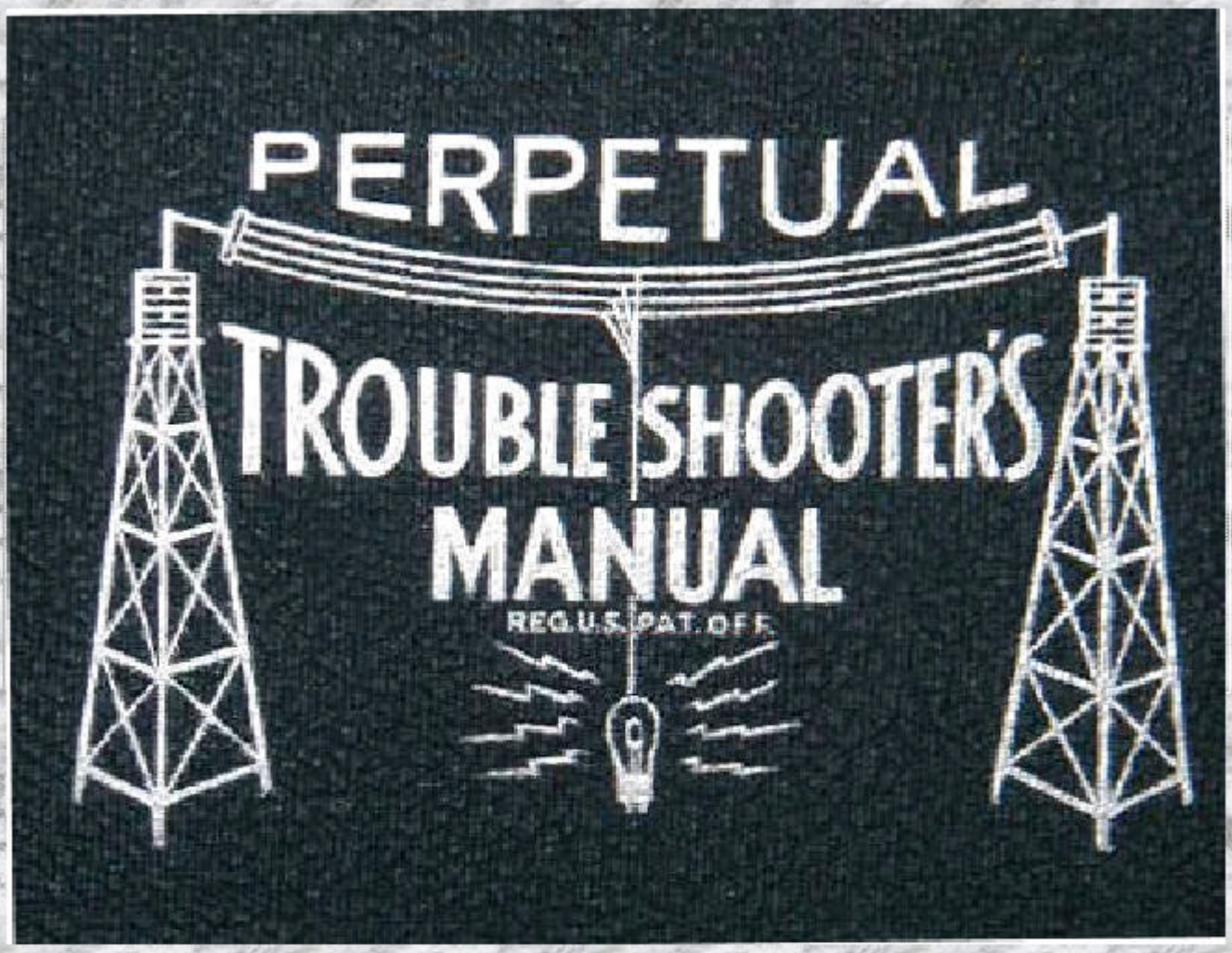
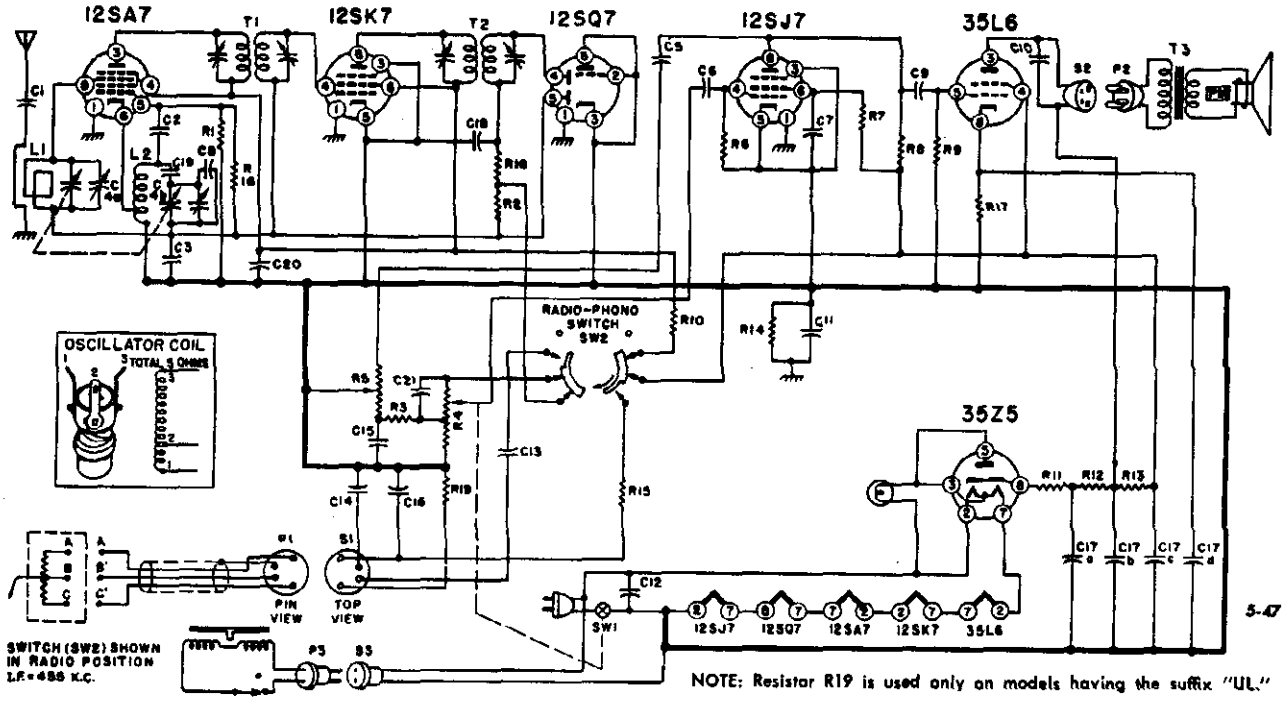
RIDER'S
VOLUME - XVI



COVERING LATE 1946
TO EARLY 1947

ADMIRAL CORPORATION

MODEL 7C62, Chassis 6M1
MODELS 7RT41, 7RT42, 7RT43



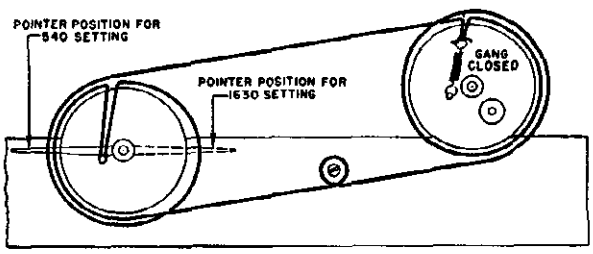
MODELS 7RT41, 7RT42, 7RT43 MODEL 7C62

ALIGNMENT PROCEDURE

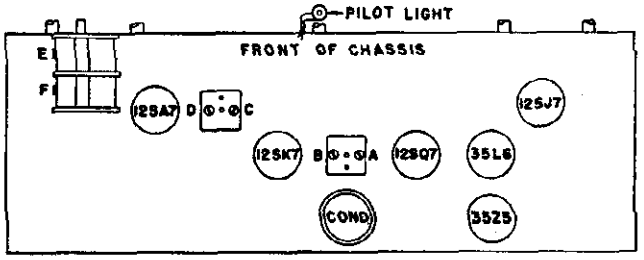
1. Connect Output Meter across Voice Coil.
2. Turn Receiver Volume Control—full on.
3. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence
4. Repeat adjustments to insure good results.

Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Frequency to—	Set Receiver Dial Frequency to—	Adjust Following Trimmers	Type of Adjustment
Tuning Condenser Antenna Stator	250 mmfd. Condenser	455 K.C.	High frequency end of Dial	A-B—2nd I. F. C-D—1st I. F.	Adjust to maximum Output
Tuning Condenser Antenna Stator	250 mmfd. Condenser	1630 K.C.	High frequency end of Dial	E—Osc.	Adjust to maximum Output
Loop radiator (or place lead from generator close to loop of set to obtain adequate signal)	No actual connection between set and generator.	1400 K.C.	Tune in generator signal	F—Ant.	Adjust to maximum Output

DIAL CORD STRINGING & POINTER SETTING



TOP VIEW



TUBE & TRIMMER LOCATION

MODEL 7C62
MODELS 7RT41, 7RT42, 7RT43

ADMIRAL CORPORATION

MODEL 7RT41, 7RT42, 7RT43

REPLACEMENT PARTS

RESISTORS

Symbol	Description	Part No.
R1	22,000 Ohms, ½ Watt	60B 8-223
R2	1 Megohm, ½ Watt	60B 8-105
R3	27,000 Ohms, ½ Watt	60B 8-273
R4	1 Megohm Volume Control (Tapped at 500,000 ohms)	75B 2-6
R5	2 Megohm Tone Control and Switch SW1	75B 1-12
R6	4.7 Megohms, ½ Watt	60B 8-475
R7	1.8 Megohms, ½ Watt	60B 8-185
R8	100,000 Ohms, ½ Watt	60B 8-104
R9	470,000 Ohms, ½ Watt	60B 8-474
R10	100 Ohms, ½ Watt	60B 8-101
R11	33 Ohms, 1 Watt	60B 28-3
R12	220 Ohms, 1 Watt	60B 28-7
R13	1,000 Ohms, 1 Watt	60B 28-2
R14	150,000 Ohms, ½ Watt	60B 8-154
R15	22,000 Ohms, ½ Watt	60B 8-223
R16	10 Megohms, ½ Watt	60B 8-106
R17	150 Ohms, 1 Watt	60B 14-151
R18	100,000 Ohms, ½ Watt	60B 8-104
R19	33,000 Ohms, ½ Watt	60B 8-333

CONDENSERS

Symbol	Description	Part No.
C1	.005 mfd., 600 Volts, Paper	64B 1-12
C2	50 mmfd. ±20%, Ceramic	65B 6-4
C3	.1 mfd., 200 Volts, Paper	64B 1-30
C4a	Gang, 0 to 420 mmfd.	68B 5
C4b	Gang, 0 to 162 mmfd.	
C5	.002 mfd., 600 Volts, Paper	64B 1-14
C6	.01 mfd., 400 Volts, Paper	64B 1-25
C7	.05 mfd., 400 Volts, Paper	64B 1-22
C8	15 mmfd. ±20%, Ceramic	65B 6-18
C9	.01 mfd., 400 Volts, Paper	64B 1-25
C10	.03 mfd., 400 Volts, Paper	64B 1-23

CONDENSERS

Symbol	Description	Part No.
C11	.18 mfd., 200 Volts, Paper	64A 2-2
C12	.05 mfd., 400 Volts, Paper	64B 1-22
C13	.001 mfd., 600 Volts, Paper	64B 1-15
C14	.05 mfd., 400 Volts, Paper	64B 1-25
C15	.01 mfd., 400 Volts, Paper	64B 1-24
C16	.1 mfd., 200 Volts, Paper	64B 1-30
C17a	30 mfd., 150 Volts	Elect. 67A 14-1
C17b	30 mfd., 150 Volts	
C17c	20 mfd., 150 Volts	
C17d	20 mfd., 25 Volts	
C18	250 mmfd. ±20%, Ceramic	65B 6-5
C19	.02 mfd., 200 Volts, Paper	64B 1-24
C20	.05 mfd., 400 Volts, Paper	64B 1-22
C21	500 mmfd. ±20%, Ceramic	65B 6-6

COILS, TRANSFORMERS, ETC.

L1	Antenna, Loop	69B 13
L2	Coil, Oscillator	69A 14
T1	Transformer, 1st I.F.	72B 3
T2	Transformer, 2nd I.F.	72B 4
T3	Transformer, Output	98A 17
	Speaker (5") & Output Transformer	78B 19-1

SWITCHES, PLUGS & SOCKETS

P1	Plug, Pickup	88A 8-5
P3	Plug, Motor	88A 8-1
S1	Socket, Phono	88A 8-6
S3	Phono-Motor Socket & Leads (Female connector)	89A 6-3
SW1	Part of Tone Control R5	
SW2	Switch, Radio-Phono	77A 16-2

CABINET PARTS

Description	Part No.
Cabinet Body Less Lid (7RT41)	34D 11-11
Cabinet Lid (7RT41)	34D 11-10
*Cabinet, Wood (7RT42)	35D 47
*Cabinet, Wood, Walnut (7RT43)	35D 48-1
*Cabinet, Wood, Mahogany (7RT43)	35D 48-2
Clip, Dial Glass Mounting (7RT43)	18A 12
Dial Scale, Glass (7RT41-7RT42)	21B 35-1
Dial Scale, Glass (7RT43)	21B 33-1
Escutcheon, Overlay (7RT41-7RT42)	23C 23-1
Grille, Inside	16C 1

PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

Cartridge and Needle, Pickup	A 1372
Centerpost	G400B137-1
Drive Disc Assembly	G 400A 179
Idler Wheel (407B3 Motor)	G 400A 23
Idler Wheel (407B1 Motor)	G 400A 57
Motor, 60 Cycle 115 Volt A.C.	407B 3-2
Pickup Cable and Plug	A 1322

MISCELLANEOUS

Background, Dial	22B 9-1
Bracket, Tuning Shaft	15A 152
Bracket, Dial	15B 151
Cord, Dial (48")	50A 1-3
Drum, Dial	17A 14
Grommet, Rubber	12A 1-2
Knob	33A 19-1
Pilot Light #47	81A 1-8
Pilot Light Socket and Leads	82A 2-3
Pointer	25A 21
Pulley, Fibre Dial 1/8"x1/2" O.D.	17A 1-3
Shaft, Tuning	28A 11-4
Spring, Dial Drum Cord Tension	19B 1-7

*** Supplied only if old cabinet cannot be repaired. When ordering, describe condition of old cabinet in detail.**

MODEL 7C62

REPLACEMENT PARTS

RESISTORS

Symbol	Description	Part No.
R1	22,000 Ohms, ½ Watt	60B 8-223
R2	1 Megohm, ½ Watt	60B 8-105
R3	27,000 Ohm, ½ Watt	60B 8-273
R4	1 Megohm Volume Control and Switch SW1 (Tapped at 500,000 ohms)	75B 2-2
R5	2 Megohms, Tone Control	75B 1-8
R6	4.7 Megohms, ½ Watt	60B 8-475
R7	1.8 Megohms, ½ Watt	60B 8-185
R8	100,000 Ohms, ½ Watt	60B 8-104
R9	470,000 Ohms, ½ Watt	60B 8-474
R10	100 Ohms, ½ Watt	60B 8-101
R11	33 Ohms, 1 Watt	60B 28-3
R12	220 Ohms, 1 Watt	60B 28-7
R13	1,000 Ohms, 1 Watt	60B 28-2
R14	150,000 Ohms, ½ Watt	60B 8-154
R15	22,000 Ohms, ½ Watt	60B 8-223
R16	10 Megohms, ½ Watt	60B 8-106
R17	150 Ohms, 1 Watt	60B 14-151
R18	100,000 Ohms, ½ Watt	60B 8-104
R19	33,000 Ohms, ½ Watt	60B 8-333

CONDENSERS

Symbol	Description	Part No.
C1	.005 mfd., 600 Volts, Paper	64B 1-12
C2	50 mmfd. ±20%, Ceramic	65B 6-4
C3	.1 mfd., 200 Volts, Paper	64B 1-30
C4a	Gang, 0 to 420 mmfd.	68B 5
C4b	Gang, 0 to 162 mmfd.	
C5	.002 mfd., 600 Volts, Paper	64B 1-14
C6	.002 mfd., 600 Volts, Paper	64B 1-14
C7	.05 mfd., 400 Volts, Paper	64B 1-22
C8	15 mmfd. ±20%, Ceramic (Used on Model 7C62-N)	65B 6-18
C8	20 mmfd., Mica (Used on Model 7C62-UL)	65B 7-5

CONDENSERS

Symbol	Description	Part No.
C9	.01 mfd., 400 Volts, Paper	64B 1-25
C10	.03 mfd., 400 Volts, Paper	64B 1-23
C11	.1 mfd., 400 Volts, Paper	64B 1-20
C12	.05 mfd., 400 Volts, Paper	64B 1-22
C13	.001 mfd., 600 Volts, Paper	64B 1-15
C14	.05 mfd., 400 Volts, Paper	64B 1-22
C15	.02 mfd., 400 Volts, Paper	64B 1-24
C16	.1 mfd., 200 Volts, Paper	64B 1-30
C17a	30 mfd., 150 Volts	Elect. 67C 7-46
C17b	30 mfd., 150 Volts	
C17c	20 mfd., 150 Volts	
C17d	20 mfd., 25 Volts	
C18	250 mmfd. ±20%, Ceramic	65B 6-5
C19	.02 mfd., 200 Volts, Paper	64B 1-24
C20	.05 mfd., 400 Volts, Paper	64B 1-22
C21	500 mmfd. ±20%, Ceramic	65B 6-6

COILS, TRANSFORMERS, ETC.

L1	Antenna, Loop	69B 15
L2	Coil, Oscillator	69A 14
T1	Transformer, 1st I.F.	72B 3
T2	Transformer, 2nd I.F.	72B 4
T3	Transformer, Output	98A 18
	Speaker (8" PM) & Output Transformer	78C 20-1

SWITCHES, PLUGS & SOCKETS

P1	Plug, Pickup	88A 8-5
P2	Plug, Speaker	88A 4
P3	Plug, Motor	88A 8-1
S1	Socket, Phono	88A 8-6
S2	Socket, Speaker	87A 6-1
S3	Phono-Motor Socket & Leads (Female connector)	89A 6-6
SW1	Part of Volume Control R4	
SW2	Switch, Radio-Phono	77A 16-2

CABINET PARTS

Description	Part No.
Screw, Chassis Mounting	1A 67-17-2
Tie Bar, Tilt Out	15B 126
Springs, Tilt Out	19A 15-1
Escutcheon, Plastic	23C 22-2
Dial Window, Plastic	24B 1
*Cabinet, Wood (7C62)	35E 52
Hinge Assembly, Record Support Side	AC 118-1
Hinge Assembly, Pickup Arm Side	AC 118-2

PHONOGRAPH PARTS

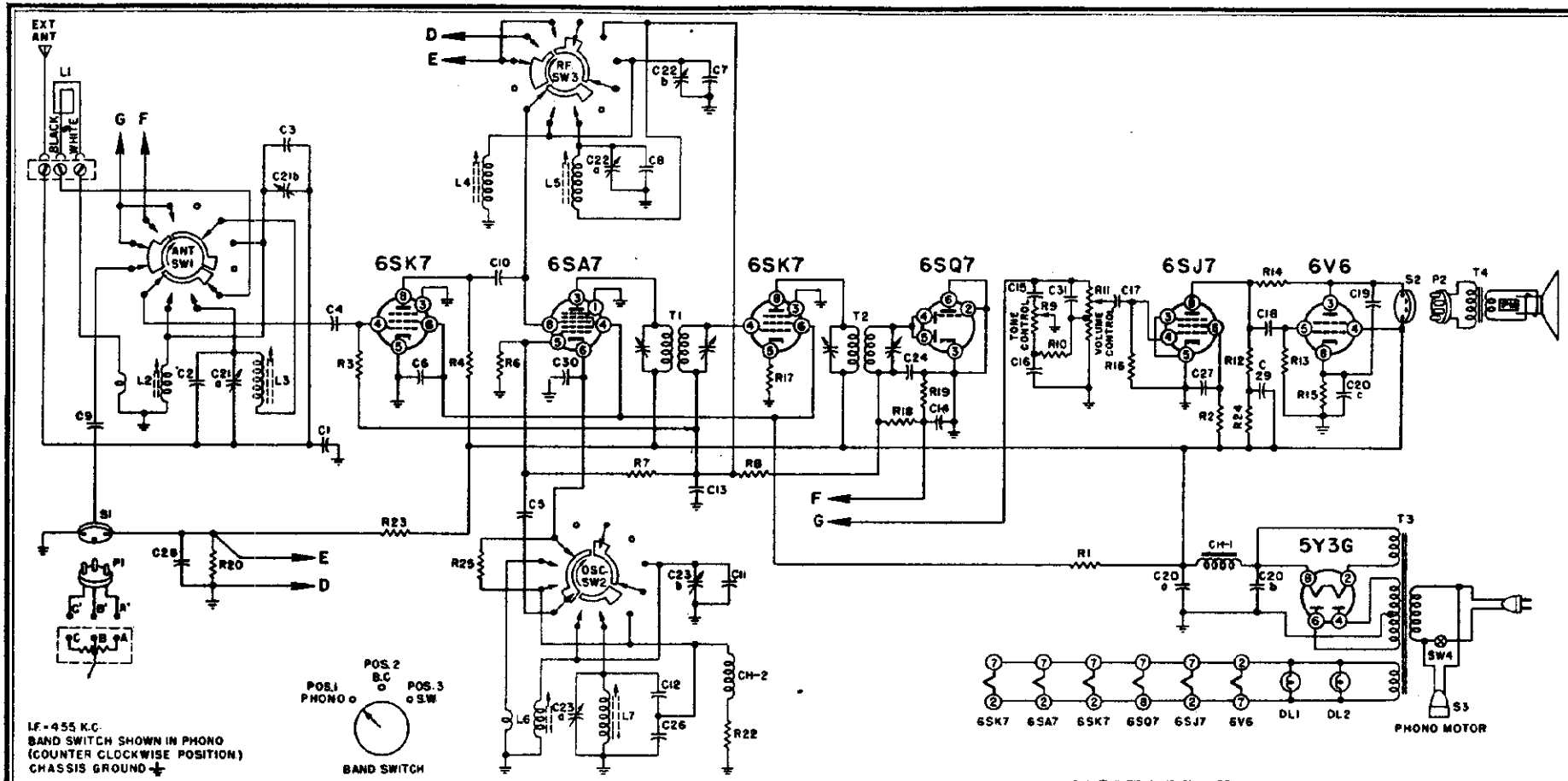
Note: See record changer manual for complete parts list.

Cartridge and Needle, Pickup	A 1372
Centerpost	G400B137-1
Drive Disc Assembly	G 400A 179
Idler Wheel (407B3 Motor)	G 400A 23
Idler Wheel (407B1 Motor)	G 400A 57
Motor, 60 Cycle 115 Volt, A. C.	407B 3-2
Pickup Cable and Plug	A 1304

MISCELLANEOUS

Compression Ring (For pointer)	18A 5-2
Cord, Dial	50A 1-3
Grommet, Rubber (For gang cond.)	12A 1-2
Knob	33A 19-2
Pilot Light #47	81A 1-8
Pilot Light Socket & Leads	82A 3-3
Pointer	25B 22
Scale, Dial	21B 30-2
Shaft, Pointer	28A 16
Shaft, Tuning	28A 10-1
Spring, Dial Drum Cord Tension	19B 1-5
Spring, Tuning Shaft Tension	19A 18

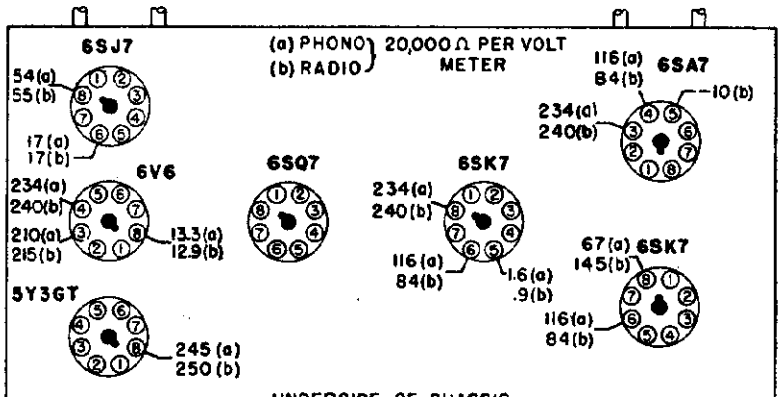
*** Supplied only if old cabinet cannot be repaired. When ordering, describe condition of old cabinet in detail.**



VOLTAGE DATA

- Measured on 117 Volt A.C. Line
- Volume control at lowest volume setting.
- No station tuned in.
- Radio readings with bandswitch in broadcast position.
- Voltages measured between point indicated and chassis.

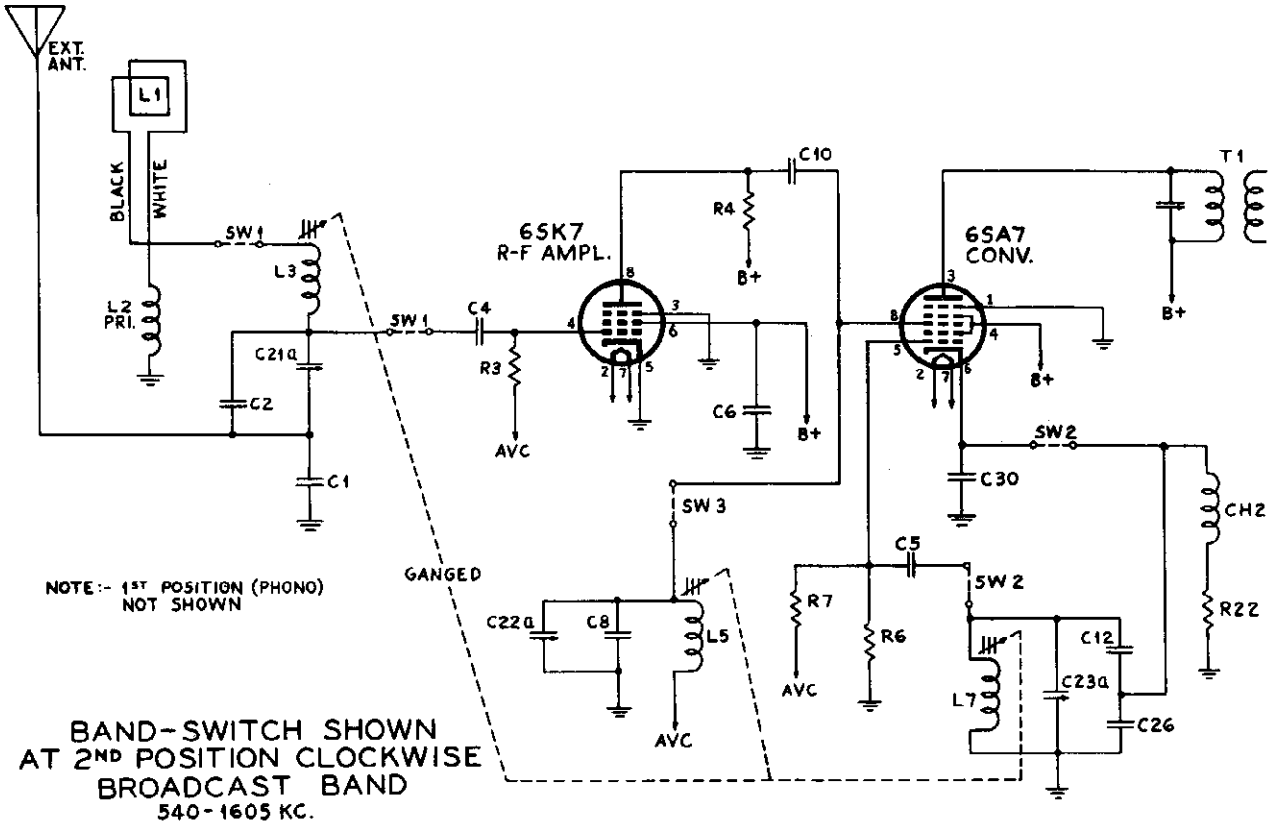
VOLTAGE CHART

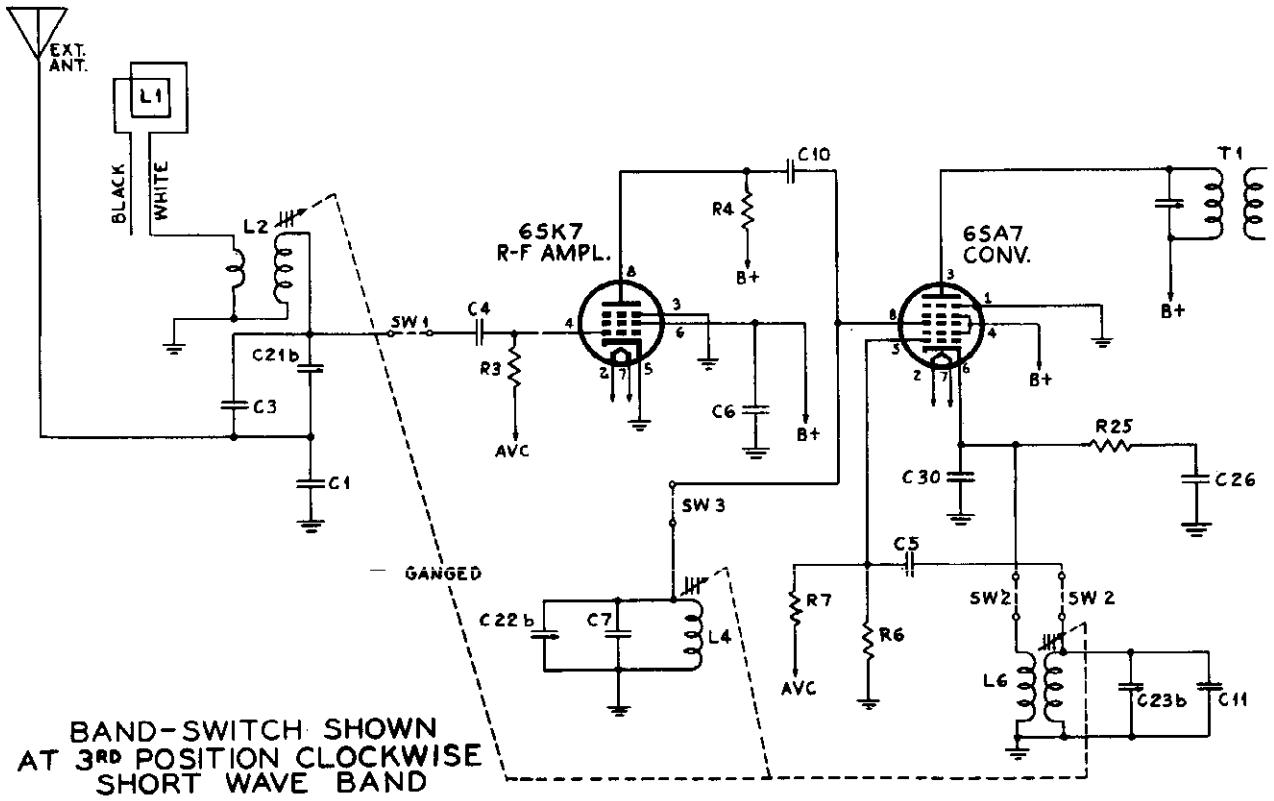


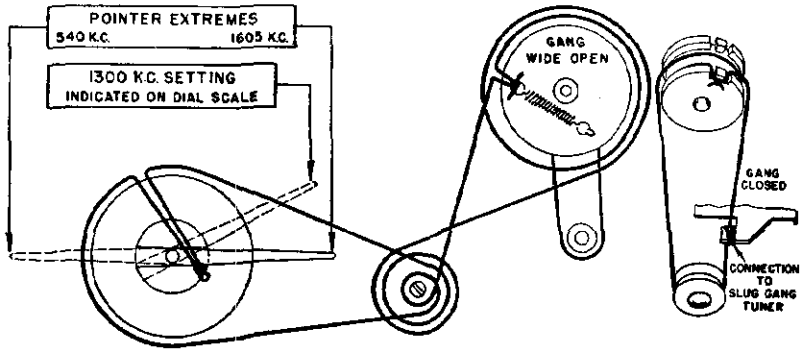
"clarified schematics"

MODEL 7C63,

ADMIRAL CORPORATION







RECORD CHANGER SERVICE DATA

The element in the new Admiral pickup cartridge is made of a special rubber which acts as a high resistance electrical conductor. The resistance varies as the length of the rubber is changed. A needle is clamped to the center of the resistive rubber as shown at "B" (see schematic). A DC voltage is applied at AA'. The voltage drop from "B" to "C" varies as the resistance changes due to the "back and forth" movement of the needle. This varying voltage drop, which is in reality an alternating voltage of audio frequency, is applied through the coupling condenser to the grid of the audio amplifier tube. In case of distortion or low volume on phono operation only, check as follows:

1. Replace cartridge and check operation. If not satisfactory, proceed with tests.
2. With the volume control at maximum, touch the needle with the finger. If a loud hum is heard, then the circuit from the needle to the grid of the audio amplifier tube is not open or shorted. If hum is not heard, check the circuit from "B" to the grid.
3. If a hum is heard, check the voltage across outer terminals "A" and "C" on the bottom of cartridge. Generally it should measure from 80 to 100 volts DC. If it does not, check the circuit for fault.
4. The resistance of the cartridge is not critical, but should measure between 100,000 ohms and 2 megohms.
5. If the needle is bent, it can be straightened by bending it so that it projects 1/16 inch below the cartridge. It should then be pressed back several times with a flat object.

Do not attempt to repair cartridges or remove the cap on the cartridge assembly as this will void the warranty.

POINTER ADJUSTMENT

Turn the tuning control knob clockwise until tuning gang is wide open. The pointer should now be at 1605 Kc. (last dial dot). If it is not, grasp the pointer with your hand and move it to 1605 Kc. Then proceed with alignment.

REPLACING TUNING SLUG

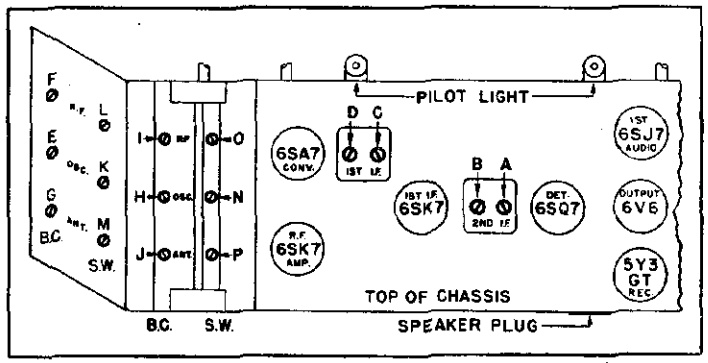
Set the gang to its wide open position, unsolder and remove the old slug. Set the slug adjusting screw about half way down. Place the new slug in such a position that 1⅝ inches of its length is above the coil form. Solder it in this position making sure that the slug wire is straight. Re-align the set as shown in the chart.

ALIGNMENT PROCEDURE

1. Loop must be connected during alignment.
   Check the set screws that hold the tuning drum to the shaft to see that they are tight and that the drum has not slipped on the shaft. The correct position of the drum can be seen on the stringing diagram.
2. In the closed position the stop on the rear of the dial drum must be against the stop post.
3. **With the gang wide open, all slugs should be 1⅝ inches out of their coil forms. If there is any serious deviation or if there has been any tampering, turn the adjusting screws until this distance is correct.**
4. Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
5. Turn receiver Volume Control full on.
6. Use lowest output setting of signal generator that gives a satisfactory reading on meter.
7. Proceed in sequence as outlined below.

Step	Connect Signal Generator To	Dummy Antenna Between Radio and Signal Generator	Signal Generator Frequency	Tuning Gang Setting	Adj. Trimmers in Following Order to Max.
1	Set Band Change Switch to Broadcast Position. 6SA7 Grid (Pin No. 8)	.1MFD.	455 K.C.	Set Pointer to Upper Limit	A, B, C, D
2	Before proceeding to step 3 check pointer travel and slug position as described below.				
3	Black Loop Lead	10 MMFD. If not available wrap several turns of the generator lead around the black loop lead.	1605 K.C.	Set Pointer to Upper Limit	E, F, G
4	Black Loop Lead		1300 K.C.	Set Pointer to 1300 K.C. on Dial Scale	H, I, J
5	Set Band Change Switch to Short Wave Position.				
6	White Loop Lead	400 Ohms	12.5 M.C.	Set Pointer to Upper Limit	K, L, M
7	White Loop Lead	400 Ohms	12.0 M.C.	Set Pointer to 12.0 M.C. on Dial Scale	N, O, P

TUBE AND TRIMMER LAYOUTS



ANTENNA CONNECTIONS

In replacing connections to antennas, it is necessary to see that the flat twin parallel conductor is not twisted. The rear parallel conductor should be connected to the rear terminal screw on each loop antenna. The front parallel conductor should be connected to the front terminal screw on each loop antenna.

MODEL 7C63
MODEL 7C73

ADMIRAL CORPORATION

PARTS LIST - 7C63

RESISTORS

SYMBOL	DESCRIPTION	PART NO.
R1	12,000 Ohms, 5 Watt	61A 1-1
R2	2.2 Megohms, Carbon, ½ Watt	60B 8-225
R3	470,000 Ohms, ½ Watt	60B 8-474
R4	10,000 Ohms, 2 Watt	60B 20-103
R6	22,000 Ohms, ½ Watt	60B 8-223
R7	10 Megohms, ½ Watt	60B 8-106
R8	1 Megohm, ½ Watt	60B 8-105
R9	2 Megohms Tone Control	75B 1-8
R10	27,000 Ohms, ½ Watt	60B 8-273
R11	1 Megohm Volume Control and Switch SW4 Tapped at 500,000 Ohms	75B 2-2
R12	470,000 Ohms, ½ Watt	60B 8-474
R13	470,000 Ohms, ½ Watt	60B 8-474
R14	3.3 Megohms, ½ Watt	60B 8-335
R15	390 Ohms, 1 Watt	60B 14-391
R16	10 Megohms, ½ Watt	60B 8-106
R17	100 Ohms, ½ Watt	60B 8-101
R18	220,000 Ohms, ½ Watt	60B 8-224
R19	100,000 Ohms, ½ Watt	60B 8-104
R20	100,000 Ohms, ½ Watt	60B 8-104
R22	100 Ohms, ½ Watt	60B 8-101
R23	100,000 Ohms, 1 Watt	60B 14-104
R24	47,000 Ohms, ½ Watt	60B 8-473
R25	470 Ohms, ½ Watt	60B 8-471

CONDENSERS

SYMBOL	DESCRIPTION	PART NO.
C1	1000 mmfd., Mica	65B 7-33
C2	35 mmfd., Silver Mica 3%	65B 1-31
C3	25 mmfd., Silver Mica 3%	65B 1-28
C4	100 mmfd., Mica	65B 7-17
C5	50 mmfd., Ceramic	65B 6-4
C6	.05 mfd., 400 V.D.C., Paper	64B 1-22
C7	65 mmfd., Silver Mica 3%	65B 1-27
C8	420 mmfd., Silver Mica	65B 1-13
C9	1000 mmfd., Mica	65B 7-33
C10	200 mmfd., Mica 2%	65B 7-5
C11	65 mmfd., Silver Mica 3%	65B 1-27
C12	200 mmfd., Silver Mica, 2%	65B 1-14
C13	.1 mfd., 400 V.D.C., Paper	64B 1-20
C14	250 mmfd., Mica	65B 7-22
C15	1000 mmfd., Mica	65B 7-33
C16	.02 mfd., 400 V.D.C., Paper	64B 1-24
C17	.01 mfd., 400 V.D.C., Paper	64B 1-25
C18	.005 mfd., 600 V.D.C., Paper	64B 1-12
C19	.01 mfd., 600 V.D.C., Paper	64B 1-10
C20a	30 mfd., 350 V.D.C., Elec.	67C 6-25
C20b	30 mfd., 350 V.D.C., Elec.	
C20c	20 mfd., 25 V.D.C., Elec.	
C21a	3-40 mmfd., Dual Trimmer	66A 1-5
C21b	3-40 mmfd., Dual Trimmer	
C22a	3-40 mmfd., Trimmer	66B 8-1
C22b	3-40 mmfd., Trimmer	66B 8-1
C23a	3-40 mmfd., Trimmer	66B 8-1
C23b	3-40 mmfd., Trimmer	66B 8-1
C24	100 mmfd., Mica	65B 7-17
C26	1,200 mmfd., Mica	65B 5-34
C27	.05 mfd., 200 V.D.C., Paper	64B 1-32
C28	.25 mfd., 200 V.D.C., Paper	64B 1-28
C29	.1 mfd., 400 V.D.C., Paper	64B 1-20
C30	.20 mmfd., Mica	65B 7-5
C31	500 mmfd. ± 20%, Ceramic	65B 6-6

CHOKES, COILS, TRANSFORMERS, Etc.

SYMBOL	DESCRIPTION	PART NO.
L1	Loop Antenna, (Record Support Side)	AD120
L1	Loop Antenna, (Pickup Arm Side)	AD117
L2	Coil, S.W. Antenna	AD116-1
L3	Coil, B. C. Antenna	AC105-2
L4	Coil, S.W., R.F.	AD116-2
L5	Coil, B. C., R.F.	AB100-1
L6	Coil, S.W., Oscillator	AD116-3
L7	Coil, B.C., Oscillator	AC101-1
CH1	Choke, Filter	74A 3
CH2	Coil, Oscillator Choke	AB103-1
T1	Transformer, 1st I.F.	72B 7
T2	Transformer, 2nd I.F.	72B 8
T3	Transformer, Power	80B 1
T4	Transformer, Output	98A 20
	Speaker 10" and Transformer	78B 6

When Ordering Slugs Specify Color Code

Slug, Tuning (B.C.—Osc. & R.F.)	71B	1-3
Slug, Tuning (S.W.—Ant., R.F. & Osc.)	71B	1-9
Slug, Tuning (B.C. Ant.)	71B	1-13

SWITCHES, PLUGS AND SOCKETS

SYMBOL	DESCRIPTION	PART NO.
P1	Plug, Pickup	88A 5-7
P2	Plug, Speaker	88A 4
S1	Phono Socket, Shielded	88A 5-9
S2	Socket, Speaker	87A 6-1
S3	Phono-Motor Socket & Leads	89A 6-8
SW1	Switch, Antenna	76B 1-3
SW2	Switch, Oscillator	76B 1-2
SW3	Switch, R.F.	76B 1-1
SW4	Part of Volume Control R11	

PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

DESCRIPTION	PART NO.
Cartridge and Needle, Pickup	A1372
Centerpost	G400B 137-1
Drive Disc Assembly	G400A 179
Idler Wheel (407B 3 Motor)	G400A 23
Idler Wheel (407B 1 Motor)	G400A 57
Motor	407B 3-2
Pickup Cable and Plug	A1305
Tilt Out Hinge Assembly (Record Support Side)	AC118-1
Tilt Out Hinge Assembly (Pickup Arm Side)	AC118-2
Tilt Out Spring	190A 15-1
Tilt Out Tie Bar	15B 126

MISCELLANEOUS

*Cabinet (7C63), Wood	35D 51
Compression Ring-Pointer	18A 5-2
Cord, Dial	50A 1-3
Dial Background Assembly	A1357
Dial Window—Plastic	24B 1
Drum and Hub Assembly, Pointer	A1355
Drum and Hub Assembly, Tuner	A1356
Escutcheon—Plastic Dial	23C 22-1
Handle, Door	37B 10-1
Knob	33A 19-2
Pilot Light No. 47	81A 1-8
Pilot Light Socket	82A 3-8
Pointer, Dial	25B 22
Screw, Escutcheon Mounting	1A 15-6-58
Spring, Dial Cord Tension	19B 1-10
Spring, Tension	19B 1-11
Transmission Line (43")	95A 16-1
Transmission Line (54")	95A 16-2

*Supplied only if old cabinet cannot be repaired. When ordering, describe condition of old cabinet in detail.

PARTS LIST (CONTD.) - 7C73-9A1

Symbol	COILS, TRANSFORMERS, ETC.	Part No.
CH1...	Choke, F.M. Antenna	AB 103-33
CH2...	Choke, Grounded Grid Cathode	AB 103-36
CH3...	Choke, Grounded Grid Plate	AB 103-35
CH4...	Choke, R.F. Plate	AB 103-56
CH5...	Choke, A.M. Oscillator Cathode	AB 103-1
CH6...	Choke, F.M. Oscillator Cathode	AB 103-54
CH7...	Choke, R.F. Filament...Consists of approximately 8 turns of #20 solid hookup wire wound around condenser C51	
CH8...	Choke, Filter	74A 9
L1...	Antenna, F.M. Folded Dipole	AB 126
L2...	Antenna, A.M. (13')	95A 18
L3...	Coil, A.M. Antenna (less slug)	AC 106-2
L4...	Coil, F.M.-R.F. (less slug)	AA 122
L5...	Coil, F.M. Converter (less slug)	AA 122
L6...	Coil, A.M. Converter (less slug)	AB 100-1
L7...	Coil, F.M. Oscillator (less slug)	AA 123
L8...	Coil, A.M. Oscillator (less slug)	AC 101-2
SW1...	Switch, Antenna (Second from chassis front)	76C 11-3
SW2...	Switch, R.F. (Fourth from chassis front)	76C 11-5
SW3...	Switch, Oscillator (Third from chassis front)	76C 11-4
SW4...	Switch, I.F. (Farthest from chassis front)	76C 11-6
SW5...	Switch, Audio (Closest to chassis front)	76C 11-2
SW6...	Switch (ON-OFF)	Part of R-25
SW7...	Switch (Tone Control)	Part of R-26
	Band-Switch Shaft Assembly	76C 11-1
	Set Screw, #6-32 x 1/4	1A 5-54
	Spacers for Shaft Assembly	89A 4-4
T1...	Transformer, 1st I.F. (F.M.)	72B 34
T2...	Transformer, 2nd I.F. (F.M.)	72B 36
T3...	Transformer, Ratio Detector	72B 37
T4...	Transformer, 1st I.F. (A.M.)	72B 35
T5...	Transformer, 2nd I.F. (A.M.)	72B 35
T6...	Transformer, Power	80B 3
T7...	Transformer, Output	98A 22
	Speaker (12" P.M.) and Output Transformer	78B 31
	When Ordering Slugs Specify Color Code	
	Slug, Iron Core (F.M.-Osc., Conv., & R.F.)	71B 1-19
	Slug, Iron Core (A.M.-Osc., Conv.)	71B 1-20
	Slug, Iron Core (A.M.-Antenna)	71B 1-21

Description	TUNER PARTS	Part No.
Tuning Shaft		28A 17
Slug Travel Bracket, Bushing and Roller Assy. (front)		A1396
Slug Travel Bracket, Bushing and Roller Assy. (rear)		A1398
Brass Guide Rod (Tuner)		28A 7-2
Cam and Hub for Tuner (front)		A1400
Cam and Hub for Tuner (rear)		A1467
Spring, Bearing Takeup		19A 16
Cable, Drive (for Cam and Hub)		96A 15
Spring, Coil (for Cam and Hub)		19B 1-14
Bakelite Plate for slug mounting (1-15/16" x 2-3/8")		32A 36
Slug-Adjusting Screw		27A 4
Drum and Hub on Tuner Shaft (includes 1" drum and 3-11/32" drum)		A1401

Description	DIAL PARTS	Part No.
Pointer Shaft		28A 19
Drum and Hub Assembly (Pointer Shaft)		A1388
Dial Cord (100 inches)		50A 1-3
Spring, Dial Cord (2 used)		19B 1-5
Dial Scale & Indicator Assembly		A1404
Indicator Link		16A 176
Indicator Arm & Hub (on Band Switch Shaft)		A1406
Dial Bulb #47		81A 1-6
Socket, Dial Bulb		82A 3-9
Dial Pointer		A1477
Dial Escutcheon (less rectangular insert)		23E 20
Dial Escutcheon insert (Approx. 2-1/2" x 3-3/4")		23C 25

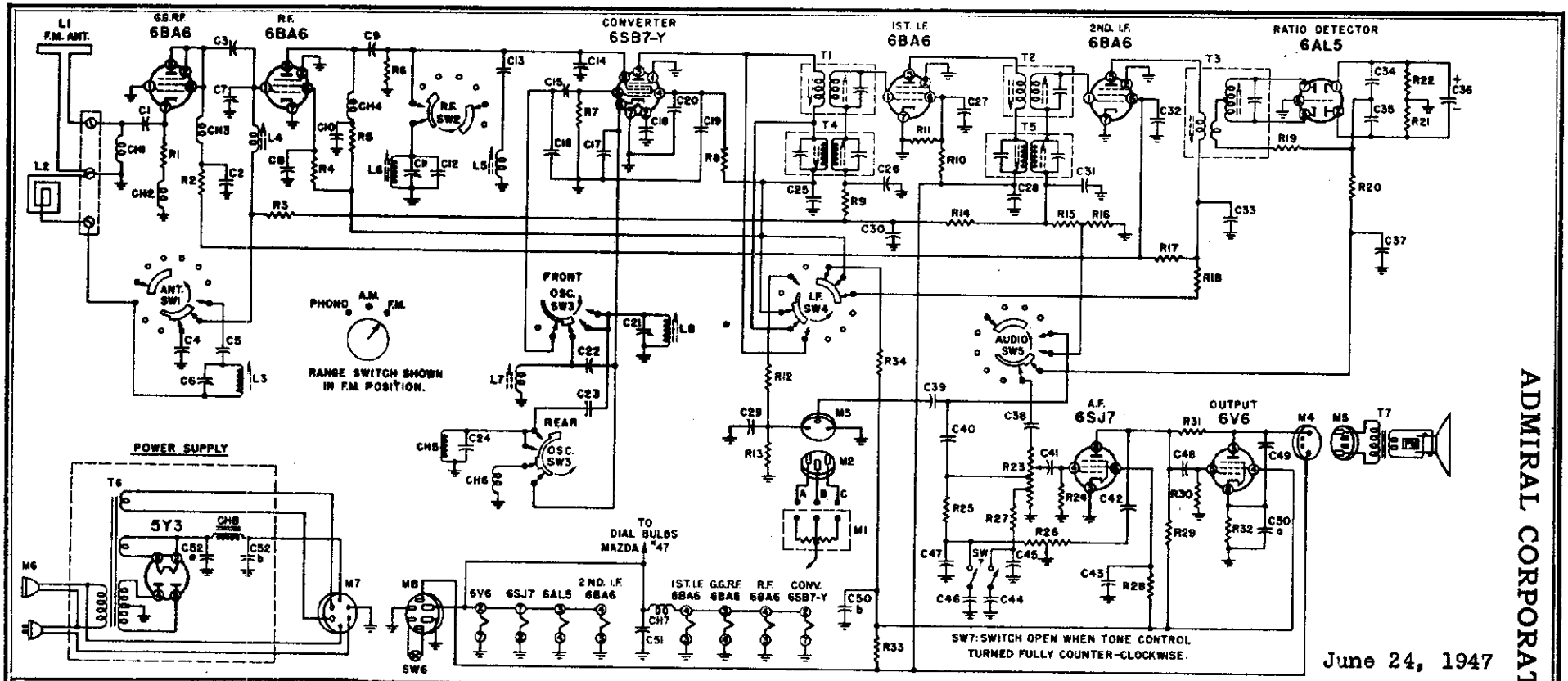
Description	PHONOGRAPH PARTS	Part No.
M1...	Cartridge and Needle, Pickup	A1372
M2...	Pickup Cable & Plug Assembly	A1415
Centerpost		G400B 137-1
Drive Disc Assembly (under turntable)		G400A 179
Idler Wheel (407B 3 Motor)		G400A 23
Idler Wheel (407B 1 Motor)		G400A 57
Motor		407B 3-2
Pickup Cable and Plug		A1305
Tilt Out Hinge Assembly (Record Support Side)		AC118-1
Tilt Out Hinge Assembly (Pickup Arm Side)		AC118-2

Description	PHONOGRAPH PARTS	Part No.
Tilt Out Spring (2-1/4" long)		19A 15-1
Shoulder Eye Bolt (For Tilt Out Spring)		1A 87-1
Tilt Out Tie Bar		15B 126

Description	MISCELLANEOUS	Part No.
M3...	Socket and Shield, Phono	88A 5-9
M4...	Speaker Socket	87A 6-1
M5...	Plug, Speaker	88A 4-4
M6...	Phono Motor Plug & Leads	89A 6-5
M7...	Power Cable & Socket	87A 16-1
M8...	Plug, Power Supply (includes retainer ring)	88A 9
Bumper, Rubber		12A 3-5
Door Bracket (left)		A1438
Door Bracket (right)		A1439
Door Arm (left)		A1440
Door Arm (right)		A1441
Grommet, Rubber (for mounting chassis)		12A 1-11
Knob		33A 13-2
Set Screw (#6-32x1/4, for Drum & Hub, For Indicator Arm & Hub; and for Pointer Shaft)		1A 6-54
Shoulder Eye Bolt (for adjusting spring)		1A 87-2
Snap Button (used with Indicator Link)		13A 1-4-47
Socket (octal)		87A 5-2
Socket (Miniature Tube)		87A 5-6
Speed Nut (for Guide Rod)		2A 10-1-58
Speed Nut (for trimmers C7,C14, C16)		2A 10-11
Spring, Adjusting (for chassis mounting)		19A 15-2
Spring, Hairpin (for mounting coils)		19A 3-1
Spring, Hairpin (for Pointer Shaft)		19A 2-2-0
Tie Bar (for receiver chassis mounting)		15B 160
Transmission Line (F.M.-300 Ohms; order length needed)		95A 16-5
Washer, "C" (for Tuning Shaft)		4A 4-1-0
Washer, Felt (for Knobs)		6A 4-2
Washer, Spring (for Pointer Shaft and for Cam & Hub)		4A 6-11-0
Washer, Spring, (used with Indicator Link)		4A 6-2-0
Washer, Spring (for Tuning Shaft)		4A 6-6-0
Sponge Rubber Strip (3/4"x7/16"x5-1/2")		12A11
Sponge Rubber Stripping (1/8" x 3/8" x 14")		12A5-3
Sponge Rubber Stripping (1/8" x 3/4" x 3/4")		12A5-4

ADMIRAL CORPORATION

MODEL 7C73, Chassis 9A1, Preliminary



June 24, 1947

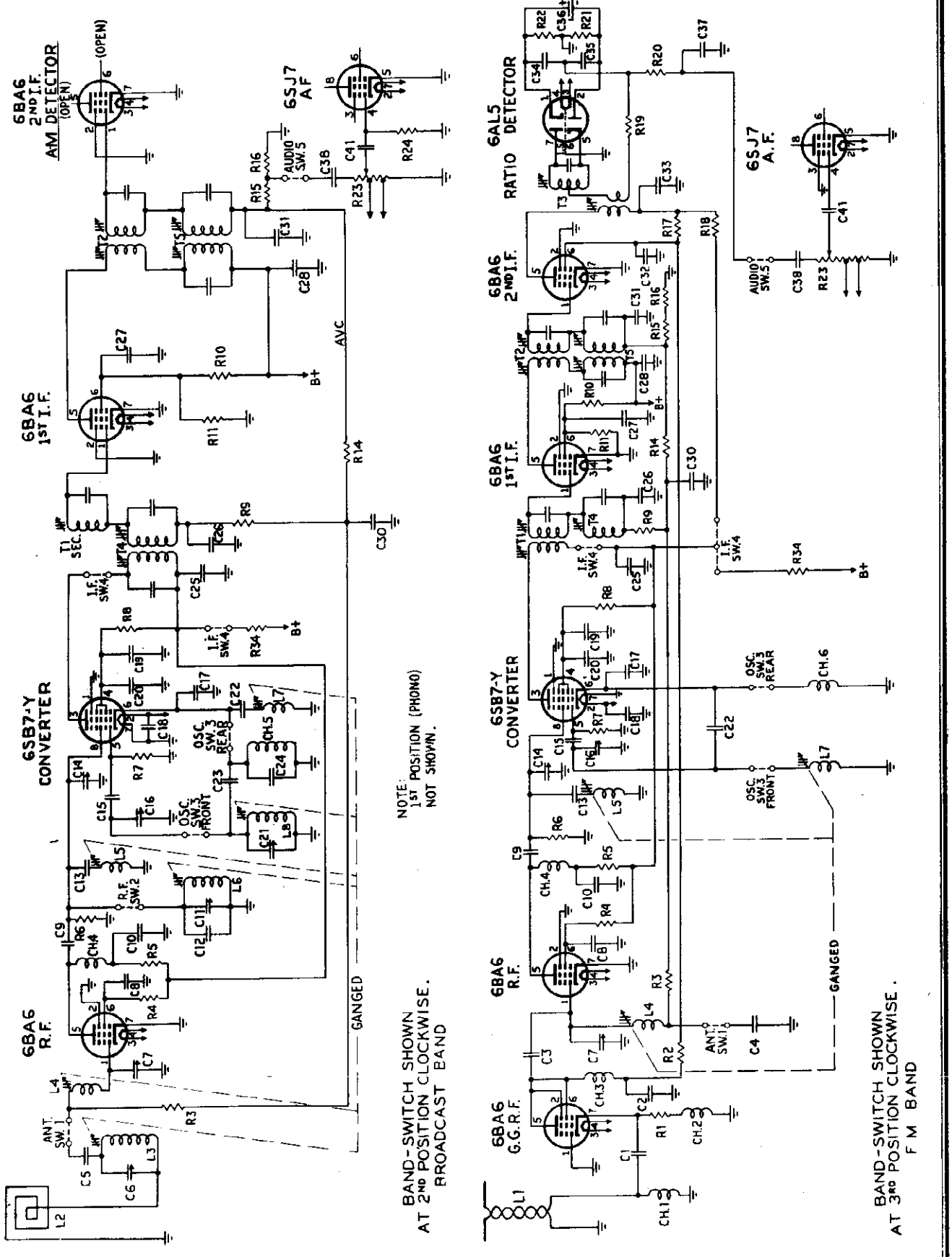
Symbol	RESISTORS	Part No.
R1...	100 Ohms, 1/2 Watt	60B 8-101
R2...	330 Ohms, 1/2 Watt	60B 8-331
R3...	470,000 Ohms, 1/2 Watt	60B 8-474
R4...	39,000 Ohms, 1 Watt	60B 14-393
R5...	4,700 Ohms, 1 Watt	60F 14-472
R6...	33,000 Ohms, 1/2 Watt	60B 8-333
R7...	47,000 Ohms, 1/2 Watt	60B 8-473
R8...	18,000 Ohms, 2 Watt	60B 20-183
R9...	120,000 Ohms, 1/2 Watt	60B 8-124
R10...	13,000 Ohms, 1 Watt	60B 14-133
R11...	22,000 Ohms, 1 Watt	60B 14-223
R12...	120,000 Ohms, 1/2 Watt	60B 8-124
R13...	100,000 Ohms, 1/2 Watt	60B 8-104
R14...	470,000 Ohms, 1/2 Watt	60B 8-474
R15...	220,000 Ohms, 1/2 Watt	60B 8-224
R16...	82,000 Ohms, 1/2 Watt	60B 8-823
R17...	8,200 Ohms, 2 Watt	60B 20-822
R18...	2,200 Ohms, 1 Watt	60B 14-222
R19...	390 Ohms, ±5%,1/2 Watt	60B 7-391
R20...	27,000 Ohms, 1/2 Watt	60B 8-273
R21...	6,800 Ohms, ±5%,1/2 Watt	60B 7-682
R22...	6,800 Ohms, ±5%,1/2 Watt	60B 7-682
R23...	1 Megohm Volume Control & on-off switch SW6. Tapped at 300,000 and 600,000 Ohms	75B 3-4
R24...	4.7 Megohms, 1/2 Watt	60B 8-475
R25...	47,000 Ohms, 1/2 Watt	60B 8-473
R26...	2 Megohms Tone control & D.P.S.T. switch SW7	75B 1-14
R27...	10,000 Ohms, 1/2 Watt	60B 8-103
R28...	470,000 Ohms, 1/2 Watt	60B 8-474
R29...	100,000 Ohms, 1/2 Watt	60B 8-104
R30...	470,000 Ohms, 1/2 Watt	60B 8-474
R31...	2.2 Megohms, 1/2 Watt	60B 8-225
R32...	390 Ohms, 1 Watt	60B 14-391
R33...	390 Ohms, 2 Watt	60B 20-391
R34...	100 Ohms, 1/2 Watt	60B 8-101

Symbol	CONDENSERS	Part No.
C1...	1000 mmfd., Mica	65B 5-33
C2...	.01 mfd., 400 Volts, Paper	64B 1-25
C3...	35mmfd., Ceramic	65B 6-14
C4...	27mmfd., Ceramic	65B 6-17
C5...	500 mmfd., Mica	65B 5-27
C6...	3-40 mmfd., Trimmer	66A 22-5
C7...	3-12 mmfd., Trimmer	66A 22-1
C8...	200 mmfd., Mica	65B 5-21
C9...	35 mmfd., Ceramic	65B 6-14
C10...	40 mmfd., Ceramic	65B 6-22
C11...	12-170 mmfd., Trimmer	66A 22-1
C12...	300 mmfd., Silver Mica	65B 1-24
C13...	26mmfd., Ceramic	65B 6-15
C14...	3-12 mmfd., Trimmer	66A 22-1
C15...	50 mmfd., Ceramic	65B 6-15
C16...	3-12 mmfd., Trimmer	66A 22-1
C17...	200 mmfd., ±3%,Ceramic	65B 6-20
C18...	.006 mfd., 600 Volts, Paper	65B 1-12
C19...	100 mmfd., Ceramic	65B 6-19
C20...	5000 mmfd., Ceramic	65B 9-53
C21...	3-40 mmfd., Trimmer	66A 22-5
C22...	27 mmfd., Ceramic	65B 6-17
C23...	180 mmfd., ±5%,Ceramic	65B 6-23
C24...	2000 mmfd., Mica	65B 5-37
C25...	.01 mfd., 400 Volts, Paper	64B 1-25
C26...	.01 mfd., 400 Volts, Paper	64B 1-25
C27...	.01 mfd., 400 Volts, Paper	64B 1-25
C28...	.10 mfd., 400 Volts, Paper	64B 1-20
C29...	.2 mfd., 400 Volts, Paper	64B 1-19
C30...	.05 mfd., 400 Volts, Paper	64B 1-32
C31...	200 mmfd., Mica	65B 5-21
C32...	.05 mfd., 200 Volts, Paper	64B 1-22
C33...	.05 mfd., 200 Volts, Paper	64B 1-22
C34...	100 mmfd., Ceramic	65B 6-19
C35...	100 mmfd., Ceramic	65B 6-19
C36...	4 mfd., 150 Volts, Electrolytic	67A 4-2
C37...	.002 mfd., 600 Volts, Paper	64B 1-14
C38...	.006 mfd., 600 Volts, Paper	64B 1-12
C39...	1000 mmfd., Mica	65B 5-33
C40...	500 mmfd., Mica	65B 5-27
C41...	.006 mfd., 600 Volts, Paper	64B 1-12
C42...	.006 mfd., 600 Volts, Paper	64B 1-12
C43...	.05 mfd., 200 Volts, Paper	64B 1-22
C44...	.05 mfd., 400 Volts, Paper	64B 1-32
C45...	.01 mfd., 400 Volts, Paper	64B 1-25
C46...	.006 mfd., 600 Volts, Paper	64B 1-12
C47...	.006 mfd., 600 Volts, Paper	64B 1-12
C48...	.01 mfd., 400 Volts, Paper	64B 1-25
C49...	.002 mfd., 600 Volts, Paper	64B 1-14
C50a..	20mfd., 250 Volts) Electrolytic	67C 7-7
C50b..	30 mfd.,350 Volts)	
C51...	.01 mfd., 400 Volts, Paper	64B 1-25
C52a..	30 mfd., 350 Volts) Electrolytic	67C 6-22
C52b..	30 mfd., 350 Volts)	

"clarified schematics"

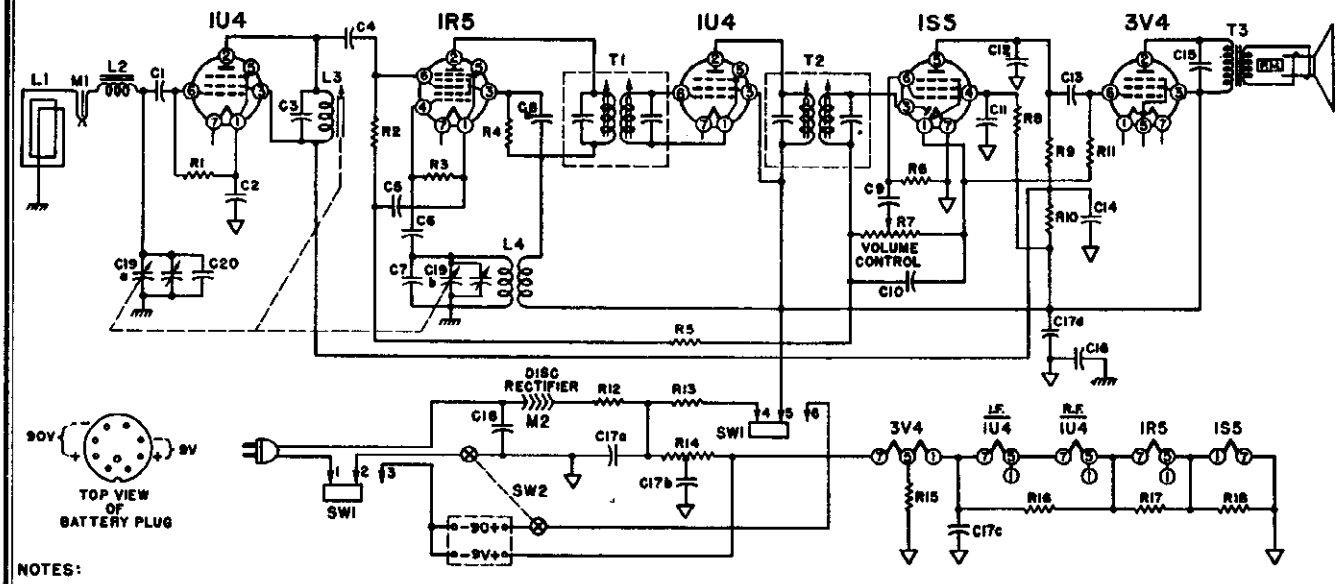
MODEL 7073

ADMIRAL CORPORATION



ADMIRAL CORPORATION

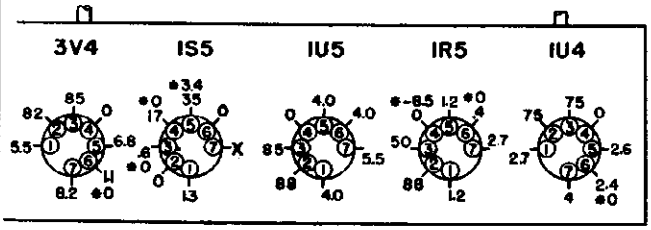
MODELS 7P32, 7P33, 7P34,
Chassis 5H1



NOTES:
I.F. = 455 K.C.
COMMON (LINE GROUND)
CHASSIS GROUND

5-47

VOLTAGE CHART



***Indicates reading taken with 1000 ohm-per-volt meter.**

VOLTAGE DATA

- All readings made between Tube Socket Terminals and Terminal No. 7 on the 1S5 (Point "X" on Voltage Chart).
- A.C. Voltages measured on a 117 Volt A.C. line.
- Dial turned to low frequency end, no signal.
- All Voltages measured with a VoltOhmyst.
- A second voltage reading (marked with an asterisk *) indicates readings made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

REPLACEMENT PARTS

RESISTORS

Symbol	Description	Part No.
R1	2.2 Megohms, ¼ Watt	60B 3-225
R2	1 Megohm, ¼ Watt	60B 3-105
R3	100,000 Ohms, ¼ Watt	60B 3-104
R4	18,000 Ohms, 1/3 Watt	60B 2-183
R5	3.3 Megohms, ¼ Watt	60B 2-335
R6	10 Megohms, ¼ Watt	60B 3-106
R7	1 Megohm Volume Control and Switch SW2 (DPST)	75B 1-18
R8	4.7 Megohms, ¼ Watt	60B 2-475
R9	470,000 Ohms, ¼ Watt	60B 3-474
R10	10,000 Ohms, ¼ Watt	60B 3-103
R11	2.2 Megohms, ¼ Watt	60B 3-225
R12	47 Ohms, 1 Watt	60B 14-470
R13	2700 Ohms, 1 Watt	60B 14-272
R14	2600 Ohms, 5 Watt	61A 6-1
R15	1500 Ohms, ¼ Watt	60B 2-152
R16	820 Ohms, ¼ Watt	60B 2-821
R17	220 Ohms, ¼ Watt	60B 2-221
R18	150 Ohms, ¼ Watt	60B 2-151

CONDENSERS

Symbol	Description	Part No.
C1	250 Mmfd., Mica	65B 7-22
C2	.25 Mfd., 200 Volts, Paper	64B 1-28
C3	420 Mmfd., Mica	65B 1-13
C4	250 Mmfd., Mica	65B 7-22
C5	.01 Mfd., 400 Volts, Paper	64B 1-25
C6	100 Mmfd., Mica	65B 7-17
C7	15 Mmfd., Ceramic	65B 6-18
C8	.01 Mfd., 400 Volts, Paper	64B 1-25
C9	.01 Mfd., 400 Volts, Paper	64B 1-25
C10	250 Mmfd., Mica	65B 7-22
C11	.01 Mfd., 400 Volts, Paper	64B 1-25

CONDENSERS

Symbol	Description	Part No.
C12	100 Mmfd., Mica	65B 7-17
C13	.01 Mfd., 400 Volts, Paper	64B 1-25
C14	4 Mfd., 150 Volts, Electrolytic	67A 4-2
C15	.002 Mfd., 600 Volts, Paper	64B 1-14
C16	.18 Mfd., 200 Volts, Paper	64A 2-2
C17a	50 Mfd., 150 Volts, Elect.	67C 7-5
C17b	20 Mfd., 150 Volts, Elect.	
C17c	200 Mfd., 25 Volts, Elect.	
C17d	20 Mfd., 150 Volts, Elect.	
C18	.05 Mfd., 400 Volts, Paper	64B 1-22
C19a	0 to 420 Mmfd., Gang	68B 6
C19b	0 to 162 Mmfd., Gang	
C20	10 Mmfd., Ceramic	65B 6-24

COILS, TRANSFORMERS, SWITCHES, ETC.

L1	Antenna, Loop (Part of cabinet —not supplied separately)	
L2	Coil, Loading	AA 121
L3	Coil, R. F.	AB 100-7
L4	Coil, Oscillator	69A 15
P1	Plug, Battery (9 prong)	88A 3-3
SW1	Switch, Power Change	77A 2-4
SW2	Switch, On-Off (Part of volume control R7)	
T1	Transformer, 1st I. F.	72B 28-1
T2	Transformer, 2nd I.F.	72B 28-1
T3	Transformer, Output	98A 21
	Slug, Tuning (R.F.)	71B 1-3
	Adjustment Screw for Slug	27A 4
	Speaker 6" P.M. & Output Transformer	78B 17-3

MISCELLANEOUS

Description	Part No.
M1....Jack for External Loop Antenna	
M2....Rectifier, Selenium	93A 1-2
Buttons, Snap (for dial scale)	13A 1-1-2
Cabinet (Black 7P32)	35D 58-1
Cabinet (Black 7P33)	35D 50-1
Cabinet (Brown 7P34)	35D 50-2
Cord, Dial	50A 1-3
Dial Window, Plastic (7P33, 7P34)	24B 2
Dial Window and Speaker Grill (7P32)	23C 26
Drum & Cam Assembly	A 1313
Escutcheon, Plastic (7P33, 7P34)	23D 24
Grommet (for mounting R.F. coil)	12A 1-12
Handle, Plastic (7P32, 7P33)	37C 11-1
Knob (7P32)	33A 18-3
Knob (7P33, 7P34)	33A 18-1
Latch, Cover (7P33, 7P34)	37B 2-1
Mounting Clip (for I.F. transformer)	72B 28-10
Mounting Plate (for R.F. coil)	32A 40
Pointer, Dial	25A 24
Scale, Dial (metal)	21B 44
Spring	19B 1-13
Spring, Tension (Dial Cord)	19B 1-5
Tube Shield	87A 7-7
Tube Socket	87A 3-2
Tuner Arm (for R.F. slug tuner)	A1314
Washer, Felt (¾") (for knobs)	5A 4-3
Washer, Spring (for tuner arm)	4A 6-3-0

MODELS 7T06, 7T12
CHASSIS 4B1

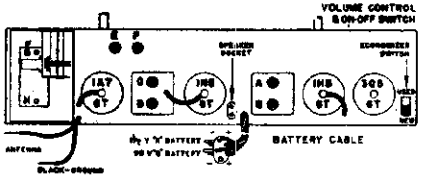
ALIGNMENT PROCEDURE

1. IMPORTANT — Check to see that dial pointer reaches each end of dial scale when Station Selector Control is turned from one end to the other.
2. Volume control—Maximum for all adjustments.
3. Connect radio chassis to ground post of signal generator with a short heavy lead.
4. Connect output meter across voice coil of speaker.
5. Connect dummy Antenna value in series with generator output lead, when needed (see below).
6. Allow chassis and signal generator to "heat up" for several minutes.
7. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.

Band	Signal Generator Frequency Setting	Signal Generator Dummy Antenna	Connection to Radio	Receiver Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Type of Adjustment
I.F.	455 KC.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	A-B—2nd I.F.	Output I.F.	Adjust to maximum output
I.F.	455 KC.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	C-D—1st I.F.	Input I.F.	Adjust to maximum output
Broadcast	1630 KC.	.00020 mfd. Mica	Antenna Lead	High Frequency end of dial	E-(See note below) F-(See note below)	Oscillator Antenna	Adjust to maximum output
Broadcast	1500 KC.	.00020 mfd. Mica	Antenna Lead	1500 KC.	G H	Oscillator Antenna	Adjust to maximum output

NOTE: Before adjusting trimmers "E" and "F," make sure that each iron core is 1¾" or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

TUBE AND TRIMMER LOCATION



CIRCUIT

Battery-operated 4 Tube Superheterodyne with Single Tuning Range: 535 KC. to 1630 KC. Covers standard broadcast band, using antenna and ground. Permeability tuning on Antenna and Oscillator circuits. Intermediate Frequency is 455 KC.

POWER SUPPLY

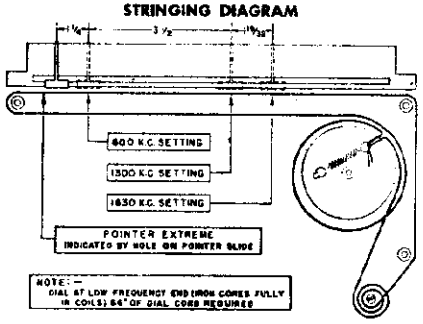
Single unit "AB" battery pack: 90 volt "B", 1½ volt "A." Plug-in connection. Use Ensign AB48, Burgess 17G-D60, Eveready 748, General 60DL-11L, Ray-O-Vac AB-82, Bond 0528 Battery or equivalent.

ECONOMIZER SWITCH

The battery economizer switch is located on the top of the chassis, right side.

Always have this Economizer Switch in the "NEW" battery position when first placing radio in operation or when installing a new battery.

STRINGING DIAGRAM



MODELS 7P32, 7P33, 7P34
CHASSIS 5H1

ALIGNMENT PROCEDURE

1. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
2. Make alignment using a battery whenever possible.
3. Connect a fresh battery to the set.

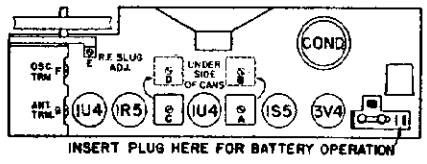
IMPORTANT: Check dial drum position on shaft. Tuner arm should just complete downward travel when gang is fully meshed. At this point, tuner arm should be on short flat part of cam. Check pointer. It should be at last dial scale mark just below 550 K.C. when gang is fully meshed. If not, move pointer on dial cord

Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Receiver Gang Setting	Trimmer Designation and Description	Type of Adjustment
(1)	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid of 1R5 (Pin 6)	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B). 1st I.F. (C), (D).	Maximum Deflection Then repeat
(2)	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Stator lug of rear variable condenser section	1620 K.C.	Tuning Gang Wide Open	Oscillator Trimmer (F)	Maximum Deflection
(3)	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Stator lug of rear variable condenser section	1400 K.C.	Tune in Generator Signal	R.F. Slug (E)	Maximum Deflection
(4)	Replace Set in Cabinet					
(5)	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (G)	Maximum Deflection

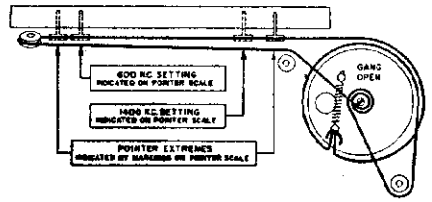
REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to realign the set as shown in the chart.

TUBE AND TRIMMER LAYOUT

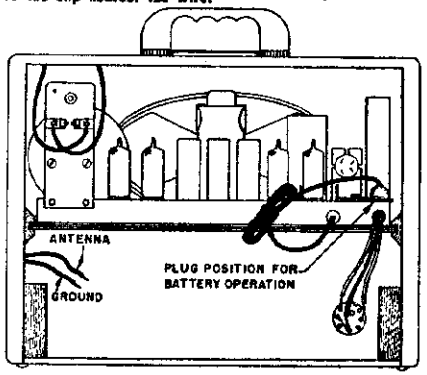


DIAL CORD STRINGING



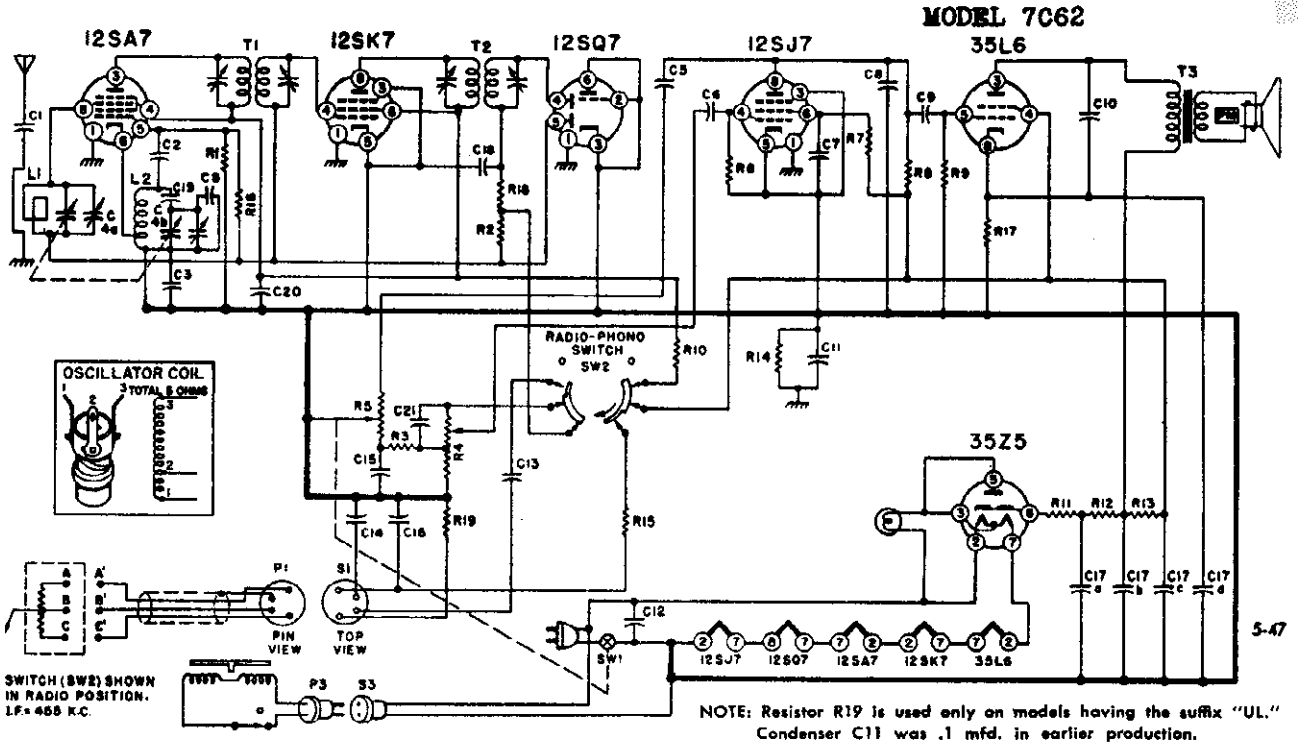
INTERNAL ANTENNA CONNECTIONS

Note: Antenna connections cross over as shown above for 7P32 only. The 7P33, 7P34 antenna connections are made to the clip nearest the wire.



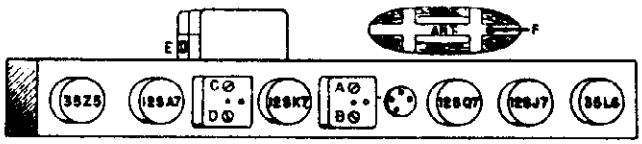
ADMIRAL CORPORATION

MODELS 7RT41, 7RT42, 7RT43
Chassis 6L1
MODEL 7C62

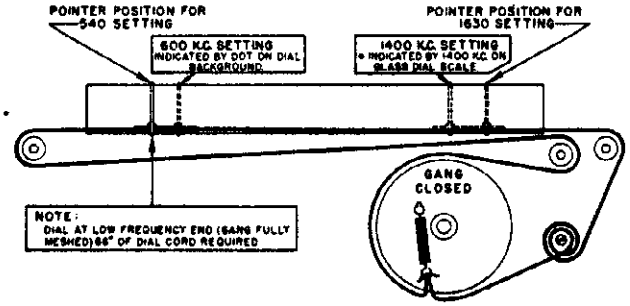


NOTE: Resistor R19 is used only on models having the suffix "UL." Condenser C11 was .1 mfd. in earlier production.

TUBE & TRIMMER LOCATION



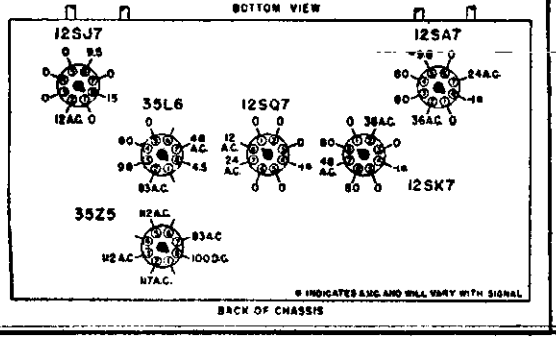
DIAL CORD STRINGING & POINTER SETTING



VOLTAGE DATA

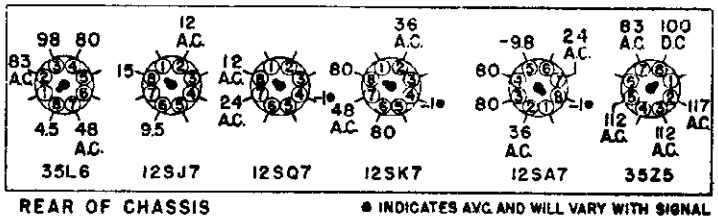
- All readings made between Tube Socket Terminals and B minus.
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltage obtained on Vacuum Tube Voltmeter.

MODEL 7C62



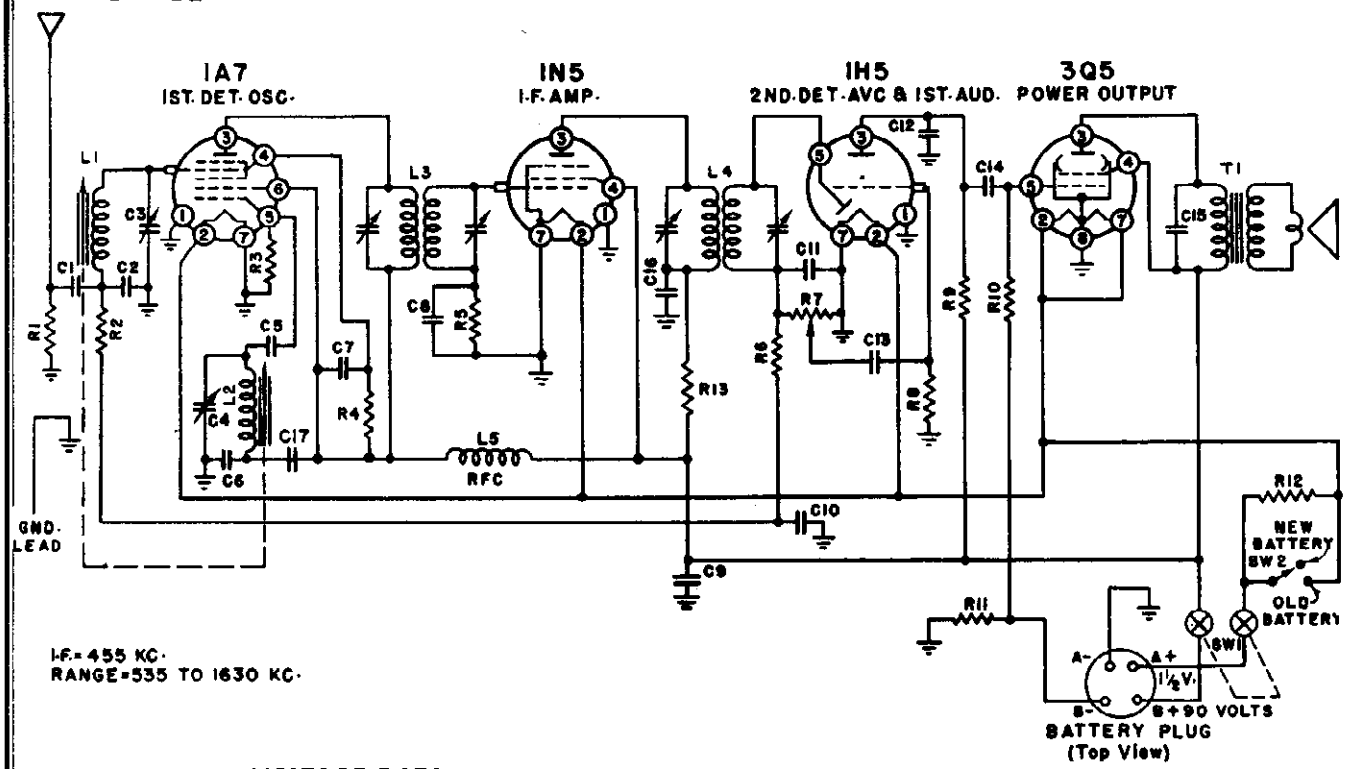
MODEL 7RT41, 7RT42, 7RT43

VOLTAGE CHART



MODELS 7T06, 7T12,
Chassis 4B1

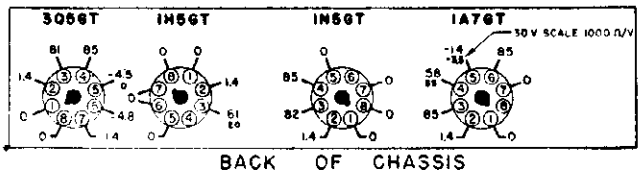
ADMIRAL CORPORATION



VOLTAGE DATA

All readings made between tube socket terminals and chassis. Voltages indicated have been obtained using a Vacuum Tube Voltmeter. A second voltage reading is shown made with a 1000 ohm-per-volt meter, when use of this instrument would result in appreciably lower readings. Measured with a fresh battery, volume control full on, dial at the high frequency end, no signal.

VOLTAGE CHART — BOTTOM VIEW



OSCILLATION IN 4B1 RADIO CHASSIS

Occasionally audio oscillation may occur in the 4B1 chassis with the volume control in an intermediate position. Should you encounter this trouble, reverse the leads of the primary of the output transformer or ground the speaker frame to the chassis. The speaker leads and the grid lead of the 1H5 should be kept as far as possible from the 3Q5 output tube.

REPLACEMENT PARTS

ISSUE A 1947

CONDENSERS

Symbol	Description	Part No.
C1	.01 mfd. 400 Volts	64B 1-25
C2	.0008 mfd., Mica	65B 5-31
C3	Trimmer, Antenna }	66A 9-1
C4	Trimmer, Oscillator }	
C5	.0001 mfd., Mica	65B 7-17
C6	.0008 mfd., Mica	65B 5-31
C7	.01 mfd., 400 Volts	64B 1-25
C8	.002 mfd., 600 Volts	64B 1-14
C9	4. mfd., 150 Volts (Elect)	67A 4-2
C10	.05 mfd., 200 Volts	64B 1-32
C11	.00025 mfd., Mica	65B 7-22
C12	.00025 mfd., Mica	65B 7-22
C13	.01 mfd., 400 Volts	64B 1-25
C14	.01 mfd., 400 Volts	64B 1-25
C15	.005 mfd., 600 Volts	64B 1-12
C16	.01 mfd., 400 Volts	64B 1-25
C17	.01 mfd., 400 Volts (C17 omitted in early models)	64B 1-25

RESISTORS

Symbol	Description	Part No.
R1	15,000 ohm ½ Watt	60B 8-153
R2	470,000 ohm ¼ Watt	60B 2-474
R3	220,000 ohm ½ Watt	60B 8-224
R4	33,000 ohm ½ Watt	60B 8-333
R5, R8	4,700,000 ohm ¼ Watt	60B 2-475
R6	2,200,000 ohm ¼ Watt	60B 2-225
R7	1 meg. Vol. Control	75B 1-1
R9, R10	1,000,000 ohm ¼ Watt	60B 2-105
R11	390 ohm ¼ Watt	60B 2-391
R12	.75 ohm ½ Watt (wire)	61A 2-1
R13	2200 ohm ¼ Watt	60B 2-222

TRANSFORMERS and COILS

Symbol	Description	Part No.
L1	Antenna Coil	AC105-1
L2	Oscillator Coil	A1020
L3	1st I.F. Transformer	72B 5
L4	2nd I.F. Transformer	72B 6
L5	Choke Coil (RF)	AB103-1
T1	Output Transformer	98A 5

MISCELLANEOUS

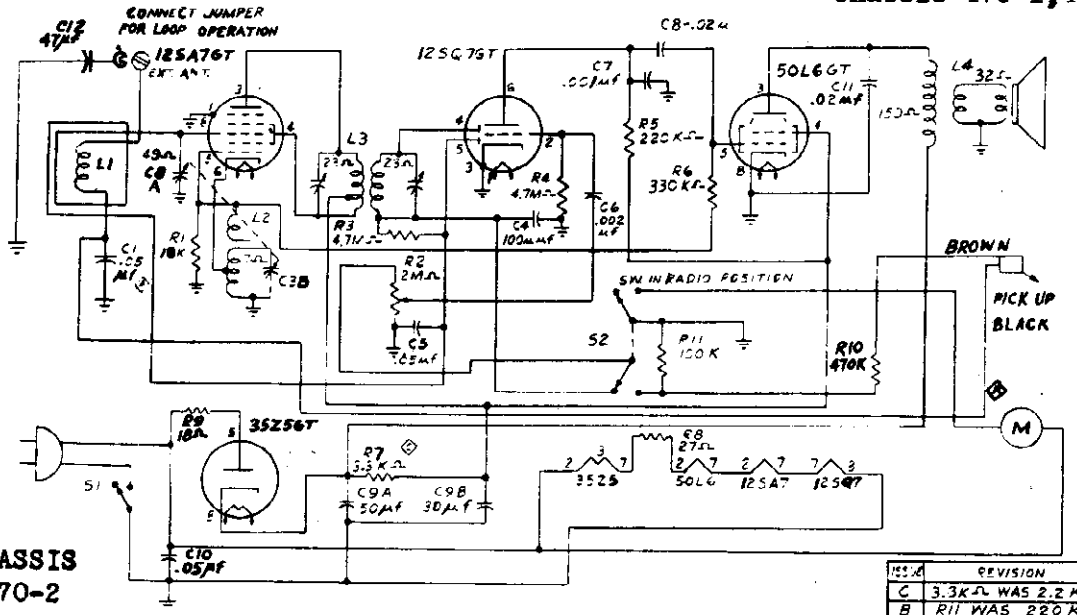
Description	Part No.
Background, Dial	X22C 5-1
Cabinet, Plastic (7T12)	34D 10
Cabinet, Wood (7T06)	35D 49
Cable, Battery (complete with plug)	A1026
Cord, Dial (5" on tuner and 66" on dial drive)	50A 1-3
Drum and Hub, Tuning	A1035
Iron Slug, with wire (Osc.)	71B 1-3
Iron Slug, with wire (Ant.)	71B 1-4
Knob	33A 21-3

MISCELLANEOUS

Description	Part No.
Plug, Battery 5 Prong	88A 4-4
Pointer, Dial	25A 9-1
Pulley, Fibre Dial	17A 1-3
Scale, Glass Dial (7T06)	21B 31-1
Scale, Glass Dial (7T12)	21B 32-1
Screw studs (for iron cores)	27A 4
Shaft, Tuning	28A 1-1
Shield, Tube	87A 8
Socket, Octal Tube	87A 5-1
Speaker and Output Transformer	78B 3
Spring, Dial Drum Cord Tension	19B 1-7
Spring, Hairpin (To hold Ant. or Osc. coils)	19A 3-1
Spring, Tuner, back bearing takeup	19A 6
Spring, Tuner, front bearing takeup	19A 5
Spring, Tuner Slide Cord Tension	19B 1-8
Spring, Tuner Slide Pressure	18A 9
Switch, SPST (Economizer) SW2	77B 1-6
Washer, C	4A 4-1
Washer, spring (coils)	4A 6-12-0
Washer, spring (shaft)	4A 6-3-0

For Alignment, data, see P.16-10

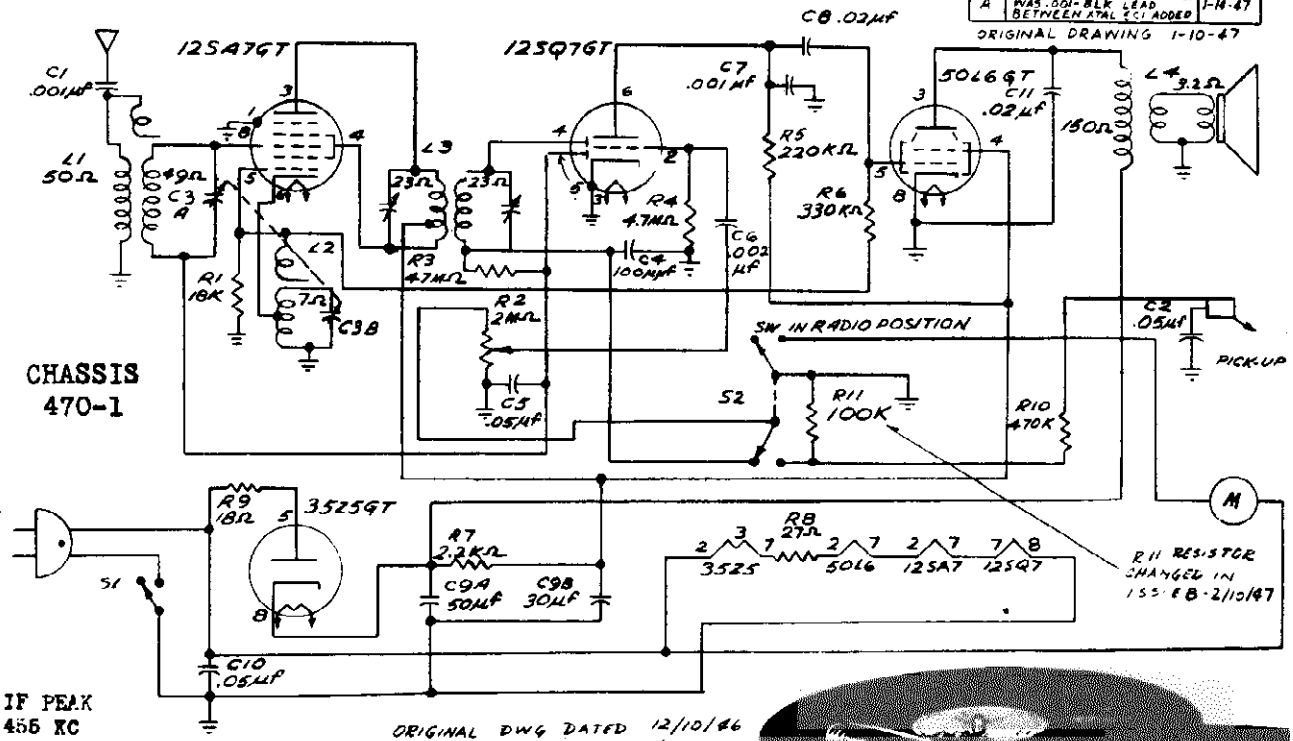
AIR KING PRODUCTS CO., INC. MODEL A-403 COURT JESTER
Chassis 470-1, 470-2



CHASSIS 470-2

ISS.	REVISION	DATE
C	3.3KΩ WAS 2.2 KΩ	3-11-47
B	R11 WAS 220 K	1-21-47
A	C8 & GROUND REMOVED-C1 WAS .001+ BLK LEAD BETWEEN XTAL & C1 ADDED	1-14-47

ORIGINAL DRAWING 1-10-47



CHASSIS 470-1

IF PEAK 455 KC

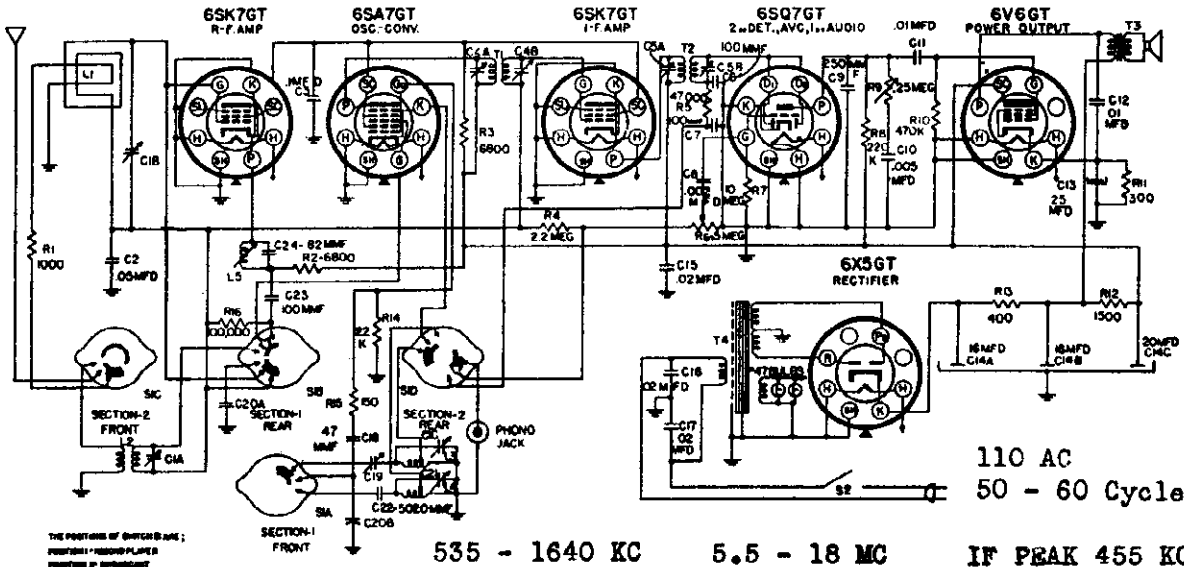
ORIGINAL DWG DATED 12/10/46
ISSUE A REVISION 1/10/47
ISSUE B REVISION 2/10/47

A403	Cabinet, wood less llo
4977	Speaker and output transformer
09150	Knob, tuning wood
09161	Knob, (volume, phono-radio)
59307	Instruction book
1[illegible]	Variable condenser
[illegible]73	Electrolytic condenser unit 50-30 mf/150 v
[illegible]93	Volume control 2 meg with switch
28184	Oscillator coil
28185	Antenna coil (chassis 470-1)
3376	I.F. transformer
28186	
28189	Loop and loading coil (chassis 470-2)
6559	Line cord
3828	Switch radio/phono
6343	Pick-up arm and rest
6417	Motor and turntable 9"
	Lifetime needle
	Paper condenser .05 mf 400 v.
	" " .002 200 v.
	" " .02 "
	" " .05 "
	" " .001 "
	Ceramic 100 mmf 500 volts
	16K ohms ½ w.
	4.7 meg ohms ½ w.
	220K " ½ w.
	2200 " 2 w.
	1M " ½ w.
	47 " 1 w.
	330K " 1 w.
	470K " 1 w.

PARTS LIST AND CABINET ARE THE SAME FOR BOTH CHASSIS 470-1 and 470-2

MODELS 4604D, 4604F
Chassis 458-2

AIR KING PRODUCTS CO., INC.



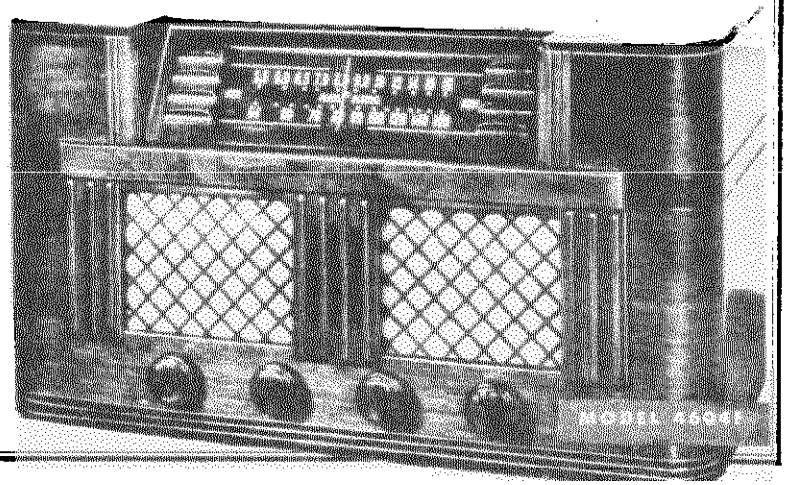
535 - 1640 KC 5.5 - 18 MC IF PEAK 455 KC

If this receiver is to be operated in conjunction with an external phonograph record player, the pin plug from the phonograph pick-up arm should be inserted in the Phono Input Socket at the back of the receiver chassis. The switch should be placed in the RP position (fully counter-clockwise). Both the volume control and tone control of the receiver function for the record player. These should be set to give the loudness and tone quality desired.

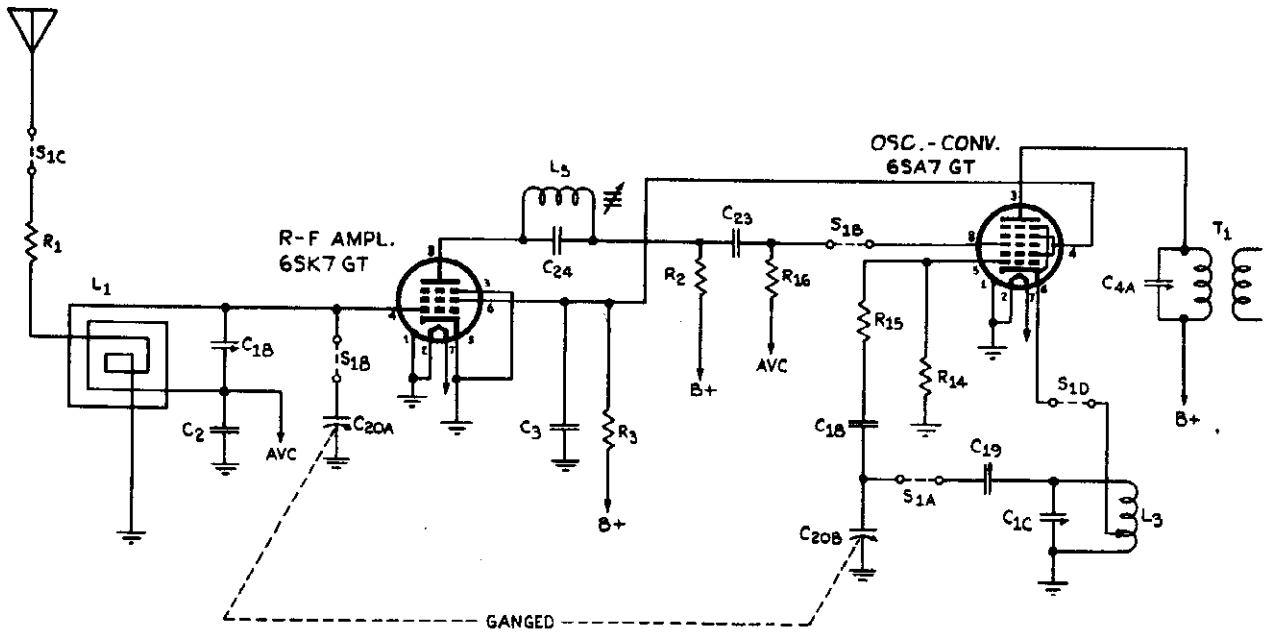
Location Schematic	Part No.	Description
	62189	Cabinet Back
C-20	1668	Condenser, Variable
C14	A20102	Condenser, Electrolytic 20-16-16 mfd. x 350 V.
C13	20105	Condenser, Electrolytic 25 mfd. x 25 VDC.
C1	A1725	Condenser, Trimmer, 3 Section. 3-30mmfd.
C18		Condenser, Mica 47 mmfd.
C6, C7, C23		Condenser, Mica 100 mmfd.
C9		Condenser, Mica 250 mmfd.
C22		Condenser, Mica 5020 mmfd.
C24		Condenser, Mica 82 mmfd.
C2		Condenser, Paper .05 mfd. 600 V.
C3		Condenser, Paper .1 mfd. 400 V.
C8		Condenser, Paper .002 mfd. 400 V.
C10		Condenser, Paper .005 mfd. 400 V.
C11		Condenser, Paper .01 mfd. 600 V.
C12		Condenser, Paper .01 mfd. 800 V.
C15		Condenser, Paper .02 mfd. 400 V.
C16, C17	1975	Condenser, Oil filled metal case .02 mfd. 600V.
R6	2470-A	Control, Volume .5 Meg
R9	2531	Control, Tone .25 Meg with switch
		Cord, Line
L1	28170	Coil, Loop
L2	28167	Coil, S.W. Antenna

Location Schematic	Part No.	Description
L3	28169	Coil, B.C. Oscillator
L4	28168	Coil, S.W. Oscillator
L5	28175	Coil, Wave Trap
		Knob, Tone-off-on
		Knob, Volume
		Knob, Tuning
		Knob, (RP, BC, SW)
		Pilot Lamp #47
R1		Resistor, 1,000 ohms ½ W.
R2, R3		Resistor, 6,800 ohms 2 W.
R14		Resistor, 22,000 ohms ½ W.
R4		Resistor, 2.2 Megohms ½ W.
R5		Resistor, 47,000 ohms ½ W.
R7		Resistor, 10 Meg ohms ½ W.
R8		Resistor, 220,000 ohms ½ W.
R10		Resistor, 470,000 ohms ½ W.
R11		Resistor, 300 ohms 2 W. Wirewound
R12		Resistor, 1500 ohms 2 W. Wirewound
R13		Resistor, 400 ohms 2 W. Wirewound
R15		Resistor, 150 ohms ½ W. Wirewound
R16		Resistor, 100,000 ohms ½ W.
	5866	Speaker, P. M.
T1	3260	Transformer, I.F. Input
T2	3530	Transformer, I.F. Output
T3	1333	Transformer, Output
T4	1020	Transformer, Power

CD-4604 Cabinet 4604D
CF-4604 Cabinet 4604F
3785A Rotary Bandswitch
4675B Drive Shaft Assembly
54161 Grommets for mounting Variable Condenser
40114 Dial scale
4140 Pointer
4633 Cord Spring
Knob Felts
Back Fastener Clips
54170 Antenna-Ground Post
24A5 Phono Jack
Ins 4604 Instruction Book

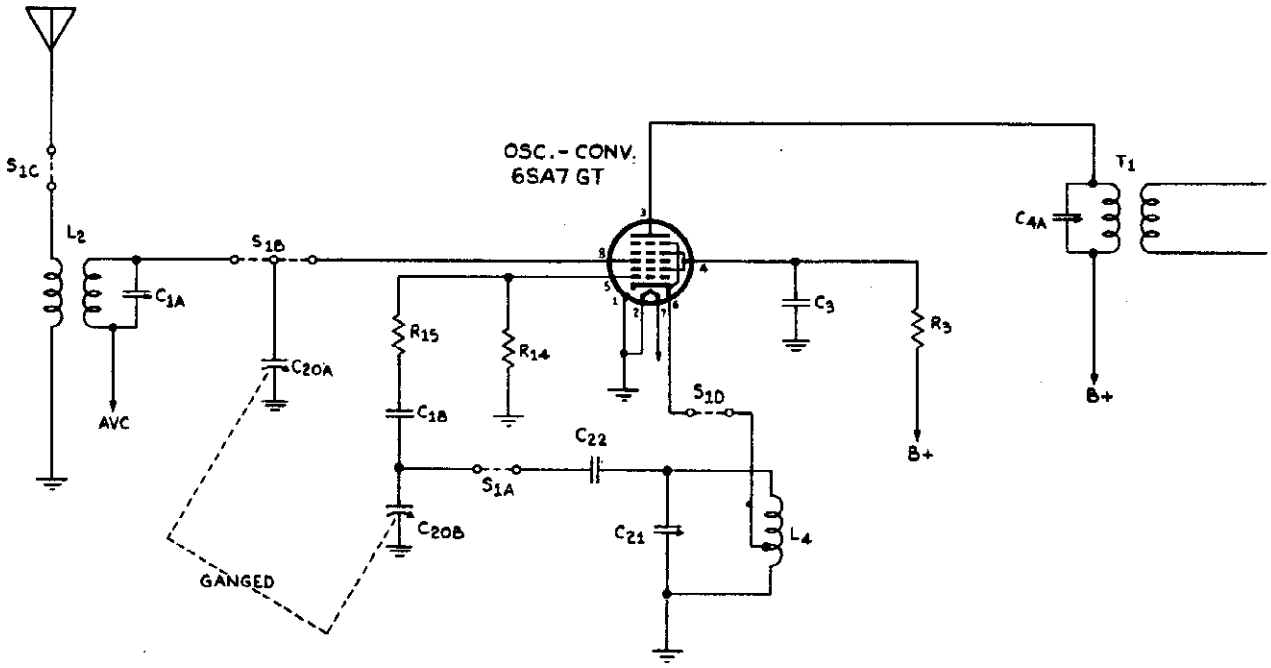


AIR KING PRODUCTS CO., INC. MODEL 4604D, 4604F



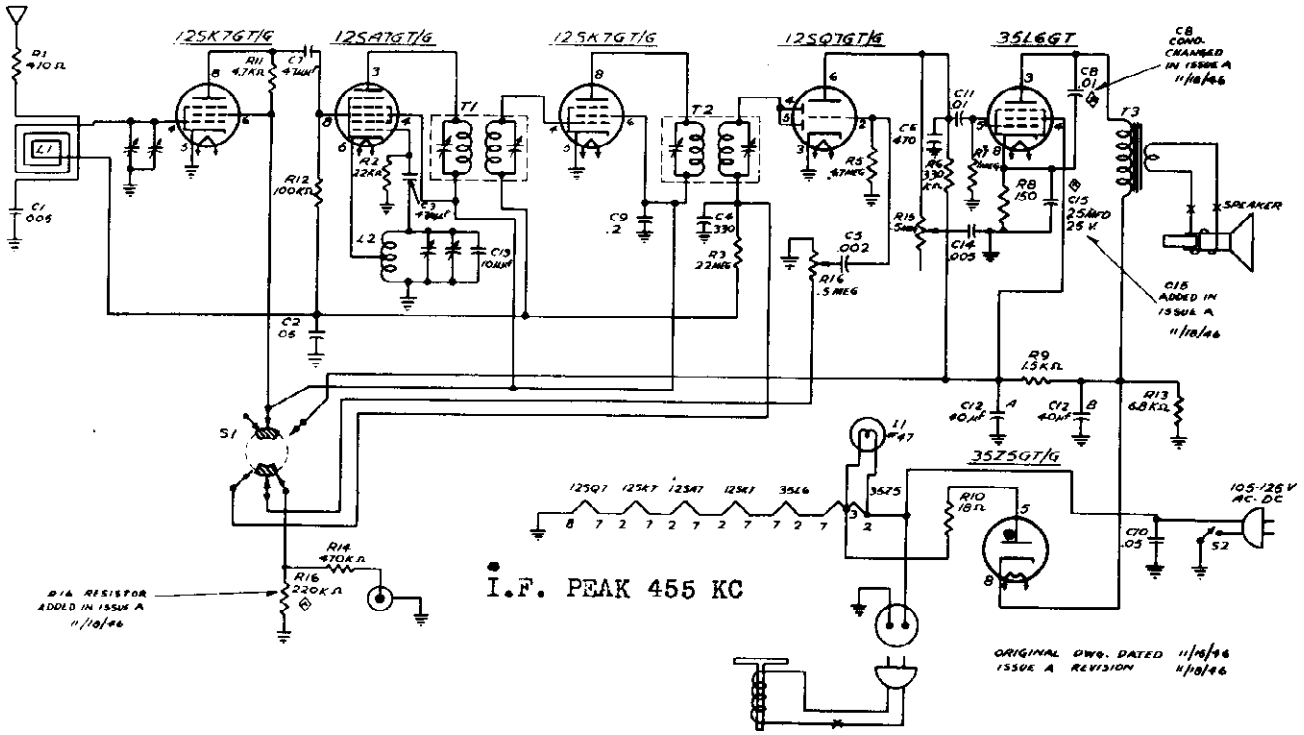
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
535 - 1640KC.

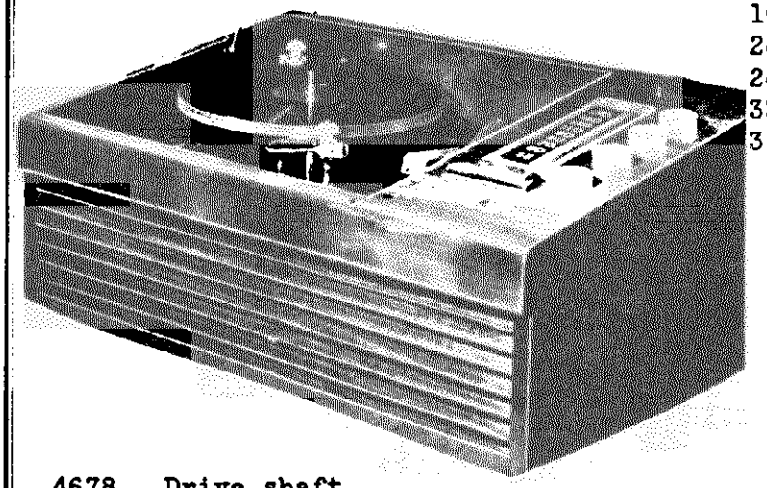
NOTE:
1ST POSITION (PHONO)
NOT SHOWN.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
5.5 - 18 MC.

MODEL 4704 CROWN PRINCESS AIR KING PRODUCTS CO., INC.
Chassis 451-2



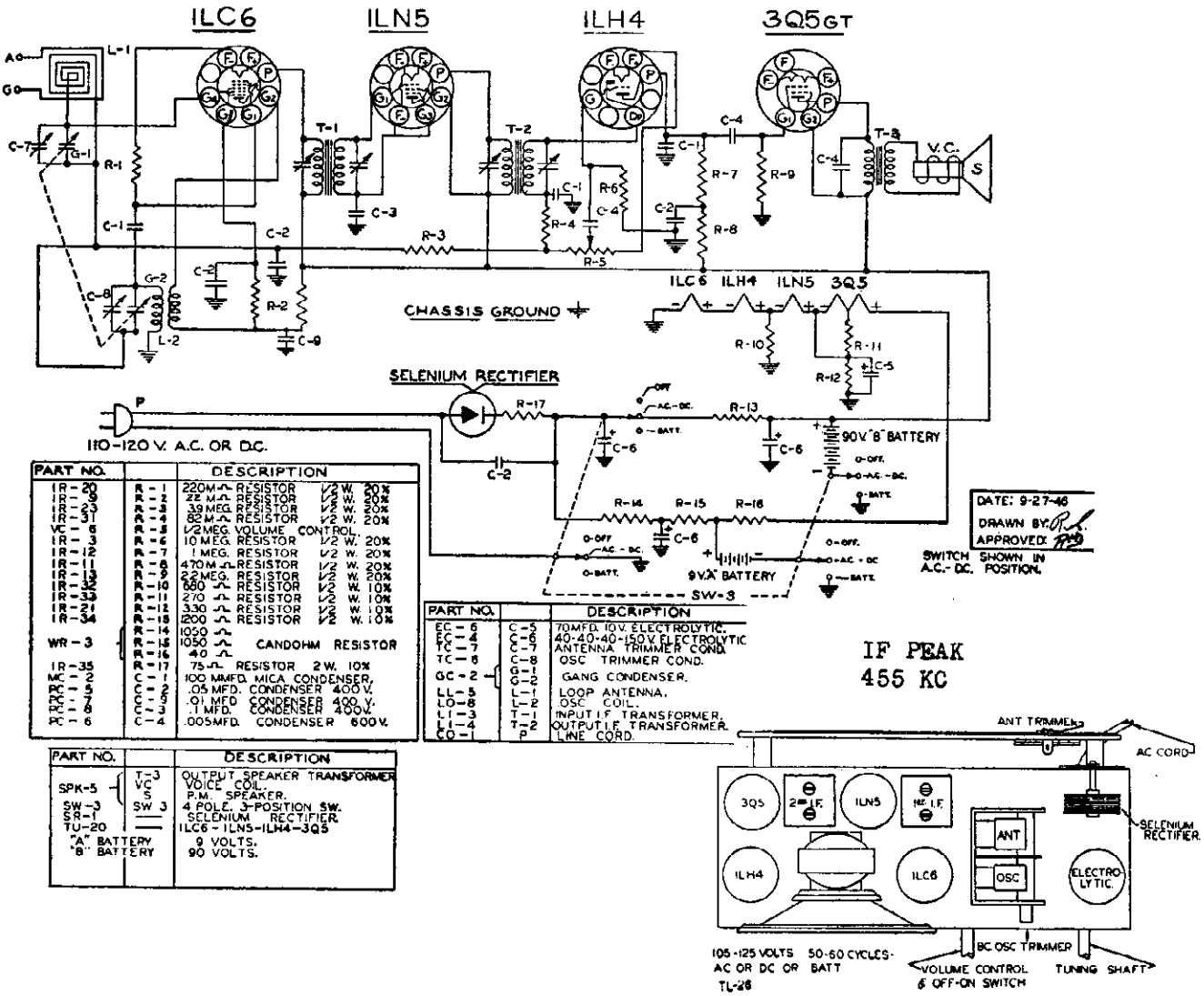


4678	Drive shaft
	Pointer
1851	Pilot light socket
4633	Cord spring
	Grommet (for variable)
40177	Lucite dial face
62191	Cabinet back
39150	Knob, phono-radio
39151	Knob, tone
39152	Knob, volume
39153	Knob, tuning
	Back fastener clips
3827A	Phono switch
	Lifetime needle
C4704	Cabinet
5870	Speaker w/transformer
C4704	Record changer assembly

1639	Variable condenser
28177	Loop antenna
28172	Oscillator coil
3329	I.F. input transformer
3529	I.F. output transformer
	Electrolytic 40-40 mf, 150 WVDC
	Mica condenser 10 mmf
	" " 47 "
	" " 50 "
	" " 330 "
	" " 470 "
	Paper condenser 200 WVDC .05mf
	" " 400 " .002mf
	" " " " .005mf
	" " " " .01mf
	" " " " .02mf
	" " " " .05mf
2477	Volume control
2476	Tone control with switch
	1/4W. carb. resistor 18 ohms
	" " " 470 "
	" " " 4700 "
	" " " 6800 "
	" " " 22000 "
	" " " 100000 "
	" " " 330000 "
	" " " 470000 "
	" " " 2.2meg "
	" " " 4.7meg "
1/2W.	" " 150 "
2W.	" " 2200 "

MODEL 5B-171

ALLIED RADIO CORP.



PART NO.		DESCRIPTION
1R-20	R-1	220M Ω RESISTOR 1/2 W. 20%
1R-3	R-2	22 M Ω RESISTOR 1/2 W. 20%
1R-23	R-3	3.9 MEG. RESISTOR 1/2 W. 20%
1R-31	R-4	82 M Ω RESISTOR 1/2 W. 20%
VC-6	R-5	1/2 MEG. VOLUME CONTROL
1R-3	R-6	10 MEG. RESISTOR 1/2 W. 20%
1R-12	R-7	1 MEG. RESISTOR 1/2 W. 20%
1R-11	R-8	470 M Ω RESISTOR 1/2 W. 20%
1R-13	R-9	2.2 MEG. RESISTOR 1/2 W. 20%
1R-32	R-10	680 Ω RESISTOR 1/2 W. 10%
1R-33	R-11	270 Ω RESISTOR 1/2 W. 10%
1R-21	R-12	330 Ω RESISTOR 1/2 W. 10%
1R-34	R-13	1200 Ω RESISTOR 1/2 W. 10%
	R-14	1050 Ω
WR-3	R-15	1050 Ω CANDOHM RESISTOR
	R-16	40 Ω
1R-35	R-17	75 Ω RESISTOR 2 W. 10%
MC-2	C-1	100 MMFD. MICA CONDENSER.
RC-5	C-2	.05 MFD. CONDENSER 400 V.
RC-7	C-3	.01 MFD. CONDENSER 400 V.
RC-8	C-3	.1 MFD. CONDENSER 400 V.
PC-6	C-4	.005 MFD. CONDENSER 600 V.

PART NO.		DESCRIPTION
EC-6	C-5	70 MFD. 10 V. ELECTROLYTIC.
EC-4	C-6	40-40-40-150 V. ELECTROLYTIC
TC-7	C-7	ANTENNA TRIMMER COND.
TC-6	C-8	OSC TRIMMER COND.
GC-2	G-1	GANG CONDENSER.
	G-2	
LL-5	L-1	LOOP ANTENNA.
LO-8	L-2	OSC. COIL.
LI-3	T-1	INPUT I.F. TRANSFORMER.
LI-4	T-2	OUTPUT I.F. TRANSFORMER.
CO-1	P	LINE CORD.

PART NO.		DESCRIPTION
SPK-5	T-3	OUTPUT SPEAKER TRANSFORMER
	VC	VOICE COIL.
	S	P.M. SPEAKER.
SW-3	SW 3	4 POLE, 3-POSITION SW.
SR-1	—	SELENIUM RECTIFIER
TU-20	—	ILC6 - ILN5 - ILH4 - 3Q5
"A" BATTERY		9 VOLTS.
"B" BATTERY		90 VOLTS.

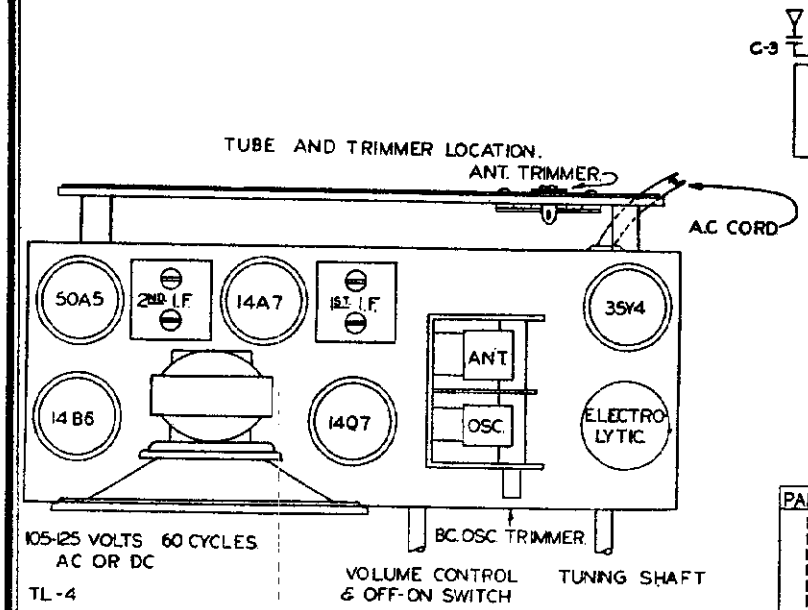
Remove chassis from cabinet for alignment.

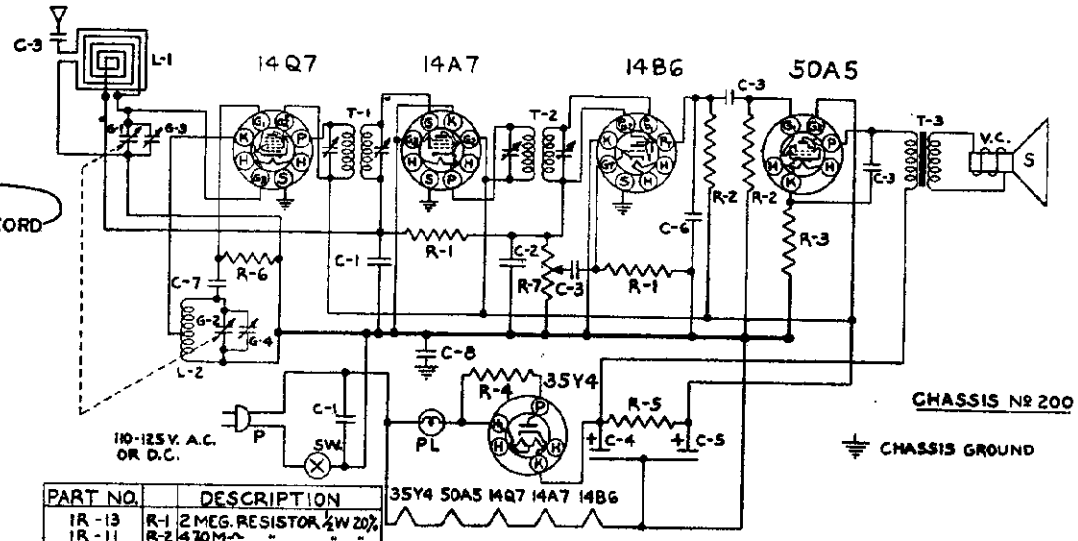
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the top of the oscillator section of the gang condenser. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.





PART NO.		DESCRIPTION
IR-13	R-1	2 MEG. RESISTOR ½W 20%
IR-11	R-2	470M-Ω " " "
IR-14	R-3	150 Ω " " "
IR-4	R-4	47 Ω " " "
IR-15	R-5	2200 Ω " " "
IR-16	R-6	33,000 Ω " " "
V.C.-3	R-7	1 MEG. VOLUME CONTROL
GC-2	G-1, G-2	GANG COND.
TC-7	G-3	ANT. TRIMMER COND.
TC-6	G-4	OSC. TRIMMER COND.
PC-5	C-1	.05 MFD. COND. 400 V.
MC-2	C-2	.0001 MFD. MICA 20%
PC-7	C-3	.01 MFD. COND. 400 V.
EC-3	C-4	40 MFD. 150 V.
	C-5	20 MFD. ELECTROLYTIC

PART NO		DESCRIRTION
MC-5	C-6	.0005 MFD. COND. 20%
MC-4	C-7	.000056 MFD. MICA 20%
PC-9	C-8	.1 MFD COND. 400 V.
LL-1	L-1	LOOP ANTENNA
LO-2	L-2	OSC. COIL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. TRANSFORMER
	T-3	OUTPUT SPK. TRANSFORMER
SPK-4	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	PL	#47 PILOT BULB
	SW	A.C. SWITCH ON VOL. CONTROL
GO-1	P	LINE CORD
TU-6		14Q7 14A7 14B6 50A5 35Y4

IF PEAK
455 KC

Remove chassis from cabinet for alignment.

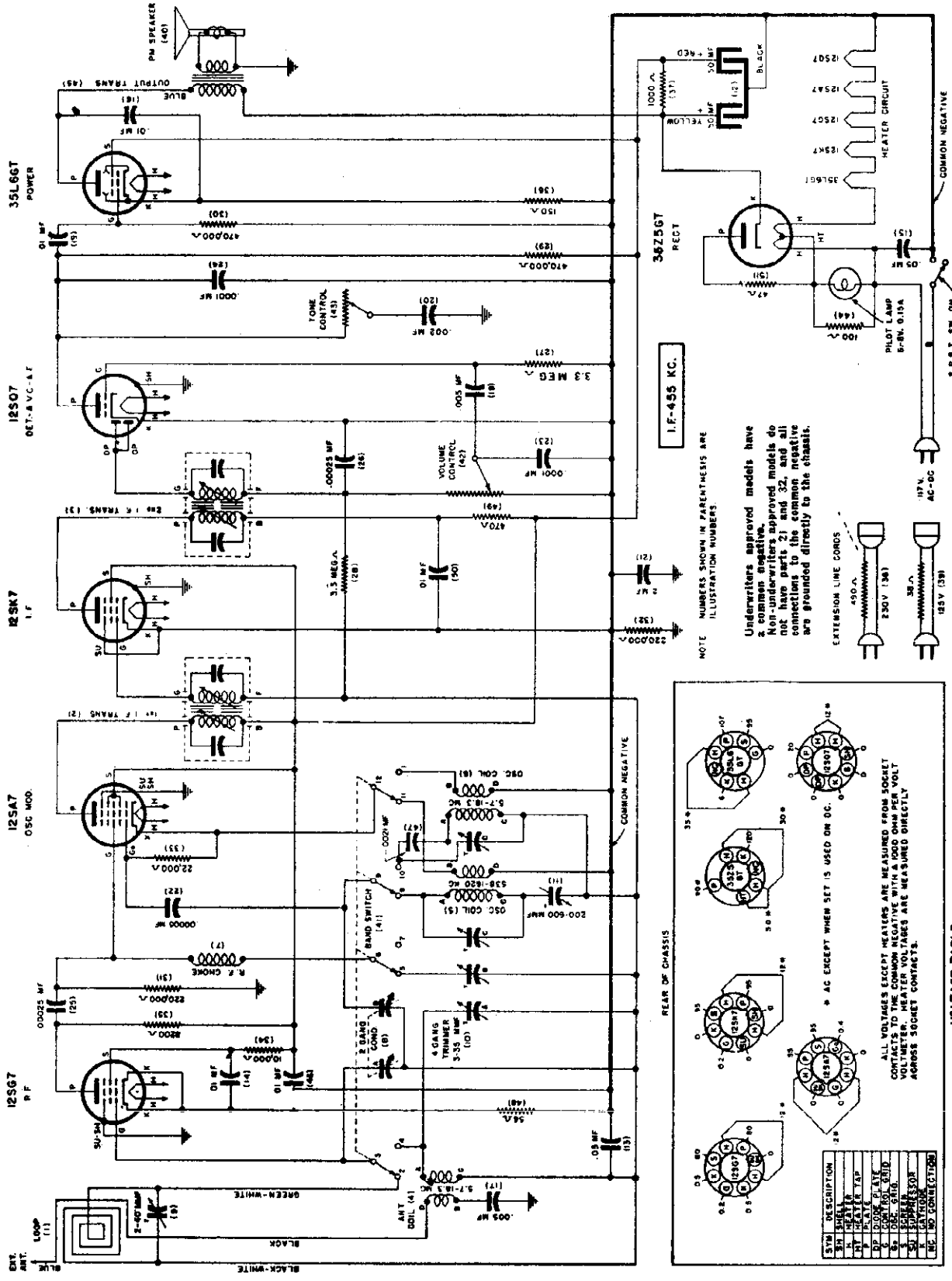
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis between the volume and tuning controls. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

ALLIED RADIO CORP.



ALIGNMENT PROCEDURE

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. Make the adjustment marked (1) first, (2) next, (3) third, etc.

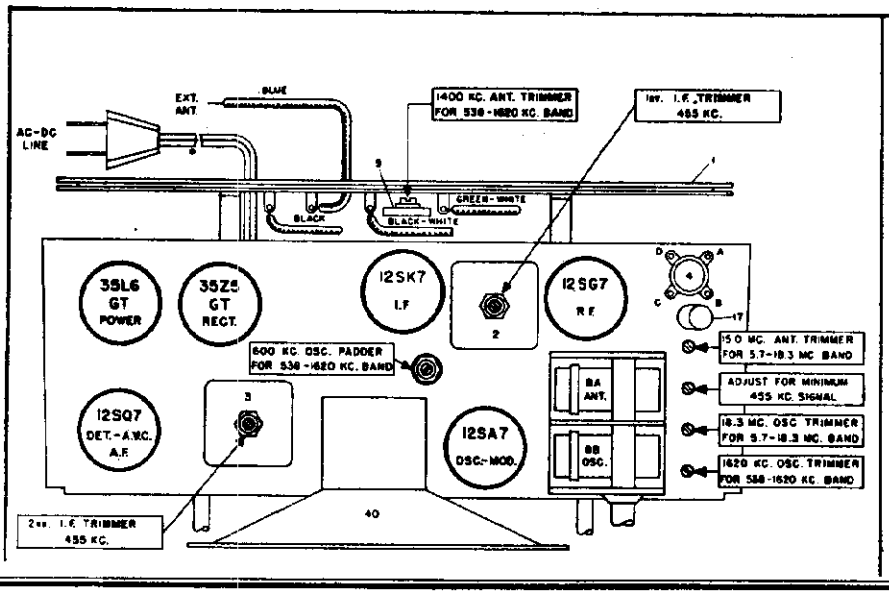
Before starting alignment:

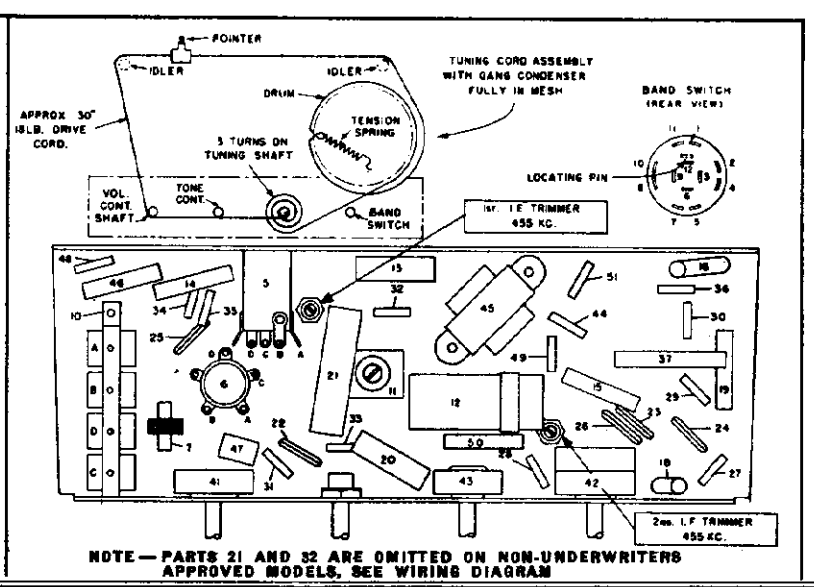
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Place loop antenna in the same position it will be in when set is in the cabinet.

Steps	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:
1	I.F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through .01 Mfd. condenser	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.
2	1620 to 538 K.C. Band	Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	.00025 Condenser	High side to BLUE Antenna Lead. Low side to chassis through a .01 mfd. condenser.	Adjust R.F. coil trimmer for **minimum** 455 K.C. signal.
		Exactly 1620 K.C.	Exactly 1620 K.C.			Adjust 1620 K.C. oscillator trimmer for maximum output.
		Approx. 1400 K.C.	Approx. 1400 K.C.			While rocking gang condenser adjust 1400 K.C. loop trimmer for maximum output.
		Approx. 600 K.C.	Approx. 600 K.C.			While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
3	5.7 to 18.3 M.C. Band	Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor		Adjust 18.3 M.C. oscillator trimmer for maximum output.
		Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm carbon resistor		While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.





NOTE—PARTS 21 AND 32 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS, SEE WIRING DIAGRAM

PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	20E105	Coil	Antenna Loop
2	20E21	Coil	1st I. F. Transformer
3	20E22	Coil	2nd I. F. Transformer
4	20E72	Coil	Antenna
5	20E102	Coil	Oscillator, Broadcast Band
6	20E103	Coil	Oscillator, Short Wave Band
7	2E19	Coil	R. F. Choke
8	24E9	Condenser	Tuning, 2 gang with pulley
9	24E3	Capacitor	Trimmer, 2-40 MMF (On Loop)
10	24E15	Capacitor	Trimmer, 4 Gang Strip
11	24E16	Capacitor	Padder, 200-600 MMF
12	25E6	Capacitor	50-50 Mfd. 150 Volt Dry Electrolytic
13	23E216	Capacitor	Tubular, .05 Mfd.—200 Volt
14	23E211	Capacitor	Tubular, .01 Mfd.—200 Volt
15	23E416	Capacitor	Tubular, .05 Mfd.—400 Volt
16	23E411	Capacitor	Tubular, .01 Mfd.—400 Volt
17	23E408	Capacitor	Tubular, .005 Mfd.—400 Volt
18	23E208	Capacitor	Tubular, .005 Mfd.—200 Volt
19	23E411	Capacitor	Tubular, .01 Mfd.—400 Volt
20	23E205	Capacitor	Tubular, .002 Mfd.—200 Volt
21	23E421	Capacitor	Tubular, .2 Mfd. 400 Volt (Und. App'd Only)
22	23E37	Capacitor	Mica, .00005 Mfd.
23	23E39	Capacitor	Mica, .0001 Mfd.
24	23E39	Capacitor	Mica, .0001 Mfd.
25	23E42	Capacitor	Mica, .00025 Mfd.
26	23E42	Capacitor	Mica, .00025 Mfd.
27	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 Watt
28	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 Watt
29	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 Watt
30	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 Watt
31	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 Watt
32	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 Watt (Und. App'd Only)
33	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 Watt
34	27E103	Resistor	Carbon, 10,000 Ohm, 1/3 Watt
35	27E822	Resistor	Carbon, 8,200 Ohm, 1/3 Watt
36	27E151	Resistor	Carbon, 150 Ohm, 1/3 Watt
37	27E102-3	Resistor	Carbon, 1,000 Ohm, 1 Watt
38		Resistor	230 Volt Extension Line Cord Used Only in in Models Not Having Common Ground
39		Resistor	125 Volt Extension Line Cord Used Only in Models Not Having Common Ground
40	1E1	Speaker	Elliptical Shape 4" x 6"
41	29E8	Switch	Band
42	28E7	Resistor	Volume Control with S.P.S.T. Switch
43	28E8	Resistor	Tone Control
44	27E101-2	Resistor	Carbon, 100 Ohm, 1/2 Watt
45	22E8	Transformer	Output, Speaker
46	23E211	Capacitor	Tubular, .01 Mfd., 200 Volt
47	23E2000	Capacitor	Mica, .0021 Mfd.
48	27E560	Resistor	Carbon, 56 Ohm, 1/3 Watt
49	27E471	Resistor	Carbon, 470 Ohm 1/3 Watt
50	23E211	Capacitor	Tubular, .01 Mfd. 200 Volt
51	27E470-2	Resistor	Carbon 47 Ohm, 1/2 Watt

MISCELLANEOUS PARTS

Part No.	Part Name	Description
40E1	Bulb	6-8 Volt .150 Amp. Dial light, No. 47
7E100	Cabinet	Wood Table Model
7E61	Cabinet Back	For Wood Table Model
65E2	Dial Cord Spring	Tension Spring
4E1	Dial Cord	36" of 18 lb. Drive Cord
68E1	Dial Shaft	Drive Shaft
19E3	Dial Shaft Bearing	Bearing for Drive Shaft
12E103-F10	Dial Shaft Washer	"C" Retainer Washer for Drive Shaft
20E65	Dial Back Plate	Back Plate Assem. less Calibrated Scale
36E28-1	Dial Scale	Calibrated Glass Scale
32E4	Dial Scale Clip	For Mounting Dial Scale
35E13	Dial Pointer	Dial Indicator
9E5	Dial Crystal	
37E21-10	Knob	Marked "OFF-ON-VOLUME" for Wood Table Cabt.
37E21-11	Knob	Marked "TONE" for Wood Table Cabt.
37E21-12	Knob	Marked "TUNING" for Wood Table Cabt.
37E21-13	Knob	Marked "SW-BC" for Wood Table Cabt.

OUTSIDE AERIAL

A 50 TO 75 FOOT AERIAL must be connected to the receiver WHEN TUNING FOR SHORT WAVE STATIONS or when the volume of 538-1620 KC band stations is not satisfactory. Attach this external aerial to the blue lead coming out of the rear of the chassis.

WARNING—DO NOT ATTACH A GROUND TO THE RADIO—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

5.7 - 18.3 M.C. BAND OPERATING INSTRUCTIONS

BE SURE TO ATTACH A REGULAR AERIAL TO BLUE ANTENNA LEAD COMING OUT OF REAR OF CHASSIS WHEN TUNING FOR SHORT WAVE STATIONS.

TURN WAVE BAND SWITCH KNOB to the left hand position.

Use section of dial that is calibrated from 5.7 - 18.3 M.C.

Remove chassis from cabinet for alignment.

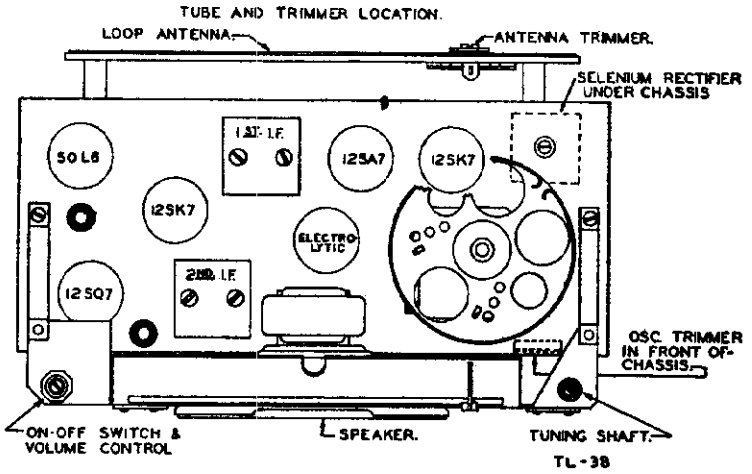
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

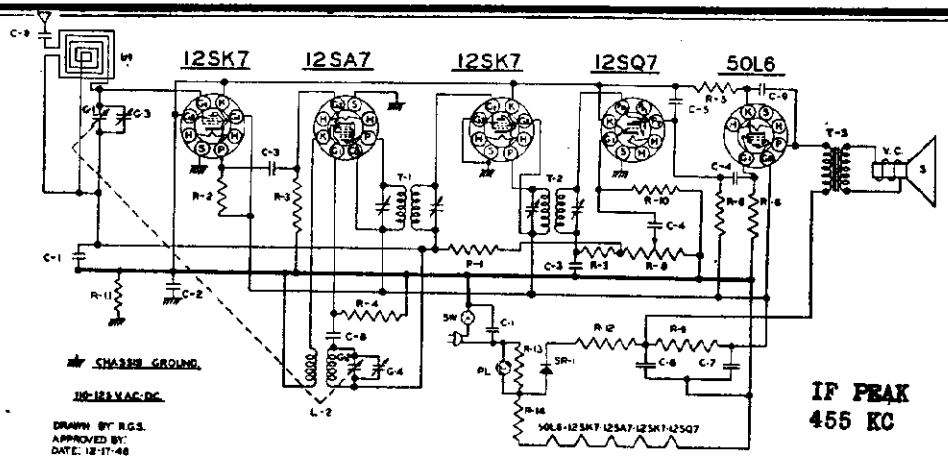
The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.





IF PEAK
455 KC

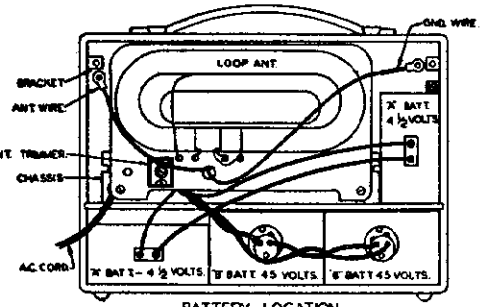
PART NO.		DESCRIPTION.	PART NO.		DESCRIPTION.	PART NO.		DESCRIPTION.
IR-23	R-1	3.5 MEG. RESISTOR 1/2W 20	MC-5	C-5	.0005 MFD MICA CONDENSER.	GC-2	C-1 C-2	GANG CONDENSER
IR-22	R-2	3000 Ω RESISTOR. 1/2 W 10	EC-10	C-6	40 MFD 150V ELECTROLYTIC			
IR-10	R-3	47M Ω RESISTOR. 1/2 W 20		C-7	40 MFD	TC-7	C-3	ANT TRIMMER CONDENSER.
IR-9	R-4	22M Ω RESISTOR. 1/2 W 20	MC-6	C-8	.0005 MFD MICA CONDENSER	TC-8	C-4	OSC. TRIMMER CONDENSER.
IR-14	R-5	1.5M Ω RESISTOR. 1/2 W 20	PC-7	C-9	.01 MFD CONDENSER 400V		SW.	SWITCH ON VOLUME CONTROL
IR-11	R-6	470M Ω RESISTOR. 1/2 W 20	LO-9	L-2	OSC COIL			R/12SK7-12SA7-12SQ7 50L6
VC-4	R-8	1 MEG. VOLUME CONTROL	CO-1	P	LINE CORD	TU-25		
IR-25	R-9	2000 Ω RESISTOR. 1 W. 10	PB-1	PL	PILOT LITE			
IR-13	R-10	2 MEG Ω RESISTOR. 1/2 W 20	LT-1	T1	INPUT I.F. TRANSFORMER			
IR-20	R-11	220M Ω RESISTOR. 1/2 W 20	LT-2	T2	OUTPUT I.F. TRANSFORMER		R-13	30 Ω 3 W. 5%
IR-33	R-12	75 Ω RESISTOR. 2 W. 10	LL-1	L1	LOOP ANTENNA	WR-4	R-14	80 Ω 3 W. 5%
MC-3	C-1	.03 MFD. CONDENSER. 400 V.		T3	SPK. TRANSFORMER			
MC-4	C-2	.1 MFD. CONDENSER. 400 V.	SPK-5	VC	VOICE COIL	SR-1	SR-1	SELENIUM RECTIFIER
MC-2	C-3	.0001 MFD. MICA CONDENSER.		S	P.M. SPEAKER			
PC-10	C-4	.003 MFD. CONDENSER. 400 V.						

To replace batteries, loosen and remove the two screws at the upper left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

Model 5B171

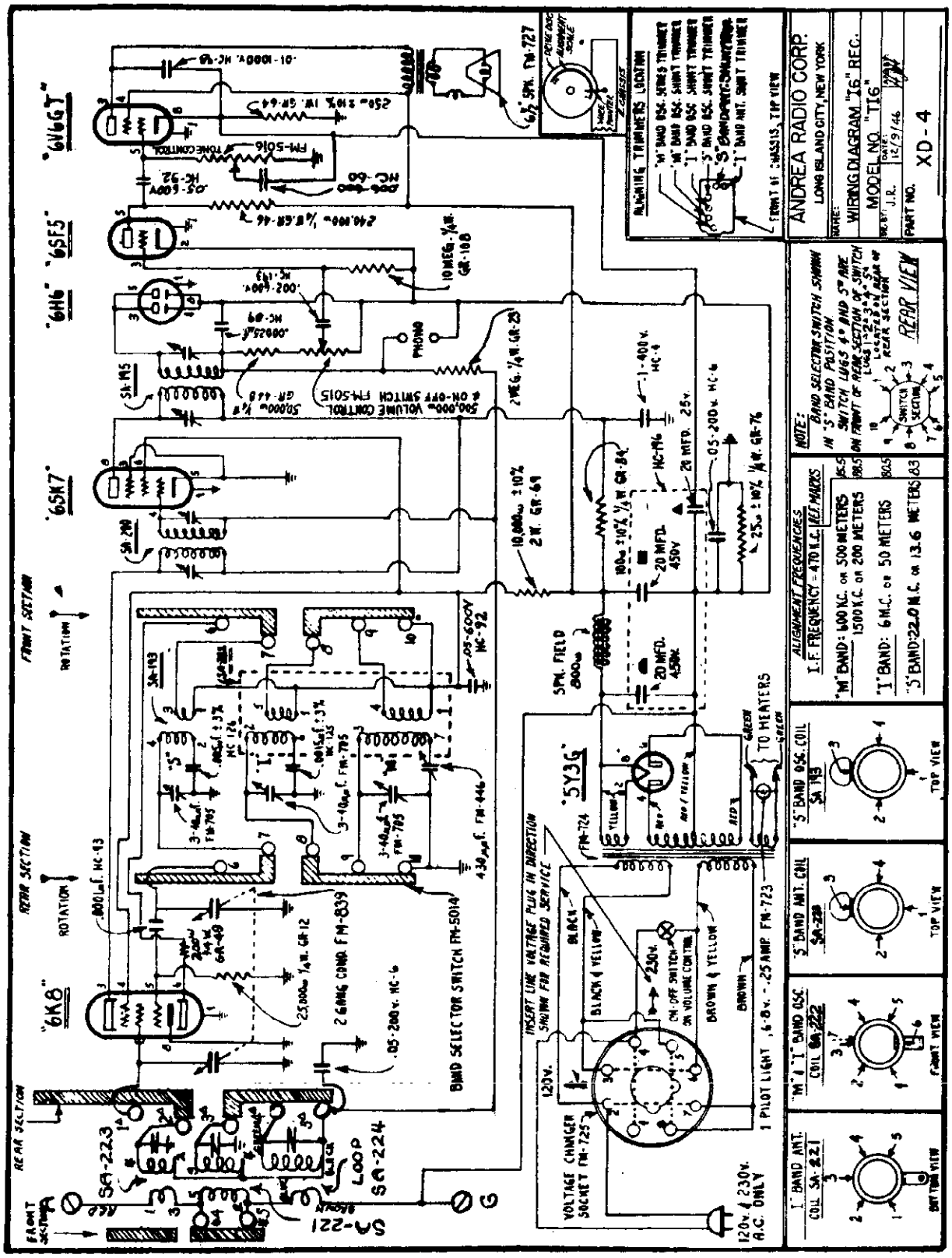
After the batteries have been installed, replace the back, making sure that the two washers riveted to the bottom of the back, fit into the slots near the bottom edge of the cabinet. Also make sure that the two wires from the loop antenna are held in place between the top brackets of the cabinet and the back by the two fastening screws.

Mfgr.	Volts	Type No.
Burgess	45 "B"	M30
General	45 "B"	W30B
Bright Star	45 "B"	3033
Usalite	45 "B"	640
Rayovac	45 "B"	P7830
Eveready	45 "B"	482
Burgess	4½ "A"	G3
General	4½ "A"	3H3
Bright Star	4½ "A"	361
Usalite	4½ "A"	683
Rayovac	4½ "A"	P83A
Eveready	4½ "A"	746



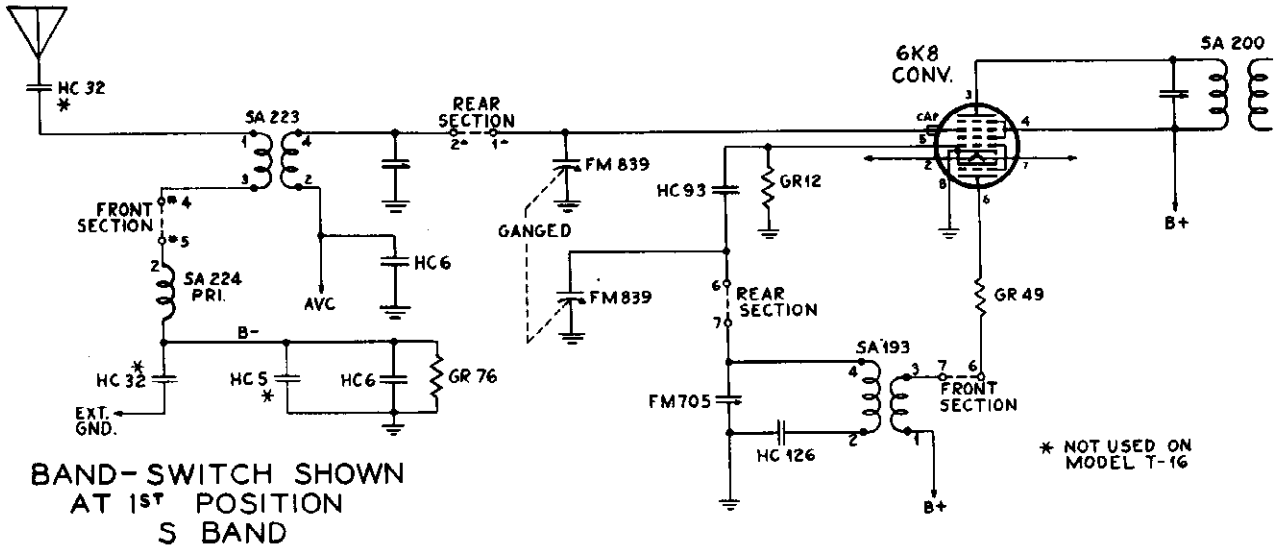
Model 5B171
BATTERY LOCATION.
FIGURE-1

ANDREA RADIO CORP.

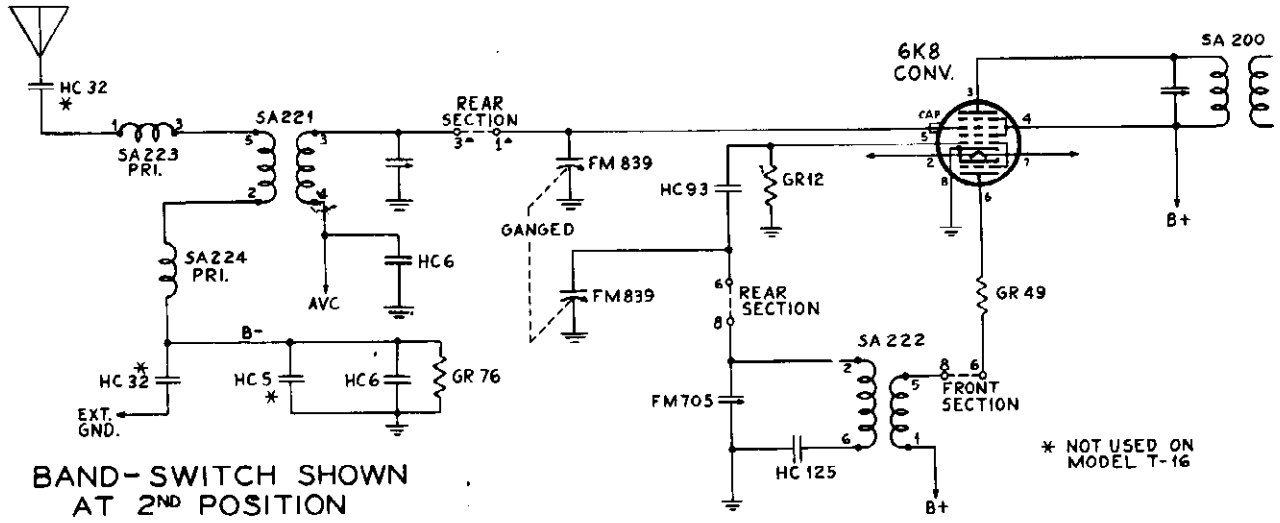


MODEL T-16

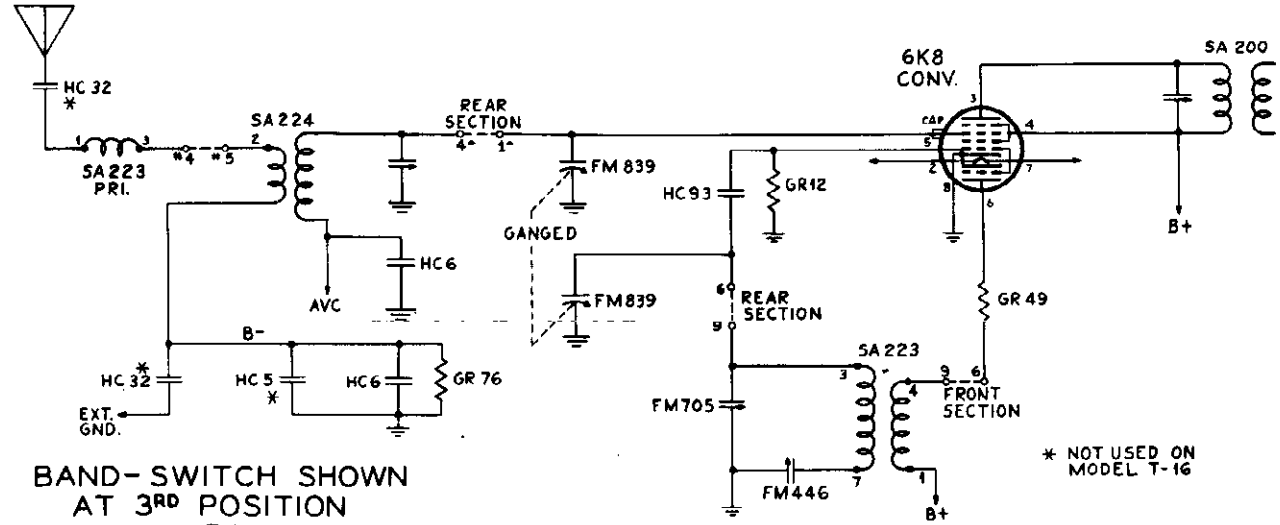
ANDREA RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION
S BAND



BAND-SWITCH SHOWN AT 2ND POSITION
I BAND



BAND-SWITCH SHOWN AT 3RD POSITION
M BAND

FOR OPERATION ON AC - LINE VOLTAGES OF
105-125, 210-240, 50/60 CYCLES

WARNING! Always remove the line plug from the electric outlet before removing the chassis from the cabinet. Also - connect the speaker plug to the receiver before switching on the power. Otherwise, damage will result.

I. F. REALIGNMENT GENERALLY SUFFICIENT: As a rule, it is not necessary to readjust the short wave oscillator and antenna shunt and series trimmers unless they have been tampered with, or require replacing. Consequently, careful realignment of the I. F. system is all that requires attention, ordinarily. Before making any adjustments, tune in one particular station and note the quality of reception so that you can check the improvement after the I. F. system has been realigned.

USE SIGNAL GENERATOR AND OUTPUT VOLTMETER: For realigning, use a signal generator to supply a modulated carrier of 470, 600, 1,500, 6,000, and 22,000 kc., plus an output voltmeter. Alignment by any other means is not recommended. Your service test generator should be checked frequently for change in calibration by getting a zero beat between the generator and broadcast stations of known frequency.

SPECIAL NOTES: Before proceeding to align the antenna and oscillator circuits bear in mind that these circuits control the accuracy of the main tuning dial calibration particularly the oscillator trimmers. As the main dial is a part of the cabinet, servicing of the chassis can be made without the use of this dial by using the reference alignment scale 0 to 100 divisions attached permanently to the gang condenser drive drum.

The table below indicates the reference dial settings for the required alignment frequencies. You will note that the chassis contains a self-tapping screw located just below the gang condenser drum, the purpose of which, is to enable you to wrap a piece of bare wire and thereby form a pointer to the reference scale. Set the pointer at the zero marking on the reference scale with the gang condenser plates fully meshed (all capacity in) after which rotate the drum to the correct reference setting for proper circuit alignment and procedure in accordance with the Band alignment instruction. Remove reference pointer before installing in cabinet.

ALIGNMENT FREQ. KC.	REFERENCE DIAL SETTING	BAND
1,500	88.5	"M"
600	15.5	"M"
6,000	80.5	"I"
22,000	83	"S"

NOTES ON REALIGNING THE BANDS: During the aligning measurements, the output of the signal generator must be kept low so that it will not cause the AVC circuit in the set to function. In other words, when the volume control on the set is turned to maximum, the output should not show more than .5 volt across the voice coil, or 50 milliwatts in the plate circuit of the output tube.

Generally, at frequencies above 7,000 kc., the signal generator frequency will change with each adjustment of the generator output attenuator control. Hence, the receiver must be retuned each time the attenuator is adjusted.

Some generators cause trouble by direct radiation to the set at frequencies above 8 mc. Experience indicates that more accurate alignment is possible when the generator is separated by several feet from the receiver under test, in order to eliminate this direct pickup.

470-KC. I. F. ALIGNMENT: Connect the high-potential lead of the signal generator in series with a .1 mfd. condenser to the grid of the 6K8 tube. Set the generator at 470 kc., and adjust the output until a small deflection is obtained in the output meter. Adjust the trimmers condensers on the top of the 1st and 2nd I.F. transformers (see circuit diagram) for maximum deflection on the output meter. After this adjustment has been made, disconnect the generator from the grid of the 6K8 tube. This completes the alignment of the I.F. system.

"S" BAND ALIGNMENT:

Connect the high-potential lead from the generator in series with a 400 ohm resistor to the antenna terminal (marked A) on rear of loop, and the low side of the generator to the ground terminal (marked G) on rear of loop. Put the wave band switch at the S position, adjust the generator to 22,000 kc., and the receiver reference scale to 22.0 mc. Vary the S band oscillator shunt trimmer slowly from maximum to minimum. You will hear the signal at two settings of the trimmer, one nearer the minimum capacity (plates open) and one near the maximum capacity (plates closed). The setting near minimum capacity is correct, because the setting near maximum capacity is at the image frequency.

Now adjust the antenna shunt trimmer. During this adjustment, be sure to rock the gang condenser back and forth SLOWLY each time you make an adjustment of the trimmer. As you continue to do this, you will reach a point where further turning of the trimmer screw, while rocking the gang condenser, will not increase the signal response. This is the correct adjustment.

A simple method of determining if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator at 22,000 kc. and tune the receiver slowly from 21,000 to 23,000 kc. Two signals should be heard, 940 kc. apart. One will be lower in frequency than 22,000 kc. and the other will be higher. The higher frequency, as indicated on the dial, is the correct aligning frequency, and the lower one is the image.

As a further check, leave the receiver tuned to the higher frequency. Very slowly, increase the generator frequency from 22,000 kc. to about 23,000 kc. A signal will be heard near 23,000 kc. if all the settings are correct for alignment. If there is no signal, the original settings were on the image frequency. In that case, you must start again from the beginning, in order to be sure of accurate results.

After you have found the correct settings, the image, or lower, frequency response on the receiver will always sound weaker than the true signal.

"I" BAND ALIGNMENT: With the signal generator connected in accordance with the preceding instructions, set the generator at 6,000 kc., turn the wave band switch to the I position, and adjust the gang reference scale to 6 mc., as set forth in the chart. Following the procedure just described, adjust the I band oscillator shunt trimmer for maximum signal response. Next, adjust the I band antenna shunt trimmer. Rock the gang condenser back and forth slowly as you adjust the trimmer, in accordance with the instructions for the S band adjustment. This completes the adjustment for the I band.

"M" BAND ALIGNMENT: Replace the 400-ohm resistor in the generator lead by a .00025 mfd. condenser. Set the generator at 1,500 kc., turn the wave band switch to the M position, and set the gang reference scale of the receiver at 1,500 kc., as set forth in the chart. Adjust the M band oscillator shunt trimmer for maximum signal response. Next, adjust the antenna shunt trimmer for maximum response.

This band must be aligned at 600 kc. also. Set the generator accordingly, and tune the receiver to 600 kc., as set forth in the chart. Adjust the M band oscillator series trimmer for maximum response. During this adjustment, be sure to rock the gang condenser for each small change of capacity of the series trimmer. When this adjustment has been completed, recheck the antenna adjustment at 1,500 kc. This completes the adjustment of the M band.

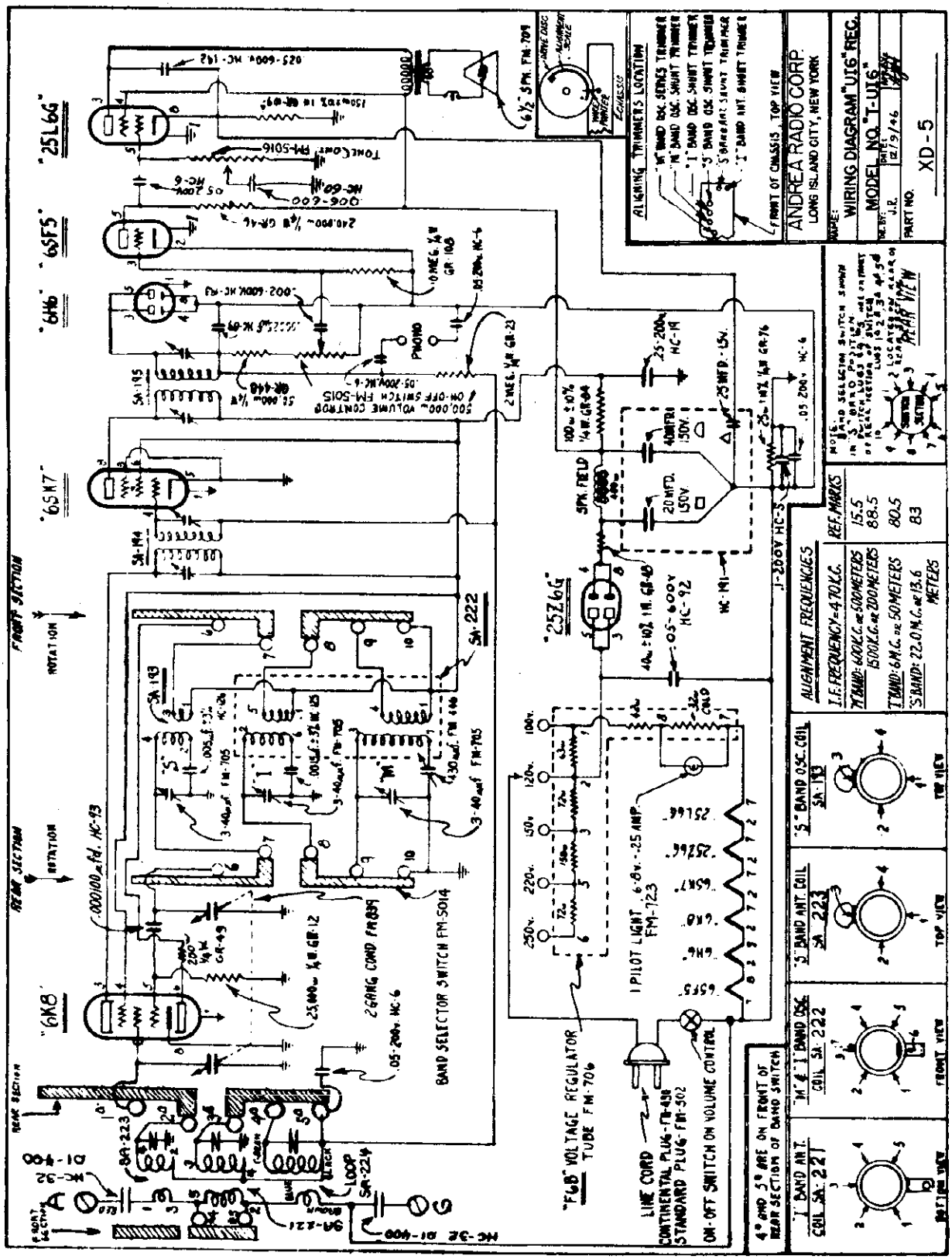
After installing the chassis in the cabinet, turn the tuning knob until the gang condenser plates are completely meshed. Then slide pointer along cord (without opening gang) until the center of the pointer is over the last diamond marking on the left side of the 2.5-7 mc. scale. When the above is followed correctly along with method of alignment, the pointer will match the correct scale calibration throughout.

TUBES:	6K8	Oscillator & Modulator	6SF5	1st Audio
	6V6GT	Beam Power Output	5Y3G	Rectifier
	6H6	2nd Detector & AVC	6BA7	I.F. Amplifier

IMPORTANT: If you find it necessary to replace any part in this receiver, bear this in mind: In order to maintain the high performance standards of Andrea Radio receivers, the component parts on all Andrea models are held to exceedingly close tolerance limits. Furthermore, Andrea components are given the exclusive "Climate Sealed" treatment which protects them from all weather and temperature conditions. Consequently, standard Andrea Radio replacement parts must be used for all service work, for the substitution of ordinary stock items will result in inferior performance.

MODEL T-U16

ANDREA RADIO CORP.



100-120-150-220-250 40/60 CYCLES OR DC
FOR OPERATION ON AC OR DC, LINE VOLTAGES OF 100 TO 250

WARNING! Always remove the line plug from the electric outlet before removing the chassis from the cabinet. Also - connect the speaker plug to the receiver before switching on the power. Otherwise, damage will result.

I. F. REALIGNMENT GENERALLY SUFFICIENT: As a rule, it is not necessary to readjust the short wave oscillator and antenna shunt and series trimmers unless they have been tampered with, or require replacing. Consequently, careful realignment of the I. F. system is all that requires attention, ordinarily. Before making any adjustments, tune in one particular station and note the quality of reception so that you can check the improvement after the I. F. system has been realigned.

USE SIGNAL GENERATOR AND OUTPUT VOLTMETER: For realigning, use a signal generator to supply a modulated carrier of 470, 600, 1,500, 6,000, and 22,000 kc., plus an output voltmeter. Alignment by any other means is not recommended. Your service test generator should be checked frequently for change in calibration by getting a zero beat between the generator and broadcast stations of known frequency.

SPECIAL NOTES: Before proceeding to align the antenna and oscillator circuits bear in mind that these circuits control the accuracy of the main tuning dial calibration particularly the oscillator trimmers. As the main dial is a part of the cabinet, servicing of the chassis can be made without the use of this dial by using the reference alignment scale 0 to 100 divisions attached permanently to the gang condenser drive drum.

The table below indicates the reference dial settings for the required alignment frequencies. You will note that the chassis contains a self-tapping screw located just below the gang condenser drum, the purpose of which, is to enable you to wrap a piece of bare wire and thereby form a pointer to the reference scale. Set the pointer at the zero marking on the reference scale with the gang condenser plates fully meshed (all capacity in) after which rotate the drum to the correct reference setting for proper circuit alignment and procedure in accordance with the Band alignment instruction. Remove reference pointer before installing in cabinet.

ALIGNMENT FREQ. KC.	REFERENCE DIAL SETTING	BAND
1,500	88.5	"M"
600	16.5	"M"
6,000	80.5	"I"
22,000	85	"S"

NOTES ON REALIGNING THE BANDS: During the aligning measurements, the output of the signal generator must be kept low so that it will not cause the AVC circuit in the set to function. In other words, when the volume control on the set is turned to maximum, the output should not show morethan .5 volt across the voice coil, or 50 milliwatts in the plate circuit of the output tube.

Generally, at frequencies above 7,000 kc., the signal generator frequency will change with each adjustment of the generator output attenuator control. Hence the receiver must be retuned each time the attenuator is adjusted.

Some generators cause trouble by direct radiation to the set at frequencies above 8 mc. Experience indicates that more accurate alignment is possible when the generator is separated by several feet from the receiver under test, in order to eliminate this direct pickup.

470 KC. I. F. ALIGNMENT: Connect the high-potential lead of the signal generator in series with a .1 mfd. condenser to the grid of the 6K8 tube. Set the generator at 470 kc., and adjust the output until a small deflection is obtained in the output meter. Adjust the trimmer condensers on the top of the 1st and 2nd I. F. transformers (see circuit diagram) for maximum deflection on the output meter. After this adjustment has been made, disconnect the generator from the grid of the 6K8 tube. This completes the alignment of the I. F. system.

"S" BAND ALIGNMENT:

Connect the high-potential lead from the generator in series with a 400 ohm resistor to the antenna terminal (marked A) on rear of loop, and the low side of the generator to the ground terminal (marked G) on rear of loop. Put the wave band switch at the S position, adjust the generator to 22,000 kc., and the receiver to 22.0 mc. Vary the S band oscillator shunt trimmer slowly from maximum to minimum. You will hear the signal at two settings of the trimmer, one nearer the minimum capacity (plates open) and one near the maximum capacity (plates closed). The setting near minimum capacity is correct, because the setting near maximum capacity is at the image frequency.

Now adjust the antenna shunt trimmer. During this adjustment, be sure to rock the gang condenser back and forth slowly each time you make an adjustment of the trimmer. As you continue to do this, you will reach a point where further turning of the trimmer screw, while rocking the gang condenser, will not increase the signal response. This is the correct adjustment.

A simple method of determining if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator at 22,000 kc., and tune the receiver slowly from 21,000 to 23,000 kc. Two signals should be heard, 940 kc. apart. One will be lower in frequency than 22,000 kc. and the other will be higher. The higher frequency, as indicated on the dial, is the correct aligning frequency, and the lower one is the image.

As a further check, leave the receiver tuned to the higher frequency. Very slowly, increase the generator frequency from 22,000 kc. to about 23,000 kc.

A signal will be heard near 23,000 kc. if all the settings are correct for alignment. If there is no signal, the original settings were on the image frequency. In that case, you must start again from the beginning, in order to be sure of accurate results.

After you have found the correct settings, the image, or lower, frequency response on the receiver will always sound weaker than the true signal.

"I" BAND ALIGNMENT: With the signal generator connected in accordance with the preceding instructions, set the generator at 6,000 kc., turn the wave band switch to the I position, and adjust the dial to 6 mc. Following the procedure just described, adjust the I band oscillator shunt trimmer for maximum signal response. Next, adjust the I band antenna shunt trimmer. Rock the gang condenser back and forth slowly as you adjust the trimmer, in accordance with the instructions for the S band adjustment. This completes the adjustment for the I band.

"M" BAND ALIGNMENT: Replace the 400-ohm resistor in the generator lead by a .00025 mfd. condenser. Set the generator at 1,500 kc., turn the wave band switch to the M position, and set the dial of the receiver at 1,500 kc. Adjust the M band oscillator shunt trimmer for maximum signal response. Next adjust the antenna shunt trimmer for maximum response.

This band must be aligned at 600 kc. also. Set the generator accordingly, and tune the receiver to 600 kc. Adjust the M band oscillator series trimmer for maximum response. During this adjustment, be sure to rock the gang condenser for each small change of capacity of the series trimmer. When this adjustment has been completed, recheck the antenna adjustment at 1,500 kc. This completes the adjustment of the M band.

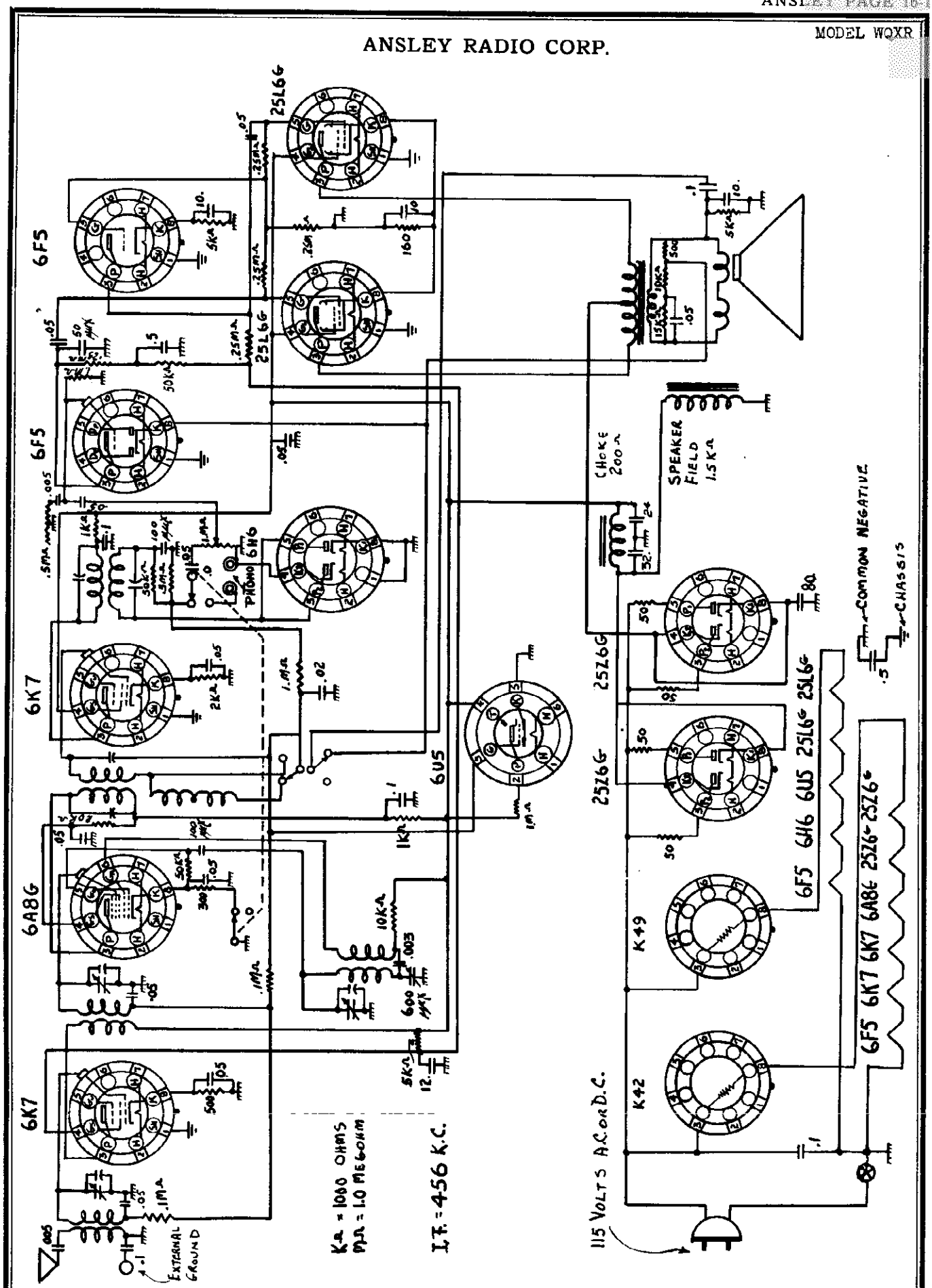
TUBES: The following tubes are required for this receiver:

6K8 Oscillator and Modulator	25L6G Beam Power Output
6SK7 I. F. Amplifier	25Z6G Rectifier
6H6 2nd Detector and AVC	F6B Ballast Tube
6SF5 1st Audio	

IMPORTANT! If you find it necessary to replace any part in this receiver, bear this in mind: In order to maintain the high performance standards of Andrea Radio receivers, the components parts on all Andrea models are held to exceedingly close tolerance limits. Furthermore, Andrea components are given the exclusive "Climate Sealed" treatment which protects them from all weather and temperature conditions. Consequently, standard Andrea Radio replacement parts must be used for all service work, for the substitution of ordinary, stock items will result in inferior performance.

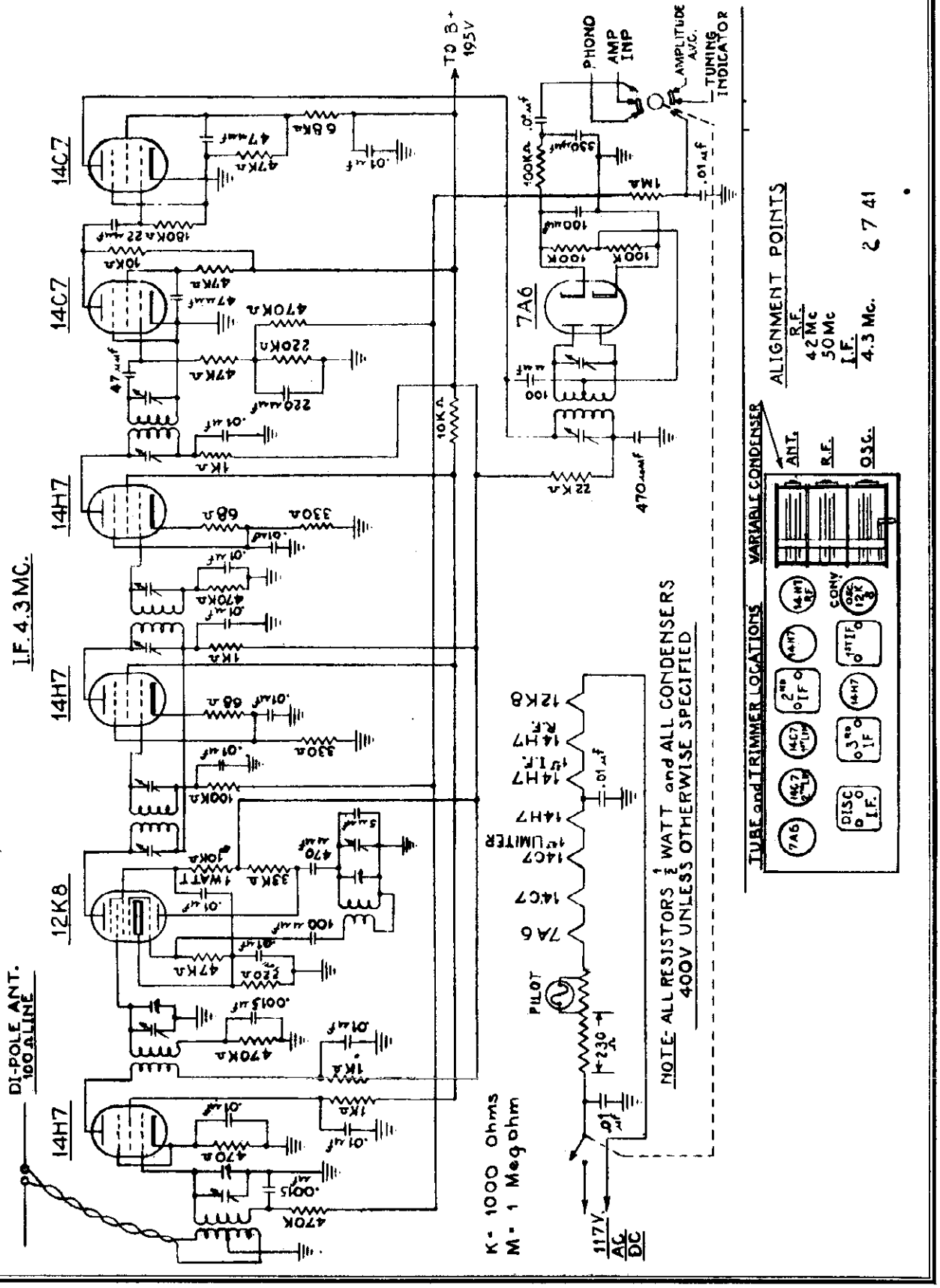
MODEL WQXR

ANSLEY RADIO CORP.



MODEL FM-4, FM Tuner

ANSLEY RADIO CORP.

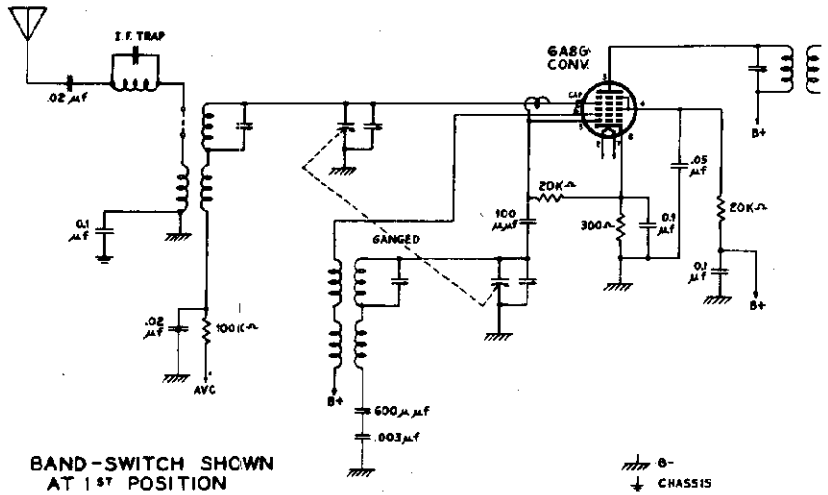


ANSLEY RADIO CORP.

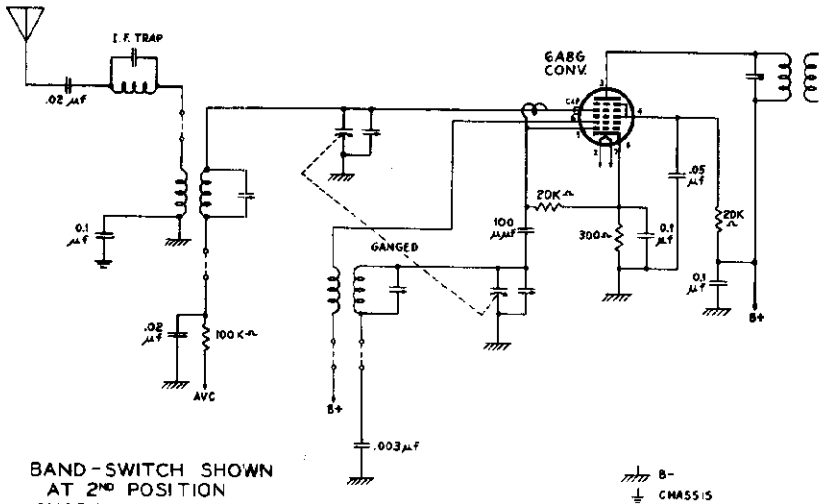
Replacement Parts
The F.M. Tuner - Model F.M. 4

Req.	Description	Part No.	List Price
3	I.F. Transformer 4.3 M.C.	8.21A	1.50
1	Discriminator Transformer 4.3 M.C.	8.22A	5.00
1	Antenna Coil	28.39A	1.00
1	Oscillator Coil	28.41A	1.00
1	R.F. Coil	28.40	1.00
1	Pilot Bulb 12-100 M.A.	18.06	.65
(	Dial Assembly	25.63)	
(	Flexible Connecting Shaft	)	
(	Flexible Casing	)	7.50
(	Hardware Shaft and Casing	)	
1	On-Off Switch	16.12	1.60
Condensers			
1	3 Section Variable	6.87A	6.00
17	.01 MFD 400 volt P.T.C.	7.76	.15
2	.0015 MFD Mica MW	6.88	.15
2	.0005 MFD Mica MW	6.10	.15
1	.00025 MFD Mica MO	6.47	.15
2	.0001 MFD Mica MO	6.08	.15
1	.00033 MFD Mica MO	6.89	.15
1	.000022 MFD Mica MO	6.90	.15
3	.00005 MFD Mica MO	6.70	.15
1	.0001 MFD Silver Mica MO	6.91	.35
1	5 MMF Sprague Type 3 Liquid Dielectric Cond.	6.92	.50
Resistors			
2	68 Ohms ½ Watt	7.89	.15
2	220 Ohms ½ Watt	7.67	.15
2	330 Ohms ½ Watt	7.73	.15
1	470 Ohms ½ Watt	7.90	.15
4	1000 Ohms ½ Watt	7.47	.15
2	10 K Ohms ½ Watt	7.91	.15
1	22 K Ohms ½ Watt	7.92	.15
1	33 K Ohms ½ Watt	7.93	.15
4	47 K Ohms ½ Watt	7.94	.15
1	68 K Ohms ½ Watt	7.95	.15
4	100 K Ohms ½ Watt	7.14	.15
1	180 K Ohms ½ Watt	7.96	.15
1	220 K Ohms ½ Watt	7.97	.15
4	470 K Ohms ½ Watt	7.98	.15
1	1 Megohm ½ Watt	7.34	.15
1	10 K Ohms 1 Watt	7.59	.15
1	230 Ohm 5 Watt Metal Clad	7.99	1.25
Tubes			
1	12K8	34.38	
3	14H7	34.39	
2	14C7	34.40	
1	7A6	34.41	

MODELS 677, 678

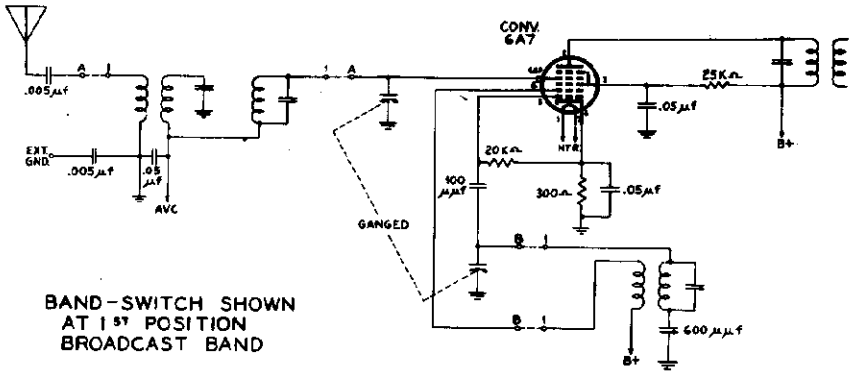


BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND

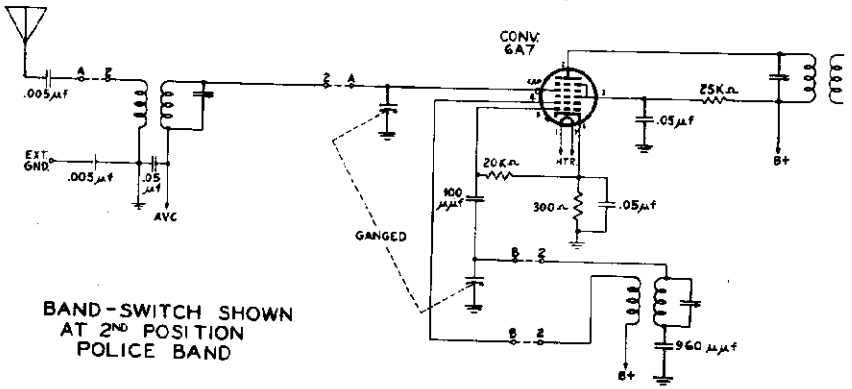


BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND

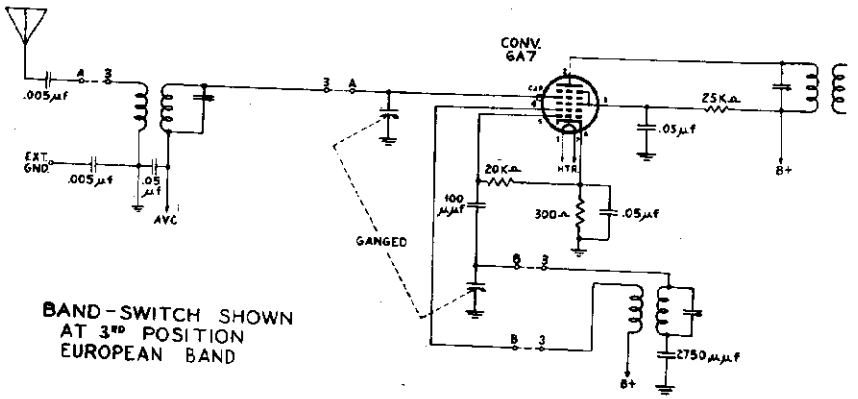
MODEL 5111



BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND



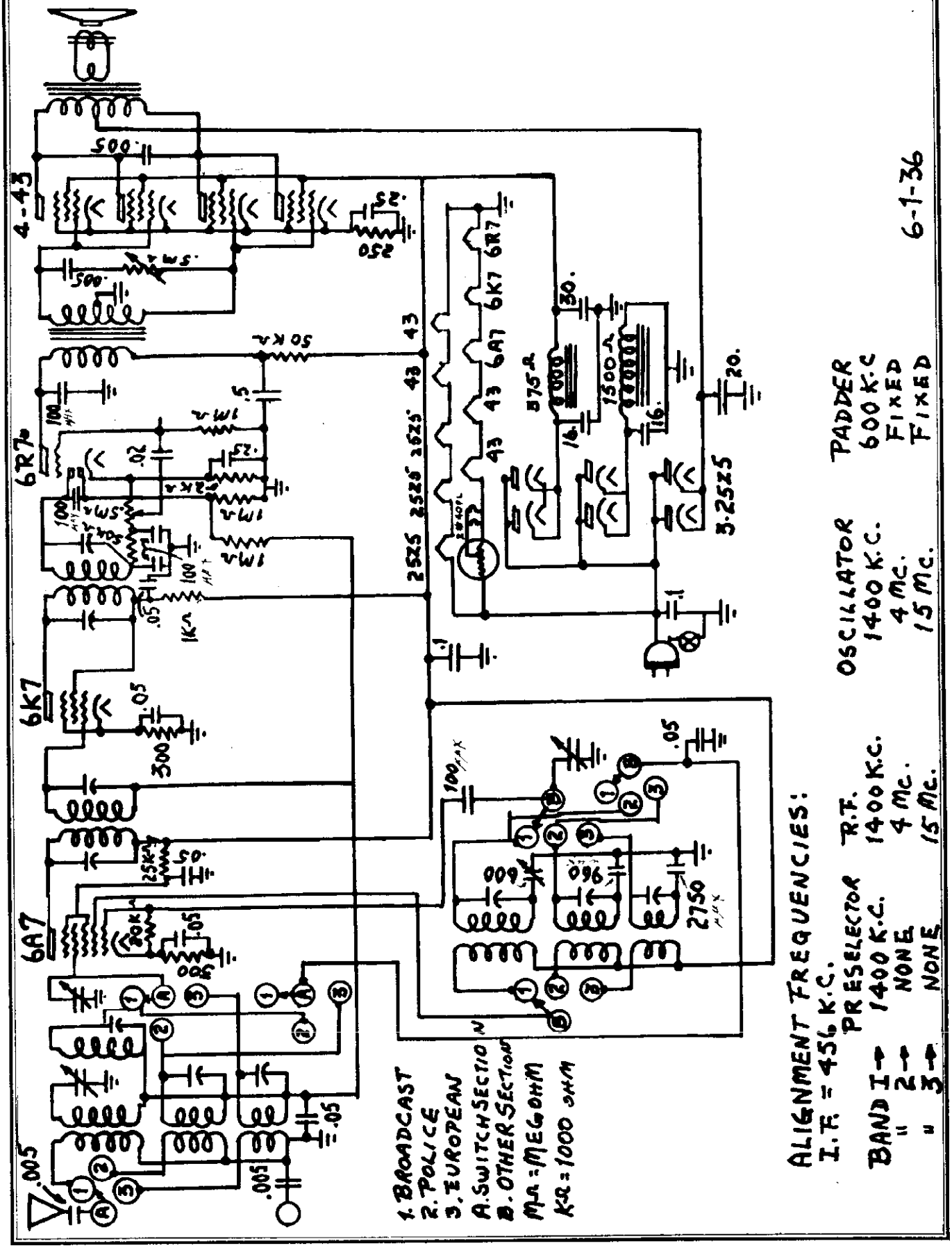
BAND-SWITCH SHOWN
AT 2ND POSITION
POLICE BAND

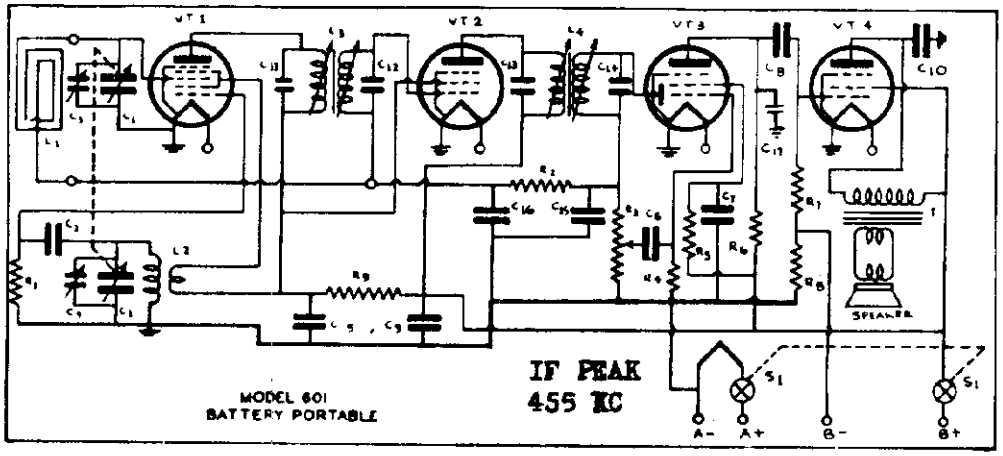


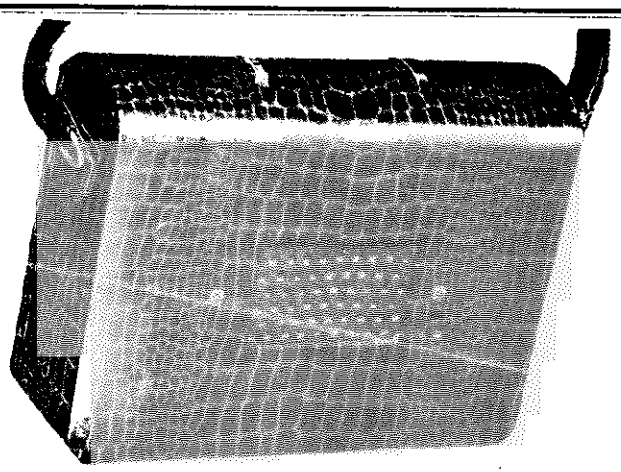
BAND-SWITCH SHOWN
AT 3RD POSITION
EUROPEAN BAND

MODEL 5111

ANSLEY RADIO CORP.

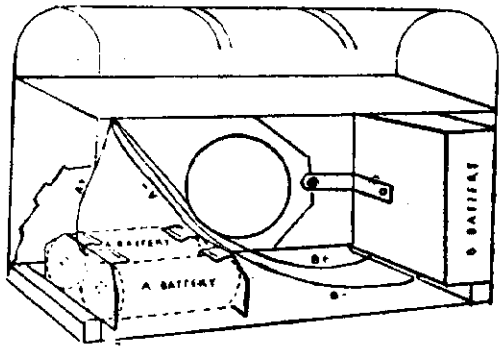






Quantity	Item**	Part No.	Description	Price
1.	c1	601-5	Two Gang Variable Condenser	$2.35
2.	c2, c17	601-43	50 MMF Condenser	.20 each
2.	*c3, c4	Part of 601-5	Trimmers, Part of Variable Condenser	0
1.	c15	601-42	.00025 Tubular Condenser	.20
3.	c6, c8, c10	601-41	.002MFD, 200 Volt Tubular Condenser	.20 each
3.	c7, c5, c16	601-44	.05MFD. 200 Volt Tubular Condenser	.20 each
1.	c9	601-10	8MFD. 150 Volt Dry Electrolytic Condenser	.50
4.	*c11, c12, c13, c14	601-3, 3A	Part of I.F. Transformers	0
1.	L1.	601-8	Loop Antenna Assembly	.85
1.	L2.	601-9	Oscillator Coil	.50
1.	L3.	601-3	Double tuned iron core First I.F. Transformer	.95
1.	L4.	601-3A	Double Tuned Iron Core Second I.F. Transformer	.95
1.	T.	Part of 601-2	Output Transformer	.95
1.	R1.	601-16	100,000 ohm ¼ Watt Carbon Resistor	.15
1.	R2.	601-17	2.2 Megohm ¼ Watt Carbon Resistor	.15
1.	R3.	601-6	1 Megohm Volume Control with S1	1.05
1.	R4.	601-18	10 Megohm ¼ Watt Carbon Resistor	.15
1.	R5.	601-19	4.7 Megohm ¼ Watt Carbon Resistor	.15
1.	R6.	601-20	1 Megohm ¼ Watt Carbon Resistor	.15
1.	R7.	601-21	3 Megohm ¼ Watt Carbon Resistor	.15
1.	R8.	601-22	820 Ohm ½ Watt Carbon Resistor	.15
1.	R9.	601-23	5000 Ohm ½ Watt Carbon Resistor	.15
1.	*S1.	Part of 601-6	Double Pole Single Throw Switch	0
1.	V.T.1	601-55	1R5 Tube	2.20
1.	V.T.2	601-54	1T4 Tube	2.20
1.	V.T.3	601-56	1S5 Tube	2.20
1.	V.T.4	601-4	3S4 Tube	2.20
1.	Speaker	601-2	4" Permanent Magnet Dynamic Speaker 1 oz. Alnico No.5	3.00

*NOT SUPPLIED SEPARATELY.



Cut-Away View

Showing Batteries

Placed in Cabinet

NOTE: Nipple end of "A" batteries go to A+.

Snap back cover in proper place. Set will not operate with cover open.

Current drain ..... A Battery-0.220 Amps.
B Battery-0.008 Amps.

Frequency Range ..... 1600 KC to 550 KC

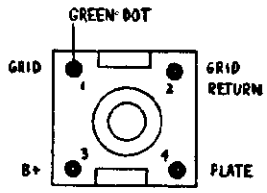
GENERAL NOTES

1. **Batteries:** The model No. 601 is designed to house the complete set of batteries within the cabinet. The battery complement should be as follows:

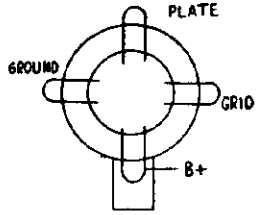
Type Battery	No. Req.	Eveready Part No.	Burgess Part No.	Ray-O-Vac Part No.
1½ Volt "A"	2	No. 950	No. 2R	No. 2LP
67½ Volt "B"	1	No. 467	No. XX 45	No. 4367

2. The lug connections for the I.F. transformers and oscillator coil are as follows:

1. Grid (green dot)
2. Grid return
3. Plate
4. B+



Oscillator Coil



3. If replacements are made in the R.F. section of the circuit, the receiver should be carefully re-aligned.
4. The self-contained loop antenna has directional characteristics. It is important therefore, once the station is tuned in, that the cabinet be rotated on its base, back and forth, through a quarter of a circle (90°) and left at the position where the station is received with maximum volume.

TUBE DATA

The tube complement is as follows:

1 1R5 oscillator modulator
1 1T4 I.F. amplifier
1 1S5 2nd detector, AVC, A.F. amplifier
1 3S4 beam power output

VOLTAGE ANALYSIS

Reading should be taken with a 20,000 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 are as follows: "A" Battery 1.4 Volts. "B" Battery 60 Volts.

TUBE	PLATE	SCREEN	OSC. PLATE	FIL.
1R5	43 Volts	43 Volts	43 Volts	1.4 Volts
1T4	60 Volts	43 Volts		1.4 Volts
1S5	14 Volts	10 Volts		1.4 Volts
3S4	60 Volts	60 Volts		1.4 Volts

Bias for the 3S4 is obtained across the R8. The voltage drop across this resistor should be 6.9 volts.

LOCATION OF COILS AND ADJUSTMENTS

The oscillator coil is located beneath the chassis. The loop is mounted inside the cover with the connection of the loop soldered to snaps on the cover. The trimmers for oscillator coil and loop are mounted on the variable condenser. The IF is permeability tuned, and the slugs are reached from top and bottom of the IF transformer.

The IF transformers are located in cans mounted on top of the chassis. The first IF transformer No. 1455-1R is at the rear right of the chassis. The second IF transformer No. 1455-6 is to the front left of the variable condenser.

NOTE: The top iron core slug is the secondary of each transformer.

A signal generator with frequencies of 455 & 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.

I.F. ALIGNMENT

Connect two jumpers, one to each snap button on cover to other part of snap button on posts of cabinet. This connects the loop.

Swing variable condenser to minimum capacity position. Feed 455KC to the grid of the 1R5 tube through a .01 condenser. Tune secondary of second IF for maximum indication of output meter, then tune primary in similar manner. Tune first IF secondary and then primary.

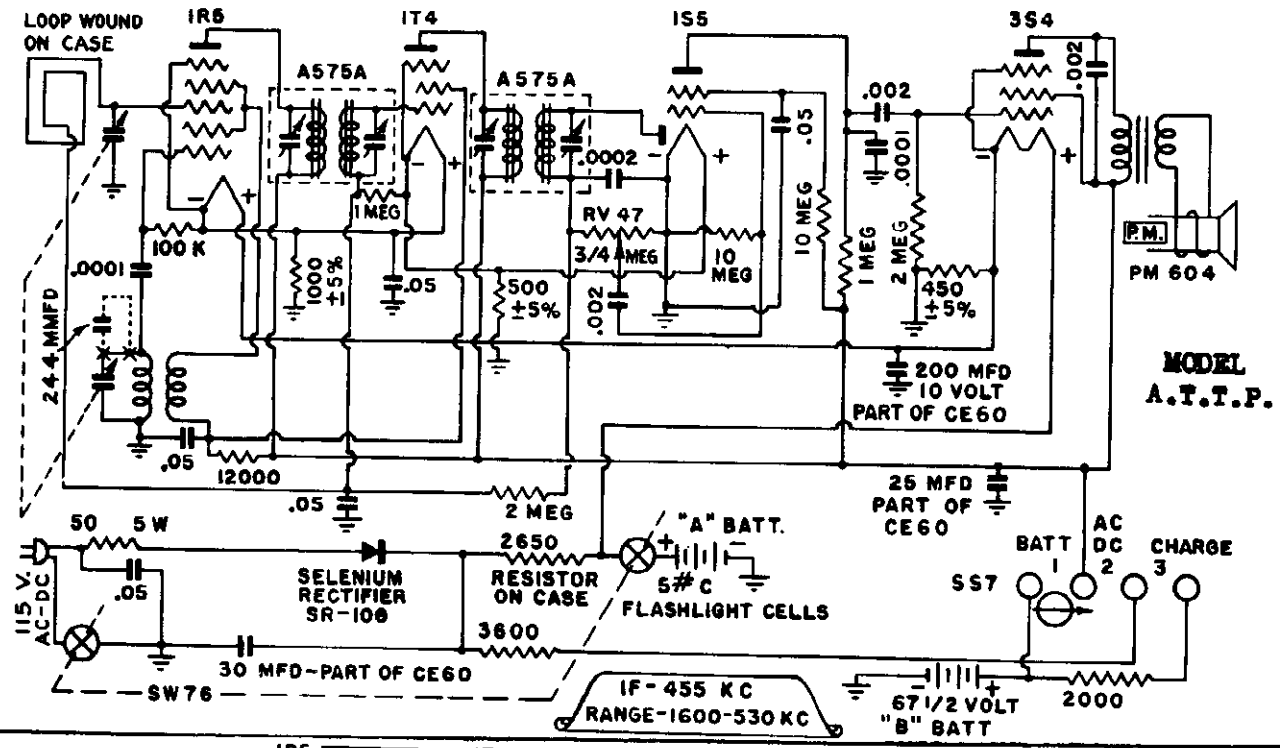
R.F. ALIGNMENT

Set the dial pointer at 1400KC. Feed 1400 KC from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop approximately one foot away from and parallel to the receiver loop antenna and advance the output of the signal generator until a suitable deflection is obtained on the output meter. First adjust the oscillator and then the antenna trimmer for maximum response.

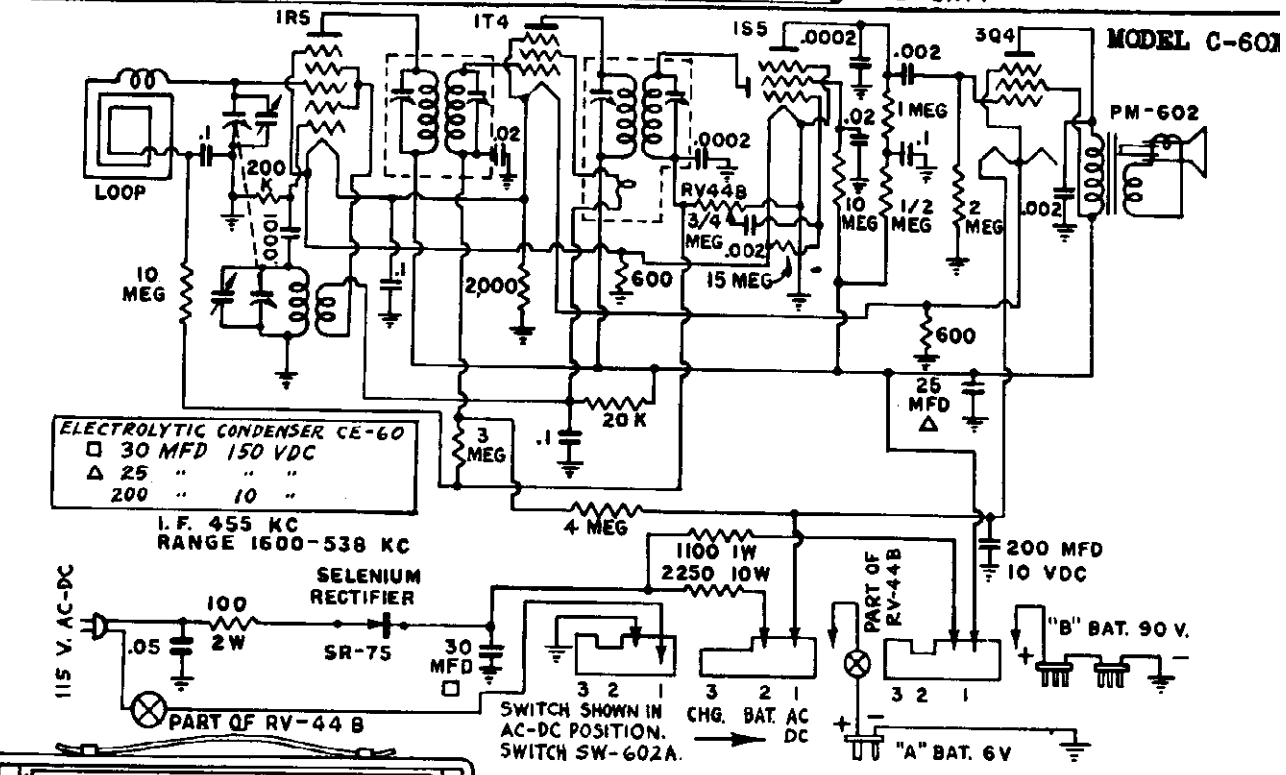
If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 1400KC. Set the dial at 600KC and feed 600KC to the antenna lead. A portion of the outside turn of loop may be swung to either side of the center to give maximum response. Realign at 1400 KC.

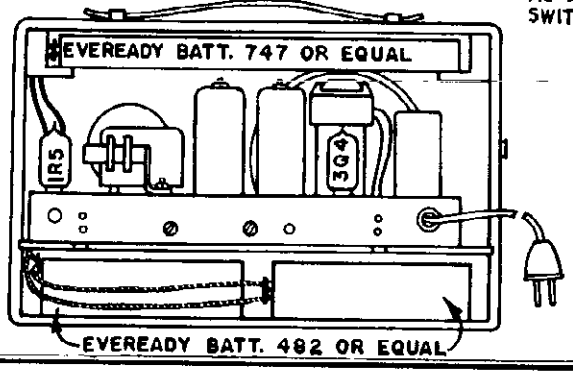
AUTOMATIC RADIO MFG. CO., INC.

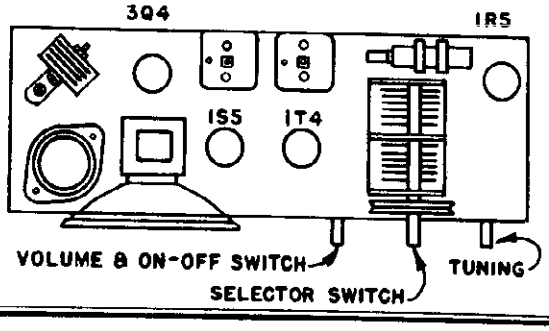
MODEL A.T.T.P. MODEL C-60X



MODEL C-60X



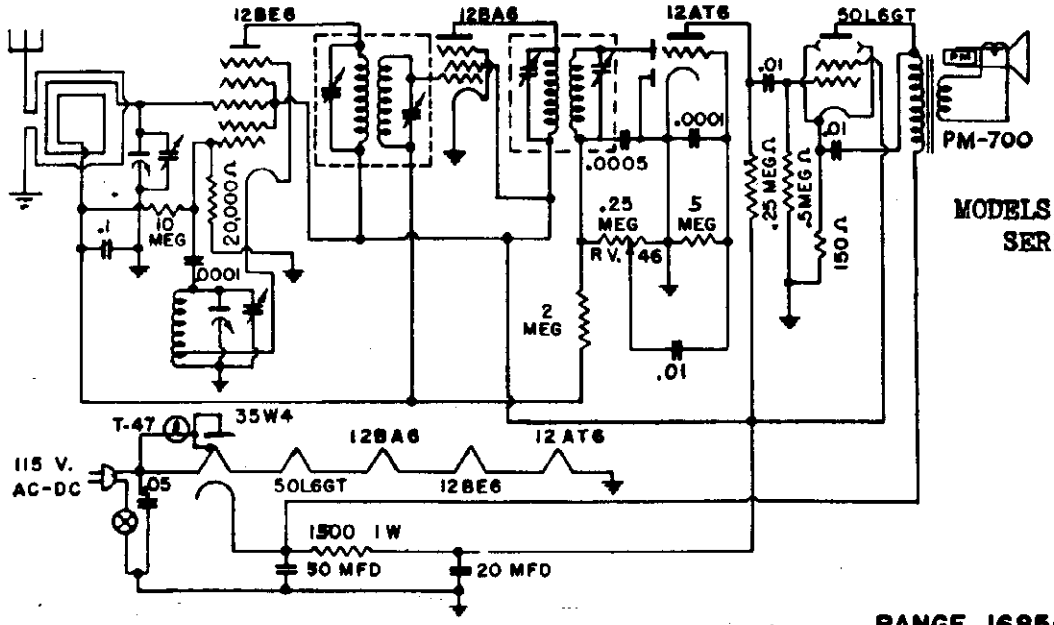




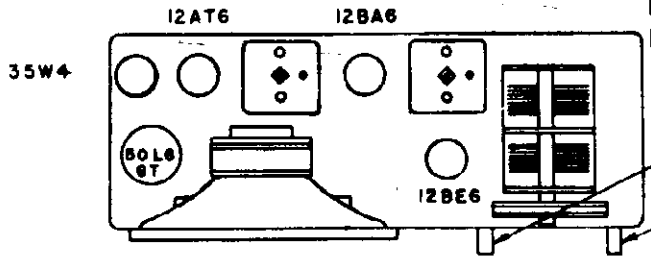
MODELS 601,602, Series B
MODELS 601,602, Series C

AUTOMATIC RADIO MFG. CO., INC.

2-8-47

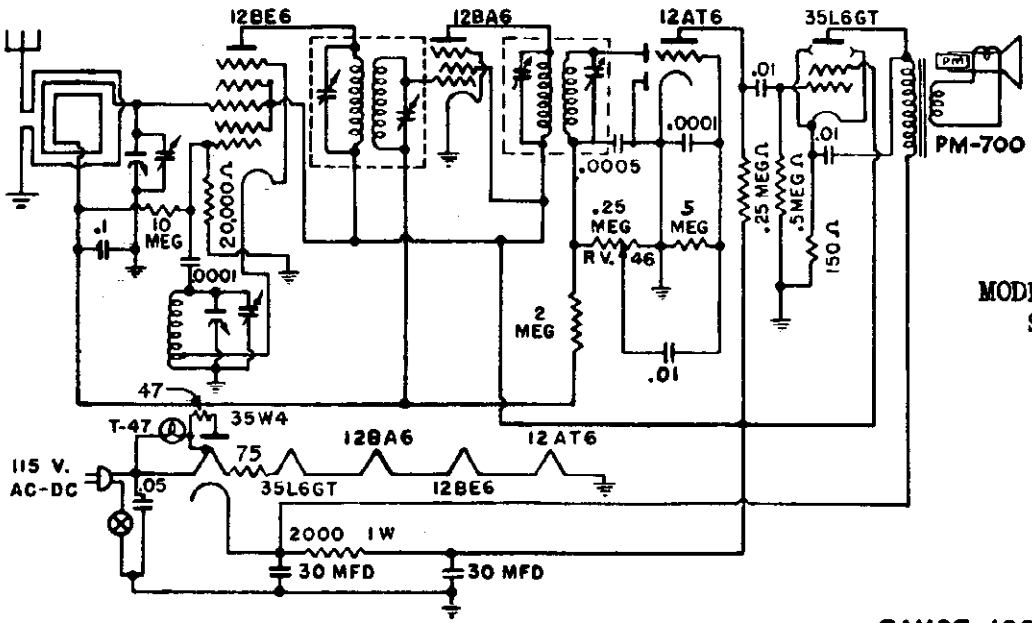


MODELS 601, 602
SERIES B

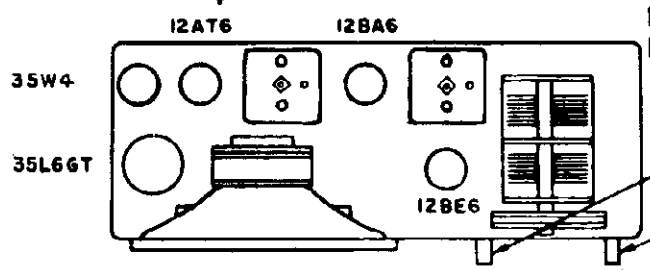


RANGE 1685-538 KC
I.F. FREQ. 455 KC

4-14-47



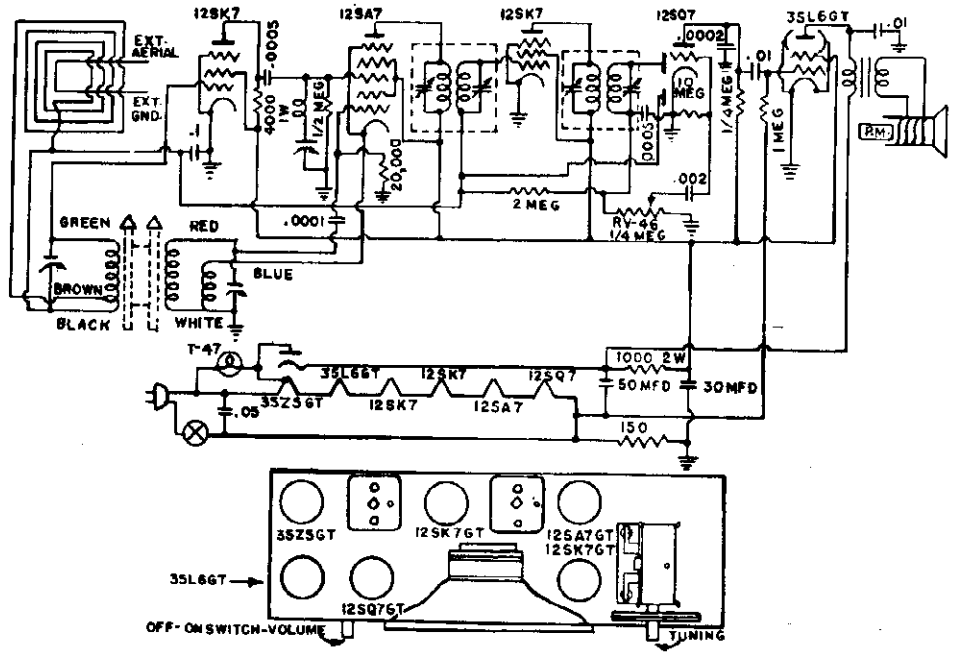
MODELS 601, 602
SERIES C



RANGE 1685-538 KC
I.F. FREQ. 455 KC

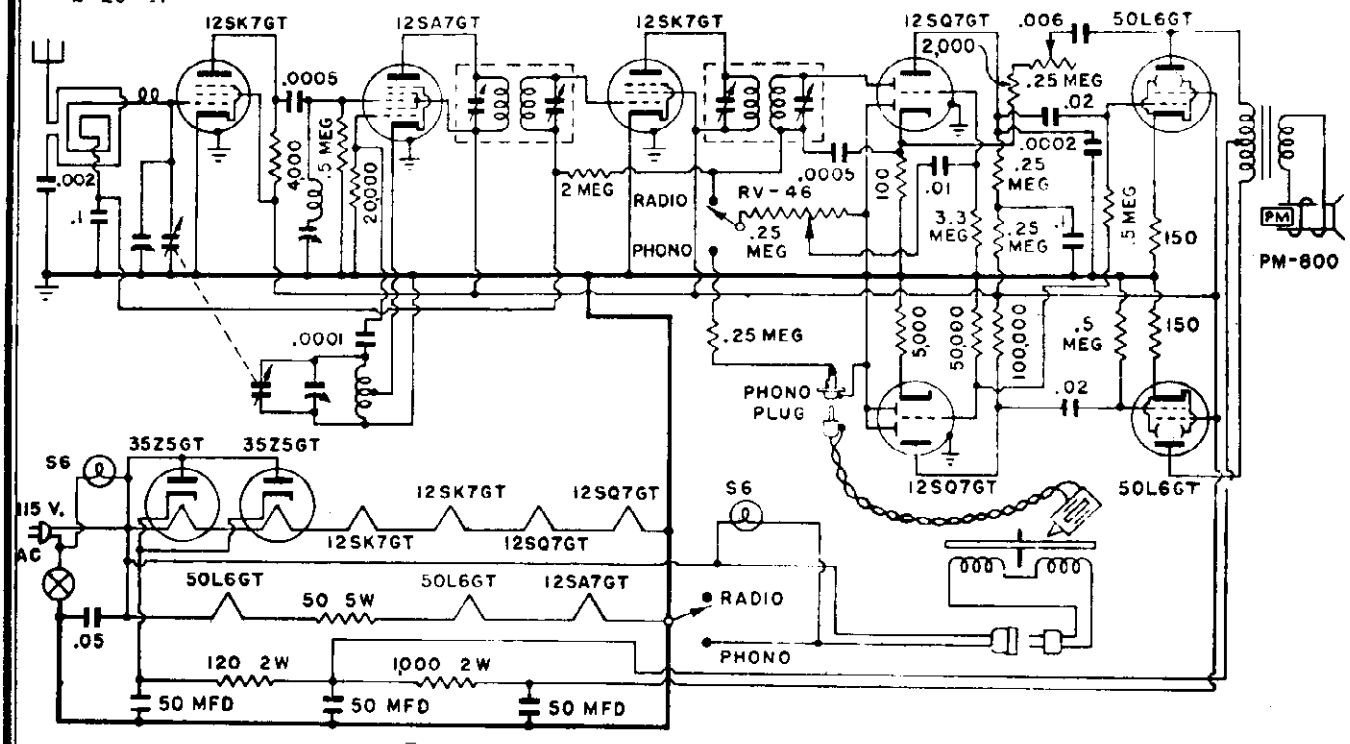
AUTOMATIC RADIO MFG. CO., INC.

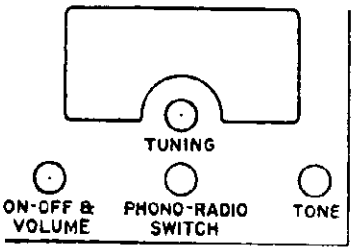
MODEL 620
MODEL F-790

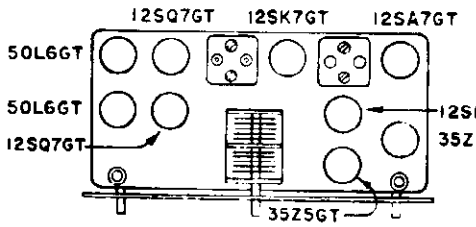


MODEL 620

2-18-47







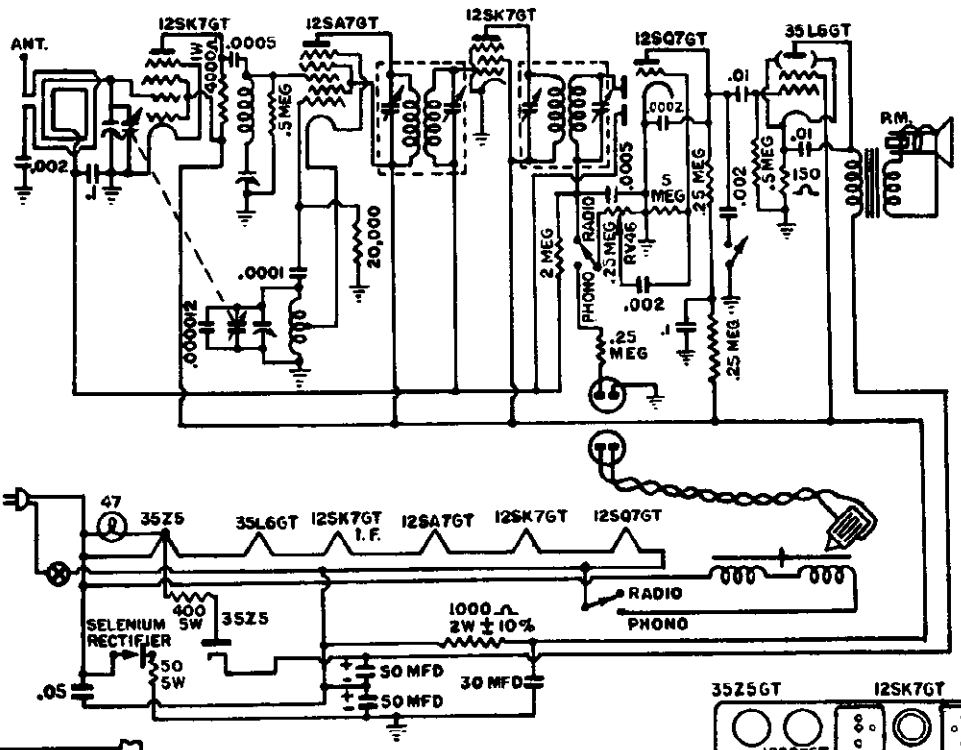
I.F. 455 K.C.
RANGE 1700-540 K.C.

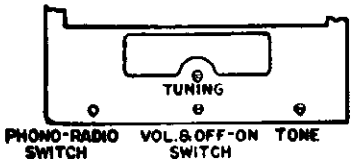
MODEL F-790

MODEL 677, Series B
MODEL 720

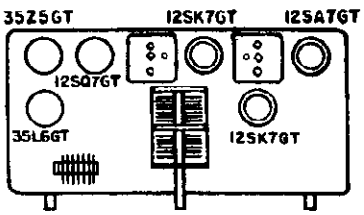
AUTOMATIC RADIO MFG. CO., INC.

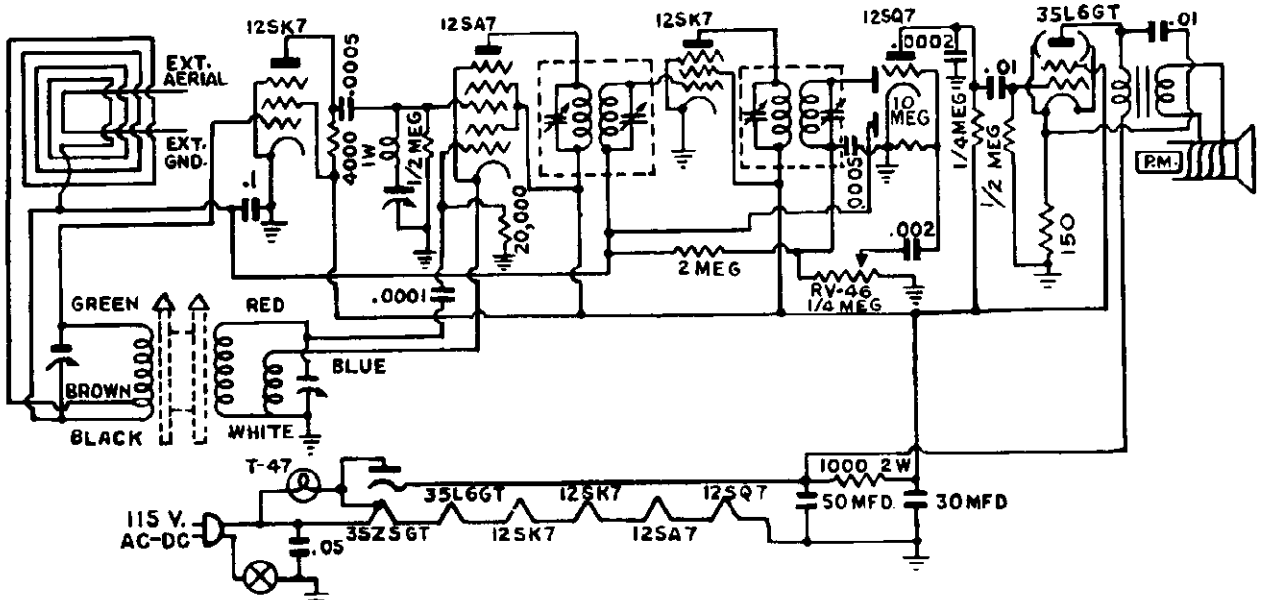
7-26-46



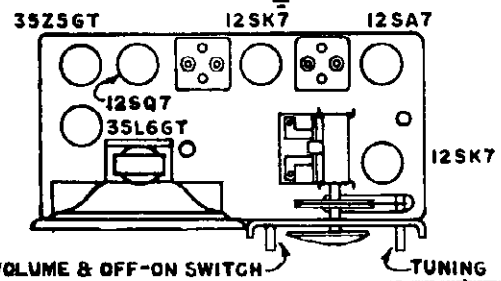


MODEL 677 SERIES B





I. F. 455 KC
RANGE 1620-540 KC

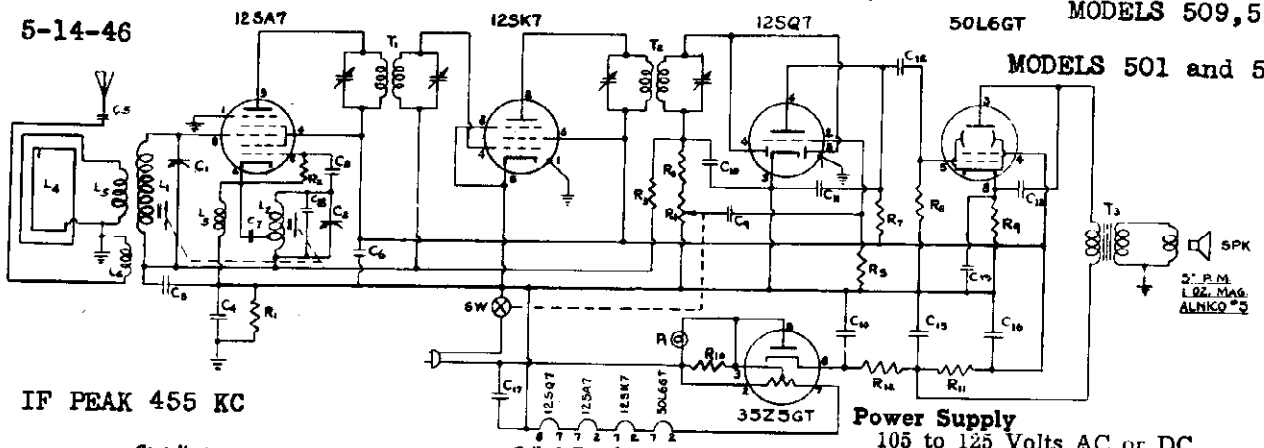


MODEL 720

AVIOLA RADIO CORP.

MODELS 501,512
MODELS 509,518

5-14-46



IF PEAK 455 KC

Power Supply
105 to 125 Volts AC or DC

Power Consumption 30 Watts

Tuning Range 540 KC to 1625 KC

Circuit
5 tybe superheterodyne. Built in Antenna with provision for connecting external antenna. Do not connect ground to receiver.

Capacitors

	Part No.
C1 Ant. Trimmer 160 mmf	R-1072-1
C2 Osc. Trimmer 160 mmf	R-1072-1
C3 .05 mf 200 V	12000-05
C4 .1 mf 200 V	12000-1
C5 100 mmf Mica	12010-100
C6 .05 mf 200 V	12000-05
C7 2000 mmf Mica	12012-2000
C8 50 mmf Mica	12010-50
C9 .01 mf 400 V	12002-01
C10 100 mmf Mica	12010-100
C11 250 mmf Mica	12010-250
C12 .01 mf 400 V	12002-01
C13 .03 mf 400 V	12002-03
C14 20 mf 150 V	12104-20-20-20
C15 20 mf 150 V	12104-20-20-20
C16 20 mf 150 V	12104-20-20-20
C17 .05 mf 400 V	12002-05
C18 250 mmf Mica	12010-250
C19 10 mf 25 V	12105-10

Resistors

	Part No.
R1 220,000 ½W	11005-224
R2 33,000 ½W	11005-333
R3 2.2 Meg. ½W	11005-225
R4 500,000 V. C. & SW	R-1043
R5 6.8 Meg ½W	11005 685
R6 47,000 ½W	11005-473
R7 470,000 ½W	11005-474
R8 470,000 ½W	11005-474
R9 150 ½W	11005-151
R10 150 ½W	11005-151
R11 1200 1W	11008-222
R12 100 ½W	11005-101

Coils & Transformers

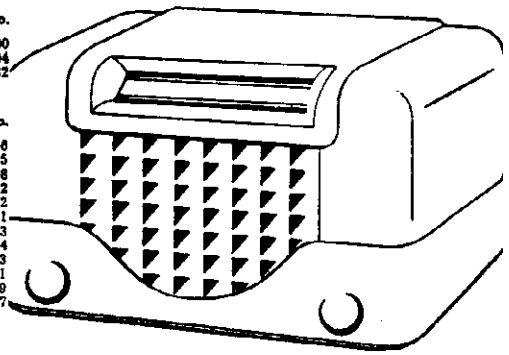
	Part No.
L1 R. F. Coil	R-1162
L2 Osc. Coil	R-1163
L3 Tracking Coil	R-1165
L4 Loop	R-1075
L5 Primary Coil	R-1166
T1 1st IF	R-1025-1
T2 2nd IF	R-1025-2
T3 Output Trans.	R-1040-1
L6 Ant. Coil	R-1093

Cabinet & Accessories

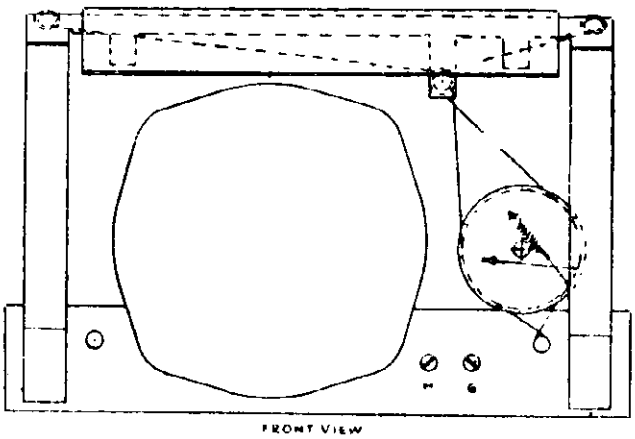
	Part No.
Cabinet Mod. 501—Plastic	R-5000
Cabinet Mod. 512—Wood	R-5004
Knobs	R-1032

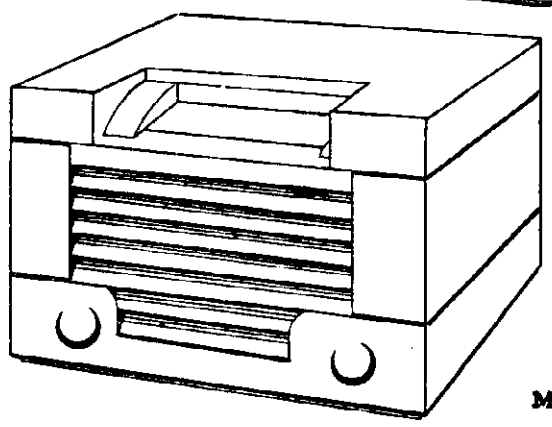
Miscellaneous

	Part No.
Spk Speaker	R-1046
Pl Mazda No. 47	R-6005
Pilot Light Socket	R-1098
Dial—Glass	R-1052
Dial—String	10132
Dial—Pointer	R-1255-1
Dial—Spring	10083
Diffusion Screen	R-1194
Pulley	R-1013
Line Cord	10111-1
Tuning Shaft, Model 501 — R-1160, Model 512 —	R-1159
Dial Glass Clip	R-1197



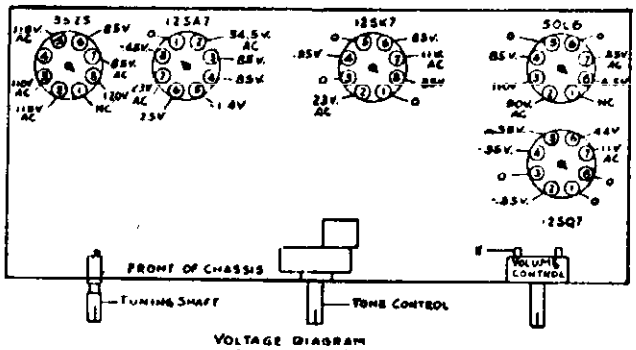
Model 501





Model 512

MODELS 501,512; 509,518



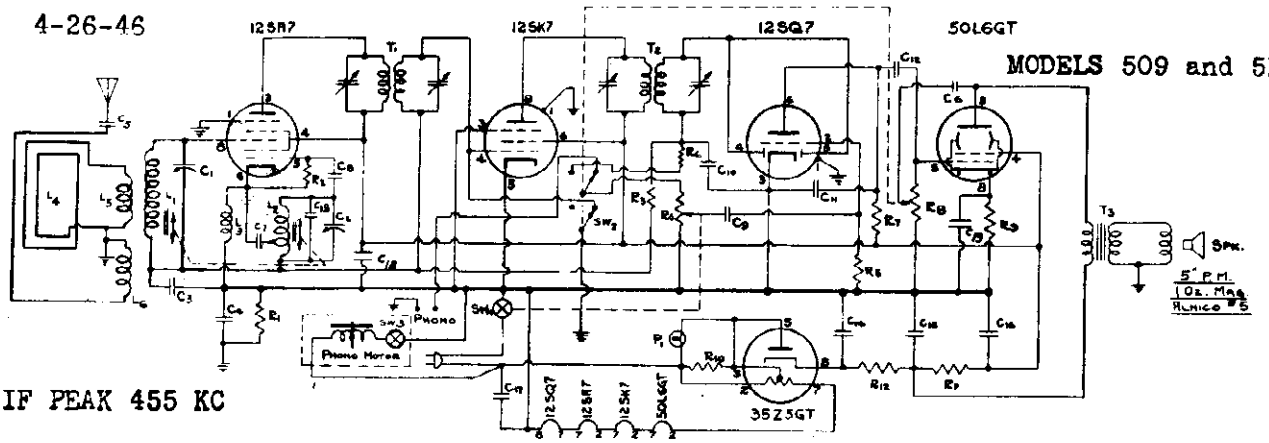
VOLTAGE DIAGRAM
(BOTTOM VIEW)

VOLTAGE DATA

Measured in 115 Volt line.
Volume control in maximum position.
Dial tuned to low frequency end — no signal.
Readings taken between tube socket and B—bus—point x on volume control.
Voltages measured with high resistance voltmeter, 20,000 ohm per volt preferable.

MODELS 501,512 MODELS 509,518 AVIOLA RADIO CORP.

4-26-46



IF PEAK 455 KC

Capacitors

	Part No.
C1 Ant. Trimmer 180 mmf	R-1027-1
C2 Osc. Trimmer 180 mmf	
C3 .05 mf 200 V	12000-05
C4 .1 mf 200 V	12000-1
C5 100 mmf Mica	12010-100
C6 1000 mmf Mica	12012-1000
C7 2000 mmf Mica	12012-2000
C8 50 mmf Mica	12010-50
C9 .01 mf 400 V	12002-01
C10 100 mmf Mica	12010-100
C11 250 mmf Mica	12010-250
C12 .01 mf 400 V	12002-01
C13 250 mmf Mica	12010-250
C14 20 mf 150 V	12104-20-20-20
C15 20 mf 150 V	
C16 20 mf 150 V	
C17 .05 mf 400 V	12002-05
C18 .05 mf 200 V	12000-05
C19 10 mf 25 V	12105-10

Resistors

	Part No.
R1 220,000 ½W	11005-224
R2 33,000 ½W	11005-333
R3 2.2 Meg. ½W	11005-225
R4 500,000 V. C. & SW	R-1043-2
R5 6.8 Meg. ½W	11005-685
R6 47,000 ½W	11005-473
R7 220,000 ½W	11005-224
R8 500,000 T. C.	R-1247
R9 150 ½W	11005-151
R10 150 ½W	11005-151
R11 1200 1W	11008-122
R12 330 1W	11008-331

Cabinet & Accessories

	Part No.
Cabinet	R-5002
Knobs	R-1051
Lid Bracket	R-5056

Coils & Transformers

	Part No.
L1 R. F. Coil	R11162
L2 Osc. Coil	R-1163
L3 Tracking Coil	R-1165
L4 Loop	R-1078
L5 Primary Coil	R-1186
T1 1st IF	R-1025-1
T2 2nd IF	R-1025-2
T3 Output Trans.	R-1040-1
L6 Antenna Coil	R-1093

Phonograph Unit

	Part No.
Phono Motor & Turntable Assem.	RC-206 or RC-207
Pickup Arm Assem.	RC-251
Motor Switch	RC-148

Miscellaneous

	Part No.
Spk Speaker	R-1046
P1 Mazda No. 47	R-6005
Pilot Light Socket	R-1098
Dial—Glass	R-1052
Dial—String	10132
Dial—Pointer	R-1255-1
Dial—Spring	10083
Diffusion Screen	R-1194
Pulley	R-1013
Line Cord	10111-1
Chassis—Mtg. screw	10019-8-14
Tuning Shaft	R-1159
Dial Glass Clip	R-1019
Phono-Radio Switch	R-1248

Specifications: These combinations are available for both 110V-60 Cycle and 50 Cycle AC.

WARNING: DO NOT USE ON DC
Each instrument is shipped operating on 110V-60 Cycle. Additional motor bushings will be supplied to each dealer desiring 50 Cycle operation.

Power Supply
105 to 125 Volts 50 or 60 Cycle AC

Power Consumption
50 Watts AC

Tuning Range
540 KC to 1625 KC

Circuit
5 tube superheterodyne. Built in Antenna with provision for connecting external antenna. Do not connect ground to receiver.

501,512 ALIGNMENT PROCEDURE 509,518

Allow receiver to warm up thoroughly before alignment. Turn volume control to maximum. Connect output meter to voice coil terminals.

455 IF ALIGNMENT

Tune receiver to high end of dial. Connect signal generator to antenna through .0005 mf condenser. Set generator to 455 KC, tune trimmers F-G-D- to maximum output. Always use lowest input from signal generator that provides good output indication.

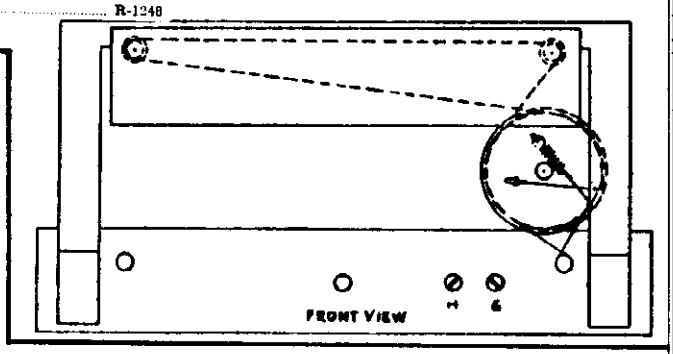
540 KC to 1640 KC ALIGNMENT

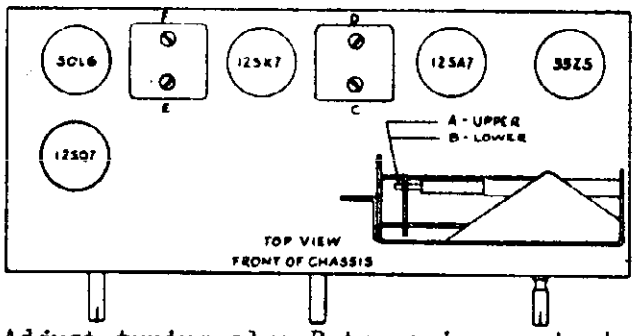
Loosely couple the signal generator to receiver by placing S.G. output lead near the pick-up antenna. (Not connected to it.) Set generator and receiver to 1400 KC.

Adjust trimmer H to signal.

Adjust trimmer G to maximum output.

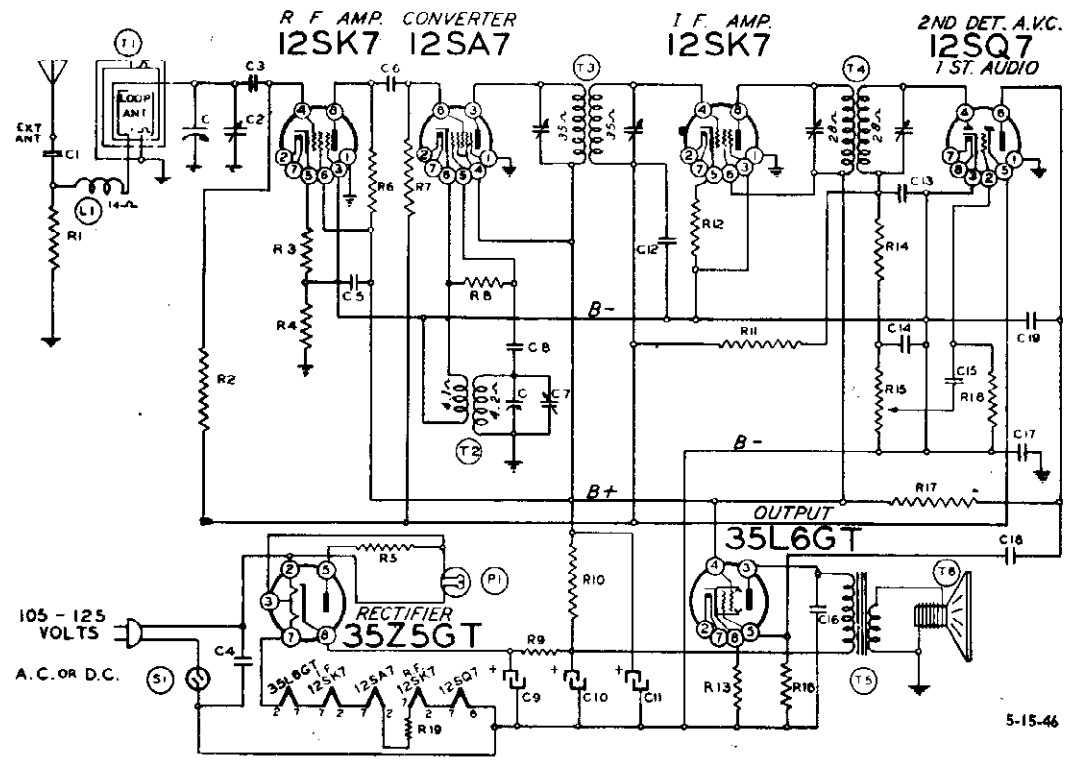
Set generator to 600 KC. Tune receiver to 600 KC. Adjust tuning slug A to signal.





Adjust tuning slug B to maximum output. Decrease signal generator output as receiver alignment provides more output to meter.

BELMONT RADIO CORP. MODEL 6D111, Series



Tuning range	530 to 1650 Kc.
Intermediate frequency	455 Kc.
Power consumption	35 Watts
Sensitivity (for 0.05 watt output)	10 microvolts average
Selectivity	55 Kc. broad at 1000 x signal at 1000 Kc
Power output (in voice coil)	
Undistorted	0.8 wat
Maximum	1.0 wat
Voice coil impedance	3.2 ohm

DIAL PARTS

115448		End plate (right hand bracket)
115448C		End plate (left hand bracket)
115146		Cams
115143		Key washer (13 used on cam shaft)
117528		Brass spacer (one used on cam shaft
117602		Brass spacer (four used on cam shaft)
131181		Spring washers, for locking collar
117604		Locking collar
117600		Lever shaft
115361		Lever with roller
120283		Return spring for levers
115449B		Dial bracket assembly
112785		Pointer
A-53A-10989		Drive cord, 6 inches used
A-49A-11087		Spring on tuning shaft, for cord
A-3N-11086		Spacer under above spring
120143		Take-up spring for drive cord
B-6D-10241		Dial scale
112659		Crystal, clear, for dial scale
A-2M-7758		Cinch buttons for fastening scale to bracket
117833		Brass spacer (for spacing pointer from dial)

MISCELLANEOUS

10798		Line cord and plug
101218	R15	Volume control and switch, 1 megohm
B-8A-10211	C	2-gang variable condenser
107249	P1	Pilot light bulb, type T-47
134123		Rubber bumper (bottom of cabinet)
128495B		Cardboard back
131193		Cinch buttons, for fastening back to cabinet
13141		Cinch buttons, to cover trimmer holes in cabinet
128292B-8		Pushbuttons
112784		Station call letters, set
112606		Acetate tabs for call letters
128473-9		Cabinet, bakelite
128496-8		Knob, volume
A-5B-10994-9		Knob, tuning
A-3F-10995		Locking screw for tuning knob.
120388		Locking spring for tuning knob
A-2H-10715		Tube shield (for metal-base 12SA7GT)
A-2H-11271		Tube shield (for bakelite-base 12SA7GT)

CONDENSERS

C-8D-10778	C1, C15	.002 x 600 volts, +40%, −15%
1292	C3	.0005, mica, ±20%
1001	C4	.1 x 400 volts, +50%, −10%
1006	C5	.25 x 200 volts, ±20%
1295	C6, C8, C19	.0001, mica, ±20%
11994	C9, C10, C11	Electrolytic (for 60-cycle sets), 40 mfd. x 150 volts, 20 mfd. x 150 volts, 20 mfd. x 150 volts.
A-8C-10946	C9, C10, C11	Electrolytic (for 25-cycle sets), 60 mfd. x 150 volts, 40 mfd. x 150 volts, 40 mfd. x 150 volts.
1009	C12	.05 x 200 volts, ±25%
129161	C13 C14	Dual .0001, mica, +25%, −10%
10026	C16	.02 x 400 volts, ±25%
100110	C17	.2 x 400 volts, +5%, −20%
100106	C18	.004 x 600 volts, ±10%

RESISTORS *

C-9B1-70	R1	4700 ohms, ½ watt, ±10%
C-9B1-31	R2	1 megohm, ½ watt, ±20%
C-9B1-50	R3	100 ohms, ½ watt, ±10%
C-9B1-26	R4	150,000 ohms, ½ watt, ±20%
C-9B1-42	R5	22 ohms, ½ watt, ±10%
C-9B1-17	R6	4700 ohms, ½ watt, ±20%
C-9B1-25	R7	100,000 ohms, ½ watt, ±20%
C-9B1-23	R8, R14	47,000 ohms, ½ watt, ±20%
C-9B2-53	R9	180 ohms, 1 watt, ±10%
C-9B2-63	R10	1200 ohms, 1 watt, ±10%
C-9B1-34	R11	3.3 megohms, ½ watt, ±20%
C-9B1-52	R12, R13	150 ohms, ½ watt, ±10%
C-9B1-29	R16	470,000 ohms, ½ watt, ±20%
C-9B1-27	R17	220,000 ohms, ½ watt, ±20%
C-9B1-35	R18	4.7 megohms, ½ watt, ±20%
C-9B2-44	R19	33 ohms, 1 watt, ±10%

COILS

12310	L1	Load coil
B-13E-10242	T1	Loop antenna assembly, complet on back
A-13D-10215	T2	Oscillator coil
108140H	T3	Input I.F. coil in can, 455 Kc.
108145	T4	Output I.F. coil in can, 455 Kc.

SOCKETS

121210		8-prong octal tube sockets, molde
121171		8-prong socket for 12SK7, laminated
121216		Socket base, bakelite
107271		Pilot light socket assembly

SPEAKER

114197	T6	5-inch P.M. speaker
105104	T5	Output transformer for speaker

MODEL 6D111, Series B

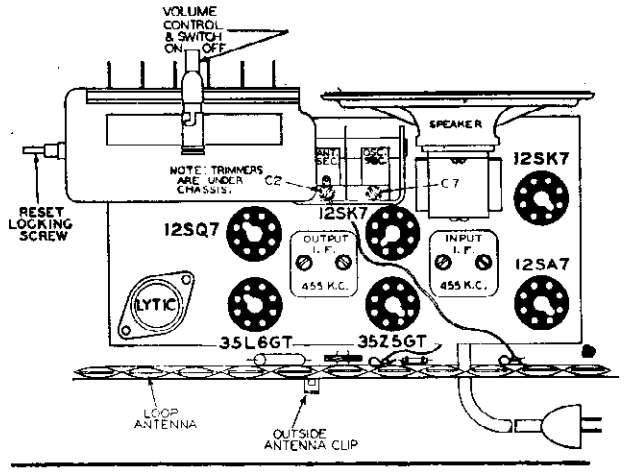
BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B— of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output (see chassis view)
I.F.	455 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	4 trimmers on input and output I.F. transformers
Broadcast	1650 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	Oscillator trimmer C7 on bottom of radio
	1400 Kc.	None	See note A	Set dial at 1400 Kc.	Antenna trimmer C2 on bottom of radio

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.



CHASSIS VIEW, SHOWING TUBE LOCATIONS

SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.

2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.

3. Insert one call-letter tab in the rectangular opening in each of the pushbuttons, in any sequence. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see illustration) is loose. If it is not, turn it several turns to the left (counterclockwise).

5. Press the first pushbutton down all the way. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the five other buttons, adjusting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

8. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw in the center of the tuning knob, set the pushbutton as described above, and re-tighten the locking screw.

REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required in the set. Use a piece slightly longer so that knots may be tied at each end. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position. This closes tuning condenser. Knob should remain in this position until installation is completed.

2. Tie cord to loop in spring as shown. Wind cord one turn around shaft in direction shown.

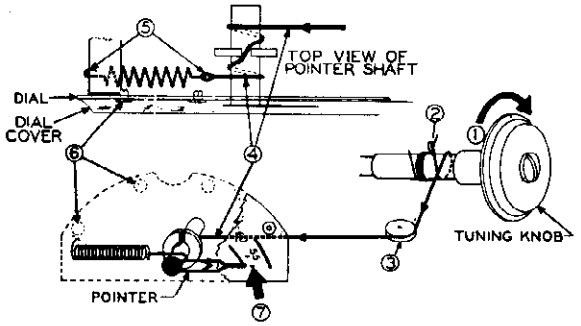
3. Pass cord over idler pulley.

4. Pass cord over pointer shaft; wind it one turn around shaft; pass it through key washer; wind it one more turn around shaft.

5. Hook spring over end of dial support. Tie cord to spring. IMPORTANT: Before tying knot stretch spring enough so that full contraction of spring will rotate pointer shaft at least one-half turn.

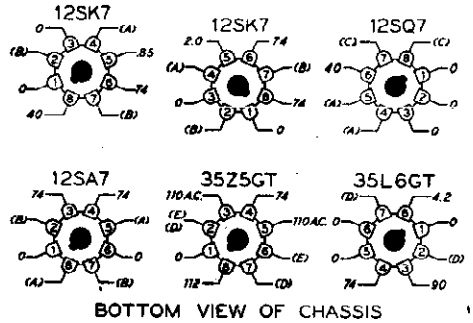
6. Remove dial crystal by removing Cinch buttons.

7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in horizontal position, as shown.



A-CANNOT BE MEASURED WITH VOLTMETER.
B-12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
C-12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.
D-30 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
E-117 VOLTS A.C. MEASURED ACROSS PINS 2 & 6.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B-. LINE VOLTAGE 117 VOLTS AC. VOLUME CONTROL AT MINIMUM.

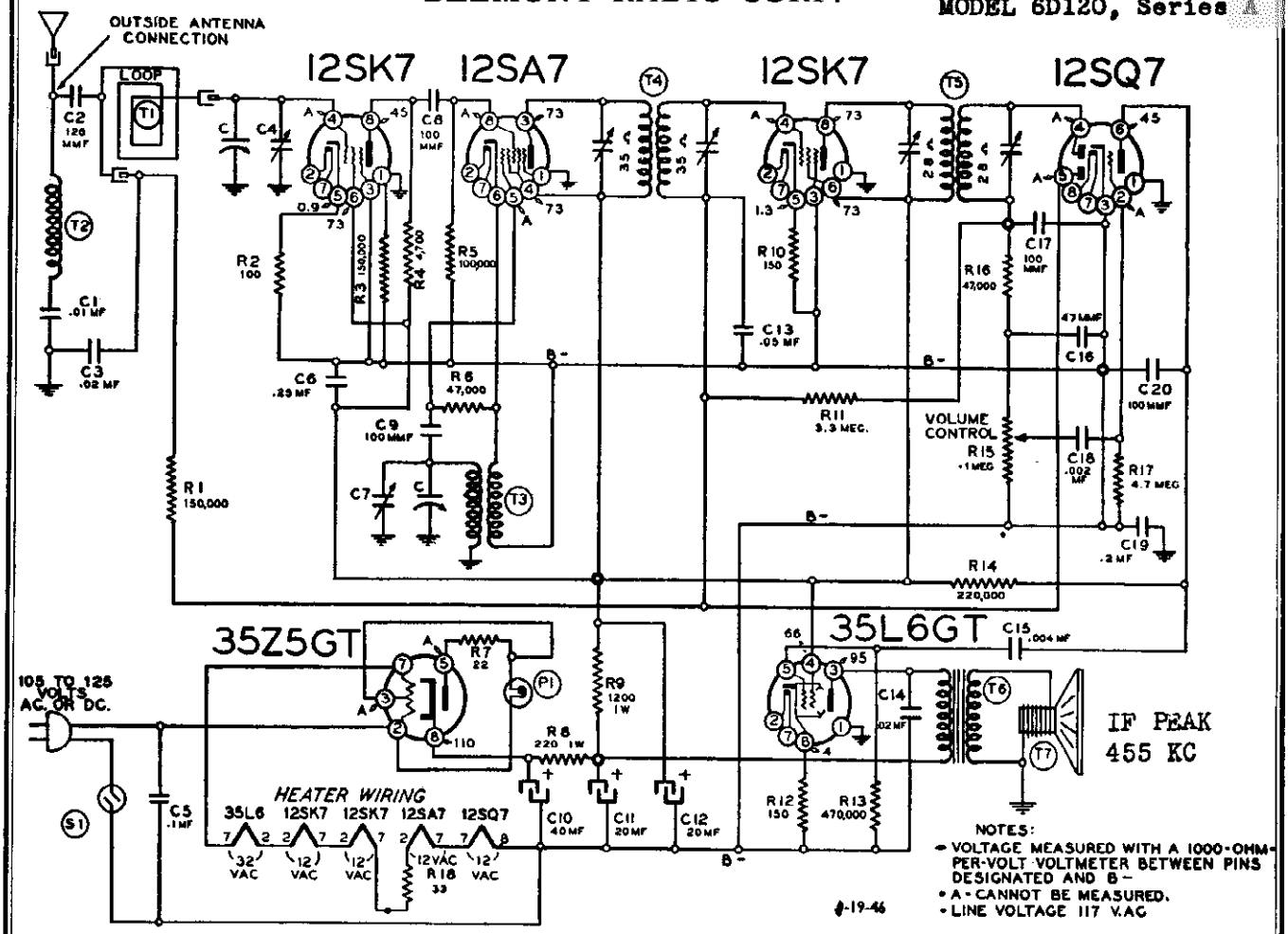


BOTTOM VIEW OF CHASSIS

VOLTAGES AT TUBE SOCKET TERMINALS

BELMONT RADIO CORP.

MODEL 6D120, Series A



NOTES:
- VOLTAGE MEASURED WITH A 1000-OHM-PER-VOLT VOLTMETER BETWEEN PINS DESIGNATED AND B—
- A - CANNOT BE MEASURED.
- LINE VOLTAGE 117 V.AC

4-19-46

CAPACITORS*

C,C4,C7	B-8A-10211	Two-gang, including antenna and oscillator trimmers
C1	C-8D-10761	.01 mf, 400 volts, 20%
C2	C-8F3-114	120 mmf, 500 volts, 10%, mica
C3,C14	C-8D-10774	.02 mf, 400 volts, 20%
C5	C-8D-10760	.1 mf, 400 volts, +20%—10%
C6	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8,C9 C17,CZ0	C-8F3-8	100 mmf, 500 volts, 20%, mica
C10,C11, C12	11994 or	Electrolytic for 60 cycles; 40 mf, 20 mf, 20 mf x 150 volts
	11995	Electrolytic for 25 cycles; 60 mf, 40 mf, 40 mf x 150 volts
C13	C-8D-10770	.05 mf, 200 volts, 20%
C15	C-8D-10788	.004 mf, 600 volts, 20%
C16	C-8F3-6	47 mmf, 500 volts, 20%, mica
C18	C-8D-10778	.002 mf, 600 volts, +40%—15%
C19	C-8D-10942	.2 mf, 400 volts, +30%—10%

RESISTORS*

R1,R3	C-9B1-26	150,000 ohms, ½ watt, 20%
R2	C-9B1-50	100 ohms, ½ watt, 10%
R4	C-9B1-70	4700 ohms, ½ watt, 10%
R5	C-9B1-25	100,000 ohms, ½ watt, 20%
R6	C-9B1-82	47,000 ohms, ½ watt, 10%
R7	C-9B1-42	22 ohms, ½ watt, 10%
R8	C-9B2-54	220 ohms, 1 watt, 10%
R9	C-9B2-63	1200 ohms, 1 watt, 10%
R10,R12	C-9B1-52	150 ohms, ½ watt, 10%
R11	C-9B1-34	3.3 megohms, ½ watt, 20%
R13	C-9B1-29	470,000 ohms, ½ watt, 20%
R14	C-9B1-27	220,000 ohms, ½ watt, 20%
R15,S1	101193	Volume control (1 megohm) and on-off switch
R16	C-9B1-23	47,000 ohms, ½ watt, 20%
R17	C-9B1-35	4.7 megohms, ½ watt, 20%
R18	C-9B2-44	33 ohms, 1 watt, 10%

COILS AND TRANSFORMERS

T1,T2	B-212-11062 or B-212-11404	Loop antenna assembly, including capacitors C1 and C2, coil T2, and cardboard back
T3	A-13D-10215	Oscillator coil
T4	108140G	Input I.F. coil complete in can. Range of trimmers: 56-104 mmf
T5	108145C	Output I.F. coil complete in can. Range of trimmers: 56-104 mmf
T6	10595B	Output transformer

TUNER MECHANICAL PARTS

115146	Cams (6 used on cam shaft)
115143	Key washers (12 used)
117528	Spacer (1 used on shaft)
117602	Spacer (4 used on shaft)
117604	Locking collar
131181	Spring washer for collar
A-3N-11086	Spacer on shaft for drive cord
A-49A-11087	Spring on shaft for drive cord
115361	Cam lever with roller
120283	Return spring for lever
112785	Pointer
A-53A-10989	Drive cord (6 inches)
120143	Tension spring for drive cord
B-6D-10241	Dial scale
or	
B-6D-10241-1	Dial scale
112659	Crystal for dial scale
B-2M-10383	Snap in rivets (4) for crystal

MISCELLANEOUS

T7	114191B	Speaker, 5-inch, P.M.
	121171	Socket for tube (6 used)
	10798D	Line cord and plug
P1	107249	Dial lamp, 6-8 volts, T-47
	107271	Socket assembly for dial lamp
	A-2H-11271	Tube shield for bakelite-base 12SA7GT
	A-2H-10715	Tube shield for metal-base 12SA7GT
	128334B-9	Cabinet, ivory
	A-5B-11249-8	Knob, volume, ivory
	B-5B-10994-9	Knob, tuning, ivory
	120388	Locking spring for tuning knob
	A-3F-10995	Locking screw in tuning knob
	128292B-8	Pushbutton, ivory
	134125	Rubber bumper for bottom of cabinet
	131193	Snap-in rivets (4) for mounting back
	112784	Station call letters, 1 set
	112606	Acetate tabs for call letters

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts, 20%

MODEL 6D120, Series A

BELMONT RADIO CORP.

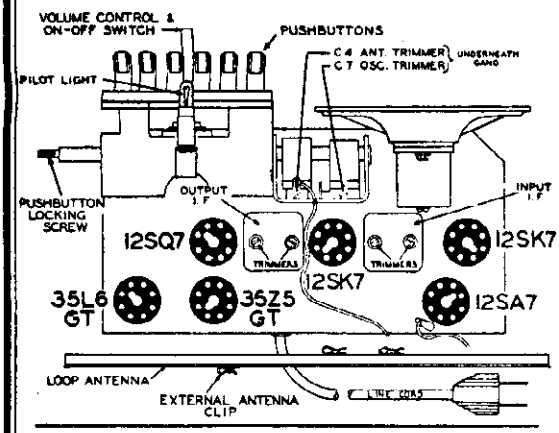
ALIGNMENT PROCEDURE

(Refer to Chassis View for location of trimmers)

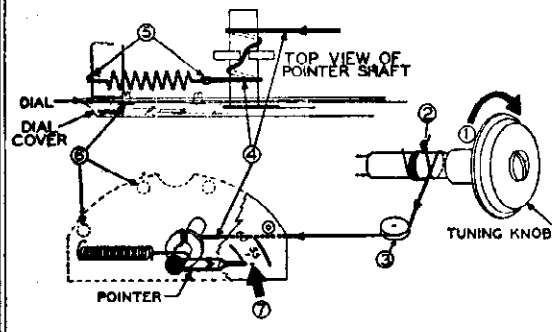
- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to B— of radio.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The screws can be reached with a long screwdriver.

SIGNAL GENERATOR			*TUNER SETTING*	*ADJUST FOR MAXIMUM OUTPUT (in order shown)*
Frequency	*Dummy Antenna*	*Connection to Radio*		
455 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Trimmers on output and input I.F. cans
1650 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Oscillator trimmer C7 on bottom of gang
1400 kc	200 mmf	See note below	Set dial at 1400 kc	Antenna trimmer C4 on bottom of gang

Note: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop will pick up energy.



Chassis View



SETTING THE PUSHBUTTONS—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations on the standard broadcast band. They can be set up in any order.

1. Turn on the radio.

2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.

3. Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).

5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the five other buttons, setting each one for a different station

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

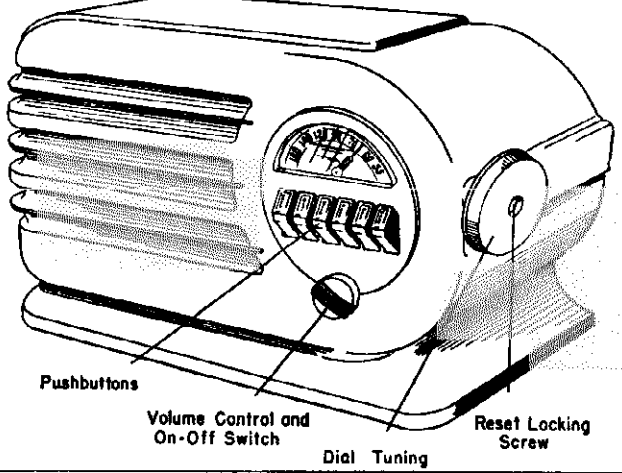
8. The pushbuttons are now properly set for automatic tuning. Any of the six stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

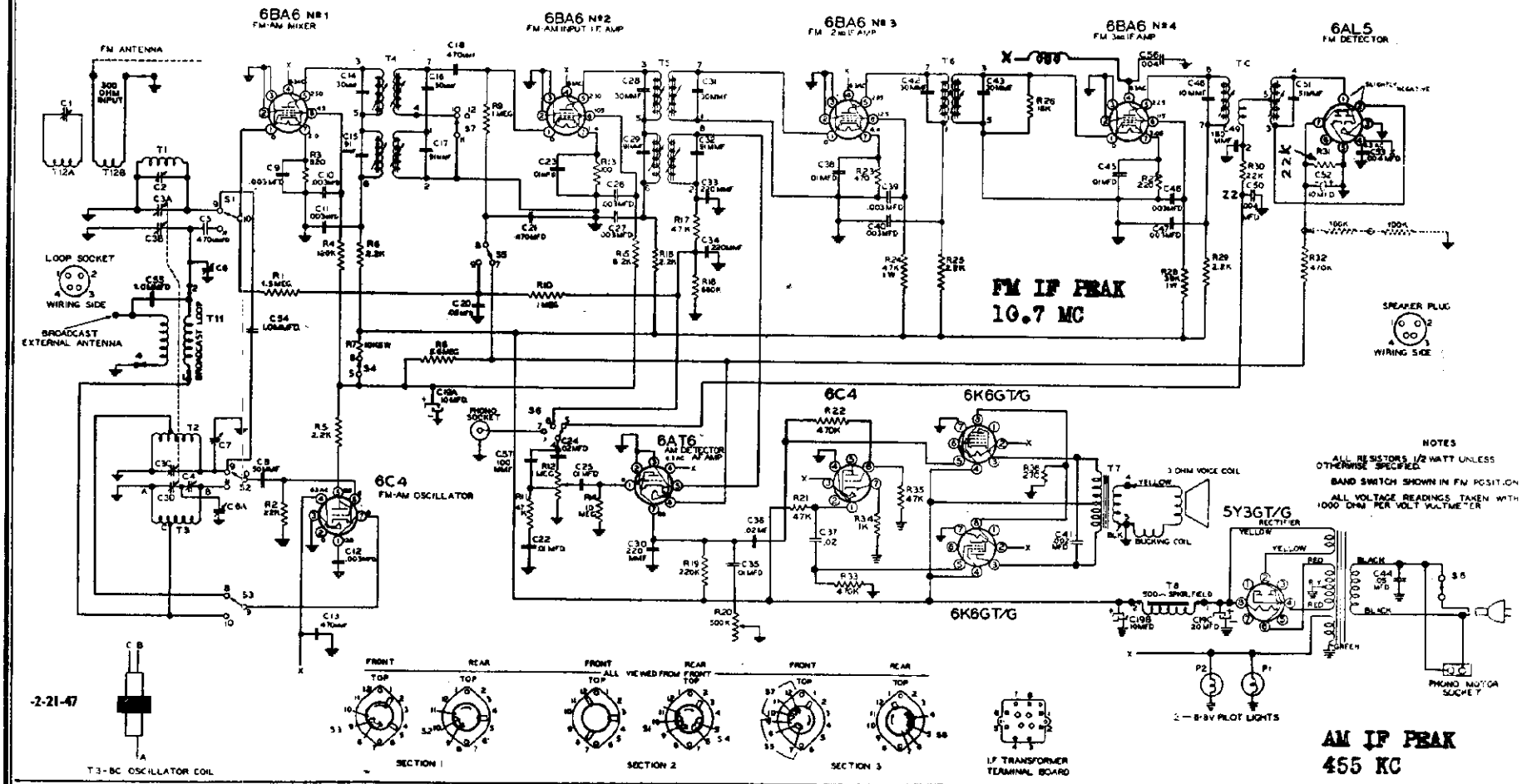
DIAL LIGHT—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the four buttons which hold the back to the cabinet. On the inside of the back unclip the green, black, and white wires clipped to the back. The Chassis View illustration shows the location of the dial lamp. *Pull* the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47. When replacing the back on the cabinet, connect the green wire to the green-painted clip, the black wire to the black-painted clip, and the white wire to the unpainted clip.

REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position.
2. Tie cord to loop in spring as shown.
3. Pass cord over idler pulley.
4. Pass cord OVER pointer shaft; wind it one turn around shaft; pass it through key washer, then once more around shaft.
5. Hook spring over end of dial support. Tie cord to spring. IMPORTANT: Full contraction of spring must rotate pointer shaft at least one half turn.
6. Remove dial crystal by removing snap-in rivets.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in a horizontal position, as shown.





Power Supply.....105 to 125 volts, AC, 60 cycles; Chassis only 90 watts. With phono operation 115 watts.

Frequency Ranges....Broadcast Band—540 to 1600 kc. F.M. Band—88 to 108 mc.

Intermediate Freq....AM-455 kc.; FM-10.7 mc.

Selectivity.....AM-50kc. broad at 1000 times signal measured at 1000 kc.
I.F. FM-180 kc. broad at 2 times down.
I.F. FM-290 kc. broad at 10 times down.

Power Output.....5.5 watts 10% distortion. 7 watts maximum.

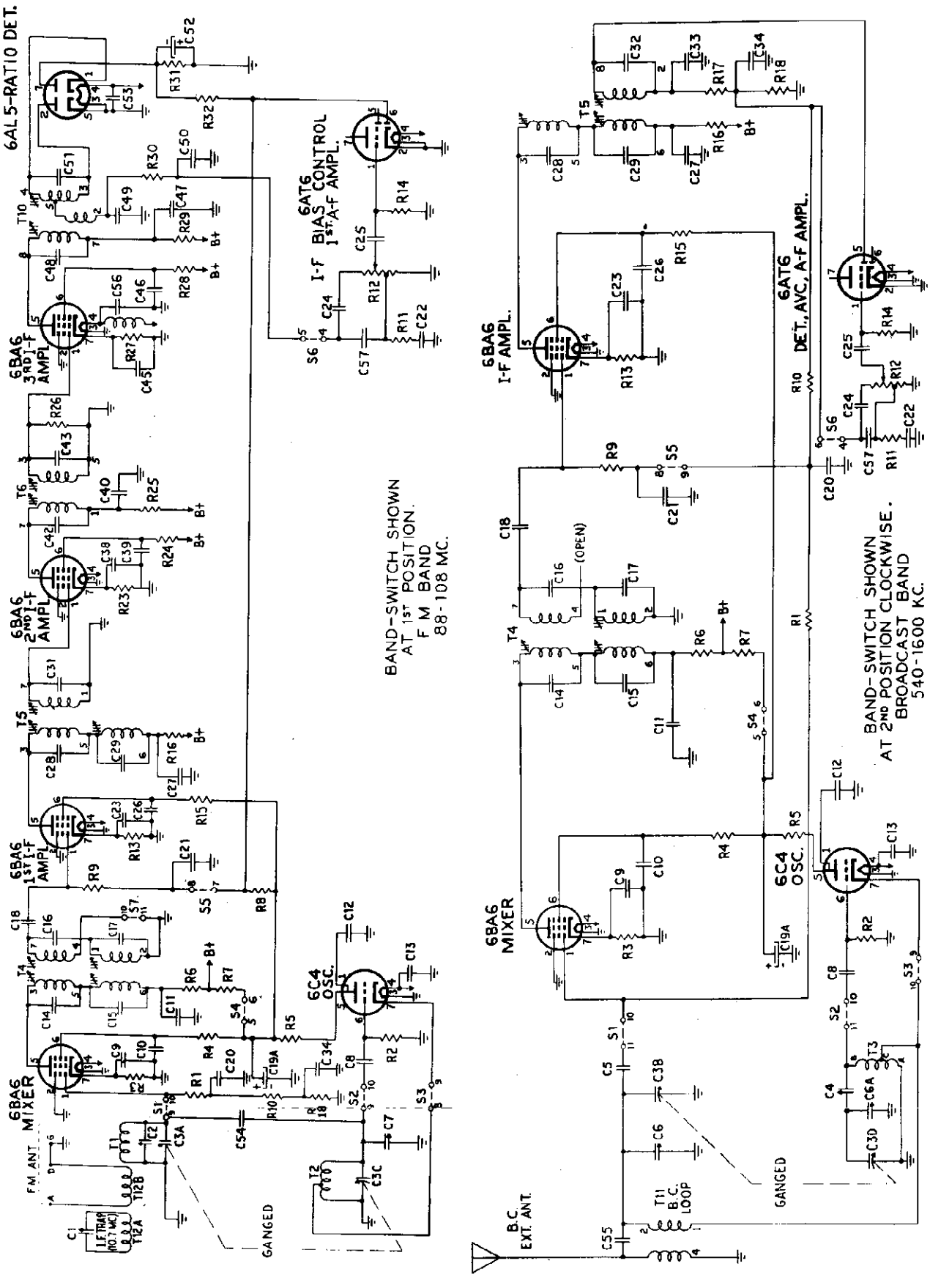
Loud Speaker.....10" electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles.

AM Sensitivity..... (For .5 watt output with external antenna)—20 microvolts average.

FM Sensitivity.....(For .5 watt output)—15 microvolts average.

"clarified schematics"

MODEL 11AF21, Series A BELMONT RADIO CORP.

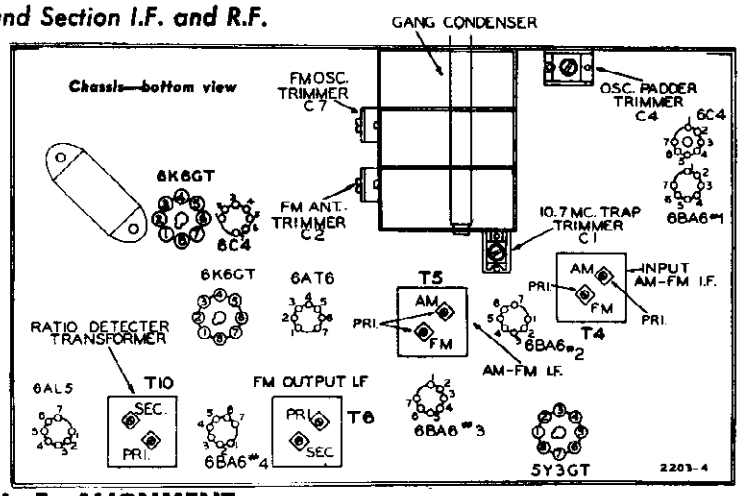


ALIGNMENT PROCEDURE

Broadcast Band Section I.F. and R.F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of ½ watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a ½-watt output with the speaker connected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.



AM - I. F. ALIGNMENT

Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.

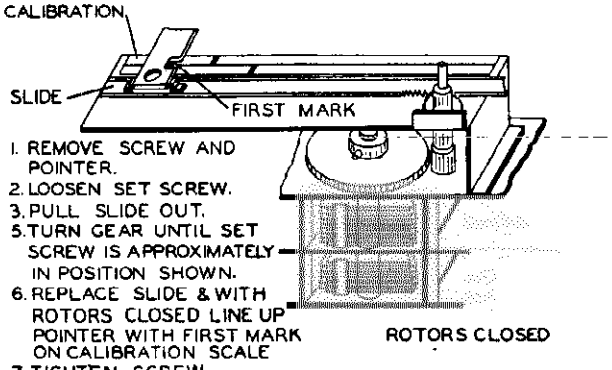
Signal Generator Frequency	*Connection to Radio*	*Adjustment to Be Made*	*Adjust for*
455 Kc. Use 2100 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T5 AM windings. See top and bottom views	Maximum output. Should be ½ watt
455 Kc. Use 64 microvolts	Pin No. 1 of 6BA6 No. 1 and ground	Primary and Secondary of T4 AM windings. See top and bottom views	Maximum output. Should be ½ watt
400 cycles. Use 63 millivolts	Pin No. 1 of 6AT6 and ground	None	Maximum output. Should be ½ watt

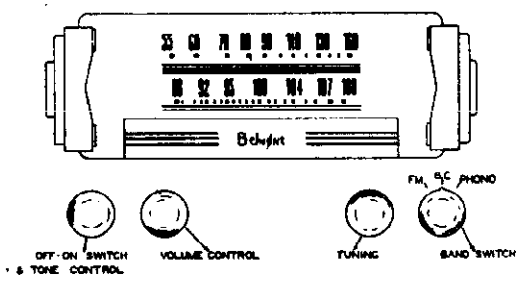
BROADCAST BAND — R. F. ALIGNMENT

Check Pointer so that the inside of the notch is exactly over the first mark to the extreme left when Gang is fully closed. For adjustment loosen set screw on large gear. (see dial mechanism illustration).

Signal Generator Frequency	*Connection to Radio*	*Dummy Antenna*	*Adjust*
1400 Kc. Use 15 microvolts	Antenna and Ground	200 mmf.	C6A for maximum. ½ watt
600 Kc. Use 25 microvolts	Antenna and Ground	200 mmf.	C4 for maximum. ½ watt
1400 Kc.	Antenna and Ground	200 mmf.	C6 See Note

NOTE: Recheck first two adjustments after this adjustment because of inter-locking effects.





Procedure for disassembly and assembly of dial mechanism

MODEL 11AF21, Series A

BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

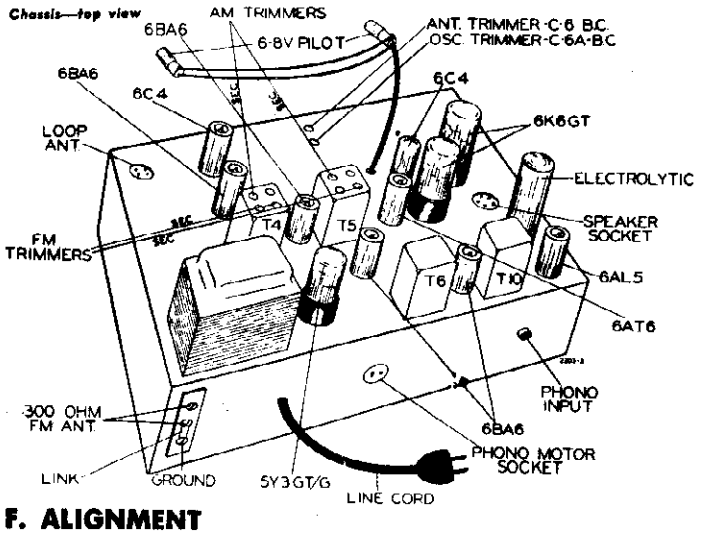
FM Band Section. I.F. and R.F.

IMPORTANT

No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.
All components used in this radio are extremely stable and the tuned circuits should require no adjustment over long periods of time.

NOTE

The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground." In other words, the meter, when used as a vacuum tube voltmeter, can have both the positive and negative sides connected to points above ground and still give true readings.
A standard AM signal generator is required.



FM - I. F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mfd.

Signal Generator Frequency	*Connection to Radio*	*Vacuum Tube Volt Meter Connection to Radio*	*Adjustment to Be Made*	*Adjust for*
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 4 and ground	Pin No. 7 of 6AL5 and ground	Primary of T10	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 4 and ground	See note "A"	Secondary of T10	Zero. Use zero center scale. See note "B"
10.7 Mc. Use about 4000 microvolts	Pin No. 1 of 6BA6 No. 3 and ground	Pin No. 7 of 6AL5 and ground	Primary and Secondary of T6	Resonance should be about 3 volts
10.7 Mc. Use about 150 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Pin No. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T5. See top and bottom views.	Resonance should be about 3 volts
10.7 Mc. Use 3000 microvolts	FM Antenna input and ground	Pin No. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T4. See top and bottom views.	Resonance should be about 3 volts See Note "C"
10.7 Mc.	FM Antenna input and ground	Pin No. 7 of 6AL5 and ground	C1	Minimum response. This is a trap circuit

NOTES ON FM—I.F. ALIGNMENT

NOTE "A"—Connect two resistors, 100K OHMS each, from Pin No. 7 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid point of the resistors and point zz.
NOTE "B"—If T10 has been tampered with, it is possible that no cross-over point will be found at first. Careful adjustment of both primary and secondary is necessary.
GENERAL—Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.
NOTE "C"—The input microvolts specified is based on the trap circuits being adjusted.

FM - R. F. ALIGNMENT

Check Pointer so that the inside of the notch is exactly over the first mark to the extreme left when Gang is fully closed. For adjustment loosen set screw on large gear. (see dial mechanism illustration).

Signal Generator Frequency	*Connection to Radio*	*Dummy Antenna*	*Adjust*	*Vacuum Tube Volt Meter Connection to Radio*	*Adjust to*
100 Mc. Use about 15 microvolts	FM Antenna lead	300 ohms	C7 Osc. C2 Ant.	Pin No. 7 of 6AL5 and Ground	Resonance about 3 volts

NOTE—If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the F.M. Band and to use the vacuum tube volt meter as above for resonance indication. A weak carrier, however, will not produce 3 volts.

REPLACEMENT PARTS LIST

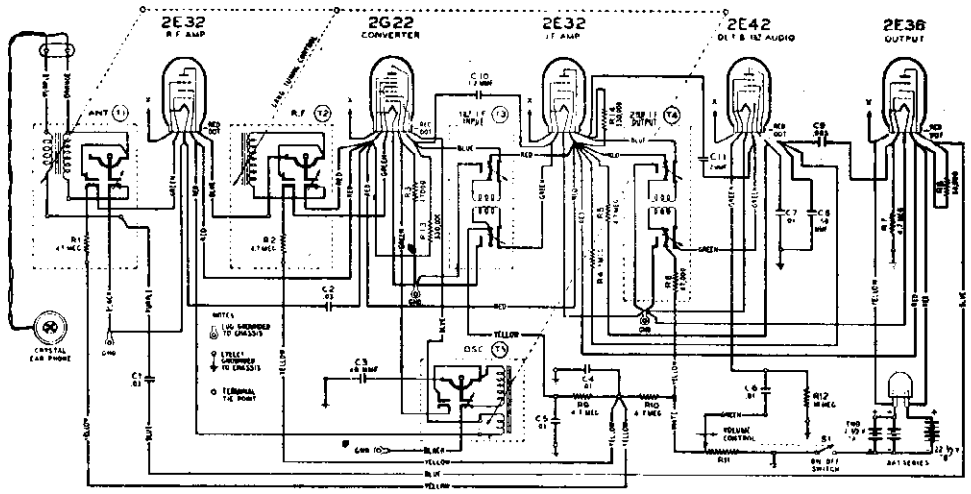
When ordering specify part number, model number, and series

Ref. No.	Part No.	Description	Qty. Used in Set
		R.F. TUNER PARTS	
		CONDENSERS	
C3A-B-C-D	B-8A-11275	Two gang split stator variable	1
C2	A-8E-12079	Trimmer cond. F.M. antenna	1
C1	A-8E-11506	Trimmer cond. I.F. trap	1
C7	A-8E-11279	Trimmer cond. F.M. osc. trimmer	1
C6, C6A	A-8E-12557	Trimmer cond. B.C. antenna and oscillator	1
C4	A-8E-12177	Padder cond.—B.C. Band	1
C8	C-8G-11484	50 mmf, ±10%, ceramic	1
C55	C-18G-12408	1.0 mmf, ±.2 mmf, ceramic	1
C-9-10-11-12	C-8G-11486	3000 mmf, ±20%, ceramic	4
C5-13	C-8F3-12	470 mmf, 500 volts, ±20% mica	2
		RESISTORS	
R3	C-9B1-61	820 ohms, ½ watt, 10%	1
R12	A-10B-11263	Volume control (1 megohm)	1
R20, S8	A-11A-11262	Tone control (500M ohms) and switch	1
R5, R6	C-9B1-15	2200 ohms, ½ watt, 20%	2
R1	C-9B1-32	1.5 megohm, ½ watt, 20%	1
R2	C-9B1-78	22K megohms, ½ watt, 10%	1
		MISCELLANEOUS	
	A-15C-11491	7-prong miniature tube socket	1
	A-15A-11276	Miniature tube socket, ceramic with base	1
	A-2H-12337	Socket shield base	1
	A-2H-11494	Tube shield	2
	200-12862	Spur gear assembly—consists of two gears, two springs and bushing	1
	A-49A-11673	Spring for above assembly	2
S1-2-3-4-5-6-7	B-20A-11261	Band switch and phono-radio switch	1
	B-2C-11188-1	Dial plate assembly with tape guide, bushing, shaft and pinion gears	1
	A-3J-11182	Pinion gear—inner side of plate	1
	A-3J-11183	Pinion gear—outer side of plate	1
	A-3A-11181	Shaft—for pinion gears	1
	B-2J-11190	Rack tape—with teeth and bracket	1
	B-2G-10588-2	Pointer	1
	A-2D-11513	Pointer bracket	1
	A-2J-11041	Pointer tension spring	1
	32F4-10830	B.H.M.S. 4-40 x 1/8 screw, to fasten pointer and bracket to tape bracket	1
		COILS	
T2	A-13D-11282	88-108 mc oscillator coil	1
T1	A-13E-11283	88-108 mc antenna coil secondary	1
T12A, T12B	A-13E-11284	88-108 mc antenna coil primary with trap	1
		MAIN CHASSIS PARTS	
C52	A-8C-11495	Electrolytic condenser 10 mfd x 150 volts	1
C19A, B, C	A-8C-10272	Electrolytic condenser 10 mfd x 10 mfd x 20 mfd	1
C24, C36, C37	C-8D-10774	.02 mfd x 400 v., 20%, tubular	3
C20	C-8D-10770	.05 mfd x 200 v., 20%, tubular	1
C22	C-8D-11738	.01 mfd x 200 v., 20%, tubular	1
C25, 35	C-8D-10761	.01 mfd x 400 v., 20%, tubular	2
C50, 53, 56	C-8D-10788	.004 mfd x 600 v., 20%, tubular	3
C49	C-8F3-116	180 mmfd x 500 v., 10%, mica	1
C23, 38, 45	C-8F9-20	10K mmfd x 300 v., 20%, mica	3
C21, 18	C-8F3-12	470 mmfd x 500 v., 20%, mica	2
C30, 33, 34	C-8F3-10	220 mmfd x 500 v., 20%, mica	3
C44	C-8J-11388	.05 mfd x 600 v., 20%, molded case paper	1
C26-27-39-40-46-47	C-8G-12449	3000 mmfd, 20%, ceramic-insulated	6
C14, 16, 28, 31, 42, 43	C-8G-12159	30 mmfd, 500 volts, 5%, ceramic	6
C48	C-8G-11789	10 mmfd, 10%, ceramic	1
C51	C-8G-11891	51 mmfd, 5%, ceramic	1
C15-17	C-8G-12160	91 mmfd, 5%, ceramic	2
C-29-32	C-8F5-224	91 mmfd, 5%, silver mica	2
C41	C-8D-10789	.002 mfd x 600 v., 20%	1
C57	C-8F3-8	100 mmfd x 500 v., 20%, mica	1
		RESISTORS	
R4	C-9B1-87	120K ohms, ½ watt, 10%	1
R15	C-9B1-73	8200 ohms, ½ watt, 10%	1
R26	C-9B1-77	18K ohms, ½ watt, 10%	1
R18	C-9B1-96	680K ohms, ½ watt, 10%	1
R21, 35	C-9B1-82	47K ohms, ½ watt, 10%	2
R28	C-9B2-81	39K ohms, 1 watt, 10%	1
R7	B-9C-11489	10K ohms, 5 watts, 10%, wirewound	1
R30	C-9B1-78	22K ohms, ½ watt, 10%	1
R16, 25, 29	C-9B1-15	2200 ohms, ½ watt, 20%	3
R8	C-9B1-107	5.6 megohms, ½ watt, 10%	1
R9, 10	C-9B1-31	1 megohm, ½ watt, 20%	2
R13	C-9B1-50	100 ohms, ½ watt, 10%	1
R11, R17	C-9B1-23	47K ohms, ½ watt, 20%	2
R19	C-9B1-27	220K ohms, ½ watt, 20%	1
R14	C-9B1-37	10 megohms, ½ watt, 20%	1
R27	C-9B1-54	220 ohms, ½ watt, 10%	1
R32, 22, 33	C-9B1-94	470K ohms, ½ watt, 10%	3
R31	C-9B1-78	22K ohms, ½ watt, 10%	1
R23	C-9B1-58	470 ohms, ½ watt, 10%	1
R34	C-9B1-62	1000 ohms, ½ watt, ±10%	1
R36	C-9B2-55	270 ohms, 1 watt, ±10%	1
		COILS	
T3	A-13D-11285	B.C. oscillator coil	1
T4	C-203-11743	Input I.F. coil combination assembly, 455 kc and 10.7 mc	1
T5	C-203-11746	2nd I.F. coil combination assembly, 455 kc and 10.7 mc	1
T6	C-203-11744	3rd I.F. coil assembly, 10.7 mc	1
T10	C-203-11745	Ratio detector I.F. coil assembly, 10.7 mc	1
T11, C55	C-15E-12340	Loop antenna assembly with 1.0 mmfd cond. C-8G-12408	1
		TRANSFORMERS	
T7	B-12C-10234-2	Output transformer for speaker	1
T9	B-12A-12254	Power transformer—105-125 volts AC, 60 cycles primary	1
		SPEAKER	
T8	B-18B-10617	Electrodynamic speaker, 10-inch, less output transformer	1
		MISCELLANEOUS	
	C-6D-12459	Dial scale	1
	B-5C-12457-14	Escutcheon—walnut	2
	B-5C-12457-41	Escutcheon—mahogany	2
	B-5B-10376-14	Knob, "Volume"—walnut	1
	B-5B-11672-14	Knob, "Bandswitch"—walnut	1
	B-5B-10377-14	Knob, "Tuning"—walnut	1
	B-5B-10378-14	Knob, "Tone"—walnut	1
	B-5B-10376-41	Knob, "Volume"—mahogany	1
	B-5B-11672-41	Knob, "Bandswitch"—mahogany	1
	B-5B-10377-41	Knob, "Tuning"—mahogany	1
	B-5B-10378-41	Knob, "Tone"—mahogany	1
	B-47A-12458	Pilot lite assembly	1
P1, P2	A-46A-11739	Pilot lite bulb, 6-8 volt, T-44	2
	A-19B-11009	Socket for phono motor	1
	A-15B-11538	Speaker socket	1
	A-19B-12170	Socket for tone arm lead	1
	A-19B-11272	Antenna socket	1
	A-15B-10440	8-prong, octal, tube socket	3
	A-15C-10717	7-prong, miniature tube socket	6
	A-2H-10718	Shield base	6
	A-2H-10974	Shield can	6
	B-14M-11479	A.C. line cord	1
	A-23A-10344	Line cord lock	1
		RECORD CHANGER	
B-201-12262		Record changer assembly, 115 volts, 60 cycles	1

Note: For list of record changer parts, see Record Changer Manual.

MODELS 5P113, 5P116, 5P117,
Boulevard

BELMONT RADIO CORP.



CAPACITORS

C1, C2	A-8J-10295	.03 mf, 150 volts, 20%
C3	A-8G-11083	40 mmf, ±2.5 mmf
C6, C7	A-8J-10297	.01 mf, 150 volts, 20%
C8	A-8J-10298	50 mmf, 150 volts, 20%
C9	A-8J-10296	.005 mf, 150 volts, 20%
C10, C11	A-13G-11303	1.2 mmf, ±0.2 mmf (two wires)

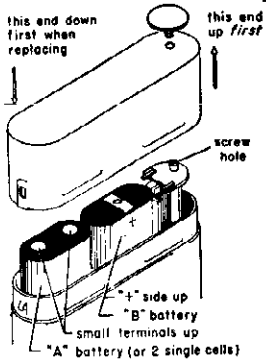
RESISTORS

R3	C-9B9-82	47,000 ohms, 1/5 watt, 10%
R4	C-9B3-98	1 megohm, 1/3 watt, 10%
R5, R7	C-9B3-106	4.7 megohms, 1/3 watt, 10%
R8	C-9B9-84	68,000 ohms, 1/5 watt, 10%
R12	C-9B3-37	10 megohms, 1/3 watt, 20%
R13, R14	C-9B9-92	330,000 ohms, 1/5 watt, 10%

MISCELLANEOUS

A-48A-10346	Crystal phone
A-19B-10354	Phone connector and cord
A-5M-10455	Earpiece (medium)
A-5M-10455-1	Earpiece (small)
A-5M-10455-2	Earpiece (large)
B-2E-10308	End bell, top (Model 5P116)
B-2E-10308-1	End bell, top (Models 5P113, 5P117)
B-202-10419	End bell, bottom (Model 5P116)
B-202-10419-1	End bell, bottom (Models 5P113, 5P117)
A-5B-10466-2	Knob, tuning (Models 5P113, 5P117)
A-5B-10466-51	Knob, tuning (Model 5P116)
A-5B-10806-2	Knob, volume (Models 5P113, 5P117)
A-5B-10806-51	Knob, volume (Model 5P116)

How to Install Them – Three "A" batteries and one "B" battery are supplied with the Boulevard. The extra "A" batteries are for replacement purposes. Remove the screw on the bottom of the radio and lift off the end bell, *screw side up first*, as shown in the illustration. (To avoid distorting the end bell, grasp it at the ends, *not on the sides*. Insert the "A" and "B" batteries in the case exactly as shown, with the "B" battery on the side with the screw hole. (If desired, the wide rubber band supplied with the set may be placed around the batteries to prevent any movement.) Then replace the end bell and the screw.



ALIGNMENT PROCEDURE

Output meter must give 1.5-volt deflection without loading output tube.

Use any 1½-volt "A" battery and 22½-volt "B" battery which can be connected to set. Keep battery leads short.

Unsolder lead between .03 mf output capacitor and purple lead (see illustration). Connect one side of meter to this capacitor terminal, other side to receiver chassis. *Be sure to reconnect leads after alignment is completed.*

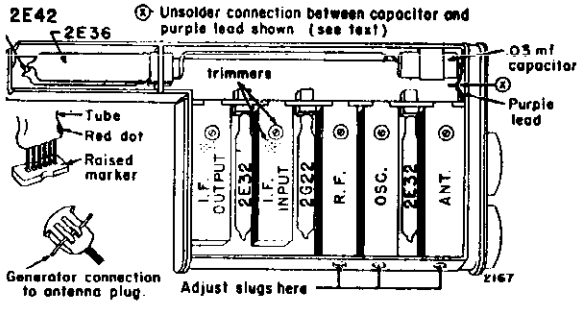
Volume control at maximum.

Connect ground lead of generator to chassis.

Align for maximum output. Reduce input as needed to keep output near 1.5 volts.

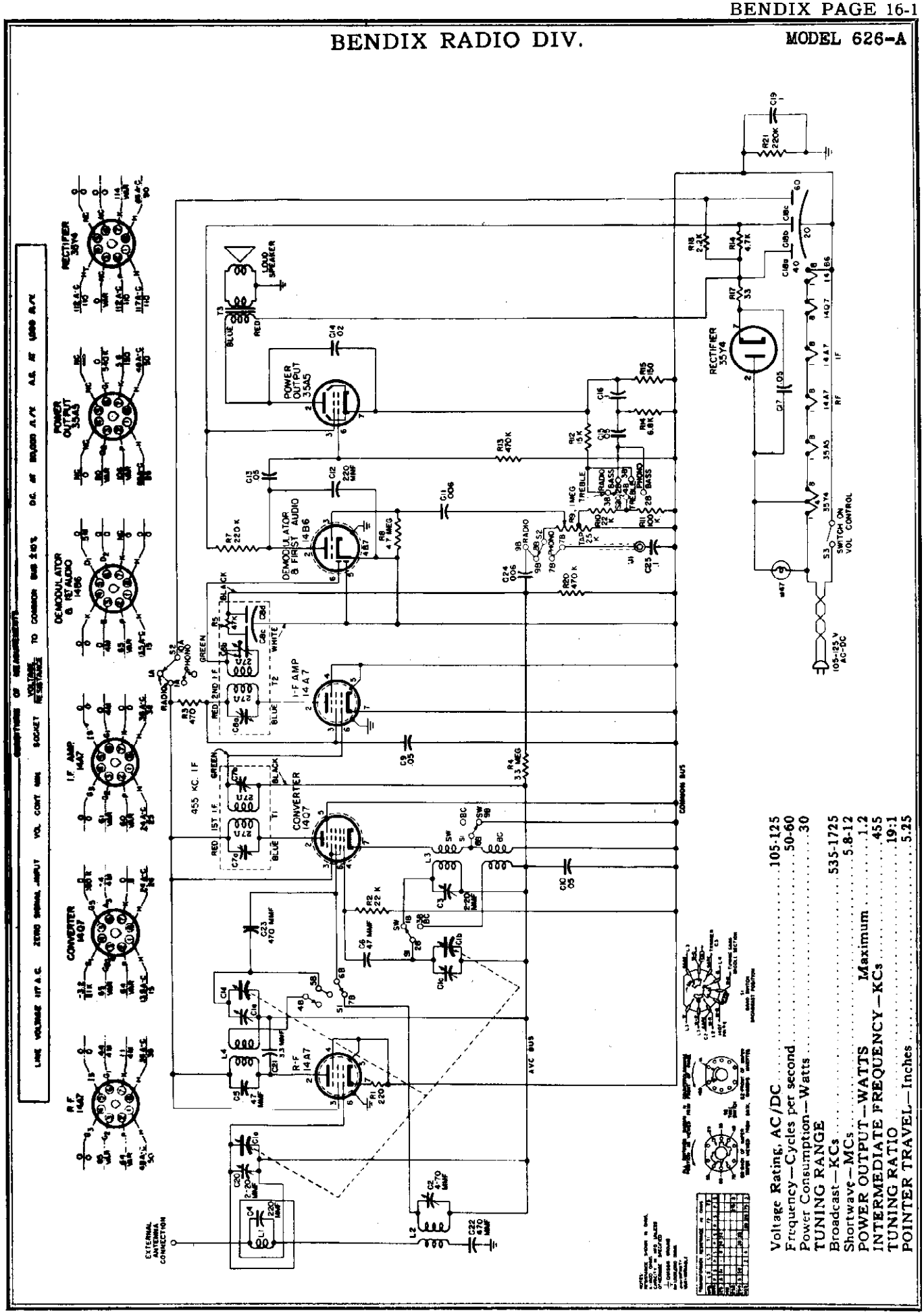
Generator Frequency	Coupling Capacitor	Connection to Set	Adjust for Max. Output
455 kc	.1 mf	Converter 2G22 grid	Trimmers on both I.F. transformers
1625 kc	.1 mf	Converter 2G22 grid	Oscillator trimmer
1400 kc	.1 mf	Converter 2G22 grid	Oscillator tuning slug*
1625 kc	10 mmf	Antenna lead (see illust.)	Osc, ant, rf trimmers
1400 kc	10 mmf	Antenna lead	Antenna, rf tuning slugs*

Repeat this and previous step alternately for best tracking.



BENDIX RADIO DIV.

MODEL 626-A

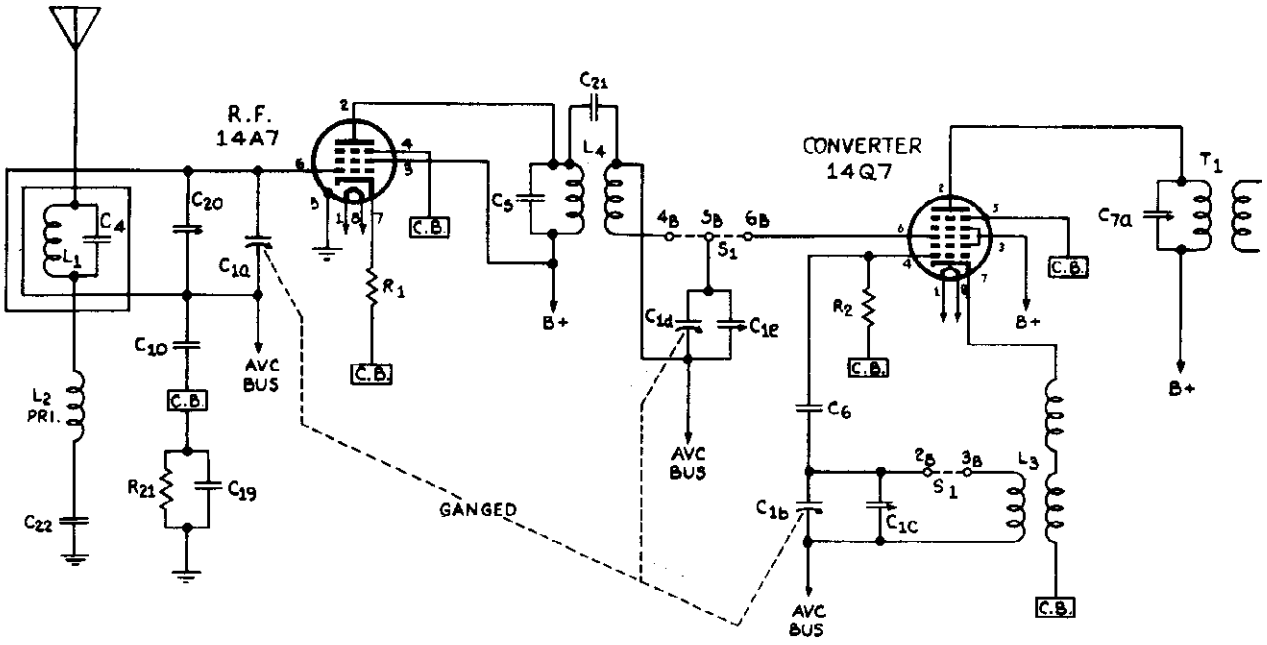


Voltage Rating, AC/DC	105-125
Frequency—Cycles per second	50-60
Power Consumption—Watts	30
TUNING RANGE	
Broadcast—KCs	535-1725
Shortwave—MCs	5.8-12
POWER OUTPUT—WATTS Maximum	1.2
INTERMEDIATE FREQUENCY—KCs	455
TUNING RATIO	19:1
POINTER TRAVEL—Inches	5.25

"clarified schematics"

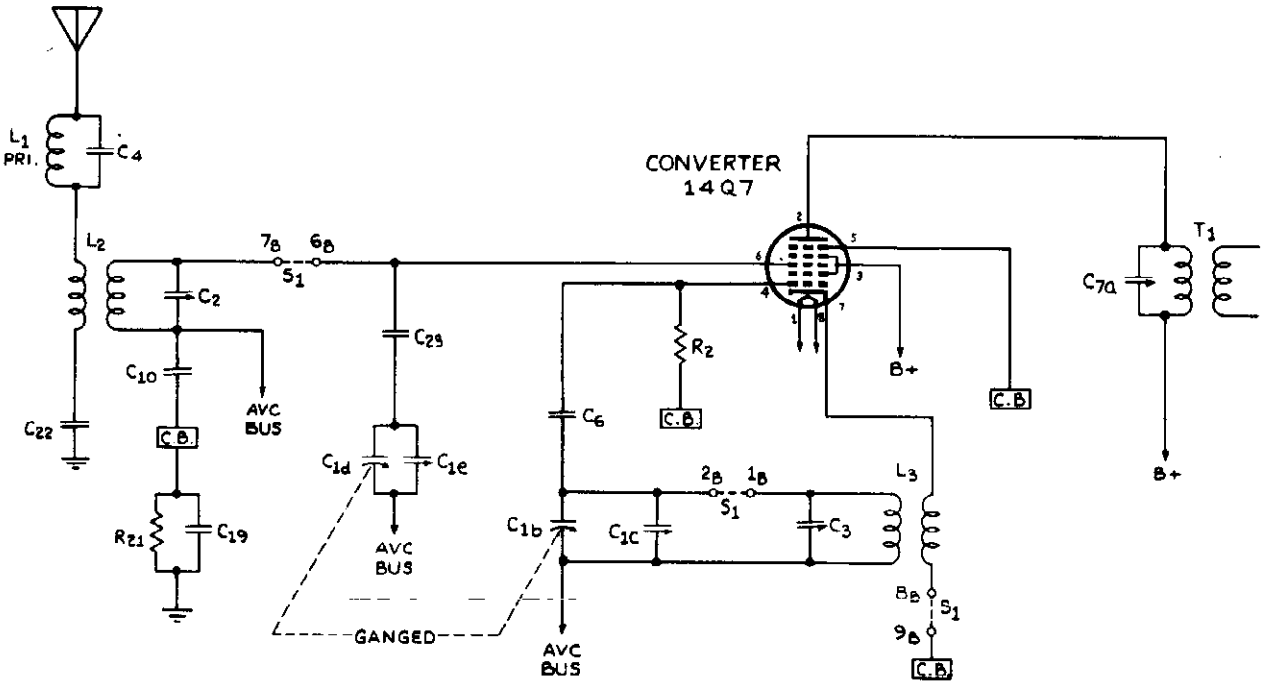
MODEL 626-A

BENDIX RADIO DIV.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535-1725 KC.

