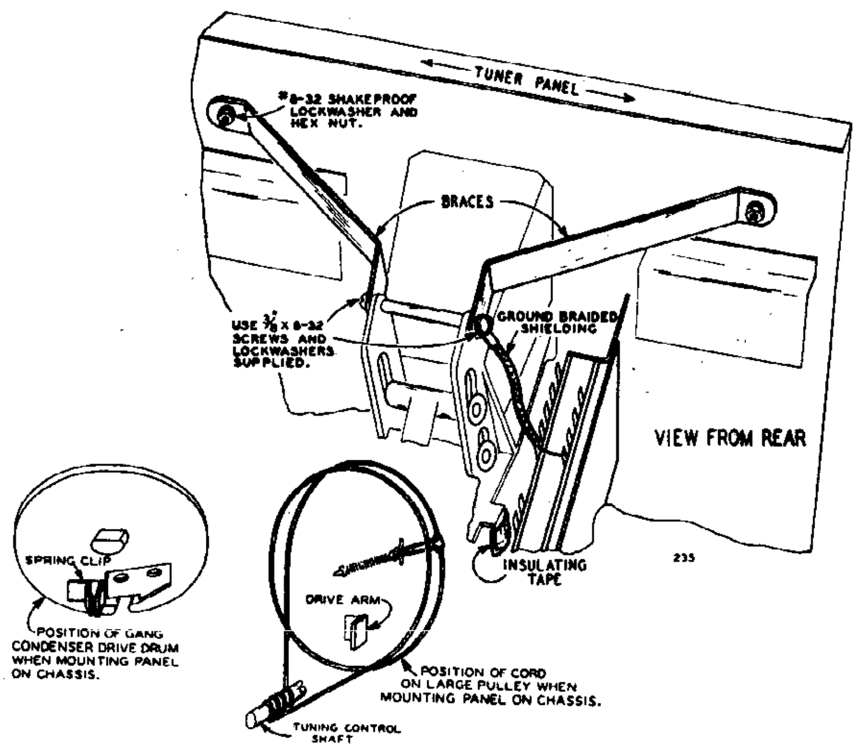
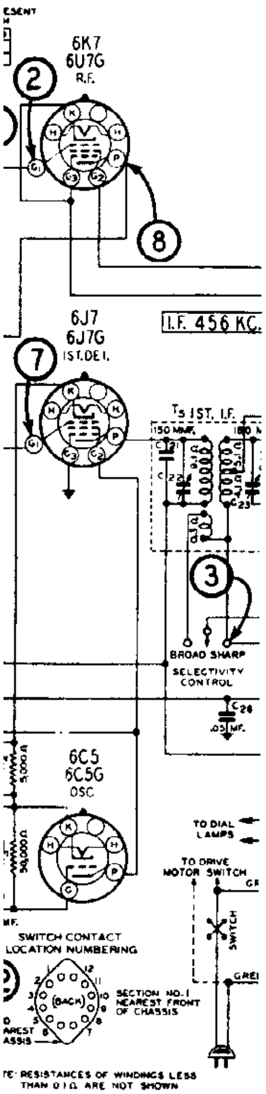


Fig. 2 Automatic Tuning Panel—Back View



...matic Diagram

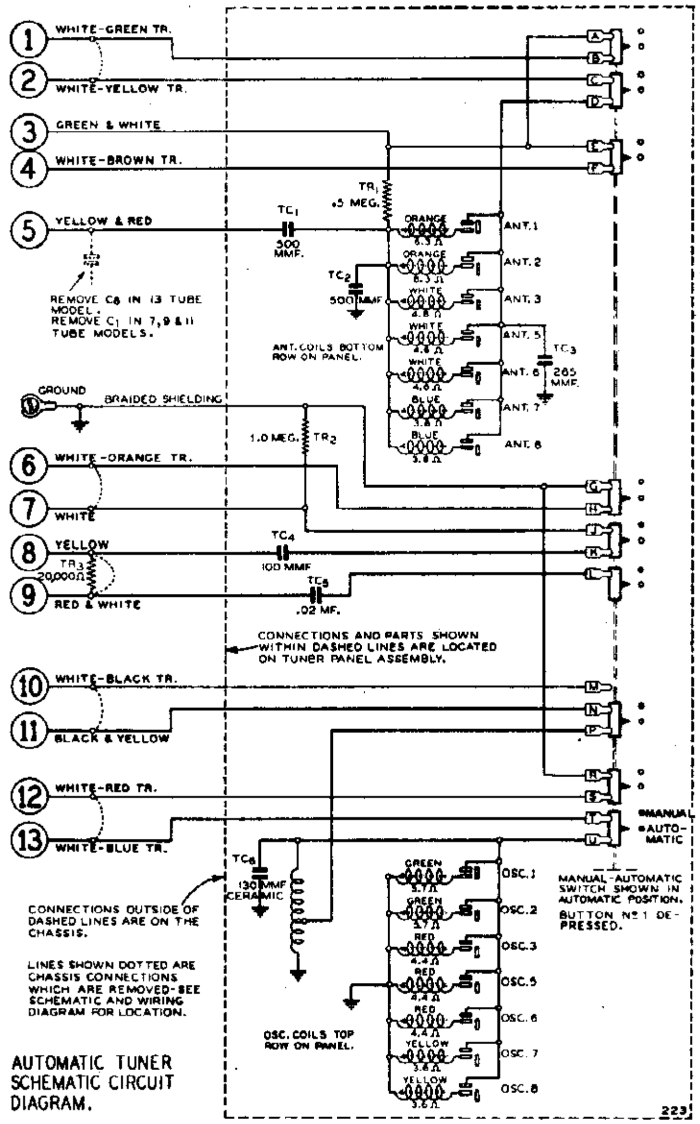


Fig. 6—Tuning Panel Schematic Diagram

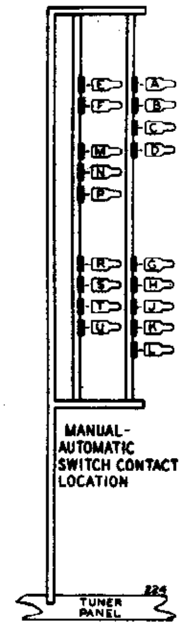


Fig. 8—Tuning Panel Switch Terminals

13 TUBE MODEL—USE ALL 13 WIRES & GROUND LEAD.

9 & 11 TUBE MODELS—CLIP OFF WHITE-BROWN TR. (4) AT SWITCH CONTACT [F]

7 TUBE MODEL—CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (6) AT SWITCH CONTACT [H]
WHITE (7) AT SWITCH CONTACT [J]
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR3 20,000 OHM RESISTOR IS NOT USED.

225

Fig. 7—Table of Tuning Panel Leads Used

13 TUBE RADIO

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODEL A4 Series

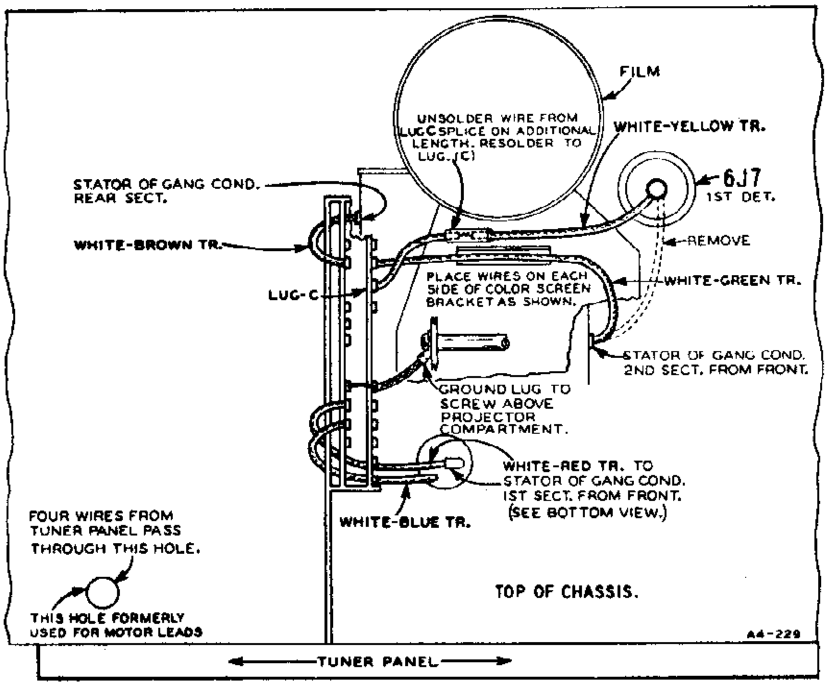


Fig. 15—7 Tube Chassis—Top View

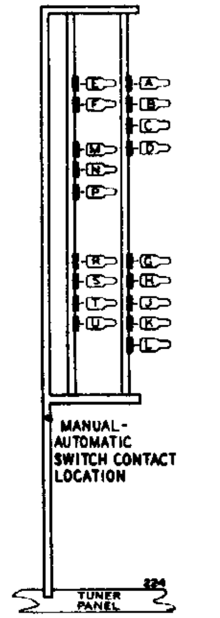


Fig. 17—Tuning Panel Switch Terminals

7 TUBE RAD

IMPORTANT-DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.

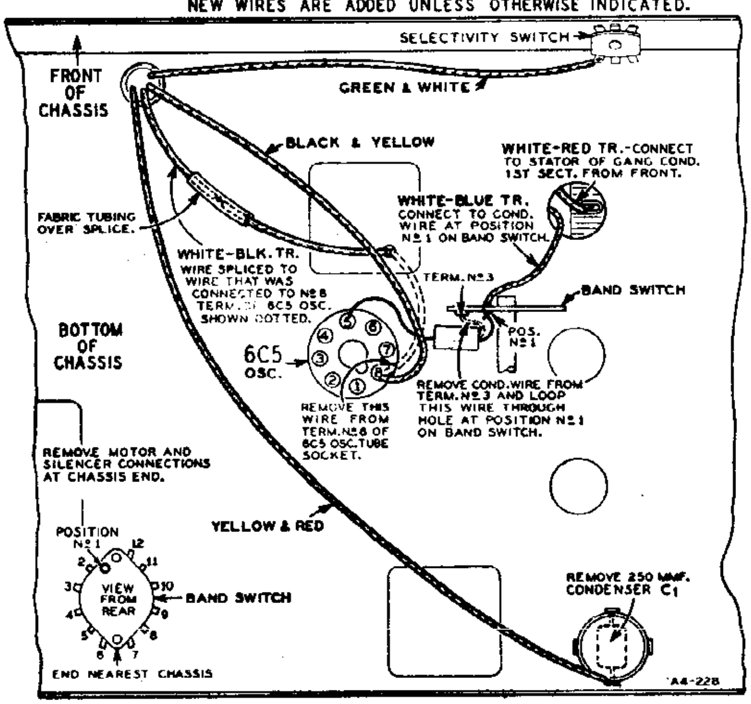


Fig. 16 7 Tube Chassis—Bottom View

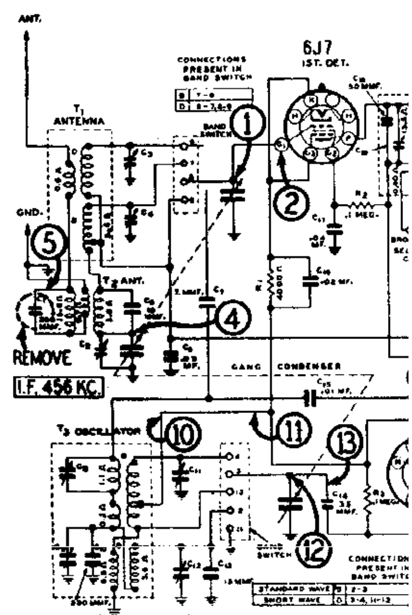


Fig. 18—7 Tube Schematic Diagram

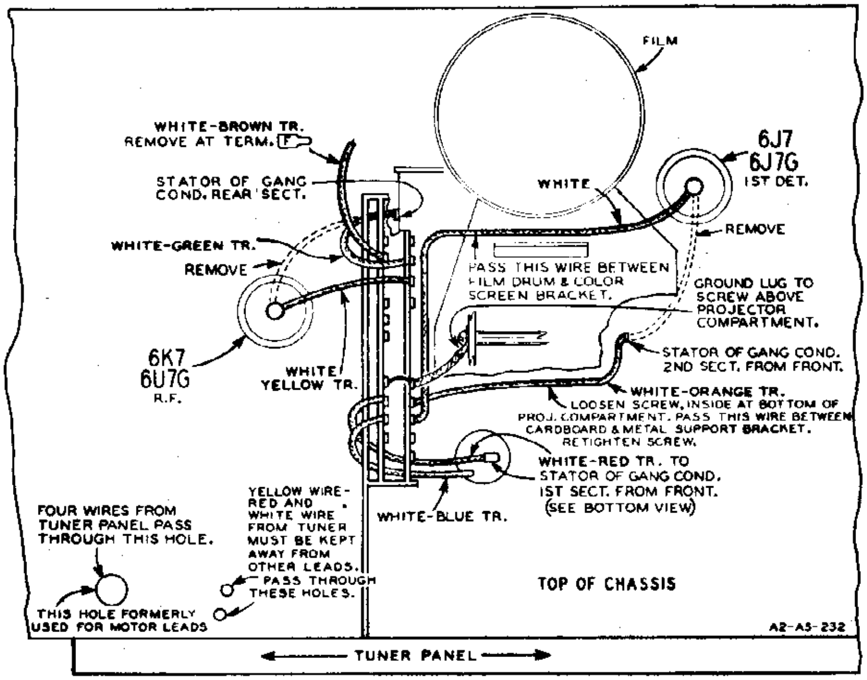


Fig. 9—9 and 11 Tube Chassis—Top View

IMPORTANT-DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.

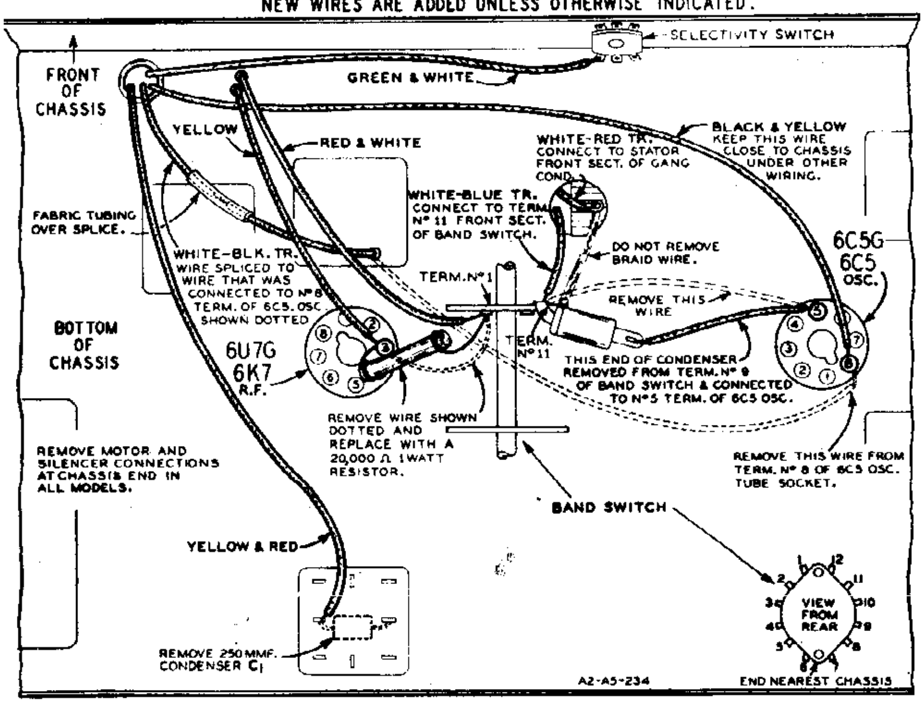


Fig. 10—9 and 11 Tube Chassis—Bottom View

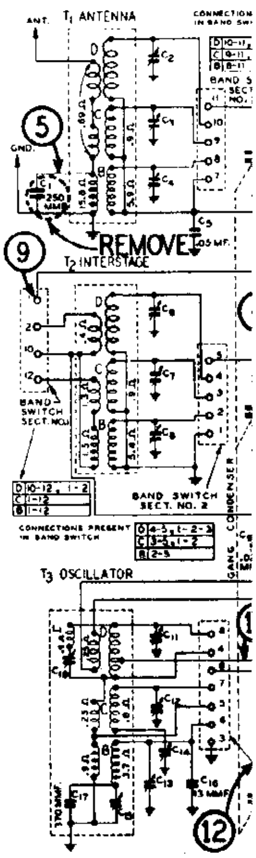


Fig. 11—9 and 11 Tu

13 TUBE MODEL-
GROUND L

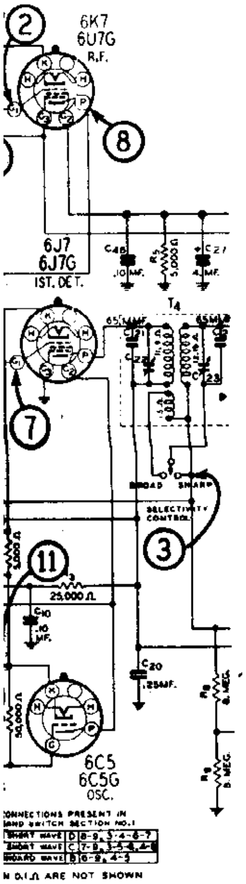
9 & 11 TUBE MOD
-BROWN T
CONTACT

7 TUBE MODEL-
LOWING W
WHITE-OR
SWITCH CO
WHITE ⑦
TACT
YELLOW ⑧
AT CONDEN
TR3 20000
NOT USED.

Fig. 12—Ta
Pa

ONER & CO.

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODELS A2 and A5 Series



chematic Diagram

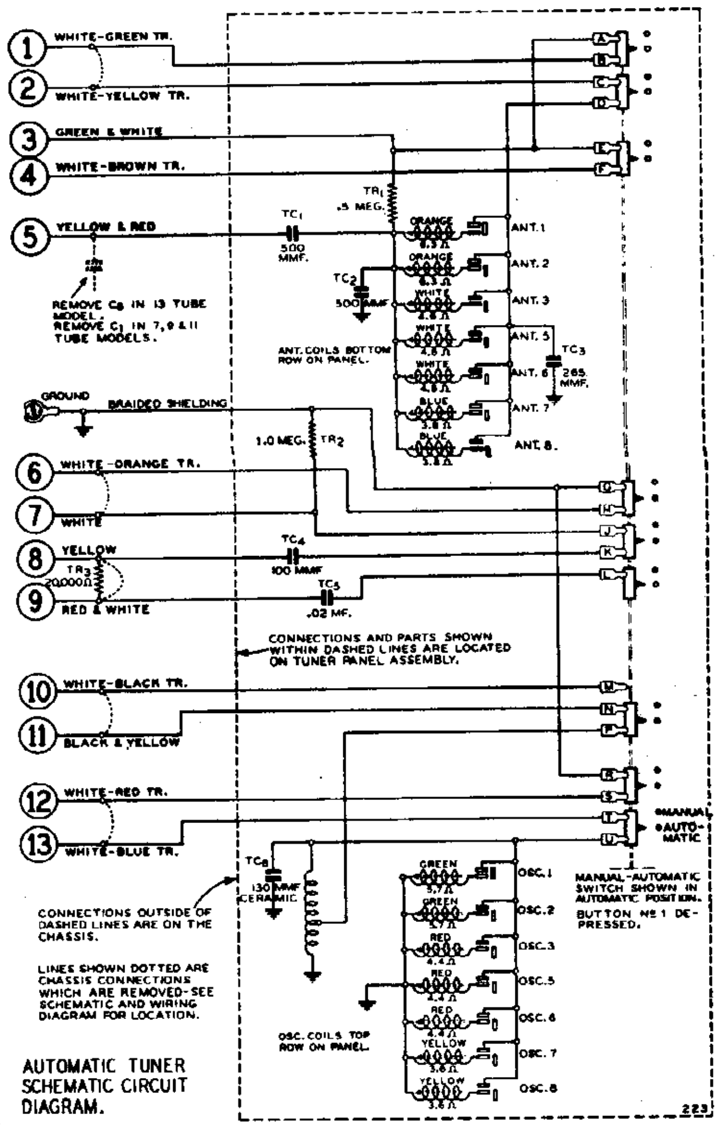


Fig. 13—Tuning Panel Schematic Diagram

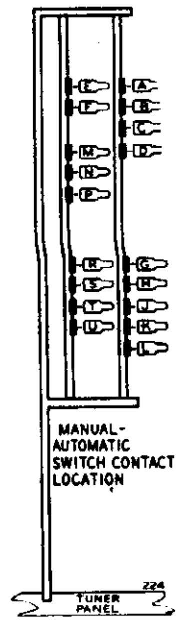


Fig. 14—Tuning Panel Switch Terminals

LL 13 WIRES &

CLIP OFF WHITE
AT SWITCH

FF THE FOL-

TR. ⑥ AT

ITCH CON-

ED & WHITE ⑨
TERMINAL STRIP.
RESISTOR IS

of Tuning
eads Used

9 AND 11 TUBE RADIOS

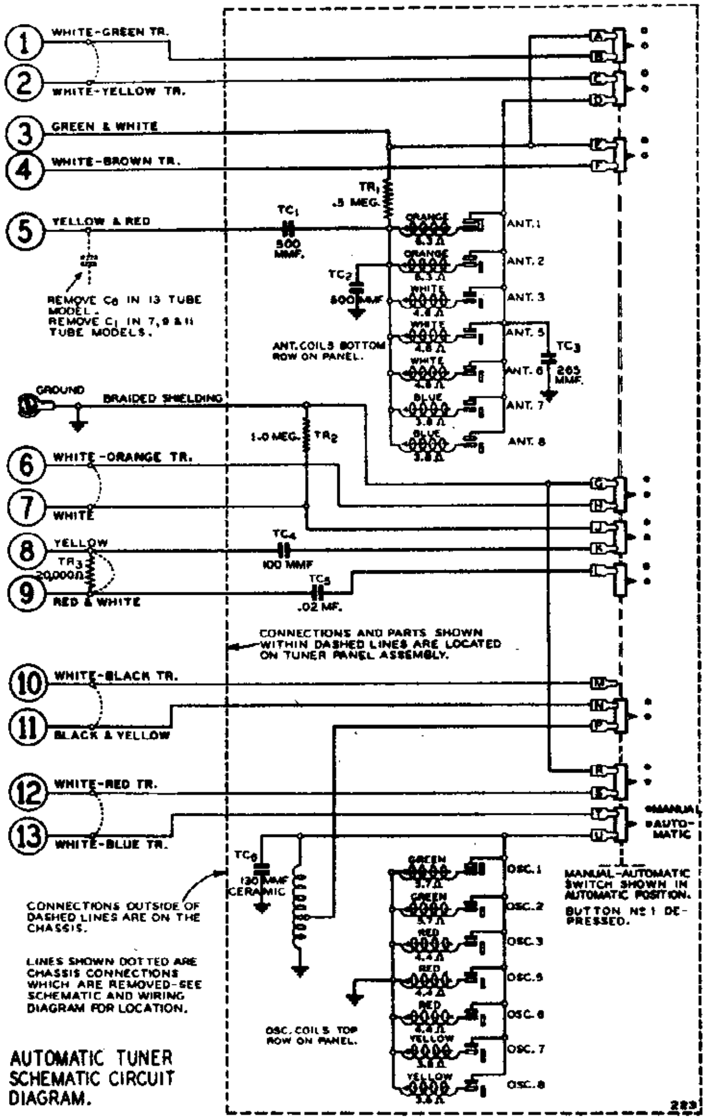


Fig. 19—Tuning Panel Schematic Diagram

13 TUBE MODEL-USE ALL 13 WIRES & GROUND LEAD.

9 & 11 TUBE MODELS-CLIP OFF WHITE-BROWN TR. (4) AT SWITCH CONTACT (F)

7 TUBE MODEL-CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (6) AT SWITCH CONTACT (H)
WHITE (7) AT SWITCH CONTACT (J)
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR3 20000 OHM RESISTOR IS NOT USED.

286

Fig. 20—Table of Tuning Panel Leads Used

Early Models—Cutting off bracket

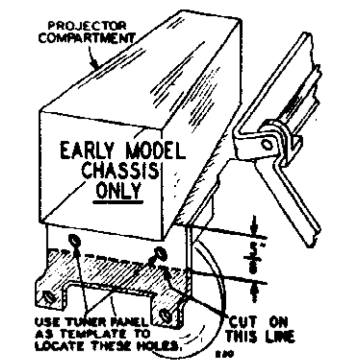


Fig. 21—Cutting Support Bracket—Early Models

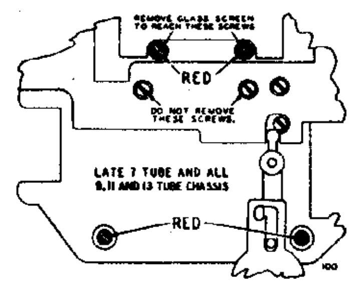


Fig. 22—Location of 4 Red Mounting Screws in Late Models

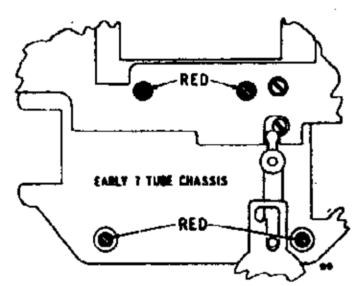


Fig. 23—Location of 4 Red Mounting Screws in Early Models

WELLS-GARDNER & CO.

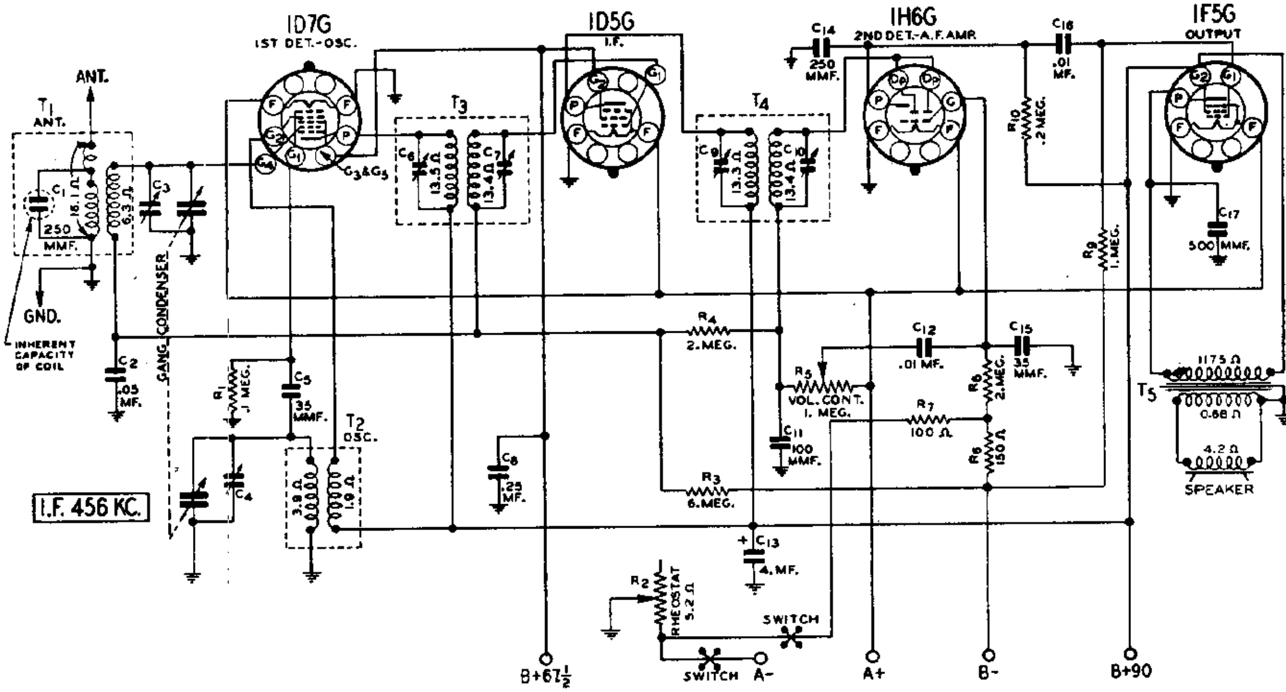
Input Voltages and Currents
"A" Battery .... 2 Volts—.3 Amperes
"B" Battery .... 90 Volts—11.5 to 15 Ma.
Power Output - - - 135 Milliwatts Undistorted
Selectivity - - 40 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - - 456 KC.
Speaker - - - - - - - - - - - 6" Dynamic
Tuning Frequency Range - - - 528 to 1730 KC.
Sensitivity - - - - - - - - - 40 Microvolts

VOLTAGES AT SOCKETS
Volume Control: Maximum — Antenna Shorted to Ground
"A" Battery — 2 Volts

Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid
1D7G	1st Det.-Osc.	2.0	87 87(1)	64	3.5(2)
1D5G	I.F.	2.0	87	64	3.5(2)
1H6G	2nd Det.-1st Audio	2.0	32(3)		1.25(4)
1F5G	Power	2.0	82	87	3.5(2)

(1) Anode Grid (G2) to ground
(2) As read across R6 and R7
(3) As read on 100 volt scale (1000 ohm per volt meter). Subject to variation.
(4) As read across R7



I.F. 456 KC.

JULY, 1937

Fig. 1—Schematic Circuit Diagram

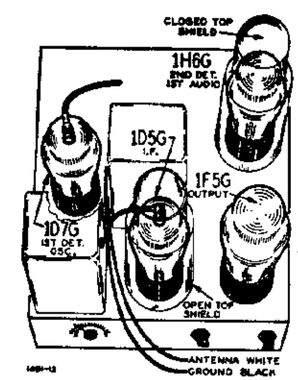


Fig. 2—Tube Arrangement

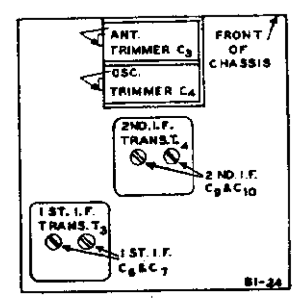


Fig. 3—Trimmer Location

ALIGNMENT PROCEDURE

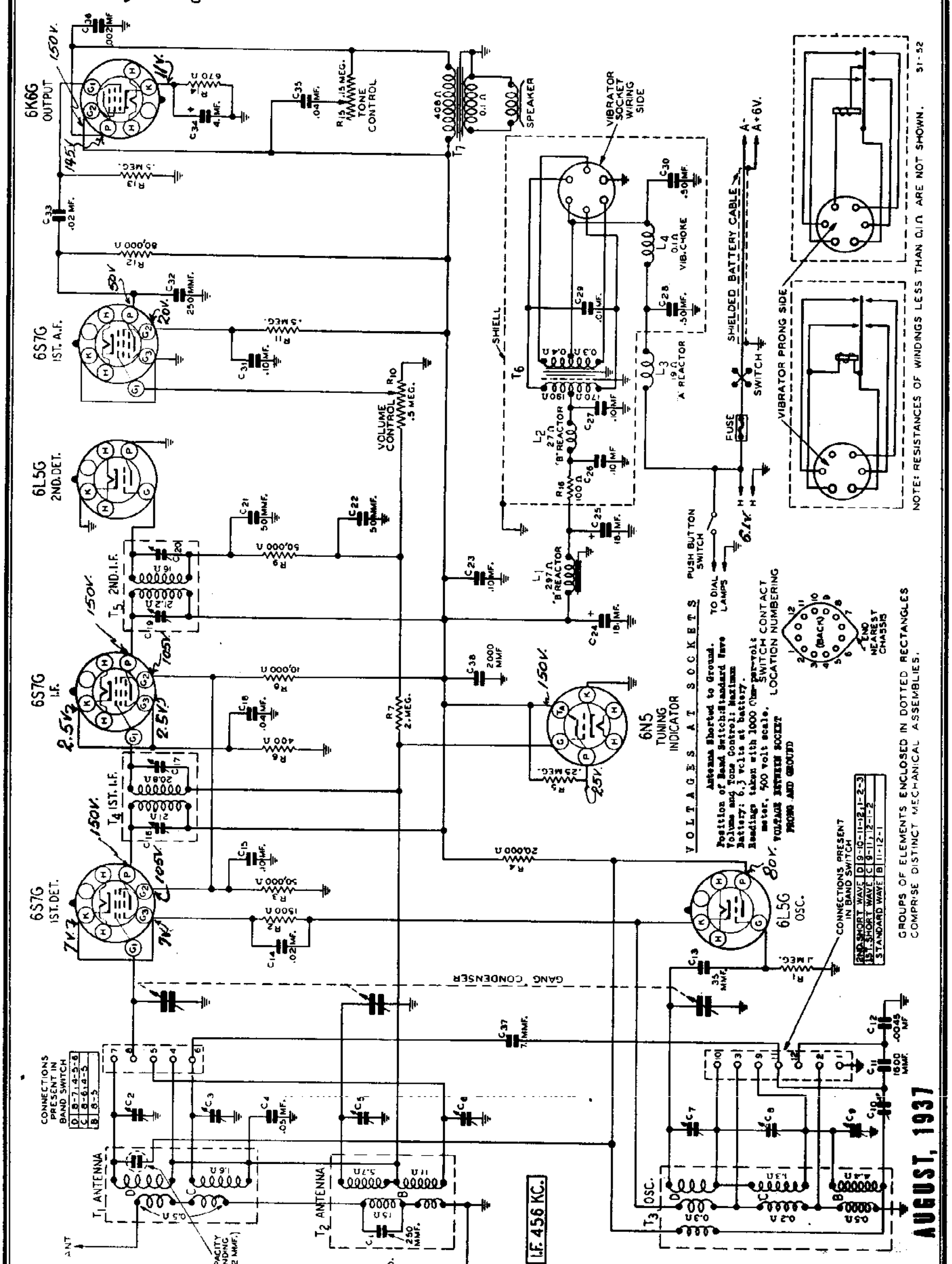
STEP (Follow Order as Given)	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.	.1 mf.	456 KC	Grid of 1st Det.	2nd I. F. (C9) & (C10) 1st I. F. (C6) & (C 7)	Turn rotor to full open	Adjust to Maximum Output
1730 KC Adj.	200 mmf.	1730 KC	Antenna Lead	Osc. (C4)	Turn rotor to full open	Adjust to Maximum Output
1500 KC Adj.	200 mmf.	1500 KC	Antenna Lead	Ant. (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, note the position of the pointer and remove the chassis from the cabinet. Loosen the pointer screw and set the pointer so that it will be at the 800 KC mark. Tighten the pointer screw and replace the chassis in the cabinet. If the pointer is not at the 800 KC mark another adjustment will be necessary.

MODEL S1 Series
Schematic, Voltage

WELLS-GARDNER & CO.



WELLS-GARDNER & CO.

ALIGNMENT PROCEDURE SERIES S1

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C16) & (C17)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C7)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C6)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

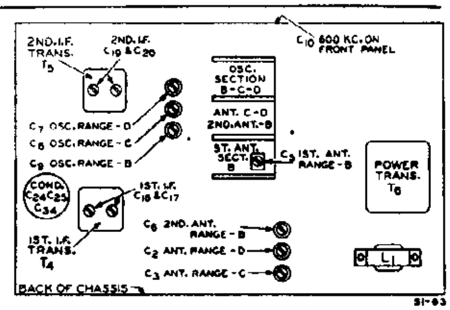
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image



ALIGNMENT PROCEDURE Series S2

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generatoreto "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C21) & (C22)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C7)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Ant. Range B (C5)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C8) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT			BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C
1100 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained

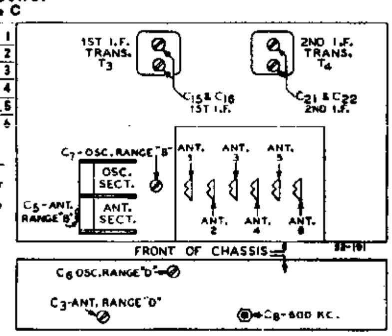


Fig. 2—Trimmer Location

MODEL S2 Series
Schematic, Voltage
Socket, Coils, Notes

WELLS-GARDNER & CO.

Power Consumption - 2.45 Amperes at 6.3 Volts

Power Output - - - - - - .9 Watt Undistorted, 1.4 Watts Maximum

Selectivity - 41 KC Broad at 1000 times Signal

Sensitivity

- B Range (Manual Tuning) .... 6 Microvolts Average
- B Range (Automatic Tuning) .... 9 Microvolts Average
- D Range .... 8 Microvolts Average

Intermediate Frequency - - - - - - 456 KC.

Speaker - - - - - - - 6" or 8" P. M. Dynamic

Tuning Frequency Range

- B Range (Manual Tuning) .... 528 to 1730 KC
- D Range (Manual Tuning) .... 5750 to 18300 KC
- Buttons 1 and 2 (Automatic Tuning) .... 820 to 1800 KC
- Buttons 3 and 4 (Automatic Tuning) .... 650 to 1350 KC
- Buttons 5 and 6 (Automatic Tuning) .... 520 to 980 KC

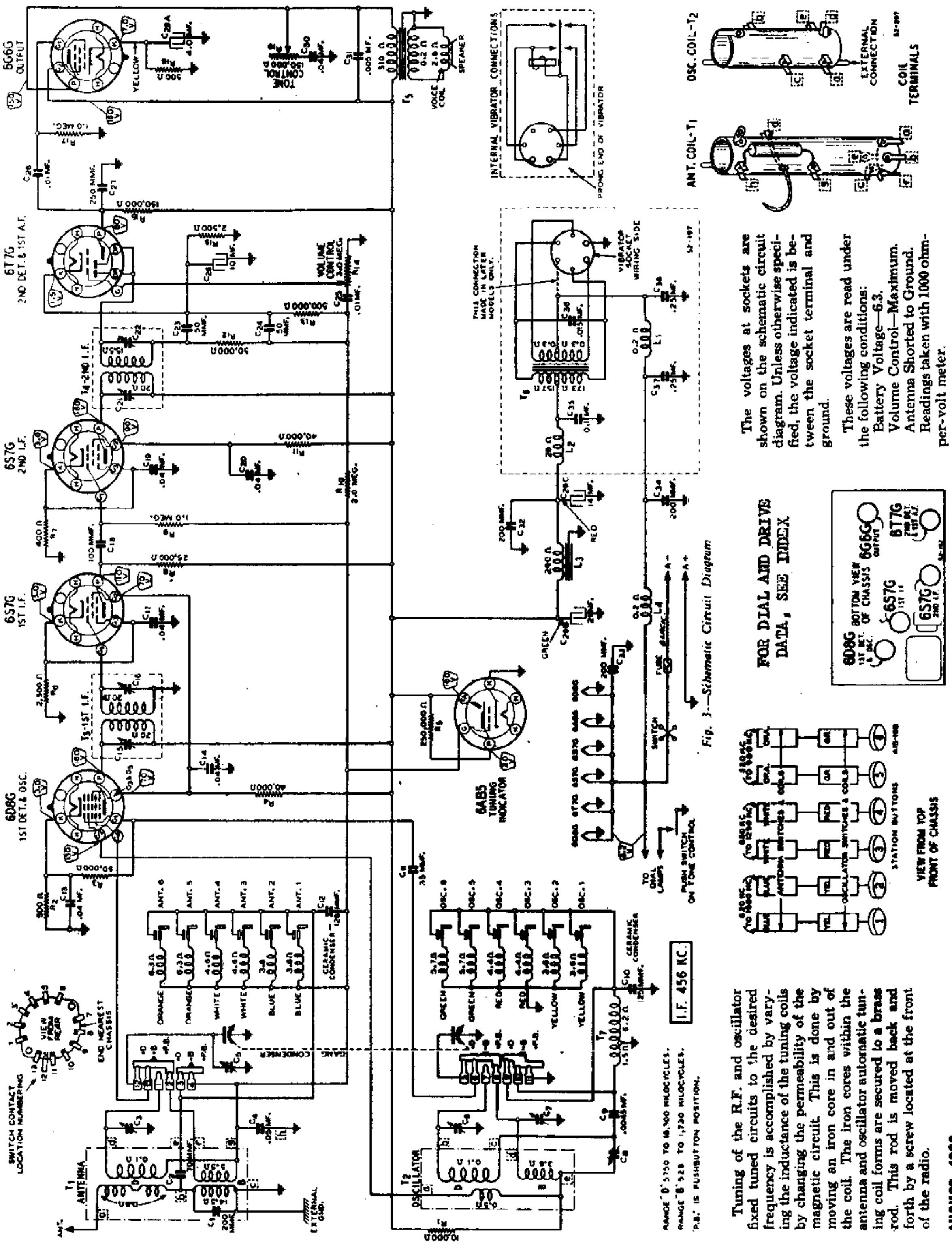


Fig. 3—Schematic Circuit Diagram

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions: Battery Voltage—6.3. Volume Control—Maximum. Antenna Shorted to Ground. Readings taken with 1000 ohm-per-volt meter.

FOR DIAL AND DRIVE DATA, SEE INDEX

Tuning of the R.F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of the tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil. The iron cores within the antenna and oscillator automatic tuning coil forms are secured to a brass rod. This rod is moved back and forth by a screw located at the front of the radio.

AUGUST, 1938

MODEL B2A Series
Schematic, Specifications

WELLS-GARDNER & CO.

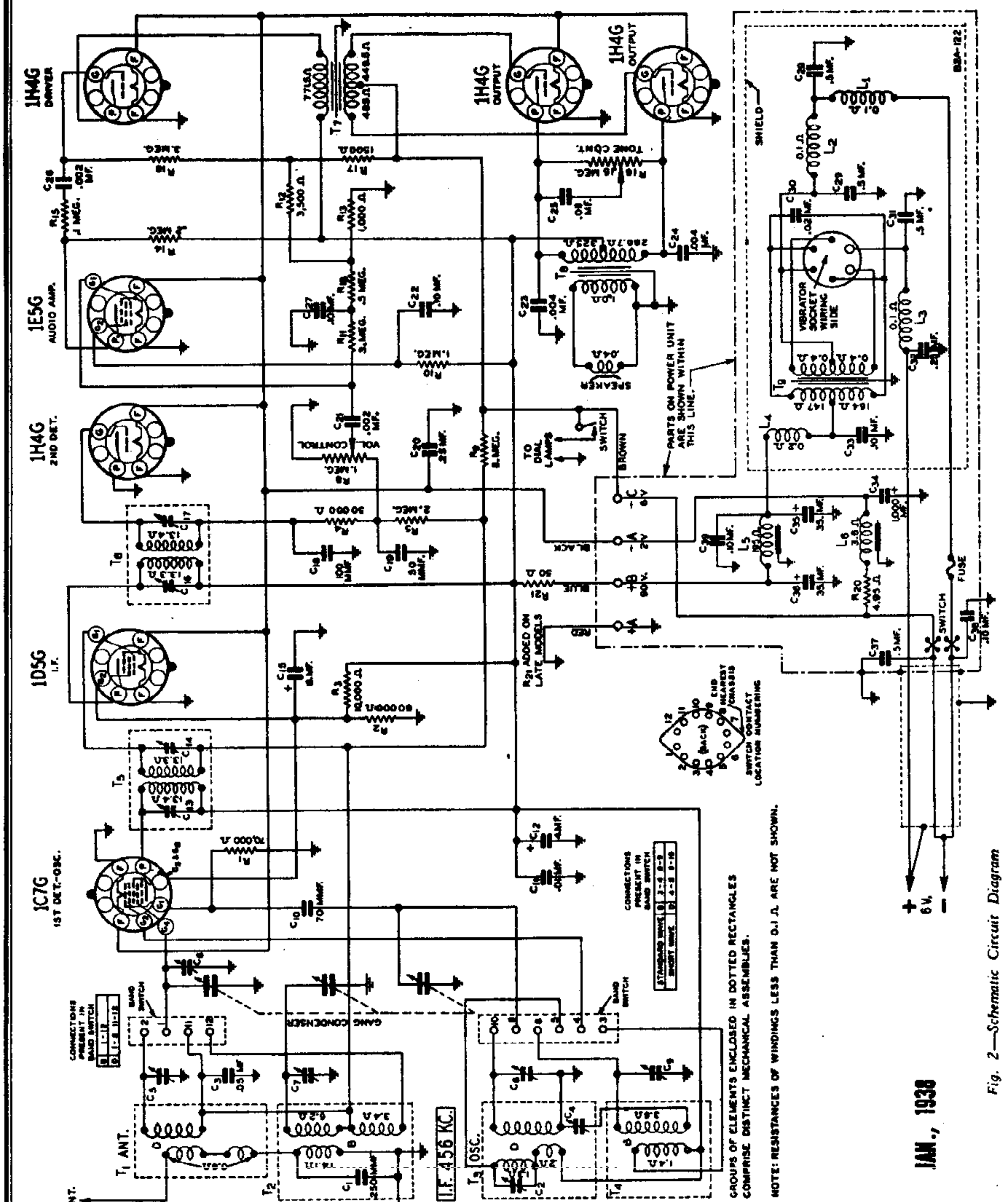


Fig. 2—Schematic Circuit Diagram

Sensitivity

B Range.......13.5 Microvolts Average

D Range.......21.0 Microvolts Average

Tuning Frequency Range

B Range....... 528 to 1730 KC

D Range.......5750 to 18300 KC

Power Consumption - - 1.3 Amperes at 6.3 Volts

Power Output - - - - - 360 Milliwatts Undistorted; 725 Milliwatts Maximum

Selectivity - - 35 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - 6" P.M. Dynamic—Mantel Models; 8" P.M. Dynamic—Console Models

MODEL B2A Series
Alignment, Voltage
Socket, Trimmers, Coils

WELLS-GARDNER & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C13) & (C14) 2nd I.F. (C16) & (C17)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B 1730 KC	Range B	200 mmf.	1730 KC	Antenna Lead	Oscillator Range B (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C6)	Turn Rotor to Max. Output Set indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C4)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
RANGE D 18300 KC	Range D	400 Ohm	18300 KC	Antenna Lead	Oscillator Range D (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
15000 KC	Range D	400 Ohm	15000 KC	Antenna Lead	Ant. Range D (C5)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
6000 KC	Range D	400 Ohm	6000 KC	Antenna Lead	6000 KC (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B

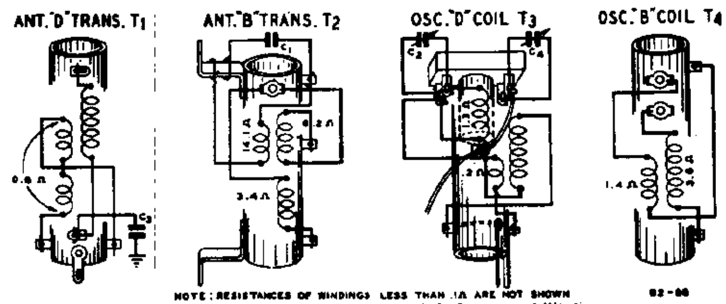


Fig. 6—Coil Terminal Arrangement and D.C. Resistance of Windings

NOTE A—In sets using the finger tip tuning dial, remove the retaining ring which holds the dial scale in position. Readjust rotor to maximum output. Hold the station selector ring and turn the dial scale until the pointer is at the 1500 KC mark. Replace the retaining ring.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

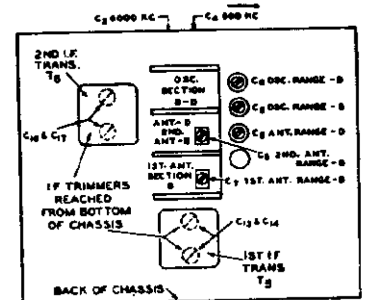


Fig. 3—Location of Trimmers

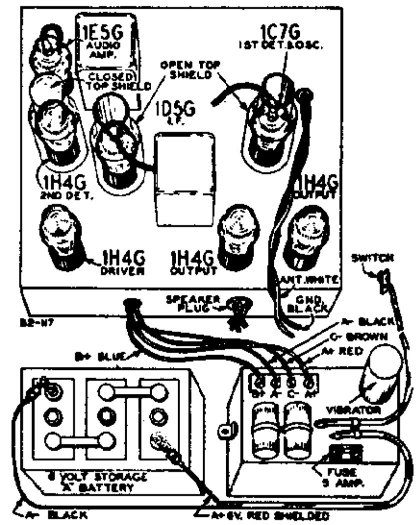


Fig. 5—Tube Arrangement and Battery Connections

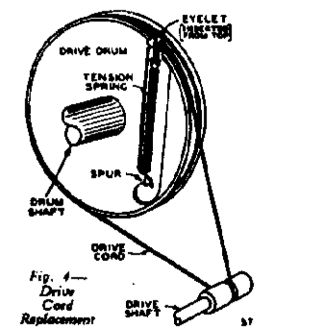


Fig. 4—Drive Cord Replacement

VOLTAGES AT SOCKETS

Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Band Switch in Standard Wave Position

TUBE	FUNCTION	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Control Grid Bias
		VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)						
1C7G	1st Det.—Osc.	0	103	66		103	2	
1D5G	I.F.	0	103	66			2	
1H4G	2nd Det.	0	0				2	
1E5G	Audio Amp.	0	40(1)	19(1)			2	1.0 Across R13
1H4G	Driver	0	100				2	4.5 Across R12 & 13
1H4G	Output	0	102		6		2	6 —C to Ground

(1) As read on 1000 volt scale.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

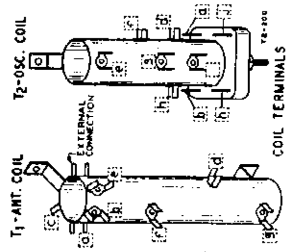
If, after a new 2 section dry electrolytic condenser has been installed, vibrator hash is encountered, reverse the connections of the 2 sections.

WELLS-GARDNER & CO.

MODEL T2 Series
Schematic, Voltage
Socket, Coils, Notes

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - - - - .17 Watts Undistorted
.40 Watts Maximum
Selectivity - - 30 KC Broad at 1000 times Signal
Sensitivity
B Range (Manual Tuning) ....6.0 Microvolts Average
B Range (Automatic Tuning) ....6.0 Microvolts Average
D Range ....6.0 Microvolts Average

Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - - - - - - 8" Dynamic
Tuning Frequency Range
B Range (Manual Tuning)... 528 to 1730 KC (Kilocycles)
D Range (Manual Tuning)... 5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning)........820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning)........650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning)........520 to 980 KC



This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

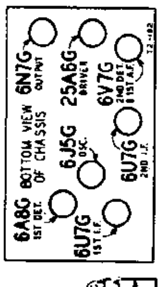
Starting Current

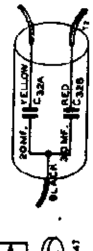
When first turned on, the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

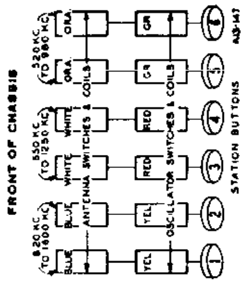
Caution

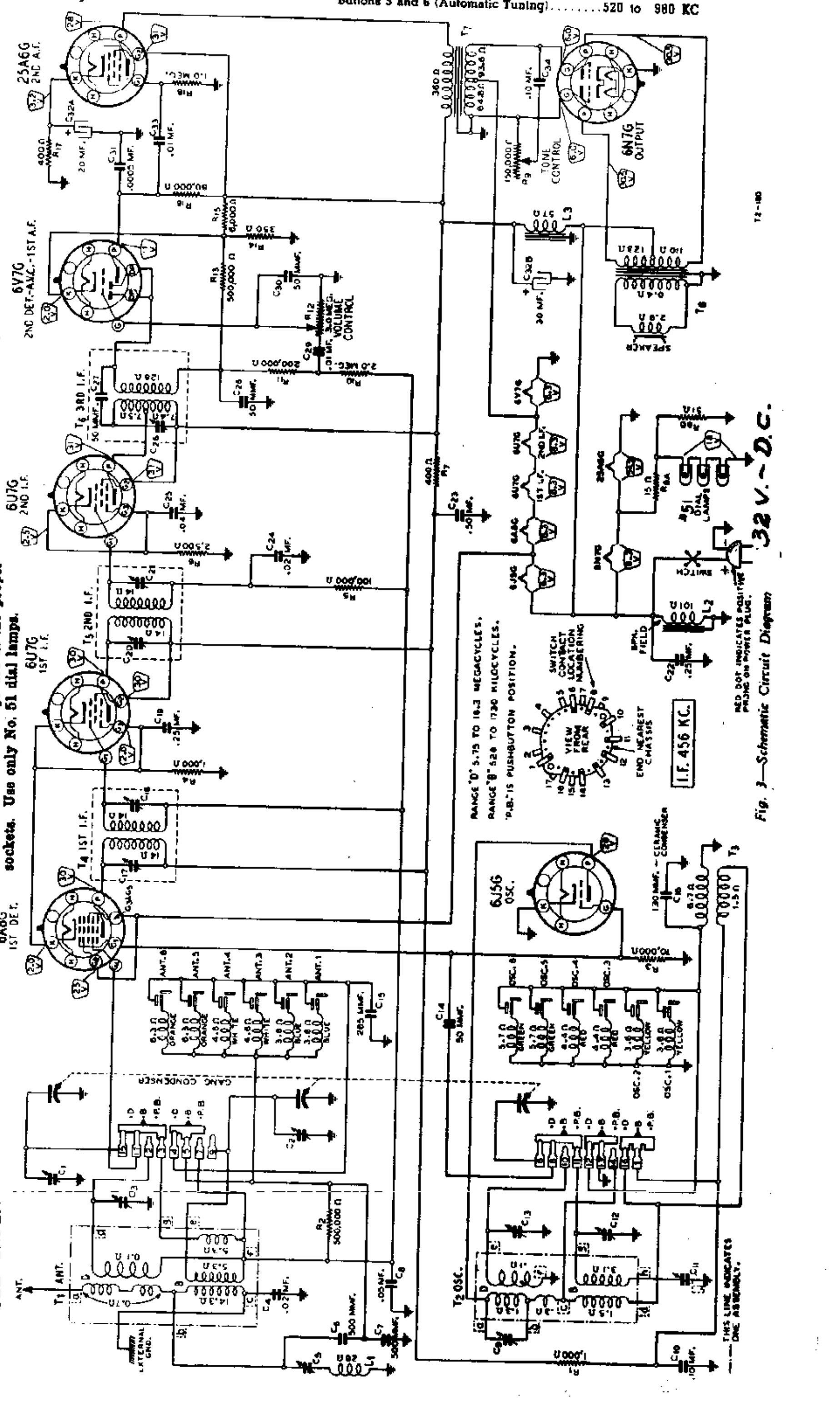
If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.









FOR OTHER DATA
SEE INDEX

Fig. 3—Schematic Circuit Diagram

MODEL T2 Series
Alignment, Trimmers

WELLS-GARDNER & CO.

MODEL A17 Series
Alignment, Trimmers
Coils, Notes

MODEL A17

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C23) & (C24) 1st I.F. (C20) & (C21)
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C6) Rock Rotor—See Note A
RANGE C 5400 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C11)
5000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C7)
RANGE B 1600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1400 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note B	Ant. Range B (C4) Int. Range B (C8)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C13) Rock Rotor—See Note A

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE B—If the pointer is not at 1400 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1400 KC mark, and tighten the clamps.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the top of the chassis base and between two of the 76 tube sockets is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

Tone Control

There are 3 wiring lugs on the tone control. One of the end lugs connects to one end of the tone control resistor. The center lug connects to the slider. The other end lug on the tone control is used for external wiring purposes only and is not connected to the tone control resistor in any way. One side of the tone control condenser and a wire from the B+ line are connected at this lug.

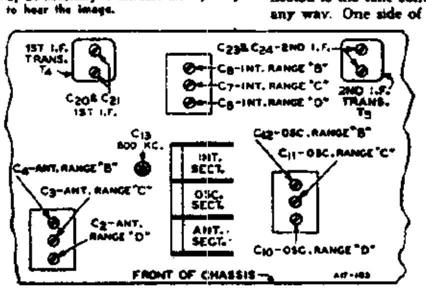
Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

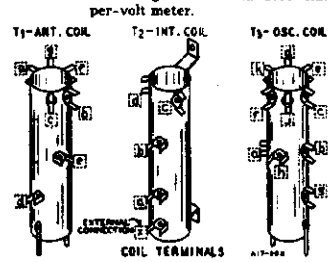
Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.



Location of Trimmers



MODEL T2

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C20) & (C21) 3rd I.F. (C26)
RANGE B 1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	1st Ant. Range B (C2) 2nd Ant. Range B (C1)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C11) Rock Rotor—See Note B
WAVE TRAP 456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C	Wave Trap (C5) Adjust for MINIMUM Output
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C9) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT			BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D
1100 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
650 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

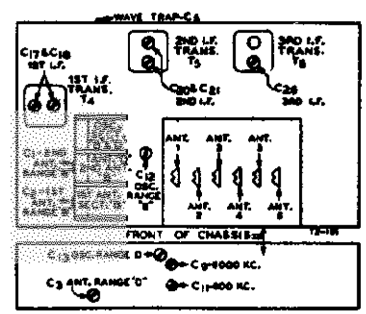
NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

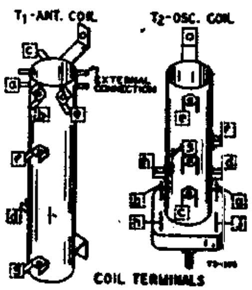


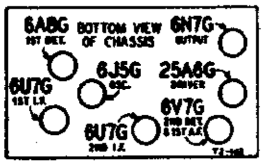
WELLS-GARDNER & CO.

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - - - .17 Watts Undistorted, .40 Watts Maximum
Selectivity - - 30 KC Broad at 1000 times Signal
Sensitivity (For .05 watt output)
B Range .... 6.0 Microvolts Average
D Range .... 6.0 Microvolts Average

Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - 6" or 8" Electro-Dynamic
Tuning Frequency Range
B Range .... 528 to 1730 KC (Kilocycles)
D Range .... 5750 to 18300 KC (Kilocycles)

32 Volt Power Supply





This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Caution

If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.

Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

Starting Current

When first turned on for a few seconds the drain is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

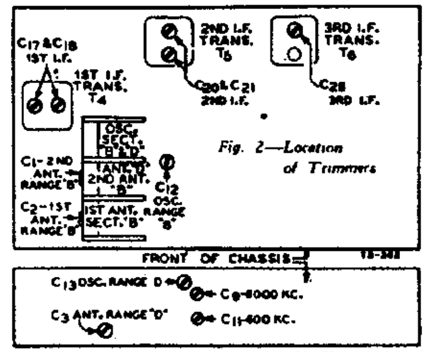


Fig. 2—Location of Trimmers

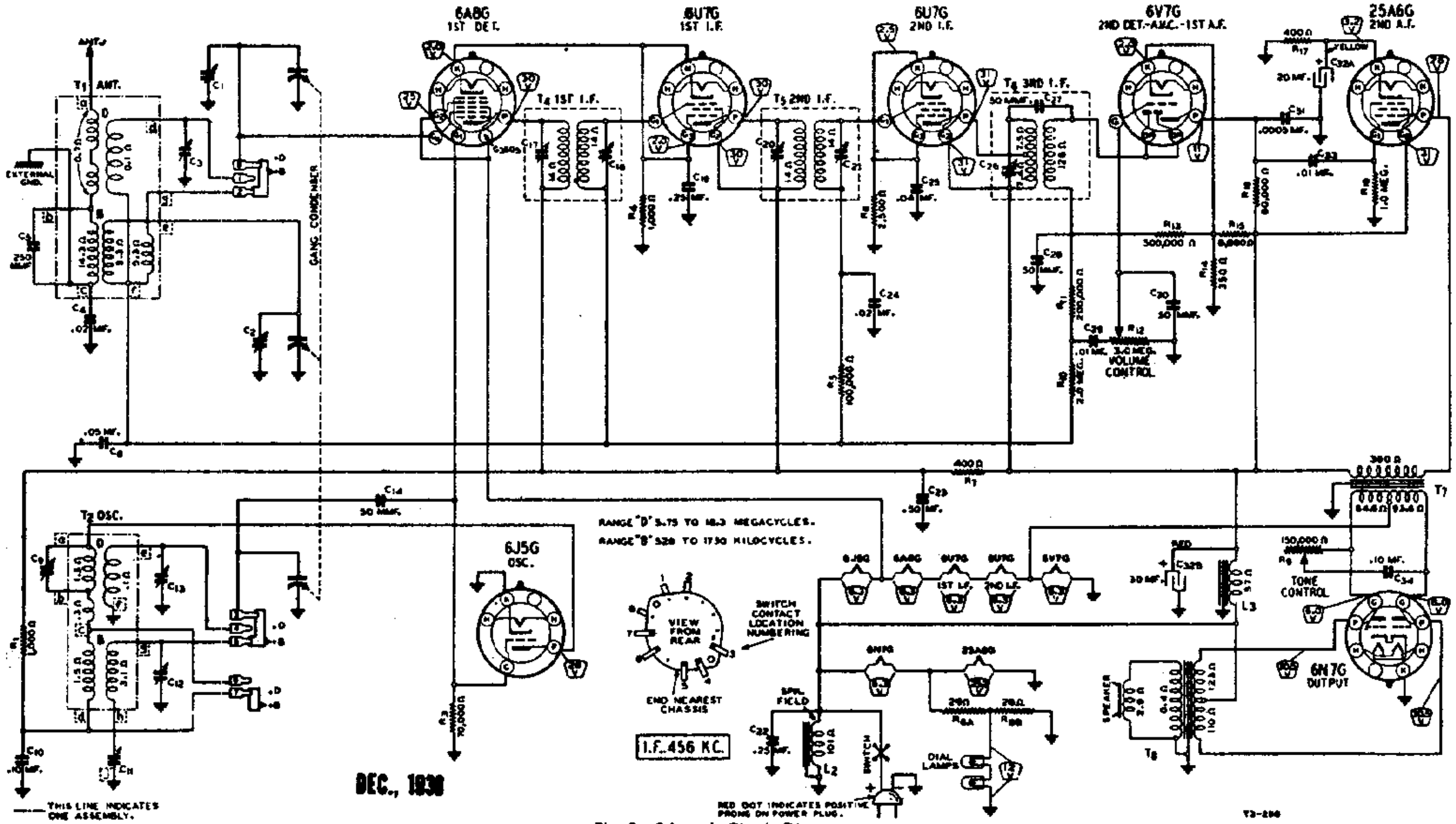


Fig. 3—Schematic Circuit Diagram

MODEL T3 Series
Alignment
Drive Cord Data

WELLS-GARDNER & CO.

MODEL A23 Series
Alignment, Trimmers
Socket, Coils

WG Series T3

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennae—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C20) & (C21) 3rd I.F. (C26)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	1st Ant. Range B (C2) 2nd Ant. Range B (C1)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C11) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C9) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTE A—If the pointer is not at 1500 KC on the dial, hold the drive cord and move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Dial Pointer Attachment—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 49¾ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. Continue cord down to shaft F and wind 4 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

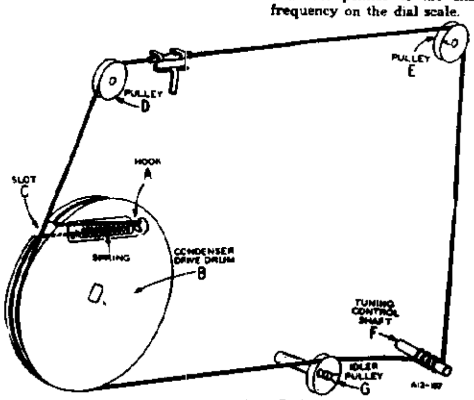
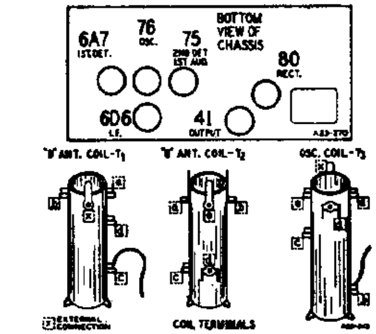


Fig. 4—Drive Cord Replacement

WG Series A23



Tuning Frequency Range
B Range.................. 528 to 1730 KC (Kilocycles)
D Range.................. 5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)
B Range.................. 30 Microvolts Average
D Range.................. 50 Microvolts Average

Power Consumption - - 60 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 1.5 Watts Undistorted, 3.0 Watts Maximum

Selectivity - - 45 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - 6", 8" or 10" Dynamic

For drive cord data, rack and panel assembly, see index.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennae—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B				Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.	
1800 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor until dial pointer is at 1500 KC	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Leave Rotor at above setting	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

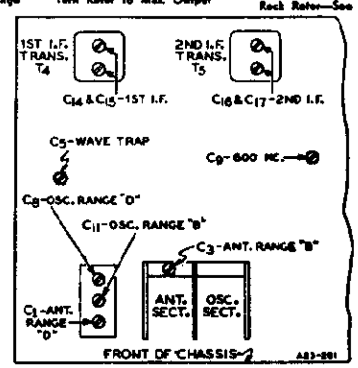


Fig. 2—Location of Trimmers

Schematic, Voltage, Socket
Trimmers, Alignment, Coils

WELLS-GARDNER & CO.

MODELS B3 Series (Portable)
B4 Series (Table Models)

Input Voltages and Currents

"A" Battery .... 1.5 Volts—.30 Amperes
"B" Battery .... 90 Volts—12 to 15 Ma.

Power Output - - - 140 Milliwatts Undistorted

Selectivity - - 41 KC Broad at 1000 Times Signal

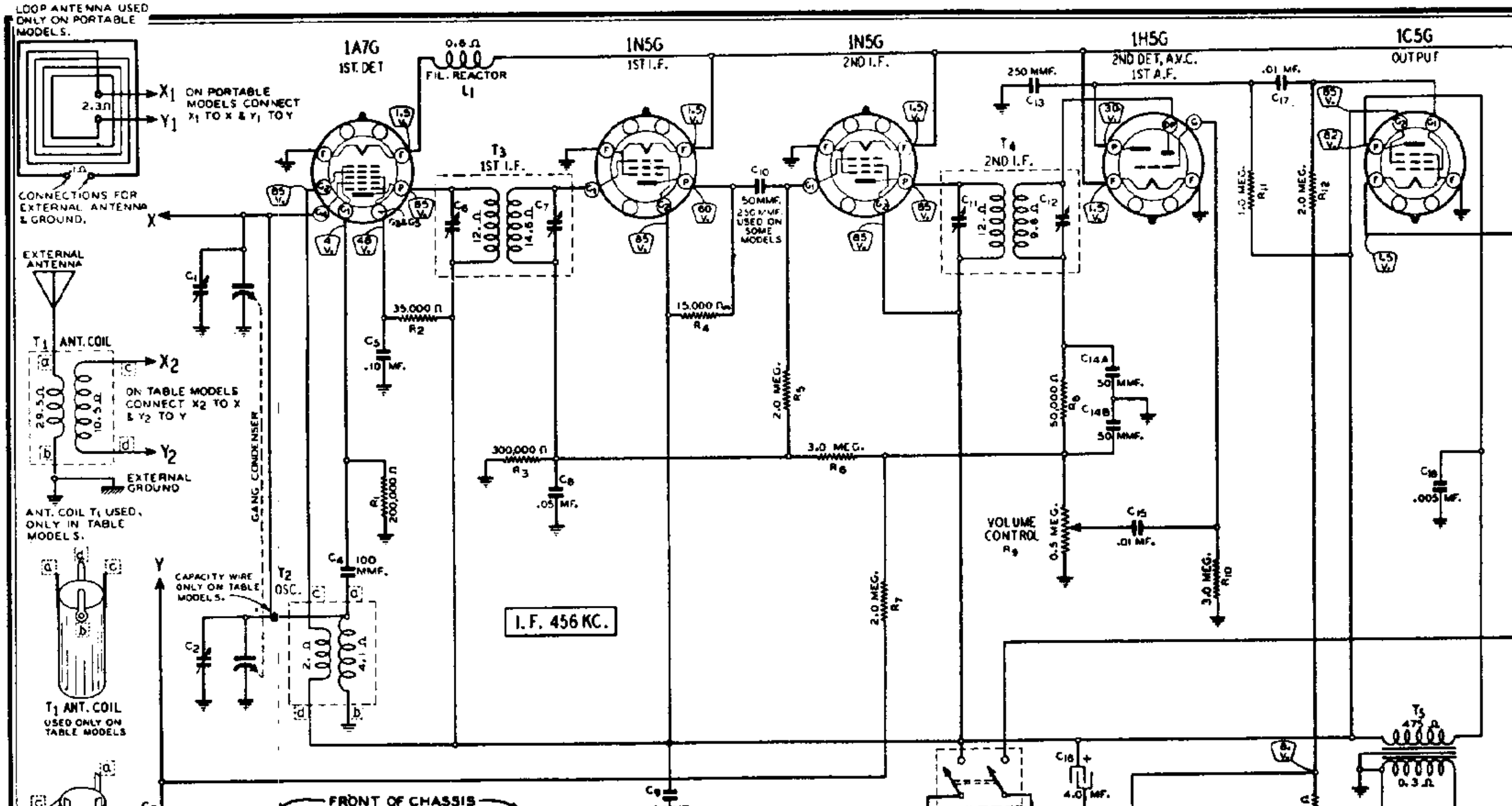
Intermediate Frequency - - - - - - 456 KC.

Speaker - - - - - - - - 6" P.M. Dynamic

Tuning Frequency Range - - - 540 to 1600 KC.

Sensitivity (For .05 Watt Output)

Table Model .... 10.5 Microvolts Average
Portable Model .... 20 Microvolts Per Meter Average



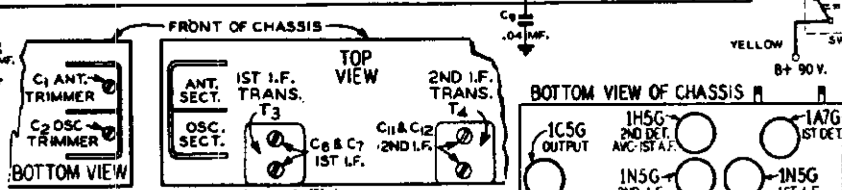


Fig. 3—Location of Trimmers

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Fig. 3)
456 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C11) & (C12)
1600 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
TABLE MODEL ONLY				
1500 KC	Antenna Lead	200 mmf.	Turn rotor to max. output	Antenna (C1)
PORTABLE MODEL ONLY				
1500 KC	None—See Note		Turn rotor to max. output	Antenna (C1)

JAN., 1939

Dummy Antennas—.1 mf. and 200 mmf.

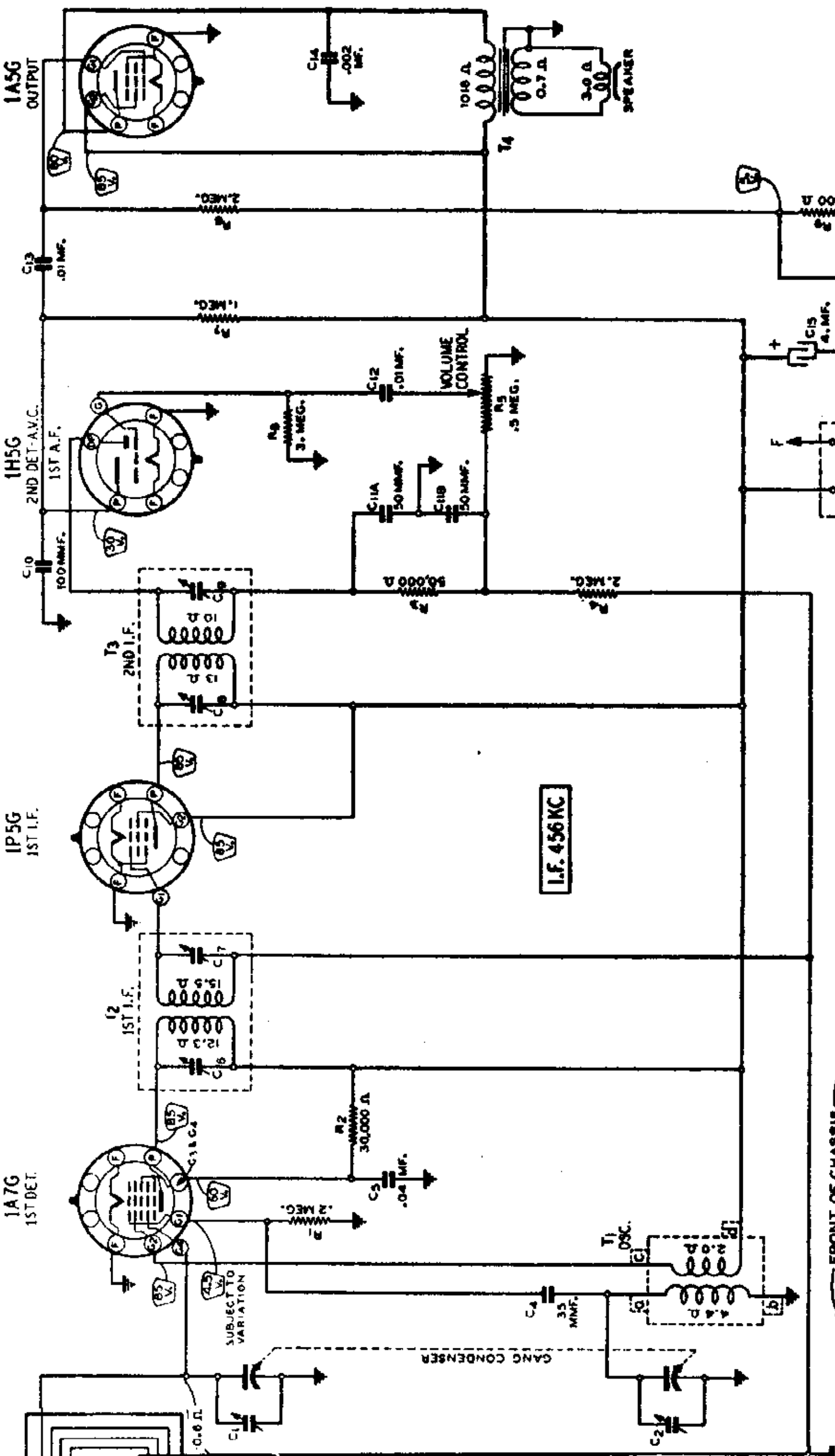
NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Connections for the output meter may be made through the opening for the outside antenna and ground connecting posts. This opening is at the bottom of the cabinet near the back. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

MODEL 4B5 Series
Schematic, Voltage

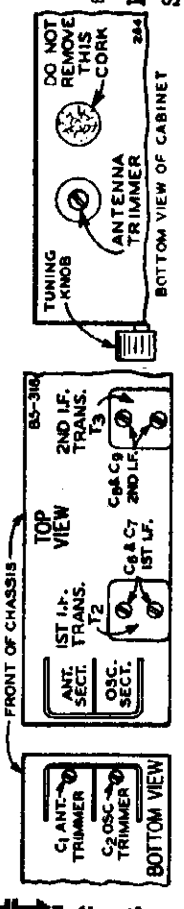
WELLS-GARDNER & CO.

Socket, Trimmers
Alignment



Power Output - - - 70 Milliwatts Undistorted

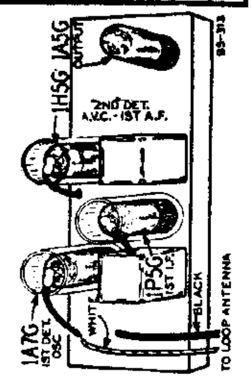
Selectivity - 41 KC Broad at 1000 Times Signal



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several minutes.

Signal Generator Frequency Setting	Signal Generator Connection at Radio	Dummy Antenna	Condenser Setting	Adjust Trimmers to Maximum (See Trimmer Illustration)
456 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C8) & (C9)
1600 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
1500 KC	None—See Note		Turn rotor to max. output	Antenna (C1)



CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

CALIBRATION (For model with pointer in back of celluloid dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. IF THE POINTER IS AT A HIGHER KC MARK THAN 800 KC, grasp the drive cord below the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord down until the pointer is at the 800 KC mark. IF THE POINTER IS AT A LOWER KC MARK THAN 800 KC, grasp the drive cord above the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord up until the pointer is at the 800 KC mark.

Adjusting Antenna Trimmer

After the batteries are installed and the back of the cabinet is in place, adjust the antenna trimmer.

Accurately tune in a weak station signal between 1400 and 1500 KC on the dial. With a screwdriver turn the adjusting screw of the antenna trimmer up or down until maximum output is obtained. This trimmer is reached through an opening in the bottom of the cabinet—see illustration. CAUTION: Do not remove the cork from the other opening at the bottom of the cabinet.

Socket, Trimmers
Alignment

WELLS-GARDNER & CO.

MODEL 5C10 Series
Schematic, Voltage

Power Consumption - **6.25 Amperes at 6.3 Volts**

Power Output - - - - - **1.5 Watts Undistorted**

Sensitivity - - **1.5 Microvolts at .5 Watt Output**

Selectivity - **42 KC Broad at 1000 Times Signal**

Tuning Frequency Range - - - **540 to 1560 KC**

Intermediate Frequency - - - - - - **456 KC**

Speaker - - - - - - - **6" Electro-Dynamic**

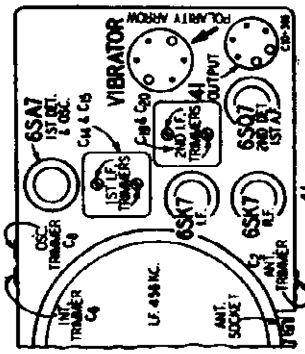
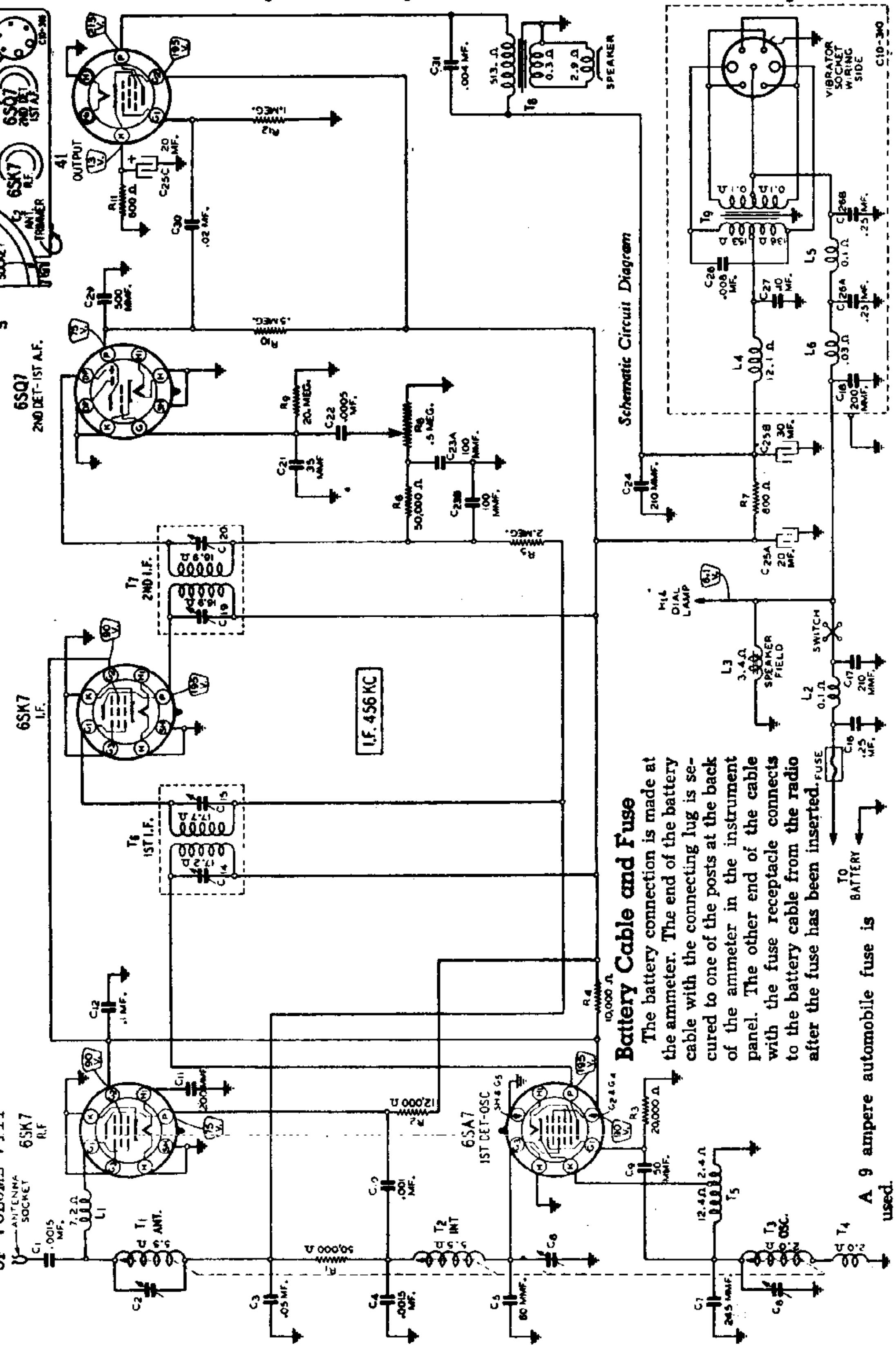


Fig. 2—Tube and Vibrator Location



FOR SETTING PUSH BUTTONS, SEE INDEX.

IF ALIGNMENT
Adjust at 456 KC through 0.05 mfd. condenser.

BC ALIGNMENT
Adjust oscillator trimmer C8 at 1560 KC.
Adjust C6 and C2 trimmers at 1000 KC.

FOR CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION OF VOLUME VIII

Battery Cable and Fuse

The battery connection is made at the ammeter. The end of the battery cable with the connecting lug is secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the cable with the fuse receptacle connects to the battery cable from the radio after the fuse has been inserted.

A 9 ampere automobile fuse is used.

MODELS C5,6CH5 Series
Schematic,Socket,Trimmers
Alignment

Alignment and Calibration

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Connect the ground lead of the signal generator to the chassis. The chassis should be in the case. Set the volume control at maximum and the L-D switch in the distance position. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC. Then adjust the three I.F. trimmers until maximum output is obtained - See Fig. 2.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Carefully turn the rotor of the tuning condenser until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

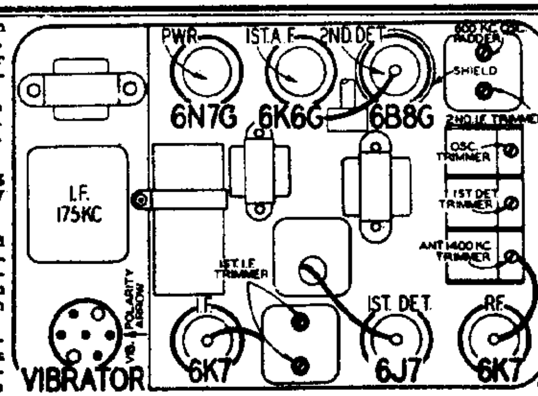
Set the signal generator for 600 KC. Connect the output through a .05 mf. condenser to the control grid of the 6K7 R. F. tube. Rock the tuning condenser rotor and adjust the 600 KC oscillator padder (See Fig. 2) until the peak of greatest intensity is obtained.

Leave the signal generator set for 600 KC and re-connect the output to the shielded antenna lead through a 120 mmf. condenser. Adjust the 600 KC antenna trimmer to maximum. (This trimmer is reached from outside of the case - See Fig. 1.)

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

__Adjusting Antenna 600 KC Trimmer__ - After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained.

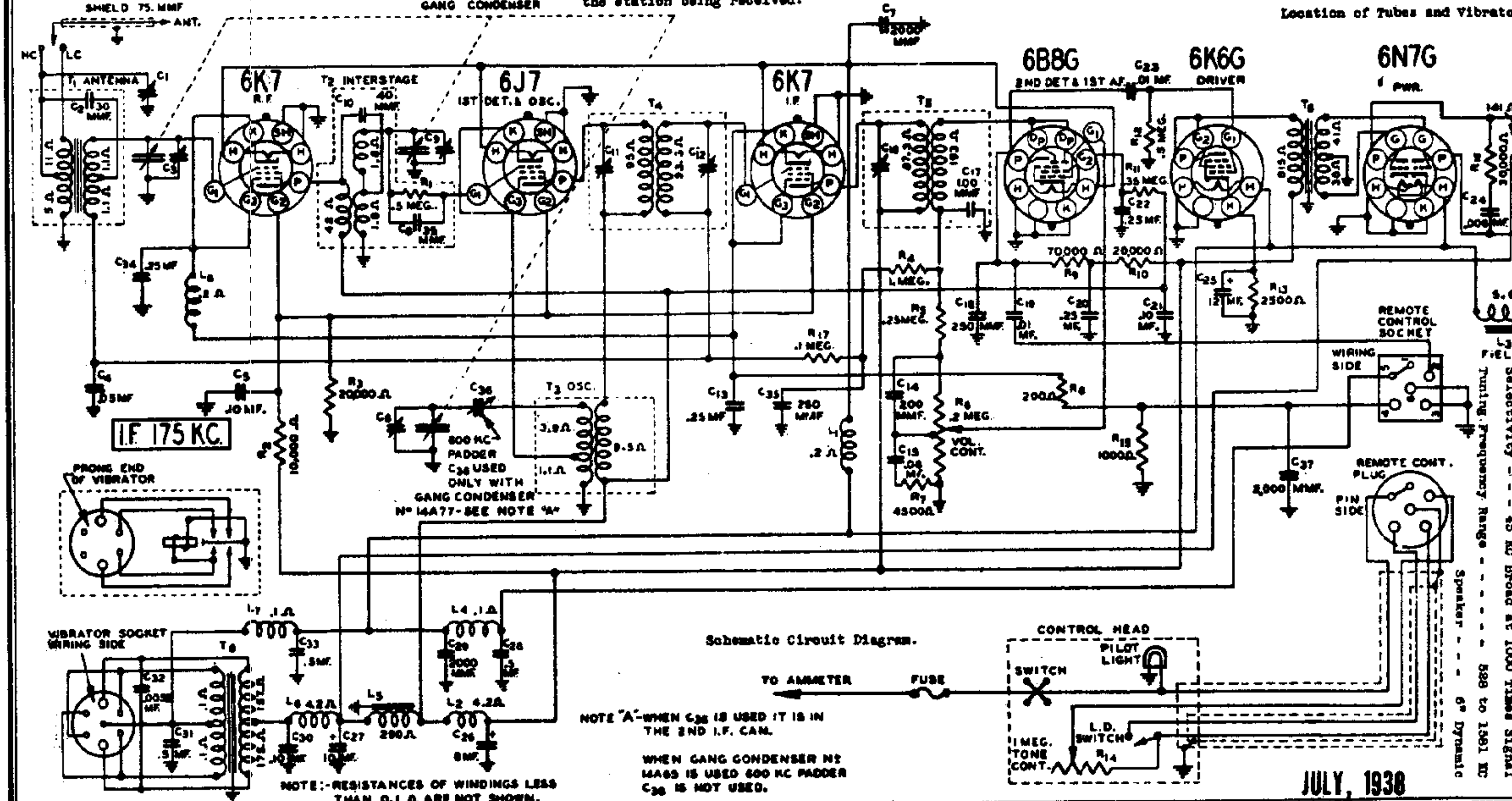
__Calibrating the Radio__ - To calibrate the radio, tune in a station of known frequency. Remove the dial lamp assembly from the back of the dial unit. The calibration screw is at the bottom of the dial lamp tube. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw so that the POINTER travels in a clockwise direction until it is at the frequency of the station being received.



Location of Tubes and Vibrator.

WELLS-GARDNER & CO.

Power Consumption - - - 8.25 Amperes at 6.3 Volts
Power Output - - - - - - - - - 6 Watts Undistorted
Sensitivity - - - 0.8 Microvolt at 1 Watt Output
Selectivity - - - 45 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - - - - 528 to 1581 KC
Speaker - - - 6" Dynamic



Schematic Circuit Diagram.

JULY, 1938

C5-178

MODEL 6C9 Series
Schematic, Voltage
Socket, Trimmers

WELLS-GARDNER & CO.

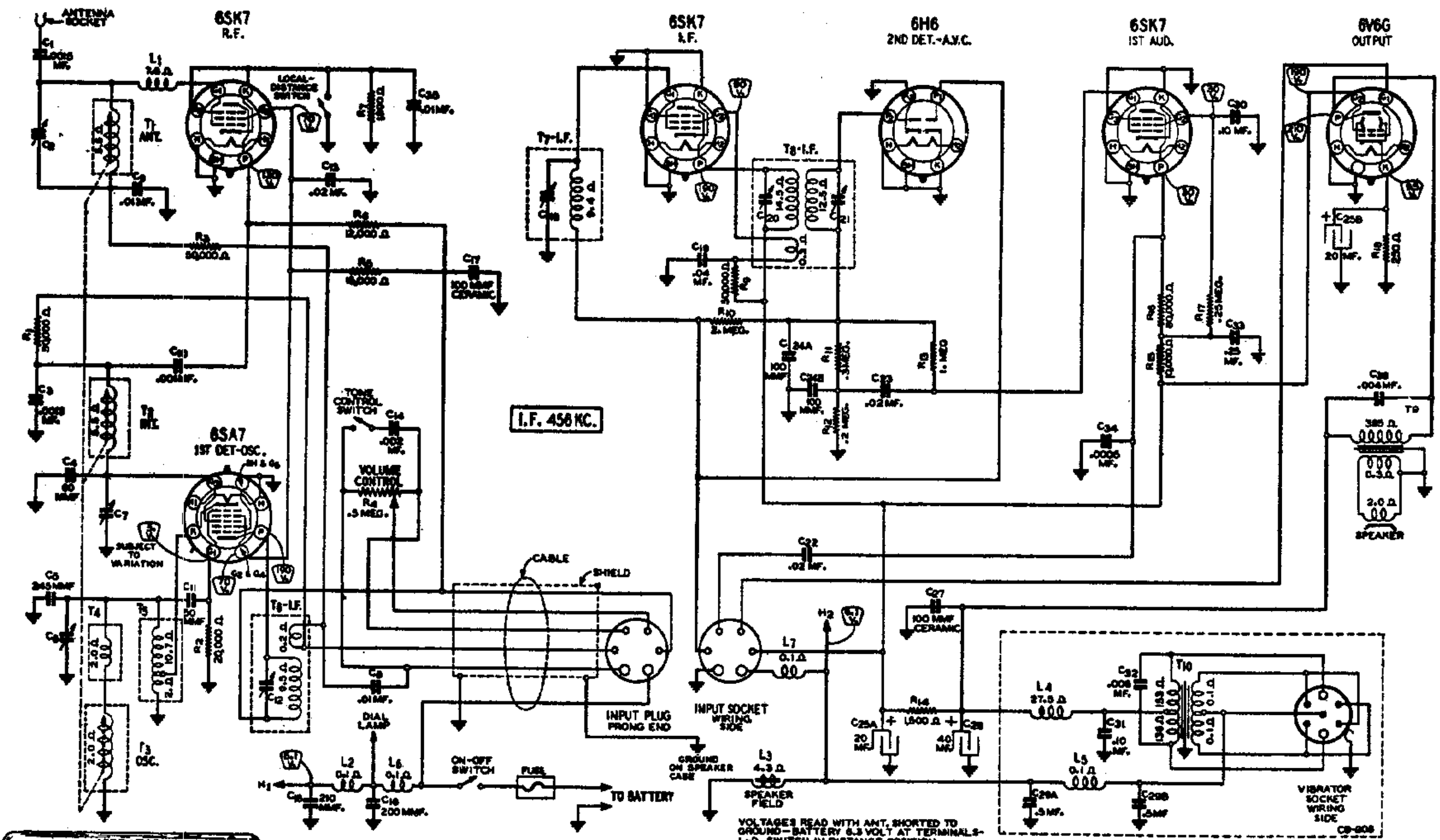


Fig. 5—Schematic Circuit Diagram

Power Consumption	6.8 Amperes at 6.3 Volts
Power Output	3 Watts Undistorted
Sensitivity	1.5 Microvolts at .5 Watt Output (L-D Switch in Distance Position)
Selectivity	39 KC Broad at 1000 Times Signal
Tuning Frequency Range	540 to 1560 KC
Intermediate Frequency	456 KC
Speaker	6" Electro-Dynamic

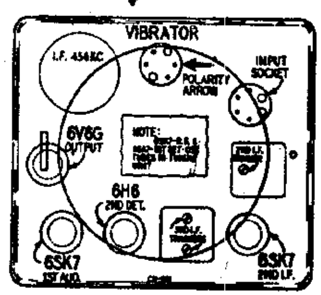


Fig. 2—Tube and Vibrator Location

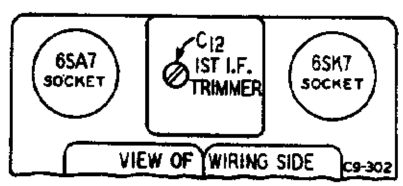


Fig. 6—Location of 1st I.F. Trimmer in Tuning Unit

MODEL 6C9 Series
Alignment, Tuner
MODEL 5C10 Series
Tuner Data

WELLS-GARDNER & CO.

Procedure for Setting the Station Buttons

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you can receive.

Make a list of your favorite stations, those which you tune in regularly.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Depress the manual tuning button AND KEEP IT DEPRESSED DURING THE ENTIRE SETTING OPERATION AS DESCRIBED BELOW. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

UNLOCK THE TUNING MECHANISM by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counter-clockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the first (left hand) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

TURN THE MANUAL TUNING KNOB CAREFULLY BACK AND FORTH UNTIL THE ABOVE MENTIONED STATION IS ACCURATELY TUNED IN TO THE LOUDEST POINT. This station is now set on button No. 1.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Next KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the second station button FIRMLY AND GENTLY. Then proceed to set the second station on your list in the same manner as described above.

Then continue to set any additional stations on your list on the remaining buttons.

After all desired stations have been set, release any station button which is depressed as follows: KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push in the OFF button a slight amount—only enough to release any station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial, until the stop is reached.

NOW LOCK THE TUNING MECHANISM by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening and turning the locking screw in a clockwise direction until it is tight.

Insert a celluloid reinforcement tab half-way in the slot at the front of station button No. 1—See Fig. 3.

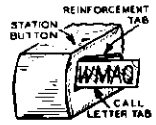


Fig. 3—Inserting Station Tab

Remove the correct station call letter tab for button No. 1 from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure outlined above. Changing the setting of one button will not affect the setting of the others.

Alignment Procedure

Remove grille and speaker from speaker unit.

Remove the chassis from tuning unit case in accordance with the article under "General Installation Items" in this manual.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6SA7 1st detector tube (prong No. 8). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control at maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC.

Then adjust the 4 I.F. trimmers **until maximum output is obtained. Three of the trimmers are in the speaker unit—See Fig. 2. One trimmer is at the top of the tuning unit—See Fig. 6.**

Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 25 mmf., use a 35 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Set the signal generator for 1560 KC. Turn the tuning knob until the iron cores are as far out of the tuning coils as they will go. Then adjust the oscillator trimmer C6 (Fig. 1) until maximum output is obtained.

Set the signal generator for 1000 KC. Turn the tuning knob until **maximum output is obtained. Adjust interstage trimmer C7 and antenna trimmer C2 for maximum output—See Fig. 1.**

Reassemble the radio and install it in the automobile. Insert the car antenna cable. Tune in a weak signal near 1000 KC and readjust the antenna trimmer C2 for maximum output.

Calibration—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—See article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 KC. Loosen the set screw of the large gear that drives the dial drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

Antenna

A shielded antenna cable with bayonet connector plug is required.

The plug on the antenna cable is inserted in the socket at the bottom of the tuning unit case as shown in Fig. 1. The wire at the other end of the cable is connected to the antenna.

LOW CAPACITY ANTENNA

This radio is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 35 to 60 mmf.

Types of Low Capacity Antennas—Door hinge; fishpole; over-the-roof types which are mounted quite a distance from the metal roof of the car.

The antenna should be mounted on the same side of the car as the tuning unit.

HIGH CAPACITY ANTENNA

If this radio is to be installed with a high capacity car antenna (200 mmf. total capacity of antenna and shielded cable) an adapter must be used. The adapter is inserted in the socket at the bottom of the tuning unit case. Then the antenna plug is inserted in the adapter.

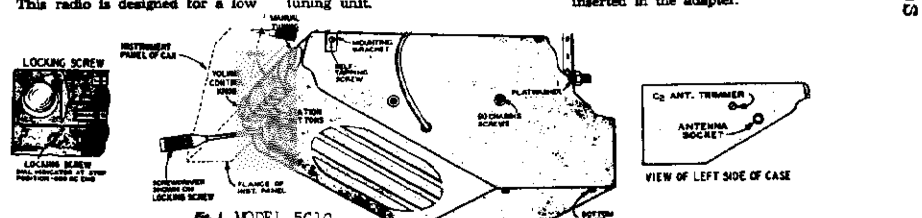


Fig. 1 MODEL 5C10

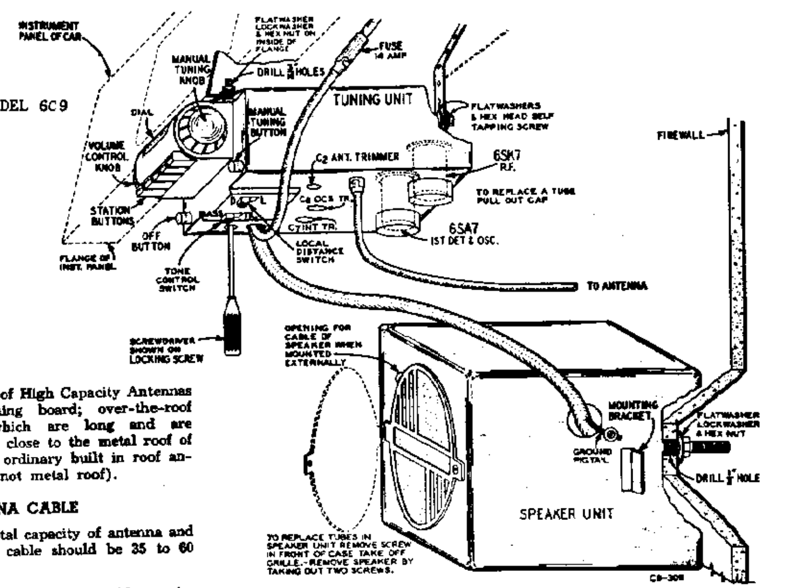


Fig. 1—Details of Mounting Tuning and Speaker Units

Types of High Capacity Antennas — Running board; over-the-roof types which are long and are mounted close to the metal roof of the car; ordinary built in roof antennas (not metal roof).

ANTENNA CABLE

The total capacity of antenna and shielded cable should be 35 to 60 mmf.

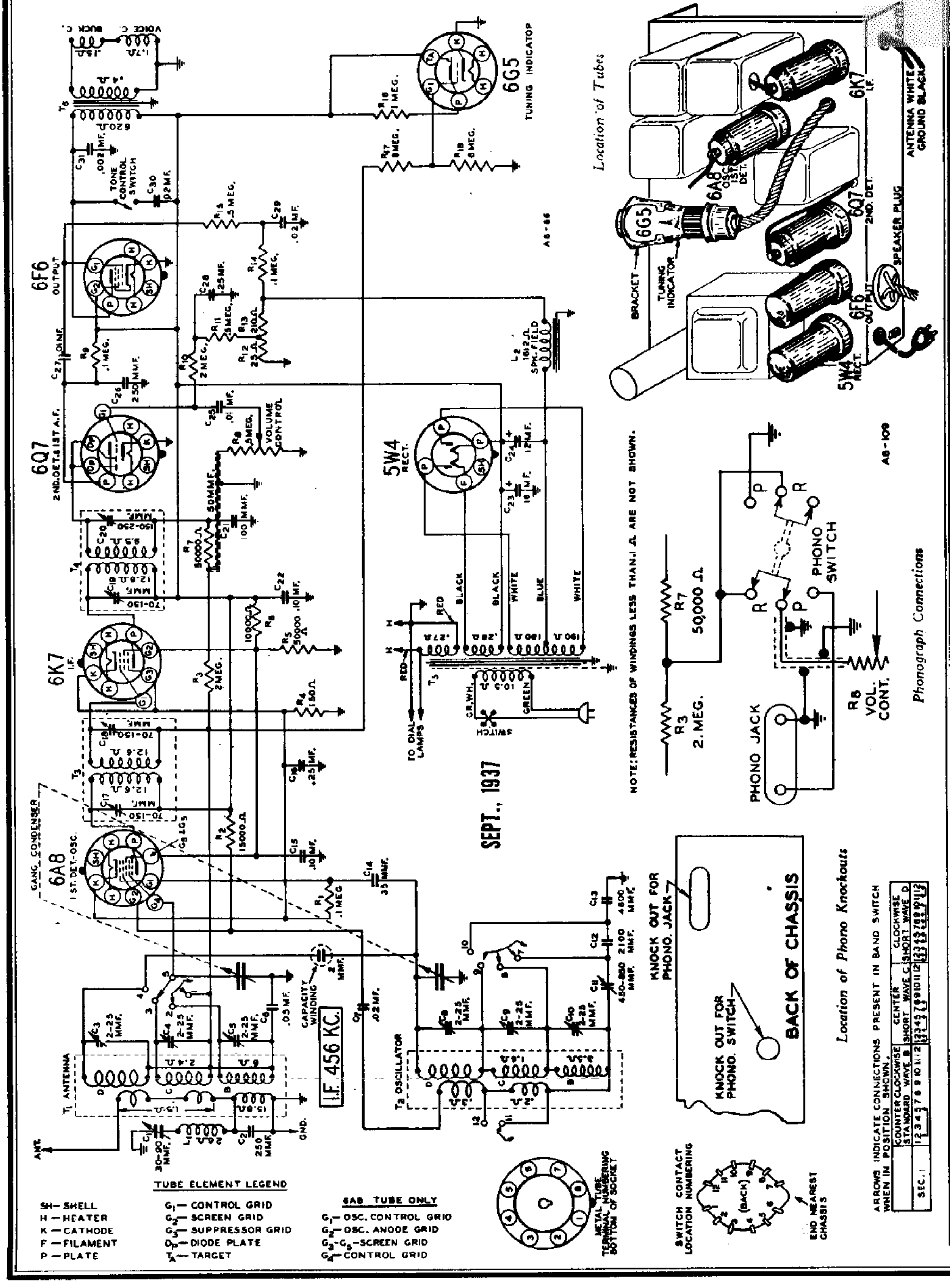
Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end, otherwise ignition noise may be picked up. The length of the pigtail from the grounding point to the end of the antenna cable should be kept as short as possible, preferably not over one inch.

For the door hinge and over-the-roof type antennas, the antenna lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the outside. In the case of a running board antenna, the antenna lead shielding must extend all the way to the antenna.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

WELLS-GARDNER & CO.

MODEL A8 Series
Schematic, Socket
Phono. Data



MODEL A8 Series
Alignment, Trimmers
Voltage, Parts

WELLS-GARDNER & CO.

VOLTAGES AT SOCKETS

Line Voltage: 115 — Volume Control: Maximum — Antenna Shorted to Ground

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
6A8	1st Det.-Osc.	0	6.3(1)	200	110		160	6.3(1)	3
6K7	I.F.	0	6.3(1)	200	110	3		6.3(1)	3
6Q7	2nd Det.	0	6.3(1)	110	0	0		6.3(1)	0(2)
6F6	Output	0	6.3(1)	185	200	12.5(3)		6.3(1)	0
5W4	Rectifier	0	5.1(4)		620(5)		620(5)		5.1(4)
6G5	Tuning Indicator	Plate to Ground 18		Target to Ground 200		Cathode to Ground 0		Across Heater 6.3 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

6 Tube - 3 Band - All-Wave Radio

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C17) & (C18)	Turn Rotor to Full Open	Adjust to Maximum Output
I.F. Wave Trap	Range B	200 mmf.	456 KC	Antenna Lead	I.F. Wave Trap (C1)	Turn Rotor to Full Open	Adjust to Minimum Output
RANGE D							
18,300 KC	Range D	400 Ohm	18,300 KC	Antenna Lead	Oscillator Range D (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
15,000 KC	Range D	400 Ohm	15,000 KC	Antenna Lead	Antenna Range D (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
5800 KC	Range C	400 Ohm	5800 KC	Antenna Lead	Oscillator Range C (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
5000 KC	Range C	400 Ohm	5000 KC	Antenna Lead	Antenna Range C (C4)	Turn Rotor to Max. Output	Adjust to Maximum Output
RANGE B							
1730 KC	Range B	200 mmf.	1730 KC	Antenna Lead	Oscillator Range B (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C5)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

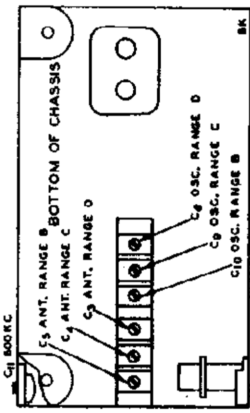
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

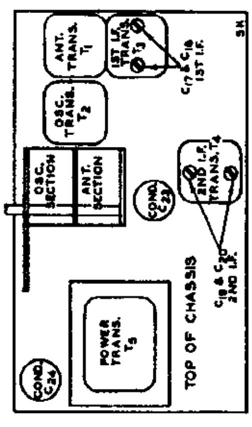
After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.





Series A8 — Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
[illegible]	C6	.05 mf.	100	$0.15
[illegible]	C7	.02 mf.	200	.16
[illegible]	C15	.10 mf.	100	.15
[illegible]	C16	.1 mf.	100	.15
[illegible]	C22	.1 mf.	200	.20
[illegible]	C25	.01 mf.	200	.15
[illegible]	C27	.01 mf.	200	.15
[illegible]	C28	.25 mf.	100	.15
[illegible]	C29	.05 mf.	400	.15
[illegible]	C30	.05 mf.	600	.15
[illegible]	C31	.002 mf.	600	.15

MOLDED

Part No.	Code	Capacitance	List Price
[illegible]	C2	250 mmf.	.15
[illegible]	C12	2100 mmf.	.25
[illegible]	C13	400 mmf.	.15
[illegible]	C14	25 mmf.	.15
[illegible]	C21	100 mmf.	.15
[illegible]	C26	250 mmf.	.15

ELECTROLYTIC

Part No.	Code	Description	List Price
[illegible]	C23	16 mf. 200 Wet	.75
[illegible]	C24	12 mf. 300 Wet	.80

TRIMMERS

Part No.	Code	Description	List Price
17A64	C1	30-90 mmf. Wave Trap Trimmer	.25
17A59	C3, C4, C5, C8, C9, C10	2-25 mmf. Range "D" Antenna Trimmer; 2-25 mmf. Range "C" Antenna Trimmer; 2-25 mmf. Range "B" Antenna Trimmer; 2-25 mmf. Range "D" Oscillator Trimmer; 2-25 mmf. Range "C" Oscillator Trimmer; 2-25 mmf. Range "B" Oscillator Trimmer	.40
17A60	C11	450-850 mmf. 600 KC Trimmer	.45
17A33	C17, C18	70-150 mmf. 1st I.F. Trimmers	.40
17A34	C19, C20	150-250 mmf. 2nd I.F. Trimmers	.40

MISCELLANEOUS

Part No.	Description	List Price
14A61	2 Gang Condenser less Dial and Drive Assembly	2.10

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
[illegible]	R1	100,000 Ohm	0.2	$0.15
[illegible]	R2	15,000 Ohm	0.5	.10
[illegible]	R3	2 Megohm	0.2	.10
[illegible]	R4	150 Ohm	0.2	.15
[illegible]	R5	50,000 Ohm	0.5	.10
[illegible]	R6	10,000 Ohm	1.0	.15
[illegible]	R7	50,000 Ohm	0.2	.15
[illegible]	R9	100,000 Ohm	0.2	.10
[illegible]	R10	2 Megohm	0.2	.10
[illegible]	R11	500,000 Ohm	0.2	.10
[illegible]	R14	100,000 Ohm	0.2	.15
[illegible]	R15	500,000 Ohm	0.2	.15
[illegible]	R16	1 Megohm	0.2	.10
[illegible]	R17	8 Megohm	0.2	.10
[illegible]	R18	8 Megohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
[illegible]	R12, R13	25 Ohm; 210 Ohm	.25; 2.0	.30

VARIABLE

Part No.	Code	Description	List Price
[illegible]	R8	0.5 Megohm Volume Control and On-Off Switch	1.00

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
P-2A31	Phono Switch (Double Pole Double Throw Switch)	.40
P-3A12	Phono Jack	.16
P-18A36	Switch Knob	.10

SPEAKERS

Part No.	Description	List Price
[illegible]	6" Dynamic Speaker Compl. with Output Transformer (T6)	5.50
[illegible]	8" Dynamic Speaker Compl. with Output Transformer (T6)	6.35
[illegible]	10" Dynamic Speaker Compl. with Output Transformer (T6)	6.85

KNOBS

Specify Name of Knob and Name and Model of Radio

Description	List Price
Tuning Control — Set Screw Type	.15
Volume Control — Push-On Type	.20
Band Switch — Push-On Type	.20

GENERAL

Part No.	Description	List Price
[illegible]	Felt Washer (Used behind knobs) ...doz.	.10
[illegible]	Rubber Chassis Mounting Cushion ...ea.	.10
[illegible]	Band Change Switch	.85
[illegible]	Tone Control Switch	.35
[illegible]	Grid Clip Only ...doz.	.10
4A80	Terminal Strip (2 lugs insulated with mounting hole in center)	.10
4A49	Terminal Strip—Single Lug Insulated (With Mounting Hole at One End)	.10
[illegible]	Clamp Bracket for Tuning Eye Tube	.10
[illegible]	Line Cord and Plug	.30
[illegible]	Antenna and Ground Lead Assembly	.10
[illegible]	Chassis Mounting Foot ...ea.	.05
[illegible]	Gang Condenser Mounting Cushion Assembly. Includes 3—Rubber Cushions, 3—Hex. Shoulder Nuts, 3—Hex. & Flat Washers	.15

DIAL AND DRIVE ASSEMBLY

Part No.	Description	List Price
11A132	Dial Assembly complete with Gang Condenser, less Dial Lamps and Dial Lamp Sockets	4.40
15A139	Dial Scale and Bracket Assembly	.85
25X422	Bracket only for Dial Scale	.05
[illegible]	Celluloid Dial Scale only	.30
15X117	Pointer	.15
	Dial Lamp—No. 51 Mazda	.15
7A60	Dial Lamp Socket	.10
4X219	Dial Crystal and Escutcheon Assembly	1.00
25X426	Dial Support Bracket ("L" Shaped)	.10
25X427	Bracket and Bushing for Drive Shaft	.10
26X204	Drive Shaft only	.10
19X21	Horseshoe Washers for above Shaft ...Doz.	.10
24X317	Drive Drum and Pointer Shaft	.30
	20" Drive Cord for Tuning Condenser ...Doz.	.30
[illegible]	Tension Spring for Drive Cord ...Doz.	.30

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A692	T1	Antenna Transformer and Can Assembly	$2.20
9A693	T2	Oscillator Coil and Can Assembly	1.90
9A694	T3	1st I.F. Transformer and Can Assembly	1.50
9A695	T4	2nd I.F. Transformer and Can Assembly	1.45
[illegible]	T5	115 Volt, 60 Cycle Power Transformer	3.70
[illegible]	T5	115-230 Volt, 40-60 Cycle Power Transformer	4.70
[illegible]	T6	Output Transformer (Part of Speaker Assembly)	2.45
9A714	L1	Wave Trap (456 KC)	.65

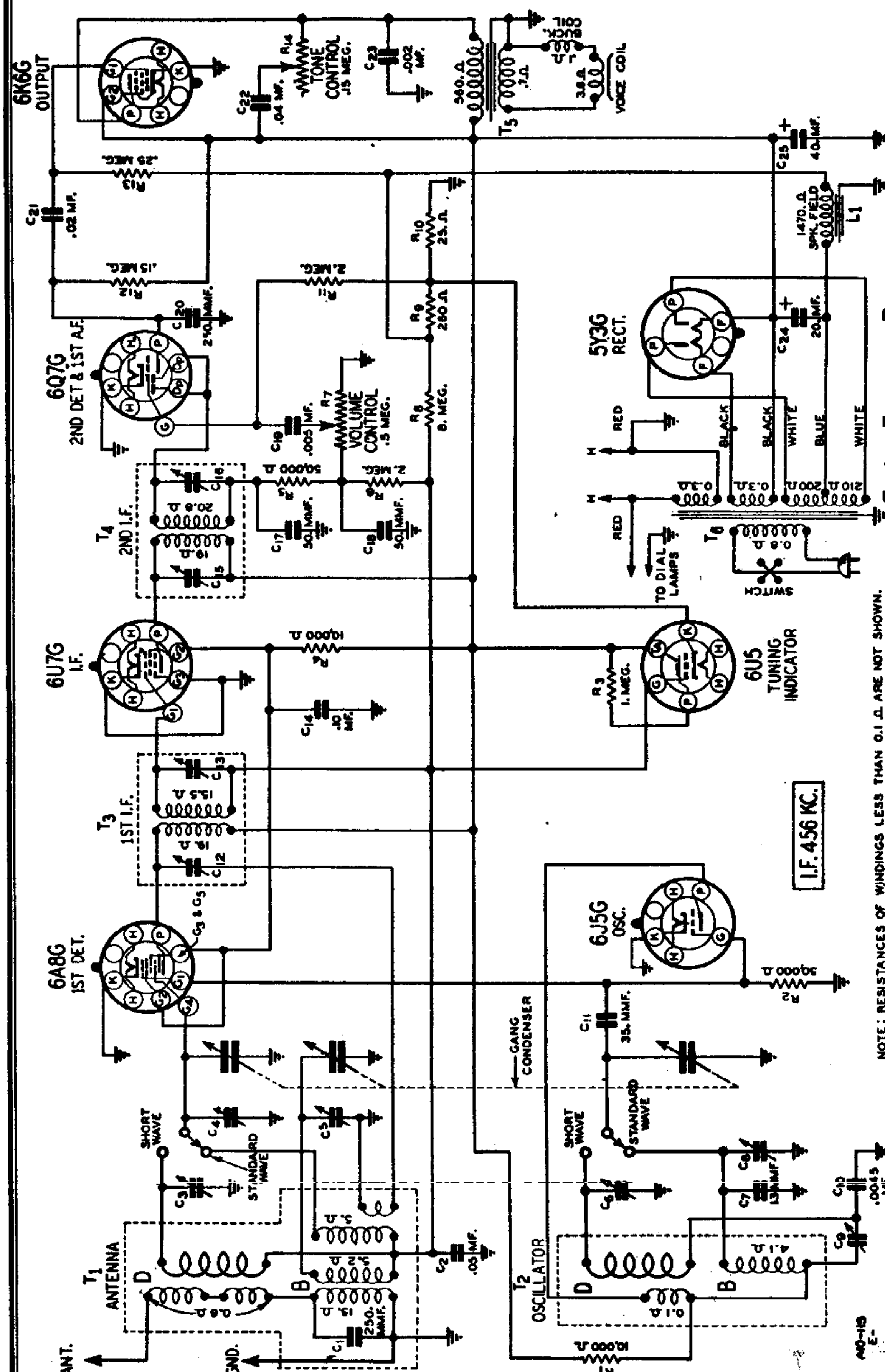
MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A258	Tube Socket—Octal (7 prong)	.15
3A259	Tube Socket—Octal (8 prong)	.15
3A260	Tube Socket—Octal (8 prong)	.15
3A88	Speaker Socket, 5 Prong	.10
[illegible]	6G5 Tube Socket and Cable Assembly	.25

MODEL A10 Series
Schematic

WELLS-GARDNER & CO.



NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

Fig. 1—Schematic Circuit Diagram

Tuning Frequency Range

B Range .... 528 to 1730 KC (Kilocycles)
D Range .... 5750 to 18300 KC (Kilocycles)

Sensitivity

B Range .... 15 Microvolts Average
D Range .... 20 Microvolts Average

Power Consumption - 50 Watts (At 117 volts 60 cycles)
Power Output - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum
Speaker - - - - 6" or 8" Dynamic
Selectivity - - 38 KC Broad at 1000 times Signal

JAN., 1938

MODEL A10 Series
Alignment, Trimmers
Voltage, Socket
Tuner, Drive Cord Data

WELLS-GARDNER & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An all Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
456 KC	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C12) & (C13) 2nd I.F. (C15) & (C16)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1730 KC	Range B	200 mmf.	1730 KC	Antenna Lead	Oscillator Range B (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C9)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor— See Note B
RANGE D							
18300 KC	Range D	400 Ohm	18300 KC	Antenna Lead	Oscillator Range D (C6)	Turn Rotor to Full Open	Adjust to Maximum Output
15000 KC	Range D	400 Ohm	15000 KC	Antenna Lead	Ant. Range D (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor— See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

NOTE A—After the 1500 KC adjustment is made, the dial indicator should be at the 1500 KC mark on the dial scale. If it is not, the position of the indicator on the drive cord must be changed. This procedure, however, should not be followed unless it is absolutely necessary as there is danger of breaking the clamp which holds the indicator in place.

If the indicator must be moved, loosen the clamp at the back which holds it in place, move the indicator to the correct position, and bend the clamp back into place again.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

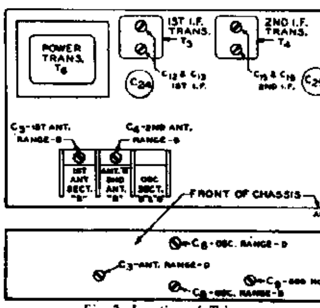


Fig. 2- Location of Trimmers

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum. Readings taken with a 1000 Ohm-per-volt meter.

Antenna Shorted to Ground. Position of Band Switch: Standard Wave.

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8G	1st Det.	0	6.1(1)	165	90	6.5	90	6.1(1)	0
6J5G	Osc.	0	6.1(1)	125		6.5		6.1(1)	0
6U7G	I.F.	0	6.1(1)	165	90	0		6.1(1)	0
6Q7G	2nd Det. & 1st. Audio	0	6.1(1)	80				6.1(1)	0(2)
6K6G	Output	0	6.1(1)	156	165	12.5(3)		6.1(1)	0
5Y3G	Rectifier	0	4.7(4)		400(5)		400(5)		4.7(4)
6U5	Tuning Indicator	Plate to Ground 35		Target to Ground 165		Cathode to Ground 1		Across Heater 6.1 A.C.	

(1) A.C. voltage read across heater terminals 2 and 7.
(2) Bias (1.2 volts) as read across R10.
(3) Bias voltage as read across R9 and R10.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

Replacing Drive Cords

Three drive cords, Nos. 1, 2, and 3, as shown in Fig. 5, are used. To replace any of these cords, proceed as follows:

Cord No. 1

Turn the gang condenser to full open position.

Turn the drive shaft so that the holes for the cord are vertical. The positions of the drive shaft and drive drum are shown in Fig. 5.

Tie a double knot in one end of the cord. From the bottom of hole (A) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Fasten the shorter of the two springs used to the free end of the cord, making the distance between the two knots 22¾ inches.

Starting at the point where the cord leaves hole (A), wind it around the shaft ¾ of a turn as shown in Fig. 5. Bring the end up to the wide groove (B) in the drive drum and wind on 2¼ turns, progressing toward the edge of the groove. Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

Cord No. 2

The gang condenser and tuning shaft should be in the same position as explained for Cord No. 1.

Tie a double knot in one end of the cord. From the top of hole (E) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Tie a slip knot with a small loop in the free end of the cord so that the length of the cord is 12 inches between the knots.

Starting at the point where the cord leaves hole (E), wind it around the shaft 3¼ turns as shown in Fig. 5. Do not attempt to wind the cord on the drive drum, but put the loop in the slip knot over pin (G). Rotate the drive drum clockwise about ½ a turn. This will unwind the cord on the drive shaft at (E).

Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut. While holding the cord on the wide flange, rotate the drive drum counterclockwise. The cord will be pulled into position in the groove.

Cord No. 3

The gang condenser and drive drum should be in the same position as explained for Cord No. 1.

Tie one end of the cord on hook (H).

Slide a ½ inch length of fabric tubing over the cord. Place this tubing approximately 13½ inches from the end of the cord to be attached to the spring.

Tie the other end of the cord to the longer of the two springs used. The length of the cord between the knots should be 34¾ inches.

Pass the cord through slot (J) in groove (P) of the drive drum. Bring the cord up to pulley (K), around the other pulleys as shown in Fig. 5, and down to groove (P). After passing the cord around the drive drum ½ turn in groove (P), fasten the spring to hook (Q).

Attaching Dial Pointer—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. After the pointer has been moved to the correct position, clamp it tightly over the fabric tubing on the cord. See Fig. 5.

Lever Tuning Assembly Adjustments

Pressure of Spacers on Heart Cams — The heart cams must rotate freely relative to the shaft spacers when the tightening lever is in the "loose" position and must not rotate relative to the shaft spacers when this lever is in the "tight" position.

Pressure of the spacers against the heart cams is determined by the position of nut (R) on the threaded shaft. See Fig. 5. If, after the tightening lever is turned to the "tight" position, the cams can turn relative to the shaft, this nut must be tightened.

Bend back the ears of washer (S). See Fig. 5, and tighten nut (R) about ⅙ turn. Bend the ears of the washer down again on nut (R). Tighten the tightening lever and see if the cams are sufficiently tight.

In general, nut (R) should be at such a position on the threaded shaft that the stop on the tightening lever moves to about ⅛ inch from the end of the slot in the tightening washers when a reasonable amount of pressure is exerted on this lever.

Connection between Gang Condenser and Cam Shaft—One screw only should be used in the universal joint connection between the condenser shaft and the cam shaft. If 2 screws are used, considerably more pressure must be exerted on the station levers to rotate the cam shaft.

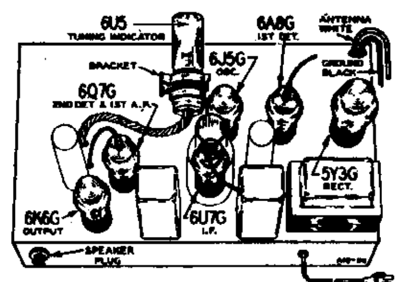


Fig. 4—Location of Tubes

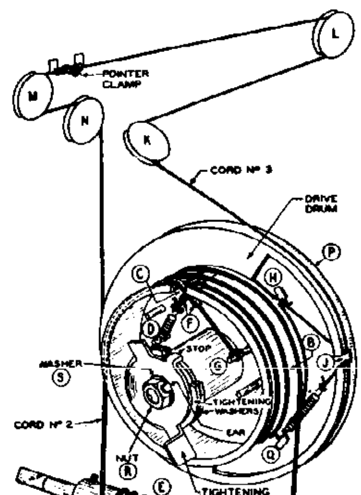


Fig. 5
Replacement of Drive Cords

MODELS C7,C11 Series
Schematic,Voltage,Socket
Alignment,Trimmers

WELLS-GARDNER & CO.

ALIGNMENT Adjust IF trimmers at 175 KC thru .05 mf dummy. Adjust Osc. trimmer at 1581 KC thru 120 mmf dummy if 60 inch cable 70 mmf is used - or thru 25 mmf dummy if 30 inch cable 35 mmf dummy is used.
Adjust Interstage and Antenna trimmers at 1400 KC.
Readjust Antenna trimmer C2 at 1400 KC.

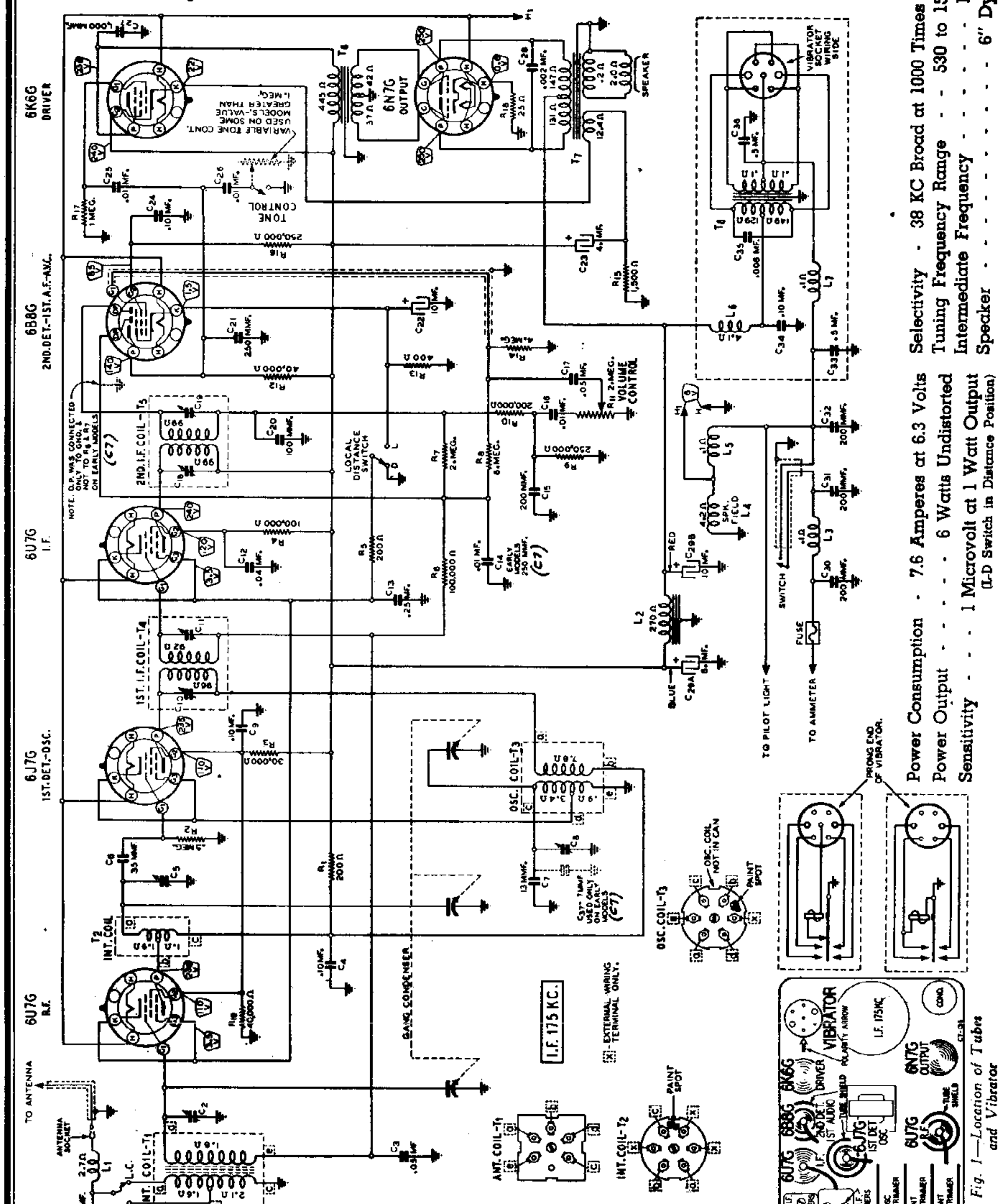
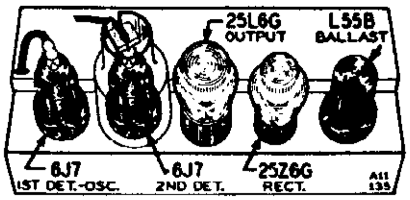


Fig. 1—Location of Tubes and Vibrator

MODEL A11 Series
Schematic, Voltage
Alignment, Socket

WELLS-GARDNER & CO.

DC OPERATION—Filament and ballast tube voltages will be the same as AC (for 117 volt line). The plate, screen and bias voltages will be slightly lower than those shown above. When operated on DC, the rectifier tube acts as a low resistance series resistor with a drop of approximately 6 volts between plate and cathode.



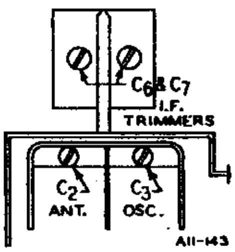
VOLTAGES AT SOCKETS FOR 117 VOLT AC LINE

See Note Below Regarding Voltages when Operated on DC
Volume Control Maximum—Antenna Lead Grounded—Readings taken with 1000 Ohm-per-volt Meter.

TUBE	FUNCTION	Voltage Between Socket Prong and Ground (Unless Otherwise Indicated) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7	1st Det. & Osc.		6.3(1)	98	98			6.3(1)	6.0
6J7	2nd Det.		6.3(1)	10	13			6.3(1)	
25L6G	Output		24(1)	92	98			24(1)	5
25Z6G	Rectifier		24(1)	117(2)	125	117(2)		24(1)	125
L55B	Ballast			56.6(3)				56.6(3)	4.5(4)

(1) AC voltage across terminals 2 and 7.
(2) AC voltage to ground.
(3) AC voltage across terminals 3 and 7.
(4) AC voltage across terminals 7 and 8.

CAUTION—In any service work on the AC-DC chassis, keep it on a wood or other insulated surface to avoid contacts with ground.



MAY, 1938

Power Consumption - 48 Watts (At 117 volts AC Supply)
Power Output - - - - .8 Watts Undistorted
Selectivity - - 30 KC Broad at 100 times Signal.
Tuning Frequency Range - - - - 530 to 1730 KC
Sensitivity - - - - - 180 Microvolts Average

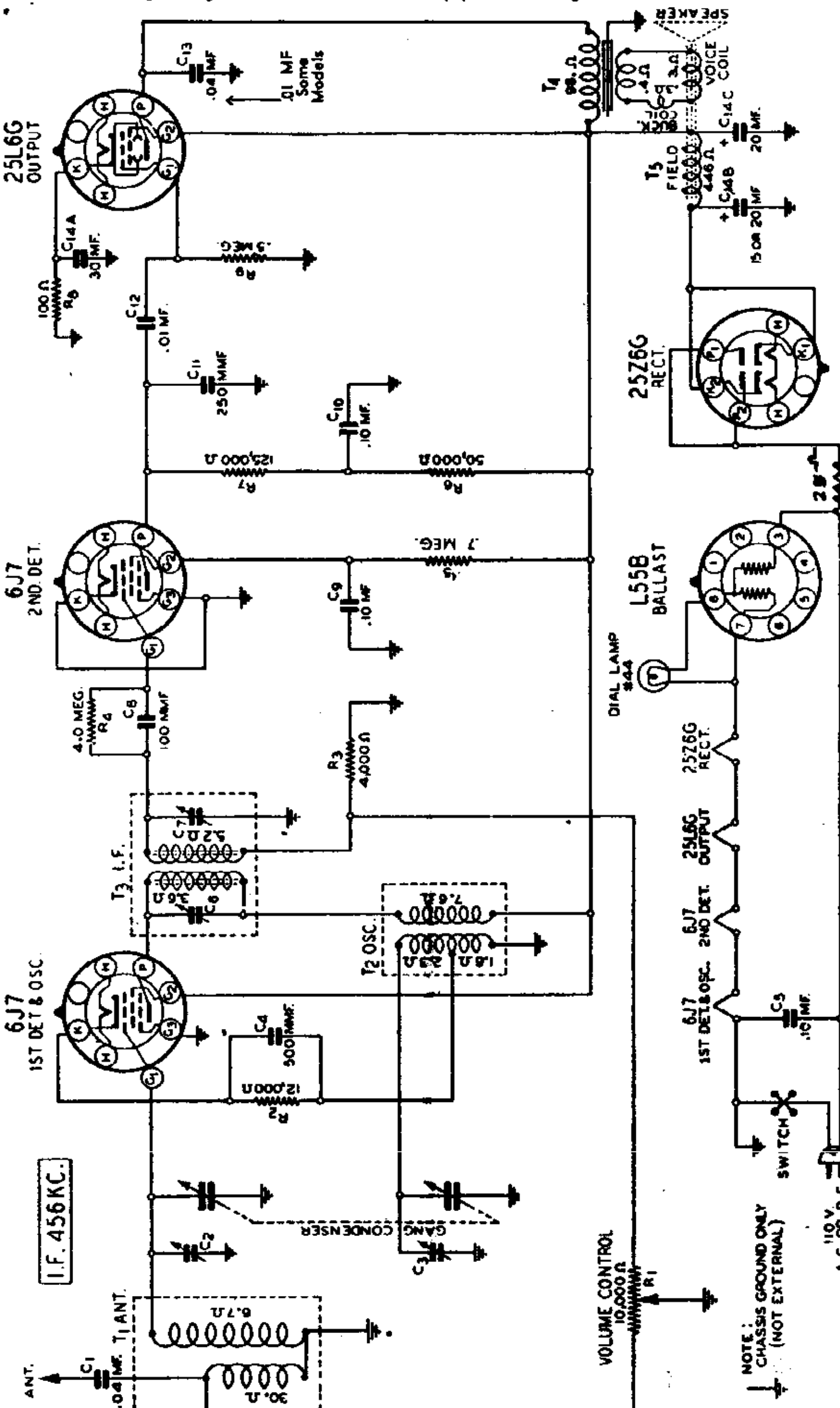
ALIGNMENT PROCEDURE

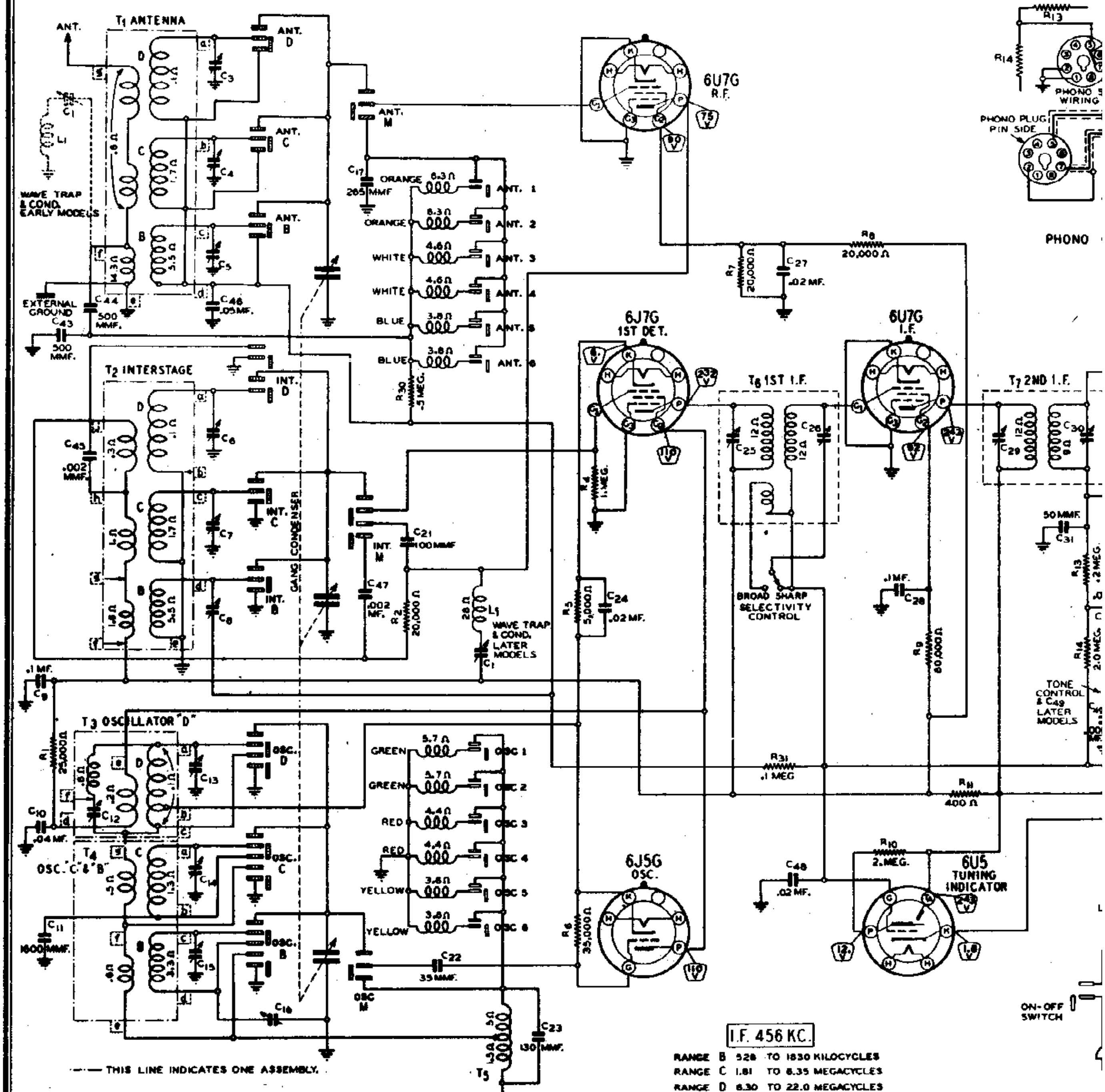
Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Illustration)
456 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	I.F. (C6) & (C7)
1730 KC	Antenna Lead	200 mmf.	Turn rotor to full open	Oscillator (C3)
1500 KC	Antenna Lead	200 mmf.	Turn rotor to max. output	Antenna (C2)

The following equipment is required for aligning: Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed. Output Indicating Meter; Non-Metallic Screwdriver. Dummy Antennas — .1 mf. and 200 mmf.

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.





ISSUE NUMBER CHANGES

The last digit of the number on the chassis number label identifies the radio as to the issue number.

ISSUE NO. 1

The information contained in the Series A12 Service Manual, with the exception of the Replacement Parts List and Schematic Circuit Diagram, applies with minor changes to all chassis issues, 1 through 6. The Replacement Parts List and Schematic Circuit Diagram, however, apply only to No. 1 issue chassis.

ISSUE NOS. 2 and 3

MECHANICAL CHANGES -- The station button plunger has a length of 7-3/16 inches.

The locking plate for the station button plungers has been redesigned and now employs two side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by two screws.

ELECTRICAL CHANGES -- The Schematic Circuit Diagram (Fig.3) is that c Issue Nos. 2 through 6. The AVC voltage is fed to the grid of the R.F. tube through the manual and automatic tuning coils. Formerly, it was applied directly to the grid of the R.F. tube through a 1 Megohm resistor.

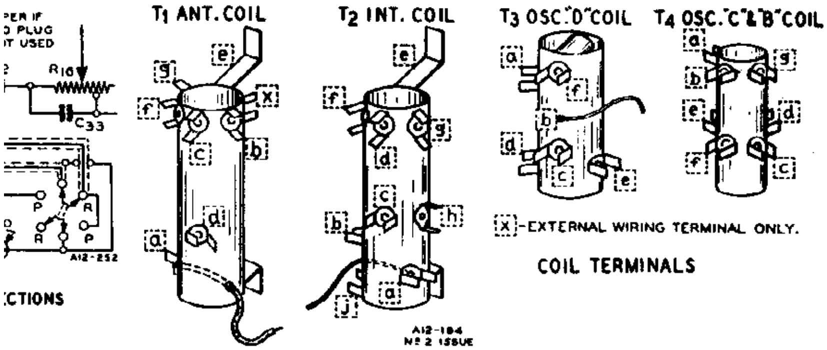
The operating voltages of several of the tubes have been changed. Correct values are shown on the schematic in this supplement.

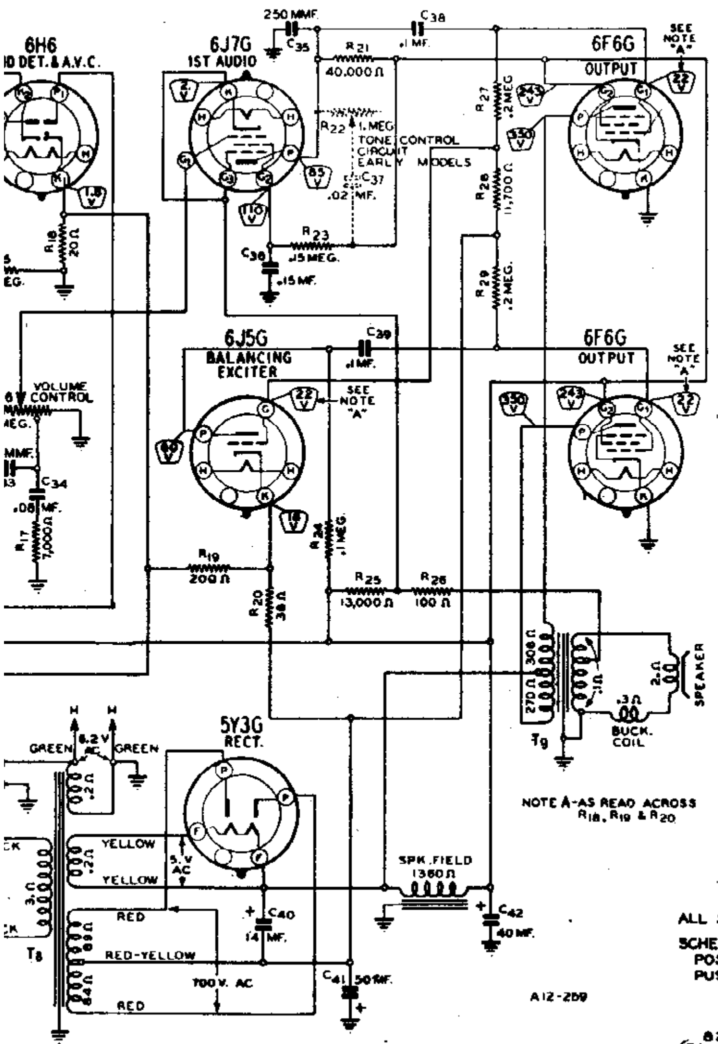
ISSUE NOS. 4 and 5

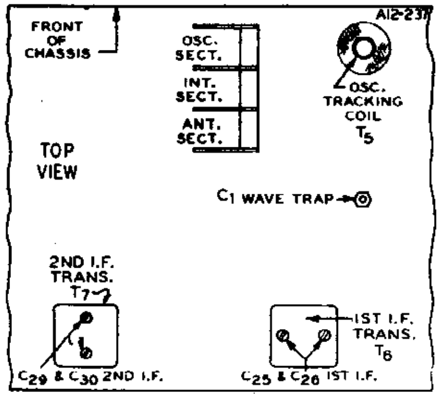
MECHANICAL CHANGES -- The antenna coil (T1) and Wave Trap Coil (L1) have been moved from the top of the chassis base to a position just in back of the band switch underneath the chassis base.

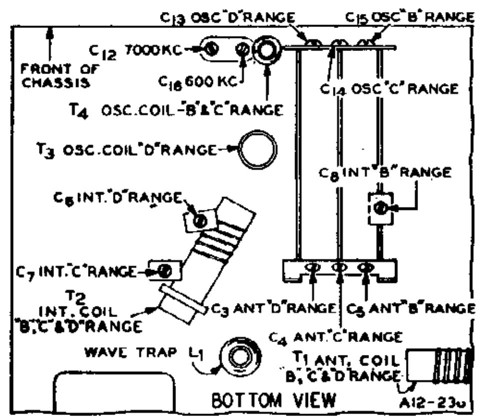
DNER & CO.

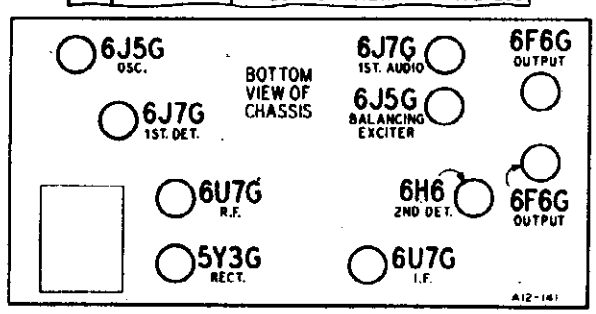
MODEL A12 Series Late
Schematic, Voltage, Socket
Trimmers, Changes
Tuner Switches

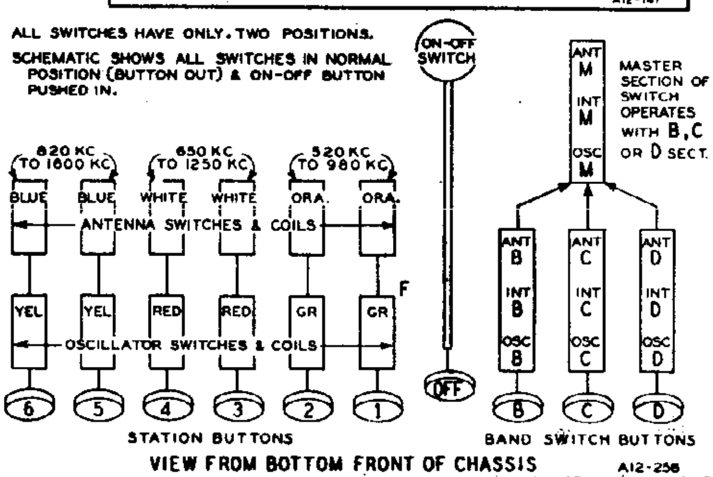












Wave Trap Trimmer (C1) has been moved from its former position the 1st I.F. Transformer (T6) to a position near the 6U7G R.F.

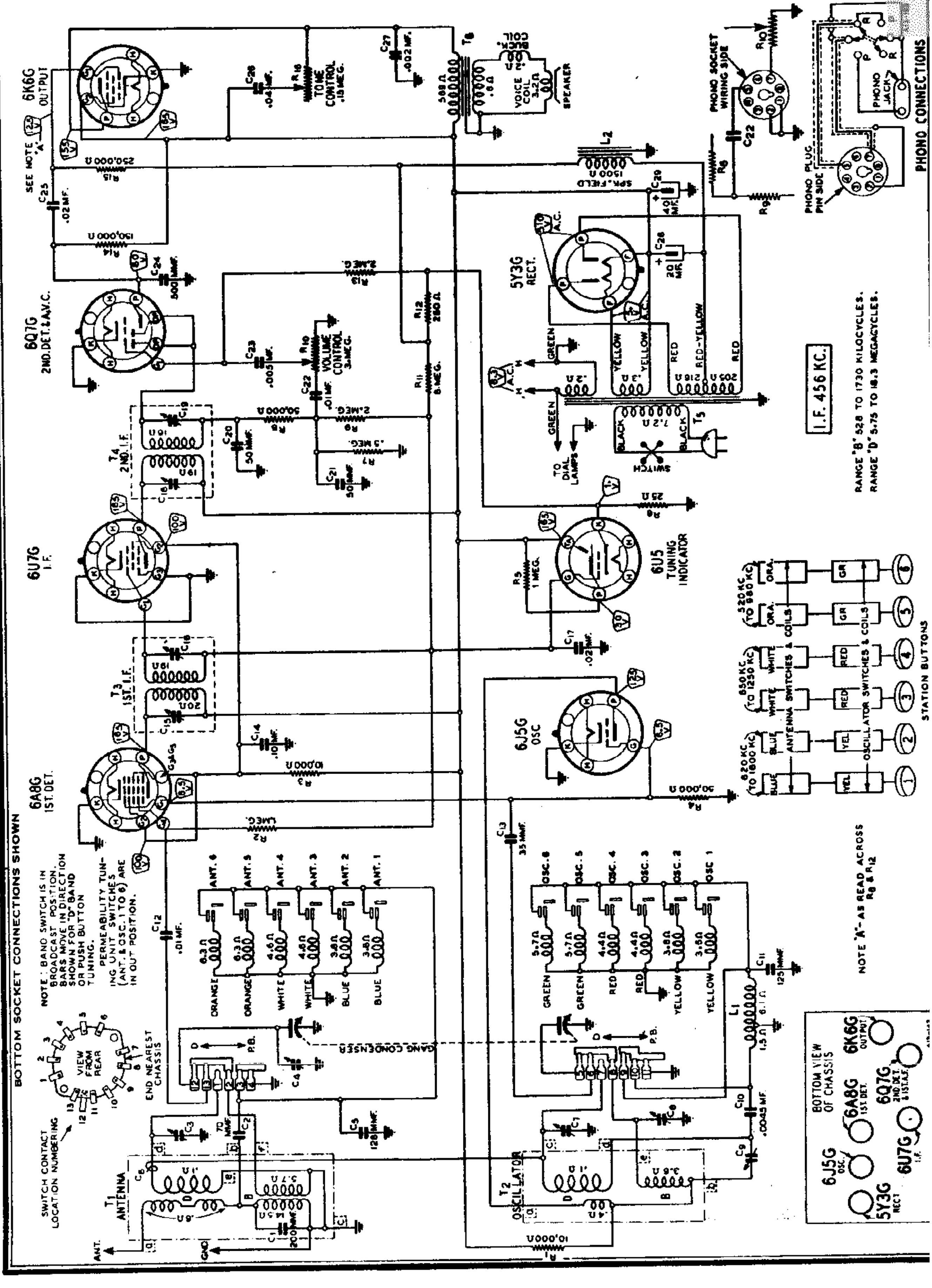
TRICAL CHANGES -- The Wave Trap Coil (L1) and Trimmer Condenser have been removed from the antenna circuit and are now connected he interstage circuit - See Fig. 3.

E NO. 6

TRICAL CHANGES -- The Tone Control, formerly in the 1st audio plate been put in the diode circuit - See Fig. 3. A 1 Megohm Tone Con- (R22) and a .02 mf. (C37) condenser were used in the audio plate. Megohm Tone Control (R32) and a .001 mf. (C49) condenser are used he diode circuit.

WELLS-GARDNER & CO.

MODEL A13 Series
Schematic, Voltage
Socket



MODEL A13 Series
Alignment, Trimmers
Coils, Specifications

WELLS-GARDNER & CO.

Power Consumption - 50 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum

Selectivity - - 38 KC Broad at 1000 times Signal

Sensitivity
- B Range (Manual Tuning)..................15 Microvolts Average
- B Range (Automatic Tuning)..............15 Microvolts Average
- D Range ....25 Microvolts Average

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - - 6" or 8" Dynamic

Tuning Frequency Range
- B Range (Manual Tuning).... 528 to 1730 KC (Kilocycles)
- D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)
- Buttons 1 and 2 (Automatic Tuning)...........820 to 1600 KC
- Buttons 3 and 4 (Automatic Tuning)...........650 to 1250 KC
- Buttons 5 and 6 (Automatic Tuning)........... 520 to 980 KC

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C18) & (C19)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C4)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B

PERMEABILITY TUNING UNIT			BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C
1100 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

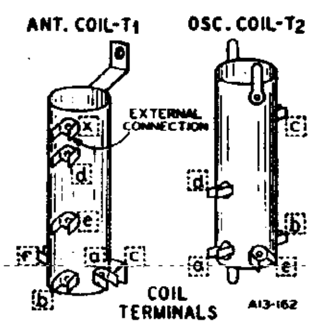
After each range is completed, repeat the procedure as a final check.

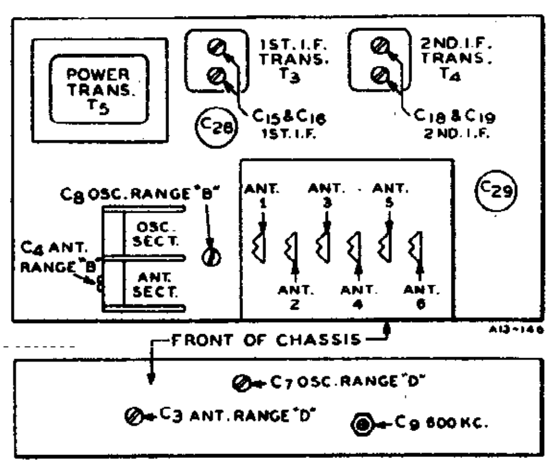
NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.





Socket, Coils, Phono.

WELLS-GARDNER & CO.

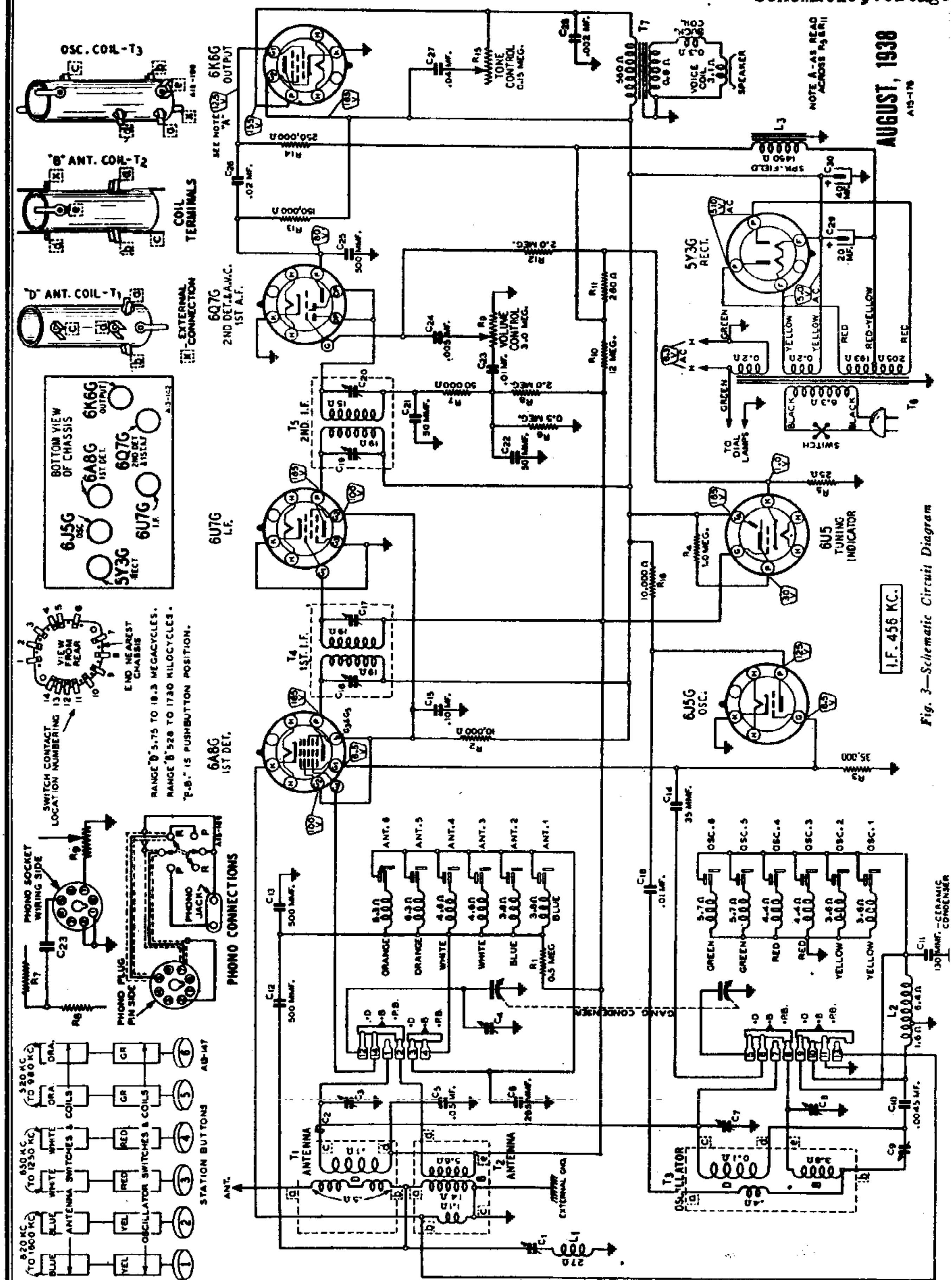


Fig. 3—Schematic Circuit Diagram

MODEL A15 Series
Alignment, Trimmers

WELLS-GARDNER & CO.

Specifications

Power Consumption - 50 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum

Selectivity - - 38 KC Broad at 1000 times Signal

Sensitivity

- B Range (Manual Tuning)................15 Microvolts Average
- B Range (Automatic Tuning)............15 Microvolts Average
- D Range ....25 Microvolts Average

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - 6" or 8" Dynamic

Tuning Frequency Range

- B Range (Manual Tuning).... 528 to 1730 KC (Kilocycles)
- D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)
- Buttons 1 and 2 (Automatic Tuning)..........820 to 1600 KC
- Buttons 3 and 4 (Automatic Tuning)..........650 to 1250 KC
- Buttons 5 and 6 (Automatic Tuning)..........520 to 980 KC

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C16) & (C17) 2nd I.F. (C19) & (C20)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C4)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C	Wave Trap (C1) Adjust for MINIMUM Output
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT			BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D
1100 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

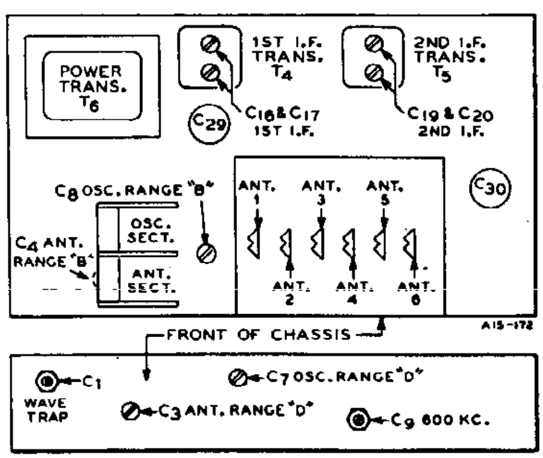


Fig. 2—Location of Trimmers

ALIGNMENT

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

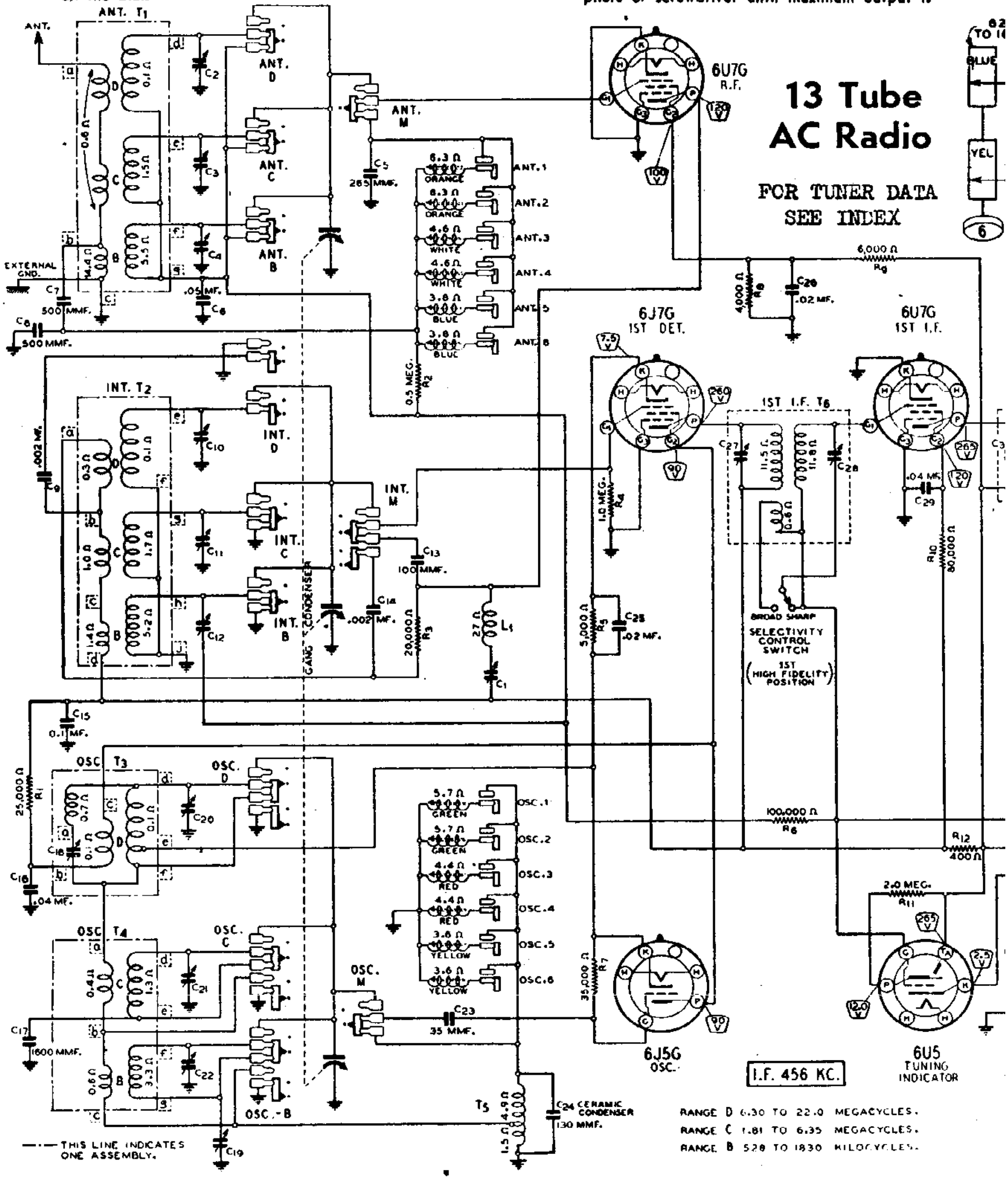
NOTE A—Hold the tuning knob and turn the film drum until it is at the 1500 KC mark on the dial.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is

13 Tube AC Radio

FOR TUNER DATA SEE INDEX

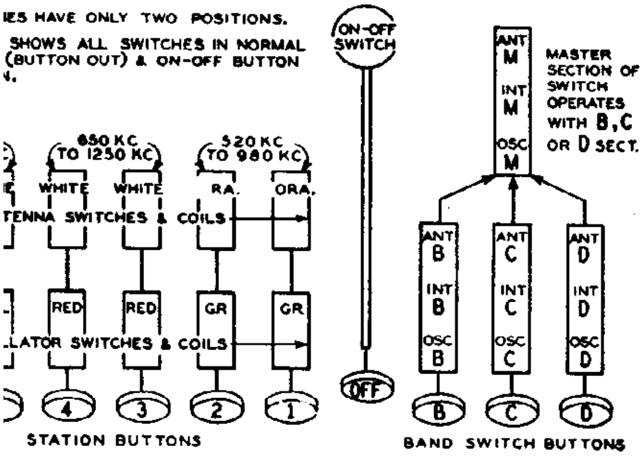


MODEL A16 Series
Schematic, Voltage
Socket, Alignment Notes

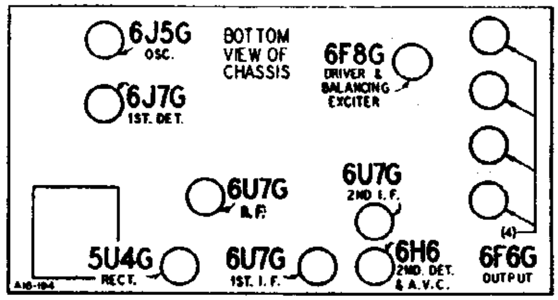
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows:

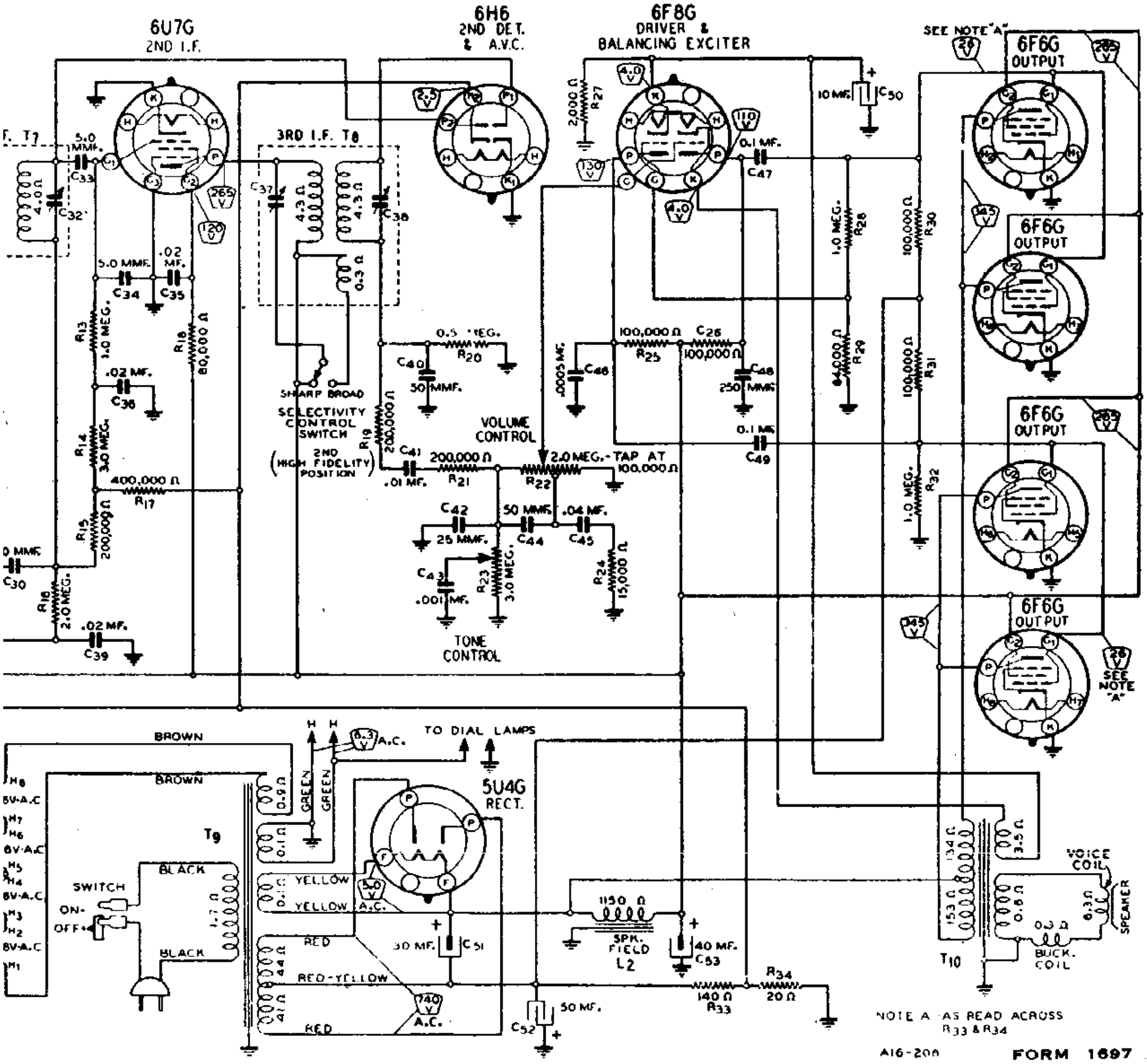
Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.



VIEW FROM BOTTOM FRONT OF CHASSIS





FORM 1697

WELLS-GARDNER & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Selectivity Control—Sharp Position All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BUTTON DEPRESSED	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 2nd I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	3rd I.F. (C37) & (C38)
456 KC	Grid of 1st I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C31) & (C32)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C27) & (C28)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	No. 1		Wave Trap (C1) Adjust for MINIMUM Output
RANGE B					
1630 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C22)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C4) Int. Range B (C12)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C19) Rock Rotor—See Note B
RANGE C					
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C21)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C11)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C20)
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C10) Rock Rotor—See Note B
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C18) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT				TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C
700 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
700 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
1100 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
1100 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Hold the tuning knob and turn the film drum until it is at the 1500 KC mark on the dial. There is a slot at the bottom of the film drum which will permit the drum to be rotated a small distance. If the drum must be rotated an additional amount in order to calibrate, loosen the film drum pulley set screw and turn the film drum until it is at the correct position. Then tighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

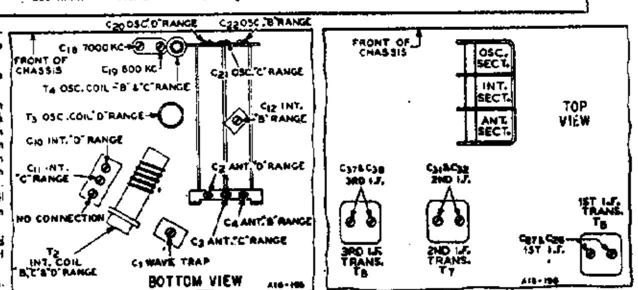


Fig. 2—Location of Trimmers

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Movie Dial Adjustments and General Service Data

Adjusting Height of Image on Screen

The image height should be so adjusted that the complete image for each band will be centered on the screen.

Depress the B band (Broadcast) button. If the image is not centered on the screen, loosen the nut of the B band image height adjusting screw—See Fig. 3. Turn the screw until the image is centered and tighten the nut.

Next depress the D band (2nd Short Wave) button. If the image is not centered on the screen, turn the knurled head of the D band image height adjusting screw until the image is centered on the screen.

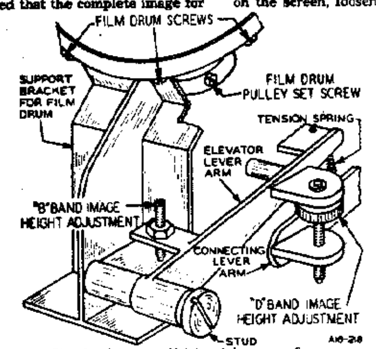


Fig. 3—Adjusting Height of Image on Screen

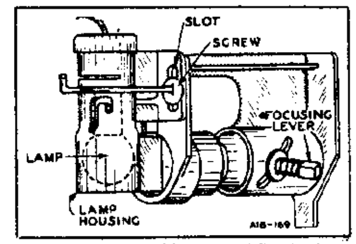


Fig. 4—Lamp Height Adjustment and Focusing Lever

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency between 800 and 1,000 KC on the Broadcast band.

Hold the tuning knob in position and turn the film drum until it is at the correct kilocycle mark on the dial scale. Care should be taken not to touch the film. There is a slot at the bottom of the film drum which will permit the drum to be rotated a small distance.

If the drum must be rotated an additional amount in order to calibrate, loosen the film drum pulley set screw (Fig. 6) and turn the film drum until it is at the correct position. Then tighten this set screw.

EARLY MODELS—Some of the first production models employed a film drum pulley bushing with a small set screw hole—See Fig. 6. Two types of film drum pulleys were used with this bushing; one employed a 3/16 inch brass set screw, the other a ⅛ inch steel set screw. In calibrating, the latter screw should not be passed through the set screw hole in the bushing, but should be tightened against the outer wall of the bushing. If calibration cannot be made without passing the set screw through the hole, loosen the 6 screws around the edge of the film drum and carefully rotate the film a slight amount

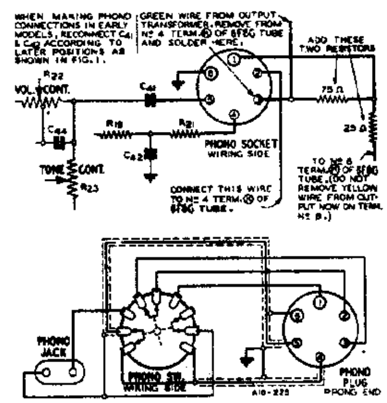


Fig. 7—Phonograph Connections

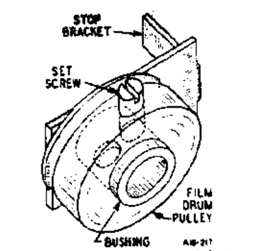
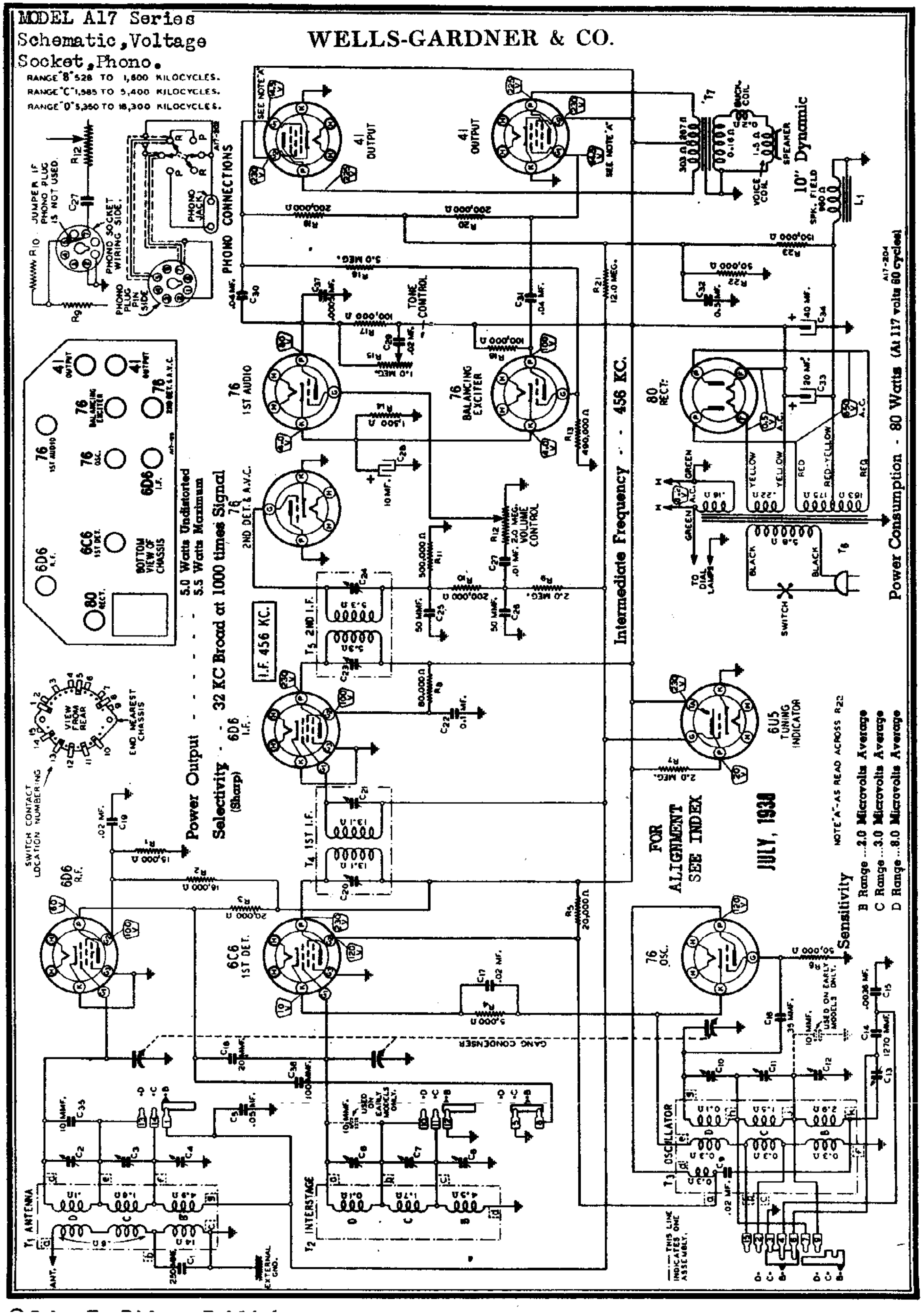


Fig. 6—Film Drum Pulley and Bushing

MODEL A17 Series
Schematic, Voltage
Socket, Phono.

RANGE "B" 528 TO 1,600 KILOCYCLES.
RANGE "C" 1,585 TO 5,400 KILOCYCLES.
RANGE "D" 5,350 TO 18,300 KILOCYCLES.

WELLS-GARDNER & CO.



MODEL A20 Series
Schematic, Voltage
Socket, Coils
Specifications

WELLS-GARDNER & CO.

SPECIFICATIONS

Power Consumption - - 65 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 3.0 Watts Undistorted; 4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - 8" or 10" Dynamic

Tuning Frequency Range

B Range.......... 528 to 1730 KC (Kilocycles)

D Range.......... 5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

B Range.......... 25 Microvolts Average

D Range.......... 40 Microvolts Average

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

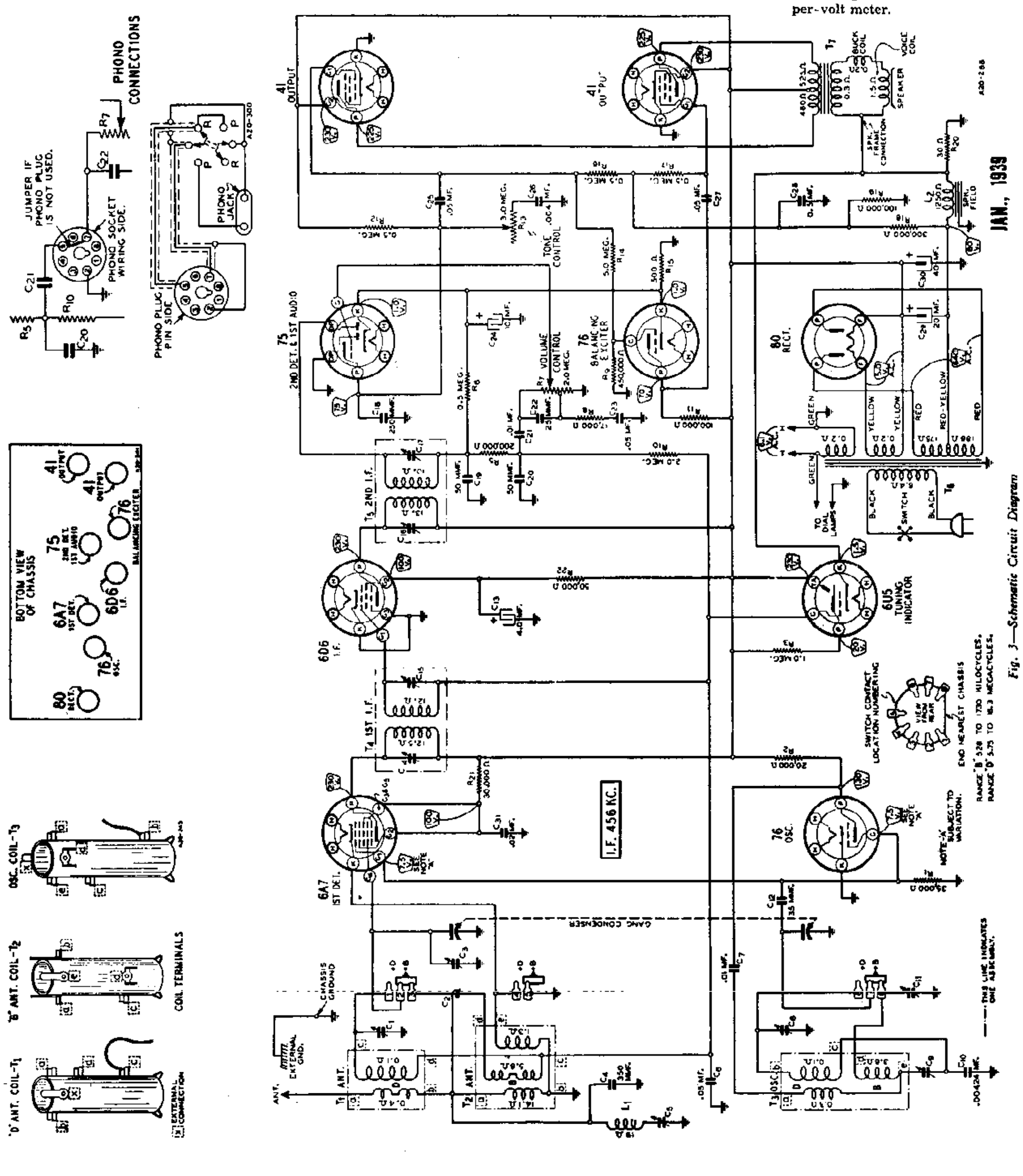


Fig. 3—Schematic Circuit Diagram

MODEL A20 Series
Alignment, Phono. Data
Drive Cord Data, Trimmers

WELLS-GARDNER & CO.

MODELS T2, A12, A13, A15
A22, A23, A24 Series
Tuner Data

SETTING PUSH BUTTONS WG SERIES A15, A22, A23, A24.

Selecting the Stations to be Set

There are 6 buttons on the push button tuning dial by means of which 6 stations may be set for quick tuning. They are numbered 1 to 6 in Fig. 2.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position—See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, accurately tune in this station. The station is now set on this button.

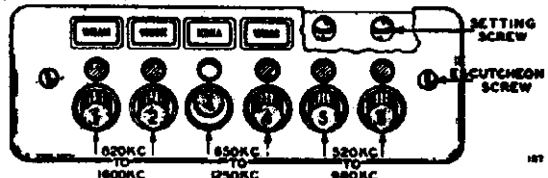
To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.



WG SERIES A20 ALIGNMENT, DRIVE CORD DATA, PHONOGRAPH NOTES.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

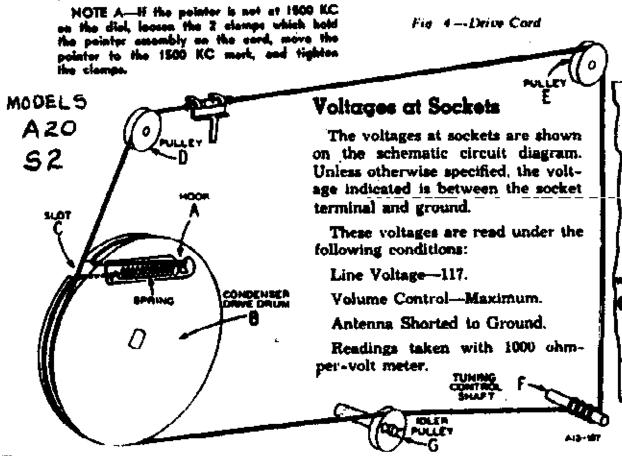
After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Fig. 4—Drive Cord



Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

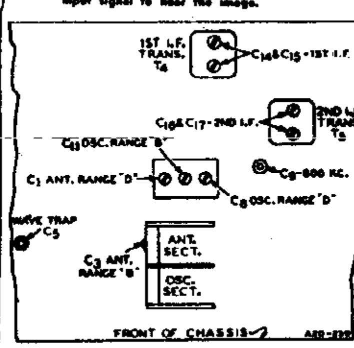


Fig. 2—Location of Trimmers

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾-inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 48½ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. See that the fabric tubing is now between pulleys D and E. Continue cord down to shaft F and wind 2¼ turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

DIAL POINTER ATTACHMENT—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. Clamp pointer tightly over the fabric tubing on the cord—See Fig. 4.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the back panel of the chassis base is a round knockout 1-9/64 inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

MODEL A22 Series
Schematic, Voltage
Socket, Phono., Coils
MODEL A24 Series
Socket, Phono., Coils

WELLS-GARDNER & CO.

SPECIFICATIONS

Power Consumption - - 65 Watts (At 117 volts 60 cycles)
Power Output - - - - - - - 3.0 Watts Undistorted; 4.0 Watts Maximum
Selectivity - - 40 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - - - - - 10" Dynamic

Tuning Frequency Range
B Range .... 526 to 1730 KC (Kilocycles)
D Range .... 5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)
B Range .... 25 Microvolts Average
D Range .... 40 Microvolts Average

Twenty-Five Cycle Models
The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.

Voltages at Sockets
The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.
These voltages are read under the following conditions:
Line Voltage—117.

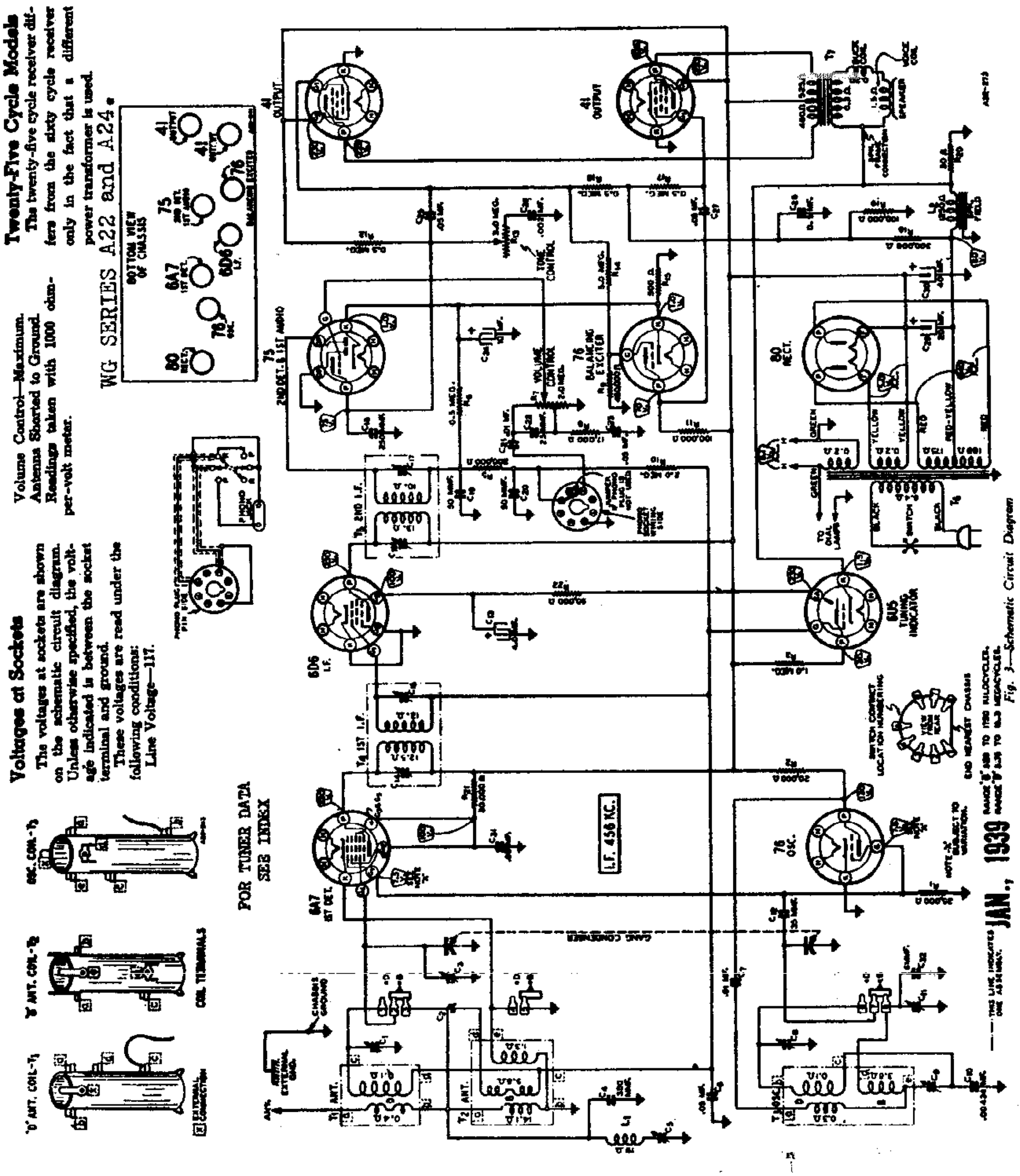


Fig. 3.—Schematic Circuit Diagram

MODEL A22 Series
MODEL A24 Series
Alignment, Trimmers
Drive Data
MODEL A23 Series
Drive Data

WELLS-GARDNER & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP 456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B				Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.	
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor until dial pointer is at 1500 KC	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Leave Rotor at above setting	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15.000 KC. The signal will then be heard at 15.000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15.000 less 912 KC, or 14.088 KC on the dial. It may be necessary to increase the input signal to hear the image.

General Service Data

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the other end to the tension spring, leaving a distance of 64⅛ inches between the knots.

Turn the gang condenser to the full open position. Secure the free end of the spring over hook A—See Fig. 4. Turn the gang condenser to the completely closed position.

Pass the cord through slot B and, guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. Hook the cord in slot B and turn the gang condenser to the completely closed position. Unhook the cord from slot B and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind 2½ turns counter-clockwise (from front of chassis) around the drive shaft spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. If necessary, stretch the tension spring and pull the drive cord taut. Pass drive cord through slot B and secure the loop to the tension spring at point G.

EARLY MODELS—In the early models using a larger drive shaft spool (See Fig. 4), there should be a distance of 65½ inches between the knots.

DIAL POINTER ATTACHMENT—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale

Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5.

The lower rack should be meshed with the pinion gear so that the 8th tooth from the tront on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the axis of the pinion gear shaft.

The rear and side brackets can then be mounted on the rack and pinion assembly.

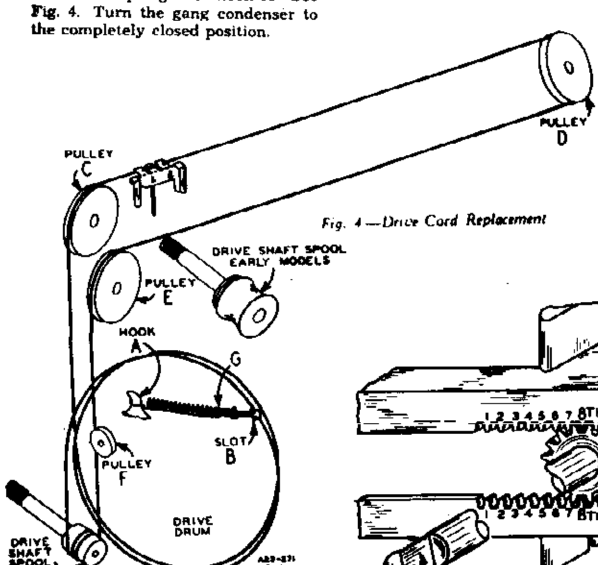


Fig. 4—Drive Cord Replacement

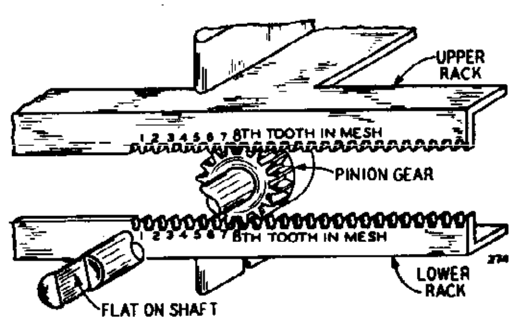


Fig. 5—Rack and Pinion Assembly

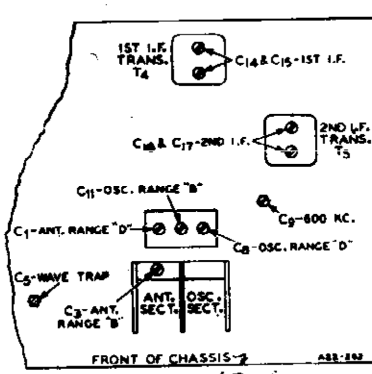
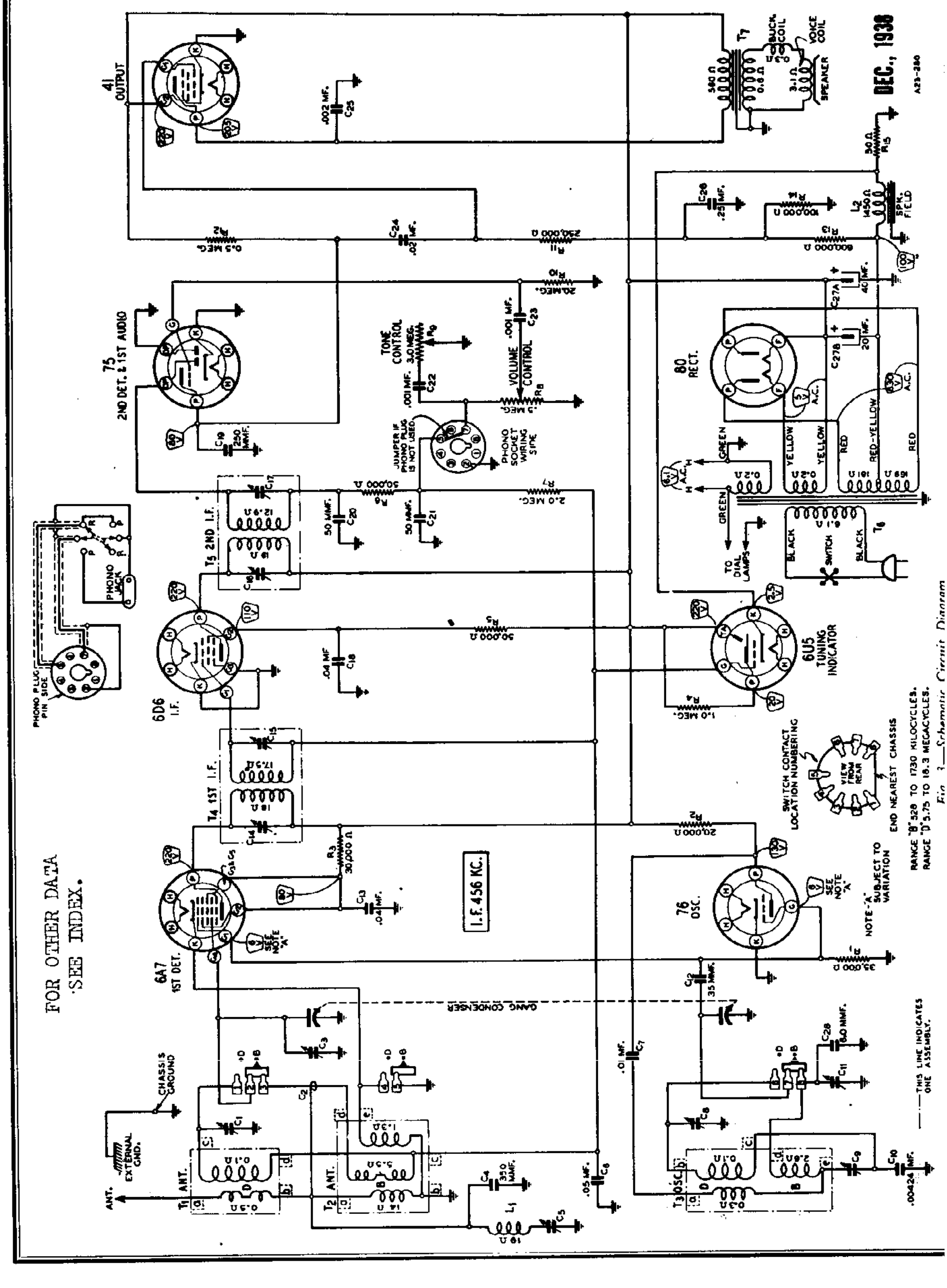


Fig. 2—Location of Trimmers

MODEL A23 Series
Schematic, Voltag
Phono. Data

WELLS-GARDNER & CO.

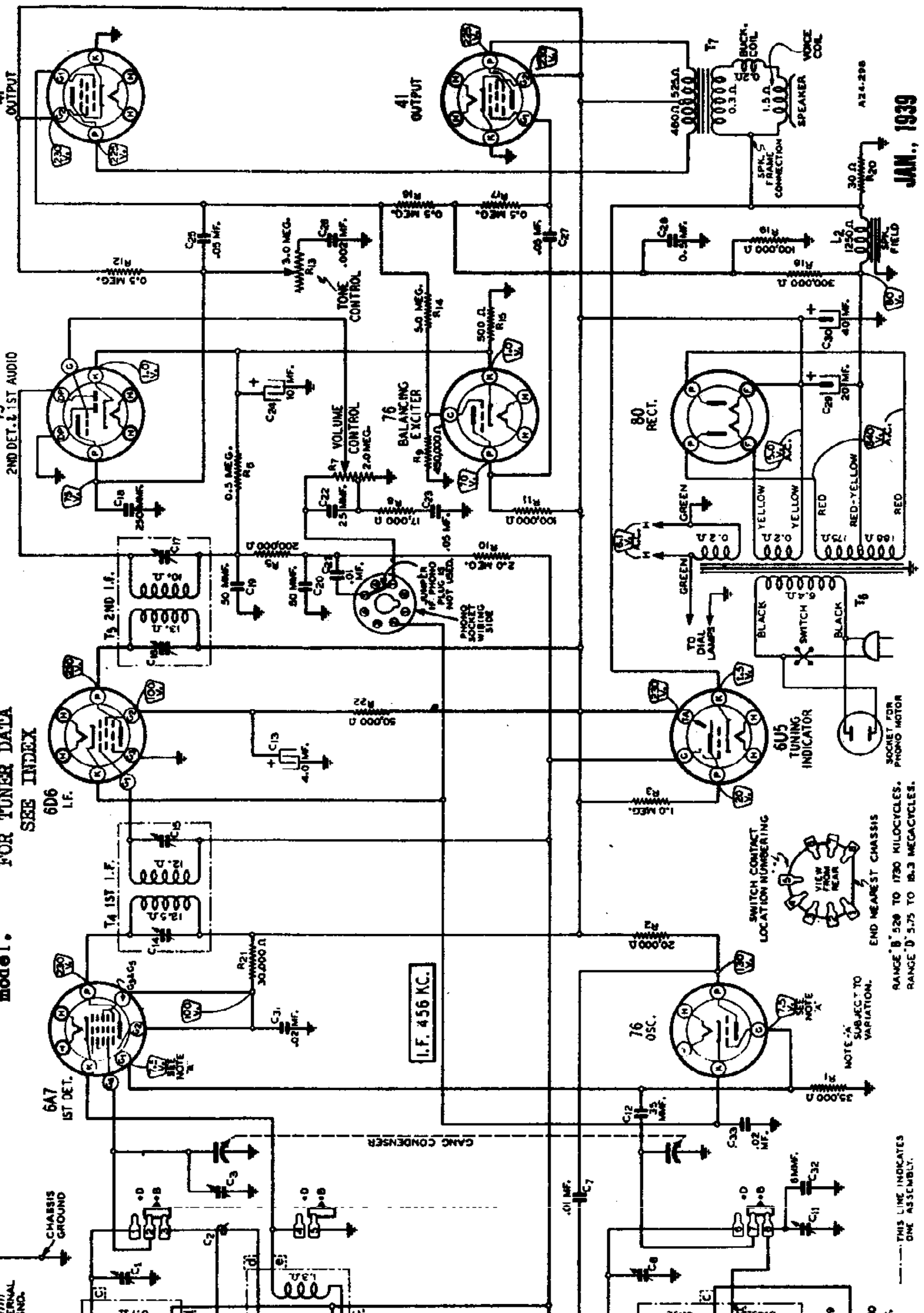


MODEL A24 Series
Schematic, Voltage
Phono. Data

WELLS-GARDNER & CO.

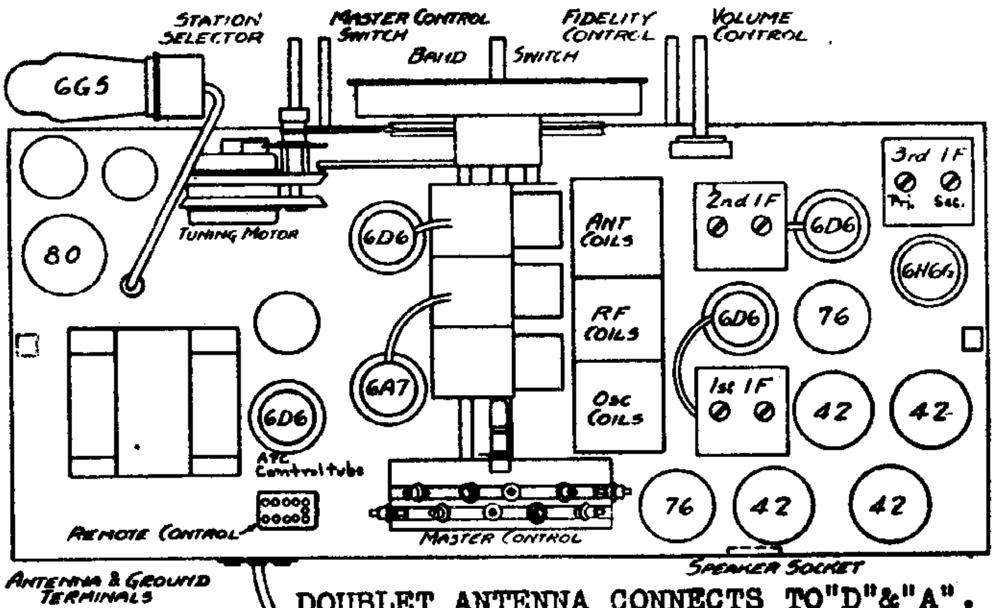
The chassis used in this model is almost identical to the chassis used in WG Series A22. The differences are in the re-mounting of the electrolytic condensers in order to keep them upright when the chassis is mounted in the cabinet, the addition of a phono motor socket to the back panel of the chassis, and the phono attachment parts. The alignment procedure and other service data given for Series A22 also applies to this model.

FOR TUNER DATA SEE INDEX



MODEL D690
Schematic, Socket
Trimmers

WESTERN AUTO SUPPLY CO.



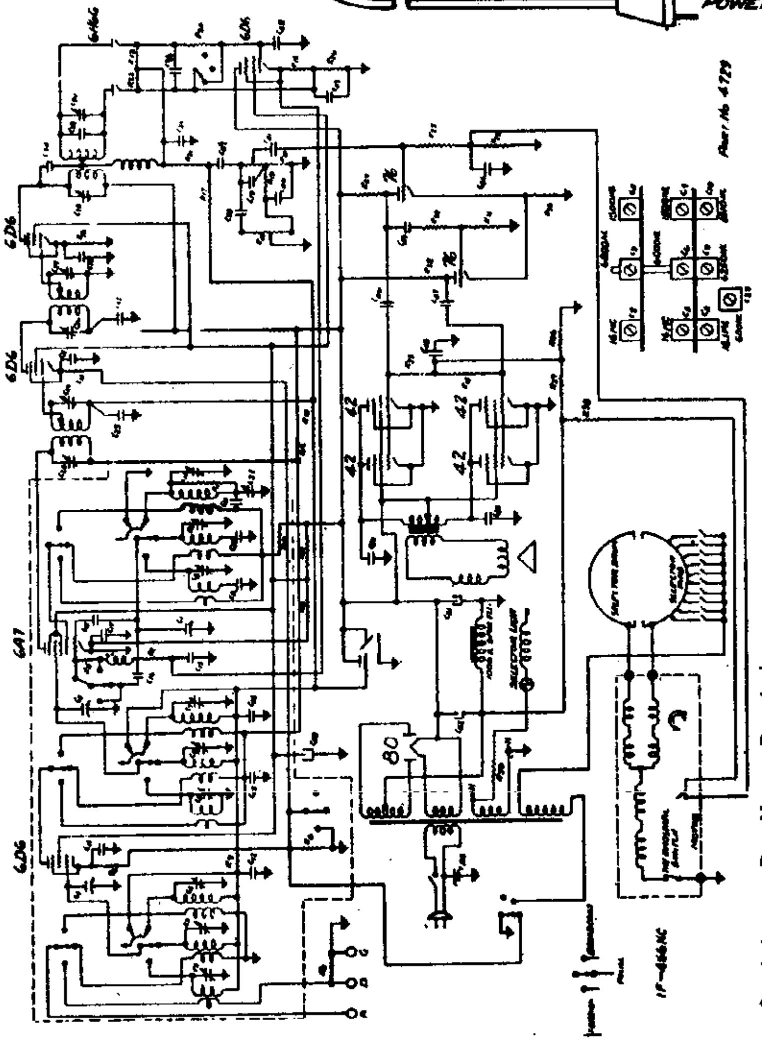
DOUBLET ANTENNA CONNECTS TO"D"&"A". SINGLE-WIRE ANTENNA TO"A",LINK"D"TO"G". GROUND-WIRE TO"G".

Part No 4728

Frequency Ranges

B-----540-1800KC
P----1800-6250KC
F---6250-18100KC

Power Supply: Unless specifically stated otherwise, these receivers are designed to operate on 115 VOLTS 60 CYCLES ALTERNATING CURRENT ONLY.



Symbol	Part No.	Description
R1,13,29,32	2880	100 M 1/3W 10%
R2,7,21	631	50 M 1/3W
R3,12,14,15,16	2421	1000 ohm 1/3W
R4	2421	1000 ohm 1/3W
R5	2783	2500 ohm 1/3W 10%
R6	3937	500 ohm ½ W Wire-wound ±10%
R8	3805	7000 ohm 3½ W Wirewound
R9	3805	8000 ohm 1½ W Wirewound
R10	600	10M 1/3W
R11	3581	3M 1/3W ±10%
R17,22,23,24, 28,27,30	2599	1 meg 1/3W 10%
R18	2737	2 meg tone control
R20	3800	3 meg volume control
R25	2572	400 ohm 1/3W 10%
R26	2691	500 ohm 1/3W 10%
R33,34,19	2730	200 M 1/3W 10%
R36		150 M 1/3W 10%
R38,37	2731	500 M 1/3W 10%
R39		20 ohm 1 W
C1		400 mmf variable
C2,3,4	3822	2-35 mmf triple trimmer
C5,6,7	3822	2-35 mmf triple trimmer
C8,9,10	3822	2-35 mmf triple trimmer
C11,12,14,17, 31,33	580	.05—200 V
C13,32	575	.1—400 V
C15,23,42,43,44	572	.1—200 V
C16	2925	25 mmf mica
C18	4676	8 mmf
C19	2694	.005—600 5%
C20	2741	1330 mmf 5%
C21		.01—400 V
C22	2560	350 mmf variable padder
C34,35	1285	100 mmf mica
C36,48	2792	.2—200 V
C37,41	576	.02—400 V
C38,40	824	.002—600 V
C39	2780	50 mmf mica
C45,46,47	2600	.02—600 V
C49,50	2601	.01—600 V
C51	4062	30 MF 275 V
C52	4649	24 MF 450 V
C53	3079	8 MF 150 V
C54	3135	.003—800 V

MODEL D690
Alignment
Tuner Data

WESTERN AUTO SUPPLY CO.

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the *Master Selector* requires no' tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:

Master Selector: This includes the *Selector Drum*, the *Selector Pins*, and the *Selector Light*. These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

Motor and Drive: This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the *Manual Station Selector* drive shaft. No oiling is necessary.

Push Button Assembly: These buttons are located on the front of the chassis, and extend through the escutcheon above the dial. Stations are tuned in automatically when the button with the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR

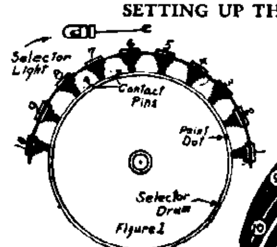
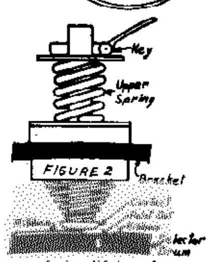


Figure 1



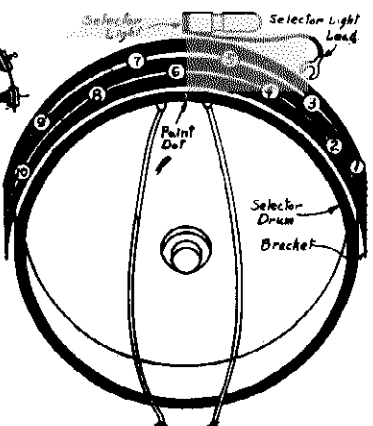


Figure 3

As a means of simplifying these operations, list ten of your favorite local or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 600 kc) the No. 1 station, and number the other stations similarly going from left to right across the dial. For example, assume that your favorite stations operate on frequencies of 600 kc, 700 kc, 800 kc, 900 kc, 1000 kc, 1100 kc, 1200 kc, 1300 kc, 1400 kc, and 1500 kc. Then the 600 kc station would be No. 1, the 700 kc station would be No. 2, and so on down the list with the 1500 kc station being designated No. 10. Reference to the push buttons is not necessary since they are not used until After the Master Selector has been set up.

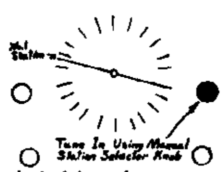
On the back of the receiver will be found the *Selector Drum* and the ten *Contact Pins* which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, *Fig. 1* shows the general layout and relation of the drum and contacts. *Fig. 2* shows one of the contact pins in detail: note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. *Fig. 3* shows the arrangement of the *Contact Pins*, each pin being numbered according to the system suggested for numbering the station, thus *pin No. 1* will be used for *Station No. 1*, *pin No. 2* will be used for *Station No. 2*, and so on down the list.

On the *Selector Drum* are two pairs of *Contact Ribbons*. Note that there is a *Paint Dot* on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This *Paint Dot* is for the purpose of locating the approximate position at which a given *Contact Pin* should be set in order to have the *Drum* stop for a particular station.

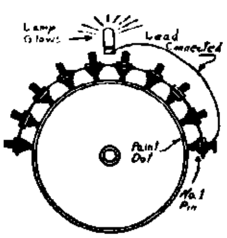
It is very important that the following steps be followed exactly as outlined; any deviation may necessitate re-setting some of the stations:

1. Set the receiver for reception of Standard Broadcast Stations as outlined previously under "Operation." Turn the Master Control Switch to the extreme right-hand position and wait about ten minutes to allow the tubes to reach their final operating temperature.

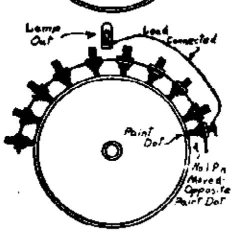
2. Using the Manual Station Selector (upper right) knob, tune in the No. 1 station, that is, the one nearest the 600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.



3. Face the rear of the chassis. Attach the lead from the *Selector Light* to the *No. 1 Contact Pin*; unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.



4. Observe the position of the *Paint Dot* on the edge of the *Drum*. Grasp the No. 1 pin firmly and slide it toward the *Paint Dot*, being careful not to break the connection between the *Selector Light* lead and the pin. When the pin is directly opposite the *Paint Dot*, the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making the setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. *Be very careful not to move the Selector Drum while the pin is being set.* When the pin is definitely in its proper position, *Disconnect the Selector Light Lead from the Pin.*



5. Repeat the above procedure for the *No. 2 station*; tune in the station, connect the *Selector Light* lead to the *No. 2* contact pin, move this pin opposite the *Paint Dot* so that the light goes out, then *Disconnect the Selector Light Lead.*

6. Using similar procedure, set up the other eight stations, in each case using the *Contact Pin* bearing the *same number as that assigned to the station being set up.* Always *Disconnect the Selector Light Lead* as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.

7. After all the stations have been set up, located the Call Letters of your stations on the printed sheets supplied with the receiver. Remove the desired call letter discs from the sheets. Remove the metal ferrules from the buttons, place the call letter discs behind the celluloid and press the ferrules back on the proper buttons.

8. The only operations necessary to receive any of the ten stations set up as outlined above are: Turn the Master Control Switch to the Center position, allow about one minute for the tubes to heat, press the button with the call letters of the desired station Holding the Button Down Until the Pointer Stops Moving and the Station is Heard, then adjust the tone and volume. Be sure that the Band Selector switch is in the proper position for reception of Standard Broadcast stations.

ALINEMENT PROCEDURE

The Master Control Switch must be turned to the extreme right hand position for all alinement.

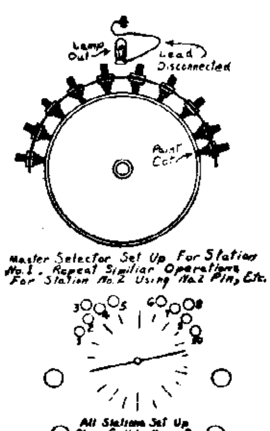
IF. Connect generator ground to receiver chassis. Using .1 mfd. condenser in series with the high side of the generator, apply 456 kc. signal to tl grid of the 6D6 second IF amplifier tube and aline the PRIMARY only of the third IF transformer. (See above diagram.) Connect generator to grid of 6D6 first IF tube and aline the second IF transformer. Repeat for transformer No. 1 applying signal to grid of 6A7 translator.

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

AFC. Connect a high resistance DC voltmeter between the cathode of the 6D6 AFC control tube and ground. Turn the Master Control Switch to the CENTER position and the Band Selector Switch to the extreme left hand position. Apply a strong 456 kc. signal to the grid of the 6A7 translator and adjust the secondary of the third IF transformer until the voltage is the same as with no signal.

FOR OPERATING SUGGESTIONS SEE MODEL D691.



Tubes required are:

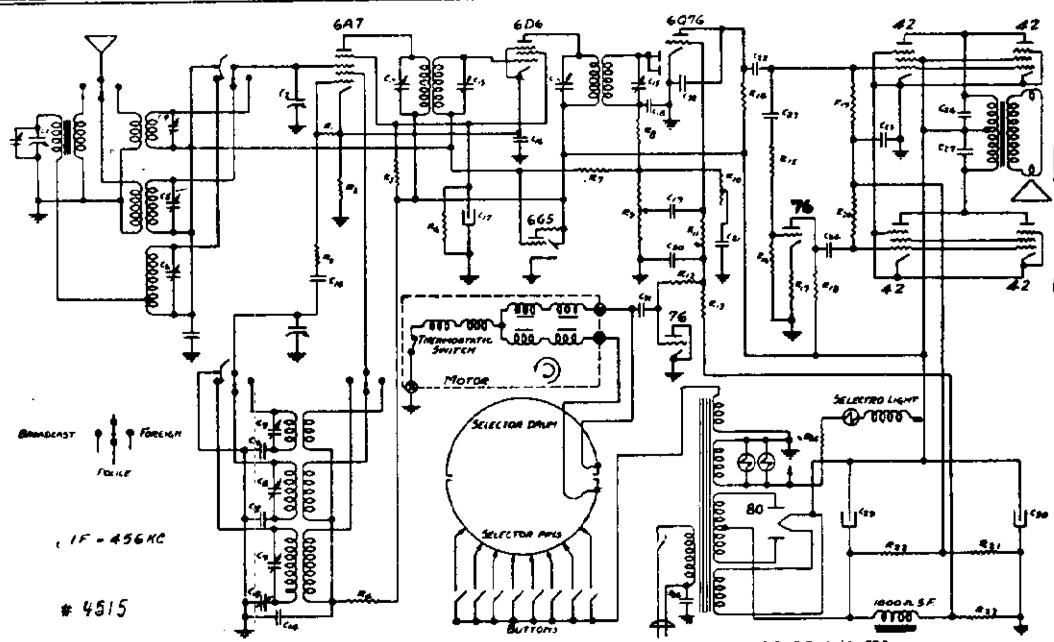
1—6D6 Radio Frequency Amplifier
1—6A7 Oscillator—translator
2—6D6 Intermediate Frequency Amplifiers
1—6H6G Detector AVC—Discriminator
1—6G5 Cathode Ray Tuning Tube
1—6D6 AFC Control
1—76 Driver
1—76 Phase Inverter
2—42 Power Output
1—80 Rectifier

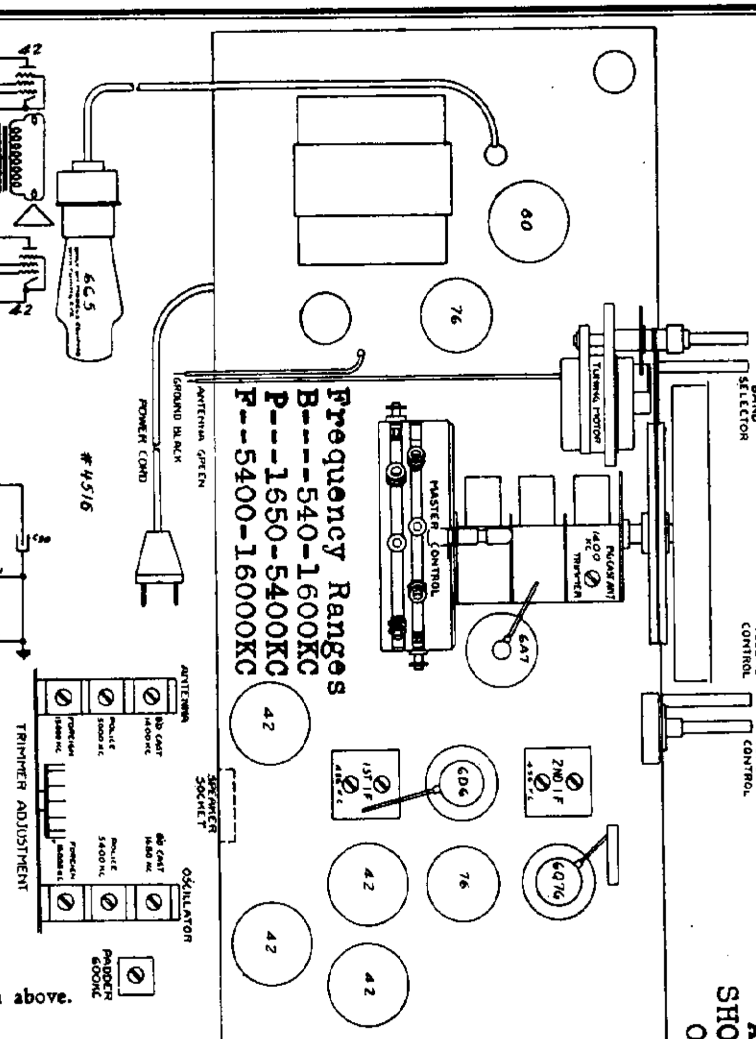
Master Control Switch: The extreme left position turns the power off. The center position connects the motor and the automatic frequency control for automatic tuning. The right hand position disconnects the motor and automatic frequency control, and increases sensitivity for manual tuning of weak stations. (The right hand position is also used for setting up stations for automatic tuning.)

MODEL D691
Schematic, Socket
Trimmers, Alignment

WESTERN AUTO SUPPLY CO.

ALIGNMENT OF SHORT-WAVE BANDS ON NEXT PAGE





Symbol	Part No.	Description	Symbol	Part No.	Description
C1,2,3	4354	Variable Condenser	R4	617	20 M 1/3 W
C4,9	1611	3-35 MMF trimmer	R5	4530	30 M 1 W
C5,6,7,8	2597	1-10 MMF trimmer	R7,11,13	624	1 Meg 1/3 W
C10	2780	50 MMF mica	R9		500 M volume control
C11	2793	.006-600 V 5%	R10		2 Meg tone control
C12	2741	1330 MMF mica 5%	R12,22	2731	500 M 1/3 W 10%
C13	2560	200-400 MMF padder	R14,18,19,20,21	2730	200 M 1/3 W 10%
C14	576	.02-400 V	R15	2599	1 Meg 1/3 W 10%
C15		IF trimmers	R16	2568	300 M 1/3 W 10%
C16,25	2792	.2-200 V	R17	4529	10 M 1/3 W 10%
C17	4528	4 MF—150 V	R23	3580	10 ohm 1/2 W 10%
C18,32	1286	250 MMF mica	R24	4535	20 ohm 1 W 10%
C19	576	.02-400 V			
C20	572	.1-200 V			
C21	581	.005-600 V			
C22,24	2600	.02-600 V			
C23	563	.05-400 V			
C26,27	2601	.01-600 V			
C28	3135	.003-800 V			
C29	3375	16 MF—450 V			
C30	4062	30 MF—275 V			
C31	580	.05-200 V			
R1,6,8	631	50 M 1/3 W			
R2,3	2689	100 ohm 1/3 W 10%			

Do not use tubes of types different from those shown above.

Unless specifically stated otherwise, these receivers are designed to operate on *115 volts 60 cycles alternating current only.*

ALINEMENT PROCEDURE

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6D6 IF amplifier tube and aline second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1680 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1400-1500 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

MODEL D691
Tuner Data
Alignment

WESTERN AUTO SUPPLY CO.

ALIGNMENT OF SHORT-WAVE BANDS

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 5400 kc., then aline the antenna trimmer at about 5000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency band to 16,000 kc., and aline the antenna trimmer at about 15,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmed down tight, then unscrew to the second peak. The antenna trimmer should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

Tubes required are:
1—6A7 Oscillator-translator
1—6D6 Intermediate Frequency Amplifier
1—6Q7G Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
1—76 Silencer
4—42 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE D691 ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the *Master Selector* requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:

Master Selector: This includes the ***Selector Drum,*** the ***Selector Pins,*** and the ***Selector Light.*** These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

Motor and Drive: This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the ***Manual Station Selector*** drive shaft. No oiling is necessary.

Push Button Assembly: These buttons are located on the front of the chassis, and extend through the escutcheon below the dial. Stations are tuned in automatically when the button under the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR

As a means of simplifying these operations, list eight of your favorite *local* or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 1600 kc) the ***No. 1*** station, and number the other stations similarly going from left to right across the dial. For example, assume that you favorite stations operate on frequencies of 1500 kc, 1400 kc, 1300 ks, 1200 kc, 1000 kc, 900 kc, 700 kc, and 600 kc. Then the 1500 kc station would be ***No. 1,*** the 1400 kc station would be ***No. 2,*** and so on down the list with the 600 kc station being designated ***No. 8.*** Reference to the push buttons is not necessary since they are not used until ***After*** the ***Master Selector*** has been set up.

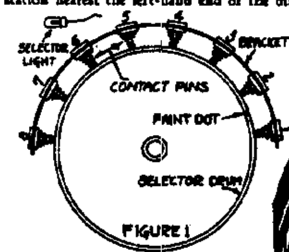


FIGURE 1

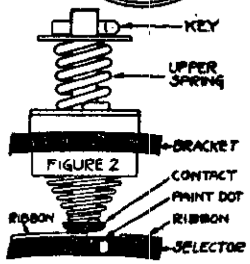


FIGURE 2

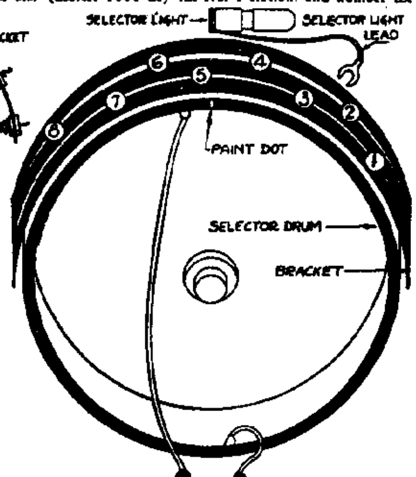


FIGURE 3

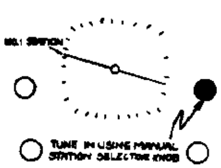
On the back of the receiver will be found the ***Selector Drum*** and the eight ***Contact Pins*** which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, ***Fig. 1*** shows the general layout and relation of the drum and contacts. ***Fig. 2*** shows one of the contact pins in detail; note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. ***Fig. 3*** shows the arrangement of the ***Contact Pins,*** each pin being numbered according to the system suggested for numbering the stations, thus ***pin No. 1*** will be used for ***Station No. 1, pin No. 2*** will be used for ***Station No. 2,*** and so on down the list.

On the ***Selector Drum*** are two pairs of ***Contact Ribbons.*** Note that there is a ***Paint Dot*** on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This ***Paint Dot*** is for the purpose of locating the approximate position at which a given ***Contact Pin*** should be set in order to have the ***Drum*** stop for a particular station.

It is very important that the following steps be followed exactly as outlined; any deviation may necessitate *re-setting* some of the stations:

1. Set the receiver for reception of ***Standard Broadcast Stations,*** as outlined previously under "***Operation.***" Turn the receiver "***On,***" let it run for ***at Least Ten Minutes*** to allow the tubes to reach their final operating temperature.

2. Using the ***Manual Station Selector*** (upper right) knob, tune in the No. 1 station, that is, the one nearest the 1600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.



3. Face the rear of the chassis. Attach the lead from the ***Selector Light*** to the ***No. 1 Contact Pin;*** unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.

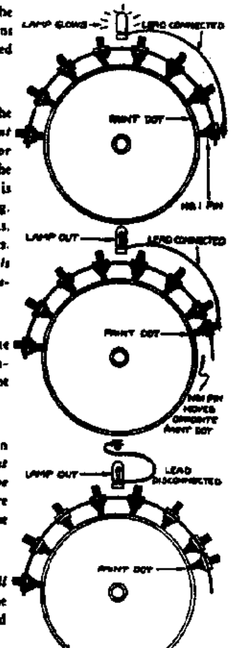
4. Observe the position of the ***Paint Dot*** on the edge of the ***Drum.*** Grasp the No. 1 pin firmly and slide it toward the ***Paint Dot,*** being careful not to break the connection between the ***Selector Light*** lead and the pin. When the pin is directly opposite the ***Paint Dot,*** the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making this setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. ***Be very careful not to move the Selector Drum while the pin is being set.*** When the pin is definitely in its proper position, ***Disconnect the Selector Light Lead from the Pin.***

5. Repeat the above procedure for the ***No. 2*** station; tune in the station, connect the ***Selector Light*** lead to the ***No. 2*** contact pin, move this pin opposite the ***Paint Dot*** so that the light goes out, then ***Disconnect the Selector Light Lead.***

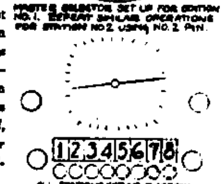
6. Using similar procedure, set up the other six stations, in each case using the ***Contact Pin*** bearing the ***same number as that assigned to the station being set up.*** Always ***Disconnect the Selector Light Lead*** as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.

7. After all the stations have been set up, locate the ***Call Letters*** of your stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets, and insert them in the proper pockets above the push buttons.

8. The only operations necessary to receive any of the eight stations set up as outlined above are: Turn the power switch on by rotating the lower left knob to the right—***turn the control a few degrees beyond the point at which the switch snaps on***—allow about one minute for the tubes to heat, press the button under the call letters of the desired station ***Holding the Button Down Until the Pointer Stops Moving and the Station is Heard,*** then adjust the tone and volume. Be sure that the ***Band Selector*** switch is in the proper position for reception of ***Standard Broadcast Stations.***



MASTER SELECTOR SET UP FOR STATION NO. 1. REPEAT SIMILAR OPERATIONS FOR STATION NO. 2 USING NO. 2 PIN.



ALL STATIONS SET UP. PLACE CALL LETTERS IN WINDOWS AS NUMBERED

OPERATING SUGGESTIONS

Be sure that your stations are listed in the proper order according to frequency or position on the dial. Do not confuse frequency (kilocycles) with wave length (meters).

Be sure that your stations are tuned in exactly before setting the contact pins.

Do not set up weak stations, or distant stations too weak to afford clear reception at all times.

Do not press more than one button at a time. Holdi down more than one button will cause inaccurate tuning, or the motor may not turn at all.

Do not leave the Selector Light Lead connected after pins are set up.

Do not run the motor for excessively long periods of time. While no damage will result, a protective cut-out will shut off the power to the motor after four to five minutes of ***continuous*** operation, and the automatic tuner will not function again until the motor has been allowed to cool for several minutes.

When tuning stations, ***do not release the button until the pointer stops moving.***

Do not attempt to set adjacent pins in the same slot too close together.

Do not expect good results unless a good outdoor antenna is used.

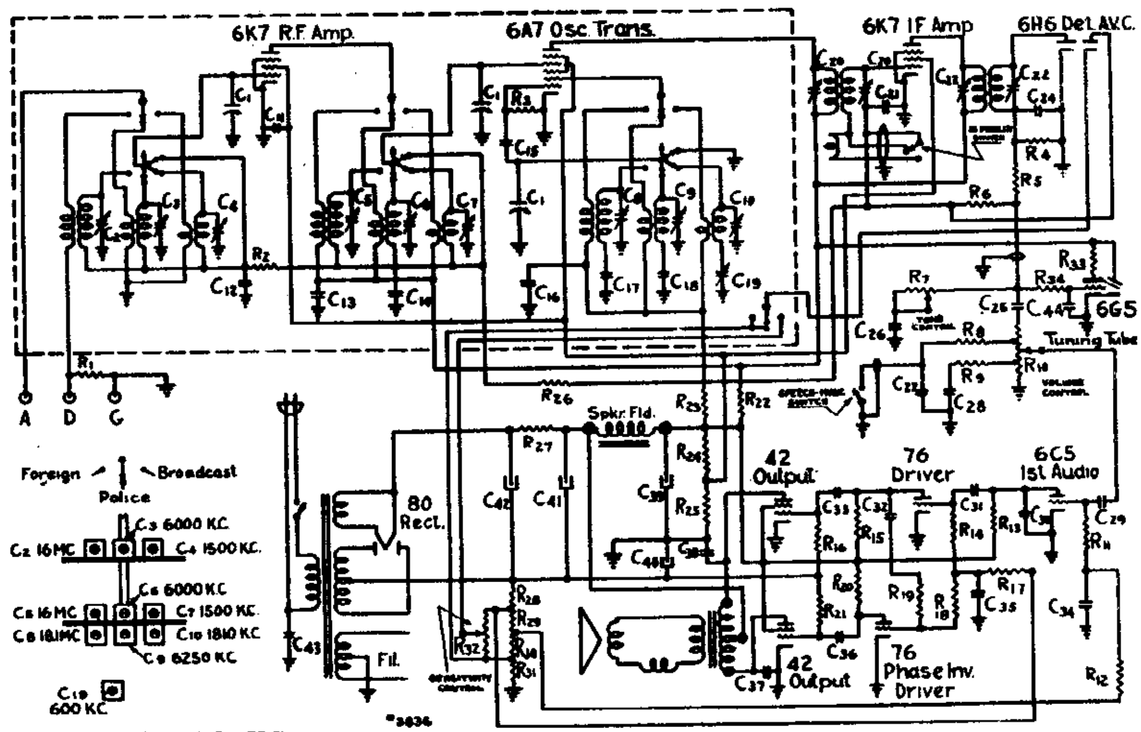
Do not change the relative positions of the contact pins; keep them in the same order as shown on the diagram (Figure 3).

MODEL D692, Early
Schematic

WESTERN AUTO SUPPLY CO.

Tubes

Tubes required are:
1—6K7 Radio frequency amplifier
1—6A7 Oscillator—translator
1—6K7 Intermediate frequency amplifier
1—6H6 Detector—automatic volume control
1—6C5 First audio amplifier
1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)
1—76 Driver
1—76 Driver-phase inverter
2—42 Power output
1—80 Rectifier



IF PEAK 456 KC

Symbol	Part No.	Description
C1	3814	9-400 mmf Variable
C2,3,4	3822	2-35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2-35 triple trimmer
C11,21,34	572	.1—200 V.
C12,14	580	.05 200 V.
C13	575	.1 400 V.
C15,24	2780	50 mmf mica
C16	568	.01 400 V.
C17	2694	.005 5% tolerance
C18	2741	1330 mmf 5% tolerance
C19	2560	350 mmf variable padder
C20,22		IF Trimmers
C25,28	2385	.02 200 V.
C26	2695	.003 600 V.
C27	824	.002 600 V.
C29	576	.02 400 V.
C30	1286	250 mmf mica
C31,33,36	2600	.02 600 V.
C32	563	.05 400 V.
C35	579	.25 200 V.
C37,38	3138	.001 800 V.
C39	3113	16 MF regulating
C40	3136	20 MF 25 V.
C41	3112	16 MF 450 V.
C42	3111	16 MF 500 V.
C43	3135	.003 800 V.
R1,5,15,20,26	603	100 M 1/3 W.
R2,3,13	631	50 M 1/3 W.
R4,14,16,21	615	500 M 1/3 W.
R6	2693	2 meg 1/3 W.
R7	3799	2 meg tone control
R8,17	2568	300 M 1/3 W.

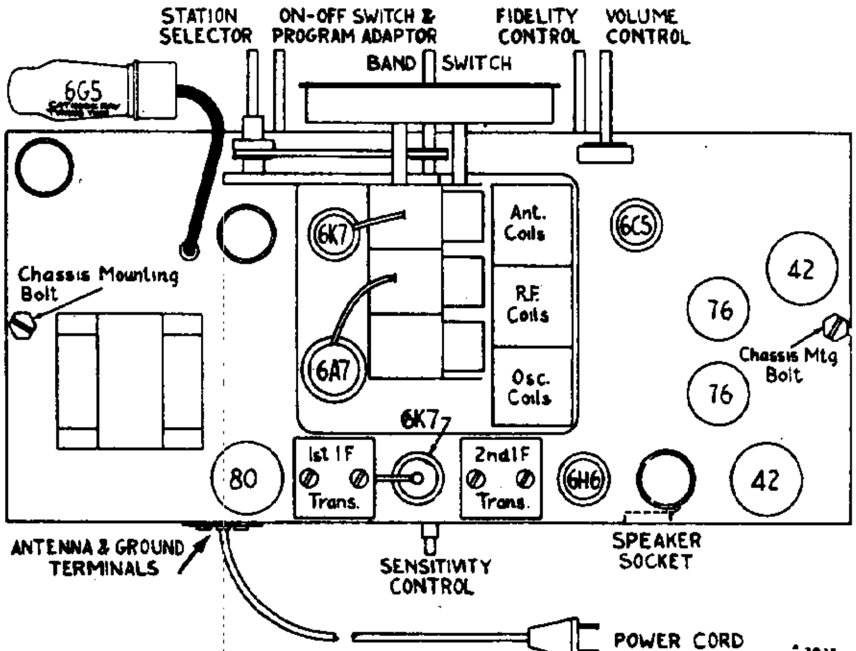
Symbol	Part No.	Description
R9,23	617	20 M 1/3 W.
R10	3800	3 meg volume control
R11,12	624	1 meg 1/3 W.
R18	2688	60 M 1/3 W. 10%
R19	2731	500 M 1/3 W. 10%
R22	2421	1 M 1/3 W.
R24	3805	7 M 3.5 W.
R25	3805	8 M 1.5 W.
R27	3809	100 ohms 2 W. 10%
R28	3806	120 ohms 1.5 W. 10%
R29	3808	50 ohms .75 W. 10%
R30	3807	35 ohms .5 W. 10%
R31	3870	15 ohms .5 W. 10%
R32	3801	2 M Variable
	3796	Power transformer
	3797	No. 1 IF transformer
	3798	No. 2 IF transformer
	2981	Tuning tube cable
	3838	12" Speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3825	Planetary drive
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	3832	Tuning pointer
	3802	On-off switch
	3818	RF and Antenna switch
	3819	Oscillator switch

MODEL D692,Early
MODEL D694
Alignment,Socket
Trimmers

WESTERN AUTO SUPPLY CO.

MODEL D-692 (EARLY)

TUBE LAYOUT *and* CONNECTION DIAGRAM



Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

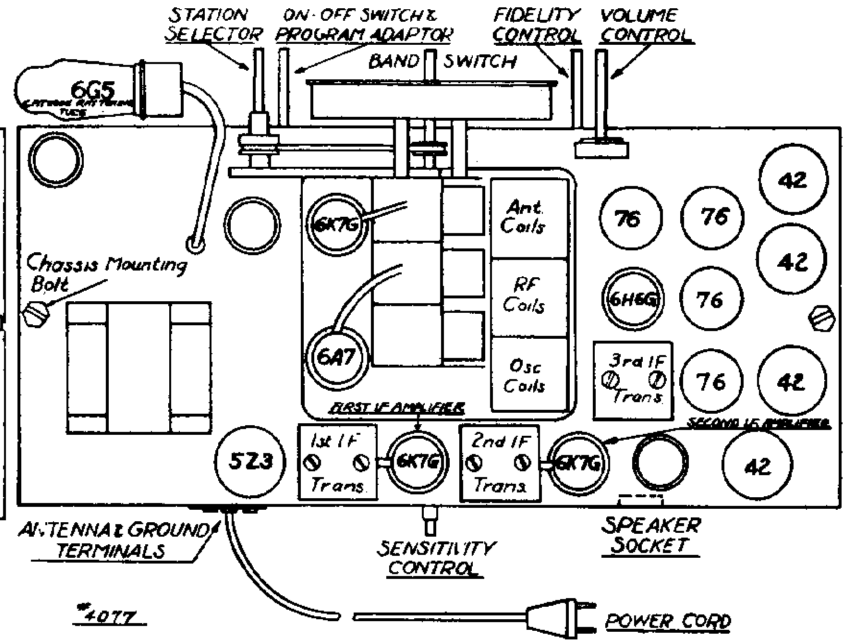
Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position."

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6K7 IF amplifier tube and aline second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

MODEL D-694



Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6K7G second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6K7G first IF amplifier. Repeat for transformer No. 1, applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

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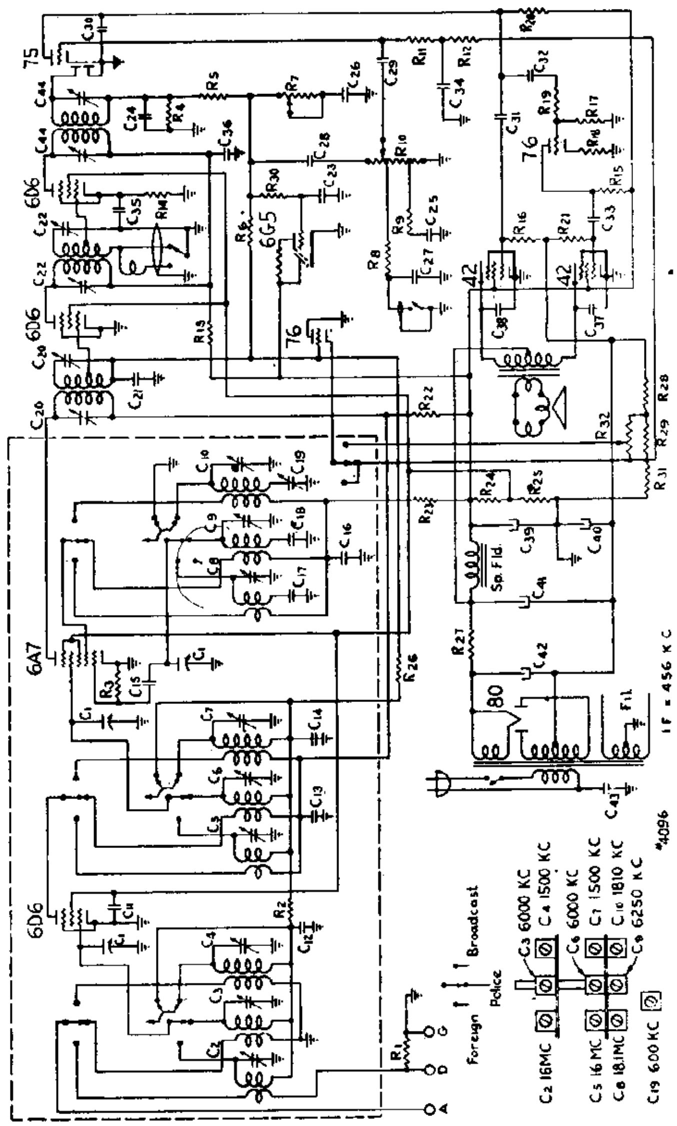
MODEL D692, Late
Schematic
Alignment

WESTERN AUTO SUPPLY CO.



ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

IF. Connect the generator ground to receiver chassis. Using .1 mfd condenser in series with high side of generator, apply 456 kc signal to grid of 6D6 second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6D6 first IF amplifier. Repeat for transformer No. 1, applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

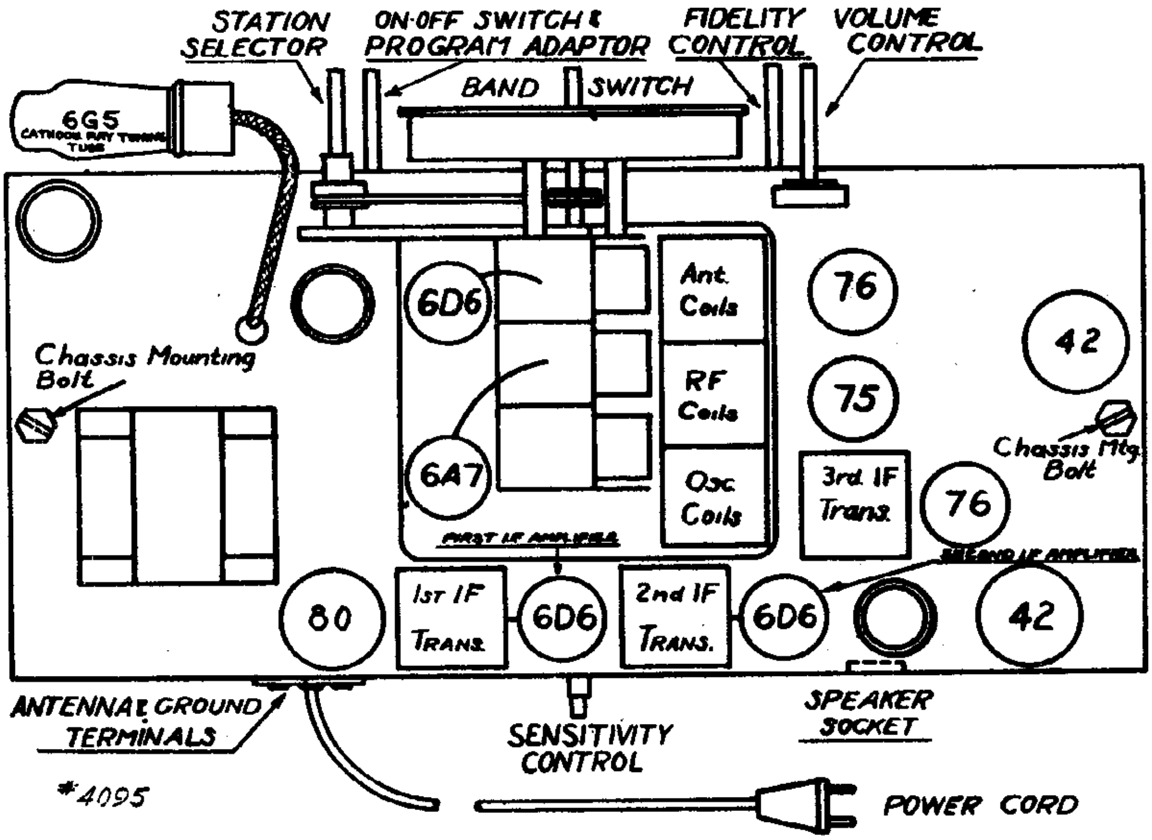
Symbol	Part No.	Description	Symbol	Part No.	Description
C1	3814	9-400 mmf Variable	R10	3800	3 meg volume control
C2,3,4	3822	2-35 triple trimmer	R11,12	624	1 meg 1/3 W.
C5,6,7	3822	2-35 triple trimmer	R13,14,22	2421	1 M 1/3 W.
C8,9,10	3822	2-35 triple trimmer	R17	2880	100 M 1/3 W. 10 %
C11,21,34	572	.1-200 V.	R18	614	5 M 1/3 W.
C12,14,23	580	.05-200 V.	R19	2731	500 M 1/3 W. 10%
C13	575	.1-400 V.	R20	598	200 M 1/3 W.
C15,24	2780	50 mmf mica	R24	3805	7 M 3.5 W.
C16,35	568	.01-400 V.	R25	3805	8 M 1.5 W.
C17	2694	.005 5% tolerance	R27	3809	100 ohms 2 W. 10%
C18	2741	1330 mmf 5% tolerance	R28	3806	120 ohms 1.5 W. 10%
C19	2560	350 mmf variable padder	R29	4111	85 ohms 1.0 W. 10%
C20,22,44		IF Trimmer	R30	2106	3 meg 1/3 W.
C25	4072	.03-200 V.	R31	3870	15 ohms .5 W. 10%
C26	2695	.003-600 V.	R32	3801	2 M variable
C27	824	.002-600 V.	R2,3	631	50 M 1/3 W.
C28,29	576	.02-400 V.	R4,16,21	615	500 M 1/3 W.
C30	1286	250 mmf mica	R6	2693	2 meg 1/3 W.
C31,33	2600	.02-600 V.	R7	3799	2 meg tone control
C32,36	563	.05-400 V.	R8	2568	300 M 1/3 W.
C37,38	3138	.001-800 V.	R9,23	617	20 M 1/3 W.
C39	3113	16 MF regulating			
C40	3136	20 MF 25 V.			
C41	3112	16 MF 450 V.			
C42	3111	16 MF 500 V.			
C43	3135	.003-800 V.			
R1,5,15,26	603	100 M 1/3 W.			

Part No.	Description
3796	Power transformer
4061	No. 1 IF transformer
4060	No. 2 IF transformer
3968	No. 3 IF transformer
2981	Tuning tube cable
3838	12" Speaker
2898	Tuning tube clamp
3815	RF coil
3943	Oscillator coil
3817	Antenna coil
4105	Drive belt
3198	Idler pulley
3199	Idler spring
3831	Minute pointer
3832	Tuning pointer
3802	On-off switch
3818	RF and Antenna switch
3819	Oscillator switch

MODEL D-692 (LATE)

MODEL D692, Late
Socket, Trimmers
Antenna Data

WESTERN AUTO SUPPLY CO.



Tubes must be in proper position and connected as shown.

Tubes required are:
1—6D6 Radio Frequency Amplifier
1—6A7 Oscillator-translator
2—6D6 Intermediate Frequency Amplifiers
1—76 Automatic Bias Control
1—75 Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
2—42 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Do not use tubes of types different from those shown above. When replacing tubes or checking connections, refer to the TUBE LAYOUT CHART.

Connections

Turn the lower right knob to the left as far as it will go. This turns the power switch "off."

Connect the antenna and ground leads to the receiver as shown on the diagrams below. For use with a single wire antenna, connect as shown on Figure 1. If used with a doublet antenna, connect according to Figure 2.

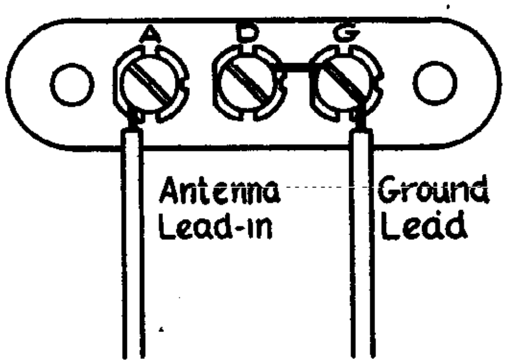


Fig. 1

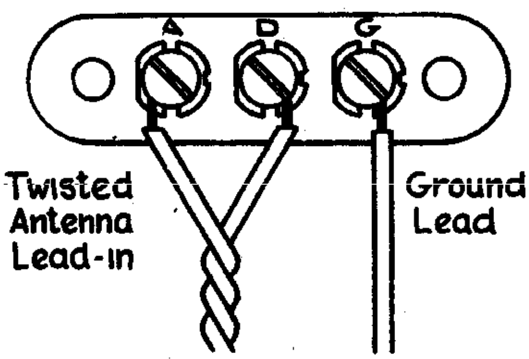


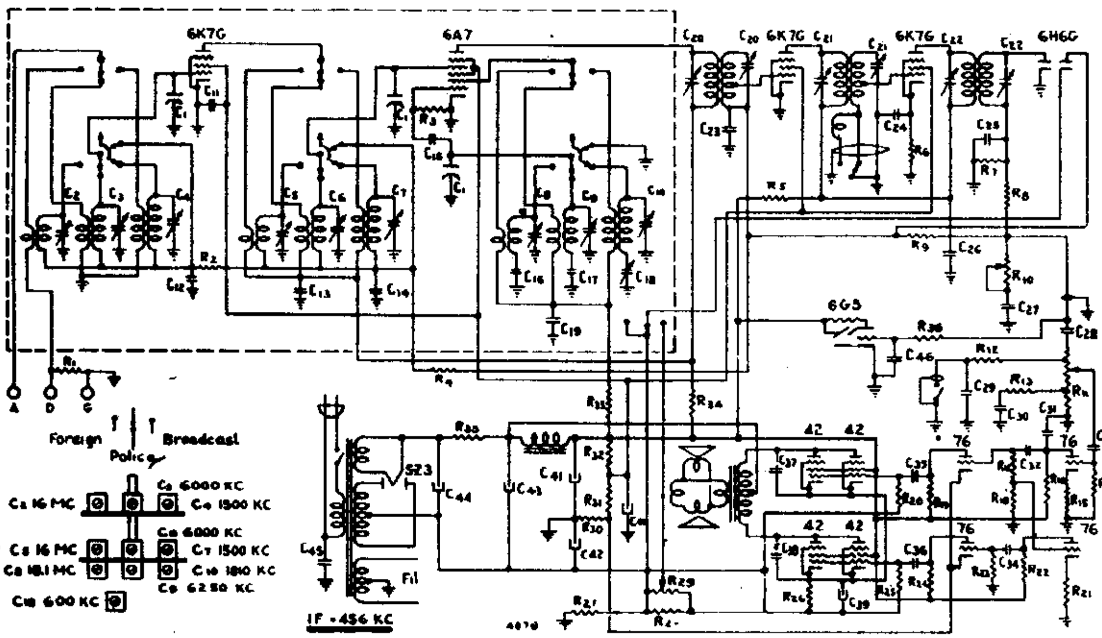
Fig. 2

MODEL D694
Schematic

WESTERN AUTO SUPPLY CO.

Tubes

Tubes required are:
1—6K7G Radio frequency Amplifier
1—6A7 Oscillator—Translator
2—6K7G Intermediate frequency Amplifiers
1—6H6G Detector—AVC—Bias control
1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)
1—76 First Audio Amplifier
1—76 Phase Inverter
2—76 Drivers
4—42 Power Output
1—5Z3 Rectifier



FOR ALIGNMENT, SEE INDEX

Symbol	*Part No.*	*Description*
C1	3814	9-400 mmf variable
C2,3,4	3822	2-35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2-35 triple trimmer
C11,23	572	.1 200V.
C12,14,46	580	.05 200V.
C13	575	.1 400V.
C15,25	2780	50 mmf mica
C16	2694	.005 5% tolerance
C17	2741	1330 mmf 5% tolerance
C18	2560	350 mmf variable padder
C19,24	568	.01 400V.
C20,21,22		IF trimmers
C26	563	.05 400V.
C27	2695	.003 600V.
C28,33	576	.02 200V.
C29	824	.002 600V.
C30	4072	.03 200V.
C31	1286	250 mmf mica
C32,34,35,36	2600	.02 600V.
C37,38	3138	.001 800V.
C39,42	4071	20 MF 35 WV.
C40	3079	8 MF 150V.
C41	~~4062~~	~~30 MF 275V. Reg.~~
C43	3112	16 MF 450V.
C44	3111	16 MF 500V.
C45	3135	.003 800V.
R1,4,8,16,19,22,24	603	100 M 1/3 W.
R2,3	631	50 M 1/3 W.
R5,6,34	2421	1 M 1/3 W.
R7,23	615	500 M 1/3 W.
R9	2693	2 meg 1/3 W.
R10	3799	2 meg tone control
R11	3800	3 meg volume control

Symbol	*Part No.*	*Description*
R12,20,25	2568	300 M 1/3 W.
R13,33	617	20 M 1/3 W.
R14	624	1 meg 1/3 W.
R15,21	614	5 M 1/3 W.
R17	2731	500 M 10% 1/3 W.
R18	2880	100 M 10% 1/3 W.
R26	4068	300 ohm 10% 3 W. flex.
R27	3808	50 ohm 10% ¾ W. flex.
R28	4069	200 ohm 10% 2 W. flex.
R29	3801	2 M variable
R30	639	750 ohm 1/3 W.
R31	3805	8 M 1.5 W.
R32	3805	7 M 3.5 W.
R35	4070	100 ohm 10% 3 W. flex
	4058	Power transformer
	4061	No. 1 IF transformer
	4060	No. 2 IF transformer
	3968	No. 3 IF transformer
	2981	Tuning tube cable
	4082	12" Dynamic speaker
	4079	12" P.M. speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3825	Planetary drive
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	3832	Tuning pointer
	3802	On-off switch
	3818	RF and antenna switch
	3819	Oscillator switch

MODEL D695(1936)
Socket, Trimmers
Phono. Data, Coils

WESTERN AUTO SUPPLY CO.