C.B. DENOTES COMMON BUS ABOVE GROUND BY R_{21} (220K) & C_{19} (.1 μf)



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.8-12 MC.

C.B. DENOTES COMMON BUS ABOVE GROUND BY R_{21} (220k) & C_{19} (.1 μf)

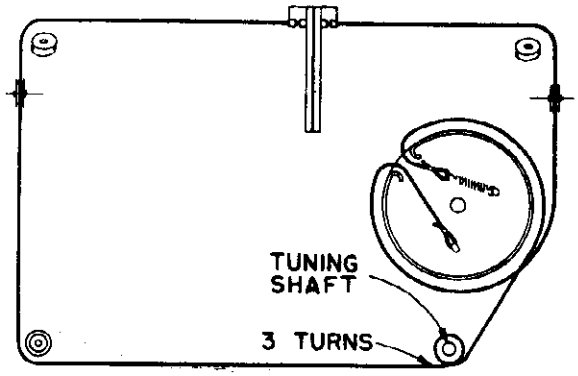
BENDIX RADIO DIV.

MODEL 626-A

Stock No.	Description	List Price
	ELECTRICAL COMPONENTS	
AL0C01*	ANTENNA—Loop (L1)	2.60
CC9A16†	CAPACITOR—Ceramic 3.3 mmf. (C21)	.05
CE3A00	CAPACITOR—Electrolytic 40, 20, 60	
CE3A00†	CAPACITOR—Electrolytic 40, 20, 60 mfd. (C18a, C18b, C18c)	1.86
CL2A01†	CORD—AC Power	.42
CM5A14†	CAPACITOR—Mica 47 mmf. (C5, C6)	.18
CM5A30†	CAPACITOR—Mica 220 mmf. (C4, C12)	.22
CM5A38†	CAPACITOR—Mica 470 mmf. (C22)	.21
CM8S50†	CAPACITOR—Mica 470 mmf. 3% (C23)	.47
CP4T20	CAPACITOR—Paper 400 V .006 mfd. (C11, C24)	.14
CP4T34†	CAPACITOR—Paper 400V .02 mfd. (C14)	.14
CP4T40†	CAPACITOR—Paper 400V .05 mfd. (C9, C10, C13, C15, C17)	.16
CP4T51†	CAPACITOR—Paper 400V .1 mfd. (C16, C19, C25)	.18
CT2A00	CAPACITOR—Trimmer (C2 4-70 mmf., C3 2-20 mmf.)	.46
CV0C00	CAPACITOR—Variable, 3 gang (C1a, C1b, C1c, C1d, C1e)	7.91
LO6H00	COIL—Oscillator (L3)	1.61
RC1H16†	RESISTOR—220 ohms 1/4 W Comp. (R1)	.04
RC1H20†	RESISTOR—470 ohms 1/4 W Comp. (R3)	.04
RC1H32†	RESISTOR—4700 ohms 1/4 W Comp. (R19)	.04
RC1H34†	RESISTOR—6800 ohms 1/4 W Comp. (R14)	.04
RC1H38†	RESISTOR—15000 ohms 1/4 W Comp. (R12)	.06
RC1H40†	RESISTOR—22000 ohms 1/4 W Comp. (R2, R10)	.04
RC1H44†	RESISTOR—47000 ohms 1/4 W Comp. (R5)	04
RC1H51†	RESISTOR—100000 ohms 1/4 W Comp. (R11)	04
RC1H54†	RESISTOR—220,000 ohms 1/4 W Comp. (R7, R21)	.04
RC1H58†	RESISTOR—470,000 ohms 1/4 W Comp., (R13, R20)	.04
RC1H68†	RESISTOR—3.3 meg. 1/4 W Comp. (R4)	.04
RC1H70†	RESISTOR—4.7 meg. 1/4 W Comp. (R8)	.04
RC4G28†	RESISTOR—2200 ohms 2W Comp. (R18)	.14
RV4S00†	POTENTIOMETER—1 meg. with Switch (R9, S3)	.92
RW1A06†	RESISTOR—33 ohms WW 1W (R17)	.14
RW1B28†	RESISTOR—150 ohms WW 1W (R15)	.08
SO0D01	SOCKET—Dial Lamp	.23
SO9S00†	SOCKET—Loctal Tube	.19
SR2C01	SWITCH—Rotary 2 Pos. 3 Pole (S1)	.70
SR4C00†	SWITCH—Rotary 4 Pos. 3 Pole (S2)	.84
TI0C01†	TRANSFORMER IF—1st (T1)	3.75
TI0D01†	TRANSFORMER IF—2nd (T2)	2.65
TR6D00	TRANSFORMER RF—Shortwave (L2)	1.26
TR6L00†	TRANSFORMER BC—RF Interstage (L4)	3.75
#47†	LAMP—Pilot	.09

Stock No.	Description	List Price
	ELECTRICAL COMPONENTS (continued)	
JR1S00†	JACK—Receptacle, 1 Contact, Phono Jack (J1)	.06
	SPEAKER AND COMPONENTS	
SP400†	SPEAKER—Oval PM (4 x 6)	5.70
CS4O00†	CONE & VOICE COIL ASS'Y.—Code 252	
CS4O01†	CONE & VOICE COIL ASS'Y.—Code 328	
CS4O02†	CONE & VOICE COIL ASS'Y.—Code 270	
CS4006†	CONE & VOICE COIL ASS'Y.—Code 191	
CS4O07†	CONE & VOICE COIL ASS'Y.—Code 371	
TA0O01†	TRANSFORMER—Output (T3)	.96
	MECHANICAL COMPONENTS	
AD0C00	ASSEMBLY—Dial Back Plate	1.04
BT1S00†	BOARD—Terminal Strip 1 Lug 1 Mt	.03
BT2S00	BOARD—Terminal Strip 2 Lugs 1 Mt	.02
BT4S01†	BOARD—Terminal Strip 4 Lugs 1 Mt	.05
CD0C02	CABLE—Dial	.17
GR0S00†	GROMMET—Shockmount Rubber	.04
HC0C00†	CLIP—Coil Mtg	.65/c
HC0C02†	CLIP—Coil Mtg	.90/c
HC0C03†	CLAMP—Cable (Dial)	.43/c
HC0S00†	CLIP—Tuning Shaft Spring	.01
HC0T00†	CLAMP—Tube Shield	.01
HN9P451	PALNUT—3/8 x 32	.60/c
HR0F00†	RIVET—Plain 13/64 x 121	.40/c
HR0P01†	RIVET—Plain .088 x 1/8	.40/c
HR0S01†	RIVET—Shoulder .171 x .118, .083 x .088	.02
HS0C00†	SPRING—Dial Cable	.04
HS0P01†	SPACER—Antenna, Wood	01
HS6F00†	SLEEVE & SPACER—Tuning Capacitor	.02
ID0M06†	INDICATOR—Metal, Dial	.28
IT0C01	INSULATOR—Elec. Cap., Tube	.04
IW0F00†	INSULATOR—Felt Washer	.20/c
MB0B00†	BEARING—Bushing (Tuning Shaft)	.18
MP0F00†	PULLEY—Fiber (Idler)	.02
MS0T02†	SHAFT—Tuning	.15
PI0P01†	PLATE—Insulating, Power Cord	.01
SM0T00†	SHIELD—Metal, Tube	.05
	CABINET COMPONENTS	
DS0C01	DIAL—Scale	.77
GC0D02	GASKET—Dial, Cork Strip	.09
HC0D00	CLIP—Dial (Metal) Retainer R.H.	.04
HC0D01†	CLIP—Dial Retainer (Metal) L.H.	.03
HC0S09	CLIP—Spring, Knob, Band Switch	.01
HK0R00†	CLIP—Spring, Knob	.01
IT0F00	INSULATOR—Flexible Tubing	.08/ft.
KB0B03	KNOB—Indexed, Tan	
KC0B08	KNOB—Plain, Tan	
KY0B00	KNOB—Brown, Band Switch	.31
ZP0I00	CABINET—Ivory, Plastic	

*Subject to excise tax /c—Price per hundred Prices subject to change without notice †Used on previous models PRINTED IN U.S.A.



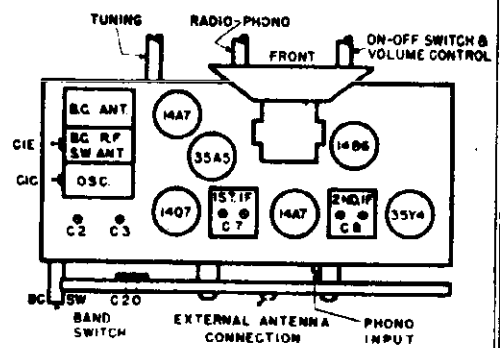
Adjust pointer 2 in. from left end with tuning gang fully meshed

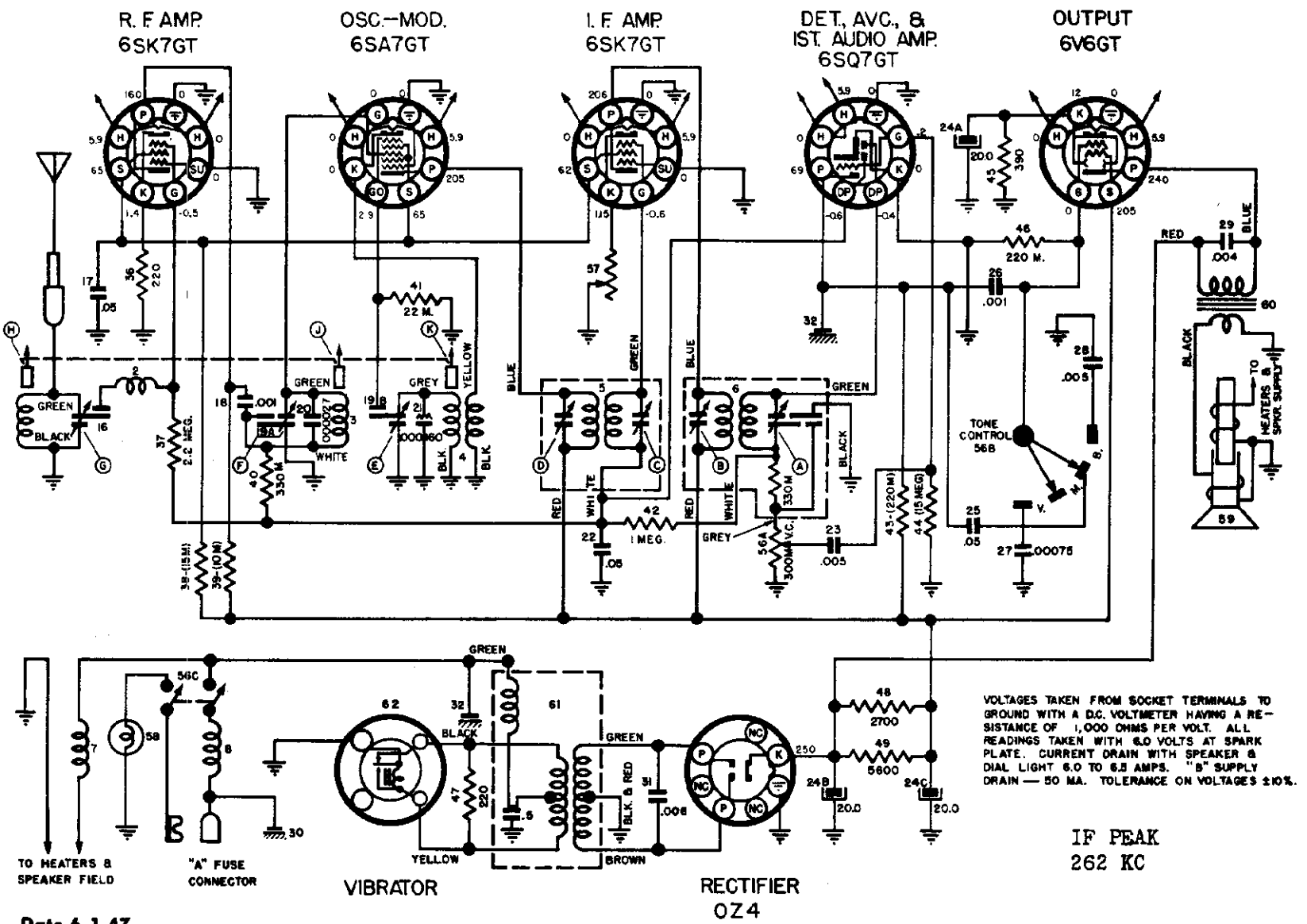
Make adjustments in table for maximum output with output meter connected across voice coil. Always keep input as low as possible for perceptible output.

PRECAUTIONS

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

CIRCUIT	CONTROL POSITIONS	APPLY	THRU	TO	ADJ
I.F.	Volume—Maximum Tone—Treble Band Switch—Broadcast Tuning Condenser—Fully Open	455 KC	.01mfd.	Grid 14A7 I.F. Amp. Grid 14Q7 I.F. Amp.	C8b C8a C7b C7a
Broadcast	Pointer 4 3/8 in. from left end.	1475 KC	50 mmf.	External Antenna Connection	C1c C1e C20
Short Wave	Pointer 4 1/2 in. from left end.	11 MC	400 ohms in series with .01 mfd.	External Antenna Connection	C3 C2





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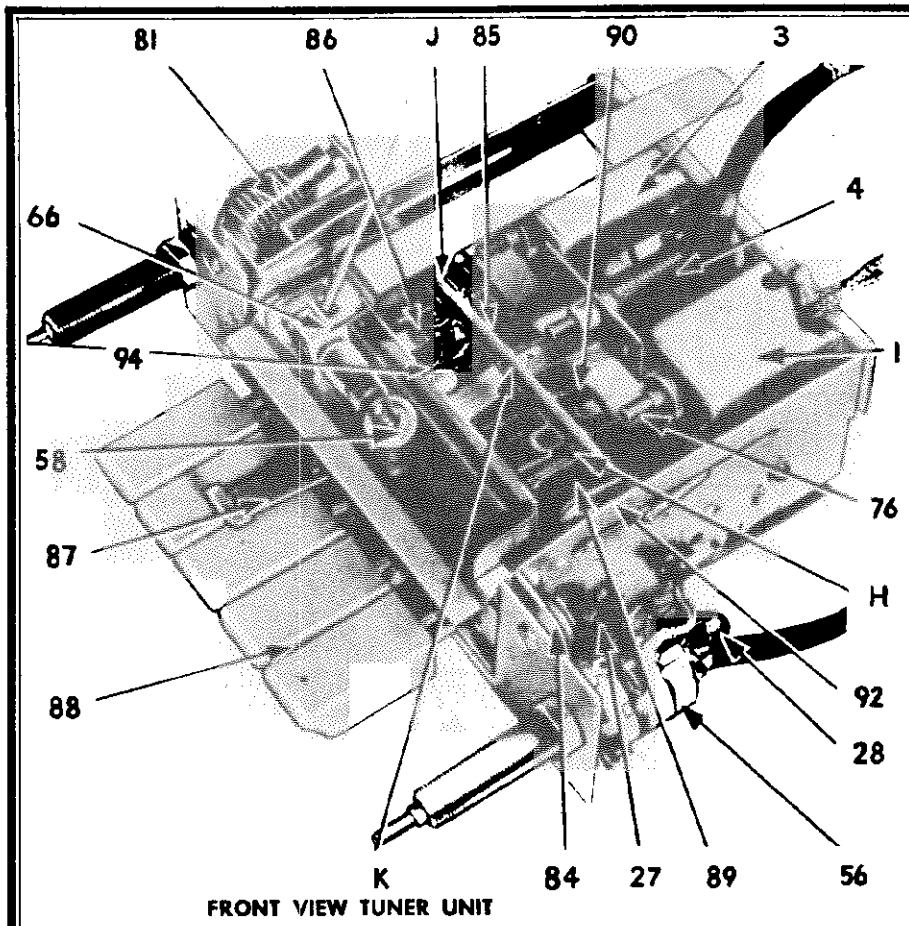
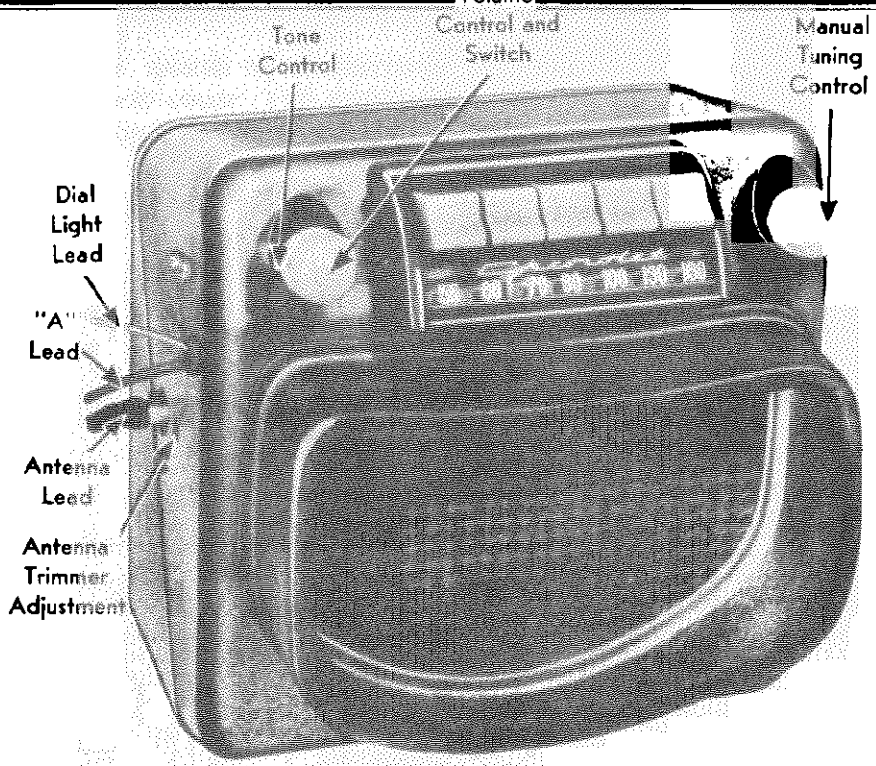
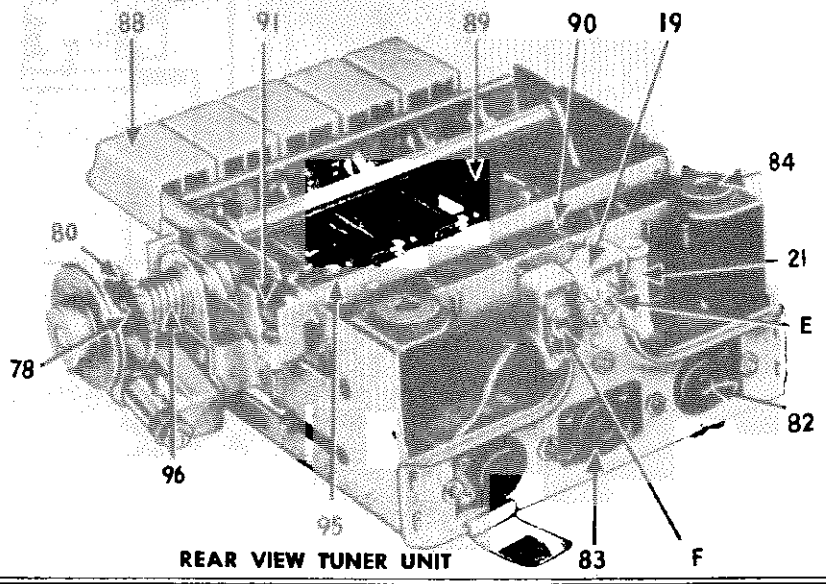
Antenna Circuit: The antenna circuit is directly coupled to the antenna. The antenna oscillator and R.F. circuits are tuned by means of iron cores. The antenna circuit is adjusted for slight variations in antenna capacity by means of an antenna trimmer located on the side of the receiver case.



FRONT VIEW TUNER UNIT





REAR VIEW TUNER UNIT

Procedure for Setting Pushbuttons

Turn on the receiver for ten minutes or longer to allow circuits to stabilize.

1. Select your five favorite stations in order of frequency.
2. Pull the button slightly to the left and out approximately one-half inch.
3. Turn the manual control knob until the desired station is tuned in. To secure an accurate set-up, turn the manual tuning knob back and forth until the station is tuned in clearly.
4. Push button in firmly to the end of its travel.
5. Repeat the same procedure to set up the remaining four buttons.

Circuit Alignment

The trimmer condensers in this receiver have been carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer) unless tampered with or a coil replaced. It is advisable not to attempt any adjustment unless it is definitely known that alignment is necessary. Since the iron cores of the tuning unit are sealed in place at the factory, only the trimmer adjustment as outlined under "Capacity Alignment" should be made, unless the coils or cores of the iron core tuning unit are changed. A signal generator and an output meter must be used to align the receiver circuits correctly. To make all alignment adjustments the back cover must be removed.

Capacity Alignment

1. I.F. Alignment at 262 Kilocycles

(a) Connect a 0.1 mfd. condenser between the plate prong of the 6V6GT output tube and one terminal of the output meter, to protect the meter from DC voltages. Connect the other terminal of the output meter to ground.

(b) Connect the ground lead of the signal generator to the chassis frame.

(c) Connect the signal lead of the signal generator to the grid (G) prong of the 6SA7 tube socket through a 0.1 mfd. condenser.

(d) Turn the set volume control on full and rotate the tone control knob to the center of its range. Adjust the signal generator to 262 kilocycles, and tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved through narrow limits no appreciable change in output is noticeable.

(e) Adjust the I.F. trimmers A, B, C, and D for maximum output.

2. Aligning at 1615 Kilocycles

(a) Connect the signal lead of the signal generator to the receiver antenna connection through a .000070 mfd. condenser.

(b) Turn the manual control of the receiver to the stop at the high frequency end of the dial.

(c) Set the signal generator to 1615 kilocycles.

(d) Adjust the oscillator trimmer "E" for maximum output.

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

(f) Adjust the antenna trimmer "G" for maximum output.

3. Aligning at 1400 Kilocycles

(a) Set the signal generator frequency to 1400 kilocycles or the nearest frequency at which there is no interference from radio stations.

(b) Tune the receiver to this signal and readjust the R.F. trimmer "F" and antenna trimmer "G" for maximum output. The signal generator output should be as low as possible and still give a satisfactory output meter reading.

NOTE: This type tuning circuit does not require alignment at 600 kilocycles.

4. Alignment with Car Antenna

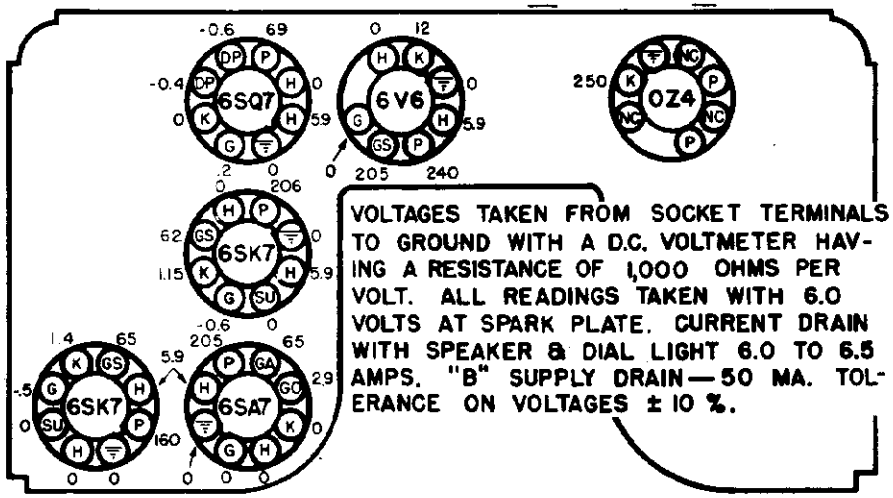
Antenna trimmer "G" must be adjusted to match the car antenna when receiver is installed. With the antenna fully extended, tune in a weak station, adjust trimmer for maximum volume.

Capacity and Inductance Alignment

This alignment should be used only when there is definite evidence that the iron cores are out of adjustment.

1. I.F. Alignment at 262 Kilocycles

The same procedure as previously outlined should be followed.



2. Aligning at 1615 Kilocycles

(a) Connect the signal lead of the signal generator to the set through a .000070 mfd. condenser.

(b) Set the signal generator to 1615 kilocycles.

(c) Rotate the manual tuning knob until the pointer is against the high frequency stop. Mechanically align the iron cores H, J, and K by setting the oscillator core "K" so that its rear edge is 1¾" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) The antenna core "H" and the R.F. core "J" are aligned in the same way as the oscillator core "H".

(d) Adjust the oscillator trimmer "E," the R.F. trimmer "F," and the antenna trimmer "G" for maximum output.

3. Aligning at 1400 Kilocycles

(a) Adjust the signal generator to 1400 kilocycles or the nearest frequency at which there is no radio station interference.

(b) Adjust the R.F. core "J" for maximum output.

(c) Adjust the antenna core "H" for maximum output.

NOTE: The rear end of iron cores are slotted so the maximum output adjustment can be made with a non-metallic screw driver that fits loosely in the coil form. (No inward force should be used.)

4. Realignment at 1615 and 1400 Kilocycles

(a) Repeat alignment of trimmers "F" and "G" at 1615 kilocycles.

(b) Repeat alignment of cores "H" and "J" at 1400 kilocycles. Do not change adjustment of oscillator core "K."

(c) Reseal core studs in guide bar with gyptal or household cement.

5. Alignment with Car Antenna

The same procedure as outlined previously should be followed.

Production Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
7256233	.....	Coil	Antenna—Coil	1
7240251	.....	Choke	Antenna—Choke	2
7256233	.....	Coil	R.F. Coil	3
7256235	.....	Coil	Oscillator—Coil	4
7256011	.....	Coil	1st I.F. Transformer Assembly	5
7256012	.....	Coil	2nd I.F. Transformer Assembly	6
7255912	7241708	Choke	Hash Choke	7
7256004	1217846	Choke	"A" Choke (inside front cover)	8
7255907	.....	Trimmer	Antenna Trimmer	16
7236842	7230592	Condenser	Tubular—.05 Mfd. 600 Volt, Screen By Pass	17
7242942	1217790	Condenser	Tubular—.001 Mfd. 600 Volt, R.F. Coupling	18
7242454	.....	Trimmer	Dual Trimmer—R.F. and Oscillator Sections	19
7256348	7256259	Condenser	Molded .000027 Mfd.	20
7256276	.....	Condenser	Temperature Compensating .000160 Mfd.	21
7236841	7230592	Condenser	Tubular .05 Mfd. 600 Volt, AVC By Pass	22
7230767	.....	Condenser	Tubular .005 Mfd. 600 Volt, Audio Coupling	23
7240724	.....	Condenser	3 Section Electrolytic	24
			Section A 20 Mfd. 25 Volt, Output By Pass	24A
			Section B 520 Mfd. 400 Volt, "B" Input Filter	24B
			Section C 20 Mfd. 400 Volt, "B" Output Filter	24C
7230892	7230592	Concenser	Tubular .05 Mfd. 600 Volt, Tone Control (Voice)	25
7239188	1217790	Concenser	Tubular .001 Mfd. 600 Volt, Audio Coupling	26
7240738	.....	Concenser	Tubular .00075 Mfd. 400 Volt, Tone Control (Music)	27
7232956	.....	Concenser	Tubular .005 Mfd. 600 Volt, Tone Control (Bass)	28
7233243	7230767	Concenser	Tubular .004 Mfd. 800 Volt, 6V6 Output	29
7241259	.....	Spark Plate	Spark Plate (inside front cover)	30
7240906	.....	Concenser	Tubular .006 Mfd. 1600 Volt, Buffer	31
1217848	.....	Concenser	Chassis Condenser	32
7237825	.....	Resistor	Insulated, 220 ohms ½ watt, R.F. Amp. Bias	36
1211147	1214563	Resistor	Insulated, 2.2 Megohm ½ watt, AVC Isolating	37
7233653	.....	Resistor	Insulated, 15,000 ohm 2 watt, Screen Dropping	38
1211085	.....	Resistor	Insulated, 10,000 ohm 1 watt, Plate Dropping	39
7240732	1214557	Resistor	Insulated, 330,000 ohm ½ watt, AVC Isolating	40
1214550	.....	Resistor	Insulated, 22,000 ohm ½ watt, Oscillator Grid	41
7238873	1213282	Resistor	Insulated, 1 Megohm ½ watt, AVC Isolating	42
1213479	1214555	Resistor	Insulated, 220,000 ½ watt, Plate Dropping	43
7235837	1213289	Resistor	Insulated, 15 Megohm ½ watt, 6SQ7 Grid	44
7240977	1216149	Resistor	Insulated, 390 ohm 1 watt, Output Tube Bias	45
1213479	1214555	Resistor	Insulated, 220,000 ohm ½ watt, 6V6 Grid	46
7237994	.....	Resistor	Insulated, 220 ohm 1 watt, Power Transformer, Primary Load	47
7240917	7242844	Resistor	Insulated, 2700 ohm 2 watt, "B" Filter	48
7240918	.....	Resistor	Insulated, 5,600 ohm 1 watt "B" Filter	49
7256188	.....	Control	Volume, Tone and Switch	56
			Volume Control, 300,000 ohm	56A
			Tone Control	56B
			Switch	56C
7242204	.....	Control	Sensitivity Control	57
125588	.....	Bulb	Dial Lamp	58
7255903	.....	Speaker	Electro Dynamic 6¾" x 9¼" Elliptical, Less Cable	59
7256009	.....	Transformer	Output Transformer	60
7255881	.....	Transformer	Power Transformer	61
7239142	.....	Vibrator	Non-Synchrpnous 4 Prong	62
7255920	.....	Cable	Speaker Cable and Plug	
7239475	.....	Socket	Antenna Socket	
1217838	.....	Socket	Dial Light Assembly (Less Lamp)	66
7236279	.....	Socket	Tube—Octal	
1216962	.....	Socket	Speaker Socket	67
7239125	.....	Socket	Vibrator Socket	

Tuner Unit Part

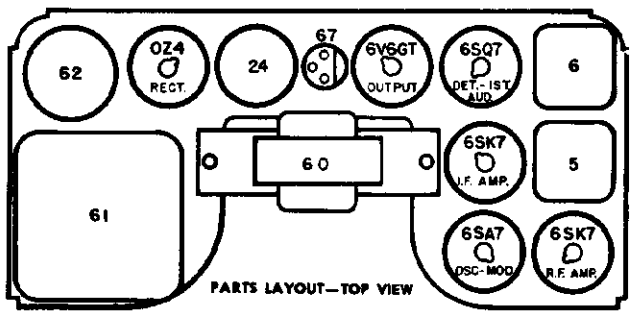
7256112	.....	Core	Iron Tuning Core	76
7255998	.....	Dial	Dial (Included in Escutcheon Assembly)	77
7256105	.....	Disc	Clutch Driver Disc	78
7256177	.....	Escutcheon	Escutcheon Assembly	79
7256102	.....	Gear	Gear and Bushing (Tuning)	80
7256100	.....	Gear	Gear and Bracket Worm (Tuning)	81
7244021	.....	Grommet	Antenna & R.F. Coil Grommet	82
7244020	.....	Grommet	Oscillator Coil Grommet	83
7237772	.....	Grommet	Mounting Bracket Grommet	84
7256179	.....	Guide	Guide Bar—Parallel	85
7256271	.....	Link	Pointer Assembly Connecting Link	86
7256125	.....	Pointer	Pointer Assembly	87
7255985	.....	Button	Push Button (Included in Slide and Push Button Package)	88
1217837	.....	Button Pkg.	Slide and Push Button Package	89
7255984	.....	Spring	Slide Return Spring	90
7255980	.....	Spring	Cam Return Spring	91
7255990	.....	Spring	Treadle Bar Connecting Link Spring	92
7256269	.....	Spring	(Included in Pointer Assembly Connecting Link)	
7255992	.....	Spring	Pointer Connecting Link Spring	94
7255987	.....	Spring	Declutch Lever Spring	95
7255991	.....	Spring	Clutch Spring	96

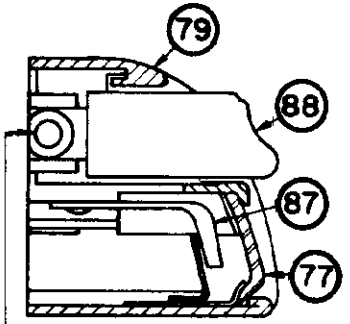
Tube Complement

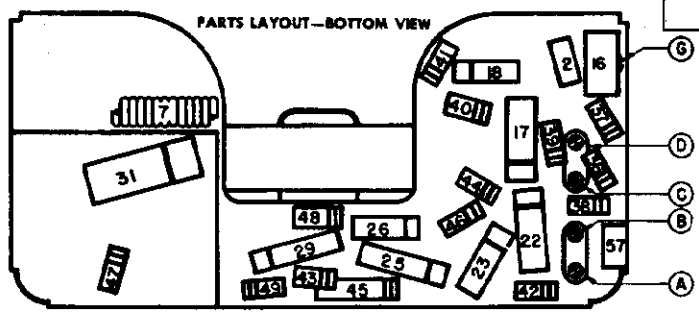
1211924	.....	Tube	0Z4 Rectifier (1 required)
1213637	.....	Tube	6V6GT Output (1 required)
7237886	.....	Tube	6SA7GT Oscillator Modulator (1 required)
7237887	.....	Tube	6SK7GT R.F. and I.F. Amplifier (2 required)
7237888	.....	Tube	6SQ7GT Detector AVC and 1st Audio (1 required)

Installation Parts

494786	.....	Collector	Static Collector (Front Wheel)
1849161	.....	Condenser	Ammeter Condenser
1908848	.....	Condenser	Generator Condenser
1910147	.....	Condenser	Ignition Coil Condenser
147685	.....	Fuse	Fuse—Radio, 14 Amp.
7256297	.....	Holder	Fuse Holder
7255936	.....	Knob	Wing Knob Tone Control
7255935	.....	Knob	Dummy Knob
7256148	.....	Knob	Control Knob
1217909	.....	Lead	"A" Lead (Includes Fuse Holder)
1888204	.....	Nipple	Rubber Nipple (Distributor Suppressor)
986121	.....	Powder	Static Powder (Tire)
1887829	.....	Suppressor	Distributor Suppressor

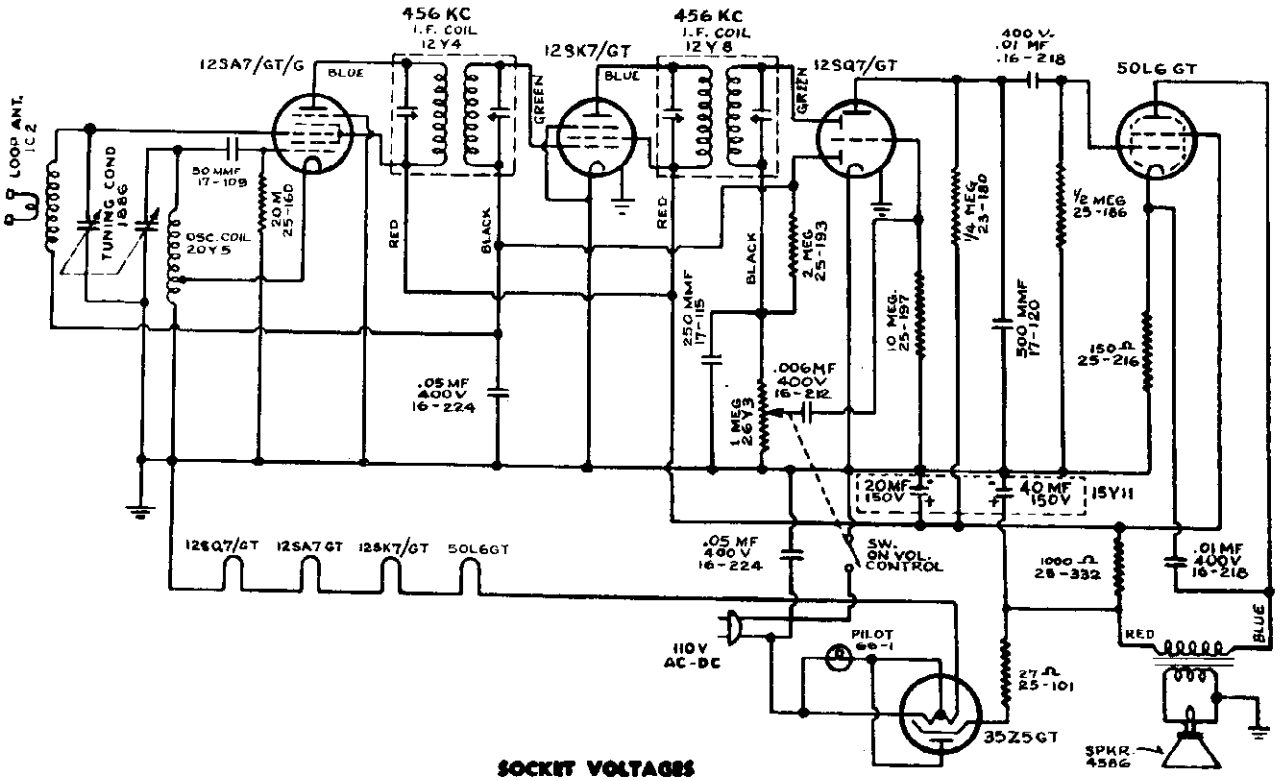






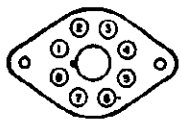
The tuning circuits are tuned by varying the inductance of the antenna, R.F. and oscillator coils by means of iron cores which slide in and out of the coils like pistons. The alignment of the cores has been sealed at the factory and further adjustment should not be required unless the coils have been changed or an iron core has been replaced.

CONCORD RADIO CORP.



SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	–4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112

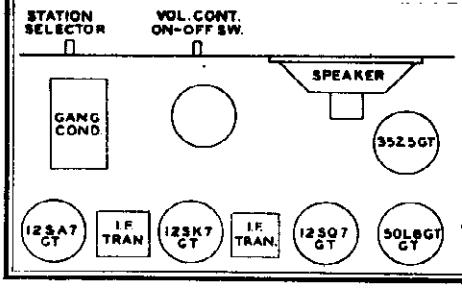


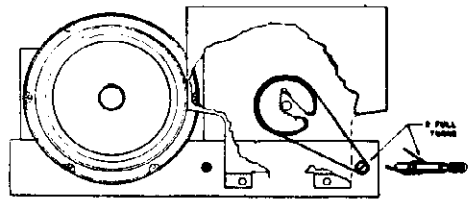
NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — 10 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
535 kc.	12SA7GT Grid	10 mmf.	LF end	Osc. trimmer B	Set limit of band
1400 kc.	12SA7GT Grid	10 mmf.	1400 kc.	Ant. trimmer A	Tune to max.



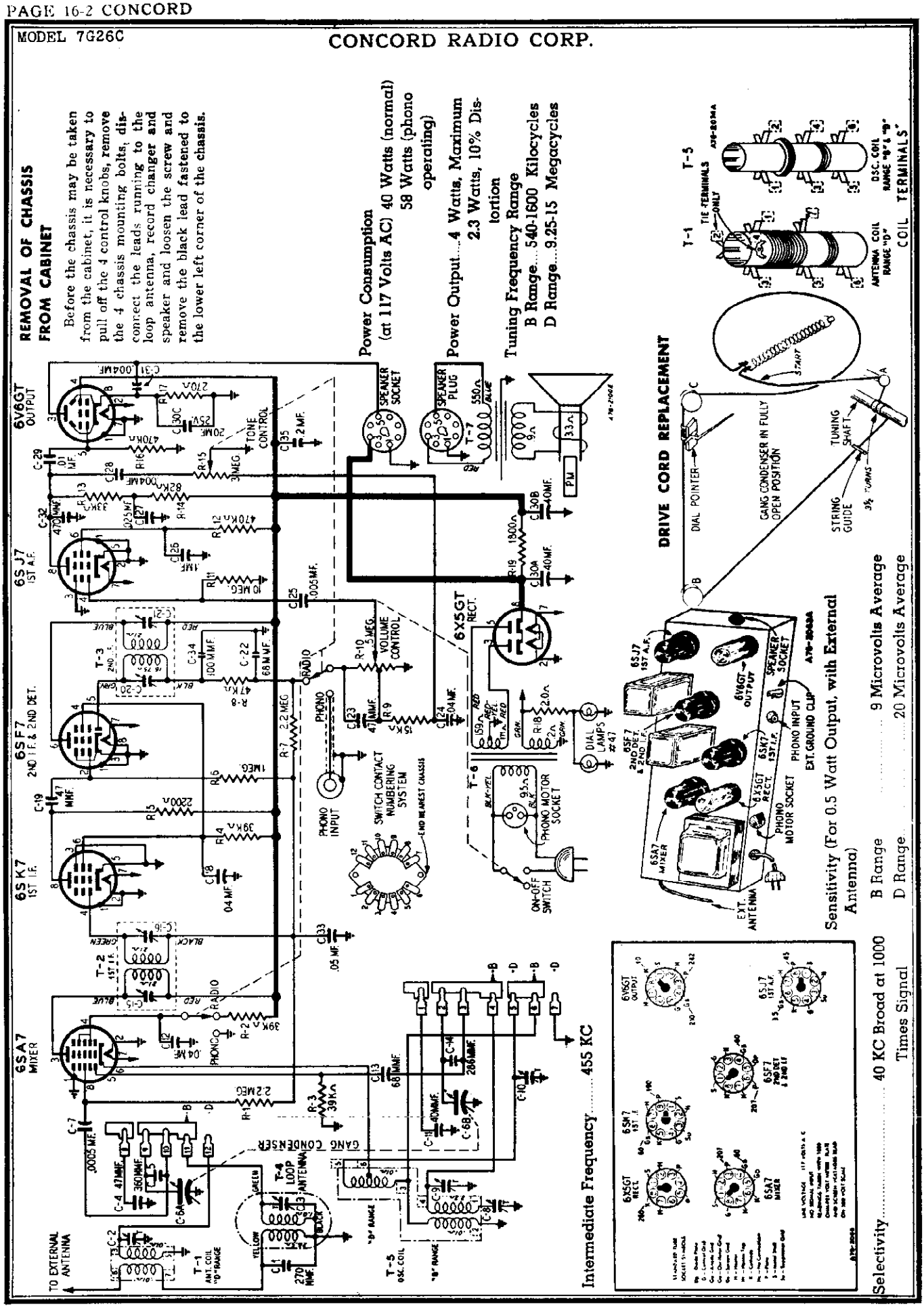


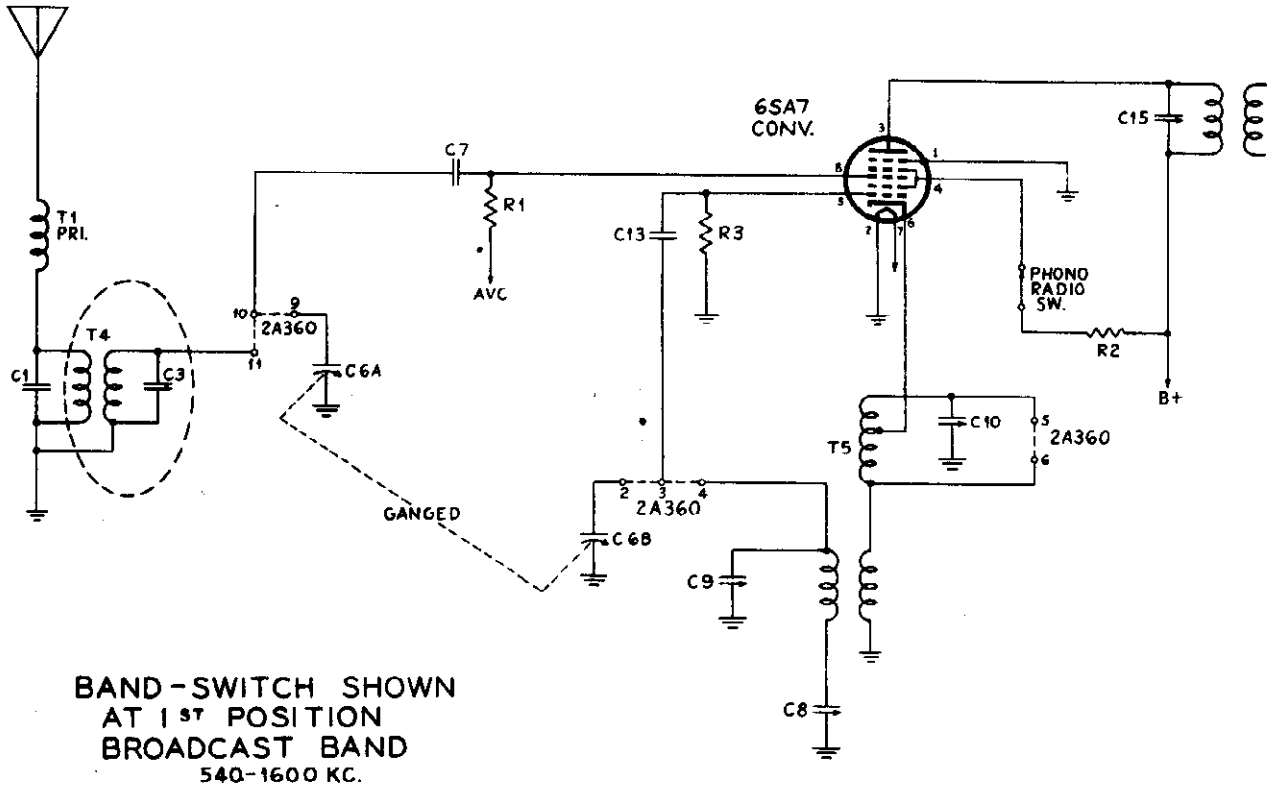
Dial Mechanism

Frequency Range....540-1700 kc.
Intermediate Frequency....455 kc.
Power Supply 105-125 volts AC-DC
Loudspeaker ...5-inch Dynamic
V.C. Impedance ..3.5 ohms at 400 cycles
Power Output (Undistorted .75 watts
Power Output (Maximum) 1.5 watts
Tuning Drive Ratio.....3 to 1
Rated Power Input .....32 watts

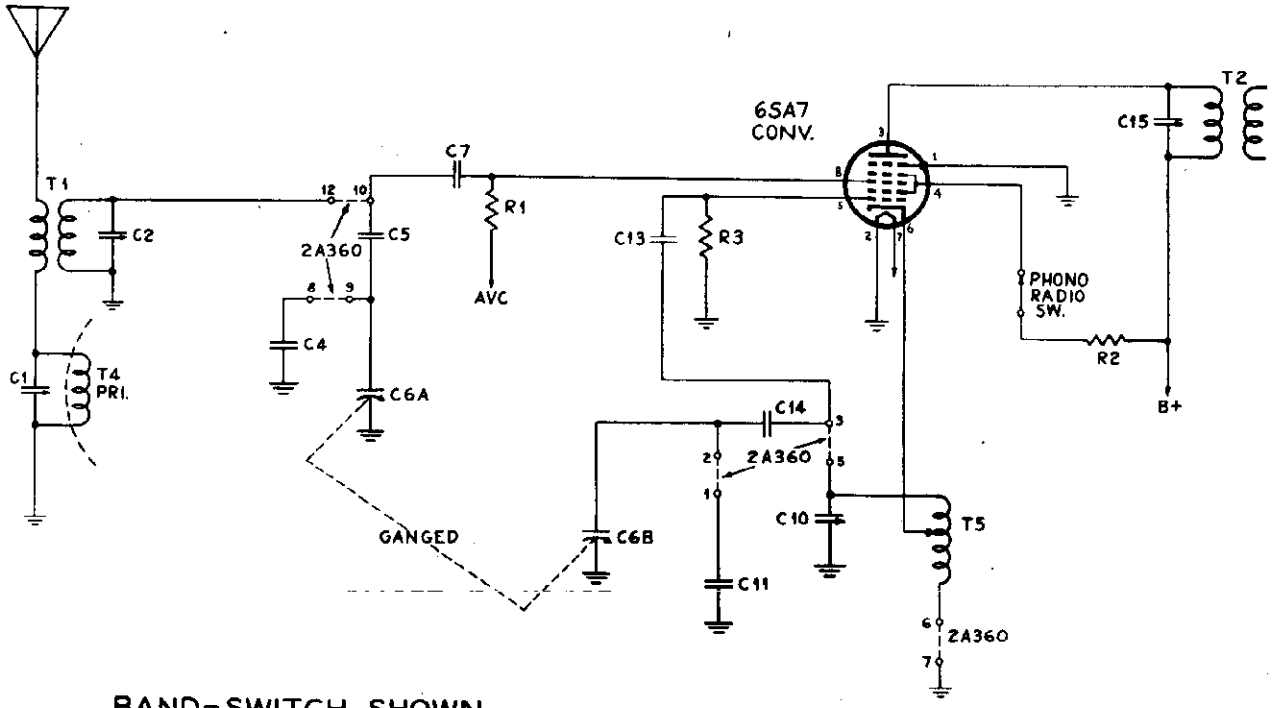
MODEL 7G26C

CONCORD RADIO CORP.





BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
9.25-15 MC.

MODEL 7G26C

CONCORD RADIO CORP.

ALIGNMENT PROCEDURE

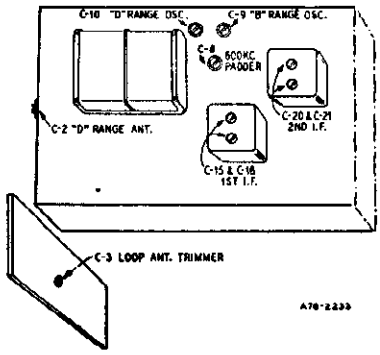
Volume Control—Maximum All Adjustments.

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., 100 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.	455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C20) & (C21)
RANGE B	1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output See Note A	Ant. Range B (C3)
	600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C8) See Note B
	Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.					
RANGE D	15.6 MC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14 MC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2)
LOOP RANGE B	Reassemble chassis in cabinet. 1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B (C3)



NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn rotor back and forth and adjust the trimmer until peak of greatest intensity is obtained.

REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

PART NO.	DESCRIPTION
12A442	6" P.M. Speaker complete with Output Transformer
12A436	8" P.M. Speaker complete with Output Transformer Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)
	Output Transformer (Specify part number and letters stamped on speaker)
3A303	Tube Socket—Octal (8 prong) Molded
3A304	Phono Motor Socket
3A305	Phono Socket—Single Pin Tip
2A360	Band Change Switch
13X328	Line Cord and Plug Assembly
10A614	Knob (Tuning)
10A615	Knob (Volume)
10A616	Knob (Tone—R.P.)
10A617	Knob (SW-BC)

TRANSFORMERS AND COILS

T-1	9A1812	"D" Range Antenna Coil Assembly
T-2	9A1814	1st I-F Coil Assembly
T-3	9A1815	2nd I-F Coil Assembly
T-4	26A449	"B" Range Loop Antenna Assembly
T-5	9A1813	"B" and "D" Range Oscillator Coil Assembly
T-6	53X282	117 Volt, 60 Cycle, Standard Power Transformer
T-7		Output Transformer (See Miscellaneous)

CAPACITORS

C-1	47X445	270 mmf		Molded
C-2	17A164	5-50 mmf		Trimmer
C-3	17A235	2-12 mmf		Trimmer
C-4	47X473	47 mmf		Silvered Mica
C-5	47X474	360 mmf		Silvered Mica
C-6A, C-6B	14A184	Gang Condenser		
C-7	866501	.0005 mf	200 V	Tubular
C-8	17A155	350-430 mmf		Trimmer
C-9, C-10	17A109	2.5-35 mmf		Dual Trimmer
C-11	47X472	40 mmf		Silvered Mica
C-12, C-18	D66403	.04 mf	400 V	Tubular
C-13	47X466	68 mmf		Molded
C-14	47X481	286 mmf		Silvered Mica
C-15, C-16	Part of T-2 (1st I-F Coil Assem.)			
C-19, C-23	47X463	47 mmf		Molded
C-20, C-21	Part of T-3 (2nd I-F Coil Assem.)			
C-22	47X471	68 mmf		Molded
C-24	D64403	.04 mf	400 V	Tubular
C-25	D66502	.005 mf	400 V	Tubular
C-26	D67104	.10 mf	400 V	Tubular
C-27	D64253	.025 mf	400 V	Tubular
C-28	D66402	.004 mf	400 V	Tubular
C-29	D66103	.01 mf	400 V	Tubular
C-30A	45X346	40 mf	450 V	Three Section Electrolytic
C-30B		40 mf	450 V	
C-30C		20 mf	25 V	
C-31	F66402	.004 mf	600 V	Tubular
C-32	47X505	470 mmf		Molded
C-33	B66503	.05 mf	200 V	Tubular
C-34	47X476	100 mmf		Molded
C-35	D67204	.2 mf	400 V	Tubular

RESISTORS

		OHMS	WATTS	
R-1, R-7	B85225	2.2 meg.	0.5	Carbon
R-2, R-4	C84393	39 K	1.0	Carbon
R-3	B84393	39 K	0.5	Carbon
R-5	B84222	2200	0.5	Carbon
R-6	B85105	1 meg.	0.5	Carbon
R-8	B85473	47 K	0.5	Carbon
R-9	B84153	15 K	0.5	Carbon
R-10	36X357	.5 meg.		Volume Control & Switch
R-11	B85106	10 meg.	0.5	Carbon
R-12, R-16	B85474	470 K	0.5	Carbon
R-13	B84333	33 K	0.5	Carbon
R-14	B84823	82 K	0.5	Carbon
*R-15	40X277	3 meg.	Tone Control & Radio Phono Switch	
R-17	C84271	270	1.0	Carbon
R-18	43X213	2.0	0.5	Wire-wound
R-19	D84182	1800	2.0	Carbon

DIAL AND DRIVE ASSEMBLY

6X21, 20X329	Rubber Grommet, Cond. Cushion Stud — Mtg. Gang Condenser
26A443	Dial Bracket Assembly complete with Spacers, Pulleys, Diffusers and Dial Background less Dial Glass
58X676	Dial Glass
26A444	Idler Bracket Assembly
26X486	Drive Shaft
19X192	"C" Washer (for drive shaft)
15X163	Pointer
10X38	Drive Cord Assembly or .50" Cord
28X113	Drive Cord Tension Spring
7X199	Pilot Light Socket Assembly
	No. 47 Pilot Light
4X353	Escutcheon

TYPE F-28A131 RECORD CHANGER PARTS

F-44038	Motor, 60 Cycle, 115 volts
F-59175	Tone Arm (Less Crystal Cartridge)
F-71214	Crystal Cartridge
F-64343	Tone Arm Spring
F-13510	Control Knob Assembly
F-13412	Automatic Stop Switch & Bracket Assembly
F-13435	Turntable
F-13544	Shelf Cover Arm & Record Hold Down Assembly
F-59176	Shelf Cover
F-561333	Shelf Cover Spring
	Needle, Permo No. 100

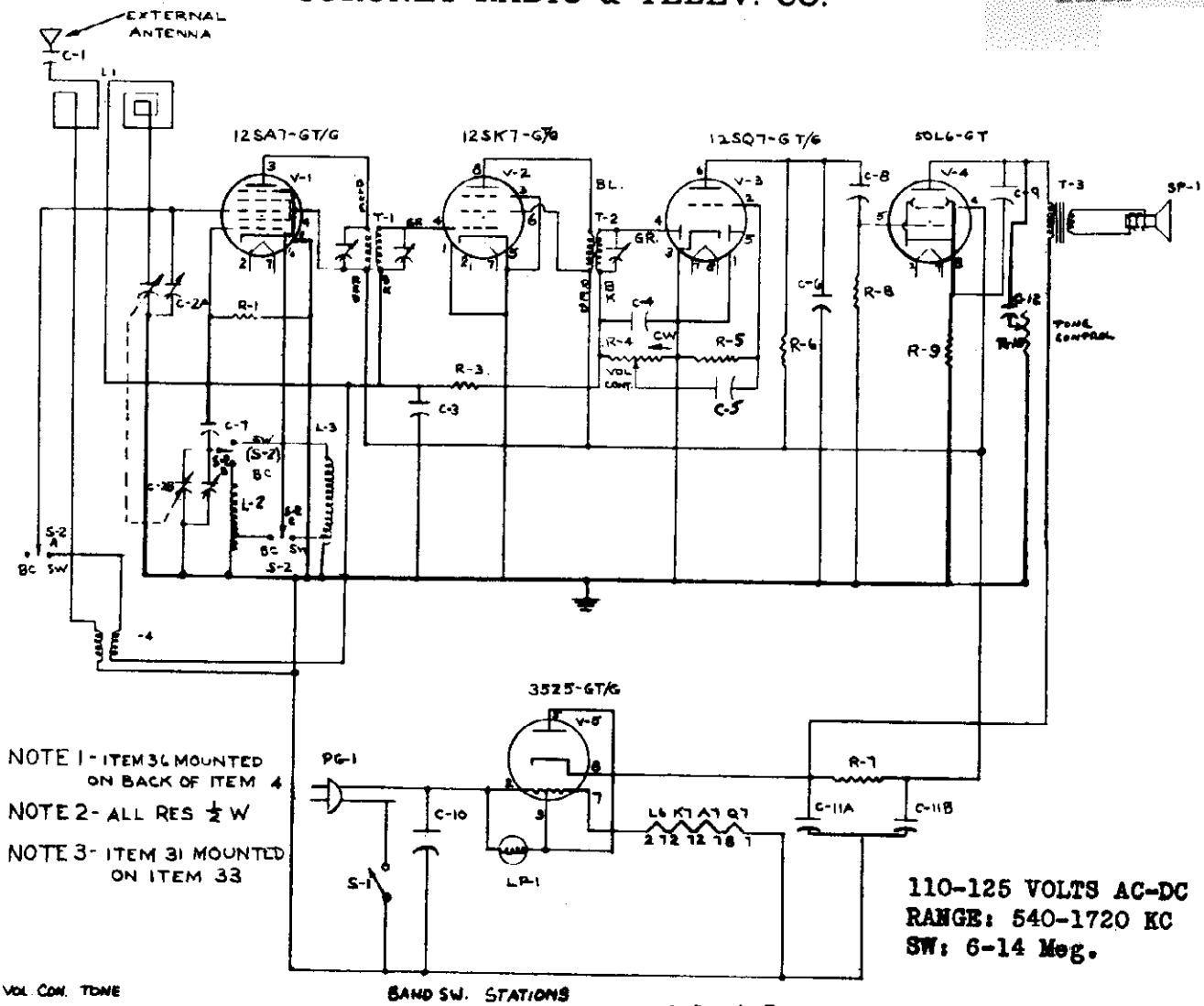
SUBSTITUTE PARTS

The following parts are used in some receivers only. Check part numbers on old part before ordering and order part originally used in receiver.

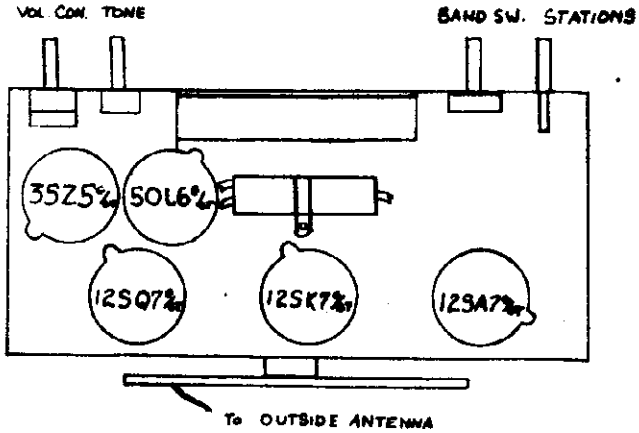
*40X282	Tone Control (Substitute for 40X277)
*25X1539	Radio Phono Switch Lever (Use with 40X282)
*2A161	D.P.D.T. Switch (Use with 40X282)

Use only GENUINE factory tested parts to insure service jobs you can depend on and to obtain original set performance.

CORONET RADIO & TELEV. CO.



110-125 VOLTS AC-DC
RANGE: 540-1720 KC
SW: 6-14 Meg.

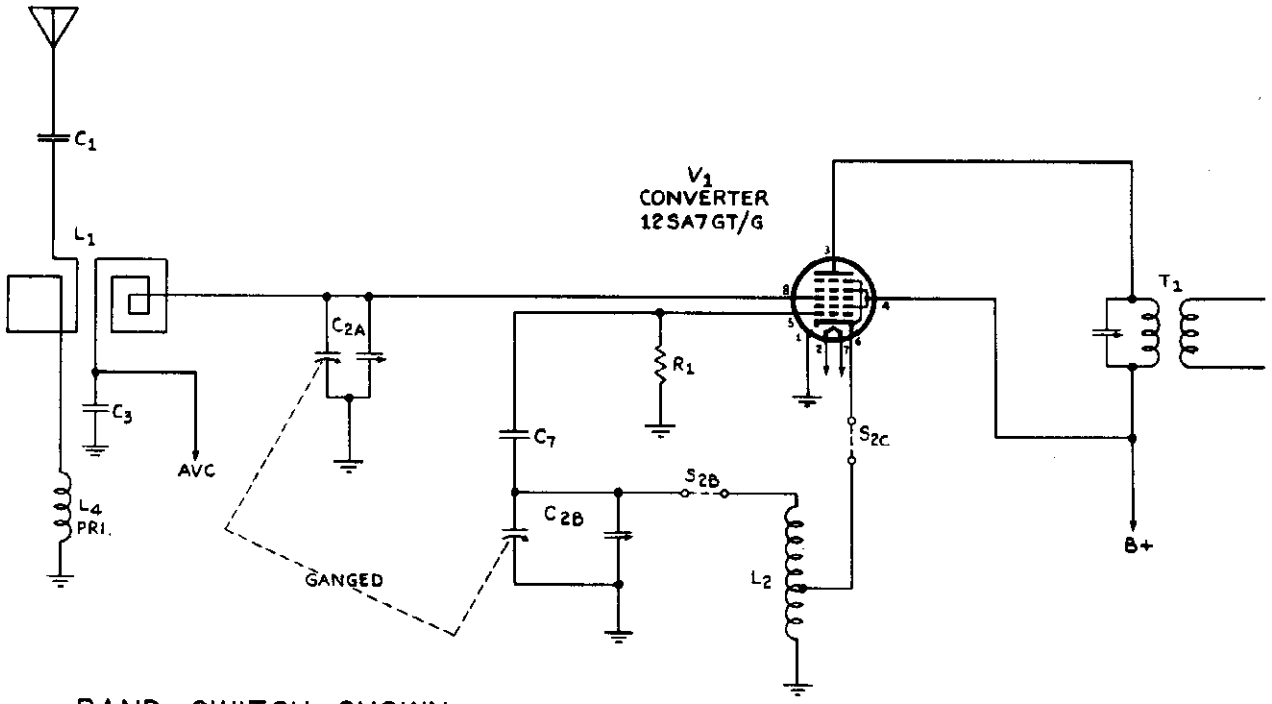


CODE	PART	DESCRIPTION	ITEM
R-1	A-95	Resistor, 22,000 ohms	1
			2
R-3	A-17	" 2.2 meg	3
R-4	A-96	Potentiom'r, 0.5 meg.	4
R-5	A-18	Resistor, 10 meg	5
R-6	A-14	" 0.25 meg	6
R-7	A-98	" 1200 ohm	7
R-8	A-15	" 0.5 meg	8
R-9	A-16	" 140 ohm	9
R-10	A-18	Potentiom'r .1 meg	10
			11

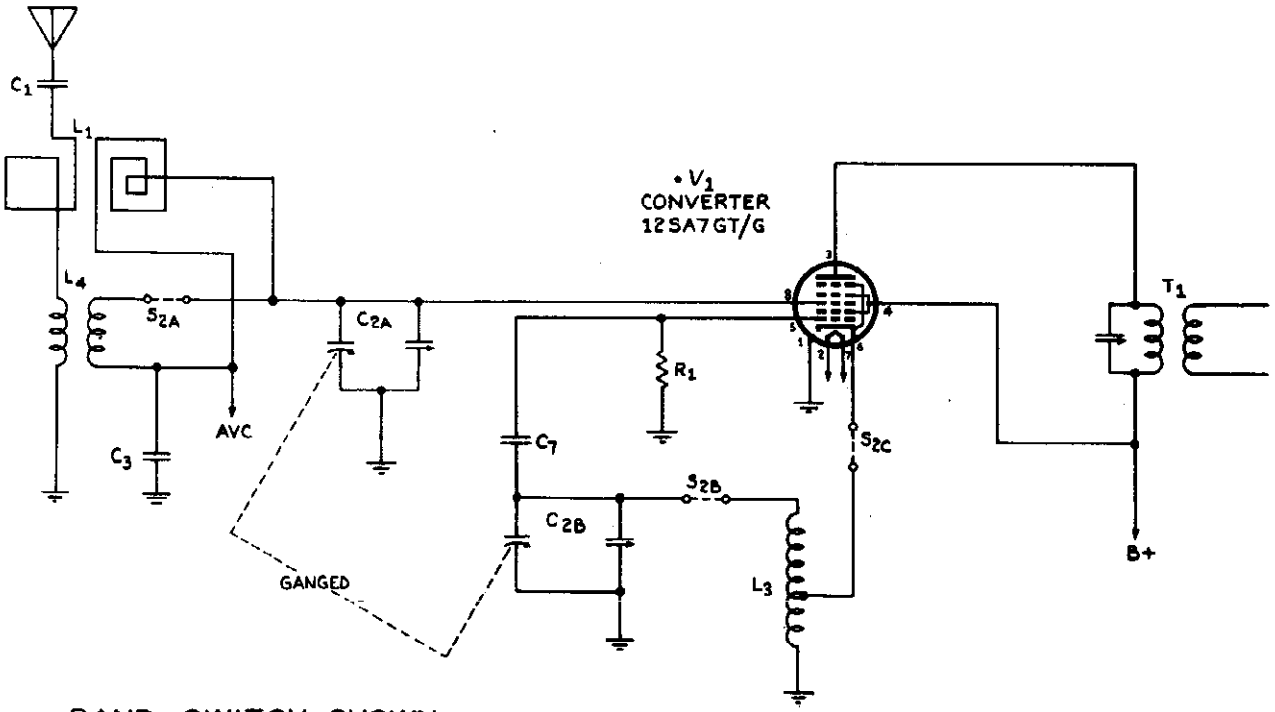
C-1	A-5	Condens'r; 02 mdg	200v	12
C-2	A-19	" Tuning		13
C-3	A-7	" .05 mf	200v	14
C-4	A-9	" 250 mmf	"	15
C-5	A-6	" .002 mf	"	16
C-6	A-9	" 250 mmf	"	17
C-7	A-8	" 100 mmf	"	18
C-8	A-5	" .02 mf	"	19
C-9	A-5	" .02 "	400v	20
C-10	A-4	" 0.1 "	200v	21
C-11	A-3	" 50-20mf	150v	22
S-2	A-97	4 pole 2 pos'ion		23
C-12	A-99	Cond. .05 mf	200v	24
L-1	A-1	Internal loop ant.		25
L-2	A-28	B.C. osc. coil		26
L-3	A-98	SW osc. coil		27
L-4	A-98	SW ant. coil		28
T-1	A-10	456 kc. IF xformer		29
T-2	A-11	" " "		30
T-3	A-2	Output "		31
LP-1	A-30	Lamp, 6v, 0.15A.		32
SP-1	A-2	P.M. speaker		33
PG-1	A-55	Power plug		34
				35
S-1	A-96	Power switch		36
V-1	A-22	Vac. tube, 12SA7-GT/G		37
V-2	A-23	" " 12SK7- "		38
V-3	A-24	" " 12SQ7 "		39
V-4	A-25	" " 50L6-GT		40
V-5	A-26	" " 35Z5-GT/G		41

MODEL 1583

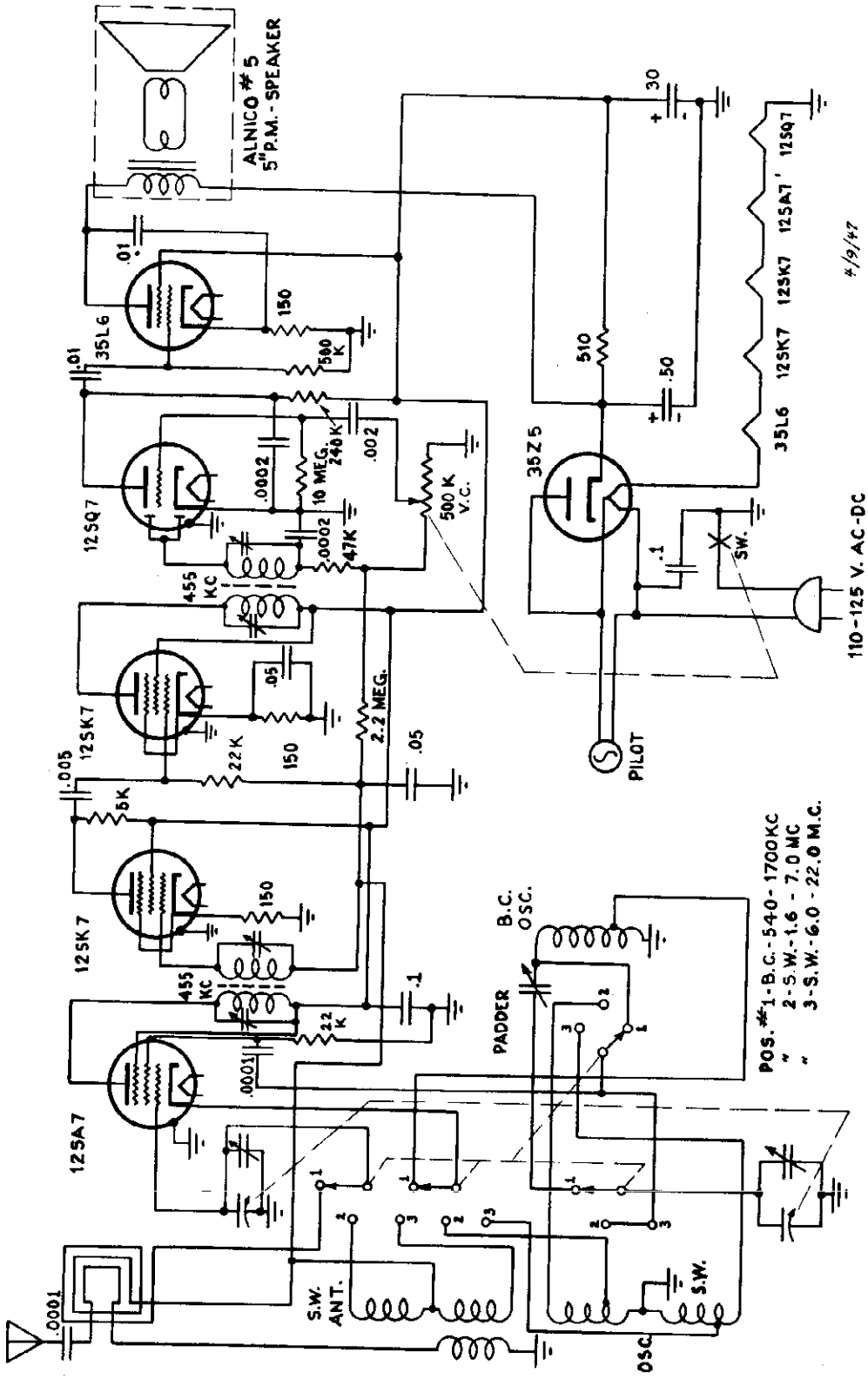
CORONET RADIO & TELEV. CO.



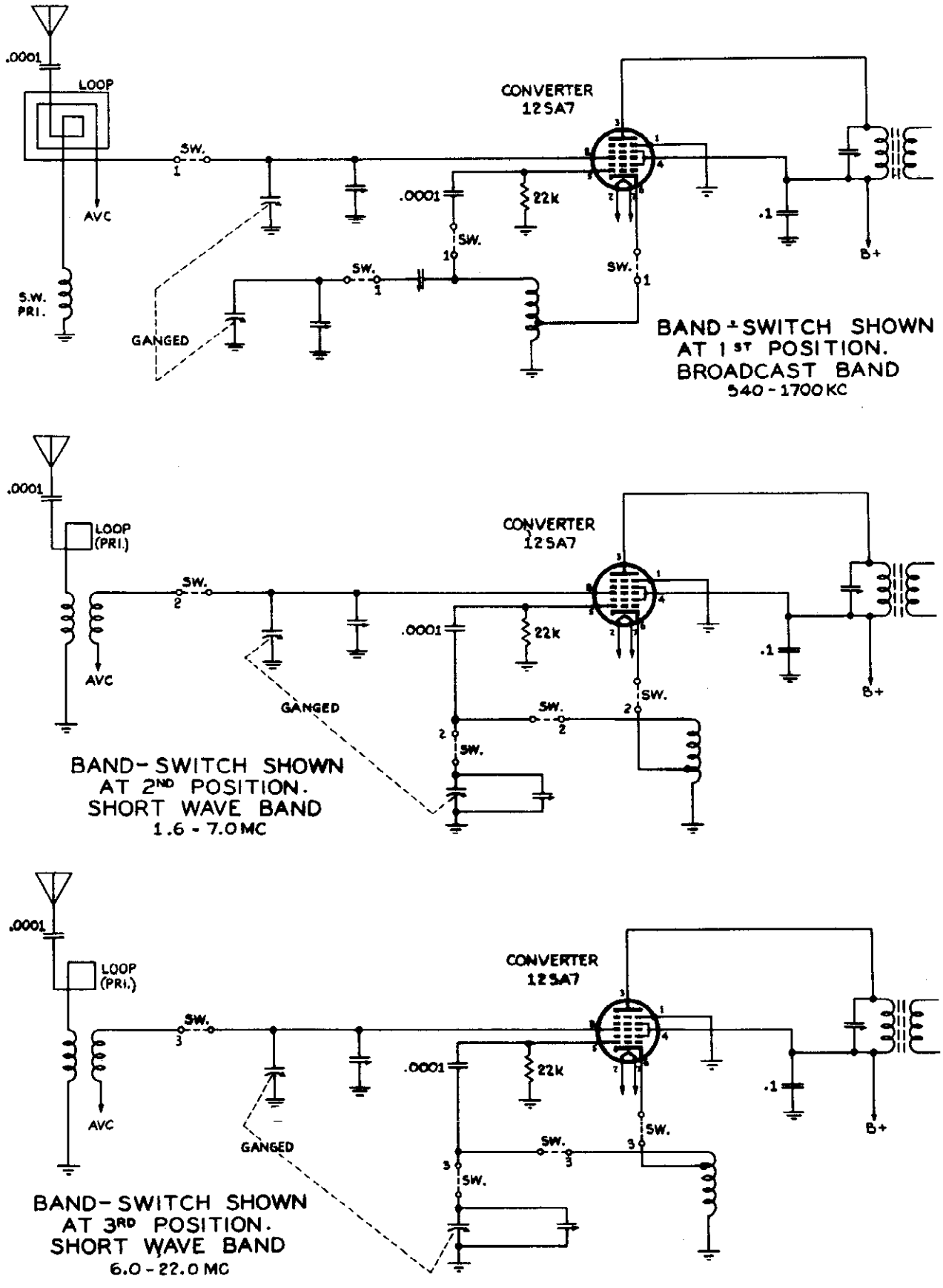
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1720 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
6 - 14 MC.

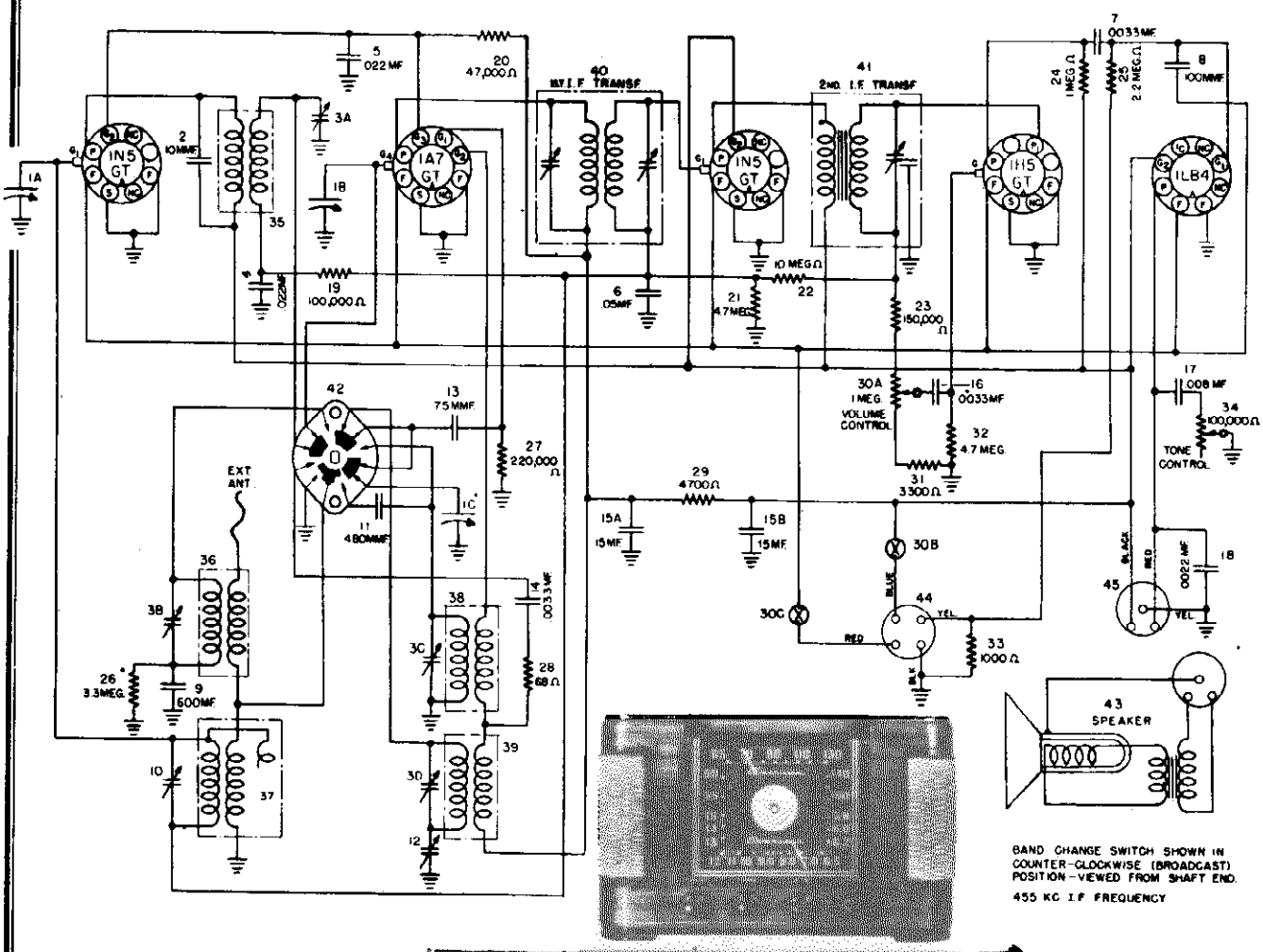

ALNICO # 5
5" P.M. - SPEAKER
35L6
12SQ7
12SK7
12SA7
35Z5
12SQ7
12SA7
12SK7
12SK7
35L6
PILOT
SW.
110-125 V. AC-DC
500 K V.C.
10 MEG.
240K
2.2 MEG.
22K
47K
455 KC
B.C. OSC.
PADDER
S.W. ANT.
S.W.
OSC.
POS. #1 - B.C. - 540 - 1700 KC
" 2 - S.W. - 1.6 - 7.0 MC
" 3 - S.W. - 6.0 - 22.0 M.C.
4/9/47

MODEL 1701 CORONET RADIO & TELEV. CO.



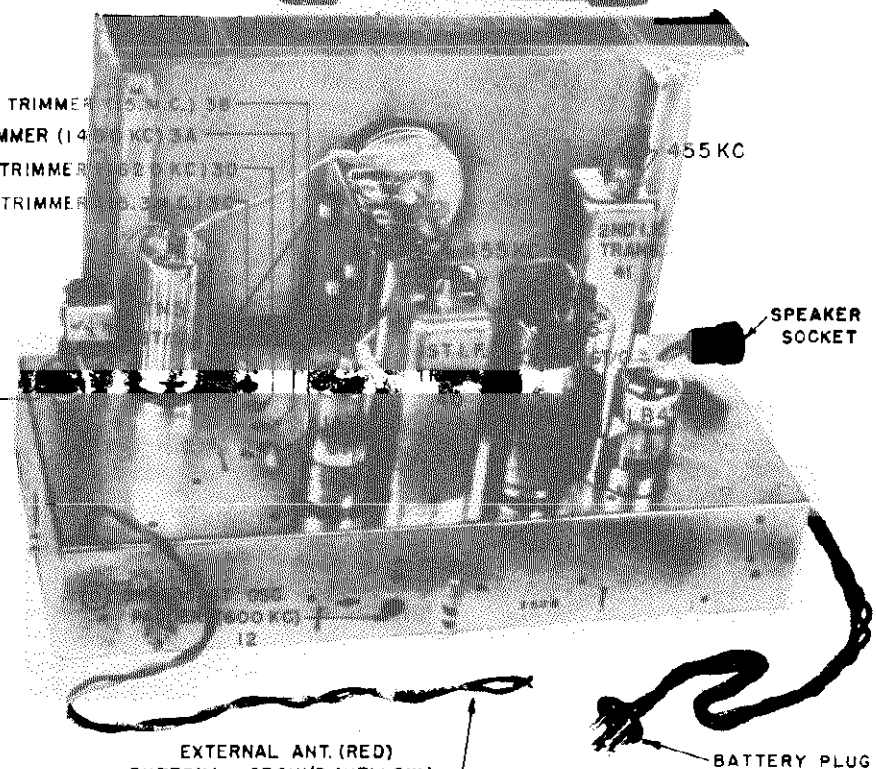
CROSLEY DIV.
AV CO MFG. CORP.

MODEL 56FC



BAND CHANGE SWITCH SHOWN IN COUNTER-CLOCKWISE (BROADCAST) POSITION - VIEWED FROM SHAFT END.

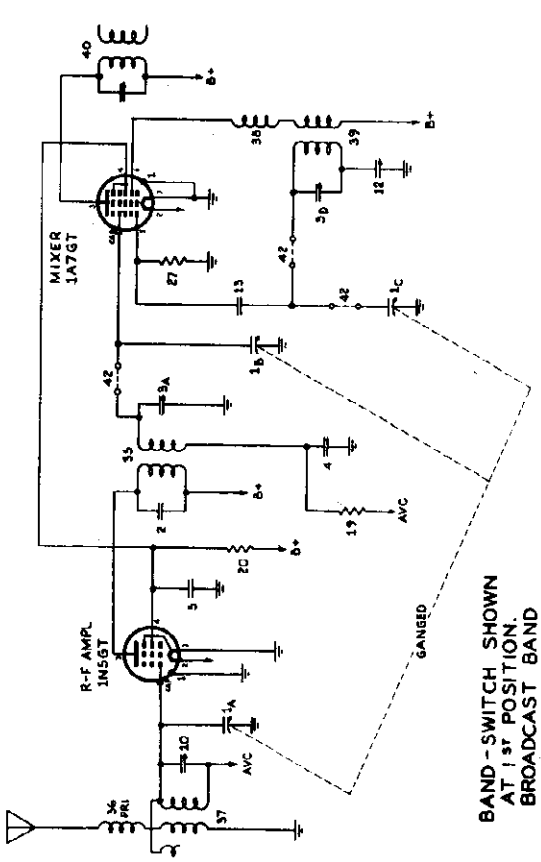
455 KC I.F. FREQUENCY



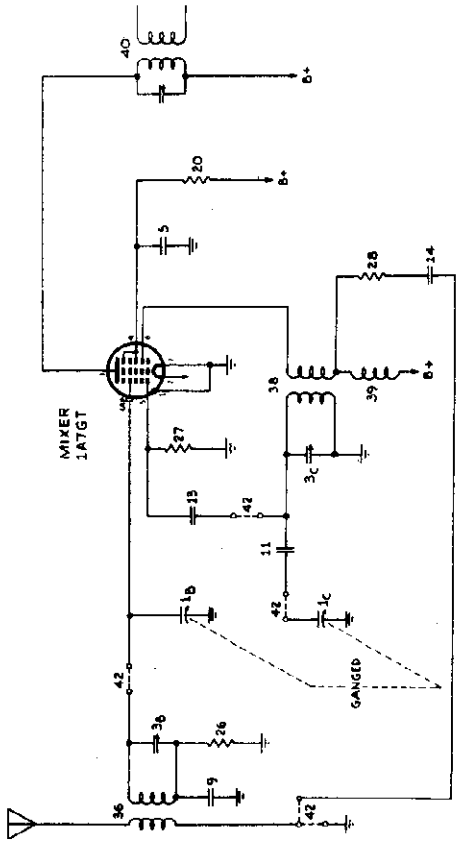
"clarified schematics"

MODEL 56FC
MODEL 56TX-L

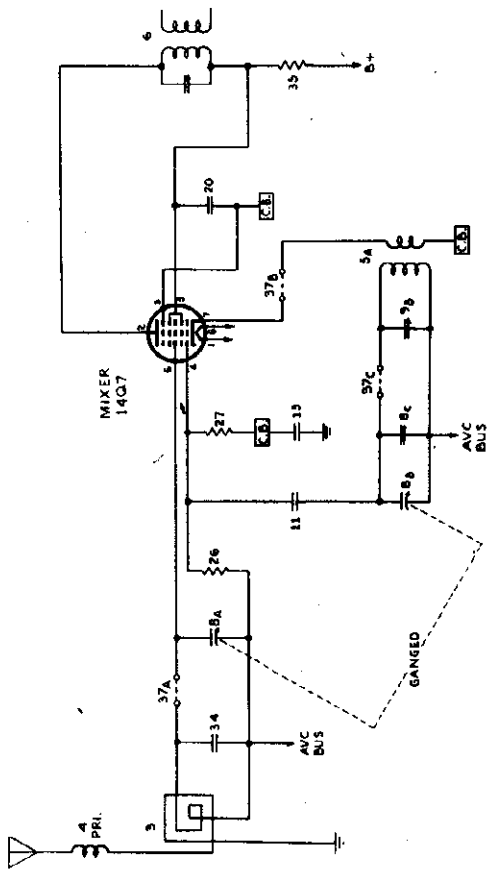
CROSLEY DIV.
AVCO MFG. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600KC

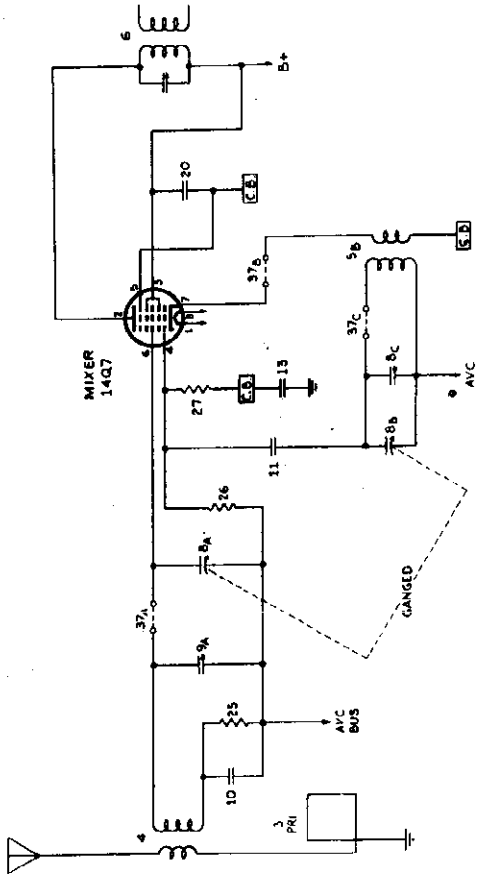


BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.



DENOTES COMMON BUS ABOVE GROUND BY C_{13} (.1 μf)

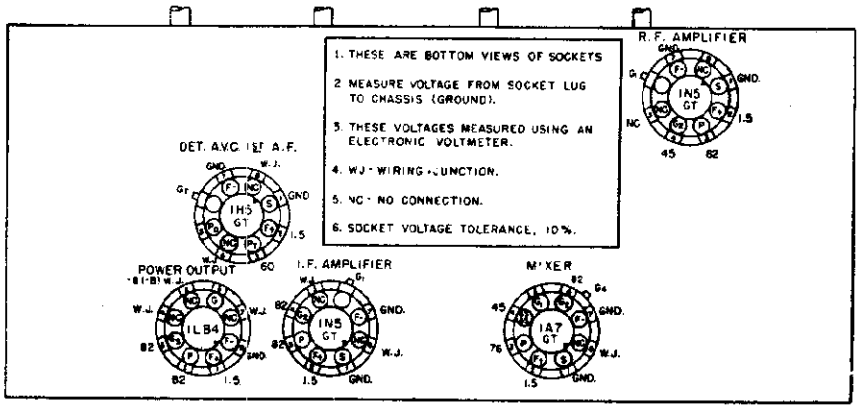
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600KC



DENOTES COMMON BUS ABOVE GROUND BY C_{13} (.1 μf)

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.

SOCKET VOLTAGE CHART



PARTS LIST—MODEL 56FC

Item No.	Part No.	Description
1A	AC-134898	Condenser (Variable) Three
1B		Condenser (Variable) Section
1C		Condenser (Variable) Assembly
2	39004-1	Condenser, 10 mmf., 500v., Mica
3A	B-132386-12	Condenser (Trimmer) Four
3B		Condenser, Trimmer Section
3C		Condenser, Trimmer Assembly
3D		Condenser, Trimmer
4	39001-80	Condenser, .02 mfd., 600v., Paper
5	39001-80	Condenser, .02 mfd., 600v., Paper
6	39001-17	Condenser, .05 mfd., 600v., Paper
7	39001-76	Condenser, .003 mfd., 600v., Paper
8	39001-1	Condenser, 100 mmf., 600v., Paper
9	GC-210685-99	Condenser, 660 mmf., 300v., Mica
10	W-49652-15	Condenser, Trimmer
11	GC-210685-138	Condenser, 480 mmf., 500v., Mica
12	W-135130	Condenser, Padder
13	B-225638-54	Condenser, 75 mmf., 500v., Mica
14	39001-76	Condenser, .003 mfd., 600v., Paper
15A	W-49664	Condenser, 15 mfd., 140 w.v. (Two Elect. Section)
15B		Condenser, 15 mfd., 140 w.v. (Elect. Filter)
16	39001-76	Condenser, .003 mfd., 600v., Paper
17	39001-78	Condenser, .006 mfd., 600v., Paper
18	39001-74	Condenser, .002 mfd., 600v., Paper
19	39294-25	Resistor, 100,000 ohm, ½ w.
20	39294-23	Resistor, 47,000 ohm, ½ w.
21	39294-35	Resistor, 4.7 megohm, ½ w.
22	39294-37	Resistor, 10 megohm, ½ w.
23	39294-26	Resistor, 150,000 ohm, ½ w.
24	39294-31	Resistor, 1 megohm, ½ w.
25	39294-33	Resistor, 2.2 megohm, ½ w.
26	39294-34	Resistor, 3.3 megohm, ½ w.
27	39294-27	Resistor, 220,000 ohm, ½ w.
28	39294-6	Resistor, 68 ohm, ½ w.
29	39294-17	Resistor, 4700 ohm, ½ w.
30A	B-130520-3	Control (Volume (1 megohm)
30B		Switch (Plate Supply) Assy.
30C		Switch (Filament Supply)
*	39384-8	Control (Volume)
*	39369-2	Switch (Plate Supply)
		Switch (Filament Supply)
31	39294-16	Resistor, 3300 ohm, ½ w.
32	39294-36	Resistor, 4.7 megohm, ½ w.
33	39014-25	Resistor, 1000 ohm, ½ w.
34	B-135198	Control, Tone (100,000 ohm)
*	39368-5	Control, (Tone)
35	AW-135133	Coil Assembly (R. F.)
36	AW-135147	Coil Assembly (H. F. Ant.)
37	AW-135134	Coil Assembly (B. C. Ant.)
38	AW-135140	Coil Assembly (H. F. Osc.)
39	AW-135141	Coil Assembly (B. C. Osc.)
40	AW-132803	Transformer (1st I. F.)
41	AW-132804	Transformer (2nd I. F.)
42	B-135079	Switch (Band Change)
43	C-135199	Speaker and Transformer Assembly
44	B-130493	Cable and Plug (Battery)
45	W-132822	Cable and Plug (Speaker)
	W-135371	Socket (1 LB4 Tube)
	G-39204	Socket (Tube)
	W-46447-1	Shield (Tube)
	CR69	"A-B" Battery Pack
	AW-135172	Dial Face Assembly
	B-134571	Pointer (Dial)
	W-134667	Clip (Dial Pointer)
	W-134917	Shaft (Drive)
	W-51071	Ring (Retaining)
	W-134916	Washer (Spring)
	W-51752	Spring (Dial Cord)
	D-133928	Cabinet
	C-132688	Lens (Dial)
	W-130197	Knob
	W-45580	Rubber Mtg.
	39220-38	Screw (Chassis Mtg.)

*These parts will replace the original equipment parts.

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the antenna lead (red) as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment Sequence	Signal Generator Output: Frequency in kc.	Signal Generator Output: In Series with	Signal Generator Output: To	Position of: Band Switch	Position of: Tuning Dial	Adjust for Maximum Output
1	455	200 mmf.	Ant.	A	1,620	A & B
2	1,620	200 mmf.	Ant.	A	1,620	C
3	600	200 mmf.	Ant.	A	600	D
4	1,620	200 mmf.	Ant.	A	1,620	C
5	1,400	200 mmf.	Ant.	A	1,400	E & F
6	600	200 mmf.	Ant.	A	600	D
7	15,300	400 ohms	Ant.	O	15,300	G*
8	15,000	400 ohms	Ant.	O	15,000	H

* **NOTE:** When aligning the short-wave oscillator trimmer (G), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

TYPE: Five-tube, two-band superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at O.)

INTERMEDIATE FREQUENCY: 455 kc.

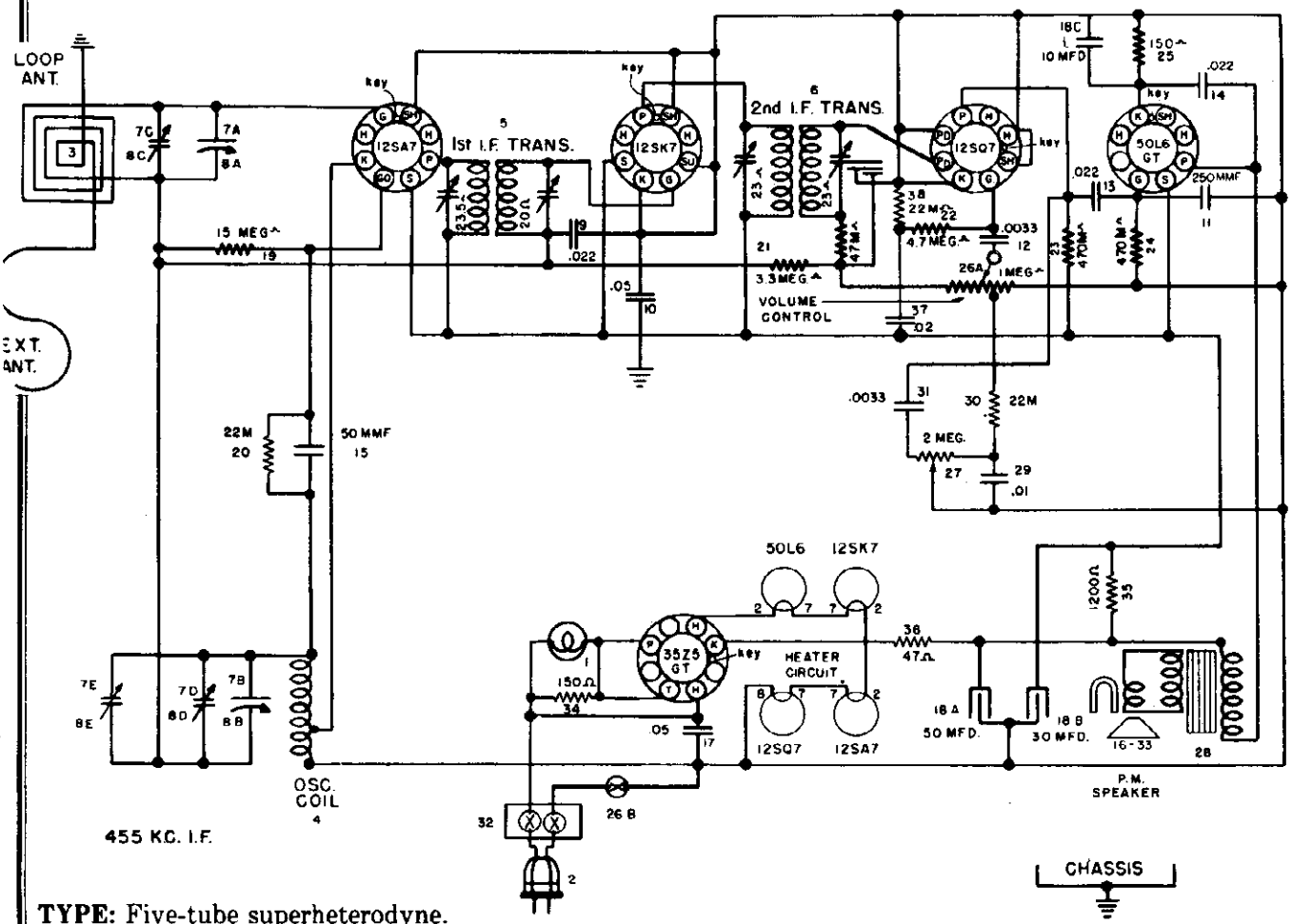
POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.

VOLTAGE RATING: 1½ v. "A"; 90 v. "B"

POWER OUTPUT: 170 mw. minimum.

MODEL 56TD

CROSLEY DIV.
AVCO MFG. CORP.



TYPE: Five-tube superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

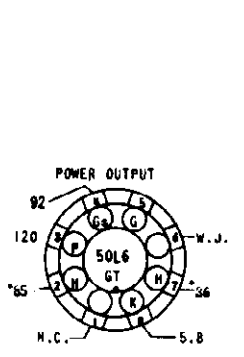
POWER SUPPLY: a. c.—d. c.

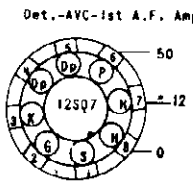
VOLTAGE RATING: 105-125 volts.

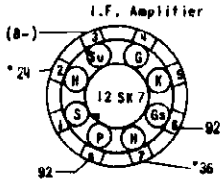
POWER CONSUMPTION: 30 watts.

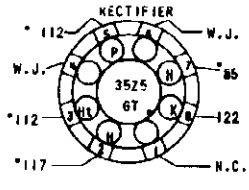
POWER OUTPUT: 2 watts maximum.

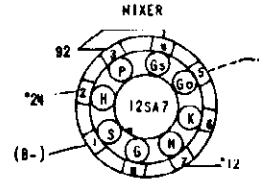
SOCKET VOLTAGE CHART











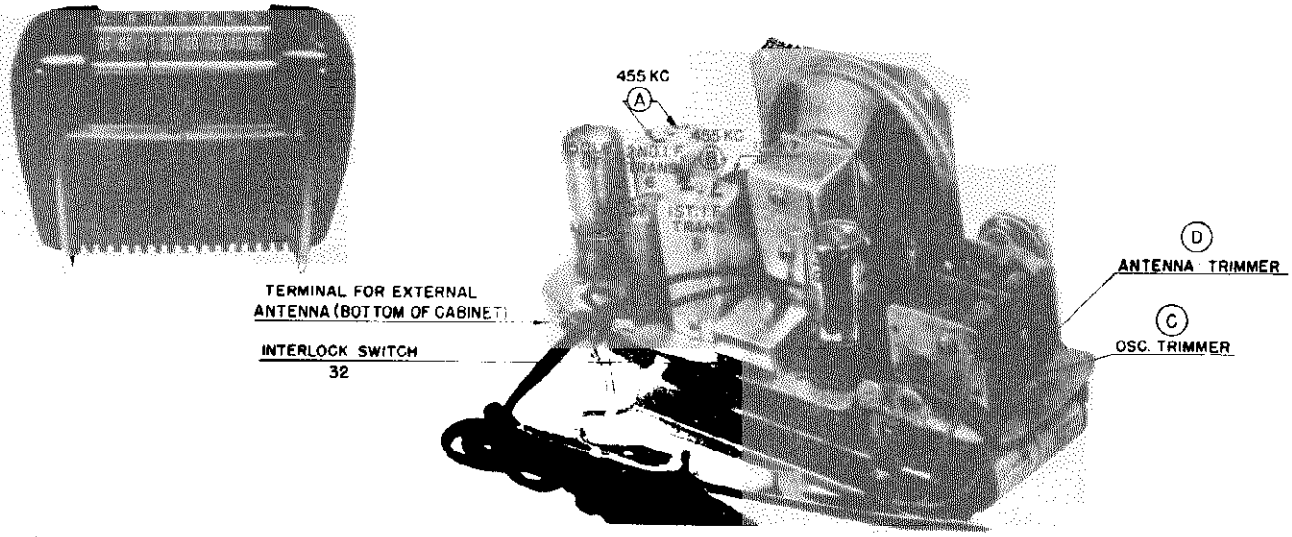
NOTES:
1. Bottom view of tube sockets.
2. Measure voltages from socket lug to (B-) (Pin 3 on the 12SK7).
3. Voltages are measured with an Electronic Voltmeter.
4. W.J. - Wiring Junction.
5. N.C.- No Connection.
6. * - A.C. Voltages
7. Voltage Tolerance, 10%
8. Line Voltage 117 V, 60 A.C.

OSCILLATOR GRID VOLTS	
FREQUENCY	VOLTS
540 KC	-7

January, 1947

For Parts List see P. 16-6

CROSLEY DIV.
AVCO MFG. CORP.



When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

Reversing the position of the power plug when alternating current is used may reduce power hum. *Under no circumstances should a ground be connected to this receiver.*

When checking or replacing tubes or aligning this receiver, the back of the cabinet must be removed. This is accomplished by removing the two screws located near the top of the cabinet back in the louvre recess. Remove the back carefully and do not exert too much pressure. When the back is removed it disengages the interlock safety switch (item 32 on schematic) and cuts off the power to the receiver. To turn on the radio when the back of the cabinet is removed, it is necessary to hold in the lever on the interlock switch and caution should be exercised not to come in contact with exposed wires on the chassis.

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna terminal screw, as indicated in the alignment chart. Connect the signal generator ground through a 0.1 mfd. condenser to—B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of Tuning Dial KC	Adjust for Maximum Outout
	Frequency in KC	In Series with	To		
1	455	200 mmf.	Ant.	1620	A & B
2	1620	200 mmf.	Ant.	1620	C
3	1400	200 mmf.	Ant.	1400	D

MODEL 56TD
MODEL 56TN-L
MODEL 56TX-L
MODELS 57TQ, 56TZ

CROSLEY DIV.
AVCO MFG. CORP.

PARTS LIST—MODEL 56TD

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W- 48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.		39368-18	Control (Volume)
2	C-132300-1	Cable and Plug (Power)	*{	39370-2	Shaft (Plug-in)
3	AC-136091	Antenna Loop Assy.		39369-1	Switch (Power)
4	AW-136058	Coil Assy. (Oscillator)	27	B-135892	Control, (2 megohm)
5	AW-137656	Transformer (1st I. F.)	*	39368-11	Control (Tone)
6	AW-137657	Transformer (2nd I. F.)	28	B-135388	Transformer (Output)
7 A	B-136810	Condenser, Variable { Two	29	39001-13	Condenser, .01 mfd., 600 v., paper
7 B		Condenser, Variable \ Section	30	39294-21	Resistor, 22,000 ohm, ½ w.
7 C	Part of Item 7A	Condenser, Trimmer	31	39001-76	Condenser, .003 mfd., 600 v., paper
7 D	Part of Item 7B	Condenser, Trimmer	32	W-135355	Switch (Interlock)
7 E	Part of Item 7B	Condenser, Trimmer	34	39294-8	Resistor, 150 ohm, ½ w.
9	39001-80	Condenser, .02 mfd., 600 v., paper	35	39015-26	Resistor, 1200 ohm, 1 w.
10	39001-17	Condenser, .05 mfd., 600 v., paper	36	W-137367	Resistor, 47 ohm, 1 w.
11	39001-73	Condenser, 250 mmf., 600 v., paper		G-39204	Socket, Tube
12	39001-76	Condenser, .003 mfd., 600 v., paper		39017-4	Socket, Dial Light
13	39001-80	Condenser, .02 mfd., 600 v., paper		AW-136809	Pulley and Pinion Drive Assy. (Var. Cond.)
14	39001-80	Condenser, .02 mfd., 600 v., paper			
15	B-226638-53	Condenser, 50 mmf., 500 v., ceramic		C-136827	Background, Dial
16	B-136767	Speaker		D-136828	Face, Dial
17	39001-17	Condenser, .05 mfd., 600 v., paper		W-134681	Roller, Drive Cord
18 A	B-136771	Condenser, 50 mfd., 150 w. v. { Three		W-51752	Spring, Drive Cord
18 B		Condenser, 30 mfd., 150 w. v. { Sec. Elec.		B-134657	Pointer, Dial
18 C		Condenser, 10 mfd., 25 w. v. { Filter		W-136916	Shaft, Drive
19	39294-38	Resistor, 15 megohm, ½ w.		W-134916	Washer, Spring (Drive Shaft)
20	39294-21	Resistor, 22,000 ohm, ½ w.		W-51071	Ring, Retaining (Drive Shaft)
21	39294-34	Resistor, 3.3 megohm, ½ w.		W-134055	Grommet
22	39294-35	Resistor, 4.7 megohm, ½ w.		AC-138163-1	Cabinet Assy.
23	39294-29	Resistor, 470,000 ohm, ½ w.		W-135387	Knob
24	39294-29	Resistor, 470,000 ohm, ½ w.		B-135275	Lens, Dial
25	39294-3	Resistor, 150 ohm, ½ w.		W-135630	Stud, Trimount
26 A	B-135388	Control, Volume (1 megohm) } Assy.	37	39001-80	Condenser, .02 mfd., 600 v., paper
26 B		Switch (Power) } Assy.	38	39294-21	Resistor, 22,000 ohm, ½ w.

*These parts will replace the original equipment parts.

PARTS LIST—MODEL 56TX-L

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48858	Bulb (Dial), Type 47, 6.3v., .15 amp.	26	39294-38	Resistor, 15 megohm, ½ w.
2	C-132300-1	Cable and Plug (power)	27	39294-21	Resistor, 22,000 ohm, ½ w.
3	AC-136091	Antenna Loop Assembly	29	39294-34	Resistor, 3.3 megohm, ½ w.
4	AW-136094	Antenna Coil Assembly	30	39294-23	Resistor, 47,000 ohm, ½ w.
5A	AW-136093	Coil (B. C. Oscillator) \ Two	31	39294-35	Resistor, 4.7 megohm, ½ w.
5B		Coil (H. F. Oscillator) / Section	33	W-137367	Resistor, 47 ohm, 1 w.
6	AW-136095	Transformer (1st I. F.)	34	Part of Item #3	Condenser (Antenna Trimmer)
7	AW-134158	Transformer (2nd I. F.)	35	39294-11	Resistor, 470 ohm, ½ w.
8A	B-136096	Condenser (Variable) \ Two	36	39015-26	Resistor, 1200 ohm, 1 w.
8B		Condenser (Variable) / Section	37A	W-49772-3	Switch (Band Change) Three
8C	Part of Item #8	Condenser (Trimmer)	37B		Switch (Band Change) Section
9A	AB-135088	Condenser (Trimmer) \ Two	37C		Switch (Band Change) Assembly
9B		Condenser (Trimmer) / Section	38	AB-137006	Speaker and Transformer Assembly
10	GC-210685-143	Condenser, 580 mmf., 300 v., Mica	38A	C-45845-6	Control, Volume (1 megohm) Assy.
11	39004-5	Condenser, 50 mmf., 500v., Mica	39B		Switch (Power)
13	39001-17	Condenser, .05 mfd., 600v., Paper	* {	39368-8	Control, Volume
14	39001-19	Condenser, .1 mfd., 600v., Paper		39369-1	Switch, Power
15	39001-17	Condenser, .05 mfd., 600v., Paper		W-135371	Socket, Tube
16	39001-28	Condenser, 250 mmf., 600v., Paper		39017-4	Socket Assembly (Dial Light)
17	39001-76	Condenser, .003 mfd., 600v., Paper		C-135175	Face (Dial)
		Two		B-134952	Pointer (Dial)
17A	W-134685	Condenser, 60 mfd., 150v., Section		W-134667	Clip (Dial Pointer)
17B		Condenser, 20 mfd., 100v., Elect.		W-134917	Shaft (Drive)
		Filter		W-51071	Ring (Retaining)
18	39001-80	Condenser, .02 mfd., 600v., Paper		W-134916	Washer (Spring)
19	39001-80	Condenser, .02 mfd., 600v., Paper		51752	Spring (Dial Cord)
20	39001-80	Condenser, .02 mfd., 600v., Paper		W-134055	Grommet
21	39294-29	Resistor, 470,000 ohm, ½ w.		AW-134738	Cabinet
22	39294-29	Resistor, 470,000 ohm, ½ w.		B-134610	Lens (Dial)
23	39294-3	Resistor, 150 ohm, ½ w.		W-134833	Knob
24	39294-7	Resistor, 100 ohm, ½ w.		W-136630	Stud, Trimount
25	39294-38	Resistor, 330,000 ohm, ½ w.		W-132124	Stud, Trimount

*These parts will replace the original equipment parts.

PARTS LIST—MODEL 56TN-L

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48858	Bulb (Dial Light), Type 47, 6.3v., .15 amp.	29	W-137367	Resistor, 47 Ohm, 1 W.
2	C-132300-1	Cable and Plug (power)	30	39281-34	Resistor, 3.3 megohm, ½ w.
3	AC-134283	Antenna Loop and Back Assembly	31	39281-23	Resistor, 47,000 ohm, ½ w.
4	AW-134994	Coil (H.F. Antenna)	32	39281-35	Resistor, 4.7 megohm, ½ w.
5A	AW-134993	Coil (B.C. Oscillator) \ Two	33	39281-29	Resistor, 470,000 Ohm, ½ w.
5B		Coil (H.F. Oscillator) / Section	34	39281-29	Resistor, 470,000 Ohm, ½ w.
6	AW-134065	Transformer (1st I.F.)	35	39281-8	Resistor, 150 Ohm, ½ w.
7	AW-134158	Transformer (2nd I.F.)	36	AD-138073	Speaker
9A	B-134995	Condenser (Variable) \ Two	37A	B-137026	Switch (Band Change) } Three
9B		Condenser (Variable) / Section	37B		Switch (Band Change) } Section
9C	Part of Item #9B	Condenser, Trimmer (H.F. Oscillator)	37C		Switch (Band Change) } Assy.
10	AB-135088	Condenser, Trimmer (H.F. Antenna)	38A	C-45845-6	Control, Volume (1 Megohm) } Assy.
11	GC-210685-143	Condenser, 580 mmf., 300 v., Mica	38B		Switch (Power) } Assy.
12	B-226638-58	Condenser, 50 mmf., 500 v., Mica	39	Part of Item #3	B. C. Ant. Trimmer
13	39001-63	Condenser, .022 mfd., 200 v., Paper	41	W-134939	Switch (Tone)
14	39001-67	Condenser, .1 mfd., 200 v., Paper	42	39001-10	Condenser, .0033 mfd., 600 v., Paper
15	39001-65	Condenser, .05 mfd., 200 v., Paper	43	39015-25	Resistor, 1200 Ohm, 1 W.
16	39001-73	Condenser, 250 mmf., 500 v., Mica		W-135371	Socket (Tube)
17	39001-10	Condenser, .0033 mfd., 600 v., Paper		39017-4	Socket Assembly (Dial Light)
		Two		C-135175	Face (Dial)
18A	B-136072	Condenser, 50 mfd., 140 V. } Section		B-134570	Pointer (Dial)
18B		Condenser, 30 mfd., 120 V. { Elect. Filter		W-134667	Clip (Dial Pointer)
				W-134917	Shaft (Drive)
				W-51071	Ring (Retaining)
19	39001-63	Condenser, .022 mfd., 200 v., Paper		W-134916	Washer (Spring)
20	39001-63	Condenser, .022 mfd., 200 v., Paper		W-51752	Spring (Dial Cord)
22	39001-63	Condenser, .022 mfd., 200 v., Paper		AB-134697	Toggle Arm and Link Assembly
23	Part of Item #10	Condenser, Trimmer (B.C. Oscillator)		W-49829	Spring (Lock)
24	39281-11	Resistor, 470 Ohm, ½ w.		W-136630	Stud (Trimount)
25	39281-8	Resistor, 150 Ohm, ½ W.		D-137113	Cabinet
26	39281-23	Resistor, 330,000 Ohm, ½ w.		B-134610	Lens (Dial)
27	39281-38	Resistor, 15 Megohm, ½ w		W-134882	Knob (Small)
28	39281-21	Resistor, 22,000 Ohm, ½ w.		W-134742	Knob, Tone (Large)

PARTS LIST—MODELS 56TZ, 57TQ

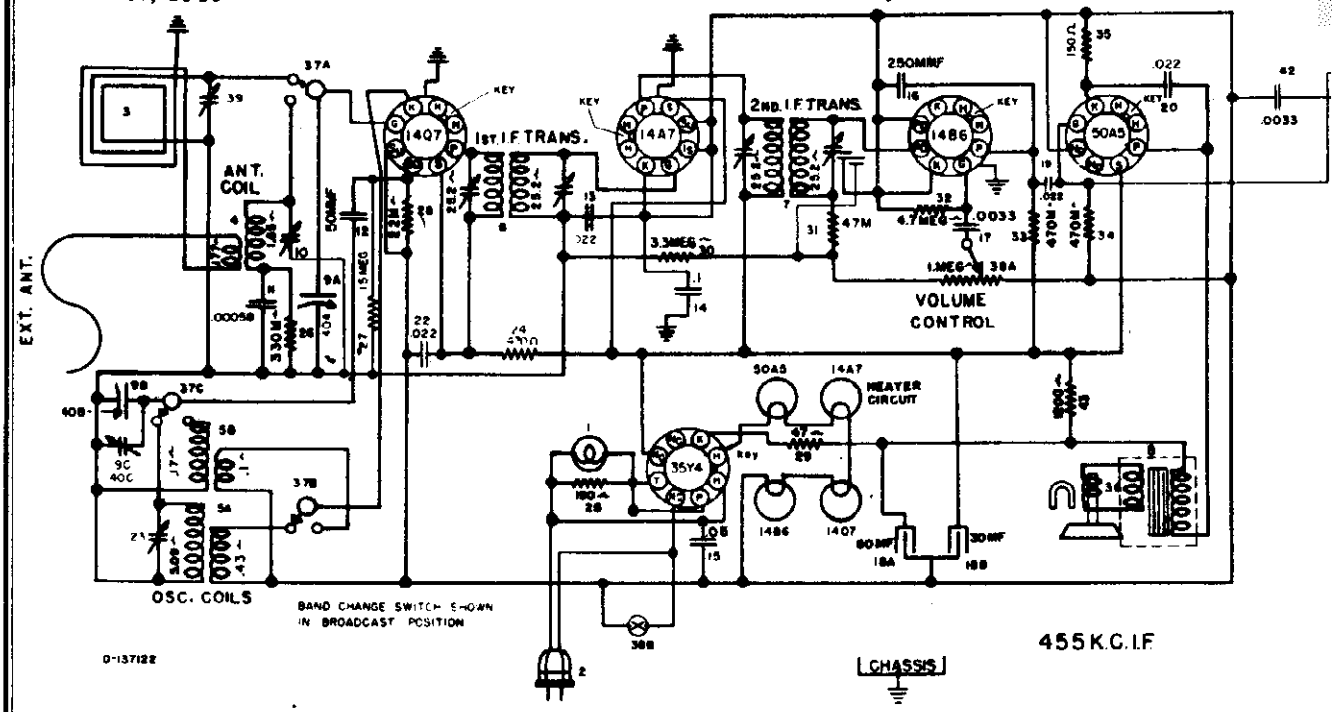
Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	29	39373-87	Resistor, 470,000 ohm, ½ w.
2	C-132300-1	Cable and Plug, Power	30	39373-16	Resistor, 150 ohm, ½ w.
3	AC-136093	Loop Assembly, Antenna	31A	B-135692	Control, Volume (1 megohm) } Assembly
4	AW-135730	Coil Assembly, Oscillator	31B		Switch, Power (Radio) } bly
5	AW-135729	Transformer, 1st I. F.	*	39368-14	Control, Volume
6	AW-135731	Transformer, 2nd I. F.		39369-1	Switch, Power (Radio)
7A	B-135670	Condenser, Variable { Two	32A	B-135641	Switch (Radio, Phono, Tone) } Assembly
7B		Condenser, Variable \ Section	32B		Switch, Power (Phono) } bly
7C	Part of Item 7B	Condenser, Trimmer	33	AD-136420	Speaker (Less Transformer)
9	39001-76	Condenser, .003 mfd., 600 v., Paper	34	B-137723	Transformer (Output)
10	39001-15	Condenser, .05 mfd., 600 v., Paper	35	D-138293	Record Changer (M-400)
11	39001-17	Condenser, .05 mfd., 600 v., Paper	38	W-137367	Resistor, 47 ohm, 1 w.
12	39001-15	Condenser, .1 mfd., 600 v., Paper	41	Part of Item #3	Condenser, Trimmer
13	39001-17	Condenser, .05 mfd., 600 v., Paper	‡‡4	39001-80	Condenser, .02 mfd., 600 v., Paper
14	39001-73	Condenser, 250 mmf., 600 v., Paper		G-39204	Socket, Tube
15	39001-76	Condenser, .003 mfd., 600 v., Paper		D-136565-15	Socket, Dial Light
16	39001-80	Condenser, .02 mfd., 600 v., Paper		AB-135575	Plate and Stud Assembly, Dial
17	39001-80	Condenser, .02 mfd., 600 v., Paper		W-135074	Pulley (Wood), Idler
‡18A	B-136779	Condenser, 50 mfd., 150 w.v. Two Section		W-131154-1	Cotter, External (Idler Pulley)
18B		Condenser, 30 mfd., 150 w.v. Elect. Filter		W-51752	Spring, Dial Drive Cord
‡18A	B-135733	Condenser, 50 mfd., 160 w.v. Three		B-135460	Pointer, Dial
**18B		Condenser, 20 mfd., 160 w.v. Section		B-135568	Shaft, Drive
18C		Condenser, 20 mfd., 150 w.v. Elect. Filter		W-51071	Ring, Retaining
19	39373-16	Resistor, 150 ohm, ½ w.		W-134916	Washer, Spring
20	39373-80	Resistor, 22,000 ohm, ½ w.		R-138310	Cabinet (56TZ)
21	39373-139	Resistor, 15 megohm, ½ w.		R-138596	Cabinet (57TQ)
22	39373-87	Resistor, 22,000 ohm, ½ w.		B-138318	Dial Glass
23	39373-95	Resistor, 220,000 ohm, ½ w.		D-138296	Escutcheon
24	39373-100	Resistor, 3.3 megohm, ½ w.		W-135929	Knob (Dial or Volume)
25	39373-144	Resistor, 1200 ohm, 1 w.		W-135930	Knob (Radio-Phono)
26	Part of Item #6	Resistor, 47,000 ohm, ½ w.		W-131697	Grommet (Speaker mtg.)
27	39373-93	Resistor, 4.7 megohm, ½ w.		AB-134935	Needle, Floating Jewel Assembly
28	39373-87	Resistor, 470,000 ohm, ½ w.		AB-138321	Lid Support (56TZ)

*These parts will replace the original equipment parts.
**These parts are used on 1st production models only.
‡These parts are used on 2nd production models only.

CROSLEY DIV.
AVCO MFG. CORP.

November, 1946

Under no circumstances should a ground be connected to this receiver.



TYPE: Five-tube, two-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c—d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: 1 watt minimum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 27 volts. **WITH E.M. SPEAKER**

RESISTANCE OF SPEAKER FIELD: 450 ohms

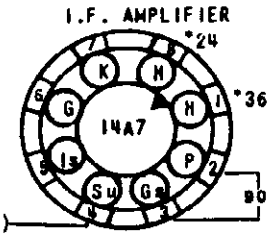
SPEAKER FIELD CURRENT: 60 ma.

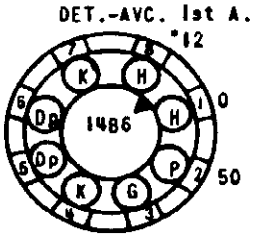
TUBE COMPLEMENT:

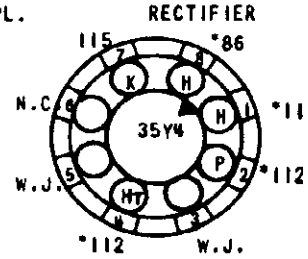
Type	Function
14Q7	Mixer
14A7	I. F. Amplifier
14B6	Detector, AVC, 1st A.F. Amplifier
50A5	A.F. Power Output
35Y4	Rectifier

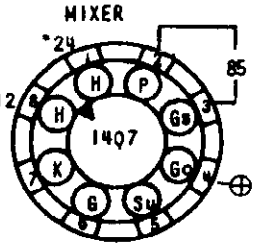
DIAL BULB: Type 47, 6.3 volts, .15 amp.

⊕ Oscillator Grid Voltage		
Band	Frequency	Volts
American	550KC.	-5.5
Overseas	5.7MC.	-4

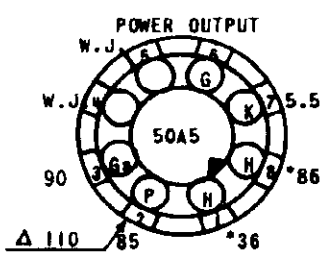






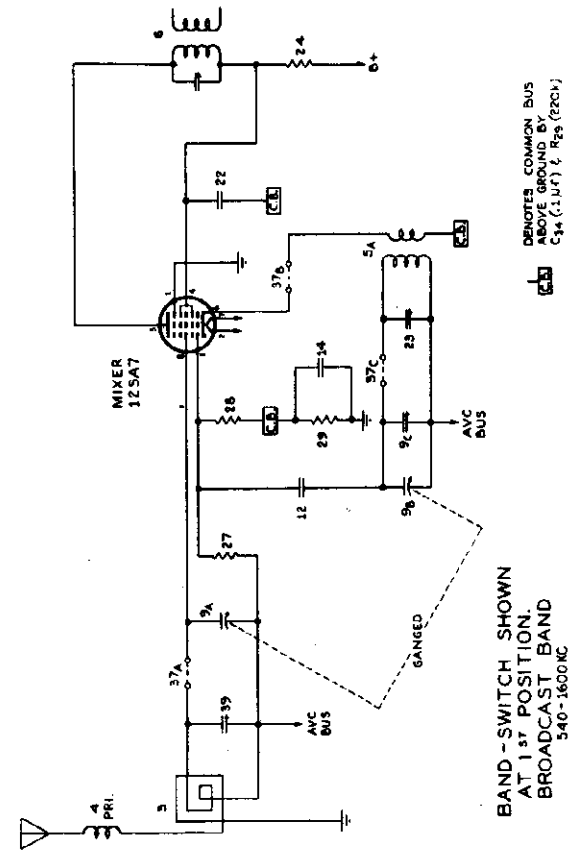


NOTES:
1. These are bottom views of sockets.
2. Measure voltages from socket lugs to -B (Pin 4 on the 14A7)
3. These voltages measured using an electronic voltmeter.
4. W.J. - Wiring Junction.
5. N.C.-No Connection.
6. * - 60 Cycle AC voltage.
7. Socket voltage tolerance, 10%.
8. All voltages are the same for receivers using E.M. or P.M. speakers except where marked with Δ ;. This voltages is for P.M. speakers only.

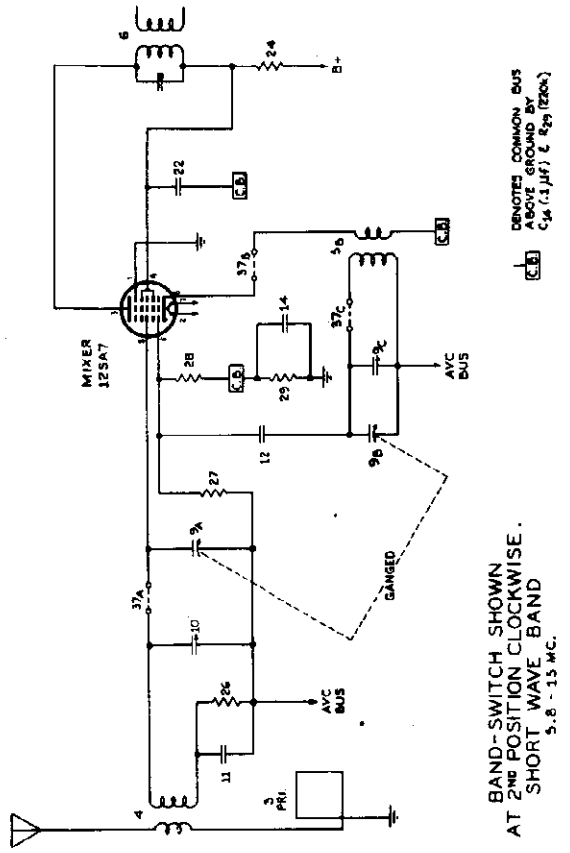


MODELS 56XIA, 56XIW
MODEL 56TN-L

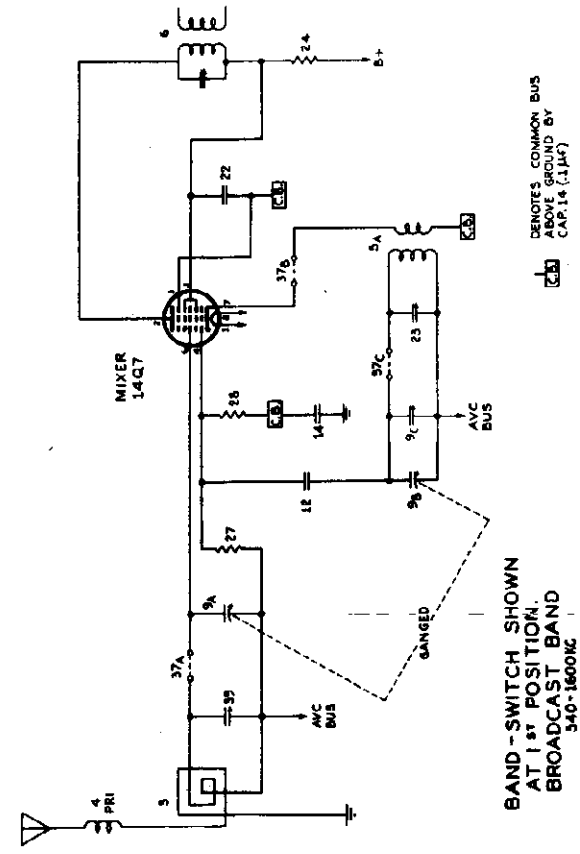
CROSLEY DIV.
AV CO MFG. CORP.



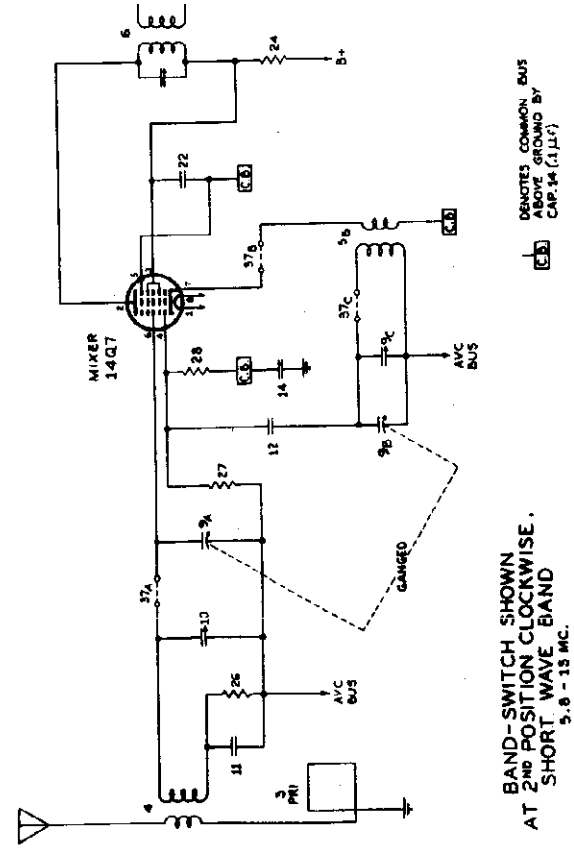
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600 KC



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.

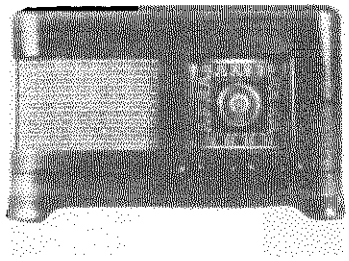


BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600 KC

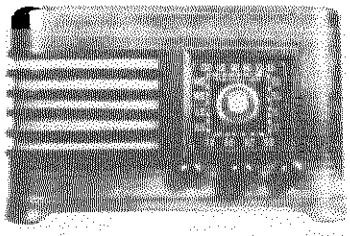


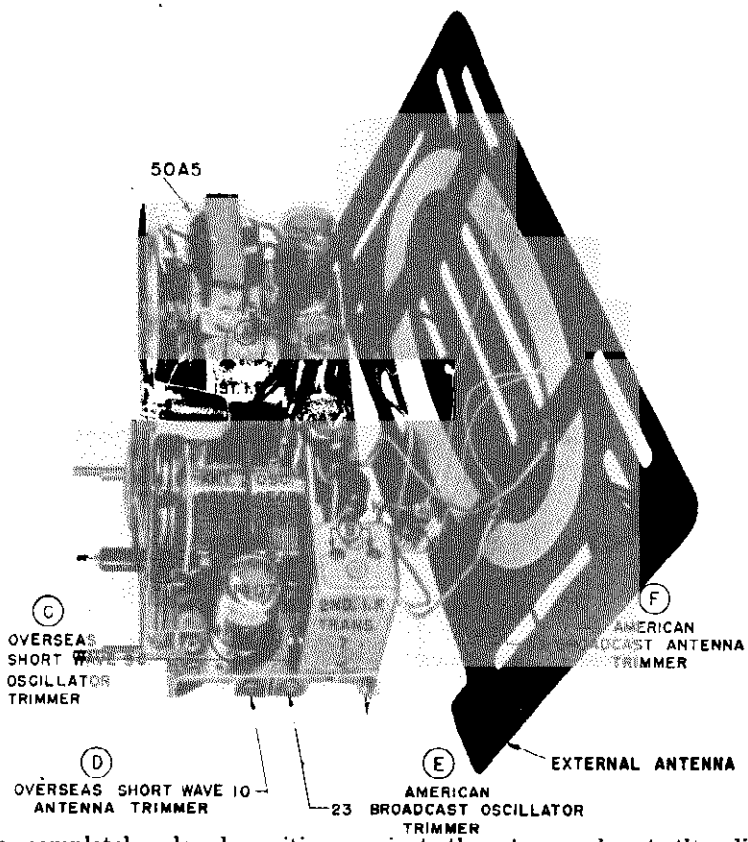
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.

CROSLEY DIV.
AVCOMFG. CORP.



Alternate Cabinet Design





1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	15,300	400 ohms	Ant.	O	15,300	C
3	15,000	400 ohms	Ant.	O	15,000	D
4	1,400	200 mmf.	Ant.	A	1,400	E & F

NOTE: When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

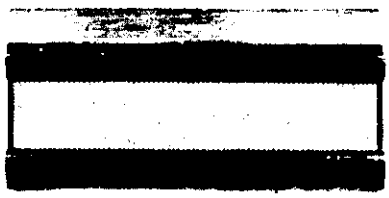
MODELS 57TQ, 56TZ
1st and 2nd Production

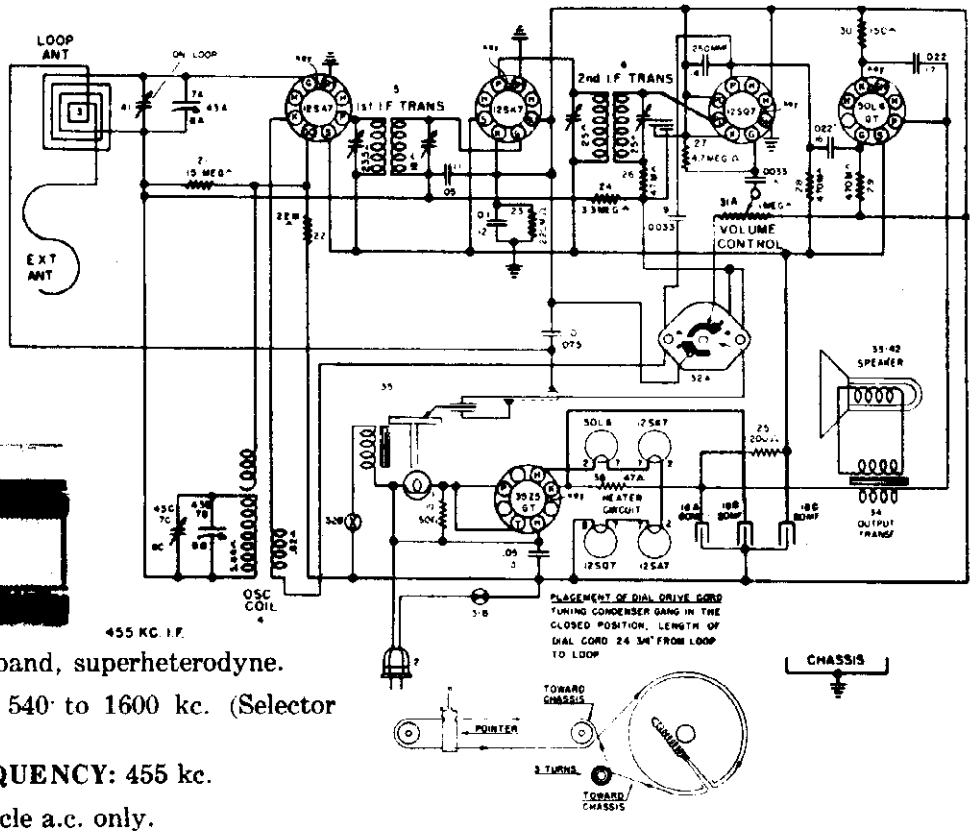
CROSLEY DIV.
AV CO MFG. CORP.

Under no circumstances should a ground be connected to this receiver.

January, 1947

56TZ





TYPE: Five-tube, single-band, superheterodyne.

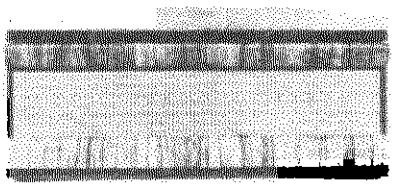
FREQUENCY RANGE: 540 to 1600 kc. (Selector switch at R.)

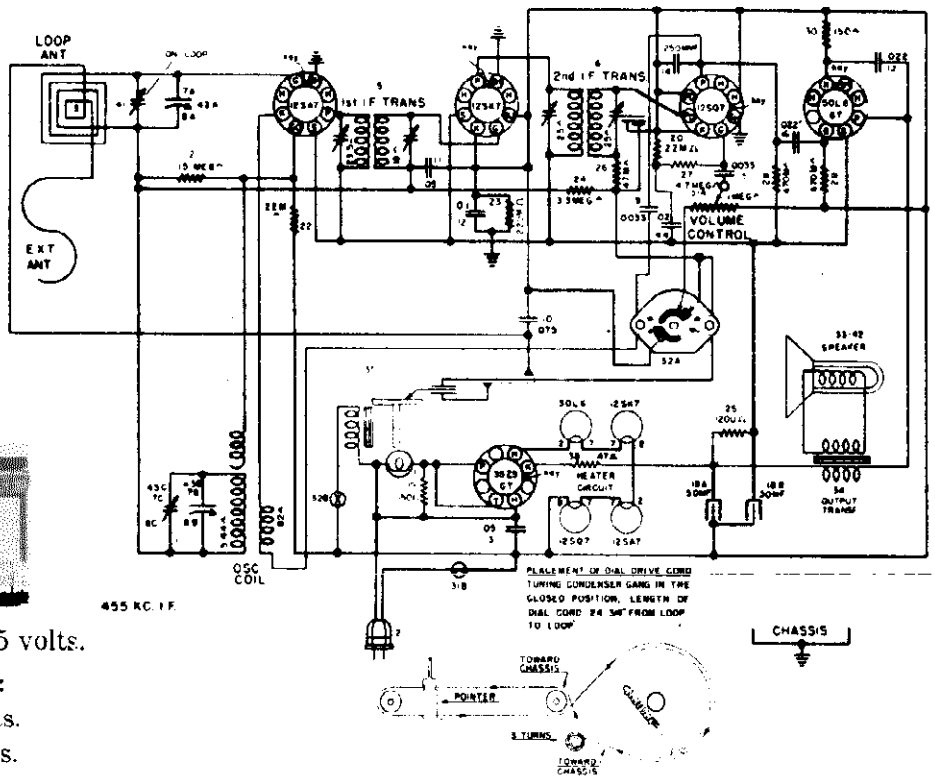
INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a.c. only.

SCHEMATIC DIAGRAM—MODELS 56TZ, 57TQ, 1st PRODUCTION

57TQ





VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

Radio position—30 watts.

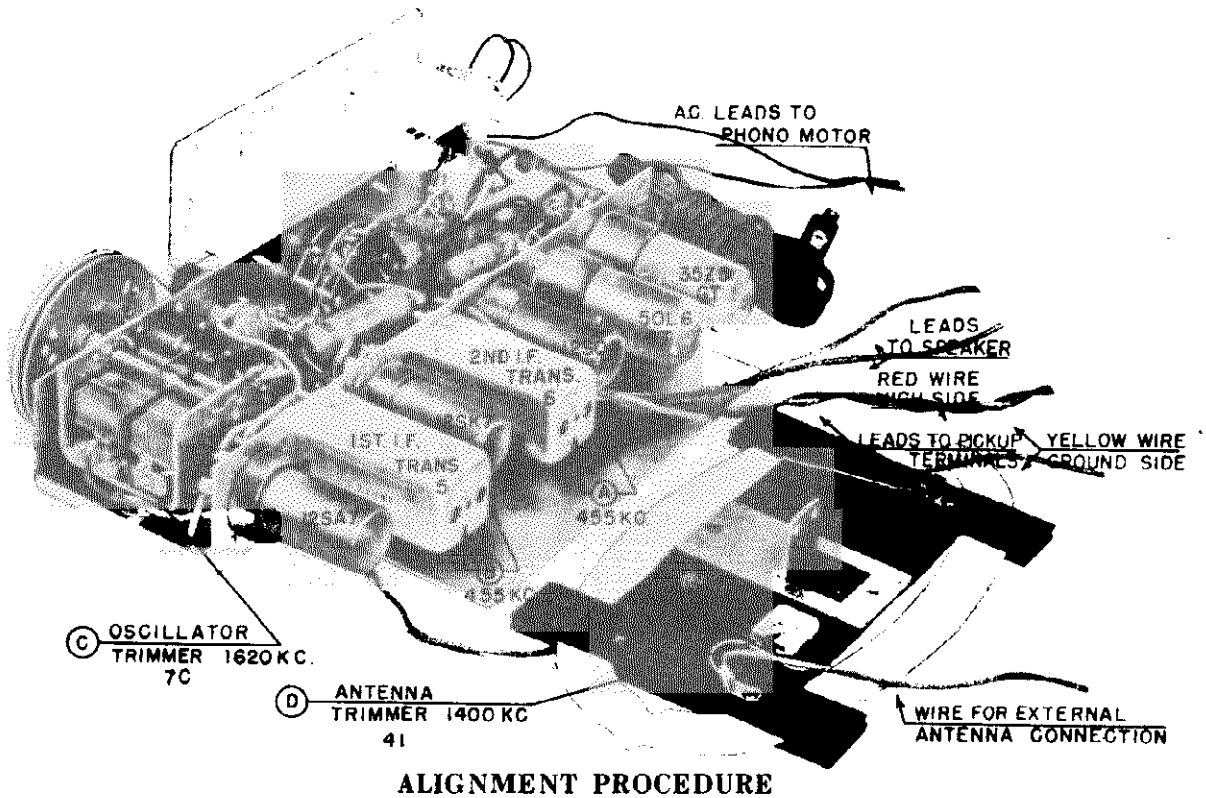
Phono position—45 watts.

POWER OUTPUT: 1.5 watts maximum.

SCHEMATIC DIAGRAM—MODELS 56TZ, 56TQ, 2nd PRODUCTION

For Parts List see P. 16-6

CROSLEY DIV.
AVCO MFG. CORP.



ALIGNMENT PROCEDURE

Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.

Turn the tone control to the normal tone position.

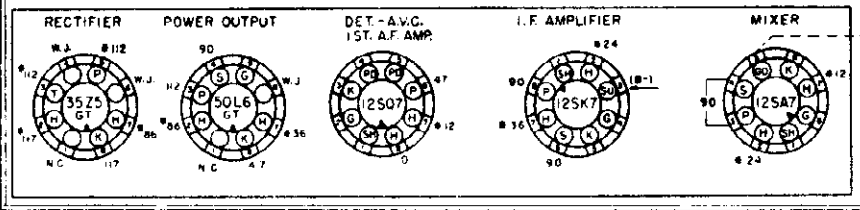
Connect the output meter across the speaker voice coil.

The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to—B (Pin 3 on 12SK7 tube socket).

Turn volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output: Frequency in kc.	Signal Generator Output: In Series with	Signal Generator Output: To	Position of: Selector Switch	Position of: Tuning Dial	Adjust for Maximum Output
1	455	200 mmf.	Ant.	R	1620	A & B
2	1620	200 mmf.	Ant.	R	1620	C
3	1400	200 mmf.	Ant.	R	1400	D

OSCILLATOR GRID VOLTAGE		
BAND	FREQUENCY	VOLTS
AMERICAN	540 KC	-5.5



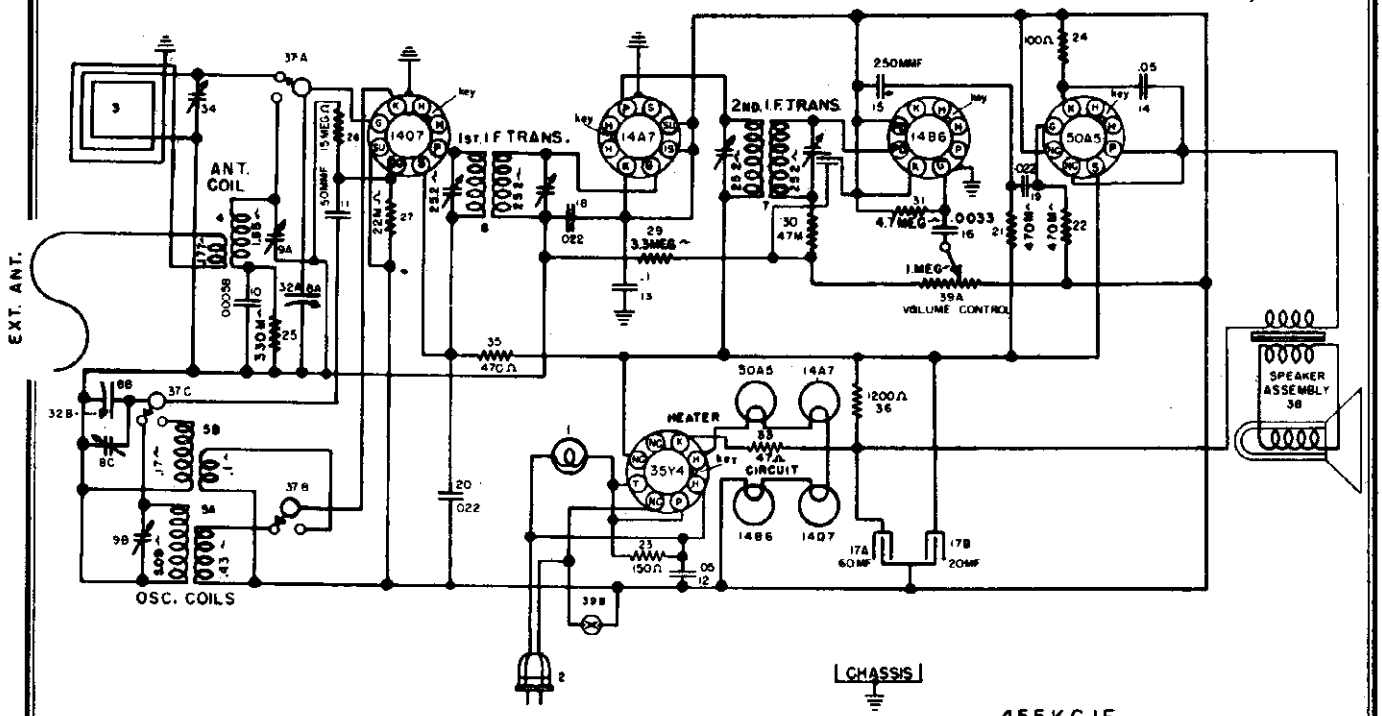
NOTES:
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO B-(PIN 3 ON THE 12SK7).
3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. — WIRING JUNCTION.
5. N.C. — NO CONNECTION.
6. # — 60 CYCLE A.C. VOLTAGES.
7. SOCKET VOLTAGE TOLERANCE, 10%.
8. LINE VOLTAGE 117 V, 60~ A.C.

MODEL 56TX-L

CROSLEY DIV.
AV CO MFG. CORP.

Under no circumstances should a ground be connected to this receiver.

October, 1946



455 K.C. I.F.

TYPE: Five-tube, two-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c—d.c.

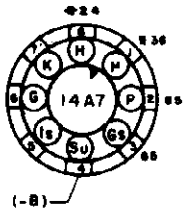
VOLTAGE RATING: 105-125 volts.

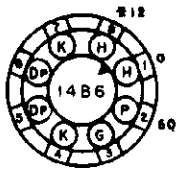
POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: 1.5 watts minimum.

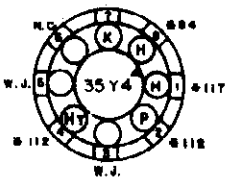
OSCILLATOR GRID VOLTAGES		
BAND	FREQUENCY	VOLTS
AMERICAN	540 KC	- 4.9
OVERSEAS	5.7 MC	- 3.8

I. F. AMPLIFIER DET. - A.V.C. - 1st A.F.

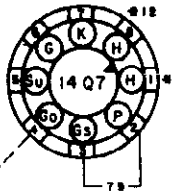


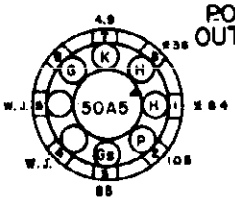


RECTIFIER



MIXER



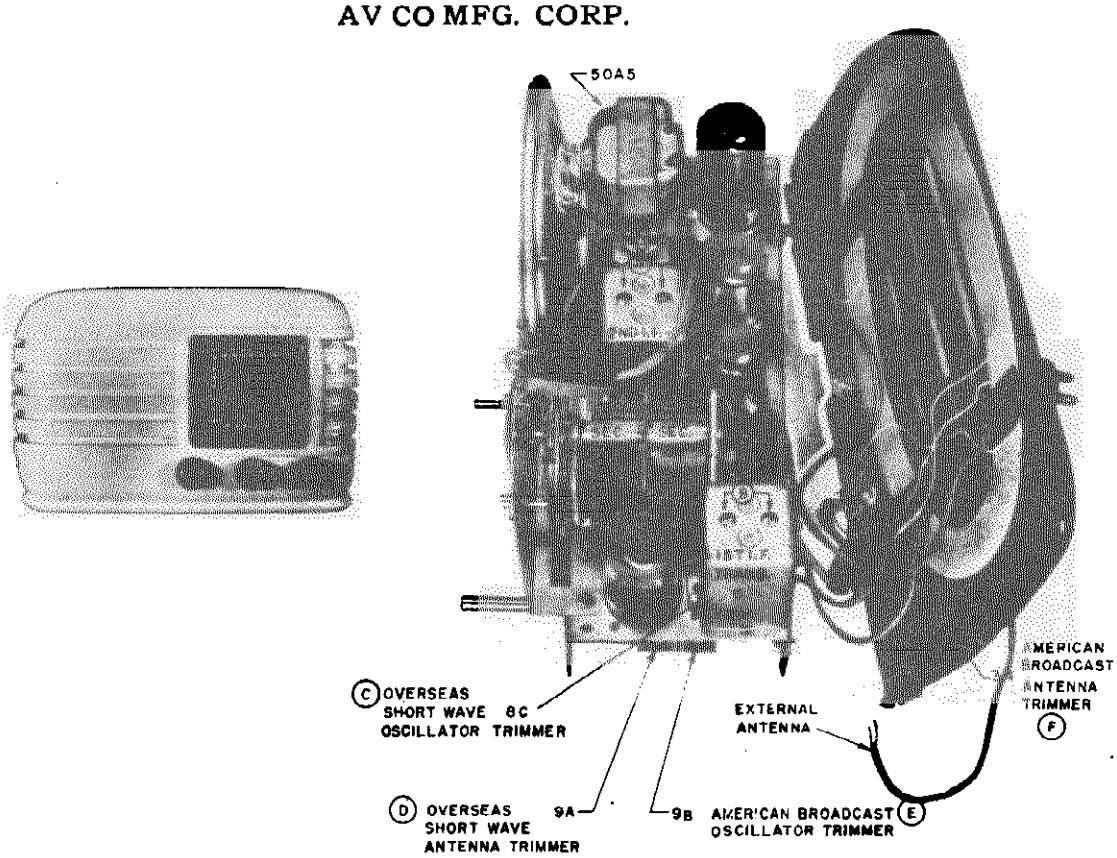


POWER OUTPUT

NOTES:
1. TUBE SOCKETS ARE BOTTOM VIEWS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO -B (PIN 4 ON THE 14A7)
3. VOLTAGES AS MEASURED WITH AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION
5. NC - NO CONNECTION
6. * - AC VOLTAGES
7. VOLTAGE TOLERANCE, 10%
8. LINE VOLTAGE 117V, 60 ∿ AC.

For Parts List, see P. 16-6

CROSLEY DIV.
AV CO MFG. CORP.



1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	Left	1,620	A & B
2	15,300	400 ohms	Ant.	Right	15,300	C
3	15,000	400 ohms	Ant.	Right	15,000	D
4	1,400	200 mmf.	Ant.	Left	1,400	E & F

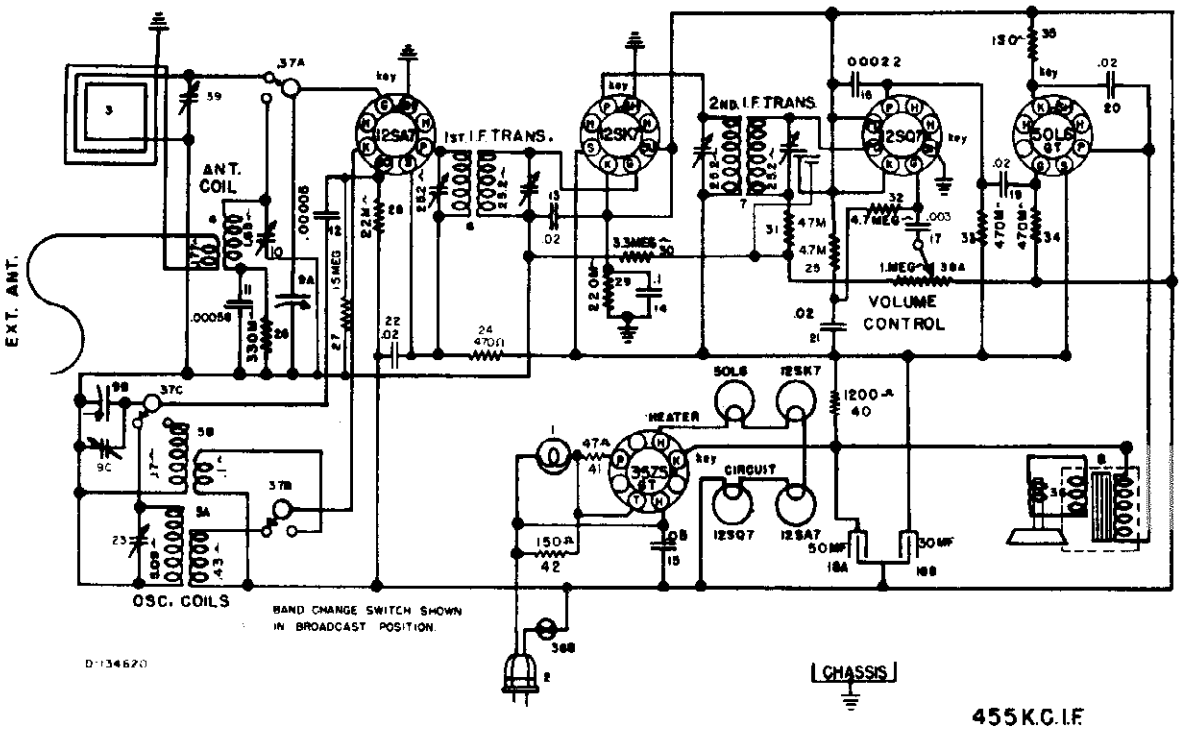
NOTE: When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

MODELS 56XTA, 56XTW

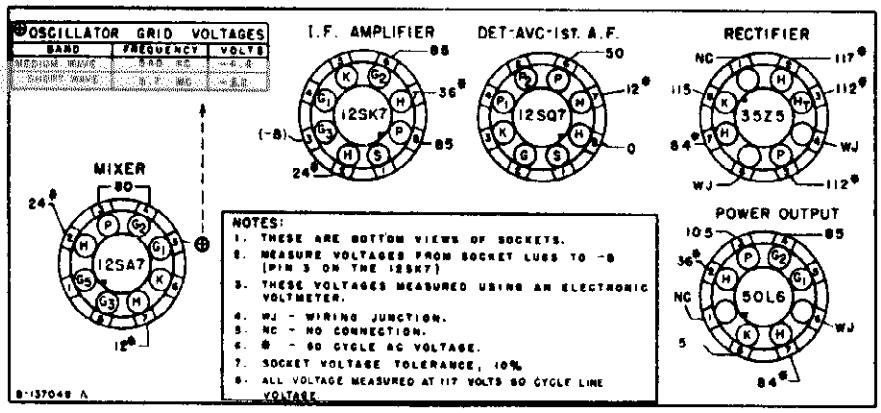
CROSLEY DIV.
AVCOMFG. CORP.

Under no circumstances should a ground be connected to this receiver.

November, 1946



SOCKET VOLTAGE CHART



Notas: El diagrama muestra el chasis visto por debajo, medir los voltajes de cada punto a B– (espiga 3 en el 12SK7) todos los valores de voltajes medidos con voltimetro al vacio.

WJ = borne de conexiones

NC = Sin conectar

* = Voltaje C. A.

Tolerancia—10%

Voltaje de linea: 117 voltios, 60 ciclos.

Voltaje de rejilla osciladora: onda media, 540 KC:—4.9
onda corta, 5.7 mc: 3.8

TIPO: Superheterodino, cinco tubos, dos bandas.

FRECUENCIAS: Banda de onda media 540 a 1600 KC (Interruptor de bandas hacia la izquierda)
Banda de onda corta: 5.8 a 15 mc (Interruptor de bandas hacia la derecha)

FRECUENCIA INTERMEDIA: 455 KC.

FUENTE DE ALIMENTACION: Corriente alterna y directa.

VOLTAJE: 105-125 voltios

CONSUMO: 35 watts.

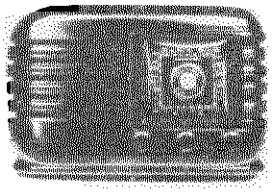
POTENCIA DE SALIDA: 1.5 watts mínima.

For English translation of Spanish, see Crosley Model 56TX-L

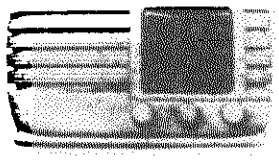
For Parts List see P. 16-19

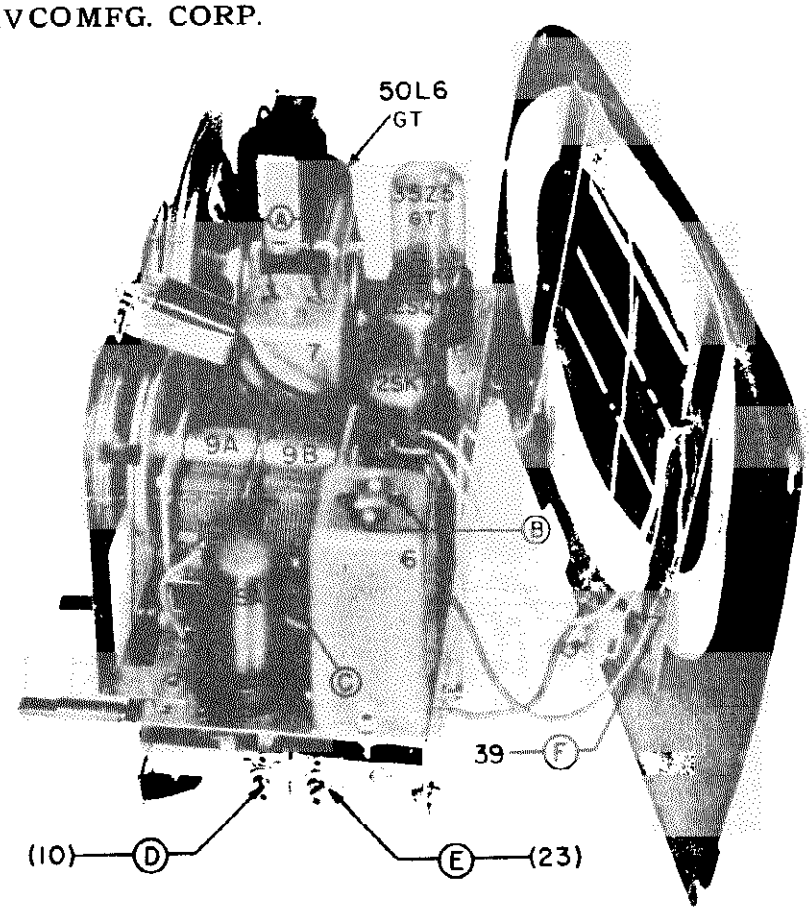
CROSLEY DIV.
AVCOMFG. CORP.

56XTA



56XTW





1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

For English translation, see Crosley 56TX-L

Orden de Ajustes	SALIDA DEL OSCILADOR			Interruptor de Bandas	Sintonia Cuadrante	Ajuste a Maximum
	Frecuencia en KC	En serie con	A			
1	455	200 mmfd	Ant	Izquierda	1,620	A y B
2	15,300	400 ohms	Ant	Derecha	15,300	C
3	15,000	400 ohms	Ant	Derecha	15,000	D
4	1,400	200 mmfd	Ant	Izquierda	1,400	E y F

Nota: Cuando ajuste el trimer (C) de onda corta asegúrese que el circuito sea ajustado a la frecuencia correcta y nó en la imagen que es 910 kilociclos más baja en el receptor. Para chequear: Sintonice la frecuencia del oscilador, aumente la salida del oscilador y sintonice la imagen en el receptor, la imagen debe ser más débil que la fundamental y estar 910 KC más abajo. Si no se puede sintonizar la imagen, el trimer del oscilador está mal ajustado, es decir el oscilador quizás esté ajustado a la imagen o algun harmónico de la frecuencia del oscilador. El pico correcto es el segundo que se escuche cuando se abre el tornillo de ajuste después de cerrarlo por completo.

MODELS 66CS, 66CSM
MODEL 66CS(s)

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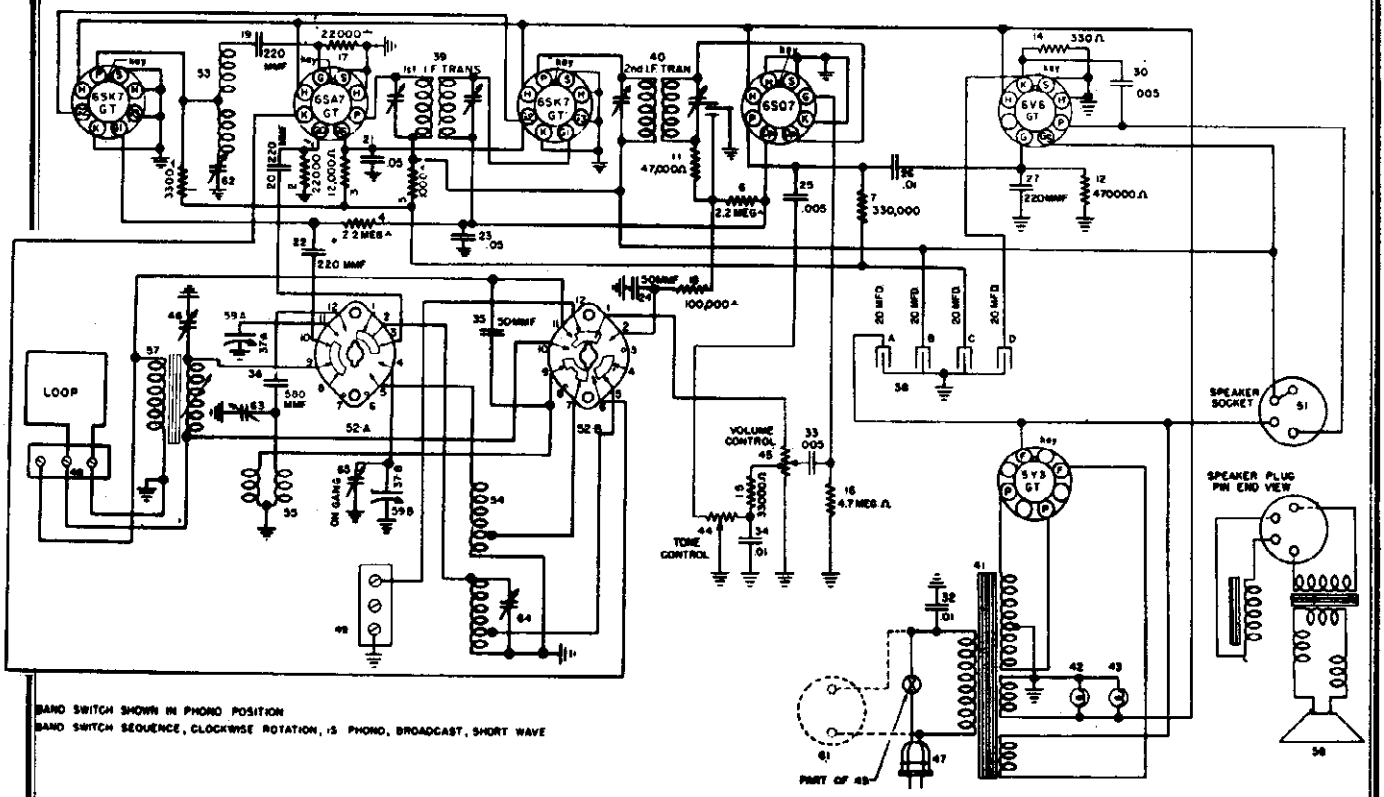
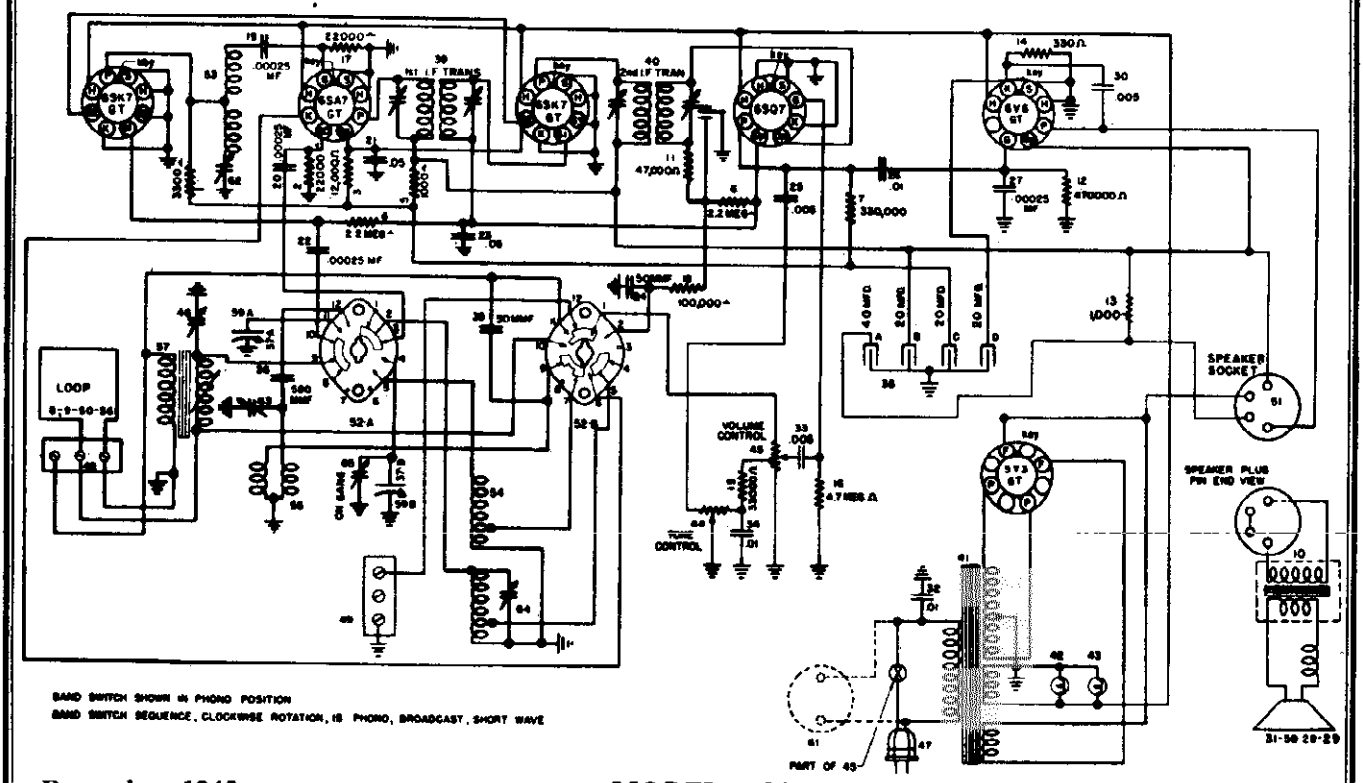
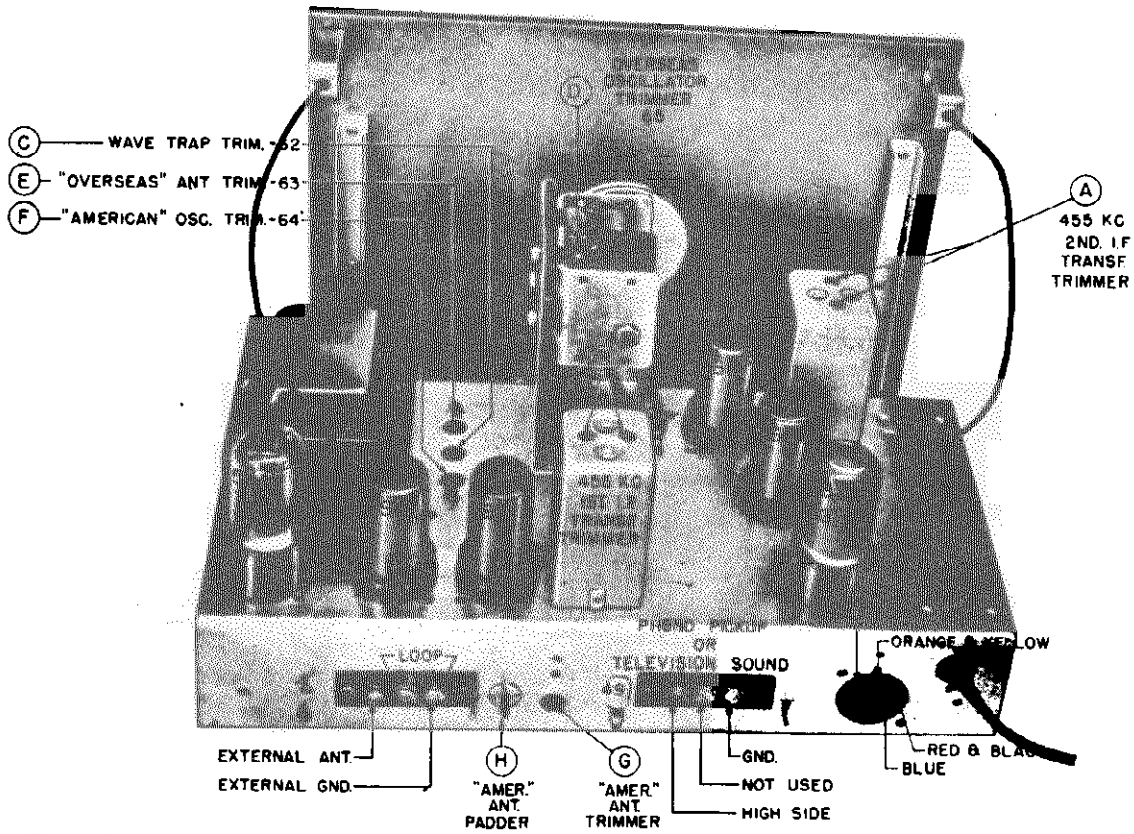


September, 1946 SCHEMATIC DIAGRAM—MODELS 66CS, 66CSM



December, 1946 MODEL 66CS (s)

CROSLEY DIV.
AV COMFG. CORP.



1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna post as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain the signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1620	A & B
2	455	200 mmf.	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf.	Ant.	A	1620	F
6	1400	200 mmf.	Ant.	A	1400	G
7	600	200 mmf.	Ant.	A	600	H
8	1400	200 mmf.	Ant.	A	1400	Recheck G

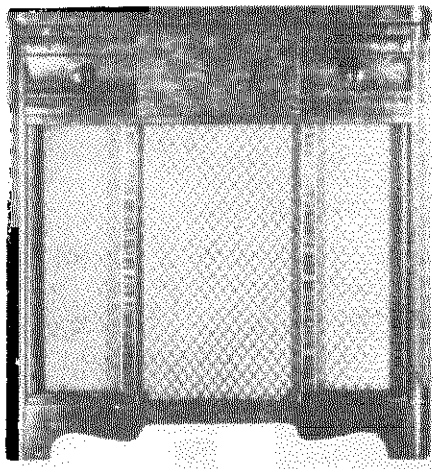
*Adjust for Minimum Output (Wave Trap).

NOTE: When aligning the "Overseas" oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak of the trimmer from the closed position.

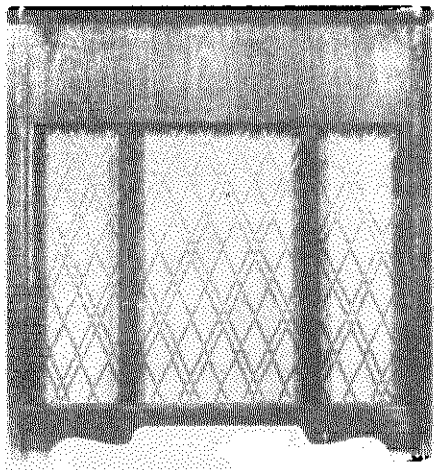
MODELS 66CS,66CSM
MODEL 66CS(s)

CROSLEY DIV.
AV CO MFG. CORP.

66CS



66CSM



TYPE: Six-tube, two-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a. c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 60 watts maximum.

POWER OUPUT: 4.5 watts minimum.

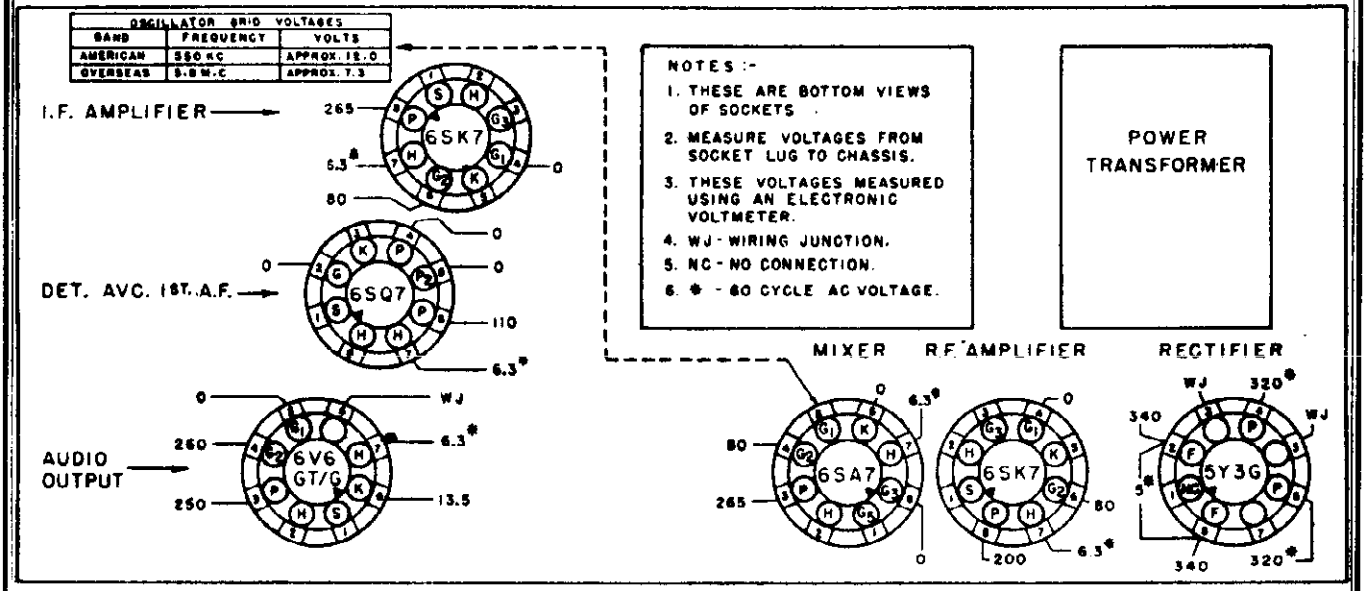
VOLTAGE DROP ACROSS SPEAKER FIELD: 76 volts.

RESISTANCE OF SPEAKER FIELD: 900 ohms.

TUBE COMPLEMENT:

Type	Function
6SA7 (GT/G)	Mixer
6SK7 (GT/G)	R. F. Amplifier
6SK7 (GT/G)	I. F. Amplifier
6SQ7 (GT/G)	Detector, AVC, 1st A.F Amplifier
6V6 (GT/G)	A. F. Power Output
5Y3 GT/G	Rectifier

DIAL BULB: Type 51, 7.5 volts, .25 amp.



SOCKET VOLTAGE TOLERANCE: 10%

PARTS LIST—MODELS 66CS, 66CSM

Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part Number	Description
1	39281-16	Resistor, 3300 ohm, ½ w.
2	39281-21	Resistor, 22,000 ohm, ½ w.
3	39016-38	Resistor, 12,000 ohm, 2 w.
4	39281-33	Resistor, 2.2 megohm, ½ w.
5	39040-13	Resistor, 1,000 ohm, 1 w.
6	39281-33	Resistor, 2.2 megohm, ½ w.
7	39281-28	Resistor, 330,000 ohm, ½ w.
11	39281-23	Resistor, 47,000 ohm, ½ w.
12	39281-29	Resistor, 470,000 ohm, ½ w.
14	39016-19	Resistor, 330 ohm, 1 w.
15	39281-22	Resistor, 33,000 ohm, ½ w.
16	39281-35	Resistor, 4.7 megohm, ½ w.
17	39281-21	Resistor, 22,000 ohm, ½ w.
18	39281-25	Resistor, 100,000 ohm, ½ w.
19	39004-9	Condenser, 220 mmf., 500 v., Mica
20	39004-9	Condenser, 220 mmf., 500 v., Mica
21	39001-41	Condenser, .05 mfd., 400 v., Paper
22	39004-9	Condenser, 220 mmf., 500 v., Mica
23	39001-65	Condenser, .05 mfd., 200 v., Paper
24	39004-5	Condenser, 50 mmf., 500 v., Mica
25	39001-11	Condenser, .005 mfd., 600 v., Paper
26	39001-37	Condenser, .01 mfd., 400 v., Paper
27	39004-9	Condenser, 220 mmf., 500 v., Mica
30	39001-11	Condenser, .005 mfd., 600 v., Paper
32	W-30805	Condenser, .01 mfd., 400 v., Paper
33	39001-11	Condenser, .005 mfd., 600 v., Paper
34	39001-61	Condenser, .01 mfd., 200 v., Paper
35	39004-5	Condenser, 50 mmf., 500 v., Mica
36	GC-210685-143	Condenser, 580 mmf., 300 v., Mica
37A	B-134995	Condenser (variable) \ Two
37B		Condenser (variable) /Section
38A	B-132807	Condenser, 20 mfd., 360 w.v. Four
38B		Condenser, 20 mfd., 275 w.v. Section
38C		Condenser, 20 mfd., 245 w.v. Elect.
38D		Condenser, 20 mfd., 25 w.v. Filter
39	AW-134065	Transformer (1st I. F.)
40	AW-134158	Transformer (2nd I. F.)
41	B-134625	Transformer (Power)
42	W-43567	Bulb (Dial Light, Type 51, 7.5 v., .25 amp.)
43	W-43567	Bulb (Dial Light, Type 51, 7.5 v., .25 amp.)
44	B-135651	Control, Tone (3 megohm)
45	B-135859	Control, Volume (1 megohm) & Switch
46	W-132267-1	Condenser (Trimmer)
47	B-132300-1	Cable and Plug (Power)
48	39019-3	Terminal Board Assembly
49	39019-3	Terminal Board Assembly
51	W-134968-1	Socket (Speaker)
52A	B-134639	Switch (Band Change) \ Two
52B		Switch (Band Change) /Section
53	AW-135907	R. F. Coil Assembly
54	AW-135908	Oscillator Coil Assembly
55	AW-135909	Antenna Coil Assembly
57	AW-135910	Antenna Loading Coil Assembly
58	B-134700	Speaker
62	B-132386-7	Condenser (Trimmer) \ Three
63		Condenser (Trimmer) |Section
64		Condenser (Trimmer) /Assembly
	G-39012-8	Core (Iron)
	G-39204	Socket (Tube)
	39017-3	Socket (Dial Light)
	AW-134793	Dial Face Assembly
	B-134571	Pointer (Dial)
	W-134667	Clip (Dial Pointer)
	W-51762	Spring (Dial Cord)
	W-134917	Shaft (Drive)
	W-51071	Ring (Retaining)
	W-134916	Washer (Spring)
	W-132366-2	Nut (Iron Core Locking)
	39196-29	Screw (Dial Mtg.)
	W-134055	Grommet (Variable Condenser Mtg.)
	R-137873	Cabinet (66CS)
	R-137917	Cabinet (66CSM)
	C-134773	Lens (Dial)
	AC-134782	Antenna Loop Assembly
	D-134945-1	Record Changer
	AB-134935	Floating Jewel Needle Assembly
	W-134959	Cable, Phono
	W-135248	Knob
	W-45580	Rubber Mtg. (Speaker and Chassis Mtg.)
	W-136539	Lid Support, Cabinet
	AW-134972	Screw and Washer Assembly (Record Changer Mtg., 66CS)
	W-134966	Nut, Spring Lock (Record Changer Mtg.)
	W-134956	Nut, Tee (Record Changer Mtg.)
	AW-134961	Lead Assembly, Shielded (Record Changer)
	W-23880	Thumbscrew (Chassis Mtg., 66CS)

MODEL 66CS (8) PARTS LIST

Item No.	Part Number	Description
13	B-210735-32	Resistor, 1000 ohm, 5 w.
38A	B-137076	Condenser, 40 mfd., 450 w. v. \ Four
38B		Condenser, 20 mfd., 450 w. v. |Section
38C		Condenser, 20 mfd., 450 w. v. | Elect.
38D		Condenser, 20 mfd., 25 w. v. / Filter
58	C-135974	Speaker
8	W-137143	Antenna (Transmission Line, 116")

NOTE:

The above models use the Model K (Part No. D-134945-1) automatic record changer.

NOTE—All other parts and service information are the same as used on models "66CS" and "66CSM".

Figures in first column correspond to figures in Schematic Diagram

PARTS LIST—MODEL 66TC-S

CHASSIS PARTS

Item No.	Part No.	Description
1	39281-16	Resistor, 3,300 Ohm, ½ W.
2	39281-21	Resistor, 22,000 Ohm, ½ W.
3	39016-38	Resistor, 12,000 Ohm, 2 W.
4	39281-33	Resistor, 2.2 Megohm, ½ W.
5	39040-13	Resistor, 1,000 Ohm, 1 W.
6	39281-33	Resistor, 2.2 Megohm, ½ W.
7	39281-28	Resistor, 330,000 Ohm, ½ W.
11	39281-23	Resistor, 47,000 Ohm, ½ W.
12	39281-29	Resistor, 470,000 Ohm, ½ W.
13	B-210735-32	Resistor, 1000 ohm, 5 W.
14	39016-19	Resistor, 330 Ohm, 1 W.
15	39281-22	Resistor, 33,000 Ohm, ½ W.
16	39281-35	Resistor, 4.7 Megohm, ½ W.
17	39281-21	Resistor, 22,000 Ohm, ½ W.
18	39281-25	Resistor, 100,000 Ohm, ½ W.
19	39004-9	Condenser, 220 mmf., Mica
20	39004-9	Condenser, 220 mmf., Mica
21	39001-41	Condenser, .05 mfd., 400 V., Paper
22	39004-9	Condenser, 220 mmf., Mica
23	39001-65	Condenser, .05 mfd., 200 V., Paper
24	39004-5	Condenser, 50 mmf., Mica
25	39001-11	Condenser, .005 mfd., 600 V., Paper
26	39001-37	Condenser, .01 mfd., 400 V., Paper
27	39004-9	Condenser, 220 mmf., Mica
30	39001-11	Condenser, .005 mfd., 600 V., Paper
32	W-30805	Condenser, .01 mfd., 400 V., Paper
33	39001-11	Condenser, .005 mfd., 600 V., Paper
34	39001-61	Condenser, .01 mfd., 200 V., Paper
35	39004-5	Condenser, 50 mmf., Mica
36	GC-210685-143	Condenser, 580 mmf., Mica
37A	B-134995	Variable Condenser
37B		Variable Condenser
38A	D-132807	Condenser, 20 mfd., 360 W.V. \ Four
38B		Condenser, 20 mfd., 275 W.V. | Section
38C		Condenser, 20 mfd., 245 W.V. | Elect.
38D		Condenser, 20 mfd., 25 W.V. / Filter
39	AW-134065	1st I. F. Coil Assembly
40	AW-134158	2nd I. F. Coil Assembly
41	B-134625	Power Transformer
42	W-43567	Dial Light, Type 51, 7.5 V., 0.2 Amp.
43	W-43567	Dial Light, Type 51, 7.5 V., 0.2 Amp.
44	B-135651	Tone Control, 3 Megohm

Item No.	Part No.	Description
45	B-135859	Volume Control (1 Megohm) and Switch
46	W-132267-1	Condenser (Trimmer)
47	B-132300-1	Cable and Plug
48	39019-3	Terminal Board Assembly
49	39019-3	Terminal Board Assembly
51	W-134968-1	Speaker Socket
52A	B-134639	Two Section Band
52B		Change Switch
53	AW-135907	R. F. Coil Assembly
54	AW-135908	Oscillator Coil Assembly
55	AW-135909	Antenna Coil Assembly
56	C-137339	Speaker
57	AW-135910	Antenna Loading Coil Assembly
62	B-132386-7	Three Section
63		Trimmer
64		Condenser
66	B-137077	Condenser, 20 mfd., 450 W.V., Elect.

CABINET PARTS

	R-135025	Wood Cabinet
	AC-134672	Antenna Loop and Back Assembly
	C-132683	Dial Lens
	W-130197	Knob
	39220-38	Screw Mounting—8 x 1¼ Hex. Hd.
	W-45580	Rubber Mounting

MECHANICAL PARTS

	W-47577	Cable Lock Plate
	AW-134807	Dial Face Assembly
	W-51762	Dial Cord Spring
	B-134571	Dial Pointer
	G-39012-8	Iron Core
	W-132365-2	Locking Nut
	W-134667	Dial Pointer Clip
	39017-3	Dial Light Socket
	G-39204	Tube Socket
	39196-29	Screw, Dial Mounting
	W-45662	Palnut ¾-32
	W-134055	Grommet
	B-134896	Transformer Shield
	W-134917	Drive Shaft
	W-51071	Retaining Ring
	W-134916	Spring Washer

PARTS LIST—MODELS 56XTA, 56XTW

Item No.	Part No.	Description
1	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.
2	C-132300-1	Cable and Plug (power)
3	AC-135817	Antenna Loop and Back Assembly
4	AW-134994	Coil, Antenna (H. F.)
5A	AW-134995	Coil, Oscillator (B. C.) Two
5B		Coil, Oscillator (H. F.) Section
6	AW-137495	Transformer (1st I. F.)
7	AW-134158	Transformer (2nd I. F.)
9A	B-135165	Condenser, Variable Two
9B		Condenser, Variable Section
9C	Part of Item #9B	Condenser (Trimmer)
10	AB-135088	Condenser Assy. (Trimmer)
11	GC-210685-143	Condenser, 580 mmf., Mica
12	39004-5	Condenser, 50 mmf., Mica
13	39001-80	Condenser, .02 mfd., 600v., paper
14	39001-19	Condenser, 1 mfd., 600 v., paper
15	39001-17	Condenser, .05 mfd., 600 v., paper
16	39004-9	Condenser, 220 mmf., Mica
17	39001-76	Condenser, .003 mfd., 600 v., paper
18A	B-137069	Condenser, 50 mfd., 150 v. Two Section
18B		Condenser, 30 mfd., 150 v. Elect. Filter
19	39001-80	Condenser, .02 mfd., 600 v., paper
20	39001-80	Condenser, .02 mfd., 600 v., paper
21	39001-80	Condenser, .02 mfd., 600 v., paper
22	39001-80	Condenser, .02 mfd., 600 v., paper
23	Part of Item #10	Condenser (Trimmer)
24	39294-11	Resistor, 470 ohm, ½ w.
25	39294-17	Resistor, 4700 ohm, ½ w.
26	39294-28	Resistor, 330,000 ohm, ½ w.
27	39294-38	Resistor, 15 megohm, ½ w.
28	39294-21	Resistor, 22,000 ohm, ½ w.
29	39294-27	Resistor, 220,000 ohm, ½ w.
30	39294-34	Resistor, 3.3 megohm, ½ w.
31	39294-23	Resistor, 47,000 ohm, ½ w.
32	39294-35	Resistor, 4.7 megohm, ½ w.
33	39294-29	Resistor, 470,000 ohm, ½ w.

Item No.	Part No.	Description
34	39294-29	Resistor, 470,000 ohm, ½ w.
35	39294-8	Resistor, 150 ohm, ½ w.
36	AD-137564	Speaker and Transformer Assy.
37A	W-135808	Switch, Band Change Three
37B		Switch, Band Change Section
37C		Switch, Band Change Assy.
38A	C-46846-5	Control (1 megohm), Volume \ Assem
38B		Switch, Power / bly
	39368-8	Control, Volume
	39369-1	Switch, Power
39	Part of Item #3	Condenser (Trimmer)
40	39015-26	Resistor, 1200 ohm, 1 w.
41	39016-9	Resistor, 47 ohm, 1 w.
42	39294-8	Resistor, 150 ohm, ½ w.
	39388	Socket, Tube
	39017-4	Socket Assy., Dial Light
	C-136962	Chart, Dial Face
	C-136721	Background, Dial
	B-134570	Pointer, Dial
	W-134667	Clip, Dial Pointer
	51752	Spring, Dial Cord
	W-134917	Shaft, Drive
	W-134916	Washer, Spring
	W-51071	Ring, Retaining
	W-49770	Stud, Trimount
	W-135164	Bumper, Rubber
	W-134055	Grommet
	AW-136464	Resistor (Line Voltage Reducing, 230 v. to 115 v.)
	AW-134738	Cabinet (56XTW)
	D-132136-1	Cabinet (56XTA)
	B-134610	Lense, Dial
	W-134882	Knob (56XTA)
	W-134883	Knob (56XTW)
	W-132124	Stud, Trimount

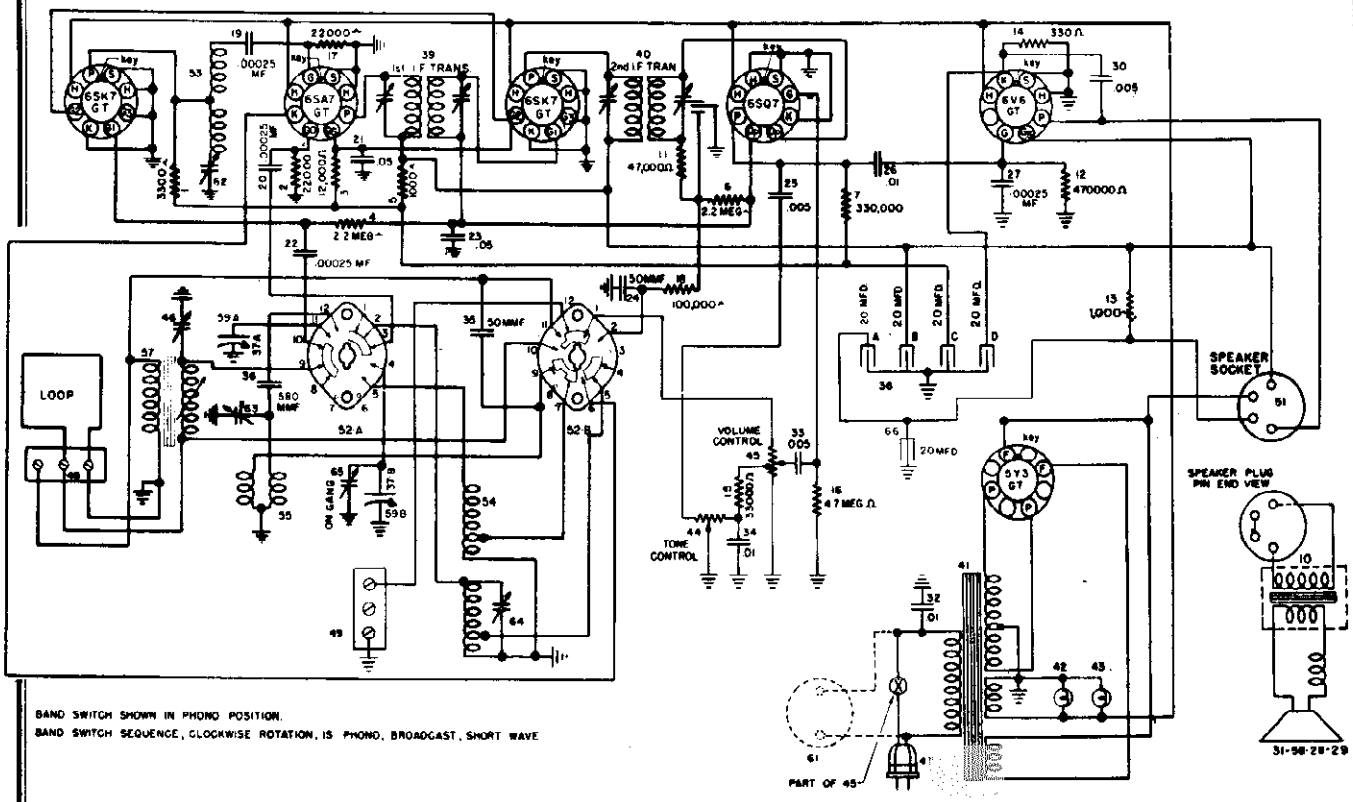
*These parts will replace the original equipment parts.

CROSLEY DIV.
AVCO MFG. CORP.

MODELS 66CS, 66CSM
MODEL 66CS(8)
MODEL 66TC-S
MODELS 56XTA, 56XTW

MODEL 66TC-S

CROSLEY DIV.
AVCO MFG. CORP.



TYPE: Six-tube, two-band superheterodyne with terminals provided for record player or television sound.

FREQUENCY RANGE: American Broadcast Band: 540 to 1600 kc. (Selector switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a.c. only.

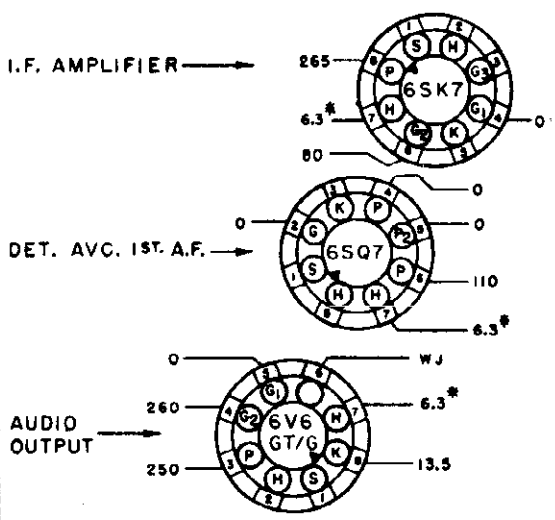
VOLTAGE RATING: 110-120 volts.

POWER CONSUMPTION: 60 watts maximum.

POWER OUTPUT: 4.5 watts minimum.

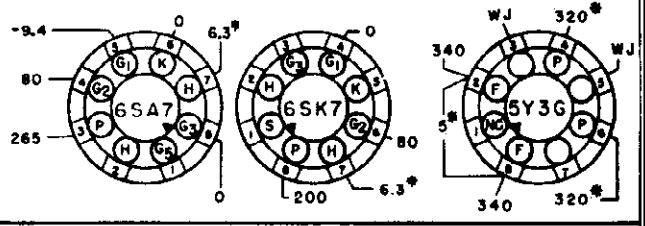
VOLTAGE DROP ACROSS SPEAKER FIELD: 76 volts. **WITH E.M. SPEAKER**

RESISTANCE OF SPEAKER FIELD: 900 ohms.



NOTES :-
1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO CHASSIS.
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 60 CYCLE AC VOLTAGE.

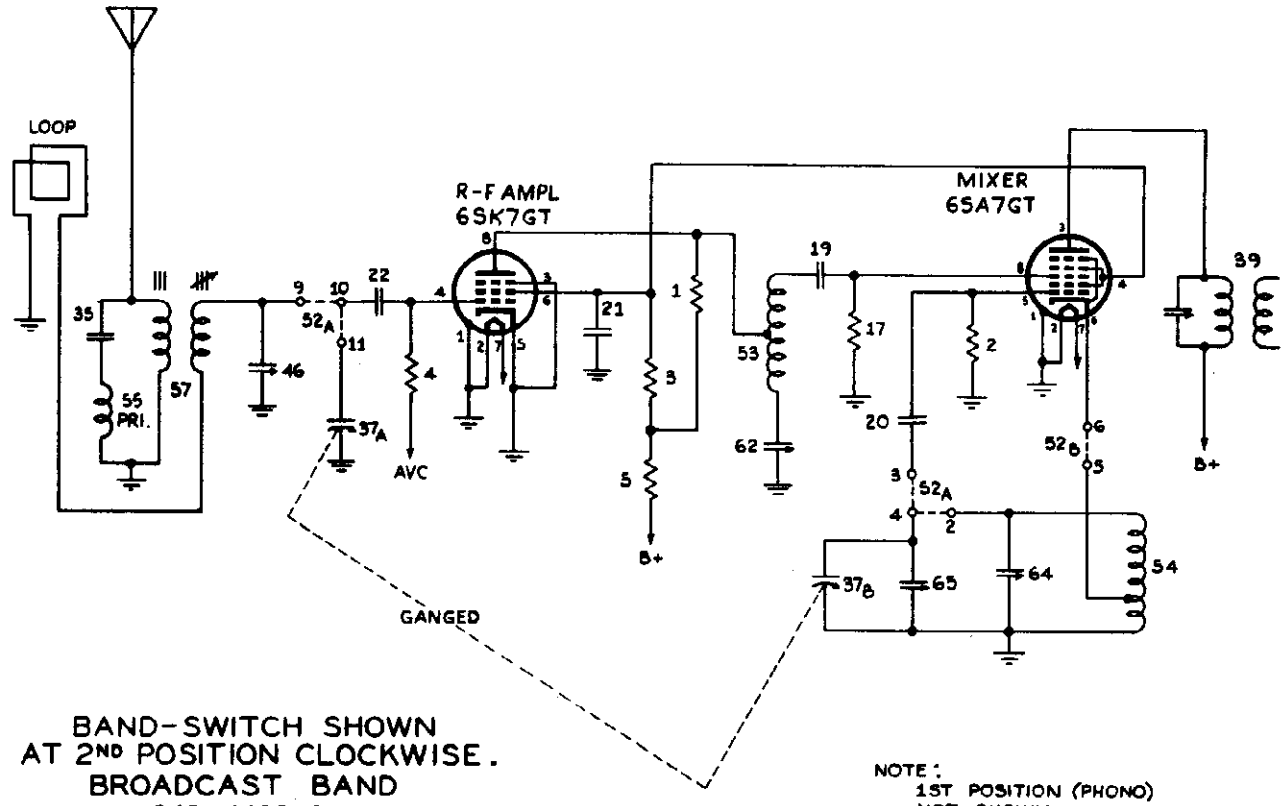
POWER TRANSFORMER



Socket Voltage Tolerance: 10%

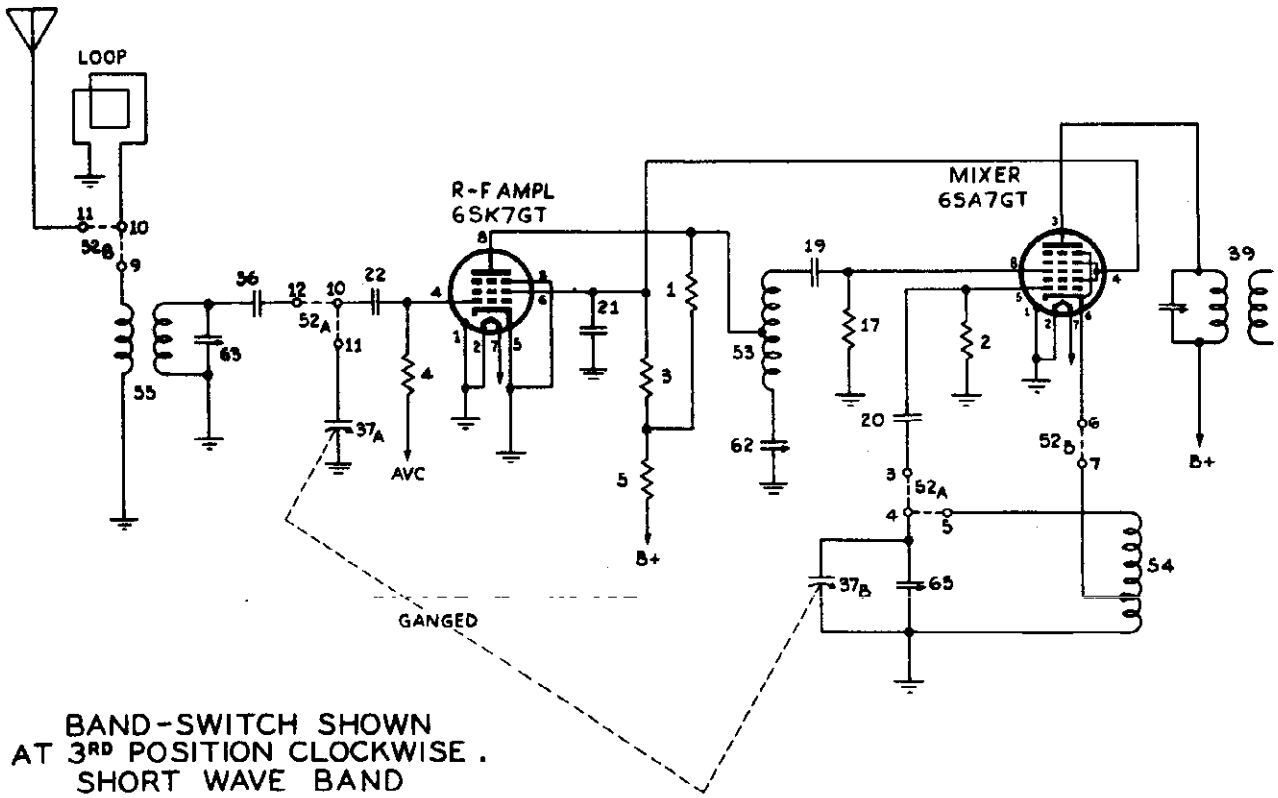
For Parts List see P. 16-19

CROSLEY DIV.
AVCO MFG. CORP.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540 - 1600 KC

NOTE:
1ST POSITION (PHONO)
NOT SHOWN



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
5.8 - 15 MC

MODEL 66TC-S

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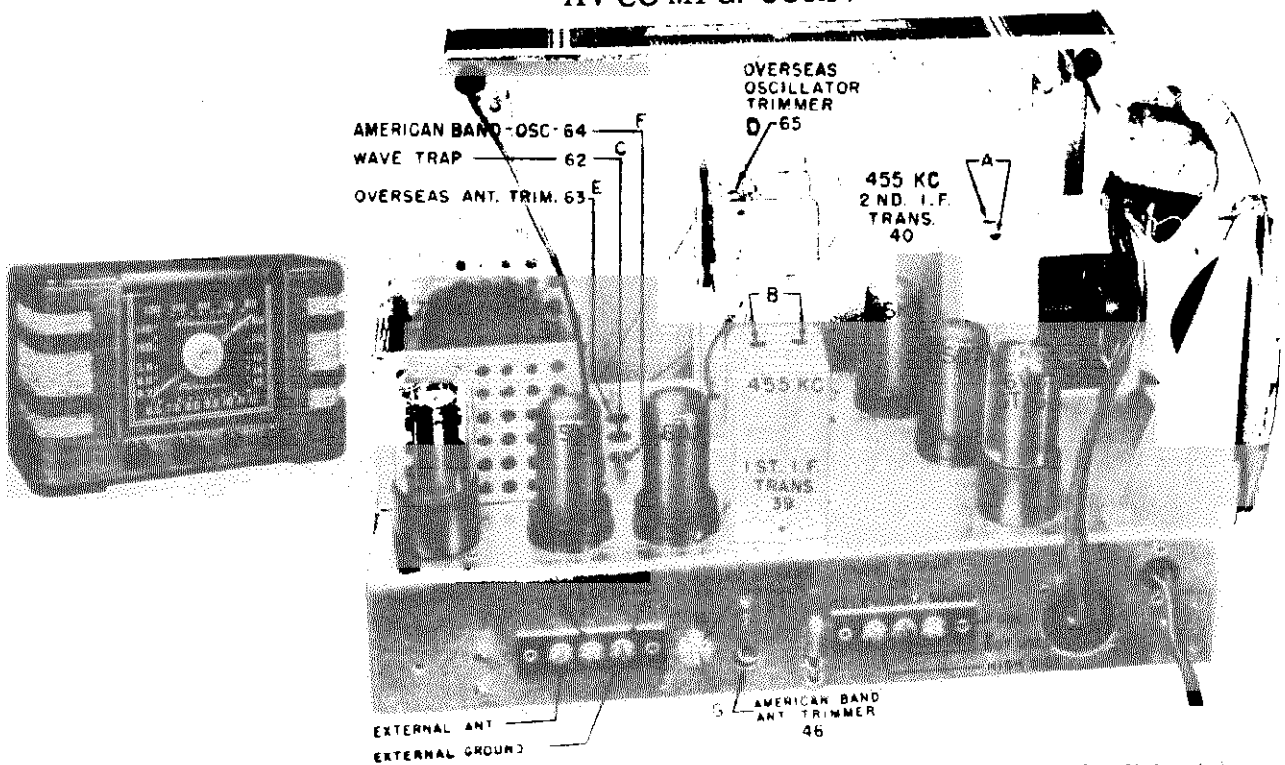

1. Turn the tuning capacitor to the completely closed position against the stop, and set the dial pointer to the reference line at the end of the dial scale.
2. Turn the tone control to the high or treble position.
3. Connect the output meter across the speaker voice coil.
4. The r.f. signal input from the signal generator should be connected to the external antenna post. Connect the signal generator ground to the chassis.
5. Turn the volume control on full, and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf	Ant.	A	1620	A & B
2	455	200 mmf	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf	Ant.	A	1620	F
6	1400	200 mmf	Ant.	A	1400	G
7	600	200 mmf	Ant.	A	600	H

*Adjust for minimum output (wavetrap).

NOTE: When aligning the short-wave oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

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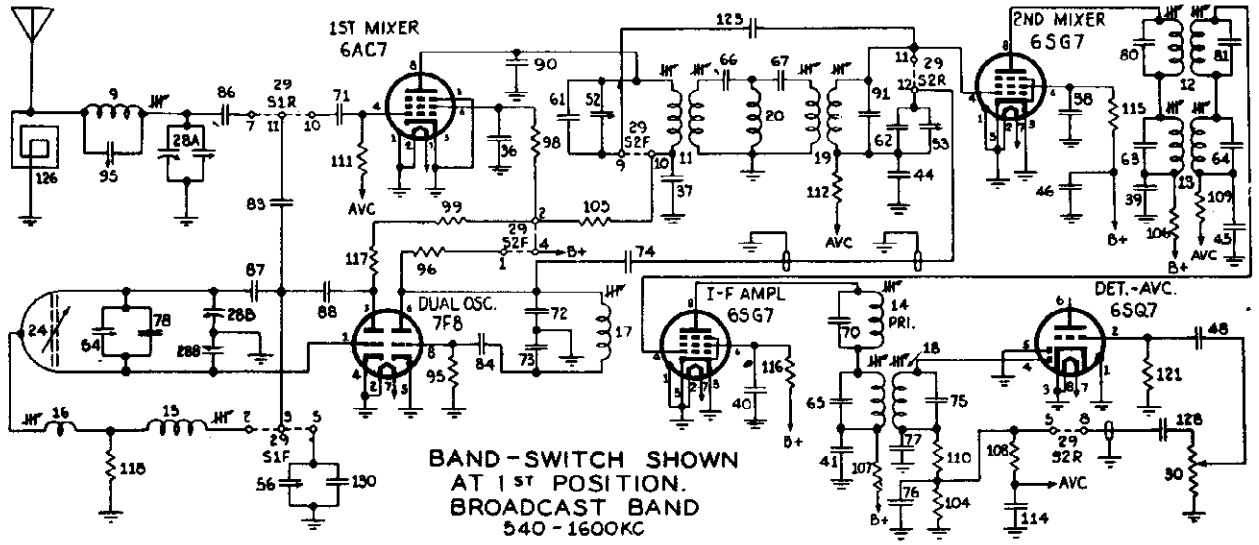
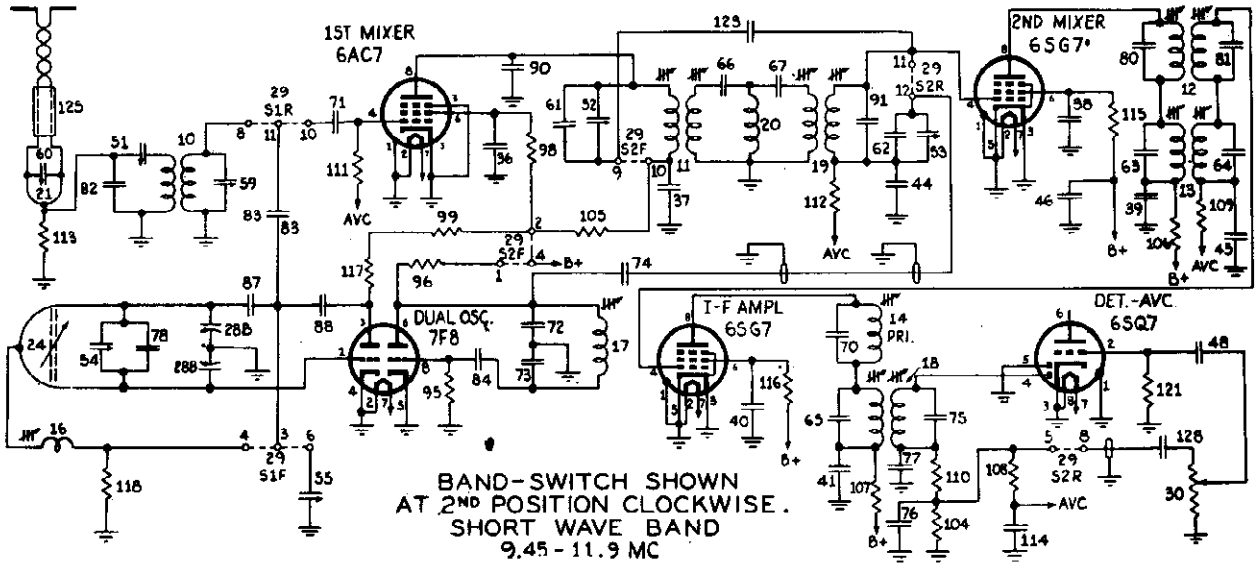
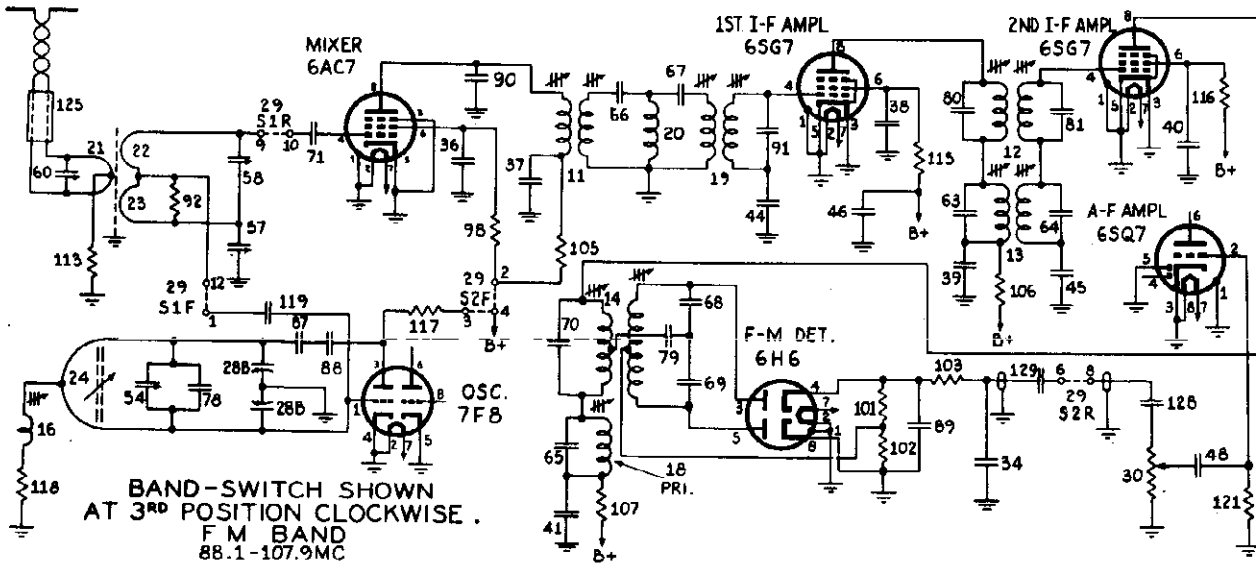
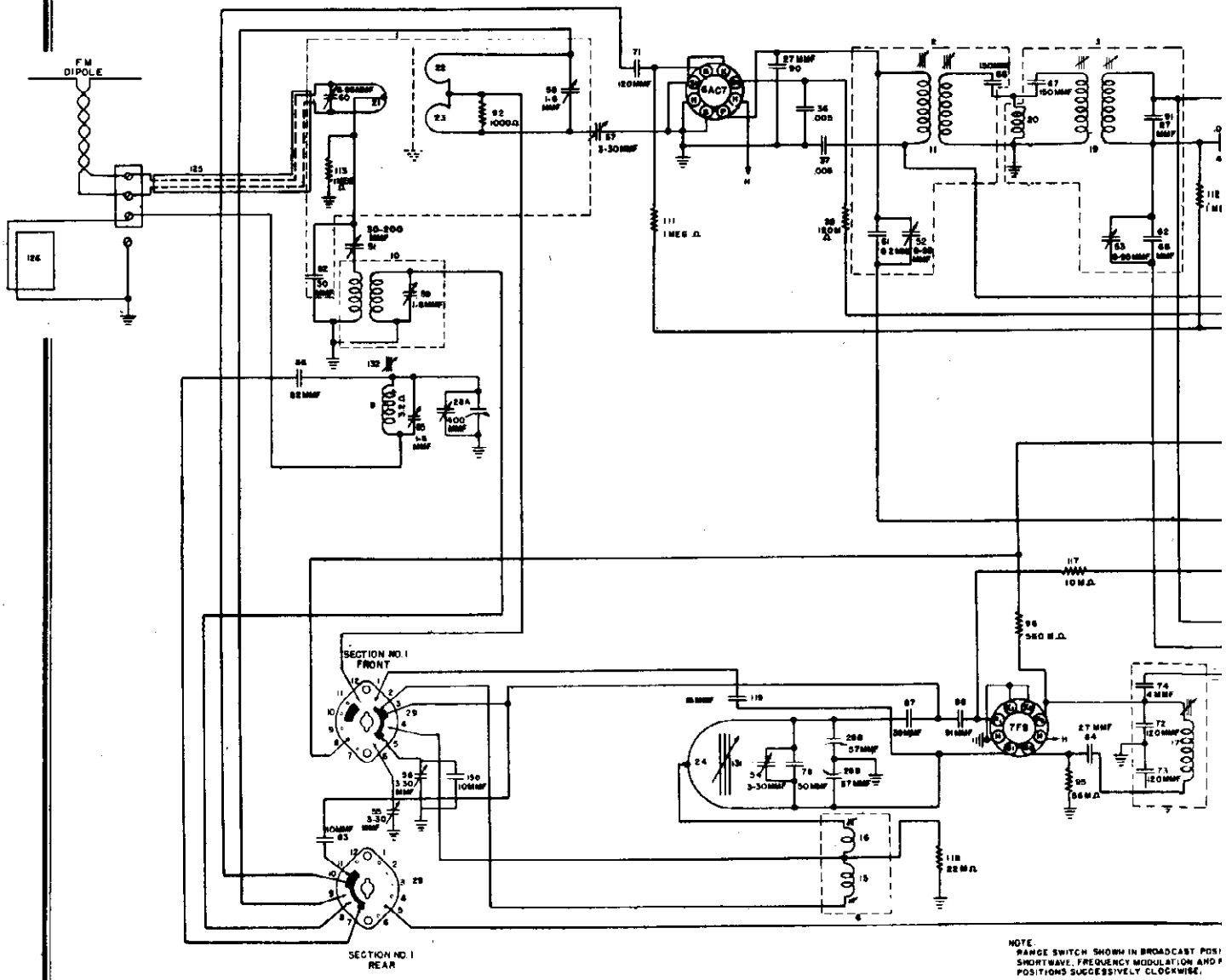
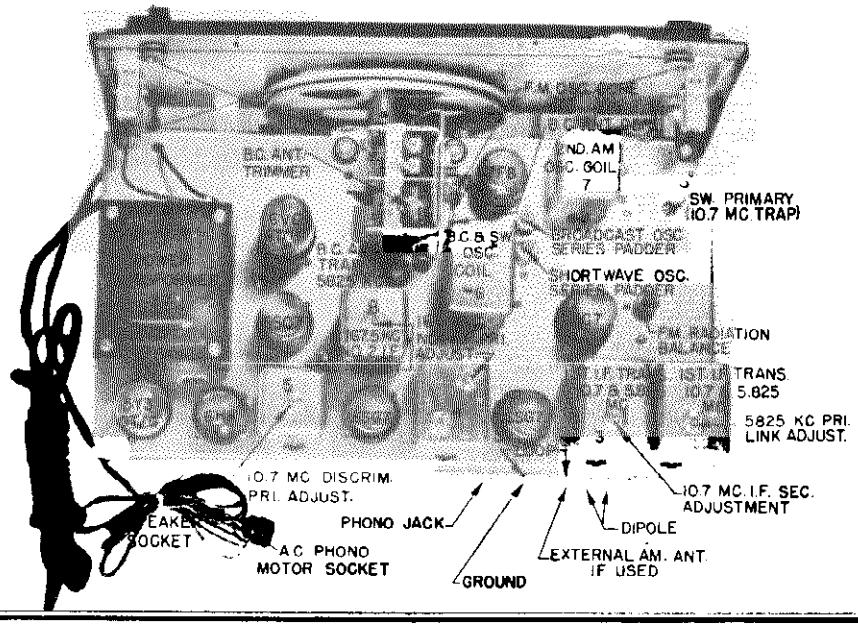


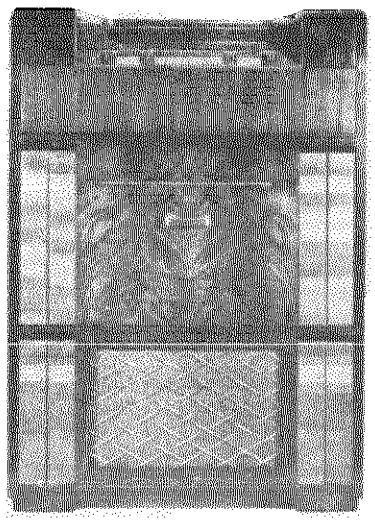




CROS
AVCO



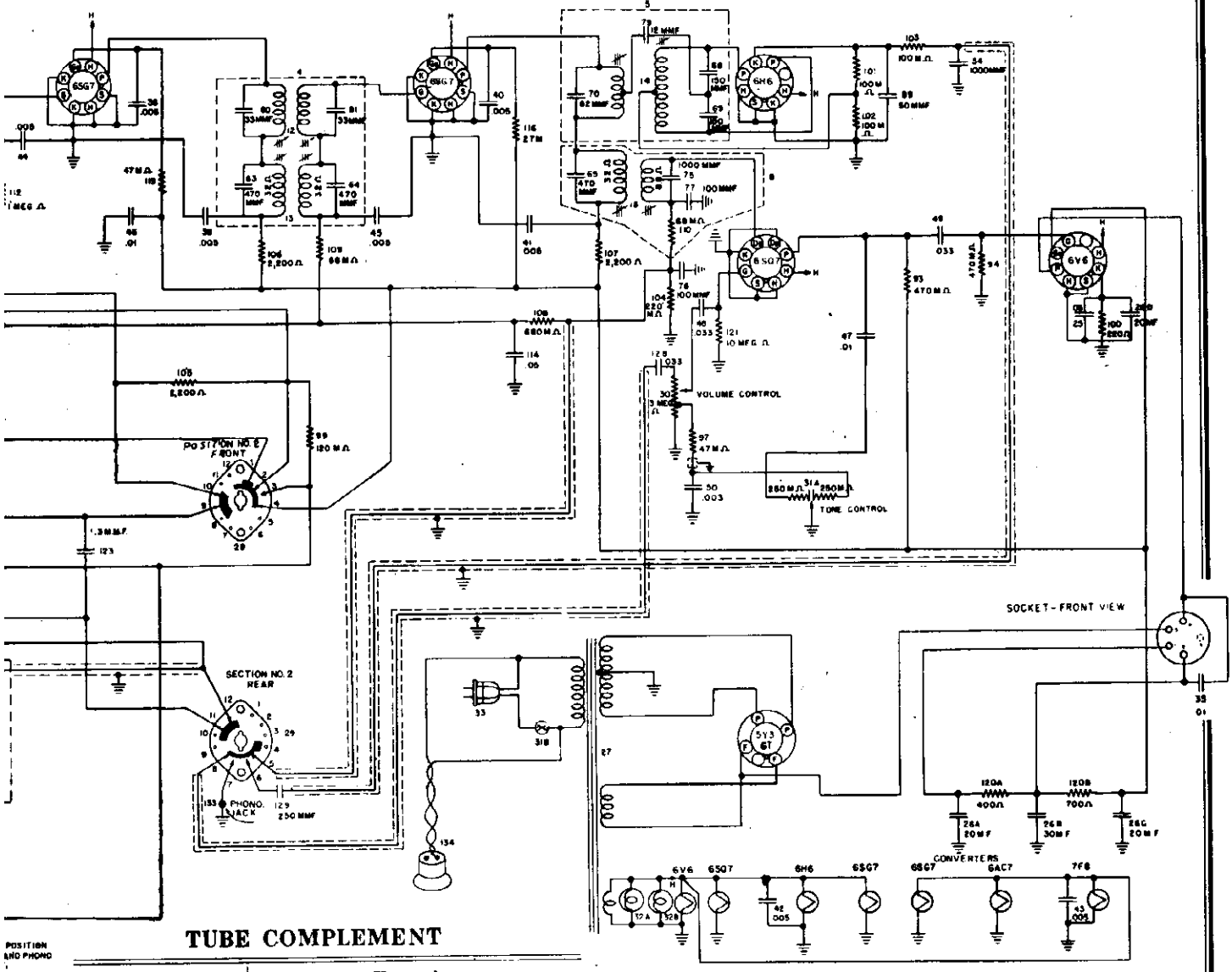




Model 86CR Uses Walnut Cabinet
Model 86CS Uses Mahogany Cabinet

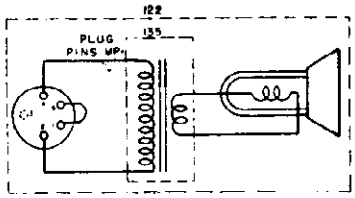
TYPE
FREQ
540 to
Overs
lector

SLEY DIV.
)MFG. CORP.



TUBE COMPLEMENT

Type	Function
6AC7	1st A.M. Mixer—FM Mixer
7F8	1st and 2nd A.M. OSC.—F.M. OSC.
6SG7	2nd A.M. Mixer—1st I. F. Ampl. F.M.
6SG7	I. F. Ampl. A. M., 2nd I. F. Ampl. F. M.
6H6	F. M. Detector (Discriminator)
6SQ7	A. M. Det. AVC, 1st A. F. Ampl.
6V6 GT/G	Output
5Y3 GT/G	Rectifier



PE: Eight-tube, three-band, Superheterodyne.
EQUENCY RANGE: American Broadcast Band, to 1600 kc. (Selector Switch at AM position). erseas Short-Wave Band: 9.45 to 11.9 mc. (Selor Switch at SW position). Frequency Modulated Band: 88.1 to 107.9 mc. Channel 201 to 300 (Selector Switch at FM position).

INTERMEDIATE FREQUENCY: Broadcast Band: 167.5 and 5825 kc

FREQUENCY MODULATION BAND: 10.7 mc.

POWER SUPPLY: 60 cycle a.c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 85 watts maximum at normal power supply voltage (117), 20 watts additional for record changer.

POWER OUTPUT: 80 watts minimum at 3.2. ohm load.

MODELS 86CR,86CS

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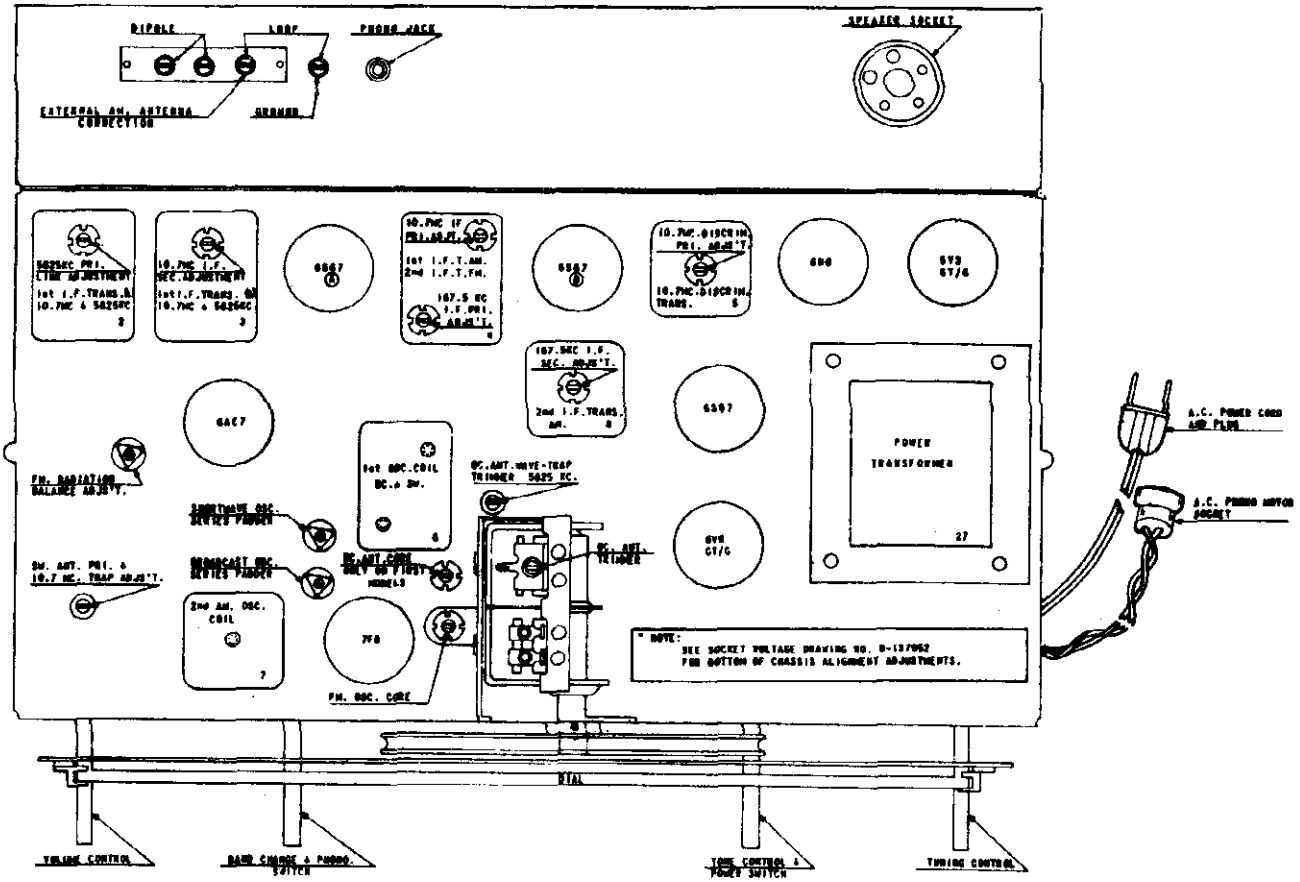
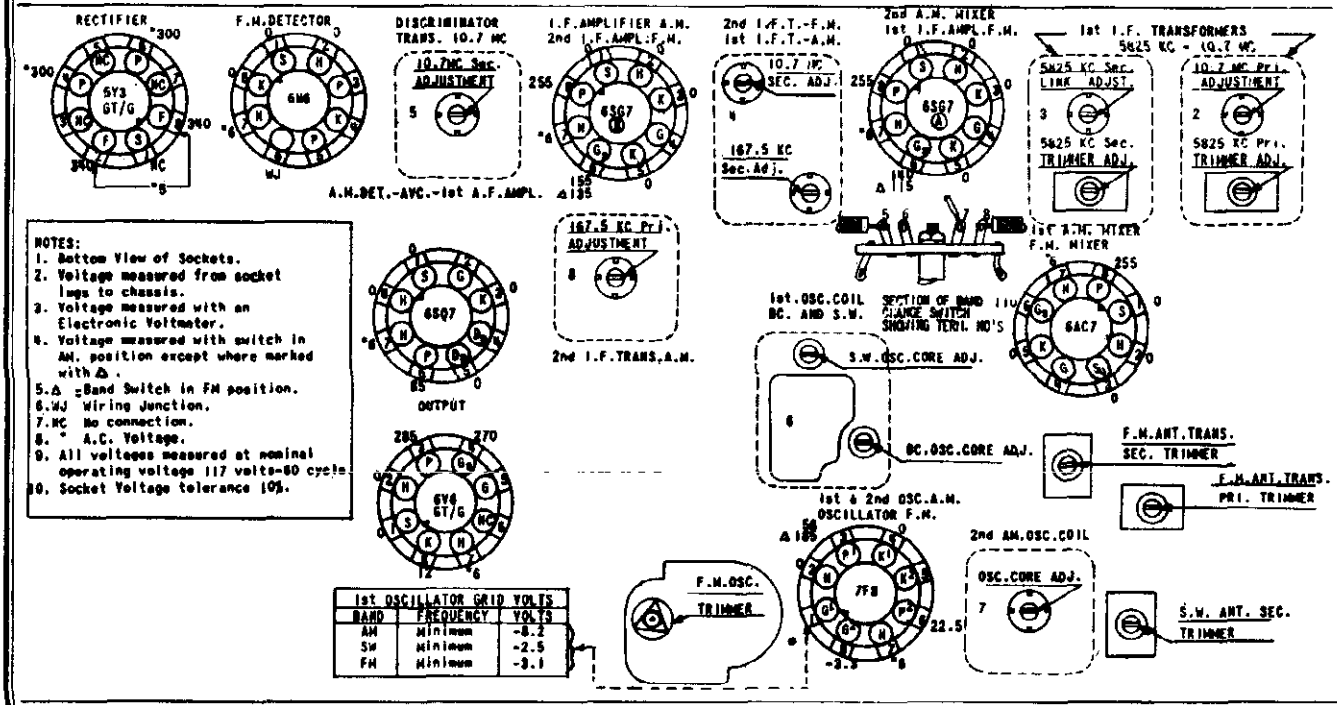


SOCKET VOLTAGE CHART



NOTES:
1. Bottom View of Sockets.
2. Voltage measured from socket lugs to chassis.
3. Voltage measured with an Electronic Voltmeter.
4. Voltage measured with switch in AM. position except where marked with Δ.
5. Δ =Band Switch in FM position.
6. WJ Wiring Junction.
7. NC No connection.
8. * A.C. Voltage.
9. All voltages measured at nominal operating voltage 117 volts-60 cycle.
10. Socket Voltage tolerance 10%.

1st OSCILLATOR GRID VOLTS		
BAND	FREQUENCY	VOLTS
AM	Minimum	-8.2
SW	Minimum	-2.5
FM	Minimum	-3.1

CROSLEY DIV.
AVCOMFG. CORP.

MODELS 86CR, 86CS

ALIGNMENT CHART (Output Meter Method)

Alignment Sequence	Signal Frequency	Generator Output in Series with	To	Position of Range Tuning Dial Switch or Tuning Cap.		Adjust	Osc. Freq.	Remarks
1.	167.5 KC.	0.1 MFD	2nd I.F. Grid 6SG7 B	S. W.	Open	2nd I.F. Trans. 8	.....	.....
2.	167.5 KC.	0.1 MFD	1st I.F. Grid 6SG7 A	S. W.	Open	1st I.F. Trans. 4	.....	.....
3.	10.7 MC.	30 MMF	2nd I.F. Grid 6SG7 B	F. M.	Open	Discriminator Trans. 5	.....	.....
4.	10.7 MC.	30 MMF	1st I.F. Grid 6SG7 A	F. M.	Open	2nd I.F. 10.7 Trans. 4	.....	.....
5.	10.7 MC.	30 MMF	See Procedure	F. M.	Open	1st I.F. 10.7 Trans. 2 & 3	.....	Signal Generator Ground Connection as Short as Possible
6.	5825 KC.	30 MMF	1st I.F. Grid 6SG7 A	S. W.	Open	2nd A.M. Osc. Core 7	167.5 KC. Above	.....
7.	5825 KC.	30 MMF	*Link Coupling on 10.7 I.F. 2	S. W.	Open	5825 KC. I.F. Trans. 3	167.5 KC. Above	*Short Lead Between Transformers 2 & 3
8.	5825 KC.	30 MMF	6AC7 Grid	S. W.	Open	5825 KC. I.F. Trans. 2	167.5 KC. Above	.....
9.	100 MC.	78 ohm Dummy	F.M. Dipole Ant. Terms.	F. M.	Channel 261	Osc. Core & Trim. F.M. Ant. Trims. Pri. & Sec.	10.7 MC. Above	See Circuit Under the Title "Alignment Equipment"
10.	87.9 MC.	78 ohm Dummy	F.M. Dipole Ant. Terms.	F. M.	Closed	F.M. Osc. Core	10.7 MC. Above	.....
11.	107.9 MC.	78 ohm Dummy	F.M. Dipole Ant. Terms.	F. M.	Channel 800	F.M. Osc. Trimmer	10.7 MC. Above	.....
12	Disconnect Generator Connect Field Strength Meter			F. M.	Channel 215	Radiation Bal. Trimmer (Null Point)	.....	See Paragraph on Field Strength Meter, Under "Alignment Equip."
13.	9.6 MC.	30 MMF	One FM. Ant. Term.	S. W.	9.6 MC.	S.W. Oscillator Series Padder	5825 KC. Above	Disconnect Field Strength Meter Connect Signal Generator
14.	11.8 MC.	30 MMF	One FM. Ant. Term.	S. W.	11.8 MC.	S. W. Oscillator Core	5825 KC. Above	.....
15.	10.7 MC.	30 MMF	One F.M. Ant. Term.	S. W.	10.7 MC.	S. W. Ant. Pri. & Sec. Padder	.....	.....
16.	10.7 MC.	30 MMF	One F.M. Ant. Term.	F. M.	10.7 MC.	S. W. Primary (10.7 MC. Trap)	.....	Adjust for Null Point
17.	535 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	Closed	B. C. Oscillator Series Padder	5825 KC. Above	.....
18.	1620 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	Open	B. C. Oscillator Core	5825 KC. Above	.....
19.	1400 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	1400 KC.	B. C. Antenna Trimmer	.....	.....
20.	600 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	600 KC.	B. C. Antenna Core	.....	First Models Only. Omitted in Later Mod
21.	5825 KC.	30 MMF	Hi. Side of Dummy Loop	B. C.	1400 KC.	B. C. Wave Trap Trimmer	.....	Adjust for Null Point

ALIGNMENT PROCEDURE

1. This receiver has been aligned at the factory for best performance, and no attempt should be made to re-align this receiver unless the proper test equipment is available.
2. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to reference point which is Channel 200 on the dial.
3. Set tone control knob to the treble position, (extreme right).
4. When output meter is used, connect across voice coil: (8.2 ohms).
5. Feed an R. F. Signal modulated 30% at 400 cycles to the receiver as indicated on the alignment chart; connect signal generator ground terminal to the chassis of the receiver, except where noted.
6. When F. M. Signal generator is used, a 30% modulated signal is equal to 22.5 kilocycles deviation.
7. Turn volume control knob to maximum clockwise position and adjust signal generator output to produce a noticeable output meter reading, (approx. 500 mw.) Keep signal generator output as low as possible to prevent excessive AVC action in the receiver.
8. The low impedance "Signal Web" antenna should remain connected at all times.

ALIGNMENT EQUIPMENT

FOR OUTPUT METER ALIGNMENT

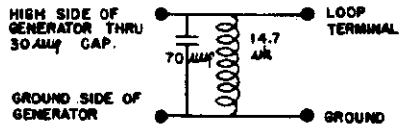
Signal Generator AM with 400 cycle modulated signal to cover 167.5 KC to 108 MC.
Suitable output meter.
Field strength meter.

DUMMY ANTENNAS TO BE USED WITH GENERATOR OUTPUT:

0.1 mfd. condenser
30 mmf. condenser
78 ohm dummy antenna (2) 39 ohm carbon resistors)

DUMMY LOOP ANTENNA:

14.7 uh inductance shunted by a 70 uuf condenser (to replace low impedance "Signal Web" when chassis is removed from cabinet.



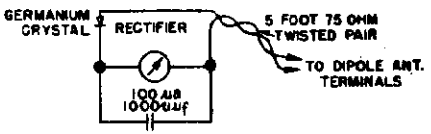
SHUNTS:

5000 ohm carbon resistor in series with a 0.1 mfd. condenser.
Hairpin shorting shunt composed of 2" of No. 14 bare tinned wire.

FIELD STRENGTH METER:

The Field Strength Meter may consist of a D. C. 100 microampere (full scale) meter shunted by a 1000 uf mica by-pass condenser; a crystal rectifier is connected in series with the meter and a five foot, 75 ohm twisted pair for leads. The open end of the twisted pair is connected to the dipole antenna terminals. Circuit for the field strength meter is given below:

NOTE: Connect condenser directly across meter terminals and crystal directly to one meter terminal, so leads are as short as possible.



OUTPUT METER ALIGNMENT

Use this procedure in conjunction with alignment chart. Sequence numbers correspond to numbers on alignment chart. Refer to alignment chart first for connection of signal generator and control settings, then follow procedure

167.5 KC I. F. TRANSFORMER ALIGNMENT: (For maximum output)

1. (a) Shunt primary of transformer No. 8 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from ground to link between transformers No. 5 and 8. Adjust secondary of 2nd I. F. Transformer No. 8 (above chassis).
   (b) Shunt secondary of transformer No. 8 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from diode plate (Pin No. 4) of the 6SQ7 to shielded lead junction on transformer and adjust primary of 2nd I. F. Transformer No. 8 (bottom of chassis).
2. (a) Connect signal generator to grid of 1st I. F. 6SG7 (A).
   (b) Shunt primary of transformer No. 4 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from plate of the 6SG7 (A) to the transformer side of the 2200 ohm resistor (106). Adjust secondary of 1st I. F. Transformer No. 4 (bottom of chassis).
   (c) Shunt secondary of transformer No. 4 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from the grid of the 6SG7 (B) to transformer side of the 68,000 ohm resistor (109). Adjust primary of 1st I. F. Transformer No. 4 (top of chassis).

10.7 MC. DISCRIMINATOR TRANSFORMER ALIGNMENT:

3. (a) Adjust discriminator transformer No. 5 secondary (bottom of chassis) padder for null point.
   (b) Tune signal generator for maximum output meter reading, approximately 75 to 100 KC. off of the 10.7 megacycle null point and note output meter reading. Retune signal generator to the opposite side of the 10.7 megacycle null point to maximum reading on the output meter reading. If the two readings are not equal, adjust discriminator primary padder until equal output meter readings and equal peak spacing are obtained on both sides of the 10.7 megacycle null point.

10.7 MC. I. F. TRANSFORMER ALIGNMENT:

4. (a) Set signal generator to peak on high side of 10.7 MC. and adjust 10.7 MC. primary (top) and secondary (bottom) of transformer No. 4 for maximum output and note output meter reading.
   (b) Set signal generator to peak on low side of 10.7 MC. and note output meter reading. If readings are unequal, readjust primary and secondary slightly until output meter readings and peak spacings are equal on both sides of the 10.7 MC. null point.
5. (a) Connect signal generator output to either lug of the F.M. ANTENNA Transformer Primary Trimmer (60). Connect signal generator ground to the receiver chassis at a point close to the trimmer to keep lead lengths to a minimum. Shielded cable of generator output should not be draped near under side of chassis.
   (b) Set signal generator to peak on high side of 10.7 MC. and adjust 10.7 MC. primary on transformer No. 2 (bottom of chassis), and 10.7 MC. secondary on transformer No. 3 (top of chassis) for maximum output, and note reading on output meter.
   (c) Set signal generator to peak on low side of 10.7 MC. and note output meter reading. If meter readings are not equal, readjust primary and secondary until equal readings are obtained on the peaks on both sides of 10.7 MC. Peaks should appear approximately 80 KC. on each side of 10.7 MC.

5825 KC. I. F. TRANSFORMER ALIGNMENT:

6. (a) Turn core adjustment screw on bottom of 2nd A. M. Oscillator Coil No. 7 until core is out of coil. DO NOT USE FORCE.
   (b) Turn core adjustment in until first peak (maximum output) is obtained.
7. (a) Connect signal generator output to link coupling (see chart).
   (b) Adjust 5825 KC. secondary trimmer and 5825 KC. secondary link adjustment on bottom of 1st I. F. Transformer No. 3 and retune 2nd A. M. Oscillator coil No. 7; adjust alternately for maximum output.
8. (a) Connect signal generator output to 6AC7 grid (see chart).
   (b) Adjust 5825 KC. primary trimmer on bottom and 5825 KC. primary link adjustment on top of 1st I. F. Transformer No. 2 for maximum output.

FREQUENCY MODULATED BAND ALIGNMENT:

9. (a) Pre-set F. M. Oscillator iron core (131) located on the top of the chassis to midway position.
   (b) Pre-set F. M. radiation balance adjustment (57) on top of the chassis to approximately two turns from the closed position.
   (c) Set signal generator to 100 megacycles A. M. modulated at 400 cycles.
   (d) Set dial pointer to channel 261 (100 MC).
   (e) Adjust F. M. oscillator trimmer (54) (bottom of chassis) to maximum output (on sets without oscillator trimmer, adjust oscillator core) but keep signal generator output as low as possible.
   (f) Short circuit F. M. Antenna primary trimmer (60) with hairpin shorting shunt.
   (g) Adjust F. M. Antenna secondary trimmer (58) on bottom of chassis for maximum output.
   (h) Transfer shorting shunt to F. M. Antenna secondary trimmer (58), and adjust F. M. Antenna primary trimmer (60) for maximum output.
   (i) Remove shorting shunt.

   NOTE: ON SETS WITHOUT OSCILLATOR TRIMMER CONDENSER, OMIT STEPS 10 AND 11.

10. (a) Set signal generator to 87.9 MC. amplitude modulated at 400 cycles.
    (b) If set does not tune to 87.9 MC. (Channel 200) adjust F. M. Oscillator core in slowly until 87.9 MC. signal is tuned in.

11. (a) Set signal generator to 107.9 MC. amplitude modulated at 400 cycles.
    (b) Set dial pointer to channel 300 and adjust F. M. Oscillator trimmer (54) for maximum output.
    (c) Repeat steps 10 and 11 until frequency shift stops.

    NOTE: TOO MUCH COVERAGE ON F. M. BAND INDICATES CAPACITY OF OSCILLATOR TRIMMER CONDENSER SET TOO HIGH.

F. M. RADIATION BALANCE ADJUSTMENT:

12. (a) Disconnect signal generator and connect Field Strength Meter to the dipole antenna terminals. (See paragraph on Field Strength Meter under title "Alignment Equipment".
    (b) Set dial pointer to channel 215.
    (c) Adjust F. M. Radiation Balance Trimmer (57) (on top of chassis) to null point. If this trimmer adjustment is changed more than a quarter turn repeat step 9 (f) to (i), and 12.

SHORTWAVE ALIGNMENT:

13. (a) Set signal generator to 9.6 MC. Amplitude Modulated at 400 cycles.
    (b) Turn volume control to maximum.
    (c) Adjust shortwave oscillator series padder (55) on top of chassis for maximum output with dial pointer set at 9.6 MC.

14. (a) Set signal generator to 11.8 MC. Amplitude Modulated at 400 cycles.
    (b) Set dial pointer to 11.8 MC.
    (c) Adjust shortwave oscillator core on bottom of chassis for maximum output.
    Repeat steps 13 (a) and (c) and 14 (a), (b) and (c) until dial tracks at 9.6 and 11.8 MC.

15. (a) Set signal generator to 10.7 MC. Amplitude Modulated at 400 cycles.
    (b) Shunt shortwave Antenna Primary Padder (51) (lug connected to coil) to chassis with shorting clip.
    (c) Retune set to 10.7 MC. signal, increase signal generator output if necessary.
    (d) Adjust shortwave antenna secondary trimmer (59) for maximum output while rocking gang.
    (e) Remove shorting clip.
    (f) Shunt across shortwave antenna secondary trimmer (59) with shorting clip.
    (g) Retune radio to 10.7 MC. signal, increase signal generator output, if necessary.
    (h) Adjust SW. antenna primary padder (51) (top of chassis) for maximum output while rocking gang.
    (i) Remove shorting clip.

WAVE TRAP ADJUSTMENT (10.7 MC.):

16. (a) Turn band switch to F. M. position.
    (b) Connect field strength meter from signal generator side of 30 mmf. cond. to chassis.
    (c) Increase or decrease signal generator output until field strength meter reads between 10 and 15 microvolts.
    (d) Adjust SW. Antenna primary padder (51) for lowest reading on Field Strength Meter. Make this adjustment slowly, otherwise the dip may be passed unnoticed when a highly damped meter is used.
    (e) Disconnect Field Strength Meter.

BROADCAST BAND ALIGNMENT:

17. (a) Connect dummy loop (14.7 uh) to Signal Web terminal and ground terminal.
    (b) Connect Signal Generator in series with a 30 mmf. condenser to high side of dummy loop.
    (c) Preset Broadcast Antenna Wave Trap (85) on top of chassis to approximately two turns from the closed position.
    (d) Set signal generator to 535 KC. Amplitude Modulated.
    (e) Set dial pointer to 535 KC. (tuning condenser gang closed).
    (f) Adjust Broadcast Oscillator Series Padder (56), on top of chassis, for maximum output.

18. (a) Set signal generator to 1620 KC.
    (b) Set dial pointer to 1620 KC. (tuning condenser gang to minimum capacity, but not against stop).
    (c) Adjust Broadcast Oscillator core on the bottom of chassis for maximum output.
    (d) Repeat steps 17 (d) to 18 (c) until frequency shift stops.

19. (a) Set signal generator to 1400 KC.
    (b) Tune receiver to 1400 KC. maximum output.
    (c) Adjust Broadcast Antenna Trimmer on top of tuning condenser gang for maximum output.

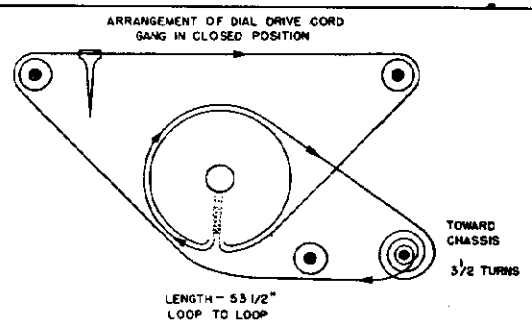
20. (a) Set signal generator to 600 KC.
    (b) Tune receiver to 600 KC. maximum output.
    (c) Adjust Broadcast Antenna Core (132), on top of chassis, for maximum output while rocking gang.

    NOTE: B. C. ANTENNA CORE IN FIRST MODELS ONLY. OMIT STEP 20 WHEN ALIGNING LATER MODELS.

5825 KC. WAVE TRAP ADJUSTMENTS:

21. (a) Set signal generator to 5825 KC. Amplitude Modulated.
    (b) Set dial pointer to approximately 1400 KC. and retune signal generator to maximum output.
    (c) Adjust signal generator output to approximately midscale reading on output meter.
    (d) Adjust Broadcast Antenna Wave Trap Trimmer (85) for lowest reading on output meter.

    NOTE: All air trimmers should be locked in position by applying a drop of household cement on the screw threads.



Item No.	Part No.	Description
1	AC-136171	Transformer Assy. (F. M. Antenna)
2	AC-136264	Transformer, 10.7 MC. and 5.825 MC. I. F. (A)
3	AC-136081	Transformer, 10.7 MC. and 5.825 MC. I. F. (B)
4	AC-136276	Transformer, 10.7 MC and 167.5 KC. I.F.
5	AC-136260	Transformer, 10.7 MC. Discriminator
6	AC-136509	Coil Assy., 1st Oscillator (B.C. & S.W.)
7	AC-136390	Coil Assy., 2nd Oscillator
8	AC-136261	Transformer, 167.5 KC., Diode
9	AW-136511	Coil, B.C., Antenna
10	AB-136444	Coil Assy., S.W. Antenna
11	Part of Item #2	Coil Assy.
12	Part of Item #4	Coil Assy.
13	Part of Item #4	Coil Assy.
14	Part of Item #5	Coil Assy.
15	Part of Item #6	Coil Assy.
16	Part of Item #6	Coil Assy.
17	Part of Item #7	Coil Assy.
18	Part of Item #8	Coil Assy.
19	Part of Item #3	Coil Assy.
20	Part of Item #3	Coil Assy.
21	Part of Item #1	Coil Assy.
22	Part of Item #1	Coil Assy.
23	Part of Item #1	Coil Assy.
24	W-136179	Coil, F.M. Oscillator
25	39001-17	Condenser, .05 mfd., 600v., paper
26 A	B-137028	Condenser, 20 mfd., 400v. Four
26 B		Condenser, 30 mfd., 350v. Section
26 C		Condenser, 20 mfd., 300v. Elect.
26 D		Condenser, 20 mfd., 25v. Filter
27	B-135936	Transformer, Power
28 A	C-135946	Condenser, Variable Two
28 B		Condenser, Variable Section
29	C-136161	Switch, Band Change
30	B-135783	Control, Volume (3 megohm, Tapped 720,000 ohm)
	39368-22	Control (Volume)
	39370-2	Shaft (Knurled Plug-in)
31 A	B-135784	Control, Tone Assy.
31 B		Switch, Power
32 A	W-48858	Bulb (Dial), Type 47, 6.3v., 15 amp.
32 B	W-48858	Bulb (Dial), Type 47, 6.3v., 15 amp.
33	C-132300-2	Cable and Plug, Power
34	39001-7	Condenser, .001 mfd., 600v., paper
35	39001-13	Condenser, .01 mfd., 600v., paper
36	39001-11	Condenser, .005 mfd., 600v., paper
37	39001-11	Condenser, .005 mfd., 600v., paper
38	39001-11	Condenser, .005 mfd., 600v., paper
39	39001-11	Condenser, .005 mfd., 600v., paper
40	39001-11	Condenser, .005 mfd., 600v., paper
41	39001-11	Condenser, .005 mfd., 600v., paper
42	39001-11	Condenser, .005 mfd., 600v., paper
43	39001-11	Condenser, .005 mfd., 600v., paper
44	39001-11	Condenser, .005 mfd., 600v., paper
45	39001-11	Condenser, .005 mfd., 600v., paper
46	39001-13	Condenser, .01 mfd., 600v., paper
47	39001-13	Condenser, .01 mfd., 600v., paper
48	39001-17	Condenser, .05 mfd., 600v., paper
49	39001-17	Condenser, .05 mfd., 600v., paper
50	39001-76	Condenser, .003 mfd., 600v., paper
51	C-137219-1	Condenser, Trimmer (S. W. Ant. Prim.)
52	Part of Item #2	Condenser, Trimmer (5.825 mc. Primary)
53	Part of Item #3	Condenser, Trimmer (5.825 mc. Secondary)
54	W-136964	Condenser, Air Trimmer (F.M. Osc.)
55	W-136964	Condenser, Air Trimmer (S. W. Osc. Series, Padder)
56	W-136964	Condenser, Air Trimmer (B. C. Osc Series, Padder)
57	W-136964	Condenser, Air Trimmer (F.M. Radiation Balance
58	Part of Item #1	Condenser, Trimmer (F.M. Ant. Secondary)
59	Part of Item#10	Condenser, Trimmer (S.W. Ant. Secondary)
60	Part of Item #1	Condenser, Trimmer (F.M. Ant. Primary)
61	Part of Item #2	Condenser, 82 mmf., 300v., ceramic
62	Part of Item #3	Condenser, 68 mmf., 300v., ceramic
63	Part of Item #4	Condenser, 470 mmf., 300v., mica
64	Part of Item #4	Condenser, 470 mmf., 300v., mica
65	Part of Item #8	Condenser, 470 mmf., 300v., mica
66	Part of Item #2	Condenser, 150 mmf., 500v., mica
67	Part of Item #3	Condenser, 150 mmf., 500v., mica
68	Part of Item #5	Condenser, 150 mmf., 500v., mica
69	Part of Item #5	Condenser, 150 mmf., 500v., mica
70	Part of Item #5	Condenser, 62 mmf., 500v., ceramic
71	B-226638-39	Condenser, 120 mmf., 300v., ceramic
72	Part of Item #7	Condenser, 120 mmf., 300v., ceramic
73	Part of Item #7	Condenser, 120 mmf., 300v., ceramic
74	Part of Item #7	Condenser, 4 mmf (Transmission Line)
75	Part of Item #8	Condenser, 1000 mmf., 500v., mica
76	GC-210685-182	Condenser, 100 mmf., 500v., mica
77	Part of Item #8	Condenser, 100 mmf., 500v., mica
78	W-136324	Condenser, 50 mmf., 500v., ceramic
79	Part of Item #5	Condenser, 12 mmf., 300v., ceramic
80	Part of Item #4	Condenser, 33 mmf., 500v., ceramic
81	Part of Item #4	Condenser, 33 mmf., 500v., ceramic
82	Part of Item #1	Condenser, 36 mmf., 500v., mica
83	B-226638-49	Condenser, 10 mmf., 300v., ceramic
84	B-226638-50	Condenser, 27 mmf., 300v., ceramic
85	C-1372 9-3	Condenser, Trimmer (B.C. Ant. Wave Trap)
86	B-226638-27	Condenser, 82 mmf., 500v., ceramic
87	B-226638-51	Condenser, 39 mmf., 300v., ceramic
88	B-226638-52	Condenser, 91 mmf., 300v., ceramic
89	GC-210685-189	Condenser, 50 mmf., 500v., mica
90	B-226638-35	Condenser, 27 mmf., 500v., ceramic
91	Part of Item #3	Condenser, 27 mmf., 500v., ceramic
92	Part of Item #1	Resistor, 1,000 ohm, $\frac{1}{2}$ w.
93	39014-57	Resistor, 470,000 ohm, $\frac{1}{2}$ w.
94	39014-57	Resistor, 470,000 ohm, $\frac{1}{2}$ w.
95	39014-46	Resistor, 56,000 ohm, $\frac{1}{2}$ w.
96	39014-58	Resistor, 560,000 ohm, $\frac{1}{2}$ w.
97	39014-45	Resistor, 47,000 ohm, $\frac{1}{2}$ w.
98	39014-50	Resistor, 120,000 ohm, $\frac{1}{2}$ w.
99	39014-50	Resistor, 120,000 ohm, $\frac{1}{2}$ w.
100	39015-17	Resistor, 220 ohm, 1 w.
101	39294-25	Resistor, 100,000 ohm, $\frac{1}{2}$ w.
102	39294-25	Resistor, 100,000 ohm, $\frac{1}{2}$ w.
103	39294-25	Resistor, 100,000 ohm, $\frac{1}{2}$ w.
104	39294-27	Resistor, 220,000 ohm, $\frac{1}{2}$ w.
105	39294-15	Resistor, 2,200 ohm, $\frac{1}{2}$ w.
106	39294-15	Resistor, 2,200 ohm, $\frac{1}{2}$ w.
107	39294-15	Resistor, 2,200 ohm, $\frac{1}{2}$ w.
108	39294-30	Resistor, 680,000 ohm, $\frac{1}{2}$ w.
109	39294-24	Resistor, 68,000 ohm, $\frac{1}{2}$ w.
110	Part of Item #8	Resistor, 68,000 ohm, $\frac{1}{2}$ w.
111	39294-31	Resistor, 1 megohm, $\frac{1}{2}$ w.
112	39294-31	Resistor, 1 megohm, $\frac{1}{2}$ w.
113	Part of Item #1	Resistor, 1 megohm, $\frac{1}{2}$ w.
114	39001-17	Condenser, .05 mfd., 600v., paper
115	39294-23	Resistor, 47,000 ohm, $\frac{1}{2}$ w.
116	39014-42	Resistor, 27,000 ohm, $\frac{1}{2}$ w.
117	39015-37	Resistor, 10,000 ohm, 1 w.
118	39014-41	Resistor, 22,000 ohm, $\frac{1}{2}$ w.
119	B-226638-59	Condenser, 15 mmf., 500v., ceramic
120 A	W-137021	Resistor (Wirewound), 400ohm, 4w. Two
120 B		Resistor (Wirewound), 700ohm, 4w. Sect.
121	39294-37	Resistor, 10 megohm, $\frac{1}{2}$ w.
122	C-135974	Speaker & Transformer Assy.
123	AW-136911	Condenser, 1.3 mmf. (Transmission Line)
124	39019-3	Terminal Board
125	W-137143	Transmission Line, 75 ohm
126	AW-137220	Loop Assy., Antenna
128	39001-17	Condenser, .05 mfd., 600v., paper
129	39001-73	Condenser, 250 mmf., 600 v., paper
130	B-226638-49	Condenser, 10 mmf., 300v., ceramic
131	39012-59	Iron Core (F.M. Osc.)
132	39012-60	Iron Core (B.C. Ant.)
	W-136998	Connector, Phone Pickup
134	W-137213	Cable and Plug Assy., Phono.
135	B-138131-2	Transformer (only), Output
	39019-3	Terminal Board
	W-134968-1	Socket, Speaker
	39232-5	Socket, Tube (6AC7, 6SG7)
	W-136470	Socket, Tube (7F8)
	39232-7	Socket, Tube (6H6)
	39232-9	Socket, Tube (6SQ7)
	39232-3	Socket, Tube (6V6GT/G)
	39232-1	Socket, Tube (5Y3GT/G)
	D-136565-12	Socket, Dial Light
	W-211101	Ring, Retaining (7F8 Socket)
	W-132366-2	Nut, Locking (Iron Core)
	AC-136204	Background, Dial
	D-136262	Dial Glass
	W-136201	Clip, Dial Glass
	W-136863	Cushion, Rubber (Dial Glass)
	W-136176	Pointer, Dial
	W-51752	Spring, Dial Drive Cord
	W-136178	Shaft, Drive
	W-51071	Ring, Shaft Retaining
	W-134916	Washer, Spring
	W-135979	Pulley, Idler (Large Stud)
	W-135074	Pulley, Idler (Small Stud)
	W-131154-1	Cotter, External
	AB-136243	Pulley & Hub Assy., Variable Condenser
	C-136222	Bracket, Variable Condenser Mtg.
	W-134055	Grommet, Variable Condenser Mtg.
	39172-200	Screw, Chassis Mtg. (Front)
	W-136111	Mounting Rubber, Chassis (Front)
	W-45580	Mounting Rubber, Chassis (Rear)
	W-137199	Nut, Tee (Chassis Mtg.)
	R-137010	Cabinet (86CR)
	R-137277	Cabinet (86CS)
	W-137201	Pull, Drawer
	W-137022	Knob, 86CR (Band Switch, or Tone Control)
	W-137350	Knob, 86CS (Band Switch, or Tone Control)
	W-135809	Knob, 86CR (Dial Tuning, or Volume Control)
	W-137349	Knob, 86CS (Dial Tuning, or Volume Control)
	D-134945-1	Record Changer (Model "K")
	AW-137333	Shielded Wire & Plug Assy. (Phono.)
	W-134956	Nut, Tee (Record Changer Mtg.)
	W-134966	Nut, Spring Lock (Record Changer Mtg.)
	AW-137232	Screw and Washer Assy. (Record Changer Mtg.)
	C-137178	Album, 86CR (12" Record)
	C-137295	Album, 86CS (12" Record)
	C-137236	Album, 86CR (10" Record)
	C-137294	Album, 86CS (10" Record)
	AB-134935	Needle, Floating Jewel Assy.

*These parts will replace the original equipment parts.

CHANNEL NUMBERS TO MEGACYCLES

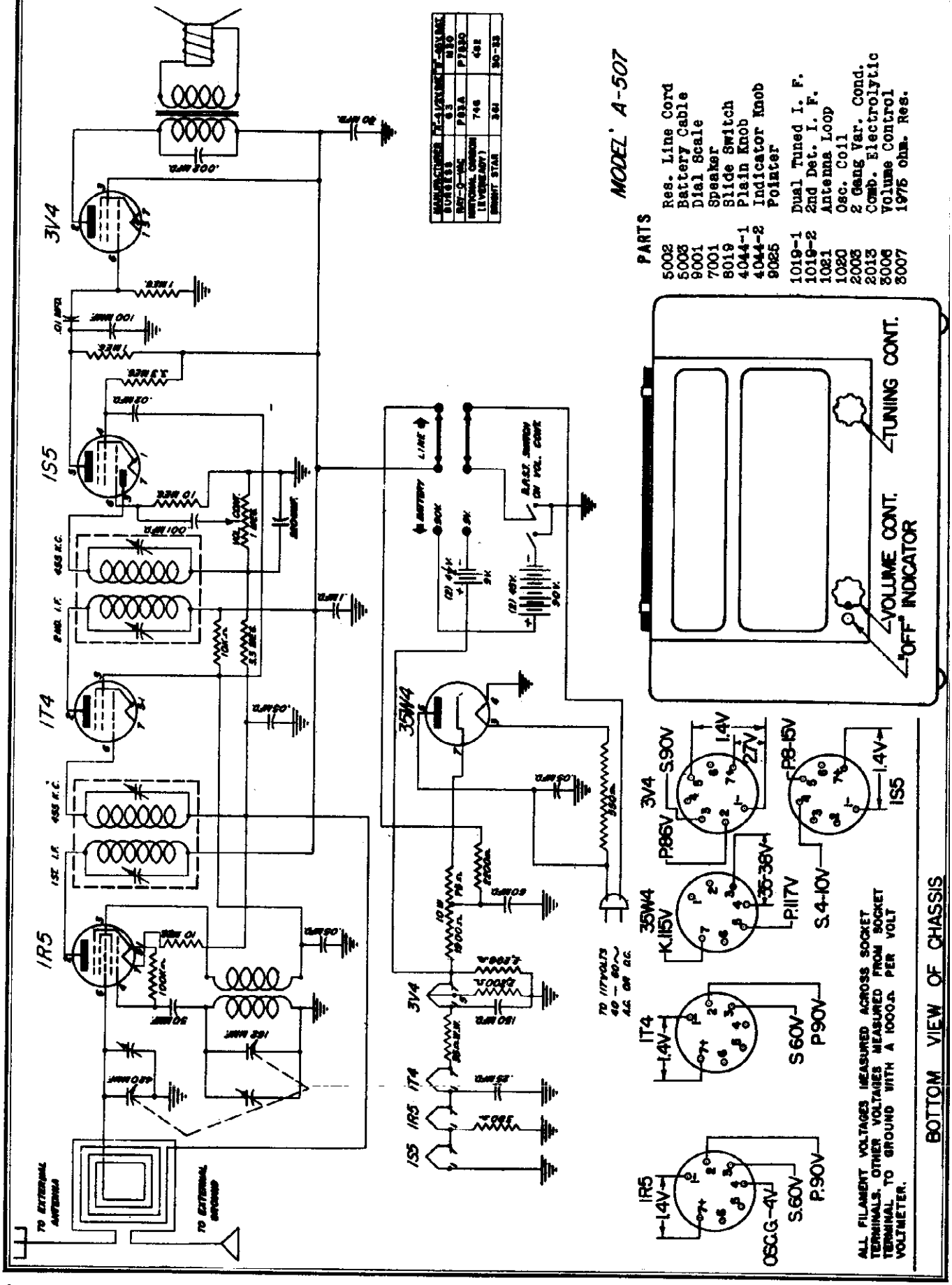
Cross index between channel calibrations on the dial and frequency in megacycles follow:

Channel No.	Frequency in Megacycles		
200	87.9	255	98.9
205	88.9	260	99.9
210	89.9	265	100.9
215	90.9	270	101.9
220	91.9	275	102.9
225	92.9	280	103.9
230	93.9	285	104.9
235	94.9	290	105.9
240	95.9	295	106.0
245	96.9	300	107.9
250	97.9		

To find the frequency in megacycles for CHANNEL NUMBERS between those given above, add .2 megacycle for every one added to the CHANNEL NUMBER; for example Channel 204 would be 88.7 megacycles and 251 would be 98.1 megacycles.

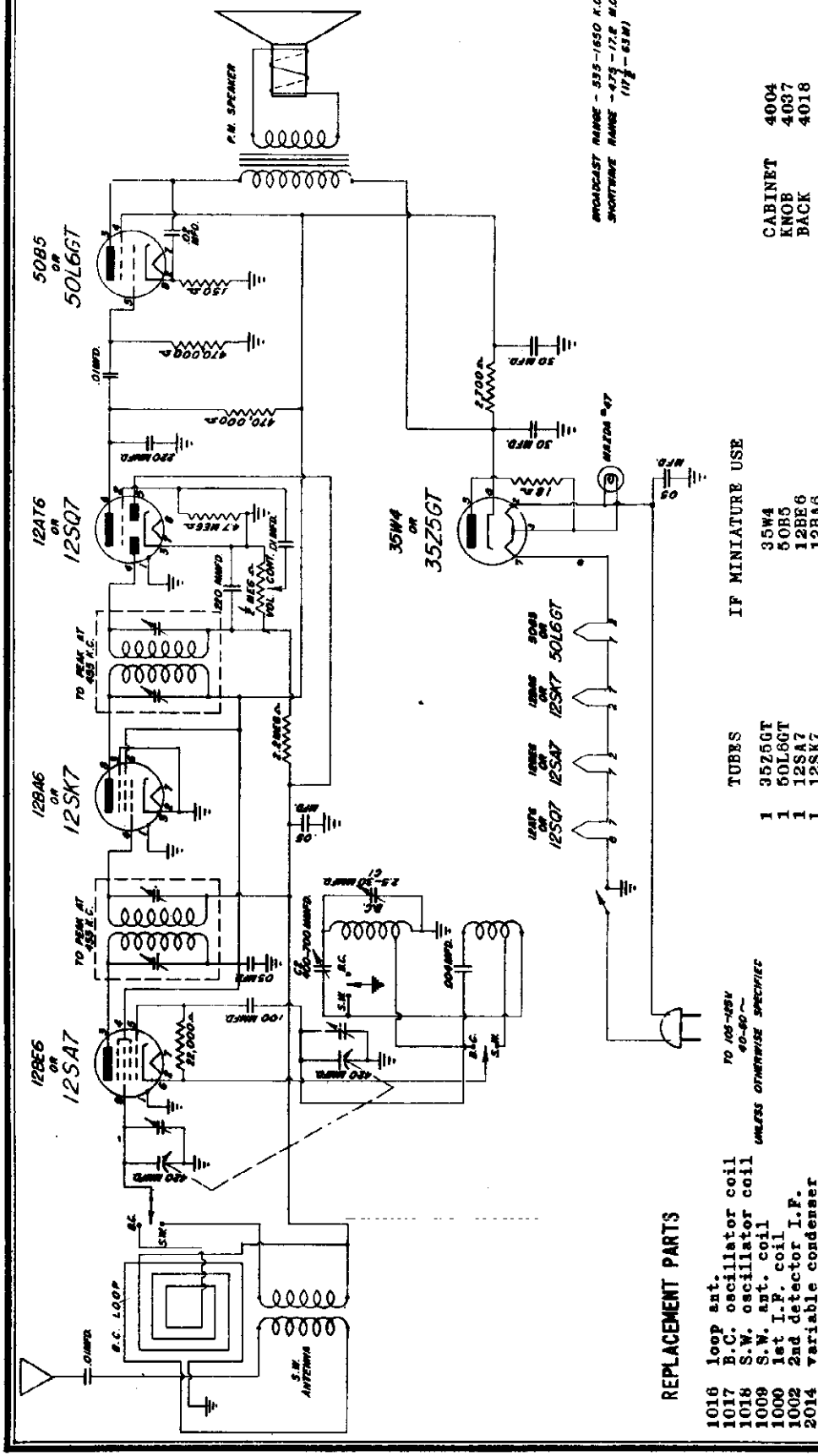
MODEL A-507

DEWALD RADIO MFG. CORP.



MODEL A-509

DEWALD RADIO MFG. CORP.



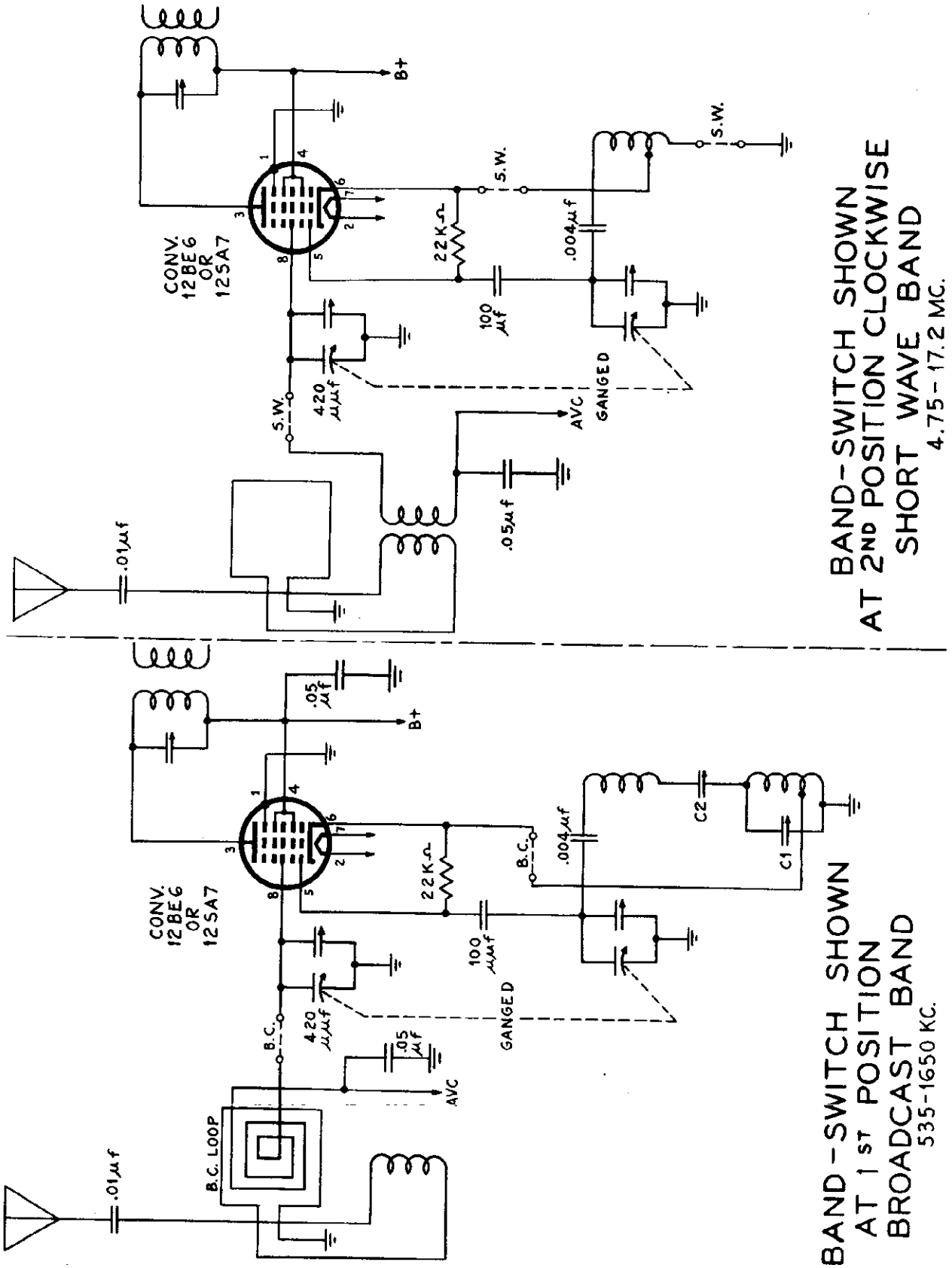
REPLACEMENT PARTS

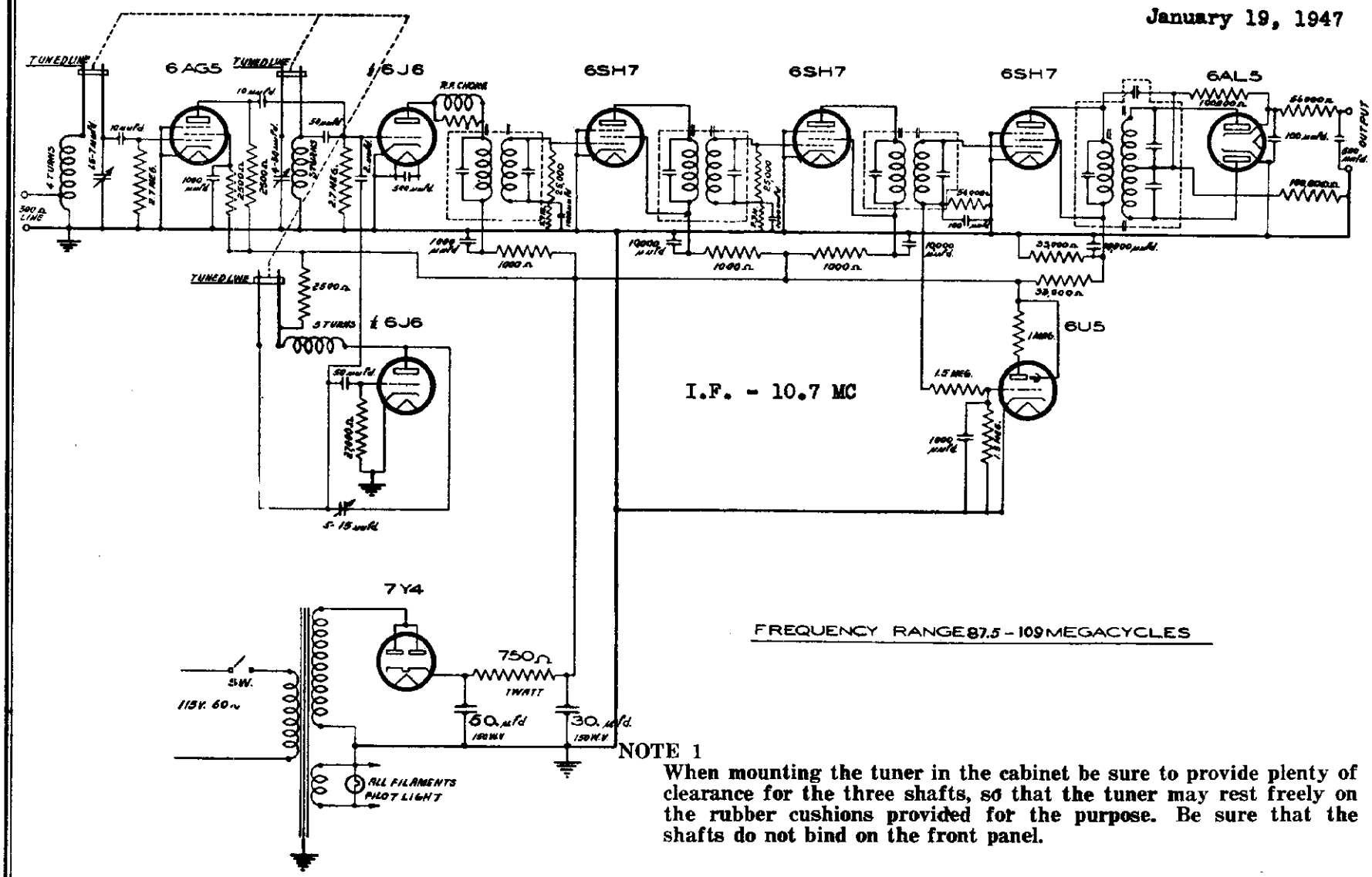
		TUBES	IF MINIATURE USE	
1016	loop ant.	1 35Z5GT	35W4	CABINET 4004
1017	B.C. oscillator coil	1 50L6GT	50B5	KNOB 4037
1018	S.W. oscillator coil	1 12SA7	12BE6	BACK 4018
1009	S.W. ant. coil	1 12SK7	12BA6	
1000	1st I.F. coil	1 12SQ7	12AT6	
1002	2nd detector I.F.			
2014	variable condenser			
2002	comb. electrolytic			
2000	paper condenser			
2012	ceramic condenser			
3000	1/4 W. resistor			
3003	1/2 W. resistor			
3004	2 W. resistor			
6003	dial scale			
9001	dial back plate			
6001	pilot lamp assembly			
#47	pilot lamp			
#20	dial cord			
9762	drive spring			
9818	bushing			
9000	shaft			
7000	speaker			
8017	wave band switch			
5000	line cord			
2011	padder condenser			
3002	comb. volume control			

To calibrate receiver connect the output of signal generator in series with a 200 MMFD fixed condenser to the flexible antenna lead attached to the loop antenna. Connect the low side of signal generator through a 1/10 mfd. condenser to receiver chassis. The wave band switch should be in the broadcast position. Adjust signal generator to 455 Kilocycles and adjust both I.F. transformers for maximum signal. Open the receiver variable condenser for minimum capacity. Turn the band switch to short wave position. Set signal generator at 17.2 Megacycles. Peak oscillator section of receiver condenser for maximum signal. Next set signal generator at 16 Megacycles. Tune in this signal. Adjust R.F. section of receiver variable condenser for maximum signal strength. The low frequency end of the dial is automatically adjusted by a fixed padder condenser. Next turn band switch to broadcast position. Rotate drive shaft until variable condenser is in minimum capacity position. Adjust signal generator to 1650 Kilocycles. Adjust the broadcast oscillator trimmer screw (C-1) until maximum signal from generator is heard. To adjust the low frequency, set the signal generator and receiver to 600 Kilocycles. Peak the broadcast padder (C-2) for maximum output. The variable condenser should be rocked during the operation. Keep the signal generator output as low as possible when making all of these measurements. It is extremely necessary in making the short wave adjustments, that the fundamental oscillator signal be tuned in and not the image frequency, which will fall below the fundamental.

DEWALD RADIO MFG. CORP.

MODEL A-509





NOTE 1

When mounting the tuner in the cabinet be sure to provide plenty of clearance for the three shafts, so that the tuner may rest freely on the rubber cushions provided for the purpose. Be sure that the shafts do not bind on the front panel.

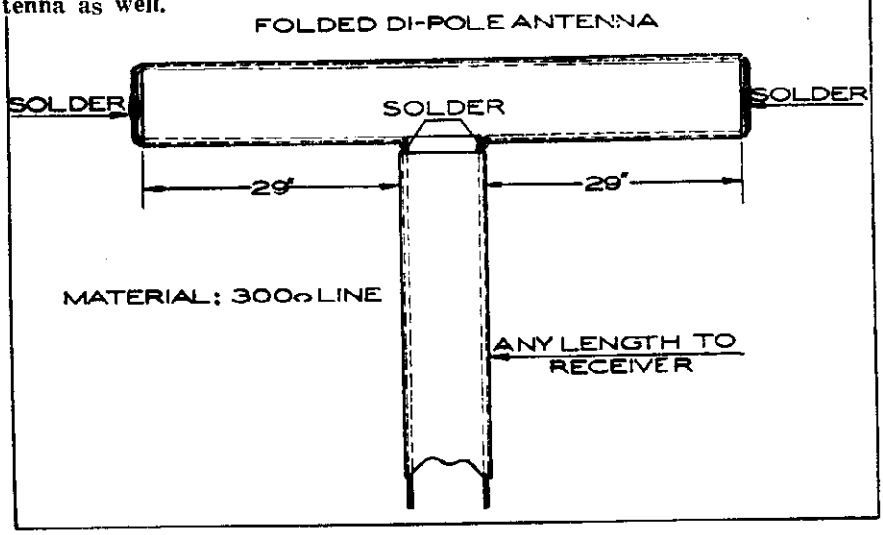
NOTE 2

The tuning lines are lubricated at the factory for best contact and smoother dial operation. Normally this lubricant will not have to be replaced. However, should it be desired to lubricate the rods, use a dab of General Cement Co. "Lube-Rex on each rod.

FM TUNER

EDWARD'S FM RADIO CORP.

In most metropolitan locations an indoor antenna may be all that is necessary. This by all means should be tried first, unless a suitable F.M. type outdoor antenna is already available. A very satisfactory indoor antenna may be improvised from a piece of 300 ohm flat type transmission line. (Same material as the antenna connection coming out from the tuner.) Cut the piece to a length of 60 inches. Then short circuit both ends. Then in the exact center cut one side of the line and use the two resulting ends to connect to the antenna line coming from the tuner. The antenna may be fastened to a molding or to a piece of wood with thumb tacks. (See diagram.) It is also advisable to try positioning the antenna at various angles and positions, so as to favor most desired stations. This applies to an outdoor antenna as well.



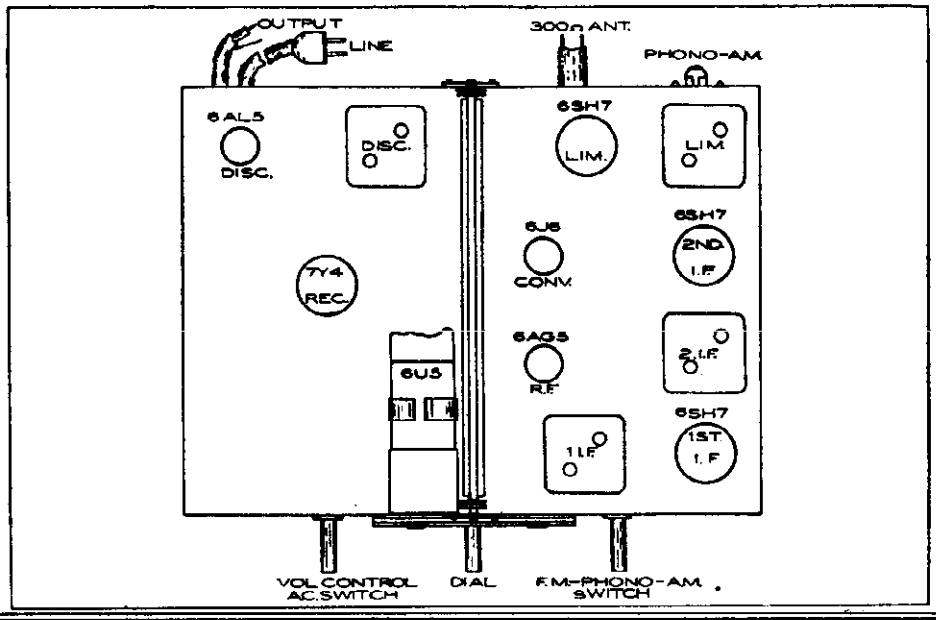
If this indoor antenna should prove unsatisfactory for your location, any standard half wave dipole F.M. outdoor antenna may be used. A 300 ohm transmission line should be used to couple to the tuner.

Any high quality audio system may be employed. Connection can be made to the phono connection provided for on most better radio receivers. Volume may be controlled either directly at the tuner by means of the volume control provided for on the receiver or amplifier, whichever is more convenient. A phono imput is provided in the rear of the tuner. The selector switch in the front may be used to switch from F.M. to phono, all connections then being permanent. If desired an A.M. tuner may be connected to the rear phono jack instead of a phono pickup.

After the tuner is in operation for about 10 minutes each time it is turned on it may be necessary to retune to compensate for a slight temperature rise drift. This will not be necessary thereafter. Tuning should be so done as to get maximum closing of the target on the 6U5 tuning eye mounted directly on the dial. However the ear should be the final judge of the exact dial position. This point will always be in the region of maximum tuning eye closing.

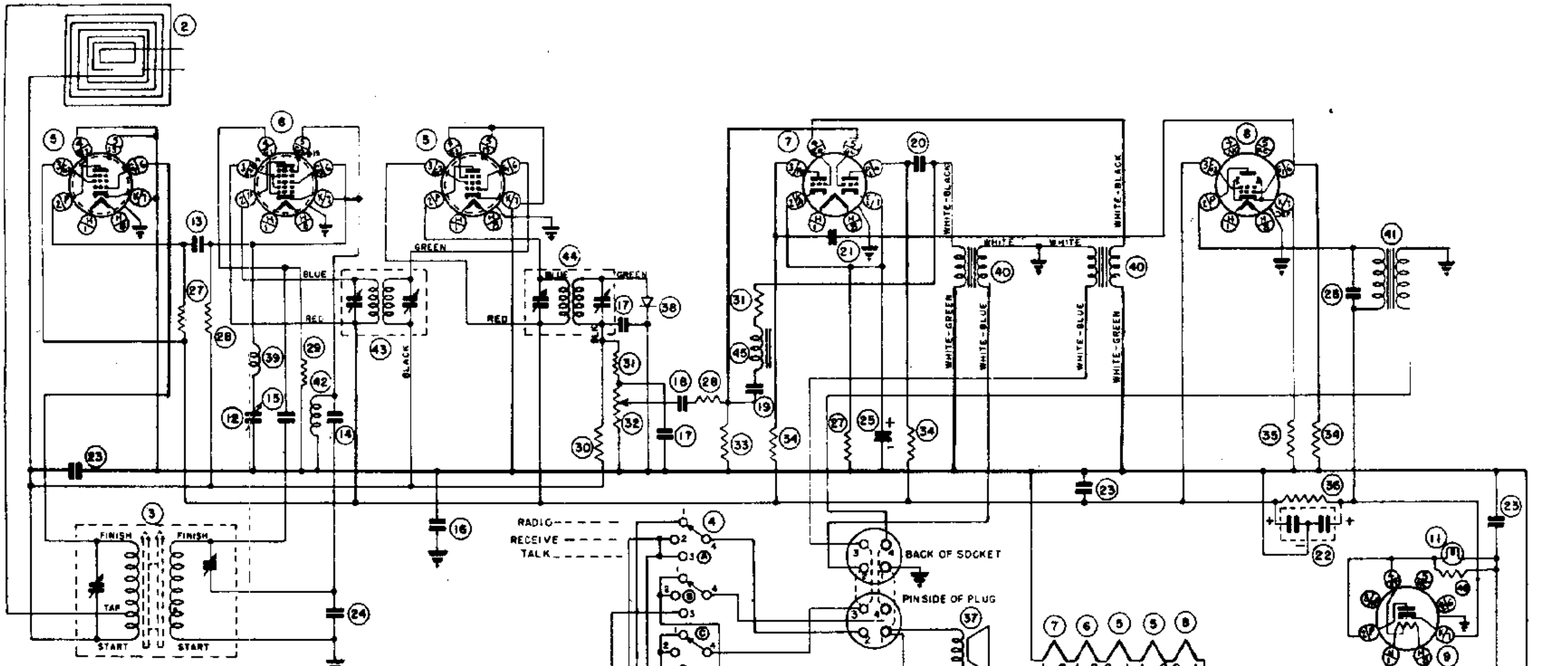
The output line is high impedance 500,000 ohms.

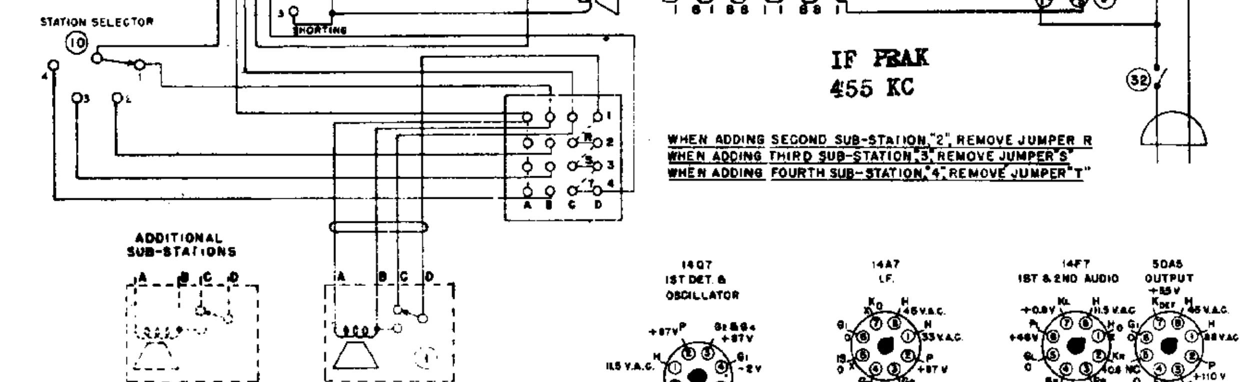
It should be ascertained that the 6J6 and 6AG5 miniature tubes mounted under the chassis are firmly in their sockets before attempting to operate the tuner.

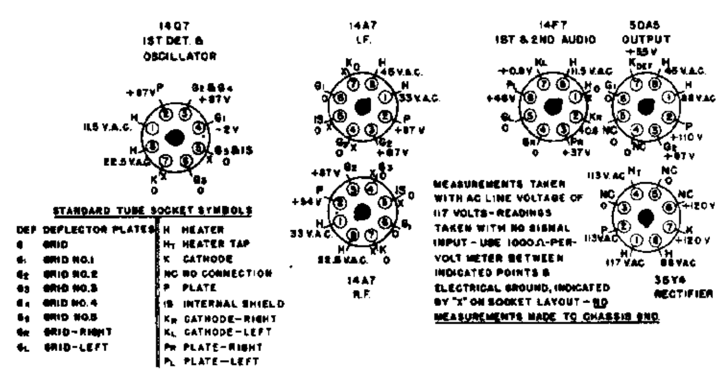


ELECTRONIC LABORATORIES, INC.

Radio Utiliphone, MODEL 76RU, Chassis 2865







ITEM	PART NO.	DESCRIPTION	REQ'D
1	2899	SLAVE STATION	1
2	A-2280A	LOOP ASSEMBLY	1
3	A-2282A	TUNING UNIT	1
4	E-171A	SWITCH-LEVER ACTION-3 CONTACT-3 POSITION	1
5	14A7	TUBE	2
6	14Q7	TUBE	1
7	14F7	TUBE	1
8	50A5	TUBE	1
9	35Y4	TUBE	1
10	E-172A	SWITCH-ROTARY TAP-4 POSITION-SINGLE POLE	1
11	H-241A	DIAL LIGHT	1
12	C-493B	CONDENSER 10-160 MMF	1
13	C-493A	CONDENSER 1000 MMF CERAMIC	1
14	C-500A	CONDENSER 0.01 MFD 400 V.D.C.	1
15	C-498A	CONDENSER 50 MMF CERAMIC	1
16	C-497A	CONDENSER 0.2 MFD 400 V.D.C.	1
17	C-494A	CONDENSER 250 MMF CERAMIC	2
18	C-490A	CONDENSER 0.005 MFD 400 V.D.C.	1
19	C-524A	CONDENSER 0.001 MFD 400 V.D.C.	1
20	C-419A	CONDENSER 0.05 MFD 400 V.D.C.	1
21	C-488A	CONDENSER 0.01 MFD 200 V.D.C.	1
22	C-488A	CONDENSER 40-40 MFD 150 V.D.C.	1
23	C-471A	CONDENSER .01 MFD 400 V.D.C.	3
34	W-441A	RESISTOR 470,000Ω 1/4 WATT	3
35	W-415A	RESISTOR 150Ω 1/2 WATT	1
36	W-451A	RESISTOR 470Ω 1 WATT	1
37	H-258A	SPEAKER 4 X 6 OVAL	1
38	H-257A	CRYSTAL	1
39	T-1372A	CHOKE R.F. 3.0 MH	1
40	TR-3600A	MICROPHONE TRANSFORMER	2
41	T-1368A	OUTPUT TRANSFORMER	1
42	T-1365A	CHOKE R.F. 1.4 MH	1
43	T-1361A	I.F. TRANSFORMER (INPUT)	1
44	T-1362A	I.F. TRANSFORMER (OUTPUT)	1
45	T-1381A	CHOKE 18 HENRIES	1
46	W-481A	RESISTOR 220Ω 1/2 WATT	1

ITEM	PART NO.	DESCRIPTION	REQ'D
24	C-531A	CONDENSER 2000 MMF CERAMIC	1
25	C-482A	CONDENSER 25 MFD 25 V.D.C.	1
26	C-496A	CONDENSER 0.02 MFD 200 V.D.C.	1
27	W-482A	RESISTOR 4700Ω 1/2 WATT	2
28	W-439A	RESISTOR 100,000Ω 1/4 WATT	2
29	W-437A	RESISTOR 22,000Ω 1/4 WATT	1
30	W-442A	RESISTOR 2.2 MEG 1/4 WATT	1
31	W-438A	RESISTOR 47,000Ω 1/4 WATT	2
32	W-464A	POTENTIOMETER & SWITCH 500,000Ω	1
33	W-443A	RESISTOR 10 MEG. 1/4 WATT	1

VOLUME, ON-OFF Turn knob to the right to turn Radio-Utiliphone on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase volume.

The Volume, ON-OFF switch must be turned on to operate both the radio, and the utiliphone.

DIAL Standard Broadcast Bank - 540 to 1620 Kilocycles. Calibrated in kilocycles. Shadow indicator behind moving dial.

TUNING Radio Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

RADIO-RECEIVE-TALK SWITCH

This is a lever switch with a fixed position at "Radio" and "Receive", and a spring return from "Talk" to "Receive".

To operate the radio, set the switch to the position marked "Radio".

To talk on the utiliphone, push the lever to "Talk" and hold in position while talking. To listen, release lever and let it swing back to "Receive" position.

SUB-STATION SELECTOR SWITCH

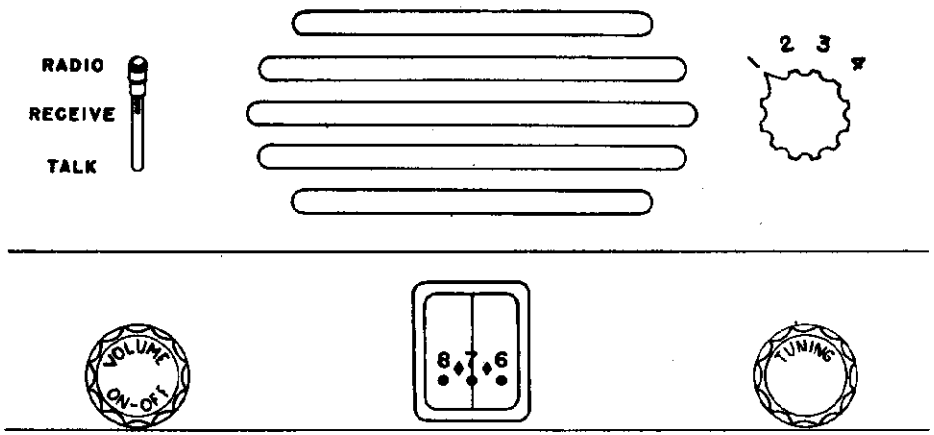
This is a four position switch with positions marked 1, 2, 3, and 4 indicating sub-stations 1, 2, 3, and 4 respectively. Set the sub-station selector switch for the desired station.

Model 7S Sub-Stations are each equipped with a push-to-talk switch, which is normally in the listen position. In order to talk from any sub-station, this switch must be depressed and held down while talking.

IF THE RADIO-UTILIPHONE FAILS TO OPERATE

FIRST- Check power supply by connecting a lamp to the outlet, or by connecting the radio-utiliphone in another socket.

SECOND - When used on DC, if the radio does not operate, even though the tubes are lighted, reverse the plug in the socket to provide correct polarity.



THIRD - See if tubes are lighted after the radio-utiliphone has been turned on for almost a minute. Tubes in the Electronic Model 76RU are connected so that if one tube is loose in its socket, or defective, none of the tubes will light.

See that tubes are pushed into sockets. If they still fail to light, have them checked by your local radio dealer.

IF THE UTILIPHONE FAILS TO OPERATE, but the radio does operate, check the following:

FIRST - Check the setting of the sub-station selector switch.

SECOND - Check for loose interconnecting wires.

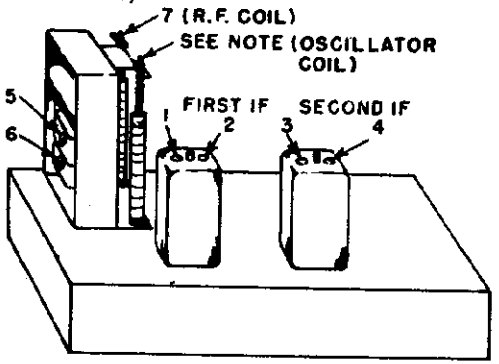
THIRD - Check for correct connections between stations. Example: - Be sure the same wire is connected from Row 1 - Terminal "A" to Station 1 - Terminal "A", etc.

Any difficulties that are not corrected by following the above instructions should be referred to a competent serviceman.

SERVICE DATA— ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F.coil winding. (Note:-The distance 1 and 2 should be measured from mounted end of the slug.)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".



ELECTRONIC LABORATORIES, INC.

Radio Utiliphone,
MODEL 76RU,
Chassis 2865

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F.adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F.input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F.coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R. F. slug until maximum output is reached at both 1400 KC and 700 KC as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

SPECIFICATIONS

Power consumption..... 35 Watts
(At 117 volts AC Supply)
Power Output- 1.1 Watts 10% Distortion
1.6 Watts Max.
Selectivity----49 KC Broad at
1000 times Signal
Intermediate Frequency..... 456 KC
Speaker..... 4"x6" Oval
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 15 microvolts average

ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

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

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

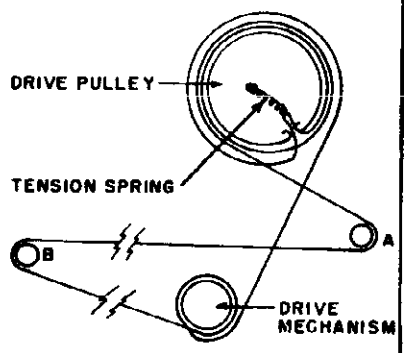
Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING	DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
I.F. 456 KC	Grid of RF tube 14A7	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	
I.F. 455 KC	Grid of RF tube 14A7	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Out	Adjust Osc. #6 for Max. Signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 1400KC	Adjust RF trimmer #6 for Max. Signal	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. Signal(care should be taken not to disturb carriage position of tuner)	Alternately adjust R.F. trimmer and R.F.slug until maximum output is reached at both 1400 KC and 700 KC as instructed above.

DRIVE CORD REPLACEMENT

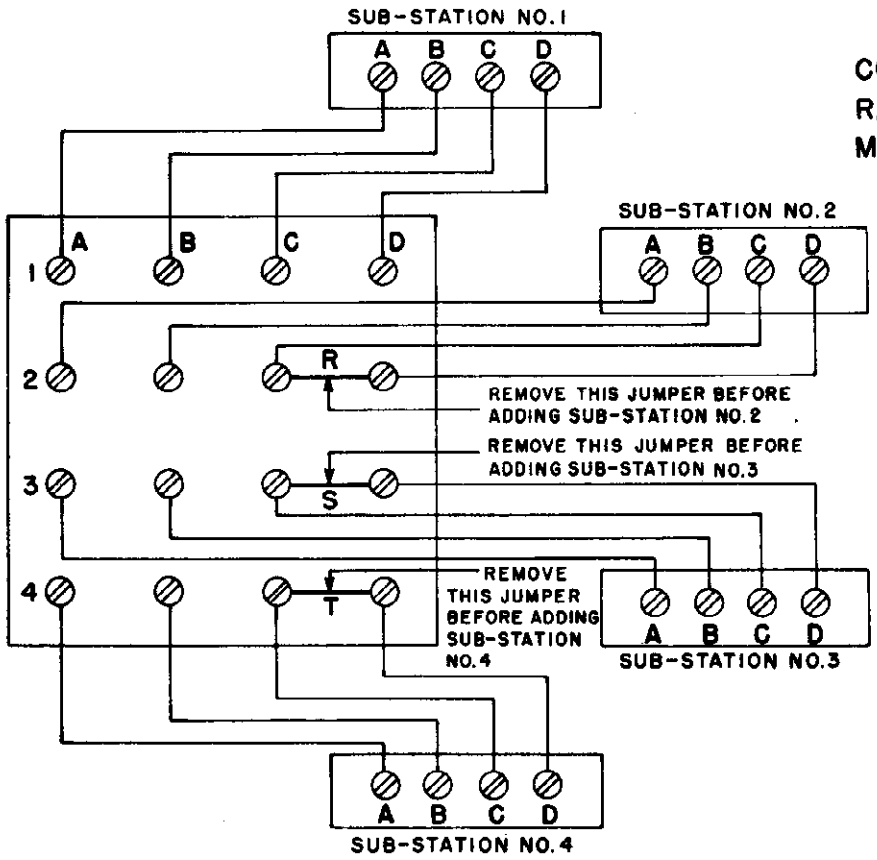
Turn the tuner to the fully open position. Use a new cord 41" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.

Attach dial pointer to cord.



MODEL 76RU

ELECTRONIC LABORATORIES, INC.



TO CONNECT TWO OR MORE SUB-STATIONS

The Model 76RU Radio-Utiliphone is supplied, by the manufacturer, set up to operate one sub-station. If more than one sub-station is to be installed, be sure to read all instructions before starting to connect the stations.

Terminal board on the 76RU, is marked 1, 2, 3, 4, and A, B, C, D. The numbers 1, 2, 3, and 4 indicate stations, the letters A, B, C and D indicate the four terminals which are to be used for connections to the sub-stations.

Stations must be connected in sequence as marked. IF ONLY ONE STATION IS TO BE USED, IT MUST BE CONNECTED TO THE SET OF TERMINALS MARKED "1".

THE SAME WIRE MUST BE CONNECTED BETWEEN TERMINALS HAVING THE SAME MARKINGS:-

Terminal 1A (on Model 76RU) to Terminal A on No. 1 Sub-Station
Terminal 1B (on Model 76RU) to Terminal B on No. 1 Sub-Station
Terminal 1C (on Model 76RU) to Terminal C on No. 1 Sub-Station
Terminal 1D (on Model 76RU) to Terminal D on No. 1 Sub-Station

Be certain that jumpers R, S, and T are in place per diagram.

LINE VOLTAGE

Model 76RU Radio Utiliphone operates only on a power supply of 105-125 volts AC, 50 to 60 cycles, or 105-125 volts DC. If in doubt about your line voltage, check with your local power company before connecting the Radio-Utiliphone.

If there seems to be an excessive amount of hum when operating the radio on AC, reverse the position of the line plug in the socket.

On DC operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.

Model 7S Sub-Station requires no electrical power connection.

LOCATION

If two units are located in the same room and are too close together, they may "sing" due to acoustic feedback. By experimenting, it is possible to change the position of the units to that this feedback is eliminated.

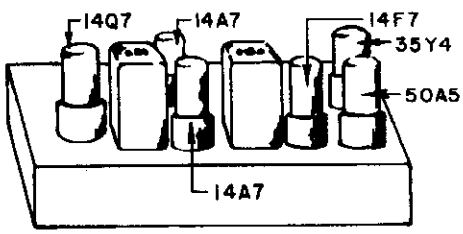
TUBES AND DIAL LAMP

The type and position of tubes are shown in illustration.

All tubes and the dial lamp MUST be in the socket to operate the radio-utiliphone.

CAUTION - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

Use only a #47 dial lamp.



INSTALLATION CONNECTION, MODEL 76RU RADIO-UTILIPHONE AND MODEL 7S SUB-STATIONS

Model 76RU Radio-Utiliphone and Model 7S Sub-Stations are interconnected by using the four-conductor wire furnished. (Additional lengths, up to approximately 500 feet may be used. This is available in 50 foot lengths.) The wire supplied with the equipment is color coded for convenience in making connections. Connections on each unit are made to screws on the terminal boards provided. (See connection diagram.)

The terminal board on the Sub-Station is located on the back of the cabinet, and on the radio-utiliphone, it is located on the back of the chassis inside of the cabinet. Remove four screws in the corners of the back cover. The back cover may then be pulled away from the cabinet far enough to permit access to the terminal board.

Wires must be clean and free of insulation before making connections. To insure a good connection, the wire should be wrapped completely around the screw terminal. Screw should then be tightened so that wires are held securely in place. Faulty connections of any kind may interfere with operation.

TO CONNECT ONE SUB-STATION

Sub-Stations must always be connected in sequence as marked on the terminal board. If two sub-stations are used, they must be connected to the terminals marked "1" and "2". Before connecting station No. 2, remove jumper "R" (refer to connection diagram). Then connect wires between terminals #2A, #2B, #2C, and #2D and Terminals A, B, D, and D of No. 2 sub-station. IF ONE STATION IS LATER REMOVED, THE REMAINING STATION MUST THEN BE CONNECTED TO THE TERMINALS MARKED "1", AND JUMPER "R" MUST BE REPLACED.

Three sub-stations must be connected to terminals #1, #2 and #3. Before connecting station #3, remove jumper "S" (refer to connection diagram). Then connect wires between terminals #3A, #3B, #3C and #4D, and terminals A, B, C, and D of No. 3 sub-station. If the third station is later removed, the two remaining stations must be connected to terminals marked "1" and "2", and jumper "S" must be replaced.

Before connecting station No. 4, remove jumper "T" (refer to connection diagram). Then connect wires between terminals #4A, #4B, #4C, and #4D, and terminals A, B, C, and D of No. 4 sub-station. If fourth station is later removed, the three remaining stations must be connected to terminals #1, #2 and #3, and jumper "T" must be replaced.

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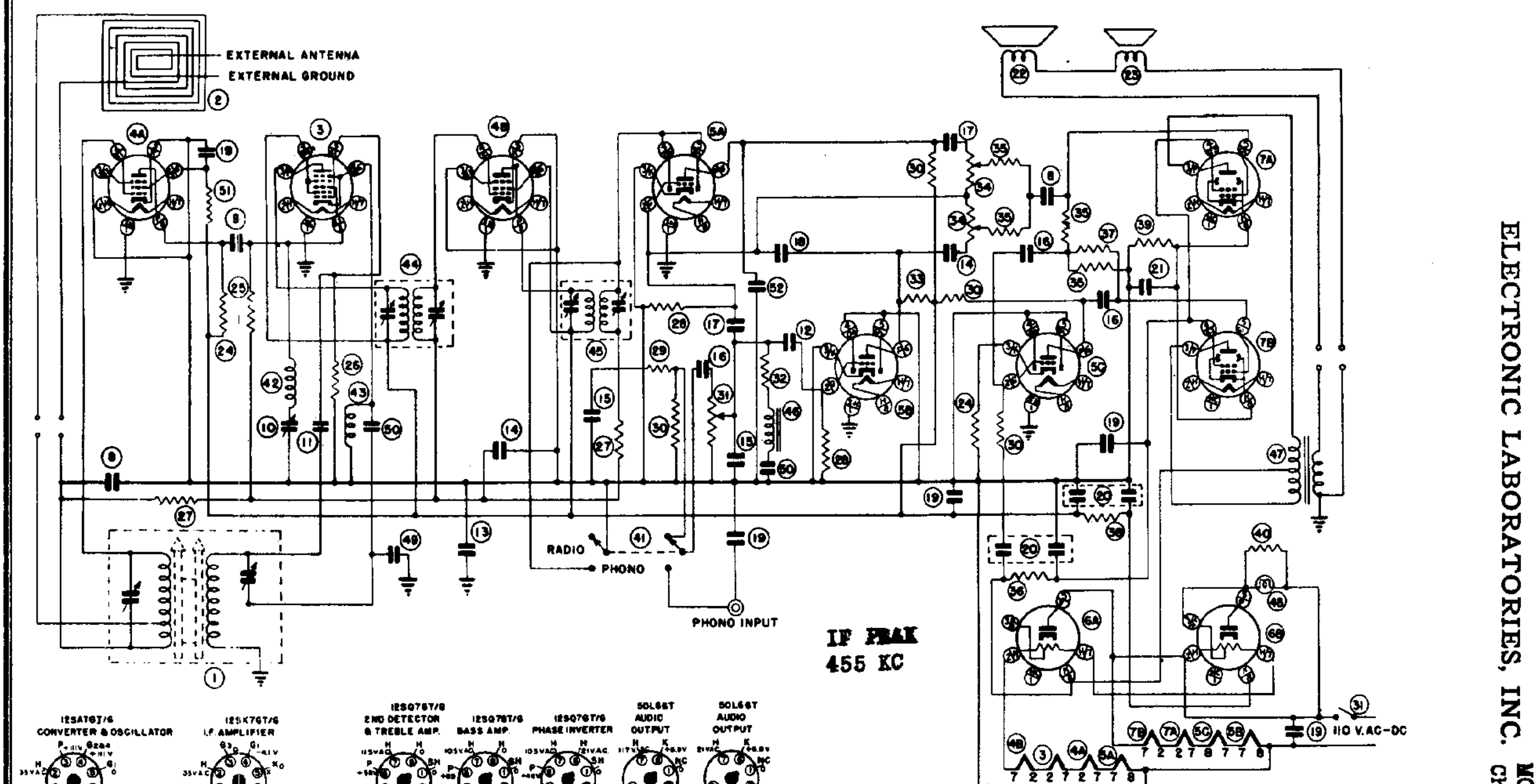
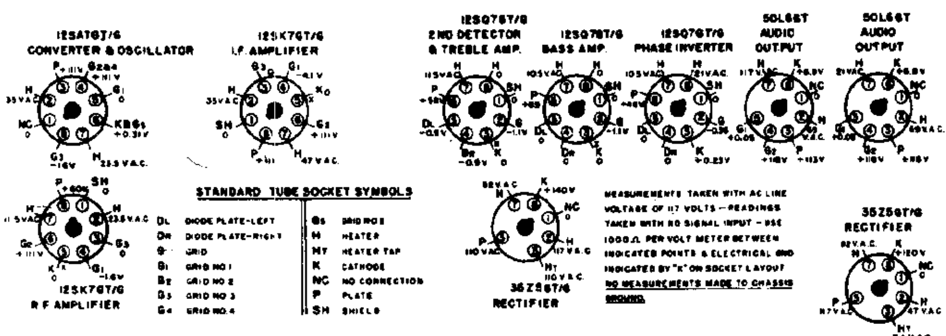
MODEL 710T, Orthosonic, Chassis 2875





		LIST OF PARTS	
ITEM	PART NO	DESCRIPTION	REQ'D
1	A-2220A	TUNER ASSEMBLY	1
2	A-2221A	LOOP & BACK COVER ASSEMBLY	1
3	12SA7GT/G	TUBE	1
4	12SK7GT/G	TUBE	2
5	12SQ7GT/G	TUBE	3
6	[illegible]	TUBE	[illegible]
7	50L6GT	TUBE	2
8	[illegible]	CONDENSER 0.1 MFD 200 V.D.C.	2
9	[illegible]	CONDENSER 1000 MMF. CERAMIC	1
10	[illegible]	CONDENSER 10-160 MMF	1
11	[illegible]	CONDENSER 50 MMF CERAMIC	1
12	[illegible]	CONDENSER 0.05 MFD 400 V.D.C.	1
13	[illegible]	CONDENSER 0.2 MFD 400 V.D.C.	1
14	[illegible]	[illegible]	2
15	C-494A	CONDENSER 250 MMF CERAMIC	2
16	C-468A	CONDENSER 0.01 MFD 200 V.D.C.	3
17	[illegible]	CONDENSER 0.001 MFD 400 V.D.C.	2
18	[illegible]	CONDENSER 0.003 MFD 400 V.D.C.	1
19	[illegible]	CONDENSER 0.1 MFD 400 V.D.C.	5
20	[illegible]	CONDENSER 40-40 MFD 150 V.D.C.	2
21	[illegible]	CONDENSER 25 MFD 25 V.D.C.	1
22	[illegible]	SPEAKER 6" PERMANENT MAGNET	1
23	[illegible]	SPEAKER 5" PERMANENT MAGNET	1
24	[illegible]	RESISTOR 4700 Ω 1/2 WATT	2
25	[illegible]	RESISTOR 100,000 Ω 1/4 WATT	1
26	[illegible]	RESISTOR 22,000 Ω 1/4 WATT	1
27	[illegible]	RESISTOR 2.2 MEG 1/4 WATT	2
28	[illegible]	RESISTOR 4.7 MEG 1/4 WATT	2
29	[illegible]	RESISTOR 47,000 Ω 1/4 WATT	1
30	[illegible]	RESISTOR 470,000 Ω 1/4 WATT	4
31	[illegible]	POTENTIOMETER & SWITCH 500,000 Ω	1
32	W-478A	RESISTOR 33,000 Ω 1/4 WATT	1
33	W-468A	RESISTOR 330,000 Ω 1/4 WATT	1
34	W-475A	POTENTIOMETER 1 MEG	2
35	W-[illegible]	RESISTOR [illegible] WATT	4
36	W-[illegible]	RESISTOR [illegible] WATT	1
37	W-[illegible]	RESISTOR [illegible] WATT	1
38	W-[illegible]	RESISTOR [illegible]	1
39	W-[illegible]	RESISTOR [illegible]	1
40	W-[illegible]	RESISTOR [illegible] WATT	1
41	E-[illegible]	SWITCH—DOUBLE POLE DOUBLE THROW	1
42	T-[illegible]	CHOKE R.F. [illegible]	1
43	T-[illegible]	CHOKE R.F. [illegible]	1
44	T-[illegible]	I.F. TRANSFORMER (INPUT)	1
45	T-[illegible]	I.F. TRANSFORMER (OUTPUT)	1
46	T-1380A	AUDIO CHOKE [illegible]	1
47	T-1379A	OUTPUT TRANSFORMER	1
48	H-241A	PILOT LAMP	1
49	C-531A	CONDENSER 2000 MMF CERAMIC	1
50	C-500A	CONDENSER 10,000 MMF 400 V.D.C.	2
51	W-490A	RESISTOR 15,000 Ω 1/4 WATT	1
52	C-492A	CONDENSER 100 MMF 50 V.D.C.	1

MODEL 710T

ELECTRONIC LABORATORIES, INC.

DIAL Standard Broadcast Band. 540 to 1620 Kilocycles. Calibrated in channel numbers. Add a zero to the dial number to obtain the kilocycle number.

VOLUME, ON-OFF Turn knob to the right to turn radio on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase the volume.

This control acts as a master volume control after treble and bass response has previously been set by the treble and bass controls. If the treble and bass controls are both turned completely off (counter-clockwise) there will be no volume to the final amplifier and therefore no sound will be heard.

TUNING Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

BASS This control adjusts the volume output from the bass amplifier. For balanced reception, this control should be turned completely on (clockwise). If less than normal is desired, the bass response can be lowered by turning the knob counter-clockwise until desired response is obtained.

TREBLE This control adjusts the volume output from the treble amplifier. For balanced reception, this control should be turned completely on (clockwise). If less treble response than normal is desired, or if unusually noisy reception conditions are encountered, this control should be turned counter-clockwise until desired response is obtained.

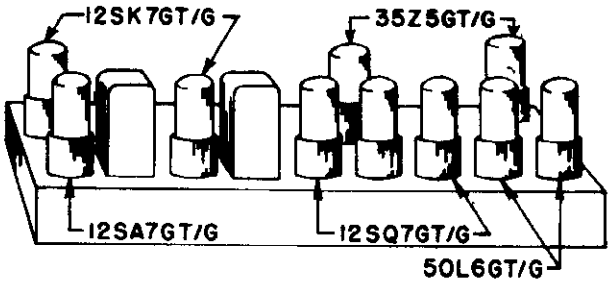
TREBLE AND BASS CONTROLS Since these controls actually regulate the volume output of separate channels, it should be noted that if both bass and treble controls are turned to the off position, there will be no output from the speaker regardless of the position of the master volume control.

TUBES AND DIAL LAMP The type and position of tubes are shown in illustration.

All tubes and the dial lamp MUST be in the socket to operate the radio.

CAUTION - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

Use only a No. 47 dial lamp



ANTENNA A High Q Loop Antenna is built into the cabinet of the Electronic Model 710T Orthosonic Radio. No other antenna is usually required for reception of local or powerful stations. Since directional effects are obtained by using only the built-in loop antenna, the signal pickup may be increased and interference from nearby stations decreased, by changing the position of the radio until the signal is at a maximum.

LINE VOLTAGE

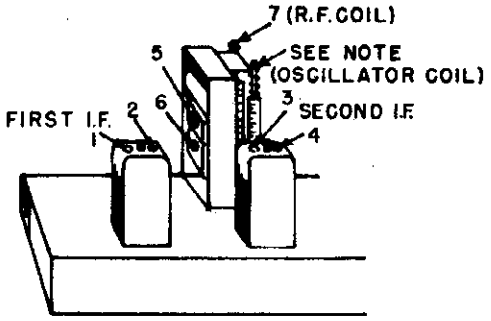
Electronic Model 710T Orthosonic Radio operates only on a power supply of 105-125 volts A.C. 50 to 60 cycles, or 105-125 volts D.C. If in doubt about your line voltage, check with your local power company before connecting the radio.

If there seems to be an excessive amount of hum when operating the radio on A.C., reverse the position of the line plug in the socket.

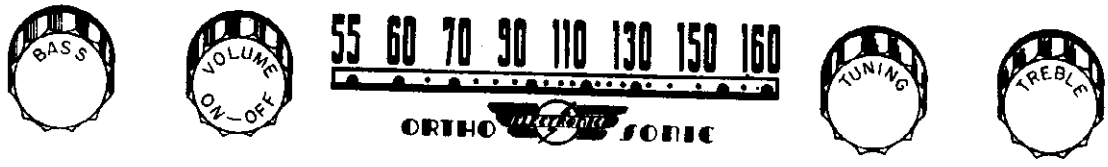
On D.C. operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.

MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding.
   (Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".



CONTROLS



MODEL 710T

ELECTRONIC LABORATORIES, INC.

I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F.adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.7 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap by turning clockwise to the minimum signal.

R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.7 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F.input to keep signal output voltage below 0.7 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F.coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R.F. slug until maximum output is reached at both 1400 kc. and 700 kc. as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

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

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING	DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
I.F. 455 KC	Grid of RF tube 12SK7 GTG	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7 GT/G	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Out	Adjust Osc. #6 for Max. signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 1400KC	Adjust RF trimmer #6 for Max. Signal.	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. Signal (care should be taken not to disturb carriage position of tuner)	Alternately adjust R.F. trimmer and R.F. slug until Maximum output is reached at both 1400 KC and 700 KC as instructed above.

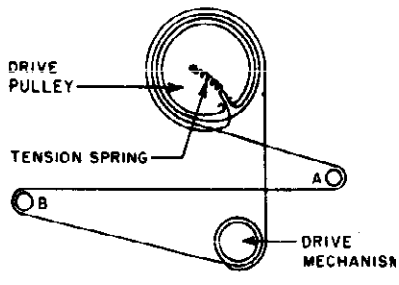
SPECIFICATIONS

Power consumption..... 60 Watts
(At 117 volts AC Supply)
Power Output- 3.5 Watts Max.
2.5 Watts 10% Distortion
Selectivity----45 KC Broad at
1000 times Signal
Intermediate Frequency.....455 KC
Speakers.....4½" PM Dynamic
6" PM Dynamic
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 10 microvolts average

DRIVE CORD REPLACEMENT

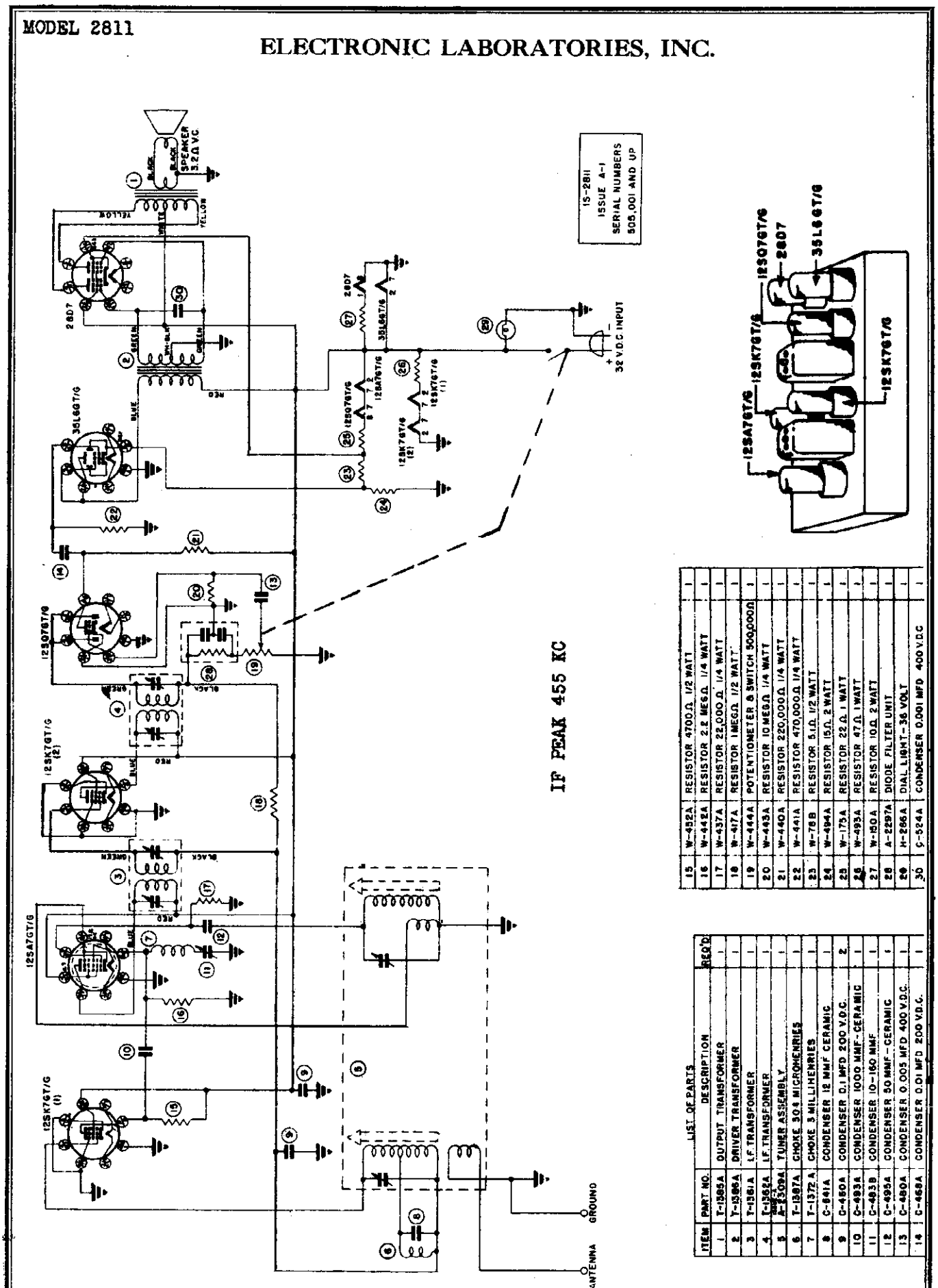
Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.

Attach dial pointer to cord.



MODEL 2811

ELECTRONIC LABORATORIES, INC.



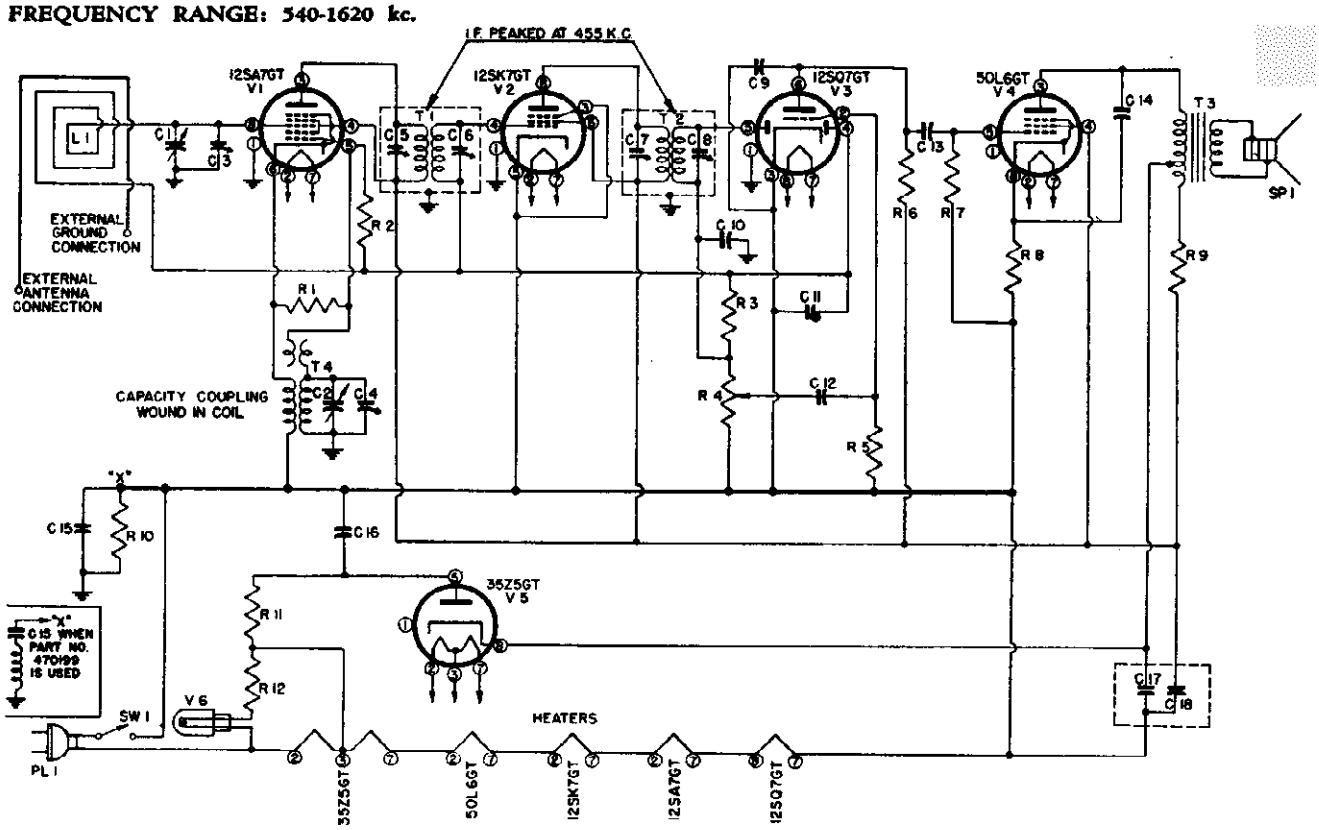
ITEM	PART NO.	DESCRIPTION	REQ'D
1	T-1385A	OUTPUT TRANSFORMER	1
2	T-1386A	DRIVER TRANSFORMER	1
3	T-1361A	I.F. TRANSFORMER	1
4	T-1362A	I.F. TRANSFORMER	1
5	A-2309A	TUNER ASSEMBLY	1
6	T-1367A	CHOKE 304 MICROHENRIES	1
7	T-1372 A	CHOKE 3 MILLIHENRIES	1
8	C-841A	CONDENSER 12 MMF CERAMIC	1
9	C-450A	CONDENSER 0.1 MFD 200 V.D.C.	2
10	C-493A	CONDENSER 1000 MMF- CERAMIC	1
11	C-493B	CONDENSER 10-160 MMF	1
12	C-495A	CONDENSER 30 MMF - CERAMIC	1
13	C-480A	CONDENSER 0.005 MFD 400 V.D.C.	1
14	C-468A	CONDENSER 0.01 MFD 200 V.D.C.	1
15	W-452A	RESISTOR 4700Ω 1/2 WATT	1
16	W-442A	RESISTOR 2.2 MEGΩ 1/4 WATT	1
17	W-437A	RESISTOR 22,000Ω 1/4 WATT	1
18	W-417A	RESISTOR 1MEGΩ 1/2 WATT	1
19	W-444A	POTENTIOMETER & SWITCH 500,000Ω	1
20	W-443A	RESISTOR 10 MEGΩ 1/4 WATT	1
21	W-440A	RESISTOR 220,000Ω 1/4 WATT	1
22	W-441A	RESISTOR 470,000Ω 1/4 WATT	1
23	W-78B	RESISTOR 5.1Ω 1/2 WATT	1
24	W-494A	RESISTOR 15Ω 2 WATT	1
25	W-175A	RESISTOR 22Ω 1 WATT	1
26	W-493A	RESISTOR 47Ω 1 WATT	1
27	W-150A	RESISTOR 10Ω 2 WATT	1
28	A-2297A	DIODE FILTER UNIT	1
29	H-286A	DIAL LIGHT - 36 VOLT	1
30	C-524A	CONDENSER 0.001 MFD 400 V.D.C	1

EMERSON RADIO & PHONO. CORP.

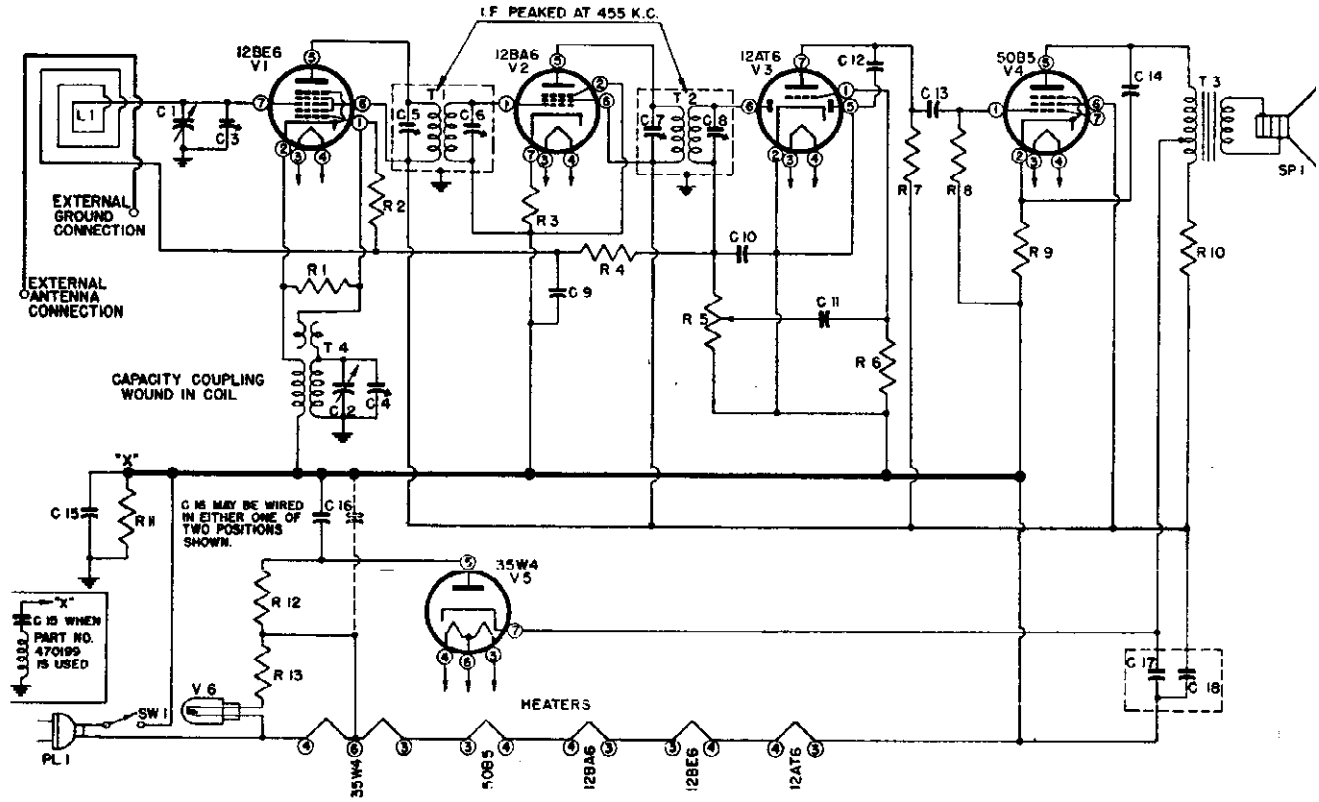
MODELS 503, 510, 510A, 520, 539
Chassis 120000, 120029, 120030, 120032, 120035, 120044

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram of Chassis Models 120000, 120029, 120030, 120044



Schematic Circuit Diagram of Chassis Models 120032, 120035

MODELS 503,510,510A,520,539
MODELS 507,509,518,522,535
MODELS 525,552
MODELS 543,544

EMERSON RADIO & PHONO. CORP.

ALL MODELS

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmer for the antenna and the trimmer for the oscillator coil are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) through a 0.1 mfd. condenser and adjust the four i-f trimmers for maximum response.

R-f Alignment

1. Connect the oscillator to a coil composed of three to four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

	PIN NUMBER							
TUBE	1	2	3	4	5	6	7	8
12SA7			89	89	*—10			*—1.6
12SK7				*—1.6		89		89
12SQ7		*—0.7		*—1.6	—0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117
12BE6	*—8.0				92	92	*—1.3	
12BA6					92	92	1.7	
12AT6	*—0.6					*—0.45	*44	
50B5		5.65			110	92		
35W4	115						115	

* Not supplied separately.
† Specify part number when ordering.

CABINET AND DIAL PARTS

MODEL—507,509,518,522,535

140015	Cabinet (Model 507)
140016	Cabinet (Model 509)
140034	Cabinet (Model 518)
140007	Cabinet (Model 522)
140070	Cabinet (Model 535)
450060	Back, molded (Model 507)
450080	Back, molded (Models 509, 518)
450050	Back, molded (Model 522)
560110	Back masonite (Model 507)
560220	Back, masonite (Models 509, 518)
560120	Back, masonite (Model 522)
575047	Back, wood (Model 535)
450000	Handle
460140	Knob (Models 507, 518, 535)
460470	Knob (Model 509)
460150	Knob (Model 522)
531009	Drive pulley
280003	Drive shaft
520499	Dial backplate (Models 507, 509, 518, 522)
520024	Dial backplate (Model 535)
520350	Dial crystal, stamped (Models 507, 509, 522), or
520190	Dial crystal, stamped (Models 507, 509, 522)
520440	Dial crystal (Model 518)
520025	Dial crystal (Model 535)
525080	Dial pointer (Models 507, 509, 518, 522)
525130	Dial pointer (Model 535
411040	Pointer hub (Model 535)

MODELS 503, 510, 510A, 520, 539

EMERSON RADIO & PHONO. CORP.

CHASSIS 120000, 120029, 120030, 120044

Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900170	Two-gang variable condenser (chassis 120000)
C1, C2	900319	Two-gang variable condenser (chassis 120030 and 120044)
C1, C2	900290	Two-gang variable condenser chassis 120029)
*C3, C4		Trimmers, part of variable condenser
*C5, C6, C7, C8		Trimmers, part of i-f transformers
C9	920170	0.001 mfd., 600 volt condenser
C10	910000	0.00022 mfd. mica condenser
C11	920040	0.1 mfd., 200 volt condenser
C12	920010	0.002 mfd., 600 volt condenser
C13, C14	920020	0.02 mfd., 400 volt condenser
C15	920050	0.2 mfd., 200 volt condenser, or
C15	470199	0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529)
C16	920030	0.05 mfd., 400 volt condenser
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser
L1	700000	Loop antenna, or
L1	700210	Loop antenna
*PL1		Plug, part of line cord
R1	310810	22,000 ohms, ¼ watt resistor
R2, R5	397000	15 meg., ½ watt resistor
R3	321330	3.3 meg., ¼ watt resistor
R4	390010	0.5 meg. volume control
R6, R7	321130	470,000 ohms, ¼ watt resistor
R8	340290	150 ohms, ½ watt resistor
R9	370490	1,000 ohms, 1 watt resistor
R10	321050	220,000 ohms, ¼ watt resistor
R11	340050	15 ohms, ½ watt resistor
R12	340010	10 ohms, ½ watt resistor
SP1	180000	P.M. speaker
*SW1		Line switch on volume control
T1	720000	First i-f transformer, or
T1	720525	First i-f transformer, midget
T2	720100	Second i-f transformer, or
T2	720529	Second i-f transformer, midget
T3	734000	Output transformer
T4	716010	Oscillator coil
	583010	Line cord

CHASSIS 120032, 120035

C1, C2	900319	Two-gang variable condenser
*C3, C4		Trimmers, part of variable condenser
*C5, C6, C7, C8		Trimmers, part of i-f transformers
C9	920040	0.1 mfd., 200 volt condenser
C10	910000	0.00022 mfd. mica condenser
C11	920010	0.002 mfd., 600 volt condenser
C12	920170	0.001 mfd., 600 volt condenser
C13, C14	920020	0.02 mfd., 400 volt condenser
C15	920050	0.2 mfd., 200 volt condenser, or
C15	470199	0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529)
C16	920030	0.05 mfd., 400 volt condenser
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser
L1	700000	Loop antenna, or
L1	700210	Loop antenna
*PL1		Plug, part of line cord
R1	310810	22,000 ohms, ¼ watt resistor
R2, R6	397000	15 meg., ½ watt resistor
R3	340310	180 ohms, ½ watt resistor
R4	321290	2.2 meg., ¼ watt resistor
R5	390010	0.5 meg. volume control
R7, R8	321130	470,000 ohms, ¼ watt resistor
R9	340290	150 ohms, ½ watt resistor
R10	370490	1,000 ohms, 1 watt resistor
R11	321050	220,000 ohms, ¼ watt resistor
R12	340050	15 ohms, ½ watt resistor
R13	340010	10 ohms, ½ watt resistor
SP1	180000	P.M. speaker
*SW1		Line switch on volume control
T1	720000	First i-f transformer, or
T1	720525	First i-f transformer, midget
T2	720100	Second i-f transformer, or
T2	720529	Second i-f transformer, midget
T3	734000	Output transformer
T4	716010	Oscillator coil
	583010	Line cord

CABINET AND DIAL PARTS

* Not supplied separately.
† Specify part numbers when ordering

807000	Pilot light
280103	Drive shaft
520019	Dial backplate, 320° dial numbers (Chassis 120000)
520500	Dial backplate, 180° dial numbers (Chassis 120029)
412600	Dial backplate, plain (Chassis 120035, 120030)
410004	Dial backplate, plain (Chassis 120032, 120044)
520513	Dial face, paper (Chassis 120032, 120044)
525010	Pointer (Chassis 120000, 120029)
525090	Pointer (Chassis 120030, 120032, 120035, 120044)
520080	Dial crystal (Chassis 120000, 120029, 120032, 120044)
520470	Dial crystal, printed (Chassis 120030, 120035)
460140	Knob (Model 503)
460470	Knob (Models 510, 539)
460150	Knob (Model 520)
450230	Ivory plastic front, square holes, (Model 520)
450250	Ivory plastic front, round holes, (Model 520)
450330	Black plastic front, square holes, (Model 510)
450350	Black plastic front, round holes, (Model 510)
140001	Cabinet (Model 503)
140000	Cabinet (Model 520)
140005	Cabinet (Model 510, 510A)
140069	Cabinet (Model 539)

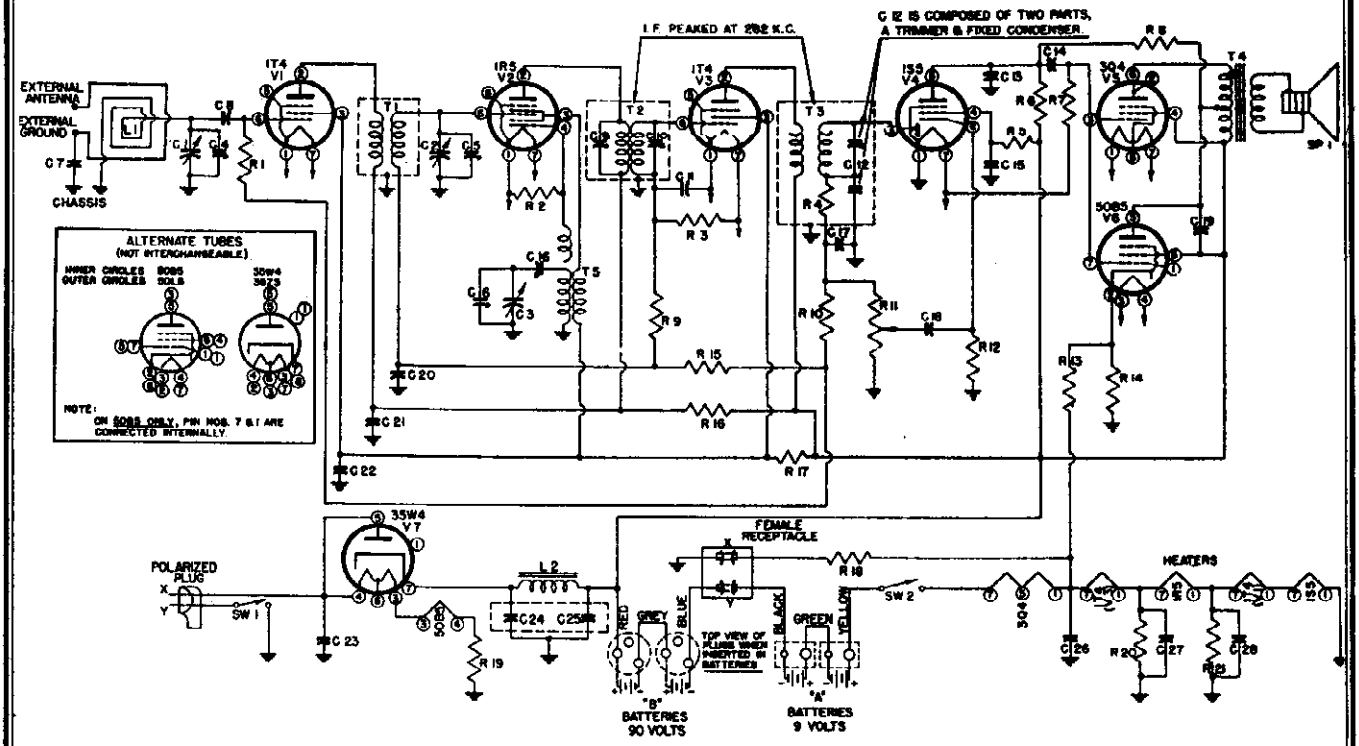
The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B+—red

Chassis 120000, 1200029, 120030, 120044 use metal or glass tubes. Chassis 120032 and 120035 use miniature tubes. Model 510A only uses chassis 120035.

MODEL 505
Chassis 120020

EMERSON RADIO & PHONO. CORP.



Schematic Circuit Diagram Model 505, Chassis 120020

Chassis 120020

C1, C2, C3	900080	Three-gang variable condenser	R2	310970	100,000 ohms, ¼ watt resistor
*C4, C5, C6		Trimmers, part of variable condenser	*R4		47,000 ohms, ¼ watt resistor part of second i-f transformer
C7, C18	920010	0.002 mfd., 600 volt condenser	R6, R7	321130	470,000 ohms, ¼ watt resistor
C8, C11	920060	0.05 mfd., 200 volt condenser	R8	311250	1.5 meg., ¼ watt resistor
*C9, C10		Trimmers, part of first i-f transformer	R10	321290	2.2 meg., ¼ watt resisotr
*C12		Trimmer and fixed condenser, part of second i-f transformer	R11	390020	0.5 meg. volume control
			R12	321450	10 meg., ¼ watt resistor
C13	910050	0.0004 mfd. mica condenser	R13	310130	33 ohms, ¼ watt resistor
C14, C21	920020	0.02 mfd., 400 volt condenser	R14	310730	10,000 ohms, ¼ watt resistor
C15, C19	920090	0.01 mfd., 400 volt condenser	R16	340630	3,900 ohms, ½ watt resistor
C16	900110	Padding condenser	R17	340770	15,000 ohms, ½ watt resistor
C17	910010	0.00011 mfd. mica condenser	R18	340510	1,200 ohms, ½ watt resistor
C20, C22, C28	920100	0.02 mfd., 200 volt condenser	R19	394110	213 ohms, 6 watt resistor
			R20	310570	2,200 ohms, ¼ watt resistor
			R21	310450	680 ohms, ¼ watt resistor
C23	920030	0.05 mfd., 400 volt condenser	SP1	180006	P.M. speaker
C24, C25	925050	20-40 mfd., 150 volt dual electrolytic condenser	*SW1		Line switch on volume control
			*SW2		Battery switch on volume control
C26	925090	100 mfd., 25 volt electrolytic condenser	T1	713000	R.F. coil
			T2	720170	First i-f transformer
C27	920110	0.25 mfd., 100 volt condenser	T3	720410	Second i-f transformer
L1	700090	Loop antenna	T4	734140	Output transformer
L2	737010	Filter choke	T5	716030	Oscillator coil
R1, R3, R5, R9 R15	311330	3.3 meg., ¼ watt resistor			

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Battery Type	Number Required	Eveready Part No.	Rayovac Part No.	Burgess Part No.
4½ volt "A"	2	746 (plug-in type)	P83A or EM-83 (plug-in type)	3G (plug-in type)
45 volt "B"	2	482 Minimax (plug-in type)	——	——

EMERSON RADIO & PHONO. CORP.

MODELS 505,523
Chassis 120020,120041

An oscillator with frequencies of 262, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Plug the receiver into the power supply in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C6) is on the middle section of the variable condenser.

The interstage coil (T1) is the shielded coil located under the chassis. Its trimmer (C5) is on the front section of the variable condenser.

The trimmer for the loop antenna (C4) is on the last section of the variable condenser (the section nearest the loop).

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted next to the loop. The second i-f transformer (T3) is mounted next to the dial.

The series padder, C10 for chassis 120002 and C16 for chassis 120020 and 120041, is located on the chassis near the 1T4 tube.

I-f Alignment

Rotate the variable condenser to the minimum capacity position. Feed 262 kc to the converter grid and adjust the three i-f trimmers for maximum response. The signal should be fed through a 0.1 mfd. condenser.

Interstage Alignment

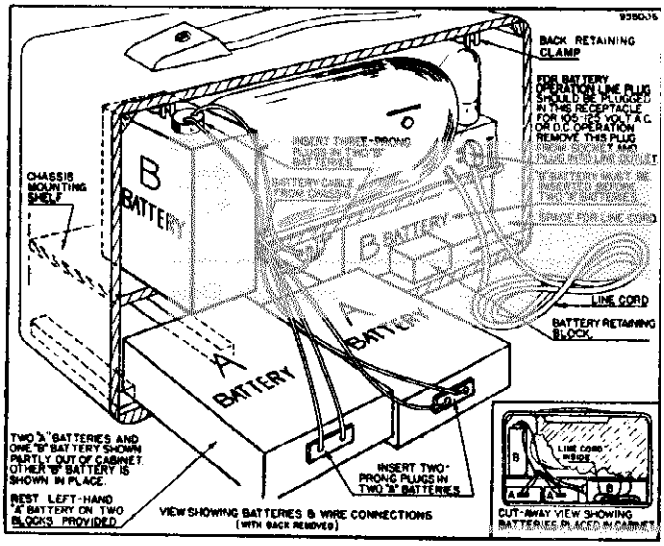
1. Set the dial indicator to 1425 kc, feed 1425 kc to the r-f grid, and adjust the oscillator and interstage trimmers for maximum response.
2. Set the dial indicator to 600 kc, feed 600 kc to the r-f grid, and adjust the oscillator padding trimmer by rocking in the signal for maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

Loop Alignment

Connect the test oscillator to a coil composed of three or four turns of wire wound in a loop approximately 12" in diameter. This coil should be held parallel to and in line with the receiver's loop at a distance of 15 to 20 inches.

1. Radiate a signal at 1425 kc, tune in the signal on the receiver, and adjust the loop trimmer for maximum response.
2. Radiate signal at 600 kc, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

Battery Installation



External Antenna

For loop antennas that do not have external antenna connection, wind one turn of insulated wire around or across the loop. Connect one end to an outside aerial. Connect the other end of a good ground or to chassis through a 0.002 mfd. condenser.

The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B+—red

CABINET AND DIAL PARTS

	525090	Pointer		520200	Escutcheon (Model 523)
	410929	Pointer hub		140002	Cabinet (Model 505)
	531009	Drive pulley		140053	Cabinet (Model 523)
	280133	Drive shaft		460470	Knob, black
	520039	Dial backplate (Model 505)		460140	Knob, brown
	520505	Dial backplate (Model 523)		450001	Handle, or
	460040	Dial crystal (Model 505)		450280	Handle
	520080	Dial crystal (Model 523)			

* Not supplied separately.

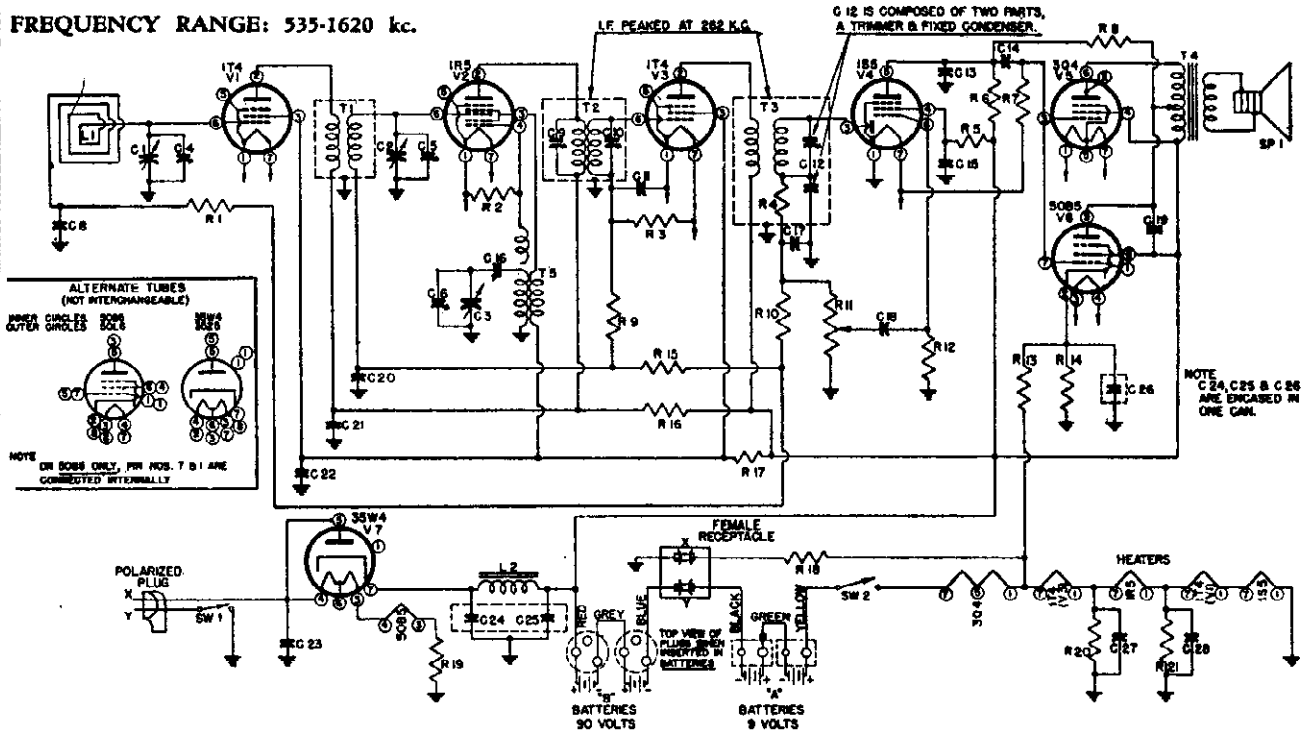
† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

MODELS 505, 523
Chassis 120041

EMERSON RADIO & PHONO. CORP.

TYPE: Three-way (battery, a.c-d.c.) portable superheterodyne.

FREQUENCY RANGE: 535-1620 kc.



Schematic Circuit Diagram Models 505-523, Chassis 120041

Chassis 120041

Schematic Symbol	†Part No.	DESCRIPTION
C1, C2, C3	900080	Three-gang variable condenser
*C4, C5, C6		Trimmers, part of variable condenser
C8, C14, C20, C21, C22, C28	920020	0.02 mfd., 400 volt condenser
*C9, C10		Trimmers, part of first i-f transformer
C11	920060	0.05 mfd., 200 volt condenser
*C12		Trimmer and fixed condenser, part of second i-f transformer
C13	910050	0.0004 mfd. mica condenser
C15, C19	920090	0.01 mfd., 400 volt condenser
C16	900110	Padding condenser
C17	910010	0.00011 mfd. mica condenser
C18	920010	0.002 mfd., 600 volt condenser
C23	920030	0.05 mfd., 400 volt condenser
C24, C25, C26	925210	Electrolytic condenser: C24, C25—20-40 mfd., 150V.; C26—100 mfd., 25 V.
C27	920110	0.25 mfd., 100 volt condenser
L1	700233	Loop antenna
L2	737067	Filter choke
R1, R3, R5, R9, R15	311330	3.3 meg., ¼ watt resistor
R2	310970	100,000 ohms, ¼ watt resistor
*R4		47,000 ohms, ¼ watt resistor, part of second i-f transformer
R6, R7	321130	470,000 ohms, ¼ watt resistor
R8	311250	1.5 meg., ¼ watt resistor
R10	321290	2.2 meg., ¼ watt resistor
R11	390020	0.5 meg. volume control
R12	321450	10 meg., ¼ watt resistor
R13	310130	33 ohms., ¼ watt resistor
R14	310730	10,000 ohms, ¼ watt resistor
R16	340630	3,900 ohms, ½ watt resistor
R17	340770	15,000 ohms, ½ watt resistor
R18	340510	1,200 ohms, ½ watt resistor
R19	394110	213 ohms, 6 watt resistor, or
R19	394170	213 ohms, 10 watt resistor
R20	310570	2,200 ohms, ¼ watt resistor
R21	310450	680 ohms, ¼ watt resistor
SP1	180012	P.M. speaker
*SW1		Line switch on volume control
*SW2		Battery switch on volume control
T1	713012	R.F. coil
T2	720500	First i-f transformer, or
T2	720510	First i-f transformer
T3	720490	Second i-f transformer, or
T3	720520	Second i-f transformer
T4	734150	Output transformer
T5	716030	Oscillator coil

Model 505 uses chassis 120002, 120020, 120041. Model 523 uses chassis 120041.

IMPORTANT—Where excessive tube burn-out is encountered, the 50B5 tube should be replaced *only* with a new Emerson tube bearing the designation 274 on the tube base.

POWER CONSUMPTION: 30 watts (line operation).

CURRENT DRAIN:

"A" Battery—0.053 amp.

"B" Battery—0.013 amp.

EMERSON RADIO & PHONO. CORP.

MODELS 505,523
MODELS 525,552

MODEL--505,523

The following voltage readings are d-c measurements taken with a line voltage of 117 volts, 60 cycles from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. The readings with the volume control set at minimum and the variable condenser closed. All voltages are d.c. positive unless indicated otherwise. Voltages for 3Q4 are given for battery operation only. Readings for 50L6 and 35Z5 can be determined from 50B5 and 35W4 by referring to schematic diagram for proper pin connections.

Chassis 120002

TUBE TYPE	PIN NUMBER							
	1	2	3	4	5	6	7	8
1T4	1.2	88	56		1.2	*0.3	2.4	
1R5	2.4	88	56	-8	2.4	*1.5	3.7	
1T4	3.7	98	56		3.7	*2.3	4.9	
1S5			*-0.3	*19	*50	*-0.2	1.2	
3Q4	4.9	92	*1.1	98	4.9	92	4.9	
117N7			92	*1.1	98	6.25		125

Chassis 120020

TUBE TYPE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4	1.32	90	50		1.32	*-0.2	2.55
1R5	2.55	90	50	*-7.0	2.55		3.85
1T4	3.85	98	50		3.85	*1.9	5.25
1S5			*-0.35	*24	*46	*-0.1	1.32
3Q4	6.1	88	*1.2	90	7.6	88	9.0
50B5	1.2	6.6	83AC	33AC	90	98	*1.2
35W4	1.32		83AC	117AC	117AC	108AC	129

Chassis 120041

TUBE TYPE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4	1.32	90	50		1.32	*-0.2	2.55
1R5	2.55	90	50	*-7.0	2.55		3.85
1T4	3.85	98	50		3.85	*1.9	5.25
1S5			*-0.35	*24.0	46.0	*-0.1	132
3Q4	6.1	88	*1.2	90	7.6	88	9.0
50B5	1.2	6.6	33AC	83AC	90	98.0	1.2
35W4			83AC	117AC	117AC	108AC	129

MODEL-- 525,552

VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*-10			*-1.6
12SK7				*-1.6		89		89
12SQ7		*-0.7		*-1.6	-0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117

CABINET AND DIAL PARTS

	807000	Dial light		520080	Crystal
	507217	Dial light socket		520200	Escutcheon
	531059	Drive pulley		140052	Cabinet (Model 525)
	280103	Drive shaft		140102	Cabinet (Model 552)
	520500	Dial backplate		460470	Knob
	525010	Dial pointer		430300	Knob, with indicator dot

† Specify part numbers when ordering.
* Not supplied separately.

POWER CONSUMPTION:

30 watts for the receiver.
20 watts for the phono motor.

The color coding of the i-f transformer leads is as follows:

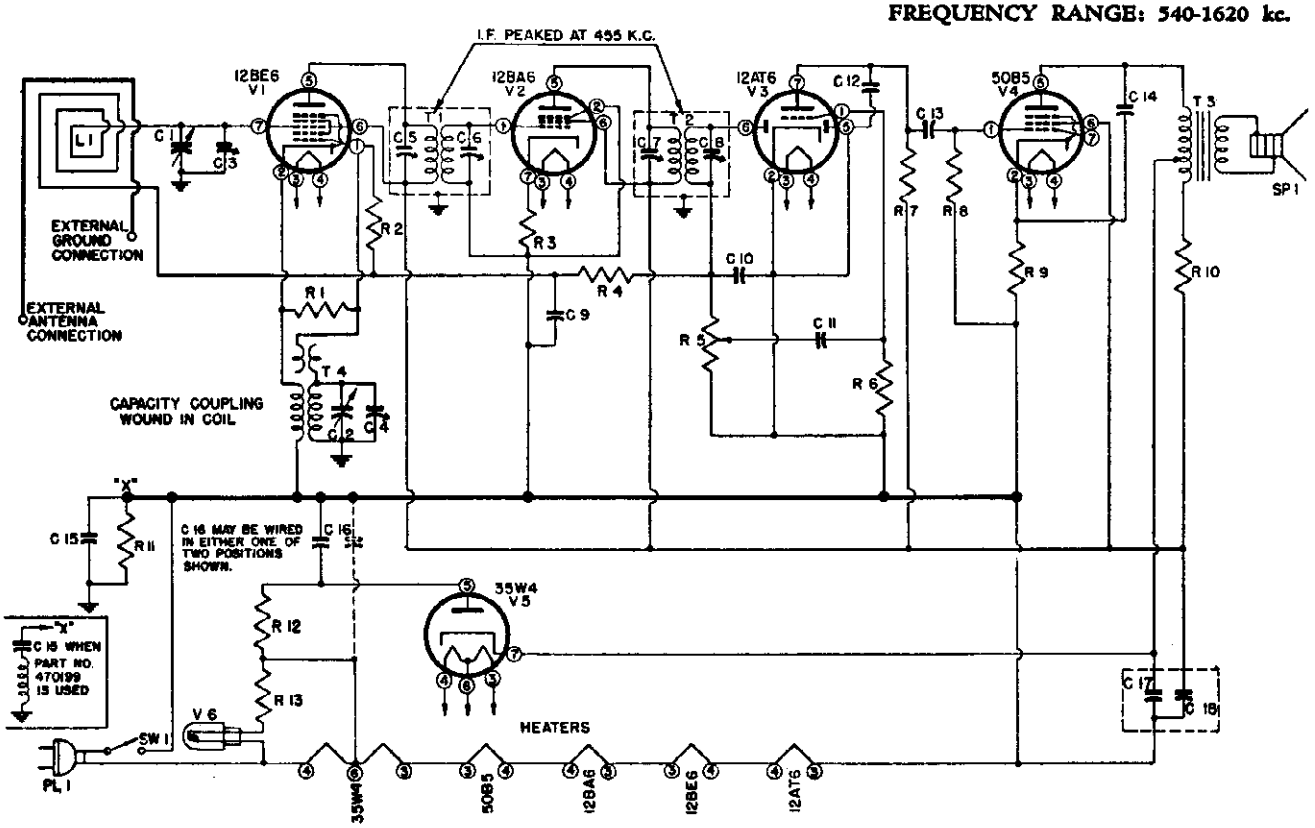
Grid return—black
Grid—green
Plate—blue
B+—red

MODELS 507,509,518,522,535
Chassis 120004,120045

EMERSON RADIO & PHONO. CORP.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram for Chassis 120004 and 120045

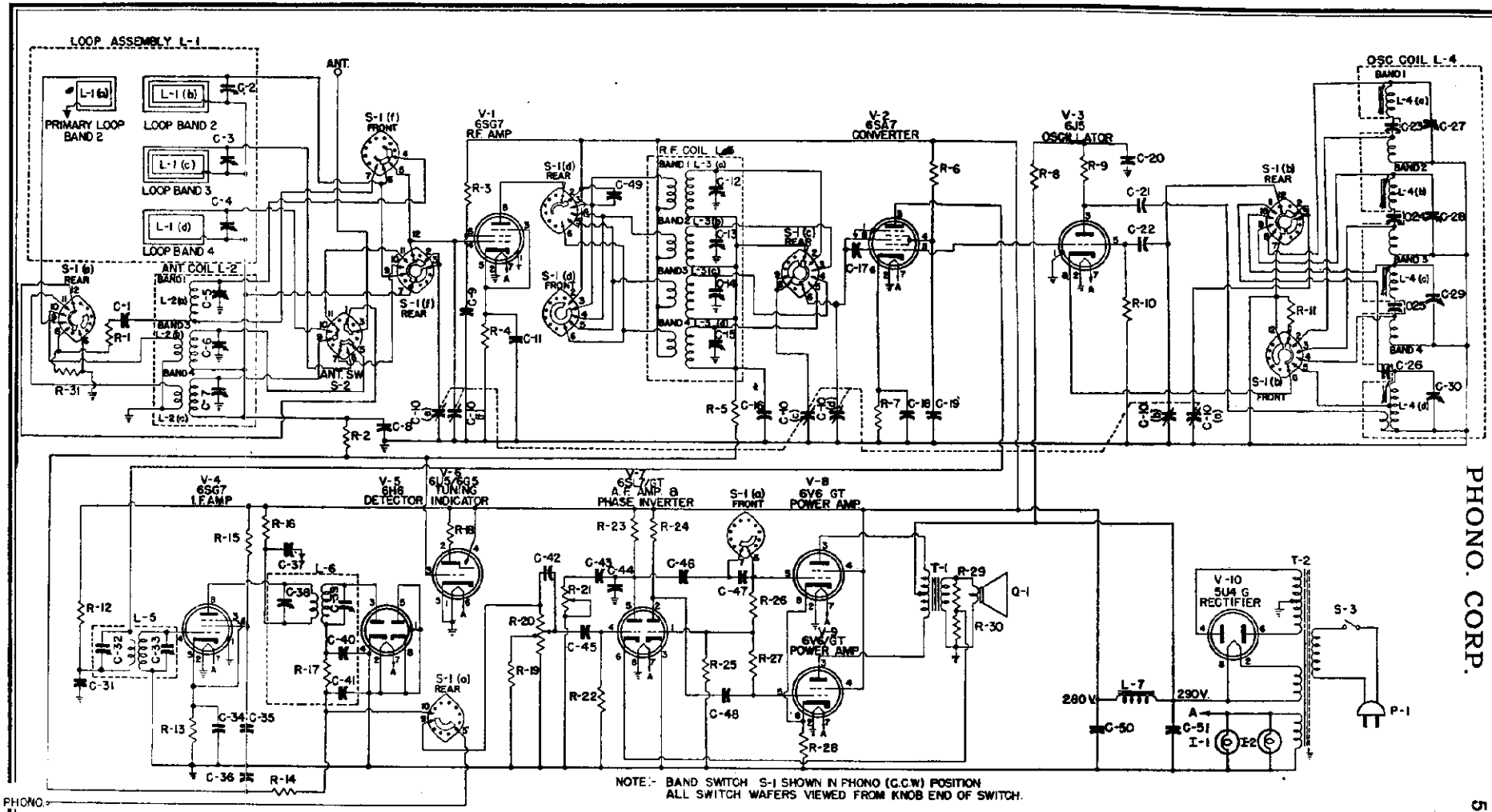
CHASSIS 120004 AND 120045

C1, C2	900160	Two-gang variable condenser	R1	310810	22,000 ohms, ¼ watt resistor
*C3, C4		Trimmers, part of variable condenser	R2, R6	397000	15 meg., ½ watt resistor
*C5, C6, C7, C8		Trimmers, part of i-f transformers	R3	340310	180 ohms, ½ watt resistor
			R4	321290	2.2 meg., ¼ watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R5	390000	0.5 meg. volume control
C10	910000	0.00022 mfd. mica condenser	R7, R8	321130	470,000 ohms, ¼ watt resistor
C11	920010	0.002 mfd., 600 volt condenser	R9	340290	150 ohms, ½ watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R11	321050	220,000 ohms, ¼ watt resistor
C15	920050	0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720000 and 720100 respectively), or	R12	340050	15 ohms, ½ watt resistor
			R13	340010	10 ohms, ½ watt resistor
			SP1	180000	P.M. speaker
C15	479199	0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720525 and 720529 respectively)	*SW1		Line switch on volume control
			T1	720000	First i-f transformer, or
			T1	720525	First i-f transformer, midget
C16	920030	0.05 mfd., 400 volt condenser	T2	720100	Second i-f transformer, or
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser, or	T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
C17, C18	925000	30-50 mfd., 150 volt dual electrolytic condenser	T4	716010	Oscillator coil
				807000	Pilot light, Mazda No. 47
L1	700000	Loop antenna, or		507090	Pilot light socket
L1	700200	Loop antenna		583010	Line cord
*PL1		Power plug, part of line cord			

The color coding of the i-f transformer leads is as follows:

Grid—green	**Plate—blue**
Grid return—black	**B+—red**

EMERSON RADIO & PHONO. CORP. MODEL 524, Chassis 120011 524-2, Chassis 120022



TYPE OF TUBES:

2—6SG7, pentode r-f amplifier and i-f amplifier
1—6SA7, pentagrid modulator
1—6J5, triode oscillator
1—6H6, diode detector, a.v.c
1—6SL7, dual triode audio amplifier and inverter
2—6V6GT, beam power push-pull output
1—5U4G, rectifier
1—6U5/6G5, tuning indicator

POWER SUPPLY: 50-60 cycle A.C.

VOLTAGE RATING:

Model 524—105-125 volts
Model 524-2—105-125 volts and 210-250 volts

POWER CONSUMPTION: 100 watts

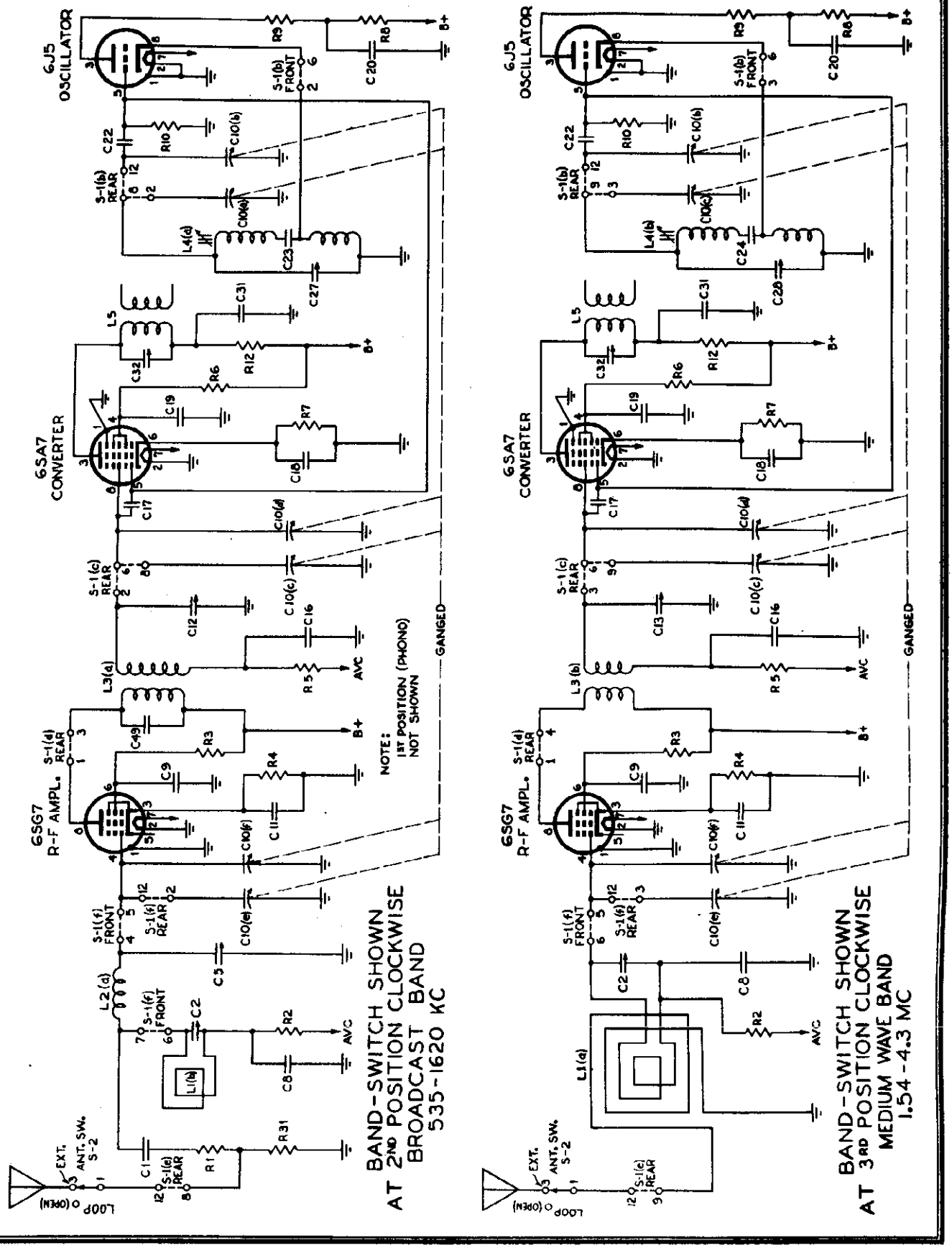
TYPE: Four band superheterodyne.

FREQUENCY RANGE:

Broadcast—535-1620 Kilocycles (185-560 Meters)
Medium Wave—1.54-4.3 Megacycles (69.8-195 Meters)
Short-Wave—4.15-10.4 Megacycles (28.9-72.3 Meters)
Short-Wave—10.1-22.7 Megacycles (13.2-29.7 Meters)

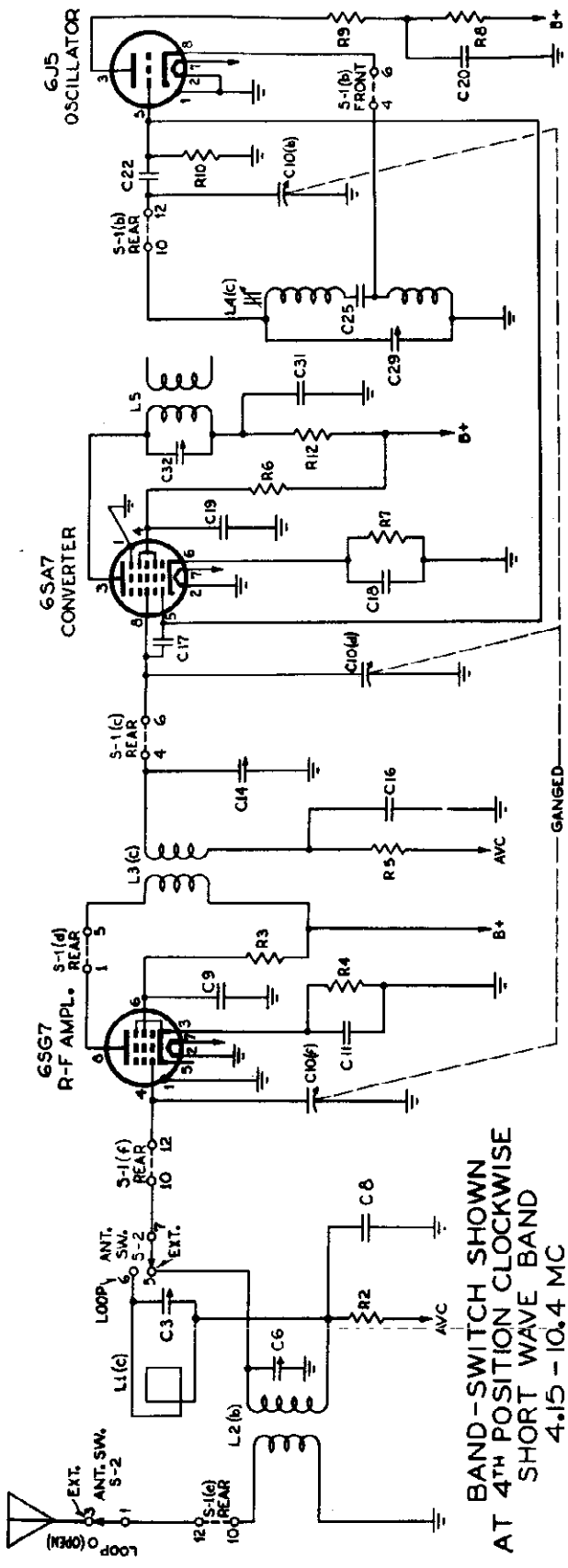
MODEL 524
MODEL 524-2

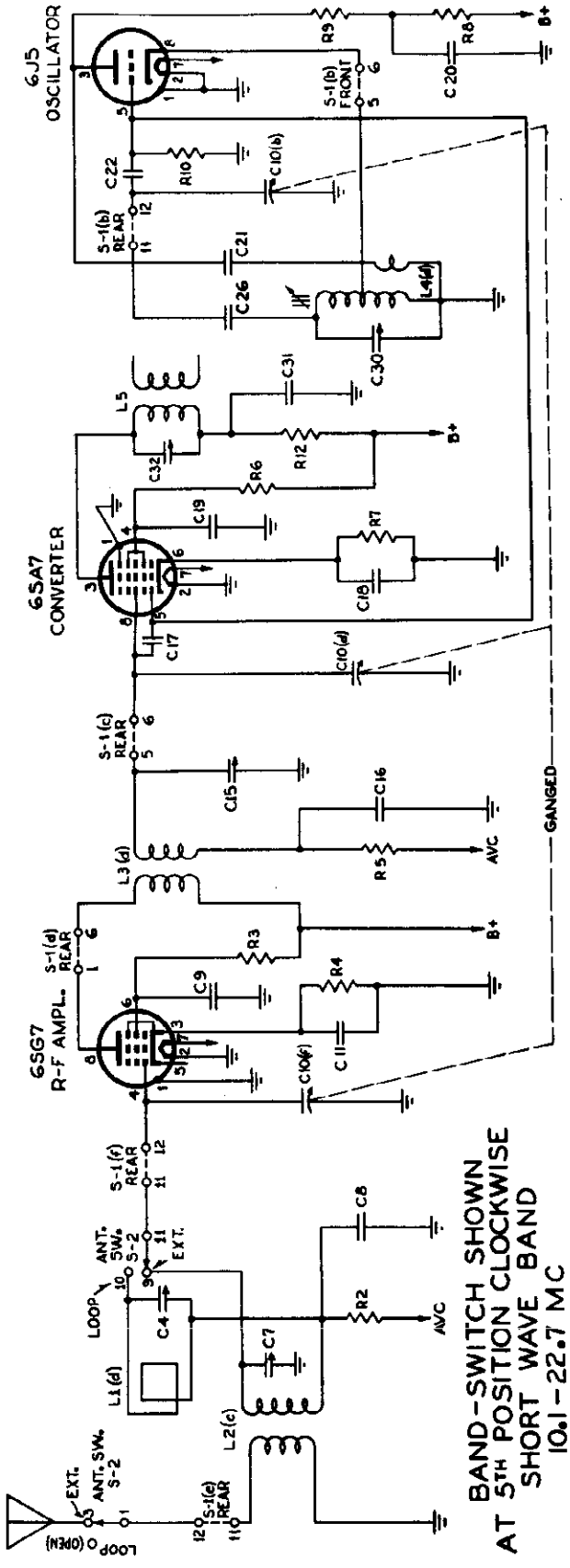
EMERSON RADIO & PHONO. CORP.



EMERSON RADIO & PHONO. CORP.

MODEL 524,
MODEL 524-2





MODEL 524
MODEL 524-2

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

A signal generator or oscillator is required, containing the following radio frequencies, amplitude modulated:

455 kc for intermediate frequencies
Band 1—600 kc, 1000 kc, 1500 kc
Band 2—1600 kc, 2.5 mc, 4 mc
Band 3—4.5 mc, 6 mc, 10 mc
Band 4—11 mc, 13 mc, 22 mc

An output meter should be connected across the voice coil of the speaker (3.5 ohms).

Always use as weak a test signal as possible when aligning receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is adjacent to the 6SG7 i-f tube, V-4. The trimmers are accessible through the top of the shield can.

The second i-f transformer is adjacent to the 6H6 tube. The trimmers are accessible through the top of the shield can.

The antenna transformer for all bands is located at the rear of the chassis behind the variable condenser. Trimmers for three bands are located on the top of the transformer for external antenna operation. For loop operation, the trimmers are located on the loop accessible from the back of the cabinet.

The r-f and amplifier transformer is located on the side of the chassis toward the rear. Adjustments for all four bands are located on the top of the shield can.

The oscillator transformer is located at the side of the chassis toward the front. There are two adjustments on this stage for each band. Four iron cores protrude from the top of the shield and four trimmer adjustments are located on the side of the shield.

I-f Alignment

1. Set variable condenser to highest frequency and range switch to broadcast position.
2. Apply 455 kc to converter stator terminal in center section of variable condenser.
3. Adjust all four trimmers of the two i-f transformers to maximum on output meter.

R-f Alignment

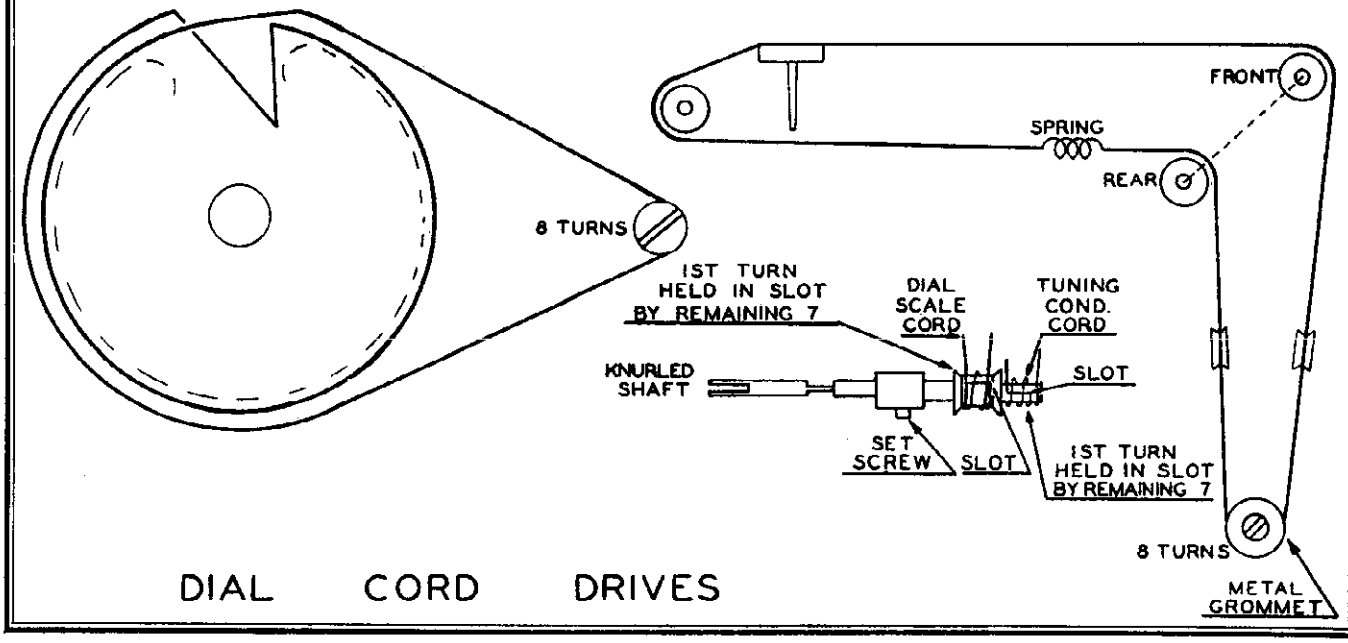
1. For Band 1 (540-1620 kc): Set rear antenna and loop switch to antenna position. Apply strong 1500 kc signal through 200 mfd. dummy antenna to antenna binding post in cabinet back. Set pointer to 1500 kc on dial and adjust oscillator trimmer to maximum on output meter. Reduce signal to normal output in the output meter and adjust r-f trimmer and antenna trimmer to maximum on output meter. Set pointer to 600 kc. apply 600 kc signal and adjust iron core to maximum on output meter by "rocking" variable condenser slightly to "track" oscillator with antenna and r-f. With 1500 kc applied, reset pointer at 1500 kc, and readjust only the oscillator trimmer.

2. Bands 2, 3 and 4: Repeat same procedure as on Band 1 using following frequencies for alignment:

	High frequency	*Low frequency*
Band 2	4 mc	1.7 mc
Band 3	10 mc	5 mc
Band 4	20 mc	11 mc

3. For loop circuit adjustments operate antenna-loop switch to loop position and adjust trimmers on loop at high-frequnecy alignment points of each band. Use a few turns of wire about six to eight inches in diameter, connected to oscillator and placed approximately 18 inches away from receiver loop as coupling device to radiate a signal into loop. It is not necessary to readjust r-f or oscillator for loop circuit adjustment since they do not change from antenna adjustment indicated above.

4. It should be noted that oscillator frequency on all bands is 455 kc (i-f frequency) above carrier frequency as indicated on dial scale. Stator of each gang of variable condenser is composed of two separate sections. The two sections are connected in parallel on Bands 1 and 2. Bands 3 and 4 use only largest section.



DIAL CORD DRIVES

EMERSON RADIO & PHONO. CORP.

MODEL 524
MODEL 524-2

REPLACEMENT PARTS LIST

Schematic Symbol	†Part No.	DESCRIPTION
C1	910180	0.001 mfd., 500 volt mica condenser
*C2, C3, C4		Trimmers, part of loop assembly
*C5, C6, C7		Trimmers, part of antenna coil
C8, C16	920060	0.05 mfd., 200 volt condenser
C9, C19, C35, C43, C46, C48	920210	0.01 mfd., 600 volt condenser
C10a, b, c, d, e, f	900200	Three-gang variable condenser
C11, C18, C34	920040	0.1 mfd., 200 volt condenser
*C12, C13, C14, C15		Trimmers, part of r-f coil
C17	915040	0.68 mmfd., 500 volt ceramic condenser
C20	925030	16 mfd., 300 volt electrolytic condenser
C21	910170	0.003 mfd., 500 volt mica condenser
C22, C42, C44, C49	910100	0.0001 mfd., 500 volt mica condenser
C23	915030	0.00056 mfd. silver mica condenser
C24	915020	0.0015 mfd. silver mica condenser
C25	915010	0.003 mfd. silver mica condenser
C26	915000	0.0068 mfd. silver mica condenser
*C27, C28, C29, C30		Trimmers, part of oscillator coil
C31, C37	920270	0.05 mfd., 600 volt condenser
*C32, C33		Trimmers, part of first i-f transformer
C36	920090	0.01 mfd., 400 volt condenser
*C38, C39		Trimmers, part of second i-f transformer
*C40, C41		50 mmfd. condenser, part of second i-f transformer
C45	920230	0.005 mfd., 600 volt condenser
C47	920240	0.0005 mfd., 600 volt condenser
C50	925010	40 mfd., 400 volt electrolytic condenser
C51	925220	40 mfd., 400 volt electrolytic condenser
I1, I2	807020	Pilot light, Mazda No. 44
L1	700110	Loop assembly
L2	710020	Antenna coil
L3	713010	R-F coil
L4	716110	Oscillator coil
L5	720330	First i-f transformer
L6	720340	Second i-f transformer
L7	737030	Filter choke
P1	583180	Line cord and plug
Q1	180024	P.M. speaker
R1	310430	560 ohms, ¼ watt resistor
R2, R5, R25	321050	0.22 meg., ¼ watt resistor
R3, R15	370910	56,000 ohms, 1 watt resistor
R4, R13	320290	150 ohms, ¼ watt resistor
R6	397080	22,000 ohms, 2 watt resistor
R7	310350	270 ohms, ¼ watt resistor
R8, R9	340650	4,700 ohms, ½ watt resistor
R10	310810	22,000 ohms, ¼ watt resistor
R11	320730	10,000 ohms, ¼ watt resistor
R12, R31	320650	4,700 ohms, ¼ watt resistor
R14	321210	1 meg., ¼ watt resistor
R16	310650	4,700 ohms, ¼ watt resistor
*R17		4,700 ohms, ¼ watt resistor, part of second i-f transformer
*R18		1 meg., ¼ watt resistor, part of tuning indicator socket cable
R19	310830	27,000 ohms, ¼ watt resistor
R20	390070	0.5 meg., ½ watt volume control
R21	390360	0.5 meg., ½ watt volume control, or
R21	390080	0.5 meg., ½ watt volume control
R22	321450	10 meg., ¼ watt resistor
R23, R24	351050	0.22 ohms, ½ watt resistor
R26, R27	311050	0.22 ohms, ¼ watt resistor
R28	394140	180 ohms, 2 watt wire-wound resistor
R29	320410	470 ohms, ¼ watt resistor
R30	310070	18 ohms, ¼ watt resistor
S1	510280	7-wafer, 5-position band switch
S2	510290	3-pole double throw antenna switch
*S3		Line switch, part of volume control R20
T1	734160	Output transformer
T2	730000	Power transformer (Chassis 120011)
T2	730010	Power transformer (Chassis 120022)

CABINET AND DIAL PARTS

140004	Cabinet	
620030	Knob	
620012	Knob, with indicator dot	
587040	Drive cord spring	
525110	Pointer	
280023	Drive shaft	
280033	Clutch shaft	
280043	Drive shaft pulley	
411361	Dial bracket	
520006	Dial glass	
470035	Dial bracket assembly (left)	
470032	Dial bracket assembly (right)	
507219	Dial light assembly	

* Not supplied separately.

† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings. Readings indicated by an asterisk (*) are a.c. Line voltage is 117.5 volts, 60 cycles a.c. Set volume control at minimum and variable condenser to 1000 kc.

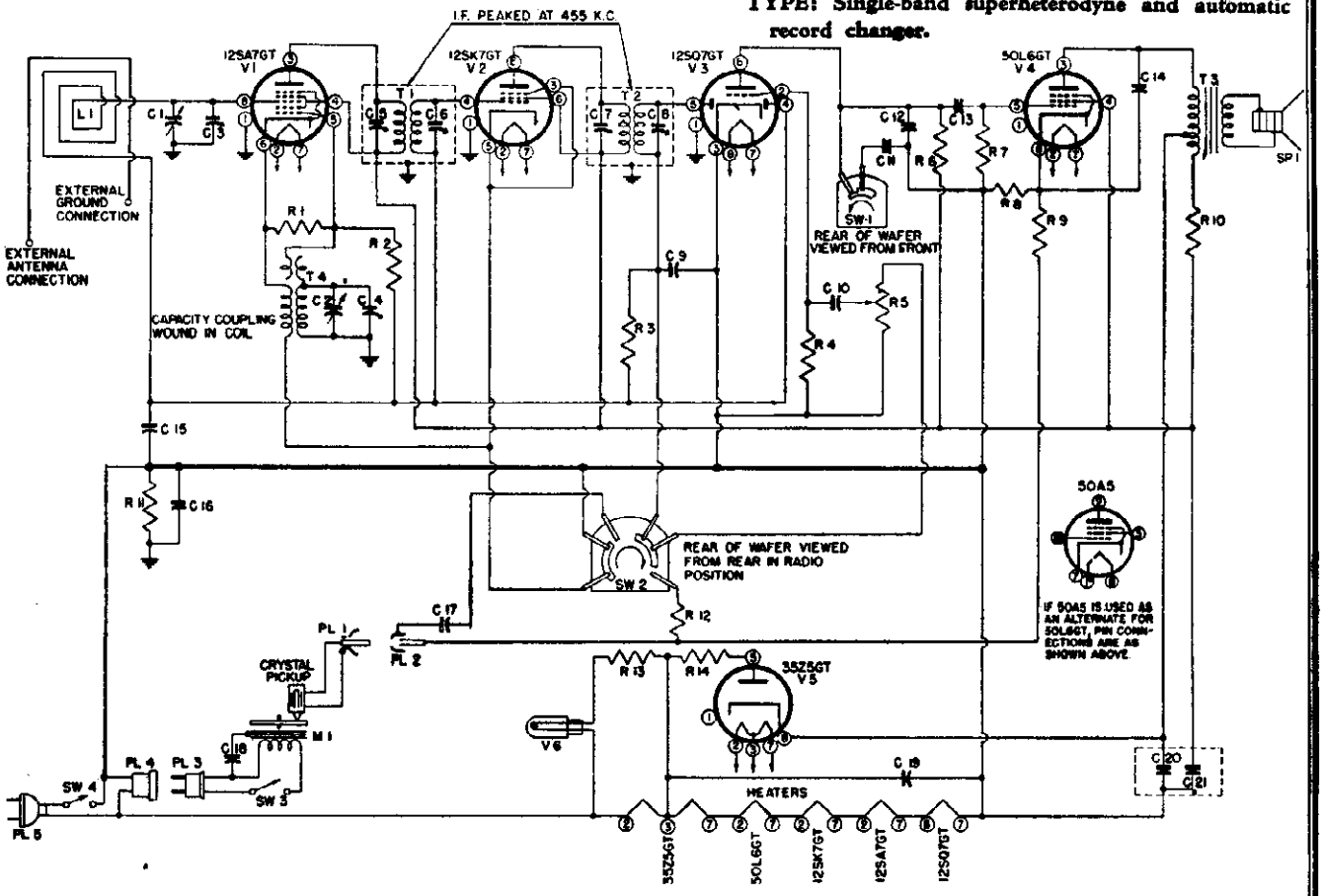
	PIN NUMBER							
TUBE	1	2	3	4	5	6	7	8
6SG7 (V1)			1.6		1.6	130	*6.3	280
6SA7			275	90	—0.02	2.4	*6.3	
6J5			215		—0.02		*6.3	
6SG7 (V4)			1.5		1.5	120	*6.3	280
6H6			—0.04				*6.3	
6SL7		70		—0.04	60			*6.3
6V6 (V8, V4)			285	280			*6.3	17
5U4G		290		*285		*285		290

Voltage readings for 6U5/6G5 measured at lead terminals are as follows: black—0; green— —0.04; red—280; brown—0; black—6.3.

MODELS 525,552
Chassis 120037

EMERSON RADIO & PHONOGRAPH CORP.

TYPE: Single-band superheterodyne and automatic record changer.

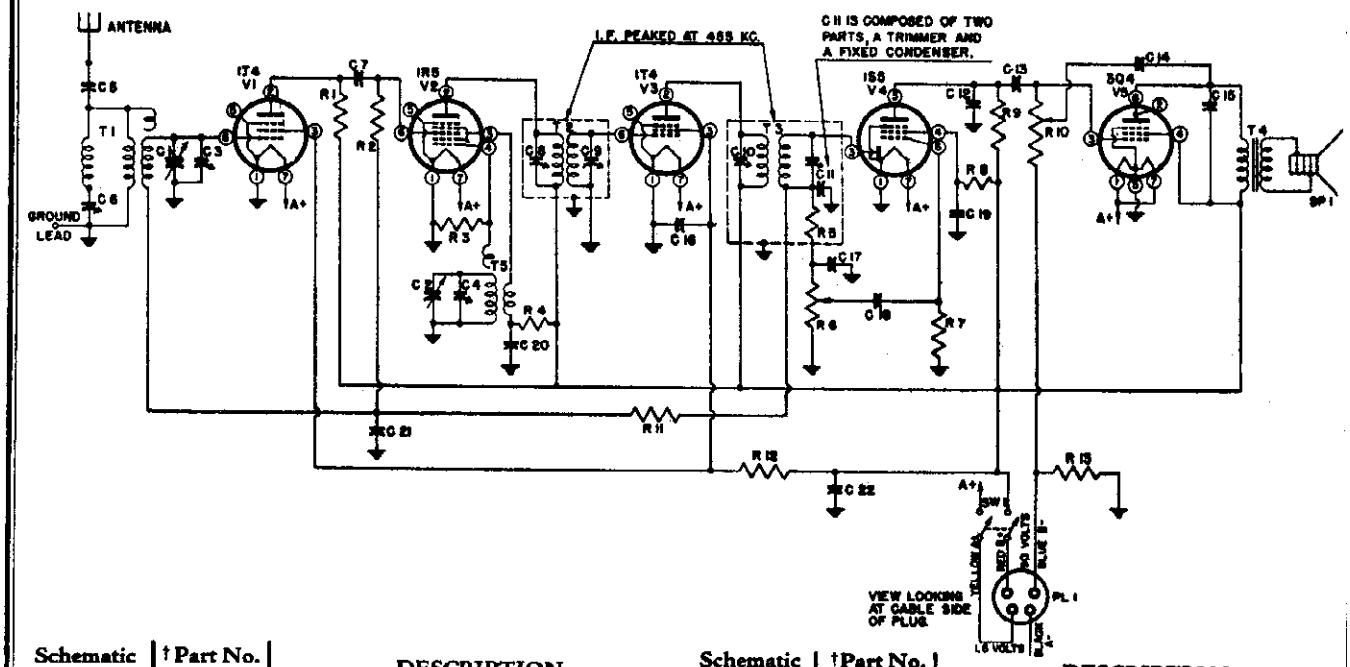


Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900290	Two-gang variable condenser
*C3, C4		Trimmers, part of variable condenser
*C5, C6, C7, C8		Trimmers, part of i-f transformers
C9	910000	0.00022 mfd. mica condenser
C10	920010	0.002 mfd., 600 volt condenser
C11	920515	0.002 mfd., 400 volt condenser
C12	920240	0.0005 mfd., 600 volt condenser
C13, C14	920020	0.02 mfd., 400 volt condenser
C15	920040	0.1 mfd., 200 volt condenser
C16	920050	0.2 mfd., 200 volt condenser (used only when T1 and T2 are 720000 and 720100 respectively)
C17, C19	920030	0.05 mfd., 400 volt condenser
C18	922090	0.05 mfd., 400 volt condenser (used up to serial No. 8,550,551), or
C18	922101	0.05 mfd., 400 volt condenser (used after serial No. 8,550,551)
C20, C21	925267	30-50 mfd., 150 volt dual electrolytic condenser (used up to serial No. 8,550,551), or
C20, C21	925110	30-50 mfd., 150 volt dual electrolytic condenser (used after serial No. 8,550,551)
L1	700000	Loop antenna, or
L1	700200	Loop antenna, or
L1	700210	Loop antenna
M1	819019	Automatic record changer
PL1	505040	Connector plug

Schematic Symbol	†Part No.	DESCRIPTION
PL2	508010	Pickup socket
*PL3		Polarized male plug, part of record changer
PL4	585070	Female plug and cable
*PL5		Power plug, part of line cord
R1	310810	22,000 ohms, ¼ watt resistor
R2, R4	397000	15 meg., ½ watt resistor
R3	321330	3.3 meg., ¼ watt resistor
R5	390010	0.5 meg. volume control
R6, R7	321130	470,000 ohms, ¼ watt resistor
R8	340290	150 ohms, ½ watt resistor
R9	321290	2.2 meg., ¼ watt resistor
R10	370490	1,000 ohms, 1 watt resistor
R11	321050	220,000 ohms, ¼ watt resistor
R12	321210	1 meg., ¼ watt resistor
R13	340010	10 ohms, ½ watt resistor
R14	340050	15 ohms, ½ watt resistor
SP1	180000	P.M. speaker
SW1	510130	Tone control switch
SW2	510390	Phono-radio switch
*SW3		Motor switch, part of record changer
*SW4		Line switch on volume control
T1	720000	First i-f transformer, or
T1	720525	First i-f transformer
T2	720100	Second i-f transformer, or
T2	720529	Second i-f transformer
T3	734200	Output transformer
T4	716010	Oscillator coil

EMERSON RADIO & PHONO. CORP.

MODELS 531, 532, 533
Chassis 120040



Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900070	Two-gang variable condenser
*C3, C4		Trimmers, part of variable condenser
C5, C15	920170	0.001 mfd., 600 volt condenser
*C6		Trimmer, part of antenna transformer
C7, C12	910000	0.00022 mfd. mica condenser
*C8, C9, C10		Trimmers, part of i-f transformer
*C11		Trimmer and fixed condenser, part of second i-f transformer
C13, C16, C19, C20	920100	0.02 mfd., 200 volt condenser
C14	910250	0.00005 mfd. mica condenser
C17	910010	0.00011 mfd. mica condenser
C18	920515	0.002 mfd., 400 volt condenser
C21	920040	0.1 mfd., 200 volt condenser
C22	925003	16 mfd., 150 volt electrolytic condenser
PL1	585311	Battery plug and cable assembly, or
PL1	585312	Battery plug and cable assembly
R1, R4	310730	10,000 ohms, ¼ watt resistor
R2	321130	470,000 ohms, ¼ watt resistor
R3	320970	100,000 ohms, ¼ watt resistor
*R5		47,000 ohms, ¼ watt resistor, part of second i-f transformer
R6	390180	0.5 meg. volume control
R7	321450	10 meg., ¼ watt resistor
R8, R11	321330	3.3 meg., ¼ watt resistor
R9	321210	1 meg., ¼ watt resistor
R10	390280	0.4 meg. tone control
R12	310770	15,000 ohms, ¼ watt resistor
R13	310410	470 ohms, ¼ watt resistor
SP1	180008	P.M. speaker
SW1	510401	Battery switch, or
SW1	510001	Battery switch
T1	710001	Antenna transformer and trap
T2	720530	First i-f transformer
T3	720531	Second i-f transformer
T4	734203	Output transformer
T5	716001	Oscillator coil

* Not supplied separately.

† Specify part numbers when ordering.

Battery replacement — Replace battery pack with one of the following types: Eveready No. 748 or No. 758, Rayovac No. AB82, Burgess No. 17GD60, General No. 60D10L, or Bright Star No. 6105.

MODELS 531,532,533

EMERSON RADIO & PHONOGRAPH CORP.

The following voltage readings are d-c measurements from tube socket pin to chassis. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. All voltages are positive unless otherwise indicated.

	PIN NUMBER						
TUBE	1	2	3	4	5	6	7
1T4(V1)		55	52	82		*—.3	1.5
1R5		82	57	*—11.0		*—.4	1.5
1T4(V3)		82	52			*—.4	1.5
1S5		—6.2	*—.45	*18	10	*—.3	1.5
3Q4		80.0	*—6.2	82	1.5	80	

An oscillator with frequencies of 455, 600, and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

I-f and Trap Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 6) of the 1R5 tube through a 0.1 mfd. condenser.
3. Adjust the four i-f trimmer screws (C8, C9, C10, C11) for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a 0.002 mfd. condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response.

The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B+—red

Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C4) is on the front section of the variable condenser.

The trimmer for the antenna (C3) is on the rear section of the variable condenser.

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted in back of the speaker. The second i-f transformer (T3) is mounted next to the output transformer.

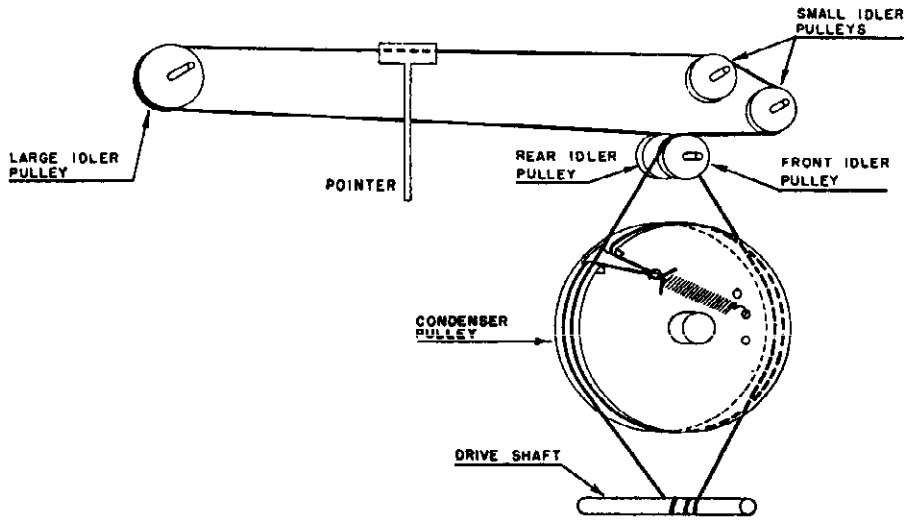
The 455 kc wave-trap is part of the antenna coil assembly, which is located on the underside of the chassis.

R-f Alignment

Feed 1620 kc through a standard broadcast dummy antenna to the antenna lead (A 0.0002 mfd. condenser may be used as a substitute). Adjust oscillator trimmer (C4). Move pointer to 1425 kc and feed 1425 kc signal. Adjust antenna trimmer (3C) for maximum response.

CABINET AND DIAL PARTS

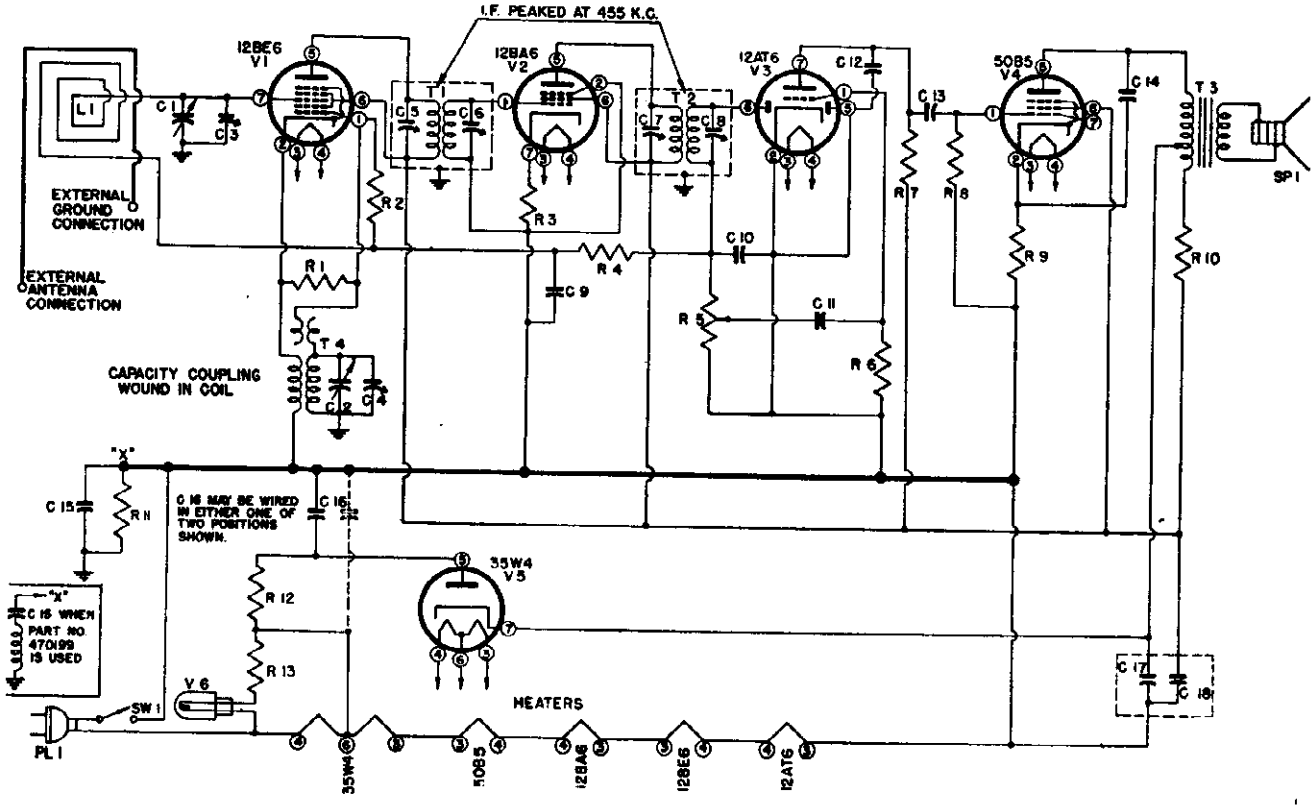
560190	Rear cover (Model 533)
280313	Drive shaft
520360	Dial backplate
520450	Dial Glass
525012	Dial pointer
140062	Cabinet (Model 531)
140029	Cabinet (Model 532)
140051	Cabinet (Model 533)
460140	Knob (Model 531)
460470	Knob (Model 532, 533)
560200	Rear cover (Model 532)



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS 543, 544
Chassis 120046



Schematic Circuit Diagram Chassis 120046

CHASSIS 120046

C1, C2	900013	Two-gang variable condenser	R2, R6	397000	15 meg., ⅓ watt resistor
*C3, C4		Trimmers, part of variable condenser	R3	340310	180 ohms, ½ watt desisteor
*C5, C6, C7, C8		Trimmers, part of i-f transformers	R4	321290	2.2 meg., ¼ watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R5	390015	0.5 meg. volume control
C10	910000	0.00022 mfd. mica condenser	R7, R8	321130	470,000 ohms, ¼ watt resistor
C11	920010	0.002 mfd., 600 volt condenser	R9	340290	150 ohms, ½ watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R11	321050	220,000 ohms, ¼ watt resistor
C15	920050	0.2 mfd., 200 volt condenser (used when T1 and T2 are 720000, and 720100 respectively), or	R12	340050	15 ohms, ½ watt resistor
			R13	340010	10 ohms, ½ watt resistor
			SP1	180000	P.M. speaker
C15	470199	0.2 mfd., 200 volt assembly (used when T1 and T2 are 720525 and 720529 respectively)	*SW1		Line switch on volume control
			T1	720000	First i-f transformer, or
			T1	720525	First i-f transformer, midget
C16	920030	0.05 mfd., 400 volt condenser	T2	720100	Second i-f transformer, or
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser	T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
L1	700000	Loop antenna	T4	716010	Oscillator coil
*PL1		Power plug, part of line cord		583010	Pilot light
R1	310810	22,000 ohms, ¼ watt resistor		807000	Line cord
				507090	Pilot light socket

CABINET AND DIAL PARTS

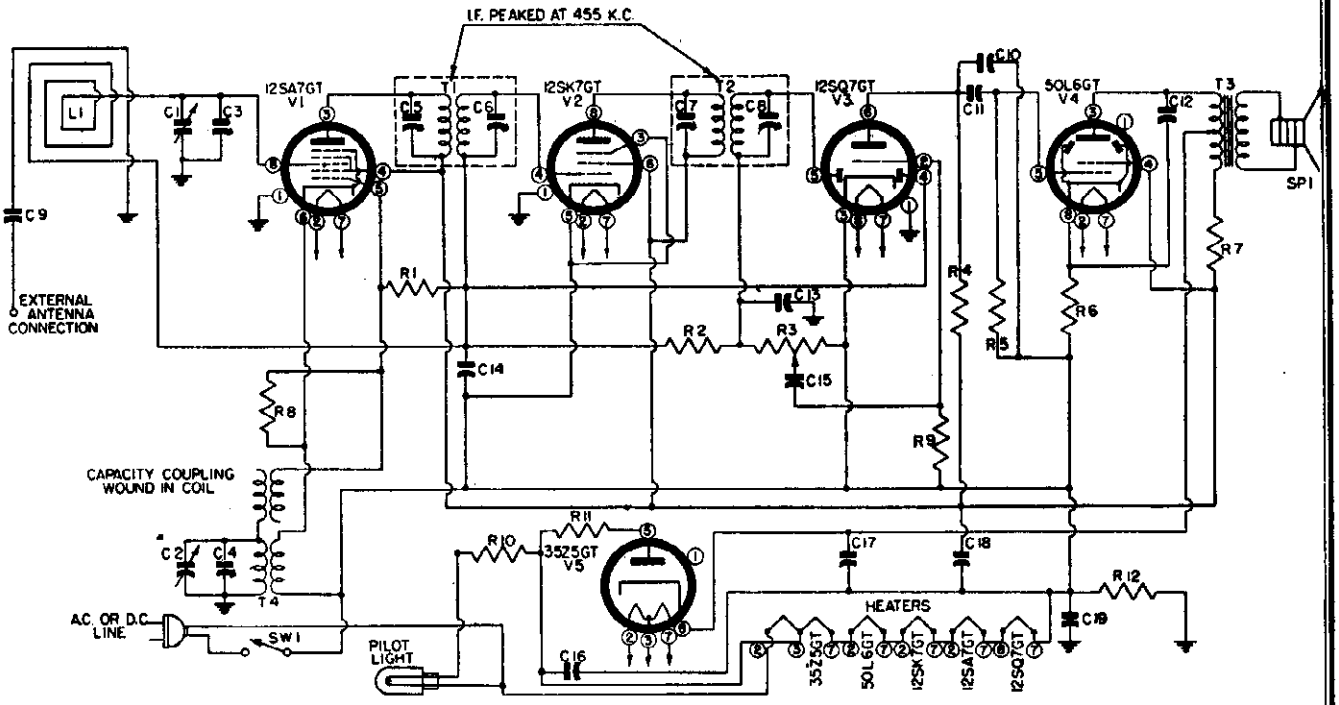
280024	Drive shaft		140082B	Cabinet, black
520033	Dial face		410090	Metal grille
525015	Dial pointer		520034	Dial crystal
140080B	Cabinet, ivory		460470	Knob

MODELS 543,544
Chassis 120052

EMERSON RADIO & PHONOGRAPH CORP.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram Chassis 120052

CHASSIS 120052

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900160	Two-gang variable condenser	R3	390015	0.5 meg. volume control
*C3, C4		Trimmer, part of variable condenser	R4, R5	321130	470,000 ohms, ¼ watt resistor
*C5, C6, C7, C8		Trimmers, part of i-f transformers	R6	340290	150 ohms, ½ watt resistor
			R7	370490	1000 ohms, 1 watt resistor
C9, C15	920010	0.002 mfd., 600 volt condenser	R8	310810	22,000 ohms, ¼ watt resistor
C10	920240	0.0005 mfd., 600 volt condenser	R10	340010	10 ohms, ½ watt resistor
C11, C12	920020	0.02 mfd., 400 volt condenser	R11	397040	15 ohms, 1 watt wire-wound resistor
C13	910000	0.00022 mfd. mica condenser	R12	321050	220,000 ohms, ¼ watt resistor
C14	920040	0.1 mfd., 200 volt condenser	SP1	180000	P.M. speaker
C16	920030	0.05 mfd., 400 volt condenser	*SW1		Line switch on volume control
C17, C18	925000	30-50 mfd., 150 volt dual electrolytic condenser	T1	720000	First i-f transformer
			T2	720100	Second i-f transformer
C19	920050	0.02 mfd., 200 volt condenser	T3	734000	Output transformer
L1	700000	Loop antenna, or	T4	716010	Oscillator coil
L1	700200	Loop antenna		583010	Line cord
R1, R9	397000	15 meg., ¼ watt resistor		807000	Pilot light
R2	321330	3.3 meg., ¼ watt resistor		507090	Pilot light socket

† Specify part numbers when ordering.
* Not supplied separately.

The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B+—red

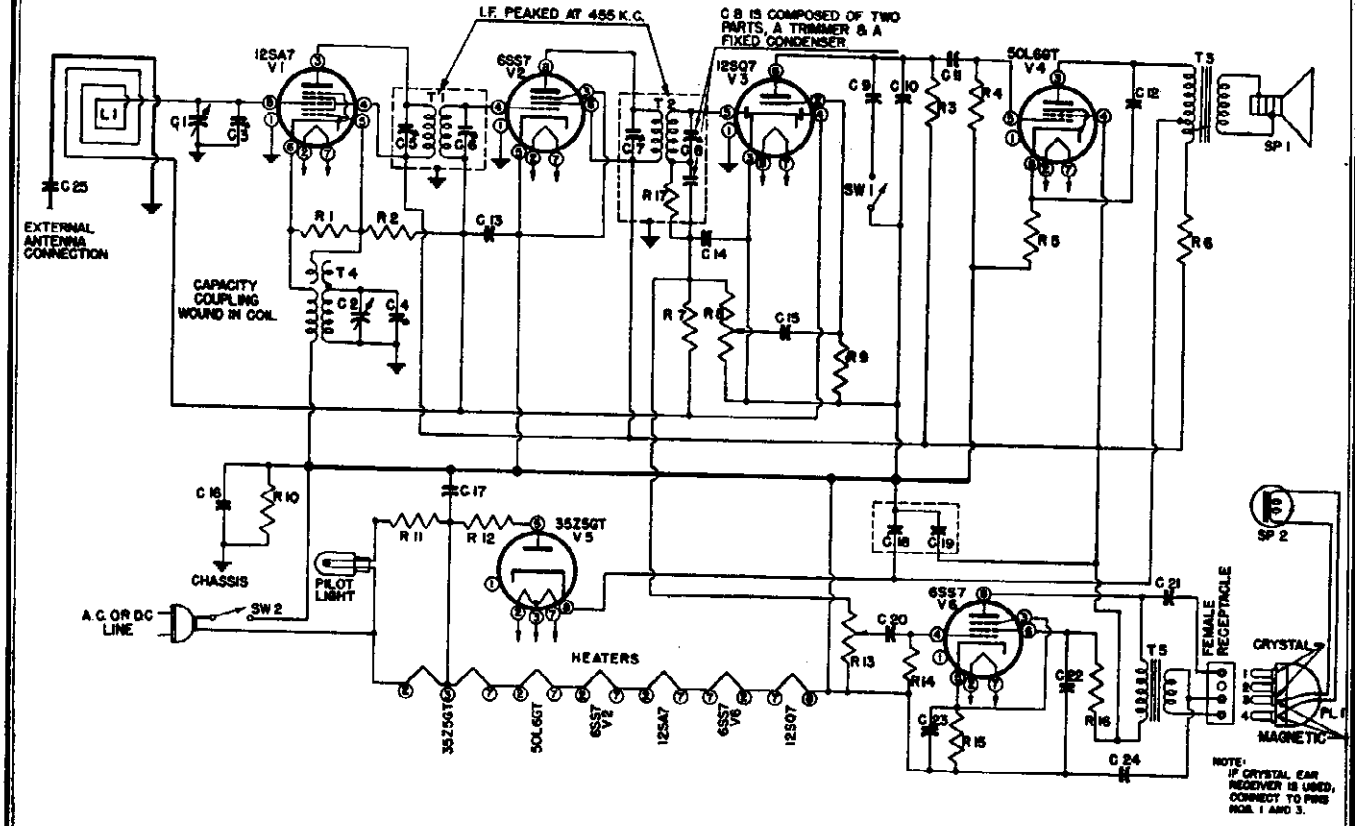
For alignment and voltage, see P.16-2

EMERSON RADIO & PHONOGRAPH CORP.

MODELS 1002, 1003
Chassis 129003

TYPE: Single-band superheterodyne with hearing aid receiver.

FREQUENCY RANGE: 540-1620 kc.



Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900070	Two-gang variable condenser
*C3, C4		Trimmers, part of variable condenser
*C5, C6, C7, C8		Trimmers, part of i-f transformers
C9, C15, C20, C25	920010	0.002 mfd., 600 volt condenser
C10	920240	0.0005 mfd., 600 volt condenser
C11, C12, C21	920020	0.02 mfd., 400 volt condenser
C13	920040	0.1 mfd., 200 volt condenser
C14	910010	0.00011 mfd. mica condenser
C16	920050	0.2 mfd., 200 volt condenser
C17, C24	920030	0.05 mfd., 400 volt condenser
C18, C19	925011	50-50 mfd., 150 volt dual electrolytic condenser
C22	920060	0.05 mfd., 200 volt condenser
C23	925180	10 mfd., 25 volt electrolytic condenser
L1	700000	Loop antenna
R1	340810	22,000 ohms, ½ watt resistor
R2, R9	397000	15 meg., ½ watt resistor
R3, R4	351130	470,000 ohms, ½ watt resistor
R5	340290	150 ohms, ½ watt resistor
R6	370490	1000 ohms, 1 watt resistor
R7, R14	351330	3.3 meg., ½ watt resistor
R8	390190	0.5 meg. volume control
R10	351050	220,000 ohms, ½ watt resistor
R11	340010	10 ohms, ½ watt resistor
R12	340050	15 ohms, ½ watt resistor

Schematic Symbol	†Part No.	DESCRIPTION
R13	390180	0.5 meg. volume control (sets below 8,767,450), or
R13	390014	2 meg. volume control (sets 8,767,450 and higher)
R15	340410	470 ohms, ½ watt resistor
R16	351050	220,000 ohms, ½ watt resistor (sets below 8,767,450), or
R16	340970	100,000 ohms, ½ watt resistor (sets 8,767,450 and higher)
SP1	180008	P.M. speaker
SP2	829001	Telex ear receiver (name imprinted), or
SP2	829002	American Earphone ear receiver (no imprint)
SW1	510120	Tone control switch
*SW2		Line switch on volume control
T1	720380	First i-f transformer
T2	720390	Second i-f transformer
T3	734080	Output transformer (used with speaker)
T4	716070	Oscillator coil (sets below 8,767,450), or
T4	716005	Oscillator coil (sets 8,767,450 and higher)
T5	734001	Output transformer (used with ear receiver)
	807000	Pilot light
	507215	Pilot light socket
	583150	Line cord

MODELS 1002, 1003

EMERSON RADIO & PHONOGRAPH CORP.

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—

R-f Alignment

1. Connect the oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser (C3, C4) for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T1) is mounted on top of the chassis deck at the rear and to the right of the variable condenser. The trimmers (C5, C6) are accessible through holes in the top of the can.

The second i-f transformer (T2) is mounted on top of the chassis to the right of the speaker. The trimmers (C7, C8) are accessible through holes in the top of the can.

The trimmer for the antenna (C3) and the trimmer for the oscillator coil (C4) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers (C5, C6, C7, C8) for maximum response.

The color coding of the i-f transformer leads is as follows:

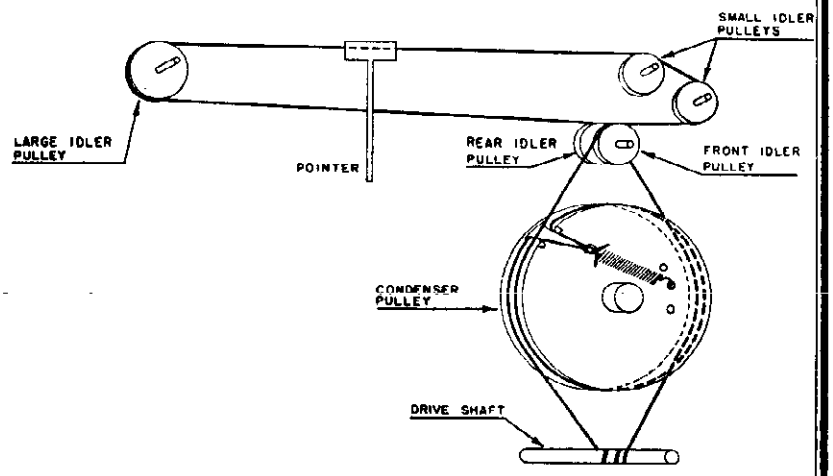
Grid—green	Plate—blue
Grid return—black	B+—red

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

	PIN NUMBER							
TUBE	1	2	3	4	5	6	7	8
12SA7			89	89	*-10			*-1.6
6SS7(V2)				*-1.6		89		89
12SQ7		*-0.7		*-1.6	*-0.5	*52.0		
50L6GT			110	89				6.2
35Z5GT				116				117
6SS7(V6)			1.4		1.4	*40.0		89

CABINET, DIAL AND ACCESSORY PARTS

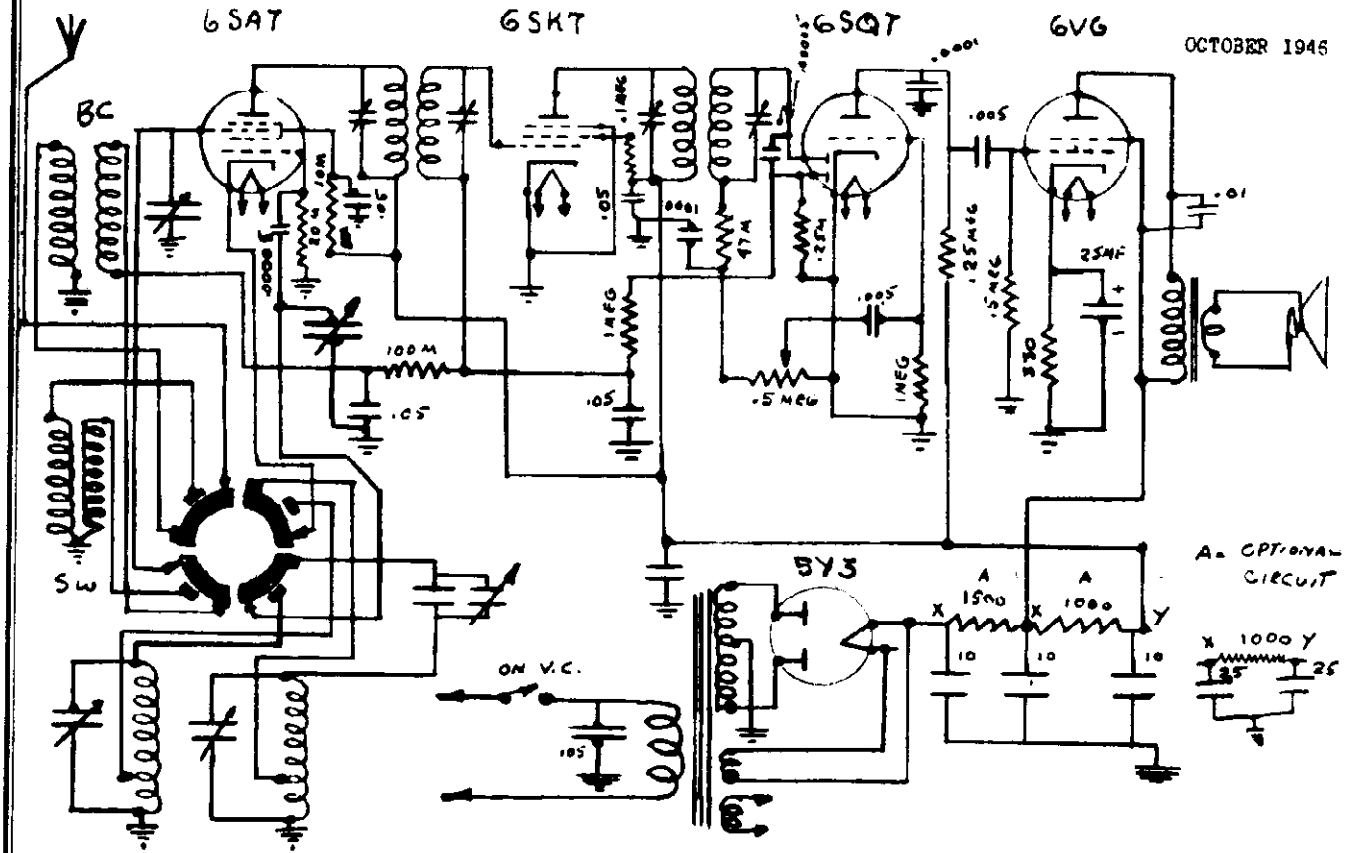
520480	Dial backplate
280313	Drive shaft
520450	Dial glass
525012	Pointer
140029	Cabinet (Model 1002)
560101	Cabinet back (Model 1002)
460470	Knob (Model 1002)
140054	Cabinet (Model 1003)
460140	Knob (Model 1003)
470222	Plug and cable with ear receiver, complete
585315	Plug and cable (for ear receiver 829001)
585122	Plug and cable (for ear receiver 829002)
508115	Socket for ear receiver plug
460005	Ear mold, or
460006	Ear mold
505057	Plug, less cover and screw
505058	Plug cover
204116	Machine screw
470220	Under-pillow speaker, with plug
829003	Under-pillow speaker, less plug

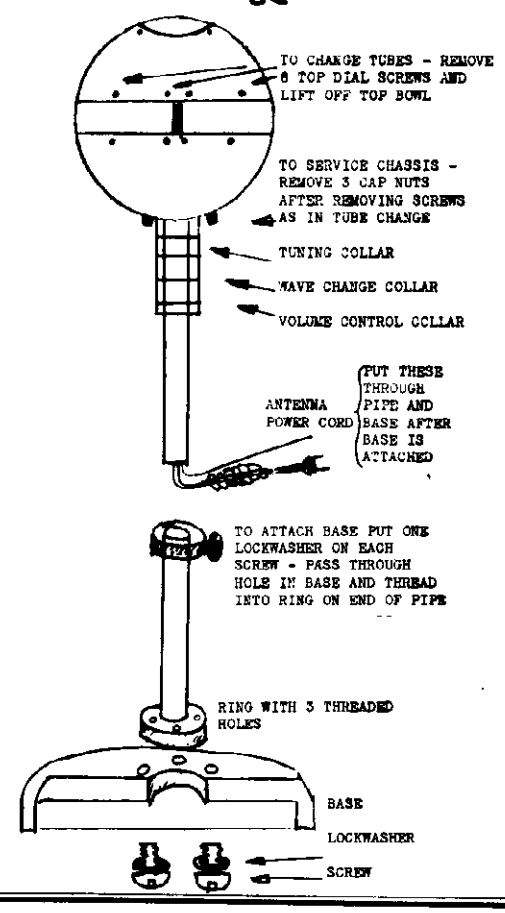


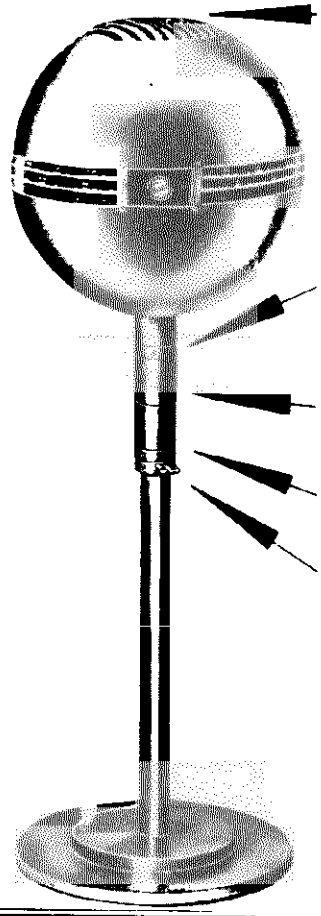
CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

EMOR RADIO, LTD. MODEL 10C

OCTOBER 1946







SPEAKER GRID
Reception is evenly distributed.

TUNING
Tuning control in top sleeve over tubular stand revolves entire globe that has oversize dial. Indicator illuminates on station location.

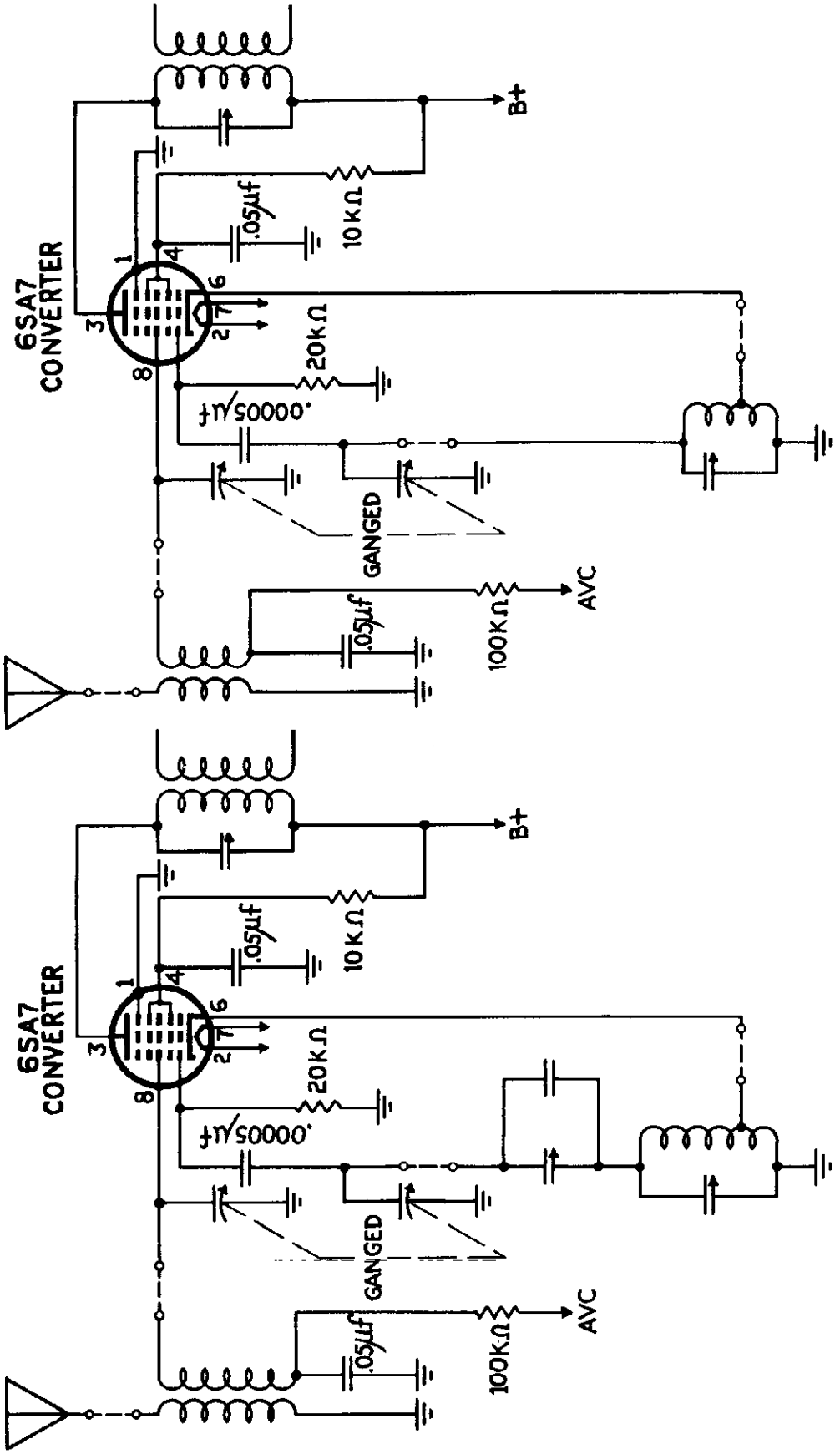
WAVE CHANGE CONTROL
Long and Short Wave.

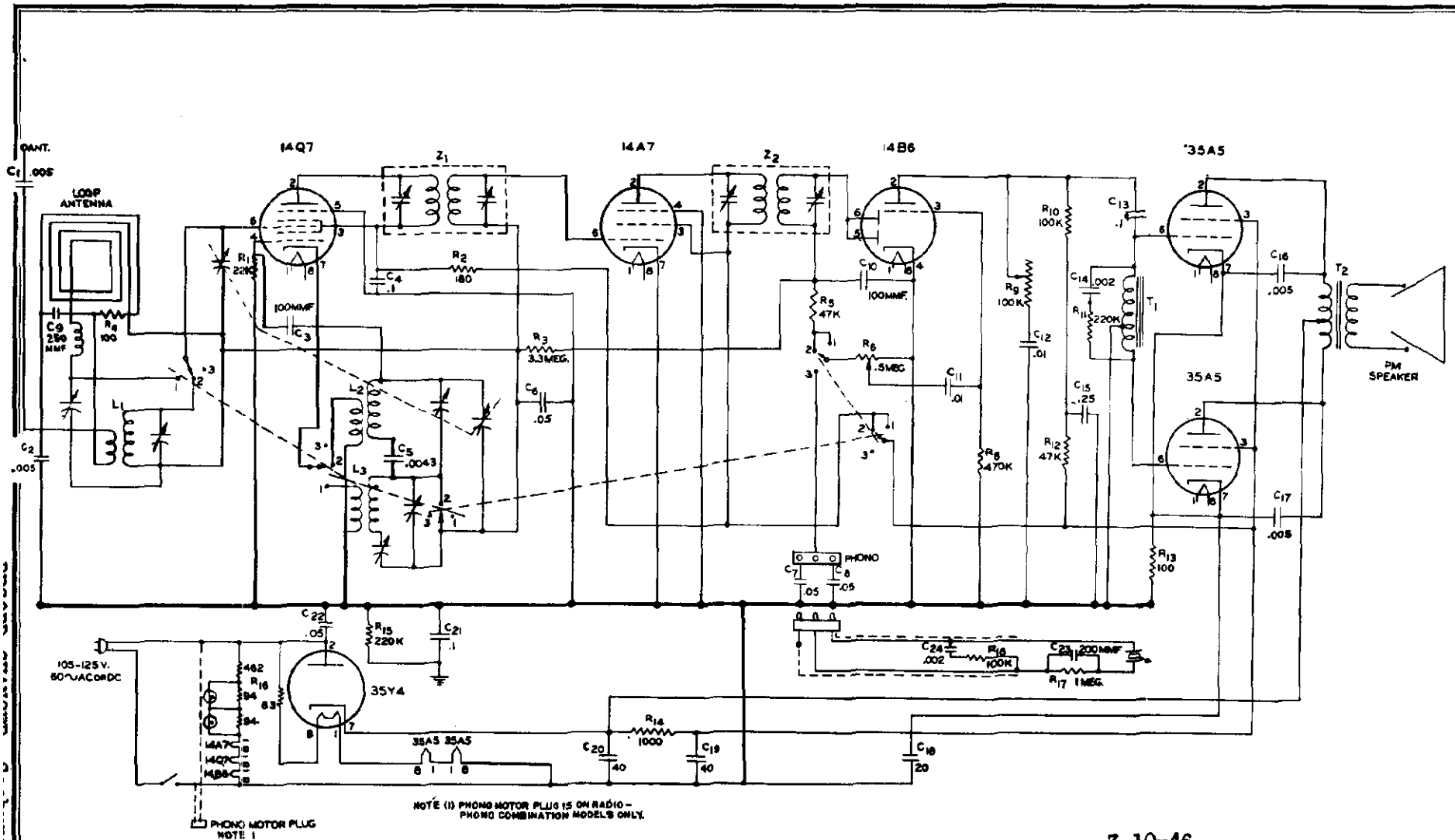
VOLUME CONTROL
Designed for smooth, easy regulation.

ADJUSTABLE HEIGHT
Height can be adjusted from 3½ feet to 5 feet.

FLOOR MODEL

EMOR RADIO, LTD.





7-10-46

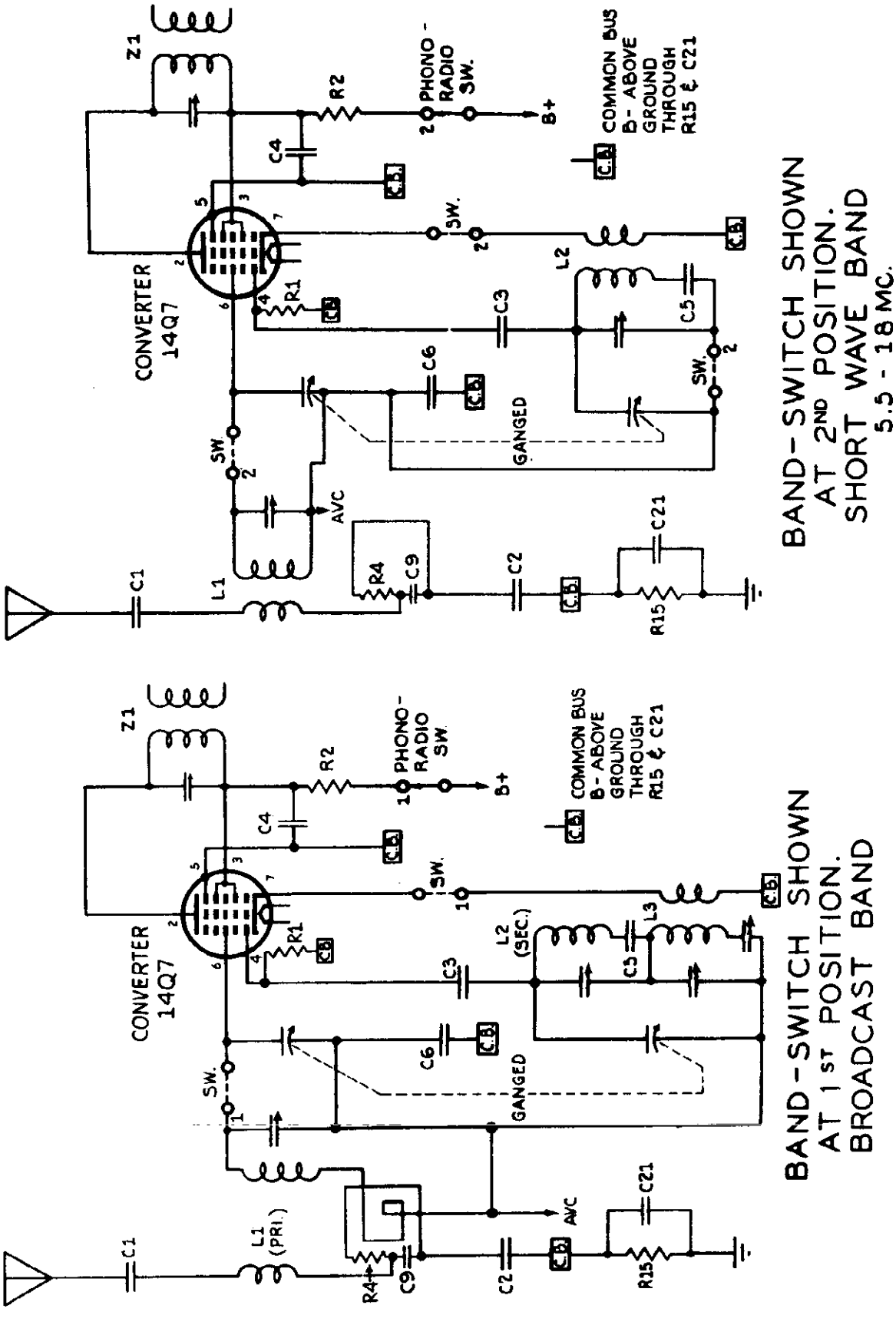
REVISIONS
Circ. revised
C9,R4,R7 deleted
R17 was 2 meg.
Nov. 4,1946 app.

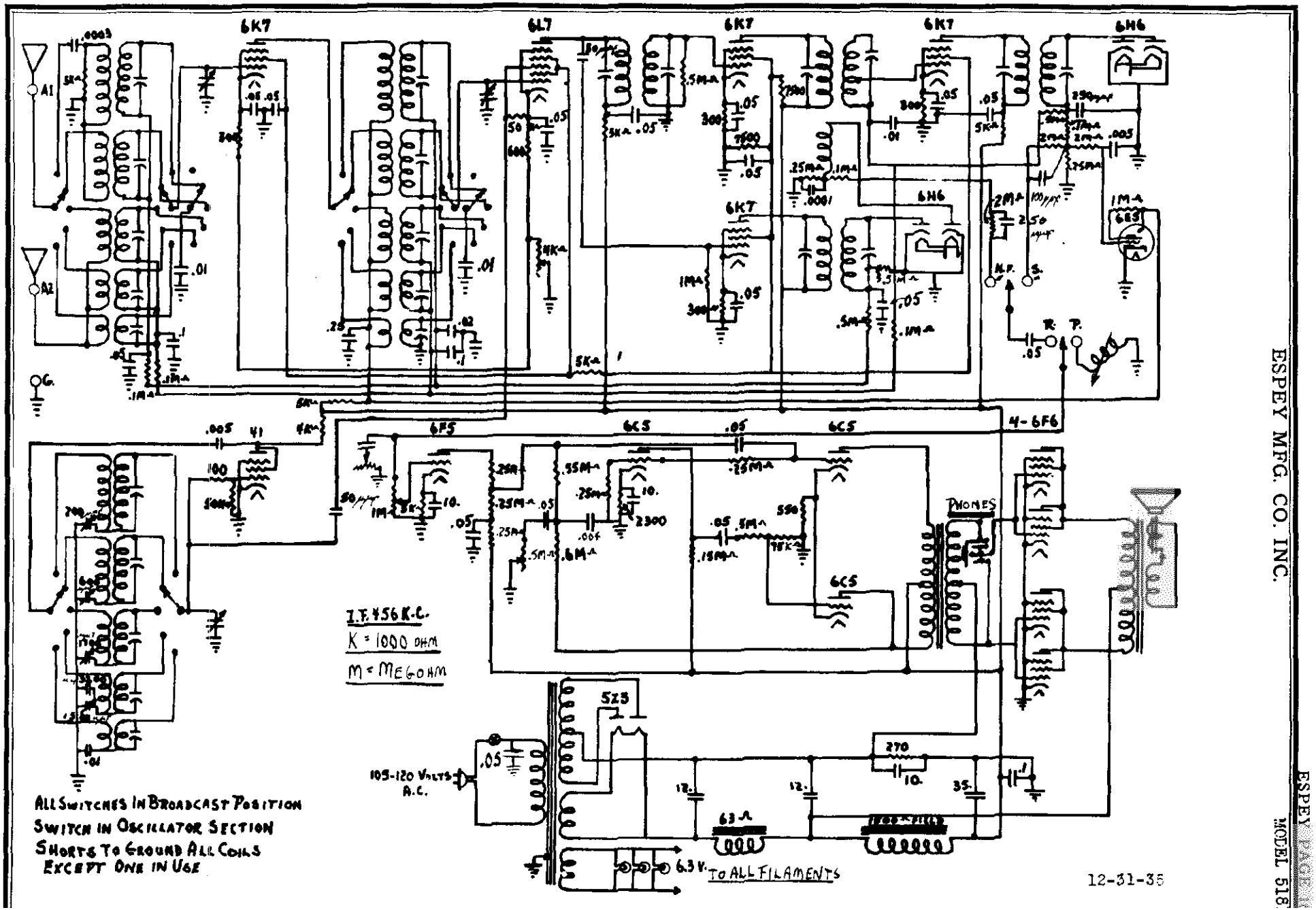
ESPEY MFG. CO. INC. CHASSIS FJ-97A.Rev1

"clarified schematics"

CHASSIS FJ-97A, Revised

ESPEY MFG. CO. INC.



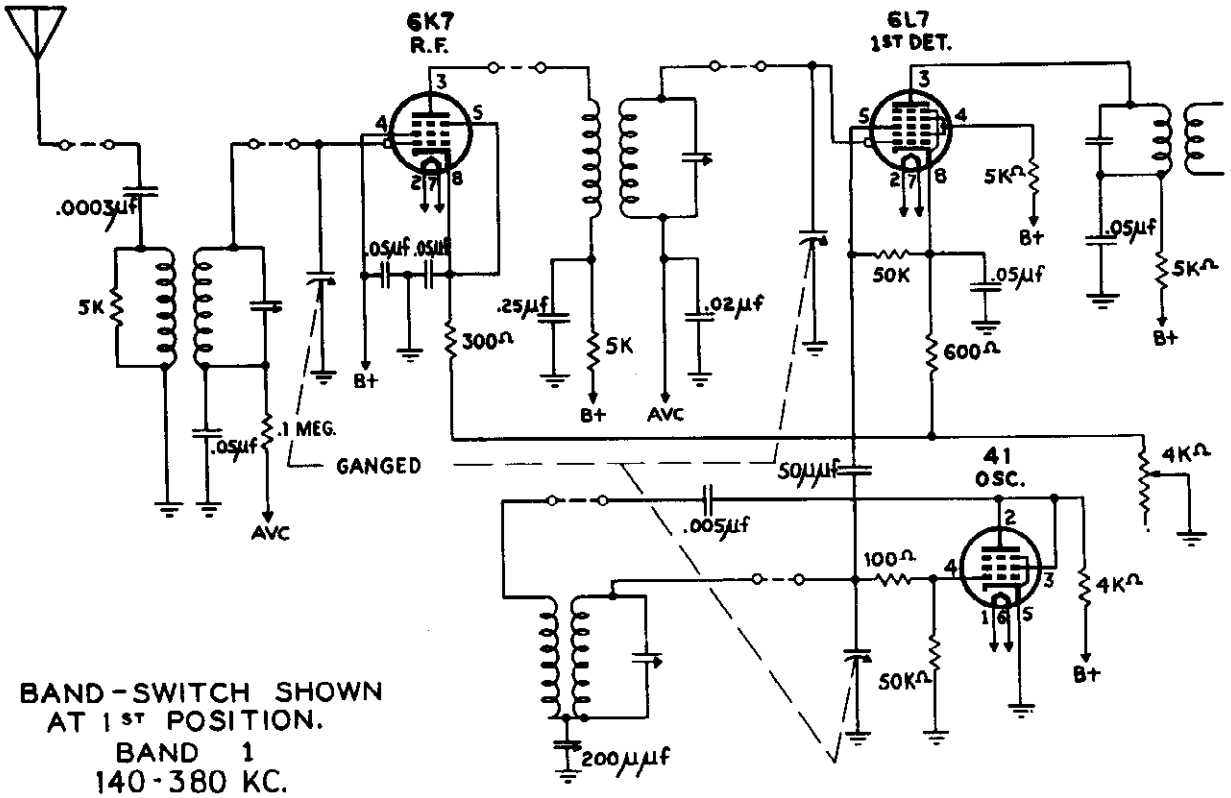


ESPEY MFG. CO. INC.

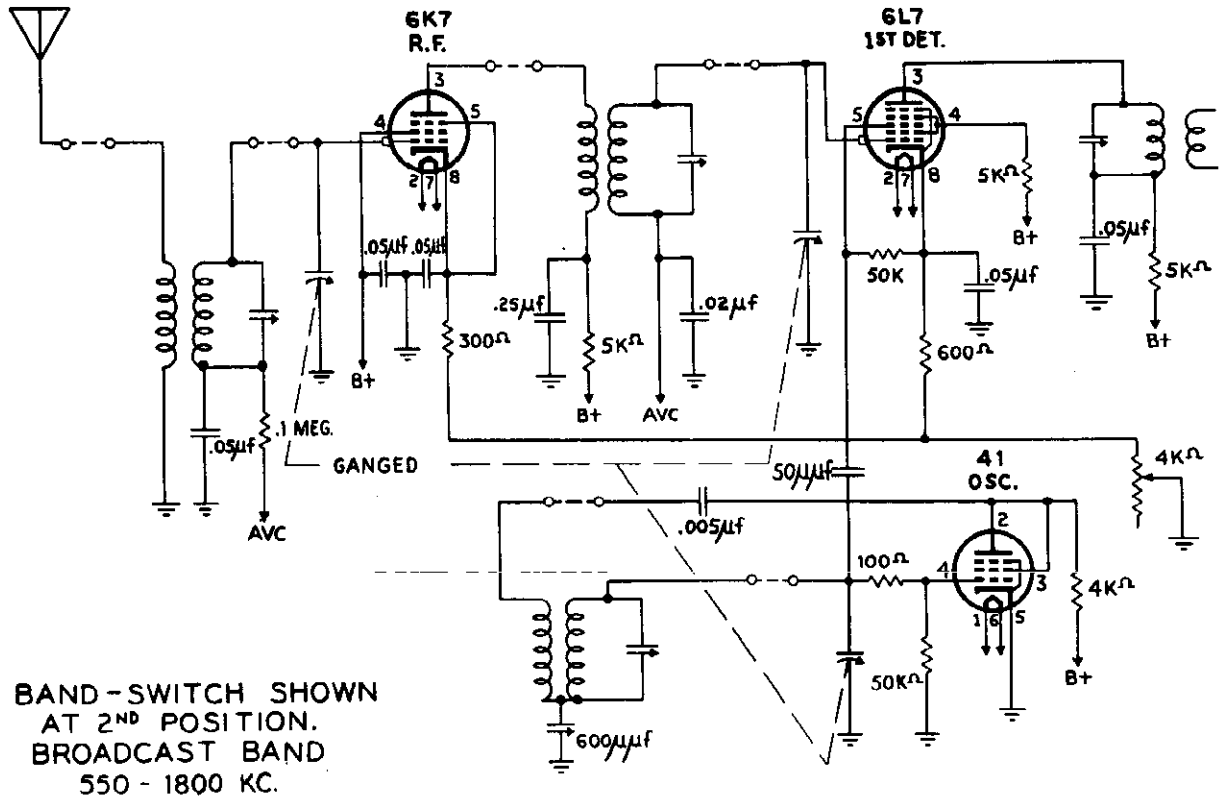
ESPEY PAGE II

MODEL 518

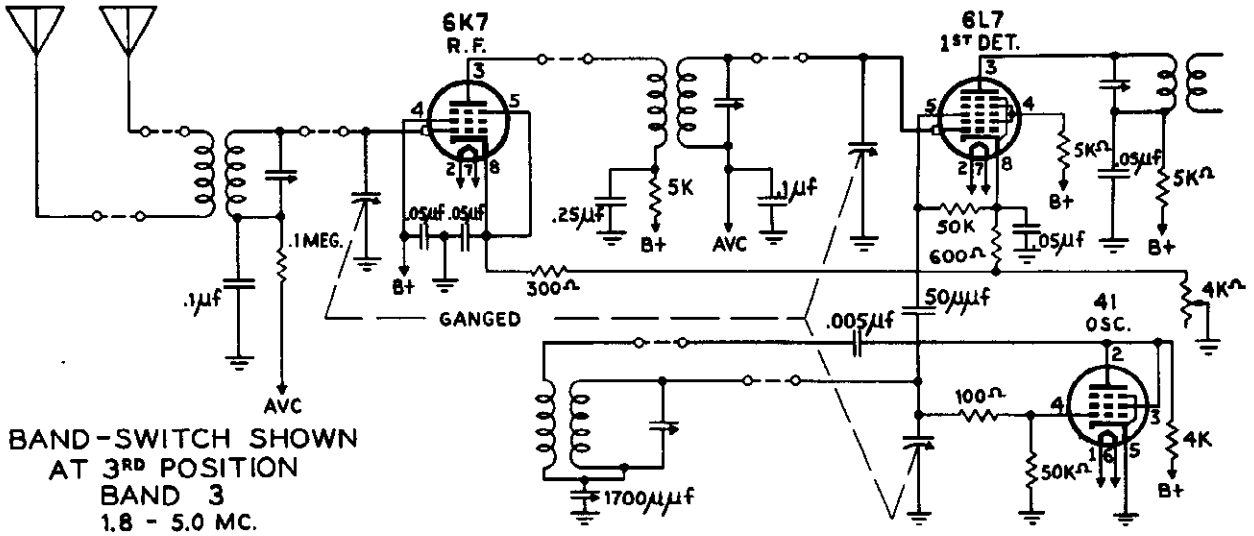
MODEL 5181 ESPEY MFG. CO. INC.



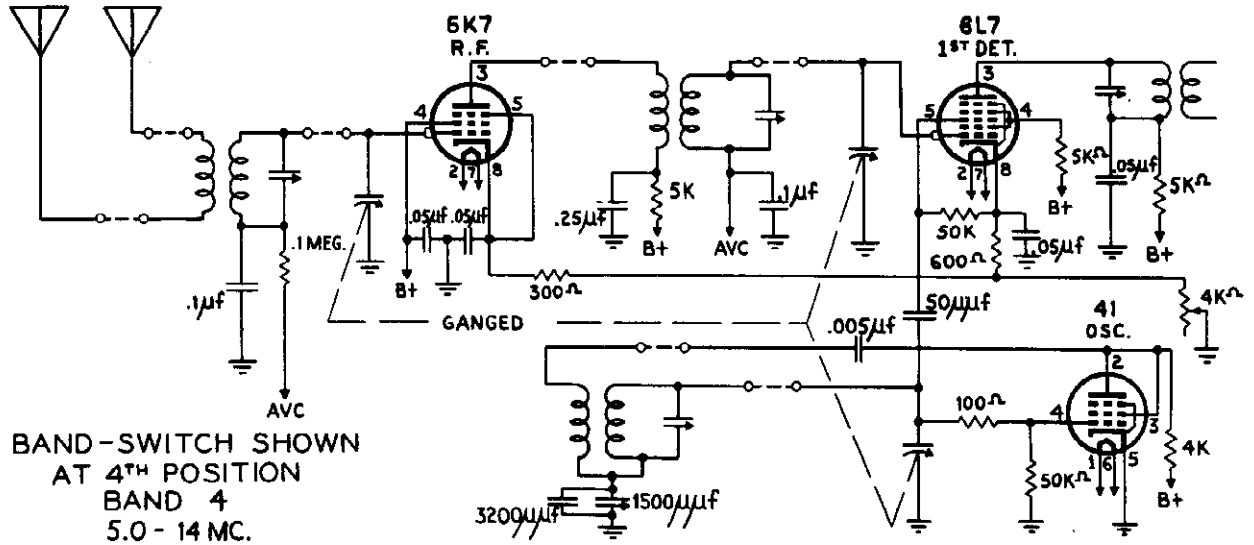
BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND 1
140-380 KC.



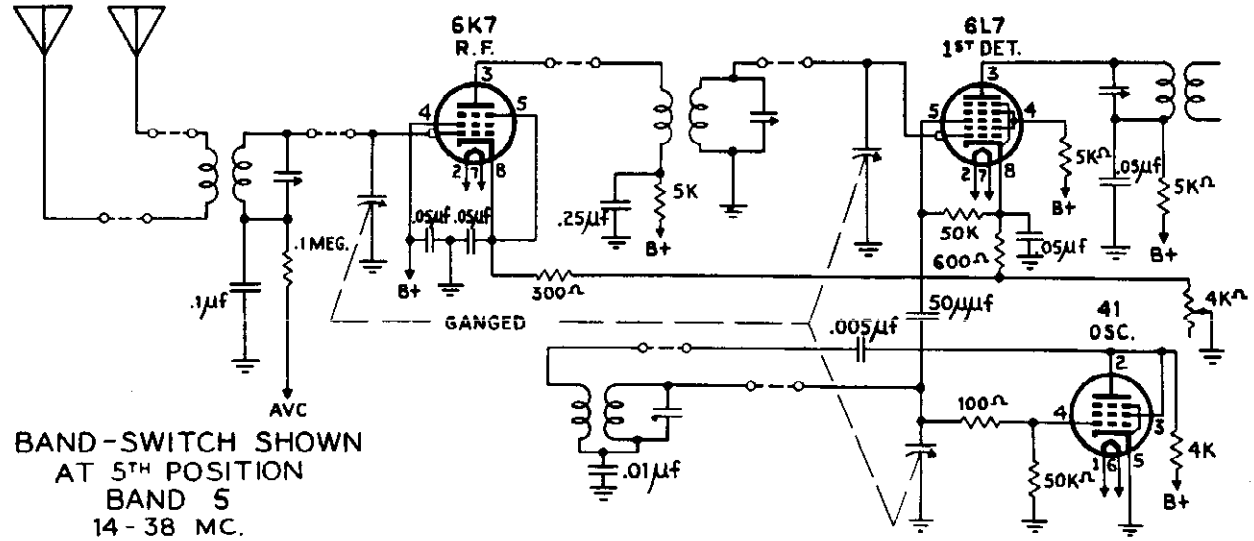
BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND
550 - 1800 KC.



BAND-SWITCH SHOWN
AT 3RD POSITION
BAND 3
1.8 - 5.0 MC.



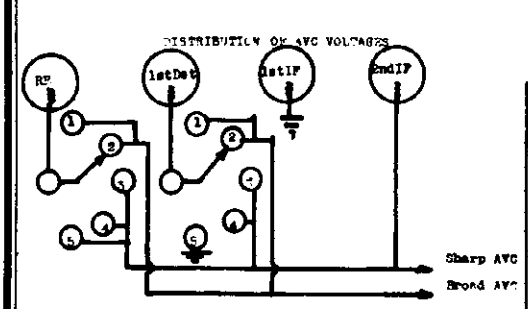
BAND-SWITCH SHOWN
AT 4TH POSITION
BAND 4
5.0 - 14 MC.

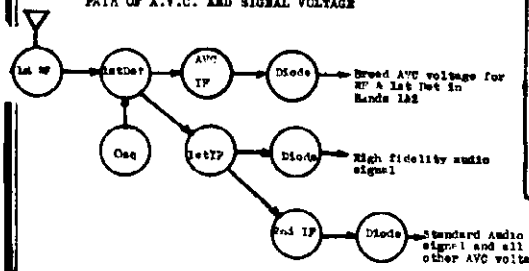


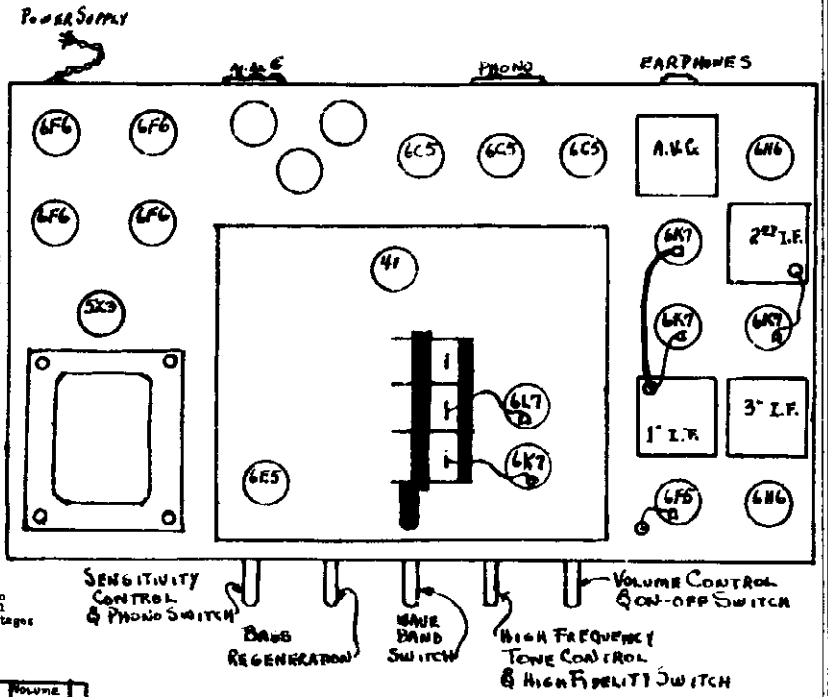
BAND-SWITCH SHOWN
AT 5TH POSITION
BAND 5
14 - 38 MC.

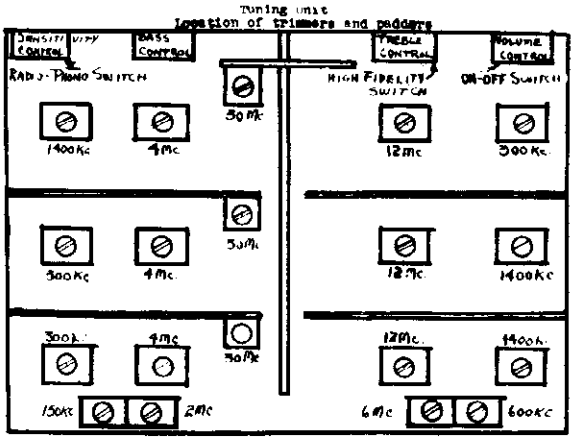
MODEL 5181

ESPEY MFG. CO. INC.









Numerals indicate frequencies at which the various trimmers and padders are adjusted.

Socket Voltage Readings

No Signal Tubes	Maximum Sensitivity Heater Volts	S. G.	Meter 1000 ohms per volt Cathode	Plate	Cathode Current ma.
6K7 R. F.	6.3	75	1.7	230	6
6L7 1st Det.	6.3	75	2.2	220	4
41 Osc.	6.3		0	160	17
6K7 1st I. F.	6.3	90	2.4	230	8
6K7 2nd I. F.	6.3	90	2	210	7
6K7 A.V.C.	6.3	90	2.2	230	7
6F5 1st Audio	6.3		.8	70	2
6C5 Phase Inverter	6.3		2.1	65	1
6F6 2nd Audio	6.3		6.6	230	6
6H6 3rd Audio	6.3	Bias 38 V	0	340	22
523 Rectifier	5		350	400-400	140
6e5 Tuning Eye	6.3		0	90	3

Voltage Rating: 105-125 Volts A. C. 50-60 Cycles

Power Consumption: 160 Watts

Type and Number of Tubes: 4-6K7, 4-6F6, 3-6C5, 2-6H6, 1-523, 1-6F5, 1-6L7, 1-6E5, 1-41

Frequency Ranges: Band 1 140-380 K. C.
Band 2 380-1200 K. C.
Band 3 1200-5000 K. C.
Band 4 5000-14,000 K. C.
Band 5 14,000-38,000 K. C.

Alignment Frequencies: 150, 300, 456, 600, 1400, 2000, 4000, 6000, 12,000 30,000 K. C.

Alignment with Output Meter

1. Short either side of the broadcast R. F. coil trimmer to ground. Remove the first detector (6L7) grid cap and apply a 456 K. C. modulated signal. The fidelity switch must be in the sharp position (left). Remove the oscillator tube (41). Align the trimmers of the third, second and first I. F. transformers for maximum output in the order given.

2. Amplified A. V. C. and Band 2 adjustment:

Put the cap back on the 6L7. Place the 41 in its socket. Set dial at 1400 K. C. Feed 1400 K. C. signal from the generator to the set. Adjust oscillator, R. F. and antenna trimmers for maximum signal. Remove the short from the Broadcast R. F. coil trimmer being careful not to alter the setting of either the set or generator. Set both A. V. C. I. F. trimmers for minimum output. Now turn dial to 600 K. C. and feed a 600 K. C. signal from generator and adjust padder while rocking variable slightly back and forth for best adjustment. Repeat 1400 adjustment.

ADJUSTMENT OF OTHER BANDS

Band 1

Oscillator, R. F., and antenna trimmers are adjusted at 300 K. C. The padder is adjusted at 150 K. C. Repeat 300 K. C. adjustment.

Band 3

Oscillator, R. F., and antenna trimmers are adjusted at 4 M. C. The padder is adjusted at 2 M. C. Repeat 4 M. C. adjustment.

Band 4

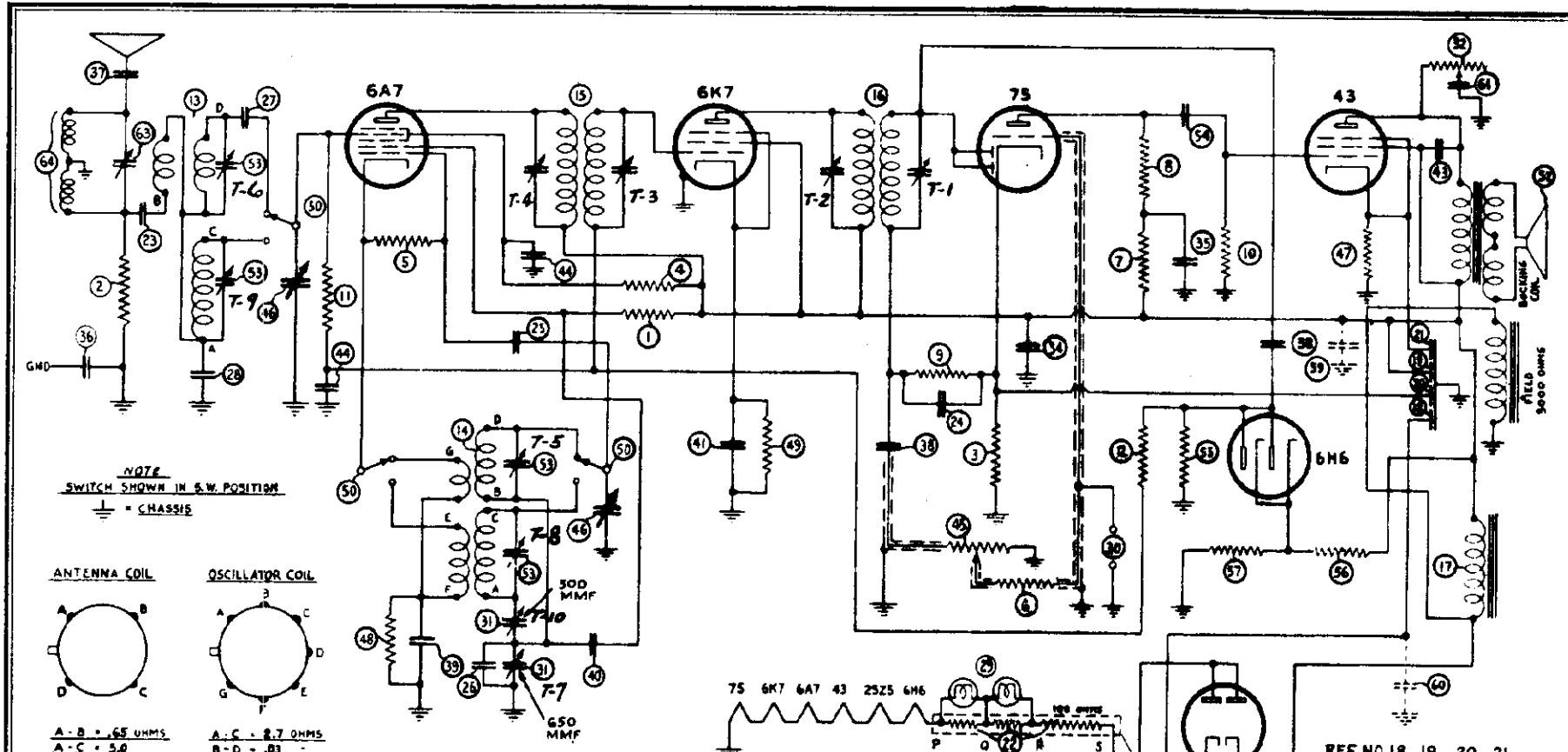
Oscillator, R. F., and antenna trimmers are adjusted at 12 M. C. The padder is adjusted at 6 M. C. Repeat 12 M. C. adjustment.

Band 5

Oscillator, R. F., and antenna trimmers are adjusted at 30 M. C. The padder on this band is fixed.

It is of the utmost importance when making all adjustments to keep the output of the generator just high enough to give a readable deflection on the output meter. If strong signals are used in alignment, your adjustments will be of very little value. This does not apply to the amplified A. V. C. adjustments where a strong signal is necessary.

FADA RADIO & ELEC. CO. INC.



REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	30.1	CARB RES - 5,000 OHMS ½W ± 10%	23	15.2	MICA COND - .0005 MF ± 10%	45	50.1	VOLUME CONTROL - ½ MEG
2	30.31	" " 10,000 " " " 20%	24	15.2	" " .0005 " "	46	25.53	VARIABLE COND
3	30.31	" " 10,000 " " "	25	15.3	" " .0001 " "	47	30.47	CARB RES - 625 OHMS ½W ± 10%
4	30.7	" " 15,000 " " 10%	26	15.19	" " .0015 " "	48	30.48	" " 350 ¼ " "
5	30.3	" " 50,000 " " "	27	15.5	" " .002 " 3%	49	30.49	" " 250 " " "
6	30.26	" " 50,000 " " 20%	29	15.6	" " .0025 " "	50	45.1	BAND SWITCH
7	30.26	" " 50,000 " " "	29	120.1	PILOT LIGHTS 6.8 V .25 A.	51		ON-OFF SW ON VOL CONT (45)
8	30.20	" " 250,000 " " "	30	125.1	PHONO JACK	52	105.1	SPEAKER - 3,000 OHMS
9	30.23	" " 500,000 " " "	31	25.1	PADDING COND - 650 - 500 MMF	53		MIN. ADJ ON COILS
10	30.23	" " 500,000 " " "	32	55.10	TONE CONTROL - 200,000 OHMS	54	10.4	TUBULAR COND - .01 MF. - 200 V
11	30.22	" " 1 MEG " " "	33			55	30.5	CARB RES - 500,000 OHMS - ½ W. ±10%
12	30.22	" " 1 " " "	34	10.2	TUBULAR COND .1 MF 200 WV	56	30.4	" " 250,000 " " "
13	20.26	ANTENNA COIL	35	10.2	" " .1 " " "	57	30.2	" " 10,000 " " "
14	31.16	OSCILLATOR "	36	10.3	" " .006 " 400 "	58	15.3	MICA COND - .0001 MF. ± 10%
15	38.19	1ST I.F. "	37	10.4	" " .01 " 200 "	59	20.25	TUBULAR ELECTRO COND - 8 MF 450 WV
16	38.20	2ND I.F. "	38	10.4	" " .01 " " "	60	20.25	" " " 8 " "
17	40.1	CHOKE - 300 OHMS	39	10.5	" " .05 " " "	61	10.5	TUBULAR COND - .05 MF. 200 W.V
18	20.36A	ELECTRO COND BLOCK - 16 MF - 100 WV	40	10.8	" " .05 " " "	62		
19	20.36A	" " " 16 " 100 "	41	10.5	" " .05 " " "	63	25.8	TRIMMING COND - 500 MMF
20	20.36A	" " " 5 " 25 "	42	10.7	" " .05 " 400 "	64	50.85	WAVE TRAP COIL
21	20.36A	" " " 5 " 25 "	43	10.10	" " .01 " 400 "			
22	BK42B	BALLAST TUBE - 15-15-100 OHMS	44	10.6	" " DUAL .05 - 200 "			

1ST I.F. TRANS.	2ND I.F. TRANS.
PRI. - 14.5 OHMS	PRI. - 14.5 OHMS
SEC. - 14.5 "	SEC. - 14.5 "

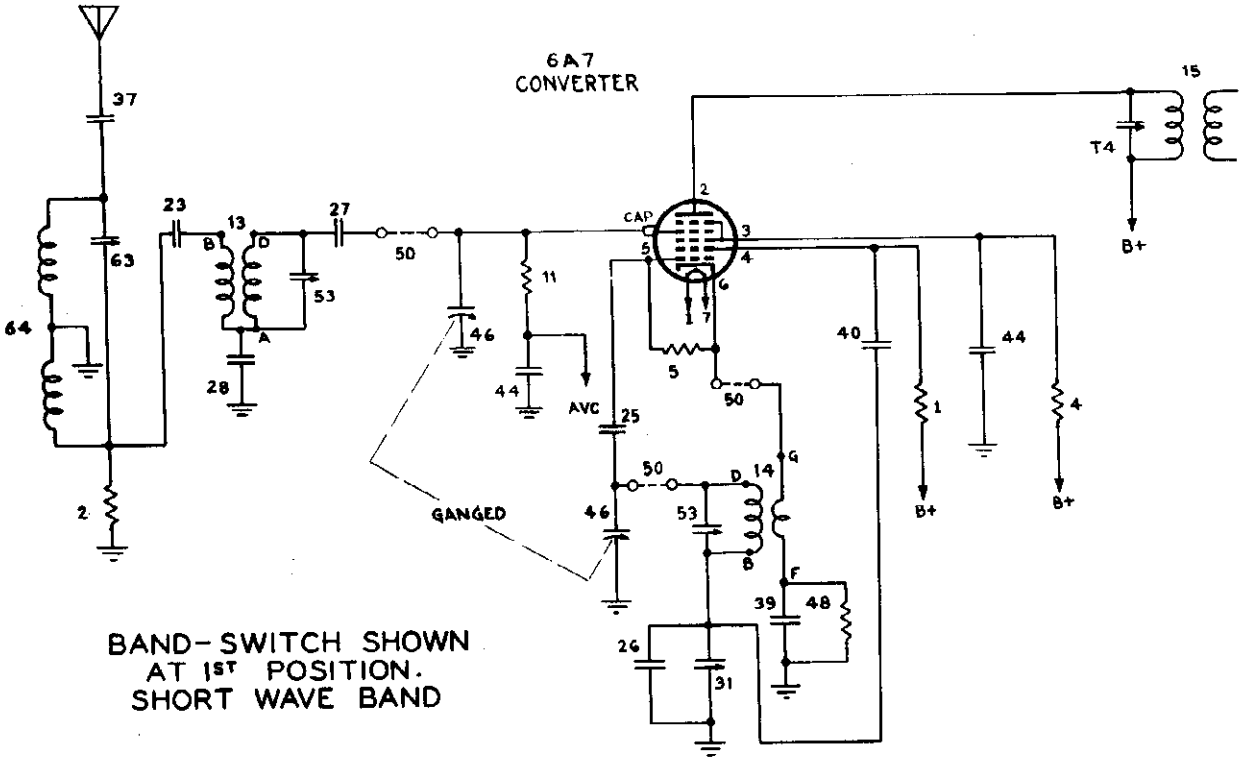
I.F. - 456 K.C.

5-11-36

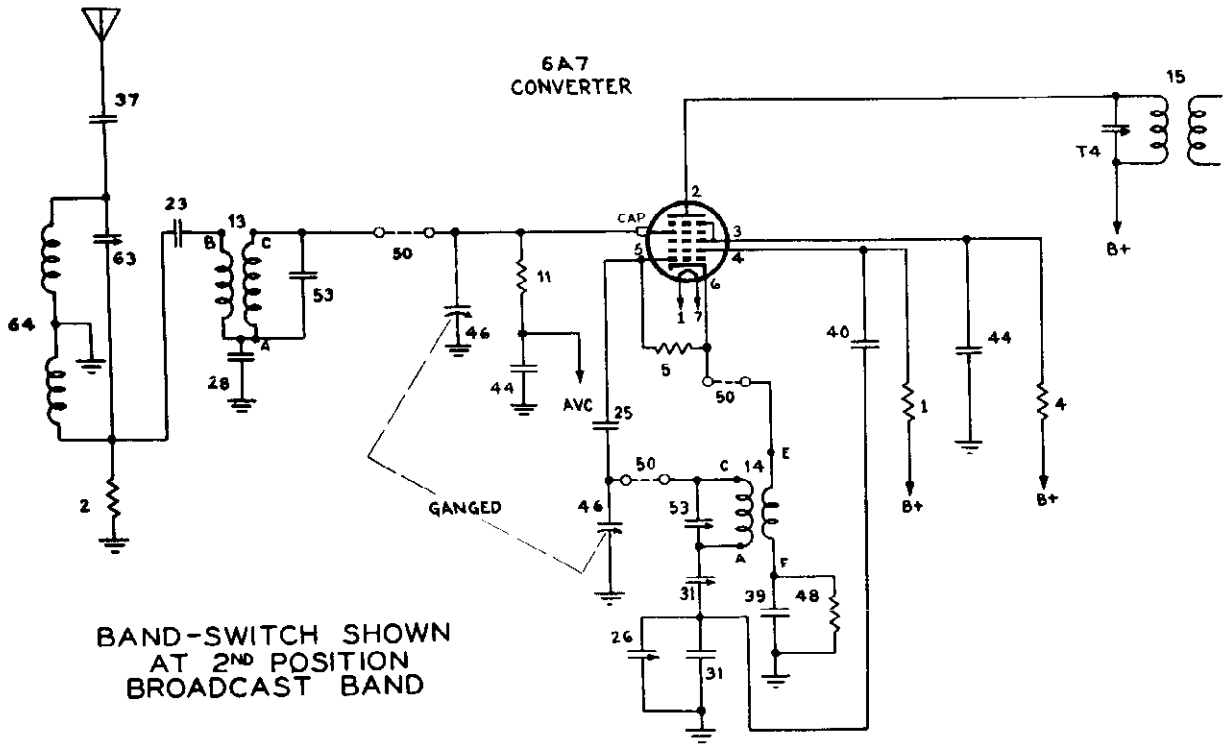
FADA RADIO & ELEC. CO. INC. MODEL 172

MODEL 172

FADA RADIO & ELEC. CO. INC.



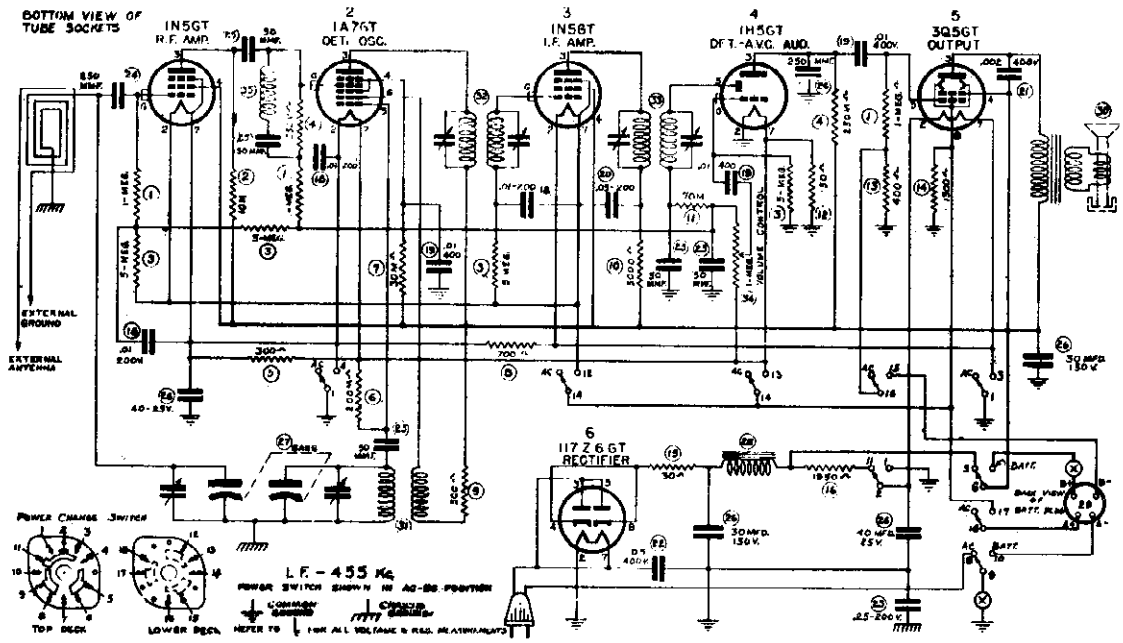
BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
BROADCAST BAND

FARNSWORTH TELEV. & RADIO CORP.

MODEL BT-6[illegible]



WATTS 30
VOLTAGE AT 117 VOLTS A.C. A.C. 105–125

Ref. No.	Old Part No.	New Part No.	DESCRIPTION	List Price
1	771-24	77218	1 Meg ½ Watt	$ .15
2	771-14	77212	10 M Ohms ½ Watt	.15
3	773-27	77272	4.7 Megs ½ Watt	.15
4	773-21	77216	220 M Ohms ½ Watt	.15
5	77-90	77260	330 Ohms ½ Watt	.15
6	77-89	77216	220 M Ohms ½ Watt	.15
7	77-85	77267	33 M ½ Watt	.15
8	77-83	77262	1000 Ohms ½ Watt	.15
9	77-94	77261	470 Ohms ½ Watt	.15
10	77-93	77211	4700 Ohms ½ Watt	.15
11	77-88	77214	100 M Ohms ½ Watt	.15
12	774-1	77234	150 Ohms ½ Watt Wire Wound	.15
13	77-81	77261	470 Ohms ½ Watt	.15
14	771-10	77263	1500 Ohms ½ Watt	.15
15	77-79	77257	33 Ohms ½ Watt	.15
16	77-86	77086	1950 Ohms 5 Watt	.50
17	253-2	25215	.1 Mfd. 600 V.	.15
18	25-94	25194	.01 Mfd. 600 V.	.15
19	255-1	25194	.01 Mfd. 600 V.	.15
20	256-1	25196	.05 Mfd. 600 V.	.15
21	255-4	25185	.002 Mfd. 600 V.	.15
22	255-2	25196	.05 Mfd. 600 V.	.25
23	256-3	25054	.25 Mfd. 200 V.	.25
24	253-2	25187	250 M. M. F. Mica	.15
25	253-5	25193	50 M. M. F. Mica	.15
26	25-61	25061	Elec. Condenser 2-30 Mfd.—150 V., 2-40 Mfd. 25 V.	1.60
27	26-64	26064	Gang Tuning Condenser	2.40
28	38-202	38202	Choke	.90
29	80-70	80070	Battery Plug	.10
30	81-70	81070	Speaker and Output Transformer	4.30
31	38-197	38197	Oscillator Coil	.50
32	38-199	38199	1st. I. F. Transformer	1.30
33	38-201	38201	2nd. I. F. Transformer	1.60
34	78-27	78027	Volume Control 1 Meg	1.10
35	38-198	38198	Wave Trap Coil	.45
	90-43	90043	Power Change Switch	1.50
	59-66	59066	Knobs	.15
	31-89	31089	Dial Scale	.20
	11-83	11083	Dial Pointer	.15
	27-137	27137	Line Cord	.35
	56-411	56411	Escutcheon	1.35

Prices subject to change without notice.

MODEL BT-68

FARNSWORTH TELEV. & RADIO CORP.

THIS SIX TUBE AC – DC OR FIVE TUBE BATTERY OPERATED PORTABLE RECEIVER HAS A BUILT IN LOOP ANTENNA. AN OUTSIDE ANTENNA MAY BE CONNECTED BY LOOSENING THE SCREW IN THE LOWER RIGHT HAND CORNER OF THE BACK COVER. A GROUND SHOULD BE CONNECTED TO THE SCREW IN THE LOWER LEFT HAND CORNER WHEN AN OUTSIDE ANTENNA IS USED.

ALIGNMENT

A SIGNAL GENERATOR CALIBRATED AT 455 Kc., 1400 Kc., AND 1730 Kc., IS NECESSARY TO PROPERLY ALIGN THIS RECEIVER. AFTER ALIGNING THE I.F. STAGES, REPLACE RECEIVER IN CABINET AND FASTEN LOOP IN NORMAL POSITION BEFORE ALIGNING THE R.F. END THROUGH THE OPENINGS IN THE END OF THE CABINET. THESE OPENINGS ARE CLOSED BY SNAP FASTENERS. THE OSCILLATOR TRIMMER IS NEAREST THE FRONT PANEL AND THE LOOP TRIMMER IS DIRECTLY BEHIND IT.

TABULATION FOR ALIGNMENT

STEPS	USE IN SERIES WITH GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	.02MFD IN EACH LEAD CONNECT HIGH SIDE OF GENERATOR TO GRID CAP OF 1A7G TUBE	455 Kc.	QUIET POINT	2ND I.F. TRIMMERS 1ST I.F. TRIMMERS	TOP OF I.F. TRANS.	MAXIMUM OUTPUT
2.	LOOP**	1730 Kc.	MINIMUM	OSCILLATOR TRIMMER*	SEE NOTE BELOW	
3.	LOOP**	1400 Kc.	1400 Kc. & ROCK GANG	LOOP TRIMMER*		

*SEE PRECEEDING PARAGRAPH FOR LOCATION OF TRIMMERS.

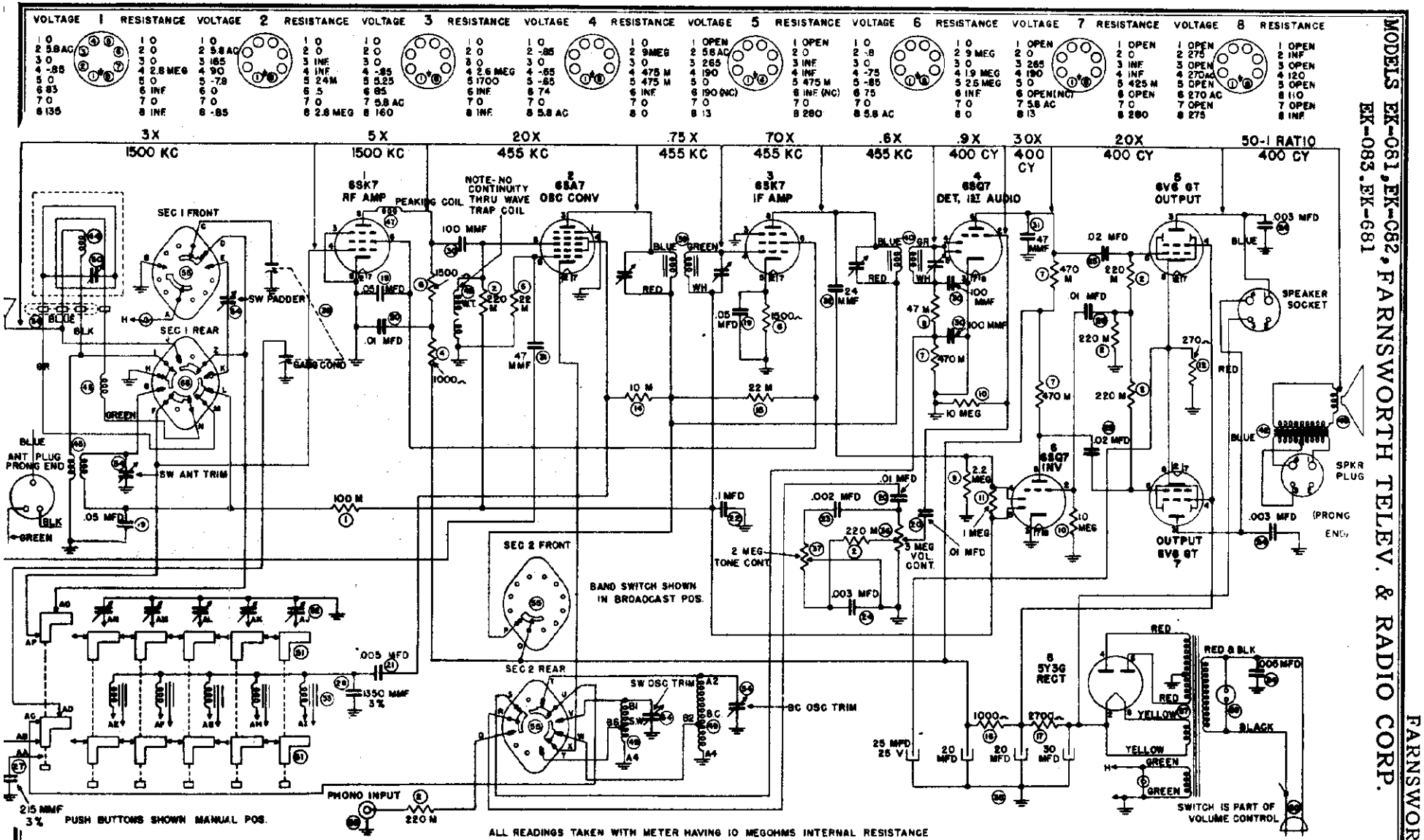
**LOOP TO CONSIST OF FIVE TO TEN TURNS OF INSULATED WIRE WOUND ON A THREE OR FOUR INCH FORM TO BE CLOSELY COUPLED TO THE LOOP ANTENNA IN THE RECEIVER.

SUGGESTED BATTERY 1 GENERAL 60A-4L 1 RAY-O-VAC AB-87
1 BURGESS 6FA-60

VOLTAGE AND RESISTANCE DATA

	1	2	3	4	5	6	7	8	Cap.
1 - 1N5GT									
Volts	open	4.2	97	100	0	16	2.8	open	1.8
Res.	open	61	3500	2500	0	6 meg.	40	open	1.5 meg.
2 - 1A7GT									
Volts	open	2.8	100	64	1.8	100	1.4	100	1.8
Res.	open	40	2500	2500	200M	2500	22	2500	1.5 meg.
3 - 1N5GT									
Volts	0	5.6	100	100	open	0	4.2	open	0
Res.	open	80	2500	2500	0	0	61	0	5 meg.
4 - 1H5GT									
Volts	open	0	47	0	0	47	1.4	open	0
Res.	open	0	1 meg.	0	1 meg.	1 meg.	22	open	5 meg.
5 - 3Q5GT									
Volts	open	8.4	93	100	0	open	5.6	9	
Res.	open	9.5	2500	2000	1 meg.	open	80	75	
6 - 117Z6GT									
Volts	open	117 AC	117 AC	123	117 AC	0	0	123	
Res.	open	500	500	2500	500	0	0	2500	

NOTES: On d-c voltage readings meter should have internal resistance of at least 10 megohms. Readings taken with no signal. Line voltage 117 V. A. C.



MODEL	CHASSIS
EK-081	C-156
EK-082	C-157
EK-083	C-193
EK-681	C-156

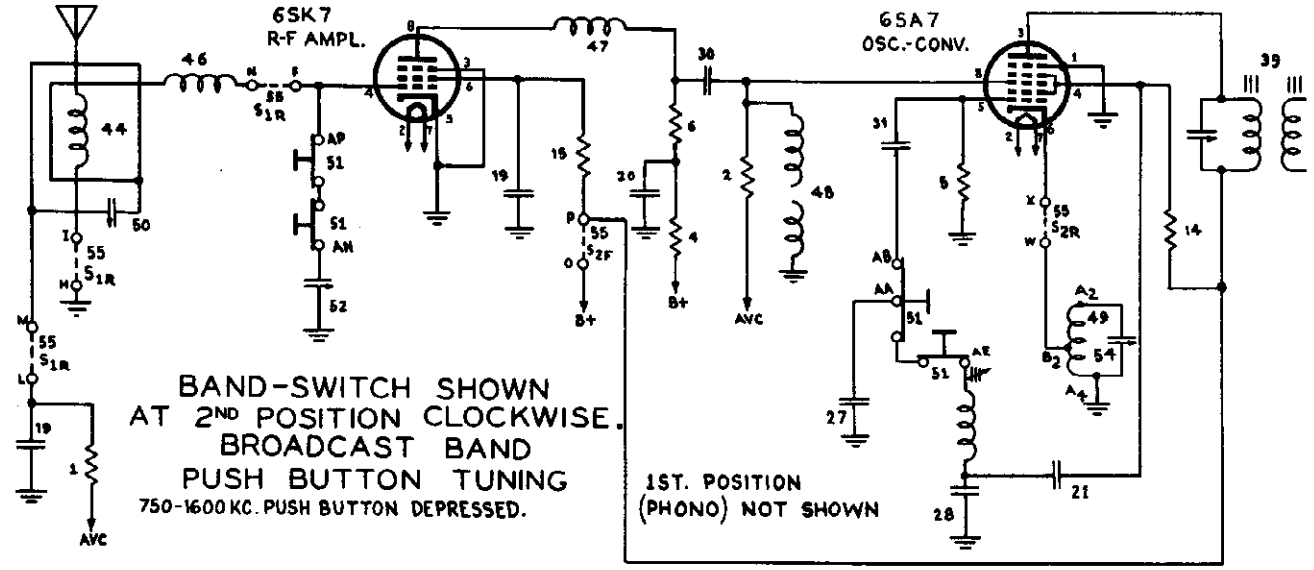
Eight Tube A. C. Two Band Superheterodyne

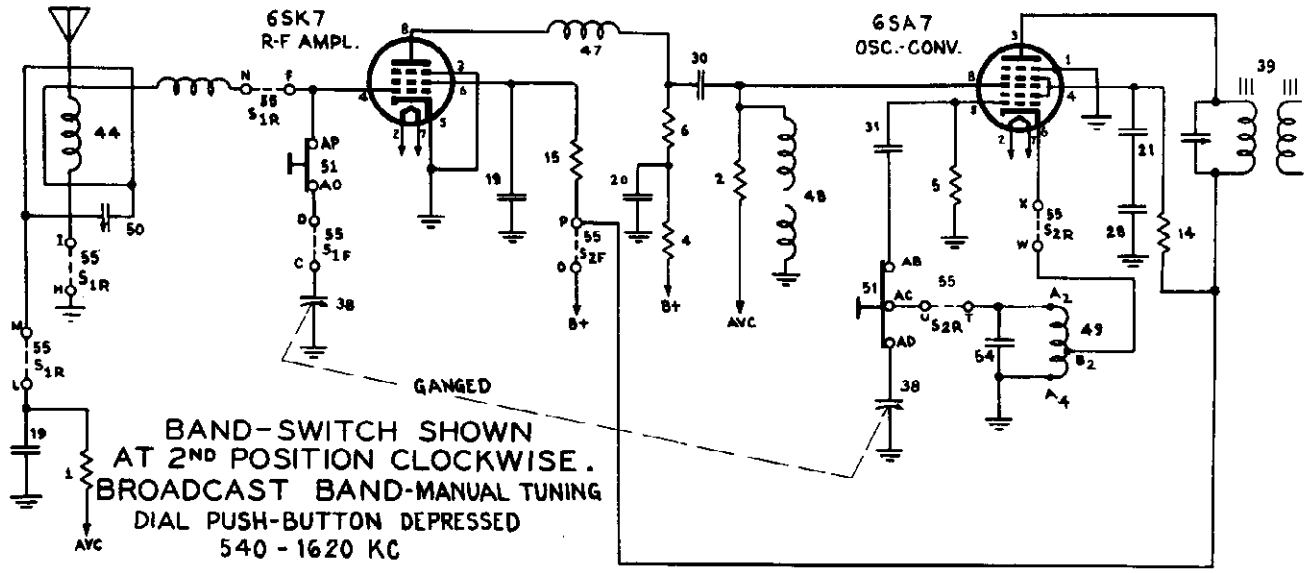
Broadcast Band	540 Kc.—1620 Kc.
Short Wave Band	9.4 Mc.—15.4 Mc.
Intermediate Frequency	455 Kc.

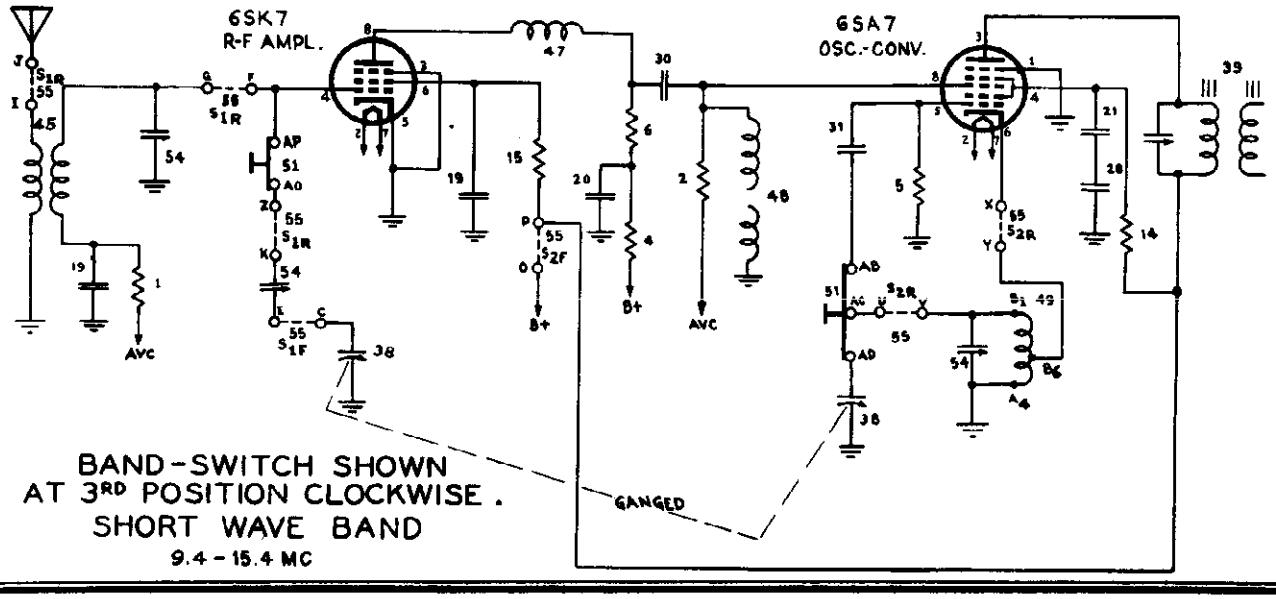
ELECTRICAL SPECIFICATIONS

Watts	At 117 Volts A.C.	90
Voltage	A. C.	105-125

MODELS EK-081, EK-082, FARNSWORTH TELEV. & RADIO CORP.
EK-083, EK-681







EQUIPMENT AND PROCEDURE FOR ALIGNMENT

To properly align this receiver, a signal generator calibrated at 455 Kc., 1000 Kc., 1500 Kc., 1620 Kc., 9.7 Mc., 15 Mc., and 15.4 Mc; and also an output indicator are required. All adjustments should be made with the volume control set for maximum volume, keeping the generator output as low as possible to prevent A.V.C. action and false readings.

The loop should be placed in the approximate position relative to chassis as when the chassis is installed in the cabinet.

Connect the low side of the generator to the ground (black) wire and the high side of the generator to the antenna (red) wire.

CAUTION—Tighten S.W. oscillator trimmer screw for maximum capacity, then unscrew to second peak. Two peaks are usually found on the S.W. oscillator trimmer—one at 16.3 Mc., and one at 15.4 Mc. The lower frequency (15.4 Mc.) is used.

STEPS	USE IN SERIES WITH ANTENNA		SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1	SET VOLUME CONTROL AT MAXIMUM						
2	250 MMFD.	I. F.	455 Kc.	MINIMUM	2nd. I.F. TRIMMERS	TOP 2nd. I.F. TRANS.	MAXIMUM OUTPUT
3					1st. I.F. TRIMMERS	TOP 1st. I.F. TRANS.	
4		BROAD-CAST	1620 Kc.	1620 Kc.	B.C. OSC. TRIMMER	See Chassis Layout	
5			1500 Kc.	1500 KC. Rock Gang	ANT. TRIMMER	ON LOOP	
6	SET POINTER AT 1000 Kc. AND CHECK POINTER CALIBRATION						
7	400 Ohms	SHORT WAVE	15.4 Mc.	MINIMUM	S.W. OSC. TRIMMER**	See Chassis Layout	
8			15 Mc.	15 Mc. Rock Gang	S.W. ANT. TRIMMER		
9			9.7 Mc.	9.7 Mc. Rock Gang	S.W. ANT. PADDER		
10	RECHECK 15.4 Mc.						

**See Caution above.

PUSH BUTTON SET UP

A Signal Generator should be used to prevent buttons being set up on wrong stations.

1. Remove the button escutcheon, exposing five pairs of adjusting screws. The small screw adjusts the oscillator and the large screw adjusts the antenna. (See PUSH BUTTON LAYOUT.)

2. Select the pair of adjustment screws covering the frequency of a wanted station.

3. Press the "Dial" button and manually tune in the desred station frequency.

4. Press the button selected for this frequency.

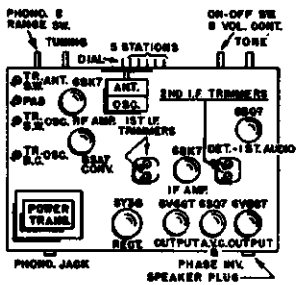
5. Adjust the lower screw of the pair selected for this frequency until the signal is heard most clearly.

6. Adjust the upper screw of the same pair until maximum volume is secured.

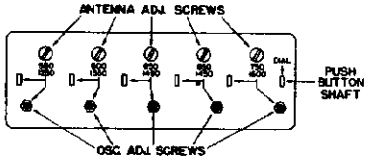
7. Press dial button, making certain original frequency is still tuned-in; check results on button just set up. If it is the same, proceed with the next button, until all are set up.

8. Recheck settings and correct any drift due to interaction between adjacent coils.

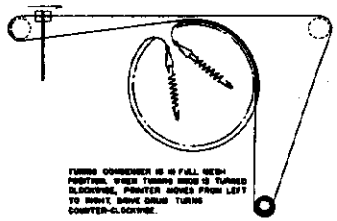
CHASSIS LAYOUT



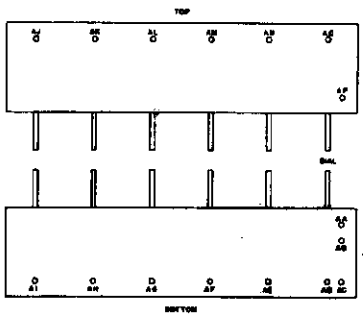
PUSH BUTTON LAYOUT



DIAL STRINGING



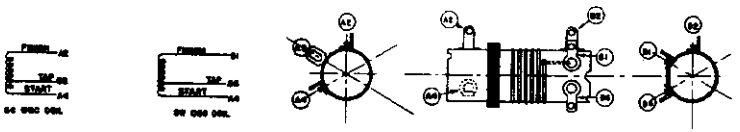
PUSH BUTTON TUNER SWITCH



Refer. No.	Part No.	DESCRIPTION
1	77214	100 M Ohms
2	77216	220 M Ohms
4	77262	1000 Ohm
5	77266	22 M Ohms
6	77283	1500 Ohm
7	77217	470 M Ohms
8	77213	47 M Ohms
9	77270	2.2 Megohm
10	77274	10 Megohm
11	77218	1 Megohm
12	77189	270 Ohm 2 Watt
14	77013	10 M Ohms 2 Watt
15	77069	22 M Ohms 1 Watt
16	77304	1000 Ohm 2 Watt
17	77243	2700 Ohm 4.7 Watt Molded
19	25196	.05 Mfd. Tubular 600 Volts
20	25194	.01 Mfd. Tubular 600 Volts
21	25183	.005 Mfd. Tubular 600 Volts
22	25215	.1 Mfd. Tubular 600 Volts
23	25185	.002 Mfd. Tubular 600 Volts
24	25184	.003 Mfd. Tubular 600 Volts
25	25195	.02 Mfd. Tubular 600 Volts
27	25212	215 Mmf. Silver Mica Capacitor
28	25213	1350 Mmf. Silver Mica Capacitor
30	25188	100 Mmf. Mica
31	25193	47 Mmf. Mica
32	25192	24 Mmf. Mica
34	25031	.005 Buffer 600 Volts
35	25214	Electrolytic Capacitor 20-20-30-450 Volts: 25-25 Volts
36	78057	Volume Control
37	78072	Tone Control
38	26194	Gang Capacitor
39	38485	1st. I. F. Transformer
40	38486	2nd. I. F. Transformer
42	94195	Output Transformer
43	81126	Speaker
44	38546	Loop Antenna
45	38542	Short Wave Antenna Coil
46	38794	Antenna Loading Coil
47	38544	Peaking Coil
48	38484	Wave Trap
49	38543	S.W. and B.C. Oscillator Coil Ass'y
50	26032	Antenna Trimmer
51	90118	Push Button Switch
52	26175	P. B. Trimmer Strip
53	38405	P. B. Coil Strip
54	26195	Trimmer Strip
55	90175	Band Switch
58	80252	Antenna Plug
56	80256	Antenna Socket
57	94104	60 Cycle Power Transformer
57	94224	50 Cycle Power Transformer for 681 COY
58	80030	Phono Input Socket
59	11210	Phono A.C. Cord and Socket
60	27118	Universal Line Cord
	80239	Rectifier Octal Socket
	80139	Molded Octal Socket
	22147	Phono Pickup Cable for EK-081 and EK-083
	22146	Phono Pickup Cable for EK-082
	31273	Glass Dial
	04055	Dial Background
	561397	Escutcheon
	07373	Dial Pointer
	59134	Knob
	42185	Dial Lamp (Mazda 44) 6 V., 250 Ma.
	41106	Drive Cord (42" Long) and springs
	17019	Drive Drum
	59249	Push Button Escutcheon
	59030	Push Button
	41101	Station Call Letter Tabs
	71223	Phono Needle
	H-224	Cabinet and Packing for EK-081
	H-225	Cabinet and Packing for EK-082
	H-267	Cabinet and Packing for EK-083

The Service Department policy is to furnish ½ watt 5% carbon resistors tubular condensers.

BROADCAST AND S. W. OSC. COILS



MODELS GK-140.
GK-141,
GK-142,GK-143,GK-144,
Preliminary

FARNSWORTH TELEV. & RADIO CORP.

FM GAIN MEASUREMENTS

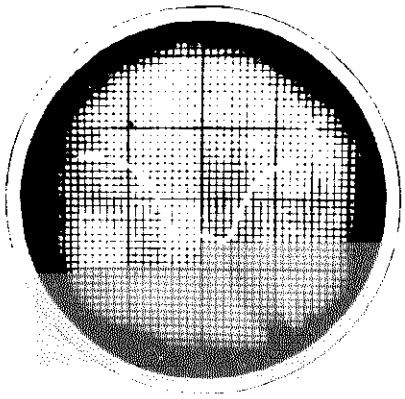
EQUIPMENT REQUIRED

FM Signal Generator, modulated at 400 cycles, 22.5 Kc deviation.

Output Meter.

Output meter connected across secondary of output transformer, 4 ohms impedance. Signal generator connected at gang capacitor. Volume control, Bass control and Treble control at maximum.

SIGNAL GENERATOR TO	DUMMY	MICROVOLTS INPUT	OUTPUT	GAIN
Ant.	330 ohms	20	.5 watt	1.5X
RF	.1 Mfd.	30	.5 watt	4.33X
Conv. Grid	.1 Mfd.	130	.5 watt	



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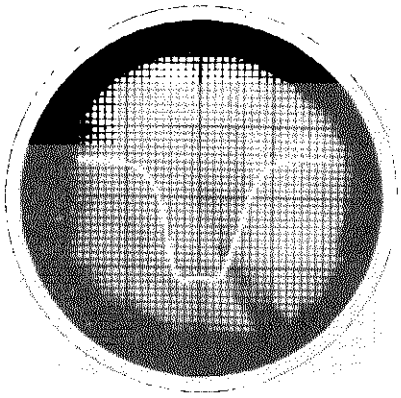
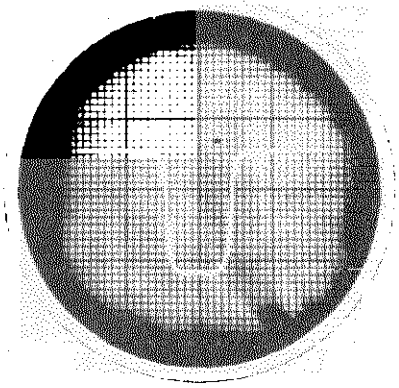


(2)

F-M

ALIGNMENT

OSCILLOGRAMS



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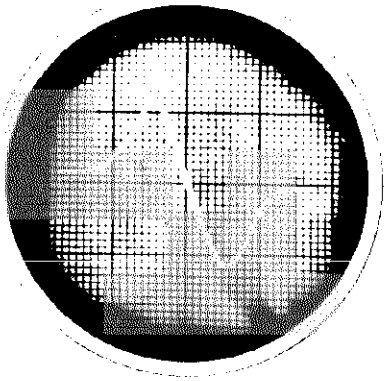
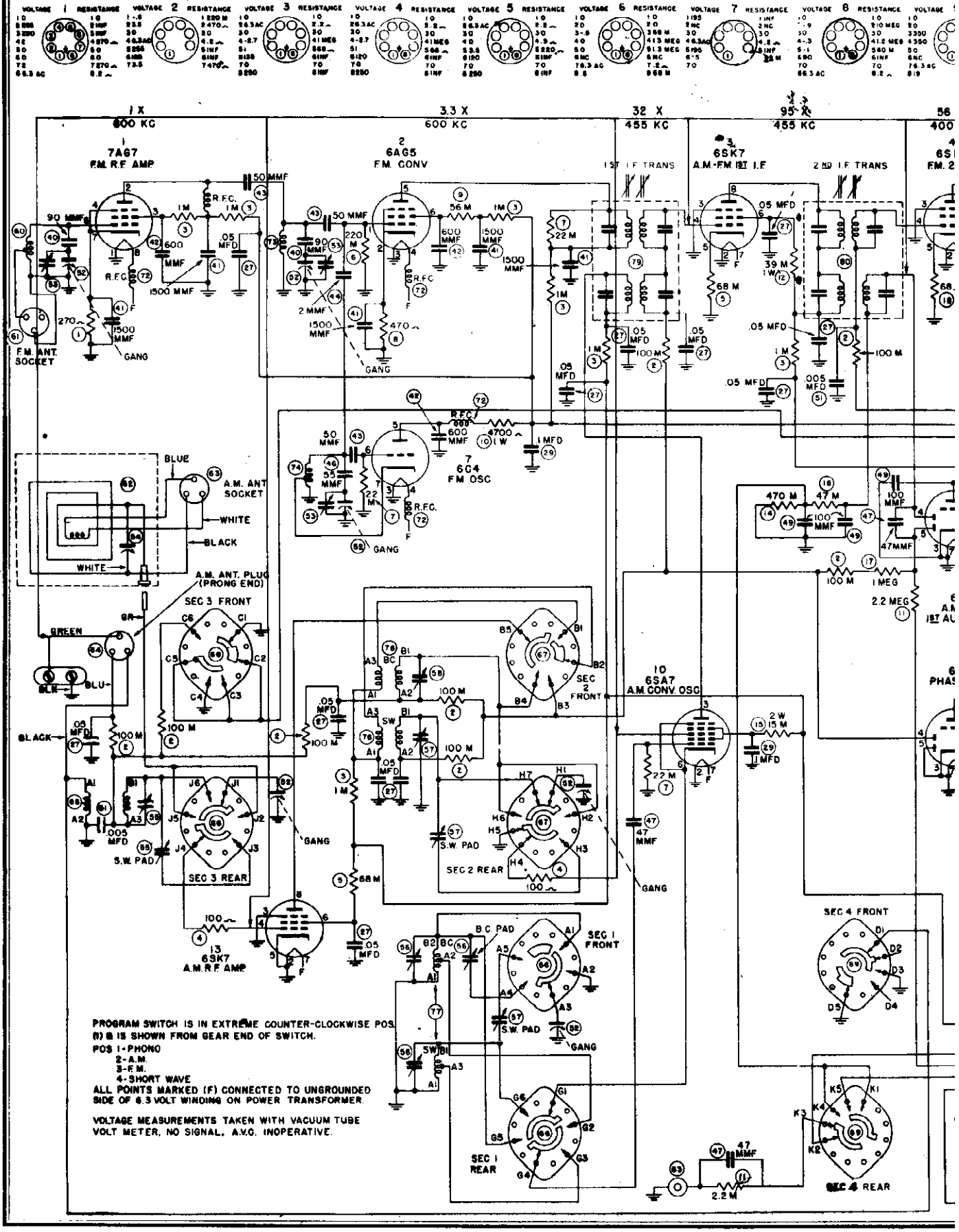


(4)

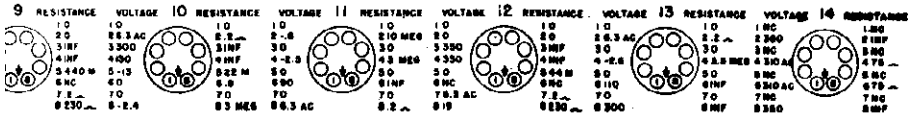
These curves were obtained under ideal conditions and show curves to be expected. They should be duplicated as nearly as practicable.

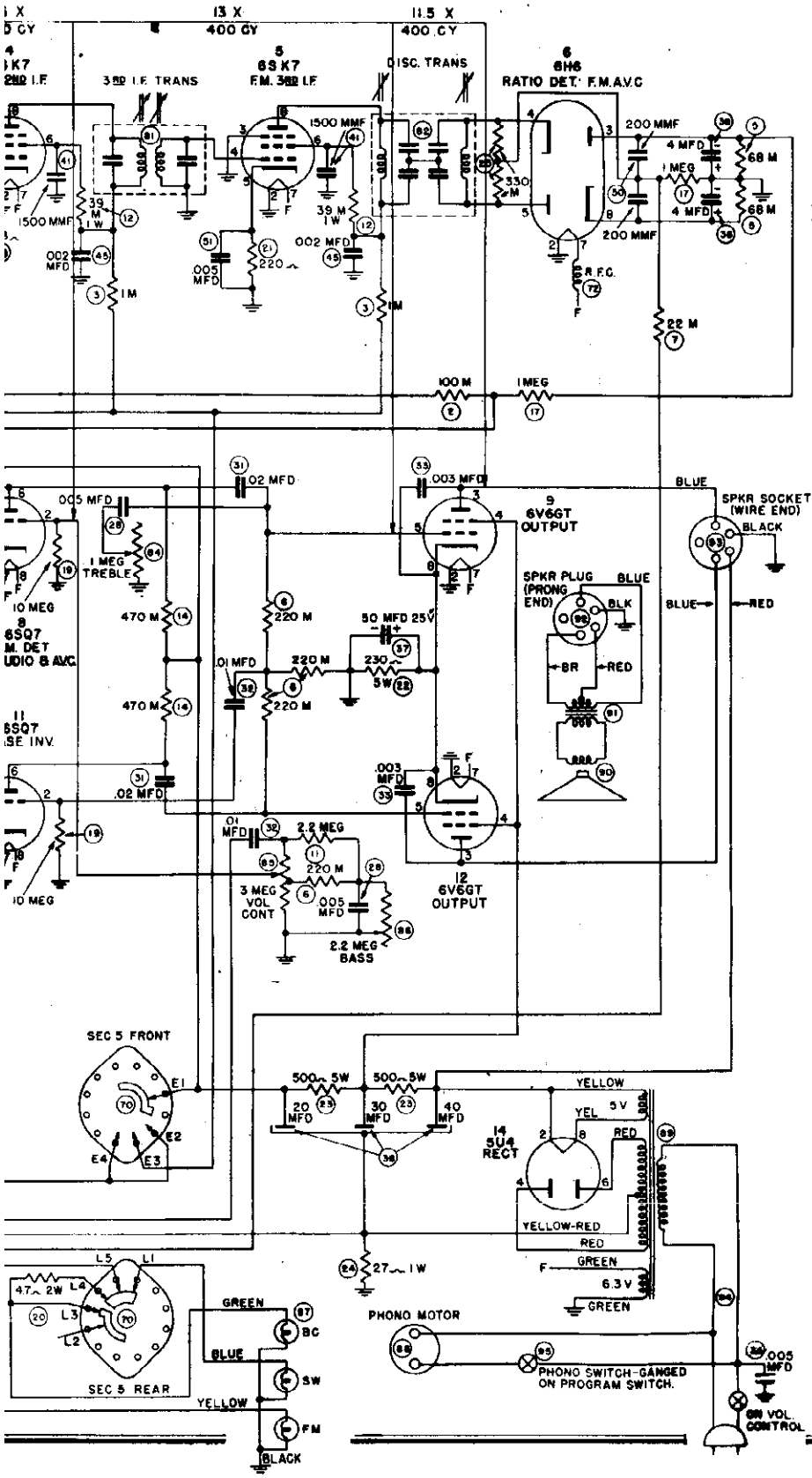
FARNSWORTH TELEV & RADIO CORP.

GK-140, GK-1
GK-142, GK-143, GK-1
Prelimins

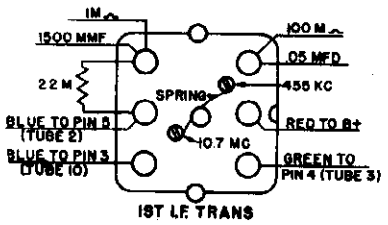

1 X
600 KC
3.3 X
600 KC
32 X
455 KC
95 X
455 KC
1
7AG7
F.M. R.F. AMP
2
6AG5
F.M. CONV
1ST I.F. TRANS
3
6SK7
A.M.-F.M. 1ST I.F.
2ND I.F. TRANS
7
6C4
F.M. OSC
10
6SA7
A.M. CONV. OSC
13
6SK7
A.M. R.F. AMP
F.M. ANT. SOCKET
A.M. ANT. SOCKET
A.M. ANT. PLUG (PRONG END)
GANG
S.W. PAD
B.C. PAD
SEC 1 FRONT
SEC 1 REAR
SEC 2 FRONT
SEC 2 REAR
SEC 3 FRONT
SEC 3 REAR
SEC 4 FRONT
SEC 4 REAR
PROGRAM SWITCH IS IN EXTREME COUNTER-CLOCKWISE POS.
(1) B IS SHOWN FROM GEAR END OF SWITCH.
POS 1 - PHONO
2 - A.M.
3 - F.M.
4 - SHORT WAVE
ALL POINTS MARKED (F) CONNECTED TO UNGROUNDED SIDE OF 6.3 VOLT WINDING ON POWER TRANSFORMER.
VOLTAGE MEASUREMENTS TAKEN WITH VACUUM TUBE VOLT METER, NO SIGNAL, A.V.C. INOPERATIVE.

MODELS GK-140, GK-141,
GK-142, GK-143, GK-144,
Preliminary

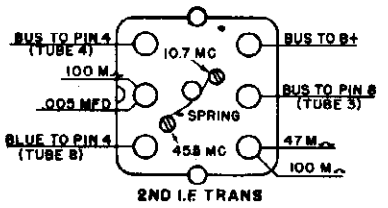




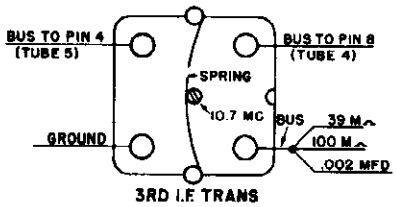
BOTTOM VIEW OF I.F. CANS



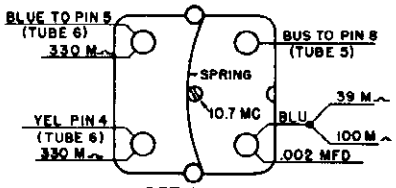
1ST I.F. TRANS



2ND I.F. TRANS



3RD I.F. TRANS



DET. TRANS

TABULATION FOR AM ALIGNMENT

STEPS	CONNECT GENERATOR		SET GENERATOR AT	SET GANG AT	ADJUST	TO OBTAIN
1	Set Tone and Volume Controls at Maximum					
2	Through .1 Mfd.	Grid Conv. tube	455 Kc	Quiet Point	2nd. I.F. Slugs	MAXIMUM OUTPUT
3					1st. I.F. Slugs	
4	Through .1 Mfd.	RF of GANG	1500 Kc	1500 Kc	BC Osc. Trimmer	
5					BC Mixer Trimmer	
6			600 Kc	600 Kc	Osc. Padder *	
7	Check dial calibration at several frequencies. If not reasonably correct, adjust oscillator padder. See Note 1					
8	#	Ext. Ant. Binding Post	1500 Kc	1500 Kc	Loop Trimmer	

#Through RMA dummy antenna.

* This adjustment should be made while gang is rocked.

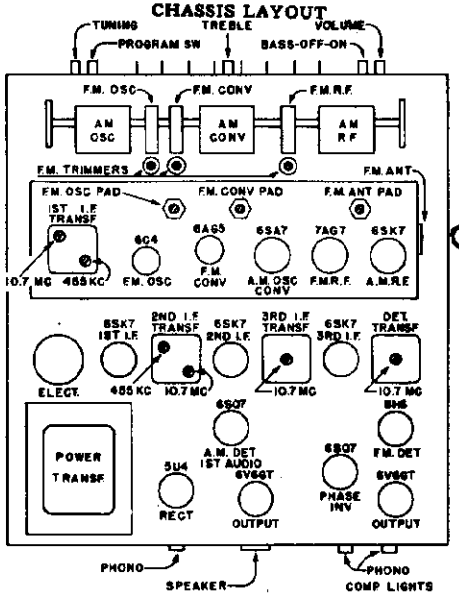
SHORT WAVE RF

9	Place Band Switch in Short Wave position.					
10	Through 400 ohm resistor	External Antenna	15 MC	15 MC	SW Osc. Trimmer See Note 2	MAXIMUM OUTPUT
11				Image at 15.91 MC	SW Conv. Trimmer	
12					SW Ant. Trimmer	
13			9.4 MC	9.4 MC	SW Osc. Padder	
14				Image at 10.31 MC	SW Conv. Padder	
15					SW Ant. Padder	
16	Recheck Steps 10 to 15 inclusive.					

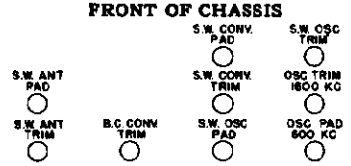
NOTE 1. After any adjustment of oscillator padder, repeat steps 4, 5 and 6.

NOTE 2. Set oscillator trimmer to maximum capacity, then slowly loosen trimmer until 2nd signal is heard.

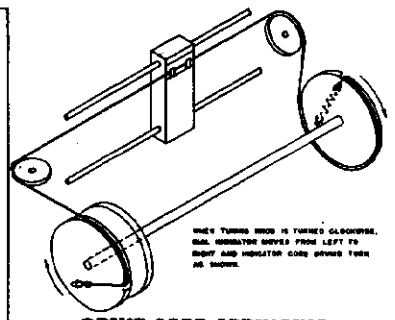
CHASSIS LAYOUT



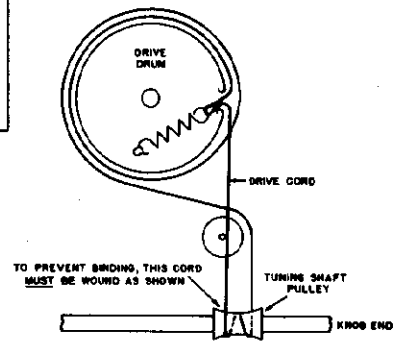
FRONT OF CHASSIS



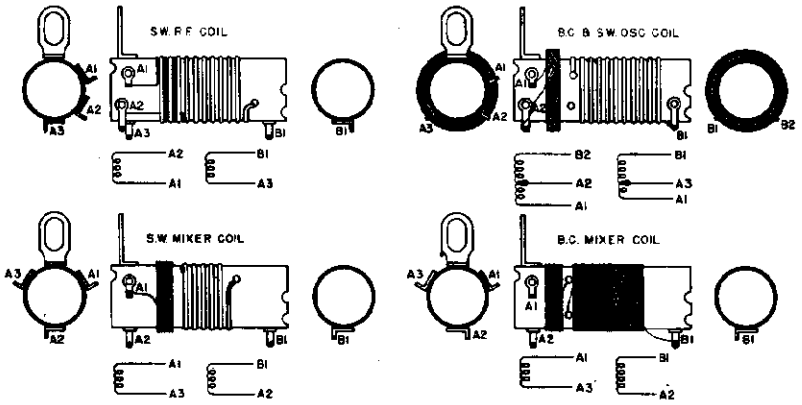
DIAL POINTER STRINGING



DRIVE CORD STRINGING



RF, OSCILLATOR AND MIXER COILS



SETTING STATION TUNING BUTTONS

Allow the set to warm up for about one-half hour before beginning to set the push buttons.

Make a list of the eight stations to be set up.

Move the program switch to proper band for the station to be set-up.

Select a push button for this station.

Remove the push button, exposing the push button lock screw.

Loosen this lock screw with a screw driver. Tune in the desired station with the manual tuning knob.

Push the push button shaft all the way in with the screw driver engaged in the slot in the lockscrew. Firmly tighten the push button locking screw.

CAUTION—Do not use a large handle screw driver as damage may result. We recommend type of screw driver used for knob setscrew.

Continue setting each button the same way.

After all the stations are set up, replace the push buttons and place the station call letter tab found in the call letter kit on the proper button.

CAUTION

When setting up push buttons it is well to select a time when the stations are not carrying "Chain" programs as adjustments might be made on the wrong stations.

Alignment of AM Bands

EQUIPMENT REQUIRED

A calibrated signal generator having fundamental frequencies from 455 Kc to 15 MC. In addition to the signal generator a crystal calibrator is a great convenience.

The indicating device for showing correct alignment may be a high resistance A.C. voltmeter, a vacuum tube voltmeter or a Cathode Ray oscilloscope.

The A.C. voltmeter can be used either across the voice coil of the loud speaker or if the meter range is high enough, from plate to plate in the output stage (don't forget a condenser (0.1 Mfd.) to keep the D.C. out of the meter).

Special care must be employed when aligning the short wave band, for the adjustment of the shunt trimmer affects the adjustment of the series pad. At the high frequency end of the band it is possible to peak the oscillator trimmer (and the pad at the low frequency end) at the image so in the alignment instructions we have indicated the fundamental frequency and the correct oscillator setting for the image so by resetting the signal generator it is possible to see if the alignment is correctly made. In each case, the image is found at a frequency 910 Kc. higher than the fundamental.

Oscilloscope Alignment FM Band

FM IF ALIGNMENT

1. Equipment Required: Oscilloscope, 10.7 MC sweep generator, voltomyst, and RF signal generator.
2. Set band switch in FM position.
3. Make connection from vertical deflection amplifier of oscilloscope to pin #3 of 6H6 discriminator tube. Make certain that the 4MFD electrolytic condenser is disconnected from this same circuit. It is necessary that the lead to the oscilloscope be shielded, of low total capacity, and connection to receiver isolated by means of a 1 meg resistor.
4. Connect sweep generator to last FM IF grid through a .1 MFD coupling capacitor.
5. Load primary of discriminator transformer with resistor of approximately 39000 ohms. Back out secondary slug (top slug) as far as it will turn. Align primary (bottom slug) to obtain curve similar to figure 1. This does not constitute a final alignment of discriminator, but is a convenient expedient to assist in I.F. alignment.
6. Shift connection of sweep signal generator to the grid of the second FM IF tube.
   NOTE: As alignment moves from stage to stage, reduce input instead of reducing oscilloscope gain.
7. Align third FM IF transformer for a symmetrical flat top pattern. (Fig. 2).
8. Shift signal generator to the grid of the first IF tube.
9. Align second IF transformer in same manner as described in Section 7.
   Note that the width of the nose of the curve is the same as before, but the sides have become steeper, as in Fig. 3.
10. Connect the signal generator to the grid of the converter tube grid in series with 10,000 ohm resistor and a .1MFD capacitor, or loosely couple by stray capacity of an insulated wire.
11. Align first FM IF transformer in the same manner as in Section 7.
    Note that the sides of the curve have further steepened, but that the nose of the curve has retained approximately the same width as in Fig. 3.
12. Connect 4 MFD electrolytic capacitor that was previously disconnected, and take off load resistor on discriminator primary.
13. Connect oscilloscope to audio output terminal of discriminator. There are several points where contact can be made and can be identified as the circuit connected to the terminal on the terminal board (nearest the discriminator transformer) to which the shielded lead is connected.
14. With sweep signal input to converter grid, align discriminator transformer for conventional discriminator pattern, as in Fig. 4.
15. Connect signal generator to converter tube grid through .1MFD capacitor. An unmodulated signal input of 65 microvolts at 10.7 Mc should develop .55 volt rise on the AVC line with voltohmyst connected to AVC line through 1 megohm resistor.

Alternate FM IF Alignment Procedure

Equipment necessary: RF Signal Generator and Vacuum tube voltmeter.

1. Connect V.T.V.M. from ground to audio lead of ratio detector (discriminator). Connect generator tuned to 10.7 mc. to grid of third FM IF tube through 0.1MFD capacity. Use minimum signal necessary for good indication in all following:
2. Turn secondary slug of ratio detector transformer (top slug) out as far as it will turn.
3. Tune primary for maximum output.
4. Connect generator to grid of second FM IF tube.
5. Tune primary and secondary of third FM IF transformer for maximum output.
6. Connect generator to grid of first FM IF tube.
7. Tune primary and secondary of second FM IF transformer for maximum output.
8. Connect generator to converter grid through 10,000 ohm resistor and 0.1 MFD capacitor.
9. Tune primary and secondary of first FM IF transformer for maximum output.
10. Tune secondary of ratio detector transformer for zero or minimum output.
11. The FM IF system should now be aligned. Tuning the signal generator equal amounts on each side 10.7 mc should produce equal deflections of opposite polarity on the VTVM. Deflections unequal by more than 10 per cent or so indicate inaccurate alignment.

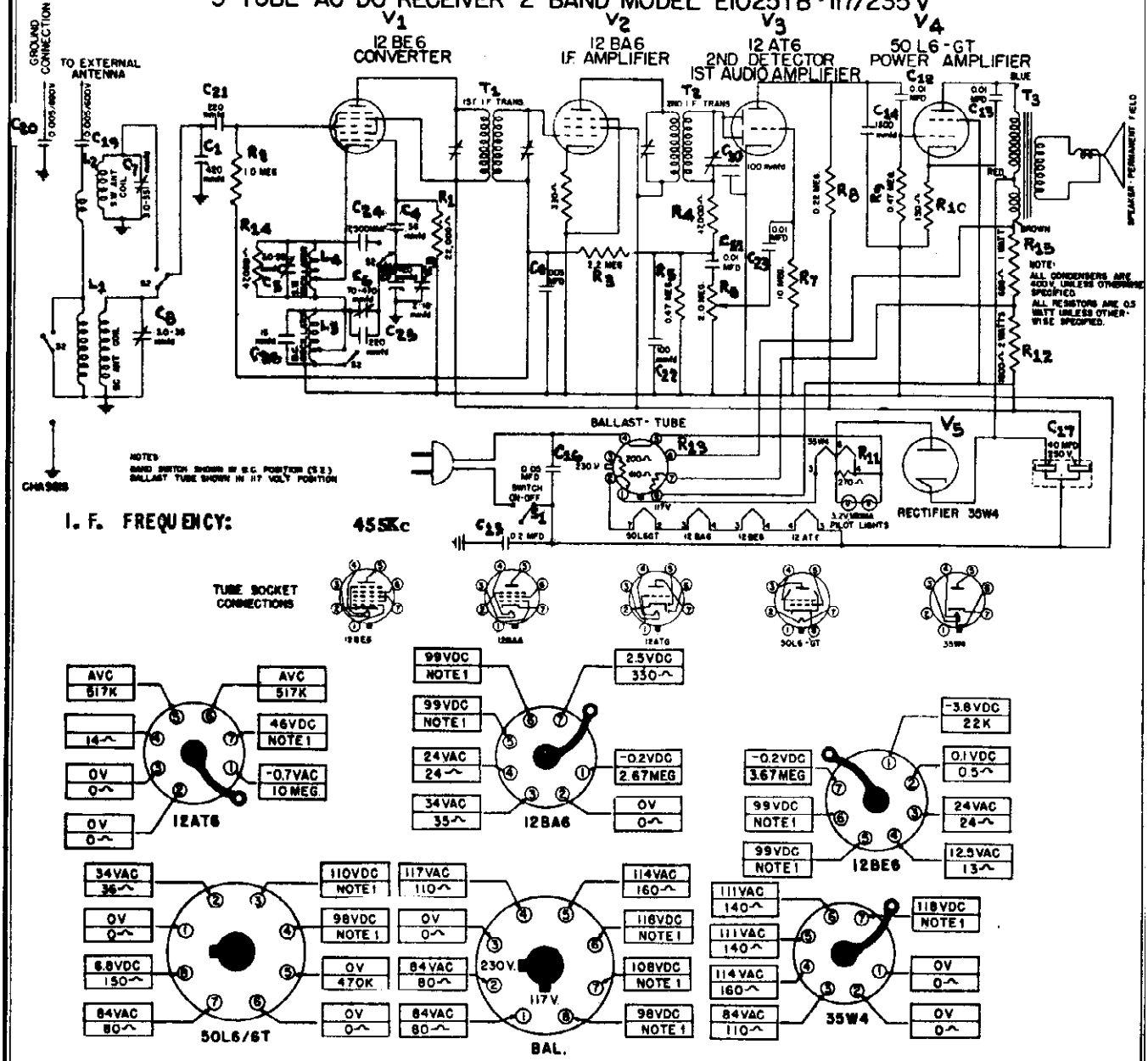
FM RF Alignment

1. Equipment Required:
   a. RF Signal Generator. Range 88 to 108 MC.
   b. Output Meter.
   c. Insulated Screw Driver.
2. Connect RF signal generator in series with 400 ohm carbon resistor to "high" side of FM antenna socket. Connect output meter across voice coil of speaker.
3. Set tuning control for pointer to calibrate at the equivalent of half way between channels 300 and 301.
4. Apply 108 MC Signal.
5. Set converter and antenna trimmers at minimum capacity.
6. Adjust oscillator trimmer by tuning from maximum capacity to first signal that is heard, and peak for maximum output.
7. Adjust antenna and converter trimmers for maximum output.
8. Set tuning controls so dial pointer calibrates at the equivalent of half way between channels 200 and 201.
9. Apply 88 MC signal.
10. Adjust oscillator, converter, and antenna slugs to maximum output.
11. Repeat operations 3 to 10 inclusive.
    NOTE: The degree of adjustment required in the tuning of the oscillator slug will determine the number of times operations 3 to 10 must be repeated until no further gain in sensitivity is obtained.
12. Carefully tune across the entire FM band for the observance of the dead or weak spots that may be a resultant of improper alignment or defective components. This can be determined by carefully noting the degree of receiver noise, that is, high noise generally is accompanied by good sensitivity.

FEDERAL TEL. & RADIO CORP.

POWER OUTPUT RATING:	For 105-125 v. operation: Undistorted 1.1 watts; maximum 1.5 watts. For 210-250 v. operation: undistorted 1.9 watts; maximum 2.8 watts.
VOICE COIL IMPEDANCE:	3.2 ohms at 400 cycles.
POWER REQUIREMENTS:	30 Watts at 105-125 volts 50-60 cycles AC, or 105-125 volts DC. 60 Watts at 210-250 volts, 50-60 cycles AC, or 210-250 volts DC.
TUNING RANGES:	Broadcast Band 540-1600 kilocycles (555-188 m) International Short Wave Band 6-18 megacycles (50-16.65 m).
ANTENNA:	External.

5 TUBE AC-DC RECEIVER-2 BAND-MODEL E1025TB-117/235V

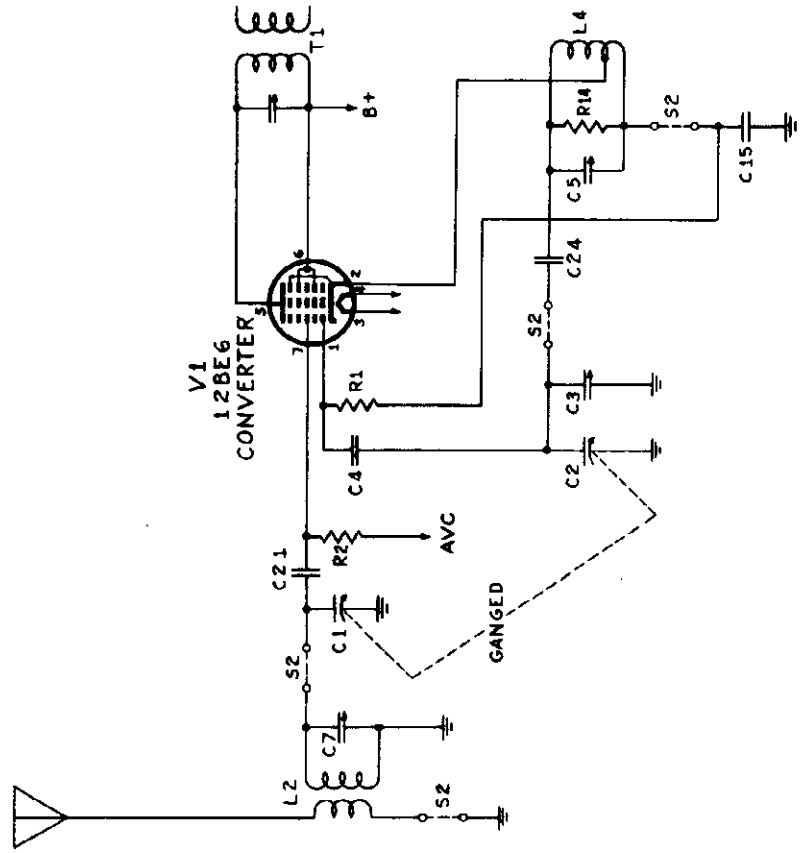


NOTE 1: RESISTANCE READINGS AT THESE POINTS WILL VARY SINCE THEY ARE IN SERIES WITH THE LEAKAGE RESISTANCE OF THE ELECTROLYTIC CONDENSERS WHICH IS SUBJECT TO CHANGE.

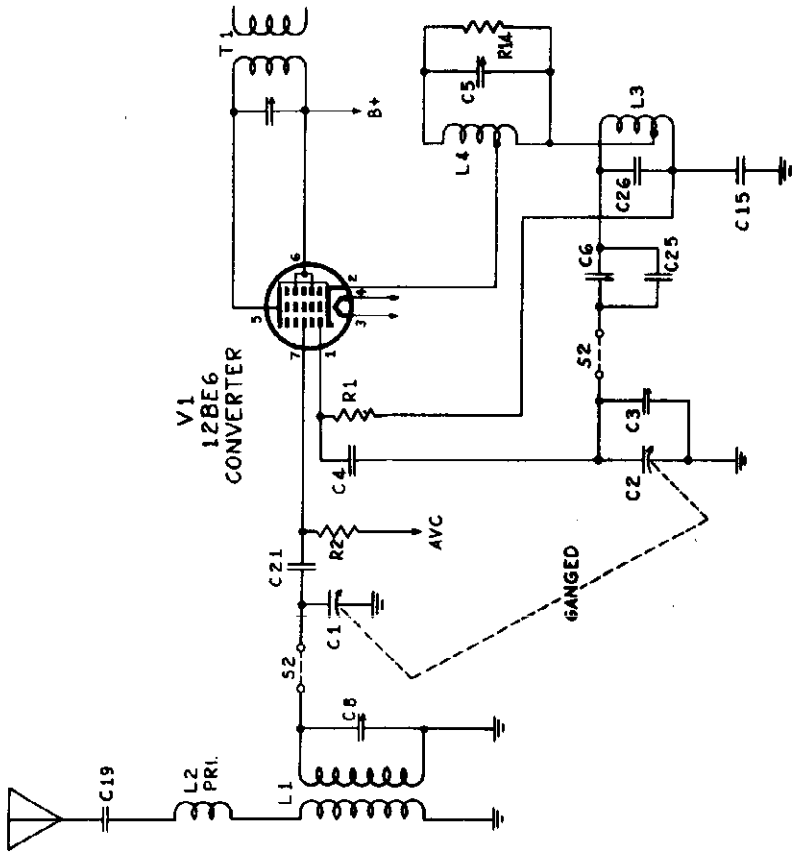
Voltage and Resistance Analysis Chart

Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to changes.
All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. Ac measurements taken at 1000 ohms per volt.
Measured values are from socket pin to circuit ground (pin #3 of 12AT6 socket).
Tolerances of component values make possible a variation of 20% in readings indicated in chart.
Socket connections are shown as bottom views.

FEDERAL TEL. & RADIO CORP.



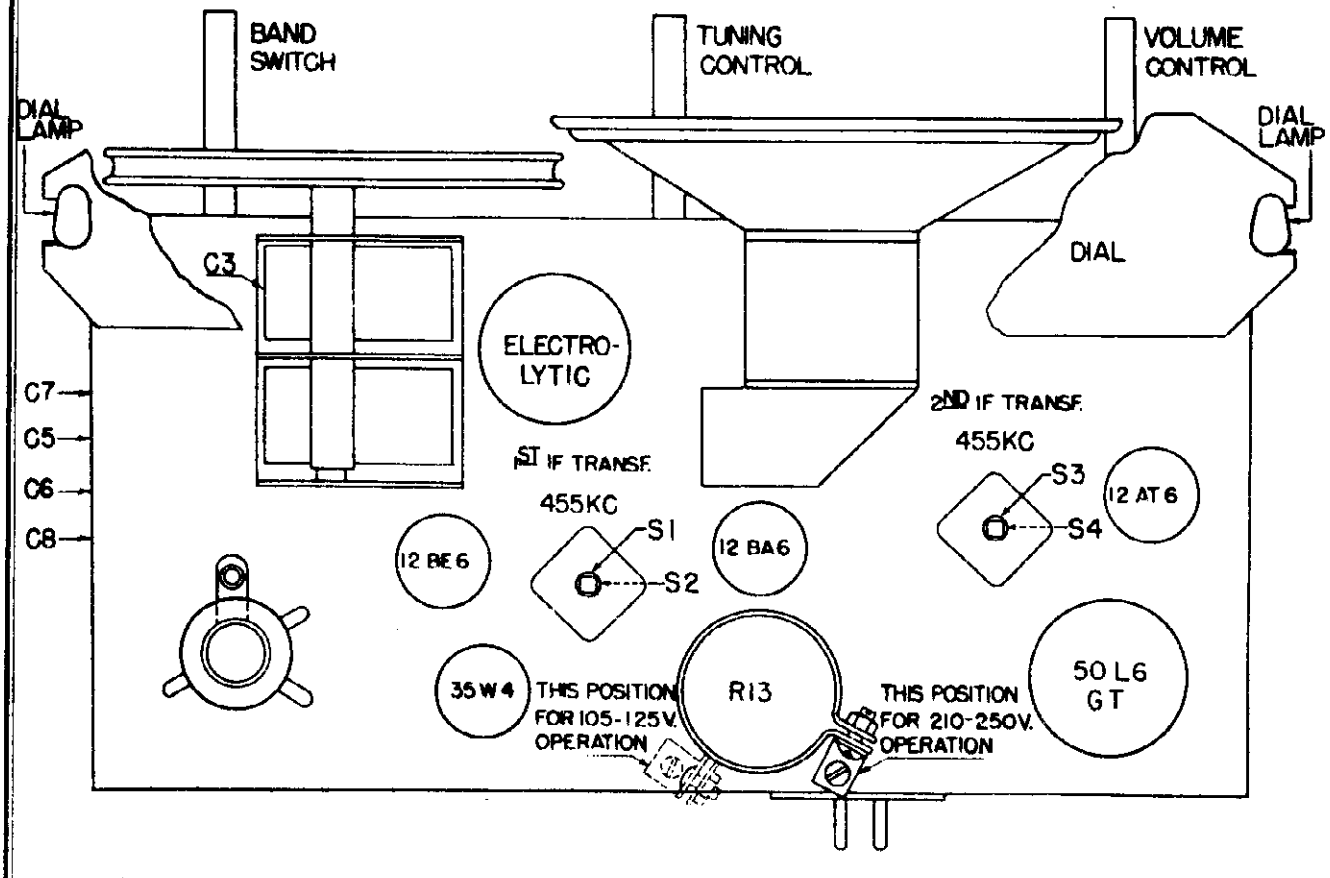
BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
6-18 MC.



BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1600 KC.

ALIGNMENT INSTRUCTIONS

Punch marks are provided on the dial back plate at 600 Kc, 900 Kc, 1500 Kc and 1600 Kc for alignment purposes.
With tuning condenser fully open, set dial pointer to the 1600 Kc punch mark.
Connect output meter across voice coil terminals on speaker frame.
Connect low side of signal generator lead through a .1 mfd coupling condenser to chassis ground.
Connect high side of generator through proper dummy antenna to external antenna lead.
Keep signal generator output at lowest practical level and make the following adjustments for maximum output meter reading in each case.



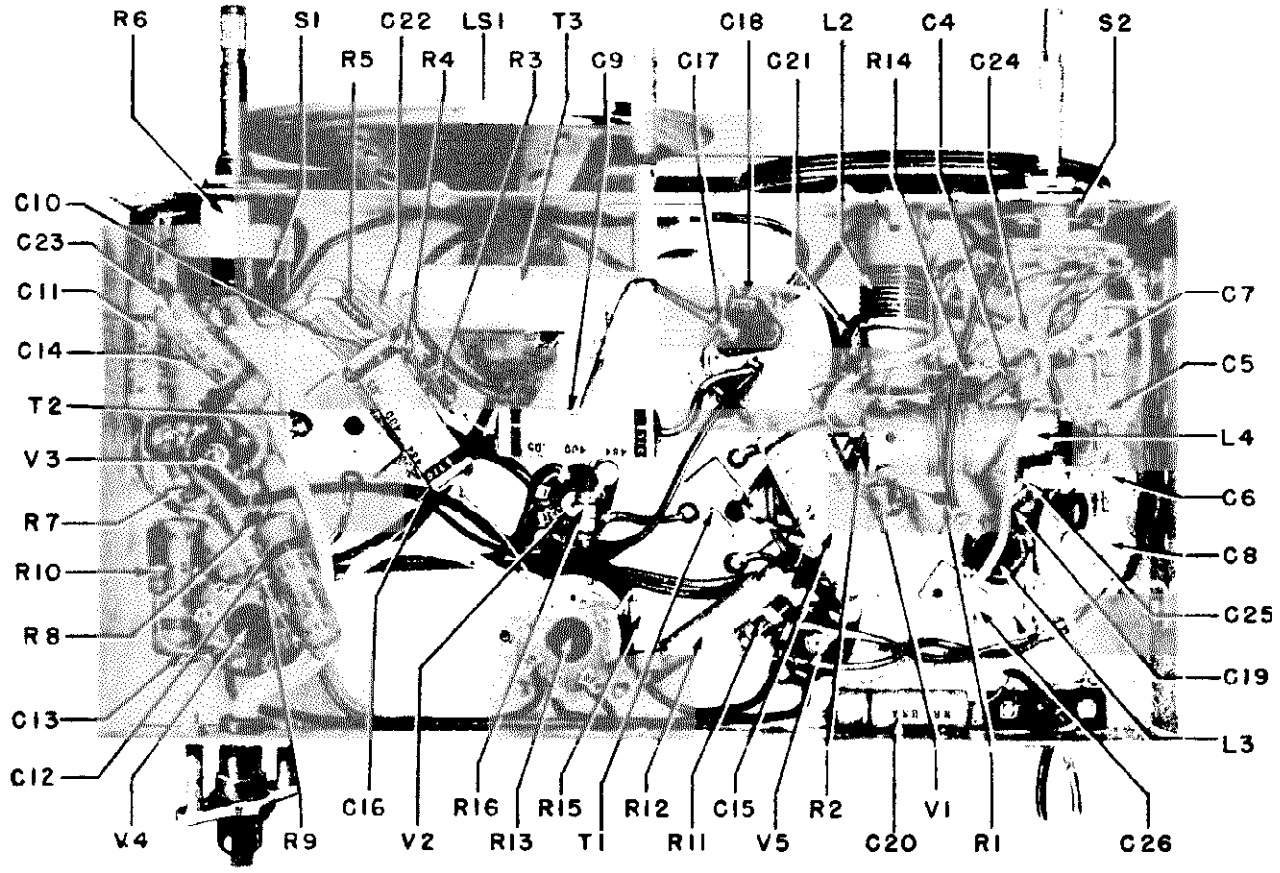
Top View of Chassis Showing Alignment Adjustment Positions

ALIGNMENT CHART

DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	ADJUSTMENT POINTS
.1 MFD	455 Kc	B.C.	Tuning Condenser Fully Open	S1, S2, S3, S4
200 MMFD	1600 Kc	B.C.	Tuning Condenser Fully Open	C3
200 MMFD	1500 Kc	B.C.	1500Kc	C8
200 MMFD	600 Kc	B.C.	Rock at 600 Kc	C6
200 MMFD	900 Kc	B.C.	900 Kc	Check Osc. Crossover
400 OHMS	18 Mc	S.W.	Tuning Condenser Fully Open	C5
400 OHMS	17 Mc	S.W.	1500 Kc	C7

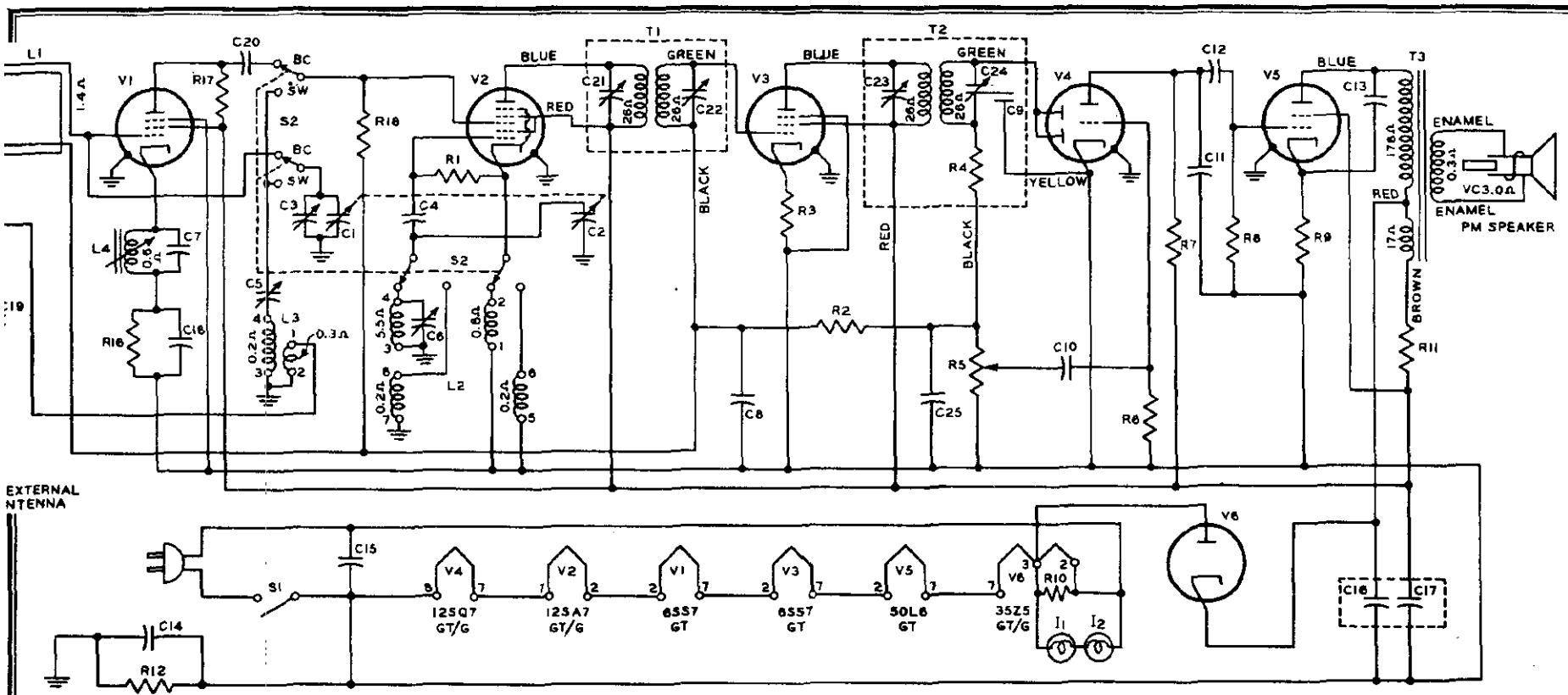
MODEL E1025TB

FEDERAL TEL. & RADIO CORP.

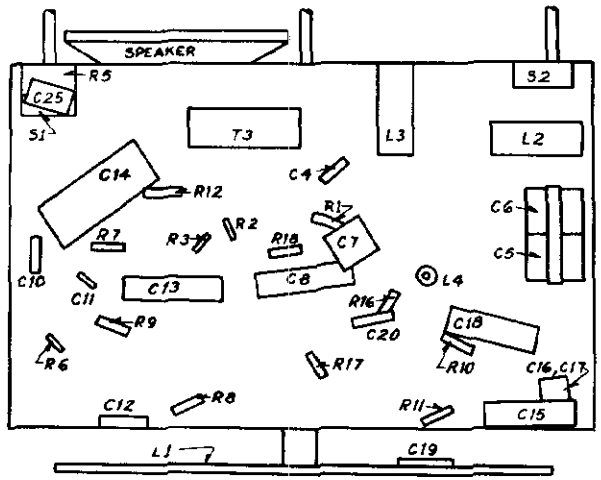


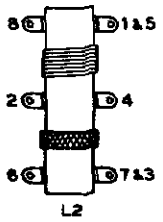
SCHEMATIC NO. OF PART	DESCRIPTION
C1	2 Gang Variable
C2	Part of C1
C3	Part of C2
C4	56 mmfd Mica 10% 500 V D.C. Working
C5	Compression Trimmer 3.0-35 mmfd
C6	Compression Trimmer 70-470 mmfd (Part of C5)
C7	Compression Trimmer 3.0-35 mmfd (Part of C5)
C8	Compression Trimmer 3.0-35 mmfd (Part of C5)
C9	.05 mfd., Tubular, Paper, 400 V D.C. Working
C10	100 mmfd Ceramic, 20%, (Part of T2)
C11	.01 mfd., Paper, Tubular, 400 V D.C. Working
C12	.01 mfd., Paper, Tubular, 400 V D.C. Working
C13	.01 mfd., Paper, Tubular, 400 V D.C Working
C14	.0015 mfd., Paper, Tubular, 400 V D.C. Working
C15	.2 mfd., Paper, Tubular, 400 V D.C. Working
C16	.05 mfd, Paper, Tubular, 400 V D.C. Working
C17	Electrolytic 2 Section Common Cathode 40 mfd. 250 DCWV, Sect. 1 40 mfd. 250 DCWV, Sect. 2
C18	Part of C17
C19	.005mfd., Paper, Tubular 600 V D.C. Working
C20	.005 mfd., Paper, Tubular 600 V D.C. Working
C21	220 mmfd., mica, 20% 500 V D.C. Working
C22	100 mmfd, mica, 20%, 500 V D.C. Working

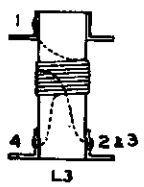
SCHEMATIC NO. OF PART	DESCRIPTION
C23	.01 mfd., Paper, Tubular, 400 V D.C. Working
C24	7500 mmfd., mica, 10% 500 V D.C. Working
C25	220 mmfd., mica, 10% 500 V D.C. Working
C26	15 mmfd., mica, 10% 500 V D.C. Working
11, 12	3.2 V 160 MA. Miniature Bayonet Base
L1	Pri. Inductance 3600 uh, Sec. Indicatnce 203.5 uh 1%
L2	Sec. Inductance 1.5 uh, 3%
L3	Sec. Inductance, 98.5 uh, 1%
L4	Sec. Inductance, 1.4 uh, 3%
LS1	5" P.M., 3.2 ohm V.C.
R1	22000 ohms, 20% 1/2 watt carbon
R2	1.0 megohm, 20% 1/2 watt carbon
R3	2.2 megohm, 20% 1/2 watt carbon
R4	47000 ohms, 20% 1/2 watt carbon (Part of T2)
R5	0.47 megohm, 20% 1/2 watt carbon
R6	2.0 megohm, Taper 0.2 megohm at 1/2 rotation, with "ON-OFF" Switch
R7	10.0 megohm, 20% 1 1/2 watt carbon
R8	0.22 megohm, 20%, 1/2 watt carbon
R9	0.47 megohm, 20%, 1/2 watt carbon
R10	150 ohms, 10%, 1/2 watt carbon
R11	270ohms, 10%, 1/2 watt carbon
R12	1800ohms, 5%, 2 watt carbon
R13	410/200 ohms
R14	47000 ohms, 20%, 1/2 watt carbon
R15	680 ohms, 5%, 1 watt carbon
R16	330 ohms, 10%, 1/2 watt carbon
S1	Part of R6
S2	Wafer Switch
T1	Double Tuned, 455 Kc
T2	Double Tuned, 455 Kc
T3	Pri. Imp. 2500 ohms, Sec. Imp. 3.2 ohms, Humbucking Winding
V1	12BE6
V2	12BA6
V3	12AT6
V4	50L6-GT
V5	35W4



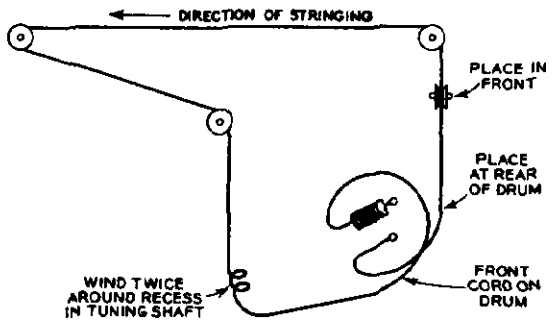
IF PEAK 455 KC





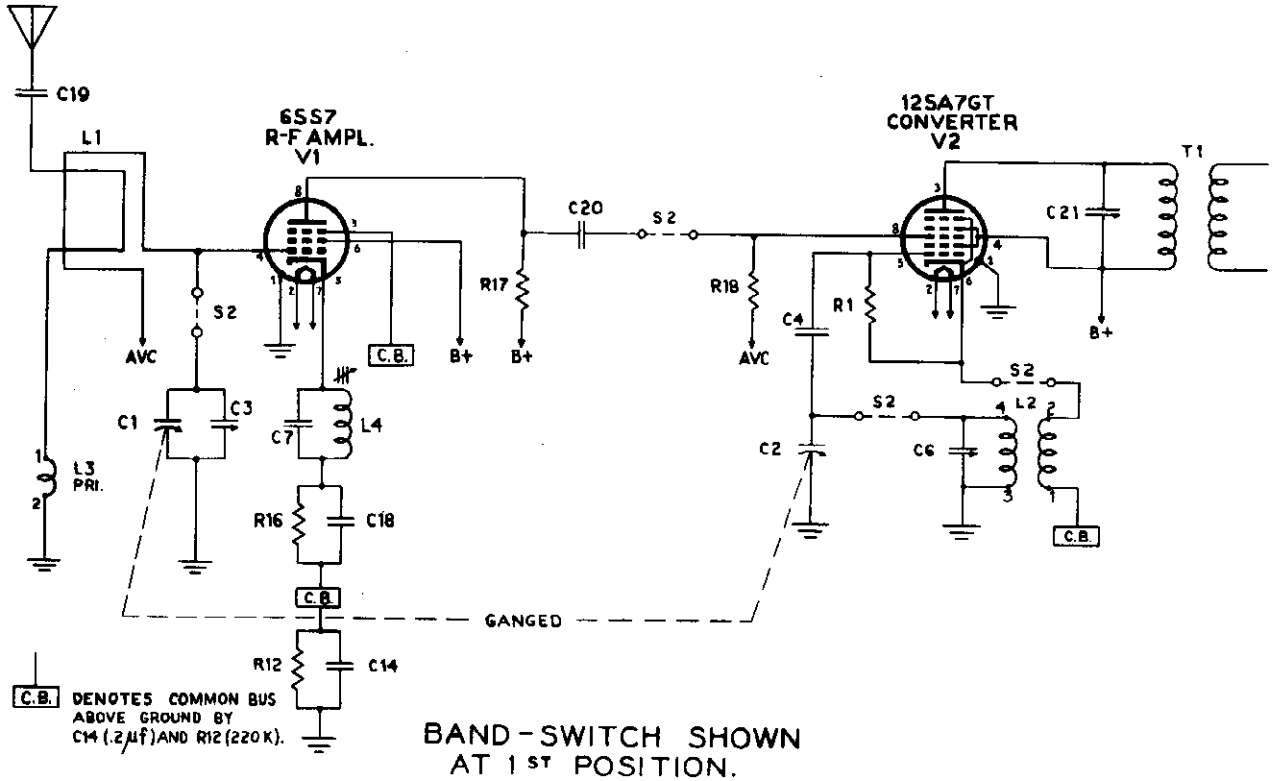


Coil Details

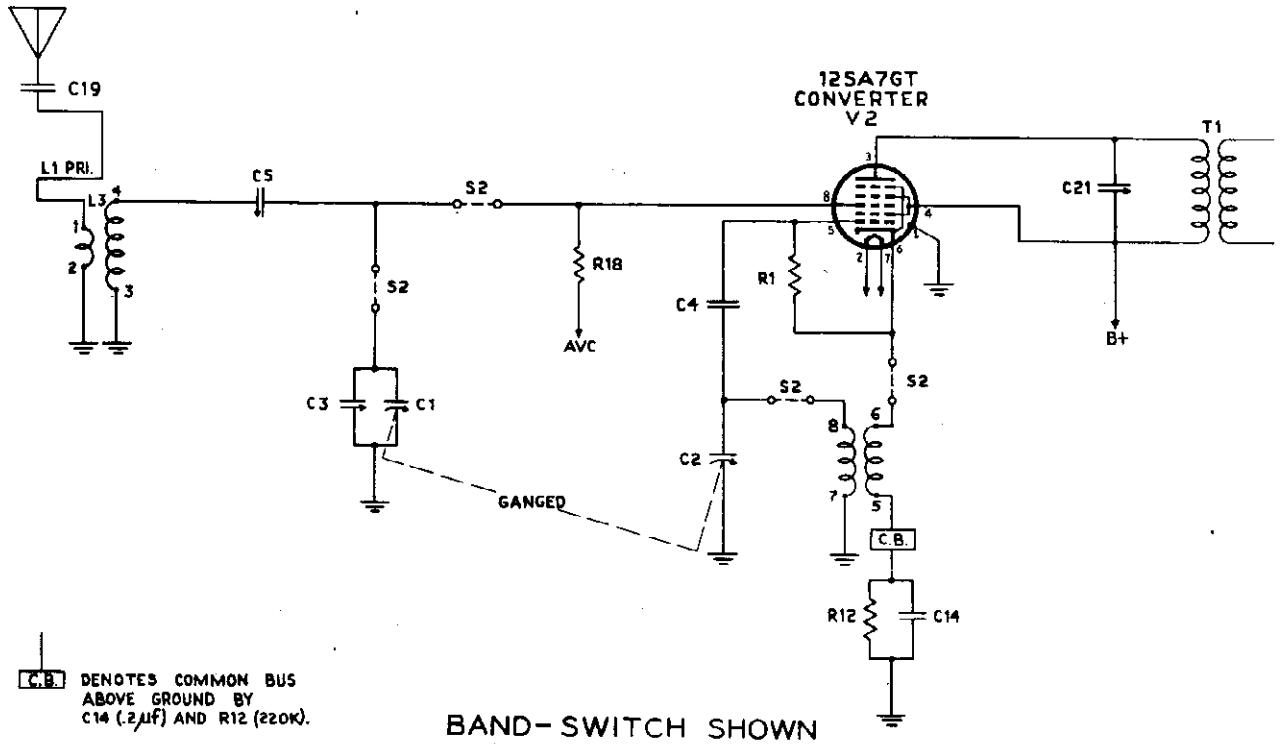


Dial Cord Stringing

MODELS 1030T, 1540T FEDERAL TEL. & RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
550-1600 KC



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.6 - 15.5 MC

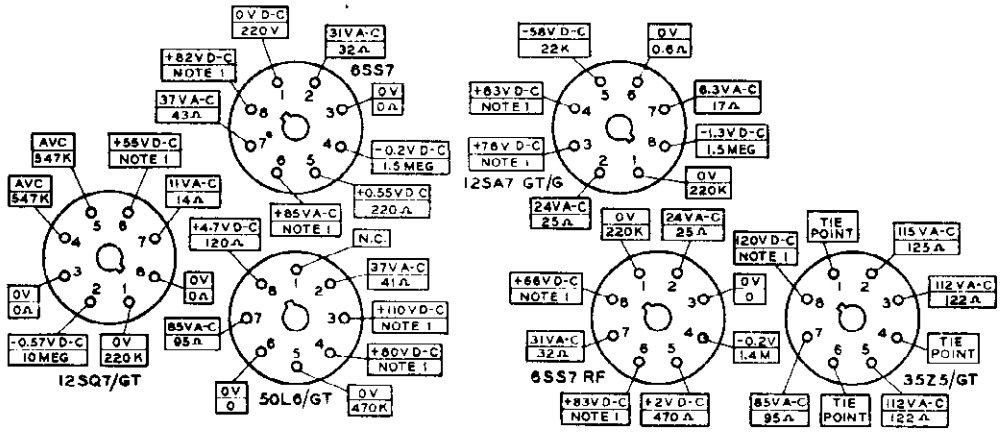


Fig. 4. Voltage and Resistance Analysis Chart

1. Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to change.
2. All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. A.C. measurements were made with a 1000 ohms per voltmeter.
3. Measured values are from socket pin to circuit ground. (pin 8 of 12SQ7 socket).
4. Tolerances of component values make possible a variation of ± 20% in readings indicated in chart.
5. Socket connections are shown as bottom views.

SCHEMATIC NO. OF PART	NAME OF PART	DESCRIPTION	FUNCTION
C 1	Capacitor	2 Gang variable	Ant. Tuning
C 2	"	Part of C 1	OSC. Tuning
C 3	"	Part of C 1	Ant. Trimmer
C 4	"	100 mmfd mica ± 10% 500 v D.C. working	osc Grid coupling
C 5	"	Compression trimmer 70-470 mmf	S. W. Padder
C 6	"	Compression trimmer 1.6-18 mmf(part of C 5)	B.C. trimmer
C 7	"	3000 mmfd mica ± 10% 500 v D.C. working	I.F. trap
C 8	"	.05 mfd, tubular, paper, 400 v D.C. working	AVC bypass
C 9	"	125 mmfd mica, ± 25% part of T2	Diode load bypass
C 10	"	.01 mfd, paper, tubular 400 v D.C. working	1st audio coupling
C 11	"	.0015 mfd, mica± 20% 500 V C.C. working	1st audio plate bypass
C 12	"	.01 mfd, paper tubular 400 v D.C. working	2nd audio coupling
C 13	"	.01 mfd, paper tubular 400 v D.C. working	Output tube Plate bypass
C 14	"	.2 mfd paper tubular 400 v D.C. working	Line bypass
C 15	"	.05 mfd paper dielectric 400 v D.C. working	Line bypass
C 16	"	Electrolytic, 2 section Common cathode 40 mfd 150 DCWV Sect. 1 40 mfd 150 DCWV Sect. 2	Filter
C 17	"	Part of C 16	Filter
C 18	"	.1 mfd, paper, tubular 400 v D.C. working	Cathode bypass, rf tube
C 19	"	.002 mfd. paper, tubular, 600 v D.C. working	External Ant. Coupling
C 20	"	470 mmf. mica ± 20% 500 v D.C. working	Coupling, Grid of convertor tube
C 21	"	Part of T1	I.F. Trimmer
C 22	"	Part of T1	" " "
C 23	"	Part of T2	" " "
C 24	"	Part of T2	" " "
C 25	"	100 mmf. mica ± 10% 500 v D.C. working	Volume Control bypass
I1, I2	Lamp	3.2 v, 160 ma. miniature bayonet base	Dial light
L1	Inductor	200.5 uh ± 1 uh; dist. cap. 12mmf max.	Loop Antenna
L2	"	2 band osc coil assy.	Oscillator Coil
L3	"	SW. RF Coil	Antenna Coil
L4	"	Slug tuned, variation 30-55 uh ± 10%	I.F. Trap
LS1	Speaker	5" p.m., 3.2 ohm v.c.	Speaker
R1	Resistor	22000 ohms ± 20% 1/2 watt carbon	Oscillator grid
R2	"	1.0 megohm ± 20%, 1/2 watt carbon	AVC Coupling
R3	"	220 ohms ± 20%, 1/2 watt carbon	I.F. Cathode
R4	"	47000 ohms, ± 20%, 1/2 watt carbon Part of T2	Volume control decoupling
R5	Potentiometer	500,000 ohms taper 50,000 ohms at 1/2 rotation, with "on-off" switch	Volume control
R6	Resistor	10.0 megohm ± 20%, 1/2 watt carbon	1st audio grid
R7	Resistor	0.22 megohm ± 20%, 1/2 watt carbon	1st Audio plate
R8	"	0.47 megohm ± 20%, 1/2 watt carbon	Output tube grid
R9	"	120 ohms ± 10%, 1/2 watt carbon	Output tube cathode
R10	"	270 ohms ± 10%, 1/2 watt carbon	Pilot light shunt
R11	"	1500 ohms ± 5%, 1 watt carbon	Filter
R12	"	220,000 ohms ± 20%, 1/2 watt carbon	Chassis return
R16	"	470 ohms ± 20%, 1/2 watt carbon	Cathode R.F. tube
R17	"	4700 ohms ± 20%, 1/2 watt carbon	Plate R.F. tube
R18	"	0.1 megohm ± 20%, 1/2 watt carbon	Grid of Mixer tube
S1	Switch	Part of R5	"On-Off"
S2	"	4 pole, 2 position	Band-Switch
T1	Transformer	Double tuned, 455 kc.	I.F. input
T2	"	" " "	I.F. output
T3	"	Primary Impedance 2500 ohms, secondery 3.2 ohms, with humbucking winding	Audio output
V1	Tube	6SS7 or 6SS7/GT	R.F. amplifier
V2	"	12SA7/GTG	Converter
V3	"	6SS7 or 6SS7/GT	I.F. amplifier
V4	"	12SQ7/GT	2nd Det. 1st audio
V5	"	50L6/GT	Power output
V6	"	35Z5/GT	Rectifier

MODELS 1030T,1540T FEDERAL TEL. & RADIO CORP.

POWER REQUIREMENTS: 30 Watts at 105-125 Volts AC, 50-60 Cycles or 105-125 Volts DC.
TUNING RANGE: 2 Bands. American Broadcast 550-1600 KC.
International Short Wave 5.6-15.5 MC.
ANTENNA: Built in loop with facilities for connection to external antenna.

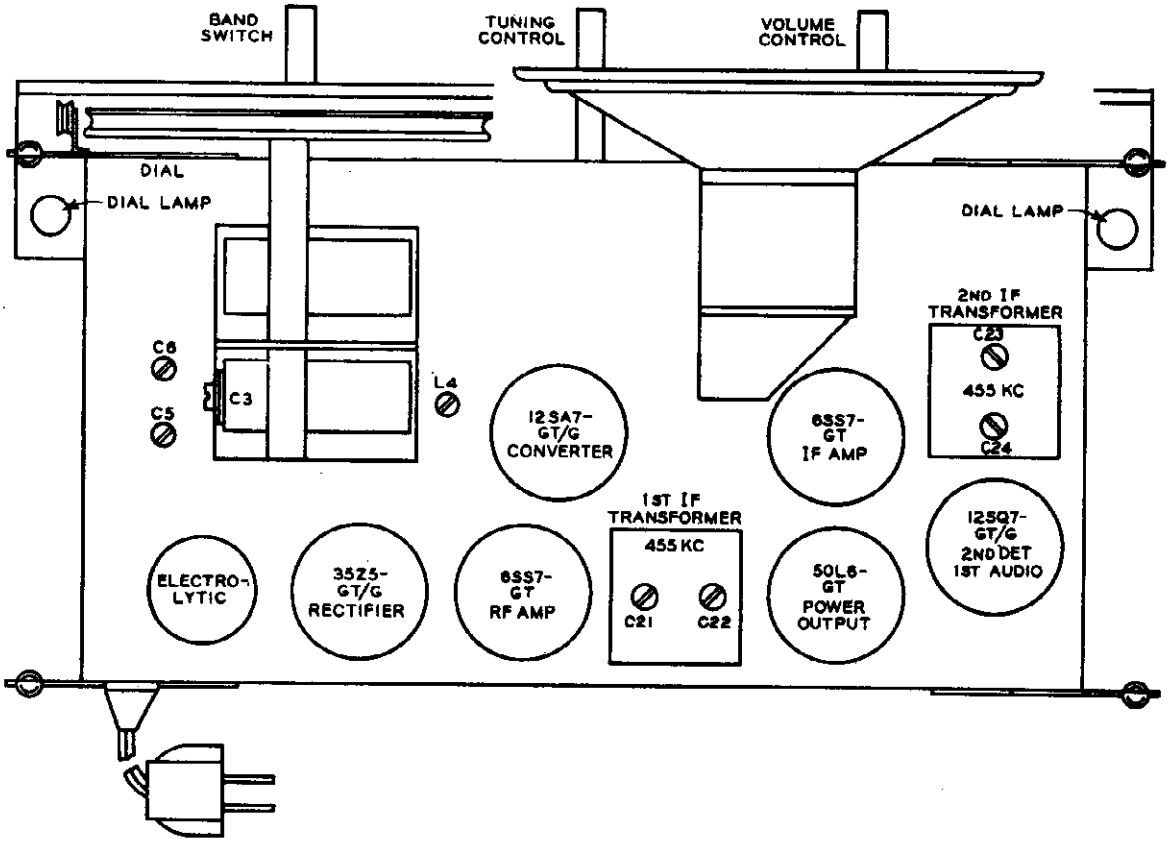


Fig. 1. Top View of Chassis showing Alignment Adjustment Positions.

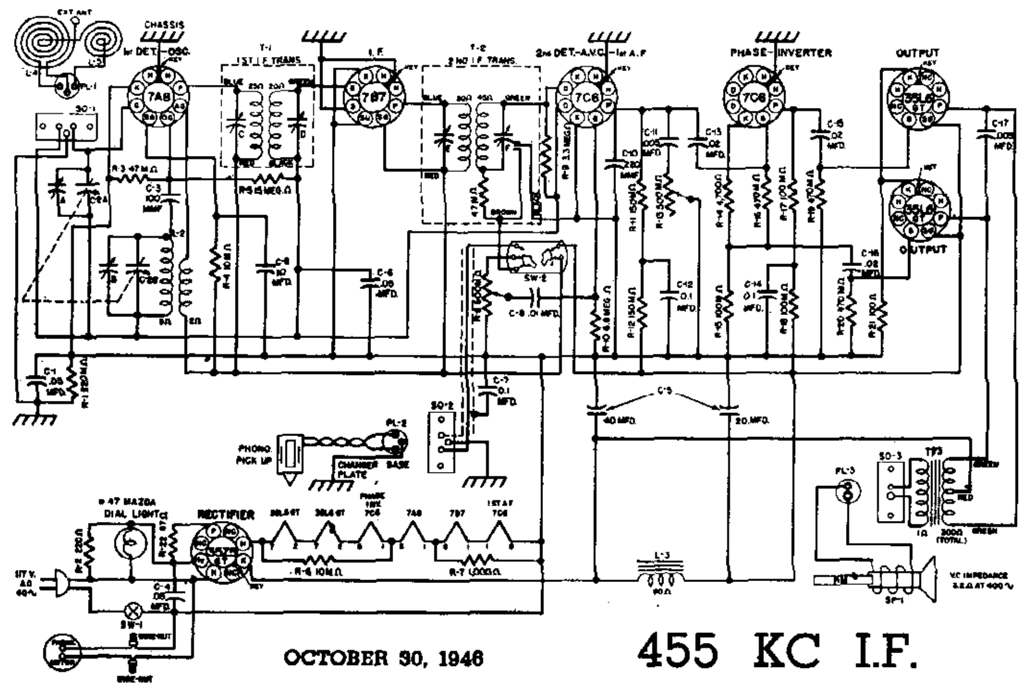
ALIGNMENT INSTRUCTIONS

Punch marks are provided on the dial back plate at 600 kc, 1000 kc, 1400 Kc and 1600 Kc for alignment purposes.
With tuning condenser completely open, set dial pointer to 1600 Kc punch mark.
Connect output meter across voice coil terminals on speaker frame.
Connect low side of signal generator lead thru a 0.1 mfd coupling condenser to chassis ground.
Connect high side of generator thru proper dummy antenna to the receiver external antenna connection.
Keep signal generator output at lowest practical level and proceed according to table below.

ALIGNMENT CHART

DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	ADJUSTMENT POINTS	OUTPUT METER READING
0.1 MFD.	455 Kc	B.C.	Tuning Condenser Open	C24,C23,C22,C21	Max.
0.1 MFD.	455 Kc	B.C.	Tuning Condenser Open	L4	Min.
200 MMFD.	1600 Kc	B.C.	Tuning Condenser Open	C6	Max.
200 MMFD.	1400 Kc	B.C.	1400 Kc	C3	Max.
200 MMFD.	600 Kc	B.C.	600 Kc	L1 (Check, adjust if necessary)	Max.
400 ohms	6 Mc	S.W.	6 Mc	C5	Max.

THE FIRESTONE TIRE & RUBBER CO.



OCTOBER 30, 1946

455 KC I.F.

ALL SOCKETS AND PLUGS SHOWN FROM PIN END VIEW
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

SYMBOL	PART NO.	DESCRIPTION	LIST PRICE
		CAPACITORS	
C-1	BD410503	Capacitor—.05 Mfd., 400 volt	$ .35
C-2A, B	C-57243-1	Capacitor—Variable gang	4.50
C-3	BM74A101	Capacitor—Mica 100 Mmfd. ± 20%	.35
C-4	BD410503	Capacitor—.05 Mfd., 400 volt	.35
C-5	A-56154	Capacitor—Electrolytic 40-20-10 Mfd., 150 volt	1.60
C-6	BD210503	Capacitor—.05 Mfd., 200 volt	.30
C-7	BD410104	Capacitor—0.1 Mfd., 400 volt	.40
C-8	BD410103	Capacitor—.01 Mfd., 400 volt	.30
C-10	BM74A221	Capacitor—Mica 220 Mmfd. ± 20%	.40
C-11	BD610502	Capacitor—.005 Mfd., 600 volt	.30
C-12	BD410104	Capacitor—0.1 Mfd., 400 volt	.40
C-13	BD410203	Capacitor—.02 Mfd., 400 volt	.30
C-14	BD410104	Capacitor—0.1 Mfd., 400 volt	.40
C-15	BD410203	Capacitor—.02 Mfd., 400 volt	.30
C-16	BD410203	Capacitor—.02 Mfd., 400 volt	.30
C-17	BD610502	Capacitor—.005 Mfd., 600 volt	.30
		RESISTORS	
R-1	BR17B224	Resistor—Carbon, 220,000 Ohms, ⅓ watt	.15
R-2	BR17C221	Resistor—Carbon, 220 Ohms, ½ watt	.15
R-3	BR17B473	Resistor—Carbon, 47,000 Ohms, ⅓ watt	.15
R-4	BR17B103	Resistor—Carbon, 10,000 Ohms, ⅓ watt	.15
R-5	BR17B156	Resistor—Carbon, 15 Meg., ⅓ watt	.15
R-6	BR17E103	Resistor—Carbon, 10,000 Ohms, 1 watt	.15
R-7	BR17B102	Resistor—Carbon, 1,000 Ohms, ⅓ watt	.15
R-8	B-56142-1	Control—Dual Potentiometer, with switch 500,000 Ohms, (V. C.)	2.25
R-9	BR17B335	Resistor—Carbon, 3.3 Meg., ⅓ watt	.15
R-10	BR17B685	Resistor—Carbon, 6.8 Meg., ⅓ watt	.15
R-11	BR17B154	Resistor—Carbon, 150,000 Ohms, ⅓ watt	.15
R-12	BR17B154	Resistor—Carbon, 150,000 Ohms, ⅓ watt	.15
R-13	B-56142-1	Control—500,000 Ohms, (T. C.) part of R-8	*
R-14	BR17B472	Resistor—Carbon, 4,700 Ohms, ⅓ watt	.15
R-15	BR17B104	Resistor—Carbon, 100,000 Ohms, ⅓ watt	.15
R-16	BR17B474	Resistor—Carbon, 470,000 Ohms, ⅓ watt	.15
R-17	BR17B104	Resistor—Carbon, 100,000 Ohms, ⅓ watt	.15
R-18	BR17B104	Resistor—Carbon, 100,000 Ohms ⅓ watt	.15
R-19	BR17B474	Resistor—Carbon, 470,000 Ohms, ⅓ watt	.15
R-20	BR17B474	Resistor—Carbon, 470,000 Ohms, ⅓ watt	.15
R-21	BR16C101	Resistor—Carbon, 100 Ohms, ± 10% ½ watt	.15
R-22	BR17G470	Resistor—Carbon, 47 Ohms ± 20% 2 watt	.30

SYMBOL	PART NO.	DESCRIPTION	LIST PRICE
		COILS AND TRANSFORMERS	
L-4, 5	D-57259	Loop Antenna assembly	$1.00
L-2	B-56143	Coil—Oscillator assembly	*
L-3	B-51726-1	Filter Choke, 80 ma.	2.00
T-1	B-51010-3	Transformer—1st I.F.	2.00
T-2	B-51011-3	Transformer—2nd I.F.	2.50
T-3	B-57253-1	Transformer—Output	1.50
		OTHER ELECTRICAL PARTS	
SW-1		Switch—power part of R-8 and R-13	
SW-2	B-56156-1	Switch—Radio-Phono	1.00
SP-1	C-57272	Speaker—6" x 9" Permanent Magnet	*
	A-6158	Lamp—Dial Mazda No. 47	.15
		MISCELLANEOUS PARTS	
	B-57275-1	Background for dial	*
	A-54848	Bushing—Strain relief (power cord)	.20
	A-56155	Bushing—Tuning control shaft	*
	E-57270-1	Cabinet	*
	B-51330-1	Channel rubber—mtg. for Dial scale	.04
	B-55402-1	Dial Cable assembly (includes clips at end of cable)	.25
	B-57269-1	Dial scale—plastic	*
	B-51427-2	Grommet—rubber; mtg., for variable gang	.05
	B-51124-1	Knob—Volume & switch, tuning or radio-phono	.15
	B-56138-1	Knob—Tone Control	.15
	BN751V02	Palnut—No. ⅜-32; for mtg., controls	.02
	BN770S02	Palnut—No. 10-24; for mtg., record changer	.01
	A-57271	Plug—3 Prong—Phono pick-up connection	*
	B-55130-9	Pointer	.15
	B-58069-1	Power Cord	.75
	BP934G02	Screw—No. 4 x ½"; for mtg., loop & back	.03
	BP928N02	Screw—No. 8 x 1⅛"; for mtg., chassis	.03
	BS016S09	Screw—No. 10-24 x 1"; for mtg., record changer	.04
	A-56136	Shaft—tuning control	*
	A-54726	Socket—octal base	.20
	A-54900	Socket—loctal base	.25
	A-57273	Socket—3 Prong; Phono pick-up & loop antenna	.20
	A-57258	Socket—2 Prong; speaker connection	.20
	A-6182-5	Socket—dial lamp (with leads)	.15
	A-51331	Spring—Mtg., for channel rubbers	.10
	A-51787	Spring—dial cable tension	.07
	A-50147	Spring—conical; for mtg., record changer	.10
	BF13NT05	Washer—flat; for mtg., record changer	.02
	B-50156-1	Washer—rubber; for mtg., record changer	.04
	A-54492	Washer—"C"; tuning shaft	.02
	A-1089	Washer—cup; variable gang mtg.	.05
	B-50964-3	Wirenut—phono motor power connection	.03

1. The chassis, record changer and loop should remain in their normal position in the cabinet when making loop adjustment.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, slide pointer along dial cord to correct position.
3. Connect output meter across speaker voice coil.
4. Connect the ground of signal generator to B–.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Radio-Phono switch in Radio position.

NOTE: For best results, it is advisable to use an isolation transformer between the 117 V. AC line and AC input to receiver.

DUMMY ANT.	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER LETTER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
0.1 Mfd. Condenser	7A8 Grid	455 KC	Any point where it does not affect the signal	F-E D-C	2nd IF 1st IF	Adjust for maximum output. Then repeat adjustment.
0.1 Mfd. Condenser	7A8 Grid	1620 KC	Gang condenser completely out of mesh.	B	Oscillator	Adjust for maximum output.
RMA Loop		1400 KC	Tuned to 1400 kc Generator signal	A	Loop Antenna	Adjust for maximum output.

FREQUENCY RANGE:

540-1600 KC.

POWER SUPPLY

117 volts
60 cycles A.C.
55 watts (including changer)

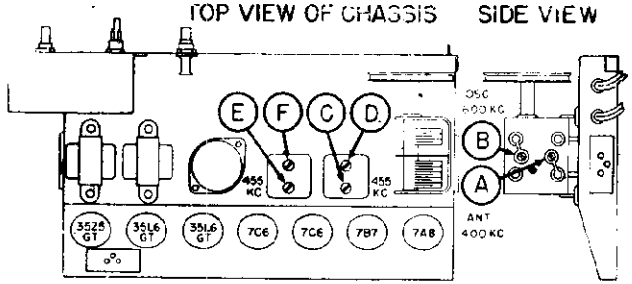
POWER OUTPUT:

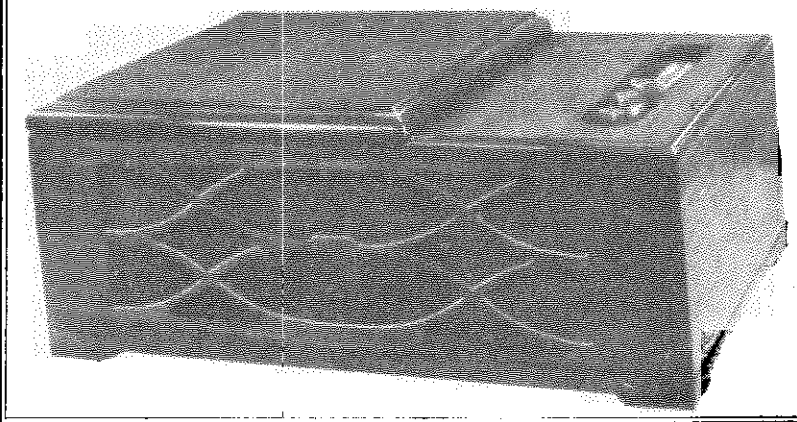
Undistorted—1.6 watts
Maximum —2.2 watts

SPEAKER:

6 x 9 elliptical type PM
Voice coil impedance—
3.2 ohms at 400 cycles

TOP VIEW OF CHASSIS SIDE VIEW



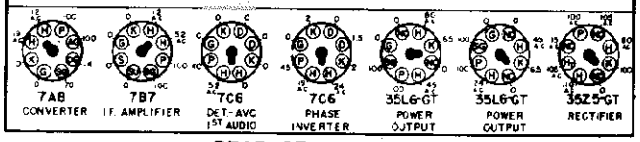


SOCKET VOLTAGES

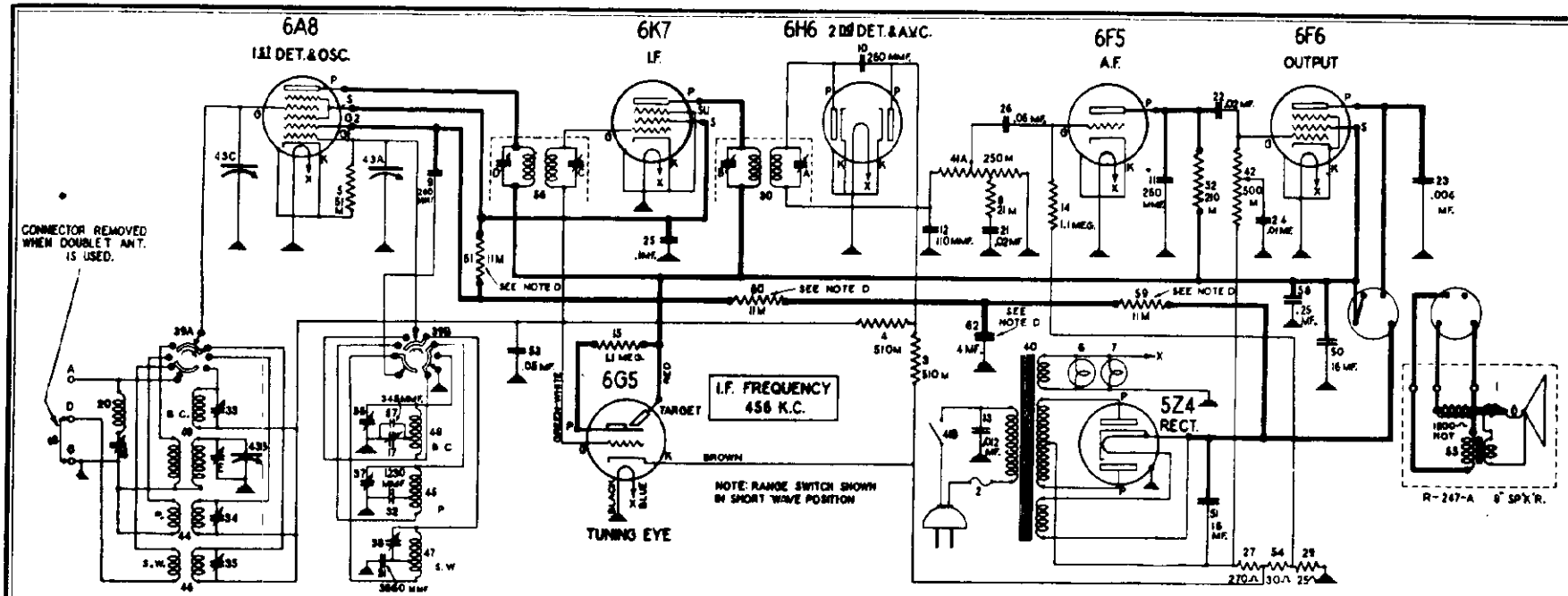
MEASURED WITH VOLTMETER HAVING SENSITIVITY OF 1000 OHMS PER VOLT
TONE CONTROL IN CLOCKWISE POSITION
VOLUME ON FULL WITH NO SIGNAL
RADIO-PHONO SWITCH IN RADIO POSITION — DIAL TUNED TO 540 KC

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE AC POWER SUPPLY USED FOR THESE MEASUREMENTS.
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.



REAR OF CHASSIS



SOCKET VOLTAGES

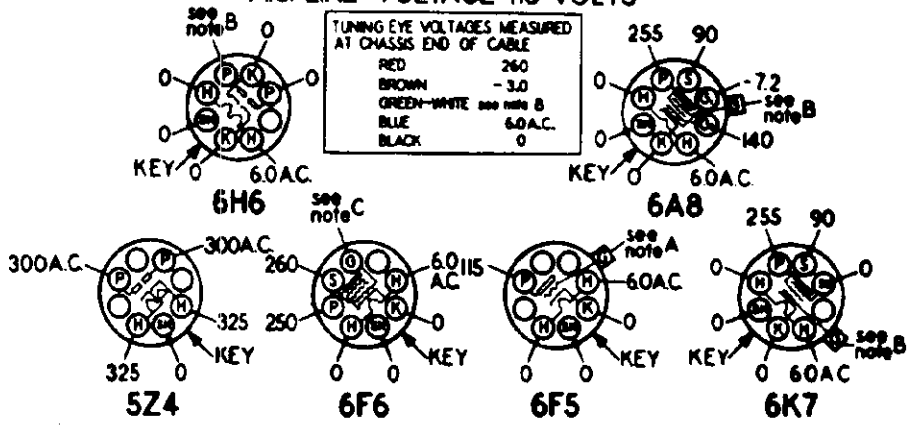
VOLUME CONTROL ON FULL — ANTENNA GROUNDED

RANGE SWITCH SET ON BROADCAST POSITION — DIAL TUNED TO 530 KC.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

A.C. LINE VOLTAGE 115 VOLTS



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

★

NOTE A: The grid bias for the 6F5 is —1.3 volts measured across resistor 29.

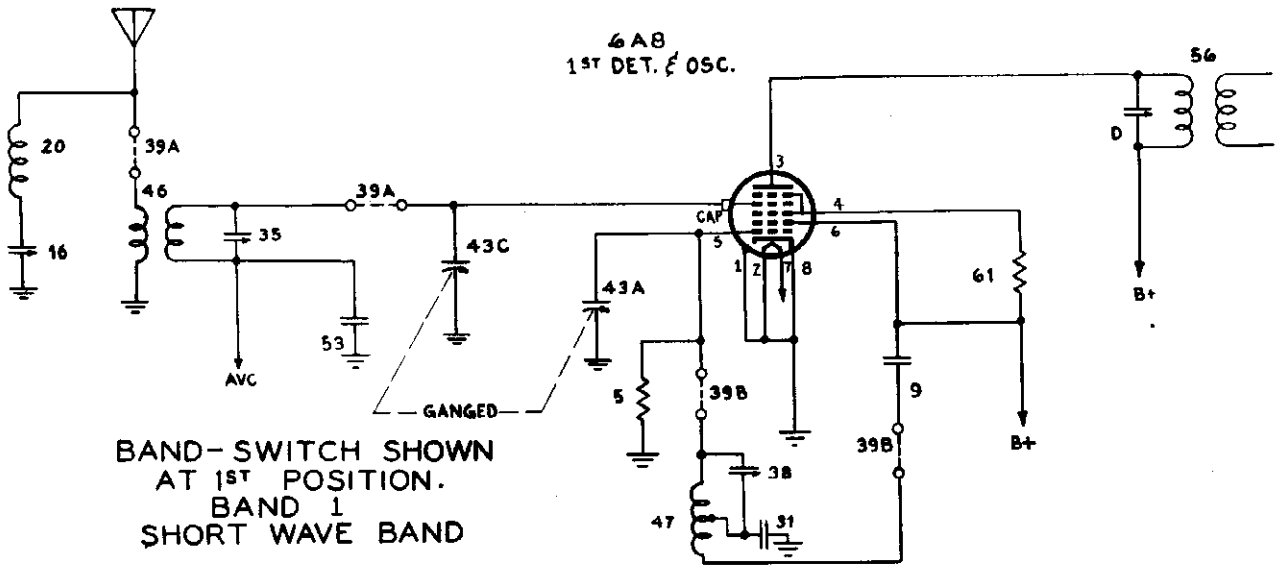
NOTE B: The grid bias for the 6A8, 6K7, and the anode voltage of the A.V.C. section of the 6H6 is —3.0 volts measured across resistors 29 and 54.

★

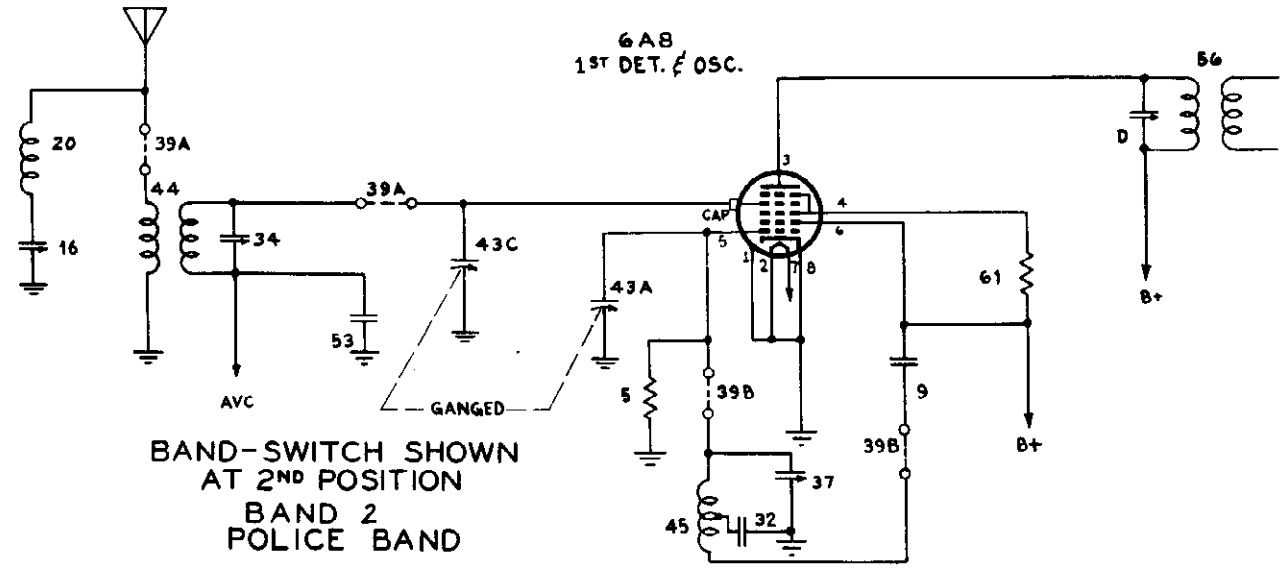
NOTE C: The grid bias for the 6F6 output tube is —17.0 volts measured across resistors 29, 54 and 27.

NOTE D: In receivers having serial numbers below 453,400 resistors 59, 60, and 61 are omitted and the screen grids of the 6K7 and 6A8 receive their current through a 26,000 ohm ¼ watt resistor which is connected to the screen grid of the 6F6. The anode grid of the 6A8 is connected in series with a 21,000 ohm ¼ watt resistor to the screen grid of the 6F6. Condenser 62 (4 mfd. 250 V.) is also omitted.

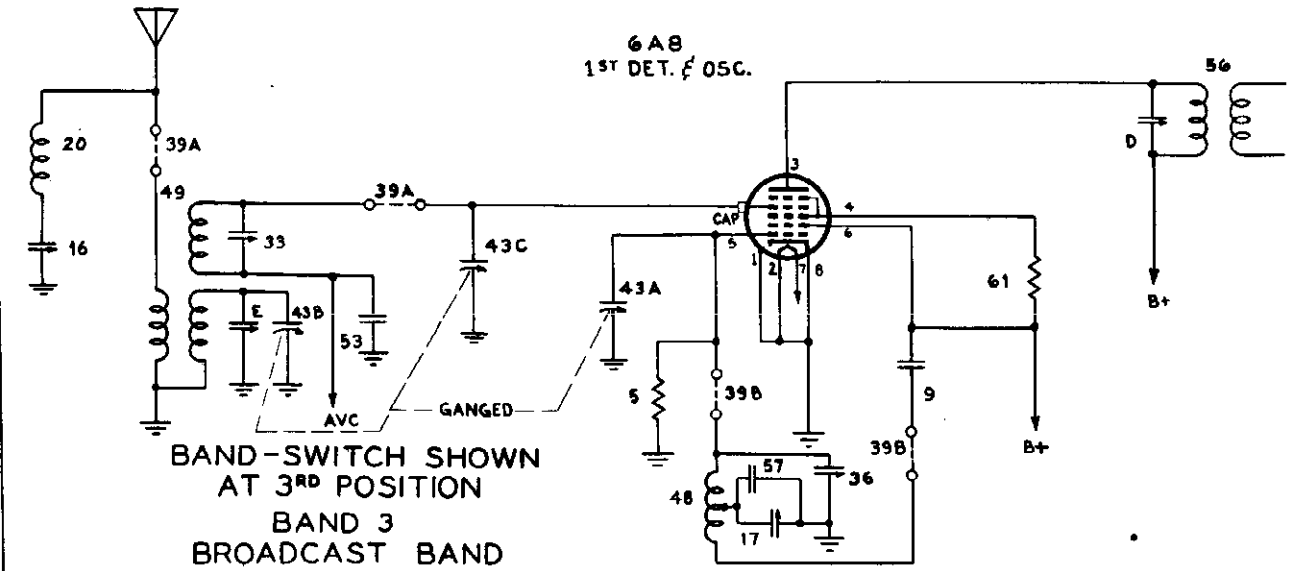
MODELS 7379-1, 7405-3, 7406-1 THE FIRESTONE TIRE & RUBBER CO.



BAND-SWITCH SHOWN AT 1ST POSITION.
BAND 1
SHORT WAVE BAND



BAND-SWITCH SHOWN AT 2ND POSITION
BAND 2
POLICE BAND



BAND-SWITCH SHOWN AT 3RD POSITION
BAND 3
BROADCAST BAND

CALIBRATION AND ALIGNMENT

Aligning Equipment

For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 456 KC. to 16 MC. are required.

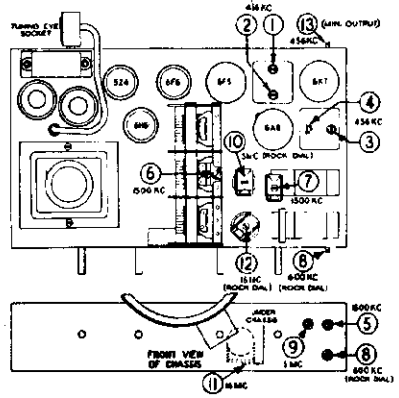
Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

Aligning the I. F. Amplifier

Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the **6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.**

Adjust the four I.F. trimmers Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	456 KC.
2.	2nd I.F. transformer trimmer	456 KC.
3.	1st I.F. transformer trimmer	456 KC.
4.	1st I.F. transformer trimmer	456 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	6 MC.
10.	Police antenna shunt trimmer	6 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.
13.	Wave-trap trimmer	456 KC.

Broadcast Band Calibration and Alignment

With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1,500 KC. and turn the receiver dial pointer to 1,500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though dial may be slightly off calibration at 600 KC.

Wave-Trap Adjustment

The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for minimum output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1,500 KC.

Band No. 2 Calibration and Alignment

Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

Band No. 3 Calibration and Alignment

Turn the range switch to the extreme counterclockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther out.

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part Number	Description	List Price
67590	Flat steel mtg. washer	$0.01
84428	Rubber chassis mtg. bushing	.03
84493	No. 10 x 1¼ chassis mtg. screw	.03
84805	Felt washer (for knobs)	.01
85086	G.D.A. terminal strip	.20
85321	Ground connector for G.D.A. strip	.01
88058	Fuse mounting	.16
88057	Fuse cover	.06
88675	Speaker socket	.12
89119	Tuning eye cable & plug	1.50
89424	Knob; tuning and tone control	.20
89425	Knob; range switch	.22
89426	Knob; volume control	.20

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
83278	Dial lamp	$0.15
88564	Pointer and stud assembly	.12
88743	Dial drive shaft	.15
88744	Dial drive shaft retainer spring	.06
88745	Dial ring and bracket assembly (for edge lighting)	.90
88748	Dial disc and bushing assembly	.30
88956	Escutcheon with glass	1.65
88958	No. 2 x 5/8 R.H. wood screw for escutcheon (each)	.01
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89285	Dial background	.12
89423	Dial scale	1.80
89432	Escutcheon for tuning eye	.60

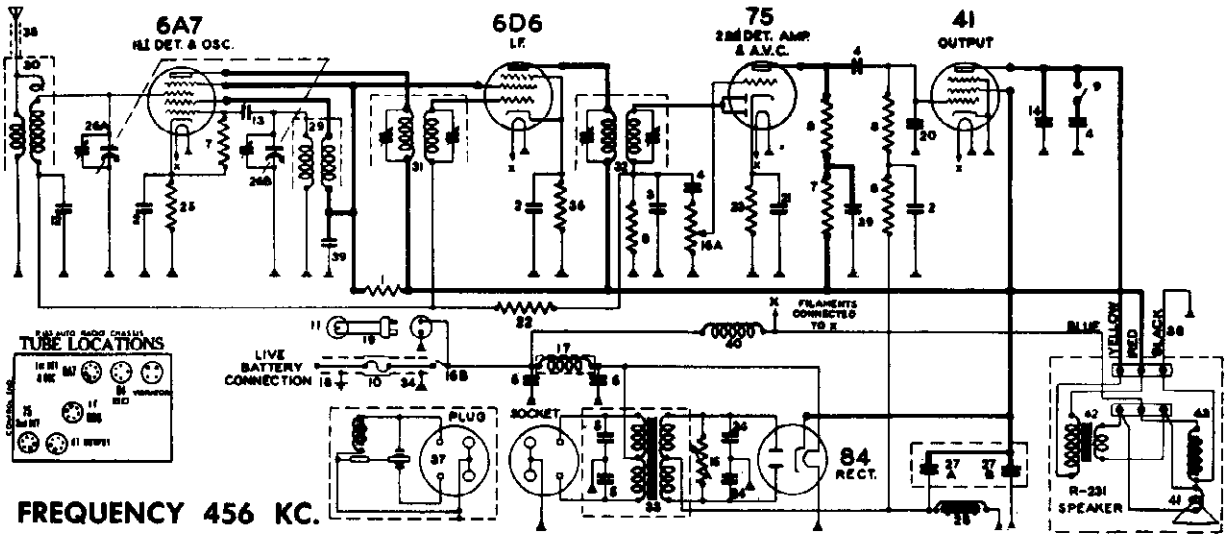
PARTS LIST

Diagram Number	Part Number	Description	List Price
1	R-247-A	8-inch Dynamic Speaker	$9.00
2	IMPORTANT	Fuse, 1 ampere (USE THIS SIZE ONLY)	
3-4	83072	510,000 ohm ½ watt carbon resistor	.15
5	83080	61,000 ohm ½ watt carbon resistor	.20
6-7	83278	Pilot lamp, 6-8 volt	.15
8	83285	21,000 ohm ½ watt carbon resistor	$0.20
9-10-11	83639	260 mmfd. mica condenser	.15
12	83783	110 mmfd. mica condenser	.16
13	83975	.012 mfd. 1,000 V. shielded condenser	.35
14-15	84235	1.1 meg. ¼ watt carbon resistor	.20
16	85285	Wave trap trimmer	.40
17	85285	Padding trimmer	.40
18	85321	Ground connector	.01
20	88014	Wave trap coil	.50
21-22	88026	.02 mfd. 400 volt paper condenser	.30
23	89826	.004 mfd. 750 volt paper condenser	.24
24	88030	.01 mfd. 400 V. paper condenser	.30
25	88046	.1 mfd. 150 V. paper condenser	.30
26	88189	.05 mfd. 200 volt paper condenser	.35
27	88463	270 ohm 1 watt carbon resist.	.15
29	88465	25 ohm ½ watt wire wound resistor	.15
30	88468	2nd I.F. transformer	2.40
31	88472	3860 mmfd. mica condenser	.35
32	88473	1230 mmfd. mica condenser	.25
33-34-35	88477	Trimmer condenser	.12
36-37-38			
39A-39B	88480	Range switch	1.90
40	88481	Power transformer, 115 V. 60 cycle	5.00
40	89216	Power transformer, 100 to 240 V.—25 to 133 cycles	11.50
41A	88487	Volume control (250,000 ohm)	
41B		A.C. line switch	$1.25
42	88488	Tone control (500,000 ohm)	.80
43A to C	88493	Three-gang condenser	5.40
44	88499	Antenna coil (police)	.85
45	88501	Oscillator coil (police)	.65
46	88502	Antenna coil (S.W.)	.80
47	88504	Oscillator coil (S.W.)	.80
48	88506	Oscillator coil (B.C.)	.55
49	88507	Antenna coil (B.C.)	1.60
50	88511	16 mfd. 300 volt electrolytic condenser	1.10
51	88512	16 mfd. 400 volt electrolytic condenser	1.10
52	88532	210,000 ohm ¼ watt carbon resistor	.12
53	88534	.05 mfd. 150 volt condenser (low loss)	.25
54	88613	30 ohm ⅛ watt wire wound resistor	.15
55	88529	Output transformer (on R-247-A speaker)	2.00
56	88466	1st I.F. transformer	2.40
40	89216	Power transformer, 100 to 240 V.—25 to 133 cycles	11.50
57	89564	345 mmfd. mica condenser	.25
58	89643	.25 mfd. 300 V paper condens.	.50
59-60	89751	11,000 ohm 1 watt carbon resistor	.12
61	89753	11,000 ohm ⅛ watt carbon resistor	.15
62	89755	.4 mfd. 250 volt electrolytic condenser	1.00

Prices Subject To Change Without Notice

MODEL 7383-4

THE FIRESTONE TIRE & RUBBER CO.



I.F. FREQUENCY 456 KC.

Diag. No.	Part No.	DESCRIPTION	List Price
1	66875	16,000 ohm 1 watt carbon resistor	$0.50
2	81630	.1 mfd. 100 volt paper condenser	.30
3	81812	.00051 mfd. mica condenser	.25
4	83007	.02 mfd. 600 volt paper condenser	.35
5	83058	.25 mfd. 100 volt paper condenser	.35
6	83063	.5 mfd. 100 volt paper condenser	.45
7	83080	51,000 ohm ¼ watt resistor	.20
8	83082	260,000 ohm ¼ watt resistor	.20
9	83179	Tone Control switch	.30
10	83207	Fuse	.05
11	83278	Pilot lamp	$0.15
12	83353	.05 mfd. 100 volt paper condenser	.30
13	83539	.00026 mfd. mica condenser	.25
14	83706	.006 mfd. 600 volt condenser	.35
15	83725	0-500,000 globar resistor	.45
16A, 16B	83728	Volume control & On-Off Switch	1.20
17	83730	R. F. Choke	.25
18	83777	Battery lead and fuse housing	.50
19	83778	Light cable and plug assembly	.50
20	83783	.00011 mfd. mica condenser	$0.16
21	83803	12 mfd. 15 volt electrolytic condenser	.80
22	84235	1.1 meg. ¼ watt resistor	.20
23	84240	4000 ohm ¼ watt resistor	.20
24	84850	.03 mfd. 750 volt paper condenser	.25
25	84888	300 ohm ½ watt resistor	.20
26A, 26B	84958	Two-gang variable condenser with shaft coupling	4.50
27A, 27B	84961	4 mfd. 400 volt electrolytic condenser; 8 mfd. 400 volt electrolytic condenser	2.50
28	84962	Filter choke	1.25
29	84963	Oscillator coil assembly	1.00
30	84969	Antenna coil and shield assembly	1.25
31	84972	1st I.F. transformer assembly	2.75
32	84974	2nd I.F. transformer assembly	2.75
33	84975	Power transformer	3.50
34	84977	Battery lead and cap (to chassis)	.34
35	84978	Antenna lead	.40
36	84979	250 ohm ½ watt resistor	.15
37	84995	Vibrator	5.00
38	85027	Speaker cable	.30
39	85029	.1 mfd. 300 volt paper condenser	.40
40	85048	Filament R.F. Choke	.25
41	85376	Diaphragm and voice coil assembly	2.00
42	85378	Output transformer	2.00
43	85379	Field coil	1.25

Part No.	DESCRIPTION	List Price
17166	Mounting nut	$0.05
83144	15,000 ohm spark plug suppressor	.35
83145	10,000 ohm distributor suppressor	.35
83319	Fuse insulator tube	.02
83737	Top cover knurled nuts	.06
84981	Tube shield section	.08
84982	Tube shield section (slotted)	.08
84983	Spring ring	.02
84984	Case assembly (less covers)	3.50
84987	Speaker grille cloth	.12
84990	Single hole mounting plate	.80
84991	Bottom cover	1.00
84992	Top cover	1.00
85012	Mounting bolt	.06
85026	Dash support washer	.05
15214	Long mtg. strap screw No. 10-32x1¼"	$0.01
81214	Flexible casing set screw	.02
83919	Bezel and glass assembly	.50
83920	Pilot light button assembly	.25
84067	Steering column mtg. bracket	.25
84484	Knob (volume and tuning)	.14
85000	Remote control head (less shafts)	6.00
85011	Complete accessories for installation	5.00
85016	Dial face	.25

FLEXIBLE SHAFTS

Part No.	DESCRIPTION	List Price
84996	Tuning shaft, 24 inches long	$1.50
84998	Volume control shaft, 24 inches long	1.50
85104	Tuning shaft, 36 inches long	2.00
85105	Volume control shaft, 36 inches long	2.00
85107	Tuning shaft, 30 inches long	2.00
85108	Volume control shaft, 30 inches long	2.00

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor (No. 15 in the circuit diagram) which is connected across the high voltage secondary of the power transformer. This resistor drops rapidly in resistance 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 below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for the proper calibration and alignment of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point at which to connect to the 41 plate is the yellow lead terminal on the speaker terminal strip.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers and may be reached by removing the top cover. The modulated oscillator should be set to exactly 456 K.C. and connected from the 6A7 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all four I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser to give maximum output meter reading.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the set should be calibrated when the arrangement of the shafts has been completed. Calibration is accomplished as follows:

Tune in a station of known frequency between 800 and 1100 KC. Insert a screw driver 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 by turning the screw driver adjust the dial pointer so that it indicates the exact station frequency.