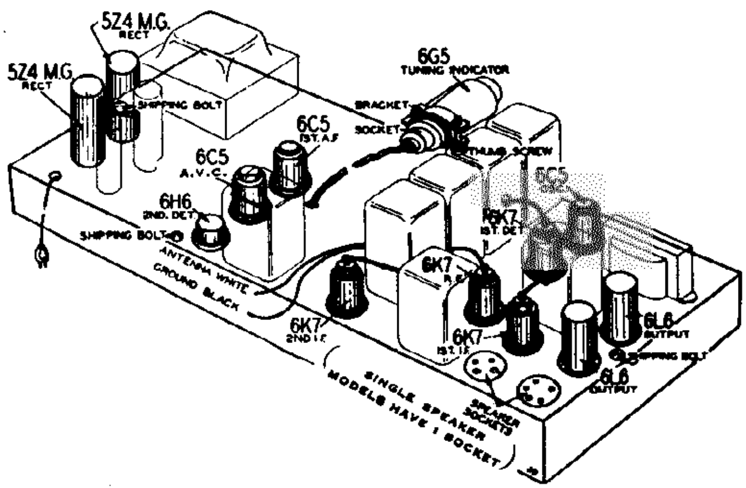


Fig. 5—Location of Tubes

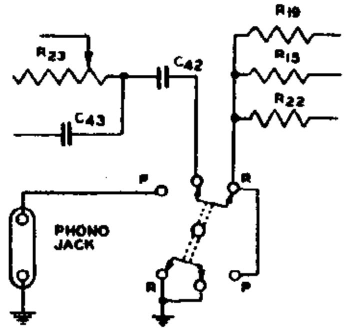


Fig. 7—Phonograph Connections

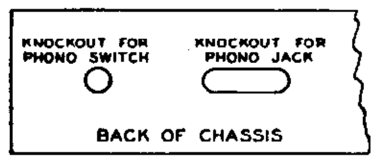
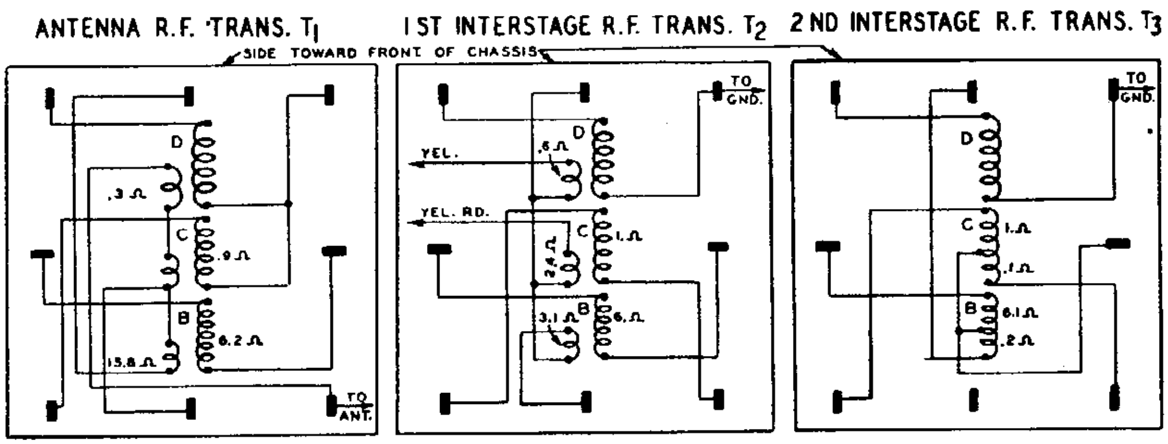


Fig. 8—Location of Phono Knockouts



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

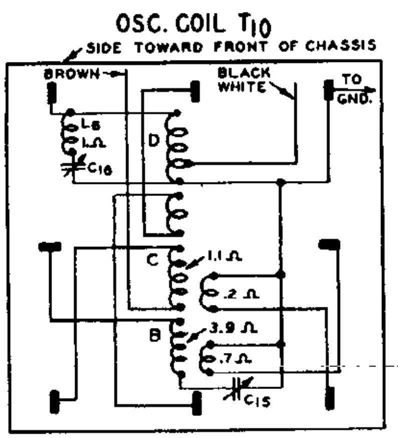


Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

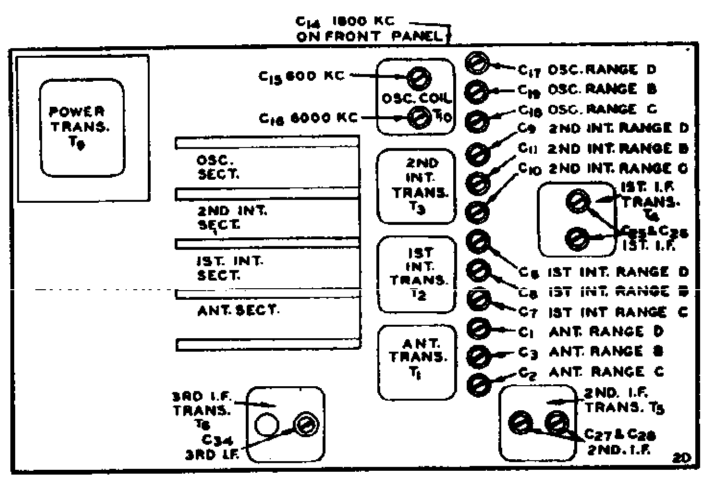
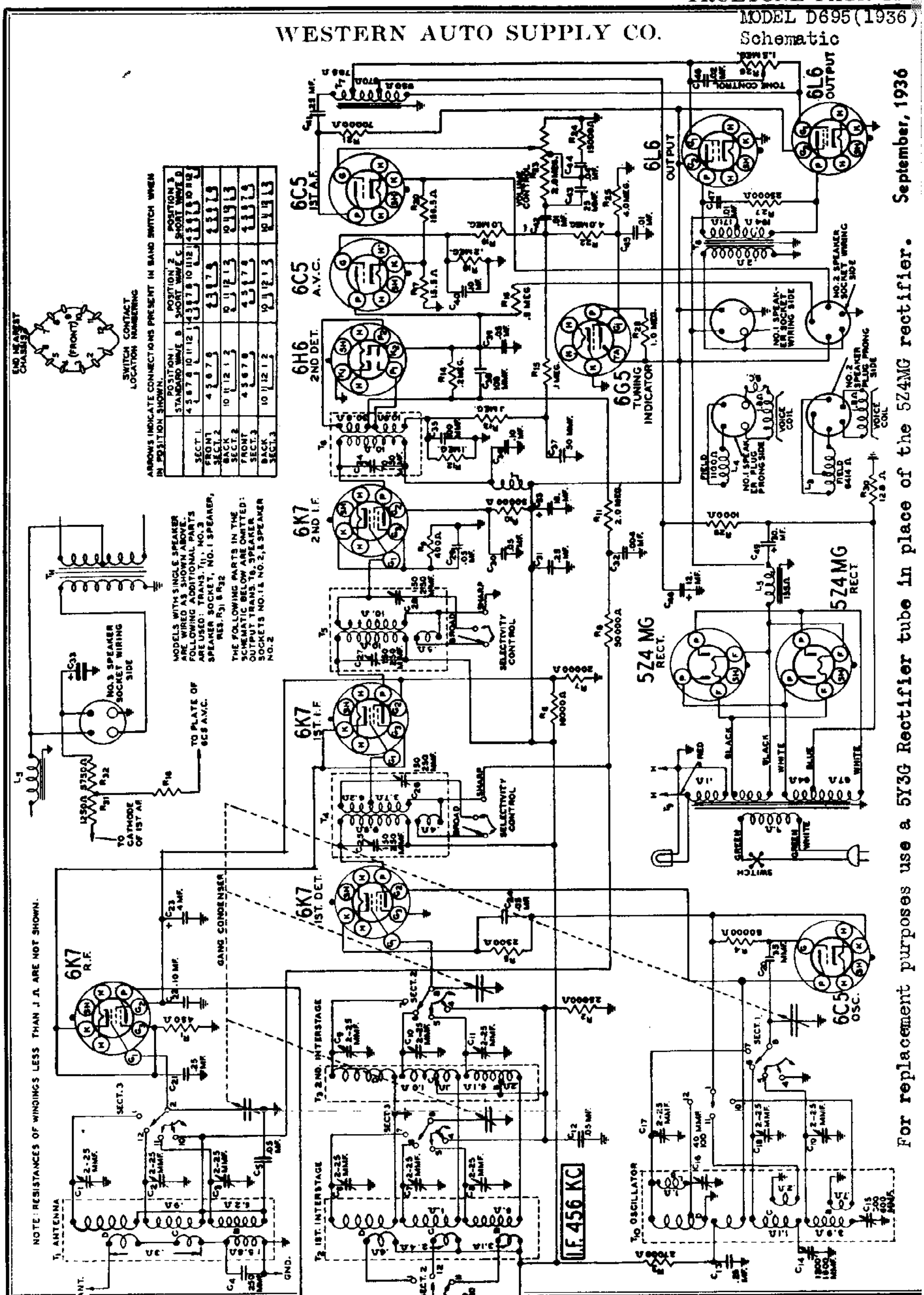


Fig. 3—Location of Trimmers

WESTERN AUTO SUPPLY CO.



For replacement purposes use a 5Y3G Rectifier tube in place of the 5Z4MG rectifier.

September, 1936

MODEL D695(1936)
Voltage, Alignment
Phono, Data, Notes

WESTERN AUTO SUPPLY CO.

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

In sets using the moving beam of light, there is moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Retighten the screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required as shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which C42 was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6C5 1st audio grid lead by running it between the volume control and the filter choke and then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Line Voltage: 115
Volume Control: Maximum

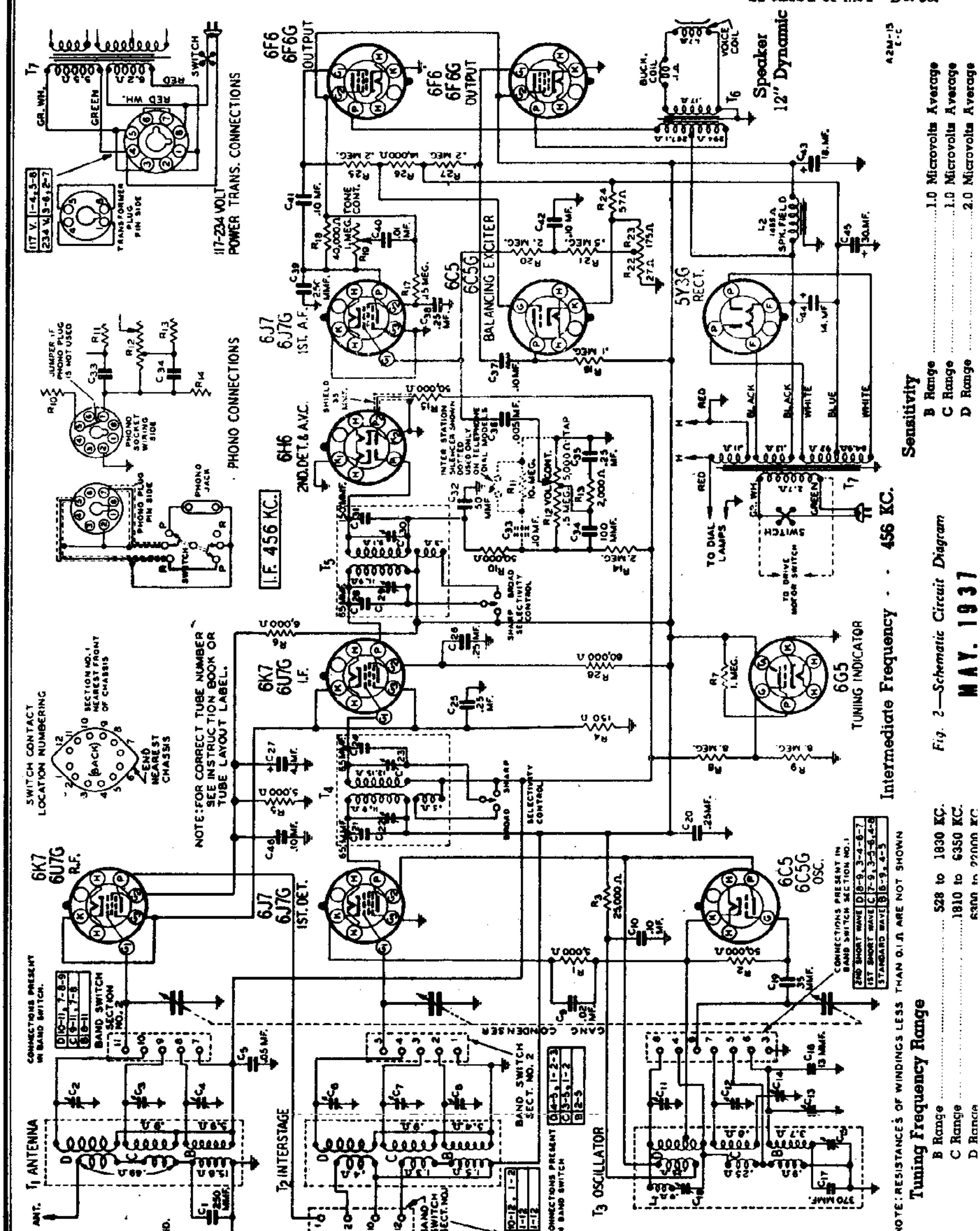
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (unless otherwise indicated) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.2 (1)	250	110	7.5 (2)		6.2 (1)	7.5 (2)
6K7	1st Det.	0	6.2 (1)	250	110			6.2 (1)	9.0
6C6	Osc.	0	6.2 (1)	110				6.2 (1)	
6K7	1st I.F.	0	6.2 (1)	250	110	7.5		6.2 (1)	7.5 (2)
6K7	2nd I.F.	0	6.2 (1)	250	146	8 (2)		6.2 (1)	8.0
6H6	2nd Det.	0	6.2 (1)					6.2 (1)	
6C6	A.V.C.	0	6.2 (1)	5 (3)				6.2 (1)	8.5
6C6	1st A.F.	0	6.2 (1)	130				6.2 (1)	6.0
6L6	Power	0	6.2 (1)	260	250	20 (4)		6.2 (1)	
5Z4MG	Rectifier	0	5.0 (5)		1024 (6)		1024 (6)		5.0 (5)
6G5	Tuning Indicator	Plate to Ground 25 (3)		Target to Ground 250		Cathode to Ground 0		Across Heater 6.3 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with 500,000 ohm meter.
(4) As read across R-38.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

MODEL D697
Schematic, Phono. Dat
Transformer Data

WESTERN AUTO SUPPLY CO.



Selectivity - - 27 KC Broad at 1000 times Signal (Sharp)

Power Consumption - 100 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 9.8 Watts Undistorted, 12 Watts Maximum

MODEL D697
Alignment, Circuit Data
Trimmers, Coils

WESTERN AUTO SUPPLY CO.

11 TUBE • 3 BAND • ALL WAVE

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C14)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C18)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 6000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

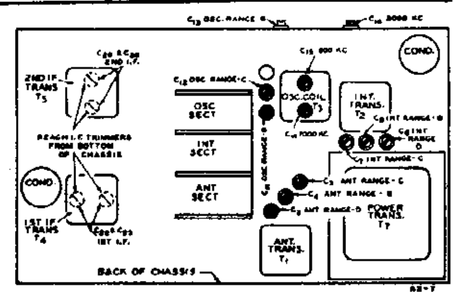


Fig. 3—Location of Trimmers

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

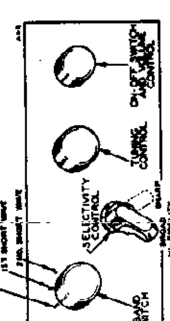


Fig. 1—Arrangement of Controls

Referring to the 1st and 2nd I.F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R12 is a filter composed of condensers C34 and C35 and resistor R13. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7 1st A. F. tube. The output of this tube is fed thru resistance coupling into the 6F6 output tube shown nearest to it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6C5 balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6 output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

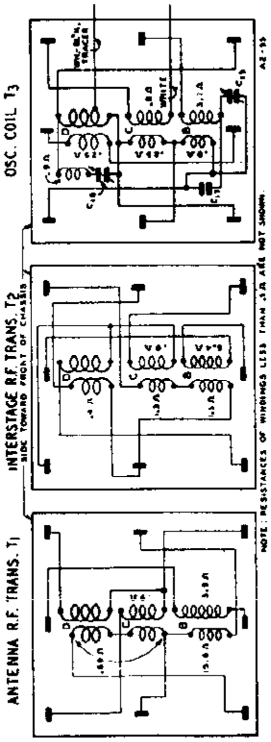


Fig. 6—Coil Terminal Arrangement and DC Resistance of Windings

MODEL D697
Voltage, Socket
Changes, Phono. Data
Parts List

WESTERN AUTO SUPPLY CO.

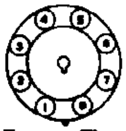


Fig. 7—Octal Tube Terminal Numbering (bottom of socket).

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true—the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic. METAL TUBES ARE IN SAME POS. AS GLASS EQUIVALENTS SHOWN IN LAYOUT

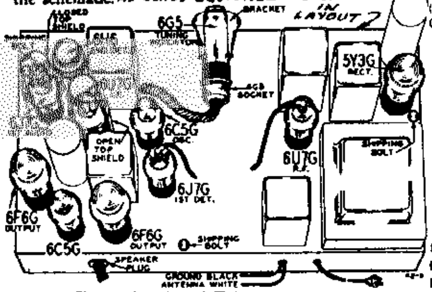


Fig. 4—Location of Tubes

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—see Fig. 2.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Notes issued for this chassis. (see index)

Changes in Later Models

Later models of this series have the following changes incorporated in them.

On the first models, the 2nd I.F. Coil was not expanded. In other words, the extra selectivity coupling winding was not incorporated in the early type coil. Models with the letter "C" or any later issue stamped on the chassis use the new type coil with the selectivity coupling winding. Because of the change in coil connections, the selectivity switch used on the late model is not interchangeable with that on the early model.

When ordering parts, therefore, it is important that the issue letter on the chassis be noted and the correct part number as shown in the parts list be specified.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7 6U7G	R.F.	0	6.1 (1)	250	105	2.5		6.1 (1)	2.5
6J7 6J7G	1st Det.	0	6.1 (1)	250	125	0		6.1 (1)	5.8
6C5 6C5G	Osc.	0	6.1 (1)	125 (2)				6.1 (1)	0
6K7 6U7G	I.F.	0	6.1 (1)	250	100	2.5		6.1 (1)	2.5
6H6	2nd Det.—A.V.C.	0	6.1 (1)					6.1 (1)	0
6J7 6J7G	1st A.F.	0	6.1 (1)	110	120	0 (3)		6.1 (1)	0 (3)
6C8 6C5G	Balancing Exciter	0	6.1 (1)	100				6.1 (1)	18.5
6F6 6F6G	Output	0	6.1 (1)	330	250			6.1 (1)	0 (4)
5Y3G	Rectifier	0	4.8 (5)		730 (6)		730 (6)		4.8 (5)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.
(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

The R.F. circuit of early models was slightly different from that used in later models. The screen grids of the R.F. and I.F. tubes now supplied by separate voltage sources were formerly connected together and supplied from a single source. On the latter models, resistor R 28 and condenser C 46 were not used.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A256	Tube Socket—Octal (7 Prong)	$0.15
3A263	Tube Socket—Octal (8 Prong)	.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A262	Speaker Socket (4 Prong)	.15
13X215	Tuning Eye Tube Socket and Cable Assembly	.55
3A264	Phono Socket—Octal (4 Prong)	.10
3A252	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above Socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

Part No.	Description	List Price
12A269	12" Dynamic Speaker, complete with Output Trans. (T6)	7.70
	Cone and Voice Coil Assembly for above speaker	4.60
	Output Transformer only (T6)	2.45

KNOBS

	Description	List Price
Specify Name of Knob & Name & Model of Radio	Volume Control Knob	.15
	Tone Control Knob	.15
	Tuning Control Knob	.15
	Band Switch Knob	.20
	Selectivity Control Knob	.25

GENERAL

Part No.	Description	List Price
25X378	Clamp Bracket for Tuning Eye Tube	.10
32X50	Tube Shield—Closed Top (Used on glass and metal tube chassis)	.15
32X32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
32X51	Tube Shield Base	.10
2X38	Felt Washers (Used Behind Knobs) doz.	.10
8X23	Rubber Cushions (Chassis Mounting)	.10
30X44	Grid Clip only doz.	.10
2A78	Selectivity Switch (Early Type—Used when 2nd I.F. is not expanded)	.40
2A83	Selectivity Switch (Late Type—Used when 2nd I.F. is expanded)	.45
4A38	Terminal Strip (1 lug insulated, one lug used for mtg.)	.10
4A53	Terminal Strip (3 lugs insulated, mounting hole used)	.10
4A68	Terminal Strip (2 lugs insulated)	.10
13X214	Antenna and Ground Lead Assembly	.30
13X80	Line Cord and Plug	.50
2A79	Band Switch (2 section, 3 position)	1.65

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A779	T1	Antenna Transformer and Can Assembly	$2.15
9A780	T2	R.F. Interstage Transformer and Can Assembly	2.30
9A781	T3	Oscillator Coil and Can Assembly	3.40
9A782	T4	1st I.F. Transformer and Can Assembly	2.40
9A783	T5	2nd I.F. Transformer and Can Assembly (Early Type—Without selectivity coupling winding)	2.75
~~9A887~~	~~T5~~	~~2nd I.F. Transformer and Can Assembly (Late Type—~~ With selectivity coupling winding)	2.75
	T6	Output Transformer (See "Speakers")	
53X148	T7	117 Volt, 60 Cycle, Standard Power Transformer	4.45
53X149	T7	117 Volt, 25 Cycle, Standard Power Transformer	7.15
53X150	T7	117-234 Volt, 40-60 Cycle, Universal Power Transformer	5.75

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X187	C9	.02 mf.	180	.15
46X108	C10	.10 mf.	340	.20
46X121	C20	.25 mf.	360	.30
46X117	C25	.25 mf.	180	.25
44X121	C26	.25 mf.	360	.30
46X98	C33	.10 mf.	180	.20
46X197	C35	.25 mf.	180	.25
46X147	C36	.006 mf.	360	.15
46X105	C37	.10 mf.	360	.20
46X121	C38	.25 mf.	360	.30
46X161	C40	.01 mf.	600	.16
46X108	C41	.10 mf.	360	.20
46X98	C42	.10 mf.	180	.20
*46X161	C46	.10 mf.	240	.15

CONDENSERS (Cont.)

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
45X223	C27	4 mf.	150 Dry	$0.75
44X11	C43	18 mf.	290 Wet	1.10
44X30	C44	14 mf.	450 Wet	1.00
45X222	C45	30 mf.	25 Dry	.90

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C1	250 mmf.	.15
47X81	C19	35 mmf.	.35
47X56	C32	50 mmf.	.40
47X57	C34	100 mmf.	.40
47X85	C39	250 mmf.	.15

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A73	C2	2-25 mmf.	Range "D" Antenna Trimmer	.35
	C3	2-25 mmf.	Range "C" Antenna Trimmer	
	C4	3-75 mmf.	Range "B" Antenna Trimmer	
17A78	C6	2-25 mmf.	Range "D" Interstage Trimmer	.35
	C7	2-25 mmf.	Range "C" Interstage Trimmer	
	C8	2-25 mmf.	Range "B" Interstage Trimmer	
17A76	C11	2-25 mmf.	Range "D" Oscillator Trimmer	.35
	C12	2-25 mmf.	Range "C" Oscillator Trimmer	
17A68	C13	1-12 mmf.	Range "B" Oscillator Trimmer	.20
17A75	C14	1300-1700 mmf.	2000 KC Adjustment	.50
17A69	C15	40-120 mmf.	Oscillator 600 KC Adjustment	.40
	C18	40-180 mmf.	Oscillator 2000 KC Adjustment	
17A70	C22	15-55 mmf.	1st I.F. Trimmer	.40
	C23	15-55 mmf.		
17A70	C29	15-55 mmf.	2nd I.F. Trimmer	.40
	C30	15-55 mmf.		

MISCELLANEOUS

Part No.	Code	Capacitance	Description	List Price
47X80	C16	13 mmf.	Compensating Capacitor	.50
47X89	C17	370 mmf.	Iron Clad	.30
47X91	C21	65 mmf.	Iron Clad	.25
47X91	C24	65 mmf.	Iron Clad	.25
47X91	C28	65 mmf.	Iron Clad	.25
47X83	C31	150 mmf.	Iron Clad	.35
14A70			3 Section Gang Condenser (less dial and drive assembly)	4.20

* Used on late models only.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94502	R1	5,000 Ohm	0.2	$0.15
A94503	R2	50,000 Ohm	0.2	.15
C94253	R3	25,000 Ohm	1.0	.15
A94151	R4	150 Ohm	0.2	.15
E94502	R5	5,000 Ohm	3.0	.30
G94602	R6	6,000 Ohm	5.0	.40
A95105	R7	1 Megohm	0.2	.10
A94805	R8	8 Megohm	0.2	.15
A94805	R9	8 Megohm	0.2	.15
A95503	R10	50,000 Ohm	0.2	.10
A95106	R11	10 Megohm	0.7	.10
A94202	R13	2,000 Ohm	0.2	.15
A95205	R14	2 Megohm	0.2	.10
A95503	R15	50,000 Ohm	0.2	.10
A94104	R16	100,000 Ohm	0.2	.15
A94154	R17	150,000 Ohm	0.2	.15
B94403	R18	40,000 Ohm	0.5	.15
A95205	R20	2 Megohm	0.2	.10
A95504	R21	500,000 Ohm	0.2	.10
B93570	R24	57 Ohm	0.5	.20
A93204	R25	200,000 Ohm	0.2	.20
A93143	R26	14,000 Ohm	0.7	.20
A95204	R27	200,000 Ohm	0.2	.10
*B94803	R28	80,000 Ohm	0.5	.15

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X77	R22	27 Ohm	0.25	.30
	R23	175 Ohm	2.0	

VARIABLE

Part No.	Code	Resistance	Description	List Price
36X236	R12	500,000 Ohm	Volume Control and On-Off Switch	1.00
40X224	R19	1 Megohm	Tone Control	.65

* Used on late models only.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X290	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.65
3A264	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
18A90	Knob Only of Phono Cable	.20

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE NOTES. (see index)

Prices Subject to Change Without Notice.

MODEL D697
MODEL D698
Telephone Dial Data

WESTERN AUTO SUPPLY CO.

NOS. 9, 10, & 11—17 BUTTON TELEPHONE DIAL

NOS. 3 & 7—PHANTOM LIGHT DIAL

APRIL, 1937

Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.

No. 11 Dial—Same as No. 9 Dial except push buttons are brown.

No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in escutcheon ring. Equipped with visible tone and volume indicators.

No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.

No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.

The following description will identify the chassis used with the above dials:

8 Tube---D698

11 Tube---D697

Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on an assembly attached at the front of the chassis. An examination of this assembly will clearly show the method of operation.

Silencer Circuit—A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

Telephone Dial Adjustments

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

If Noise Occurs on All Buttons—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to insure a good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

If Noise Occurs on One Button Only—This is due to a poor contact between the pulley ring stud, spring, contact washer, and contact ring—See Fig. 1. Clean all of these items of the particular button, in the same manner as mentioned previously, so as to provide a good electrical connection.

Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord tension pulley. Loosen the tension pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not com-

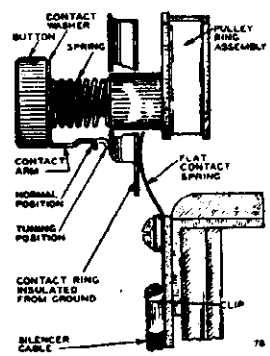


Fig. 1—Silencer Assembly

pletely open or close. The travel of the rotor in this respect is controlled by the gang stop pin on the pulley ring—See Fig. 4. This is necessary to protect the gang condenser in case the telephone dial is swung rapidly to either of the extreme positions. When the gang stop pin is properly set, it will serve as the stop at both extreme positions. If the rotor is seen to open completely or close completely, the stop pin should be pulled back and re-set to overcome this condition.

Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

Telephone Dial Replacements

Replacing Complete Dial and Condenser Assembly

Remove the grid lead clip from tube grid cap.

Remove silencer cable from the contact spring assembly. Unsolder dial lamp lead from terminal of tube socket.

Unsolder the three stator section connections of the gang condenser. Unsolder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a cotter pin. Remove only the cotter pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushions slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the procedure as given above.

Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from prong of the tube socket. Pull this lead through and out to the front of the assembly.

Remove the four escutcheon screws which hold the escutcheon ring and glass crystal in place. The dial scale pointer is removed by unhooking it from the center stud. Unscrew and remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin (Fig. 2) is directly in back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the center position—See Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—See. Fig. 2.

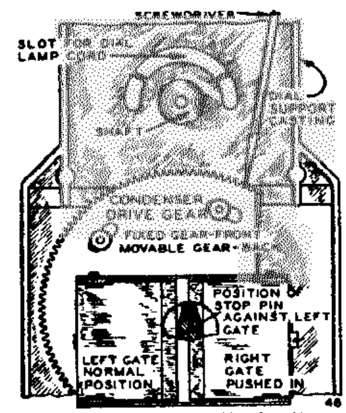


Fig. 2—Replacing Pulley Ring Assembly

Place the pulley ring assembly on the shaft with the knot of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the pulley ring gear and through the long slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) ½ revolution until the stop pin passes over the right gate and comes to rest against the left gate—See Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the *fixed gear only* (front) of the condenser drive gear assembly. Hold the pulley ring assembly and with a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—See Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, lay the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button spacer ring. Center the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

Replace the drive cord as explained in the article "Replacing Drive Cord."

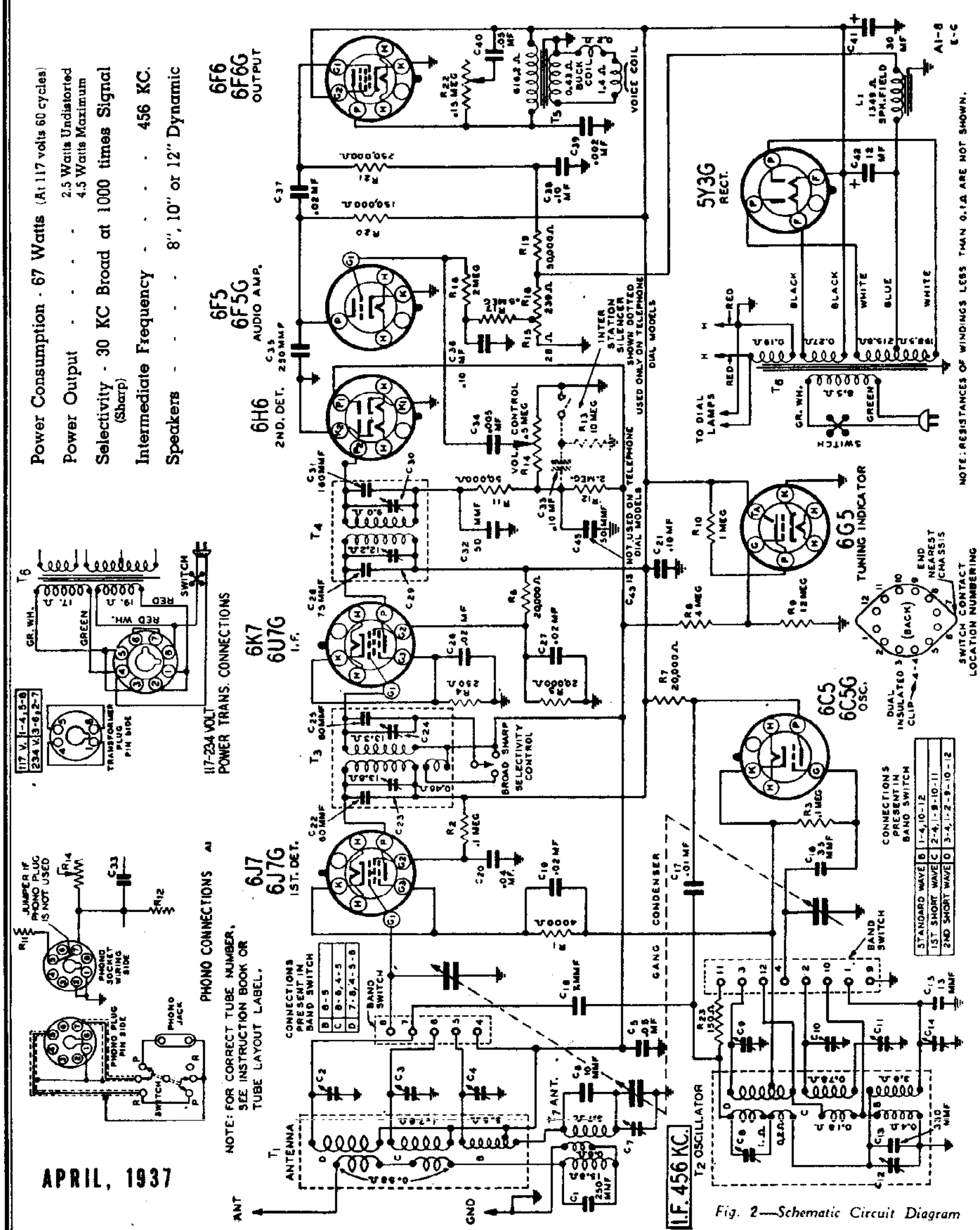
Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in the article "Replacing Pulley and Button Ring Assembly."

The stop gate assembly is then removed by taking out the two screws at the bottom of the assembly.

MODEL D698
Schematic, Phono.
Transformer Data

WESTERN AUTO SUPPLY CO.



APRIL, 1937

Fig. 2—Schematic Circuit Diagram

Tuning Frequency Range

B Range	528 to 1830 KC.
C Range	1810 to 6350 KC.
D Range	6300 to 22000 KC.

Sensitivity

B Range	8 Microvolts Average
C Range	13 Microvolts Average
D Range	9 Microvolts Average

MODEL D698
Alignment, Voltage
Socket, Trimmers, Coils

WESTERN AUTO SUPPLY CO.

8 TUBE • 3 BAND • ALL WAVE

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C23) & (C24)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C12)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

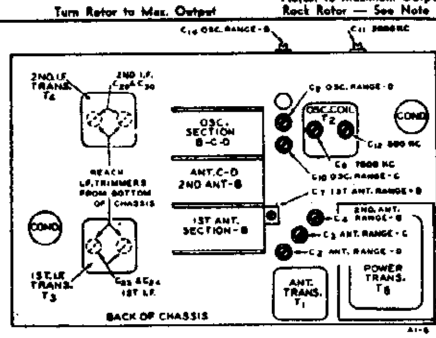


Fig. 3—Location of Trimmers

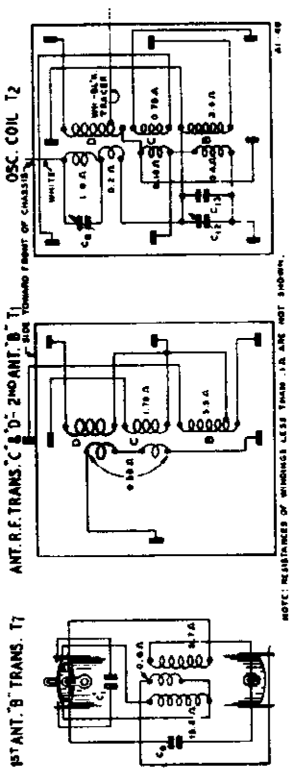


Fig. 7—Coil Terminal Arrangement and D.C. Resistance of Windings

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the side panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Early Models—A few of the early models did not have the circular knockout for the phonograph socket as mentioned above. If a phonograph installation is to be made in connection with one of these early models, write the factory for detailed instructions.

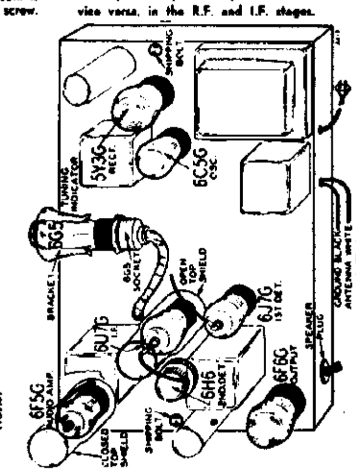


Fig. 4—Location of Tubes

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
6J7 6J7G	1st Det.	0	6.1(1)	220	100	7.9		6.1(1)	7.9
6C5 6C5G	Osc.	0	6.1(1)	140				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	220	100	2		6.1(1)	2
6H6	2nd Det.	0	6.1(1)		0			6.1(1)	0
6F5 6F5G	Audio Amp.	0	6.1(1)		75			6.1(1)	0(2)
6F6 6F6G	Power	0	6.1(1)	215	220			6.1(1)	0(3)
5Y3G	Rectifier	0	4.9(4)		610(5)		610(5)		4.9(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 220		Cathode to Ground 0		Across Heater 6.1 A. C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

MODELS D701,D721,S721(1936)

WESTERN AUTO SUPPLY CO. Schematic, Specifications

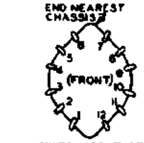
Power Consumption . . 85 Watts (At 115 volts 60 cycles)
Power Output . . . . 3 Watts Undistorted
Selectivity . . . . 28 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency . . . . 456 KC.
Speaker . . . . 8" and 10" Dynamic

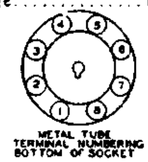
Tuning Frequency Range
B Range . . . . 528 to 1730 KC.
C Range . . . . 1710 to 5800 KC.
D Range . . . . 5750 to 18300 KC.

Sensitivity
B Range . . . . 0.5 to 2 Microvolts Absolute
C Range . . . . 0.5 to 2 Microvolts Absolute
D Range . . . . 1.0 to 4 Microvolts Absolute

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE B	POSITION 2 SHORT WAVE C	POSITION 3 SHORT WAVE D
BACK SECT. 1	11 1 2 3	11 1 2 3	11 1 2 3
FRONT SECT. 1	9 10 11 12 4 5 6 7 8	9 10 11 12 4 5 6 7 8	9 10 11 12 4 5 6 7 8
FRONT SECT. 2	4 5 6 7 8	4 5 6 7 8	4 5 6 7 8
BACK SECT. 2	10 11 12 1 2	10 11 12 1 2	10 11 12 1 2





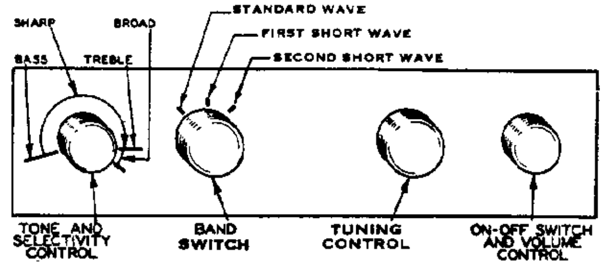


Fig. 1—Arrangement of Controls

TUBE ELEMENT LEGEND

- SH - SHELL
- H - HEATER
- K - CATHODE
- P - PLATE
- G_1 - CONTROL GRID
- G_2 - SCREEN GRID
- G_3 - SUPPRESSOR GRID
- D_P - DIODE PLATE
- T_A - TARGET
- HK - HEATER AND CATHODE

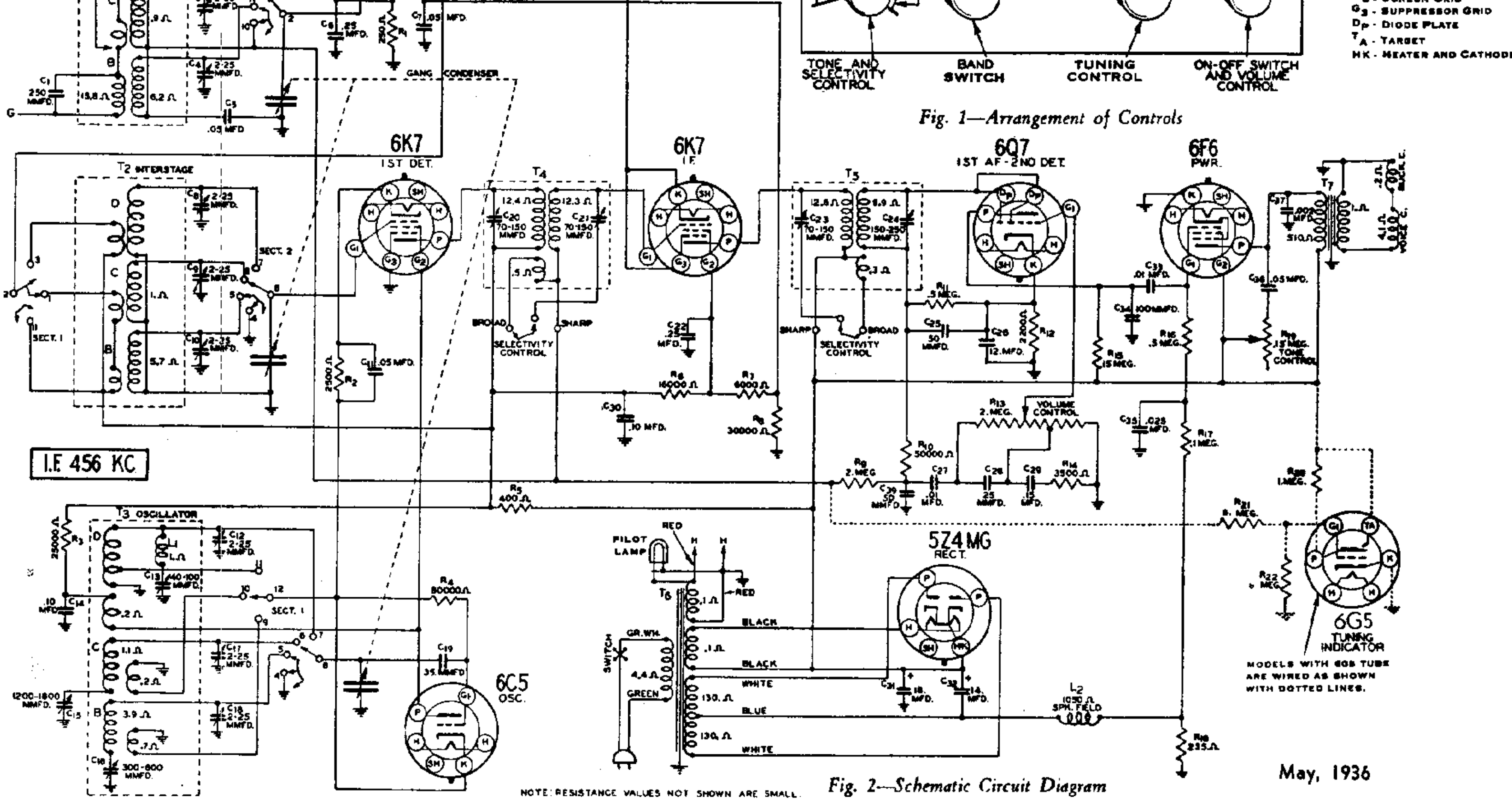


Fig. 2—Schematic Circuit Diagram

May, 1936

MODELS D701,D721
S721 (1936)
Circuit Data,Alignment

WESTERN AUTO SUPPLY CO.

Circuit

This model is a three band radio with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a two-section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st, and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The band switch sections are designated as section one and section two.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 1st detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

Two stages of I. F. amplification are employed using 6K7 tubes. The primaries and secondaries of the first and second I. F. transformers and the primary of the 3rd I. F. transformer are tuned by small trimmer condensers.

Referring to the 1st and 2nd I. F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A type 6Q7 duo-diode triode tube functions as the second detector and a one stage amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R13 is applied through the movable arm to the control grid of the 6Q7 tube.

Across the volume control resistor R13 is a filter composed of condensers C28 and C29 and resistor R14. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the pointer approaches the tap, the higher frequencies are bypassed through condenser C29. Very high frequencies are transmitted through condenser C28 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 5Z4MG (metal glass tube) full wave rectifier is used in the power unit.

The models with the tuning indicator tube are wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode, which is operated at a high positive potential. When this electron stream strikes the target the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6E5 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the potentiometer arrangement of the 10 and 1.5 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage and causes the darkened sector of the target to widen, because of the opposition to the flow of electrons in the direction of the control electrode.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2 is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

WESTERN AUTO SUPPLY CO.

MODELS D701,D721
S721 (1936)
Voltage,Socket,Trimmers
Coils,Phono.Connections

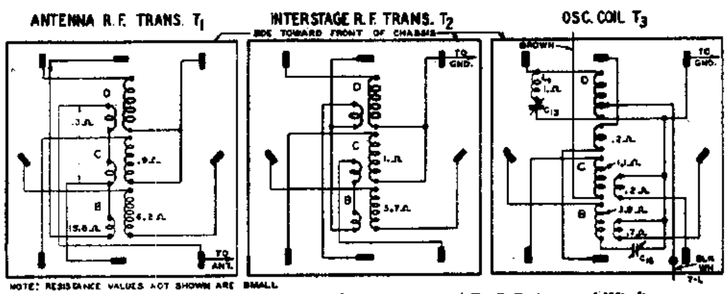


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

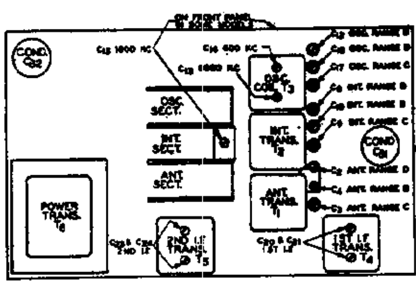


Fig. 3—Location of Trimmers

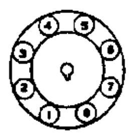


Fig. 5—Metal tube terminal numbering (bottom of socket)

Drive Assembly

This model uses a two-speed planetary drive.

All of the early sets are equipped with a flat belt and may be identified by the ¼ inch wide belt. The later sets use the same type of drive, but have a black cord belt. This is a bronze cable with a black fabric covering. It is about ¹⁄₁₆ inch in diameter.

The belt type also has an idler pulley which the cord type does not have.

The planetary assembly is the unit that is integral with the tuning shaft. It is at the bottom of the belt. If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect. If the nut is too loose, the drive will slip in slow speed. The remedy in this case is, of course, to tighten up the nut.

Should the drive belt slip when the planetary pulley is turning, first inspect the drive drum assembly. This is the assembly which is mounted on the tuning condenser shaft. If this assembly and the tuning condenser rotor turn satisfactorily, the belt is probably too loose and a new one will be required. In the sets with the flat belt type of drive, there is an idler pulley which can be positioned, and by means of which the belt tension can be increased. In this type, therefore, the belt tension should be increased before attempting to put on a new one.

The replacement parts list shows the parts used in each type of drive and the parts common to both types.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

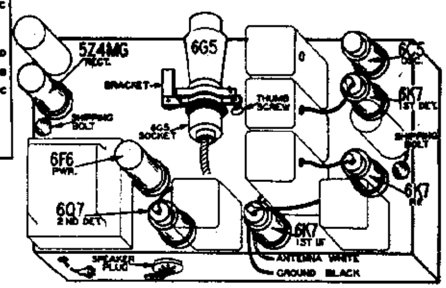


Fig. 6—Location of Tubes

Line Voltage: 115 Volume Control: Maximum									Antenna Shorted to Ground Position of Band Switch: Standard Wave
TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det.	0	6.1(1)	260	110	0	....	6.1(1)	9.0
6C5	Osc.	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F.	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.	0	6.1(1)	108	0	0	....	6.1(1)	1.4
6F6	Power Amp.	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect.	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)
6E5	Tuning Indicator	Plate to Ground 30(4)		Target to Ground 270		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 2¾ inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .05 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned.

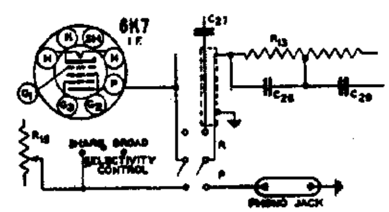


Fig. 7—Phonograph Connections

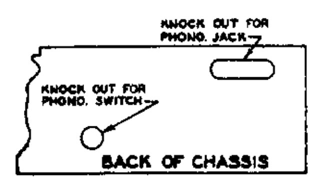


Fig. 8—Location of Phono Knockouts

MODEL D705
Issues 1 to 6

WESTERN AUTO SUPPLY CO.

Drive Cord Data
Switch Data, Phono.

Drive Cord Replacement

LATE MODELS—Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56⅜ inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3½ turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drive drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

EARLY MODELS—The procedure is the same as for the late models with the following exceptions:

The distance between the knots on the drive cord should be 49¼ inches.

Leaving shaft D (Fig. 3), the drive cord is brought directly to the top of drive drum A and then continued as in late models.

Permeability Tuning and Band Switch Assemblies—Differences in Early Models

A few of the first models used a station button plunger 6 13/32 inches long. These models may be identified by a red paint mark on the front bracket of the tuning unit at the upper right corner. On later models, this length was changed to 6 7/16 inches. These models have an orange paint mark in place of the red mark. It is important, therefore, that the length be noted when ordering this part and the correct part number, as shown in the parts list, be specified.

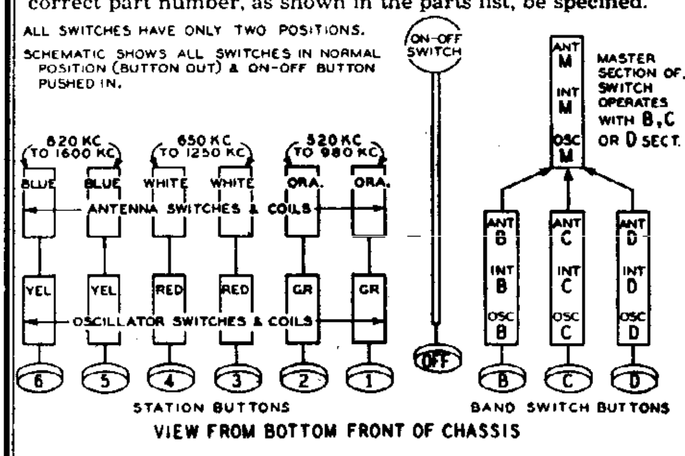


Fig. 5—Permeability Tuning Unit and Band Switch Arrangement.

The plungers are replaceable only on the permeability (6 button) tuning unit. In the case of the band switch unit, if any parts require replacing, the entire assembly must be ordered. Two of these assemblies are listed, one using the early short shaft and the other using the later long shaft. The short shaft (early unit) has no paint mark on it. The long shaft (late unit) has an orange paint mark on it.

A change was also made on the tuning rod assembly (Rod on which 2 iron cores are mounted). The rod used on early models was 3¾ inches long and the back end of the rod rested in a small cup in the end of the compression spring. The rod used on late models is 4¾ inches long, extends through the compression spring and projects beyond the rear bracket of the tuning assembly. Only the later type rod complete with the compression spring and a small washer is being furnished for replacement. This complete assembly is interchangeable with the early type.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram. On the back panel of the chassis base is a round knockout 1 9/64 inches in diameter. An octal base socket is then mounted in this knockout opening. In the case of the early models a 1 9/64 inch hole must be drilled in the back panel.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

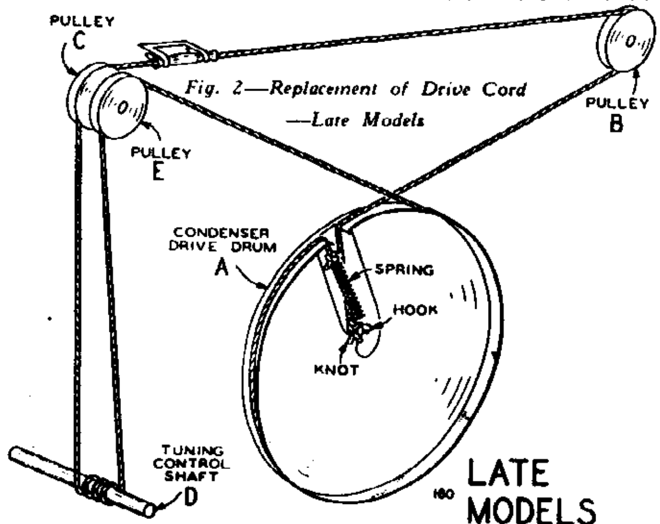


Fig. 2—Replacement of Drive Cord—Late Models

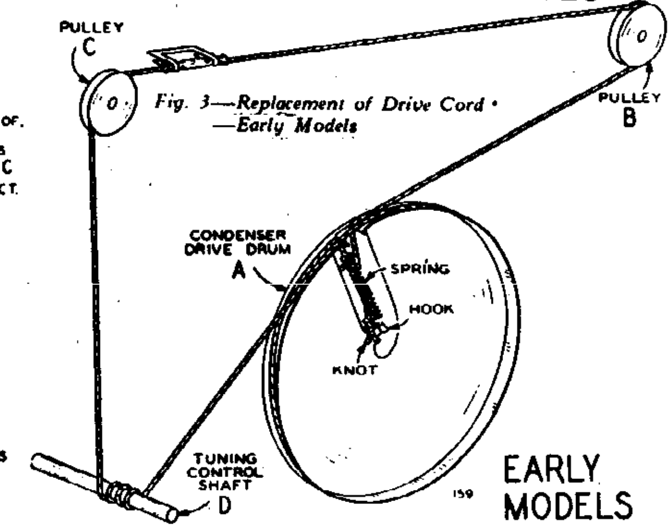
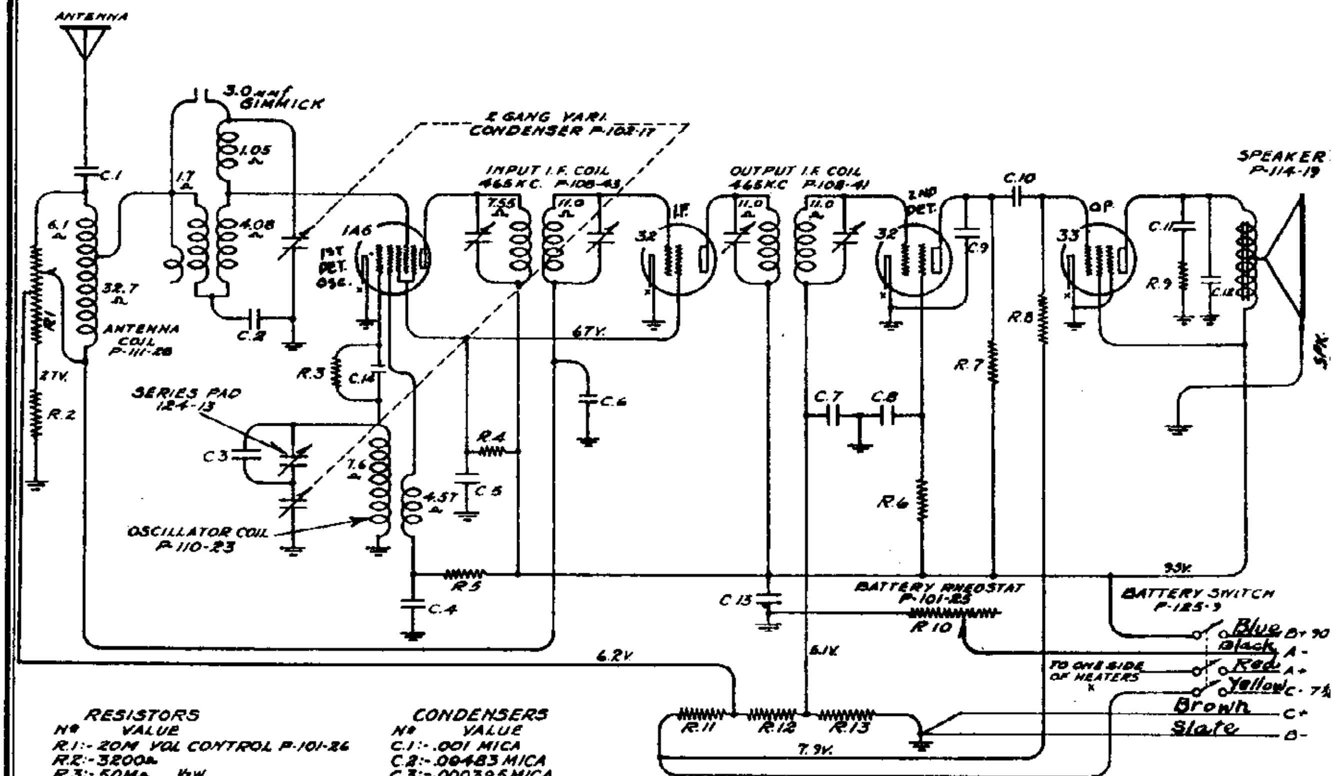


Fig. 3—Replacement of Drive Cord—Early Models

WESTERN AUTO SUPPLY CO.

MODEL D709 (1933)
Schematic, Socket
Trimmers



RESISTORS

Nº	VALUE
R.1:	20M VOL CONTROL P-101-26
R.2:	3200Ω
R.3:	50MΩ 1/3W
R.4:	11MΩ 1/3W
R.5:	10MΩ 1/3W
R.6:	3MEGΩ 1/3W
R.7:	750MΩ 1/3W
R.8:	500MΩ 1/3W
R.9:	35MΩ 1/3W
R.10:	4Ω BAT. RHEOSTAT P-101-25
R.11:	1300Ω
R.12:	1920Ω
R.13:	9800Ω 1/3W

CONDENSERS

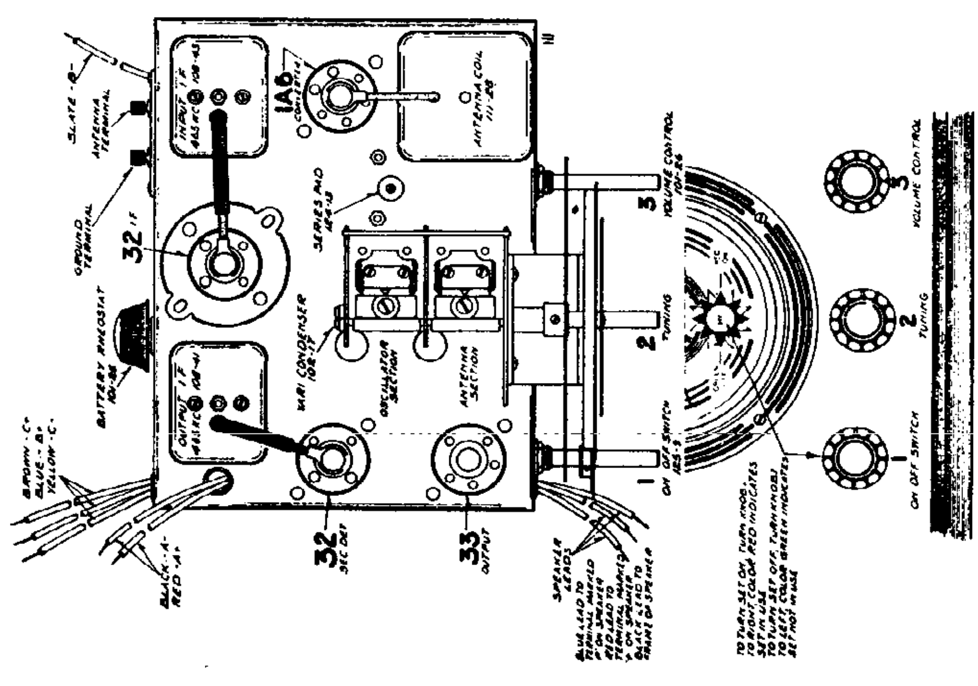
Nº	VALUE
C.1:	.001 MICA
C.2:	.00483 MICA
C.3:	.000395 MICA
C.4:	.01 X 200V.
C.5:	.05 X 200V
C.6:	.25 X 200V.
C.7:	.05 X 200V
C.8:	.01 X 200V.
C.9:	.00025 MICA
C.10:	.01 X 400V
C.11:	.01 X 400V
C.12:	.0005 MICA
C.13:	.25 X 200V
C.14:	.00025 MICA

- NOTE -

R.2, R.11, R.12 ARE IN ONE UNIT. P-106-21
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " " P-118-5
C.7, C.8 " " " " P-118-11
NUMBERS PREFIXED BY LETTER P ARE PART Nºs
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES, VOLUME CONTROL ON FULL

IF PEAK 465 KC

Serial No. 5D115200A and up



BATTERIES NEEDED

The following batteries are needed.

2.........45 volt "B" Batteries.
1.........7½ Volt "C" Battery.
1.........3 Volt Dry "A" Battery or 2 Volt Storage Battery.

MODEL D709 (1935) S709
Voltage, Alignment
Drive Cord Data
Battery Data

WESTERN AUTO SUPPLY CO.

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

3 Volt "A" Battery—The voltage regulator required with this type of battery as illustrated in Fig. 4 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 5.

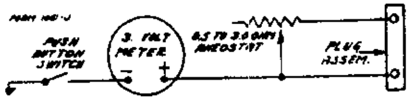


Fig. 5—Schematic Diagram of Voltage Regulator

The receiver is shipped from the factory with a jumper between the two socket connections and a fibre strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A+" line.

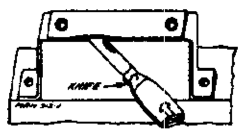


Fig. 6—Prying off Fiber Cover

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. Caution the user never to operate the receiver with the adjustment beyond 2 volts.

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery

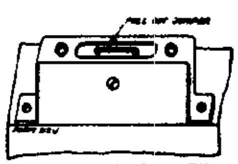


Fig. 7—Removing Jumper Wire

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pointer by removing the screw at the center of the dial.

Remove the dial by taking out the six rivets from the dial assembly.

Remove the on-off indicator dial by pulling it forward.

With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9.

Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole.

Slip the opposite end of the drive cord thru hole "B" of the drive drum.

Now slip the piece of fine tubing (about ¼" long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut.

Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front.

Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

Pull the cord tight and tie the end of the cord to the tension spring as shown in the illustration. The knot should be at the bend in the flange so that the spring will be under sufficient tension to prevent the drive cord from slipping.

Now, by applying a little tension on the spring, hook the other end of the spring into hole "D" on the opposite side of the drum. Hook the spring from the inside (in later models hole "D" is replaced by a hook on the inside of the drive drum).

Turn the drive shaft back and forth several times to take out the slack and see if the drive is operating properly. *If the cord slips on the drive shaft, remove the spring from the drive drum and add an additional knot in the cord at the spring in order to put greater tension on the spring.*

Replace the on-off indicator dial, care being taken that the indicator is so placed that it will properly show the on and off positions.

Re-assemble the pointer and dial to the drive assembly. If the rivets are broken use No. 2 by ¼" long round head machine screws and nuts.

Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

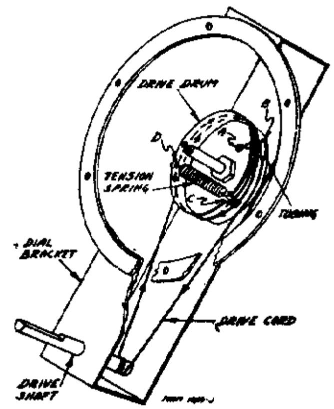


Fig. 9—Replacing Drive Cord

VOLTAGES AT SOCKETS
Volume Control at Maximum—Antenna Shorted to Ground. B+135 Volts
Voltages to Chassis

Type of Tube	Function	Across Filament	Plate to Gnd.	Screen to Gnd.	Grid to Gnd.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5 (1) (2)	2.5
34	I. F.	2.0	135	67.5	2.5 (3)	2.8
34	2nd Det.	2.0	50	40 (1)	0	1.8
30	1st Audio	2.0	135		9 (4)	3.0
19	Output	2.0	135		4.5	3.2 Total

(1) With 250,000 ohm meter.
(2) Subject to variation.
(3) With 25,000 ohm meter.
(4) Read at "C" battery.

Alignment Procedure and Dial Calibration

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser stator to a lug at the bottom of the R. F. coil assembly. This connection can be made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position.

Then adjust the three I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

1750 KC Adjustment

Set the signal generator for 1750 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver thru a 250 mmf. condenser to the output of the signal generator.

Keep the volume control at the maximum position.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Dial Calibration

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

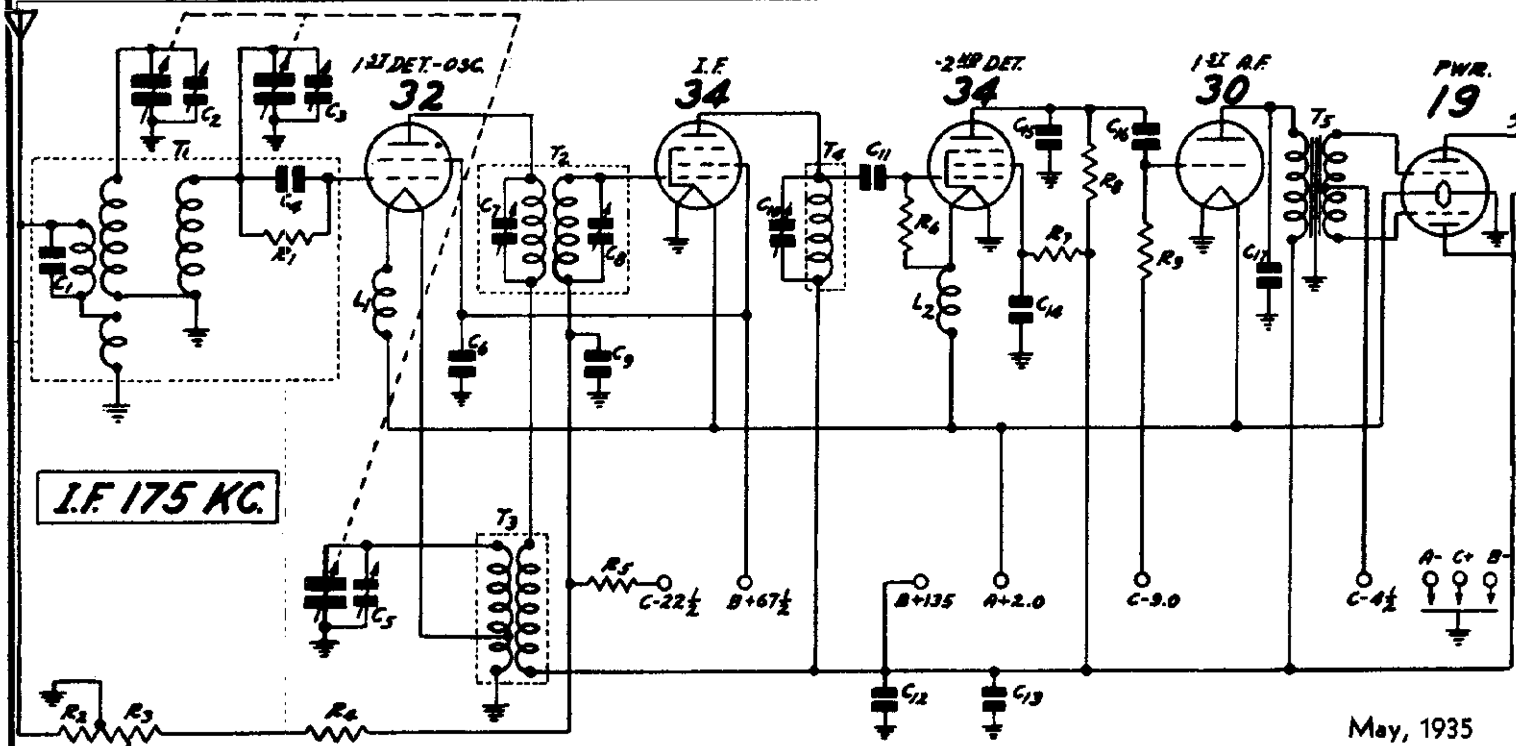
SPECIFICATIONS

Input Voltages
"A" Battery . . . . . . 2 Volts (.5 Amperes)
"B" Batteries . . . . . . 67½ and 135 Volts
"C" Batteries . . . . . . 4½, 9 and 22½ Volts
Power Output . . . . 1 Watt (Undistorted)

Sensitivity . . . . 15 Microvolts Absolute
Tuning Range . . . . . . 530 to 1750 KC
Intermediate Frequency . . . . . 175 KC
Speaker . . . . 6" Magnetic

MODEL D709 (1935) S709
Schematic, Socket
Trimmers

WESTERN AUTO SUPPLY CO



May, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C1 150 MMF MOULDED
C2 GANG TRIMMER
C3 GANG TRIMMER
C4 35 MMF MOULDED
C5 GANG TRIMMER
C6 .25 MF 180V.
C7 40-100 MMF } DUAL
C8 20-70 MMF } (P-17A37)
C9 .05 MF 180V.
C10 40-100 MMF (P-17A38)
C11 50 MMF MOULDED
C12 .10 MF 180V.
C13 4.0 MF 150V. ELECTROLYTIC
C14 .10 MF 180V.
C15 .002 MF 300V.
C16 .006 MF 300V.
C17 .002 MF 300V.

R1 1.0 MEGOHM .2 W.
R2 10 000 OHM } VOLUME
R3 60 000 OHM } CONTROL
R4 900 OHM .2 W.
R5 6 500 OHM .2 W.
R6 2.0 MEGOHM .2 W.

R7 100 000 OHM .5 W.
R8 40 000 OHM .5 W.
R9 1.0 MEGOHM .2 W.

L1 SINGLE FILAMENT REACTOR (P-9A281)
L2 SINGLE FILAMENT REACTOR (P-9A281)

T1 DOUBLE TUNED ANTENNA COIL (P-9A381)
T2 1ST I.F. COIL (P-9A383)
T3 OSC. COIL (P-9A382)
T4 2ND I.F. COIL (P-9A384)
T5 AUDIO INPUT TRANS. (P-50X11)

Following are the D. C. resistances of the various windings in the chassis.

Part No.		Code	D. C. Resistance in Ohms
9A381	Double Tuned Ant. Trans. Pri. (in series)	T1	17.
	Double Tuned Ant. Trans. Sec. (Antenna)	T1	3.5
	Double Tuned Ant. Trans. Sec. (1st Det.)	T1	3.5
9A383	1st I.F. Trans. Primary	T2	80.
	1st I.F. Trans. Secondary	T2	105.
9A382	Oscillator Coil Cathode Winding	T3	2.
	Oscillator Coil Plate Winding	T3	7.
9A384	2nd I.F. Reactor Coil	T4	50.
9A281	Filament Reactor (In 1st Det. Ckt.)	L1	Small
9A281	Filament Reactor (In 2nd Det. Ckt.)	L2	Small
50X11	Audio Transformer Primary	T5	950.
	Audio Transformer Secondary (Center Tap to outside)	T5	600.
	Audio Transformer Secondary (Center Tap to inside)	T5	550.
12A217	Magnetic Speaker (Center Tap to outside)		290.
	Magnetic Speaker (Center Tap to inside)		250.

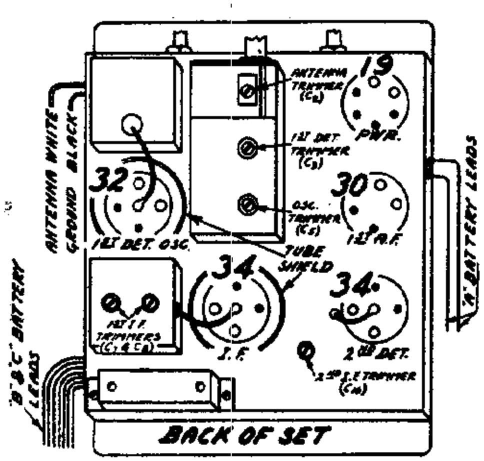


Fig. 8—Tube Arrangement

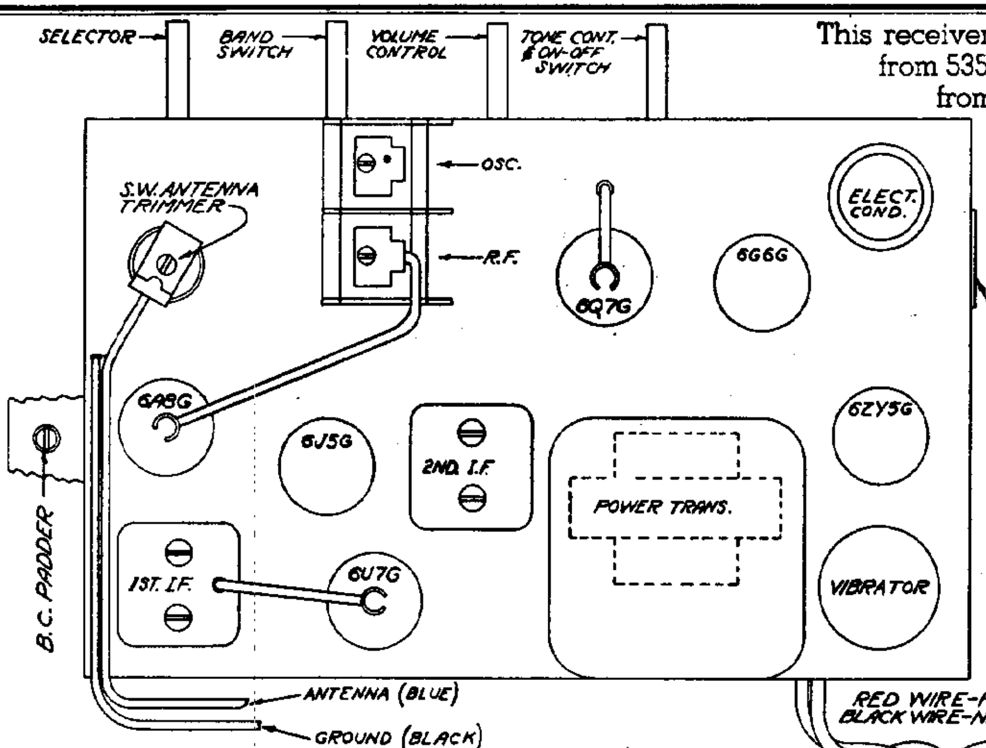
MODEL D709 (1938)

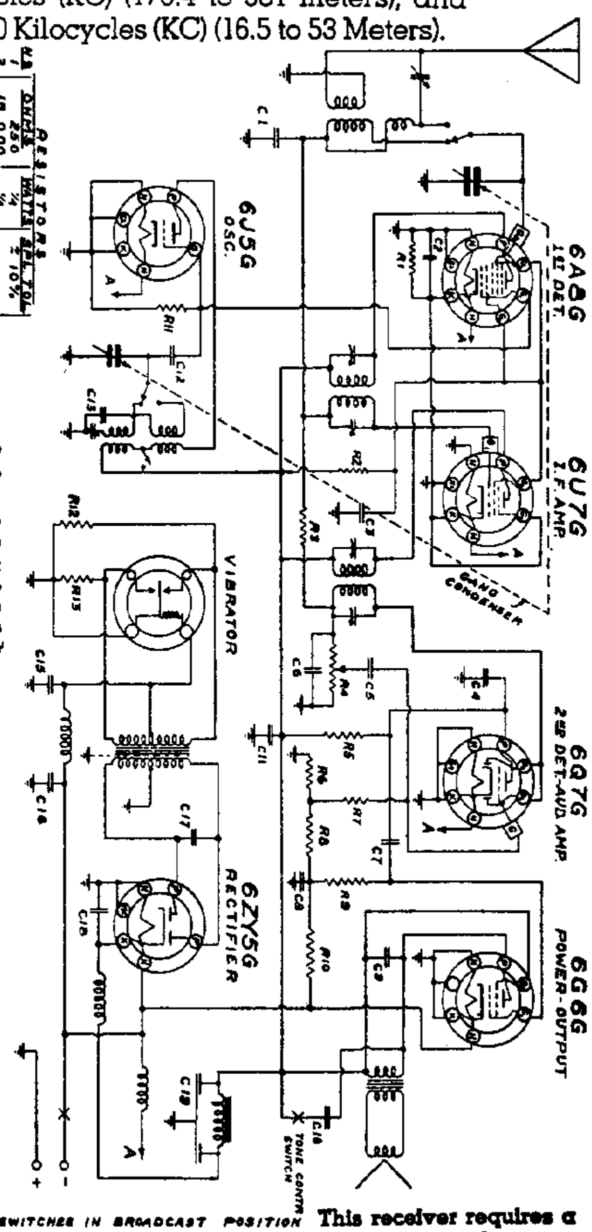
WESTERN AUTO SUPPLY CO.

Schematic, Socket Trimmers, Alignment

Six Tube 6 Volt Battery Dual Wave Superheterodyne

This receiver is designed to operate over two tuning ranges: from 535 to 1730 Kilocycles (KC) (173.4 to 561 meters), and from 5650 to 18,100 Kilocycles (KC) (16.5 to 53 Meters).





This receiver requires a good ground.

RESISTORS

No.	Ohms	Watts	Spl. Tol.
1	250	¼	± 10%
2	15,000	¼	
3	1 MEG	¼	
4	800,000	¼	(Vol. Con)
5	150,000	¼	
6	150,000	¼	± 10%
7	500,000	¼	
8	600,000	¼	± 10%
9	400,000	¼	
10	100,000	¼	
11	40,000	¼	
12	150	¼	
13	150	¼	

CONDENSERS

No.	Cap.-MFD.	Type	No.	Cap.-MFD.	Type
1	.05	200 V.	11	.1	200 V.
2	.25	200 V.	12	.00005	MICA
3	.1	200 V.	13	.004 (± 5%)	MICA
4	.00025	MICA	14		
5	.01	400 V.	15	.5	50 V.
6	.00025	MICA	16	.5	50 V.
7	.01	400 V.	17	.015	1000 V.
8	.05	200 V.	18	.01	400 V.
9	.006	600 V.	19	8-8 CCCW	200 W.V.
10	.02	400 V.			

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency I.F. stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output of test oscillator or signal generator to the grid of the first detector tube (6A8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the Broadcast "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the Broadcast "antenna" trimmer to a maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver.

Note: Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

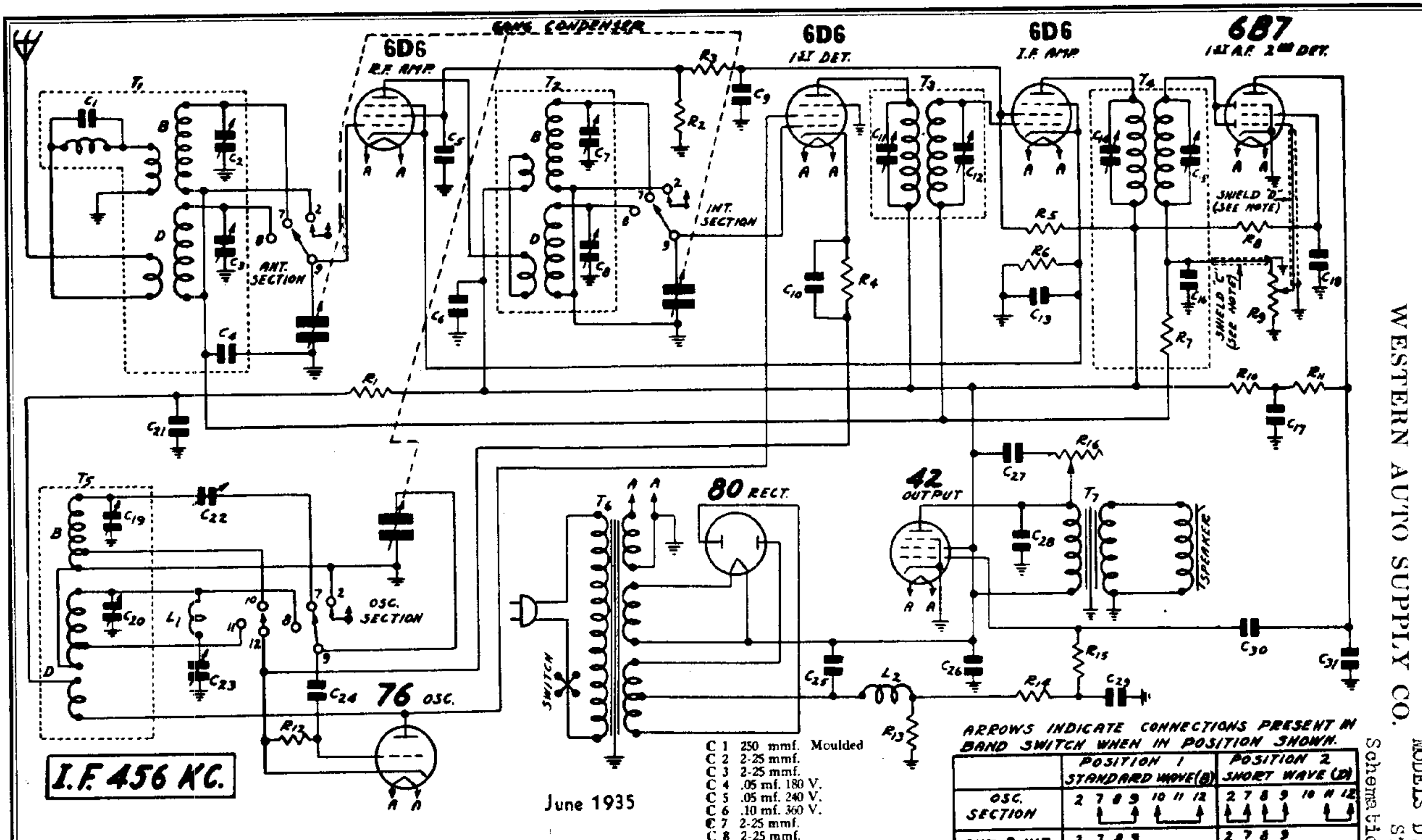
SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the generator to 16,000 KC and tuning in the signal. Adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

MODELS D710,D711(1935)
S710,S711

WESTERN AUTO SUPPLY CO.

Schematic



June 1935

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (D)
OSC. SECTION	2 7 8 9 10 11 12	2 7 8 9 10 11 12
ANT. & INT. SECTION	2 7 8 9	2 7 8 9

CONTACT LOCATIONS NOT NUMBERED ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. THE CAPACITY OF SHIELD "C" AND "D" IS 50 MMF EACH.

C 1 250 mmf. Moulded
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 .05 mf. 180 V.
C 5 .05 mf. 240 V.
C 6 .10 mf. 360 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 .25 mf. 240 V.
C10 .05 mf. 180 V.
C11 70-150 mmf. } One
C12 70-150 mmf. } Assembly
C13 .25 mf. 180 V.
C14 70-150 mmf. } One
C15 150-250 mmf. } Assembly
C16 50 mmf. Moulded
C17 .25 mf. 360 V.
C18 .25 mf. 360 V.
C19 2-25 mmf.
C20 2-25 mmf.
C21 .10 mf. 360 V.
C22 300-600 mmf. } One
C23 40-100 mmf. } Assembly
C24 35 mmf. Moulded
C25 14 mf. 400 V. Electrolytic
C26 18 mf. 300 V. Electrolytic
C27 .05 mf. 600 V.
C28 .002 mf. 600 V.
C29 .03 mf. 180 V.
C30 .01 mf. 480 V.
C31 .002 mf. 600 V.

R 1 25000 ohm 1.0 W.
R 2 30000 ohm .5 W.
R 3 6000 ohm .5 W.
R 4 2500 ohm .2 W.
R 5 16000 ohm 2.0 W.
R 6 150 ohm .2 W.
R 7 2.0 Megohm .2 W.
R 8 300000 ohm .5 W.
R 9 500000 ohm Volume Control
R10 20000 ohm .2 W.
R11 60000 ohm .5 W.
R12 80000 ohm .2 W.
R13 235 ohm Armored Wire Wound
R14 100000 ohm .2 W.
R15 500000 ohm .2 W.
R16 150000 ohm Tone Control

T 1 Antenna R. F. Trans.
T 2 Interstage R. F. Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 Osc. Inductors
T 6 Power Trans.
T 7 Output Trans.

L 1 Osc. Tracking Coil
L 2 Speaker Field (1050 ohms)

MODELS D710,D711(1935)
S710,S711
Alignment,Trimmers
Voltage,Socket,Coils
Resistances,Changes

WESTERN AUTO SUPPLY CO.

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the grid of the 1st detector. Connect the ground lead of the signal generator to the chassis ground.

Turn the band switch to the standard wave position.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 250 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator standard wave trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

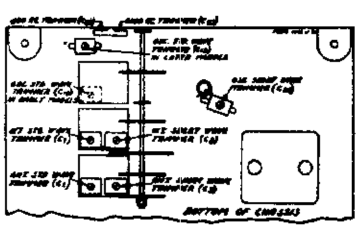


Fig 4—Location of Trimmers

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage standard wave trimmer (C7) and antenna standard wave trimmer (C2) until maximum output is obtained.

Do not change the setting of the oscillator standard wave trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Be sure to use a non-metallic screw driver for this adjustment.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the short wave position.

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator short wave trimmer (C20) until maximum output is obtained. See Fig. 4 for location of this trimmer.

If a maximum output peak cannot be reached, it may be due to the fact that the antenna and interstage short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage short wave trimmer (C8) and antenna short wave trimmer (C3) until maximum output is obtained.

When adjusting the interstage short wave trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator short wave trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Use a non-metallic screw driver for this adjustment.

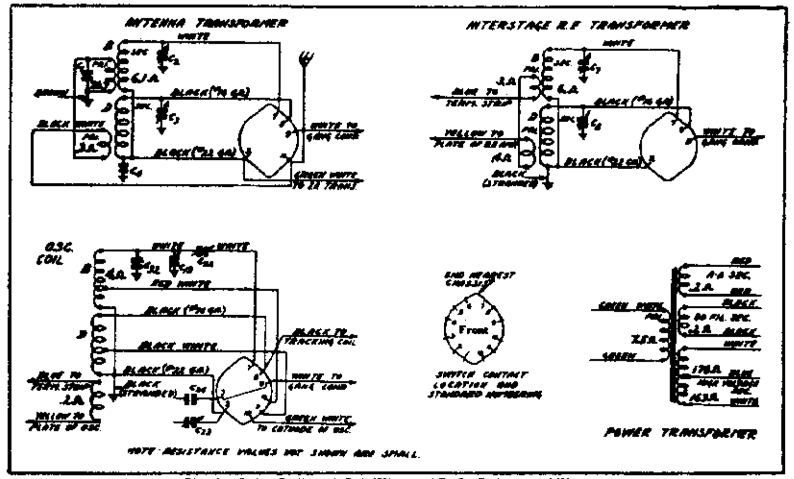


Fig. 3—Color Coding of Coil Wires and D. C. Resistance of Windings

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets. Refer to Fig. 3.

New Part No.	Item	Code	D. C. Resistance in Ohms
9A368	Antenna Transformer		
	Range B Primary Winding	T1	20.7
	Range D Primary Winding	T1	0.3
	Range B Secondary Winding	T1	6.1
	Range D Secondary Winding	T1	Small
9A387	R. F. Interstage Transformer		
	Range B Primary Winding	T2	3.0
	Range D Primary Winding	T2	0.4
	Range B Secondary Winding	T2	6.0
	Range D Secondary Winding	T2	Small
9A388	Oscillator Coils		
	Range B Grid Coil	T5	
	Red White to White		6.0
	Red White to ground		Small
	Range D Grid Coil	T5	
	Black White to Black		Small
	Black White to ground		Small
	Oscillator Plate Coil	T5	0.2
9A389	1st I. F. Transformer		
	Primary Winding	T3	12.6
	Secondary Winding	T3	11.1
9A390	2nd I. F. Transformer		
	Primary Winding	T4	12.0
	Secondary Winding	T4	4.5
	Output Transformer (Part of Speaker Assembly)		
	Primary Winding	T7	510.
	Secondary Winding	T7	1.0
	Dynamic Speaker		
	Speaker Field	L2	1025.
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2
53X91	115 volt 60 cycle Power Transformer		
	Primary Winding	T6	7.5
	Tube Filament Secondary (A-A)	T6	0.2
	80 Filament Secondary	T6	0.2
	High Voltage Secondary Winding	T6	
	Center tap to inside		173.
	Center tap to outside		178.
9A391	High Frequency Oscillator		
	Tracking Coil	L1	1.1

VOLTAGES AT SOCKETS
Line Voltage - 112
Antenna Shorted to Ground

Type of Tube	Function	Heater Volts	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6D6	R.F.	6.1	240	95	3	7.
6D6	1st Det.	6.1	240	100	9	3.5
76	Osc.	6.1	100			5.
6D6	I.F.	6.1	240	120	3	7.5
6B7	2nd Det.	6.1	55	40	0	2.3
42	Power	6.1	225	240	17 (1)	38.0
80	Rectifier	4.6				32.0 per plate

Changes in Early Models

In the early models of this receiver the oscillator standard wave trimmer C19 was in the oscillator coil can—see Fig. 4.

In the early models the antenna transformer had two B primary windings as shown in Fig. 5. In later models only one winding was used as shown in Fig. 3.

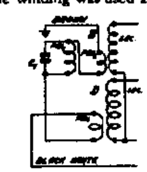


Fig. 5—Antenna Transformer on Early Models

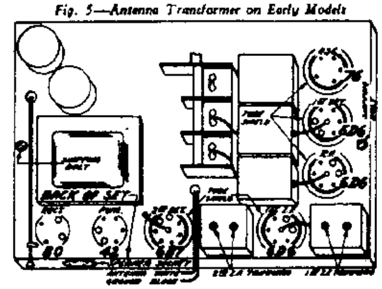


Fig. 6—Location of Tubes

WESTERN AUTO SUPPLY CO.

MODELS D-710, D-711, S-710, S-711 (1935)

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —see Fig. 8.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis base directly below the wet electrolytic condensers. These holes are 1¼" from

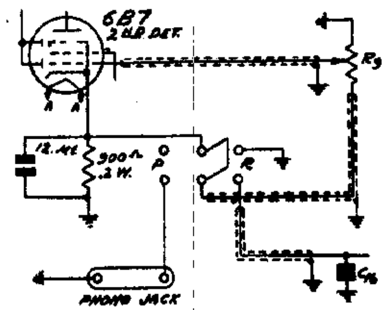


Fig. 7—Phonograph Connections

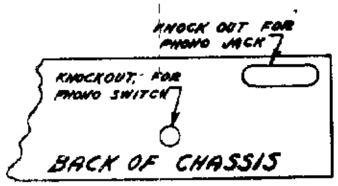


Fig. 8—Location of Phono Knockouts

the bottom, ⅞" and 3¼" from the front of the chassis.

The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

The connections are made by opening the diode return circuit at the volume control. Unsolder the shielded lead which runs from the I. F. transformer to the volume control at the lug on the volume control. Cut this lead to length and connect it to the switch as shown in Fig. 7. The extra length of shielded lead which is provided, is connected from the volume control R9 to the phono switch as illustrated.

Remove the ground from the cathode terminal of the 6B7 2nd detector tube by bending the chassis ground lug away from this terminal. Be sure to solder back to this ground lug any leads that were connected to it (not including cathode connection of socket).

Connect one side of the 12 mfd. 25 volt electrolytic condenser to ground and the other side of the condenser to the cathode terminal of the 6B7 2nd detector and the phono switch as shown in Fig. 7. To this same terminal on the phono switch connect the 900 ohm .2 watt resistor. The other side of this resistor goes to ground. Complete the other connections as illustrated.

A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

Servicing R. F. Coil Assemblies

The R. F. coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 3.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

MODELS D-714-M, S-712 (1935)

PHONO ATTACHMENT PARTS

Part No.: P-9A386, P-9A387, P-9A389, P-9A390, P-9A388

New Part No.	Description	List Price
2A31	Phono Switch (Double Pole Double Throw Switch)	$ .60
3A12	Phono Jack	.15
10A36	Switch Knob	.20
45X37	12.0 mf. - 25 Volt - Dry Electrolytic Condenser	.75
A9-901	900 Ohm 0.2 Watt Resistor	.15
	12 Inches of No. 722G Shielded Hookup Wire	.10
4A39	Terminal Strip	.10

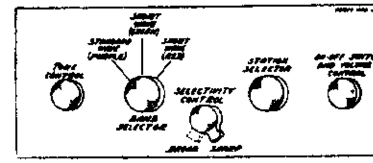


Fig. 1—Arrangement of Controls

General Service Data

D. C. Resistance of Windings
Refer to Fig. 5.

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
9A376	Antenna Transformer	T1	
	Range B Primary Winding		21.2
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
9A377	R. F. Interstage Transformer	T2	
	Range B Primary Winding		2.4
	Range C Primary Winding		1.4
	Range D Primary Winding		0.4
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.9
	Range D Secondary Winding		Small
9A378	Oscillator Coils	T5	
	Range B Grid Coil		
	Red White Tap to White		3.8
	Red White Tap to Ground		0.9
	Range C Grid Coil		
	Green White Tap to Green		1.3
	Green White Tap to Ground		0.6
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
9A379	1st I. F. Transformer	T3	
	Primary Winding		11.6
	Secondary Winding		
	Long Portion		11.4
	Short Portion		0.5
9A380	2nd I. F. Transformer	T4	
	Primary Winding		14.3
	Secondary Winding		4.4
*12A223	Dynamic Speaker (8")	L1	
	Output Transformer Primary Winding	T7	510.
	Output Transformer Sec. Winding	T7	1.0
	Speaker Field		1025.
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2
53X91	115 Volt 60 Cycle Power Transformer	T6	
	Primary Winding		7.5
	Tube Filament Winding (A-A)		0.2
	80 Filament Secondary		0.2
	High Voltage Secondary Winding		
	Center Tap to Inside		161.
	Center Tap to Outside		178.
9A391	High Frequency Oscillator Tracking Coil	L2	1.1

*Speakers with other part numbers may have slightly different values of D. C. resistance.

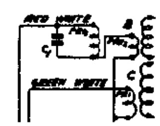


Fig. 8—Antenna Transformer in Early Models

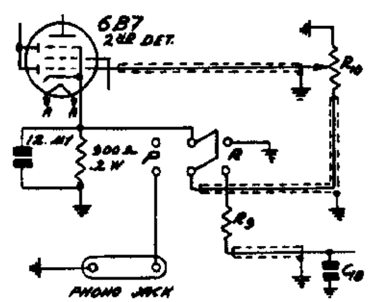


Fig. 9—Phonograph Connections

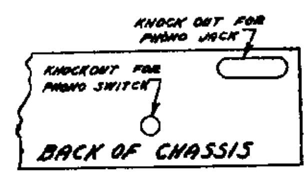


Fig. 10—Location of Phono Knockouts

MODEL D712M (1935)
Voltage, Socket, Trimmers
Coils, Phono, Connections

WESTERN AUTO SUPPLY CO.

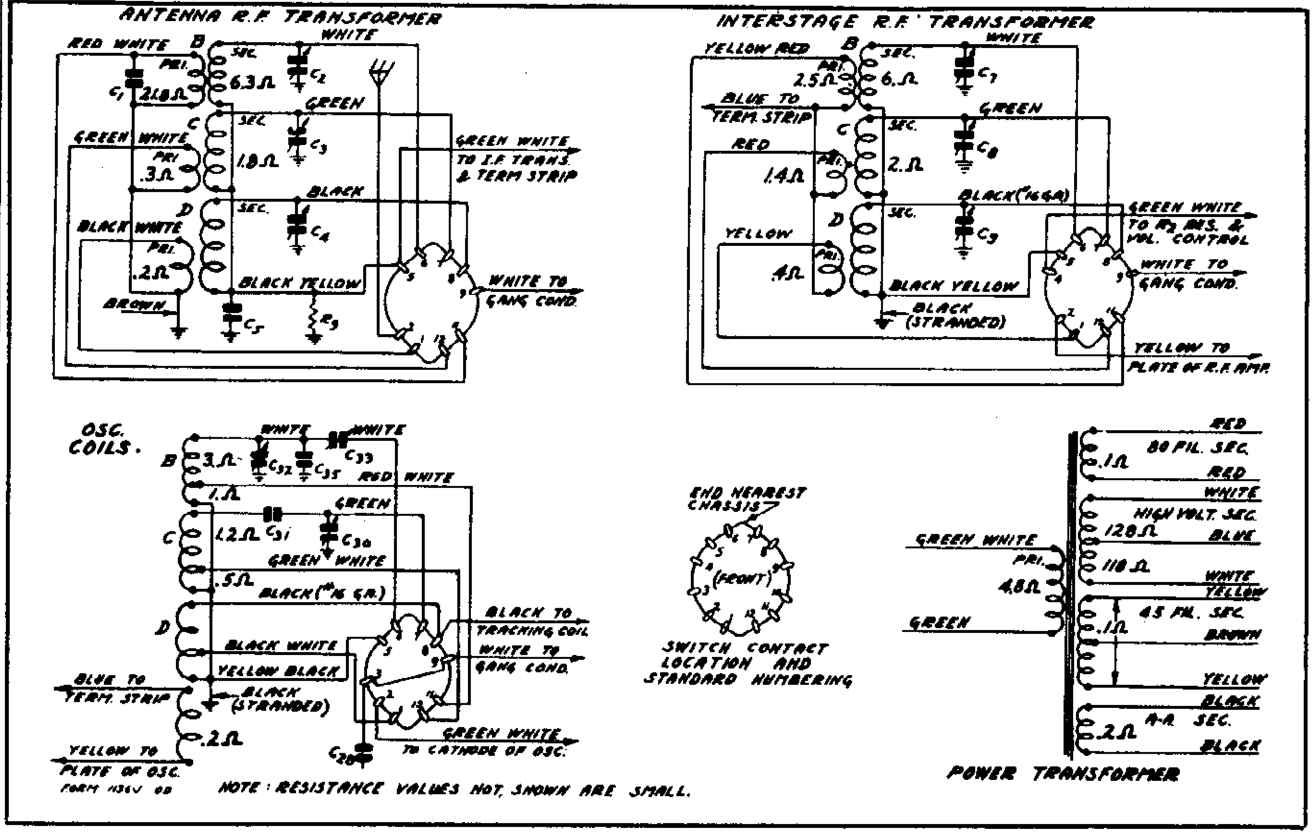


Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)

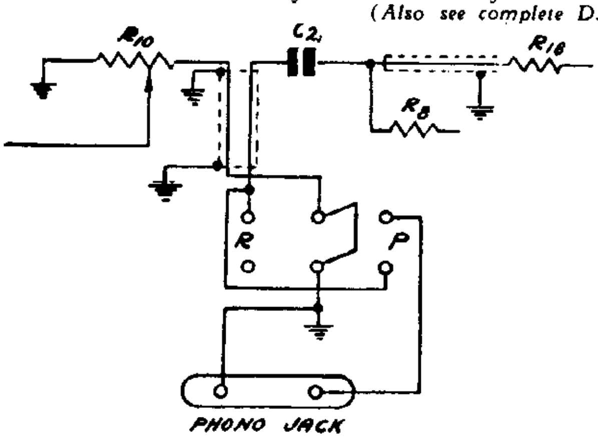


Fig. 7—Phonograph Connections

VOLTAGES AT SOCKETS

Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode M. A.
6K7 (6D6)	R. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	1st Det.	6.1	265	110	9.5	3.8
76	Osc.	6.1	110			5.8
6K7 (6D6)	1st. I. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	2nd I. F.	6.1	265	120	3.7	9.0
76	2nd Det.	6.1				
76	1st A. F.	6.1	265		14.	5.0
45	Power	2.5	265		50.(1)	22.
80	Rectifier	4.9				90. (total)

(1) As read with 500 Volt Scale. Grid to Ground.

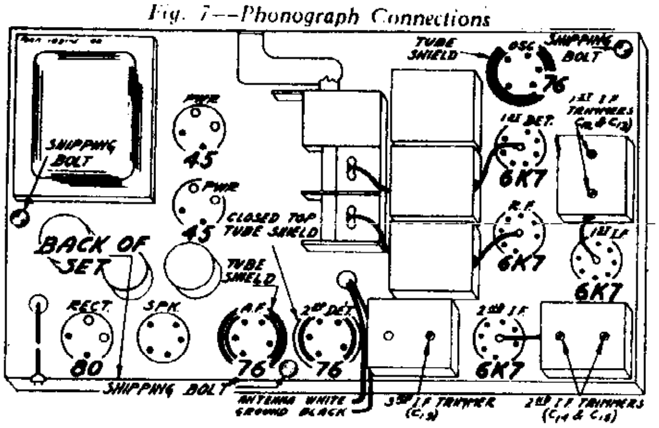


Fig. 5—Location of Tubes

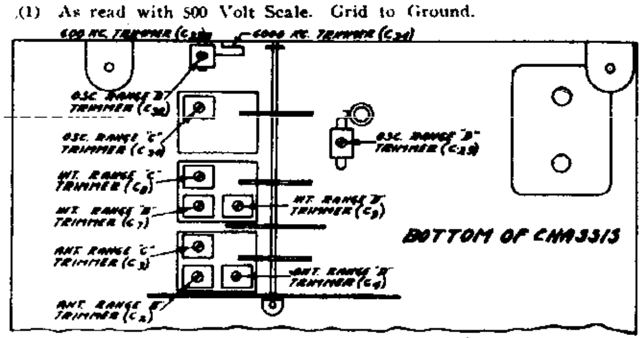


Fig. 3—Location of Trimmers

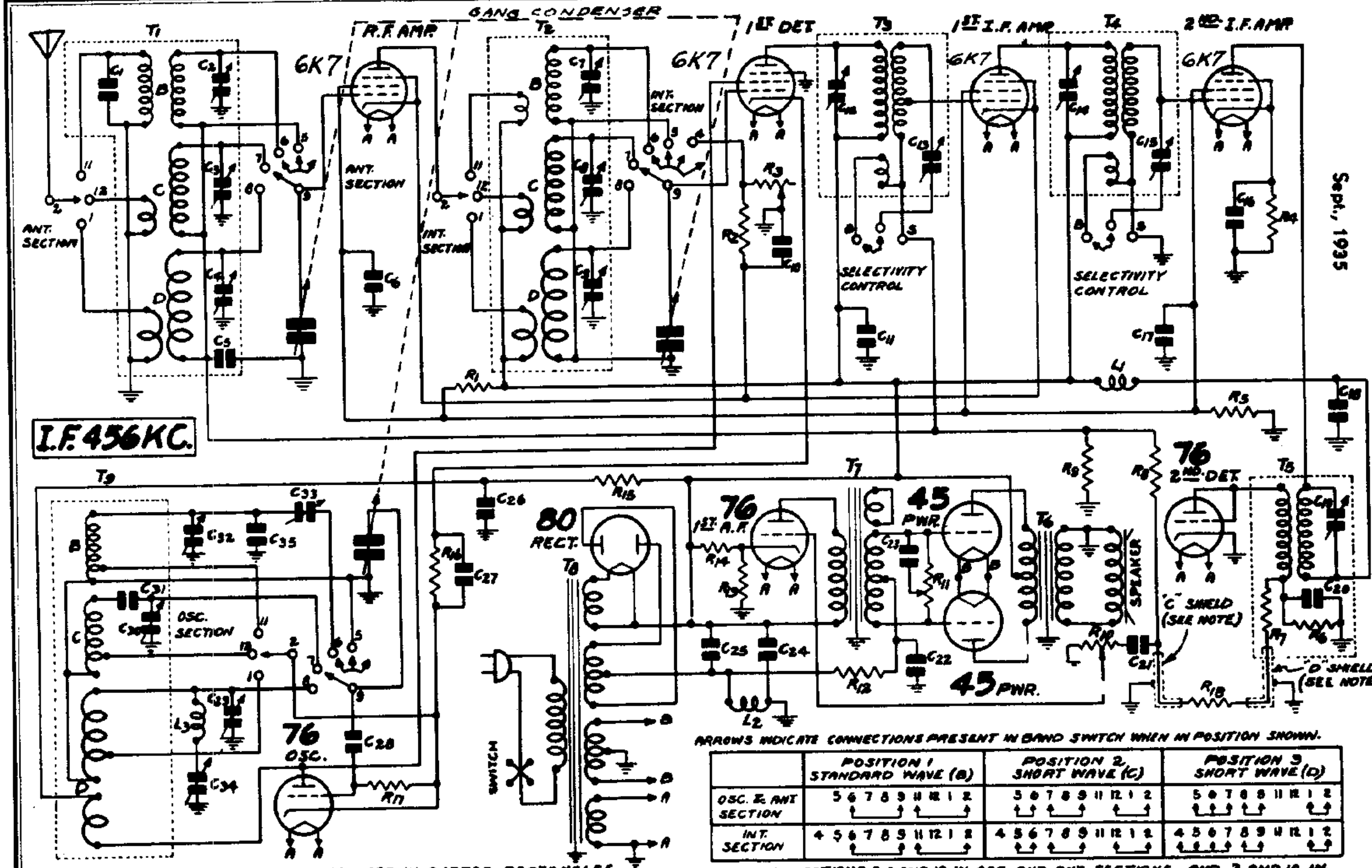
MODEL D712M (1935)
Schematic

WESTERN AUTO SUPPLY CO.

Power Consumption - 90 Watts (At 115 volts 60 cycles)
Power Output - - - - - - - 5 Watts Undistorted
Selectivity - 22 KC Broad at 1000 times Signal (Sharp)

Tuning Frequency Range
B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - - - 5750 to 18300 KC.

Sept., 1935



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. & ANT SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2
INT. SECTION	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2

CONTACT LOCATIONS 3,4 AND 10 IN OSC. AND ANT. SECTIONS, AND 3 AND 10 IN INT. SECTION ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
"B" AND "S" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY.
THE CAPACITY OF THE "C" SHIELD IS 55 μμf. THE CAPACITY OF THE "D" SHIELD IS 20 μμf

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .25 mf. 240 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 .25 mf. 180 V.

C11 .25 mf. 360 V.
C12 150-250 mmf. } ONE
C13 150-250 mmf. } UNIT
C14 150-250 mmf. } ONE
C15 150-250 mmf. } UNIT
C16 .05 mf. 180 V.
C17 4.0 mf. 150 V.
C18 .10 mf. 360 V.
C19 70-150 mmf.
C20 50 mmf.

C21 .01 mf. 360 V.
C22 .50 mf. 180 V.
C23 .004 mf. 600 V.
C24 18.0 mf. 290 V.
C25 14.0 mf. 400 V.
C26 .05 mf. 360 V.
C27 .05 mf. 180 V.
C28 35 mmf.
C29 2-25 mmf.
C30 2-25 mmf.

C31 1400 mmf.
C32 2-25 mmf.
C33 300-600 mmf. } ONE
C34 40-100 mmf. } UNIT

R 1 16,000 ohm 2.0 W.
R 2 150 ohm .2 W.
R 3 2,500 ohm } Dual Volume
R10 2.0 megohm } Control
R 4 400 ohm .2 W.

R 5 30,000 ohm 1.0 W.
R 6 300,000 ohm .2 W.
R 7 100,000 ohm .2 W.
R 8 2.0 megohm .2 W.
R 9 1.0 megohm .2 W.
R11 3.0 megohm Tone Cont.
R12 100,000 ohm .2 W.
R13 1,000 ohm .5 W.
R14 25,000 ohm 3.0 W.
R15 25,000 ohm 1.0 W.
R16 2,500 ohm .2 W.
R17 80,000 ohm .2 W.

T 1 Ant. R.F. Trans.
T 2 Interstage R.F. Trans.
T 3 1st I.F. Trans.
T 4 2nd I. F. Trans.
T 5 Diode Input Trans.
T 6 Audio Output Trans.
T 7 Audio Input Trans.
T 8 Power Trans.
T 9 Osc. Inductors

L 1 Isolating Reactor
L 2 Speaker Field (570 Ohm)
L 3 Osc. Tracking Coil

MODEL D712M (1935)
Alignment, Changes
Resistances

WESTERN AUTO SUPPLY CO.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

D. C. Resistance of Windings
Refer to Fig. 4.

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A405	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.8
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.3
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A425	Interstage R. F. Transformer	T2	
	Range B Primary Winding		2.5
	Range C Primary Winding		3.4
	Range D Primary Winding		0.4
	Range B Secondary Winding		6.0
	Range C Secondary Winding		2.0
	Range D Secondary Winding		Small
P-9A426	Oscillator Coils	T9	
	Range B Grid Coil		
	Red White Tap to White		3.0
	Red White Tap to Ground		1.0
	Range C Grid Coil		
	Green White Tap to Green		1.2
	Green White Tap to Ground		0.5
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
P-9A397	1st I. F. Transformer	T3	
	Primary Winding		4.6
	Secondary Winding		
	Long Portion		3.4
	Short Portion		1.7
	Coupling Winding		0.2
P-9A396	2nd I. F. Transformer	T4	
	Primary Winding		9.4
	Secondary Winding		9.0
	Coupling Winding		0.5
P-9A399	3rd I. F. Transformer	T5	
	Primary Winding		10.2
	Secondary Winding		28.4
P-30816	Audio Input Transformer	T7	
	Primary Winding		2150.
	Secondary Winding		
	Center Tap to Inside		2000.
	Center Tap to Outside		2090.
P-51X32	Audio Output Transformer	T6	
	Primary Winding		
	Center Tap to Inside		198.
	Center Tap to Outside		222.
	Secondary Winding		0.4
P-12A208	Dynamic Speaker (10")		
	Speaker Voice Coil		1.6
	Speaker Field	L2	570.
P-53X94	115 Volt 60 Cycle Power Trans.	T8	
	Primary Winding		4.8
	Tube Filament Secondary (A-A)		0.2
	Tube Filament Secondary (B-B) (45)		0.1
	Rectifier Filament Secondary		0.1
	High Voltage Secondary Winding		
	Center Tap to Inside		118.
	Center Tap to Outside		129.
P-9A410	2nd I. F. Plate Isolating Reactor	L1	36.
P-9A391	High Frequency Oscillator Tracking Coil	L3	1.2

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Changes in Early Models

In the early models of this receiver the tone control resistor (R11) was connected as a series variable resistor connecting in series through the condenser C23 between the grids of the 45 tubes in the audio output stage. In the later models it is employed as a potentiometer in the manner shown in Fig. 2.

The 100,000 ohm resistor (R18) was not used in the early models. Condenser C21 was connected directly to resistor R7.

The type 6K7 metal tubes replace the type 6D6 glass tubes which were used in the early models.

Condenser C35 was added to the oscillator coil standard wave section in later models. It is not, however, used in all cases but only when this capacity is required in this circuit.

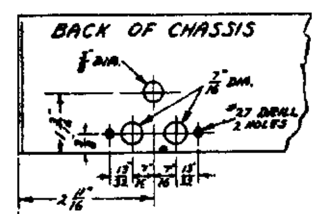


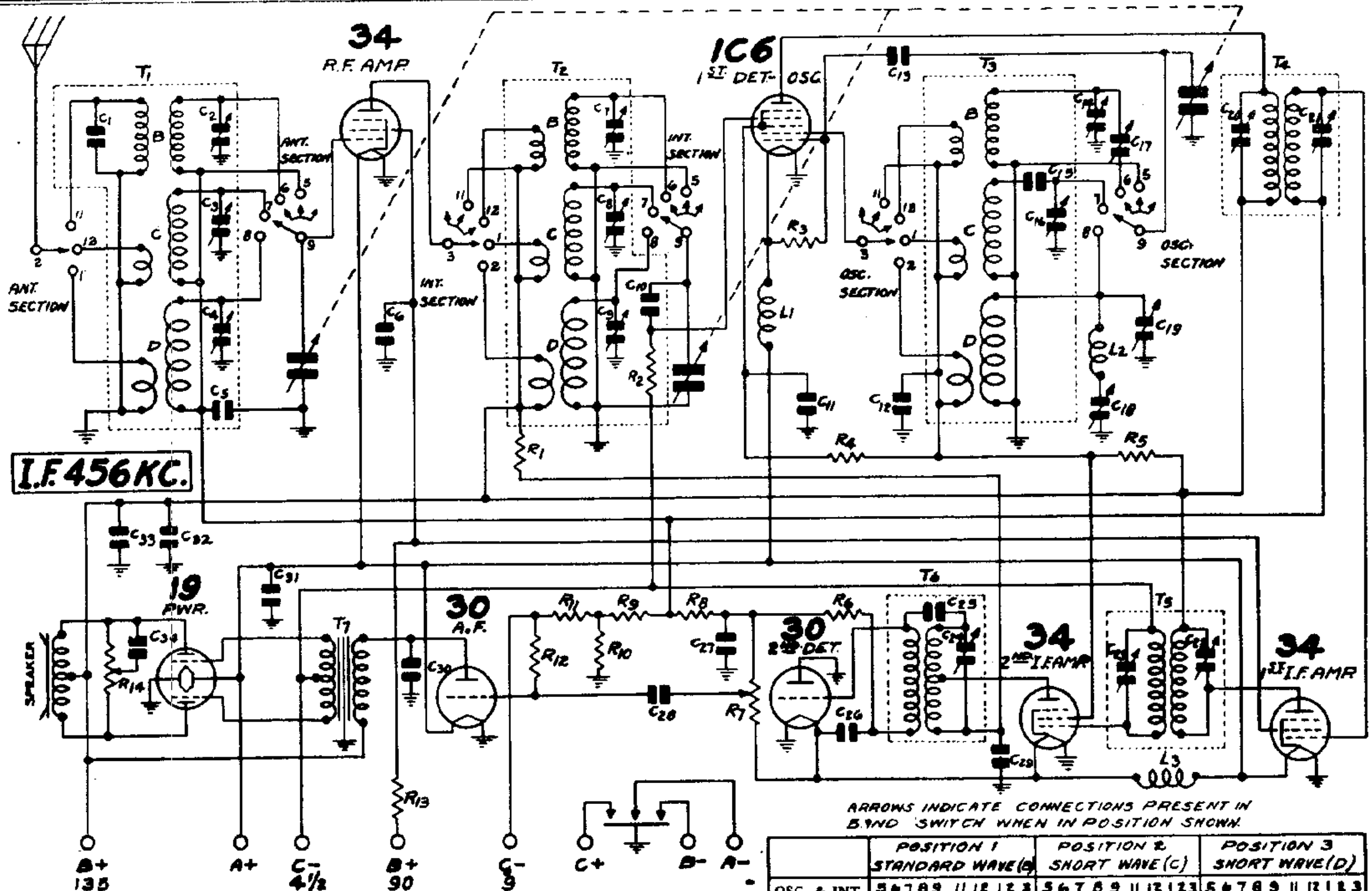
Fig. 8.—Details of Panel Drilling for Phono Assembly

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes of a size and in the position shown in Fig. 8 at the left hand side (from back) of the rear panel of the chassis.

WESTERN AUTO SUPPLY CO.



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. & INT. SECTION	5 6 7 8 9 11 12 1 2 3	5 6 7 8 9 11 12 1 2 3	5 6 7 8 9 11 12 1 2 3
ANT. SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

Sept., 1935

Fig. 2—Schematic Circuit Diagram

Contact Locations 4 and 10 in Osc. & Int. Sections and 3, 4 and 10 in Ant. Section are Blank.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .25 mf. 180 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 35 mmf.

C11 .05 mf. 180 V.
C12 .25 mf. 180 V.
C13 35 mmf.
C14 2-25 mmf.
C15 1400 mmf.
C16 2-25 mmf.
C17 300-600 mmf. } ONE
C18 40-100 mmf. } ASSEMBLY
C19 2-25 mmf.
C20 70-150 mmf. } ONE
C21 70-150 mmf. } ASSEMBLY

C22 70-150 mmf. } ONE
C23 70-150 mmf. } ASSEMBLY
C24 40-100 mmf.
C25 50 mmf.
C26 100 mmf.
C27 50 mmf.
C28 .002 mf. 600 V.
C29 .05 mf. 180 V.
C30 250 mmf.
C31 .50 mf. 180 V.
C32 .25 mf. 180 V.

C33 20.0 mf. 150 V. Electrolytic
C34 .05 mf. 240 V.

R 1 1,000 Ohm .2 W.
R 2 1.0 Megohm .2 W.
R 3 100,000 Ohm .2 W.
R 4 5,000 Ohm .2 W.
R 5 10,000 Ohm .5 W.
R 6 60,000 Ohm .2 W.
R 7 1.0 Megohm Vol. Cont.

R 8 3.0 Megohm .2 W.
R 9 1.0 Megohm .2 W.
R10 2,000 Ohm .2 W.
R11 7,000 Ohm .2 W.
R12 3.0 Megohm .2 W.
R13 30,000 Ohm .2 W.
R14 150,000 Ohm Tone Control

T 1 Antenna R.F. Trans.
T 2 Interstage R.F. Trans.
T 3 Osc. Inductors
T 4 1st. I.F. Trans.
T 5 2nd. I.F. Trans.
T 6 3rd. I.F. Trans.
T 7 Push-Pull Input Trans.

L 1 Single Filament Reactor
L 2 Osc. Tracking Coil
L 3 Single Filament Reactor

MODEL D713 (1935)
Voltage, Socket, Coils
Trimmers

WESTERN AUTO SUPPLY CO.

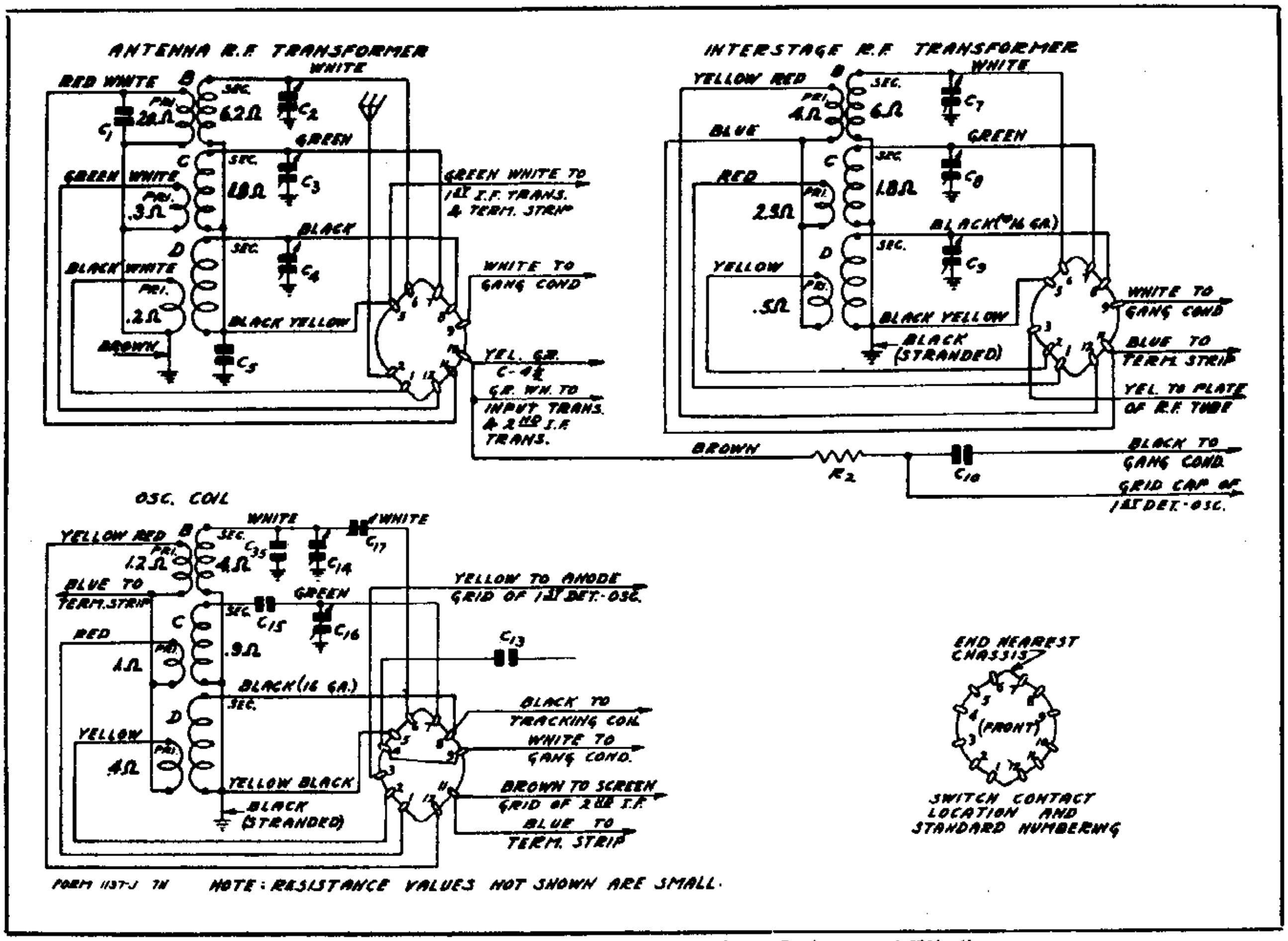


Fig. 11—Color Coding of Coil Wires and D. C. Resistance of Windings (Also See Complete D. C. Resistance List Below)

VOLTAGES AT SOCKETS

Batteries up to Rated Voltages Ant. Shorted to Ground
Voltages Read from Negative Fil. Terminal
Volume Control at Maximum

Type of Tube	Function	Across Filam't	Plate to Ground	Screen to Ground	Control Grid to Ground	Normal Plate M.A.
34	R. F. Amp.	2.0	135	45		1.8
1C6	1st Detector Oscillator	2.0	135 75(1)	65		2.6 1.8(1)
34	1st I. F. Amp.	2.0	135	45		1.8
34	2nd I. F. Amp.	2.0	133	75	4.5	2.25
30	2nd Detector	2.0				
30	A. F. Amp.	2.0	135			3.0
19	Power Amp.	2.0	135		4.5	1.0 (Per Plate)

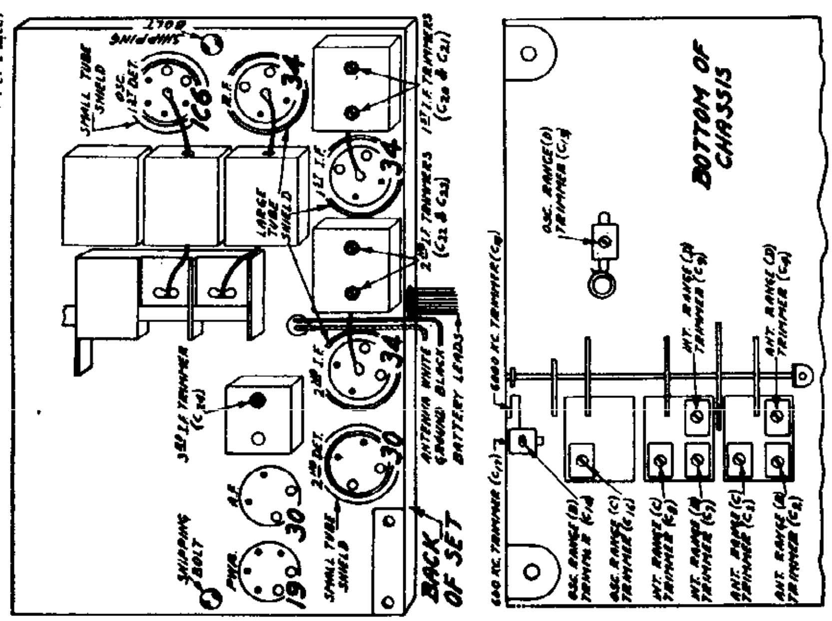


Fig. 9—Arrangement of Trimmers

WESTERN AUTO SUPPLY CO.

SPECIFICATIONS

Input Voltages	
"A" Battery	2 Volts (0.68 Amperes)
"B" Batteries	90 and 135 Volts
"C" Batteries	4½ and 9 Volts
Power Output	1 Watt Undistorted
Selectivity	24 KC Broad at 1000 times Signal
Intermediate Frequency	456 KC.
Speaker	8" Magnetic
Tuning Frequency Range	
B Range	535 to 1730 KC.
C Range	1680 to 4800 KC.
D Range	5650 to 16000 KC.
Sensitivity	
B Range Average	2.0 Microvolts Absolute
C Range Average	4.0 Microvolts Absolute
D Range Average	6.0 Microvolts Absolute

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C-10—see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser—see Fig. 10. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 10.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C14) until maximum output is obtained. The location of this trimmer is shown in Fig. 9.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

4800 KC Adjustment

Set the signal generator for 4800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C16) until maximum output is obtained. See Fig. 9 for location of this trimmer.

4200 KC Adjustment

Set the signal generator for 4200 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C19) until maximum output is obtained. See Fig. 9 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer (C18) until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

Changes in Early Models

Condenser C35 7 mmf. (not shown in Fig. 2), was added to the oscillator coil assembly in parallel with oscillator Range B trimmer condenser C14. It is not, however, used in all cases but only when this capacity is required in this circuit.

MODEL D713 (1935)
Drive Cord Data
Resistances

WESTERN AUTO SUPPLY CO.

Replacing Drive Cord

Take off the station pointer by removing the screw at the center of the dial.

Loosen the two set screws in the collar on the band selector shaft.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket.

Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 12.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 12. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one half turns, progressing toward the front.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one half times around this shaft as shown in Fig. 12, progressing toward the back of chassis.

Wrap the cord on directly under the drive drum above.

Then bring this cord up to the drive drum until it is up to the hole in the drive drum as shown in the illustration.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring when hanging free should be approximately 3/8" from the flange of the drum as shown in Fig. 12. Cut off the surplus length of cord after it is knotted.

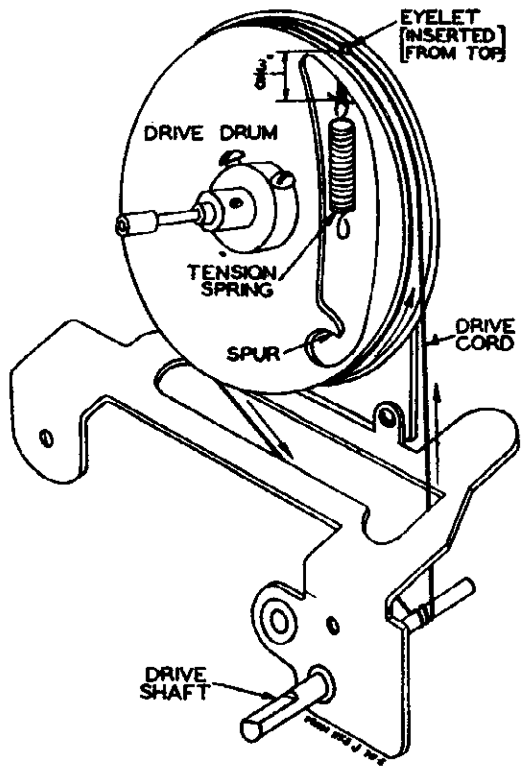


Fig. 12—Drive Cord Replacement

Then secure the other end of the tension spring over the spur on the drive drum.

Turn the drive shaft back and forth several times.

Replace the drive assembly and pointer.

Replace the chassis in the cabinet.

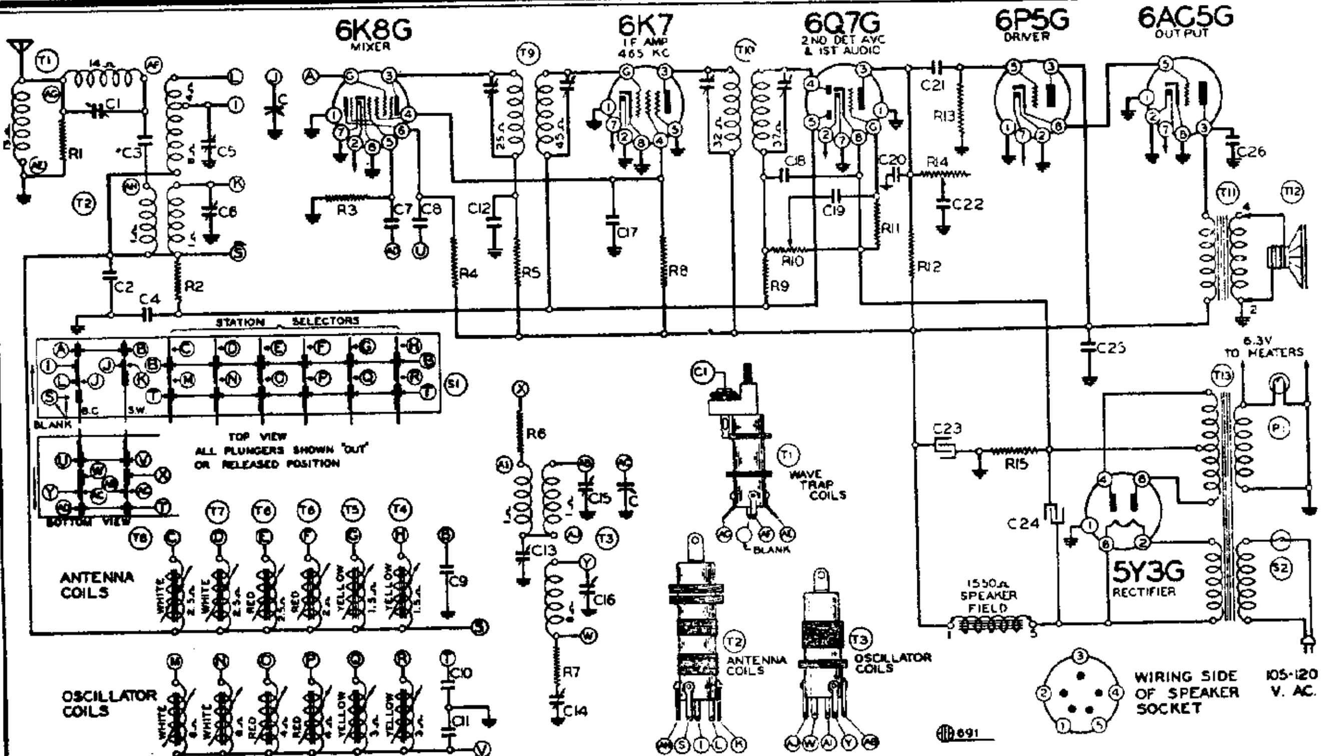
Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A416	Antenna R. F. Transformer	T1	
	Range B Primary Winding		20.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.2
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P 9A392	Interstage R. F. Transformer	T2	
	Range B Primary Winding		4.0
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A393	Oscillator Coils	T3	
	Range B Plate Coil		1.2
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		4.0
	Range C Grid Coil		0.9
	Range D Grid Coil		Small

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A394	1st I. F. Transformer	T4	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A395	2nd I. F. Transformer	T5	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A396	3rd I. F. Transformer	T6	
	Primary Winding		
	Tap to B+		8.0
	Tap to Variable Trimmer		8.2
	Secondary Winding		126.0
P-50X11	Audio Input Transformer	T7	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		275.0
	Center Tap to Outside		300.0
P-9A281	Single Filament Reactor	L1	1.2
P-9A391	High Frequency Oscillator Tracking Coil	L2	0.7
P-9A281	Single Filament Reactor	L3	1.2

MODEL D714 (1939)
Schematic, Voltage
Socket, Trimmors

WESTERN AUTO SUPPLY CO.



Power Consumption — 50 Watts (At 115 volts 50-60 cycles)
Power Output — 1.6 Watts Undistorted, 3 Watts Maximum
Intermediate Frequency — 465 KC.

FREQUENCY RANGE
5.65 to 18.3 MC.
540 to 1750 KC.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts.

RESISTORS

R1	13017	10M ohm—½ w.
R2	13011	250M ohm—⅓ w.
R3	13094	50M—⅓ w.
R4	13048	15M ohm—⅓ w.
R5	13023	2M—⅓ w.
R6	130254	100 ohm—½ w.
R7	130253	30 ohm—½ w.
R8	130176	20M ohm—½ w.
R9	1304	3 megohm—⅓ w.
R10	101142	Volume Control—1 megohm
R11	130225	15 megohm—⅓ w.
R12	13011	250M ohm—⅓ w.
R13	13019	1 megohm—⅓ w.
R14	101143	Tone Control (250M Ohm)
R15	130174	50 ohm—⅓ w.