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 as explained below. In order to reach this trimmer the chassis will have to be removed from the case as follows.

(1) Remove the flexible shafts and dismount the receiver.
(2) Remove the four terminals of the speaker cable from the speaker.
(3) Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.
(4) Remove the blue dial light lead from the socket terminal.
(5) Remove the yellow tone control lead from the tone control switch.
(6) Remove the six slotted chassis fastening screws and slide the chassis out of the case.

Connect a .00025 mfd. condenser in series with the output lead of the test oscillator and the antenna lead lug on the antenna coil and connect the ground lead of the test oscillator to the chassis. Set the test oscillator to exactly 600 KC. Tune the radio set to maximum volume and set the dial to read exactly 6.0 (600 KC.). Then set the test oscillator to exactly 1400 KC. Turn the tuning knob until the dial pointer indicates 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 condenser trimmer as directed under the R.F. alignment.

MODEL 7402-6
MODEL 7383-4

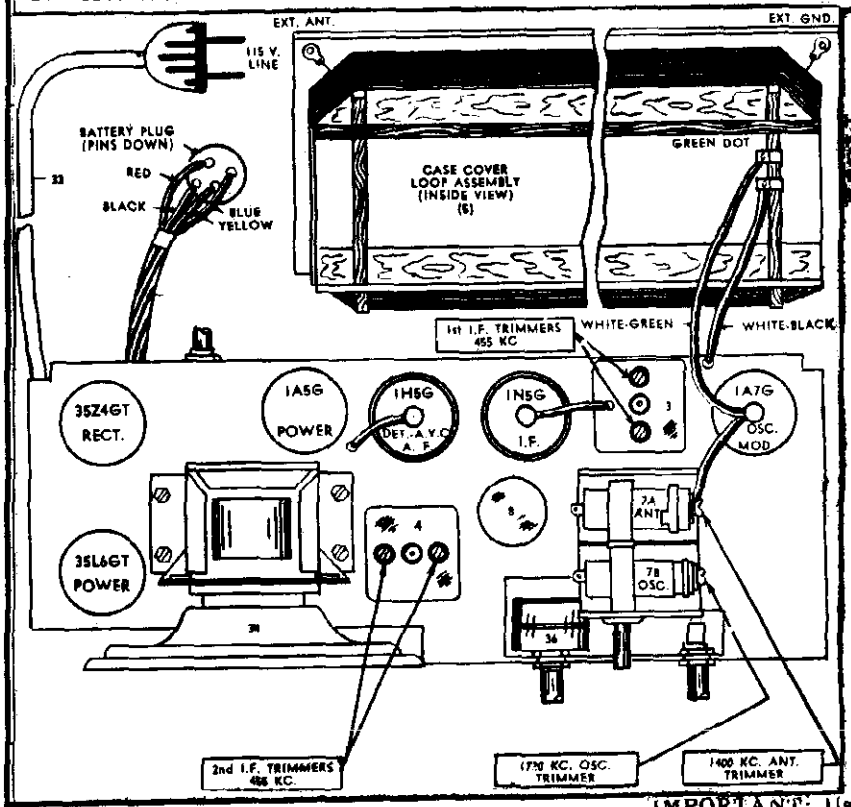
THE FIRESTONE TIRE & RUBBER CO.

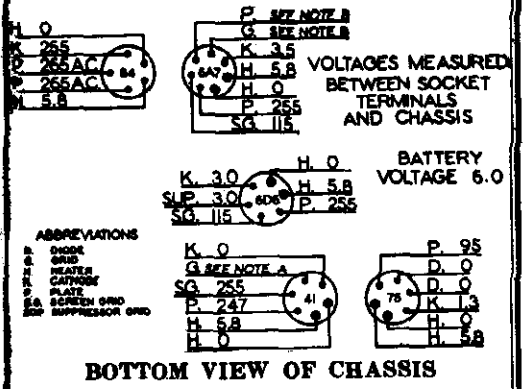
MODEL 7402-6

Illus. No.	Part No.	Part Name	Description	List Price
1	11824	Cable	Battery with four prong plug	$0.35
2	10832	Choke	Filter	.85
3	10768	Coil	1st I.F. Transformer	1.05
4	10769	Coil	2nd I.F. Transformer	1.10
5	11830	Loop	Antenna Assembly complete with frame	1.75
6	11813	Coil	Oscillator	.65
7	11814	Condenser	Tuning Two Gang	1.65
8	11822	Condenser	Tubular Dry Electrolytic (40-40) Mfd. 150 Volt & 20 Mfd. 25-Volt)	1.15
9	9981	Condenser	Tubular .2 Mfd. 200 Volt	.29
10	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
11	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
12	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
13	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
14	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
15	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
16	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
17	10762	Condenser	Tubular .002 Mfd. 400 Volt	.19
18	9457	Condenser	Tubular .05 Mfd. 400 Volt	.18
19	9458	Condenser	Mica .00025 Mfd.	.21
20	9458	Condenser	Mica .00025 Mfd.	.21
21	7934	Condenser	Mica .0001 Mfd.	.21
22	2705	Resistor	Carbon 2 Megohm ⅛ Watt	.19
23	7998	Resistor	Carbon 1 Megohm ⅛ Watt	.19
24	2673	Resistor	Carbon 750,000 Ohm ⅛ Watt	.19
25	6984	Resistor	Carbon 500,000 Ohm ⅛ Watt	.19
26	3534	Resistor	Carbon 75,000 Ohm ⅛ Watt	.19
27	9693	Resistor	Carbon 5,000 Ohm ⅛ Watt	.19
28	6875	Resistor	Carbon 250 Ohm ⅛ Watt	.19
29	9018	Resistor	Carbon 150 Ohm ⅛ Watt	$0.19
30	1408	Resistor	Wire Wound, Flexible 25 Ohm 1½ Watt	.19
31	10858	Resistor	Wire Wound, Flexible 200 Ohm 2 Watt	.22
32	11823	Resistor	Wire Wound 1700 and 20 Ohm	.45
33	11825	Resistor	Line Cord	.90
34	11821	Speaker	P.M. Dynamic 5"	4.00
35	11815	Switch	Voltage Selector	.90
36	11112	Vol. Control	With D.P.S.T. Switch	.90

MISCELLANEOUS PARTS

11304	Bulb	6-8 Volt .150 Amp. Type No. 47	$0.10
11816	Dial Scale	Calibrated Scale	.40
8184	Dial Cord	9" of 18 Lb. Drive Cord	.10
10679	Dial Pointer	For Dial	.15
11084	Dial Shaft	Drive Shaft	.15
8117	Dial Shaft "C" Washer	Retainer Washer	.02
11818	Dial Crystal	For Dial	.25
11819	Dial Plate	Metal Front Plate over Dial	.40
10884	Indicator Plate	Marked "AC-DC"—"OFF"—"BATT"	.10
10787	Knob	For Tuning and Volume Controls	.08
10907	Knob	For Voltage Selector Control	.10
10850	Plug	4 Prong for Battery	.10





MODEL 7383-4

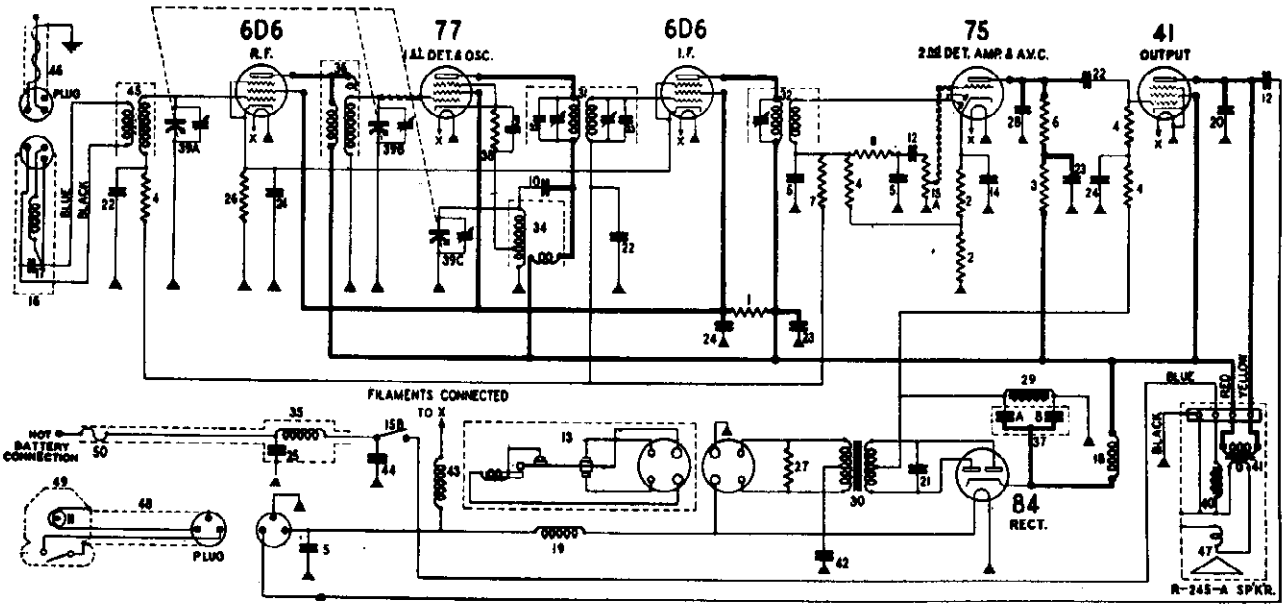
NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowance for battery voltage variations.

NOTE B: The oscillator grid voltage varies from about —3 at 1500 KC. to —5.0 at 530 KC. The oscillator anode voltage may vary from 115 at 1500 KC. to 120 at 530 KC.

MODEL 7396-1
MODEL 4-A-17

THE FIRESTONE TIRE & RUBBER CO.



I. F. FREQUENCY 177.5 KC.

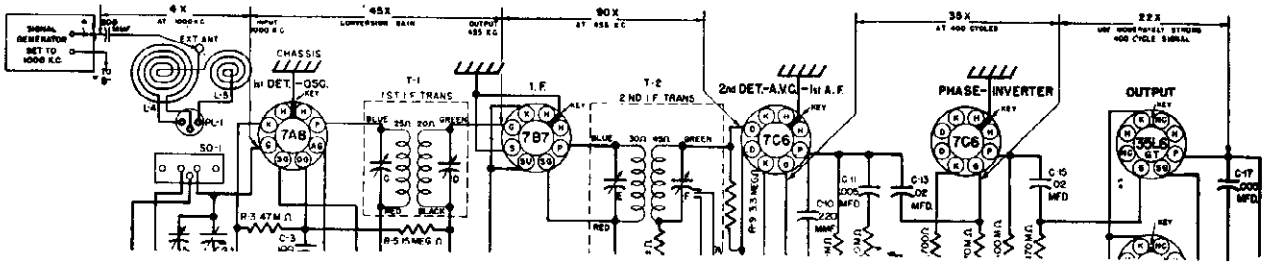
MODEL 7396-1

MODEL 4-A-17

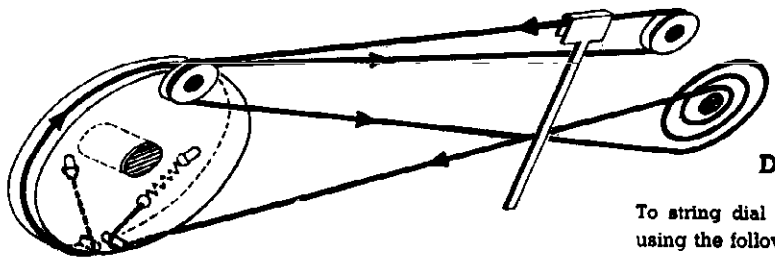
APPROXIMATE STAGE GAIN

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 1000 KC signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. Be sure radio is carefully tuned to generator signal. (Use weak signal for sharp tuning.)
3. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



DIAL AND POINTER DRIVE CABLE ARRANGEMENT

To string dial cable, set gang condenser to fully meshed position, using the following parts:

A-51726-1 Spring, cable

B-55402-1 Cable assembly

PARTS LIST

Ding. No.	Part No.	DESCRIPTION	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67303	2,000 ohm ¼ watt carbon resistor	.25
3	83080	51,000 ohm ¼ watt carbon resistor	.20
4	83082	250,000 ohm ¼ watt carbon resistor	.20
5	83539	260 mmfd. mica condenser	.25
6	84198	110,000 ohm ¼ watt carbon resistor	.30
7	84235	1.1 megohm ¼ watt carbon resistor	.20
8	84238	11,000 ohm ½ watt carbon resistor	.20
9	84282	.001 mfd. mica condenser	.25
10	84833	70 mmfd. mica condenser	.20
11	85296	Pilot lamp 6-8 volt (bayonet base)	.18
12	88026	.02 mfd. 400 volt paper condenser	.30
13	88156	Vibrator	3.50
14	88170	10 mfd. 25 volt electrolytic condenser	.80
15A } 15B }	88171	{ Volume control 500,000 ohm { Line switch	1.20
16	88172	Antenna Filter	1.20
17	88173	50 mmfd. mica condenser	.20
18	88181	R. F. choke coil	.40
19	88183	R. F. choke coil (to vibrator)	.25
20	88185	.006 mfd. 600 volt paper condenser	.35
21	88187	.01 mfd. 1500 volt paper condenser	.40
22	88189	.05 mfd. 200 volt paper condenser	.35
23	88191	.1 mfd. 300 volt paper condenser	.35
24	88193	.25 mfd. 150 volt paper condenser	.35
25	88195	.5 mfd. 150 volt paper condenser	.50
26	88203	600 ohm ¼ watt carbon resistor	.15
27	88204	210 ohm ½ watt carbon resistor	.15
28	88205	.0021 mfd. mica condenser	$0.35
29	88210	Filter choke	1.25
30	88213	Power transformer	3.50
31	88222	1st I.F. transformer	2.75
32	88223	2nd I.F. transformer	2.60
33	88233	110 mmfd. mica condenser	.25
34	88234	Oscillator coil and shield assembly	1.50
35	88239	"A" filter	1.00
36	88250	R.F. coil and shield assembly	1.50
37A } 37B }	88255	{ Electrolytic condenser 4 mfd. 350 volt Electrolytic condenser 8 mfd. 350 volt }	2.40
38	88257	9,500 ohm ¼ watt carbon resistor	.15
39 A to C	88258	Three gang variable condenser	6.00
40	88274	Field coil and housing (for R-245-A spkr.)	2.50
41	88276	Output transformer	2.00
42	88285	1.25 mfd. 150 volt paper condenser	.80
43	88289	R.F. choke (to filaments)	.20
44	88298	.25 mfd. 150 volt paper condenser (low reactance)	.40
45	88312	Antenna coil and shield assem. (iron core)	2.00
46	88327	Antenna cable and plug	1.10
47	88328	Diaphragm and shell assem. (R-245-A spkr.)	2.10
48	88339	Pilot light and tone control cable with plug	.90
49	88364	Control head less shell, knobs and shafts	3.50
50	88365	Fuse, 10 amperes	.05
	83777	Battery lead and fuse housing	.50

PARTS NOT SHOWN ON CIRCUIT DIAGRAM

INSTALLATION PARTS

Part No.	DESCRIPTION	List Price
12412	Split lockwasher for receiver mounting	$0.02
17166	Hex nut for receiver mounting ½"-13	.05
84990	Receiver mounting plate	.60
85012	Receiver mounting bolt, ½"-13x2"	.06
88326	Complete accessories for installation	3.28
88335	Shakeproof lockwasher for receiver mounting	.04
88336	Large flat washer for receiver mounting	.04

MISCELLANEOUS PARTS

83319	Fuse insulator tube	.02
83777	Battery lead and fuse housing	.50
88159	Vibrator shield	.35
88161	Tube shield half section (short)	.08
88162	Tube shield half section (long)	.08
88164	Tube shield cap (long)	.06
88165	Tube shield cap (short)	.06
88297	Speaker mounting screw No. 8-32 special head	.02
88319	Self tapping screw No. 8z¼" for receiver cover mtg.	.02
88321	Receiver case assembly (less covers)	5.00
88327	Antenna cable	1.10
88330	Receiver case cover with tube location label	1.00
88350	Interference filter condenser with bracket, .5 mfd., 150 V.	.70

STEERING COLUMN CONTROL HEAD PARTS

88333	Shell for control head (right-hand mounting)	.50
88334	Bracket for control head mounting	.50
88337	Shell mounting screw No. 1-72 R.H.M.S.	.01
88338	Knob for control head	$0.25
88339	Pilot light and tone control cable with plug and socket	.90
88385	Extra length pilot light and tone control cable with plug and socket (43")	1.00
88410	Shell for control head (left-hand mounting)	.50

FLEXIBLE SHAFTS

88406	18" tuning and volume control shaft	2.00
88407	24" tuning and volume control shaft	1.50
88408	30" tuning and volume control shaft	2.00
88409	36" tuning and volume control shaft	2.00

SPECIAL ACCESSORIES

88422	Ford distributor condenser	.70
88429	Distributor suppressor	.35
88430	Dome light filter	1.00
88431	Shielded loom with connector tip for antenna lead-in	.40

Prices subject to change without notice.

CEILING PRICES — A retail outlet must not sell at prices higher than those allowed by OPA Price Regulations. The suggested selling prices herein may not be charged by any retailer if his ceiling on any item is below the prices herein.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the test oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter may be conveniently connected between the chassis and the yellow lead terminal on pilot light and tone control lead socket. You will find that the yellow lead is connected through an .02 mfd. condenser to the plate of the 41 output tube. However, if the output meter is suitable, it should be connected across the speaker voice coil.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on top of the I.F. transformers which may be reached by removing the receiver top cover. Pull out the antenna plug. The test oscillator should be set to exactly 177.5 KC. and connected from the control grid of the 77 to ground. Adjust the test oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station signal is tuned in, since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the control head is calibrated in kilocycles except that one zero is omitted. Sets using the steering column control head or the Ford dash control head are calibrated as follows:

Tune in a station of known frequency between 800 and 1100 KC. Loosen the set screw in the right hand knob and remove the knob. Loosen the set screw in the knob shaft, and by rotating the knob shaft, turn the pointer until it indicates the frequency of the station which has been tuned in. Then re-tighten the set screw and replace the knob.

If the set is used with a dash control head other than that for the Ford, calibrate as follows:

Turn the knob to the right as far as it will go, and then turn it to the end in the other direction. It is necessary to continue to turn the knob after the dial pointer reaches the end stop, until the knob will turn no farther.

If the set is badly out of calibration, so that when the dial reads correctly at the low frequency end, it is off at the high frequency end, it will be necessary to adjust the oscillator shunt trimmer as explained below. The oscillator shunt trimmer is located on the oscillator section of the gang condenser which can be reached when the receiver bottom cover is removed. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the antenna lead of the receiver. This condenser is essential to the proper adjustment of the antenna stage. Set the test oscillator to exactly 600 KC. Tune the receiver to maximum output. If the control head is of the steering column or Ford dash control type, calibrate at the low end of the dial by setting the pointer to read exactly 60 (600 KC.).

Set the test oscillator to exactly 1400 KC. Turn the gang condenser by means of the tuning knob until the dial pointer indicates 140 (1400 KC.). Adjust the oscillator shunt trimmer (on gang condenser section third from shaft end) for maximum output. Adjust the two trimmers nearest the shaft end as explained under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

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, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved 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 TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

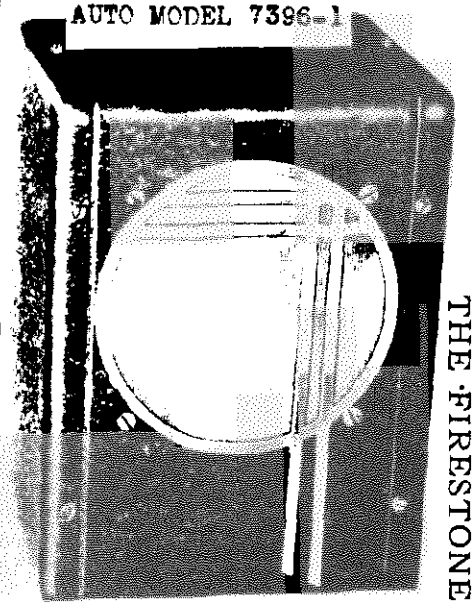
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control 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 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 (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated in circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

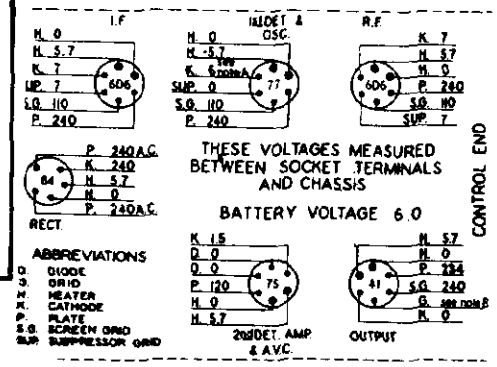


Diag No.	Part No.	Description	List Price
C-9	N-1376	.02 mfd. 400 V. 20%	$ 0.35
C-10	N-3658	40 mfd. 150 W. V. Electrolytic	1.10
C-11	N-3658	40 mfd. 150 W. V. Electrolytic	1.10
C-12	N-1346	.05 mfd. 400 V. 20%	.40
C-13	N-3080	.22 mfd. 200 V. 10%	.70
C-14	N-1345	.05 mfd. 200 V. 20%	.40
R-1	N-3814	15,000 Ohm .5 W. 20%	.20
R-2	N-3964	2,000 Ohm .5 W. 10%	.20
R-3	N-1260	50,000 Ohm .5 W. 20%	.20
R-4	N-1627	20,000 Ohm .5 W. 20%	.20
R-5	N-1263	10 Megohm .5 W. 20%	.20
R-6	N-1682	3 Megohm .5 W. 20%	0.20
R-7	N-1460	30,000 Ohm .5 W. 20%	.20
R-8	N-4076	0.5 Megohm Volume Control	2.25
R-9	N-2189	4 Megohm .5 W. 20%	.20
R-10	N-1264	500,000 Ohm .5 W. 20%	$ 0.20
R-11	N-3663	150 Ohm .5 W. 10%	.20
R-12	N-1377	200,000 Ohm .5 W. 20%	.20
R-13	N-3819	1,200 Ohm 1 W. 10%	.30
R-14	N-1742	25 Ohm .5 W. 20%	.20
R-15	N-3869	30 Ohm 1 W. 10%	.30
R-16	N-1377	200,000 Ohm .5 W. 20%	.20
R-17	N-1262	1 Megohm .5 W. 20%	.20
1	N-3784	Antenna Loop Coil	.90
2	N-3298	Oscillator Coil	.70
3	N-3816	1st I.F. Transformer	1.20
4	N-3804	2nd I.F. Transformer	1.20
5	N-3782	Output Transformer	1.00
6	N-3781	5" P. M. Speaker	3.75
	N-4025	2 Gang Condenser	3.00

N-1958	Rubber line cord	$ 0.45	
N-3812	Wood dowel spacers—loop mounting	.10	
N-3795	Screw—6-32x2¼" round head	.12	
N-3642	Washer—fibre—chassis mounting	.10	
N-4687	Cabinet back	.65	
N-4749	Knobs	.20	
N-4386	Clips—dial scale fastening	.10	
N-4696	Speaker baffle	.16	
N-4697	Grille cloth	.22	
N-4054	Dial scale (glass)	$ 0.80	
N-4055	Dial background plate	.80	
N-4053	Dial pointer	.50	
N-3787	Dial driv shaft	.50	
N-3238	Dial drive shaft bushing	.40	
N-3243	"C" Washer—dial drive shaft retainer	.07	
N-2655	Dial drive string	.10	
N-3925	Dial drive spring	.10	
N-4075	Dial lamp socket	.50	

SOCKET VOLTAGES

BOTTOM VIEW



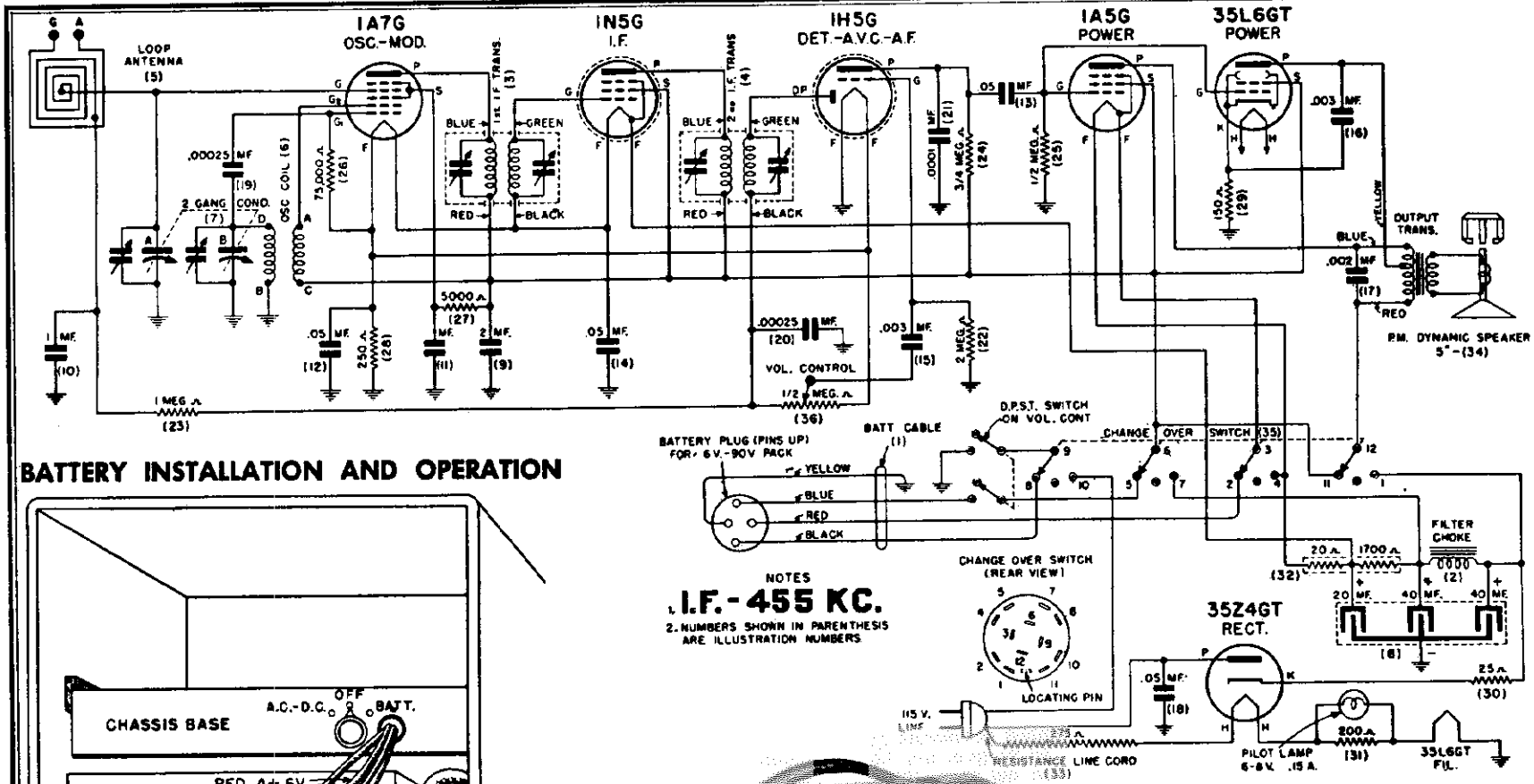
THESE VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

BATTERY VOLTAGE 6.0

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Make allowances for battery voltage variation.

NOTE A: The cathode voltage of the 77 varies from 6 to 10 volts, depending on the gang condenser setting.

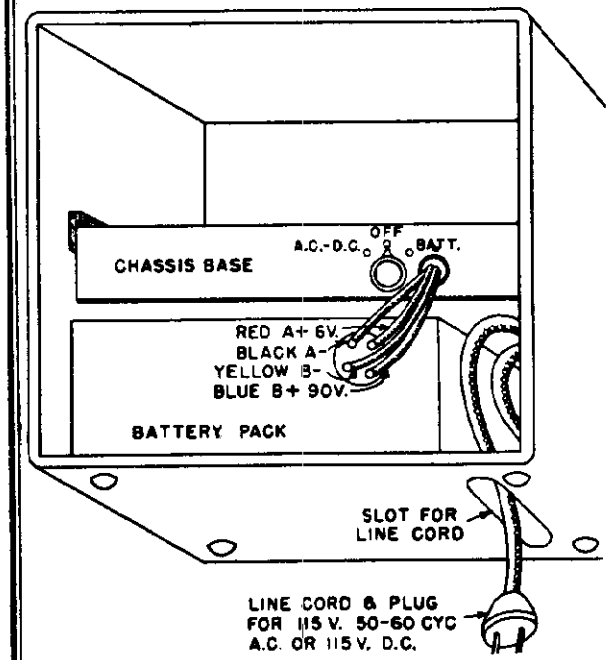
NOTE B: The grid bias on the 41 output tube is —18 volts, measured from the chassis to the ungrounded filter choke terminal.



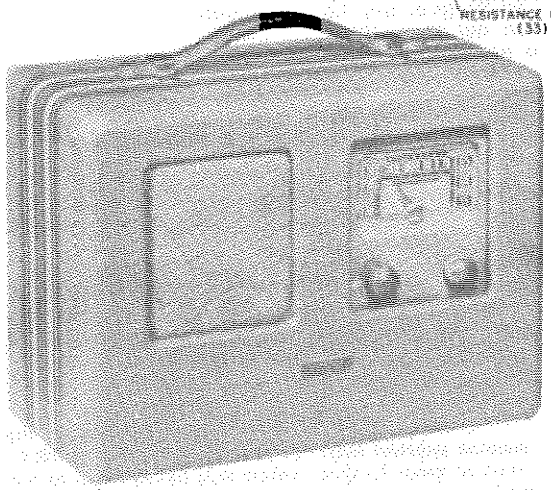
NOTES

1. I.F. - 455 KC.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS

BATTERY INSTALLATION AND OPERATION



WHEN USING AN EXTERNAL AERIAL A GROUND MUST BE PLACED UNDERNEATH THE SCREW IN THE UPPER LEFT HAND CORNER OF CABINET BACK.



NOTE: The special heat dissipating line cord used will become warm when the set is in operation. To provide maximum ventilation remove all of the line cord from the receiver cabinet and stretch it out to its full length before operating the set. When disconnecting the line cord from light supply receptacle do not pull on the line cord as this may damage it, but grasp the plug attached to the end of the cord and pull outward on this.

Do not lengthen or shorten line cord.

ALWAYS PLACE LINE CORD INSIDE CABINET WHEN NOT IN USE.

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.

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.

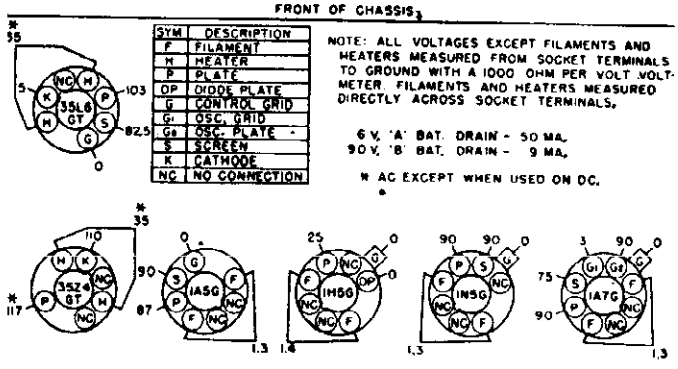
(b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

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:
(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.
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.

SHOULD THE RECEIVER FAIL TO OPERATE CHECK FOR:

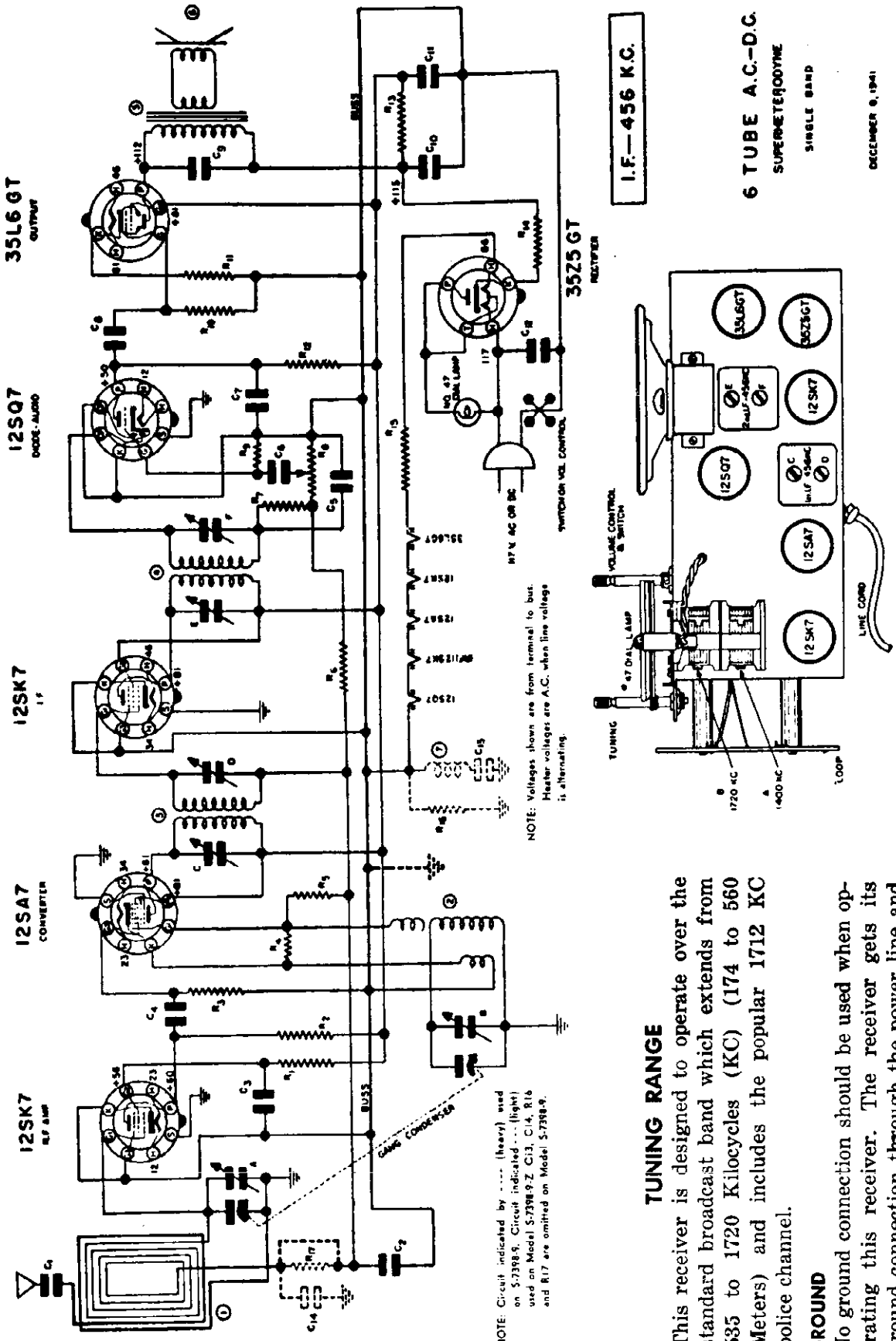
1. **Weak battery.**
2. **A defective tube.**
3. **Tubes not properly inserted in tube sockets.**
4. **Grid caps not properly inserted on grid terminals on top of tubes.**
5. **Set may not be in correct position—rotate radio to point of greatest volume.**
6. **If set is being operated in an isolated district, an external aerial may be required.**

A NOTICEABLE REDUCTION IN RECEIVER VOLUME, assuming that all tubes are in good condition, can generally be attributed to a low battery that should be replaced.



MODEL 7403-1, Brilliantone

THE FIRESTONE TIRE & RUBBER CO.



TUNING RANGE

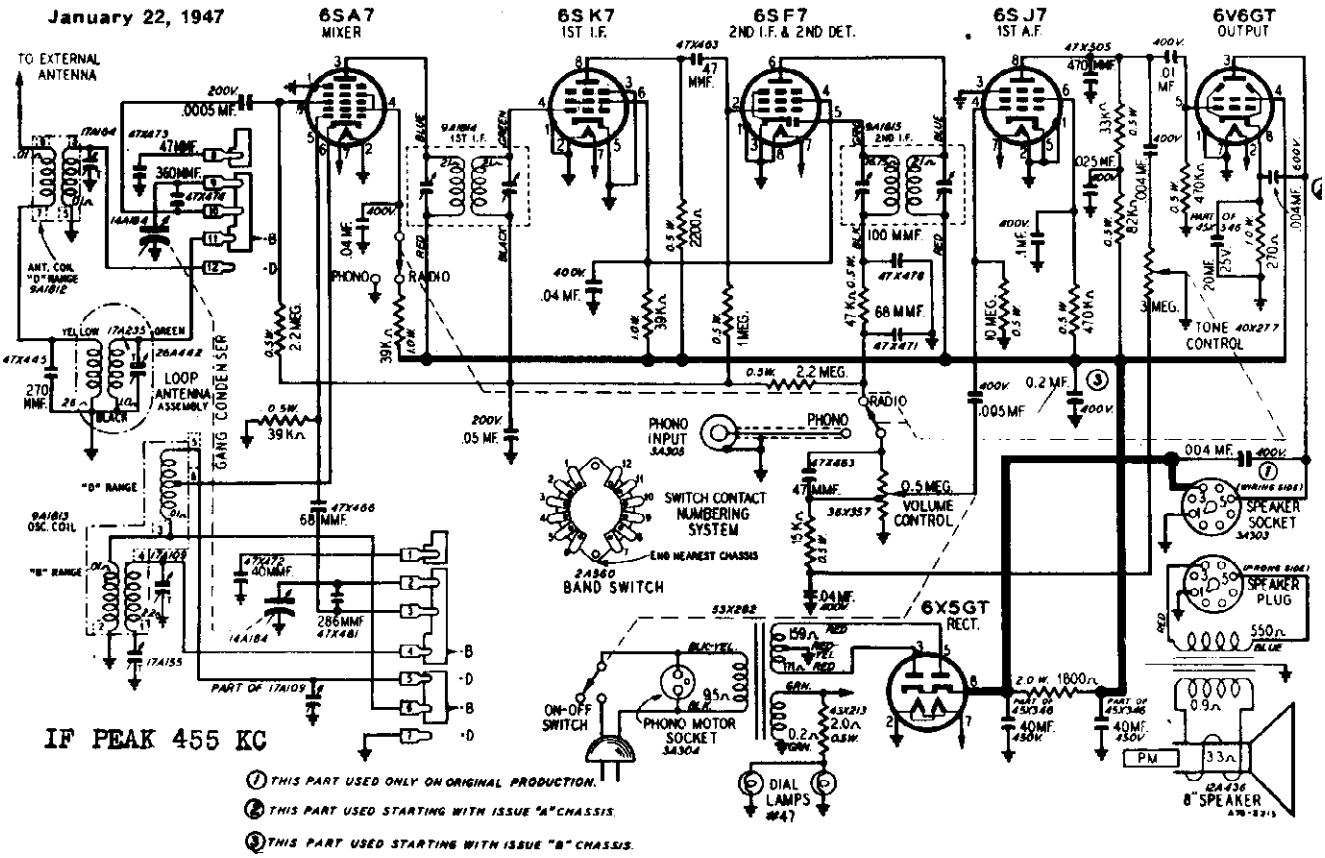
This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

GROUND

No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

GAMBLE-SKOGMO INC.

MODELS 43-7601, 43-7601A, 43-7601B
MODEL 43-7602



SUBSTITUTE PARTS LIST

The following parts are used in some receivers only. Check part number on part before ordering and order part originally used in receiver.

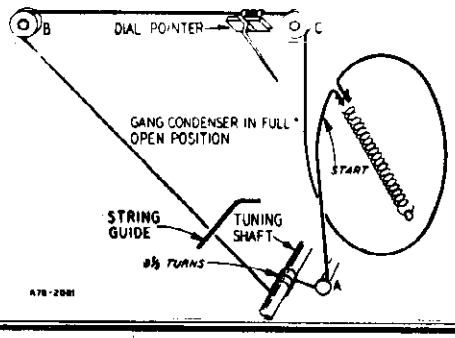
40X282 Tone Control (Substitute for 40X277)

25X1539 Radio-Phono. Switch Lever (When 40X282 is used)
No. 6-32 x 5/16" Slab Hd. Set Screw (Mtg. 25X1539)

2A161 D.P.D.T. Switch (When 40X282 is used)

DRIVE CORD REPLACEMENT

To install a new drive cord, turn the large drive pulley until the gang condenser is completely unmeshed. Hook one end of the new drive cord to the tension spring and fasten the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the rim of the drive pulley and run it ¼ turn counter-clockwise around the pulley. Pass it around the idler stud A and wind three turns clockwise around the tuning shaft with the turns progressing away from the chassis. Run the string behind the string guide, around pulleys B and C, down and under the large drive pulley, then counterclockwise around the pulley to the slot in the rim. Hook the end of the cord to the end of the tension spring and turn the tuning shaft a few turns to remove any slack in the cord.



SPECIFICATIONS

6 Tube Superheterodyne, including rectifier tube
Power Consumption ..... 60 w. normal, 60 w. phono operating (at 117 v. A.C.)
Selectivity ..... 40 kc. broad at 1,000 times signal
Intermediate Frequency ..... 455 kc.
Speaker ..... 8 inch P.M. dynamic
Tuning Frequency Range ..... B range, 540-1,600 kc.; D range, 9-15.5 meg.
Sensitivity ..... B range, 9 mv. avg.; D range, 20 mv. avg. (for 0.5 w. output with external antenna)
Power Supply ..... 105-125 v. 60 cycles only
Power Output ..... 4 w. maximum 3.5 w., 10% harmonics
Record Changer ..... Plays ten 12 inch or twelve 10 inch

CIRCUIT DESCRIPTION

The automatic record changer is connected to the rear of the chassis through jacks marked "Phono" and "Phono Motor." The "Phono" jack is switched in or out of the audio circuit by a switch controlled by the tone control knob. This switch also shorts out the r-f signal when it is turned to the phono position.

"clarified schematics"

MODELS 43-7601, 43-7601A, 43-7601B
MODEL 43-7602
MODEL 43-8576

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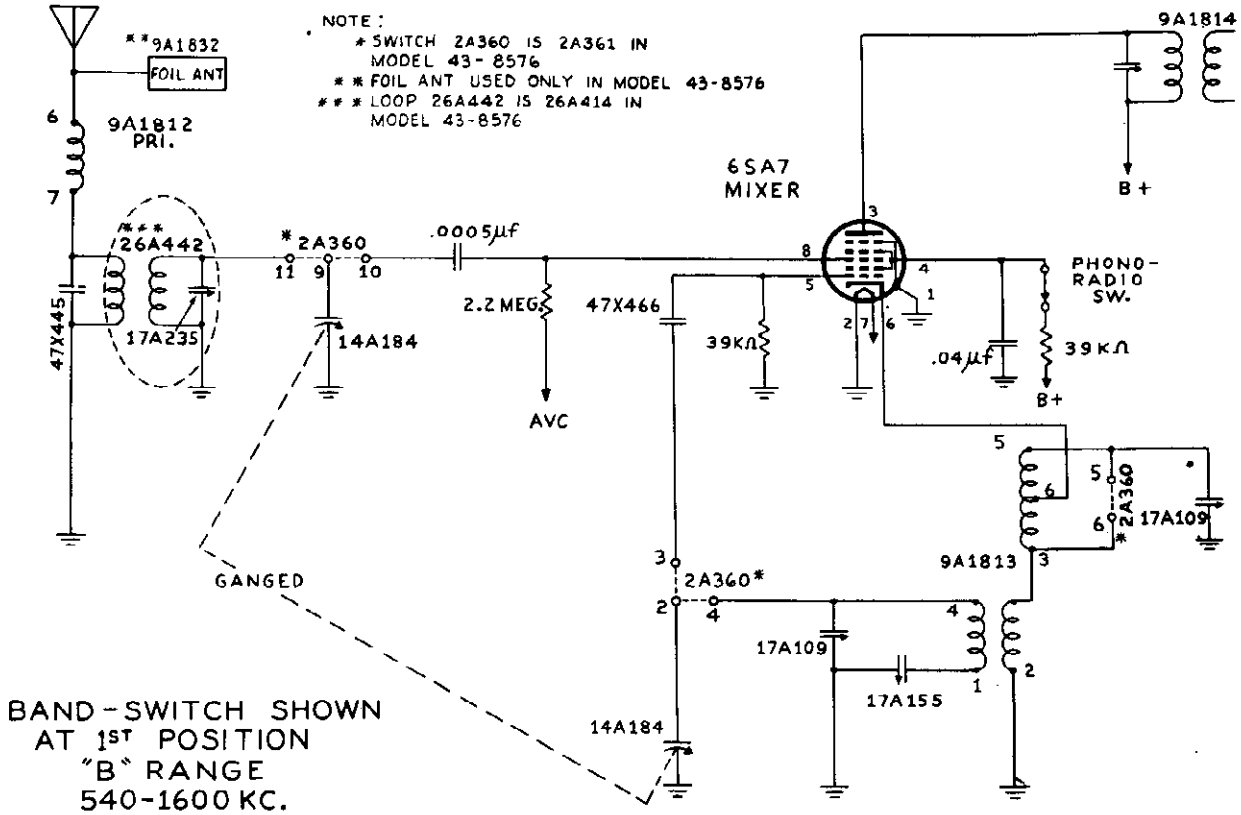
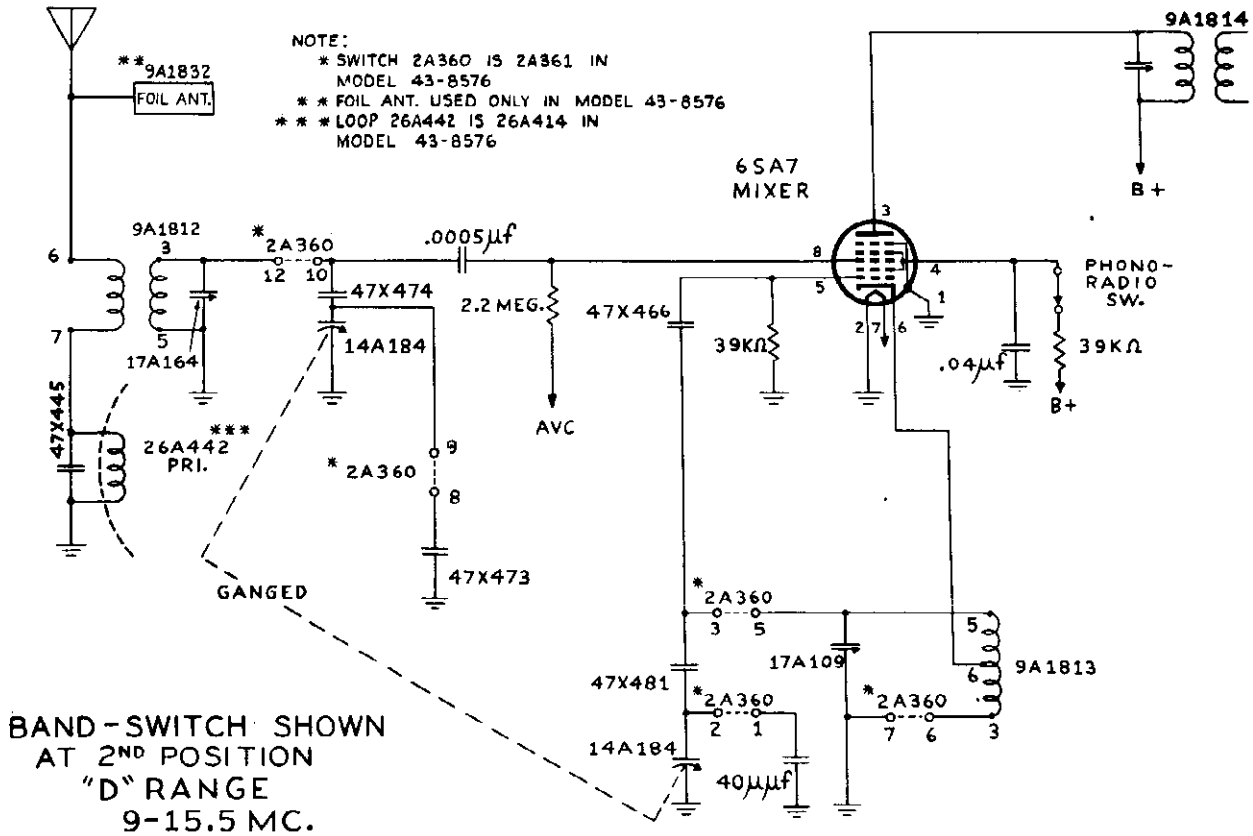


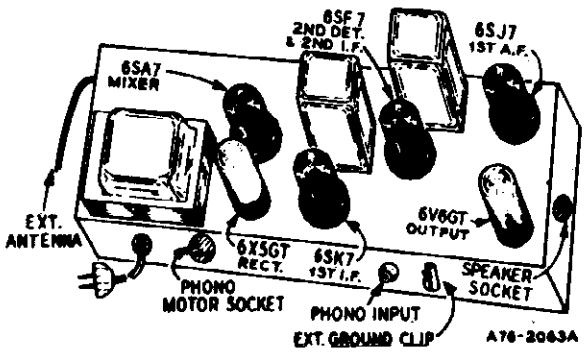
BAND-SWITCH SHOWN AT 1ST POSITION "B" RANGE 540-1600 KC.

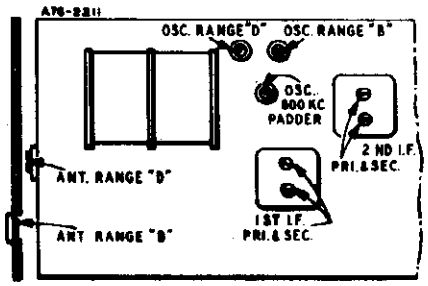


BAND-SWITCH SHOWN AT 2ND POSITION "D" RANGE 9-15.5 MC.

GAMBLE-SKOGMO INC.

MODELS 43-7601, 43-7601A, 43-7601B
MODEL 43-7602





ALIGNMENT PROCEDURE

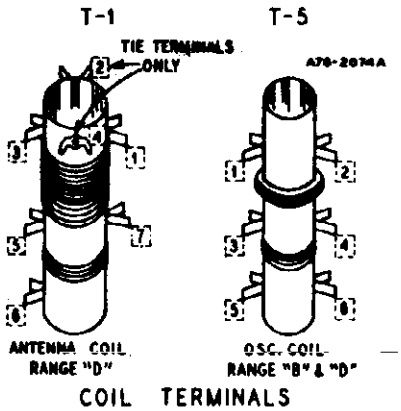
Volume Control—Maximum all adjustments.
Connect radio chassis to ground post of signal generator with a short heavy lead.
Allow chassis and signal generator to "heat up" for several minutes.
The following equipment is required for aligning:

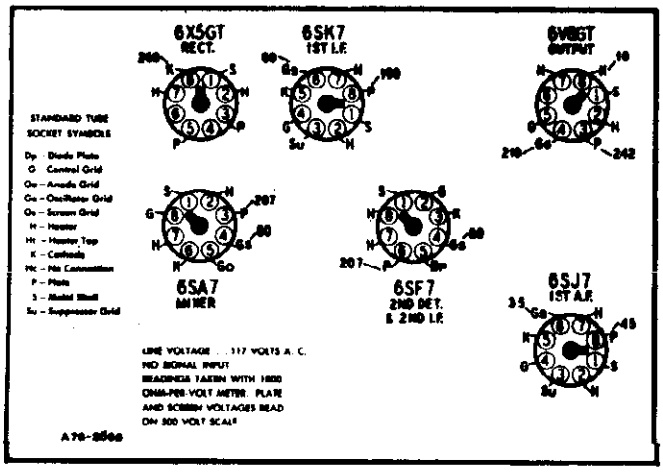
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-metallic screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.	455 Kc	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (Pri.) and (Sec.) 1st I.F. (Pri.) and (Sec.)
RANGE B	1,620 Kc.	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B
	1,400 Kc.	Antenna Lead	200 mmf.	B Range	Tune Rotor to Max. Output Set Pointer to 1,400 Kc. (See Note A)	Antenna Range B
	600 Kc.	Antenna Lead	200 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (600 Kc. Padder) Rock Rotor See Note B
	Repeat above steps at 1,620 and 600 Kc. until readjusting the oscillator. Range B Trimmer causes no further improvement of output.					
RANGE D	15,000 Kc.	Antenna Lead	400 ohm	D Range	Turn Rotor to Full Open	Oscillator Range D
	14,000 Kc.	Antenna Lead	400 ohm	D Range	Tune Rotor to Max. Output	Antenna Range D Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet.					
	1,400 Kc.	Antenna Lead	200 mmf.	B Range	Tune Rotor to Max. Output	Antenna Range B

NOTE A—Set pointer at the 1,400 KC. mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.





CIRCUIT CHANGES

Issue A chassis differ from the original production by the use of a .004 mf 600 volt tubular capacitor connected between the plate and cathode of the output tube instead of the .004 mf 400 volt tubular capacitor originally connected across the primary of the output transformer.

Issue B chassis differ from issue A chassis by the addition of a .2 mf 400 volt tubular capacitor connected from B — to chassis ground as an R-F filter.

MODELS 43-7601,43-7601A, 43-7601B
MODEL 43-7602

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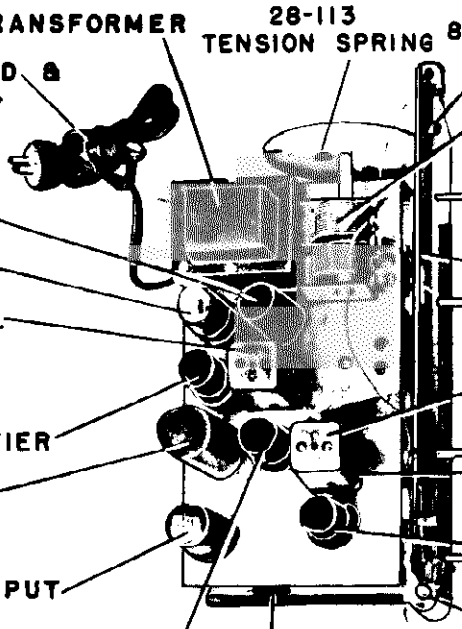
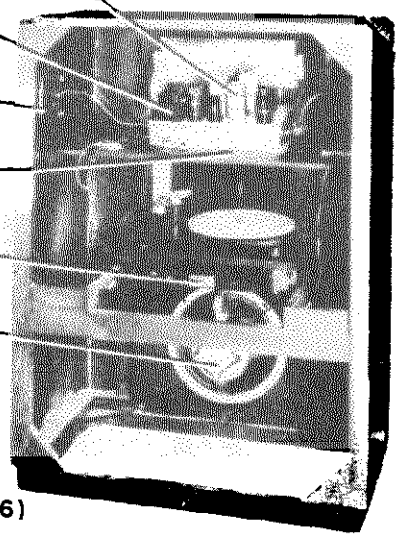
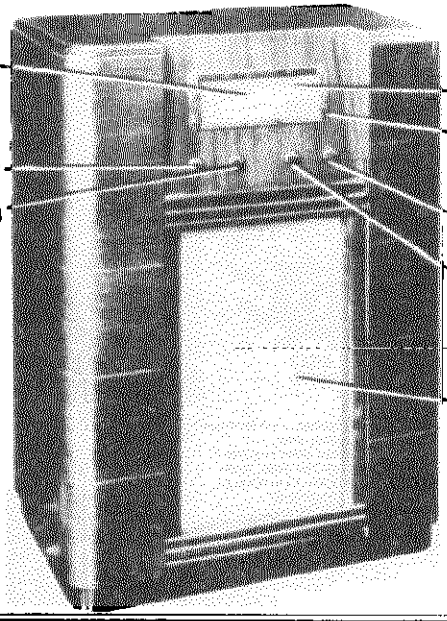


MODELS 43-7601, 43-7601A, 43-7601B; 43-7602

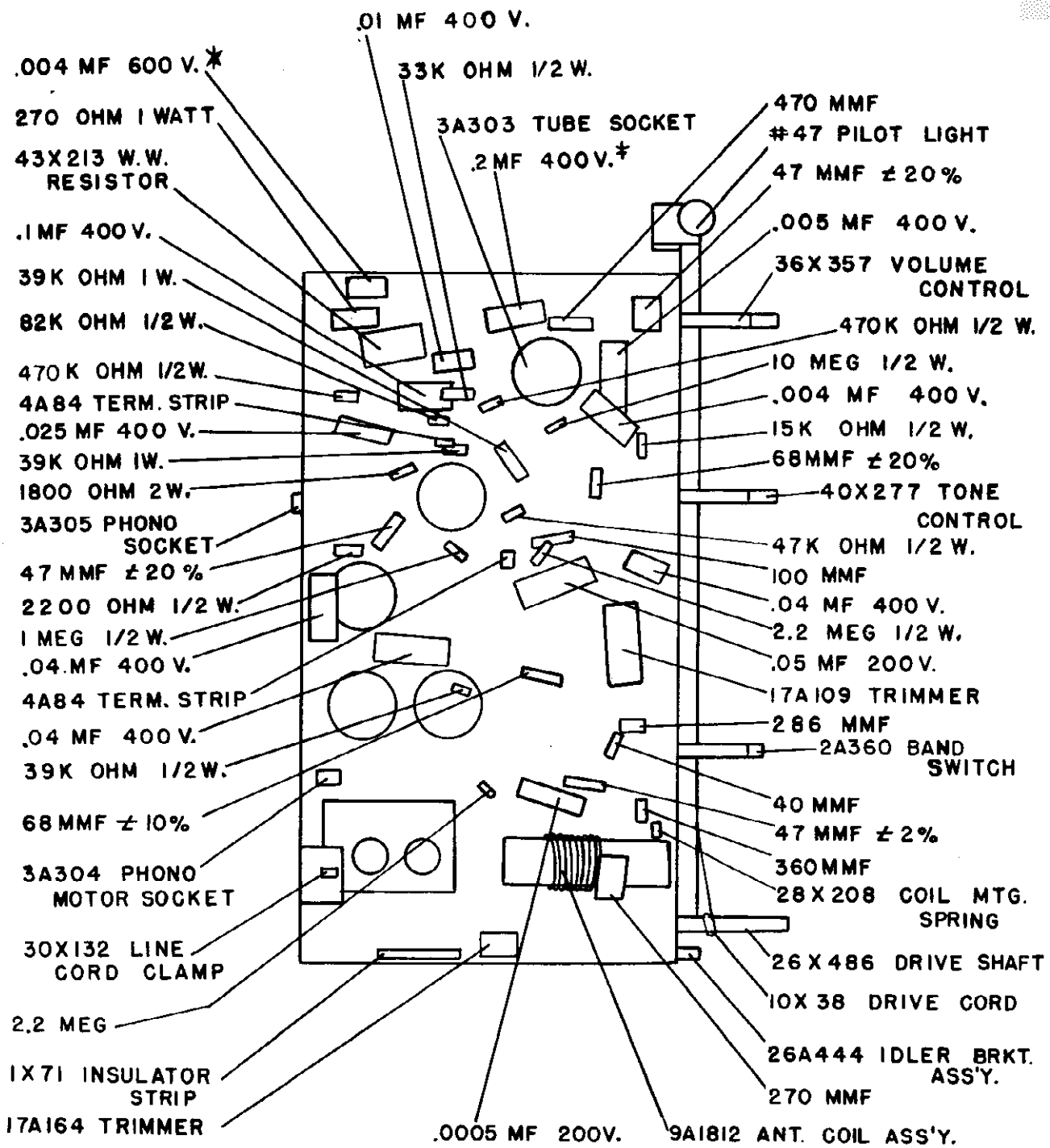


MODELS 43-7601, 43-7601A, 43-7601B



GAMBLE-SKOGMO INC.

MODELS 43-7601, 43-7601A, 43-7601B
MODEL 43-7602



‡ USED STARTING ISSUE "B" CHASSIS

* REPLACES .004 MF 400V. STARTING ISSUE "A" CHASSIS

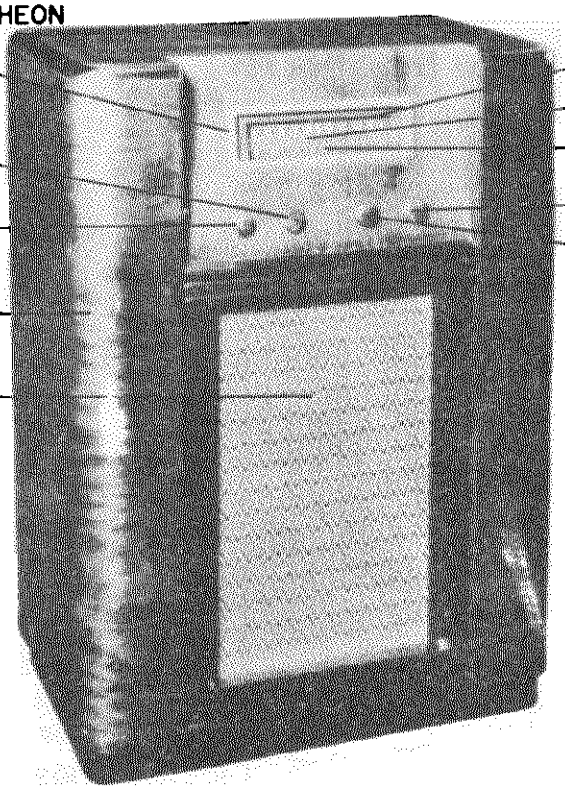
SUBSTITUTE PARTS LIST

The following parts are used in some receivers only. Check part number on part before ordering and order part originally used in receiver.

40X282	Tone Control (Substitute for 40X277)
25X1539	Radio-Phono. Switch Lever (When 40X282 is used)
	No. 6-32 x 5/16" Slab Hd. Set Screw (Mtg. 25X1539)
2A161	D.P.D.T. Switch (When 40X282 is used)

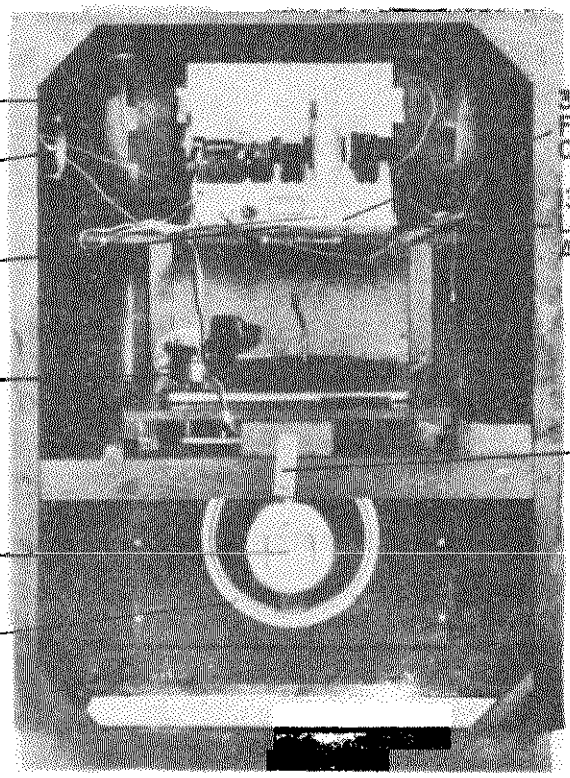
MODEL 43-7602

GAMBLE-SKOGMO INC.



FRONT VIEW

SHURE PICKUP-CARTRIDGE P30-1.



REAR VIEW

GAMBLE-SKOGMO INC.

MODEL 43-8160

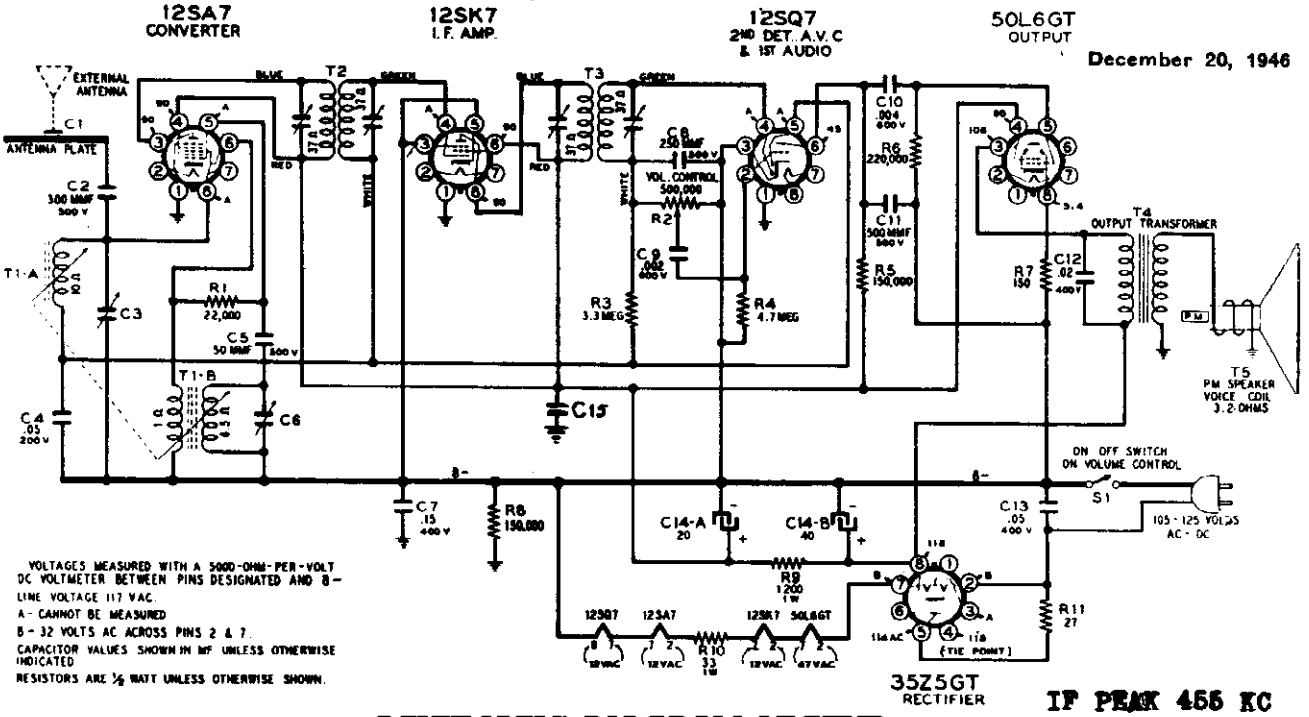
ALIGNMENT PROCEDURE

Output meter across 3.2-ohm output load.
Volume control at maximum for all adjustments.

Align for maximum output.
Reduce input as needed to keep output near 0.4 volts.

FREQUENCY	SIGNAL GENERATOR COUPLING CAPACITOR	SIGNAL GENERATOR CONNECTION TO RADIO	GROUND CONNECTION	TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
456 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3 (B—)	Iron cores all the way out	Trimmers on output and input I.F. ca
1720 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C6
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C3
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of antenna coil (see coil assembly view)
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1720 kc	Antenna trimmer C3*

*After the antenna coil has been tracked at 1400 kc. it is necessary to check the antenna trimmer C3 again at 1720 kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires considerable change, the position of the antenna coil at 1400 kc must be readjusted. These two adjustments should be made several times, until no trimmer adjustment is required at 1720 kc.



SCHEMATIC DIAGRAM LEGEND

C 1 Antenna plate, walnut color
C 1 Antenna plate, ivory color
C 2 300 mmf. 20% mica
C 3 Dual trimmer 74-136 mmf. (antenna)
C 4 .05 mf. 200 v. 25%
C 5 .05 mf. 400 v. 25%
C 6 95-175 mmf. (oscillator)
C 7 .15 mf. 400 v. 25%
C 8 250 mmf. 20% mica
C 9 .002 mf. 600 v. 25%
C10 .004 mf. 600 v. 25%
C11 500 mmf. 20% mica
C12 .02 mf. 400 v. 25%
C13 .05 mf. 400 v. 25%
C14-A, B Electrolytic 40 mf. x 150 v.
20 mf. x 150 v. for 60 cycles
Electrolytic 60 mf. x 150 v.
40 mf. x 150 v. for 25 cycles
C15 .01 mf. 400 v. 25%

RESISTORS

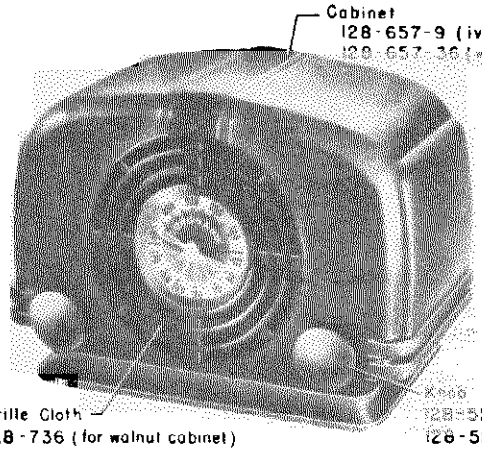
R 1 22,000 ohms ½ w. 10%
R 2 Volume control, 500,000 ohms, on-off switch
R 3 3.3 megohms ½ w. 20%
R 4 4.7 megohms ½ w. 20%
R 5 150,000 ohms ½ w. 20%
R 6 220,000 ohms ½ w. 20%
R 7 150 ohms ½ w. 10%
R 8 150,000 ohms ½ w. 20%
R 9 1,200 ohms 1 w. 10%
R10 33 ohms 1 w. 10%
R11 27 ohms ½ w. 10%

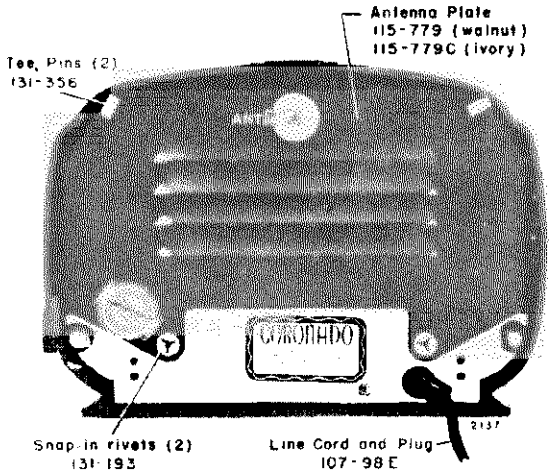
MISCELLANEOUS

T1A, B Permeability tuning unit complete, including antenna and oscillator coils
T2 Input I.F. coil complete in can. Range of trimmers: 39-73 mmf. each
T3 Output I.F. coil complete in can. Range of trimmers: 39-73 mmf. each
T4 Output transformer
T5 Speaker 4 inch P.M. voice coil impedance, 3.2 ohms

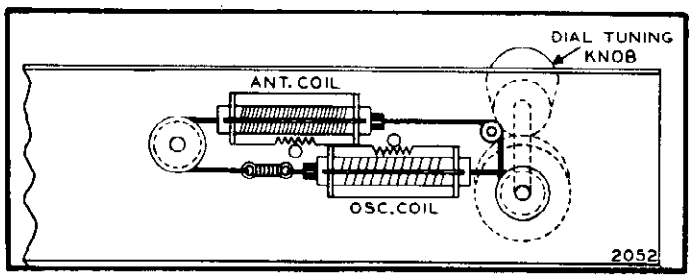
MODEL 43-8160

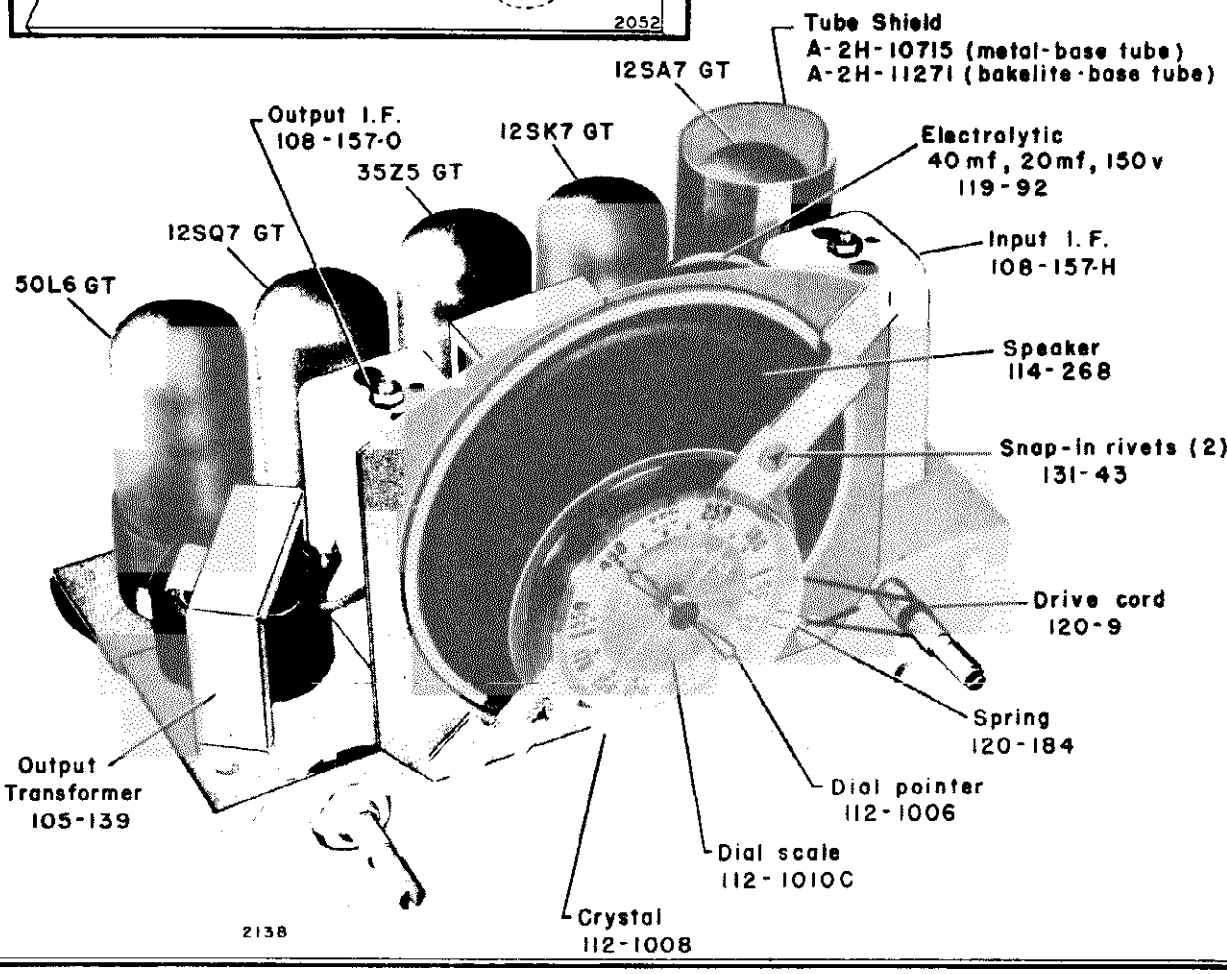
GAMBLE-SKOGMO INC.

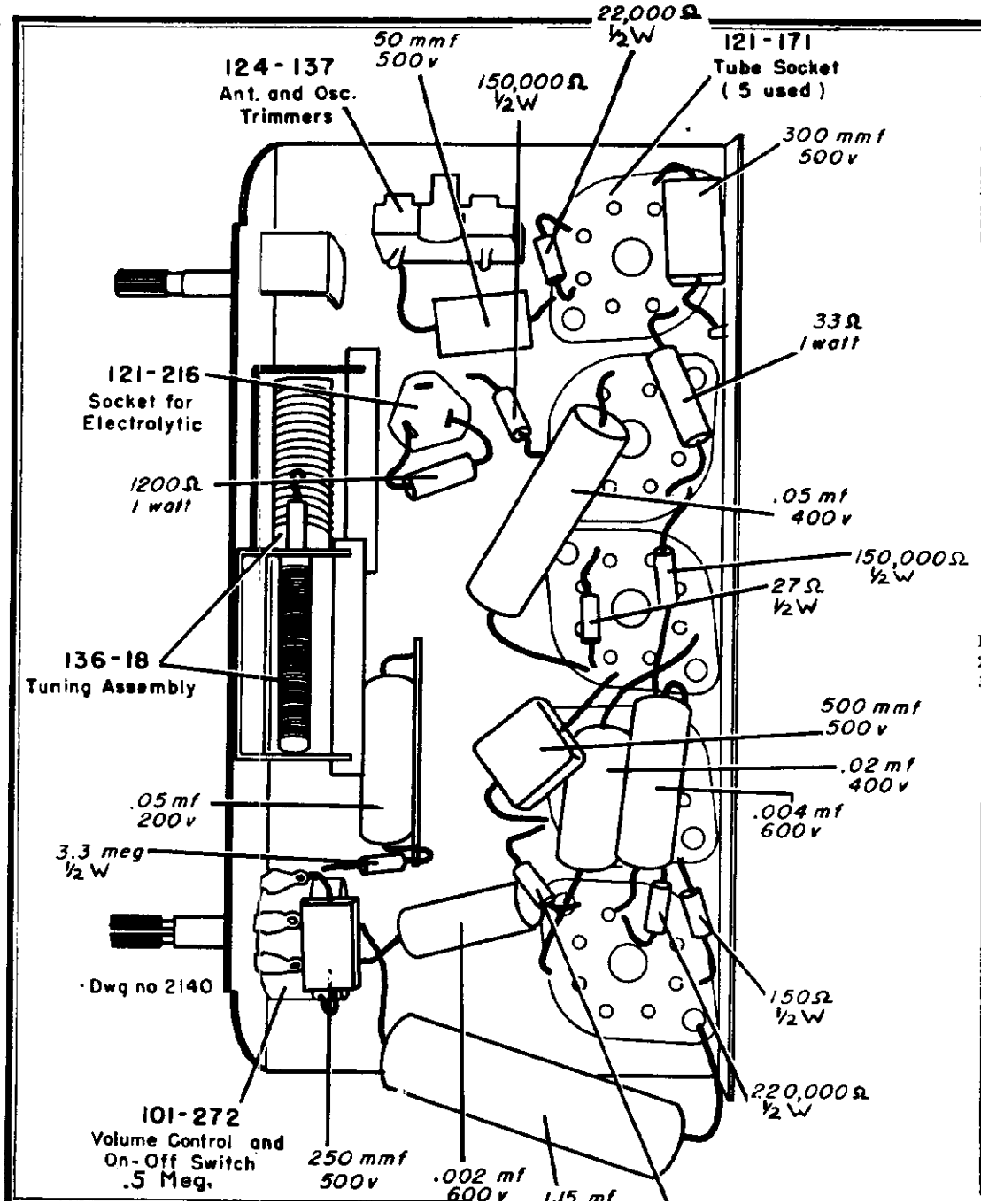




SLUG TUNER



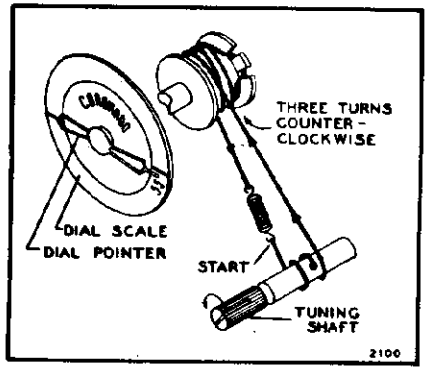




SPECIFICATIONS

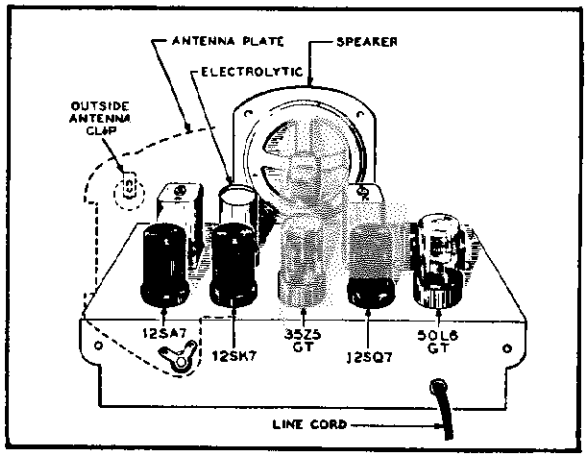
5 Tube Superheterodyne, including rectifier tube	
Power Consumption	28 w.
Power Output	0.80 w. undistorted, 1.5 w. maximum
Selectivity	71 kc. broad at 1,000 times signal at 1,000 kc.
Antenna	Self-contained plate antenna. Also provision for connection of external antenna
Intermediate Frequency	455 kc.
Speaker	4 inch P.M., voice coil impedance, 3.2 ohms
Tuning	Two permeability-tuned circuits
Sensitivity	40 mv. avg. for 50 mw. output
Frequency Range	540 to 1,720 kc.
Power Supply	105 to 125 v., A.C.-D.C., 50-60 cycle

DRIVE CORD REPLACEMENT



1. Turn tuning shaft counter-clockwise.
2. Re-string as shown.
3. Adjust pointer so that the band is covered properly when turning the tuning shaft back and forth.

CHASSIS VIEW



MODEL 43-8437

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—I.R.E.

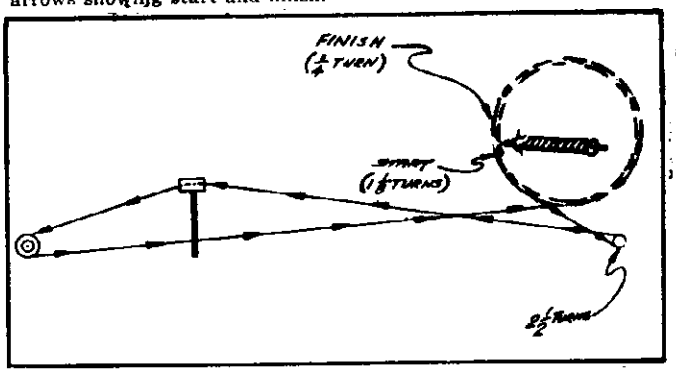
	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS
I.F. (See Note A)	455 kc	Apply signal to the converter grid 12SA7 through a .05MFD Condenser	I.R.E. Dummy Antenna	Turn rotor to full open	2nd I.F. (Pri.) & (Sec.) 1st I.F. (Pri.) & (Sec.) Adjust for maximum output
R.F. Alignment	1720 kc	Antenna Lead	I.R.E. Dummy Antenna	Turn rotor to full open	C17B Antenna Trimmer
	1500 kc	Antenna Lead	I.R.E. Dummy Antenna	Set Pointer to 1500 kc (See Note B)	Tune C17A for maximum output

NOTE A—Connect an output meter across the voice coil.

NOTE B—Set pointer at the 1500KC mark on the dial scale. Attach pointer to drive cord.

DRIVE CORD REPLACEMENT

The drive cord can be replaced by carefully following the drawing showing cord replacement. Care should be taken to follow arrows showing start and finish.



SPECIFICATIONS

5 Tube Superheterodyne, including rectifier tube
Power Consumption ..... 28 w. (at 117 v. A.C.)
Power Output ..... 1.5 w. maximum 1 w., 10% harmonics
Selectivity ..... 65 kc. broad at 1,000 times signal
Intermediate Frequency ..... 455 kc.
Speaker ..... 5¼ inch P.M. dynamic
Tuning Frequency Range ..... 540 to 1,700 kc.
Sensitivity ..... 85 mv. avg. (for 0.5 w. output with external antenna)

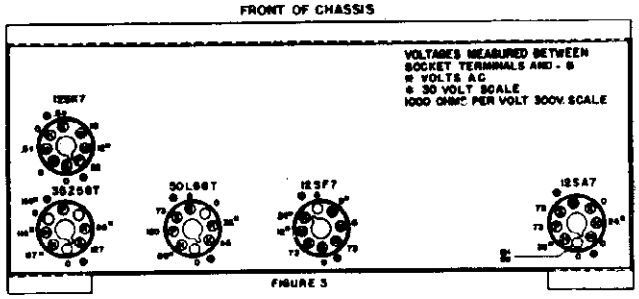
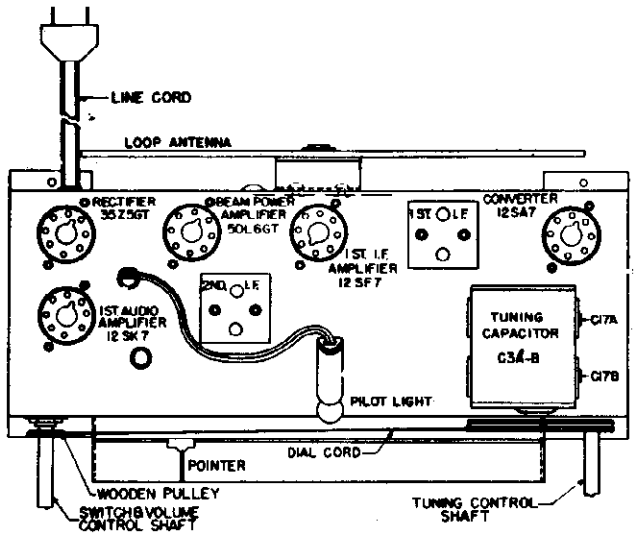
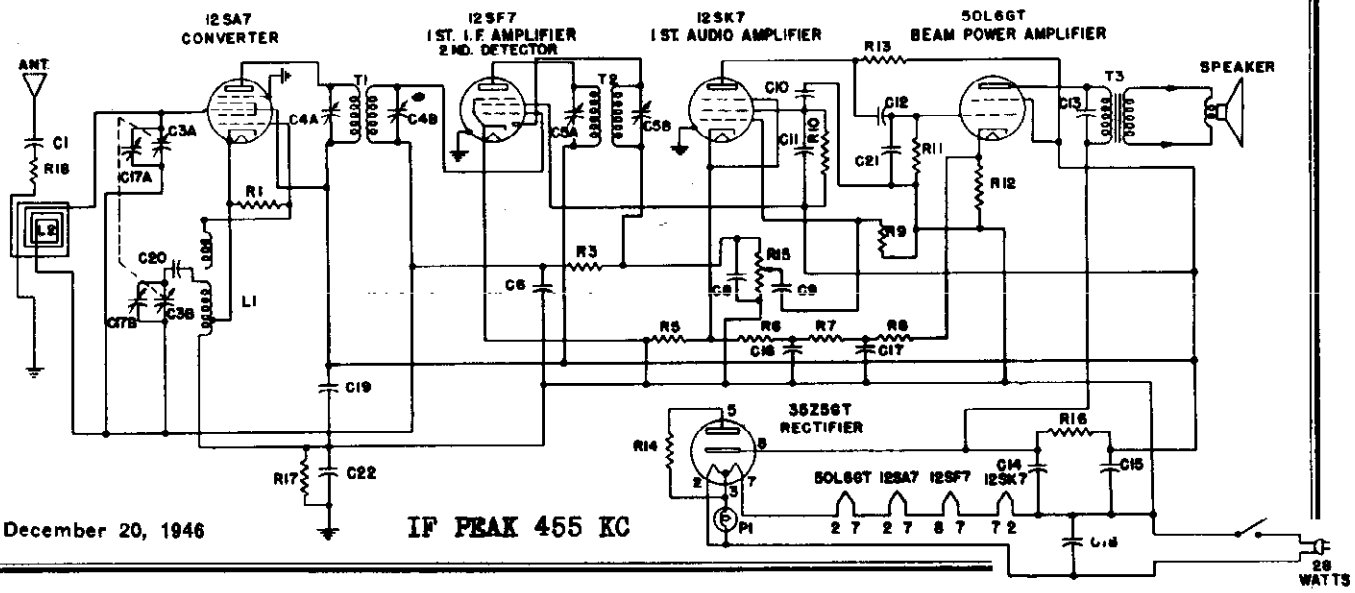


FIGURE 3

AC LINE VOLTS-117 MAX VOLUME GANG CLOSED NO SIGNAL



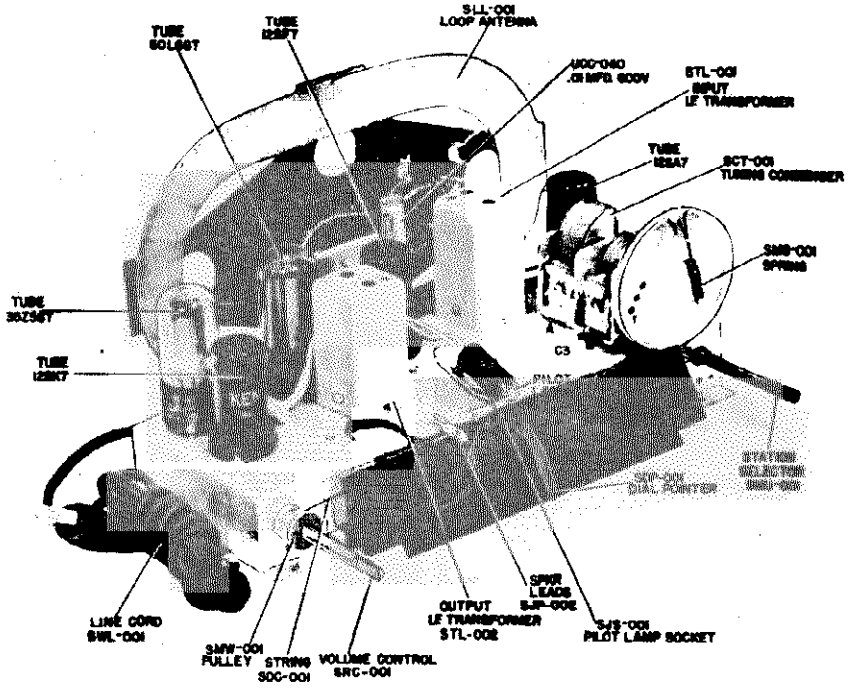


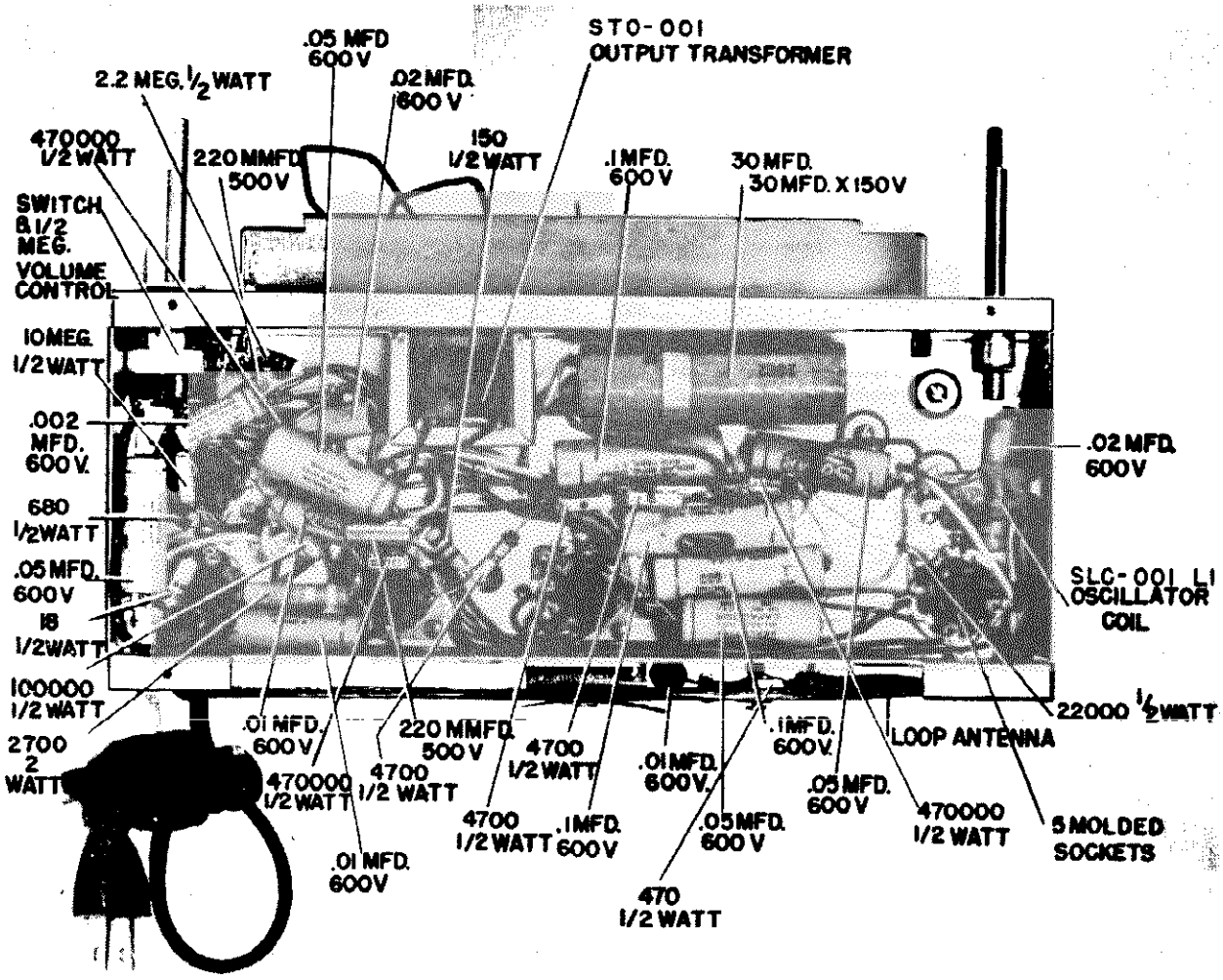
December 20, 1946

IF PEAK 455 KC

GAMBLE-SKOGMO INC.

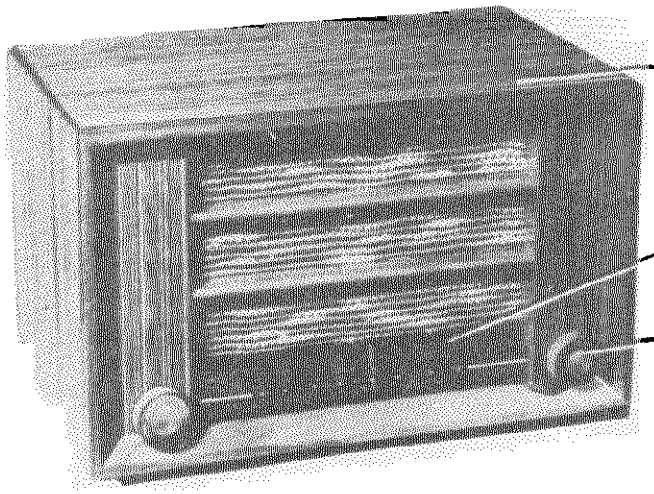
MODEL 43-8437

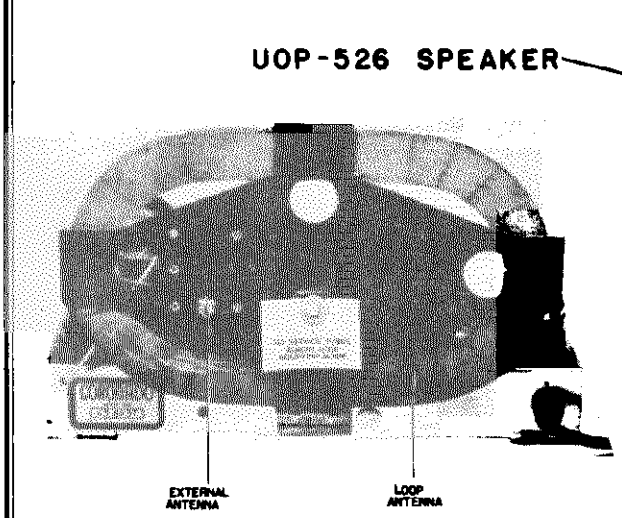


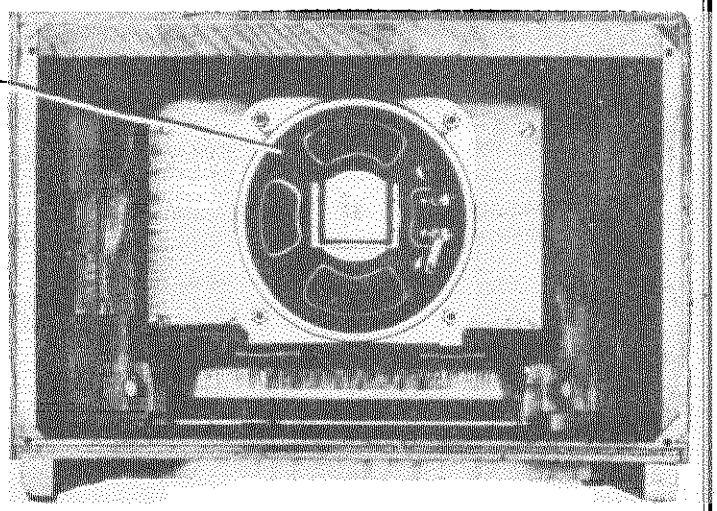


MODEL 43-8437

GAMBLE-SKOGMO INC.







PRECAUTION

If the signal generator is A-C operated, use an isolating transformer between the power supply and radio receiver power input. The use of an isolating capacitor is not recommended, as A-C through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

REMOVAL OF CHASSIS FROM CABINET

In order to remove the chassis from the cabinet, pull off the two control knobs, remove the four push pins holding the cabinet back in place, and take out the four chassis mounting bolts from the bottom of the cabinet. When the chassis has been loosened, disconnect the two clips which connect the chassis to the speaker. The chassis can now be removed from the cabinet.

SCHEMATIC DIAGRAM LEGEND

RESISTORS

R 1	220,000 ohm carbon, ½ watt
R 3	2.2 megohm carbon resistor, ½ watt
R 5	680 ohm carbon resistor, ½ watt
R 6	4,700 ohm carbon resistor, ½ watt
R 7	4,700 ohm carbon resistor, ½ watt
R 8	4,700 ohm carbon resistor, ½ watt
R 9	10 megohm carbon resistor, ½ watt
R10	470,000 ohm carbon resistor, ½ watt
R11	470,000 ohm carbon resistor, ½ watt
R12	150 ohm carbon resistor, ½ watt
R13	100,000 ohm carbon resistor, ½ watt
R14	18 ohm carbon resistor, 1 watt
R15	500,000 ohm carbon resistor, ½ watt
R16	2,700 ohm carbon resistor, 2 watt
R17	470,000 ohm carbon resistor, ½ watt
R18	470 ohm carbon resistor, ½ watt

CONDENSERS

C 1	.01 mfd. paper capacitor
C 2	47 mmfd. mica capacitor
C 3A	Antenna section
C 3B	Oscillator section
C 6	.05 mfd. paper capacitor
C 8	22 mmfd. mica capacitor
C 9	.002 mfd. paper capacitor
C10	.05 mfd. paper capacitor
C11	.02 mfd. paper capacitor
C12	.01 mfd. paper capacitor
C13	.01 mfd. paper capacitor
C14	30 mfd. 150 v. electrolytic capacitor
C15	30 mfd. 150 v. electrolytic capacitor
C16	.1 mfd. paper capacitor
C17A	Antenna trimmer
C17B	Oscillator trimmer
C18	.05 mfd. paper capacitor
C19	.05 mfd. paper capacitor
C20	.02 mfd. paper capacitor
C21	22 mmfd. mica capacitor
C22	.1 mfd. paper capacitor

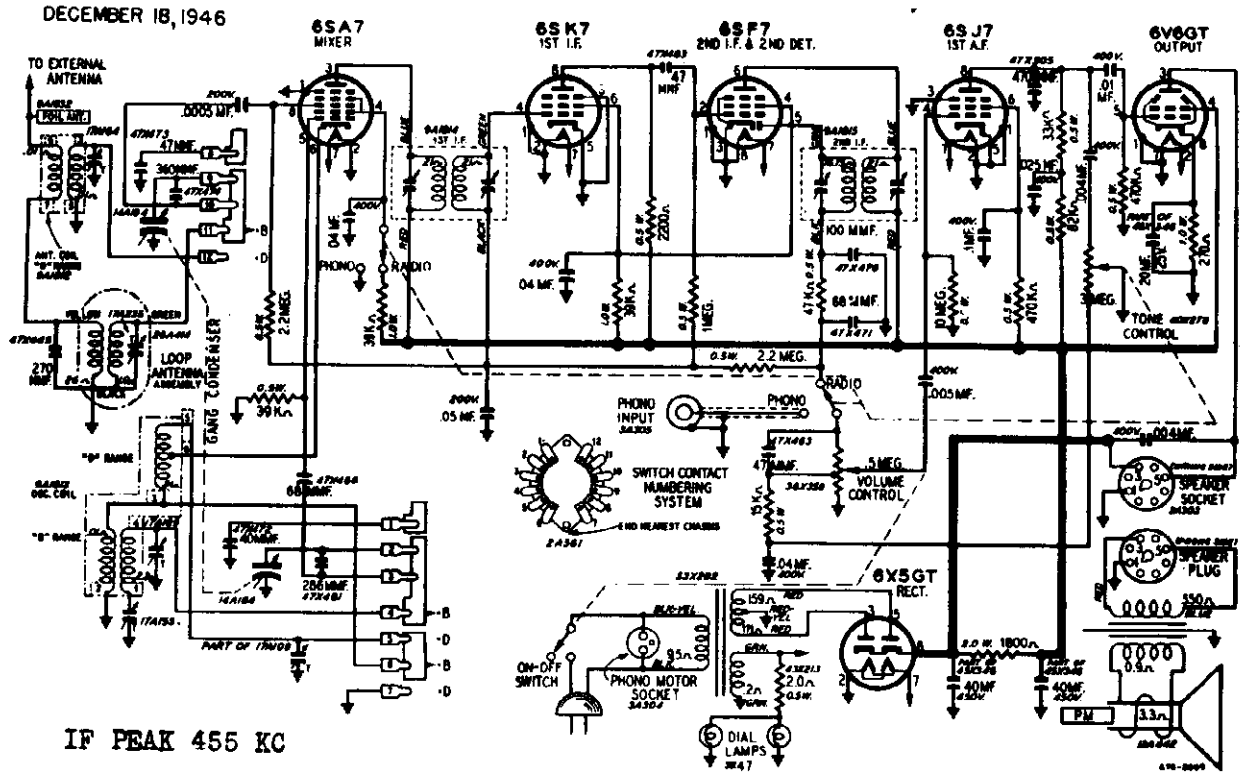
MISCELLANEOUS

L1	Oscillator coil
L2	Antenna loop
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
P1	Pilot light—Mazda No. 51

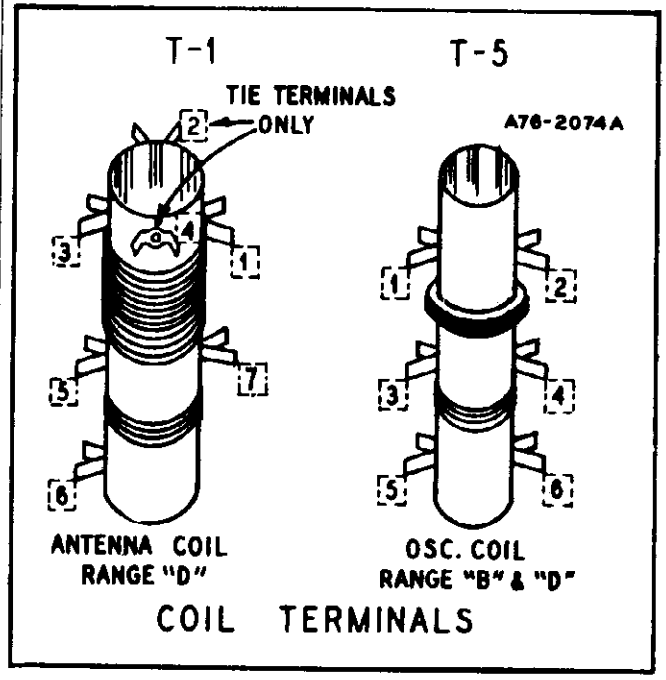
GAMBLE-SKOGMO INC.

MODEL 43-8576

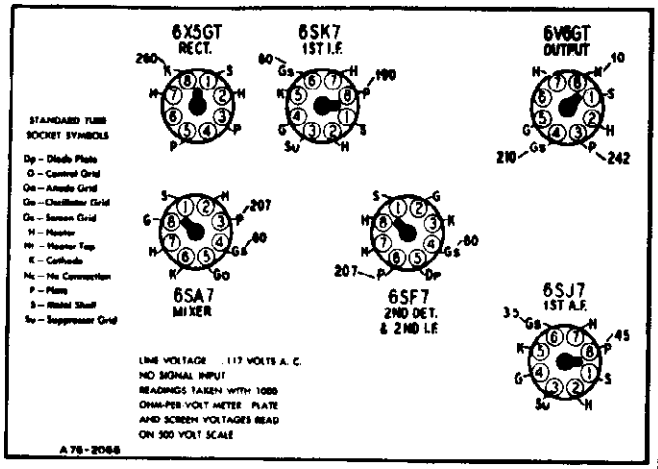
DECEMBER 18, 1946



IF PEAK 455 KC



COIL TERMINALS



CIRCUIT DESCRIPTION

The circuit and tube complement of the receiver are as follows: 1—6SA7 1st Detector and Oscillator, 1—6SK7 1st I-F Amplifier, 1—6SF7 2nd I-F Amplifier and 2nd Detector, 1—6SJ7 1st Audio Amplifier, 1—6V6GT Power Output, 1—6X5GT Rectifier. Two No. 47 dial lamps are used for dial illumination.

A jack is provided at the rear of the chassis for record player or other special service connections. This jack is switched in or out of the audio circuit with a switch controlled by the tone control knob that also shorts out the r-f signal when it is turned to the phono position.

SPECIFICATIONS

6 Tube Superheterodyne, Including Rectifier Tube

Speaker.....6" PM Dynamic

Intermediate Frequency.....455 Kc.

Selectivity.....40 Kc. Broad at 1,000 Times Signal

Sensitivity (For 0.5 Watt Output, with External Antenna)

B Range ..... 9 Microvolts Av.

D Range .....20 Microvolts Av.

Power Consumption (at 117 Volts AC).40 Watts (normal)

Power Output.....

4 Watts Maximum 2.3 Watts, 10% Harmonics

Tuning Frequency Range

B Range.....540-1600 Kilocycles

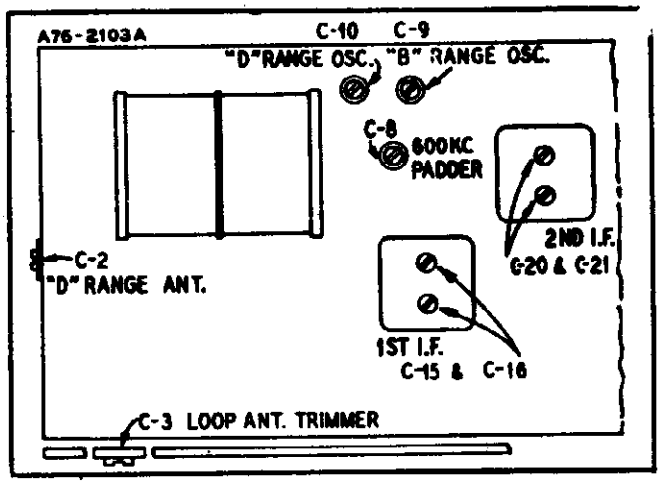
D Range.....9-15.5 Megacycles

MODEL 43-8576

GAMBLE-SKOGMO INC.

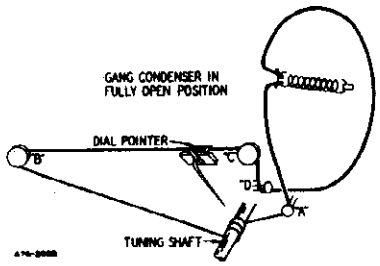
REMOVAL OF CHASSIS FROM CABINET

After the cabinet back has been taken off, it is necessary to disconnect the white lead from the foil antenna mounted in the top of the cabinet and to loosen the screw and remove the black lead fastened to the lower left rear corner of the chassis. The chassis may then be pulled from the cabinet.



DRIVE CORD REPLACEMENT

When installing a new drive cord, turn the large drive pulley until the gang condenser plates are fully unmeshed. Hook one end of the new drive cord to the tension spring and hook the tension spring to the tab on the large drive pulley. Pass the cord through the slot in the drive pulley rim and continue one-fourth turn counterclockwise around the drive pulley. Then pass the cord around idler stud A (see illustration) and wind three turns clockwise around the tuning shaft with the turns progressing away from the chassis. Pass the cord over pulleys B and C and around idler stud D. Wrap the cord one-half turn counterclockwise around the large drive pulley and hook the end of the drive cord to the tension spring. It may be necessary to unhook the tension spring from the drive pulley in order to attach the cord, after which it should be again hooked to the drive pulley and the tuning shaft turned a few turns in order to take up the slack in the drive cord.



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 Screw-driver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

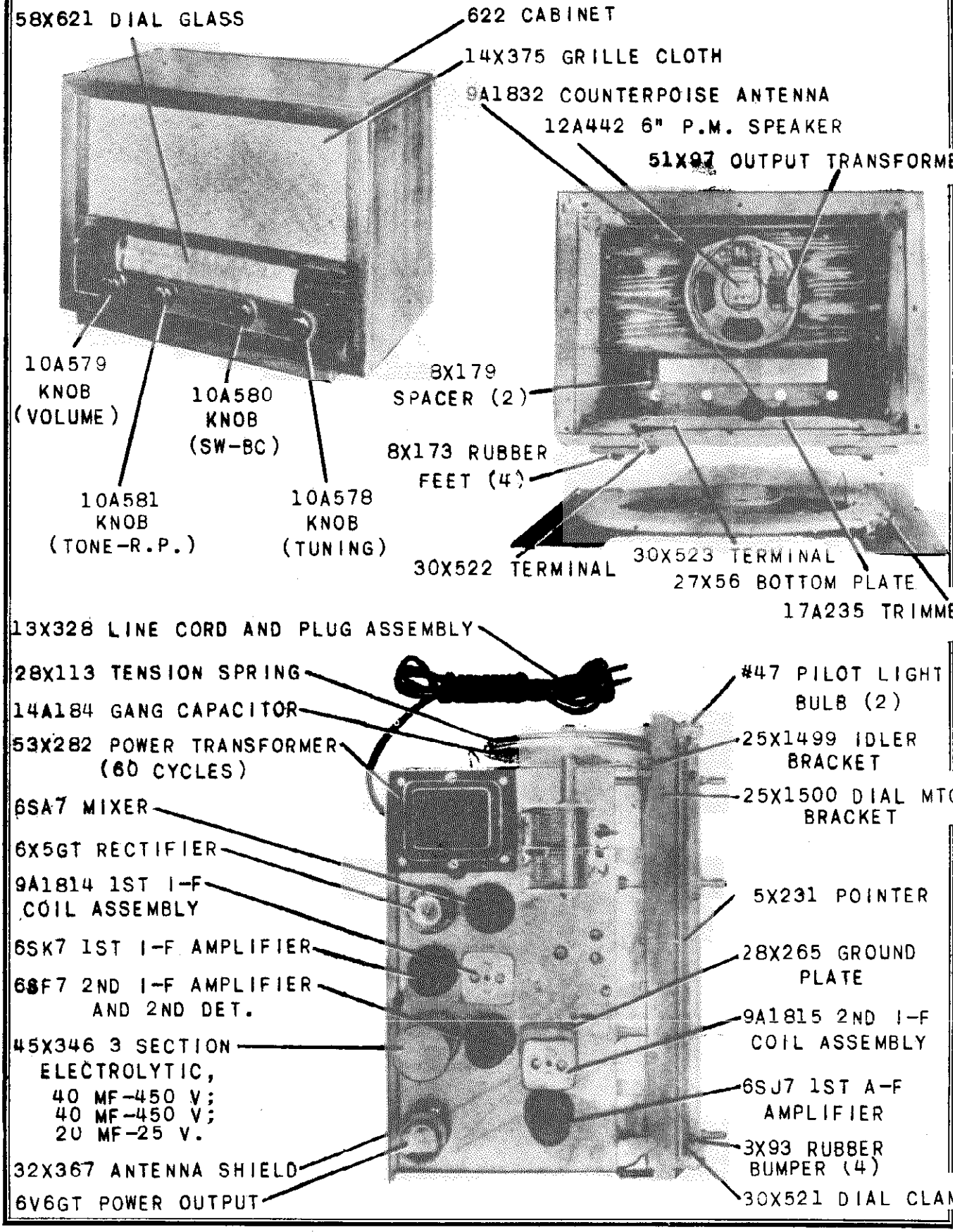
	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 Kc.	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C20) & (C21) 1st I.F. (C15) & (C16)
RANGE B	1,620 Kc.	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
	1,400 Kc.	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Set Pointer to 1,400 Kc. (See Note A)	Ant. Range B (C3)
	600 Kc.	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C8) Rock Rotor See Note B
	Repeat above steps at 1,620 and 600 Kc. until readjusting the oscillator Range B Trimmer (C8) causes no further improvement of output.					
RANGE D	15,600 Kc.	Antenna Lead	400 ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14,000 Kc.	Antenna Lead	400 ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2)
LOOP RANGE B	1,400 Kc.	Reassemble chassis in cabinet. Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Rock Rotor—See Note B Ant. Range B (C3)

NOTE A—Set pointer at the 1,400 Kc. mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

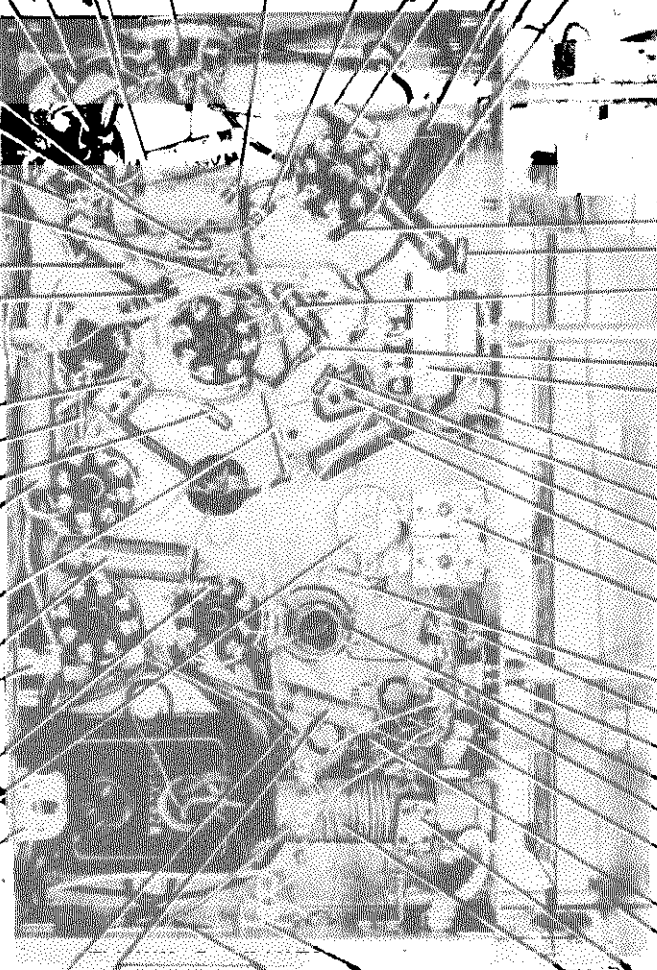
GAMBLE-SKOGMO INC.

MODEL 43-8576



MODEL 43-8576

GAMBLE-SKOGMO INC.



19X8 FLAT WASHER

#10 X 1/2" SLOTTED HEX HD. P-K TYPE "Z" SCREW (MTG. CHASSIS TO CABINET) (4)

28X292 SNAP BUTTON (7)

3A303 SPEAKER SOCKET

C. .004 MF 200 V

C. .01 MF 400 V

R. 270Ω 1 W

R., WIRE WOUND 2Ω ± 20% 1/2 W

C. .1 MF 400 V

R. 82,000Ω 1/2 W

R. 470Ω 1/2 W

R. 39,000Ω 1 W

30X138 CLIP

C. .025 MF 400 V

R. 1,800Ω 2 W

3A305 PHONO SOCKET

C. 47 MMF ± 20%

R. 2,200Ω 1/2 W

R. 1 MEG. 1/2 W

C. .04 MF ± 10% 400 V

4A84 TERMINAL STRIP (2)

C. .04 MF 400 V

3A304 PHONO MOTOR SOCKET

R. 39,000Ω 1/2 W

17A155 TRIMMER 350-430 MMF

30X132 LINE CORD CLAMP

R. 2.2 MEG. 1/2

C. .0005 MF 200 V

1X71 INSULATOR STRIP

R. 470,000Ω 1/2 W

R. 33,000Ω 1/2 W

C. 470 MMF ± 10%

3A303 TUBE SOCKET (6)

C. .005 MF 400 V

C. 47 MMF ± 20%

36X359 VOLUME CONTROL AND SWITCH .5 MEG.

C. .004 MF 400 V

R. 10 MEG. 1/2 W

R. 15,000Ω 1/2 W

R. 39,000Ω 1 W

R. 47,000Ω 1/2 W

40X278 TONE CONTROL AND R.P. SWITCH

C. .04 MF 400 V

R. 2.2 MEG. 1/2 W

C. 100 MMF ± 20%

C. .05 MF, 200 V

17A109 TRIMMER DUAL 2.5-35 MMF

C. 68 MMF ± 10%

C. 286 MMF ± 2%

2A361 BAND SWITCH

9A1813 OSC. COIL

C. 40 MMF ± 2%

C. 360 MMF ± 2%

C. 47 MMF ± 2%

26X487 DRIVE SHAFT

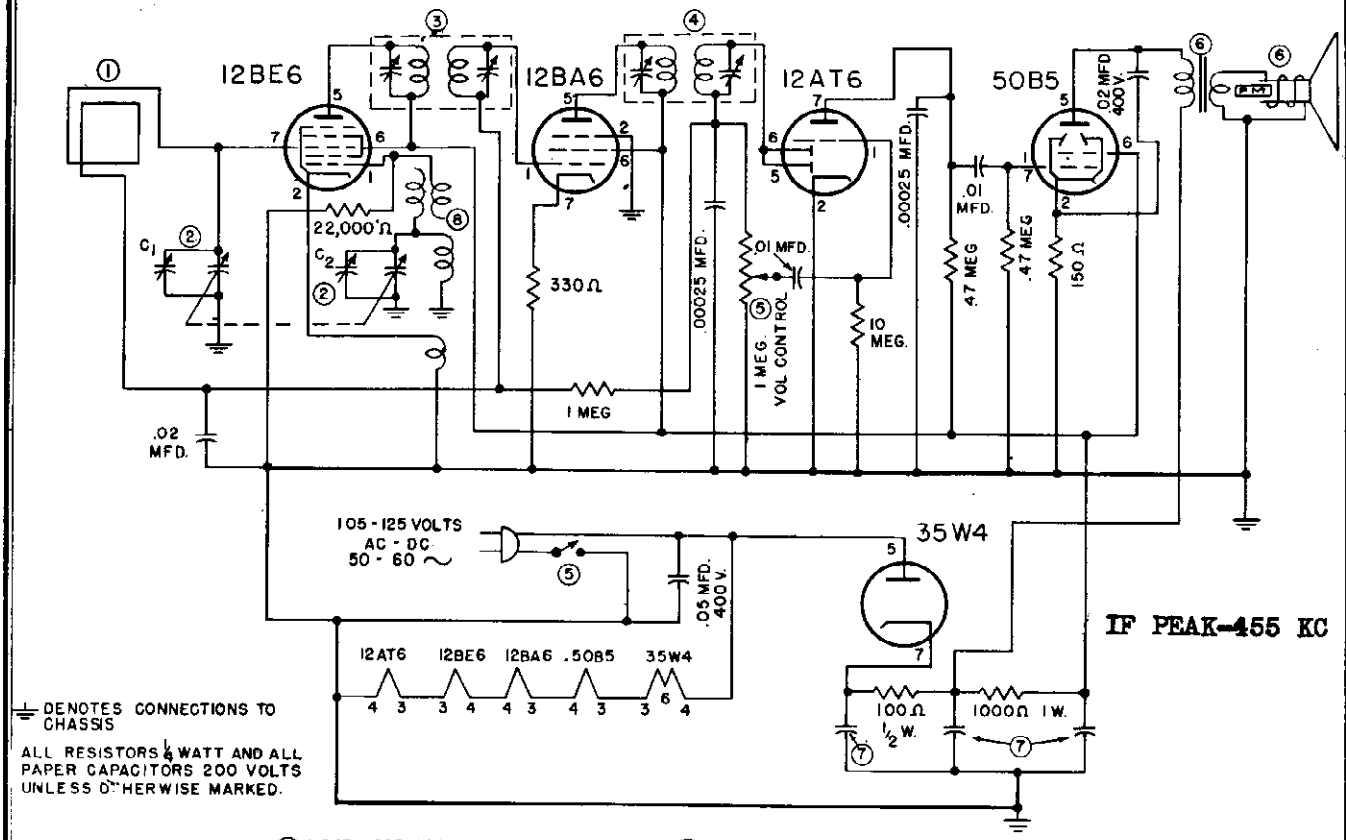
C. 270 MMF ± 10%

9A1812 ANTENNA COIL

17A164 TRIMMER 5-50 MMF

GAROD ELECTRONICS CORP.

The Ensign
MODEL 5A1



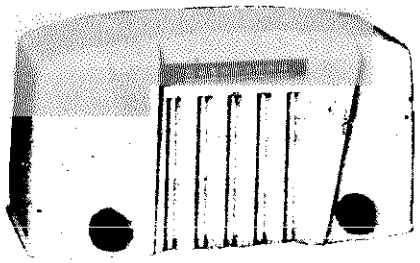
① 1.443 LOOP ASSEMBLY
② 2.200. 2 GANG VARIABLE COND.
③ 1.259 1ST I.F. TRANSFORMER
④ 1.259 2ND I.F. TRANSFORMER
⑤ 8.200-9 OR 8.200-4 VOLUME CONTROL & SWITCH
⑥ 30.303 P.M. 4" SPEAKER & OUTPUT TRANS.
⑦ 5.415-2 ELECTROLYTIC CAP. 20-20-20 MFD.
⑧ 1.444-1 OSCILLATOR COIL

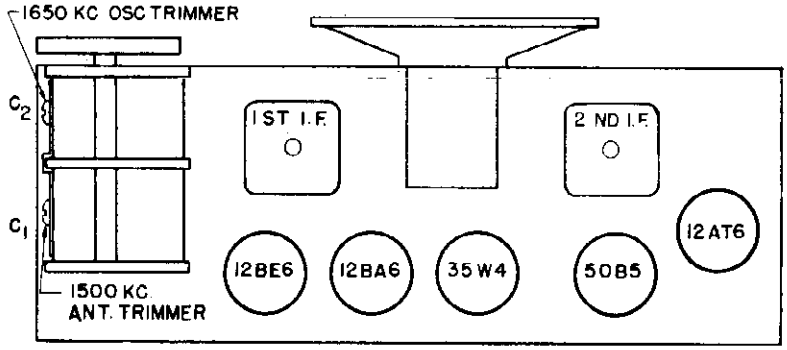
2-47

LINE VOLTAGE: This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC).

POWER CONSUMPTION: 30 Watts.

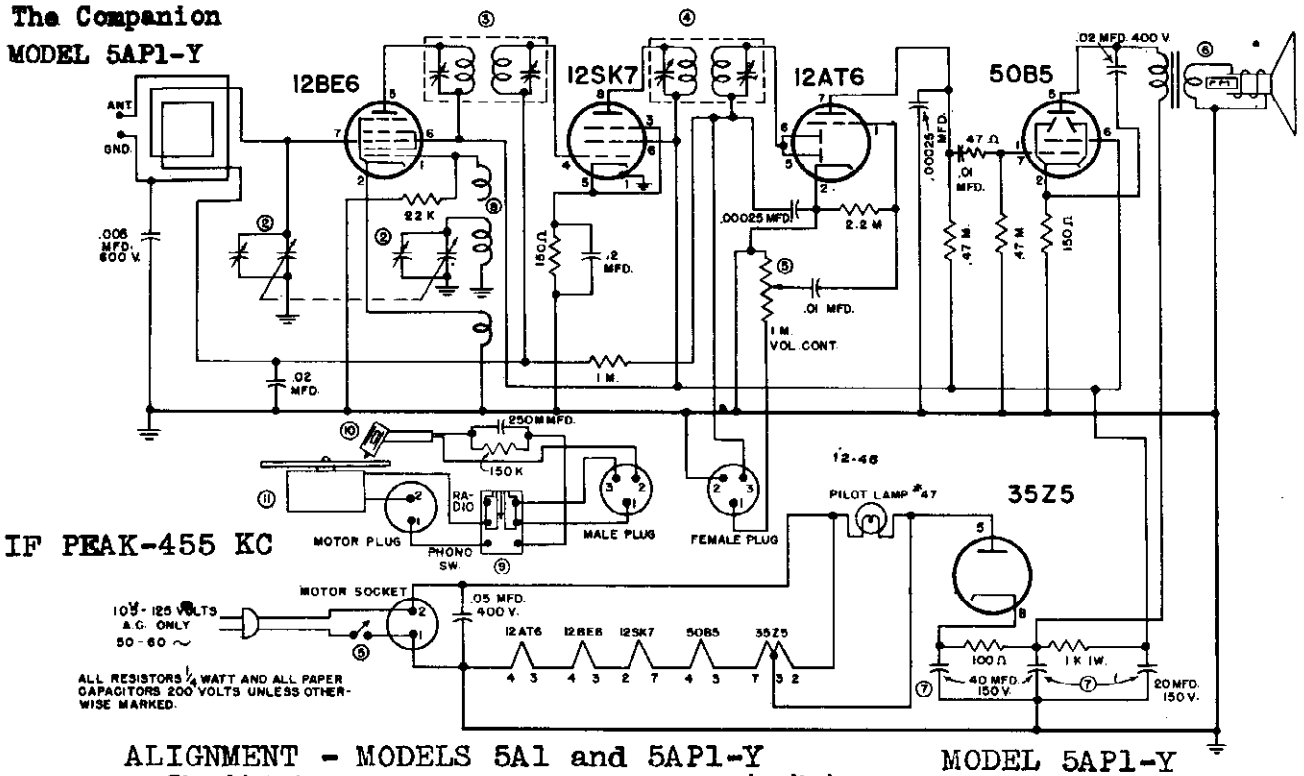
TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).





The Ensign
MODEL 5A1
The Companion
MODEL 5AP1-Y

GAROD ELECTRONICS CORP.



IF PEAK-455 KC

ALIGNMENT - MODELS 5A1 and 5AP1-Y

Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

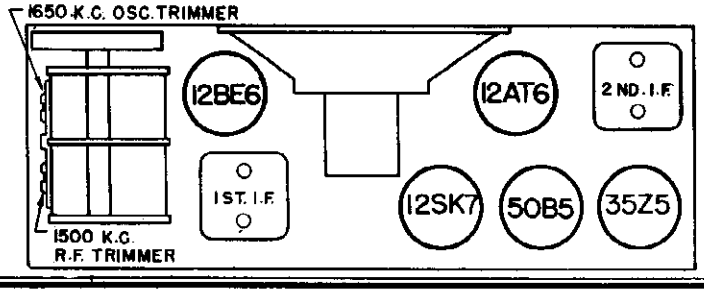
(1) Set the Signal Generator to 455 KC and connect to the stator lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.

(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

(3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.

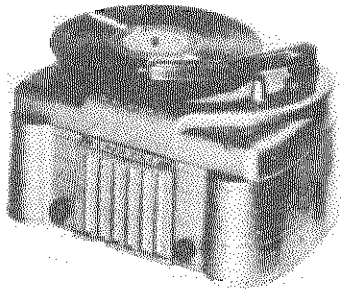
(4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).

(5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.



MODEL 5AP1-Y

① 1.410 LOOP ASSEMBLY
② 2.200 2 GANG VARIABLE CONDENSER
③ 1.259 1ST. I.F. TRANSFORMER
④ 1.259 2ND. I.F. TRANSFORMER
⑤ 6.201-2 VOL. CONTROL & SWITCH
⑥ 30.301 P.M. 4" SPEAKER & OUTPUT TRANS.
⑦ 5.400-8 ELECTROLYTIC CAP. 40-40-20 MFD
⑧ 1.402-2 OSCILLATOR COIL
⑨ 11.207 D.P.D.T. SWITCH
⑩ 36.104 PHONO PICKUP
⑪ 36.108 PHONOMOTOR & TURNTABLE

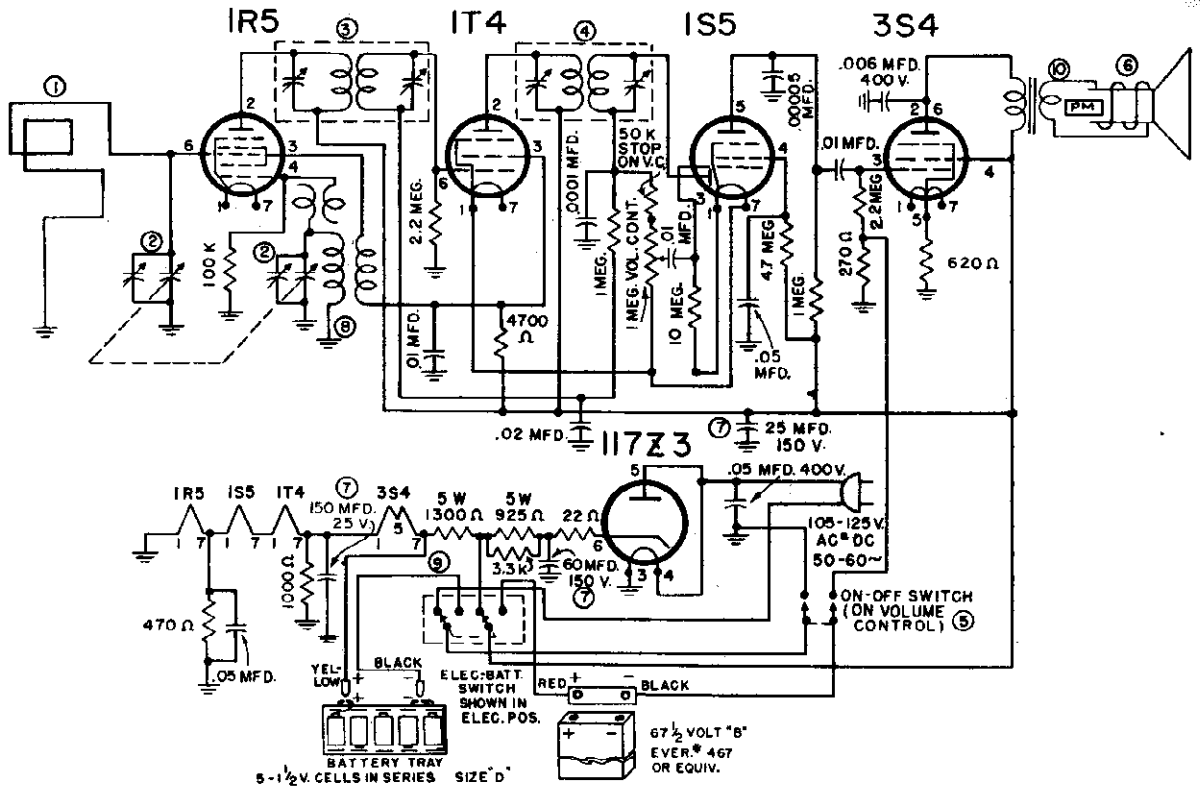


LINE VOLTAGE: 105-125 Volts, 60 Cycles, Alternating Current (AC) only.

POWER CONSUMPTION: 45 Watts.

TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

GAROD ELECTRONICS CORP.



ALL RESISTORS ¼ WATT AND ALL PAPER CAPACITORS 200 VOLTS UNLESS OTHERWISE MARKED.

K = KILOHMS

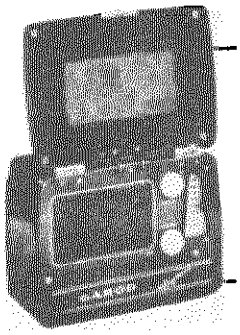
I.F. = 455 K.C.

① 1.437 LOOP ANTENNA
② 2.203 2 GANG VARIABLE CONDENSER
③ 1.412 1ST I.F. TRANSFORMER
④ 1.413 2ND I.F. TRANSFORMER
⑤ 8.200-2 VOLUME CONTROL & SWITCH
⑥ 30.313 4" P.M. SPEAKER
⑦ 5.400-3 ELECTROLYTIC CAP. 60-25-150 MFD.
⑧ 1.414 OSCILLATOR COIL
⑨ 11.207 ELECTRIC-BATTERY SWITCH
⑩ 9.205 OUTPUT TRANSFORMER

3-47

THE FOLLOWING CHANGES IN PARTS ARE MADE FOR MODEL 5D-3

① 1.405 LOOP ANTENNA
⑥ 30.302 3½" P.M. SPEAKER
⑨ 11.200 ELECTRIC-BATTERY SWITCH



BATTERY OR LINE VOLTAGE: This receiver is designed for operation on 105-125 volts, 50-60 cycles either Alternating or Direct Current (AC-DC) and also from self contained batteries.

POWER CONSUMPTION: 20 Watts on Electric Operation.

BATTERY REQUIREMENTS: The following batteries are required for battery operation:

QUANTITY	TYPE	MANUFACTURER
5	1½ volt "A"	Eveready #950, Burgess #2 or equivalent.
1	67½ volt "B"	Eveready #467, Burgess #XX45 or equivalent.

TUNING RANGE: Broadcast 540 to 1650 Kilocycles (180 to 555 meters).

ALIGNMENT: (Electric Operation) Receiver removed from cabinet. Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

(1) Set the Signal Generator to 455 KC and connect to the stator lug (front section) of variable capacitor. Extend the loop leads and solder to the lug connecting green wire from Ant. Section of variable capacitor and chassis. Connect the Signal Generator ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the variable capacitor to the extreme counter clockwise position (minimum capacity).

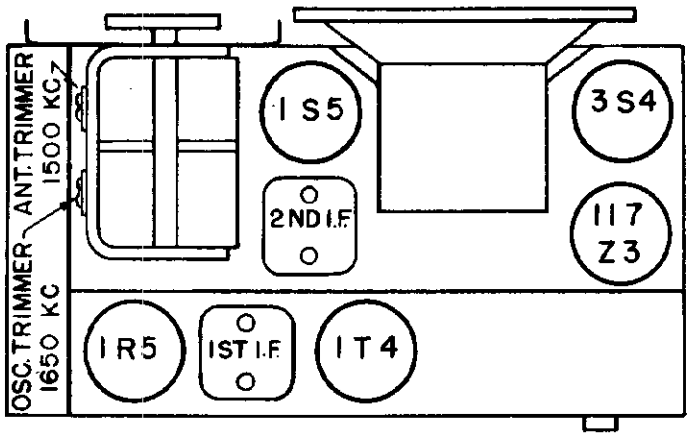
(2) Adjust the trimmers located at the top of the first and second I. F. transformers for maximum output as indicated on the output meter.

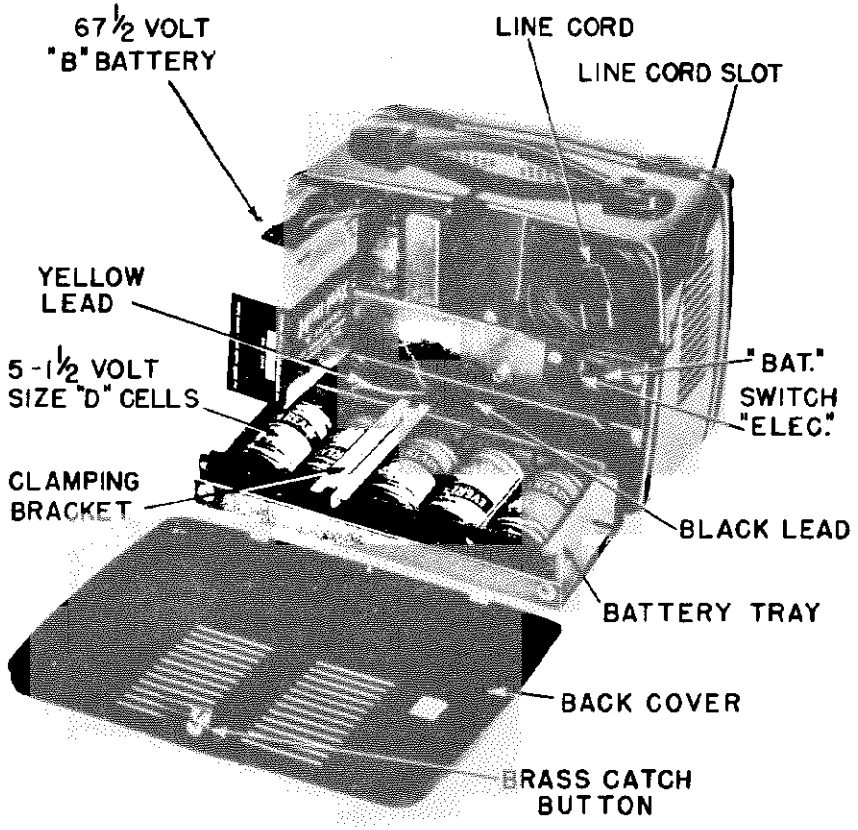
(3) Loosely couple the Signal Generator lead to the Loop (open position) and set to 1650 KC.

(4) With the variable capacitor set at the extreme counter clockwise position (minimum capacity), tune in the 1650 KC signal by means of the oscillator trimmer on the variable capacitor (rear section).

(5) Set the Signal Generator to 1500 KC and turn the tuning control so that this frequency is indicated on the dial. Adjust the antenna trimmer on the variable capacitor (front section) for maximum output.

(6) Install the chassis into cabinet and check the dial calibration. If further adjustment is required, remove the two plug buttons on the side of the cabinet adjacent to the variable capacitor and adjust the oscillator trimmer as required. Adjust the antenna trimmer for maximum output and replace plug buttons.

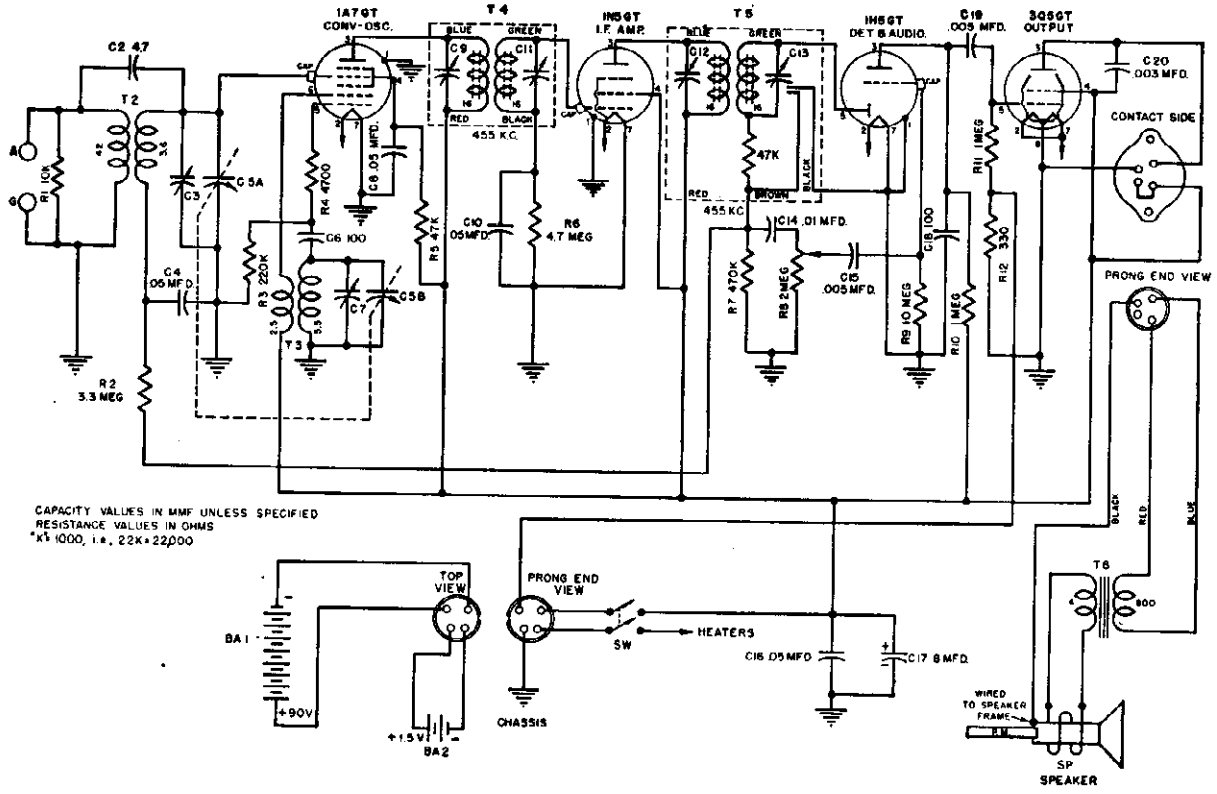




MODEL 5D-3A REAR VIEW
SHOWING BATTERIES REMOVED FROM CABINET

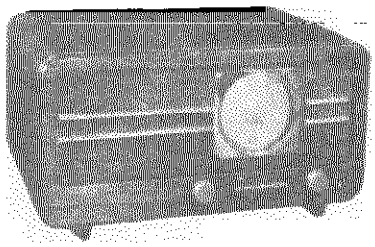
GENERAL ELECTRIC CO.

MODEL 180



UNIVERSAL REPLACEMENT PARTS

PART NO.	SYMBOL	DESCRIPTION
UCC-011	C4, 8, 10	CAPACITOR—.05 mfd., 200 v., paper
UCC-028	C16	CAPACITOR—.05 mfd., 400 v., paper
UCC-037	C20	CAPACITOR—.003 mfd., 600 v., paper
UCC-039	C15, 19	CAPACITOR—.005 mfd., 600 v., paper
UCC-040	C14	CAPACITOR—.01 mfd., 600 v., paper
UCU-1028	C6, 18	CAPACITOR—100 mmf., mica
UOP-629	SP	SPEAKER—6½ in, permanent magnet
UOX-001		CONE—Replacement speaker cone
URD-037	R12	RESISTOR—330 ohm, ⅓ w., carbon
URD-065	R4	RESISTOR—4700 ohm, ⅓ w., carbon
URD-073	R1	RESISTOR—10,000 ohm, ⅓ w., carbon
URD-089	R5	RESISTOR—47,000 ohm, ⅓ w., carbon
URD-105	R3	RESISTOR—220,000 ohm, ⅓ w., carbon
URD-113	R7	RESISTOR—470,000 ohm, ⅓ w., carbon
URD-121	R10 11	RESISTOR—1 meg., ⅓ w., carbon
URD-133	R2	RESISTOR—3.3 meg., ⅓ w., carbon
URD-137	R6	RESISTOR—4.7 meg., ⅓ w., carbon
URD-145	R9	RESISTOR—10 meg., ⅓ w., carbon



SPECIALIZED REPLACEMENT PARTS

PART NO.	SYMBOL	DESCRIPTION
RAB-5001		BACK—Cabinet back
RAV-5001		CABINET—Model 180 cabinet
RCE-5001	C17	CAPACITOR—8 mfd., 150 v., electrolytic
RCT-5001	C5A, 5B	CAPACITOR—Tuning condenser
RCU-5002	C2	CAPACITOR—4.7 mmf., mica
RDC-5001		CORD—Drive cord
RDE-5001		ESCUTCHEON—Dial escutcheon assembly
RDF-5001		WASHER—Felt washer for knobs
RDK-5001		KNOB—Volume or tuning knob
RDM-5001		FLAG—Off-On indicator flag
RDP-5001		POINTER—Plastic dial pointer
RDW-5001		GLASS—Dial glass
RDX-5001		BRACKET—Dial bracket and pulley assembly
RHC-5001		CLIP—Off-On indicator retaining clip
RJS-5001		SOCKET—Octal tube socket
RJS-5002		SOCKET—Speaker socket
RLA-5001	T2	COIL—Antenna coil
RLC-5001	T3	COIL—Oscillator coil
RMB-5001		BEARING—Dial drive shaft supporting bearing
RMC-5001		CAM—Off-On indicator cam
RMU-5001		SHAFT—Dial drive shaft
RRC-5001	R8, S3	VOLUME CONTROL—2 meg. vol. control and switch
RTL-5001	T5	TRANSFORMER—2nd i-f transformer
RTL-5002	T4	TRANSFORMER—1st i-f transformer
RTO-5001	T6	TRANSFORMER—Output transformer
RWX-5501		CABLE ASSEMBLY—Battery cable
RYM-5001		CHART—Dial calibration chart

MODEL 180 GENERAL ELECTRIC CO.

POWER SUPPLY AND REQUIREMENTS:

(1.5 volts "A", 90 volts "B" pack)

Burgess	17GD60
Ray-O-Vac	AB-82
Eveready	748 or 758
General	60 DL-11L

OPERATING FREQUENCIES:

Broadcast Band	540-1710 kc
I-F Amplifier	455 kc

POWER OUTPUT:

Undistorted	0.15 watt
Maximum	0.27 watt

LOUDSPEAKER:

Type	Alnico P.M.
Outsider Cone Diameter	6 in.
Voice Coil Impedance (400 cycles)	3.2 ohms

TUBE COMPLEMENT:

Oscillator-Converter	Type 1A7GT
I-F Amplifier	Type 1N5GT
Detector-Audio	Type 1H5GT
Power Output	Type 3Q5GT

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Oscillator Setting	Pointer Setting On Radio	Adjust For Max. Output
1	1N5GT IF grid in series with .05 mfd.	455 KC	550 KC	1st IF trans. trimmers
2	1A7GT Conv. grid in series with .05 mfd.	455 KC	550 KC	2nd IF trans. trimmers
3	To Ant. Post through 200 mmf. dummy and to Grd. Post.	1500 KC	1500 KC	C7* (osc.) and C3 (R-F)

*Rock gang condenser when making alignment.

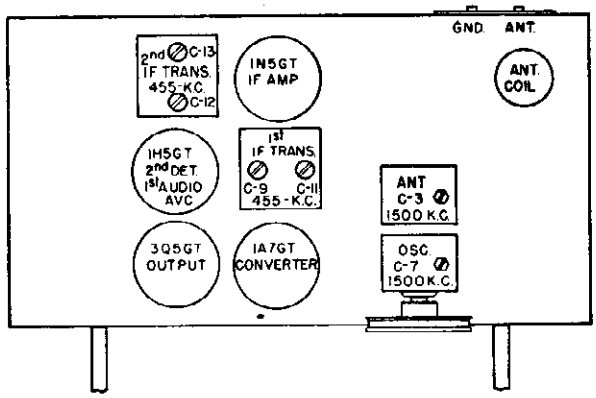
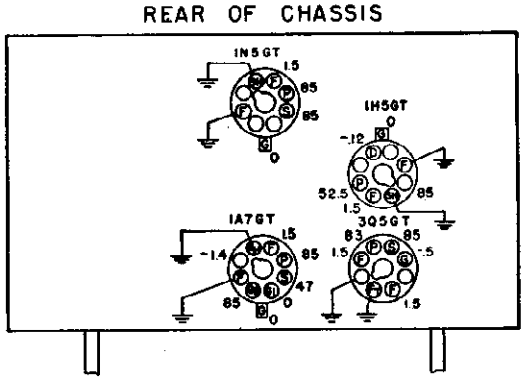


Fig. 1. Tube and Trimmer Location

RSM-1

REAR OF CHASSIS



BOTTOM VIEW OF CHASSIS

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT METER. MEASURED FROM PIN TO CHASSIS.
1.5 V "A" – 90 V "B" BATTERY PACK. NO SIGNAL INPUT. VOLUME CONTROL AT MAXIMUM.

Fig. 2. Socket Voltage Diagram

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna post to 1A7GT grid	6.6 at 1000 kc
1A7GT grid to 1N5GT grid	46 at 1000 kc
1A7GT grid to 1N5GT grid	60 at 455 kc
1N5GT grid at 1H5GT diode plates	80 at 455 kc

(2) Audio Gain.
.06 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately .05 watts output across speaker voice coil.

(3) D-C voltage developed across oscillator grid resistor (R2) averages 7 volts at 1000 kc.

(4) Socket Pin Voltages.
Figure 2 shows voltages from all tube pins to B-. Voltage readings much lower than those specified may help localize defective components or tubes.

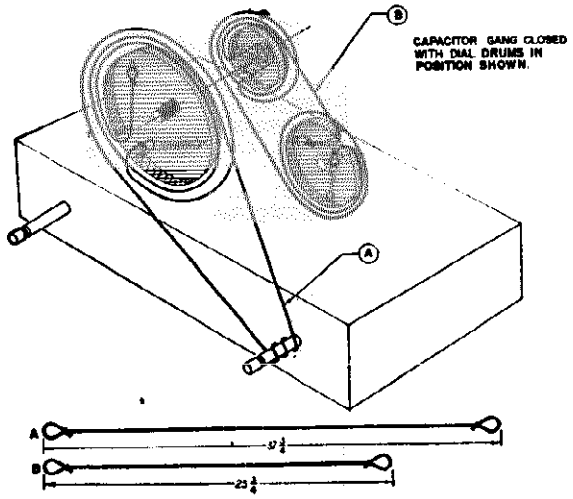
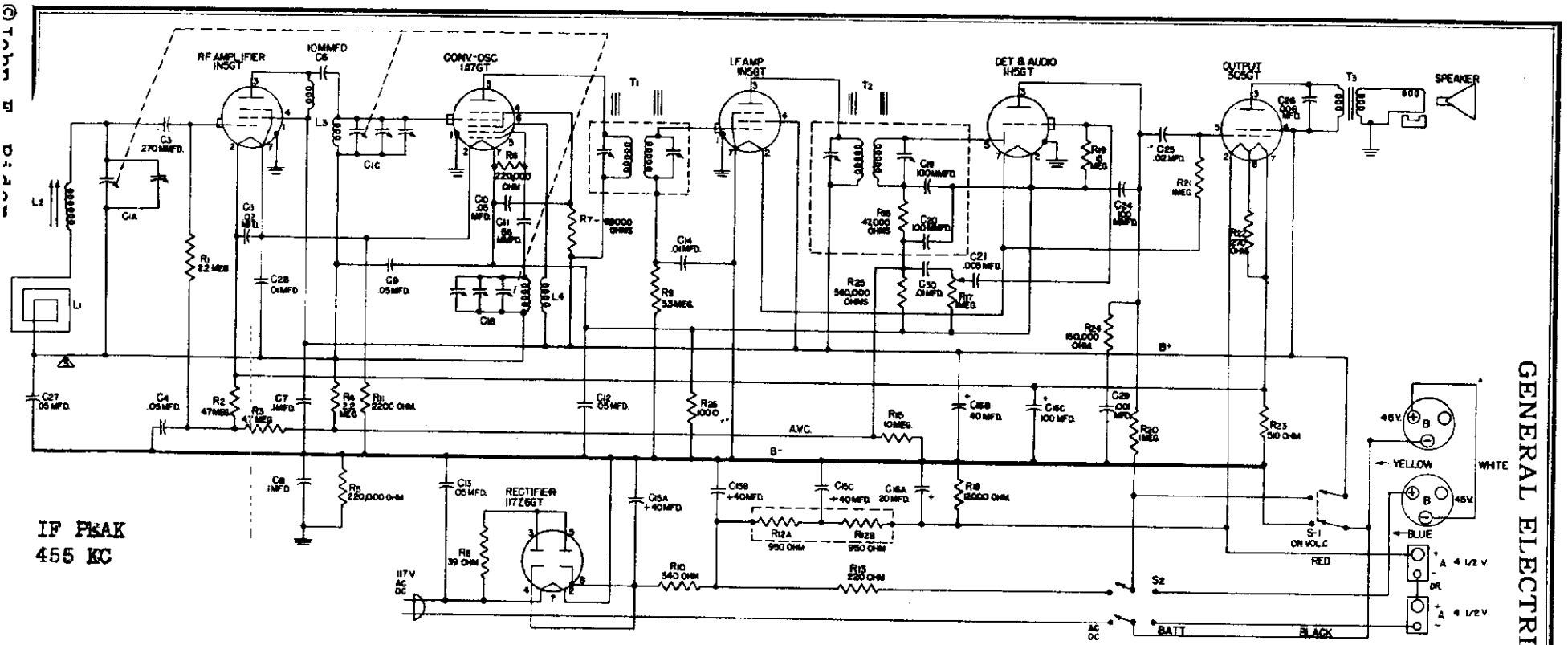


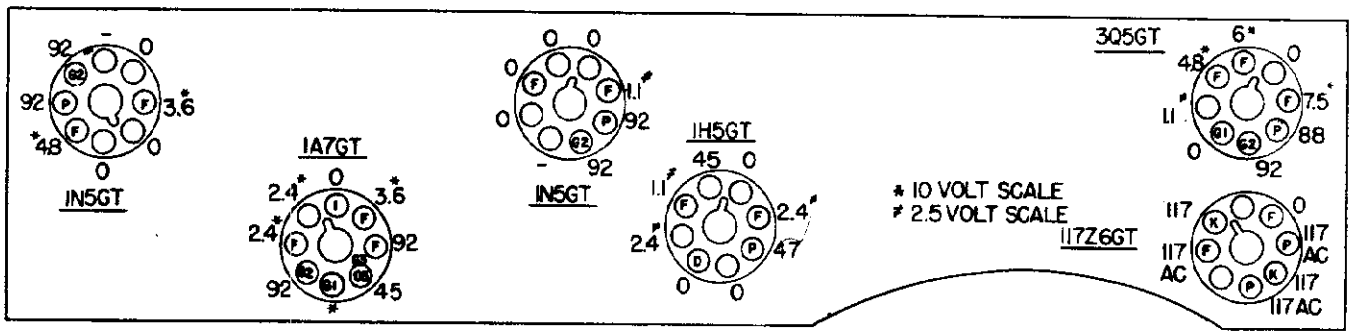
Fig. 3. Dial Stringing



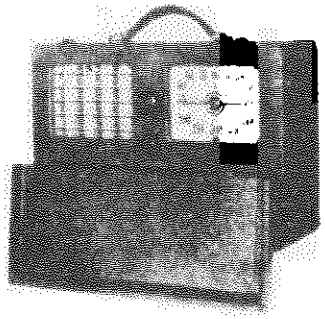
IF PEAK
455 KC

CONDITIONS OF TEST

MEASUREMENTS TAKEN WITH 20,000 OHMS PER VOLT METER
READINGS TAKEN BETWEEN SOCKET PIN & B-
A-C LINE VOLTS = 117 V.
SWITCH S2 IN AC-DC POSITION



BOTTOM VIEW OF CHASSIS



GENERAL ELECTRIC CO.
MODEL 254

POWER SUPPLY:

(AC-DC Operation)
Voltage ..... 105–125 volts
Frequency (on a-c) ..... 50–60 cycles
Power Consumption ..... 18 watts
(Battery Operation)
2—4½-volt "A" Batteries.. Eveready No. 746 or equivalent
2—45-volt "B" Batteries... Eveready No. 482 or equivalent

OPERATING FREQUENCIES:

Broadcast Band ..... 540–1620 kc
I-F Amplifier ..... 455 kc

POWER OUTPUT:

Undistorted ..... 0.15 watts
Maximum ..... 0.27 watts

LOUDSPEAKER:

Type ..... Alnico PM
Outside Cone Diameter ..... 5¼ in.
Voice Coil Impedance (400 cycles) ..... 3.2 ohms

TUBE COMPLEMENT:

R-F Amplifier 1N5GT
Oscillator-Converter 1A7GT
I-F Amplifier 1N5GT
Detector-Audio 1H5GT
Power Output 3Q5GT
Rectifier 117Z6GT

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES:

R-F ..... 1620, 1500 kc and 600 kc
I-F ..... 455 kc

EQUIPMENT REQUIRED:

1. Test oscillator with tone modulation
2. A-C output meter
3. .05 mfd. paper capacitor
4. Insulated screwdriver

PROCEDURE—GENERAL. 1. The alignment procedure is given in table form. All i-f and r-f alignments may be made with the chassis removed from the cabinet. The location of the i-f and r-f adjustments is shown in Figure 1.

2. Adjustment of L2 is accomplished by loosening the lock washer and turning the slug with a screwdriver. Retighten the lock washer, being careful not to turn the slug.

3. For accurate frequency calibration, set the test oscillator at 1000 kc, and turn the dial to tune in maximum a 1000-kc signal. Set pointer to read 100 on the dial, making sure the gang condenser does not turn. This adjustment should be made only after all steps on the alignment chart are carried out.

4. The output meter should be connected across the voice coil terminals on the speaker. The low side of the test oscillator output should be connected to the chassis ground; the high side of the oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the volume control should be at its maximum (clockwise) position. The test oscillator should be attenuated so that the output meter reading doesn't exceed ½ volt.

5. For alignment of the oscillator and r-f trimmers, the input signal should be inductively coupled to the radio loop antenna by connecting a 4-turn, 6-inch diameter loop of bell wire across the signal generator output terminals, and then locate the loop about one foot from the radio loop antenna. To prevent possible errors in peak readings, the position of the loop with respect to the radio loop antenna should not be changed during any one set of adjustments.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Oscillator Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	1N5GT I-F grid in series with .05 mfd	455 kc	550 kc	2nd I-F Trans. (T2) Trimmers
2	1A7GT Conv. grid in series with .05 mfd	455 kc	550 kc	1st I-F Trans. (T1)
3	Repeat Steps 1 and 2			
4	Inductively coupled	1620 kc	Max. freq. cond. open	C1B OSC
5	Inductively coupled	1500 kc	1500 kc	C1A Ant. C1C RF
6	Inductively coupled	600 kc	600 kc	L2 Ant. Loading Coil
7	Inductively coupled	1500 kc	1500 kc	C1A Ant. C1C RF
8	Recheck Steps 5, 6, and 7			

STAGE GAIN AND VOLTAGE CHECKS

Stage gain by vacuum tube voltmeter or similar measuring devices may be used to check circuit performances and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings should be taken with low signal input so that the AVC is not effective.

(1) RF STAGE GAINS.

1N5GT r-f grid to 1A7GT grid ..... 25 at 1000 kc
1A7GT grid to 1N5GT i-f grid ..... 25 at 1000 kc
1A7GT grid to 1N5GT i-f grid ..... 30 at 455 kc
1N5GT i-f grid to 1H5GT diode plate ..... 65 at 455 kc

(2) AUDIO GAIN.

.06 volt at 400 cycles across volume control (R17) with control set at maximum will give approximately .05 watt output across speaker voice coil.

(3) DC voltage developed across oscillator grid resistor (R6) averages 13 volts at 1000 kc.

(4) SOCKET PIN VOLTAGES.

Figure 3 shows voltages from all tube pins to B—. Voltage readings much lower than those specified may help localize defective components or tubes.

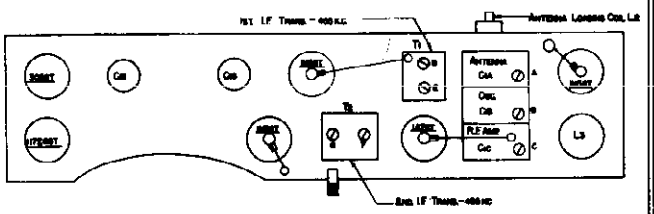


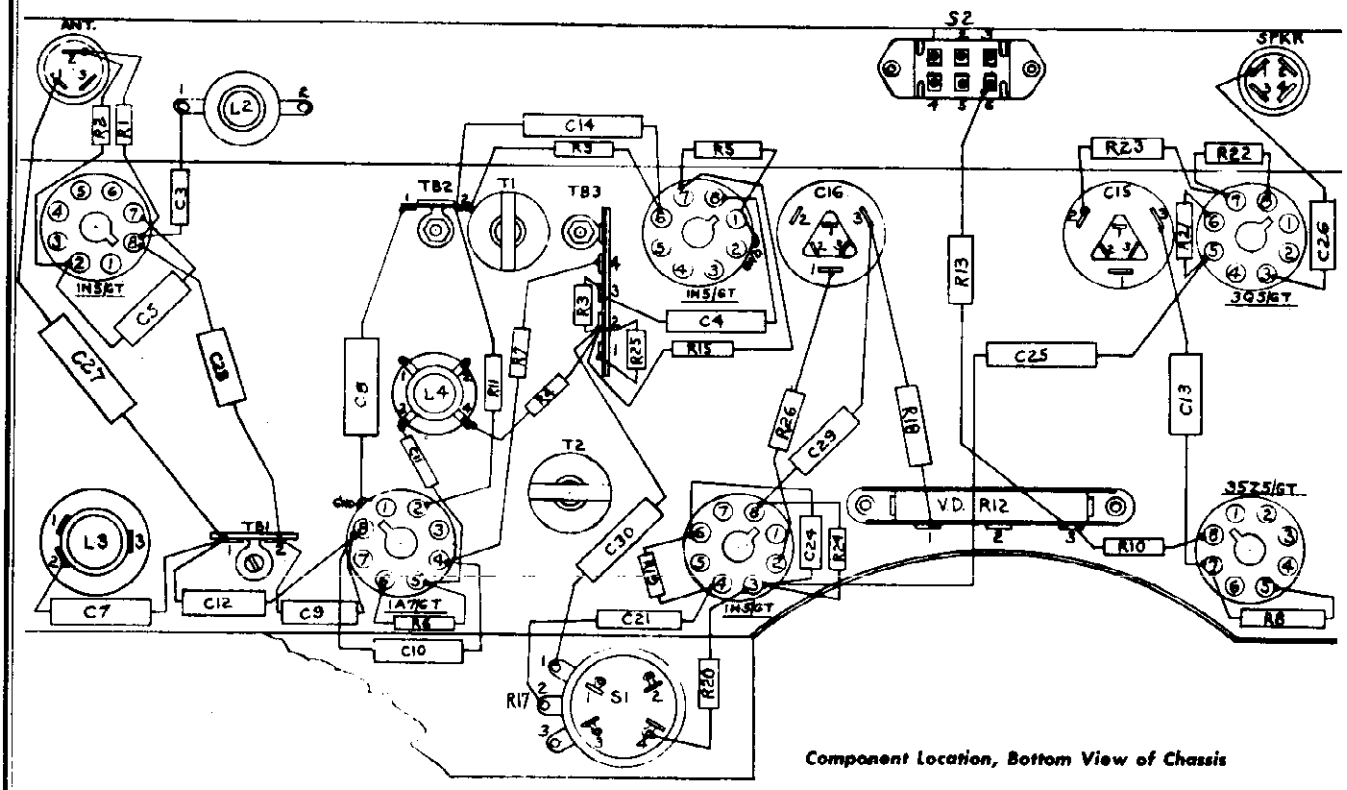
Fig. 1. Tube and Trimmer Location

GENERAL ELECTRIC CO.

REPLACEMENT PARTS LIST—MODEL 254

CAT. NO.	SYMBOL	DESCRIPTION
SPECIALIZED REPLACEMENT PARTS (CONT'D)		
SCE-021	C15A, B, C	CAPACITOR—40 mf., 150 v.; 40 mf., 150 v.; 40 mf., 150 v.; electrolytic
SCT-010	C1A, B, C	CONDENSER—Tuning condenser, pulley, and trimmers
SDC-002		CORD—Dial cord
SDK-036		KNOB—Control knob
SDP-003		POINTER Dial pointer
SDS-012		SCALE—Dial scale
SDW-003		WINDOW—Dial scale window
SDX-006		DRIVE Dial drive assembly
SJJ-009		CONNECTOR Female speaker connector
SJJ-010		CONNECTOR—Female antenna connector
SJP-007		CONNECTOR—Male 2-contact "A" battery connector
SJP-008		CONNECTOR—Male 3-contact "B" battery connector
SJP-009		CONNECTOR—Male speaker connector, 4-contact
SJS-031		SOCKET—Octal tube socket
SJS-035		SOCKET—Octal tube socket
SLA-002	L2	COIL—Antenna loading coil
SLB-002	L3	COIL—R-F transformer
SLC-011	L4	COIL—Oscillator coil
SLL-003	L1	BEAM-A-SCOPE—Loop antenna assembly
SMS-012		SPRING—Dial cord spring
SMS-013		SPRING Indicator spring
SMX-014		TRIGGER—Trigger bushing assembly
SRC-044	R17, S1	VOLUME CONTROL 1.0 meg., potentiometer and switch
SRW-024	R12A, B	RESISTOR 1900 ohms, CT, 5 w., w.w.
SRW-025	R8	RESISTOR—39 ohms, 5 w., w.w.
SRW-026	R10	RESISTOR 340 ohms, 5 w., w.w.
SSS-009	S2	SWITCH—Battery-line selector slide switch
STL-009	T1	TRANSFORMER—1st I-F transformer
STL-010	T2	TRANSFORMER—2nd I-F transformer
STO-007	T3	TRANSFORMER—Output transformer
SWL-006		CORD—Power cord

CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL REPLACEMENT PARTS		
UCC-018	C29	CAPACITOR—0.001 mfd., 400 v., paper
UCC-025	C14, 28, 30	CAPACITOR—0.01 mfd., 400 v., paper
UCC-030	C7, 8	CAPACITOR—0.1 mfd., 400 v., paper
UCC-039	C21, 26	CAPACITOR—0.005 mfd., 400 v., paper
UCC-041	C5, 25	CAPACITOR—0.02 mfd., 600 v., paper
UCC-045	C4, 9, 10, 12, 13, 27	CAPACITOR—0.05 mfd., 600 v., paper
UCU-1004	C6	CAPACITOR—10 mmfd., 500 v., mica
UCU-1022	C11	CAPACITOR—56 mmfd., 500 v., mica
UCU-1028	C24	CAPACITOR—100 mmfd., 500 v., mica
UCU-1038	C3	CAPACITOR—270 mmfd., 500 v., mica
UOP-546		LOUDSPEAKER—5¼-inch PM speaker
UOX-008		CONE Replacement cone
URD-049	R26	RESISTOR—1000 ohms, ½ w., carbon
URD-057	R11	RESISTOR—2200 ohms, ½ w., carbon
URD-093	R7	RESISTOR—68,000 ohms, ½ w., carbon
URD-101	R24	RESISTOR—150,000 ohms, ½ w., carbon
URD-105	R5, 6	RESISTOR 220,000 ohms, ½ w., carbon
URD-113	R25	RESISTOR—470,000 ohms, ½ w., carbon
URD-121	R20, 21	RESISTOR 1 meg., ½ w., carbon
URD-129	R1, 4	RESISTOR 2.2 meg., ½ w., carbon
URD-133	R9	RESISTOR 3.3 meg., ½ w., carbon
URD-137	R2, 3	RESISTOR 4.7 meg., ½ w., carbon
URD-145	R15	RESISTOR 10 meg., ½ w., carbon
URD-149	R19	RESISTOR 15 meg., ½ w., carbon
URE-033	R13	RESISTOR—200 ohms, 1 w., carbon
URE-035	R22	RESISTOR 270 ohms, 1 w., carbon
URE-1042	R23	RESISTOR 510 ohms, 1 w., carbon
URF-075	R18	RESISTOR 12,000 ohms, 2 w., carbon
SPECIALIZED REPLACEMENT PARTS		
SAT-001		CABINET—Tan finish cabinet
SCE-020	C16A, B, C	CAPACITOR—20 mf., 150 v.; 40 mf., 150 v.; 100 mf., 50 v.; electrolytic



REPLACEMENT PARTS LIST—MODEL 260

UNIVERSAL REPLACEMENT PARTS

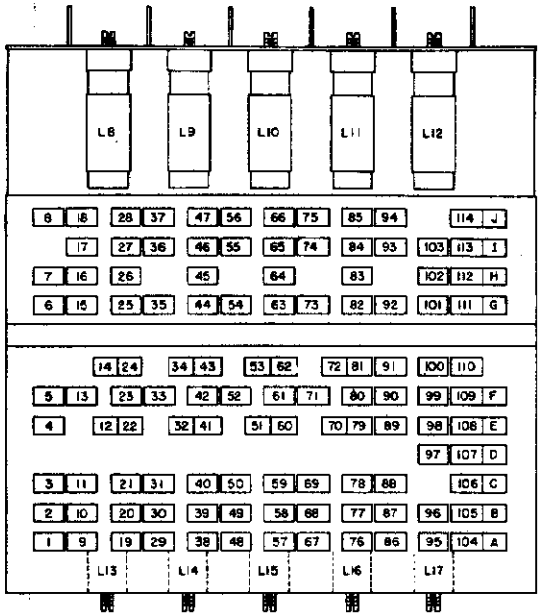
Part No.	Symbol	Description
UCC-030	C8, 17	CAPACITOR—.1 mfd., 400 v., paper
UCC-032	C22	CAPACITOR—.25 mfd., 400 v., paper
UCC-039	C21, 38	CAPACITOR—.005 mfd., 600 v., paper
UCC-040	C23	CAPACITOR—.01 mfd., 600 v., paper
UCC-041	C24	CAPACITOR—.02 mfd., 600 v., paper
UCC-048	C6, 16, 35, 32	CAPACITOR—.05 mfd., 400 v., paper
UCG-3049	C13	CAPACITOR—750 mmf., silver mica
UCN-501	C54	CAPACITOR—1.0 mmf., ceramic
UCW-2506	C49	CAPACITOR—6.8 mmf., ceramic
UCU-028	C19, 20	CAPACITOR—100 mmf., mica
UCU-064	C12, 27, 28	CAPACITOR—3300 mmf., mica
UCU-1032	C36	CAPACITOR—150 mmf., mica
UCU-1040	C4, 15	CAPACITOR—330 mmf., mica
UCU-2563	C9	CAPACITOR—3000 mmf., mica
UCW-1004	C5	CAPACITOR—10 mmf., ceramic
UCW-2007	C44	CAPACITOR—13 mmf., ceramic
UCW-2009	C53	CAPACITOR—16 mmf., ceramic
UCW-2010	C46	CAPACITOR—18 mmf., ceramic
UCW-2016	C47	CAPACITOR—33 mmf., ceramic
UCW-2017	C50, 52	CAPACITOR—36 mmf., ceramic
UCW-2022	C37, 45	CAPACITOR—56 mmf., ceramic
UCW-2025	C48	CAPACITOR—75 mmf., ceramic
UIC-001		CEMENT—Cement for speaker cone replacement
UIC-002		THINNER—Speaker cement thinner
UOP-545	SPKR	SPEAKER—5¼-in. P.M. speaker
UOI-006		CONE—Replacement cone kit
URD-051	R23	RESISTOR—1200 ohms, ½ w., carbon
URD-059	R15	RESISTOR—2700 ohms, ½ w., carbon
URD-061	R6	RESISTOR—3300 ohms, ½ w., carbon
URD-073	R21	RESISTOR—10,000 ohms, ½ w., carbon
URD-075	R19	RESISTOR—12,000 ohms, ½ w., carbon
URD-085	R5	RESISTOR—33,000 ohms, ½ w., carbon
URD-089	R9	RESISTOR—47,000 ohms, ½ w., carbon
URD-093	R18	RESISTOR—68,000 ohms, ½ w., carbon
URD-095	R3	RESISTOR—82,000 ohms, ½ w., carbon
URD-105	R2, 33	RESISTOR—220,000 ohms, ½ w., carbon
URD-109	R24	RESISTOR—330,000 ohms, ½ w., carbon
URD-121	R1, 4, 34	RESISTOR—1.0 meg., ½ w., carbon
URD-129	R8	RESISTOR—2.2 meg., ½ w., carbon
URD-137	R11, 14, R25, 35	RESISTOR—4.7 meg., ½ w., carbon
URE-053	R17	RESISTOR—1500 ohms, 1 w., carbon

SPECIALIZED REPLACEMENT PARTS

Part No.	Symbol	Description
RAC-002		COVER—Battery compartment cover
RAC-003		COVER—Power supply compartment cover
RAC-006		COVER—Case back cover (crinkle brown)
RAC-007		COVER—Case back cover (crinkle grey)
RAC-008		COVER—Case right end cover (crinkle brown)
RAC-009		COVER—Case right end cover (crinkle grey)
RAC-012		COVER—Case left end cover (crinkle brown)
RAC-013		COVER—Case left end cover (crinkle grey)
RAC-018		COVER—Back cover (Hammertone grey)
RAC-019		COVER—Back cover (Hammertone blue-green)
RAC-020		COVER—Back cover (Hammertone copper)
RAC-024		COVER—Left end cover (Hammertone grey)
RAC-025		COVER—Left end cover (Hammertone blue-green)
RAC-026		COVER—Left end cover (Hammertone copper)
RAC-030		COVER—Right end cover (Hammertone grey)
RAC-031		COVER—Right end cover (Hammertone blue-green)
RAC-032		COVER—Right end cover (Hammertone copper)
RAC-036		COVER—Antenna plug (crinkle brown)
RAC-037		COVER—Antenna plug (crinkle grey)
RAC-038		COVER—Antenna plug (Hammertone grey)
RAC-039		COVER—Antenna plug (Hammertone blue-green)
RAC-040		COVER—Antenna plug (Hammertone copper)
RAC-041		COVER—Trimmer cover (crinkle brown)
RAC-042		COVER—Trimmer cover (crinkle grey)
RAC-043		COVER—Trimmer cover (Hammertone grey)
RAC-044		COVER—Trimmer cover (Hammertone blue-green)
RAC-045		COVER—Trimmer cover (Hammertone copper)
RAG-005		COVER—Case front and grille cover (crinkle brown)
RAG-006		COVER—Case front and grille cover (crinkle grey)
RAG-013		COVER—Case front and grille cover (Hammertone grey)
RAG-014		COVER—Case front and grille cover (Hammertone blue-green)
RAG-015		COVER—Case front and grille cover (Hammertone copper)
RAI-001		BRACE—Cover brace assembly, supports hinge (crinkle brown)
RAI-002		BRACE—Cover brace assembly supports hinge (crinkle grey)
RAI-004		BRACE—Cover brace assembly, supports cover (Hammertone grey)
RAI-005		BRACE—Cover brace assembly, supports cover (Hammertone blue-green)
RAI-006		BRACE—Cover brace assembly, supports cover (Hammertone copper)
RAX-004		COVER—Case top cover assembly (crinkle brown)
RAX-005		STAT ARM ASSEMBLY
RAX-006		COVER—Case top cover assembly (crinkle grey)
RAX-011		COVER—Top cover (Hammertone grey)

SPECIALIZED REPLACEMENT PARTS (Cont'd)

Part No.	Symbol	Description
RAX-012		COVER—Top cover (Hammertone blue-green)
RAX-013		COVER—Top cover (Hammertone copper)
RBC-001	B2	CELL—Bias cell assembly
RCC-068	C30	CAPACITOR—0.5 mfd., 120 v., paper
RCC-069	C29	CAPACITOR—0.5 mfd., 120 v., paper
RCC-070	C34, 35	CAPACITOR—0.5 mfd., 120 v., paper
RCC-073	C31	CAPACITOR—.003 mfd., 1500 v., paper
RCE-007	C26A, B, C	CAPACITOR—15 mfd., 150 v.; 15 mfd., 150 v.; 1200 mfd., 1.5 v.; dry electrolytic
RCE-012	C51	CAPACITOR—10 mfd., 150 v., dry electrolytic
RCE-016	C33	CAPACITOR—1200 mfd., 1.5 v., dry electrolytic
RCT-011	C1A, B; C3A, B; C9A, B	CONDENSER—Tuning condenser and trimmers
RCW-082	C7	CAPACITOR—100 mmf., ceramic
RCY-012	C39, 40, 41, C42, 43	TRIMMER STRIP—Antenna trimmer strip
RDB-005		PUSH BUTTON—Single push button
RDC-011		ASSEMBLY—Dial cord and spring
RDE-009		ESCUTCHEON—Main dial escutcheon
RDK-020		KNOB—Tuning knob
RDK-033		KNOB—Volume control knob
RDP-013		POINTER—Dial pointer assembly
RDS-019		SCALE—Dial scale
RDK-017		PUSH BUTTON—Charge-Tone push button and escutcheon assembly
RDX-018		PUSH BUTTON—Band selector push button and escutcheon assembly
RDX-022	S1	SWITCH—Push button band switch assembly
REF-001	F1	FUSE—½ amp. fuse, Type 3AG-¼
REV-001	V1	VIBRATOR—Vibrator unit
REX-001	X1, 2, 3, 4	RECTIFIER—Copper oxide rectifier assembly
RHF-001		FOOT—Cabinet foot
RHK-001		KNOB—Lock mechanism (crinkle brown)
RHK-002		KNOB—Lock mechanism (crinkle grey)
RHK-003		KNOB—Lock mechanism (Hammertone grey)
RHK-004		KNOB—Lock mechanism (Hammertone blue-green)
RHK-005		KNOB—Lock mechanism (Hammertone copper)
RHX-003		HARDWARE—Tuning condenser mounting hardware
RHX-008		STUD—Handle stud and cotter
RHY-001		HANDLE—Case cover handle (crinkle brown)
RHY-002		HANDLE—Case cover handle (crinkle grey)
RHY-003		HANDLE—Case cover handle (Hammertone grey)
RHY-004		HANDLE—Case cover handle (Hammertone blue-green)
RHY-005		HANDLE—Case cover handle (Hammertone copper)
RIG-001		GASKET—Dial scale gasket
RJB-004	P2	BOARD—Loop antenna terminal board
RJP-014		PLUG—Battery terminal contact pins
RJS-019		SOCKET—Vibrator socket
RJS-020		SOCKET—Loktal base tube socket
RJS-021		SOCKET—Electrolytic mounting plate socket
RJS-026		SOCKET—Octal base tube socket
RJW-001		HOLDER—Fuse holder
RLB-011	L3	COIL—Broadcast RF coil
RLB-012	L8	COIL—RF coil, 49 meter
RLB-013	L9	COIL—RF coil, 31 meter
RLB-014	L10	COIL—RF coil, 25 meter
RLB-015	L11	COIL—RF coil, 19 meter
RLB-016	L12	COIL—RF coil, 16 meter
RLC-018	L4	COIL—Broadcast oscillator coil
RLC-035	L13	COIL—Oscillator coil, 49 meter
RLC-036	L14	COIL—Oscillator coil, 31 meter
RLC-037	L15	COIL—Oscillator coil, 25 meter
RLC-038	L16	COIL—Oscillator coil, 19 meter
RLC-039	L17	COIL—Oscillator coil, 16 meter
RLF-001	L5 and 6	CHOKE—Vibrator and B+ chgke
RLP-004	L7	CHOKE—Filament choke
RLL-007	L2	BEAM-A-SCOPE—SW band loop antenna (external)
RLL-012	L1	BEAM-A-SCOPE—"B" band loop in cover (crinkle brown)
RLL-019	L1	BEAM-A-SCOPE—"B" band loop in cover (crinkle grey)
RLL-020	L1	BEAM-A-SCOPE—"B" band loop in cover (Hammertone grey)
RLL-021	L1	BEAM-A-SCOPE—"B" band loop in cover (Hammertone blue-green)
RLL-022	L1	BEAM-A-SCOPE—"B" band loop in cover (Hammertone copper)
RLP-009	L18	CHOKE—I-F plate choke
RMC-008		CAM—Cover lock mechanism cam
RMC-009		CATCH—Cover lock mechanism catch
RMU-013		SHAFT—Tuning shaft and retainer ring
RMW-004		PULLEY—Dial drive pulley (small), and stud
RMW-009		PULLEY—Dial drive pulley (large), and stud
RMX-013		CATCH—Battery compartment cover catch
RMX-020		CHAIN—Trimmer cover chain
RMX-082		CATCH—Spring catch for rear cabinet cover
RTX-083		TUBE—Vent tube and casing
RRC-015	R10	VOLUME CONTROL—1.0 megohm potentiometer
RRW-018	R18	RESISTOR—7.5 ohm, ½ w., w.w.
RSP-003	S2 and 3	SWITCH—Operation and tone push button switch
RTC-001	T4	TRANSFORMER—Charging transformer
RTC-002	T6	TRANSFORMER—Charging transformer
RTL-028	T1 and 2	TRANSFORMER—IF transformer, 1st or 2nd
RTO-007	T3	TRANSFORMER—Output transformer
RTV-001	T5	TRANSFORMER—Vibrator transformer
RWL-005	P3	CORD—Power cord



TERMINALS A THROUGH J ARE NON-OPERATING LUGS ON THE SWITCH AND ARE USED ONLY FOR TIE-IN CONNECTIONS.

Band Selector Switch Terminal Diagram

ELECTRICAL RATING:

Charging from A-C Line:

Voltage	105-125 volts, a-c only
Frequency	50/60 cycles/sec.
Wattage	12 watts

Operating from Internal Battery:

Voltage	2.1 volts
Current	1.9 amperes
Wattage	4 watts
Hours of Operation without Recharging Battery	10-13 Approx.

Battery Requirement:

Willard 2.0 volt, No. 25-2, rechargeable battery or equivalent.

Fuse:

GE, No. 2548, ¼-ampere rating.

OPERATING FREQUENCIES:

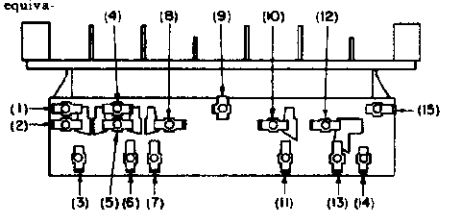
1-F Amplifier	455 kc
Broadcast Band	540-1600 kc
49 M. Band	5.9-6.5 mc
31 M. Band	9.5-9.85 mc
25 M. Band	11.65-11.9 mc
19 M. Band	15.07-15.35 mc
16 M. Band	17.65-17.9 mc

POWER OUTPUT:

Undistorted	448 milliwatts
Maximum	365 milliwatts

LOUDSPEAKER:

Type	Alnico PM
Outside Cone Diameter	5¼ inches
Voice Coil Impedance (400 cps)	3.2 ohms

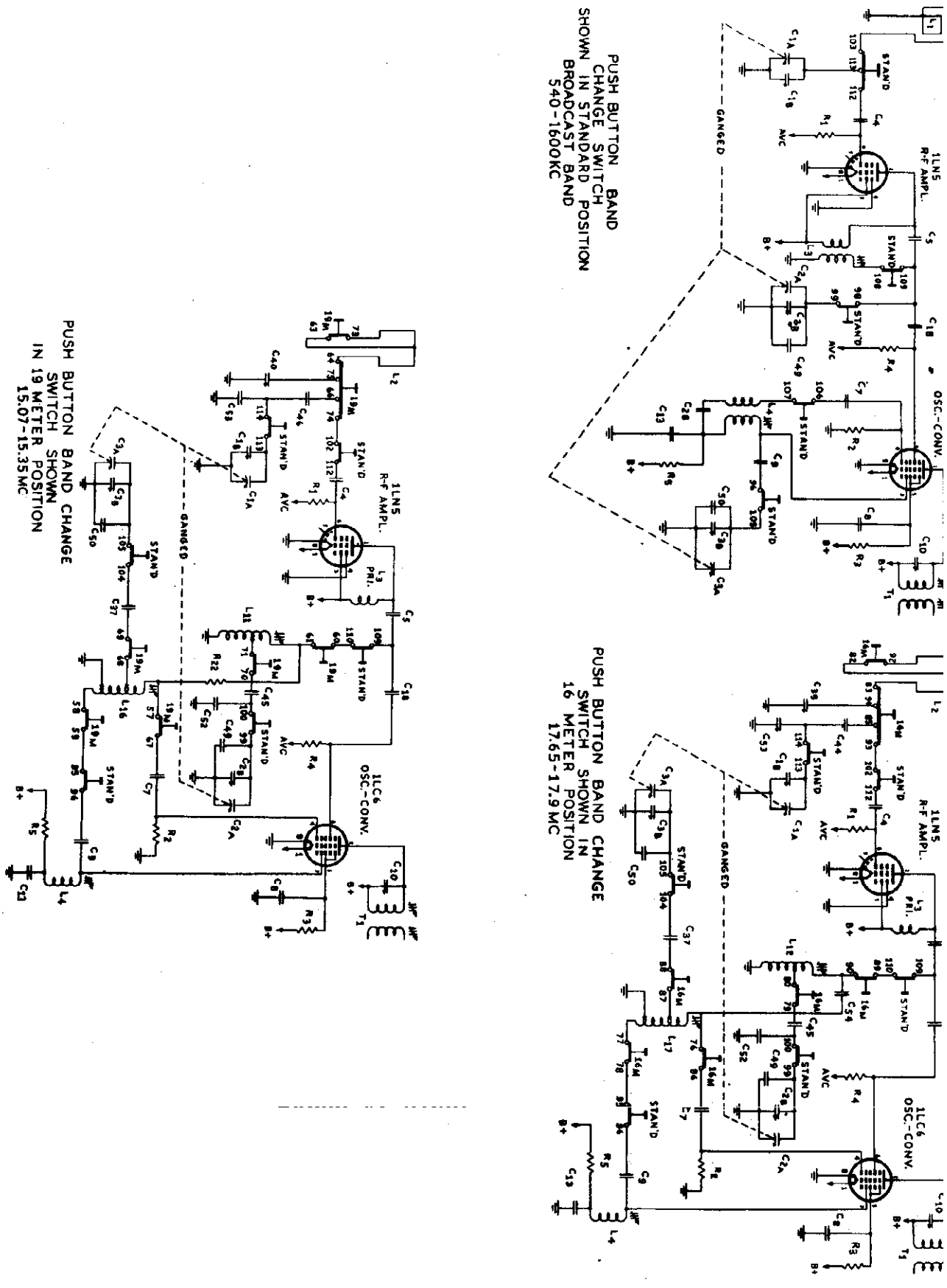


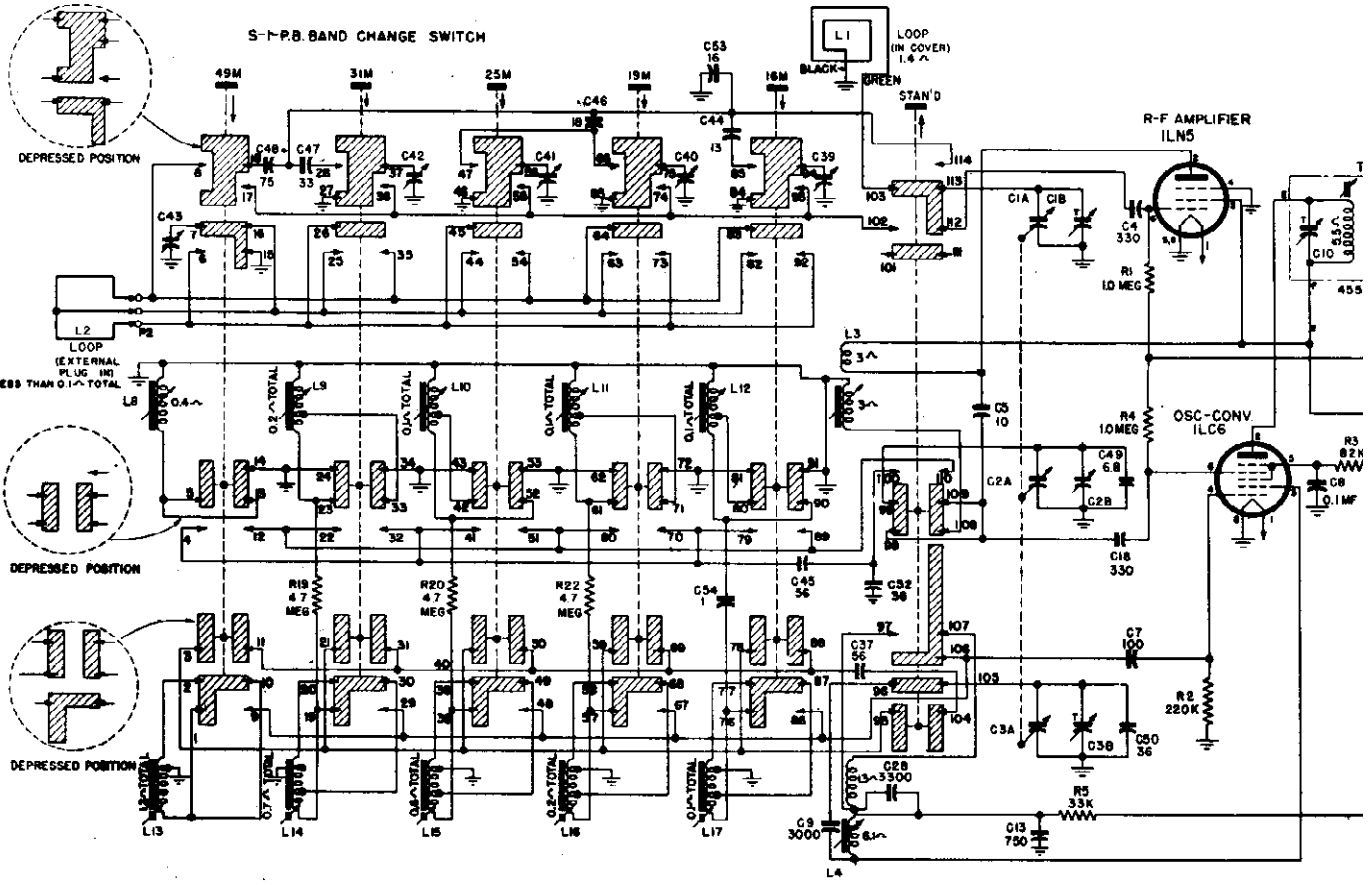
(1) TO FI
(2) TO JUNCTION T4 & C12
(3) TO JUNCTION R18 & 3Q5GT FIL (2&7)
(4) TO P1 & CENTER TAP T4 SECONDARY
(5) TO BATTERY (+)
(6) TO C34
(7) TO L7 (CENTER) & R18
(8) TO BATTERY (+)
(9) TO GND.
(10)(12) TO R15
(11) TO R23
(13) TO C17
(14) TO R10 & C21
(15) TO C21 & R11

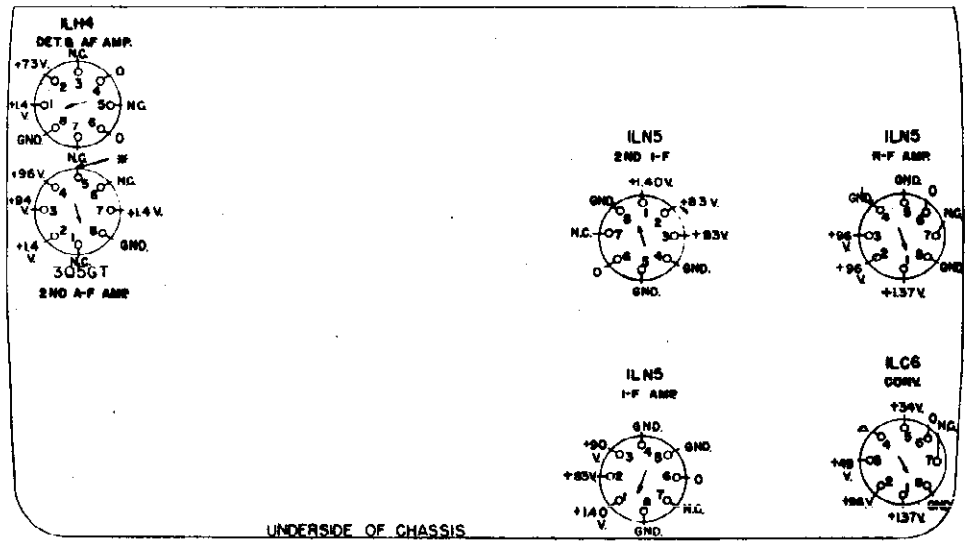
Operations Switch Wiring Diagram

GENERAL ELECTRIC CO.

MODEL 260



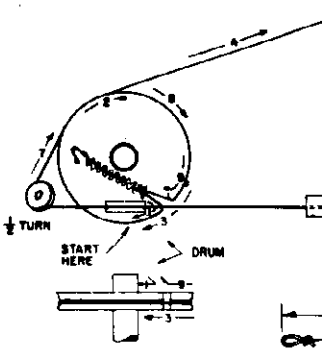




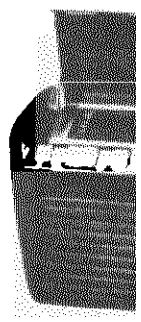
CONDITIONS OF TEST:
- ALL MEASUREMENTS D-C
- MEASUREMENTS MADE TO GROUND
- MEASUREMENTS MADE WITH 20,000 OHM/VOLT METER
- LINE VOLTAGE 117 V.- BATTERY FULLY CHARGED
- VOL. CONTROL MAX. CLOCKWISE
- TONE CONTROL TREBLE POSITION
- RECEIVER OPERATING ON BROADCAST BAND

N.C.- NOT CONNECTED TO TUBE
8 - 4.5 V. IF MEASURED WITH V.T.V.M.
CENTER POST ON ALL LOCTAL TUBES IS GROUNDED
Δ READING AFFECTED BY INSTRUMENT

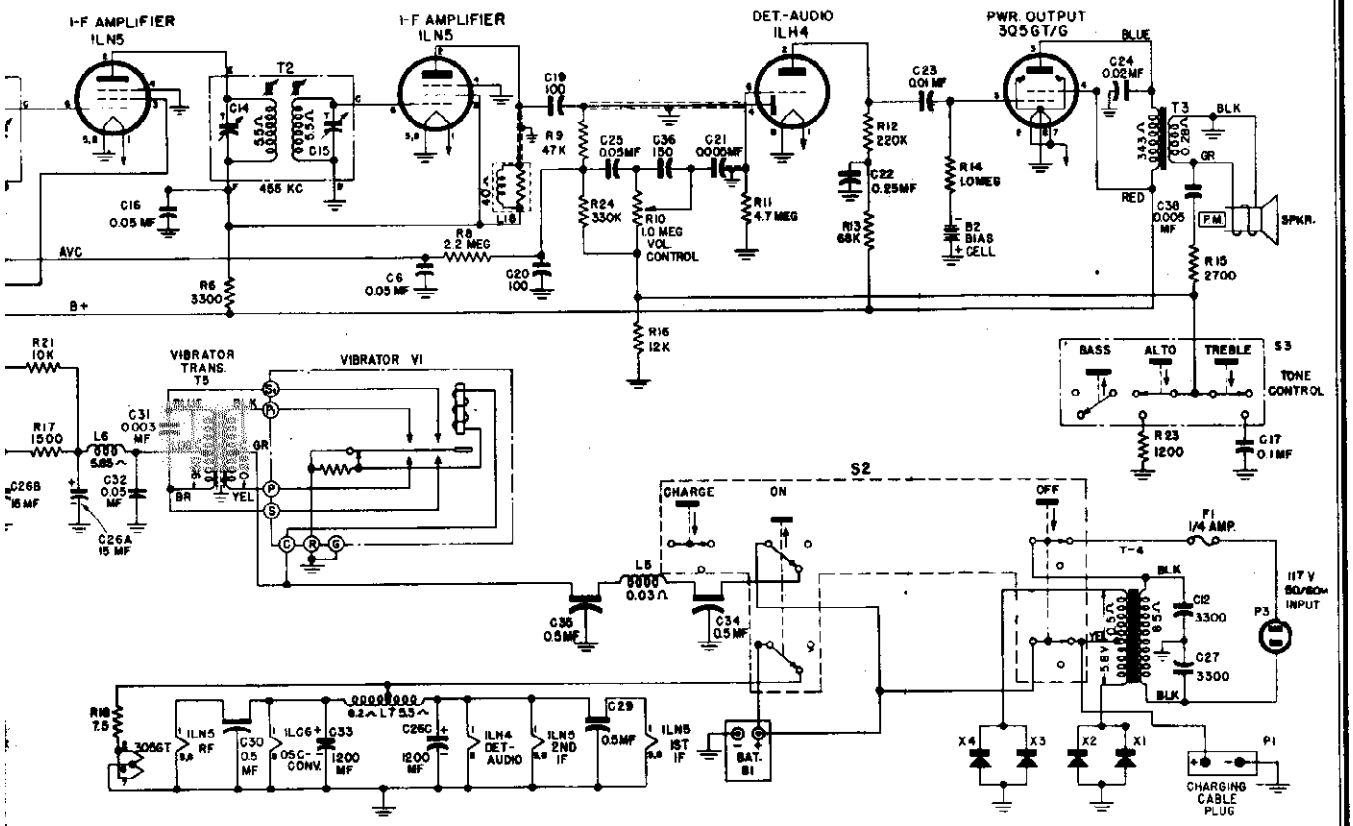
Socket Voltage Diagram

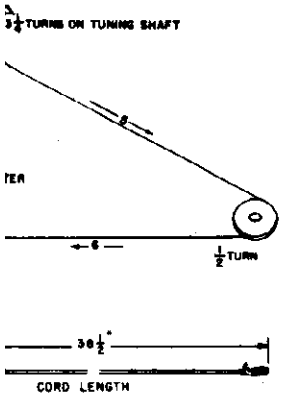


Dial S



LECTRIC CO.





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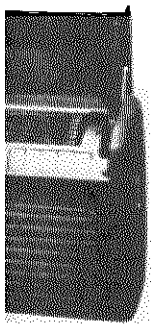
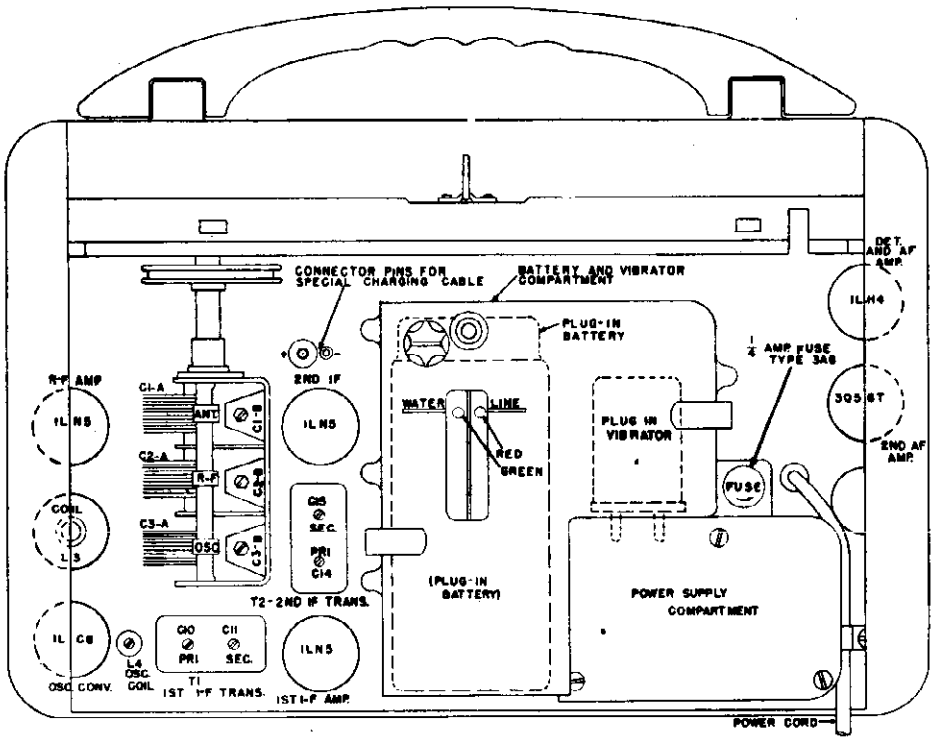


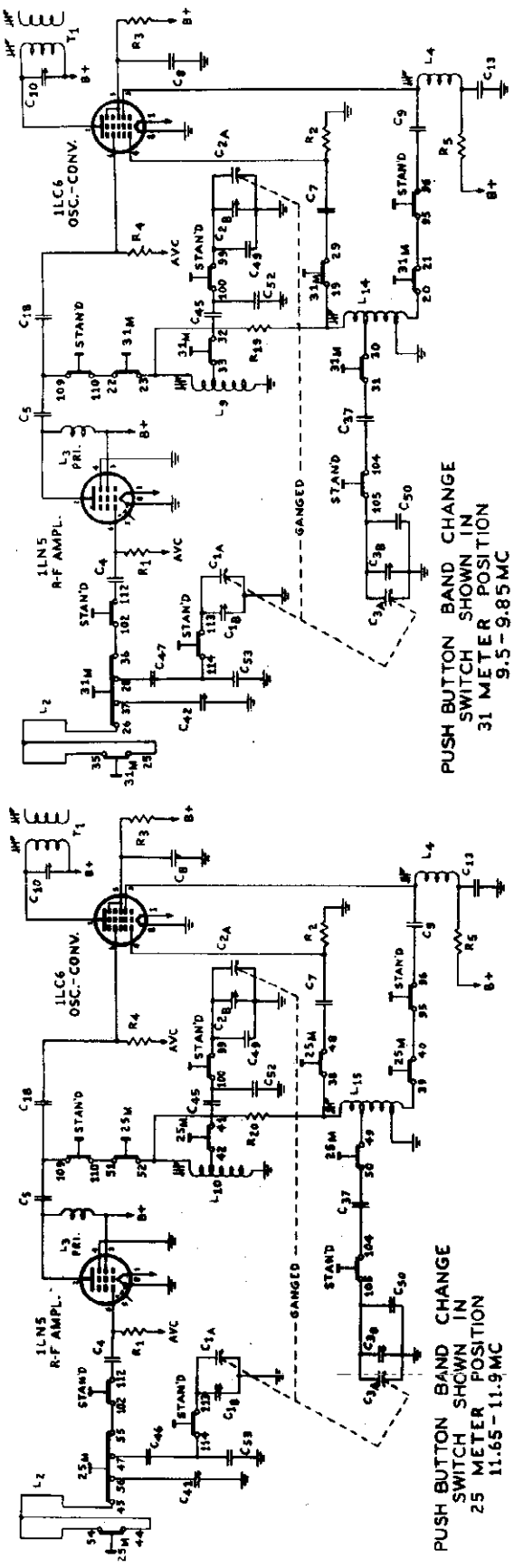


Tube and Trimmer Location

"clarified schematics"

MODEL 260

GENERAL ELECTRIC CO.



ELECTRICAL CIRCUIT ALIGNMENT

1. EQUIPMENT REQUIRED.

1. Signal Generator with Audio Tone Modulation.
2. A-c output meter, 1 or 1½ volts full scale, 1000 ohms/volt.
3. Insulated screwdriver.

2. ALIGNMENT PROCEDURE.

1. General.—The alignment procedure is given in table form for convenience. Reference is made to Figures 3, 5, and 6 for the trimmer locations. The low side of the signal generator should be connected to the chassis of the receiver for i-f alignment; the high side should be connected as indicated in the Alignment Chart. A meter or some other suitable indicating device must be connected to the output of the receiver. Two methods for connecting an output meter are given in later paragraphs.

When aligning the receiver, the Volume Control on the receiver should be turned to its maximum position and the TREBLE push button should be depressed. The output signal of the signal generator should be kept as low as possible at all times; the reading of a meter connected across the voice coil leads of the receiver should be kept below ½ volt by changing the signal generator output. If the signal level is too high, the AVC becomes effective and alignment errors may result.

The following paragraphs give greater details regarding the connection of the output meter and the signal generator to the receiver during alignment.

2. Connecting the Output Meter.—In aligning the receiver, some means for indicating differences in the output voltage will be required. Either of the following methods is satisfactory. The first requires more disassembly of the receiver case than the second, but the second requires additional test equipment.

Method 1.—A satisfactory method for indicating differences in output is to connect a rectifier-type a-c meter of 1 or 1½ volts full scale deflection across the speaker voice coil terminals. To gain access to the speaker, remove the front panel from the radio as previously described. Connect a lead to the green lead that connects to the ungrounded side of the speaker voice coil. Thread this lead through into the rear compartment. The front panel is reinstalled in place so that the stray capacities in the set will be the same as when the set is operating normally. Connect the meter between this lead and ground. A convenient ground connection may be obtained by removing the push-button band change switch escutcheon, and connecting a clip lead to the exposed chassis.

STAGE GAINS AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%.

1. R-F and I-F Stage Gains.

R-F amplifier grid (6) to converter grid (6).....8.0 at 1000 kc
R-F amplifier grid (6) to converter grid (6).....6.0 at 6100 and 9600 kc
R-F amplifier grid (6) to converter grid (6).....5.0 at 11.8, 15.2 and 17.8 mc
Converter grid (6) to 1st IF grid (6).....26 at 455 kc
Converter grid (6) to 1st IF grid (6).....15 at 1000 kc
Converter grid (6) to 1st IF grid (6).....15 at 6100 kc, 9600 kc, 11.8 mc, 15.2 mc, and 17.8 mc
1st IF grid (6) to 2nd IF grid (6).....69 at 455 kc
2nd IF grid (6) to diode plates.....3.9 at 455 kc

2. Audio Gain.

The power output across the speaker voice coil should be approximately 50 milliwatts with a 400 cps audio signal of 0.07 volts applied across the volume control, R10 (volume control maximum—TREBLE push button depressed).

3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak (R2) averages 6.5 volts at 1000 kc.

Method 2.—The following is an alternate method which eliminates the necessity of removing the front panel of the set, but which requires additional test equipment. Make an indicating device by connecting a 4- to 6-inch diameter magnetic speaker or the high-impedance leads from the output transformer of a good p-m dynamic speaker to the terminals of a rectifier-type microammeter with a full scale deflection of 100 microamperes or less. For convenience, the meter and speaker may be mounted in a small box in such a way that the meter will be visible when the speaker is placed in front of the speaker on the receiver being aligned.

To use this device, place its speaker in front of and about an inch away from the speaker of the receiver being aligned. The meter will then deflect in proportion to the intensity of the sound produced by the speaker, and therefore may be used as an output meter. The meter must not be moved during alignment.

3. Connecting the Signal Generator.—For aligning the i-f transformers, the output of the signal generator should be coupled through a 0.05 mf. capacitor to the grid (pin 6) of the 1LC6 oscillator-converter tube. This may be accomplished easily by connecting the capacitor to the stator of C2-A, the middle section of the tuning gang, as this stator is connected to the converter grid through a blocking condenser. The low side of the signal generator output should be connected to the chassis ground to complete the circuit.

For aligning the oscillator, r-f, and loop circuits, the r-f signal should be inductively coupled by means of a three- or four-turn, 6-inch diameter, loop of bell wire across the signal generator output terminals. The loop should be located about one foot from the radio cover, with cover open for broadcast alignment, and about one foot away from the external loop when making the shortwave band alignment. To prevent possible errors in peak readings, the position of the loop with respect to the receiver should not be changed during any one set of adjustments.

4. Alignment Suggestions.—The dial pointer should fall under the extreme left end mark on the dial scale when the gang condenser is fully closed. If necessary, move the dial pointer along the dial drive cord until such registration is obtained.

To gain access to the shortwave oscillator tuning slugs, L13 through L17, remove the snap cover from the bottom of the receiver. The short-wave antenna and converter trimmers are accessible when the push-button band-change switch escutcheon (right-hand side) is removed. When aligning the trimmers on the gang condenser (for broadcast band alignment), close the cabinet back cover and make the adjustments through the snap button openings in the back cover.

The oscillator operates on the high frequency side of the signal on all bands. With this method of operation, and with the dial set at an alignment point, the image response should be heard when the signal generator is tuned to a frequency 910 kc higher than the alignment frequency.

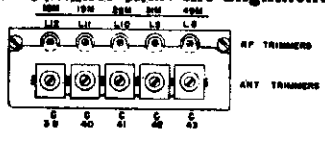
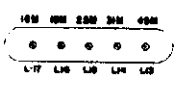


Fig. 5. RF and Antenna Trimmer Location

Fig. 6. Oscillator Trimmer Location



ALIGNMENT CHART

Depress Treble Push Button
Turn Volume Control to Maximum

Step	Sig. Gen. Setting	Connect Signal Generator to	Depress Push Button	Dial Scale Setting	Adjust
1	455 kc	Stator of C-2A in series with .05 mf	Standard	Below 550 kc	2nd i-f (T2) trimmers for max.
2	455 kc	Stator of C-2A in series with .05 mf	Standard	Below 550 kc	1st i-f (T1) trimmers for max.
3	1500 kc	Inductively coupled	Standard	1500 kc	**C-3B, C-2B, and C-1B for max. in sequence given
4	580 kc	Inductively coupled	Standard	580 kc	* L4 and L3 for max.
5	Repeat Step 3				
6	6.1 mc	Inductively coupled	49 M	6.1 mc	L13 for max.
7	6.1 mc	Inductively coupled	49 M	6.1 mc	* L8 and C43 for max.
8	9.6 mc	Inductively coupled	31 M	9.6 mc	L14 for max.
9	9.6 mc	Inductively coupled	31 M	9.6 mc	* L9 and C42 for max.
10	11.8 mc	Inductively coupled	25 M	11.8 mc	L15 for max.
11	11.8 mc	Inductively coupled	25 M	11.8 mc	* L10 and C41 for max.
12	15.22 mc	Inductively coupled	19 M	15.22 mc	L16 for max.
13	15.22 mc	Inductively coupled	19 M	15.22 mc	* L11 and C40 for max.
14	17.8 mc	Inductively coupled	16 M	17.8 mc	L17 for max.
15	17.8 mc	Inductively coupled	16 M	17.8 mc	* L12 and C39 for max.

* Alternately peak circuits to obtain peak while rocking gang condenser.
** Remove snap buttons on back cover to permit these adjustments and close back cover while aligning.
NOTE.—The oscillator operates on the high frequency side of the signal on all bands.

BATTERY INFORMATION

The receiver uses a 2-volt Willard Radio Battery No. 25–2 or equivalent. It has a 25 ampere-hour capacity and should be cared for in the same manner as any other storage battery.

Charge Indicator

The degree of charge of the battery can be determined by raising the back cover of the radio and referring to the charge ball indicators visible through the hole in the metal battery case.

If the battery is fully charged, two indicator balls will be visible at the surface of the liquid in the battery. When the battery discharges, these ball indicators will sink and disappear in the following order:

1. Green indicator sinks when approximately 20 per cent of battery capacity has been discharged.
2. The red ball sinks when battery is 80 per cent discharged.

On charge, the balls rise or float in the reverse order and the charge may be stopped when both balls appear in the opening.

To Charge Battery

The battery is charged by merely plugging the receiver power cord in the rated a-c power outlet and depressing the CHARGE push button. Frequent check should be made of the charge indicator and when both indicator balls are visible, the battery is adequately charged. Charging the battery after all indicator balls are visible will not harm the battery except that it will evaporate the water faster. A completely discharged battery will be restored usually within 20 to 30 hours.

When operating the receiver from the a-c house current, the battery floats or is being charged at a slow rate. Thus, if you wish to operate the receiver at the same time that you are charging even a fully discharged battery, plug the power cord in the a-c receptacle and depress the ON push button. Prolonged operation in this manner usually will cause the battery potential to stabilize at some voltage determined by the line voltage and the characteristics of the charging circuit components. The degree of charge obtainable with this method of operation likewise is dependent on the line voltage and the characteristics of the charging circuit components.

Battery Operating Instructions

1. Add distilled or tap water in the filler cap at sufficiently frequent intervals to keep liquid level at indicator mark as viewed through opening in battery case. DO NOT OVERFILL as this impairs the nonspill feature.
2. Whenever possible, it is best not to allow the battery to become discharged to the extent that both indicators disappear.

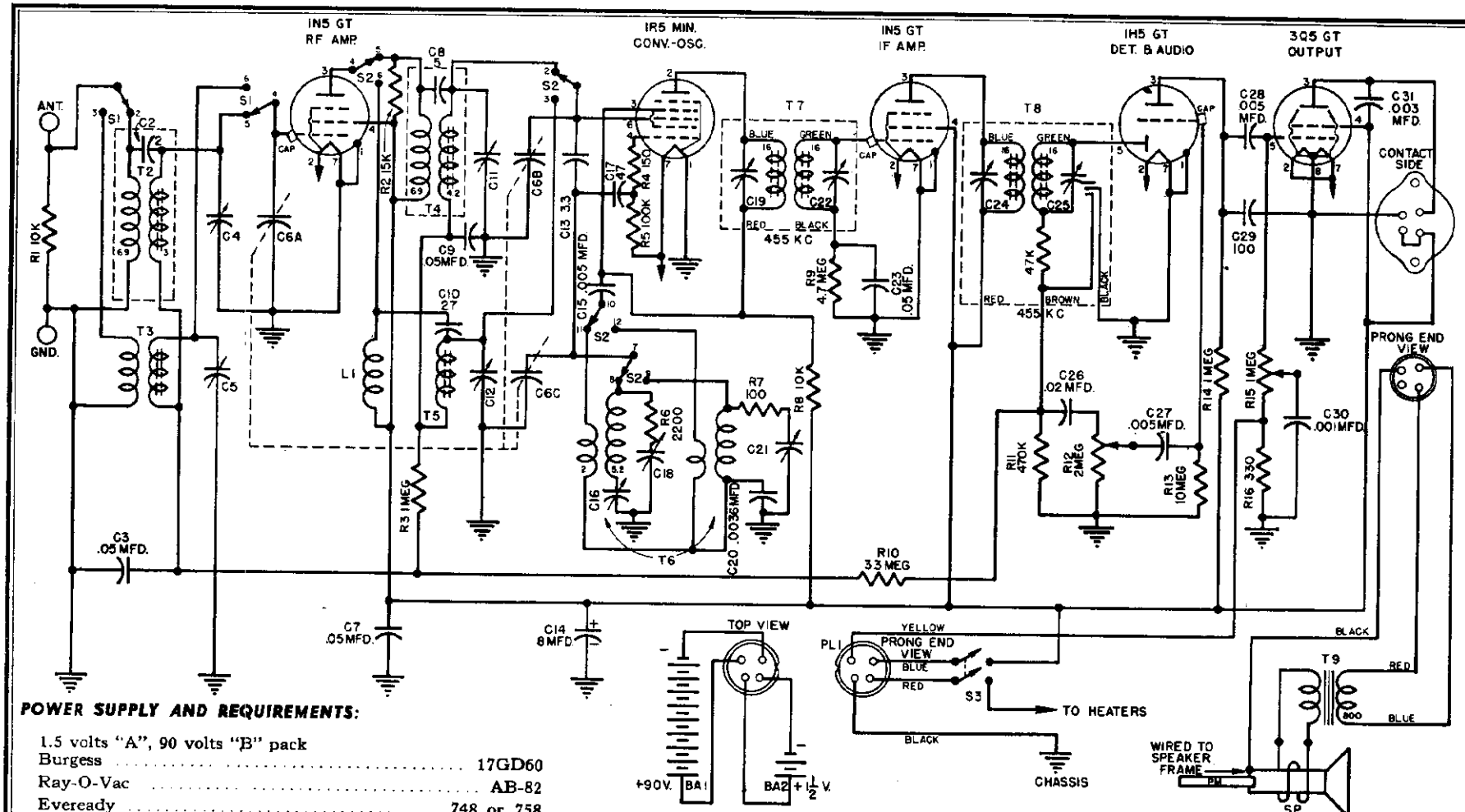
However, if both indicators have sunk, the battery should be recharged immediately or within 24 hours.

3. A battery will continually discharge at a slow rate even when not in use. For this reason, monthly checks should be made of the charge condition, and the battery should be placed on charge when necessary. This will prevent damage to the battery such as freezing during cold weather.

BATTERY INSTALLATION

The following instructions should be carefully followed in installing a battery, or replacing an old one:

1. Remove new battery from packing carton.
2. If needed, add water to bring liquid level to indicator mark on battery container. *Do not overfill.*
3. Raise back cover on radio, remove battery case cover. The latter is removed by unclipping the two catches. Pry off cover.
4. Unplug old battery if present, and replace with new battery.
5. Place battery on charge, if necessary, as described in a previous paragraph, until both indicators are showing in the opening in the case cover.



POWER SUPPLY AND REQUIREMENTS:

1.5 volts "A", 90 volts "B" pack

Burgess	17GD60
Ray-O-Vac	AB-82
Eveready	748 or 758
General	60 DL-11L

OPERATING FREQUENCIES:

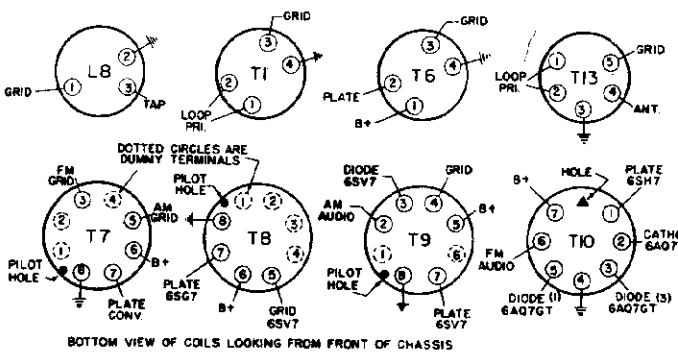
Broadcast Band	540-1710 kc
Shortwave Band	5.8-18.3 mc
I-F Amplifier	455 kc

POWER OUTPUT:

Undistorted	0.15 watt
Maximum	0.27 watt

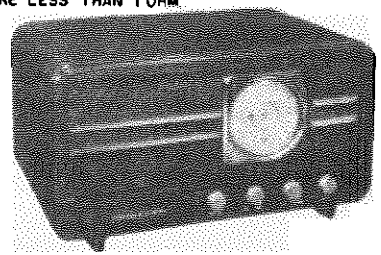
LOUDSPEAKER:

Type	Alnico P.M.
Outside Cone Diameter	6 in.
Voice Coil Impedance (400 cycles)	3.2 ohms



BOTTOM VIEW OF COILS LOOKING FROM FRONT OF CHASSIS

CAPACITY VALUES IN MMF UNLESS SPECIFIED.
RESISTANCE VALUES IN OHMS.
"K" = 1000, i.e., 22K = 22,000.
RESISTANCE VALUES NOT SHOWN ON COILS ARE LESS THAN 1 OHM.



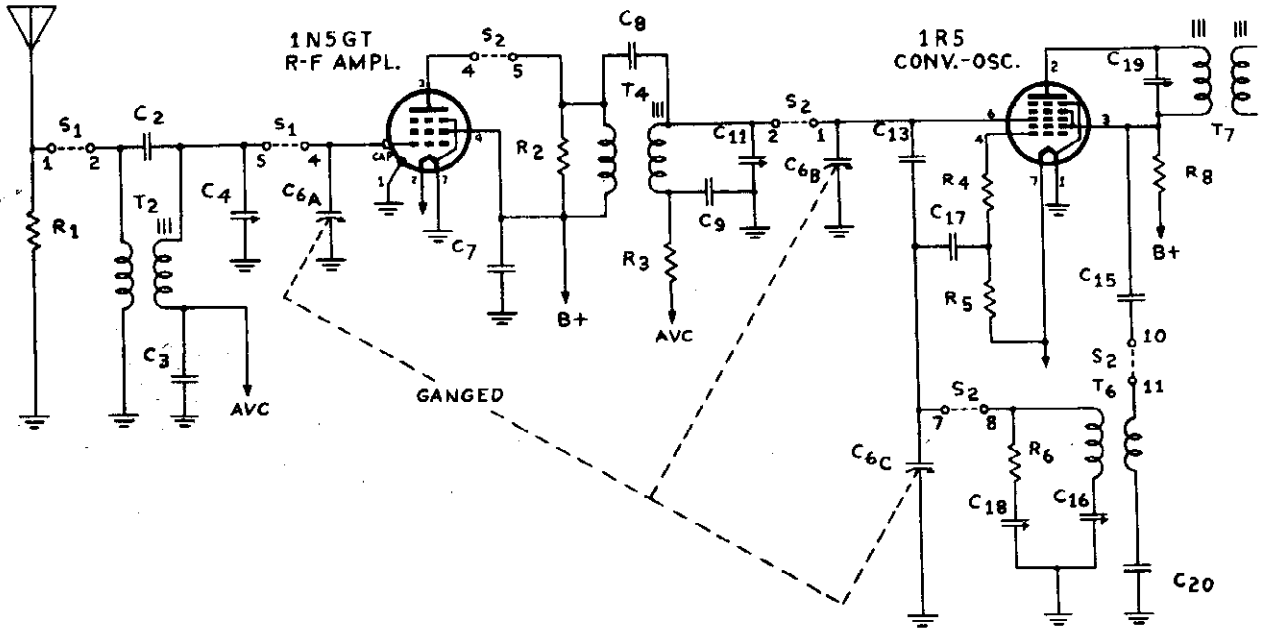
GENERAL ELECTRIC CO.

MODEL 280

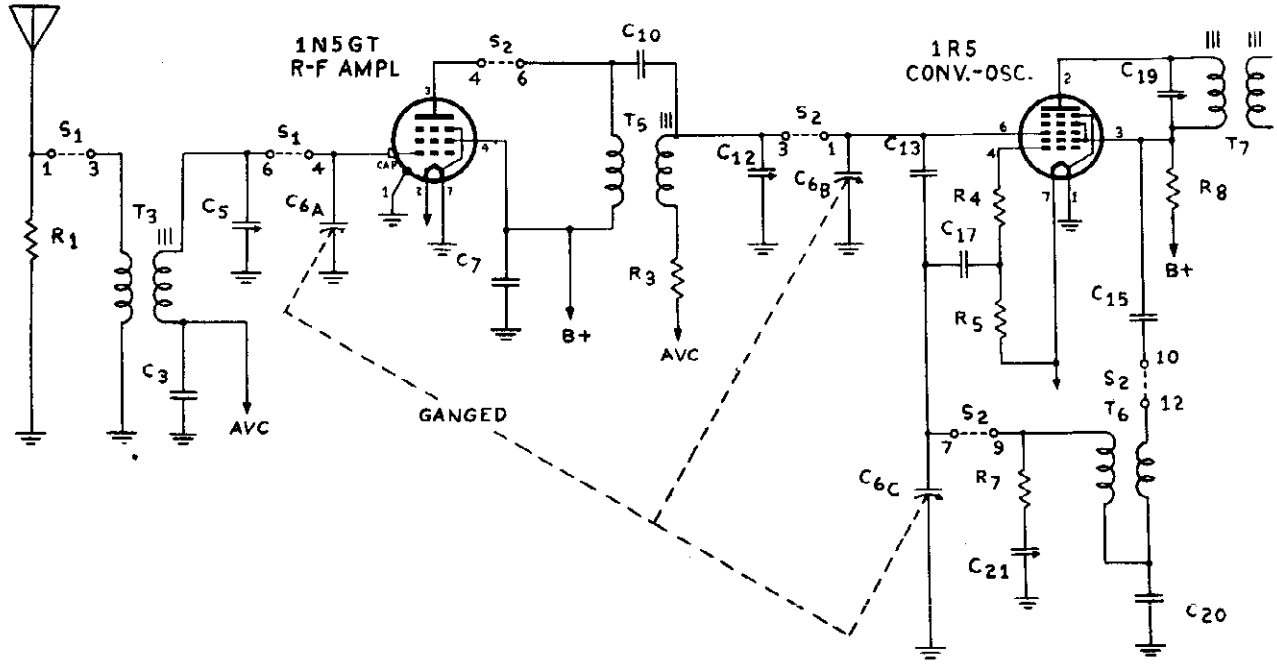
"clarified schematics"

MODEL 280

GENERAL ELECTRIC CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1710 KC



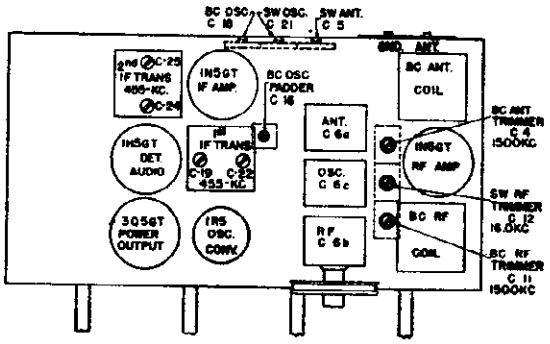
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.8-18.3 MC

ELECTRICAL CIRCUIT ALIGNMENT

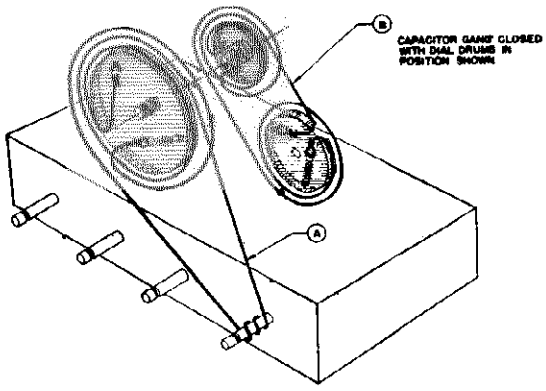
PROCEDURE—GENERAL. 1. Connect output meter across loud speaker voice coil terminals.

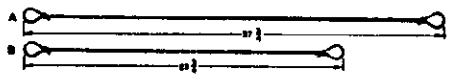
2. Keep radio volume control at maximum and attenuate test oscillator signal output for low output meter reading.

3. All trimmer adjustments are made with the chassis removed from the cabinet.



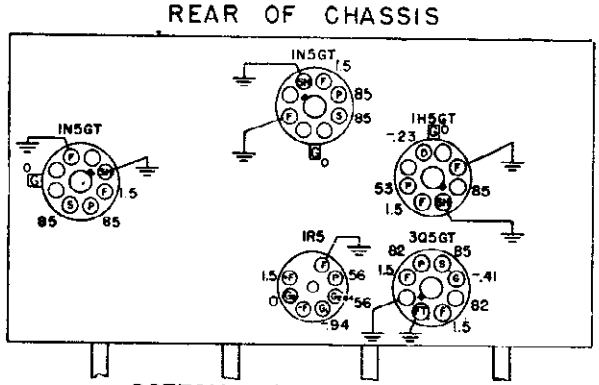
Tube and Trimmer Location





Dial Stringing

REAR OF CHASSIS



BOTTOM VIEW OF CHASSIS

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT METER. MEASURED FROM PIN TO CHASSIS.
1.5 V "A" — 90 V "B" BATTERY PACK. NO SIGNAL INPUT
VOLUME CONTROL AT MAXIMUM

Socket Voltages

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Oscillator Setting	Pointer Setting On Radio	Adjust For Max. Output
1	1N5GT IF grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	1st IF transformer trimmers
2	1R5 conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	2nd IF transformer trimmers
3	1N5GT RF grid in series with .05 mfd.	1710 KC	HF End	C18 (osc.)
4	1N5GT RF grid in series with .05 mfd.	1500 KC	1500 KC	C11 (conv.)
5	1N5GT RF grid in series with .05 mfd.	600 KC	600 KC	* **C16 (osc. padder)
6	Antenna Post in series with 200 mmf.	1500 KC	1500 KC	C4 (RF)
7	1N5GT RF grid in series with .05 mfd.	18.3 MC	HF End	C21 (osc.)
8	Antenna Post in series with 400 ohms	16.0 MC	16.0 MC	* C12 and C5 (Conv. and R-F)

*Rock Gang condenser when making alignment.
**Repeat steps 3 and 4 for beat results.

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna post to 1N5GT r-f grid	3 at 1000 kc
1N5GT r-f grid to 1R5	10 at 1000 kc
1R5 grid to 1N5GT i-f grid	46 at 1000 kc
1R5 grid to 1N5GT i-f grid	60 at 455 kc
1N5GT grid to 1H5GT i-f diode plates	80 at 455 kc

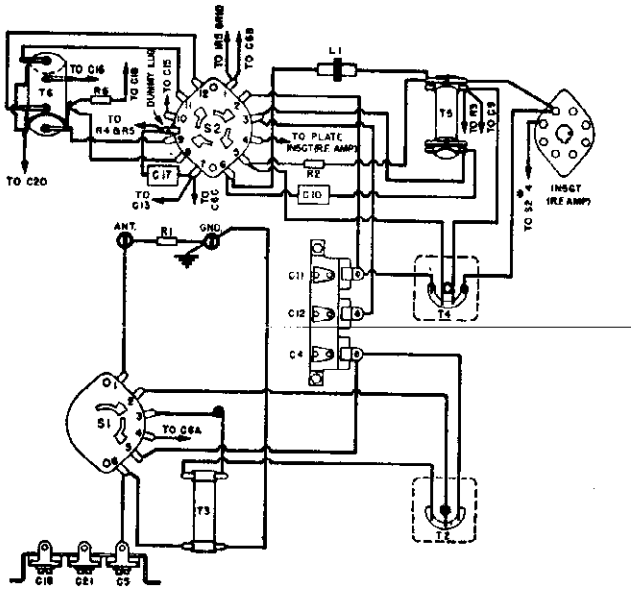
(2) Audio Gain.

.06 volt at 400 cycles across volume control (R12) with control set at maximum will give approximately .05 watts output across speaker voice coil.

(3) D-C voltage developed across oscillator grid resistor (R5) averages 8 volts at 1000 kc.

(4) Socket Pin Voltages.

Figure 5 shows voltages from all tube pins to B-. Voltage readings much lower than those specified may help localize defective components or tubes.



Switch Wiring

MODEL 280
MODEL 417

GENERAL ELECTRIC CO.

PARTS LIST - MODEL 417

Part No.	Symbol	Description
UNIVERSAL REPLACEMENT PARTS		
UCC-039	C43	CAPACITOR—.005 md., 600 v. paper
UCC-040	C17, 30 64, 69, 91, 103	CAPACITOR—.01 mfd., 600 v., paper
UCC-041	[illegible]	CAPACITOR—.02 mfd., 600 v., paper
UCC-042	[illegible]	CAPACITOR—.03 mfd., 600 v., paper
UCC-045	[illegible]	CAPACITOR—.05 mfd., 600 v., paper
UCG-2048	[illegible]	CAPACITOR—680 mmfd., 500 v., silver mica
UCN-506	[illegible]	CAPACITOR—6.8 mmf., ceramic
UCU-020	[illegible]	CAPACITOR—47 mmf., 500 v., mica
UCU-028	[illegible]	CAPACITOR—100 mmf., 500 v., mica
UCU-048	[illegible]	CAPACITOR—680 mmf., 500 v., mica
UCU-520	[illegible]	CAPACITOR—47 mmf., mica
UCU-528	[illegible]	CAPACITOR—100 mmf., 500 v., mica
UCU-536	[illegible]	CAPACITOR—220 mmf., 500 v., mica
UCU-544	[illegible]	CAPACITOR—470 mmf., 500 v., mica
UCU-1042	[illegible]	CAPACITOR—390 mmfd., 500 v., mica
UCU-1054	[illegible]	CAPACITOR—10 mmfd., mica
UCU-1512	[illegible]	CAPACITOR—22 mmfd., 500 v., mica
UCU-1532	[illegible]	CAPACITOR—150 mmfd., mica
UCU-1544	[illegible]	CAPACITOR—470 mmfd., mica
UCW-1004	[illegible]	CAPACITOR—10 mmf., ceramic
UCW-1014	[illegible]	CAPACITOR—27 mmf., ceramic
UCW-1020	[illegible]	CAPACITOR—47 mmf., ceramic
UCW-1028	[illegible]	CAPACITOR—100 mmf., ceramic
UIC-001		CEMENT—Speaker cone replacement cement
UJB-014		TERMINALS—4 lug terminal strip
UJB-018		TERMINALS—2 lug terminal strip
UOP-1230		SPEAKER—12 in. permanent magnet speaker
UOX-002		CONE—Loudspeaker replacement cone assembly
URD-007	[illegible]	RESISTOR—18 ohms, ½ w., carbon
URD-009	[illegible]	RESISTOR—22 ohms, ½ w., carbon
URD-017	[illegible]	RESISTOR—47 ohms, ½ w., carbon
URD-025	[illegible]	RESISTOR—100 ohms, ½ w., carbon
URD-033	[illegible]	RESISTOR—220 ohms, ½ w., carbon
URD-049	[illegible]	RESISTOR—1000 ohms, ½ w., carbon
URD-057	[illegible]	RESISTOR—2200 ohms, ½ w., carbon
URD-061	[illegible]	RESISTOR—3300 ohms, ½ w., carbon
URD-065	[illegible]	RESISTOR—4700 ohms, ½ w., carbon
URD-077	[illegible]	RESISTOR—15,000 ohms, ½ w., carbon
URD-083	[illegible]	RESISTOR—27,000 ohms, ½ w., carbon
URD-085	[illegible]	RESISTOR—33,000 ohms, ½ w., carbon
URD-089	[illegible]	RESISTOR—47,000 ohms, ½ w., carbon
URD-091	[illegible]	RESISTOR—56,000 ohms, ½ w., carbon
URD-093	[illegible]	RESISTOR—68,000 ohms, ½ w., carbon
URD-095	[illegible]	RESISTOR—82,000 ohms, ½ w., carbon
URD-097	[illegible]	RESISTOR—100,000 ohms, ½ w., carbon
URD-099	[illegible]	RESISTOR—120,000 ohms, ½ w., carbon
URD-103	[illegible]	RESISTOR—180,000 ohms, ½ w., carbon
URD-105	[illegible]	RESISTOR—220,000 ohms, ½ w., carbon
URD-113	[illegible]	RESISTOR—470,000 ohms, ½ w., carbon
URD-121	[illegible]	RESISTOR—1.0 meg., ½ w., carbon
URD-125	[illegible]	RESISTOR—1.5 meg., ½ w., carbon
URD-129	[illegible]	RESISTOR—2.2 meg., ½ w., carbon
URD-133	[illegible]	RESISTOR—3.3 meg., ½ w., carbon
URD-145	[illegible]	RESISTOR—10.0 meg., ½ w., carbon
URD-1079	[illegible]	RESISTOR—16,000 ohms, ½ w., carbon
URD-1104	[illegible]	RESISTOR—200,000 ohms, ½ w., carbon
URE-035	[illegible]	RESISTOR—270 ohms, 1 w., carbon
URE-073	[illegible]	RESISTOR—10,000 ohms, 1 w., carbon
URE-083	[illegible]	RESISTOR—27,000 ohms, 1 w., carbon
URE-085	[illegible]	RESISTOR—33,000 ohms, 1 w., carbon
SPECIALIZED REPLACEMENT PARTS		
RAB-021	[illegible]	BEAM-A-SCOPE—Cabinet back and loop assembly
RAD-016		BRACKET—For band switch mounting at front
RAX-007	[illegible] 6	COIL—Pushbutton coils mounted on bracket
RAX-008		BRACKET—Bracket and roller fork for elevator shaft
RCC-001	[illegible]	CAPACITOR—[illegible]
RCC-041	C16, 19, 60, 62	CAPACITOR—[illegible]
RCC-056	C51	CAPACITOR—[illegible]
RCE-030	C105A	CAPACITOR—[illegible]
	C105B	CAPACITOR—[illegible]
RCE-039	C46A	CAPACITOR—[illegible]
	C46B	CAPACITOR—[illegible]
	C46C	CAPACITOR—[illegible]
	C46D	CAPACITOR—[illegible]
RCW-001	C12	CAPACITOR—[illegible]
RCW-013	C67	CAPACITOR—[illegible]
RCW-014	C27, 44	CAPACITOR—[illegible]
RCW-015	C87	CAPACITOR—[illegible]
RCW-060	C71	CAPACITOR—[illegible]
RCW-1028	C7, 11, 25	CAPACITOR—[illegible]
RCX-011	C80	CAPACITOR—[illegible]
	C81	CAPACITOR—[illegible]
	C82	CAPACITOR—[illegible]
	C83	CAPACITOR—[illegible]
	C84	CAPACITOR—[illegible]
RCX-016	C5	CAPACITOR—[illegible]
	C58	CAPACITOR—[illegible]
	C59	CAPACITOR—[illegible]
RCX-022	C3	CAPACITOR—[illegible]
	C4	CAPACITOR—[illegible]
	C56	CAPACITOR—[illegible]
	C57	CAPACITOR—280-380 mmf., trimmer capacitor
	C63	CAPACITOR—45-80 mmf., trimmer capacitor
RCX-025	C1	CAPACITOR—34-70 mmf., trimmer capacitor
	C55	CAPACITOR—4-50 mmf., trimmer capacitor
RCX-024	C2	CAPACITOR—3-30 mmf., trimmer capacitor
	C65	CAPACITOR—80-130 mmf., trimmer capacitor

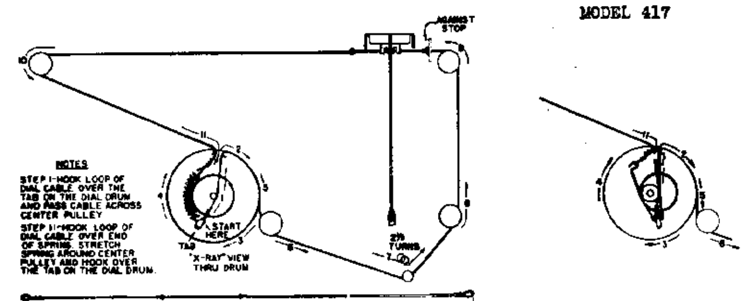
Part No.	Symbol	Description
RCY-011	C54	CAPACITOR—3-30 mmf., trimmer for loop
RCY-017	C6, 45	CAPACITOR—3-30 mmf., air trimmer
RDB-001		PUSHBUTTON—Black pushbutton used at bottom of strip only
RDB-004		PUSHBUTTON—Black pushbuttons used in upper five positions only
RDC-019		CORD—Hoist cord 6½" long
RDC-021		CORD—Drive cord 40½"
RDE-016		ESCUTCHEON—For dial scale and pushbuttons
RDG-003		BACK PLATE—Large metal panel plate
RDK-004		KNOB—Black knob, plain
RDK-032		KNOB—Black control knob with pointer
RDP-016		POINTER—Dial pointer and slide
RDP-027		POINTER—Dial pointer
RDS-014		SCALE—Tuning dial scale
REI-006		CORE—Iron core for broadcast antenna, r-f, and oscillator coils
REX-002		CORE—Iron core with glass tubing for broadcast antenna, r-f, and oscillator coils
RHC-007		PIN—Hairpin cotter for securing shaft through pushbuttons
RHC-009		PIN—Hairpin cotter for idler wheel
RHC-010		SPRING CLIP—Holds FM coil assembly
RHE-001		EYELET—For connecting FM coil links
RHG-005		GROMMET—For power cord
RHM-016		CLIP—Mounting clip for L1 and L7
RHM-024		LINK—Hoist link holding end of hoist cord
RHM-025		RING—Retaining ring for flywheel
RHM-026		COIL LINK—Rectangular coil link for assembling FM coils T2 and T5
RHM-027		COIL LINK—Rectangular coil link for assembling FM coil, T4
RII-001		POST—Mycalex posts for assembling all FM coils
RJC-001		CONTACT PIN—For speaker connection
RJJ-004		RECEPTACLE—Pre-amp. and pushbutton receptacle
RJP-002		PLUG—Four-prong pre-amp. power plug
RJP-003		PLUG—Phono power male plug
RJP-004		PLUG—Male phono plug from pre-amplifier
RJP-005		PLUG—Plug and cover for pushbutton cable
RJP-010		SOCKET—Phono input socket
RJP-011		PLUG—Shipping screw hole plug
RJS-003		SOCKET—Octal socket for V5, V6, and V7
RJS-012		PLATE—For mounting electrolytic
RJS-027		SOCKET—Dial light socket
RJS-030		SOCKET—Octal socket for V4, V8, and V9
RJS-044		TUBE SOCKET—Tube socket for V1, V2, and V3
RJS-049		SOCKET—Phono power female socket
RJS-051		RECEPTACLE—3 pin receptacle for Beam-a-scope
RJX-009		PLUG—Plug attached to Beam-a-scope
RLA-009	T1	COIL—Broadcast band antenna coil
RLA-011	L6	COIL—FM antenna choke coil
	L19	COIL—FM oscillator cathode choke coil
	L20	COIL—SW loop shunt coil
RLA-016	T11	COIL—Pushbutton antenna coil
RLB-005	T2, 5	COILS—FM antenna coil and FM RF coil
RLB-006	T6	COIL—Broadcast band RF coil
RLB-007	L5	COIL—FM oscillator cathode choke coil
RLB-008	L3	COIL—SW band RF plate choke coil
RLB-009	L2	COIL—Broadcast band plate choke dummy
RLB-010	L4	COIL—FM RF plate choke coil
RLC-013	T4	COIL—FM band oscillator coil
RLC-014	T3	COIL—Broadcast band oscillator coil
RLC-015	L1	COIL—SW oscillator loading coil
RLC-015	L8	COIL—Broadcast band oscillator shunt coil
RLC-017	L7	COIL—SW band RF loading coil
RLF-003	L9	COIL—Filament choke coil
RLI-002	L11	CHOKE—Power line choke
RLP-004	L10	COIL—FM IF plate coil
RLP-006	L18	COIL—Oscillator plate choke coil
RMC-012		CLAMP—For holding cover on RF unit
RMC-013		CLIP—Support for clamp RMC-012
RMC-014		CLIP—For holding shielded phono cable
RMK-001		CAPACITOR—Large bi-metallic strip forming moving element of temperature-compensating capacitor
[illegible]		CAPACITOR—Small metallic strip forming stationary plate of temperature-compensating capacitor
[illegible]		SPACER—Metal sleeve on hoist pulley shaft
[illegible]		VANE—Tuner vane for FM coils T2 and T5
[illegible]		VANE—Tuner vane for FM oscillator coil, T4
[illegible]		SUPPORT—Cabinet drop-leaf support
[illegible]		ROLLER—Presses against hoist shaft
[illegible]		SPRING—Maintains pushbutton tension
[illegible]		WASHER—"C" washer on idler pulley
[illegible]		SPRING—Flat spring against hoist pulley shaft
[illegible]		SPRING—Wire spring against hoist pulley shaft
[illegible]		SPRING—Hoist cord tension spring
[illegible]		SCREW—Iron core adjusting screw
[illegible]		SPRING—Guide wire spring in elevator plate
[illegible]		SPRING—Dial cord tension spring in large drum
[illegible]		SHAFT—Manual tuning shaft
[illegible]		PULLEY—Main tuning drum
[illegible]		PULLEY—Small idler pulley
[illegible]		FLYWHEEL—Flywheel with setscrew
[illegible]		PULLEY—Hoist pulley and shaft
[illegible]		PLATE AND SHAFT—Elevator top plate and vertical shaft
[illegible]	R25	VOLUME CONTROL—2 meg. potentiometer tapped at 1 meg.
[illegible]	S2	SWITCH—Bass tone switch
[illegible]	R35, 36	RESISTOR—1150 and 5000 ohm, w.w.
[illegible]	S5	SWITCH—Pushbutton switch
[illegible]	S1	SWITCH—Band change switch
[illegible]	S3	SWITCH—Treble tone and power switch
[illegible]	T10	TRANSFORMER—Discriminator
[illegible]	T7	TRANSFORMER—1st I-F transformer
[illegible]	T8	TRANSFORMER—2nd I-F transformer
RTL-019	T9	TRANSFORMER—3rd I-F transformer
RTO-012	T11	TRANSFORMER—Output transformer
RTP-020	T12	TRANSFORMER—Power transformer
RWL-004		CORD—Power cord
RWX-004		WIRE—Guide wire for pointer

PARTS LIST - MODEL 280

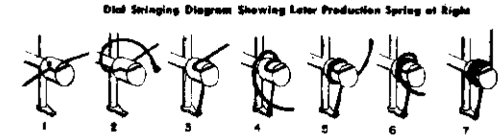
PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL REPLACEMENT PARTS		
UCC-011	C3, 9, 23	CAPACITOR—.05 mfd., 200 v., paper
UCC-028	C7	CAPACITOR—.05 mfd., 400 v., paper
UCC-035	C30	CAPACITOR—.001 mfd., 600 v., paper
UCC-037	C31	CAPACITOR—.003 mfd., 600 v., paper
UCC-039	C15, 27, 28	CAPACITOR—.005 mfd., 500 v., paper
UCC-041	C26	CAPACITOR—.02 mfd., 600 v., paper
UCU-1014	C18	CAPACITOR—27 mmf., mica
UCU-1020	C17	CAPACITOR—47 mmf., mica
UCU-1028	C29	CAPACITOR—100 mmf., mica
UCU-1065	C20	CAPACITOR—3600 mmf., mica
UOP-654	SP	SPEAKER—6½ in. permanent magnet speaker
UOX-011		CONE—Speaker cone
URD-025	R7	RESISTOR—100 ohm, ½ w., carbon
URD-029	R4	RESISTOR—150 ohm, ½ w., carbon
URD-037	R16	RESISTOR—330 ohm, ½ w., carbon
URD-057	R6	RESISTOR—2200 ohm, ½ w., carbon
URD-073	R1, 8	RESISTOR—10,000 ohm, ½ w., carbon
URD-077	R2	RESISTOR—15,000 ohm, ½ w., carbon
URD-097	R5	RESISTOR—100,000 ohm, ½ w., carbon
URD-113	R11	RESISTOR—470,000 ohm, ½ w., carbon
URD-121	R3, 14	RESISTOR—1 meg., ½ w., carbon
URD-133	R10	RESISTOR—3.3 meg., ½ w., carbon
URD-137	R9	RESISTOR—4.7 meg., ½ w., carbon
URD-145	R13	RESISTOR—10 meg., ½ w., carbon
SPECIALIZED REPLACEMENT PARTS		
RAB-5001		BACK—Cabinet back
RCE-5001	C14	CAPACITOR—8 mfd., 150 v., electrolytic
RCT-5000	C6A, 6B, 6C	CONDENSER—Tuning condenser
RCU-5000	C13	CAPACITOR—3.3 mmfd., mica

PART NO.	SYMBOL	DESCRIPTION
SPECIALIZED REPLACEMENT PARTS LIST (Cont'd)		
RCY-5000	C5, 18, 21	CAPACITOR—SW antenna trimmer, BC oscillator trimmer and SW oscillator trimmer
RHC-5001		CLIP—Off-On indicator retaining clip
RJS-5000		SOCKET—Miniature tube socket
RJS-5001		SOCKET—Octal tube socket
RJS-5002		SOCKET—Speaker socket
RLA-5000	T2	COIL ASSEMBLY—Broadcast antenna coil
RLA-5002	T3	COIL ASSEMBLY—Short wave antenna coil
RLB-5000	T4	COIL ASSEMBLY—Broadcast RF
RLB-5002	T5	COIL ASSEMBLY—Short wave RF
RLC-5000	T6	COIL ASSEMBLY—BC and SW oscillator
RLI-5000	L1	COIL ASSEMBLY—SW RF choke coil
RMB-5001		BEARING—Dial drive shaft supporting bearing
RMC-5000		CAM—Off-On indicator cam
RMU-5001		SHAFT—Dial drive shaft
RRC-5000	R12	VOLUME CONTROL—2 meg. volume control
RRC-5002	R15, S3	TONE CONTROL—1 meg. control and power switch
RSW-5000	S1, 2	SWITCH—Band change switch
RTO-5001	T9	TRANSFORMER—Output transformer
RTL-5000	T8	TRANSFORMER—2nd i-f transformer
RTL-5003	T7	TRANSFORMER—1st i-f transformer
RWX-5000		CABLE ASSEMBLY—Battery cable
RYM-5000		CHART—Dial calibration chart
RCY-5001	C16	CAPACITOR—BC oscillator padder
RDC-5001		CORD—Drive cord
RDE-5001		ESCUTCHEON—Dial scale escutcheon
RDF-5001		WASHER—Felt washer for knobs
RDK-5000		KNOB—Control knobs
RDM-5000		FLAG—Off-On indicator flag
RDP-5000		POINTER—Plastic dial pointer
RDX-5001		BRACKET—Dial bracket and pulley assembly

MODEL 417



Dial Stringing Diagram Showing Later Production Spring at Right



—Elevator Windless Stringing Procedure

Model 417 -- Howl on FM Band

Howl may be caused by a microphonic 6AK5 converter tube. If this doesn't remedy the condition, the howl is possibly set up in the "guillotine" tuning unit. Apply Vistac to the moving vane of the "guillotine" tuning unit where it contacts the runners so that it is coated for its full length. Use only a small amount.

Vistac is obtainable from the Advance Solvent and Chemical Corp., Jersey City, New Jersey.

GENERAL ELECTRIC CO.

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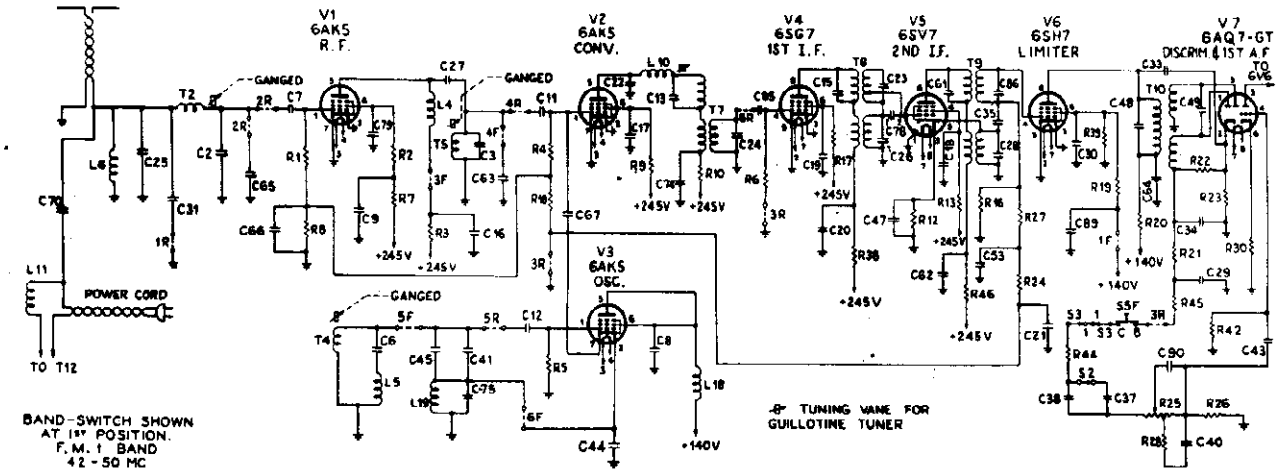

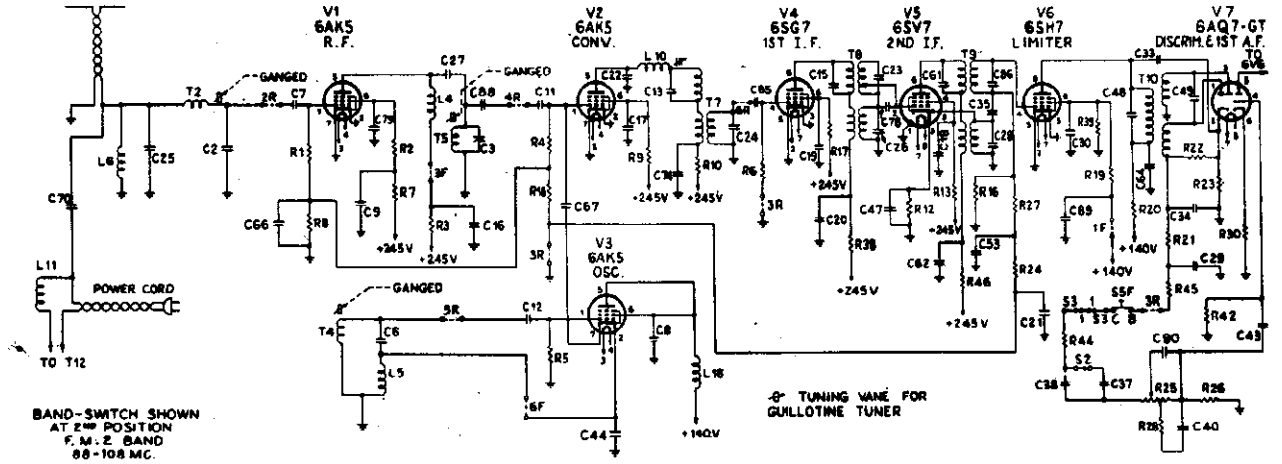

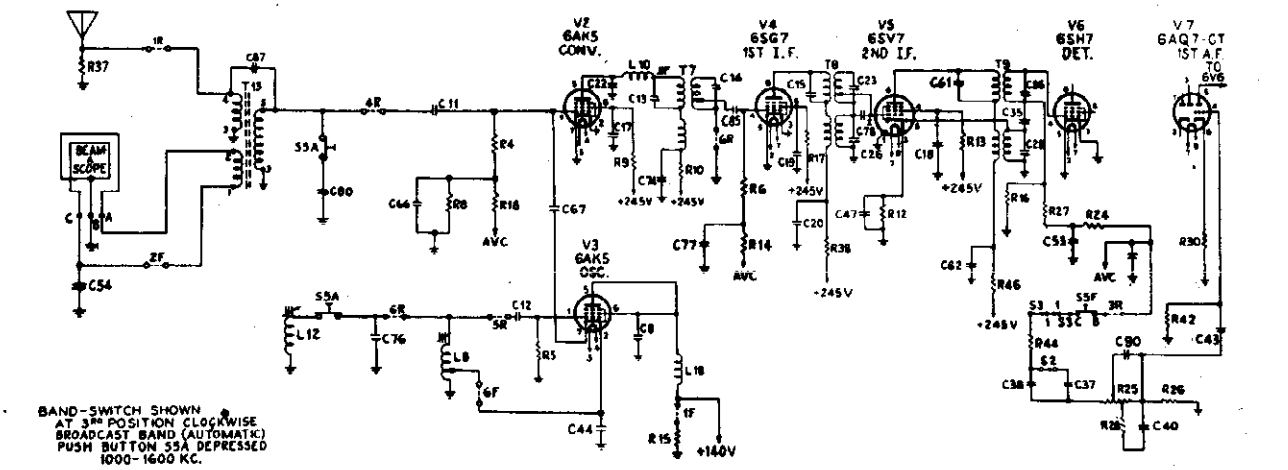

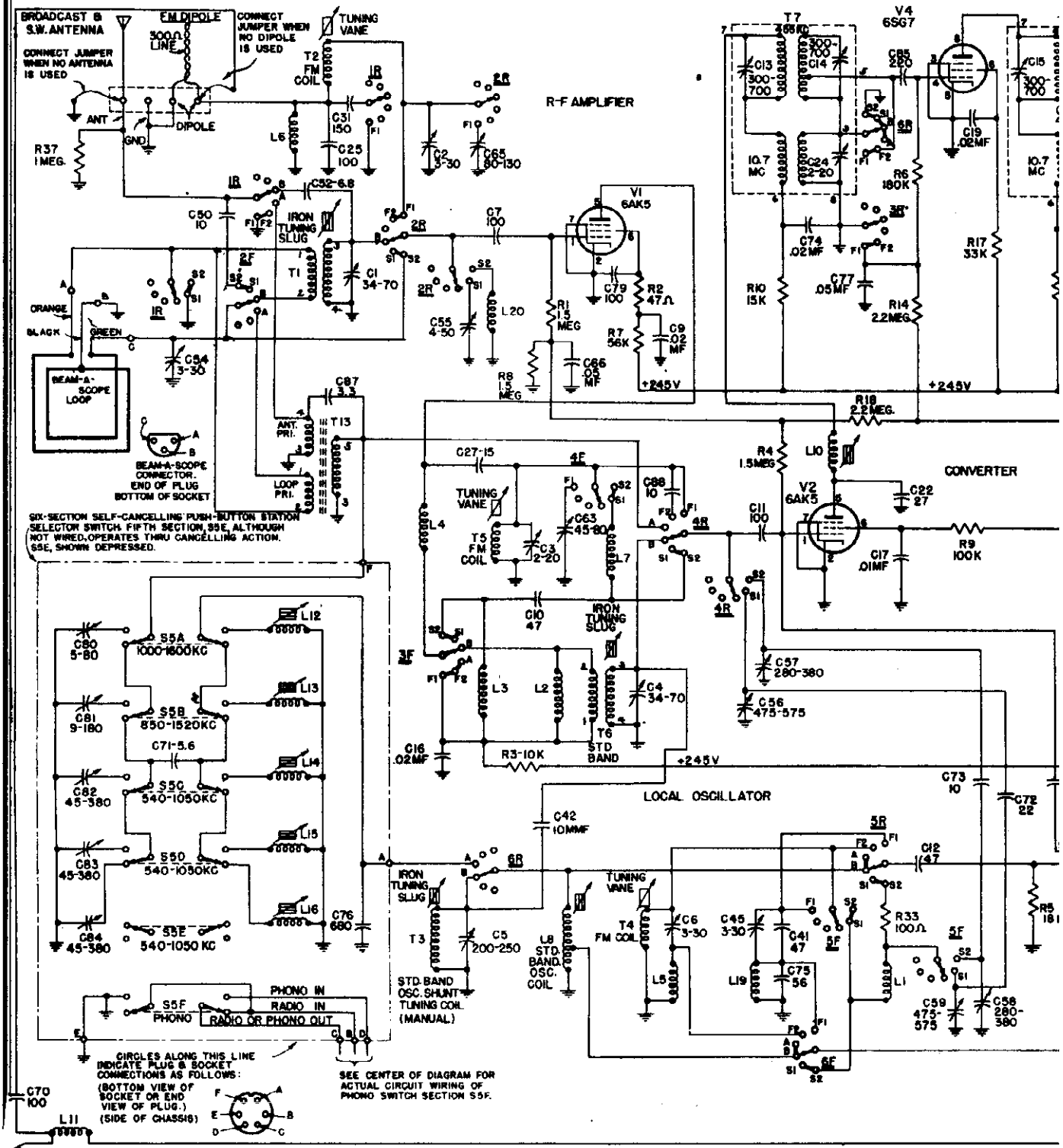

ELECTRICAL RATING (INPUT):	Rating A5	Rating A6
Voltage	100–125	100–125
Frequency	50 cycles	60 cycles
Wattage	105	105

OPERATING FREQUENCIES:

Standard Band	540 to 1600 kc
Short Wave 1	9.4 to 9.9 mc
Short Wave 2	11.6 to 12.1 mc
Frequency Modulation 1	42 to 50 mc
Frequency Modulation 2	88 to 108 mc
AM I-F Frequency	455 kc
FM I-F Frequency	10.7 mc

RIC CO.

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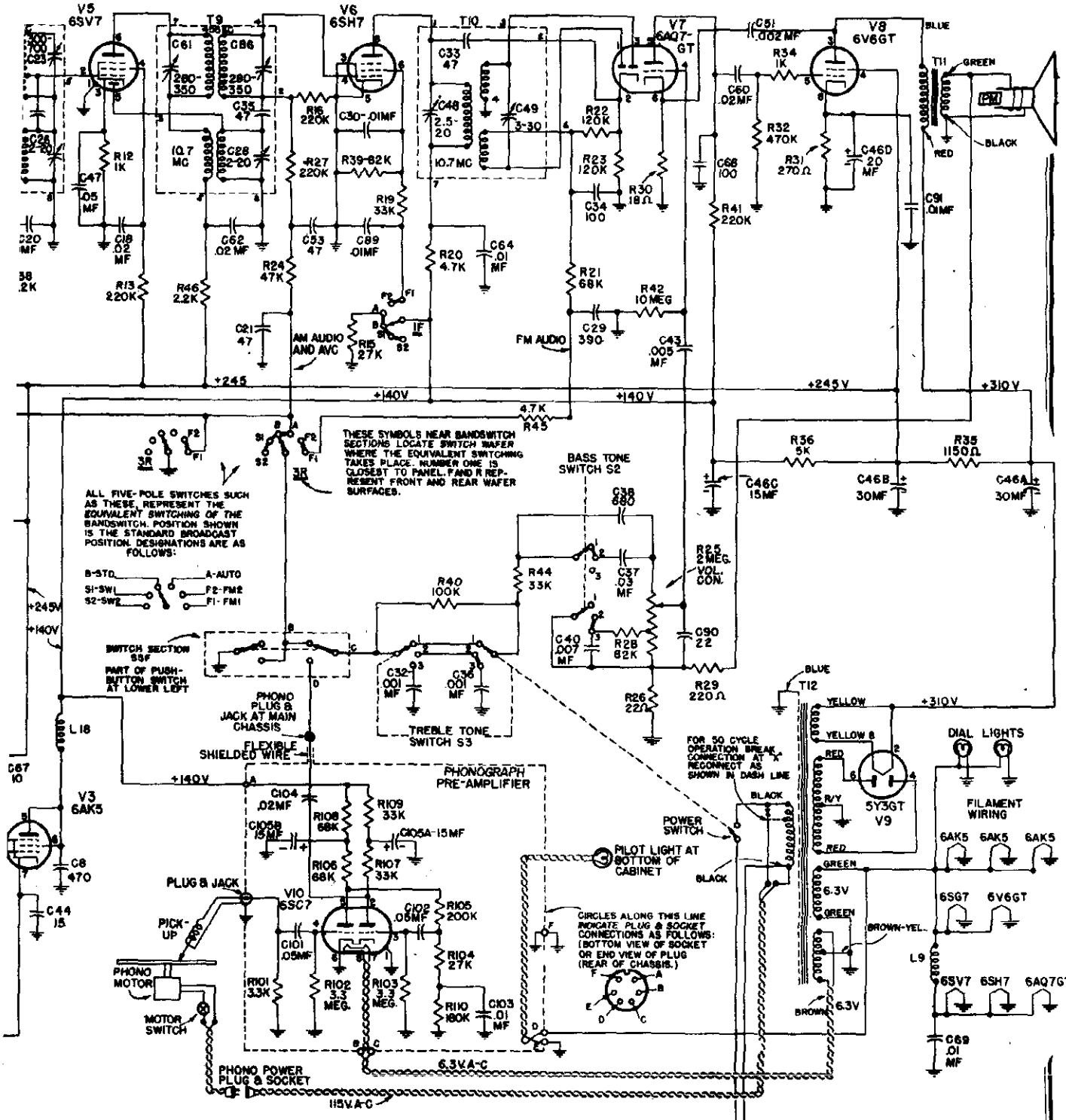

POWER OUTPUT (117 volts line):

Undistorted	4.0 watts
Maximum	5.5 watts

LOUDSPEAKER:

Type	Alnico PM
Size	12 inches
Voice Coil Impedance (400 cps)	8 ohms

PHONOGRAPH PICK-UP:

Type	Variable Reluctance
D-C Resistance	250 ohms

"clarified schematics"

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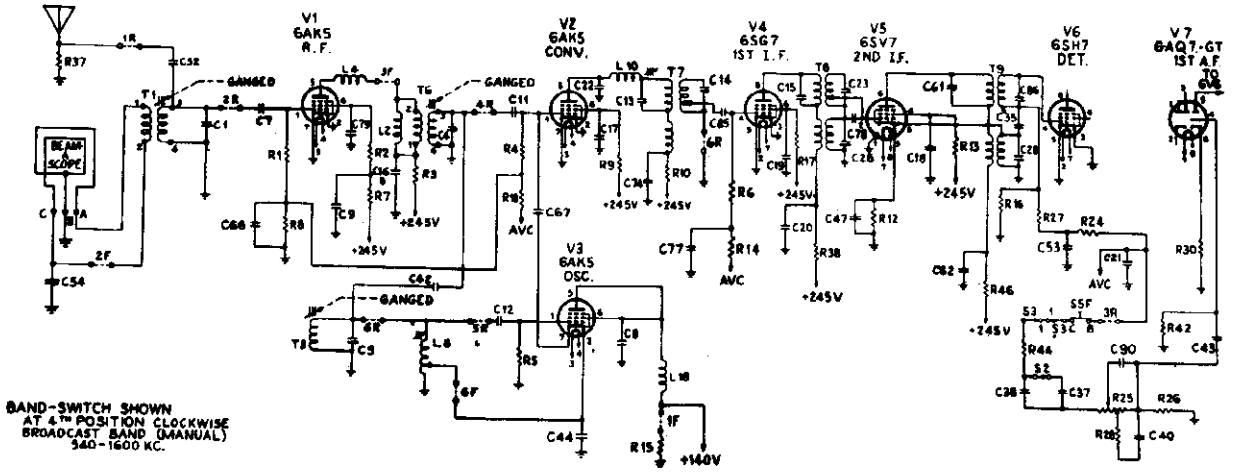
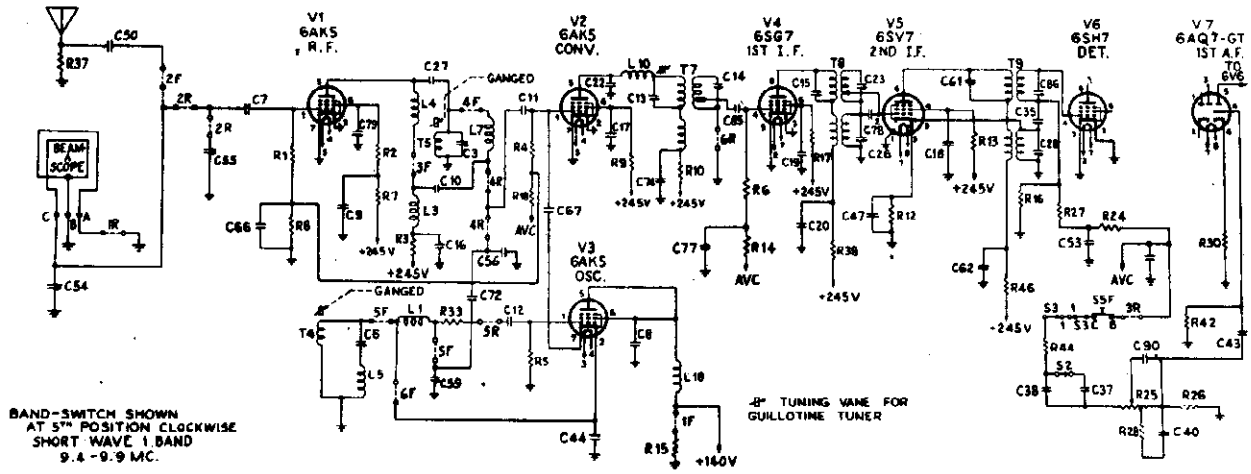
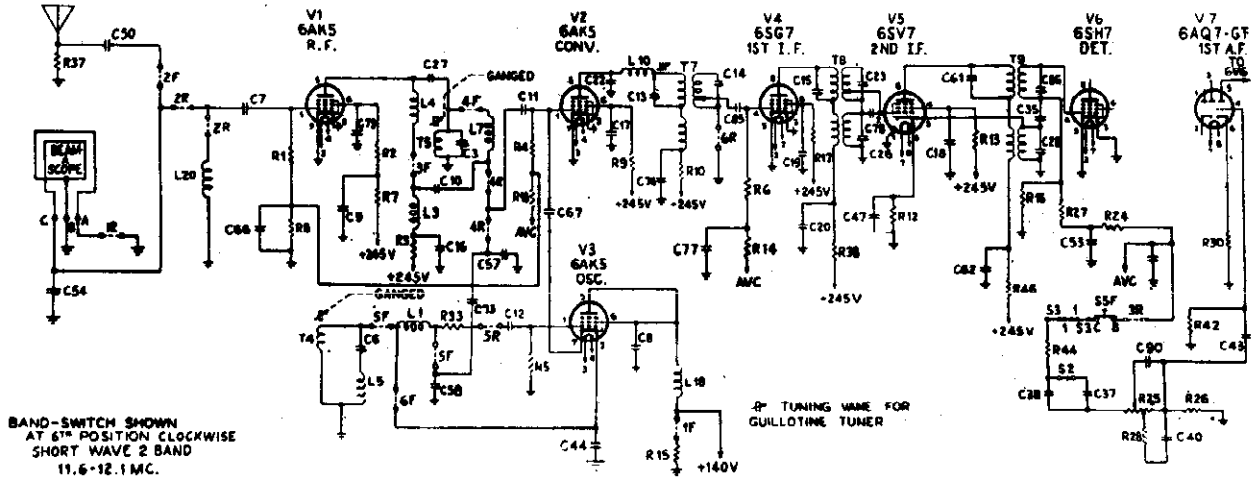
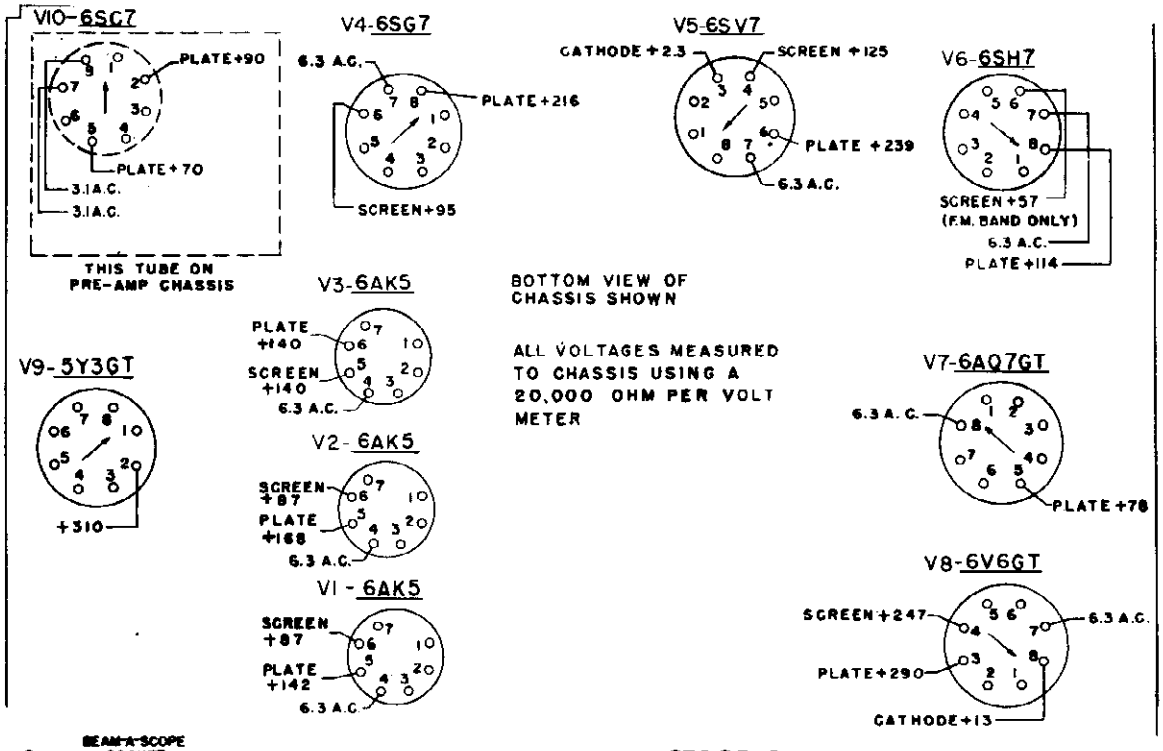
GENERAL ELECTRIC CO.









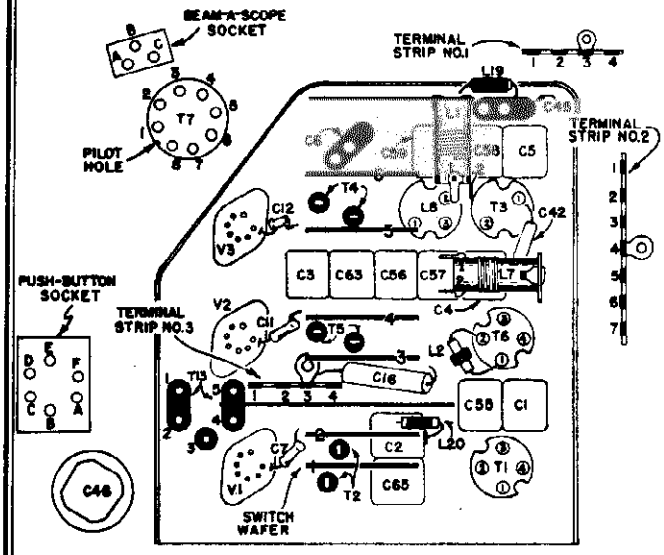
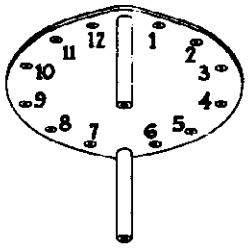


Figure 4—Physical Location of Components Listed in Band Switch Wiring Table



—Identification of Switch Lugs
—Set Inverted and Viewed from Panel

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal so that AVC is not effective.

(1) *R-F and I-F Stage Gains*

Signal applied through IRE dummy antenna:

Antenna post to V1 grid	4 @ 1000 kc
Antenna post to V1 grid	2 @ 9.6 mc
Antenna post to V1 grid	2 @ 11.8 mc

Signal applied through 300-ohms, including signal generator impedance:

Dipole terminals to V1 grid	1.5 @ 45 mc
Dipole terminals to V1 grid	2 @ 98 mc

These checks with oscillator tube (V3) removed:

V1 grid to V2 grid	13 @ 1000 kc
V1 grid to V2 grid	6 @ 9.6 mc
V1 grid to V2 grid	9 @ 11.8 mc
V1 grid to V2 grid	13 @ 45 mc
V1 grid to V2 grid	10 @ 98 mc

These checks with oscillator tube (V3) removed:

V2 grid to V4 grid	23 @ 455 kc
V2 grid to V4 grid	37 @ 10.7 mc
V4 grid to V5 grid	23 @ 455 kc
V4 grid to V5 grid	58 @ 10.7 mc
V5 grid to V6 grid	40 @ 455 kc
V5 grid to V6 grid	17 @ 10.7 mc

(2) *Audio Gain*

.07 volts at 400 cps across volume control with control set at maximum will give approximately ½ watt output across the speaker voice coil.

(3) *Oscillator Grid Bias*

D-c voltage developed across R5 (average):

13 v. @ 1000 kc	2.7 v. @ 11.8 mc
2.7 v. @ 9.6 mc	5.5 v. @ 45 mc
	7 v. @ 98 mc

(4) *Socket Pin Voltages*

Fig. 8 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

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ALIGNMENT

EQUIPMENT REQUIRED:

1. Test Oscillator with tone modulation. (See Table.)
2. D-C Voltmeter or Microammeter. (See notes 2 and 3.)
3. A-C Voltmeter, 2-volts. (See note 6.)
4. Insulated hex wrench, ¼". (See steps 1, 10, 13.)
5. 01 MF Paper Capacitor. (See steps 1 to 5.)
7. 400-ohm, ½ watt resistor. (See steps 16 to 21.)
7. 200 mmf. mica capacitor. (See steps 22 to 28.)

Important detailed instructions and references in connection with the alignment table which follows are keyed in by means of column 7, headed "See Note." The notes are included in numerical order after the table. They are important—refer to them carefully.

ALIGNMENT TABLE

Step	Signal Generator Frequency	Signal Input Point	Band Switch	Dial Setting	Adjust	See Note	Remarks
1	10.7 mc	6SH7 grid thru .01 mf	FM1	.....	C49 for zero**	1, 2	Adjust C49 for *zero* meter reading. Apply 1 volt signal input.
2	See last column	6SH7 grid thru .01 mf	FM1	.....	Signal Generator	1, 2,	Detune signal generator to point of *maximum* meter reading.
3	As in step 2	6SG7 grid thru .01 mf	FM1	.....	Peak C48	1, 2	
4	10.7 mc	6SV7 grid thru .01 mf	FM1	.....	Peak C28	1, 3	6AQ7GT tube removed from its socket.
5	10.7 mc	6SG7 grid thru .01 mf	FM1	.....	Peak C26	1, 3	6AQ7GT tube removed from its socket.
6	10.7 mc	Conv. grid directly	FM1	.....	Peak C24 & L10	1, 3, 4	6AQ7GT tube removed from its socket.
7	455 kc	Conv. grid directly	STD	.....	Peak C86 & C61	5, 6	
8	455 kc	Conv. grid directly	STD	.....	Peak C15 & C23	5, 6	
9	455 kc	Conv. grid directly	STD	.....	Peak C13 & C14	5, 6	
10	88 mc	DIPOLE terminals	FM2	88 mc—6.8 to 6.9 in.*	Peak C6**	1, 3, 7, 10	Set dial accurately—then adjust C6.
11	98 mc	DIPOLE terminals	FM2	For max. output	Peak C3	1, 3, 8	Tune dial for maximum output, then peak C3 while rocking dial.
12	98 mc	DIPOLE terminals	FM2	Do not change	Peak C2	1, 3	
13	43 mc	DIPOLE terminals	FM1	43 mc—6 to 6.1 in.*	Peak C45**	1, 3, 7	Set dial accurately—then adjust C45.
14	46 mc	DIPOLE terminals	FM1	For max. output	Peak C63	1, 3, 8	Tune dial for maximum output, then peak C63 while rocking dial.
15	46 mc	DIPOLE terminals	FM1	Do not change	Peak C65	1, 3	
16	11.8 mc	Antenna thru 400-ohms	SW2	11.8 mc—4.5 to 4.6 in.*	Peak C58	5, 6, 7, 10	Set dial accurately—then adjust C58.
17	11.8 mc	Antenna thru 400-ohms	SW2	Do not change	Peak C57	5, 6, 8	Peak C57 while rocking dial.
18	11.8 mc	Antenna thru 400-ohms	SW2	Do not change	Peak C54	5, 6	C54 is located on back apron of chassis.
19	9.6 mc	Antenna thru 400-ohms	SW1	9.6 mc—4.5 to 4.6 in.*	Peak C59	5, 6, 7, 10	Set dial accurately—then adjust C59.
20	9.6 mc	Antenna thru 400-ohms	SW1	Do not change	Peak C56	5, 6, 8	Peak C56 while rocking dial.
21	9.6 mc	Antenna thru 400-ohms	SW1	Do not change	Peak C55	5, 6	
22	1620 kc	Antenna via 200 mmf	STD	Extreme right-hand position	Peak C5	5, 6	

* Important! See Note 7.
** Use insulated hex wrench, ¼"

GENERAL ELECTRIC CO.

ALIGNMENT TABLE (Cont'd)

Step	Signal Generator Frequency	Signal Input Point	Band Switch	Dial Setting	Adjust	See Note	Remarks
23	1620 kc	Antenna via 200 mmf	STD	Extreme right-hand position	Peak C4	5, 6	
24	1620 kc	Antenna via 200 mmf	STD	Extreme right-hand position	Peak C1	5, 6	
25	1500 kc	Antenna via 200 mmf	STD	1500 kc—1.4 to 1.5 in.*	Osc. Coil T3 iron slug	5, 6, 7, 9	T3 iron slug is the rear one on the left side. Adjust for peak.
26	1000 kc	Antenna via 200 mmf	STD	For max. output	Conv. coil T6 iron slug	5, 6, 9	T6 iron slug is the center one on the left side. Adjust for peak.
27	1000 kc	Antenna via 200 mmf	STD	Do not change	R-F coil T1 iron slug	5, 6, 9	T1 iron slug is the front one on the left side. Adjust for peak.
28	580 kc	Antenna via 200 mmf	STD	For max. output	Peak L8	5, 6, 8	Peak L8 while rocking dial.
29							Repeat steps 22 to 28.

* Important! See Note 7.

Notes in Connection with Alignment Table

1. Use *unmodulated* signal.
2. Connect 20,000-ohm-per-volt meter from junction of R21 and C29 to chassis. Use ten-volt scale. (Steps 1-3.)
3. Connect 20,000-ohm-per-volt meter from grid pin 4 of 6SH7 to chassis with a 200,000-ohm resistor in series. The resistor must be connected directly to the grid so that capacity loading will be negligible and so that the meter is isolated from the i-f signal voltage. Keep signal generator output down so that the meter indicates not more than one volt at the grid (5 micro-amperes through 200,000-ohms). (Alignment steps 4 to 6, 10 to 15.)
4. Connect signal generator directly to the converter grid at some convenient point. The generator lead must be shielded up to this connection so that not more than 1/16 inch of exposed lead exists. Ground the shield solidly by clamping it firmly to the chassis or a shield as close to the connection as possible. (Steps 6-9.)
5. Use 400-cycle modulation. (Steps 7 to 9, 16 to 28.)
6. Connect a standard output meter across speaker voice coil. Turn volume control fully on. Keep signal generator output down so that the meter indicates not more than ½ watt output (2 volts) during alignment. (Steps 7 to 9, 16 to 28.)
7. If dial scale is not available, index pointer as follows: Turn pointer to right-hand limit of travel. Mark the dial back plate at a reference edge of the pointer slider. Then set pointer by turning dial knob until the indicated dimension exists between the reference edge and the mark.
8. "Rocking" consists of adjusting the indicated adjuster while turning the dial a small amount back and forth through peak output. The object is to find the maximum peak. Rocking is necessary and is permissible only when interlocking circuits are being adjusted.
9. The main tuning iron slugs are suspended from the left side of the tuning "elevator." They are individually adjustable by loosening the locknut and turning the supporting screw into which the suspending wire is soldered.
10. *Two* oscillator settings will give response. The higher frequency response point is the correct one; the other is the image. If in doubt, start with the trimmer screw loosened completely and adjust for the *first* response.

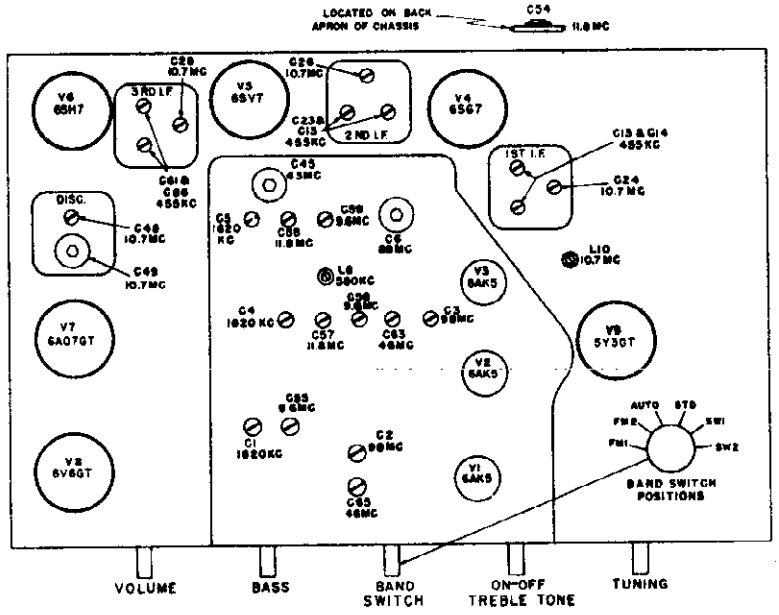
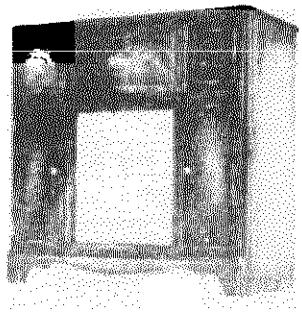


Figure 7—Location of Tubes and Adjusters

TUBE COMPLEMENT:

R-F Amplifier	6AK5
Converter	6AK5
Oscillator	6AK5
1st I-F Amplifier	6SG7
2nd I-F Amplifier	6SV7
FM Limiter—AM Detector	6SH7
Discriminator—1st A-F Amplifier	6AQ7-GT
Power Amplifier	6V6GT
Phono Pre-Amplifier	6SC7
Rectifier	5Y3GT
Dial Lamp (2)	GE No. 44
Pilot Lamp (bottom of cabinet)	GE No. 47



MODEL 417 GENERAL ELECTRIC CO.

WIRING OF BAND SWITCH

(Wire length given from end to end before stripping)

SECTION 1

At this lug—	—connect this—	—the other end of which is connected to this—
1	Insulated wire, 5" lg.	Antenna transformer T13, terminal 4
2	a. Insulated wire, 11½" lg. b. Insulated wire, 2" lg. c. Capacitor C50	Antenna terminal at rear of chassis Switch section 1, lug 6 Switch section 2, lug 1
3	Capacitor C52	Switch section 2, lug 3
4	a. Insulated wire, 1¼" lg. b. Insulated wire, 14" lg. c. Insulated wire, 5½" lg.	Antenna transformer T1, terminal 1 Beam-a-scope plug, terminal A Antenna transformer T13, terminal 2
5	a. Short bare bus b. Resistor R15	Ground lug on C65 Switch section 1, lug 11
6	See lug 2b, above	
7	Insulated wire, 11" lg.	Terminal strip 1, lug 4
8	Capacitor C31	Front terminal of T2
9	a. Insulated wire, 9" lg. b. Insulated wire, 7" lg.	Terminal strip 2, lug 5 Filter capacitor, C46C
11	See lug 5b, above	

SECTION 2

At this lug—	—connect this—	—the other end of which is connected to this—
1	See section 1, lug 2c	
3	a. Insulated wire, 2½" lg. b. See section 1, lug 3	Trimmer C1, lug nearer T1
4	Insulated wire, 1½" lg.	Trimmer C55, lug nearer T1
5	Coil L20	Ground lug on trimmer C2
6	Short bare bus	Trimmer C65, left-hand terminal*
7	Short bare bus	Trimmer C2, left-hand terminal*
8	Capacitor C7	Tube socket V1, pin 1
9	Insulated wire, 4" lg.	Antenna transformer T13, terminal 1
10	Insulated wire, 3½" lg.	Antenna transformer T1, terminal 2
11**	Insulated wire, 11½" lg.	Beam-a-scope plug, terminal C

SECTION 3

At this lug—	—connect this—	—the other end of which is connected to this—
1	Shielded wire, 8⅜" lg.	Terminal strip 2, lug 6
2	Insulated wire, 1½" lg.	Switch section 3, lug 12
3	a. Insulated wire, 2½" lg. b. Capacitor C16 c. Choke L3	Converter coil T6, terminal 1 Ground lug on terminal strip 3 Switch section 3, lug 11
4	Insulated wire, 7½" lg.	Terminal strip 2, lug 3
5*	Insulated wire, 1⅜" lg.	Converter coil T6, terminal 2
6	Short bus with spaghetti	Chassis
7	Short bare bus	Terminal strip 3, lug 4
10	Shielded wire, 10½" lg.	Terminal strip 2, lug 2
11	a. See lug 3c, above b. Capacitor C10	Switch section 4, lug 3
12	a. See lug 2, above b. Shielded wire, 7¾" lg.	Push-button socket, Terminal B

SECTION 4

At this lug—	—connect this—	—the other end of which is connected to this—
1	a. Insulated wire, 5½" lg. b. Insulated wire, 7¼" lg.	Antenna transformer T13, terminal 5 Push-button socket, terminal F
2	Insulated wire, 2½" lg.	Trimmer C4, lug nearer T6
3	a. See Section 3, lug 11b b. Short bus with spaghetti c. Short jumper	Coil L7, terminal 2 (toward front) Switch Section 4, lug 4 (adjacent)
4	See lug 3c, directly above	
5**	Short bare bus	Trimmer C63, lug nearer front
6	Capacitor C88	Tuner T5, left-hand terminal*
7	Short bare bus	Tuner T5, left-hand terminal
8	Capacitor C11	Tube socket V2, pin 1
9	a. Capacitor C72 b. Insulated wire, 2½" lg.	Section 5, lug 11 Trimmer C56, front terminal
10	a. Capacitor C73 b. Insulated wire, 2½" lg.	Section 5, lug 12 Trimmer C57, front terminal
12	Bus with spaghetti, 2½" lg.	Coil L7, terminal 1

SECTION 5

At this lug—	—connect this—	—the other end of which is connected to this—
1	a. Bus with spaghetti, 1¾" lg. b. Resistor R33	Coil L1, terminal 1 Section 5, lug 4
2	a. Insulated wire, 3" lg. b. Insulated wire, 1¾"	Coil L8, terminal 1 Section 6, lug 4
4	See Section 5, lug 1b	
5	Bus with spaghetti, 3" lg.	Coil L1, terminal 2
6	a. Bus with spaghetti, 3" lg. b. Bus with spaghetti, 1½" lg.	Capacitor C45, left-hand terminal* Section 5, lug 10
7**	Short bare bus	Tuner T4, left-hand terminal*
8	Capacitor C12	Tube socket V3, pin 1
9	Insulated wire, 4" lg.	Trimmer C5, lug nearer T3
10	a. See Section 5, lug 6b b. Capacitor C41	Section 6, lug 6
11	a. Insulated wire, 3¾" lg. b. See Section 4, lug 9a	Trimmer C59, lug nearer front
12	a. Insulated wire, 3½" lg. b. See Section 4, lug 10a	Trimmer C58, lug nearer front

SECTION 6

At this lug—	—connect this—	—the other end of which is connected to this—
1	Insulated wire, 4½" lg.	I-F transformer T7, terminal 8
2	Bus with spaghetti, 1½" lg.	Coil L1, terminal 2
4	See Section 5, lug 2b	
5	Insulated wire, 12" lg.	Push-button socket, terminal A
6	a. Bus with spaghetti, 2" lg. b. Capacitor C75 c. See section 5, lug 10b	Trimmer C45, center terminal Ground at C59
7	Short bare bus	Trimmer C6, center terminal
8	Bare bus, 1" lg.	Tube socket V3, pin 7
9	Insulated wire, 2½" lg.	I-F transformer T7, terminal 5
10	Insulated wire, 2¾" lg.	I-F transformer T7, terminal 3
12	Insulated wire, 3½" lg.	Coil L8, terminal 3

* Looking from front, chassis inverted.
** Double lug (front and rear) soldered together.

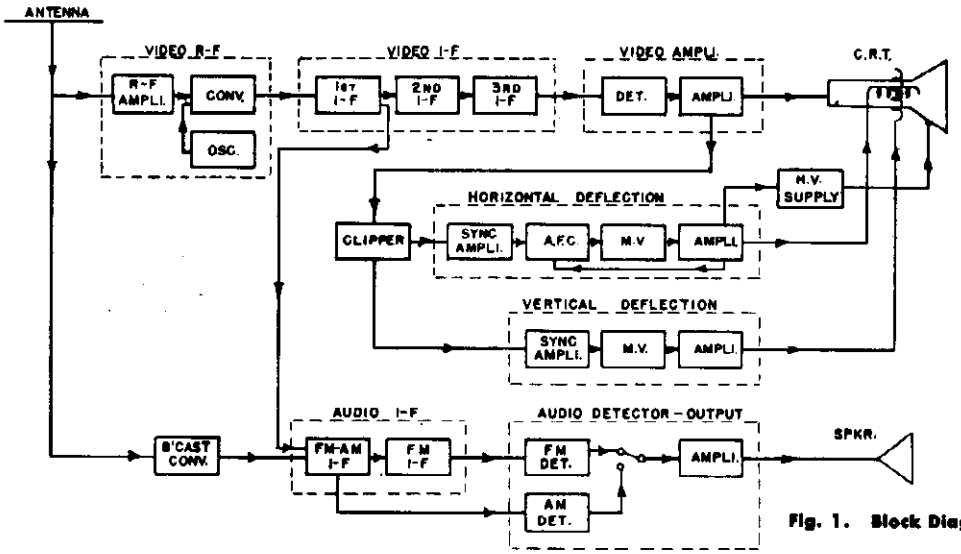


Fig. 1. Block Diagram, Model 80

DESCRIPTION—TELEVISION CIRCUITS

The television receiver circuits are divided into the following sections:

1. R-f amplifier, converter and oscillator
2. Video and audio i-f amplifier
3. Video detector and amplifier
4. Sync pulse clipper-amplifier
5. Horizontal multivibrator and AFC sync.
6. Horizontal sweep output
7. Vertical multivibrator and sweep output
8. High voltage power supply (H.V. supply)
9. Low voltage power supply (L.V. supply)

A brief description of the operation of each section is described in the following paragraphs. This is supplemented by a comprehensive television training course in the publication, RSM-4-TV.

A block diagram of the complete receiver is shown in Figure 1 to assist in signal tracing and to better visualize the operation of the receiver as a whole.

1. R-F AMPLIFIER, CONVERTER & OSCILLATOR (See Figure 2)—The r-f amplifier makes use of a Type 6AU6 tube connected as a triode grounded-grid amplifier. The antenna is connected into the cathode circuit so as to provide a substantially constant input impedance of 300 ohms to the antenna at all frequencies. With a 300-ohm antenna and transmission line system, this coupling arrangement permits optimum transfer of signal from antenna to r-f amplifier for all 13 channels. R101 is the normal bias resistor. A choke, L_K, is placed in series with this cathode resistor to prevent the input impedance from being lowered by the shunting effect of the total stray capacity to ground of the cathode of the tube. The choke value is changed with frequency.

The r-f amplifier is coupled to the converter tube by a wide band transformer consisting of windings L_p and L_s.

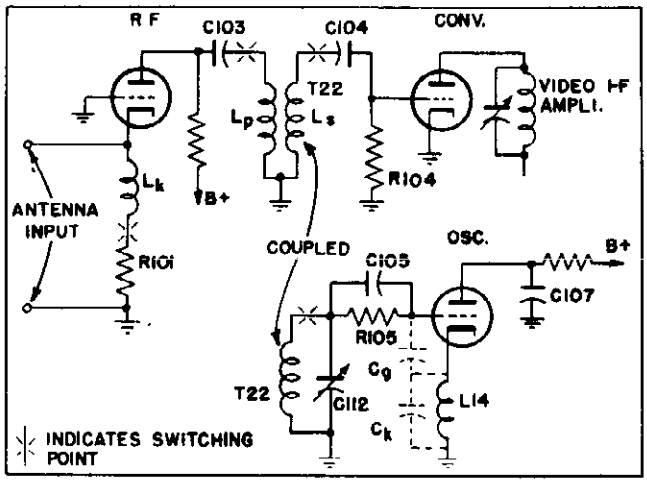


Fig. 2. R-f Amplifier, Converter & Oscillator

The windings are self-tuned by the distributed and tu capacities to provide optimum gain. On channels No. 1 a No. 2 the transformer is triple tuned to prevent the ima frequencies of the 88-108 mc FM band from interferi with these two channels. The triode converter is one secti of a Type 7F8 dual triode, V2A. Bias for this tube provided by the oscillator voltage appearing in the grid V2A causing grid rectification charging the grid resist condenser combination, R104 and C104.

The oscillator makes use of the remaining half of the Ty 7F8 tube, V2B, and is inductively coupled to the conver grid by locating the oscillator grid coil, T22, on the sa coil form as the converter grid coil, L_s. The oscillator is modified Colpits oscillator, oscillation being produced by t cathode-to-grid, C_g, and cathode-to-plate, C_k, interelectro capacities of the oscillator tube. The choke L_f provides a ground to the cathode of the oscillator but maintains t cathode off-ground at the r-f frequencies. The oscillat operates on the high frequency side of the r-f signal on bands.

The r-f amplifier, converter and oscillator is construct as a complete unit sub-assembly which can readily be mounted from the main chassis.

2. VIDEO AND AUDIO I-F AMPLIFIERS (See Figure 3)—T video i-f amplifier makes use of a three-stage band-p amplifier using three Type 6AC7 tubes. The transforme T1, T2, T3, and T4, are overcoupled and then loaded wi resistance, R_L, to give an adequate (approx. 4 mc) band-p frequency characteristic. A third winding is added to ea video transformer and tuned to trap out the adjacent aud and associated audio interference. The trap on T1 is tun to 27.9 mc to provide rejection of the adjacent channel aud i-f, while the traps at T2, T3, and T4 are tuned to 21.9 to provide rejection of the same channel audio.

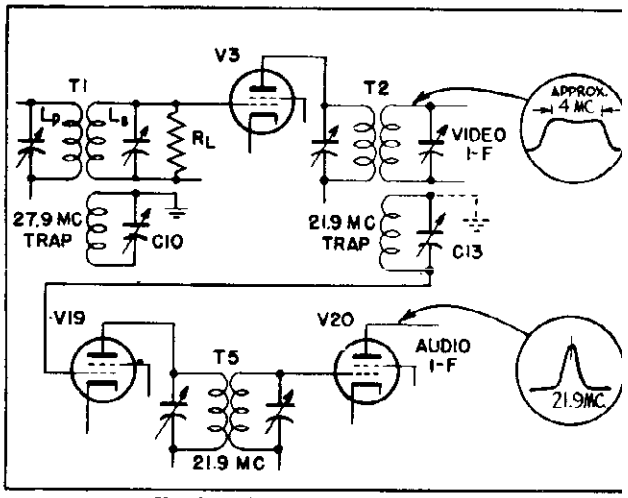
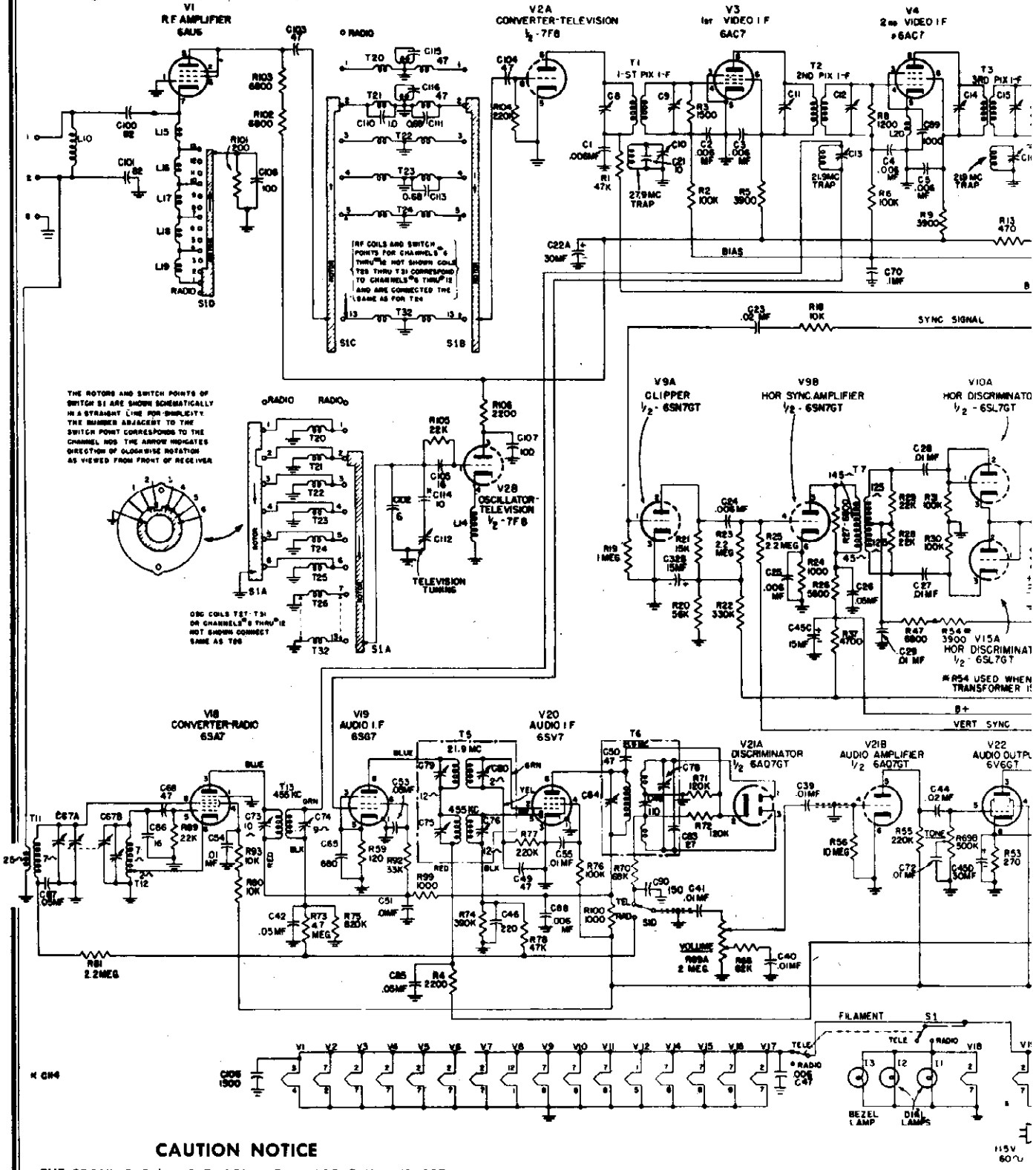


Fig. 3. Video & Audio I-f Amplifier

Frequency	50/60 cps	60 cps
Voltage	105–125 v.	105–125 v.
Wattage (Radio)	85	85
Wattage (Television)	215	215



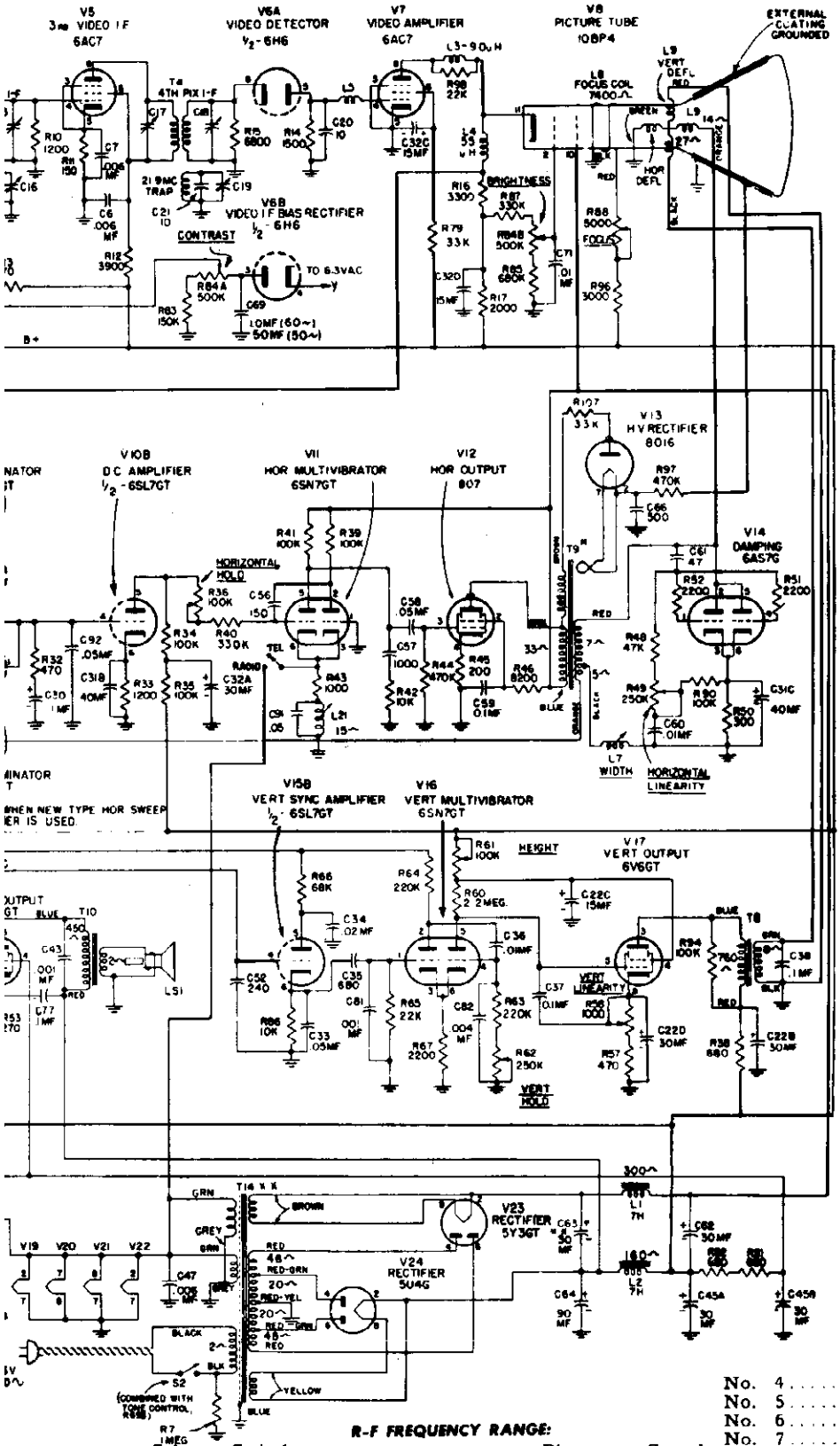
CAUTION NOTICE

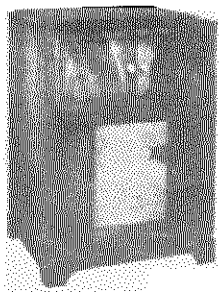
THE REGULAR B+ VOLTAGES ARE DANGEROUS AND PRECAUTIONS SHOULD BE OBSERVED WHEN THE CHASSIS IS REMOVED FROM THE CABINET FOR SERVICE PURPOSES. THE HIGH VOLTAGE SUPPLY (8000 v.) AT THE PICTURE TUBE ANODE WILL GIVE AN UNPLEASANT SHOCK BUT DOES NOT SUPPLY ENOUGH CURRENT TO GIVE A FATAL BURN OR SHOCK. HOWEVER, SECONDARY HUMAN REACTIONS TO OTHERWISE HARMLESS SHOCKS HAVE BEEN KNOWN TO CAUSE INJURY. SINCE THE HIGH VOLTAGE IS OBTAINED FROM THE B+ VOLTAGE, CERTAIN PORTIONS OF THE HIGH VOLTAGE GENERATING CIRCUIT ARE DANGEROUS AND EXTREME PRECAUTIONS SHOULD BE OBSERVED.