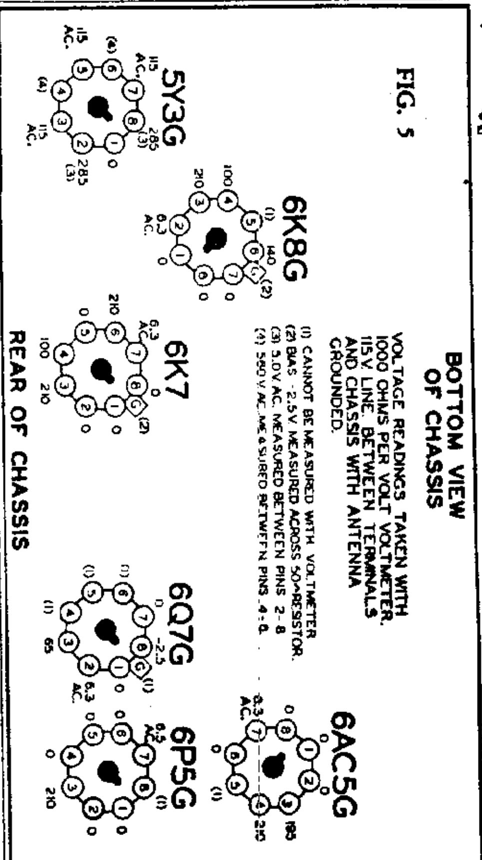
PARTS

T1	108124	Wave Trap
T2	111111	B. C.—S. W. Antenna Coils
T3	11097	B. C.—S. W. Oscillator coil
T4	11081C	High Frequency tuner coil
T5	11081	High Frequency tuner coil
T6	11082	Middle Frequency tuner coil
T7	11083	Low Frequency tuner coil
T8	11083B	Low Frequency tuner coil
T9	108122B	Input I. F.—465 kc.
T10	108106L	Output I. F.—465 kc.
T11	10578	Output Transformer
T12	114125B	6" speaker—dynamic (1550 ohm Field)
T13	104124G	Power Transformer
S1	12567	Push Button switch
S2		Off-on switch on volume control
P1	10794	Pilot light

CONDENSERS

C	10291	2 gang condenser
C1	12451	Adjustable Trimmer (Wave trap)
C2	129129	.0025 mica
C3	10078	.01 x 200 v.
C4	1009	.05 x 200 v.
C5	12439C	B. C. Antenna trimmer
C6	12439C	S. W. Antenna trimmer
C7	129130	.000025 mica
C8	10025	.002 x 600 v.
C9	129111	.000484 mica—(0— Temperature Coefficient)
C10	129119	.000329 mica—(o— Temperature Coefficient)
C11	129123	.0008 mica—(o— Temperature Coefficient)
C12	10026	.02 x 400 v.
C13	12465	S. W. Series padder—1500 mmf.
C14	12465	B. C. Series padder—350 mmf.
C15	12439C	S. W. Oscillator trimmer
C16	12439C	B. C. Oscillator trimmer
C17	1001	.1 x 400 v.
C18	1295	.0001 mica
C19	10019	.006 x 600 v.
C20	1292	.0005 mica
C21	10036	.02 x 400 v.
C22	10011	.01 x 400 v.
C23	11969	16 mfd. lytic
C24	11969	16 mfd. lytic
C25	10074	.1 x 400 v.
C26	10071	.004 x 600 v.

FIG. 5



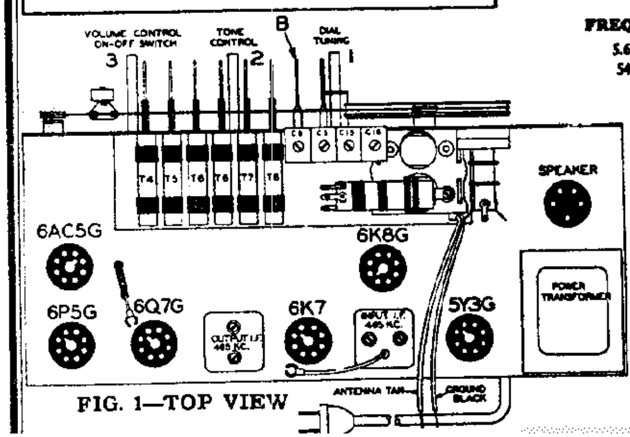


FIG. 1—TOP VIEW

MODEL D714 (1939)
Alignment, Tuner

WESTERN AUTO SUPPLY CO.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE:—On the front of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

DIAL CALIBRATION:

To correct dial calibration rotate the tuning knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider bar make the pointer self aligning thereby correcting dial calibration.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Pushbutton Indicated Below Pushed "In"	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8G	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROADCAST BAND	1750 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C16) (See Fig. 1)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Trimmer (C5) (See Fig. 1)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C14) (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
	465 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C1) (See Fig. 4)	I. F. Wave Trap	Adjust for minimum output
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 17 MC	Trimmer (C15) (See Fig. 1)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave	Dial Set at 17 MC	Trimmer (C6) (See Fig. 1)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 6 MC	Trimmer (C13) (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

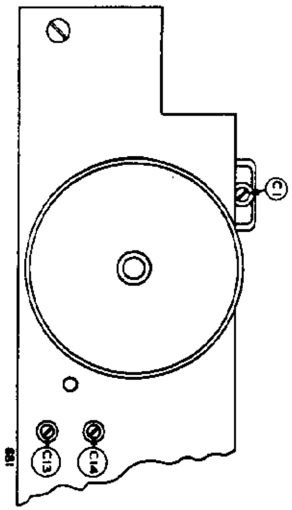


FIG. 4

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts A. C. on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHBUTTONS:

Important: Allow the radio to "warm up" for about 15 minutes before setting the station adjustment screws for the pushbuttons.

After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 3). Adjust screw through station tab opening above button pressed until the same station is heard clearly and is correctly tuned.

Press pushbutton marked "Broadcast" and tune in next station selected. Press button covering frequency range in which station is located. Adjust screw through station tab opening above button pressed until the same station is heard clearly and with maximum volume.

Follow this procedure for each button until you have selected all of your stations. The automatic buttons are now set up for quick tuning and no further adjustment is necessary.

NOTE: In setting up the pushbuttons, station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order or sequence of programs with that on dial tuning.

Punch out the station call letter tabs of the stations you have set up for the automatic buttons from the set of sheets supplied and insert them into the rectangular openings in the escutcheon. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

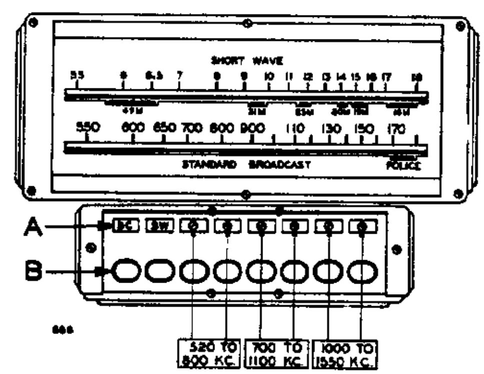
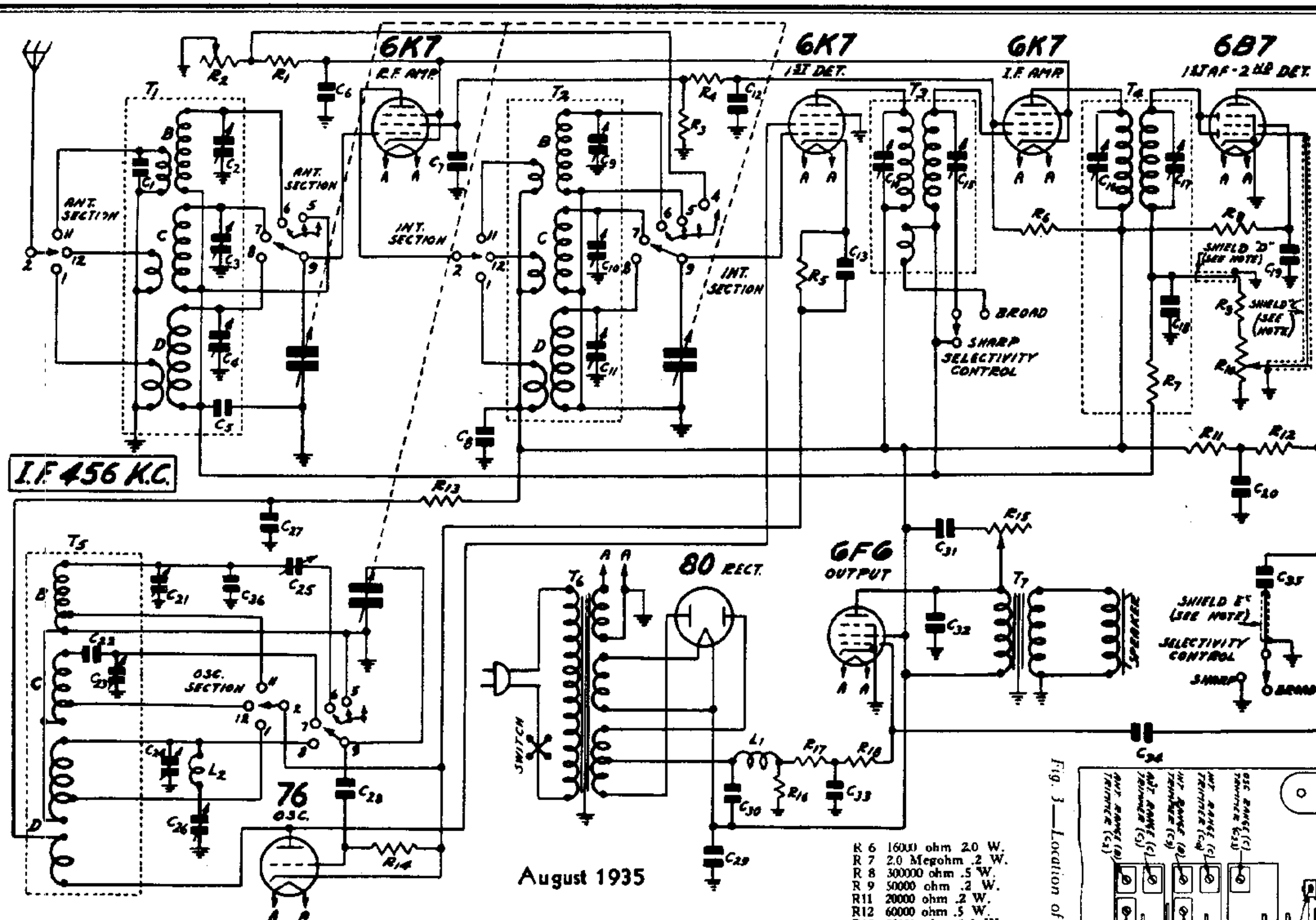


FIG. 3—Showing Station Adjustment Screws.

MODEL S712,D714H (1935)

WESTERN AUTO SUPPLY CO. Schematic, Trimmers



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
ANT. & OSC. SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2
INT. SECTION	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2

CONTACT LOCATIONS 3, 4 AND 10 IN ANT. AND OSC. SECTIONS AND 3 AND 10 IN INT. SECTION ARE BLANK.

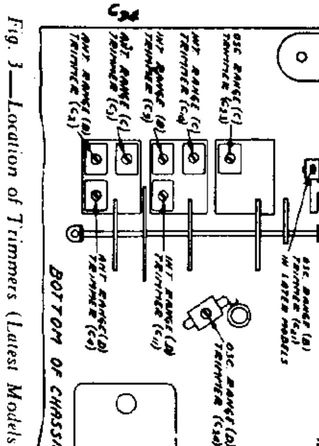


Fig. 3—Location of Trimmers (Latest Models)

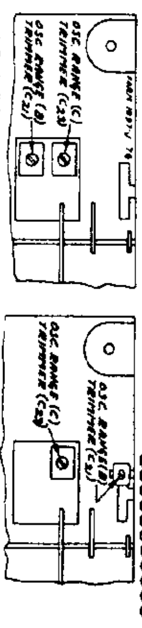


Fig. 4 Oscillator Trimmer Location

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

THE CAPACITY OF SHIELD "C" "D" AND "E" IS 50 MMF EACH.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .25 mf. 180 V.
C 7 .05 mf. 240 V.
C 8 .10 mf. 360 V.
C 9 2-25 mmf.
C10 2-25 mmf.
C11 2-25 mmf.
C12 .25 mf. 240 V.
C13 .05 mf. 180 V.
C14 70-150 mmf. } ONE
C15 70-150 mmf. } UNIT
C16 70-150 mmf. } ONE
C17 150-250 mmf. } UNIT
C18 50 mmf.
C19 .25 mf. 360 V.
C20 .25 mf. 360 V.
C21 2-25 mmf.
C22 1400 mmf.
C23 2-25 mmf.
C24 2-25 mmf.
C25 300-600 mmf. } ONE
C26 40-100 mmf. } UNIT
C27 .10 mf. 360 V.
C28 35 mmf.
C29 18 mf. 300 V.
C30 14 mf. 400 V.
C31 .05 mf. 600 V.
C32 .002 mf. 600 V.
C33 .03 mf. 180 V.
C34 .01 mf. 480 V.
C35 .004 mf. 600 V.
R 1 150 ohm .2 W.
R 2 2500 ohm } Dual Vol.
R10 500000 ohm } Control
R 3 30000 ohm .5 W.
R 4 6000 ohm .5 W.
R 5 2500 ohm .2 W.
R 6 16000 ohm 2.0 W.
R 7 2.0 Megohm .2 W.
R 8 300000 ohm .5 W.
R 9 50000 ohm .2 W.
R11 20000 ohm .2 W.
R12 60000 ohm .5 W.
R13 25000 ohm 1.0 W.
R14 80000 ohm .2 W.
R15 150000 Tone Cont.
R16 235 ohm 2.0 W.
R17 100000 ohm .2 W.
R18 500000 ohm .2 W.
T 1 Antenna R.F. Trans.
T 2 Interstage R.F. Trans
T 3 1st. I.F. Trans.
T 4 2nd I.F. Trans.
T 5 Osc. Inductors
T 6 Power Trans.
T 7 Output Trans.
L 1 Speaker Field
L 2 Osc. Tracking Coil

MODELS S712,D714M(1935)
Voltage,Socket,Coils
Change s,Phono.Data

WESTERN AUTO SUPPLY CO.

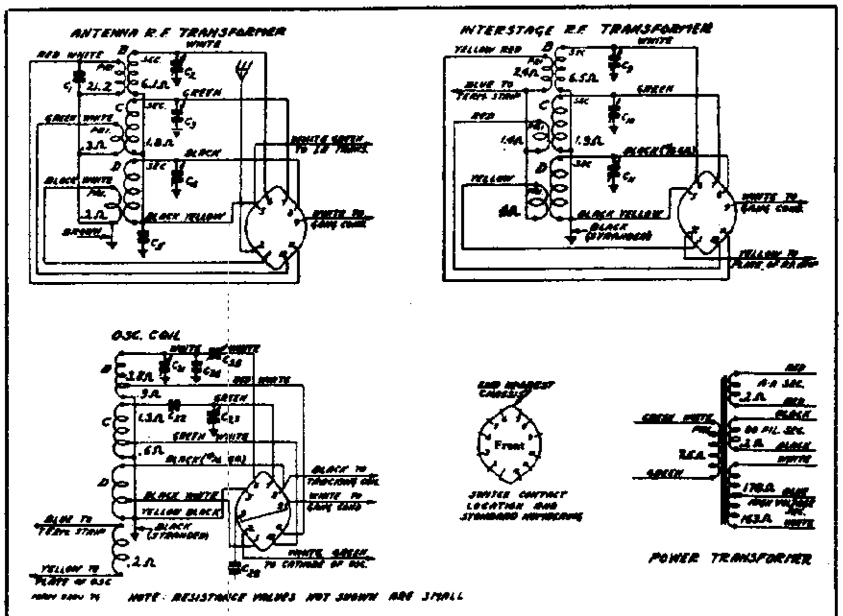


Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)

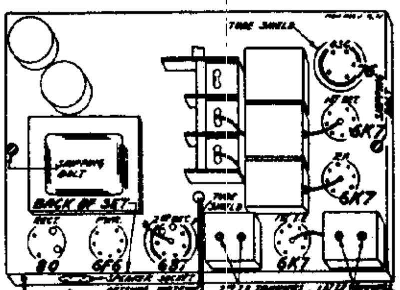


Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6D6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 500,000 ohm meter.
(2) As read across R16

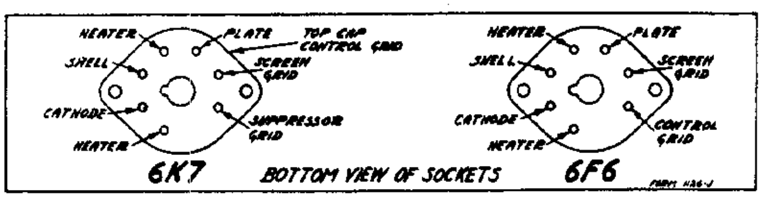


Fig. 7—Metal Tubes—Bottom View of Sockets

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

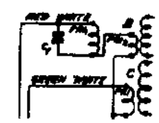


Fig. 8—Antenna Transformer in Early Models

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1¾" from the bottom, ⅞" and 3¼" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

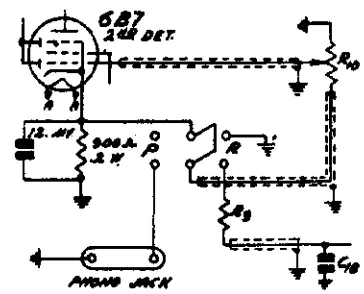


Fig. 9—Phonograph Connections

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

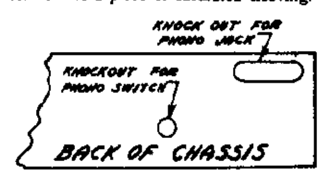


Fig. 10—Location of Phono Knockouts

Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T5 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T5, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned.

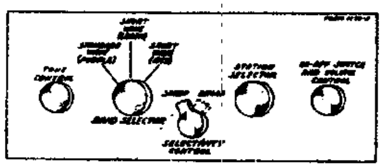


Fig. 1—Arrangement of Controls

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. High audio frequencies are by-passed to ground through condenser C35.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C24) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Tuning Frequency Range	
B Range	535 to 1780 KC.
C Range	1715 to 5800 KC.
D Range	5750 to 18300 KC.
Sensitivity	
B Range Average	0.5 Microvolts Absolute
C Range Average	1.0 Microvolts Absolute
D Range Average	2.0 Microvolts Absolute
Power Consumption	68 Watts (At 115 volts 60 cycles)
Power Output	3 Watts Undistorted
Selectivity	28 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency	456 KC.
Speaker	6" and 8" Dynamic

MODEL D716 (1935)
Alignment,Resistances

WESTERN AUTO SUPPLY CO.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator to the grid of the 1st detector through a 0.1 MF condenser.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C38) until maximum output is obtained The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C13) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C9 and C12) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C10 and C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

D. C. Resistance of Windings

Part No.	Winding	Code	in Ohms
P-9A418	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.4
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		2.1
	Range D Secondary Winding		Small
P-9A411	1st Interstage R. F. Transformer	T2	
	Range B Primary Winding		3.6
	Range C Primary Winding		2.4
	Range D Primary Winding		0.5
	Range B Secondary Winding		5.8
	Range C Secondary Winding		2.1
	Range D Secondary Winding		Small
P-50X24	Audio Input Transformer	T7	
	Primary Winding		415.0
	Secondary Winding		
	Center Tap to Inside		211.7
	Center Tap to Outside		208.5
P-51X36	Audio Output Transformer	T8	
	Primary Winding		
	Center Tap to Inside		133.5
	Center Tap to Outside		155.3
	Secondary Winding		
	Tap to Upper Side		0.16
	Tap to Ground Side		0.12
P-53X82	Power Transformer (115 Volt-60 Cycle)	T9	
	Primary Winding		1.7
	Tube Filament Secondary (A-A)		Small
	Tube Filament Secondary (B-B), (80)		Small
	High Voltage Secondary Winding		
	Center Tap to Inside		97.9
	Center Tap to Outside		106.4
P-9A407	Oscillator Coils	T10	
	Range B Grid Coil		
	Red White Tap to White		3.1
	Red White Tap to Ground		0.7
	Range C Grid Coil		
	Green White Tap to Green		1.7
	Green White Tap to Ground		0.5
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
P-9A400	2nd I. F. Plate Isolating Reactor	L1	34.7
P-12A204	12" Dynamic Speaker (No. 1—See Fig. 2)		
	Speaker Field	L4	6400.
	Voice Coil		Small
P-12A205	12" Dynamic Speaker (No. 2—See Fig. 2)		
	Speaker Field	L3	1000.
	Voice Coil		Small
P-12A226	12" Dynamic Speaker (No. 3—See Fig. 2)		
	Speaker Field	L2	1000.
	Voice Coil		Small
P-52X30	Reactor Assembly	L5	143.6
P-9A391	High Frequency Oscillator Tracking Coil	L6	1.0
P-9A412	2nd Interstage R. F. Coils	T3	
	Range B Section		
	Long Portion		5.9
	Short Portion		0.3
	Range C Section		
	Long Portion		1.8
	Short Portion		0.2
	Range D Section		Small
P-9A413	1st I. F. Transformer	T4	
	Primary Winding		4.4
	Coupling Winding		0.2
	Secondary Winding		
	Tap to Condenser Side		2.3
	Tap to Switch Side		2.3
P-9A414	2nd I. F. Transformer	T5	
	Primary Winding		4.3
	Coupling Winding		0.3
	Secondary Winding		
	Tap to Condenser Side		2.3
	Tap to Switch Side		2.3
P-9A415	3rd I. F. Transformer	T6	
	Primary Winding		9.8
	Secondary Winding		30.0

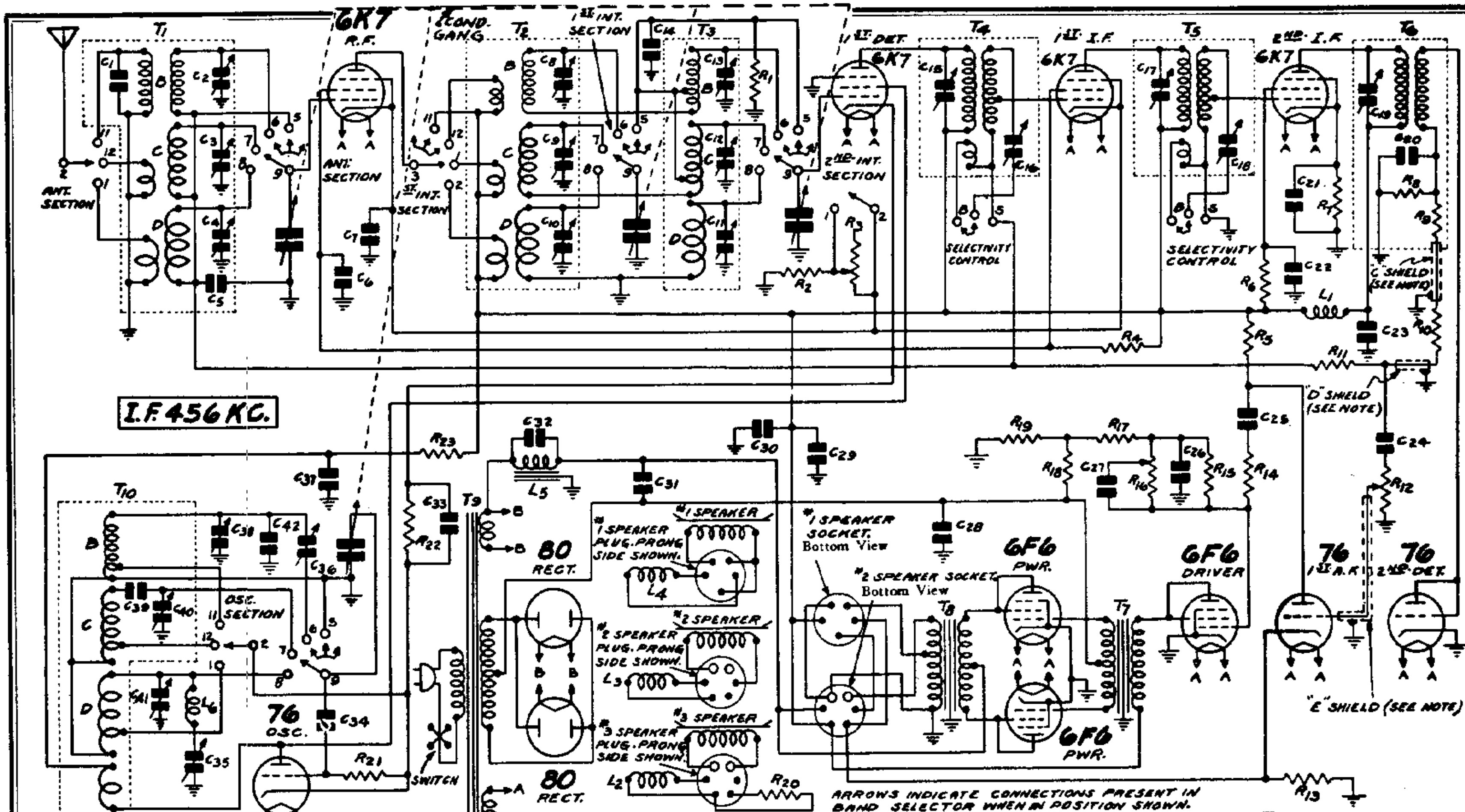
MODEL D716 (1935)
Schematic

WESTERN AUTO SUPPLY CO.

Power Consumption - 140 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 15 Watts Undistorted

Tuning Frequency Range
B Range . . . . 535 to 1730 KC.
C Range . . . . 1715 to 5800 KC.
D Range . . . . 5750 to 18300 KC.



	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. AND ANT. SECTION	11 12 1 2 5 6 7 8 9	11 12 1 2 5 6 7 8 9	11 12 1 2 5 6 7 3 9
2nd INT. SECTION	1 2 5 6 7 8 9	1 2 5 6 7 8 9	1 2 5 6 7 8 9
1st INT. SECTION	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9

CONTACT LOCATIONS 3,4 AND 10 IN OSC. AND ANT. SECTIONS, 3,4,10,11 AND 12 IN 2nd INT. SECTION AND 4 AND 10 IN 1st INT. SECTION ARE BLANK.

October, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
"B" AND "S" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY.
THE CAPACITY OF THE "C" SHIELD IS 20 μμf.
THE CAPACITY OF THE "D" SHIELD IS 70 μμf.
THE CAPACITY OF THE "E" SHIELD IS 16 μμf.
ON SETS USING ONE SPEAKER THE #3 SPEAKER IS FURNISHED.
ON SETS USING TWO SPEAKERS THE #1 AND #2 SPEAKERS ARE FURNISHED.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .70 mf. 360 V.
C 7 .25 mf. 180 V.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 2-25 mmf.
C11 2-25 mmf.
C12 2-25 mmf.
C13 2-25 mmf.
C14 .05 mf. 180 V.
C15 150-250 mmf. } One Unit
C16 150-250 mmf. }
C17 150-250 mmf. } One Unit
C18 150-250 mmf. }
C19 70-150 mmf.
C20 50 mmf.
C21 .05 mf. 180 V.
C22 .05 mf. 360 V.
C23 .10 mf. 360 V.
C24 .01 mf. 400 V.
C25 .05 mf. 360 V.
C26 .25 mf. 180 V.
C27 .004 mf. 600 V.
C28 125.0 mf. 45 V. Electrolytic
C29 18.0 mf. 290 V. Electrolytic
C30 .25 mf. 360 V.
C31 30.0 mf. 450 V. Electrolytic
C32 .15 mf. 280 V. A. C.
C33 .05 mf. 180 V.
C34 35 mmf.
C35 40-100 mmf. } One Unit
C36 300-600 mmf. }
C37 .25 mf. 360 V.
C38 2-25 mmf.
C39 1400 mmf.
C40 2-25 mmf.
C41 2-25 mmf.
C42 10 mmf.

R 1 25,000 ohm 0.2 watt
R 2 150 ohm 0.2 watt
R 3 2500 ohm } Dual Volume Control
R12 2.0 megohm }
R 4 50,000 ohm 1.0 watt
R 5 60,000 ohm 0.5 watt
R 6 100,000 ohm 0.5 watt
R 7 500 ohm 0.2 watt
R 8 200,000 ohm 0.5 watt
R 9 100,000 ohm 0.2 watt
R10 100,000 ohm 0.2 watt
R11 2.0 megohm 0.2 watt
R13 200 ohm 0.5 watt
R14 250,000 ohm 0.2 watt
R15 250,000 ohm 0.2 watt
R16 3.0 megohm Tone Control
R17 100,000 ohm 0.2 watt
R18 128 ohm 2.5 watt } Armored Wire-Wound
R19 145 ohm 3.0 watt }
R20 7800 ohm 12.0 watt
R21 80,000 ohm 0.2 watt
R22 2,500 ohm 0.2 watt
R23 27,000 ohm 1.0 watt

T 1 Ant. R.F. Trans.
T 2 1st Interstage R.F. Trans.
T 3 2nd Interstage R.F. Trans.
T 4 1st I.F. Trans.
T 5 2nd I.F. Trans.
T 6 3rd I.F. Trans.
T 7 Push-Pull Input Trans.
T 8 Push-Pull Output Trans.
T 9 Power Trans.
T10 Osc. Inductors

L 1 2nd I. F. Plate Isolating Reactor
L 2 No. 3 Speaker Field (1000 ohm)
L 3 No. 2 Speaker Field (1000 ohm)
L 4 No. 1 Speaker Field (6400 ohm)
L 5 Choke Coil
L 6 Osc. Tracking Coil

MODEL D716 (1935)
Voltage, Socket, Coils
Trimmers

WESTERN AUTO SUPPLY CO.

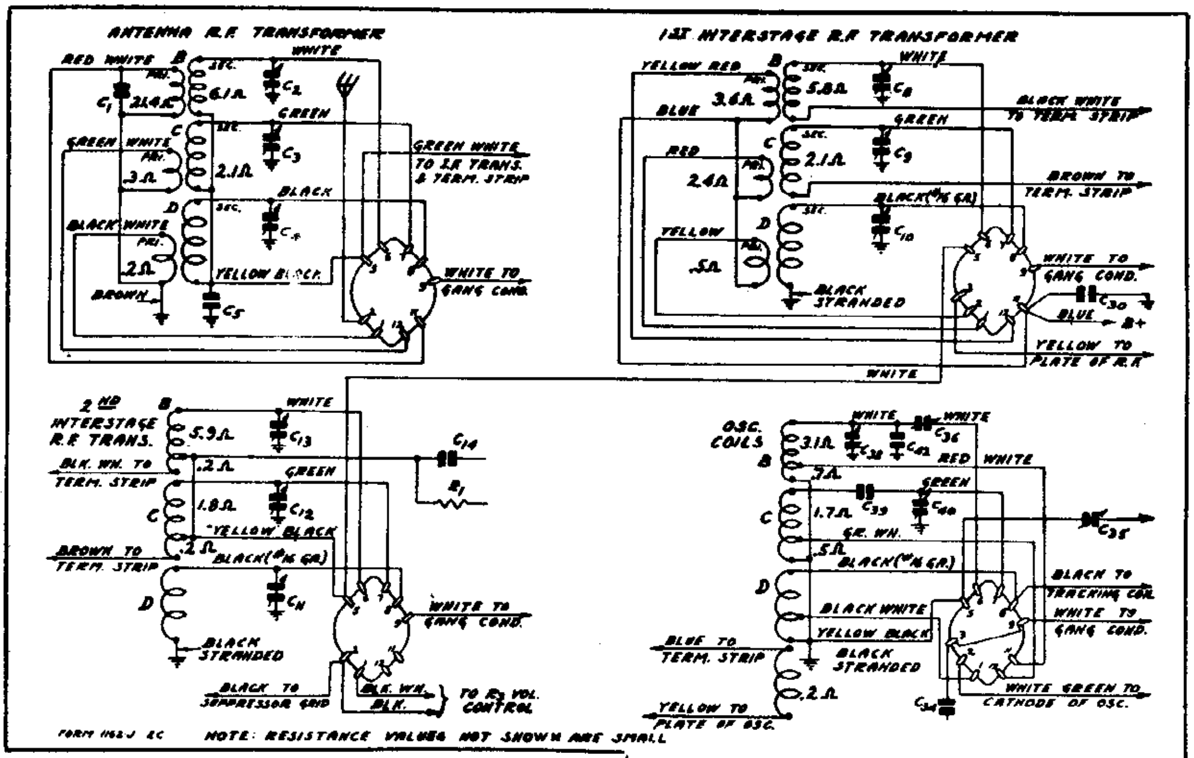
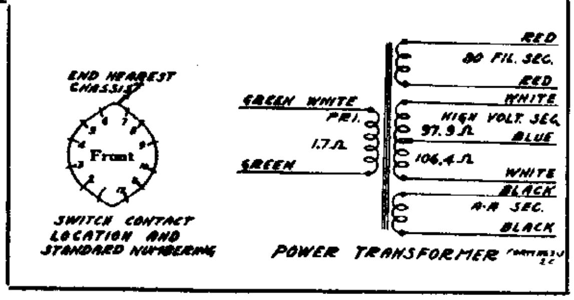


Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List)



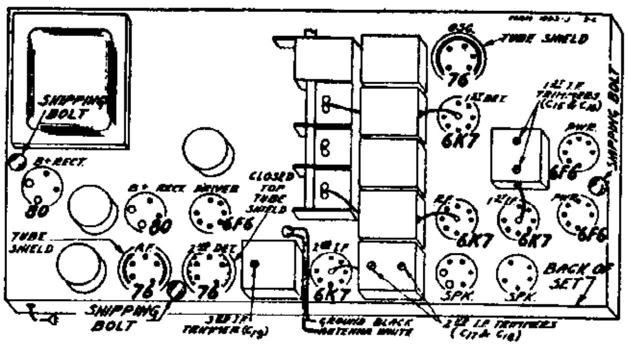


Fig. 5—Location of Tubes

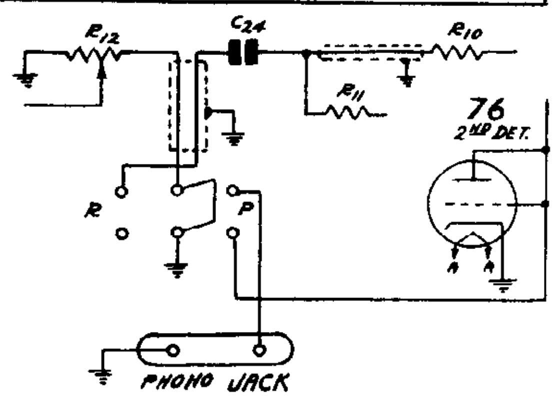


Fig. 7—Phonograph Connections

VOLTAGES AT SOCKETS

Line Voltage 115 - Antenna Shorted to Ground
Volume Control at Maximum

Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Cath. M A
6K7	R. F.	6.2	245	80	2.8	7.6
6K7	1st Det.	6.2	245	90	6.5	2.6
76	Osc.	6.2	90			5.3
6K7	1st I. F.	6.2	245	80	2.8	7.6
6K7	2nd I. F.	6.2	245	74	3.9	7.0
76	2nd Det.	6.2				
76	1st A. F.	6.2	110		5.6	2.1
6F6	Driver	6.2	235	230	20.0(1)	27.0
6F6	Power	6.2	345	345	38.0(2)	22.5
80	Rectifier	5.1	500(3)			140.0(4)

(1) As read across R19
(2) Grid to Ground
(3) Plate to Center Tap
(4) Two tubes in parallel

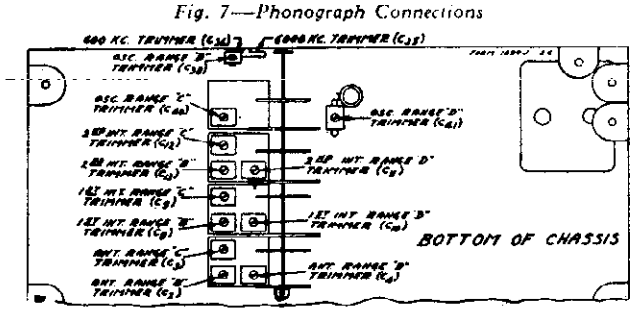
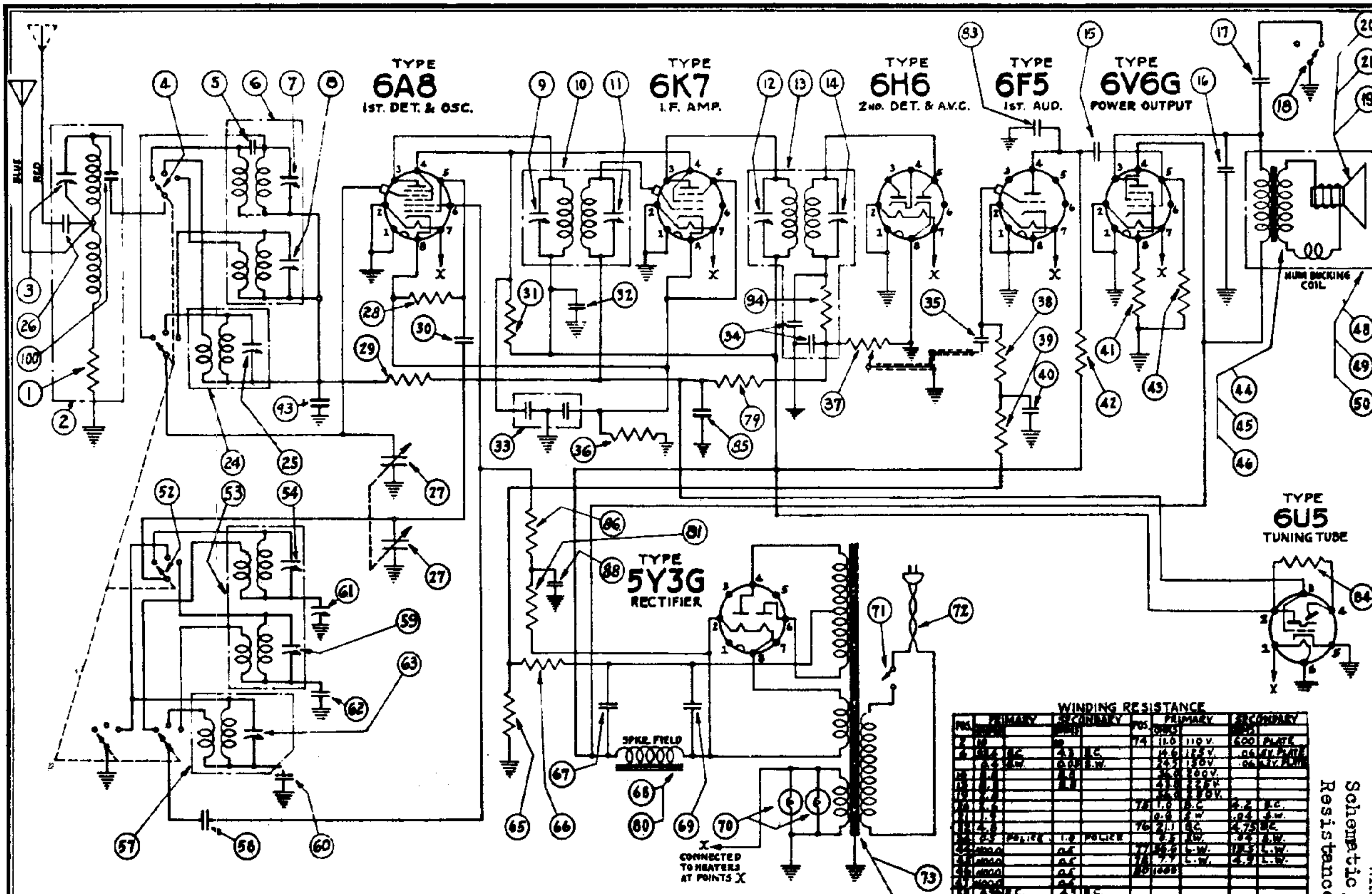


Fig. 3—Location of Trimmers

WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR226, WR326
WR338
Schematic, Voltage
Resistances



INT. FREQ. 455 K.C.

SOCKET VOLTAGES

TUBE	STAGE	FIL.	PIN NO.	PLATE	PIN NO.	SCREEN	PIN NO.	BIAS	[illegible]
6A8	1st. Det. & Osc.	6.0V	2-7	250	1-3	95	1-4	3.2V	
6K7	I.F. Amp.	6.0V	2-7	250	1-3	95	1-4	3.2V	
6H6	2nd Det. A.V.C.	6.0V	2-7	–		–		–	
6F5	1st. Audio	6.0V	2-7	70	1-4	–		0.9V	
6V6G	Pwr. Output	6.0V	2-7	227	1-3	250	1-4	12V	
5Y3G	Rectifier	[illegible]	2-8	310	4-6	–		–	

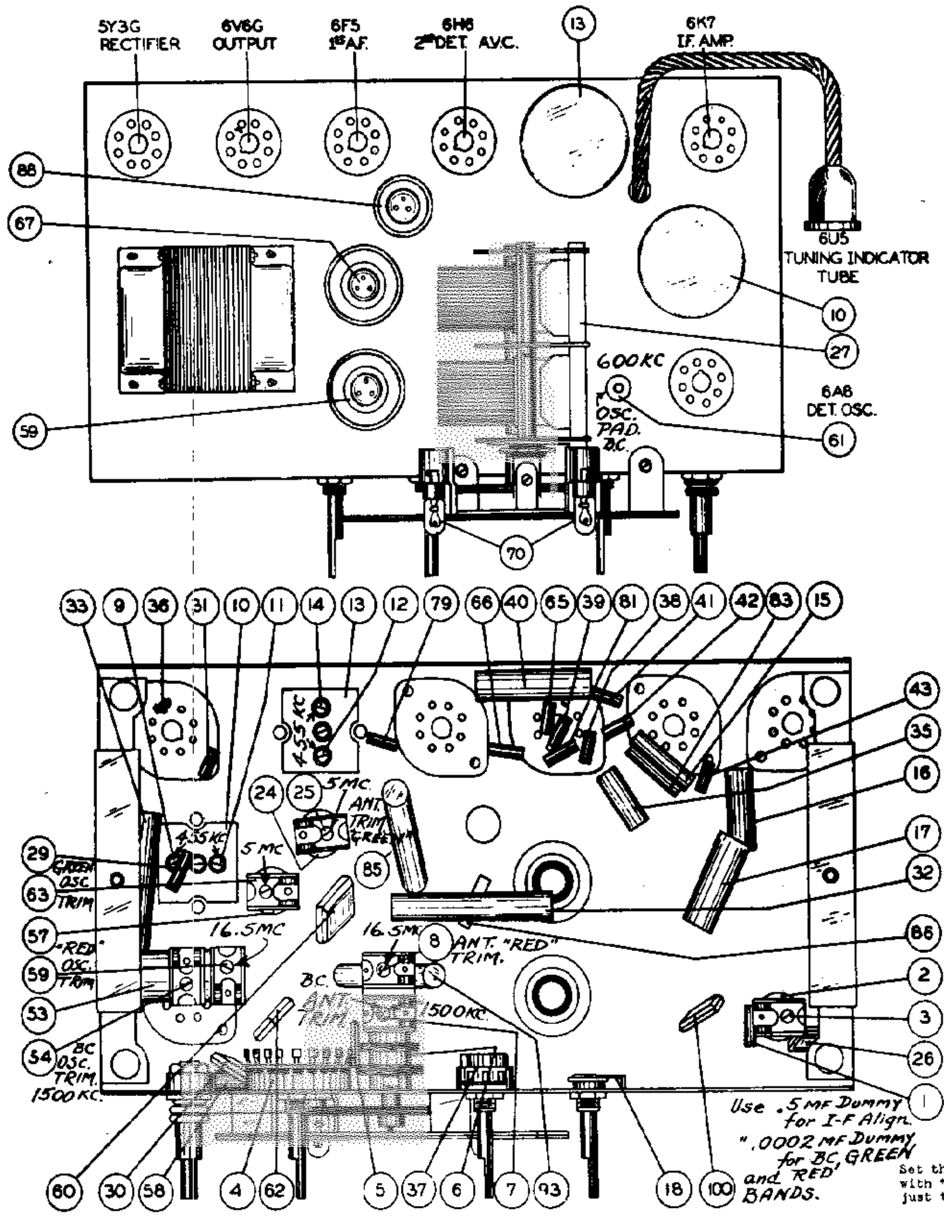
WINDING RESISTANCE

POS.	PRIMARY OHMS		SECONDARY OHMS		POS.	PRIMARY OHMS		SECONDARY OHMS	
2	10		[illegible]		74	11.0	110 V.	600	PLATE
6	4.4	B.C.	4.3	B.C.		14.6	125 V.	.06	[illegible]
	[illegible]	S.W.	0.08	S.W.		24.5	150 V.	.06	[illegible]
[illegible]	[illegible]		[illegible]			34.6	200 V.		
[illegible]	[illegible]		[illegible]			43.8	225 V.		
[illegible]	[illegible]					54.6	250 V.		
[illegible]	[illegible]				75	1.0	B.C.	2.4	B.C.
[illegible]	[illegible]					0.6	S.W.	.04	S.W.
[illegible]	4.8				76	2.1	B.C.	4.75	B.C.
[illegible]	6.5	POLICE	1.0	POLICE		0.3	S.W.	.04	S.W.
[illegible]	1000		0.5		77	36.4	L.W.	17.5	L.W.
[illegible]	1000		0.5		78	7.7	L.W.	4.9	L.W.
[illegible]	1000		0.5		80	1000			
[illegible]	1000		0.5						
[illegible]	5.5	B.C.	4.5	B.C.					
	[illegible]	S.W.	.08	S.W.					
[illegible]	5.55	POLICE	0.9	POLICE					
[illegible]	1000								
73	14.0		325	PLATE					
			.04	5V HEATER					
			[illegible]	[illegible]					

MODELS WR226, WR326
WR338

WESTINGHOUSE ELEC. SUPPLY CO.

Socket, Trimmers, Parts
Alignment



SERVICE PARTS LIST

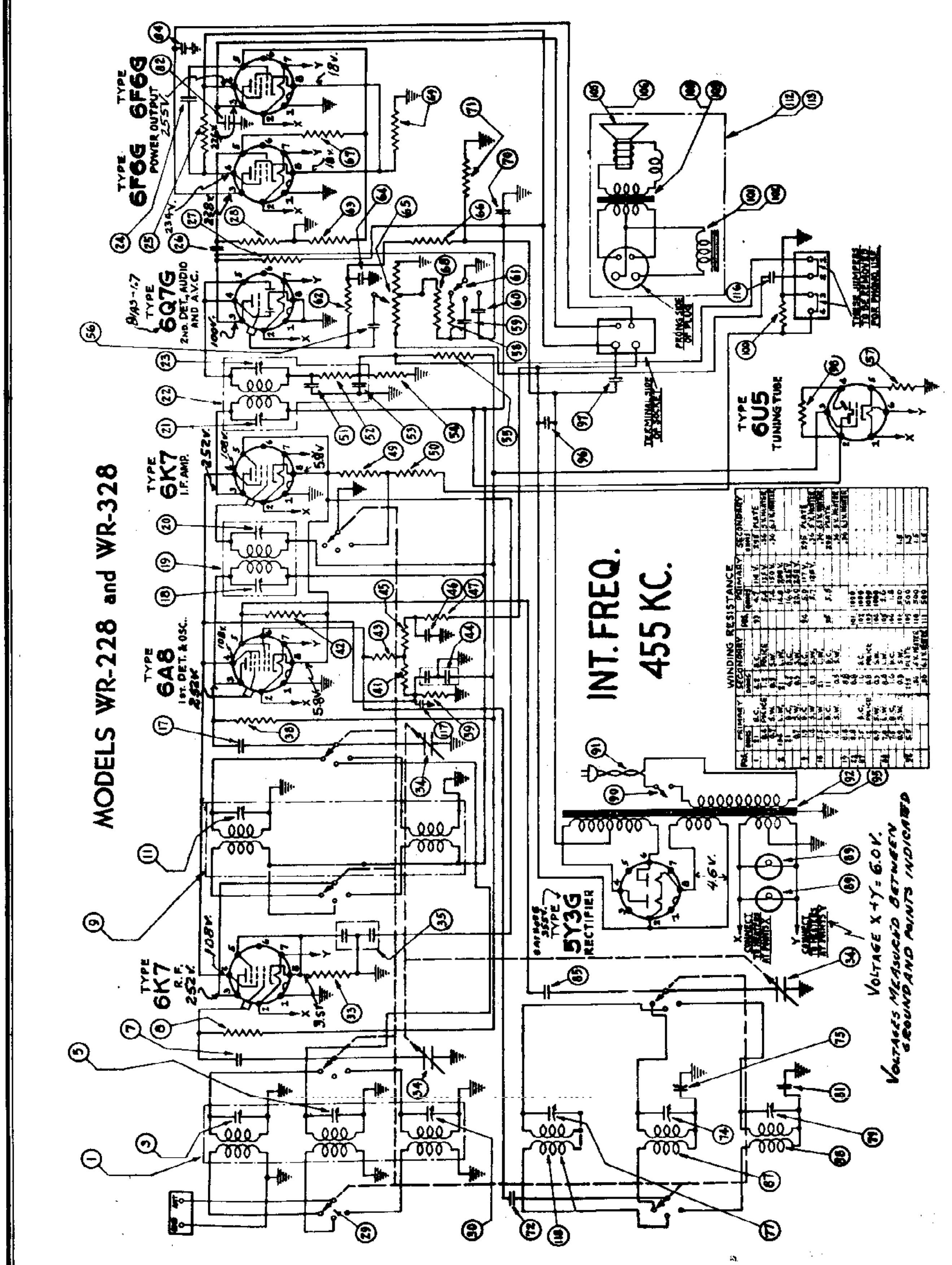
Dia. #	Part #	Description of Parts
1	RE 3333	33,000 ohm, 1/2 W. resistor - part of RC 95326 ......
2	RC 95326	Trap coil ....
3		Trimmer condenser 100-200 mmf. - part of RC 95326
4	SW 9579	Switch assembly ....
5		.000005 mfd. mica condenser - part of RC 95302
6	RC 95302	Preselector coil ....
7		Trimmer condenser 1.6-12 mmf. - part of RC 95302
8		Trimmer condenser 4-35 mmf. - part of RC 95302
9		Trimmer condenser - part of IC 95113
10	IC 95113	1st I.F. coil (455 K.C.) ....
11		Trimmer condenser - part of IC 95113
12		Trimmer condenser - part of IC 95114
13	IC 95114	2nd I.F. coil (455 K.C.) ....
14		Trimmer condenser - part of IC 95114
15	CW 4-02	.02 mfd., 400 V. condenser ....
16	CW 6-005	.005 mfd., 600 V. condenser ....
17	CW 6-05	.05 mfd., 600 V. condenser ....
18	SW 9573	Tone control switch ....
19	DM 9529	Speaker diaphragm (SK 9578) ....
20	DM 9527	Speaker diaphragm (SK 9575) ....
21	DM 9534	Speaker diaphragm (SK 9583) ....
24	RC 95304	Preselector coil (police band) ....
25		Trimmer condenser 1.6-12 mmf. - part of RC 95304
26		.00005 mfd. mica condenser - part of RC 95326
27	CG 9567	Gang condenser ....
28	RE 4733	47,000 ohm, 1/2 W. resistor ....
29	RE 2243	22,000 ohm, 1/2 W. resistor ....
30	CM 9545	.00005 mfd. mica condenser ....
31	RE 4733	47,000 ohm, 1/2 W. resistor ....
32	CW 4-10	.1 mfd., 400 V. condenser ....
33	CW 9535	.1-.1 mfd., 400 V. dual condenser ....
34		.0001-.0001 mfd. condenser - part of IC 95114
35	CW 2-02	.02 mfd., 200 V. condenser ....
36	RE 2213	220 ohm, 1/2 W. resistor ....
37	VR 9548	Volume control - .5 meg. ....
38	RE 1053	1 meg., 1/2 W. resistor ....
39	RE 4743	470,000 ohms, 1/2 W. resistor ....
40	CW 4-05	.05 mfd., 400 V. condenser ....
41	RE 2713	270 ohm, 1/2 W. resistor ....
42	RE 2243	220,000 ohm, 1/2 W. resistor ....
43	RE 4743	470,000 ohm, 1/2 W. resistor ....
44	TR 95145	Output transformer (6-1/2" speaker SK 9578) ....
45	TR 95143	Output transformer (12" speaker SK 9575) ....
46	TR 95154	Output transformer (10" speaker SK 9583) ....
48	SK 9578	Speaker 6-1/2" ....
49	SK 9575	Speaker 12" ....
50	SK 9583	Speaker 10" ....
53		Broadcast oscillator coil - part of RC 95303
54		Trimmer condenser 4-35 mmf. - part of RC 95303
57	RC 95305	Police oscillator coil ....
58	CW 4-02	.02 mfd., 400 V. condenser ....
59		Trimmer condenser 1.6-12 mmf. - part of RC 95303
60	CM 9547	.0016 mfd. mica condenser ....
61	CS 9585	Oscillator series (lag) condenser 225-700 mmf. ......
62	CM 959	.002 mfd. mica condenser ....
63		Trimmer condenser 4-35 mmf. - part of RC 95305
65	RE 1503	15 ohm. 1/2 W. resistor ....
66	RE 2703	27 ohm, 1/2 W. resistor ....
67	CE 9562	18 mfd., 300 V. electrolytic condenser ....
68	CL 9569	Field coil (6-1/2" speaker SK 9578) ....
69	CE 9554	18 mfd., 450 V. electrolytic condenser ....
70	LP 9610	Dial lamp - 6.3 V., .25 amp. ....
71		Line switch - part of VR 9548
72	CB 9512	Line cable assembly ....
73	TR 95132	Power transformer 105-125 V., 50-60 cycle ....
79	RE 4743	470,000 ohm, 1/2 W. resistor ....
80	CL 9567	Field coil (12" speaker SK 9575 & 10" speaker SK9583)
81	RE 3333	33,000 ohm, 1/2 W. resistor ....
82	TR 95135	Power transformer 105-125V., 25 cycle ....
83	CW 6-001	.001 mfd., 600 V. condenser ....
84		1 meg., 1/4 W. resistor - part of CB 95152
85	CW 4-05	.05 mfd., 400 V. condenser ....
86	RE 1033	10,000 ohm, 1/2 W. resistor ....
88	CE 9568	8 mfd., 450 V. electrolytic condenser ....
93	CW 4-05	.05 mfd., 400 V. condenser ....
94		47,000 ohm, 1/2 W. resistor - part of IC 95114
100	CM 959	.002 mfd. mica condenser ....

WAVE TRAP ADJUSTMENT

Set the test oscillator to 455 K.C. and with the signal applied to the antenna adjust trimmer condenser #3 to minimize the signal. Under actual operating conditions this trimmer may be adjusted slightly to minimize an interfering signal known to be on or near the 455 K.C. channel.

WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR228, WR328
Schematic, Voltage
Resistances



WINDING RESISTANCE

POS.	PRIMARY OHMS		SECONDARY OHMS		POS.	PRIMARY OHMS		SECONDARY OHMS	
1	21	B.C.	4.5	B.C.	93	4.7	114 V.	295	PLATE
	8.6	POLICE	7.5	POLICE		5.4	135 V.	.36	5 V. HEATER
	0.7	S.W.	0.3	S.W.		7.4	150 V.	.36	6.3 V. HEATER
2	134	L.W.	21	L.W.		14.0	200 V.		
	21	B.C.	4.5	B.C.		16.6	225 V.		
	0.7	S.W.	0.5	S.W.		20.0	250 V.		
3	1.9	B.C.	11	B.C.	94	6.0	117 V.	295	PLATE
	1.4	S.W.	0.3	S.W.		7.7	128 V.	.36	5 V. HEATER
18	17.5	L.W.	21	L.W.				.36	6.3 V. HEATER
	1.9	B.C.	11	B.C.	95	5.5		295	PLATE
	1.4	S.W.	0.5	S.W.				.36	5 V. HEATER
19	0.8		0.8					.36	6.3 V. HEATER
21	0.8		0.8		101	1000			
87	7.5	B.C.	1.0	B.C.	102	1000			
	1.1	POLICE	0.8	POLICE	103	1000			
	6.9	S.W.	0.3	S.W.	104	1000			
88	7.4	L.W.	0.6	L.W.	105	3.6			
	7.5	B.C.	1.6	B.C.	106	1.8			
	0.9	S.W.	0.3	S.W.	107	500		1.5	
96	5.5		295	PLATE	109	500		1.5	
			.36	5 V. HEATER	110	500		1.5	
			.36	6.3 V. HEATER	111	500		1.5	

MODELS WR228, WR328
Socket, Trimmers
Aligmment, Parts

WESTINGHOUSE ELEC. SUPPLY CO.

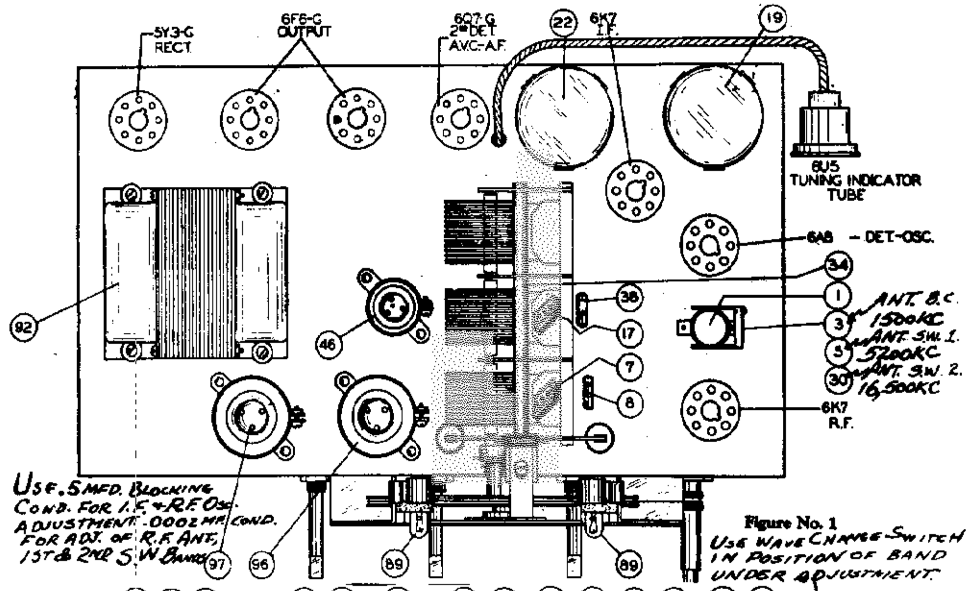


Figure No. 1

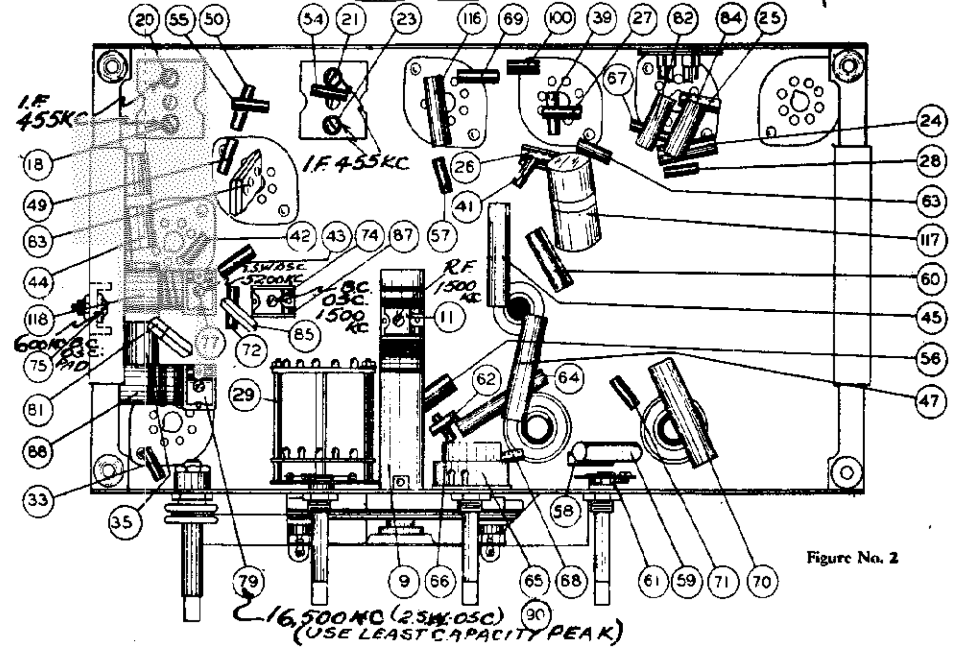


Figure No. 2

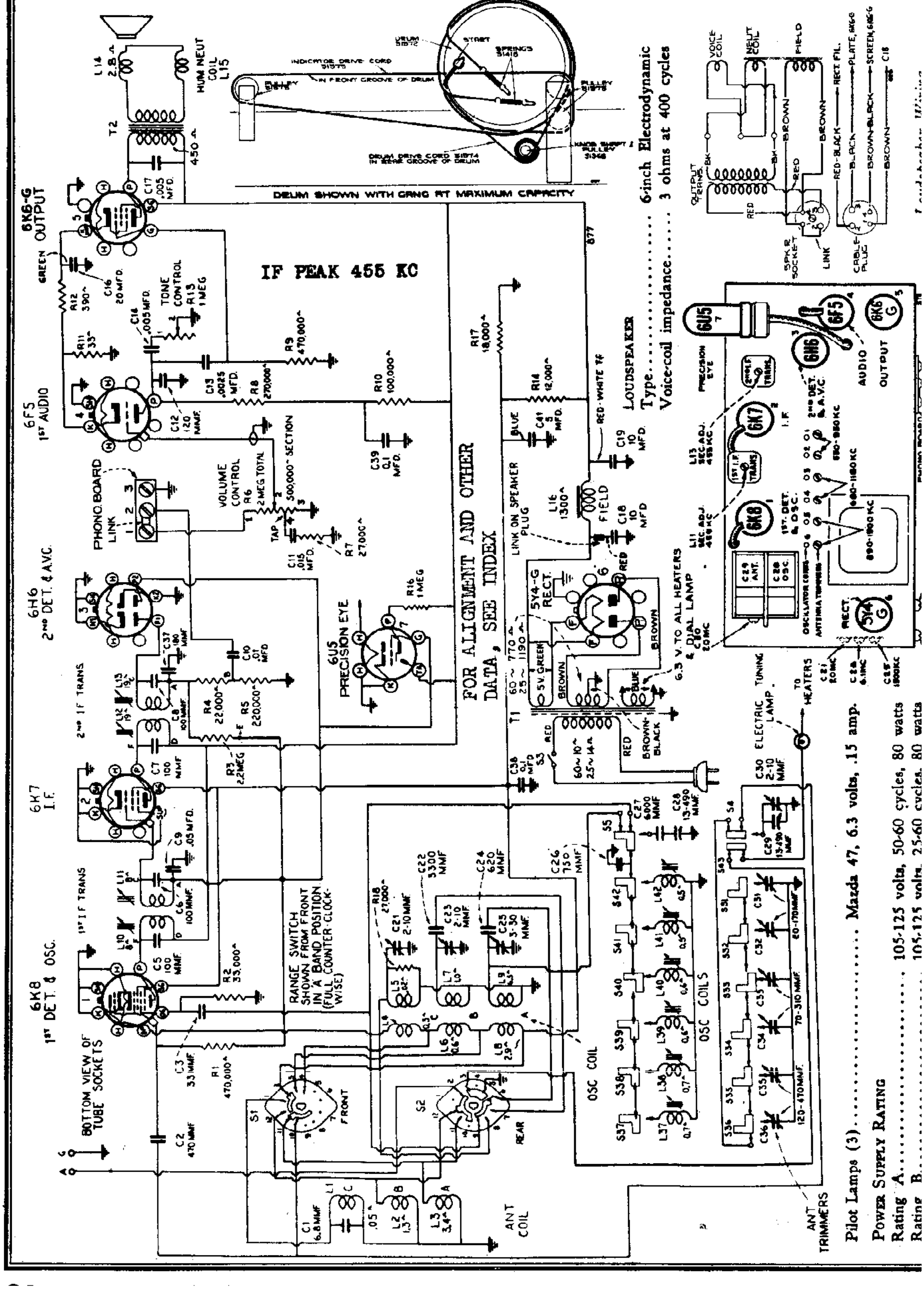
Dia. #	Part #	Description of Parts
1	RC 95306	Antenna composite coil assembly ....
3		Broadcast antenna trimmer - part of RC 95306
5		Police antenna trimmer - part of RC 95306
7	CM 9519	.0005 mfd. mica condenser ....
8	RE 2743	270,000 ohm, 1/2 W. resistor ....
9	RC 95307	R.F. composite coil assembly ....
11		Broadcast R.F. trimmer - part of RC 95307
17	CM 9519	.0005 mfd. mica condenser ....
18,20		1st I.F. trimmers - part of IC 95119
19		1st I.F. transformer (less housing) ....
21,23		2nd I.F. trimmers - part of IC 95120
22	IC 95120	2nd I.F. transformer (less housing) ....
24	CW 4-01	.01 mfd., 400 V. condenser ....
25	RE 1023	1000 ohm, 1/2 W. resistor ....
26	CW 4-02	.02 mfd., 400 V. condenser ....
27	RE 1043	100,000 ohm, 1/2 W. resistor ....
28	RE 1843	180,000 ohm, 1/2 W. resistor ....
29	SW 9580	Wave-change switch assembly ....
30		Short-wave antenna trimmer - part of RC 95306
33	RE 3913	390 ohm, 1/2 W. resistor ....
34	CG 9569	Variable gang condenser ....
35	CW 9535	.1 mfd.-.1 mfd., 400 V. dual condenser ....
38	RE 2743	270,000 ohm, 1/2 W. resistor ....
39	RE 6833	68,000 ohm, 1/2 W. resistor ....
41	RE 1033	10,000 ohm, 1/2 W. resistor ....
42	RE 4733	47,000 ohm, 1/2 W. resistor ....
43	RE 4723	4700 ohm, 1/2 W. resistor ....
44	CW 9535	.1 mfd.-.1 mfd., 400 V. dual condenser ....
45	RE 103522	10,000 ohm, 2 W. resistor ....
46	CE 9568	8 mfd., 450 V. electrolytic condenser .....
47	RE 682522	6800 ohm, 2 W. resistor ....
49	RE 1513	150 ohm, 1/2 W. resistor ....
50	RE 1513	150 ohm, 1/2 W. resistor ....
51	CM 9513	.0001 mfd. mica condenser ....
52	RE 4733	47,000 ohm, 1/2 W. resistor ....
53	CM 9513	.0001 mfd. mica condenser ....
54	RE 4743	470,000 ohm, 1/2 W. resistor ....
55	RE 4743	470,000 ohm, 1/2 W. resistor ....
56	CW 4-02	.02 mfd., 400 V. condenser ....
57	RE 2713	270 ohm, 1/2 W. resistor ....
58	RE 1043	100,000 ohm, 1/2 W. resistor ....
59	CW 6-002	.002 mfd., 500 V. condenser ....
60	CW 4-02	.02 mfd., 400 V. condenser ....
61	SW 9581	Tone control switch ....
62	RE 2253	2.2 meg., 1/2 W. resistor ....
63	RE 4743	470,000 ohm, 1/2 W. resistor ....
64	CW 2-10	.1 mfd., 200 V. condenser ....
65	VR 9556	2 meg., mid-tapped volume control ....
66	RE 4743	470,000 ohm, 1/2 W. resistor ....
67	RE 3343	330,000 ohm, 1/2 W. resistor ....
68	RE 1043	100,000 ohm, 1/2 W. resistor ....
69	RE 271522	270 ohm, 2 W. resistor ....
70	CW 4-10	.1 mfd., 400 V. condenser ....
71	RE 1803	18 ohm, 1/2 W. resistor ....
72	CW 6-005	.005 mfd., 600 V. condenser ....
74		B.C. oscillator trimmer - part of RC 95308
75	CS 9585	B.C. oscillator lag condenser ....
77		Police oscillator trimmer - part of RC 95309
79		S.W. oscillator trimmer - part of RC 95310
81	CM 9545	4050 mmfd. mica condenser ....
82	CW 6-002	.002 mfd., 600 V. condenser ....
84	CW 6-002	.002 mfd., 600 V. condenser ....
86	CM 9513	.0001 mfd. mica condenser ....
87	RC 95308	Broadcast oscillator coil ....
88	RC 95310	S.W. oscillator coil ....
89	LP 9510	Dial light - 6.3 V., .25 amp. ....
91	CB 9512	Line cable and plug assembly ....
92	TR 95117	Power transformer 105-125 V. 50-60 cycle ..
95	TR 95120	Power transformer 105-125 V. 25 cycle .....
96	CE 9554	18 mfd., 450 V. electrolytic condenser ....
97	CE 9562	18 mfd., 300 V. electrolytic condenser ....
98	RE 1053	1 meg., 1/2 W. resistor ....
100	RE 1033	10,000 ohm, 1/2 W. resistor ....
101	CL 9574	Field coil (8" speaker) ....
102	CL 9572	Field coil (12" speaker) ....
105	DM 9532	8" speaker diaphragm ....
106	DM 9528	12" speaker diaphragm ....
107	TR 95153	Output transformer (8" speaker) ....
108	TR 95150	Output transformer (12" speaker) ....
112	SK 9581	8" speaker complete ....
113	SK 9585	12" speaker complete ....
116	CW 4-02	.02 mfd., 400 V. condenser ....
117	CW 9525	1 mfd., 200 V. condenser ....
118	RC 95309	Police oscillator coil ....

Trimmers, Speaker Drive Cord Data

WESTINGHOUSE ELEC. SUPPLY CO.

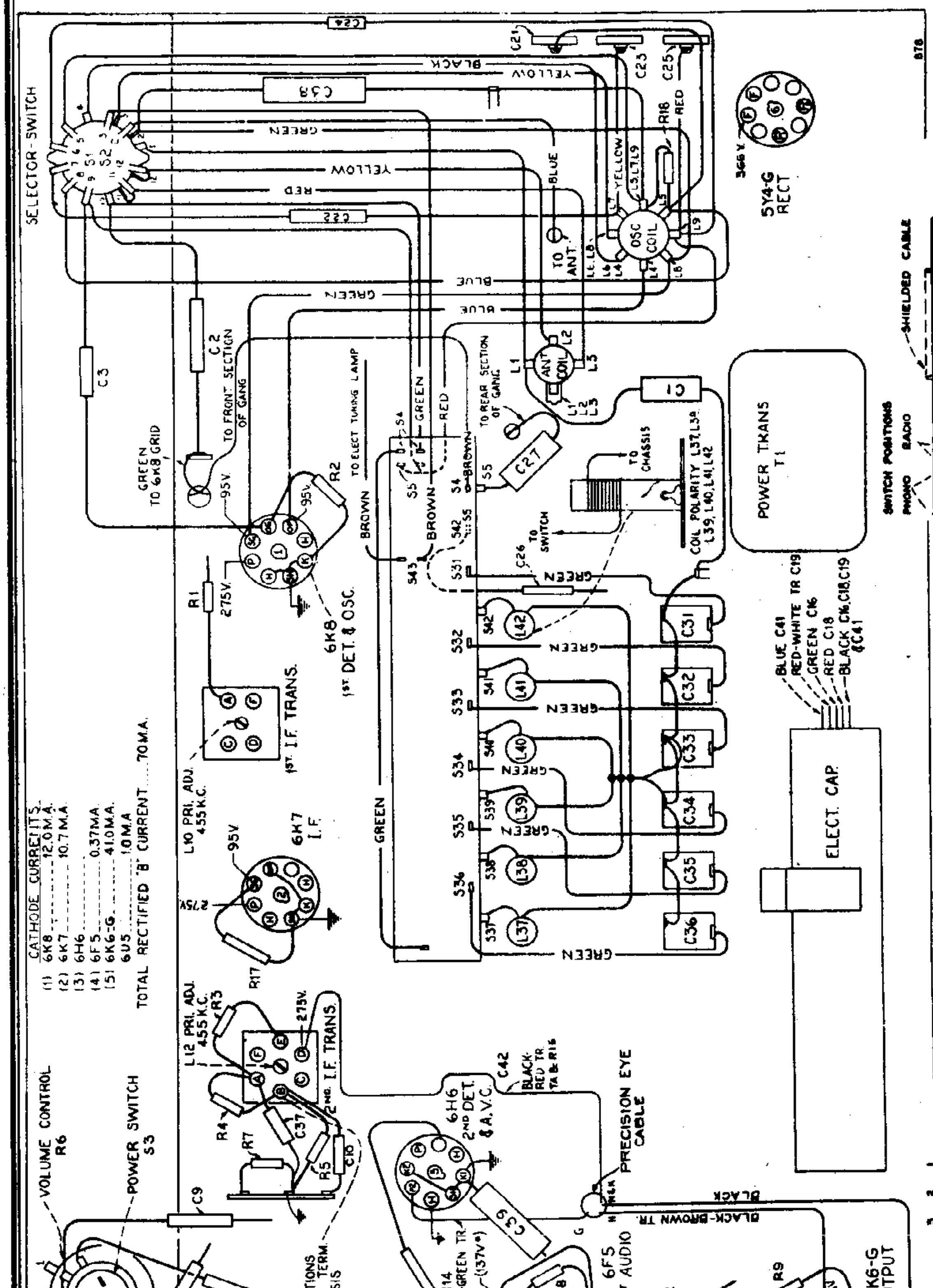
MODEL WR264

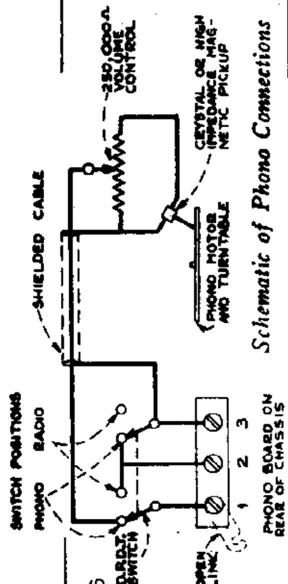
Schematic, Socke



MODEL WR264
Chassis Wiring
Voltage

WESTINGHOUSE ELEC. SUPPLY CO.





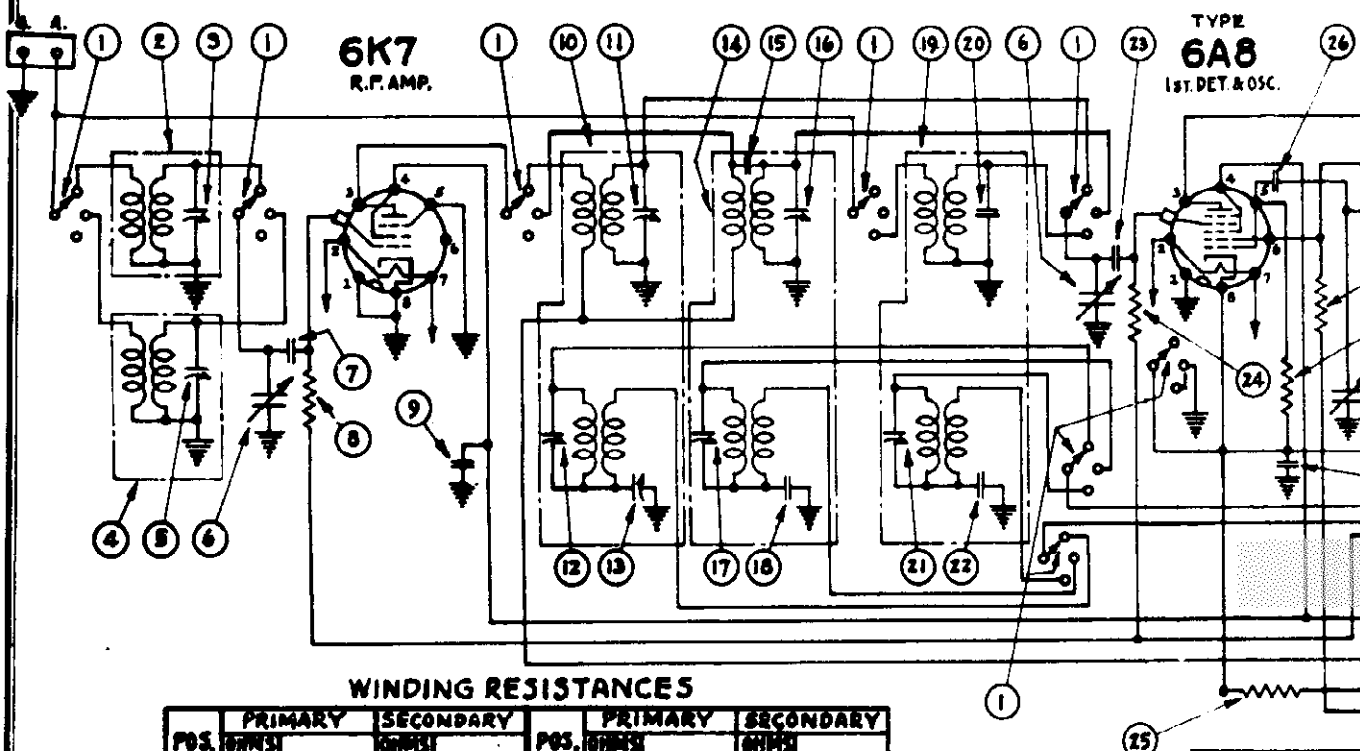
Schematic of Phono Connections

***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

R-F ALIGNMENT FREQUENCIES

"Short Wave" (C).. 20 mc (osc., ant.)
"Medium Wave" (B)..... 6.1 mc (osc.)
"Standard Broadcast" (A 1,500 kc (osc.)



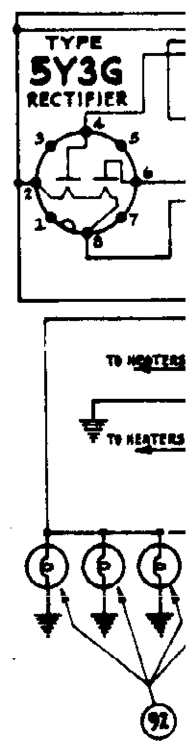
WINDING RESISTANCES

POS.	PRIMARY OHMS		SECONDARY OHMS		POS.	PRIMARY OHMS		SECONDARY OHMS	
2	18.5		3.8		71	1000			
4	.73		.03		72	560		.2	
10	1.7	R.F.	1.0	R.F.	73			1.7	VOICE COIL
	1.5	OSC.	3.1	OSC.	77	5.5		295	PLATE
14	2.3	R.F.	.03	R.F.				.11	5 V. HEATR
	.7	OSC.	.03	OSC.				.06	6.3 V. HEATR
19	2.9	ANT.	.9	ANT.					
	.5	OSC.	.9	OSC.					
32	8.8		8.8						
39	8.8		8.8						

TUBE VOLTAGES

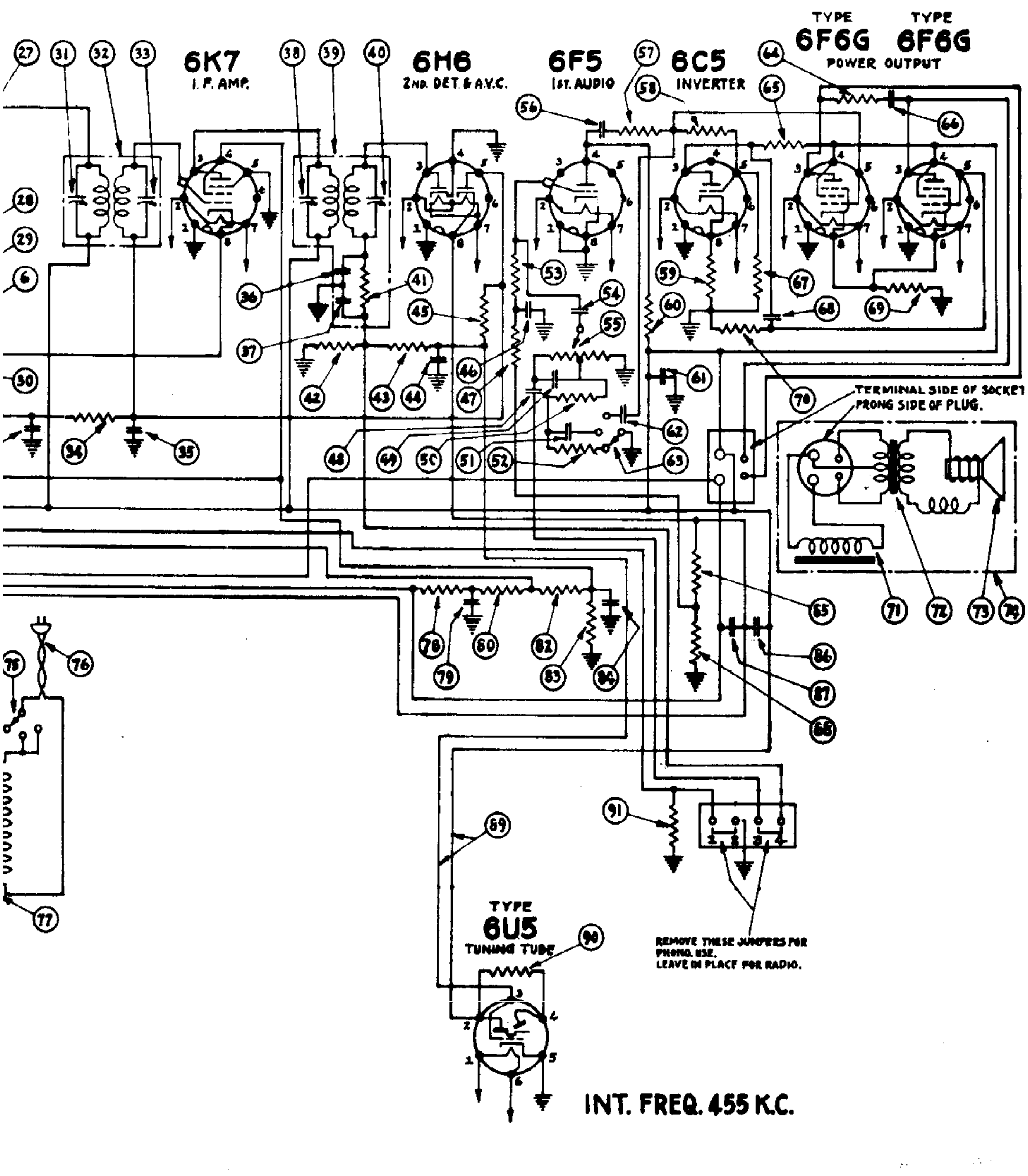
TUBE	STAGE	FIL.	PIN NO.	PLATE	PIN NO.	SCREEN	PIN NO.	CATH.	OSC. PLATE
6K7	R.F. AMP.	6.0	2 TO 7	269	1 TO 3	100	1 TO 4		
6A8	1ST. DET.	6.0	2 TO 7	269	1 TO 3	100	1 TO 4	1.90	175
6K7	I.F. AMP.	6.0	2 TO 7	269	1 TO 3	100	1 TO 4	1.90	
6H6	2ND. DET.	6.0	2 TO 7					-3.5	
6F5	1ST. AUDIO	6.0	2 TO 7	138	1 TO 4				
6C5	INVERTER	6.0	2 TO 7	184	1 TO 3			4.5	
6F6	POWER OUTPUT	6.0	2 TO 7	261	1 TO 3	269	1 TO 4	17.2	
6F6	POWER OUTPUT	6.0	2 TO 7	261	1 TO 3	269	1 TO 4	17.2	
6U5	TUNING	6.0	1 TO 6	261	G TO 2				
5Y3	RECTIFIER	4.6	2 TO 8					379	
5Y4	RECTIFIER	4.6	7 TO 8					379	

VOLTAGES TAKEN WITH BROADCAST BAND IN OPERATION.
TAKEN WITH 1,000 OHMS PER VOLT VOLTMETER.



ELEC. SUPPLY CO.

MODEL WR330
Schematic, Voltage
Resistances



INT. FREQ. 455 K.C.

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR330
Socket, Trimmers
Alignment, Parts

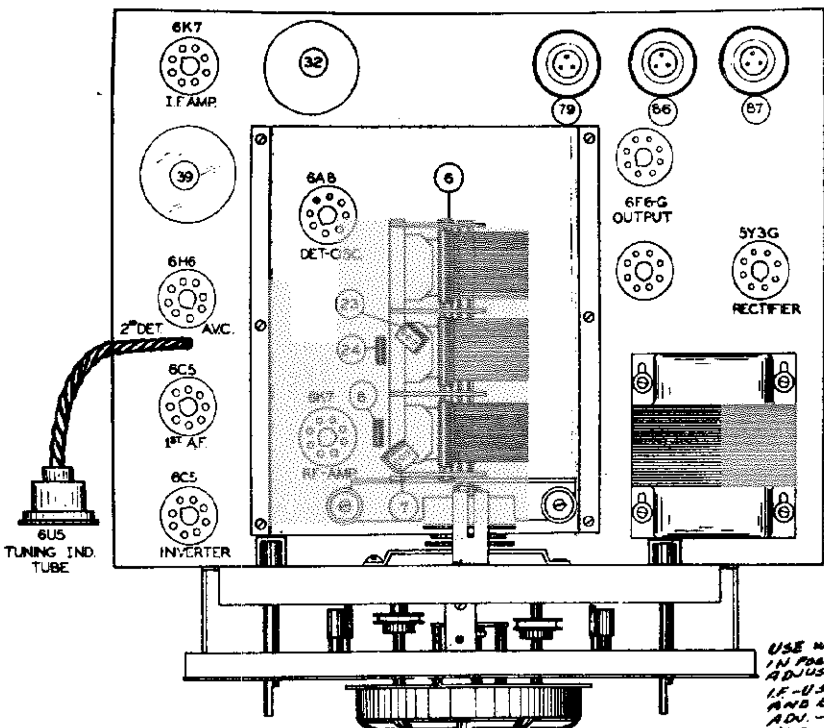
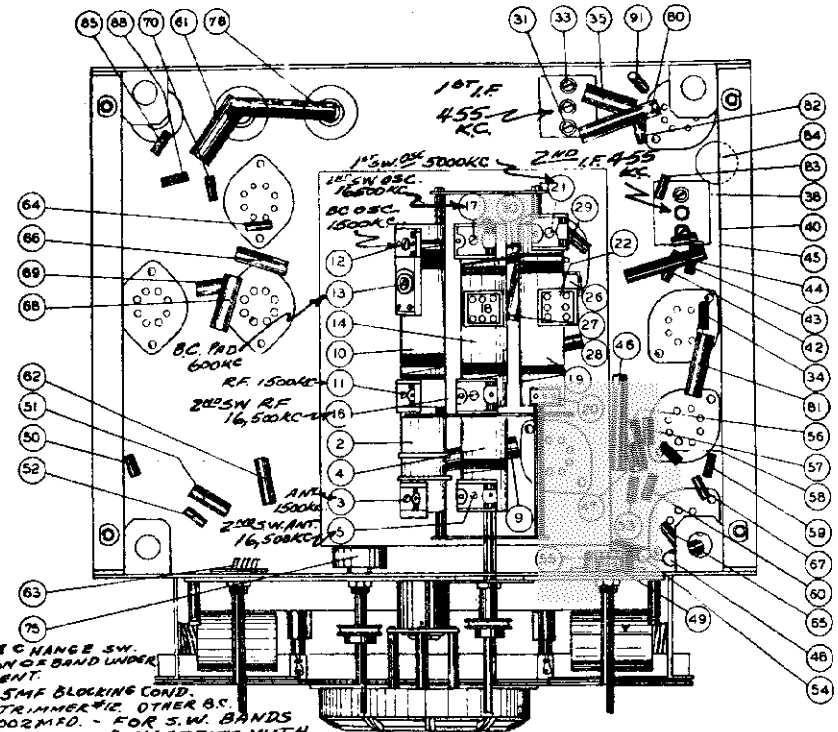


Figure No. 1



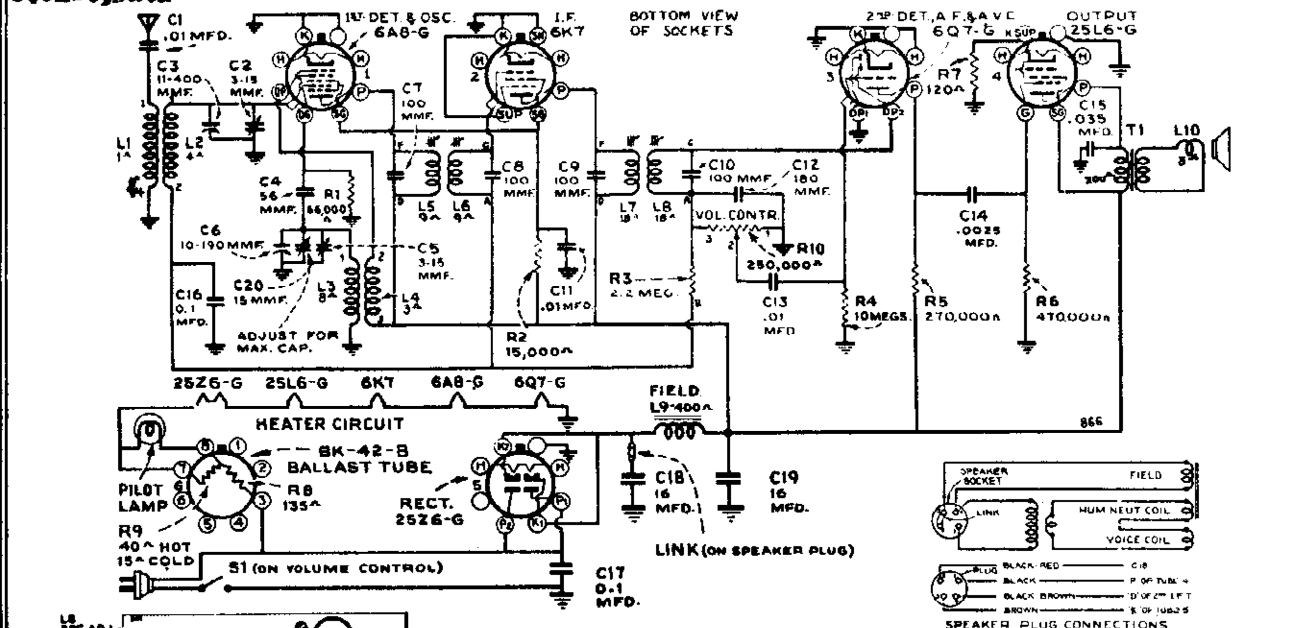
USE WAVE CHANGE SW. IN POSITION OF BAND UNDER ADJUSTMENT.
I.F.-USE .5MF BLOCKING COND. AND B.C. TRIMMER #12. OTHER B.C. ADJ.-.0002MFD. - FOR S.W. BANDS USE-.0002MFD COND. IN SERIES WITH 400 OHM RES. (EQUIV. OF S.W. ANT.)

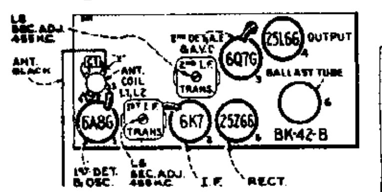
Figure No. 2

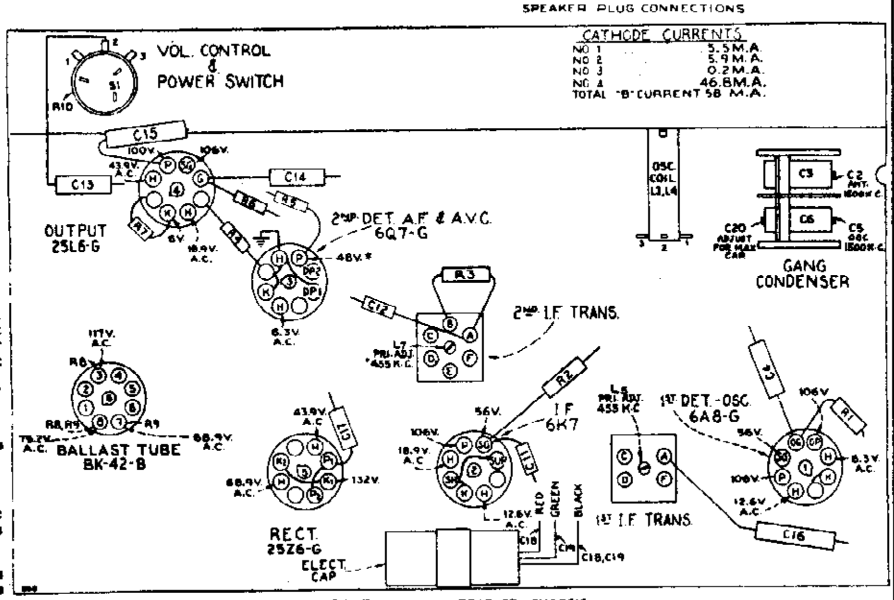
Dia. #	Part #	
1	SW 9586	Wave change switch assembly
2	RC 95311	B.C. antenna coil assembly
3		4-35 mmf. trimmer - part of RC 95311
4	RC 95312	S.W. antenna coil assembly
5		4-35 mmf. trimmer - part of RC 95312
6	CG 9566	Variable condenser gang
7	CM 9519	.0005 mfd. mica condenser
8	RE 1043	100,000 ohm, 1/2 W. resistor
9	CW 4-10	.1 mfd., 400 V. condenser
10	RC 95317	B.C. composite coil assembly
11		4-35 mmf. trimmer - part of RC 95317
12		5-25 mmf. trimmer - part of RC 95317
13		300-600 mmf. trimmer - part of RC 95317
14	RC 95315	S.W. composite coil assembly
15		10 mmf. mica condenser - part of RC 95315
16-17		4-35 mmf. trimmers - part of RC 95315
18		3400 mmf. mica condenser - part of RC 95315
19	RC 95314	Police composite coil assembly
20		10 mmf. mica condenser - part of RC 95314
21		4-35 mmf. trimmer - part of RC 95314
22		1100 mmf. mica condenser - part of RC 95314
23	CM 9519	.0005 mfd. mica condenser
24	RE 1043	100,000 ohm, 1/2 W. resistor
25	RE 1513	150 ohm, 1/2 W. resistor
26	CM 9513	.0001 mfd. mica condenser
27	CW 4-01	.01 mfd., 400 V. condenser
28	RE 562412	5,600 ohm, 1 W. resistor
29	RE 4733	47,000 ohm, 1/2 W. resistor
30	CW 2-05	.05 mfd., 200 V. condenser
31-33		80-200 mmf. trimmers - part of IC 95119
32	IC 95119	1st I.F. transformer
34	RE 4743	470,000 ohm, 1/2 W. resistor
35	CW 4-05	.05 mfd., 400 V. condenser
36-37		100 mmf. mica condenser - part of IC 95121
38-40		80-200 mmf. trimmers - part of IC 95121
39	IC 95121	2nd I.F. transformer
41	RE 4733	47,000 ohm, 1/2 W. resistor
42	RE 4743	470,000 ohm, 1/2 W. resistor
43	RE 1053	1 meg., 1/2 W. resistor
44	CW 4-10	.1 mfd., 400 V. condenser
45	RE 1053	1 meg., 1/2 W. resistor
46	CW 4-10	.1 mfd., 400 V. condenser
47	RE 4743	470,000 ohm, 1/2 W. resistor
48	CW 4-02	.02 mfd., 400 V. condenser
49	CM 9518	75 mmf. mica condenser
50	RE 1043	100,000 ohm, 1/2 W. resistor
51	CW 6-002	.002 mfd., 600 V. condenser
52	RE 1043	100,000 ohm, 1/2 W. resistor
53	RE 2253	2.2 meg., 1/2 W. resistor
54	CW 4-02	.02 mfd., 400 V. condenser
55	VR 9555	2 meg. - mid tapped volume control
56	CW 4-02	.02 mfd., 400 V. condenser
57	RE 4733	47,000 ohm, 1/2 W. resistor
58	RE 3943	390,000 ohm, 1/2 W. resistor
59	RE 5613	560 ohm, 1/2 W. resistor
60	RE 2243	220,000 ohm, 1/2 W. resistor
61	CW 4-10	.1 mfd., 400 V. condenser
62	CW 4-01	.01 mfd., 400 V. condenser
63	SW 9578	Tone control switch
64	RE 223522	22,000 ohm, 2 W. resistor
65	RE 1033	10,000 ohm, 1/2 W. resistor
66	CW 6-001	.001 mfd., 600 V. condenser
67	RE 6833	68,000 ohm, 1/2 W. resistor
68	CW 4-02	.02 mfd., 400 V. condenser
69	RE 271522	270 ohm, 2 W. resistor
70	RE 4743	470,000 ohm, 1/2 W. resistor
71	CL 9572	Speaker field coil
72	TR 95150	Speaker output transformer
73	DM 9528	Speaker diaphragm assembly (12")
74	SK 9565	Speaker complete (12")
75	SW 9577	Line switch
76	CB 9512	Line cable and plug assembly
77	TR 95121	Power transformer - 105-125 volts, 50-60 cycles
78	RE 682522	6800 ohm, 2 W. resistor
79	CE 9528	8 mfd., 450 V. electrolytic condenser
80	RE 103522	10,000 ohms, 2 W. resistor
81	CW 4-05	.05 mfd., 400 V. condenser
82	RE 1033	10,000 ohm, 1/2 W. resistor
83	RE 6833	68000 ohm, 1/2 W. resistor
84	CW 4-50	.5 mfd., 400 V. condenser
85	RE 1803	18 ohm, 1/2 W. resistor
86	CE 9562	18 mfd., 300 V. electrolytic condenser
87	CE 9554	18 mfd., 450 V. electrolytic condenser
88	RE 1803	18 ohm, 1/2 W. resistor
89	CB 95151	Cable and socket for tuning tube
90		1 meg. resistor - part of CB 95151
91	RE 223522	22,000 ohm, 2 W. resistor .
92	LP 9510	Dial light - 6.3 V., .25 amp.

MODEL WR154
Schematic, Voltage
Alignment, Trimmers
Socket, Data

WESTINGHOUSE ELEC. SUPPLY CO.







BOTTOM VIEW - REAR OF CHASSIS

Frequency Range............. 540 to 1,720 kc
R-F Alignment Frequency.. 1,500 kc (osc., ant.)
Intermediate Frequency............... 455 kc

Tube Complement

(1) RCA-6A8-G............. First-Det., Osc.
(2) RCA-6K7............ Intermediate Amp.
(3) RCA-6Q7-G......... Second-Det., A-F, A.V.C.
(4) RCA-25L6-G............... Power Output
(5) RCA-25Z6-G..................... Rectifier
(6) BK-42-B........................ Ballast

Dial lamp.... Mazda No. 47, 6.3 volts, 0.15 amp.

Power Output (125-volt, 60-cycle supply)

Undistorted.......................... 1.0 watt
Maximum............................. 1.5 watts

Loudspeaker

Type.................... 5-inch Electrodynamic
Voice-coil Impedance...... 3.4 ohms at 400 cycles

Power Supply Ratings

A-C Rating. 105-125 volts, 50-60 cycles, 50 watts
D-C Rating.......... 105-125 volts, 50 watts

Figure 8—Tube Socket Voltages and Location of Parts

* Note: Values with star (*) are operating voltages. Values not starred are actual measured voltages.

Measurements made to chassis unless otherwise indicated.

Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, 250, and 500 volts. (Use nearest range above the specified measured voltage).

Values should hold within approximately ± 20% for 117-volt 60-cycle supply. On d-c, voltages are approximately 10% lower except heaters which remain the same.

Precautionary Lead Dress

1. Keep power cord close to chassis base and away from volume control.
2. Keep speaker leads close to chassis and away from volume control and 25L6-G socket.
3. Keep black wire from 2nd i-f transformer to volume control close to front apron and away from other parts.
4. Keep pilot lamp leads close to chassis base.
5. Keep 6Q7-G grid lead away from dial lamp.

Alignment Procedure

CAUTION: The chassis is connected to one side of the power supply. Avoid contact of chassis or parts to external ground when servicing.

Output meter alignment.—Connect the meter across the speaker voice-coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis through a 0.1 mfd. capacitor.

Pre-setting dial.—With gang condenser in full mesh, move dial pointer to coincide with horizontal lines. This is a friction adjustment.

Re-sealing i-f adjusting screws.—After completion of alignment, seal the i-f adjusting screws with a few drops of household cement.

Note 1.—Reel up the antenna wire and connect the high side of test oscillator through an 80-mmfd. capacitor to terminal "X" on antenna coil (see top view).

25-cycle operation.—For operation with 25-cycle power supply, connect a 16-mfd., 150-volt dry electrolytic capacitor (Part No. 31323) in parallel with C18.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Transformer)
No. 2	6A8-G 1st-det. grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L5 and L6 (1st I-F Transformer)
No. 3	See Note 1	1,500 kc	1,500 kc	C5* (oscillator) C2 (antenna)

* Trimmer C20 on gang condenser should be screwed clockwise for maximum capacity before adjusting C5.

Transformer Data
Pick-up, Motor Coils

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR472
Schematic, Voltage
Socket, Trimmers

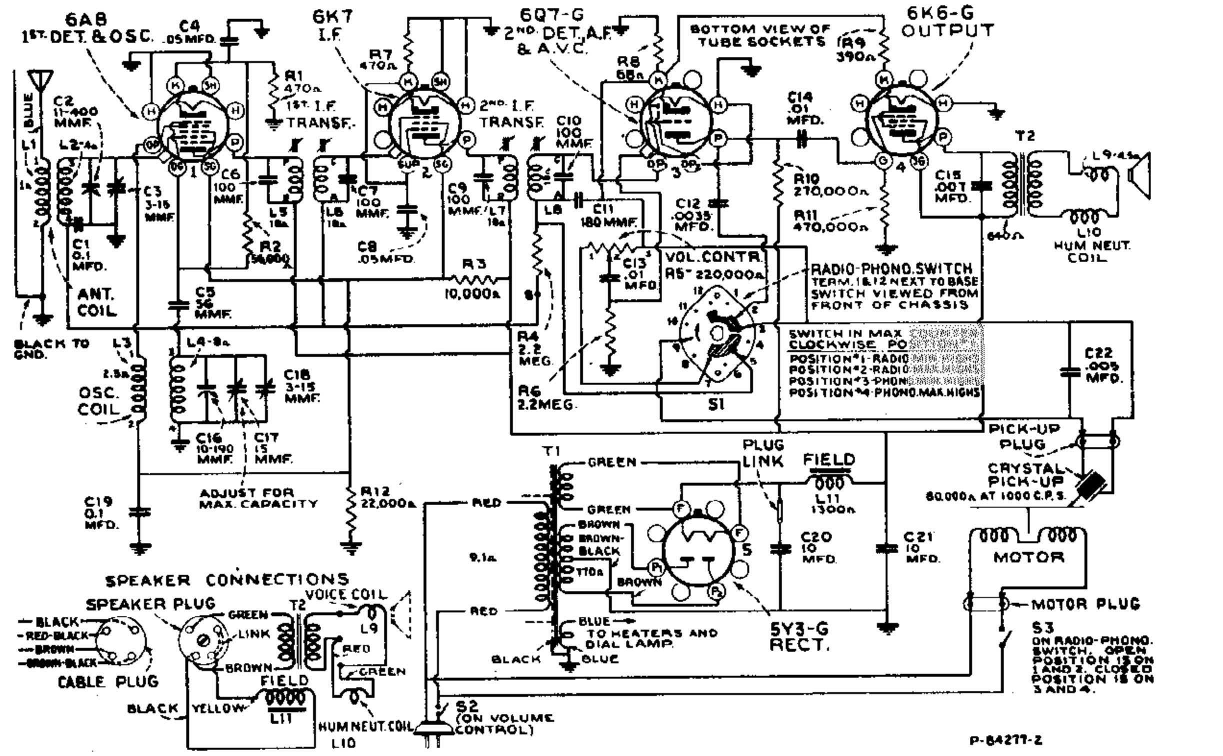


Figure 4—Schematic Circuit Diagram

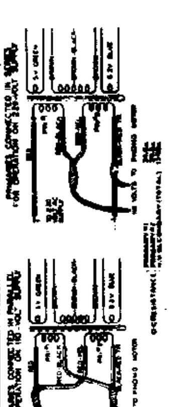
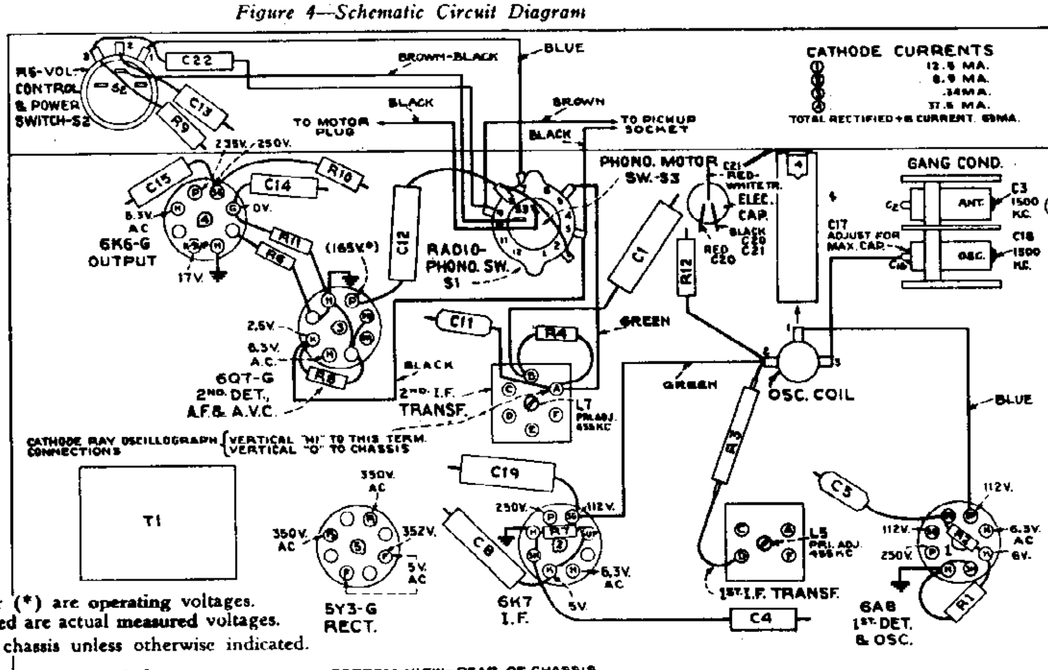


Figure 7—Connections for No. 30888 Replacement Transformer



* **Note:** Values with star (*) are operating voltages. Values not starred are actual measured voltages.
Measurements made to chassis unless otherwise indicated.

Figure 3—Tube Socket Voltages

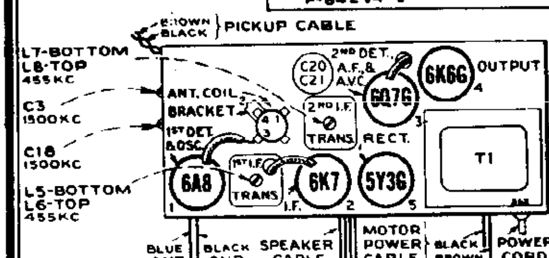


Figure 2—Tube and Trimmer Locations

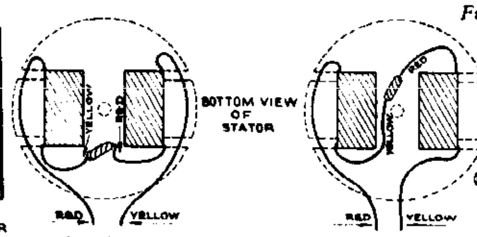


Figure 5—Motor Coil Connections
D-C resistance of each coil (for 110 volts, 50 and 60 cycles) is approximately 82 ohms.

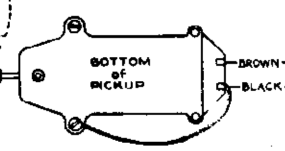


Figure 6—Pickup Connections

MODEL WR264
Alignment, Tuner
Phono. Data
Lead Dress

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR472
Alignment
Phono. Data

MODEL WR-472 PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is designed to be simple and foolproof. Among its many features are constancy of speed, low power consumption, single moving part, ease of starting, rubber damper, ease of repair, and long life. The parts that may require attention are plainly shown in figure 1. The motor is started by turning "on" the power switch and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rotor Adjustment.—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

Lubrication.—Oiling points are indicated in figure 1.

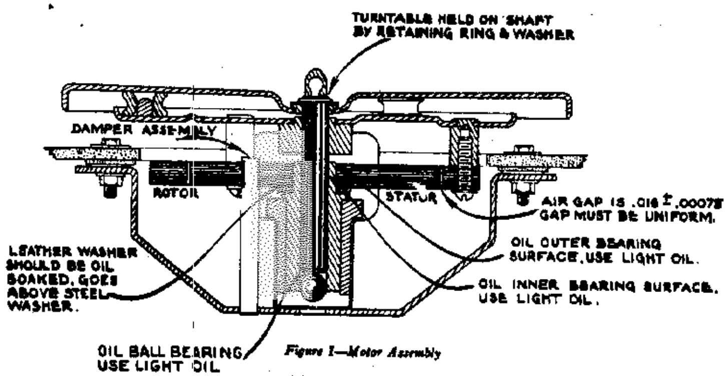


Figure 1—Motor Assembly

Alignment Procedure

Cathode-ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output meter alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Pre-setting dial.—With gang condenser in full mesh, move dial pointer to coincide with horizontal lines. This is a friction adjustment.

Re-sealing I.F. Adjustment Screws.—After completion of alignment, seal the I.F. core adjustment screws with a few drops of household cement.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Transformer)
No. 2	6A8 1st-det. grid cap, in series with .01 mfd.	455 kc		L5 and L6 (1st I-F Transformer)
No. 3	Antenna lead, in series with 200 mmfd.	1,500 kc	1,500 kc	C18* (osc.) C3 (antenna)

* Trimmer C17 on gang condenser should be screwed clockwise for maximum capacity before adjusting C18

Precautionary Lead Dress

1. Dress power leads to phono motor switch away from the audio wiring.
2. Dress power cord and motor cable to end of chassis (free from volume control wiring).
3. Dress pilot lamp lead away from 6Q7G grid.
4. Capacitors C18 and C15 (located at volume control) must be dressed at right angles to each other and as far apart as possible.

Frequency Range........................ 540-1,720 kc
R-F Alignment Frequency.......... 1,500 kc (osc., ant.)
Intermediate Frequency........................ 455 kc

Tube Complement
(1) RCA-6A8.................... First Det., and Osc.
(2) RCA-6K7.................... Intermediate Amp.
(3) RCA-6Q7-G.......... Second Det., A-F, and A.V.C.
(4) RCA-6K6-G.................... Power Output
(5) RCA-5Y3-G.................... Rectifier
Dial Lamp............ Mazda No. 44, 6.3 volts, 0.25 amp.

Power Output (125-volt, a-c supply)
Undistorted........................ 2.0 watts
Maximum........................ 3.5 watts

Loudspeaker
Type........................ 5 inch electrodynamic
V-C impedance.................. 5 ohms at 400 cycles

Power Supply Ratings
Rating A-6............ 105-125 volts, 60 cycles, 80 watts
Rating A-5............ 105-125 volts, 50 cycles, 80 watts

Phonograph............ Synchronous (manual starting)
Records.............. 10-inch and 12-inch, 78 r.p.m.
Pickup............ Crystal, 80,000 ohms at 1,000 c.p.s.
Average Output of Pickup....... 1½-volts, at 1,000 c.p.s. across ¼ meg. load

MODEL WR-264

Phonograph Terminal Board.—A 3-terminal board is located on the rear of the chassis for connecting a phonograph pickup, or Record Player, into the audio amplifier of the receiver. The above schematic shows connections for a high-impedance pickup with a switch for changing from radio to records. For low-impedance pickups, a suitable step-up transformer should be used to provide proper impedance matching, and should be connected between the pickup and radio-phono switch. The volume control is optional.

Loudspeaker.—The loudspeaker voice-coil may be centered in the normal manner by using three narrow feelers to obtain equal spacing of the air-gap. The dust cover must be removed before centering, and may be done by gently cutting it free from the cone, being careful not to cut or damage the cone while doing so.

Precautionary Lead Dress.—

1. Dress power-switch leads against left apron to prevent hum pickup.
2. Dress R1 away from front of chassis.
3. Electric-tuning lamp leads must be dressed in front of range switch.
4. Dress lead from L5 to range switch away from other leads.
5. Dress leads away from antenna coil.
6. Dress other parts and leads away from R14, as it becomes heated.
7. Leads across back of chassis should be dressed under electrolytic to prevent approaching phono board.
8. Keep leads of C27 as short as possible.

Frequency Ranges
"Standard Broadcast" (A).................. 540-1,720 kc
"Medium Wave" (B)........................ 2.3-7 mc
"Short Wave" (C)........................ 7-22 mc

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed ⅜-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

After completion of alignment, seal the i-f core-adjusting screws with household cement.

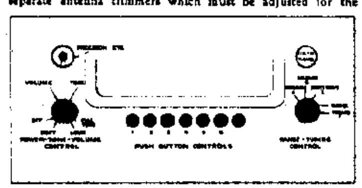
The dial tuning (right hand) push button must be pushed in for steps 1 to 5 inclusive.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 400 ohms	20 mc	20 mc (28°) "C" band	C21 (osc.)* C30 (ant.)**
4	Antenna Terminal, in series with 400 ohms	6.1 mc	6.1 mc (91°) "B" band	C23 (osc.)†
5	Antenna Terminal, in series with 200 mmf.	1,500 kc	1,500 kc (204°) "A" band	C25 (osc.)
6	Follow "Adjustments for Electric Tuning"			

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly and use maximum capacity peak if two peaks can be obtained with C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 28° (19.09 mc), where a weaker signal should be received.
† Use minimum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by turning to approximately 49° (5.19 mc), at which point a weaker signal should be received.
NOTE: Oscillator tracks 455 kc above signal on all bands.

ADJUSTMENTS FOR ELECTRIC TUNING

This receiver has seven push buttons. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate permeability tuned oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool for making adjustments. Allow at least five minutes warm-up period before making adjustments.



Location of Controls
The right-hand push-button is for dial tuning

The procedure is as follows:

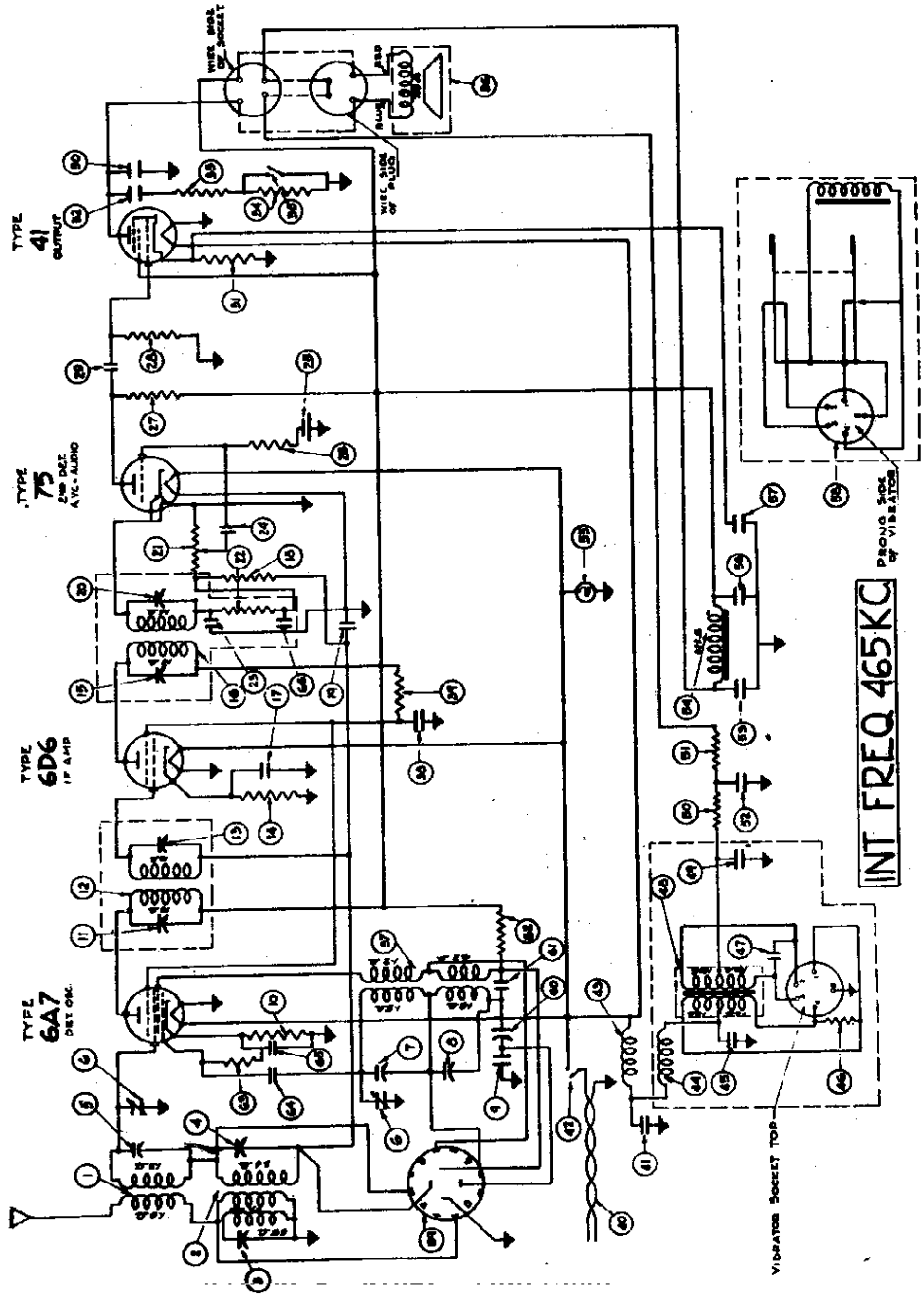
1. Make a list of the desired six stations, arranged in order from low to high frequencies. See "Tube and Trimmer Locations" view for frequency coverage of each button.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers. Use the Precision Eye to ensure sharp peaking.

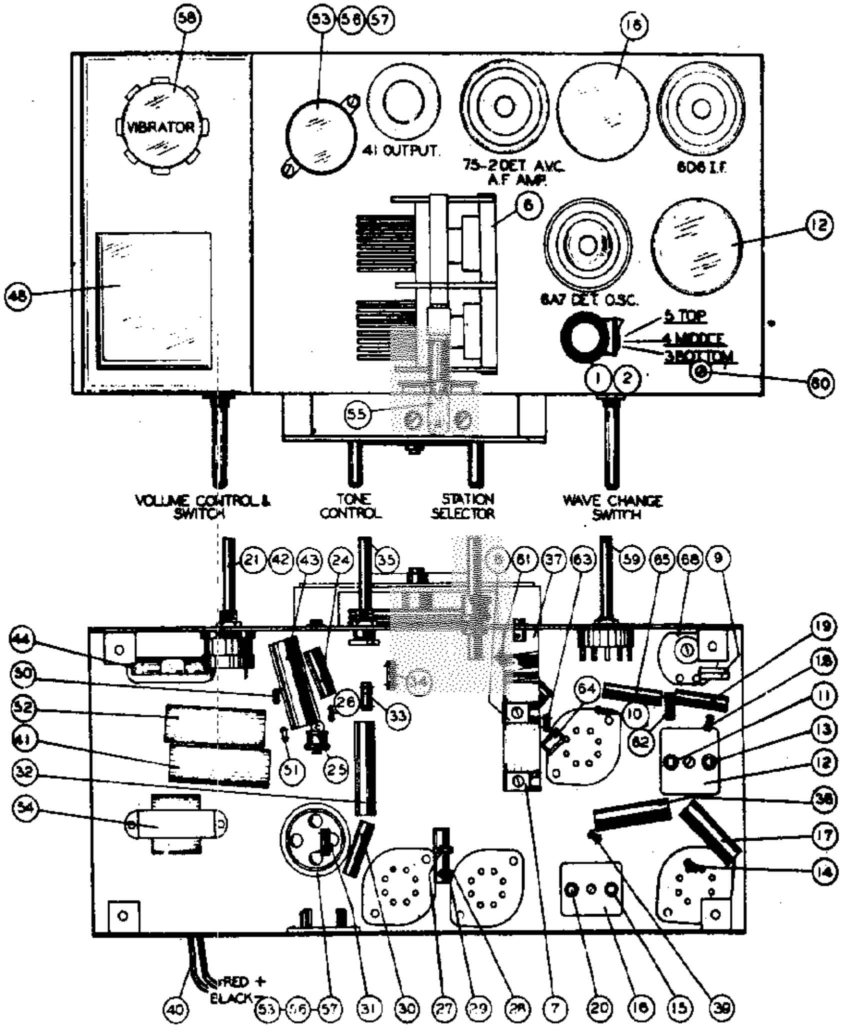
MODELS WR603,WR606

WESTINGHOUSE ELEC. SUPPLY CO. Schematic



MODELS WR603,WR606
Chassis,Socket,
Trimmers,Alignment
Parts

WESTINGHOUSE ELEC. SUPPLY CO.



Set the volume control to the maximum position, the tone control to the treble position, the wave change switch to the broadcast band position and the dial indicator to approximately 600 KC. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type #6D6 I.F. amplifier tube thru a .5 mfd. condenser.
Adjust trimmer condenser #15 and #20 to maximum output.
Apply the test signal to the grid of the type #6A7 first detector-oscillator tube and adjust trimmer condensers #12 and #13 to maximum output.
Apply the test signal to the antenna lead of the receiver and adjust the trap coil trimmer #3 to minimum output.

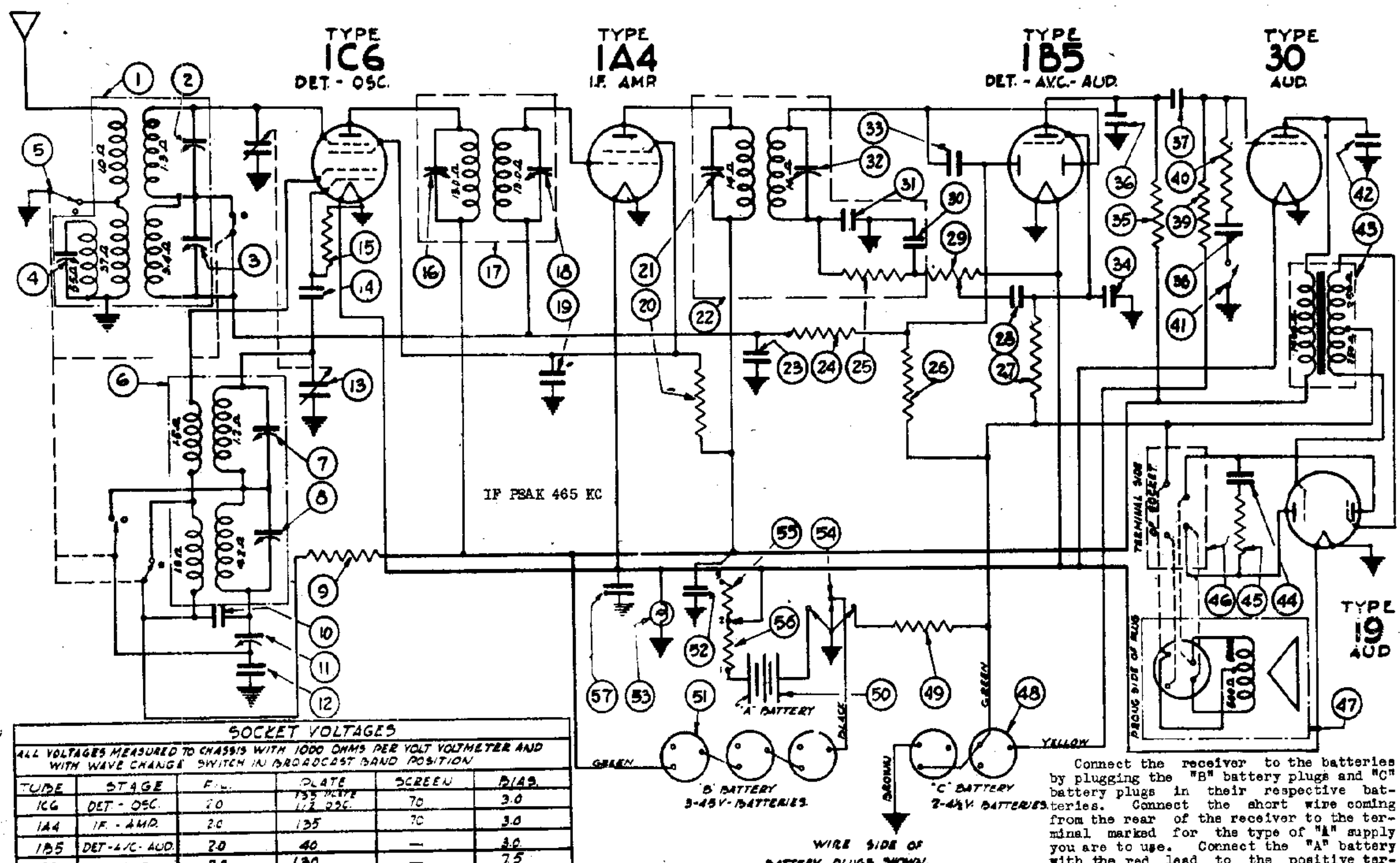
SHORT-WAVE BAND ADJUSTMENTS

Set the test oscillator and dial indicator to 6000 KC. and adjust the short-wave oscillator trimmer condenser, #7, to maximum output.
Adjust the short wave antenna trimmer #5 to maximum output. Check the receiver over the shortwave band for sensitivity and calibration.