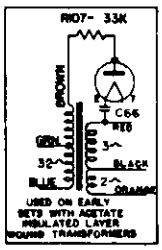
THE PICTURE TUBE IS HIGHLY EVACUATED AND IF BROKEN, GLASS FRAGMENTS WILL BE VIOLENTLY EXPELLED. IF IT IS NECESSARY TO CHANGE THE PICTURE TUBE, USE SAFETY GOGGLES AND GLOVES.

LECTRIC CO.

MODEL 801







INTERMEDIATE FREQUENCIES:

Television Video (carrier freq. equivalent) ..... 26.4 mc

Television Audio ..... 21.9 mc
Radio ..... 455 kc

AUDIO POWER OUTPUT:

Undistorted ..... 3 watts
Maximum ..... 4.5 watts

LOUDSPEAKER:

Type ..... Alnico "PM" Dynamic
Size ..... 12 inches
Voice Coil Impedance (400 cycles) ..... 3.2 ohms

PICTURE SIZE:

Height ..... 6 inches
Width ..... 8 inches

ANTENNA REQUIREMENTS:

Type ..... Folded Dipole
Impedance ..... 300 ohms

** EARLY SETS-THIS WILL BE A 5V4G
SETS USING 5V4G WILL USE PT 1 OF POWER TRANSFORMER SETS USING 5Y3GT WILL USE PT 2 OF POWER TRANSFORMER

R-F FREQUENCY RANGE:

Selector Switch Position	Freq. Range	Picture Carrier	Sound Carrier
Radio	540-1600 kc	....	....
No. 1	44- 50 mc	45.25	49.75
No. 2	54- 60 mc	55.25	59.75
No. 3	60- 66 mc	61.25	65.75
No. 4	66- 72 mc	67.25	71.75
No. 5	76- 82 mc	77.25	81.75
No. 6	82- 88 mc	83.25	87.75
No. 7	174- 180 mc	175.25	179.75
No. 8	180 186 mc	181.25	185.75
No. 9	186- 192 mc	187.25	191.75
No. 10	192- 198 mc	193.25	197.75
No. 11	198- 204 mc	199.25	203.75
No. 12	204- 210 mc	205.25	209.75
No. 13	210- 216 mc	211.25	215.75

The audio i-f frequency is developed by taking the 21.9 mc signal from across the trap on T2 and applying it to the grid of the audio i-f amplifier tube V19. The ground return side of the trap is effectively connected to ground at 21.9 mc through the low impedance circuit offered by the capacitors C74 and C42. Since the audio channel of the television is frequency-modulated, the transformer T6 functions with the diode sections of V21 as the discriminator.

Bias voltage, derived by rectifying 6.3 volts a-c through the diode V6B, is applied to the grid circuits of the video i-f amplifier tubes, V3 and V4. A variable potentiometer contrast control, permits this voltage to be changed so as to vary the gain of the i-f amplifier.

3. VIDEO DETECTOR AND AMPLIFIER (See Figure 4)—The video i-f amplifier output is applied to a diode rectifier, V6, and the diode load, R14, is connected so as to develop a negative-going signal voltage at this point. The signal is amplified by tube V7 and then applied directly to the cathode of the picture tube, V8. This provides direct coupling so that d-c reinsertion is unnecessary. The chokes L5 and L3 are series peaking chokes, while L4 is a shunt peaking choke. These are used to obtain good high frequency response. L5 also prevents harmonics of the i-f frequency from being passed through the video amplifier. R16 is the V7 tube plate load resistor.

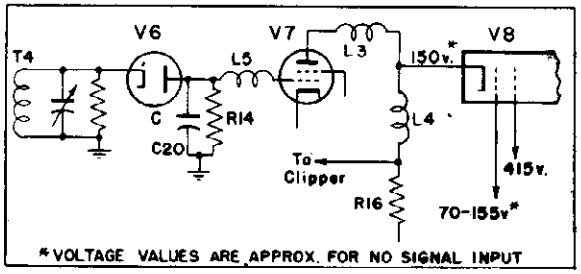


Fig. 4. Video Detector & Amplifier

With the cathode of V8 coupled directly into the plate circuit of V7, it is necessary to apply a variable positive voltage to the control grid of the picture tube in order to control the beam current and, therefore, the brightness of the picture. In late production receivers where the rectifier V23 is a Type 5Y3G tube, the cathode and control grid voltages of V8 will be approximately 25 volts less.

4. CLIPPER AND SYNC AMPLIFIER—The triode section, V9A, of a Type 6SN7GT tube is used to separate the sync pulses from the video signal taken off at the load resistor, R16, see Figure 4. This is accomplished by applying very low plate voltage to V9A, then the resulting grid rectification causes negative bias to be developed at the grid of V9A so that conduction occurs only during the sync pulse intervals which are the most positive component of the video signal.

Tube V9B is a horizontal synchronizing amplifier which rejects the vertical pulse at the transformer, T7, by virtue of its low inductance to the vertical synchronizing pulse. The cathode impedance is required to raise the control grid to a positive voltage with respect to chassis for proper operation of V15B. The tube V15B is operated as a cathode follower vertical synchronizing amplifier. Integration of the vertical signal is provided in both the grid and cathode circuits.

5. HORIZONTAL MULTIVIBRATOR AND AFC SYNC (See Figure 5)—The horizontal sawtooth oscillator makes use of a Type 6SN7GT tube, V11, in a conventional cathode-coupled multivibrator circuit. Instead of its frequency being controlled directly by the horizontal sync pulses, it is controlled by a d-c voltage on its grid, which is the resultant of the phase error between the incoming sync signal and a sawtooth voltage derived from the output of the horizontal sweep amplifier. This voltage is called an automatic frequency control (AFC) voltage.

The AFC voltage is developed by the diode-connected triodes V10A and V15A by mixing the horizontal sync pulse at the secondary of transformer T7 with a sawtooth waveform derived at the output of the sweep amplifier. When the sync pulse occurs at the time "a" shown in the sawtooth waveform drawing in Figure 5, no voltage will be developed at the output of the filter. However if the multivibrator runs faster or slower so that the pulse falls at a point other than at "a," a positive or negative voltage will appear at the filter, which will be amplified by the d-c amplifier V10B and then

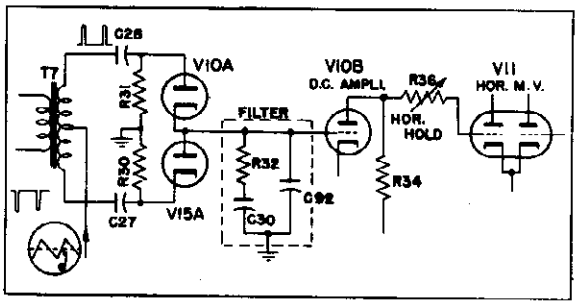


Fig. 5. Horizontal M.V. & Sync Circuit

applied to the grid of the multivibrator. This change in d-c voltage on the grid of the multivibrator will cause it to speed up or slow down so as to cause the sawtooth wave to combine with the incoming sync pulses until the correction voltage becomes zero. With the filter, consisting of C92, R32, and C30, the change is relatively slow in controlling the speed, permitting a synchronizing system which is relatively free from random noise triggering. The Horizontal Hold control, R36, controls the speed of the multivibrator, permitting the free-running speed of it to be set near the correct frequency during the time when no sync pulses are available.

6. HORIZONTAL SWEEP OUTPUT (See Figure 6)—The horizontal sawtooth voltage generated by the multivibrator, V11, is shaped and then amplified by a Type 807 tube, V12. The output of this tube is coupled to the horizontal deflection yoke through an impedance matching transformer, T9. An oscillatory voltage, as shown in the dotted line in the wave shape at the upper left of Figure 6, which results from the rapid retrace in transformer T9, is removed by the damping tube, V14. This tube is a triode Type 6AS7 and by its use the transient may be dampened, linearity controlled and the positive overshoot voltage retained for use in the high voltage supply. The linearity of the horizontal trace is controlled by varying the voltage wave shape applied to the grid of V14 by potentiometer R49. The horizontal size is varied by the adjustable iron core inductance, L7, which is in series with the output to the yoke.

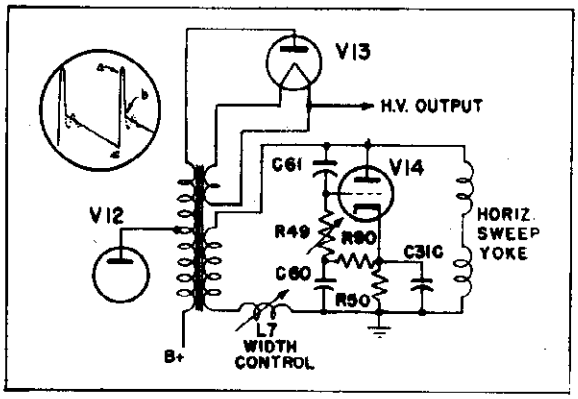


Fig. 6. Horizontal Sweep Output

7. VERTICAL MULTIVIBRATOR AND SWEEP OUTPUT (See Figure 7)—The vertical sawtooth voltage is generated by a Type 6SN7-GT tube, V16, connected as a multivibrator. This voltage is coupled directly to a Type 6V6G vertical sweep output tube, V17, and then to the vertical sweep yoke through the impedance matching transformer, T8. Vertical speed is controlled by changing the time constant of the multivibrator grid circuit by the potentiometer, R62. Sweep size is changed by the potentiometer, R61, which changes the B+ voltage applied to the charging network of tube V16 simultaneously with the screen voltage on tube V17. Vertical linearity is controlled by feeding back voltage through C37 from the cathode to grid of the output tube. The amount of the voltage is varied by the variable cathode resistor, R58.

8. HIGH VOLTAGE SUPPLY (See Figure 6)—The high voltage is derived by making use of the inductive "kick" voltage produced during retrace in the horizontal output transformer.

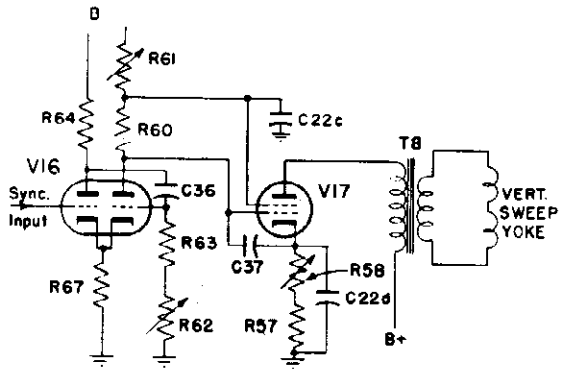


Fig. 7. Vertical Sweep Output

This "kick" voltage is shown in the wave shape shown as a-b in Figure 6. This voltage is generated in the primary winding and is further increased by an additional winding added to the transformer which connects to the rectifier tube plate of V13. The rectifier tube, V13, is a Type 8016 which derives its filament voltage from the horizontal sweep transformer T9 by a single turn around the transformer. Because of the high frequency which is rectified, a 500 mmf capacitor is more than sufficient for filtering purposes.

9. LOW VOLTAGE POWER SUPPLY—Two rectifiers are used to supply the required plate current for the television and radio receiver. A Type 5U4G tube, V24, supplies the bulk of the current and makes use of combination inductive and resistance type filter. A Type 5V4G or 5Y3G tube, V23, is used to supply higher voltage to the horizontal output, horizontal multivibrator, and the cathode ray tube 1st anode. This is followed by a choke filter. All filament supply leads except for tubes V19, V20, V21, V22 and the rectifier filaments pass through the band switch so that tubes may be switched ON or OFF when switching from radio to television.

CIRCUIT ALIGNMENT

GENERAL—A complete alignment of the Model 801 television receiver consists of the following individual alignment procedures. These are listed below in the correct sequence of alignment. However, any one alignment may be performed without the necessity of realignment of any one of the other sectional alignments.

1. Broadcast i-f amplifier
2. Broadcast r-f amplifier
3. Television i-f traps
4. Television sound i-f amplifier
5. Video i-f amplifier
6. Oscillator adjustments
7. Television r-f amplifier

The alignment procedure is in table form on pages 8 through 11. The following paragraphs are important suggestions to be followed when attempting alignment and should be read thoroughly before alignment is attempted.

TEST EQUIPMENT REQUIREMENTS—To provide the over-all alignment as outlined above, the following test equipment is required.

1. Cathode Ray Oscilloscope—This scope should preferably have a 5-inch screen and should preferably have good high frequency response, which will be useful in making waveform voltage measurements on pages 20 and 21.

2. Signal Generator—This signal generator must have good frequency stability and be accurately calibrated. It should be capable of covering the following frequency ranges with tone modulation where desired.

(a) 455 kc for broadcast
(b) 550-1600 kc for broadcast
(c) 21.9 mc for video i-f trap
(d) 27.9 mc for video i-f trap
(e) 23.0 mc for video i-f marker
(f) 25.65 mc for video i-f marker
(g) 26.4 mc for video i-f marker
(h) 44-110 mc and 174-238 mc for oscillator adjustment and markers for the r-f channel bandwidth measurements.

3. R-F Sweep Generator—This should give approximately 0.1-volt output with adjustable attenuation of the output. The output should be flat over wide frequency variations. The frequency coverage should be:

(a) 20 to 30 mc, with 10 mc sweep width
(b) 40 to 90 mc, with 25 mc sweep width
(c) 170 to 220 mc, with 25 mc sweep width

4. Output Meter—An output meter with a voltage range 0-2.5 volts a-c.

ALIGNMENT SUGGESTIONS—With the exception of the broadcast i-f and r-f trimmers and the FM sound i-f discriminator trimmers, all alignment adjustments are performed from the underside of the chassis. Remove the chassis from the cabinet and turn it on its side with the power transformer down. This is the only safe position in which the chassis will rest and leave all adjustments accessible. The following suggestions apply to each individual alignment procedure.

1. Broadcast I-F Alignment—(a) Although the oscilloscope is recommended in the table for indicating the output voltage during alignment, an output meter may be connected across the speaker voice coil as an alternate output indicating device. When this is used, the volume control should be set for maximum volume and then attenuate the signal generator output so as not to cause audio overload.

(b) Use a 200 mmf mica capacitor or standard RMA dummy between the high side of the signal generator and the signal input point, as indicated in the Alignment Table.

2. Broadcast R-F Alignment—Apply signal generator input to one of dipole input terminals through a 200 mmf mica capacitor as in (1) above. An output meter may be used in place of the oscilloscope for indicating output. First adjust oscillator trimmer by tuning gang condenser to minimum capacity and aligning oscillator trimmer for maximum with a 1620 kc input signal. Next with 1500 kc input signal, tune in signal, set pointer to 1500 kc calibration then align r-f trimmer for maximum output.

3. Video I-F Trap Alignment—The video i-f traps are used to attenuate the sound i-f of the same and adjacent channels from being detected and reproduced as sound bar interference on the picture tube. Misalignment of these traps results in the interference pattern, as shown in Figure 31.

Set the contrast control about half-way up. Turn the Station Selector to channel 13. Connect the oscilloscope through a 10,000-ohm resistor, to the top of the 3300-ohm video load resistor, R16.

Connect the output of an accurately calibrated signal generator with tone modulation to the grid of the converter tube, V2A, through a 200 mmf mica capacitor. The alignment frequencies are:

T1 (C10)—27.9 mc
T2 (C13)—21.9 mc
T3 (C16)—21.9 mc
T4 (C19)—21.9 mc

The trimmers should be aligned for minimum output, care being taken to get the lowest possible indication at the output. The input signal should be attenuated below saturation of the i-f amplifier tubes at start, then raised as signal is attenuated during alignment.

4. Television Sound I-F Alignment—Since the television sound i-f amplifier transformer is slightly overcoupled, alignment by a sweep generator is recommended. Connect the generator through a 200 mmf capacitor to grid (4) of V3. For alignment, connect the oscilloscope through a 100,000 ohm isolating resistor across capacitor C49.

For step 1, insert a 21.9 mc marker signal from an unmodulated signal generator into the same point of input as the sweep generator. This input from the signal generator should be very loosely coupled by clipping the signal generator through insulation to the grid (4) of V3.

Keep the input of the sweep generator low enough so that the sound i-f amplifier does not overload. Check by increasing the output of the sweep; the response curve on the scope should increase in size proportionally. Set Contrast Control to half-advanced position.

The response curve of the amplifier at the grid return of V20 should appear as in Figure 8A.

For discriminator alignment the secondary trimmer, C78, of T6 is aligned by using a tone modulated 21.9 mc signal and listening to the tone at the loudspeaker. The trimmer is adjusted for minimum tone signal output. If the sweep is used for the secondary trimmer alignment, the cross-over should be symmetrical about a 21.9 mc marker and should be a straight line between the alternate peaks, as shown in Figure 8B. Reconnect oscilloscope across the top of the volume control.

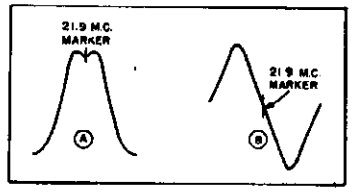


Fig. 8. T-V Audio I-F Curves

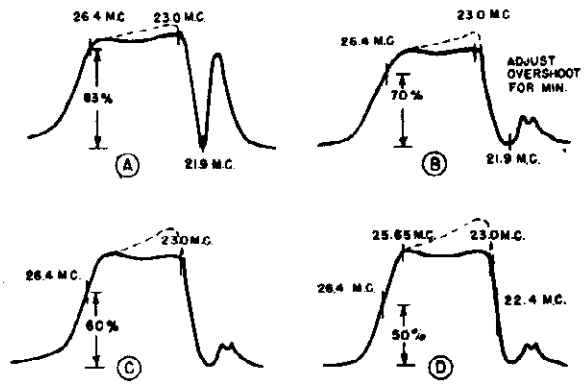


Fig. 9. Video I-F Alignment Curves

With the same sweep input as in step 1, adjust the primary trimmer, C84, of T6 for maximum peak-to-peak amplitude of the positive and negative peaks as shown in Figure 8B.

5. Video I-F Alignment—The video i-f amplifier uses transformers which are coupled and loaded to give the proper band-pass characteristic. Before attempting alignment of the video i-f, the sound i-f traps should be aligned as in (3), then do not touch these trimmers when making the video i-f alignment.

Stage-by-stage alignment should be performed so as to duplicate the curves, as shown in Figures 9A, B, C, and D. The markers are used to establish the correct bandwidth and frequency limits.

The trap formed by L20 and C89 in the cathode of V4 is used to reduce the overshoot of the 21.9 mc traps. Adjust the spacing of turns comprising L20 by either pushing them together or separating them so as to give a minimum amplitude to the overshoot.

Connect the sweep generator to the tube grid preceding the transformer to be aligned. Adjust the sweep width for a minimum of 10 mc about the center frequency of the video i-f. The marker frequencies are supplied by a signal generator and sufficient marker signal may be supplied in most cases by merely connecting the high side of the signal generator to the television chassis.

The primary of the transformer preceding the grid where the signal is applied will act as a trap putting a hole in the alignment curves as viewed on the scope unless it is short circuited or detuned. It may be detuned readily by connecting a 100 to 200 mmf capacitor across the primary trimmer or place a temporary short circuit across the primary trimmer. ***Be sure to remove this capacitor after the stage is aligned.***

Keep the input of the sweep generator low so as not to overload the video i-f amplifier.

The response curves shown are obtained on an oscilloscope at the junction of L4 and R16. Use a 10,000 resistor in series with the input lead to the oscilloscope.

The contrast control should be advanced approximately to its half-advanced position.

The Selector Switch should be turned to radio position and a temporary jumper put across filament switch wafer so as to keep the television tube filaments lit while in this radio position. If a television position is used, the i-f curve will be affected by the interaction from the r-f coil in the converter tube grid. NOTE—When jumper is used, remove B+ from r-f assembly by disconnecting external lead to terminal (2) of r-f assembly, see Fig. 12.

6. Oscillator Adjustment The oscillator coil must be adjusted so that the Television Tuning Condenser, C112, will tune the sound carrier of the television signal at the middle of its range. Set the condenser, C112, to mid-position. Then adjust oscillator coil for channels No. 1 through No. 6 by spreading turns to raise frequency or compressing turns to lower frequency. For channels No. 7 through No. 13, the oscillator coil consists of a single turn. Adjust these coils by spreading the gap to lower frequency or closing the gap to raise frequency in the leads of the coil which run to the terminals.

Apply the signal generator with tone modulation to the antenna input terminals and set the generator to the sound carrier frequency for the channel under alignment. The signal generator must be very accurately calibrated. This can be done by beating its output against a known channel carrier or use a station operating on the channel and tune in the sound.

For output indication, advance the volume control about to mid-position so that the tone modulation or audio modulation on the channel station may be heard through the loudspeaker.

The oscillator coil is located on the coil form or assembly nearest to the front of the switch assembly and is wound of heavier wire than the other coils. This is shown in Figure 10.

7. R-F Coil Alignment—The r-f coil assembly is designed for stable, band-pass operation and under normal conditions will seldom require adjustment. In cases where it is definitely known that alignment is necessary (such as when the present coil is damaged and has been changed), do not attempt the adjustment unless suitable equipment is available. When tubes V1 or V2 are changed, alignment of r-f and oscillator may be necessary.

The minimum requirements for correct r-f alignment is to provide the correct band width, and for the response curve to be centered within the limit frequencies shown for each of the individual bands, as shown in Figure 11. It is also necessary that the curve be adjusted for maximum amplitude consistent with correct band width. To provide these minimum requirements, the r-f coils are overcoupled in a very similar manner to the video i-f transformers. However, instead of adjusting capacity to tune the coils, the inductance is varied by moving a few turns. Coupling is also adjustable by moving the entire coil either away from or toward the adjacent coil on the form.

The physical assembly of the coils in the band switch locates the r-f amplifier plate coil at the rear of the switch and the oscillator coil towards the front end. Two types of coils are used—the Channel No. 1 and No. 2 coils have an additional link circuit between the grid and plate coils to provide better image rejection of the FM band (88 to 108 mc) signals on these two channels. These links are tuned by means of two copper rings which are moved along the coil forms for adjustments.

The input sweep signal is applied to the antenna terminal board at the r-f unit. The 300-ohm cable between the antenna terminal board and r-f amplifier input must be disconnected at the r-f unit when making r-f alignment. The marker signal

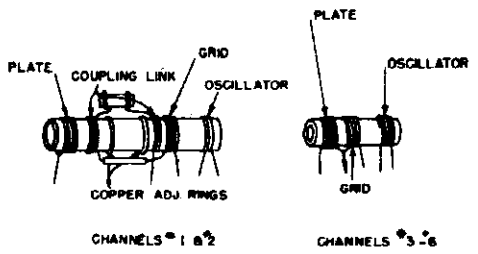


Fig. 10. R-F Coil Assembly

generator may be coupled loosely to the antenna input terminals.

The output r-f response curve is taken off at the junction of R1 and C1. The Contrast Control should be set for minimum for all r-f alignment.

For channels No. 1 and No. 2, the r-f coil should be aligned to give approximately the curve shown in Figure 11A. The high frequency end of curve (at S marker) may be peaked slightly higher than the low frequency end of curve, but the low frequency end should never be aligned with more amplitude than the high frequency end. The markers should be located on the inside of the humps of the curves, the video marker (P) preferably being inside slightly farther than the sound marker (S). Adjustment of the bandwidth is made by moving the plate coil closer to the grid coil or vice-versa. In most cases the sliding of the copper rings will give both the required bandwidth and frequency adjustment. Spread

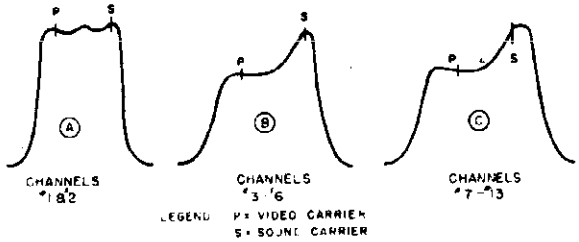
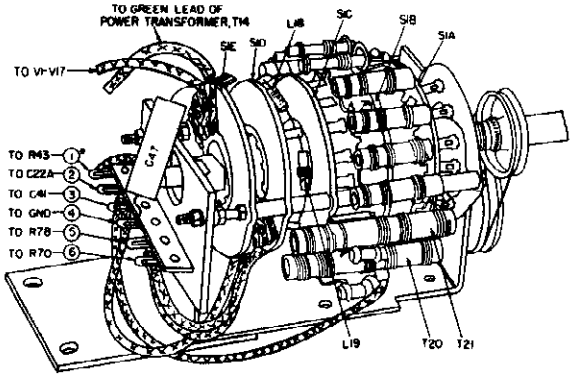


Fig. 11. R-F Alignment Curves

or squeeze turns in plate and grid coils if the frequency cannot be obtained by sliding the rings. Spreading turns results in a raising of the frequency; while squeezing turns lowers the frequency.

For the remainder of the channels, the adjustment of the plate coil in relation to the grid coil changes the bandwidth while the spreading or squeezing of the plate and grid coil turns results in the raising or lowering of frequency. Only when the plate and grid coils are tuned to the same frequency will the amplitude be greatest with the correct bandwidth. The outside peaks of the r-f response curve should be aligned to the carrier markers. In general it is desirable to have a slight rise on the high frequency (sound carrier) side of the curve, however the rise should not exceed approximately 30 per cent of the low frequency side. A low frequency rise in the response curve is not desirable and must be avoided, as a picture with poor definition will result if this is done.

The upper channel coils (No. 11, No. 12, and No. 13) may have the plate winding reversed from the winding direction of the plate coil of the other transformers. If this is the case, the bandwidth will be increased by separating the plate and grid coils and vice-versa. This condition can be determined by inspection or by the effect on the curve when making the alignment.



* TERMINAL (1) NOT USED ON EARLY PRODUCTION RECEIVERS

Fig. 12. R-F Coil & Switch Assembly

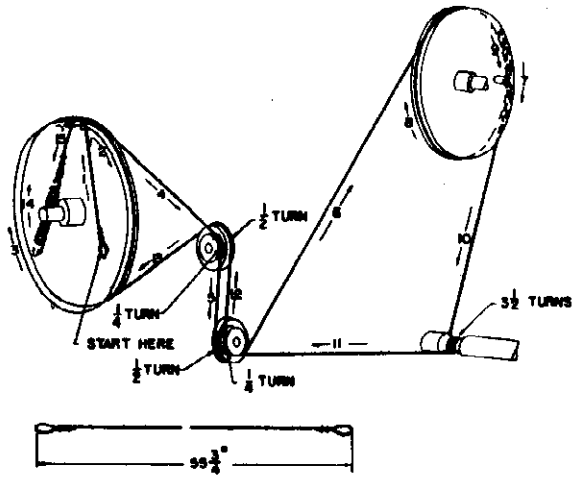


Fig. 15. Radio Tuning, Dial Drive Stringing

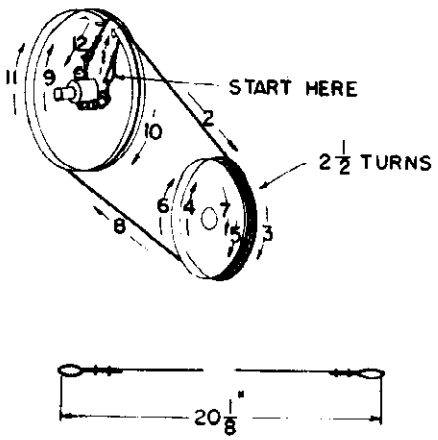


Fig. 16. Television Tuning, Drive Stringing

MISCELLANEOUS INSTALLATION AND SERVICE ADJUSTMENTS

REPLACEMENT OF PICTURE TUBE

To remove the picture tube from the television chassis, remove the picture tube socket and then untape and slide off the ion trap adjustment assembly. The ion trap can be removed readily, if the gap in the assembly is pulled apart slightly with the fingers while attempting to slide it. Loosen the two set screws partially that clamp the left side of the picture tube mounting strap, then slide the strap backward from the top-front rim of the picture tube until the rim of the tube is free from the strap. Carefully pull the tube out through the focus and deflection coils.

To replace a picture tube the reverse procedure should be followed, being careful never to force the picture tube if it sticks or fails to slip into place readily. Investigate and remove the source of the trouble. The picture tube should be oriented so that the anode cap is adjacent to the H.V. rectifier, V13, and the high voltage lead.

Wipe the screen surface of the tube to remove finger marks and dust. ***PRECAUTION—Do not handle, remove, or install a picture tube unless shatterproof goggles and heavy gloves are worn.***

ION TRAP ADJUSTMENT

The ion trap may be approximately located as shown in Figure 17; however its final adjustment must be made with the television receiver operating.

The approximate adjustment requires that the gaps in the two magnets be lined up with the break in the rubber holder.

NOTE—Some ion traps have been magnetized so that it is necessary to rotate the small magnet at 180 degrees to this normal position. Then slide the assembly onto the picture tube neck so that the ion trap assembly slit is at the bottom or top (dependent upon picture tube) and lines up with pin #12 or #6. Slide the assembly forward on the picture tube until it is about the position shown in the illustration. NOTE —The wider of the two magnets should be located at the rear or the base end of the picture tube. The final following steps should be taken with the television receiver operating:

1. With Brilliance control advanced, turn ion trap assembly so that gap in rubber holder is faced up or down and lines up with either pin #6 or pin #12. Whichever way gives some illumination, is the correct approximate orientation of assembly. If the tube V16 is removed, it will be found much easier to adjust for maximum illumination since the resultant thin line will illuminate even though the magnets are considerably out of adjustment.
2. Move assembly back and forth and rotating it while viewing screen, adjust for maximum brightness.
3. If illuminated area gets very bright, reduce brightness with control and repeat step 2. If tube V16 was removed as suggested in Step 1, replace it before proceeding with step 4.
4. If any shadowing of the tube neck is present after completing step 3, rotate the small (front) magnet to correct shadow and repeat step 2 and 3. NOTE —Badly out-of-line focus coils can also cause neck shadowing. The focus coil should be symmetrical and straight before starting the ion trap adjustment.

MODEL 801

GENERAL ELECTRIC CO.

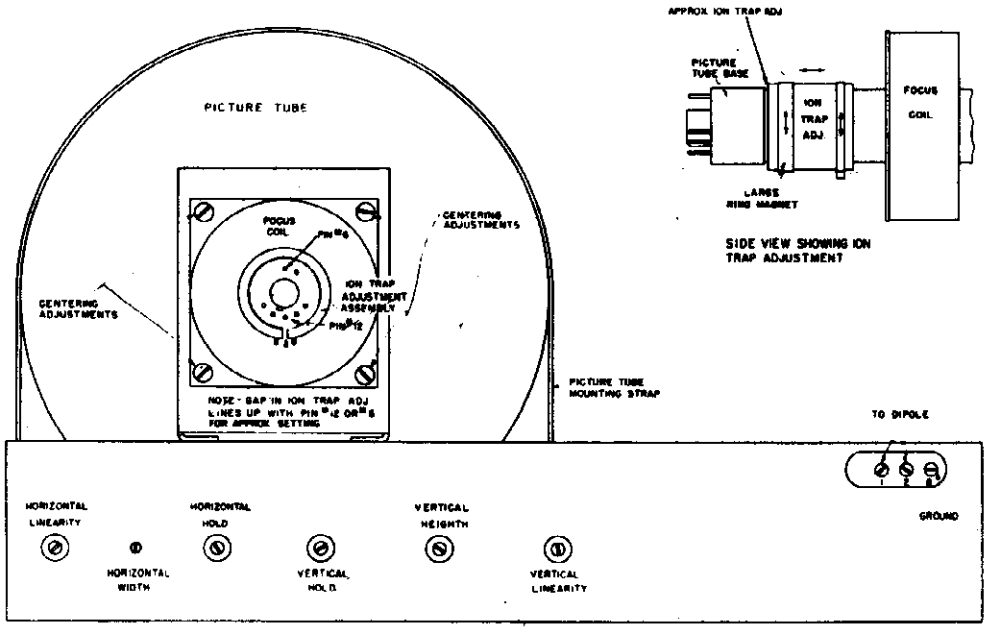


Fig. 17. Location of Installation Adjustment Controls

CENTERING (FOCUS COIL) ADJUSTMENT

The four focus coil adjustment screws should all be tightened sufficiently so that the springs are always under tension. Too loose pressure on the springs will result in the picture centering being unstable. These adjustments are not readily available with the back cover in place unless a long screwdriver is used. Since each screw adjustment reacts in both the horizontal and vertical directions, a maladjustment in the centering may have to be corrected by the adjustment of one to four screws.

DEFLECTION YOKE ADJUSTMENT

Three set screws permit the deflection yoke to be loosened, permitting limited turning in either direction. If the picture does not line up horizontally or square with the picture tube mask, rotate the yoke until this condition is remedied, then tighten the set screws.

HORIZONTAL (HOLD) OSCILLATOR SPEED ADJUSTMENT

The horizontal hold control is a preset adjustment on the rear of the chassis which is used to adjust the speed. In late production receivers, a tuned circuit consisting of L21 and C91 was added to the horizontal oscillator cathode circuit to stabilize the horizontal hold operation. For complete alignment both controls must be adjusted. Check operation first as follows:

Check on Alignment—With a normal television signal being received, free from excessive noise, turn the horizontal hold control to the position where the picture locks in horizontally and passes the following tests:

1. With a picture being received, switch the Station Selector to a channel having no program and then back to the desired channel. The picture should immediately lock into position.

2. With a picture being received, turn the television receiver power "off" for two or three seconds and then turn it back "on" again. The picture should come into synchronization within ten seconds after the picture tube has been illuminated.

3. Turn the Station Selector to the "radio" position and allow the television receiver to transfer for two or three minutes to Broadcast reception, and then return to the television channel transmitting a picture. The picture should synchronize within ten seconds after the picture tube becomes illuminated with receivers not equipped with L21. Receivers with L21 should sync immediately upon showing raster.

4. Turn power off for three or four minutes and then turn "ON." The picture should lock-in horizontally within ten seconds after the raster becomes illuminated.

Minor Adjustments—If the receiver does not have the tuned circuit consisting of L21 and C91 in the cathode of the horizontal multivibrator, V11, the horizontal hold control, R36, should be adjusted until the above checks can be satisfactorily accomplished. If attempted adjustment of the hold control will not permit all the above checks to be met when the tuned circuit is incorporated, then make the adjustment as outlined under "Complete Realignment."

Complete Realignment—Tune in a television signal for optimum sound and adjust for normal contrast.

1. Adjust the Horizontal Hold control to the center of its range.

2. Remove tube V9, and then adjust the iron core of L21 until the picture is approximately synchronized (held in frame) in the horizontal direction.

3. Replace tube V9 and then adjust the Horizontal Hold control until the picture passed all tests as outlined in "Check on Alignment."

VERTICAL (HOLD) OSCILLATOR SPEED ADJUSTMENT

This control, R62, is used to lock the picture in synchronism with the transmitted picture in the vertical direction. When the control is maladjusted the picture will slide vertically out-of-frame or lock out-of-frame, giving overlapping vertical images or even double images in the vertical direction. After the picture is locked in vertically on a normal picture, reduce the contrast control until the picture is barely visible, then readjust the control until the picture holds in frame.

HORIZONTAL LINEARITY AND WIDTH CONTROL

These controls react on each other so that when one control is adjusted the other may have to be. The adjustment of the linearity control should only be made on a test pattern signal. First, obtain the correct width by adjusting the width control, L7, until the picture extends approximately $\frac{1}{8}$-inch outside the edge of the mask on both sides. Next, adjust the Horizontal Linearity control, R49, until the test pattern is symmetrical in the left and right direction. A slight readjustment of the Width control may now be necessary, as well as touching up of the centering adjusting screws.

VERTICAL LINEARITY AND HEIGHT CONTROL

The Height control, R61, is adjusted until the picture extends approximately $\frac{1}{8}$ inch outside the edge of the mask on both top and bottom. Next, adjust the Vertical Linearity control, R58, until the test pattern is symmetrical from top to bottom. Readjustment of the Height and Vertical Hold controls as well as the centering adjustments may be necessary.

PRODUCTION CHANGES

The following production changes have taken place up to the time that this service data was compiled. In most cases the change can not be accurately identified with the serial number of the chassis. The order of listing below does not indicate the chronological order of the change.

1. Power Transformer, T14 and V23—The original transformer, T14, supplied, gave insufficient B+ voltage (385 volts) when using a Type 5Y3GT rectifier tube, V23. This resulted in a low anode voltage of 7500 volts for the picture tube. To increase this voltage, a Type 5V4G tube was substituted for the 5Y3G tube, V23. At approximately serial number 2500, a new transformer T14 having Stock No. RTP-040 was substituted, which gave the correct B+ voltage of 415 volts when a Type 5Y3G tube was used as V23. This B+ voltage gives an anode voltage to the picture tube of 8500 volts.

2. Television Tuning Trimmer C112—For approximately the first 2000 receivers, the tuning trimmer C112 did not quite have the correct tuning range, making it necessary to add a fixed 10 mmf. capacitor C114 in series with it. The shunt capacitor C102 had a value of 4.7 mmf. Later production trimmer, C114, has the correct range. With this new value of trimmer, the shunt capacitor C112 was changed to 6.0 mmf. This shunt capacitor in a few receivers was merely a 5.0 mmf., while in most it will consist of two capacitors; a 5 mmf. and a 1.0 mmf. capacitor in parallel. The early production trimmer has a ¼-in. O.D. shaft, while the late production trimmer is slightly larger and has a ¼-in. O.D. shaft.

3. Tone Control, R69B—The tone control R69B, on early production receivers was connected in series between the Volume Control R69A, movable arm, and C39. C72 was a 680 mmf. capacitor from C39 to ground. Hum in the audio dependent upon the tone control setting necessitated a revision as shown in the schematic.

4. Tuned Circuit, L20 and C89—The capacitor, C89, was originally 240 mmf. and the coil, L20, was fixed-tuned and wound on a resistor form. This was later changed to 1000 mmf. and the coil turns were reduced and made variable, resulting in a higher Q circuit. This change permitted adjustment of the trap as described in the alignment procedure.

5. Resistor, R87—This resistor was changed from 100,000 ohms to 330,000 ohms to prevent excessive beam current in the picture tube, V8. This excessive beam current caused the high voltage to be reduced when the Brilliance control was advanced to maximum with the result that the control reduced brightness at end of its clockwise travel instead of increasing brightness.

6. Resistor, R47—This resistor has been changed from ½-watt to a 1-watt size. In some cases, the original ½-watt resistor dissipation is exceeded, especially if the Width control iron core is nearly all the way in the coil, resulting in a reduction in the resistance value. This reduced resistance changes the waveshape across C29 so much that the horizontal multivibrator may lock in at half frequency or not lock at all. It may also result in the resistor burning out.

7. Change in Horizontal Output Transformer, T9—A new design horizontal output transformer, T9, was used in late production receivers. This may be identified by the fact that it has two windings instead of the single winding design, as characterized the early production receivers. When the late production transformer is used, a 3900-ohm, 1-watt resistor must be added in series to the existing 6800-ohm, 1-watt resistor, R47. *Do not use a single 1-watt resistor for this.* The capacitor, C66, should be returned to ground when the new type transformer is used.

8. Horizontal Multivibrator Cathode Switching—After the first 150 receivers were built, a shorting contact was added to the filament wafer of the Station Selector switch so as to stop the horizontal multivibrator as soon as the Station Selector was switched to "Radio" position. This connects the multivibrator cathode to ground through the filament circuit when switching to "Radio" so that "birdies" are not heard on the broadcast band as the television tubes cool off after switching from television to radio reception.

9. Screen Resistor, R79—This resistor was changed from an original 47,000 ohms to 33,000 ohms. This reduces the operating d-c voltage on the plate of V7, and gives greater brightness.

10. Addition of C21—A fixed 10 mmf. mica capacitor, C21, was added across C10 so that the trimmer C10 would peak at the center of its range.

11. Change in R63—The 330,000 ohm resistor, R63, was changed to 220,000 ohms so that the Vertical Hold control will operate near its mid-adjustment position.

12. Removal of R95—To correct a transient which appeared in the vertical retrace as a white line at the top of the picture, the 2200 ohm resistor, R95, in series with capacitor, C37, was removed. The potentiometer, R58, was reconnected as a variable resistance as shown on the schematic.

13. Value Change of C52—The original capacity of C52 was 47 mmf. To improve vertical interlace, this capacitor was changed to 240 mmf.

14. Addition of Tuned Circuit, L21 and C91—A 15.75 kc tuned circuit was added to the cathode of the horizontal multivibrator, V11. This stabilizes the horizontal AFC circuit to the extent that it prevents picture wiggles on noise pulses and echoes. With this addition, the 240 $\mu\mu$f capacitor, C56, should be changed to 150 mmf. and the 150,000 ohm resistor, R40, should be increased to 330,000 ohms. This prevents a white line at the left-center of the picture which may result with installation of L21-C91. With addition of L21, the capacitor, C30, was changed from a 40 mfd to a 1.0 mfd, and C92 was changed from 1.0 mfd to a .05 mfd.

15. Connection of Primary of T11—On early production receivers the primary of T11 was connected to a mid-tap on choke L10. This connection caused a resonant condition to develop which affected the lower television bands. This was corrected temporarily by shunting a 47 mmf. capacitor between the midtap of L10 and ground. Later the primary of T11 was connected to the junction of L10 and C101 as shown on the schematic.

50-CYCLE OPERATION

The supplement schematic diagram, Figure 18, shows the wiring of the power transformer, T14, through the special terminal board installed. Also, it shows the addition of capacitors C98 and C99 required for additional filtering. The changes involved in changing from 60-cycle to 50-cycle operation are listed below:

1. The 50-cycle power transformer, T14, is separated from the chassis and installed on a mounting plate at the base of the cabinet.

2. All filament and high voltage leads are extended on the transformer and terminated at the chassis proper in a terminal board. The connection of these leads through this terminal board is shown in Figure 18. All leads are twisted.

3. A 90 mfd. capacitor, C98, is shunted across C62. A 90 mfd. capacitor, C99, is shunted across C45-A.

4. The bias supply filter capacitor, C69, is changed to a 50 mfd. capacitor.

5. Filament leads to V6, V7, V9, V10, V11, V12, V14, V15, V16, and V17 are twisted. The ground connection is made at one point only for this series of tubes, and the high side is connected through the filament wafer of the band switch.

TROUBLE SHOOTING

The following is a listing of possible troubles and their cures. This is not intended as a comprehensive coverage of all possible failures but serves to point out some of the more difficult troubles that may be experienced. From time to time this information will be expanded as information becomes available.

I. NO RASTER ON PICTURE TUBE

(a) Ion trap adjustment incorrectly made. Assembly on backward or improperly oriented. See ion trap adjustment under "Miscellaneous Preset and Service Adjustments."

(b) Check for waveform at output of T9. If present, the trouble is probably in the Type 8016 rectifier tube or filter circuit. Check for open in high voltage winding of T9. If the V13 tube filament glows yellow, high-voltage is being generated and the trouble will possibly exist in the picture tube, V8.

(c) If there is no waveform at output of T9, check operation of 807, V12, V7, and multivibrator V11 by oscilloscope waveform measurement.

(d) Check that high voltage anode cap is contacting the anode terminal of V8.

1. NO RASTER ON PICTURE TUBE (Cont'd)

(e) Open Brightness control R84B, R87, or R85.
(f) No. B+ voltage at junction L4 and L3.
(g) If only two or three thousand volts are generated, check deflection yoke, L9, and Width control, L7, for continuity.

2. RASTER NORMAL, NO PICTURE OR SOUND

(a) Oscillator V2B defective, or oscillator coil resonates out of band.
(b) Defective antenna or lead-in.
(c) Converter, r-f amplifier, or first video i-f amplifier stage defective.

3. PICTURE NORMAL, NO SOUND

(a) 21.9 mc audio i-f amplifier, discriminator, or audio amplifier defective.
(b) Oscillator V2B off frequency.
(c) Defective speaker.

4. RASTER NORMAL, SOUND NORMAL, NO PICTURE

(a) Video i-f amplifier (after 1st i-f) inoperative.
(b) Resistor R83 in contrast control defective or open.
(c) Screen by-pass C32C open or shorted.

5. NORMAL PICTURE AND SOUND, NO HORIZONTAL OR VERTICAL SYNC.

(a) Check for signal input waveform at grid (1) of V9A.
(b) Defective V9A or plate circuit components.
(c) Operation of receiver with Contrast control advanced too far.

6. PICTURE NORMAL, NO VERTICAL SYNC.

(a) Check grid of V15B for normal waveform.
(b) Check speed of vertical multivibrator. Should be capable of free running speed less than 60 cps.
(c) Check V15B circuit components.

7. PICTURE NORMAL, NO HORIZONTAL SYNC.

(a) Check AFC transformer, T7.
(b) Check alignment of L21 and C91.
(c) Check socket voltages and waveforms of V10B and V11.
(d) Check resistor R47 for correct value.

8. NO VERTICAL OR NO HORIZONTAL DEFLECTION

(a) Check waveform and socket voltages of output and multivibrator tubes of respective sweep circuits.
(b) Check output transformer and yoke for continuity.

9. ONE OR MORE HORIZONTAL WHITE LINES AT TOP OF PICTURE

(a) Check for Production Change #12.

10. RIPPLE ON EDGE OF PICTURE

(a) Reflections on antenna lead-in.
(b) Instability of horizontal AFC circuit. See Production Change #14.
(c) Defective capacitor, C30.

11. RASTER EDGE NOT STRAIGHT—KEYSTONING

(a) Defective yoke.
(b) Defective sweep transformer.
(c) Improperly adjusted ion trap adjustment assembly.

12. PICTURE JUMPY

(a) Operation at too high contrast control setting.
(b) If picture moves at regular rate sideways, check capacitor C30, R32 and C92. Put in change #14.
(c) If left of picture jitters, change 807 sweep tube, V12.
(d) Noisy sweep or sync circuit tubes.

13. POOR INTERLACE OF VERTICAL SWEEP

(a) Check Production Change #13.

14. POOR PICTURE DETAIL

(a) Mismatch in antenna or lead-in.
(b) Misalignment of i-f or r-f circuits.
(c) Defective chokes L3, L4 or L5 in video amplifier.
(d) Make sure that focus control operates on both sides of proper focus point.
(e) Overload of video amplifier, check contrast control operation.

15. PICTURE CANNOT BE CENTERED

(a) Move focus coil back by loosening all four adjustment screws.

16. FOCUS CONTROL AT END OF TRAVEL

(a) Short out resistor R96.
(b) Check for correct B+ voltages.

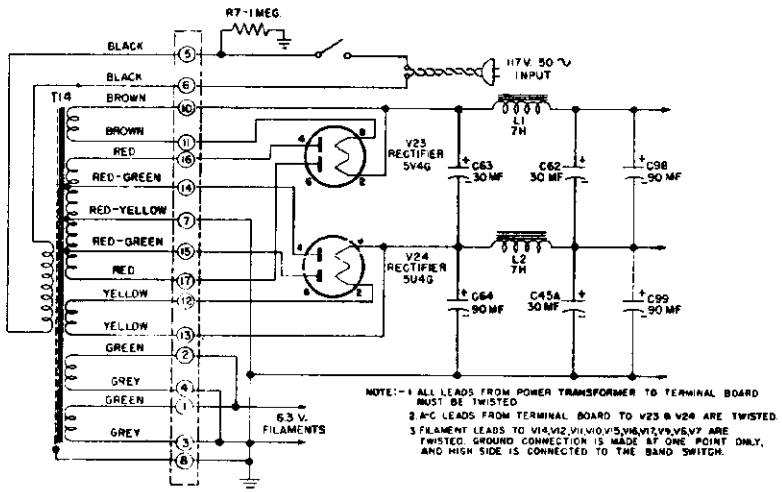


Fig. 18. Schematic Changes for 50-cycle Operation

SOCKET VOLTAGE CHART

NOTE—All d-c measurements taken by a 20,000 ohm/volt meter. Station selector switch at Channel No. 1 unless noted. Contrast control at maximum. Brilliance at minimum.

SYMBOL	TUBE TYPE	PLATE		SCREEN		CATHODE		GRID		PLATE M.A.	SCREEN M.A.	NOTES
		PIN	VOLTS	PIN	VOLTS	PIN	VOLTS	PIN	VOLTS			
V1	6AU6	5	140	6	140	7	1.3	1	0	7.3	—	
V2A	7F8	5	115	—	—	5	0	8	−4.5*	2.5	—	* Measured with V.T.V.M.
V2B		3	180	—	—	4	0	1	0	10	—	
V3	6AC7	8	150	6	150	5	0	4	−2*	14	3	* Measured on 50 v scale
V4	6AC7	8	160	6	160	5	0	4	−2*	15	3.2	* Measured on 50 v scale
V5	6AC7	8	170	6	170	5	2	4	0	14	3	
V6A	6H6	5	0	—	—	8	0	—	—	4	—	
V6B		3	−8.5	—	—	4	6.3AC	—	—	0	—	
V7	6AC7	8	150	6	125	5	0	4	0	15	3.7	
V8	10BP4	CAP	8300*	10	415	11	150	2	90	—	—	* Use multiplier with 1000 v scale
V9A	6SN7GT	2	12.5	—	—	3	0	1	−1	.2	—	
V9B		5	110*	—	—	6	11	4	6	10	—	
V10A	6SL7GT	2	−95	—	—	3	0.5	1	−9.5	0	—	
V10B		5	42.5	—	—	6	0.5	4	0.5	1	—	
V11A	6SN7GT	5	170	—	—	6	6	4	−25	2.5	—	
V11B		2	135	—	—	3	6	1	0	2.9	—	
V12	807	CAP	415	2	345	4	22	3	−10	76	13	
V13	8016	CAP	—	—	—	2	8300*	—	—	—	—	* Use multiplier with 1000 v scale
V14	6AS7GT	2 & 5	0	—	—	3 & 6	10	1 & 4	−15	—	—	
V15A	6SL7GT	2	0.5	—	—	3	7.5	1	0.5	0	—	
V15B		5	105	—	—	6	10	4	4	1	—	
V16A	6SN7GT	2	30	—	—	3	1.5	1	0	.7	—	
V16B		5	14.5	—	—	6	1.5	4	4.5	.1	—	
V17	6V6GT	3	195	4	135	8	23.5	5	14.5	20	1.85	
V18*	6SA7	3	200	4	80	8	0	6	0	3	8.5	
V19	6SG7	8	200	6	110	5	1	4	0	10	4	
V20	6SV7	6	195	4	88	2	−0.5	3	0	9.7	1.7	
V21A	6AQ7GT	1 & 3	0	—	—	2	0	—	—	0	—	
V21B		5	75	—	—	6	0	4	0	1	—	
V22	6V6GT	3	230	4	200	8	10	5	0	41.5	4.5	
V23	5Y3GT	4 & 6	315AC	—	—	2	425	—	—	85*	—	* Cathode current
V24	5U4G	4 & 6	240AC	—	—	2	250	—	—	160*	—	* Cathode current.

ALIGNMENT TABLE

Before attempting the following tabular alignment procedure, read the preceding section "ALIGNMENT SUGGESTIONS"

STEP NO.	SIGNAL GENERATOR FREQUENCY	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINT	CONNECT OSCILLOSCOPE TO CHASSIS &	STATION SELECTOR SWITCH	DIAL SETTING	ADJUST	REMARKS
	(1) BROADCAST I-F ALIGNMENT							
1	455 kc with tone modulation	Not Used	Grid (4) of V19 thru 200 mmf	Junction C41 & R69A	Radio	550 kc	C75 & C76 for max. output	
2	455 kc with tone modulation	Not Used	Grid (5) of V18 thru 200 mmf	Junction C41 & R69A	Radio	550 kc	C73 & C74 for max. output	
	(2) BROADCAST R-F ALIGNMENT							
1	1500 kc with tone modulation	Not Used	Ant. terminal thru 200 mmf	Junction C41 & R69A	Radio	*	C67B osc. trimmer for maximum output	* Tune gang condenser to minimum capacity setting.
2	1500 kc with tone modulation	Not Used	Ant. terminals thru 200 mmf	Junction C41 & R69A	Radio	1500 kc**	C67A r-f trimmer for maximum output	** If pointer does not fall on the 1500 kc calibration when 1500 kc signal is tuned in, slip pointer drum on dial cord until it does.
	(3) TELEVISION I-F TRAP ALIGNMENT							
1	21.9 mc with tone modulation	Not Used	Grid (8) of V2A thru 200 mmf	Junction L4 & R16	Channel #13	—	C19 on T4 for minimum output	Connect 10,000 ohms in series with oscilloscope input lead.
2	21.9 mc with tone modulation	Not Used	Grid (8) of V2A thru 200 mmf	Junction L4 & R16	Channel #13	—	C16 on T3 for minimum output	
3	21.9 mc with tone modulation	Not Used	Grid (8) of V2A thru 200 mmf	Junction L4 & R16	Channel #13	—	C13 on T2 for minimum output	
4	27.9 mc with tone modulation	Not Used	Grid (8) of V2A thru 200 mmf	Junction L4 & R16	Channel #13	—	C10 on T1 for minimum output	
	(4) TELEVISION SOUND I-F AMPLIFIER ALIGNMENT							
1	21.9 mc unmodulated	21.9 mc with 2 mc sweep width	Grid (4) of V3	Junction of R77 & C49	Channel #13	—	C79 & C80 for max. amplitude and symmetry at 21.9 mc	Detune C84 on T6; then adjust trimmers C79 and C80. Adjust for max. amplitude and symmetry about 21.9 mc marker as shown in Fig. 8A.
2	21.9 mc with tone modulation	Not Used	Grid (4) of V3		Channel #13	—	C78 for minimum tone output	With volume control halfway up and speaker connected, adjust C78 for minimum tone output.
3	Not Used	21.9 mc with 2 mc sweep width	Grid (4) of V3	Junction of C41 and R69A	Channel #13	—	C84 for max. peak to peak amplitude	Peak trimmer so that the positive and negative peaks have max. peak to peak amplitude. See Fig. 8B.
4	Repeat steps 2 and 3.							

ALIGNMENT TABLE (CONT'D)

STEP NO.	SIGNAL GENERATOR FREQUENCY	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINT	CONNECT OSCILLOSCOPE TO CHASSIS &	STATION SELECTOR SWITCH	DIAL SETTING	ADJUST	REMARKS
	(5) VIDEO I-F AMPLIFIER ALIGNMENT							
1	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V5	Junction of L4 and R16	Channel #13	—	C17 and C18 for max. amplitude, bandwidth, and correct positioning of markers.	Shunt C14, T3 primary trimmer with a 100 mmf capacitor. See Fig. 9A.
2	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V4	Junction of L4 and R16	Channel #13	—	C14 and C15 for max. amplitude, bandwidth, and correct positioning of markers.	Remove 100 mmf capacitor from C14, and shunt C11, T2 primary trimmer, with it. See Fig. 9B.
3	23.0 mc & 26.4 mc marker	20-30 mc sweep	Grid (4) of V4	Junction of L4 and R16	Channel #13	—	Adjust L20 for minimum overshoot	See Fig. 9B. Either spread or squeeze turns together to give minimum amplitude of overshoot.
4	23.0 mc & 26.4 mc	20-30 mc sweep	Grid (4) of V3	Junction of L4 and R16	Channel #13	—	C11 and C12 for max. amplitude, bandwidth, and correct position of markers	Remove 100 mmf capacitor from C11 and shunt C8, T1 primary trimmer, with it. See Fig. 9C.
5	23.0 mc & 26.4 mc	20-30 mc sweep	Grid (4) of V3	Junction of L4 and R16	Channel #13	—	Readjust L20 for minimum overshoot	See Fig. 9 C. Repeat procedure as in step 3, except for point of signal input.
6	23.0 mc, 26.4 mc, & 25.65 mc	20-30 mc sweep	Grid (8) of V1A	Junction of L4 and R16	Radio*	—	C8 and C9 for max. amplitude, bandwidth, and correct position of markers	Remove 100 mmf. capacitor from C8. See Fig. 9D. * Jump filament wafer switch with clip lead so that tube filaments will be lit. Remove B+ from r-f assembly.
	(6) OSCILLATOR COIL ADJUSTMENT							
1	49.75 mc with tone modulation	—	Antenna terminals	—	Channel #1	—	Turns of osc. coil, T20.	Make sure that C112 is at mid-position of travel. Use sound output as indicator.
2	59.75 mc with tone modulation	—	Antenna terminals	—	Channel #2	—	Turns of osc. coil, T21.	Same as for Step #1.
3	65.75 mc with tone modulation	—	Antenna terminals	—	Channel #3	—	Turns of osc. coil, T22.	Same as for Step #1.
4	71.75 mc with tone modulation	—	Antenna terminals	—	Channel #4	—	Turns of osc. coil, T23.	Same as for Step #1.
5	81.75 mc with tone modulation	—	Antenna terminals	—	Channel #5	—	Turns of osc. coil, T24.	Same as for Step #1.
6	87.75 mc with tone modulation	—	Antenna terminals	—	Channel #6	—	Turns of osc. coil, T25.	Same as for Step #1.
7	179.75 mc with tone modulation	—	Antenna terminals	—	Channel #7	—	Lead gap of oscillator coil, T26.	Same as for Step #1.

ALIGNMENT TABLE (CONT'D)

STEP NO.	SIGNAL GENERATOR FREQUENCY	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINT	CONNECT OSCILLOSCOPE TO CHASSIS &	STATION SELECTOR SWITCH	DIAL SETTING	ADJUST	REMARKS
			(6) OSCILLATOR COIL ADJUSTMENT (Cont'd)					
8	185.75 mc with tone modulation	—	Antenna terminals	—	Channel #8	—	Lead gap of oscillator coil, T27.	Same as for Step #1.
9	191.75 mc with tone modulation	—	Antenna terminals	—	Channel #9	—	Lead gap of oscillator coil, T28.	Same as for Step #1.
10	197.75 mc with tone modulation	—	Antenna terminals	—	Channel #10	—	Lead gap of oscillator coil, T29.	Same as for Step #1.
11	203.75 mc with tone modulation	—	Antenna terminals	—	Channel #11	—	Lead gap of oscillator coil, T30	Same as for Step #1
12	209.75 mc with tone modulation	—	Antenna terminals	—	Channel #12	—	Lead gap of oscillator coil, T31.	Same as for Step #1
13	215.75 mc with tone modulation	—	Antenna terminals	—	Channel #13	—	Lead gap of oscillator coil, T32.	Same as for Step #1
			(7) R-F COIL ALIGNMENT					
1	Markers 45.25 mc & 49.75 mc	Channel #1 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #1	—	For max. amplitude and for recommended response	See Fig. 11A for resultant alignment curve.
2	Markers 55.25 mc & 59.75 mc	Channel #2 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #2	—	For max. amplitude and for recommended response	See Fig. 11A for resultant alignment curve.
3	Markers 61.25 mc & 65.75 mc	Channel #3 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #3	—	For max. amplitude and for recommended response	See Fig. 11B.
4	Markers 67.25 mc & 71.75 mc	Channel #4 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #4	—	For max. amplitude and for recommended response	See Fig. 11B for resultant alignment curve.
5	Markers 77.25 mc & 81.75 mc	Channel #5 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #5	—	For max. amplitude and for recommended response	See Fig. 11B for resultant alignment curve.
6	Markers 83.25 mc & 87.75 mc	Channel #6 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #6	—	For max. amplitude and for recommended response	See Fig. 11B for resultant alignment curve.
7	Markers 175.25 mc & 179.75 mc	Channel #7 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #7	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
8	Markers 181.25 mc & 185.75 mc	Channel #8 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #8	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
9	Markers 187.25 mc & 191.75 mc	Channel #9 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #9	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
10	Markers 193.25 mc & 197.75 mc	Channel #10 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #10	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
11	Markers 199.25 mc & 203.75 mc	Channel #11 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #11	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
12	Markers 205.25 mc & 209.75 mc	Channel #12 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #12	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.
13	Markers 211.25 mc & 215.75 mc	Channel #13 with 25 mc sweep	Antenna terminals at r-f amplifier	Junction R1 and C1	Channel #13	—	For max. amplitude and for recommended response	See Fig. 11C for resultant alignment curve.

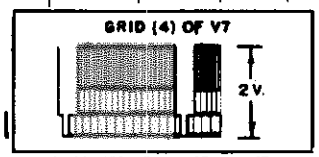


Fig. 35. Video Output of Detector (Osc. Synced at Half of Vert. Speed)

WAVEFORM MEASUREMENTS

The waveforms shown in Figures 35 through 55 represent measurements on an average receiver wherein the controls have been adjusted for a normal picture with correct Contrast, Height, Width and Linearity. Most measurements must be made when a signal is being received.

An oscilloscope where the vertical deflection amplifier has been pre-calibrated is used to take measurements at the point indicated in the waveform boxes. The oscilloscope sweep frequency is indicated in the waveform title.

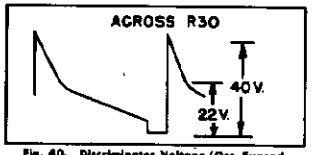


Fig. 40. Discriminator Voltage (Osc. Synced at Half of Hor. Sweep Speed)

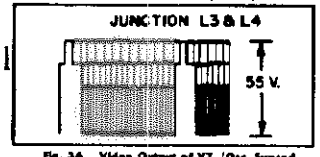


Fig. 36. Video Output of V7. (Osc. Synced at Half of Vert. Sweep Speed)

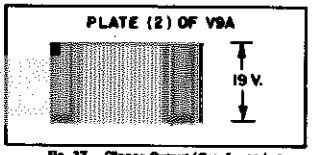


Fig. 37. Clipper Output (Osc. Synced at Half of Vert. Sweep Speed)

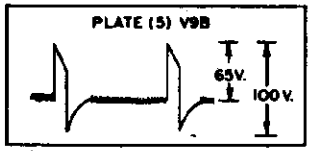


Fig. 38. Sync Amplifier Output (Osc. Synced at Half of Hor. Sweep Speed)

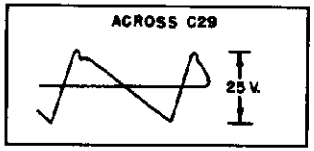


Fig. 39. A.F.C. Sawtooth (Osc. Synced at Half of Hor. Sweep Speed)

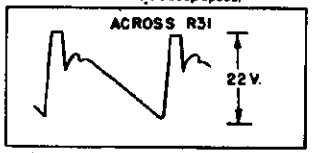
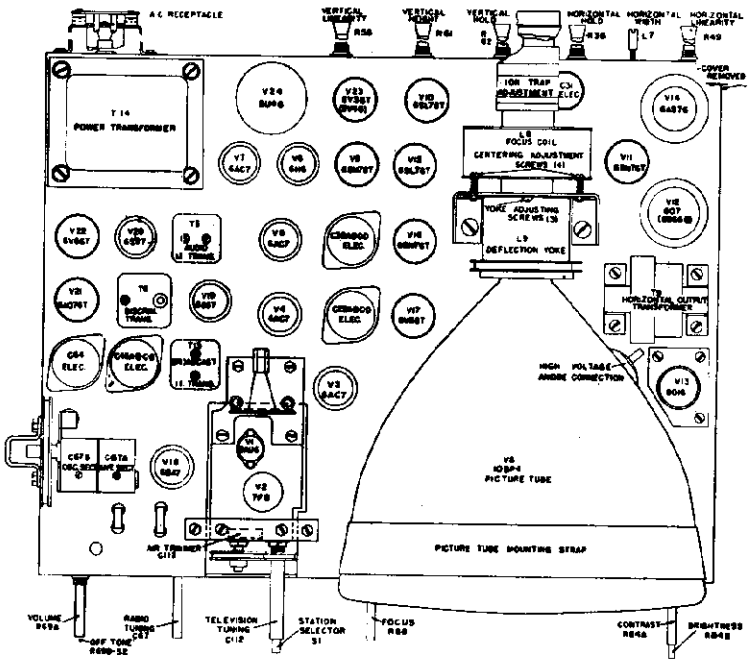


Fig. 41. Discriminator Voltage (Synced at Half of Hor. Sweep Speed)



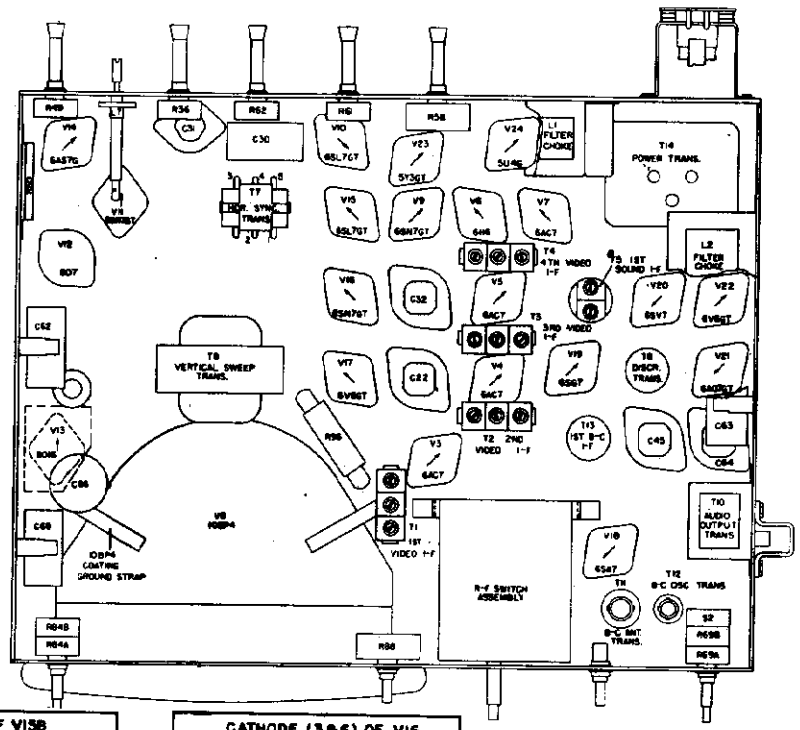


Fig. 13. Component Location, Top View of Chassis

Fig. 14. Component Location, Bottom View of Chassis

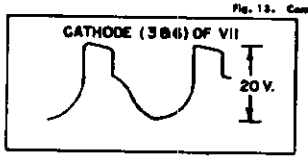


Fig. 42. Hor. M-V Cathode (Osc. Synced at Half of Hor. Sweep Speed)

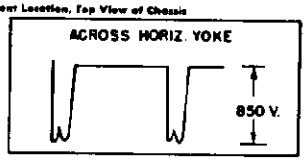


Fig. 45. Hor. Yoke Input (Osc. Synced at Half of Hor. Sweep Speed)

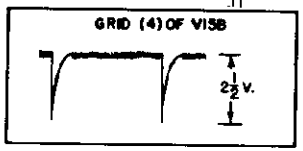


Fig. 48. Vert. Sync at V15B. (Osc. Synced at Half of Vert. Sweep Speed)

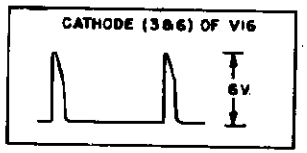


Fig. 51. Vert. M-V Cathode (Osc. Synced at Half of Vert. Sweep Speed)

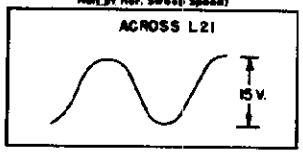


Fig. 43. Cathode Tuned Circuit (Synced at Half of Hor. Sweep Speed)

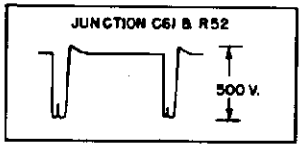


Fig. 46. V14 Control Voltage (Osc. Synced at Half of Hor. Sweep Speed)

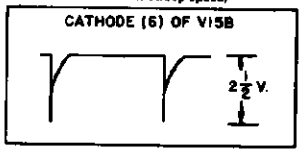


Fig. 49. Vertical Sync at Cathode V15B (Osc Synced at Half of Vert. Sweep Speed)

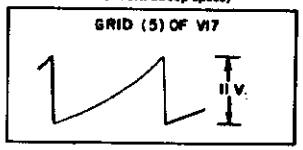


Fig. 52. Vert. M-V Output. (Osc. Synced at Half of Vert. Sweep Speed)

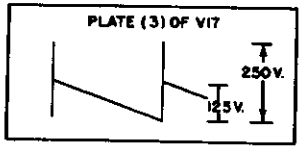


Fig. 54. Vert. Output of V17 (Osc. Synced at Half of Vert. Sweep Speed)

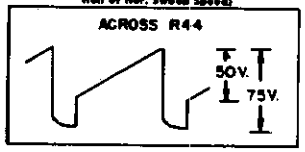


Fig. 44. Hor. M-V Output (Osc. Synced at Half of Hor. Sweep Speed)

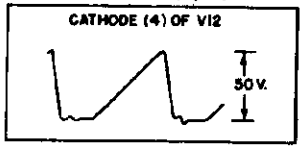


Fig. 47. 807 Cathode (Osc. Synced at Half of Hor. Sweep Speed)

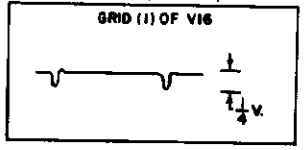


Fig. 50. Vert. Sync at Grid of M-V. (Osc. Synced at Half of Vert. Sweep Speed)

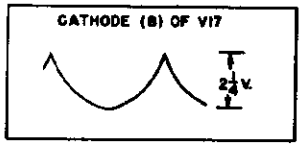


Fig. 53. Vert. Output Cathode (Osc. Synced at Half of Vert. Sweep Speed)

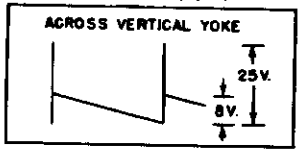


Fig. 55. Vert. Yoke Input (Osc. Synced at Half of Vert. Sweep Speed)

MODEL 801

GENERAL ELECTRIC CO.

UNIVERSAL REPLACEMENT PARTS

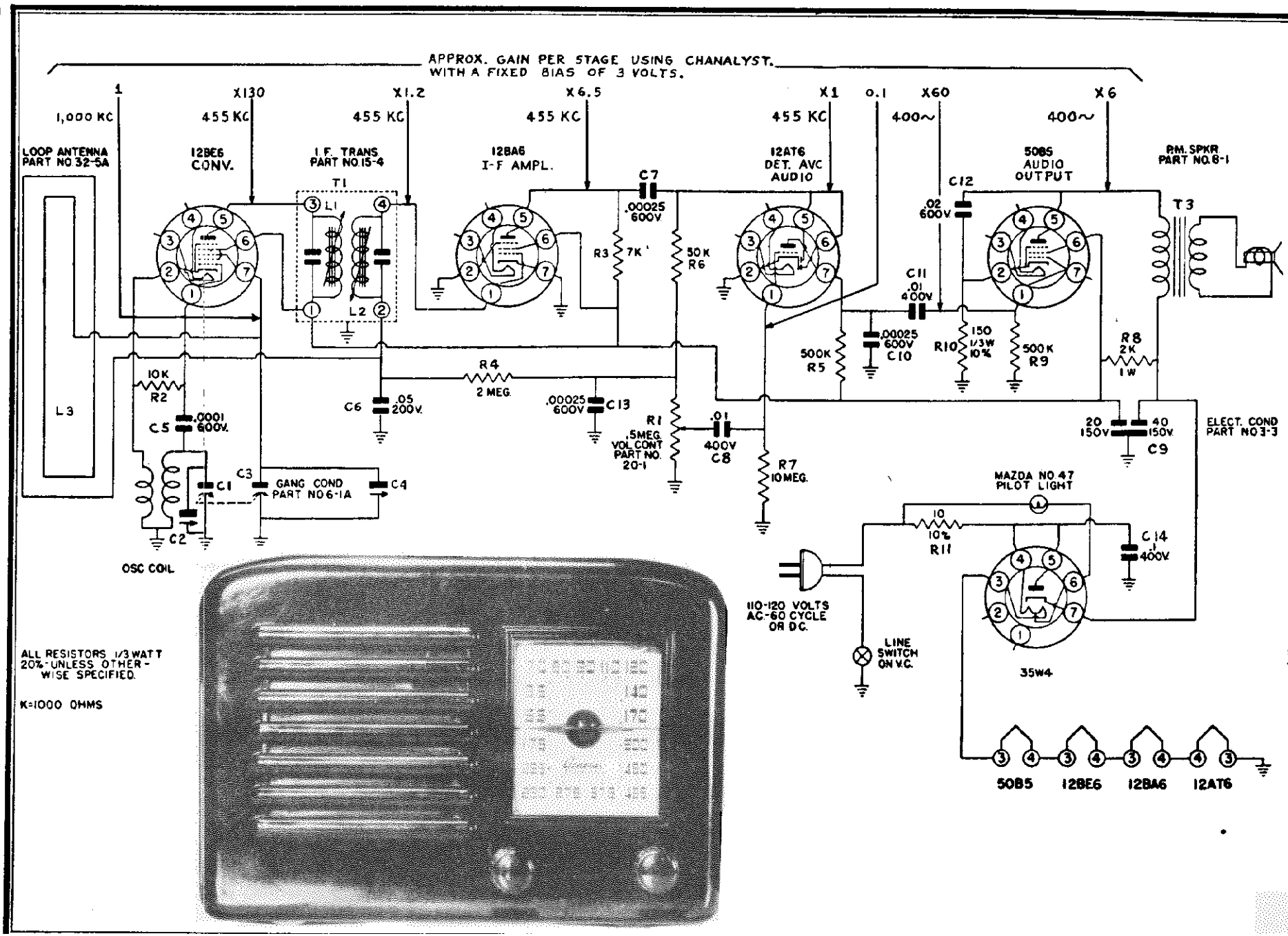
UCC-011	C42, 87	CAPACITOR—.05 mfd., 200 v., paper
UCC-017	C30, 69	CAPACITOR—1.0 mfd., 200 v., paper (C69 for 60-cycle receiver only)
UCC-025	C27, 28	CAPACITOR—.01 mfd., 400 v., paper
UCC-035	C43, 81	CAPACITOR—.001 mfd., 600 v., paper
UCC-040	C36, 39, 40, 41, 51, 54, 55, 60, 71, 29, 72	CAPACITOR—.01 mfd., 600 v., paper
UCC-041	C23, 34, 44	CAPACITOR .02 mfd., 600 v., paper
UCC-045	C26, 33, 53, 58, 85, 92	CAPACITOR—.05 mfd., 600 v., paper
UCC-048	C37, 38, 59, 70, 77	CAPACITOR—.10 mfd., 600 v., paper
UCU-520	C50	CAPACITOR—47 mmf., mica
UCU-1014	C83	CAPACITOR—27 mmf., mica
UCU-1048	C35, 65	CAPACITOR—680 mmf., mica
UCU-1052	C57, 89	CAPACITOR—1000 mmf., mica
UCU-1504	C20, 21	CAPACITOR—10 mmf., mica
UCU-1520	C49, 61, 68	CAPACITOR—47 mmf., mica
UCU-1526	C100, 101	CAPACITOR—82 mmf., mica
UCU-1532	C90, 56	CAPACITOR—150 mmf., mica
UCU-1536	C46	CAPACITOR 220 mmf., mica
UCU-2538	C52	CAPACITOR 240 mmf., mica
UCW-1020	C103, 104	CAPACITOR—47 mmf., ceramic
UCW-2009	C86, 105	CAPACITOR—16 mmf., ceramic
UOP-1206	LS1	LOUDSPEAKER—12-inch PM speaker
UOX-005		CONE—Replacement speaker cone assembly
URD-027	R59	RESISTOR—120 ohms, ½ w., carbon
URD-029	R11	RESISTOR—150 ohms, ½ w., carbon
URD-049	R24, 43, 99, 100	RESISTOR—1000 ohms, ½ w., carbon
URD-057	R4, 51, 52, 67	RESISTOR—2200 ohms, ½ w., carbon
URD-073	R18, 42, 80	RESISTOR—10,000 ohms, ½ w., carbon
URD-077	R21	RESISTOR—15,000 ohms, ½ w., carbon
URD-081	R65, 89, 28, 29	RESISTOR—22,000 ohms, ½ w., carbon
URD-085	R92	RESISTOR 33,000 ohms, ½ w., carbon
URD 089	R78, 79	RESISTOR—47,000 ohms, ½ w., carbon
URD-091	R20	RESISTOR—56,000 ohms, ½ w., carbon
URD-093	R66, 70	RESISTOR—68,000 ohms, ½ w., carbon
URD-095	R68	RESISTOR—82,000 ohms, ½ w., carbon
URD-097	R2, 6, 94, 39, 41, 76	RESISTOR—100,000 ohms, ½ w., carbon
URD-099	R71, 72	RESISTOR—120,000 ohms, ½ w., carbon
URD-101	R83	RESISTOR—150,000 ohms, ½ w., carbon
URD-105	R55, 77, 63, 64	RESISTOR—220,000 ohms, ½ w., carbon
URD-109	R22, 87, 40	RESISTOR—330,000 ohms, ½ w., carbon
URD-111	R74	RESISTOR—390,000 ohms, ½ w., carbon
URD-113	R44, 97	RESISTOR 470,000 ohms, ½ w., carbon
URD-117	R85	RESISTOR—680,000 ohms, ½ w., carbon
URD-119	R75	RESISTOR—820,000 ohms, ½ w., carbon
URD-121	R7, 19	RESISTOR—1.0 meg., ½ w., carbon
URD-129	R23, 25, 81, 60	RESISTOR—2.2 meg., ½ w., carbon
URD-137	R73	RESISTOR—4.7 meg., ½ w., carbon
URD-145	R56	RESISTOR—10.0 meg., ½ w., carbon
URD-1041	R32, 57	RESISTOR—470 ohms, ½ w., carbon
URD-1051	R33, 8, 10	RESISTOR—1200 ohms, ½ w., carbon
URD-1053	R14, 3	RESISTOR—1500 ohms, ½ w., carbon
URD-1069	R15, 27	RESISTOR—6800 ohms, ½ w., carbon
URD-1097	R34, 35	RESISTOR—100,000 ohms, ½ w., carbon
URE-035	R53	RESISTOR—270 ohms, 1 w., carbon
URE-045	R38	RESISTOR 680 ohms, 1 w., carbon
URE-065	R37	RESISTOR—4700 ohms, 1 w., carbon
URE-067	R26	RESISTOR—5600 ohms, 1 w., carbon
URE-089	R1, 48	RESISTOR—47,000 ohms, 1 w., carbon
URE-097	R90	RESISTOR—100,000 ohms, 1 w., carbon
URE-1056	R17	RESISTOR—2000 ohms, 1 w., carbon
URE-1063	R5, 9, 12, 54	RESISTOR—3900 ohms, 1 w., carbon
URF-041	R13	RESISTOR—470 ohms, 2 w., carbon
URF-045	R82, 91	RESISTOR—680 ohms, 2 w., carbon
URF-071	R46	RESISTOR—8200 ohms, 2 w., carbon
URF-073	R80, 93	RESISTOR—10,000 ohms, 2 w., carbon
URF-1061	R16	RESISTOR—3300 ohms, 2 w., carbon

SPECIALIZED REPLACEMENT PARTS

RAB-040		BACK—Cabinet back cover
RAL-001		BEZEL—Pilot light bezel, bottom of cabinet
RAV-033		CABINET—Model 801 cabinet (less hardware)
RCC-002	C1, 2, 3, 4, 5, 6, 7, 24, 25, 47, 88	CAPACITOR—.006 mfd., 600 v., paper
RCC-038	C82	CAPACITOR—.004 mfd., 600 v., paper
RCE-017	C64	CAPACITOR—90 mfd., 450 v., electrolytic
RCE-018	C31A, B, C	CAPACITOR—40 mfd., 40 mfd., 25 v., electrolytic
RCE-019	C45A, B, C, D; 22A, B, C, D	CAPACITOR—30 mfd., 30 mfd., 15 mfd., 450 v.; 30 mfd., 15 v., electrolytic
RCE-020	C32A, B, C, D	CAPACITOR—30 mfd., 15 mfd., 15 mfd., 15 mfd., 450 v., electrolytic
RCE-021	C62, 63	CAPACITOR—30 mfd., 300 v., electrolytic
RCE-048	C69	CAPACITOR—50 mfd., 25 v., electrolytic (used on 50-cycle receivers only)
RCN-001	C110	CAPACITOR—1 mmf., miniature
RCN-002	C111, 113	CAPACITOR—0.68 mmf., miniature
RCN-003	C66	CAPACITOR—500 mmf., lectrofilm
RCS-001	C94	CAPACITOR—.05 mfd., 200 v., paper
RRC-023	R84A, B	POTENTIOMETER—500,000 ohms, ½ w., (Brightness control); 500,000 ohms, ½ w., (Contrast control)
RRC-024	R58	POTENTIOMETER—1000 ohms, 2 w., w.w., (Vertical Linearity)
RRC-025	R88	POTENTIOMETER—5000 ohms, 4 w., w.w., (Focus control)
RRC-034	L7	CHOKE—Variable choke (Horizontal size)
RRD-1032	R101	RESISTOR—200 ohms, ½ w., carbon
RRD-1057	R106	RESISTOR—2200 ohms, ½ w., carbon
RRD-1081	R105	RESISTOR—22,000 ohms, ½ w., carbon
RRD-1097	R30, 31	RESISTOR—100,000 ohms, ½ w., carbon
RRD-1105	R104	RESISTOR—220,000 ohms, ½ w., carbon
RRE-1009	R102, 103, 47	RESISTOR—6800 ohms, 1 w., carbon
RRW-011	R50	RESISTOR—300 ohms, 7.4 w., wirewound
RRW-012	R96	RESISTOR—3000 ohms, 7.4 w., wirewound
RTD-003	T6	TRANSFORMER—FM i-f discriminator
RTL-023	T1	TRANSFORMER—1st video i-f transformer

SPECIALIZED REPLACEMENT PARTS (Cont'd)

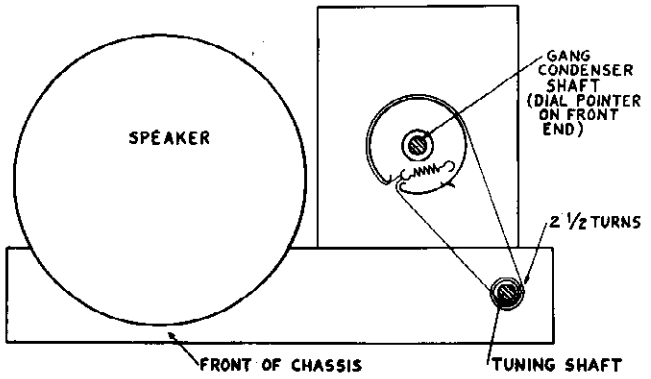
RCT-013	C67A, B	CONDENSER—2-section broadcast tuning condenser
RCW-2001	C102	CAPACITOR—5 mmf., ceramic
RCW-026	C106	CAPACITOR 1500 mmf., ceramic
RCW-1028	C107, 108	CAPACITOR—100 mmf., ceramic
RCY-015	C112	CONDENSER—Television tuning condenser
RDC-029		CORD—Television tuning drive cord
RDC-027		CORD—Broadcast dial cord
RDD-007		HUB AND DRUM ASSEMBLY—On Broadcast dial
RDD-008		DRUM AND SHAFT ASSEMBLY—For Broadcast dial
RDD-009		DRUM—Dial drive pointer drum and shaft assembly for B-C tuning
RDK-071		KNOB—Control knob for Radio Tuning or Focus
RKD-072		KNOB—Control knob for Television Tuning
RKD-073		KNOB—Control knob for Station Selector
RDK-074		KNOB—Control knob for Volume or Contrast
RDK-075		KNOB—Control knob Off-Tone or Brightness
RDL-002		LIGHT—Pilot light, Mazda No. 44, 6-8 v., 0.25 A., frosted for B-C tuning scale
RDM-006		MASK—Picture tube mask
RDP-023		POINTER—Broadcast dial pointer and hub assembly
RDS-034		GLASS—Broadcast dial glass
RDW-004		GLASS—Picture tube safety glass
RDX-028		SCALE—Broadcast dial scale assembly
RHC-008		CLIP—Clip for holding tubular capacitors
RHG-006		GROMMET—Power cord grommet
RHM-016		CLIP—B-C oscillator coil clip
RHM-028		CLIP—B.C. r-f coil clip
RHX-010		HARDWARE Hardware for mounting gang condenser
RJC-001		PIN—Speaker lead contact pin
RJC-007		CONNECTOR—High voltage anode connector for picture tube
RJJ-005		RECEPTACLE—A-C receptacle (male) on chassis
RJP-015		PLUG—A-C plug (on back cover)
RJS-012		PLATE—Mounting plate for electrolytic capacitor (small size)
RJS-030		SOCKET—Octal base tube socket
RJS-037		PLATE—Mounting plate for electrolytic capacitor (large size)
RJS-041		SOCKET—Miniature tube socket for 6AU6
RJS-042		SOCKET—Loctal tube socket for 7F8
RJS-057		TUBE SOCKET 5-pin socket for 807
RJS-058		SOCKET Tube socket for picture tube
RJS-059		SOCKET—Dial scale pilot lamp socket
RJS-064		SOCKET—Bezel pilot lamp socket
RJX-014	S1	SWITCH—R-f coil assembly completely wired and aligned (including tubes)
RLA-007	T11	TRANSFORMER—B-C antenna transformer
RLC-012	T12	TRANSFORMER—B-C oscillator transformer
RLD-001	L9	COIL—Deflection coil
RLF-005	L1	CHOKE—7 h., 75 ma. filter choke
RLF-006	L2	CHOKE—7 h., 140 ma. filter choke
RLF-008	L8	COIL—Focus coil
RLF-009	L10	CHOKE—Broadcast choke coil
RLI-003	L18	CHOKE—R-F amplifier cathode choke
RLI-006	L15, 19	CHOKE R-F amplifier cathode choke
RLI-007	L3 and L98	CHOKE 90 uh. video choke
RLI-008	L4	CHOKE—55 uh. video choke
RLI-009	L5	CHOKE—Video detector choke
RLI-011	T26	COIL—R-F and oscillator coil (Band 7)
RLI-012	T27	COIL—R-F and oscillator coil (Band 8)
RLI-013	T28	COIL—R-F and oscillator coil (Band 9)
RLI-014	T29	COIL—R-F and oscillator coil (Band 10)
RLI-015	T30	COIL—R-F and oscillator coil (Band 11)
RLI-016	T31	COIL—R-F and oscillator coil (Band 12)
RLI-017	T32	COIL—R-F and oscillator coil (Band 13)
RLI-019	L14	CHOKE—Oscillator cathode choke
RLI-031	L21	CHOKE—Cathode choke assembly
RLM-003	T22	COIL—R-F and oscillator coil (Band 3)
RLM-004	T23	COIL R-F and oscillator coil (Band 4)
RLM-005	T24	COIL—R-F and oscillator coil (Band 5)
RLM-006	T25	COIL—R-F and oscillator coil (Band 6)
RLM-008	T20	COIL—R-F and oscillator coil (Band 1)
RLM-009	T21	COIL—R-F and oscillator coil (Band 2)
RMB-009		BUSHING—B-C tuning shaft bushing
RMF-004		CLIP—Dial window clip
RMR-004		RUBBER—Channel rubber for dial
RMM-039		CUSHION—Picture tube cushion
RMM-040		TRAP—Ion trap assembly
RMM-041		SHIELD—Tube base shield for 7F8 tube
RMM-042		SHIELD—Tube base shield for television tube
RMS-004		SPRING—Television tuning drive cord tension spring
RMS-109		SPRING—For focus coil assembly
RMS-110		STRAP Safety strap for picture tube
RMS-111		SPRING—B-C drive cord tension spring
RMW-027		PULLEY—Idler pulley for B-C drive cord, ½ in. O. D.
RMW-035		PULLEY—Idler pulley for B-C drive cord, 13/16 in. O. D.
RMX-100		SHAFT—B-C tuning shaft assembly and "C" washer
RMX-101		SHAFT Television tuning shaft and pulley assembly
RRC-020	R36, 61	POTENTIOMETER—100,000 ohms, 2 w., (Hor. Hold and Height)
RRC-021	R49, 62	POTENTIOMETER—250,000 ohms, ½ w., (Hor. Linearity and Vertical Hold)
RRC-022	R69A, B	POTENTIOMETER—2 meg., ½ w., (Volume control); 500,000 ohms, ½ w., (Tone control)
RTL-024	T2	TRANSFORMER—2nd video i-f transformer
RTL-025	T3	TRANSFORMER—3rd video i-f transformer
RTL-027	T13	TRANSFORMER—455 kc i-f transformer
RTL-033	T4	TRANSFORMER—4th video i-f transformer
RTL-034	T5	TRANSFORMER—Composite 455 kc and 10.7 mc i-f transformer
RTM-001	T7	TRANSFORMER—AFC synchronizing transformer
RTO-016	T8	TRANSFORMER—Vertical sweep output
RTO-019	T10	TRANSFORMER Audio output transformer
RTO-032	T9	TRANSFORMER—Horizontal sweep output
RTP-037	T14	TRANSFORMER Power transformer (50 cycles)
RTP-040	T14	TRANSFORMER—Power transformer (60 cycles)
RWL-004		CORD—Power cord
RWL-010		CORD—Power cord assembly, includes female plug


APPROX. GAIN PER STAGE USING CHANALYST.
WITH A FIXED BIAS OF 3 VOLTS.
1
X130
X1.2
X6.5
X1
0.1
X60
X6
1,000 KC
455 KC
455 KC
455 KC
455 KC
400~
400~
LOOP ANTENNA
PART NO.32-5A
12BE6
CONV.
I.F. TRANS.
PART NO.15-4
T1
12BA6
I-F AMPL.
12AT6
DET. AVC
AUDIO
50B5
AUDIO
OUTPUT
PM. SPKR
PART NO.8-1
T3
C7
.00025
600V
R3
7K
50K
R6
C12
.02
600V
C11
.01
400V
.00025
600V
C10
R10
150
1/3W
10%
500K
R9
500K
R5
R8
2K
1W
R4
2 MEG.
10K
R2
C5
.0001
600V.
C6
.05
200V.
.00025
600V
C13
R1
.5MEG.
VOL.CONT
PART NO.
20-1
.01
400V
C8
20
150V
40
150V
C9
ELECT. COND
PART NO.3-3
L3
C1
C3
GANG COND
PART NO.6-1A
C4
C2
OSC COIL
R7
10MEG.
MAZDA NO.47
PILOT LIGHT
10
10%
R11
C14
.1
400V
110-120 VOLTS
AC-60 CYCLE
OR D.C.
LINE
SWITCH
ON V.C.
35W4
50B5
12BE6
12BA6
12AT6
ALL RESISTORS 1/3 WATT
20%-UNLESS OTHER-
WISE SPECIFIED.
K=1000 OHMS

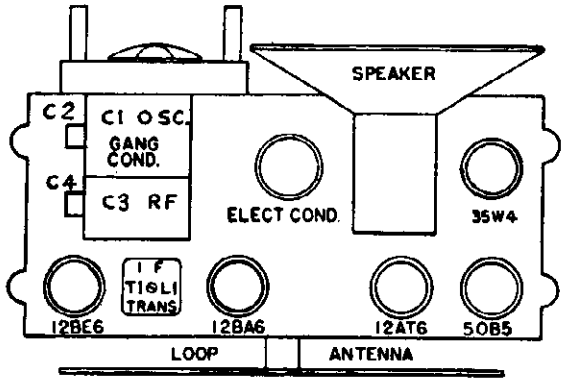
MODEL 4B5
MODEL 5B5, MODEL 9A5,
MODEL 23A6, MODEL 24B6,
MODEL 25B5

GENERAL TELEV. & RADIO CORP.

DIAL CORD DRIVE - MODELS 4B5,5B5,9A5, 23A6,24B6,25B5



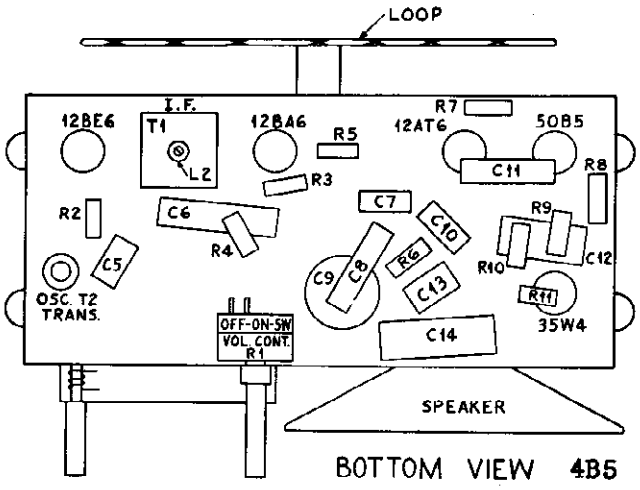
Model 4B5



TUBE LAYOUT 4B5

SOCKET	PIN	VTVM	20,000Ω/P.V.	1,000Ω/P.V.	RESISTANCE
12BE6 CONV.	1	-6	-6	-6 ON 100V SCALE -3.5 ON 10V SCALE	10K
	2	0	0	0	0
	3	AC	AC	AC	45Ω
	4	AC	AC	AC	30Ω
	5	+82	+82	+82	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	-1.0	-0.5	-0.2	3 MEGS
12BA6 I.F. AMPL.	1	-1.0	-0.5	-0.2	3 MEGS
	2	0	0	0	0
	3	AC	AC	AC	25Ω
	4	AC	AC	AC	15Ω
	5	+25	+24	+22	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	0	0	0	0
12AT6 DET. AVC AUDIO	1	-0.5	-0.2	0	10 MEGS
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	15Ω
	5	-0.5	-0.2	0	500K
	6	-0.5	-0.2	0	500K
	7	+40	+38	+15	OVER 5 MEGS
50B5 AUDIO OUTPUT	1	0	0	0	500K
	2	+5	+5	+5	150Ω
	3	AC	AC	AC	85Ω
	4	AC	AC	AC	35Ω
	5	+120	+120	+120	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	--	--	--	--
35W4 RECT	1	AC	AC	AC	110Ω
	2	--	--	--	--
	3	AC	AC	AC	85Ω
	4	AC	AC	AC	115Ω
	5	AC	AC	AC	115Ω
	6	AC	AC	AC	110Ω
	7	+125	+125	+125	OVER 5 MEGS

ALL VOLTAGE AND RESISTANCE MEASUREMENT MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

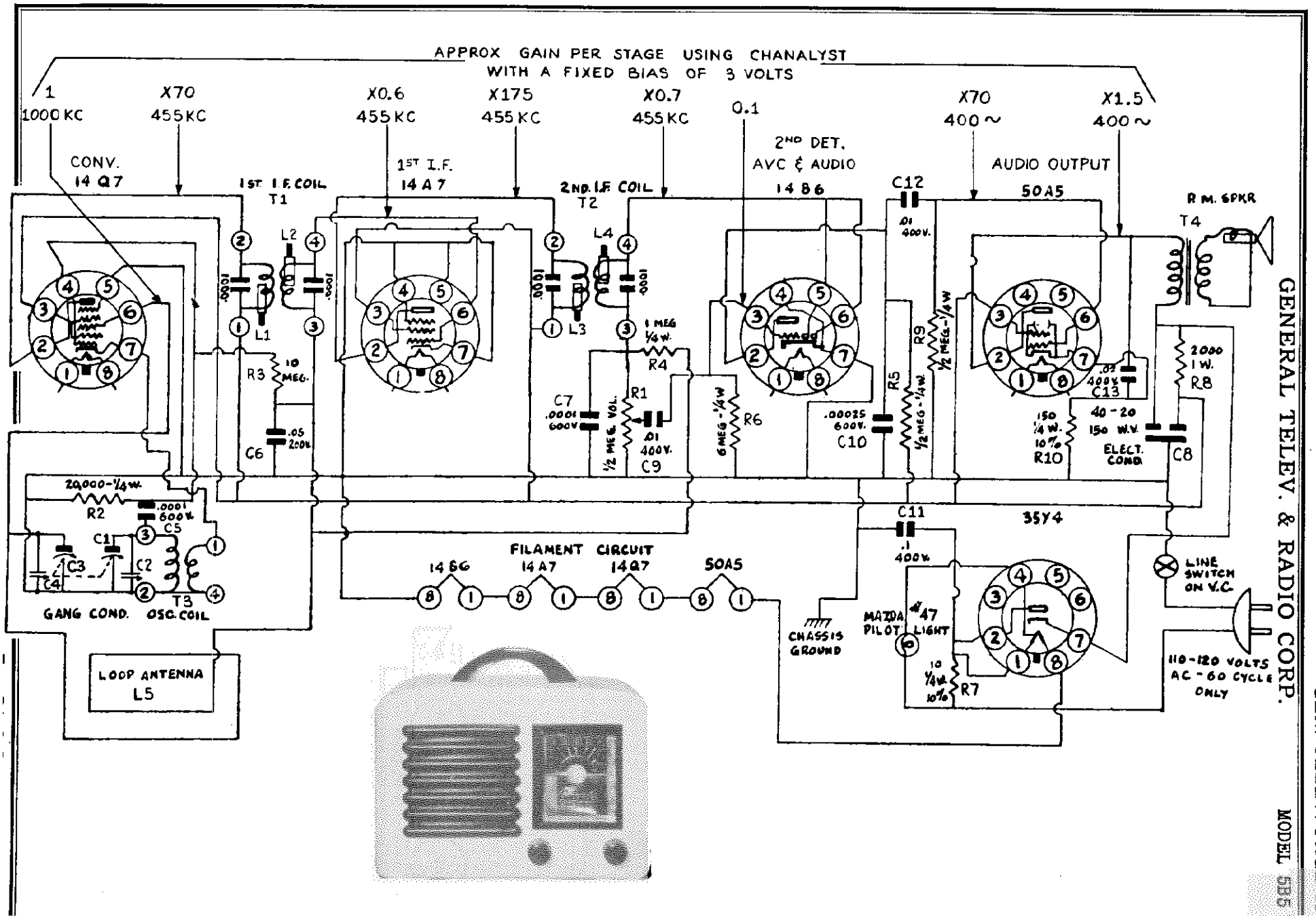


BOTTOM VIEW 4B5

A L I G N M E N T - 4B5

THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM.

THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE SUFFICIENT TO GIVE HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM METER DEFLECTION IN THE FOLLOWING SEQUENCE: L2, L1. SET THE GENERATOR AND RECEIVER TO 700 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST LOOP TRIMMER C4 FOR MAXIMUM OUTPUT.


APPROX GAIN PER STAGE USING CHANALYST
WITH A FIXED BIAS OF 3 VOLTS
1
1000 KC
X70
455 KC
X0.6
455 KC
X175
455 KC
X0.7
455 KC
0.1
X70
400 ~
X1.5
400 ~
CONV.
14 Q7
1ST I.F. COIL
T1
1ST I.F.
14 A 7
2ND I.F. COIL
T2
2ND. DET.
AVC & AUDIO
14 B 6
AUDIO OUTPUT
50A5
R M. SPKR
T4
L1
L2
L3
L4
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
10 MEG.
1 MEG 1/4 W.
6 MEG - 1/4 W
1/2 MEG - 1/4 W
2000 1 W.
150 1/4 W. 10%
40 - 20 150 W.V. ELECT. COND
20,000 - 1/4 W.
.0001 600 V.
.00025 600 V.
.01 400 V.
.1 400 V.
.05 200 V.
.03 400 V.
35Y4
FILAMENT CIRCUIT
14 B6
14 A7
14 Q7
50A5
GANG COND.
OSC. COIL
T3
LOOP ANTENNA
L5
CHASSIS GROUND
MAZDA PILOT #47 LIGHT
LINE SWITCH ON V.C.
110-120 VOLTS AC - 60 CYCLE ONLY

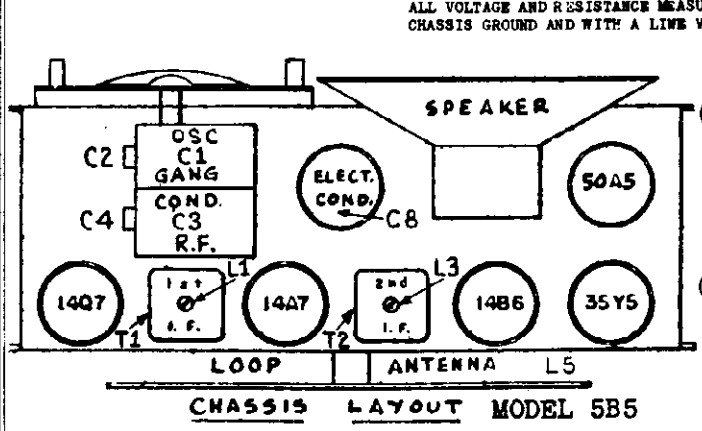
MODEL 5B5
MODEL 9A5
MODEL 24B6
MODEL 23A6
MODEL 25B5

GENERAL TELEV. & RADIO CORP.

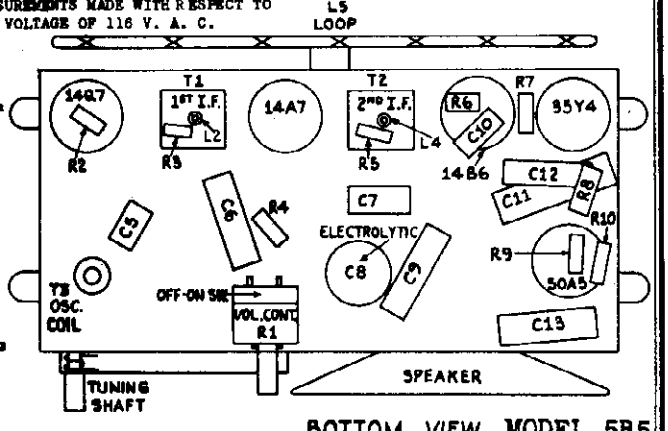
Model 5B5

SOCKET	PIN	VTVM	20,000Ω/P.V.	1,000Ω/P.V.	RESISTANCE
14Q7	1	AC	AC	AC	40Ω
CONV.	2	+86	+86	+86	OVER 5 MEGS
	3	+86	+86	+86	OVER 5 MEGS
	4	-12	-10	-7	20K
	5	0	0	0	0
	6	-1.5	-1.0	-0.2	1 MEG
	7	0	0	0	1Ω
	8	AC	AC	AC	25Ω
14A7	1	AC	AC	AC	15Ω
I.F.	2	+86	+86	+86	OVER 5 MEGS
	3	+86	+86	+86	OVER 5 MEGS
	4	0	0	0	0
	5	0	0	0	0
	6	-1.5	-1.0	-0.2	1 MEG
	7	0	0	0	0
	8	AC	AC	AC	25Ω
14B6	1	AC	AC	AC	15Ω
2ND DET.	2	+58	+52	+40 ON 1000V RANGE	OVER 5 MEGS
AVC AND				+12 ON 100V RANGE	
AUDIO	3	-1.0	-0.6	-013	5.5 MEGS
	4	--	--	--	--
	5	-1.0	-0.6	-0.3	400K
	6	-1.0	-0.6	-0.3	400K
	7	0	0	0	0
	8	0	0	0	0
50A5	1	AC	AC	AC	85Ω
AUDIO OUTPUT	2	+120	+120	+120	OVER 5 MEGS
	3	+86	+86	+86	OVER 5 MEGS
	4	--	--	--	--
	5	--	--	--	--
	6	0	0	0	OVER 5 MEGS
	7	+5.0	+5.0	+5.0	150Ω
	8	AC	AC	AC	35Ω
35Y4	1	AC	AC	AC	120Ω
RECT.	2	AC	AC	AC	120Ω
	3	--	--	--	--
	4	AC	AC	AC	110Ω
	5	AC	AC	AC	110Ω
	6	AC	AC	AC	0
	7	+125	+125	+125	OVER 5 MEGS
	8	AC	AC	AC	85Ω

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.



CHASSIS LAYOUT MODEL 5B5

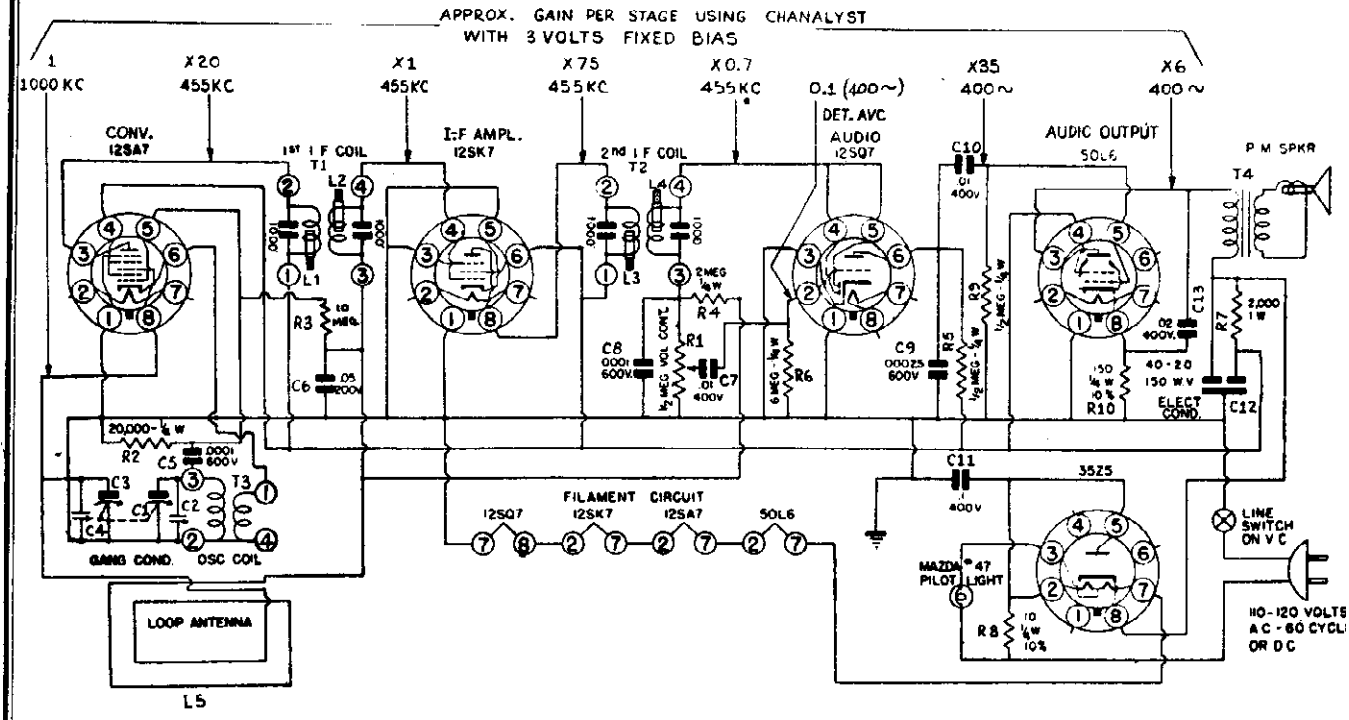


BOTTOM VIEW MODEL 5B5

ALIGNMENT - MODELS 5B5,9A5,23A6,24B6,25B5

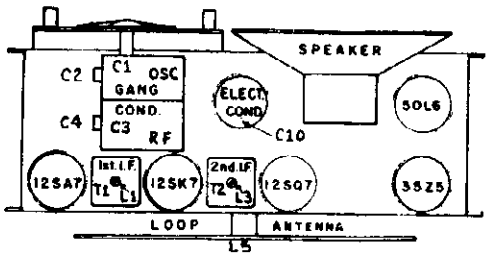
THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM. THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE JUST SUFFICIENT TO OBTAIN HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM OUTPUT IN THE FOLLOWING SEQUENCE: L4, L3, L2, L1. SET THE GENERATOR AND RECEIVER TO 1600 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST R.F. TRIMMER C4 FOR MAXIMUM OUTPUT.

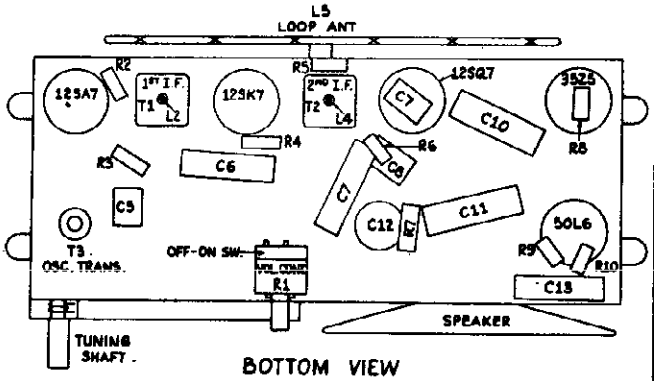
GENERAL TELEV. & RADIO CORP.



SOCKET	PIN	VTVM	20,000Ω/P2	1,000Ω/P2	RESISTANCE
12SA7GT	1	0	0	0	0
CONV	2	AC	AC	AC	25Ω
	3	+78	+78	+76	OVER 5 MEGS
	4	+78	+78	+76	OVER 5 MEGS
	5	-9	-8	-4.5	17K
	6	0	0	0	1Ω
	7	AC	AC	AC	40Ω
	8	-6	-2	-0.5	1.3 MEGS
12SK7GT	1	0	0	0	0
I-F AMPL.	2	AC	AC	AC	15Ω
	3	0	0	0	0
	4	-2	-0.8	-0.4	1.3 MEGS
	5	0	0	0	0
	6	+78	+78	+76	OVER 5 MEGS
	7	AC	AC	AC	25Ω
	8	+78	+78	+76	OVER 5 MEGS
12SQ7GT	1	0	0	0	0
DET. AVC	2	-1	-0.6	-0.4	6MEGS
AUDIO	3	0	0	0	0
	4	-1.5	-0.4	-0.2	400K
	5	-1.5	-0.4	-0.2	400K
	6	+48	+46	+12	OVER 5 MEGS
	7	AC	AC	AC	16Ω
	8	AC	AC	AC	0
50L6GT	1	0	0	0	0
AUDIO OUTPUT	2	AC	AC	AC	40Ω
	3	+115	+115	+115	OVER 5 MEGS
	4	+75	+75	+75	OVER 5 MEGS
	5	0	0	0	550K
	6	--	--	--	--
	7	AC	AC	AC	80Ω
	8	+5	+5	+5	150Ω
35Z5GT	1	--	--	--	--
	2	AC	AC	AC	120Ω
	3	AC	AC	AC	110Ω
	4	--	--	--	--
	5	AC	AC	AC	120Ω
	6	AC	AC	AC	120Ω
	7	AC	AC	AC	90Ω
	8	+115	+115	+115	OVER 5 MEGS

"NOTE" ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.



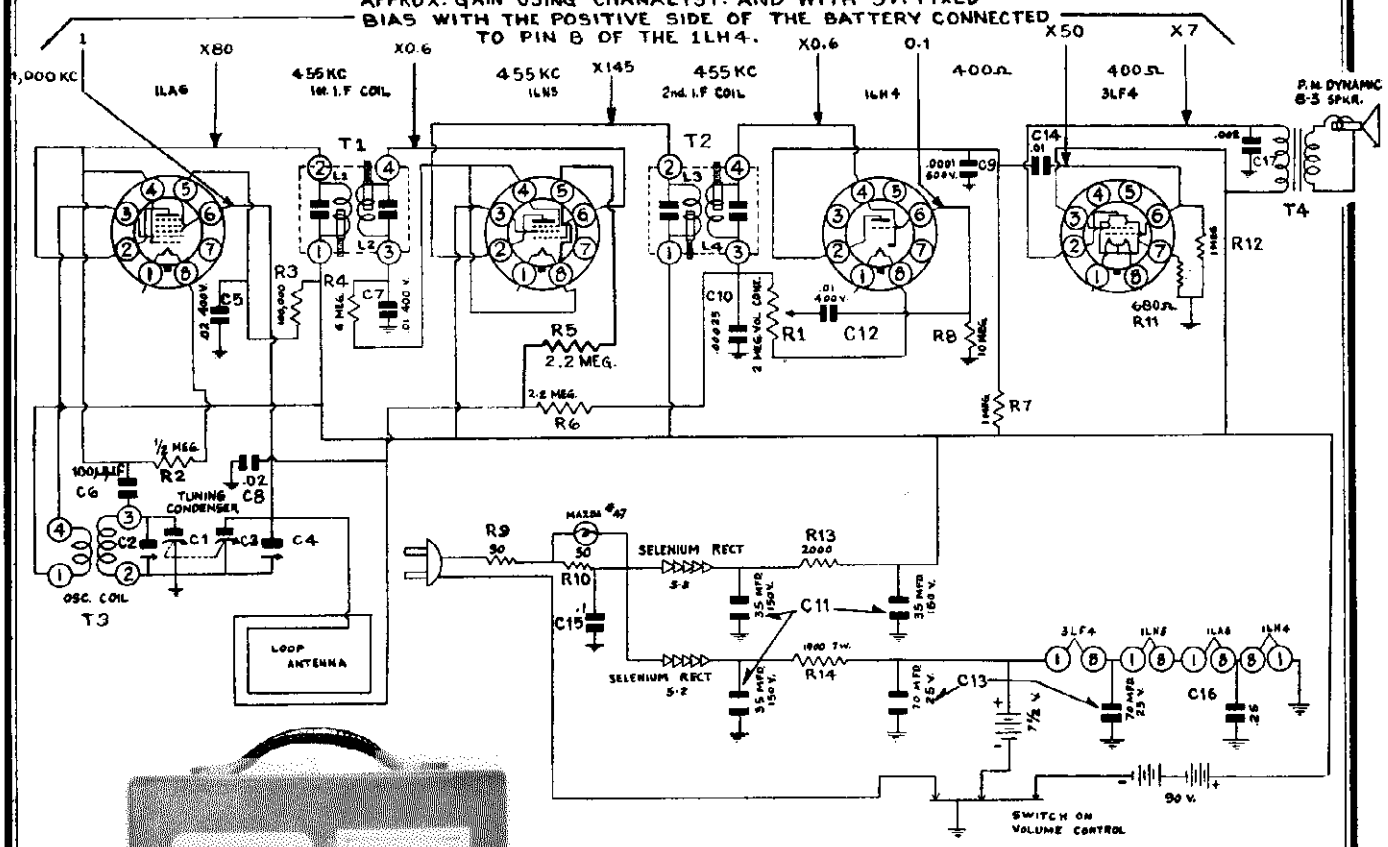


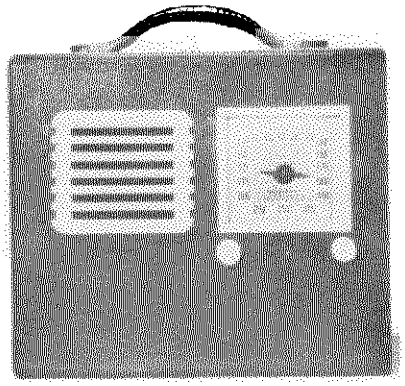
BOTTOM VIEW

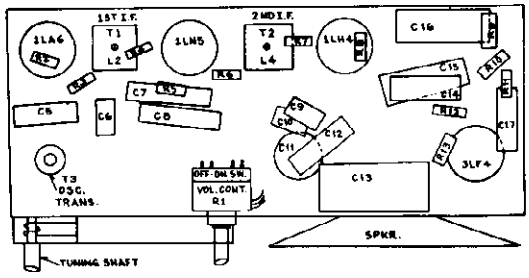
MODEL 23A6

GENERAL TELEV. & RADIO CORP.

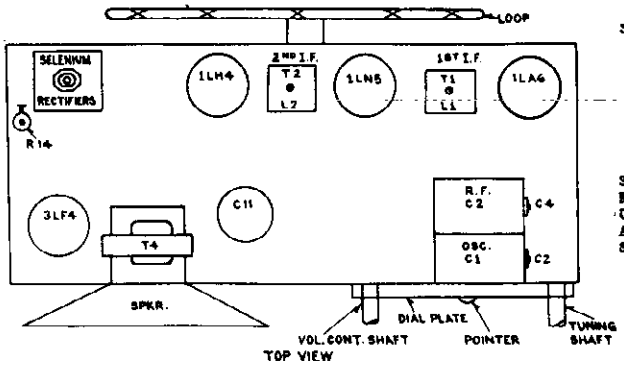
APPROX. GAIN USING CHANALYST. AND WITH -3V. FIXED BIAS WITH THE POSITIVE SIDE OF THE BATTERY CONNECTED TO PIN 8 OF THE 1LH4.







BOTTOM VIEW



TOP VIEW

SOCKET	PIN	VTVM	20,000Ω/P.V.	1,000Ω/P.V.	RESISTANCE
1LA6	1	+3.5	+3.4	+3.4	24 Ω
	2	+100	+100	+100	500K TO 1 MEG
	3	+100	+100	+100	500K TO 1 MEG
	4	-2	-0.2	0	500K
	5	+40	+40	--	500K TO 1 MEG
	6	+0.5	+0.2	+32	1.5 MEG
	7	--	--	--	--
	8	+1.8	+1.7	+1.7	14 Ω
1LN5	1	+5.3	+5.2	+5.2	34 Ω
	2	+100	+100	+100	500K TO 1 MEG
	3	+100	+100	+100	500K TO 1 MEG
	4	+3.5	+3.4	+3.4	24 Ω
	5	+3.5	+3.4	+3.4	24 Ω
	6	+2.5	+0.2	0	6 MEGS
	7	+1.5	+0.2	0	1.5 MEGS
	8	+3.5	+3.4	+3.4	24 Ω
1LH4	1	0	0	0	0
	2	+56	+48	+8	1.5 MEG TO 2 MEGS
	3	+8.2	+8	+8	52 Ω
	4	+0.7	+0.2	0	1.2 MEGS
	5	--	--	--	--
	6	-0.2	0	0	10 MEGS
	7	--	--	--	--
	8	+1.6	+1.7	+1.7	14 Ω
3LF4	1	+8.2	+8	+8	52 Ω
	2	+98	+98	+96	500K TO 1 MEG
	3	+100	+100	+100	500K TO 1 MEG
	4	--	--	--	--
	5	+130	+130	+130	500K TO 1 MEG
	6	0	0	0	1.3 MEGS
	7	+6.6	+6.4	+6.4	44 Ω
	8	+5.3	+5.2	+5.2	36 Ω

SELENIUM RECTIFIERS USED FOR A AND B SUPPLY

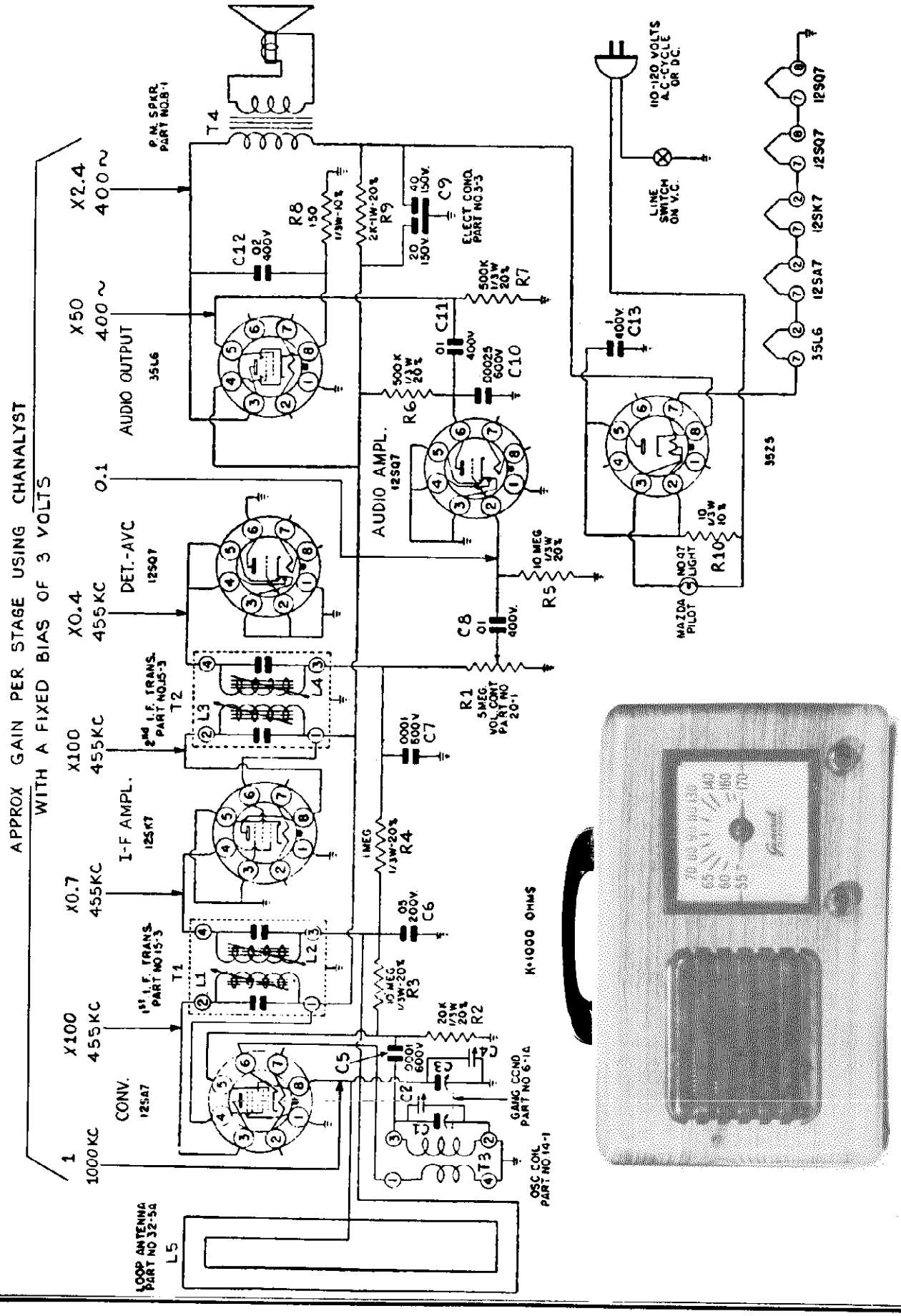
FILAMENT SUPPLY = 6.2 V. D. C.
PLATE SUPPLY = 130V

ALL VOLTAGE AND RESISTENCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

For Alignment, see P.16-4

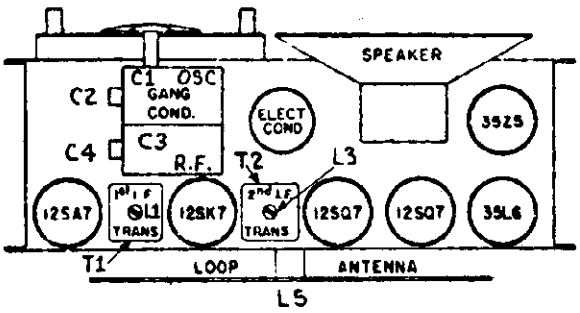
GENERAL TELEV. & RADIO CORP.

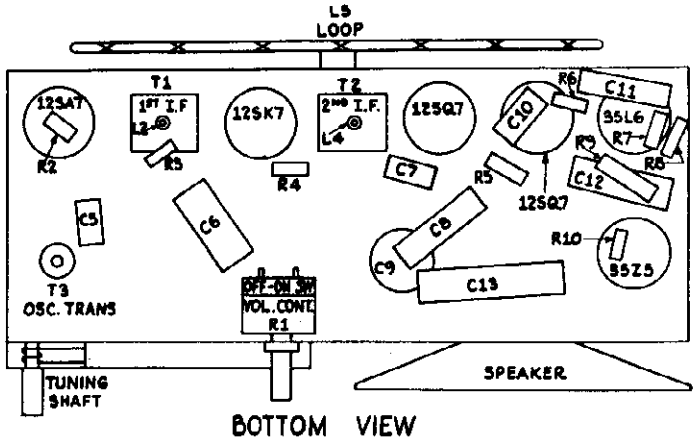
MODEL 2486



MODEL 24B6

GENERAL TELEV. & RADIO CORP.





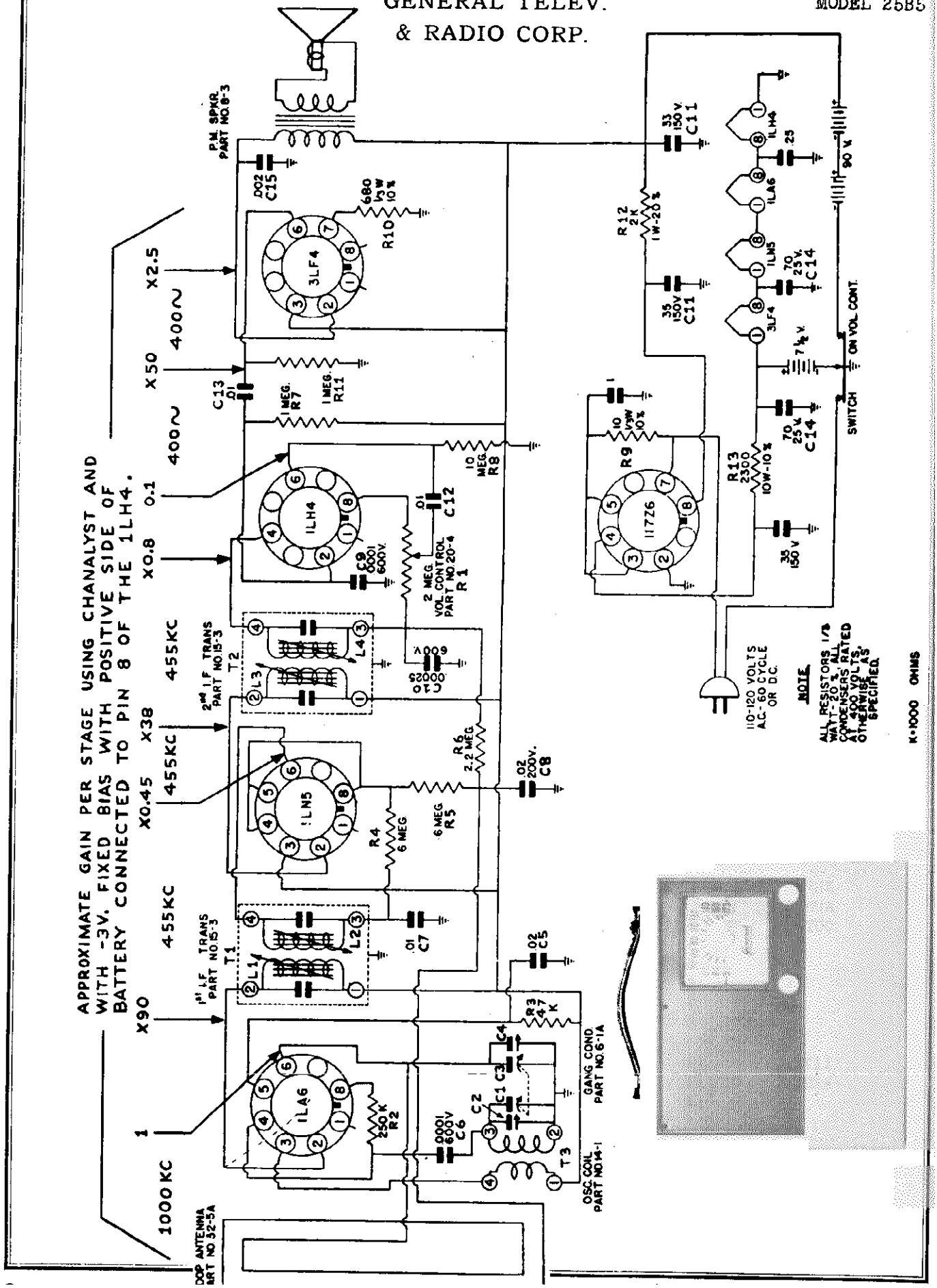
BOTTOM VIEW

SOCKET	PIN	VTVM	20,000Ω/P.V.	1,000Ω/P.V.	RESISTANCE
12SA7	1	0	0	0	0
CONV.	2	AC	AC	AC	70
	3	+84	+84	+84	OVER 5 MEGS
	4	+84	+84	+84	OVER 5 MEGS
	5	-11	-10	-9 ON 100V SCALE	
				-5 ON 10V SCALE	17K
	6	0	0	0	1.2Ω
	7	AC	AC	AC	70Ω
	8	-1.5	-0.6	-0.4	1 MEG
12SK7	1	0	0	0	0
I-F AMPL	2	AC	AC	AC	30Ω
	3	0	0	0	0
	4	-1.5	-0.6	-0.4	1 MEG
	5	0	0	0	0
	6	+84	+84	+84	OVER 5 MEGS
	7	AC	AC	AC	45Ω
	8	+84	+84	+84	OVER 5 MEGS
12SQ7	1	0	0	0	0
DET	2	0	0	0	0
AVC	3	0	0	0	0
	4	-0.5	-0.4	-0.2	450K
	5	-0.5	-0.4	-0.2	450K
	6	0	0	0	0
	7	AC	AC	AC	30Ω
	8	AC	AC	AC	20Ω
12SQ7	1	0	0	0	0
AUDIO	2	-0.8	-0.6	-0.2	9 MEG
AMPL.	3	0	0	0	0
	4	0	0	0	0
	5	0	0	0	0
	6	+52	+48	+14	OVER 5 MEG
	7	AC	AC	AC	15Ω
	8	0	0	0	0
35L6	1	0	0	0	0
AUDIO	2	AC	AC	AC	55Ω
OUTPUT	3	+125	+125	+125	OVER 5 MEGS
	4	+84	+84	+84	OVER 5 MEGS
	5	0	0	0	525K
	6	--	--	--	--
	7	AC	AC	AC	90Ω
	8	+4.5	+4.5	+4.5	150Ω
35Z5	1	--	--	--	--
RECT.	2	AC	AC	AC	120Ω
	3	AC	AC	AC	110Ω
	4	AC	AC	AC	0
	5	AC	AC	AC	120Ω
	6	AC	AC	AC	115Ω
	7	AC	AC	AC	85Ω
	8	+130	+130	+130	OVER 5 MEGS

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V.A.C.

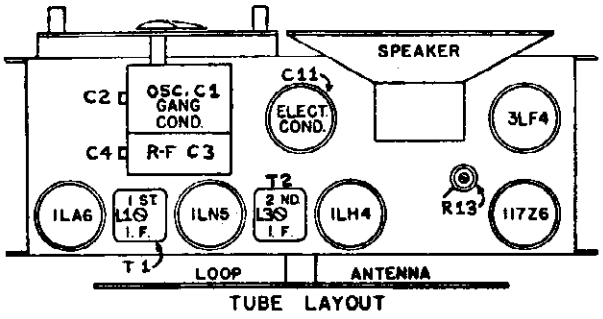
GENERAL TELEV. & RADIO CORP.

MODEL 25B5

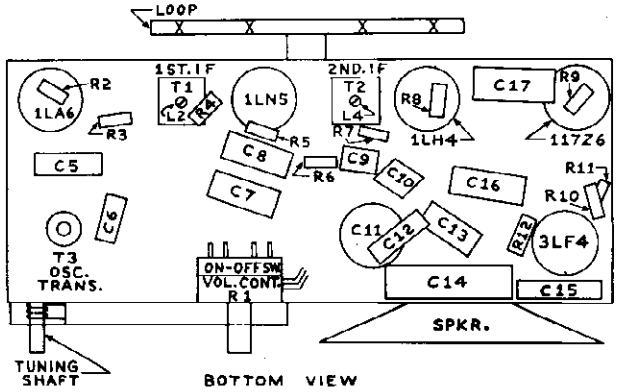


MODEL 25B5

GENERAL TELEV. & RADIO CORP.



TUBE LAYOUT



BOTTOM VIEW

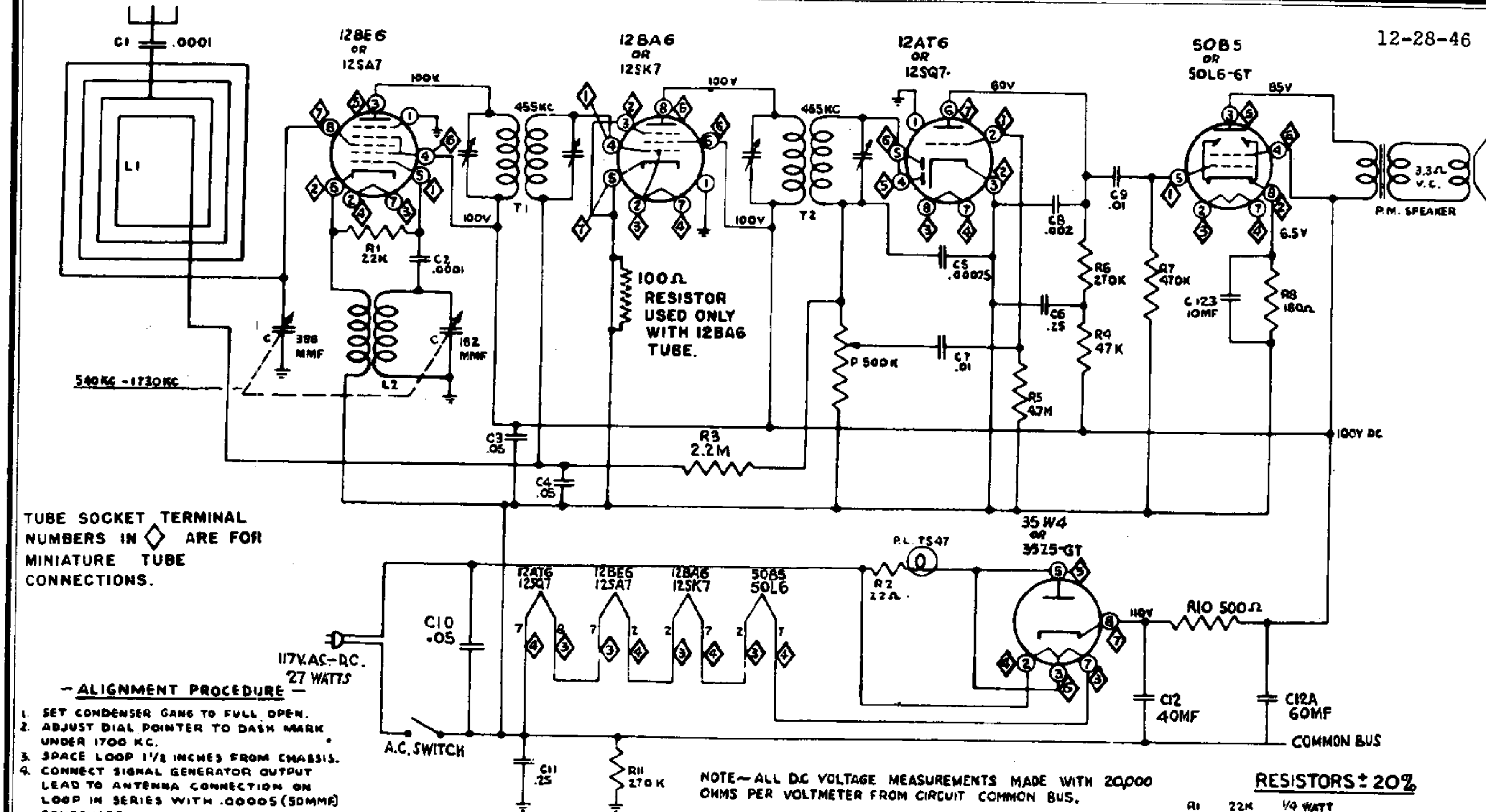
SOCKET	PIN	VTVM	20,000Ω/P2	1,000Ω/P2	RESISTANCE
1LA6	1	+3.5	+3.4	+3.4	50Ω
CONV.	2	+110	+110	+110	OVER 5 MEGS
	3	+110	+110	+110	OVER 5 MEGS
	4	-3	-0.6	0	280K
	5	+58	+57	+48	OVER 5 MEGS
	6	+1.3	0	0	2.7 MEGS
	7	--	--	--	--
	8	+1.7	+1.7	+1.7	30Ω
1LN5	1	+4.8	+4.7	+4.7	60Ω
I-F AMPL	2	+110	+110	+110	OVER 5 MEGS
	3	+110	+110	+110	OVER 5 MEGS
	4	+3.3	+3.2	+3.2	50Ω
	5	+3.3	+3.2	+3.2	50Ω
	6	+2.5	0	0	6 MEGS
	7	+1.3	0	0	2.6 MEGS
	8	+3.4	+3.2	+3.2	50Ω
1LH4	1	0	0	0	0
DET	2	+62	+55	+40	OVER 5 MEGS
AVC	3	+7.4	+7.1	+7.1	70Ω
AUDIO	4	+0.6	+0.2	0	1.5 MEGS
	5	0	0	0	0
	6	-0.4	0	0	8 MEGS
	7	--	--	--	--
	8	+1.7	+1.6	+1.6	30Ω
3LF4	1	+7.3	7.2	7.2	70Ω
AUDIO	2	+107	+107	+107	OVER 5 MEGS
OUTPUT	3	+110	+110	+110	OVER 5 MEGS
	4	--	--	--	--
	5	+118	+118	+118	OVER 5 MEGS
	6	0	0	0	1 MEG.
	7	+6.2	+6	+6	55Ω
	8	+5	+4.8	+4.8	50Ω
117Z6GT	1	--	--	--	--
RECT.	2	0	0	0	0
	3	AC	AC	AC	250Ω
	4	+125	+125	+125	2.5K
	5	AC	AC	AC	250Ω
	6	--	--	--	--
	7	AC	AC	AC	240Ω
	8	+142	+140	+140	OVER 5 MEGS

VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

GILFILLAN BROS. INC.

MODELS 56A, 56B, 56C, 56D, 56E

12-28-46



TUBE SOCKET TERMINAL NUMBERS IN ◇ ARE FOR MINIATURE TUBE CONNECTIONS.

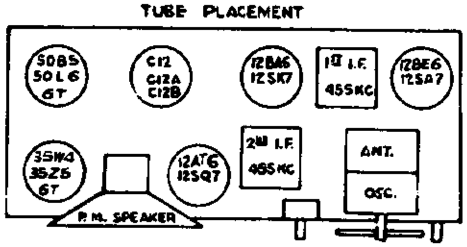
NOTE—ALL D.C. VOLTAGE MEASUREMENTS MADE WITH 20,000 OHMS PER VOLTMETER FROM CIRCUIT COMMON BUS.

NOTE: ON SOME PRODUCTION R6 & R11 IS 220K
R2 IS 18Ω
R8 IS 220 Ω

— ALIGNMENT PROCEDURE —

1. SET CONDENSER GANG TO FULL OPEN.
2. ADJUST DIAL POINTER TO DASH MARK UNDER 1700 KC.
3. SPACE LOOP 1½ INCHES FROM CHASSIS.
4. CONNECT SIGNAL GENERATOR OUTPUT LEAD TO ANTENNA CONNECTION ON LOOP IN SERIES WITH .00005 (50MMF) CONDENSER.
5. SET SIGNAL GENERATOR TO 455 KC. THEN ADJUST I.F. TRIMMERS FOR PEAK RESPONSE INDICATED BY OUTPUT METER CONNECTED TO SPEAKER VOICE COIL TERMINALS. FINAL ADJUSTMENT MADE WITH VOLUME CONTROL FULL ON & SIGNAL GENERATOR OUTPUT ADJUSTED TO GIVE OUTPUT METER READING OF ½ VOLT A.C. MAXIMUM.
6. SET SIGNAL GENERATOR TO 1500 KC. TURN TUNING KNOB TO SET POINTER ON 1500 KC., THEN ADJUST OSCILLATOR TRIMMER FOR MAXIMUM RESPONSE ON OUTPUT METER. NOW ADJUST R.F. TRIMMER FOR MAXIMUM INDICATION ON OUTPUT METER.
7. INSTALL CHASSIS IN CABINET. MAKE CERTAIN LOOP RESTS AGAINST BACK OF CABINET.

TUBE PLACEMENT



CONDENSERS

C	CONDENSER GANG		800-1685	
C1	.0001	MFD.	500 WV	MICA
C2	.0001		500	MICA
C3	.05		200	TUBULAR
C4	.05		200	" "
C5	.00025		500	MICA
C6	.25		200	TUBULAR
C7	.01		200	
C8	.002		200	
C9	.01		200	
C10	.05		200	
C11	.25		200	TUBULAR
C12	40.		150	ELECTROLYTIC
C12A	60.		150	" "
C12B	10.		25	ELECTROLYTIC
C13	.02	MFD	200 WV	TUBULAR

RESISTORS ± 20%

R1	22K	1/4 WATT	
R2	22 Ω		
R3	2.2 MEG.		
R4	47 K		
R5	4.7 MEG.		
R6	270 K		
R7	470 K	1/4	
R8	180Ω	1/2	± 10 %
R9	—	—	
R10	500	3	WIRE WOUND
R11	270 K	1/4 WATT	

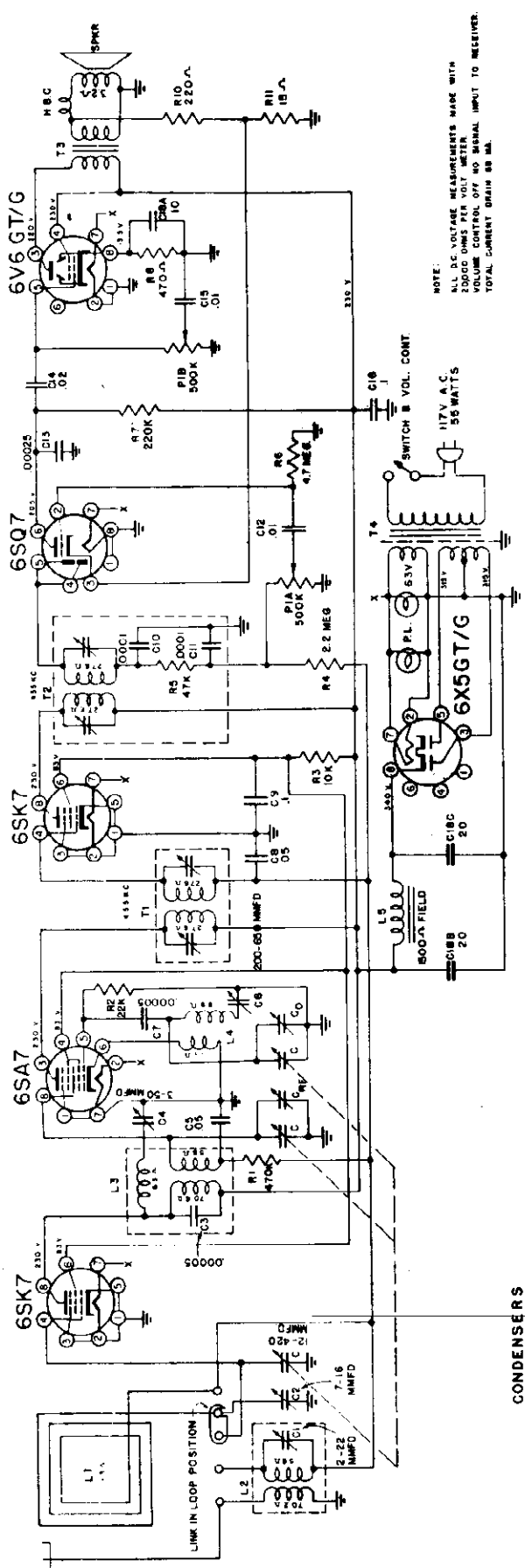
L1	LOOP	C00-16847	
L2	OSC.	COIL	B16-23136
T1	1ST	I.F.	800-23126
T2	2ND	I.F.	800-23127

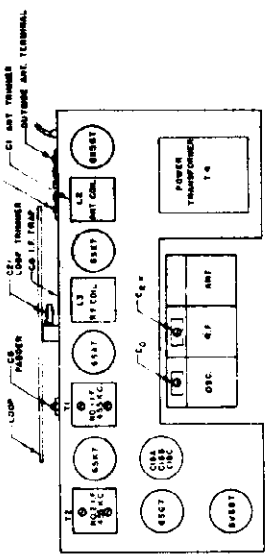
P. M. SPEAKER C14-23036

P	500 K Ω	VOL. CONTROL A11-16854
P.L.	TS 47	

MODELS 66AM, 66DM

GILFILLAN BROS. INC.





CONDENSERS

C	.02-.420	MMFD	3 GANG TUNING 66AM-66D
C1	2-22	MMFD	TRIMMER
C2	17-18	"	"
C3	50	"	500 VOLT MICA
C4	3-150	"	TRIMMER
C5	.05	MFD	400 VOLT TUBULAR
C6	200-450	MMFD	PADDER
C7	.50	"	600 VOLT MICA
C8	.05	MFD	400 VOLT TUBULAR
C9	.1	"	"
C10	100	MMFD	500 " MICA
C11	100	"	" " "
C12	.01	MFD	600 " TUBULAR
C13	.250	MMFD	500 " MICA
C14	.02	MFD	600 " TUBULAR
C15	.01	"	" " "
C16	.1	"	" " "
C17	.05	"	" " "
C18A	10	MFD	25 VOLT ELECTROLYTIC
C18B	20	"	450 " "
C18C	20	"	450 " "

RESISTORS ±10%

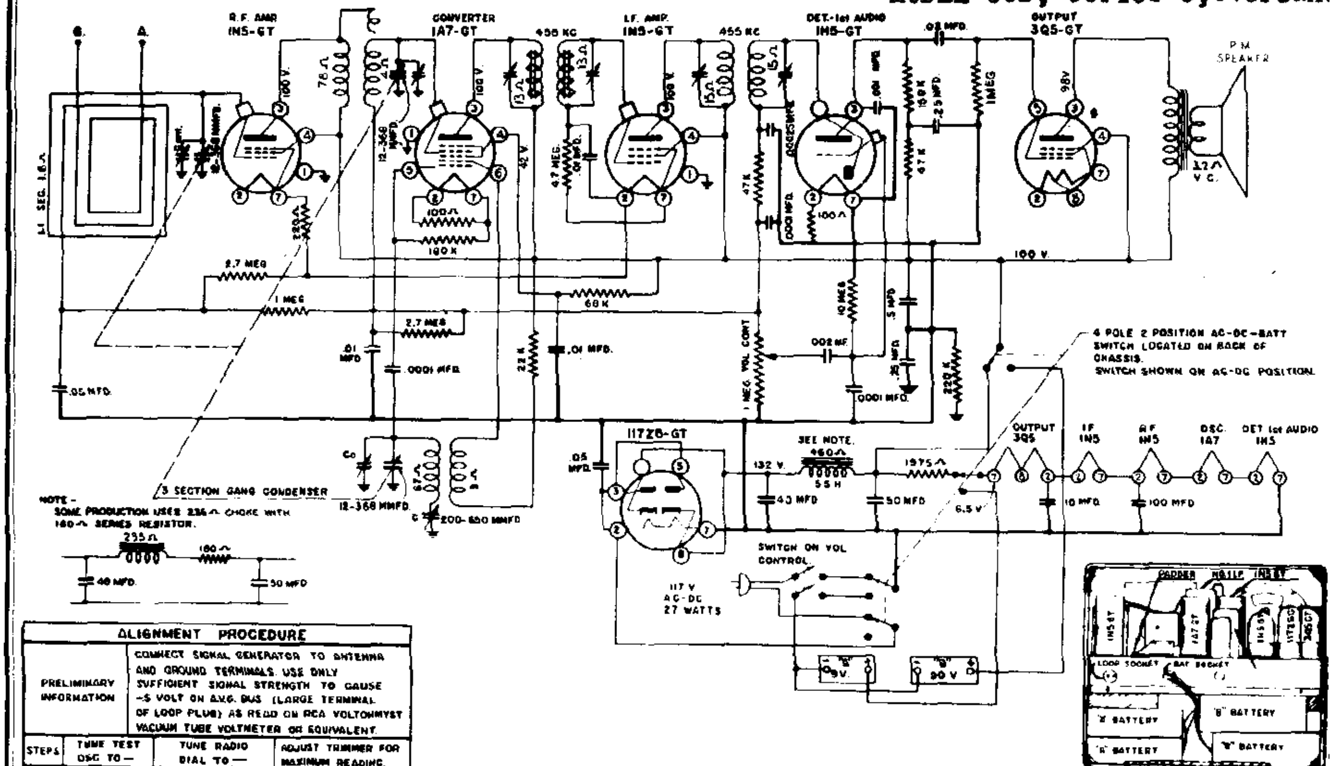
R1	470K	1/2 WATT	CARBON	
R2	22K	"	"	
R3	10K	"	WIRE WOUND	±10%
R4	2.2 MEG	1/2	CARBON	
R5	47K	"	"	
R6	4.7MEG	"	"	
R7	220K	"	"	
R8	470Ω	1	"	
R9	220Ω	1/2	"	
R10	220Ω	"	"	
R11	15Ω	"	"	
P1A	500K VOLUME CONTROL "A" TAPER			810-23112
P1B	500K TONE CONTROL "C" TAPER			
L1	LOOP			66AM-221-LOOP
L2	ANTENNA COIL			66AM-221-ANT
L3	R.F. COIL & TRAP			66AM-221-RF
L4	OSCILLATOR COIL	PART OF		66AM-124-OSC
L5	SPEAKER FIELD	PART OF		C14-23101
T1	1st I.F. TRANSFORMER			BHS-13822
T2	2nd I.F. TRANSFORMER			BHS-13823
T3	OUTPUT TRANSFORMER	PART OF		C14-23101
T4	POWER TRANSFORMER			14888
PL	PILOT LIGHTS 6-8V		No	73-47
SPKR	ELECTRO-DYNAMIC			C14-23101

ALIGNMENT PROCEDURE

STEPS				
	CONNECT JUMPER ON ANTENNA BINDING POST FOR OUTSIDE ANTENNA RECEPTION.			
	CONNECT SIGNAL GENERATOR TO ANTENNA TERMINAL THRU A .0001 MFD. CONDENSER. USE MINIMUM GENERATOR SIGNAL SO THAT A.V.C. VOLTMETER READING DOES NOT EXCEED MORE THAN APPROXIMATELY 1 VOLT.			
	CONNECT RCA VOLTOHMYST VACUUM TUBE VOLTMETER TO A.V.C. BUS			
	TUNE TEST OSC TO —	TURN RADIO DIAL TO —	ADJUST TRIMMERS FOR — MAX READING	MIN READING
2	455 K.C.	CONDENSER GANG FULLY MESHED. SET POINTER TO INDEX MARK ON DIAL	NO 1 & NO 2 I.F. TRANSFORMERS.	I.F. TRAP C4
3	1800 K.C.	1800 K.C.	OSC TRIMMER C_8 R.F. TRIMMER C_7 ANT TRIMMER C1	
4	600 K.C.	600 K.C.	PADDER C6 ROCK GANG.	
5	REPEAT STEP 3			
6	DISCONNECT SIGNAL GENERATOR, CHANGE ANTENNA JUMPER FOR LOOP OPERATION. TUNE RADIO TO SOME STATION NEAR 600 KC AND ADJUST LOOP TRIMMER C5 LOCATED ON LOOP, FOR MAXIMUM VOLTMETER READING			

GILFILLAN BROS. INC.

MODEL 66B, Series 2, Overland
MODEL 66B, Series 3, Overland

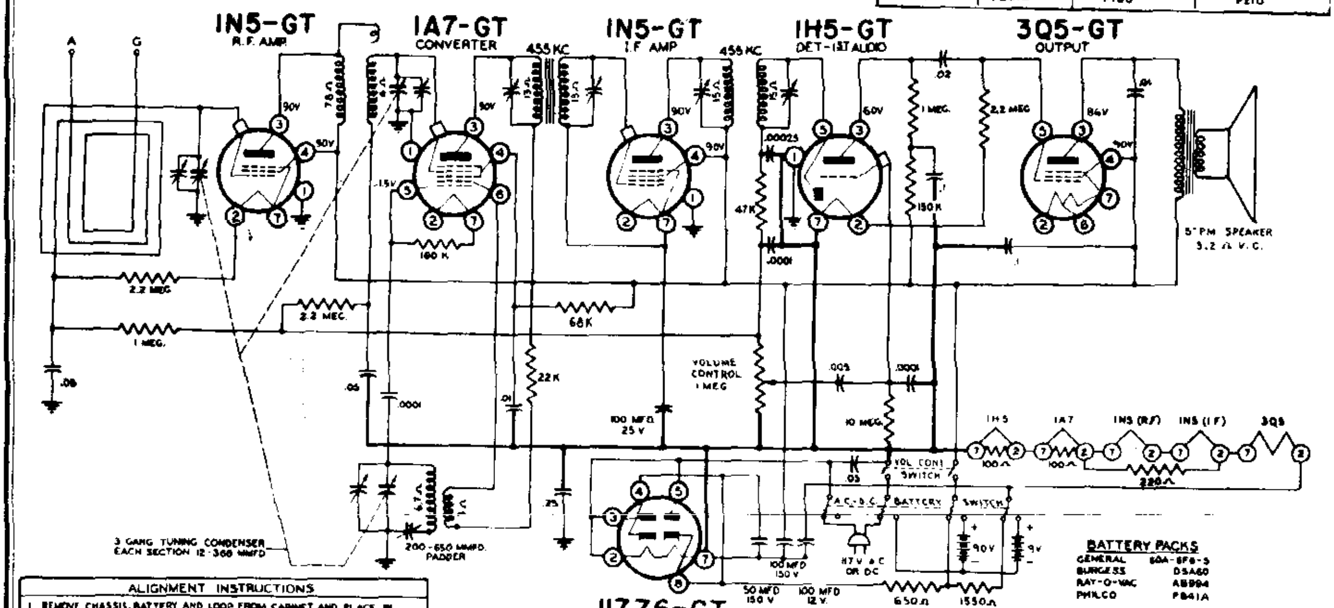


ALIGNMENT PROCEDURE			
PRELIMINARY INFORMATION	CONNECT SIGNAL GENERATOR TO ANTENNA AND GROUND TERMINALS. USE ONLY SUFFICIENT SIGNAL STRENGTH TO CAUSE -5 VOLT ON A.V.C. BUS (LARGE TERMINAL OF LOOP PLUG) AS READ ON RCA VOLTOHMYST VACUUM TUBE VOLTMETER OR EQUIVALENT.		
STEPS	TUNE TEST OSC TO —	TUNE RADIO DIAL TO —	ADJUST TRIMMER FOR MAXIMUM READING.
1	455 KC	CONDENSER GANG FULLY MESHED SET POINTER HORIZONTAL	I.F. TRANSFORMERS T1 AND T2
2	1600 KC	1600 KC	OSC TRIMMER Co R F TRIMMER Crf ANT. TRIMMER Cant
3	600 KC	600 KC	PADDER C WHILE ROCKING GANG
4	REPEAT STEP 2		
5	MOVE POINTER SLIGHTLY IF CALIBRATION CAN BE IMPROVED.		

THIS RADIO IS SUPPLIED WITH COMBINATION A-B BATTERY PACK. FOR YOUR CONVENIENCE AN EXTRA BATTERY CABLE MAY BE OBTAINED FROM YOUR DEALER SO THAT YOU MAY MAKE BATTERY REPLACEMENTS BY MEANS OF SEPARATE "A" AND "B" BATTERIES. YOUR GILFILLAN PORTABLE RADIO HAS BEEN ESPECIALLY DESIGNED TO GIVE 200-250 HOURS OF BATTERY LIFE WHEN USED ON BATTERIES AN AVERAGE OF 4 HOURS PER DAY. WHEN OPERATED ON A.C. OR D.C. HOUSE CURRENT YOUR BATTERIES ARE NOT USED.

MFG'R	A-B PACKS NO.	"A" BATTERIES NO	"B" BATTERIES NO
GENERAL	6OA-6F6-5	3H3	V304 OR F30A
BURGESS	25A60	53	M30
EVEREADY		746	482
RAY-O-VAC	AB994	P85A	P430
PHILCO	PB41A	P100	P210

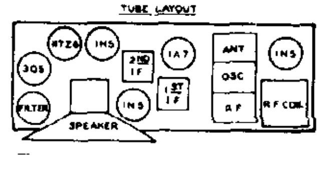
THE OVERLAND - MODEL 66B
SERIES 2



ALIGNMENT INSTRUCTIONS			
1 REMOVE CHASSIS, BATTERY AND LOOP FROM CABINET AND PLACE IN SAME RELATIVE POSITION AS IF SET WERE IN CABINET. LOOP MUST BE CLOSE TO BACK OF CHASSIS TO OBTAIN PROPER ALIGNMENT. 2 CONNECT SIGNAL GENERATOR LEADS TO ANT.-GND POSTS ON LOOP; [illegible]ER ACROSS VOICE COIL TERMINALS. [illegible] METER. ADJUST POINTER [illegible] GANG CLOSED.			
STEP	TUNE TEST OSCILLATOR [illegible]	[illegible]	[illegible]ST TRIMMERS FOR [illegible]M OUTPUT READING
1	455 KC	[illegible]	[illegible] TRANSFORMERS
2	1400 KC	1400 KC	OSC., R.F., ANT.
3	600 KC	600 KC	PADDER CONDENSER
IN SOME CASES IT IS IMPOSSIBLE TO OBTAIN SUFFICIENT ATTENUATION OF THE GENERATOR SIGNAL FOR ACCURATE ALIGNMENT. IN SUCH CASES THE GENERATOR SHOULD BE CONNECTED TO AN AUXILIARY LOOP PLACED A FOOT OR SO FROM THE RECEIVER LOOP.			

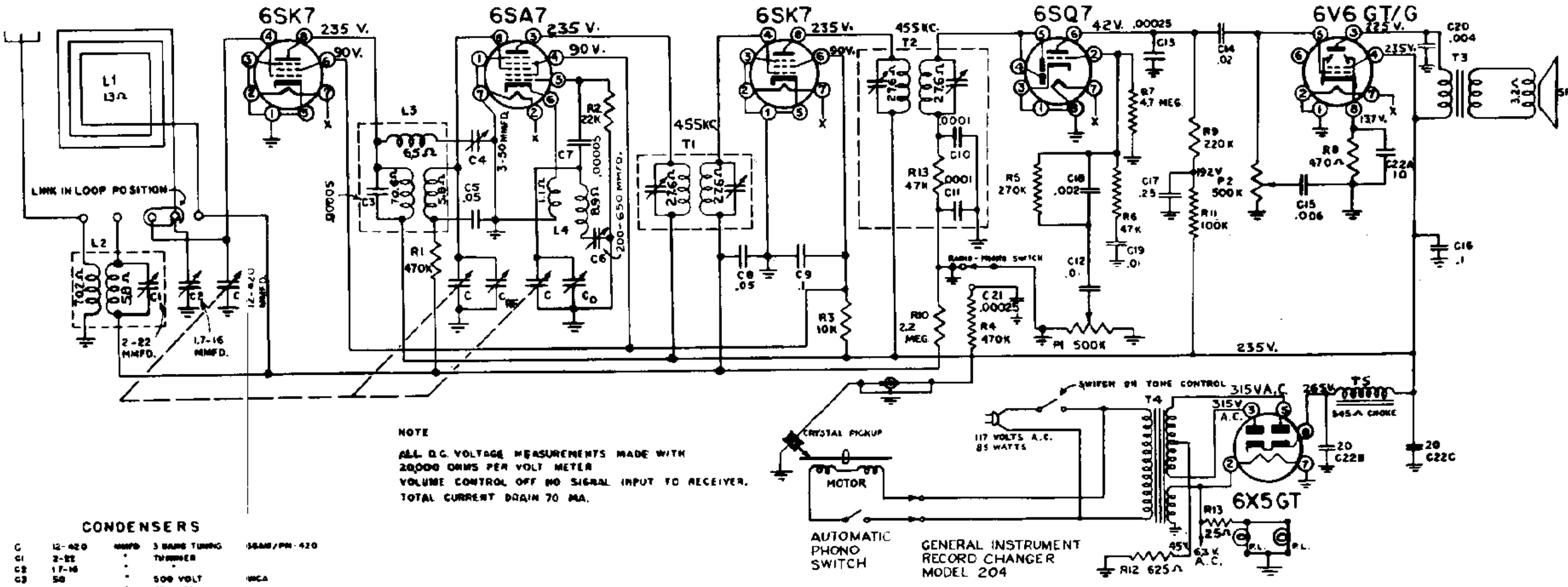
THE OVERLAND - MODEL 66B
THIRD SERIES

TUBE LAYOUT

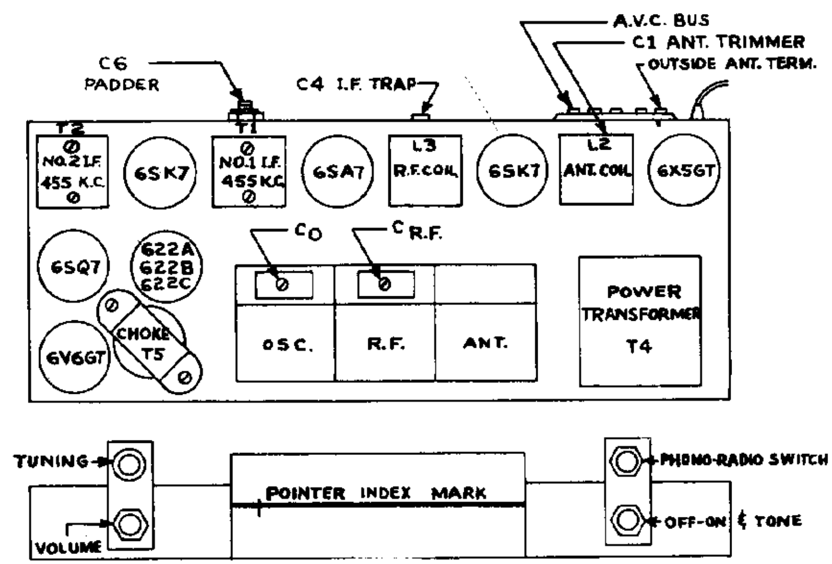


MODEL 66PM

GILFILLAN BROS. INC.



NOTE
ALL D.C. VOLTAGE MEASUREMENTS MADE WITH 20,000 OHMS PER VOLT METER
VOLUME CONTROL OFF NO SIGNAL INPUT TO RECEIVER.
TOTAL CURRENT DRAIN 70 MA.



CONDENSERS

C	12-420	MMFD	3 GANG TUNING	66AM/PM-420
C1	2-22	"	TRIMMER	
C2	1.7-16	"	"	
C3	50	"	500 VOLT	MICA
C4	3-50	"	TRIMMER	
C5	.05	MFD	400 VOLT	TUBULAR
C6	200-650	MMFD	PADDER	
C7	50	"	500 VOLT	MICA
C8	.05	MFD	400 VOLT	TUBULAR
C9	.1	"	" "	"
C10	100	MMFD	500 "	MICA
C11	100	"	"	"
C12	.01	MFD	600 "	TUBULAR
C13	250	MMFD	500 "	MICA
C14	.02	MFD	600 "	TUBULAR
C15	.006	"	400 "	"
C16	.1	"	600 "	"
C17	.25	"	400 "	"
C18	.002	"	600 "	
C19	.01	"	400 "	TUBULAR
C20	.004	"	600 "	"
C21	250	MMFD	500 "	MICA
C22A	10	MFD	25 "	ELECTROLYTIC
C22B	20	"	450 "	"
C22C	20	"	" "	"

RESISTORS ± 20%

R1, R4	470K	1/2	WATT	CARBON	
R2	22K	"	"	"	
R3	10K	5	"	WIRE WOUND ±10%	
R5	270K	1/2	"	CARBON ±10%	
R6, R13	47K	"	"	"	
R7	4.7 MEG	"	"	"	
R8	470Ω	1	"	"	
R9	220K	1/2	"	"	
R10	2.2 MEG	"	"	"	
R11	100K	"	"	"	
R12	625Ω	10	"	WIREWOUND ±10%	
R13	25Ω	1/2	"	CARBON	
P1	500K VOLUME CONTROL				66PM-14
P2	500K TONE CONTROL				66PM-13
L1	LOOP				66PM-29
L2	ANTENNA COIL				66PM-214
L3	R F COIL & TRAP				66PM-200
L4	OSCILLATOR COIL				66AM/PM-37
T1	1st I F TRANSFORMER				66AM/PM-34
T2	2nd I F TRANSFORMER				66AM/PM-35
T3	OUTPUT TRANSFORMER				66PM-16
T4	POWER TRANSFORMER				66AM/PM-150
T5	FILTER CHOKE				66PM-16
P.L.	PILOT LIGHTS 6-8V 150 MA				TS-44
SPKR	P M SPEAKER				66PM-2

ALIGNMENT PROCEDURE

STEPS	ALIGNMENT PROCEDURE			
	CONNECT JUMPER ON ANTENNA BINDING POST FOR OUTSIDE ANTENNA RECEPTION. CONNECT SIGNAL GENERATOR TO ANTENNA TERMINAL THRU A .0001 MFD. CONDENSER. USE MINIMUM GENERATOR SIGNAL SO THAT A.V.C. VOLTMETER READING DOES NOT EXCEED MORE THAN APPROXIMATELY 1 VOLT. CONNECT RCA VOLTOHMYST VACUUM TUBE VOLTMETER TO A.V.C. BUS			
	TUNE TEST OSC. TO —	TURN RADIO DIAL TO —	ADJUST TRIMMERS FOR — MAX. READING	ADJUST TRIMMERS FOR — MIN READING
2	455 KC	CONDENSER GANG FULLY MESHED SET POINTER TO INDEX MARK ON DIAL	NO 1 & NO 2 I F TRANSFORMERS.	I.F. TRAP C4
3	1500 KC.	1500 KC.	OSC TRIMMER C_O / R.F. TRIMMER $C_{R.F.}$ / ANT TRIMMER C1	
4	600 KC.	600 KC.	PADDER C6 ROCK GANG.	
5	REPEAT STEP 3			
6	DISCONNECT SIGNAL GENERATOR, CHANGE ANTENNA JUMPER FOR LOOP OPERATION TUNE RADIO TO SOME STATION NEAR 1500 KC., AND ADJUST LOOP TRIMMER C2 (LOCATED ON LOOP) FOR MAXIMUM VOLTMETER READING			

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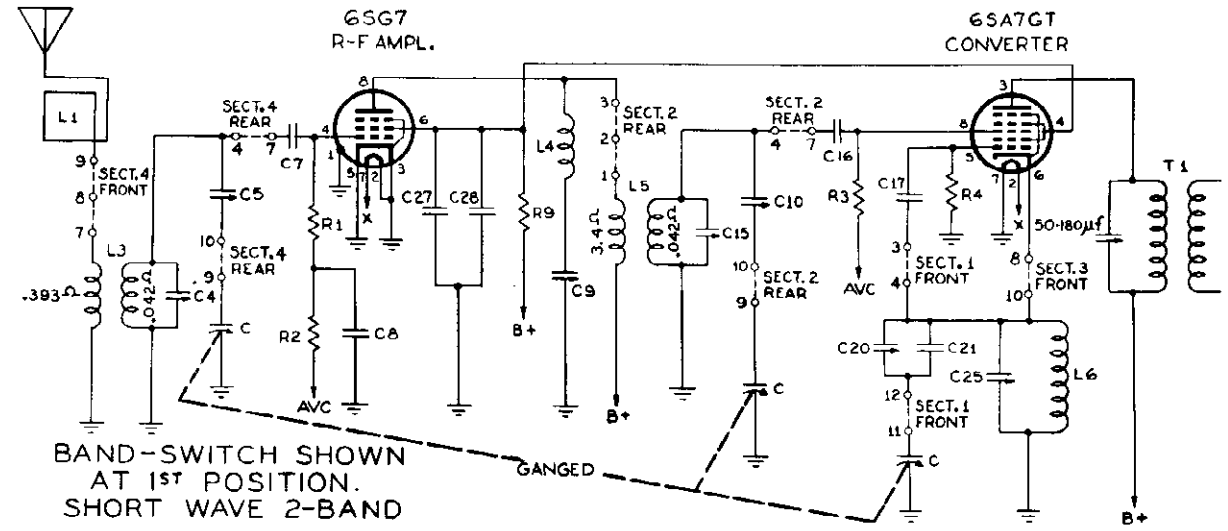
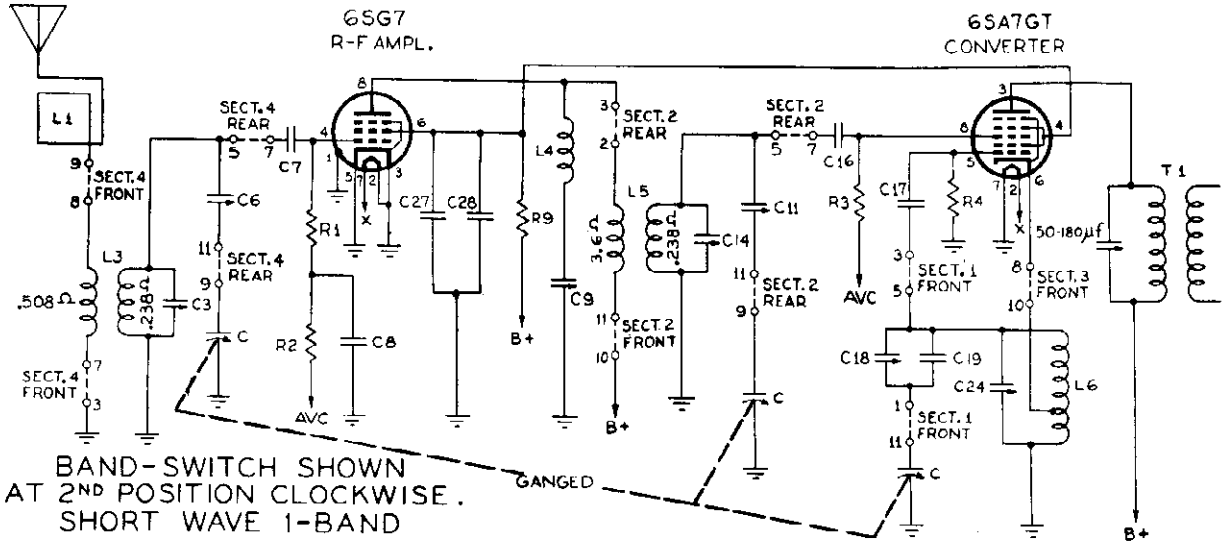
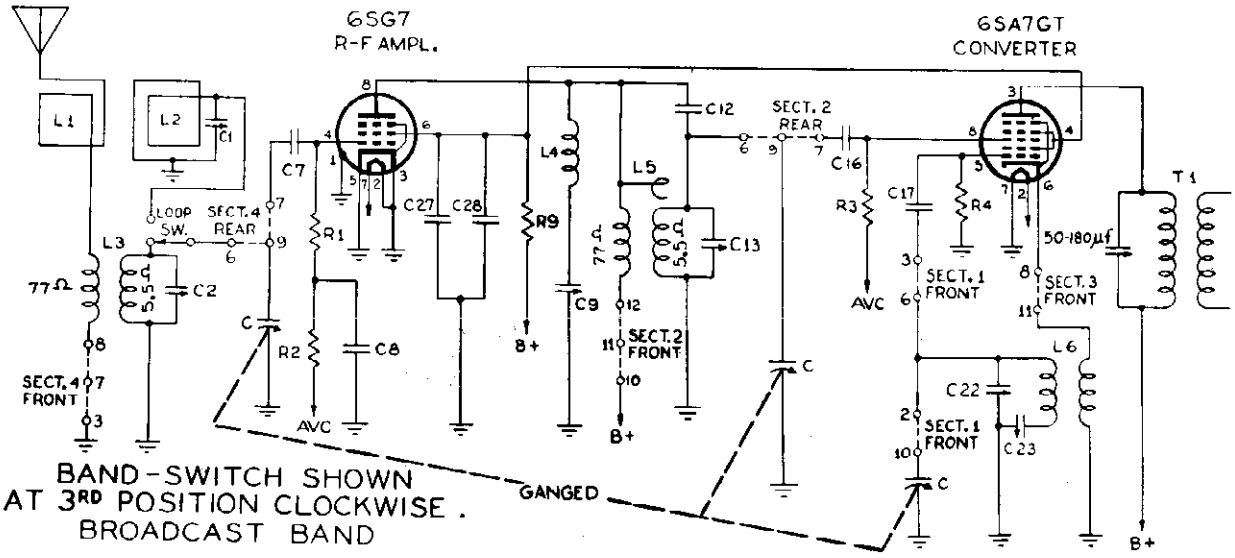
MODEL 86 Series

MODEL 86 Series

GILFILLAN BROS. INC.







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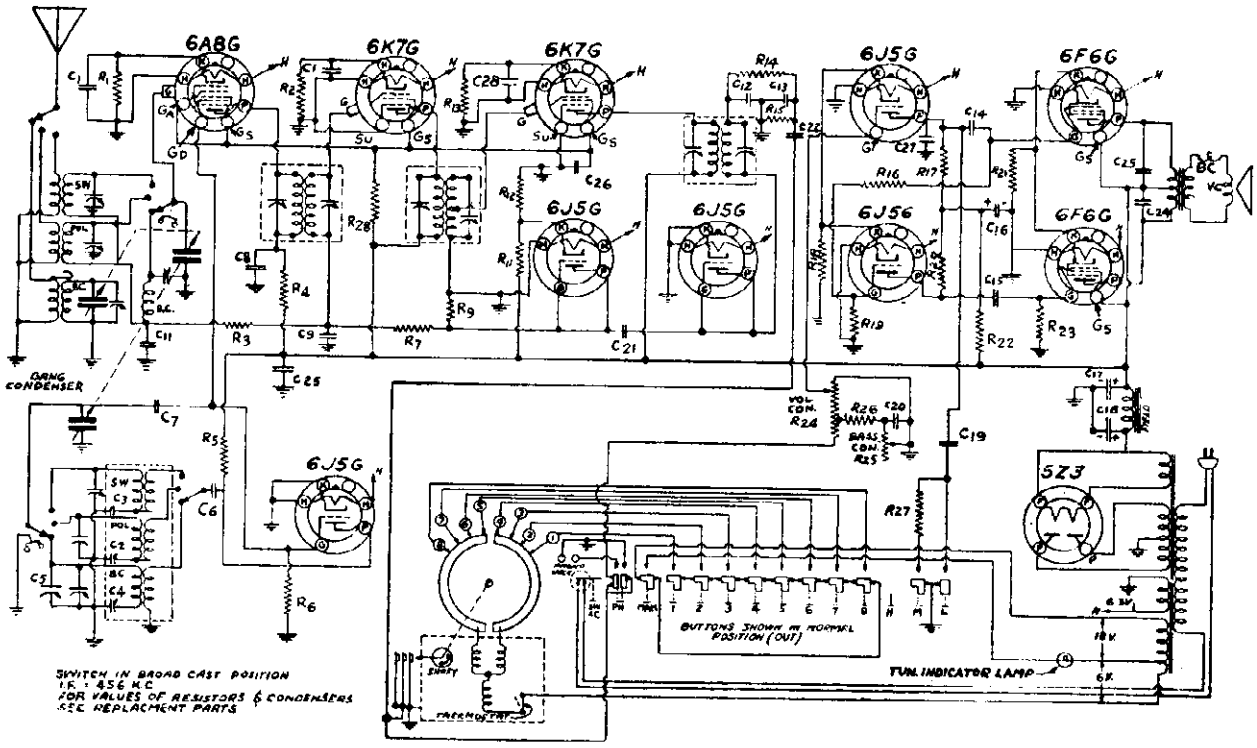

11A REPLACEMENT PARTS LIST

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.

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

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

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
P2694	Push Button Switch
3	Pilot Light Socket
P1504	Pilot Light Bulb
MU	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

"clarified schematics"

MODEL R-635

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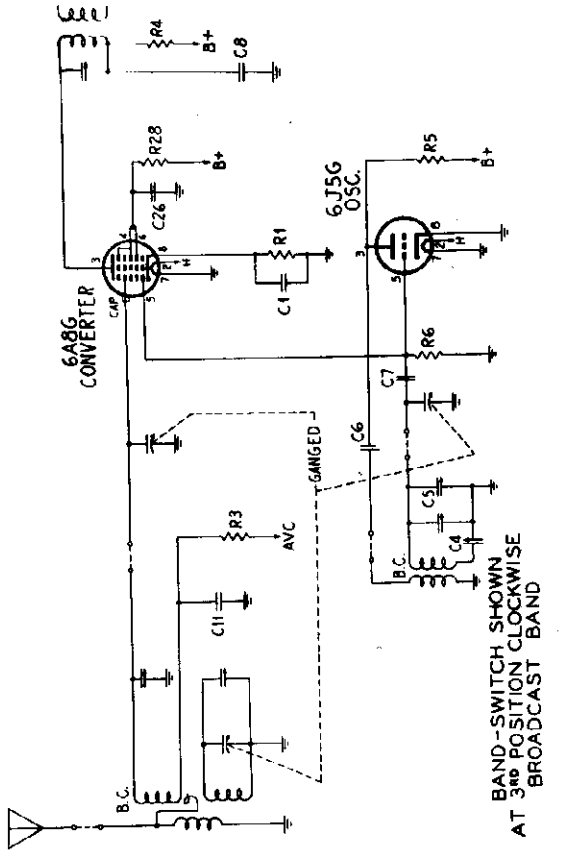
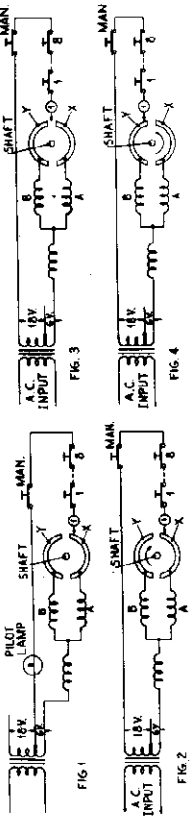
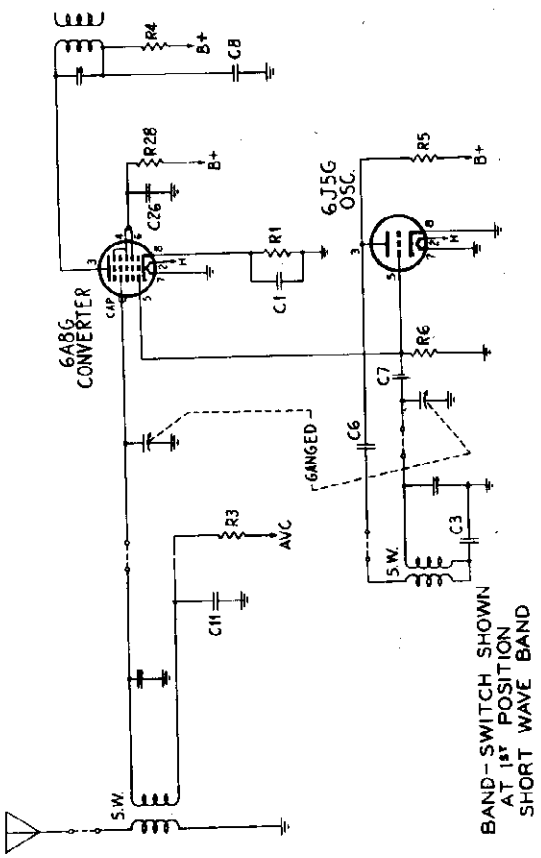
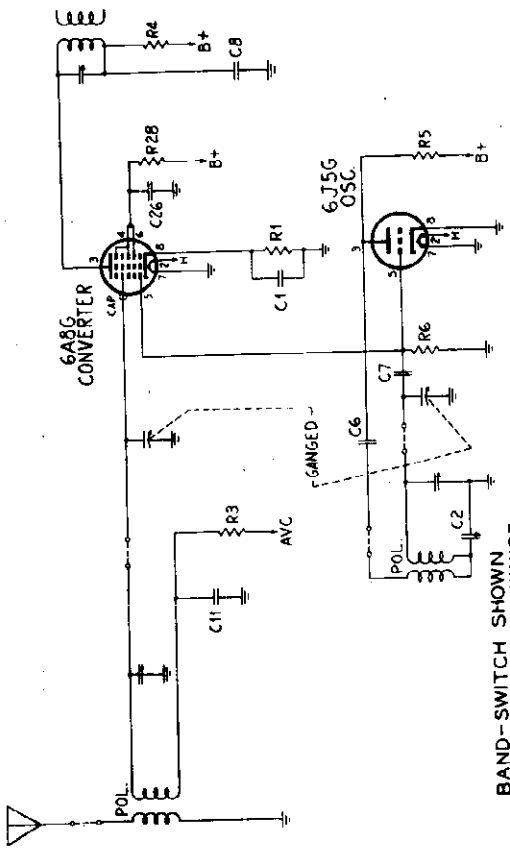




NOTES: FIGS. 1, 2, 3 AND 4 SHOW SCHEMATICALLY THE SETTING UP AND AUTOMATIC TUNING OF PUSHBUTTON NO. 1. THE OTHER PUSHBUTTONS FOLLOW THIS PATTERN BUT AREN'T SHOWN FOR CLARITY OF DIAGRAM. FIG. 1 SHOWS THE SETTING UP OF PUSHBUTTON 1, WITH THE MANUAL AND NO. 1 BUTTONS DEPRESSED. THE PILOT LAMP WILL LIGHT, BEING ENERGIZED ACROSS THE 6-V. TAP THROUGH THE MOTOR WINDING (A), ROTOR PLATE X, CONTACT 1, AND THE PUSHBUTTONS. WHEN BUTTON NO. 1 IS ADJUSTED TO THE CORRECT FREQUENCY, THE PILOT LAMP GOES OUT BECAUSE CONTACT 1 IS THEN POSITIONED BETWEEN PLATES X AND Y, SIMILAR TO FIG. 3, WHICH BREAKS THE ELECTRICAL CONTACT. IN ORDER TO TUNE TO STATION 1 AUTOMATICALLY, PUSHBUTTON 1 IS DEPRESSED, ENERGIZING THE MOTOR ACROSS 18-V AS SHOWN IN FIG. 2. SINCE THE (A) WINDING IS ENERGIZED, THE MOTOR WILL TURN PLATES X AND Y IN DIRECTION OF ARROW SHOWN UNTIL CONTACT IS BROKEN, WHICH WILL OCCUR WHEN PLATES REACH POSITION SHOWN IN FIG. 3. IF THE MOTOR DOES NOT STOP FAST ENOUGH, THEN PLATES X AND Y, WHICH ARE MECHANICALLY GANGED BY THE SHAFT TO THE TUNING CAPACITORS, WILL TURN TOO FAR, PUTTING THE STATION OUT OF TUNE BUT IF THEY DO ROTATE TOO MUCH THEY MUST ASSUME THE POSITION SHOWN IN FIG. 4 WHICH THEN ENERGIZES THE OTHER (B) WINDING OF THE MOTOR, REVERSING THE DIRECTION OF ROTATION UNTIL IT COMES TO A STOP AT ITS CORRECTLY TUNED POSITION SHOWN IN FIG. 3.





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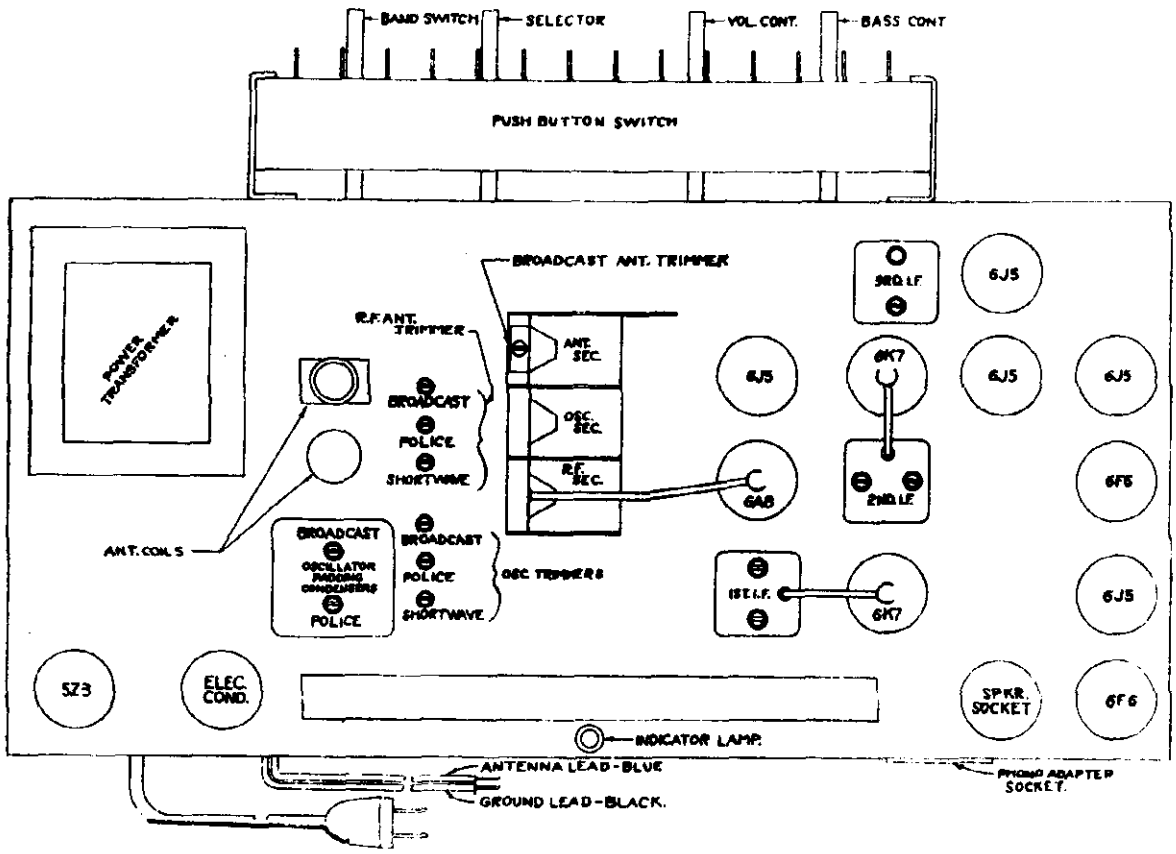

ALIGNMENT DATA AND SERVICING

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.) 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 With the wave switch in the Broadcast Band and the gang condenser set at minimum push in the white button until it locks. 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. Align the six 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 "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 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.

MODEL R-635

B. F. GOODRICH

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.

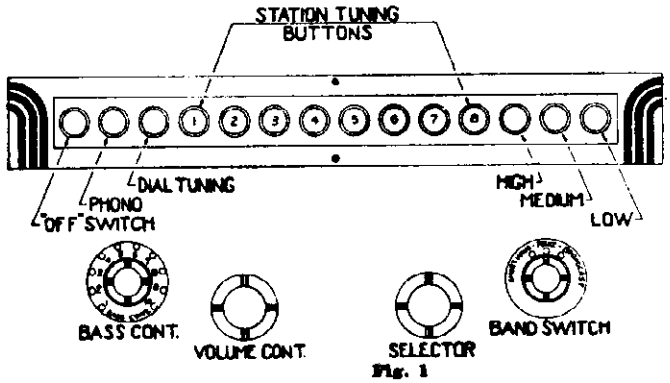

Fig. 1

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. **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.

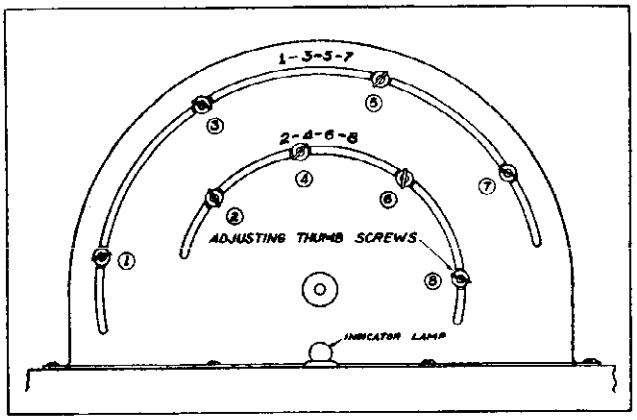

Fig. 2

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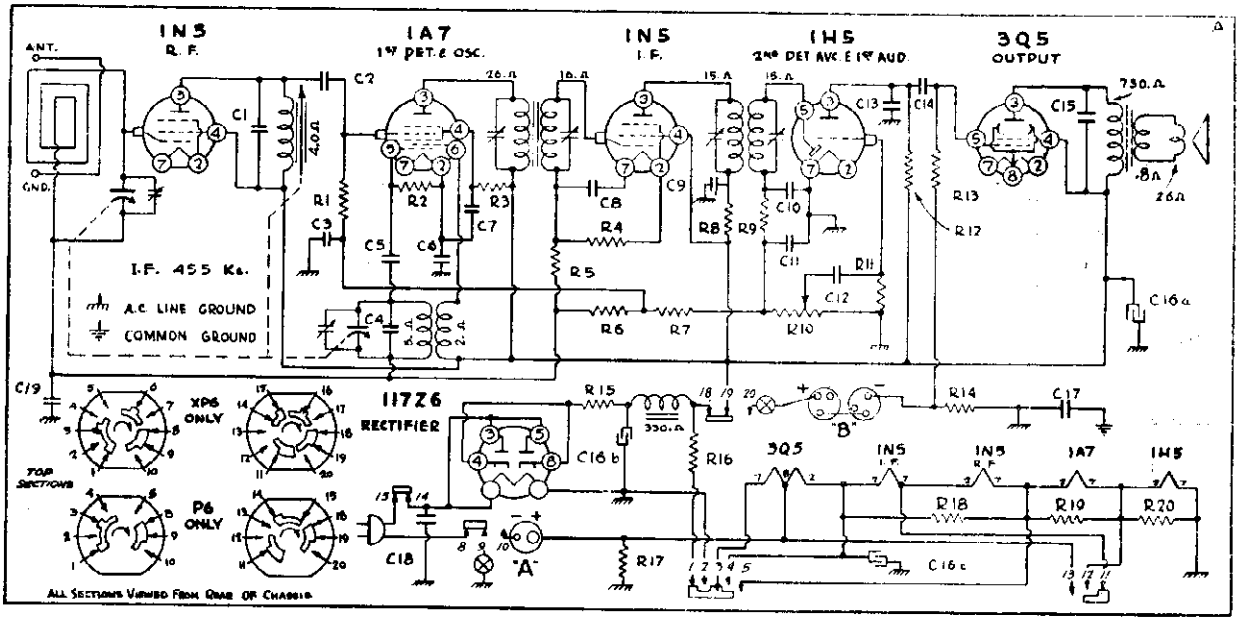
MODEL R-601



Late Model.

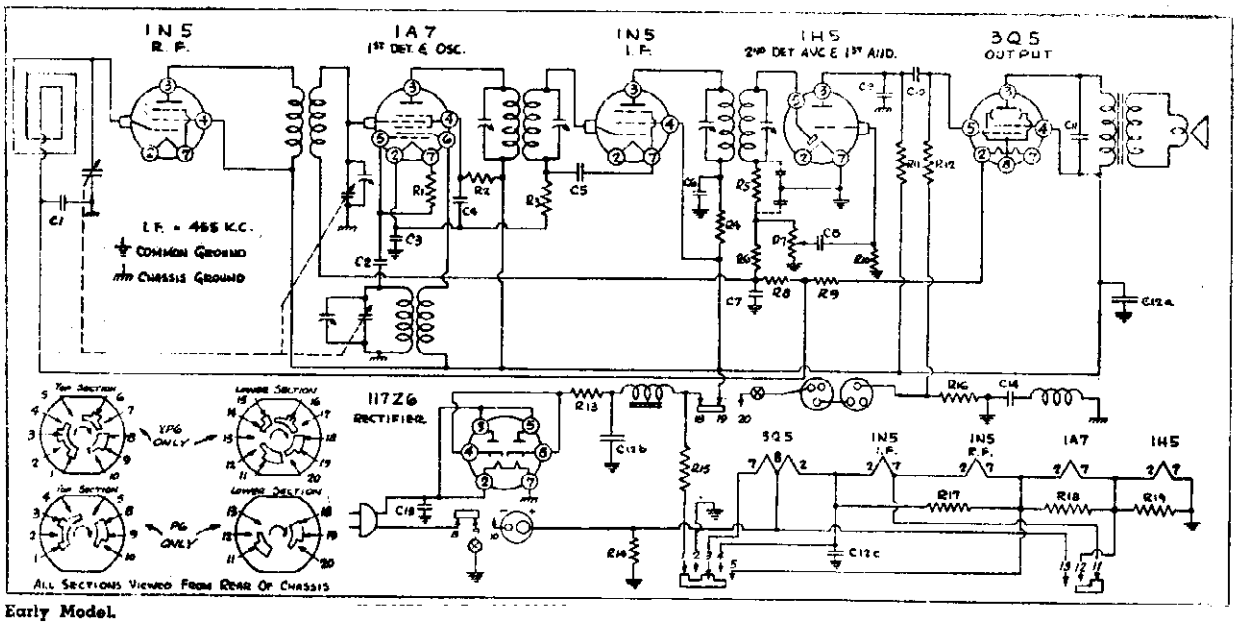
Power switch in line position. Common ground is chassis ground.

CONDENSERS

No.	Ohms	Watts	No.	Ohms	Watts
R1	100,000	½	R11	15,000,000	½
R2	200,000	½	R12	1,000,000	½
R3	5,000,000	½	R13	2,000,000	½
R4	5,000,000	½	R14	400	½
R5	5,000,000	½	R15	22	½
R6	5,000,000	½	R16	2,150	5
R7	3,000,000	½	R17	3,000	½
R8	5,000	½	R18	500	½
R9	70,000	½	R19	200	½
R10	1,000,000	V.C.	R20	110	½

RESISTORS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.000367	Silver Mica	C11	.001	Mica
C2	.00025	Mica	C12	.01	400
C3	.01	400	C13	.00025	Mica
C4	.000015	Mica	C14	.01	400
C5	.00005	Mica	C15	.002	600
C6	.25	200	C16a	40.	150
C7	.01	400	C16b	30.	150
C8	.01	400	C16c	100.	25
C9	.05	400	C17	.1	400
C10	.00005	In I.F. Can	C18	.05	400
			C19	.05	200



Early Model.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	200,000	½	R11	1,000,000	½
R2	50,000	½	R12	2,000,000	½
R3	5,000,000	½	R13	22—10%	½
R4	5,000	½	R14	1,000	½
R5	70,000	½	R15	2,150—10%	5
R6	3,000,000	¼	R16	400—10%	½
R7	1,000,000	V.C.	R17	500—10%	½
R8	5,000,000	½	R18	200—10%	½
R9	10,000,000	¼	R19	110—10%	½
R10	15,000,000	½			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C9	.00025	Mica
C2	.00005	Mica	C10	.001	600
C3	.25	200	C11	.002	600
C4	.01	400	C12a	50. Elect.	150
C5	.001	600	C12b	30. Elect.	150
C6	.05	400	C12c	100. Elect.	25
C7	.05	200	C13	.05	400
C8	.001	600	C14	.2	200

1942

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MODEL R-661

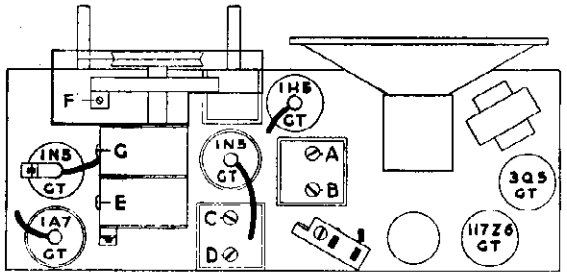


FIG. 1 TOP VIEW

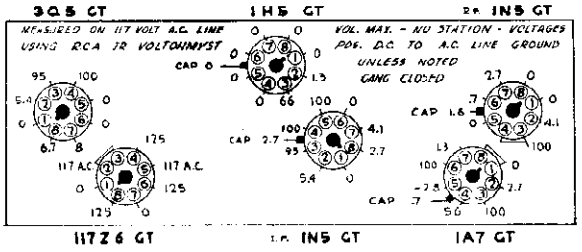


FIG. 2 VOLTAGE CHART

STEP	Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Controls to—	Set Radio Controls to—	Adj. Following Trimmers to Max. Output
1	Grid 1A7 GT	.1	455 Kc	1600 Kc.	A, B, C, D, I. F.
2	Grid 1N5 GT	.1	1600 Kc.	1600 Kc.	E Osc.
3	Grid 1A7 GT	.1	1400 Kc.	1400 Kc.	F — R. F. (Gang Early) on (Slug Late)
4	Loop Radiator	Two feet from Radio No Connection	1400 Kc.	1400 Kc.	G Ant.

Use Aerometer or three turn loop in series with 400 ohm resistor 10" diameter on Signal Generator in Step 4.

REPLACEMENT PARTS LIST

PAPER CONDENSERS

P1193 .002 mfd. 600 volt..... .20
P164 .01 mfd. 400 volt..... .25
P148 .05 mfd. 200 volt..... .20
P334 .05 mfd. 400 volt..... .40
P276 .1 mfd. 400 volt..... .40
P141 .25 mfd. 200 volt..... .30

MICA CONDENSERS

P5209 .000015 mfd..... .20
P1382 .00005 mfd..... .20
P480 .0001 mfd..... .20
P817 .00025 mfd..... .20
P1599 .000367 mfd. silver..... .65
or
P5200 .000367 mfd. special..... .60

ELECTROLYTIC CONDENSERS

VARIABLE CONDENSERS

P4860A { 40 mfd. 150 volt / 30 mfd. 150 volt / 100 mfd. 25 volt } 1.60

VARIABLE RESISTORS

P4820 R10 1 meg. Volume control..1.25

TRANSFORMERS AND COILS

G6543 R.F. Coil and Mtg. Bracket .55
P5208 Oscillator Coil..... .65
P3967 Oscillator Coil (Early)..... .65
P4818 1st I.F. Transformer.....1.50
P4819 2nd I.F. Transformer.....1.70

P5187 Gang Condenser, 2 gang....3.50
P4817 Gang Condenser, 3 gang.....3.50

RESISTORS

P5268 R15 22 ohm ½ w (wirewound)..... .20
P3801 R20 110 ohm ½ w..... .20
P3806 R19 200 ohm ½ w..... .20
P3816 R14 400 ohm ½ w..... .20
P3820 R18 500 ohm ½ w..... .20
P4856 R16 2,150 ohm 5 w (wirewound)..... .60
P3833 R17 3,000 ohm ½ w..... .20
P3836 R8 5,000 ohm ½ w..... .20
P3853 R3 50,000 ohm ½ w..... .20
P3857 R9 70,000 ohm ½ w..... .20
P3860 R1 100,000 ohm ½ w..... .20
P3864 R2 200,000 ohm ½ w..... .20
P3882 R12 1,000,000 ohm ½ w..... .20
P3883 R13 2,000,000 ohm ½ w..... .20
P4663 R7 3,000,000 ohm ½ w..... .20
P3886 R4,R5,R6 5,000,000 ohm ½ w..... .20
P3891 R11 15,000,000 ohm ½ w..... .20

MISCELLANEOUS

P4583 Tube Socket..... .20
P5206 Electrolytic Mounting Base..... .15
P5194 Drive shaft..... .20
P1399 Horseshoe Washer (for drive shaft) ½ doz. .15
P2925 Takeup Spring..... .15
P1585 Snap button for scale ½ doz. .15
P4435 Dial Pointer..... .20
P4816 Dial Background..... .25
P4876 Knob..... .20
P4695 Escutcheon..... 1.75
P4833 Indicator disc..... .20
P929A Line cord..... .65
P3557 Line cord clamp..... .15
P3017 Two-prong battery plug..... .15
P3016 Three-prong battery plug .15

P470 Grid clip..... .05
P3571 Tube shield..... .15
G6538 Drum and cam assembly .30
P5193 Left hand dial bracket..... .20
P6546 Lever arm assembly..... .20
P5005 Spring, P5032 Spacer, P5197 Washer, P931 Screw — Lever mounting hdw. ..... set .10
P4979 Iron Slug..... .40
P5192 Right hand dial bracket..... .25
P4852 I.F. Shield..... .20

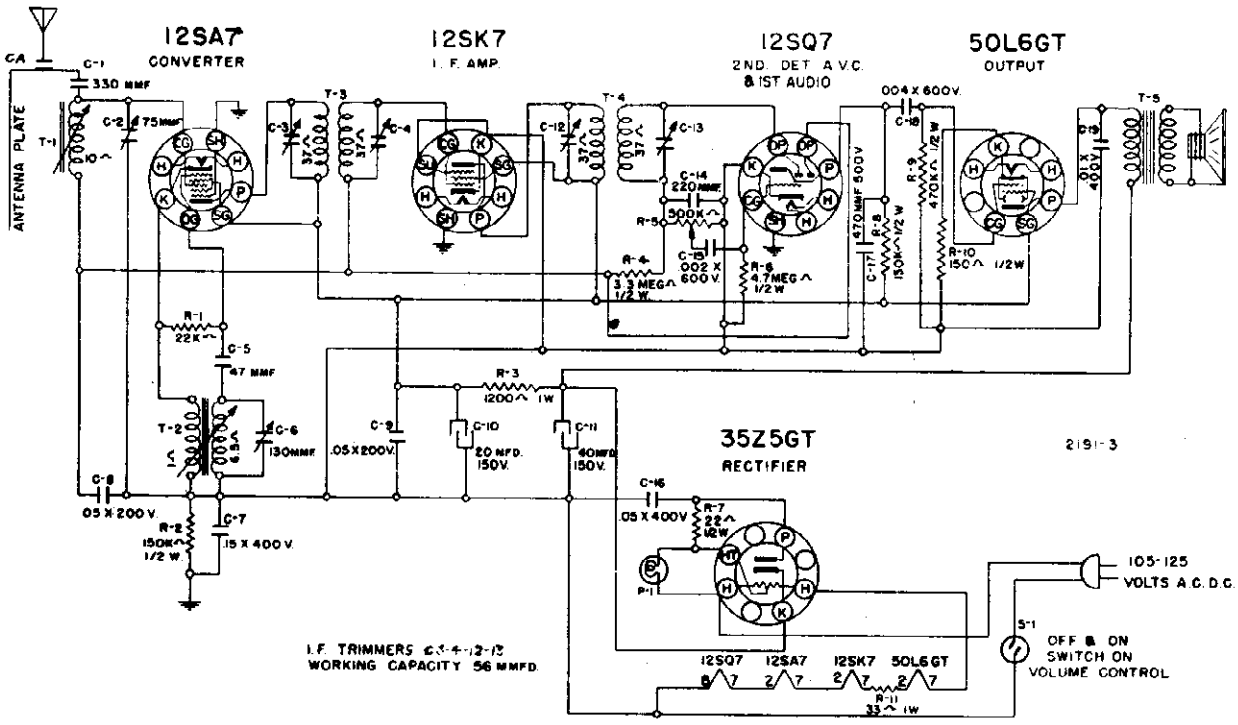
All prices quoted are list and subject to the usual trade discount.

A handling charge of $0.25 will be made on all orders under $0.75 list.

Shipments are F.O.B. our factory. When remitting in advance please include postage.

Price are subject to change without notice.

W. T. GRANT CO. MODELS 500,501,Series A



CORRECTION:— Pin 7 of 12SA7 tube goes to pin 7 of 12SQ7 tube. Pin 2 of 12SA7 tube goes to Pin 2 of 12SK7 tube.

POWER SUPPLY.....105 to 125 volts, DC or 50-60 cycle AC, 35 watts.

FREQUENCY RANGE.....545 to 1700 kc.

INTERMEDIATE FREQ....455 kc.

TUNING.....Permeability.

ANTENNA.....Built-in plate type. Also provisions for external antenna. No ground required.

SPEAKER.....4-inch; P.M.; voice coil impedance 3.2 ohms.

POWER OUTPUT.....800 milliwatts, undistorted. 1.0 watts maximum.

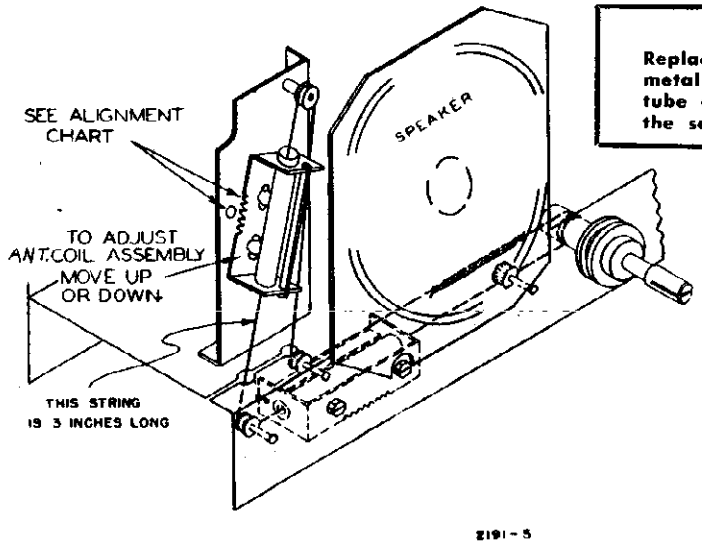
SENSITIVITY.....35 microvolts average for 50-milliwatt output.

SELECTIVITY.....75 kc. broad at 1000 times signal at 1000 kc.

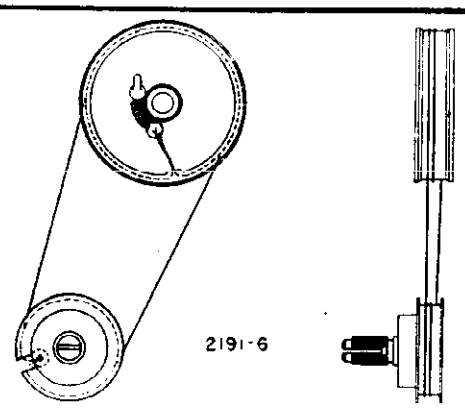
TUBE COMPLEMENT.....12SA7, converter
12SK7, I. F. amplifier
12SQ7, 2nd detector, AVC, 1st audio
50L6GT, output amplifier
35Z5GT, rectifier

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.



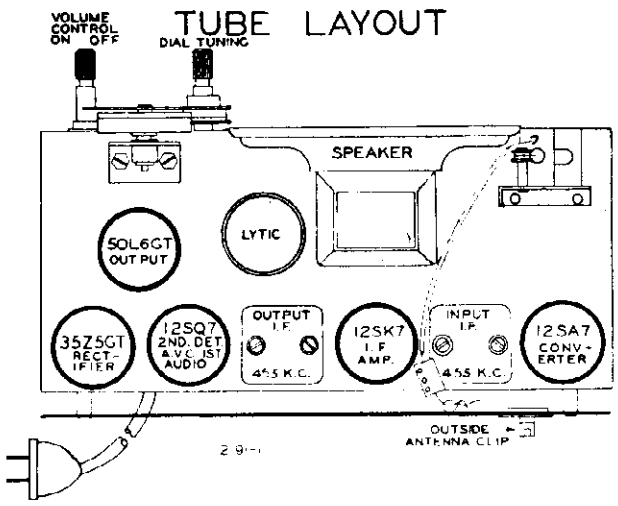
Coil Assembly View



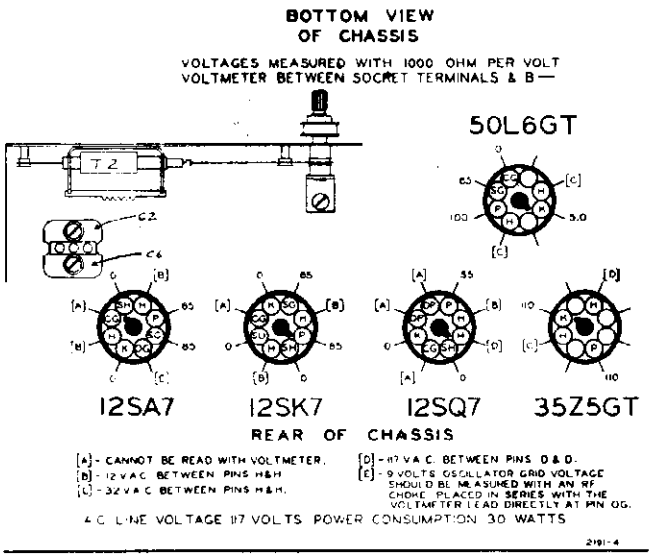
Dial Stringing View

MODELS 500,501, Series A

W. T. GRANT CO.



Chassis View



Voltage Chart

ALIGNMENT PROCEDURE

(Refer to Chassis View and Voltage Chart for location of trimmers)

Output meter across 3.2-ohm output load.

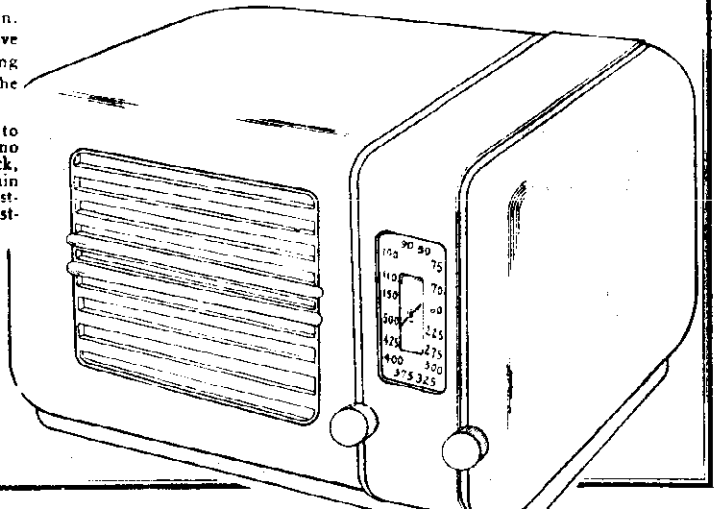
Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

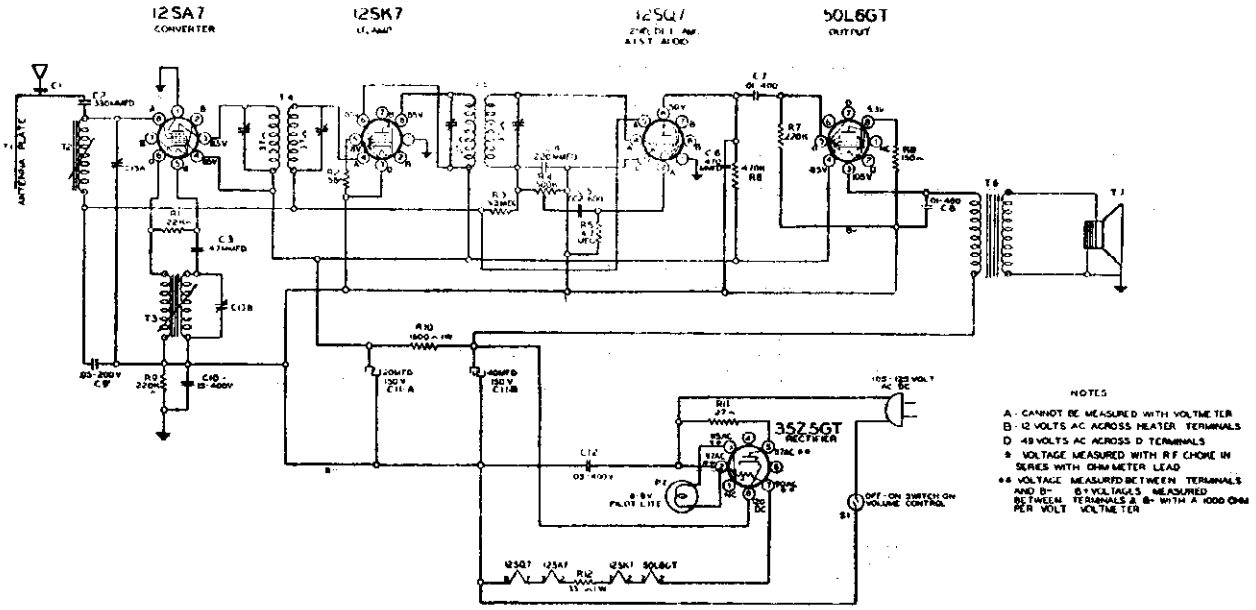
- Volume control at maximum for all adjustments.
- Chassis must be removed from cabinet for proper alignment

SIGNAL GENERATOR				*TUNER SETTING*	*ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)*
Frequency	*Dummy Antenna*	*Connection to Radio*	*Ground Connection*		
455 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Trimmers on output and input I.F. cans
1720 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C6
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C2
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of ant. coil (see coil assembly view)
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1720 kc	Antenna trimmer C2

The antenna coil assembly is made so that it is movable up or down. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C2) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.





POWER SUPPLY.....105 to 125 volts, DC or 50-60 cycle AC, 35 watts.

FREQUENCY RANGE.....545 to 1700 kc.

INTERMEDIATE FREQ....455 kc.

TUNING.....Permeability.

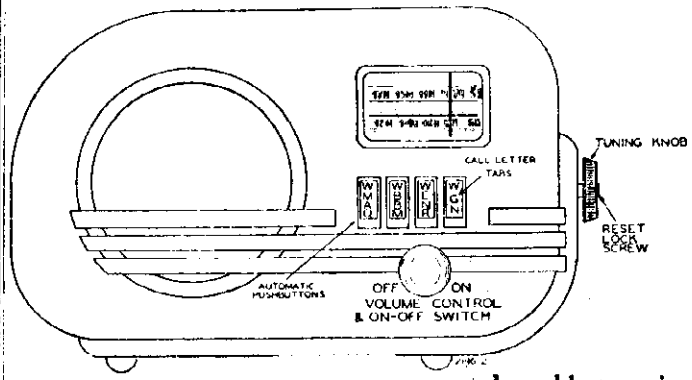
ANTENNA.....Built-in plate type. Also provisions for external antenna. No ground required.

SPEAKER.....5-inch; P.M.; voice coil impedance 3.2 ohms.

POWER OUTPUT.....800 milliwatts, undistorted. 1.2 watts maximum.

SENSITIVITY.....35 microvolts average for 50-milliwatt output.

TUBE COMPLEMENT.....12SA7, converter
12SK7, I. F. amplifier
12SQ7, 2nd detector, AVC, 1st audio
50L6GT, output amplifier
35Z5GT, rectifier



SETTING THE PUSHBUTTONS—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any four stations on the standard broadcast band. They can be set up in any order.

1. Turn on the radio.

2. Push out the call letters of the four stations from the call-letter sheets supplied with this manual.

3. Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).

5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the push button.

6. Follow this procedure for each of the three other buttons, setting each one for a different station.

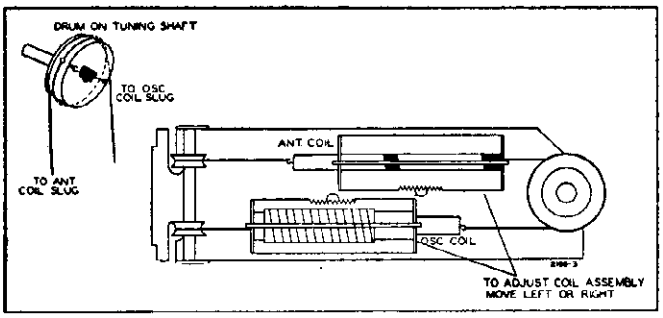
7. Rotate the tuning knob or the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob

IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

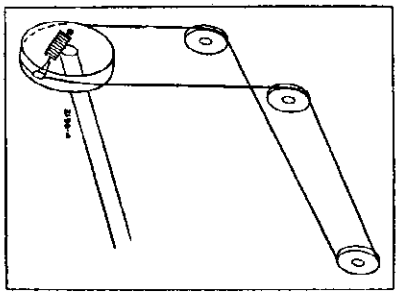
8. The pushbuttons are now properly set for automatic tuning Any of the four stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

MODELS 502,503, Series A

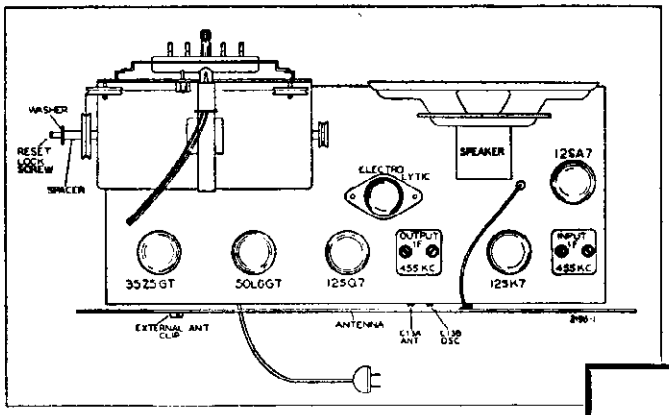
W. T. GRANT CO.



Coil View



Dial Stringing View



Chassis View

DIAL LIGHT—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the buttons which hold the back to the cabinet. The Chassis View illustration shows the location of the dial lamp. ***Pull*** the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47.

• NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

ALIGNMENT PROCEDURE

(Refer to Chassis View for location of trimmers)

Output meter across 3.2-ohm output load.
Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

- Volume control at maximum for all adjustments.
- Chassis must be removed from cabinet for proper alignment.

SIGNAL GENERATOR				*TUNER SETTING*	*ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)*
Frequency	*Dummy Antenna*	*Connection to Radio*	*Ground Connection*		
455 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Trimmers on output and input I.F. cans
1700 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C13-B
1700 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron Cores all the way out	Antenna trimmer C13-A
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of ant. coil (see coil assembly view)
1700 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C13-A

The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C13-A) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.

Models 502 and 503—Series A

Reference No.	Part No.	Description
		CAPACITORS
C11-A	11992	Electrolytic—20 mf; 40 mf x 150 volts
C11-B		For use on 60 cycles
C11-A	11993	Electrolytic—40 mf; 60 mf x 150 volts
C11-B		For use on 25 cycles
C13-A	124151	Dual Trimmer—Ant. and OSC.
C13-B		
C9	C-8D-10770	.05 Mf x 200 Volts—Tubular
C7, 8	C-8D-10761	.01 Mf x 400 Volts—Tubular.
C12	C-8D-10813	.05 Mf x 400 Volts—Tubular
C5	C-8D-10778	.002 Mf x 600 Volts—Tubular
C10	C-8D-10953	.15 Mf x 400 Volts—Tubular
C6	C-8F3-12	470 Mmf, 20% Mica
C4	C-8F3-10	220 Mmf, 20% Mica
C2	C-8F3-11	330 Mmf, 20% Mica
C3	C-8F3-6	47 Mmf, 20% Mica
		***RESISTORS**
R4	101-238	Volume Control (500 K) and Switch
S1		or
R4	A-10A-11306	Volume Control (500 K) and Switch
S1		
R8	C-9B1-52	150 Ohms ½ Watt 10%
R7, 9	C-9B1-27	220K Ohms ½ Watt 20%
R5	C-9B1-35	4.7 Megohms ½ Watt 20%
R3	C-9B1-34	3.3 Megohms ½ Watt 20%
R1	C-9B1-78	22K Ohms ½ Watt 10%
R10	C-9B2-64	1500 Ohms 1 Watt 10%
R2	C-9B1-47	56 Ohms ½ Watt 10%
R12	C-9B2-4	33 Ohms 1 Watt 20%
R6	C-9B1-94	470K Ohms ½ Watt 10%
R11	C-9B1-43	27 Ohms ½ Watt 10.
		COILS
T4	108157L	Input I. F. Coil Complete in Can
T5	108157N	Output I. F. Coil Complete in Can
T2, T3	112877	Antenna and Oscillator Coil Tuning Assembly R-F. Choke
		SOCKETS
	121210	Eight Prong Octal Socket
	121216	Bakelite Socket Base for Filter Condenser
		SPEAKER
T7	114225	Five Inch P.M. Dynamic Speaker
T6	105108E	Output Transformer for Speaker
		MISCELLANEOUS
	10798D	Line Cord and Plug
	120389	Coiled Tension Spring (For Coil Assembly)
P1	107249	6-8 Volt Pilot Lite Bulb—Type T47
	107274	Socket Assembly for Pilot Lite
	107205	Insulating Shield for Pilot Lite Sock
	134101	Rubber Feet for Bottom of Cabinet
T1, C1	128586-S-1	Back for Cabinet—Walnut
T1, C1	128-586-S	Back for Cabinet—Ivory
	131193	Snap-in Rivets to Fasten Back
	128333-18	Bakelite Cabinet—Dark Walnut
	128333-9	Bakelite Cabinet—Ivory Color
	128162-17	Knob for Volume Control—Walnut
	128162-8	Knob for Volum Control—Ivory
	B-5B-10994-18	Tuning Knob—Walnut
	B-5B-10994-9	Tuning Knob—Ivory
	A-2H-10996	Reset Key
	120388	Locking Spring for Tuning Knob
	A-3F-10995	Locking Screw
	128-292B-17	Molded Pushbuttons—Walnut
	128-292B-8	Molded Pushbuttons—Ivory
	112784	Set of Station Call Letters
	112-606	Acetate Tabs
		TUNER PARTS
	117837	Cam Shaft
	117840	Brass Spacer
	117838	Thrust Collar.
	131142	"C" Washer
	115146	Cam
	115143	Keywasher
	117528	Brass Spacer
	117529	Brass Spacer.
	131181	Spring Washer
	117604	Locking Collar
	117610	Brass Spacer
	112602	Drum for Dial String
	120285	Coiled Spring for Dial String
	120214	Silk Line Dial String
	115361	Lever with Roller.
	120283	Return Spring for Lever
		DIAL PARTS
	112878	Dial Scale
	112661	Crystal for Dial
	131277	Metal Clamp for Crystal
	115453	Dial Bracket—with 3 Pulleys
	112668	Pointer
	117609	Brass Spacer for Pointer

Models 500 and 501—Series A

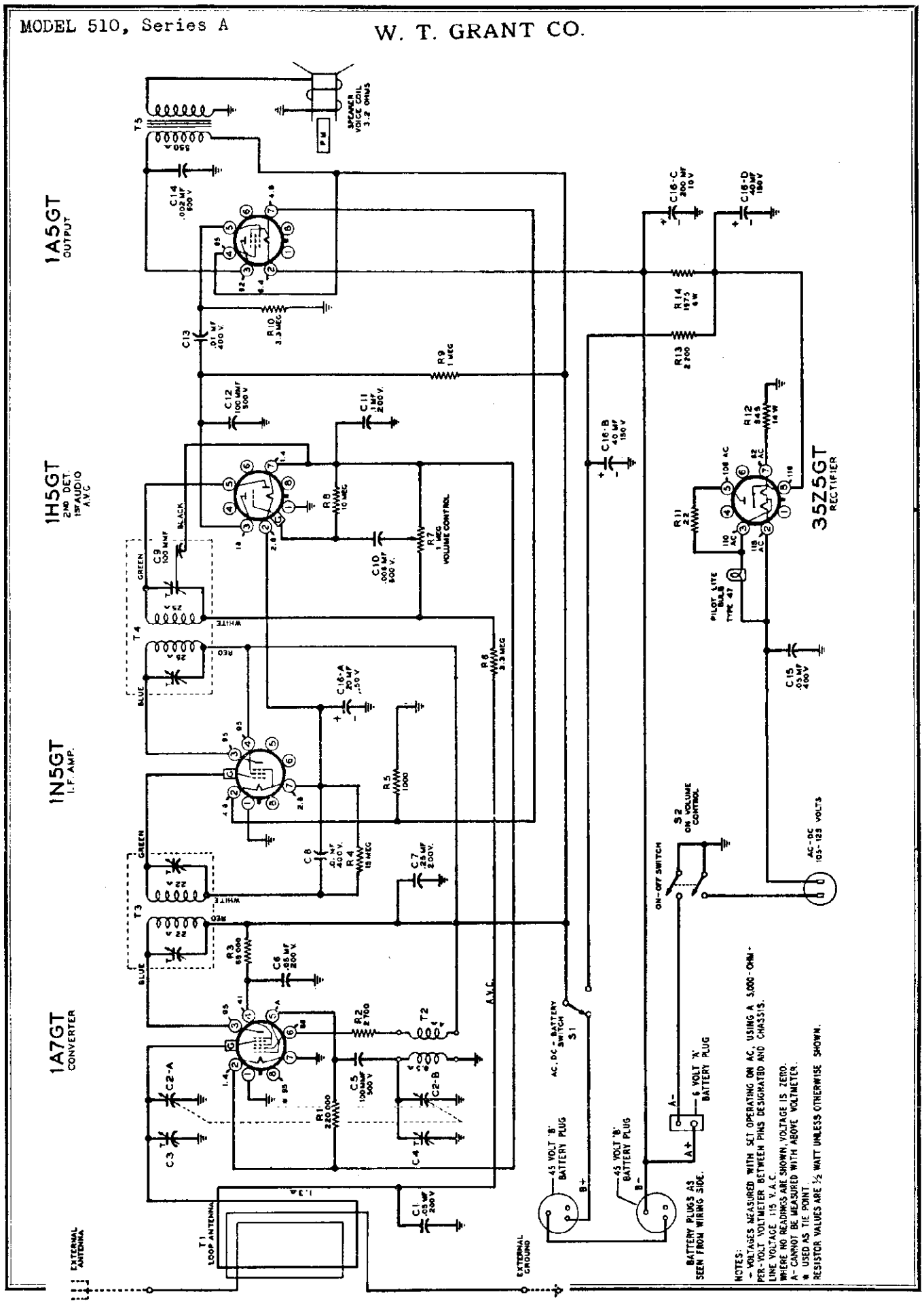
Reference No.	Part No.	Description
		CAPACITORS*
C18	C-8D-10788	.004 x 600 Volt Tubular Condenser
C19, C15	C-8D-10761	.01 x 400 Volt Tubular Condenser
C16	C-8D-10813	.05 x 400 Volt Tubular Condenser
C8, C9	C-8D-10770	.05 x 200 Volt Tubular Condenser
C15	C-8D-10789	.002 x 600 Volt Tubular Condenser
C7	C-8D-10953	.15 x 400 Volt Tubular Condenser
C10, C11	119-92	20 Mfd.—40 Mfd. x 150 Volt Electrolytic (For 60 Cycle)
C2, C6	124100	Trimmer (Antenna; Oscillator)
C17	C-8F6-121	.00047 Mica Condenser
C14	C-8F3-10	.00022 Mica Condenser
C5	C-8F3-11	.00033 Mica Condenser
C1	C-8F3-6	.000047 Mica Condenser
		RESISTORS*
R4	C-9B1-34	3.3 megohm, ½ watt resistor
R9	C-9B1-29	470M ohm, ½ watt resistor
R2, R8	C-9B1-26	150M ohm, ½ watt resistor
R10	C-9B1-52	150 ohm, ½ watt resistor
R1	C-9B1-78	22M ohm, ½ watt resistor
R6	C-9B1-35	4.7 megohm, ½ watt resistor
R3	C-9B2-63	1200 ohm, 1 watt resistor
R7	C-9B1-42	22 ohm, ½ watt resistor
R11	C-9B2-44	33 ohm, 1 watt resistor
R5, S1	101196	Volume control and on-off switch (500M ohm)
		COILS
T3-C3-C4	108157C	Input I.F. coil assembly complete
T4-C12-C13	108157C	Output I.F. coil assembly complete
T2	110126	Oscillator coil assembly complete
T1	111136B	Antenna coil assembly complete with bracket
	112-676	Iron core for antenna coil
	112-677	Iron core for oscillator coil
		SOCKETS
	121210	Eight prong octal socket
	121177	Eight prong octal socket 12SK7
		SPEAKER
T5	8-18A-11124	4 Inch P.M. dynamic speaker complete with output transformer
		MISCELLANEOUS
	10798	Line cord and plug
	115408	Mounting bracket complete with brass pulley (for mounting ant. coil)
CA	115-459-18	Walnut finish metal antenna plate (back for cabinet)
CA	115-459-9	Ivory finish metal antenna plate (back for cabinet)
	12742	Flat fibre washer for mounting antenna plate (back)
	127138	Fibre grommet for mounting antenna plate
	13255	No. 6 x ¼" hex. head screws (mount antenna plate to chassis)
	132-69	No. 6 x ⅜" hex. head self-tapping screw, holds antenna plate to cabinet
	13220	No. 6—32 x ⅜ screws; unslotted head; chassis mounting
	128-345-18	Walnut cabinet complete (less back)
	128-345-9	Ivory cabinet complete (less back)
	128342-17	Walnut knobs
	128342-8	Ivory knobs
		DIAL PARTS LIST
	112-673	Dial scale (calibrated)
	112675	Pointer disc
P1	107249	6-8 volt pilot light bulb type T-47
	A55A-11408	Socket assembly for pilot light
	A2D-11331	Bracket for socket assembly
	117625	Tuning control drive shaft
	117624	Drive pulley with stop pin (for drive shaft)
	115464	Bracket for dial shaft
	115465	Dial bracket
	117627	Dial shaft
	112602	Dial drum
	120214	Silk drive string for pointer (1 ft. used)
	120285	Tension spring for drive string
	131269	Speed nut to fasten dial scale

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts, 20%

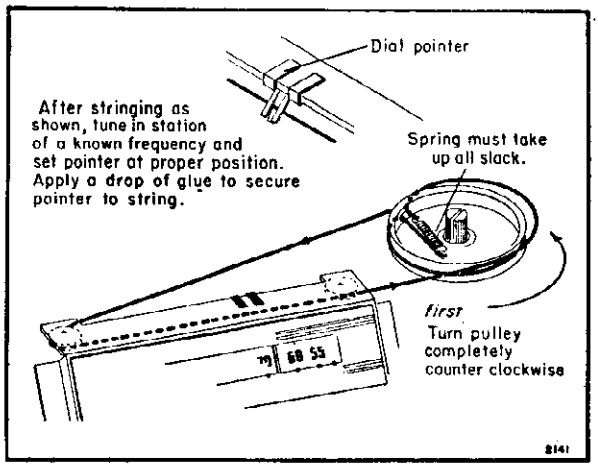
MODEL 510, Series A

W. T. GRANT CO.

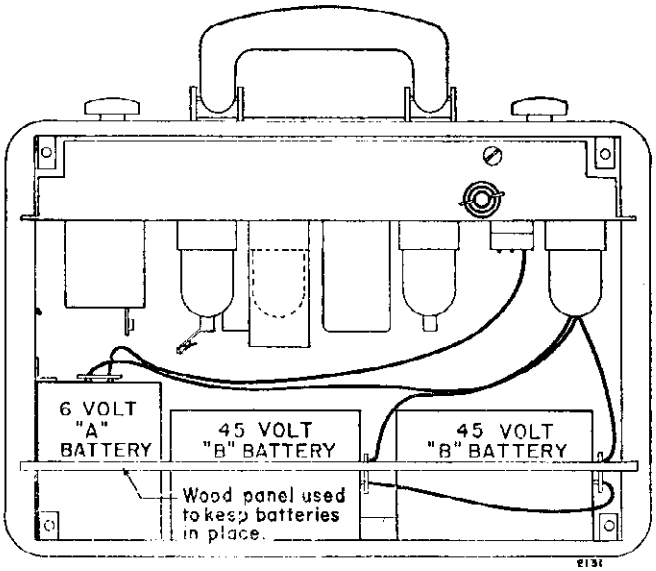


ELECTRICAL SPECIFICATIONS

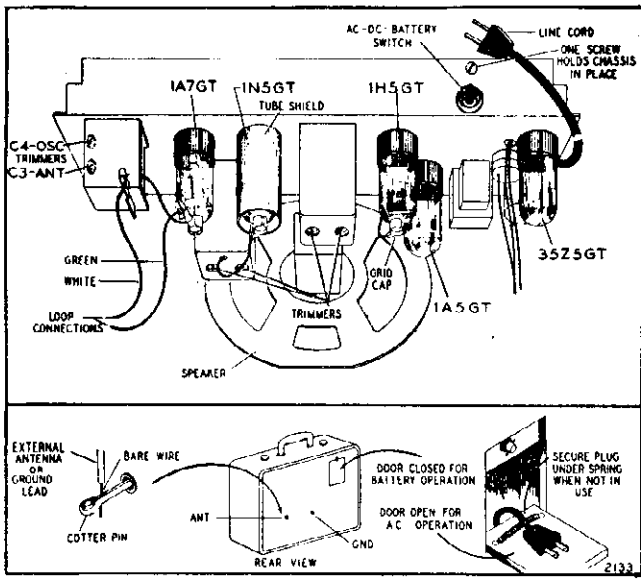
Power Supply.....105 to 125 volts, DC or 50-60 cycle AC, 30 watts.
Battery: A—6 volts, 58 ma.
B—90 volts, 9 ma.
Frequency Range.....530 to 1650 kc.
Intermediate Freq......455 kc.
Tuning.....Two-gang capacitor.
Antenna.....Built-in loop. Provisions also for external antenna and ground.
Speaker.....5-inch; P.M.; voice coil impedance 3.2 ohms.
Power Output.....80 milliwatts undistorted.
180 milliwatts maximum.
Sensitivity.....30 microvolts average for 50-milliwatt output.
Selectivity.....43 kc broad at 1000 times signal at 1000 kc.



Replacement of Dial Pointer Drive Cord



Battery Installation



Chassis View, Showing Tube Location

ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				*TUNER SETTING*	*ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)*
Frequency	*Coupling Capacitor*	*Connection to Radio*	*Ground Connection*		
455 kc	.1 mf	1A7GT grid cap*	Chassis	Rotor full open (plates out of mesh)	Input and output trimmers on IF cans
1650 kc	.1 mf	1A7GT grid cap*	Chassis	Rotor full open (plates out of mesh)	Oscillator trimmer C4
1400 kc†	200 mmf	External antenna clip	External ground clip	1400 kc	Antenna trimmer C3

* If loop is not connected when making this adjustment, substitute a 1-megohm resistor across the loop leads.

† For this adjustment chassis should be remounted in cabinet and loop connected. Antenna trimmer can be reached through a ho in the side of the cabinet.

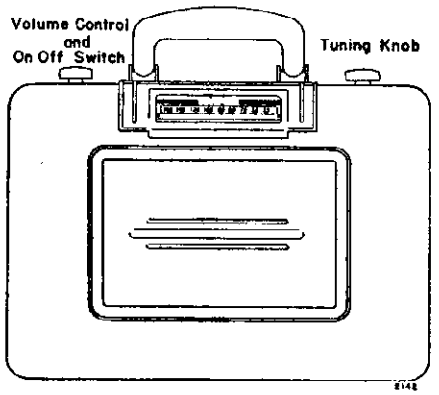
MODEL 510, Series A — W. T. GRANT CO.

Ref. No.	Part No.	Description
		CAPACITORS
C2-A, C2-B, C3, C4	B-8A-10246	Two gang, including antenna and oscillator trimmers. Range of gang: 14-452 mmf (ant) and 10-198 (osc).
C16-A-B-C-D	119-123	Electrolytic; 20 mf x 50 volts; 40 mf x 150 volts; 200 mf x 10 volts; 40 mf x 150 volts.
C15	C-8D-10813	.05 mf x 400 volts tubular
C14	C-8D-10789	.002 mf x 600 volts tubular
C11	C-8D-10771	.1 mf x 200 volts tubular
C1, C6	C-8D-10770	.05 mf x 200 volts tubular
C10	C-8D-10785	.006 mf x 600 volts tubular
C7	C-8D-10775	.25 mf x 200 volts tubular
C8, C13	C-8D-10761	.01 mf x 400 volts tubular
C5, C12	C-8F3-8	.0001 mf x 500 volts 20 % mica
C9	C-8F3-8	.0001 mf x 500 volts 20% mica (Part of 2nd I.F. coil assembly.)
		RESISTORS*
R1	C-9B1-27	220,000 ohms, ½ watt, 20%
R2	C-9B1-67	2,700 ohms, ½ watt, 10%
R3	C-9B1-84	68,000 ohms, ½ watt, 10%
R4	C-9B1-302	15 megohms, ½ watt, 20%
R5	C-9B1-62	1,000 ohms, ½ watt, 10%
R6, R10	C-9B1-34	3.3 megohms, ½ watt, 20%
R7, S2	101252	Volume contol (1 megohm) and on-off switch
R8	C-9B1-37	10 megohms, ½ watt, 20%
R9	C-9B1-31	1 megohm, ½ watt, 20%
R11	C-9B1-42	22 ohms, ½ watt, 10%
R12	130343	545 ohms, 14 watts, 5%
R13	C-9B1-66	2,200 ohms, ½ watt, 10%
R14	130344	1,975 ohms, 6 watts, 5%

Ref. No.	Part No.	Description
		COILS AND TRANSFORMERS
T1	B-13E-10250	Loop antenna assembly
T2	A-13D-10239	Oscillator coil
T3	108201	Input I.F. transformer. Range of trimmers: 53-97 mmf each.
T4, C9	108200	Output I.F. transformer. Range of trimmers: 39-71 mmf each.
T5	105127	Output transformer
		MISCELLANEOUS
	114240B	Speaker, 5-inch, P.M.
	120406	"B"-battery cable assembly
	120407	"A"-battery cable assembly
	121171	Tube socket
S1	125153	Line-battery switch
	120417	Spring for line-battery switch
	107-363	Line cord and plug
	115396B	Tube shield
	B-6D-11301	Dial scale
	112925	Diffuser
	A-2M-7758	Snap-in rivets for diffuser and dial scale
	131-307	Cotter pin
	112922	Dial pointer
	120-214	Drive cord for dial pointer (20")
	120197	Spring for drive cord
	107249	Pilot light, 6-8 volts, type T-47
	107362	Socket assembly for pilot light
	128641	Cabinet back
	120410	Spring for securing line cord plug
	112910-1	Escutcheon for dial
	128643	Escutcheon for grille
	128645	Knob, tuning
	128647	Knob, volume
	131253	Snap-in rivet, for trimmer hole
	13448B	Rubber grommet for trimmer hole
	112-928	Drive pulley

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts, 20%



BATTERY REPLACEMENT — Run-down batteries are indicated when (1) the volume cannot be brought up to the desired level; (2) the tone of the radio is "mushy" (not clear); or (3) reception fails completely. If you are in doubt as to whether the batteries are faulty, have your radio dealer check them for you.

If the batteries need replacement, get two 45-volt "B" batteries (size: 3½" x 2¼" x 4½") and one 6-volt "A" battery (size: 2⅝" x 2⅝" x 4").

PILOT LIGHT — If the pilot lamp burns out, the set should not be operated on AC or DC power until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube.

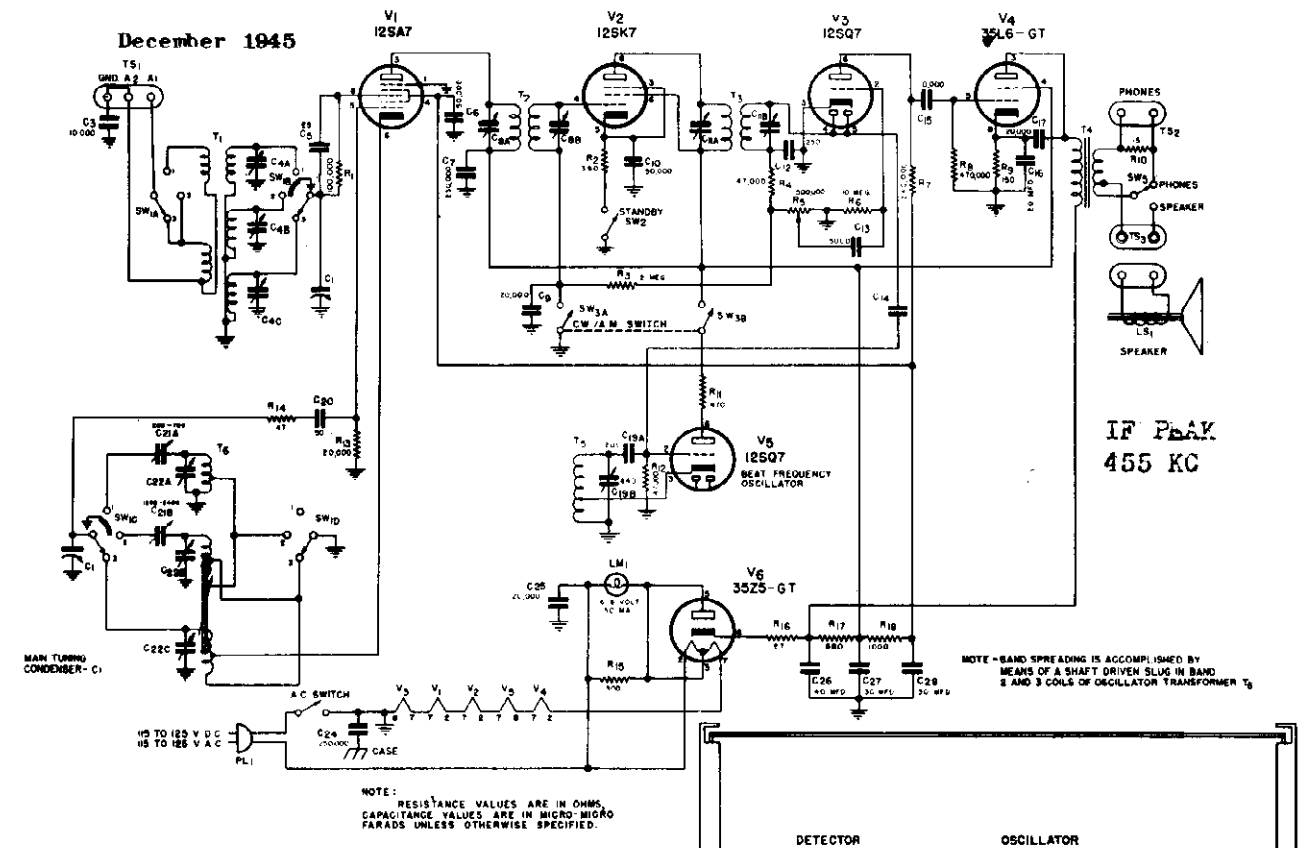
TUBES—Tubes which have weakened with age may cause poor or erratic reception; therefore have the tubes tested periodically and replace those which are weak. To remove the tubes, first remove the back of the cabinet. Pull the grid caps from the tops of the 1A7GT, 1N5GT, and 1H5GT tubes (see Chassis View). Then remove the tube shields where present. When removing a tube, rock it back and forth gently while pulling it out of its socket.

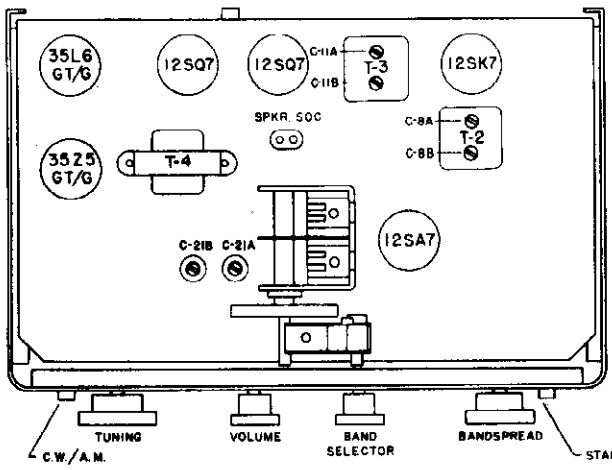
When replacing tubes, grid caps, and shields, refer to the Chassis View illustration to make sure that the replacements are properly made.

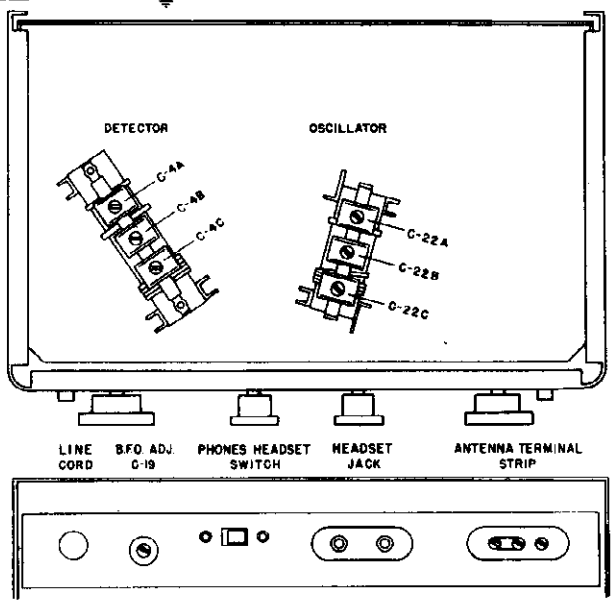
THE HALLICRAFTERS CO.

MODEL EC-1B, Echophone

December 1945







Listed below in table form, are the alignment frequencies and adjustments necessary to align the receiver. CAUTION - Do not connect signal generator ground directly to the chassis, connect it to the "G" terminal of the antenna terminal strip.

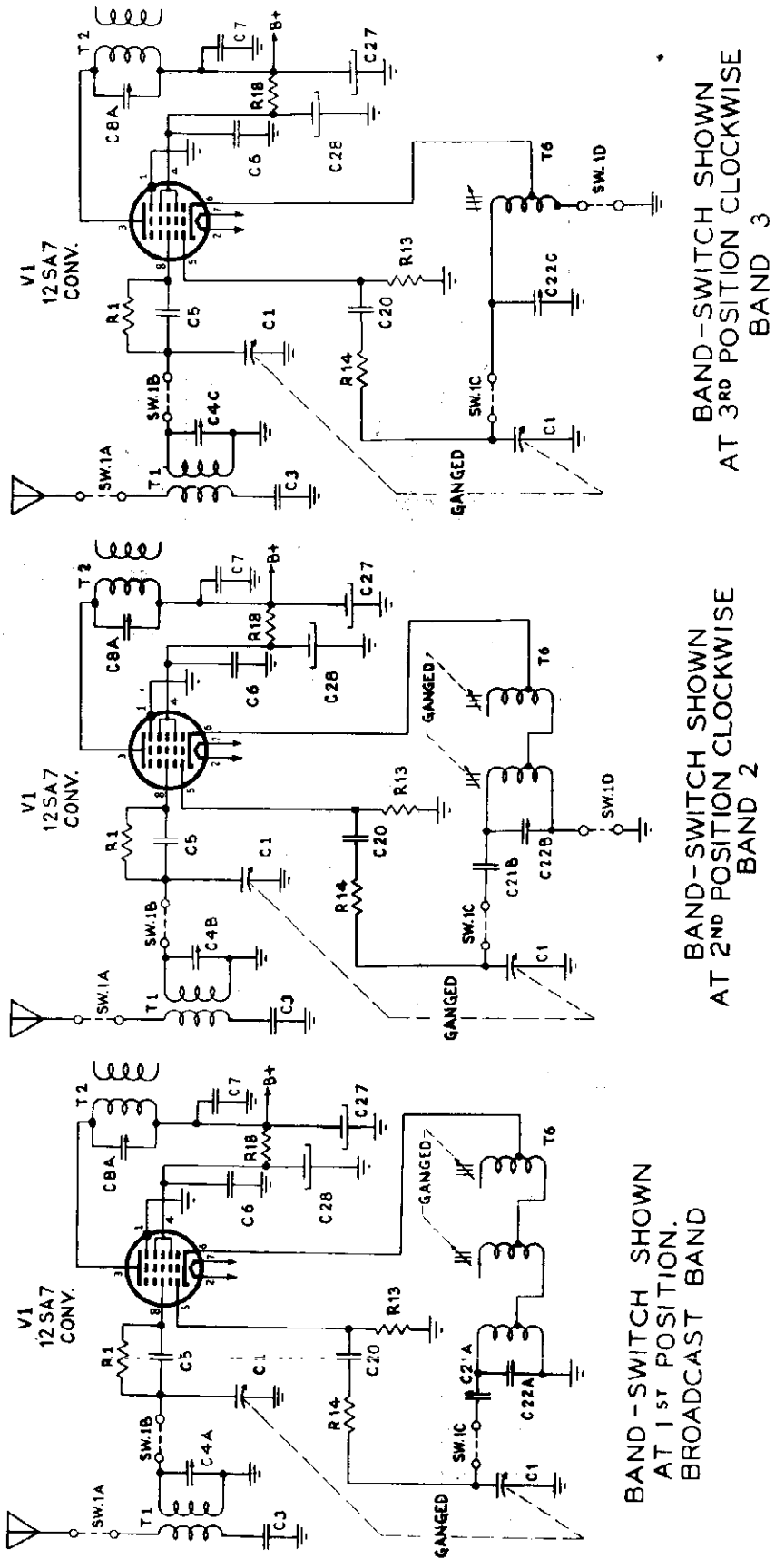
NOTE - Set BANDSPREAD dial at "0" before attempting alignment. (Slug should be between Band 1 and Band 2 coils.)

ALIGNMENT DATA

BAND	Signal Generator Frequency	Dummy Antenna	Adjust Pads	Adjust Trimmers
I-F	455 kc.	None	None	C-8A, C-8B, C-11A, C-11B
BFO	455 kc.	None	Adjust capacitor C-19 for zero beat.	
1	600 kc. 1600 kc	330 ohm 330 ohm	C-21A None	None C-22A, C-4A
2	2.4 mc. 7.0 mc.	330 ohm 330 ohm	C-21B None	None C-22B, C-4B
3	No low frequency adjustment on this band. 28 mc.	330 ohm	None	C-22C, C-4C

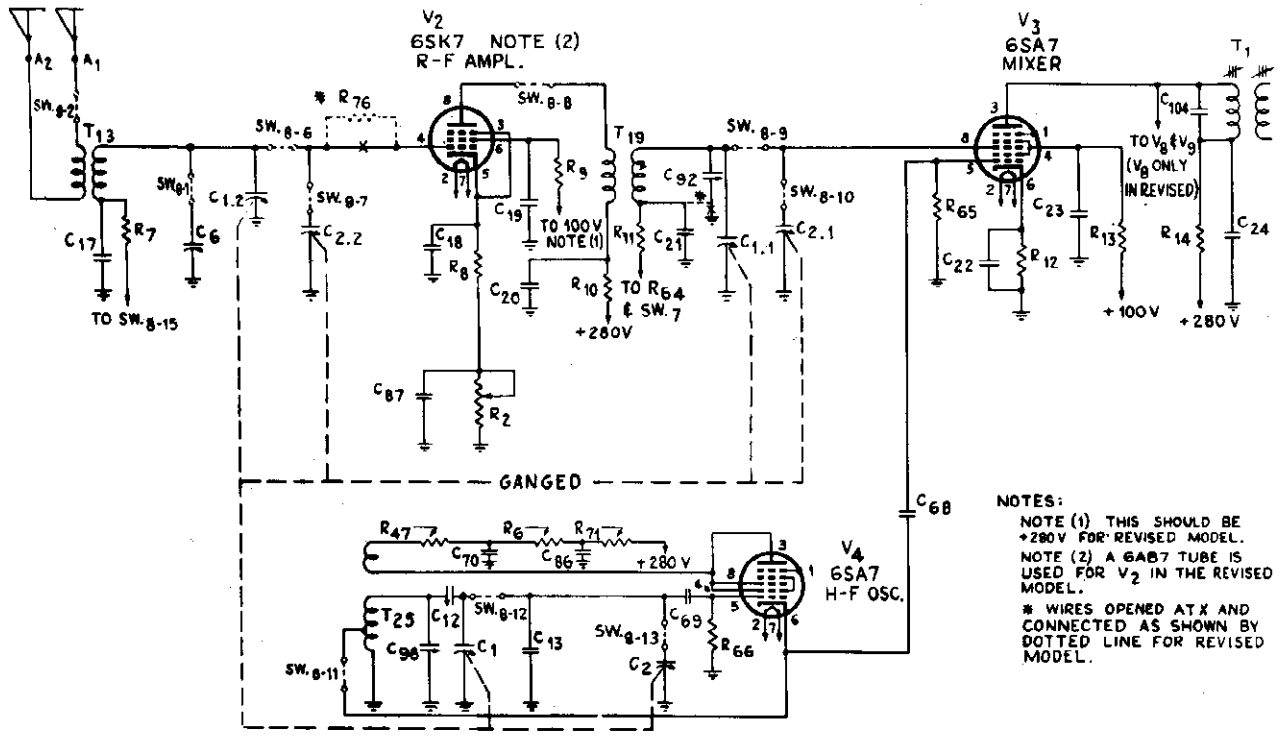
MODEL EC-1B, Echophone

THE HALLICRAFTERS CO.



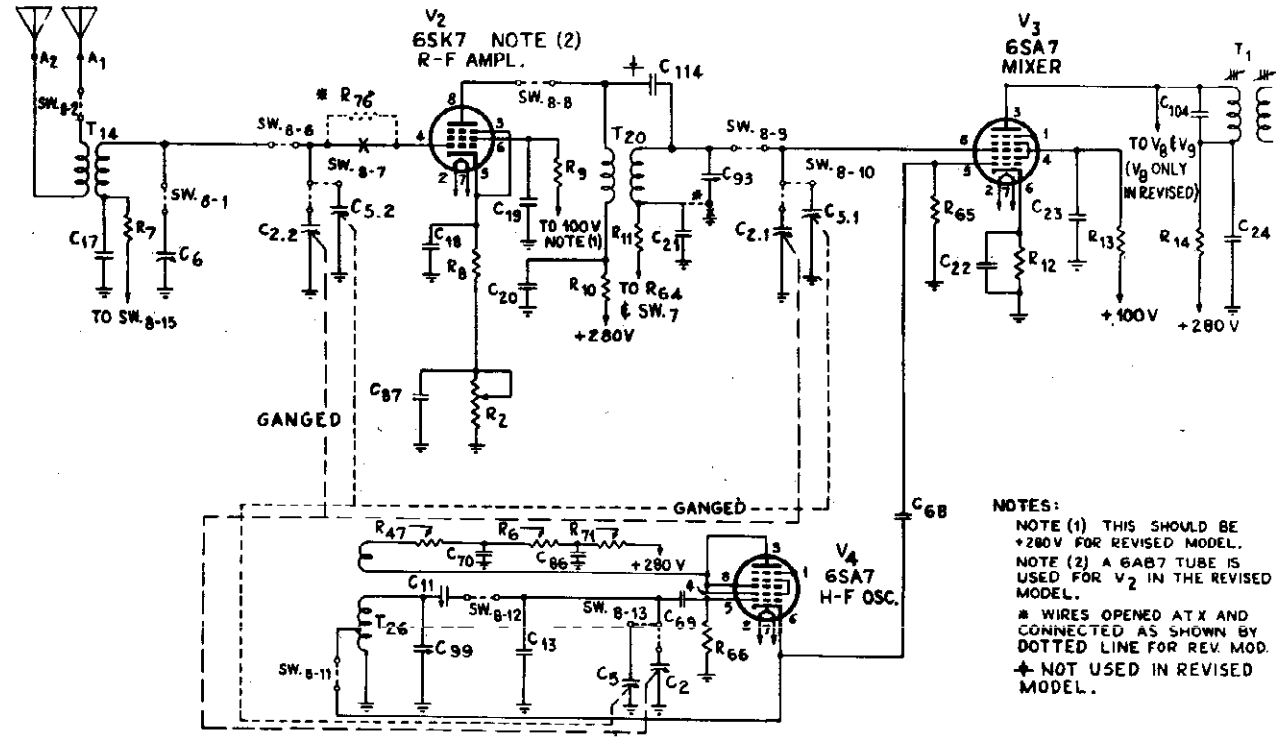
THE HALLICRAFTERS CO.

MODEL SX-2
Super Skyrid



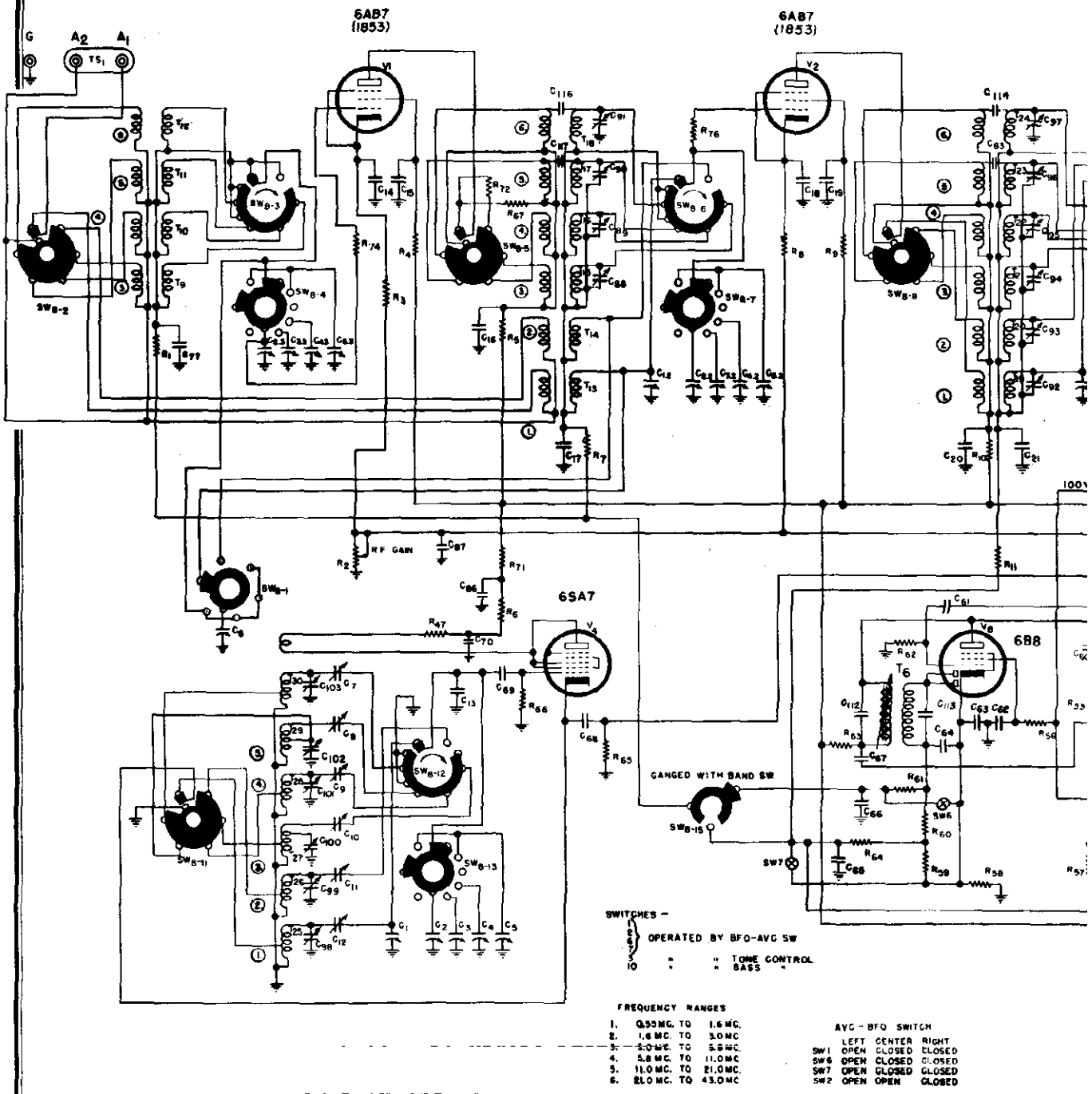
NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR V_2 IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REVISED MODEL.

BAND-SWITCH SHOWN
AT 1ST POSITION
BAND 1 - BROADCAST
550-1600 KC.



NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR V_2 IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REV. MOD.
+ NOT USED IN REVISED MODEL.

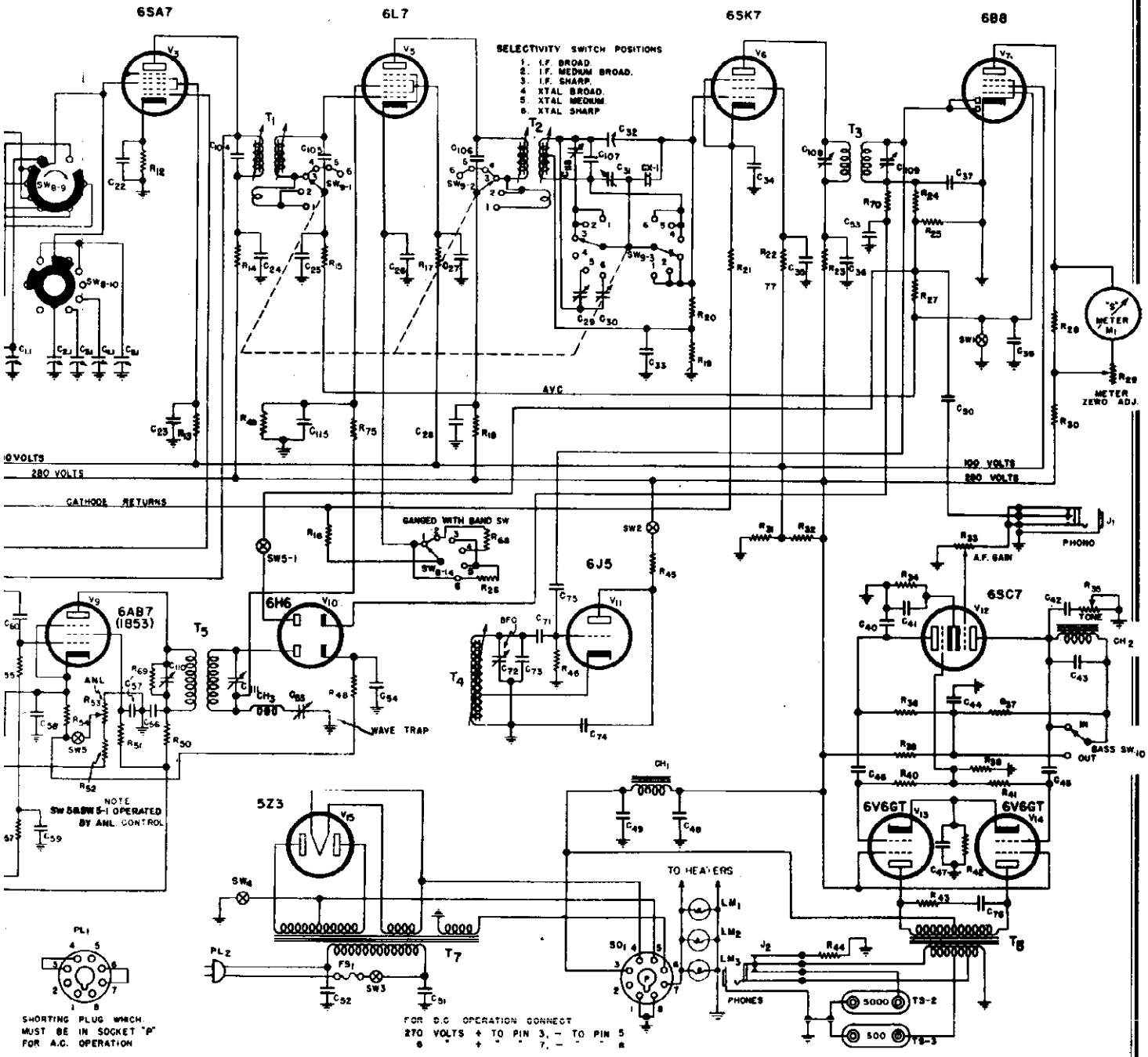
BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE
BAND 2 - BROADCAST
1.6-3.0 MC.



IF PEAK 455 KC

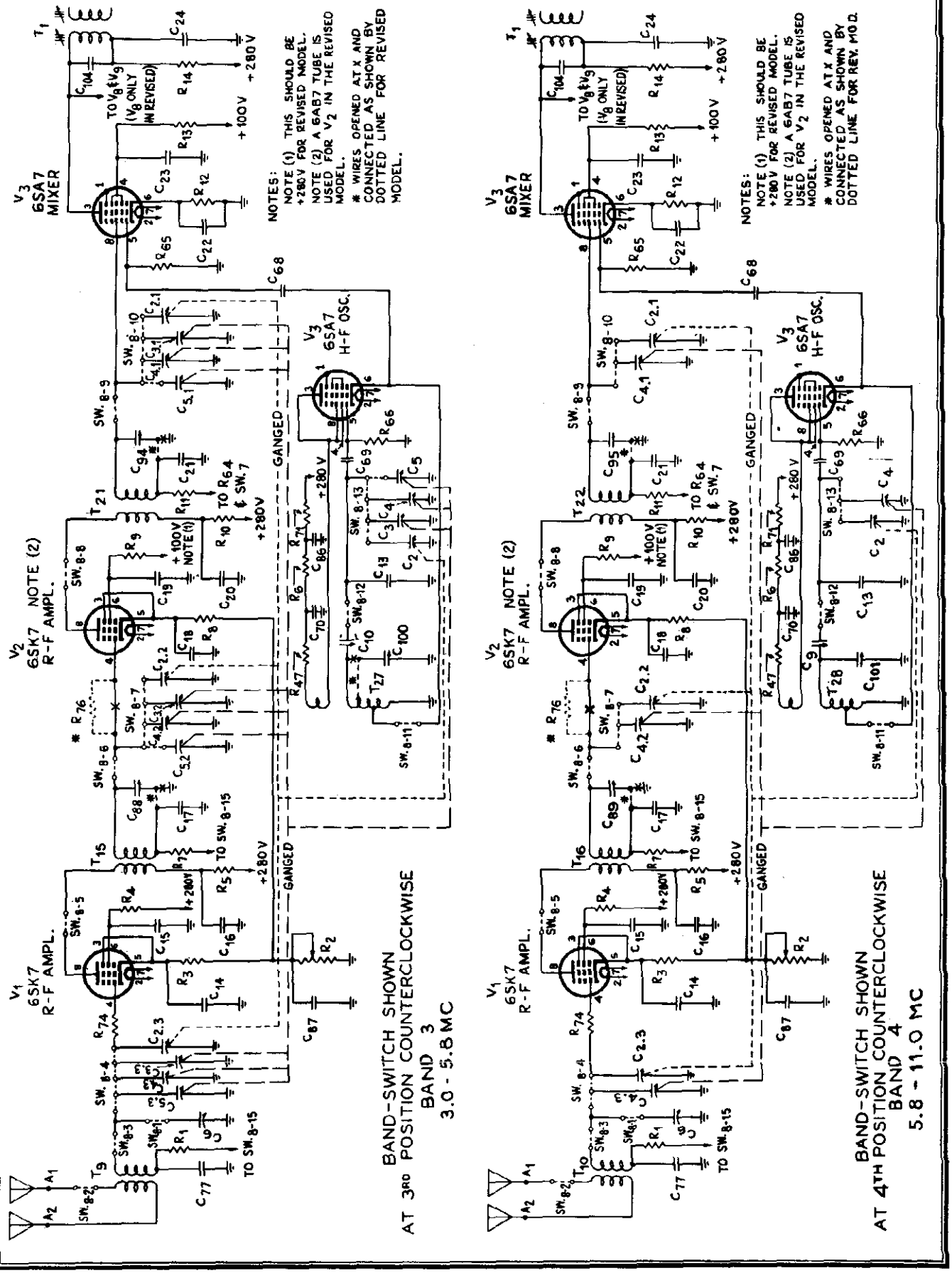
ALLICRAFTERS CO.

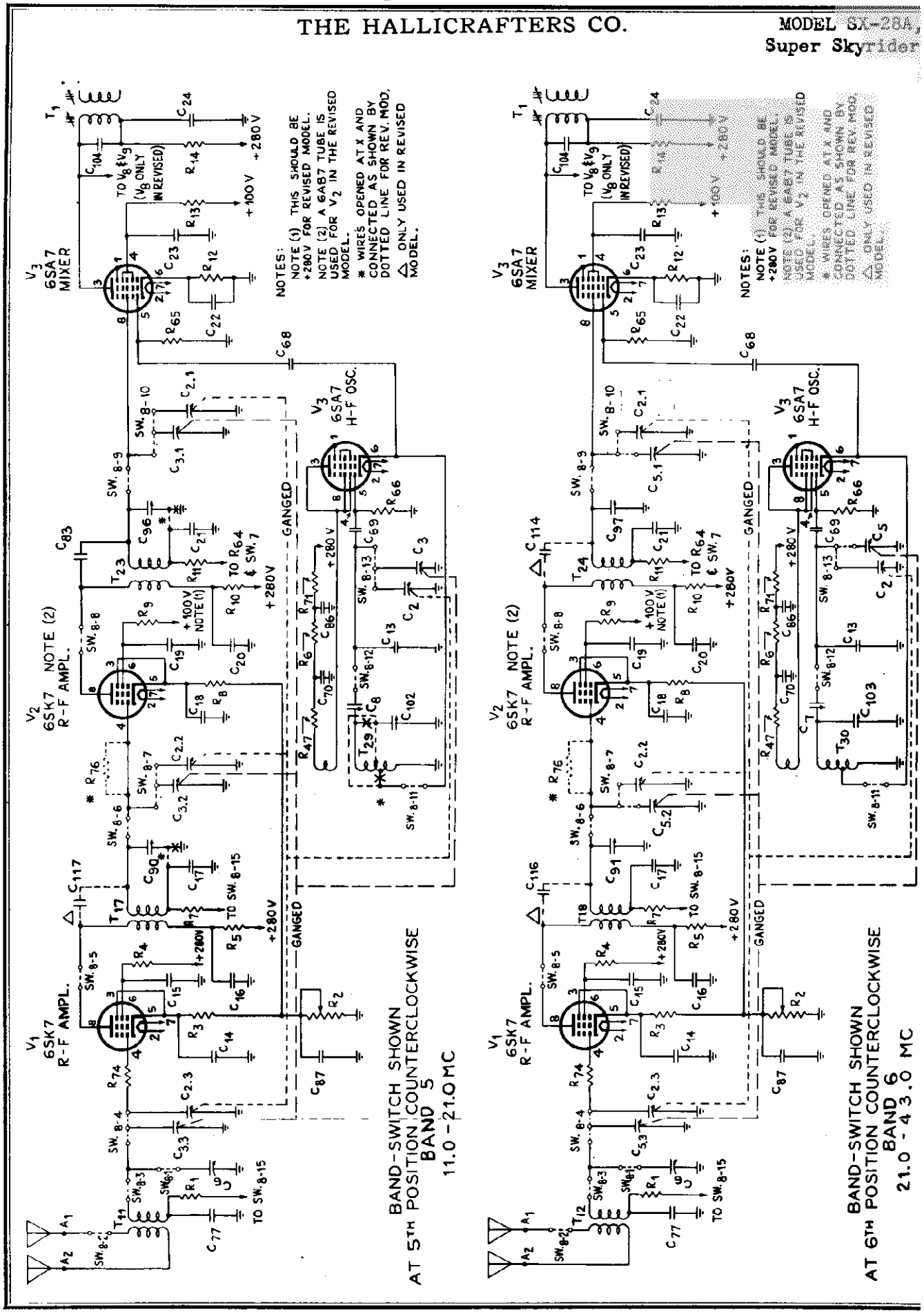
MODEL SX-28A, Super Skyrider



MODEL SX-28A,
Super Skyrider

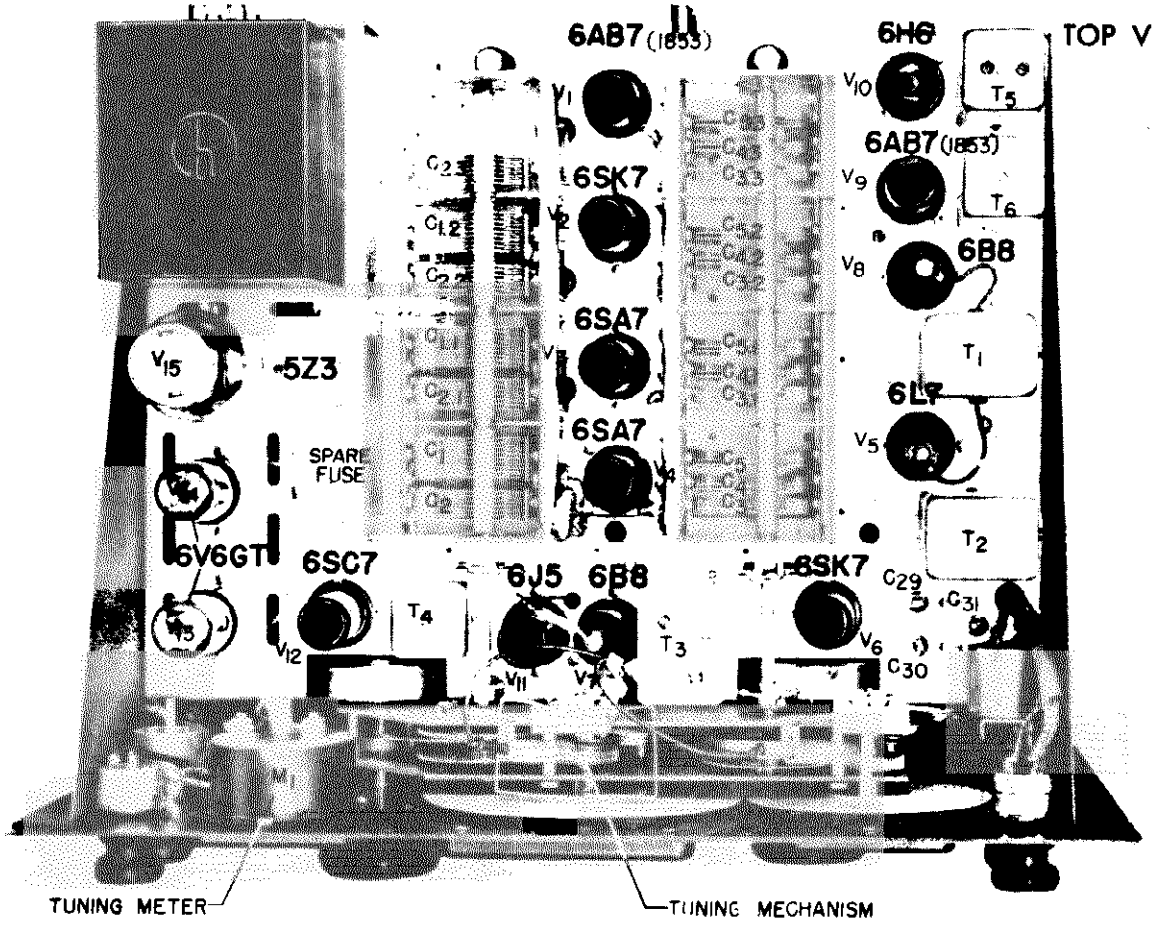
THE HALLICRAFTERS CO.

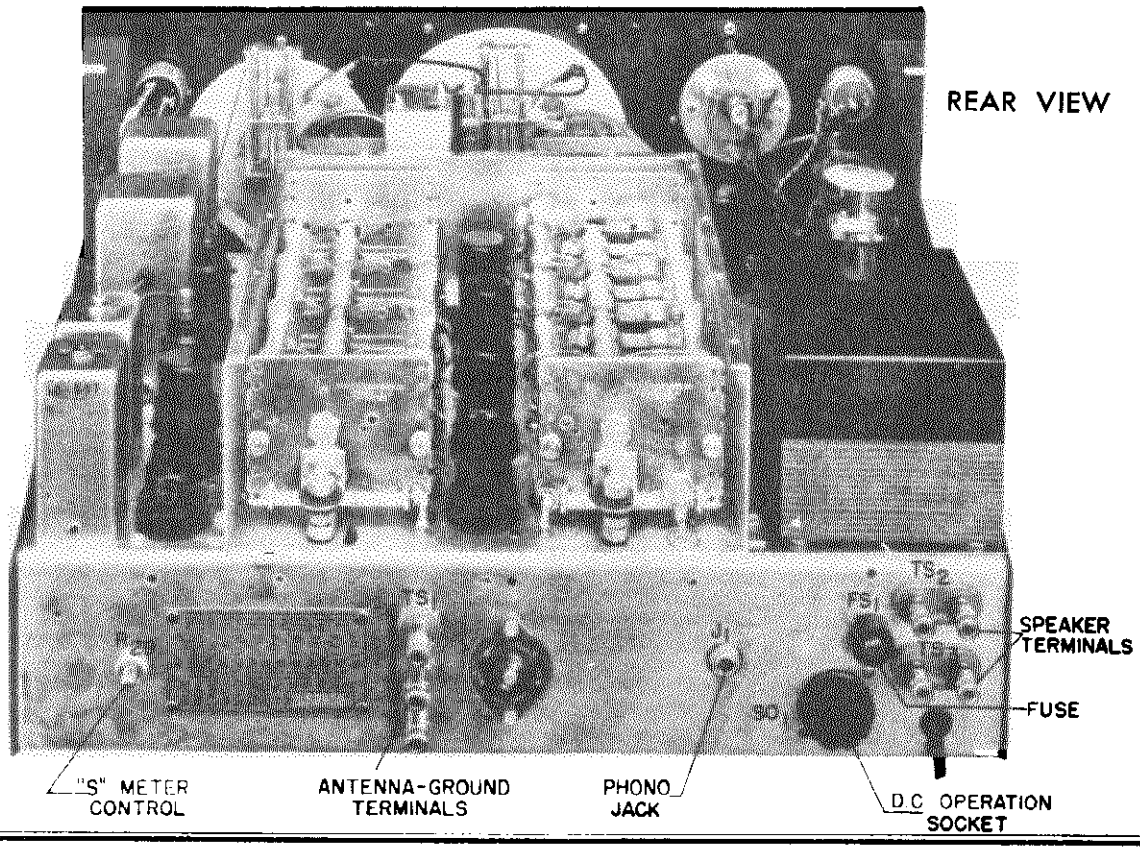



THE HALLICRAFTERS CO.
MODEL SX-28A
Super Skyrider
NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR V2 IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REV. MOD.
△ ONLY USED IN REVISED MODEL.
V1 6SK7 R-F AMPL.
V2 6SK7 R-F AMPL.
V3 6SA7 MIXER
V3 6SA7 H-F OSC.
GANGED
BAND-SWITCH SHOWN AT 5TH POSITION COUNTERCLOCKWISE
BAND 5
11.0 - 21.0 MC
BAND-SWITCH SHOWN AT 6TH POSITION COUNTERCLOCKWISE
BAND 6
21.0 - 43.0 MC

MODEL SX-28A,
Super Skyrider

THE HALLICRAFTERS CO.





THE HALLICRAFTERS CO.

MODEL SX-28A, Super Skyrider

TERMINALS AND CONNECTIONS ON REAR OF RECEIVER

(1) SPEAKER

On the rear apron of the receiver's chassis appear two terminal strips for connecting either a 500 or 5000 ohm speaker to the receiver. Should a matching HALLICRAFTERS Bass-Reflex speaker be used with the receiver, it should be connected to the 5000 ohm terminals. The 500 ohm terminals can be connected to a speaker or other load of that impedance value.

(2) ANTENNA

To the terminals marked A1-A2 and G should be connected the antenna you have chosen to use with the model SX-28-A receiver.

Very satisfactory results throughout the tuning range of the SX-28-A will be obtained with a conventional inverted "L" Marconi type of antenna 75 to 100 feet long including lead-in. This antenna should be erected as high as possible and removed from surrounding objects. Be sure that the antenna is insulated from the ground at all points. When this type of antenna is used it is connected to terminal A-1. The Jumper between A-2 and G should remain connected.

In the event a doublet antenna is used with the model SX-28-A SUPER SKYRIDER receiver, the two wires of the doublet lead-in should be connected to terminals A1 and A2. The Jumper between A2 and G can remain connected or removed, depending upon its effect on favorable reception.

A ground can be used if desired and should be connected to the G terminal. Connecting the receiver to a good ground (cold water pipe or 6 foot rod driven in moist soil) might improve reception and reduce noise. Under normal conditions no noticeable difference will exist so a ground is suggested only if it aids reception.

Should you wish to have a separate antenna for some one short wave frequency or band, a half-wave antenna cut to the proper length for the desired frequency will prove very effective. The following formula will give the length of the ½ wavelength antenna depending on the desired frequency.

$$\text{Length in feet} = \frac{463}{\text{frequency in megacycles.}}$$

or, for example, a half wave 40 meter antenna would be $\frac{463}{7} = 66.14$ feet long.

The antenna should preferably be of solid soft drawn enameled copper wire for ease in handling. The center of the wire is cut and an insulator inserted at that point. The twisted pair, or open wire transmission line, is then soldered to each 33 foot length, after the enamel has been scraped off, directly on either side of this center insulator. The other end of the transmission line should be connected to A1 and A2 on the receiver. It should be remembered that such an antenna has directional properties broadside to its length and should be so oriented if maximum pickup from a certain direction is to be expected.

In designing transmission line systems for a more accurate match of the line to the antenna input circuit, it will be helpful to know that the approximate antenna input impedance of the receiver is 400 ohms.

(3) PHONO-JACK

The Phono-Jack enables you to use the high fidelity audio amplifier of the receiver for phonograph record or transcription play-back purposes. A high impedance crystal or magnetic pick-up arm should be used for this purpose and connected to a standard headphone plug. This plug is then inserted in the PHONO-JACK when record playing is desired. The receiver is inoperative to radio signals, when the plug is in the phono-jack.

The volume of the audio amplifier is varied by rotating the AF Gain control until the proper level is obtained. Removal of the plug from the Phono-Jack once more places the RF and IF portions of the receiver in operation.

(4) DC POWER SOCKET

The octal socket on the rear of the chassis is used when it is necessary to furnish power to the receiver from a direct current source. For conventional AC operation, the shorting plug must remain in the DC OPERATION SOCKET. The shorting plug is removed for battery or vibrapack operation. A similar plug to the shorting plug is then wired, as shown in Fig. 13, and inserted in the octal socket.

A "B" supply capable of delivering 270 volts at 150 milliamperes is necessary for successful operation. Refer to the section on receiver specifications for the total battery drain for DC operation.

In addition to its function as connector for a DC supply, this socket also serves as an outlet for a remote stand-by switch. If the remote stand-by switch or relay is connected between pins #1 and #5 on the shorting plug and the SEND-RECEIVE switch on the front panel of the receiver is set at SEND, the remote switch or relay will control the operation of the receiver in the same manner as the SEND-RECEIVE switch.

(5) "S" METER ZERO SET

"S" METER CONTROL is obtained by varying the knurled knob appearing on the left hand chassis apron edge. This control enables you to properly set the "S" Meter to zero. In order to make the adjustment correctly, the RF GAIN CONTROL must be advanced clockwise as far as it will go. In addition, the switch directly below the bandspread hand-wheel must be in the AVC—ON Position. When these conditions have been complied with, remove the antenna from the Receiver and then adjust the S meter control until the S meter reads zero. Reconnecting the antenna to the receiver will then make the meter indicate the relative carrier strength of each incoming signal as various signals are tuned in.

B OPERATION

Each control of the Model SX-28-A SUPER SKYRIDER receiver performs a definite function that contributes to the outstanding reception capabilities of the unit. Full appreciation of the receiver is to be expected only after you have become familiar with each of the controls and the effect their operation has on the receiver's performance.

The large calibrated main dial shows the frequencies covered throughout the 6 band, 550 kc to 43 mc frequency range of the reciever. They are as follows:

Band 1—	550	to 1,600 kilocycles
Band 2—	1.6	to 3.0 megacycles
Band 3—	3.0	to 5.8 megacycles
Band 4—	5.8	to 11.0 megacycles
Band 5—	11.0	to 21.0 megacycles
Band 6—	21.	to 43. megacycles

(1) The BAND SWITCH, directly below the main dial, will place the proper set of coils in the circuit to cover the desired frequency. The main dial is turned by the large handwheel which is equipped with a micrometer scale for maximum accuracy in reserring or logging purposes. Of particular interest is the locking clutch which will be found directly below the handwheel. This feature will allow you to lock the main dial after a desired signal has been tuned in. Subsequent movement of the handwheel will not detune the receiver because the control is provided with a clutch which disengages the handwheel once the dial lock has been set.

The International Shortwave broadcast bands are indicated on the main dial by heavier lines showing the frequencies on which these transmissions will be heard.

The Amateur band setting positions of the main dial are indicated by a small 0 appearing over the red numbers which identify each amateur band. The hairline on the main dial window should be set so that it intersects this small circle when the main dial is placed in position for the desired amateur band.

(2) The BANDSPREAD dial is calibrated for the 10-20-40 and 80 meter amateur bands. When tuning on the 160 meter band the main dial should be used.

Note: The calibration on the main dial will be accurate *only* if the bandspread condenser is set at minimum capacity which is indicated by a setting of 100 on the bandspread logging scale. It should be recognized that if the bandspread condenser is left at any other setting but 100, that small amount of bandspread condenser capacity, added to the main tuning condenser capacity, would throw off the main tuning dial calibration because the receiver is calibrated with the Bandspread condenser set at minimum capacity. The portions of the amateur bands on which type A3, or telephone, transmissions will be heard are underscored with another dark line.

The numbered outer edge of the bandspread dial will prove to be of great help for logging or pre-setting purposes when the bandspread tuning control is used for easier tuning on frequencies other than those covered by the amateur bands.

When "bandspreading" any frequency throughout the tuning range of the receiver remember the main dial must then be set to a slightly higher frequency than the desired signal. The difference depends on the amount of bandspread condenser capacity used and the frequency of the received signal.

When switching from one range to another, an indicator moves vertically behind both the main and bandspread dials. Tuning fatigue is thereby greatly minimized by focusing attention on only the frequencies covered by that particular setting of the bandswitch.

The translucent, indirectly lighted dials are easily read and so arranged that parallax is reduced to an absolute minimum.

To operate the receiver adjust the following controls in the order in which they are mentioned:

(3) The TONE CONTROL turns the receiver *on* and *off* and in addition emphasizes either the base or treble frequencies to the extent required by various receiving conditions. The effect the Tone Control has on the fidelity of reproduction is shown in Fig. 10.

(4) Place the SEND-RECEIVE switch in the RECEIVE position—have the ANL control off (turned to the left until the switch operates).

Place the bandswitch in position .55 to 1.65 mc, which will then enable you to tune in stations on the standard Broadcast Band.

(5) Rotate the RF GAIN control to the right until #9 on the skirt of the control appears under the panel marker. (The RF Gain must be full ON as above indicated before the S meter will indicate correctly.) So that the S meter will be properly connected in the circuit, the AVC-BFO switch appearing to the lower right of the bandspread handwheel, must be in the AVC ON position.

(6) Note: The *Antenna Trimmer* control is operated on all Bands. Proper adjustment of this control is indicated by the maximum signal.

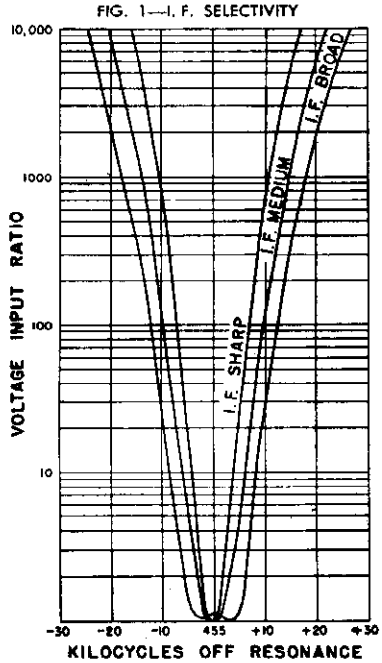
(7) After complying with the above conditions, the AF GAIN control should be advanced to the right until the desired volume is obtained. Tuning the receiver by operating the main dial handwheel will now allow you to pick up stations throughout the .55 to 1.65 mc tuning range of the Broadcast band. Maximum deflection of the S Meter will indicate when each station is accurately tuned in.

When covering the short-wave or higher frequency bands the above procedure should be followed—except that greater care should be used because it is so easy to completely pass over a station.

The other controls on the model SX-28-A SUPER SKYRIDER receiver will enable you to obtain the best results from the receiver once you have become used to their effects on the reception of various types of signals.

(8) The SELECTIVITY control acts as a shutter or gate and varies the width of the path on which signals reach the second detector of the receiver. Six different selectivity steps are provided so that you can successfully cope with different degrees of interference. Reference to Fig. 1 and Fig. 4 will show, graphically, how the control trims the width of the signal so that what interference might be present in the signal's skirts or sidebands is effectively clipped off. Should an interfering signal lap over into the desired signal, adjustment of the SELECTIVITY control, will reduce that interference.

FIG. 1—I. F. SELECTIVITY



Once more refer to Fig. 1 and Fig. 4 and recognize the fact that with the control set in the BROAD IF position, the signal proper and all its parts, which are combined in the side bands, or skirts, will be passed to the 2nd detector, audio amplifier, and then Speaker. As the selectivity of the receiver is increased from BROAD-IF to XTALSHARP, the gate, or admittance path, is so narrowed that only the main portion of the signal is allowed to pass through. This fact and its effect on the quality of reproduction is readily appreciated by listening to a signal and noting the reduction in higher frequency response in the more selective settings of the switch. (See Fig. 10 and Fig. 11)

At this point, it is suggested that the CRYSTAL SHARP setting be used only in cases of extreme interference—the receiver must then be tuned exactly to the signal. Only then will the signal be intelligible because you have clipped off its sidebands in which the sibilants and overtones are embodied.

The CRYSTAL SHARP position of the selectivity switch is to be used principally for the reception of code, or CW, signals. By proper associated operation of the CRYSTAL PHASING control true single signal operation and the maximum in selectivity can be obtained (crystal circuit discussed in detail in the summary of related circuits). See Fig. 3.

MODEL SX-28A, Super Skyrider

THE HALLICRAFTERS CO.

(3) THE IF AMPLIFIER

The IF Amplifier of the Model SX-28-A was designed with a view towards permanency of adjustment under conditions of extreme changes in temperature and humidity as well as unusual mechanical vibration.

The first two IF Transformers are permeability tuned. In comparing this type of transformer with one having compression mica tuning condensers, it must be remembered that it takes many more turns of the adjusting screw to cause the equivalent change in tuning of the permeability tuned type. Hence a slight change in the position of the screw will have negligible effect upon the tuning. The adjusting screw is under spring tension thereby making it impossible to turn under vibration.

The diode transformer is air-tuned with two variable condensers each with a lump capacity of 50 mmf and variable of 50 mmf. These air trimmers are also under spring tension so that they can withstand considerable vibration. Being of the air tuned type, their capacity change is negligible with wide changes in humidity. Reference to the Schematic will show that the IF transformers are expanded in two steps—thereby enabling medium or full reproduction of the higher frequencies to be obtained.

(4) VARIABLE SELECTIVITY

Six ranges of selectivity are provided in the model SX-28-A receiver. They are:

1—Broad IF—(for high fidelity reception)
2—Medium IF—(more selectivity—less highs)
3—Sharp IF—(reduces annoying interference—far less highs)
4—Crystal Broad—(Similar to Sharp IF but cleaner cutting of side bands)
5—Crystal Medium (next selectivity step to #4—greatly increased sideband cutting—more pronounced crystal "Slot" for interference—very little highs present)
6—Crystal Sharp—(position of extreme selectivity—practically no sideband content—very pronounced crystal "slot")

The graphic effects of the different steps of selectivity on a signal are shown in Fig. 1 and Fig. 4.

(5b)

CRYSTAL

The CRYSTAL FILTER and holder are wired directly into the receiver and do not plug in as heretofore. In this manner exceptional crystal filter action is obtained because of the elimination of the capacity and losses of a socket. So mounting the crystal prevents possible change in polarity which would occur if the crystal were improperly inserted in the circuit.

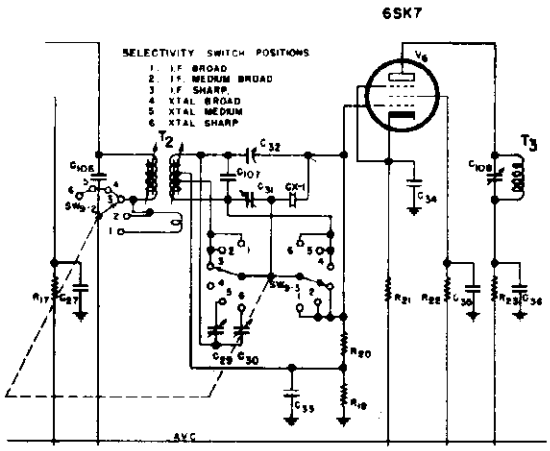
The size of the crystal has been carefully determined to allow the BROAD CRYSTAL position to tune as broadly as possible. The capacity of the crystal holder has been reduced to a minimum through the use of a specially designed polystyrene holder.

(5) CRYSTAL FILTER CIRCUIT

In positions 1, 2, 3 the crystal is short circuited. In position 4 the short across the crystal is opened and the iron core in the secondary of the transformer is adjusted for Broad Crystal Action and at this point is accurately tuned to the crystal frequency. Due to the close coupling of the secondary to the crystal, the sharply rising resonance curve of the crystal causes, in contrast, a sharply falling resonance curve in the secondary. The combined action of these two characteristics results in a relatively broad resonance curve for the CRYSTAL BROAD selectivity setting. In the MEDIUM CRYSTAL No. 5 position, C_{29} is adjusted for selectivity midway between the BROAD and CRYSTAL SHARP settings. (See Fig. 2 and Fig. 4)

In position 6, or CRYSTAL SHARP, the trimmer C_{30} is adjusted for the Sharpest crystal action. Under this condition, the Secondary is slightly detuned from the resonant crystal frequency sufficiently so that its resonance curve is not greatly affected by the crystal but still coupled tightly enough so that it can transfer energy to the crystal circuit. When this point is reached it is indicated by a rise in the output. Two such points of increased output will normally occur—one for each adjustment of the secondary on either side of the resonant frequency of the crystal.

FIG. 2—CRYSTAL FILTER SCHEMATIC



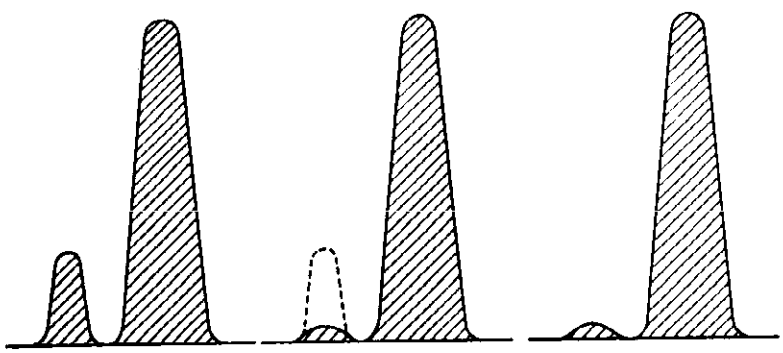
(5a)

SINGLE SIGNAL ADJUSTMENT

It is extremely simple to attain single signal reception with the SX-28-A. First, turn on the BFO to the desired Beat Note and turn the selectivity switch to the XTAL SHARP position. Pick a good solid CW signal, preferably a commercial station because a commercial is likely to stay on long enough for you to complete the phasing adjustment for single signal reception.

You will find on tuning across this signal that it has two amplitudes. Tune first to the weaker of these two amplitudes. Now, turn the PHASING control until this weaker of the two amplitudes is reduced to a minimum. (If the weaker amplitude appears on the right the above procedure still holds.) Then tune to stronger of the two amplitudes and adjust the BFO control to a tone most pleasing to you. This adjustment for single signal selectivity will hold with no further adjustment unless you change the phasing control. (See Fig. 3.)

FIG. 3—SINGLE SIGNAL OPERATION



With Selective Switch in XTAL Sharp position identify the weaker amplitude—Tune Receiver to the weaker.

Adjust phasing control carefully until this weaker amplitude is reduced to a minimum.

Retune Receiver to the stronger amplitude and then adjust pitch control until you get note most pleasing to copy.

(9) CRYSTAL PHASING CONTROL

The Phasing Control is in the circuit on three positions of the selectivity control namely—XTAL Sharp, XTAL Medium and XTAL Broad.

The control is used to remove heterodyne interference as well as to minimize other forms of interference having a predominance of high frequency components—such as static and interference from electrically operated devices.

(10) The A.N.L., or *Automatic Noise Limiter*, materially contributes to the satisfactory operation of the receiver by limiting objectionable interference caused by ignition systems or other man made causes of electrical disturbances. With the A.N.L. control retarded to the left as far as it will go, or until the A.N.L. switch is heard to operate—the noise limiter circuit is not functioning. Turning the control to the right closes the switch which is mounted on the control. The noise limiter is now operating. Progressively turning the control clockwise varies the threshold at which the noise limiter starts to take hold. The setting at which the control will be left depends entirely on the type and amount of interference present as well as the signal strength. The noise limiter should be judiciously adjusted because through its operation the desired signal can even be eliminated or badly distorted which destroys its usefulness. Only after you have become familiar with the operation of this control by actual practice can you determine how far it should be advanced before the best compromise between noise and signal is obtained. (See Fig. 6.)

(11) The AVC-BFO OFF-ON switch performs a dual function. The AVC circuit should be operating for the reception of telephone, or modulated, signals in order to reduce fading to a minimum. As previously mentioned, the functioning of the S Meter is dependent upon AVC action so the switch must be in the AVC ON position when the S meter is used to measure relative carrier intensity.

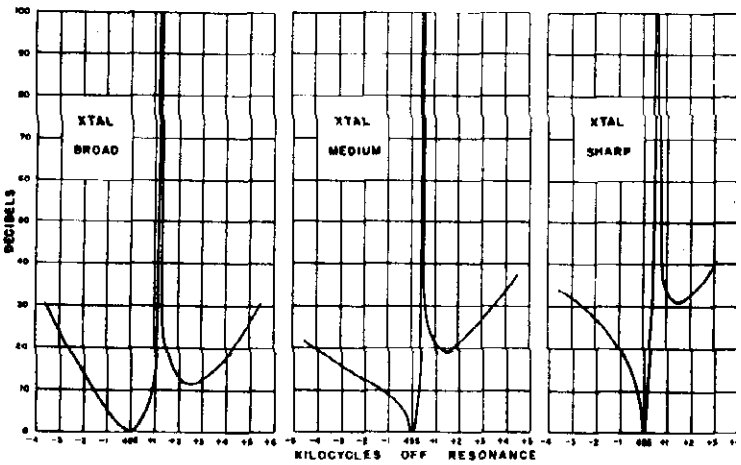
Inasmuch as the AVC circuit levels all signals to a predetermined value (See Fig. 7) no one signal can overload the receiver and cause distortion. At times, in searching for distant or weak signals, it might be desirous to use the full sensitivity of the Model SX-28-A. In that case place the AVC switch in the AVC OFF position. Remember that with the receiver operating with no AVC action, strong signals will overload the input circuit with resultant distortion. Under such a condition of operation the sensitivity of the set must be then controlled, manually, by properly retarding the RF Gain control until you have reached the point below which overloading takes place.

The other function of this switch is to turn on the Beat Frequency oscillator. When receiving code signals, a beat note is absolutely essential. With the BFO switch in the ON position, each signal tuned in will be accompanied with a beat note or whistle. For proper adjustment of the BFO control which appears directly under the TONE CONTROL the following procedure is suggested. Set the BFO control to zero, now tune in a signal either voice or code. If a code signal is received, only the carrier or thump of the signal will be audible because no beat note is present. Be sure that you have the signal accurately resonated. Now, without retuning the receiver, rotate the BFO control until a beat note of the desired pitch is obtained. You now have introduced a beat note which differs from the IF frequency of the receiver, namely 455 kc, by the frequency of the audible signal. Variation of the BFO control will allow you to change the pitch, or frequency, of the oscillator which will prove to be of help under various conditions of interference.

(12) Directly under the BFO control will be seen the BASS IN-OUT Switch. With this switch in the BASS IN position you will have normal audio fidelity. Placing the switch in the BASS OUT position, the audio filter CH_2 is inserted. The effect of this filter on the band of frequencies passed is shown Fig. 11. This filter will contribute greatly to the intelligibility of the received signal when the receiver is operated in the advanced positions of selectivity.

(13) The Head Phone Jack is connected to a tap on the output transformer. The signal in the headphones is of the proper volume for satisfactory communications reception. Since no direct current is present in the headphone circuit crystal type phones can be used.

FIG. 4—CRYSTAL SELECTIVITY



(1) THE 2-STAGE PRESELECTOR

The RF AMPLIFIER, or pre-selector, of the Model SX-28-A SUPER SKYRIDER has 1-6AB7, 1-6SK7 tubes in cascade on Bands 3, 4, 5, and 6. On Bands 1 and 2 more than one stage is unnecessary to obtain the required image ratio and reduction of spurious interference. With two RF stages using three pre-selection circuits, the band width would be narrowed to such an extent that even expanding the IF Amplifier to its utmost would still not provide high-fidelity reception. The modern communications receiver requires two stages of preselection on the higher frequencies to accomplish only one primary object —satisfactory image rejection.

The Model SX-28-A has an image ration of 20 to 1 at 28 mc—350 to 1 at 14 mc and a proportionately increasing ratio as the frequency is lowered. While the two RF stages are principally needed to obtain such image ratios they also perform two other useful functions—more favorable signal to noise ratio and slightly increased selectivity.

Examining the coil assembly will immediately show how rigidly it is constructed and what care has been taken to completely shield each section from the other. The manner in which the RF and antenna coils are tuned on bands 3, 4, 5, and 6 will be interesting. Rather than push turns to compensate for variations in inductance, each coil is permeability tuned. This results in exact adjustment of inductance with improved tracking and gain as the result. On Bands 1 and 2 the inductance of the antenna coils is sufficiently large so that lead length differences do not cause any noticeable inductance change.

2) THE OSCILLATOR AND CONVERTER

A separate 6SA7 tube is used as the High Frequency Oscillator in the Model SX-28-A SUPER SKYRIDER. This tube proves desirable in this function because of its very high value of transconductance which enables the oscillator to operate with very little coupling to the coil. This feature reduces the unfavorable effects of tube variations and voltage fluctuations on the tuned circuit. The HF Oscillator is coupled to the 6SA7 converter tube at the Cathode Tap—a point where variations of operating parameters of the converter tube will least affect the 6SA7 Oscillator. A 6SA7 tube is used in the Mixer Circuit because tests indicated that changes in operating voltages caused less reflection in the injector grid loading than would occur in most converter tubes. Another feature in favor of the 6SA7 tube is that a negative loading is applied to the tuned circuit feeding its control grid. This characteristic improves the gain and selectivity of the tuned circuit which in turn improves the image and signal to noise ratio.

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FIG. 5—NOISE LIMITER SCHEMATIC

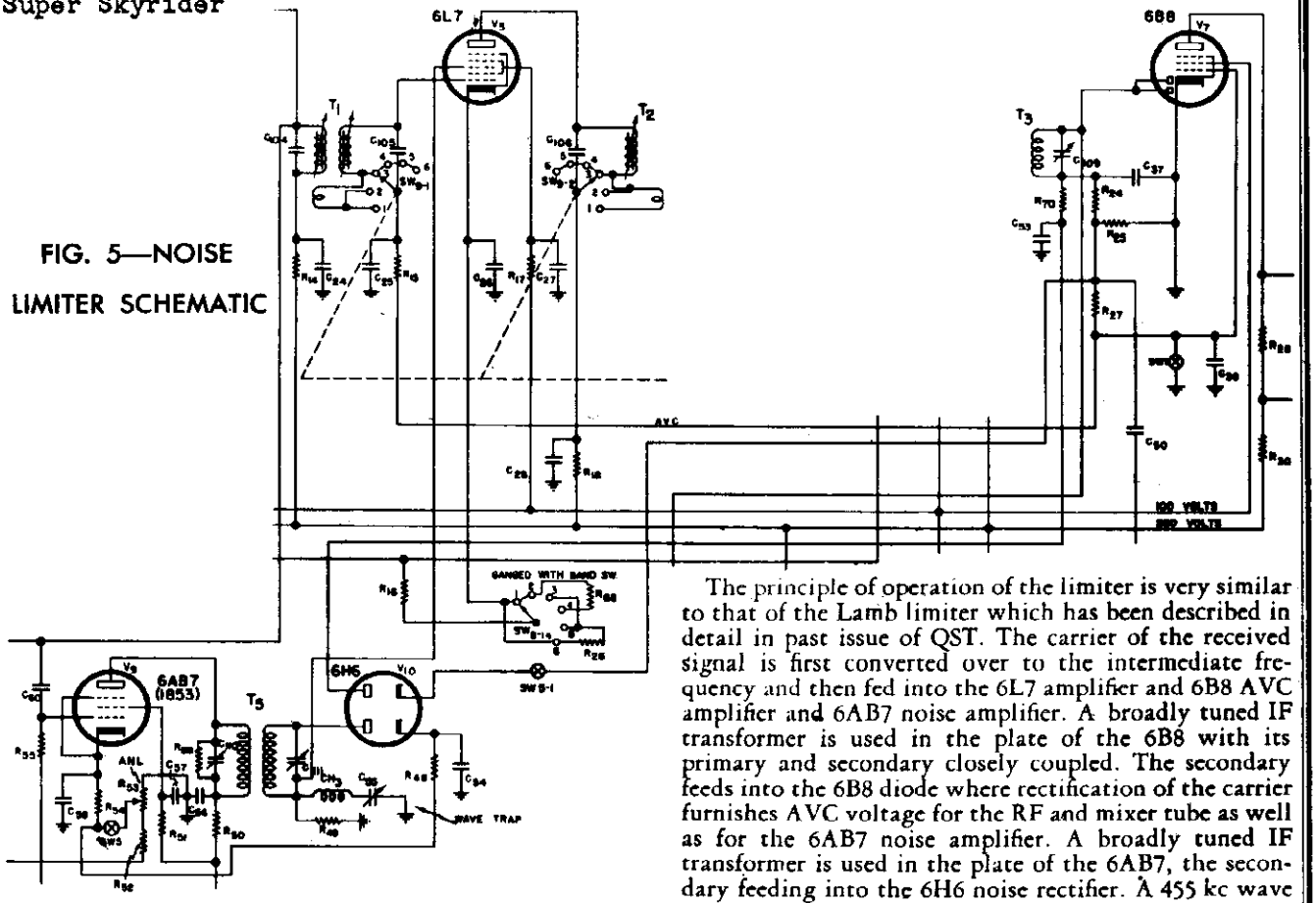
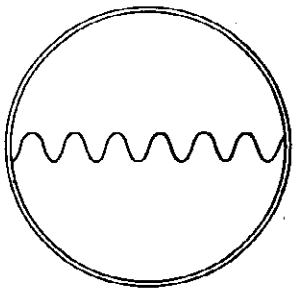
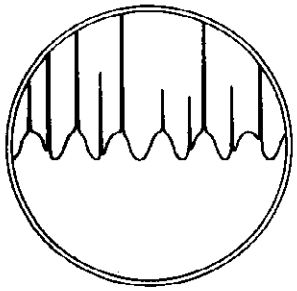


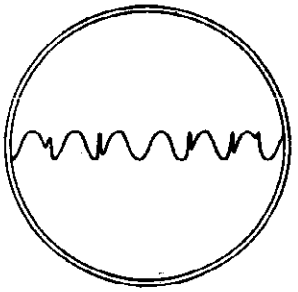
FIG. 6—NOISE LIMITER ACTION



Constant tone signal no interference ANL OFF.



Same Signal ANL OFF. (Note transient peaks extend well beyond range of screen. Signal not readable.)



Same signal. Same noise. ANL-ON adjusted for most favorable signal to noise ratio.

The principle of operation of the limiter is very similar to that of the Lamb limiter which has been described in detail in past issue of QST. The carrier of the received signal is first converted over to the intermediate frequency and then fed into the 6L7 amplifier and 6B8 AVC amplifier and 6AB7 noise amplifier. A broadly tuned IF transformer is used in the plate of the 6B8 with its primary and secondary closely coupled. The secondary feeds into the 6B8 diode where rectification of the carrier furnishes AVC voltage for the RF and mixer tube as well as for the 6AB7 noise amplifier. A broadly tuned IF transformer is used in the plate of the 6AB7, the secondary feeding into the 6H6 noise rectifier. A 455 kc wave trap (CH4 and C55) is used which allows the passage of the higher audio frequencies without attenuation. In the form of further explanation of our approach toward noise elimination, it must be remembered that noise in general is composed of a random mixture of high and low frequencies. Of this mixture the predominating higher frequencies are the most objectionable. It is to our advantage to retain the high frequency components. Thus, these transients will be allowed to rise to a point far above the carrier level with the result that they will be applied to the injector grid of the 6L7 tube without being reduced in value. Transients, such as ignition interference having a steep wave front, consist largely of high frequency components. The voltage applied to the grid of the 6L7 tube has a negative polarity because of the 6H6 noise rectifier. By varying the ANL control, we raise or lower the negative voltage applied to the 6L7 tube until it is barely sufficient to overcome the noise impulses applied to the grid of this tube without allowing the modulation peaks of the carrier to become badly distorted.

If the noise limiter adjustment permits too great a value of transient voltage to be applied to the 6L7 injector grid, detection will take place and rectified components of this modulated carrier will appear in the 6L7 plate circuit. This effect will appear as distortion in the output of the receiver. If, on the other hand, not enough noise voltage is applied, then the momentary decrease in sensitivity will not be great enough to stop the noise from getting through and some of it will appear in the plate circuit of the 6L7 tube and consequently in the output of the receiver. As a result the noise limiter must be carefully adjusted to the particular carrier and noise level being received. (See Fig. 6)

The following measurements made with a 20,000 ohms per volt meter and taken from the socket terminal indicated to ground or receiver chassis. Antenna and ground were disconnected from the receiver when these measurements were taken and the RF and AF gain controls set at maximum. "DL" means Dead Lug but will indicate voltage when used as a tie. Normal tolerance allows a variation of ±10% from the indicated values.

TUBE	FUNCTION	SOCKET TERMINALS								
		1	2	3	4	5	6	7	8	Cap.
V_1-6AB7	RF Amp. (1)	...	...	...	0.1	4.15	170	6.3	227	.....
V_2-6SK7	RF Amp. (2)	...	...	4.35	0.1	4.35	105	6.3	279	.....
V_3-6SA7	Mixer	...	...	250	100	0.12	4.1	6.3	...	.....
V_4-6SA7	HF Osc.	...	...	116	116	0.3	...	6.3	116	.....
V_5-6L7	IF Amp. (1) Noise Limiter	...	...	245	102	...	...	6.3	4	−.075
V_6-6SK7	IF Amp. 2	...	...	4	...	4	107.5	6.3	235	.....
V_7-6B8	2nd Det. S Meter Tube	...	...	17.2	−.255	−.255	108	6.3	..	−.17
V_8-6B8	AVC Amp.	...	...	225.5	0.2	0.2	107	6.3	2	.....
V_9-6AB7	Noise Amp.	...	...	...	.07	1.1	150	6.3	225	.....
V_{10}-6H6	Noise Rectifier	...	...	...	.1	...	17.6 DL	6.3	—.1	.....
V_{11}-6J5	Beat Osc.	...	...	140	...	−7.4	...	6.3	...	BFO ON ONLY FOR TEST
V_{12}-6SC7	1st Audio Amp.	...	140	...	...	137	1.4	6.3	...	.....
V_{13}-6V6GT	P.P. Audio Amp.	...	...	310	290	...	198 DL	6.3	17	.....
V_{14}-6V6GT	P.P. Audio Amp.	...	...	310	290	...	...	6.3	17	.....
V_{15}-5Z3	Rectifier *	320	340 AC	340 AC	320	...	...	...	...	.....

* 5 V. AC between Terminals 1 & 4

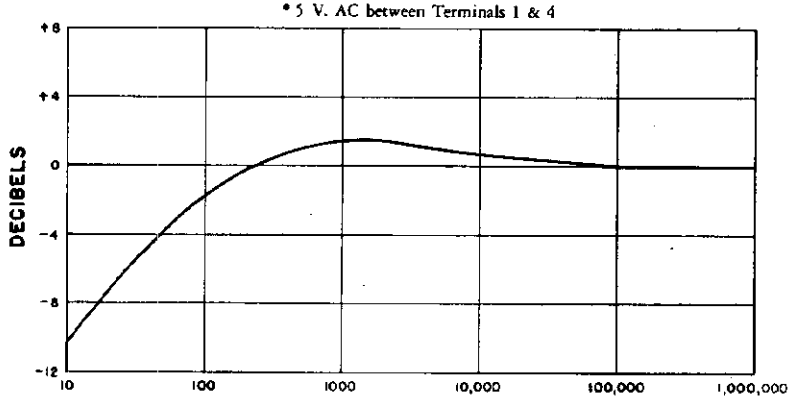


FIG. 7—A.V.C. CURVE—AT 3 MC.

FIG. 10—AUDIO FIDELITY CURVE

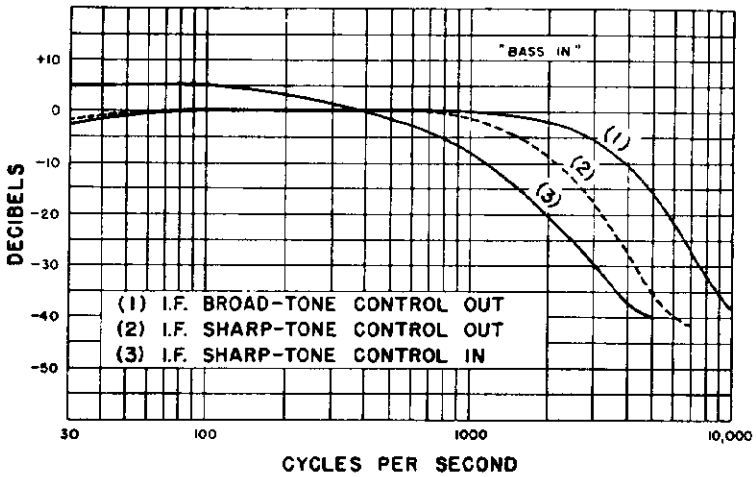


FIG. 11—AUDIO FILTER CURVE

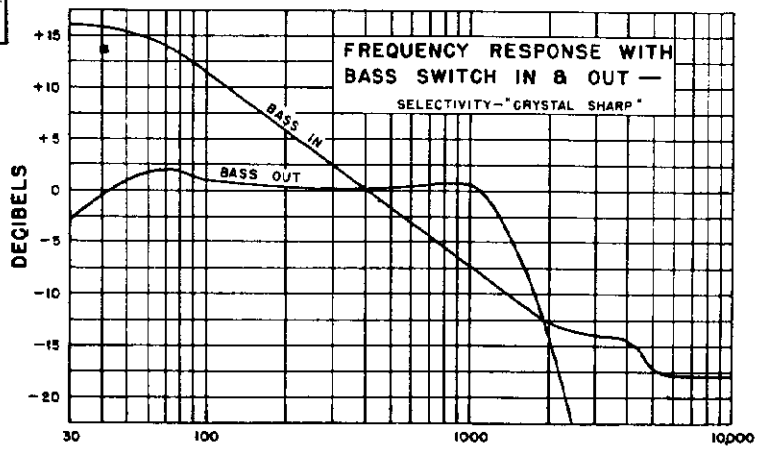


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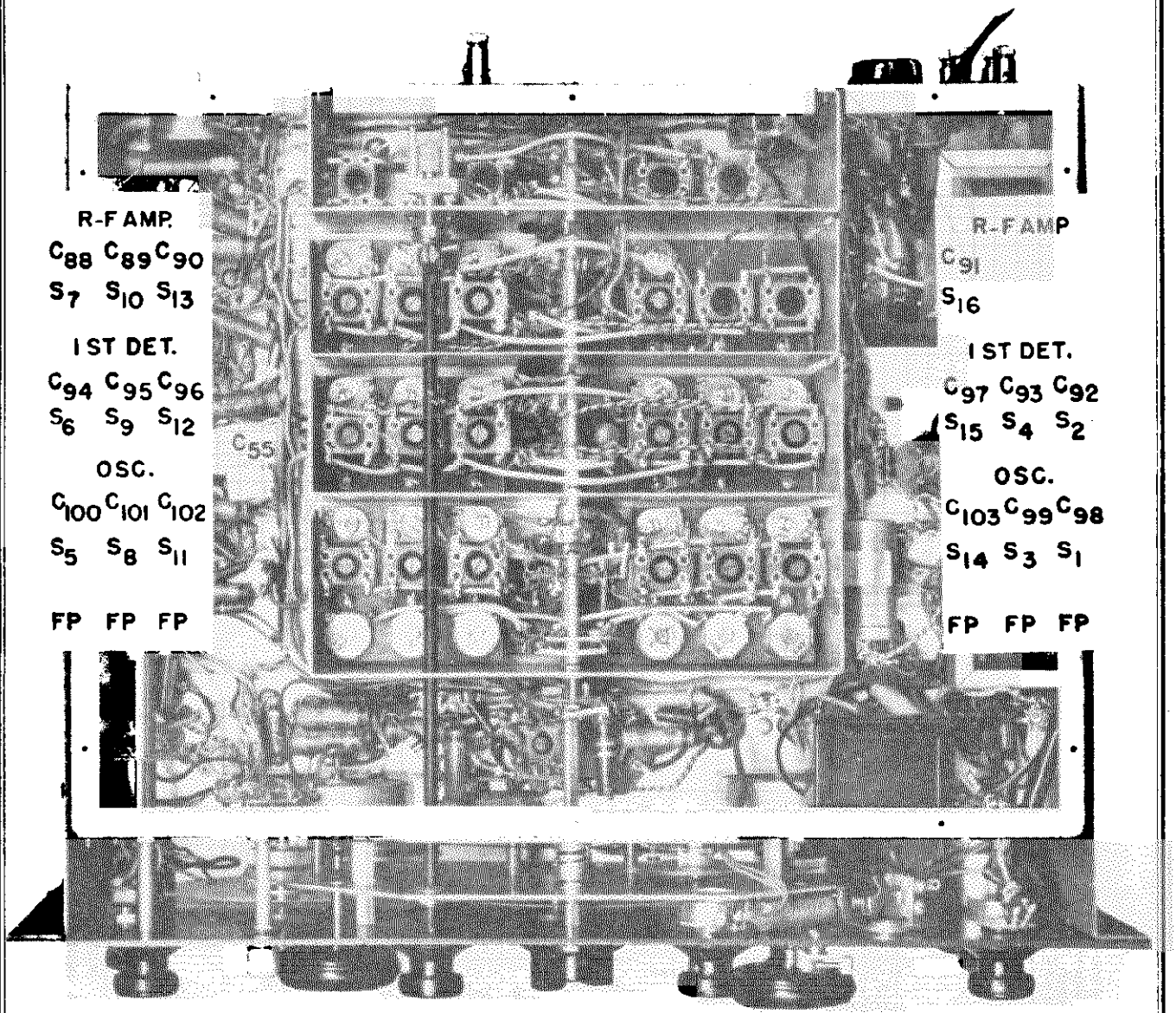
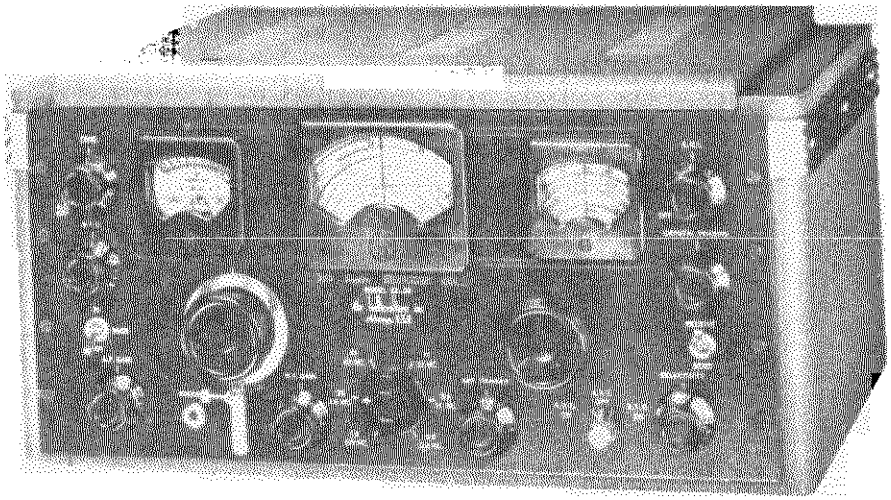
FIG. 12—RF AND OSC ADJUSTMENT LOCATION AND ALIGNMENT PROCEDURE





Equipment Needed for Aligning:

1—An all wave signal generator which will provide an accurately calibrated signal at the test frequencies indicated.

2—Output indicating meter connected to 5000 ohm output terminals.

3—Non-metallic screw driver.

4—Dummy antenna of 200 mmf and also 400 ohm carbon resistor.

Setting of controls prior to alignment—IF and RF.

Tone control at maximum high frequency position (#9)—BFO at 0—Bass switch at Bass IN—AF Gain at #9—RF Gain at #9—Band switch—IF alignment position .55 to 1.6 band—RF alignment depending on band aligned.

Selectivity control at sharp IF—Send-Receive switch in Receive—Crystal phasing at #3 on left side—ANL—OFF at 0—AVC OFF.

Important: Have bandspread control so logging scale reads 100.

Antenna trimmer adjusted for Maximum gain at each RF alignment point on all bands.

(1) **455 KC—IF Alignment:** Tune main dial to 1400 kc on .55 to 1.6 mc band. Connect the hot lead from the signal generator to 6SA7 mixer terminal #8—Ground to chassis. Roughly adjust the aligning screws of T1, the lower screw of which is accessible through hole in right mounting bracket, for maximum gain. Now adjust lower screw on T2 (do not adjust upper screw). Also adjust C31 and the air trimmer condensers at the top of T3 for maximum gain. (See Fig. 8 for location of IF adjustments)

Switch to Crystal Broad Position—Turn on BFO and adjust to a tone of about 1000 cycles. Vary the frequency of the signal generator while adjusting the top screw on T2 until the output goes through a maximum, dips down and starts going up again. Adjust the phasing control for maximum selectivity and then back off the top screw on T2 until the output reaches a minimum value between the two maximum values first noted. The frequency of the signal generator should be varied over a small range while adjusting the top screw of T2. A swishing note, in contrast to the usual sharp crystal tone will be apparent when the correct adjustment has been reached.

Switch to "Xtal Sharp" and adjust C_{36} for maximum output while varying signal generator frequency. Two points of maximum output will be noted corresponding to two adjustments of C_{36}. Either one of these points may be used at which to leave C_{36} a sharply peaked tone will result at the correct adjustment.

Switch to "Xtal Medium" and adjust C_{35} till the output is midway between the outputs reached while aligning the "Xtal Sharp" and "Xtal Broad" positions. The apparent sharpness of tone should be midway between the "Sharp" and "Broad" positions.

Switch again to "Xtal Sharp" and set the signal generator to exact crystal frequency. Set BFO front panel control to a tone of approximately 1000 cycles. Switch again to "Sharp IF" and carefully realign the IF transformers as earlier described in the first paragraph of these instructions.

(2) **BFO Adjustment:** Set front panel control to zero—BFO switch ON. Signal Generator tuned to crystal frequency—selectivity switch in IF Sharp position—now, adjust screw on top of T4, after loosening lock nut, to zero best. (See Fig. 8)

(3) **Noise Limiter and AVC Amplifier Adjustment:** Have the controls set as before except that the AVC switch is now in the ON position. Connect a high resistance type voltmeter across R49 which is connected between terminal #5 of the 6L7 tube and chassis. Connect a 50,000 ohm resistor across primary of T5 (Red and Blue leads) Set generator at 455 kc as for IF alignment. Connect generator to grid of 6AB7 tube (pin #4). Rotate ANL control all the way to the right, or position #9. Adjust screws on top of T5 for maximum indication on DC meter connected across R47. Reconnect generator, as for IF alignment, to mixer grid of 6SA7 tube. Remove 50,000 ohm resistor which was inserted across primary of T5 during alignment. Remove grid clip off top of 6L7 tube. With generator set at 455 kc and ANL control at extreme right adjust wave trap trimmer C55 for minimum signal as indicated on output meter. (See Fig. 8 and Fig. 12 for location of adjustments)

With generator connected to 6SA7 mixer grid as above, replace 6L7 grid and turn ANL control to extreme left until switch clicks. Connect high resistance DC meter across 6B8 diode filter condenser C64. Adjust screw on top of T6 for maximum indication on DC meter across C64.

(4) For RF and oscillator adjustment location and alignment procedure see Fig. 12.

Connect hot lead of signal generator to A_1—through dummy antenna shown in table. Leave jumper connected between A_2 and G. Ground of Generator to Chassis. "FP" indicates fixed pad—*do not adjust.*

Band	Rec. Dial Setting	Sig. Gen. Freq.	Dummy Antenna	HIGH FREQUENCY END		LOW FREQUENCY END	
				Adjust Osc. With	Adjust Trimmers for Max. Gain	Adjust Osc. With	Permeability Tuned By
1	1.5 mc	1.5 mc	200 mmf	C_{96}	C_{92}	....	.....
1	.6	.6	200 mmf	....	.....	S_1	S_2
2	3.0	3.0	400 ohms	C_{99}	C_{93}	....	.....
2	1.8	1.8	400 ohms	....	.....	S_3	S_4
3	5.4	5.4	400 ohms	C_{100}	C_{94} C_{95}	....	.....
3	3.0	3.0	400 ohms	....	.....	S_5	S_6 S_7
4	10.0	10.0	400 ohms	C_{101}	C_{95} C_{98}	....	.....
4	7.0	7.0	400 ohms	....	.....	S_8	S_9 S_{10}
5	20.0	20.0	400 ohms	C_{102}	C_{96} C_{90}	....	.....
5	12.0	12.0	400 ohms	....	.....	S_{11}	S_{12} S_{13}
6	36.0	36.0	400 ohms	C_{103}	C_{97} C_{91}	....	.....
6	24.0	24.0	400 ohms	....	.....	S_{14}	S_{15} S_{16}

AVC ACTION

A double AVC system is used. The RF and mixer tubes are operated by the broadly tuned carrier coming through only three tuned IF circuits. The final signal however passes through six-tuned IF circuits. As a result, when the signal is slightly detuned, the receiver output has dropped considerably while the AVC action has dropped but very little. This results in a reduction of between-station noise and a more sharply defined aural tuning action.

"S" OR SIGNAL INTENSITY METER

The approximate DB per S unit equivalent is 6 DB's. As is known, a DB, or decibel, is a unit of change in signal level and is defined as being the least detectable change the average ear can appreciate when listening to a single pitched tone. 3DB is the least change the ear detects when listening to sounds varying in both amplitude and pitch. By comparison, a variation of one S unit on the meter will indicate a change of two detectable steps in signal level. Quantitatively, a DB gain or loss is equal to 20 $\log_{10}\left(\frac{E_1}{E_2}\right)$ where E_1 = input voltage and E_2 = output voltage.

THE SECOND DETECTOR

As will be noted, a diode type of second detector is used in the Model SX-28-A. Its choice was prompted by the fact that such a detector is capable of handling large percentages of modulation with very little distortion. This is due to the output of the diode being easily filtered (IF Removed). In addition, the rectified output contains a DC component which can be used for AVC purposes.

THE BEAT FREQUENCY OSCILLATOR

The BFO is turned on with the switch below the bandspread handwheel and adjusted by the skirted knob directly below the tone control. The BFO circuit, as will be seen by referring to Fig. 13, is the well known Hartley oscillator. It will be noticed that a plate dropping resistor is used to compensate for plate voltage variations. An increase in receiver voltage causes an increase in the plate current of the oscillator. This increase in turn causes the voltage drop across the resistor to increase, thus maintaining a more constant voltage at the plate of the beat oscillator tube. A favorable ratio of capacity to inductance is used. The fixed tank capacity has been artifically aged by alternately exposing it to very high and then low temperatures. In this manner any residual strains of the component parts are removed and the capacity of the condenser remains constant. The BFO coil is permeability tuned which further removes the possibility of drift which would occur should a compression variable be used to resonate the circuit.

Proper location of the Beat Oscillator tube and its associated components plus excellent shielding and mechanical rigidity do much to keep stray fields from being established. Little BFO leakage is to be expected in the Model SX-28-A so "tweets" or BFO harmonics will not prove to be bothersome.

THE AUDIO AMPLIFIER

The second or output stage of the audio amplifier in the Model SX-28-A receiver uses two 6V6GT tubes connected in push-pull. These tubes are driven by the 6SC7 double triode. One of the triode sections of the 6SC7 tube is used as the inverter to the 6V6GT tubes. A portion of the signal from the plate circuit of the first 6SC7 triode is fed to the grid of the other 6SC7 triode Section, thereby giving two output voltages in opposite phase suitable for exciting the push-pull 6V6GT output amplifier.

THE POWER SUPPLY

The power supply in the Model SX-28-A is quite normal except that it supplies voltage for the 6V6GT output tubes directly from the rectifier or before the filter system. Voltage fluctuations in the receiver are greatly reduced—increasing the audio output of the receiver and stabilizing the operation of all circuits.

The filter circuit consisting of a total of 60 mfds of capacity plus an additional filter in the 6SC7 plate supply and a 12 henry choke keep the hum level of the receiver in excess of 60 DB below maximum output. The power transformer is built to withstand continuous operation at 250 degrees F but has been designed to run at approximately 160 degrees F under normal conditions.

SPECIFICATIONS

Tubes:

1	6AB7	1st RF Amplifier
1	6SK7	2nd RF Amplifier
1	6SA7	Mixer
1	6SA7	HF Oscillator
1	6L7	1st IF Amplifier Noise Limiter
1	6SK7	2nd IF Amplifier
1	6B8	2nd Detector and S meter tube
1	6B8	AVC Amplifier
1	6AB7	Noise Amplifier
1	6H6	Noise Rectifier
1	6J5	Beat Oscillator
1	6SC7	1st Audio Amplifier
2	6V6GT	Push-Pull Output Amplifiers
1	5Z3	Rectifier

Power Consumption - at 117 volts - 60 cycles—138 watts
Power Consumption DC operation 118 amp at 6 volts or 108 watts
Power Output 8 watts undistorted
Sensitivity—(for 500 milliwatts output) varies between the limits of 6 to 20 microvolts over the entire frequency range of the receiver.

	2 x	1000 x
Selectivity—IF broad (high fidelity)	12 kc	36 kc
IF Sharp	4.1 kc	22 kc

Frequency Range RF Note: These are the actual frequencies covered corresponding to nominal figures indicated on the front panel

550	to	1620 kilocycles
1.5	to	3.1 megacycles
2.9	to	5.9 megacycles
5.75	to	11.5 megacycles
10.3	to	21.5 megacycles
20.4	to	43 megacycles

Frequency response AF (audio filter out—broad IF—tone control high) 70 to 3000 cycles ± 2½ DB
Speaker Output Impedances 5000 and 500 ohms
Intermediate Frequency 455 kc
Table cabinet dimensions 20½" long x 10" high x 14⅜" deep
Relay Rack dust cover dimensions 14⅜" deep x 17⅞" long x 8¾" high
Panel dimensions 19" x 8¾"
Chassis dimensions—17⅞" x 13½"
Weight—(unpacked) 75 lbs. packed 87 lbs.

MODEL SX-28A,
Super Skyrider

THE HALLICRAFTERS CO.

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
R_1	Resistor, 100,000 ohm ± 10%, ½ watt, carbon	ASA	RC21AE104K
R_2	Resistor, variable, 10,000 ohm ± 20% carbon, type 35	CT	25C066
R_3	Resistor, 330 ohm ± 10%, ½ watt, carbon	ASA	RC21AE331K
R_4	Resistor, 27,000 ohm ± 10%, 1 watt, carbon	ASA	RC31AE273K
R_5	Resistor, 1000 ohm ± 10%, ½ watt, carbon	ASA	RC21AE102K
R_6	Resistor, 6,800 ohm ± 10%, 2 watt, carbon	ASA	RC41AE682K
R_7	Same as R_1		
R_8	Same as R_3		
R_9	Same as R_5		
R_{10}	Resistor, 2700 ohm, ± 10%, ½ watt, carbon	ASA	RC21AE272K
R_{11}	Same as R_1		
R_{12}	Resistor, 390 ohm ± 10%, ½ watt, carbon	ASA	RC21AE391K
R_{13}	Same as R_5		
R_{14}	Same as R_{10}		
R_{15}	Same as R_1		
R_{16}	Resistor, 270 ohm ± 10%, ½ watt, carbon	ASA	RC21AE271K
R_{17}	Same as R_5		
R_{18}	Same as R_{10}		
R_{19}	Same as R_1		
R_{20}	Resistor, 470,000 ohm ± 10%, ½ watt, carbon	ASA	RC21AE474K
R_{21}	Resistor, 270 ohm ± 10%, ½ watt, carbon	ASA	RC21AE271K
R_{22}	Same as R_5		
R_{23}	Same as R_{10}		
R_{24}	Same as R_1		
R_{25}	Same as R_{20}		
R_{26}	Resistor, 1,000 ohm ± 10%, ½ watt, carbon	ASA	RC21AE102K
R_{27}	Same as R_{20}		
R_{28}	Resistor, 100 ohm ± 10%, ½ watt, carbon	ASA	RC21AE101K
R_{29}	Resistor, variable, 500 ohm ± 20%, carbon, type 25	CT	25C022
R_{30}	Resistor, 27,000 ohm ± 10%, 2 watt, carbon	ASA	RC41AE273K
R_{31}, R_{32}	Resistor, two sections; section #1 (R_{31}), 11,000 ohm ± 10%, 1½ watts; section #2 (R_{32}) 4,000 ohm ± 10%, 7 watts; metal clad, wire wound	CS	24A046
R_{33}	Resistor, variable, 500,000 ohm ± 20%, carbon	CT	25C065
R_{34}	Same as R_5		
R_{35}	Resistor, variable, 500,000 ohm ± 20%, carbon type AE-35-500M	CT	25C064
R_{36}	Same as R_1		
R_{37}	Same as R_1		
R_{38}	Resistor, 47,000 ohm ± 10%, ½ watt, carbon	ASA	RC21AE473K
R_{39}	Resistor, 180,000 ohm ± 10%, ½ watt, carbon	ASA	RC21AE184K
R_{40}	Resistor, 270,000 ohm ± 10%, ½ watt, carbon	ASA	RC21AE274K
R_{41}	Same as R_{40}		
R_{42}	Resistor, 220 ohm ± 10%, 2 watt, wire wound, type BW2	IRC	24BV221E
R_{43}	Resistor, 20,000 ohm ± 5%, 2 watt, carbon	ASA	RC41AE203J
R_{44}	Resistor, 5,000 ohm ± 20%, 10 watt, wire wound, viterous enamel, type CC	U	24BG502F
R_{45}	Same as R_{43}		
R_{46}	Same as R_{38}		
R_{47}	Resistor, 10 ohm ± 10%, ½ watt, carbon	ASA	RC21AE100K
R_{48}	Same as R_1		
R_{49}	Resistor, 1 megohm ± 10%, ½ watt carbon,	ASA	RC21AE105K
R_{50}	Resistor, 560 ohm ± 10%, ½ watt, carbon	ASA	RC21AE561K
R_{51}	Resistor, 20,000 ohm ± 5%, 1 watt, carbon	ASA	RC31AE203J
R_{52}	Same as R_{38}		
R_{53}	Resistor, variable, 50,000 ohm ± 20%, carbon with DPST switch, type WR-35	CT	25C067
R_{54}	Resistor, 33 ohm ± 10%, ½ watt, carbon	ASA	RC21AE330K
R_{55}	Same as R_{20}		
R_{56}	Same as R_5		
R_{57}	Same as R_1		
R_{58}	Resistor, 180 ohm ± 10%, ½ watt, carbon	ASA	RC21AE181K
R_{59}	Same as R_1		
R_{60}	Same as R_{40}		
R_{61}	Same as R_{20}		
R_{62}	Same as R_{20}. Part of transformer T_1. Shown for reference only.		
R_{63}	Same as R_{10}		
R_{64}	Same as R_{20}		
R_{65}	Same as R_{38}		
R_{66}	Same as R_{38}		
R_{67}	Same as R_{50}		
R_{68}	Resistor, 1,200 ohm ± 10%, ½ watt, carbon	ASA	RC21AE122K
R_{69}	Same as R_1		
R_{70}	Same as R_{49}		
R_{71}	Resistor, 4700 ohm ± 10%, 1 watt, carbon	ASA	RC31AE472K
R_{72}	Same as R_{50}		
R_{73}	Not used		
R_{74}	Same as R_{47}		

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
C_1, $C_{1.1}$, $C_{1.2}$, C_2, $C_{2.1}$, $C_{2.2}$, $C_{2.3}$	Capacitor, variable, 4 unit gang, each unit consists of 2 sections, except unit 4 at rear which contains only one section (section #2), air dielectric, special; Section #1-min. cap. 16.3 mmfd., max. cap. 187.5 mmfd. (C_1, $C_{1.1}$, $C_{1.2}$); Section #2-min. cap. 21.5 mmfd., max. cap. 250.0 mmfd. (C_2, $C_{2.1}$, $C_{2.2}$, $C_{2.3}$).	RC	48B050
C_3, $C_{3.1}$, $C_{3.2}$, $C_{3.3}$, C_4, $C_{4.1}$	Capacitor, variable, 4 unit gang, each unit consists of 3 sections, air dielectric, special; Section #1-min. cap. 6 mmfd., max. cap. 16 mmfd. (C_3, $C_{3.1}$, $C_{3.2}$, $C_{3.3}$); Section #2-min. cap. 6.5 mmfd., max. cap. 21.8 mmfd. (C_4, $C_{4.1}$, $C_{4.2}$, $C_{4.3}$); Section #3-min. cap. 6.5 mmfd., max. cap. 27 mmfd. (C_5, $C_{5.1}$, $C_{5.2}$, $C_{5.3}$)	RC	48B051
$C_{4.2}$, $C_{4.3}$, C_5, $C_{5.1}$	Capacitor, variable, 4 unit gang, each unit consists of 3 sections, air dielectric, special; Section #1-min. cap. mmfd., max. cap. 16 mmfd. (C_3, $C_{3.1}$, $C_{3.2}$, $C_{3.3}$); Section #2-min. cap. 6.5 mmfd., max. cap. 2.5 mmfd. (C_4, $C_{4.1}$, $C_{4.2}$, $C_{4.3}$) Section #3-min. cap. 6.5 mmfd., max. cap. 27 mmfd. (C_5, $C_{5.1}$, $C_{5.2}$, $C_{5.3}$)	RC	48B051
C_6	Capacitor, variable, min. cap. 3.5 mmfd., max. cap. 50 mmfd., air diclectric, ceramic insulation, type 22	RC	48A053
C_7	Capacitor, 2960 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special	UE	44B110
C_8	Capacitor, 2400 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special	UE	44B109
C_9	Capacitor, 2240 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special	UE	44B108
C_{10}	Capacitor, 1700 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special	UE	44B107
C_{11}	Capacitor, 822 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special	UE	44B106
C_{12}	Capacitor, 541 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special	UE	44B105
C_{13}	Capacitor, adjustable, 5 mmfd. ± 0.2 mmfd. at 25° C., capacity change -0.02 mmfd. per ° C., type S-2739	UE	44A062
C_{14}	Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric	SP	46AW203J
C_{15}	Same as C_{14}		
C_{16}	Capacitor, fixed, 0.02 mfd. - 10 + 40%, 600 V. D-C working, paper dielectric	SP	46AY203J
C_{17}	Capacitor, fixed, 0.05 mfd. - 10 + 40%, 200 V. D-C working, paper dielectric	SP	46AU503J
C_{18}	Same as C_{14}		
C_{19}	Same as C_{14}		
C_{20}	Same as C_{16}		
C_{21}	Same as C_{17}		
C_{22}	Same as C_{14}		
C_{23}	Same as C_{14}		
C_{24}	Same as C_{16}		
C_{25}	Capacitor, fixed, 2200 mmfd. ± 10%, 500 V. D-C working, mica dielectric	ASA	CM30A222K
C_{26}	Same as C_{17}		
C_{27}	Same as C_{14}		
C_{28}	Same as C_{16}		
C_{29}	Capacitor, variable, min. cap. 2 mmfd., max. cap. 6 mmfd., ceramic dielectric, special mtg. bracket, type B-820-202	CRL	44A079
C_{30}	Capacitor, variable, min. cap. 4 mmfd., max. cap. 20 mmfd., ceramic dielectric, special mtg bracket, type B-820-304	CRL	44A078
C_{31}	Same as C_{30}	RC	48A039
C_{32}	Capacitor, variable, min. cap. 3.0 mmfd., max. cap. 25 mmfd., air dielectric, ceramic insulation, type 22-7		
C_{33}	Same as C_{14}		
C_{34}	Same as C_{17}		
C_{35}	Same as C_{14}		
C_{36}	Same as C_{16}		
C_{37}	Capacitor, fixed, 47 mmfd. ± 10%, 500 V. D-C working, mica dielectric	ASA	CM20A470K
C_{38}	Not used		
C_{39}	Same as C_{14}		

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MODEL SX-28A, Super Skyrider

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
C_{40}	Capacitor, fixed, 470 mmfd. ± 10%, 500 V. D-C working, mica dielectric	ASA	CM35A512J
C_{41}	Capacitor, fixed, one unit of dual unit, 40 mfd. - 10 + 40%, 25 V. D-C working, electrolytic (See C_{44})		
C_{42}	Same as C_{16}		
C_{43}	Capacitor, fixed, 5100 mmfd. ± 5%, 300 V. D-C working, mica dielectric	ASA	CM20A471K
C_{44}	Capacitor, fixed, one unit of dual unit, 10 mfd. - 10 + 40%, 300 V. D-C working, electrolytic (See C_{41})	SP	42A032
C_{45}	Capacitor, fixed, 0.05 mfd. - 10 + 40%, 400 V. D-C working, paper dielectric	CEP	46AW503J
C_{46}	Same as C_{45}		
C_{47}	Capacitor, fixed, one unit of dual unit, 40 mfd. - 10 + 40%, 5 V. D-C working, electrolytic (See C_{48})	SP	42A031
C_{48}	Capacitor, fixed, one unit of dual unit, 30 mfd. - 10 + 40%, 400 V. D-C working, electrolytic in same container with C_{47}		
C_{49}	Capacitor, fixed, 30 mfd. - 10 + 40%, 450 V. D-C working, electrolytic, type D8290	SP	42A030
C_{50}	Same as C_{14}		
C_{51}	Capacitor, fixed, 0.01 mfd. - 10 + 40%, 600 V. D-C working, paper dielectric	SP	46AY103J
C_{52}	Same as C_{51}		
C_{53}	Same as C_{17}		
C_{54}	Same as C_{45}		
C_{55}	Capacitor, variable, compression type, 50 mmfd. (nominal), mica dielectric, type SW-1530	SWI	53A012
C_{56}	Same as C_{16}		
C_{57}	Same as C_{14}		
C_{58}	Same as C_{17}		
C_{59}	Same as C_{17}		
C_{60}	Same as C_{37}		
C_{61}	Capacitor, fixed, 250 mmfd. ± 20%, 500 V. D-C working, mica dielectric, type 1466. Part of transformer T_1. Shown for reference only.		
C_{62}	Same as C_{14}		
C_{63}	Same as C_{17}		
C_{64}	Capacitor, fixed, 100 mmfd. ± 10%, 500 V. D-C working, mica dielectric	ASA	CM20A101K
C_{65}	Same as C_{14}		
C_{66}	Same as C_{17}		
C_{67}	Same as C_{16}		
C_{68}	Same as C_{37}		
C_{69}	Same as C_{37}		
C_{70}	Same as C_{25}		
C_{71}	Same as C_{64}		
C_{72}	Capacitor, variable, min. cap. 5 mmfd., max. cap. 25 mmfd., air dielectric, special	RC	48A064
C_{73}	Capacitor, fixed, 500 mmfd. ± 5%, 500 V. D-C working, silver mica, type 1469, Part of transformer T_4. Shown for reference only.	A	47ET501D
C_{74}	Capacitor, fixed, 0.01 mfd. -10 + 40%, 600 V. D-C working, paper dielectric, braided leads, type AB	SP	46A021
C_{75}	Capacitor, 2 mmfd., twisted leads		
C_{76}	Same as C_{25}		
C_{77}	Same as C_{17}		
C_{78}	Not used		
C_{79}	Not used		
C_{80}	Not used		
C_{81}	Not used		
C_{82}	Not used		
C_{83}	Capacitor, fixed, 2.5 mmfd. ± 20%, 500 V. D-C working, bakelite dielectric		49A001
C_{84}	Not used		
C_{85}	Not used		
C_{86}	Same as C_{40}		
C_{87}	Capacitor, fixed, 0.25 mfd. - 10 + 40%, 200 V. D-C working, paper dielectric	SP	46AT254J
C_{88}	Capacitor, variable, min. cap. 4 mmfd., max. cap. 20 mmfd., ceramic insulation, temp. coeff. - 0.005 mmfd mmfd/ ° C., type 820-B	CRL	44A102
C_{89}	Same as C_{86}		
C_{90}	Same as C_{88}		
C_{91}	Same as C_{88}		
C_{92}	Capacitor, variable, min. cap. 2.5 mmfd., max. cap. 6 mmfd., ceramic insulation, temp. coeff. 0.0005 mmfd. mmfd/ ° C, special	CRL	44A119
C_{93}	Same as C_{88}		
C_{94}	Same as C_{88}		
C_{95}	Same as C_{88}		
C_{96}	Same as C_{88}		
C_{97}	Same as C_{88}		
C_{98}	Same as C_{88}		
C_{99}	Same as C_{88}		
C_{100}	Same as C_{88}		
C_{101}	Same as C_{88}		
C_{102}	Same as C_{88}		
C_{103}	Same as C_{88}		

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
C_{104} C_{105}	Capacitor, fixed, 275 mmfd., silver mica. Part of transformer T_1. Shown for reference only.		
C_{106}	Capacitor, fixed, 125 mmfd., silver mica. Part of transformer T_2. Shown for reference only.		
C_{107}	Capacitor, fixed, 85 mmfd., silver mica. Part of transformer T_2. Shown for reference only.		
C_{108} C_{109}	Capacitor assembly; fixed capacitor, 25 mmfd. ± 5%, silver mica; variable capacitor, min. cap. 70 mmfd., max. cap. 90 mmfd., ceramic dielectric; both capacitors connected in parallel to form assembly. Part of transformer T_3. Shown for reference only.		
C_{110} C_{111}	Capacitor, variable, compression type, 80 mmfd., (nominal), mica dielectric. Part of transformer T_5. Shown for reference only.		
C_{112}	Capacitor, fixed, 100 mmfd. ± 10%, 500 V. D-C working mica. Part of transformer T_6. Shown for reference only.		
C_{113}	Capacitor, fixed, 25 mmfd. ± 10%, 500 V. D-C working, mica. Part of transformer T_6. Shown for reference only.		
C_{114}	Capacitor, fixed, 10 mmfd. ± 10%, 500 V. D-C working, ceramic dielectric, -0.00075 mmfd./mmfd./deg. Cent. temp. coeff., type class D modified	CRL	47A041
T_1	Transformer, I-F, 455KC, primary and secondary tuned by adjustable iron core, secondary has expander winding, special.	SI	50B062
T_2	Transformer, I-F, 455KC, primary and secondary tuned by adjustable iron core, secondary tapped for crystal filter and variable band width, primary has expander winding, special	SI	50B081
T_3	Transformer, I-F, 455KC, primary and secondary tuned by variable capacitor, iron core coils, type 3365	SWI	50B083
T_4	Transformer, 455KC, tuned by adjustable iron core, special	SWI	54B014
T_5	Transformer, I-F, 455KC, primary and secondary tuned by variable capacitor, iron core coils special	SWI	50B097
T_6	Transformer, I-F, 455KC, primary tuned by adjustable iron core, secondary untuned air core, special	SWI	50B080
T_7	Transformer, power, standard; primary, 117 V. A-C, single phase, 50/60 cycles; secondary, 580 V. A-C @ 185 ma., center tapped; 6.3 V. A-C @ 5.5 amperes, 5 V. A-C @ 3 amperes, type 6K33	GT	52B033
	Transformer, power, universal; primary, 117/230 V A-C, single phase, 50/60 cycles; secondary-same as standard transformer, type 9G62	GT	52B034
T_8	Transformer, A-F; primary, 10,000 ohm winding center tapped; secondary, 5000 ohm winding tapped at 500 and 100 ohms, iron core, type 3A347	GT	55B009
T_9	Transformer, R-F, range 3.0-5.8 megacycles, air core, special	SWI	51B568
T_{10}	Transformer, R-F, range 5.8-11.5 megacycles, air core, special	SWI	51B569
T_{11}	Transformer, R-F, range 10.5-21 megacycles, air core, special	SWI	51B570
T_{12}	Transformer, R-F, range 21-43 megacycles, air core, special	SWI	51B571
T_{13}	Transformer, R-F, range .55-1.6 megacycles, air core, special	SWI	51B566
T_{14}	Transformer, R-F, range, 1.6-3.0 megacycles, air core, special	SWI	51B567
T_{15}	Transformer, R-F, range, 3.0-5.8 megacycles, adjustable iron core, special	SWI	51B572
T_{16}	Transformer, R-F, range 5.8-11.5 megacycles, adjustable iron core, special	SWI	51B573
T_{17}	Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special	SWI	51B574
T_{18}	Transformer, R-F, range 21-42 megacycles, adjustable iron core, special	SWI	51B575
T_{19}	Transformer, R-F, range .55-1.6 megacycles, adjustable iron core, special	SWI	51B576
T_{20}	Transformer, R-F, range 1.6-3.0 megacycles, adjustable iron core, special	SWI	51B577
T_{21}	Transformer, R-F, range 3.0-5.8 megacycles, adjustable iron core, special	SWI	51B578
T_{22}	Transformer, R-F, range 5.8-11.5 megacycles adjustable iron core, special	SWI	51B579
T_{23}	Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special	SWI	51B580
T_{24}	Transformer, R-F, range 21-42 megacycles, adjustable iron core, special	SWI	51B581
T_{25}	Transformer, R-F, range, .55-1.6 megacycles, adjustable iron core, special	SWI	51B582
T_{26}	Transformer, R-F, range 1.6-3.0 megacycles, adjustable iron core, special	SWI	51B583
T_{27}	Transformer, R-F, range 3-5.8 megacycles, adjustable iron core, special	SWI	51B584
T_{28}	Transformer, R-F, range 5.8-11.5 megacycles, adjustable iron core, special	SWI	51B585

MODEL SX-28A,
Super Skyrider

THE HALLICRAFTERS CO.

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFG. CODE	CONTR'S PART NO.
T_{29}	Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special	SWI	51B586
T_{30}	Transformer, R-F, range 21-42 megacycles, adjustable iron core, special	SWI	51B587
SO_1	Socket, octal, female, low loss mica-filled bakelite insulation, type MIP8T	AP	6A042
TS_1	Terminal strip, black bakelite, marked "A_2" "A_1", special	H	8A039
TS_2	Terminal strip, black bakelite, marked "5000", special	H	8A040
TS_3	Terminal strip, black bakelite, marked "500", special	H	8A041
CH_1	Inductor, 13 henries ± 10%, @ 100 milliamperes D-C, d-c resistance 300 ohms ± 10%, iron core, type 1D25	GT	56B008
CH_2	Inductor, 4 henries ± 10% d-c resistance 220 ohms ± 10%, iron core, type 10C5	ST	55A010
CH_3	Inductor, universal winding, iron core, designed to resonate at 455KC with 47 mmfd. ± 7% across the coil, type 774	SWI	53B012
J_1	Jack, single circuit, switching type, single pole double throw, 1 pair contacts normally closed, bushing 3/8-32 x 5/16" long, type 503C	U	36B003
J_2	Jack, switching type, single pole double throw, 1 pair contacts normally closed, bushing 3/8-32 x 3/8" long, type ST-627A	U	36B011
FS_1	Fuse, 1.5 amperes @ 250 V., 4AG, glass enclosed, type 1041	LF	39A320
PL_1	Plug, octal, male, bakelite body, jumpers connect terminals 6 and 7, and terminals 3 and 4, type CP-8	AP	35A003
PL_2	Plug and line cord assemble, 2 conductor rubber covered #18 copper stranded wire moulded rubber plug at one end, length 6 feet	E	87A078
M_1	Meter 0.5 milliamperes, 8.8 ohms internal resistance, pointer swing 90 degrees, special mtg bracket, special	BE	82A070
CX_1	Crystal, frequency 456KC ± 3KC, type CF6	BL	19A123
SW_1, SW_2	Switch, rotary selector, single section, 3 position, shorting type rotar contacts, bakelite wafer, shaft 2-1/16" long x 1/4" dia., bushing 1/4" deep, type H	OM	60B052
SW_3	Switch, SPST, toggle action, located on rear of resistor R_{35}		
SW_4	Switch, SPST, bat handle toggle, rated 3 amperes @ 250 V., type 213500A	HH	60A103
SW_5, SW_{5-1}	Switch, DPST, toggle action, located on the rear of resistor R_{33}		
SW_6, SW_7	Same as SW_1		
SW_{8-1}, SW_{8-2}, SW_{8-3}, SW_{8-4}	Switch, rotary selector, 3 section, 6 position, bakelite wafers, sections are assembled to struts, type H	OM	62B025
SW_{8-5}, SW_{8-6}, SW_{8-7}	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type 18906-H2	OM	62B013
SW_{8-8}, SW_{8-9}, SW_{8-10}	Same as SW_{8-5}, SW_{8-6} and SW_{8-7}		
SW_{8-11}, SW_{8-12}, SW_{8-13}	Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts type H	OM	62B015
SW_{8-14}, SW_{8-15}	Switch, rotary selector, single section, 6 position, shorting type rotor contacts, bakelite wafer, type 23586-H	OM	62B023
SW_{9-1}, SW_{9-2}, SW_{9-3}	Switch, rotary selector, 3 section, 6 position, shorting type rotor, contacts, bakelite wafers, shaft 2-3/8" long x 1/4" dia., bushing 1/4" deep, type 22659-H3	OM	62B048
SW_{10}	Switch, SPDT, bat handle toggle, rated 1 ampere @ 250 V. and 3 amperes @ 125 V., type 20994KF	HH	60A102
LM_1	Lamp 6.3 V. @ 250 milliamperes, bayonet base type 44	GE	39A003
LM_2	Same as LM_1		
LM_3	Lamp, 6.3 V. @ 150 milliamperes, bayonet base type 47	GE	39A004

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
V_1	Tube, pentode type 6AB7	RCA	90X6AB7
V_2	Tube, triple-grid super-control amplifier, type 6SK7	RCA	90X6SK7
V_3	Tube, multi-electrode pentagrid converter, type 6SA7	RCA	90X6SA7
V_4	Same as V_3		
V_5	Tube, multi-electrode pentagrid mixer amplifier, type 6L7	RCA	90X6L7
V_6	Same as V_2		
V_7	Tube, duplex-diode pentode, type 6B8	RCA	90X6B8
V_8	Same as V_7		
V_9	Same as V_1		
V_{10}	Tube, twin diode, type 6H6	RCA	90X6H6
V_{11}	Tube, triode, type 6J5	RCA	90X6J5
V_{12}	Tube, twin triode, type 6SC7	RCA	90X6SC7
V_{13}	Tube, beam power amplifier, type 6V6GT	RCA	90X6V6GT
V_{14}	Same as V_{13}		
V_{15}	Tube, full wave high vacuum rectifier; type 5Z3	RCA	90X5Z3

TROPICALIZED PARTS LIST

R_{31}, R_{32}	Resistor, two sections; section #1 (R_{31}) 10,000 ohm ± 10%, 2 watts; section #2 (R_{32}) 4,000 ohm ± 10%, 6 watts; metal clad, wire wound, type MW 5	IRC	24A822
T_3	Transformer, I-F, 455 KC., primary and secondary tuned by adjustable capacitors, fixed iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, special	SWI	50B132
T_4	Transformer, 455 KC., tuned by adjustable iron core, winding vacuum wax impregnated and dipped in zophar #1598, special	SWI	54B020
T_5	Transformer, I-F, 455 KC., primary and secondary tuned by adjustable capacitors, air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, trimmers heat cycled at nominal capacity setting (80 mmfd.) and humidity stabilized, special	SWI	50B131
T_6	Transformer, I-F, 455 KC., primary tuned by adjustable iron core, secondary untuned air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, special	SWI	50B130
T_7	Transformer, power, standard; primary, 115 V. A-C, single phase, 50/60 cycles; secondary #1, to provide 290 V. A-C @185 milliamperes with a 5Z3 rectifier and a 30 mfd. input capacitor, center tapped; secondary #2, 6.3 V. A-C @5.5 amperes; secondary #3, 5 V. A-C @3 amperes; windings and core vacuum wax impregnated; transformer potted in a high melting point compound, type 6K64	GT	52B045
T_8	Transformer, A-F; primary, 10,000 ohm winding, center tapped; secondary, 5000 ohm winding tapped at 500 and 100 ohms, iron core, entire unit dipped in Korite #4, type 3A517	GT	55B052
CH_1	Inductor, 13 henries, ± 15% @100 milliamperes D-C, d-c resistance 300 ohms ± 10%, iron core, winding impregnated with vacuum wax, entire unit dipped in Korite #4, type 1D34	GT	56B035
SW_1, SW_2	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x ¼" dia., bushing ¼" deep, type H	OM	60B144
SW_4	Switch, SPST, bat handle toggle, rated 3 amperes @250 V., type 8280 15/32 bushing	CH	60A138
SW_5, SW_7	Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x ¼" dia., bushing ¼" deep, type H	OM	60B144
SW_{8-1}, SW_{8-2}, SW_{8-3}, SW_{8-4}	Switch, rotary selector, 3 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H	OM	62B033
SW_{8-5}, SW_{8-6}, SW_{8-7}	Switch, rotary selector, 2 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW_{8-8}, SW_{8-9}, SW_{8-10}	Switch, rotary selector, 2 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H	OM	62B031
SW_{8-11}, SW_{8-12}, SW_{8-13}	Switch, rotary selector, 2 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H	OM	62B032

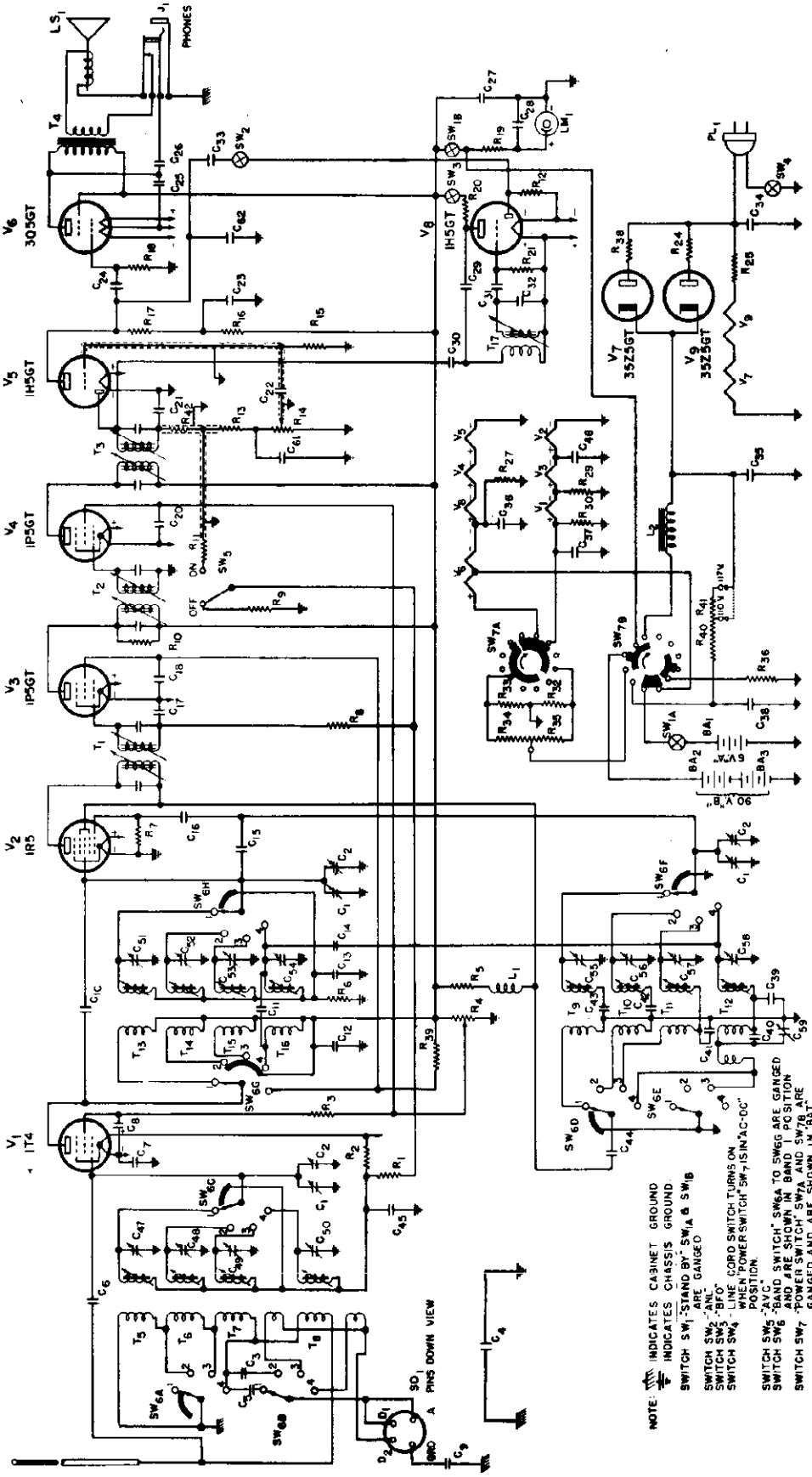
SW_{8-14} SW_{8-15}	Switch, rotary selector, single section, 6 position, wax impregnated bakelite wafer, section is assembled to strut, type H	OM	60B135
SW_{9-1} SW_{9-2} SW_{9-3}	Switch, rotary selector, 3 section, 6 position, wax impregnated bakelite wafers, shorting type rotar contacts shaft 2-5/8" long x $\frac{1}{4}$" dia., bushing $\frac{1}{4}$" deep, type	OM	60B134
SW_{10}	Switch, SPDT, bat handle toggle, 3 amperes @125 V., type 8282 15/32 bushing	CH	60A139

INDEX TO PARTS MANUFACTURERS

SYMBOL	MANUFACTURER	SYMBOL	MANUFACTURER
A	Aerovox Corp. New Bedford, Mass.	H	The Hallicrafters Co. Chicago, Illinois
AP	American Phenolic Corp. Cicero, Illinois	HH	Hart & Hegeman Elec. Co. Hartford, Conn.
ASA	Any manufacturer meeting the applicable American Standard Association specification	IRC	International Resistance Co. Philadelphia, Pa.
		LF	Littlefuse Inc. Chicago, Illinois
BE	Beede Electrical Inst. Co. Penacook, N. H.	OM	Oak Mfg. Co. Chicago, Illinois
BL	Bliley Electric Co. Erie, Pa.	RC	Radio Condenser Camden, N. J.
CH	Cutler-Hammer Inc. Milwaukee, Wis.	RCA	R.C.A. Mfg. Co. Harrison, N. J.
CM	Chicago Molding Co. Chicago, Illinois	SI	F.W. Sickles Co. Springfield, Mass.
CRL	Centralab Milwaukee, Wis.	SP	Sprague Specialties Co. North Adams, Mass.
CS	Clarostat Mfg. Co. Brooklyn, N. Y.	ST	Standard Transformer Corp. Chicago, Illinois
CT	Chicago Telephone Supply Co. Elkhart, Ind.	SWI	S.W. Inductor Chicago, Illinois
E	Essex Wire Co. Chicago, Illinois	U	Utah Radio Products Co. Chicago, Illinois
GE	General Electric Co. Schenectady, N. Y.	UE	Underwood Elec. Co. Chicago, Illinois
GT	General Transformer Corp. Chicago, Illinois		

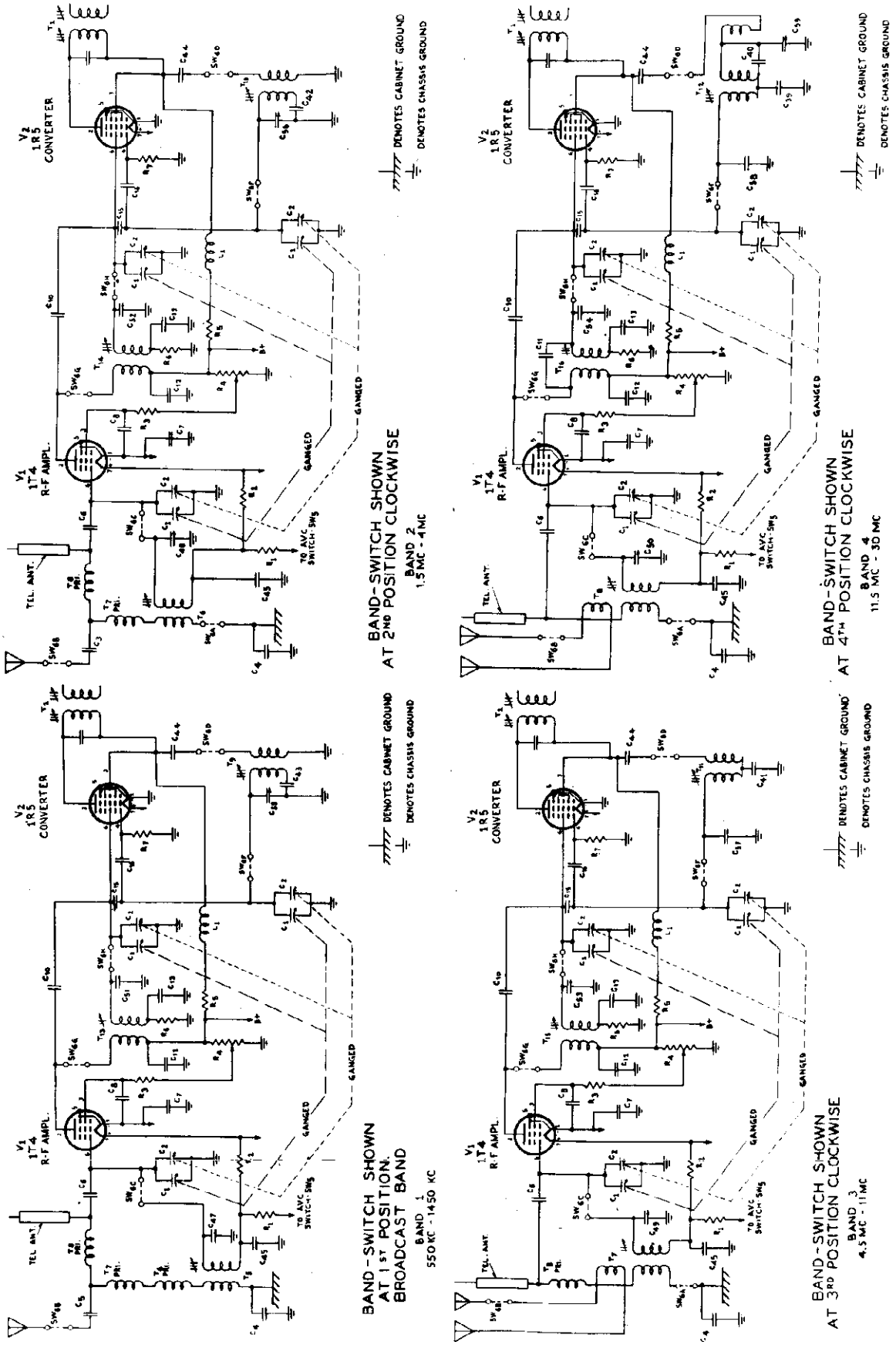
MODEL S-39, Skyranger

THE HALLICRAFTERS CO.

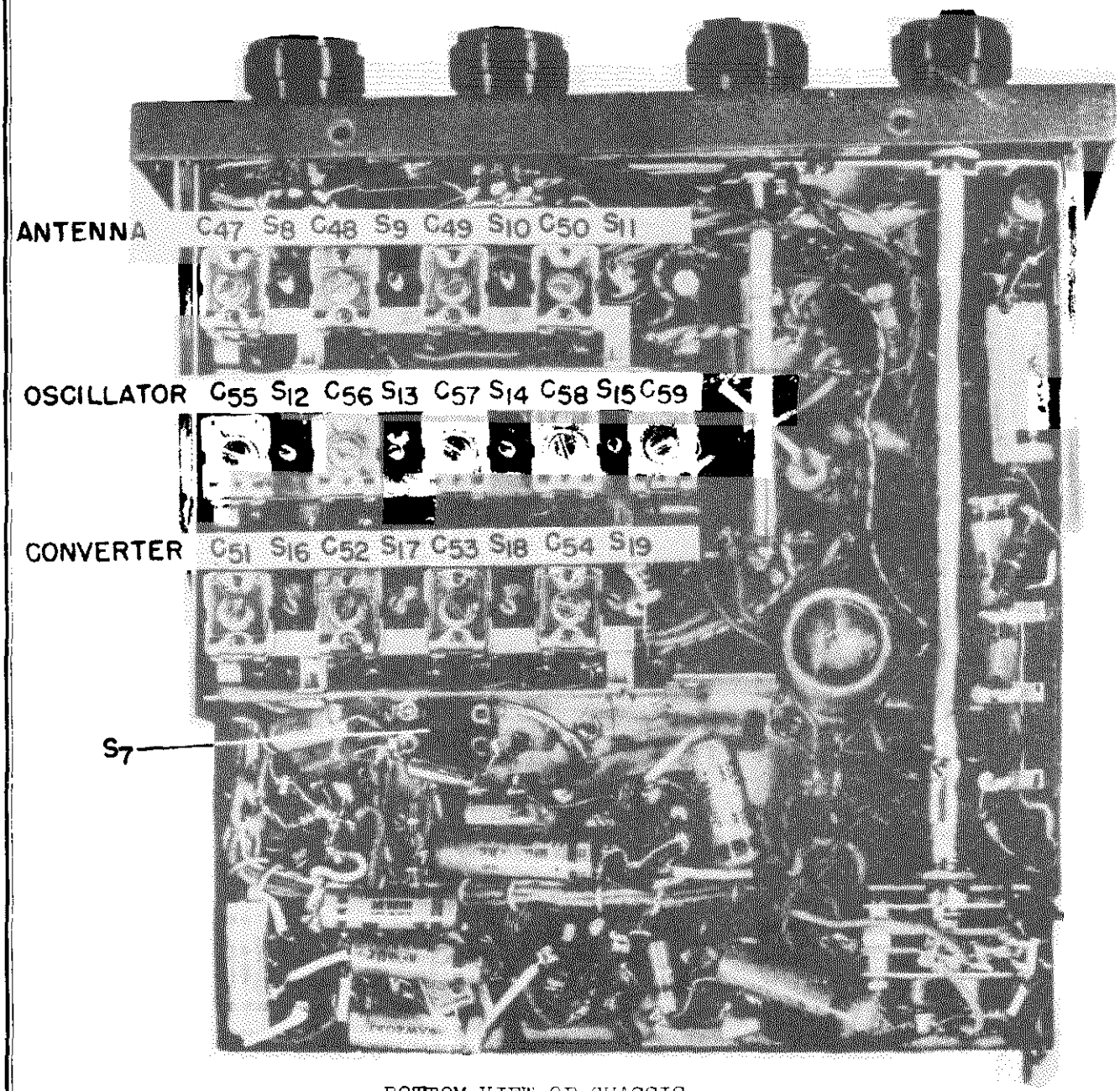


June 9, 1944

THE HALLICRAFTERS CO. MODEL S-39, Skyranger



MODEL S-39, Skyranger THE HALLICRAFTERS CO.



BOTTOM VIEW OF CHASSIS

TUBE	TYPE	PURPOSE
V_1	1T4	R-F amplifier
V_2	1R5	Converter and oscillator
V_3	1P5GT	First i-f amplifier
V_4	1P5GT	Second i-f amplifier
V_5	1H5GT	Detector, A-V-C and first audio amplifier
V_6	3Q5GT	Audio amplifier
V_7	35Z5GT	Rectifier
V_8	1H5GT	Beat frequency oscillator and automatic noise limiter
V_9	35Z5GT	Rectifier

F-9. TABLE OF TUBE SOCKET VOLTAGES

Measured from socket pin to ground with 1000 ohm-per-volt meter
All voltages are D-C unless otherwise specified.

	Tube	Pin Number 1	2	3	4	5	6	7	8	Cap.
Battery Supply										
V_1	1T4	2.62	87	84	NC	2.62	0	4.1	X	X
V_2	1R5	0	65	65	0	0	0	1.5	X	X
V_3	1P5GT	0	2.7	87	60	NC	†1.5	1.5	NC	0
V_4	1P5GT	0	2.8	88	88	NC	X	1.4	NC	0
V_5	1H5GT	0	1.45	62	NC	0	X	0	NC	0
V_6	3Q5GT	NC	7.4	84	88	0	X	4.4	5.9	X
V_7	35Z5GT	NC	0	NC	X	0	X	0	0	X
V_8	1H5GT	0	4.4	*70	NC	0	X	2.8	NC	3.5
V_9	35Z5GT	NC	0	NC	X	0	X	0	0	X
117 Volts AC										
V_1	1T4	2.6	103	92	NC	2.7	0	4.2	X	X
V_2	1R5	0	75	75	0	0	0	1.5	X	X
V_3	1P5GT	0	2.5	105	75	NC	†1.45	1.45	NC	0
V_4	1P5GT	0	2.95	102	105	NC	X	1.55	NC	0
V_5	1H5GT	0	1.5	70	NC	0	X	0	NC	0
V_6	3Q5GT	NC	7.6	100	110	0	X	4.6	6.1	X
V_7	35Z5GT	NC	0	7.8 A-C	X	114A-C	X	33.5 A-C	110	X
V_8	1H5GT	0	4.3	*82.5	NC	0	X	2.95	NC	3.5
V_9	35Z5GT	†115 A-C	33.5 A-C	43 A-C	X	114A-C	†115 A-C	65 A-C	110	X
120 Volts DC										
V_1	1T4	2.8	103	92	NC	2.8	0	4.2	X	X
V_2	1R5	0	72	72	0	0	0	1.5	X	X
V_3	1P5GT	0	2.6	103	72	NC	†1.5	1.5	NC	0
V_4	1P5GT	0	3.2	102	102	NC	X	1.6	NC	0
V_5	1H5GT	0	1.6	87	NC	0	X	0	NC	0
V_6	3Q5GT	NC	7.7	100	103	0	X	4.8	6.3	X
V_7	35Z5GT	NC	0	7.3	X	118	X	35.	110	X
V_8	1H5GT	0	4.8	*85	NC	0	X	3.2	NC	4
V_9	35Z5GT	†120	35	43	X	118	120	70	110	X

NC - No Connection.
X - No Pin.
* - With BFO switch at ON.
† - Tie Lug.

E-1. RECEIVER ALIGNMENT -

(a) Equipment needed to align the receiver -
Signal generator to cover 455 KC to 30 MC
Non-metallic screwdriver
Output meter with a phone plug connector
.1 mfd. condenser
6.5 mmfd. condenser. (Dummy antenna)

(b) Setting of controls for I-F alignment -
ANL, AVC and BFO switches at OFF
STAND BY switch it ON
A.F. and R.F. GAIN controls set at maximum gain
BAND SWITCH at #1 Band
POWER SWITCH at BAT. (power cord removed from wall socket)
BANDSPREAD TUNING at "0"
Telescoping antenna completely collapsed.

(c) I-F alignment (455 KC) -
Remove top and bottom cover for access to internal components
Have external antenna plug PL_2 out of socket SO_1
Connect "hot" lead of signal generator through the .1 mfd condenser to the lug on rear stator section of main tuning condenser (C_1).
Connect "ground" lead of signal generator to chassis
Plug output meter plug in the phone jack (J_1)
Set MAIN TUNING dial at 1500 KC - Band #1
Tune signal generator to 455 KC. Adjust slugs S_1 to S_6 inclusive for maximum output. Refer to figure 4 for location of the adjusting screws on transformers T_1, T_2 and T_3.
Repeat adjustments of slugs S_1 to S_6 to peak all the i-f transformers for maximum output.

(d) B-F-O adjustment -
Without disconnecting the signal generator, after completing the i-f transformer alignment, adjust the BFO transformer as follows:
Set BFO switch at ON
Remove modulation from the signal generator
Adjust tuning slug S_7 to desired pitch (Approx. 1000 cycles). Slug S_7 is located under the chassis just in back of the coil shield plate.
Note: It is possible to adjust the B-F-O pitch without the use of the signal generator. Tune in a c-w signal to exact resonance with the BFO switch set at OFF. Set BFO switch at ON and adjust pitch to the tone desired by turning slug S_7. Replace top cover after aligning the I-F and B-F-O transformers.

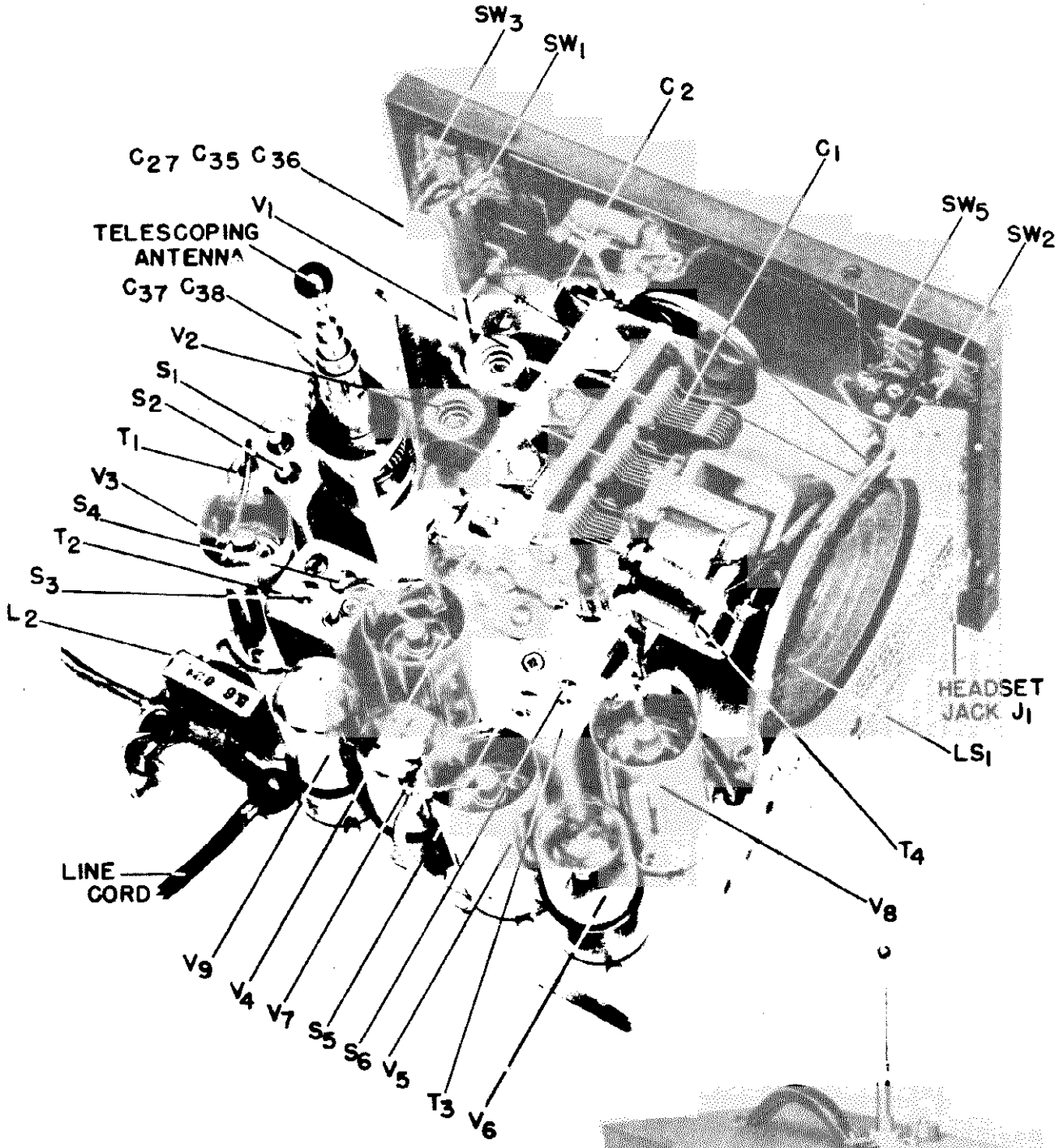
(e) Setting of controls for R-F alignment -
ANL, AVC and BFO switches at OFF
STAND BY switch at ON
A.F. and R.F. GAIN controls set at maximum gain
BAND SWITCH at Band to be aligned (See alignment chart)
POWER SWITCH at BAT. (power cord removed from wall socket)
BANDSPREAD TUNING at "0"
Telescoping antenna is collapsed except for bottom section

(f) R-F alignment -
Leave output meter plug in phone jack (J_1)
Connect "Hot" lead of signal generator to extended section of the telescoping antenna through the 6.5 mmfd dummy antenna condenser.
Connect ground side of generator to chassis
Have external antenna plug PL_2 out of socket SO_1
Set MAIN TUNING dial of receiver and signal generator frequency as shown in the alignment chart.
Adjust trimmers (C_{47} to C_{58}) and slugs (S_8 to S_{19}) in the order shown on the alignment chart. (See figure 5 for location of adjustment screws).
Note: When aligning bands 3 and 4 "rock" the MAIN TUNING control slightly to peak the adjustment.
When aligning the low frequency end of band 4 by adjusting slug S_{15}, the oscillator may cease to function. A slight adjustment of condenser C_{59} will bring it back into oscillation.
Note: Only one section of the telescoping antenna shall extend above the top cover of the receiver. (This procedure is necessary to obtain an accurate calibration for the receiver when aligning with the dummy antenna of 6.5 mmfd.) The receiver's top cover must be fastened down for the following adjustments.

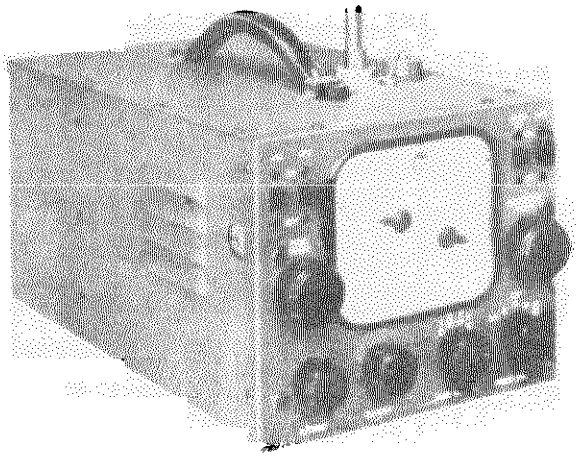
ALIGNMENT CHART

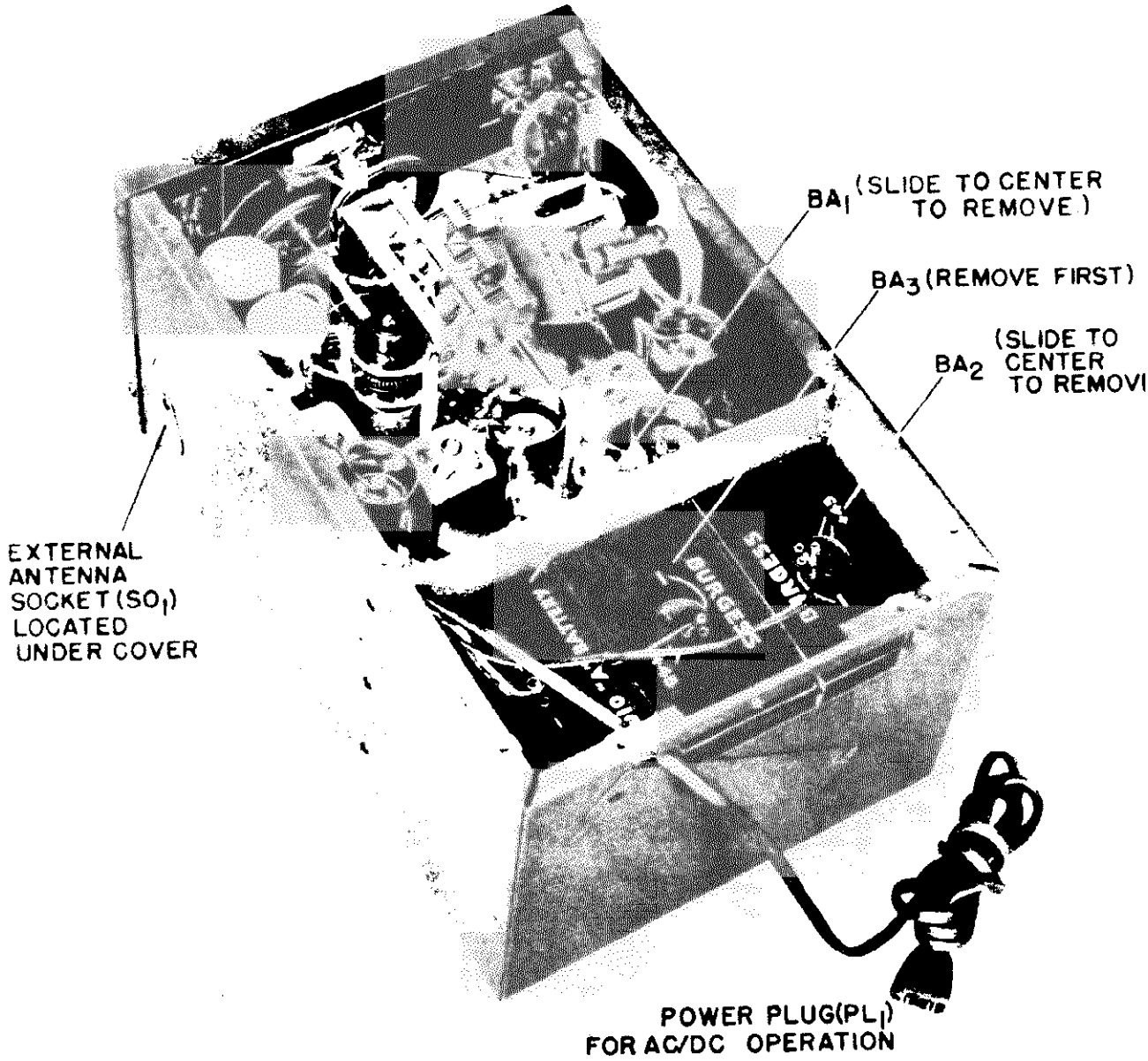
BAND	SIGNAL GENERATOR FREQUENCY AND "MAIN TUNING" DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT: OSCILLATOR SECTION	ADJUST FOR MAXIMUM OUTPUT: ANTENNA AND CONVERTER SECTIONS	OSCILLATOR FREQUENCY RELATIVE TO SIGNAL FREQUENCY
1	1.4 MC	C_{55}	C_{47} and C_{51}	455 KC Above
	.6 MC	S_{12}	S_8 and S_{16}	
2	4.0 MC	C_{56}	C_{48} and C_{52}	455 KC Above
	2.0 MC	S_{13}	S_9 and S_{17}	
3	10.0 MC	C_{57}	C_{49} and C_{53}	455 KC Above
	5.0 MC	S_{14}	S_{10} and S_{18}	
4	28.0 MC	C_{58}	C_{50} and C_{54}	455 KC Below
	14.0 MC	S_{15} C_{59}	S_{11} and S_{19}	

MODEL S-39, Skyranger THE HALLICRAFTERS CO.



TOP VIEW.





MODEL S-39 RECEIVER, REAR VIEW, COVER REMOVED, SHOWING POWER CORD COMPARTMENT AND BATTERY COMPARTMENT.

A-3. POWER SUPPLIES - Two separate and independent power supplies are incorporated in the receiver, namely an internal battery supply and a rectifier-filter type of supply for use with an external a-c/d-c source.

The battery supply consists of two 45-volt "B" batteries (BA_2 and BA_3) connected in series, and one 6-volt "A" battery (BA_1) all of which are located in the back section of the carrying-case cabinet. See figure 6.

The a-c/d-c supply consists of two type 35Z5GT rectifier tubes (V_7 and V_9) and the associated filter (L_2, C_{35} and C_{27}) and filament voltage dropping resistors (R_{32}, R_{33}, R_{34} and R_{35}). This supply may be used whenever commercial power lines, delivering 110-to 117-volts A-C or D-C are accessible. Refer to Section D for operating instructions.

The supply to be used is selected from the front panel by POWER SWITCH, SW_7. Refer to figure 2 for circuit details.

MODEL S-39, Skyranger THE HALLICRAFTERS CO.

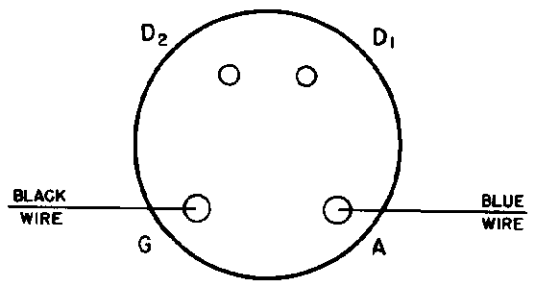
REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR S. PART NO.
R_1	Resistor, 2.2 megohm ± 10%, ½ watt, carbon	ASA	RC10AE225K
R_2	Same as R_1		
R_3	Resistor, 8,200 ohm ± 10%, ½ watt, carbon	ASA	RC21AE822K
R_4	Resistor, variable, ½ megohm ± 20%, carbon	CT	25C071
R_5	Resistor, 4700 ohm ± 10%, ¼ watt, carbon	ASA	RC10AE472K
R_6	Same as R_1		
R_7	Resistor, 100,000 ohm ± 10%, ¼ watt, carbon	ASA	RC10AE104K
R_8	Resistor, 1.0 megohm ± 10%, ¼ watt, carbon	ASA	RC10AE105K
R_9	Same as R_1		
R_{10}	Resistor, 51,000 ohm ± 5%, ½ watt, carbon	ASA	RC21AE513J
R_{11}	Same as R_1		
R_{12}	Same as R_8		
R_{13}	Same as R_7		
R_{14}	Resistor, variable, ½ megohm ± 20%, carbon	CT	25C070
R_{15}	Resistor, 10 megohm ± 20%, ¼ watt, carbon	ASA	RC10AE106M
R_{16}	Same as R_7		
R_{17}	Resistor, 470,000 ohm ± 20%, ¼ watt, carbon	ASA	RC10AE474M
R_{18}	Same as R_{17}		
R_{19}	Same as R_{17}		
R_{20}	Resistor, 47,000 ohm ± 20%, ¼ watt, carbon	ASA	RC10AE473M
R_{21}	Same as R_{20}		
R_{22}	Not used		
R_{23}	Not used		
R_{24}	Resistor, 24 ohm ± 5%, 1 watt, carbon	ASA	RC31AE240J
R_{25}	Resistor, 330 ohm ± 5%, 9 watt, wire wound, candohm, type FH	MT	24A029
R_{26}	Not used		
R_{27}	Resistor, 1000 ohm ± 10%, ¼ watt, carbon	ASA	RC10AE102K
R_{28}	Not used.		
R_{29}	Resistor, 560 ohm ± 10%, ¼ watt, carbon	ASA	RC10AE561K
R_{30}	Same as R_{29}		
R_{31}	Not used		
R_{32}	Same as R_{27}		
R_{33}	Resistor, 820 ohm ± 10%, 1 watt, carbon	ASA	RC31AE821K
R_{34}, R_{35}	Resistor, 1645 ohm ± 10%, tapped at 800 ohm, 7.4 watt, 2 unit, wire wound, unit #1 800 ohm (R_{34}), unit #2 845 ohm (R_{35}), candohm, type MW-2	IRC	24A044
R_{36}	Resistor, 820 ohm ± 10%, ½ watt, carbon	ASA	RC10AE821K
R_{37}	Not used.		
R_{38}	Same as R_{24}		
R_{39}	Resistor, 1.5 meghom ± 20%, ¼ watt, carbon	ASA	RC10AE155M
R_{40}, R_{41}	Resistor, 450 ohm tapped at 87 ohm, 7 watt, 2 unit, wire wound, unit #1 363 ohm (R_{40}), unit #2 87 ohm (R_{41}) candohm, special	MT	24A819
R_{42}	Same as R_7		
C_1, C_2	Capacitor, variable, 3 section, 2 unit, unit #1-(C_1), max. cap. per section 352 mmfd., air dielectric, unit #2-(C_2) max. cap. per section 22 mmfd. air dielectric, each unit has separate drive shaft to which pulleys are fixed, type 945-3-20	OM	46B055
C_3	Capacitor, 51 mmfd. ± 5%, 500 V. D-C working, low loss mica dielectric	ASA	CM20C510J
C_4	Capacitor, 0.1 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type 484	A	46AW104J
C_5	Capacitor, 15 mmfd. ± 20%, 500 V. D-C working, temp. coeff., -.00075 mmfd./ mmfd./ degree Cent., ceramic dielectric, type 809-047	CRL	47A027
C_6	Capacitor, 10 mmfd. ± 20%, 500 V. D-C working, temp. coeff., -.00075 mmfd./ mmfd./ degree Cent., ceramic dielectric, type 811-013.	CRL	47A028
C_7	Capacitor, 0.05 mfd. -10 + 40%, 200 V. D-C working, paper dielectric, type AB	SP	46AU503J
C_8	Capacitor, 0.01 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB	SP	46AW103J
C_9	Same as C_8		
C_{10}	Capacitor, adjustable, min. cap. 5 mmfd., max. cap. 6.5 mmfd., 500 V. D-C working, temp. coeff. -.00075 mmfd./ mmfd./ degree Cent., ceramic dielectric, type 807-004	CRL	47A005
C_{11}	Same as C_{10}		
C_{12}	Same as C_7		
C_{13}	Same as C_7		
C_{14}	Capacitor, 3 mmfd., twisted wire leads		
C_{15}	Capacitor, 2 mmfd., twisted wire leads		
C_{16}	Same as C_3		
C_{17}	Same as C_7		
C_{18}	Same as C_8		
C_{19}	Not used		
C_{20}	Same as C_7		
C_{21}	Capacitor, 100 mmfd. ± 20%, 500 V. D-C working, mica dielectric	ASA	CM20A101M
C_{22}	Capacitor, 0.004 mfd. -10 + 40%, 600 V. D-C working, paper dielectric, type 684	A	46AZ402J
C_{23}	Capacitor, 0.1 mfd. - 10 + 40%, 200 V. D-C working, paper dielectric, type 284	A	46AU104J
C_{24}	Same as C_8		
C_{25}	Capacitor, 0.005 mfd. - 10 + 40%, 400 V. D-C working, paper dielectric, type 484	A	46AW502J
C_{26}	Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB	SP	46AW203J
C_{27}	Capacitor, 60 mfd. -10 + 50%, 150 V. D-C working, electrolytic, one section of 3 section unit, 6 prong plug-in assembly, type 10B536	IC	45A065
C_{28}	Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB	SP	46AW203J
C_{29}	Same as C_{28}		
C_{30}	Capacitor, 3 turn twisted wire leads		
C_{31}	Same as C_{21}		
C_{32}	Capacitor, 510 mmfd. ± 5%, 500 V. D-C working, mica dielectric	ASA	CM20A511J
C_{33}	Same as C_7		
C_{34}	Capacitor, 0.05 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type 484	A	46AW503J
C_{35}	Capacitor, 30 mfd. -10 + 50%, 150 V. D-C working, electrolytic, one part of triple unit - refer to C_{27}		
C_{36}	Capacitor, 100 mfd. -10 + 65%, 5 V. D-C working, electrolytic, one part of triple unit - refer to C_{27}		
C_{37}, C_{38}	Capacitor, dual, 120 mfd. -10 + 50%, 150 V. D-C working (C_{38}), 60 mfd. -10 + 65%, 5 V. D-C working (C_{37}), unit hermetically sealed 4 prong plug-in assembly, type 10B535	IC	45A066
C_{39}	Capacitor, 4300 mmfd. ± 5%, 500 V. D-C working, mica dielectric	ASA	CM35A432J
C_{40}	Capacitor, 240 mmfd. ± 5%, 500 V. D-C working, mica dielectric	ASA	CM20A241J

THE HALLICRAFTERS CO. MODEL S-39, Skyranger

REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
C_{41}	Capacitor, 2000 mmfd. ± 5%, 500 V. D-C working, mica dielectric	ASA	CM30A202J
C_{42}	Capacitor, 910 mmfd. ± 5%, 500 V. D-C working, mica dielectric	ASA	CM30A911J
C_{43}	Capacitor, 390 mmfd. ± 5%, 500 V. D-C working, mica dielectric	ASA	CM20A391J
C_{44}	Same as C_8		
C_{45}	Same as C_7		
C_{46}	Capacitor, 0.5 mfd. -10 + 40%, 200 V. D-C working, paper dielectric		46AT504J
C_{47} C_{48} C_{49} C_{50}	Capacitor, 4 unit assembly, mica dielectric, compression type adjustment, trimmers mounted on a single metal strip, 3 units with min. cap. 2.7 mmfd., max. cap. 35 mmfd. (C_{47}, C_{49}, C_{50}) 1 unit with min. cap. 1.5 mfd., max. cap. 10 mmfd. (C_{48} special	UE	44A064
C_{51} C_{52} C_{53} C_{54}	Same as C_{47}, C_{48}, C_{49}, C_{50}, assembly. C_{51}, C_{53}, C_{54} same as C_{47}, C_{48}, C_{50}; and C_{52} same as C_{48})		
C_{55} C_{56} C_{57} C_{58} C_{59}	Capacitor, 5 unit assembly, mica dielectric, compression type adjustment, trimmers mounted on a single metal strip, 2 units with min. cap. 1.5 mmfd., max. cap. 10 mfd. (C_{57} and C_{58}), 2 units with min. cap. 2.7 mmfd., max. cap. 35 mmfd. (C_{55} and C_{56}), 1 unit with min. cap. 25 mmfd., MAX. 140 mmfd. (C_{59}), special	UE	44A092
C_{60}	Not used		
C_{61}	Same as C_{40}		
C_{62}	Same as C_{21}		
T_1	Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 80 mmfd., primary and secondary are tuned by adjustable iron cores, special	SI	50A086
T_2	Same as T_1 except for length of leads	SI	50B157
T_3	Same as T_1, except for length of leads	SI	50B158
T_4	Transformer, A-F, primary to match the output of the type 3Q5GT tube, part of speaker assembly LS_1. Shown for reference only		
T_5 T_6 T_7 T_8	Transformer, R-F, 4 unit assembly, tunes from .55 MC. to 30 MC. in 4 bands with condenser C_1 and C_2, inductance adjusted by movable iron cores.	SWI	51B301
T_9 T_{10} T_{11} T_{12}	Transformer, R-F, 4 unit assembly, tunes from .55 MC. to 30 MC. in 4 bands with condensers C_1 and C_2, inductance adjusted by movable iron cores	SWI	51B305
SW_2	Switch, DPST, slide action, bakelite insulation, steel mtg. plate with 2 holes having 1-1/8" mtg. centers, type 71	OM	60A061
SW_3	Same as SW_2		
SW_4	Switch, SPST, toggle action, refer to SW_7		
SW_5	Switch, SPDT, slide, bakelite insulation, brass solder lugs, steel mtg. plate with 2 holes having 1-1/8" mtg. centers, type 77	OM	60A130
SW_6	Switch, rotary selector, 4 position, 3 section, shorting type contacts, bushing ¼" long, type RM	MA	60B160
SW_7	Switch, rotary selector, 3 position, single section, non-shorting type contacts, has a type 8030-K1 toggle action, SPST A-C switch ganged on rear of assembly "ON" position full clockwise, type H	OM	60A132
SO_1	Socket, female, 4 contacts, bakelite insulation, wafer type, brass contacts, 2 mtg. holes with 1¼" mtg. centers, type 2642	CN	10A080
PL_1	Plug with line cord, 2 conductor, rubber insulation, #18 ga. stranded copper wire, length 6 feet, 2 prong spring type molded on plug, special	E	87A078
BA_1	Battery, 6 V. D-C, 2 hole socket, 3-7/8" x 2-15/16" x 5½", type P698A	ROV	27A010
BA_2	Battery, 45 V. D-C, combination "B" socket, 4-1/8" x 2-9/16" x 5-5/16", type P5303	ROV	27A009
BA_3	Same as BA_2		
J_1	Jack, single circuit, normally closed, brass mechanism, bakelite insulation, type 1J102	U	36A002
LS_1	Loudspeaker; 4 inch O.D. permanent magnet dynamic, includes transformer T_4 in the assembly, type 4-OM-11A	OT	85B009
LM_1	Lamp, indicator, 1-1/8" leads, clear glass bulb type 4½, type NE-7	GE	39A007
V_1	Tube, pentode, type 1T4	RCA	90X1T4
V_2	Tube, pentagrid converter, type 1R5	RCA	90X1R5
V_3	Tube, type, 1P5GT	RCA	90X1P5GT
V_4	Same as V_3		
V_5	Tube, diode triode, type 1H5GT	RCA	90X1H5GT
V_6	Tube, beam power amplifier, type 3Q5GT	RCA	90X3Q5GT
V_7	Tube, half-wave high-vacuum rectifier, type 35Z5GT	RCA	90X35Z5GT
V_8	Same as V_5		
V_9	Same as V_7		
	FOR TROPICAL RECEIVERS USE THE ABOVE PARTS		
T_1	Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special (Note: T_1 differs from T_2 and T_3 in the length of the wire leads)	SI	50A150
T_2	Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special (Note: T_2 differs from T_1 and T_3 in the length of the wire leads)	SI	50A159
L_1	Reactor, R-F, inductance 170 microhenries, air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2012, type 3485	SWI	53A057
L_2	Reactor, filter, d-c resistance 250 ohms ± 20%, max. load current 30 milliamperes, inductance 3.6 henrys at 30 milliamperes, vacuum wax impregnated and flash dipped in Hallowax #2012, type 1A1251 modified	GT	56B051
SW_8	Switch, rotary selector, 4 position, 3 section, shorting type contacts, bushing ¼" long, terminal 6 of section 2 front and rear are electrically connected, type RM	MA	60B179

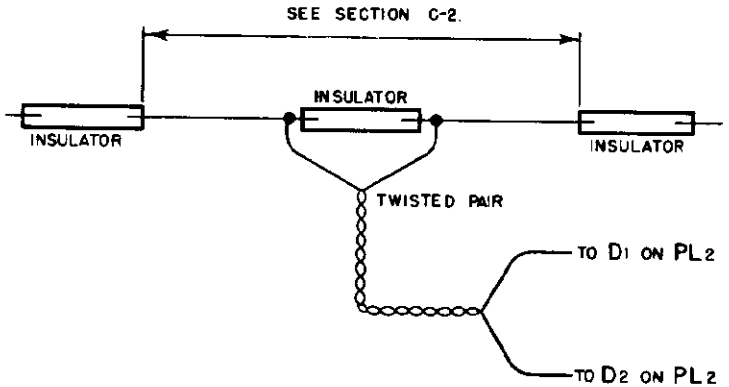
REF. SYMBOL	NAME OF PART AND DESCRIPTION	MFR. CODE	CONTR'S. PART NO.
T_3	Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special, (Note T_3 differs from T_1 and T_2 in the length of the wire leads)	SI	50A151
T_5 T_6 T_7 T_8	Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser C_1 and C_2, inductance adjusted by movable iron cores, wax impregnated with Hallowax #2012	SWI	51B648
T_9 T_{10} T_{11} T_{12}	Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser C_1 and C_2, inductance adjusted by movable iron cores, wax impregnated with Hallowax #2012	SWI	51B650
T_{13} T_{14} T_{15} T_{16}	Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser C_1 and C_2, inductance adjusted oy movable iron cores. wax impregnated with Hallowax #2012	SWI	51B649

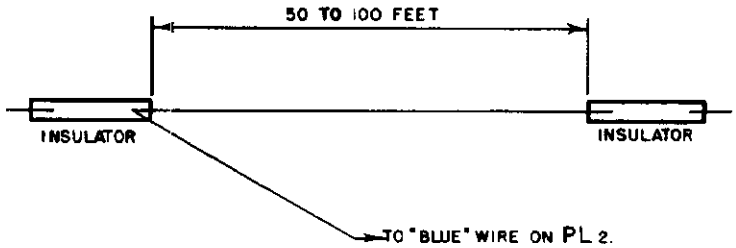
RECOMMENDED ANTENNA INSTALLATIONS

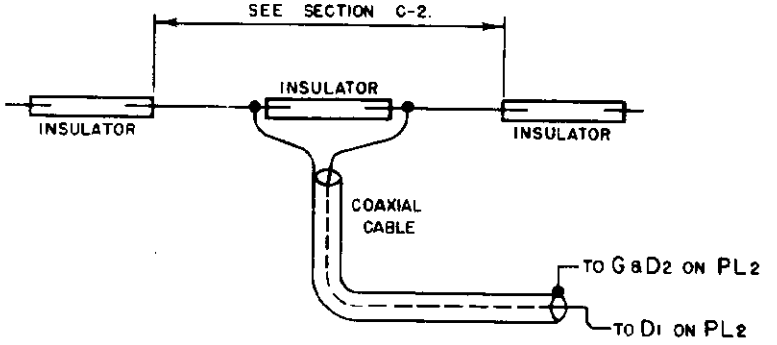


PL2
PIN VIEW

NOTE: PL2 IS SUPPLIED WIRED AS ABOVE







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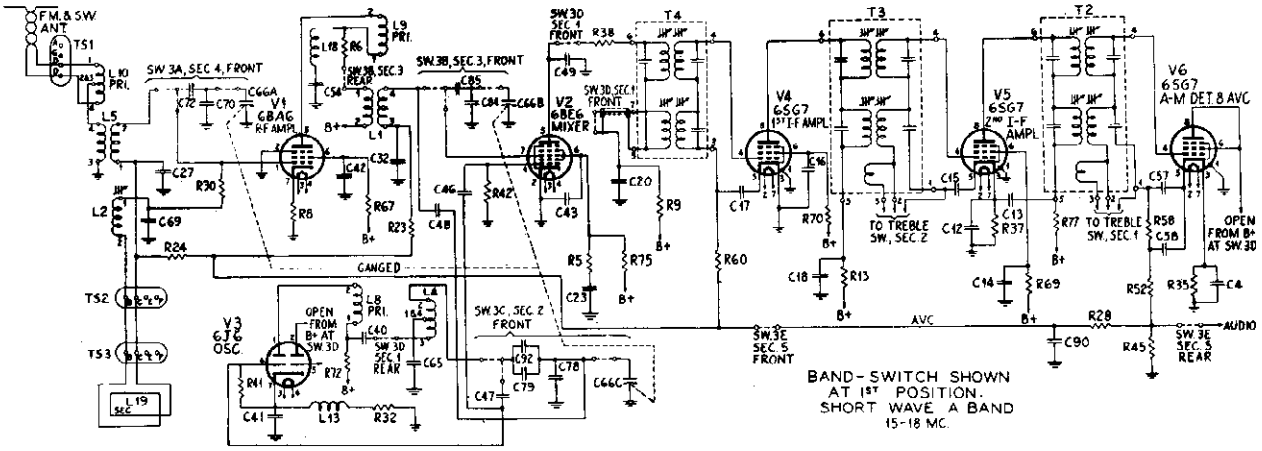

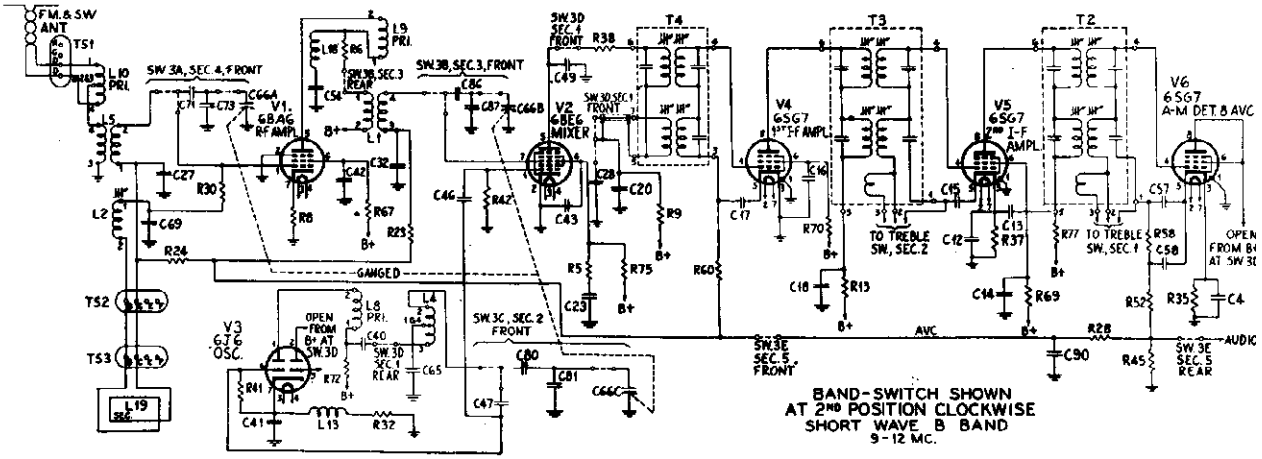

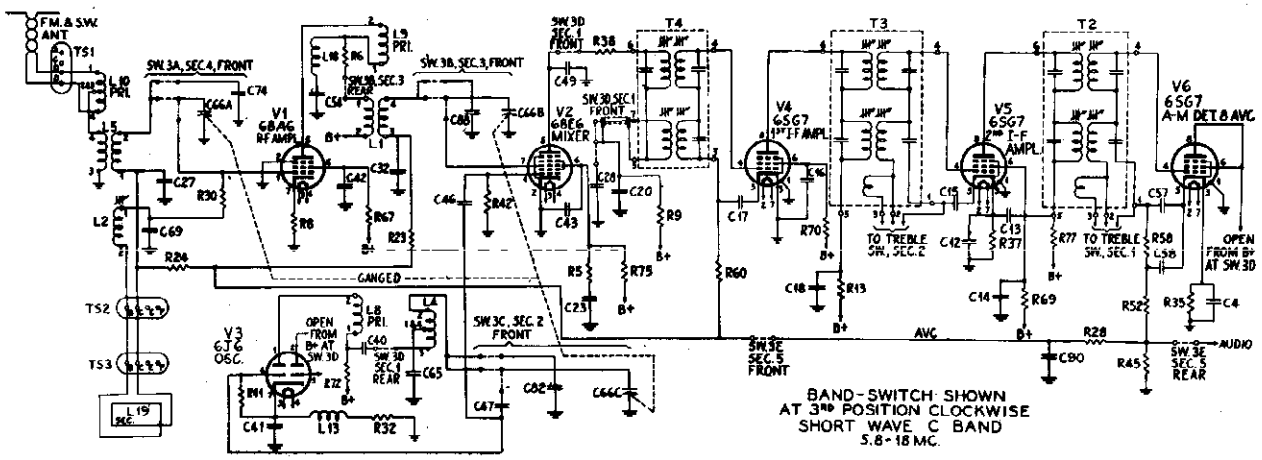

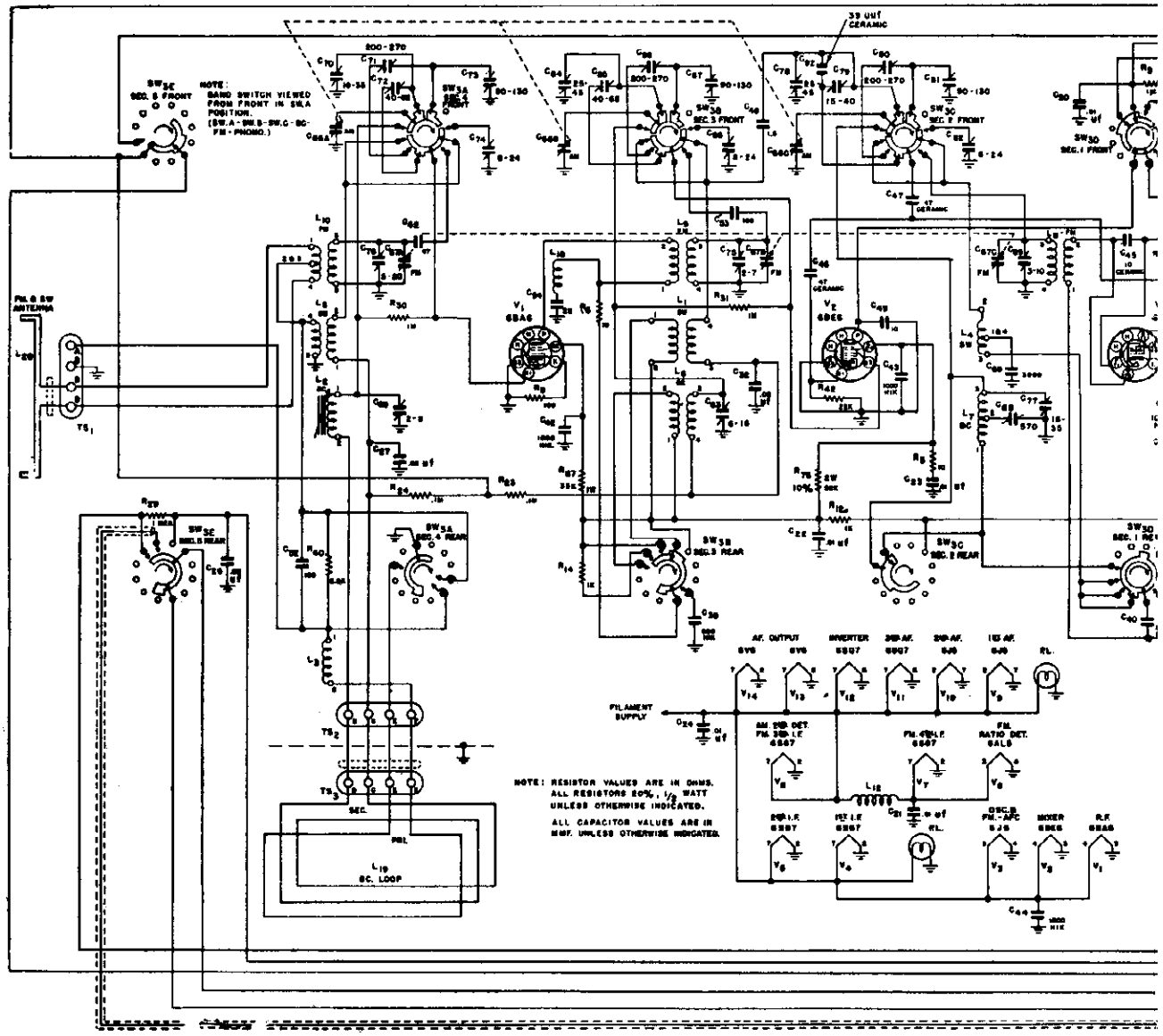

Tuning Range.....	(BC)	540 kc —1700 kc
	(A)	15 mc— 18 mc
	(B)	9 mc— 12 mc
	(C)	5.8 mc— 18 mc
	(FM)	88 mc— 108 mc
Intermediate Frequency.....455 kc		
Intermediate Frequency.....10.7 mc		
Power Supply.....105-125 V. 60 cycle AC		
Power Consumption.....180 watts		

BUTTON SETTING:

1. Select any one pushbutton.
2. Pull translucent insert straight out.
3. Insert screw driver blade through large hole of pushbutton into slot of locking screw. (See Fig. 1).
4. Loosen locking screw about one-half turn. (Not more than one full turn.)
5. With pushbutton depressed, carefully tune in desired station with the manual control.
6. With the manual control held firm, tighten the locking screw.

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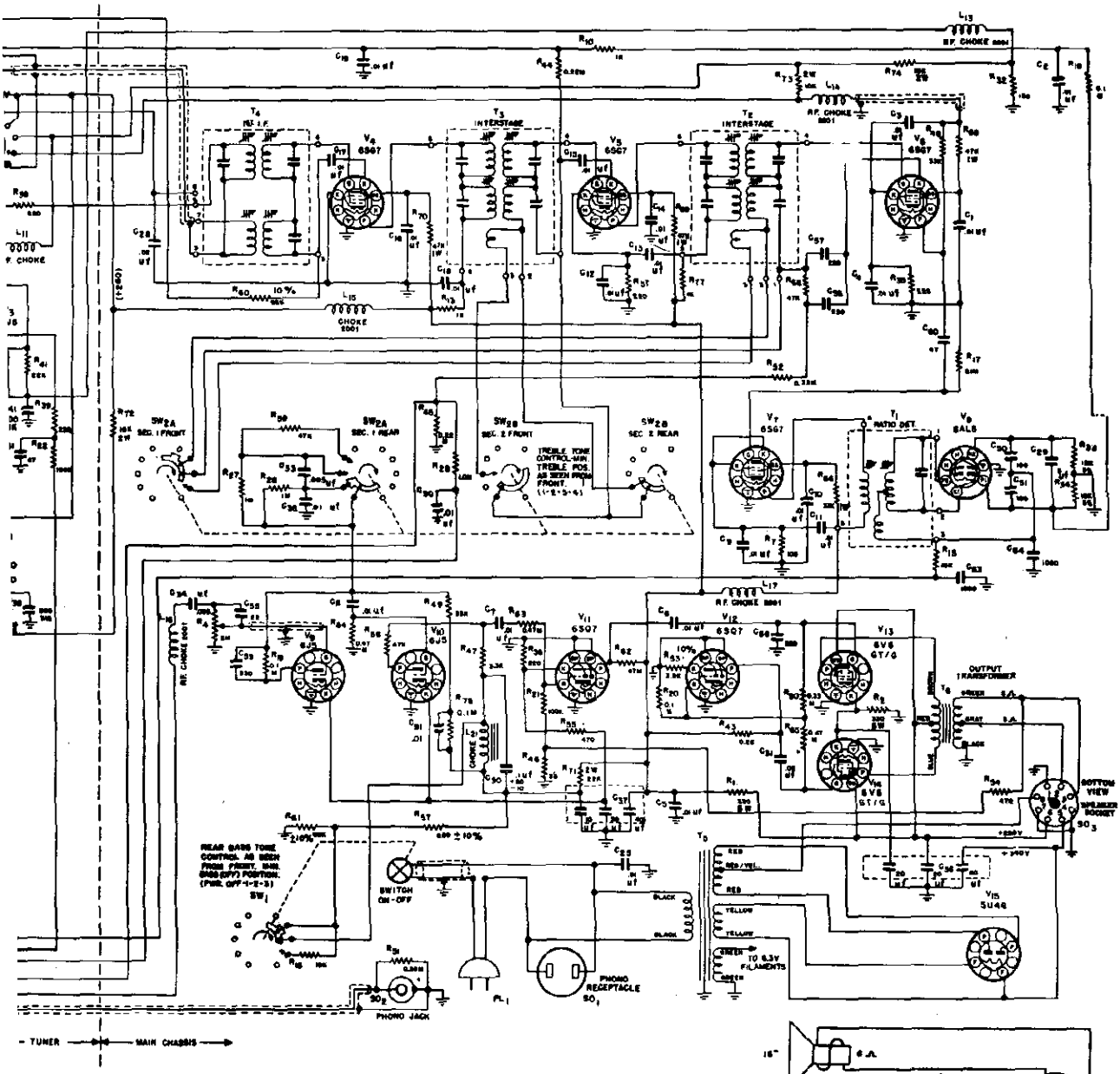

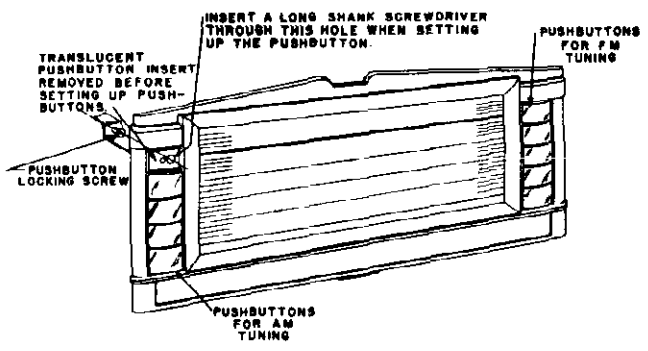

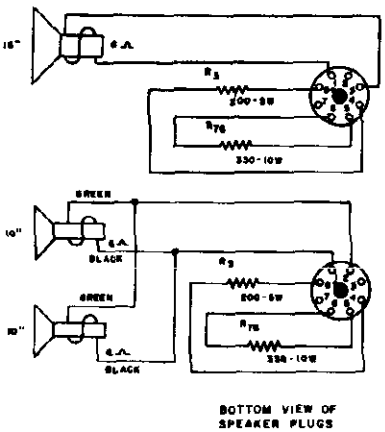

Fig. 1. View showing pushbutton setup.

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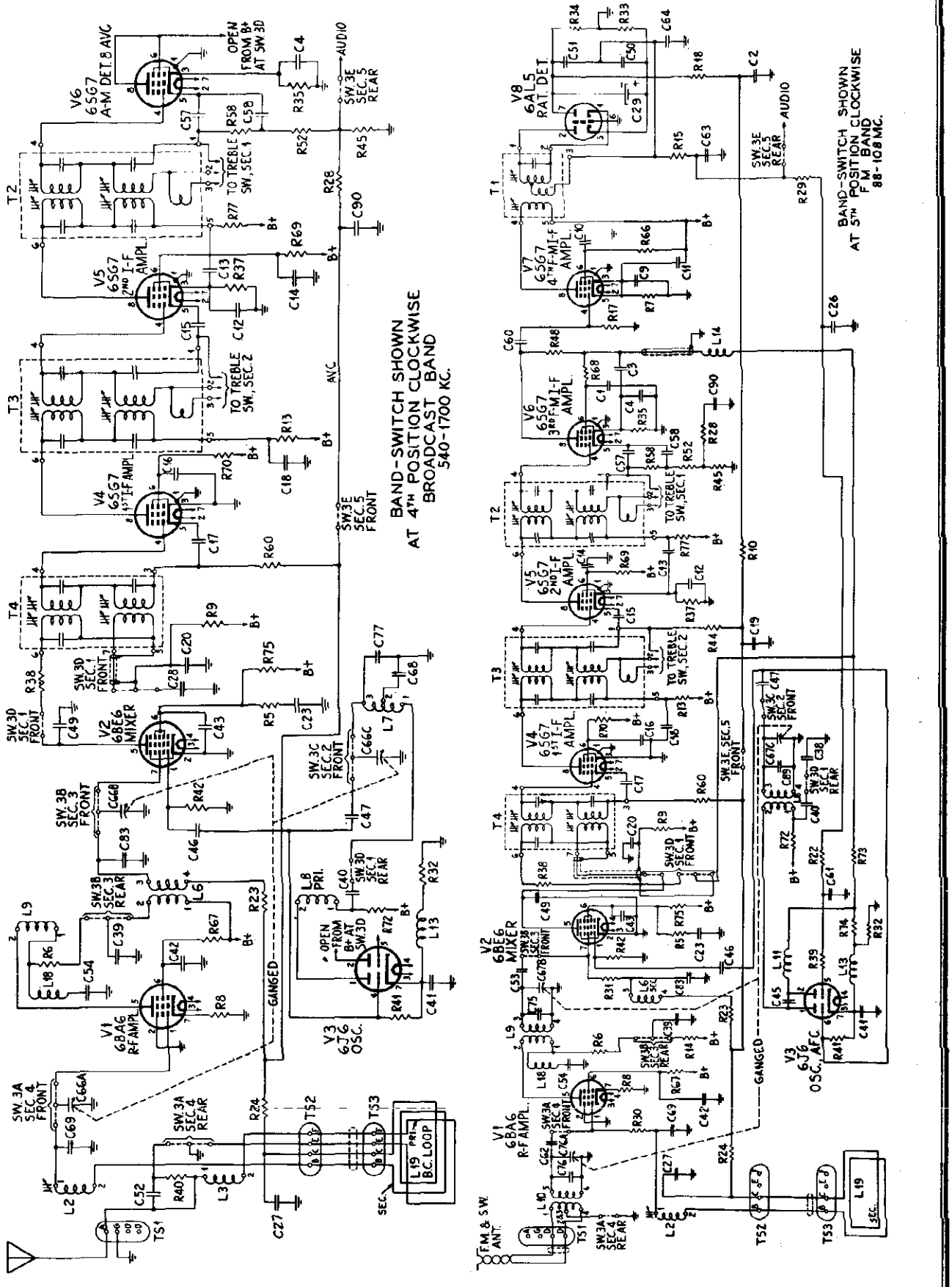

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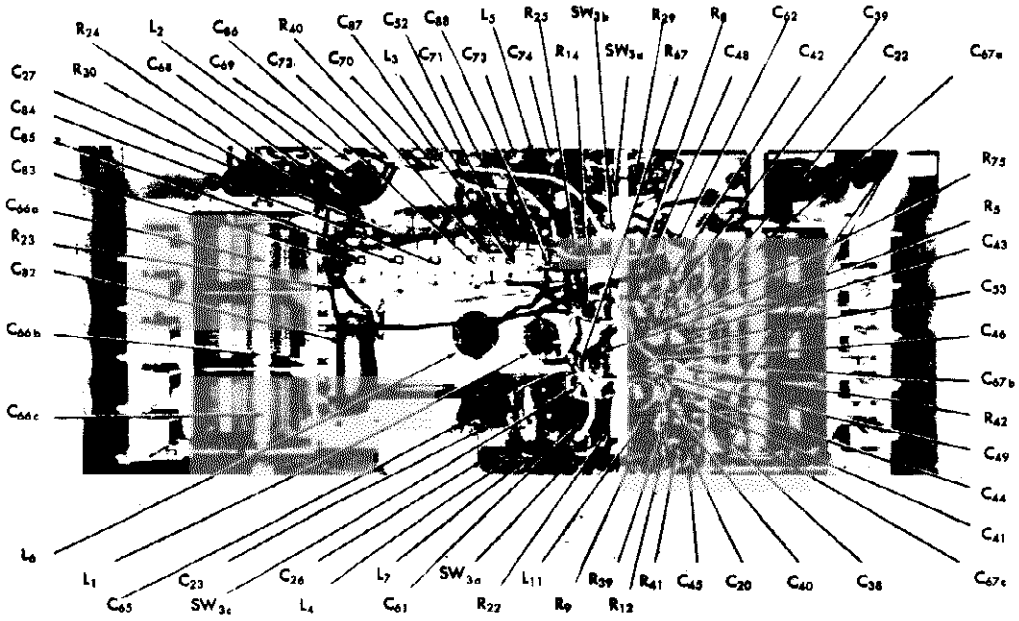
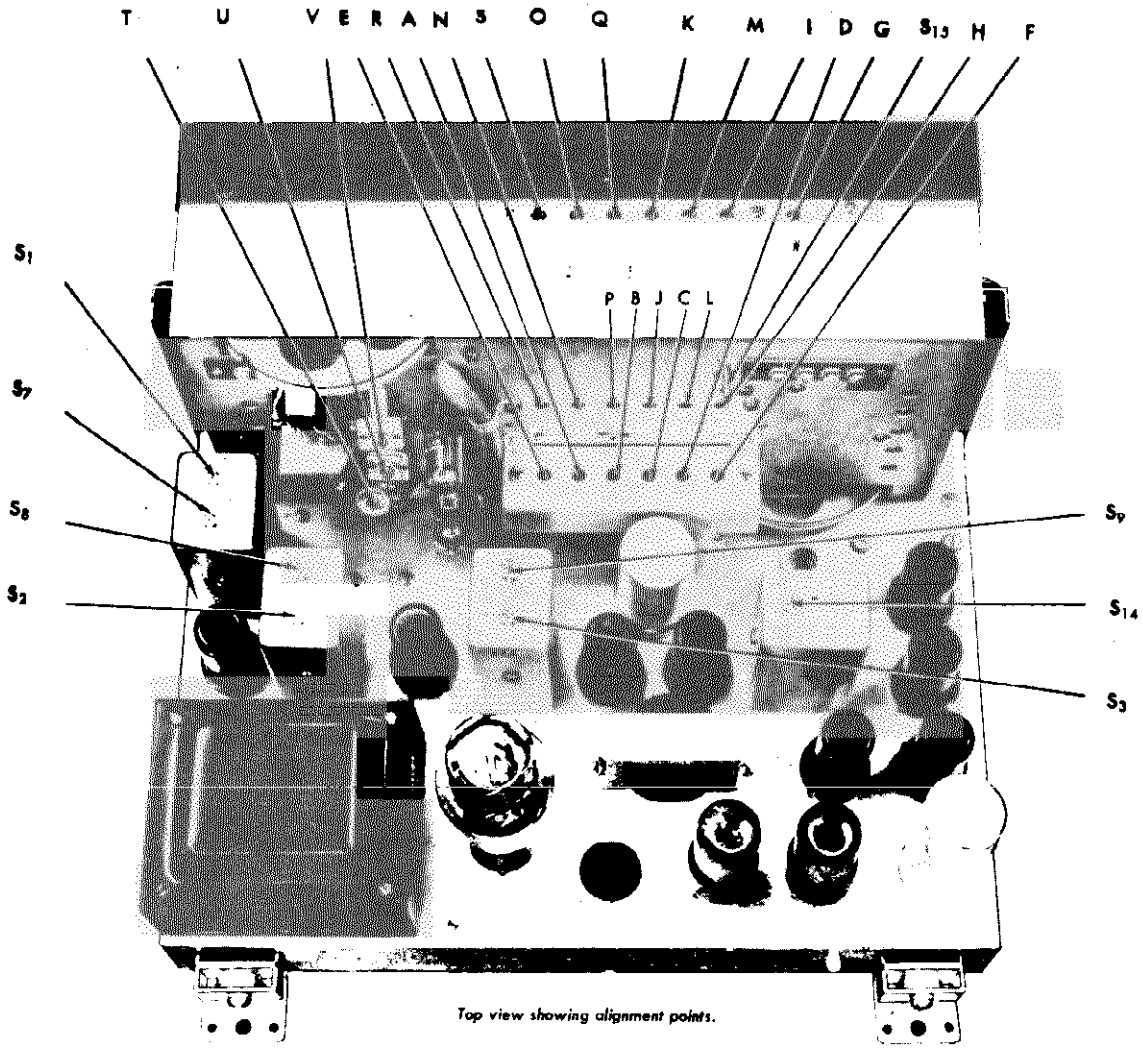
MODELS EC-403, EC-404,
Echophone



Back view of R.F. chassis showing component location.



Top view showing alignment points.

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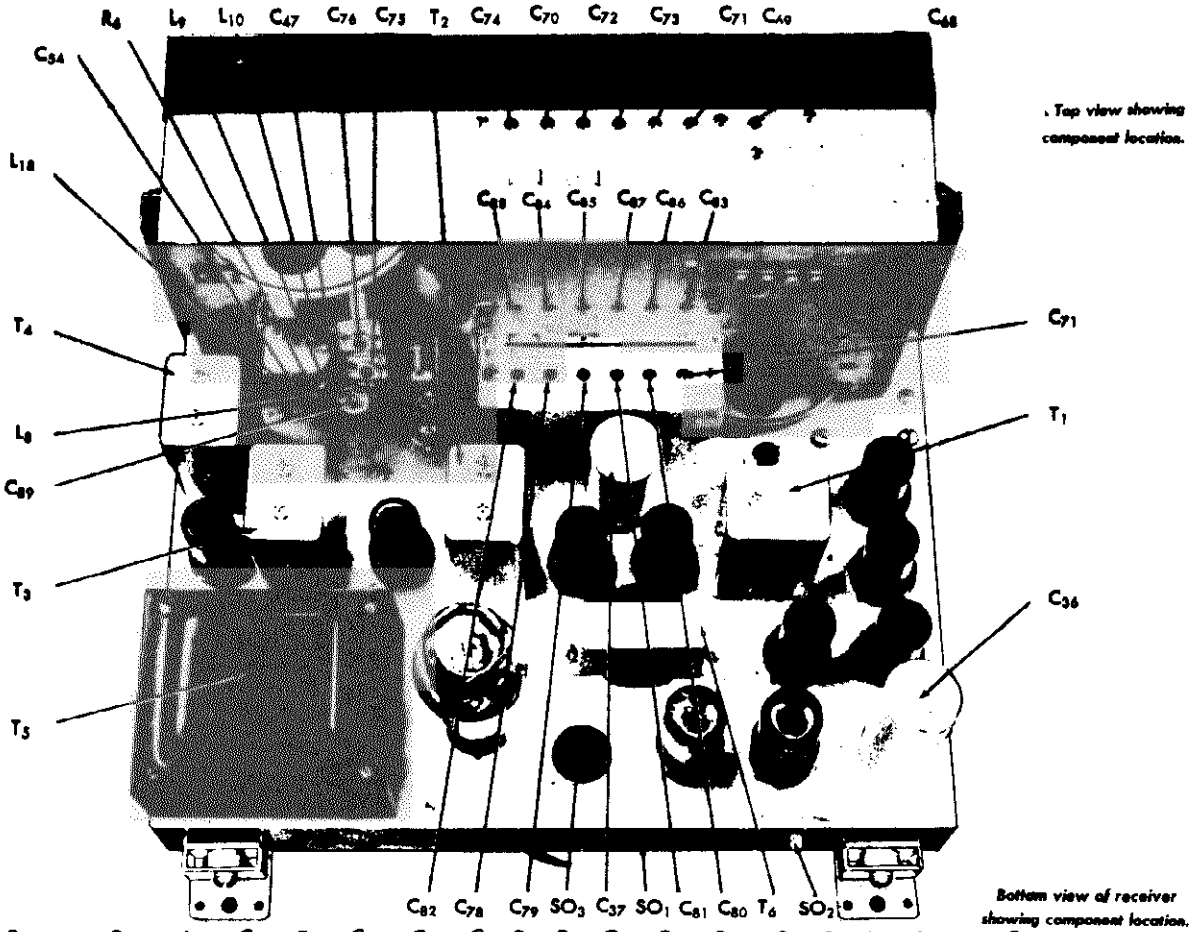
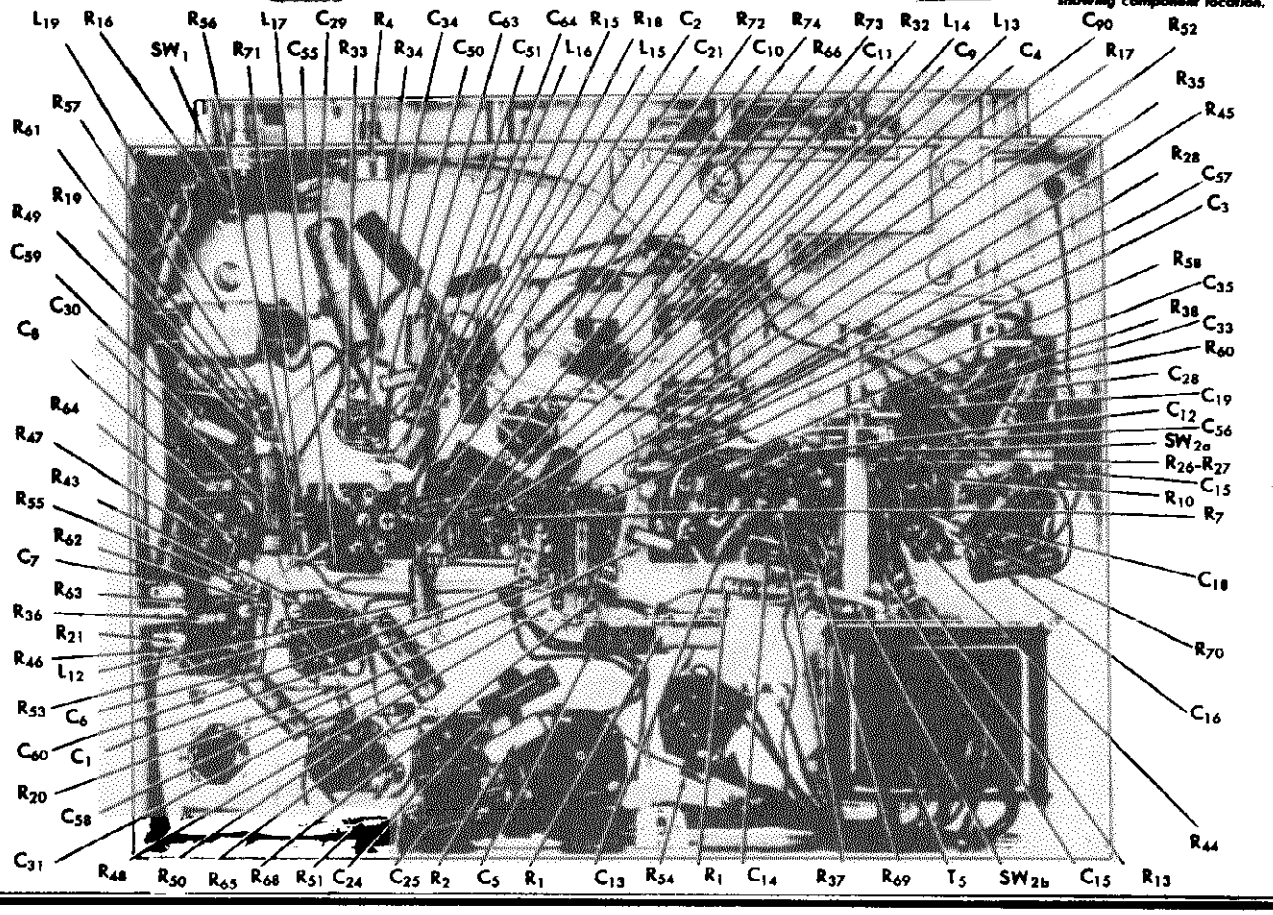


Top view showing component location.



Bottom view of receiver showing component location.

ALIGNMENT PROCEDURE

Removal of the receiver chassis from the cabinet requires the use of other calibration means than the dial glass. Calibration strips mounted on the pointer rails are provided for alignment purposes.

In order to see these calibration strips, it is necessary that the dial plate (brown metal cover) be removed in the following order:

1. Pull out dial pointers.
2. Remove seven self-tapping screws holding dial plate to chassis.
3. Remove the Right hand and Left hand Dial lamp assemblies fastened by one self-tapping screw each.
4. Remove dial plate.

With the variable condenser's fully "meshed," the right hand side of the pointer carriage will be indexed to "0" on the calibration strips (see fig. 3).

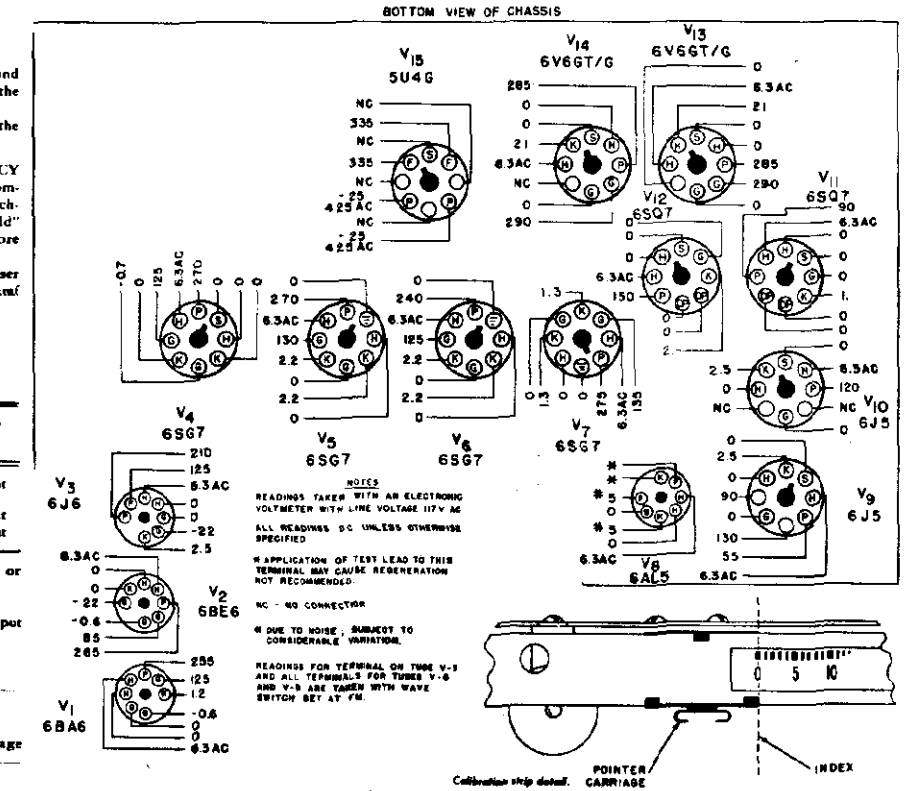
Proceed with alignment of the receiver as indicated on the alignment chart.

NOTE: This receiver has AUTOMATIC FREQUENCY CONTROL employed on the "FM" band in order to compensate for mechanical variations in the push-button mechanism. Correction factor is approximately 5 times; "take hold" characteristics are: "Before" 100 kc and "Release" before 450 kc at .1 volt input signal.

Standard RMA dummy consisting of a 200 mmf condenser in series with a 20 uh r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.

ALIGNMENT PROCEDURE

Steps	*Signal Generator Then .01 Mfd to:*	*Sig. Gen. Tuned to:*	*Receiver Tuned to:*	*Cal. No.*	*Adjust the Following Slugs/Trimmers for:*
"AM" i.f.	1. 2nd i.f. control grid	455 kc	"BC" Band 1000 kc	55	S3 and S6, Max. output
	2. 1st i.f. control grid	455 kc	1000 kc	55	S2 and S5, Max. output
	3. 1st Det. control grid	455 kc	1000 kc	55	S1 and S4, Max. output
NOTE: Set "Bass" control at No. 1, and "Treble" control at No. 4, read output for maximum AVC voltage, using a VTVM or 20,000 ohms volt meter connected to pin No. 7 of the 6AL5 radio detector tube to ground.					
"FM" i.f.	4. 2nd i.f. control grid	10.7 mc	"FM" Band Mid-scale	55	S9, S12, S13 Max. output
	5. 1st i.f. control grid	10.7 mc	Mid-scale	55	S8 & S11 Max. output
	6. 1st Det. control grid	10.7 mc	Mid-scale	55	S7, S10 Max. output
NOTE: For ratio detector alignment, clip output meter to C-34 leading to audio control potentiometer and ground.					
	7. 1st Det. control grid	10.7 mc	Mid-scale	55	S14 for "0" audio voltage
	8. Standard RMA dummy ant. to:	1500 kc	"BC" Band 1500 kc	82	"F," Calibration
	9. "A" "G"	1500 kc	1500 kc	82	"H," Max. output
	10. "A" "G"	1500 kc	1500 kc	82	"I," Max. output
	11. "A" "G"	600 kc	600 kc	15.5	"G," Calibration
	12. "A" "G"	600 kc	600 kc	15.5	S15, Max. output
	13. "A" "G"	12 mc	"B" Band 12 mc	91.5	"C," Calibration
	14. "A" "G"	12 mc	12 mc	91.5	"J," Max. output
	15. "A" "G"	12 mc	12 mc	91.5	"K," Max. output
	16. "A" "G"	9 mc	9 mc	6.5	"D," Calibration
	17. "A" "G"	9 mc	9 mc	6.5	"L," Max. output
	18. "A" "G"	9 mc	9 mc	6.5	"M," Max. output
	19. "A" "G"	18 mc	"A" Band 18 mc	94.5	"A," Calibration
	20. "A" "G"	18 mc	18 mc	94.5	"N," Max. output
	21. "A" "G"	18 mc	18 mc	94.5	"O," Max. output
	22. "A" "G"	15 mc	15 mc	7.5	"B," Calibration
	23. "A" "G"	15 mc	15 mc	7.5	"P," Max. output
	24. "A" "G"	15 mc	15 mc	7.5	"Q," Max. output
	25. "A" "G"	16 mc	"C" Band 16 mc	84	"E," Calibration
	26. "A" "G"	16 mc	16 mc	84	"R," Max. output
	27. "A" "G"	16 mc	16 mc	84	"S," Max. output
	28. Two 150 ohm resistors to: "D" "D"	108 mc	"FM" Band 108 mc	83.5	"T," Calibration
	29. "D" "D"	108 mc	108 mc	83.5	"U," Max. output
	30. "D" "D"	108 mc	108 mc	83.5	"V," Max. output



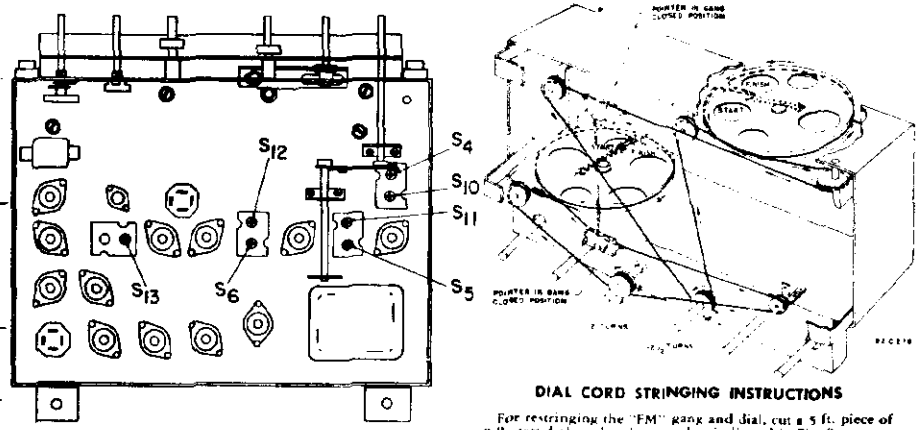


Fig. 5. Bottom view showing alignment points.

DIAL CORD STRINGING INSTRUCTIONS

For restringing the "FM" gang and dial, cut a 5 ft. piece of 9 lb. test dial cord and proceed as indicated in Fig. 9.

For restringing the "AM" gang and dial, cut a 4½ ft. piece of dial cord and proceed as indicated in Fig. 9.

MODELS EC-403, EC-404,
Echophone

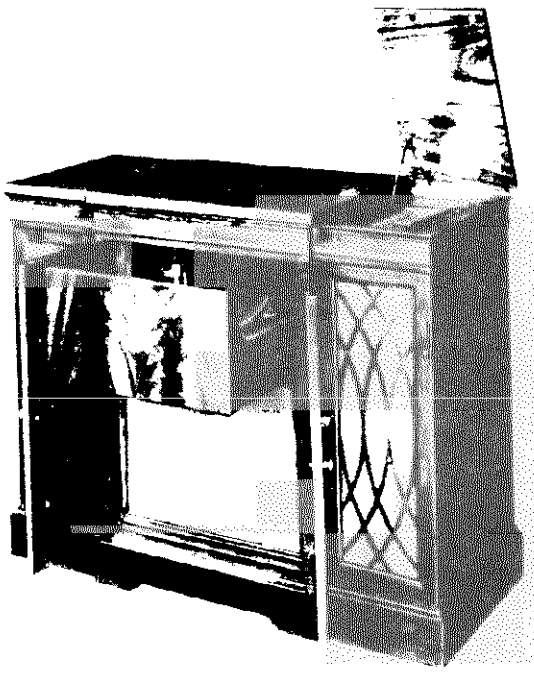
THE HALLICRAFTERS CO.

SERVICE PARTS LIST

Illustration No.	Description	Hallicrafters Part No.
	CABINET PARTS	
	Mahogany, cabinet	66F341
	Walnut, cabinet	66F342
	TRANSFORMERS AND COILS	
T1	Freq. detector trans. FM	50C208
T2, 3	Interstage I.F. trans.	50C209
T4	1st I.F. trans.	50C210
L1	R.F. Coil, short wave	51B905
L2	Loading coil, ant., BC	51B906
L3	Loop loading coil	51B907
L4	Osc. coil, short wave	51B908
L5	Ant. coil, short wave	51B909
L6	R.F. Coil, B.C.	51B910
L7	Osc. coil, B.C.	51B911
L8	Osc. coil, FM	51B914
L9	R.F. coil, FM	51B915
L10	Ant. coil, FM	51B916
L11	Plate choke	53B008
L12	Filament choke	53B009
L13, 14, 15, 16, 17	R.F. choke	53A106
L18	R.F. choke	53A115
L19	BC-SW loop ant.	57D106
L20	FM dipole ant.	57C108
T5	Power transformer	52C132
T6	Output transformer	55B086
L21	Audio choke	56B082
	CONDENSERS	
C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 90, 91.	.01 mfd. 600 v. tubular	46AZ103F
C26, 27, 28	.02 mfd 600 v. tubular	46AV203F
C30	.1 mfd 200 v. tubular	46AU104H
C31, 32	.05 mfd 600 v. tubular	46AY503F
C33	.002 mfd 600 v. tubular	46AZ202J
C34, 35	.003 mfd 600 v. tubular	46AZ302J
C38, 39	500 uuf ceramic	47A147
C40, 41, 42, 43, 44, 16	1000 uuf ceramic	47A148
C45	10 uuf ceramic	47A149
C46, 47	47 uuf ceramic	47A150
C48	1.5 uuf "Gimmick," wire	Not Supplied
C49	10 uuf 500 v. mica, 10%	CM20A100K
C50, 51, 52, 53	100 uuf 500 v. mica	CM20A101M
C54	22 uuf 500 v. mica, 10%	CM20A220K
C55	22 uuf 500 v. mica	CM20A220M
C56, 57, 58	220 uuf 500 v. mica	CM20A221M
C59	330 uuf 500 v. mica	CM20A331M
C60, 61, 62	47 uuf 500 v. mica	CM20A470M
C63, 64	1000 uuf 500 v. mica	CM30A102M
C65	3900 uuf 500 v. mica	CM35A392J
C36	60-20 mfd 450 v. electrolytic 20 mfd 30 v. electrolytic	45B099
C37	40-10 mfd 450 v. electrolytic 20 mfd 30 v. electrolytic	45B100
C29	5 mfd. 50 v. electrolytic	45A108
C68	570 uuf. trimmer	44A189
C75	Trimmer, FM, RF	44A192
C89	Trimmer, FM, Osc.	44A193
C76	Trimmer, FM, Ant.	44A194
C69, 70, 71, 72, 73, 74	Trimmer assembly, ant.	44B190
C77, 78, 79, 80, 81, 82	Trimmer assembly, Osc	44B195
C83, 84, 85, 86, 87, 88	Trimmer assembly, RF	44B196
C67a-b-c	Variable condenser, "FM"	48C175
C66a-b-c	Variable Condenser, "AM"	48C176
C92	39 uuf, Ceramic	CC30SH390M
	RESISTORS	
R1, 2	330 ohm, 5W WW	24A864
R76	330 ohm 10 W WW	24BG331E
R3	200 ohm 5W WW	24A865
R4	2 meg. volume control.	25A571
R5, 6	10 ohm, 1/2 W	RC20AE100M
R7, 8	100 ohm, 1/2 W	RC20AE101M
R9, 10, 11, 12, 13, 14, 77	1000 ohm, 1/2 W	RC20AE102M
R15, 16	10,000 ohm 1/2 W	RC20AE103M
R17, 18, 19, 20, 21, 22, 23, 24, 25, 78	100,000 ohm 1/2 W	RC20AE104M
R26, 27, 28, 29, 30, 31	1 meg. 1/2 W.	RC20AR105M
R32	150 ohm 1/2 W	RC20AE151M
R33, 34	15,000 ohm 1/2 W	RC20AE153J
R35, 36, 37, 38, 39	220 ohm, 1/2 W	RC20AE221M
R40	2200 ohm, 1/2 W	RC20AE222M
R41, 42	22,000 ohm, 1/2 W	RC20AE223M
R43, 44, 45	220,000 ohm, 1/2 W	RC20AE224M
R46	33 ohm, 1/2 W	RC20AE330M
R47, 48	3300 ohm, 1/2 W	RC20AE332M
R49	33,000 ohm, 1/2 W	RC20AE333M
R50, 51, 52	330,000 ohm, 1/2 W	RC20AE334M
R53	3900 ohm, 1/2 W (10%)	RC20AE392K
R54, 55	470 ohm, 1/2 W	RC20AE471M
R56	4700 ohm, 1/2 W	RC20AE472M
R57	820 ohm, 1/2 W	RC20AE821K
R58, 59	47,000 ohm, 1/2 W	RC20AE473M

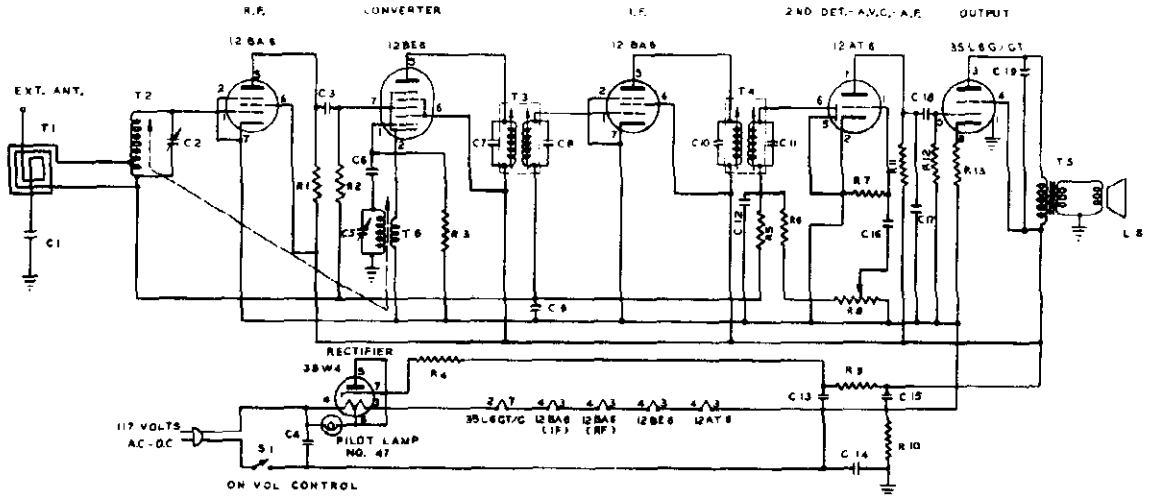
SERVICE PARTS LIST (Continued)

Illustration No.	Description	Hallicrafters Part No.
	RESISTORS (Continued)	
R60, 61	68,000 ohm, 1/2 W	RC20AE683K
R62, 63, 64, 65	470,000 ohm, 1/2 W	RC20AE474M
R66, 67	33,000 ohm, 1 W	RC30AE333M
R68, 69, 70	47,000 ohm, 1 W	RC30AE473M
R71	68,000 ohm, 1 W	RC30AE683M
R72, 73, 74	10,000 ohm, 2 W	RC40AE103M
R75	22,000 ohm, 2 W	RC40AE223K
	MISCELLANEOUS	
SW1	Bass, on and off, complete	60B265
SW2	Treble, complete	60B264
SW3	Band switch, 5 sec. 6 pos.	60C266
	Phono motor receptacle	10A015
	Phono pick-up jack	36A034
	Speaker socket	6A190
	Octal socket, (tube)	6A190
	Miniature socket	6A276
	Pilot light socket and bracket, L.H.	86A046
	Pilot light socket and bracket, R. H.	86A047
	Pointer carriage	67B645
	Tube shield spring retainer	69A104
	Shield base	69A169
	Dial cord	38A014
	Line cord and plug	87A157
	Pilot lamp	39A004
	Pointer, FM	82A120
	Pointer, AM	82A121
	Insert, pointer, FM	17A022
	Insert, pointer, AM	17A023
	Push-button	17B028
	Speaker, PM, 15"	85C045
	Speaker, PM, 10"	85C043 No. 1 85C047 No. 2
	Knob, with index	15B093
	Knob	15B096
	Push-button insert	17A027
	Call letters	17A025
	Record changer	115C002-2
	Dial glass, lower	22B179
	Dial glass, upper	22B178
	Escutcheon	7D039
	TUBES	
V15	5U4G Rectifier	90X5U4G
V8	6AL5 FM Freq. detector	90X6AL5
V1	6BA6 RF amplifier	90X6BA6
V2	6BE6 1st detector	90X6BE6
V9, 10	6J5 1st and 2nd audio amp.	90X6J5
V3	6J6 H.F. osc. and FM AFC	90X6J6
V4, 5, 6, 7	6SG7 1st and 2nd I.F., AM 2nd det., FM 3rd and 4th I.F.	90X6SG7
V13, 14	6V6GT-G push pull audio amp.	90X6V6GT
V12, 11	6SQ7 Inverter and 3rd audio amp.	90X6SQ7



HOFFMAN RADIO CORP.

MODELS A202, A309,
Chassis 119



SYMBOL	DESCRIPTION	HOFFMAN No.
C1	.005 Mfd. 600 Volt Tubular Paper	4102
C2, C5	Dual Padder 280 Mmf. Per Section	4307
C3, C6	100 Mmf. ± 20% Mica	4000
C4	.05 Mfd. 400 Volt Tubular Paper	4101
C7, C8	100 Mmf. ± 10% Ceramic	4012
C9	.05 Mfd. 200 Volt Tubular Paper	4100
C10, C11	100 Mmf. ± 10% Ceramic	4012
C12	270 Mmf. ± 20% Mica	4001
C13, C15	Dry Electrolytic (30-50 Mfd. 150 V)	4201
C14	.2 Mfd. 200 Volt Paper Tubular	4108
C16	.005 Mfd. 600 Volt Paper Tubular	4102
C17	270 Mmf. ± 20% Mica	4001
C18	.005 Mfd. 600 Volt Tubular Paper	4102
C19	.02 Mfd. 400 Volt Tubular Paper	4106
LS	5" PM Loudspeaker	9003
R1	2200 Ohm ± 20% ½ Watt	4512
R2, R6	47,000 Ohm ± 20% ½ Watt	4504
R3	22,000 Ohm ± 20% ½ Watt	4501
R4	47 Ohm ± 20% ½ Watt	4508
R5	2.2 Megohm ± 20% ½ Watt	4502
R7	10 Megohm ± 20% ½ Watt	4505
R8	.5 Megohm Pot. with Switch (Volume)	4802
R9	500 Ohm ± 10% 5 Watt	4700
R10, R12	.47 Megohm ± 20% ½ Watt	4506
R11	.22 Megohm ± 20% ½ Watt	4500
R13	150 Ohm ± 20% ½ Watt	4510
S1	On-Off Switch (on Volume Control)	
T1	Antenna Loop	5238
T2	R.F. Coil	55203
T3	Input I.F. Transformer (455 Kc.)	55201
T4	Output I.F. Transform (455 Kc.)	55202
T5	Audio Output Transformer	5101
T6	Oscillator Coil	55204

MODELS A202 & A309

DESCRIPTION

Hoffman Models A202 and A309 are electrically identical and differ in cabinet design only. The receiver consists of a 6-tube broadcast band AC-DC Superheterodyne incorporating a built-in loop antenna.

SPECIFICATIONS

Tuning Range ..... 540 Kc to 1650 Kc
Intermediate Frequency ..... 455 Kc.
Power Supply ..... 115 V. D.C. or 115 V. A.C. 50-60 C.P.S.
Power Consumption ..... 28 Watts
Undistorted Audio Output ..... .6 Watt
Maximum Audio Output ..... .9 Watt
Loudspeaker ..... 5-inch round P.M.

NORMAL OPERATING CURRENTS

35W4	Cathode Current	60 Ma.
35L6	Cathode Current	30 Ma.

Meter inserted in circuit at cathode.

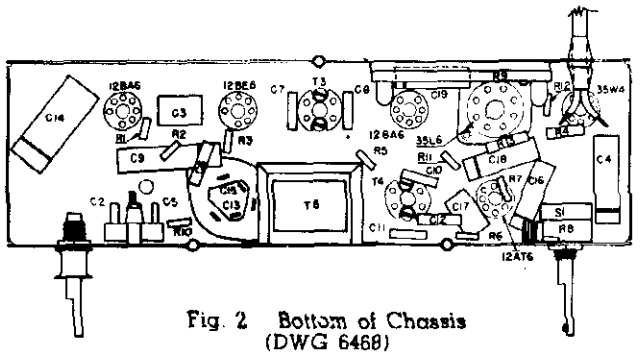


Fig. 2 Bottom of Chassis
(DWG 6468)

NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

PIN NO.	1	2	3	4	5	6	7	8
12BA6(R.F.)	— .45	0.	25. A.C.	37.5 A.C.	+65.	+80.	0.	
12BE6	4.6*	0.	12.5 A.C.	25. A.C.	+80.	+80.	0.	
12BA6 (I.F.)	— .45	0.	37.5 A.C.	50. A.C.	+80.	+80.	0.	
12AT6	—1.5*	0.	0.	12.5 A.C.	0.	—15.	+37.5	
35L6	0	85 A.C.	+75 D.C.	+80. D.C.	0.	0.	50. A.C.	+4.6
35W4	115 A.C.	0.	85. A.C.	115. A.C.	110. A.C.	110. A.C.	+110. D.C.	

D.C. voltages measured with 1000 ohm/volt meter
A.C. voltages measures with 1000 ohm/volt meter
All voltages measured with reference to B-
Line voltage 115

* These readings taken with V. T.V.M.

NOTE: The above readings are obtained with no signal input to receiver.

MODELS A202, A309
MODEL B400

HOFFMAN RADIO CORP.

A202, A309

ALIGNMENT PROCEDURE

CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. .25 Mfd. Condenser.

I.F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to 12BE6 control grid; connect ground side of generator to chassis of receiver through .25 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. slugs (first T4 and then T3) for maximum reading on output meter.
   Note: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out; volume control should be on full. After adjustment, put a drop of wax on each I.F. tuning slug to hold it in place.

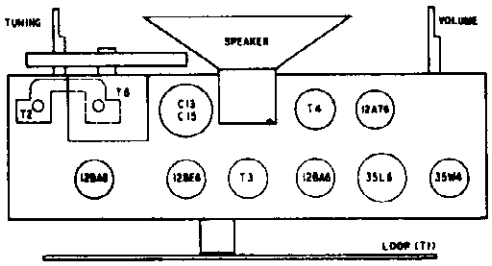


Fig. 1 Top of Chassis
(DWG 1023-4)

R.F. ALIGNMENT: control slugs

1. Set receiver tuning ~~condenser~~ with ~~plates~~ all the way in.
2. Set signal generator on 540 Kc (modulated) and connect generator output to antenna post on receiver. The ground side of the generator should be connected to receiver B- through a .25 Mfd. condenser.
3. Tune in signal by adjusting oscillator trimmer C5.
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer for maximum output.
6. Set signal generator on 1650 Kc and check signal with tuning condenser plates all the way out.
7. Set signal generator on 1470 Kc.
8. Tune in signal on receiver and adjust rf trimmer C2 for maximum reading on output meter. Feed only enough signal from the generator to keep maximum reading on lower half of meter scale.
9. Recheck at 600 Kc, 1000 Kc and 1410 Kc for tracking and readjust as required.

DIAL ADJUSTMENT:

To set the dial on calibration, pick up a station of known frequency near the center of the dial and move the pointer by hand as required.

B400

ALIGNMENT PROCEDURE

CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

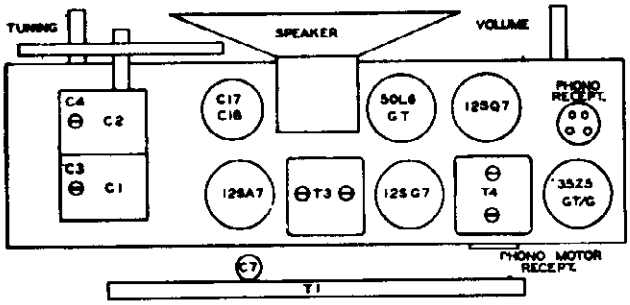
EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. .1 Mfd. Condenser.

I. F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to antenna post on loop; connect ground side of generator to chassis of receiver through .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T4 and then T3) for maximum reading on output meter.

NOTE: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out, volume control should be on full.



R.F. ALIGNMENT:

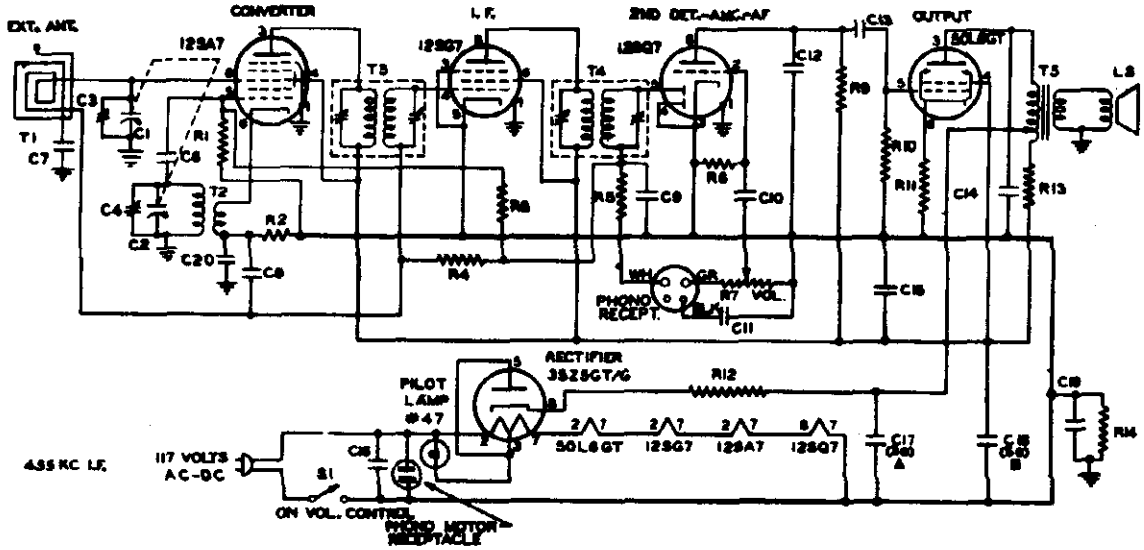
1. Set tuning condenser with plates completely out.
2. Set signal generator at 1650 Kc (modulated) and feed its output into a loop of wire about 6" in diameter. Place this loop about one foot away from and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer (C4).
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer (C4) for maximum output.
6. Set signal generator at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna trimmer (C3) while rocking gang condenser for maximum reading on output meter. Feed only enough signal from generator to keep maximum reading on lower half of meter scale.

DIAL ADJUSTMENT:

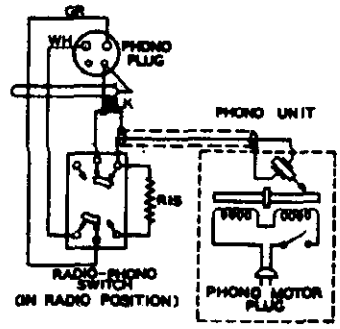
To set the dial on calibration, tune in a station of known frequency near the center of the dial and move the pointer by hand as required.

HOFFMAN RADIO CORP.

MODEL B400, Chassis 118



SYMBOL	DESCRIPTION	HOFFMAN No.
C1, C2	Two Section Variable (385-180 Mmf.)	4401
C3, C4	Trimmer: Part of Variable Cond.	
C5	100 Mmf. ±20% Mica	4080
C7, C10, C13	.005 Mfd. 600 Volt Tubular Paper	4102
C8, C11, C15	.05 Mfd. 200 Volt Tubular Paper	4100
C9, C12	270 Mmf. ±20% Mica	4091
C14	.02 Mfd. 400 Volt Tubular Paper	4106
C16	.05 Mfd. 400 Volt Tubular Paper	4101
C17, C18	Dry Electrolytic (20-20 Mfd. 150 V.)	4201
C19	.2 Mfd. 200 Volt Tubular Paper	4108
C20	.001 Mfd. 600 Volt Tubular Paper	4104
R1	22,000 Ohm ±20% ½Watt	4501
R4	2.2 Megohm ±20% ½Watt	4522
R5	47,000 Ohm ±20% ½Watt	4504
R6, R8	10 Megohm ±20% ½Watt	4505
R7	.5 Megohm Pot. with Switch (Vol.)	4002
R9	.22 Megohm ±20% ½Watt	4508
R10, R14, R15	.47 Megohm ±20% ½Watt	4506
R11	150 Ohm ±20% ½Watt	4510
R12	47 Ohm ±20% ½Watt	4508
R13	1500 Ohm ±20% 1 Watt	4552
S2	Phono-Radio-Tone Switch	6021
LS	PM Loudspeaker	9023
S1	On-Off Switch (on Vol. Control)	
T1	Antenna Loop	5255
T2	Oscillator	5208
T3	Input I.F. Transformer (455Kc.)	5205
T4	Output I.F. Transformer (455Kc.)	5206
T5	Audio Output Transformer	5117



DESCRIPTION

Hoffman model B400 is a table model radio-phonograph combination. The radio section consists of a 5-tube AC-DC superheterodyne receiver with a built-in loop antenna. The phonograph section consists of an automatic record changer which plays either fourteen 10-inch records or twelve 12-inch records at one loading. The record changer may also be operated manually.

SPECIFICATIONS

Tuning Range	540 Kc to 1650 Kc
Intermediate Frequency	455 Kc
Power Supply	115 V. D.C. or A.C. 50-60 C.P.S.
Power Consumption	48 Watts
Audio Output	1.25 Watts

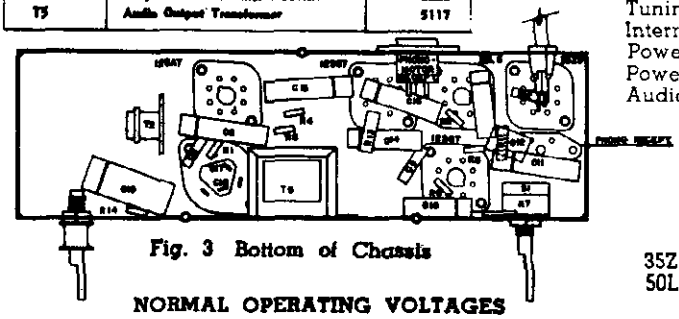


Fig. 3 Bottom of Chassis

NORMAL OPERATING CURRENTS

35Z5	Cathode Current	57 Ma
50L6	Cathode Current	33 Ma

NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

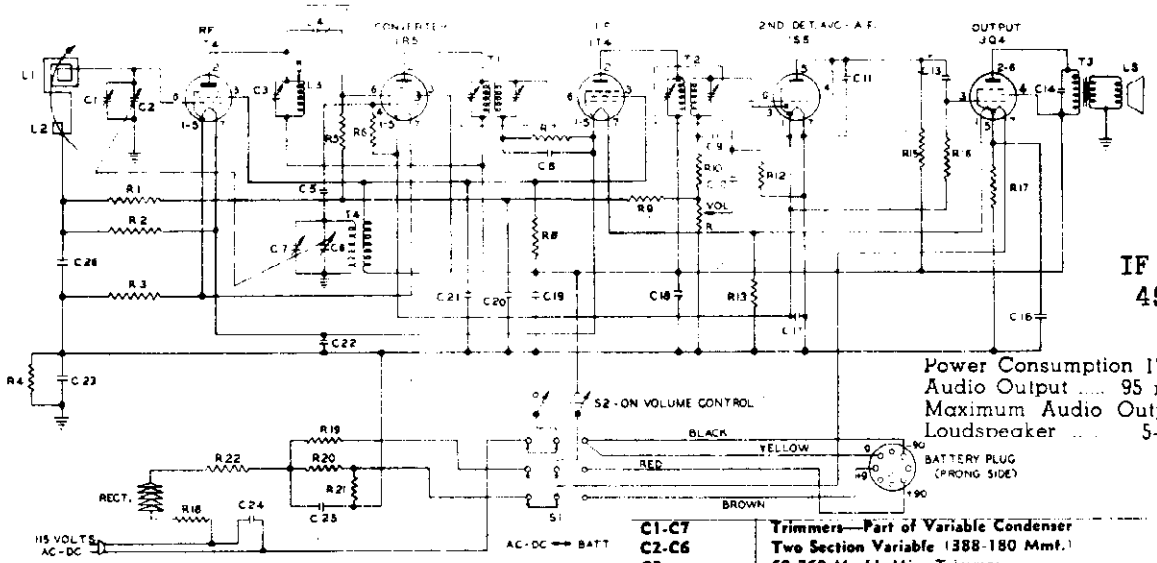
PIN NO.	1	2	3	4	5	6	7	8
12SA7	0	24 A.C.	+85	+92	−5.5	0	11.5 A.C.	−.4
12SG7	0	22 A.C.	0	−.4	0	+92	36 A.C.	+86
12SQ7	0	−.8	0	0	−1.0	+60	0	9 A.C.
50L6	0	36 A.C.	+101	+93	+.2	0	87 A.C.	+7.5
35Z5	0	117 A.C.	114 A.C.	+112	114 A.C.	0	87 A.C.	+116

D.C. voltages measured with 20,000 ohm/volt meter.
A.C. voltages measured with 1,000 ohm/volt meter.
All voltages measured with reference to B−.
Line voltage 117.

NOTE: The above readings are obtained with no signa input to the receiver, radio-phono switch in the RADIO position, and volume control full on.

MODEL A700, Chassis 110S

HOFFMAN RADIO CORP.



IF PEAK 455KC

Power Consumption 17 watts at 117 V.
Audio Output ..... 95 mw. at 10% dist.
Maximum Audio Output ... 225 mw.
Loudspeaker ... 5-inch round P.M.

In order to align the receiver properly, remove the chassis from the cabinet and remove the bottom plate from the chassis.

I. F. Alignment

1. Connect output meter across speaker voice coil; set meter on 1-volt scale.
2. Connect output of signal generator to trimmer C3 (blue wire on trimmer located at rear of chassis). The ground side of the signal generator should be connected to B- through a .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T2 and then T1) for maximum reading on output meter.
   NOTE: Keep signal level low, just enough to keep the maximum reading on the output meter at 0.4 volt or less. tuning gang should be set with plates all the way out; volume control full on.
4. Replace bottom cover plate.

R. F. Alignment

1. Leave tuning gang with plates all the way out.
2. Set signal generator on 1650 Kc (modulated) and feed generator output into a loop of wire approximately 6" in diameter. Place the loop about one foot away and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer C7.
4. Adjust output of signal generator to obtain deflection of .4 volt or less on output meter.
5. Adjust oscillator trimmer for maximum output.
6. Set Signal generator to 1400 Kc and tune in signal with tuning condenser.
7. Adjust loop antenna trimmer C1 and R. F. Coil assembly for maximum output. The R. F. coil adjustment is made by loosening the coil mounting clamp and sliding the coil up or down as required.
8. Set signal generator and tuning gang to 600 Kc and adjust R. F. trimmer C3 for maximum output.
9. Go back to 1400 Kc to check tracking and readjust at 1400 Kc and 600 Kc as required.

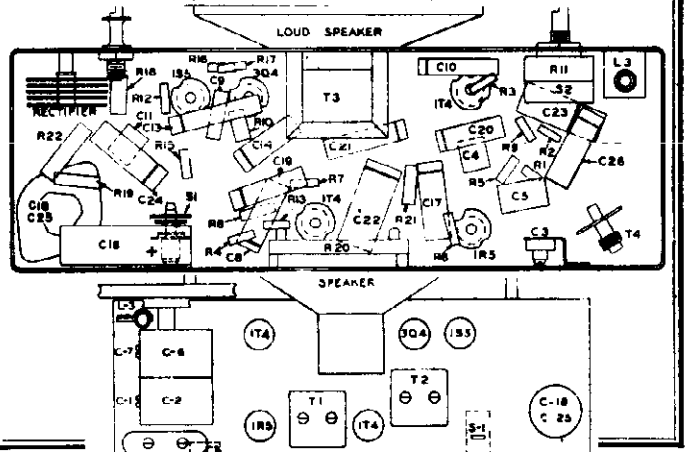
PIN NO.	1	2	3	4	5	6	7	8
1T4 (RF)	2.6	84	65		2.6		3.9	
1R5	1.3	84	64	—5.0*	1.3	3*	2.6	
1T4 (RF)	3.9	84	65	1.2*	3.9	1.5*	5.2	
1S5	1.3	0	.5*	20*	1	—.5*	0	
3Q4	5.2	84	—1.3*	84	6.5	84	7.8	

NOTE: All voltages are measured with reference to B- (black wires on volume control switch) and no signal input to receiver.

* These readings must be taken with a V. T. V. M.

C1-C7	Trimmers—Part of Variable Condenser	
C2-C6	Two Section Variable (388-180 Mmf.)	4401
C3	60-260 Mmfd. Mica Trimmer	4306
C4-C9-C11	.0001 Mfd. Mica	4000
C5	47 Mfd. Mica	4009
C8-C26	.01 Mfd. 400 Volt Tubular Paper	4112
C10-C12-C13-C14	.005 Mfd. 600 Volt Tubular Paper	4102
C15-C16	100 Mfd. 25 Volt Dry Electrolytic	4204
C17-C19-C20-C21	.05 Mfd. 200 Volt Tubular Paper	4100
C18-C25	Dry Electrolytic Condenser (30-50 Mfd. 150-150 Volt)	4201
C22-C23	.2 Mfd. 200 Volt Tubular Paper	4108
C24	.05 Mfd. 400 Volt Tubular Paper	4101
L1	Antenna Loop	55208
L2	Antenna Loop Compensator	5250
L3	R.F. Coil Permeability Tuned	5245
L.S.	5¼" P.M. Speaker	9019
R1-R14	3.3 Megohm, ½ Watt	4535
R2-R7-R9-R16	2.2 Megohm, ½ Watt	4502
R3	680 Ohms, ½ Watt	4514
R4	.47 Megohm, ½ Watt	4506
R5-R15	1 Megohm, ½ Watt	4513
R6-R10	.1 Megohm, ½ Watt	4511
R8	3900 Ohms ± 10%, ½ Watt	4527
R11	1 Megohm Potentiometer with D.P.S.T. Switch (Volume)	4808
R12	10 Megohm, ½ Watt	4505
R13*	820 Ohm ± 10%, ½ Watt	4533
R17	1500 Ohm, ½ Watt	4534
R18-R22	47 Ohm, 2 Watt	4532
R19	1000 Ohm, 1 Watt	4522
R20	1500 Ohm, 6½ Watt ± 5% Wirewound	4701
R21	470 Ohm, 1 Watt ± 10%	4531
S1	AC/DC Battery Switch Plug Operated	6010
S2	On-Off Switch (on Volume Control)	
T1	Input I.F. Transformer (455 K.C.)	5242
T2	Output I.F. Transformer (455 K.C.)	5243
T3	Output Audio Transformer	5104
T4	Oscillator Coil	5244
Rect.	Selenium Rectifier	9517

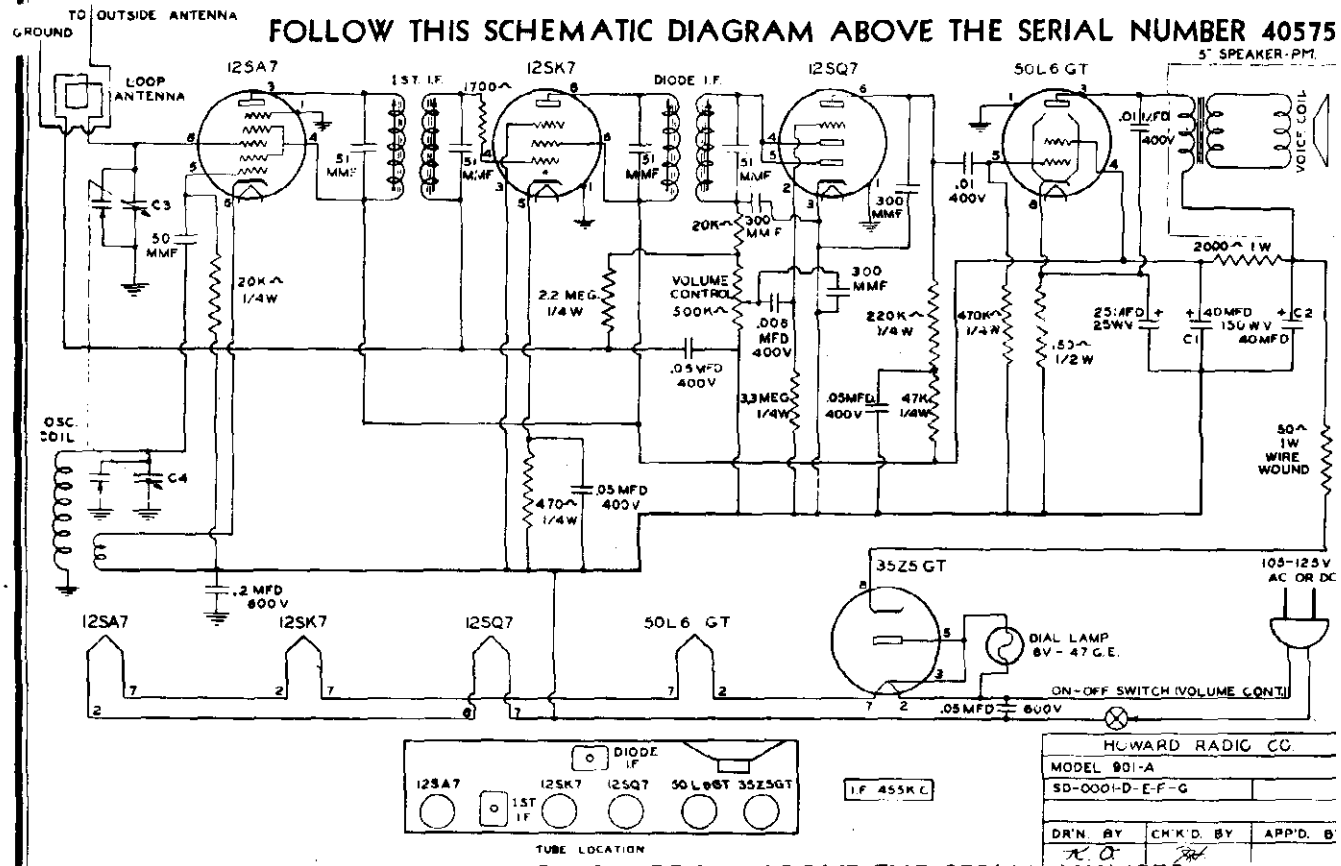
* Some sets use 1000 ohms ± 20%, ½ Watt, Part No. 4542.



MODEL 901-A
MODEL M901-A

HOWARD RADIO CO.

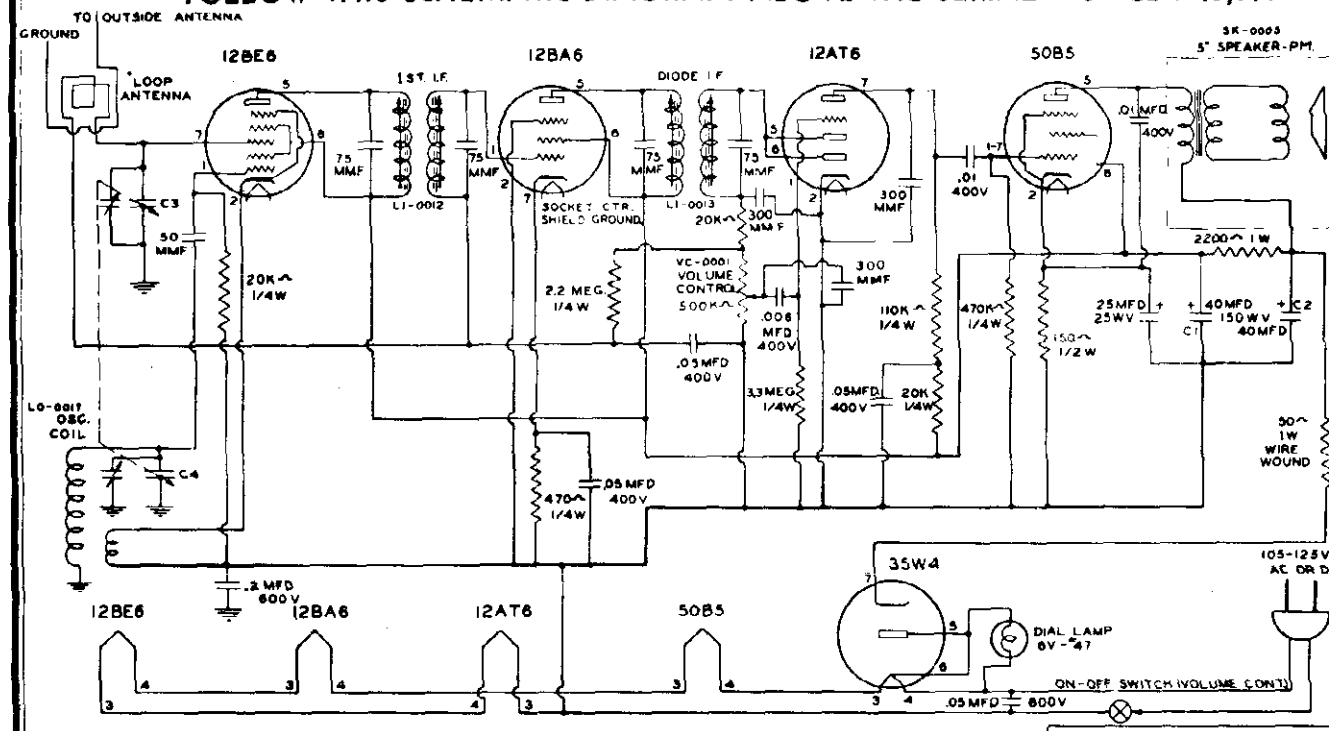
FOLLOW THIS SCHEMATIC DIAGRAM ABOVE THE SERIAL NUMBER 40575

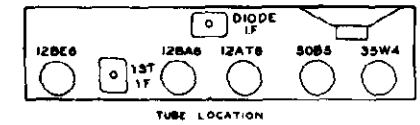


I.F. 455 K.C.

HOWARD RADIO CO.		
MODEL 901-A		
SD-0001-D-E-F-G		
DR'N. BY	CH'K'D. BY	APP'D. BY

FOLLOW THIS SCHEMATIC DIAGRAM ABOVE THE SERIAL NUMBER 45,771



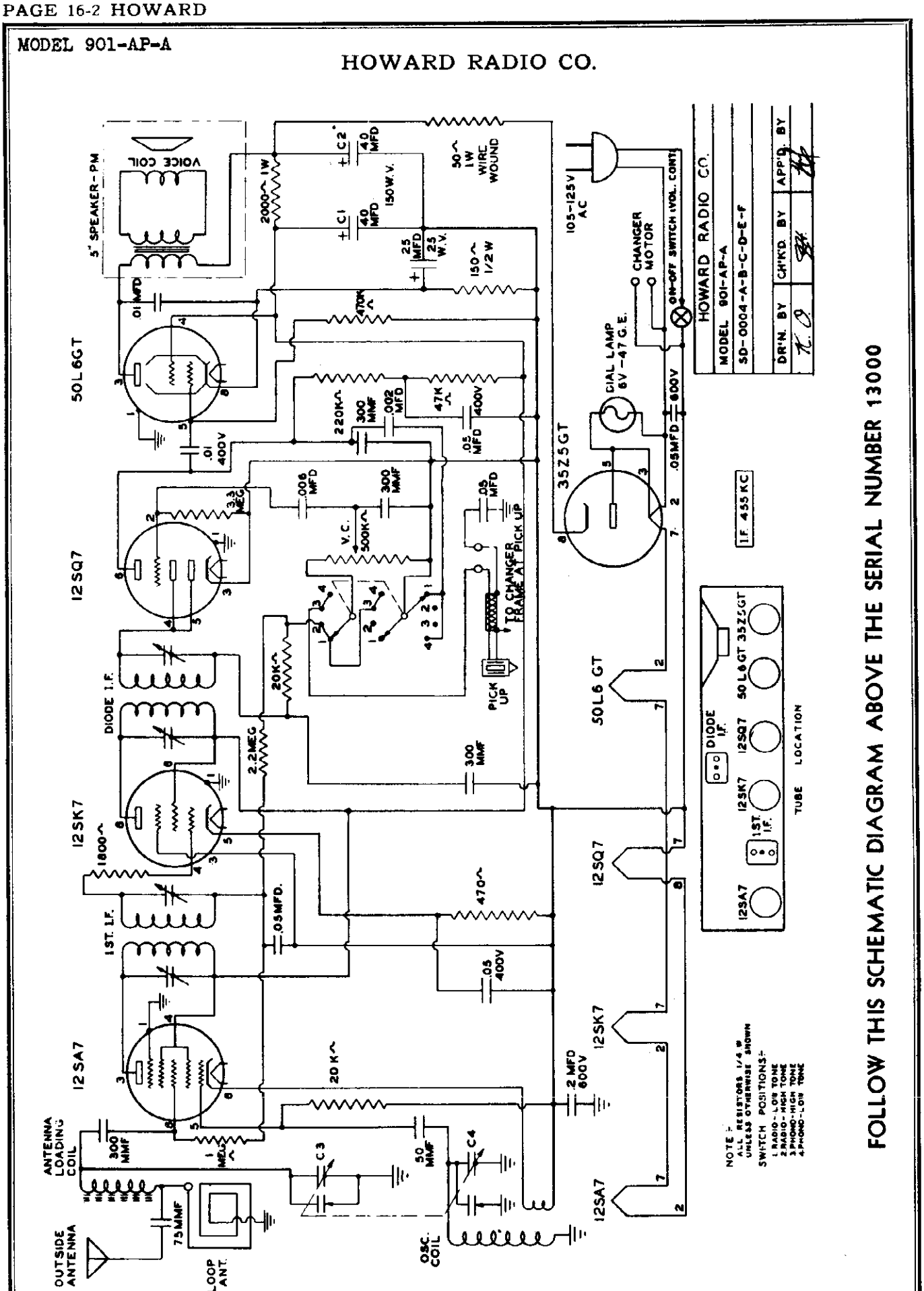


I.F. 455 K.C.

HOWARD RADIO CO.		
MODEL M901-A		
SD-0007		
DR'N. BY	CH'K'D. BY	APP'D. BY

MODEL 901-AP-A

HOWARD RADIO CO.



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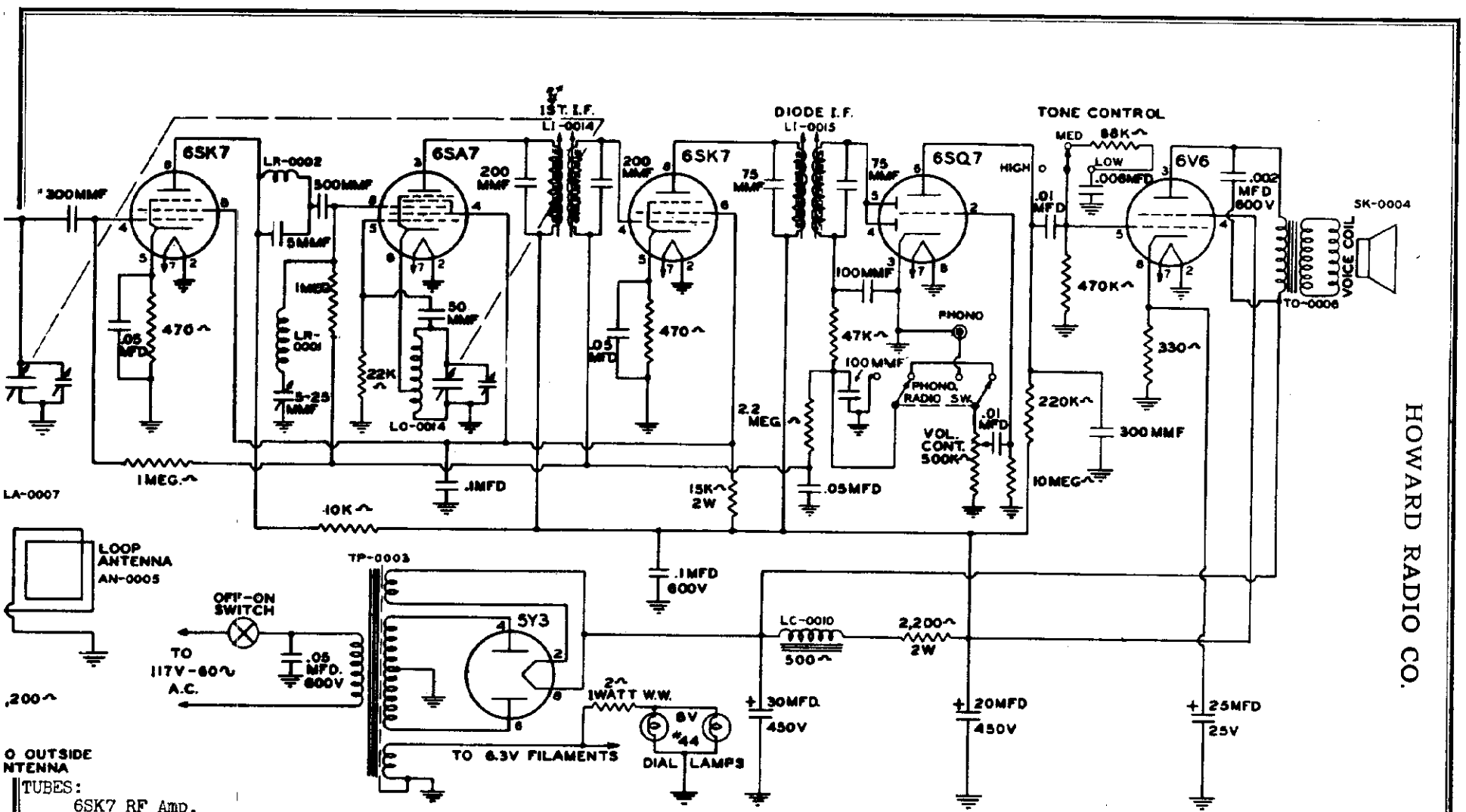


TUBES:
- 6SK7 RF Amp.
- 6SA7 Mixer & Oscillator
- 6SK7 IF Amp.
- 6SQ7 Diode Det. & 1st AF.
- 6U6 Output
- 5Y3 Rectifier

BEAM POWER OUTPUT:
Undistorted output over 3 watts. Maximum output 4-1/2 watts.

SPEAKER:
Rubber floated 6x9 inch HOWARD P.M., using large Alnico No. 5 core.

LF. 455KC.

PHONO-RADIO SWITCH SHOWN IN RADIO POSITION.

HOWARD RADIO CO.		
MODEL 908		
SD-0005		
DR'N. BY	CH'K'D. BY	APP'D. BY
K.O.		

HOWARD RADIO CO.

SOCKET VOLTAGE READINGS - 906 AND 906C

Voltage reading taken from ground with voltage at line set at 110 volts A.C. These readings were taken with a vacuum tube voltmeter of the VoltOhmyst type.

TUBE	FUNCTION	CATH.		SC.		PLATE		B+	
6SK7	R.F	1.8	*5	79.	*6	210.	*8		*
6SA7	Converter .			79.	4	230.	3		
6SK7	1st. I.F. .	2.3	5	79.	6	240.	8		
6SQ7	Det. & 1st. Audio. . .					115.	6		
6V6	Output. . .	11.	8	235.	4	225.	3		
5Y3	Rectifier .							285	8

* Socket Terminal Number.

Voltage drop across filter choke 10 volts.

PARTS LIST - 906

CONTROLS

VC-0005 Volume Control with Switch
or
VC-0006 Volume Control with Switch

CONDENSERS

AC-0004 Tuning Gang with Gears and Drive Hub.
CE-0009 Capacitor - Electrolytic 30-20-20 mfd. 450 volts or the following 3 capacitors.
CE-0005 Capacitor - 25 mfd. 25 volts.
CE-0011 Capacitor - 30 mfd. 450 volts.
CE-0012 Capacitor - 20 mfd. 450 volts.

COILS

AN-0005 Loop Antenna
LA-0007 Loop Load Coil
LI-0014 1st IF Transformer in can
LI-0015 2nd IF Transformer in can
LO-0014 Oscillator Coil
LR-0001 Wave Trap 455 KC
LR-0002 Untuned RF Coil

DIAL AND CONTROL ACCESSORIES

AS-0213 Tuning Shaft Assembly
AS-0217 Dial Pointer Assembly
AR-0019 Dial Light Bracket Assembly - Right Side
AR-0024 Dial Light Bracket Assembly - Left Side
ES-0001 Dial covering - Plastic escutcheon for cabinet
SP-0010 Dial Drive Spring
DC-0001 Dial Drive Cord 52" long
FR-0062 Dial Glass Snaps
GR-0001 Rubber Grommets for Tuning Gang and Speaker Mounting
DG-0004 Calibrated Lucite Dial
LS-0002 #44 Blue Bead Pilot Lamp

KNOBS

AR-0025 Thumb Wheel Assembly (Tone Control)
AR-0026 Thumb Wheel Assembly (Radio Phono)
KB-0015-1 Knobs Brown Bakelite

SPEAKER

SK-0004 Speaker 9" Elliptical PM Table Model

TRANSFORMERS

TO-0006 Speaker Output Transformer
TP-0003 Power Transformer - 60 cycle 110 volt
LC-0010 Power Choke (500 ohm D.C.)

TUBE COMPLEMENT

TU-5Y3 Tube
TU-6SK7 Tubes (2 used)
TU-6SA7 Tube
TU-6SQ7 Tube
TU-6V6 Tube

SOCKETS

SO-0010 Phono Socket
SO-0017 Tube Socket
TB-0007 Terminal Strip, External Antenna

SWITCHES

SW-0009 Radio Phono Switch D.P.D.T.
SW-0010 Tone Switch - 3 position

CABINET

CW-0008 Cabinet complete
AS-0240 Metal Grill Assembly (1 used)
BC-0003 Wood Baffle used with above item
or
MO-0026 Plastic Grill (2 used)

LINE CORD

CA-0038 Line Cord - 6 ft and Moulded Plug

ALIGNMENT CHART-MODELS 906 AND 906C

Set controls at indicated positions before following alignment chart.

Tone switch high
Volume control on full
Set dial between stations
Radio phono control at radio

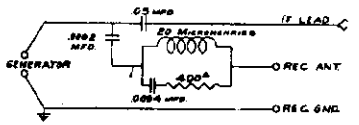
DUMMY ANTENNA	SIG. GEN. CONNECTION TO	GEN. FREQ.	BAND POSITION	DIAL SETTING	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	SEE NOTE
.05 Mfd.	Grid of 6SA7	455 KC	BC	Off Station	①②③④	I.F. Peak to Max. Output	A
.05 Mfd.	Ant.	455 KC	BC	Off Station	⑤	Null	B
400 Ohm. Resistor	"A" Ant. Post	1400 KC	BC	1400 KC	⑥⑦	BC Osc. and RF	C

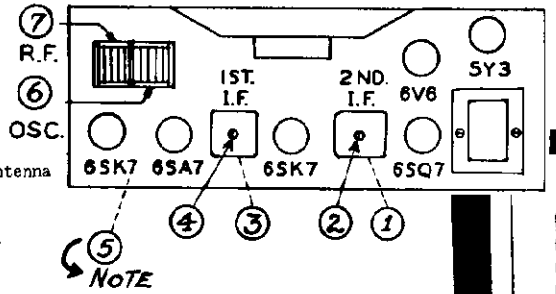
NOTE A. The I.F. adjustments are iron core slug tuning and it should not be necessary to move them very far in either direction from the factory setting, since they are of a very stable nature.

NOTE B. Important. Connect the signal generator to the antenna screw on the outside of the radio chassis and keep the metal of the chassis between the generator lead and the wave trap coil. Use your signal generator in a turned up powerful position and adjust the wave trap trimmer to null.

NOTE C. Set dial at 1400 KC. Adjust oscillator and R.F. trimmer for maximum sensitivity.

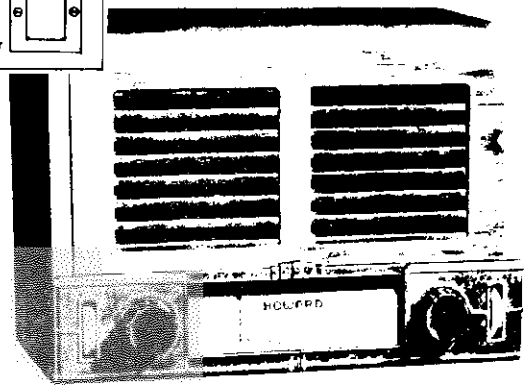
RECOMMENDED DUMMY ANTENNA. Although the values as shown in above table for antenna load may be satisfactory, we urgently recommend the circuit as shown at the right to properly take care of the various frequencies to accomplish the correct alignment.



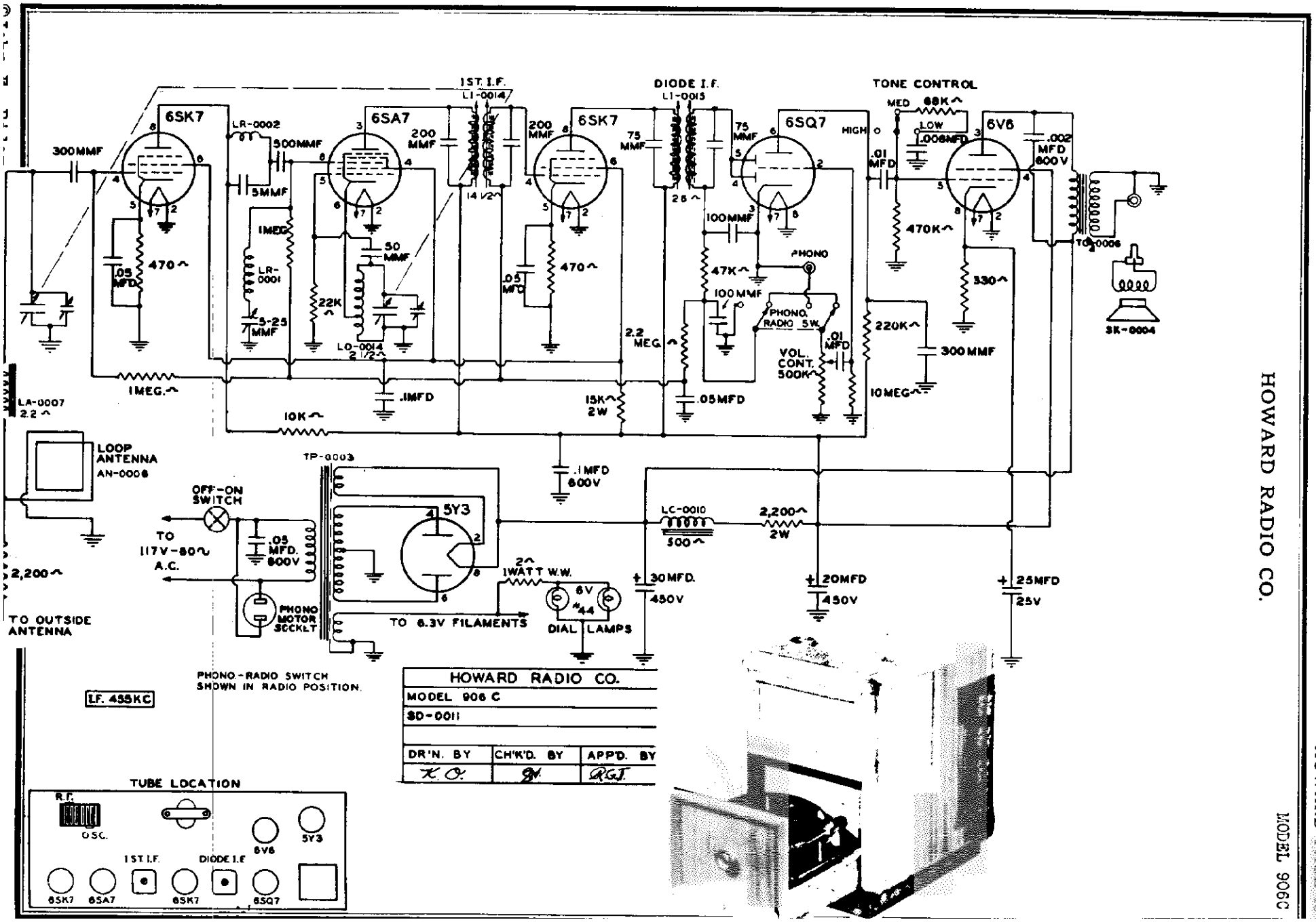


Wave Trap adjustment is located beneath chassis at this point. Adjustments 1 & 3 also beneath chassis.

TUBE LAYOUT

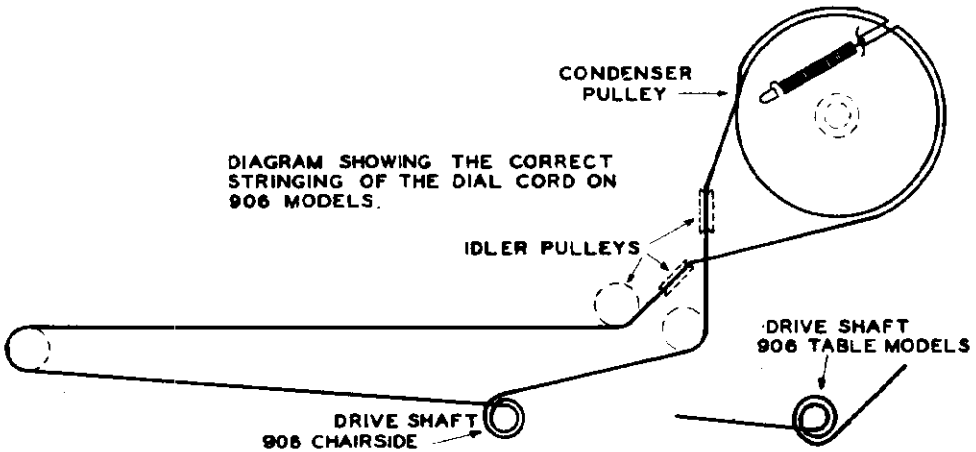


MODEL 906



HOWARD RADIO CO.

MODEL 906C



TO REMOVE RADIO CHASSIS FROM CABINET

Take knobs off volume control and tuning control by loosening set screws. Remove the wood screws that are located inside the record storage space at the top rear of cabinet. The entire top wood panel lifts out by pushing upward inside the storage space one inch, and then remove panel by lifting to the rear of the cabinet. After the panel is removed, it is easy to see the mounting bolts that hold the chassis.

TO REMOVE DRAWER

Pull the drawer out to its full extremity. Place your hands (one on each s'de) beneath the drawer about 3 inches from the back and feel along the track until y i hit two little metal flaps that are the stops for the drawer. Lift these up with yo index fingers and the drawer can then be pulled right out of the cabinet.

PARTS LIST

CONTROLS

VC-0005	Volume Control with A.C. Switch
	or
VC-0006	Volume Control with A.C. Switch

CONDENSERS

AC-0004	Tuning Gang with Gears and Drive Hub
CE-0009	Capacitor - Electrolytic 30-20 M.F.D. 450 V. - 25 M.F.D. 25 V.
CE-0005	Capacitor - 25 M.F.D. 25 V. } Substitute for CE-0009
CE-0011	Capacitor - 30 M.F.D. 450 V. } Substitute for CE-0009
CE-0012	Capacitor - 20 M.F.D. 450 V. } Substitute for CE-0009

COILS

AN-0006	Loop Antenna (low impedance)
LA-0007	Loop Load Coil
LI-0014	1st I.F. Transformer in can - iron slug tuned
LI-0015	2nd I.F. Transformer in can - iron slug tuned
	or
LI-0021	1st I.F. Transformer - air trimmers
LI-0022	2nd I.F. Transformer - air trimmers
LO-0014	Oscillator Coil
LR-0001	Wave Trap 455 KC
LR-0002	Untuned RF Coil

TRANSFORMERS

TO-0006	Speaker Output Transformer
TP-0003	Power Transformer - 60 cycle 110 V.
LC-0010	Power Choke - 500 Ohm. D.C.

SOCKETS AND PLUGS

SO-0017	Tube Socket
TB-0007	Terminal Strip, external antenna
SO-0010	Phono and Speaker Socket (female)
SO-0012	Power Socket 110 V.
TL-0005	Phono Speaker Plug (male)

SWITCHES

SW-0009	Radio Phono Switch DPDT
SW-0010	Tone Switch - 3 position

CABINET

CW-0009-1	Cabinet - Mahogany
CW-0009-2	Cabinet - Blonde
AA-0008-1	Drawer Sub-assembly (Mahogany)
AA-0008-2	Drawer Sub-assembly (Blonde)
AW-0015	Carriage Assembly

AUTOMATIC RECORD CHANGER

PH-0003	Record Changer VM400

LINE CORD

CA-0039	Line Cord - 8 ft. and Moulded Plug
CA-0043	Line Cord & Plug 42" long for record changer motor

DIAL AND CONTROL ACCESSORIES

AS-0213	Tuning Shaft Assembly
AS-0217	Dial Pointer Assembly
AR-0019	Dial Light Bracket Assembly - right side
AR-0024	Dial Light Bracket Assembly - left side
SP-0010	Dial Drive Spring
PR-0062	Dial Glass Snaps
DC-0001	Dial Drive Cord 52" long
GR-0001	Rubber Grommets for tuning gang & Mounting Bracket
DG-0008	Calibrated Lucite Dial 550 KC at right
LS-0002	#44 Blue Bead Pilot Lamp
ES-0004-1	Metal Escutcheon (Mahogany)
ES-0004-2	Metal Escutcheon (Blonde)

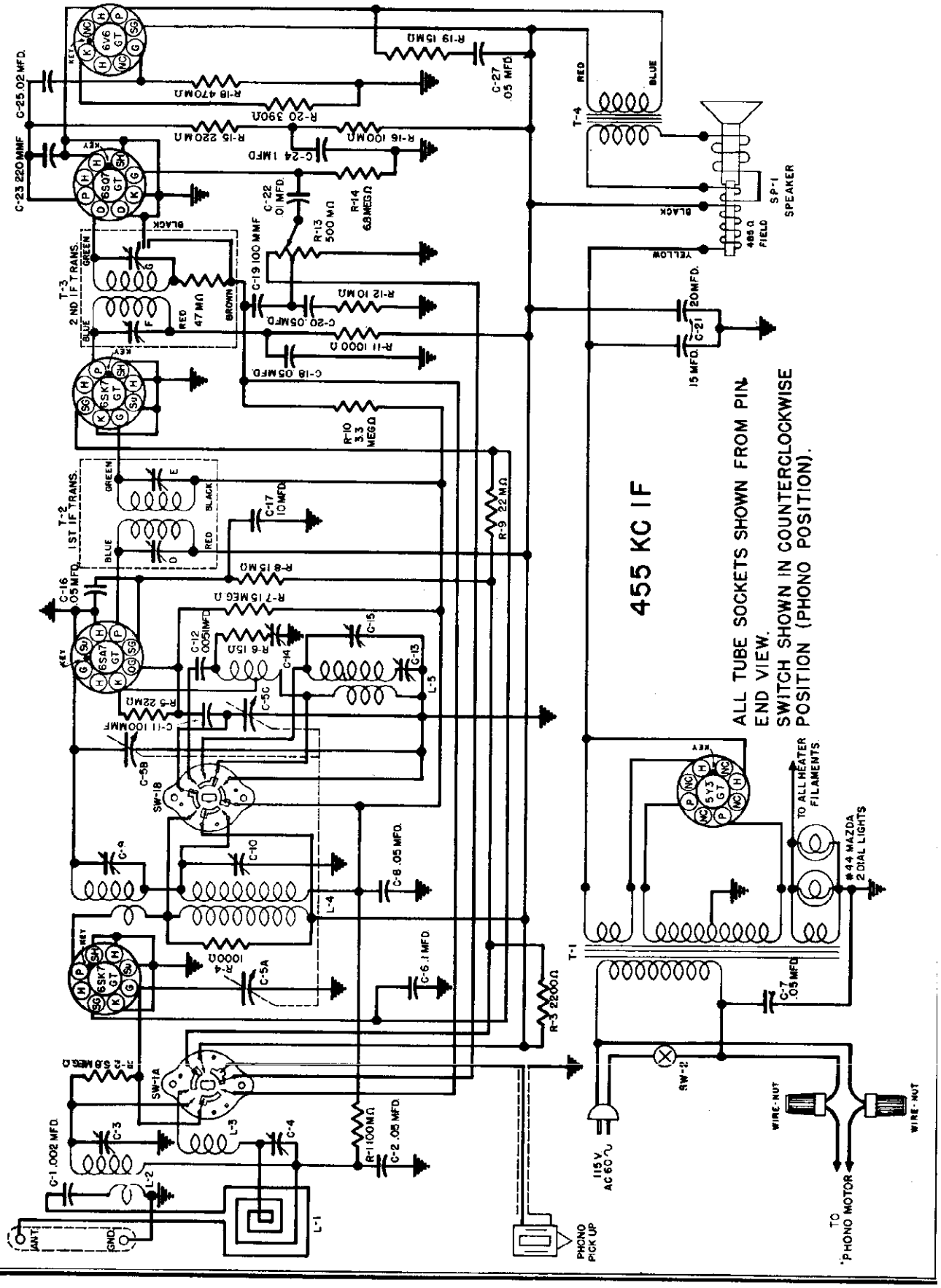
KNOBS

AR-0042	Thumb Wheel Assembly (Tone Control)
AR-0043	Thumb Wheel Assembly (Radio Phono)
KB-0015-1	Knob for Radio (Walnut)
KB-0015-3	Knob for Radio (Blonde)
KB-0014-1	Knob for Drawer (Mahogany)
KB-0014-2	Knob for Drawer (Blonde)

SPEAKER

SK-0004	Speaker 9" Elliptical P.M.

INTERNATIONAL DETROLA CORP.



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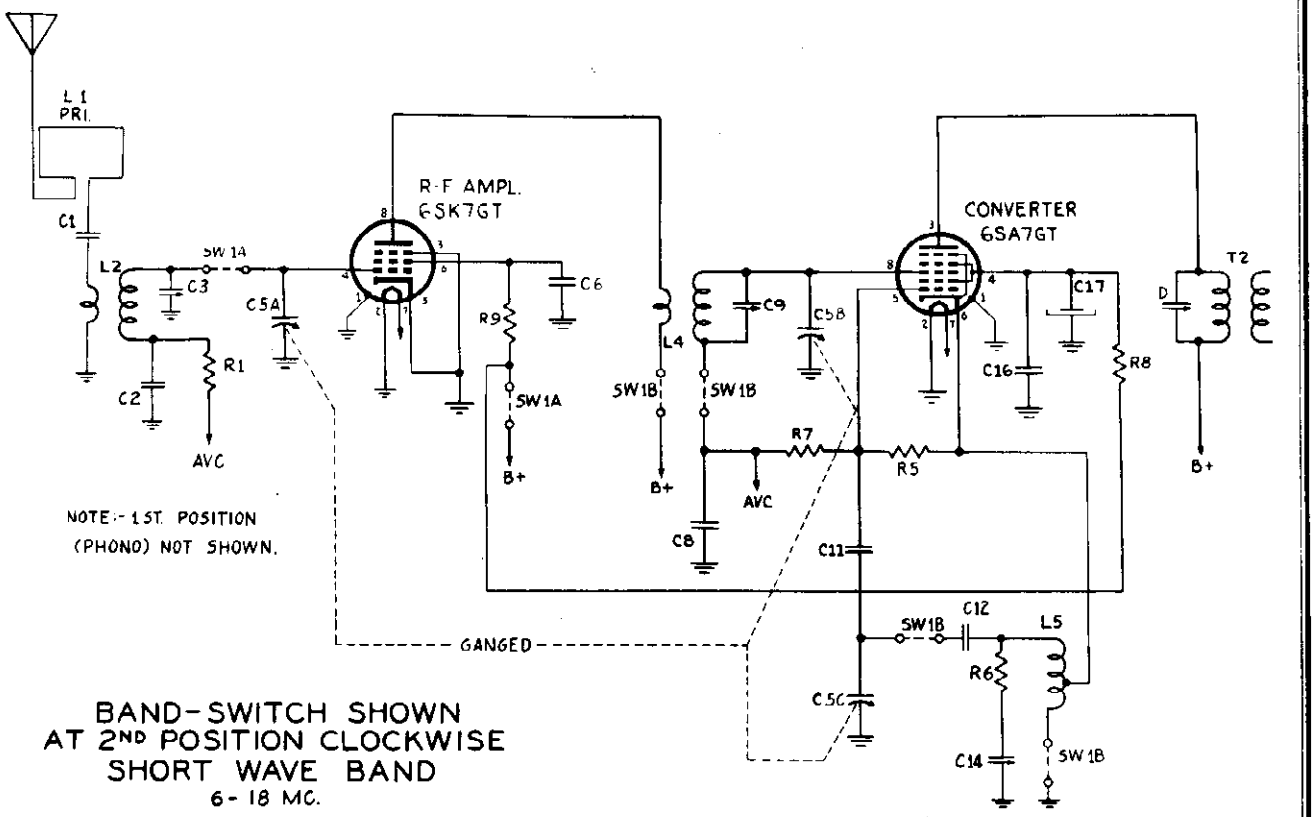
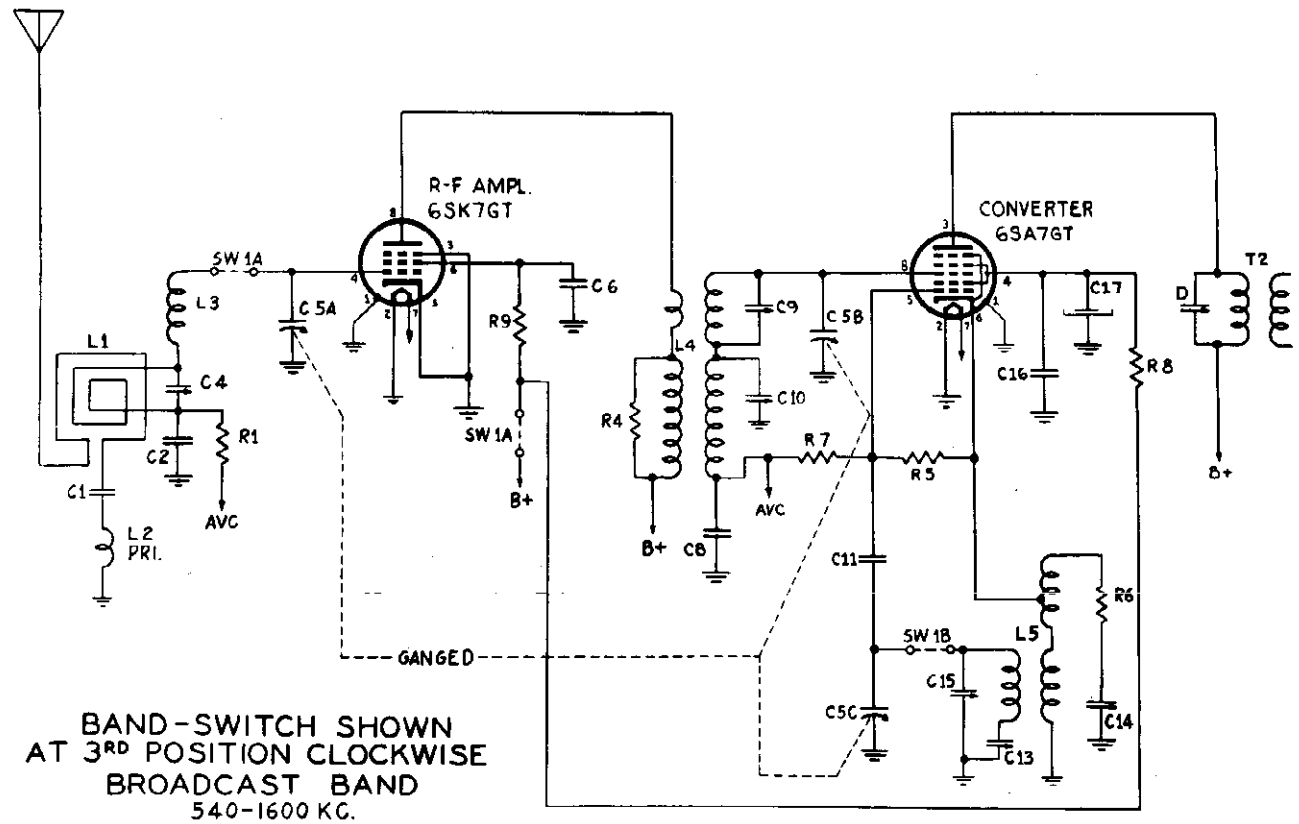


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
6-18 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BROADCAST BAND
540-1600 KC.

MODEL 582 INTERNATIONAL DETROLA CORP MODEL 582
MODEL 727C

Electrical and Mechanical Specifications

Frequency Range	540-1600 kc., 6-18 mc.	Power Output (Undistorted)	1.8 watts
Intermediate Frequency	455 kc.	Power Output (Maximum)	3.75 watts
Power Supply	105-125 volts, 60 cycle AC	Rated Power Input	65 watts at 115 volts
Loudspeaker	8-inch, Dynamic	Tuning Drive Ratio	6 to 1
V.C. Impedance	3.5 ohms at 400 cycles		

ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

A non-metallic screwdriver.

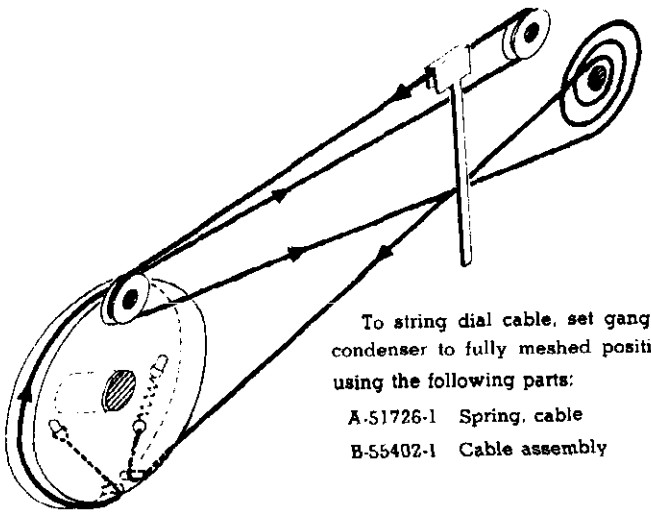
Dummy antenna: .1 mfd. — 400 ohm resistor — RMA loop.

NOTE: Intermediate Frequency and Oscillator Adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the RF grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to the loop may be substituted for RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd.	18.3 mc.	Short wave	HF end	C-14	Set limit of band
6SK7GT RF grid	.1 mfd.	16 mc.	Short wave	16 mc.	C-9	Align RF
Antenna post	400 ohms	16 mc.	Short wave	16 mc.	C-3	Align antenna
6SK7GT RF grid	.1 mfd.	1620 kc.	Broadcast	HF end	C-15	Set limit of band
6SK7GT RF grid	.1 mfd.	1400 kc.	Broadcast	1400 kc.	C-10	Align RF
6SK7GT RF grid	.1 mfd.	600 kc.	Broadcast	600 kc.	C-13	Rock gang and adjust to maximum
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	C-4	Align antenna

MODEL 7270

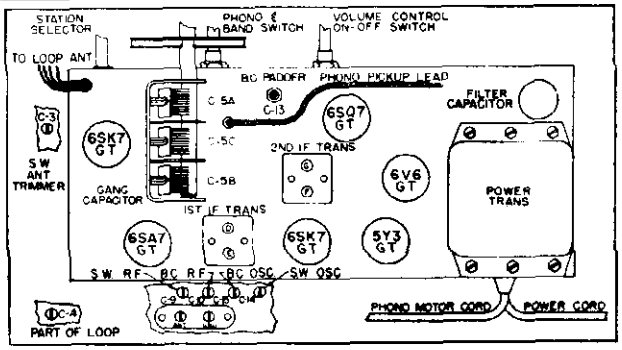
DIAL AND POINTER DRIVE CABLE ARRANGEMENT



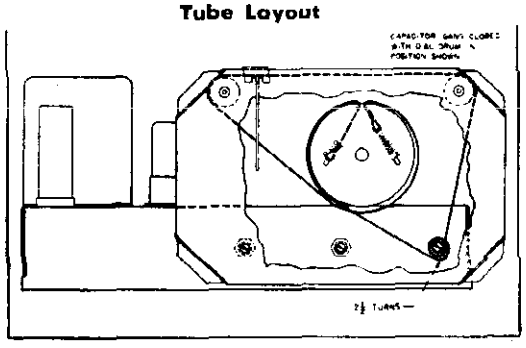
To string dial cable, set gang condenser to fully meshed position, using the following parts:

A-51726-1 Spring, cable

B-55402-1 Cable assembly



Tube Layout

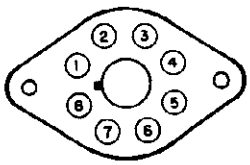


Dial Mechanism

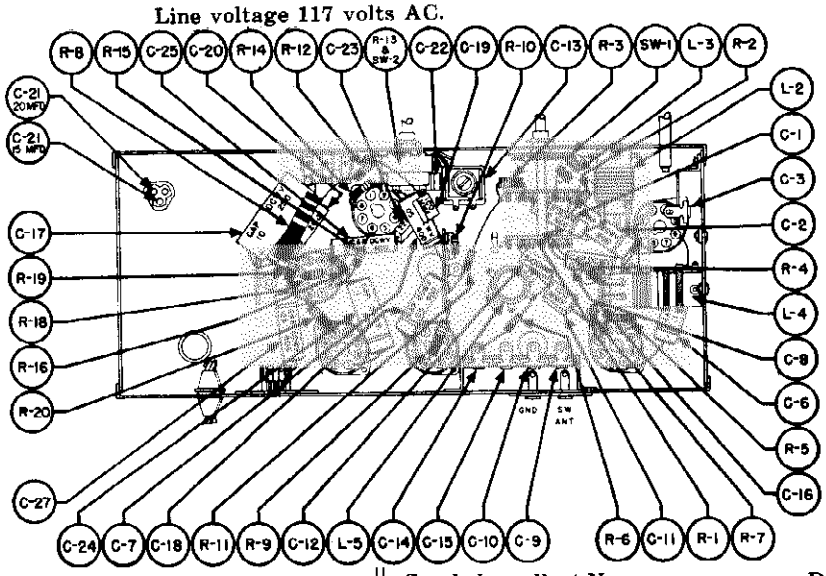
SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	107	6AC	255
6SA7GT	Converter	0	6AC	250	103	0	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	105	6AC	237
6SQ7GT	Det.—AVC—1st Audio	0	0	0	0	0	34	6AC	0
6V6GT	Power Output	0	0	235	250	0	0	6AC	13
5Y3GT	Rectifier	0	310	0	300 AC	0	300 AC	0	310

NOTE: The above glass tubes are interchangeable with their metal equivalent.



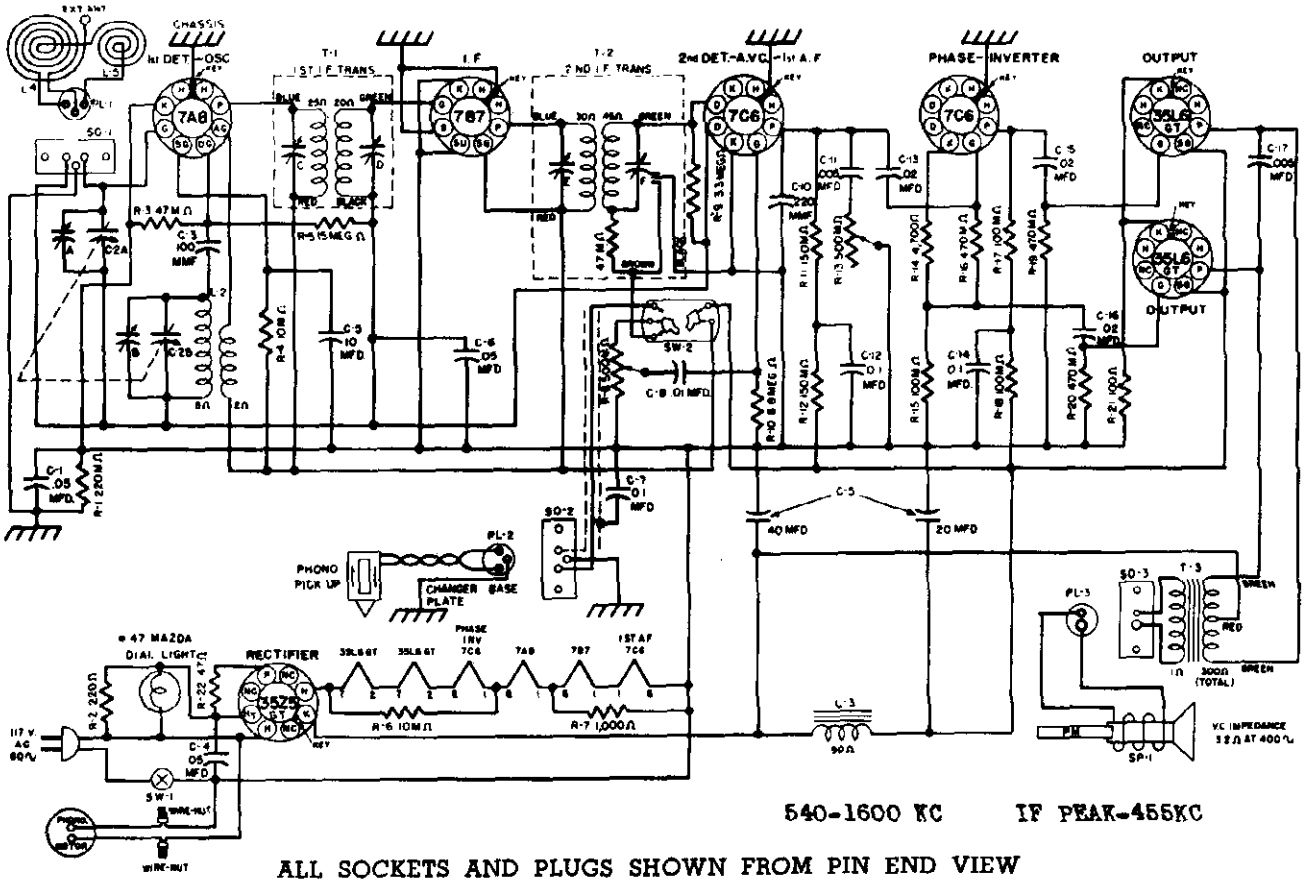
NOTE: Band switch in "Broadcast" position.
All voltages measured from chassis to socket contact indicated. DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. No signal.
Line voltage 117 volts AC.



Parts Layout
Chassis Model 582

Symbol	Part No.	Description
C-2, 8, 20	BD210503	Capacitor, Paper, .05 mfd., 200 v.
C-22	BD410103	Capacitor, Paper, .01 mfd., 400 v.
C-6, 24	BD410104	Capacitor, Paper, .1 mfd., 400 v.
C-25	BD410203	Capacitor, Paper, .02 mfd., 400 v.
C-16, 18, 29, 7	BD410503	Capacitor, Paper, .05 mfd., 400 v.
C-1	BD610202	Capacitor, Paper, .002 mfd., 600 v.
C-12	BM58D512	Capacitor, Mica, 5100 mmf.
C-11, 19	BM78A101	Capacitor, Mica, 100 mmf.
C-23	BM78A221	Capacitor, Mica, 200 mmf.
R-20	BR16E391	Resistor, 390 ohm, 1 w.
R-4, 11	BR17B102	Resistor, 1000 ohm, 1/3 w.
R-12	BR17B103	Resistor, 10M ohm, 1/3 w.
R-1, 16	BR17B104	Resistor, 100M ohm, 1/3 w.
R-6	BR17B150	Resistor, 15 ohm, 1/3 w.
R-19	BR17B153	Resistor, 15M ohm, 1/3 w.
R-7	BR17B156	Resistor, 15 megohm, 1/3 w.
R-5	BR17B223	Resistor, 22M ohm, 1/3 w.
R-15	BR17B224	Resistor, 220M ohm, 1/3 w.
R-10	BR17B335	Resistor, 3.3 megohm, 1/3 w.
R-18	BR17B474	Resistor, 470M ohm, 1/3 w.
R-2, 14	BR17B685	Resistor, 6.8 megohm, 1/3 w.
R-3	BR17E222	Resistor, 2200 ohm, 1 w.
R-9	BR17E223	Resistor, 22M ohm, 1 w.
R-8	BR17G153	Resistor, 15M ohm, 2 w.
	A-2163	Cable, Drive
	A-9285	Lamp, Pilot, Mazda No. 44
	A-54847	Cord, Power, 6 ft.
	B-51162-7	Shaft, Dial Drive
	A-51163	Clip, Spring
	A-51260	Shield, Tube
	A-51331	Spring, Dial Bracket
C-21	A-51356	Cap., Electrolytic, 15-20-20 mfd.
C-5	C-51401-2	Capacitor, Variable, 3-section
T-2	B-51416-1	Transformer Assembly, 1st IF
T-3	B-51417-1	Transformer Assembly, 2nd IF
C-17	A-51419	Cap., Electrolytic, 10 mfd., 250 v.
L-5	B-51420	Coil Assembly, Oscillator
T-1	C-51421	Transformer, Power
L-4	B-51425	Coil Assembly, RF
C-13	A-51428-5	Capacitor, Padder
L-2	B-51430	Coil Assembly, S.W. Antenna
R-13	B-51445-3	Control, Volume & Sw., 500M ohm
C-9, 10, 14, 15	A-51656	Capacitor Assembly, Trimmer (4)
C-3	A-51657	Capacitor Assem., Trimmer (Spec.)
	A-51787	Spring, Cable
	A-51801	Rivet, Pronged (for dial cable)
SW-1	B-51952-1	Switch, Band
SP-1	C-51961	Speaker, 8-inch Dyn., 485 ohm
L-3	B-51968	Coil Assembly, Antenna Loading
	A-57464	Sheet, Service
	A-54848	Bushing, Strain Relief

INTERNATIONAL DETROLA CORP.



540-1600 KC IF PEAK-455KC

ALL SOCKETS AND PLUGS SHOWN FROM PIN END VIEW
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

SYMBOL	PART NO.	DESCRIPTION	LIST PRICE
		CAPACITORS	
C-1	BD410503	Capacitor—.05 Mfd., 400 volt	$ .35
C-2A, B	C-57243-1	Capacitor Variable gang	4.50
C-3	BM74A101	Capacitor—Mica 100 Mmfd. ± 20%	.35
C-4	BD410503	Capacitor—.05 Mfd., 400 volt	.35
C-5	A-56154	Capacitor—Electrolytic 40-20-10 Mfd., 150 volt.	1.60
C-6	BD210503	Capacitor—.05 Mfd., 200 volt	.30
C-7	BD410104	Capacitor—0.1 Mfd., 400 volt	.40
C-8	BD410103	Capacitor—.01 Mfd., 400 volt	.30
C-10	BM74A221	Capacitor—Mica 220 Mmfd. ± 20%	.40
C-11	BD610502	Capacitor—.005 Mfd., 600 volt	.30
C-12	BD410104	Capacitor—0.1 Mfd., 400 volt	.40
C-13	BD410203	Capacitor—.02 Mfd., 400 volt	.30
C-14	BD410104	Capacitor—0.1 Mfd., 400 volt	.40
C-15	BD410203	Capacitor—.02 Mfd., 400 volt	.30
C-16	BD410203	Capacitor—.02 Mfd., 400 volt	.30
C-17	BD610502	Capacitor—.005 Mfd., 600 volt	.30
		RESISTORS	
R-1	BR17B224	Resistor—Carbon, 220,000 Ohms, ½ watt	.15
R-2	BR17C221	Resistor—Carbon, 220 Ohms, ½ watt	.15
R-3	BR17B473	Resistor—Carbon, 47,000 Ohms, ½ watt	.15
R-4	BR17B103	Resistor—Carbon, 10,000 Ohms, ½ watt	.15
R-5	BR17B156	Resistor—Carbon, 15 Meg., ½ watt	.15
R-6	BR17E103	Resistor—Carbon, 10,000 Ohms, 1 watt	.15
R-7	BR17B102	Resistor—Carbon, 1,000 Ohms, ½ watt	.15
R-8	B-56142-1	Control—Dual Potentiometer, with switch 500,000 Ohms, (V. C.)	2.25
R-9	BR17B335	Resistor—Carbon, 3.3 Meg., ½ watt	.15
R-10	BR17B685	Resistor—Carbon, 6.8 Meg., ½ watt	.15
R-11	BR17B154	Resistor—Carbon, 150,000 Ohms, ½ watt	.15
R-12	BR17B154	Resistor—Carbon, 150,000 Ohms, ½ watt	.15
R-13	B-56142-1	Control—500,000 Ohms, (T. C.) part of R-8	
R-14	BR17B472	Resistor—Carbon, 4,700 Ohms, ½ watt	.15
R-15	BR17B104	Resistor—Carbon, 100,000 Ohms, ½ watt	.15
R-16	BR17B474	Resistor—Carbon, 470,000 Ohms, ½ watt	.15
R-17	BR17B104	Resistor—Carbon, 100,000 Ohms, ½ watt	.15
R-18	BR17B104	Resistor—Carbon, 100,000 Ohms ½ watt	.15
R-19	BR17B474	Resistor—Carbon, 470,000 Ohms, ½ watt	.15
R-20	BR17B474	Resistor—Carbon, 470,000 Ohms, ½ watt	.15
R-21	BR16C101	Resistor—Carbon, 100 Ohms, ± 10% ½ watt	.15
R-22	BR17G470	Resistor—Carbon, 47 Ohms ± 20% 2 watt	.30

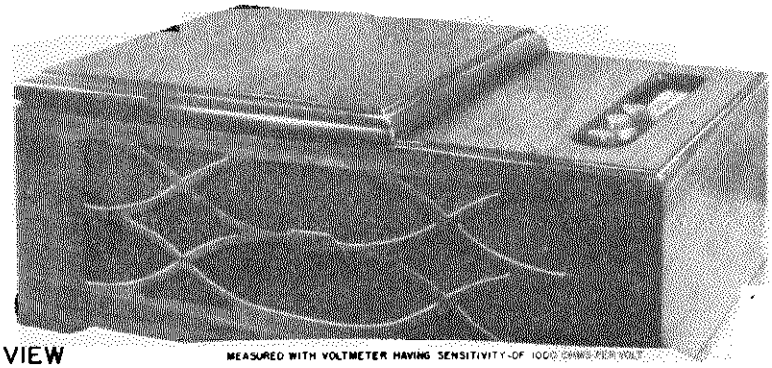
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SYMBOL	PART NO.	DESCRIPTION	LIST PRICE
		COILS AND TRANSFORMERS	
L-4, 5	D-57259	Loop Antenna assembly	$1.00
L-2	B-56143	Coil—Oscillator assembly	*
L-3	B-51726-1	Filter Choke, 90 ma.	2.00
T-1	B-51010-3	Transformer—1st I.F.	2.00
T-2	B-51011-3	Transformer—2nd I.F.	2.50
T-3	B-57253-1	Transformer—Output	1.50
		OTHER ELECTRICAL PARTS	
SW-1		Switch—power part of R-8 and R-13	
SW-2	B-56156-1	Switch—Radio-Phono	1.00
SP-1	C-57272	Speaker—6" x 9" Permanent Magnet	*
	A-6158	Lamp—Dial Mazda No. 47	.15
		MISCELLANEOUS PARTS	
	B-57275-1	Background for dial	*
	A-54848	Bushing—Strain relief (power cord)	.20
	A-56155	Bushing—Tuning control shaft	*
	E-57270-1	Cabinet	*
	B-51330-1	Channel rubber—mtg. for Dial scale	.04
	B-55402-1	Dial Cable assembly (includes clips at end of cable)	.25
	B-57269-1	Dial scale—plastic	*
	B-51427-2	Grommet—rubber; mtg., for variable gang	.05
	B-51124-1	Knob—Volume & switch, tuning or radio-phono	.15
	B-56138-1	Knob—Tone Control	.15
	BN751V02	Palnut—No. ⅜-32; for mtg., controls	.02
	BN770S02	Palnut No. 10-24; for mtg., record changer	.01
	A-57271	Plug—3 Prong—Phono pick-up connection	*
	B-55130-9	Pointer	.15
	B-58069-1	Power Cord	.75
	BP924G02	Screw—No. 4 x ½"; for mtg., loop & back	.03
	BP928N02	Screw—No. 8 x 1⅛"; for mtg., chassis	.03
	BS016S09	Screw—No. 10-24 x 1"; for mtg., record changer	.04
	A-56136	Shaft—tuning control	*
	A-54726	Socket—octal base	.20
	A-54900	Socket—loctal base	.25
	A-57273	Socket—3 Prong; Phono pick-up & loop antenna	.20
	A-57258	Socket—2 Prong; speaker connection	.20
	A-6182-5	Socket—dial lamp (with leads)	.15
	A-51331	Spring—Mtg., for channel rubbers	.10
	A-51787	Spring—dial cable tension	.07
	A-50147	Spring—conical; for mtg., record changer	.10
	BF13NT05	Washer—flat; for mtg., record changer	.02
	B-50156-1	Washer—rubber; for mtg., record changer	.04
	A-54492	Washer—"C"; tuning shaft	.02
	A-1089	Washer—cup; variable gang mtg.	.05
	B-50964-3	Wirenut—phono motor power connection	.03

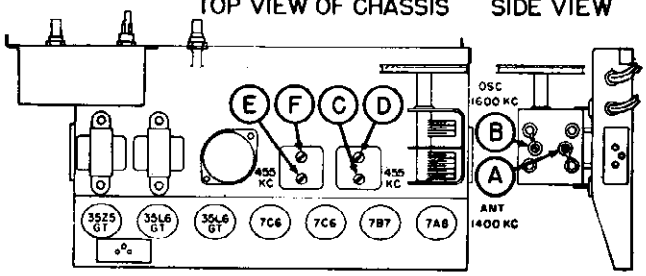
*PRICE AVAILABLE UPON REQUEST

For Dial Data, see P.1

MODEL 7270 INTERNATIONAL DETROLA CORP.



TOP VIEW OF CHASSIS SIDE VIEW

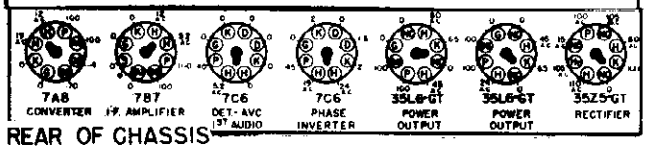


MEASURED WITH VOLTMETER HAVING SENSITIVITY OF 1000 OHMS PER VOLT

TONE CONTROL IN CLOCKWISE POSITION
VOLUME ON FULL WITH NO SIGNAL
RADIO-PHONO SWITCH IN RADIO POSITION DIAL TUNED TO 540 KC

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.



REAR OF CHASSIS

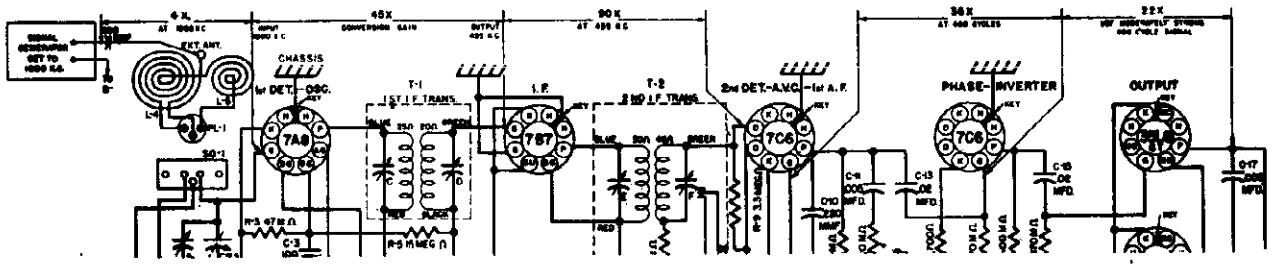
1. The chassis, record changer and loop should remain in their normal position in the cabinet when making loop adjustment.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, slide pointer along dial cord to correct position.
3. Connect output meter across speaker voice coil.
4. Connect the ground of signal generator to B–.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Radio-Phono switch in Radio position.

NOTE: For best results, it is advisable to use an isolation transformer between the 117 V. AC line and AC input to receiver.

DUMMY ANT.	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER LETTER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
0.1 Mfd. Condenser	7A8 Grid	455 KC	Any point where it does not affect the signal	F-E D-C	2nd IF 1st IF	Adjust for maximum output. Then repeat adjustment.
0.1 Mfd. Condenser	7A8 Grid	1620 KC	Gang condenser completely out of mesh.	B	Oscillator	Adjust for maximum output.
RMA Loop		1400 KC	Tuned to 1400 kc Generator signal	A	Loop Antenna	Adjust for maximum output.

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

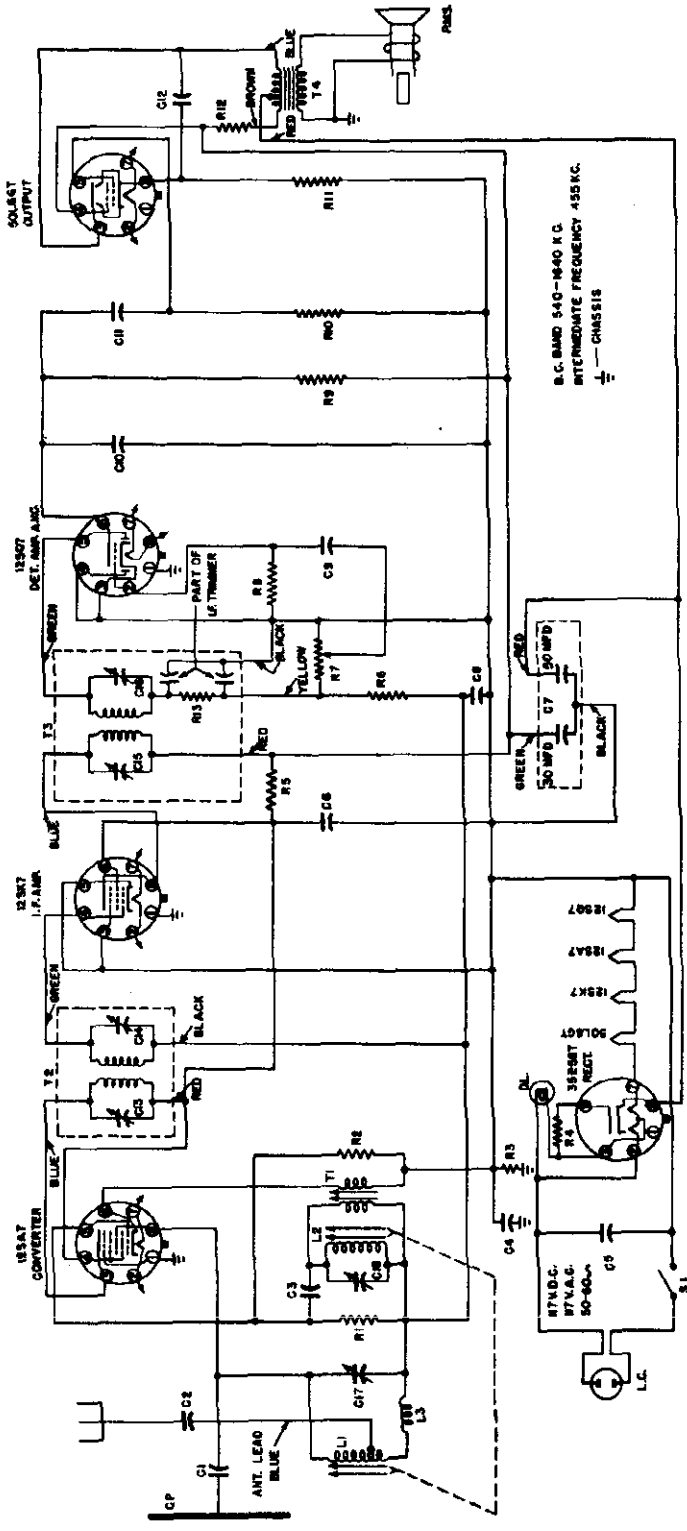
1. For all gain measurements connect signal generator as shown. Use 1000 KC signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. Be sure radio is carefully tuned to generator signal. (Use weak signal for sharp tuning.)
3. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

MODELS 565,565BL,566,
567,568

LEAR, INC.



DWG. SYM.	PART NO.	DESCRIPTION
R1	55496	15 meg. ½ w. carbon resistor
R2	55479	22,000 ohm ½ w. carbon resistor
R3	55485	220,000 ohm ½ w. carbon resistor
R4	55460	15 ohm ½ w. carbon resistor
R5	55475	4,700 ohm ½ w. carbon resistor
R6	55491	2.2 meg. ½ w. carbon resistor
R7,S1	56380	500,000 ohm vol. control & line sw.
R8	55491	2.2 meg. ½ w. carbon resistor
R9	55487	470,000 ohm ½ w. carbon resistor
R10	55487	470,000 ohm ½ w. carbon resistor
R11	55466	150 ohm ½ w. carbon resistor
R12	55474	1,200 ohm 1 w. carbon resistor
R13	55481	47,000 ohm ½ w. carbon resistor
L1,L2	54284	Sing tuner & gang assy.
C17,C18	53385	Antenna loading coil
L3	53091	Line cord
L.C.	53091	Dial light, type 47
P.M.S.	70535	5" Permanent magnet speaker

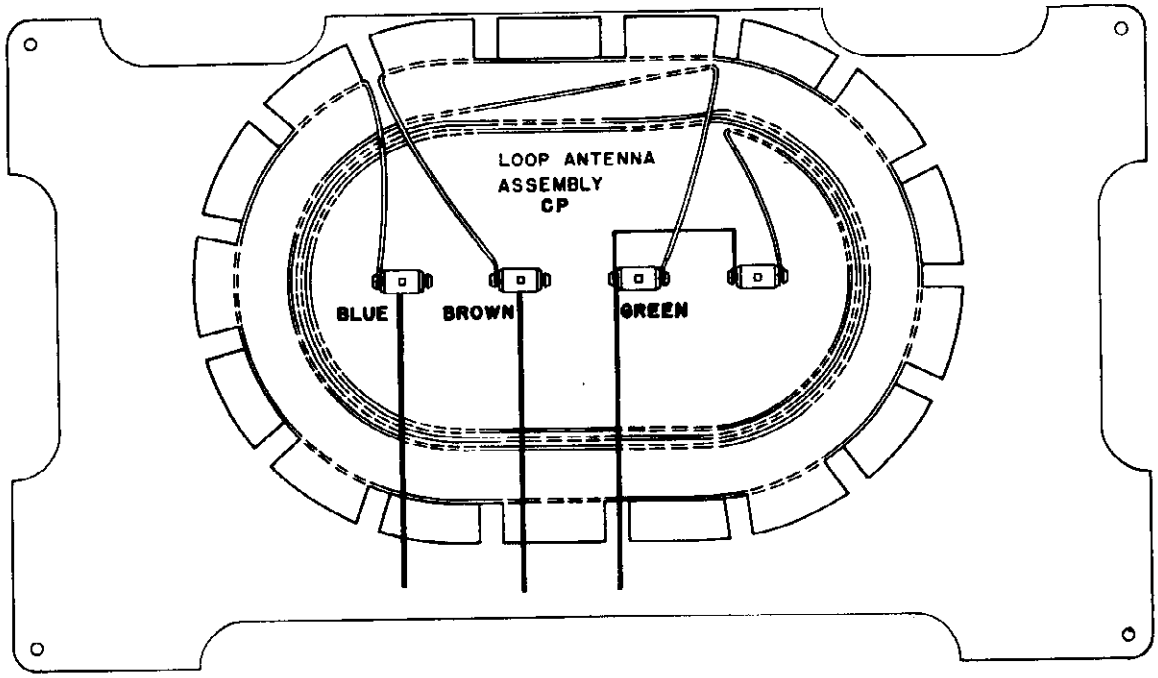
DWG. SYM.	PART NO.	DESCRIPTION
CP	52570	Antenna Assy. Loop
T1	54282	Oscillator Transformer Assy.
T2	53350	#1 I.F. Transformer Assy.
T3	53361	#2 I.F. Transformer Assy.
T4	52531	Output Transformer
C1	56053	22 mmfd. Mica Capacitor
C2	56053	22 mmfd. Mica Capacitor
C3	56055	47 mmfd. Mica Capacitor
C4	56531	.1 mfd. 600 v. Paper Capacitor
C5	56556	.05 mfd. 600 v. Paper Capacitor
C6	56631	.1 mfd. 400 v. Paper Capacitor
C7	52336	50 - 30 mfd. 150 v. Electrolytic Capacitor
C8	56600	.05 mfd 200 v. Paper Capacitor
C9	56596	.02 mfd. 200 v. Paper Capacitor
C10	56059	220 mmfd. Mica Capacitor
C11	56583	.004 mfd. 200 v. Paper Capacitor
C12	56628	.05 mfd. 400v. Paper Capacitor
C13,C14		#1 I.F. Trimmers (Part of assy.)
C15,C16		#2 I.F. Trimmers (Part of assy.)

JULY 1, 1946

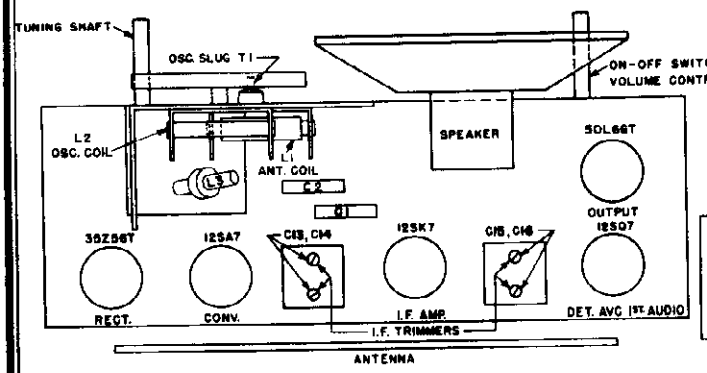
MODELS 565, 565BL, 566, 567, 568

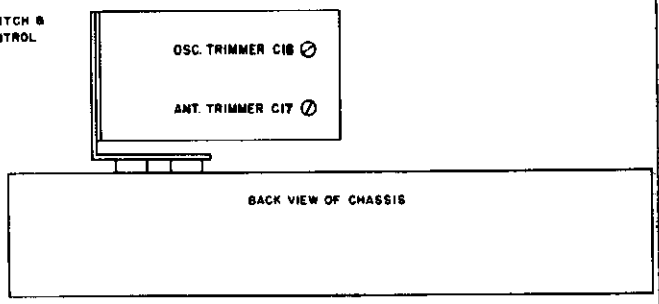
LEAR, INC.

LOOP WIRING DIAGRAM



CHASSIS DIAGRAMS





ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	TRIMMER	REMARKS
1	Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop.						
2	2nd IF	Pin No. 8 of 12SA7 and B–	.05 mf.	455 KC	1620 KC	C15, 16	Max. Output
3	1st IF					C13, 14	Max. Output
4	Osc. Trim	Antenna lead (blue wire) and B–	200 mmf.	1620 KC	1620 KC	C18	Max. Output
5	Ant. Trim			1500 KC	1500 KC	C17	Max. Output
6	Osc. Slug			600 KC	600 KC	T1	Max. Output*
7	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

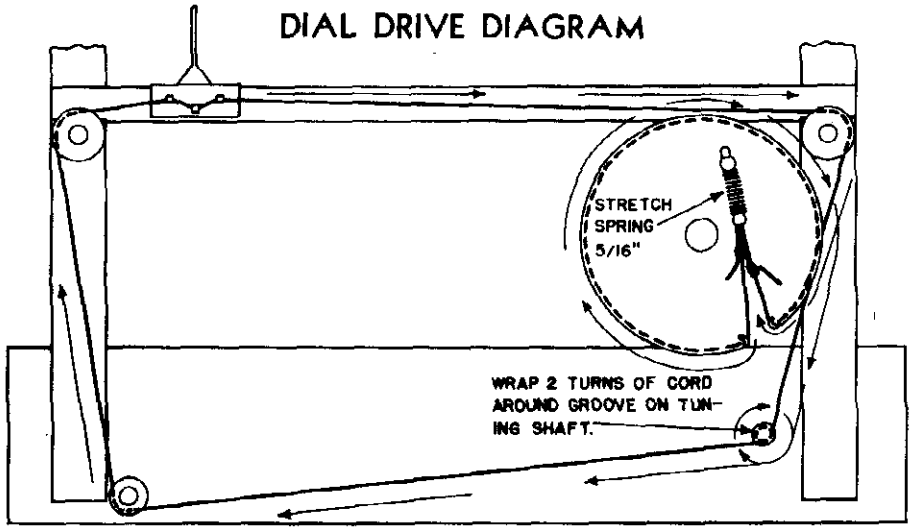
* Rock dial tuner slightly while adjusting

Notes: Connect output meter to voice coil circuit.
Volume control on full for all adjustments.
Signal generator gain control at minimum for satisfactory output meter reading.

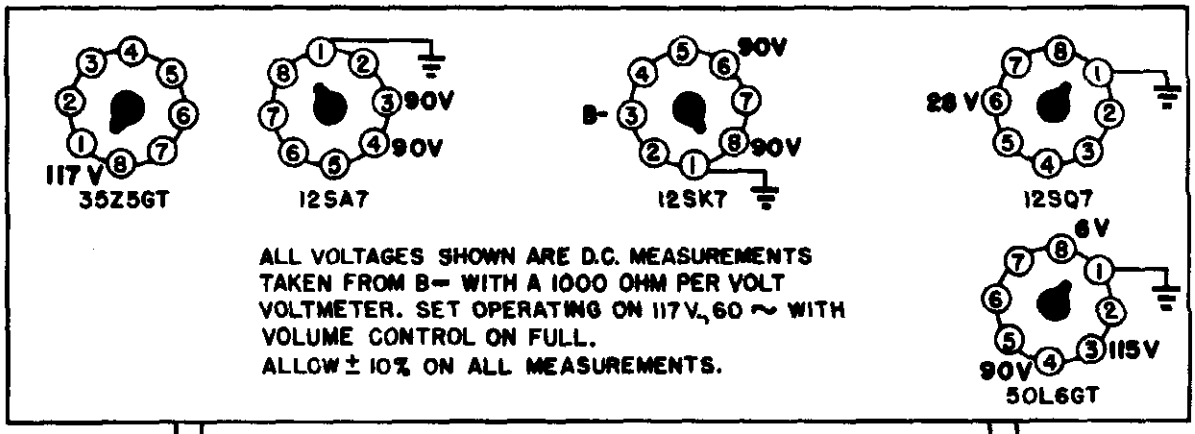
MODELS 565,565BL,566
567,568

LEAR, INC.

DIAL DRIVE DIAGRAM



FRONT VIEW



TUNING SHAFT

BOTTOM VIEW OF CHASSIS

ON-OFF SWITCH & VOLUME CONTROL

VOLTAGE CHART

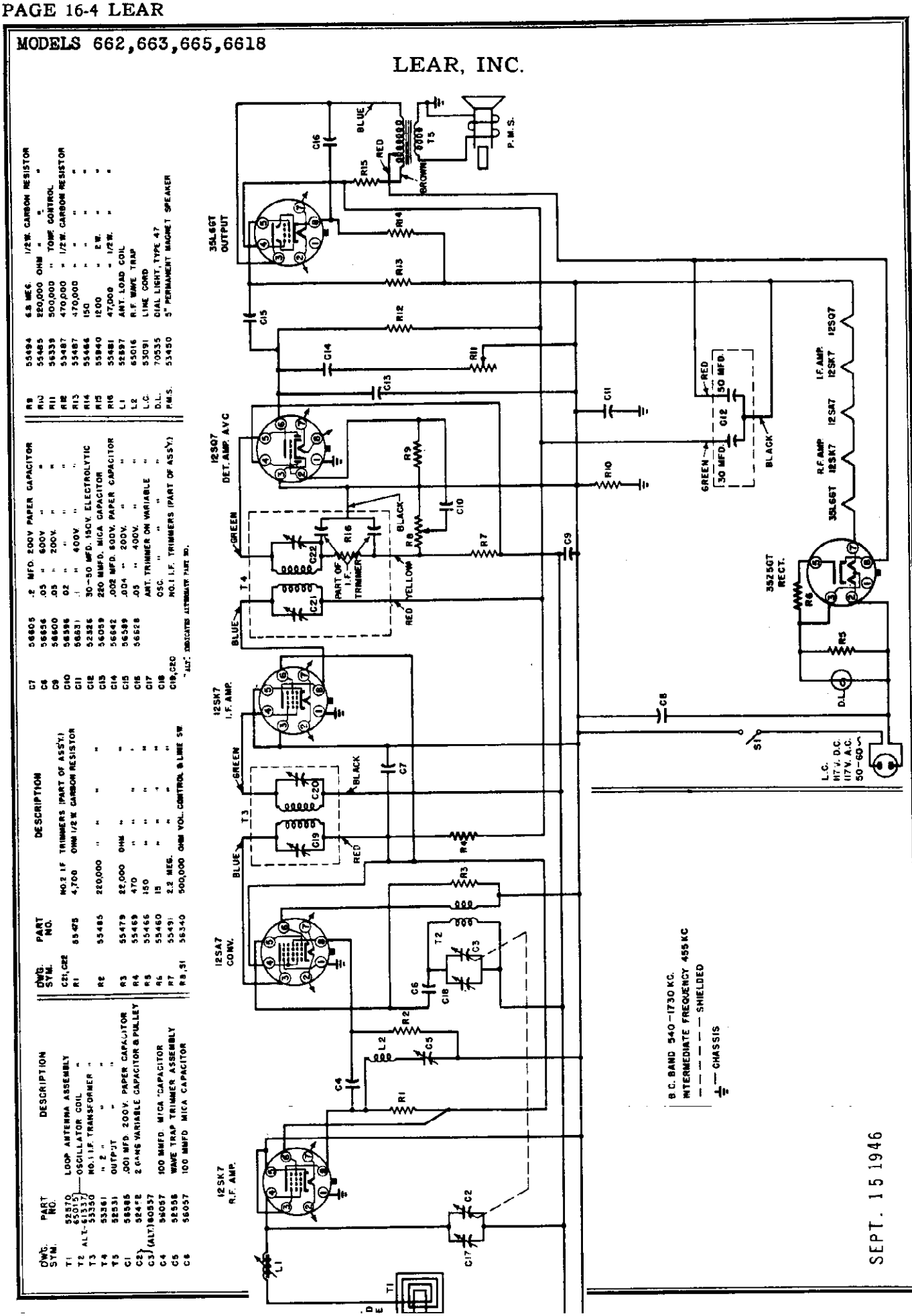
Line voltage: 117 volts, 60 cycles (AC) Position of volume control: On full (with no signal)

TUBE	FUNCTION	Voltage of each socket prong to B- (Prong No. 3 of 12SK7)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No.
12SA7	Oscillator - Converter	0	-	90	90	0	0	-	0
12SK7	I-F Amplifier	0	-	0	0	0	90	-	90
12SQ7	Detector - AVC - 1st. Audio	0	0	0	0	0	28	-	-
50L6	Beam Power Amplifier	0		115	90	0	0	-	6
35Z5	Rectifier	-	-	-	-	110 AC	-	-	117

Notes: Voltage readings are for schematic diagram in this bulletin. Allow 10% ± 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.
Voltages are DC unless otherwise specified.
All voltages measured from prong No. 3 of 12SK7 tube socket, or B-.

MODELS 662,663,665,6618

LEAR, INC.



DWG. SYM.	PART NO.	DESCRIPTION
T1	52570	LOOP ANTENNA ASSEMBLY
T2	45015 ALT-61337	OSCILLATOR COIL "
T3	53350	NO.1 I.F. TRANSFORMER "
T4	53361	" 2 " "
T5	52531	OUTPUT " "
C1	56585	.001 MFD. 200V. PAPER CAPACITOR
C2	324*2	2 GANG VARIABLE CAPACITOR & PULLEY
C3	(ALT) 80537	
C4	56057	100 MMFD. MICA CAPACITOR
C5	52556	WAVE TRAP TRIMMER ASSEMBLY
C6	56057	100 MMFD MICA CAPACITOR

DWG. SYM.	PART NO.	DESCRIPTION
C21, C22		NO.2 I.F. TRIMMERS (PART OF ASS'Y.)
R1	55475	4,700 OHM 1/2 W. CARBON RESISTOR
R2	55485	220,000 " " " "
R3	55479	82,000 OHM " " "
R4	55469	470 " " " "
R5	55466	150 " " " "
R6	55460	15 " " " "
R7	55491	2.2 MEG. " " "
R8, 51	56340	500,000 OHM VOL. CONTROL & LINE SW.

C7	56805	.2 MFD. 200V PAPER CAPACITOR
C8	56656	.05 " 600V " "
C9	56800	.05 " 200V. " "
C10	56596	.02 " " " "
C11	56831	.1 " 400V " "
C12	52326	30-50 MFD. 150V. ELECTROLYTIC
C13	56059	220 MMFD. MICA CAPACITOR
C14	56642	.002 MFD. 600V. PAPER CAPACITOR
C15	56589	.004 " 200V. " "
C16	56628	.05 " 400V. " "
C17		ANT. TRIMMER ON VARIABLE "
C18		OSC. " " " "
C19, C20		NO.1 I.F. TRIMMERS (PART OF ASS'Y.)

* ALT. INDICATES ALTERNATE PART NO.

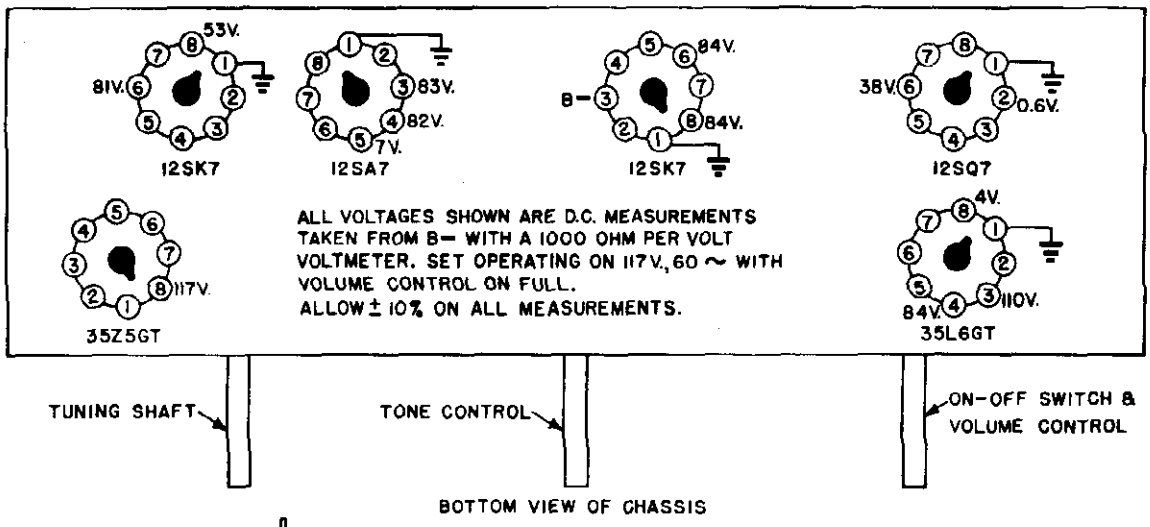
R9	55494	6.8 MEG. 1/2 W. CARBON RESISTOR
R10	55485	220,000 OHM " " "
R11	56339	500,000 " TONE CONTROL
R12	53487	470,000 " 1/2 W. CARBON RESISTOR
R13	53487	470,000 " " " "
R14	55466	150 " " " "
R15	55940	1200 " 2 W. " "
R16	53481	47,000 " 1/2 W. " "
L1	52597	ANT. LOAD COIL
L2	65016	R.F. WAVE TRAP
L.C.	53091	LINE CORD
D.L.	70535	DIAL LIGHT, TYPE 47
P.M.S.	53450	5" PERMANENT MAGNET SPEAKER

MODELS 662,663,665,661
MODEL 6617PC

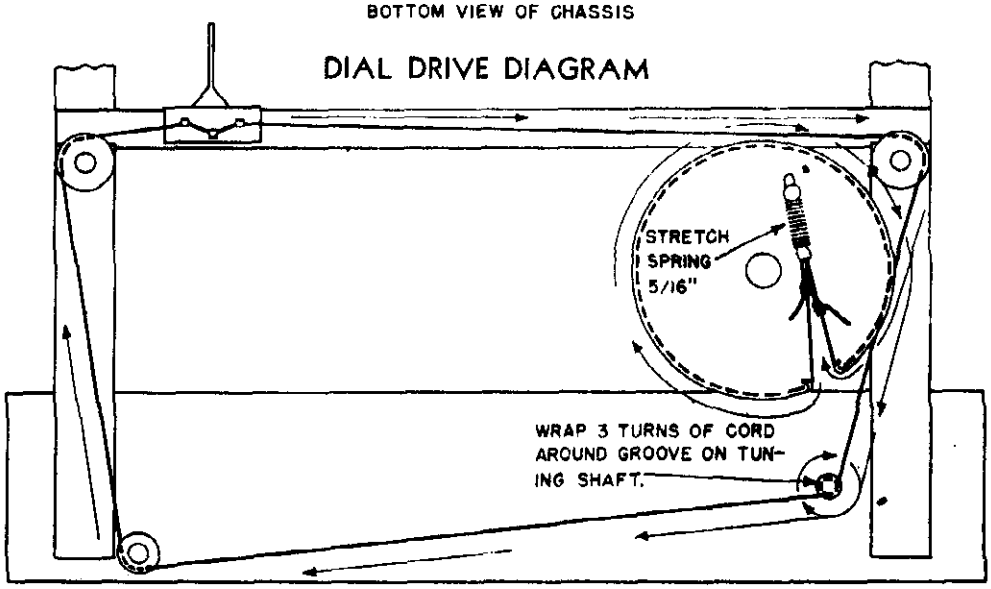
LEAR, INC.

MODELS 662,663,665,6618

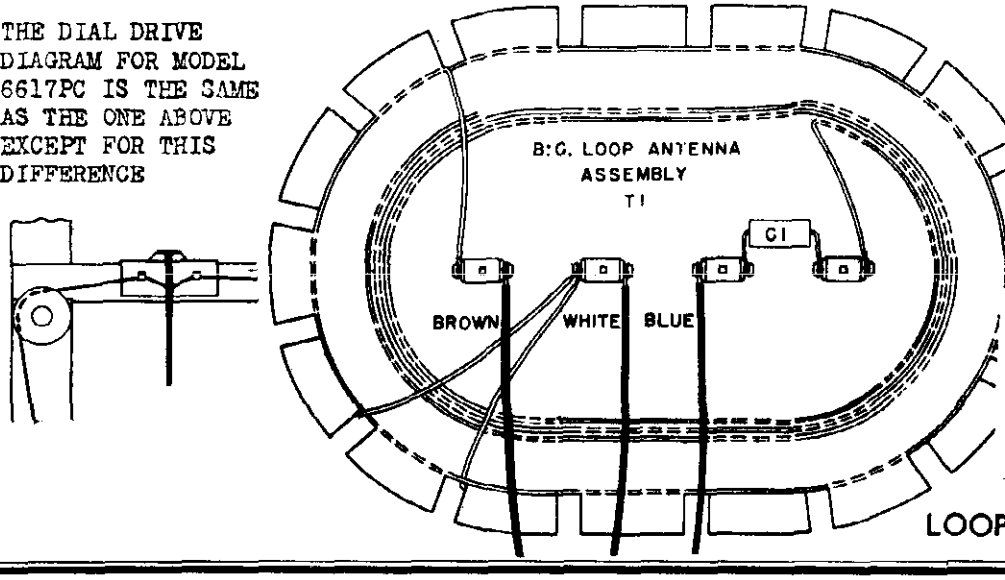
CHASSIS VOLTAGE CHART



DIAL DRIVE DIAGRAM



THE DIAL DRIVE DIAGRAM FOR MODEL 6617PC IS THE SAME AS THE ONE ABOVE EXCEPT FOR THIS DIFFERENCE

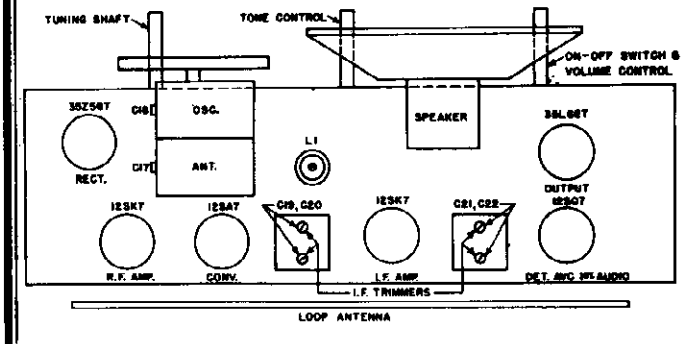


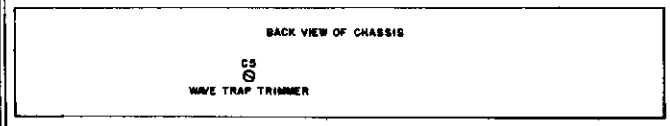
THE LOOP WIRING DIAGRAM FOR MODEL 6617PC IS THE SAME AS THE ONE ON THE LEI EXCEPT THAT BROWN IS REPLACED BY WHITE AN WHITE BY BROWN

LOOP WIRING DIAGRAM

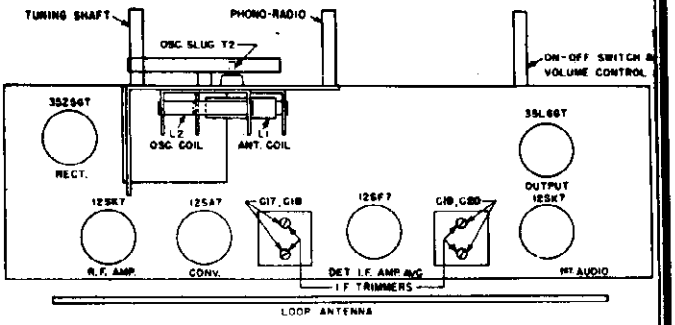
MODELS 662,663,665,6618
MODEL 6617PC

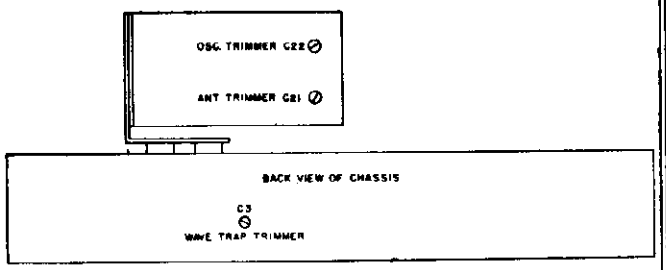
LEAR INC.





MODELS 662,663,665,6618





MODEL 6617PC

ALIGNMENT CHART MODELS 662,663,665,6618

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL AND CONDENSER SETTING	TRIMMER	REMARKS
1	Set dial pointer to last mark at low frequency and of dial with gang condenser closed						
2	2nd IF	Pin No. 8 of 12SA7 and B-	.05mf.	455 KC	open	C21, C22	Max. Output
3	1st IF					C19, C20	Max. Output
4	Wave trap	Antenna lead (Blue wire) and B-	200 mmf.	455 KC	open	C5	Max. Output
5	Osc. trim.			1500 KC	1500 KC	C18	Max. Output
6	Ant. trim.			1500 KC	1500 KC	C17	Max. Output
7	Load Coil			600 KC	600 KC	Slug in L1	Max. Output
8	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

Notes: Connect output meter to voice coil circuit.
Volume control on full for all adjustments.
Signal generator gain control at minimum for satisfactory output meter reading.

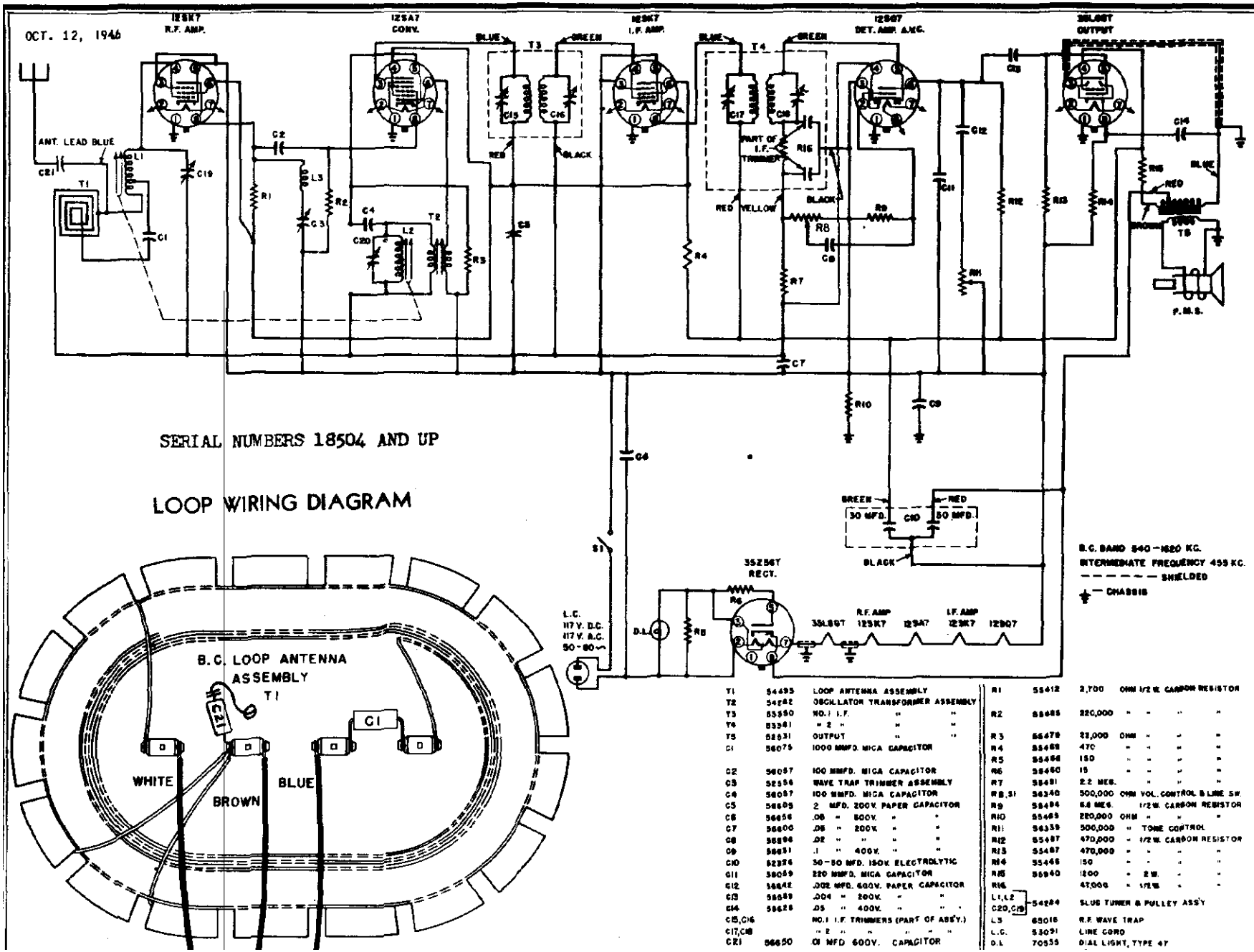
ALIGNMENT CHART MODEL 6617PC

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	TRIMMER	REMARKS
1	Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop.						
2	2nd IF	Pin No. 8 of 12SA7 and B-	.05 mf.	455 KC	1620 KC	C19, C20	Max. Output
3	1st IF					C17, C18	Max. Output
4	Wave Trap	Antenna lead (blue wire) and B-	200 mmf.	455 KC	1620 KC	C3	Min. Output
5	Osc. Trim			1620 KC	1620 KC	C22	Max. Output
6	Ant. Trim			1500 KC	1500 KC	C21	Max. Output
7	Osc. Slug			600 KC	600 KC	T2	Max. Output*
8	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

* Rock dial tuner slightly while adjusting T2.

Notes: Connect output meter to voice coil circuit.
Volume control on full for all adjustments.
Signal generator gain control at minimum for satisfactory output meter reading.

OCT. 12, 1946



T1	54495	LOOP ANTENNA ASSEMBLY
T2	54282	OSCILLATOR TRANSFORMER ASSEMBLY
T3	53550	NO.1 I.F. " "
T4	53561	" 2 " " "
T5	52531	OUTPUT " "
C1	56075	1000 MMFD. MICA CAPACITOR
C2	56057	100 MMFD. MICA CAPACITOR
C3	52556	WAVE TRAP TRIMMER ASSEMBLY
C4	56057	100 MMFD. MICA CAPACITOR
C5	56605	2 MFD. 200V. PAPER CAPACITOR
C6	56656	.05 " 600V. " "
C7	56600	.05 " 200V. " "
C8	56596	.02 " " " "
C9	56631	.1 " 400V. " "
C10	52326	30-50 MFD. 150V. ELECTROLYTIC
C11	56059	220 MMFD. MICA CAPACITOR
C12	56642	.002 MFD. 600V. PAPER CAPACITOR
C13	56589	.004 " 200V. " "
C14	56628	.05 " 400V. " "
C15,C16		NO.1 I.F. TRIMMERS (PART OF ASS'Y.)
C17,C18		" 2 " " " " "
C21	56650	.01 MFD 600V. CAPACITOR

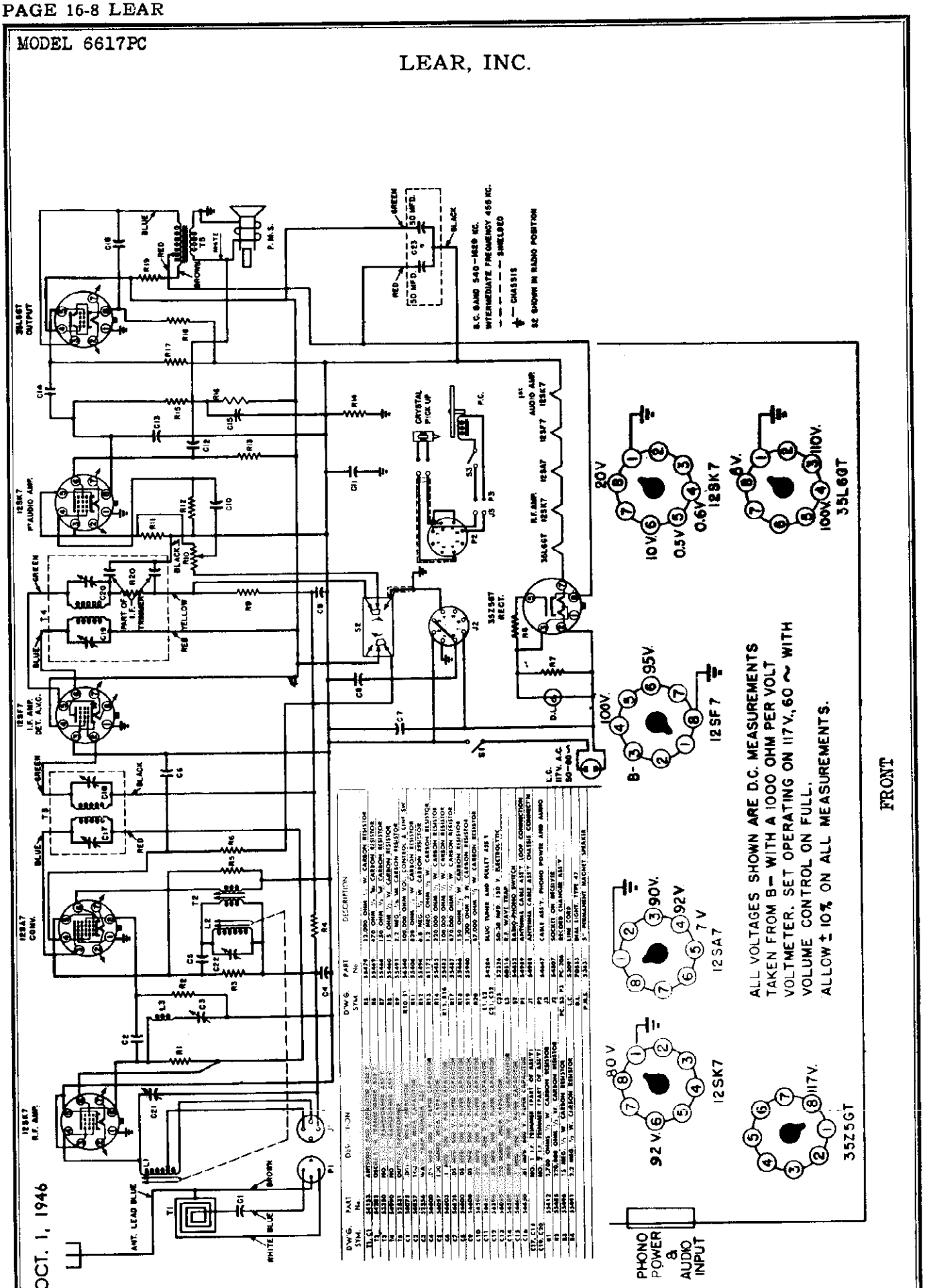
R1	55412	2,700 OHM 1/2 W. CARBON RESISTOR
R2	55485	220,000 " " " "
R3	55479	22,000 OHM " " "
R4	55488	470 " " " "
R5	55496	150 " " " "
R6	55490	15 " " " "
R7	55481	2.2 MEG. " " "
R8,S1	56340	500,000 OHM VOL. CONTROL & LINE SW.
R9	55494	5.6 MEG. 1/2 W. CARBON RESISTOR
R10	55485	220,000 OHM " " "
R11	56339	500,000 " TONE CONTROL
R12	55487	470,000 " 1/2 W. CARBON RESISTOR
R13	55487	470,000 " " " "
R14	55485	150 " " " "
R15	55940	1200 " 2 W. " "
R16		47,000 " 1/2 W. " "
L1,L2 C20,C19	54284	SLUG TUNER & PULLEY ASS'Y
L3	55018	R.F. WAVE TRAP
L.C.	53091	LINE CORD
D.L.	70535	DIAL LIGHT, TYPE 47

LEAR, INC.

MODELS 6614, 6615, 6616, 6618

MODEL 6617PC

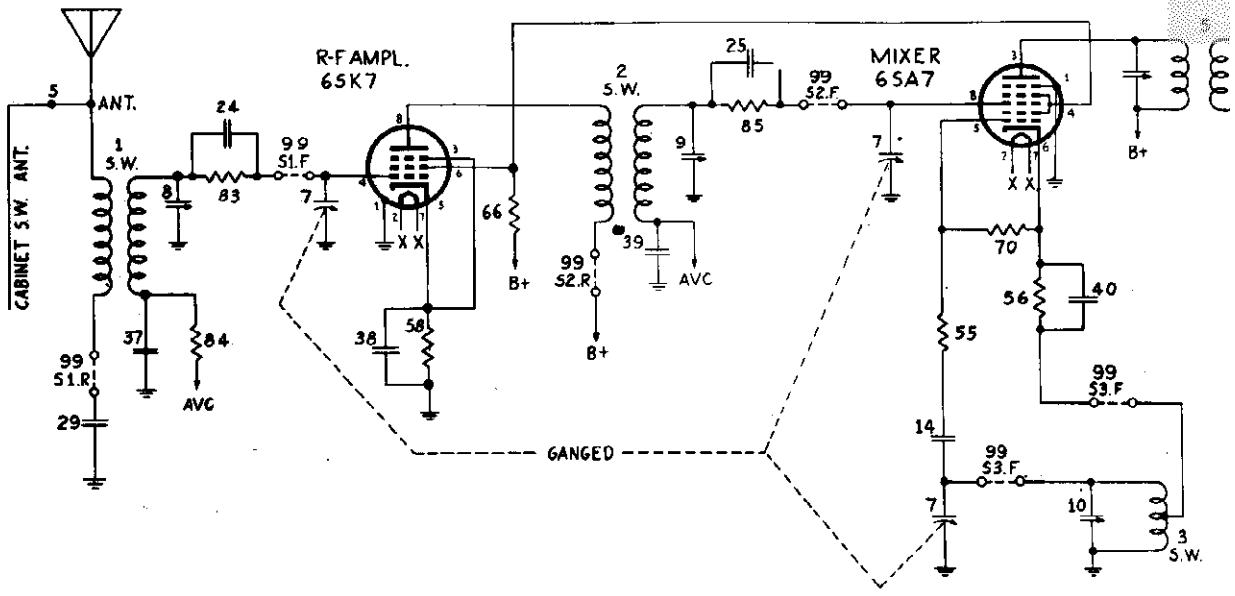
LEAR, INC.



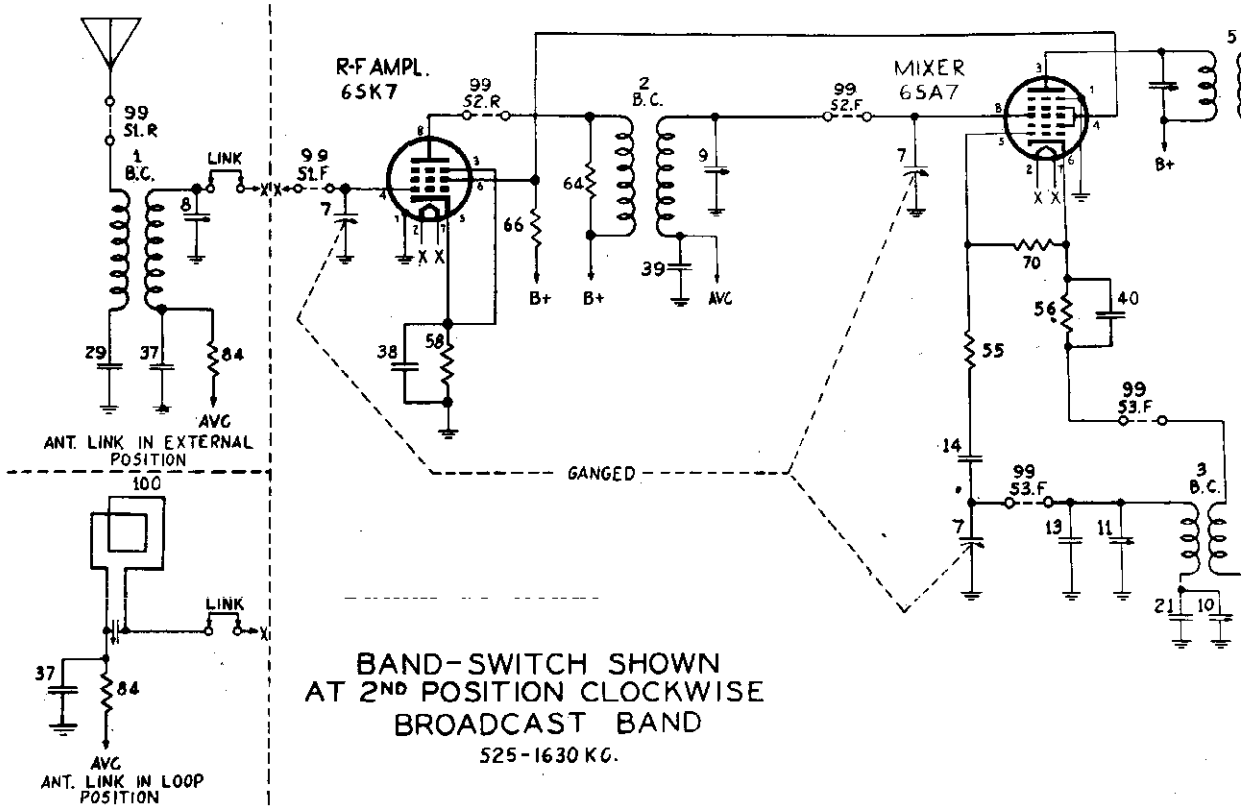
For Dial Drive and Loop, see P.16-5

THE MAGNAVOX CO.

MODELS CR-197, CR-19
CR-197B

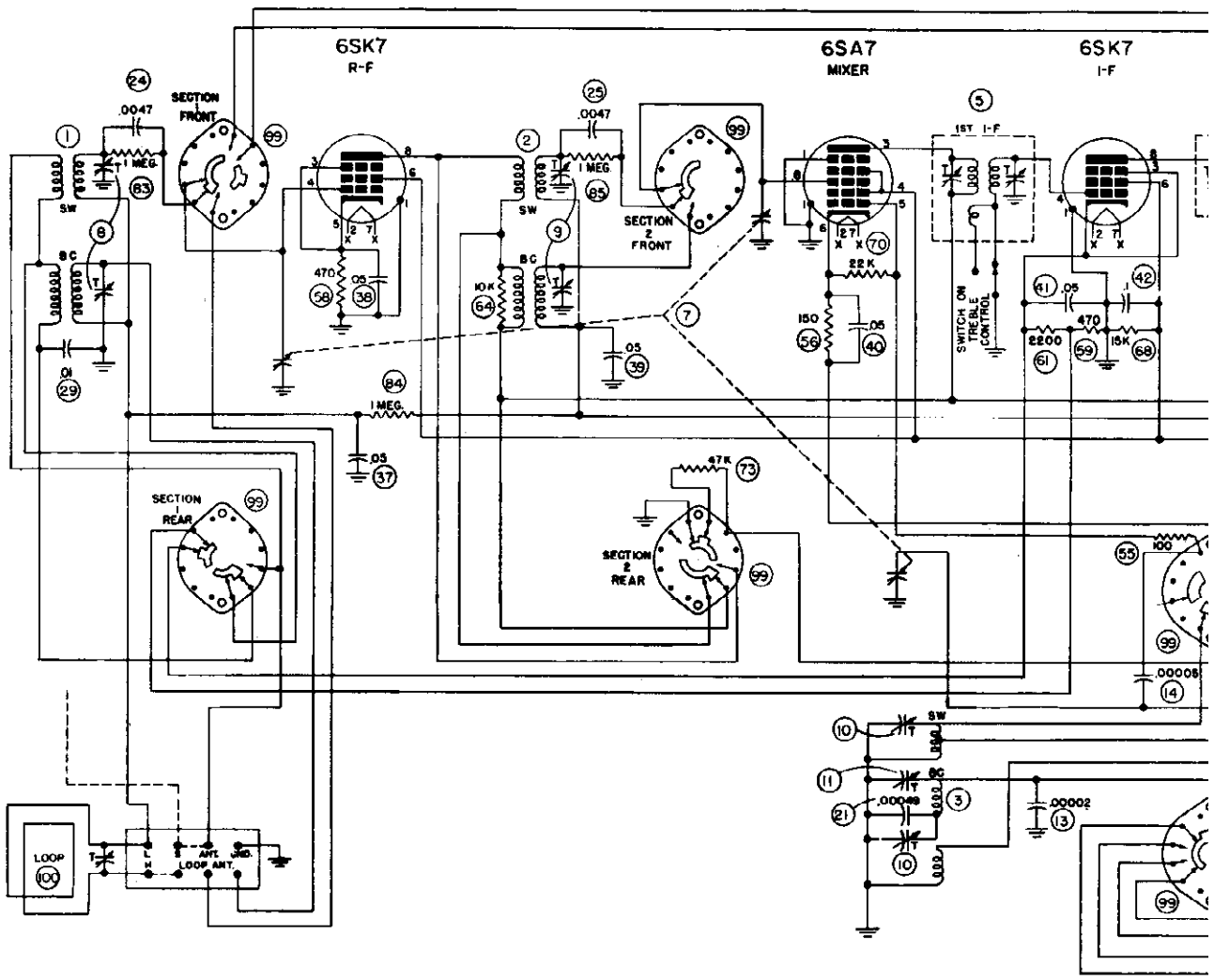


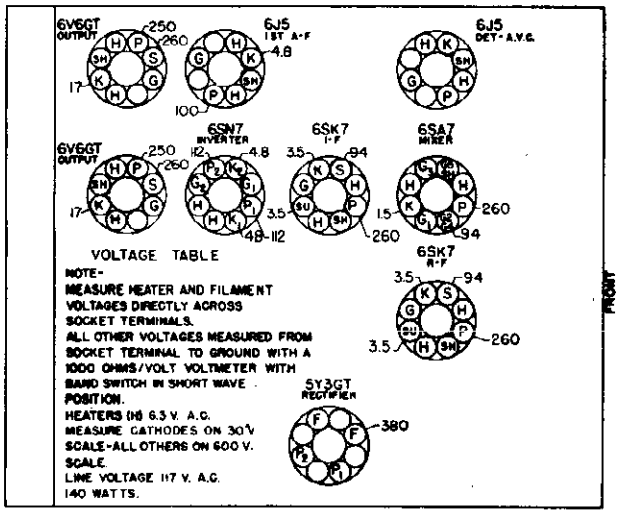
BAND-SWITCH SHOWN
AT 1ST POSITION
SHORT WAVE BAND
4.95-18.4 MC.

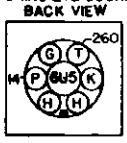


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND
525-1630 KC.

FIRST ISSUE—MARCH, 1947







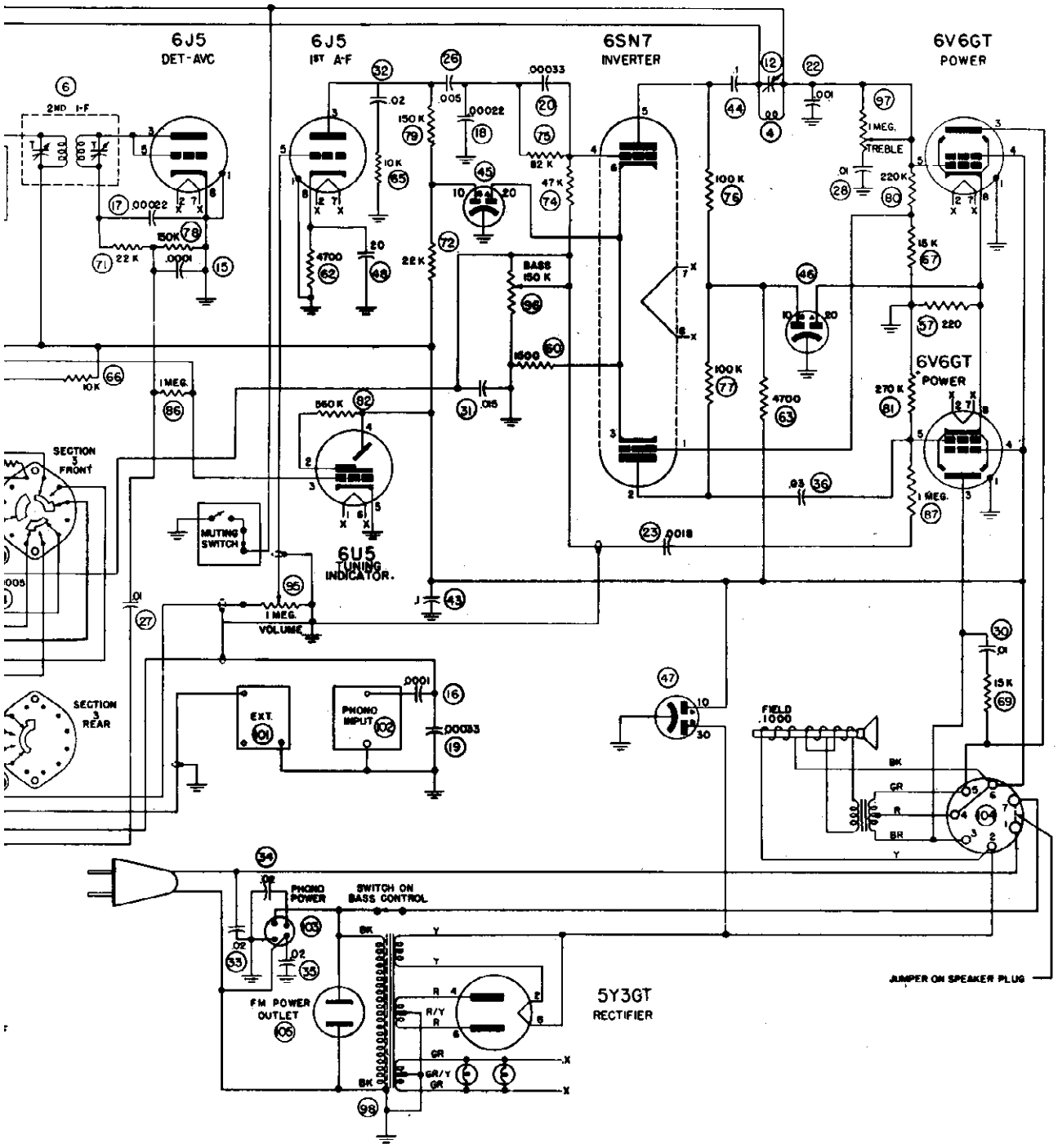
I-F 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN CLOCKWISE (SHORT WAVE) POSITION. THIS CONDITION OBTAINS WITH KNOB IN COUNTERGLOCKWISE POSITION.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

Models CR-1
However, a

FIGURE 6



GENERAL

R-197A and CR-197B are alike electrically. a change is incorporated in the dial drive mechanism. The differences are indicated on Figure 4.

MODELS CR-197, CR-197A, CR-197B

THE MAGNAVOX CO.

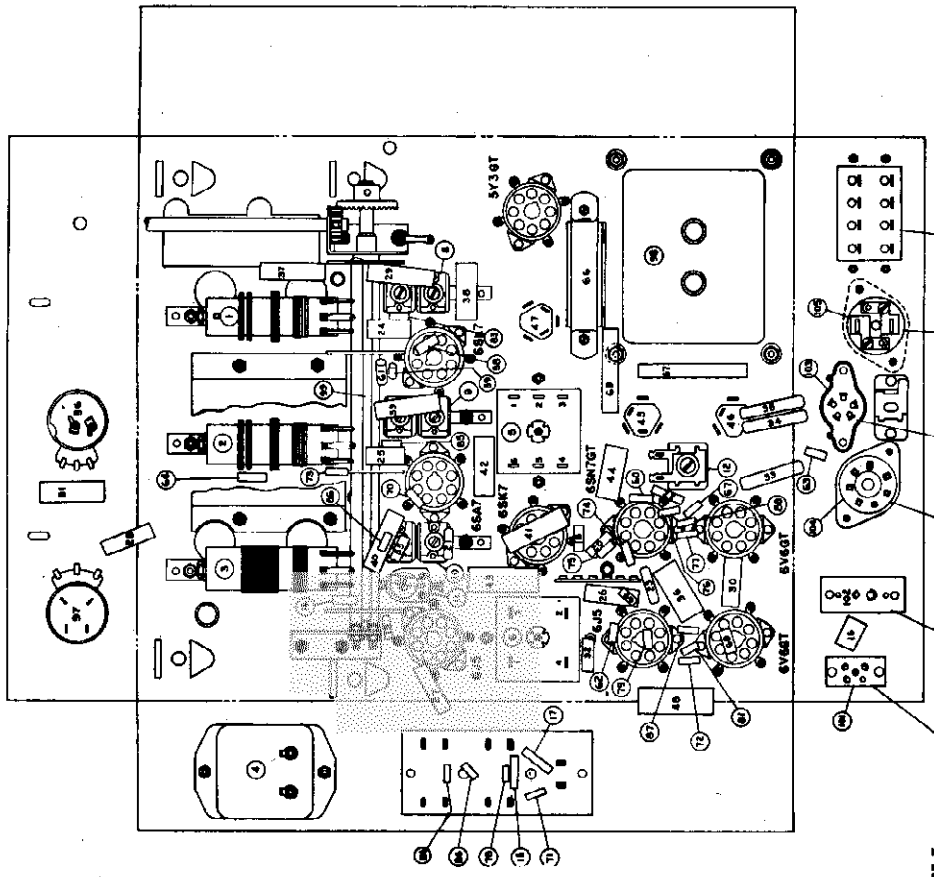
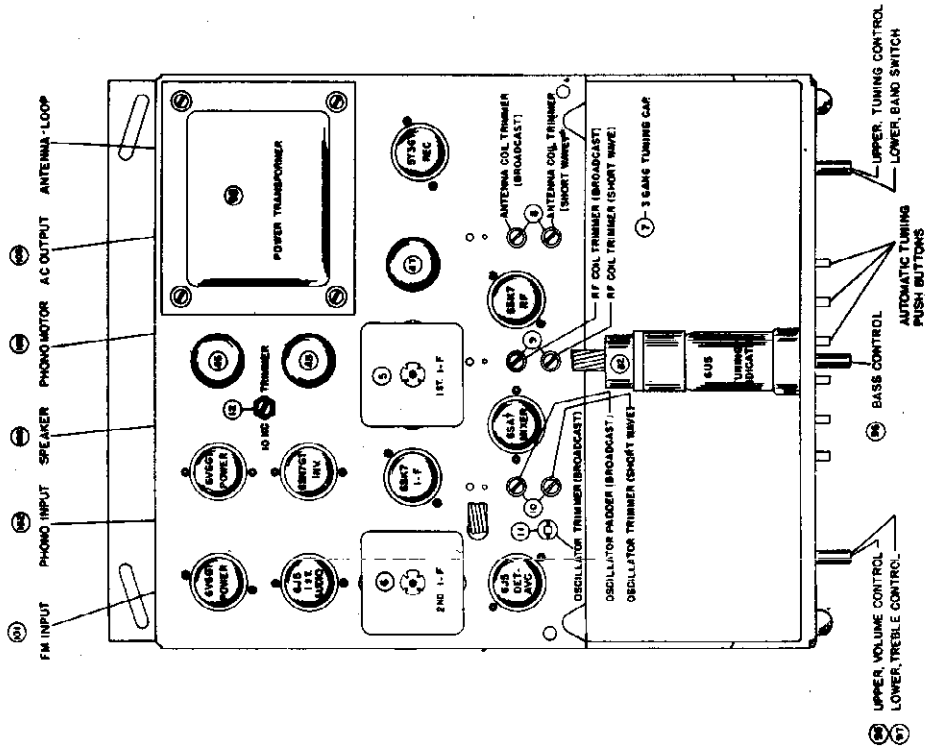


FIGURE 7



SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	95 watts
Power output	12 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	525—1630 kc.
Short Wave band	4.95—18.4 mc.
Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6I5
First Audio	6I5
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6V6GT
Rectifier	5Y3GT
Tuning Indicator	6U5
Dial lamps	Mazda No. 44
Speakers:	
Field coil resistance	1000 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	8,000/3 ohms

Method for Removing Chassis from Cabinet

THE DATA ON THIS ENTIRE PAGE ALSO APPLIES TO THE CR-198 SERIES

Model CR-197 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 7. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

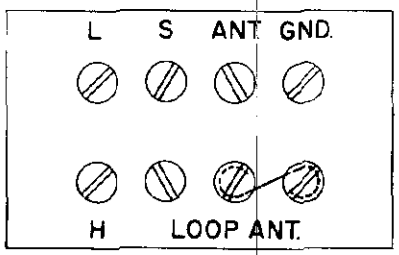


FIGURE 1

On some models of the CR-197 chassis, the two i-f trimmers are located in the top of the respective i-f transformers, while in others one trimmer is accessible from the top and the other from the bottom of each transformer as shown in the layout diagram, Figure 7.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The link on the antenna terminal board must be set in the ANT position as shown in Figure 1.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 3 and make the necessary adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc., adjust the 1400 kc. oscillator trimmer, the 1400 kc. r-f trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the link on the antenna terminal board to the LOOP position as shown in Figure 2. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

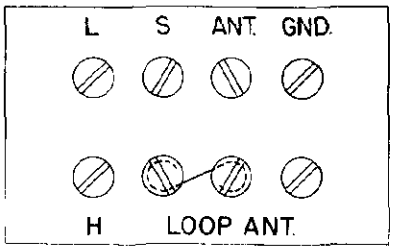


FIGURE 2

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer, the 15 mc. r-f trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

SETTING THE PUSH BUTTONS

1. Loosen each of the push button knobs several turns.

2. Select a station that is to be automatically tuned by one of the push buttons, using the Dial Tuning knob. Be sure to set the Selectivity Switch to Sharp Tune and observe that the shaded portion of the green circle in the tuning indicator is as narrow as possible.

3. Press inward on the Dial Tuning knob (without turning it to the left or right) to hold the station in tune and press one of the push button knobs in as far as it will go—while holding it in this position, tighten the push button knob by turning it clockwise as far as possible.

4. Insert the correct tab with the call letters of the selected station in the space provided and proceed with setting up the remaining push buttons in the same manner. Stations should be set up on the push buttons in the order of their frequency so that the lowest frequency station is tuned by the button at the extreme left of the assembly; the highest frequency station should be selected by the button at the right end.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	4.1
6 mc.	1.85

R-F to Converter Grid at:

600 kc.	14.3
6 mc.	2.8

R-F on Converter to I-F Grid at:

600 kc.	46
6 mc.	42

I-F on Converter Grid to I-F Grid at:

455 kc.	60

I-F Grid to Detector Plate at:

	BDCST	SW
455 kc.	30	70

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	6.6
6 mc.	5.3

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .0075 volt with Band Selector Switch in BDCST setting.

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 8.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

THE MAGNAVOX CO. MODELS CR-197, CR-197A, CR-19
MODELS CR-198, CR-198A, CR-19

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 3 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 3. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 3, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 3. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

CONDENSER GANG DRIVE ADJUSTMENTS

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 4 and 5 are correct; otherwise, the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring and Flywheel in the order shown on Figure 5. The distance between the front of the Drive Collar and the front of the Tuning Shaft must be 1 1/8 inches as specified on Figure 4. Install the Flywheel on the rear of the Tuning Shaft and slide it forward until it nearly touches the edge of the Drive Wheel; then tighten one of the set screws in the Flywheel hub. Insert a .010" gauge between the Flywheel and the Pin, and while holding the gauge in this position, loosen the set screw in the Flywheel hub that was previously tightened. The Compression Spring should force the Flywheel back against the gauge—when this occurs, tighten both set screws in the Flywheel hub.

2. Adjust the Muting Switch contact clearance by loosening the two screws in the Contact Bracket and sliding the bracket in the required direction until a 1/16" clearance is obtained. If this adjustment cannot be obtained in the manner prescribed, bend the Contact Bracket until proper clearance is realized.

3. The Drive Wheel is properly located on its shaft when its edge nearest the hub is in line with the outside edge of the Drive Collar as shown on Figure 5. Two Allen set screws in the Drive Wheel hub provide a means of adjusting the position of this wheel.

4. When the adjustment outlined in paragraph 2 is correct, the proper contact clearance will automatically be obtained when the Muting Switch is to be "unmuted" while the push buttons are being set. While pressure is applied to any one of the push buttons while they are being set up, a pressure applied simultaneously to the Tuning Control knob will cause the Muting Switch contacts to open. Detailed instructions on setting up these push buttons are shown elsewhere in this bulletin.

5. If the push button shafts at both ends do not engage the Treadle Bar as shown on Figure 5, the three screws in the Treadle Bar must be loosened and the Treadle Bar should be moved until the required condition is obtained.