Dia. #	Part #	Description of Parts
1	RC 95237	Antenna coil assembly
2		Trap coil - part of RC 95237
3		Trimmer condenser, 30-60 mmf. - part of RC 95237
4		Trimmer condenser, 1.5-10 mmf. - part of RC 95237
5		Trimmer condenser, 4-25 mmf. - part of RC 95237
6	CG 9552	Variable condenser - 2 gang
7		Trimmer condenser, 6-30 mmf. - part of RC 95238
8		Trimmer condenser, 4-25 mmf. - part of RC 95238
9	CM 9526	.0012 mfd. oscillator series condenser
10	SA 105264	500 ohm, 1/4 W. resistor
11		Trimmer condenser, 45-135 mmf. - part of IC 9569
12	IC 9569	1st I.F. coil (465 KC.)
13		Trimmer condenser, 45-135 mmf. - part of IC 9569
14	RE 95117	500 ohm, 1/4 W. resistor
15		Trimmer condenser, 30-100 mmf. - part of IC 9574
16	IC 9574	2nd I.F. coil (465 KC.)
17	CW 2-05	.05 mfd., 200 V. condenser
18	RE 9574	1 meg., 1/4 W. resistor
19	CW 4-02	.02 mfd., 400 V. condenser
20		Trimmer condenser, 30-100 mmf. - part of IC 9574
21	VR 9523	.5 meg. volume control
22	RE 9524	50,000 ohm, 1/8 W. resistor
23		.0001 mfd. mica condensor - part of IC 9574
24	CW 4-02	.02 mfd., 400 V. condenser
25	BY 952	Grid bias cell
26	RE 9574	1 meg., 1/4 W. resistor
27	RE 9585	1/4 meg., 1/4 W. resistor
28	RE 9572	1/2 meg., 1/4 W. resistor
29	CW 4-02	.02 mfd., 400 V. condenser
30	CW 4-005	.005 mfd., 400 V. condenser
31	SA 105265	750 ohm, 1/4 W. resistor
32	CW 4-05	.05 mfd., 400 V. condenser
33	SA 105249	5000 ohm, 1/4 W. resistor
34	SA 105274	20,000 ohm, 1/4 W. resistor
35	SW 9558	Tone control switch
36	SK 9539	Speaker
37	RC 95238	Oscillator coil
38	CW 2-05	.05 mfd., 200 V. condenser
39	SA 105254	15,000 ohm, 1/4 W. resistor
40	CB 9556	Power supply cable
41	CW 2-50	.5 mfd., 200 V. condenser
42		On-Off switch - part of VR 9523
43	SA 105452	"A" choke
44	SA 105452	"A" choke
45	CW 957	.5 mfd., 120 V. condenser
46	SA 105258	200 ohm, 1/4 W. resistor
47	CW 9521	.008 mfd., 1600 V. condenser
48	TR 9569	Power transformer
49	CW 9513	.05 mfd., 200 V. condenser
50	RE 9537	50 ohm, 1/4 W. resistor
51	RE 9516	50 ohm, 1/4 W. resistor
52	CW 2-50	.5 mfd., 200 V. condenser
53		8 mfd., 200 V. electrolytic cond. - part of CE 9541
54	TR 9534	"B" choke
55	LP 9516	Dial lamp (6. volt)
56		8 mfd., 250 V. electrolytic condenser - part of CE 9541
57		10 mfd., 25 V. electrolytic condenser - part of CE 9541
58	VI 957	Vibrator
59	SW 9559	Wave change switch
60	CS 9560	Broadcast oscillator series condenser
61	CW 4-02	.02 mfd., 400 V. condenser
62	SA 105275	25,000 ohm, 1/4 W. resistor
63	RE 9575	50,000 ohm, 1/4 W. resistor
64	CM 9513	.0001 mfd., mica condenser
65	CW 2-05	.05 mfd., 200 V. condenser
66		.0001 mfd. mica condenser - part of IC 9574
67	DM 9519	Speaker diaphragm

WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR604, WR607
Schematic, Voltage



SOCKET VOLTAGES

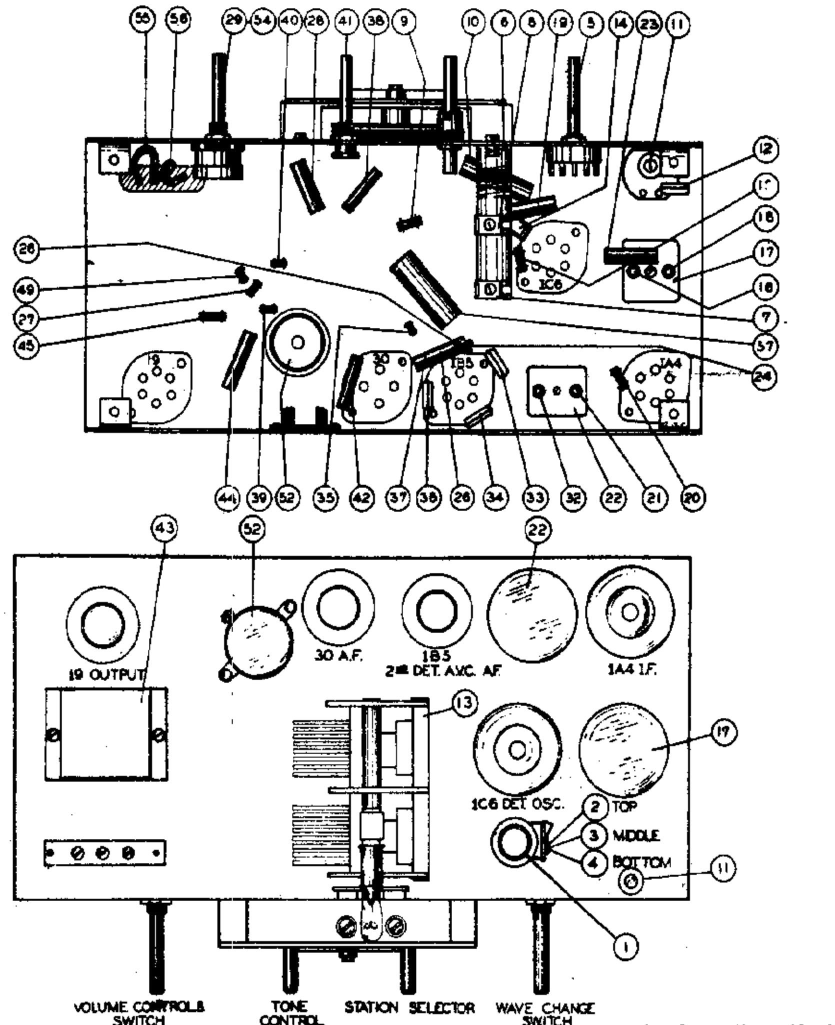
ALL VOLTAGES MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PLATE	SCREEN	BIAS.
1C6	DET. - OSC.	2.0	135 PLATE 112 OSC.	70	3.0
1A4	I.F. - AMP.	2.0	135	70	3.0
1B5	DET.-A.V.C.-AUD.	2.0	40	—	3.0
30	AUD.	2.0	130	—	7.5
19	AUD.	2.0	133	—	3.0

Connect the receiver to the batteries by plugging the "B" battery plugs and "C" battery plugs in their respective batteries. Connect the short wire coming from the rear of the receiver to the terminal marked for the type of "A" supply you are to use. Connect the "A" battery with the red lead to the positive terminal and the black lead to the negative terminal.

MODELS WR604,WR607
Alignment,Trimmers
Socket,Chassis,Parts

WESTINGHOUSE ELEC. SUPPLY CO.



Dia. #	Part #	Description of Parts	List Price
1	RC 95237	Antenna coil assembly	$ 2.25
2		4-25 mmf. trimmer condenser - part of RC 95237	
3		1.5-10 mmf. trimmer condenser - part of RC 95237	
4		30-60 mmf. trimmer condenser - part of RC 95237	
5	SW 9559	Wave change switch	.65
6	RC 95238	Oscillator coil assembly	1.60
7		10-35 mmf. trimmer condenser - part of RC 95238	
8		4-25 mmf. trimmer condenser - part of RC 95238	
9	SA 105249	5,000 ohm, 1/4 W. resistor	.15
10	CW 4-02	.02 mfd., 400 V. condenser	.15
11	CS 9560	350-700 mmf. oscillator series condenser	.35
12	CM 9526	.0012 mfd. mica condenser	.20
13	CO 9552	Variable condenser (2 gang)	2.75
14	CM 9513	.100 mmf. mica condenser	.10
15	RE 9575	50,000 ohm, 1/4 W. resistor	.15
16		30-100 mmf. trimmer condenser - part of IC 9579	
17	IC 9579	First I.F. coil (465 KC.)	2.00
18		30-100 mmf. trimmer condenser - part of IC 9579	
19	CW 2-05	.05 mfd., 200 V. condenser	.15
20	SA 105254	15,000 ohm, 1/4 W. resistor	.15
21		30-100 mmf. trimmer condenser - part of IC 9574	
22	IC 9574	Second I.F. coil (465 KC.)	1.75
23	CW 2-05	.05 mfd., 200 V. condenser	.15
24	RE 9530	1 meg., 1/8 W. resistor	.10
25	RE 9524	50,000 ohm, 1/4 W. resistor	.10
26	RE 9530	1 meg., 1/8 W. resistor	.10
27	RE 9574	1 meg., 1/4 W. resistor	.15
28	CW 4-02	.02 mfd., 400 V. condenser	.15
29	VR 9538	.5 meg. volume control	.95
30		100 mmf. mica condenser - part of IC 9574	
31		100 mmf. mica condenser - part of IC 9574	
32		30-100 mmf. trimmer condenser - part of IC 9574	
33	CM 9513	100 mmf. mica condenser	.10
34	CM 9513	100 mmf. mica condenser	.10
35	RE 9586	250,000 ohm, 1/4 W. resistor	.15
36	CM 9513	100 mmf. mica condenser	.10
37	CW 4-02	.02 mfd., 400 V. condenser	.15
38	CW 4-005	.005 mfd., 400 V. condenser	.15
39	RE 9572	500,000 ohm, 1/4 W. resistor	.15
40	SA 105272	10,000 ohm, 1/4 W. resistor	.15
41	SW 9558	Tone control switch	.40
42	CW 6-005	.005 mfd., 600 V. condenser	.15
43	TR 9570	Audio transformer	2.00
44	CW 4-01	.01 mfd., 400 V. condenser	.15
45	SA 105274	20,000 ohm, 1/4 W. resistor	.15
46	SA 107257	Speaker socket	.10
47	SK 9540	Speaker	6.00
48	PG 9514	"C" battery plug	.10
49	SA 105267	1000 ohm, 1/4 W. resistor	.15
50	DM 9519	Speaker diaphragm	1.25
51	PG 958	"B" battery plug	.10
52	CE 9542	8 mfd., 200 V. electrolytic condenser	1.25
53	LP 9518	Dial lamp, 2 V., .06 amp.	.30
54		On-off switch - part of VR 9538	
55	RE 9591	0.94 ohm resistor	.15
56	RE 9592	0.42 ohm resistor	.15
57	CW 2-50	.5 mfd., 200 V. condenser	.25

Set the volume control to the maximum position, the tone control to the treble position, the wave change switch on the broadcast band and the dial indicator to approximately 600 KC.

Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 1A4 tube, through a 0.5 mfd. blocking condenser, and adjust the I.F. trimmer condensers #21 and #32 to maximum output.

Apply the test signal to the grid of the type 1C6 first detector-oscillator tube and adjust the I.F. trimmer condensers #16 and #18 to maximum output.

Apply the test signal to the antenna lead of the receiver and adjust the wave trap trimmer condenser #4 to minimum output.

BROADCAST BAND ADJUSTMENTS

1. Set the test oscillator and dial indicator to 1600 KC. and apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.

2. Adjust the broadcast oscillator trimmer condenser #8 to maximum output.

3. Adjust the Broadcast preselector trimmer #3 to maximum output.

4. Set the test oscillator and dial indicator to 600 KC. and adjust the oscillator series condenser #11 to maximum output at the same time rocking the variable condenser.

5. Return the test oscillator and dial indicator to 1600 KC. and check the adjustment of trimmer condensers #8 and #3 for accuracy.

SHORT WAVE BAND ADJUSTMENTS

1. Set the wave change switch to the short-wave band position.

2. Set the test oscillator and dial indicator to 6000 KC. and adjust the short-wave trimmer condenser #7 to maximum output.

3. Adjust the short-wave preselector trimmer condenser #2 to maximum output.

4. Check the receiver over the short-wave band for sensitivity and calibration.

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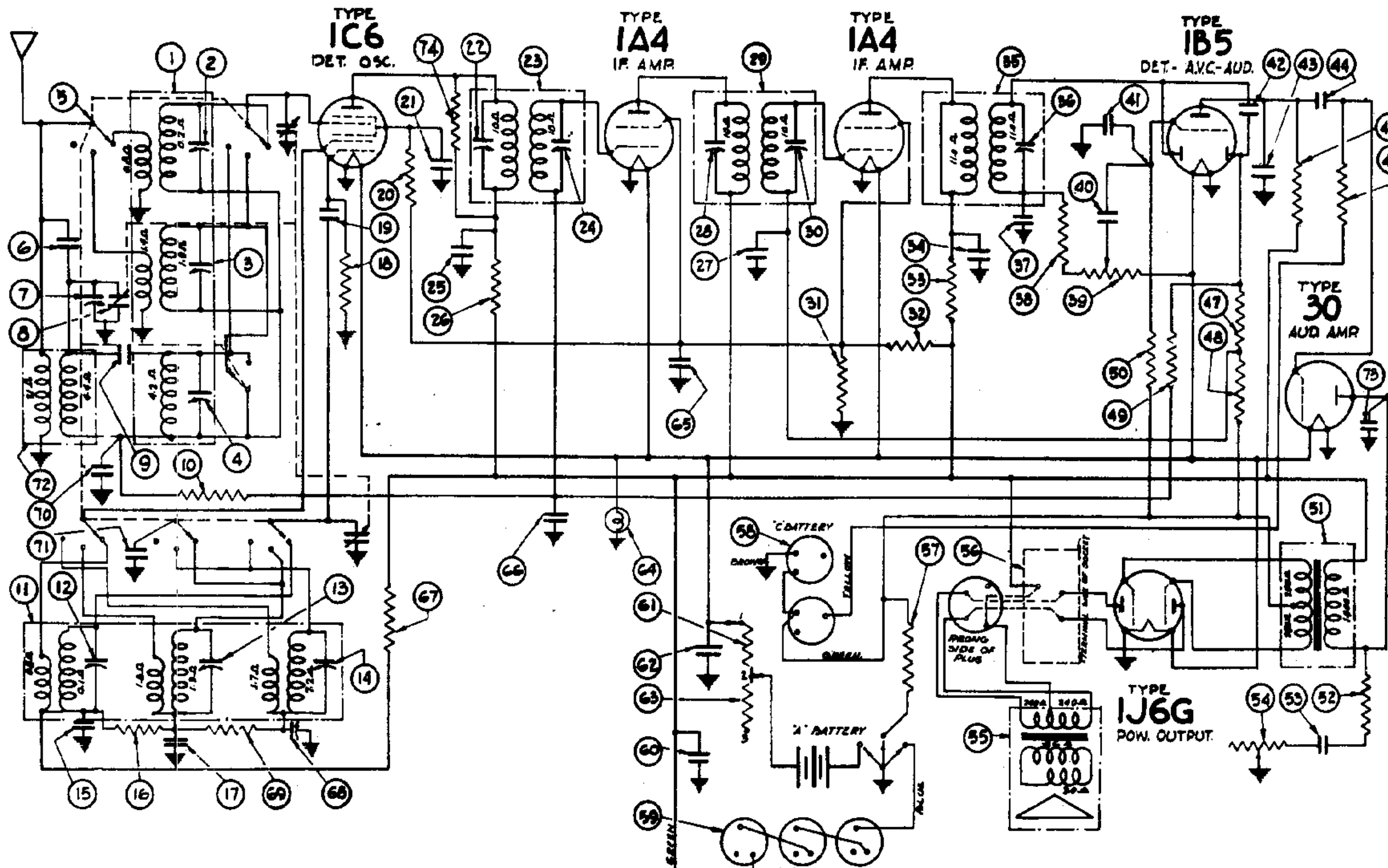
MODELS WR605, WR608
Schematic, Voltage



SOCKET VOLTAGES					
ALL VOLTAGES MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION					
TUBE	STAGE	FIL.	PLATE	SCREEN	BIAS
1C6	DET.-OSC.	2.0	135 PLATE-100 OSC.	70	3.0
1A4	I.F. AMP	2.0	135	70	3.0
1A4	I.F. AMP	2.0	135	70	3.0
1B5	DET.-AVC.-AUD.	2.0	45	—	3.0
30	AUD. AMP	2.0	130	—	7.5
1J6G	POW. OUTPUT	2.0	135	—	3.0

INT FREQ 465KC

MODELS WR605, WR608
Alignment, Socket
Trimmers, Chassis, Parts

WESTINGHOUSE ELEC. SUPPLY CO.

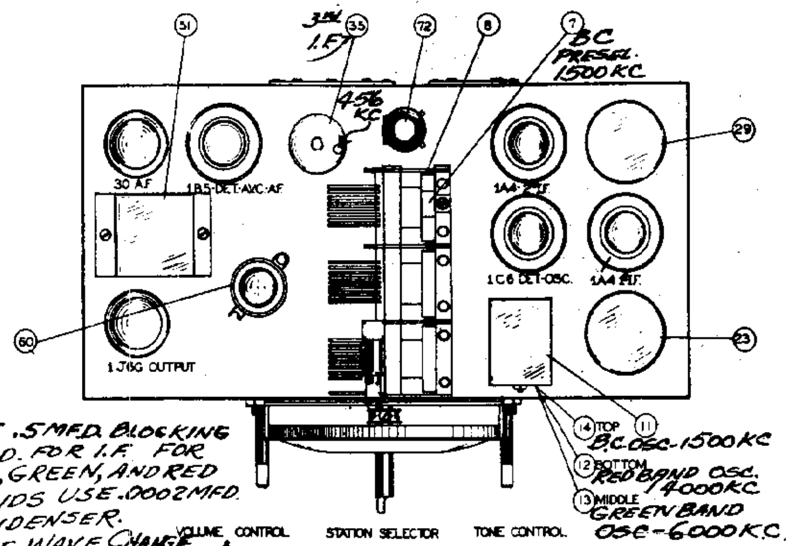


Figure No. 1

USE .5MFD. BLOCKING COND. FOR I.F. FOR B.C., GREEN, AND RED BANDS USE .0002MFD. CONDENSER.
HAVE WAVE CHANGE SWITCH IN POSITION OF BAND UNDER ADJUSTMENT.

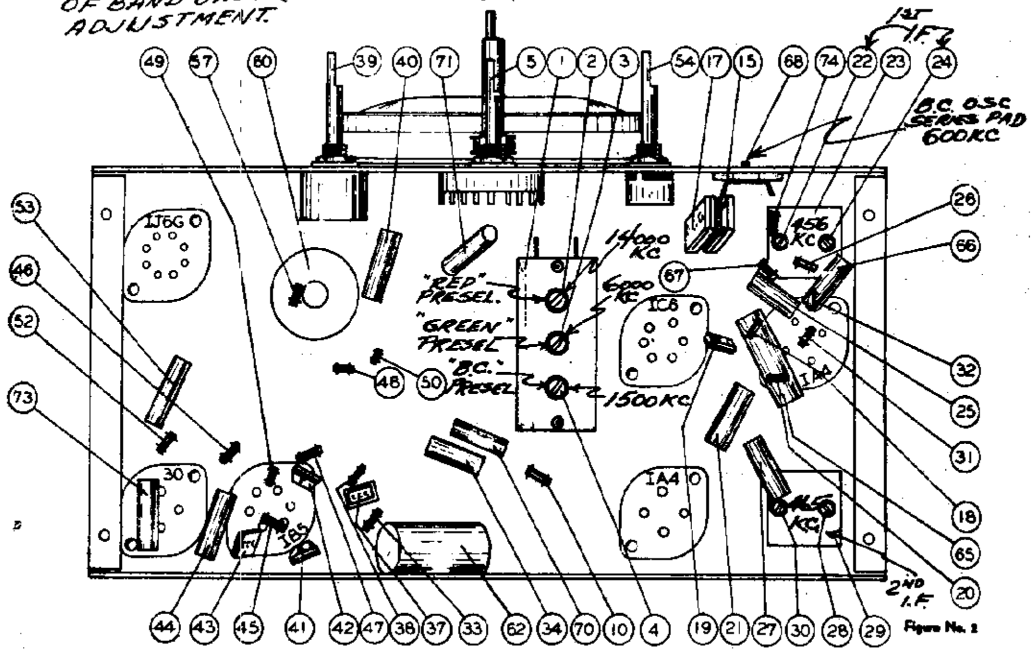


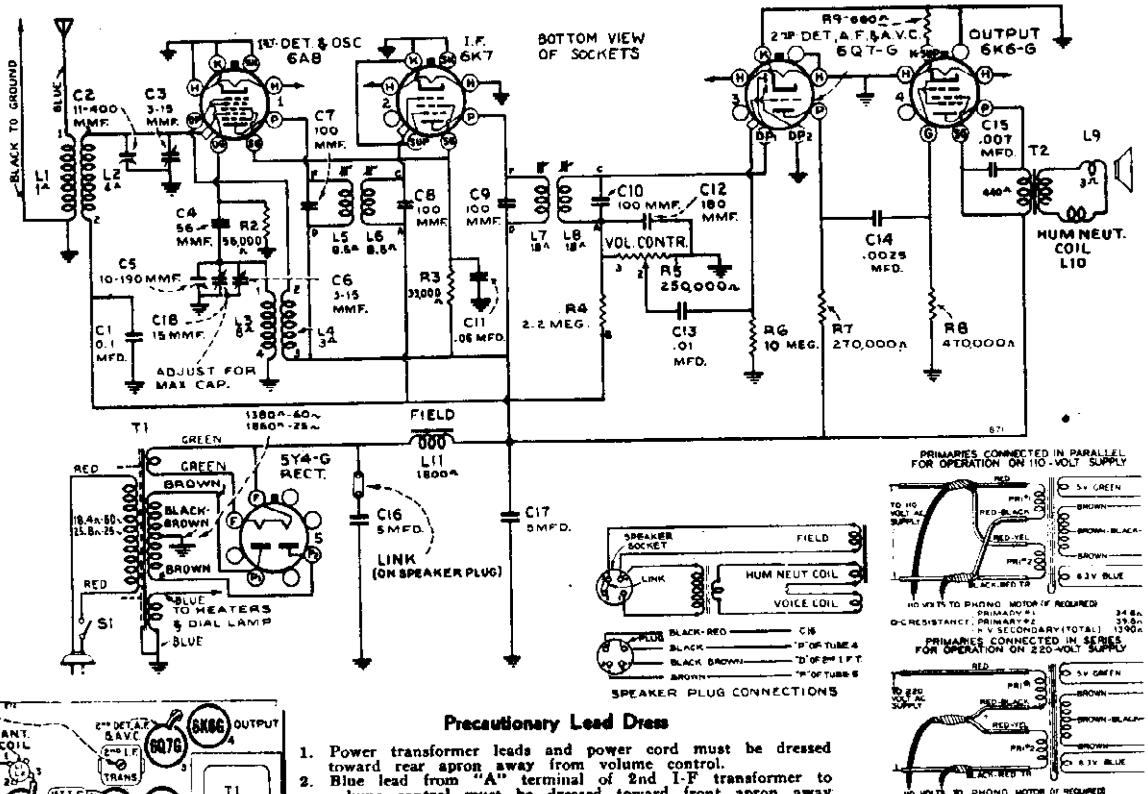
Figure No. 2

Dia. #	Part #	Description of Parts
1	RC 95257	Preselector coil
2		30-60 mmf. trimmer condenser - part of RC 95257
3		4-30 mmf. trimmer condenser - part of RC 95257
4		4-30 mmf. trimmer condenser - part of RC 95257
5	SW 9548	Wave change switch
6		10 mmf. mica condenser - part of RC 95258
7		15-25 mmf. trimmer condenser - part of CG 9554
8	CG 9554	Variable condenser - 3 gang
9		Twisted wires
10	RE 9584	100,000 ohm, 1/4 W. resistor
11	RC 95259	Oscillator coil
12		1.5 to 10 mmf. trimmer condenser - part of RC 95259
13		1.5 to 10 mmf. trimmer condenser - part of RC 95259
14		4-30 mmf. trimmer condenser - part of RC 95259
15	CM 9510	.0032 mfd. mica condenser
16	RE 95128	2500 ohm, 1/8 W. resistor
17	CM 959	.002 mfd. mica condenser
18	SA 105276	50,000 ohm, 1/4 W. resistor
19	CM 9513	.0001 mfd. mica condenser
20	SA 105267	1000 ohm, 1/4 W. resistor
21	CW 2-05	.05 mfd., 200 V. condenser
22		45 to 135 mmf. trimmer condenser - part of IC 9572
23	IC 9572	1st I.F. coil (465 KC.)
24		45 to 135 mmf. trimmer condenser - part of IC 9572
25	CW 2-05	.05 mfd., 200 V. condenser
26	SA 105270	2500 ohm, 1/4 W. resistor
27	CW 2-05	.05 mfd., 200 V. condenser
28		45 to 135 mmf. trimmer condenser - part of IC 9569
29	IC 9569	2nd I.F. coil
30		45 to 135 mmf. trimmer condenser - part of IC 9569
31	SA 105276	50,000 ohm, 1/4 W. resistor
32	SA 105272	10,000 ohm, 1/4 W. resistor
33	SA 105267	1000 ohm, 1/4 W. resistor
34	CW 2-05	.05 mfd., 200 V. condenser
35	IC 9568	3rd I.F. coil (465 KC.)
36		30-60 mmf. trimmer condenser - part of IC 9568
37	CM 9513	.0001 mfd. mica condenser
38	SA 105276	50,000 ohm, 1/4 W. resistor
39	VR 9540	1/2 meg. volume control
40	CW 4-02	.02 mfd., 400 V. condenser
41	CM 9513	.0001 mfd. mica condenser
42	CM 9513	.0001 mfd. mica condenser
43	CM 956	.00025 mfd. mica condenser
44	CW 4-02	.02 mfd., 400 V. condenser
45	RE 9585	.25 meg., 1/4 W. resistor
46	RE 9572	.5 meg., 1/4 W. resistor
47	RE 9574	1 meg., 1/4 W. resistor
48	RE 9574	1 meg., 1/4 W. resistor
49	RE 9574	1 meg., 1/4 W. resistor
50	RE 9574	1 meg., 1/4 W. resistor
51	TR 9570	Audio transformer
52	SA 105267	1000 ohm, 1/4 W. resistor
53	CW 2-05	.05 mfd., 200 V. condenser
54	VR 9539	10,000 ohm tone control
55	SK 9541	Speaker
56	SA 107257	Speaker socket
57	SA 105267	1000 ohm, 1/4 W. resistor
58	PG 9514	"C" battery plug
59	PG 958	"B" battery plug
60	CE 9543	30 mfd 200 V. electrolytic condenser
61	RE 9594	0.31 ohm resistor
62	CW 2-50	.5 mfd., 200 V. condenser
63	RE 9591	0.94 ohm resistor
64	LP 9518	Dial lamp
65	CW 2-25	.25 mfd., 200 V. condenser
66	CW 2-05	.05 mfd., 200 V. condenser
67	SA 105270	2500 ohm, 1/4 W. resistor
68	CS 9560	350-700 mmf. oscillator series condenser
69	RE 9527	5000 ohm, 1/8 W. resistor
70	CW 2-05	.05 mfd., 200 V. condenser
71	CW 4-005	.005 mfd., 400 V. condenser
72	RC 95258	Antenna coil
73	CW 4-005	.005 mfd., 400 V. condenser
74	RE 9584	.1 meg., 1/4 W. resistor
75	TR 9596	Output transformer
76	DM 9520	Speaker diaphragm

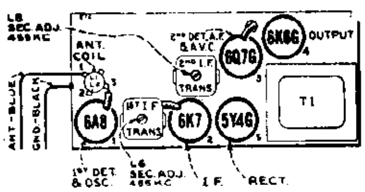
Alignment, Socket Trimmers, Data

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR256
Schematic, Voltag[e]



Connections for No. 30688 Transformer



Precautionary Lead Dress

1. Power transformer leads and power cord must be dressed toward rear apron away from volume control.
2. Blue lead from "A" terminal of 2nd I-F transformer to volume control must be dressed toward front apron away from other parts.
3. Speaker cable leads must be dressed close to chassis base, away from 6K6-G socket and volume control.

Frequency Range.................540 to 1,720 kc
R-F Alignment Frequency.... 1,500 kc (osc., ant.)
Intermediate Frequency.................. 455 kc

Tube Complement

(1) RCA-6A8.................. First-Det., Osc.
(2) RCA-6K7.............. Intermediate Amp.
(3) RCA-6Q7-G........ Second-Det., A-F, A.V.C.
(4) RCA-6K6-G.................. Power Output
(5) RCA-5Y4-G........................ Rectifier

Dial lamp......Mazda No. 44, 6.3 volts, 0.25 amps.

Power Output (125-volt, a-c supply)

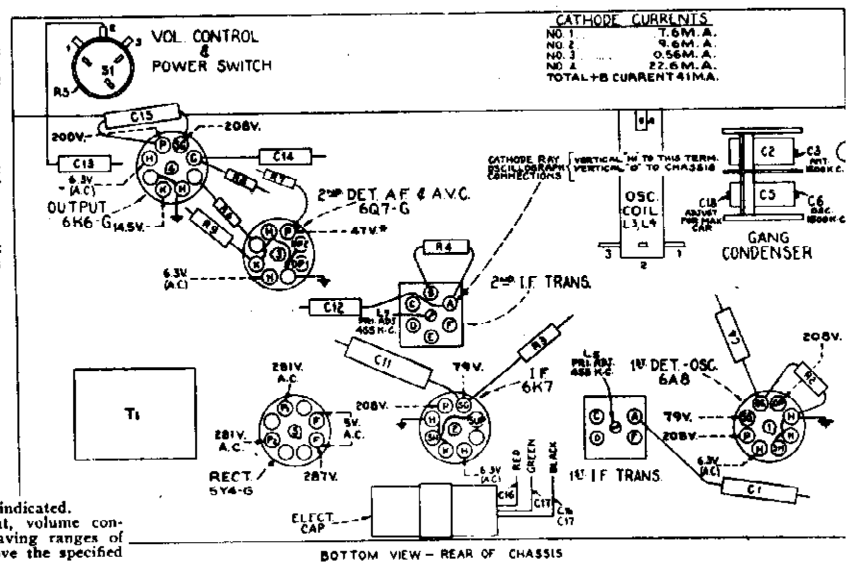
Undistorted.......................... 1.0 watt
Maximum .... 2.0 watts

Loudspeaker

Type...................... 5-inch Electrodynamic
Voice-coil Impedance....... 3.4 ohms at 400 cycles

Power Supply Ratings

Rating A..... 105-125 volts, 50-60 cycles, 50 watts
Rating B..... 105-125 volts, 25-60 cycles, 50 watts



Measurements made to chassis unless otherwise indicated.
Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, 250, and 500 volts. (Use nearest range above the specified measured voltage.)
Values should hold within approximately ± 20% for 117-volt 60-cycle supply.

Tube Socket Voltages and Location of Parts
Values with star (*) are operating voltages.
Values not starred are actual measured voltages.

Alignment Procedure

Cathode-ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output meter alignment. If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator. For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Pre-setting dial. With gang condenser in full mesh, move dial pointer to coincide with horizontal lines. This is a friction adjustment.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Transformer)
No. 2	6A8 1st-det. grid cap, in series with .01 mfd.	455 kc		L5 and L6 (1st I-F Transformer)
No. 3	Antenna lead, in series with 200 mmfd.	1,500 kc	1,500 kc	C6* (oscillator) C3 (antenna)

*Trimmer C18 on gang condenser should be screwed clockwise for maximum capacity before adjusting C6.

MODELS WRT700
WRT701
MODELS WRT702
WRT703

WESTINGHOUSE ELEC. SUPPLY CO.

Data, Parts

EXCEPT for the following data:-
Model WRT-700 is the same as RCA Model TT-5
Model WRT-701 is the same as RCA Model TRK-5

SUPPLEMENTARY REPLACEMENT PARTS LIST FOR WESTINGHOUSE TELEVISION RECEIVERS

Model WRT-700 (5" Television Attachment)
Model WRT-701 (5" Console)

When ordering replacement parts refer to this supplementary sheet first and if the part appears here it should be ordered by the stock number and receiver model indicated. For parts not listed in this sheet, refer to the main parts list.

Parts should be ordered from your Westinghouse Parts Distributor giving the stock number of part and model number of receiver.

TELEVISION CHASSIS ASSEMBLIES

Stock Number			Unit List Price
33835	Adjuster	Magnetite core and stud in tube for high frequency oscillator circuit adjustment (used with L13)	$ .60
33120	Choke	Filter choke (L39)	3.25

3-BAND RADIO RECEIVER
RC-429-A Used with Model WRT-701

Stock Number			Unit List Price
30752	Bracket	"Precision Eye" bracket	.25
30766	Cap	Rubber cap for "Precision Eye"	.15
13871	Socket	"Precision Eye" socket	.45

MISCELLANEOUS ASSEMBLIES
Model WRT-700
Model WRT-701

Stock Number			Unit List Price
33827	Cap	Pilot lamp "bulls eye" (Model WRT-701 only)	.65
33716	Escutcheon	Dial escutcheon less scale and buttons (Model WRT-701 only)	14.00
31210	Button	Station selector push button (Model WRT-701 only)	.10
33715	Dial	3 Band glass dial scale (Model WRT-701 only)	1.70
31095	Disc	Package of 8 protective cover discs for push buttons (Model WRT-701 only)	.10
33754	Glass	Safety protective glass for Kinescope	2.90
31355	Knob	Band switch knob (Model WRT-701 only)	.12
33181	Knob	Television "Brightness", "Vert. Hold", or Radio "Volume" knob	.25
31391	Knob	Television "Contrast", "Hor. Hold", "Fine Tuning" or Radio "Tone Control" knob	.15
33178	Knob	Television "Off-on" control knob (Model WRT-700 only)	.20
33179	Knob	Radio tuning knob (Model WRT-701 only)	.25
33176	Knob	Television "Station Selector" control knob (white dot)	.30
31355	Knob	Television "Volume Control" knob (Model WRT-700 only)	.12
30991	Markers	Complete set of call letter markers (Model WRT-701")	.40
14270	Spring	Knob spring for Stock No. 31355, 33176, 33178 and 33181 knobs	.05
30330	Spring	Knob spring for Stock No. 31391 knob	.03
4982	Spring	Knob spring for Stock No. 33179 knob	.05

Prices subject to change without notice.

EXCEPT for the following data:-
Model WRT-702 is the same as RCA Model IRK-9
Model WRT-703 is the same as RCA Model TRK-12

SUPPLEMENTARY REPLACEMENT PARTS LIST FOR WESTINGHOUSE TELEVISION RECEIVERS

Model WRT-702 (9" Console)
Model WRT-703 (12" Console)

When ordering replacement parts refer to this supplementary sheet first and if the part appears here it should be ordered by the stock number (and receiver model) indicated. For parts not listed in this sheet, refer to the main parts list.

Parts should be ordered from your Westinghouse Parts Distributor giving the stock number of the part and the model number of the receiver.

3-BAND RADIO RECEIVER CHASSIS
RC-427-B in WRT-703
RC-427-C in WRT-702

Stock Number			Unit List Price
30716	Clip	Precision eye mounting clip with wing screw	$ .25
32634	Cord	Variable condenser drive cord	.10
33712	Plate	Finished drive plate with drive pully and bracket	1.95
33713	Pointer	Dial pointer and carriage	.40
13871	Socket	"Precision Eye" socket	.45

MISCELLANEOUS ASSEMBLIES
WRT-702 and WRT-703

Stock Number			Unit List Price
32425	Button	Station selector push button	.20
33827	Cap	Orange pilot lamp "Bulls Eye"	.65
33752	Cushion	Kinescope masking cushion (Model WRT-703 only)	2.30
33753	Cushion	Kinescope masking cushion (Model WRT-702 only)	2.00
33710	Dial	Three band glass dial scale	2.30
33711	Escutcheon	Dial escutcheon less buttons, button shaft, and dial scale	4.75
31355	Knob	Radio tuning, volume, or range selector knob	.12
31391	Knob	Television "Contrast", "Hor. Hold", or "Fine Tuning" knob	.15
33181	Knob	Television "Brightness" or "Vert. Hold" knob	.25
33176	Knob	Television "Station selector" knob	.30
33178	Knob	"Victrola, Radio, Television - Fidelity selection knob"	.20
32067	Marker	Complete set of call letter markers	.35
31460	Marker	"Dial Tuning" push button marker	.04
30330	Spring	Knob spring for stock No. 31391 knob	.03
14270	Spring	Knob spring for stock No. 31355, 33181, 33176, and 33178 knobs	.05

Prices subject to change without notice.

Trimmers
Chassis

WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODEL WR 10
Alignment
Socket

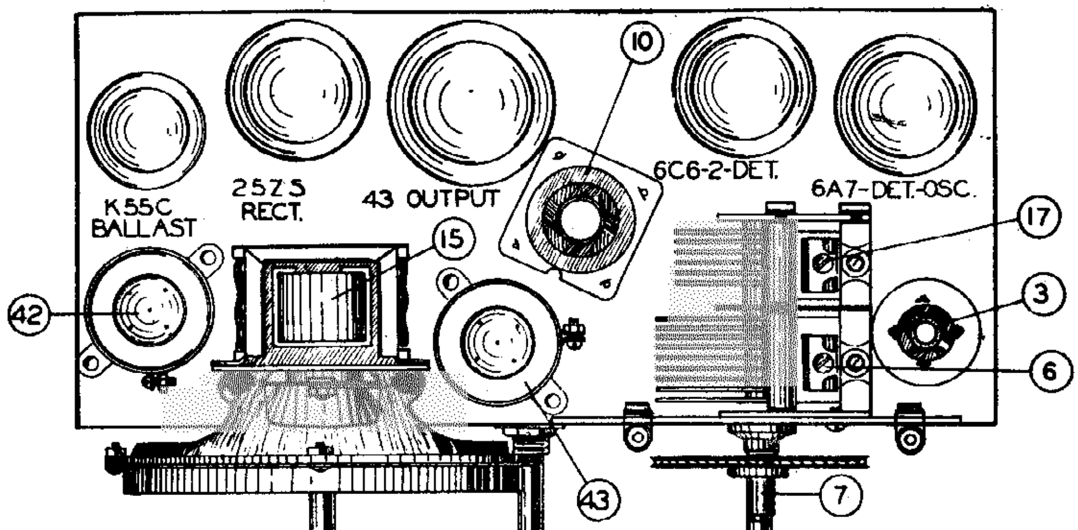


Figure No. 1

FOR OTHER DATA SEE INDEX

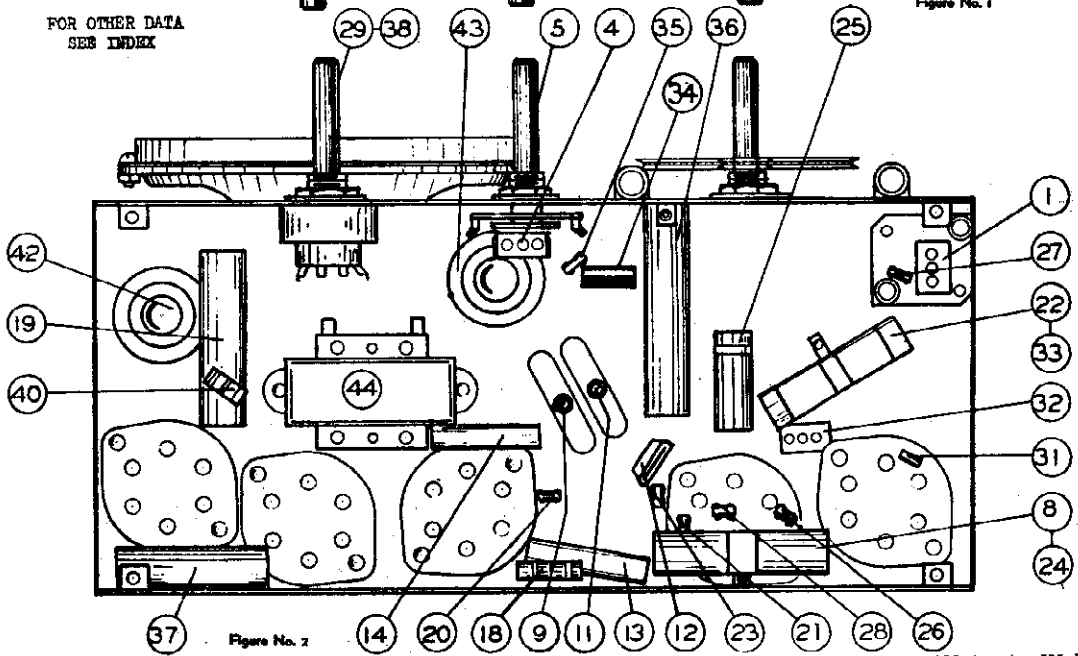


Figure No. 2

Type and Number of Tubes 1 #6A7, 1 #6C6, 1 #43, 1 #25Z5, 1 #K55C (Ballast) - Total 5
Power Supply Characteristics .. 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.
Power Consumption .... 44 Watts
Total Power Output .... 1.10 Watts
Undistorted Power Output .... 0.75 Watts
Tuning Ranges .... (Broadcast Band 535 to 1525 K.C. / Shortwave Band 1500 to 3000 K.C.)
Line-Up Frequencies .... I.F. 465 K.C., 1400 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of this meter must be sufficient to give satisfactory readings with low input signals.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the various tubes and alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before actual work is started.

ALIGNMENT OF I.F. (465 K.C.)

1. Set the volume control to maximum position and wave change switch to standard broadcast band.
2. Connect the output meter across the voice coil terminals of the speaker.
3. Set the test oscillator to 465 K.C. and adjust its output to produce a measureable reading on the output meter when the test signal is applied to the grid of the type 6A7 first detector-oscillator tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #9 and #11 to maximum output.

ALIGNMENT OF OSCILLATOR AND R. F.

1. Check the pointer setting to be sure that is is exactly horizontal when the tuning condenser is completely closed.
2. Set the test oscillator and dial indicator to 1400 K.C. and adjust the oscillator trimmer condenser #17 to maximum output.
3. Apply the test signal to the antenna of the receiver through a .0001 mfd. blocking condenser and adjust trimmer condenser #6 to maximum output.
4. Check sensitivity over the band.
5. Turn wave change switch to the shortwave band and check the sensitivity over scale.

MODEL WR209 **WESTINGHOUSE ELEC. INTERNATIONAL CO.**

Alignment, Socket
Trimmers, Chassis

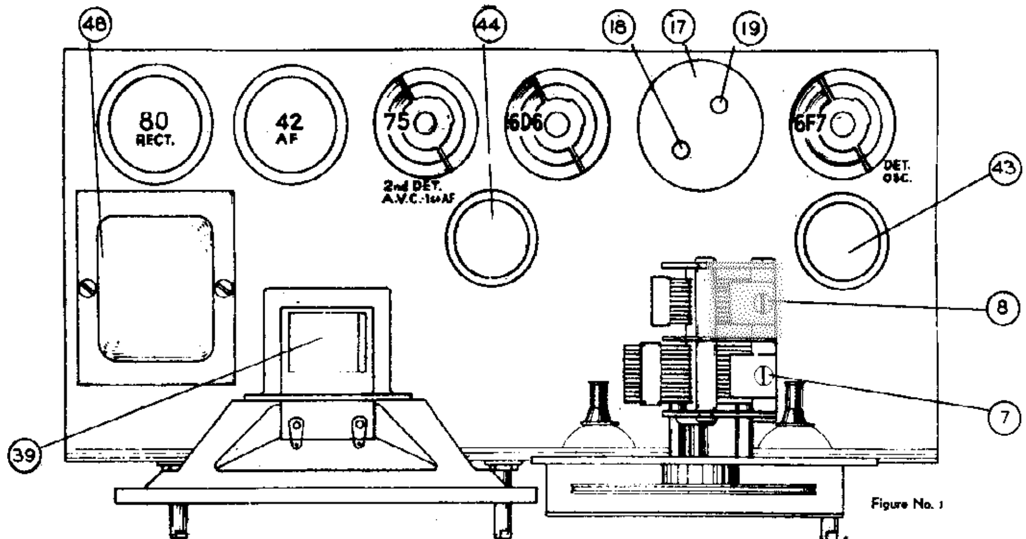


Figure No. 1

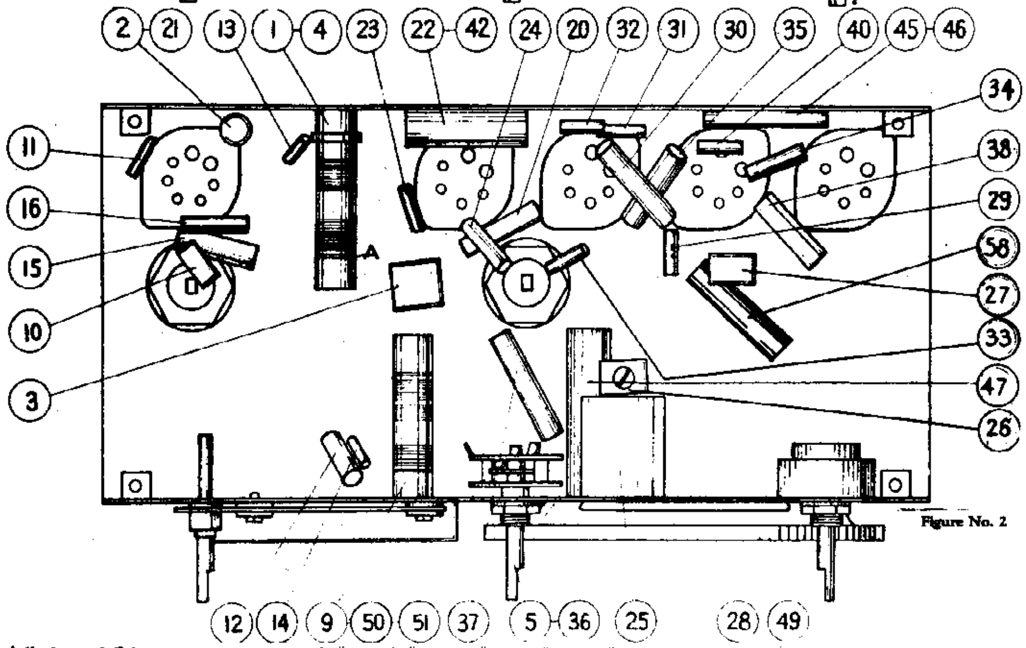


Figure No. 2

Type and Number of Tubes	1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply	105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption	46 Watts
Tuning Ranges	540 to 1500 K.C. and 1500 to 3200 K.C.
Maximum Undistorted Output	1.5 Watts
Maximum Output	2.8 Watts
Line-Up Frequencies	I.F. 465 K.C., 1400 K.C.

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 540 to 1600 K.C. and a police band which extends from 1400 to 3200 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started

ADJUSTMENT OF I.F. (465 K.C.)

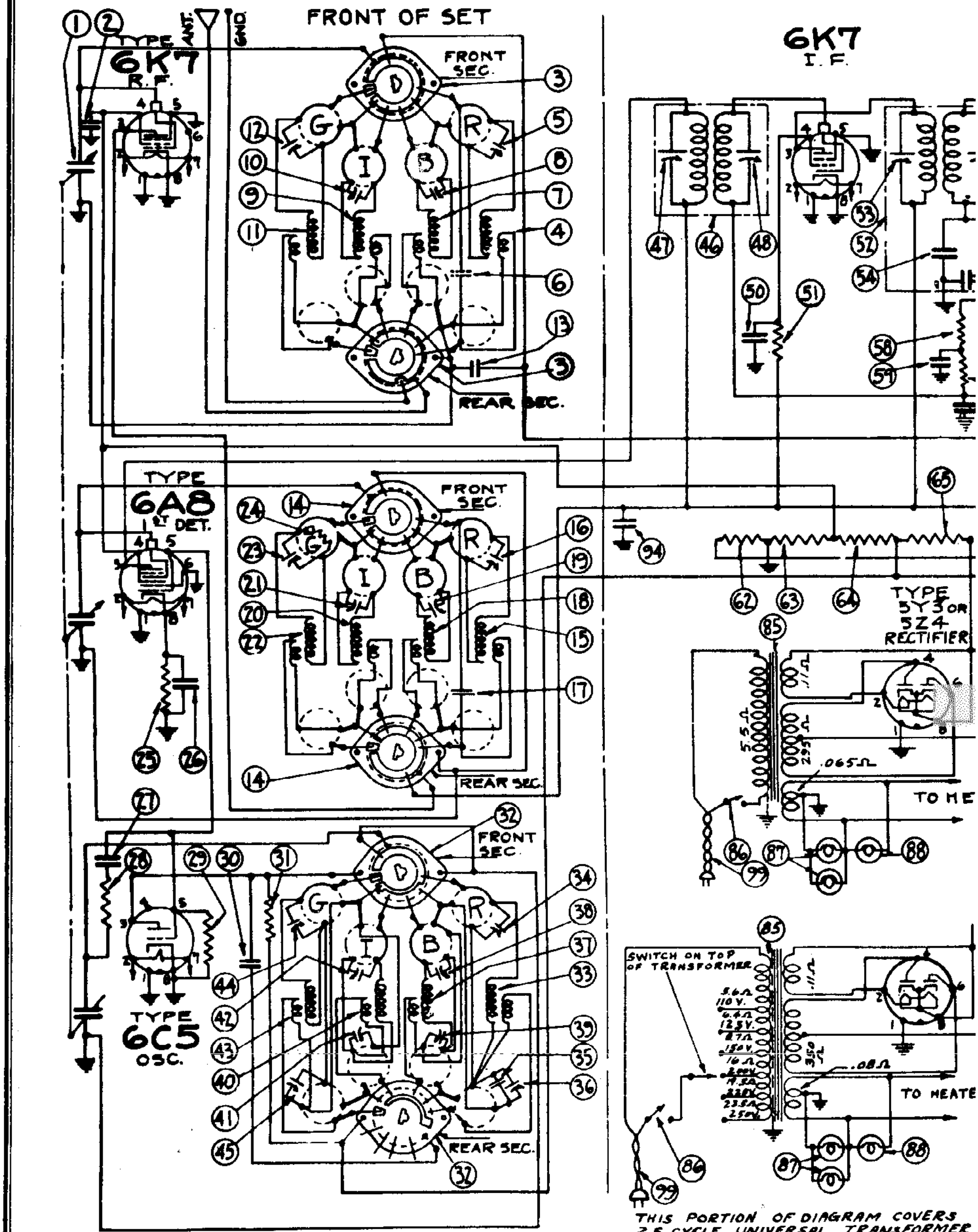
1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set the test oscillator to1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

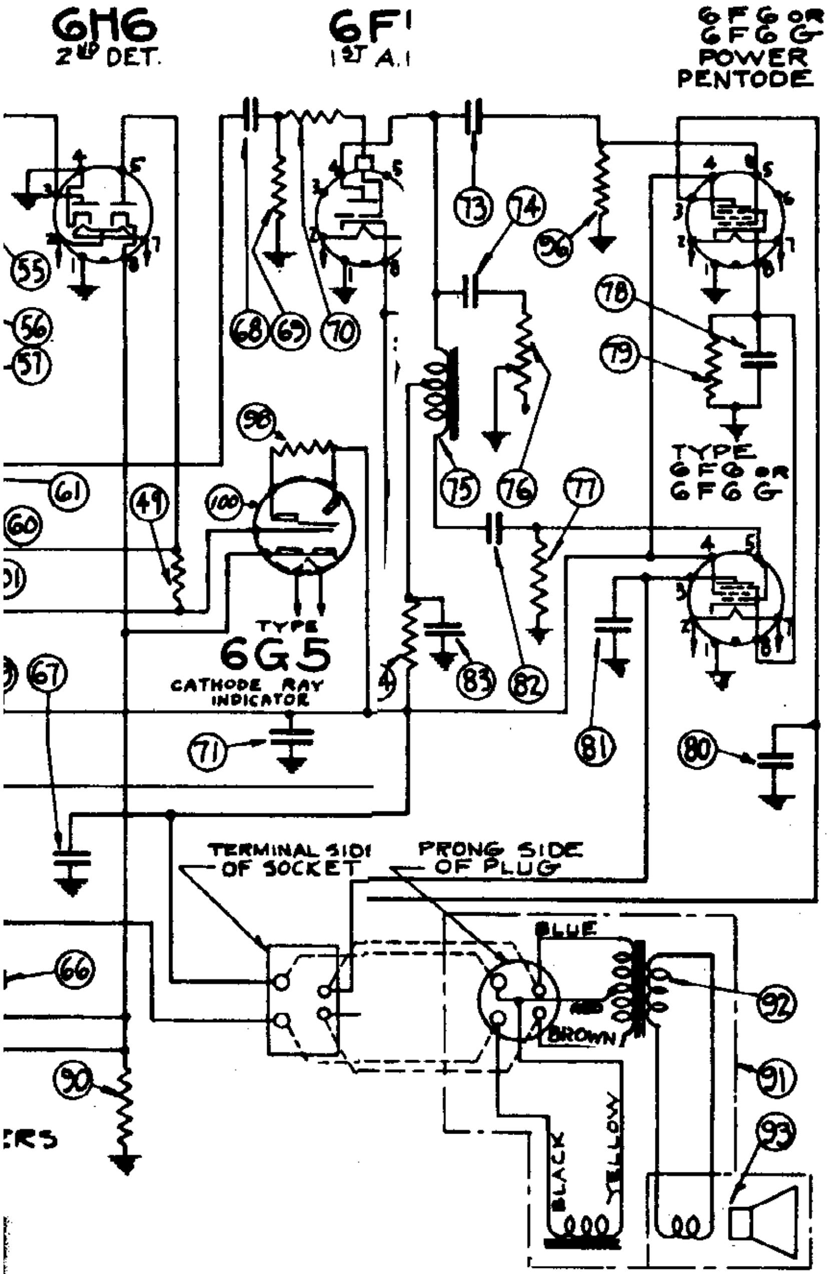
ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna load. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.


FRONT OF SET
TYPE 6K7 R.F.
ANT.
GND.
FRONT SEC.
REAR SEC.
6K7 I.F.
TYPE 6A8 1ST DET.
TYPE 6C5 OSC.
TYPE 5Y3 OR 5Z4 RECTIFIER
TO HEATERS
SWITCH ON TOP OF TRANSFORMER
THIS PORTION OF DIAGRAM COVERS 25 CYCLE UNIVERSAL TRANSFORMER.

INTERNATIONAL CO.

MODELS WR214X, WR314X
Schematic, Voltage
Resistances



D.C. RESISTANCE MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. NO.	PRIM.	SEC
G-ANT	11	120	20
G-R.F.	22	11	20
G-OSC.	43	6	8
I-ANT.	9	18.5	3.8
I-R.F.	20	0.8	10.7
I-OSC.	40	1.4	3.3
B-ANT.	7	2.1	1.0
B-R.F.	18	1.8	1.0
B-OSC.	37	0.5	0.9
R-ANT	4	0.7	.03
R-R.F.	15	2.0	.03
R-OSC	33	0.5	.03
1ST I.F.	46	8.6	8.6
2ND I.F.	52	8.6	8.6
INTERSTAGE TRANS	75	4200	9000
OUTPUT TRANS.	92	[illegible]	.03
SPKR FIELD		1800	
VOICE COIL	93	3.2	

INFREQ. 465KC.

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS									
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	BIAS	PIN NOS
6K7	R F	6.25	2-7	245	3-1	100	4-1	*SEE NOTE	
6A8	1ST DET	6.25	2-7	250	3-1	100	4-1	2.4	8-1
6C5	OSC	6.25	2-7	180	3-1				
6K7	I. F.	6.25	2-7	250	3-1	105	4-1	* SEE NOTE	
6H6	2ND DET.	6.25	2-7					5.1	8-1
6F5	AUDIO	6.25	2-7	230	4-1			1.5	8-1
6F6	OUTPUT	6.25	2-7	235	3-1	250	4-1	21.5	8-1
5Y3	RECTIFIER	5.	2-8	395	8-1				
6F6	OUTPUT	6.25	2-7	235.	3-1	250	4-1	21.5	8-1
6G5	[illegible] TUBE	6.35	1-6	263	2-5			*SEE NOTE	

* CONTROL GRID BIAS ON 6K7 & 6G5 TUBES IS EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

Socket,Trimmers
Chassis

WESTINGHOUSE ELEC. INTERNATIONAL CO.

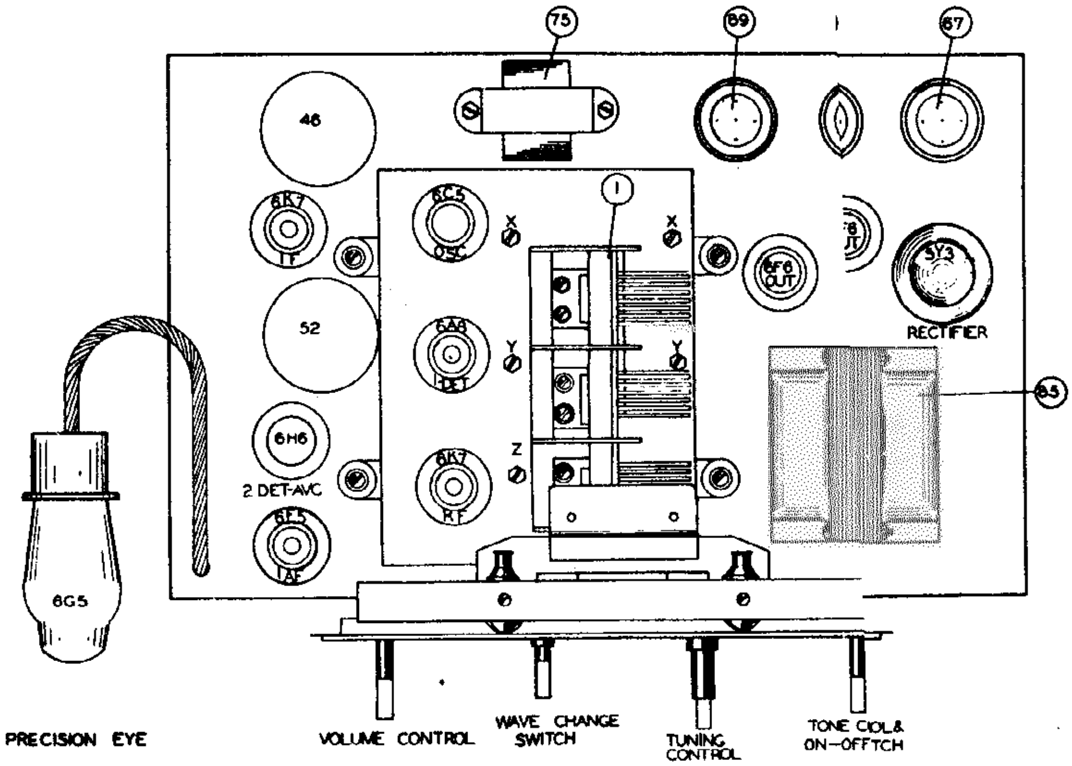


Figure No. 1

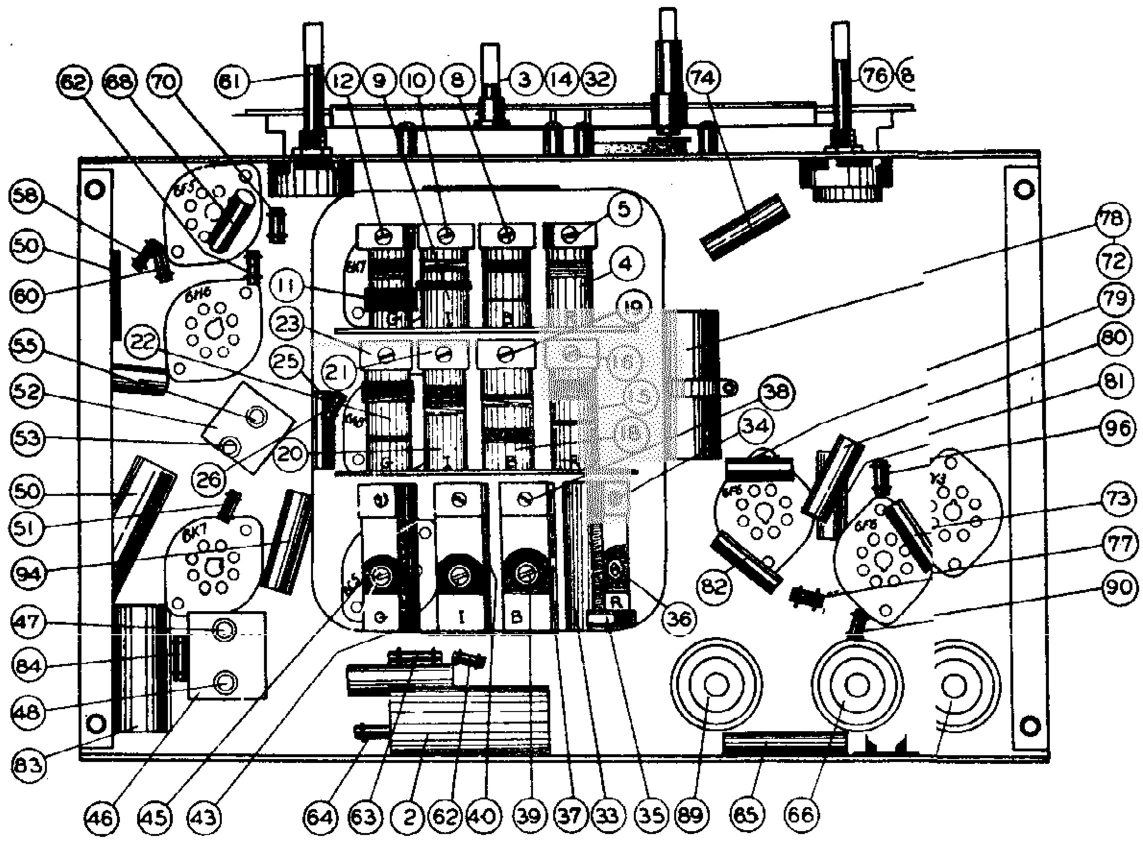


Figure No. 2

ODELS WR214X
WR314X

WESTINGHOUSE ELEC. INTERNATIONAL CO.

lignment
arts

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ...... 2 #6K7, 1 #6A8, 1 #6C5, 1 #6H6, 1 #6F5, 2 #6F6, 1 #6G5, 1 #5Y3 - Total 10

Power Supply .... 105 to 125 volts, 50 to 60 cycles
Power Consumption .... 80 Watts
Maximum Undistorted Output .... 4.5 Watts
Maximum Output .... 6.5 Watts

Tuning Ranges ....
(Green Band - 150 to 390 KC.
(White Band - 525 to 1800 KC.
(Blue Band - 1750 to 6000 KC.
(Red Band - - 5800 to 18500 KC.

Line-Up Frequencies .. I.F. 465 KC., 350 KC., 165 KC., 1600 KC., 570 KC., 5500 KC., 1900 KC., 17000 KC., and 6000 KC.

LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full and turn tone control to bass position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmers #53 and #55 for maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector and adjust #47 and #48 for maximum output.

ADJUSTMENT OF GREEN BAND

1. Set wave change switch to Green Band position.
2. Set test oscillator and dial indicator to 350 KC.
3. Apply test signal to antenna terminal of the chassis through a .0002 mfd. series condenser and adjust #44, #23, and #12 for maximum output.
4. Set test oscillator and dial indicator to 165 KC. and adjust #45 for maximum output, at the same time rocking the variable tuning condenser.
5. Return to 350 KC. setting with both test oscillator and dial indicator and repeat adjustment of #44, #23 and #12 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to the White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 KC. and adjust #42, #21 and #10 for maximum output.
3. Set test oscillator and dial indicator to 570 KC., and adjust #41 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 1600 KC. setting and make readjustment of #42, #21 and #10.

ADJUSTMENT OF BLUE BAND

NOTE: In adjusting the Blue and Red Bands, a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change switch to Blue Band position.
2. Set test oscillator and dial indicator to 5500 KC. and adjust #38, #19 and #8 for maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #39 for maximum output, at the same time rocking the variable tuning condenser.

ADJUSTMENT OF RED BAND

1. Set wave change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #34, #16 and #5 for maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #36 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #34, #16 and #5.

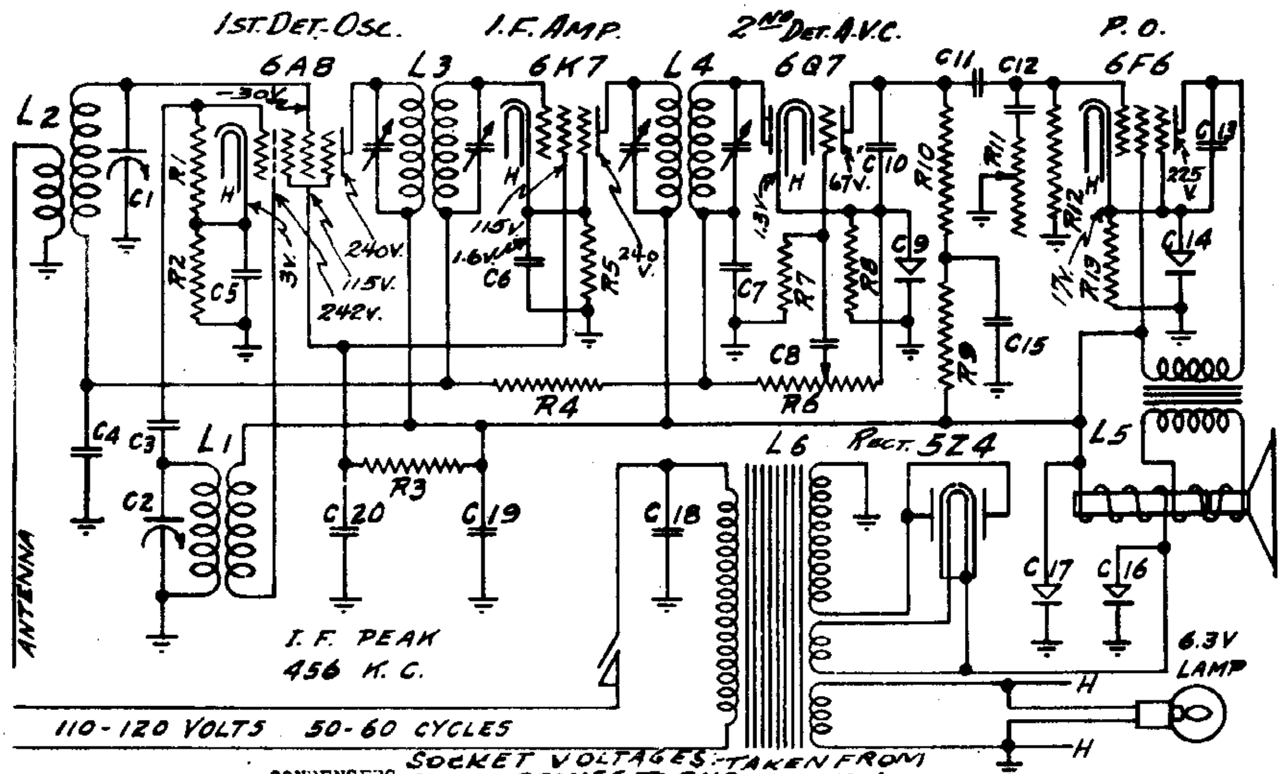
IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out through the air vents making the condenser appear to be defective. If left in this position too long the condenser may be injured.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

Dia. #	Part #	Description of Parts	List Price
1	CO 9551	Variable condenser - 3 gang	$ 4.50
2	CW 2-100	1 mfd., 200 V. condenser	.40
3	SW 9555	Switch and bracket assembly - antenna section	1.40
4	RC 95220	Antenna coil (Red)	.95
5	CS 9554	4-30 mmf. trimmer condenser	.15
6		Twisted wire - part of RC 95220	
7	RC 95212	Antenna coil (Blue)	.80
8	CS 9554	4-30 mmf. trimmer condenser	.15
9	RC 95218	Antenna coil (White)	1.00
10	CS 9554	4-30 mmf. trimmer condenser	.15
11	RC 95219	Antenna coil (Green)	1.25
12	CS 9554	4-30 mmf., trimmer condenser	.15
13	CW 9513	.05 mfd., 200 V. condenser	.25
14	SW 9556	Switch and bracket assembly - R.F. section	1.40
15	RC 95217	R.F. coil (Red)	1.35
16	CS 9554	4-30 mmf. trimmer condenser	.15
17	CM 9512	6 mmf. mica condenser	.15
18	RC 95214	R.F. coil (Blue)	1.00
19	CS 9553	1.5-10 mmf. trimmer condenser	.15
20	RC 95215	R.F. coil (White)	1.00
21	CS 9554	4-30 mmf. trimmer condenser	.15
22	RC 95216	R.F. coil (Green)	1.30
23	CS 9553	1.5-10 mmf. trimmer condenser	.15
24		.1 meg., 1/4 W. resistor - part of RC 95216	
25	RE 9529	300 ohm, 1/4 W. resistor	.10
26	CW 2-05	.05 mfd., 200 V. condenser	.15
27	CM 9511	.000065 mfd. mica condenser	.15
28	RE 9537	50 ohm, 1/4 W. resistor	.10
29	RE 9524	50,000 ohm, 1/4 W. resistor	.10
30	CW 9515	.05 mfd., 200 V. condenser	.25
31	RE 9526	5,000 ohm, 1 W. resistor	.20
32	SW 9557	Switch and bracket assembly - oscillator section	1.50
33	RC 95223	Oscillator coil (Red)	2.50
34		3-15 mmf., trimmer condenser - part of CS 9557	.80
35	CM 959	.002 mfd., mica condenser	.25
36		800-1600 mmf. oscillator series cond. - part of CS 9557	
37	RC 95213	Oscillator coil (Blue)	1.75
38		3-15 mmf. trimmer condenser - part of CS 9520	.75
39		800-1500 mmf. osc. series condenser - part of CS 9520	
40	RC 95221	Oscillator coil (White)	1.80
41		300-600 mmf. osc. series condenser - part of CS 9517	.55
42		5-25 mmf. trimmer condenser - part of CS 9517	
43	RC 95222	Oscillator coil (Green)	1.85
44		50-100 mmf. trimmer condenser - part of CS 9558	.60
45		60-150 mmf. osc. series condenser - part of CS 9558	
46	IC 9576	First I.F. coil assembly - 465 K.C.	1.50
47		80-200 mmf. trimmer condenser - part of IC 9576	
48		80-200 mmf. trimmer condenser - part of IC 9576	
49	RE 9585	.25 meg., 1/4 W. resistor	.15
50	CW 2-25	.25 mfd., 200 V. condenser	.15
51	SA 105277	75,000 ohm, 1/4 W. resistor	.15
52	IC 9577	Second I.F. coil assembly - 465 KC.	1.85
53		80-200 mmf. trimmer condenser - part of IC 9577	
54		100 mmf. mica condenser - part of IC 9577	
55		80-200 mmf. trimmer condenser - part of IC 9577	
56		50,000 ohm, 1/4 W. resistor - part of IC 9577	
57		100 mmf. mica condenser - part of IC 9577	
58	SA 105281	1 meg., 1/4 W. resistor	.15
59	CW 2-05	.05 mfd., 200 V. condenser	.15
60	SA 105281	1 meg., 1/4 W. resistor	.15
61	VR 959	.5 meg. volume control	1.00
62	SA 105268	1500 ohm, 1/4 W. resistor	.15
63	SA 104966	30,000 ohm, 1/2 W. resistor	.15
64	SA 101404	15,000 ohm, 1 W. resistor	.20
65	SA 103835	10,000 ohm, 2 W. resistor	.25
66	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
67	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
68	CW 4-02	.02 mfd., 400 V. condenser	.15
69	SA 105281	1 meg., 1/4 W. resistor	.15
70	RE 9584	.1 meg., 1/4 W. resistor	.15
71	CW 4-10	.1 mfd., 400 V. condenser	.15
72	CE 9526	12 mfd., 25 V. electrolytic condenser	.90
73	CW 4-02	.02 mfd., 400 V. condenser	.15
74	CW 4-02	.02 mfd., 400 V. condenser	.15
75	TR 9563	Interstage transformer	2.50
76	VR 9537	.1 meg., tone control - 5,000 ohm min.	1.00
77	RE 9585	.25 meg., 1/4 W. resistor	.15
78		12 mfd. electrolytic condenser - part of CE 9526	
79	RE 9587	500 ohm resistor	.35
80	CW 4-005	.005 mfd., 400 V. condenser	.15
81	CW 4-005	.005 mfd., 400 V. condenser	.15
82	CW 4-02	.02 mfd., 400 V. condenser	.15
83	CW 9526	1 mfd., 400 V. condenser	.40
84	SA 105272	10,000 ohm, 1/4 W. resistor	.15
85	TR 9562	Power transformer - 105-125 V., 50-60 cycle	5.00
86		On & Off switch - part of VR 9537	
87	LP 9515	Dial lamp - 3.5 V., .35 amp.	.20
88	LP 9510	Tuning indicator lamp - 6.3 V., .25 amp.	.16
89	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
90	RE 95101	37 ohm, 1/4 W. resistor	.15
91	SK 9537	Speaker	7.50
92	TR 9577	Output transformer	1.75
93	SA 107282	Diaphragm and voice coil assembly	1.15
94	CN 4-05	.05 mfd., 400 V. condenser	.15
96	RE 9585	.25 meg., 1/4 W. resistor	.15
98		1 meg., 1/4 W. resistor - part of CB 9598	
99	CB 9512	Line cable and plug	.50
100	CB 9598	"Precision eye" cable assembly	.70
101	CW 2-05	.05 mfd., 200 V. condenser	.15

WILCOX-GAY CORP.

MODEL 7E5
Schematic, Voltage
Alignment, Socket
Trimmers

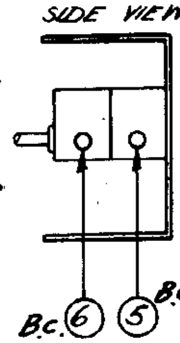


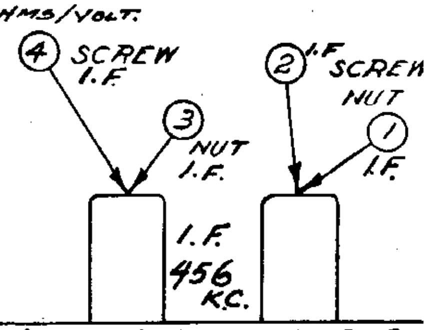
SOCKET VOLTAGES:- TAKEN FROM SOCKET PRONGS TO GND. B+242V. SPEAKER FIELD 78. METER 1000 OHMS/VOLT.

CONDENSERS

C1	77-2007	Preselector Section of Variable Condenser
C2	77-2007	Oscillator Section of Variable Condenser
C3	76-2002	.00005 Mfd. Mica Condenser
C4	75-2005	.1 Mfd. 200 V. Paper Condenser
C5	75-2005	.1 Mfd. 200 V. Paper Condenser
C6	75-2005	.1 Mfd. 200 V. Paper Condenser
C7	76-268	.00025 Mfd. Mica Condenser
C8	75-2005	.1 Mfd. 200 V. Paper Condenser
C9	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C10	76-662	.002 Mfd. Mica Condenser
C11	75-2005	.1 Mfd. 200 V. Paper Condenser
C12	75-2003	.01 Mfd. 400 V. Paper Condenser
C13	75-2002	.004 Mfd. 600 V. Paper Condenser
C14	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C15	75-2005	.1 Mfd. 200 V. Paper Condenser
C16	18-2008	6 Mfd. 350 W.V. Dry Electrolytic
C17	18-2008	6 Mfd. 250 W.V. Dry Electrolytic
C18	75-2003	.01 Mfd. 400 V. Paper Condenser
C19	75-2011	.5 Mfd. 200 V. Paper Condenser
C20	75-2005	.1 Mfd. 200 V. Paper Condenser

SIDE VIEW





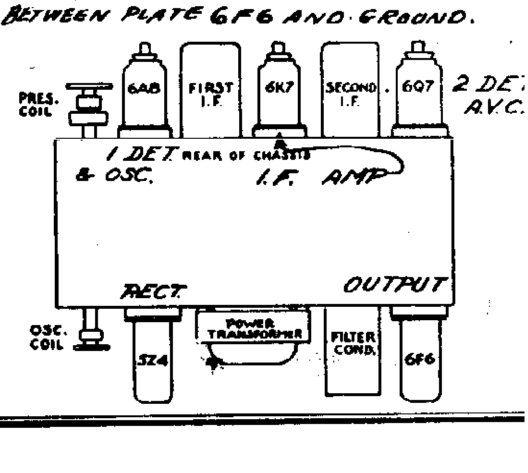
ALIGN I.F. TRIMMERS, ABOVE, IN NUMERICAL ORDER, DIAL SET AT 1400 KC. (REMOVE GRID CAP OF 6A8) ALIGN 5, 6, AT 1400KC. THEN 600KC. (6A8 GRID CAP CONNECTED) USE A STANDARD DUMMY ANT. - VOL. CONTR. ON FULL AT ALL TIMES. REAR VIEW

25-2120

INDUCTANCES

L1	17-2135	Oscillator Coil Assembly
L2	17-2138	Preselector Coil Assembly
L3	68-2040	First I.F. Transformer Assembly
L4	68-2041	Second I.F. Transformer Assembly
L5	64-2045	5" Speaker, 1500 Ohm Field, 6F6 Output Trans.
L6	80-2009	Power Transformer for 110-120 V. 60 Cycle

ALIGNMENT:- CONNECT OUTPUT METER BETWEEN PLATE 6F6 AND GROUND.

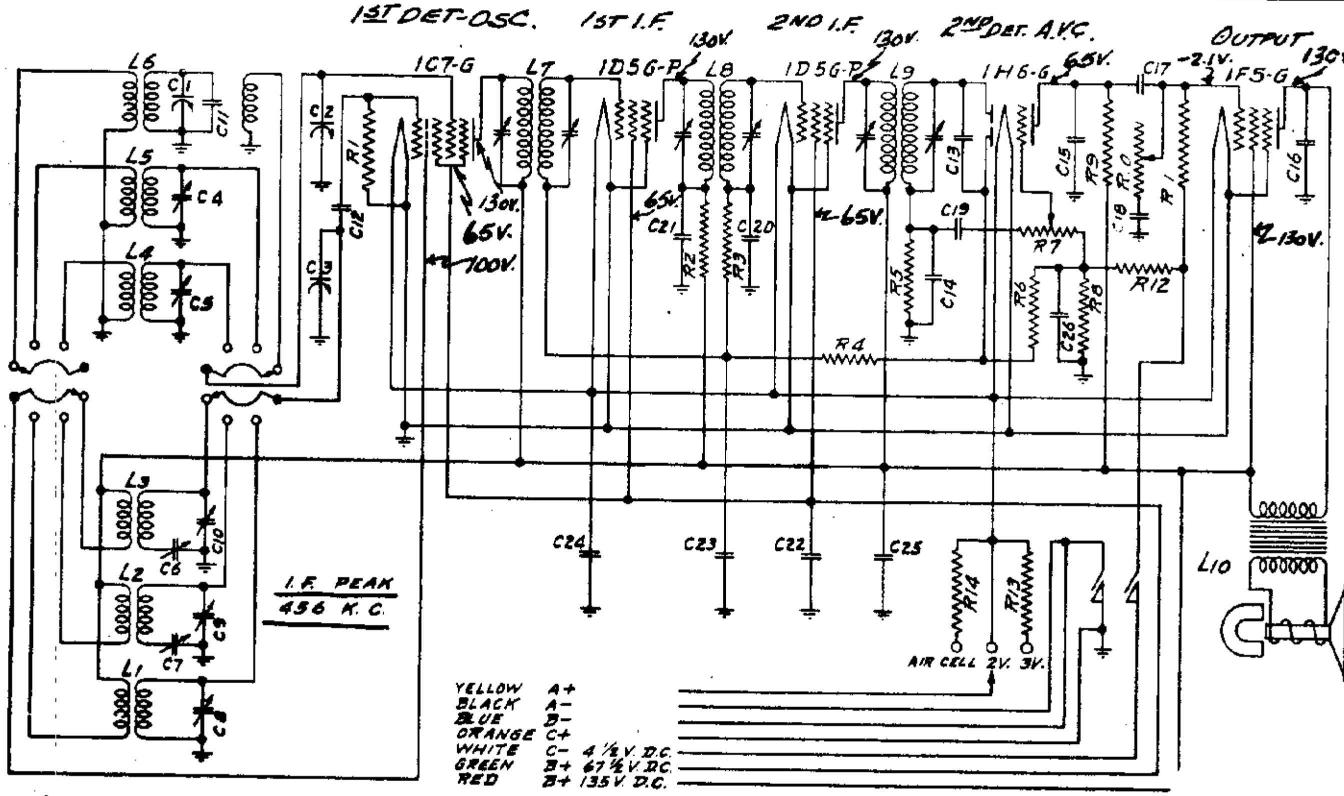


RESISTORS

CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Type M Resistor
R2	53-1062	250 Ohm Wirewound Resistor
R3	53-1042	25,000 Ohm Type M Resistor
R4	53-926	1 Meg Ohm Type M Resistor
R5	53-1062	250 Ohm Wirewound Resistor
R6	19-1291	500,000 Ohm Volume Control & Line Switch
R7	53-925	500,000 Ohm Type M Resistor
R8	53-919	5,000 Ohm Type M Resistor
R9	53-923	100,000 Ohm Type M Resistor
R10	53-924	250,000 Ohm Type M Resistor
R11	19-1317	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm Type M Resistor
R13	53-1063	500 Ohm Wirewound Resistor

MODELS A41,A42
Chassis 7R5
Schematic,Voltage
Socket,Alignment

WILCOX-GAY CORP.

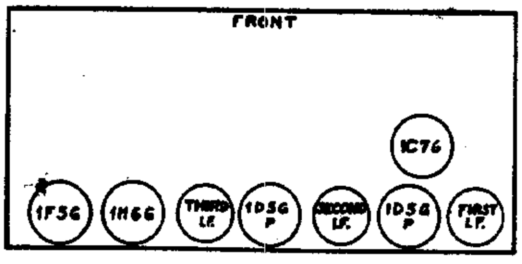


VOLTAGES MEASURED FROM SOCKET PRONGS TO GROUND. WITH A 1000 OHM PER VOLT METER. FILAMENT VOLTAGE 1.5.

25-2133

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

LOCATION OF TUBES



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm 1/4 Watt Resistor
R2	53-919	5,000 Ohm 1/4 Watt Resistor
R3	53-923	100,000 Ohm 1/4 Watt Resistor
R4	53-926	1 Meg Ohm 1/4 Watt Resistor
R5	53-925	500,000 Ohm 1/4 Watt Resistor
R6	53-925	500,000 Ohm 1/4 Watt Resistor
R7	19-2008	500,000 Ohm Volume Control
R8	53-923	100,000 Ohm 1/4 Watt Resistor
R9	53-924	250,000 Ohm 1/4 Watt Resistor
R10	19-2010	250,000 Ohm Tone Control & D.P.S.T. Switch
R11	53-925	500,000 Ohm 1/4 Watt Resister
R12	53-898	50,000 Ohm 1/4 Watt Resistor
R13	53-2016	2.12 Ohm Wirewound Resistor
R14	53-2015	.78 Ohm Wirewound Resister

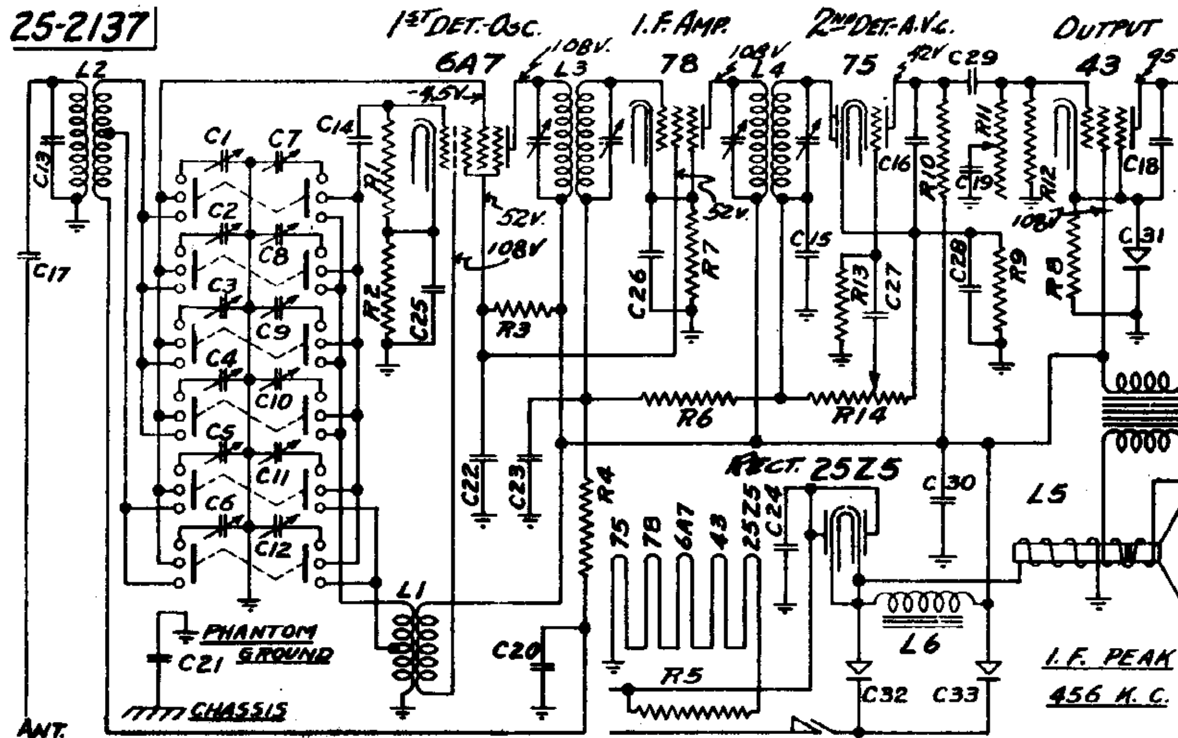
CODE	PART NO.	CONDENSERS
C1,C2,C3	77-2011	3 Gang Tuning Condenser
C4, C5	78-1567	3-30 Mmfd. 2 Gang Trimmer Cond.
C6, C7	78-2028	600 & 1600 Mmfd. 2 Gang Trimmer Cond.
C8,C9,C10	78-2030	3-50 Mmfd. 3 Gang Trimmer Condenser
C11	76-2003	.00001 Mfd. Mica Condenser
C12	76-2002	.00005 Mfd. Mica Condenser
C13	76-2002	.00005 Mfd. Mica Condenser
C14	76-207	.0005 Mfd. Mica Condenser

CODE	PART NO.	CONDENSERS (Cont'd.)
C15	76-265	.001 Mfd. Mica Condenser
C16	75-2002	.004 Mfd. 600 V. Paper Condenser
C17	75-2003	.01 Mfd. 400 V. Paper Condenser
C18	75-2003	.01 Mfd. 400 V. Paper Condenser
C19	75-2003	.01 Mfd. 400 V. Paper Condenser
C20	75-2003	.01 Mfd. 400 V. Paper Condenser
C21	75-2003	.01 Mfd. 400 V. Paper Condenser
C22	75-2005	.1 Mfd. 200 V. Paper Condenser
C23	75-2005	.1 Mfd. 200 V. Paper Condenser
C24	75-2011	.5 Mfd. 200 V. Paper Condenser
C25	75-2011	.5 Mfd. 200 V. Paper Condenser
C26	75-2011	.5 Mfd. 200 V. Paper Condenser

CODE	PART NO.	INDUCTANCES
L1	17-2183	Foreign Band Oscillator Coil Assembly
L2	17-2170	Police Band Oscillator Coil Assembly
L3	17-2150	Broadcast Band Oscillator Coil Assembly
L4	17-2182	Foreign Band Preselector Coil Assembly
L5	17-2168	Police Band Preselector Coil Assembly
L6	17-2151	Broadcast Band Preselector Coil Assembly
L7	68-2047	First I. F. Transformer Assembly
L8	68-2047	Second I. F. Transformer Assembly
L9	68-2048	Third I. F. Transformer Assembly
L10	64-2052	5" Speaker Permanent Magnet Field, for Model A-41 Output Trans. for single 1F5-G tube
L10	64-2053	6¼" Speaker Permanent Magnet Field, for Model A-42 Output Trans. for single 1F5-G

WILCOX-GAY CORP.

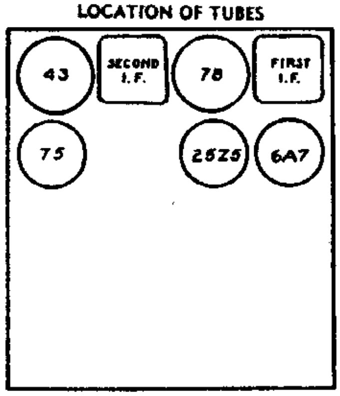
MODEL A48
Chassis 7S5
Schematic, Voltage
Socket, Alignment



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125 V., Line voltage was 120 at 60 cycles.

LOCATION OF TUBES



C1, C2	78-2033	40-240 Mmfd. Two Gang Trimmer Condenser
C3, C4	78-2033	40-240 Mmfd. Two Gang Trimmer Condenser
C5, C6	78-2033	40-240 Mmfd. Two Gang Trimmer Condenser
C7, C8	78-2033	40-240 Mmfd. Two Gang Trimmer Condenser
C9, C10	78-2033	40-240 Mmfd. Two Gang Trimmer Condenser
C11, C12	78-2033	40-240 Mmfd. Two Gang Trimmer Condenser
C13	76-2002	.00005 Mfd. Mica Condenser
C14	76-2002	.00005 Mfd. Mica Condenser
C15	76-307	.0005 Mfd. Mica Condenser
C16	76-265	.001 Mfd. Mica Condenser
C17	76-265	.001 Mfd. Mica Condenser
C18	75-2002	.004 Mfd. 600 V. Paper Condenser
C19	75-2003	.01 Mfd. 400 V. Paper Condenser
C20	75-2003	.01 Mfd. 400 V. Paper Condenser
C21	75-2006	.1 Mfd. 200 V. Paper Condenser
C22	75-2006	.1 Mfd. 200 V. Paper Condenser
C23	75-2006	.1 Mfd. 200 V. Paper Condenser
C24	75-2005	.1 Mfd. 200 V. Paper Condenser
C25	75-2006	.1 Mfd. 200 V. Paper Condenser
C26	75-2006	.1 Mfd. 200 V. Paper Condenser
C27	75-2006	.1 Mfd. 200 V. Paper Condenser
C28	75-2006	.1 Mfd. 200 V. Paper Condenser
C29	75-2006	.1 Mfd. 200 V. Paper Condenser
C30	75-2011	.5 Mfd. 200 V. Paper Condenser
C31	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C32, C33	18-2009	20 Mfd. & 10 Mfd. 150 W.V. Dry Elect. Cond.

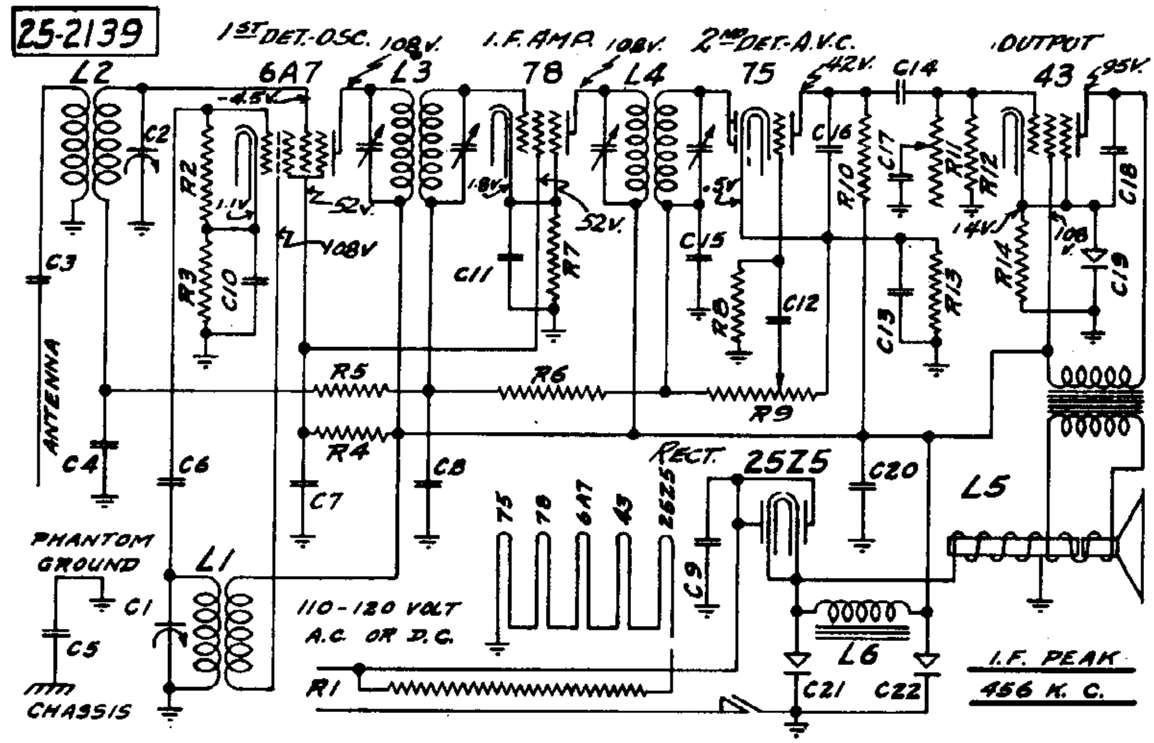
CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm 1/4 Watt Resistor
R2	53-1062	250 Ohm Wirewound Resistor
R3	53-1042	25,000 Ohm 1/4 Watt Resistor
R4	53-923	100,000 Ohm 1/4 Watt Resistor
R5	20-2009	173 Ohm Resistor in Power Line Cord
R6	53-926	1 Megohm 1/4 Watt Resistor
R7	53-1063	500 Ohm Wirewound Resistor
R8	53-1063	500 Ohm Wirewound Resistor
R9	53-919	5,000 Ohm 1/4 Watt Resistor
R10	53-924	250,000 Ohm 1/4 Watt Resistor
R11	19-2009	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm 1/4 Watt Resistor
R13	53-925	500,000 Ohm 1/4 Watt Resistor
R14	19-2007	500,000 Ohm Volume Control & Off-On Switch

INDUCTANCES

L1	17-2198	Oscillator Coil Assembly
L2	17-2200	Preselector Coil Assembly
L3	68-2051	First I. F. Transformer Assembly
L4	68-2052	Second I. F. Transformer Assembly
L5	64-2055	4" Speaker, 2100 Ohm, 43 Tube Output Trans.
L6	14-2002	20 Henry Filter Choke

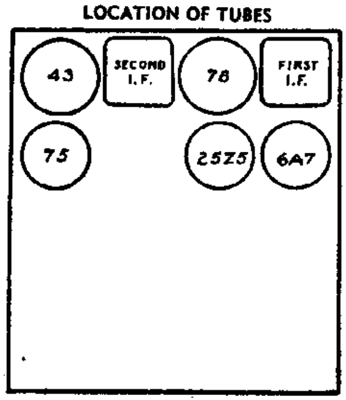
MODEL A49
Chassis 7T5
Schematic, Voltage
Alignment, Socket

WILCOX-GAY CORP.



SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125 V., Line voltage was 120 at 60 cycles.

LOCATION OF TUBES



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

CODE	PART NO.	RESISTORS
R1	20-2009	173 Ohm Resistor in Power Line Cord
R2	53-898	60,000 Ohm 1/4 Watt Resistor
R3	53-1062	250 Ohm Wireohm Resistor
R4	53-1042	25,000 Ohm 1/4 Watt Resistor
R5	53-923	100,000 Ohm 1/4 Watt Resistor
R6	53-926	1 Megohm 1/4 Watt Resistor
R7	53-1063	500 Ohm Wirewound Resistor
R8	53-1063	500 Ohm Wirewound Resistor
R9	19-2007	500,000 Ohm Volume Control & Off-On Switch
R10	53-924	250,000 Ohm 1/4 Watt Resistor
R11	19-2009	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm 1/4 Watt Resistor
R13	53-919	5,000 Ohm 1/4 Watt Resistor
R14	53-1063	500 Ohm Wireohm Resistor

CONDENSERS

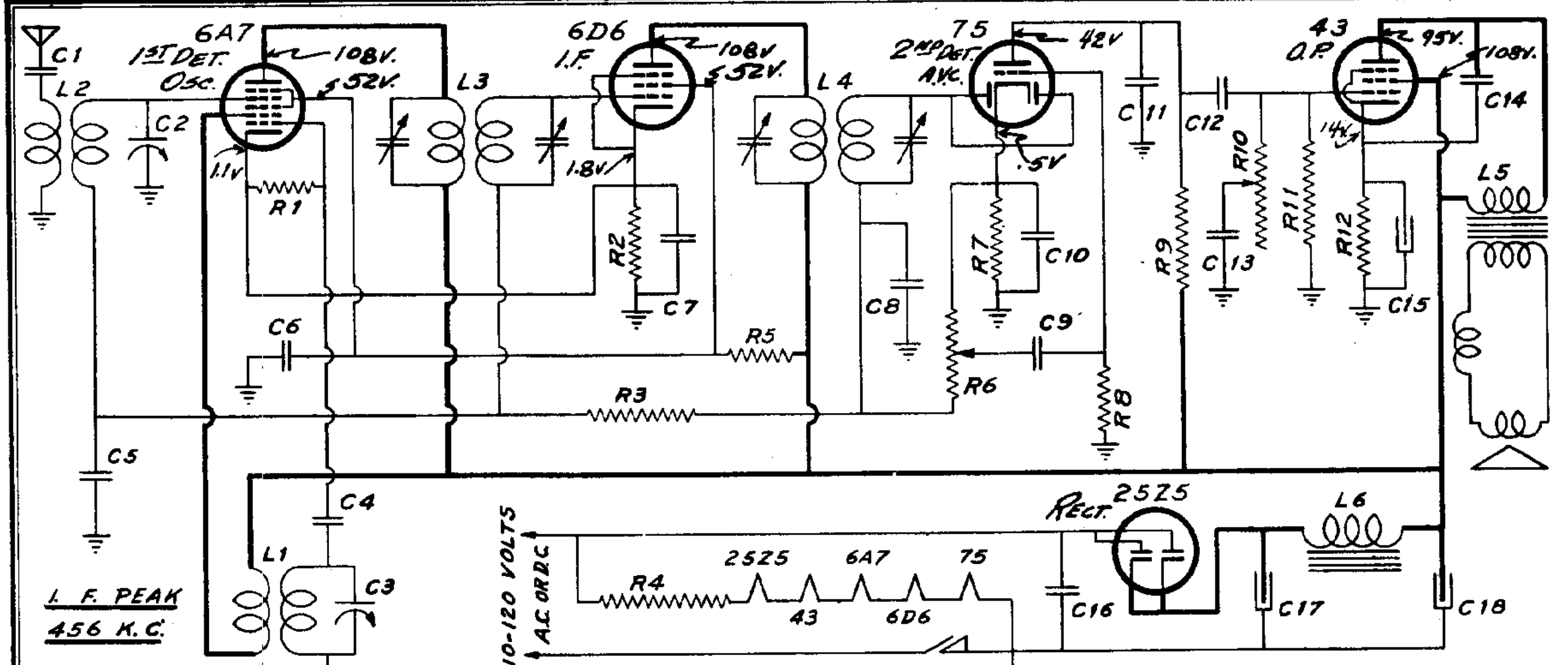
C1, C2	77-2007	2 Gang Variable Condenser
C3	76-265	.001 Mfd. Mica Condenser
C4	75-2003	.01 Mfd. 200 V. Paper Condenser
C5	75-2005	.1 Mfd. 200 V. Paper Condenser
C6	76-2002	.00005 Mfd. Mica Condenser
C7	75-2005	.1 Mfd. 200 V. Paper Condenser
C8	75-2005	.1 Mfd. 200 V. Paper Condenser
C9	75-2005	.1 Mfd. 200 V. Paper Condenser
C10	75-2005	.1 Mfd. 200 V. Paper Condenser
C11	75-2005	.1 Mfd. 200 V. Paper Condenser
C12	75-2005	.1 Mfd. 200 V. Paper Condenser
C13	75-2005	.1 Mfd. 200 V. Paper Condenser
C14	75-2005	.1 Mfd. 200 V. Paper Condenser
C15	76-307	.0005 Mfd. Mica Condenser
C16	76-265	.001 Mfd. Mica Condenser
C17	75-2002	.004 Mfd. 600 V. Paper Condenser
C18	75-2002	.004 Mfd. 600 V. Paper Condenser
C19	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C20	75-2011	.5 Mfd. 200 V. Paper Condenser
C21, C22	18-2009	25 Mfd. & 10 Mfd. W.V. Dry Elect. Cond.

INDUCTANCES

L1	17-2204	Oscillator Coil Assembly
L2	17-2202	Preselector Coil Assembly
L3	68-2051	First I.F. Transformer Assembly
L4	68-2052	Second I.F. Transformer Assembly
L5	64-2056	4" Speaker, 2100 Ohm, 43 Tube Output Trans
L6	14-2002	20 Henry Filter Choke

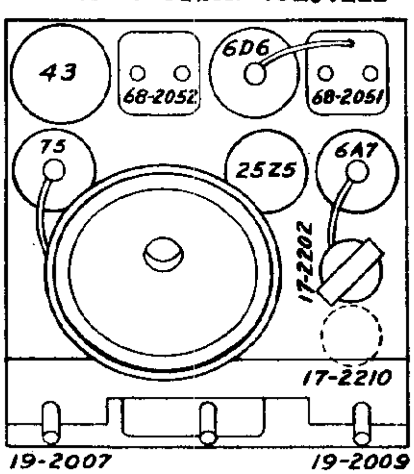
WILCOX-GAY CORP.

MODEL A50
Chassis 8D5
Schematic, Voltag
Alignment, Socket



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125V., Line voltage was 120 at 60 cycles.



RESISTORS		
R1	53-898	50,000 Ohm 1/4 Watt Resistor
R2	53-1062	250 Ohm 1/2 Watt Resistor
R3	53-926	1 Meg Ohm 1/4 Watt Resistor
R4	20-2009	173 Ohm Resist. in Power Cord
R5	53-1042	25,000 Ohm 1/4 Watt Resistor
R6	19-2007	500,000 Ohm Volume Cont. & Switch
R7	53-919	5,000 Ohm 1/4 Watt Resistor
R8	53-925	500,000 Ohm 1/4 Watt Resistor
R9	53-924	250,000 Ohm 1/4 Watt Resistor
R10	19-2009	250,000 Ohm Tone Control
R11	53-925	500,000 Ohm 1/4 Watt Resistor
R12	53-1063	500 Ohm 1/2 Watt Resistor

CONDENSERS		
C1	75-2001	.002 Mfd. 600 V. Paper Cond.
C2, C3,	77-2007	Two Gang Variable Condenser
C4	76-2002	.00005 Mfd. Mica Condenser
C5	75-2005	.1 Mfd. 200 V. Paper Cond.
C6	75-2005	.1 Mfd. 200 V. Paper Cond.

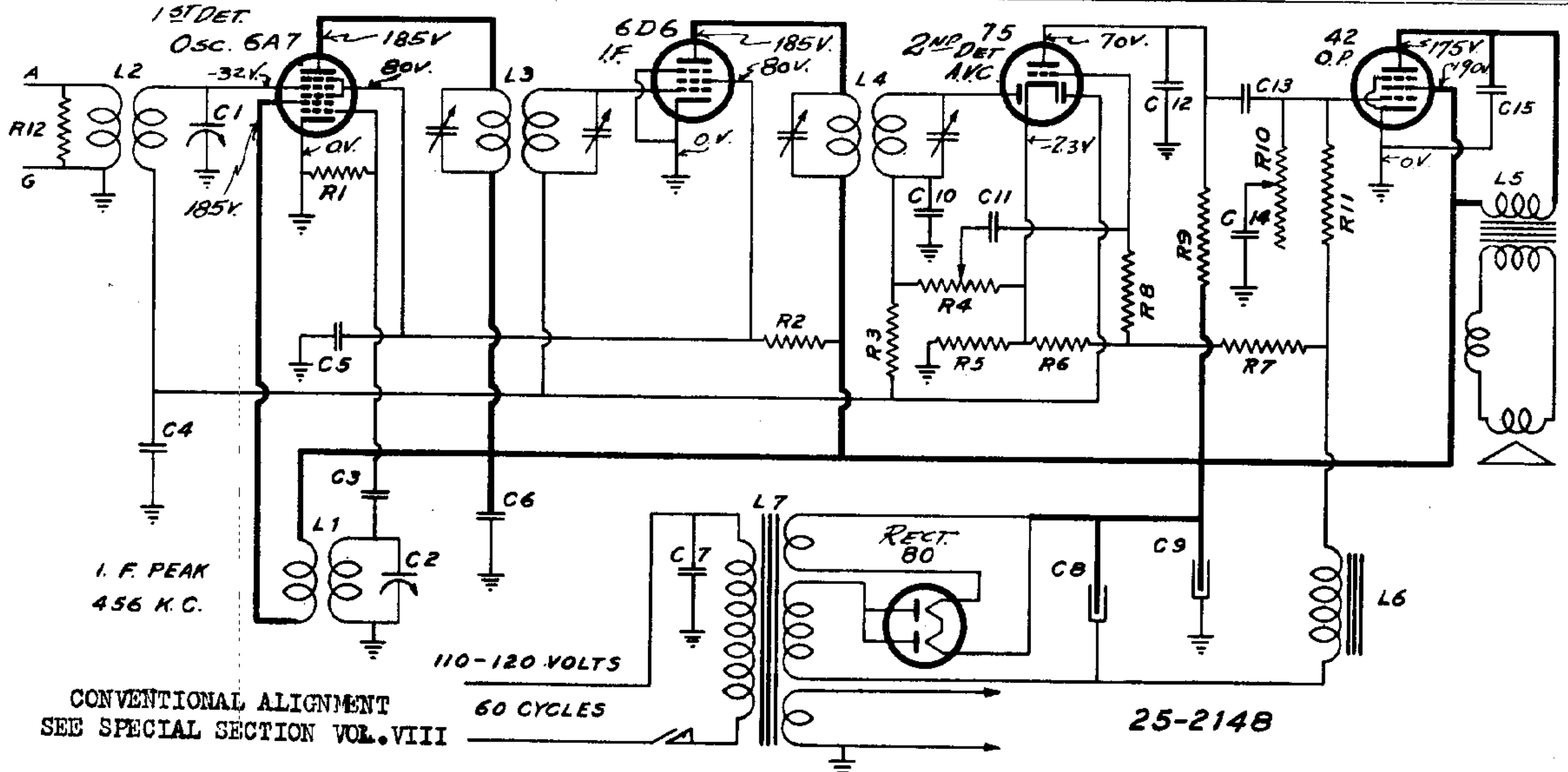
COND. (Cont.)		
C7	75-2005	.1 Mfd. 200 V. Paper Cond.
C8	76-307	.0005 Mfd. Mica Condenser
C9	75-2005	.1 Mfd. 200 V. Paper Cond.
C10	75-2005	.1 Mfd. 200 V. Paper Cond.
C11	75-2014	.001 Mfd. 600 V. Paper Cond.
C12	75-2005	.1 Mfd. 200 V. Paper Cond.
C13	75-2003	.01 Mfd. 400 V. Paper Cond.
C14	75-2002	.004 Mfd. 600 V. Paper Cond.
C15	18-928	25 Mfd. 25 W.V. Dry Elect. Cond.
C16	75-2005	.1 Mfd. 200 V. Paper Cond.
C17	18-2010	16 Mfd. 150 W.V. Dry Elect. Cond.
C18	18-2011	8 Mfd. 150 W.V. Dry Elect. Cond.

INDUCTANCES		
L1	17-2210	Oscillator Coil Assembly
L2	17-2202	Preselector Coil Assembly
L3	68-2051	First I.F. Trans. Assembly
L4	68-2052	Second I.F. Trans. Assembly
L5	81-2003	Output Transformer for # 43 Tube
L6	64-2056	4" Speaker, 450 Ohm Field

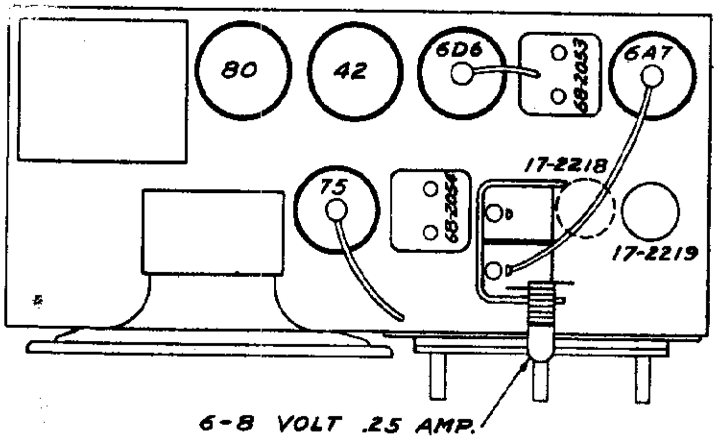
25-2144

MODEL A52
Chassis 8E5
Schematic, Voltage
Socket, Alignment

WILCOX-GAY CORP.



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII



Voltages taken from socket prongs to ground with a 1000 ohm per volt meter. B- 185 v., Speaker field 65v., Line 120v, 60~.

R1	53-898	50,000 Ohm 1/4 Watt Resistor	
R2	53-941	20,000 Ohm 1/4 Watt Resistor	
R3	53-926	1 Meg Ohm 1/4 Watt Resistor	
R4	19-2007	500,000 Ohm Vol. Cont. & Switch	
R5		60 Ohm	Candohm Resistor
R6	53-2019	20 Ohm	Candohm Resistor
R7		240 Ohm	Candohm Resistor
R8	53-925	500,000 Ohm 1/4 Watt Resistor	
R9	53-924	250,000 Ohm 1/4 Watt Resistor	
R10	19-2009	250,000 Ohm Tone Control	
R11	53-925	500,000 Ohm 1/4 Watt Resistor	
R12	53-923	100,000 Ohm 1/4 Watt Resistor	

CONDENSERS

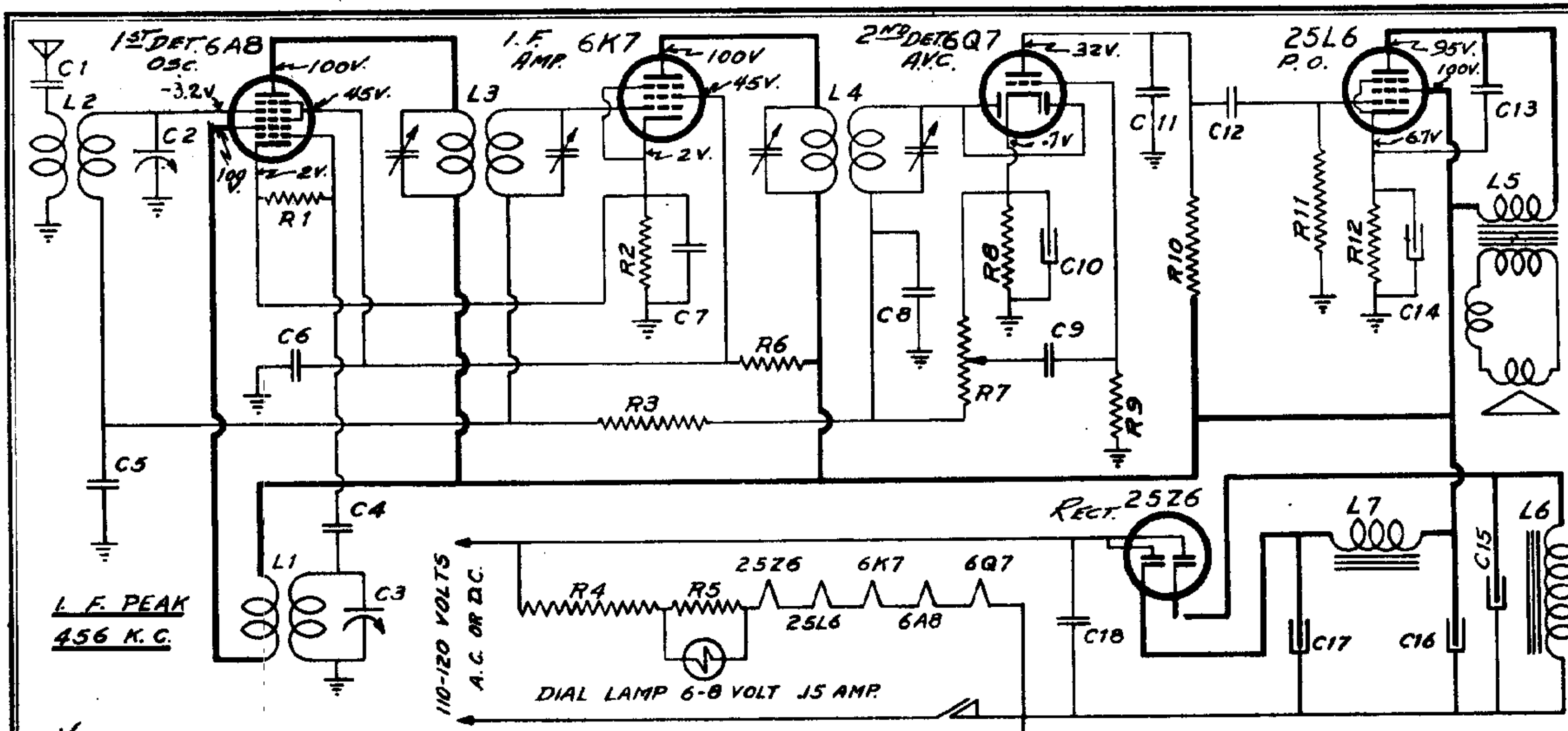
C1,C2	77-2014	Two Gang Variable Condenser
C3	76-2002	50 Mmfd. Mica Condenser
C4	75-2005	.1 Mfd. 200 V. Paper Condenser
C5	75-2005	.1 Mfd. 200 V. Paper Condenser
C6	75-2005	.1 Mfd. 200 V. Paper Condenser
C7	75-2003	.01 Mfd. 400 V. Paper Cond.
C8	18-2014	8 Mfd. 300 W.V. Elect. Cond.
C9	18-2013	4 Mfd. 300 W.V. Elect. Cond.
C10	76-307	.0005 Mfd. Mica Condenser
C11	75-2003	.01 Mfd. 400 V. Paper Cond.
C12	75-2014	.001 Mfd. 600 V. Paper Cond.
C13	75-2003	.01 Mfd. 400 V. Paper Cond.
C14	75-2003	.01 Mfd. 400 V. Paper Cond.
C15	75-2002	.004 Mfd. 600 V. Paper Cond.

INDUCTANCES

L1	17-2218	Oscillator Coil Assembly
L2	17-2219	Preselector Coil Assembly
L3	68-2053	First I.F. Trans. Assembly
L4	68-2054	Second I.F. Trans. Assembly
L5	64-2057	6½" Speaker, Output Trans. for #42 Tube
L6	64-2057	1500 Ohm Speaker Field
L7	60-2009	Power Transformer

MODEL A53, Thin Man
Chassis 8J5
Schematic, Voltage
Alignment, Socket

WILCOX-GAY CORP.

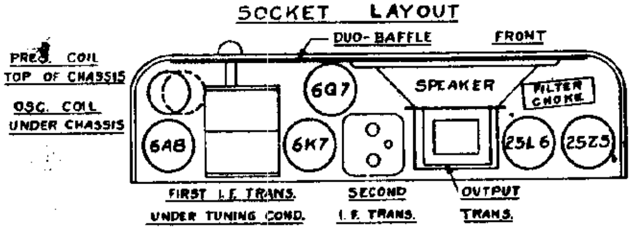


L.F. PEAK 456 K.C.

VOLTAGES SHOWN ARE MEASURED FROM SOCKET PRONGS TO GROUND. B+ 100V, SPEAKER FIELD 185, LINE VOLTAGE WAS 120V 60~. METER 1000 OHMS PER VOLT.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

SOCKET LAYOUT



RANGE:- 1850-540 K.C.

RESISTORS

R1	53-898	50,000 Ohm	1/4 Watt Resistor
R2	53-1062	250 Ohm	1/2 Watt Resistor
R3	53-926	1 Meg Ohm	1/4 Watt Resistor
R4	20-2011	154 Ohm	14 Watt Resistor
R5	53-2018	26 Ohm	2.34 Watt Resistor
R6	53-1042	25,000 Ohm	1/4 Watt Resistor
R7	19-2012	500,000 Ohm	Volume Cont. & Switch
R8	53-910	5,000 Ohm	1/4 Watt Resistor
R9	53-925	500,000 Ohm	1/4 Watt Resistor
R10	53-924	250,000 Ohm	1/4 Watt Resistor
R11	53-925	500,000 Ohm	1/4 Watt Resistor
R12	53-2014	200 Ohm	1/4 Watt Resistor

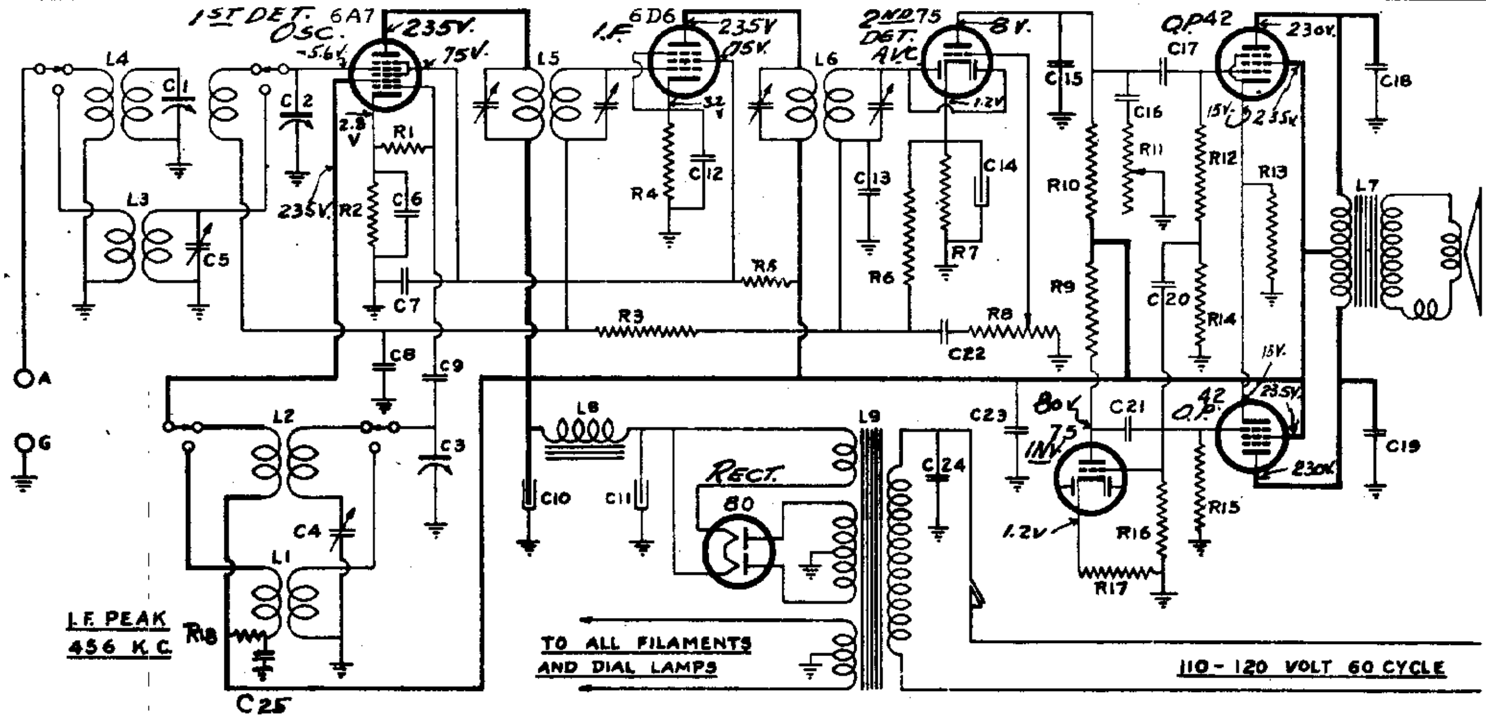
L1	17-2232	Oscillator Coil Assembly
L2	17-2230	Preselector Coil Assembly
L3	60-2055	First I.F. Trans. Assembly
L4	60-2052	Second I.F. Trans. Assembly
L5	64-2043	5" Speaker, Output Trans. for 25L6 Tube
L6	64-2043	3000 Ohm Field on L5
L7	14-2002	12 Henry Filter Choke

CONDENSERS

C1	75-2003	.01 Mfd 400 V. Paper Cond.
C2, C3	77-2015	Two Gang Variable Condenser
C4	76-2002	.00005 Mfd Mica Condenser
C5	75-2005	.1 Mfd 200 V. Paper Cond.
C6	75-2005	.1 Mfd 200 V. Paper Cond.
C7	75-2005	.1 Mfd 200 V. Paper Cond.
C8	76-307	.0005 Mfd Mica Condenser
C9	75-2003	.01 Mfd 400 V. Paper Cond.
C10	18-2012	10 Mfd 25 W. V. Dry Elect. Cond.
C11	75-2014	.001 Mfd 600 V. Paper Cond.
C12	75-2003	.01 Mfd 400 V. Paper Cond.
C13	75-2001	.002 Mfd 600 V. Paper Cond.
C14	18-2012	10 Mfd 25 W.V. Dry Elect. Cond.
C15	18-2011	8 Mfd 150 W.V. Dry Elect. Cond.
C16	18-2011	8 Mfd 150 W.V. Dry Elect. Cond.
C17	18-2010	16 Mfd 150 W.V. Dry Elect. Cond.
C18	75-2005	.1 Mfd 200 V. Paper Condenser

MODELS A54, Chassis 8L7
A55, Chassis 8N7
Schematic, Voltage
Socket, Alignment

WILCOX-GAY CORP.



Voltages taken from socket prongs to ground. B+ 235V. Speaker field 87. Line 120 volts 60 cycles. Meter 1000 ohms per volt.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

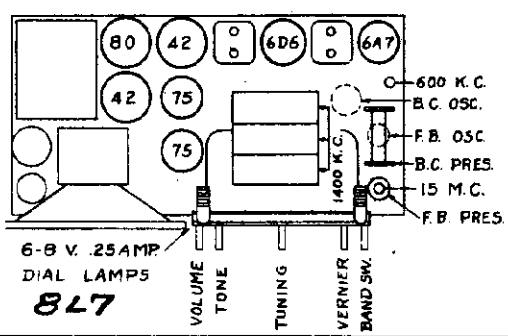
C1,C2,C3	77-2016	3 Gang Variable Condenser
C4	78-2031	Broadcast Series Osc. Trimmer
C5	78-2010	3-30 MMFD. Foreign Band
C6	75-2005	.1 Mfd. 200 V. Paper Condenser
C7	75-2005	.1 Mfd. 200 V. Paper Condenser,
C8	75-2005	.1 Mfd. 200 V. Paper Condenser
C9	76-2002	.00005 Mfd. Mica Condenser
C10	18-2006	16 Mfd. 250 W.V. Elect. Condenser
C11	18-721	8 Mfd. 450 W.V. Elect. Condenser
C12	75-2005	.1 Mfd. 200 V. Paper Condenser
C13	76-307	.0005 Mfd. Mica Condenser
C14	18-2012	10 Mfd. 25 W.V. Dry Elect. Cond.
C15	75-2014	.001 Mfd. 600 V. Paper Condenser
C16	75-2003	.01 Mfd. 400 V. Paper Condenser
C17	75-2005	.1 Mfd. 200 V. Paper Condenser
C18	75-2001	.002 Mfd. 600 V. Paper Condenser
C19	75-2001	.002 Mfd. 600 V. Paper Condenser
C20	75-2005	.1 Mfd. 200 V. Paper Condenser
C21	75-2005	.1 Mfd. 200 V. Paper Condenser
C22	75-2005	.1 Mfd. 200 V. Paper Condenser
C23	75-2012	.5 Mfd. 400 V. Paper Condenser
C24	75-2003	.01 Mfd. 400 V. Paper Condenser
C25	75-2005	.1 MFD 200V. PAPER CONDENSER
R1	53-898	50,000 Ohm 1/4 Watt Resistor
R2	53-1062	250 Ohm 1/2 Watt Resistor
R3	53-926	1 Megohm 1/4 Watt Resistor
R4	53-1063	500 Ohm 1/2 Watt Resistor
R5	53-921	40,000 Ohm 1/4 Watt Resistor
R6	53-925	500,000 Ohm 1/4 Watt Resistor
R7	53-919	5,000 Ohm 1/4 Watt Resistor
R8	19-2007	500,000 Ohm Vol. Cont. & Switch
R9	53-924	250,000 Ohm 1/4 Watt Resistor
R10	53-924	250,000 Ohm 1/4 Watt Resistor
R11	19-2009	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm 1/4 Watt Resistor
R13	53-2011	250 Ohm 1/2 Watt Resistor
R14	53-921	20,000 Ohm 1/4 Watt Resistor
R15	53-925	500,000 Ohm 1/4 Watt Resistor
R16	53-925	500,000 Ohm 1/4 Watt Resistor
R17	53-919	5,000 Ohm 1/4 Watt Resistor
R18	53-898	50,000 OHM 1/4 WATT RESISTOR
L1	17-2149	Foreign Band Osc. Coil Assembly
L2	17-2227	Broadcast Oscillator Coil Assembly
L3	17-2228	Foreign Band Pres. Coil Assembly
L4	17-2226	Broadcast Preselector Coil Assembly
L5	68-2051	First I.F. Transformer Assembly
L6	68-2051	Second I.F. Transformer Assembly
L9	80-2022	Power Transformer

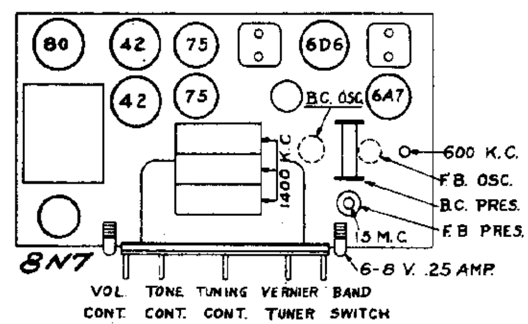
MODEL A54

L7	64-2058	6½" Speaker - #42 Push Pull Output Trans.
L8	64-2058	6½" Speaker - 1000 Ohm Field

MODEL A55

64-2059	12" Speaker - #42 Push Pull Output Trans.
64-2059	12" Speaker - 1000 Ohm Field





For MODELS 6S306, 9S307 15S308 ZENITH RADIO CORP. MODEL 169-31 Automatic Record Changer

Installation, Operation

INSTALLATION, OPERATION AND SERVICE
AUTOMATIC RECORD CHANGER

used in

Models 6-S-306; 9-S-307; 15-S-308

This Record Changer will automatically play a series of eight 10- or seven 12-inch records of the 78 revolutions-per-minute type or, if you so desire, you may change records, of any size up to 12 inches, manually. Records of the last few years with the standard eccentric or spiral stopping groove will operate the automatic mechanism and change your records for you.

INSTALLATION

The Automatic Record Changer as supplied consists of two units.

1. The **Motorboard Unit** which includes the automatic record changer mechanism, the turntable, and the pickup.

2. The **Motor Unit** which includes the support plate assembly.

The units are supplied ready for mounting on a cabinet rail. This rail must be drilled in accordance with the information and dimensions shown on page 4. Wooden support blocks as shown, must be provided by the customer. All other necessary parts are included in your purchase. It is essential for proper operation that the rail and support blocks provide for the mounting of the motor support plate exactly 2¾ inches below the top surface of the motorboard. The support blocks should be attached to the rail with heavy wood screws. Details of this mounting, with all necessary dimensions, are given on page 4.

1. Install the Motor Unit with support plate loosely in position as shown on page 4. Do not tighten the mounting screws.
2. Loosen the two set screws in the collar of the flexible coupling on the Motorboard Unit, a detail of which is shown on page 3.
3. Place the Motorboard Unit in position on the cabinet rail with the upper mounting springs in place as shown on page 4. Make sure that the guide pins extending from the motor support plate enter the rubber grommets in the Motorboard Unit without binding.
4. Secure Motorboard in position using the screws and lower mounting springs as shown on page 4. Tighten up the four motorboard mounting screws to compress all eight mounting springs to the dimensions shown. *Make sure that the Motorboard Assembly is level in the cabinet.*
5. Tighten up the mounting screws on the Motor Unit support plate assembly so that they are firmly down against the spacers.
6. Check the installation to be sure that there is no binding between the collar of the flexible coupling and the collar of the motor spindle. See page 3.
7. Tighten the two set screws of the flexible coupling down on the spindle of the Motor Unit.

Needle Box

The needle box is in a separate package. Place the box in the hole in the motorboard with the needle ejector tab toward the front. To do this tilt the box upwards at front and lower into hole with the lug on back of box in the slot in the motorboard. Slide the lug under the motorboard and the box drops in place.

Speed Regulation and Lubrication

There are three holes in the top of the turntable which give access to oil holes and a speed regulating screw in the motor mechanism beneath. Revolve the turntable slowly until you can see the holes and screw through the turntable. A few drops of good quality light machine oil should be applied in the oil holes at regular intervals, about once every six months.

Speed Regulation.—After the phonograph is in operation the speed should be checked while playing a record.

1. Place a piece of white paper under edge of record so that it is plainly visible.
2. Count the number of revolutions per minute with the aid of a watch.
3. If not 78, stop the turntable, lift off the record and set the turntable to give access to the speed regulator screw through one of the holes.
4. Insert a screwdriver through the hole in the turntable into the groove in the speed regulator screw and turn to right (clockwise) to decrease speed, or to the left (counter-clockwise) to increase speed.
5. Replace and replay record, recount and adjust until speed is checked at 78 r. p. m.

Shipping

Shipping blocks as shown on page 4 should be used in all cases of reshipment.

OPERATION

Before operating the phonograph, either automatically or manually, be sure that the pickup is down and can be moved by hand. If not, a "cycle" must be completed to bring it down. To do this, throw Turntable Switch "on." The turntable will start to revolve and the cycle of motion on the pickup arm will be resumed. When the pickup arm comes down, turn off the Turntable Switch.

Cautions

1. Never use force to start or stop the motor or any part of the record-changing mechanism or pickup arm.

2. The use of records which have become warped or damaged through improper care may cause the mechanism to jam and damage the instrument. In addition, records which have become warped will slide on one another when playing, resulting in unsatisfactory reproduction.

3. This instrument is not recommended for playing 10-inch and 12-inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pickup will come down in position for a 10-inch record and repeat the playing of the record on a 10-inch diameter unless the Turntable Switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.

4. Do not leave records on the record holder posts, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use. If any records should become warped, place them on a flat surface with a flat heavy article, such as a large book, on top and leave them in this position for a few days.

Controls and Moving Mechanism

Index and Record Reject Lever.—This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"MANUAL," "12," "10," and "REJECT." When you desire to change record selections manually, this lever should be set in the "MANUAL" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "REJECT" position and let go. The pickup will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "MANUAL" position when not actually playing records automatically.

1.

MODEL 169-31 Automatic Record Changer | ZENITH RADIO CORP. **Automatic Record Changer** | Adjustments, Notes

GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record. — The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife. — The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

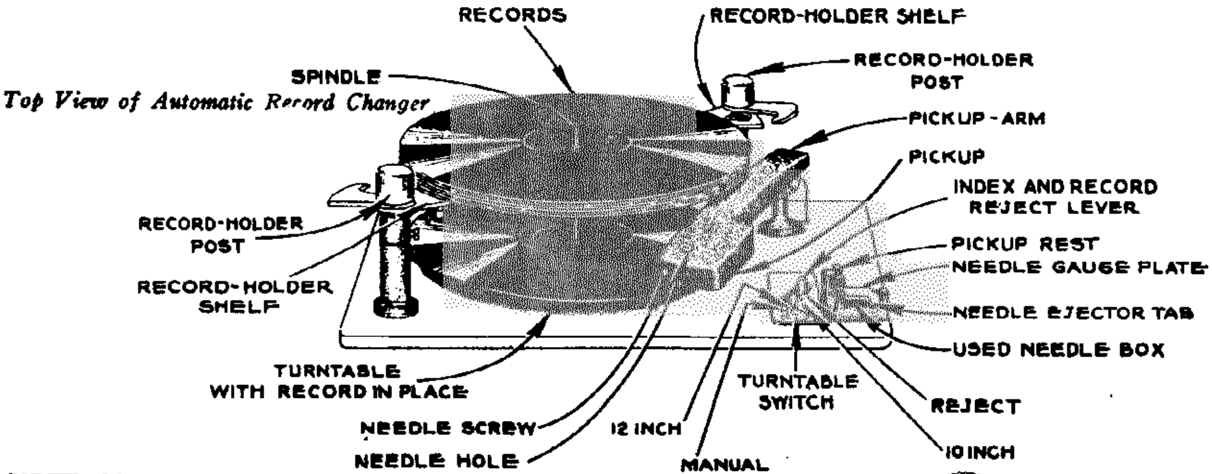
1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "30".

2.

Chassis,Details

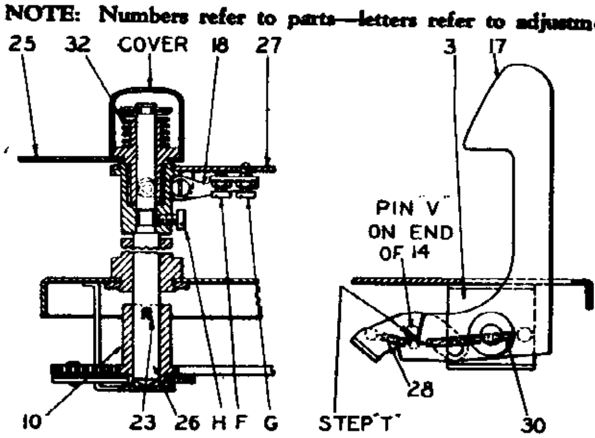
ZENITH RADIO CORP.

MODEL 169-31 Automatic Record Changer

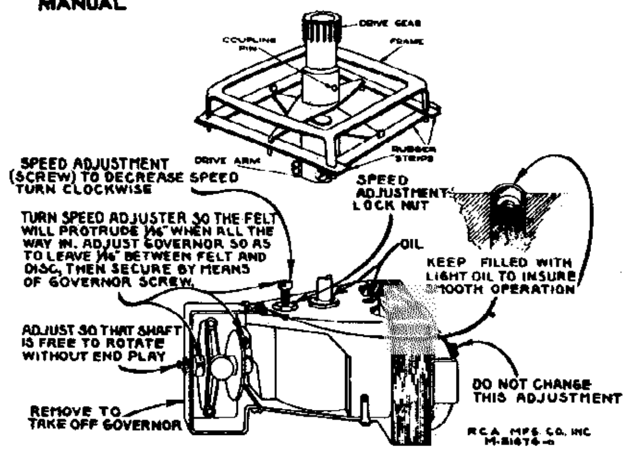


Top View of Automatic Record Changer

NOTE: Numbers refer to parts—letters refer to adjustments.

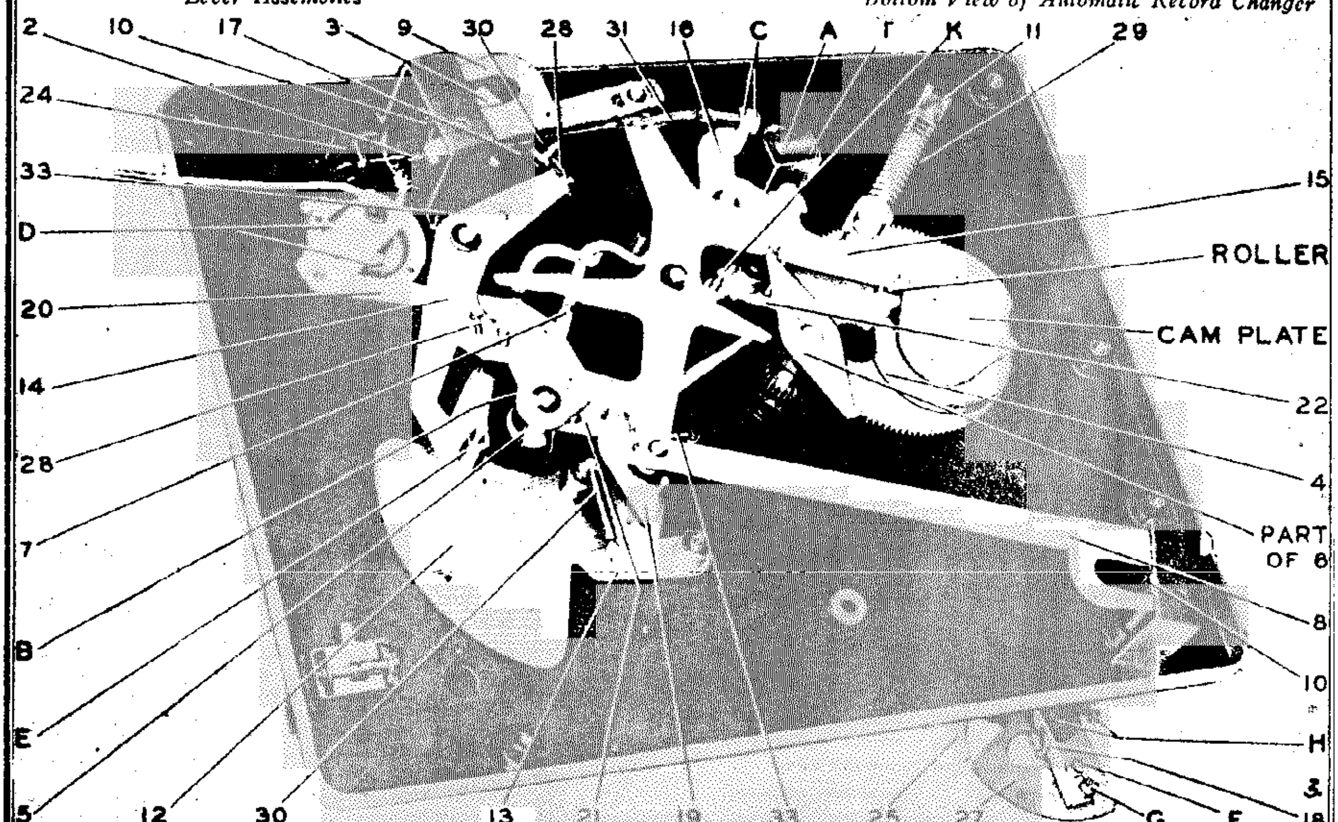


Details of Record Shelf Posts, and Locating Lever Assemblies



Motor Data and Coupling

Bottom View of Automatic Record Changer



MODEL 169-31 Automatic Record Changer
Details, Notes

ZENITH RADIO CORP.

Turntable Switch.—The toggle switch located just in front of the Index and Record Reject Lever controls the current to the turntable motor. To start the turntable, throw the switch to the "ON" position. To stop the turntable throw the switch to the "OFF" position.

Pickup and Top-Loading Needle Socket.—The pickup is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pickup arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pickup arm in the groove and the pickup over the needle gauge plate. The pickup must be in this position to change needles.

To insert a needle initially, loosen the needle screw on the front of the pickup, place needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw.

Needle Ejector.—The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pickup in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pickup as described above.

Record Holder Shelves.—To place a record on the turntable or to remove records, raise the record holder shelves, by lifting with the fingers under the shelf, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record holder post. You now have clear access to the turntable. Before loading the magazine for Automatic Operation swing the record holder shelves back into position.

Automatic Operation

1. See that pickup is over needle gauge plate with needle properly in place. If not, complete a "cycle" as explained in the first paragraph under "OPERATION."

2. With Index and Record Reject Lever at "MANUAL," place the first of the series of records on the turntable and the remainder of the series (up to seven 10-inch or six 12-inch records) on the record holder posts (as shown in Figure 1). The records should be arranged in the desired order with the desired selection face up and the last selection on top.

3. Set the Index and Record Reject Lever to the proper position. (See CONTROLS: — INDEX AND RECORD REJECT LEVER.)

4. Throw Turntable Switch to the left—"ON"—turntable should commence to revolve.

5. When turntable has attained speed, lift pickup and lower gently on to the record so that the needle point enters the outside groove.

6. Close the lid of the cabinet to eliminate mechanical reproduction of sound by the needle.

The whole series of records will now play without further attention, and the last record will repeat until the Turntable Switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped.. Then lift the pickup, swing the arm to the right beyond the edge of the record and lower it onto the pickup rest with pickup over needle gauge plate. The record player is then ready for reloading, or for manual operation.

Manual Operation

To play records manually:

1. Proceed as in step 1, under "AUTOMATIC OPERATION."

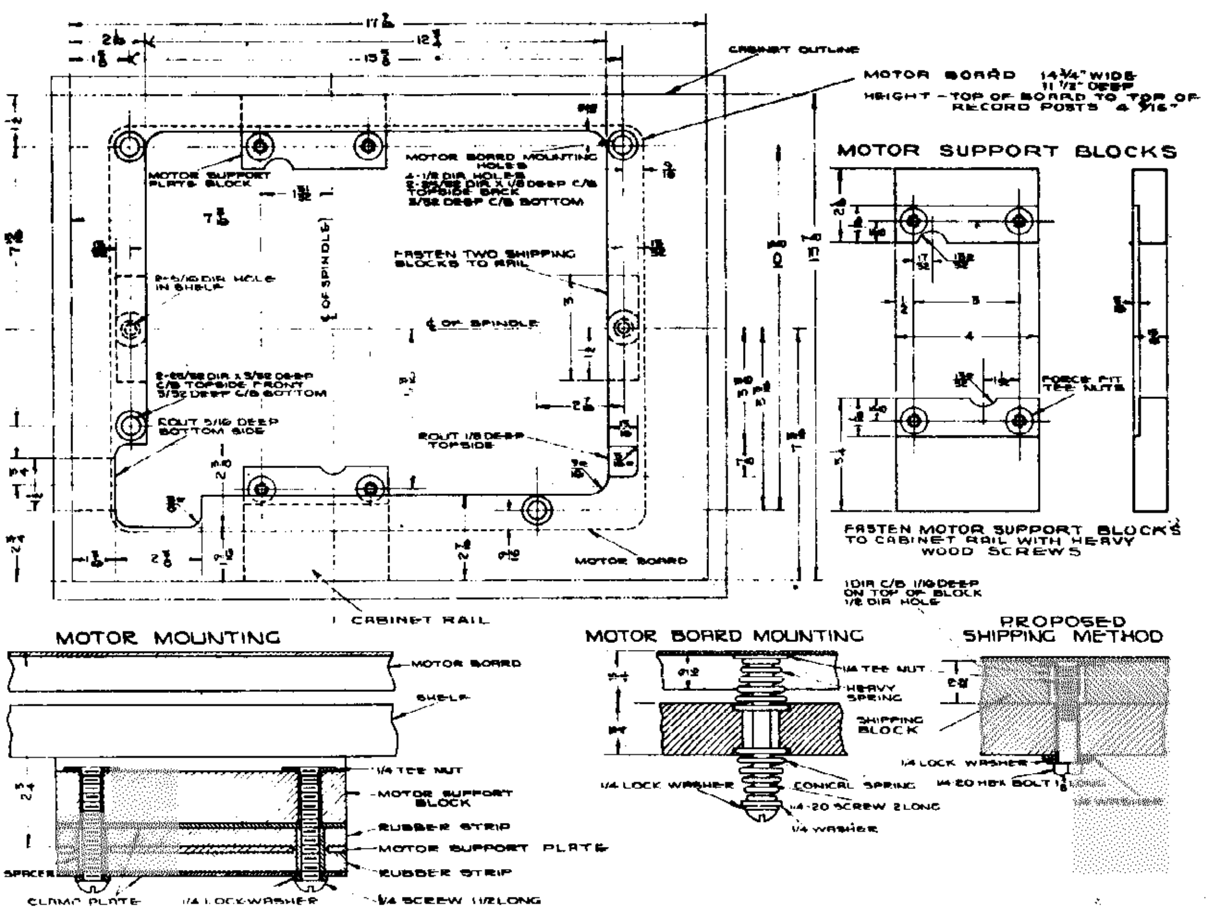
2. Place record on turntable with desired selection upwards.

3. Set Index and Record Reject Lever to "MANUAL" position.

4. Proceed as in steps 4, 5 and 6 under "AUTOMATIC OPERATION."

When you have finished playing, be sure that the turntable has stopped and the pickup is in the rest position over needle gauge plate. Never leave pickup with needle resting on a record or on the turntable.

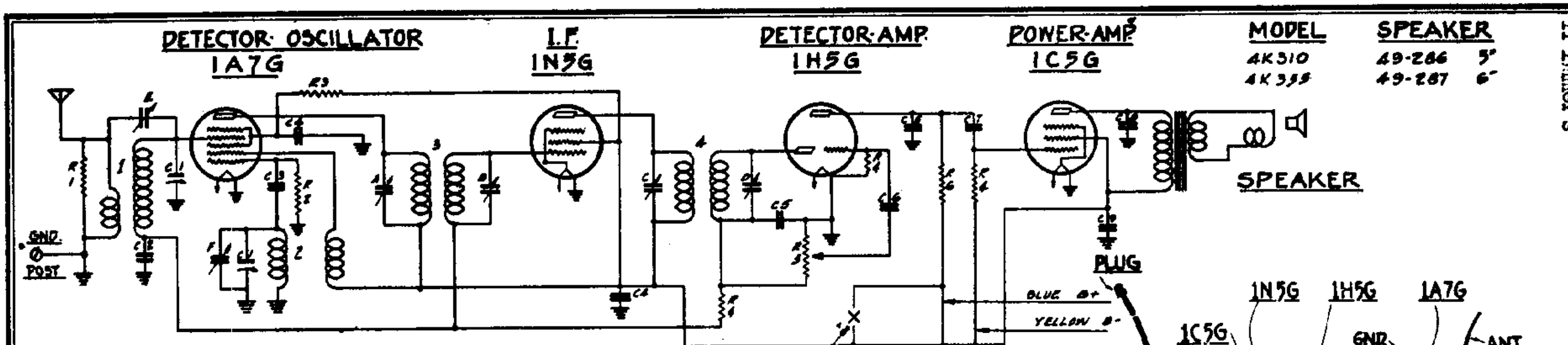
Good reproduction can only be obtained with the turntable revolving at 78 revolutions per minute. For speed check and regulation see INSTALLATION.



Schematic, Voltage
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

MODELS 4K310, 4K331
4K355, Chassis 5412

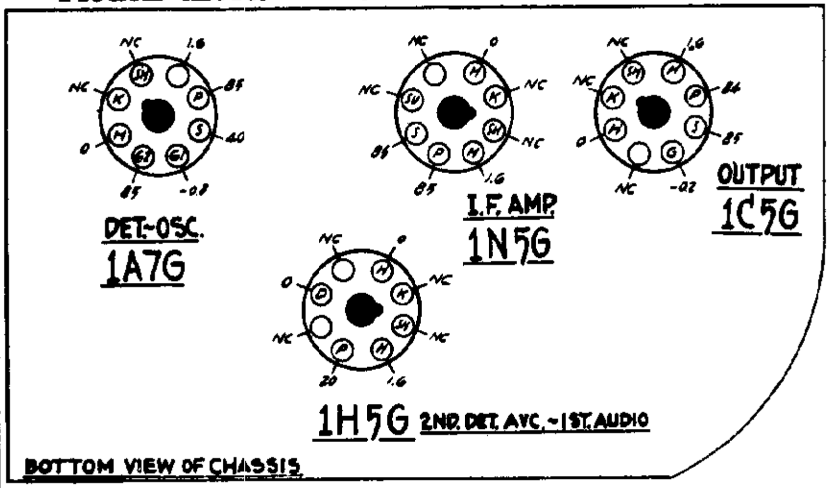


MODEL	SPEAKER	
4K310	49-286	5"
4K355	49-287	6"

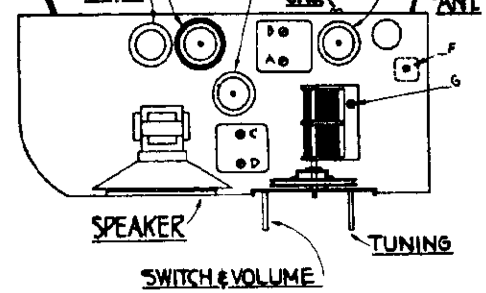
I. F. FREQUENCY 455 K.C.

4 TUBE BATTERY SUPERHETERODYNE

Models 4K310, 4K331, 4K355. Chassis No. 5412



FRONT OF CHASSIS



Location of tubes and trimmers

#123-181

LEGEND

NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
F — Filament

DWG NO.	PART NO.	DESCRIPTION
1	S-6704	ANTENNA COIL ASSEMBLY
2	S-6381	OSCILLATOR COIL ASSEMBLY
3	95-513	1ST. I.F. TRANSFORMER
4	95-520	2ND I.F. TRANSFORMER
5		SPEAKER TRANS. (ON SPEAKER)
A		1ST I.F. TRANS. PRIMARY
B		1ST. I.F. TRANS. SECONDARY
C		2ND. I.F. TRANS. PRIMARY
D		2ND. I.F. TRANS. SECONDARY
E	22-306	ANTENNA TRIMMER
F		BROADCAST OSC. (ON GANG)

DIAG. NO.	PART NO.	DESCRIPTION	
C-1	22-778	2 GANG VARIABLE	
C-2	22-250	.05 MFD.	200V
C-3	22-162	.00025 MFD	600V
C-4	22-212	.05 MFD	400V
C-5	22-162	.0001 MFD	600V
C-6	22-186	.01 MFD	200V
C-7	22-243	.01 MFD	400V
C-8	22-448	.006 MFD	600V
C-9	22-684	8 MFD DRY ELEC.	150
R-1	63-587	4700 OHM	1/2 W
R-2	63-656	100 M OHM	1/2 W
R-3	63-596	68 M OHM	1/2 W
R-4	63-640	2.2 MEGOHM	1/2 W
R-5	63-997	400 M OHM VOL. CONT. & SWITCH	
R-6	63-271	1 MEGOHM	1/2 W
R-7	63-236	1000 OHM	1/2 W

NOTE

All voltages measured from point indicated to chassis using a 1000 ohm per volt meter.

All voltages measured using Zenith No. Z28 battery pack.

Antenna disconnected — volume control at minimum and condenser plates in full mesh.

ALIGNMENT PROCEDURE

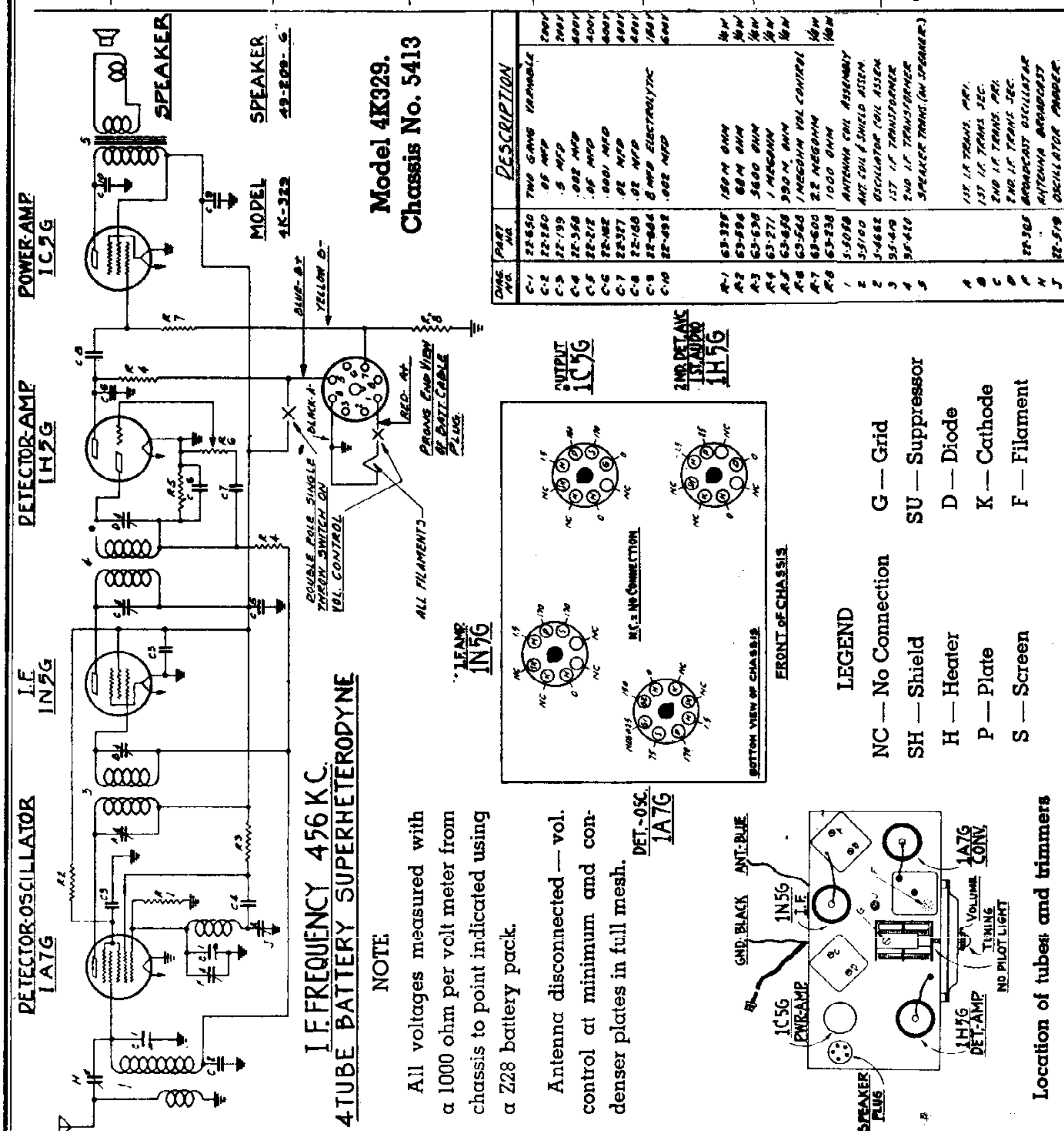
Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Aligment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.

MODEL 4K329, Chas. 5413
Schematic, Voltage
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

ALIGNMENT PROCEDURE

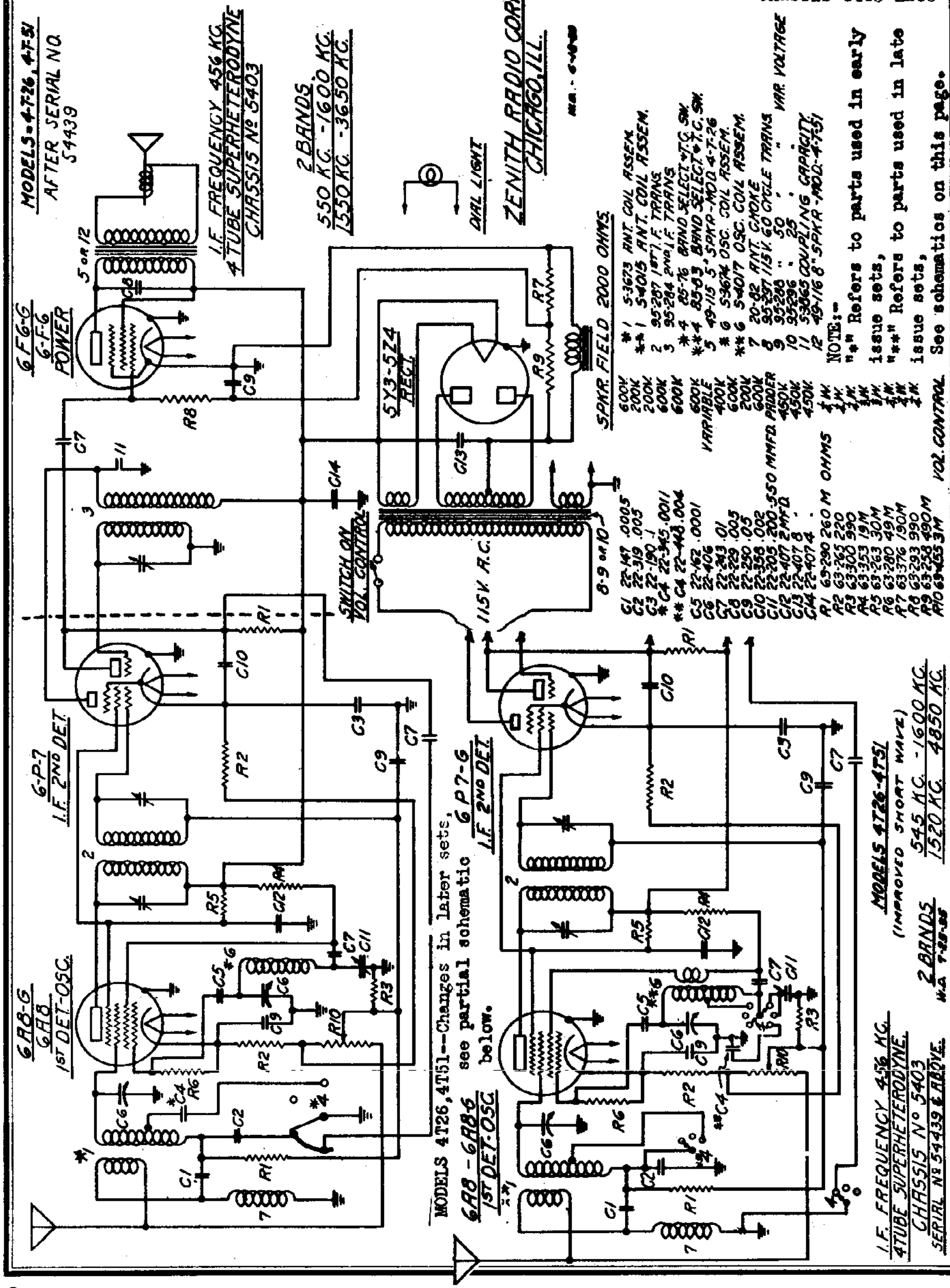
Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	½ Mfd.	456	Br'dc't	600	ABCD	I. F. Algm't.
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Algm't of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Rpt. 3 & 4



With Improved Short Wave
Schematics, Changes

ZENITH RADIO CORP.

MODELS 4T26, 4T51
Chassis 5403 Early
MODELS 4T26, 4T51
Chassis 5403 Late



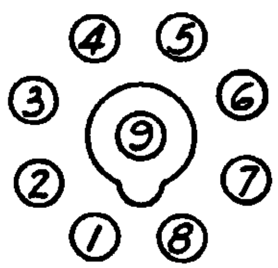
MODELS 4T26,4T51
Chassis 5403
Early,Late
Alignment,Voltage
Socket,Trimmers

ZENITH RADIO CORP.

Socket Voltages

TUBE	POSITION	1	2	3	4	5	6	7	8	9
6A8	1st Det. Osc.	0	6 AC	220	90	6	125	6 AC	14	0
6P7	I.F. 2nd Det.	0	6 AC	0	220	100	100	0	13	0
6F6	PWR	0	0	200	220	-1	-	6 AC	0	-
5Y3	Rect.	0	220	-	230 AC	-	230 AC	-	220	-

Line Voltage 110   Antenna and Ground Disconnected.

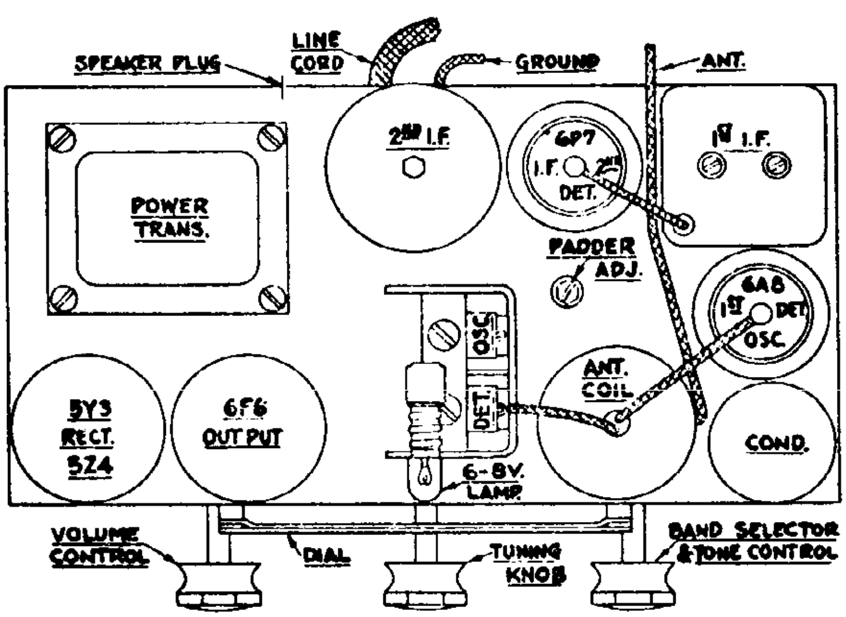


BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground, using a 1000 ohm per volt D.C. meter (unless marked otherwise.)

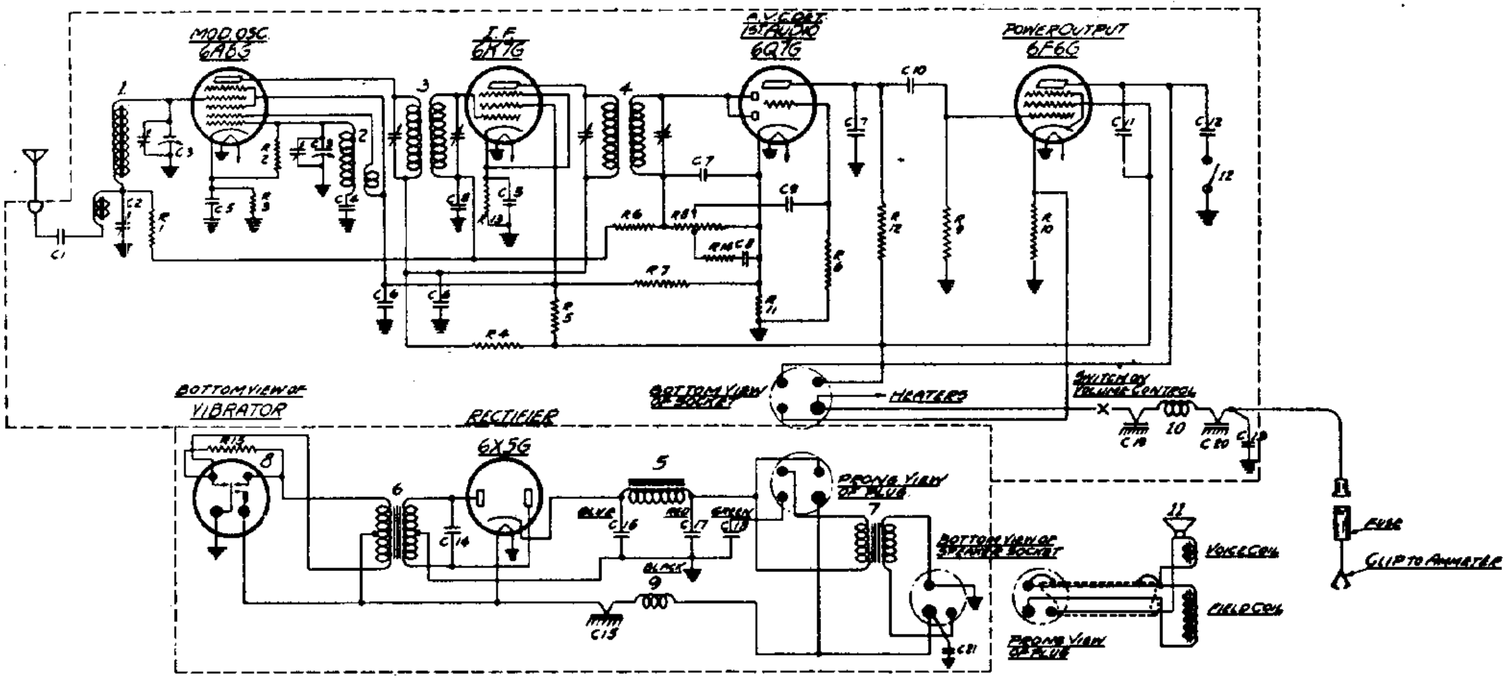
Alignment

(1) Balance I.F. transformer at 456 K.C.
(2) Place switch in left or broadcast position. Set dial pointer at 1500 K.C., and align trimmers on gang to resonance. Align broadcast padder at 540 K.C. slowly rocking pointer past 540 on dial to position giving strongest signal.
There are no adjustments for the short wave band.



ZENITH RADIO CORP.

MODEL 5M291, Chas. 5527
Schematic



DIAG. No.	PART No.	DESCRIPTION	
C 1	22-219	.03 MFD	200V
C 2	22-462	600 K.C. ANTENNA TRIMMER	
C 3	22-461	TWO GANG VARIABLE	
C 4	22-463	OSCILLATOR PADDER	
C 5	22-250	.05 MFD	200V
C 6	22-170	1 MFD	400V
C 7	22-182	.00025 MFD	600V
C 8	22-319	.005 MFD	200V
C 9	22-387	.02 MFD	200V
C 10	22-435	.02 MFD	600V
C 11	22-229	.005 MFD	600V
C 12	22-287	.03 MFD	600V
C 13	22-678	.25 MFD	200V
C 14	22-660	.006 MFD	1600V
C 15	22-654	5 MFD	125V
C 16	22-659	7 MFD DRY ELECTROLYTIC	400V
C 17		8 " "	350V
C 18		10 " "	25V
C 19	3-5737	400 MMFD LOW REACTOR	
C 20		400 " " "	
C 21	22-147	.0003 MFD	600V
R 1	63-717	220 M OHM	1/4W
R 2	63-715	100 M OHM	1/4W
R 3	63-768	560 OHM	1/4W
R 4	63-784	15000 OHM	1/4W
R 5	63-967	15 M OHM	2W
R 6	63-646	1 MEGOHM	1/4W
R 7	63-760	39 M OHM	1/4W
R 8	63-959	500 M OHM VOLUME CONTROL	
R 9	63-719	470 M OHM	1/4W
R 10	63-961	390 OHM	1W
R 11	63-759	680 OHM	1/4W

DIAG. No.	PART No.	DESCRIPTION	
R 12	63-775	270 M OHM	1/4W
R 13	63-750	820 OHM	1/4W
R 14	63-718	47 M OHM	1/4W
R 15	63-940	220 OHM	1/2W
1	20-179	ANTENNA COIL	
2	20-169	OSCILLATOR COIL	
3	95-906	1ST I.F. TRANS.	
4	95-905	2ND " "	
5	95-506	POWER CHOKE	
6	95-508	POWER TRANS	
7	95-507	AUDIO TRANS	
8	190-13	VIBRATOR	
9	20-178	HASH CHOKE COIL	
10	20-176	ANT NOISE CHOKE COIL	
11	49-232	8" DYNAMIC SPEAKER (1 & H 277 FIREWALL MOUNTING)	
12	85-134	TONE CONTROL SWITCH	

NOTE: 1400 K.C. ANT. TRIMMER ON C 2

I.F. FREQUENCY-455-K.C.

MODEL-5-M-291 CHASSIS-5527

ZENITH RADIO CORPORATION
CHICAGO, ILL.

MODEL 5M291,Chas.5527
Socket,Trimmers,Voltage
Alignment
MODEL 5M294,Chas.5530
Alignment,Tuner Data

ZENITH RADIO CORP.

MODELS 5X230,5X248
5X274,Chas.5523
Voltage

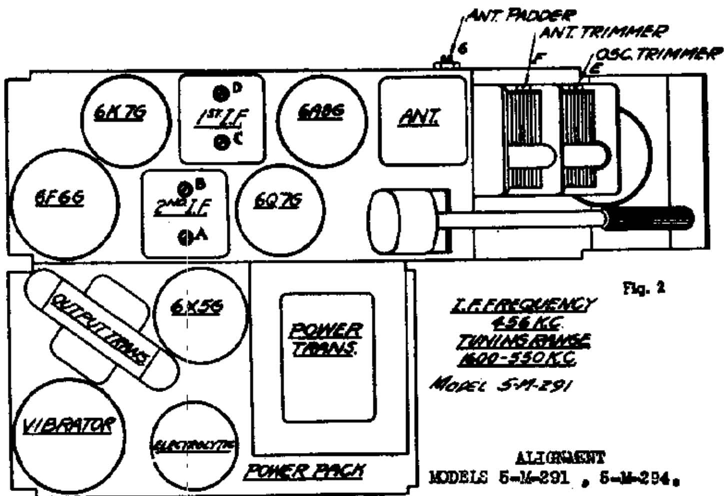
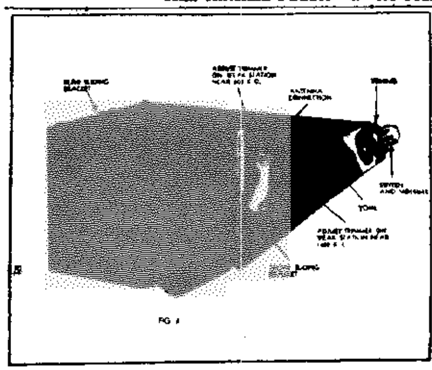


Fig. 2

ALIGNMENT
MODELS 5-M-291, 5-M-294.

Operation	Connect Test Oscillator To	Dummy Antenna	Set Test Osc. To	Manual or Automatic Position	Set Gang Cond.	Adjust Trimmers	Purpose
1	1st Det. Grid	½ Mfd.	456	Manual	Max. Cap.	A.B.C.D.	I. F. Alignment
2	Rec. Ant. Lead	50 Mmfd.	1530	Manual	Min. Cap.	E	Trim Oscillator
3	Rec. Ant. Lead	50 Mmfd.	1400	Manual	1400	F	Trim Ant. Stage
4	Rec. Ant. Lead	50 Mmfd.	600	Manual	600	G	Adjust Ant. Padder For Max. Output
5	Connect Car Antenna to Set — Tune to Weak Station Around 1400 K. C. — Trim Antenna Trimmer "F" for Maximum Peak Output.						
6	With Set Connected to Car Antenna—Tune To Weak Station Around 600 K. C. —Trim Antenna Padder "G" for Maximum Peak Output.						



ANTENNA ALIGNMENT
(Models 5-M-291 and 5-M-294)

There is such a great variation in the capacity of different antennas that it is impossible to meet every condition without some means of variable antenna alignment. To accomplish this, 2 screw adjustments are provided on the receiver case as shown in Figure 3. After the set has been completely installed, the proper method of antenna alignment is as follows: Tune in a weak signal at or near 1400 K.C., and carefully adjust the lower screw as indicated in Figure 3 to loudest signal strength. Turn the tuning dial to a station at or near 600 K.C., and carefully adjust the upper left screw, also shown in Figure 3. Do not use a loud local signal for either of the adjustments. The adjustments at both 600 and 1400 K.C. should be repeated not only as a recheck but for more perfect alignment.

IMPORTANT — ANTENNA ALIGNMENT
5-M-294 — CHASSIS 5530

Due to the large variation in electrical capacity of different automobile antennas it is necessary to adjust the receiver to the particular antenna used after installation has been made for maximum performance. Model 5-M-294 is equipped with two adjusting screws to accomplish this alignment. The green tag on the side of the receiver case shows the location of the two adjusting screws.

To align, first turn the receiver on with the center knob shown in Fig. 3. Press the tuning knob IN. This places the tuning mechanism in the **manual** operating position. Tune to a weak station near 1400 K.C. and adjust the trimmer directly below the antenna connector to maximum volume. Next tune the receiver to a weak station near 600 K.C. and adjust the trimmer nearest the power pack case for maximum volume. Repeat the adjustments for greatest accuracy.

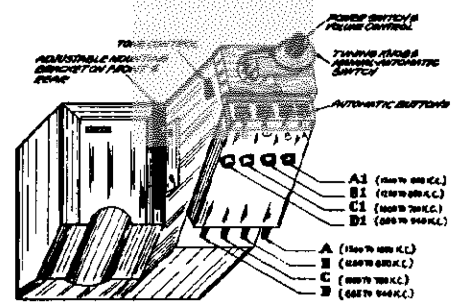


Fig. 5

AUTOMATIC

To set the automatic buttons, first pull the tuning knob OUT. This shifts the tuning mechanism to the **Automatic** position. **Press** Automatic button A and turn the volume up and with a small screw driver carefully adjust screw A at bottom of the Automatic unit shown in Fig. 3 to a local station between 1500 to 1050 K.C. Set to exact position of maximum volume and clearest tone. Next adjust trimmer A1 for maximum volume and clearest tone **on the same station.** It should be noted that there are two trimmer adjustments to each station button. To set the second button press B and tune trimmer B to a local station between 1250 to 850 K.C. Trim with adjustment B1 to best volume and tone on the same station. To set the third button press C and tune trimmer screw C to a station between 1000 to 700 K.C. and corresponding adjustment C1 again for maximum volume of the selected station. Follow the same procedure for the fourth button by pressing button D and using trimmers D and D1 on a local station between 885 to 540 K.C. After all four button have been set, cut the call letters of stations selected from the gummed call letter sheet supplied with the receiver. Remove the escutcheon over the automatic buttons by taking out the three screws which hold it in position. Remove the celluloid strip and paste the station call letters in their proper positions by wetting the back of the call letter sticker. The four outlines on the celluloid strip provide the exact points at which the gummed labels are placed. After the call letter stickers are attached replace the celluloid and the escutcheon plate.

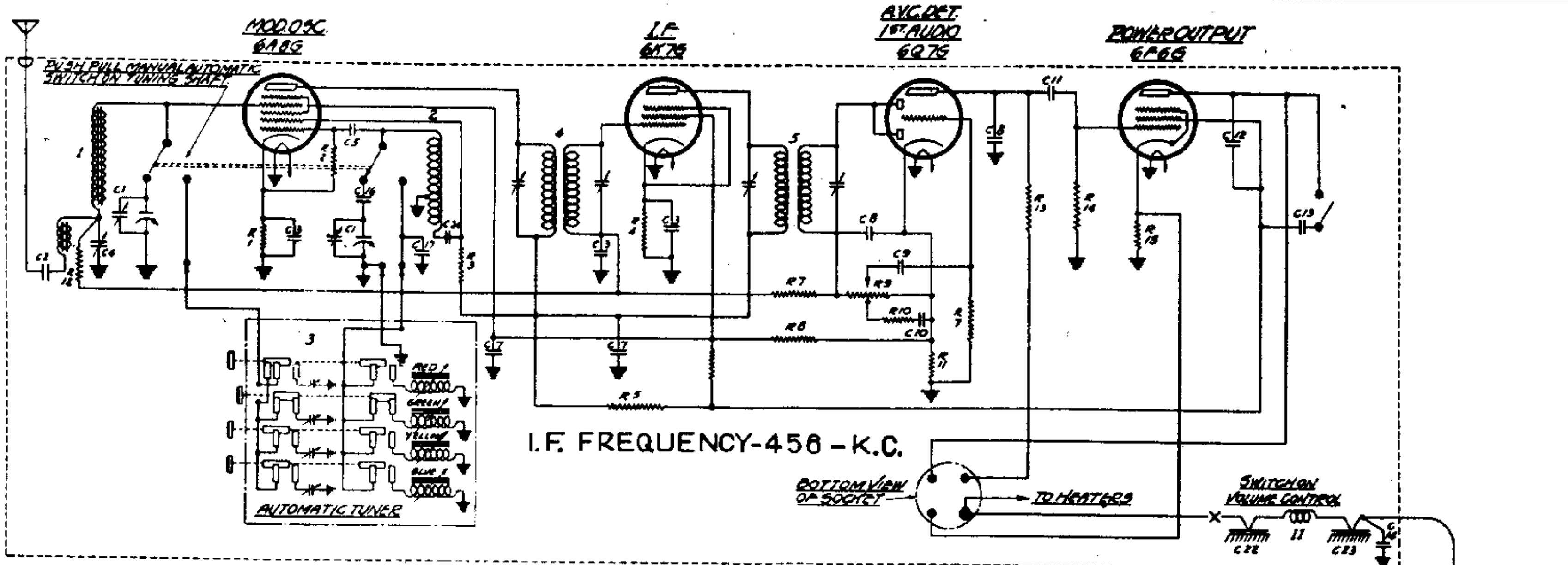
SOCKET VOLTAGES
5X-230, 5-X-248, 5X-274 — CHASSIS 5523

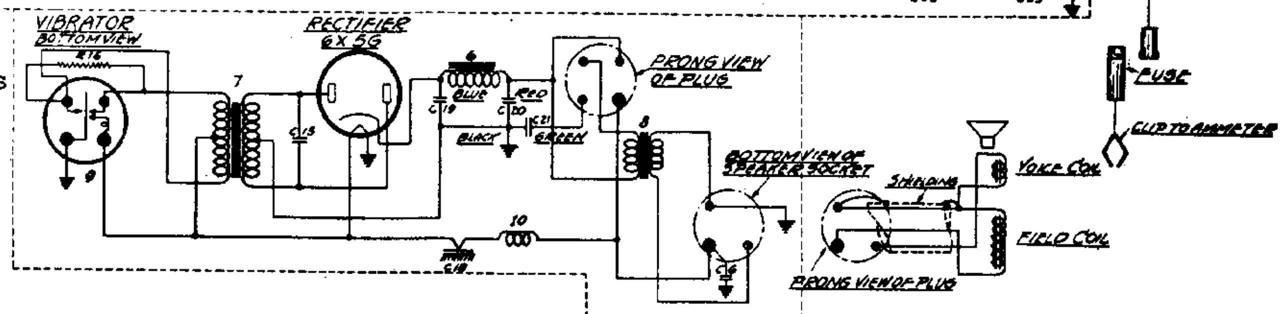
TUBE	POSITION	1	2	3	4	5	6	7	8	9
6A8	1st Det. Osc.	0	10	146	50	0	132	5.5	2.5	0
6K7	I.F.	0	16.5	154	50	2	-	10.5	2.	0
6Q7	2nd Det.A.V.C.	0	0	25	0	0	-	5.	1.	0
6V6	Power	0	22	134	154	0	-	16	6	-
6X5	Rect.	0	28	A.C.	-	AC	-	22	166	-

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected.
Line voltage 31.5 volts.
Consumption 3.9 amp.

ZENITH RADIO CORP.

MODEL 5M294, Chas. 5530
Schematic, Voltage





Total current consumption 7.1 amperes
Sensitivity at 1 watt out put 5-10M
Maximum power output 3.2 watts.

All voltages measured with 1000 ohms per volt D. C. meter

Tube	1	2	3	4	5	6	7	8	9
6A8G	0	0	240	93.0	*	147	6.0	**	—
6K7G	0	0	240	93.0	***	—	6.0	***	—
6Q7G	0	0	112	—	—	—	6.0	—	1.8
6F6G	0	0	235	250	—	—	6.0	—	16.0
6X5G	—	0	—	—	—	—	6.0	250	—

* { −5.8 manual, +4.2 automatic
** { +4.4 manual, +5.0 automatic
*** { +5.2 manual, +4.9 automatic

C 1	22-661	TWO GANG VARIABLE	
C 2	22-279	.03 MFD	200V
C 3	22-250	.05 MFD	200V
C 4	22-662	ANTENNA TRIMMER	
C 5	22-162	.0001 MFD	600V
C 6	22-147	.0003 MFD	600V
C 7	22-170	1 MFD	400V
C 8	22-182	.00025 MFD	600V
C 9	22-327	.02 MFD	200V
C 10	22-319	.005 MFD	200V
C 11	22-435	.02 MFD	600V
C 12	22-229	.005 MFD	600V
C 13	22-387	.03 MFD	600V
C 14	22-678	.25 MFD	200V
C 15	22-660	.006 MFD	1600V
C 16	22-663	OSCILLATOR PADDER	
C 17	22-667	COMPENSATING CONDENSER	
C 18	22-664	5 MFD	180V
C 19	22-650	7 MFD DRY ELECTROLYTIC	400V
C 20		8 MFD DRY ELECTROLYTIC	350V
C 21		10 MFD DRY ELECTROLYTIC	25V
C 22		400 MMFD LOW REACTOR	
C 23		400 MMFD LOW REACTOR	
C 24	22-716	.0006 MFD	600V

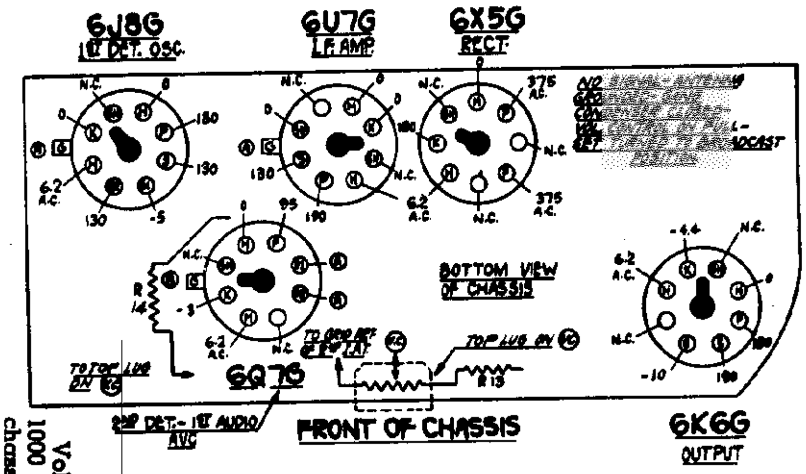
R 1	63-748	560 OHM	1/4 W
R 2	63-716	100 M OHM	1/4 W
R 3	63-946	33 M OHM	1 W
R 4	63-780	820 OHM	1/4 W
R 5	63-734	1500 OHM	1/4 W
R 6	63-967	27 M OHM	2 W
R 7	63-444	1 MEGOHM	1/4 W
R 8	63-744	39 M OHM	1/4 W
R 9	63-962	400 M OHM VOL. CONTROL	
R 10	63-713	47 M OHM	1/4 W
R 11	63-740	680 OHM	1/4 W
R 12	63-717	220 M OHM	1/4 W
R 13	63-775	270 M OHM	1/4 W
R 14	63-719	470 M OHM	1/4 W
R 15	63-961	390 M OHM	1 W
R 16	63-960	220 OHM	1/2 W
1	S-6028	ANTENNA COIL & SHIELD ASSEM	
2	20-185	OSCILLATOR COIL	
3	86-142	SELECTOR SWITCH ASSEM	
4	95-504	1ST I F TRANSFORMER	
5	95-505	2ND I F TRANSFORMER	
6	95-506	POWER CHOKE	
7	95-508	POWER TRANSFORMER	
8	95-507	AUDIO TRANSFORMER	
9	190-13	VIBRATOR	
10	20-175	HASH CHOKE COIL	
11	20-176	MOTOR NOISE CHOKE COIL	

MODELS 5A318, 5A325
Chassis 5532A
Voltage, Tuner Data
Socket

ZENITH RADIO CORP.

MODEL 5S313B
Chassis 5535BT
Socket, Voltage

CHASSIS 5535BT **SOCKET VOLTAGES**



(A) Bias for 6J8G—6U7G and diodes of 6Q7 measured across resistor R14.

(B) Bias for triode section of 6Q7G and 6K6G measured across R13 and R14.

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Line voltage 115 v.

LEGEND: N.C.—*No Connections;* S.H.—*Shield;* H.—*Heater;* P.—*Plate;* S.—*Screen;* S.U.—*Suppressor Grid;* G.—*Grid;* D.I. *Diode;* K.—*Cathode.*

CHASSIS 5532A

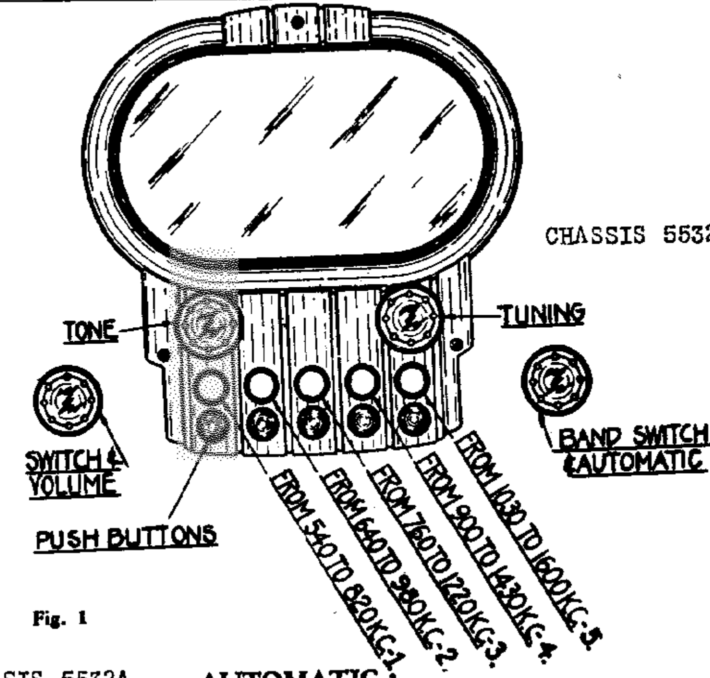


Fig. 1

CHASSIS 5532A **AUTOMATIC**

To set the buttons for automatic operation proceed as follows:

1. Select a station in the tuning range of the No. 1 button.
2. Place the band switch on BROADCAST and tune this station manually in the conventional manner.
3. Set the band switch to the AUTOMATIC position and press No. 1 button.
4. Remove the cap above the button by inserting a pin or your finger nail under the edge and pulling out.
5. Turn the exposed screw in either direction until the previously selected station is heard. (Recheck by switching back to BROADCAST.) Adjust the screw very carefully for best tone, greatest freedom from noise, and maximum volume.
6. Replace cap and cut the call letters of the station from the call sheet furnished with the receiver. Wet the rear surface of the tab, and place it in the space provided on the cap.
7. Follow the above operations in setting the remaining four buttons.
8. The call letter sheets should be preserved for use in the event it is desired to change any of the buttons to some other station.

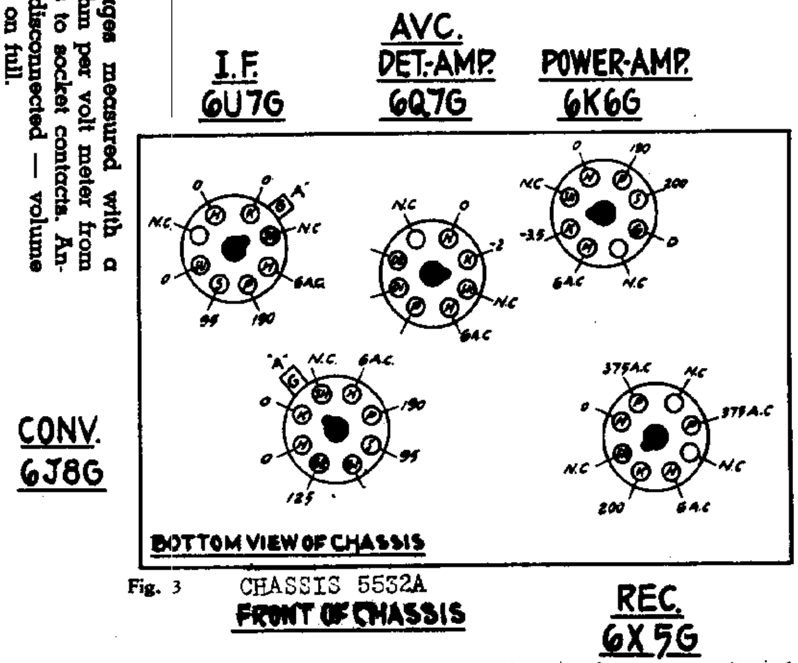


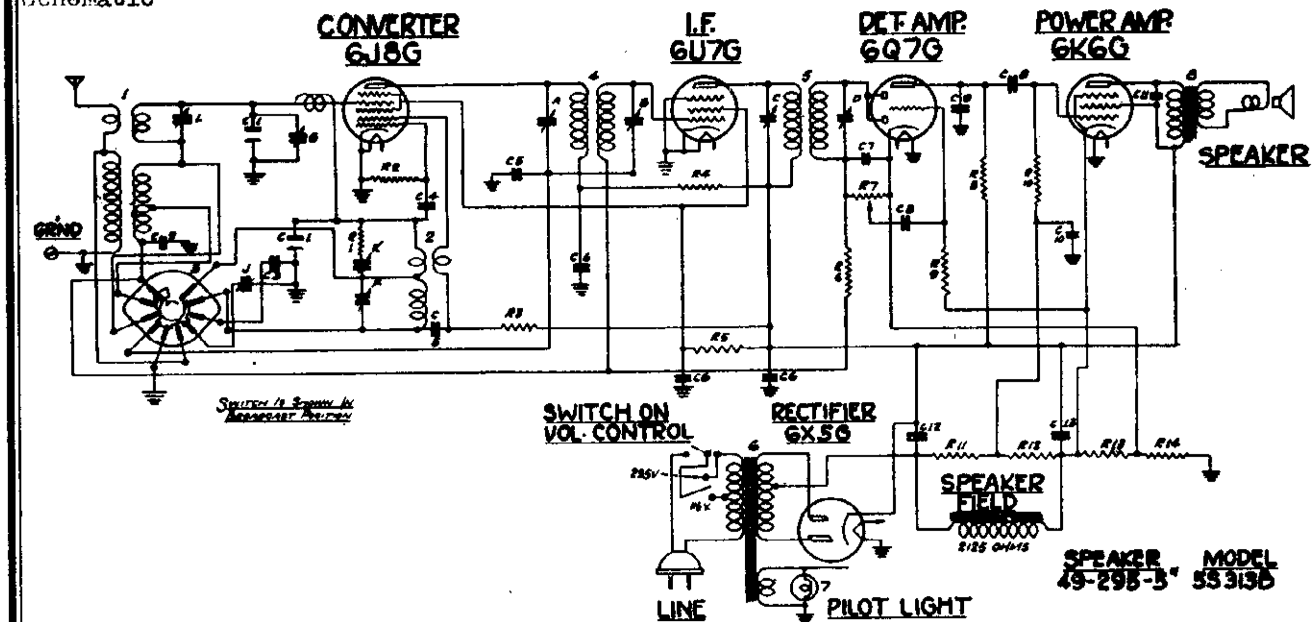
Fig. 3 CHASSIS 5532A
FRONT OF CHASSIS

All Voltage is taken with a 1000 ohm per volt meter from point indicated to ground. Line Volts 115 A.C. Vol. at minimum, no ant. Band sw on manual Broadcast position. NOTE "A" Grid Bias for 6U7G and 6V8G is—2 V. measured at "K" of 6Q7G.

MODEL 5S313B
Chassis 5535BT
Schematic

ZENITH RADIO CORP.

MODELS 5A318, 5A325
Chassis 5532A
Schematic

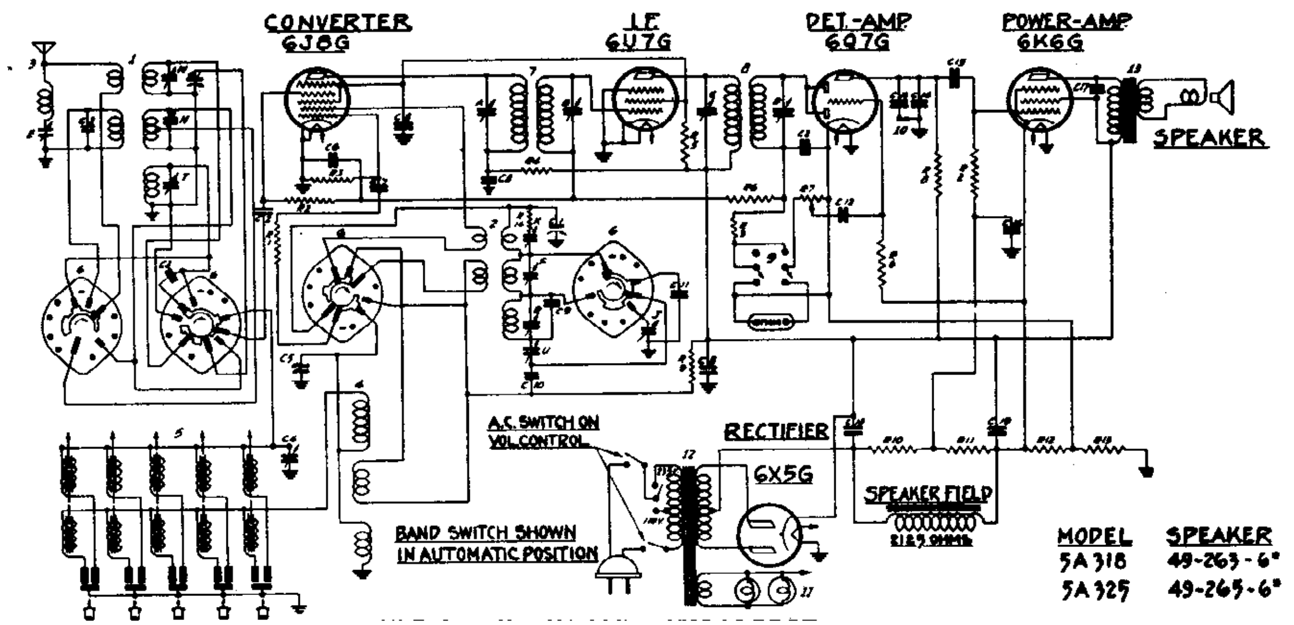


DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION
C-1	22-832	TWO GANG VAR		R-2	63-590	47M OHMS	1/4W	3	63-182	BAND SWITCH
C-2	22-818	.05 MFD	400V	R-3	63-1014	15M OHMS	2W	4	95-595	1ST I.F. TRANSFORMER
C-3	22-569	FIXED PADDER COND.		R-4	63-505	1000 OHMS	1/2W	5	95-596	2ND I.F. TRANSFORMER
C-4	22-239	50 MMFD	600V	R-5	63-208	12M OHMS	1W	6	95-570	POWER TRANSFOR. 60 CYC. [illegible] V
C-5	22-358	.002 MFD	600V	R-6	63-600	2.2 MEGOHMS	1/4W	7	100-36	PILOT LIGHT [illegible]-6.3V
C-6	22-819	.05 MFD	400V	R-7	63-1027	VOLUME CONTROL		8		SPEAKER TRANS
C-7	22-162	.0001 MFD	600V	R-8	63-296	220M OHMS	1/4W			
C-8	22-811	.01 MFD	600V	R-9	63-271	1 MEGOHM	1/4W	A		1ST I.F. TRANS PRI
C-9	22-147	.0005 MFD	600V	R-10	63-597	470M OHMS	1/4W	B		1ST I.F. TRANS SEC
C-10	22-824	.5 MFD	200V	R-11	63-658	390M OHMS	1/4W	C		2ND I.F. TRANS PRI
C-11	22-812	.01 MFD	400V	R-12	63-260	100M OHMS	1/4W	D		2ND I.F. TRANS SEC
C-12	22-775	8 MFD ELECTROLYTIC	450V	R-13	63-563	80 OHMS WIREWOUND	1/4W	E		BROADCAST OSC. (SEE NOTE)
C-13	22-776	8 MFD ELECTROLYTIC	350V	R-14	63-686	150 OHMS WIREWOUND	1/2W	G		ANTENNA BROAD. (ON GANG)
								J	22-465	BROADCAST PADDER
				1	S-6874	ANTENNA COIL ASSM.		K		SHORT WAVE OSC. (SEE NOTE)
R-1	63-626	82 OHMS	1/4W	2	S-6875	OSCILLATOR COIL ASSM.		L	22-786	SHORT WAVE DETECTOR

NOTE: TRIMMERS E & K MOUNTED ON BAKELITE STRIP #22-754

I.F. FREQUENCY 455 KC.
5 TUBE SUPERHETERODYNE
CHASSIS No. 5535 BT
ZENITH RADIO CORPORATION
CHICAGO, ILL.

Total power consumption 45 watts.
Power output 3.5 watts.



DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	DESCRIPTION
C-1	22-789	TWO GANG ADJUSTABLE						4	30-194	COMPENSATING COIL	R	SHORT WAVE OSC. - SEE NOTE
C-2	22-162	.0001 MFD	600V					5	J-6176	AUTOMATIC TUNING ANT. ASSEM.	N	SHORT WAVE ANT. - SEE NOTE
C-3	22-289	50 MMFD	600V	R-1	63-625	82 OHM	1/4W	6	89-172	BAND SELECTOR SWITCH	P	LONG WAVE OSC. - SEE NOTE
C-4	22-519	TRIMMER CONDENSER		R-2	63-597	470 M OHM	1/4W	7	95-573	1ST I.F. TRANS.	T	LONG WAVE ANT. - SEE NOTE
C-5	22-761	COMPENSATING COND.		R-3	63-593	47 M OHM	1/4W	8	95-574	[illegible]	U	LONG WAVE PADDER - SEE NOTE
C-6	22-212	.05 MFD	400V	R-4	63-583	1000 OHM	1/4W	9	89-171	[illegible]		
C-7	22-127	25 MMFD	600V	R-5	63-998	22 M OHM	1W	10	89-149	[illegible]		
C-8	22-171	.05 MFD	600V	R-6	63-271	1 MEGOHM	1/4W	11	100-36	[illegible]		
C-9	22-792	60 MMFD CERAMIC		R-7	63-998	220 M OHM VOL. CONTROL		12	95-523	[illegible]		
C-10	22-354	.002 MFD	600V	R-8	63-296	220 M OHM	1/2W	13		[illegible]		
C-11	22-563	FIXED PADDER COND.		R-9	63-151	15 M OHM	1W					
C-12	22-190	.01 MFD	600V	R-10	63-658	390 M OHM	1/4W					
C-13	22-448	.004 MFD	600V	R-11	63-260	100 M OHM	1/4W	A		1ST I.F. TRANS. PRI.		
C-14	22-167	.0005 MFD	600V	R-12	63-563	80 OHM WIREWOUND	1/4W	B		1ST SEC.		
C-15	22-435	.02 MFD	600V	R-13	63-686	150 OHM WIREWOUND	1/2W	C		2ND PRI.		
C-16	22-188	.1 MFD	200V	R-14	63-821	39 OHM	1/4W	D		2ND SEC.		
C-17	22-790	.006 MFD	1000V	1	S-6711	ANT. COIL ASSEMBLY		E		WAVE TRAP SEE NOTE		
C-18	22-775	8 MFD ELECTROLYTIC	450V		S-6770	ANT. COIL & FIELD ASSEM.		F		BROADCAST OSC. - SEE NOTE		
C-19	22-776	8 MFD "	350V	2	S-6657	OSC. COIL ASSEMBLY		H		ANT. BROADCAST - SEE NOTE		
				3	20-193	WAVE TRAP COIL		J	22-519	BROADCAST PADDER - SEE NOTE		

NOTE - TRIMMERS "R-N-T & U" ARE MOUNTED ON BAKELITE STRIP #22-785.
TRIMMERS "E-H-F & P" ARE MOUNTED ON BAKELITE STRIP #22-784.

Total power consumption 45 watts.

Power output 3.0 watts.

I.F. FREQUENCY 455 K.C.
5 TUBE SUPERHETERODYNE
CHASSIS No. 5532-A-
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

MODELS 5A318, 5A325
Chassis 5532A
MODEL 5S313B
Chassis 5535BT
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

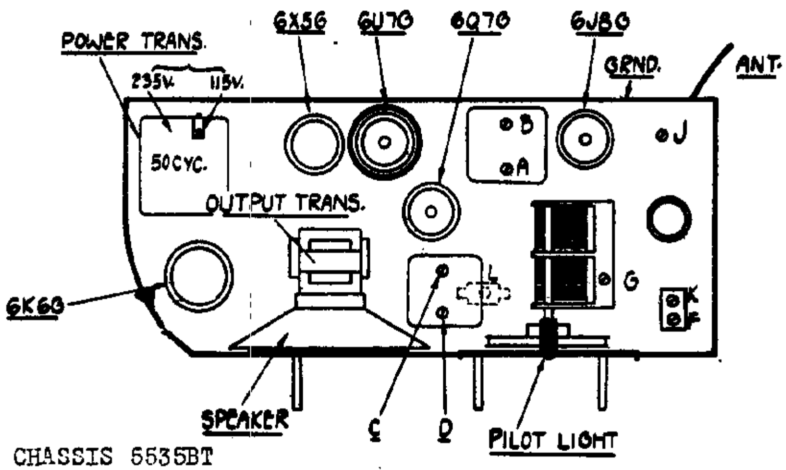
5 Tube A.C. receiver—Chassis No. 5535BT

GENERAL

This receiver is a modern five tube superheterodyne with a dual tuning range covering frequencies between 18.2 to 5.4 megacycles and 540 to 1750 kilocycles. The tuning is explained under "Operation.".

UNDER NO CIRCUMSTANCES SHOULD THIS RECEIVER BE CONNECTED TO DIRECT CURRENT (D. C.).

This receiver is designed to operate on 50 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 110 or 235 Volt power lines by means of the switch on top of the power transformer. The proper position of the switch for either voltage is marked on the transformer case.



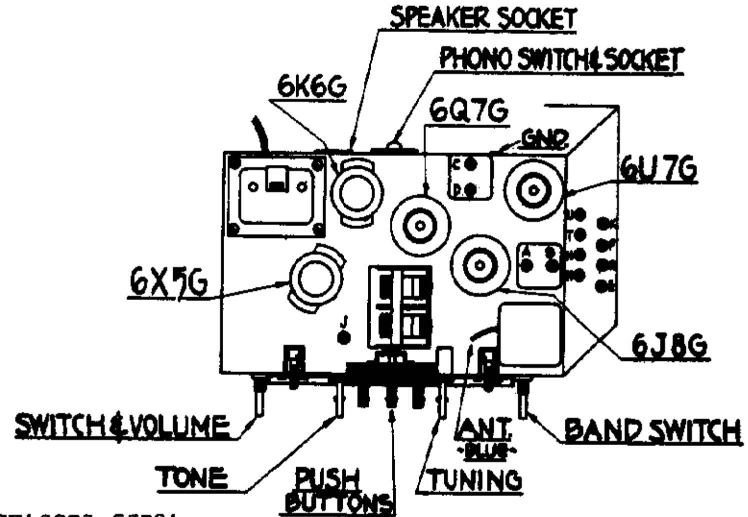
CHASSIS 5535BT

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	½ Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	Br'dc't	1500	F	Set Osc. to Scale
3	Rec. Ant. Lead	200 Mmfd.	1500	Br'dc't	1500	G	Al'gment of Ant.
4	Rec. Ant. Lead	200 Mmfd.	600	Br'dc't	600	J	Rock gang & adj. for max. output
5	Rec. Ant. Lead	200 Mmfd.	1500	Br'dc't	1500	F • G	Repeat 2 & 3
6	Rec. Ant. Lead	400 ohms	18000	S. W.	18000	K	Set Osc. to Scale
7	Rec. Ant. Lead	400 ohms	18000	S. W.	18000	L	Rock gang & adj. for max. output

UNDER NO CIRCUMSTANCES SHOULD THIS RECEIVER BE CONNECTED TO DIRECT CURRENT (D.C.).

Chassis 5532A only is designed to operate on 25 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 110 or 235 Volt power lines by means of the switch on top of the power transformer. The proper position of the switch for either voltage is marked on the transformer case.



CHASSIS 5532A

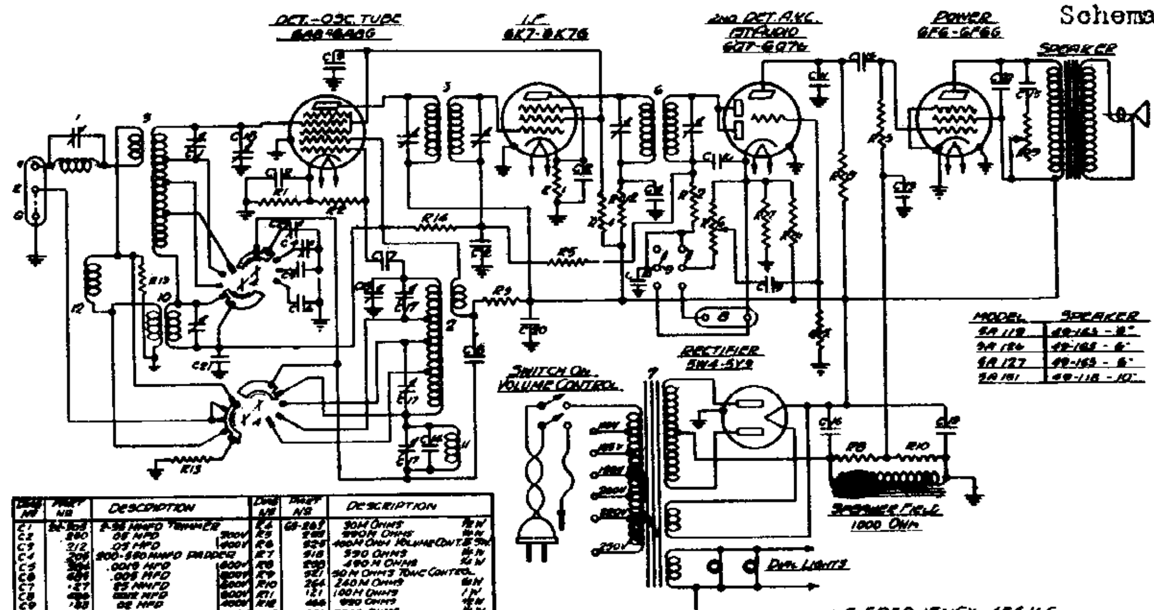
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to— (Meters)	Wave Band	Set Dial to— (Meters)	Adjust Trimmers	Purpose
1	1st Det. Grid	½ Mfd.	660	Med.	500	ABCD	I.F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	660	Med.	500	E	See Note
3	Rec. Ant. Lead	200 Mmfd.	200	Med.	200	F	Set Osc. to Scale
4	Rec. Ant. Lead	200 Mmfd.	200	Med.	200	H	Algmt. of Antenna
5	Rec. Ant. Lead	200 Mmfd.	500	Med.	500	J	Rock gang & adj. for max. output
6	Rec. Ant. Lead	200 Mmfd.		Med.		FH	Repeat 3 & 4
7	Rec. Ant. Lead	200 Mmfd.	800	Long	800	R	Set Osc. to Scale
8	Rec. Ant. Lead	200 Mmfd.	800	Long	800	T	Algmt. of Antenna
9	Rec. Ant. Lead	200 Mmfd.	1900	Long	1900	U	Rock gang & adj. for max. output
10	Rec. Ant. Lead	200 Mmfd.		Long		RT	Repeat 7 & 8
11	Rec. Ant. Lead	400 Ohms	17	Short	17	K	Set Osc. to Scale
12	Rec. Ant. Lead	400 Ohms	17	Short	17	M	Algmt. of Antenna

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna, connected and receiver operating in Medium Wave position.

ZENITH RADIO CORP.

MODELS 5A119, 5A126
5A127, 5A151, Ch. 5517A
MODELS 5L228, 5L237
Chassis 5525A
Schematics



MODEL	SPEAKER
5A 119	49-165 - 8"
5A 126	49-165 - 6"
5A 127	49-165 - 6"
5A 151	49-118 - 10"

DWG NO	PART NO	DESCRIPTION	
C1	22-[illegible]	2-35 MMFD TRIMMER	
C2	260	.05 MFD	300V
C3	212	.05 MFD	400V
C4	205	900-990 MMFD PADDER	
C5	[illegible]	.0015 MFD	600V
C6	[illegible]	.005 MFD	600V
C7	127	85 MMFD	600V
C8	[illegible]	[illegible] MFD	600V
C9	183	.02 MFD	400V
C10	182	.0001 MFD	600V
C11	147	.0005 MFD	600V
C12	435	.02 MFD	600V
C13	186	.5 MFD	400V
C14	[illegible]	60 MMFD	600V
C15	229	.05 MFD	600V
C16	236	16 MFD WET ELECT.	450V
C17	984	2-35 MMFD TRIMMER	
C18	682	2-GANG VARIABLE COND.	
C19	305	12 MFD WET ELEC. COND.	325V
C20	170	.1 MFD	400V
C21	487	.05 MFD	600V
C22	628	.005 MFD	600V
C23	918	160-350 MMFD PADDER	
R1	63-366	400 OHMS	½ W
R2	280	49 M OHMS	½ W
R3	974	11 M OHMS	½ W

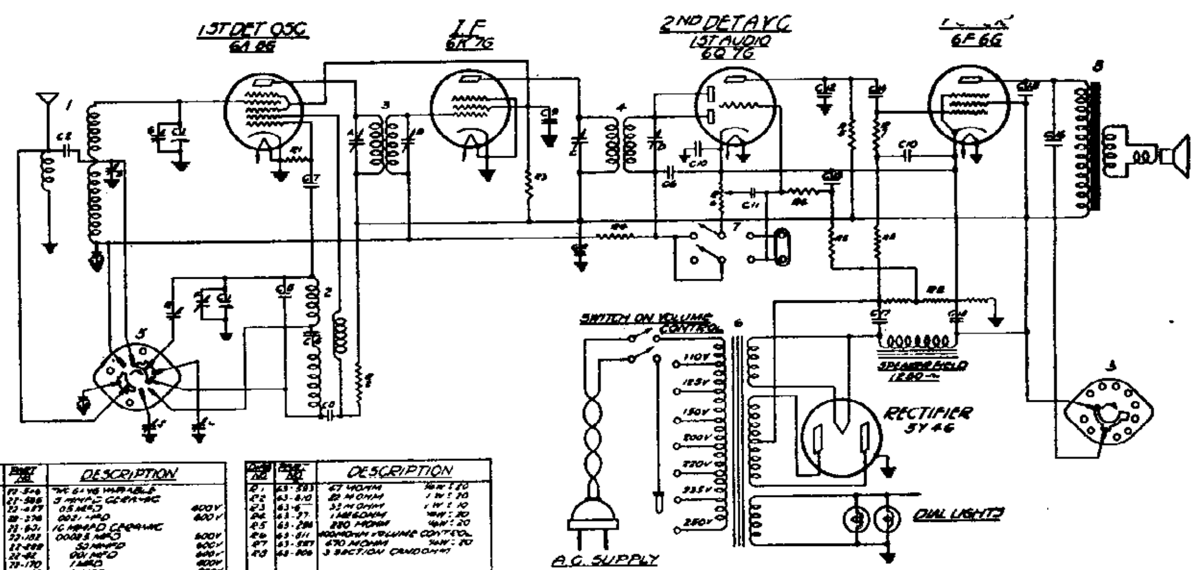
DWG NO	PART NO	DESCRIPTION	
R4	63-263	30 M OHMS	½ W
R5	265	990 M OHMS	½ W
R6	925	400 M OHM VOLUME CONT. & SW.	
R7	916	330 OHMS	½ W
R8	290	490 M OHMS	¼ W
R9	921	50 M OHMS TONE CONTROL	
R10	264	240 M OHMS	½ W
R11	121	100 M OHMS	1 W
R12	466	[illegible] OHMS	½ W
R13	261	9900 OHMS	½ W
R14	278	99 M OHMS	¼ W
1	20-183	WAVE TRAP ASSEMBLY	
2	S-4618	OSCILLATOR COIL ASSEMBLY	
3	S-4615	ANTENNA COIL ASSEMBLY	
4	85-110	BAND SELECTOR SWITCH	
5	95-349	1ST I.F. TRANSFORMER	
6	95-350	2ND I.F. TRANSFORMER	
7	95-386	POWER TRANSFORMER 25 CYCLE ALL VOLT	
8	447	PHONOGRAPH JACK	
9	85-98	PHONOGRAPH SWITCH	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible] COIL	

I.F. FREQUENCY 456 K.C.
5 TUBE SUPERHETERODYNE - 4 BANDS
CHASSIS NO 5517A

BAND	COLOR	KILOCYCLES
A	Green	492-1640
B	Yellow	1750-6040
C	Red	5520-19000
D	Blue	148-400

The total consumption is 55 watts. Power output 3 watts.

FOR OTHER DATA, SEE INDEX



DWG NO	PART NO	DESCRIPTION	
C1	22-546	TWO GANG VARIABLE	
C2	21-586	3 MMFD CERAMIC	
C3	22-437	.05 MFD	400V
C4	22-376	.002 MFD	400V
C5	22-631	10 MMFD CERAMIC	
C6	22-182	.00025 MFD	600V
C7	22-288	50 MMFD	600V
C8	22-[illegible]	.001 MFD	600V
C9	22-170	.1 MFD	400V
C10	22-186	.5 MFD	200V
C11	22-327	.02 MFD	200V
C12	22-[illegible]	.0003 MFD	800V
C13	22-180	.1 MFD	200V
C14	22-[illegible]	.02 MFD	600V
C15	22-220	.002 MFD	600V
C16	22-171	.05 MFD	600V
C17	22-[illegible]	8 MFD DRY ELECTROLYTIC	450V
C18		[illegible] MFD DRY ELECTROLYTIC	450V

VARIABLE TRIMMERS

A	1ST I.F. TRANS PRIMARY
B	1ST I.F. TRANS SECONDARY
C	2ND I.F. TRANS PRIMARY
D	2ND I.F. TRANS SECONDARY
F	BROADCAST OSCILLATOR # 22-305
G	DETECTOR BROADCAST (ON GANG)
J	BROADCAST PADDER # 22-518
R	LONG WAVE OSC. (SEE NOTE)
S	LONG WAVE DETECTOR (SEE NOTE)
U	LONG WAVE PADDER # 22-[illegible]

DWG NO	PART NO	DESCRIPTION	
R1	63-583	47 M OHM	⅓ W ± 20
R2	63-610	22 M OHM	1 W ± 20
R3	63-6	33 M OHM	1 W ± 10
R4	63-77	1 MEGOHM	⅓ W ± 20
R5	63-286	220 M OHM	⅓ W ± 20
R6	63-611	400 M OHM VOLUME CONTROL	
R7	63-587	470 M OHM	⅓ W ± 20
R8	63-906	3 SECTION CANDOHM	
1	S 5306	ANT COIL ASSEMBLY	
1	S 5425	ANT COIL & SHIELD ASSEMBLY	
2	S 5358	OSC COIL ASSEMBLY	
3	95-457	1ST I.F. TRANSFORMER	
4	95-408	2ND I.F. TRANSFORMER	
5	85-121	BAND SWITCH	
6	95-465	POWER TRANSFORMER 25 CYCLE ALL VOLTAGE	
7	85-39	PHONO SWITCH	
8		SPEAKER TRANSFORMER	

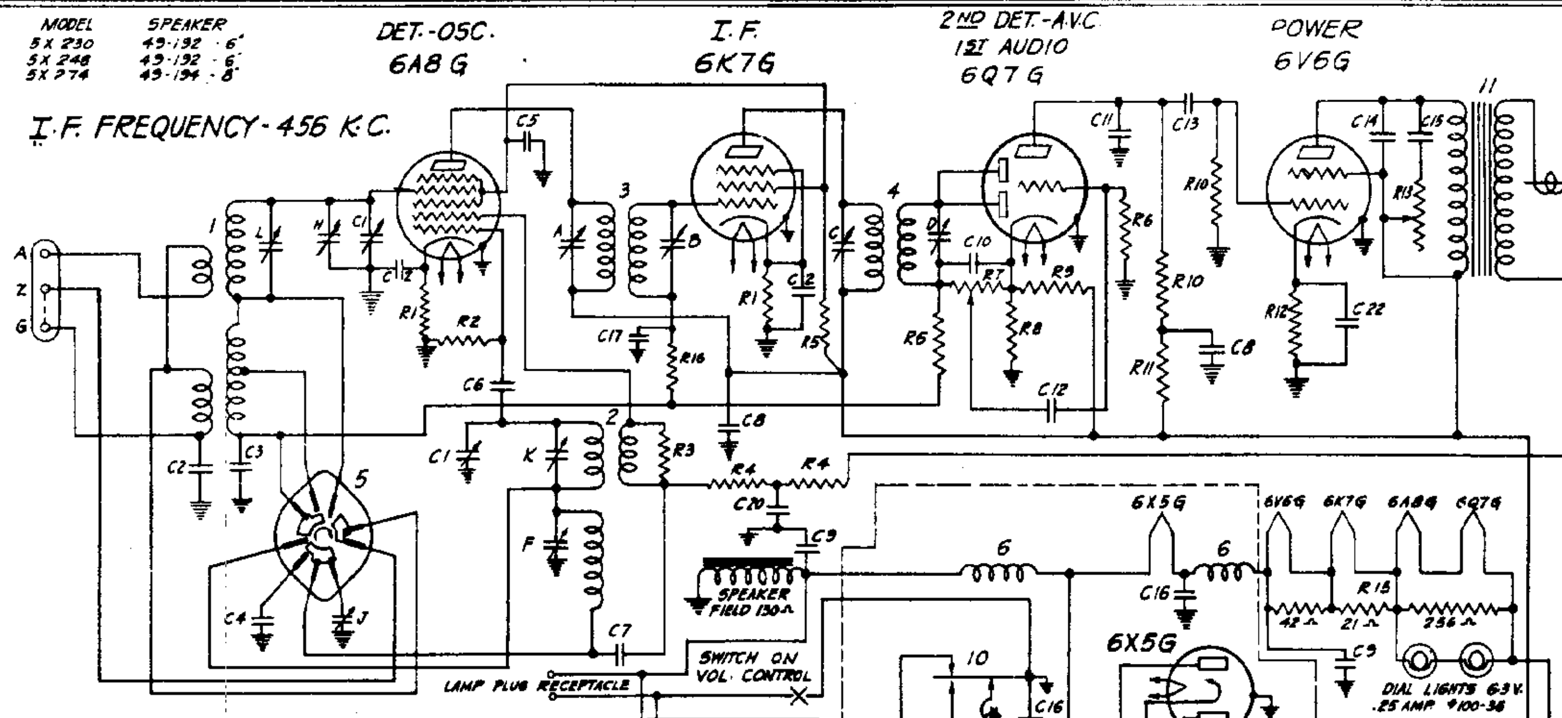
MODEL	SPEAKER
5L 228	49-180 6"
5L 237	49-180 6"

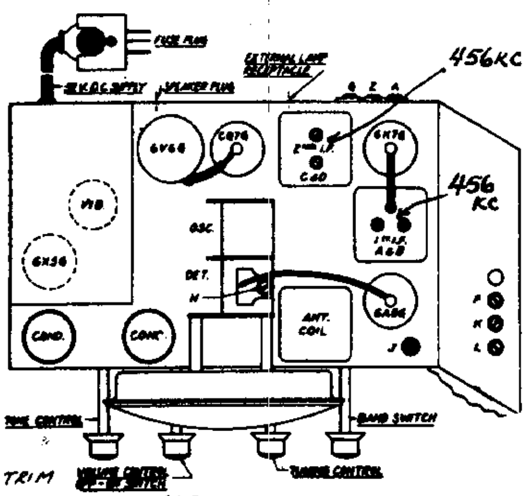
I. FREQUENCY 456 KC
5 TUBE SUPERHETERODYNE
2-BAND LONG WAVE
CHASSIS NO-5525A
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

The total consumption is 65 watts.
Power output 4.5 watts.

MODELS 5X230, 5X248
5X274, Chas. 5523
Schematic, Alignment
Socket, Trimmers

ZENITH RADIO CORP.





TRIM
A,B,C,D AT 456KC   K AT 18000KC.
F, G " 1500KC   L " 16500KC.
J " 600KC

LOCATION OF TRIMMERS

R1	63-632	560 OHM	1/4 W. ± 10%
R2	63-593	47 M OHM	1/4 W. ± 20%
R3	63-589	10 M OHM	1/4 W. ± 20%
R4	63-675	5600 OHM	1/2 W. ± 10%
R5	63-678	47 M OHM	1/2 W. ± 10%
R6	63-271	1 MEGOHM	1/4 W. ± 20%
R7	63-520	400 M OHM VOLUME CONTROL	
R8	63-633	680 OHM	1/4 W ± 10%
R9	63-160	100 M OHM	1/2 W. ± 10%
R10	63-597	470 M OHM	1/4 W. ± 20%
R11	63-296	220 M OHM	1/4 W. ± 20%
R12	63-805	300 OHM WIREWOUND	1/2 W. ± 10%
R13	63-521	50 M OHM TONE CONTROL	
R14	63-804	2 SECTION CANDOHM	
R15	63-528	3 SECTION CANDOHM	
R16	63-595	100 M OHM	1/4 W. ± 20%
C1	22-632	TWO GANG VARIABLE	
C2	22-250	.05 MFD.	200 V.
C3	22-487	.05 MFD.	400 V.
C4	22-565	FIXED PADDER	
C5	22-212	.05 MFD.	400 V.
C6	22-127	25 MMFD.	600 V.
C7	22-358	.002 MFD.	600 V.
C8	22-170	.1 MFD.	400 V.
C9	22-350	.25 MFD.	200 V.
C10	22-162	.0001 MFD.	600 V.
C11	22-147	.0005 MFD.	600 V.
C12	22-327	.02 MFD.	200 V.
C13	22-435	.02 MFD.	600 V.
C14	22-229	.005 MFD.	800 V.
C15	22-171	.05 MFD.	600 V.
C16	22-199	.5 MFD.	200 V.
C17	22-185	.01 MFD.	200 V.
C18	22-646	.1 MFD.	1000 V.
C19	22-647	8 MFD. DRY ELECT.	450 V.
C20	22-647	8 MFD. DRY ELECT.	450 V.
C21	22-648	16 MFD. DRY ELECT.	450 V.
C22	22-648	10 MFD. DRY ELECT.	25 V.
C23	22-243	.01 MFD.	400 V.
1	S-5045	ANTENNA COIL ASSEMBLY	
	S-5478	ANTENNA COIL & SHIELD ASSEMBLY	
2	S-4909	OSCILLATOR COIL ASSEMBLY	
3	95-508	1ST I.F. TRANSFORMER	
4	95-414	2ND I.F. TRANSFORMER	
5	85-112	BAND SELECTOR SWITCH	
6	S-5043	R.F. CHOKE ASSEMBLY	
7	95-467	POWER CHOKE	
8	20-82	R.F. CHOKE	
9	95-449	POWER TRANSFORMER	
10	190-10	VIBRATOR	
11		SPEAKER TRANSFORMER	

VARIABLE TRIMMERS

A	1ST I.F. TRANSFORMER PRIMARY
B	1ST I.F. " SECONDARY
C	2ND I.F. " PRIMARY
D	2ND I.F. TRANSFORMER SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR (SEE NOTE)

NOTE:-
TRIMMERS F, K & L MOUNTED ON BAKELITE STRIP #22-538

FOR VOLTAGE SEE INDEX

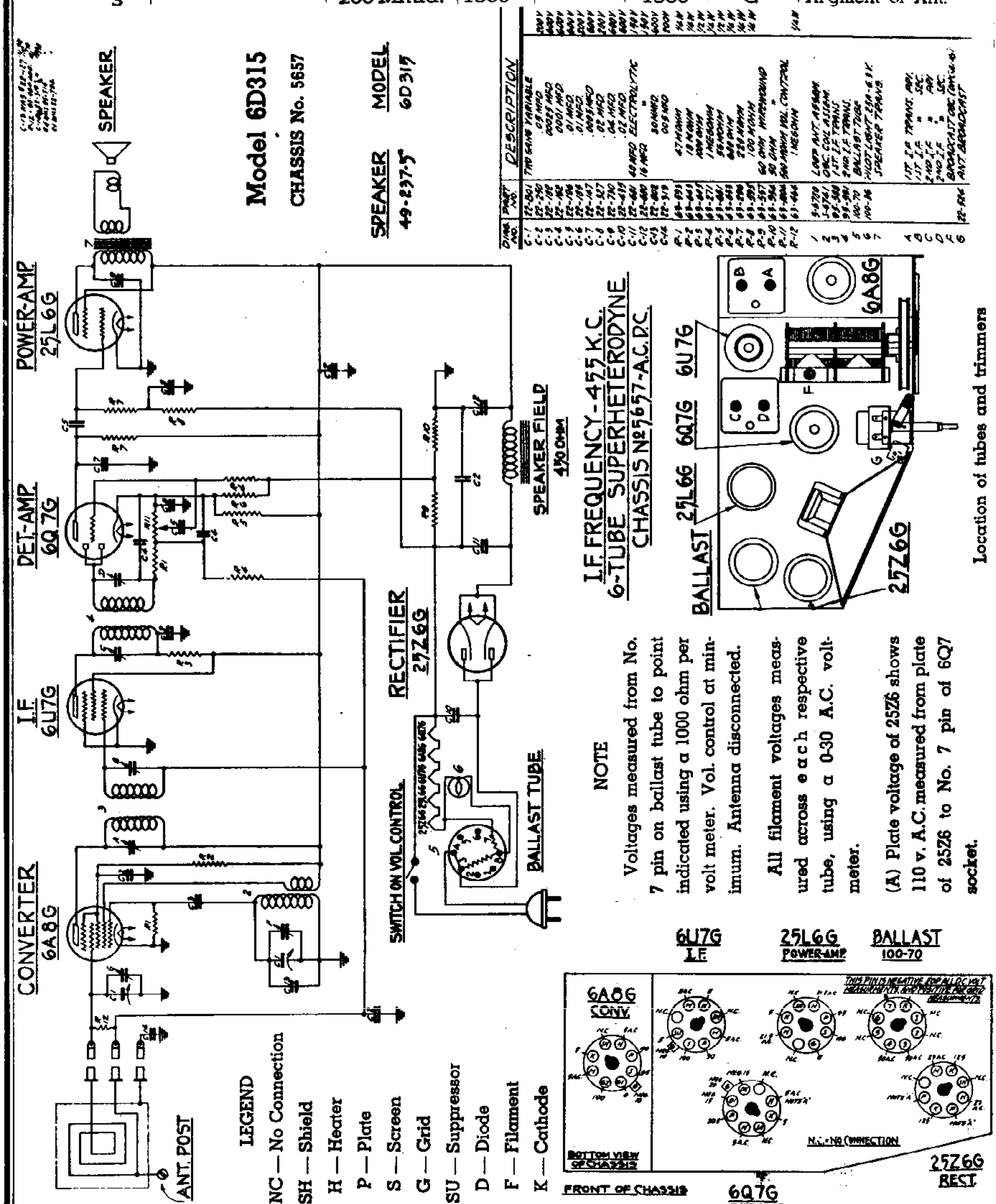
CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

ZENITH RADIO CORP.

MODEL 6D315, Chas. 5657
Schematic, Voltage, Socket
Trimmers, Alignment

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.



NOTE

Voltages measured from No. 7 pin on ballast tube to point indicated using a 1000 ohm per volt meter. Vol. control at minimum. Antenna disconnected.

All filament voltages measured across each respective tube, using a 0-30 A.C. voltmeter.

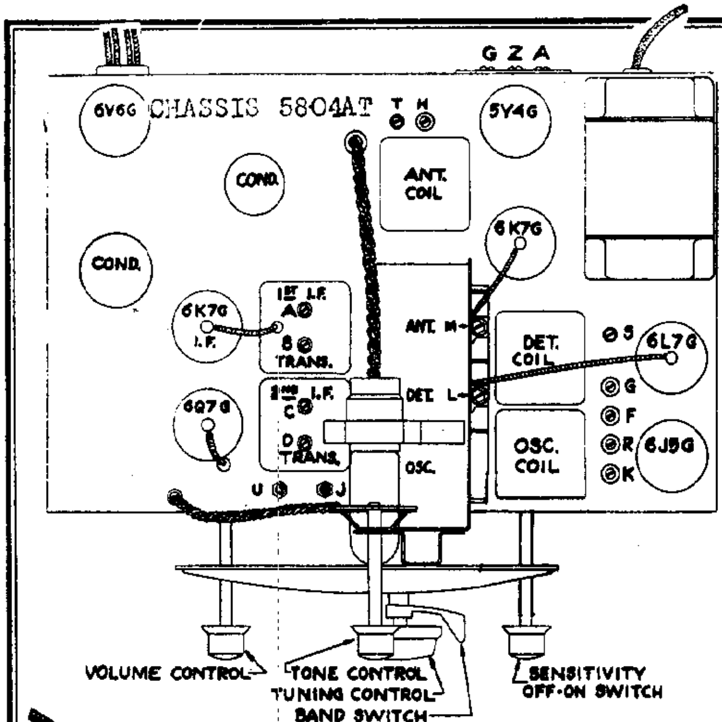
(A) Plate voltage of 25Z6 shows 110 v. A.C. measured from plate of 25Z6 to No. 7 pin of 6Q7 socket.

LEGEND

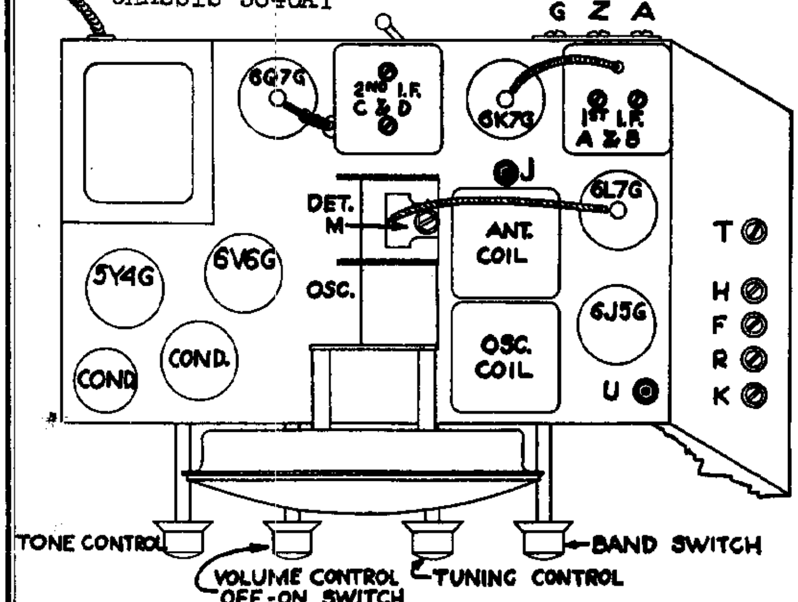
NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
F — Filament
K — Cathode

MODELS 6A203,6A223,6A229
6A239,6A241,Chas.5640AT
MODELS 8A232,8A242,8A244
8A262,Chassis 5804AT
Alignment,Socket,Trimmers

ZENITH RADIO CORP.



CHASSIS 5640AT



CHASSIS 5640, 5804A Secret Volume Governor

Where it is desired to limit the maximum volume of the receiver to a predetermined level such as for hospital use. use in public places, etc., this may be done as follows:

1. Tune the receiver carefully to a local station, and adjust the volume to the loudest desired setting.

2. Remove the knob by pulling directly away from the panel. and insert the short headless screw into the hole provided in the rear of the knob closest to the right side of the elongated cut-out around the volume control shaft.

3. It may be necessary to move the screw to the next hole in either direction before it is definitely determined what volume level is desired.

Alignment Procedure

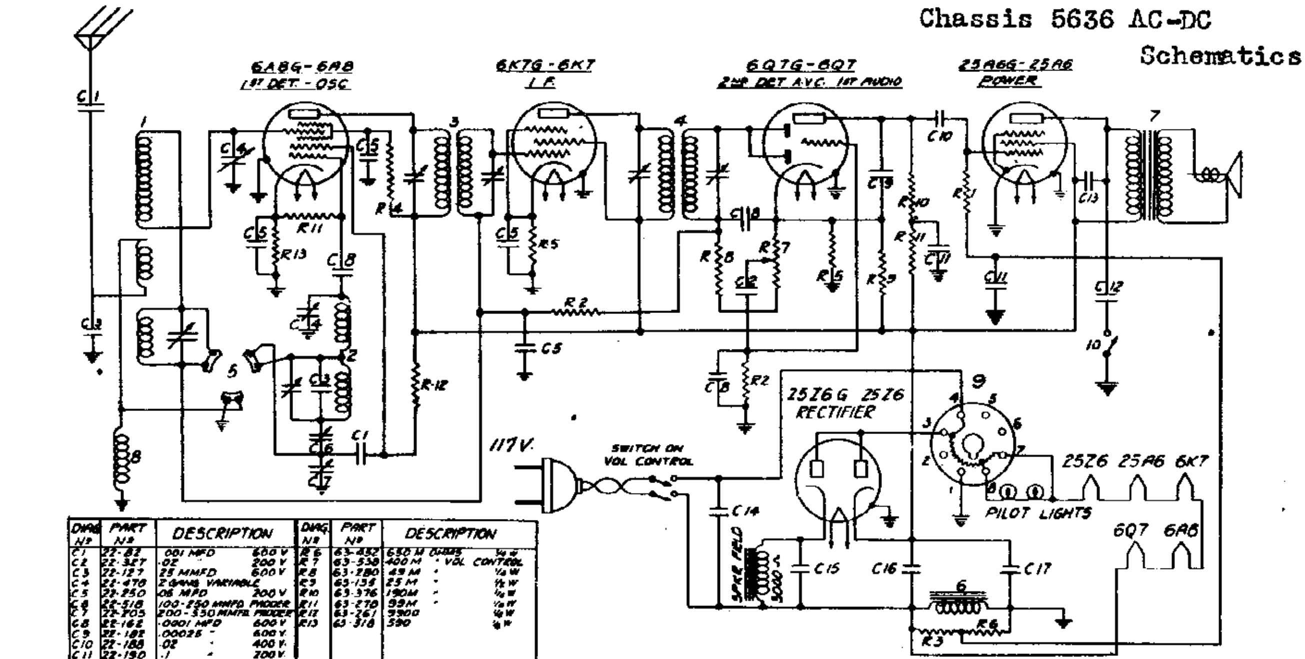
CHASSIS 5640AT AND 5804AT

Operation	Sig. Gen. Connected to	Dummy	Gen. Freq.	Band Switch	Receiver Dial	Trimmer	Remarks:
1	1st Det. Grid	½ mfd	456	Med. Wave	550KC	ABCD	I F Alignment
2	Rec. Ant. Post	400 Ohms	18000	S. W.	18000	K	Set. Osc. To Scale
3	Rec. Ant. Post	400 Ohms	18000	S. W.	18000	L—*M	Rock Gang While Adj. for Max. Output
4	Rec. Ant. Post	200 mfd.	1500	Med. Wave	1500	F	Set. Osc. to Scale
5	" " "	200 "	1500	" "	1500	G—*H	Adjust for Max. Output
6	" " "	200 "	550	" "	550	J	Rock Gang while Adjusting for Maximum Output
7	" " "	200 "	1500	" "	1500	F-G-*H	Repeat 4 & 5
8	" " "	200 "	400	L. W.	400	R	Set. Osc. to Scale
9	" " "	200 "	400	L. W.	400	S—*T	Adjust for Max. Output
10	" " "	200 "	166.7	L. W.	166.7	U	Rock Gang While Adjusting for max. Output
11	" " "	200 "	400	L. W.	400	R-S-T	Repeat 8 & 9

*MODEL CHASSIS 5804A ONLY

MODELS 6A203, 6A223, 6A229
6A239, 6A241, Ch. 5640AT
MODELS 6DL120 to 6DL122
Chassis 5636 AC-DC
Schematics

ZENITH RADIO CORP.



DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-82	.001 MFD	600 V	R6	63-452	650 M OHMS	1/4 W
C2	22-327	.02	200 V	R7	63-538	400 M · VOL. CONTROL	
C3	22-127	25 MMFD	600 V	R8	63-280	49 M	1/2 W
C4	22-470	2 GANG VARIABLE		R9	63-155	25 M	1/2 W
C5	22-250	.05 MFD	200 V	R10	63-376	190 M	1/4 W
C6	22-518	100-250 MMFD PADDER		R11	63-270	99 M	1/4 W
C7	22-705	200-550 MMFD PADDER		R12	63-251	3300	1/4 W
C8	22-162	.0001 MFD	600 V	R13	63-318	390	1/4 W
C9	22-182	.00025 "	600 V				
C10	22-188	.02 "	400 V				
C11	22-190	.1 "	200 V				
C12	22-218	.05 "	400 V				
C13	22-229	.005 "	600 V				
C14	22-455	.01 "	1200 V				
C15	22-517	14 "	250 V				
C16		16 "	250 V	1	20-144	ANT. COIL ASSEMBLY	
C17	22-516	8 "	250 V	2	20-145	OSC. COIL ASSEMBLY	
				3	95-378	1ST I.F. TRANS.	
				4	95-347	2ND I.F. TRANS.	
				5	85-101	BAND SELECT SWITCH	
				6	95-345	POWER CHOKE	
				7	49-161	SPEAKER	
				8	20-88	ANTENNA CHOKE	
				9	100-37	BALLAST TUBE (117V)	
R1	63-290	260 M OHMS	1/2 W	10	85-102	TONE CONTROL SWITCH	
R2	63-293	990 M	"				
R3	63-481	400 M	"				
R4	63-288	1.9 M	"				
R5	63-382	400	"				

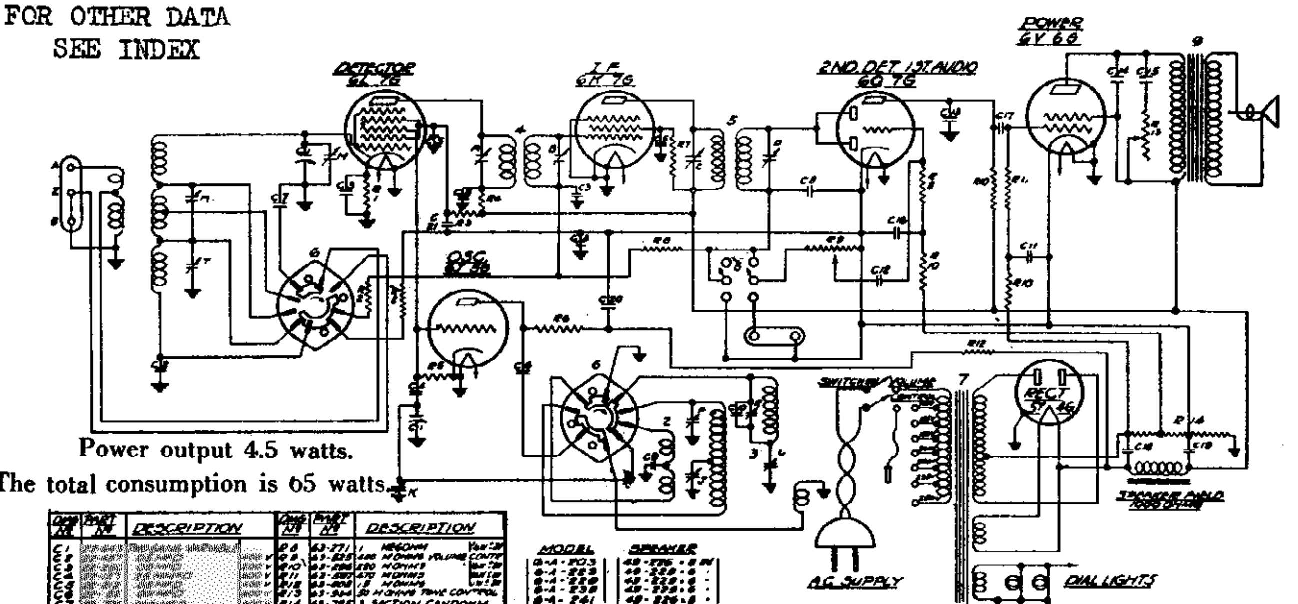
MODEL	SPEAKER
6DL 120	49-161 — 5
6DL 121	49-161 — 5
6DL 122	49-161 — 6

Power Output 1.5 watts.
Current Consumption 44 watts

I.F. FREQUENCY 456 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 5636 AC-DC

ZENITH RADIO CORPORATION
CHICAGO ILLINOIS

FOR OTHER DATA
SEE INDEX



Power output 4.5 watts.
The total consumption is 65 watts.

DIAG. Nº	PART Nº	DESCRIPTION		DIAG. Nº	PART Nº	DESCRIPTION	
C1	[illegible]	[illegible]		R8	63-271	1 MEGOHM	[illegible]
C2	[illegible]	[illegible]	[illegible]	R9	63-[illegible]	[illegible] M OHMS VOLUME	CONTROL
C3	[illegible]	[illegible]	[illegible]	R10	63-[illegible]	250 M OHMS	[illegible]
C4	[illegible]	[illegible]	[illegible]	R11	63-[illegible]	470 M OHMS	[illegible]
C5	[illegible]	[illegible]	[illegible]	R12	63-[illegible]	1.5 M OHMS	[illegible]
C6	[illegible]	[illegible]	[illegible]	R13	63-[illegible]	50 M OHMS TONE CONTROL	
C7	[illegible]	[illegible]	[illegible]	R14	63-795	3 SECTION CANDOHM	
C8	[illegible]	[illegible]	[illegible]				
C9	[illegible]	[illegible]		1	S 5434	ANTENNA COIL ASSEM	
C10	[illegible]	[illegible]			S 5460	ANT COIL & SHIELD ASSEM	
C11	[illegible]	[illegible]	[illegible]	2	S 5445	SHORT WAVE OSC COIL	
C12	22-327	[illegible]	[illegible]		S 5436	OSC COIL ASSEM	
C13	22-167	.0005 MFD	[illegible]	3	S 5441	OSC COIL & SHIELD ASSEM	
C14	22-186	.01 MFD	[illegible]	4	95-[illegible]	1ST I.F. TRANSFORMER	
C15	22-171	.05 MFD	[illegible]	5	95-[illegible]	2ND I.F. TRANSFORMER	
C16	22-190	.1 MFD	[illegible]	6	85-122	BAND SWITCH	
C17	22-438	.02 MFD	[illegible]	7	95-[illegible]	POWER TRANSF. ALL VOLTAGE 25 CYCLE	
C18	22-633	[illegible] MFD ELECTROLYTIC	475 V				
C19		[illegible] MFD ELECTROLYTIC	480 V	8	85-30	PHONO SWITCH	
C20	22-657	4 MFD ELECTROLYTIC	480 V	9		SPEAKER TRANSFORMER	
C21		[illegible] MFD ELECTROLYTIC	[illegible] V				
R1	63-629	330 OHMS	[illegible]				
R2	63-[illegible]	100 M OHMS	[illegible]				
R3	63-208	12 M OHMS	[illegible]				
R4	63-605	1000 OHMS	[illegible]				
R5	63-383	47 M OHMS	[illegible]				
R6	63-680	10 M OHMS	[illegible]				
R7	63-381	100 M OHMS	[illegible]				

MODEL	SPEAKER
6-A-203	49-[illegible]
6-A-223	49-[illegible]
6-A-229	49-[illegible]
6-A-239	49-[illegible]
6-A-241	49-[illegible]

VARIABLE TRIMMERS	
A	1ST I.F. TRANSF. PRIMARY
B	1ST I.F. TRANSF. SECONDARY
C	2ND I.F. TRANSF. PRIMARY
D	2ND I.F. TRANSF. SECONDARY
F	BROADCAST OSC. (SEE NOTE)
H	[illegible]
J	[illegible]
K	[illegible]
M	[illegible]
R	[illegible]
T	[illegible]
U	[illegible]
	MIXER

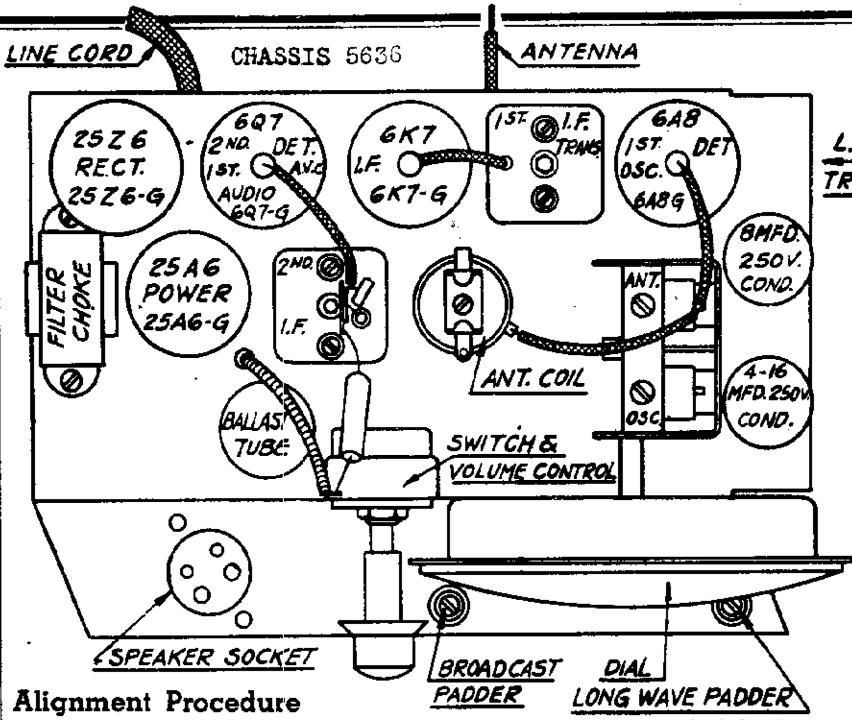
I.F. FREQUENCY 456 KC.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 5640 AT
3 BAND LONG WAVE

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

BAND	KILOCYCLES
A	411 — 150
B	1538 — 432
C	23077 — 5660

MODELS 6DL120 to 6DL122
Chassis 5636
MODELS 7DA119, 7DA126, 7DA127, 7DA138, 7DA148, 7DA162, 7DA168, Ch. 5708E
Alignment, Socket Trimmers

ZENITH RADIO CORP.



Alignment Procedure

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K. C. and carefully adjust the four I. F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

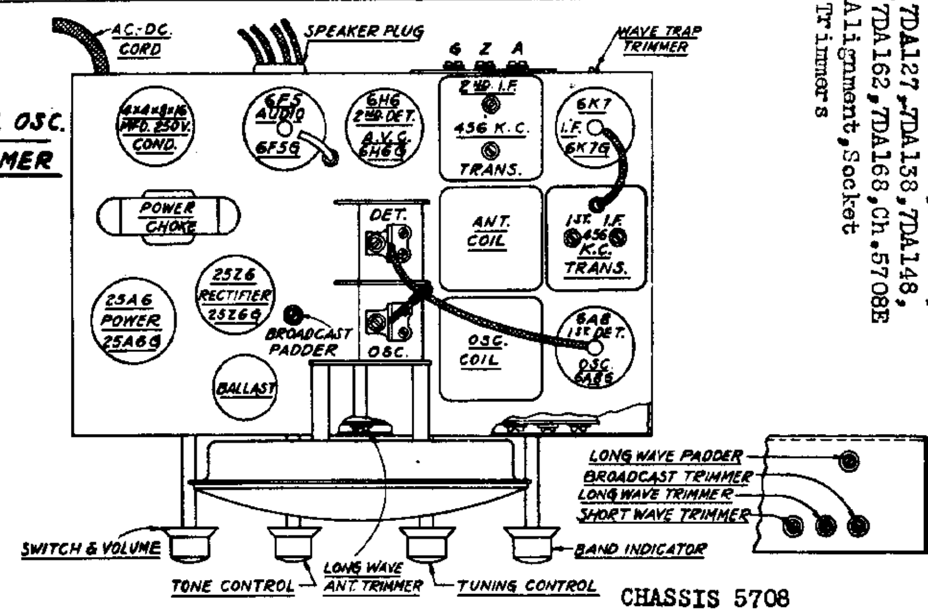
All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.
(4) Set signal generator at 1500 K. C., switch receiver to broadcast band and adjust oscillator trimmer on gang for correct dial reading at 200 meters. Also adjust antenna trimmer on gang to resonance.

(5) Set signal generator to 600 K. C. and rock pointer past 500 meters on dial while adjusting the broadcast padder (adjacent to gang) to combination giving the greatest output reading.
(6) Repeat operation No. 4.
(7) Set signal generator at 375 K. C. Switch receiver to long wave band and adjust long wave oscillator trimmer (located on oscillator coil underneath chassis) for correct dial reading at 800 meters. Also adjust trimmer on top of coil adjacent to gang for greatest output reading.

(8) Set the signal generator at 167 K. C. Rock the pointer past 1800 meters on dial and adjust the long wave padder to point giving the highest output.

(9) Repeat operation No. 7.



CHASSIS 5708

ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and chassis of the receiver.

(4) Adjust the wave trap (located on rear of chassis) for minimum output reading.

(5) Set signal generator at 6 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.

(6) Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (see diagram) for correct dial reading at 215 meters. Also adjust det. trimmer on gang for greatest output reading.

(7) Set signal generator to 600 K.C. and rock pointer past 500 meters on dial while adjusting the broadcast padder (adjacent to gang) to combination giving the greatest output reading.

(8) Repeat operation No. 6.

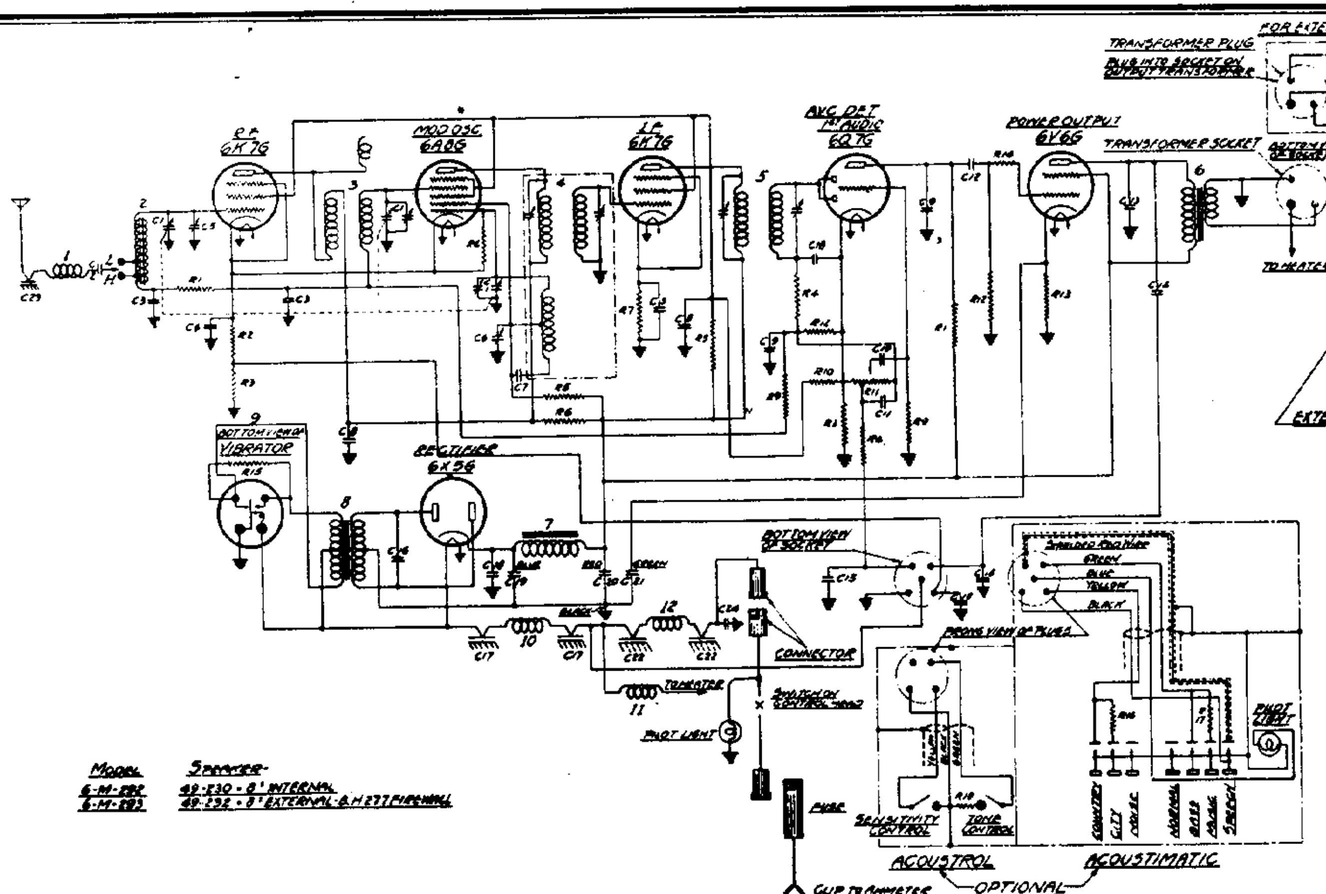
(9) Set the signal generator at 17 M.C. Switch the receiver to band C and adjust short wave trimmer while rocking pointer past 17.5 meters on dial to combination giving the greatest output.

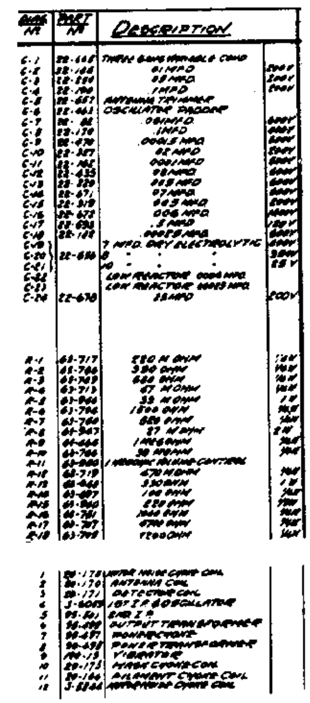
(10) Set the signal generator at 375 K.C. Switch receiver to Band D and adjust the long wave trimmer for correct dial reading at 800 meters. Also adjust the long wave ant. trimmer to resonance.

(11) Set the signal generator at 167 K.C. Rock the pointer past 1800 meters on dial and adjust the long wave padder to point giving the highest output.

(12) Repeat operation No. 10.

ZENITH RADIO CORP.





SOCKET VOLTAGES 6-M-292, 6-M-293

Tube	1	2	3	4	5	6	7	8	9
6K7G	0	6.0	250	78	*	—	0	*	
6A8G	0	6.0	250	78	**	132	0	*	
6K7G	0	0	250	78	-3.8	—	6.0	3.5	
6Q7G	0	0	95	0	—	—	6.0	1.6	
6V6G	0	6.0	240	250	—	—	0	11.5	
6X5G	—	0	—	—	—	—	6.0	255	

*Sensitivity position { —4.96 country, —8.0 city, —9.5 noise }
**Sensitivity position { —18.5 country, —17.5 city, —15.0 noise }

I.F. FREQUENCY

252½ —K.C.

Voltage at Battery 6.3
Voltage a' Receiver 6.0
Antenna disconnected
All Voltages measured with 1000 ohm per volt meter
Total current consumption 7.4 amperes
Sensitivity at 1 watt output - 1 microvolt
Maximum power output 6 watts.

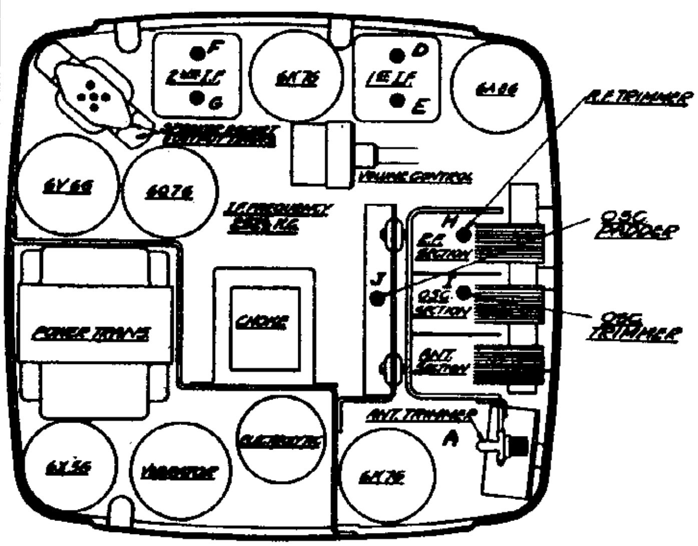
MODELS 6M292,6M293
Chassis 5645
Alignment,Socket
Trimmers
MODEL 6M295,Ch.5650
Alignment

ZENITH RADIO CORP.

MODELS 6-M-292, 6-M-293, 6-M-295

Operation	Connect Test Oscillator To	Dummy Antenna	Set Test Osc. To	Manual or Automatic Position	Set Gang Cond.	Adjust Trimmers	Purpose
1	1st Det. Grid	½ Mfd.	252.5	Manual	Max. Cap.	DEFG	I. F. Alignment
2	Rec. Ant. Lead	50 Mmfd.	1600	Manual	Min. Cap.	I	Trim Oscillator
3	Rec. Ant. Lead	50 Mmfd.	1400	Manual	1400	AH	Trim Ant. & R. F. Stage
4	Rec. Ant. Lead	50 Mmfd.	600	Manual	600	J	Rock Gang & Adjust Osc. Padder for Max. Output
5	Rec. Ant. Lead	50 Mmfd.	——	Manual	Tune To A Station Around 900 K. C. and Set Dial for Calibration		
6	Rec. Ant. Lead	50 Mmfd.	1000	Automatic	Range #2	Trim Ant. & R.F. of Automatic Unit — Trimmers "B" - "C"	
7	Connect Car Antenna to Set — Tune to Weak Station Around 1400 K. C. — Trim Antenna Trimmer "A" for Maximum Peak Output.						
8	Trim Automatic Antenna Trimmer "B" to Car Antenna on a Weak Station around 1000 K. C. on Range #2.						