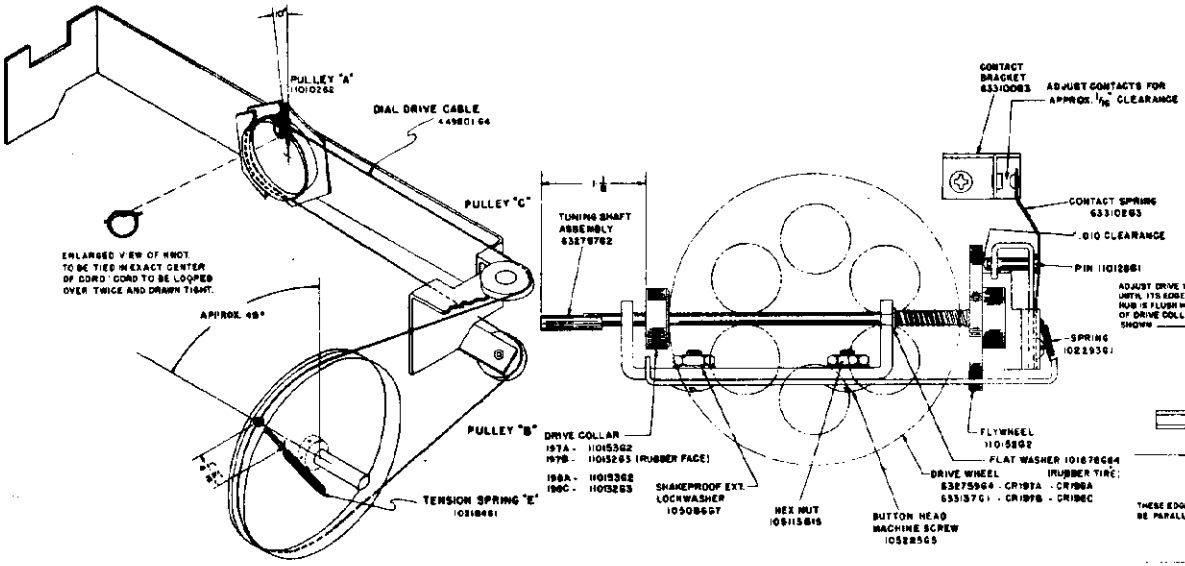


FIGURE 3

FIGURE 4

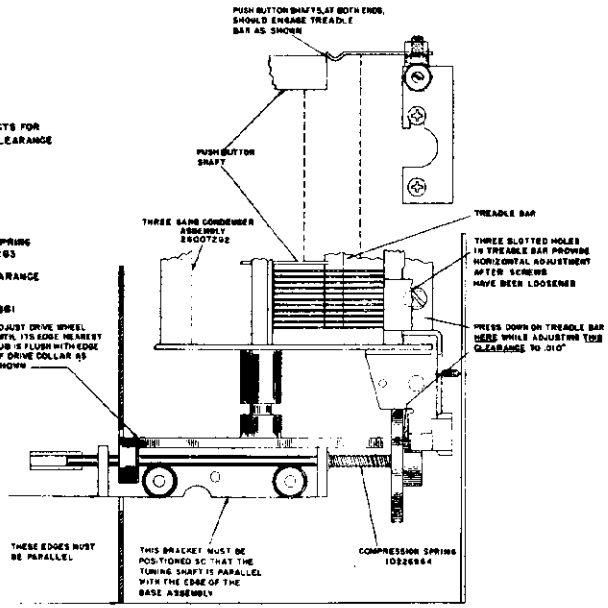


FIGURE 5

THE MAGNAVOX CO. MODELS CR-197,CR-197A,CR-197B
MODELS CR-198.CR-198A,CR-198B

PARTS LIST

MODELS CR-197,CR-197A,CR-197B

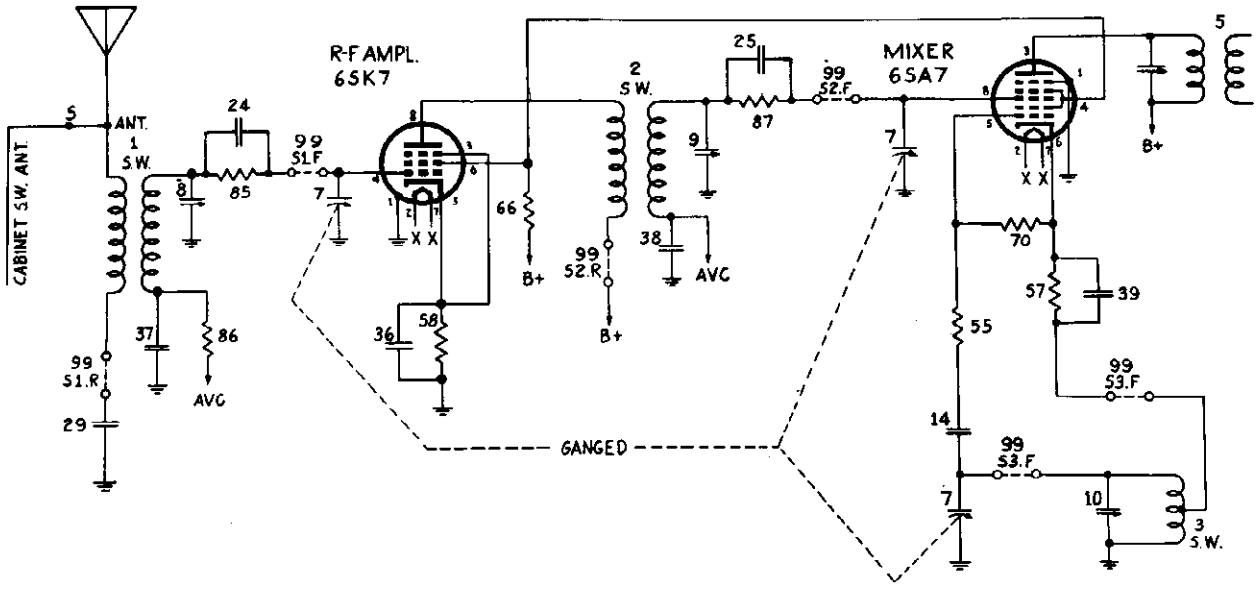
REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, Antenna, two band	360273G1
2	Coil Assembly, r-f, two band	360274G1
3	Coil Assembly, Oscillator, two band	360275G1
4	Coil Assembly, 10KC filter	360278G1
5	Transformer, First i-f	360024G1
6	Transformer, Second i-f	360025G1
7	Capacitor, Variable, three-gang, tuning	260071G1
	Push button assembly for 260071G1 capacitor	260063G1
8	Capacitor, Variable, two-gang trimmer	260021G1
9	Capacitor, Variable, two gang trimmer	260021G1
10	Capacitor, Variable, two-gang trimmer	260021G1
11	Capacitor, Variable, Oscillator padder	260067G3
12	Capacitor, Variable, 10 KC trimmer	250008G1
13	Capacitor, Ceramic, 20 mmf	250088G32
14	Capacitor, Ceramic, 50 mmf	250088G24
15	Capacitor, molded mica, 100 mmf ± 20%	250159G98
16	Capacitor, molded mica, 100 mmf ± 10%	250159G82
17	Capacitor, molded mica, 220 mmf ± 20%	250159G100
18	Capacitor, molded mica, 220 mmf ± 20%	250159G100
19	Capacitor, molded mica, 330 mmf ± 10%	250159G88
20	Capacitor, molded mica, 330 mmf ± 10%	250159G88
21	Capacitor, silvered mica, 490 mmf ± 1%	250085G32
22	Capacitor, molded mica, 1000 mmf ± 20%	250160G82
23	Capacitor, molded mica, 1800 mmf ± 10%	250160G67
24	Capacitor, molded mica, 4700 mmf ± 2%	250160G5
25	Capacitor, molded mica, 4700 mmf ± 2%	250160G5
26	Capacitor, paper .005 mfd, 400V	250152G30
27	Capacitor, paper .01 mfd, 200V	250152G18
28	Capacitor, paper .01 mfd, 200V	250152G18
29	Capacitor, paper .01 mfd, 600V	250152G38
30	Capacitor, paper .01 mfd, 600V	250152G38
31	Capacitor, paper .015 mfd, 200V	250152G70
32	Capacitor, paper, .02 mfd, 400V	250152G26
33	Capacitor, molded paper, .02 mfd, 600V	250129G3
34	Capacitor, molded paper, .02 mfd, 600V	250129G3
35	Capacitor, molded paper, .02 mfd., 600V	250129G3
36	Capacitor, paper, .03 mfd, 400V	250152G25
37	Capacitor, paper, .05 mfd, 200V	250152G15
38	Capacitor, paper, .05 mfd, 200V	250152G15
39	Capacitor, paper, .05 mfd, 200V	250152G15
40	Capacitor, paper, .05 mfd, 200V	250152G15
41	Capacitor, paper, .05 mfd, 200V	250152G15
42	Capacitor, paper, .1 mfd, 200V	250152G13
43	Capacitor, paper, .1 mfd, 400V	250152G22
44	Capacitor, paper, .1 mfd, 400V	250152G22
45	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
46	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
47	Capacitor, electrolytic, 10-30 mfd, 450V	270023G2
48	Capacitor, electrolytic, 20 mfd, 25V	270027G2
55	Resistor, composition, 100 ohms, ½ W	230084G7
56	Resistor, composition, 150 ohms, ½ W	230084G8
57	Resistor, composition, 220 ohm, 2W ± 10%	230064G54
58	Resistor, composition, 470 ohms, ½ W	230084G11
59	Resistor, composition, 470 ohms, ½ W	230084G11
60	Resistor, composition, 1500 ohms, ½ W	230084G14
61	Resistor, composition, 2200 ohms, ½ W	230084G15
62	Resistor, composition, 4700 ohms, ½ W	230084G17
63	Resistor, composition, 4700 ohms, ½ W	230084G17
64	Resistor, composition, 10,000 ohms, ½ W	230084G19
65	Resistor, composition, 10,000 ohms, ½ W	230084G31
66	Resistor, Wire wound, 10,000 ohms, 3 W ± 10%	240035G2
67	Resistor, composition, 15,000 ohms, ± 5%, ½ W	230084G187
68	Resistor, composition, 15,000 ohms, 2 W	230086G20
69	Resistor, composition, 15,000 ohms, 1 W	230085G20
70	Resistor, composition, 22,000 ohms, ½ W	230084G21
71	Resistor, composition, 22,000 ohms, ½ W	230084G21
72	Resistor, composition, 22,000 ohms, ½ W	230084G21
73	Resistor, composition, 47,000 ohms, ½ W	230084G23
74	Resistor, composition, 47,000 ohms, ½ W	230084G23
75	Resistor, composition, 82,000 ohms, ± 10%, ½ W	230084G85
76	Resistor, composition, 100,000 ohms, ½ W	230084G25
77	Resistor, composition, 100,000 ohms, ½ W	230084G25
78	Resistor, composition, 150,000 ohms, ½ W	230084G26
79	Resistor, composition, 150,000 ohms, ½ W	230084G26
80	Resistor, composition, 220,000 ohms ± 5%, ½ W	230084G215
81	Resistor, composition, 270,000 ohms, ± 10%, ½ W	230084G91
82	Resistor, composition, 560,000 ohms, ± 10%, ½ W	230084G95
83	Resistor, composition, 1 megohm, ½ W	230084G31
84	Resistor, composition, 1 megohm, ½ W	230084G31
85	Resistor, composition, 1 mehohm, ½ W	230084G31
86	Resistor, composition, 1 megohm, ½ W	230084G31
87	Resistor, composition, 1 megohm ± 10%, ½ W	230084G98
95	Control, Volume, 1 megohm	220044G23
96	Control, Bass, 150,000 ohm with Power Switch	220045G61
97	Control, Treble, 1 megohm with Band Expander Switch	220071G2
98	Transformer, Power, 117 V., 50/60 cycle	300034G1
99	Switch, Rotary, Band Selector	160126G1
100	Antenna Loop Assembly	*
101	Socket, FM Input	180060G1
102	Socket, Phonograph Input	189741G1
103	Socket, Phonograph Motor	180501G5
104	Socket, Speaker	180504G1
105	Socket, FM Power	180428G1
	Dial Glass Assembly	150291G1

PARTS LIST

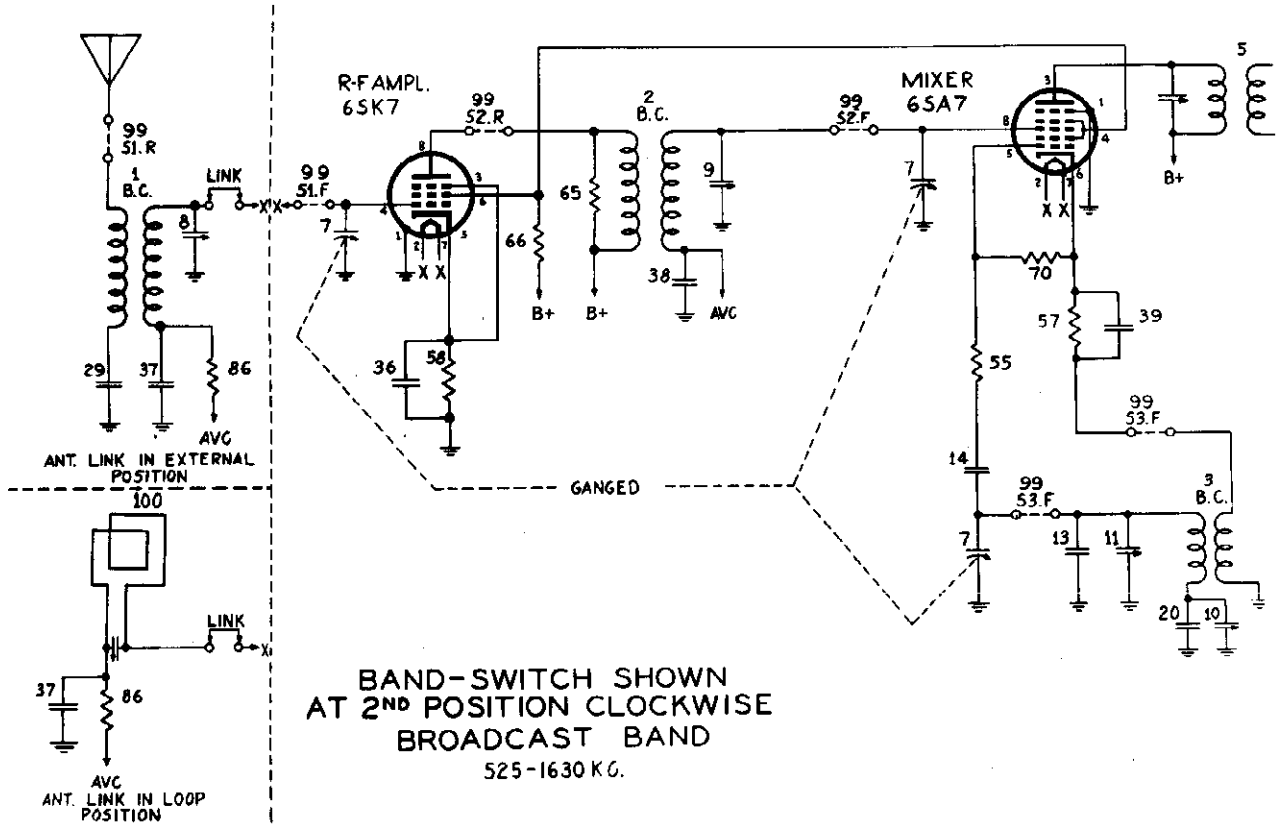
MODELS CR-198,CR-198A,CR-198B

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, Antenna, two band	360273G1
2	Coil Assembly, r-f, two band	360274G1
3	Coil Assembly, Oscillator, two band	360275G1
4	Coil Assembly, 10KC filter	360278G1
5	Transformer, First i-f	360024G1
6	Transformer, Second i-f	360025G1
7	Capacitor, Variable, three gang, tuning	260071G1
	Push Button assembly for 260071G1	260063G1
8	Capacitor, Variable, two gang trimmer	260021G1
9	Capacitor, Variable, two gang trimmer	260021G1
10	Capacitor, Variable, two gang trimmer	260021G1
11	Capacitor, Variable, Oscillator padder	260067G3
12	Capacitor, Variable, 10KC trimmer	250008G1
13	Capacitor, Ceramic, 20 mmf	250088G32
14	Capacitor, Ceramic, 50 mmf	250088G24
15	Capacitor, molded mica, 100 mmf ±20%	250159G98
16	Capacitor, molded mica, 100 mmf ±10%	250159G82
17	Capacitor, molded mica, 220 mmf ±20%	250159G100
18	Capacitor, molded mica, 220 mmf ±20%	250159G100
19	Capacitor, molded mica, 330 mmf ±10%	250159G88
20	Capacitor, silvered mica, 490 mmf ±1%	250085G32
21	Capacitor, molded mica, 680 mmf ±10%	250159G131
22	Capacitor, molded mica, 1000 mmf ±20%	250160G82
23	Capacitor, molded mica, 1800 mmf ±10%	250160G67
24	Capacitor, molded mica, 4700 mmf ±2%	250161G5
25	Capacitor, molded mica, 4700 mmf ±2%	250161G5
26	Capacitor, paper .005 mfd, 400V	250152G30
27	Capacitor, paper .01 mfd, 200 V	250152G18
28	Capacitor, paper .01 mfd, 200V	250152G18
29	Capacitor, paper .01 mfd, 600V	250152G38
30	Capacitor, paper .01 mfd, 600V	250152G38
31	Capacitor, paper .015 mfd, 200V, +10%	250152G70
32	Capacitor, molded paper, .02 mfd, 600V	250129G3
33	Capacitor, molded paper, .02 mfd, 600V	250129G3
34	Capacitor, molded paper, .02 mfd, 600V	250129G3
35	Capacitor, paper, .03 mfd, 400V	250152G25
36	Capacitor, paper, .05 mfd, 200V	250152G15
37	Capacitor, paper, .05 mfd, 200V	250152G15
38	Capacitor, paper, .05 mfd, 200V	250152G15
39	Capacitor, paper, .05 mfd, 200V	250152G15
40	Capacitor, paper, .05 mfd, 200V	250152G15
41	Capacitor, paper, .1 mfd, 200V	250152G13
42	Capacitor, paper, .1 mfd, 400V	250152G22
43	Capacitor, paper, .1 mfd, 400V	250152G22
44	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
45	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
46	Capacitor, electrolytic, 10-30 mfd, 450V	270023G2
47	Capacitor, electrolytic, 20 mfd, 25V	270027G2
55	Resistor, composition, 100 ohms, ½ W	230084G7
56	Resistor, Wire wound, 125 ohms, 5 W	240021G11
57	Resistor, composition, 150 ohms, ½ W	230084G8
58	Resistor, composition, 470 ohms, ½ W	230084G11
59	Resistor, composition, 470 ohms, ½ W	230084G11
60	Resistor, composition, 1000 ohms, 2 W ±10%	230064G62
61	Resistor, composition, 1500 ohms, ½ W	230084G14
62	Resistor, composition, 2200 ohms, ½ W	230084G15
63	Resistor, composition, 4700 ohms, ½ W	230084G17
64	Resistor, composition, 4700 ohms, ½ W	230084G17
65	Resistor, composition, 10,000 ohms, ½ W	230084G19
66	Resistor, Wire wound, 10,000 ohms, ±10%, 3 W	240035G2
67	Resistor, composition, 15,000 ohms, ±5%, ½ W	230084G187
68	Resistor, composition, 15,000 ohms, 2 W	230086G20
69	Resistor, composition, 15,000 ohms, 1 W	230085G20
70	Resistor, composition, 22,000 ohms, ½ W	230084G21
71	Resistor, composition, 22,000 ohms, ½ W	230084G21
72	Resistor, composition, 22,000 ohms, ½ W	230084G21
73	Resistor, composition, 47,000 ohms, ½ W	230084G23
74	Resistor, composition, 47,000 ohms, ½ W	230084G23
75	Resistor, composition, 82,000 ohms, ±10%, ½ W	230084G85
76	Resistor, composition, 100,000 ohms, ½ W	230084G25
77	Resistor, composition, 100,000 ohms, ½ W	230084G25
78	Resistor, composition, 150,000 ohms, ½ W	230084G26
79	Resistor, composition, 150,000 ohms, ½ W	230084G26
80	Resistor, composition, 220,000 ohms, ±5%, ½ W	230084G215
81	Resistor, composition, 270,000 ohms, ±10%, ½ W	230084G91
82	Resistor, composition, 560,000 ohms, ±10%, ½ W	230084G95
83	Resistor, composition, 680,000 ohms, ½ W	230084G30
84	Resistor, composition, 1 megohm, ±10%, ½ W	230084G98
85	Resistor, composition, 1 megohm, ½ W	230084G31
86	Resistor, composition, 1 megohm, ½ W	230084G31
87	Resistor, composition, 1 megohm, ½ W	230084G31
88	Resistor, composition, 1 megohm, ½ W	230084G31
95	Control, Volume, 1 megohm	220044G23
96	Control, Bass, 150,000 ohm with Power Switch	220045G6
97	Control, Treble, 1 megohm with Band Expander Switch	220071G2
98	Transformer, Power, 117 V., 50/60 cycle	300035G1
99	Switch, Rotary, Band Selector	160172G1
100	Antenna Loop Assembly	*
101	Socket, FM Input	180060G1
102	Socket, Phonograph Input	189741G1
103	Socket, Phonograph Motor	180501G5
104	Socket, Speaker	180504G16
105	Socket, FM Power	180428G1
	Dial Glass Assembly	150291G1

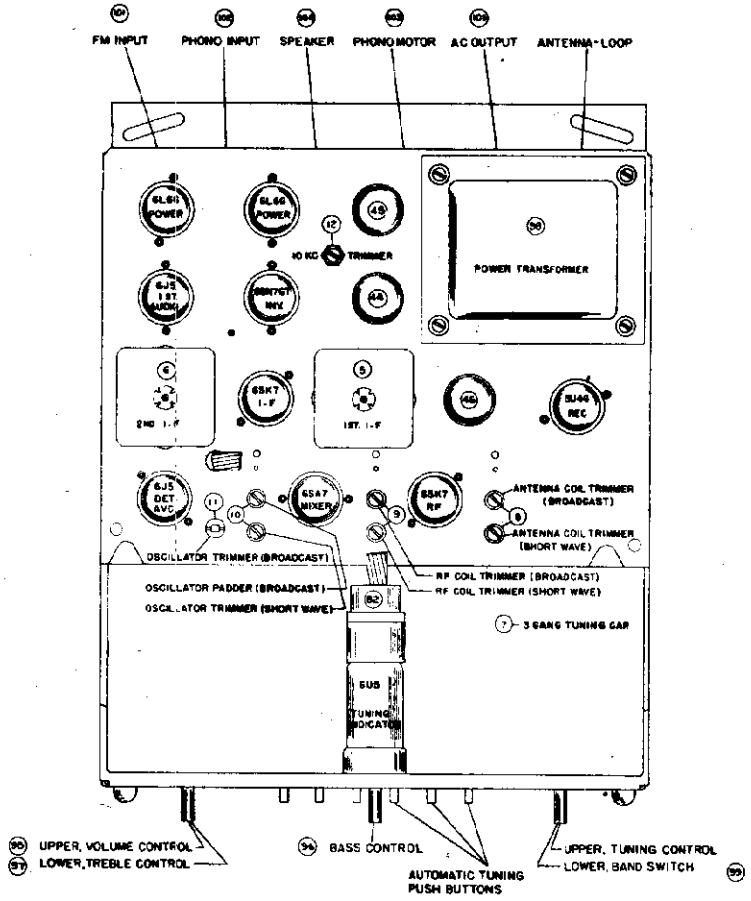
*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the *Style Number* of the instrument when ordering a replacement loop antenna assembly.



BAND-SWITCH SHOWN
AT 1ST POSITION
SHORT WAVE BAND
4.95-18.4 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND
525-1630 KC.



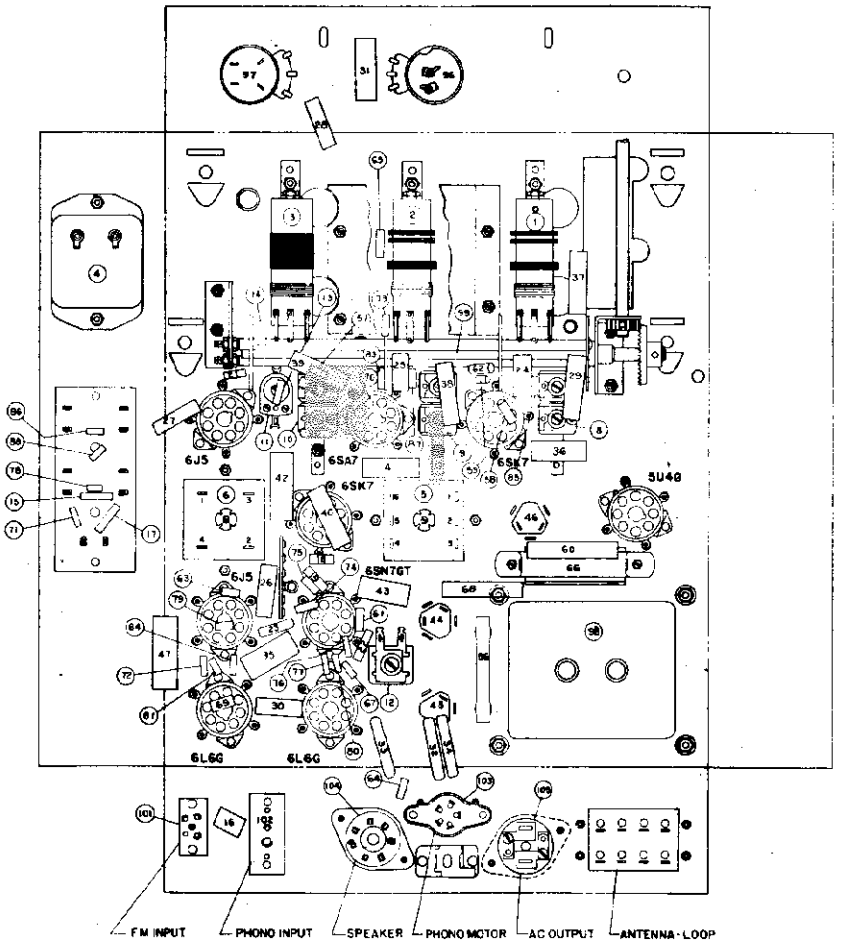


FIGURE 7

SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	140 watts
Power output	20 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	525—1630 kc.
Short Wave band	4.95—18.4 mc.
Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6J5
First Audio	6J5
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6L6G
Rectifier	5U4G
Tuning Indicator	6U5
Dial lamps	Mazda No. 44

Speakers:	No. 582815	No. 582847
Field coil resistance	250 ohms	250 ohms
Voice coil impedance (400 cycles)	5.7 ohms	5.4 ohms
Output transformer	None	5,000/3 ohms

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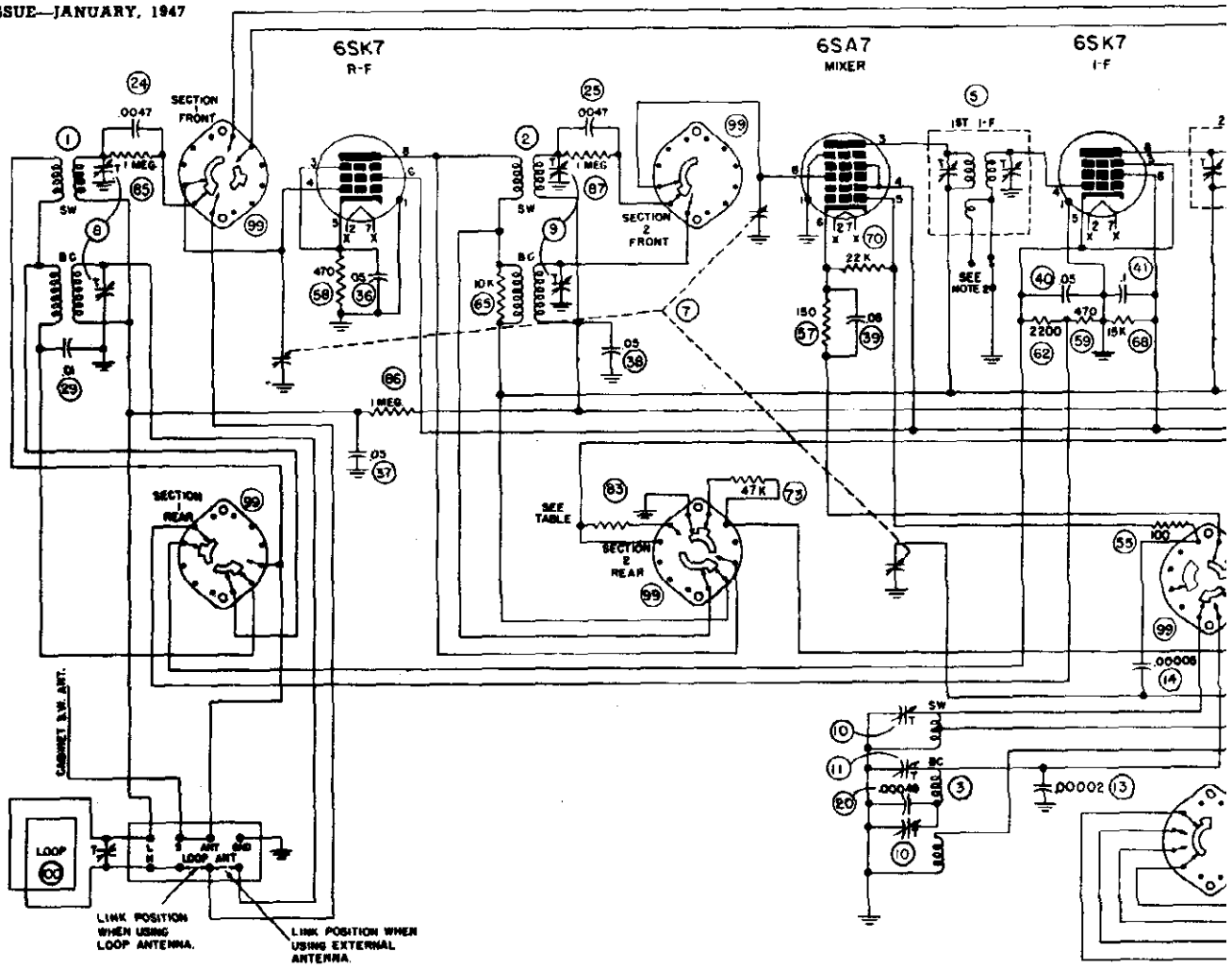
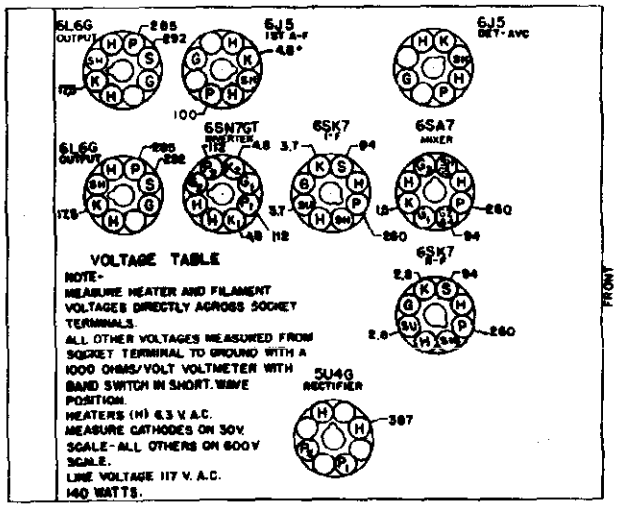
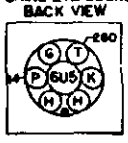






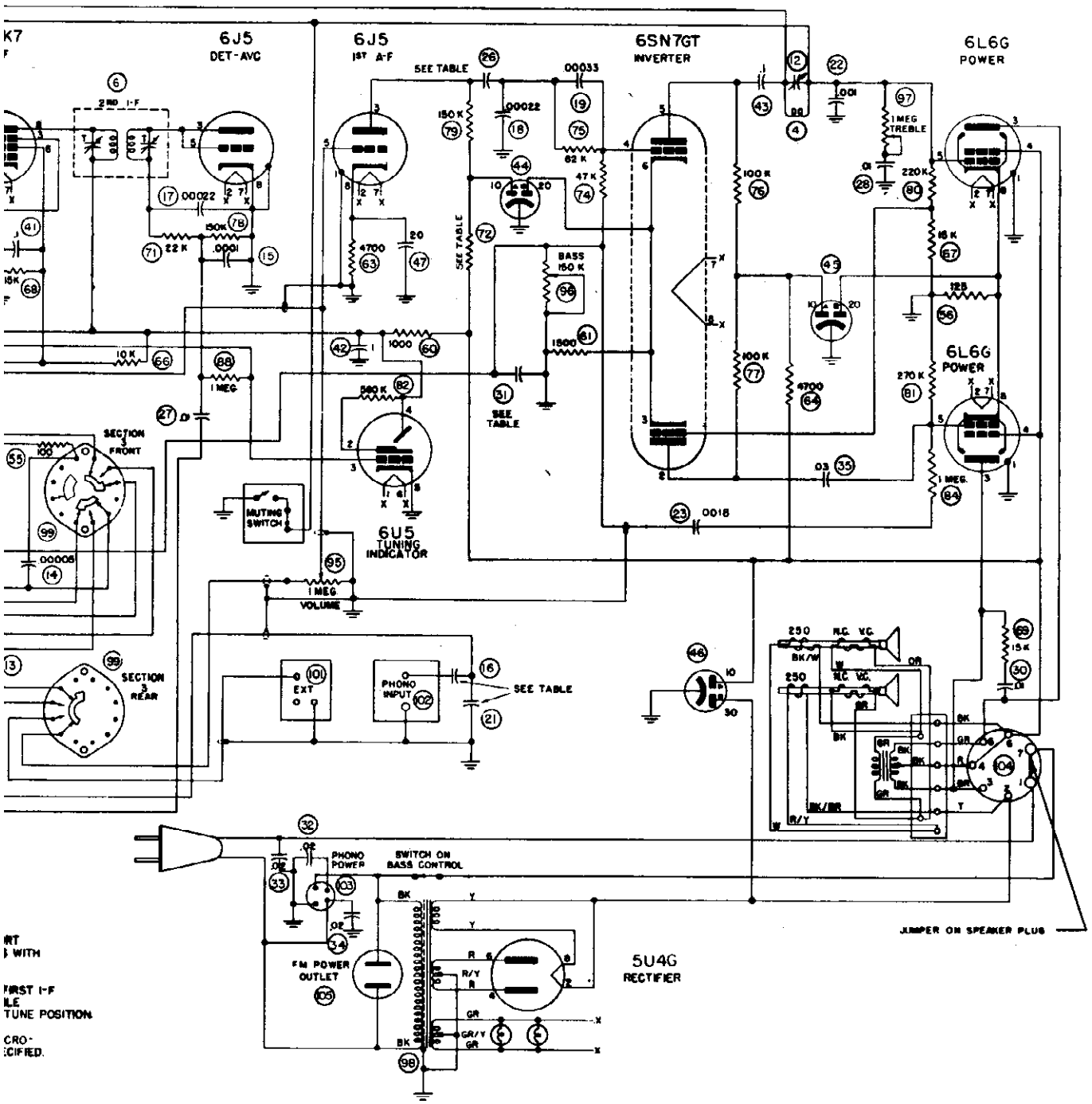
I-F 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN CLOCKWISE (SHORT WAVE) POSITION. THIS CONDITION OBTAINS WITH KNOB IN COUNTERCLOCKWISE POSITION.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB. SWITCH SHOWN IN SHARP TUNE POSITION.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICRO-FARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

ITEM NO	ELECTRICAL VALUES CR 198 A	CR 198 D
16	.00068	.0001
26	.01	.005
31	.02	.015
21	.00033	.00068
83	OMITTED	680K
72	4700	22K

FIGURE 6



GENERAL

Models CR-198A and CR-198B are alike mechanically. Circuit changers were made since the CR-198A was released to increase the bass response and also to increase the effective range of the bass control. Model CR-198B identifies the receiver in which these changes were incorporated and the table at the bottom of the circuit diagram, Figure 6, shows component values for both CR-198A and CR-198B.

Model CR-198C is electrically the same as CR-198B, however, a change is incorporated in the dial drive mechanism. The differences are indicated on Figure 4.

URE 6

For Parts List, see P.16-7

PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna	360279G1
2	Coil assembly, r-f	360280G1
3	Coil assembly, oscillator	360281G1
4	Transformer, first i-f	363700G1
5	Transformer, second i-f	363700G1
6	Capacitor, variable, three-gang tuning	260074G1
7	Capacitor, variable, two-gang trimmer	260021G1
8	Capacitor, variable, two-gang trimmer	260078G1
9	Capacitor, 8 mmf.	250164G1
10	Capacitor, molded mica, 100 mmf. ±20%	250159G98
11	Capacitor, molded mica, 150 mmf. ±10%	250159G84
12	Capacitor, molded mica, 220 mmf. ±20%	250159G100
13	Capacitor, molded mica, 220 mmf. ±20%	250159G100
14	Capacitor, molded mica, 330 mmf. ±10%	250159G88
15	Capacitor, silvered mica, 518 mmf. ±1%	250085G35
16	Capacitor, molded mica, 1800 mmf. ±10%	250160G67
17	Capacitor, paper, .002 mfd. 600 V.	250152G44
18	Capacitor, paper, .005 mfd. 600 V.	250152G41
19	Capacitor, paper, .01 mfd. 200 V.	250152G18
20	Capacitor, paper, .01 mfd. 200 V.	250152G18
21	Capacitor, paper, .01 mfd. 400 V.	250152G27
22	Capacitor, paper, .015 mfd. ±10%, 200 V.	250152G70
23	Capacitor, paper, .02 mfd. 200 V.	250152G17
24	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
27	Capacitor, paper, .03 mfd. 400 V.	250125G25
28	Capacitor, paper, .05 mfd. 200 V.	250152G15
29	Capacitor, paper, .05 mfd. 200 V.	250152G15
30	Capacitor, paper, .05 mfd. 200 V.	250152G15
31	Capacitor, paper, .05 mfd. 200 V.	250152G15
32	Capacitor, paper, .05 mfd. 200 V.	250152G15
33	Capacitor, paper, .1 mfd. 200 V.	250152G13
34	Capacitor, paper, .1 mfd. 400 V.	250152G22
35	Capacitor, paper, .1 mfd. 400 V.	250152G22
36	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V.	270023G6
37	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V.	270023G6
38	Capacitor, electrolytic, 10-30 mfd. 475 V.	270023G2
39	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
50	Resistor, Composition, 150 ohm, ½ W.	230084G8
51	Resistor, wire wound, 220 ohm, ±10%, 2 W.	230064G54
52	Resistor, composition, 1500 ohm, ½ W.	230084G14
53	Resistor, composition, 3300 ohm, ½ W.	230084G16
54	Resistor, composition, 3300 ohm, ½ W.	230084G16
55	Resistor, composition, 4700 ohm, ½ W.	230084G17
56	Resistor, composition, 4700 ohm, ½ W.	230084G17
57	Resistor, composition, 10,000 ohm, ½ W.	230084G19
58	Resistor, composition, 10,000 ohm, 1 W.	230085G19
59	Resistor, wire wound, 10,000 ohm ±10%, 3 W.	240035G2
60	Resistor, composition, 15,000 ohm ±5%, ½ W.	230084G187
61	Resistor, composition, 15,000 ohm, 2 W.	230086G20
62	Resistor, composition, 22,000 ohm, ½ W.	230084G21
63	Resistor, composition, 22,000 ohm, ½ W.	230084G21
64	Resistor, composition, 22,000 ohm, ½ W.	230084G21
65	Resistor, composition, 33,000 ohm, ½ W.	230084G22
66	Resistor, composition, 47,000 ohm, ½ W.	230084G23
67	Resistor, composition, 82,000 ohm, ±½ W.	230084G85
68	Resistor, composition, 100,000 ohm, ½ W.	230084G25
69	Resistor, composition, 100,000 ohm, ½ W.	230084G25
70	Resistor, composition, 150,000 ohm, ½ W.	230084G26
71	Resistor, composition, 150,000 ohm, ½ W.	230084G26
72	Resistor, composition, 220,000 ohm, ±5%, ½ W.	230084G215
73	Resistor, composition, 270,000 ohm, ±10%, ½ W.	230084G91
74	Resistor, composition, 1 megohm, ±10%, ½ W.	230084G98
75	Resistor, composition, 1 megohm, ½ W.	230084G31
76	Resistor, composition, 1 megohm, ½ W.	230084G31
77	Resistor, composition, 1.5 megohm, ½ W.	230084G32
78	Resistor, composition, 3.9 megohm, ±10%, ½ W.	230084G105
79	Resistor, composition, 4.7 megohm, ±10%, ½ W.	230084G106
90	Control, volume, 1 megohm with 100,000 ohm tap	220074G1
91	Control, bass, 150,000 ohm with power switch	220045G6
92	Control, treble, 500,000 ohm	220044G22
93	Transformer, power, 117 V. 50-60 cycle	300036G1
94	Switch, rotary, band selector	160175G1
95	Switch, slide, SPDT antenna loop	160176G1
96	Antenna loop assembly	*
97	Socket, fm input	180060G1
98	Socket, phonograph input	189741G1
99	Socket, phonograph motor	180501G5
100	Socket, speaker	180504G16
101	Socket, fm power	180428G1
	Dial glass assembly	150293G1
97	Socket, FM input	180060G1
101	Socket, FM power	180428G1
	Dial Glass Assembly	150293G1

All resistor tolerances not given are ±20%

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR 199 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated L-H. The two terminals on the loop are designated L and H; the leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 3. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings.

I-F ALIGNMENT

1. Connect the output of the signal generator to the control grid (pin No. 8) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the input selector switch to RAD.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The Ant-Loop switch on top of the chassis must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. Adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc., adjust the 1400 kc. oscillator trimmer, the 1400 kc. r-f trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch on the top of the chassis to the LOOP setting. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to R-F Grid at:
600 kc. 4.88

R-F Grid to Converter Grid at:
600 kc. 4.7

R-F on Converter to I-F Grid at:
600 kc. 42.6

I-F on Converter Grid to I-F Grid at:
455 kc. (gang closed) 50.7

I-F Grid to Detector Plate at:
455 kc. 72

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across the Oscillator Grid Resistor at:
600 kc. ..... 12 V.
or 0.55 ma. through 22,000 ohm Oscillator Grid Resistor (62).

AUDIO GAIN

Voltage required across the Volume Control to produce .05 watt speaker output** at 400 cycles is .011 volt with Input Selector Switch in RAD setting.

*Variations of ± 20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

**.05 watt speaker output at 400 cycles is equivalent to a reading of 0.8 volts as measured by a high resistance AC voltmeter across the voice coil of speaker.

DIAL CORD REPLACEMENT

Two separate drive cables are used in the CR-199 dial assembly. One cable is used to transmit the motion from the tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is rotated. Separate instructions for replacing either of these cables is given in the following paragraphs.

CONDENSER DRIVE CABLE REPLACEMENT

Remove dial assembly after taking out two screws on each side of chassis. Slide a short length (approximately ½ inch) of sleeving over one end of a length of dial cable, form a small loop and tie a knot in the manner shown on Figure 1. Tie spring to opposite end of cable making length including spring 20¾ inches. Hook loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counterclockwise direction when viewed from the rear of the chassis keeping the cable to the rear of the pulley groove. Lace the cable around the smaller diameter portion of the tuning control shaft wrapping 2½ turns *from front to back;* then around the opposite side of pulley "C" into the pulley through the slot. Hook the end of tension spring "D" in the hole provided in pulley "C"; completing this operation.

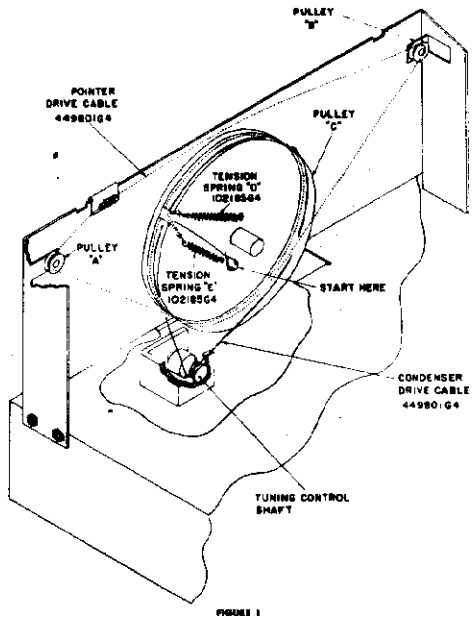


FIGURE 1

DIAL POINTER DRIVE CABLE REPLACEMENT

Remove dial assembly after taking out two screws on each side of chassis. Slip a one-half inch length of sleeving into a 42-inch length of dial cable. Tie the two ends to the loop end of the cable spring "E" securely so that the cable doubled measures 20¾ inches end to end including spring.

Place spring hook in bottom hole and draw cable through slot of pulley "C". Loop one end of cable around pulley "C" in a clockwise direction in front of condenser drive cable (viewing chassis from front) then loop the remaining end around pulley in a counterclockwise direction. Secure both ends of cable to chassis at edge of pulley slot with scotch tape, keeping piece of sleeving on remaining loop of cable.

Replace dial assembly and loop cable over pulley "A". While holding cable taut remove scotch tape and loop cable over pulley "B".

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lug on the pointer pressed over the sleeving. After checking to make certain that the condenser gang is completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

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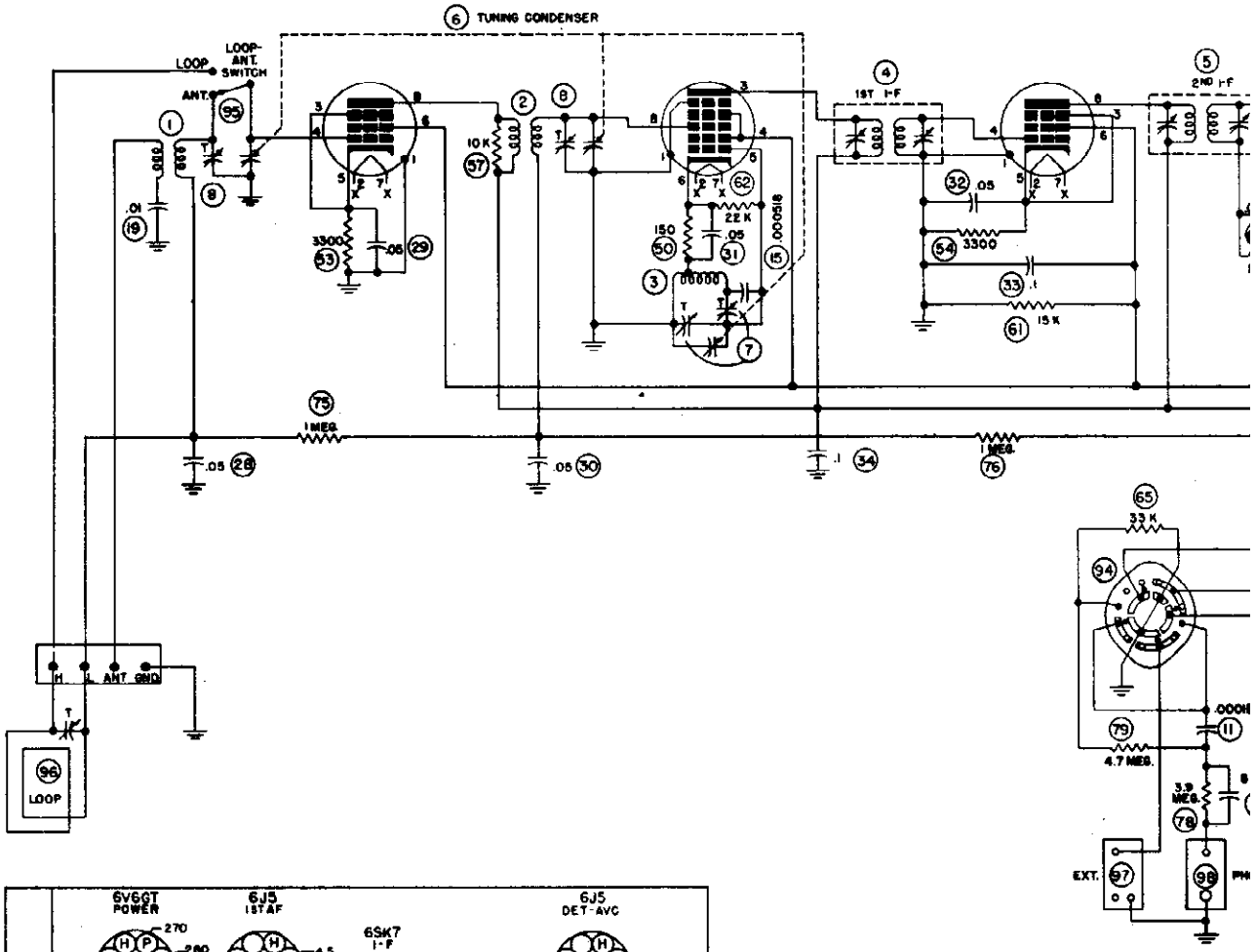
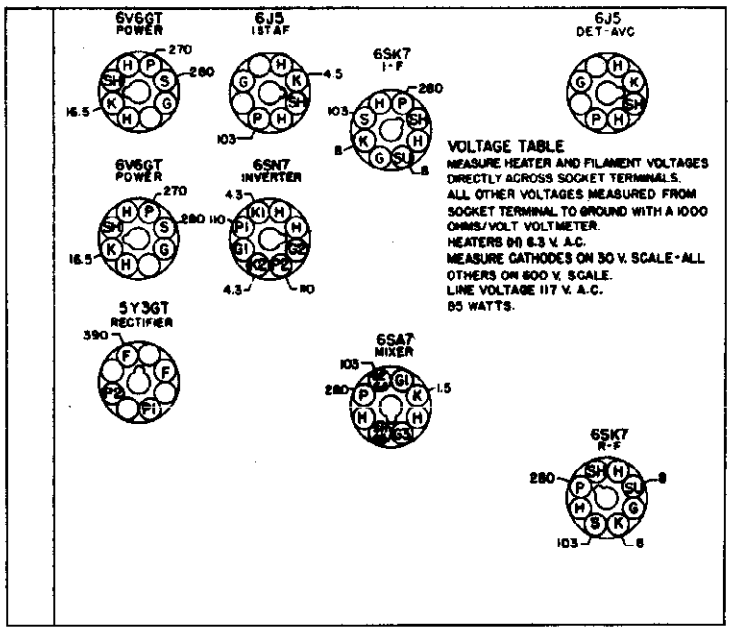
6SK7 R-F | 6SA7 MIXER | 6SK7 I-F





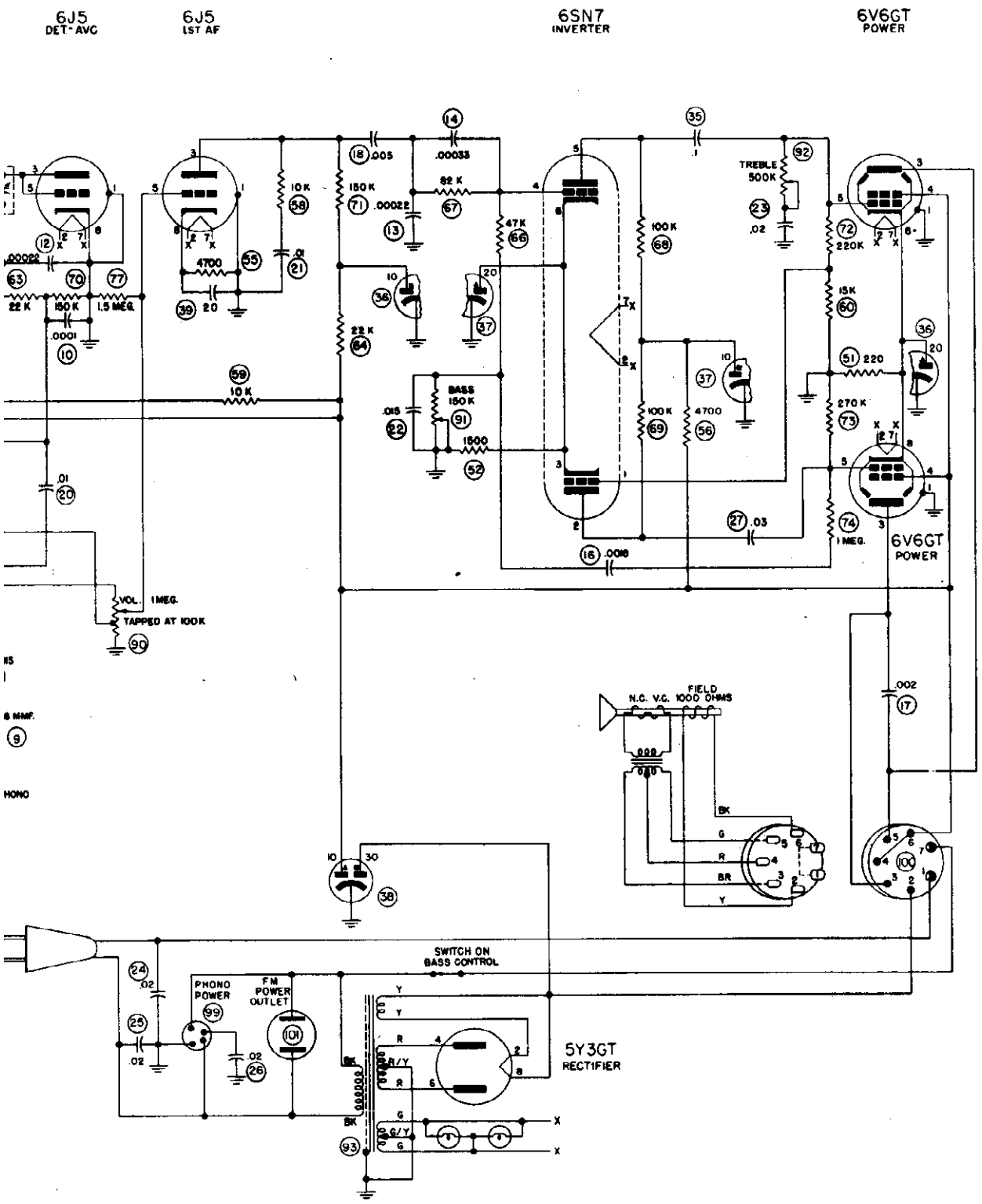
I-F 455 KC.

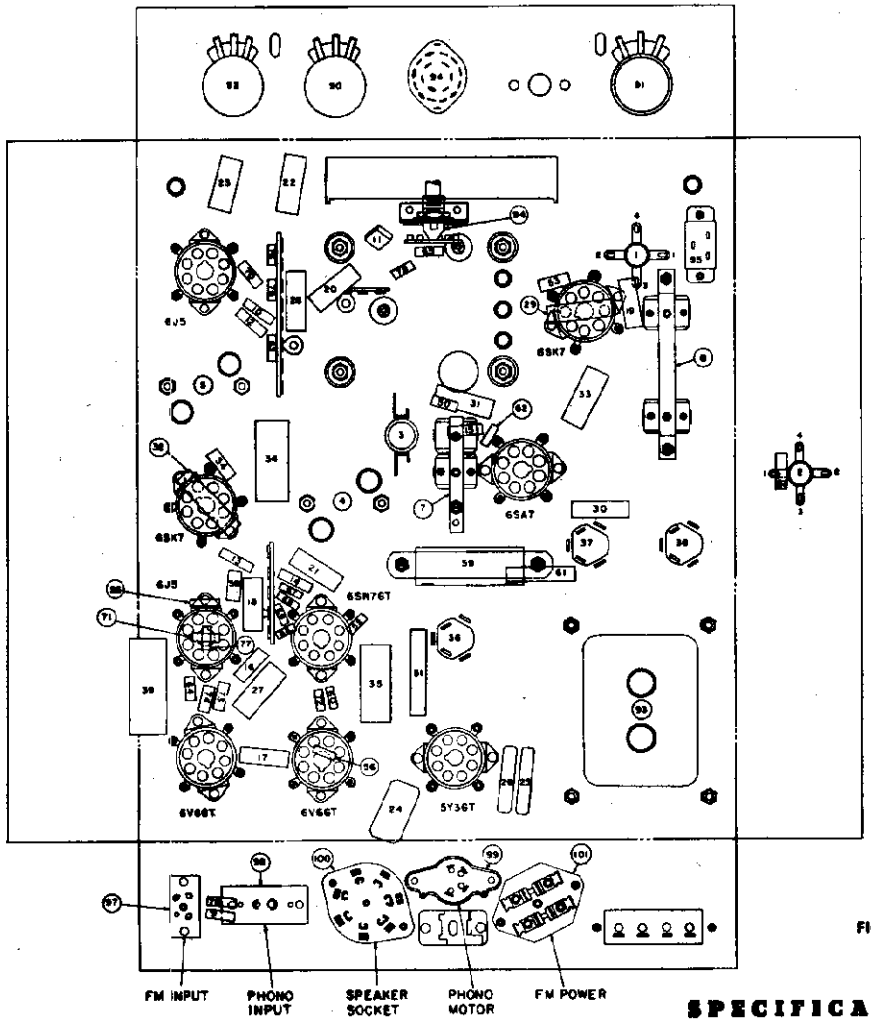
NOTE

ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

SELECTOR SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION WHEN VIEWED FROM THE FRONT PANEL.

FIGURE 2


6J5
DET-AVC
6J5
1ST AF
6SN7
INVERTER
6V6GT
POWER
VOL. 1 MEG.
TAPPED AT 100K
BASS
TREBLE
500K
FIELD
N.C. V.C. 1000 OHMS
SWITCH ON
BASS CONTROL
PHONO
POWER
FM
POWER
OUTLET
5Y3GT
RECTIFIER
6V6GT
POWER



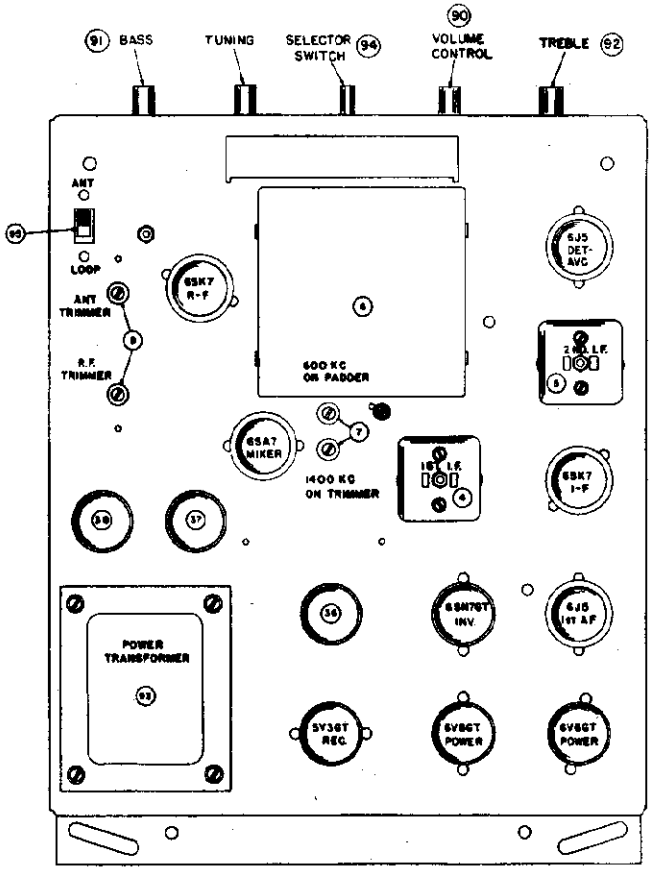
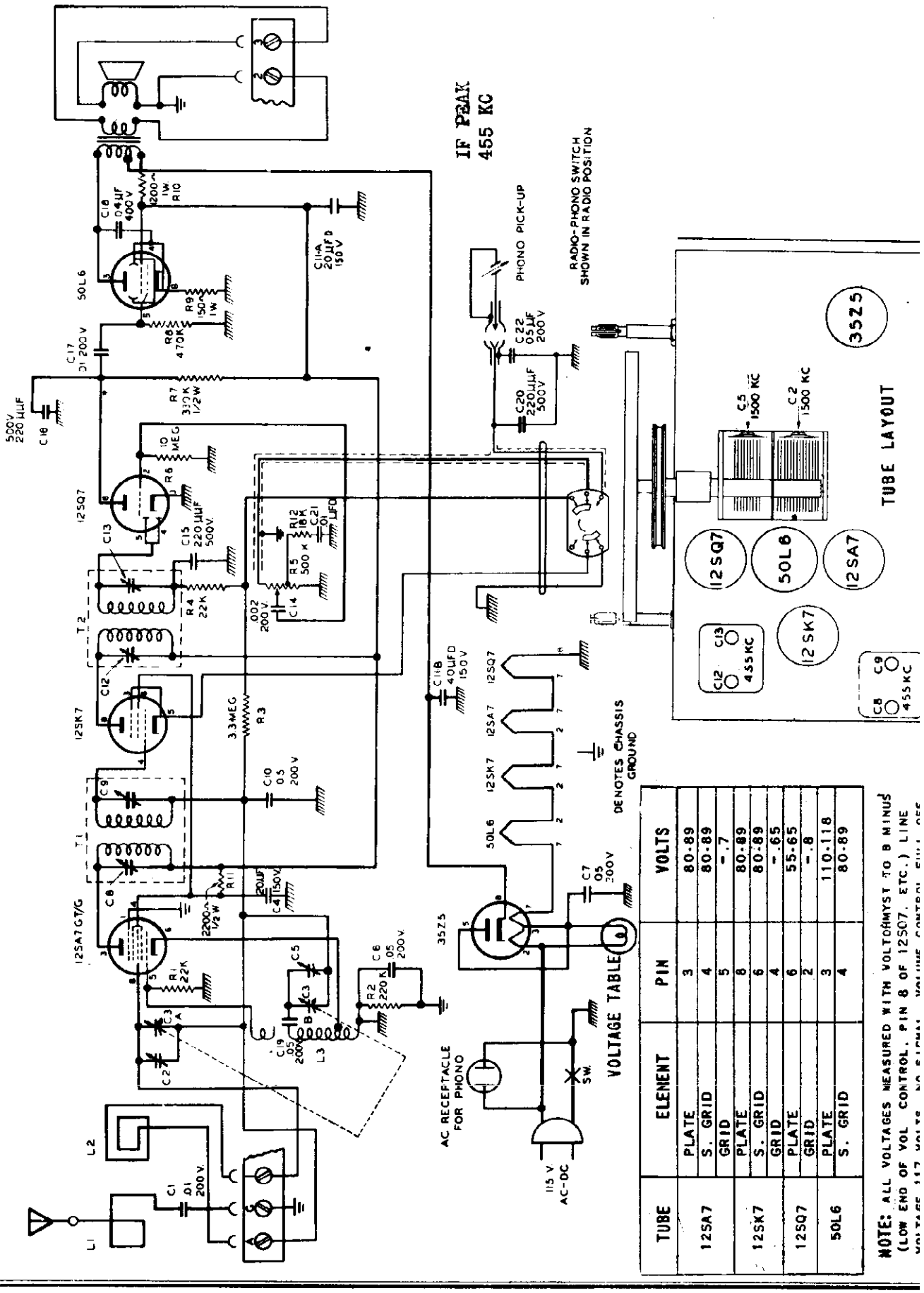


FIGURE 3

SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	85 watts
Power output	10 watts
Intermediate frequency	455 kc.
Tuning frequency range	534–1620 kc.
Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6J5
First Audio	6J5
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6V6GT
Rectifier	5Y3GT
Dial lamps	Mazda No. 44
Speakers:	
Field coil resistance	1000 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	8,000/3 ohms

MAJESTIC RADIO & TELEV. CORP. MODELS 5A445,5A445



TUBE	ELEMENT	PIN	VOLTS
12SA7	PLATE	3	80-89
	S. GRID	4	80-89
	GRID	5	-.7
12SK7	PLATE	8	80-89
	S. GRID	6	80-89
	GRID	4	-.65
12SQ7	PLATE	6	55-65
	GRID	2	-.8
50L6	PLATE	3	110-118
	S. GRID	4	80-89

VOLTAGE TABLE

NOTE: ALL VOLTAGES MEASURED WITH VOLTOHMYST TO B MINUS (LOW END OF VOL CONTROL, PIN 8 OF 12SQ7, ETC.) LINE

PARTS LIST

ITEM	DESCRIPTION	PART NO.
R1 R4	22,000 OHM, 20%, 1/4 WATT	9-184
R2	220,000 OHM, 20%, 1/4 WATT	9-182
R3	3.3 MEGOHM, 20%, 1/4 WATT	9-206
R5	VOLUME CONTROL WITH SWITCH, ½ MEGOHM	13-28
R6	10 MEGOHM, 20%, 1/4 WATT	9-160
R7	330,000 OHM 20%, 1/2 WATT	9-89
R8	470,000 OHM 20%, 1/4 WATT	9-207
R9	150 OHM, 20%, 1 WATT	9-251
R10	1200 OHM, 10%, 1 WATT	9-216
R11	2200 OHM, 10%, 1/2 WATT	02-100
R12	18,000 OHM, 20%, 1/4 WATT	9-269
C1,C17, C21	.01 MFD. + 40%-10%, 200V	5-57
C2,C3,C5 C6,C7, C10,C19, C22	GANGED TUNING CONDENSER	7-24
C8,C9, C12,C13,	TRIMMER (PART OF GANG CONDENSER)	
C11	20-40 MFD 150V ELECTROLYTIC	19-24
C4	20 MFD ELECTROLYTIC CONDENSER 150V.	19-32
C14 C15,C16,	.002 MFD. + 40%-10%, 200V	5-52
C20	220 MMFD ± 20%, 500V	6-151
C18	.04 MFD + 20%-10%, 400V	5-58
T1	1ST I.F. TRANSFORMER	3-116
T2	2ND I.F. TRANSFORMER	3-117
L3	OSCILLATOR COIL ASSEMBLY	3-158
	OUTPUT TRANSFORMER	12-20
	SPEAKER	22-32
	DIAL SCALE	117-86
	DIAL CORD TENSION SPRING	129-29
	DIAL POINTER	135-14
	SWITCH, PHONO-RADIO	11-52
	LOOP ANTENNA AND BACK COVER	20-30
	KNOB-TUNING	128-54
	KNOB, RADIO-PHONO	128-55
	KNOB, VOLUME	128-56
	PILOT LIGHT JEWEL	127-205
	PILOT LIGHT SHIELD	23-45
	PILOT LIGHT, #47	26-2
	PHONO MOTOR RECEPTACLE	15-98
	CABINET, MODEL 5A445R	115-22
	ESCUTCHEON, MODEL 5A445R	122-38
	CABINET MODEL 5A445	115-18
	DIAL CRYSTAL AND ESCUTCHEON, MODEL 5A445	122-33

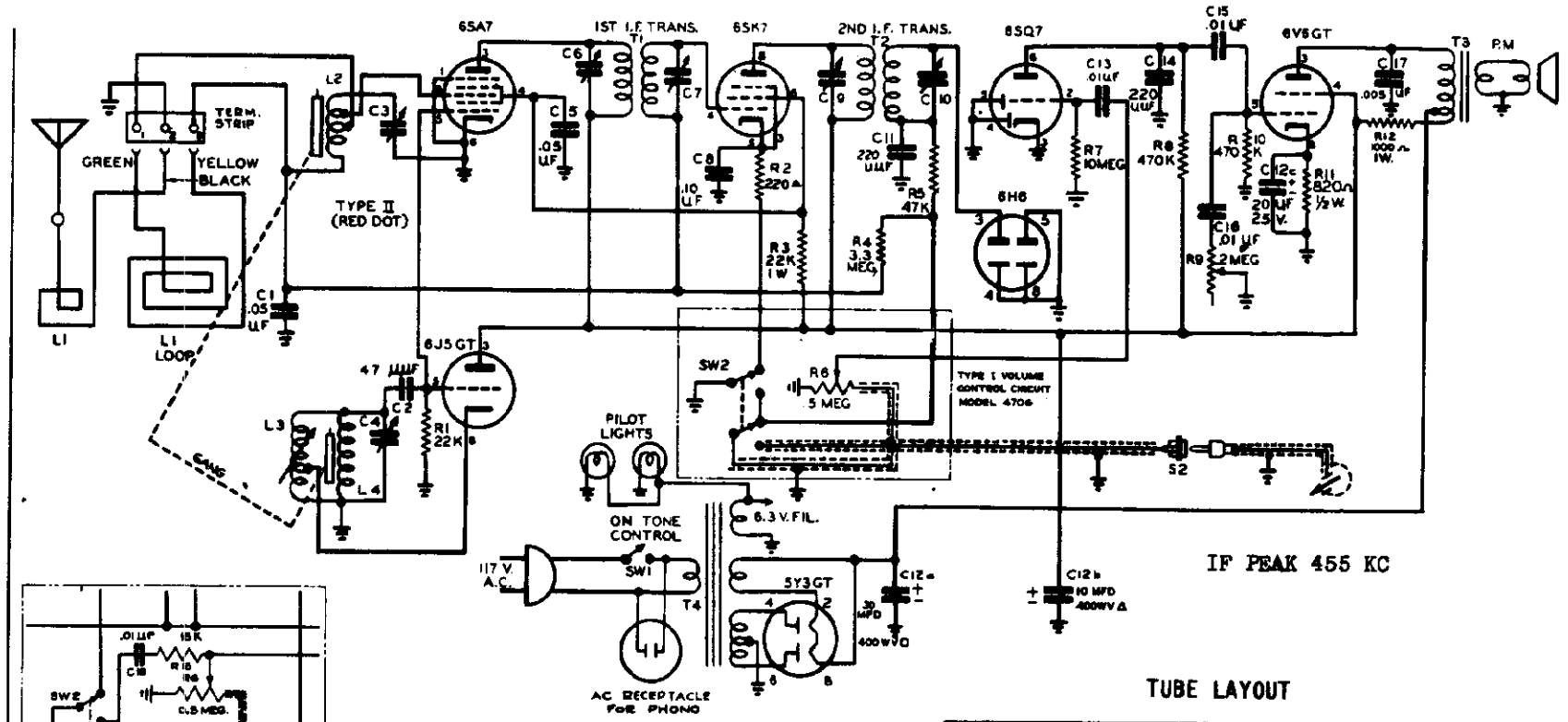
ALIGNMENT

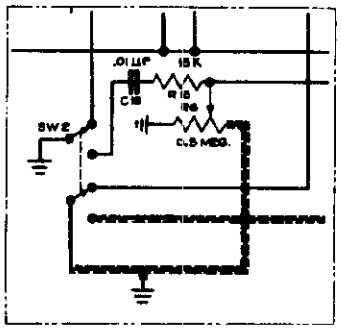
BEFORE ALIGNING, SET THE DIAL POINTER AS FOLLOWS: OPEN THE TUNING GANG CONDENSER (PLATES FULLY OPEN) SET DIAL POINTER SO THAT IT IS IN LINE WITH THE LAST MARK AT THE HIGH FREQUENCY END OF THE DIAL SCALE

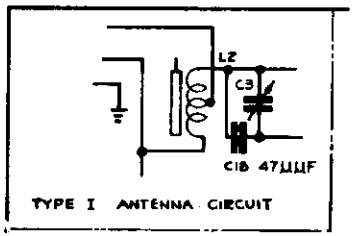
WHILE ALIGNING THIS RECEIVER, TURN THE VOLUME CONTROL FULL ON, AND KEEP THE SIGNAL GENERATOR OUTPUT AS LOW AS POSSIBLE TO PREVENT AVC ACTION AND FALSE READINGS

STEP	DUMMY ANT.	TEST OSC. CONNECTION	TEST OSC. FREQUENCY	RECEIVER DIAL	ADJUST	REMARKS
1	.01 MFD	12SA7 GRID (PIN NO 5)	455 KC. MODULATED	ANY QUIET SPOT	C13,C12,C9,C8 FOR MAX. OUTPUT	REPEAT IN REVERSE ORDER
2	.....	LOOP*	1500 KC MODULATED	150	C5 FOR MAXIMUM OUTPUT	
3	.....	LOOP*	1500 KC MODULATED	150	C2 FOR MAXIMUM OUTPUT	ROCK GANG WHILE ADJUSTING
4	REPEAT COMPLETE ALIGNMENT PROCEDURE CAREFULLY					

* MAKE A TWO OR THREE TURN LOOP ABOUT 12 INCHES IN DIAMETER CONNECT TO OUTPUT TERMINALS OF THE SIGNAL GENERATOR PLACE THIS LOOP IN A PLANE PARALLEL TO THE RECEIVER LOOP ANTENNA AND ABOUT A FOOT AWAY FROM THE RECEIVER LOOP IMPORTANT: WHEN MAKING RF ADJUSTMENTS, THE RECEIVER LOOP ANTENNA SHOULD BE SPACED FROM THE CHASSIS EXACTLY AS WHEN THE RECEIVER IS IN THE CABINET

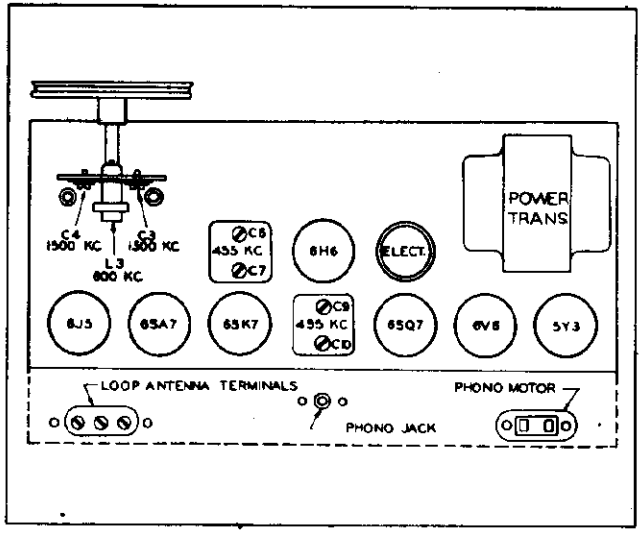






NOTE: Tuners using type II antenna circuit are identified by a dot of red paint on the mounting plate adjacent to the 600 kc padding coil.

TUBE LAYOUT



ITEM	DESCRIPTION	PART NO.
C1	.05 mfd, + 40% - 10%, 200 volt, paper	5-40
C2	47 mmfd. 20% 500 volts, ceramic	6-159
C3, C4	Trimmers, part of tuning unit	
C5	.05 mfd, 30% 600 v. paper	5-77
C6, C7	Trimmers, part of T1	
C8	.1 mfd + 40% - 10% 200 volts, paper	5-39
C9, C10	Trimmers, part of T2	
C11, C14	220 mmfd. 20% 500 volts, mica	6-151
C12a,b,c	30-10-20 mfd., 400-400-25 volts, electrolytic	19-26
C13	.01 mfd, + 20% - 10% 200 volts, paper	6-112
C15, C16	.01 mfd, + 30% - 10% 400 volts, paper	6-132
C17	.005 mfd 20% 600 volts, paper	5-61
C18	47 mmfd 20% 500 volts ceramic	6-159
C19	.01 mfd., + 40% - 10% 200 v., paper	5-57
R1	22,000 ohms, 20%, 1/3 watt	9-184
R2	220 ohms, 20%, 1/3 watt	9-208
R3	22,000 ohms, 10%, 1 watt	9-320
R4	3.3 megohms, 20%, 1/3 watt	9-206
R5	47,000 ohms, 20%, 1/3 watt	9-201
R6	Volume control, .5 megohms	13-19
R7	10 megohms, 20%, 1/3 watt	9-160
R8	470,000 ohms, 20%, 1/2 watt	9-211
R9	Tone control, 2 megohm, (with switch)	14-6
R10	470,000 ohms, 20%, 1/3 watt	9-207
R11	820 ohms, 10%, 1/2 watt	02-85
R12	1,000 ohms, 20%, 1 watt	9-169
R13	18,000 ohms, 20%, 1/4 watt	9-269
T1	1st I.F. transformer, inc. C6 & C7	3-159
T2	2nd I.F. transformer, inc. C9 & C10	3-160
T3	Output transformer (chassis 4706)	12-27
	Output transformer (chassis 4707)	12-26
T4	Power transformer	2-16
	Tuner assembly	32-1
	Speaker, Model 7C432	22-20
	Speaker, Model 7C447	22-26
	Loop antenna assembly, Model 7C432	20-23
	Loop antenna assembly, Model 7C447	20-24
SW2	Phono-radio switch	11-52
	Phono motor receptacle	15-98
	Pilot light, Mazda #47	26-2
	Knobs	128-50
	Escutcheon, Model 7C447	122-30
	Dial scale, Model 7C432	117-56
	Dial scale, Model 7C447	117-59
	Dial pointer	135-8
	Dial cord spring	129-29
	Dial cord assembly	S-1297
	Cabinet, Model 7C432	115-7
	Cabinet, Model 7C447	115-14

Model 7C447 - REMOVING CHASSIS FROM CABINET:

Always slide the chassis out through the BACK of the cabinet, NEVER through the bottom. On some cabinets there is a reinforcing block in the rear, lower left corner. Remove this block by removing the two wood screws before removing chassis.

CRITICAL LEAD DRESS:

1. Green lead from r.f. coil on tuner to pin 8 of the 6SA7 socket should be dressed well over toward the 6J5 socket, around the ceramic condenser C2.
2. Plate leads (BLUE) of both I.F. transformers should be laid down against the chassis.
3. Grid leads (GREEN) of both I.F. transformers should be dressed up away from the chassis as far as possible.
4. The .01 mfd. 400 v. condenser (C13) from the volume control to the 6SQ7 grid should be dressed as far over as possible toward the electrolytic condenser.
5. The .005 mfd. 600 v. condenser (C17) from the 6V6 plate to ground should be dressed as far away from C13 as possible.

Before aligning, close the tuner (slugs fully into the coils). Set the pointer to extreme left-hand mark on the dial.

When making r.f. adjustments, connect to the output of the signal generator a loop, about 12 inches in diameter, consisting of two or three turns of wire. Place this loop in a plane parallel to that of the receiver loop antenna and about a foot away from it. The receiver loop antenna should be in about the same position relative to the chassis as it is when installed in the cabinet.

While aligning, keep the volume control full on and the signal generator output no higher than is necessary to obtain an output indication.

USE ONLY ALL PLASTIC OR FIBRE SCREWDRIVER ON THE 600 KC PADDING COIL. INSERTION OF THE SLIGHTEST BIT OF METAL INTO THIS COIL WILL DETUNE THE CIRCUIT.

STEP	DUMMY ANTENNA	TEST OSCILLATOR CONNECTION	TEST OSCILLATOR FREQUENCY	RECEIVER DIAL	ADJUST FOR MAXIMUM	NOTES
1	.01 MFD.	6SA7 GRID	455 KC	ANY QUIET SPOT	C10, C9 C7, C6	REPEAT IN REVERSE ORDER
2	LOOP	-----	1500 KC.	150	C3, C4	
3	LOOP	-----	600 KC	60	L3	ROCK TUNER WHILE ADJUSTING
4	LOOP	-----	1500 KC.	150	C4	DO NOT READJUST C3
5	REPEAT STEPS 3 & 4					

VOLTAGE TABLE

TUBE	PLATE	SCREEN	CATHODE
6SA7 (CONV.)	244	74	--
6J5 (OSC.)	244	--	--
6SK7 (I.F.)	244	74	1.6
6SQ7 (A.F.)	75		
6V6 (OUT)	268	243	11

NOTE: All voltages measured to ground with 1,000 Ohm per volt meter; line 117 v.a.c. values may vary 10 per cent.

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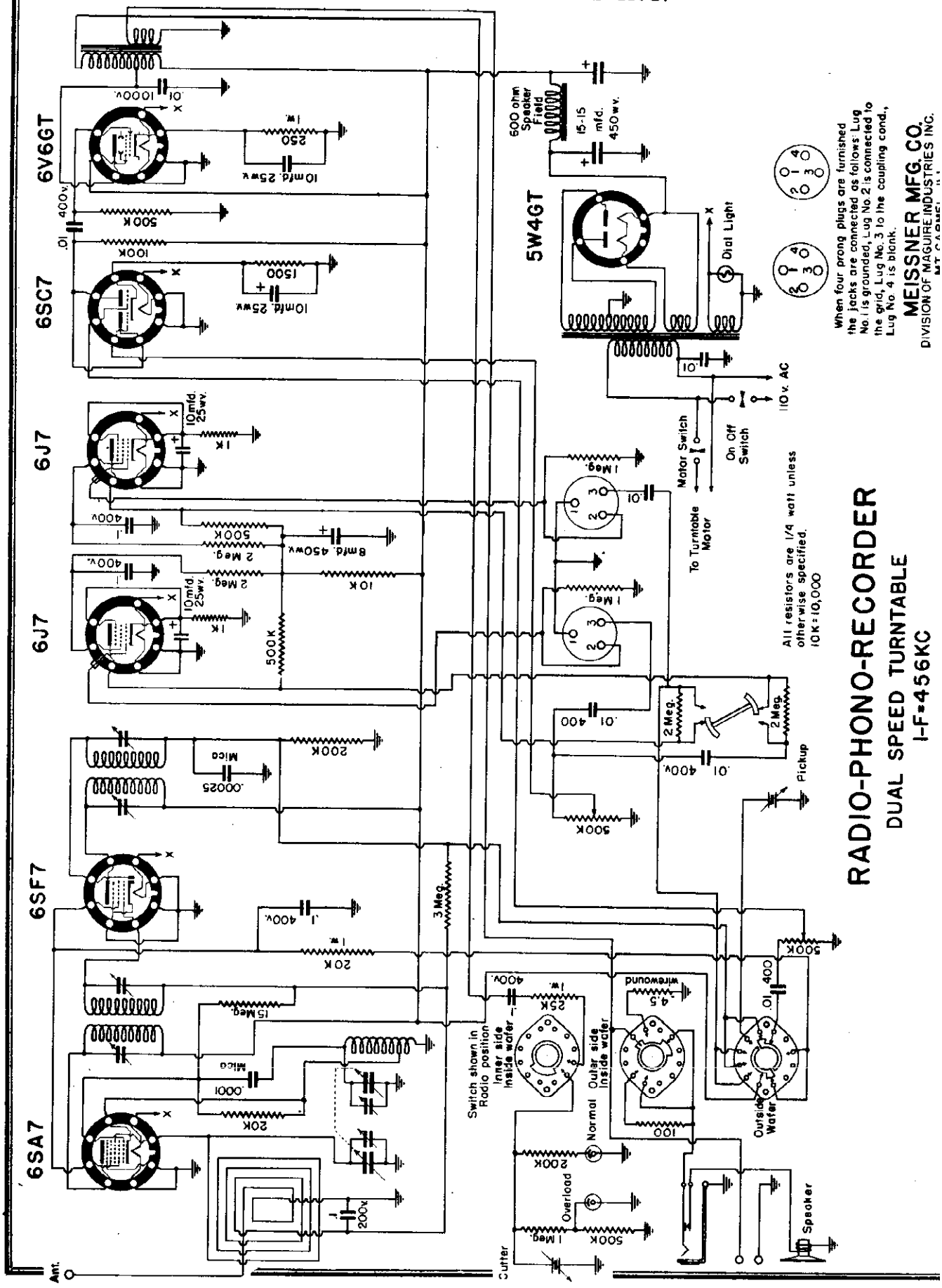


POWER SUPPLY .....110-125 volts 50-60 cycles A.C.

OPERATING VOLTAGES

Below is given the voltage measured from the tube pins shown—to chassis, using a 1000 ohm per volt meter, line volts 117. It should be remembered that variations of as much as several percent from the voltages shown in the chart, do not necessarily indicate trouble, since variation in line voltage, variation of resistors within the allowable tolerance, etc. all effect the operating voltages.

POWER CONSUMPTION .....110 Watts including motor

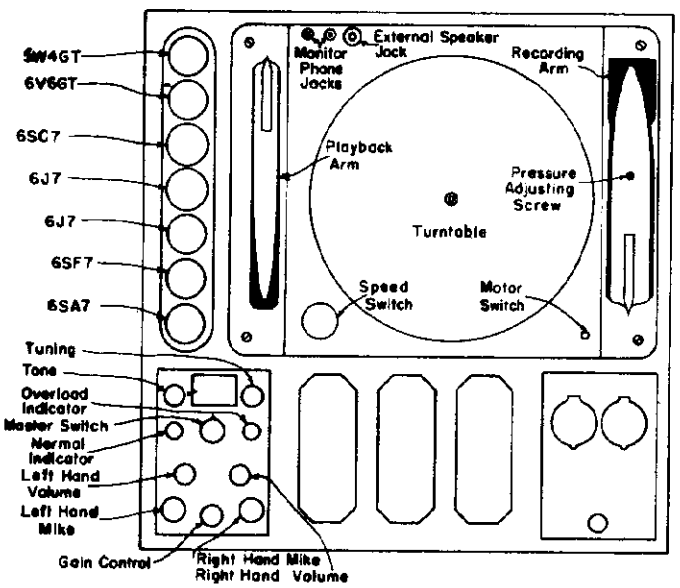
INTERMEDIATE FREQUENCY .....456 KC

ALIGN .....1400 KC

PAD .....No adjustment necessary

NEON VOLUME INDICATORS .....GE T-2

DIAL LIGHT .....Any 6-8 Volt type—Bayonet Base



VOLTAGE CHART

Tubes	*1 Pin	*2 Pin	*3 Pin	*4 Pin	*5 Pin	*6 Pin	*7 Pin	*8 Pin
6SA7	—	—	260	80	—	—	6.3AC	—
6SF7	—	—	—	80	—	260	6.3AC	—
6J7	—	—	60 *	— ‡	.4	250	6.3AC	.4
6J7	—	—	60 *	— ‡	.4	250	6.3AC	.4
6SC7	—	125	—	—	125	1.7	6.3AC	—
6V6GT	—	—	230	260	—	—	6.3AC	12.5
5W4GT	—	310	—	320AC	—	320AC	—	310

Note: Line voltage = 117 volts * Measured on 1000 volt range. ‡ Very low reading on 1000 volt range. Switch to be in RADIO position for all readings

02076	Antenna coil (Loop)
01710	Oscillator coil
02072	Input I-F transformer
02074	Output I-F transformer
19851	Output transformer
19847	Power transformer
19843	D. P. S. T. wafer switch
19842	5 Position switch
19696	Motor switch
19828	Tone control with switch
19827	Volume control
18162	2-gang Variable cond.
16124	15-15 mfd. 450 wv. Electrolytic
24126	10-10 mfd. 25 wv. Electrolytic
16113	8 mfd. 450 wv. Electrolytic
15143	.1 mfd. 400 v. paper condenser
15142	.1 mfd. 200 v. paper condenser
14181	.05 mfd. 400 v. paper condenser
16136	.01 mfd. 1000 v. paper condenser
14110	.01 mfd. 400 v. paper condenser
18107	.01 mfd. line condenser
14102	.00025 mfd. mica condenser
16198	4.5 ohm candohm resistor
15152	100 ohm ¼ w. resistor
14191	1,000 ohm. ¼ w. resistor
14194	1,500 ohm ¼ w. resistor
14143	10,000 ohm ¼ w. resistor
14169	20,000 ohm ¼ w. resistor
14190	20,000 ohm 1 w. resistor
14144	100,000 ohm ¼ w. resistor
14170	200,000 ohm ½ w. resistor
14155	500,000 ohm ¼ w. resistor
18152	1 megohm ¼ w. resistor
24127	2 megohm ¼ w. resistor
17146	3 megohm ¼ w. resistor
18166	15 megohm ¼ w. resistor
19846	Dial Scale
19628	Neon Indicators
19695	Speaker
19821	Motor turntable
19470	Jack
19468	Pin Jack
19855	Microphone
19856	Microphone Plug

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OPERATION

The following chart is designed to give the user of the Meissner Radio-Recorder a quick insight of the functions of the various controls. For best results the notes and instructions following the chart should be read and followed, since the chart alone cannot contain all the information essential to the proper use of the equipment.

In the top row of the chart are listed the five functions of the unit, corresponding to the five positions of the selector switch in the center of the control panel. In the left hand column are listed the different controls and other devices on the control panel. By glancing down any vertical column it can be immediately determined what controls and indicators are in use for that position of the selector switch.

In operating the Meissner Radio-Recorder as a radio receiver, a record player, a recorder, or a public address system, there are certain precautions that must be observed and also several special hook-ups that may be used to get the best results and to take advantage of the full flexibility of which the unit is capable. These are listed under sub-headings following, and should be studied carefully before attempting to operate the equipment, and should also be referred to often until the user is fully acquainted with his equipment and all functions it will perform.

Position of Selector Switch	Radio Only	Phono Playback	Record Mike	Record Radio	Public Address
Tuning	Radio Tuning	———	———	Radio Tuning	———
Tone	——— Tone Control & Line Switch ———				
Normal and Overload	———	———	Volume Level Indicators	Volume Level Indicators	———
Volume (Left Hand)	——— Volume Control for Left Hand Mike ———				
Volume (Right Hand)	Radio Volume Contol	Phono Volume Control	Volume Control for Right Hand Mike	Radio Volume Control	Volume Control for Right Hand Mike
Mike (Left Hand)	Input for Mike, External Radio, or External Phono ———				
Mike (Right Hand)	———	———	Input for Mike Ext. Phono Ext. Radio	———	Input for Mike Ext. Phono Ext. Radio
Gain	—Gain Control for using different types of Microphones ———				

POWER SUPPLY

This Radio-Recorder is designed to operate from a 110-125 volt 50-60 cycle alternating current supply. Never attempt to operate it from other source of supply—serious damage to the equipment is almost sure to occur.

LINE SWITCH

The line switch for the unit is located on the tone control. The switch for the turntable is located in the front, right hand corner of the turnable base. The turntable will not operate unless both the master switch on the tone control and the motor switch are turned on.

ADJUSTMENT

CUTTER ARM HEIGHT

The cutter arm height is adjusted at the factory for a standard ⅝" stylus. If recoring blanks of the usual home recording type are used, the cutter arm height should not have to be changed. If recording blanks of unusual thickness are used, it will be necessary to re-adjust the cutter arm height. For instructions for performing this adjustment, refer to the section of this instruction sheet entitled SERVICE NOTES.

CUTTER ARM PRESSURE

Variation in the hardness of different record coatings may require different cutting pressures for different makes of records.

The normal depth of cut produces a width of groove approximately equal to the width of the uncut portion left between grooves. When changing kinds or make of records examine a portion of the new record after having made a trial cutting to see if it approaches this condition. If not, refer to the SERVICE NOTES of this sheet and make the proper adjustment according to the instructions given there.

REPRODUCING NEEDLES

In choosing the correct reproducing needles to use, it should be kept in mind that while most any good make of reproducing needle is satisfactory for reproducing commercial records, the same is not true with home recordings. The material used to make instantaneous recording blanks is necessarily softer than the material used in commercial records and is more easily damaged by a reproducing needle which is not properly made to fit the groove in the record. There are a number of good needles on the market made especially for reproducing instantaneous recordings and one of these should be chosen.

RECORDING SPEED

Two recording speeds are provided on the Meissner Radio-Recorder, 78 RPM and 33⅓ RPM. In general it may be said that the 78 RPM speed is for quality, the 33⅓ RPM speed for economy.

The 33⅓ RPM speed is not recommended where the best fidelity is desired. It will be found that at the center of the record, made at this speed, music loses its brilliance and does not have the high frequency notes recorded faithfully. The same is true of speech recordings but to a much lesser degree, since the high frequencies contained in voice are negligible. Thus when recording long speeches the 33⅓ RPM speed offers the advantage of being able to record for longer time intervals without interruptions to change records, as well as the advantage of record economy. For instance, a 10 inch record when operated at 78 RPM will record 4½ minutes of program material, while at 33⅓ RPM it will record 10 minutes of program material.

In other cases where the best fidelity is not essential, it may be found that the economy of the lower recording speed is more desirable than the better quality of the higher speed.

The switch that controls the turntable speed is located on the front left-hand corner of the turntable base.

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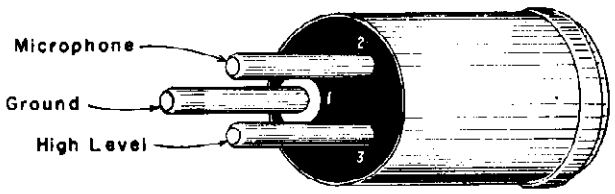
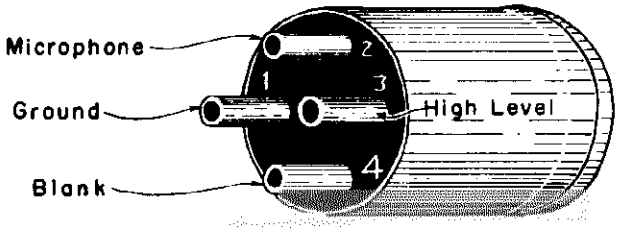
INPUT OTHER THAN MICROPHONES

In many cases it may be desirable to introduce external input to the amplifier other than that from the microphone. For either recording or Public Address work it may be desirable to feed in the output of (a) an external radio (b) FM Tuner (c) external phono pickup or other electronic devices. Such sources are considered high level inputs and the gain switch should be set accordingly.

Any high level input may be introduced into either of the mike jacks through a plug like the extra plug supplied with the unit and should be connected as shown below.



Some trouble may be experienced in the making of instrumental recordings. There may be heard what appears to be distortion but due to the fact that the ordinary room does not have the accoustical properties of a recording studio there will be room reverberation. The ear does not notice this at the time but the microphone will. Frequently this trouble is corrected by the use of c o n t a c t microphones. Placed directly on the sounding boards of the instrument, (Piano, Violin etc.), it gives a true reproduction of the tones and overtones produced by the instrument.



CUTTING ARM ADJUSTMENTS

CUTTING ARM HEIGHT

1. Place on the turntable an uncut record of the type that is to be used for recording.

2. Place stylus in the cutting head. Insert it as far as it will go, rotate it until the long flat on the shank of the stylus faces the stylus screw, then firmly tighten the screw.

3. Raise the cutter arm well up from its rest, swing it over the record and carefully lower it so that the stylus rests on the record near the center (which should not be revolving). Observe the position of the stylus screw in the slot in the cutter arm. If the screw is approximately in the middle of the slot no adjustment of the cutter arm height is required, but if the stylus screw is close to either the top or the bottom of the slot the arm should be adjusted in the following manner:

(a) Lift the cutter arm into a vertical position. Underneath the arm will be found a machine screw on which the arm rests. The adjustment of this screw is preserved by a lock nut. Loosen the lock nut and rotate this screw until the stylus screw occupies the center position in the slot when the cutter arm is in the recording position, then tighten the lock nut and again check the position of the stylus screw to see that the adjustment has not been disturbed by tightening the lock nut.

(b) Cut a few blank grooves (volume control at zero) while watching the stylus screw to see that as the record revolves, the stylus screw does not approach either end of the slot. If this condition holds true, the height of the cutter arm is properly adjusted until a new stylus is used having a length a great deal different than the stylus used in the original adjustment, or unless records of a new thickness are used that are sufficiently different from the original records to require readjustment of cutter arm height. NEVER ATTEMPT TO MAKE A RECORDING WITH MORE THAN ONE DISC ON THE TURNTABLE.

If the normal position of the screw is too high, the entire weight of the cutting arm is placed on the stylus when the stylus screw hits the top of the slot. This heavy weight will cause the stylus to dig into the record base and ruin at least the record and in all probability the stylus as well.

CUTTING PRESSURE

Variation in the hardness of different record coatings may require different cutting pressures for different makes of records.

The normal depth of cut produces a width of groove approximately equal to the w i d t h of the uncut portion left standing between grooves. Examine the blank grooves cut during the preliminary adjustment to see whether they approach this condition. If not, the adjusting screw exposed through the top of the cutting arm can be changed quite easily to accomplish the desired result. If the cut is too light, the playback needle may not "track" and may jump out of the groove and scratch across the record. If the cut is too heavy the stylus m a y c u t over into the adjacent groove on loud notes, or in cutting one groove, the stylus may push some of the wall material into the previously cut groove producing what is called an "echo", although when played back the "echo" precedes rather than follows the normally recorded sound.

The most common error in adjusting cutting pressure is making the cutting pressure greater than necessary, which increases the wear on the stylus, increases echo, and increases the difference in speed between recording and playback.

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MAKING A RECORD

The first attempt at cutting a record may best be done by recording from the microphone. After having plugged the microphone into the left-hand mike jack, turn on the line switch and set the selector switch to "Record Mike", speak into the microphone in a normal tone of voice about four to six inches away from it and adjust the left hand volume control until the "normal" neon indicator is flashing most of the time but the "overload" neon indicator flashes only occasionally. Touch a finger lightly to the needle in the cutting head and you will feel the needle vibrate in accordance with the sound impressed on the microphone.

In placing the recording disc on the turntable make certain that the drive pin enters the hole provided for it in all recording discs. NEVER PUT ON OR REMOVE A DISC WHILE TURNTABLE IS ROTATING. To do otherwise will injure the drive mechanism. ALWAYS HAVE TURNTABLE IN MOTION BEFORE LOWERING CUTTING STYLUS DOWN ON DISC as the stylus may easily be damaged if this care is not taken.

Pick up the cutting head, swing it over the record and lower it gently onto the record at the desired starting point. Permit two or three grooves to be cut before beginning the recording so that when the record is played back it will not be essential that the pickup start at the beginning of the first groove in order to reproduce the beginning of the recording. During the entire recording very careful attention should be paid to the volume indicators as explained in the section "Volume Indicators." Note: The mechanism which traverses the cutting head is engaged when the cutting head is lowered onto the record. Never attempt to force the cutting head sideways. Lift it first, which will disengage the cross-feed mechanism and allow the arm to be swung freely into any desired position. Lowering the arm onto its rest does not engage the cross-feed because the mechanism does not operate at such a great radius. For the same reason, the recorder will not cut 12 inch discs.

When the recording is finished, the "thread" that the stylus has cut out of the disc must be removed before the record is played. The best device for this purpose is a camels hair brush with which the thread is "picked up" rather than merely brushed to the center for manual removal, but if no brush is available, a wad of cotton, a piece of soft cloth or even a finger drawn lightly over the disc may be used to gather the thread around the spindle where it can be easily removed. The "thread" should be deposited in some fireproof container since many of the "Instantaneous Recording" discs are coated with highly inflamable cellulose nitrate (celluloid) although there are others coated with cellulose acetate (safety film) which do not require such precautions. It is very wise operating procedure to assume that all "threads" are inflammable and to dispose of them accordingly.

EXTERNAL ANTENNA

A built in loop antenna is supplied with the unit. This antenna should give excellent results in localities reasonably near the stations to be received. However, in some localities the performance of loop antennas is not entirely satsifactory and for this reason provision has been made for connecting an external antenna.

A lead will be found in the microphone compartment to which an external antenna may be connected. No ground connection is ecessary.

PUBLIC ADDRESS SYSTEM

The amplifier in the unit has ample power for many applications as a public address amplifier. When coverage of an area greater than that of a medium sized room in a home is desired, it is best to use an external speaker connected as explained under EXTERNAL SPEAKERS. Such a speaker should be mounted in a baffle or carrying case and a little experiment in its placement will soon show how best results may be obtained.

When using the unit as a public address system, it will be found that if the speaker is operated near the microphone the sound from the speaker will feed back into the microphone causing a "howl". This is true in any PA system and may be remedied by (a) removing the loud speaker farther from the microphone (b) reducing the volume (c) using a directional microphone turned so that its direction of greatest pickup is away from the loud speaker.

EXTERNAL SPEAKER

If it is desired to use an external speaker instead of the one in the unit, provision is made for doing so. The voice coil of an external speaker may be plugged into the phone plug jack located on the back side of the turntable base. The voice coil impedence of the external speaker should be 6 to 8 ohms. This cuts out the internal speaker voice coil and substitutes the voice coil of the external speaker. An external speaker so used must either be of the permanent magnet type or of the electrodynamic type with self-contained field supply.

The advantages of such an arrangement are that for use as a public address system, the speaker may be placed in a remote position away from the amplifier to get better sound coverage in a room or building, at the same time, reducing the tendency for microphonic feed back from the speaker to the microphone when high output is desired.

MIXING

The input from the left hand mike jack may be superimposd on any other input to the system at any time by merely turning up the left hand volume control. The input from this jack may be fed in any time regardless of the setting of the selector switch. Before attempting to make a recording by mixing in the input from this channel, it will be well to do a little experimenting with the setting of the two volume controls to assure that the signals from the two input channels have the correct relative levels when they reach the cutting head. This may be done by adjusting each volume control while the other is turned to zero, adjusting to the correct level by observing the neon indicators and noting the setting of the volume control knob. After the correct setting for each has been determined in this way, set each volume control knob to its correct position and make the recording.

MICROPHONES

Microphones in general, as far as sensitivity is concerned, may be divided into two classes: (a) High level and (b) Low level. Ordinarily quality microphones will be found to fall in the low level classification. The crystal microphone supplied with this unit is this high quality low level type. The single button carbon type with transformer and battery and the contact microphones are high level microphones. Other high level sources will be discussed under the head, input other than microphone.

A gain switch has been provided to allow the use of high or normal input to the amplifier. When recording with a low level input the gain switch should be set on the High Gain position and when using a high level input, it should be set on the normal gain position.

RE-RECORDING

Many novel effects may be obtained by Re-Recording, that is after a record is cut it may be placed on an external record player, the output of whose pickup head is fed into the right hand mike jack of the recorder. This should be fed in by a specially wired plug as shown above. As the record is being played on the record player and re-recorded on the Recorder, input from the Recorder microphone may be superimposed on it by turning up the left hand volume control. As an example of the novel effects obtainable, a person might record a song, re-record it, mixing in his own voice while re-recording, thus sing a duet with himself.

MODEL 9-1065

MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.

RECORDING STYLI

Recording styli are made of three general types of material, ordinary hard steel, special tool steel and alloy such as Stellite or equivalent, or they may be made of the still harder material, sapphire. When samples of all three types of styli are in good condition, it can usually be demonstrated that the steel styli, either regular steel or tool steel, produce about equal surface noise, while the sapphire stylus will usually produce less.

The advantage of the special alloy steel stylus over the regular steel stylus is longer playing life, but this is accomplished at a sacrifice in ability to withstand abuse. The same thing applies to sapphire styli only to a much greater extent because the sapphire is quite brittle and can easily be chipped.

The two accidents most likely to damage a stylus are:

(1) Dropping the cutting arm so that the stylus strikes some surface thereby chipping or breaking the stylus.

(2) Cutting through the record coating into the base material.

The latter may be caused by poor quality or damaged records, either by cutting through thin spots that may exist, or by digging in after the stylus has been thrown off of the record surface by bumps or hard spots.

From the foregoing, it seems that in general home recording service, especially if the equipment may be handled by many people, as at parties, amateur dramatics, amateur concerts etc., it is more economical to use good quality regular steel styli that can be discarded without regret if accidentally damaged, rather than to invest in a supposedly long-lived high priced stylus, whose life may be greatly shortened by the careless act of some well meaning but uninformed person.

RECORD BLANKS

The Meissner Radio-Recorder is designed to cut records up to 10 inches in diameter and to play records up to 12 inches in diameter.

"Instantaneous Recording" phonograph discs are comparatively new and consequently their manufacturer is far from being standardized. The only rule for selection is that of experience, either personal or that of your dealer. The record that performs best for you on your recorder is the best for you to use. Concentrate on that particular brand if you wish to produce consistently good recordings.

The most important characteristics of a record are listed below to be used as a guide in comparing and selecting records:

1. The blank should cut a clean shiny groove and produce a continuous thread. Records which produce a rough and dull looking groove, or which powder the material cut out of the groove, or which break the thread up into many pieces, or that produce a "sticky" thread, are not good records.

2. The "needle scratch" should be low. Generally the record producing the smoothest looking grooves will give the lowest needle scratch, but a more reliable method of testing is to cut a few blank grooves at the same radius with the same stylus on each of the records to be compared, and then to play them successively with the same setting of the volume control for all records, selecting the one producing the least volume of scratch, provided that its other characteristics are acceptable.

3. "Rumbel" is produced on some records having very flexible base materials. This is especially true of paper records. It is almost axiomatic that if a high quality recording is desired a paper (or other very flexible) base record should not be used, however, because of the economy that such discs offer they probably will enjoy the maximum volume of sale.

4. The "ageing" characteristics of records is a factor influencing the production of consistently good recordings but is somewhat difficult for the home recordist to check unless he is on the lookout for such differences and is a keen observer. Some records cut beautifully at a certain age and less well both before and after that time. Others cut well only when relatively fresh, while still others will not cut well until they have aged some time. This ageing characteristic may explain why a certain make of record may give excellent results at one time and not at another.

5. High Frequency Response is a characteristic in which wide variation can be expected. The variation between some makes of records is so great that only the most casual listening test is required to distinguish the record with good high-frequency response from that with poor high-frequency response. Such a test should, of course, be made with the same stylus, the same type of program, and the same type of play-back needle. Preferably the test should be made with live program material having a reasonable percentage of high-frequency notes. If the program is obtained from the radio, the tuning should be adjusted to produce a reasonable percentage of high notes and should not be changed between the several test runs because the tuning of most sets has a considerable influence on the high-frequency response.

6. Groove depth should be uniform. If there is any great difference in cutting depth a definite "pattern" will be evident on the record and the variable load on the motor will tend to produce a "wow" or unsteadiness in tone.

VOLUME INDICATORS

ONE OF THE MOST IMPORTANT PHASES OF RECORDING IS CLOSE ATTENTION TO THE PROPER RECORDING VOLUME. THE BEST OPERATION IS OBTAINED WHEN THE "NORMAL" NEON INDICATOR IS LIT AS MUCH OF THE TIME AS POSSIBLE WHILE THE "OVERLOAD" NEON INDICATOR FLASHES ONLY AT RARE INTERVALS. A close control of program level is required to achieve such results but every bit of effort expended in the attempt will be well worth while.

If the volume is too high, it will cause distortion to be recorded on the disc. Once this distortion is recorded, no playback amplifier, however perfect it may be, can reproduce the program without distortion. Too much volume while recording will also cause overcutting, that is cutting into an adjoining groove, and may damage the cutting stylus itself.

If the recording level is too low, the surface noise is exaggerated and the playback has to be made with a high setting of the volume control. In the extreme case of very low recording volume, the volume control on playback may have to be set so high that a low frequency "microphonic howl" may be set up that can be eliminated only by turning down the volume control or by playing the record on an electric phonograph that has the speaker well isolated from the turntable and pickup.

When a musical program of a limited range of volume levels is being recorded, the volume control should be set so that the maximum volume operates the "overload" indicator only at very rare intervals. If the program has a very wide range of level, the volume will have to be turned up somewhat in the softest passages and reduced in the loudest passages. Such a practice is standard in professional recording and is the only way in which, for example, the tremendous volume range of a symphony orchestra from a single instrumental solo to full orchestra can be recorded without having the loud passages "cut over" into adjacent grooves, or having the softest passages covered up by needle scratch.

It will be helpful when recording to keep in mind that the volume indicators are giving a direct indication of the volume level being applied to the cutting head.

TONE CONTROL WHEN RECORDING

The setting of the tone control when recording is partly a matter of choice and preference of the operator but it might well be pointed out here that usually the most satisfactory recordings are made with the tone control turned to the counter-clockwise position. There are exceptions to this and the operator, after a little experience in handling the equipment will learn what setting of the tone control is required for any particular set of conditions.

MONITORING

There are several conditions under which it is desirable to be able to listen to the output of the amplifier when the speaker must of necessity be in-operative. The one such condition most commonly encountered is when recording from the self contained radio receiver, and is automatically taken care of in the switching. When the selector switch is turned to the "Record Radio" position, the speaker is put into the circuit but is operated at reduced volume. Thus the operator may hear the program material at the same time it is being recorded and can determine when the recordings should be stopped etc.

Other conditions under which it may be desirable to monitor the amplifier output are:

1. When recording from an external radio.

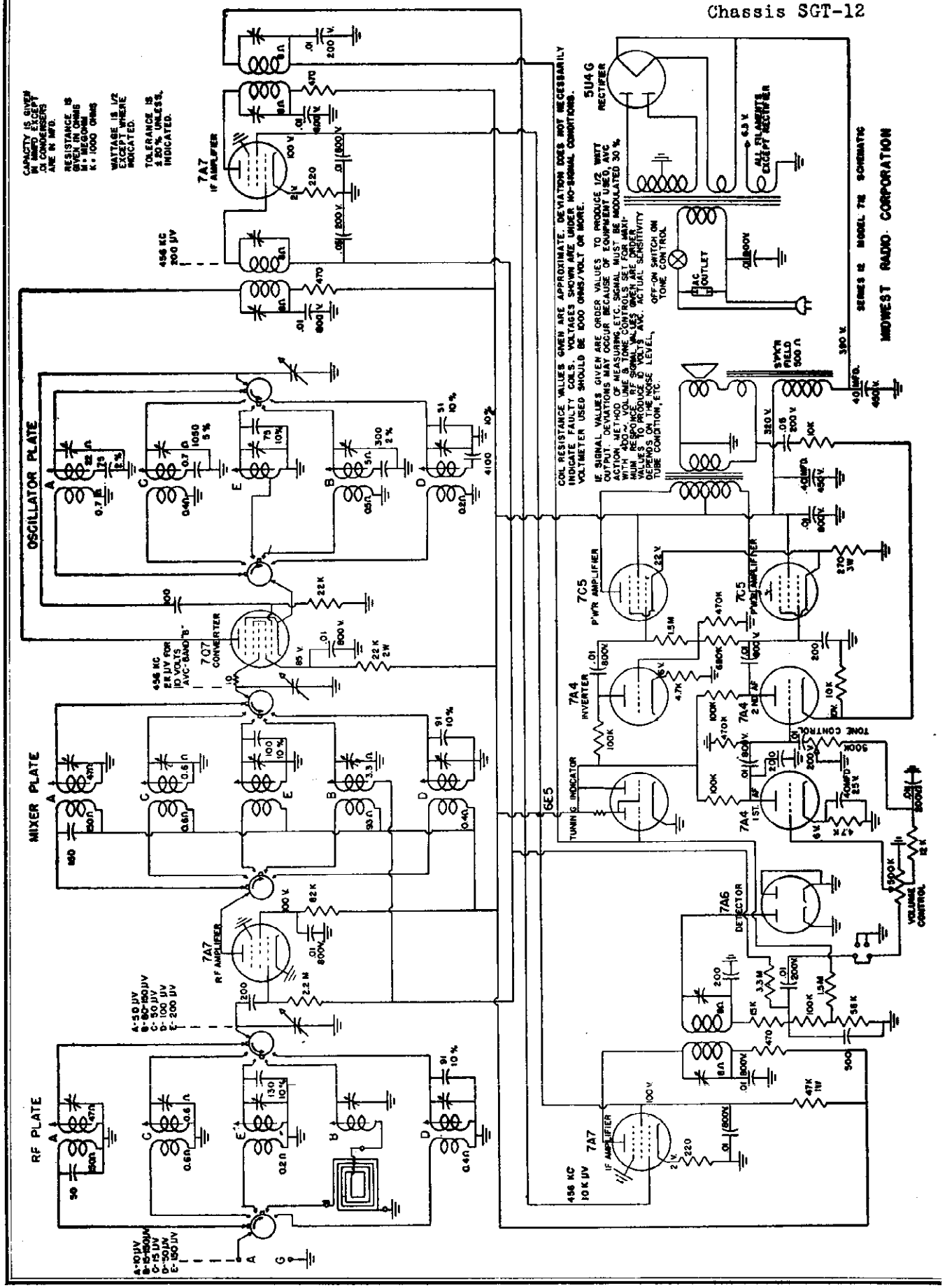
2. When recording from two mikes. The operator may desire to listen to the actual signal that is being applied to the cutting head to keep the levels from the two mikes equal.

3. When operating as a PA system using a remote speaker. If the remote speaker is located some distance away or in another room, the operator can use monitoring phones to adjust volume level etc.

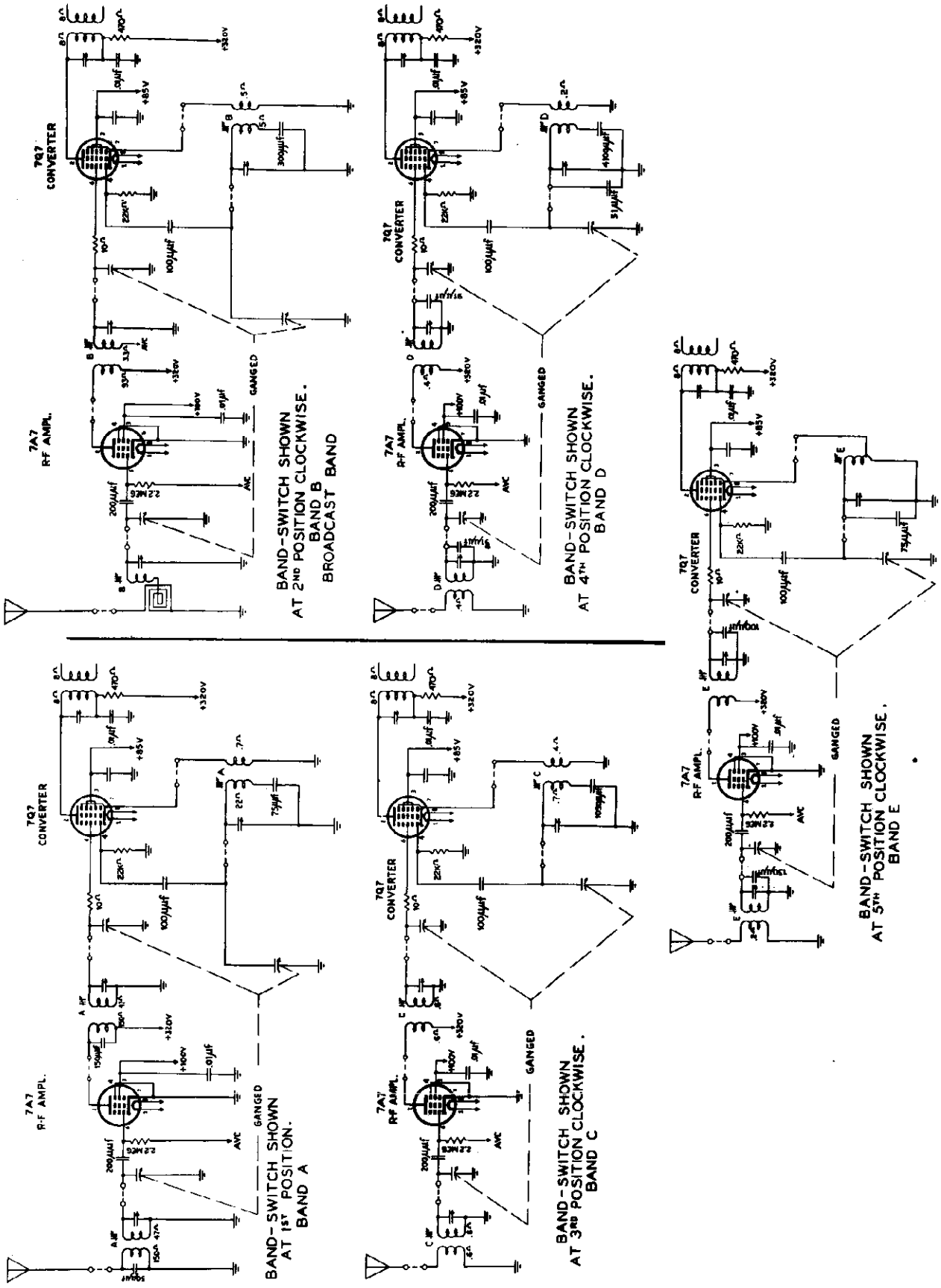
Provision is made for plugging in high-impedence headphones for monitoring. They should plug into the Phone tip jacks located on the left hand rear side of the turntable base. Only high impedence phones should be used.

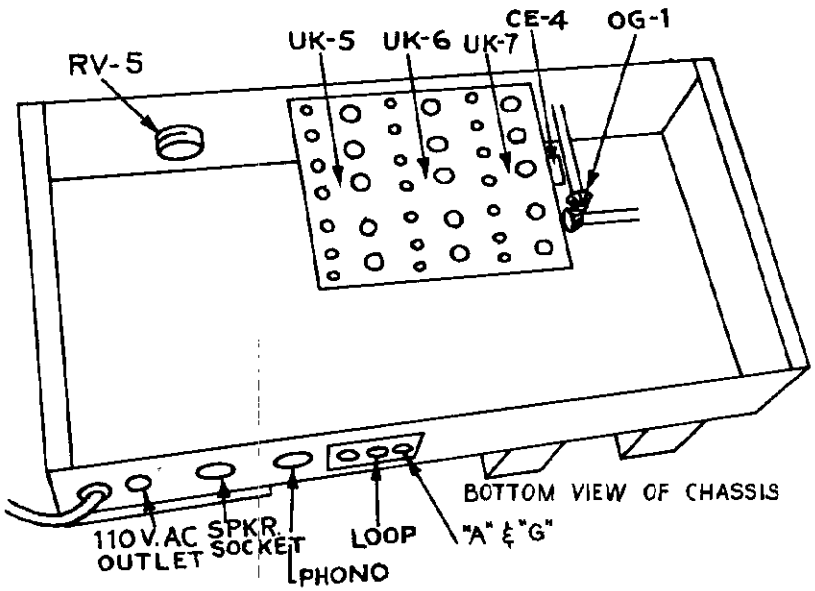
MIDWEST RADIO CORP.

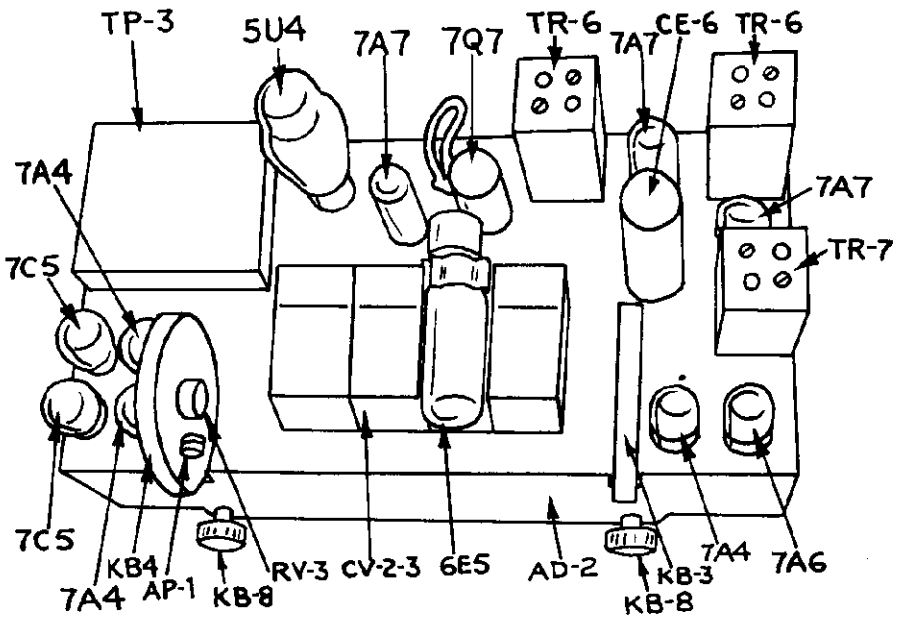
MODEL 712; Series 12;
S-12, ST-12, SG-12;
Chassis SGT-12



MIDWEST RADIO CORP.







TOP VIEW OF CHASSIS

ALIGNMENT CHART

Coupling	Signal	Band Switch	Dial	Adjustment
To converter grid thru .05 mfd capacitor	456 KC	B	1000 KC	Peak 1st, 2nd & 3rd IF trimmers.
To "A" on antenna-ground terminal strip through 200 mmfd. and 400 ohms in series.	400 KC	A	400 KC	Peak RF, converter and oscillator trimmers marked "A"
	150 KC	A	150 KC	Peak RF, converter and oscillator cores marked "A".
	1600 KC	B	1600 KC	Peak "B" trimmers. Loop must be plugged in.
	550 KC	B	550 KC	Peak "B" cores except RF. Loop must be plugged in.
	4.7 MC	C	4.7 MC	Peak "C" trimmers.
	1.6 MC	C	1.6 MC	Peak "C" cores.
	10 MC	D	10 MC	Peak "D" trimmers.
	5 MC	D	5 MC	Peak "D" cores.
	22 MC	E	22 MC	Peak "E" trimmers.
	11.5 MC	E	11.5 MC	Peak "E" cores.

ALIGNMENT — The schematic includes the various signal strengths necessary for standard output of 0.5 watt for I. F. measurement, except at the converter grid. The output indicator may be an audio frequency meter across the voice coil or a vacuum tube voltmeter at the avc. For 0.5 watt the voltage at the voice coil is 1.5 volts or 2.5 to 3.5 volts avc. if a 30% modulated signal is used.

I. F. alignment should be made with the band switch on B, pointer turned to 1000KC and signal coupled to the mixer grid through a .05 mfd. condenser. Trim the three I. F. transformers for maximum reading at avc.

R. F. alignment should be made with meter across avc. There is no inter-action between bands. The only precaution is that a dummy antenna be used between the generator and the antenna post on the receiver. This may be simply a 200 micro micro farad condenser in series with a 400 ohm resistor. The B band RF padder, 550 KC, is very broad and should not be adjusted. The loop must be plugged in when adjusting the B band RF trimmer, 1600 kc.

R. F. signal values given on the schematic will produce 10 volts of avc. This rather high level of signal is given to assure that the noise level will be overcome.

SERVICE — Series 12, Model 712, is a straight forward design, containing no trick circuits. Servicing of the coil plates or IF transformers should be avoided, except under special conditions, and rather than attempt to repair these assemblies a replacement should be ordered.

The Midwest Radio Corporation is anxious to help the service technician in every way; inquiries for special data will be promptly answered and your comments will be most welcome.

PARTS LIST

Part	Description
AD-2	Dial
AE-1	Escutcheon
AK-2	Coil plate cover
AP-1	Wood pulley
AP-6	Pointer
AS-1	Wood pulley mtg. stud
CE-6	Filter condenser 40-40
CE-4	Cathode by pass 40 mfd. 25v
*CV-2-3	Tuning gang
EG-2	Speaker grommet
ES-12	Tube shield
HE-1	Speaker mtg. eyelet
IL-1	Panel lamp 6-8 volts
KB-3	Tuning knob
KB-4	Volume control knob
KB-8	Tone or Band knob
KB-6	Push buttons, set of 7
OG-1	Miter gear, pair
OS-3	Dial string spring
PC-3	Loop plug
PC-4	Phonograph plug
RV-3	Volume control
RV-5	Tone control
*SP-2	Speaker, 14 inch
TP-3	Power transformer
TP-4	Universal power transformer
*TR-6	1st IF and 2nd IF Transformer
*TR-7	3rd IF transformer
*TR-6	1st IF and 2nd IF transformer
*TR-7	3rd I F transformer
*UK-5	R.F. Coil plate
*UK-6	Mixer coil plate
*UK-7	Oscillator coil plate

Note: Order resistors and condensers by value, tolerance and wattage or voltage.
Note: When ordering include serial number of chassis, since Midwest records of changes in parts specifications are kept by that number.

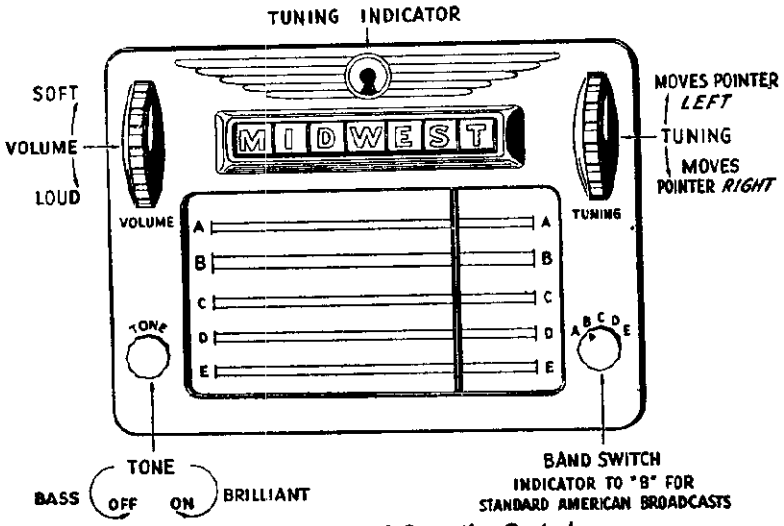


Figure 1. Series 12 Operating Controls

Note: Modulate the signal with 400 cycles 30%. The output indicator must be a VTUM on the avc. The I F sensitivity figures shown on the schematic are for ½ watt output except at converter grid; the voltage of the voice coil is 1.5 and the avc. voltage is between 2.5 and 3.5 for ½ watt output. The R F and IF alignment should be done with an avc. indicator only. The schematic shows R F signal values to produce 10 volts avc.

MODELS 712,716,716A

DIAL STRINGING — Use a light weight flexible dial cord when replacing worn or broken cord such as Beven-Wilcox FSN-25-12.

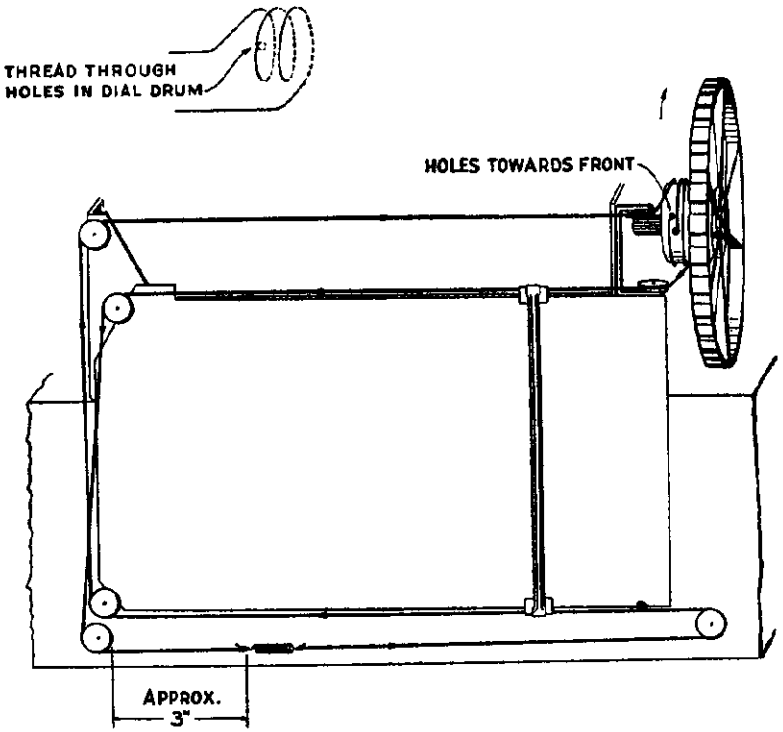
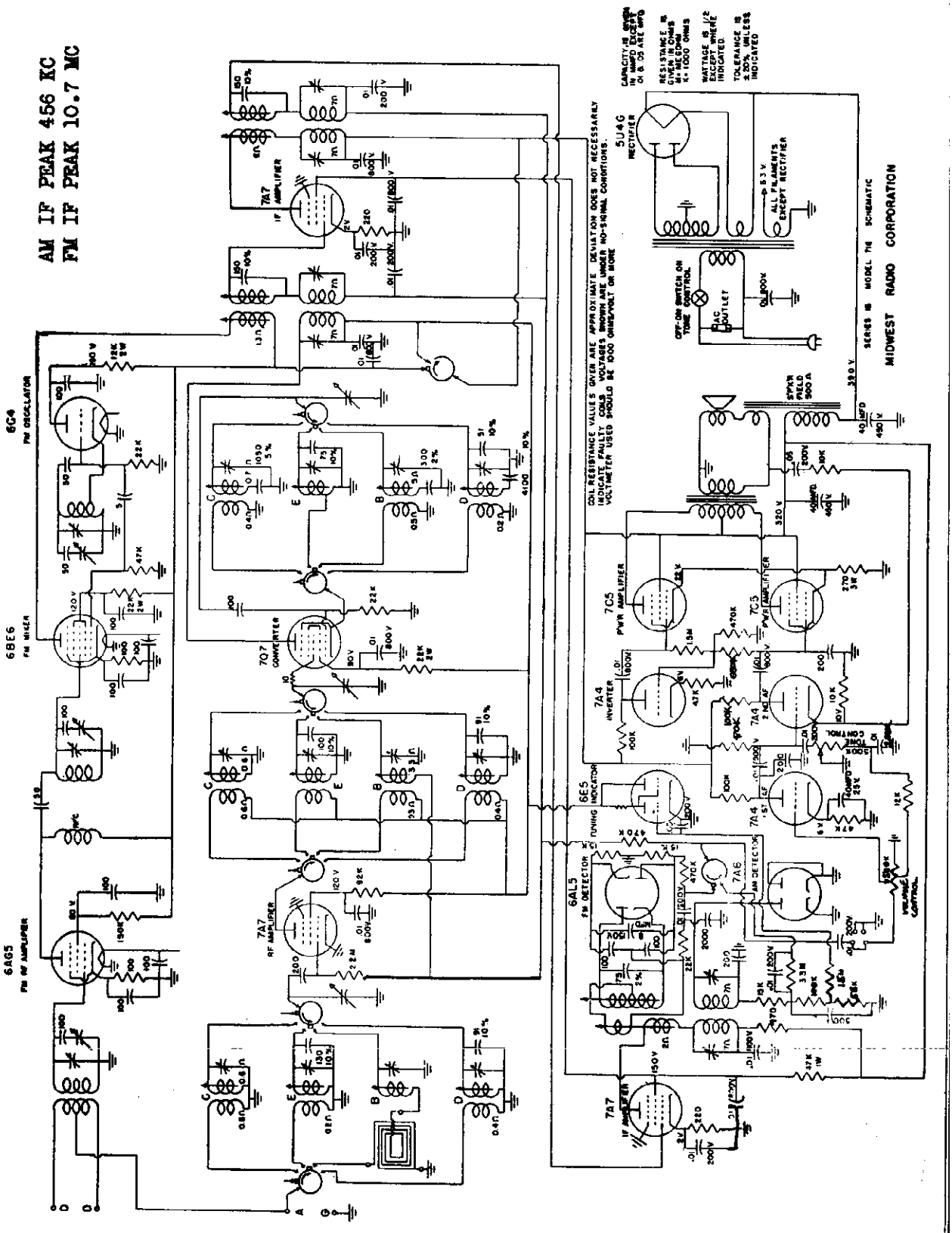


Figure 4. Series 12 Dial Stringing

Care must be taken to assure travel room for the SPRING. If the dial is strung with parts approximately as shown in Figure 4, there will not be too much adjustment necessary. The final step should be to set the pointer after replacing the dial, at the low frequency end of the dial in line with the end of the calibration base line. Use a small piece of gummed tape on the string so that clamping the pointer does not cut the dial cord.

MIDWEST RADIO CORP.

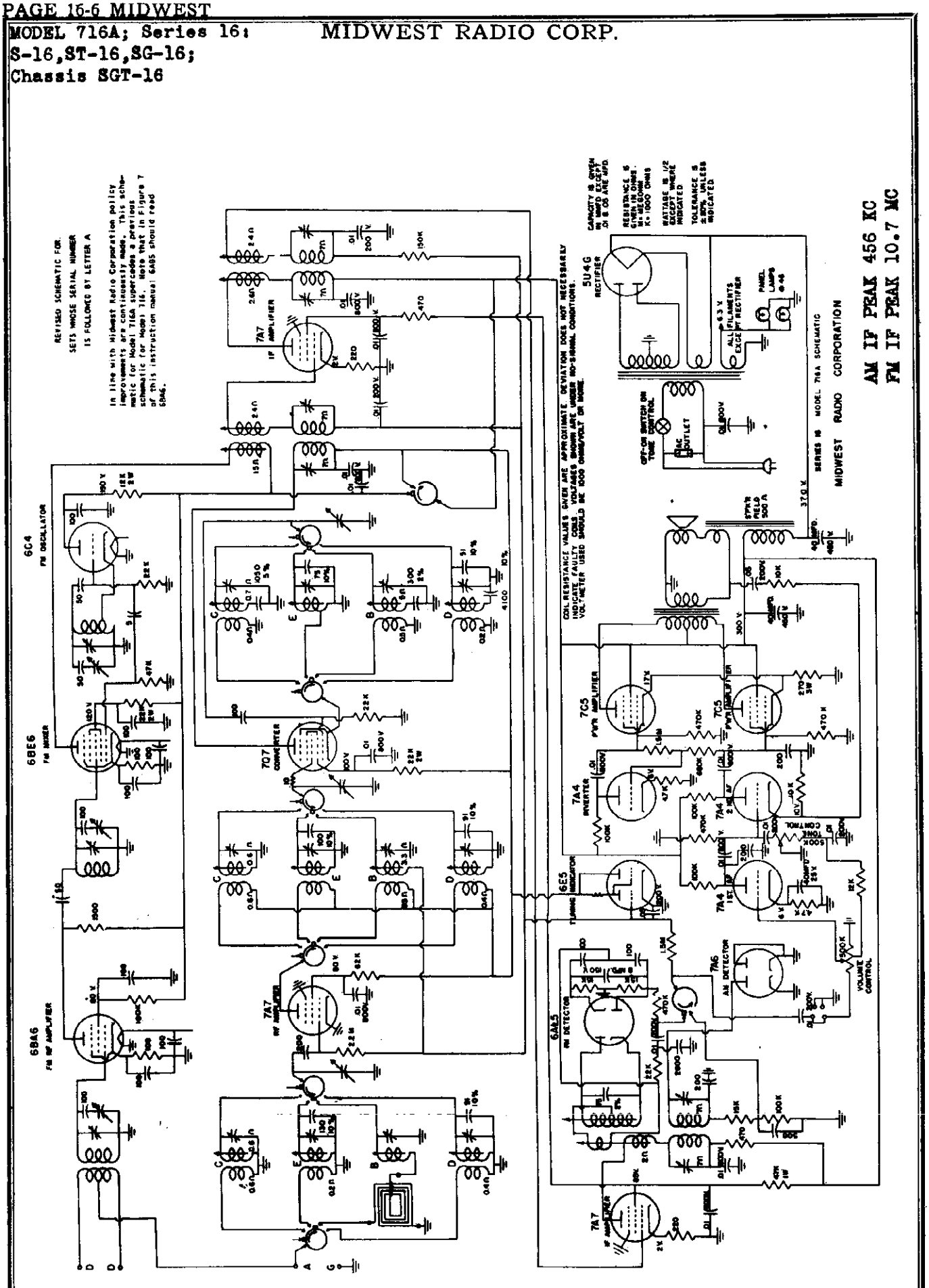
MODEL 716; Series 16:
S-16, ST-16, SG-16;
Chassis SGT-16



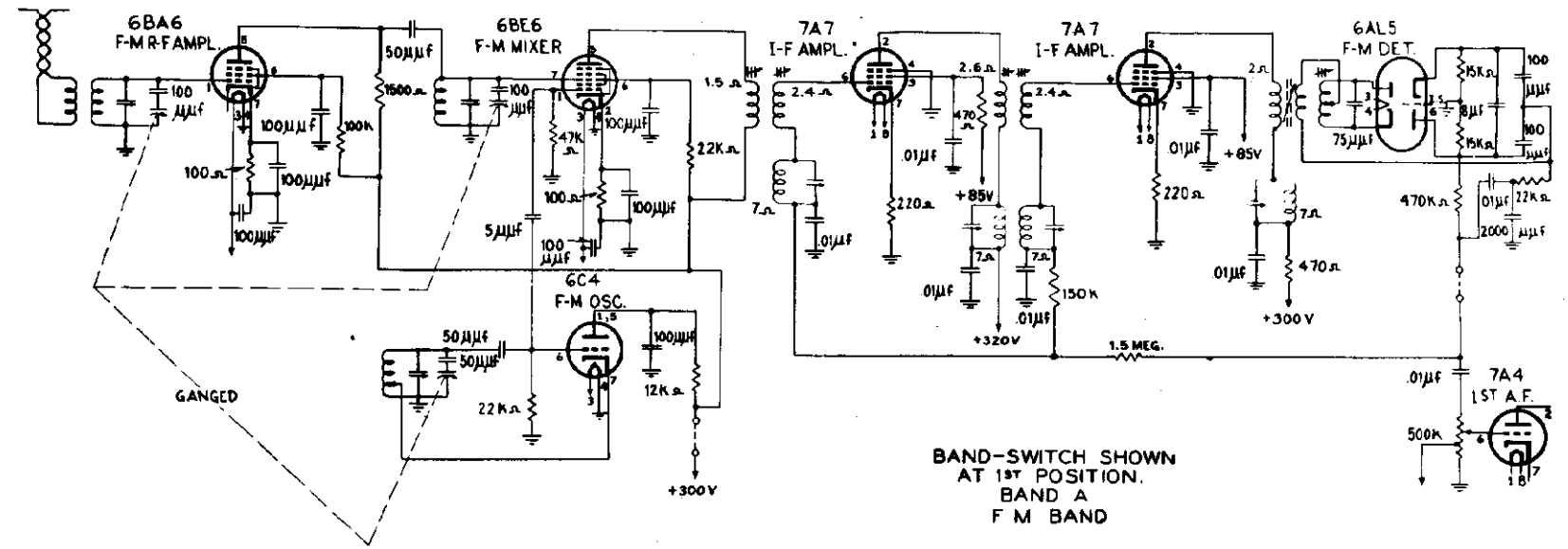
For dial data, see P.16-4

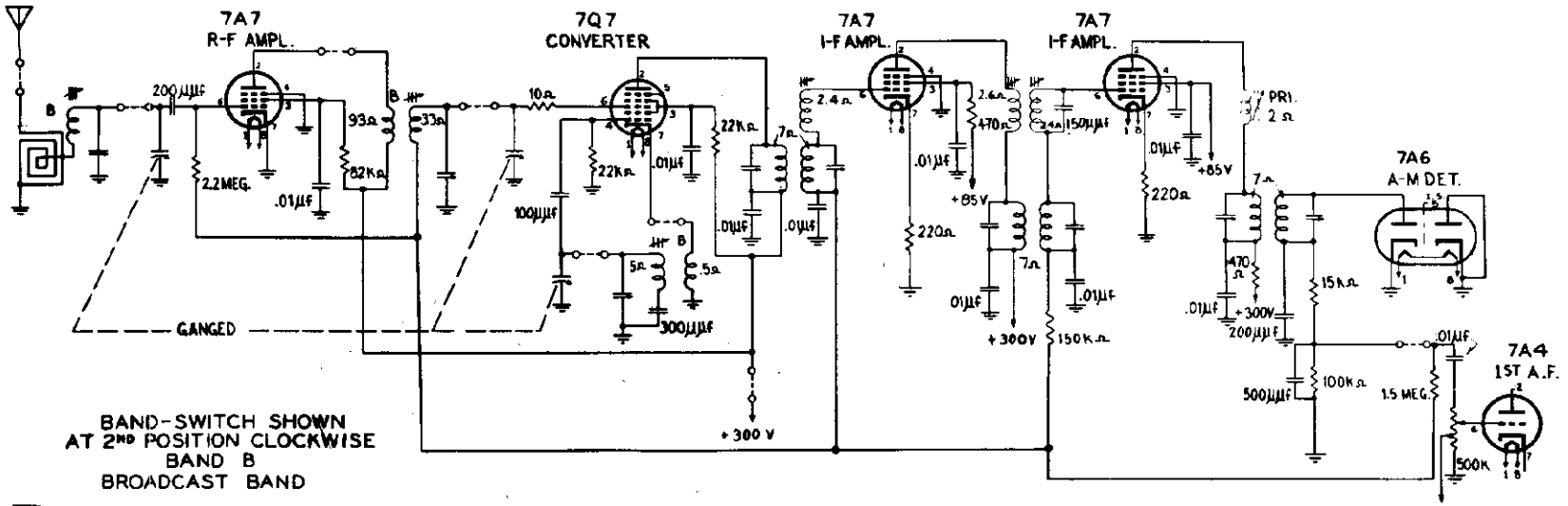
MODEL 716A; Series 16:
S-16,ST-16,SG-16;
Chassis SGT-16

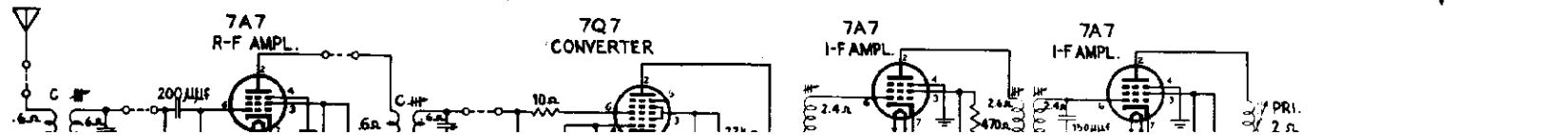
MIDWEST RADIO CORP.

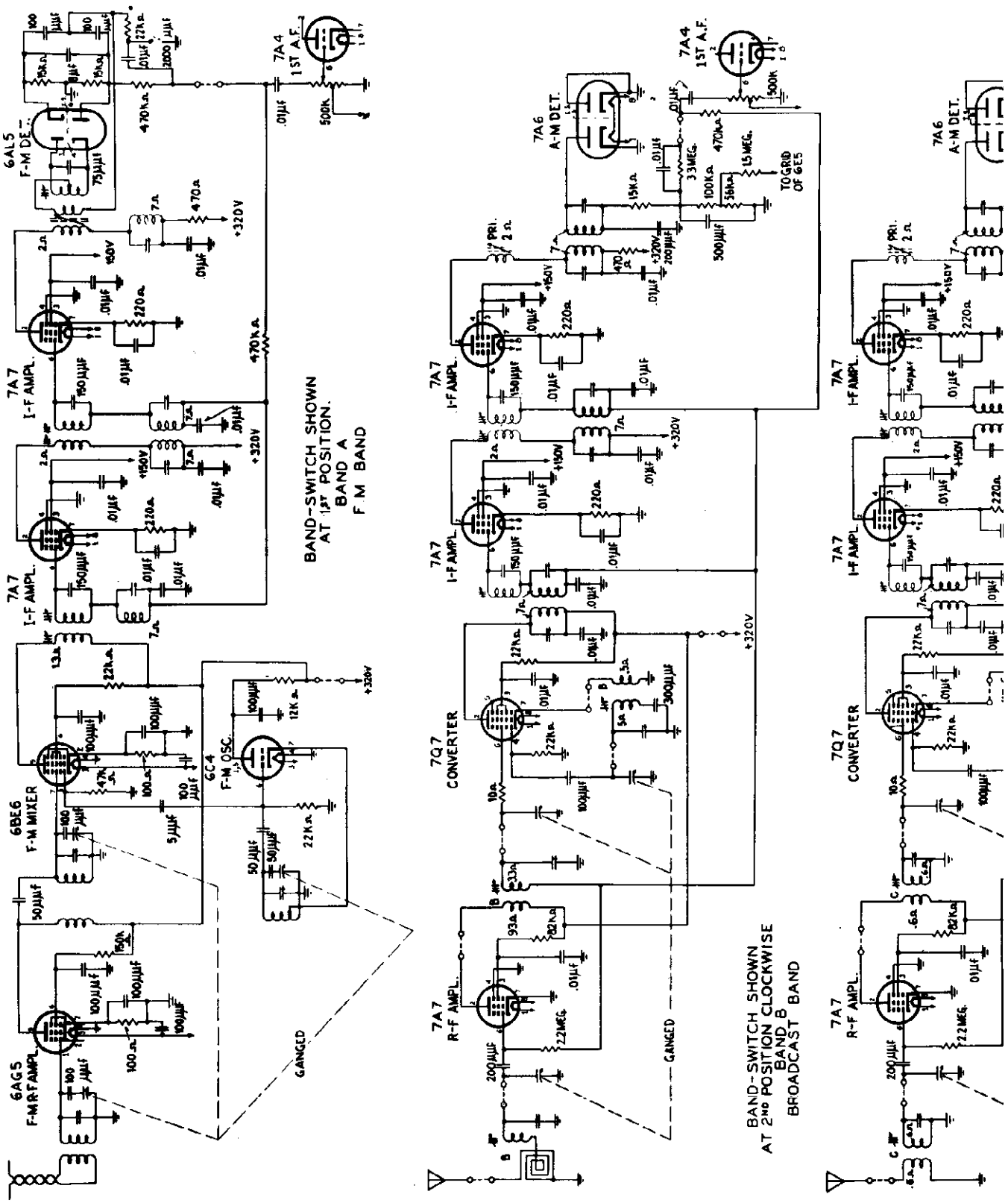


For dial data, see P.16-4

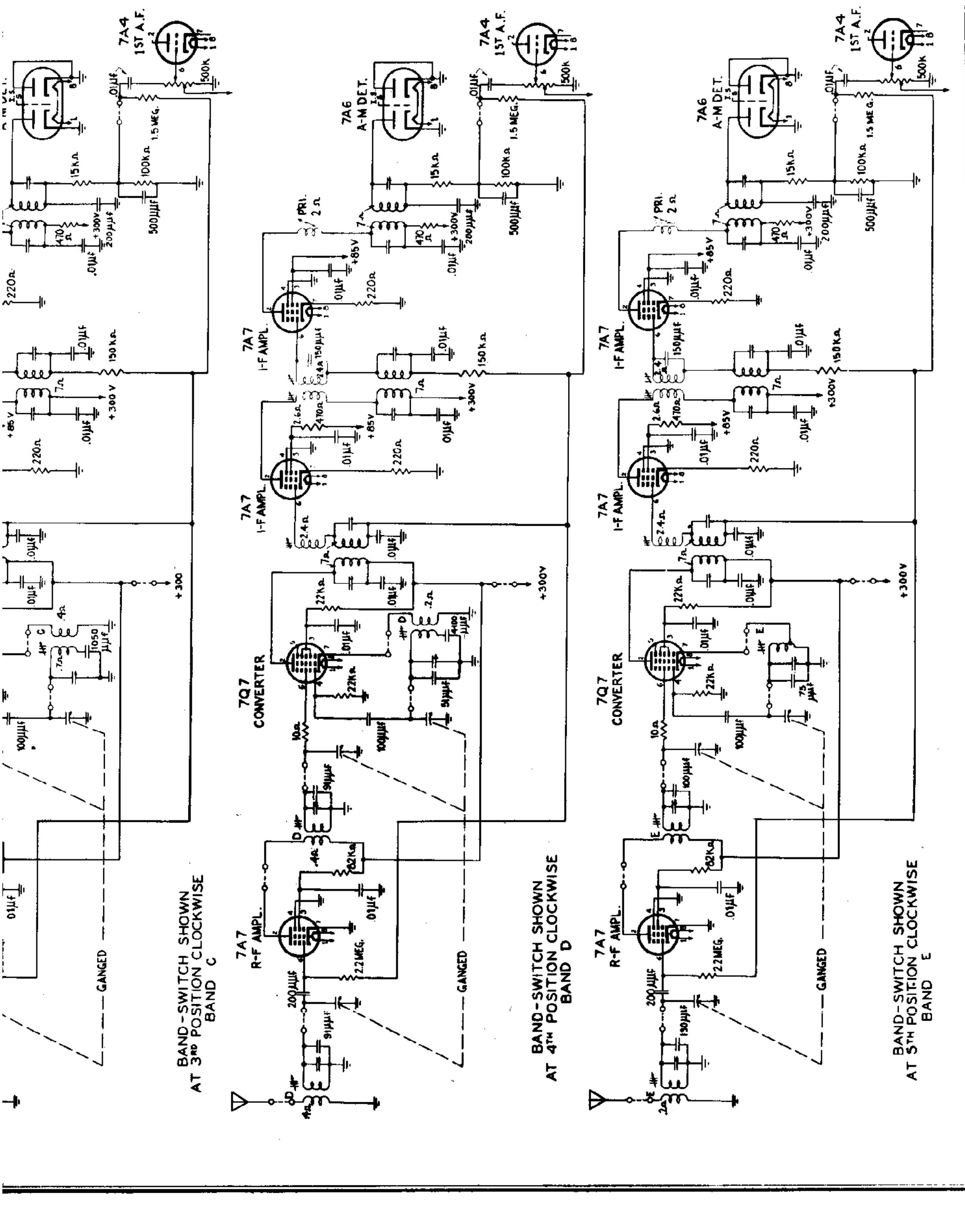

6BA6
F-M R-F AMPL.
6BE6
F-M MIXER
7A7
I-F AMPL.
7A7
I-F AMPL.
6AL5
F-M DET.
6C4
F-M OSC.
GANGED
+85V
+320V
+300V
1.5 MEG.
7A4
1ST A.F.
BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND A
F M BAND


7A7
R-F AMPL.
7Q7
CONVERTER
7A7
I-F AMPL.
7A7
I-F AMPL.
7A6
A-M DET.
7A4
1ST A.F.
GANGED
+300 V
+85V
+300V
1.5 MEG.
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BAND B
BROADCAST BAND


7A7
R-F AMPL.
7Q7
CONVERTER
7A7
I-F AMPL.
7A7
I-F AMPL.


6AL5
F-M DE...
7A4
1ST A.F.
7A7
I-F AMPL.
7A7
I-F AMPL.
6BE6
F-M MIXER
6C4
F-M OSC.
6AG5
F-M R-F AMPL.
GANGED
BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND A
F.M BAND
7A6
A-M DET.
7A4
1ST A.F.
TO GRID
OF 6E5
7A7
I-F AMPL.
7A7
I-F AMPL.
7Q7
CONVERTER
7A7
R-F AMPL.
GANGED
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BAND B
BROADCAST BAND
7A6
A-M DET.
7A7
I-F AMPL.
7A7
I-F AMPL.
7Q7
CONVERTER
7A7
R-F AMPL.

RADIO CORP.


7A4
1ST A.F.
7A6
A-M DET.
7A7
I-F AMPL.
7A7
I-F AMPL.
7Q7
CONVERTER
7A7
R-F AMPL.
GANGED
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BAND C
BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
BAND D
BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE
BAND E
+300V
+85V
500K
1.5 MEG.
100KΩ
15KΩ
500µµf
200µµf
150KΩ
220Ω
22KΩ
82KΩ
2.2MEG.

ALIGNMENT — Refer to the alignment chart for step by step procedure. It is preferable to align the FM IF stages with an AM or CW Signal. It should be noted that all adjustment are made for peak avc reading except the secondary of the third transformer. At this point, if you use an AM signal, it may be tuned for minimum audio signal; or the discriminator voltage may be used, reading it with a VTVM, and the secondary may be adjusted to the zero voltage. There may be some discrepancy between these methods, and if it is not excessive, is of no importance; it is simply an indication of the exactness of equivalent capicitative and inductive coupling balance in the transformer.

The FM RF alignment should be made using an FM signal and either avc or audio for peaking. In doing this alignment, or when feeding the IF signal into the FM mixer grid, care must be taken not to move the wiring. If the wiring is displaced so as to affect the inductance of the RF circuits it is difficult to re-establish the RF-Oscillator tracking.

The AM, RF and IF alignment should be done with a VTVM across the avc. The recommended signal value is one which will generate 10 volts of avc. When aligning the "B" band the loop must be plugged in and you need not adjust the RF padder core. The RF padder is very broad and can be aligned only if the converter grid lead is connected to an RF type VTVM as indicator; this will usually involve a signal level greater than is normally available.

Coupling	Signal	Band Switch	Dial	Adjustment
To 7Q7 converter grid through .05 mfd. capacitor.	456 KC AM	B	1000 KC	Peak 1st, 2nd and 3rd IF trimmers on top of IF cans.
To "A" on antenna ground terminal strip through 200 mfd. and 400 ohms in service.	1600 KC AM	B	1600 KC	Peak RF, converter and oscillator trimmers marked "B".
	550 KC AM	B	550 KC	Peak converter and oscillator padder cores marked "B". Loop must be plugged in. Do not adjust RF.
	4.7 MC AM	C	4.7 MC	Peak "C" trimmers.
	1.6 MC AM	C	1.6 MC	Peak "C" cores.
	10 MC AM	D	10 MC	Peak "D" trimmer
	5 MC AM	D	5 MC	Peak "D" cores.
	22 MC AM	E	22 MC	Peak "E" trimmer.
	11.5 MC AM	E	11.5 MC	Peak "E" cores.
To 6BE6 mixer grid direct.	10.7 MC AM or CW	A	100 MC	Peak core adjustments for avc (around 3 volts) at 1st, 2nd and primary of 3rd IF. Adjust secondary of 3rd IF for audio null from 30% amplitute modulated 10.7 MC IF signal.
To "D" and "D" on doublet terminal strip above "A-G" strip through a pair 150 ohm resistors.	105 MC FM	A	105 MC	Peak RF mixer and oscillator trimmers for avc or audio.

*Read text for use of CW for FM-IF alignment.

PUSH BUTTONS — The push buttons are for your convenience in selecting stations without the bother of making the exact tuning adjustments necessary for best reception. There are seven buttons and each button may be set for a station. The station may be at any point on the dial.

It is not recommended that the buttons be used for short wave stations.

To set the push buttons this exact procedure should be followed. A small screw driver will be needed.

1. Turn on the receiver and allow at least three minutes to warm up.
2. Remove the push button by pulling straight out. A hooked instrument will assist in removing the end buttons.
3. Loosen the LOCK SCREW at least one half turn.
4. Using the screw driver with the blade in the screw slot, push the mechanism in firmly. Hold in during step 5. The mechanism may bind at first. Use sufficient force to break loose so that the push button and tuning control are independent.
5. Tune the pointer past the desired station then back to the desired station and make the tuning adjustment as carefully as you know how.
6. Tighten the LOCK SCREW.
7. Check the setting of this push button by tuning away from the station manually, then pushing in firmly. Pushing the button must return the pointer to the position it had when the LOCK SCREW was tightened. If the station is not now tuned in perfectly repeat the steps 2 to 6 carefully.
8. Adjust each of the seven buttons, or as many as you wish to set, exactly as outlined above.

Any button can be set for any pointer position, however, you may find it more desirable to select the button nearest the pointer position so that each successive adjustment moves the pointer in the same direction. That is, the "M" button will be set for a station at the left of the dial, the "W" button will set for a station near the center, etc.

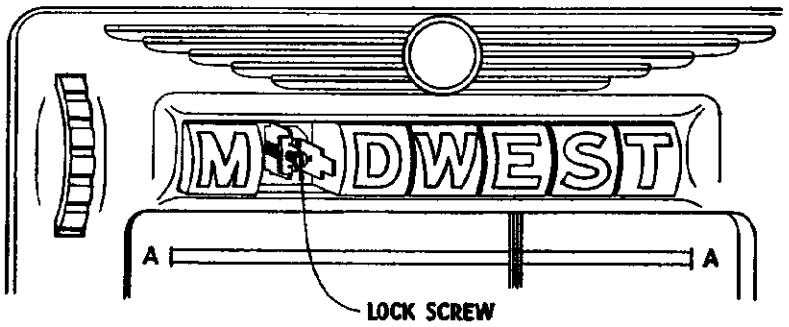
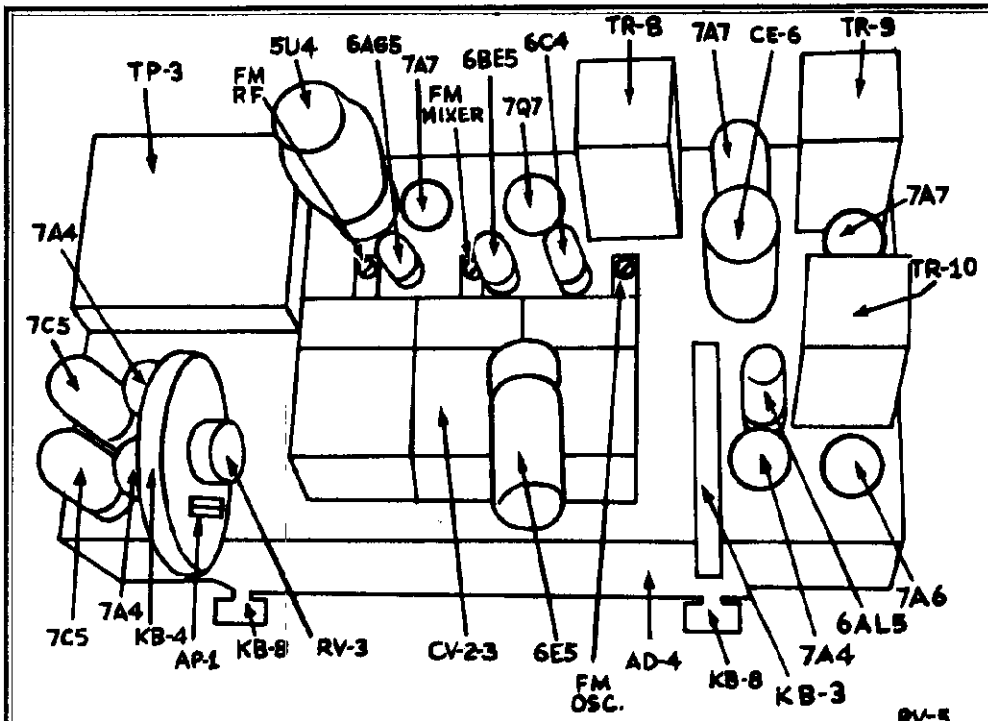


Figure 4. Push Button Mechanism

SERVICE — Series 16, Model 716, is a straight forward design, containing no trick circuits. Servicing of the coil plates or IF transformers should be avoided, except under special conditions, and rather than attempt to repair these assemblies a replacement should be ordered.

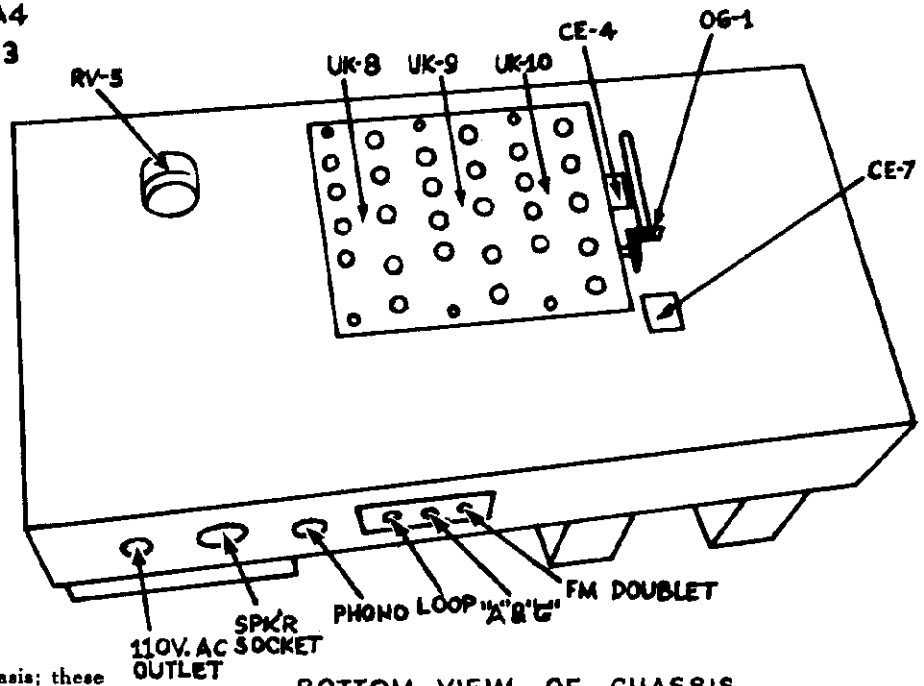


TOP VIEW OF CHASSIS

KB-4—Volume control knob
KB-8—Tone or Band knob
KB-6—Push buttons, set of 7
OG-1—Miter gear, pair
OS-3—Dial string spring
PC-3—Loop plug
PC-4—Phonograph plug
RV-3—Volume control
RV-5—Tone control
*SP-2—Speaker, 14 inch
TP-3—Power transformer
TP-4—Universal power transformer
*TR-8—1st IF transformer
*TR-9—2nd IF transformer
*TR-10—3rd IF transformer
*UK-8—R.F. Coil plate
*UK-9—Mixer coil plate
*UK-10—Oscillator coil plate

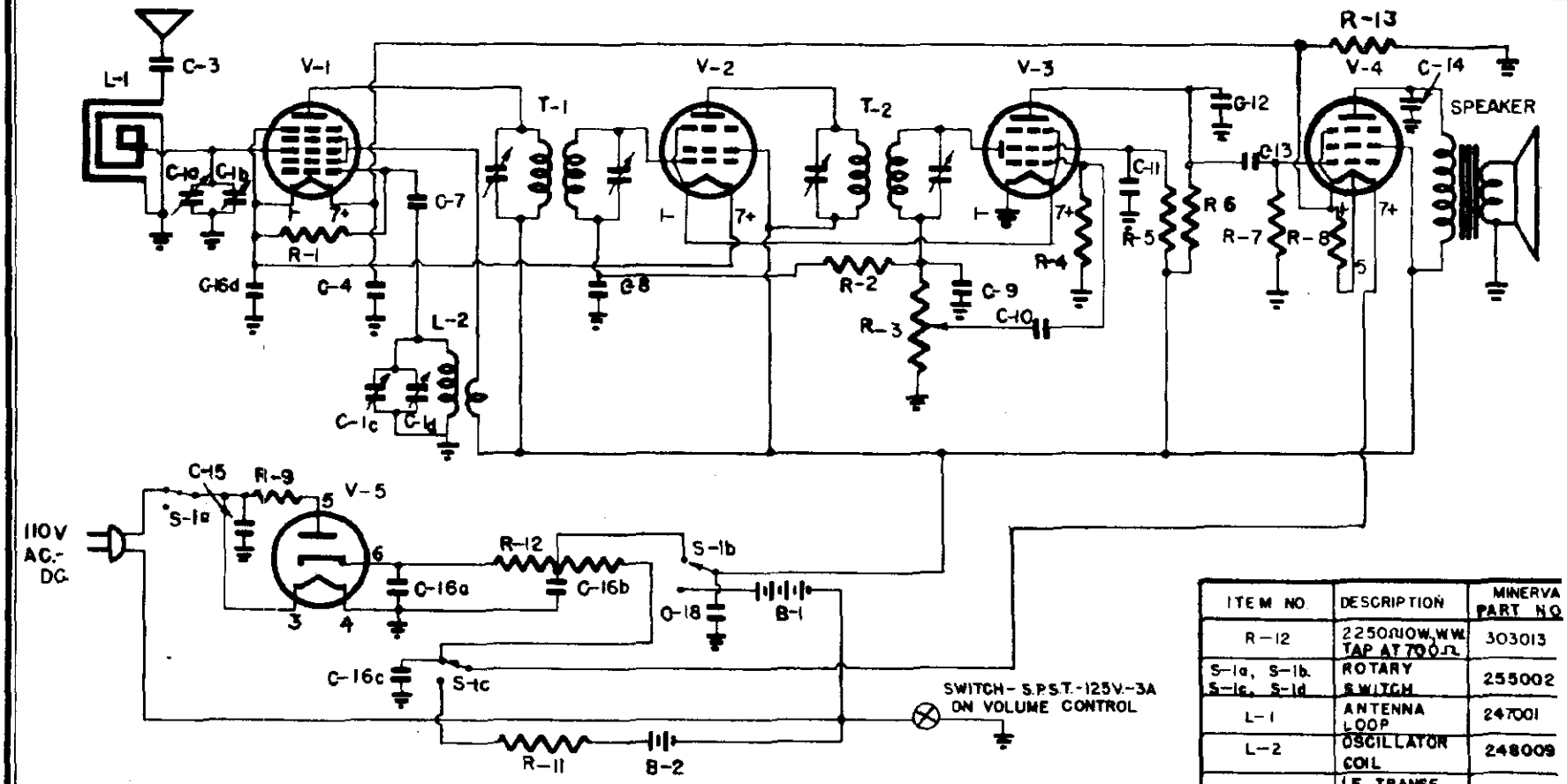
PARTS LIST

Part	Description
AD-4	Dial
AE-1	Escutcheon
AK-2	Coil plate cover
AP-1	Wood pulley
AP-6	Pointer
AS-1	Wood pulley mtg. stud
CE-6	Filter condenser 40-40
CE-4	Cathode by pass 40 mfd. 25v.
CE-7	Electrolytic 8 mfd. 150v
*CV-2-3	Tuning gang
EG-2	Speaker grommet
ES-12	Tube shield
HE-1	Speaker mtg. eyelet
IL-1	Panel lamp 6-8 volts
KB-3	Tuning knob



BOTTOM VIEW OF CHASSIS

REPLACEMENT PARTS — Certain parts are available on an exchange basis; these are shown on the parts list with an "*"



ITEM NO.	DESCRIPTION	MINERVA PART NUMBER
C-1a, C-1b C-1c, C-1d	2 GANG VAR. CAPACITOR	238003
C-3	.01 MFD. 200V PAP. TUB. CAP.	190038
C-4	.1 MFD. 200V. PAP. TUB. CAP.	190039
C-7	50 MMFD. MICA CAPACITOR	212015
C-8	.05 MFD. 200V PAP. TUB. CAP.	190007
C-9	200 MMFD. MIC. CAPACITOR	212027
C-10	.01 MFD. 200V. PAP. TUB. CAP.	190038
C-11	.1 MFD. 200 V. PAP. TUB. CAP.	190039
C-12	200 MMFD. MICA CAPACITOR	212027
C-13	.01 MFD. 200V. PAP. TUB. CAP.	190038
C-14	.005 MFD. 200V PAP. TUB. CAP.	190042
C-15	.05 MFD. 200V. PAR TUB. CAP.	190004
C-16a C-16b C-16c, C-16d	40 MFD. 150V. 100 MFD. 25 V.	230005
C-18	.1 MFD. 200 V. PAP. TUB. CAP.	190039
R-1	100K 1/2 W. CARBON RES.	272104
R-2	2.2 M. 1/2 W. CARBON RES.	272225
R-3	.5 M CARBON POT. VOLUME	300014
R-4	10 M 1/2 W. CARBON RES.	272106
R-5	3 M. 1/2 W. CARBON RES.	272305
R-6	1 M. 1/2 W. CARBON RES.	272105
R-7	470 K 1/2 W. CARBON RES.	272474
R-8	270 Ω 1/2 W. CARBON RES.	272271
R-9	33 Ω 1/2 W. CARBON RES.	282330
R-11	33 Ω 1/2 W. CARBON RES.	282350

ITEM NO	DESCRIPTION	MINERVA PART NO
R-12	2250Ω 10W. W.W. TAP AT 700 Ω	303013
S-1a, S-1b. S-1c, S-1d	ROTARY SWITCH	255002
L-1	ANTENNA LOOP	247001
L-2	OSCILLATOR COIL	248009
T-1	I.F. TRANSF. INPUT	305002
T-2	I.F. TRANSF OUTPUT	305003
V-1	1R5	312074
V-2	1T4	312077
V-3	1S5	312076
V-4	3Q4	312072
V-5	117Z3	312128
B-1	45V BATTERY	372002
B-2	4 1/2 VOLT BATTERY.	378001
R-13	1000 Ω 1/2 W. CARBON RES.	272102

VOLTAGE MEASUREMENT

All reading in AC-DC position of power selector switch with 20,000 ohms per meter. Readings taken are referred to ground.

11Z3

PIN	AC	DC	RESISTANCE IN OHMS
1	117V	—	540
2	—	120V	2000
3	117V	—	500
4	—	—	
5	117V	—	500
6	120V	—	2000
7	—	—	—

3Q4

PIN	DC	RESISTANCE IN OHMS
1	4.8V	50
2	86V	2000
3	—	500,000
4	88V	1500
5	6V	50
6	86V	2000
7	7.6V	70

1S5

PIN	DC	RESISTANCE IN OHMS
1	—	—
2	—	—
3	—	400,000
4	19V	3,000,000
5	7.6V	1,500,000
6	—	10,000,000
7	1.5V	260

1T4

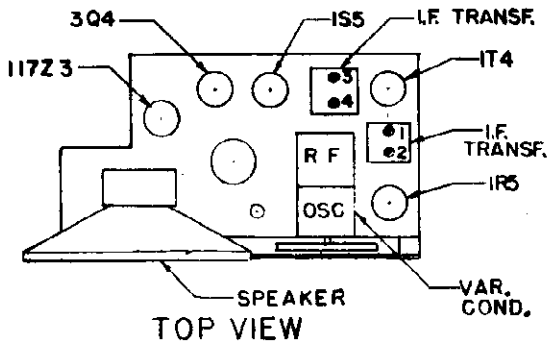
PIN	DC	RESISTANCE IN OHMS
1	1.5V	260
2	88V	1500
3	88V	1500
4	—	2,000,000
5	1.6V	
6		2,200,000
7	3.3V	45

1R5

PIN	DC	RESISTANCE IN OHMS
1	3.3V	45
2	88V	1500
3	88V	1500
4	—	85
5	1.6V	45
6	—	—
7	2.3V	50

CORRECTIONS

1. Servicing Notes Section:	2. Voltage Measurements Section:	3. Schematic Diagram Section:
Stator large section gang open to read: Stator large section gang closed.	20,000 ohms per meter to read: 20,000 ohms per volt D. C. 1,000 ohms per volt A. C. meter 11Z3 to read: 117Z3	No S-Id C 18: .1 mfd, 200 volts to read: .1 mfd, 400 volts 1000 mfd - 6v D.C. Pin # 1 of V2 to ground.



Generator Connection	Dummy Ant.	Freq.	Adj. Trimmers	Output	Sensitivity uv.
Stator large section gang open	.1 MFD cond.	455 KC	1, 2, 3, 4	Max.	120
Antenna loop wire	200 mmf cond.	1400 KC	5 & 6	Max.	50
Antenna loop wire	200 mmf	600 KC	Variable Plates	Max.	150

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Tuning Range: Standard Broadcast 540-1640 KCS

Power Supply: Direct Current 105-125 volts or alternating current 105-125 volts, 50-60 Cycle or Batteries.

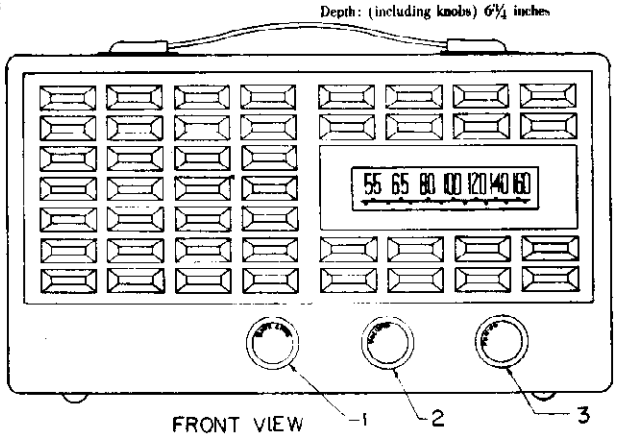
Power Consumption: AC or DC—12 watts

Battery Complement: 2—4½ Volt "A" Batteries
Eveready No. 746 or equivalent.

2—45 Volt "B" Batteries
Eveready No. 482 or equivalent.

Tube Complement: IR5—Converter
IT4—1. F. Amplifier
IS5—2nd Det.—AVC—1st Audio
3Q4—Power Amplifier
11Z3—Rectifier

Mechanical Characteristics: Dimensions — Height: (including feet) 7⅛ inches
Width: 13 inches
Depth: (including knobs) 6¼ inches



SERVICING NOTES

All specifications and measurements based on 117 Volts, 60 Cycles, and all readings based on a 20,000 ohms per volt meter. All readings are taken with volume control (switch No. 2) in maximum clockwise position. Apply the lowest signallevel from the signal generator.

Output: 50 mw into a 3.2 ohm voice coil impedance.

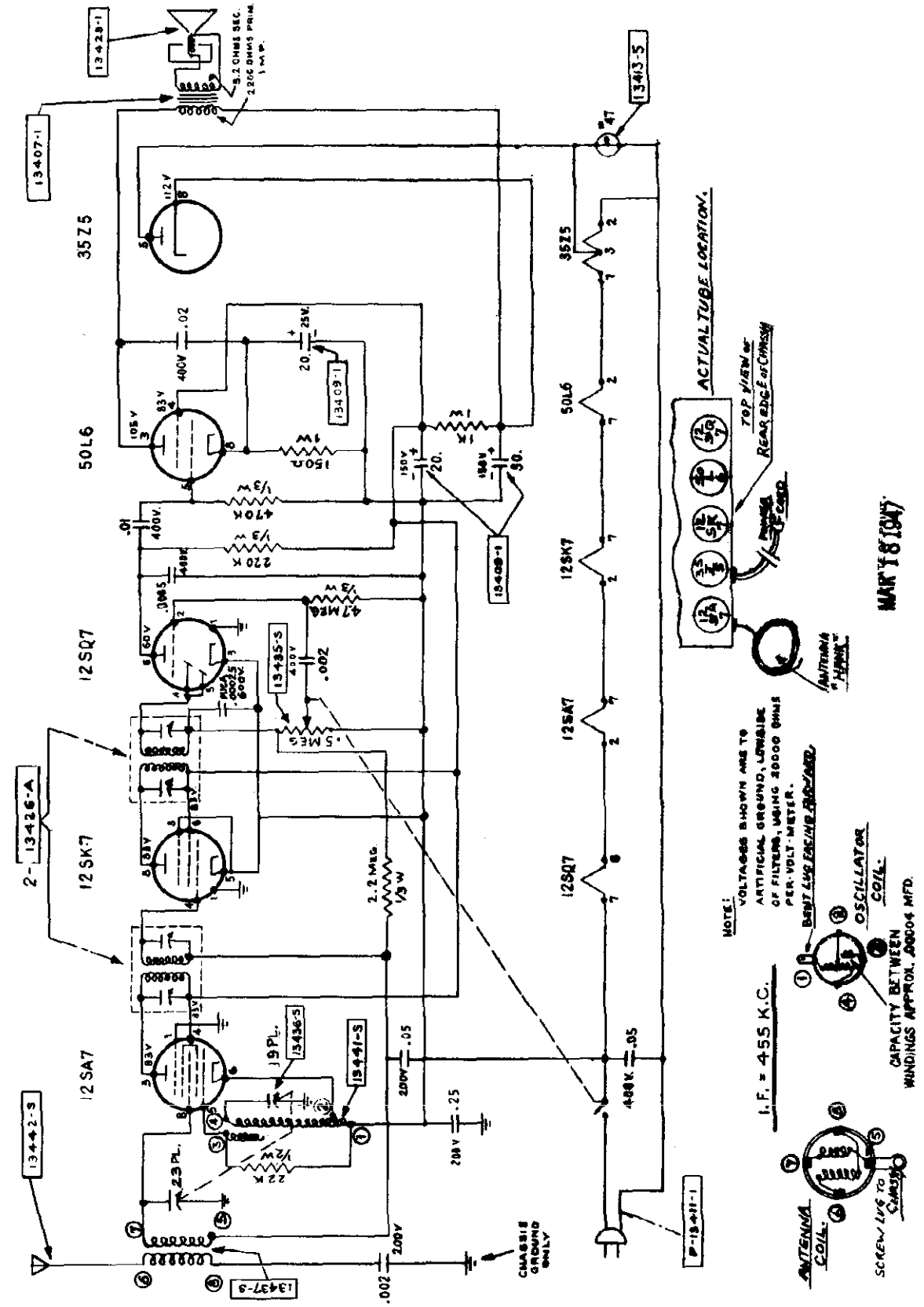
Approximate reading 0.4 Volt.

I. F. ALIGNMENT: With signal generator, set a 455 KC, apply signal through a .1 MFD condenser dummy to R.F. grid of convertor (IR5) or the stator of RF section of the variable condenser (condenser must be fully meshed). Peak I.F. trimmers 1, 2, 3, 4 (top view diagram) to give maximum reading on output meter connected across voice coil. (Note: If for any possible reason the signal does not come through indicating the receiver is way out of alignment, apply the signal to the grid of the I.F. Amplifier (1T4) and tune signal in by trimmers 3. 4 of second I.F. Transformer. Peak for maximum and once this stage is tuned, repeat above procedure.)

R.F. Alignment: With signal generator, set at 1400 KC, apply signal through a dummy antenna (200 mmf condenser) to the antenna loop wire. Set dial of receiver to 1400 KC and peak trimmers 5 & 6 to give maximum reading of output meter. Then set signal generator at 600 KC and tune receiver to 600 KC mark on dial. This setting should fall on calibrated point.

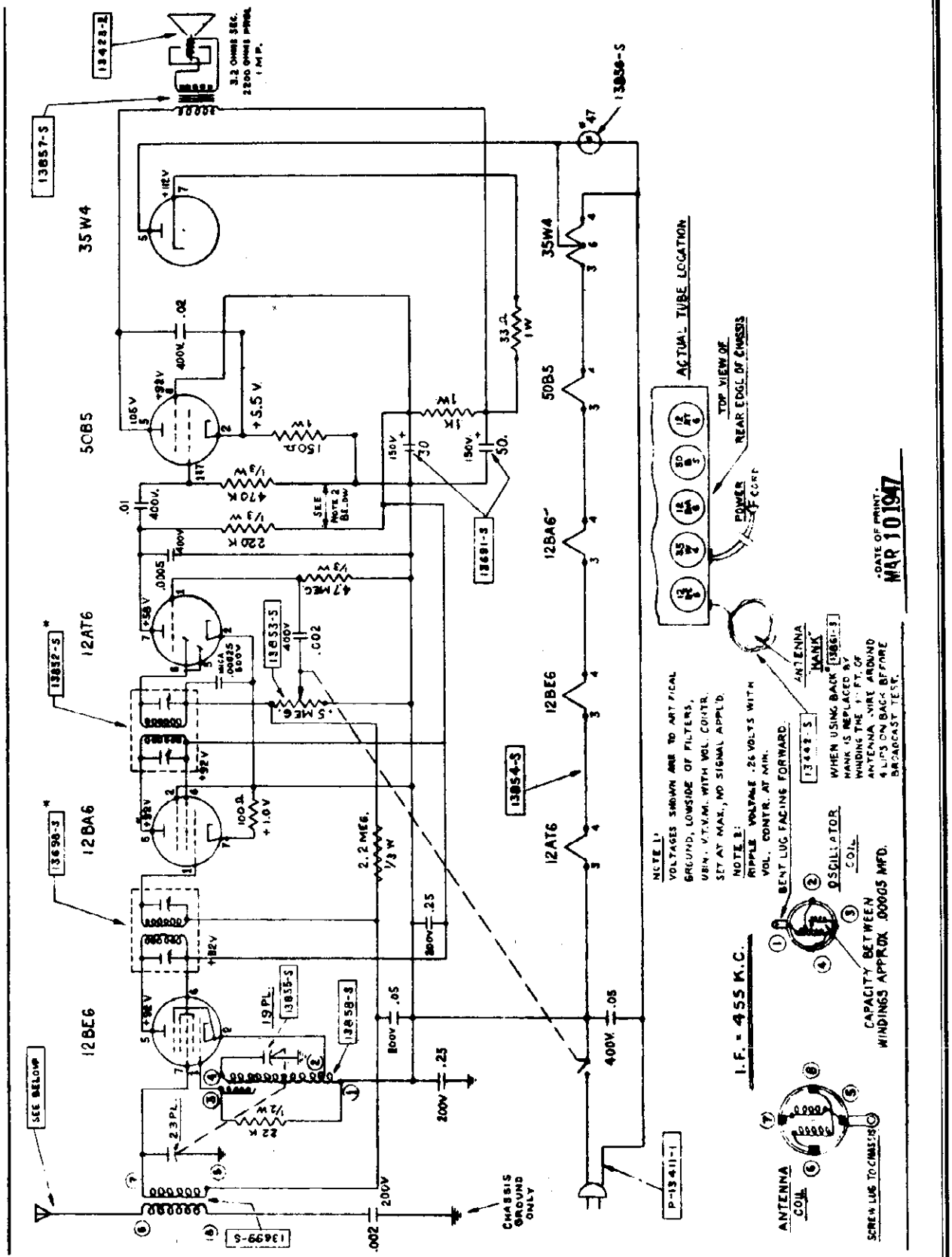
MOLDED INSULATION CO.

MODEL RS-



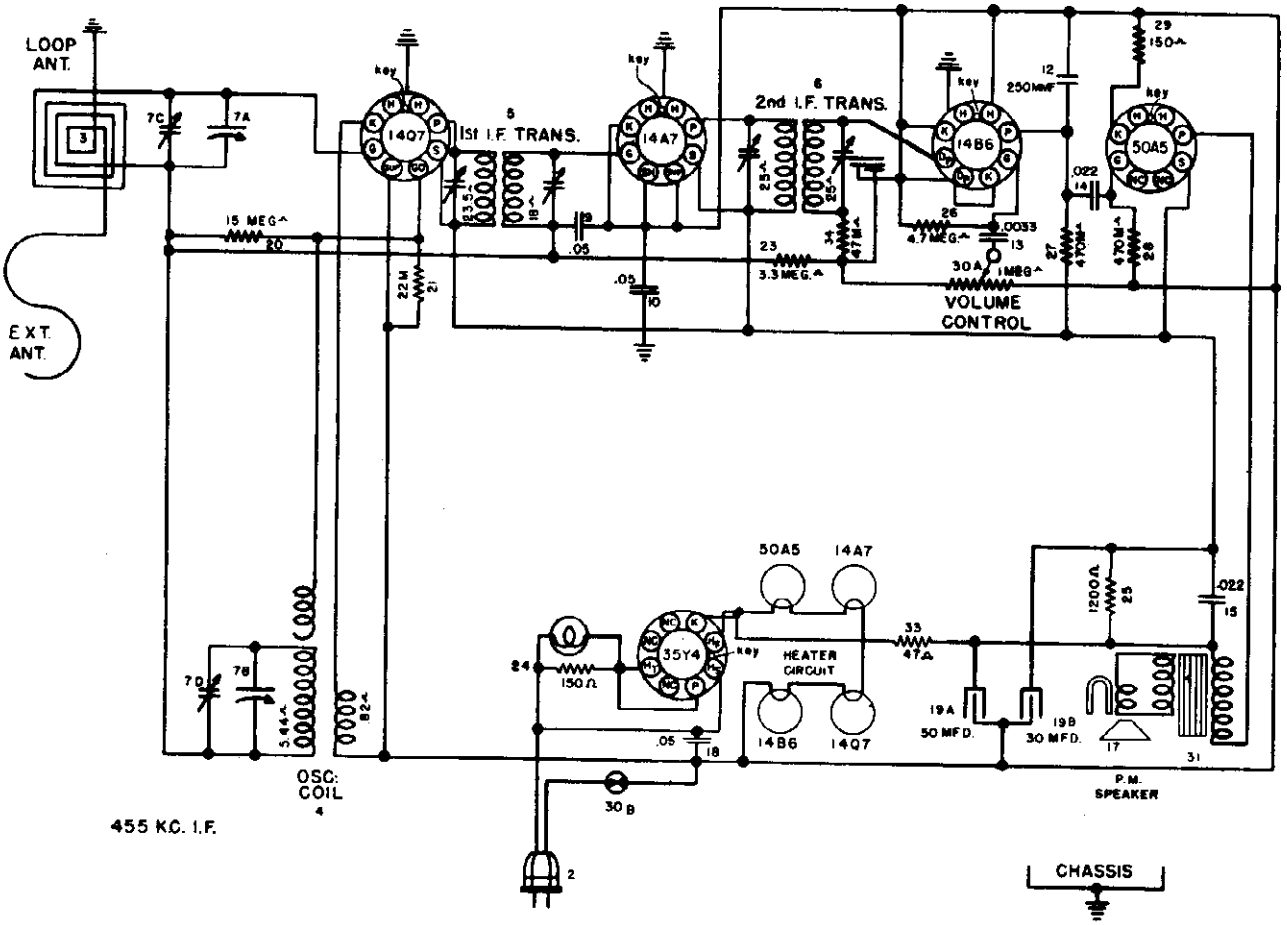
MODEL RS-1A

MOLDED INSULATION CO.



MONITOR EQUIPMENT CORPORATION

August, 1946



SCHEMATIC DIAGRAM

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for corre polarity. Reversing the position of the power plug when alternating current is used may reduce power hum. UNDER N CIRCUMSTANCES SHOULD A GROUND BE CONNECTED TO THIS RECEIVER.

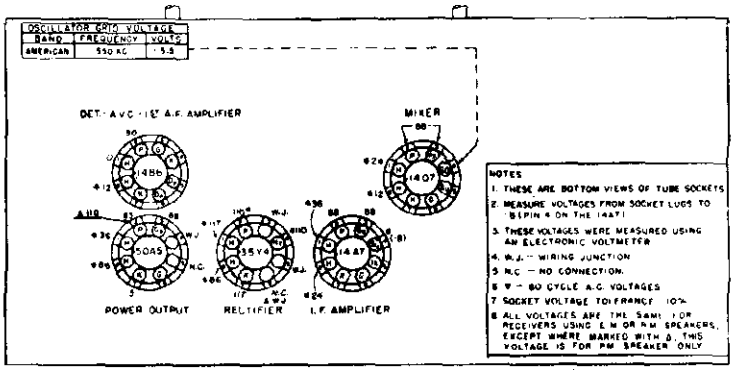
PARTS LIST

Figures in first column correspond to figures in Schematic Diagram

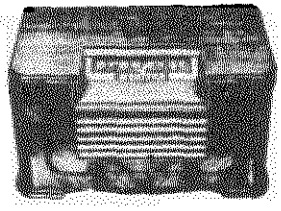
ITEM No.	PART No.	DESCRIPTION
1	W-48858	Bulb (dial), Type 47, 6.3 v., .15 amp.
2	C-132300-1	Cable and Plug (power)
3	AC-135209	Ant. Loop and Back Assy. (TA56M, TW56M)
	AC-135253	Ant. Loop and Back Assy. (TC56M)
4	AW-135195	Oscillator Coil Assembly
5	AW-137665	Transformer (1st I.F.)
6	AW-137667	Transformer (2nd I.F.)
7A	B-135202	Condenser (variable) } Two
7B		Condenser (variable) } Section
7C	Part of Item #7A	Condenser (trimmer)
7D	Part of Item #7B	Condenser (trimmer)
9	39001-65	Condenser, .05 mfd., 200 v., paper
10	39001-65	Condenser, .05 mfd., 200 v., paper
12	39001-73	Condenser, 250 mmf., 600 v., paper
13	39001-10	Condenser, 3300 mmf., 600 v., paper
14	39001-63	Condenser, .022 mfd., 200 v., paper
15	39001-63	Condenser, .022 mfd., 200 v., paper
17	B-136768	Speaker
18	39001-65	Condenser, .05 mfd., 200 v., paper
19A	B-136770	Condenser, 50 mfd., 150 v. } Two Section
19B		Condenser, 30 mfd., 150 v. } Elect. Filter
20	39294-38	Resistor, 15 megohm, ½ w.
21	39294-21	Resistor, 22,000 ohm, ½ w.
23	39294-34	Resistor, 3.3 megohm, ½ w.
24	39294-8	Resistor, 150 ohm, ½ w.
25	39015-26	Resistor, 1200 ohm, 1 w.
26	39294-35	Resistor, 4.7 megohm, ½ w.
27	39294-29	Resistor, 470,000 ohm, ½ w.
28	39294-29	Resistor, 470,000 ohm, ½ w.
29	39294-8	Resistor, 150 ohm, ½ w.
30A	C-135127	Control, Volume (1 megohm) } Assy.
30B		Switch (power) } Assy.
31	B-135077	Transformer (output)
33	W-137367	Resistor, 47 ohm, 1 w.
34	Part of Item #6	Resistor, 47,000 ohm, ½ w.
	W-135371	Socket (tube)
	39017-5	Socket (dial light)
	AB-135135	Plate Assembly (dial)
	W-135074	Pulley (idler)
	B-135094	Pointer (dial)
	B-135075	Shaft (drive)
	W-134016	Washer (spring)
	W-51071	Ring (retaining)
	W-131154-1	Cotter (external)
	W-51752	Spring (drive cord)
	W-134055	Grommet
	W-135164	Bumper
	W-136630	Trimount Stud
	R-135163	Cabinet (TA56M)
	AW-135245	Cabinet (TW56M)
	D-135235	Cabinet (TC56M)
	B-135461	Dial Glass
	W-135391	Knob (TA56M, TC56M)
	W-135390	Knob (TW56M)
	W-132124	Trimount Stud (TA56M, TW56M)

MODELS TA56M, TC56M, TW56M MONITOR EQUIPMENT CORPORATION

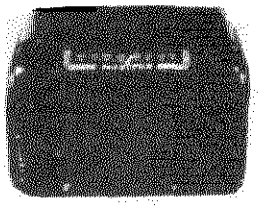
SOCKET VOLTAGE CHART



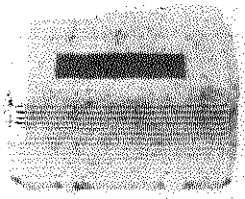
TC56M



TA56M



TW56M



DESCRIPTION

TYPE: Five-tube, single-band, superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.—d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: 1 watt minimum.

TUBE COMPLEMENT:

Type	Function
14Q7	Mixer
14A7	I.F. Amplifier
14B6	Detector, AVC, 1st A.F. Amplifier
50A5	A.F. Power Output
35Y4	Rectifier

DIAL BULB: Type 47, 6.3 volts, .15 amp.

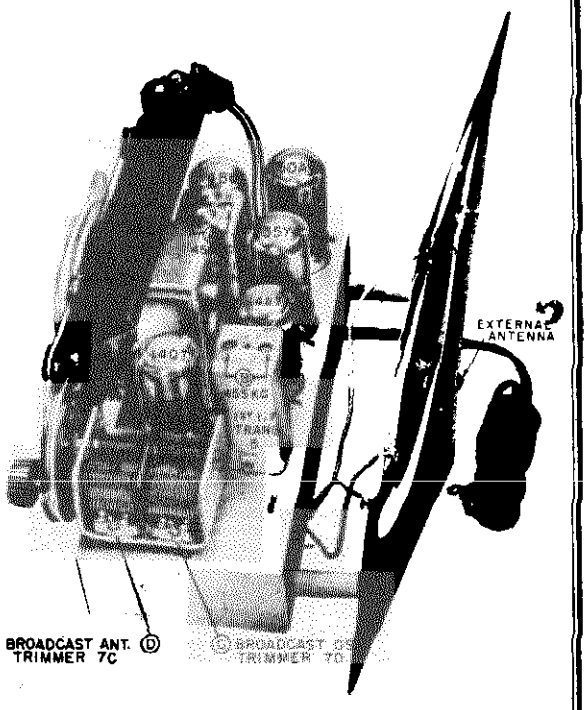
ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown in Chassis, Side View at the right.

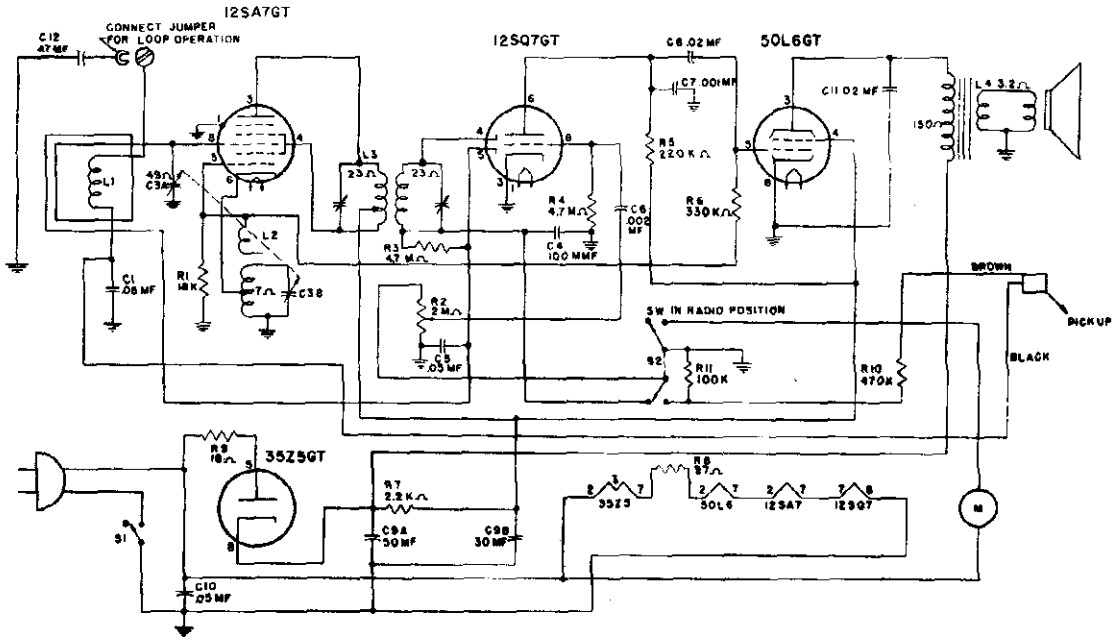
Alignment sequence	Signal Gen. Output			Position of Tuning Dial	Adjust for max. output
	Frequency in KC	In Series with	To		
1	455	200 mmf.	Ant.	1620	A & B
2	1620	200 mmf.	Ant.	1620	C
3	1400	200 mmf.	Ant.	1400	D



CHASSIS, SIDE VIEW

MONITOR EQUIPMENT CORPORATION

MODEL M-40



Tuning range ..... 530 to 1600 kc

Intermediate frequency ..... 455 kc

Power consumption ..... 30 watts

Selectivity ..... 1. A.C.A.—3 to 1. 2. A.C.A.—12.5 to 1

Sensitivity (for 0.5 watt output):

Loop ..... 8000 microvolts per meter avera

Antenna ..... 800 microvolts avera

Power output (in voice coil):

Undistorted ..... 0.8 wat

Maximum ..... 2.5 wat

Ref. No.	*Part No.*	*Description*
		Capacitors
C1-C10		Paper, .05 mfd 400 volts
C6		Paper, .002 mfd 400 volts
C8-C11		Paper, .02 mfd 400 volts
C5		Paper, .05 mfd 200 volts
C7		Paper, .001 mfd 500 volts
C4		Ceramic 100 mmfd 500 volts
C12		Ceramic 47 mmfd 500 volts
C3	1675	Variable Air—2 gang
C9	2073	Electrolytic, 50-30 mfd 150 volts
		Resistors
R2	2480	Control, volume with switch, 2 meg-ohms
R1		18000 ohms, ¼ watt
R3, R4		4.7 meg ohms, ¼ watt
R5, R10		220,000 ohms, ¼ watt
R6		330,000 ohms, ¼ watt
R7		2200 ohms, 2 watts
R8		27 ohms, ½ watt
R9		18 ohms, ½ watt
R11		100,000 ohms, ¼ watt

Ref. No.	*Part No.*	*Description*
		Coils and Transformers
L1	28186	Back cover with loop
L2	28184	Oscillator coil
L3	3376	I.F. transformer
L4	1300	Output transformer
		Miscellaneous
		Cord, line 6 ft.
	39160	Knob, tuning
	39161	Knob, volume
	5877	Speaker
	T470	Cabinet, wood
	54314	Tuning knob washer
		Phono-needle
	346-5	Walsco back clips
	18110	Sockets, wafer octal
	3828	Switch, phono-radio
		Phono motor and 8-inch turntabl
		Phono crystal, L-26

* The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences in both resistors and capacitors follows:

Pre-standardized value—50,000 ohms, 1/3 watt, 10%

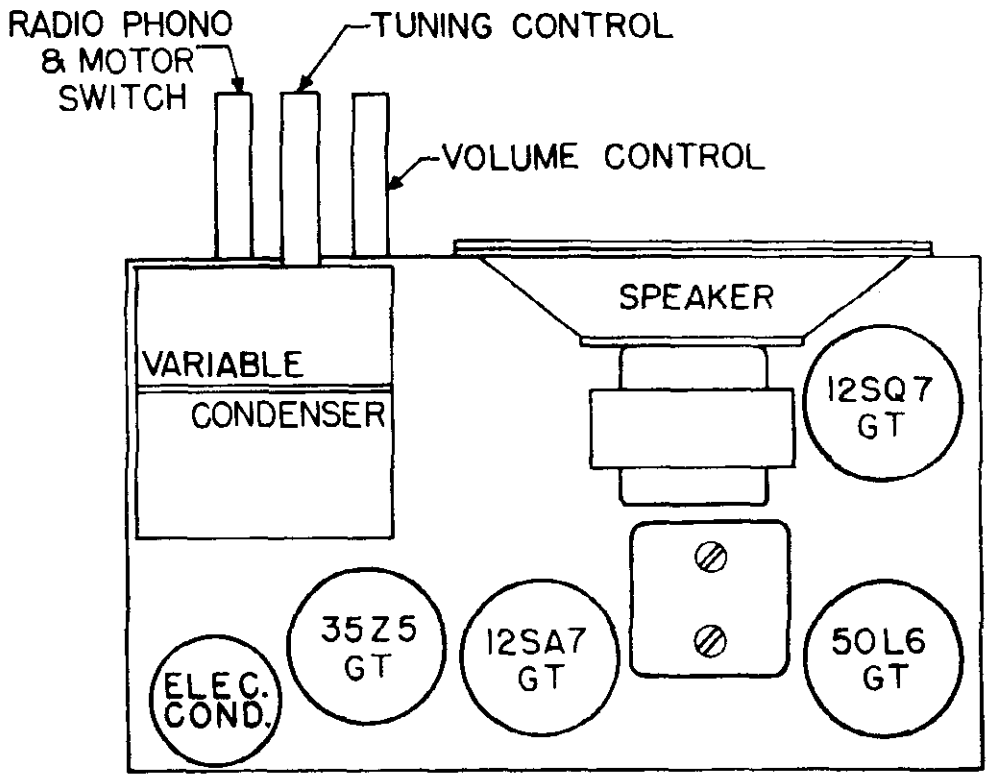
RMA value—47,000 ohms, 1/2 watt, 10%

Pre-standardized value—200 mmf, 500 volts, 20%

RMA value—220 mmf, 500 volts, 20%

MODEL M-403 MONITOR EQUIPMENT CORPORATION

TUBE LOCATION



ALIGNMENT PROCEDURE

(Refer to Chassis View)

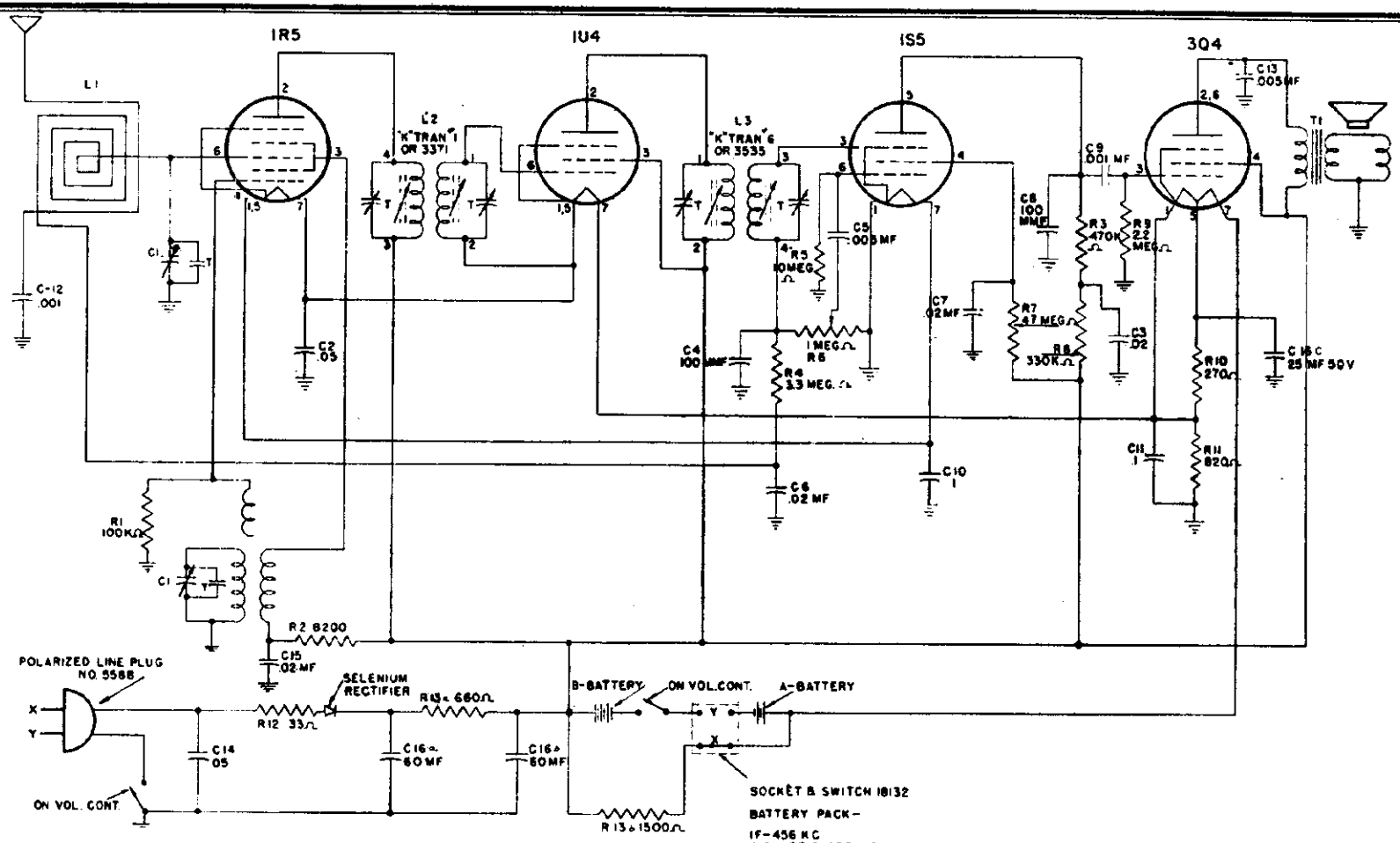
- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Connect ground post of signal generator to chassis.

	SIGNAL GENERATOR			
Frequency	*Dummy Antenna*	*Connection to Radio*	*TUNER SETTING*	*ADJUST FOR MAXIMUM OUTPUT (in order shown)*
455 kc	0.1 mf	Stator of antenna section of gang	Any	Trimmers on I.F. can
1590 kc	* *	* *	Rotor full open (plates out of mesh)	Oscillator trimmer
1590 kc	* *	* *	Rotor full open (plates out of mesh)	Antenna trimmer

* * Run a wire from output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

To remove the chassis from the cabinet, proceed as follows: Make sure the line cord is disconnected from the power receptacle. Remove the phonograph turntable and motor by unscrewing the three mounting screws on the phono motor. If the back has not been removed, pull out the four fasteners with which the back is mounted. Pull the volume and tuning knobs off their shafts. Remove the three mounting screws on the bottom of the cabinet. The chassis can then be slipped out of the cabinet.

This receiver is designed to operate without a ground. NO ATTEMPT SHOULD BE MADE TO USE ONE.



CAPACITORS

C1	1694	Variable
C2, C14		Paper, .05 MFD 200 volts
C3		Paper, .2 MFD 200 volts
C4, C8		Mica or ceramic, 100 MMFD
C5, C13		Paper, .005 MFD 200 volts
C6, C7, C15		Paper, .02 MFD 200 volts
C9, C12		Paper, .001 MFD 200 volts
C10, C11		Paper, .1 MFD 200 volts
C16 A,B,C	2075	Electrolytic

RESISTORS

R1	100,000 ohms, ¼ watt
R2	8200 ohms, ¼ watt
R3	470,000 ohms, ¼ watt
R4	3.3 meg ohms, ¼ watt
R5	10 meg ohms, ¼ watt
R6	Control, volume, DPST Switch, 1 meg ohm
R7	4.7 meg ohms, ¼ watt
R9	2.2 meg ohms, ¼ watt
R10	270 ohms, ¼ watt
R11	820 ohms, ¼ watt
R12	33 ohms, 1 watt
R13	Filter and Filament, dropping

COILS AND TRANSFORMERS

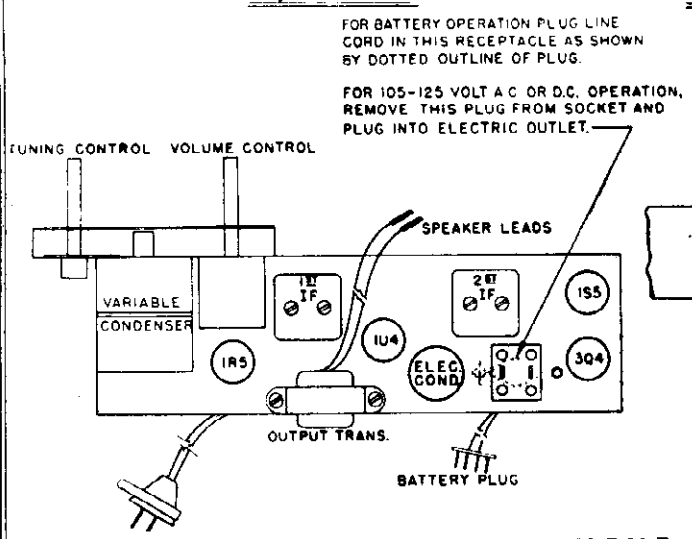
28197	Oscillator coil
L3 3535	Output IF Transformer
T1 1337	Output transformer
L1 28190	Loop

MISCELLANEOUS

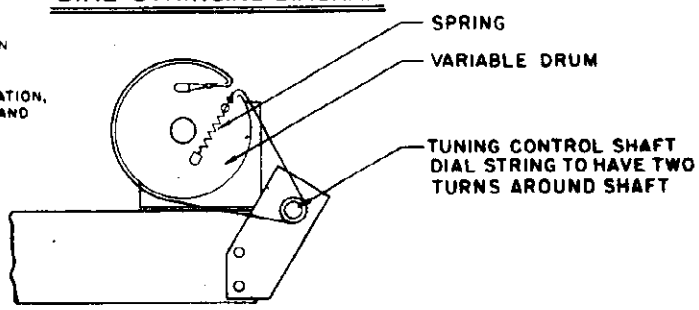
5588	Cord, Line (Polarized)
39164	Knobs
5899	Loud Speaker 4"
472	Cabinet

MODEL M-510 MONITOR EQUIPMENT CORPORATION

TUBE LOCATION



DIAL STRINGING DIAGRAM



ALIGNMENT PROCEDURE

- Output Meter across 3.2 ohm output load
- Volume control at maximum
- Align for maximum output. Reduce input as needed to keep ouput near 0.05 watts
- Connect ground post of signal generator to chassis

SIGNAL GENERATOR				
Frequency	*Connection to Radio*	*Dummy Antenna*	*Tuner Setting*	*Adjust for Maximum Output (in order shown)*
455 KC	Center of antenna section of Gang	0.2 mf	Any	Trimmers on I.F. Can
•1500 KC	* *	* *	Set pointer at second dot from end. On dial pan	Oscillator Trimmer on Gang.
1500 KC	* *	* *	Set pointer at second dot from end. On dial pan	R.F. Trimmer on Gang

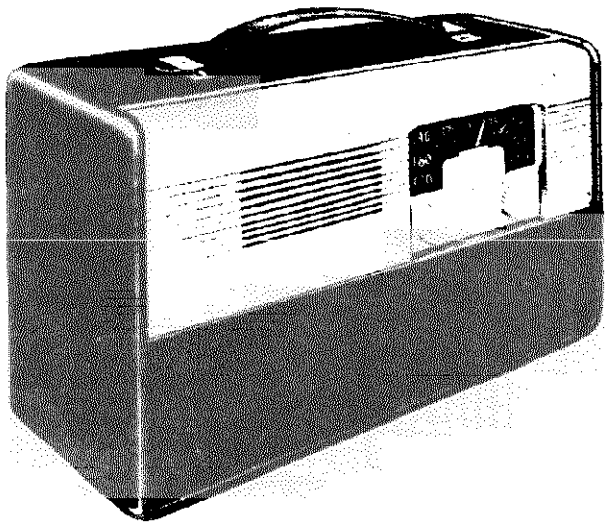
** Run a wire from Output Terminal of the Generator near the Receiver. However, no connection is made between the signal generator and the Receiver.

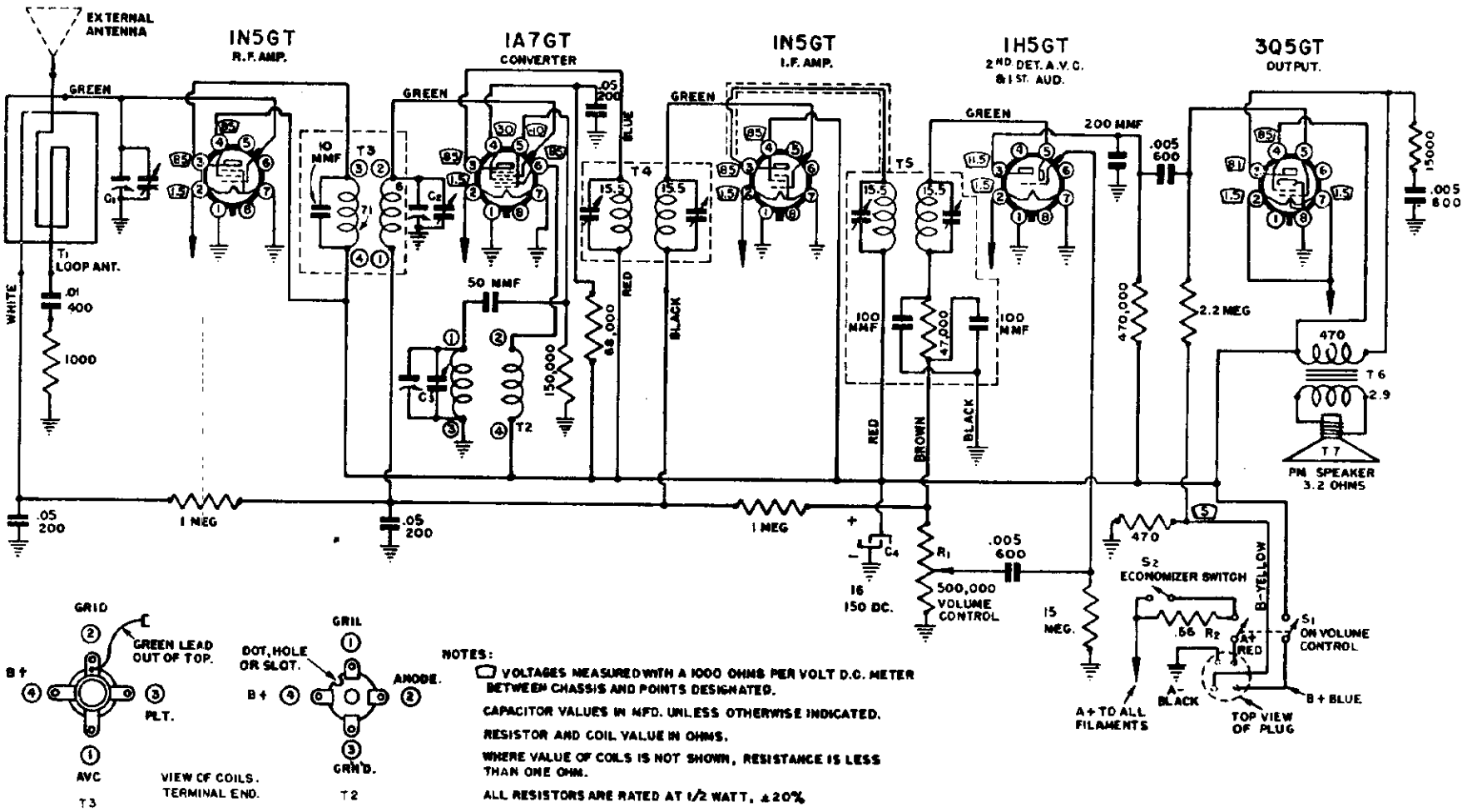
Tuning Range	540-1600
Intermediate Frequency	455 KC
Power Consumption	15 Watts
Selectivity	A.C.A. 12-1

Sensitivity (For 0.05 Watt Output)	300 Microvolts per Meter Average
Power Output (in voice coil):	
Undistorted	130 Watts
Maximum	300 Watts

This receiver is designed to operate without a ground. *NO ATTEMPT SHOULD BE MADE TO USE ONE.*

To remove the chassis from the cabinet, proceed as follows:— Make sure the line cord is disconnected from the power receptacle. Remove the back and disconnect the wires to the loop antenna. Pull the volume and tuning knobs off their shafts. Remove the two mounting screws which hold the chassis mounting shelf in place. The chassis with the mounting shelf can now be slipped out of the cabinet. To remove the chassis from the chassis mounting shelf, it is only necessary to remove the three mounting screws on the bottom of the shelf.





NOTE—Resistor - 68,000 Ohm in Screen Circuit of 1A7GT Tube, Replaced With 33,000 Ohm.

Voltage at Terminal #4 on 1A7GT Tube Increased to 48 (Average).

ELECTRICAL SPECIFICATIONS

BATTERY USED . . . (Wards 62-57): Battery dimensions, 16 x 6⅝ x 4½". "A" 1½ volts. "B" 90 volts. "A" current 300 M. A., B current 11.5 M. A.

TUNING RANGE . . . 535-1620 KC.

INTERMEDIATE-FREQUENCY . . . 455 KC.

SELECTIVITY . . . Over-all band width 35 KC at 1000 X signal at 1000 KC.

SENSITIVITY . . . 12 Microvolts for 50 Milliwatts output.

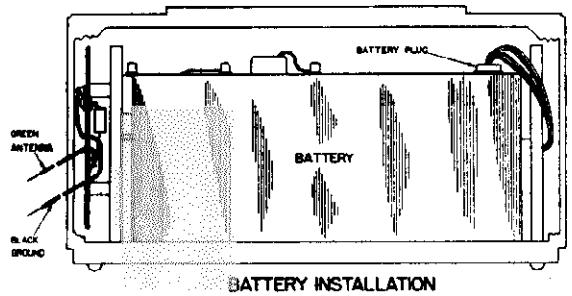
POWER OUTPUT . . . 150 M. W. undistorted 330 M. W. maximum.

LOUD SPEAKER . . . 5 inch diameter P. M. Magnet 2.15 oz. Alnico V. Voice coil 3.2 ohms impedence.

TUBE COMPLEMENT . . . 1N5GT (RF), 1A7GT (Det.-Osc.), 1N5GT (IF), 1H5GT (Det.-Audio), 3Q5GT (Pwr.)

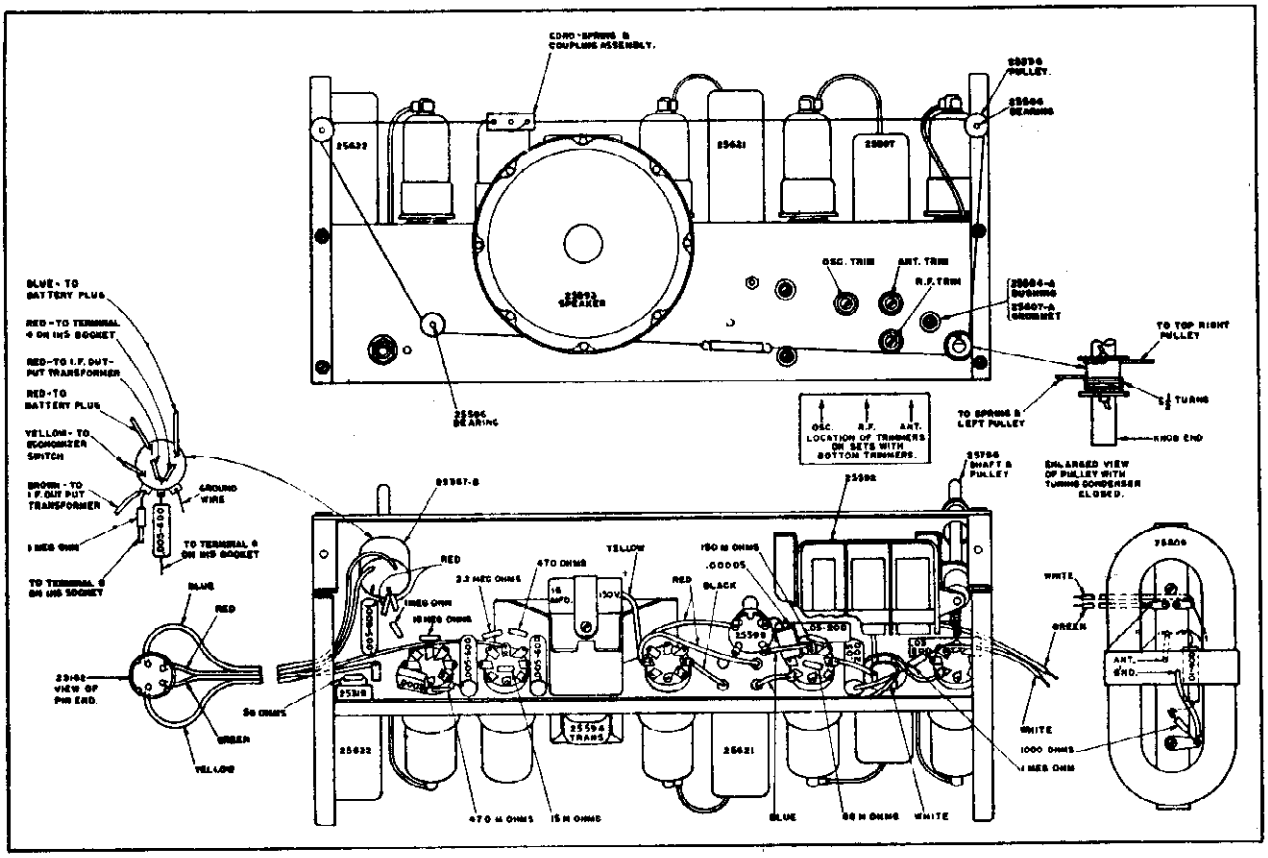
MODEL 54KP-1209B

MONTGOMERY WARD



BATTERY INSTALLATION

REMOVAL OF CHASSIS—If it is found necessary for any reason to remove the radio chassis from the cabinet, proceed as follows: Remove knobs by pulling straight off, disconnect battery by removing plug, and remove two screws inserted through bottom of cabinet. Chassis can be removed now. (Note—After installing chassis in cabinet see that the bakelite strip attached to dial cord is engaged with the pin on the dial pointer.)



ALIGNMENT PROCEDURE

(Position of trimmers shown above)

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Loop antenna should be connected to receiver and in its proper position when making adjustments.

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RADIO	GROUND CONNECTION		
455 KC	.1	Grid Cap of 1N5GT (I.F.)	To Chassis	Capacitor full open (plates out of mesh)	2 trimmers on output IF can T5 (25622)
455 KC	.1	Grid Cap of 1A7GT	To Chassis	Capacitor full open (plates out of mesh)	2 trimmers on input IF can T4 (25621)
1620 KC	200 Mmf	Antenna Lead	To Chassis	Capacitor full open (plates out of mesh)	Oscillator trimmer C3 on gang
1400 KC	200 Mmf	Antenna Lead	To Chassis	Set dial pointer at 1400 KC	Antenna and R. F. trimmers C1, C2 on gang

MODEL 54KP-1209B
MODEL 64WG-1207A
MODEL 64WG-1804C

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 kc and 455 kc signals modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.

The volume control must be set to maximum.

MODEL 54 KP-1209B

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RADIO	GROUND CONNECTION	
1000 KC	200 Mmf or RMA Dummy Antenna	External Antenna Clip	To Ground Lead	12 uv
1000 KC	.1 Mfd.	Grid (Top Connection) of R. F. Amp. (1N5)	To Chassis	20 uv
1000 KC	.1 Mfd.	Grid (Top Connection) of Converter (1A7)	To Chassis	220 uv
455 KC	.1 Mfd.	Grid (Top Connection) of Converter (1A7)	To Chassis	125 uv
455 KC	.1 Mfd.	Grid (Top Connection) I. F. Amp. (1N5)	To Chassis	6000 uv
400 Cycles	.1 Mfd.	Grid (Top Connection) Audio Amp. (1H5)	To Chassis	.1 v.
400 Cycles	.1 Mfd.	Grid (Pin) of Output Amp. (3Q5)	To Chassis	1.5 v.

MODEL 74WG-1207B 64WG-1207A & B

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Antenna Lead	Chassis	10 microvolts
1000 kc	.05 mf	1R5 Mixer, Pin 6	Chassis	30 microvolts
455 kc	.05 mf	1R5 Mixer, Pin 6	Chassis	25 microvolts
455 kc	.05 mf	1U4 1st I-F, Pin 6	Chassis	400 microvolts
455 kc	.05 mf	1U4 2nd I-F, Pin 6	Chassis	3500 microvolts
400 cycles	.05 mf	1S5 1st A-F, Pin 6	Chassis	.031 volt
400 cycles	.05 mf	3Q4 Output, Pin 3	Chassis	2.7 volts

MODEL 64 WG-1804C

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna— External antenna clip	Chassis	19.5 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	150 microvolts
455 kc	.05 mf	12SA7 Mixer—Pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf	12SJ7 1st A-F—Pin 4	Same as above	.042 volt
400 cycles	.05 mf	35L6GT Output—Pin 5	Same as above	1 volt

MODEL 54KP-1209B

MONTGOMERY WARD

REPLACEMENT PARTS INFORMATION

HOW TO ORDER PARTS — When ordering, specify PART number, schematic diagram reference number when applicable, and CHASSIS MODEL number. The model number appears on a label on the chassis.

REPLACEMENT PARTS LIST

Use Only Genuine Factory Replacement Parts

Ref. No.	Part No.	Description	Qty. Used In Set
		CAPACITORS	
C1, C2, C3	25592	3 Gang Tuning Capacitor Including Trimmers	1
C4	25600	Electrolytic 16 Mfd. 150 V.	1
	8661	.05 Mfd. 200 V. Tubular	3
	8583	.01 Mfd. 400 V. Tubular	1
	14061	.005 Mfd. 600 V. Tubular	3
	14370	200 Mmf. Mica	1
	17091	50 Mmf. Mica	1
		RESISTORS	
R1	25367	Control-Volume Including On-Off Switch	1
	14365	15 Megohm 1/2 Watt 20%	1
	25134	2.2 Megohm 1/2 Watt 20%	1
	8766	1 Megohm 1/2 Watt 20%	2
	25042	470,000 Ohm 1/2 Watt 20%	1
	14616	150,000 Ohm 1/2 Watt 20%	1
NOTE—	25040	68,000 Ohm 1/2 Watt 20%	1
	17164	15,000 Ohm 1/2 Watt 20%	1
	25414	1,000 Ohm 1/2 Watt 20%	1
	25085	470 Ohm 1/2 Watt 20%	1
	25613	.56 Ohm 1/2 Watt 10% (Wire Wound)	1
		TRANSFORMERS AND COILS	
T1	25609	Loop Antenna (Includes Mounting Strips and Terminals)	1
T2	25598	Coil - Oscillator	1
T3	25597	Coil - RF (Includes Shield Can and 10 Mmf Condenser)	1
T4	25621	Transformer - IF Input (Complete in Can)	1
T5	25622	Transformer - IF Output (Complete in Can - Includes 2 100 Mmf Capacitors Built-In With Trimmers)	1
T6	25594	Transformer - Speaker (Includes Mounting Clamp)	1

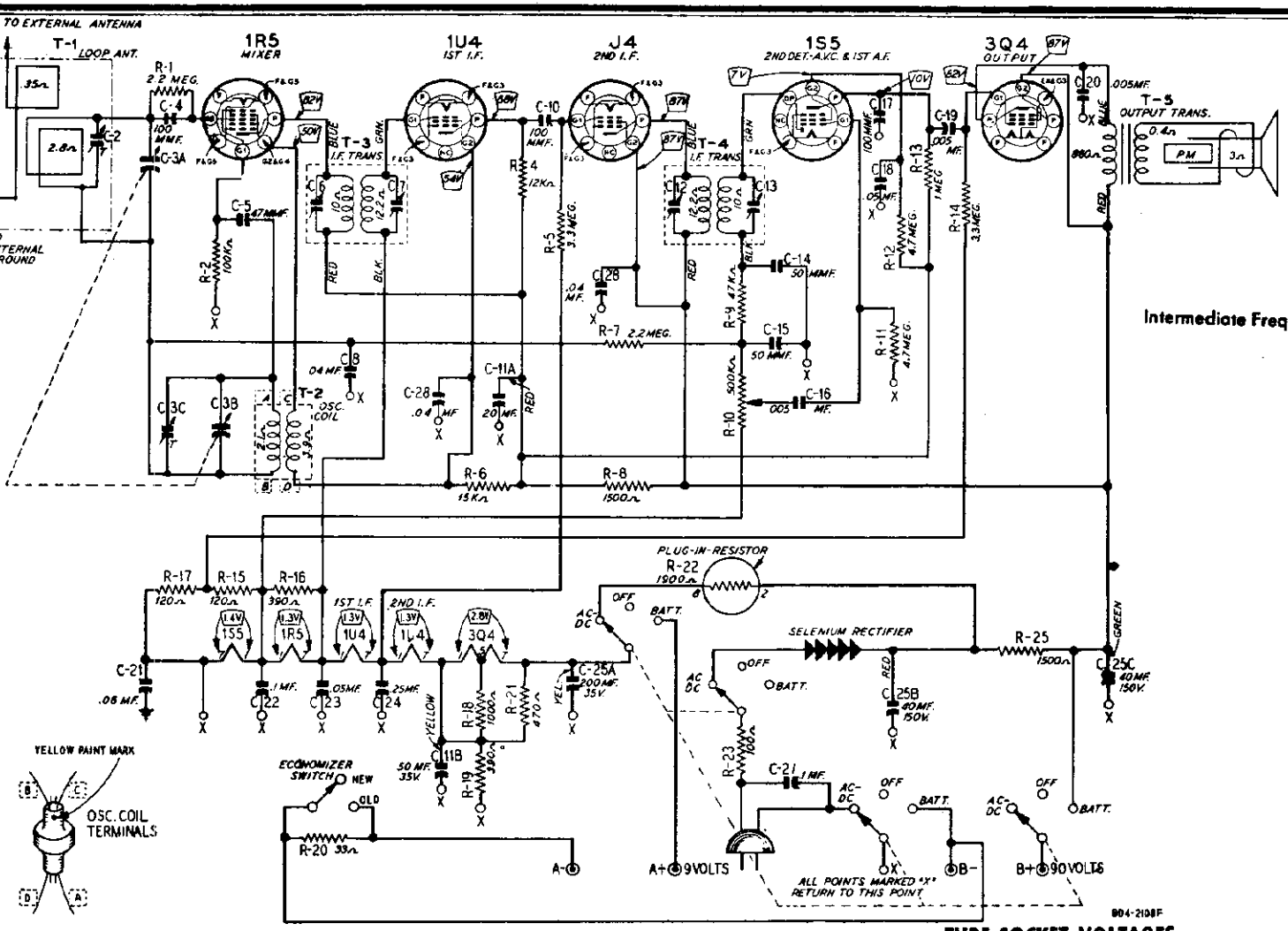
Ref. No.	Part No.	Description	Qty. Used In Set
		SPEAKER	
T7	25593	5" P. M. Speaker	1
		SWITCHES	
S1		Part of Volume Control	
S2	25319	S. P. S. T. Slide Switch	1
		DIAL AND TUNING PARTS	
	25566	Bearing - Short (For Upper Wood Pulleys)	2
	25596	Bearing - Long (For Lower Wood Pulley)	1
	25767	Cord - Dial (Includes Spring and Pointer Coupling)	1
	25336	Pulley - Wood	3
	25809	Plate - Assembly (Includes Dial Backing Plate with Brackets, Track, and Pointer)	1
	25586	Pointer	1
	25581	Track (For Pointer)	1
	25590	Scale - Dial	1
	25766	Shaft - Tuning (Includes "Spool" Pulley)	1
	25774	Screw - Set 8-32 x 1/8 (Used in Worm Gear of Tuning Condenser)	1
	25654	Screw - Wood #4 x 1/4 (Mounting Dial Back Plate)	4
		MISCELLANEOUS	
	25553	Back - Chassis (Removable Back Plate)	1
	25591	Cabinet - Wood	1
	25603	Cap - Grid	4
	25605	End - Chassis	2
	25696	Knob - Bakelite	2
	25612	Plug - 4 Prong (For Battery Cable)	1
	25620	Socket - Octal, For Tubes	5
	25618	Screw - 10-32 x 7/8 (For Mounting Chassis)	2

*The values of the resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value - 50,000 ohms,

RMA value - 47,000 ohms,

NOTE—#25040 resistor replaced with #25144 resistor 33,000 ohm. 1/2 watt 20%.



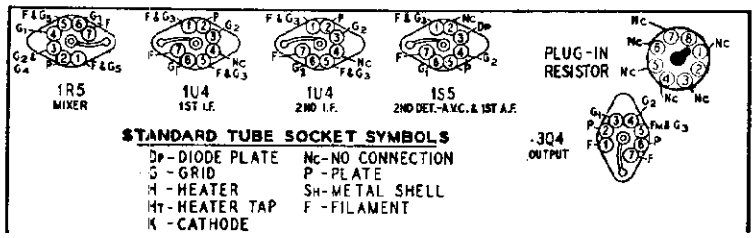
Intermediate Frequency. 455 KC

TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the filaments are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none



STANDARD TUBE SOCKET SYMBOLS

Dp - DIODE PLATE	Nc - NO CONNECTION
G - GRID	P - PLATE
H - HEATER	Sh - METAL SHELL
Ht - HEATER TAP	F - FILAMENT
K - CATHODE	

MODELS 64WG-1052B,
74WG-1C52B

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volt AC across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.
The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Output variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	20 microvolts
1000 kc	.05 mf.	1R5 Mixer—Pin 6	Point "X" (1S5 Pin 1)	30 microvolts
*455 kc	.05 mf.	1R5 Mixer—Pin 6	Same as above	15 microvolts
455 kc	.05 mf.	1U4 1st I-F—Pin 6	Same as above	440 microvolts
455 kc	.05 mf.	1U4 2nd I-F—Pin 6	Same as above	2200 microvolts
400 cycles	.05 mf.	1S5 1st A-F—Pin 6	Same as above	.022 volt
400 cycles	.05 mf.	3Q4 Output—Pin 3	Same as above	1.8 volts

*Short out the oscillator section of the gang condenser while making this measurement.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right 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.

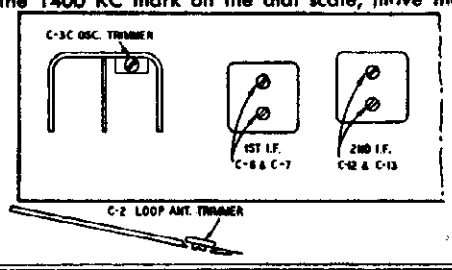
Dummy Antenna—.1 mf., 50 mmf.

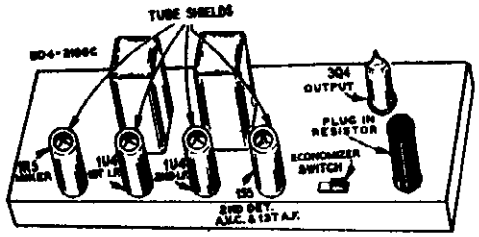
SIGNAL GENERATOR				CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	.1 mf	Control Grid 1U4—1st I-F Pin 6	Point "X" At Electrolytic Capacitor Black Lead	Turn Rotor to full open	2nd I-F (C13) & (C12)
455 kc	.1 mf	Control Grid 1R5—Mixer Pin 6 See Note C	Same as above	Turn Rotor to full open	1st I-F (C7) & (C6)
1620 kc	.1 mf	Control Grid 1R5—Mixer Pin 6	Same as above	Turn Rotor to full open	Oscillator (C3C)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	External Ground connection on loop	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B	Antenna (C2)

NOTE A—Re-assemble chassis in cabinet and close the cabinet back before making adjustment.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, move the pointer on the string to the 1400 KC mark.

NOTE C—Short out the oscillator section of the gang condenser for this adjustment only.





OPERATING VOLTAGES—Chassis for Models 64WG-1052B and 74WG-1052B are available for operation on the following power supplies:

Power Line.....105-125 Volts AC 50-60 Cycles or 105-125 Volts DC

Battery.....Wards Battery { A Section 9 Volts / B Section 90 Volts } Pack No. 62-35

HOW TO ORDER PARTS — Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Parts should be ordered from the nearest Wards Retail Store, Catalog Order office or Mail Order House.

REPLACEMENT PARTS LIST

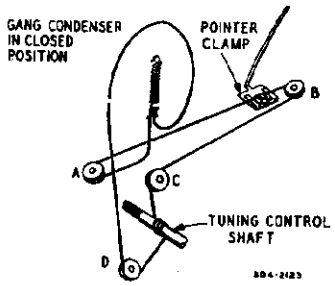
Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C-2	17A123	1.5 mmf-12 mmf Trimmer	1
C-3	14A186	Gang Capacitor with Drive Pulley	1
C-4, C-10, C-17	47X475	100 mmf Moulded	3
C-5	47X463	47 mmf Moulded	1
C-6, C-7, C-8		Part of T-3 (1st I-F Transformer)	
C-28, C-29	B66403	.04 mf 200 V Tubular	3
C-11A, C-11B	45X348	20 mf 150 V / 50 mf 55 V Dry electrolytic	1
C-12, C-13, C-14		Part of T-4 (2nd I-F Transformer)	
C-15	47X113	50 mmf Dual Mica	1
C-16, C-19	B66502	.005 mf 200 V Tubular	2
C-18, C-23	B66503	.05 mf 200 V Tubular	2
C-20	D66502	.005 mf 400 V Tubular	1
C-21	D66603	.06 mf 400 V Tubular	1
C-22	B66104	.1 mf 200 V Tubular	1
C-24	B66254	.25 mf 200 V Tubular	1
C-25A	45X347	200 mf 35 V	1
C-25B		40 mf 150 V Dry	
C-25C		40 mf 150 V electrolytic	
C-27	D67104	.1mf 400 V Tubular	1
RESISTORS			
		Ohms Watts	
R-1, R-7	B85225	2.2 meg. 0.5	2
R-2	B85104	100 K 0.5	1
R-4	B84123	12 K 0.5	1
R-5, R-14	B85335	3.3 meg. 0.5	2
R-6	B84153	15 K 0.5	1
R-8, R-25	B84152	1500 0.5	2
R-9	B85473	47 K 0.5	1
R-10	36X307	500 K Volume control	1
R-11, R-12	B85475	4.7 meg. 0.5	2
R-13	B85105	1.0 meg. 0.5	1
R-15, R-17	B84121	120 0.5	2
R-16, R-19	B84391	390 0.5	2
R-18	B84102	1000 0.5	1
R-20	B85330	33 0.5	1
R-21	B84471	470 0.5	1
R-22	43X215	1900 Shielded W. W. Resistor (Ballast tube)	1
R-23	D84101	100 2.0	1

Ref. No.	Part No.	Description	Qty. Used in Set
TRANSFORMERS AND COILS			
T-1	9A1843	B Range Loop Antenna	1
T-2	9A1296	Oscillator Coil Assembly	1
T-3	9A1840	1st I-F Transformer and Can Assem.	1
T-4	9A1841	2nd I-F Transformer and Can Assem.	1
T-5		Output Transformer (See Miscellaneous)	1
DIAL AND DRIVE ASSEMBLY			
	26A381	Dial Scale Mounting Plate Assembly Complete with Idler Pulleys and Bracket for Drive Shaft Less Dial Scale, Brace Bracket, Drive Shaft and Gang Capacitor	1
	25X1504	Dial Brace Bracket	1
	58K633	Dial Scale	1
	28X56	Snap Button (Mtg. Dial Scale & Celluloid Crystal to Dial Bracket)	6
	17X65	Celluloid Crystal	1
	18X191	Pointer for Dial Scale	1
	25X832	Gang Capacitor Mounting Bracket	1
	6X21, 57X176	Rubber Grommet, Mounting Plate (Mounting Gang Capacitor)	3
	20X329	Cond. Cushion Stud	3
	28X95	Drive Cord Tension Spring	1
		30" Drive Cord	1
	4X942	Escutcheon	1
	26X489	Drive Shaft	1
	19X192	"C" Washer for Drive Shaft	2
MISCELLANEOUS			
	12A443	5¼" P.M. Speaker complete with Output Transformer	1
		Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	1
		Output Transformer (Specify part number and letters stamped on speaker)	1
	25A1019	Selenium Rectifier and Housing Assembly	1
	3A303	Socket-Octal (8 prong) Moulded	1
	3A312	Tube Socket (Miniature)	5
	32X221	Tube Shield	4
	2A175	On-Off Switch (Economizer)	1
	2A203	Changeover Switch (AC-DC, Battery Switch)	1
	13X429	Battery Cable and Plug Assembly	1
		Grille Cloth 4¾"x6½" (426W)	1
	10A595	Knob, Switch	1
	10A596	Knob, Tuning	1
	10A597	Knob, Volume	1
	13X328	Line Cord and Plug Assembly	1
	11X117	Shield, Volume Control and Switch (Paper)	1
	32X368	Shield, Volume Control and Switch (Metal)	1

DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new cord 30" long and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley rim ¼ turn clockwise. Pass cord around pulleys A, B, and C as shown in the illustration. Wind three turns clockwise (viewed from rear of chassis) around tuning control shaft. The turns must progress toward rear of chassis. Pass cord around pulley D and continue ¾ turn clockwise around large drive pulley. Pass cord through the slot in the pulley rim then stretch the tension spring and tie free end of cord to it. Cut off any excess string.

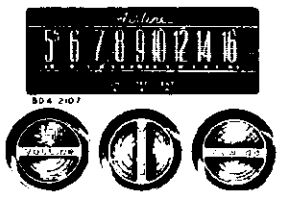


ELECTRICAL SPECIFICATIONS

Power Supply	"A" Battery Supply—9 Volts, 50 Ma. "B" Battery Supply—90 Volts, 11 Ma. or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC
Battery Pack	Ward's Battery Pack No. 62-35
Frequency Range	540-1600 KC
Selectivity	At 1000 KC, 53 KC wide at 1000 times signal
Sensitivity	(for .05 watt output with external antenna) 20 microvolts average
Power Output	0.3 watt maximum 0.125 watt 10% distortion
Loud Speaker	5¼" PM dynamic
Voice Coil Impedance	3.2 ohms at 400 cycles

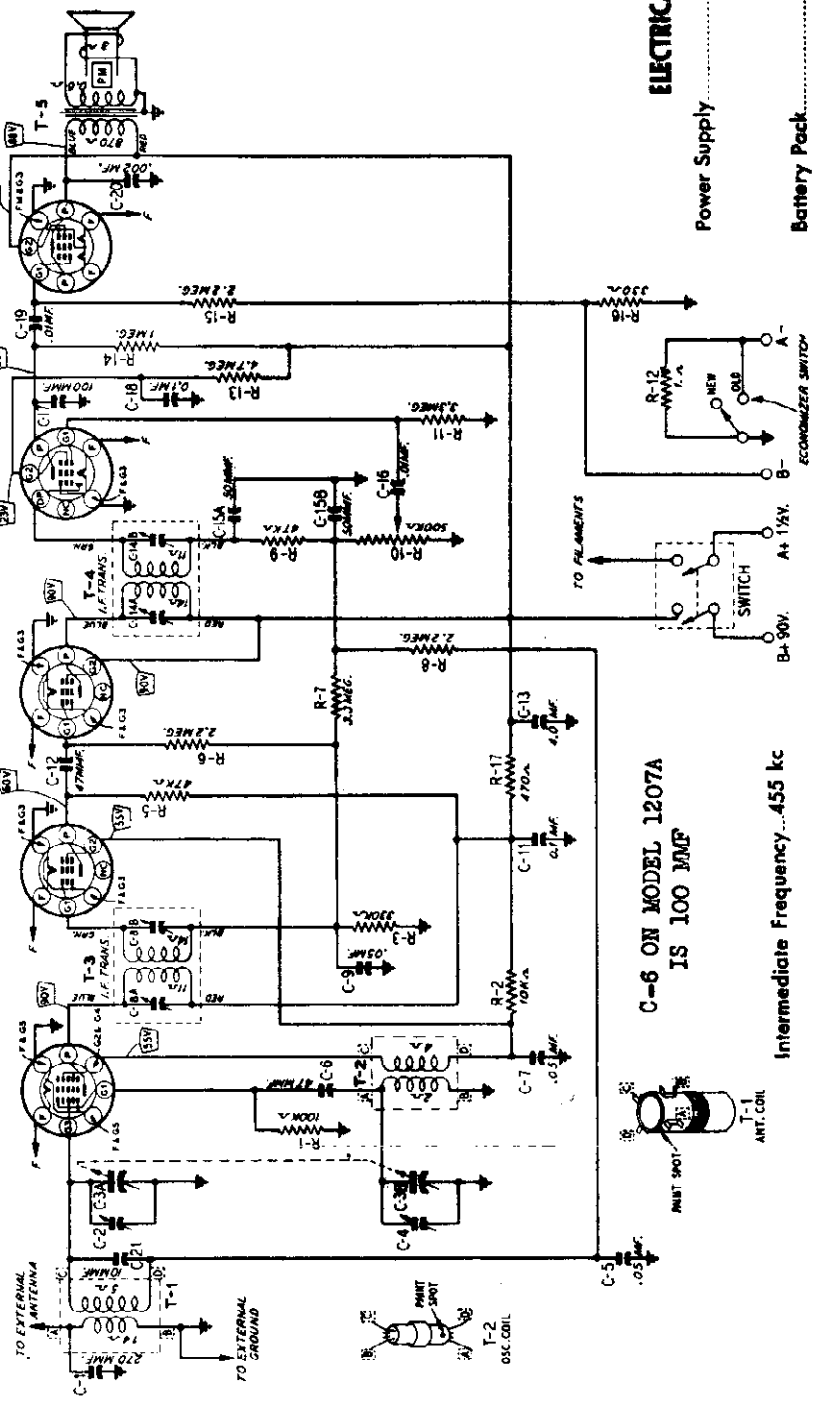
REMOVAL OF CHASSIS FROM CABINET

Pull off the three control knobs and disconnect the battery plug. Unwrap the power cord from the radio at the top of the cabinet if necessary. Remove the four screws that fasten the chassis to the cabinet (2 on the outside at each end of the cabinet). Tip the chassis slightly forward and at the same time withdraw it from the cabinet.



MODELS 64WG-1207A,
64WG-1207B,
74WG-1207B

MONTGOMERY WARD



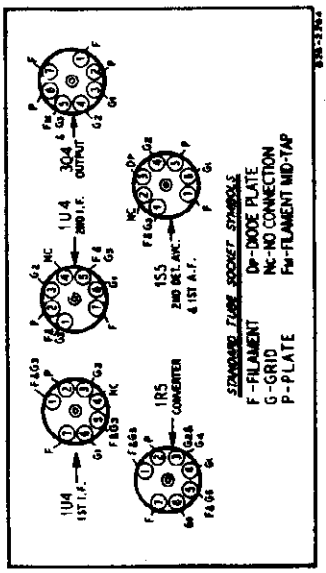
C-6 ON MODEL 1207A IS 100 MMF

Intermediate Frequency....455 kc

ELECTRICAL SPECIFICATIONS

Power Supply.....“A” Battery Supply 1½ volts, 220 Ma.
“B” Battery Supply 90 volts, 12 Ma.
Battery Pack.....Wards Battery Pack 62-51 or 62-57

Frequency Range.....540-1600 kc
Selectivity.....At 1,000 kc, 40 kc broad at 1,000 times signal
Sensitivity.....(For .05 watt output and with external antenna) 10 microvolts average
Power Output.....23 watts maximum
.1 watt 10% distortion
Loud Speaker.....5” PM dynamic
Voice Coil Impedance.....3.2 ohms at 400 cycles



TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and the chassis.

All readings, except those for the 1S5 tube, were taken with a 1000 ohm-per-volt meter and read on a 500 volt scale. The plate and screen voltages for the 1S5 tube were read with a vacuum tube voltmeter.

Conditions of measurement are:

Battery voltages under load.....B, 90 volts
A, 1½ Volts
Volume control.....maximum
Signal input.....none

▲ variation of ±10% is usually permissible.

For sensitivity data, see P.16-3

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

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

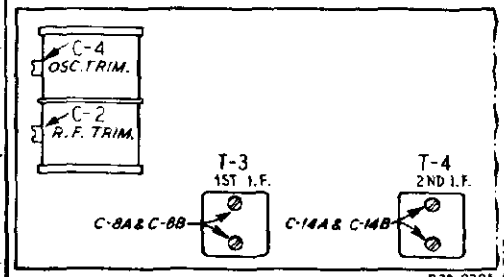
The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antenna—.1 mf., 50 mmf.

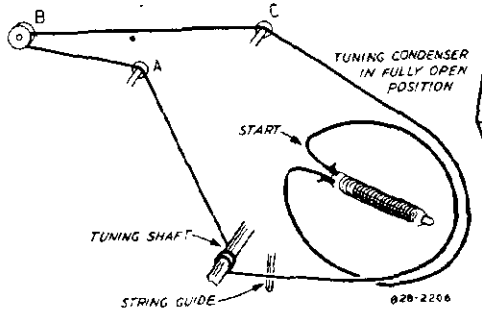
SIGNAL GENERATOR				RECEIVER	
Frequency Setting	**Coupling Capacitor**	**Connection to Radio**	**Ground Connection**	**Condenser Setting**	**Adjust Trimmers for Maximum Output (See Trimmer Illustration)**
455 kc	.1 mf	Control Grid 1R5 Mixer Pin 6	Chassis	Turn Rotor to full open	2nd I-F C-14A and C-14B 1st I-F C-8A and C-8B
1620 kc	.1 mf	Control Grid 1R5 Mixer Pin 6	Chassis	Turn Rotor to full open	Oscillator C-4
1400 kc	50 mmf	External Antenna lead	Chassis	Turn Rotor to Max. Output Set pointer to 1400 kc See note A	Antenna C-2

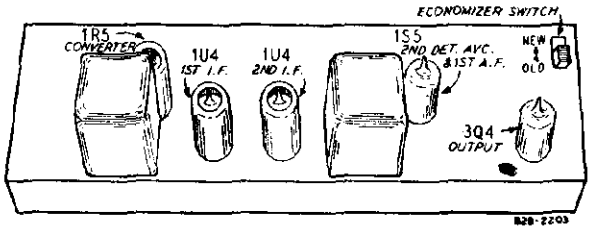


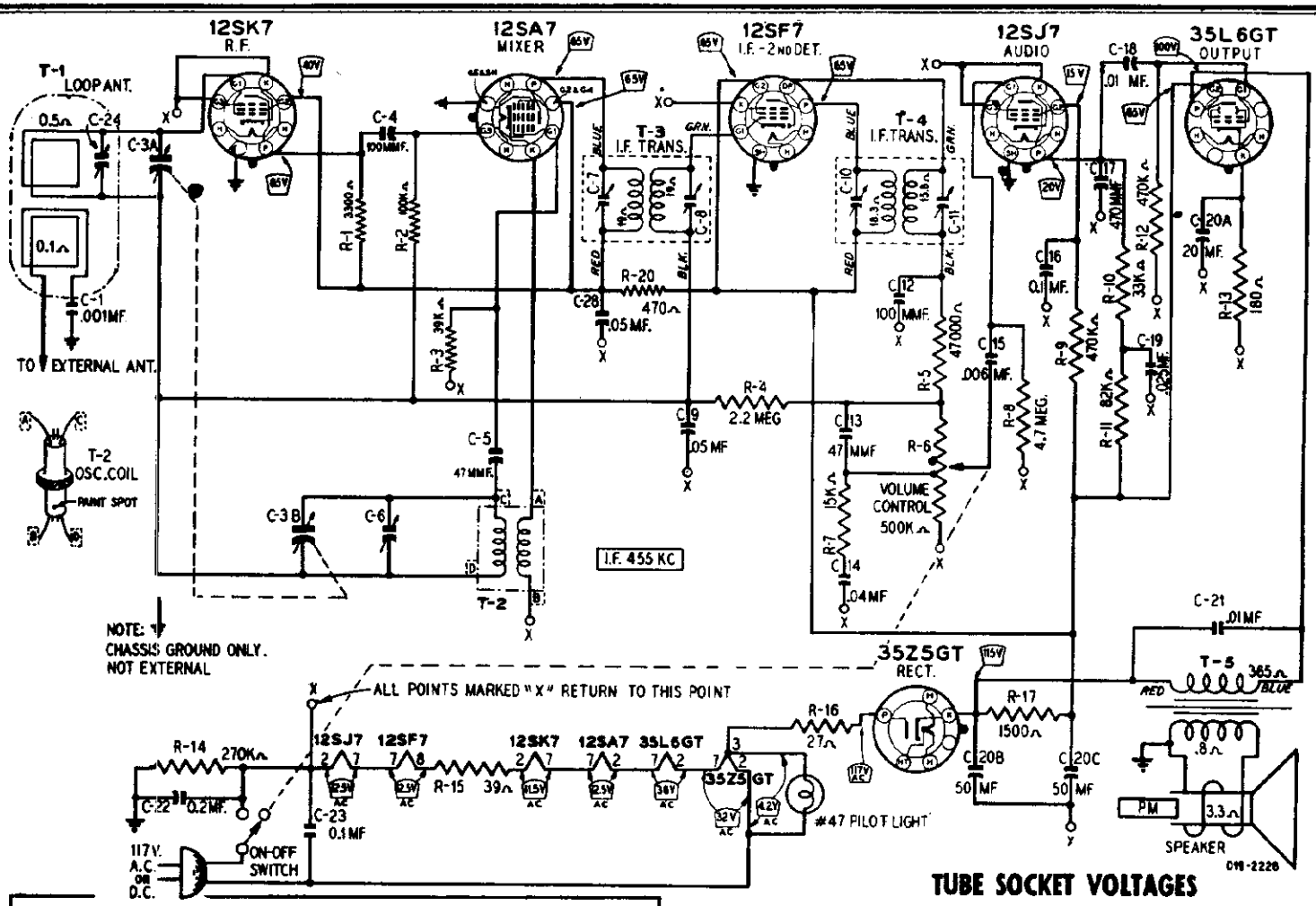
NOTE A—Tune in a 1400 kc signal. If the pointer is not at the 1400 kc mark on the dial, move it along the string to 1400 kc.

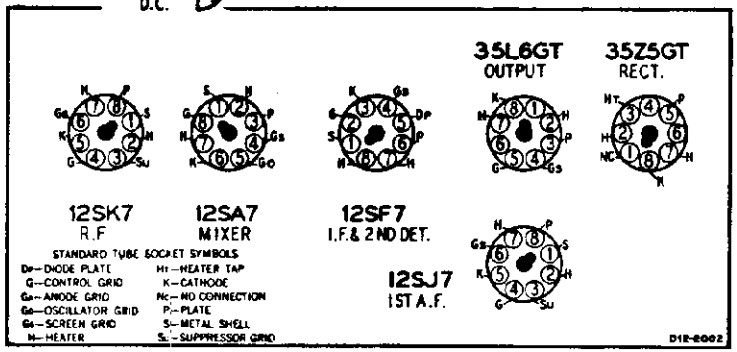
DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position and use a new drive cord 35" long. Tie one end of the new cord to the tension spring and hook the other end of the tension spring over the tab on the large drive pulley. Pass the cord through the opening in the drive pulley rim and continue ¾ turn clockwise around the pulley rim. Pass the cord in front of the string guide, under the tuning shaft and wind 2¾ turns around the shaft with the turns progressing toward the chassis. Run the cord up and over the idler stud A, around pulley B, over idler stud C and then wind ½ turn clockwise around the large drive pulley. Pass the cord through the opening in the pulley rim, stretch the tension spring and tie the free end of the cord to it. Rotate the tuning shaft several times in order to take up any slack in the drive cord. If the installation is satisfactory cut off any excess string and attach the dial pointer.









TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of ±10% is usually permissible.

For condition see P.16-

MODEL 64WG-1804C

MONTGOMERY WARD
ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibration paragraph.

Volume Control—Maximum All Adjustments.

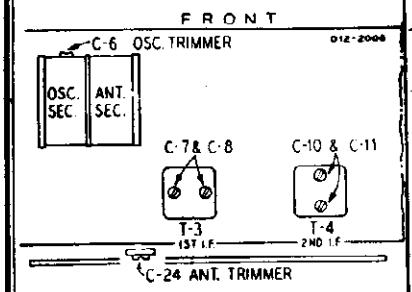
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right 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., 50 mmf.



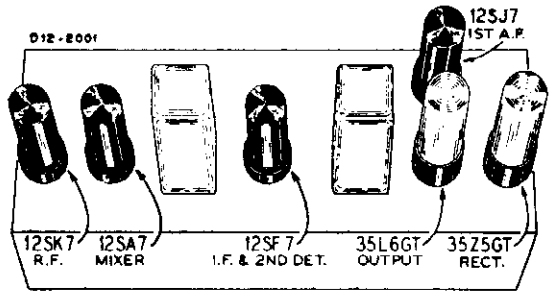
SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	Turn Rotor to full open	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to full open	1st I-F (C7) & (C8)
1620 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to fully open position	Oscillator (C6)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	Turn Rotor to 1400 kc Index Line. See Note A	Antenna (C24)

NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new drive cord 42" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim, around stud A and wind two turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Pass cord around pulley B and studs C and D. Pass cord under drive pulley and wind 1¾ turns counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess cord.

Attach the dial pointer to the cord and position as instructed in paragraph DIAL CALIBRATION.



ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC

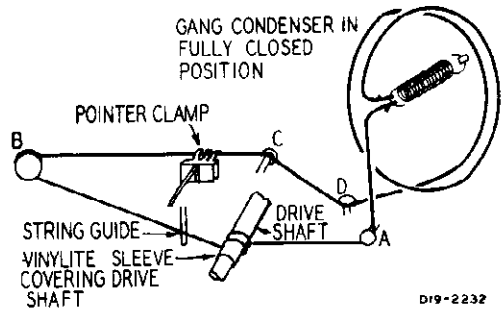
Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal

Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average

Power Output.....1.3 watts maximum
.75 watt 10% distortion

Loud Speaker.....4"x 6" PM dynamic

Voice Coil Impedance...3.2 ohms at 400 cycles

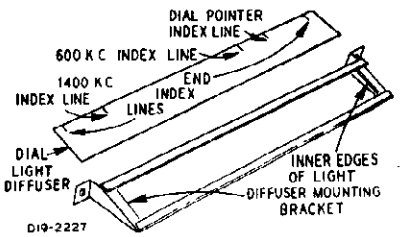


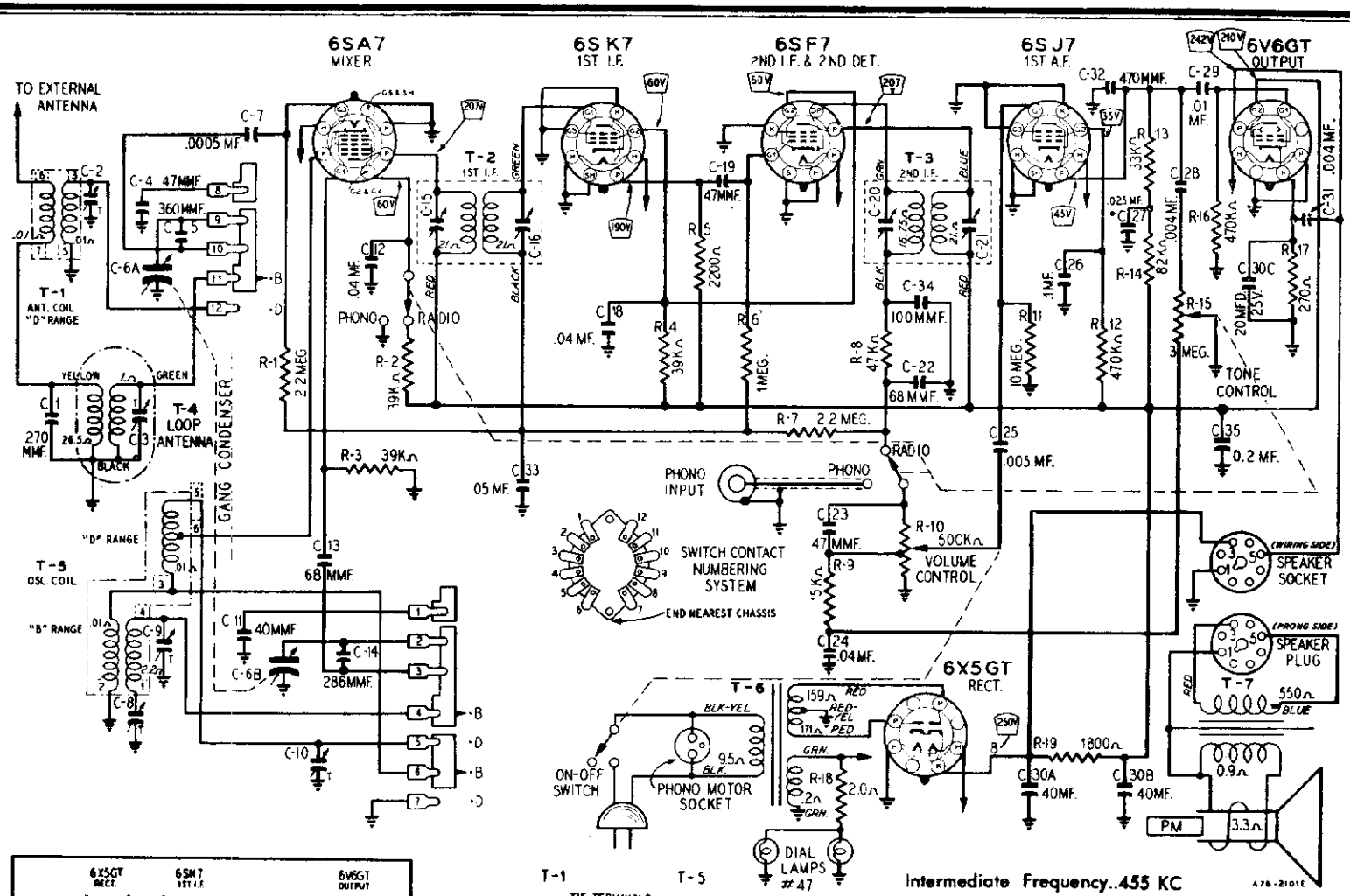
DIAL CALIBRATION

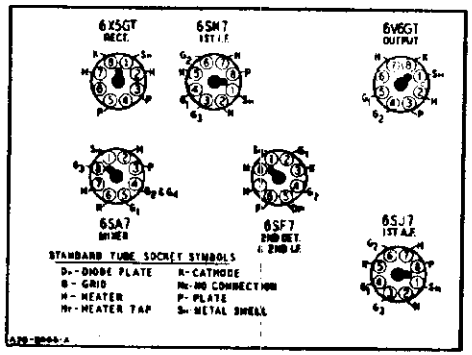
In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

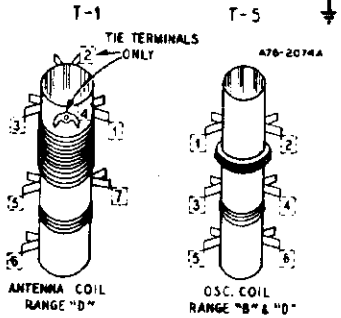
Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration)

The 1400 KC index line is for use when aligning the receiver.









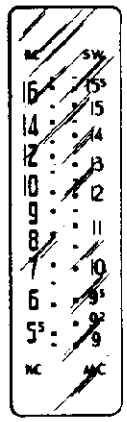
TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

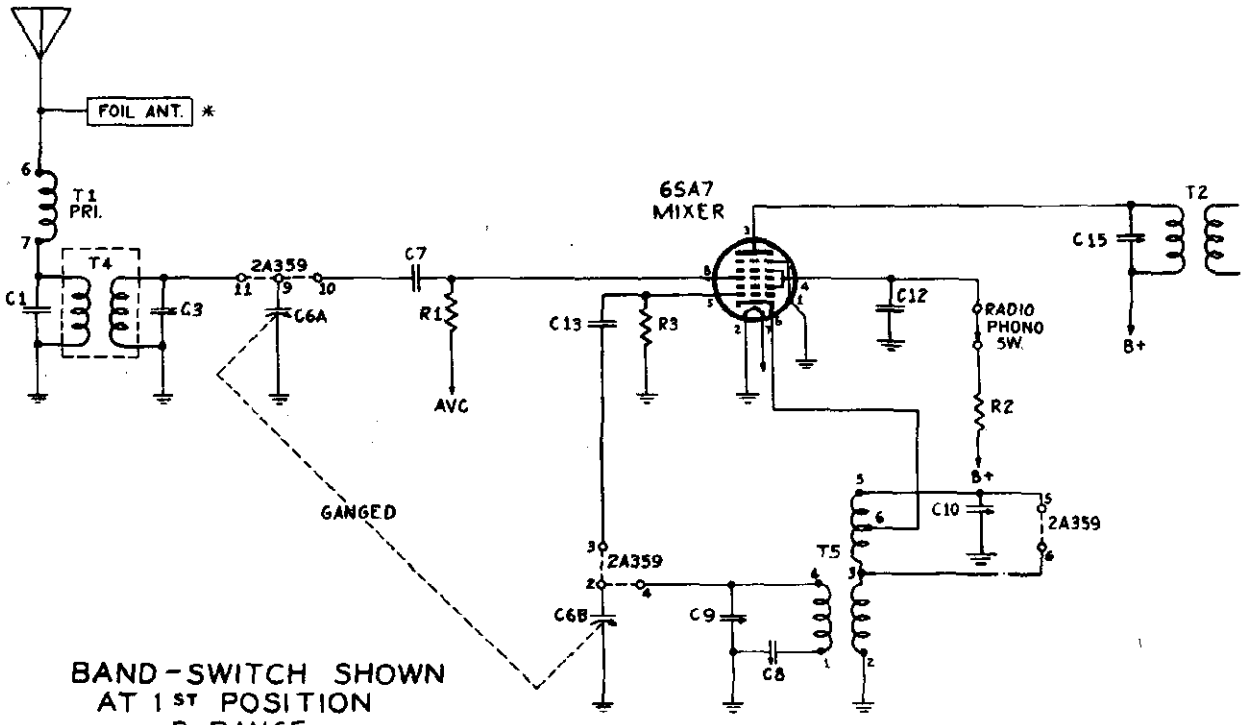
Line voltage	117 volts AC
Volume control	maximum
Signal input	none

A variation of ± 10% is usually permissible.



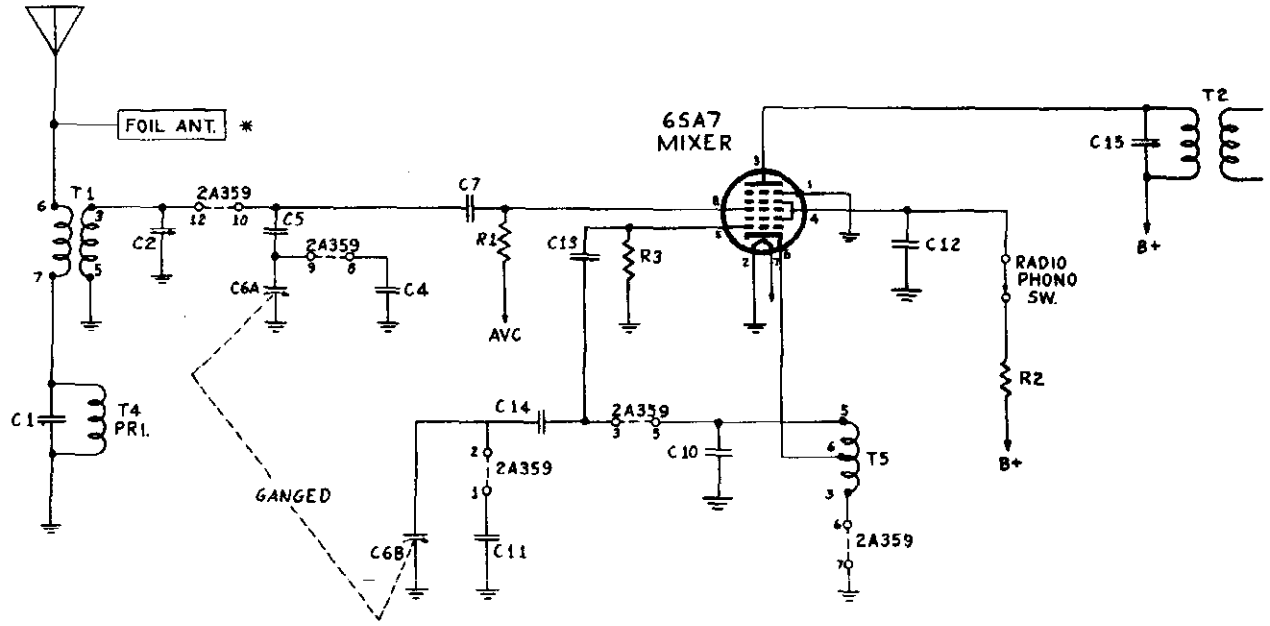
MODELS 64WG-2010A,
64WG-2010B,
74WG-2010B

MONTGOMERY WARD



BAND-SWITCH SHOWN
AT 1ST POSITION
B RANGE
540-1600 KC.

*-NOT USED IN MODEL 74WG-2010B



BAND-SWITCH SHOWN
AT 2ND POSITION
D RANGE
9-15.5 MC.

*-NOT USED IN MODEL 74WG-2010B

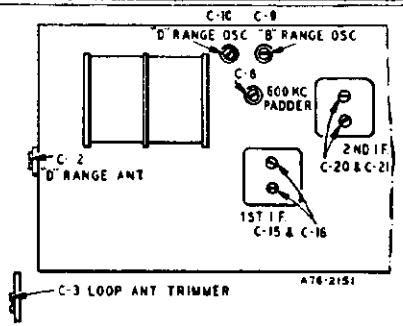
ALIGNMENT PROCEDURE

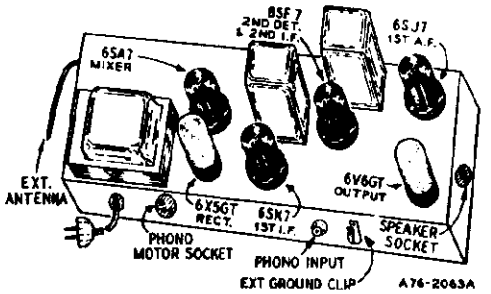
Volume Control—Maximum All Adjustments.

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., 100 mmf., and 400 ohms.





	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SA7, Pin 8	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C-20) & (C-21) 1st I-F (C-15) & (C-16)
RANGE B	1620 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output. Set Indicator to 1400 KC. See Note A	Antenna Range B (C3)
	600 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output	600 kc (C8) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement in output.						
RANGE D	15.6 mc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14 mc	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Antenna Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output	Antenna Range B (C3)

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

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

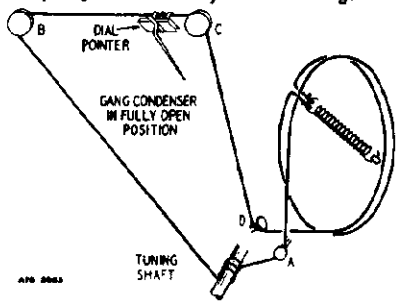
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

50 CYCLE OPERATION

Should it be desired to use the radio and record player on a 50 cycle power supply, it will be necessary to slip a 50 cycle conversion spring over the motor drive shaft on the record player. This conversion spring is listed in the parts list; however, alternate motor sources have been used for the changer and it will be necessary to check the motor assembly number stamped on the motor mounting plate and then order the conversion spring listed in the parts list under that motor.

DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 46" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one and one-half turns counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three and one-half turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord around pulleys B and C and around idler stud D. Wrap cord counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess string.



ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC, 60 cycles, 40 watts. (60 watts phono operating)

Frequency Range.....B range—540-1600 KC
D range—9 to 15.5 MC

Selectivity.....40 KC broad at 1000 times signal, 1000 KC

Sensitivity.....(for .5 watt output) with external antenna
B range—9 microvolts average
D range—20 microvolts average

Power Output.....4 watts maximum
2.3 watts, 10% distortion

Loud Speaker.....6" PM dynamic

Voice Coil Impedance....3.2 ohms at 400 cycles

MONT-WARD PAGE
MODELS 64WG-2010A, 64WG-2010B, 74WG-2010B

MODELS 64WG-2010A,
64WG-2010B, 74WG-2010B
MODELS 74WG-2505A,
74WG-2705A

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES

MODEL 74WG-2010B 64WG-2010A & B

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

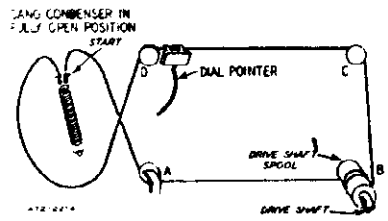
SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead	Chassis	9 microvolts
1000 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	42 microvolts
455 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	40 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1075 microvolts
455 kc	.05 mf	6SF7 2nd I-F, Pin 2	Same as above	3900 microvolts
400 cycles	.05 mf	6SJ7 1st A-F, Pin 4	Same as above	.08 volt
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.75 volts

DRIVE CORD REPLACEMENT

MODEL 74WG-2505A, 2705A

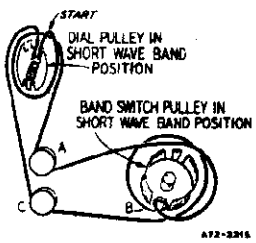
DIAL POINTER CORD

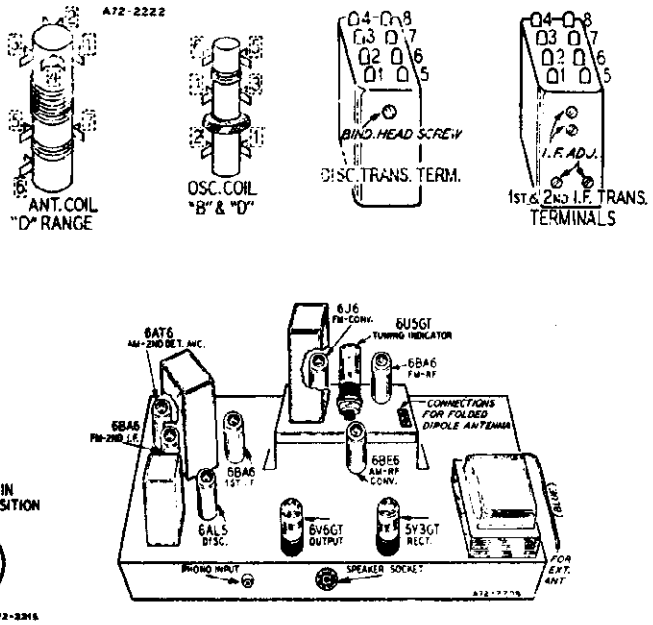
Use a new 10X60 drive cord assembly or a new length of cord 50 inches long for the installation. Install the cord as shown in the illustration winding two turns counterclockwise around the drive shaft spool with the turns progressing towards the front end of the drive shaft. After completing the installation rotate the drive shaft a few turns to take up the slack in the cord.



DIAL ROTATION CORD

Use a new 10X61 drive cord assembly or a new length of cord 21 inches long for the installation. Both the dial pulley and the band switch pulley must be turned to the short wave band positions as shown in the illustration. Install the new cord exactly as shown then change the position of the band switch several times and note the movement of the dial.





ELECTRICAL SPECIFICATIONS

Power Supply	105-125 volts AC 50-60 cycles, 80 watts
Frequency Ranges	Broadcast 540-1600 KC Frequency Modulation 88-108 MC Short Wave 9—15.5 MC
Selectivity	AM—40 KC broad at 1000 times signal, measured at 1000 KC I.F. FM—225 KC broad at 2 times down I.F. FM—700 KC broad at 200 times down
AM Sensitivity	(For .5 watt output with external antenna) Broadcast, 12 microvolts average Short Wave, 20 microvolts average
FM Sensitivity	(For .5 watt output) 25 microvolts average
Power Output	5.2 watts maximum 3.5 watts 10% distortion
Loud Speaker	10" Electro Dynamic
Voice Coil Impedance	3.2 ohms 400 cycles

REPLACEMENT PARTS INFORMATION

OPERATING VOLTAGES—Chassis for Model 74WG-2010B are available for operation on the following power supply:

105-125 volts AC, 60 cycles

HOW TO ORDER PARTS—Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or Mail Order House.

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description			Qty. Used in Set
		CAPACITORS			
C-1	47X445	270 mmf		Moulded	1
C-2	17A164	5-50 mmf		Trimmer	1
C-3	17A123	1.5-12 mmf		Trimmer	1
C-4	47X473	47 mmf		Silvered Mica	1
C-5	47X474	360 mmf		Silvered Mica	1
C-6A, C-6B	14A178	Gang Condenser with Drive Pulley			1
C-7	B66501	.0005 mf	200 V	Tubular	1
C-8	17A155	350-430 mmf		Trimmer	1
C-9, C-10	17A109	2.5-35 mmf		Dual Trimmer	1
C-11	47X472	40 mmf		Silvered Mica	1
C-12, C-18	D66403	.04 mf	400 V	Tubular	2
C-13	47X466	68 mmf		Moulded	1
C-14	47X481	286 mmf		Silvered Mica	1
C-15, C-16, C-19, C-23, C-20, C-21	Part of T-2 (1st I-F Coil Assembly)				
C-17	47X463	47 mmf		Moulded	2
C-22	47X471	68 mmf		Moulded	1
C-24	D64403	.04 mf	400 V	Tubular	1
C-25	D66502	.005 mf	400 V	Tubular	1
C-26	D67104	.10 mf	400 V	Tubular	1
C-27	D64253	.025 mf	400 V	Tubular	1
C-28	D66402	.004 mf	400 V	Tubular	1
C-29	D66103	.01 mf	400 V	Tubular	1
C-30A	45X346	40 mf	450 V	3 Section Electrolytic	1
C-30B		40 mf	450 V		
C-30C		20 mf	25 V		
C-31	F66402	.004 mf	600 V	Tubular	1
C-32	47X505	470 mmf		Moulded	1
C-33	B66503	.05 mf	200 V	Tubular	1
C-34	47X476	100 mmf		Moulded	1
C-35	D67204	.2 mf	400V	Tubular	1
		RESISTORS			
		OHMS	WATTS		
R-1, R-7	B85225	2.2 meg.	0.5	Carbon	2
R-2, R-4	C84393	39 K	1.0	Carbon	2
R-3	B84393	39 K	0.5	Carbon	1
R-5	B84222	2200	0.5	Carbon	1
R-6	B85105	1 meg.	0.5	Carbon	1
R-8	B85473	47 K	0.5	Carbon	1
R-9	B84153	15 K	0.5	Carbon	1
R-10	36X358	500 K		Volume Control and Line Switch	1
R-11	B85106	10 meg.	0.5	Carbon	1
R-12, R-16	B85474	470 K	0.5	Carbon	2
R-13	B84333	33 K	0.5	Carbon	1
R-14	B84823	82 K	0.5	Carbon	1
R-15	*40X276	3.0 meg.		Tone Control and Radio Phono Switch	1
R-17	C84271	270	1.0	Carbon	1
R-18	43X213	2.0	0.5	Wire Wound	1
R-19	D84182	1800	2.0	Carbon	1

Ref. No.	Part No.	Description	Qty. Used in Set
		TRANSFORMERS AND COILS	
T-1	9A1812	"D" Range Antenna Coil Assembly	1
T-2	9A1814	1st I-F Coil Assembly	1
T-3	9A1815	2nd I-F Coil Assembly	1
T-4	9A1816	"B" Range Loop Antenna	1
T-5	9A1813	"B" Range and "D" Range Oscillator Coil Assembly	1
T-6	53X282	117 Volt, 60 Cycle, Standard Power Transformer	1
T-7		Output Transformer (See Miscellaneous)	
		DIAL AND DRIVE ASSEMBLY	
	26A423	Dial Mtg. Plate Assembly Complete with Dial, Background, Diffusers and Spacers	1
	6X21	Rubber Grommet (Mtg Gang)	3
	20X329	Cond. Cushion Stud (Cond.)	3
	26X485	Drive Shaft	1
	19X192	"C" Washer (For Drive Shaft)	2
	15X150	Pointer	1
	28X113	Drive Cord Tension Spring	1
		46" Drive Cord	1
	7A202	Pilot Light Socket Assembly	1
		No. 47 Pilot Light Bulb	2
		MISCELLANEOUS	
	‡12A442	6" P.M. Speaker Complete with Output Transformer	1
		Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	1
		Output Transformer (Specify part number and letters stamped on speaker)	1
	3A303	Tube Socket-Octal (8 prong) Moulded	7
	3A304	Phono Motor Socket	1
	3A305	Phono Socket-Single Pin Tip	1
	2A359	Band Change Switch	1
	13X328	Line Cord and Plug Assembly	1
	10A576	Knob (Tuning)	1
	10A579	Knob (Off-On, Volume)	1
	10A580	Knob (SW BC)	1
	10A581	Knob (Tone-R.P.)	1
		TYPE S-28A119 RECORD CHANGER PARTS	
	S-K22823	Motor, 60 cycle, 117 V	
	S-K228229	50 Cycle Conversion Spring	
	S-Shure P-93	Crystal Pickup Cartridge	
	S-K228250	Motor 60 cycle, 117 V	
	S-K228249	50 Cycle Conversion Spring	

SUBSTITUTE PARTS

The following parts are used in some receivers only. Check part number on old part before ordering and order part originally used in receiver.

*40X281	Tone Control (Substitute for 40X276)
*25X1539	Radio-Phono Switch Lever (When 40X281 is used)
*2A161	D.P.D.T. Switch (When 40X281 is used)
‡12A459	6" P.M. Speaker Complete with Output Transformer

USES SEEBURG MODEL "K" RECORD CHANGER

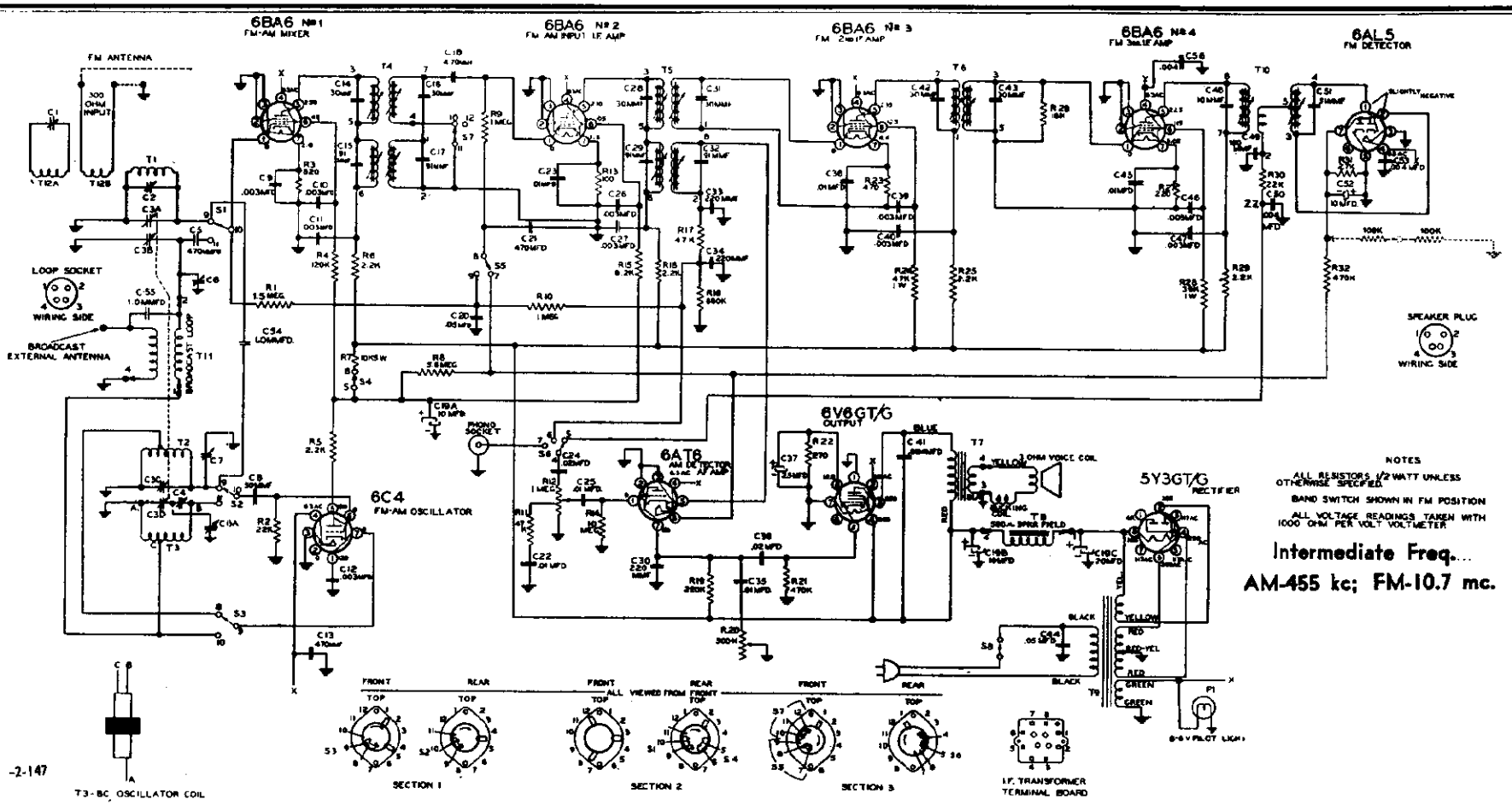
HOW TO ORDER PARTS—When ordering, specify *PART* number, schematic diagram reference number when applicable, and *CHASSIS MODEL* number. The model number appears on a label on the chassis.

REPLACEMENT PARTS LIST

Use Only Genuine Factory Replacement Parts

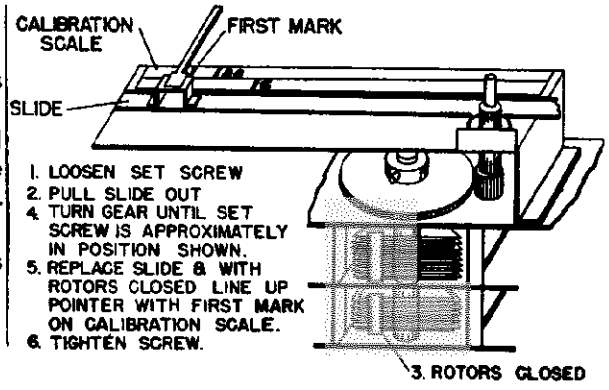
Ref. No.	Part No.	Description	Qty. Used in Set
		R. F. TUNER PARTS	
		CONDENSERS	
C3A-B-C-D	B-8A-11275	Two gang split stator variable	1
C2	A-8E-12079	Trimmer cond. FM antenna	1
C1	A-8E-11506	Trimmer cond. I.F. trap	1
C7	A-8E-11279	Trimmer cond. FM osc. trimmer	1
C6, C6A	A-8E-12557	Trimmer cond. B.C. antenna and oscillator	1
C4	A-8E-12177	Padder cond.—B.C. Band	1
C8	C-8BG-11484	50 mmf, ±10%, ceramic	1
C55	C-1BG-12408	1.0 mmf, ±.2 mmf, ceramic	1
C-9-10-11-12	C-8G-11486	3000 mmf, ±20%, ceramic	4
C5-13	C-8F3-12	470 mmf, 500 volts, ±20% mica	2
		RESISTORS	
R3	C-9BI-61	520 ohms, ½ watt, 10%	1
R12	A-10B-11263	Volume control (1 megohm)	1
R20, S8	A-81A-11262	Tone control (500M ohms) and switch	1
R5, R6	C-9BI-15	2200 ohms, ½ watt, 20%	2
R1	C-9BI-32	1.5 megohms, ½ watt, 20%	1
R2	C-9BI-78	22K megohms, ½ watt, 10%	1
		MISCELLANEOUS	
	A-15C-11491	7-prong miniature tube socket	1
	A-15A-11276	Miniature tube socket, ceramic with base	1
	A-2H-12337	Socket shield base	1
	A-2H-11494	Tube shield	2
	200-12862	Spur gear assembly—consists of two gears, two springs and bushing	1
	A-49A-11673	Spring for above assembly	2
S1-2-3-4-5-6-7	B-20A-11261	Band switch and phono-radio switch	1
	A-2G-11197	Pointer	1
	B-2C-11188	Dial plate assembly with tape guide, bushing, shaft and pinion gears	1
	A-3J-11182	Pinion gear—inner side of plate	1
	A-3J-11183	Pinion gear—outer side of plate	1
	A-3A-11181	Shaft—for pinion gears	1
	B-7J-11190	Rack tape—with teeth and bracket	1
	32F4-10830	B. H. M. S. 4-40 x ½ screw to fasten pointer to bracket	1
	A-6A-11768	Diffuser	1
	B-2M-10383	Cinch button	1
		COILS	
T2	A-13D-11282	88-108 mc oscillator coil	1
T1	A-13E-11283	88-108 mc antenna coil secondary	1
T12A, T12B	A-13E-11284	88-108 mc antenna coil primary with trap	1
		MAIN CHASSIS PARTS	
C52	A-8C-11495	Electrolytic condenser 10 mfd x 150 volts	1
C37	A-8C-11496	Electrolytic condenser, 25 mfd x 25 volts	1
C19A, B, C	A-8C-10272	Electrolytic condenser, 10 mfd x 10 mfd x 20 mfd	1
C24, C36	C-8D-10774	.02 mfd x 400 v., 20%, tubular	2
C20	C-8D-10770	.05 mfd x 200 v., 20%, tubular	1
C22	C-8D-11738	.01 mfd x 200 v., 20%, tubular	1
C25, 35	C-8D-10761	.01 mfd x 400 v., 20%, tubular	2
C41, 50, 53, 56	C-8D-10788	.004 mfd x 600 v., 20%, tubular	4
C49	C-8F3-116	100 mmfd x 500 v., 10%, mica	1
C23, 38, 45	C-8F9-20	10K mmfd x 300 v., 20%, mica	3

Ref. No.	Part No.	Description	Qty. Used in Set
C21, 18	C-8F3-12	470 mmfd x 500 v., 20%, mica	2
C30, 31, 34	C-8F8-10	220 mmfd x 500 v., 20%, mica	3
C44	C-8J-11388	.05 mfd x 600 v., 20%, molded case paper	1
C26-27-39 40-46-47	C-8G-12449	3300 mmfd, 20%, ceramic-insulated	6
C14, 16, 28, 31, 42, 43	C-8G-12159	33 mmfd, 500 volts, 5%, ceramic	6
C48	C-8G-11789	10 mmfd, 10%, ceramic	1
C51	C-8G-11891	51 mmfd, 5%, ceramic	1
C15-17	C-8G-12160	91 mmfd, 5%, ceramic	2
C29-32	C-8F5-224	91 mmfd, 5%, silver mica	2
		RESISTORS	
R4	C-9BI-87	120K ohms, ½ watt, 10%	1
R15	C-9BI-73	8200 ohms, ½ watt, 10%	1
R26	C-9BI-77	18K ohms, ½ watt, 10%	1
R18	C-9BI-96	680K ohms, ½ watt, 10%	1
R24	C-9B2-82	47K ohms, 1 watt, 10%	1
R28	C-9B2-81	39K ohms, 1 watt, 10%	1
R7	B-9C-11489	10K ohms, 5 watts 10%, wire-wound	1
R30	C-9BI-78	22K ohms, ½ watt, 10%	1
R21	C-9BI-29	470K ohms, ½ watt, 20%	1
R22	C-9BI-55	270 ohms, ½ watt, 10%	1
R16, 25, 29	C-9BI-15	2200 ohms, ½ watt 20%	3
R8	C-9BI-107	5.6 megohms, ½ watt, 10%	1
R9, 10	C-9BI-31	1 megohm, ½ watt, 20%	2
R13	C-9BI-50	100 ohms, ½ watt, 10%	1
R11, R17	C-9BI-23	47K ohms, ½ watt, 20%	2
R19	C-9BI-27	220K ohms, ½ watt, 20%	1
R14	C-9BI-37	10 megohms, ½ watt, 20%	1
R27	C-9BI-54	220 ohms, ½ watt, 10%	1
R32	C-9BI-94	470K ohms, ½ watt, 10%	1
R31	C-9BI-79	27K ohms, ½ watt, 10%	1
R23	C-9BI-58	470 ohms, ½ watt, 10%	1
		COILS	
T3	A-13D-11285	B.C. oscillator coil	1
T4	C-203-11743	Input I.F. coil combination assembly, 455 kc and 10.7 mc	1
T5	C-203-11746	2nd I.F. coil combination assembly, 455 kc and 10.7 mc	1
T6	C-203-11744	3rd I.F. coil assembly 10.7 mc	1
T10	C-203-11745	Ratio detector I.F. coil assembly 10.7 mc	1
T11, C55	C-13E-12287	Loop antenna assembly with 1.0 mmfd cond. C-8G-12408	1
		TRANSFORMERS	
T7	B-12C-11253	Output transformer for speaker	1
T9	B-12A-11259	Power transformer—105-125 volts AC, 60 cycles primary	1
		SPEAKER	
T8	C-18B-12404	Electrodynamic speaker, 6 x 9 in., less output transformer	1
		MISCELLANEOUS	
	B-8D-11993	Dial scale	1
	B-58-10376-37	Knob, "Volume"	1
	B-58-11672-37	Knob, "Bandswitch"	1
	B-58-10377-37	Knob, "Tuning"	1
	B-58-10378-37	Knob, "Tone"	1
	B-47A-11889	Pilot lite assembly	1
P1	A-46A-11739	Pilot lite bulb, 6-8 volt, T-44	1
	A-2D-11883	Reflector	1
	A-15B-11538	Speaker socket	1
	A-19B-12170	Socket for tone arm lead	1
	A-19B-11272	Antenna socket	1
	A-15B-10440	8-prong, octal tube socket	2
	A-15C-10717	7-prong, miniature tube socket	5
	A-2H-10718	Shield base	5
	A-2H-10974	Shield can	5
	B-14M-11045-1	A.C. line cord	1
	A-23A-10344	Line cord lock	1



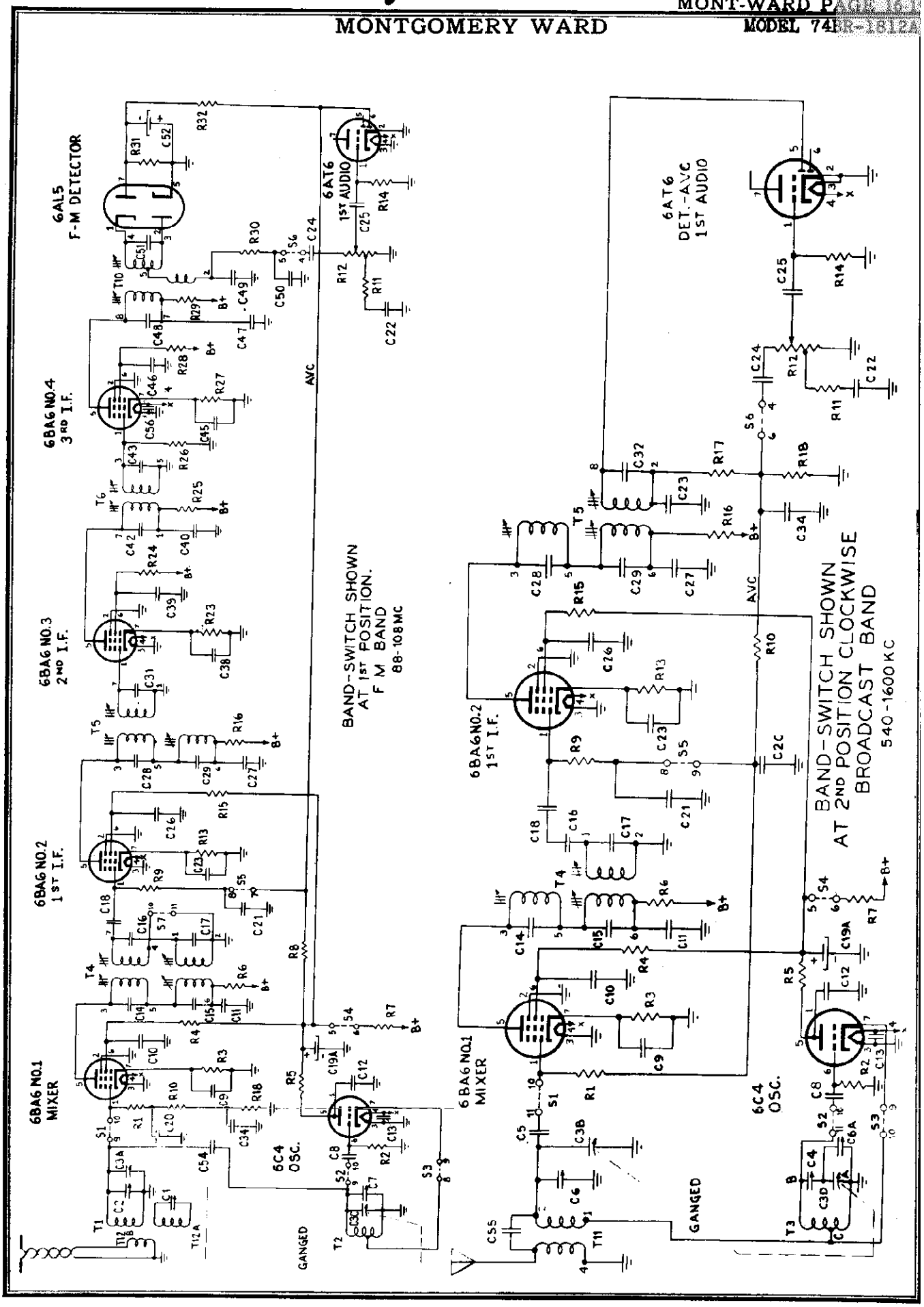
ELECTRICAL SPECIFICATIONS

Power Supply	105 to 125 volts, AC, 50-60-cycles; 85 watts.
Frequency Ranges	Broadcast Band—540 to 1600 kc. FM band—88 to 108 mc.
Selectivity	AM-50 kc. broad at 1000 times signal, measured at 1000 kc.
	I.F. FM-180 kc. broad at 2 times down.
	I.F. FM-290 kc. broad at 10 times down.
AM Sensitivity	(For .5 watt output with external antenna)—20 microvolts average
FM Sensitivity	(For .5 watt output)—15 microvolts average.
Power Output	3.5 watts 10% distortion. 7 watts maximum.
Loud Speaker	6"x 9" oval electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles.



MONTGOMERY WARD

MODEL 741 R-1812A



MODEL 74BR-1812A

MONTGOMERY WARD

ALIGNMENT PROCEDURE

Broadcast Band Section I.F. and R. F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of ½ watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a ½-watt output with the speaker connected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycles audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.

AM - I. F. ALIGNMENT

Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.

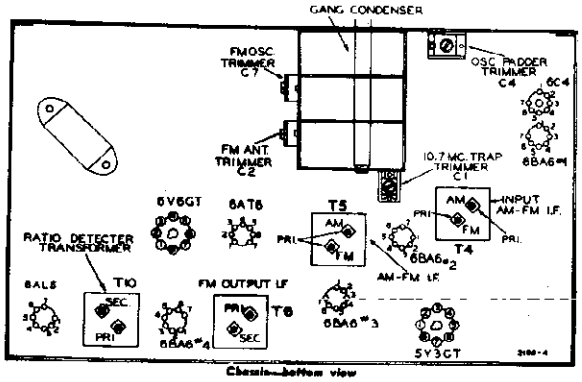
SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENT TO BE MADE	ADJUST FOR
455 Kc. Use 2100 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T5 AM windings. See top and bottom views	Maximum output Should be ½ watt
455 Kc. Use 64 microvolts	Pin No. 1 of 6BA6 No. 1 and ground	Primary and Secondary of T4 AM windings. See top and bottom views	Maximum output Should be ½ watt
400 cycles. Use 63 millivolts	Pin No. 1 of 6AT6 and ground	None	Maximum output Should be ½ watt

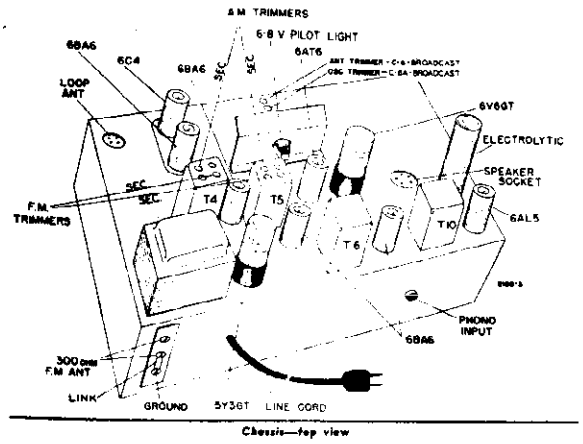
BROADCAST BAND - R. F. ALIGNMENT

Check Pointer so that it is Exactly Over Calibration Marker to the Extreme Left When Gang is Fully Closed. For Adjustment Loosen Set Screw on Large Gear. (see dial mechanism illustration.)

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST
1400 Kc. Use 15 microvolts	Antenna and Ground	200 mmf.	C6A for maximum ½ watt
600 Kc. Use 25 microvolts	Antenna and Ground	200 mmf.	C4 for maximum ½ watt
1400 Kc.	Antenna and Ground	200 mmf	C6 See Note

NOTE: Recheck first two adjustments after this adjustment because of inter-locking effects.





ALIGNMENT PROCEDURE

FM Band Section. I.F. and R.F.

IMPORTANT

No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.

All components used in this radio are extremely stable and the tuned circuits should require no adjustment over long periods of time.

NOTE

The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground". In other words, the meter, when used as a vacuum tube voltmeter, can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

FM - I. F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUSTMENT TO BE MADE	ADJUST FOR
10.7 Mc. Use about .1 volt	Pin No.1 of 6BA6 no. 4 and ground	Pin no. 7 of 6AL5 and ground	Primary of T10	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No.1 of 6BA6 no. 4 and ground	See note "A"	Secondary of T10	Zero. Use zero center scale. See note "B"
10.7 Mc. Use about 4000 microvolts	Pin No.1 of 6BA6 no. 3 and ground	Pin no. 7 of 6AL5 and ground	Primary and Secondary of T6	Resonance should be about 3 volts
10.7 Mc. Use about 150 microvolts	Pin No.1 of 6BA6 no. 2 and ground	Pin no. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T5. See top and bottom views	Resonance should be about 3 volts
10.7 Mc. Use 3000 microvolts	FM Antenna input and ground	Pin no. 7 of 6AL5 and ground	Primary and Secondary of 10.7 mc. windings of T4. See top and bottom views	Resonance should be about 3 volts See Note "C"
10.7 Mc.	FM Antenna input and ground	Pin no. 7 of 6AL5 and ground	C1	Minimum reponse. This is a trap circuit

NOTES ON FM—I.F. ALIGNMENT:

NOTE "A" Connect two resistors, 100K OHMS each, from Pin No. 7 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid point of the resistors and point xx.

NOTE "B" If T10 has been tampered with, it is possible that no crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL: Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

NOTE "C" The input microvolts specified is based on the trap circuits being adjusted.

FM - R. F. ALIGNMENT

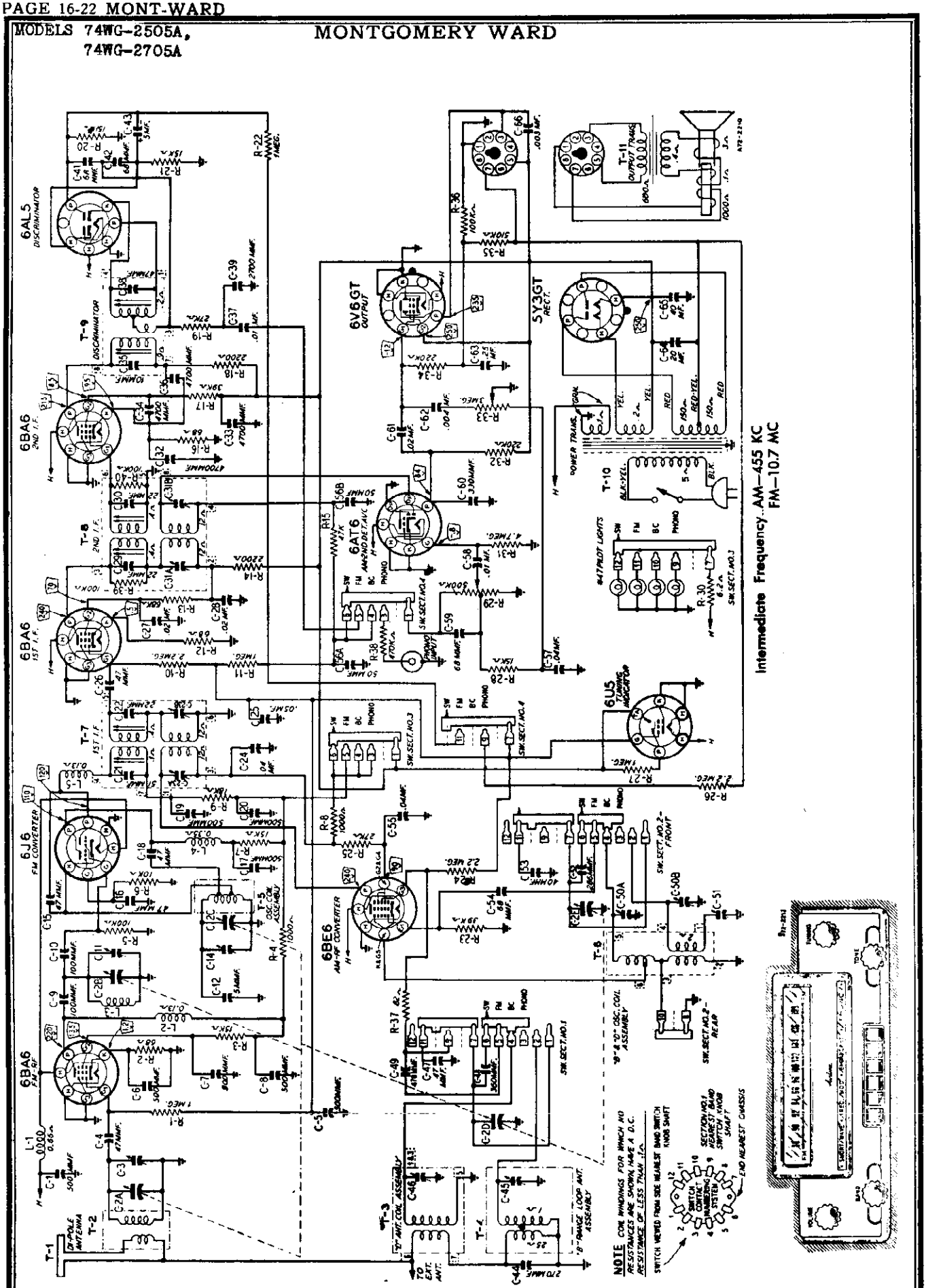
Check Pointer so that it is Exactly Over Calibration Marker to the Extreme Left When Gang is Fully Closed. For Adjustment Loosen Set Screw on Large Gear. (see dial mechanism illustration.)

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUST TO
100 Mc. Use about 15 microvolts	FM Antenna lead	300 ohms	C7 Osc. C2 Ant.	Pin No. 7 of 6AL5 and Ground	Resonance about 3 volts

NOTE: If a signal generator with the above fundamental frequency. is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt meter as above for resonance indication. A weak carrier, however will not produce 3 volts.

MODELS 74WG-2505A,
74WG-2705A

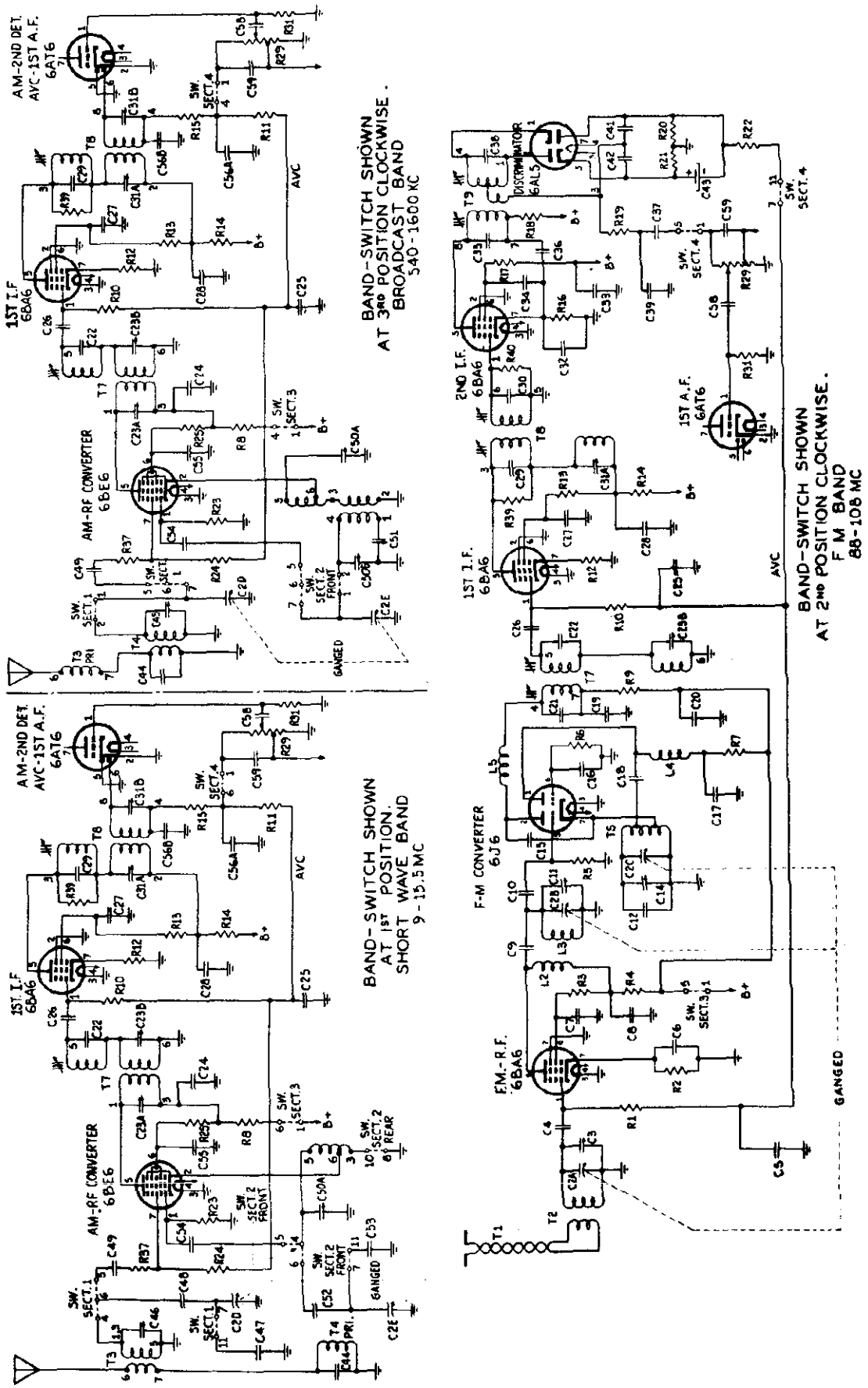
MONTGOMERY WARD



RECORD CHANGER for MODEL 74WG-2705A: Seeburg Model L. P.15-18

MONTGOMERY WARD

MODELS 74WG-2505A
74WG-2705A



MODELS 74WG-2505A,
74WG-2705A

MONTGOMERY WARD

ALIGNMENT PROCEDURE

FM STAGES

Allow chassis and signal generator to warm up for several minutes. The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—.01 mf, 300 ohms and 5000 ohms.