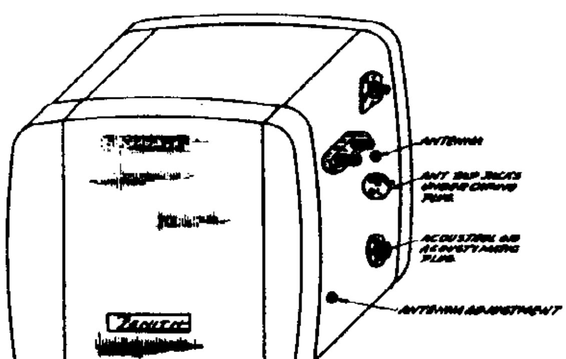
See tube layouts for location of aligning trimmers



6-M-292, 6M-293

Fig. 7

Tube Position



6M-292, 6-M-293

Fig. 8

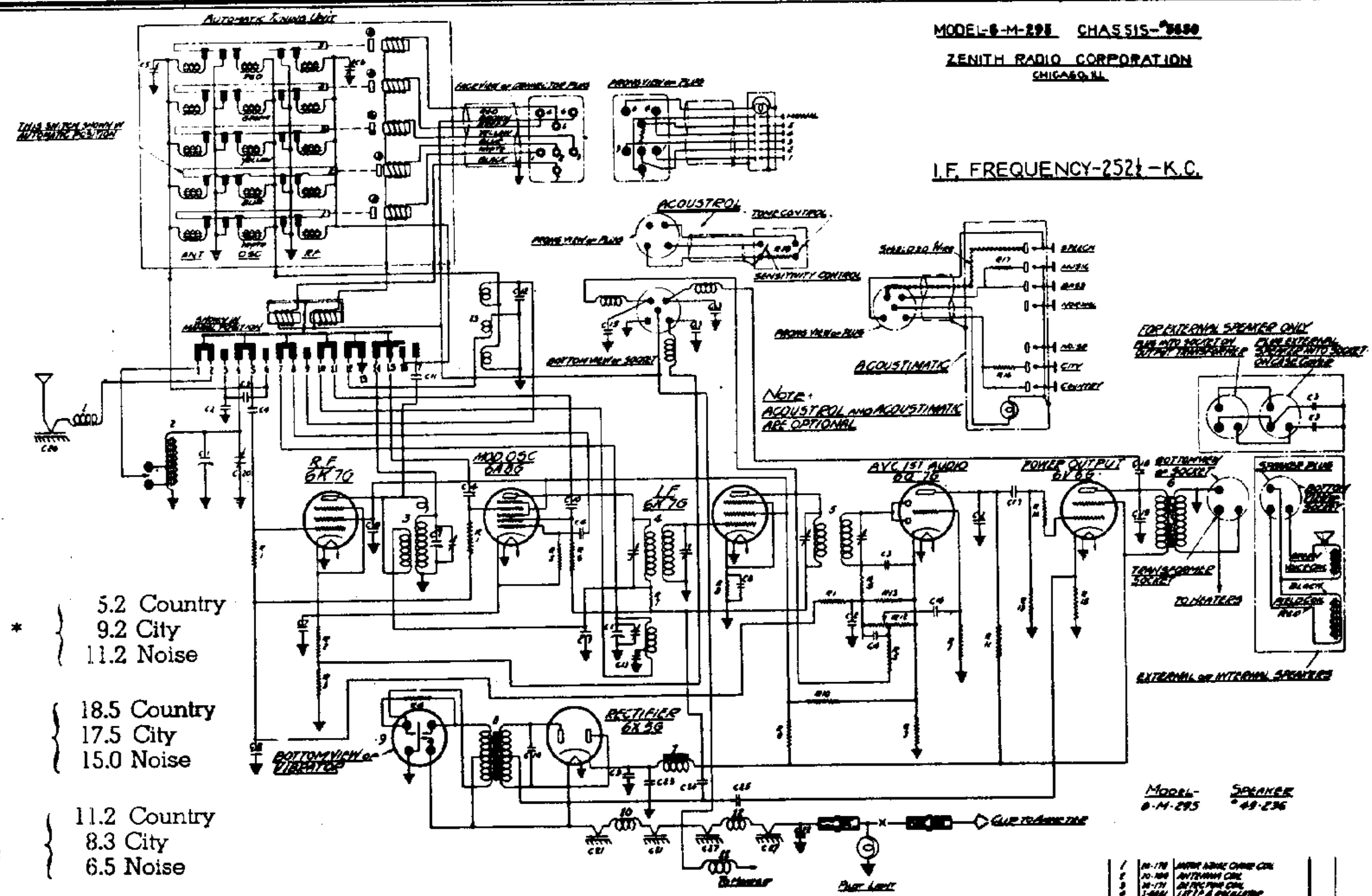
6M-292, 6-M-293

ANTENNA ALIGNMENT

Fig. 8 shows the location of the antenna tap jacks on the side of the receiver case. Remove the capping plug from over this jack assembly, and insert the antenna pin lead in the "H" or "L" position, depending on the capacity of the antenna being used The "H" position must be used for antennas with a capacity in the range of from 100 to 500 mmfd. The "L" connection must be used for low capacity antennas of from 0 to 125 mmfd. Compare this listing with that given under the various antennas, and the proper position will easily be recognized. After selecting the position desired, place the capping plug back over the hole to prevent motor noise from entering into the antenna circuit of the receiver. Connect the antenna proper by means of the Delco-Remy connector shown in Fig. 8.

MODEL 6M295
Chassis 5650
Schematic, Voltage

ZENITH RADIO CORP.



Sensitivity * 5.2 Country, 9.2 City, 11.2 Noise

** Manual 18.5 Country, 17.5 City, 15.0 Noise

** Automatic 11.2 Country, 8.3 City, 6.5 Noise

Tube	1	2	3	4	5	6	7	8	9
6K7G	0	6.1	245	100	0	—	0	*	
6A8G	0	6.1	245	100	**	128	0	*	
6K7G	0	0	250	100	4.2	—	6.1	4.2	
6Q7G	0	0	155	0	0	—	6.1	1.9	
6V6G	0	6.1	240	250	0	—	0	12.5	
6X5G	[illegible]	0	—	—	—	—	6.1	255	

MODEL 6M295
Chassis 5650
Socket, Trimmers
Antenna Data, Tuner

ZENITH RADIO CORP.

ANTENNA ALIGNMENT

Manual Tuning: Press the MANUAL button on the automatic key board. This disconnects the automatic system and allows operation of the receiver from the standard tuning mechanism. After adjusting the dial calibration accurately, turn the volume control up full and tune to a weak station near 1400 K.C. Adjust the antenna trimmer A (Fig. 8) to the point of greatest volume. This completes antenna alignment for manual operation. The trimmer does not have to be adjusted at any other point on the dial.

Automatic Tuning: Press automatic button 2 (Fig. 8) This will disconnect the manual tuning mechanism and place the automatic buttons into service. After button 2 has been pressed, turn adjusting screw 2 in either direction until a weak station between 1100 to 1000 K.C. is heard. Now adjust trimmers B and C on the automatic assembly for maximum signal strength of the weak station tuned in by the number 2 adjusting screw. The automatic is in complete resonance with the antenna over the entire automatic button range and need not be resonated at any other button setting. Adjusting screw 2 may now be tuned to a local station as outlined under "AUTOMATIC" with no further attention to adjustments B or C.

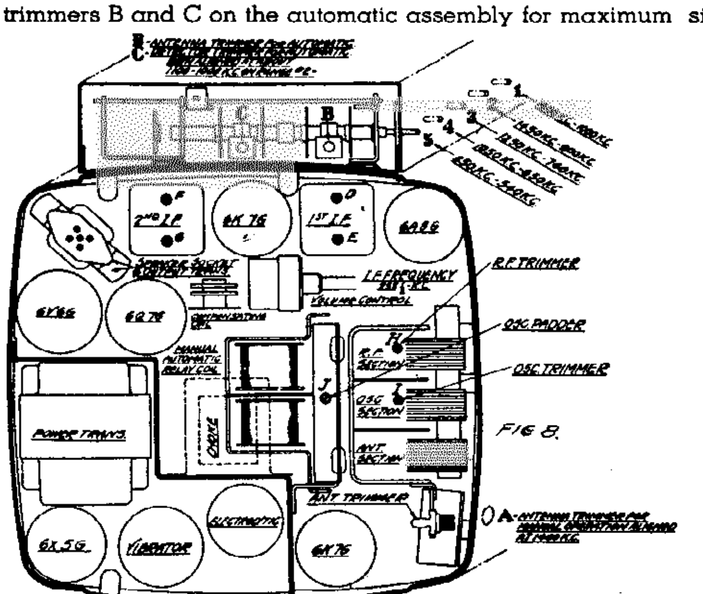


FIG 8.

AUTOMATIC

Study Fig. 8 carefully. Although simple in adjustment, best results will only be obtained if made accurately and by the following procedure.

1. Press button 1. (This button will be on the left if automatic unit is mounted on edge of instrument panel.)

2. Adjust automatic trimmer screw (until a desired local station between 1600 and 1000 K.C. is heard. Turn the screw slowly back and forth over the station as if tuning the dial of a receiver, for clearest reception and best tone quality and allow the screw setting to remain at that point.

3. Press button 2 and tune for a station between 1450 and 900 K.C. on automatic adjusting screw 2.

4. Follow above procedure for buttons 3, 4 and 5 using the ranges shown on Fig. 8.

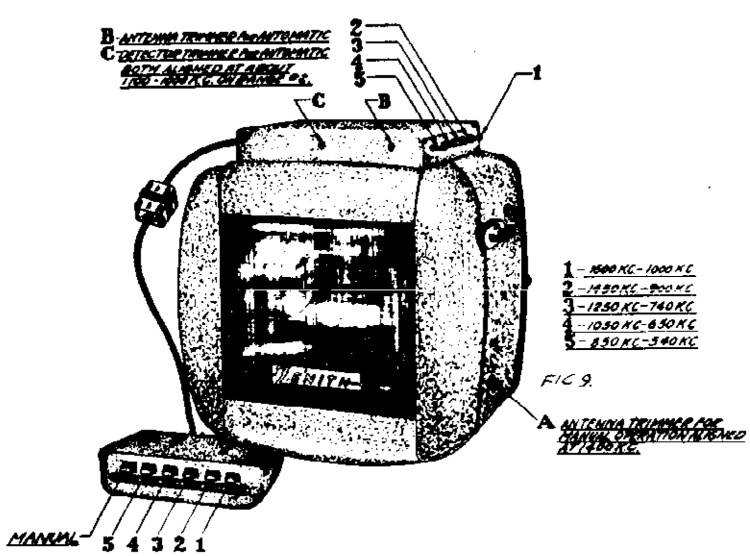


FIG 9.

5. Remove the chrome bezel over the parts adjacent to the automatic buttons and insert the station call letters cut from the sheet supplied. After placing the proper station calls in correct order over the port holes, fasten the escutcheon back in place.

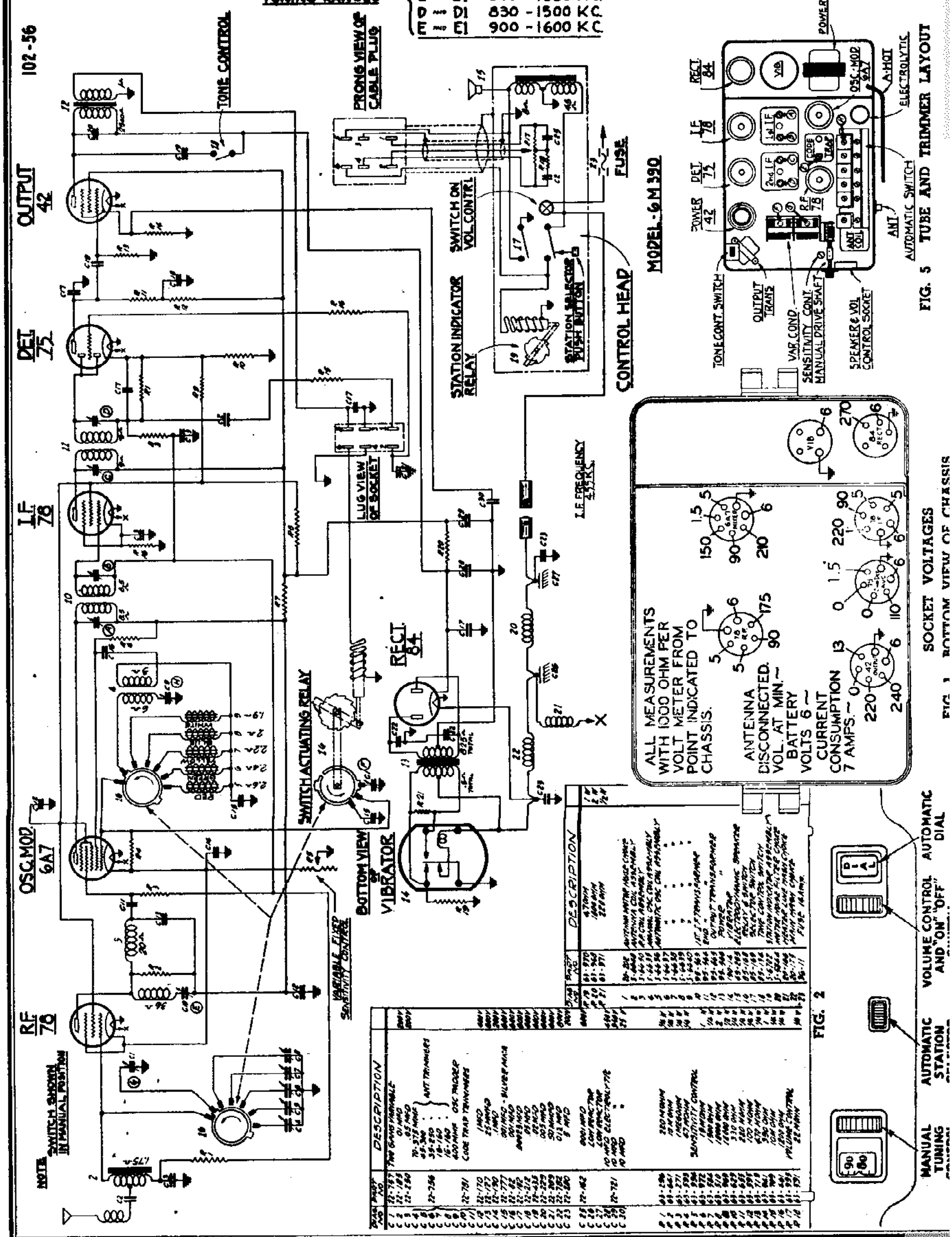
6. Repeat careful adjustment of each automatic trimmer pressing the corresponding button in order from 1 to 5 to obtain best tone, loudest signal and greatest freedom from noise.

MODEL 6M390
Schematic, Voltag
Socket, Trimmers

ZENITH RADIO CORP.

TUNING RANGES

A and A1	540 - 970 KC.
B and B1	610 - 1100 KC.
C and C1	675 - 1250 KC.
D and D1	830 - 1500 KC.
E and E1	900 - 1600 KC.



MODEL 6MS90
Alignment, Trimmers
Tuner Data

ZENITH RADIO CORP.

NOTE: This receiver is equipped with a fixed-variable sensitivity control located on the chassis base below the tuning control shaft of the variable condenser. (See Fig. 5.) The control can be adjusted with a screw driver either from above or below the chassis, and is set at the factory to a position which gives a sensitivity of 10 microvolts at 1 watt output. In practice it is found advisable to hold the receiver to this level as any higher sensitivity might result in increased motor noise or excessive background noise. Unless laboratory equipment capable of accurately measuring the input and output of the receiver is available, it is not advisable to alter this setting.

MANUAL DIAL ADJUSTMENT: The manual control dial must be aligned with the receiver for correct calibration. To do this, turn the manual tuning knob in one direction as far as it will go. Now do the same in the opposite direction. Then tune in a station of known frequency, and note if the dial reading corresponds. If the frequency reading is not correct, hold the tuning knob firmly and move the dial drum with your fingers through the bezel to the correct frequency reading of the station being received.

AUTOMATIC DIAL SYNCHRONIZATION: Before setting the station adjusting screws for automatic tuning, it may be necessary to synchronize the automatic dial to the receiver which is done as follows: Turn on the receiver, and try to tune in a station with the manual tuning control. If no station can be picked up, push the automatic station selector button until a position is found where stations can be tuned in manually. Remove the automatic dial assembly by pulling out from the rear and turn the station indicator drum downward until the word "Dial" appears in the opening. The adjusting screws in the receiver can now be resonated for the stations shown around the automatic dial as the automatic button is operated. It is very important that these adjusting screws be set on a weak signal from the station so that the circuit may be sharply tuned. A very short piece of wire used as an antenna will hold down the signal strength. Always be sure the antenna characteristics are similar to actual car conditions. A 38 mmfd. condenser from antenna to ground will provide the necessary input capacity.

AUTOMATIC TUNING ADJUSTMENTS: 1. Turn the receiver on and allow it to operate until thoroughly heated. Loosen the screws holding the cover plate over the automatic adjustments, and slide it upward exposing the adjusting screws and recording strip. This plate is on the front of the receiver. (See Fig. 4.)

2. Push the automatic station selector button until the word "Dial" is at the automatic dial window. Tune in manually the station whose call letters are in the No. 1 position on the dial (the lowest frequency station see Fig. 3) and note the program so that it can be identified. Push the automatic station selector button once, and this station's call letters will appear at the automatic window.

3. With a small screw driver, turn the station setting screw A (see Fig. 4) in the upper row to the right or left until that station is tuned in accurately. Now adjust the corresponding screw A1 in the lower row until maximum volume is obtained. Make these adjustments very carefully as it is quite easy to pass the resonant point due to the unusual selectivity of the receiver.

4. Press the automatic station selector button until "Dial" again is at the automatic window and tune in manually the station whose call letters are in the No. 2 position (the next higher frequency) on the automatic dial. Press the automatic station selector button twice to bring the No. 2 station's call letters in view, and adjust B and B1 screws to this station. Repeat this procedure until each of the five pairs of adjusting screws have been carefully set to their respective stations. It is necessary that the setting of the adjusting screws be repeated in the order given to be sure that they are properly set for maximum performance.

If the station setup on the automatic tuning dial should appear in the wrong position, the dial can easily be re-synchronized to the receiver as explained under "Dial Synchronization." If it is necessary to examine the automatic dial mechanism or change call letters it may easily be removed from the speaker housing by pressing the spring catch directly beneath the assembly and pulling out from the rear.

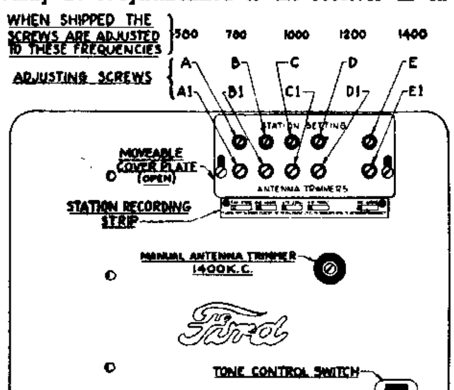


FIG. 4

If difficulty is experienced in setting the adjusting screws for the desired station, first turn the antenna trimmer screw down tight, and then adjust the station setting screw (oscillator) to the station, and follow with a readjustment of the antenna trimmer screw for resonance.

ALIGNMENT: I. F. Connect signal generator set at 455 K. C. through .1 mfd. condenser direct to 6A7 grid cap. Adjust I. F. trimmers A, B, C, D, (Fig. 5) to resonance. This should be done with the volume control of the receiver on full, and the generator signal reduced to a weak level.

Wave Trap: Remove signal generator lead from 6A7 grid, and attach to 78 R. F. tube grid. Using the same signal frequency of 455 K. C. carefully adjust the wave trap trimmer E for minimum response with a strong generator signal.

R. F. Press the automatic button to where the "Dial" position shows, or until the set can be tuned manually. Now rotate the manual tuning control until the condenser plates are completely out of mesh. Remove the generator lead from the 78 R. F. tube and connect it direct through a Zenith dummy antenna unit (Zenith part No. S6740) to the antenna socket on the receiver. Set the signal generator to 1580 K. C., and adjust the oscillator trimmer F on the gang condenser to resonance. Reset the signal generator to 1400 K. C. turn the dial until the signal is heard and adjust the gang condenser trimmer G to maximum response. Reset the signal generator to 600 K. C., and again turn the manual dial until the signal is heard. Rock the condenser gang slightly while adjusting padder H to maximum response at this point.

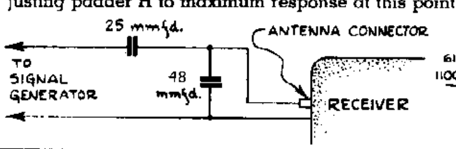


FIG 6 DUMMY ANTENNA REQUIREMENTS.

Figure 6 shows the dummy antenna requirements necessary where the special Zenith dummy connector S6740 is not available.

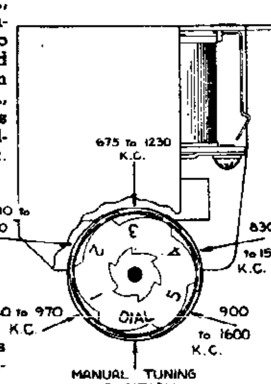


FIG. 3

ELECTRICAL SPECS: Rotomatic Tuning—Provides a means of selecting either manual or any one of five pre-selected stations using a single push-button. The automatically controlled circuits consist essentially of permeability tuned inductances in the oscillator circuit and mica type trimmers in the detector stage. Switching is accomplished electrically by coincidental solenoid operation of band-switch type segments.

Sensitivity—10 microvolts at 1 watt output. **Tuning range** 540—1580 K.C. **Power output**—3 watts measured at voice coil. **Speaker**—8" dynamic. **I.F.**—455 K.C. **Automatic**—Five positions and "Dial."

Tube complement—78 R.F., 6A7 mixer, 78 I.F., 75 2nd det. and audio, 42 output, 84 rectifier. **Current Consumption**—7 amp. at 6 volts.

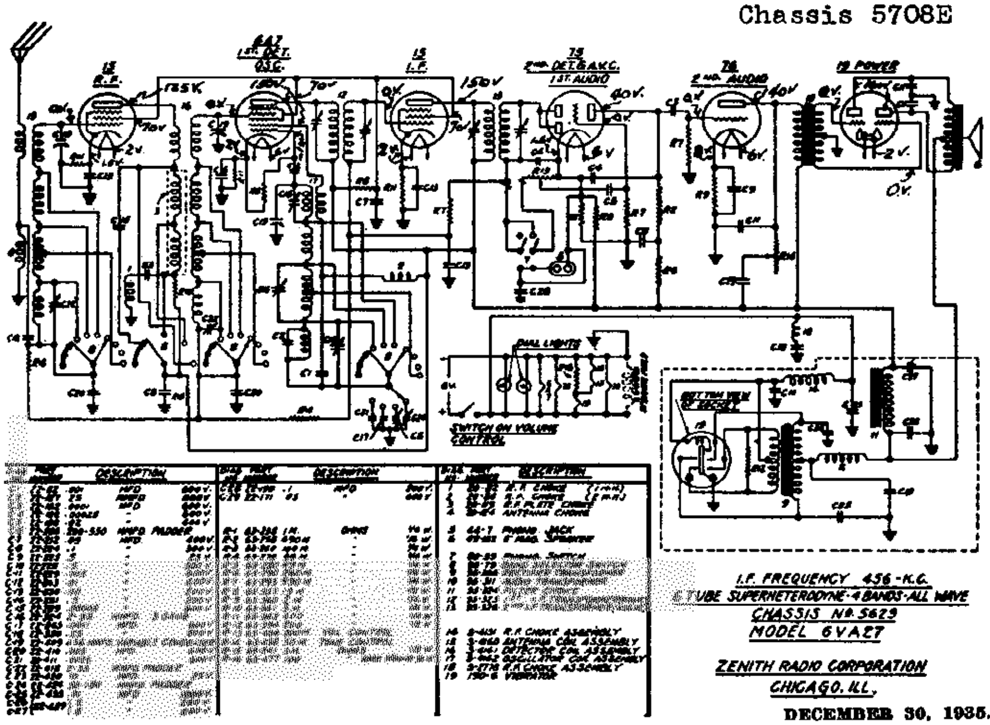
IMPORTANT: Unless certain dummy antenna capacities are employed with either the signal generator or in making adjustments on stations, the receiver will not respond properly. The values provided in the Zenith dummy antenna unit shown in Fig. 6 are identical with the conditions in the Ford car, and if adjusted accordingly the instrument will operate properly when reinstalled in the automobile. The Zenith dummy antenna S6740 is especially priced at 25c net to service stations, and should be purchased for use in servicing Zenith built Ford receivers.

Schematics, Voltage

ZENITH RADIO CORP.

MODELS 6VA27, 6VA62
Chassis 5629
MODELS 7DA119, 7DA126
7DA127, 7DA138, 7DA148
7DA162, 7DA168
Chassis 5708E

Band	Color	Kilocycles	Megacycles	Meters
A	Green	550- 1,740	.55- 1.74	545 -172
B	Yellow	2,000- 7,000	2 - 7	150 - 42.8
C	Orange	150- 370	.15- .37	2,000 -800
D	Red	7,000-22,500	7 -22.5	42.8- 13.3



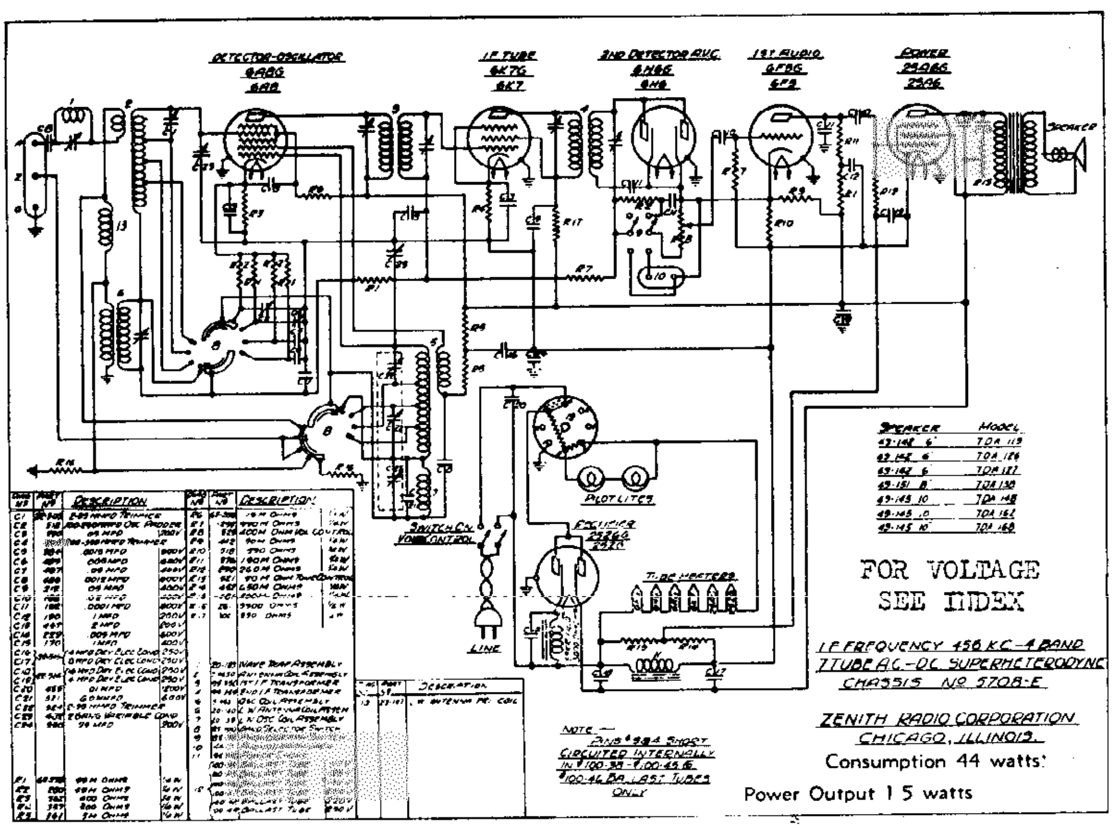
DECEMBER 30, 1935.

VOLTAGES AT SOCKET TERMINALS; - ANTENNA AND GROUND DISCONNECTED
MEASURED FROM SOCKET TERMINALS TO GROUND WITH 1000 OHM PER VOLT D.C. METER.

FOR OTHER DATA
SEE INDEX

The tuning is divided into four bands represented by the four scales A B C and D on the dial. These letters correspond to the letters above the band indicator knob and show the range and scale in use.

BAND	COLOR	KILOCYCLES	MEGACYCLES	METERS
A	Green	492-1640	.492-1.640	610-183
B	Yellow	1750-6040	1.75-6.04	171-49.6
C	Red	5520-19000	5.52-19	54.4-15.8
D	Blue	148-400		2025-750



FOR VOLTAGE
SEE INDEX

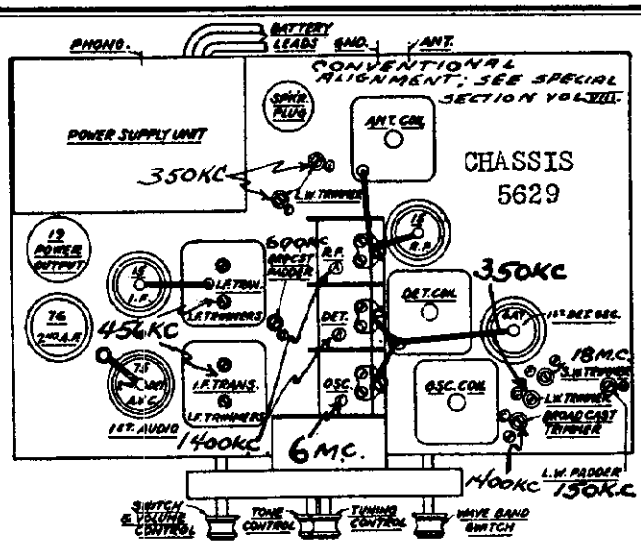
Consumption 44 watts.

Power Output 1.5 watts

MODELS 5A119, 5A126, 5A127
5A151, Chassis 5517A
MODELS 6VA27, 6VA62
Chassis 5629

ZENITH RADIO CORP.

Alignment, Socket
Trimmers



CHASSIS 5517A ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Adjust the wave trap (located on rear of chassis) for minimum output reading.

(5) Set signal generator at 6 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.

(6) Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (see diagram) for correct dial reading at 215 meters. Also adjust det. trimmer on gang for greatest output reading.

(7) Set signal generator to 600 K.C. and rock pointer past 500 meters on dial while adjusting the broadcast padder (adjacent to gang) to combination giving the greatest output reading.

(8) Repeat operation No. 6.

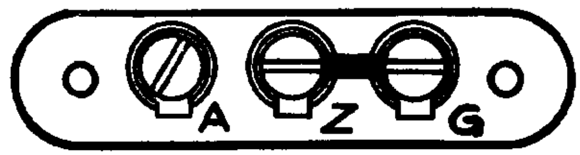
(9) Set the signal generator at 17 M.C. Switch the receiver to band C and adjust short wave trimmer while rocking pointer past 17.5 meters on dial to combination giving the greatest output.

(10) Set the signal generator at 375 K.C. Switch receiver to Band D and adjust the long wave trimmer for correct dial reading at 800 meters. Also adjust the long wave ant. trimmer to resonance.

(11) Set the signal generator at 167 K.C. Rock the pointer past 1800 meters on dial and adjust the long wave padder to point giving the highest output.

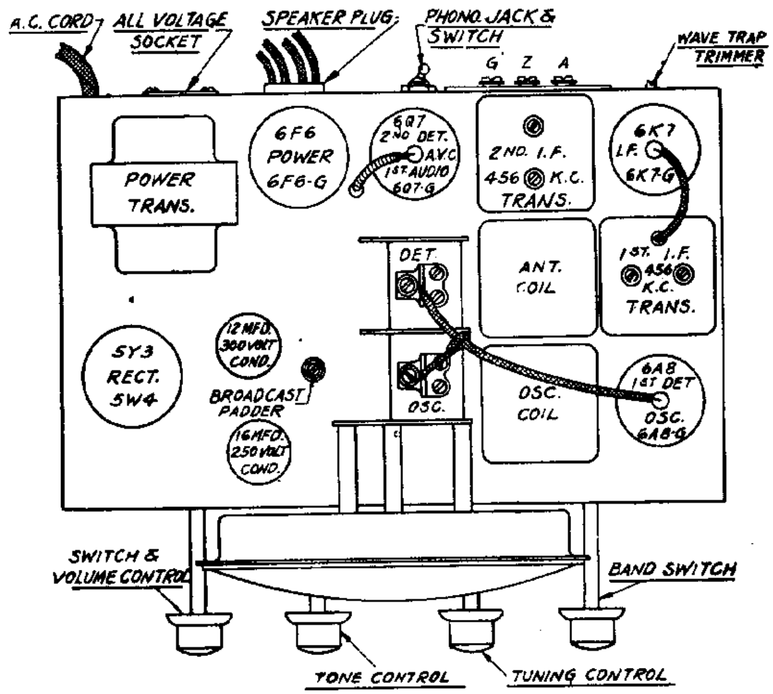
(12) Repeat operation No. 10.

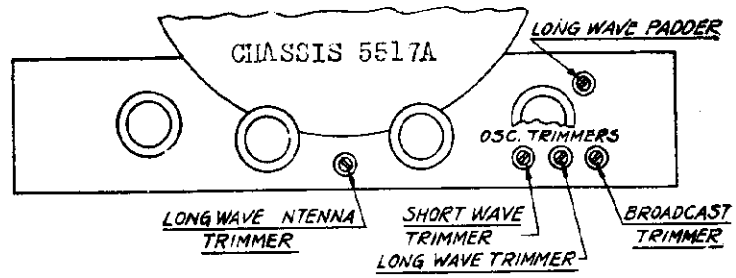
CHASSIS 5517A **IMPORTANT!**



Connect ordinary single wire antenna to A. Jumper wire placed between Z and G (shipped from factory in this manner.)

When using a ZENITH DOUBLET ANTENNA, remove jumper wire between Z and G and attach doublet lead-in to A and Z.



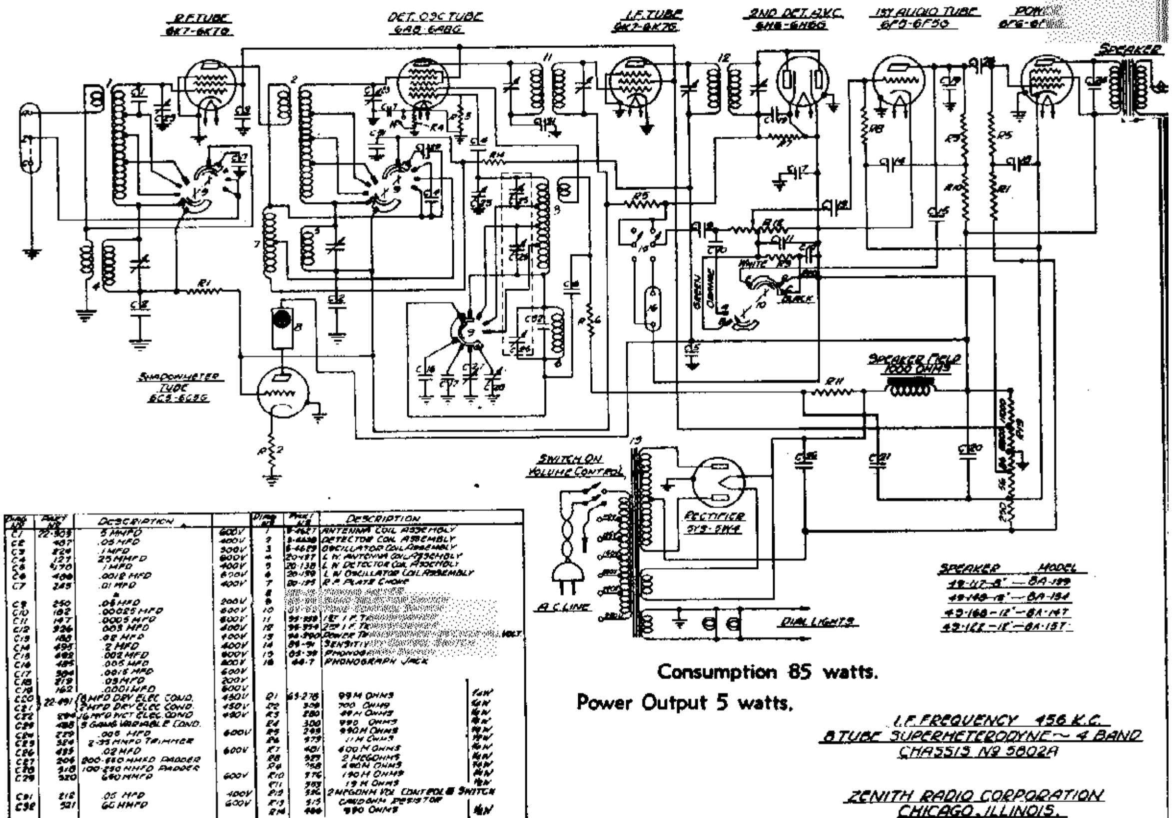


MODELS 8A232, 8A242, 8A244
8A262, Chassis 5804AT
Schematics

ZENITH RADIO CORP.

MODELS 8A129, 8A154, 8A147
8A157, Chassis 5802A

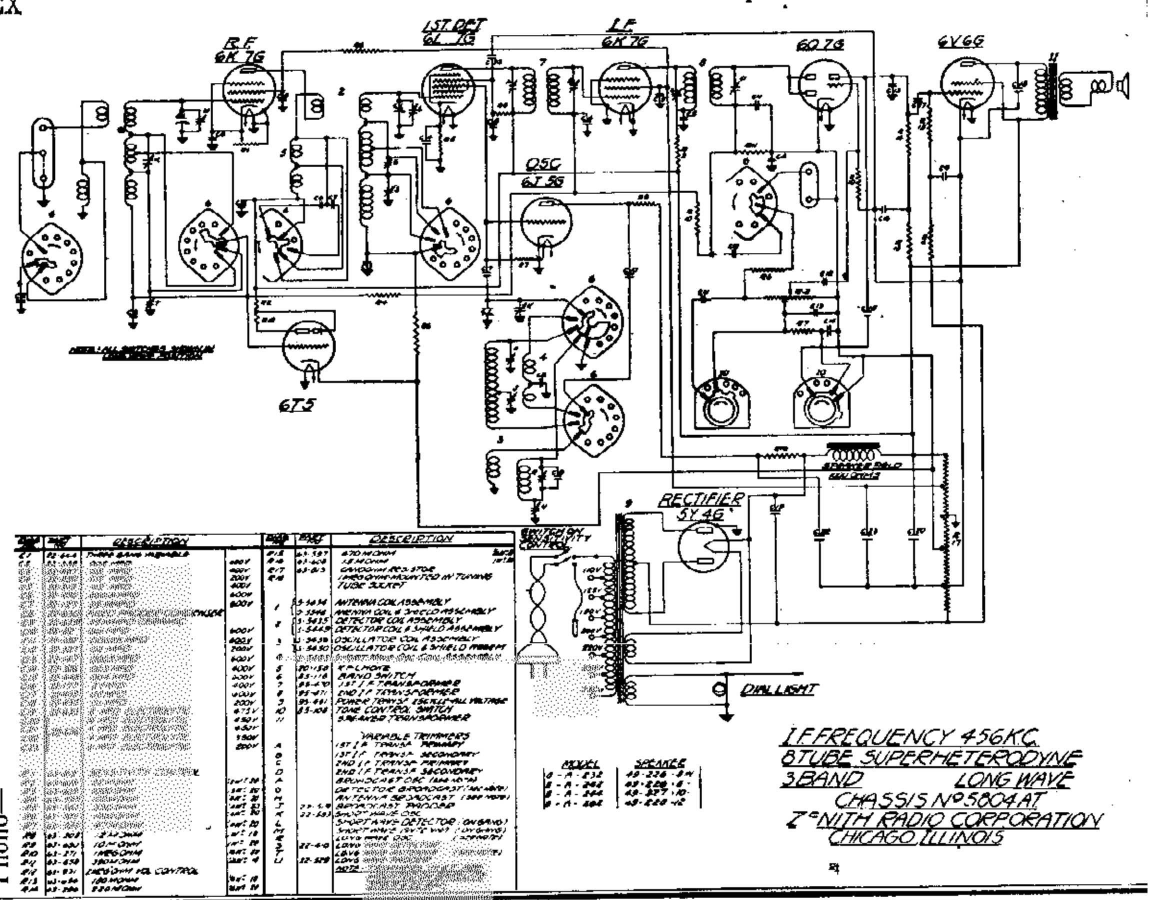
BAND	COLOR	KILOCYCLES	MEGACYCLES	METERS
A	Green	492-1640	.492- 1.640	610 -183
B	Yellow	1750-6040	1.75 - 6.04	171 - 49.6
C	Red	5520-19000	5.52 -19	54.4- 15.8
D	Blue	148-400		2025 -750



FOR OTHER DATA
SEE INDEX

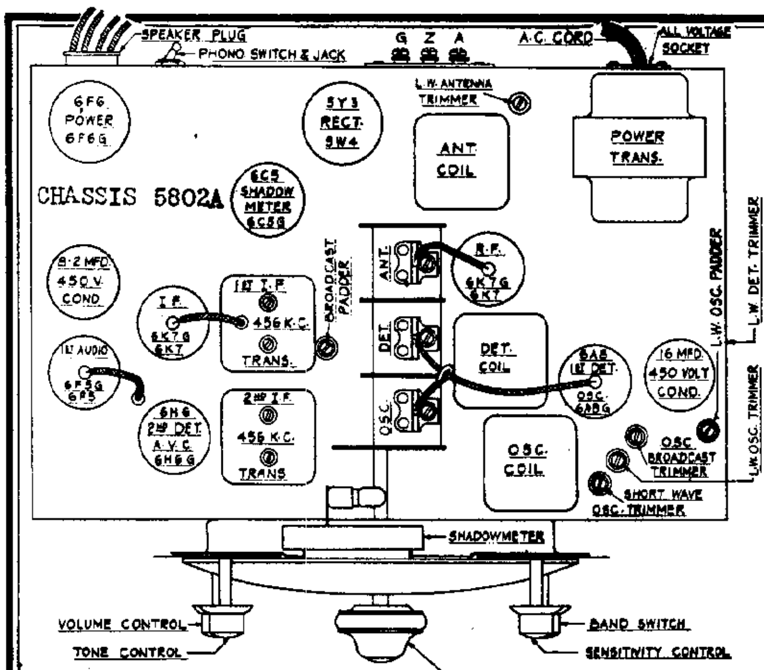
The total consumption is 70 watts. Power output 4.5 watts.

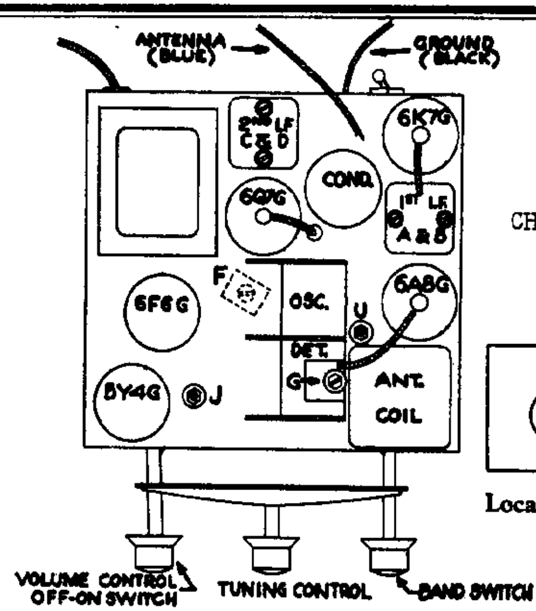
BAND	KILOCYCLES	MEGACYCLES	METERS
Short Wave	23,076 — 5660	23 — 5.6	13 — 53
Standard Broadcast	1538 — 499	1.5 — .49	195 — 601
Long Wave	411 — 150	.41 — .15	729 — 1987
Phono—			



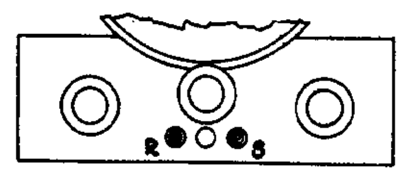
MODELS 5L228, 5L237
Chassis 5525
MODELS 8A129, 8A147
8A154, 8A157
Chassis 5802A
Alignment, Socket
Trimmers

ZENITH RADIO CORP.





CHASSIS 5525



Location of Tubes and Trimmers

CHASSIS 5525 Alignment Procedure

Operation	Sig. Gen. Connected to	Dummy	Gen. Freq.	Band Switch	Receiver Dial	Trimmer	Remarks
1	1st Det. Grid	½ mfd.	456KC	Med. Wave	550	ABCD	I F Alignment
2	Rec. Ant. Lead	200 mmfd	1500	Med. Wave	1500	F	Set Osc to scale
3	Rec. Ant. Lead	200 mmfd	1500	Med. Wave	1500	G	Adj. for Max. Output
4	" " "	" "	550	" "	550	J	Rock gang and adjust. for max. Output
5	" " "	" "	1500	" "	1500	F—G	Repeat two and three
6	" " "	" "	400	L. W.	400	R	Set. Osc. to Scale
7	" " "	" "	400	L. W.	400	S	Adjust for Max. Output
8	" " "	" "	166.7	L. W.	166.7	U	Rock Gang while adjusting for Max. Output
9	" " "	" "	400	L. W.	400	R—S	Repeat six and seven

ALIGNMENT PROCEDURE

Chassis 5802-A

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K. C. and carefully adjust the four I. F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A. V. C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 6 M. C.—Switch receiver to Band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.

(5) Set signal generator at 1500 K. C.—Switch receiver to band A and adjust broadcast trimmer for correct dial reading at 200 meters. Also adjust ant. and det. trimmer on gang to resonance.

(6) Set signal generator at 17.5 M. C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 17 meters on the dial to the combination giving the greatest output.

(7) Set signal generator at 600 K. C.—Switch receiver to band A, and rock pointer past 500 meters on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.

(8) Repeat operation No. 5.

(9) Set signal generator at 375 K. C. Switch receiver to Band D and adjust long wave osc. trimmer for correct dial reading at 800 meters. Also adjust long wave det. and ant. trimmers (located on side and rear of chassis), for maximum output reading.

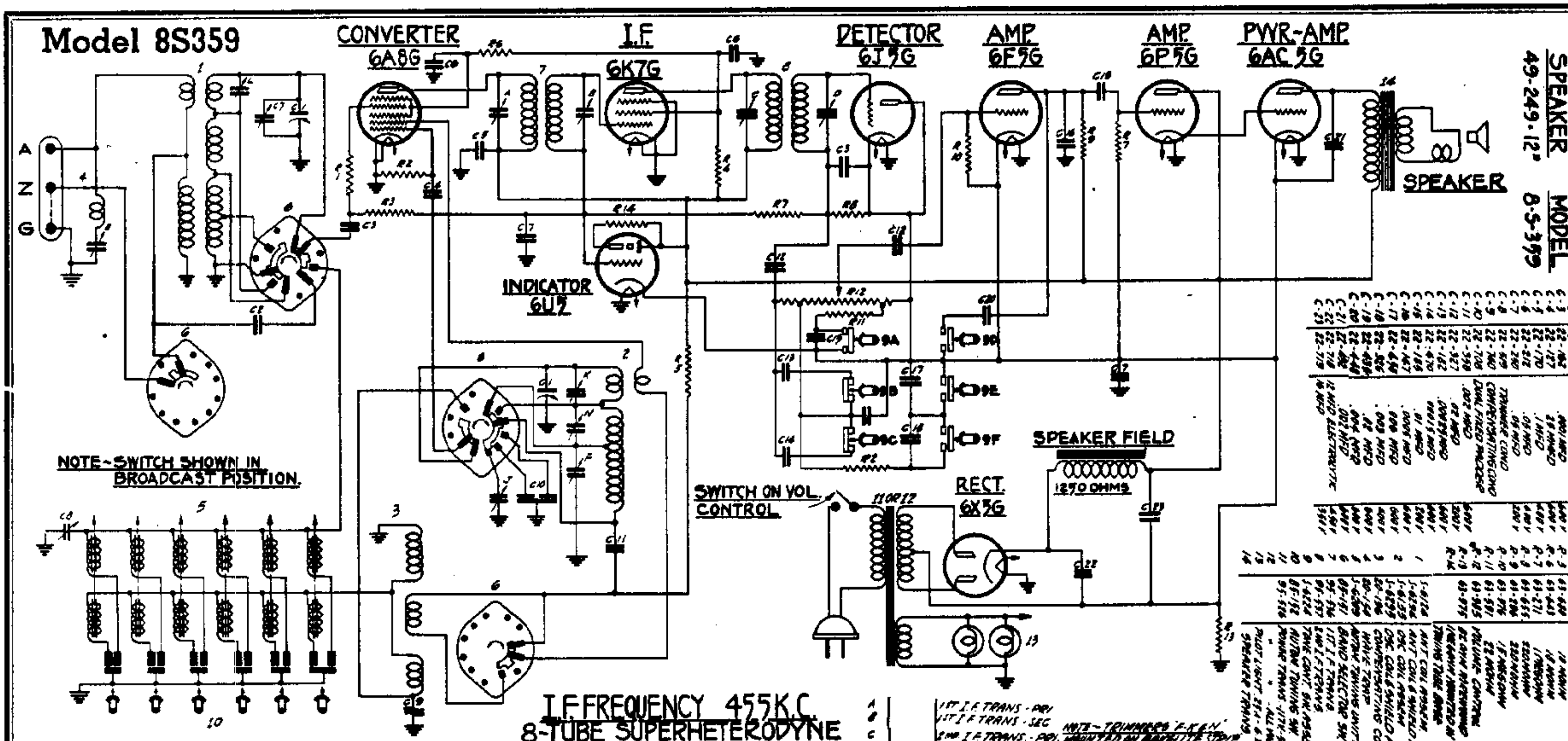
(10) Set signal generator at 150 K. C. and rock pointer past 2000 meters on dial while adjusting the long wave osc. padder to combination giving the highest output reading.

(11) Repeat operation No. 9.

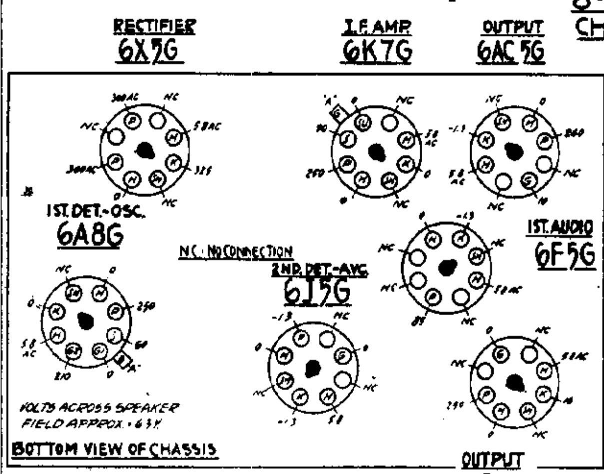
MODEL 8S359, Ch. 5807
Schematic, Voltage
Socket, Trimmers

ZENITH RADIO CORP.

Model 8S359



I.F. FREQUENCY 455 K.C.
8-TUBE SUPERHETERODYNE
CHASSIS No 5807-A.C. 3-BAND



LEGEND

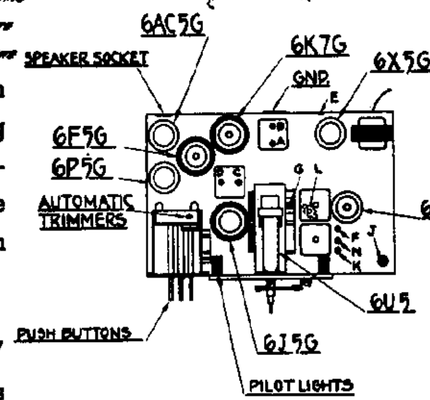
NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
F — Filament
K — Cathode

All voltages measured from chassis to point indicated using a 1000 ohm per volt meter. Antenna disconnected. Volume control at minimum. Bandswitch on manual B.C. position.

Line voltage 114 v.

(A) Grid bias for 6A8 and 6K7 tubes measured from chassis to K of 6J5 tube is neg. 1.3 volts.

NOTE-9A-ALTO
9B-TREBLE
9C-VOICE
9D-NORMAL
9E-LOW BASS
9F-BASS



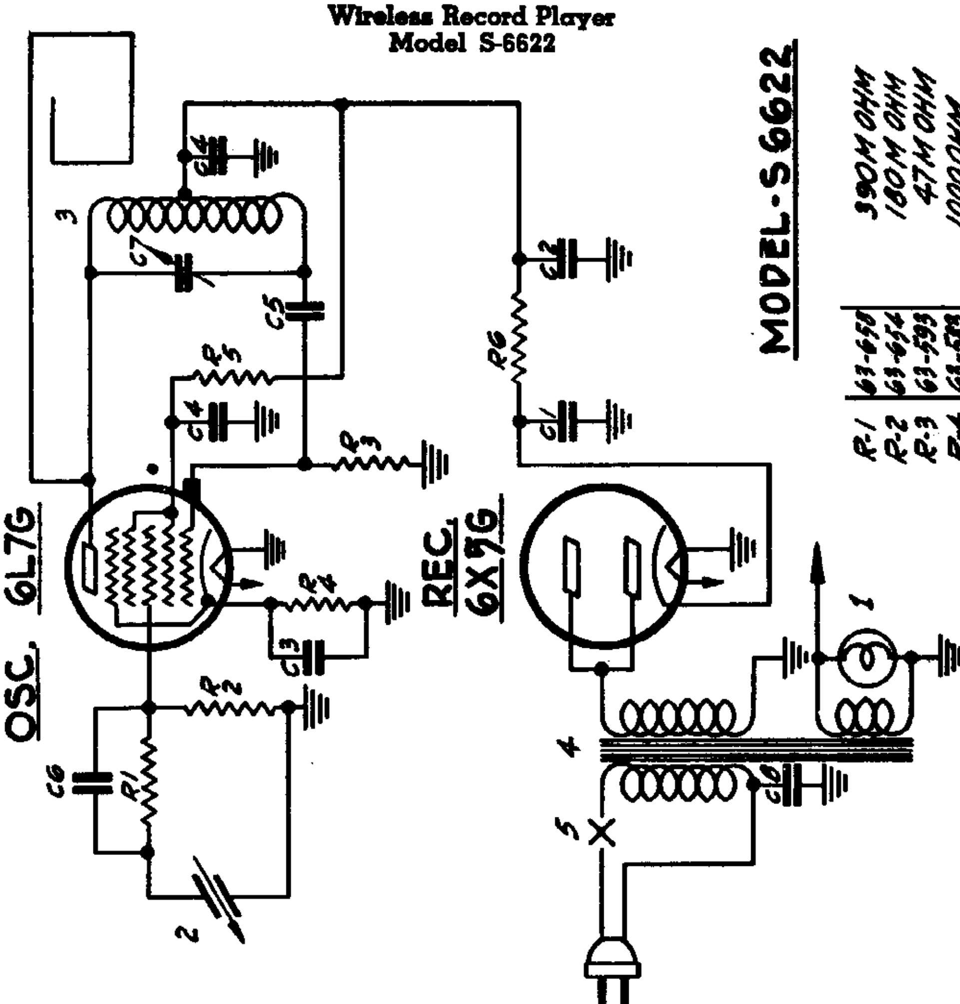
Location of tubes and trimmers

MODEL 8S359, Ch. 5807
Alignment
MODEL S-6622
Wireless Record Player
Schematic

ZENITH RADIO CORP.

PHONOGRAPH OSCILLATOR

Wireless Record Player
Model S-6622



R-1	63-658	390M OHM	1/4W
R-2	63-654	180M OHM	1/4W
R-3	63-595	47M OHM	1/4W
R-4	63-589	10000 OHM	1/4W
R-5	63-507	4700 OHM	1/4W
R-6	63-964	4700 OHM	1/2W
1	100-36	PILOT LIGHT-6.3V. .25A.	
2	142-14	PICK-UP ARM-COMPLETE	
	142-16	CRYSTAL UNIT ONLY	
3	S-6685	OSC. COIL ASSEM.	
4	95-567	POWER TRANS.	
5	85-170	SWITCH	

DIAG. No	PART No	DESCRIPTION	
C-1	22-768	16 MFD ELECTROLYTIC	200V
C-2		40 MFD "	150V
C-3	22-250	.05 MFD	200V
C-4	22-196	.01 MFD	600V
C-5	22-182	.00025 MFD	600V
C-6	22-147	.0005 MFD	600V
C-7	22-463	TRIMMER	
C-8	22-525	.005 MFD	1000V

Model 8S359. Chassis No. 5807

ALIGNMENT PROCEDURE

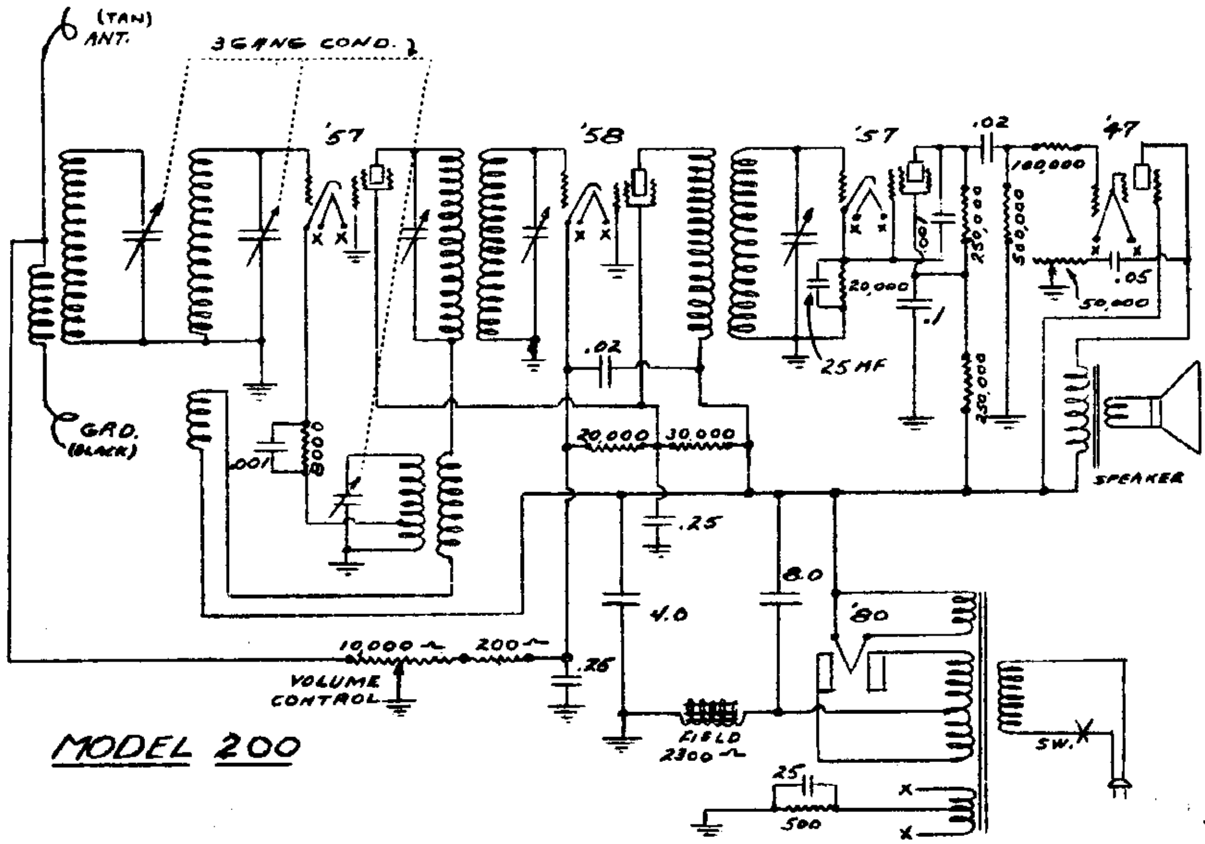
Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	455	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
6	" " "	200 Mmfd.		"		FG	Repea 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8.	" " "	400 Ohms	18000	S.W.	18000	L	Rock Gang & adj. for max. output.
9	" " "	400 Ohms	6000	Police	6000	N	Rock Gang & adj. for max. output.

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

MODELS 834,1102,1106
Chassis 1002
Alignment,Notes

ZENITH RADIO CORP.

MODEL 200
Schematic



MODELS 1102,1106,and 834. CHASSIS 1002
All components used in these models as the same as those used in Zenith Chassis 1001 - 1001A excepting the following changes.

Parts added	Parts Deducted
26-75 Complete Dial and Drive Assem.	(26-66 Dial and Drive)
26-73 Dial scale only	(26-67 Dial Scale only)
22-305 (2) 35 mfd. Condensers	(22-289 Condenser)
22-245 Padder	(22-225 Condenser)
S-3317 Long wave ant coil Assem.	(20-84 7 Meter coil)
S-3318 Long wave osc. coil ..	(S-3115 7 Meter coil)
S-3321 Long Wave Dectector Coil Assem.	

The long wave band has two trimmers on each stage. The oscillator stage has a trimmer and padder assembly of the nut and screw type. The nut is the trimmer and the screw is the padder.
The detector and R.F. stages each have two trimmers whose actions are dependent. The arrangement consists of a coupling condenser and a coil trimmer.
The coil trimmer can be distinguished in that one side is grounded. Maximum gain with this system is obtained by having the coupling condenser with as much capacity as possible and still be able to obtain a peak on the coil trimmer.

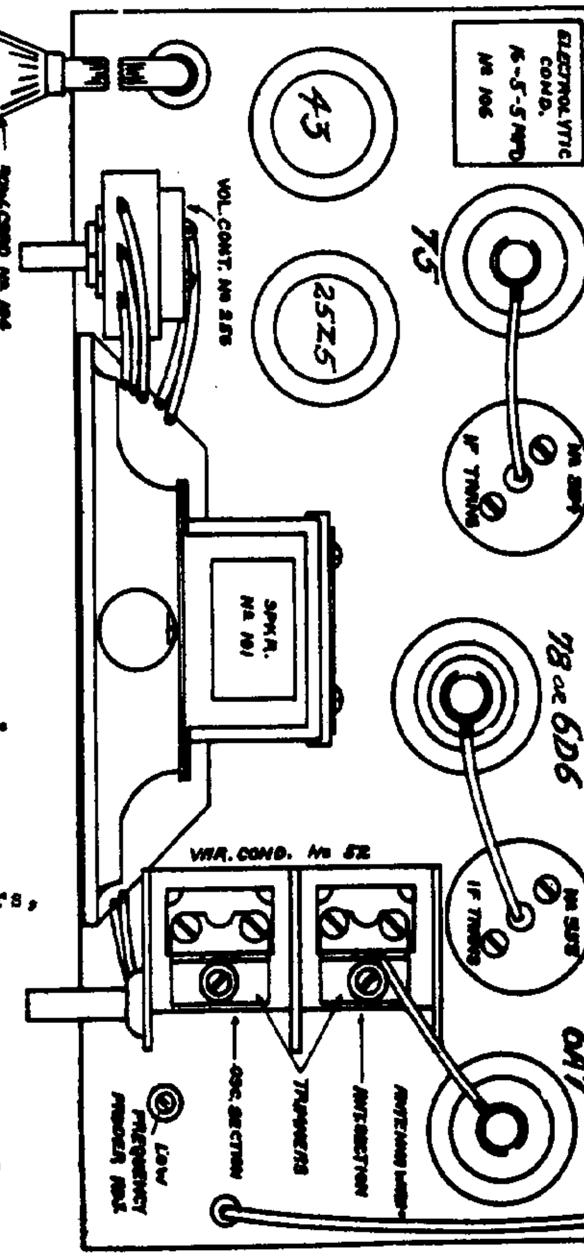
BALANCING PROCEDURE FOR LONG WAVE

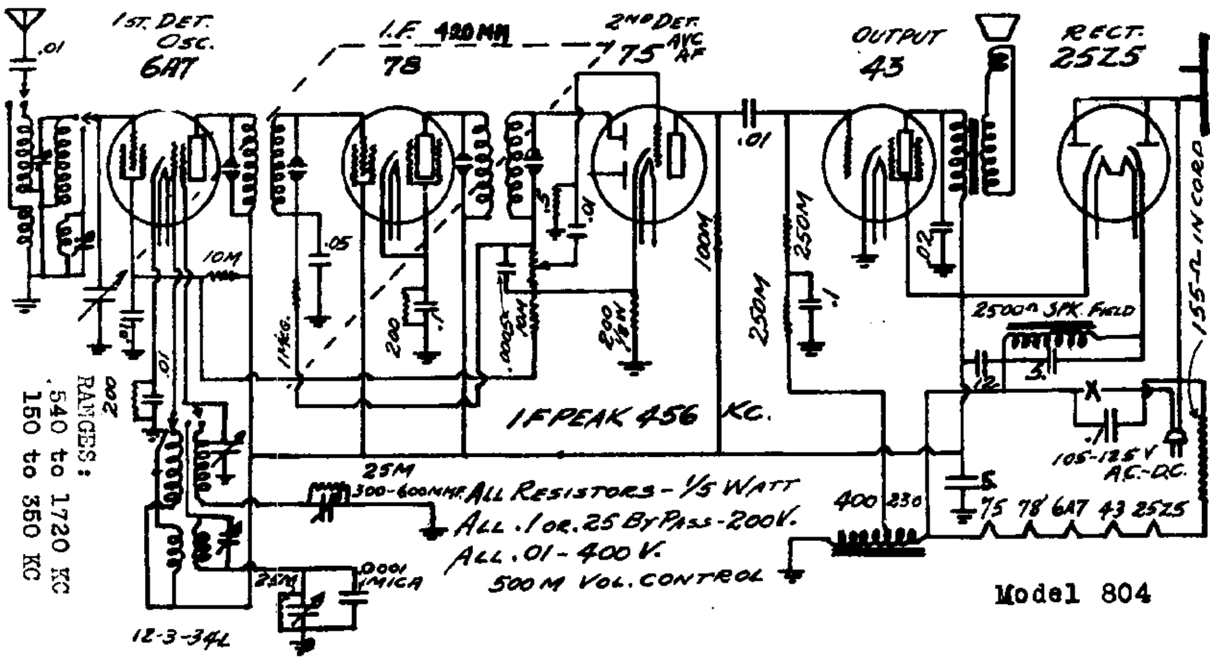
Connect service oscillator to antenna post and set at 375 KC. Set dial at 375 KC. Adjust nut on oscillator trimmer assembly to bring in signal. Open R.F. and detector coil trimmers as far as possible and still leave enough capacity for peaking (about 2 or 3 turns). Open coupling condensers until what appears to be resonance is obtained. Then repeak coil trimmers to resonance. Remember the resonance obtained by means od the coupling condensers is not true resonance and the coil trimmers must be re-adjusted for true resonance.
Move I.F. selector switch to 160 KC. and set dial at this point. Adjust padder screw in oscillator coil assembly for maximum gain, rocking condenser to reach this point, whereever it happens to fall. Repeak 375 KC. as it will be thrown off by the movements of the padder.

MODEL 804
Schematic, Alignment

ZENITH RADIO CORP.

Socket, Trimmers





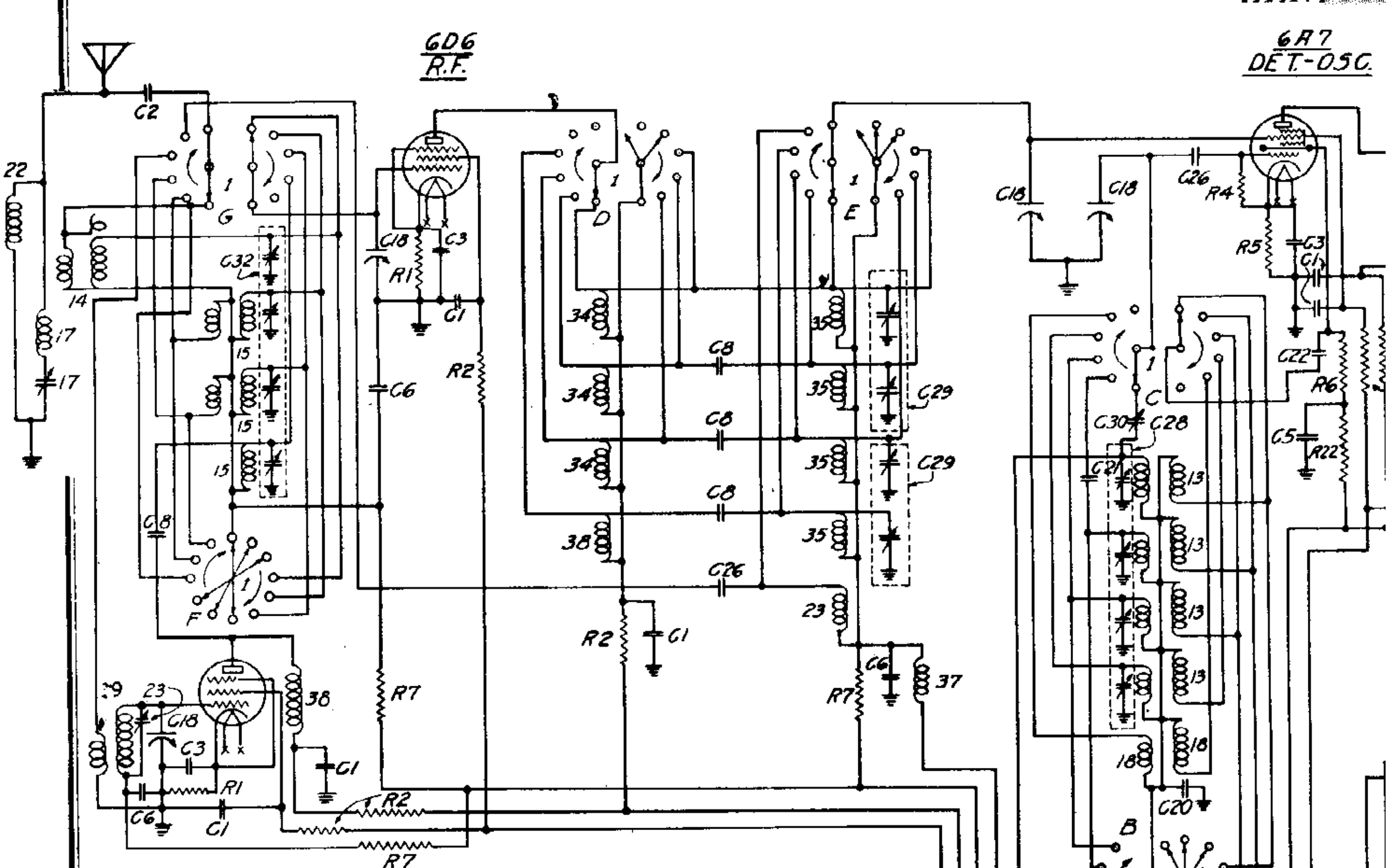
RANGES:
.540 to 1720 KC
150 to 350 KC

To align receiver, proceed as follows:

1. Peak I R transformer, applying a 456 KC note on the 6A7 control grid.
2. Turn variable condenser all the way open and apply a 1712 KC note to the antenna. Set oscillator trimmer on oscillator section of variable condenser first, then line up R F section.
3. Adjust low frequency padder at 600 KC, rocking condenser back and forth across 600 KC signal and adjust for maximum gain.
4. Go back and check 1400 KC alignment.
5. Long Wave- Apply 150 KC note to antenna. Set long wave oscillator and R F trimmers, through holes at front of chassis , for maximum gain.
6. Apply a 300 KC note to the antenna and adjust long wave padder, through hole on front of chassis, for maximum gain - rocking condenser back and forth while adjusting.
7. Go back and check 150 KC again for alignment.

NOTE: Supply cord of set gets warm while operating set, this is normal.
Make sure that all tubes are pushed firmly in their proper sockets.
Unreel antenna supplied with set, to full length and place along the floor or drop out of window, if an outdoor antenna is used, make sure connection to set antenna (brown wire) is good.
DO NOT ATTACH A GROUND WIRE TO THIS SET.
If necessary to service chassis, under no circumstances remove the chassis without first removing plug from receptacle.

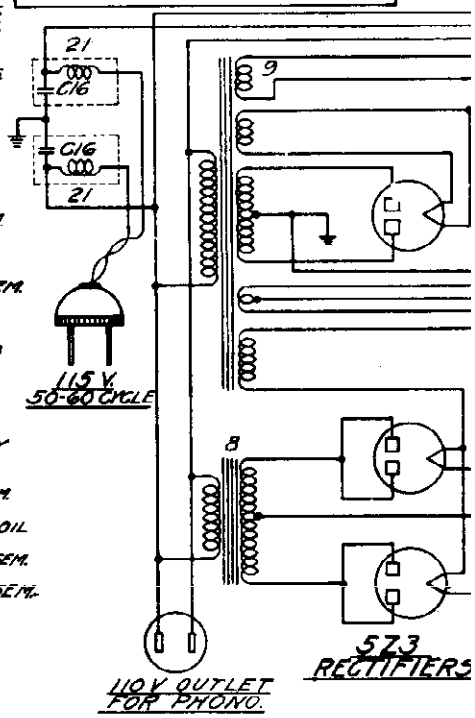
ZENITH



DIAG. Nº	PART Nº	DESCRIPTION	
R1	63-362	400 OHMS	¼W.
R2	63-416	1400 "	¼W.
R3	63-258	490M "	¼W.
R4	63-136	50M "	½W.
R5	63-357	300 "	¼W.
R6	63-291	29M "	½W.
R7	63-260	100M "	¼W.
R8	63-412	3500 "	½W.
R9	63-390	1MEG. DUAL VOL.C	
R10	63-391	" T.C.	
R11	63-387	4M OHMS CANDOHM	
R12	63-389	1M-1857- CANDOHMS	
R13	63-406	5M OHMS CANDOHM	
R14	63-413	4M "	½W
R15	63-405	330 " CANDOHM	
R16	63-408	500M " Q CONTROL	
R17	63-404	60 OHMS CANDOHM	
R18	63-279	3M "	¼W.
R19	63-414	99M OHMS	½W.
R20	63-417	99 OHMS	¼W.
R21	63-326	4M "	¼W.
R22	63-407	10M OHMS CANDOHM	
R23	63-396	10M "	¼W.
R24	63-442	50M "	¼W.
R25	63-440	200M "	¼W.
R26	63-441	1MEG.	¼W.
R27	63-290	260M "	¼W.
R28	63-241	5M "	½W.
R29	63-432	5 OHMS CANDOHM	
R30	63-430	20M OHMS	¼W.
R31	63-439	2700 OHMS	¼W.
R32	63-378	250	¼W.

DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-371	.01 MFD.	600V.
C2	22-374	.01 "	300V.
C3	22-373	.05 "	300V.
C4	22-377	.1 "	600V.
C5	22-361	16 "	450V.
C6	22-372	.01 "	300V.
C7	22-365	.0001 "	600V.
C8	22-127	.000025 MFD.	600V.
C9	22-375	.1 MFD.	300V.
C10	22-367	.00005 MFD.	600V.
C11	22-189	20 MFD.	25V.
C12	22-378	.04 "	600V.
C13	22-362	8 MFD.	300V.
C14	22-225	5 "	25V.
C15	22-360	4 "	600V.
C16	22-379	.002 MFD.	600V.
C17	22-289	.0005 "	600V.
C18	22-395	450 MMFD.	4 GANG
C19	22-287	.03 MFD.	600V.
C20	22-342	.0029 MFD.	600V
C21	22-341	.00092 "	600V.
C22	22-147	.0005 "	600V.
C23	22-305	2-35 MFD.	
C24	22-383	ORDER BY PART Nº ONLY	
C25	22-338	SPECIAL TOLERANCES.	
C26	22-289	.00005 MFD.	600
C27	22-199	.5 MFD. "	200V.
C28	22-397	2-35 MMFD.	4 GANG
C29	22-398	2-35 "	2 GANG
C30	22-205	200-500 MMFD.-PADDER	
C31	22-321	8 MFD.	450V.
C32	22-396	2-35 MMFD.	4 GANG
C33	22-229	.005	600V.

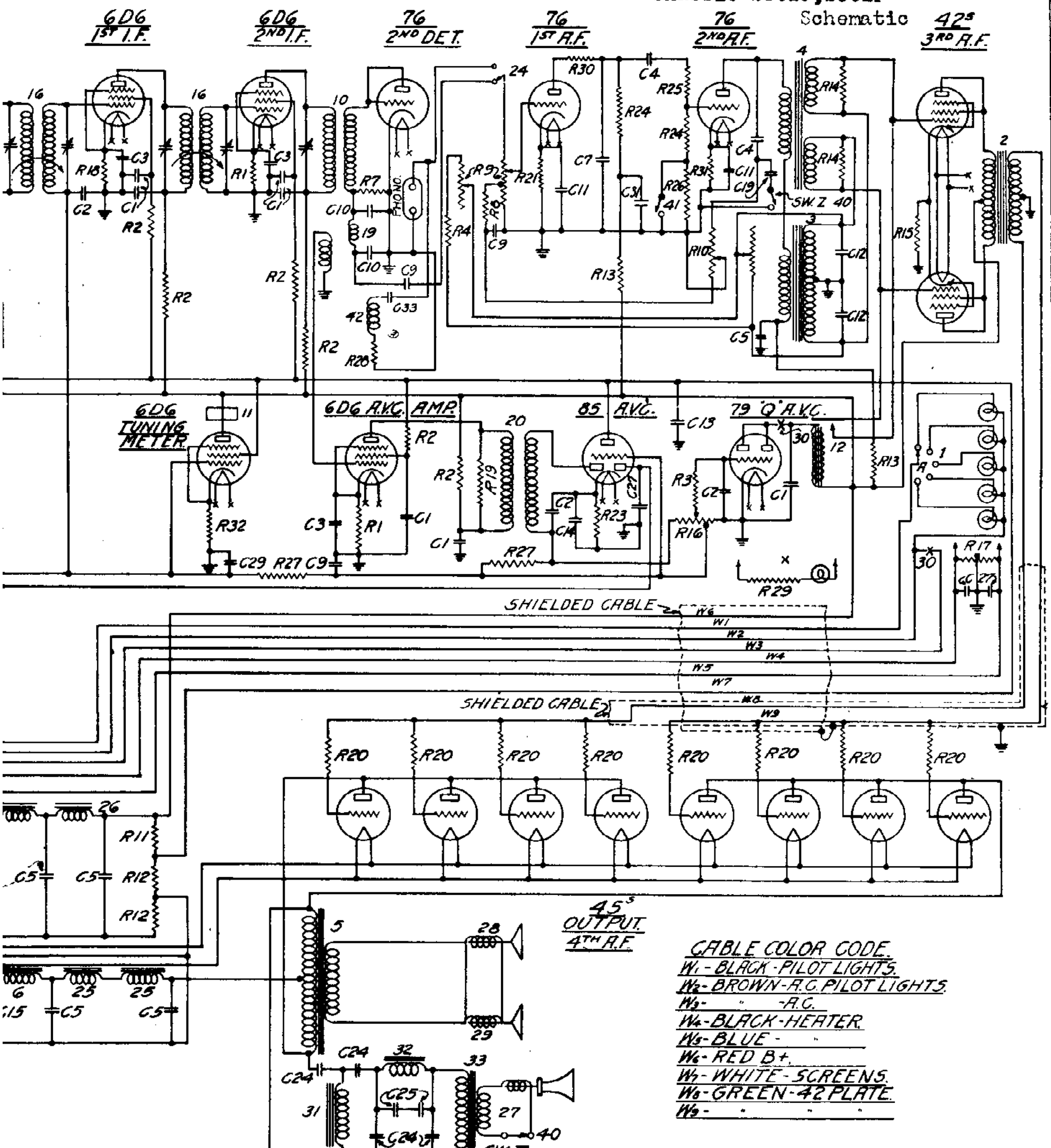
DIAG. Nº	PART Nº	DESCRIPTION
1	85-71	BAND SELECTOR SWITCH
2	95-250	DRIVER TRANS.
3	95-251	LOW BOOST AUDIO TRANS.
4	95-252	HIGH FREQUENCY TRANS.
5	95-253	SPEAKER OUTPUT TRANS.
6	95-254	POWER CHOKE
7	95-255	" "
8	95-256	OUTPUT "B" SUPPLY TRANS.
9	95-257	POWER TRANS.
10	95-264	3RD I.F. TRANS.
11	122-9	SHADOWGRAPH
12	195-1	SINGLE CONTACT RELAY
13	5-3587	OSC. COIL ASSEM.
14	5-3593	ANT. COIL
15	5-3589	R.F. COIL ASSEM.
16	5-3358	VAR. SELECT I.F. ASSEM.
17	20-109	WAVE TRAP COIL ASSEM.
18	5-3115	H.F. OSC. COIL ASSEM.
19	20-99	DET. FILTER CHOKE
20	20-100	UNTUNED I.F. COIL
21	5-3367	LINE FILTER COIL ASSEM.
22	20-88	ANT. CHOKE
23	20-114	7 METER DET. COIL
24	85-69	PHONO. SWITCH
25		SPKR. FIELD 49-102-49-103
26		" " 49-99
27	49-99	SPEAKER
28	49-102	#2 JENSEN SPEAKER.
29	49-103	#1 " "
30	85-64	TOGGLE SWITCH
31	95-266	ORDER BY PART Nº ONLY
32	95-265	SPECIAL TOLERANCES
33	95-267	
34	20-81	R.F. PLATE CHOKE ASSEM.
35	5-3588	DET. COIL ASSEM.
36	20-79	DET. BROADCAST BAND COIL
37	20-71	R.F. CHOKE
38	5-3538	R.F. PLATE CHOKE ASSEM.
39	5-3591	10-23 MEGACYCLE COIL
40	85-75	TWEETER SWITCH ASSEM.
41	85-75	" SWITCH
42	20-118	SCRATCH FILTER COIL



NO

RADIO CORP.

MODEL 1000Z Stratosphere Revised
Chassis 2501C,2501P
Schematic



CABLE COLOR CODE.
W1 - BLACK - PILOT LIGHTS.
W2 - BROWN - A.C. PILOT LIGHTS.
W3 - " - A.C.
W4 - BLACK - HEATER.
W5 - BLUE - "
W6 - RED B+.
W7 - WHITE - SCREENS.
W8 - GREEN - 42 PLATE.
W9 - " " "

SWITCHES SHOWN IN BROADCAST POSITION.

REVISED MODEL Nº 1000Z.

SECTIONS OF SWITCH ARE IN ALPHABETICAL ORDER FROM FRONT TO REAR OF CHASSIS.
A - SECTION Nº 1.
B - " - 2
C - " - 3
D - " - 4
E - " - 5
F - " - 6
G - " - 7

25 TUBE SUPERHETERODYNE.
I.F. FREQUENCY 485 KC.
CHASSIS Nº 2501-C & 2501-P.

ZENITH RADIO CORP.
CHICAGO, ILL.
U.S.A.

The chassis and power pack layout are the same as for the early model, for which see the Index

W.D. 2-22-34

ZENITH RADIO CORP.

MODEL 1000Z Revised
Chassis 2501C, 2501P
Alignment, Trimmers
Voltage, Resistances

Socket Voltages

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	1st R. F.	6.3	3	0	100	3	300
6D6	2nd R. F.	6.3	3	0	100	3	300
6A7	1st Det.	6.3	3	0	100	-	300
	Osc.			3	-	-	130
6D6	1st I. F.	6.3	7	0	100	7	300
6D6	2nd I. F.	6.3	3	0	100	3	300
76	2nd Det.	6.3	0	0	-	-	0
76	1st A.F.	6.3	8	0	-	-	140
76	2nd A. F.	6.3	14	0	-	-	270
42	Driver	6.3	22	0	300	-	300
45	Power A.F.	2.5	63	0	-	-	330
79	Q.A.V.C.	6.3	0	0	-	-	250 Q on 0 Q off
6D6	Shadowmeter Amplifier	6.3	3	0	100	3	300
6D6	A.V.C.Amplf.	6.3	3	0	100	3	300
85	A.T.C.	6.3	0	0	-	-	100
5Z3	Rect. Power Amplifier	5	-	-	-	-	-
5Z3	Rect. for Upper Chassis	5	-	-	-	-	-

Line Voltage 112. Antenna and Ground shorted.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

Balance Procedure: Caution - Test set thoroughly for defective tubes, antenna and ground, check line voltage and chassis voltages before any attempt is made to rebalance. All balancing should be done with a calibrated oscillator capable of a steady signal and minimum attenuation of signal input strength. The screw driver used should be of non metallic type and output meter usually connected across plates of 45 tubes at point where the two green speaker wires come out of power pack.

Warning. Do not rebalance this chassis unless absolutely necessary as all chassis are balanced on an accurate signal generator before shipment. Set volume control in full on position, tone control on treble, high fidelity control in selective position. Band switch set on broadcast position, gang 580 K.C., approximately. Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground, adjust I.F. transformers, to maximum output with minimum input signal. Rotate selectivity control to broad position, I.F. output should remain constant 6 K.C. plus and minus 485 K. C. Next, connect the same 485 K.C. signal directly across aerial and ground binding post. Balance wave trap to minimum signal. Gang set at 550.

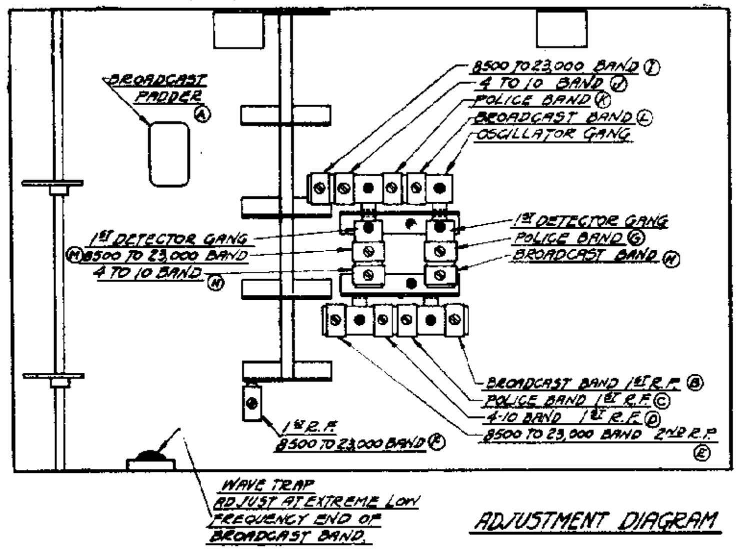
Note: Refer to drawing of trimmer assembly to identify trimmers.
Set service oscillator at 600 K.C. Adjust broadcast padder "A" meanwhile rocking pointer past 600 K.C. on dial to combination giving greatest output. Set chassis dial to exactly 1400 K.C., and service oscillator to 1400 K.C. Balance "L" oscillator trimmer to scale. Reset oscillator to 600 K.C., rotate gang to 600 and re-check 600 padder for maximum output. Next, retune oscillator trimmer at 1400 K.C. Adjust detector trimmer "H" and R.F. trimmer "B" to maximum output.

Police or Orange band. Rotate chassis band switch to police band, gang should be rotated to 3 megacycles, oscillator to 3 megacycles also. Adjust oscillator trimmer "K" to scale, peak "G" detector and "C" R.F. trimmers to maximum peak.

Yellow band. Set dial and oscillator to 9 megacycles. Peak oscillator trimmer "J" for scale, "M" detector and "D" R. F. trimmers for maximum peak.

Red band. Set dial and oscillator at 21 megacycles, peak "I" oscillator for scale, "N" detector and "E" R.F., and trimmer "F" located at back of band switch for maximum peak. There are no adjustments on the Blue band.

On all short wave adjustments be careful not to balance the oscillator circuit to the image frequency of the signal. This is equal to signal frequency minus twice the I.F. frequency.



ADJUSTMENT DIAGRAM

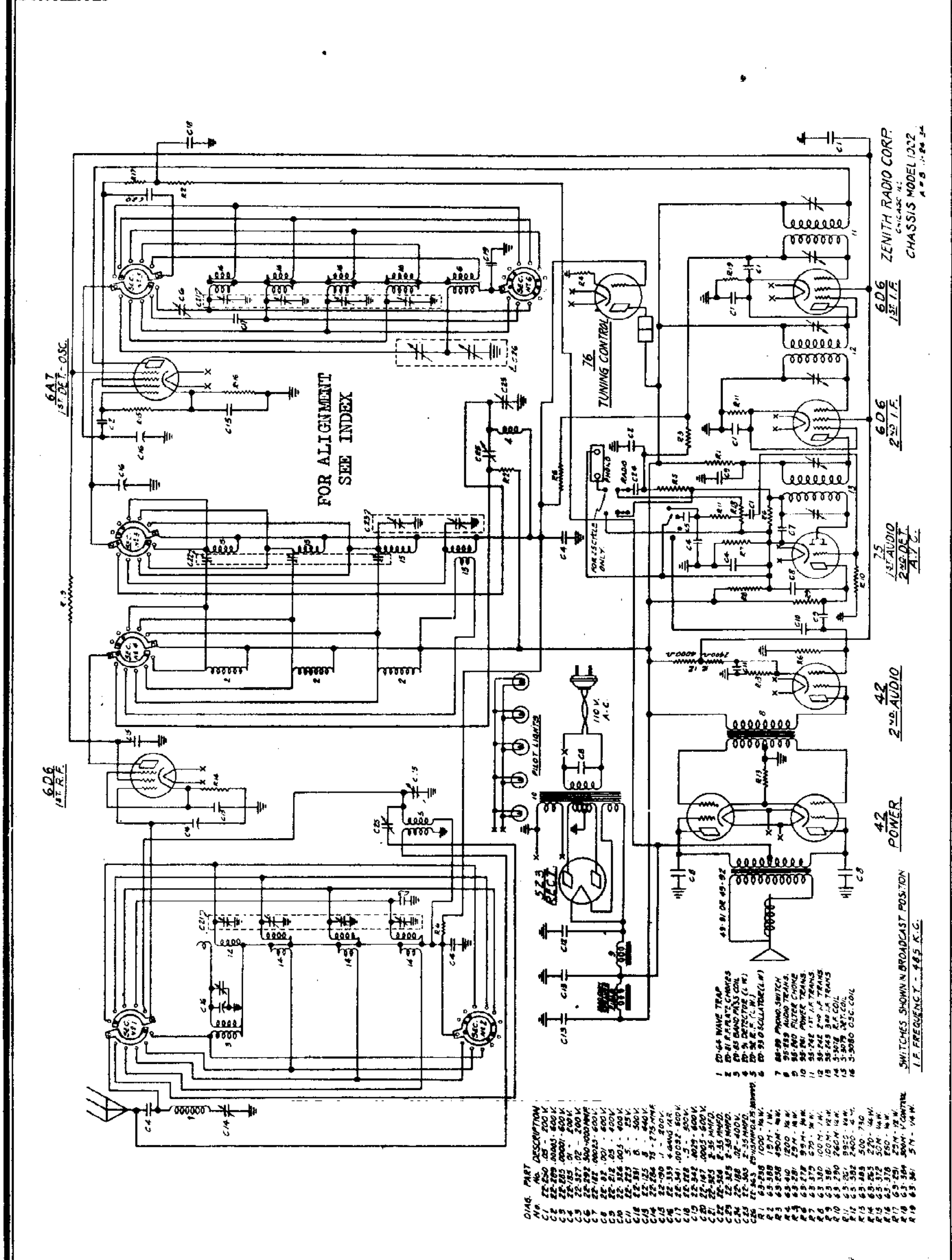
RESISTANCE MEASUREMENTS - UPPER CHASSIS

TUBE	POSITION	HEATER	CATHODE	GRID	SCREEN	SUPPRESSOR	PLATE
6D6	1st. R. F.	20	350	600 M.	5 Meg.	350	1 Meg.
6D6	2nd. R. F.	20	350	600 M.	5 Meg.	350	1 Meg.
6A7	1st. Det.	20	275	600 M.	5 Meg.	-	1 Meg.
	Osc.			50 M.	-	-	1 Meg.
6D6	1st. I. F.	20	350	2	5 Meg.	350	1 Meg.
6D6	2nd. I. F.	20	3000	500 M.	5 Meg.	3000	1 Meg.
76	2nd Det.	20	0	100 M.	-	-	100 M.
75	1st. Aud.	20	4000	8000	-	-	1 Meg.
76	2nd. Aud.	20	3000	1 Meg.	-	-	1 Meg.
42	Driver	20	325	3000	-	-	1 Meg.
79	Q.A.V.C.	20	0	1 Meg.	-	-	1 Meg. Q on
6D6	Shadowmeter Amplifier	20	250	500 M.	5 Meg.	250	1 Meg.
6D6	A.V.C.Amplf.	20	250	2	5 Meg.	250	1 Meg.
85	A.V.C.	20	10M	250 M.	400 M.	500 M.	5 Meg.

All Measurements Made With Lower Chassis Disconnected.

MODELS 834,1102,1106
Chassis 1002
Schematic

ZENITH RADIO CORP.



ZENITH RADIO CORP.

CHASSIS 5517A SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	1st Det. Osc.	0	0	240	85	–1	166	6ac	4	0
6K7	I. F	0	0	240	85	3	—	6ac	3	0
6Q7	2nd Det A.V.C.	0	0	75	1	1	—	6ac	1 5	0
6F6	Power	0	0	230	240	–5	—	6ac	0	—
5Y3 5W4	Rectifier	0	240	—	AC	—	AC	—	240	—

BOTTOM VIEW OF SOCKET

CHASSIS 5636 SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	1st Det Osc.	0	AC	100	50	-5	100	AC	1	–1
6K7	I. F	0	AC	100	100	5	—	AC	5	0
6Q7	2nd Det. A.V.C.	0	AC	50	0	0	—	AC	1	0
25A6	Power	0	AC	90	100	1	—	AC	0	—
25Z6	Rectifier	0	AC	AC	AC	100	—	AC	125	—
100-37	115 Volt Ballast	—	—	—	—	—	—	—	—	—

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected.
Line Voltage 112V (A.C.)

CHASSIS 5640AT Socket Voltages

Tube	Position	1	2	3	4	5	6	7	8	9
6L7	1st Det	0	0	231	141	—10	—	6.3	2.5	0
6J5	Osc	0	6.3	129	—	—17	—	0	0	—
6K7	IF	0	6.3	234	65	0	—	0	0	0
6Q7	2nd Det Audio	0	0	88	—5	—5	—	6.3	—1	—2
6V6	Power	0	0	210	234	—2	—	6.3	—1.5	—
5Y4	Rect.	0	—	AC	—	AC	188?	288	288	—

CHASSIS 5525A Socket Voltages

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.3	244	97	—9	149	0	0	—.5
6K7	I. F.	0	6.3	246	97	0	—	0	0	—.5
6Q7	2nd Det. AVC 1st Audio	0	0	71	—2.5	—2.5	—	6.3	—2.5	—2.5
6F6	Power	0	0	231	246	—3.5	—	6.3	—2.5	—
5Y4	Rect.	0	—	AC	—	AC	—	316	316	—

All voltages measured from point indicated to ground using a 1000 ohm per volt meter, antenna and ground disconnected. Line voltage 117 v.

CHASSIS 5802A SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	6AC	250	68	0	—	0	0	0
6A8	1st Det. Osc.	0	6AC	250	68	–4	150	0	0	0
6K7	I. F.	0	6AC	250	68	0	—	0	Local 5	0
6H6	2nd Det. A.V.C.	0	6AC	–3	–3	–3	—	0	–3	—
6F5	1st Audio	0	6AC	—	70	0	0	0	–3	–3
6F6	Power	0	6AC	235	250	–4	—	0	–4	—
6C5	Target Tuning Amp.	0	6AC	250	—	-5	—	0	4	—
5Y3 5W4	Rectifier	0	310	—	AC	—	AC	—	310	—

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected
Line Voltage 112V.

CHASSIS 5708E SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	1st Det Osc.	0	AC	125	80	20	100	AC	25	15
6K7	I F	0	AC	125	125	25	—	AC	25	10
6H6-	2nd Det A.V.C.	0	AC	10	25	10	—	AC	25	—
6F5	1st Audio	0	AC	—	60	—	—	AC	25	5
25A6	Power	0	AC	110	125	1	—	AC	25	—
25Z6	Rectifier	0	0	AC	AC	105	—	AC	125	—
	Ballast	—	—	—	—	—	—	—	—	—

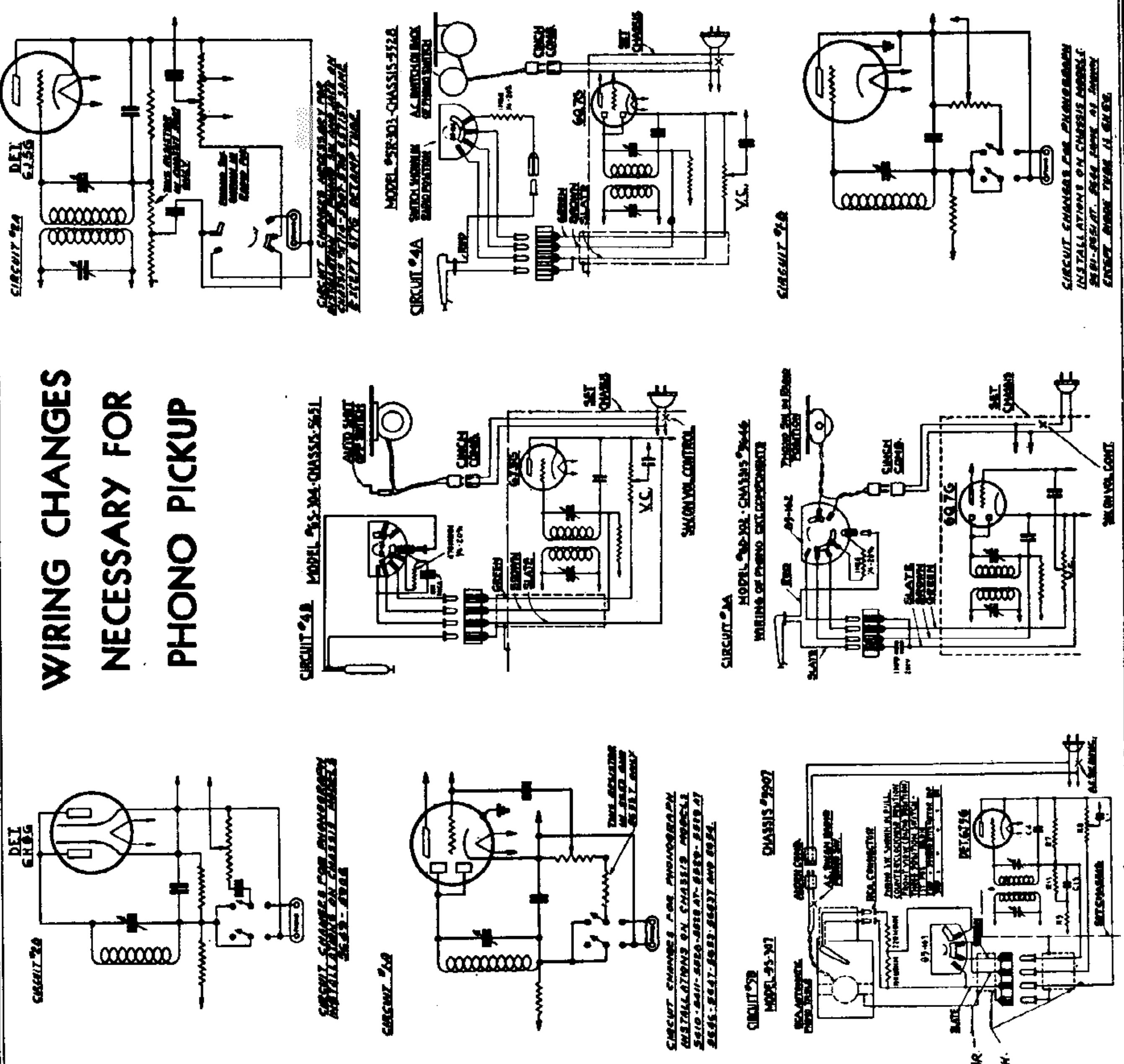
Measured from point indicated to junction of filter choke and speaker field using a 1000 ohm per volt meter
Line Voltage 112 (A.C.)

CHASSIS 5804AT Socket Voltages

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	RF	0	0	216	90	0	—	6.2	0	0
6L7	1st Det	0	0	216	130	—3	—	6.2	2	0
6J5	Osc	0	6.2	116	—	—3	—	0	0	—
6K7	IF	0	6.2	212	90	0	—	0	0	0
6Q7	2nd Det Audio	0	0	70	—2	—2	—	6.2	—2	—2
6V6	Power	0	0	210	216	—3	—	6.2	—4	—
5Y4	Rect	0	—	AC	—	AC	—	276	276	—
6T5	Eye		0	10	—2	216	—2	6.2		
			H	P	C.G	T	K	H		

MODEL Phono.Pick-up
Circuit Changes

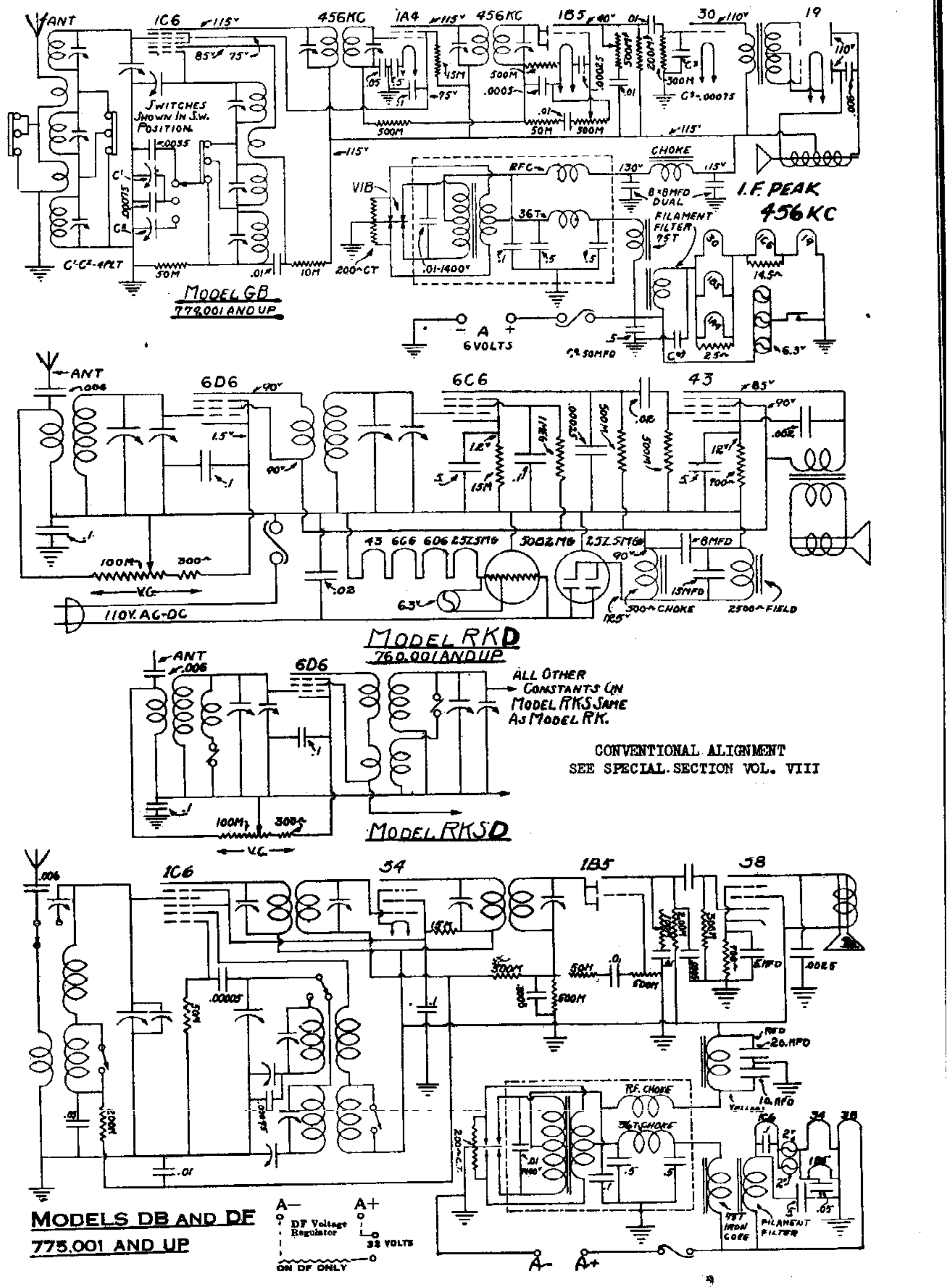
ZENITH RADIO CORP.



Schematics, Voltage

ZEPHYR RADIO CO.

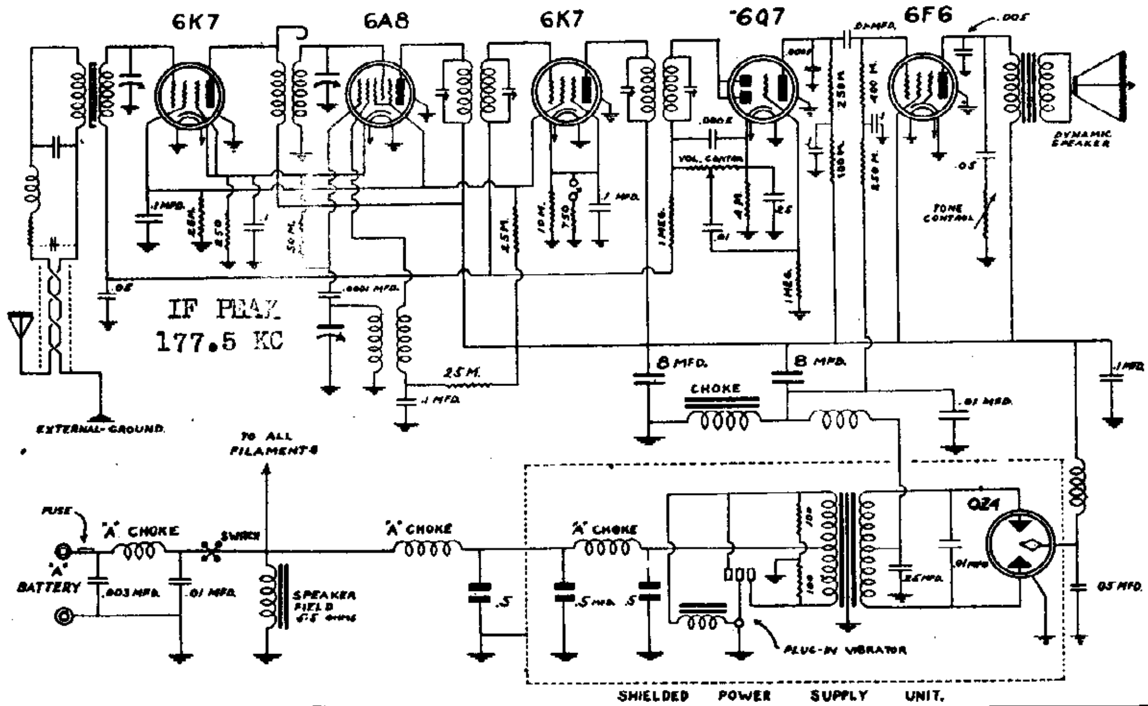
MODEL GB, Above Ser. 779001
MODELS DB, DF, Above 775,001
MODEL RKD, Above Ser. 760,001
MODEL RKSD



MODELS 2M7, B102
Schematic

ZEPHYR RADIO CO.

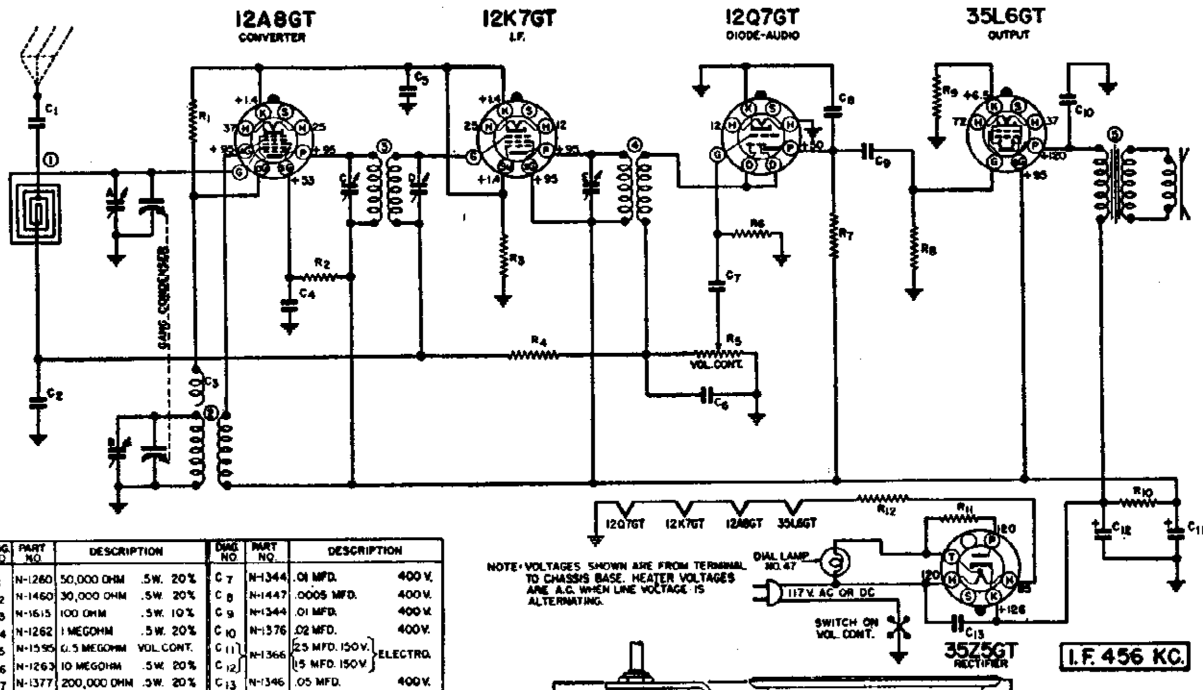
MODEL TSA105
Schematic, Socket
Trimmers, Alignment



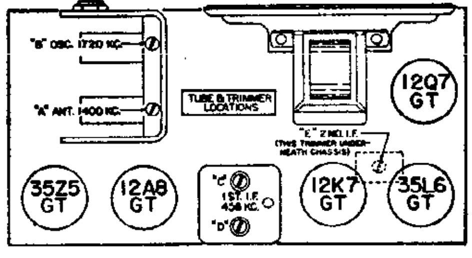
Models B102 & 2M7

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

1936



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R_1	N-1260	50,000 OHM .5W. 20%	C_7	N-1344	.01 MFD. 400 V.
R_2	N-1460	30,000 OHM .5W. 20%	C_8	N-1447	.0005 MFD. 400 V.
R_3	N-1615	100 OHM .5W. 10%	C_9	N-1344	.01 MFD. 400 V.
R_4	N-1262	1 MEGOHM .5W. 20%	C_{10}	N-1376	.02 MFD. 400 V.
R_5	N-1595	0.5 MEGOHM VOL. CONT.	C_{11}	N-1366	25 MFD. 150 V. ELECTRO.
R_6	N-1263	10 MEGOHM .5W. 20%	C_{12}		15 MFD. 150 V. ELECTRO.
R_7	N-1377	200,000 OHM .5W. 20%	C_{13}	N-1346	.05 MFD. 400 V.
R_8	N-1264	500,000 OHM .5W. 20%			
R_9	N-1616	250 OHM .5W. 10%			
R_{10}	N-1617	2500 OHM .5W. 20%	1	N-1594	ANTENNA COIL LOOP
R_{11}	N-1614	50 OHM .5W. 20%	2	N-1452	OSCILLATOR COIL
R_{12}	N-1618	60 OHM 2W. 10%	3	N-1598	1ST. I.F. TRANSFORMER
			4	N-1596	2ND I.F. TRANSFORMER
			5	N-1585	4" P.M. SPEAKER & TRANS.
C_1	N-1344	.01 MFD. 400V	E	N-1597	2ND I.F. TRIMMING COND.
C_2	N-1345	.05 MFD. 200 V.			
C_3		CAPACITY INCLUDED IN OSCILLATOR COIL		N-1431	GANG CONDENSER
C_4	N-1345	.05 MFD. 200 V.			
C_5	N-1351	.1 MFD. 200 V.			
C_6	N-1374	100 MMFD.			



I.F. 456 KC.

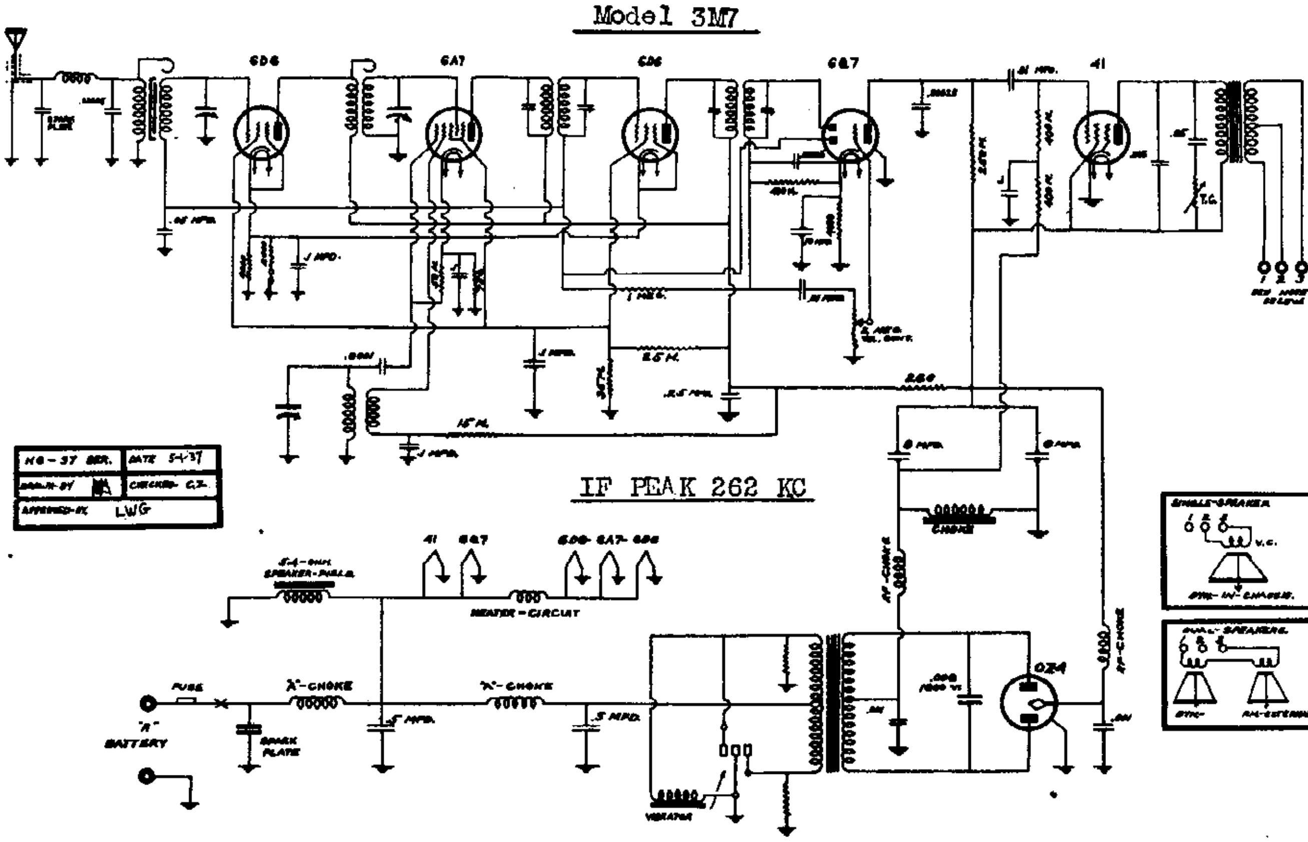
MODEL
TSA105

5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

MODEL 3M7
MODEL 3M8
Schematics

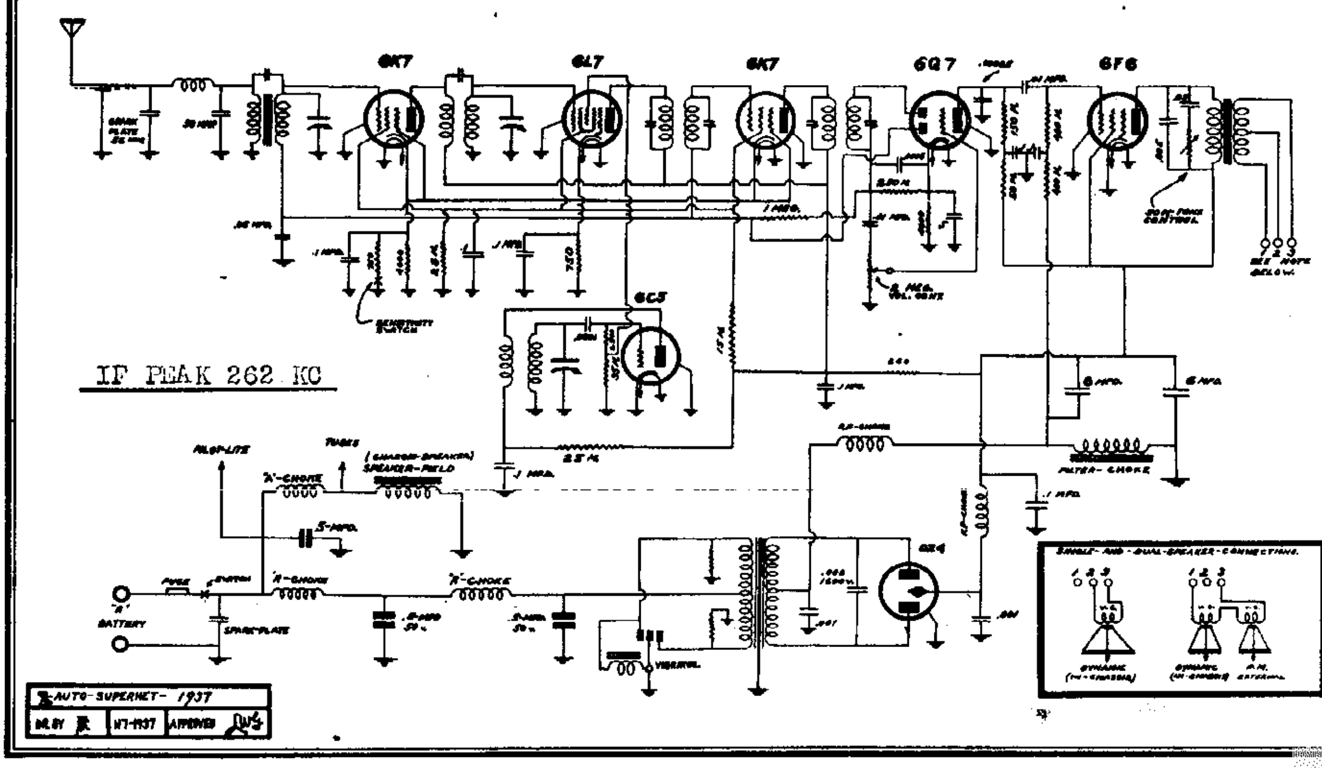
ZEPHYR RADIO CO.

Model 3M7



CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

Model 3M8

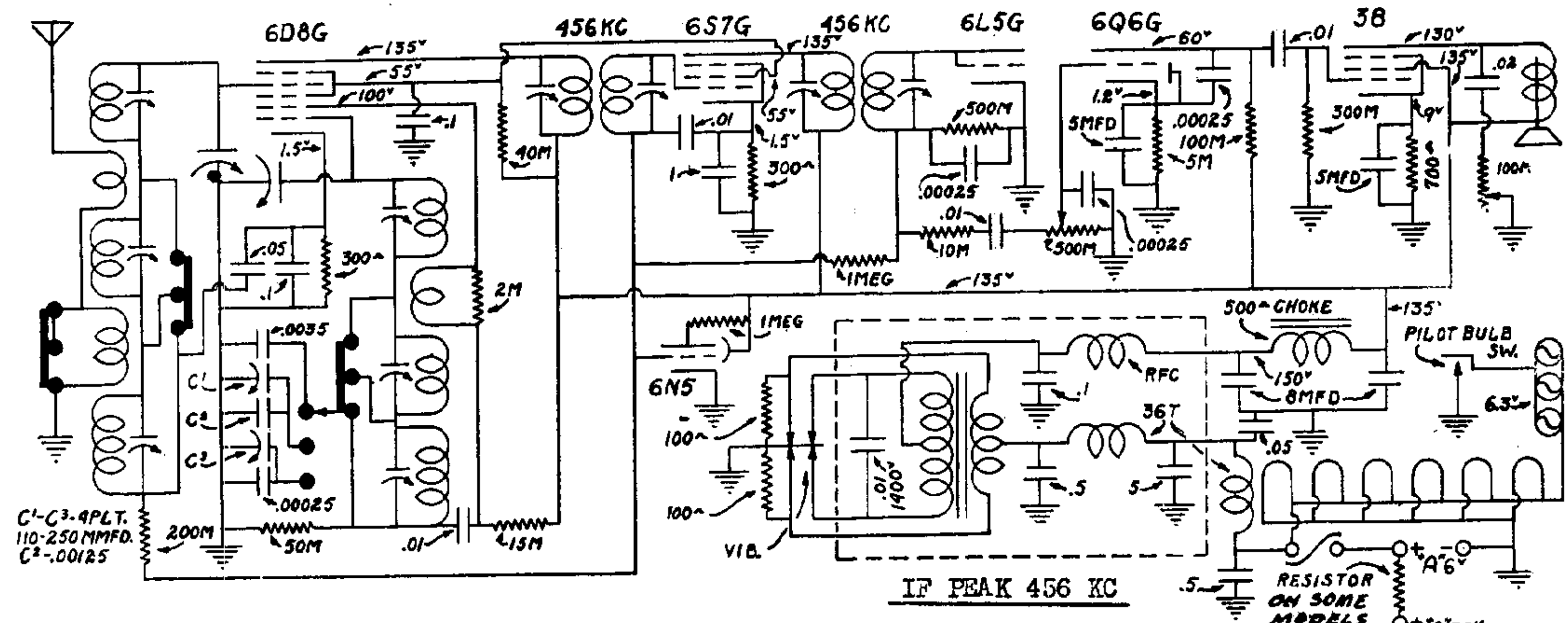


MODEL 25X7
MODEL 30B7, Above Ser. 780001

ZEPHYR RADIO CO.

Schematics

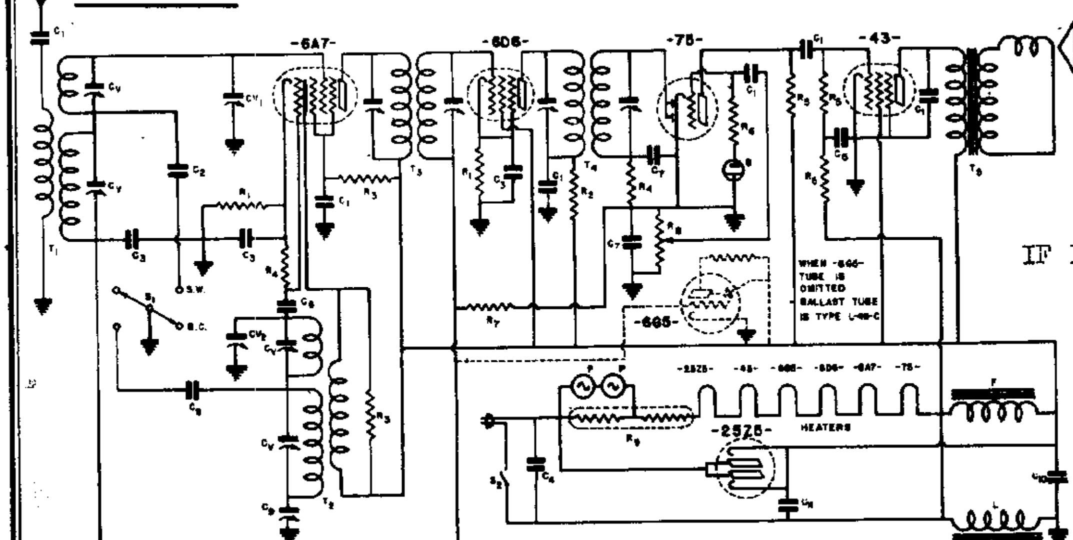
Model 30B7



IF PEAK 456 KC

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

Model 25X7



Model 25X7
Parts List

IF PEAK 456 KC

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MFD TRIMMER CONDENSER
R_1	103	250 OHM ½ WATT CARBON RESISTOR
R_2	116	2000 OHM ½ WATT CARBON RESISTOR
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ½ WATT CARBON RESISTOR
R_5	116	250,000 OHM ½ WATT CARBON RESISTOR
R_6	117	500,000 OHM ½ WATT CARBON RESISTOR
R_7	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_8	2009	500,000 OHM VOLUME CONTROL
R_9	2906	L-42-C BALLAST TUBE (with 665 tube)
R_9	2905	L-49-C BALLAST TUBE (without 665 tube)

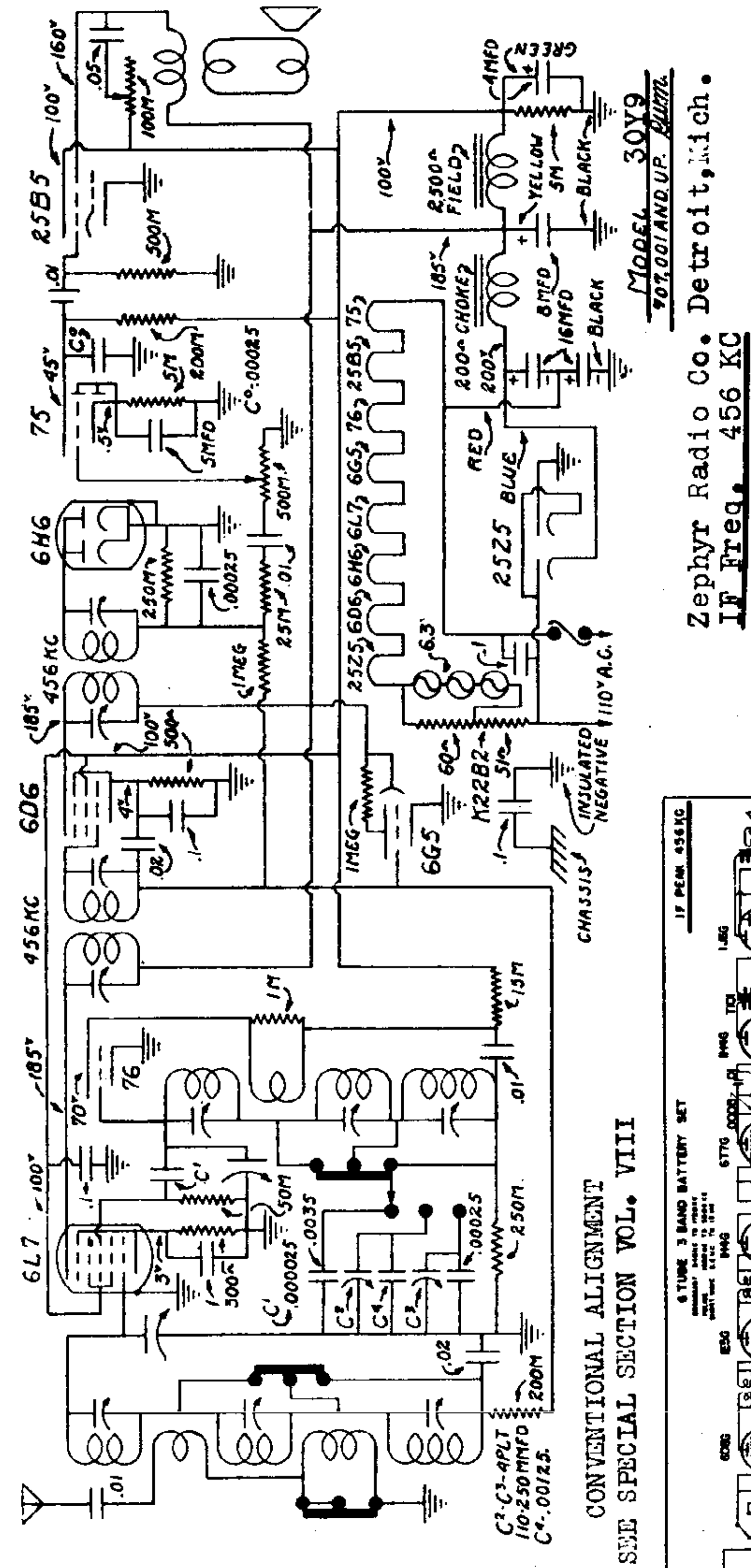
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V. TUBULAR CONDENSER
C_2	206	.05 MFD 200 V. TUBULAR CONDENSER
C_3	205	.1 MFD 200 V. TUBULAR CONDENSER
C_4	210	.1 MFD 400 V. TUBULAR CONDENSER
C_5	204	.25 MFD 200 V. TUBULAR CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	411	.00125 MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_{10}	514	10 MFD 150 W.V. WET ELECTROLYTIC COND.
C_{11}	311	20 MFD 150 W.V. WET ELECTROLYTIC COND.

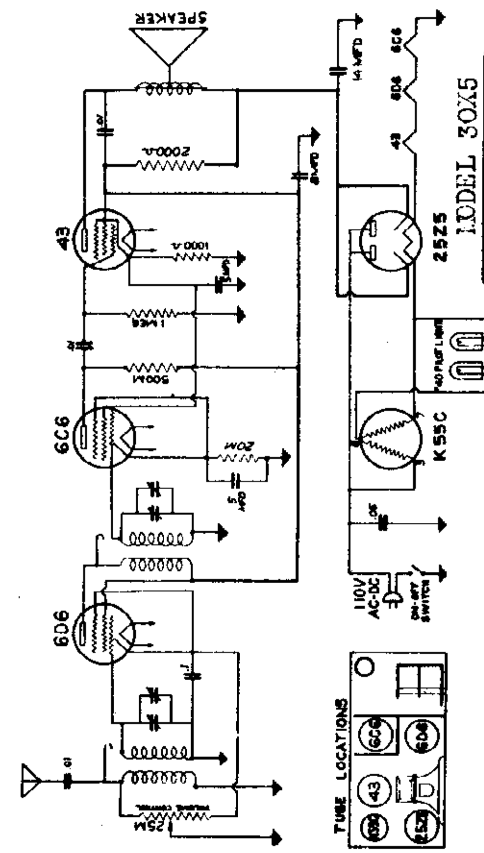
LEGEND	OUR PART NO.	DESCRIPTION
T_1	1210	ANTENNA COIL
T_2	1404	OSCILLATOR COIL
T_3	1507	OUTPUT IF TRANSFORMER
T_4	1505	INPUT IF TRANSFORMER
T_5	800	SPEAKER TRANSFORMER
L	1100	FILTER CHOKE
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46. PILOT LIGHT
B	3000	BIAS CELL
F	800	SPEAKER FIELD ([illegible] OHMS)

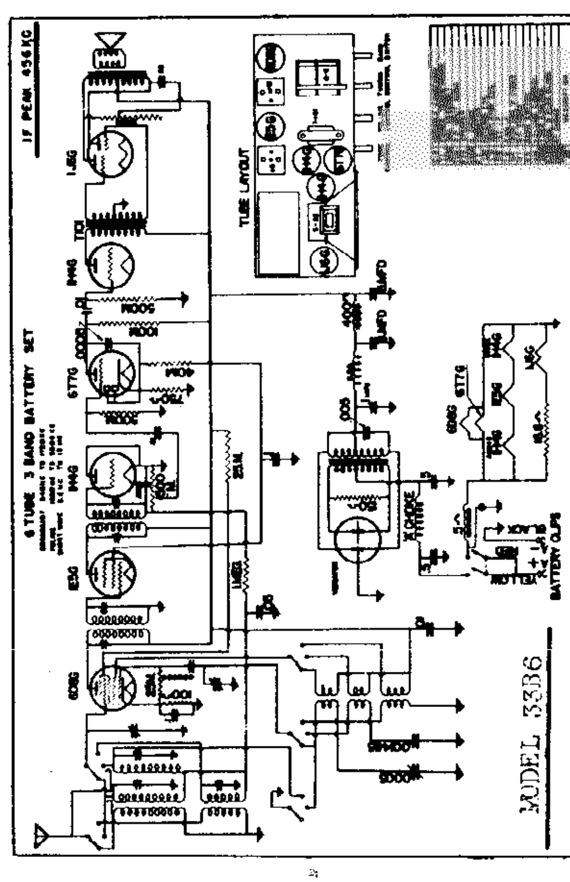
MODEL 33B6
Schematics, Socket

ZEPHYR RADIO CO.

MODEL 30X5
MODEL 30Y9
Above Ser. 707001



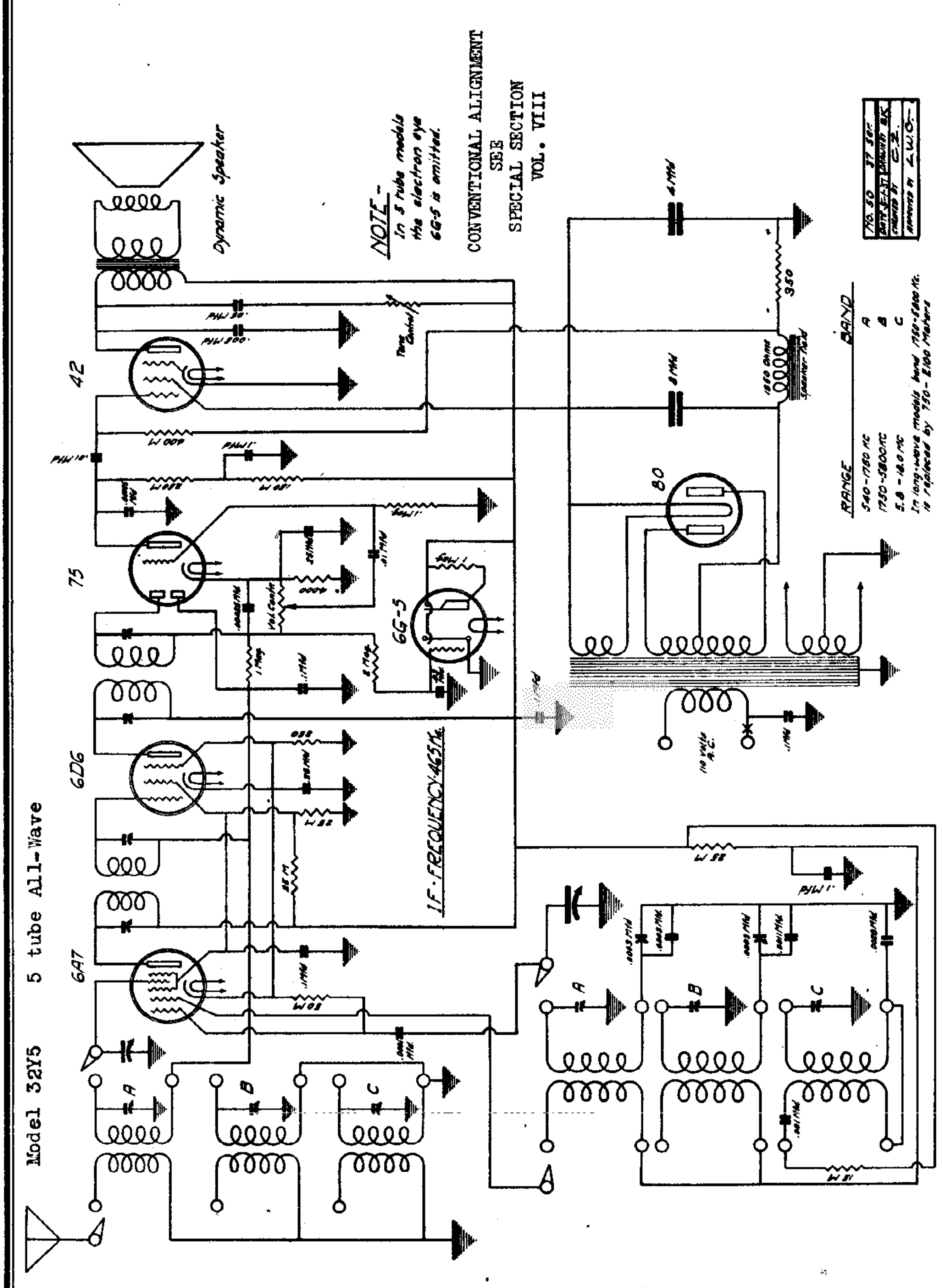




CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

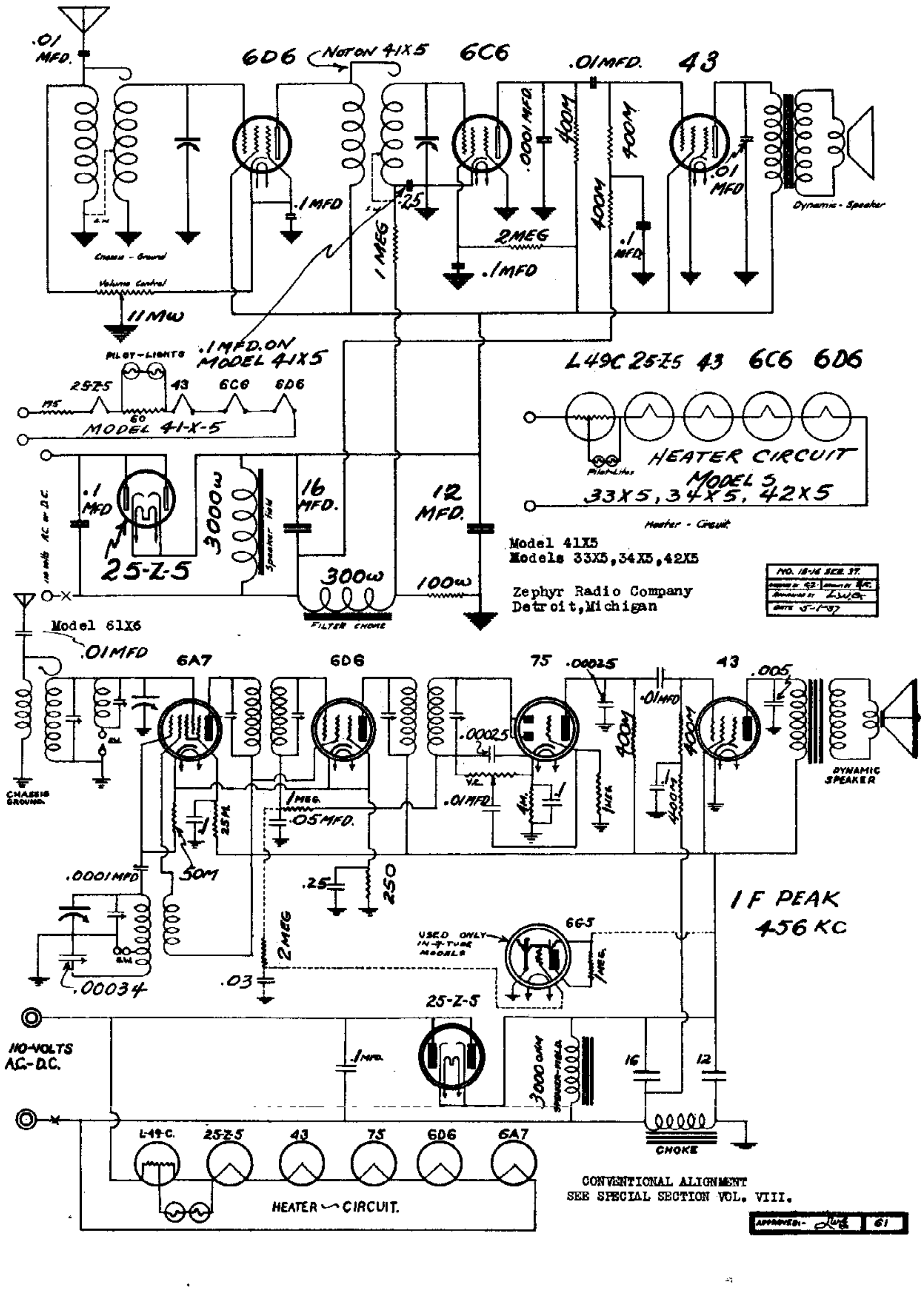
MODEL 32Y5
Schematic

ZEPHYR RADIO CO.



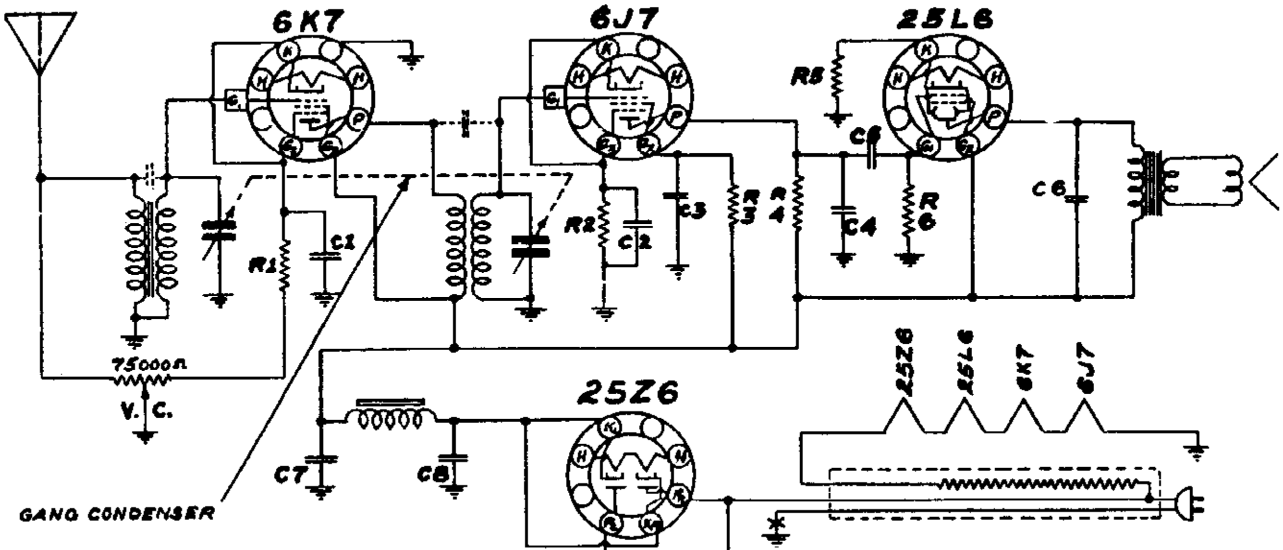
ZEPHYR RADIO CO.

MODELS 33X5, 34X5, 42X5
MODEL 41X5
MODEL 61X6
Schematics



MODEL 39X4
MODEL 39Y6
Schematics

ZEPHYR RADIO CO.



CAPACITORS

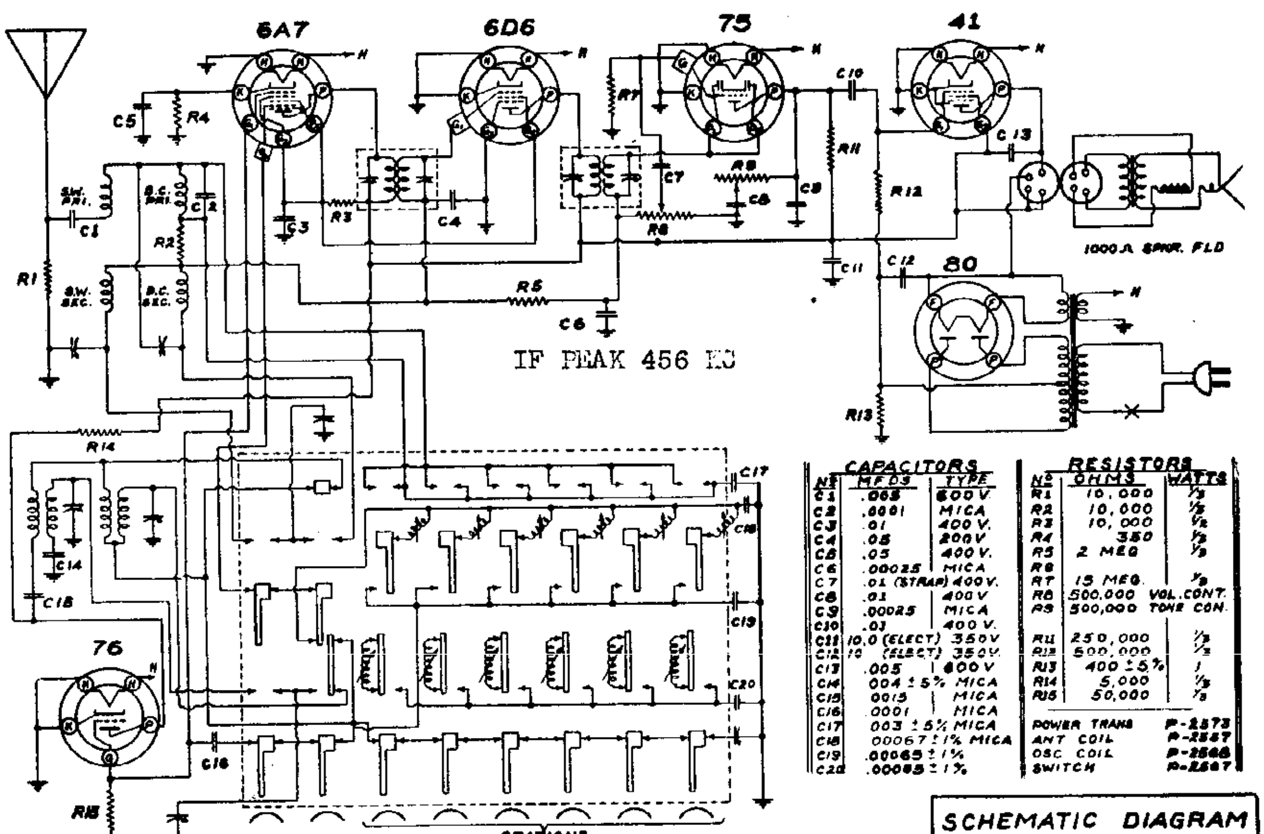
Nº	MFD.	TYPE	Nº	MFD.	TYPE
C1	.1	200V.	C5	.01	400V.
C2	.25	200V.	C6	.02	400V.
C3	.1	200V.	C7	10.0	ELECT.
C4	.00025	MICA	C8	30.0	ELECT.

RESISTORS

Nº	OHMS	WATTS	Nº	OHMS	WATTS
R1	250	1/4	R4	500,000	1/4
R2	25,000	1/4	R5	110	1/2
R3	2,000,000	1/4	R6	500,000	1/4

RESISTANCE OF LINE CORD 173 OHMS

SCHEMATIC DIAGRAM
MODEL 39X4



IF PEAK 456 KC

CAPACITORS

Nº	MFDS	TYPE
C1	.005	600 V.
C2	.0001	MICA
C3	.01	400 V.
C4	.05	200 V
C5	.05	400 V.
C6	.00025	MICA
C7	.01 (STRAP)	400 V.
C8	.01	400 V
C9	.00025	MICA
C10	.01	400 V.
C11	10.0 (ELECT)	350V
C12	10 (ELECT)	350V.
C13	.005	600 V
C14	.004 ± 5%	MICA
C15	.0015	MICA
C16	.0001	MICA
C17	.003 ± 5%	MICA
C18	.00067 ± 1%	MICA
C19	.00065 ± 1%	
C20	.00065 ± 1%	

RESISTORS

Nº	OHMS	WATTS
R1	10,000	1/3
R2	10,000	1/3
R3	10,000	1/2
R4	350	1/3
R5	2 MEG	1/3
R6		
R7	15 MEG.	1/3
R8	500,000	VOL. CONT.
R9	500,000	TONE CON.
R11	250,000	1/3
R12	500,000	1/2
R13	400 ± 5%	1
R14	5,000	1/3
R15	50,000	1/3

POWER TRANS	P-2573
ANT COIL	P-2567
OSC COIL	P-2566
SWITCH	P-2567

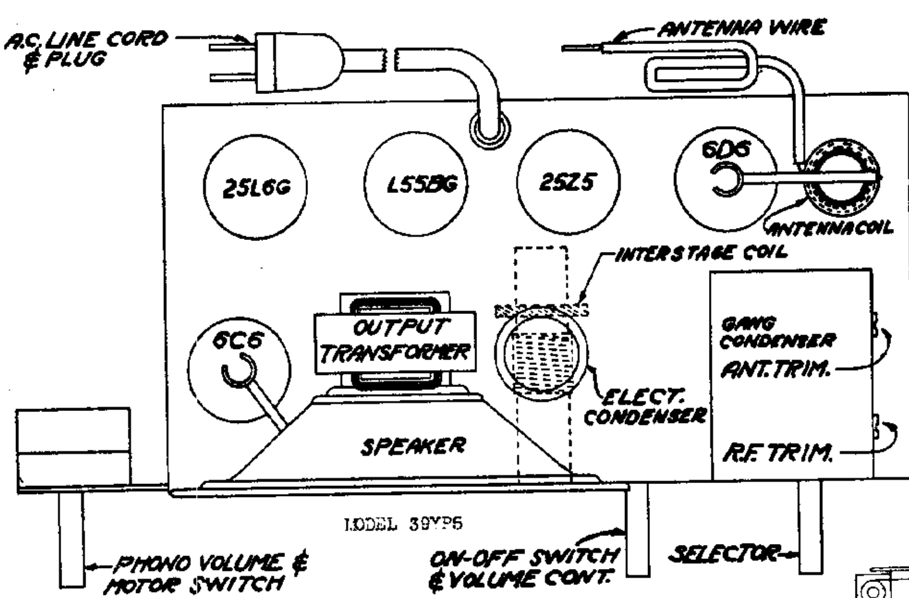
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

SCHEMATIC DIAGRAM
MODEL 39Y6

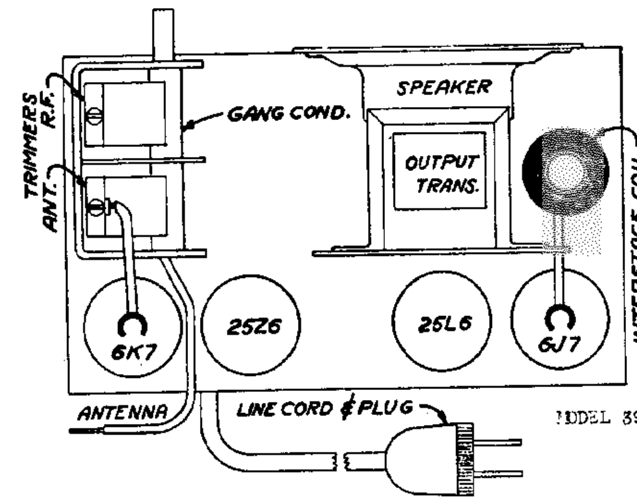
MODEL 39Y6
Tuner
MODELS 40Y8, 40Y8C
Alignment, Tuner
Socket, Trimmers

ZEPHYR RADIO CO.

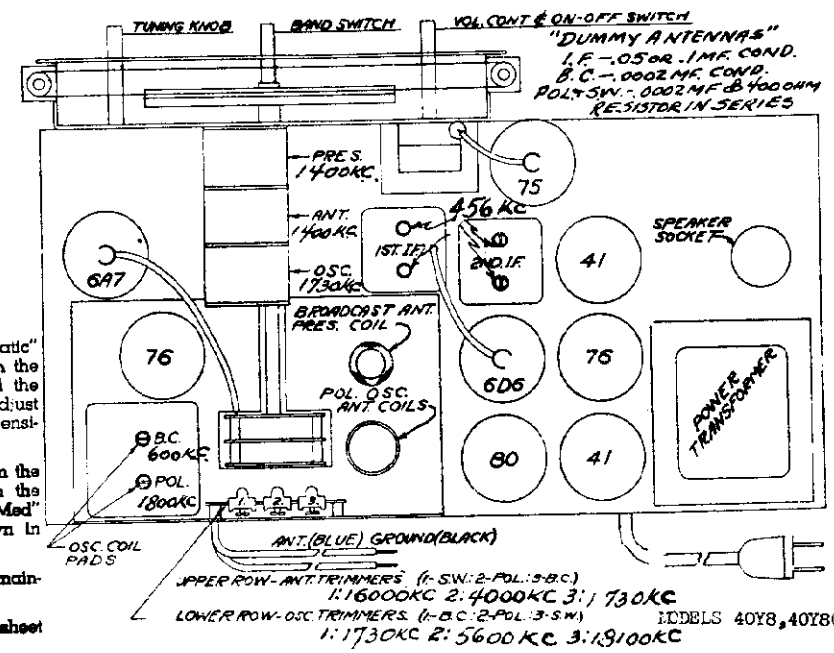
MODEL 39X4
MODEL 39YP5
Socket, Trimmers



MODEL 39YP5



MODEL 39X4



MODELS 40Y8, 40Y8C

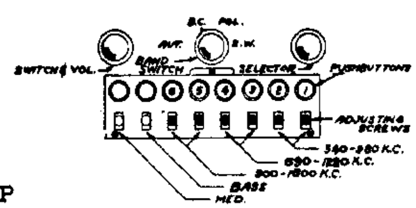


Fig. 1

MODEL 39Y6

MODELS 40Y8, 40Y8C

PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these.

Fig. 1 also shows the tuning range or frequencies covered by each button.

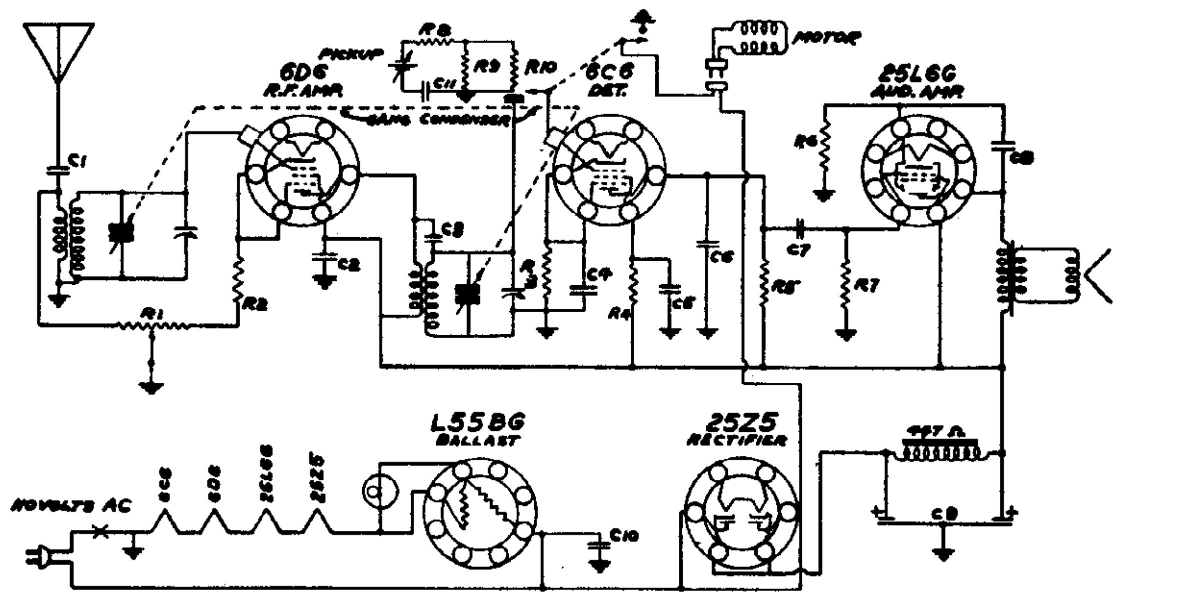
The remaining two (2) push buttons, located at the extreme left hand end of the push button plate are for tone control.

1. Choose a station having a frequency within the range of button No. 1 (540 K.C. to 930 K.C.)
2. With the middle knob in the "broadcast" position, tune this station conventionally by using the selector knob.
3. Now turn the middle knob to the "automatic" position and press button No. 1 and turn the adjusting screw in either direction until the previously selected station is heard. Adjust the screw for maximum volume and sensitivity.
4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw. Insert "Med" and "Bass" tabs in windows as shown in Fig. 1.
5. Repeat the above procedure for the remaining five (5) stations.

NOTE: It is advisable to retain the call letter sheet in case of station change later on.

MODEL 39YP5
MODELS 40Y8, 40Y8C
Schematics

ZEPHYR RADIO CO.



NO.	CAPACITY	TYPE
C1	.002 MFD.	400 V.
C2	.1 "	200 V.
C3	1.5 mmf.	GIMMIK
C4	.25 MFD.	200 V.
C5	.1 "	200 V.
C6	.0002 "	600 V.
C7	.01 "	400 V.
C8	.02 "	400 V.
C9	16-16 "	150 V. ELECT.
C10	.1 "	400 V.
C11	.005 "	600 V.

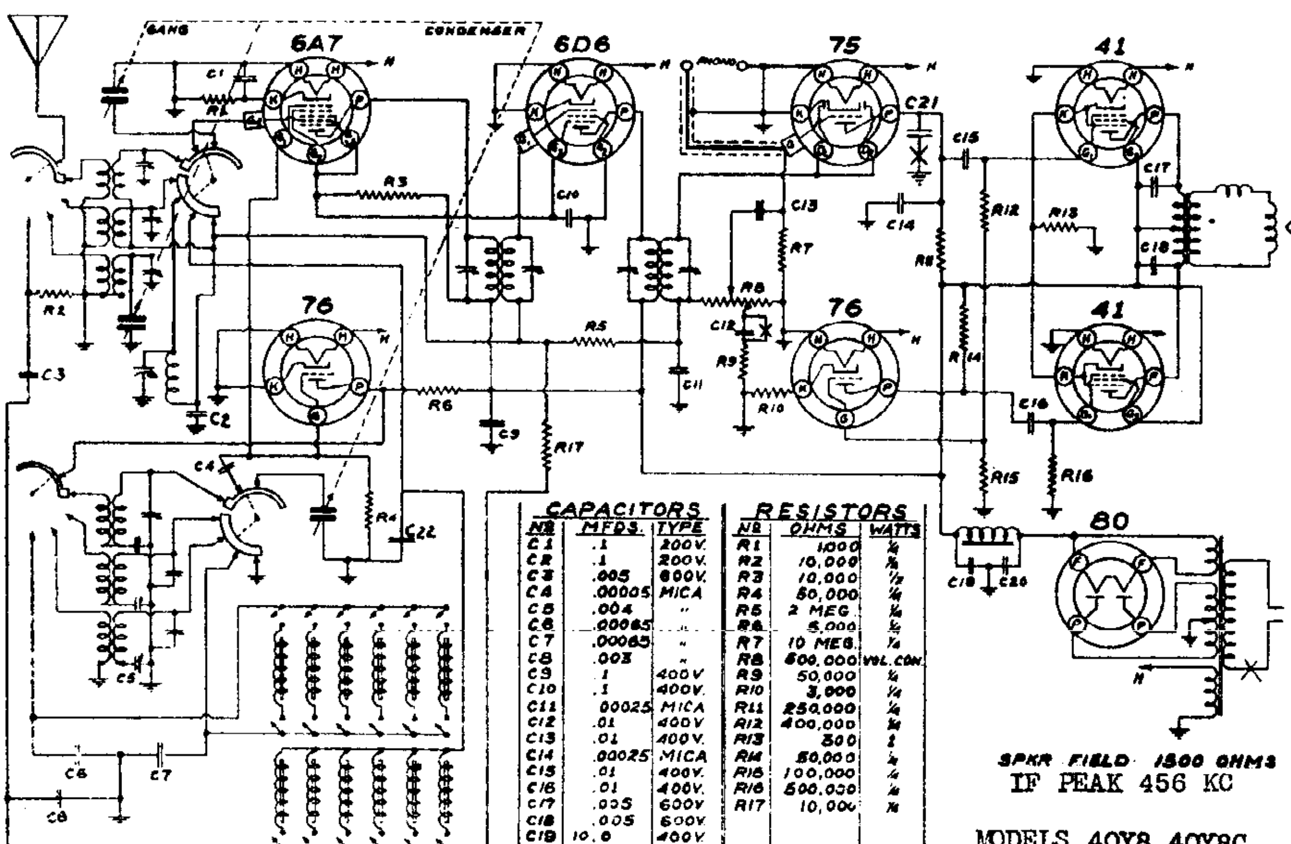
CONDENSERS

NO.	OHMS	WATTS	
R1	15,000		VOL. CONT.
R2	250	½	
R3	25,000	½	
R4	2,000,000	½	
R5	500,000	½	
R6	110	½	WIRE WOUND
R7	500,000	½	
R8	1,000,000	¼	
R9	250,000	¼	
R10	500,000		PHONO VOL. CONT.

RESISTORS

PHONO COMBINATION

MODEL 39YP5



CAPACITORS

NO.	MFDS.	TYPE
C1	.1	200V.
C2	.1	200V.
C3	.005	600V.
C4	.00005	MICA
C5	.004	"
C6	.00065	"
C7	.00065	"
C8	.003	"
C9	.1	400V
C10	.1	400V.
C11	.00025	MICA
C12	.01	400V
C13	.01	400V.
C14	.00025	MICA
C15	.01	400V.
C16	.01	400V.
C17	.005	600V
C18	.005	600V.
C19	10.0	400V.
C20	10.0	400V.
C21	.005	600V.

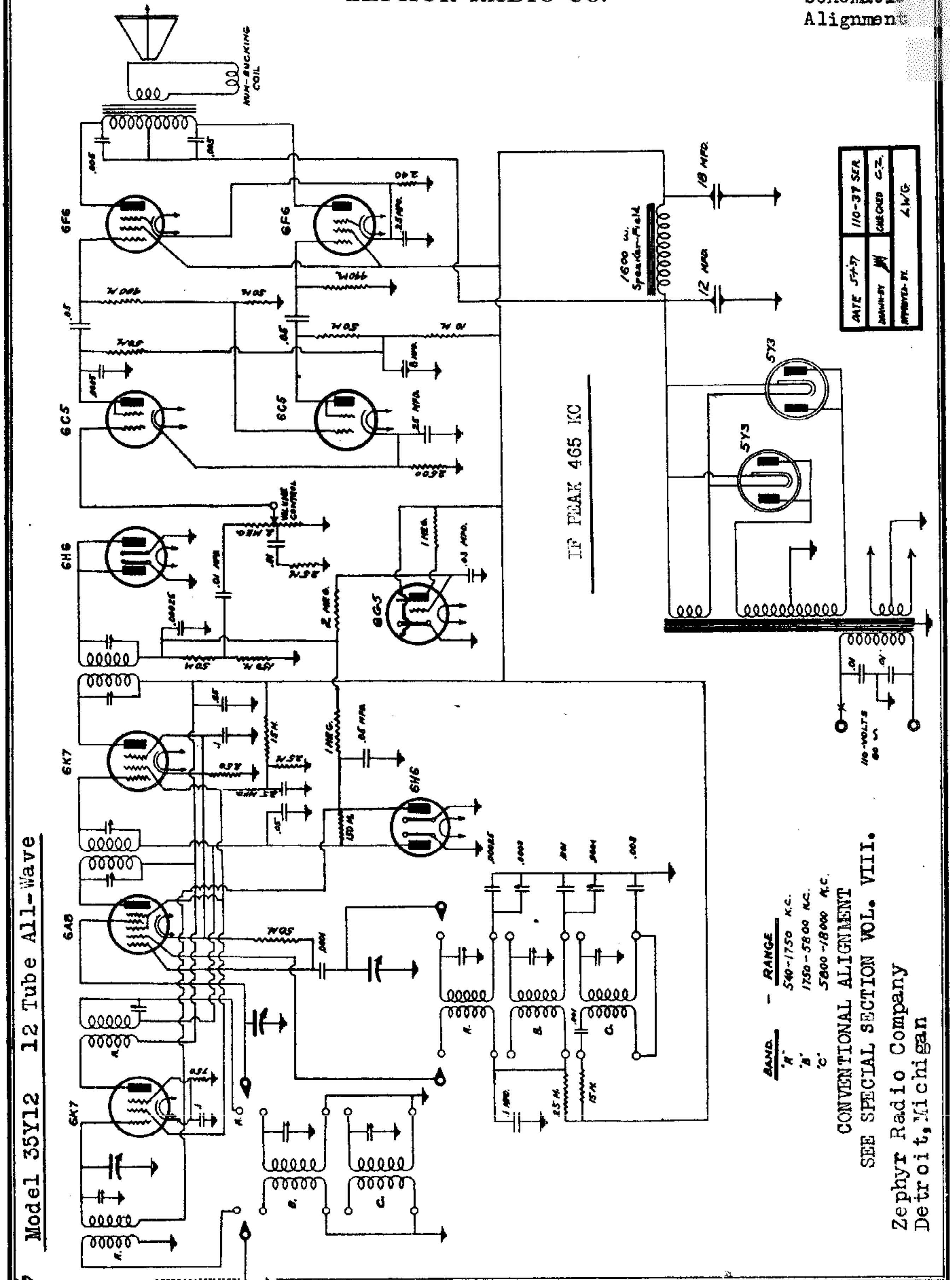
RESISTORS

NO.	OHMS	WATTS
R1	1,000	¼
R2	10,000	½
R3	10,000	½
R4	50,000	¼
R5	2 MEG.	¼
R6	5,000	½
R7	10 MEG.	¼
R8	500,000	VOL. CON.
R9	50,000	¼
R10	3,000	¼
R11	250,000	¼
R12	400,000	¼
R13	300	1
R14	50,000	¼
R15	100,000	¼
R16	500,000	¼
R17	10,000	¼
C22	.00067½	MICA

SPKR FIELD 1800 OHMS
IF PEAK 456 KC

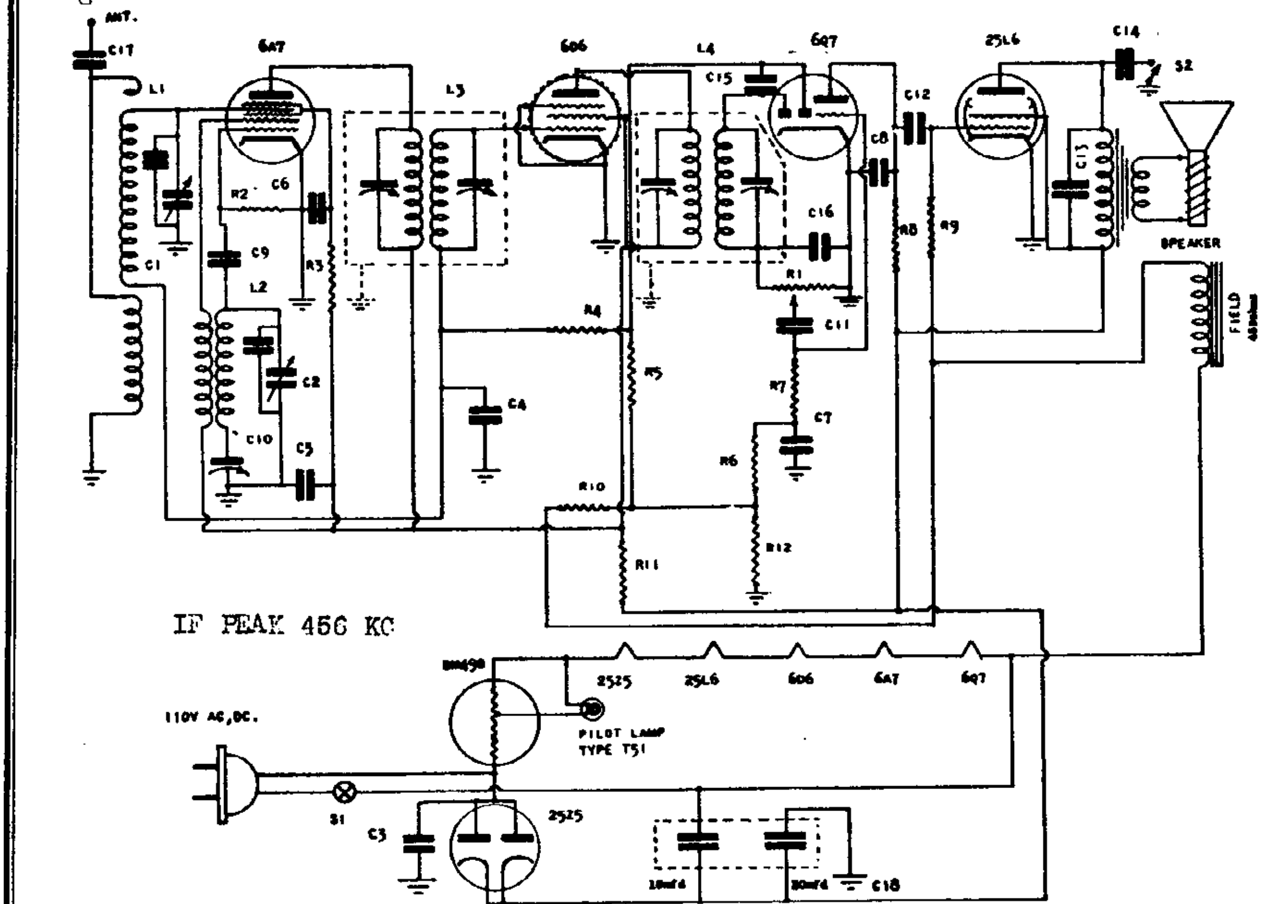
MODELS 40Y8, 40Y8C

ZEPHYR RADIO CO.



MODEL 41X6
Schematic
Alignment

ZEPHYR RADIO CO.



ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

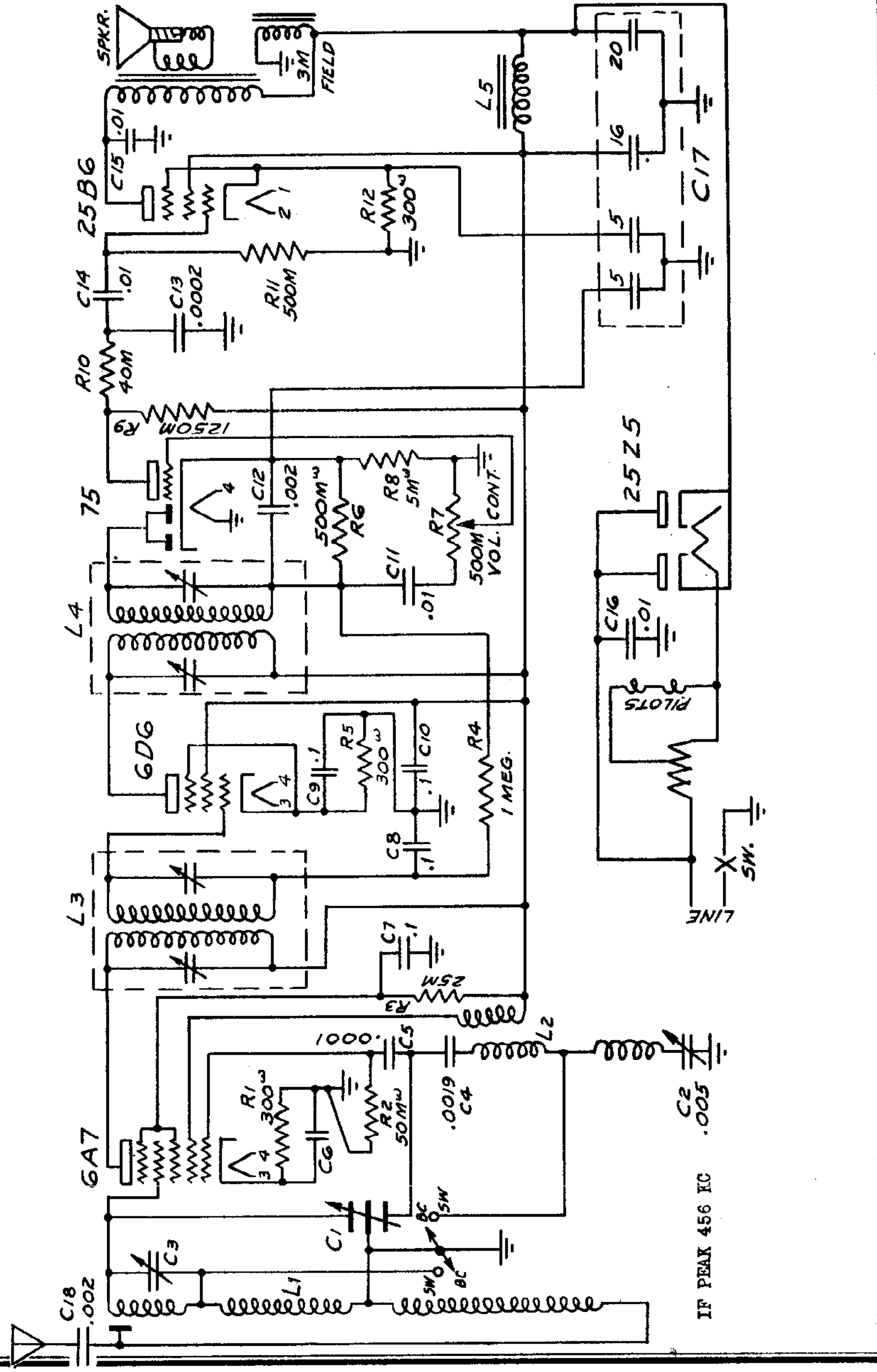
R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil	BA110	$0.50
L2	Oscillator Coil	BO110	.40
L3	1st I.F. Coil	LC110	.80
L4	2nd I.F. Coil	LC112	.80
——	Speaker	SD23	3.50
C1, C2	Tuning Condenser	CV25	1.80
C3, C4, C5, C6, C7	Fixed " .1mfd—200v	——	.20
C8, C9, C16	Mica " 200mmfd	——	.20
C15	Mica " 100mmfd	——	.20
C10	Variable Padder 550mmfd	——	.40
C11, C12, C13	Fixed Condenser .01mfd—200v	——	.20
C14	Fixed " .02mfd—600v	——	.20
C17	Fixed " .002mfd—600v	——	.25
C18	Electrolytic Condenser Block	CE20	1.40
S1	Line Switch (On Vol. Control)	——	——
S2	Tone Control Switch	S12	.40
R1	Volume Control ¼ megohm	RV18	.80
R2	Resistors 50,000 ohms—¼ Watt	——	.15
R3	" 25,000 ohms—¼ Watt	——	.20
R4, R5	" 2 megohms—¼ Watt	——	.15
R6, R7	" 1 megohm—¼ Watt	——	.15
R8,	" ¼ megohm—¼ Watt	——	.15
R9	" ½ megohm—¼ Watt	——	.15
R10	" 100 ohms—½ Watt	——	.20
R11	" 30 ohms—¼ Watt	——	.29
R12	" 25 ohms—¼ Watt	——	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

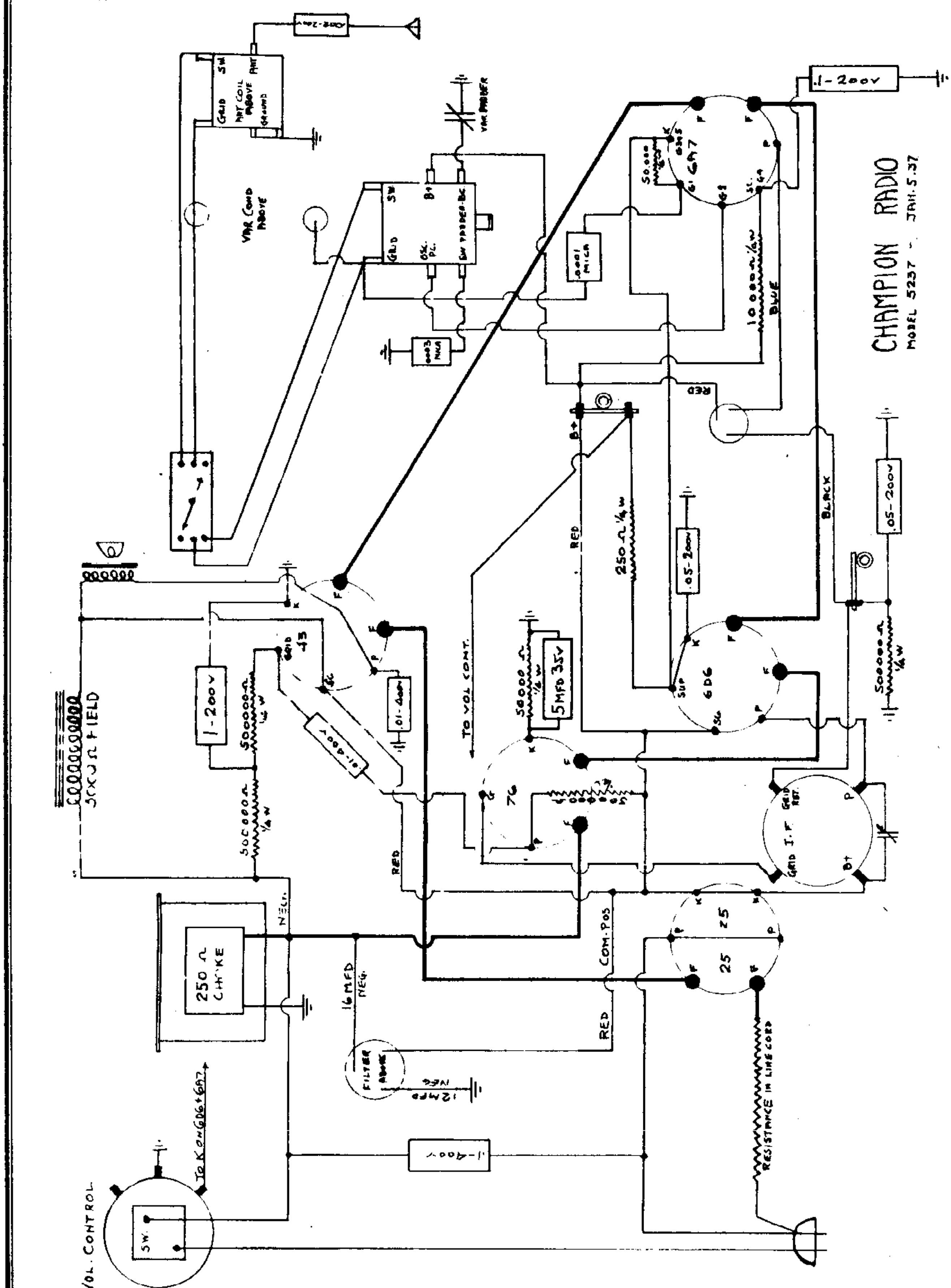
MODEL R6
Schematic

AUTOMATIC RADIO MFG. CO., INC.

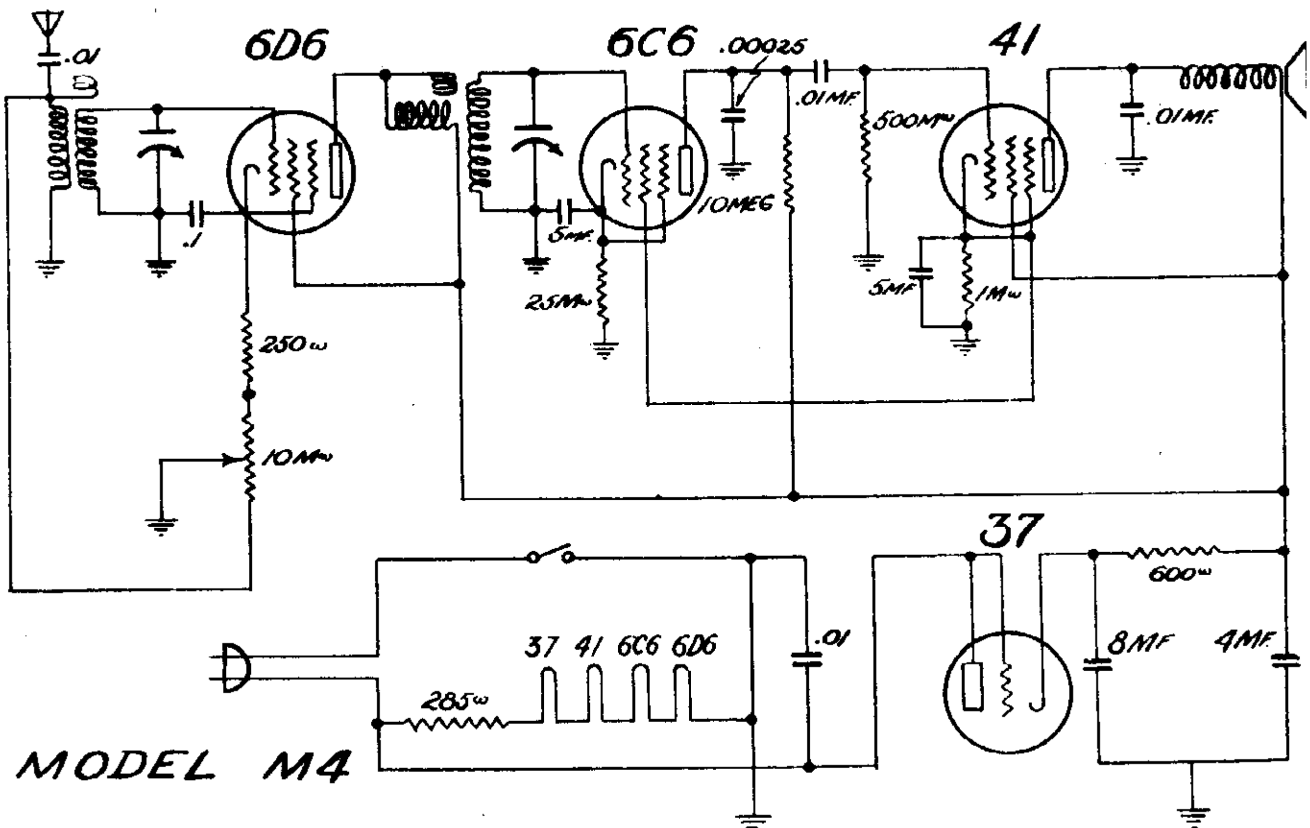


MODEL 5237
Schematic

CHAMPION RADIO



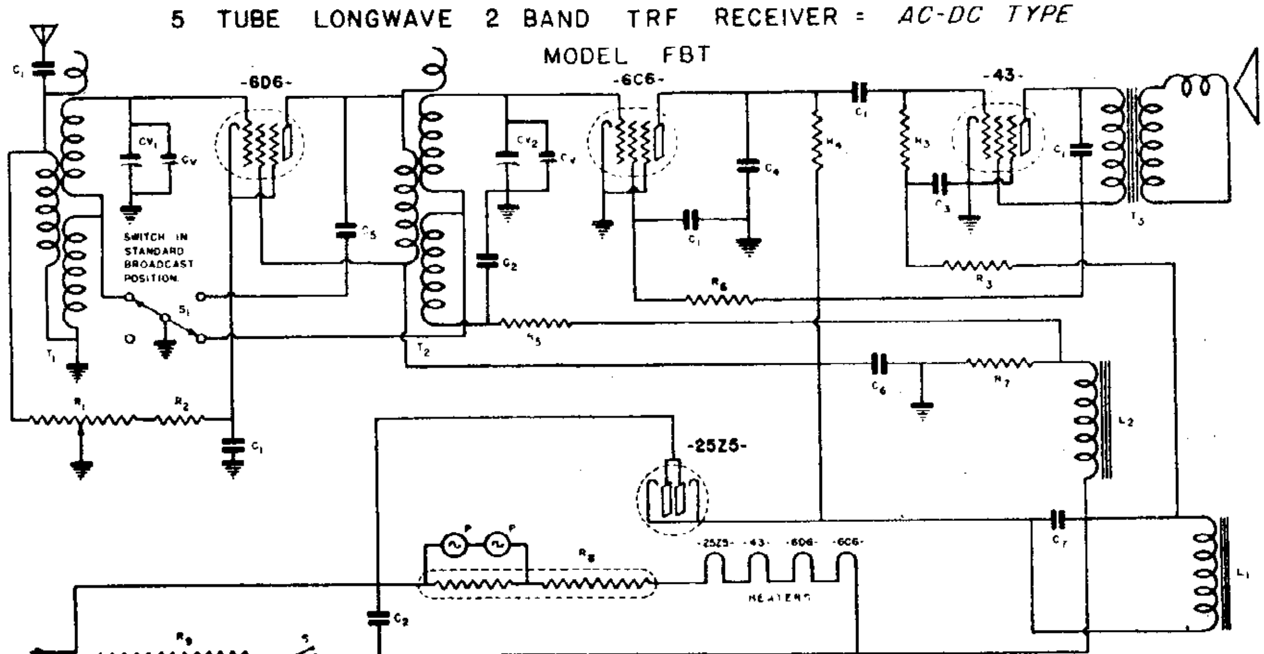
CLIMAX RADIO & TELEVISION CO., INC.



MODEL M4

5 TUBE LONGWAVE 2 BAND TRF RECEIVER = *AC-DC TYPE*

MODEL FBT



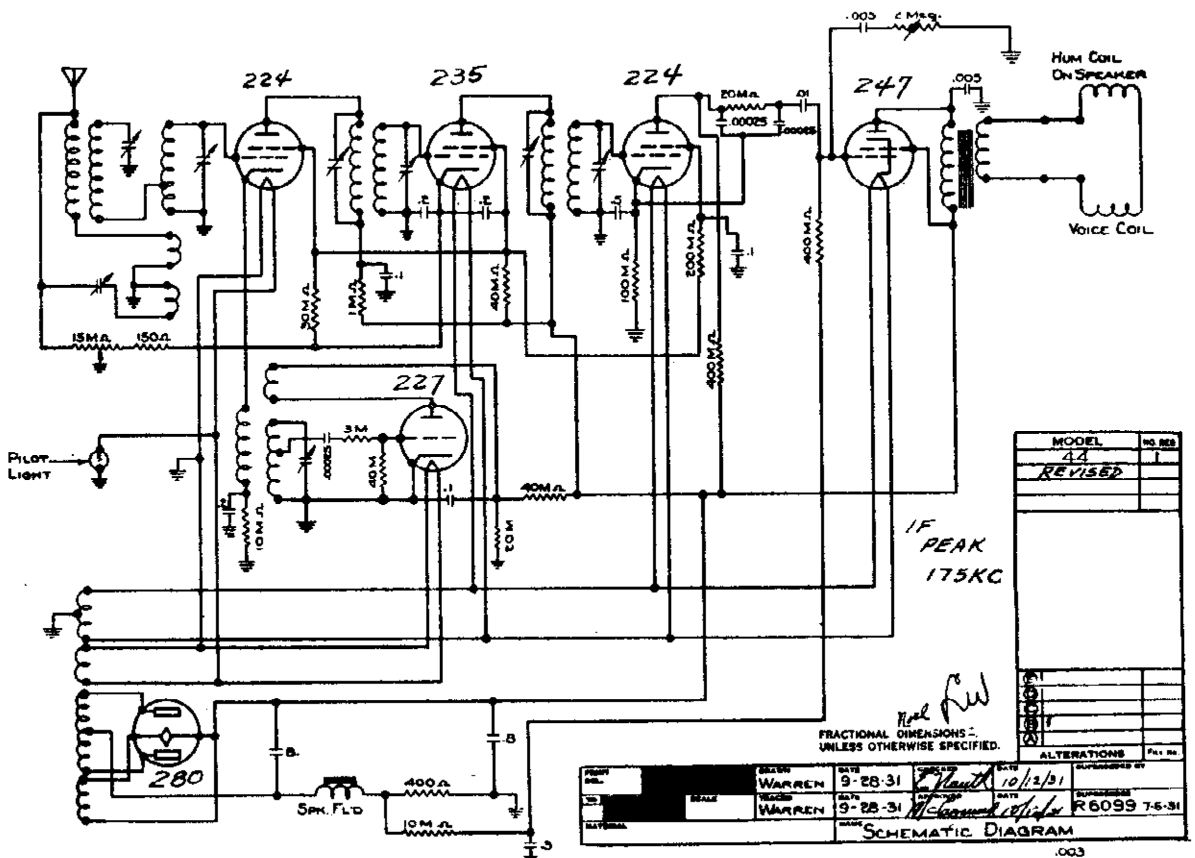
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400V TUBULAR CONDENSER
C_2	210	.1 MFD-400V TUBULAR CONDENSER
C_3	204	.25 MFD-400V. TUBULAR CONDENSER
C_4	401	.00025 MICA CONDENSER
C_5	405	.0004 MICA CONDENSER
C_6	314	10 MFD 150 W.V. ELECTROLYTIC COND.
C_7	311	20 MFD 150 W.V. ELECTROLYTIC COND.
CV_1 CV_2	615	2 GANG VARIABLE CONDENSER
C_V	ON 615	VARIABLE CONDENSER TRIMMER

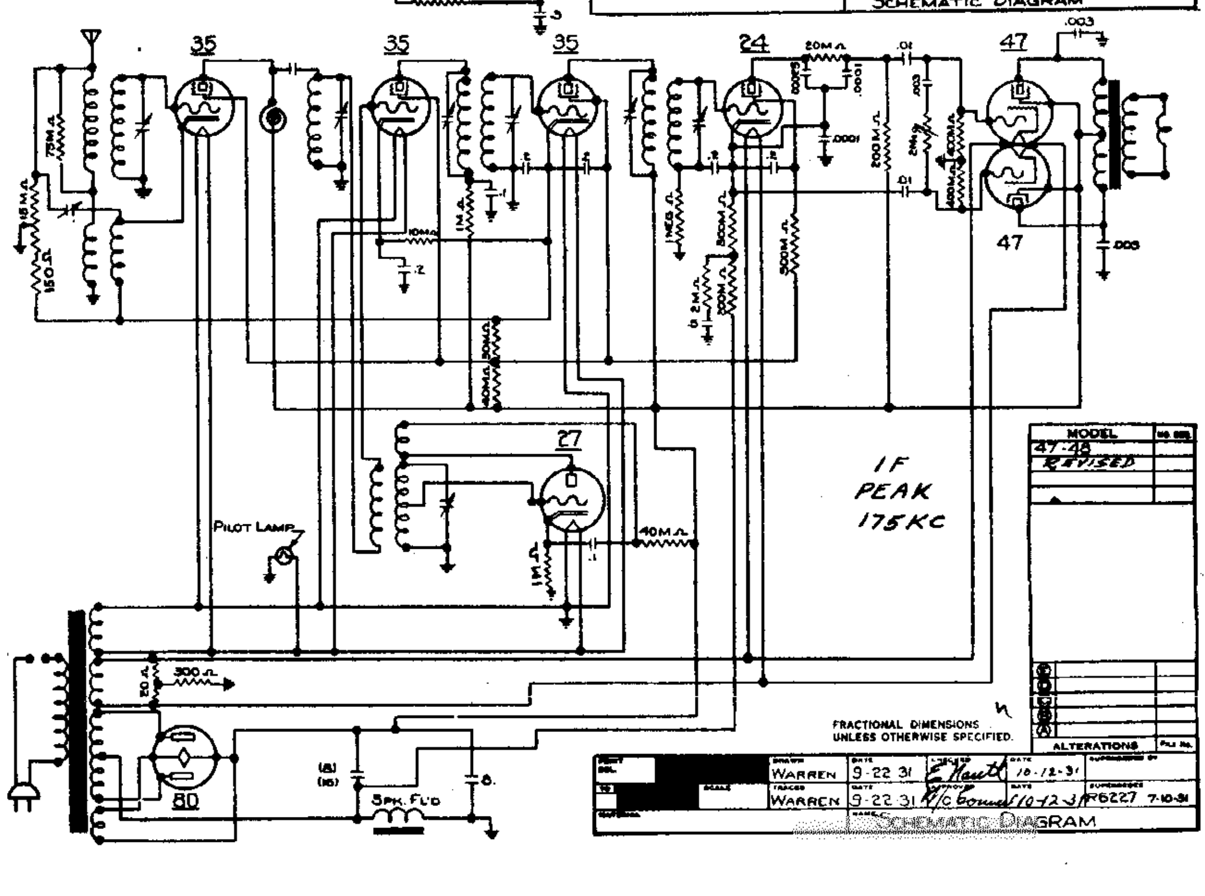
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	250 OHM (Minimum on Volume Control)
R_3	116	250,000 OHM ½ WATT CARBON RESISTOR
R_4	117	500,000 OHM ½ WATT CARBON RESISTOR
R_5	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_6	120	3 MEGOHM ½ WATT CARBON RESISTOR
R_7	139	85 OHM ½ WATT CARBON RESISTOR
R_8	2904	L-55-C BALLAST TUBE

LEGEND	OUR PART NO.	DESCRIPTION
R_9	18 1	285 OHM RESISTOR CORD
T_1	1206	LONG WAVE ANTENNA COIL
T_2	1307	LONG WAVE R.F. COIL
T_3	IN 900	SPEAKER TRANSFORMER
L_1	1100	FILTER CHOKE
L_2	IN 900	SPEAKER FIELD (2500 OHMS)
S_1	1914	BAND SELECTOR SWITCH
S	—	SWITCH ON VOLUME CONTROL
P	2902	MAZDA [illegible] PILOT LIGHT

MODEL 44 Revised
MODELS 47,48 Revised
Schematics

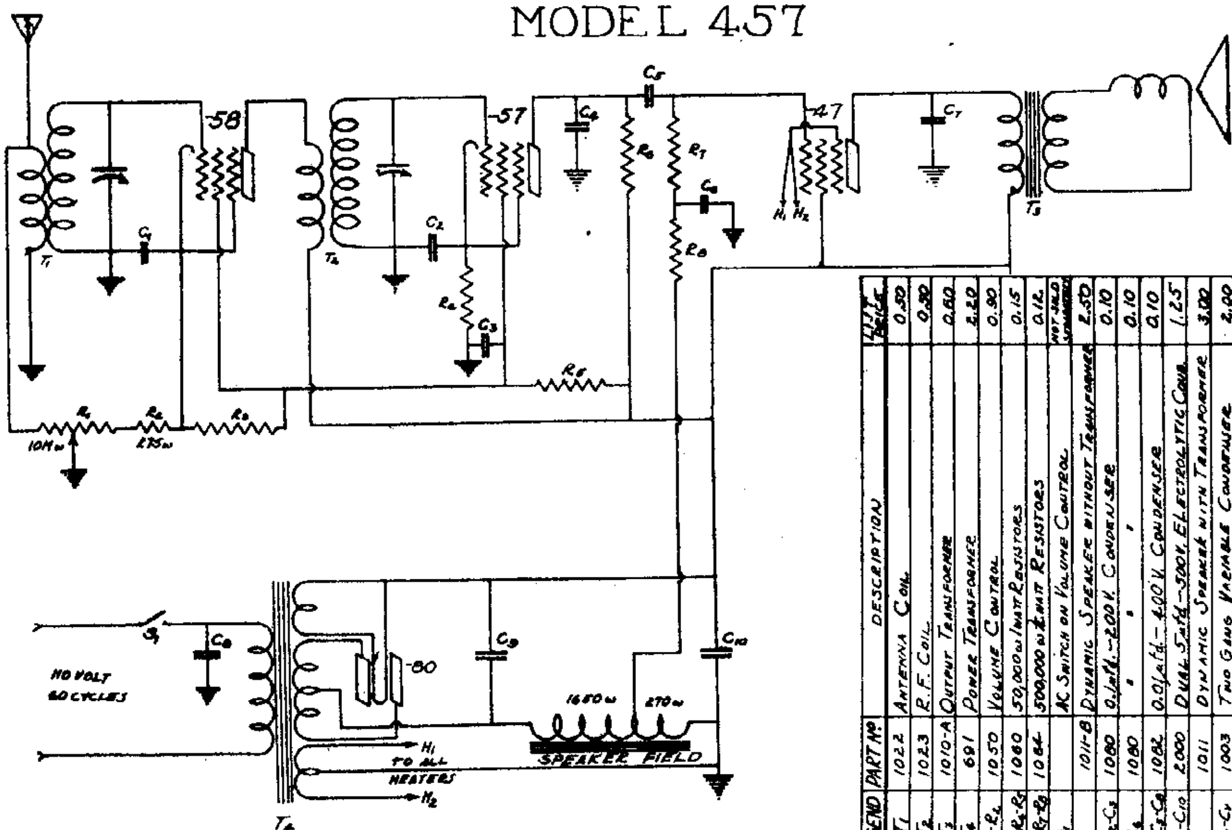
COLONIAL RADIO CORP.





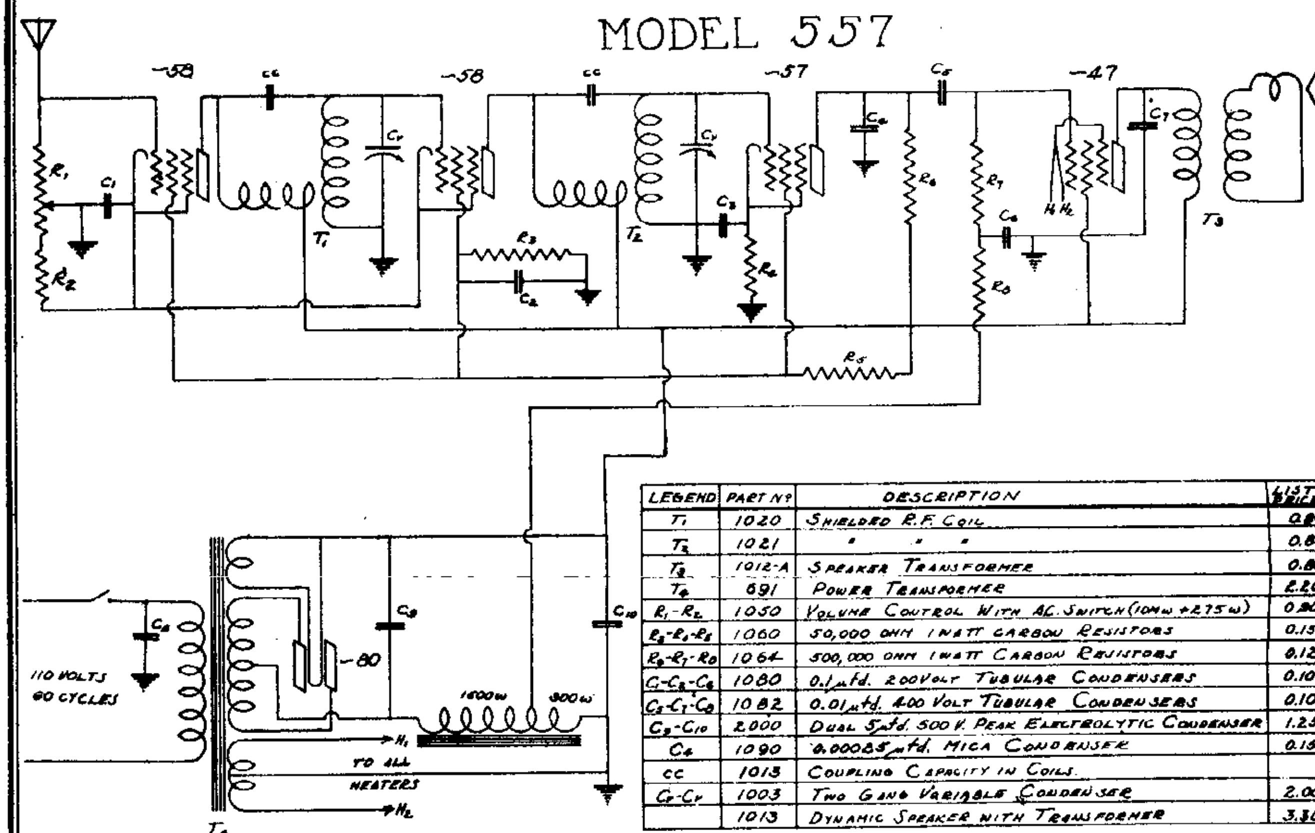
GENERAL TELEVISION, INC.

MODEL 457



LEGEND	PART No.	DESCRIPTION	LIST PRICE
T_1	1022	Antenna Coil	0.50
T_2	1023	R.F. Coil	0.50
T_3	1010-A	Output Transformer	0.60
T_4	691	Power Transformer	2.20
R_1-R_2	1050	Volume Control	0.90
R_3-R_4-R_5	1060	50,000 ω 1 watt Resistors	0.15
R_6-R_7-R_8	1064	500,000 ω 1 watt Resistors	0.12
S_1		AC Switch on Volume Control	Not sold separately
	1011-B	Dynamic Speaker without Transformer	2.50
C_1-C_2-C_3	1080	0.1 mfd. - 200 V. Condenser	0.10
C_6	1080	" "	0.10
C_4-C_5-C_8	1082	0.01 mfd. - 400 V. Condenser	0.10
C_9-C_{10}	2000	Dual 5 mfd. - 500 V. Electrolytic Cond.	1.25
	1011	Dynamic Speaker with Transformer	3.00
C_r-C_r	1003	Two Gang Variable Condenser	2.00

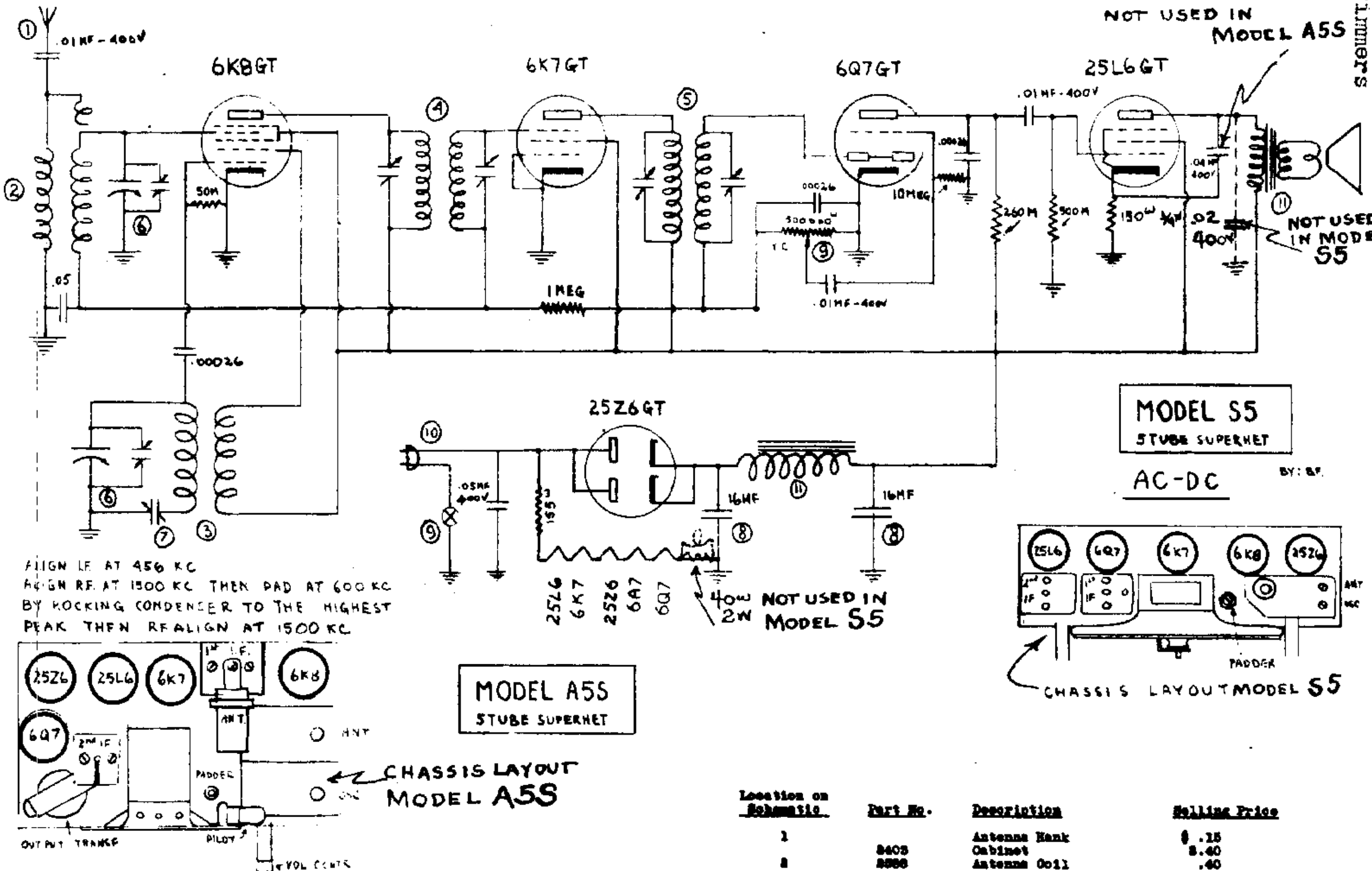
MODEL 557



LEGEND	PART No.	DESCRIPTION	LIST PRICE
T_1	1020	Shielded R.F. Coil	0.80
T_2	1021	" " "	0.80
T_3	1012-A	Speaker Transformer	0.80
T_4	691	Power Transformer	2.20
R_1-R_2	1050	Volume Control with A.C. Switch (10M ω + 275 ω)	0.90
R_3-R_4-R_5	1060	50,000 ohm 1 watt carbon Resistors	0.15
R_6-R_7-R_8	1064	500,000 ohm 1 watt Carbon Resistors	0.12
C_1-C_2-C_6	1080	0.1 mfd. 200 Volt Tubular Condensers	0.10
C_3-C_7-C_8	1082	0.01 mfd. 400 Volt Tubular Condensers	0.10
C_9-C_{10}	2000	Dual 5 mfd. 500 V. Peak Electrolytic Condenser	1.25
C_4	1090	0.00085 mfd. Mica Condenser	0.15
CC	1013	Coupling Capacity in Coils.	
C_r-C_r	1003	Two Gang Variable Condenser	2.00
	1013	Dynamic Speaker with Transformer	3.30

MODELS A5S, S5
Schematic, Socket
Alignment,
Trimmers

HALSON RADIO & TELEVISION, INC.



Five Tube Superheterodyne, Broadcast And Police Receiver.

LINE VOLTAGE 110 to 120 Volts, AC or DC, Alternating or Direct Current.

TUNING RANGES Broadcast Band - 545 Kilocycles (540 Meters) to 1550 Kilocycles (195 Meters).
Police Band - State and Municipal Police - 1600 Kilocycles (190 Meters) to 1750 Kilocycles (170 Meters)

TUBES Five tubes as follows:
6K8GT, 6K7GT, 6Q7GT, 25L6GT, 25Z6GT.

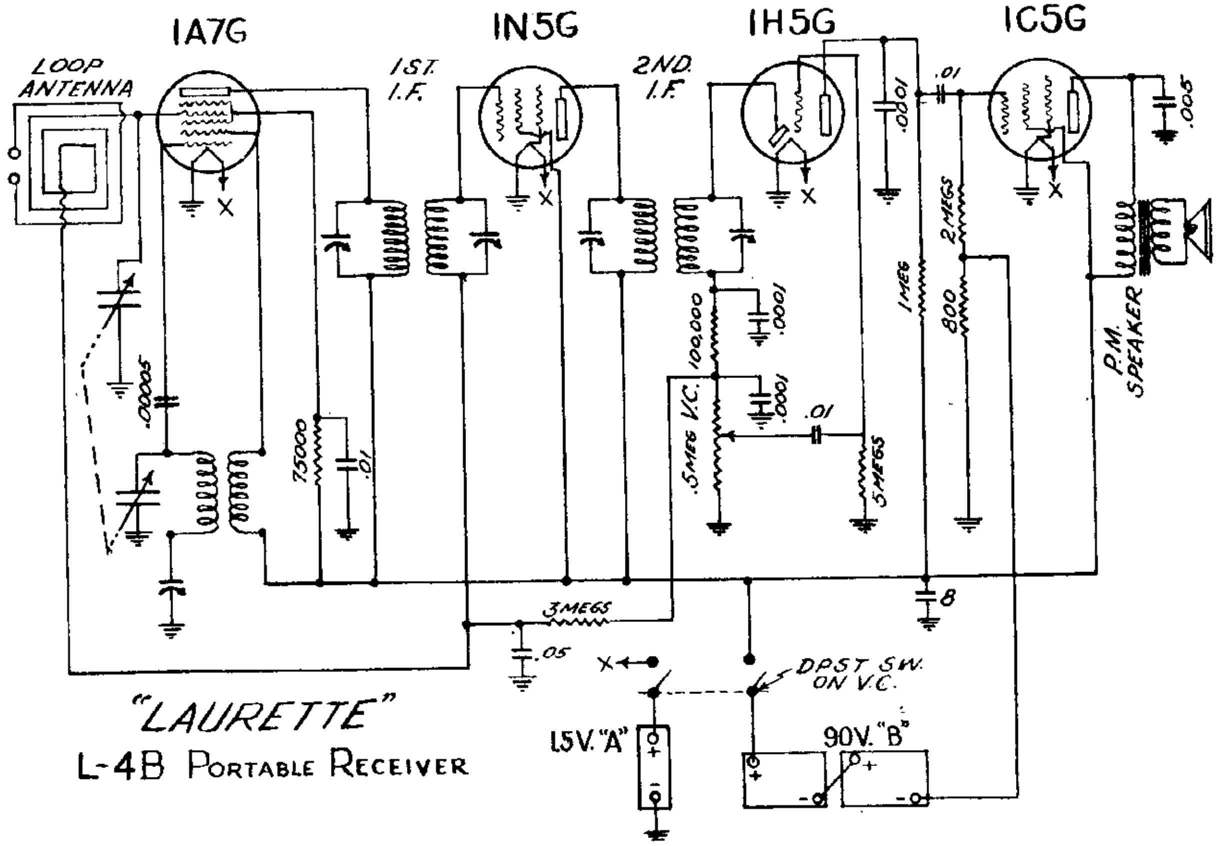
Location on Schematic	Part No.	Description	Selling Price
1		Antenna Hank	$ .15
	2403	Cabinet	2.40
2	2388	Antenna Coil	.40
3	2389	Oscillator Coil	.31
4	2399	1st I.F. Coil	.60
5	2390	2nd I.F. Coil	.60
6	2400	Variable Condenser	1.65
7	1621-1	Padder 600 KC	.27
8	2561	Electrolytic 16-16 MF-150V	.64
9	1848-5	Volume Control & Switch	.75
	2597	Dial Scale	.05
	2268	Pilot Bulb-6.3V	.13
10	2459	Linecord & Plug 155Ω	.44
		Pointer (dial)	.18
11	2564-A	Speaker 5" dynamic	2.90
12		Output Transformer	
	2598	Dial Assembly	.57

ANTENNA

The antenna built into this set will perform with best results in most localities. However, in localities more than 100 miles from a broadcasting station an outdoor antenna of 50 to 75 feet attached to the end of the built-in antenna will be sufficient to give the best performance. THIS RECEIVER WAS DESIGNED TO OPERATE WITHOUT A GROUND. UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH ANY METAL PART OF THIS RECEIVER.

LAUREHK MFG. CO.
SIMPLEX RADIO CO.

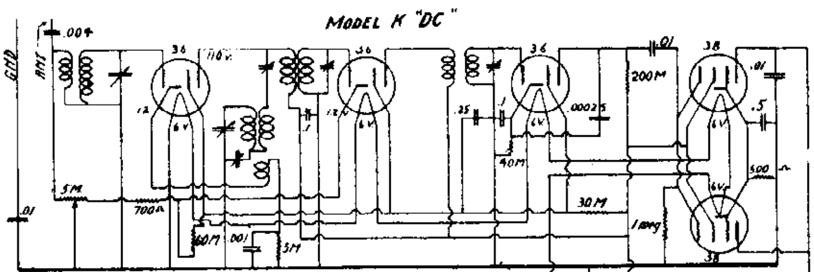
MODEL L-4B Laurette
MODEL K D-C
Schematics



"LAURETTE"
L-4B Portable Receiver

SIMPLEX

MODEL K "DC"



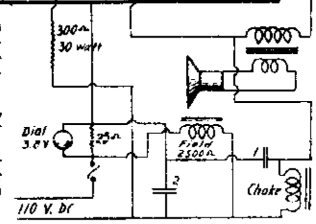
CAUTION: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT. IF RECEIVER DOES NOT START WORKING IN ABOUT ONE MINUTE AFTER BEING TURNED ON REVERSE ATTACHMENT PLUG.*

INSTALLATION: "Ant" lead may be fed from indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: Attach output of 175 k.c. oscillator to grid of 236 tube at front of chassis. Adjust the condenser screws in top of tall can and one in under side of panel to loudest point. Repeat adjustment. Disconnect oscillator. Turn dial to station near 1400 k.c. and adjust trimmers on tuning condenser to loudest signal. Turn dial to station near 550 k.c. and adjust condenser screw in center of rear flange to loudest point.

PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals.

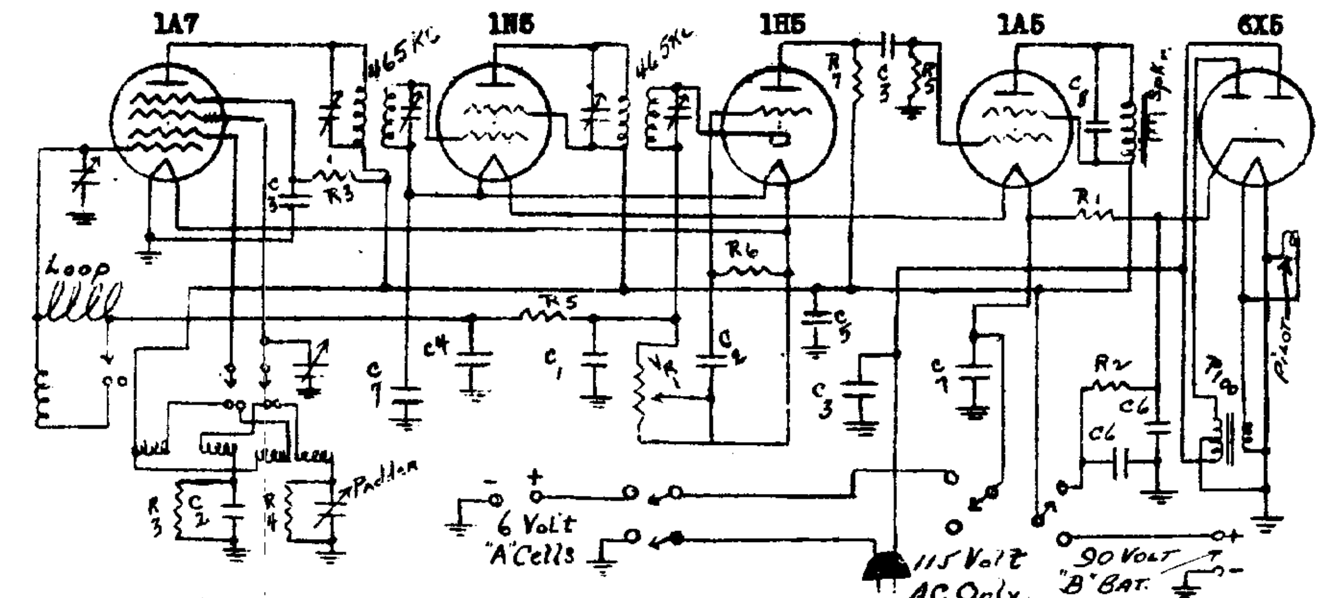
GUARANTEE: This instrument is guaranteed for ninety days, within which period any part showing electrical or mechanical defect will be replaced without charge when returned prepaid to the factory, but if the complete instrument is returned a nominal charge will be made for such labor as may be necessary to install the defective part.

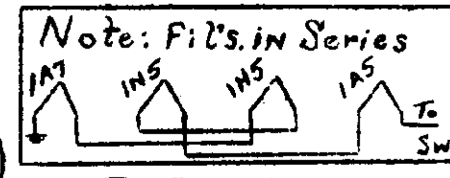


MODEL 55 Portable
Schematic, Socket
Trimmers

SETCHELL CARLSON, INC.

Setchell-Carlson ----PORTABLE "55"

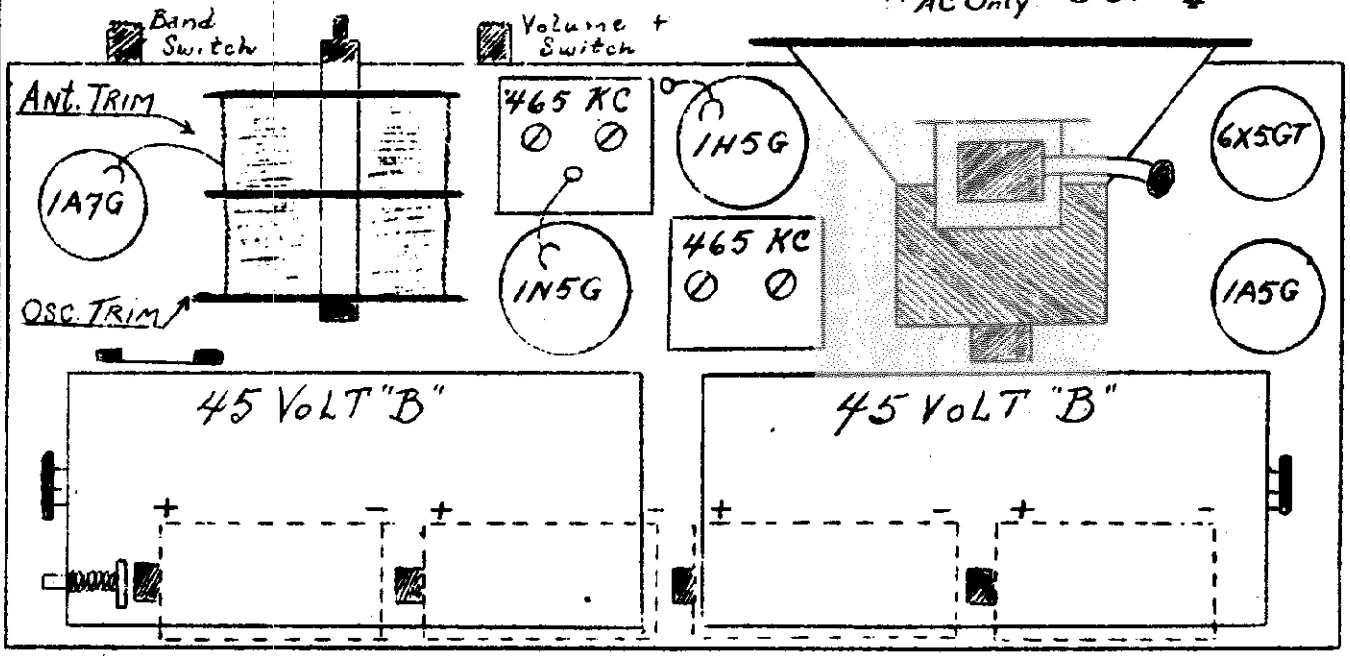




BATTERIES

2-45 V.-"B"'s (Portable Size)
Avg. Life - 6 Months
4-Regular Flash Light
Cells - Av'g Life - 100 Hrs

115 Volts - AC only
60 cycles - 12 Watts



Resistors

R_1 - 2500 ohms	10watt	
R_2 - 3000 ohms	1/2 watt	
R_3 - 50M ohms	..	
R_4 - 100M ohms	..	
R_5 - 1 megohm	..	
R_6 - 15 megohms	..	
R_7 - 200M ohms	..	
VR_1 - 500M ohms V.C.-Sw.		

Condensers

C_1	-.0001	600Volt.
C_2	-.002	600 ..
C_3	-.01	400 ..
C_4	-.1	200 ..
C_5	-.25	400 ..
C_6	-20	200 ..
C_7	-75	20 ..
C_8	-.001	600 ..

CAUTION

DO NOT CHANGE TUBES
WHEN SET IS TURNED ON.

Arvin 618, 618A, etc.

In order to eliminate the hum in the chassis used in these and other six-tube models, follow this procedure:

Remove the chassis from the cabinet. Locate the ground lug on the 6Q7G tube socket (see chassis layout on *page 8-16 of Rider's Volume VIII*). This lug is fastened to the chassis by a rivet which attaches the 6Q7G socket to the chassis. Bend this lug over and *solder it to the chassis* and then recheck for hum. If this is soldered correctly, the hum level should be brought to a minimum.

•

Pilot X114, X115

Changes have been made in the chassis used in these models, which have a similar schematic to the one shown on *page 6-15 in Rider's Volume VI.* The condensers C32 and C33 in the plate circuit of the second detector have been removed from the circuit, so that now the switch S3 is used to short out only the one condenser, C34, which now has a value of 250 mmf.

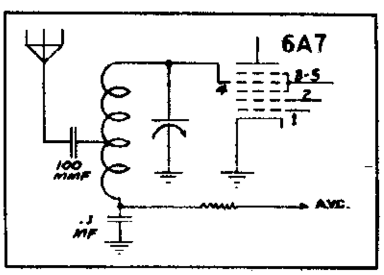
The value of the 10,000-ohm resistor No. 26 has been changed to 6,000 ohms. This is in the primary circuit of the pushpull input transformer.

A line condenser (1000-volt, paper) has been added across the primary of the power transformer. This is a dual condenser, grounded between the 0.01-0.01 mf sections.

•

Automatic 960A

The accompanying partial schematic shows a change which was incorporated in the 960 series, the schematic of which is shown on *page 9-2 in Rider's Volume IX*. Note also that the receivers in which this change has been made have an i-f peak of 480 kc, instead of 456 kc and that they are identified by the letter "A" after the model number.



New antenna circuit of the Automatic 960 A Series.

Arvin 818, 828, etc.

In order to reduce the hum level of the models in which the 8-tube chassis is used, follow this procedure:

Remove the chassis from the cabinet. Unsolder the 250,000-ohm plate resistor of the 6F5G tube from the B+ terminal, which is the lug on the 16-mf—300 volt electrolytic condenser. See chassis layout on *page 8-20 of Rider's Volume VIII.* Connect this resistor to the first tap down from B+ on the voltage divider resistor R87. This voltage tap supplies the potential for the 6A8G anode grid. Recheck for hum, which now should be reduced to a satisfactory level.

•

Oldsmobile 982043

In some of the early receivers (under serial A-20,000) of this model, several differences exist which should be noted on *page 9-1 in Rider's Volume IX*.

Resistor No. 46 is 100,000-ohms instead of 20,000.

Resistor No. 54 is 125,000 instead of 100,000-ohms and No. 55 is 75,000 instead of 100,000-ohms.

Resistor No. 44 and condenser No. 26 have been transposed, i.e. the resistor is connected to the grounded end of resistor No. 53 instead of the condenser.

The value of condenser No. 82 is indicated as 0.000063-mf and its connections are as follows: one terminal is connected to the junction of condenser No. 26 and the tap from resistor No. 58 and the other termnial is connected to the junction of condenser No. 18 and the left end of resistor No. 58.

•

Emerson Chassis AF

Receivers using this chassis and bearing serial numbers above 1,244,716 differ from the schematic shown on *page 8-45 in Rider's Volume VIII.* The condenser C-17 is omitted and the negative side of the filament circuit is grounded to the chassis.

•

Fairbanks-Morse 9A

Refer to the schematic shown on *page 8-9 of Rider's Volume VIII.* During production, the 47,000-ohm resistor (8) and the filter condenser (7) were removed and the r-f secondary was grounded direcdy, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 1-megohm resistor (9). A 1000-ohm variable resistor was added in the cathode circuit of the 6J7G AFC control tube (at 37) to make possible compensation for variation in calibration due to variation in tube characteristics. This control was found unnecessary and was removed in later runs.

Fairbanks-Morse 8A

Refer to schematic shown on *page 8-7 of Rider's Volume VIII.* During production, the 47,000-ohm resistor (16) and the 0.05-mf condenser (7) were removed and the r-f secondary was grounded directly, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 470,-000-ohm resistor (17).

•

G.E. G-57

This model is identical to model G-55, except for the cabinet and the loud speaker, which has a part number RS-095. The 12-inch cone of this unit has a part number RC-943.

The servicing data for model G-55, found on *pages 9-3, 9-4, and 9-5 of Rider's Volume IX*, apply to the G-57. This additional model number should be added to the listing in your Index.

•

Stromberg-Carlson Push-Button Tuner

The push buttons on all the new receivers, such as those whose servicing data are found in *Rider's Volume IX* which employ padding condensers for tuning purposes are set up from the front of the chassis. It is unnecessary to get into the back of the receiver to set up the desired stations, except to adjust the electric tuning switch on the rear of the chassis.

To set up the stations, it is only necessary to remove the escutcheon over the push buttons and the adjusting screws become readily accessible. These escutcheons are held in place by several Phillips type screws, which can be removed with any small pointed instrument, such as a small nailfile or an old knife blade. However, the use of a special tool is recommended, as this will not mar the surface of the screw head.

•

DeWald 1106

This model is identical with the Models 1104 and 1105, shown on *pages 9-1 and 9-10 of Rider's Volume IX*, except that the new model has an additional short-wave band for the 14-40 mc range, giving it a total of five bands.

•

RCA 8M3, 8M4

On 8M3 and 8M4 receivers, it is often advantageous to connect the 22 mmf condenser (C1, on *page 9-37 of Rider's Volume IX*) from the output end of coil L1 to ground, instead of from the antenna end. Later runs of sets include this change. Note also that good electrical contact is required between vibrator-transformer and chassis to minimize internal noise.

Majestic 11356

This model is found on *pages 9-8, 9-11 and 9-12 of Rider's Volume IX.* A new electric tuning system has been incorporated in later runs of this receiver and is illustrated in Fig. 1. The procedure for indexing this tuning system for desired stations is as follows:

(1) Set receiver to Standard Broadcast band.
(2) Place "Manual-Electric" lever in "Manual" position, which is extreme counter-clockwise. Be sure the tone control is in the "Normal" position as shown by the indicator.
(3) Pull out Indexing Rod located at center bottom half of the escutcheon. This rod has numbers on it which correspond to the push buttons (counting from left to right.)
(4) Set Indexing Rod so that the number on the rod corresponding to the push button you wish to index is in line with the escutcheon plate.
(5) Turn tuning knob until the pointer has covered the entire dial. This is essential to engage the tuning disc.
(6) Tune in the desired station accurately, using the tuning eye.
(7) Push Indexing Rod all the way in, and that particular station will always be tuned in automatically when that particular button is depressed while the "Manual-Electric" lever is in the "Electric" position.
To index more than one station, go through steps (3) to (6) for each station desired and when finished, push the Indexing Rod back as far as it will go.

Caution: When using electric tuning, do not depress more than one button at a time. Depressing two buttons will cause the motor to run continuously or until the automatic thermal switch operates to prevent the motor from burning out. If this happens, it may take fifteen minutes for the motor to become cool enough for the electric tuning to become operative again.

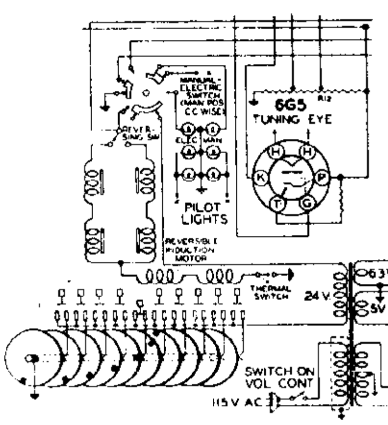


Fig. 1. How the new electric tuning unit is connected in the Majestic Model 11356.

Philco 38-10 (121, 124)

Run No. 5. Resistor No. 11, 70,000-ohms changed to 40,000-ohms, Part No. 33-340339 in order to improve the oscillator circuit performance. See *page 8-67 in Rider's Volume VIII*

Spiegel Chassis X1

This chassis is used in the following models: 1900, 1920, 1931, 1970, 4502, 9922, and 9925. It is quite similar to the chassis used in the Spiegel Model 100 found on *page 9-1 of Rider's Volume IX,* the difference being as follows:

The 250,000-ohm resistor in the plate circuit of the 75 second detector is connected directly to +B. This means that the 100,000-ohm resistor and the 0.1-mf by-pass condenser are not used in this chassis. An 0.05-mf condenser is used across the 110-volt a-c leads to the power transformer primary instead of one with a value of 0.02 mf.

No wave trap is used in the X1 chassis, such as is shown in the broadcast-band antenna coil. Also no condenser is shunted across the short-wave oscillator coil. The value of the fixed condenser connected between the Police-band oscillator coil and ground is 0.005 mf instead of 0.012 mf.

RCA 10K11, 10T11

The chassis and speakers of these two models are identical to models 10K and 10T, which will be found in *Rider's Volume VII on page* 7-132. The service data starting on that page applies to these new model numbers with the exception of some minor replacement parts for the new cabinets in which these chassis are housed.

Majestic 11056, 11057, 11058

Models 11056 and 11058 are found on *pages 9-8 to 9-10 of Rider's Volume IX.* The data given there also apply to Model 11057. Alignment instructions for these three models are given in the table below.

DeWald 1004

This model is identical with the Models 1002 and 1003, shown on *page 9-6 of Rider's Volume IX,* except that the new model has an additional short-wave band for the 14-40 mc range, giving it a total of five bands.

Fairbanks-Morse 5A

During production runs, a 10-mf, 25-volt condenser was added across the cathode resistor of the type-41 output tube to increase sensitivity. In the schematic shown on *page 9-5 of Rider's Volume IX,* the cathode resistor mentioned bears the number, 21.

Fairbanks-Morse 6C

Referring to the schematic shown on *page 8-5 of Rider's Volume VIII,* the 10,000-ohm resistor (15), in the screen circuit of the 6D8G and 15 tubes, was changed during production to 22,000 ohms. Both resistors are of 2-watts rating.

Silvertone 4600, 4601

A receiver is occasionally encountered in which the volume goes to a low value as the volume control is turned down, but then increases again as the control is turned still lower. This can usually be corrected as follows: Remove the chassis from its case and remove the connections to the two outside terminals of the volume control. Then connect a 22.5-volt "B" battery between the center terminal and the case of the control. Rotate the control a couple of times throughout its range. This should repair the control and the connections should be soldered back onto the outside terminals.

Signal Generator Connection	Signal Generator Frequency	Band Switch Position	Dial Position	Trimmer Designation	Output Signal
6A8G Mixer Control Grid	455 kc (1)	BC	(2)	Trim 455 kc	Max.
Antenna (3)	18 mc	SW	18 mc	Osc— 18 mc	(4)
				R-F— 18 mc	Max.
				Ant— 18 mc	Max.
	11 mc	SW	To Gen.		(5)
	6 mc	SW	To Gen.		(5)
	19 mc	SW	18 mc		(6)
Antenna (3)	6 mc	POL	6 mc	Osc— 6 mc	(4)
				R-F— 6 mc	Max.
				Ant— 6 mc	Max.
	7 mc	POL	6 mc		(6)
Antenna (7)	1500 kc	BC	1500 kc	Osc—1500 kc	(4)
				R-F—1500 kc	Max.
				Ant—1500 kc	Max.
Antenna (7)	600 kc	BC	600 kc	Pad— 600 kc	Max. (8)
Antenna (7)	1500 kc	BC	1500 kc	Osc—1500 kc	(4)
				R-F—1500 kc	Max.
				Ant—1500 kc	Max.
Antenna (7)	600 kc	BC	600 kc	Pad— 600 kc	Max. (8)

Note (1)—Apply through 0.1-mf condenser; use smallest possible signal from generator to prevent AVC action from affecting output readings.
Note (2)—Gang condenser about 50% engaged; if a squeal is heard, rotate gang until squeal is removed.
Note (3)—Apply through 400-ohm dummy antenna.
Note (4)—Unscrew trimmer to minimum, then slowly turn screw to increase capacity until the signal is heard.
Note (5)—Check sensitivity.
Note (6)—Image check: If alignment is correct, about 10 times as much signal-generator input will be required to give image same output reading as did the desired signal.
Note (7)—Apply through 200-mmf mica condenser as dummy antenna.
Note (8)—While rocking gang condenser.

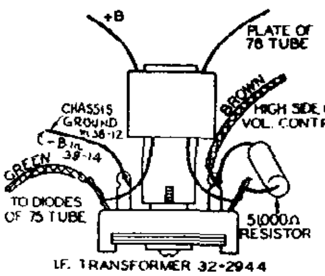
Philco 38-12

Run No. 3. It is important that the following leads be dressed in order to eliminate hum:

Dress the green wire connecting the *diodes of the 75 tube to the 2nd i-f* transformer as far as possible from the filament prongs of the 75.

The brown wire connecting the 51,000-ohm resistor to the high side of the volume control should be dressed under the coil of the 2nd i-f transformer.

The grid lead of the 75 tube should be dressed toward the back of the receiver and between the tube and shield.



New i-f transformer for Philco models 38-12 and 38-14.

The *second i-f transformer*, No. 12 in the schematic on *page 8-69 of Rider's Volume VIII*, has been changed from Part No. 32-2674 to No. 32-2944. Note that condenser 12B and 12C are part of the padder in these transformers. The wiring of this new transformer is shown in the accompanying illustration.

•

Philco 38-14

In the list of parts on *page 8-72 in Rider's Volume VIII*, the parts numbers of the following are incorrect:

Schematic No.	*Incorrect No.*	*Correct No.*
12—Compensator	31-6209	31 6100
20—Volume Control	33-5236	33-5230

A condenser, 5 mmf, was connected across the secondary of the short-wave transformer, No. 2. This condenser is connected to lugs Nos. 3 and 4 of the transformer shown on the schematic. *See page 8-71 of Rider's Volume VIII.*

Run No. 2. The second i-f transformer, No. 17, was changed from Part No. 32-2674 to No. 32-2944. The wiring lugs on the new transformer are slightly changed. The drawing of this transformer is shown in the preceding change notice covering Philco 38-12. Note that in the case of Model 38-12, the middle left-hand lead in the sketch goes to chassis ground, but in the Model 38-14, this same lead goes to -B.

Philco 38-4

Run No. 5. The two condensers, Part No. 30-1097, which were connected in parallel with the new air padder, No. 16 in Run No. 3 receivers (see SUCCESSFUL SERVICING, July 1938, page 2) have been removed, starting with Run No. 5. For schematic see *page 8-61 in Rider's Volume VIII.* In place of these condensers, a thermal compensator, Part No. 31-6227 is connected in parallel with the air padder. The air padder, No. 16, Part No. 31-6206, has also been relocated and is now mounted between the 6U7G r-f tube and the 6F6G output tube. (*See page 8-63 for chassis layout*). The thermal compensator, Part No. 31-6227, is also mounted in the same position with the thermostatic plate facing the power transformer.

The oscillator transformer, No. 15, *was changed from* Part No. 32-2631 to 32-2894. Connection No. 1 of the new transformer has been increased in length for soldering to the air padder in the new location.

•

Philco 38-14 (121, 124)

Run No. 4, Code 121. In order to eliminate hum modulation, the electrolytic condenser, No. 32, was changed from 16-mf to 40-mf, Part No. 30-2237. The electrolytic condenser in Code 124 receivers was also changed from 16- to 40-mf, Part No. 30-2256. The oscillator blocking condenser No. 8, 250-mmf was changed to 50-mmf, Part No. 30-1029.

See *page 8-71 in Rider's Volume VIII* for schematic of both codes.

•

Philco 38-33 (121)

Run No. 3. Resistor No. 20, 8000-ohms, was changed to 20,000-ohms, Part No. 33-320339. It was removed from the 90-volt wire (see schematic on *page 9-3 of Rider's Volume IX*) and reconnected to the 135-volt wire of the battery cable. The battery cable assembly was also changed to Part No. 41-3402.

Belmont 665,765

It will be noticed that another model number, 765, has been added to 665, which appears in the Index to Rider's Volume IX. This new series *starts with serial* 9A532400 for which the model numbers are 665 Series A, Issue B and 765 Series A. The servicing data on both these models are the same as the information published in Rider's Volume IX with the following changes:

A 6U5 tuning indicator tube has been added in the model 765. The grid of *the 6U5 is connected to the junction* of No. 5 terminal of the 6Q7G and R8; the target to +B; and the cathode to the junction of R10 and R12. See schematic on *page 9-21 in Rider's Volume IX*.

The short pieces of wire on the antenna coil, which are designated as CA and CB in the schematic, have been removed.

A resistor, R17, 2000 ohms, has been shunted across the P and H terminals of the oscillator coil.

A 0.008-mf, 800-volt condenser, C21, has been added between the plate of the output tube, 6AC5G, and ground.

The short-wave oscillator padder, C12, was not shown on the bottom view of the chassis. This is located on the layout just above and between the trimmers C8 and C11. Note that this padder C12 is adjusted at the factory and needs no other adjustment.

•

Zenith Chassis 5516, 5634, 5707

The alignment instructions for the three chassis mentioned above are identical and will be found below. The model numbers of the receivers in which these chassis are used will be found on the pages of *Rider's Volume VII.* The schematics and trimmer locations for the respective chassis will be found on these pages: Chassis 5516, schematic *page 7-7*, trimmers *page 7-2;* Chassis 5634, schematic *page 7-17*, trimmers *page 7-9;* Chassis 5707, schematic *page 7-18*, trimmers *page 7-11.*

Signal Generator Connection	*Signal* Generator Frequency	Dial Position	Wave-Band Switch Position	Trimmer Number	Output Signal
Det.-Osc. Control Grid	456 kc[1]	——	——	4 I-F Trimmers	Max.
Antenna	456 kc	——	——	Wave-Trap Trim. (Rear of chassis)	Min.
Antenna	6 mc	6 mc	Band B	Osc. Trim.[2]	——
Antenna	1400 kc	1400 kc	Band A	Broadcast Trim.[2]	——
				Antenna Trim.	Max.
Antenna	18 mc	18 mc	Band C	Short-Wave Trim.	Max.[3]
Antenna	600 kc	600 kc	Band A	Broadcast Pad.	Max.[3]
Antenna	1400 kc	1400 kc	Band A	Broadcast Trim.[2]	——
				Antenna Trim.	Max.

Note 1—Use smallest possible signal from generator to prevent AVC action from affecting output readings.
Note 2—Adjust for correct dial reading.
Note 3—While rocking.

RCA U-112, Late U-111 and U-112

The U-112 is a 5-tube superheterodyne-Victrola combination similar to U-111 except that the cabinet has been enlarged to permit the playing of 12-inch records. The service data for the U-111 found on *pages 9-169 and 9-170 of Rider's Volume IX* apply to these later models, with the following exceptions:

In the U-112, the rectifier has been changed to a 5W4.

A 12,000-ohm resistor, R18, has been added in series with the 0.005-mf condenser across the pickup in U-112.

Model U-112 is made in three power supply ratings, all 105-125 volts with 80 watts consumption:

Rating	Frequency
A-6	60 cycles
A-5	50 "
B-2	25 "

The 25-cycle power transformer for U-112 has a d-c resistance of 13.7 ohms in its primary and 1190 ohms in the secondary. The speaker in this model, 84265-4, has the following d-c resistances: Field coil—1300 ohms; Primary of output transformer—420 ohms; Voice coil—2 ohms.

Later production of both the U-111 and U-112 models have the following changes:

The antenna coil has been changed from stock number 30894 (1-ohm primary) to 32338 (35-ohm primary). This last coil may be used to replace the former.

A 270-mmf condenser, C23, is connected from the triode plate of the 6Q7G to the chassis.

The following additional alignment data apply to both models: On r-f alignment, turn the gang condenser all the way out of mesh and with the test oscillator tuned to 1720 kc, align the oscillator trimmer C18. Set the test oscillator to 1500 kc, tune the receiver to the 1500-kc signal and align the antenna trimmer C3 for maximum output.

Note that the connections for the motor coil assembly, shown on *page 9-170*, has been revised. The connections shown in the left-hand view of the stator are used for both 25-cycle and 60-cycle operation on 110 volts and are unchanged. For 110-volt, 50-cycle operation, the red and yellow designations in the right-hand sketch should be reversed; in other words, the yellow of the left-hand coil is connected to the red of the right coil, making the leads at the bottom red from the left coil and yellow from the right. Note also that the d-c resistance of each coil for 25-cycles in 250 ohms, those for 50- and 60-cycles remaining 82 ohms. These notes apply to both U-111 and U-112

RCA 5T

Two different speakers are used on Model 5T, and are identified by the numbers stamped on them as follows: (1) RL-63C1 and (2) 72203-5. Replacement parts for No. RL-63C1 are listed in the service data for Model 5T, shown on *page 7-14 of Rider's Volume VII,* and the replacement parts for No. 72203-5 are listed below:

Stock No.	*Description*
9579	Coil—Field coil
9533	Cone—Reproducer cone mounted and centered in housing
5118	Connector—3-contact male connector for reproducer
9578	Reproducer complete
4818	Transformer—Output transformer

RCA 5X

Late-production Model 5X receivers include the following minor changes from the original Model 5X which is found on *pages 7-18 to 7-20 of Rider's Volume VII:* (1) a fixed-tuned wave-trap is used in place of the adjustable wave-trap and (2) a few changes in component parts which are listed below. For late-production Model 5X, under "Alignment Procedure," omit the wave-trap adjustment. Early- and late-production receivers can be distinguished readily by inspection of the wave-trap. Component part changes for late-production models are as follows:

Stock No.	*Description*
11414	Capacitor—0.1 mf (C19)
13837	Capacitor pack—Comprising one 10-mf and two 16-mf sections (C23, C24, C26)
12695	Resistor—15,000 ohms, insulated, ¼ watt (R2)
12679	Resistor—2.2 megohms, insulated, ¼ watt (R3, R7)
13836	Switch—Range switch (S2, S3, S4, S5)
13838	Trap—Wave trap (L1, C1)
13149	Coil—Reproducer field coil (L13, L15)

Stock Nos. 12537, 4835, 12398, 12410, 12411, 12399, 3404, 12402, 12395, 12497, 12499, 12731, 12498, 9684, 12500, 13150, 13071, 12936 and 12937 are not used in Model 5X with fixed wave-trap.

RCA 8T2

Four different speakers are used with Model 8T2 receiver, and are identified by the numbers stamped on them as follows: (1) RL-63-4, (2) 76365-1, (3) 76365-3 and (4) RL-63E2. Replacement parts for Nos. RL-63-4 and 76365-1 are listed on *page 8-40 of Rider's Volume VIII,* and No. 76365-3 is listed on the schematic on *page 8-41*. The replacement parts for No. RL-63E2 are listed below:

Stock No.	*Description*
12641	Board—Reproducer terminal board
12640	Bracket—Output transformer mounting bracket
11254	Coil—Field coil
11233	Coil—Hum neutralizing coil
12642	Cone—Reproducer cone and dust cap
5118	Connector—3-contact male connector for reproducer
9773	Reproducer complete
11253	Transformer—Output transformer

RCA 8U

Two different phonograph turntable motors are used on Model 8U, and are distinguished by the numbers stamped on the motor name plate as follows: (1) 72444-1 and (2) 56992-1. No. 72444-1 is an induction motor with a governor-type speed regulator; No. 56992-1 is a synchronous motor. Replacement parts for No. 72444-1 are listed on *page 8-51 of Rider's Volume VIII;* replacement parts for No. 56992-1 are listed below:

Stock No.	*Description*
8989	Motor complete, 105-125 volts, 60 cycles
8993	Rotor and shaft for Stock No. 8989
3398	Spring—Motor mounting spring assembly
3817	Stud—Motor mounting stud

RCA 87K1, 87K2, 87T2

The service data and replacement parts for the Model 87K1 are shown on *pages 9-83 to 9-86 of Rider's Volume IX*. Three replacement parts have been added as follows:

Stock No.	*Description*
30846	Core—Inductance adjustment for instantaneous tuning coils
12007	Spring—Retaining spring for core Stock No. 30846
30695	Card—Station call-letter card for push buttons

All service data and replacement parts for Model 87K1 apply directly to Model 87K2, including the three additional replacement parts listed above for Model 87K1.

All service data and replacement parts for Model 87K2 apply directly to Model 87T2, except that the Reproducer Replacement Parts listed below should be used instead of those listed for Model 87K1.

Stock No.	*Description*
14614	Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-1 or 84001-3)
14934	Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-2 or 84001-6)
5118	Plug—3-contact male plug for reproducer
14613	Reproducer complete (marked 84001-3 or 84001-6 but interchangeable with speaker marked 84091-1 or 84091-2 respectively)
14615	Transformer — Output transformer (T2) (for speaker marked 84091-1 or 84001-3)
14935	Transformer — Output transformer (T2) (for speaker marked 84091-2 or 84001-6)

Stock Nos. 13866, 14354, 11469, 12667, 14395, 14358, 14355 and 14357 for Model 87K1 Reproducer Assemblies are not used in Model 87T2.

Silvertone 7127, 7133

The schematic for the chassis used in these models will be found on *Sears page 7-63 in Rider's Volume VII.* The alignment has just been obtained and will be found below.

Apply a 456-kc signal at the control grid of the 2A7 and adjust the i-f trimmers.

Apply a 1712-kc signal at the antenna. Turn condenser all the way open. First adjust oscillator trimmer on the oscillator coil, then the r-f trimmer on the condenser.

Adjust the low-frequency padder at 600 kc while rocking the condenser.

Check at 1400 kc for alignment.

Short-wave Adjustment: adjust the small trimmer found under the chassis on short-wave antenna coil for maximum output. If short wave does not track with dial, adjust trimmer on oscillator section of variable condenser until correct. Make all adjustments for short wave with the variable condenser turned to center of 25-meter location on scale.

●

Silvertone 4600

A .1-mf condenser should be added to eliminate bad chassis pickup as shown in Fig. 1, the partial schematic. This type of pickup is heard as noise when the car engine is running and the antenna is disconnected from the receiver.

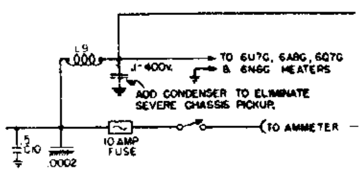


Fig. 1. Partial schematic of Silvertone model 4600 in which is shown where the .1-mf condenser is connected to eliminate chassis pickup.

This instruction applies to sets having identification number 101.458 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.458B or a subsequent letter. See location in Fig. 2. Note that the schematic is shown on *Sears page 9-35 of Rider's Volume IX.*

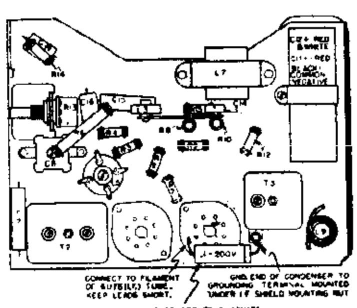


Fig. 2. Bottom of chassis showing location of the added condenser.

Silvertone 4601

A .1-mf condenser should be added to eliminate bad chassis pickup, as shown in the partial schematic of Fig. 1. This type of pickup is heard as

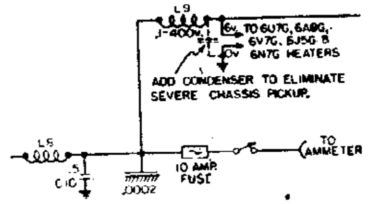


Fig. 1. Where the 0.1-mf condenser is added in Silvertone 4601 to eliminate chassis pickup.

noise when the car engine is running and the antenna is disconnected from the receiver. This instruction applies to sets having identification number 101.463 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.463B or a subsequent letter.

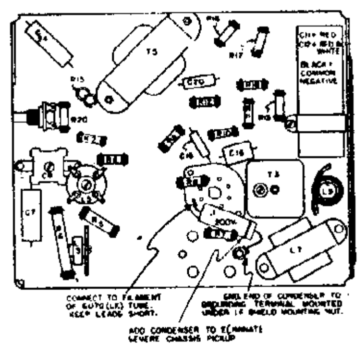


Fig. 2. Location of added condenser.

The location of this condenser is shown in Fig. 2, the bottom view of the chassis. Note that the Silvertone 4601, shown on *Sears page 8-75 of Rider's Volume VIII,* does not show this condenser; it may be assumed, therefore, that this is Chassis 101.463.

●

Silvertone 4414, 4415, etc.

The original production of this chassis (No. 101,393) used part number 1012814032, r-f coil and detector coil (iron core). Later production, which can be identified by the letter "C" or a subsequent letter rubber-stamped on the chassis, used part number 1012818509 detector coil and number 1012818510, r-f coil (air core). When the new air-core type coils are used, the 350-ohm resistor, R2, in series with the volume control, is changed to 150 ohms.

Later production used part number 1012418344 as volume control, instead of the one used originally. The new control incorporates the 150-ohm resistor, R2, mentioned above, as a tap on the resistance element, eliminating R2 as an external resistor. The new control can be used to replace the old one in those sets using a 350-ohm R2 by substituting a 200-ohm resistor, as the 150 ohms are incorporated in the control itself. It can be used to replace the original control in those sets that use a 150-ohm external resistor for R2 by removing R2 and connecting to the tap on the volume control.

Please notice that three more model numbers have been added to this chassis and these should be added to the listing in the Index, which should now read: 4414, 4415, 4500, 4505, 4506, 4509, 4510, 4511, Chassis 101.393. The schematic for this chassis will be found on *page 8-15 in Rider's Volume VIII.*

●

Silvertone 4502, 4504, etc.

The same changes relating to Chassis 101.393 also apply to these models, with the exception that the later production is identified by the letter "A" or a subsequent letter rubber-stamped on the chassis.

New model numbers have also been added to this chassis and they should be incorporated in your Index, which should read: 4502, 4502A, 4504, 4508, 4512, 4513, 4514, Chassis 101.427. The schematic of this chassis will be found on *page 8-58 in Rider's Volume VIII.*

●

Silvertone 4487, 4587, 4587A

If one of these models has been out of service for several months, the 25-mf electrolytic condenser may lose its formation, causing the 5Y3G rectifier tube plates to become redhot or the tube to burn out. While this condition seldom occurs, the electrolytic can be reformed and the condition remedied as follows:

Using a 5Y3 plug and a 5X4 socket, make an adapter by connecting together the prongs indicated below. Then put a 5X4G rectifier tube in the adapter socket and push the adapter plug into the rectifier socket of the receiver. (It is advisable to remove the output tubes from their sockets during the reforming period.) The receiver should be turned on for about five minutes, the 5X4G tube being used to reform the electrolytic. After this period, the 5Y3G tube can be replaced in its socket and the receiver will perform normally.

This same remedy can be applied to other chassis, although it is very unlikely that this condition will be often encountered.

5X4G Plug			*5Y3G Socket*
3	connects to		2
5	"	"	4
7	"	"	6
8	"	"	8

●

Stewart-Warner-Firestone R-1332

The filter system and rectifier tube are protected against breakdown during the warming up period by the Globar resistor (No. 15 in the schematic on *page 6-16 in Rider's Volume VI*), which functions as follows: The resistance of this unit drops rapidly as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage under the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, this resistor can not be checked with an ordinary ohmmeter as it will show a resistance of several megohms.

I-F Alignment:

This is conventional, the i-f peak being 456-kc. The trimmers are located on the top of the i-f transformers and may be reached by removing the top cover. The signal generator is connected between the control grid of the 6A7 and ground.

Dial Calibration:

Tune in a station of known frequency between 800 and 1000-kc. Insert a screwdriver in the slotted end of the dial shaft projecting through the back of the control head. Hold the tuning control knob so that the station remains tuned in properly and adjust the dial pointer with the screwdriver so that the exact station frequency is indicated.

If the set is badly out of calibration, such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer. In order to reach this trimmer the chassis must be removed from the case as follows:

Remove the flexible shafts and dismount the receiver.

Remove the four terminals of the speaker cable from the speaker.

Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.

Remove the blue dial-light lead from the socket terminal.

Remove the yellow tone-control lead from the tone control switch.

Remove the six slotted chassis fastening screws and slide the chassis from the case.

Reconnect the red and yellow leads of the speaker cable to the speaker.

Insert the tuning shaft in the gang condenser fitting and reconnect the battery lead.

Set the chassis on a flat metal plate and adjust as follows:

Connect a 0.00025-mf condenser in series with the output of the signal generator and the antenna lead plug on the antenna coil and the ground lead of the signal generator to the chassis of the set. Set signal generator to 600-kc and tune the receiver to maximum volume and set the dial to read exactly 6.0 (600-kc). Set the signal generator to 1400-kc and turn the tuning knob until the dial pointer reaches 14.0 (1400-kc). Adjust the oscillator shunt trimmer (on the gang condenser second from the control end) until the meter indicates maximum output. Then adjust the other gang trimmer as directed below.

R-F Alignment:

With the signal generator tuned to 1400 kc, tune the receiver carefully for maximum output. Adjust the output of the signal generator to minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser for maximum output.

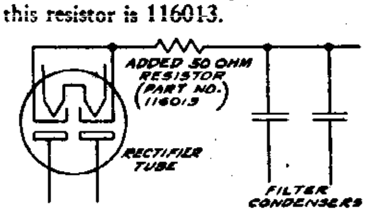
●

Stewart-Warner AC-DC Receivers

There is a tendency for filter condensers and rectifier tubes in AC-DC receivers to fail prematurely. The Stewart-Warner Engineering Department has developed a simple remedy which will be incorporated in all future production of Stewart-Warner AC-DC receivers, and which can be applied easily by the serviceman to existing receivers.

With certain power-line impedances, extremely high surge voltages are developed across the filter condenser. These voltages may be as high as 300 volts, and occur only if the set is turned off on a particular part of the a-c cycle of the power-line current. Such a surge often punctures the filter condenser, and this causes the rectifier tube to fail. Since this difficulty is caused by a power-line condition, if it happens once in a certain customer's home, it is very likely to happen again.

The remedy for this trouble is to connect an inexpensive 50-ohm 1-watt resistor in series with the connection from the rectifier-tube cathodes to the electrolytic filter condensers. The proper connection of the resistor is shown in the accompanying diagram. The Stewart-Warner part number for this resistor is 116013.



The 50-ohm resistor added in the rectifier circuit for line surge protection.

Firestone-Stewart-Warner R-1322

The alignment instructions for this receiver are practically the same as those which will be found on *page 8-16 in Rider's Volume VIII*. As this set is used with a steering column control head, the portion of the instructions pertaining to the dash control head can be disregarded. Also the trimmers on the gang condenser are reached by removing the *back cover* instead of the bottom cover.

A note is contained in the circuit description which should be observed. The correct position of the vibrator in its socket depends upon which car battery terminal is grounded. If the negative terminal is grounded, the vibrator should be inserted so that the arrow *points away* from the adjacent transformer cover. If the positive side of the battery is grounded, this arrow should point *towards* the transformer cover. The schematic for this receiver will be found on *Stewart-Warner page 6-15 in Rider's Volume VI.*

●

Stewart Warner R-160 Chassis

The circuit description and alignment notes found on *page 8-16 in Rider's Volume VIII*, are practically the same as those which apply to models 1601 to 1609 inclusive, the major difference occuring in the section devoted to dial calibration. In the instructions for calibrating a dial for receivers having a dash control head, only the 1400-kc adjustment is used, the 600-kc setting being neglected. The schematic for the R-160 chassis will be found on *page 7-8 in Rider's Volume VII.*

●

RCA 262,263

The a-f driver transformer, T3 has a revised coil design, the d-c resistance of the primary now being 1350 ohms and that of the secondary being 2000 ohms. An extra connection has also been provided on this unit for equalizing the primary and core potentials so that electrolysis between these parts will be reduced. This additional lead is colored red-green and it should be connected to plug "B" of the primary circuit. See schematic diagrams of the early models on *pages 5-102 and 5-103 of Rider's Volume V and the late models on pages 6-51 and 6-53 of Rider's Volume VI.*

Bosch 376BT, 376F, 376S

Please make a note in the table of socket voltages on *page 6-2 in Rider's Volume VI* that the filament voltages should be 2.0 instead of 6.2 volts.