Zero center scale DC vacuum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

	SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUSTMENT FOR MAX. METER DEFLECTION
	FREQUENCY SETTING	CONNECTION AT RADIO				
Discriminator	10.7 MC Note B	6BA6 2nd I-F Pin 1 and Chassis	.01 mf	FM	Rotor to Full Open	Disc. Pri. (1) Note A
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc Sec. Note C (2)
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc. Pri. (1) Note A
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note C (2)
I-F	10.7 MC	6BA6 1st I-F, Pin 1 and Chassis	.01 mf	FM	Same as above	2nd I-F Pri. Note A and D (3) 2nd I-F Sec. Note A and E (4)
	10.7 MC	Connect to the FM-RF Gang Condenser terminal on underside of chassis	.01 mf	FM	Same as above	1st I-F Pri. (5) 1st I-F Sec. (6) Note A
Recheck I-F Adjustments in order given						
R-F & Osc.	108.4	Disconnect dipole and connect generator to dipole terminals with resistor in series	300 ohms	FM	Rotor to full open	Oscillator C-14
	104.5	Same as above	300 ohms	FM	Tune Rotor for Max. AVC voltage	R.F. C-11
	104.5	Same as above	300 ohms	FM	Same as above	Ant. C-3
Recheck R-F and Osc. Adjustments in order given						

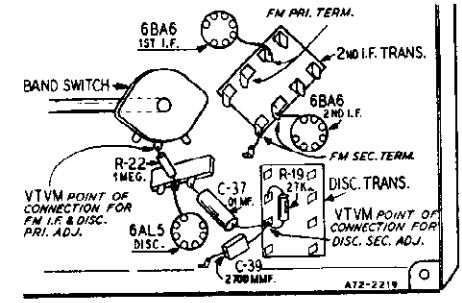
Note A—Test Equipment connections are as given in the table. The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the AVC line at the 1 megohm resistor R-22 and the band switch terminal (as shown in the illustration) for all adjustments except the discriminator secondary adjustment, for which see Note C.

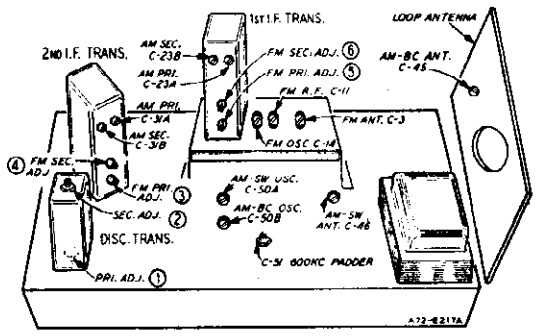
Note B—A signal of .1 volt must be fed into the receiver for this adjustment.

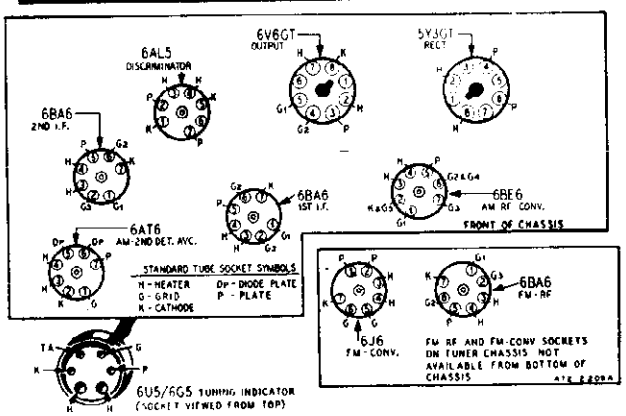
Note C—Disconnect zero center DC vacuum tube voltmeter from AVC and reconnect to junction of R-19, C-37 and C-39 (See illustration). Adjust for zero voltage indication.

Note D—Before adjusting Pri. core connect 5000 ohm load resistor across the 2nd I.F. secondary terminals, (See illustration).

Note E—Disconnect 5000 ohm load resistor from secondary terminals and reconnect across the 2nd I.F. primary terminals, (See illustration).







TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage.....117 Volts AC

Signal Input.....None

A variation of ±10% is usually permissible.

RECEIVER STAGE SENSITIVITIES
AM AND AUDIO STAGES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output.

The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations in sensitivity of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RECEIVER	GROUND CONNECTION	
1000 KC	200 mmf or RMA Dummy Antenna	External Antenna Lead	Chassis	25 Microvolts
1000 KC	.05 mf	6BE6 Converter Pin 7	Chassis	60 Microvolts
455 KC	.05 mf	6BE6 Converter Pin 7	Chassis	58 Microvolts
455 KC	.05 mf	6BA6 1st I-F Pin 1	Chassis	2400 Microvolts
400 cycles	.05 mf	6AT6 1st A-F Pin 1	Chassis	.05 Volt
400 cycles	.05 mf	6V6GT Output Pin 5	Chassis	2.8 Volts

FM STAGES

The table below lists the sensitivity for the FM stages of the receiver. The receiver must be tuned to 98 MC for all readings. Measurements are based on a .5 watt output the same as for the AM and Audio stage measurements.

The signal source must be an accurately calibrated signal generator capable of supplying a 98 MC signal modulated by a 400 cycle audio signal. For these measurements the generator must be adjusted for a 22.5 KC deviation. This will correspond to 30% AM modulation.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING TO RECEIVER	CONNECTION TO RECEIVER	GROUND CONNECTION	
98 MC	300 ohms	External Antenna Terminal	External Ant. Terminal	30 microvolts
10.7 MC	.01 mf	6BA6 1st I-F Pin 1	Chassis	1200 microvolts
10.7 MC	.01 mf	6BA6 2nd I-F Pin 1	Chassis	37,000 microvolts

ALIGNMENT PROCEDURE
AM BROADCAST AND SHORT WAVE BAND

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		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	FREQUENCY SETTING	CONNECTION AT RADIO				
I-F	455 kc	6BE6 Pin 7	.1 mf	Broadcast	Rotor Fully Open	2nd I-F C-31B & C-31A 1st I-F C-23B & C-23A
Broadcast	1620 kc	External ant. lead	200 mmf	Broadcast	Rotor Fully Open	Oscillator C-50B
	1400 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output Set pointer to 1400 kc See Note A	Antenna C-45
	600 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output and Rock See Note B	600 Kc padder C-51
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer C-50B causes no further improvement in output.						
Short Wave	15.5 MC	External antenna lead	400 ohm	Short Wave	Rotor Fully Open	Oscillator C-50A
	15 MC	External antenna lead	400 ohm	Short Wave	Turn Rotor to Max. Output	Antenna C-46
Reassemble chassis in cabinet						
Broadcast	1400 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output	Antenna C-45

After each range is completed, repeat the procedure as a final check.
Note A—If the pointer is not at 1400 KC on the dial, reset pointer at the 1400 KC mark on the dial scale.

Note B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

OPERATING VOLTAGES— Chassis for Models 74WG-2505A are available for operation on the following power supply:

105-125 volts AC, 50-60 cycles

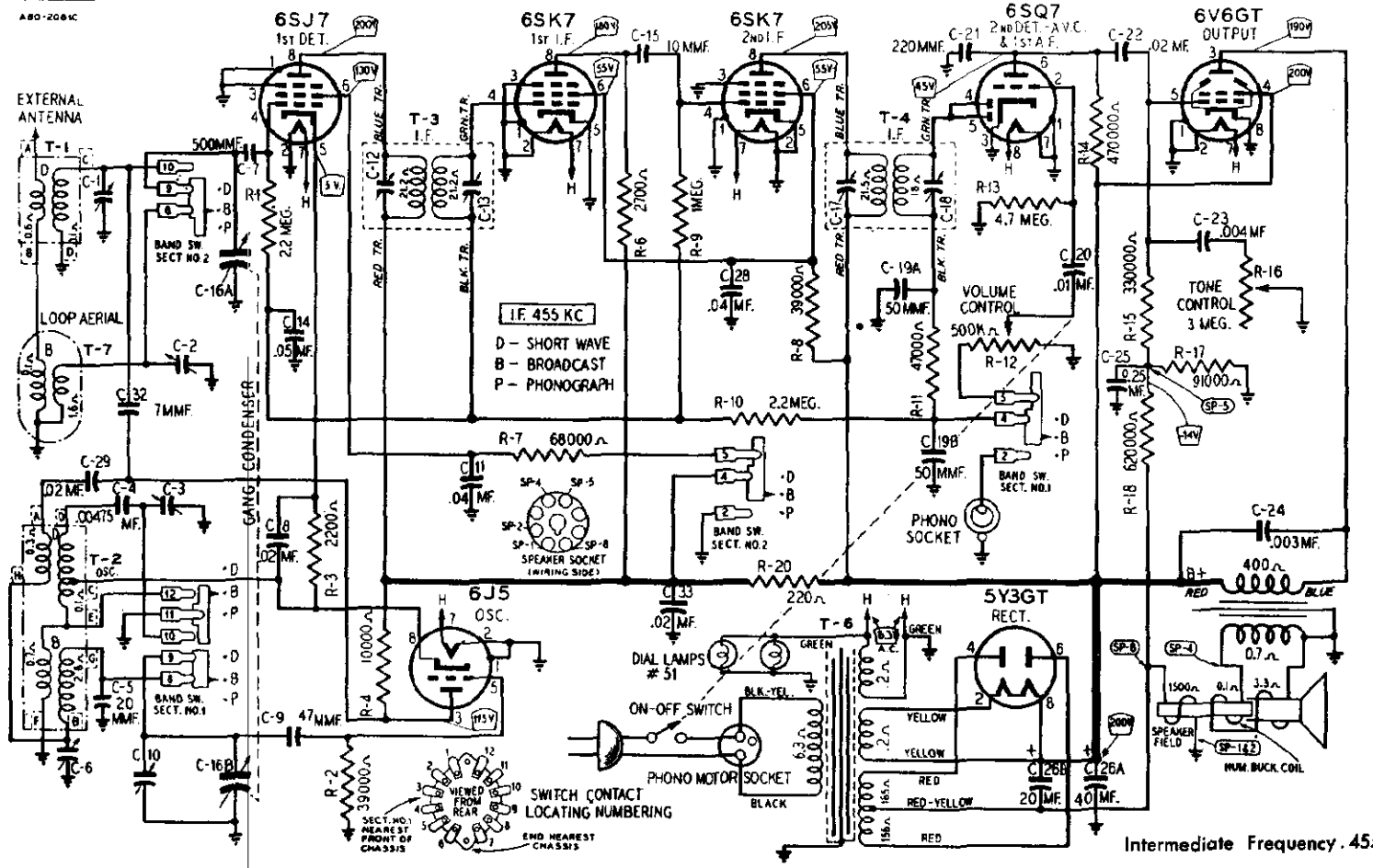
HOW TO ORDER PARTS— Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or Mail Order House.

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description			Qty. Used in Set
		CAPACITORS			
C-1 thru C-6					
C-7 thru C-8	47X496	500 mmf		Ceramic	8
C-17 thru C-20					
C-2	26A433	Tuner & Gang Condenser Assembly			1
C-3	17A249	5-25 mmf		Trimmer	1
C-4 thru C-16 thru C-26	47X495	47 mmf		Ceramic	3
C-9 thru C-10	47X497	100 mmf		Ceramic	2
C-11 thru C-14	17A247	3-12 mmf		Trimmer	2
C-12	47X500	5 mmf		Ceramic	1
C-15 thru C-38	47X499	47 mmf		Ceramic	2
C-18	47X498	47 mmf		Ceramic	1
C-21	47X488	51 mmf		Ceramic	1
C-22 thru C-29 thru C-30	47X487	22 mmf		Ceramic	3
C-23A thru C-23B thru C-31A thru C-31B	17A248	70-150 mmf		Dual Trimmer	2
C-24 thru C-35	D66403	.04 mf	600 V	Tubular	2
C-25	B66503	.05 mf	200 V	Tubular	1
C-27 thru C-28 thru C-61	*D66203*	*.02 mf*	*400 V*	*Tubular*	3
C-32 thru C-33 thru C-34 thru C-36	47X491	4700 mmf		Molded	4
C-35	47X489	10 mmf		Ceramic	1
C-37 thru C-38	D66103	.01 mf	200 V	Tubular	2
C-39	47X492	2700 mmf		Molded	1
C-41 thru C-42 thru C-54 thru C-59	47X501	68 mmf		Ceramic	4
C-43	45X352	5 mf	250 V	Dry Electrolytic	1
C-44	47X445	270 mmf		Molded	1
C-45	17A123	1.5-12 mmf		Trimmer	1
C-46	17A244	5-50 mmf		Trimmer	1
C-47	47X503	47 mmf		Ceramic	1
C-48	47X474	360 mmf		Silvered Mica	1
C-49	47X467	470 mmf		Molded	1
C-50A thru C-50B	17A246	3.2-35 mmf		Dual Trimmer	1
C-51	17A241	300-475 mmf		Trimmer	1
C-52	47X481	286 mmf		Silvered Mica	1
C-53	47X504	40 mmf		Ceramic	1
C-56A thru C-56B	47X112	50 mmf		Dual Mica	1
C-57	B66403	.04 mf	200 V	Tubular	1
C-60	47X470	330 mmf		Molded	1
C-62	B66402	.004 mf	200 V	Tubular	1
C-63	B66254	.25 mf	200 V	Tubular	1
C-64	*45X351*	*20 mf*	*450 V*	*Dry Electrolytic*	1
C-65	45X302	40 mf	450 V	Dry Electrolytic	1
C-66	D66302	.003 mf	400 V	Tubular	1
		RESISTORS			
		Ohms	Watts		
R-1 thru R-11 thru R-22	B85105	1 meg	0.5	Carbon	3
R-2 thru R-12 thru R-16	B83680	68	0.5	Carbon	3
R-3 thru R-28	B85153	15K	0.5	Carbon	2
R-4 thru R-8	B85102	1K	0.5	Carbon	2
R-5	*B85104*	*100K*	*0.5*	*Carbon*	1
R-6	B84103	10K	0.5	Carbon	1
R-7	DB5153	15K	2.0	Carbon	1
R-9	C85183	18K	1.0	Carbon	1
R-10 thru R-24 thru R-26	B85225	2.2 meg	0.5	Carbon	3
R-13	C84683	68K	1.0	Carbon	1
R-14 thru R-18	B85222	2200	0.5	Carbon	2
R-15	B85473	47K	0.5	Carbon	1
R-17	C84393	39K	1.0	Carbon	1
R-19	B84273	27K	0.5	Carbon	1
R-20 thru R-21	B83153	15K	0.5	Carbon	2
R-23	B84393	39K	0.5	Carbon	1
R-25	C84273	27K	1.0	Carbon	1
R-27	Part of 13X549 Cable and Socket assembly				1
R-29	36X363	500K		Volume Control	1
R-30	43X217	6.2	0.5	W.W.	1
R-31	B85475	4.7 meg	0.5	Carbon	1
R-32 thru R-34	B85224	220K	0.5	Carbon	2
R-33	40X239	3.0 meg		Tone Control	1
R-35	B85514	510K	0.5	Carbon	1
R-36	B83104	100K	0.5	Carbon	1
R-37	B84820	82	0.5	Carbon	1
R-38	B85474	470K	0.5	Carbon	1
R-39 thru R-40	B84104	100K	0.5	Carbon	2
		TRANSFORMERS AND COILS			
L-1	9A1881	Filament Choke Assembly			1
L-2 thru L-3	9A1880	FM Mixer Plate Choke			2
L-3	9A1874	R-F Coil			1
L-4	9A1882	FM Oscillator Plate Choke			1
T-1	9A1900	Bi-Pole Antenna			1
T-2	9A1875	Antenna Coil Assembly			1
T-3	9A1812	"D" Antenna Coil Assembly			1
T-4	26A436	"B" Range Loop Antenna Assembly			1
T-5	9A1873	Oscillator Coil Assembly			1
T-6	9A1813	"B" and "D" Oscillator Coil Assembly			1
T-7	9A1876	1st I-F Coil Assembly			1
T-8	9A1877	2nd I-F Coil Assembly			1
T-9	9A1895	Discriminator Coil Assembly			1
T-10	53X286	Power Transformer (60 cycle)			1
T-10	53X287	Power Transformer (25 cycle			1
T-10	53X288	Power Transformer (40 cycle)			1
T-11		Output Transformer (see miscellaneous)			1

Ref. No.	Part No.	Description	Qty. Used in Set
		MISCELLANEOUS	
	12A470	10" E.D. Speaker complete with output transformer	1
		Cone and voice coil assembly (specify part number and letters stamped on speaker)	
		Output transformer (specify part number and letters stamped on speaker)	
	3A303	Tube socket—octal (8 prong) molded	3
	3A425	Tube socket—miniature	5
	32X386	Tube shield—miniature	7
	3A427	*Tube socket—Miniature (for FM R-F and Converter Tubes)*	2
	13X549	Cable and socket assembly—tuning indicator	1
	3A305	Phono Socket—single pin	1
	3A304	*Phono motor socket*	1
	2A367	Band switch	1
	13X328	Line cord and plug assembly	1
	10A510	Knob—tuning-band-tone	3
	10A513	Knob—volume control and switch	1
	10A509	Push Button	6
	22X320	Push Button Spring	6
	26A439	Escutcheon Assembly	1
	4X870	Escutcheon Eye	1
		DIAL AND DRIVE ASSEMBLY	
	26A435	Dial Bracket Assembly	1
	58X590	Dial	1
	58X591	Dial Background	1
	15X221	Pointer	1
	26A438	Dial Drum Assembly	2
	26X500	Dial Drum Shaft	1
	26A440	Pulley and Collar Assembly (For Dial Drum Shaft)	1
	26A427	Pulley Assembly (For Band Switch)	1
	26X469	Band Switch Shaft	1
	24X553	Pinion Gear (For Band Switch Shaft)	1
	26A441	Crown Gear Assembly (For Mtg. to Band Switch)	1
	26A434	Idler Bracket Assembly	1
	25X1389	Drive Shaft Bracket	1
	26X467	Drive Shaft	1
	24X551	*Drive Shaft Spool*	1
	10X60	Drive Cord and Clip Assembly (Band Change)	1
	28X524	Tension Spring (Band Change)	1
	10X61	Drive Cord and Clip Assembly (Dial Drive)	1
	28X530	Tension Spring (Dial Drive)	1
	7A209	Indicator Light Socket Assembly	4
	41X72	Light Shield	4
	7A187	Pilot Light Socket Assembly (Dual)	1
	41X35	*Light Shield*	2
		No. 47 Pilot Light	6
	25X498	Tuning Eye Clamp	1
	25X1396	Tuning Eye Bracket	1



Intermediate Frequency . 455 KC

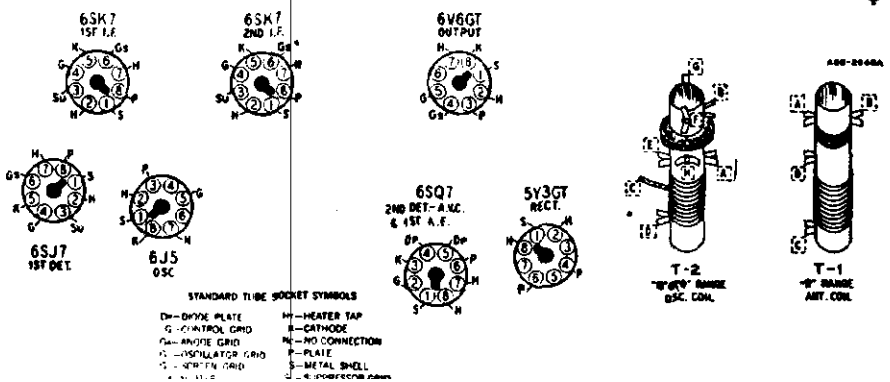
TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

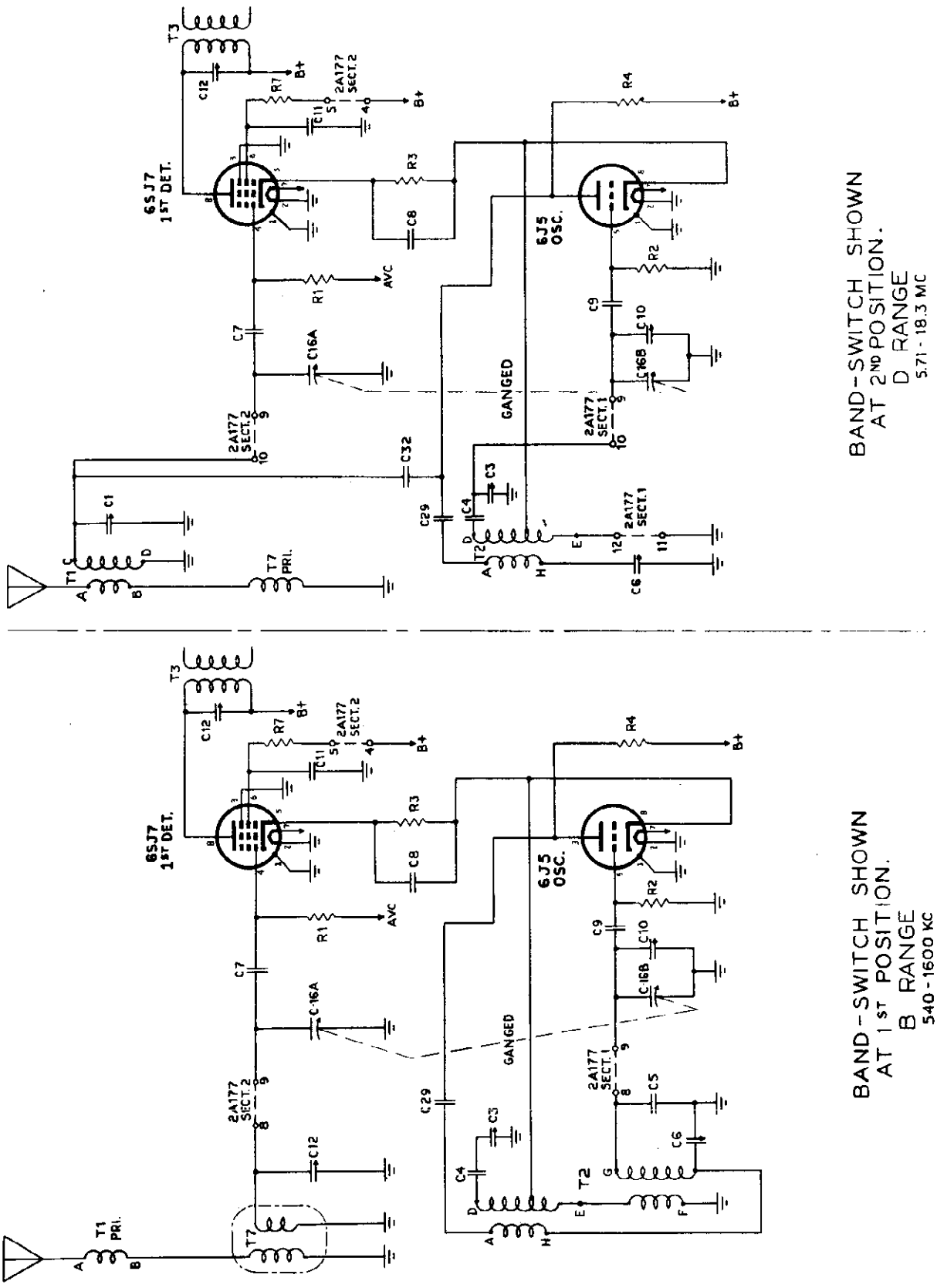
The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

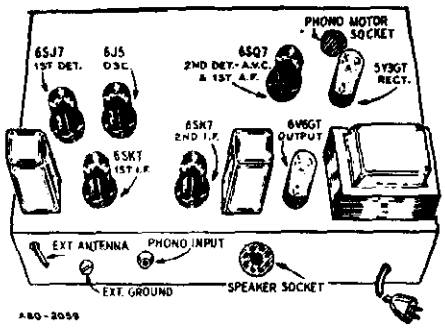
Line voltage . . . . . 117 volts AC
Volume control . . . . . maximum
Signal input . . . . . none

A variation of ±10% is usually permissible.



MONTGOMERY WARD





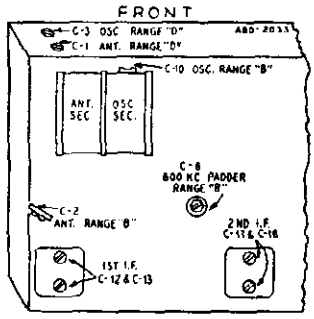
DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new 10X59 drive cord or a piece of cord 46" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one half turn counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord through string guide B, over pulleys C and D and around idler stud E. Wrap ¾ turn counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess cord.

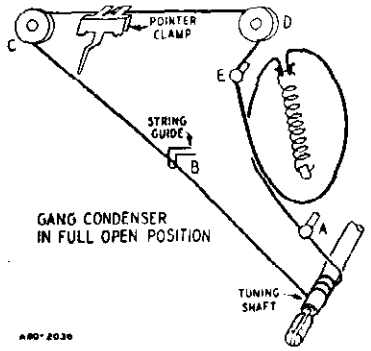
50 CYCLE OPERATION

If it is desired to use the radio and record player on a 50 cycle power supply, it will be necessary to replace the metal drive pulley on the record player motor shaft with a 50 cycle pulley. This pulley is listed in the parts list.

To change the pulley, turn the record selector post to the 12" position and lift the turntable off the record changer. Loosen the set screw holding the drive pulley on the motor shaft and remove the old pulley. Install the new 50 cycle pulley and replace the turntable.



TRIMMER POSITIONS



DRIVE DIAGRAM

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., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	Condenser Setting	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SJ7, Pin 4	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C17) & (C18) 1st I-F (C12) & (C13)
RANGE B	1600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
	1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A	Antenna Range B (C2)
	600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	600 kc (C6) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1600 and 600 kc until readjusting the oscillator Range B Trimmer (C10) causes no further improvement in output.						
RANGE D	18,300 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
	17,000 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Antenna Range D (C1) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	Antenna Range B (C2)

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

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

REPLACEMENT PARTS INFORMATION

OPERATING VOLTAGES Chassis for Model 74WG-2703A, are available for operation on the following power supply:

105-125 volts AC, 60 cycles

HOW TO ORDER PARTS Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or mail Order House.

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No	Part No	Description	Qty. Used in Set
		CAPACITORS	
C-1	17A163	2-25 mmf Ant. 'D' Range Trimmer	1
C-3	17A163	2-25 mmf Osc. 'D' Range Trimmer	
C-2	17A149	1.8-12 mmf loop aerial trimmer	1
C-4	46X289	.00475 180 V Tubular	1
C-5	47X482	20 mmf Molded	1
C-6	17A234	300-450 mmf 600 kc Padder	1
C-7	D67501	.0005 mf 400 V Tubular	1
C-8	B66203	.02 200 V Tubular	2
C-29			
C-9	47X463	47 mmf Molded	1
C-10		Part of gang condenser C-16	
C-11	D66403	.04 mf 400 V Tubular	2
C-28			
C-12		Part of 1st I-F Assembly	
C-13			
C-14	B66503	.05 mf 200 V Tubular	1
C-15	47X477	10 mmf Molded	1
C-16	14A150	Gang condenser assembly	1
C-17		Part of 2nd I-F Assembly	
C-18			
C-19A	47X112	50 mmf Dual Mica	1
C-19B			
C-20	B66103	.01 mf 200 V Tubular	1
C-21	47X468	220 mmf Molded	1
C-22	D66203	.02 mf 400 V Tubular	2
C-33			
C-23	B66402	.004 mf 200 V Tubular	1
C-24	D66302	.003mf 400 V Tubular	1
C-25	B66254	.25 mf 200 V Tubular	1
C-26A	45X277	40 mf 400 V Dry electrolytic	1
C-26B		20 mmf 450 V	
C-32	47X182	7 mmf Ceramic	1
		RESISTORS	
		Ohms Watts	
R-1	B85225	2.2 meg. 0.5 Carbon	2
R-10			
R-2	B84393	39,000 0.5 Carbon	1
R-3	B84222	2200 0.5 Carbon	1
R-4	C84103	10,000 1.0 Carbon	1
R-6	B84272	2700 0.5 Carbon	1
R-7	B84683	68,000 0.5 Carbon	1
R-8	C84393	39,000 1.0 Carbon	1
R-9	B85105	1.0 meg. 0.5 Carbon	1
R-11	B85473	47,000 0.5 Carbon	1
R-12	36X311	500,000 Volume control, ON-OFF switch	1
R-13	B85475	4.7 meg. 0.5 Carbon	1
R-14	B85474	470,000 0.5 Carbon	1
R-15	B85334	330,000 0.5 Carbon	1
R-16	40X259	3 meg. Tone control	1
R-17	B83913	91,000 0.5 Carbon	1
R-18	B83624	620,000 0.5 Carbon	1
R-20	B85221	220 0.5 Carbon	1

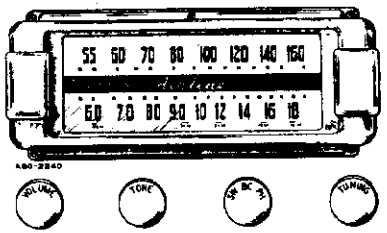
Ref. No.	Part No	Description	Qty. Used in Set
		TRANSFORMERS AND COILS	
T-1	9A1451	Antenna transformer assembly "D" range	1
T-2	9A1452	Oscillator coil assembly	1
T-3	9A1810	1st I-F Transformer and can assembly	1
T-4	9A1811	2nd I-F Transformer and can assembly	1
T-5	51X97	Output transformer	1
T-6	53X235	117 volt, 60 cycle standard power transformer	1
T-7	9A1395	"B" Band loop antenna	1
		MISCELLANEOUS	
	12A455	10" Electro dynamic speaker	1
		Cone and voice coil assembly (specify part number and letter stamped on speaker)	1
	3A303	Tube Socket—octal (8 prong) molded	7
	3A293	Speaker socket—octal (8 prong) molded	1
	3A304	Phono motor socket	1
	3A305	Single pin-tip socket (phono)	1
	10A579	Knob (Volume control)	1
	10A578	Knob (Tuning)	1
	10A618	Knob (Tone control)	1
	10A619	Knob (Band change)	1
	13X328	Line cord and plug assembly	1
	2A177	Band and phone switch	1
	8X99	Rubber chassis cushions (chassis to cabinet)	4
		DIAL AND DRIVE ASSEMBLY	
	25X839	Gang mounting bracket	1
	6X26	Rubber grommets (Mounting gang condenser and bracket to chassis)	4
	20X347	Con. cushion studs	4
	19X432	Flat washer	4
	26A459	Pulley Mtg. Plate Assem. Complete with idler pulleys, idler studs, brace bracket, string guide and dial background	1
	58X681	Dial scale glass	1
	30X184	Glass clamp	2
	4X962	Dial escutcheon	1
		No. 2 x ¾ Phillips Fr. oval hd. Stat. bronze (screws for escutcheon mounting)	5
	15X190	Pointer	1
	10X59	Drive cord	1
	28X113	Drive cord tension spring	1
	26X336	Drive shaft	1
	25X580	Drive shaft bracket	1
	19X192	"C" washers for drive shaft	2
	7A142	Pilot light socket assembly	2
		Dial lamp (No. 51)	2
	41X75	Light shield	2
		TYPE W-28AIII RECORD CHANGER PARTS	
		W-15X084-6 Motor assembly, 60 cycle, 115 volt	1
		Astatic L-75 Crystal cartridge	1
		W41P544-4 50 cycle drive pulley	1

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead	Chassis	2.3 microvolts
1000 kc	.05 mf	6SJ7 1st Detector, Pin 4	Same as above	17 microvolts
455 kc	.05 mf	6SJ7 1st Detector, Pin 4	Same as above	13.0 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1300 microvolts
455 kc	.05 mf	6SK7 2nd I-F, Pin 4	Same as above	3400 microvolts
400 cycles	.05 mf	6SQ7 1st A-F, Pin 2	Same as above	.07 volt
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.8 volts



ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC, 60 cycles, 55 watts normal, 72 watts phono operating

Frequency Range.....B range—540-1600 KC
D range—5.71 to 18.3 MC

Selectivity.....43 KC broad at 1000 times signal, 1000 KC

Sensitivity.....(for .5 watt output) with external antenna
B range—2.5 microvolts average
D range—12 microvolts average

Power Output.....3.5 watts maximum
2 watts, 10% distortion

Loud Speaker.....Electro dynamic

Voice Coil Impedance..3.2 ohms at 400 cycles

MOTOROLA, INC.

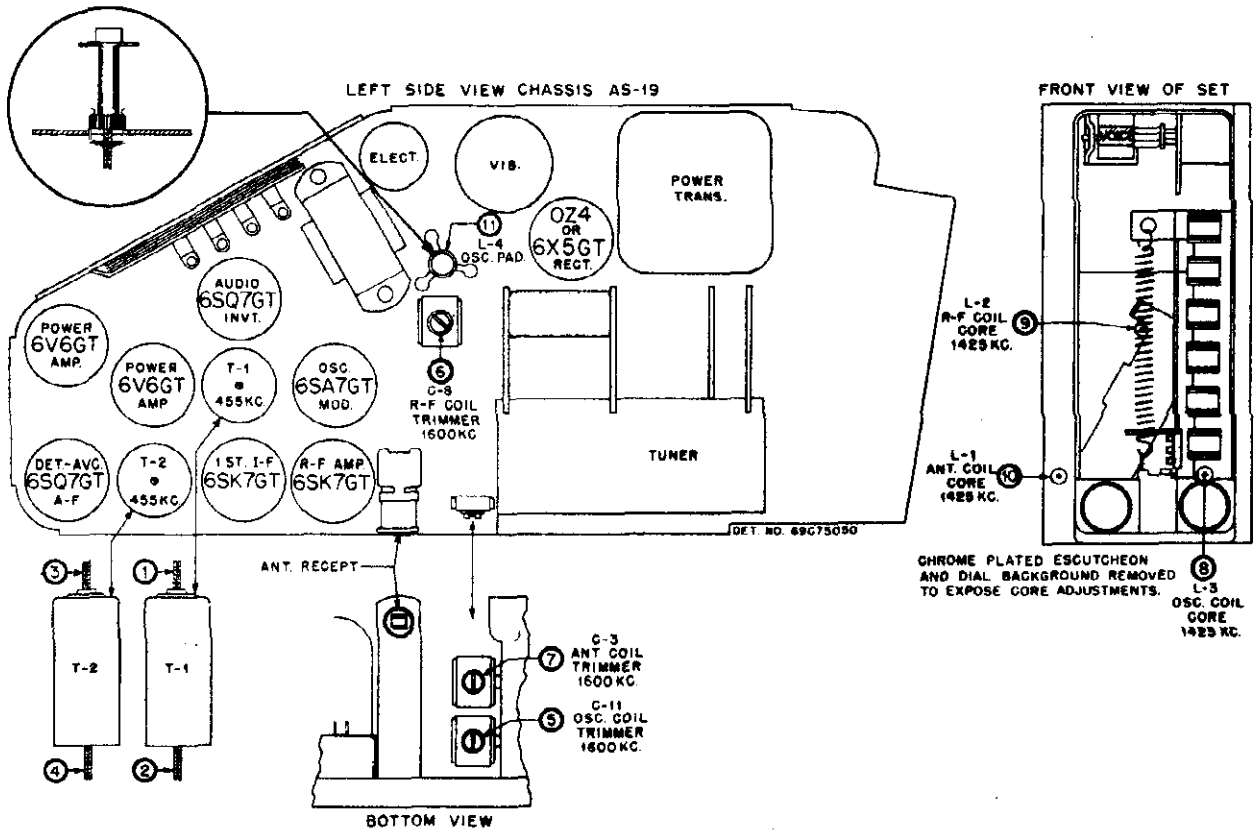


FIGURE 5. TUBE AND TRIMMER LOCATION DETAIL.

ALIGNMENT TABLE

Refer to Figure 5 for location of trimmers and adjustable iron cores.

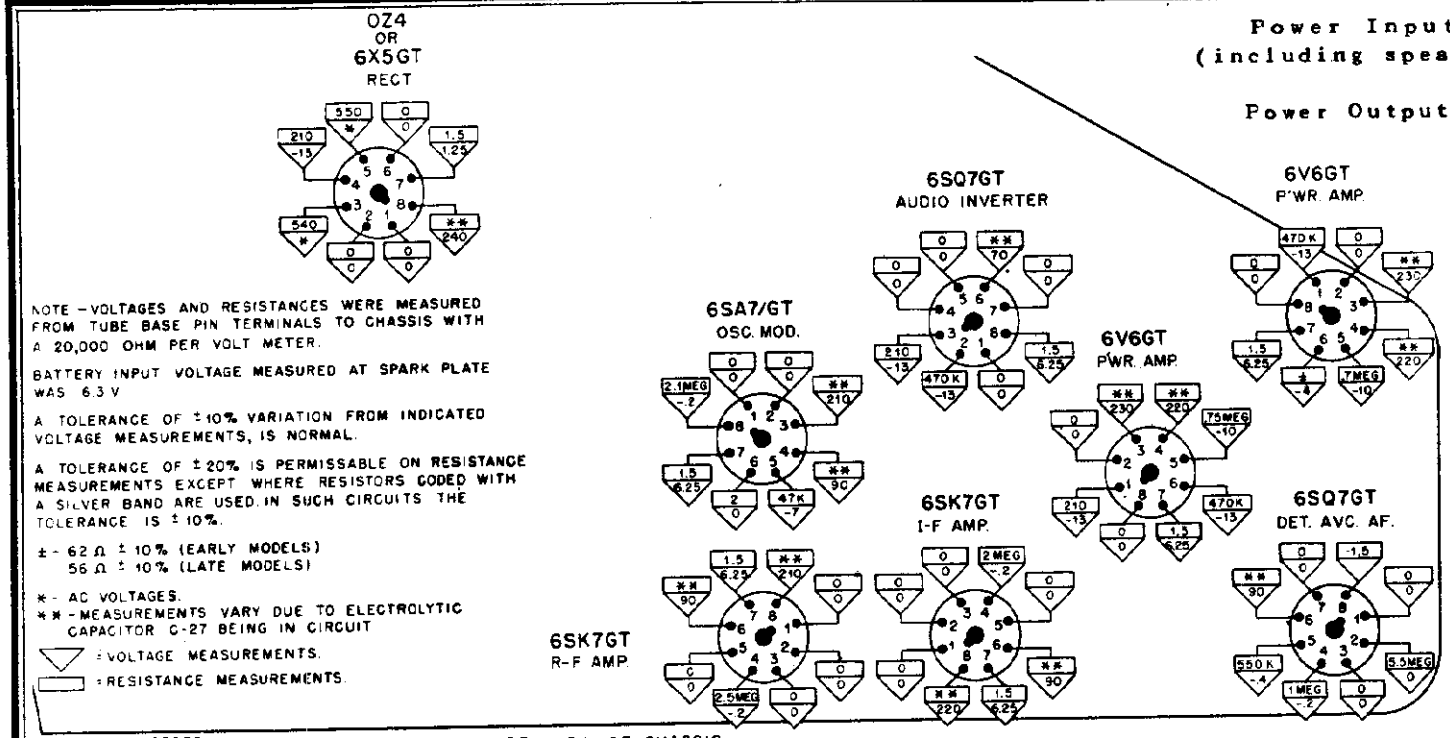
STEP	TUNER POSITION SET TO	DUMMY ANTENNA	SIGNAL GENERATOR LEAD CONNECTED TO	SIG.GEN. SET AT	ADJUST FOR PEAK ON OUTPUT METER
1.	High frequency end (cores out)	.1 mfd. at Sig. Gen.	Osc.-Mod. grid (#5 pin)	455 Kc	#1 and 2 P & S in T-1 #3 and 4 P & S in T-2
2.	High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans.	60 mmf. at Sig.Gen. in series in 21" long coax lead.	Antenna Receptacle	1600 Kc	#5 Osc. trimmer C-11 #6 R.F. trimmer C-8 #7 Ant. trimmer C-3
3.	EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward.			1425 Kc	#8 Osc. Core of L-3 #9 R.F. Core of L-2 #10 Ant. Core of L-1
4.	EXACTLY four more full turns in (as indicated by knob setscrew)			Power turned OFF	#11 Osc.Pad core of L-4 for maximum noise.

5. Assemble and install receiver in car and connect car antenna. Turn the dial to approximately 1400 Kc (not to a local station) and adjust antenna trimmer for maximum noise. This adjustment is referred to as Antenna Padder in Figure 7 .

NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3, and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.

Power Input: 10 A. at 6.3V
(including speaker field)

Power Output: 9 watts



NOTE - VOLTAGES AND RESISTANCES WERE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

BATTERY INPUT VOLTAGE MEASURED AT SPARK PLATE WAS 6.3 V

A TOLERANCE OF ± 10% VARIATION FROM INDICATED VOLTAGE MEASUREMENTS, IS NORMAL.

A TOLERANCE OF ± 20% IS PERMISSABLE ON RESISTANCE MEASUREMENTS EXCEPT WHERE RESISTORS CODED WITH A SILVER BAND ARE USED IN SUCH CIRCUITS THE TOLERANCE IS ± 10%.

± - 62 Ω ± 10% (EARLY MODELS)
56 Ω ± 10% (LATE MODELS)

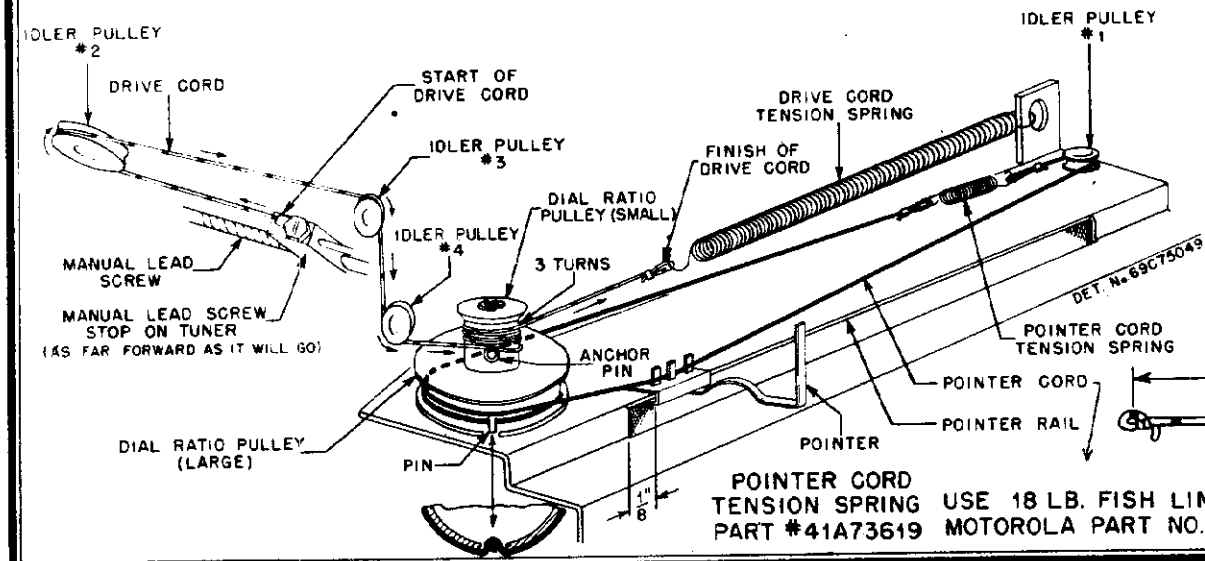
* - AC VOLTAGES.
** - MEASUREMENTS VARY DUE TO ELECTROLYTIC CAPACITOR C-27 BEING IN CIRCUIT

▽ = VOLTAGE MEASUREMENTS.
▭ = RESISTANCE MEASUREMENTS.

DET NO. 63C75052

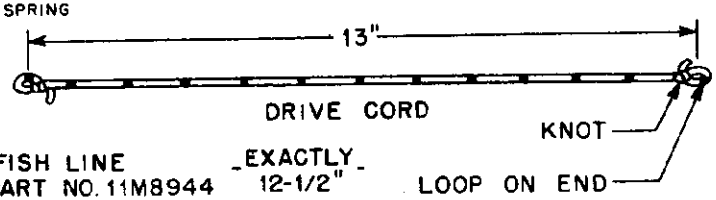
RIGHT SIDE VIEW OF CHASSIS

VOLTAGE AND RESISTANCE DIAGRAM



POINTER CORD TENSION SPRING PART #41A73619

USE 18 LB. FISH LINE MOTOROLA PART NO. 11M8944



EXACTLY 12-1/2"

OVERALL SENSITIVITY

Freq.	1400 Kc.	1000 Kc.	600 Kc.
Sensitivity	1.5 uv	1.5 uv	1.0 uv

Standard output is to be 1 watt and is measured across the 3 ohm resistive load. (1 watt = 1.74 volts). Test is made with 30% 400 cycle modulation. Tone control is set to VOICE position and volume control at maximum.

MOTOROLA, INC.

ELIMINATION OF IGNITION INTERFERENCE

a. Install distributor suppressor.
b. Install generator condenser.

Mount the generator condenser on the generator frame, under the ground lead screw. Connect the space tip end of the condenser wire under the battery terminal of the generator. ***WARNING: Do not connect the condenser wire to the field terminal.***

c. Install hood bonds.

Remove one of drive screws that holds the cloth tape along the rear edge of the hood. Insert Hood Bond under tape so hole lines up with hole drive screw was in, put in self-tapping screw and fold back over tape so rough points of hood bond are against under side of hood when hood is closed.

ADDITIONAL MOTOR NOISE HINTS

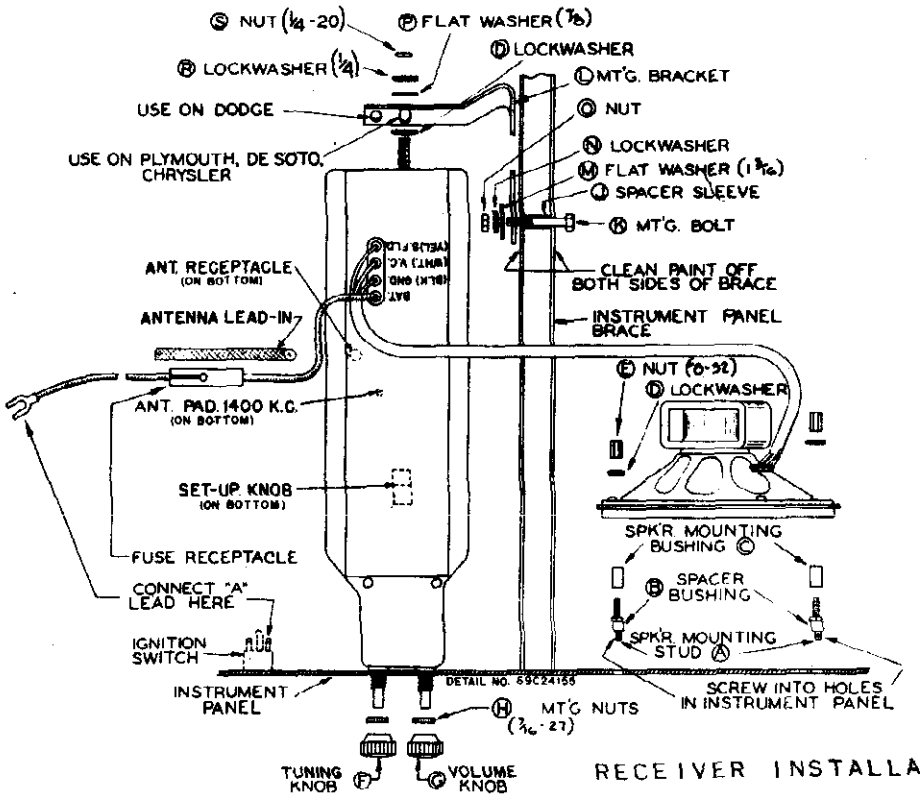
In most cars, the steps outlined above will completely take care of ignition interference. However, there are occasions when additional corrections are needed. Below are listed some suggestions which may be helpful in curing these unusual cases.

a. When checking the car for motor noise, clamp the hood down tight.

b. Motorola Hood Bonds (Part No. 39A4205) should be installed at the shoulders so that the hood makes a good-ground to the cowl of the car on the side the antenna is mounted.

c. Wheel static can be cured by installing static collectors in the front hub caps. (Part No. 39A20513).

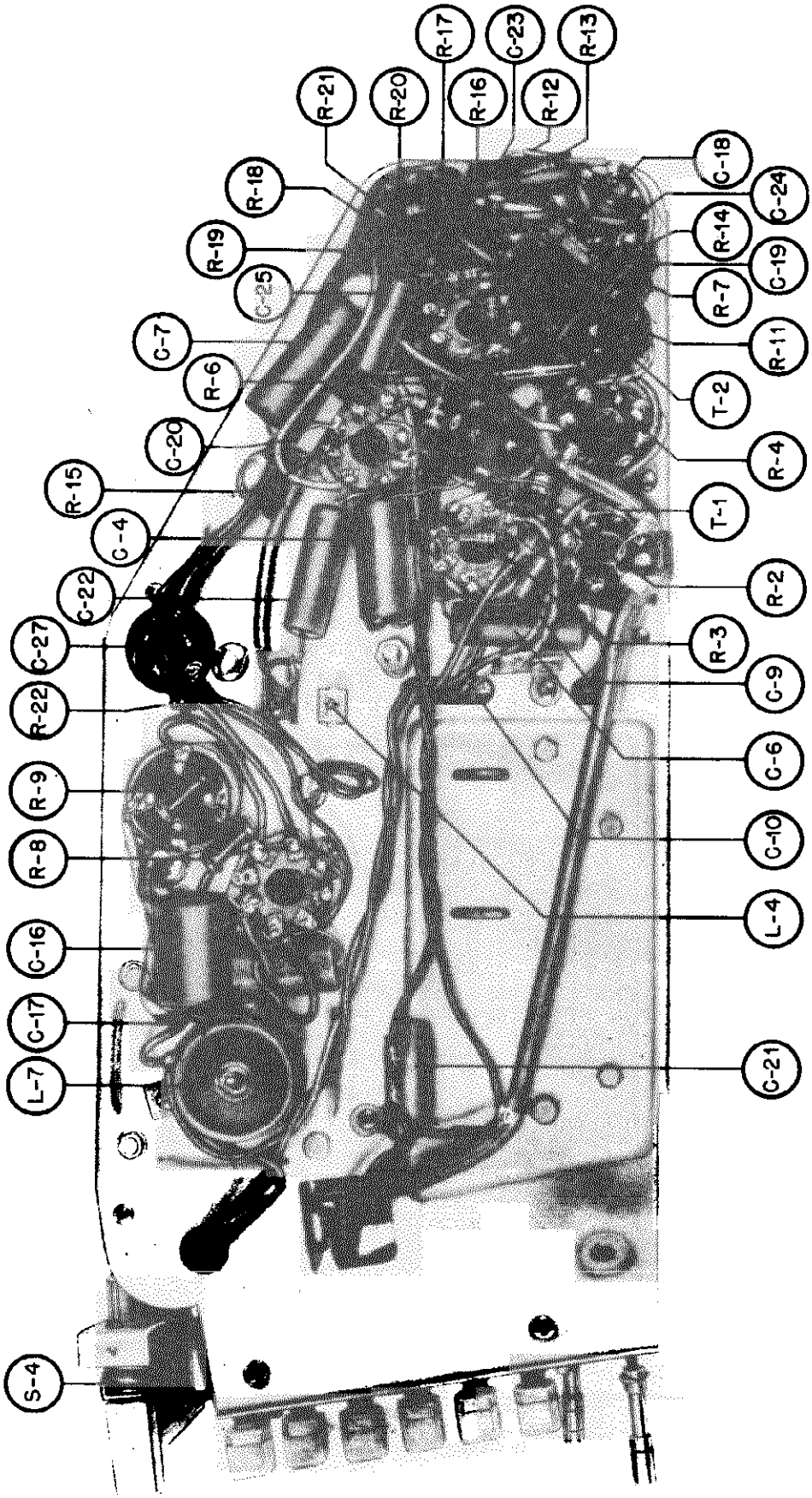
d. If required, install an ammeter condenser, (Part No. 8K4661).



RECEIVER INSTALLATION DETAIL

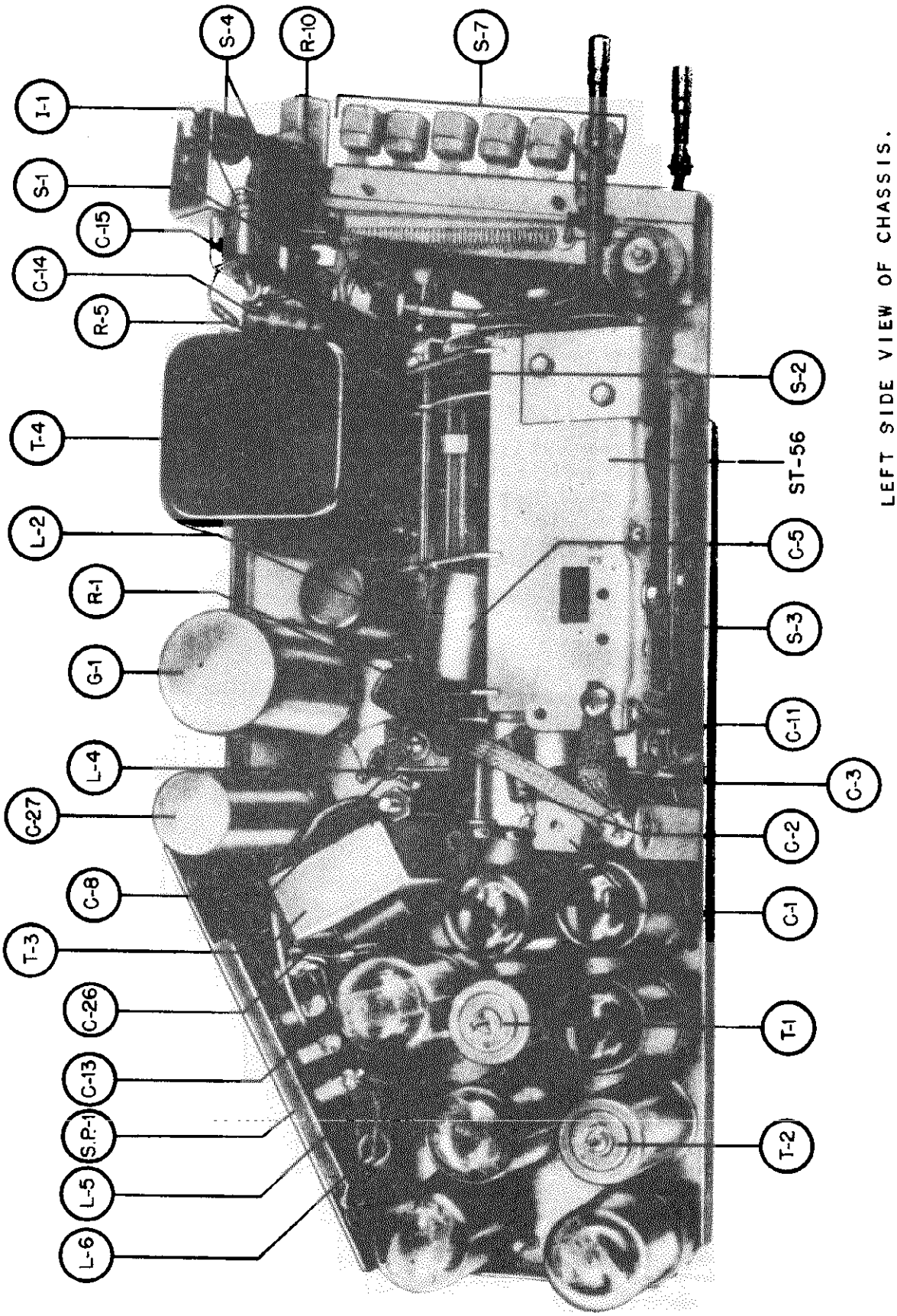
MODEL CR6

MOTOROLA, INC.



RIGHT SIDE VIEW OF CHASSIS

MOTOROLA, INC.



LEFT SIDE VIEW OF CHASSIS.

MODEL CR6
MODEL PD6
MODELS FD6,NH6

MOTOROLA, INC.

SETTING THE PUSH BUTTONS

PROCEDURE

a. Turn ON the receiver

b. Press the manual button marked "M"

c. Turn the tuning knob until the desired station is tuned in.

d. Press the number one button.

e. Turn the set-up lever CLOCKWISE (right) as far as it will go and release allowing it to return.

f. Turn the tuning knob until the previously noted program is heard. (The dial will not indicate the station to which the button is set.)

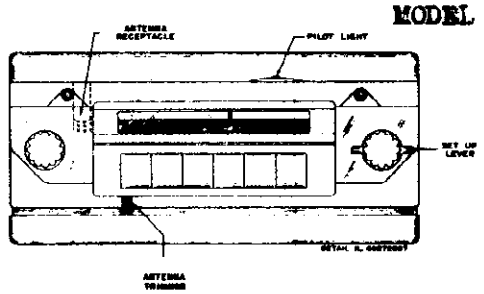
NOTE: The dial pointer may reach the end of the dial scale before the desired station is received. However, continue turning the tuning knob until the station is received. The dial pointer mechanism will not be affected.

g. Press the "M" button and the "1" button is set.

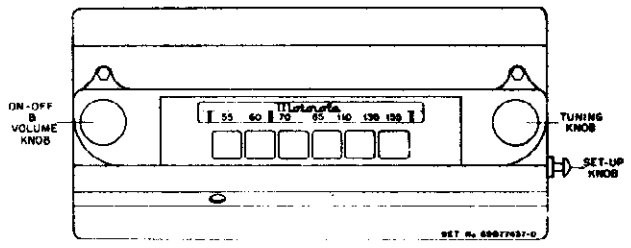
NOTE: Check the setting of the automatic button by tuning in the desired station, having the "M" button pushed in and then push the automatic button, either button should give the same volume and clarity.

h. Repeat the above procedure, steps b and through g for each of the push buttons.

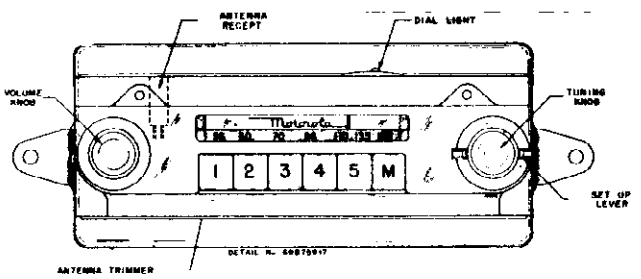
MODEL NH6



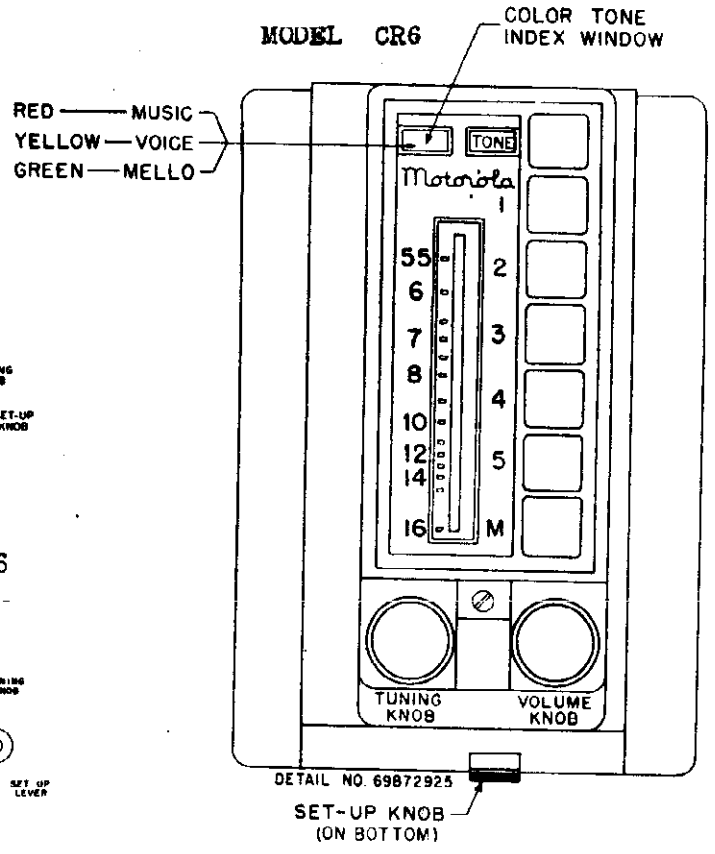
MODEL PD6



MODEL FD6



MODEL CR6



MOTOROLA, INC.

MODEL CR6
MODELS CT6,OE6,PC6
MODELS FD6,NH6
MODEL PD6

MODEL 40
MODEL 50
MODEL 60
MODEL 70

Two types of I.F.-Diode transformers have been used. The transformer shields for the late units have a powdered iron sleeve whereas none was used with the early I.F.-Diode transformers. See Figure 5.

The late transformer or shield assemblies are not interchangeable with the early ones. Although a late transformer and shield can be used to replace an early transformer and shield combination, it is not recommended because of difficulty in replacing shields which are staked to the chassis. Do not attempt to intermix the transformers and shields. If the wrong combination of transformer and shield is used, the transformer will not peak at the I.F. frequency of 455 Kc.

Replace transformer coil assemblies, if necessary, with same type as in the receiver.

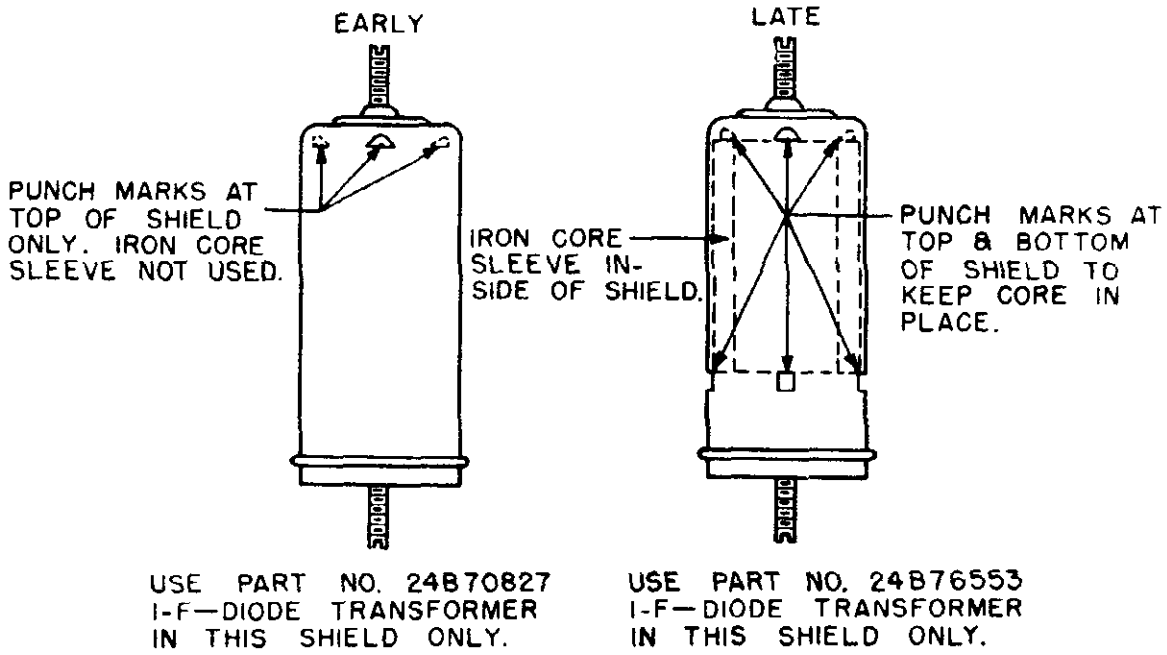
The capacitor across each winding of both types of I.F.-Diode transformers is a dual 100 mmf. wafer type silver mica, which is a part of the transformer assembly.

EARLY SETS

Transformer, I.F. or diode: Part No. 24B70827
Shield: Part No. 26B70107

LATE SETS:

Transformer, I.F. or diode: Part No. 24B76553.
Shield & Iron Core Sleeve Assembly: Part No. 1A71049.



I.F.-DIODE (EARLY-LATE) TRANSFORMER IDENTIFICATION DETAIL

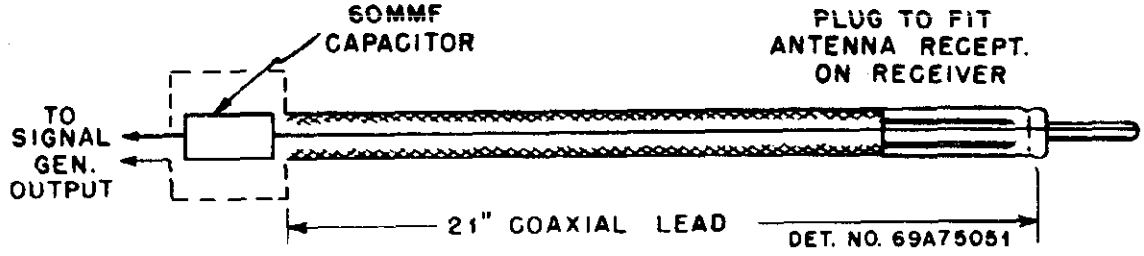


FIGURE 2. DUMMY ANTENNA CONSTRUCTION DETAIL

REF. NO.	PART NO.	DESCRIPTION
C-1	21AR0677	Capacitor, fixed: metal mica; 90 mmf
C-2	8A4529	Capacitor, fixed: paper; .006 mf 100 V
C-3	20A70801	Capacitor, variable: mica; 50-180 mmf
C-4	8A14791	Capacitor, fixed: paper; .05 mf 400 V
C-5	8A19133	Capacitor, fixed: paper; .5 mf 100 V
C-6	8A14791	Capacitor, fixed: paper; .05 mf 400 V
C-7	6K13166	Capacitor, fixed: paper; .1 mf 400 V
C-8	20A70601	Capacitor, variable: mica; 50-180 mmf
C-9	21K70720	Capacitor, fixed: mica; 5 mmf
C-10	21R6513	Capacitor, fixed: mica; 50 mmf 300 V
C-11	20A70214	Capacitor, variable: mica; 30-60 mmf
C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf
C-13	8A17028	Capacitor, fixed: paper; .5 mf 100 V
C-14	8K23690	Capacitor, fixed: paper; .01 mf 400 V
C-15	8K23690	Capacitor, fixed: paper; .01 mf 400 V
C-16	8A17028	Capacitor, fixed: paper; .5 mf 100 V
C-17	8A12840	Capacitor, fixed: paper; .006 mf 1600 V
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf
C-19	21R6513	Capacitor, fixed: mica; 50 mmf 300 V
C-20	21R6638	Capacitor, fixed: mica; 1000 mmf 500 V
C-21	8A4736	Capacitor, fixed: paper; .002 mf 400 V
C-22	8K13166	Capacitor, fixed: paper; .1 mf 400 V
C-23	8K23690	Capacitor, fixed: paper; .01 mf 400 V
C-24	21R6648	Capacitor, fixed: mica; 250 mmf 500 V
C-25	8K23690	Capacitor, fixed: paper; .01 mf 400 V
C-26	6K13166	Capacitor, fixed: paper; .005 1000 V
C-27	23A75428	Capacitor, electrolytic: 20-20 mf 400 V, 20 mf 25V

NOTE: Unless otherwise specified, all Resistors are 20%.

REF NO.	PART NO.	DESCRIPTION
R-1	6R6052	Resistor, fixed: carbon; 470,000 1/2W Ins.
R-2	6R6075	Resistor, fixed: carbon; 100,000 1/2W Ins.
R-3	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
R-4	6R6106	Resistor, fixed: carbon; 10,000 1W N.I.
R-5	6R6026	Resistor, fixed: carbon; 22,000 1/2W Ins.
R-6	6R6147	Resistor, fixed: carbon; 330 1W Ins.
R-7	6R6004	Resistor, fixed: carbon; 1 meg. 1/2W Ins.
R-8	6R6005	Resistor, fixed: carbon; 50 1/2W N.I.
R-9	6R6005	Resistor, fixed: carbon; 50 1/2W N.I.
R-10	18A71925 or 18A70172	Resistor, variable: carbon; .5 meg; with SPST switch
R-11	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
R-12	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
R-13	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.
R-14	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.
R-15	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.
R-16	6R6004	Resistor, fixed: carbon; 1 meg. 1/2W Ins.
R-17	6R6255	Resistor, fixed: carbon; 150 10% 1W N.I.
R-18	6R5614	Resistor, fixed: carbon; 56 10% 1/2W Ins.
R-19	6R6052	Resistor, fixed: carbon; 470,000 1/2W Ins.
R-20	6R6407	Resistor, fixed: carbon; 220,000 10% 1/2W Ins.
R-21	6R6414	Resistor, fixed: carbon; 270,000 10% 1/2W Ins.
R-22	6R6184	Resistor, fixed: carbon; 1000 1W N.I.

REF. NO.	PART NO.	DESCRIPTION
F-1	65K4657	Fuse: 20 amp; type 3AG
O-1	48B3353	Vibrator, non-sync.
I-1	65K4151	Bulb: 6.3 v. type #51
L-1	1A71661	Coil, antenna or R.F. (See solenoid tuner ST-58 Service Manual before replacing).
L-2	1A71661	Coil, antenna or R.F. (See solenoid tuner ST-58 Service Manual before replacing).
L-3	1A71679	Coil, oscillator. (See solenoid tuner ST-58 Service Manual before replacing).
L-4	24A70227	Coil, oscillator padder: includes mounting clip and adjustable iron core.
L-5	24K70640	Coil, "A" choke
L-6	24K73555	Coil, dial light & speaker field choke: 9 turns #16 yellow wire
L-7	24A70199	Coil, "A" choke: with mounting bracket
S-1	Part of R-10	Switch; SPST (Part of volume control R-10)
S-2	40B70952	Switch, selector
S-3	1B70944	Switch Assembly, solenoid
S-4	1K74067	Switch, tone control: with bracket; complete
S-5	40A70951	Switch, mute
S-7	1K73625	Switch, push button assembly
S.P.1	1K75194	Spark plate assembly
T-1	24B70887	Transformer, I.F. or diode: 455 kc; iron core tuned; less shield can. (Used in early sets only)
T-2		
	or	
	24B73553	Transformer, I.F. or diode: 455 kc; iron core tuned; less shield can. (Used in late sets only)
T-3	25K72044	Transformer, output
T-4	25B70950	Transformer, power
	1K74121	Accessories, group CR6: Includes all parts necessary to install receiver in car, except speaker assembly and receiver mounting bracket.
	8A4481	Capacitor, generator
	1K74111	Cord, Assembly: dial pointer cord
	1K74295	Cord, Assembly: drive cord; with lug on one end

PART NO.	DESCRIPTION
1K71047	Core & Palnut Assembly (I.F. & diode coil top tuning iron core with nut)
1K71048	Core & Clip Assembly (I.F. & diode bottom tuning iron core & clip)
1K4695	Lead, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on other end.
1K4694	Lead, fuse: 20" long; fuse receptacle on one end, spade lug on other end
1K27619	Lead, speaker: 3 conductor rubber covered lead with insulated pin terminals on one end
1K72125	Pointer & Slider Assembly
1K74108	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together
1K70646	Receptacle, antenna: metal ferrule with ins. contact
9A70208	Socket, tube: 4 prong (vibrator socket)
9A6786	Socket, tube: octal; plain
9A70165	Socket, tube: octal; shielded type (for R.F. & I.F. amp)
1K74142	Speaker Assembly: includes mounting plate and connecting cable
50B71900	Speaker: 6" electro; 3 ohm V.C. less mtg. plate and lead
or	or
50B74946 or	50B74041
6K17117	Suppressor, distributor
40A72112	Switch, tone: consists of switch leafs, contacts and insulator assembly only.
1K74109	Tone Indicator Assembly: consists of clear plastic indicator drum; bakelite cam and ratchet, and colored tone strip
1K74080	Tuner, Model ST-58- CR6 (complete)

MOTOROLA, INC.

MODELS CT6, OE6, PC6

SETTING THE PUSH BUTTONS

1. Turn ON the receiver.

2. Press the push button marked "M"

3. Turn the tuning knob until the desired station is tuned in. (Make mental note of the program)

4. Press the number one button.

5. Turn the set-up lever CLOCKWISE (right) as far as it will go and release, allowing it to return.

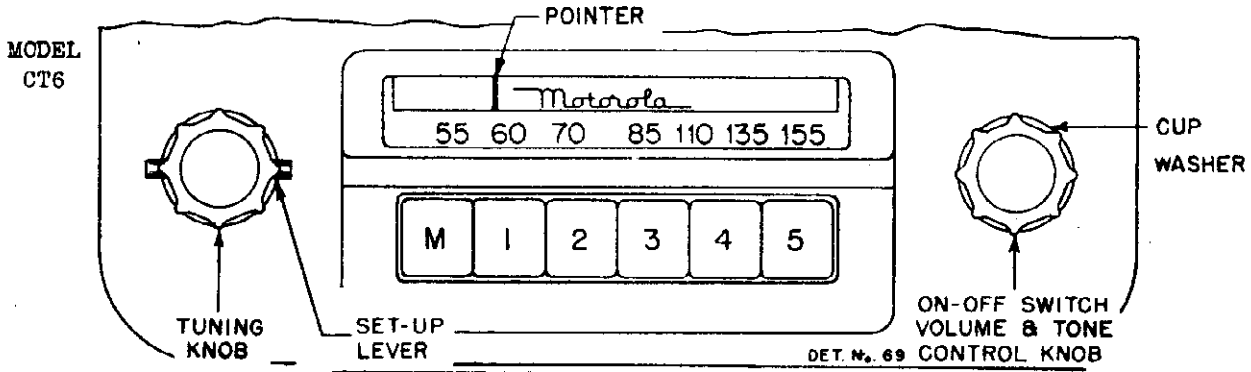
6. Turn the tuning knob until the previously heard program is heard. (The dial will not indicate the station to which the button is set).

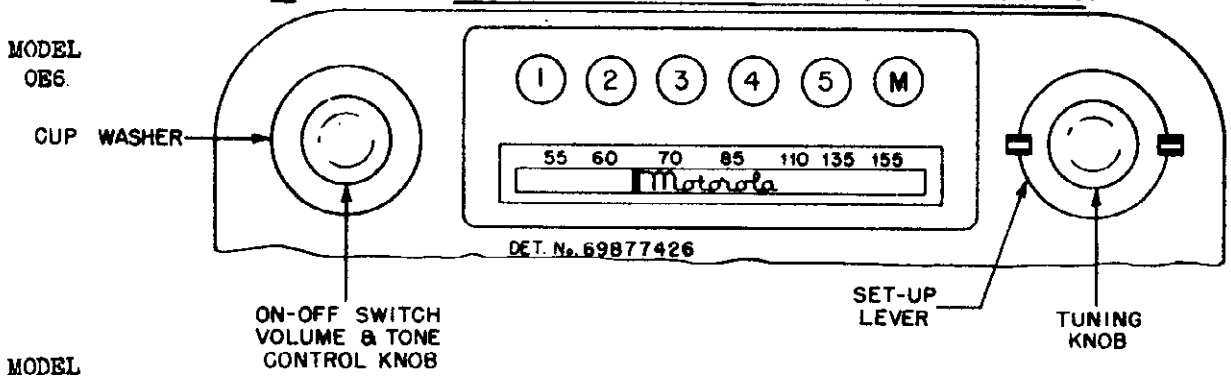
NOTE: The dial pointer may reach the end of the dial scale before the desired station is received. However, continue turning the tuning knob until the station is received. The dial pointer mechanism will not be affected.

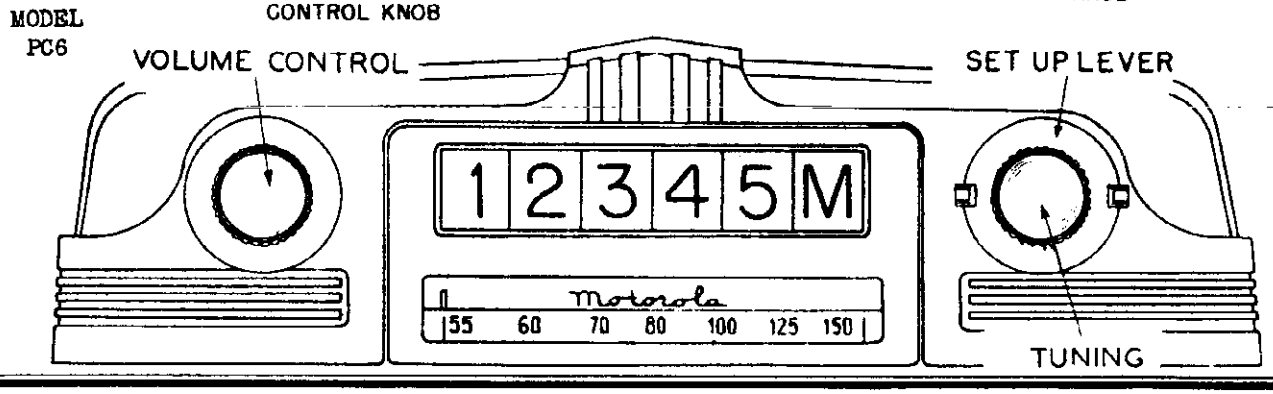
7. Press the "M" button and the number one push button is set.

NOTE: Check the setting of the automatic button by tuning in the desired station having the "M" button pushed in, and then push the automatic button that is set to the same station that was tuned in manually, either button should give the same volume and clarity. Any difference indicates that the push button was not set correctly.

8. Repeat the above procedure, steps 2 through 7 for each of the push buttons.







For I-F transformer notes, see P.16

MODELS CT6,OE6,PC6

MOTOROLA, INC.

WARNING: CHECK VOLTAGE REGULATOR

Many late cars develop exceedingly high voltage due to improper adjustment of voltage regulator, which shortens the life of radio tubes, vibrator, electrical accessories and headlights. When voltage exceeds 7.3 volts with motor running at about 35 miles per hour and no load on battery, have the voltage regulator adjusted for maximum voltage of 7.3 volts under a no load condition.

TO REPLACE DIAL LIGHT

It will be necessary to remove set from car when replacing dial light. Pry out large snap button directly under push-button "M" and replace with a #44 bayonet base pilot lamp.

POINTER AND DRIVE CORD REPLACEMENT

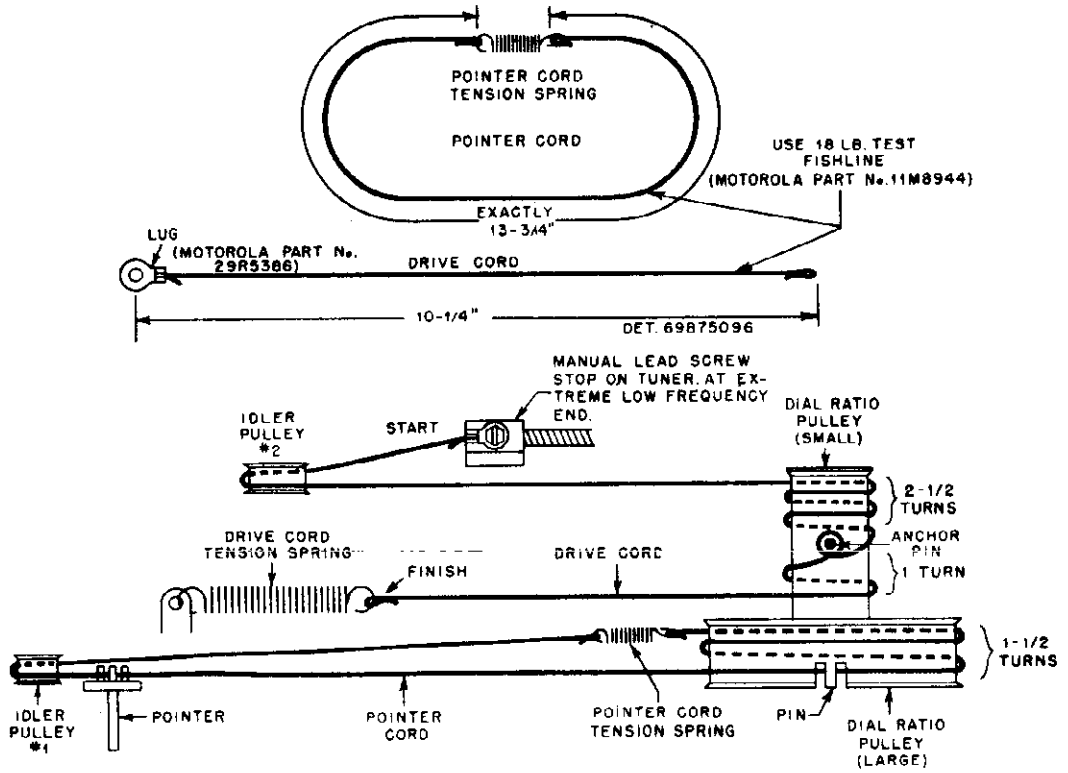
PREPARE RECEIVER AS FOLLOWS

1. Remove the front cover.

2. Remove the dial background. Two snap-in eyelets hold it in position.

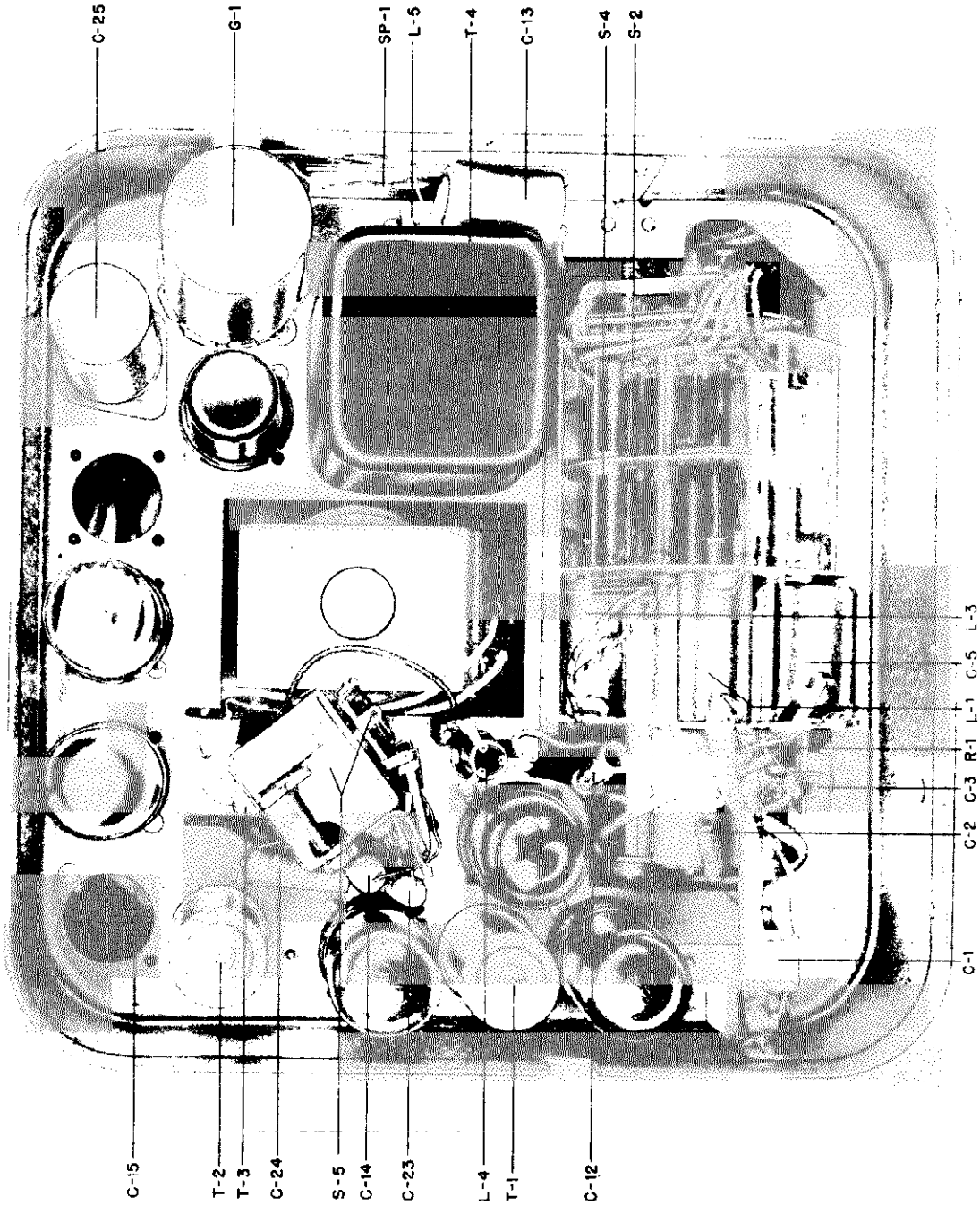
3. Remove the push button assembly. Four screws hold it in position. Do not unsolder any wire leads; just lay the push button assembly on top of the set.

4. The pointer & drive cords are now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord from dial ratio pulley to make the pointer cord more readily accessible.



POINTER AND DRIVE CORD RESTRINGING DETAIL

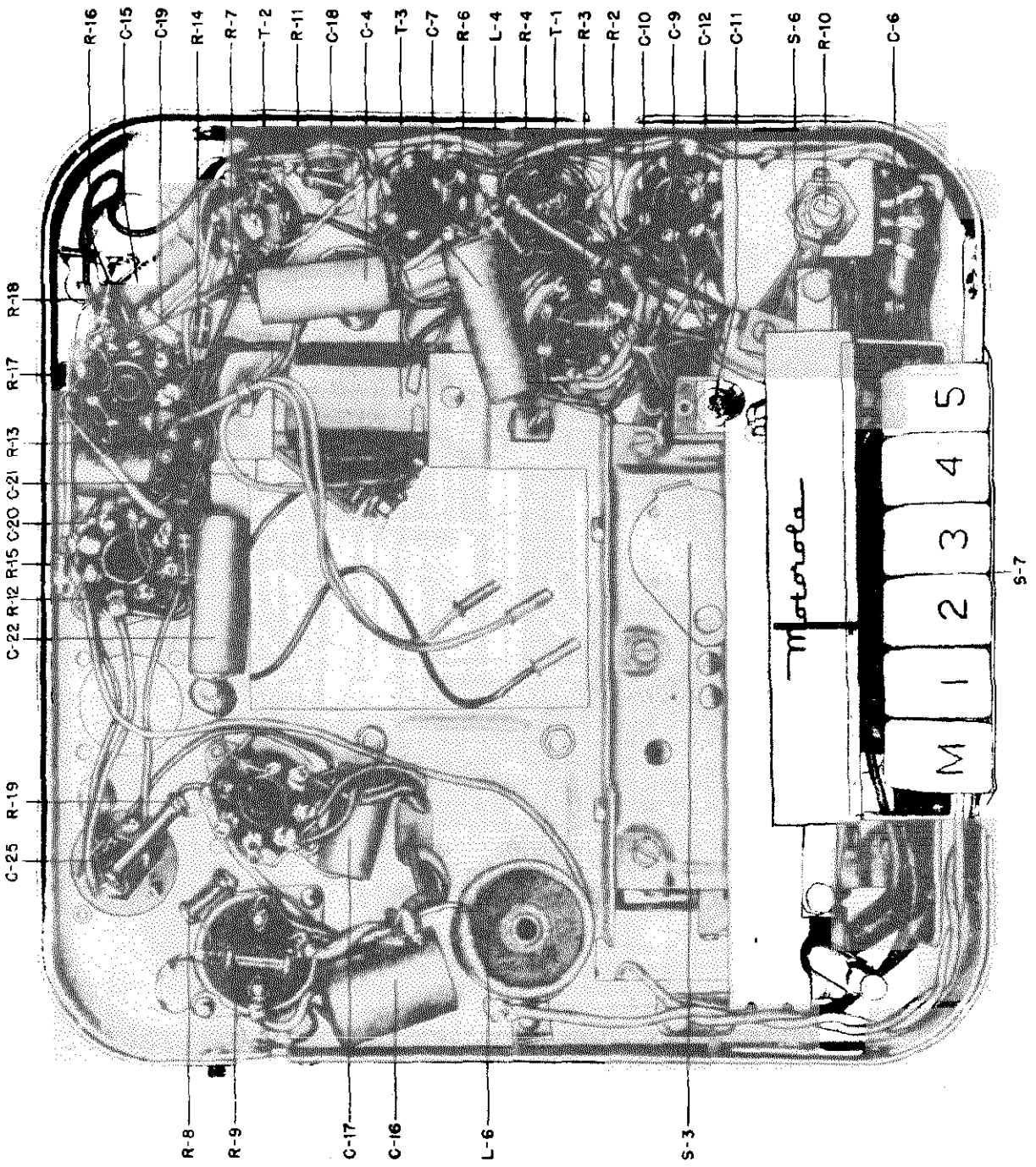
MOTOROLA, INC.



CHASSIS TOP VIEW

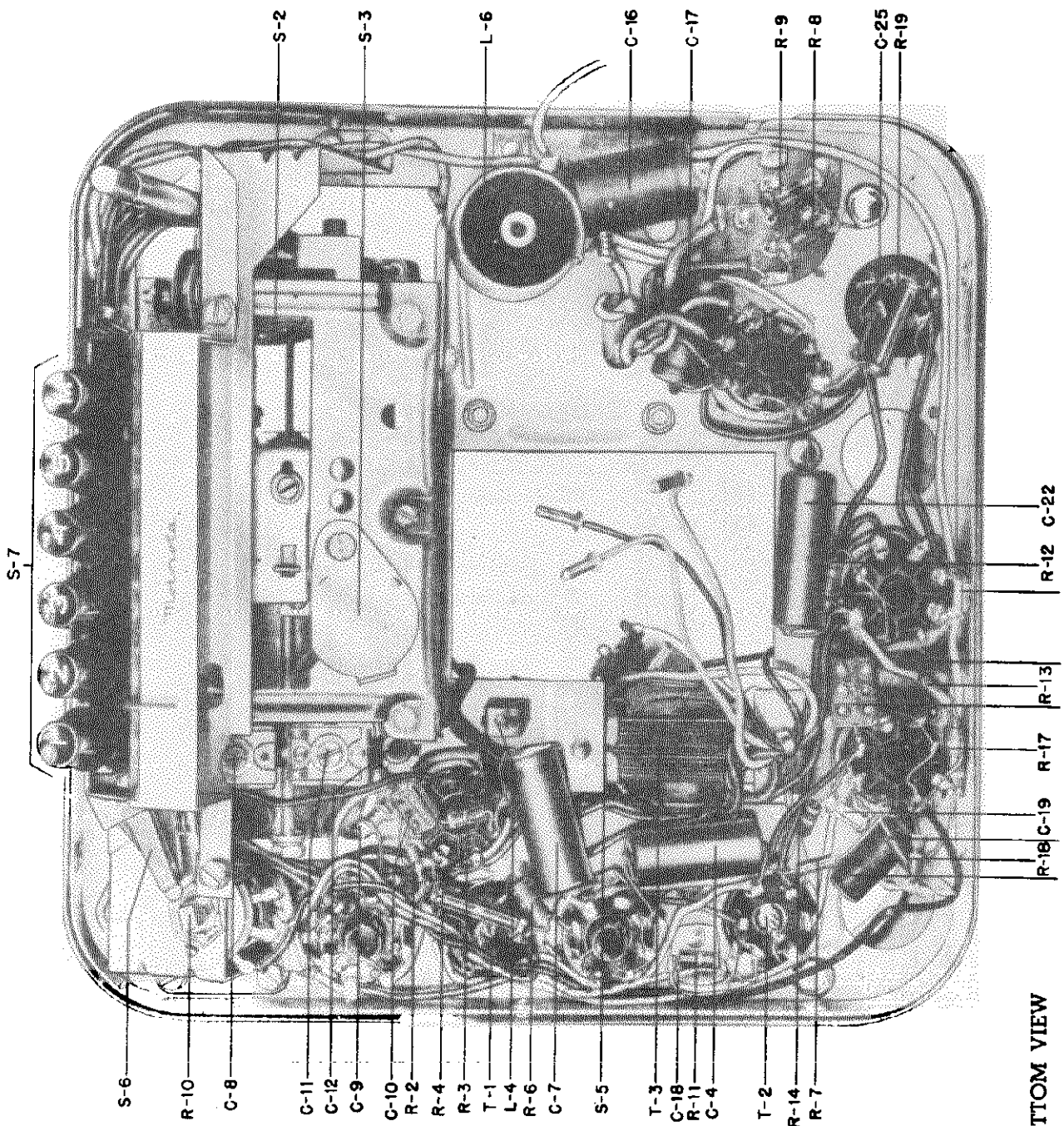
MODEL CT6

MOTOROLA, INC.



CHASSIS BOTTOM VIEW

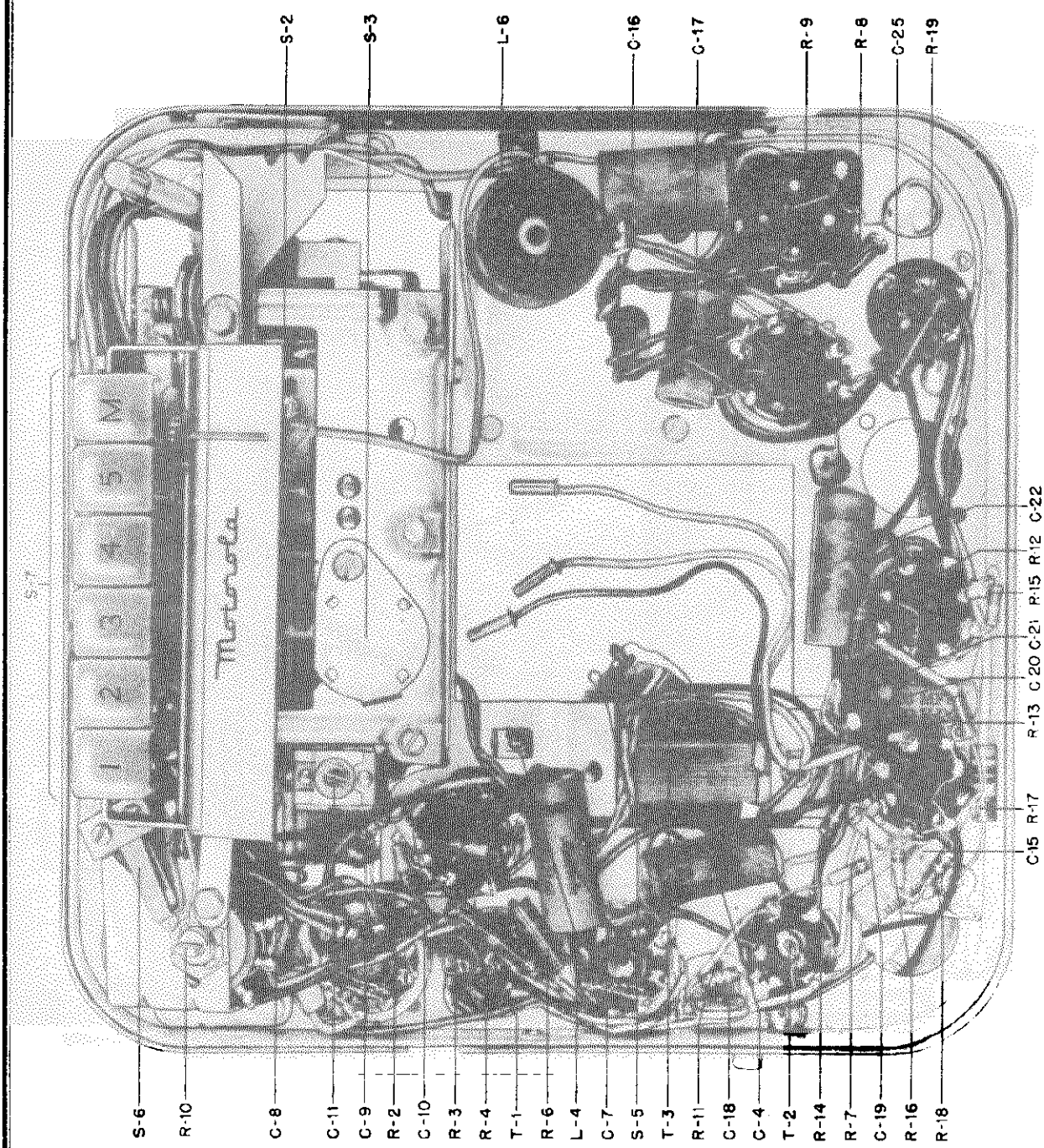
MOTOROLA, INC.



CHASSIS BOTTOM VIEW

MODEL PC6

MOTOROLA, INC.



CHASSIS BOTTOM VIEW

MOTOROLA, INC.

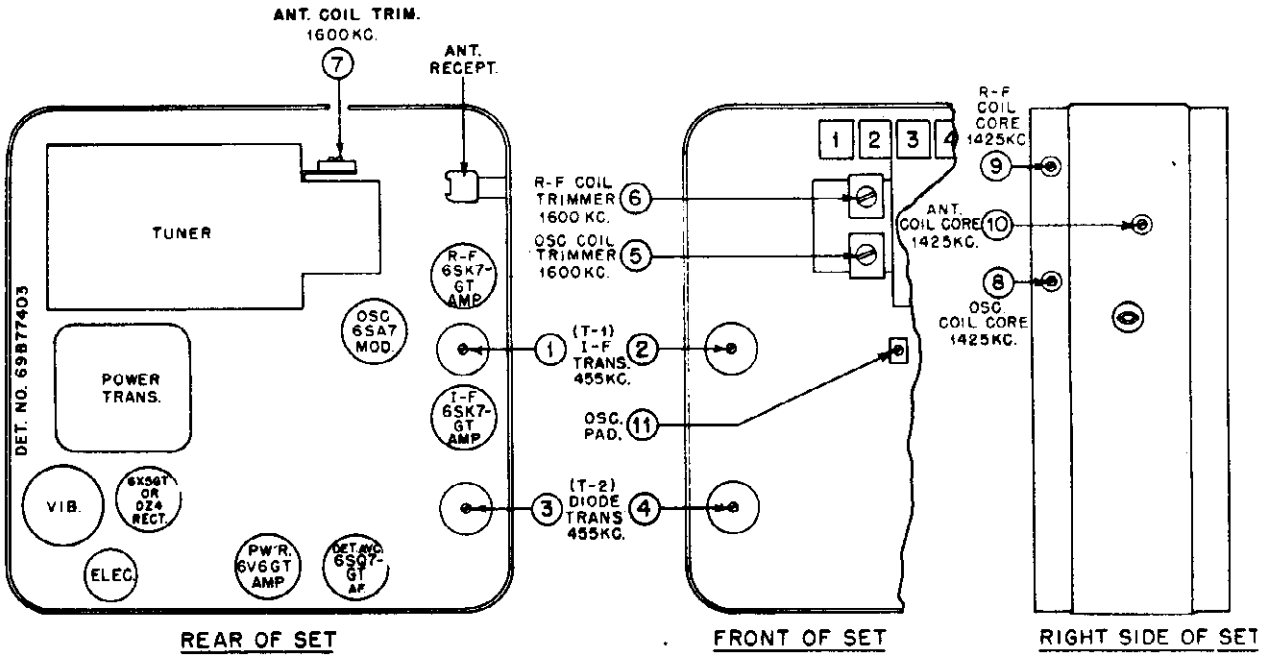
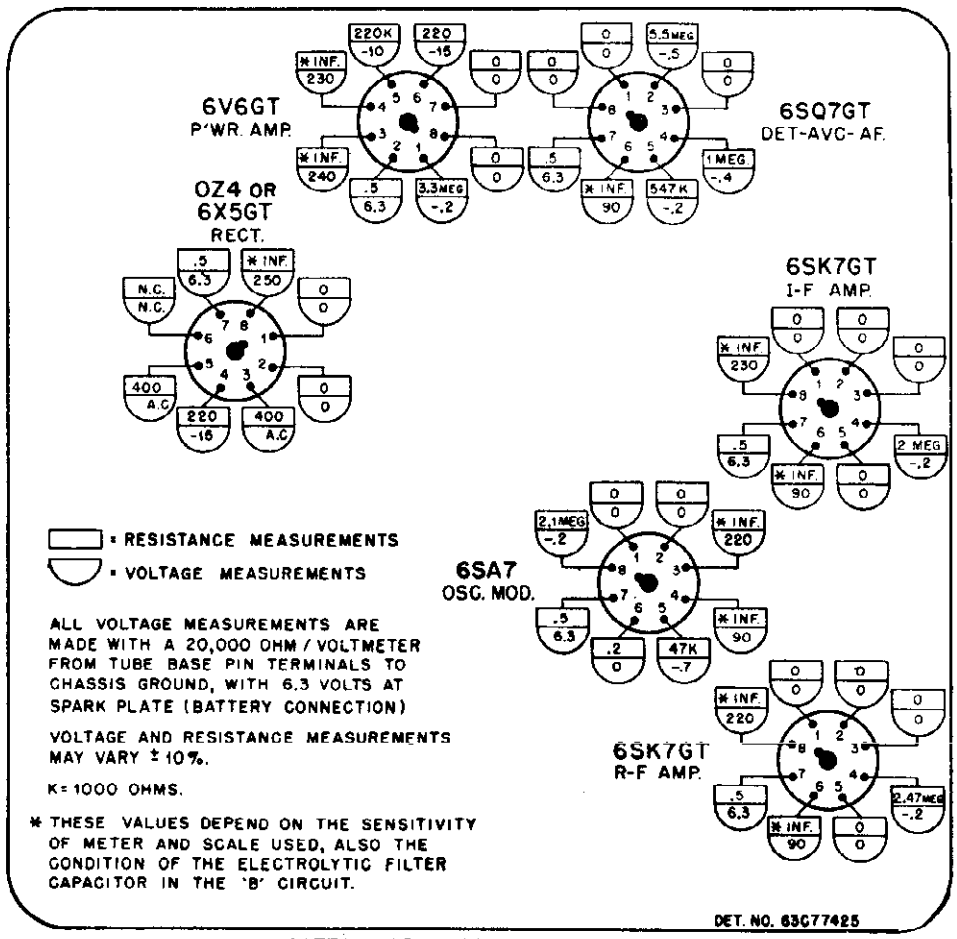


FIGURE 3. TUBE AND TRIMMER LOCATION DETAIL



BOTTOM OF CHASSIS

VOLTAGE AND RESISTANCE DIAGRAM

ALIGNMENT

EQUIPMENT REQUIRED

1. A special tool for adjusting the tuner cores. Use alignment tool, Motorola Part No. 66A76278.

2. A small screwdriver for I.F. and R.F. Alignment.

3. A modulated signal generator that can be accurately tuned to the frequencies indicated in the alignment chart.

4. A special dummy antenna for R.F. alignment. Construct dummy antenna per instructions given in Figure 2. The 21" coaxial lead needed in its construction is the same type as used for lead-in on Motorola car antenna.

5. A low range output meter.

6. A special tuner gauge, Motorola Part No. 66X76825, for accurately setting tuner to exact alignment frequencies is available. Instructions on its use come with the gauge. Receiver can be aligned without using gauge, but use of gauge will help you to do a speedier and more accurate job.

PROCEDURE

1. Remove the front and rear covers. All adjustments are now exposed. Refer to Figure 3 for their location.

2. Turn the receiver on and allow it to warm up for a few minutes. Press the "M" button to place automatic tuner in manual tuning position.

3. Connect the output meter across the speaker voice coil.

4. Set receiver volume control at maximum and tone control to voice position (high position).

5. Refer to the following alignment chart for procedure.

STEP	TUNER POSITION SET TO	DUMMY ANTENNA	SIGNAL GENERATOR LEAD CONNECTED TO	SIG. GEN. SET AT	ADJUST FOR PEAK ON OUTPUT METER
1.	High frequency end (cores out)	.1 mfd. at Sig. Gen.	Osc Mod grid (#5 pin)	455 Kc	#1 and 2 P & S in T-1 #3 and 4 P & S in T-2
2.	High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans. *	60 mmf. at Sig. Gen. in series with 21" long coax lead.	Antenna receptacle	1600 Kc	#5 Osc. coil trimmer #6 R.F. coil trimmer #7 Ant. coil trimmer
3.	EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward *	"	"	1425 Kc	#8 Osc. coil core #9 R.F. coil core #10 Ant. coil core
4.	EXACTLY four more full turns in (as indicated by knob setscrew)	"	"	Power turned Off.	#11 Osc. Pad. core for maximum noise

NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3, and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.

5. Assemble receiver and peak antenna trimmer (#7) to car antenna. The antenna trimmer is located at the top of the receiver and is inaccessible when the receiver is installed behind instrument panel, therefore, it is necessary to adjust antenna trimmer before final installation. Proceed by laying set on floor of car, connect antenna and "A" leads, tune set to a spot around 1400 kc that is free of stations and adjust antenna trimmer for maximum noise. The antenna should be fully extended.

IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.

TUNING RANGE

535 to 1600 K.C.

I. F. Frequency - 455 kc.

ELECTRICAL CHARACTERISTICS

Power Input: 6 Amp. at 6.3V (with P.M. dynamic type speaker)
7.5 Amp. at 6.3V (with electrodynamic type speaker)

Power Output: 5.6 watts (max.)

OVERALL SENSITIVITY

Frequency	1400 Kc	1000 Kc	600 Kc
Sensitivity	1.4uv	1.6uv	1.4 uv

Standard output is to be 1 watt and is measured across the 3 ohm resistive load. (1 watt = 1.74 volts). Test is made with 30% 400 cycle modulation. Tone control is set to voice position (high) and volume control at maximum. Signal is fed through 60 mmf. dummy to antenna connector of set through 21" coaxial lead. See Figure 2 for dummy antenna detail.

MOTOROLA, INC.

PARTS LIST - MODELS CT6, PC6, OE6

REF NO.	PART NO.	DESCRIPTION
C-1	21A20677	Capacitor, fixed: metal mica; 90 mmf
C-2	8A4529	Capacitor, fixed: paper; .006 mf. 100V
C-3	20A70601	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket
C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V
C-5	8A19153	Capacitor, fixed: paper; .5 mf. 100V
C-6	8A14791	Capacitor, fixed: paper; .05 mf. 400V
C-7	8X15166	Capacitor, fixed: paper; .1 mf. 400V
C-8	20A70601	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket
C-9	21X70720	Capacitor, fixed: mica; 5 mmf. 500V
C-10	21R6518	Capacitor, fixed: mica; 50 mmf. 500V
C-11	20A70214	Capacitor, variable; mica; 50-80 mmf.; with mounting bracket
C-12	21A71672	Capacitor, fixed: ceramic; 400 mmf. 5% 500V
C-13	8A17088	Capacitor, fixed: paper; .5 mf. 100V
C-14	8X25690	Capacitor, fixed: paper; .01 mf. 400V
C-15	8X25600	Capacitor, fixed: paper; .01 mf. 400V
C-16	8A19153	Capacitor, fixed: paper; .5 mf. 100V
C-17	8A12940	Capacitor, fixed: paper; .006 mf. 1600V
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf.
C-19	21R6518	Capacitor, fixed: mica; 50 mmf. 300V
C-20	8A71911	Capacitor, fixed: paper; .05 mf. 400V
C-21	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
C-22	8A15166	Capacitor, fixed: paper; .1 mf. 400V
C-23	8A71909	Capacitor, fixed: paper; .004 mf. 400V
C-24	8A71910	Capacitor, fixed: paper; .006 mf. 400V
C-25	25A76429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
F-1	65X4657	Fuse: 20 Amp.: type SAG
G-1	46X5553	Vibrator: full wave; non-sync.
I-1	65X10667	Bulb: 6-8V, .25 Amp., tubular bayonet; type #44
L-1	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)
L-2	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)
L-3	1A71879	Coil, oscillator (specify color of paint dots on old coil when ordering)
L-4	24A70227	Coil, oscillator padder: includes mounting clip and adjustable iron core
L-5	24A74054	Coil, "A" choke
L-6	24A70199	Coil, "A" choke: with mounting bracket
R-1	6R6052	Resistor, fixed: carbon; 470,000 1/2W Ins.
R-2	6R6075	Resistor, fixed: carbon; 100,000 1/2W Ins.
R-3	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
R-4	6R6106	Resistor, fixed: carbon; 10,000 1W N.I.
R-5	6R6088	Resistor, fixed: carbon; 22,000 1/2W Ins.
R-6	6R6147	Resistor, fixed: carbon; 330 1W Ins.
R-7	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
R-8	6R6005	Resistor, fixed: carbon; 50 1/2W N.I.
R-9	6R6005	Resistor, fixed: carbon; 50 1/2W N.I.
R-10	18A71825 or 18A70178	Resistor, variable: carbon; 500,000 with S.P.S.T. switch; tapped at 50,000 ohms; less shaft
R-11	6R6068	Resistor, fixed: carbon; 47,000 1/2W Ins.
R-12	6R6119	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.
R-13	6R6087	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
R-14	6R6052	Resistor, fixed: carbon; 470,000 1/2W Ins.
R-15	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.
R-16	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
R-17	6R6300	Resistor, fixed: carbon; 180 10% 1W Ins.
R-18	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.
R-19	6R6184	Resistor, fixed: carbon; 1000 1W N.I.
S-1		ON-OFF Switch (part of volume control R-10)
S-2	1B70944	Switch, solenoid: with mounting plate
S-3	40B70952	Switch, selector
S-4	40A70951	Switch, mute
S-5	1X71470	Relay, MR-5 Tone control: complete
	1X70677	Magnet, tone relay
S-6	40B71385	Switch, tone control actuating
S-7	1X75625	Switch Assembly, push button
SP-1	1X74252	Spark Plate Assembly
T1 & T2	24B70827	Transformer, I.F. or diode: 455 kc; iron core tuned: includes 100 mmf padder across each winding; less shield can (used in early sets only)
	or 24B76685	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only)
T-3	25A72256	Transformer, output: with bracket
T-4	25B70960	Transformer, power

ADDITIONAL PARTS LIST - MODEL CT6

PART NO.	DESCRIPTION
8X4661	Capacitor, ammeter
8A4491	Capacitor, generator
11N8944	Cord, dial: 18 lb; black
1X74729	Dial Background & Strip Assembly: plastic; with re-inforcing strip
1X74302	Dial Light & Bracket Assembly
1X74932	Lead Assembly, fuse: 20" long; fuse retainer on one end, ammeter clip on other end
1X4695	Lead Assembly, battery: 10" long; male ferrule on one end
1X76898	Lead-in, antenna extension: 20" long
9A12705	Plate, electrolytic capacitor mtg.: bakelite wafer
1X74268	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together
1X74358	Shaft Assembly, tuning control: consists of manual tuning shaft with gear, cam and shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer
9A70208	Socket, tube: 4 prong (vibrator socket)
9A6788	Socket, tube: octal; plain
9A70165	Socket, tube: octal; shielded type
50B75808 or 50B76590	Speaker, dynamic: 6"; 3 ohm V.C.
6X4141	Suppressor distributor
1X74336	Tuner, Model ST-56-CT6 (complete)

ADDITIONAL PARTS LIST - MODEL PC6

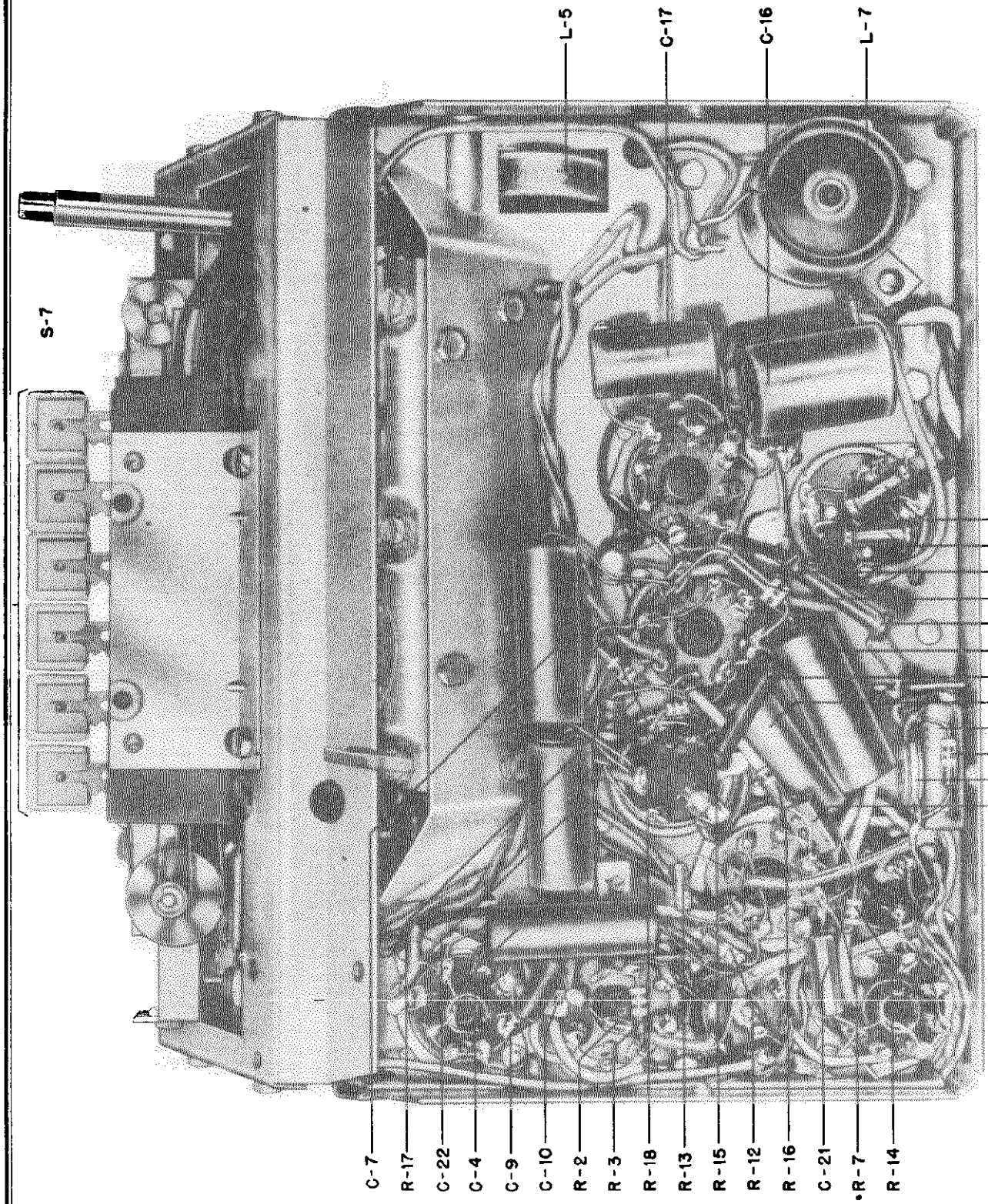
PART NO.	DESCRIPTION
8X4661	Capacitor, ammeter
8A4491	Capacitor, generator
11N8944	Cord, dial: 18 lb; black
1X74306	Dial Background & Strip Assembly: plastic; with reinforcing strip
1X74304	Dial Light & Bracket Assembly: with 8-1/2" lead
1X4695	Lead Assembly, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on the other
1X74932	Lead Assembly, fuse: 20" long; fuse retainer on one end, ammeter clip on other end
1X73866	Pointer & Slider Assembly
1X74268	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together
1X74299	Shaft Assembly, tuning: consists of manual tuning shaft with gear, cam and shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer
9A70208	Socket, 4 prong
9A6788	Socket, tube: octal; plain
9A70165	Socket, tube: octal; shielded type
50B75808	Speaker, dynamic: 6" 3 ohm v.c.
1X74336	Tuner, Model ST-56-PC6 (complete)

ADDITIONAL PARTS LIST - MODEL OE6

PART NO.	DESCRIPTION
8A4491	Capacitor, generator
1X74273	Dial Background and Strip Assembly: translucent white plastic; with metal reinforcing strip
1X4695	Lead Assembly, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on other end.
1X4694	Lead Assembly, fuse: 20" long; fuse receptacle on one end, spade lug on other end
1X73732	Pointer and Slider Assembly
1X74266	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together
49A75806	Pulley, cord: brass, 5/16 diameter (pointer cord idler pulley)
9A70208	Socket, 4 prong
9A6788	Socket, tube: octal, plain
1X74265	Shaft Assembly, tuning: includes manual tuning shaft with gear, cam & shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer.
1X74336	Tuner, Model ST-56-OE6 (complete)

MODELS FD6,NH6

MOTOROLA, INC.



CHASSIS BOTTOM VIEW

For schematic, see P 15-13

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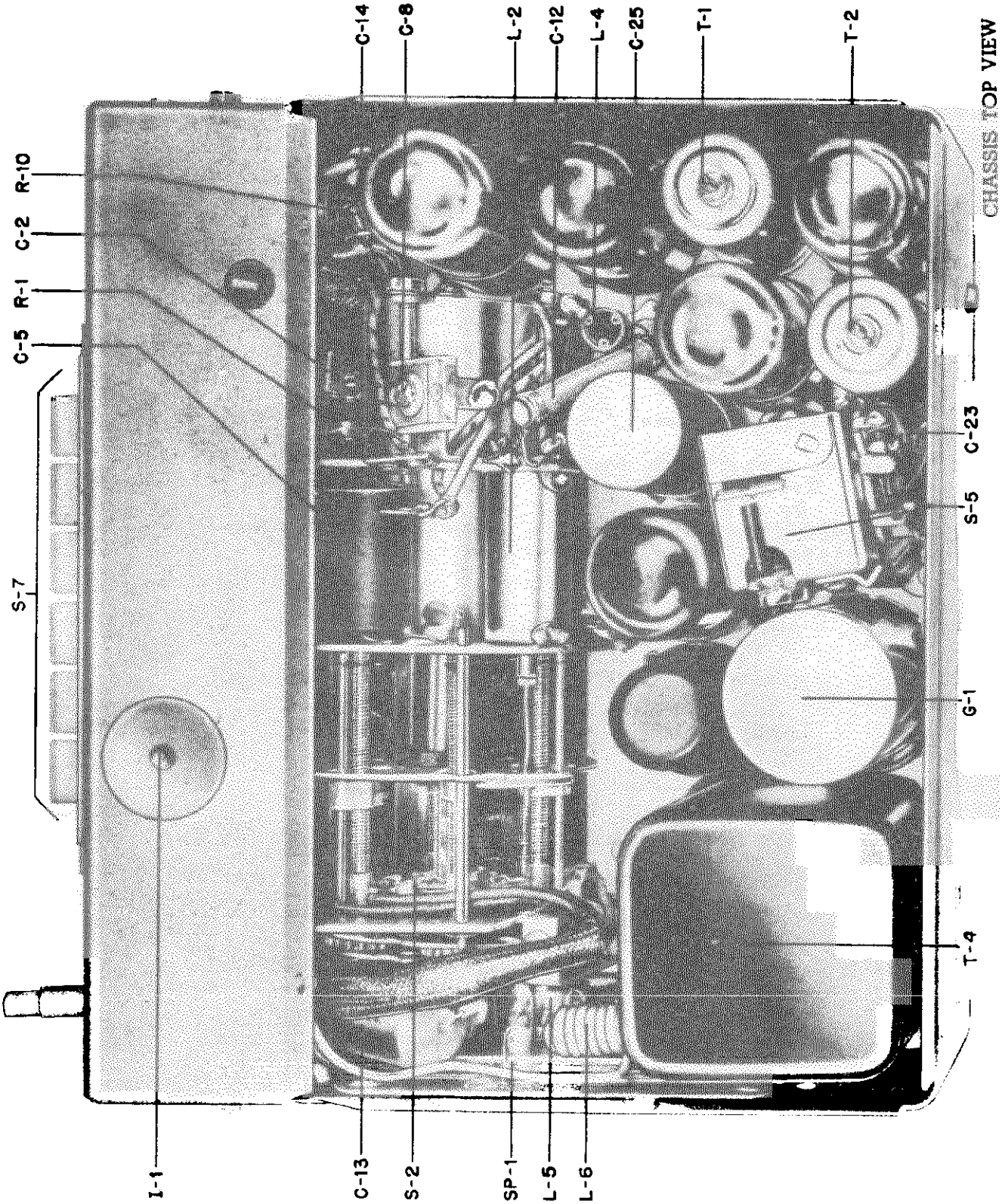


CHASSIS TOP VIEW

MODELS FD6,NH6

MOTOROLA, INC.

WARNING: CHECK VOLTAGE REGULATOR

Many late cars develop exceedingly high voltage due to improper adjustment of voltage regulator, which shortens the life of radio tubes, vibrator, electrical accessories and headlights. When voltage exceeds 7.3 volts with motor running at about 35 miles per hour and no load or battery, have the voltage regulator adjusted for maximum voltage of 7.3 volts under a no load condition.

TO REPLACE DIAL LIGHT

It will be necessary to remove set from car when replacing dial light. Pry off the large plug button directly over the "M" push button and replace with a #44 miniature bayonet base pilot lamp.

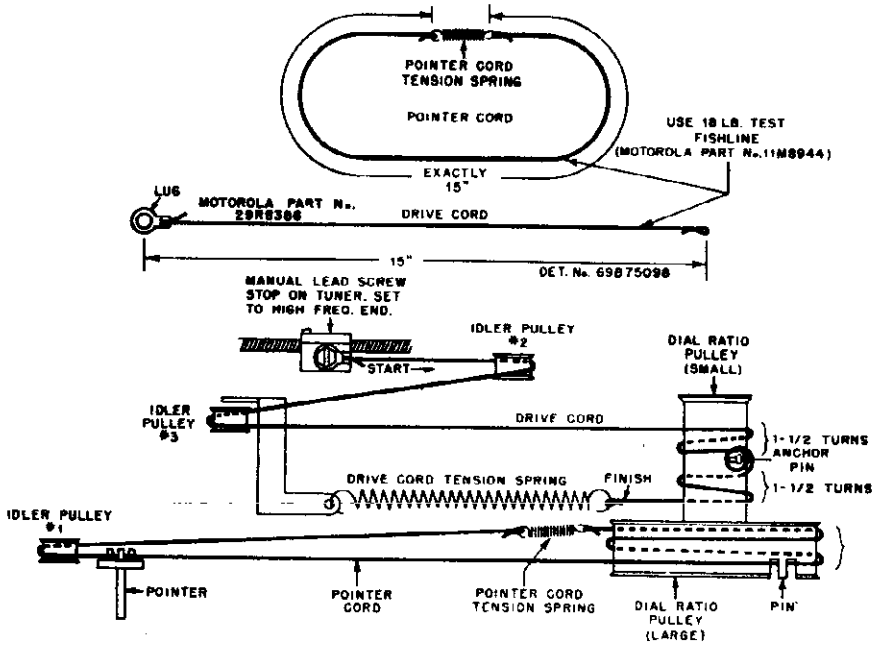
POINTER AND DRIVE CORD REPLACEMENT

PREPARE RECEIVER AS FOLLOWS

1. Remove the escutcheon.

2. Remove the push button assembly. Two screws hold it in position. Do not unsolder any wire leads; just lay the push button assembly on top of the set.,

3. The pointer & drive cords are now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord to make the pointer cord more readily accessible.



POINTER AND DRIVE CORD RESTRINGING DETAIL

MOTOROLA, INC.

MODEL FD6

Hash, Ripple and Mechanical Vibration in Model FD-6.

Some Model FD-6's have been troubled by hash, ripple and mechanical vibration. These conditions can be remedied by dressing leads, changing the position of the screen by-pass capacitor (C06) and adding a copper washer to the hash choke.

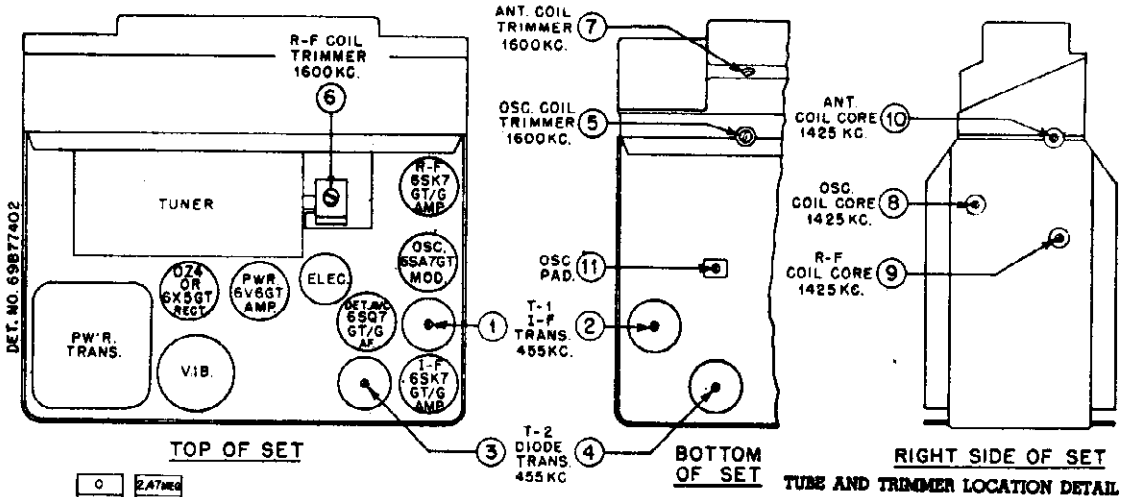
Hash: Remove Capacitor C-6 from its present location and mount it between electrolytic capacitor and the 6SA7 tube along side of the oscillator padder adjustment screw. It is a tight fit but there is room for it.

Dress the vibrator leads (black and green) into the opening in the chassis base. Next, dress the hot "A" (yellow) lead away from the black and green vibrator leads.

Ripple: Ripple may be reduced by removing the chassis from the housing and removing the nose of the set exposing the volume control. Unsolder the grounded lug of the volume control from the bracket. Attach a lead to this lug and run it back to the cathode terminal of the 6SQ7 tube socket.

Mechanical Vibration: A magnetic field is set up by the hash choke which in some instances causes a mechanical vibration (buzz). This condition can be eliminated by soldering a copper washer, Motorola Part Number 4S8203, (15/16 - 7/32 x .025) on top (end) of the hash choke. Solder the washer to the hash choke eyelet.

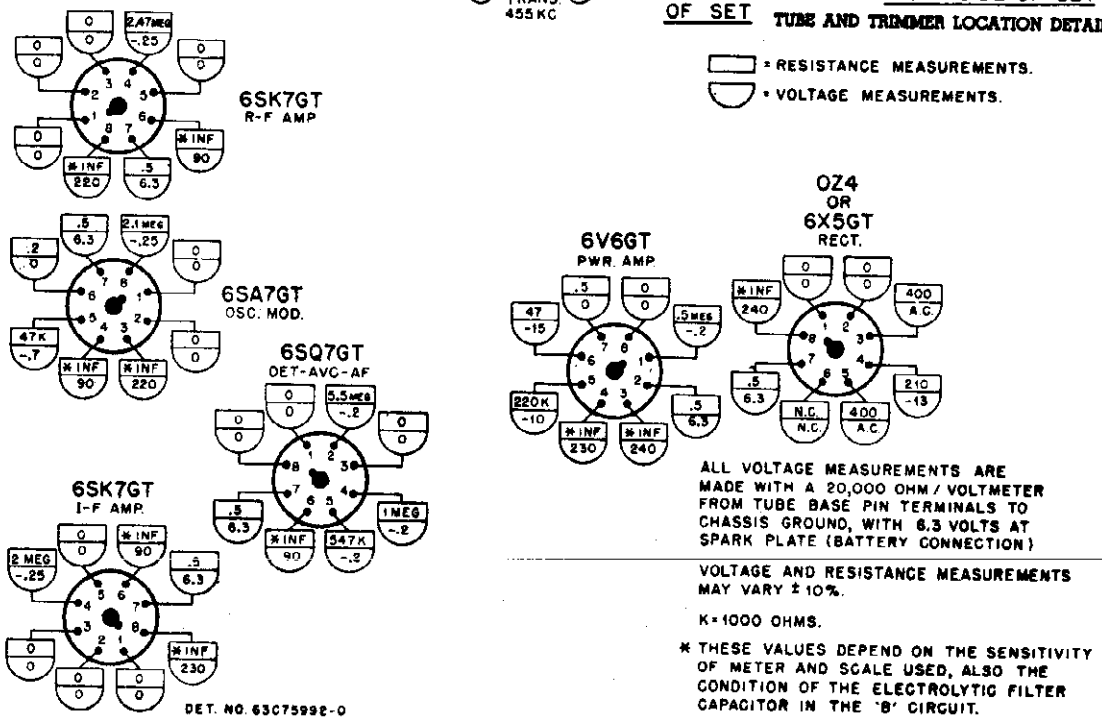
MODELS FD 6 and NH6



TUBE AND TRIMMER LOCATION DETAIL

▭ = RESISTANCE MEASUREMENTS.

▭ = VOLTAGE MEASUREMENTS.



ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM / VOLTMETER FROM TUBE BASE PIN TERMINALS TO CHASSIS GROUND, WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTION)

VOLTAGE AND RESISTANCE MEASUREMENTS MAY VARY ± 10%.

K = 1000 OHMS.

* THESE VALUES DEPEND ON THE SENSITIVITY OF METER AND SCALE USED, ALSO THE CONDITION OF THE ELECTROLYTIC FILTER CAPACITOR IN THE 'B' CIRCUIT.

DET. NO. 63C75992-0

VOLTAGE AND RESISTANCE DIAGRAM

MODELS FD6, NH6

MOTOROLA, INC.

MODELS FD6 and NH6

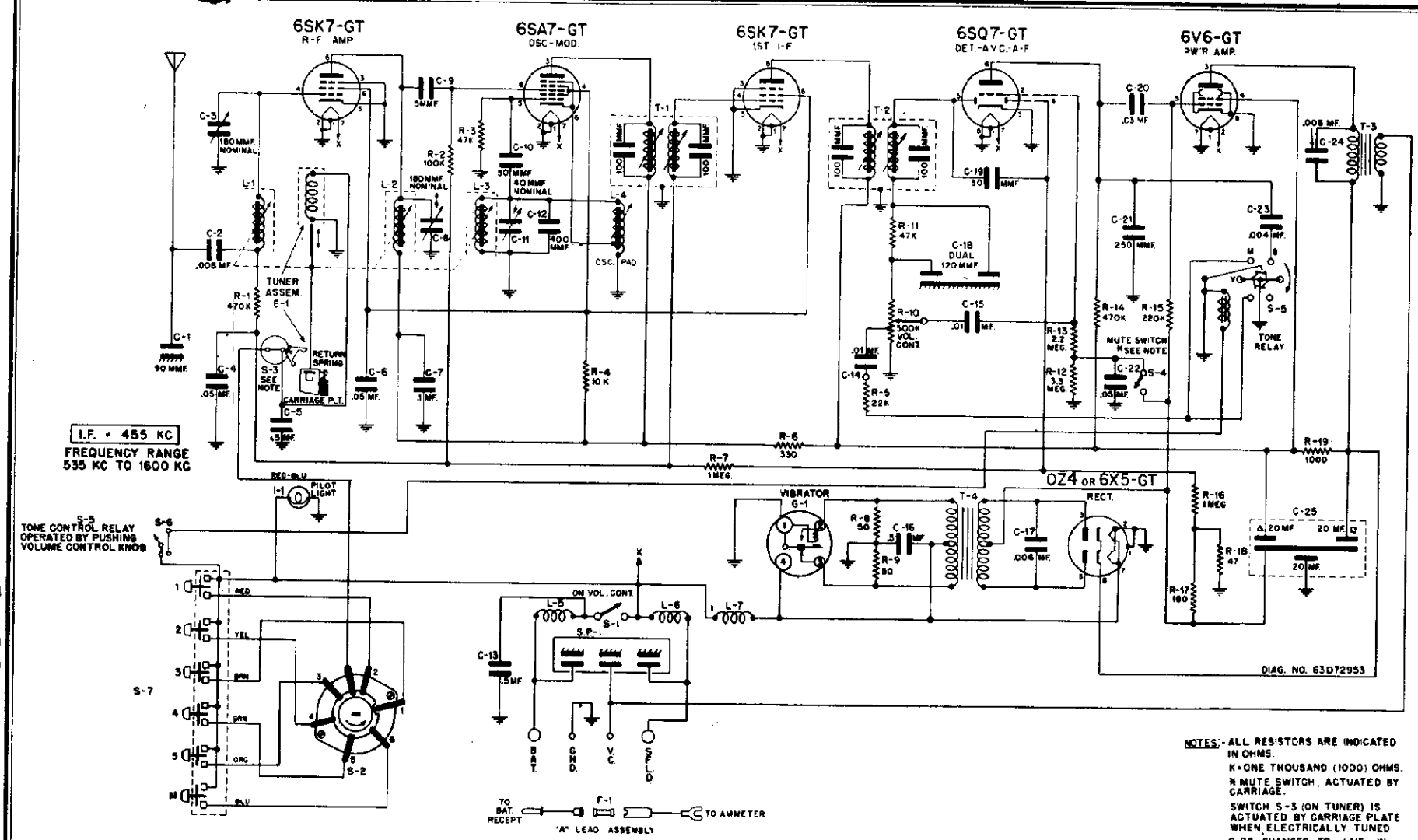
REF. NO.	PART NO.	DESCRIPTION
C-1	21A20877	Capacitor, fixed: metal mica; 90 mmf
C-2	8A4529	Capacitor, fixed: paper; .006 mf. 100V
C-3	20A70601	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket
C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V
C-5	8A19133	Capacitor, fixed: paper; .5 mf. 100V
C-6	8A14791	Capacitor, fixed: paper; .05 mf. 400V
C-7	8K15166	Capacitor, fixed: paper; .1 mf. 400V
C-8	20A70601	Capacitor, variable; mica; 50-180 mmf.; with mounting bracket
C-9	21K70720	Capacitor, fixed: mica; 5 mmf. 500V
C-10	21R6513	Capacitor, fixed: mica; 50 mmf. 300V
C-11	20A70214	Capacitor, variable; mica; 30-80 mmf.; with mounting bracket
C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf. 5% 500V
C-13	8A17028	Capacitor, fixed: paper; .5 mf. 100V
C-14	8K23690	Capacitor, fixed: paper; .01 mf. 400V
C-15	8K23690	Capacitor, fixed: paper; .01 mf. 400V
C-16	8A19133	Capacitor, fixed: paper; .5 mf. 100V
C-17	8A12840	Capacitor, fixed: paper; .006 mf. 1600V
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf.
C-19	21R6513	Capacitor, fixed: mica; 50 mmf. 300V
C-20	8A71911	Capacitor, fixed: paper; .05 mf. 400V
C-21	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
C-22	8A15166	Capacitor, fixed: paper; .1 mf. 400V
C-23	8A71909	Capacitor, fixed: paper; .004 mf. 400V
C-24	8A71910	Capacitor, fixed: paper; .006 mf. 400V
C-25	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
E-1	1X75200	Tuner, Model 8C-56 - FD6 - NH6 FD6: complete
F-1	85K4637	Fuse: 20 Amp.; type 3AG
G-1	4823333	Vibrator: full wave; non-sync.
I-1	65X10867	Bulb: 6-8V, .25 Amp., tubular bayonet: type #44
L-1	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)
L-2	1A71881	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)
L-3	1A71879	Coil, oscillator (specify color of paint dots on old coil when ordering)
L-4	24A70227	Coil, oscillator padder: includes mounting clip and adjustable iron core
L-5	24K70840	Coil, "A" choke
L-6	24K73535	Coil, choke: dial light and speaker field; 9 turns #16 yellow wire
L-7	24A70199	Coil, "A" choke: with mounting bracket
R-1	6R6032	Resistor, fixed: carbon; 470,000-1/2W Ins.
R-2	6R6075	Resistor, fixed: carbon; 100,000-1/2W Ins.
R-3	6R6056	Resistor, fixed: carbon; 47,000-1/2W; Ins.
R-4	6R6106	Resistor, fixed: carbon; 10,000-1W; N. I.
R-5	6R6056	Resistor, fixed: carbon; 22,000-1/2W: Ins.
R-6	6R6147	Resistor, fixed: carbon; 250-1W; Ins.
R-7	6R6004	Resistor, fixed: carbon; 1 meg-1/2W; Ins.
R-8	6R6005	Resistor, fixed: carbon; 50-1/2W; N. I.
R-9	6R6005	Resistor, fixed: carbon; 50-1/2W; N. I.
R-10	18A71925 or 18A70172	Resistor, variable: carbon; .5 meg; with S.P.S.T. switch; tapped at 50,000 ohms; less shaft
R-11	6R6056	Resistor, fixed: carbon; 47,000-1/2W; Ins.
R-12	6R6118	Resistor, fixed: carbon; 3.3 meg 1/2W; Ins.
R-13	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
R-14	6R6032	Resistor, fixed: carbon; 470,000-1/2W; Ins.
R-15	6R6015	Resistor, fixed: carbon; 220,000-1/2W; Ins.
R-16	6R6004	Resistor, fixed: carbon; 1 meg 1/2W; Ins.
R-17	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.
R-18	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.
R-19	6R6184	Resistor, fixed: carbon; 1000 1W N. I.
S-1		ON-OFF switch (part of volume control R-10)
S-2	1B70944	Switch, solenoid: with mounting plate
S-3	40B70952	Switch, selector
S-4	40A70931	Switch, mute
S-5	1X71470	Relay, MR-5 Tone Control: complete
S-6	40B71363	Switch, tone control
S-7	1K75625	Switch Assembly, push button
SP-1	1X75194	Spark Plate Assembly
T-1 & T-2	24B70827 or	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in early sets only)
	24B76553	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only)
T-3	25A72258	Transformer, output: with bracket
T-4	25B70950	Transformer, power

MODEL FD6 - ADDITIONAL PARTS

	1X75223	Shaft Assembly, volume control: brass shaft with bakelite washer at one end
	47A75655	Shaft, volume control: hairpin shaped; 29/32" long (fits into volume control)
	26B70107	Shield, coil (for T-1 & T-2; use with 24B70827 I.F.-diode
	1A71049	Shield and Iron Core Sleeve Assembly (for T-1 & T-2; use with 24B76553 I.F.-diode transformers only)
	9A70206	Socket, tube: 4 Pin
	9A5788	Socket, tube: octal; plain
	9A70165	Socket, tube: octal, shielded type
	50B71900 or 50B76589	Speaker: dynamic 6"; 3 ohm v.c.
	51K72404	Strip, terminal: 1 insulated lug, #1 mounting.
	51K74292	Strip, terminal: 1 insulated lug, #2 mounting
	51K74291	Strip, terminal: 2 insulated lugs, #2 mounting
	41A51096	Spring, coil (used under volume knob for tone control operation)
	41A75996	Spring, drive cord tension (large)
	41A73619	Spring, string tension (small)
	48A72155	Stud, dial ratio pulley: brass; 1/8" diameter x 51/64" long
	6A76813	Suppressor, distributor
	29X5408	Terminal, insulated pin: black; (speaker ground terminal)
	14A74226	Insulator, switch: armite; 4" x 2-7/16"
	56B72165	Knob, station set-up: die cast; polished chrome finish
	56K75406	Knob, control: with setscrew; (volume & tuning)
	29R5586	Lug, soldering: #4 hot-tin dipped (used on one end of drive cord)
	1X4894	Lead Assembly, fuse: 20" long; fuse retainer on one end, spade lug on other end
	1X4896	Lead Assembly, battery: 10" long, male connector on one end, insulated pin terminal on other end.
	1X76659	Lead Assembly, speaker: 2 conductor with black & white insulated pin terminals
	1X27819	Lead Assembly, speaker: 3 conductor, with black, white & yellow insulated pin terminals
	1X72203	Plate, speaker mounting: includes speaker gasket
	1X72248	Pointer & Slider Assembly
	1X74268	Pulley Assembly, dial ratio: one large and one small pulley Assembled together
	49A75807	Pulley, cord: 1/2" groove
	1X70646	Receptacle Assembly, antenna: metal ferrule with insulated contact
	34B72259	Scale, dial: plastic
	8K19266	Capacitor, distributor
	8A4491	Capacitor, generator
	42A51461	Clamp, electrolytic capacitor mounting
	42A4215	Clip, vibrator grounding
	11M8944	Cord, dial: 18 lb; black
	1X75221	Dial Background & Strip Assembly: plastic with reinforcing strip
	1X75319	Dial Light Assembly: miniature bayonet base socket riveted to large plug button; with 12" lead
	13C72265	Escutcheon, front plate: polished chrome finish (less dial scale and retaining frame)
	5B7805	Eyelet, snap-in: steel (dial background strip mounting)
	7C74211	Frame, dial scale retaining
	14K74155	Insulator, electrolytic: fishpaper; 3-7/64 x 2-3/8"
	14X51112	Insulator, fuse: fibre tube

MODEL NH6 - ADDITIONAL PARTS

	11M8944	Cord, dial: 18 lb. black
	49A75807	Pulley, cord: 1/2" groove
	1X74268	Pulley Assembly, dial ratio: one large & one small pulley assembled together
	1X70646	Receptacle Assembly, antenna: metal
	26B70107	Shield, coil: (for T-1 & T-2; use with 24B70827 I.F-Diode transformers only)
	1A71049	Shield and Iron Core Sleeve Assembly (for T-1 & T-2; use with 24B76553 I.F.-Diode transformers only)
	9A70206	Socket, tube: 4 pin
	9A5788	Socket, tube: octal; plain
	9A70165	Socket, tube: octal; shielded type
	50B71900 or 50B76589	Speaker, dynamic: 6"; 3 ohm v.c.
	6X4141	Suppressor, distributor



NOTES:- ALL RESISTORS ARE INDICATED IN OHMS.
K = ONE THOUSAND (1000) OHMS.
* MUTE SWITCH, ACTUATED BY CARRIAGE.
SWITCH S-3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.
C-22 CHANGED TO .1 MF. IN LATE MODELS.

WARNING: Many late model cars develop exceedingly high voltage due to improper adjustment of voltage regulator which shortens the life of radio tubes, vibrators and headlights. When voltage exceeds 7.3 volts with motor running at about 35 miles per hour and no load on battery, have your auto mechanic adjust the voltage regulator for maximum voltage of 7.3 volts under a no load condition.

MODEL PD6

MOTOROLA, INC.

ALIGNMENT

PROCEDURE

1. Remove the top and bottom covers. All adjustments are now exposed. Refer to Figure 3 for their location.

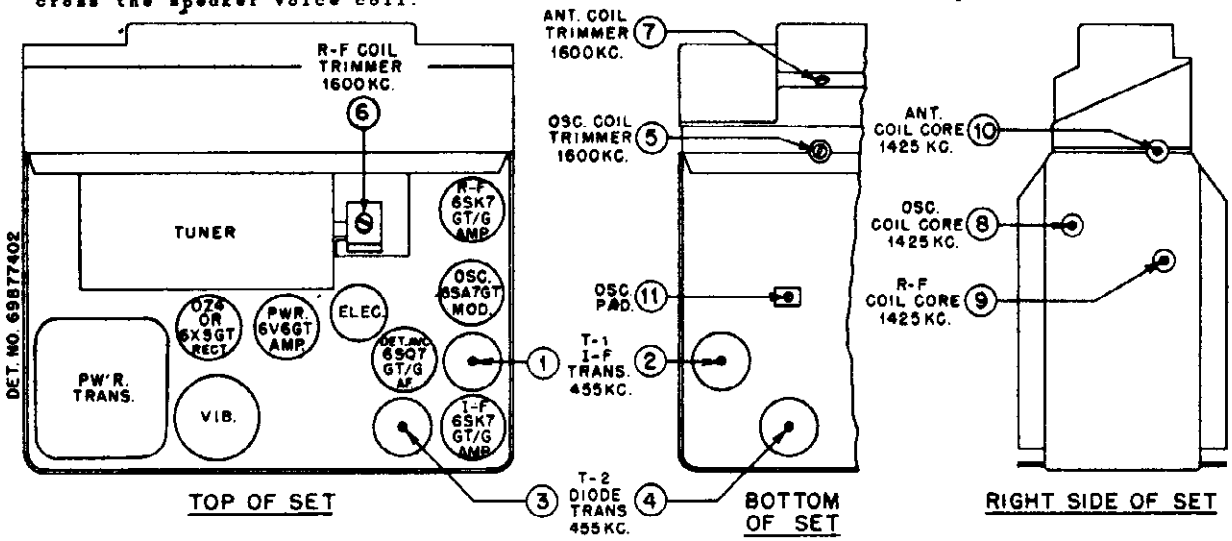
2. Turn the receiver on and allow it to warm up for a few minutes. Press the "M" button to place automatic tuner in manual tuning position.

3. Connect the output meter across the speaker voice coil.

4. Set receiver volume control at maximum and tone control to voice position (high position).

5. Refer to the following alignment chart for procedure.

IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.



TUBE AND TRIMMER LOCATION DETAIL

Step	Tuner Position Set to	Dummy Antenna	Signal Generator Lead Connected to	Sig. Gen. Set at	Adjust for Peak on Output Meter
1.	High frequency end	.1 mfd. at Sig. Gen.	Osc. Mod grid (#5 pin)	455 Kc	#1 and 2, P & S in T-1 #3 and 4, P & S in T-2
2. *	High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans.	60 mmf. at Sig. Gen. in series with 21" long coax lead.	Antenna Receptacle	1600 Kc	#5 Osc. coil trimmer #6 R.F. coil trimmer #7 Ant. Coil trimmer
3. *	EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward.	"	"	1426 Kc	#8 Osc. coil core #9 R.F. coil core #10 Ant. coil core
4.	EXACTLY four more full turns in (as indicated by knob setscrew)	"	"	Power turned Off	#11 Osc. Pad. core for maximum noise

NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3 and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.

5. Assemble receiver and peak antenna trimmer (#7) to car antenna. The antenna trimmer is inaccessible when the receiver is installed behind instrument panel, therefore, it is necessary to adjust antenna trimmer before final installation. Proceed by laying set on floor of car, connect antenna and "A" leads, tune set to a spot around 1400 kc that is free of stations and adjust antenna trimmer for maximum noise. The antenna should be fully-extended.

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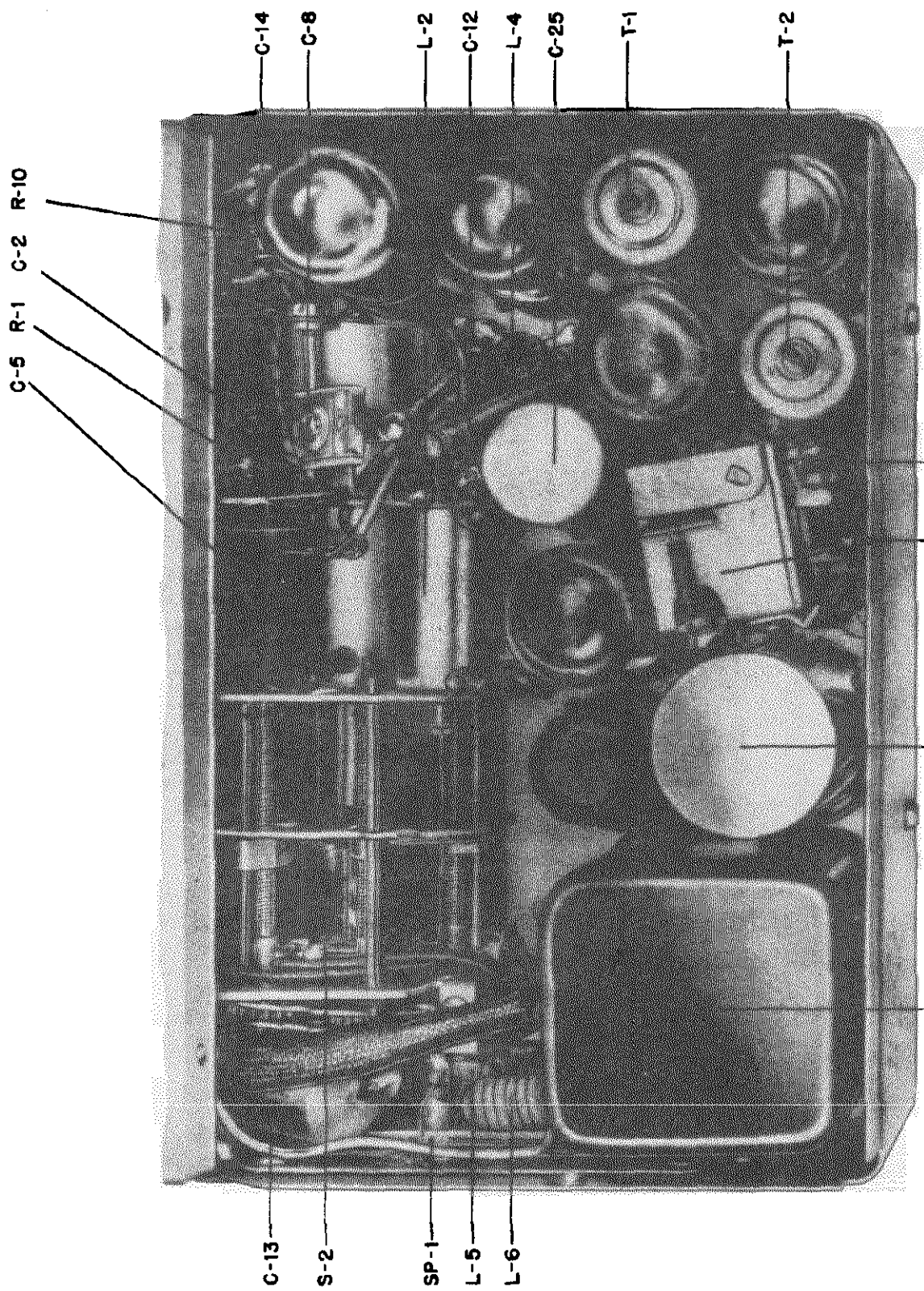
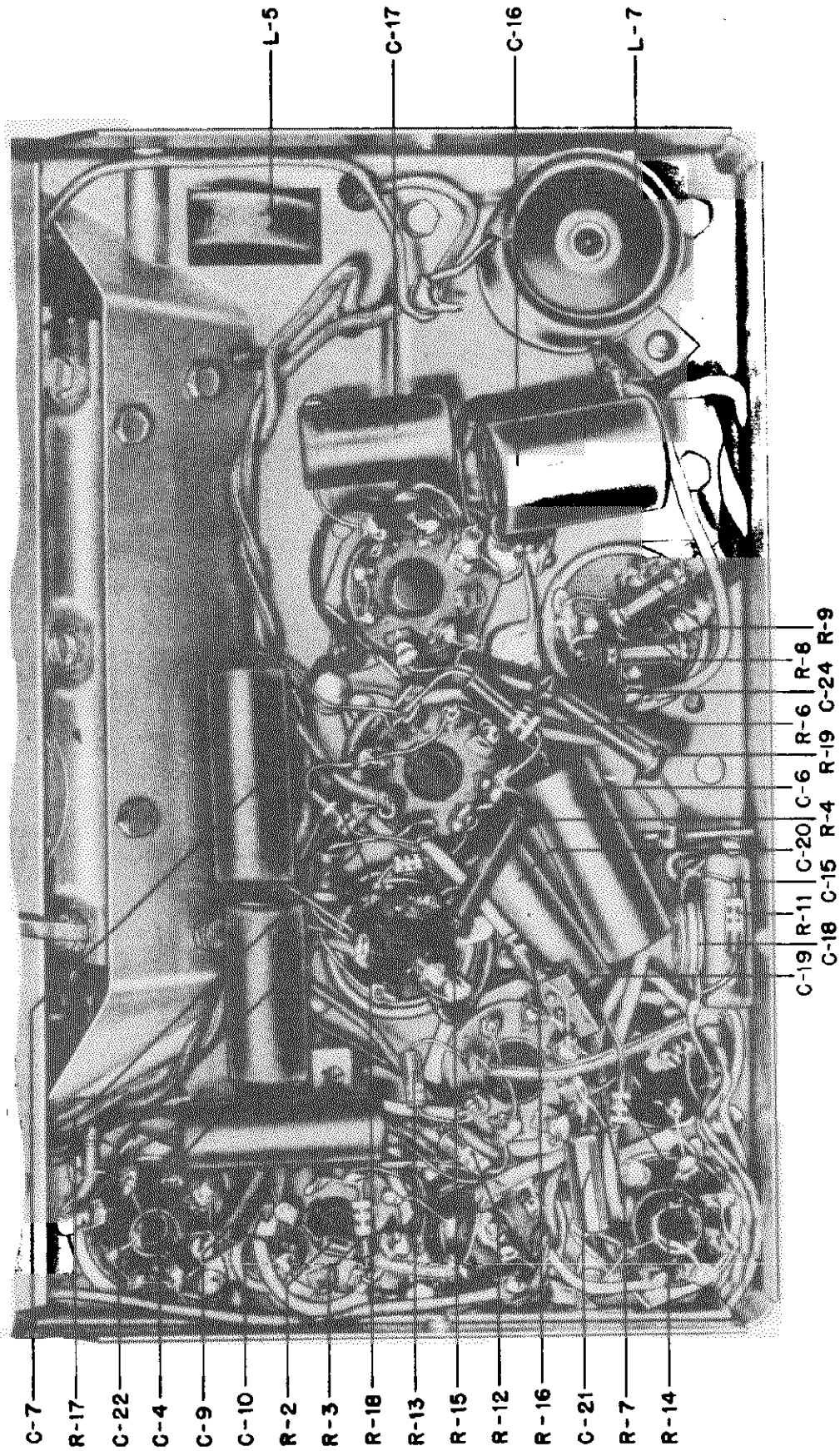


CHASSIS TOP VIEW

MODEL PD6

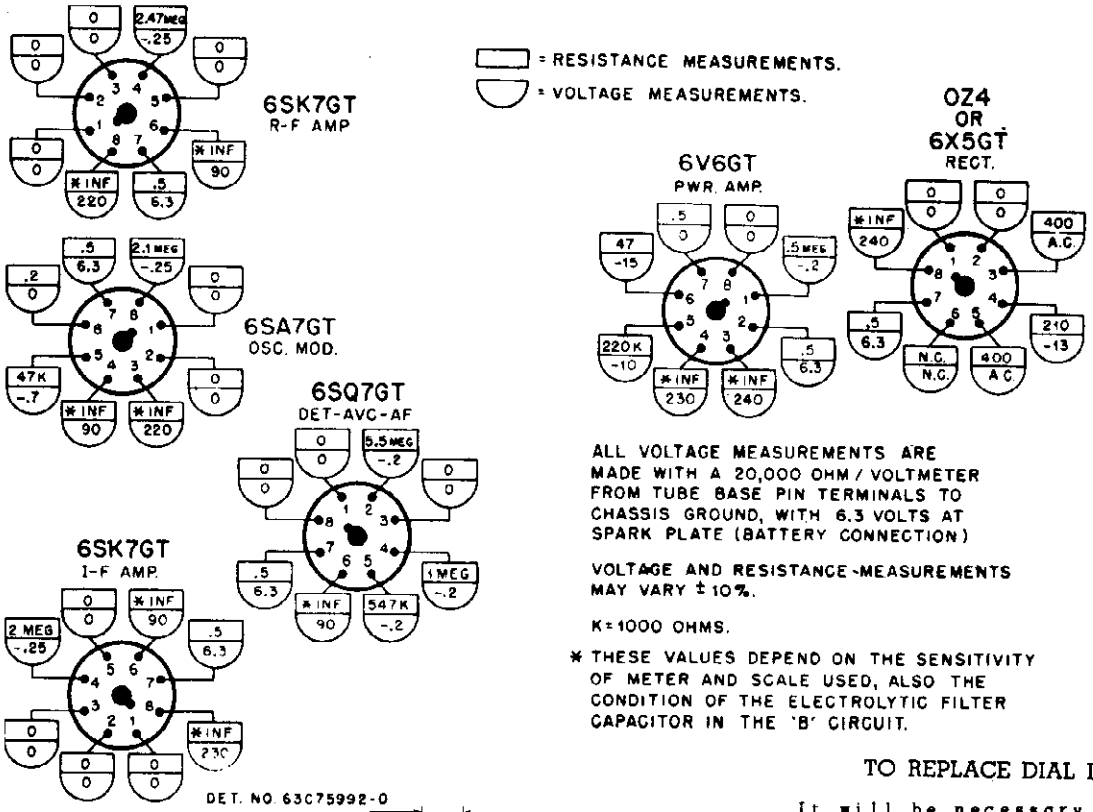
MOTOROLA, INC.



CHASSIS BOTTOM VIEW

MOTOROLA, INC.

MODEL PD6



ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM / VOLTMETER FROM TUBE BASE PIN TERMINALS TO CHASSIS GROUND, WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTION)

VOLTAGE AND RESISTANCE MEASUREMENTS MAY VARY ± 10%.

K = 1000 OHMS.

* THESE VALUES DEPEND ON THE SENSITIVITY OF METER AND SCALE USED, ALSO THE CONDITION OF THE ELECTROLYTIC FILTER CAPACITOR IN THE 'B' CIRCUIT.

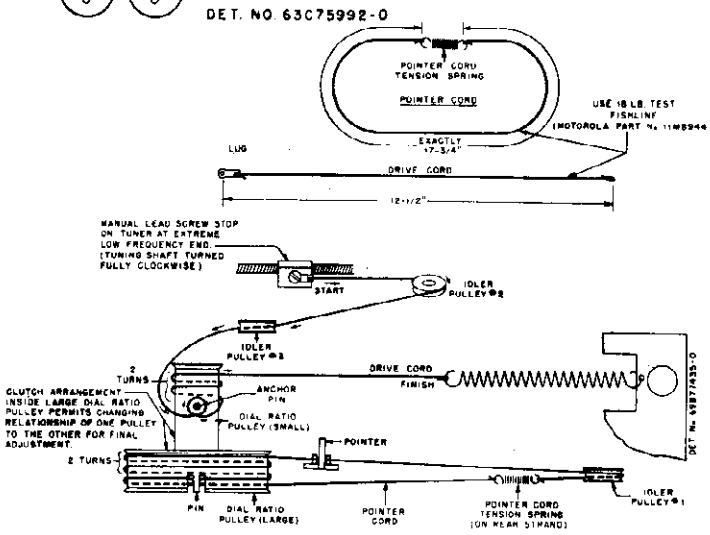


FIGURE 1. POINTER AND DRIVE CORD RESTRINGING DETAIL

TO REPLACE DIAL LIGHT

It will be necessary to remove set from car when replacing dial light. Pry out the large plug button directly over the "M" push button and replace bulb with a #44 miniature bayonet base pilot lamp.

POINTER CORD REPLACEMENT

1. Make up the pointer cord as shown in Figure 1. The ends are tied to the pointer cord spring. IT MUST MEASURE 17-3/4" FROM ONE END OF THE SPRING TO THE OTHER AFTER BEING TIED. Secure the knots with a drop of shellac or household cement.

2. Restring as shown in Figure 1.

DIAL DRIVE CORD REPLACEMENT

1. Make up the drive cord as shown in Figure 1. Secure the knots with a drop of shellac or household cement.

3. Restring as shown in Figure 1.

POINTER AND DRIVE CORD REPLACEMENT

PREPARE RECEIVER AS FOLLOWS

1. Remove the escutheon and push button assembly. Four screws hold it in position. Do not unsolder any wire leads; just lay the escutcheon and push button assembly to one side.

2. The pointer cord is now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord to make the pointer cord more readily accessible.

3. To reach drive cord, it will be necessary to remove stamped front of receiver in addition to escutcheon.

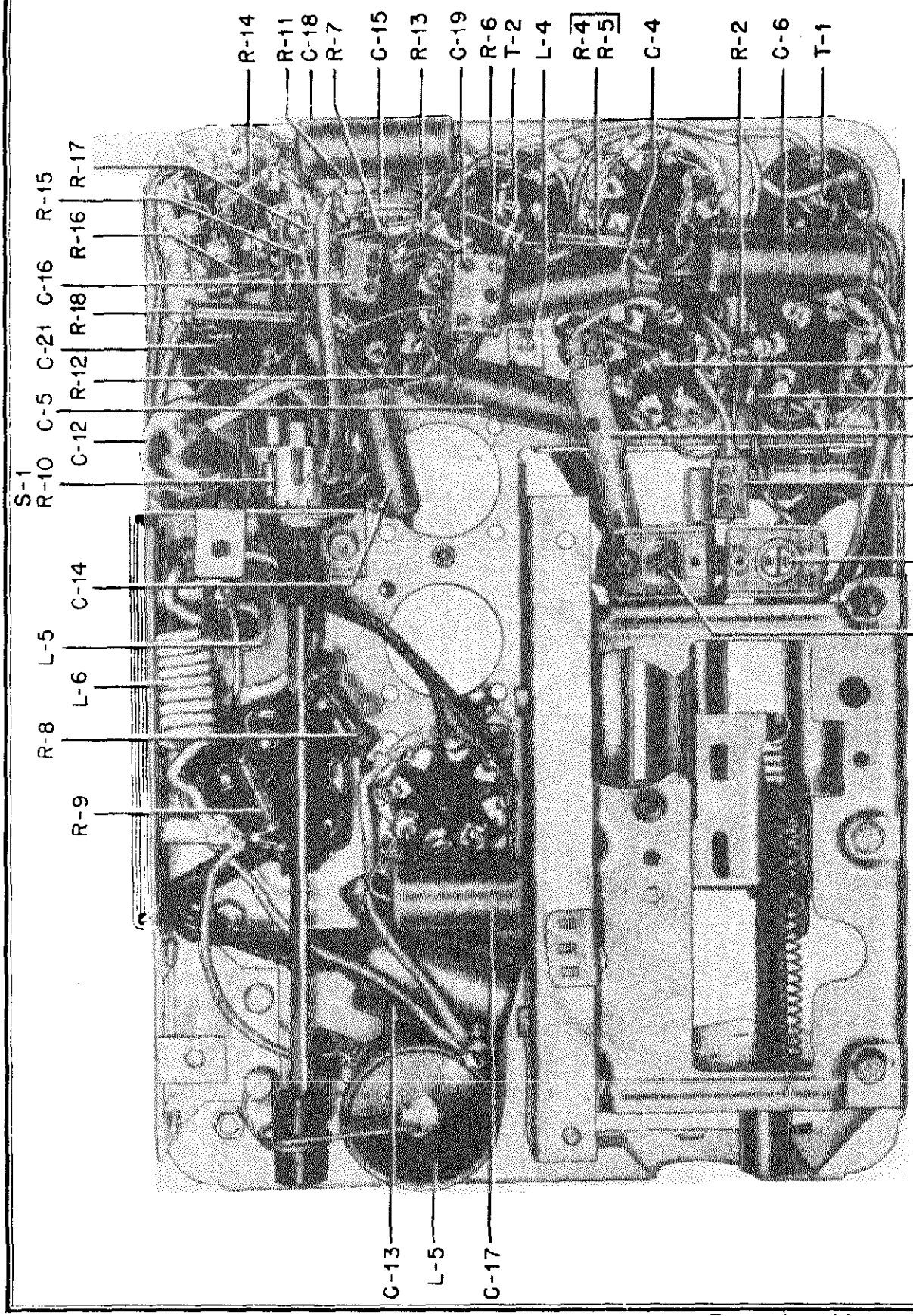
MODEL PD6

MOTOROLA, INC.

REF. NO.	PART NO	DESCRIPTION
C-1	21AB0977	Capacitor, fixed: metal mica; 90 mmf
C-2	8A4529	Capacitor, fixed: paper; .006 mf. 100V
C-3	20A70801	Capacitor, variable: mica; 50-180 mmf.; with mounting bracket
C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V
C-5	8A19135	Capacitor, fixed: paper; .5 mf. 100V
C-6	8A14791	Capacitor, fixed: paper; .05 mf. 400V
C-7	8K13166	Capacitor, fixed: paper; .1 mf. 400V
C-8	20A70801	Capacitor, variable; mica; 50-180 mmf.; with mounting bracket
C-9	21K70720	Capacitor, fixed: mica; 5 mmf. 500V
C-10	21R6513	Capacitor, fixed: mica; 50 mmf. 500V
C-11	20A70214	Capacitor, variable; mica; 30-60 mmf.; with mounting bracket
C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf. 5% 500V
C-13	8A17028	Capacitor, fixed: paper; .5 mf. 100V
C-14	8K23690	Capacitor, fixed: paper; .01 mf. 400V
C-15	8K23690	Capacitor, fixed: paper; .01 mf. 400V
C-16	8A19133	Capacitor, fixed: paper; .5 mf. 100V
C-17	8A12840	Capacitor, fixed: paper; .008 mf. 1600V
C-18	21A70176	Capacitor, fixed: mica; dual 120 mmf.
C-19	21R6513	Capacitor, fixed: mica; 50 mmf. 500V
C-20	8A71911	Capacitor, fixed: paper; .05 mf. 400V
C-21	21R6646	Capacitor, fixed: mica; 250 mmf. 500V
C-22	8A15166	Capacitor, fixed: paper; .1 mf. 400V
C-23	8A71909	Capacitor, fixed: paper; .004 mf. 400V
C-24	8A71910	Capacitor, fixed: paper; .008 mf. 400V
C-25	25A75428	Capacitor, electrolytic; 20-20 mf. 400V, 20 mf. 25V
E-1	1X75200	Tuner, Model St-36 - PD6 - MR6 PD6: complete
F-1	65K4657	Fuse: 20 Amp.: type 3AG
G-1	4S3333	Vibrator: full wave; non-sync.
I-1	65X10667	Bulb: 6-6V, .25 amp., tubular bayonet; type #44
L-1	1A71881	Coil, antenna or R.F. (specify color of paint dots on old coil when ordering)
L-2	1A71881	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)
L-3	1A71879	Coil, oscillator (specify color of paint dots on old coil when ordering)
L-4	24A70227	Coil, oscillator padder: includes mounting clip and adjustable iron core
L-5	24K70840	Coil, "A" choke
L-6	24K75535	Coil, choke: dial light and speaker field; 9 turns #18 yellow wire
L-7	24A70199	Coil, "A" choke: with mounting bracket
R-1	6R6032	Resistor, fixed: carbon; 470,000-1/2W Ins.
R-2	6R6075	Resistor, fixed: carbon; 100,000-1/2W Ins.
R-3	6R6056	Resistor, fixed: carbon; 47,000-1/2W; Ins.
R-4	6R6106	Resistor, fixed: carbon; 10,000-1W; N. I.
R-5	6R6028	Resistor, fixed: carbon; 22,000-1/2W: Ins.
R-6	6R6147	Resistor, fixed: carbon; 330-1W; Ins.
R-7	6R6004	Resistor, fixed: carbon; 1 meg-1/2W; Ins.
R-8	6R6005	Resistor, fixed: carbon; 50-1/2W; N. I.
R-9	6R6005	Resistor, fixed: carbon; 50-1/2W: N. I.
R-10	18A71925 or 18A70172	Resistor, variable: carbon; .5 meg: with S.P.S.T. switch; tapped at 50,000 ohms; less shaft
R-11	6R6056	Resistor, fixed: carbon; 47,000-1/2W; Ins.
R-12	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W; Ins.
R-13	6R5627	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
R-14	6R6052	Resistor, fixed: carbon; 470,000-1/2W; Ins.
R-15	6R6015	Resistor, fixed: carbon; 220,000-1/2W; Ins.
R-16	6R6004	Resistor, fixed: carbon; 1 meg 1/2W; Ins.
R-17	6R6590	Resistor, fixed: carbon; 180 10% 1W Ins.
R-18	6R6550	Resistor, fixed: carbon; 47 10% 1/2W Ins.
R-19	6R6184	Resistor, fixed: carbon; 1000 1W N. I.
S-1		ON-OFF switch (part of volume control R-10)
S-2	1B70844	Switch, solenoid: with mounting plate
S-3	40B70952	Switch, selector
S-4	40A70931	Switch, mute
S-5	1X71470	Relay, MR-5 Tone Control: complete
S-6	40B71385	Switch, tone control
S-7	1X75825	Switch Assembly, push button
SP-1	1X75194	Spark Plate Assembly
T-1 & T-2	24B70827	Transformer, I.F. or diode: 455 kc: iron core tuned; includes 100 mmf padder across each winding: less shield can (used in early sets only)
	or	
	24B76553	Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding: less shield can (used in late sets only)
T-3	26A72256	Transformer, output: with bracket
T-4	25B70950	Transformer, power
	64A4491	Capacitor, generator
	1X4895	Lead Assembly, battery 10" long insulated bushing and contact eyelet on one end, insulated pin on the other end
	1X74932	Lead Assembly: 20" long; fuse retainer on one end, ammeter clip on other end
	1X76869	Lead Assembly, speaker; 2 conductor; with black and white insulated pin terminals
	1X27619	Lead Assembly, speaker: 3 conductor; with black, white and yellow insulated pin terminals
	64A24794	Plate, dial scale retainer
	1X72011	Plate, speaker mounting: includes speaker gasket
	1X75353	Pointer & Slider Assembly
	1X74366	Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together
	49A75807	Pulley, cord: 1/2" groove
	1X76405	Shaft Assembly, tuning: consists of tuning shaft with gear, "C" washer, miter gear bracket and manual drive bearing
	1X76328	Shaft Assembly, volume control; brass: with bakelite washer at one end.
	47A73535	Shaft, volume control: hairpin shaped; 29/32" long (fits into volume control)
	9A8788	Socket, tube: octal: plain
	9A70165	Socket, tube: octal; shielded type
	9A70808	Socket, tube: 4 prong
	50B71900 or 50B76509	Speaker, dynamic: 8"; 3 ohm v.c.

MODEL 405

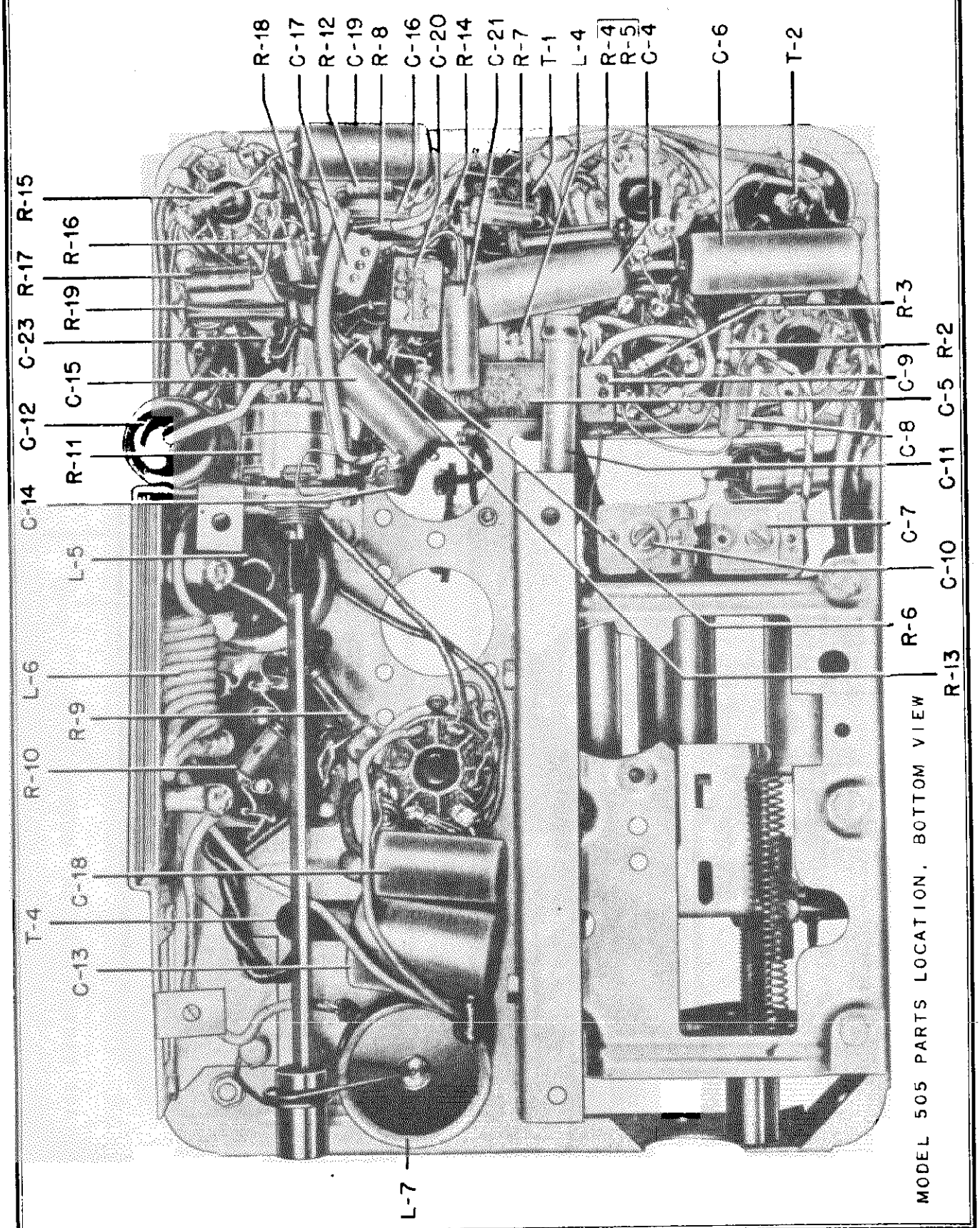
MOTOROLA, INC.



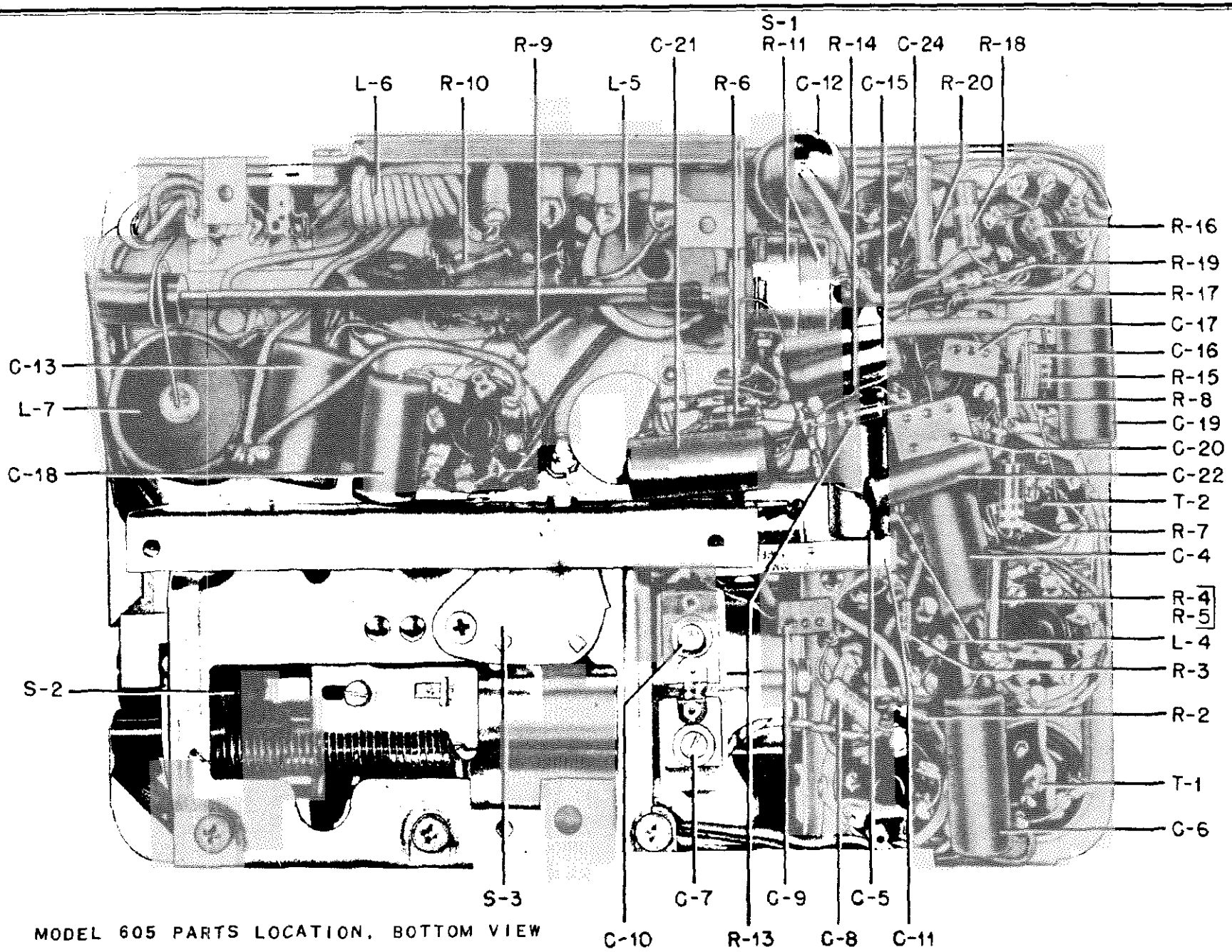
MODEL 405 PARTS LOCATION, BOTTOM VIEW.

MODEL 505

MOTOROLA, INC.



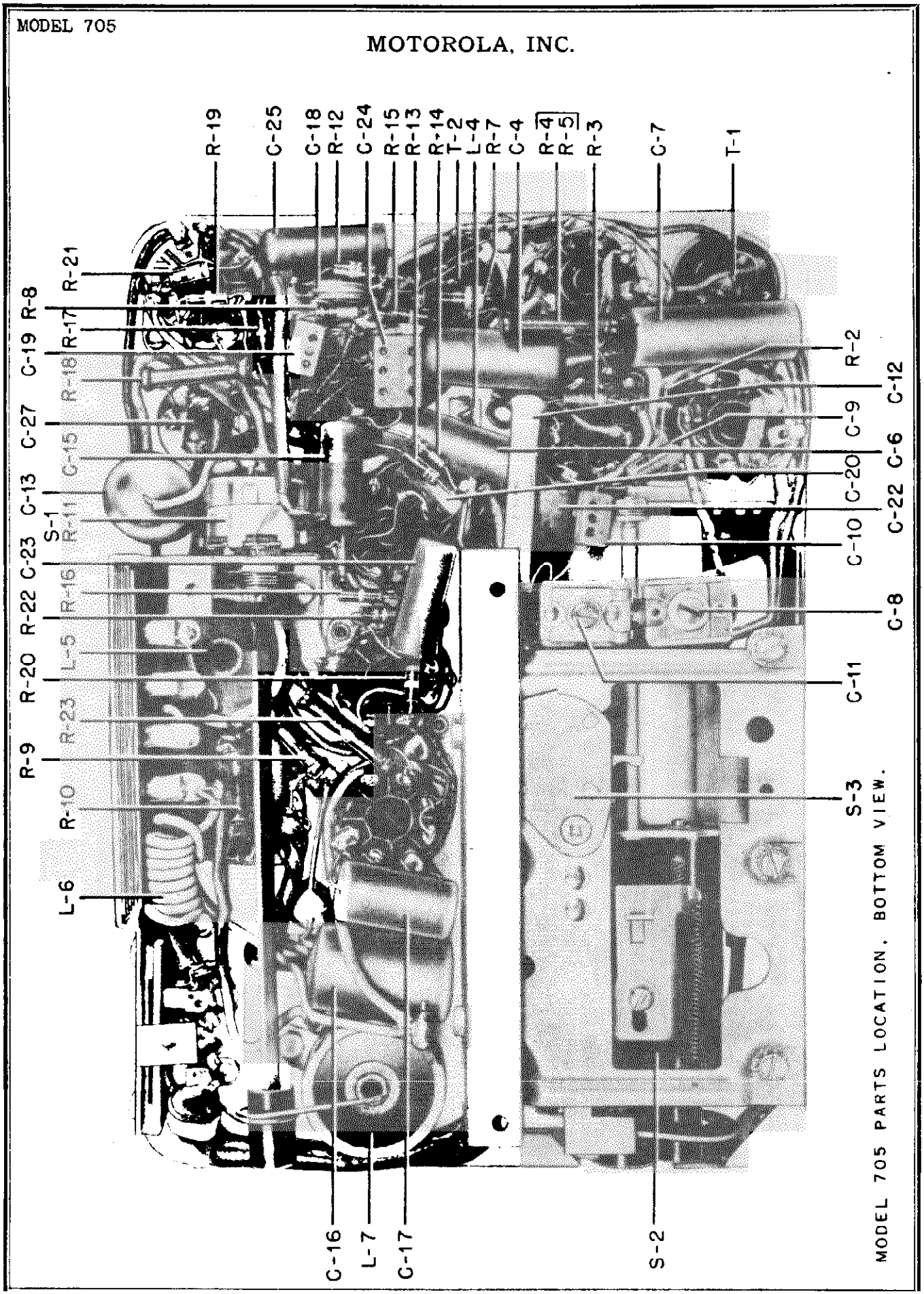
MODEL 505 PARTS LOCATION, BOTTOM VIEW



MODEL 605 PARTS LOCATION, BOTTOM VIEW

MODEL 705

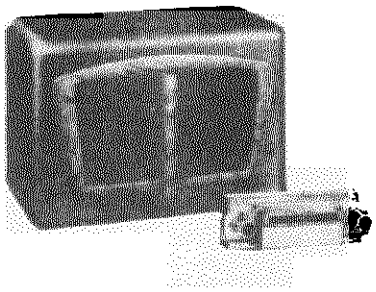
MOTOROLA, INC.



MODEL 705 PARTS LOCATION, BOTTOM VIEW.

MOTOROLA, INC.

MODEL 405, MODEL 505
MODEL 605, MODEL 705



MODEL 405

MODEL 405

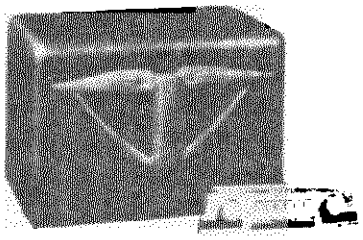
Current drain - 7.5 amps at 6.3 volts
Power output - 5.6 watts

Frequency	1400 kc	1020 kc	600 kc
Max. Sensitivity	1.4 uv	1.3 uv	1.1 uv

MODEL 605

Current drain - 7.5 amps at 6.3 volts
Power output - 5.6 watts

Frequency	1400 kc	1020 kc	600 kc
Max. Sensitivity	1.4 uv	1.6 uv	1.45 uv

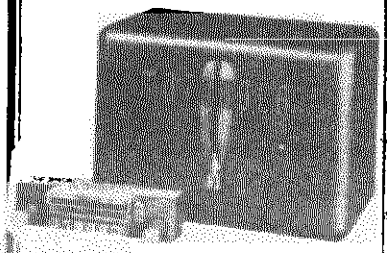


MODEL 605

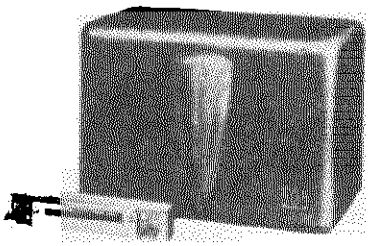
MODEL 705

Current drain - 10 amps at 6.3 volts
Power output - 9 watts

Frequency	1400 kc	1000 kc	600 kc
Max. Sensitivity	1.5 uv	1.6 uv	.9 uv



MODEL 705

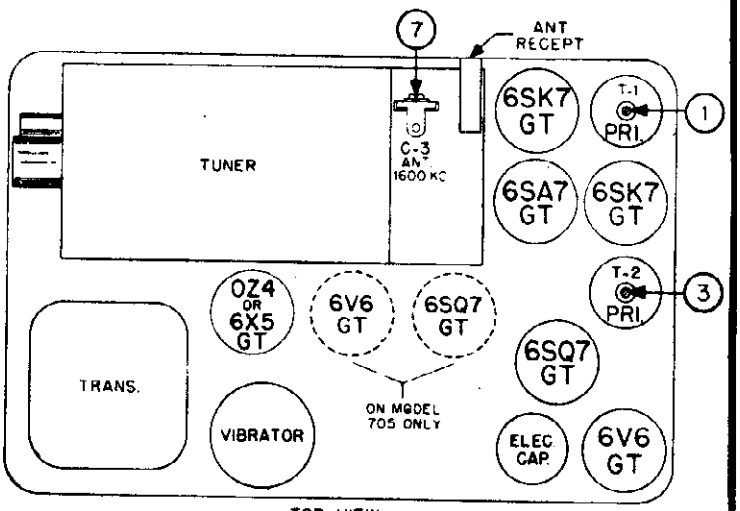


MODEL 505

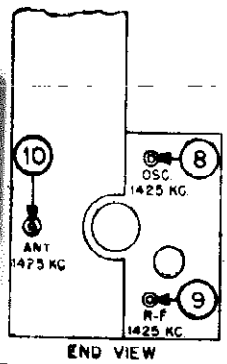
MODEL 505

Current drain - 7.5 amps at 6.3 volts
Power output - 5.6 watts

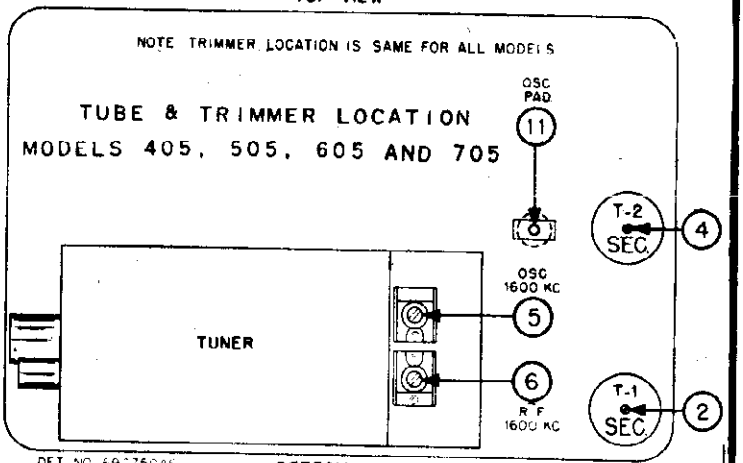
Frequency	1400 kc	1000 kc	600 kc
Max. Sensitivity	1.5 uv	1.4 uv	1.5 uv



TOP VIEW



END VIEW



DET NO 69C75046

BOTTOM VIEW

MODEL 605
MODEL 705

MOTOROLA, INC.

PROCEDURE FOR SETTING UP PUSH BUTTONS (MODELS 605 & 705)

1. Receiver must be turned on for a few minutes before setting up push-buttons.
2. Extend antenna fully.
3. Press manual button "M" on the control head till tuner in the receiver stops cycling.
4. Turn tuning knob on the control head till the desired station is heard. (Make mental note of the program).
5. Keep volume low, so that you can tell when a station is tuned in correctly.
6. Press desired button in and hold till tuning mechanism completes its operation.

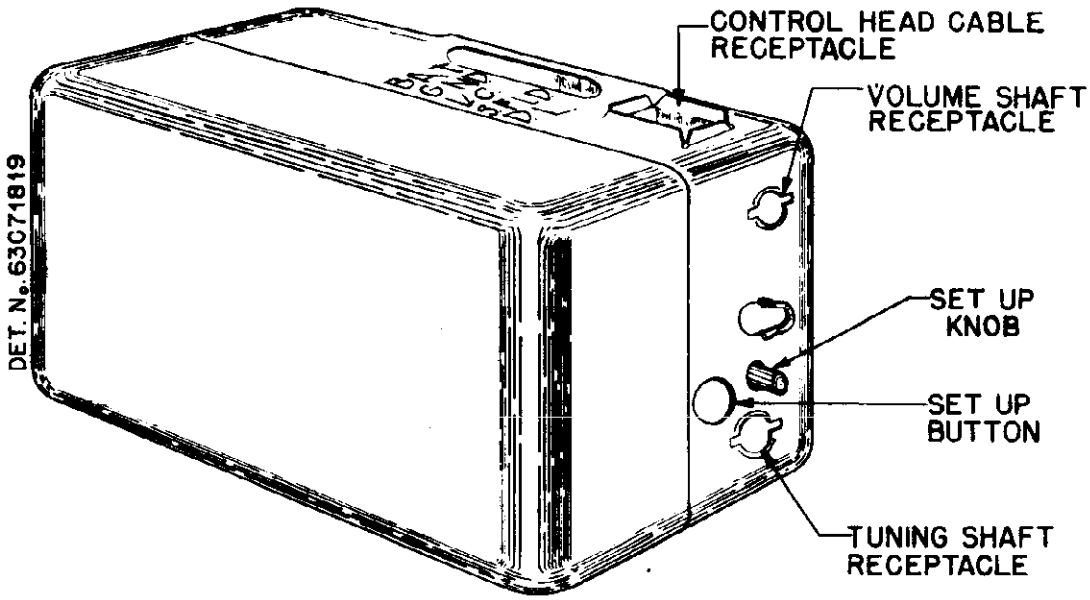
NOTE:

It will be necessary to hold the push-button in only when an early type of control head is used. On later model control heads, the push-buttons latch when pressed in.

7. Press "set-up button" in till click is heard (see Figure 4)
8. Turn "set-up knob" till previously noted program is heard. See Figure 4
9. Press the "M" button and that station is set.
10. Repeat the above procedure for each additional station desired.

IMPORTANT:

To check whether push-buttons were set accurately, press the "M" button in, tune in a station manually that is set to a push-button, then press the push-button in that was set to that station. There should be no difference in quality or volume when a push-button is set correctly. Make this check for each push-button.



LOCATION OF "SET-UP BUTTON" AND "SET-UP KNOB"

FIGURE 4 PUSH-BUTTON MODELS 605, AND 705.

MOTOROLA, INC.

MODEL 405, MODEL 505
MODEL 605, MODEL 705

MODEL 405 VOLTAGE AND RESISTANCE DIAGRAM

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.
METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.
TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS, (REVERSE TEST PRODS IF METER POINTER BACKS UP.)
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

MODEL 505 VOLTAGE AND RESISTANCE DIAGRAM

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.
METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.
TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS, (REVERSE TEST PRODS IF METER POINTER BACKS UP.)
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

MODEL 605 VOLTAGE AND RESISTANCE DIAGRAM

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.
METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.
TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS, (REVERSE TEST PRODS IF METER POINTER BACKS UP.)
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

MODEL 705 VOLTAGE AND RESISTANCE DIAGRAM

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.
METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.
TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS, (REVERSE TEST PRODS IF METER POINTER BACKS UP.)
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

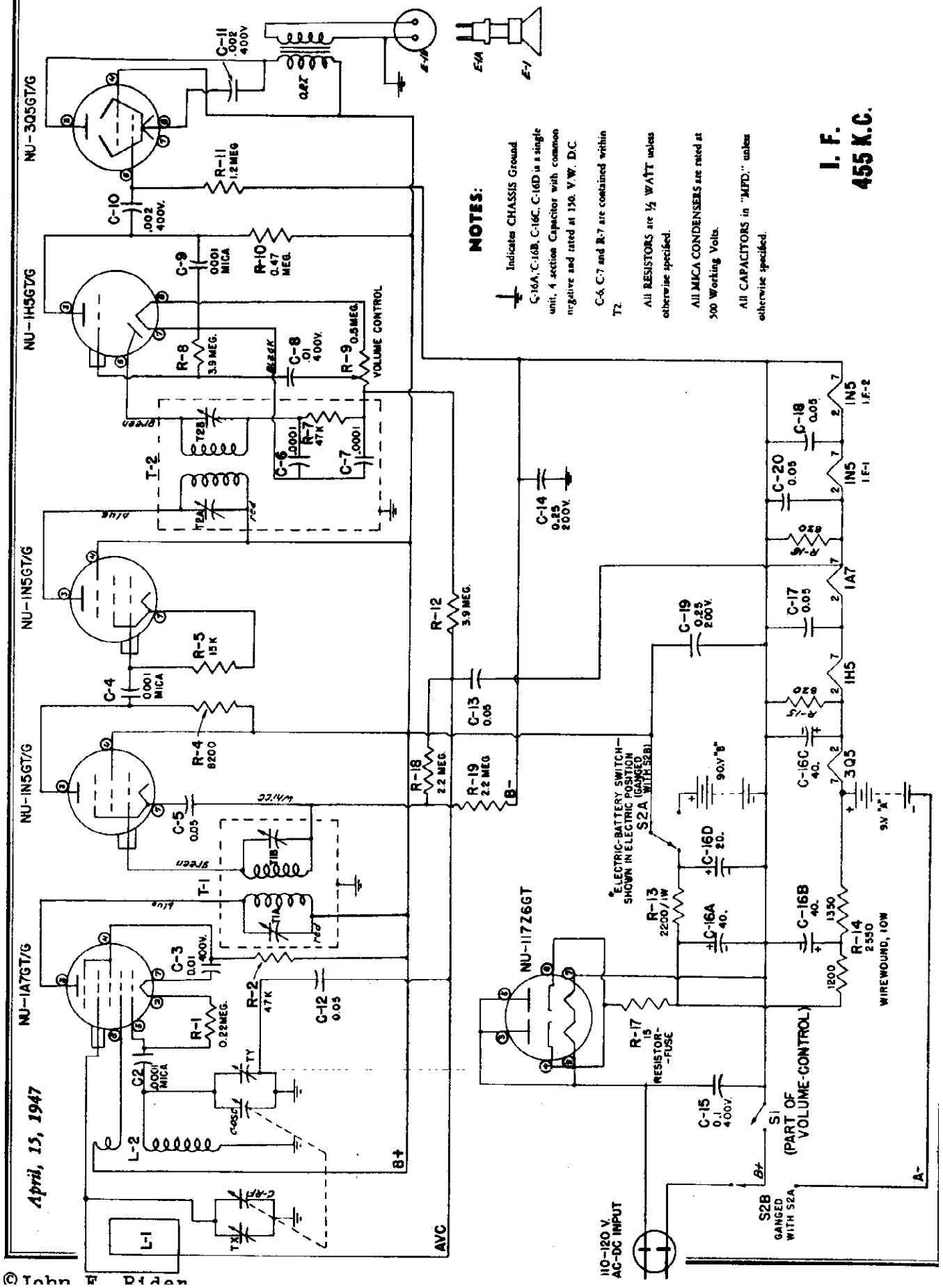
MODELS USED ON 405	505	605	705	REF. NO.	PART NO.	DESCRIPTION
*	*	*	*	C-1	21A20677	Capacitor, fixed: metal mica; 90 mmf.
*	*	*	*	C-2	8A4529	Capacitor, fixed: paper; .006 mf. 100V
*	*	*	*	C-3	20A70601‡	Capacitor, variable: mica; 50-180 mmf; with mounting bracket
*	*	*	*	C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V
			*	C-5	8A19135 ‡	Capacitor, fixed: paper; .5 mf. 100V
*	*	*		C-5	8A14791	Capacitor, fixed: paper; .05 mf. 400V
			*	C-6	8A14781	Capacitor, fixed: paper; .05 mf. 400V
*	*	*		C-6	8A13166	Capacitor, fixed: paper; .1 mf. 400V
			*	C-7	8A13166	Capacitor, fixed: paper; .1 mf. 400V
*	*	*		C-7	20A70601‡	Capacitor, variable: mica; 50-180 mmf; with mounting bracket
			*	C-8	20A70601‡	Capacitor, variable: mica; 50-180 mmf; with mounting bracket
*	*	*		C-8	21K70720	Capacitor, fixed: mica; 5 mmf.
			*	C-9	21K70720	Capacitor, fixed: mica; 5 mmf.
*	*	*		C-9	21R6515 or 21A74661	Capacitor, fixed: mica; 50 mmf. 300V Capacitor, fixed: ceramic; 50 mmf. 500V
			*	C-10	21R6513 or 21A74661	Capacitor, fixed: mica; 30 mmf. 300V Capacitor, fixed: ceramic; 30 mmf. 500V
*	*	*		C-10	20A70814‡	Capacitor, variable: mica; 30-60 mmf; with mounting bracket
			*	C-11	20A70814‡	Capacitor, variable: mica; 30-60 mmf; with mounting bracket
*	*	*		C-11	21A71972	Capacitor, fixed: ceramic; 400 mmf.
			*	C-12	21A71972	Capacitor, fixed: ceramic; 400 mmf.
*	*	*		C-12	8A17028	Capacitor, fixed: paper; .5 mf. 100V
			*	C-13	8A17028	Capacitor, fixed: paper; .5 mf. 100V
*	*	*		C-13	8A19135	Capacitor, fixed: paper; .5 mf. 100V
*	*	*	*	C-14	8A25690	Capacitor, fixed: paper; .01 mf. 400V
	*	*	*	C-15	8A25690	Capacitor, fixed: paper; .01 mf. 400V
*				C-15	21A70176	Capacitor, fixed: mica; dual 120 mmf.
	*	*		C-16	21A70176	Capacitor, fixed: mica; dual 120 mmf.
*				C-16	21R6515	Capacitor, fixed: mica; 50 mmf. 300V
			*	C-16	8A19135	Capacitor, fixed: paper; .5 mf. 100V
	*	*		C-17	21R6515	Capacitor, fixed: mica; 50 mmf. 300V
*			*	C-17	8A12840	Capacitor, fixed: paper; .006 mf. 1600V
	*	*		C-18	8A12840	Capacitor, fixed: paper; .006 mf. 1600V
*				C-18	8A71911	Capacitor, fixed: paper; .05 mf. 400V
			*	C-16	21A70176	Capacitor, fixed: mica; dual 120 mmf.
*				C-19	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
	*	*		C-19	8A71911	Capacitor, fixed: paper; .05 mf. 400V
			*	C-19	21R6515	Capacitor, fixed: mica; 50 mmf. 300V
*				C-20	8A25690	Capacitor, fixed: paper; .01 mf. 400V
	*	*		C-20	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
			*	C-20	21R6656	Capacitor, fixed: mica; 1000 mmf. 500V
*				C-21	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
	*			C-21	8A71909	Capacitor, fixed: paper; .004 mf. 400V
		*		C-21	8R13166	Capacitor, fixed: paper; .1 mf. 400V
			*	C-21	8A4736	Capacitor, fixed: paper; .002 mf. 400V
	*			C-22	8A71910	Capacitor, fixed: paper; .006 mf. 400V
		*		C-22	8A71909	Capacitor, fixed: paper; .004 mf. 400V
			*	C-22	8R13166	Capacitor, fixed: paper; .1 mf. 400V
	*			C-23	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
		*		C-23	8A71910	Capacitor, fixed: paper; .006 mf. 400V
			*	C-23	8R25690	Capacitor, fixed: paper; .01 mf. 400V
		*		C-24	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
			*	C-24	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
		*		C-25	8A19133 ‡	Capacitor, fixed: paper; .5 mf. 100V
			*	C-25	8A25690	Capacitor, fixed: paper; .01 mf. 400V
			*	C-25	8R13165	Capacitor, fixed: paper; .003 mf. 1000V
			*	C-27	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
*	*	*	*		8A4491	Capacitor, generator
*	*	*	*	F-1	8R14637	Fuse: 20 Amp; type 3AG
*	*	*	*	G-1	48A3535	Vibrator: full wave; non-sync.

MODELS USED ON 405	505	605	705	REF. NO.	PART NO.	DESCRIPTION
*	*	*	*	L-1	1A71881 ‡	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)
‡	*	*	*	L-2	1A71881 ‡	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)
*	*	*	*	L-3	1A71879 ‡	Coil, oscillator (specify color of paint dots on old coil when ordering)
	*			L-4	24A70327	Coil, oscillator padder: includes mounting clip and adjustable iron core
*				L-5	24E70640	Coil, "A" choke
*	*	*	*	L-6	24E75555	Coil, dial light and speaker field choke: 9 turn #16 yellow wire
	*			L-7	24A70199	Coil, "A" choke: with mounting bracket
*	*	*	*	R-1	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
*	*	*	*	R-2	6R6076	Resistor, fixed: carbon; 100,000 1/2W Ins.
	*			R-3	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
		*		R-4& R-5	6R6028	Resistor, fixed: carbon; 22,000 1/2W Ins.
				Note:		R-4 and R-5 are replaced with one 10,000, 1 watt resistor in later models.
					6R6106	Resistor, fixed: carbon; 10,000 1W N.I.
*				R-5	6R6147	Resistor, fixed: carbon; 330 1W Ins.
	*	*	*	R-6	6R6028	Resistor, fixed: carbon; 22,000 1/2W Ins.
*				R-7	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
	*	*	*	R-7	6R6147	Resistor, fixed: carbon; 330 1W Ins.
*				R-8	6R6006	Resistor, fixed: carbon; 50 1/2W N.I.
	*	*	*	R-8	6R5004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
*	*	*	*	R-9	6R5005	Resistor, fixed: carbon; 50 1/2W N.I.
*				R-10	18A70170 or 18A71920	Resistor, variable: carbon; 500,000; with S.P.S.T. switch
	*	*	*	R-10	6R5005	Resistor, fixed: carbon; 50 1/2W N.I.
*				R-11	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
	*	*	*	R-11	18A70172 or 18A71925	Resistor, variable: 500,000; tapped at 50,000 ohms; with SPST switch
*				R-12	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.
	*	*	*	R-12	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
*				R-13	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
	*			R-13	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.
		*		R-13	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.
			*	R-13	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
*				R-14	6R6016	Resistor, fixed: carbon; 220,000 1/2W Ins.
	*			R-14	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
		*		R-14	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
			*	R-14	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.
*				R-15	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
	*		*	R-15	6R6016	Resistor, fixed: carbon; 220,000 1/2W Ins.

MODELS USED ON 405	505	605	705	REF. NO.	PART NO.	DESCRIPTION
		*		R-15	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
*				R-16	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.
		*	*	R-16	6R6016	Resistor, fixed: carbon; 220,000 1/2W Ins.
	*			R-16	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
*				R-17	6R5560	Resistor, fixed: carbon; 47 10% 1/2W Ins.
	*			R-17	6R5390	Resistor, fixed: carbon; 180 10% 1W Ins.
		*	*	R-17	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
*				R-18	6R6184	Resistor, fixed: carbon; 1000 1W N.I.
	*			R-18	6R5560	Resistor, fixed: carbon; 47 10% 1/2W Ins.
		*		R-18	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.
			*	R-18	6R5253	Resistor, fixed: carbon; 180 10% 1W N.I.
	*			R-19	6R6184	Resistor, fixed: carbon; 1000 1W N.I.
		*		R-19	6R5560	Resistor, fixed: carbon; 47 10% 1/2W Ins.
			*	R-19	6R5614	Resistor, fixed: carbon; 56 10% 1/2W Ins. (82 ohms used in earlier models)
		*		R-20	6R6184	Resistor, fixed: carbon; 1000 1W N.I.
			*	R-20	6R6016	Resistor, fixed: carbon; 220,000 1/2W Ins.
			*	R-21	6R6407	Resistor, fixed: carbon; 220,000 10% 1/2W Ins.
			*	R-22	6R6414	Resistor, fixed: carbon; 270,000 10% 1/2W Ins.
			*	R-23	6R6184	Resistor, fixed: carbon; 1000 1W N.I.
*	*	*	*	S-1		Switch; On-Off (part of volume control
	*			S-2	40A70872	Switch, tone control: slider type
		*	*	S-2	40B70952‡	Switch, selector
		*	*	S-3	1B70844 ‡	Switch, solenoid: with mtg. plate
		*	*	S-4	40A70931‡	Switch, mute
		*	*	S-5	1J71470	Relay, MR-5 tone control: complete
				S.P.-1	1B70841	Spark Plate Assembly: with mounting bracket
	*			S.P.-1	1J72064	Spark Plate Assembly: with mounting bracket
		*	*	S.P.-1	1J73047	Spark Plate Assembly: with mounting bracket
*	*	*	*	T-1, T-2	24B70827	Transformer, I. F. or diode: 455 Kc; iron core tuned; less shield can (used in early sets only)
				or	24B75553	Transformer, I. F. or diode: 455 Kc; iron core tuned; less shield can (used in late sets only)
*	*	*		T-3	25B70171	Transformer, output
			*	T-3	25B70619	Transformer, output
*	*	*	*	T-4	25B70950	Transformer, power
*	*	*	*		3A51404	Bolt, "J" (receiver mounting)
*	*	*	*		7A76565	Bracket, volume control shaft alignment
*	*				6BZ4151	Bulb: 6-8V, bayonet base; type #51
*					50B73997 or 50B75431	Speaker: 5-1/4"; 3 ohm VC; with connecting leads
	*	*	*		50B71900	Speaker: 6"; 3 ohm VC; less connecting leads

NATIONAL UNION RADIO CORP.

MODEL G-613



MODEL G-613

NATIONAL UNION RADIO CORP.

SPECIFICATIONS:

CIRCUIT—Superheterodyne—A.C.-D.C.—Battery Automatic Volume Control

ANTENNA—Self-Contained plug-in Loop

TUNING—Broadcast Band 540-1650 K.C.

POWER SUPPLY—105-120 Volts A.C. or D.C. or Batteries
Consumption approx. 25 Watts (Electric operation)

BATTERY COMPLEMENT—2 NU-A835 "A" Batteries—2 NU-B862 "B" Batteries

TUBE COMPLEMENT—1 NU-1A7GT Converter
2 NU-1N5GT I.F.
1 NU-1H5GT Detector
1 NU-3Q5GT Power Amplifier
1 NU-117Z6GT Rectifier

CABINET—(Approx.) 13" Wide, 6" Deep, 10⅝" High (Not incl. Carrying Handle)

PARTS LIST

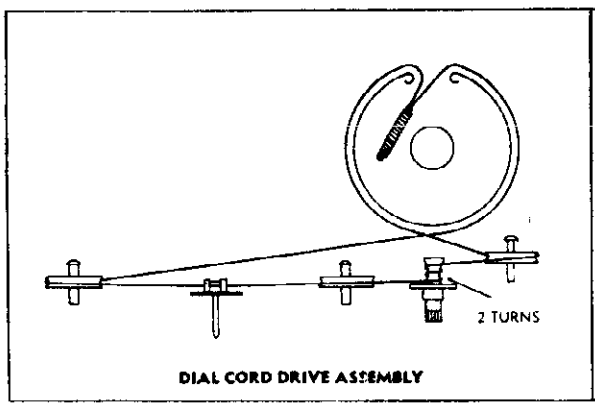
SYMBOL	DESCRIPTION	FACTORY PART NO.	NOTES
E-1	Speaker	EH-6-3	Less Ouput Transf.
L-1	Loop Antenna	LL-3	
T-1	1st I.F. Transf.	TM2-12	
T-2	2nd I.F. Transf.	TM2-13	
O.P.T.	Output Transf.	TA7-1	For 3Q5GT
C-RF C-OSC	2 gang Variable Capacitor	CV-6	
C16A, B, C, D	Quadruple—Single Unit Eactrolytic Capacitor	CEI-4A81	
R-9	Volume Control	RPS-2	
R-17	Resistor Fuse		
S2A, B	Switch	SS-1	
	Dial Pointer	NP-3	
	Dial Scale	ND-12	
	"A" Battery Plug	PM2-1	
	"B" Battery Plug	PM2-2	
E-1a	Speaker Plug	PM1-2	Male Section
E-1b	Speaker Plug	PM1-1	Female Section
	Cabinet	CCCD-613	
	Back Panel	AP-8	
	Window	NW-1	
	Handle	HK-27	

ALIGNMENT PROCEDURE

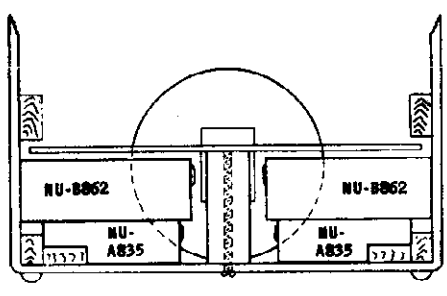
PRELIMINARY.

(a) Set VOLUME CONTROL to the FULL ON position; (b) OUTPUT METER across voice coil; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output meter indication; (d) Follow sequence indicated below.

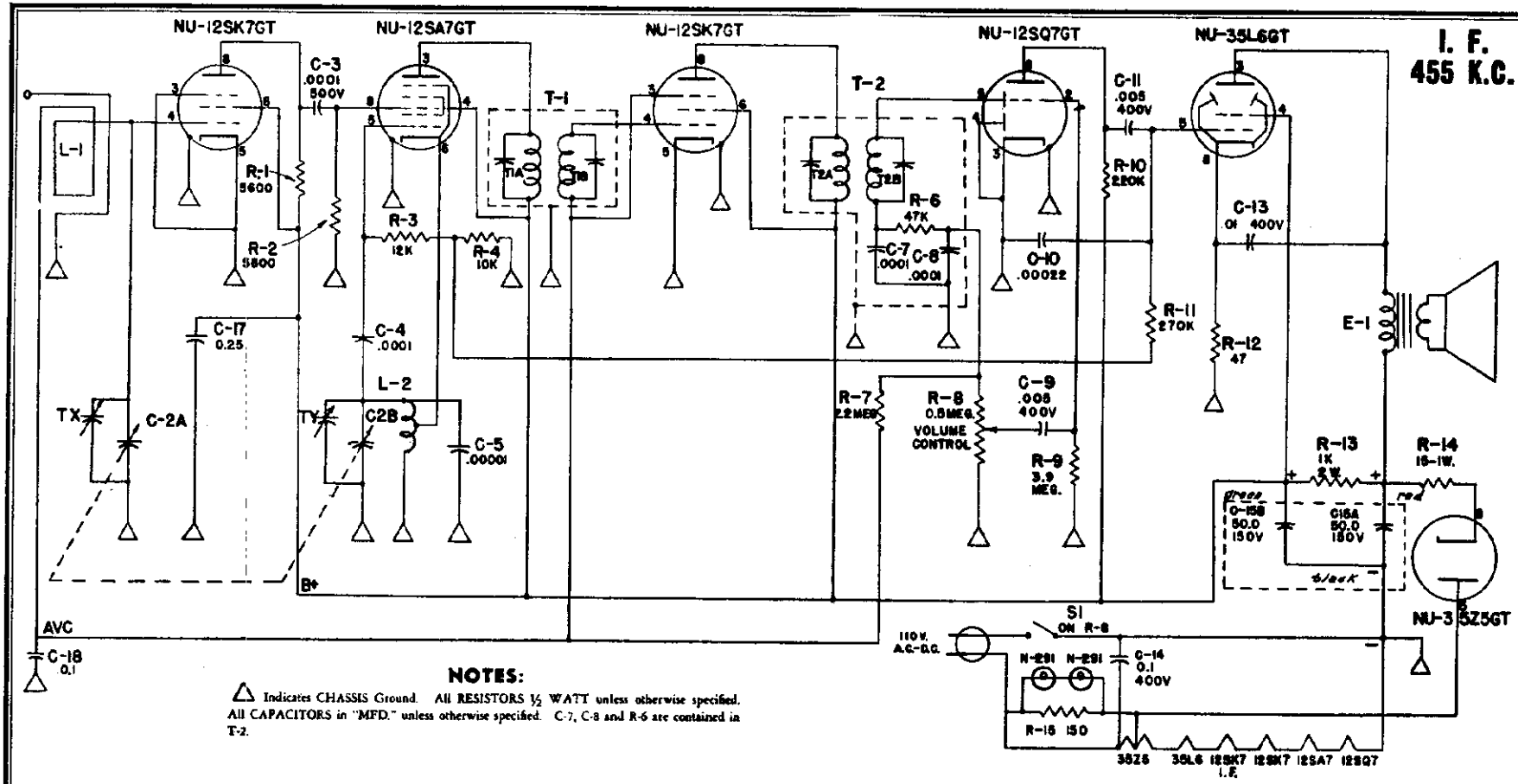
SEQUENCE	DUMMY ANTENNA	DIAL SETTING	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR SETTING	ADJUST TRIMMERS	NOTES
1 I.F.	.01 mfd.	At HIGH frequency end of scale. (Min. Capacity)	High side to stator lug of C-RF. Low side to B—	455 K.C.	T2a T2b T1a T1b	Adjust Trimmers for MAX. output reading
2 OSC.	3 turn coil of #18 or #20 insulated wire on 7" or 8" diameter LOOSELY Coupled to loop Antenna in Receiver.	Pointer at extreme RIGHT HAND END of dial scale (Min. Capacity)	Across Dummy Antenna	1700 K.C.	TY	Adjust Trimmer for MAX. output reading
3 R.F.	Same as in 2 above	1550 K.C.	Across Dummy Antenna	1550 K.C.	TX	Adjust Trimmer for MAX. output reading



DIAL CORD DRIVE ASSEMBLY



BATTERY INSTALLATION



NOTES:

△ Indicates CHASSIS Ground. All RESISTORS ½ WATT unless otherwise specified. All CAPACITORS in "MFD." unless otherwise specified. C-7, C-8 and R-6 are contained in T-2.

SPECIFICATIONS:

CIRCUIT—A.C.-D.C. Superheterodyne—Tuned R.F. Stage—Automatic Volume Control

ANTENNA—Self-contained Loop—Coupling for External Antenna

TUNING—Broadcast Band—535 K.C. to 1620 K.C.—2 Gang Variable Capacitor

POWER SUPPLY—105-125 Volts, 60 cycles A.C.—105-125 Volts, Direct Current—Approx. 30 Watts Consumption

TUBE COMPLEMENT—1 NU-12SK7GT R.F. Amp.
1 NU-12SA7GT Converter
1 NU-12SK7GT I.F. Amp.
1 NU-12SQ7GT Det-AVC-AF
1 NU-35L6GT Power Output
1 NU-35Z5GT Rectifier

PANEL LAMP—2 N-291 (2.9V/.17A) Bayonet

CABINET—Approximate Dimensions 13¾" Wide, 8⅝" High, 6½" Deep

NATIONAL UNION RADIO CORP.

NAT. UNION PAGE 1

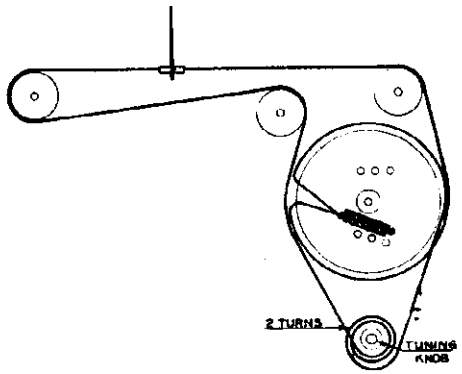
MODEL G-615

MODEL G-615

NATIONAL UNION RADIO CORP.

PARTS LIST

SYMBOL	DESCRIPTION	FACTORY PART NO.	NOTES
S-1	Complete Assembly (O.P. Transf. and P.M. Speaker)	EH6-2	Replacement of complete assembly is advisable if either part fails
Loop	Loop Antenna	LL-15	
L-2	Oscillator Coil	LO-2	
T-1	1st I.F. Trans.	TM2-1	
T-2	2nd I.F. Trans.	TM2-3	
R-8	Vol. Control With Switch (S-1)	RPS-2	NU-500M-CB may be used as a replacement
C2-A C2-B	2 Gang Variable Capacitor	CV-16	
C15A C15B	Electrolytic Capacitor 50-50/150	CE-55	
	Dial Lamps 2.9 Volt .170 Amp.		N 291
	Dial Scale (Glass)	ND-17-2	
	Dial Pointer	ND-1-2	
	Dial Lamp Socket	JS13-163	



DIAL DRIVE ASSEMBLY

ALIGNMENT PROCEDURE

PRELIMINARY.

(a) Adjust the DIAL POINTER along the dial cord to the position opposite the first right-hand *punch mark* on the dial backing-plate, with the tuning condenser gang completely out of mesh (Minimum Capacity); (b) Set VOLUME CONTROL to the FULL ON position; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output Meter indication; (d) OUTPUT METER across voice coil; (e) Follow sequence indicated below.

SEQUENCE	DUMMY ANTENNA	DIAL SETTING	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR SETTING	ADJUST TRIMMERS	NOTES
1 I.F.	.01 mfd.	At HIGH frequency end of scale. (Min. Capacity)	High side to stator lug of C2-A Low side to B—	455 K.C.	T2a T2b T1a T1b	Adjust Trimmers for MAX. output reading
2 OSC.	3 turn coil of #18 or #20 Insulated wire on 7" or 8" diameter LOOSELY Coupled to loop Antenna in Receiver	Pointer at extreme RIGHT HAND END of dial scale (Min. Capacity) Pointer will be in line with FIRST punch mark at right	Across Dummy Antenna	1700 K.C.	TY	Adjust Trimmer for MAX. output reading
3 R.F.	Same as in 2 above	Pointer in line with punch mark SECOND from right	Same as in 2 above	1520 K.C.	TX	Adjust Trimmer for MAX. output reading
4	Same as in 2 above	At LOW frequency end of scale (Max. Capacity)	Same as in 2 above	530 K.C.	None	530 K.C. signal should be picked up at or near this dial setting. Check operation in Seq. 2 if signal is not picked up
5	***REINSTALLING CHASSIS (AFTER ALIGNMENT):—*** (a) With chassis still on the bench, set dial pointer at the minimum capacity end of travel. (b) Slide chassis into cabinet and adjust its position so that the dial pointer is opposite and in line with the FIRST calibration mark at the right-hand end of the GLASS DIAL SCALE. (c) Tighten the chassis hold down screws. (d) Tuning should now track so that peak signal is attained at the proper frequency calibration on the glass dial scale.					

MODELS 552N, 552A
555, 555A

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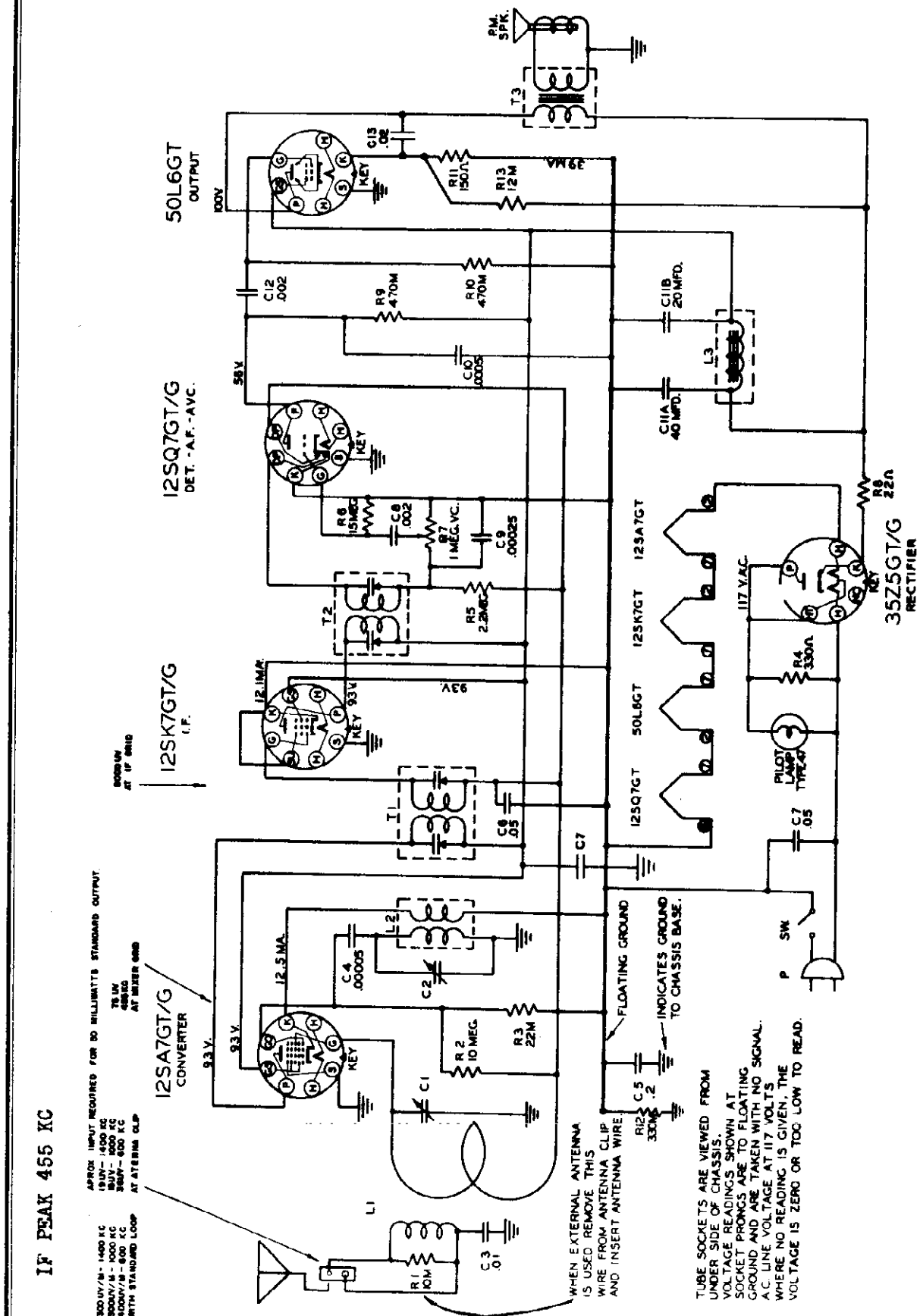

MODELS 552N, 552AN,
555, 555A

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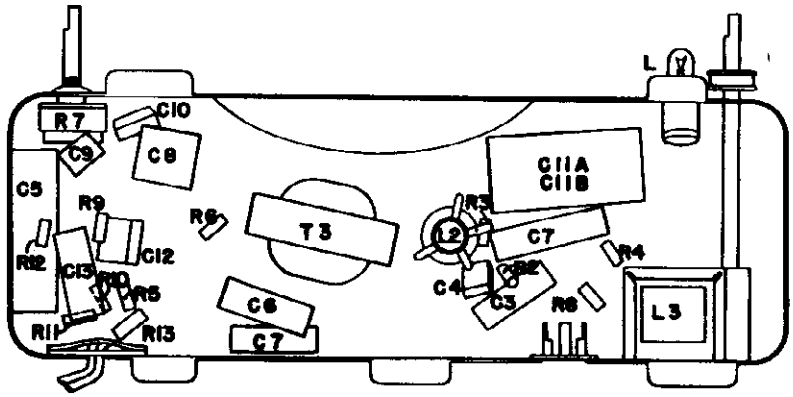
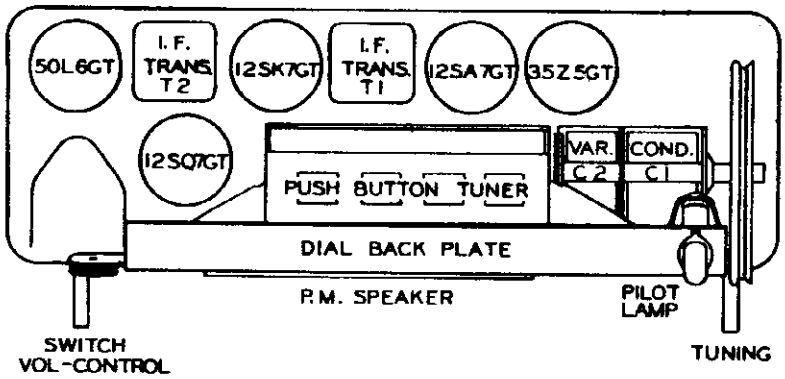


LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT OUTLINE

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection ..... Across Speaker Voice Coil
Output meter reading to indicate 200 milliwatts (Standard output) ..... .8 Volt
Generator Modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise
Position of dial pointer with variable condenser fully closed ..... See Note below

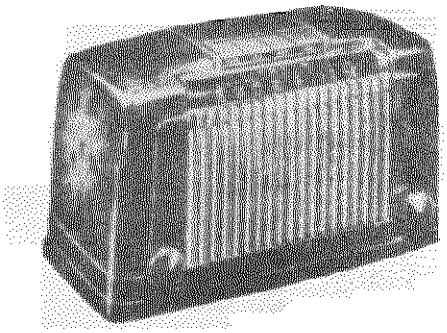
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION HIGH SIDE	GENERATOR CONNECTION GROUND LEAD	ADJUST TRIMMERS IN ORDER SHOWN	TRIMMER FUNCTION
Open	455 KC	.05 mfd.	Mixer grid	Floating Ground	T2-T1	IF
1400 KC	1400 KC	50 mmf.	Ant. Clip	Floating Ground	C2	Oscillator
1400 KC	1400 KC	50 mmf.	Ant. Clip	Floating Ground	C1	Ant.

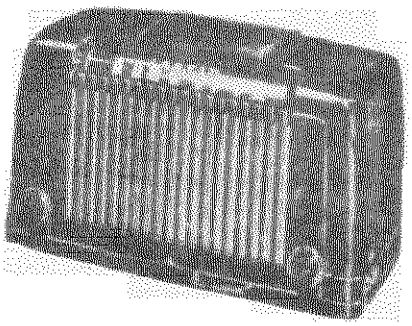
NOTES:

1. To Set Pointer: There are 4 notches cut in the dial scale backing plate for calibration marks at 540; 600; 1400 & 1620 KC. Set the dial pointer at the 540 KC mark at the right-hand end of the dial plate with the variable completely closed.
2. Place set loop in the same position and at the same distance with respect to the back of the chassis as it would be when the set is mounted in the cabinet, during alignment of the RF stage. (1 7/16" from back of chassis to front of long loop strip).
3. If a standard test loop is used with the Signal Generator for alignment of the receiver the black wire will be left in the antenna clip. When the generator lead is connected to ant. clip the black wire is removed from the clip.
4. The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A.V.C. action of the receiver ineffective.

MODELS 552N,552A
555,555A

NOBLITT-SPARKS INDUSTRIES INC.





FREQUENCY RANGE

Broadcast	540-1600 kc
IF	455 kc

TUBES & FUNCTIONS

12SA7	Mixer-oscillator
12SK7	IF Amp.
12SQ7GT	DET-AVC-AF
50L6GT	Output
35Z5GT	Rectifier

POWER SUPPLY

105-125 Volts AC-DC, 35 Watts

POWER OUTPUT

Undistorted	1.1 Watts
Maximum	2.4 Watts
Plate load	2000 ohms

LOUD SPEAKER

Type: Permanent magnet
Size: 4 inch
Voice coil impedance ..... 3.2 ohms

CHASSIS FEATURES

Automatic Volume Control
Built-in Loop
Underwriters' Listed

OPERATING CONTROLS

1. Left knob ..... ON-OFF Sw. & Volume
2. Right knob ..... Tuning

PHYSICAL DIMENSIONS

Length	11½ inches
Height	6⅞ inches
Depth	6⅞ inches

Models 552N and 555 are in walnut cabinets. Models 552AN and 555A are in ivory cabinets. Models 555 and 555A have push buttons. Models 552N and 552AN do not have push buttons.

THE HEATER CIRCUIT.

The heaters of all of the tubes are connected in series, accordingly if one tube burns out the others will not light. It is necessary to replace only the burned out tube, the others will then light. The burned out tube can be located through the fact that the full line voltage will appear across its heater prongs.

To obtain best results always rebalance receiver after replacing tubes.

POSITION OF POWER CORD PLUG.

On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. On DC, the receiver will work in only one position of the plug in its receptacle.

THE ANTENNA.

This receiver has a built-in loop which gives satisfactory reception in most locations. If the receiver is located some distance from a broadcasting station, or where the electrical interference is high, an outside antenna will improve reception. The Black wire should be removed from the antenna clip before the antenna is connected.

This receiver is designed to operate without a ground connection and no attempt should be made to use one.

CIRCUIT CHANGES.

On some sets C4 condenser is connected from Plate to Screen Grid instead of from Plate to Cathode of the output tube.

C-10, .05 uf condenser from screen grid of 12SA7 tube to chassis was added after the start of production to prevent oscillation.

MODELS 552N, 552AN
555, 555A

NOBLITT-SPARKS INDUSTRIES INC.

Replacement parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the factory, except in the case of tubes, which should be obtained through regular tube distribution channels.

Parts shipments are F.O.B. Columbus, Indiana. Terms of sale are the same as those applying to finished Arvin products.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
R1	C20060-103	Resistor, 10,000 ohm, ½ watt	.10
R2	C20060-106	Resistor, 10 megohm, ½ watt	.10
R3	C20060-223	Resistor, 22,000 ohm, ½ watt	.10
R4	C20060-331	Resistor, 330 ohm, ½ watt	.10
R5	C20060-225	Resistor, 2.2 megohm, ½ watt	.10
R6	C20060-156	Resistor, 15 megohm, ½ watt	.10
R7	C19389	Volume Control & Switch	1.00
R8	C20060-220	Resistor, 22 ohm, ½ watt	.10
R9,R10	C20060-474	Resistor, .47 megohm, ½ watt	.10
R11	C20060-151	Resistor, 150 ohm, ½ watt	.10
R12	C20060-334	Resistor, 330,000 ohm, ½ watt	.10
R13	C20070-123	Resistor, 12,000 ohm, 1 watt	.15
C1,C2	*E19359	Var. Condenser, 2 gang	8.00
	**C19840	Var. Condenser, 2 gang	3.65
C3	C20068-103	Condenser, .01 uf, 400 V.	.25
C4	C20065-500	Condenser, .00005 uf, 500 V.	.25
C5	A19765	Condenser, .2 uf, 400 V.	.35
C6	C20067-503	Condenser, .05 uf, 200 V.	.25
C7	C20068-503	Condenser, .05 uf, 400 V.	.25
C8,C12	C20068-202	Condenser, .002 uf, 400 V.	.20
C9	C20065-251	Condenser, .00025 uf, 500 V.	.25
C10	C20065-501	Condenser, .0005 uf, 500 V.	.40
C11A,C11B	A19360	Elect. Cond., 40-20 uf, 150 V.	1.25
C13	C20068-203	Condenser, .02 uf, 400 V.	.25
L1	AC19207-1	Ant. Loop Assy.	1.50
L2	AC19354-1	Osc. Coil	.60
L3	AC19357-1	Iron Core "B" Choke	1.00
T1	AC19355-1	1st I. F. Coil	1.95
T2	AC19356-1	2nd I. F. Coil	1.95
T3	AC19358-1	Output Transformer	1.25

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
Spk.	C19393	4" P. M. Speaker	4.25
P	B20064-3	Line Cord & Plug Assy	1.00
	E19301	Cabinet, Walnut (Model 555)	5.00
	E19302	Cabinet, Ivory (Model 555A)	5.50
	E19303	Cabinet, Walnut (Model 552N)	5.00
	E19304	Cabinet, Ivory (Model 552AN)	5.50
	A19401	Dial Crystal Mtg. Clip	.05
	A19410	Ant. Loop Retainer Brkt.	.05
	C19406	Dial	1.00
	A19391-1	Knob, Walnut	.20
	C19422	Speaker Baffle	.15
	*C19348-1	Call Letter Sheets (3)	.50
	A19414	Carton	.20
	A19391-2	Knob, Ivory	.20
	*A19276	P. B. Knobs, Walnut	.25
	*A19275	P. B. Knobs, Ivory	.30
	*A19346	P. B. Knob Shaft	.05
	A19344-3	Idler Pulley	.05
	A19344-2	Idler Pulley	.05
	A19364	Dial Pointer	.15
	A19205	Capacitor Mtg. Clip	.10
	A20149-2	Dial Cord Spring	.10
	A19361	Hair Pin Clip	.05
	A19132	Dial Drive Cord	.10
	A19351	Dial Light Bulb	.20
	A18254-1	Tube Sockets	.15
	A19235-1	Tube Sockets	.15
	A19234	Ant. Loop Socket	.10
	A19396	Dial Light Socket Assy.	.35
	AA19425-1	Tuning Shaft Assy.	.25
	A19252	Ant. Conn. Plug	.10

* used only on 555 and 555A. ** used only on 552N and 552AN.

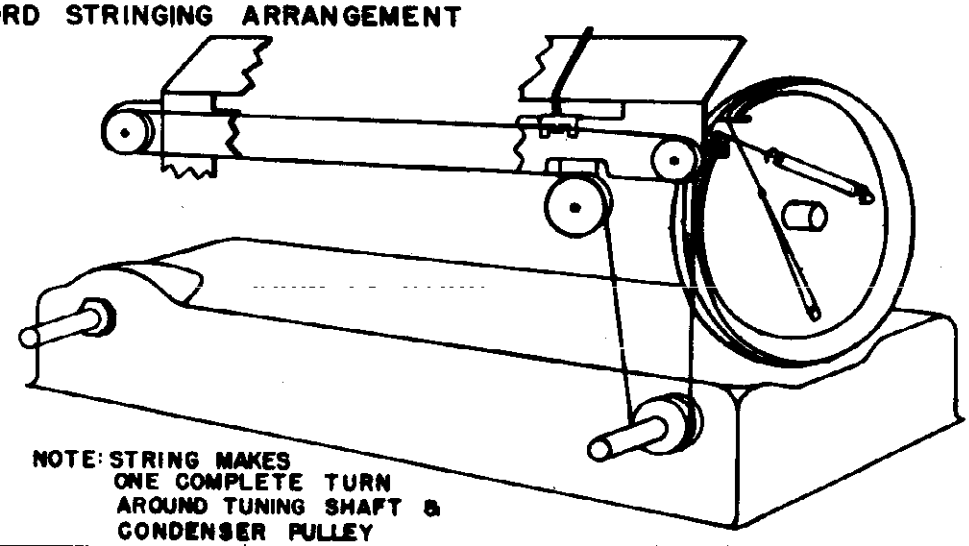
INSTRUCTIONS FOR SETTING UP PUSH BUTTONS:

Allow the receiver to remain on for ten to fifteen minutes before making the push button adjustments.

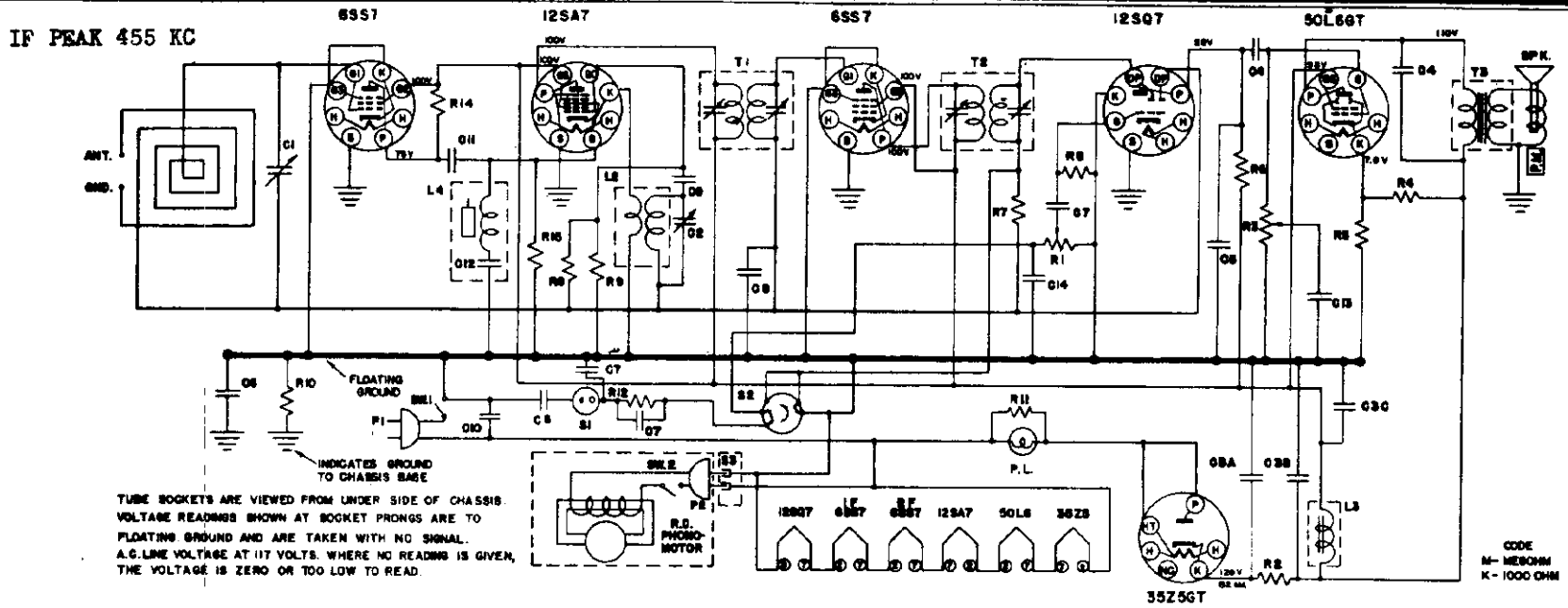
Each of the push buttons should be set to a desired station in the following manner:

1. Make a list of the four local stations for which push button tuning is desired and punch out the corresponding call letters from the call letter sheets.
2. Lift each button and insert a call letter tab into the slot at the side of the button, centering it in the front opening.
3. Lift a push button and insert a screw driver in the slotted screw head just below the button. Press down and loosen the locking screw by turning it to the left about two turns.
4. While holding the screw all the way down with the screw driver, tune in the desired station by hand with the tuning knob. Turning the tuning knob back and forth slightly either side of the station while holding the screw down will help to obtain a precise setting.
5. Tighten the screw, keeping it pushed all the way down while tightening it.
6. Check for accuracy by moving the pointer off the station about an inch and retuning it by depressing the push button set up for that station. If the setting is not accurate, repeat the foregoing procedure.
7. Follow the same procedure for each of the remaining buttons.
8. Should you desire to change your selection of stations, the old call letters can be removed from the buttons by pushing them out with a penknife, nail file or eraser on a pencil and repeating steps 3 to 8.

DIAL CORD STRINGING ARRANGEMENT



NOTE: STRING MAKES ONE COMPLETE TURN AROUND TUNING SHAFT & CONDENSER PULLEY



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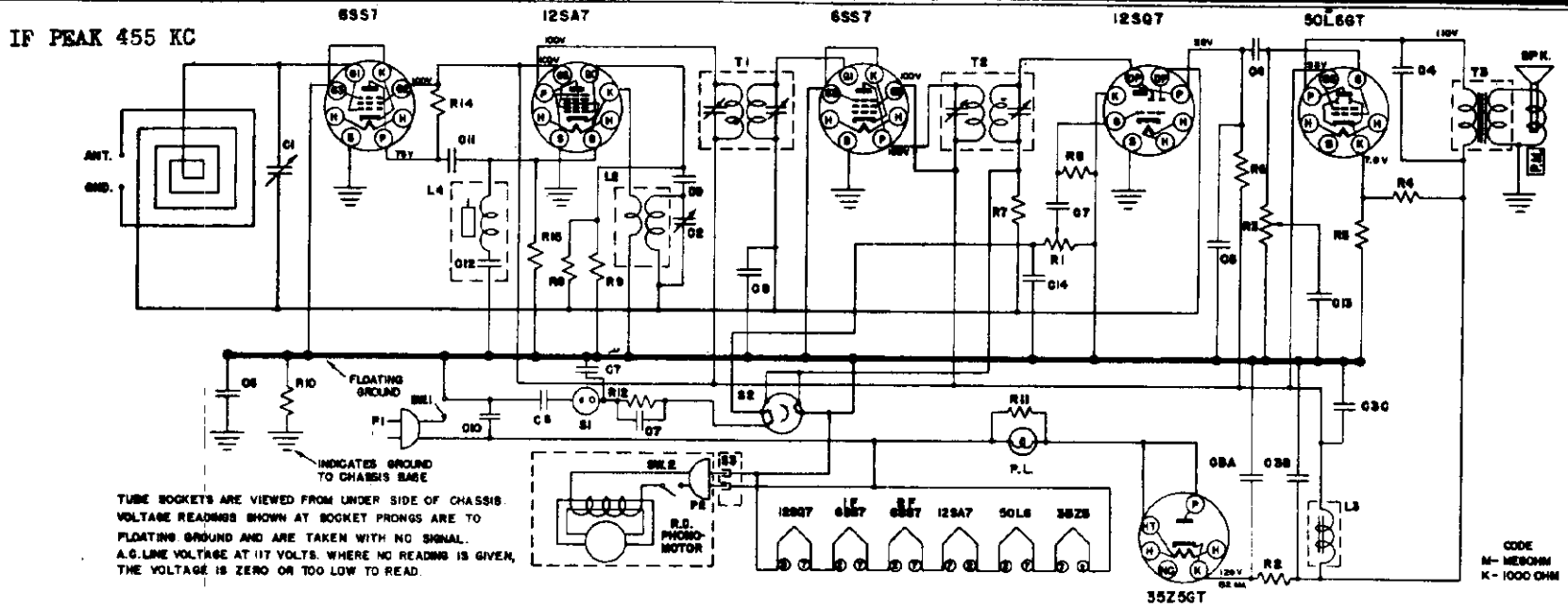
Parts shipments are F.O.B. Columbus, Indiana. Terms of sale are the same as those applying to finished Arvin products.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
R1	C19522	Volume Control - 1 meg.	.75
R2	C20060-150	Resistor, 15 ohm	.10
R3	C19945	Tone Control & Switch	1.00
R4	C20070-123	Resistor, 12,000 ohm - 1 W.	.15
R5	C20060-151	Resistor, 150 ohm	.10
R6	C20060-474	Resistor, .47 meg.	.10
R7	C20060-225	Resistor, 2.2 meg.	.10
R8	C20060-156	Resistor, 15 meg., ½ W.	.10
R9	C20060-223	Resistor, 22,000 ohm	.10
R10	C20060-334	Resistor, 330,000 ohm	.10
R11	C20060-331	Resistor, 330 ohm	.10
R12	C20060-224	Resistor, .22 meg.	.10
R13	C20060-105	Resistor, 1 megohm	.10
R14	C20060-222	Resistor, 2200 ohm, ½ W.	.10
R15	C20060-104	Resistor, 100,000 ohm, ½ W.	.10
C1, C2	C19584	Var. Condenser, 2 gang	3.75
C3C		Elect. Cond., 40 uf, 150 V.	
C3B	A19780	Elect. Cond., 20 uf, 150 V.	1.25
C3A		Elect. Cond., 10 uf, 150 V.	
C4	C20068-103	Condenser, Paper, .01 uf, 400 V.	.20
C5	C20065-501	Condenser, .0005 uf, 500 V.	.25
C6	A19765	Condenser, 2 uf, 400 V.	.45
C7	C20068-202	Condenser, Paper, .002 uf, 400 V.	.20
C8	C20067-503	Condenser, .05 uf, 200 V.	.25
C9	C20065-500	Condenser, Mica, .00005 uf, 500 V.	.25
C10	C20068-503	Condenser, .05 uf, 400 V.	.25
C11	C20065-102	Condenser, Mica, .001 uf, 500 V.	.60
C12	A21040	Condenser, .00003 uf, 500 V.	.25
C13	C20068-502	Condenser, .005 uf., 400 V.	.25
C14	C20065-251	Condenser, .00025 uf, 600 V.	.25
L1	AE19943-1	Ant. Loop Assy.	2.00
L2	AC19586-1	Osc. Coil	.60
L3	AC21073-1	Choke, Iron Core	1.00
L4	AC21039-1	Wave Trap	1.00
		Lid, Cabinet	15.00
		Hinges (each)	.30
		Drawer Pulls (each)	.30
T1	AC19587-1	1st I. F. Coil	1.95
T2	AC19588-1	2nd I. F. Coil	1.95
T3	AC19591-1	Output Transformer	1.50
	A19344-5	Idler Pulley	.05
	A19889	Dial Pointer	.20
	C19890	Dial Glass	.75
	A19132	Dial Drive Cord	.10
	A19295	Dial Drive Spring	.05
	A19205-4	Capacitor Mtg. Clip	.10
S1	A19552	Socket, One-Prong	.15
S2	C19580	Phono-Radio-Switch	1.00
S3	A19551	Socket, Phono-Motor	.40
	A19579	Socket, Speaker	.15
	A19553	Socket, Insulator	.05
	A19268	Dial Lamp Socket	.35
PL	A19351	Dial Lamp	.20
	AA19593-1	Tuning Shaft & Pulley Assy.	.50
P1	S20064-10	Line Cord & Plug Assy.	1.00
P2	A19556	Plug, A. C.	.50
	N19869	Cabinet & Carton	90.00
	AE19645	Record Changer	40.00
	A19850	Needle, Semi-Permanent	1.00
	C19881	Escutcheon	1.50
	C19948	Knob-Volume	.20
	C19949	Knob-Tuning	.20
	C19950	Knob-Phono-Radio	.20
	C19951	Knob-Tone Control	.20
	A19554	Plug, One Prong	.10
	D19802	Speaker, 8" P. M.	7.50
	A20040-11	Felt Washer	.05
	A19885	Carton w/filler	3.50
	A19711	Operating Instructions	.05
	A19252	Ant. Connector Plug	.10
		Record Compartment Door	8.00



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REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
R1	C19582	Volume Control - 1 meg.	.75
R2	C20060-150	Resistor, 15 ohm	.10
R3	C19948	Tone Control & Switch	1.00
R4	C20070-123	Resistor, 12,000 ohm - 1 W.	.15
R5	C20060-151	Resistor, 150 ohm	.10
R6	C20060-474	Resistor, .47 meg.	.10
R7	C20060-225	Resistor, 2.2 meg.	.10
R8	C20060-156	Resistor, 15 meg., ½ W.	.10
R9	C20060-223	Resistor, 22,000 ohm	.10
R10	C20060-334	Resistor, 330,000 ohm	.10
R11	C20060-331	Resistor, 330 ohm	.10
R12	C20060-224	Resistor, .22 meg.	.10
R13	C20060-105	Resistor, 1 megohm	.10
R14	C20060-222	Resistor, 2200 ohm, ½ W.	.10
R15	C20060-104	Resistor, 100,000 ohm, ½ W.	.10
C1, C2	C19584	Var. Condenser, 2 gang	3.75
C3C		Elect. Cond., 40 uf, 150 V.	
C3B	A19780	Elect. Cond., 20 uf, 150 V.	1.25
C3A		Elect. Cond., 10 uf, 150 V.	
C4	C20068-103	Condenser, Paper, .01 uf, 400 V.	.20
C5	C20065-501	Condenser, .0005 uf, 500 V.	.25
C6	A19765	Condenser, .2 uf, 400 V.	.40
C7	C20068-202	Condenser, Paper, .002 uf, 400 V.	.20
C8	C20067-503	Condenser, .05 uf, 300 V.	.25
C9	C20065-500	Condenser, Mica, .00005 uf, 500 V.	.25
C10	C20068-503	Condenser, .05 uf, 400 V.	.25
C11	C20065-102	Condenser, Mica, .001 uf, 500 V.	.60
C12	A21040	Condenser, .00003 uf, 500 V.	.25
C13	C20068-502	Condenser, .005 uf., 400 V.	.25
C14	C20065-251	Condenser, .00025 uf, 600 V.	.25
L1	AE19943-1	Ant. Loop Assy.	2.00
L2	AC19586-1	Osc. Coil	.60
L3	AC21073-1	Choke, Iron Core	1.00
L4	AC21039-1	Wave Trap	1.00
		Lid, Cabinet	15.00
		Hinges (each)	.30
		Drawer Pulls (each)	.30
T1	AC19587-1	1st I. F. Coil	1.95
T2	AC19588-1	2nd I. F. Coil	1.05
T3	AC19591-1	Output Transformer	1.50
	A19344-5	Idler Pulley	.05
	A19889	Dial Pointer	.20
	C19890	Dial Glass	.75
	A19132	Dial Drive Cord	.10
	A19295	Dial Drive Spring	.05
	A19205-4	Capacitor Mtg. Clip	.10
S1	A19552	Socket, One-Prong	.15
S2	C19580	Phono-Radio-Switch	1.00
S3	A19551	Socket, Phono-Motor	.40
	A19579	Socket, Speaker	.15
	A19553	Socket, Insulator	.05
	A19268	Dial Lamp Socket	.35
PL	A19351	Dial Lamp	.20
	AA19593-1	Tuning Shaft & Pulley Assy.	.50
P1	B20064-10	Line Cord & Plug Assy.	1.00
P2	A19556	Plug, A. C.	.50
	N19869	Cabinet & Carton	90.00
	AE19645	Record Changer	40.00
	A19850	Needle, Semi-Permanent	1.00
	C19881	Escutcheon	1.50
	C19948	Knob-Volume	.20
	C19949	Knob-Tuning	.20
	C19950	Knob-Phono-Radio	.20
	C19951	Knob-Tone Control	.20
	A19554	Plug, One Prong	.10
	D19882	Speaker, 8" P. M.	7.50
	A20040-11	Felt Washer	.05
	A19885	Carton w/filler	3.50
	A19711	Operating Instructions	.05
	A19252	Ant. Connector Plug	.10
		Record Compartment Door	8.00

MODEL 665

NOBLITT-SPARKS INDUSTRIES INC.

FREQUENCY RANGE

Broadcast	540-1600 kc
IF	455 kc

TUBES & FUNCTIONS

6SS7	RF Amp.
12SA7	Mixer-oscillator
6SS7	IF Amp.
12SQ7GT	DET-AVC-AF
50L6GT	Output
35Z5GT	Rectifier

POWER SUPPLY

105-125 Volts AC , 55 Watts

POWER OUTPUT

Undistorted	1 Watt
Maximum	2.2 Watts
Plate load	2000 ohms

LOUD SPEAKER

Type: Permanent magnet
Size: 8 inch
Voice coil impedance ..... 3.2 ohms

CHASSIS FEATURES

Automatic Record Changer
Automatic Volume Control
Built-in Loop
Underwriters Listed

OPERATING CONTROLS, LEFT TO RIGHT

1. Volume
2. Radio-Phono Sw.
3. ON-OFF - TONE
4. Tuning

PHYSICAL DIMENSIONS

Length	30 1/2 inches
Height	33 1/4 inches
Depth	16 1/2 inches

SERVICE HINTS AND CIRCUIT CHANGES

On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. Do not attempt to operate on DC.

For service information on the record changer see "Automatic Record Changer Service Instructions, Model 205", which should be filed with this bulletin.

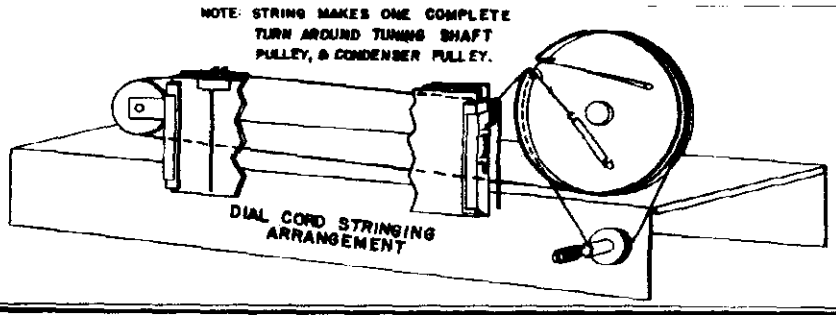
CIRCUIT CHANGES MADE SINCE THE START OF PRODUCTION.

1. C3B and C3C have been interchanged, and Filter Choke L3 changed from Part No. AC19589-1 to AC21073-1 to reduce hum.

2. The filament string arrangement has been changed. The original order was 35Z5; 6SS7 IF; 12SA7; 6SS7 RF; 50L6; and 12SQ7. If frequent burnout of the 6SS7 IF tube is encountered on these sets, the filaments should be rewired to correspond with the present Schematic Diagram.

3. 1 Megohm Resistor, R13 in grid circuit of converter tube replaced by 100M Resistor, R15 to eliminate hum modulation. R15 is connected from grid to floating ground, R13 was connected from grid to AVC.

4. Condensers C5, .0005 mfd., 500 V., across Volume Control, and C7, .002 mfd., 400 V., on Tone Control, replaced by C14, .00025 mfd., 600 V., and C13, .005 mfd., 400 V. respectively, to improve tone quality.



NOBLITT-SPARKS INDUSTRIES INC.

ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection ..... Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output) ..... .8 volts
Dummy antenna value to be used in series with generator output ..... See chart below
Connection of generator output lead ..... See chart below
Connection of generator ground lead ..... Floating ground
Generator modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise
Position of dial pointer with variable fully closed ... Last rectangular mark at left edge of dial

Place the set loop in the same position with respect to the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for *Max. Output	Function of Trimmer
Open	455	.05 mfd.	12SA7 Grid (Stator of rear section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
Open	455	.05 mfd.	RF Grid	*Adj. L4 for min. output	Wave Trap
1400	1400	.00005 mfd.	Antenna connection on back of loop	C2; C1, trimmers on Front & Rear sections of Variable Condenser	Osc. Ant.
600	600	.00005 mfd.	Antenna connection on back of loop	**Adj. antenna section plates of variable cond. for Max. output	Antenna

If a standard test loop is used with the signal generator for alignment of the receiver, the approximate sensitivities should be 350 uv/m and 250 uv/m or less at 600 Kc and 1400 Kc respectively.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. -------- 2600 uv Mixer 1000 Kc. -------- 75 uv
Mixer 455 Kc. -------- 60 uv Antenna 1400 Kc. ------- 70 uv

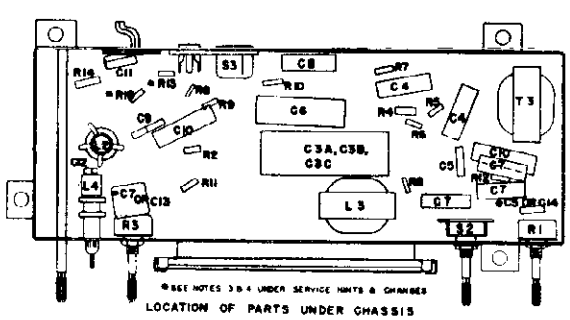
The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

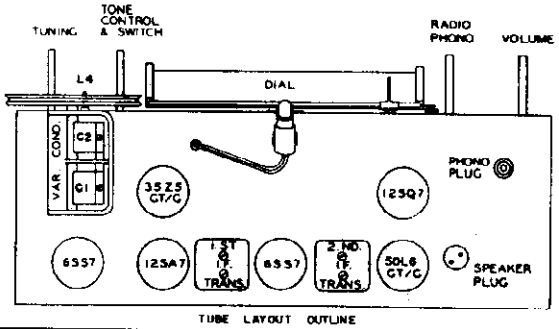
The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.



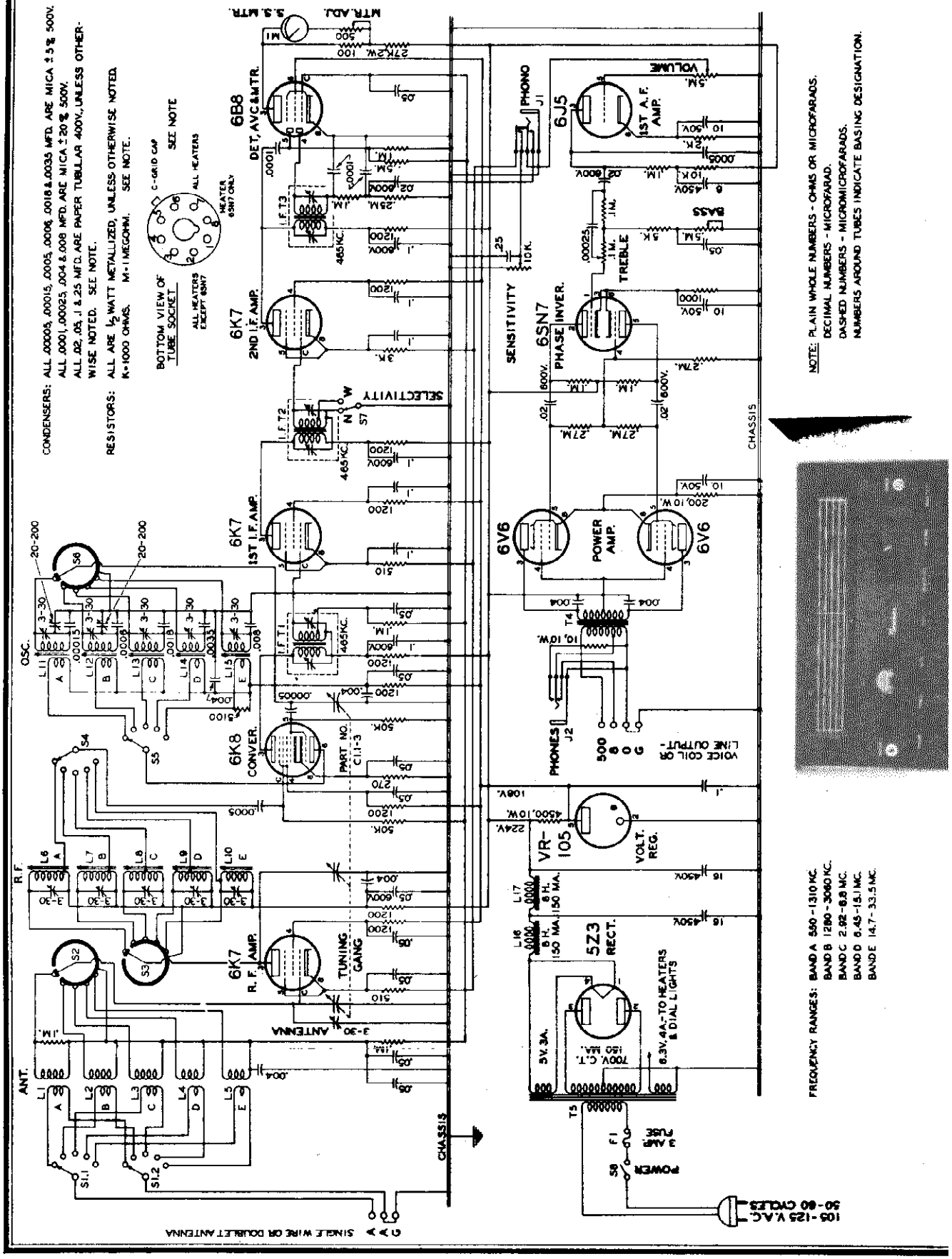
LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT OUTLINE

MODEL N605-E

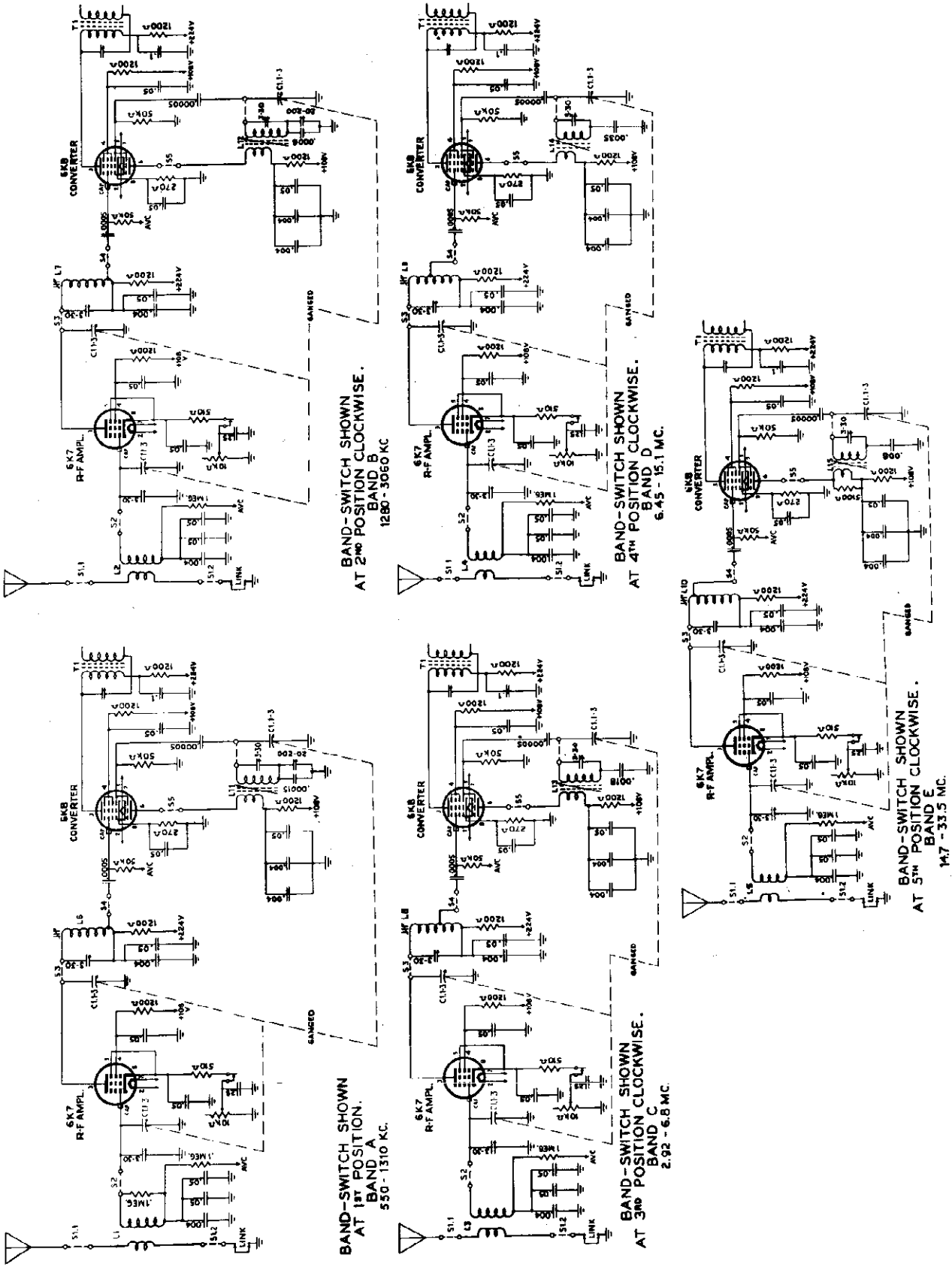
NORTHERN RADIO COMPANY



"clarified schematics"

MODEL N605-E

NORTHERN RADIO COMPANY



NORTHERN RADIO COMPANY

ALIGNMENT: Alignment of this receiver will not be necessary unless a component part of the tuned circuits is replaced or the adjustments have been tampered with. When alignment is necessary, the following conditions must be observed before proceeding:

A. SENSITIVITY control full on—clockwise.
B. SELECTIVITY control in W (wide) position.
C. BASS and TREBLE controls off—counterclockwise.
D. Receiver chassis effectively grounded.
E. Antenna terminals strapped for single-wire antenna.
F. Dial pointer must center on vertical line at low frequency end of scale when tuning condenser is at maximum capacity.
G. A dummy antenna consisting of a 400 ohm non-inductive resistor and .01 uf. mica condenser should be connected in series with the "hot" lead from the signal generator.

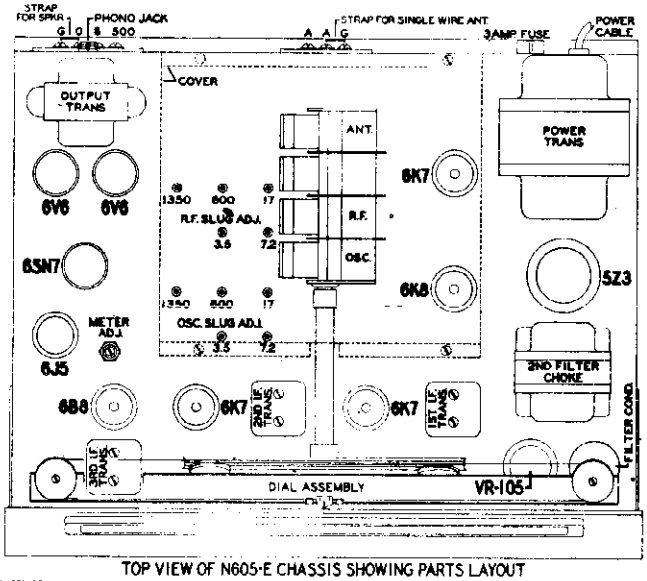
ALIGNMENT CHART

FILE NO 605E-12-1 — 12-46

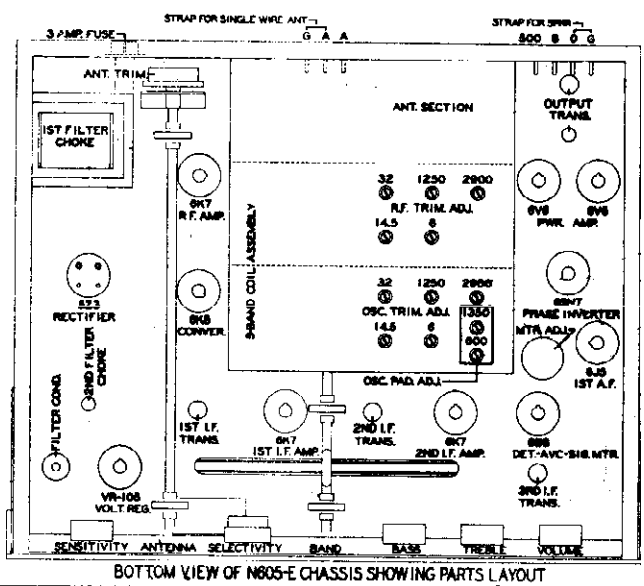
STEP	CONNECT DUMMY ANT. TO-	SET SIG. GEN. TO-	SET BAND SW. TO-	SET DIAL TO-	ADJUST FOR MAXIMUM S.S. METER READING	SEE NOTE
1	CONV. 6K8 GRID CAP	465 KC	A	QUIET POINT	ALL I. F. TRIMMERS	1,2&6
2	"A" TERM.	600 KC	A	600 KC	OSC.600 PAD, ANT. TRIM & RF 600 SLUG	1&3
3	"A" TERM.	1250 KC	A	1250 KC	OSC.1250 TRIM, ANT. TRIM & RF 1250 TRIM	
4	"A" TERM.	1350 KC	B	1350 KC	OSC.1350 PAD, ANT. TRIM & RF 1350 SLUG	1&3
5	"A" TERM.	2900 KC	B	2900 KC	OSC.2900 TRIM, ANT. TRIM & RF 2900 TRIM	
6	"A" TERM.	3.5 MC	C	3.5 MC	OSC. 3.5 SLUG, ANT. TRIM & RF 3.5 SLUG	1&4
7	"A" TERM.	6.0 MC	C	6.0 MC	OSC. 6.0 TRIM, ANT. TRIM & RF 6.0 TRIM	1&4
8	"A" TERM.	7.2 MC	D	7.2 MC	OSC. 7.2 SLUG, ANT. TRIM & RF 7.2 SLUG	1&4
9	"A" TERM.	14.5 MC	D	14.5 MC	OSC.14.5 TRIM, ANT. TRIM & RF 14.5 TRIM	1&4
10	"A" TERM.	17 MC	E	17 MC	OSC.17 SLUG, ANT. TRIM & RF 17 SLUG	1&4
11	"A" TERM.	32 MC	E	32 MC	OSC. 32 TRIM, ANT. TRIM & RF 32 TRIM	1,4&5

Notes:

1. Trimming and padding steps for each band should be repeated several times as each adjustment affects the other a small percentage. The SIGNAL STRENGTH (S.S.) meter is used as a tuning indicator, with a signal input sufficient to give one-half scale deflection.
2. A very large input, 100,000 microvolts or more, may be required to force a signal through the I.F. stages if seriously detuned. The dummy antenna can be connected to the I.F. grids as an alternative if sufficient signal is not available.
3. *Do not adjust A and B band oscillator coil slugs.* Use padding condensers only for dial calibration.
4. Above 3.5 mc. care must be taken to avoid image frequencies. When two signals are heard in the range of an oscillator trimming or padding adjustment the one tuned with minimum C or L is correct.
5. A small amount of interlock between Osc. and RF stages is present above 30 mc. Use a strong signal for aligning, rock the tuning condenser slightly while making the "RF-32 trim" adjustment and set this adjustment approx. 1/4 turn towards maximum C past the apparent optimum setting.
6. One trimmer of the 3rd I.F. transformer will be found to give maximum output at minimum meter reading and should be adjusted correspondingly.



TOP VIEW OF N605-E CHASSIS SHOWING PARTS LAYOUT



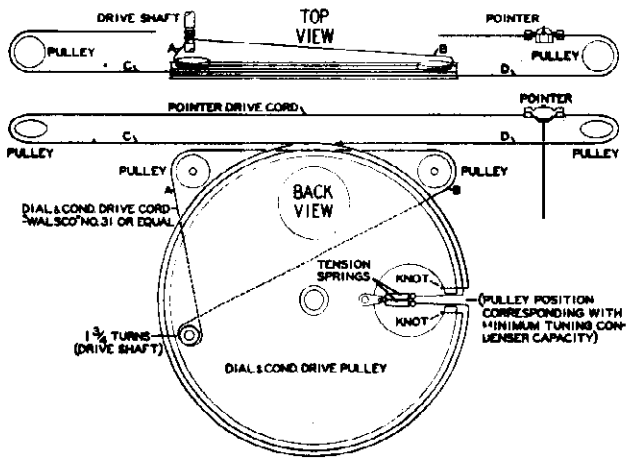
BOTTOM VIEW OF N605-E CHASSIS SHOWING PARTS LAYOUT

MODEL N605-E

NORTHERN RADIO COMPANY

Before attempting any maintenance disconnect the power cable (cord), remove the four screws holding the back plate, remove three screws in the back lip of the chassis and slide the chassis out of the cabinet.

All tubes should be checked in a mutual-conductance type tester and replacements made accordingly. Regardless of test results, tubes having been in service more than two years should be replaced to avoid unnecessary maintenance expense. Tube sockets are stamped for quick identification. Dial lights are Mazda type 47 and should be replaced whenever other maintenance work is done. Ready access to the center pilot light may be had by rotating the dial until the hole in the pulley is behind the light. Whenever the type 6B8 is replaced it will be necessary to reset the tuning meter as follows: set BAND switch on "C", SENSITIVITY control at minimum, disconnect antenna, set mechanical zero on meter, turn on POWER switch and after warm-up set METER ADJ. control for zero.



DIAL AND TUNING CONDENSER DRIVE MECHANISM

SPECIFICATIONS

FREQUENCY RANGES:

Overall	550 Kc to 33.5 Mc (546 to 8.96M)
Band A	550 Kc to 1310 Kc (546 to 228.8M)
Band B	1280 Kc to 3060 Kc (234 to 98.1M)
Band C	2.92 Mc to 6.8 Mc (102.7 to 44.1M)
Band D	6.45 Mc to 15.1 Mc (46.5 to 19.8M)
Band E	14.7 Mc to 33.5 Mc (20.4 to 8.96M)

INTERMEDIATE FREQUENCY.....465 Kc.

POWER OUTPUT.....7 Watts, undistorted

OUTPUT IMPEDANCE.....8 and 500 ohms

TUBE COMPLEMENT:

(1) 6K7	R.F. Amplifier
(2) 6K8	Converter (1st Detector-Oscillator)
(3) 6K7	1st I.F. Amplifier
(4) 6K7	2nd I.F. Amplifier
(5) 6B8	2nd Detector, A.V.C. & Signal Meter
(6) 6J5	1st A.F. Amplifier
(7) 6SN7	Phase Inverter
(8-9) 6V6G	Push-Pull Power Amplifier
(10) VR105	Voltage Regulator
(11) 5Z3	Plate Power Rectifier

TEST READINGS: Test readings are taken under the following conditions:

A. SENSITIVITY (R.F. Gain) control full on—clockwise.

B. SELECTIVITY switch in W (Wide) position.

C. BASS and TREBLE controls off—counterclockwise.

D. Antenna disconnected—no signal tuned in.

E. Band switch in Band B position for voltage readings.

F. A.C. line voltage—117 volts.

FILE NO 605E-13-1	TEST READINGS					12-46
TUBE	STAGE	PLATE VOLTAGE	SCREEN VOLTAGE	CATHODE VOLTAGE	GRID VOLTAGE	SEE NOTE
6K7	R.F. AMP.	216	106	3.5	.6	1,2&3
6K8	CONVERTER.	220	100	2.8	.6	1,2&3
	OSC. SECTION	104	--	--	1.8-8.0	1,2,3&4
6K7	1ST I. F. AMP.	220	106	7	.6	1,2&3
6K7	2ND I. F. AMP.	215	106	3.7	0	1&2
6B8	2ND DET. & A.V.C. SECTION.	--	--	--	0	
	SIG. STRENGTH METER SECTION	43	108	9	6	1,2,3&5
6J5	1ST A.F. AMP.	75	--	2.9	0	1&2
6SN7	PHASE INVERTER	82	--	3.1	0	1&2
6V6	POWER OUTPUT	219	224	12.5	0	1,2&6
VR-105	VOLTAGE REG.	108	--	0	--	1&2
5Z3	RECTIFIER	350	--	--	--	1,2&7

Notes:

1. All voltages shown are in respect to chassis.
2. Plate, screen and cathode voltages read with 20,000 ohm/volt meter.
3. Control grid voltage read with VTVM having a d.c. input resistance of 11 megohms.
4. Oscillator grid voltage varies between limits over various bands.
5. Grid of 6B8 (AVC bus) varies from .5 to .9 V. over all bands.
6. Readings shown are applicable to either tube or section of dual tube.
7. Reading taken with .05—600 V. cond. in series with "hot" meter lead.

AUDIO RESPONSE.....Normal response (bass and treble controls off) within plus or minus 2.5 db. from 100 to 10,000 cycles.

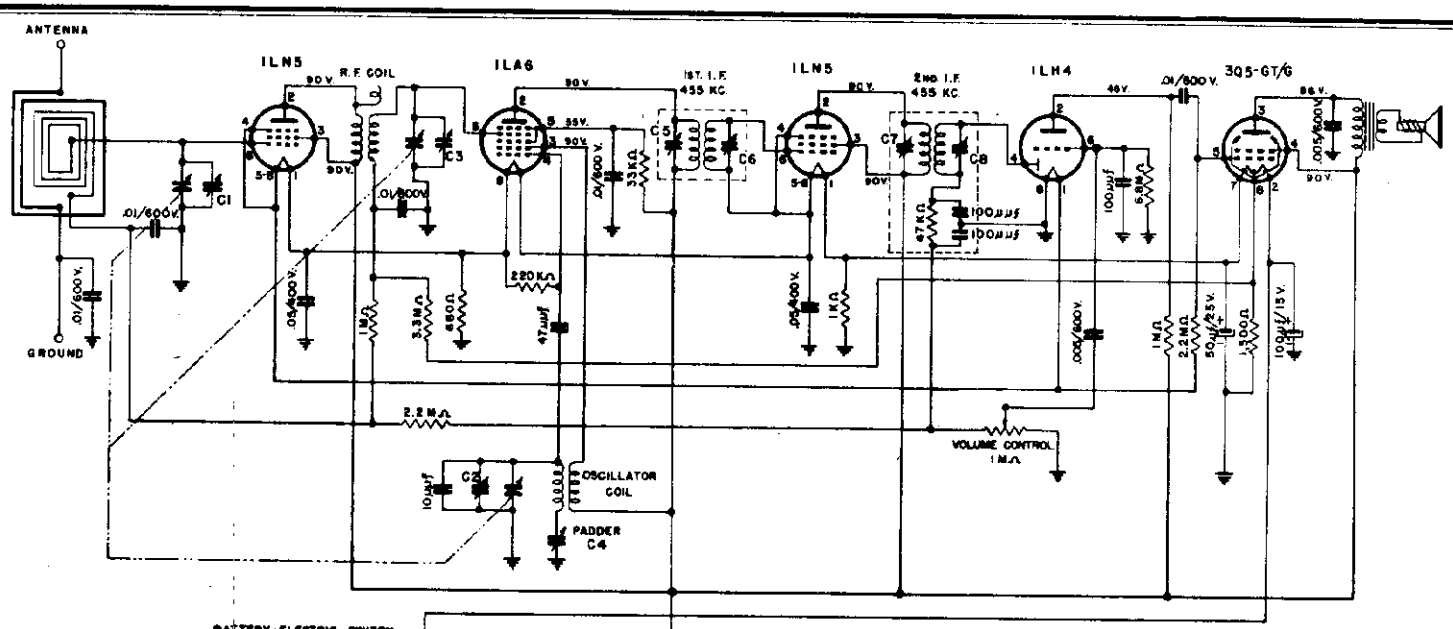
BASS & TREBLE BOOST.....10 db. above normal

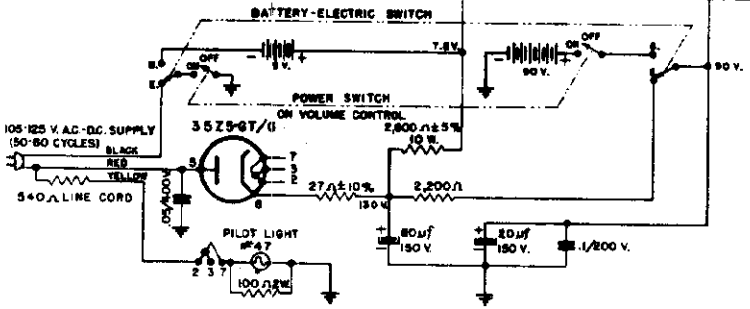
POWER SUPPLY RATING:*
105-125 Volts, A.C., 50-60 cycles.....85 Watts

CABINET DIMENSIONS.....17-3/4" Wide; 9-1/2" High; 14-7/8" Deep

NET WEIGHT.....45 lbs.

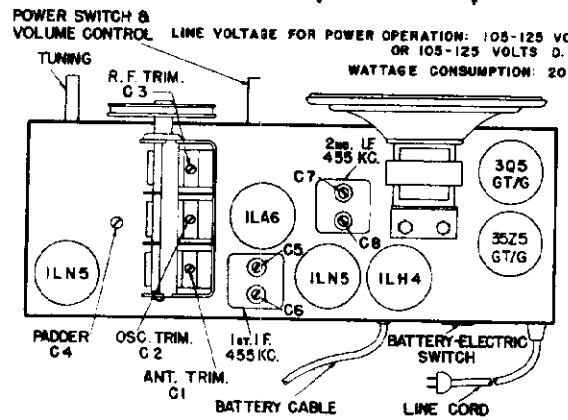
*On special order, the N605-E Receiver can be supplied for 115-230 volt, A.C. operation.



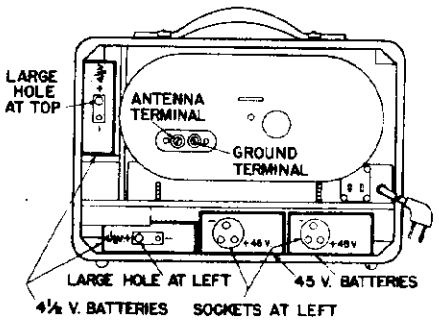


ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND I.F. TRANSFORMERS)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3		600 KC.	600 KC. (APPROX. 60 ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4		REPEAT STEPS 2 AND 3		



LINE VOLTAGE FOR POWER OPERATION: 105-125 VOLTS A.C., 50 TO 60 CYCLES OR 105-125 VOLTS D.C.
WATTAGE CONSUMPTION: 20 WATTS.



NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%.
ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

Frequency Range 530 - 1700 kc.

MODEL 6A-606

OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

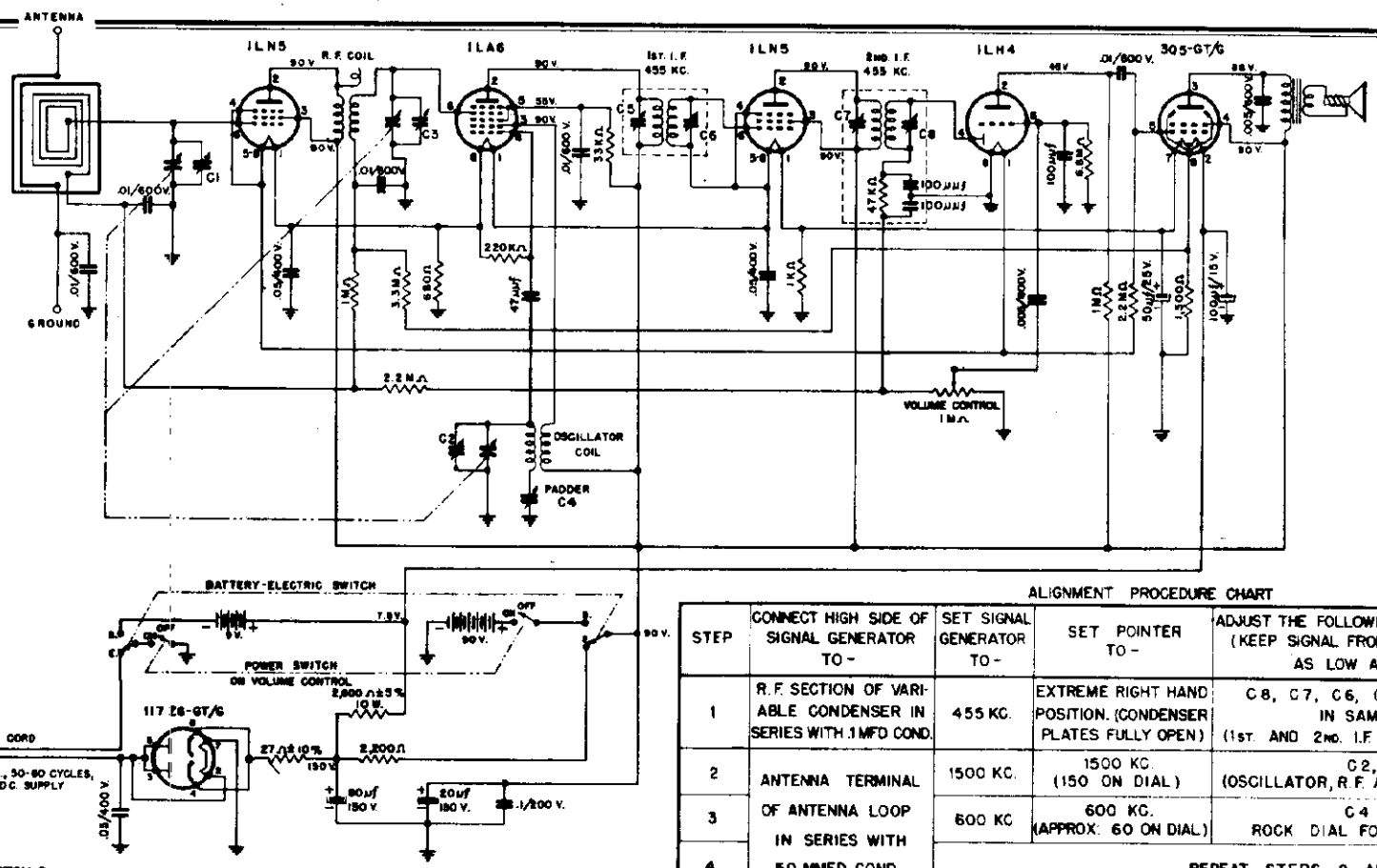
Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

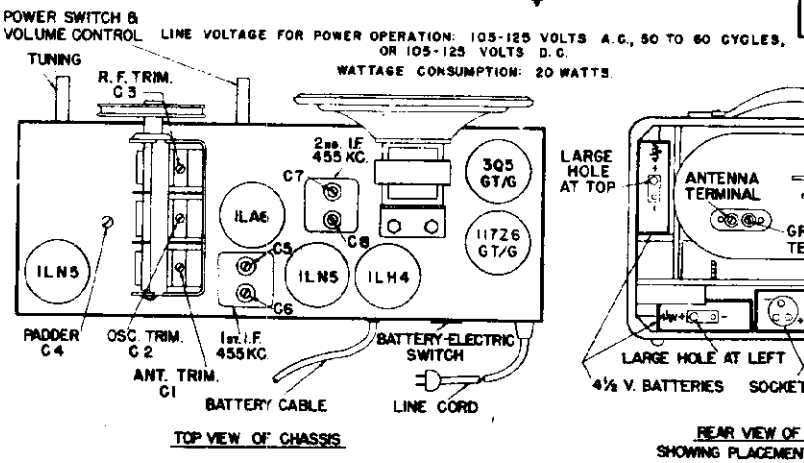
REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-177	Coil-oscillator coil
CL-630	Coil-R.F. coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LC-315	Line Cord-540 ohms resistance line cord
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control 1 megohm with D.P.S.T. switch
RCM20A100M	Condenser-10 mmfd ±20% mica condenser
RCM20A101M	Condenser-100 mmf ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1/200WV paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% ½ watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB 222M	Resistor-2200 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB270K	Resistor-27 ohms ±10% ½ watt resistor
REB333M	Resistor-33,000 ohms ±20% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB681M	Resistor-680 Ohms ±20% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
RED101M	Resistor-100 ohms ±20% 2 watt resistor
SK-476	Speaker-5" P.M. Speaker with output transformer
SO-572	Socket-pilot light socket assembly
SP-191	Spring-Drive shaft retaining spring
SW-185	Switch-battery-electric D.P.D.T. slide switch
TR-707	Transformer-I.F. 455 K.C. input-Transformer
TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter

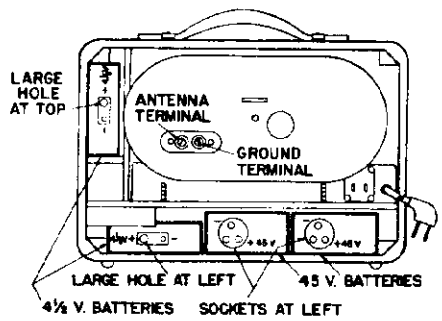


ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3		600 KC	600 KC. (APPROX. 60 ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4		REPEAT STEPS 2 AND 3		



TOP VIEW OF CHASSIS



REAR VIEW OF CABINET
SHOWING PLACEMENT OF BATTERIES

NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

Frequency Range 530 - 1700 kc.

OLYMPIC RADIO & TELEV. INC.

OLYMPIC PAGE 15
MODEL 65-605

MODEL 6B-606 OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

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Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

REPLACEMENT PARTS

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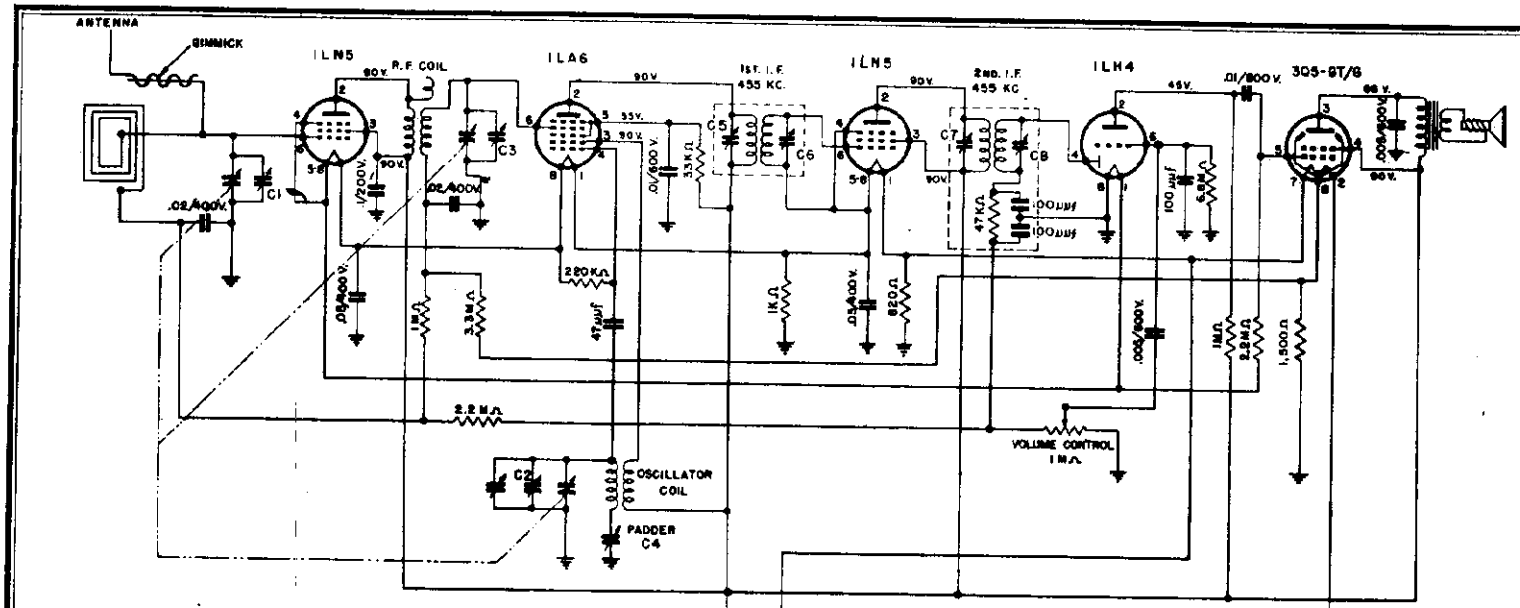
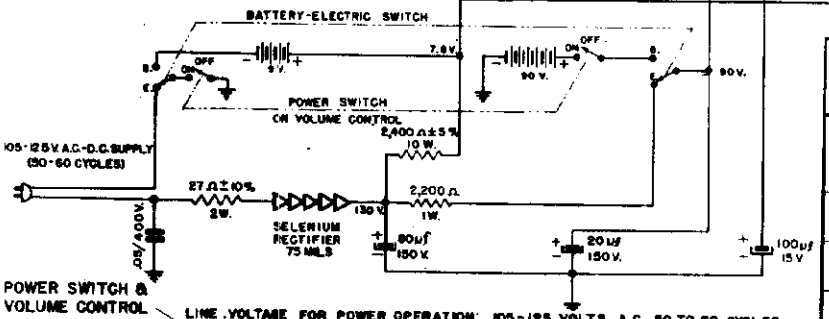
CB-335	Cable-battery cable
CL-177	Coil-oscillator coil
CL-630	Coil-R.F. coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control 1 megohm with D.P.S.T. switch
RCM20A101M	Condenser-100 mmf ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1/200WV paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% ½ watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB 222M	Resistor-2200 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB270K	Resistor-27 ohms ±10% ½ watt resistor
REB333M	Resistor-33,000 ohms ±20% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB681M	Resistor-680 Ohms ±20% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
RED101M	Resistor-100 ohms ±20% 2 watt resistor
SK-476	Speaker-5" P.M. Speaker with output transformer
SP-191	Spring-Drive shaft retaining spring
SW-185	Switch-battery-electric D.P.D.T. slide switch
TR-707	Transformer-I.F. 455 K.C. input-Transformer
TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter





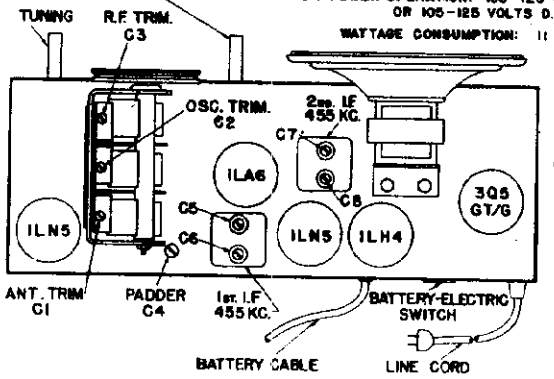
POWER SWITCH & VOLUME CONTROL

LINE VOLTAGE FOR POWER OPERATION: 105-125 VOLTS A.C., 50 TO 60 CYCLES OR 105-125 VOLTS D.C.

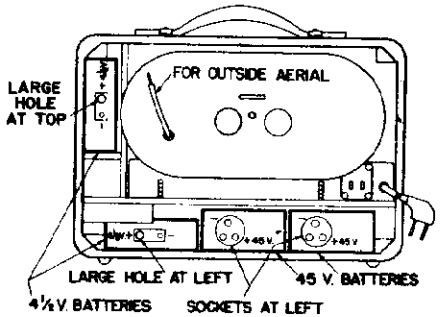
WATTAGE CONSUMPTION: 11 WATTS

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	SET POINTER TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN.)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS.)
2	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3		600 KC	600 KC. (APPROX. 60 ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4		REPEAT STEPS 2 AND 3		



TOP VIEW OF CHASSIS



REAR VIEW OF CABINET-
SHOWING PLACEMENT OF BATTERIES

NOTES:

1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

Frequency Range 535 - 1650 kc.

MODEL 7-526

OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

To insure proper alignment, it is suggested to use a radiated signal. To radiate a signal connect a loop of about 6" to 8" diameter 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of about 8" or 10".

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

BATTERIES

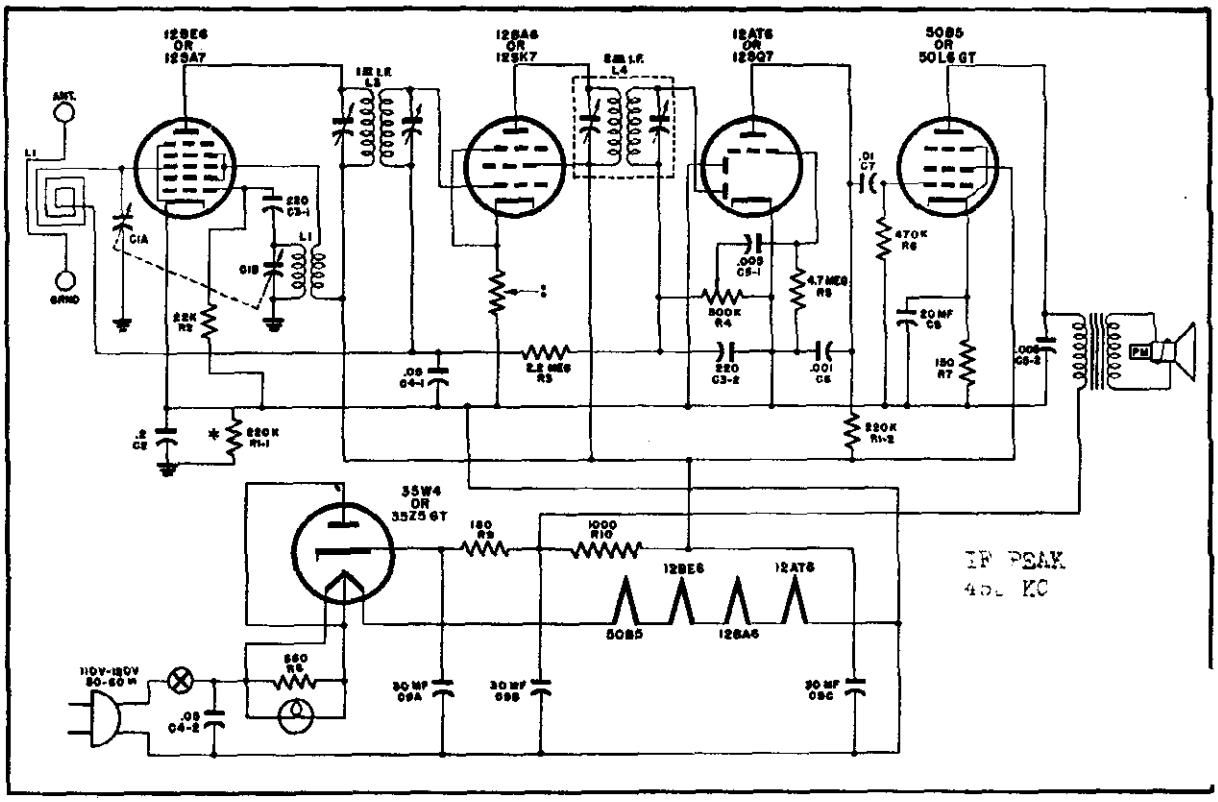
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-resistor mounting bracket
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-954	Coil-r-f coil
CL-957	Coil-oscillator coil
CO-182	Condenser-80/20/150 W.V. & 100/15 W.V. elect. condenser
CT-388	Condenser-220/680 mmfd. padder condenser
CV-816	Condenser-3 gang variable condenser
DL-872	Dial-metal dial scale
ES-274-1	Escutcheon-molded escutcheon
KN-352	Knob-walnut knob
KN-947	Knob-walnut knob with dot
LP-993	Loop-antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control
RCM20A101M	Condenser-100 mmfd. ±20% mica condenser
RCM20A470M	Condenser-47 mmfd. ±20% mica condenser
RCP10W2104A	Condenser-.1/200 W.V. tubular paper condenser
RCP10W4203A	Condenser-.02/400 W.V. tubular paper condenser
RCP10W4503A	Condenser-.05/400 W.V. tubular paper condenser
RCP10W6103A	Condenser-.01/600 W.V. tubular paper condenser
RCP10W6502A	Condenser-.005/600 W.V. tubular paper condenser

Part No.	Description
RE-879	Resistor-2400 ohms ±5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% ½ watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB333M	Resistor-33,000 ohms ±20% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
REB821M	Resistor-820 ohms ±20% ½ watt resistor
REC222M	Resistor-2200 ohms ±20% 1 watt resistor
RED270K	Resistor-27 ohms ±10% 2 watt resistor
RF-770	Rectifier-75 mils selenium rectifier
SK-476	Speaker-5" P.M. speaker
SP-191	Spring-drive shaft retaining spring
SP-295	Spring-pointer drive spring
SW-185	Switch-battery electric slide switch
TR-707	Transformer-455 kc first I.F. transformer
TR-708	Transformer-455 kc second I.F. transformer with diode filter

PACKARD BELL CO. MODEL 5D



*R1-1, 220,000 ohm resistor, is used only in sets utilizing metal, octal base tubes.

:180 ohm ½ watt resistor used for sets employing miniature glass tubes.

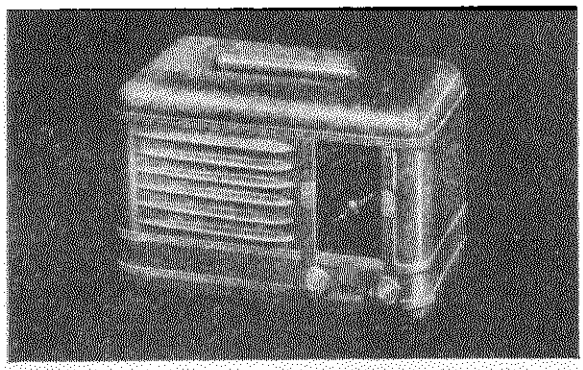
TABLE OF REPLACEABLE PARTS

PART NO.	REF. SYMBOL	DESCRIPTION
21004-AL		Cabinet, plastic: ivory
21004-BG		Cabinet, plastic: walnut
23503	C1A,B	Capacitor, variable
23018	C2	Capacitor, paper: .2 Mfd., 200 volt
23228	C3-1 C3-2	Capacitor, mica: 220 Mmf., 20%
23009	C4-1 C4-2	Capacitor, paper: .05 Mfd., 400 volt
23004	C5-1 C5-2	Capacitor, paper: .005 Mfd., 600 volt
23001	C6	Capacitor, paper: .001 Mfd., 600 volt
23006	C7	Capacitor, paper: .01 Mfd., 600 volt
24032	C8	Capacitor, electrolytic: 3 X 30 Mfd.
	C9A,B&C	150 volt & 20 Mfd., 25 volt
28013		Clip, electrolytic
29308	L1	Loop, antenna
29203	L2	Coil, oscillator
29002	L3	Coil, 1st I.F.: 455 KC
29004D	L4	Coil, 2nd I.F.: 455 KC
32012-AB		Cord, AC:6' brown rubber
32011-AL		Cord, AC:6' white plastic
38032		Dial scale, stationized
38047		Dial scale, export
49009-AL		Handle, ivory
49009-AG		Handle, walnut
52027A-AL		Knob, plastic: ivory
52021A-BG		Knob, plastic: walnut
54002		Dial, lamp, bayonet base: T-47
55003		Crystal, dial
62000B		Panel, loop
68126		Instruction label

PART NO.	REF. SYMBOL	DESCRIPTION
73049	R1-1 R1-2	Resistor, carbon: 220,000 ohms, 20%, ½ watt
73041	R2	Resistor, carbon: 22,000 ohms, 10%, ½ watt
73055	R3	Resistor, carbon: 2.2 megohms, 20%, ½ watt
25001A	R4	Control, volume: 500,000 ohms, with AC switch
73057	R5	Resistor, carbon: 4.7 megohms, 20%, ½ watt
73051	R6	Resistor, carbon: 470,000 ohms, 20%, ½ watt
73081	R7	Resistor, carbon: 150 ohms, 10%, 1 watt
73022	R8	Resistor, carbon: 560 ohms, 10%, ½ watt
73077	R9	Resistor, carbon: 180 ohms, 10%, 1 watt
73071	R10	Resistor, carbon: 1000 ohms, 10%, 1 watt
77015		Shaft, dial drive
79002		Socket, tube: octal base, 8 prong wafer type
79012		Socket, tube: 8 prong miniature
79033		Socket, dial lamp: bayonet base
78029B		Shield, cabinet: paper
83004		Speaker, permanent magnet: 4"
84001		Spring, dial drive
84016		Spring, handle
89411		Transformer, output

AN EARLY RUN OF THESE RECEIVERS UTILIZED MINIATURE GLASS TUBES, CONSEQUENTLY THE INFORMATION SHOWN HAS BEEN COMPILED TO ACCOMODATE MINIATURE GLASS OR [redacted] TUBES.

OCTAL BASE



SPECIFICATIONS

Overall Dimensions:
Height . . . . . 6"
Width . . . . 9¼"
Depth . . . . . 6"
Weight . . 6¾ lbs.

Electrical Rating:
Line Voltage . . . 110-120 volts AC-DC
Power Consumption . . . 28 watts

Tuning Frequency Range:
540 to 1740 KC

Intermediate Frequency:
455 KC

Electrical Power Output:
Maximum . . . 1.7 watts

Loudspeaker:
Type . . . Permanent Magnet
Outside Cone Diameter . . . 4"
Voice Coil Impedance . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1.0 Oz. Alnico 5

Tubes:

Tube		Function
No. 1	12BE6 or 12SA7	Frequency Converter
No. 2	12BA6 or 12SK7	I. F. Amplifier
No. 3	12AT6 or 12SQ7	Detector Amplifier
No. 4	50B5 or 50L6-GT	Power Amplifier
No. 5	35W4 or 35Z5-GT	Rectifier

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to ground buss.—A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to ground buss.*—Volume Control maximum.—No signal.—117 volts A.C. line voltage.—All voltages shown are positive D.C. unless otherwise noted.
*NOTE: Filament voltages should be measured across the filament of the tube.

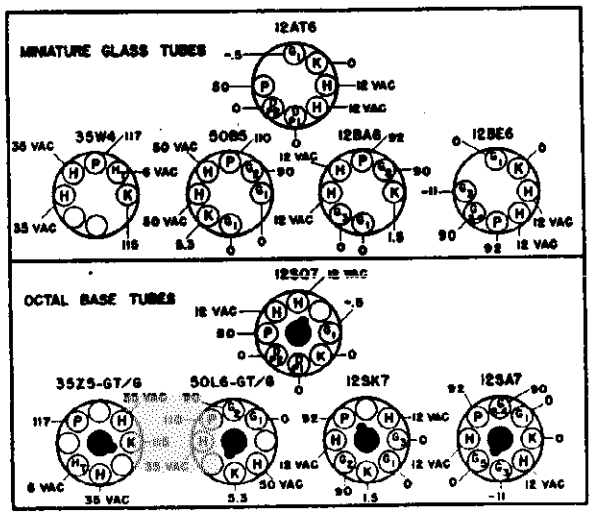


FIGURE 1—SOCKET VOLTAGES

GENERAL INFORMATION

Model 5DA is a superheterodyne receiver employing five tubes and a permanent magnet speaker. This model is for operation on AC or DC current and is enclosed in a plastic cabinet.

SPECIAL SERVICE INFORMATION

Stage Gain Measurements:

Measurements taken with volume control maximum. — AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy antenna . . . 200 Mmf.
Converter Grid to 1st I.F. Grid . . . 71X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 78X at 455 KC
1st I.F. Grid to 2nd Detector . . . 77X at 455 KC
Overall Audio Gain . . . 375X at .5 watts 400 cycles

Oscillator Grid Voltages:

At 117 volts AC line voltages. — Measurements made with an A.C. vacuum tube voltmeter input loading above 10 megohms.
600 KC . . . 15 volts AC 1500 KC . . . 20 volts AC

D.C. Resistance Measurements:

1st I.F. Coil
Primary . . . 17.5 ohms Secondary . . . 17.5 ohms

2nd I.F. Coil
Primary . . . 14.5 ohms Secondary . . . 14.5 ohms

Oscillator Coil
Primary . . . 1.2 ohms Secondary . . . 4.5 ohms

ALIGNMENT PROCEDURE

Alignment Procedure consists of the four steps outlined in the Alignment Procedure Chart.

For Step No. 1, I.F. Alignment, connect the leads of a test oscillator to the mixer grid and the ground buss through an .01 Mfd. capacitor (dummy load). Upon completion of this step "Rock" the variable condenser to assure that the I.F.s have been aligned to the correct frequency. Output should remain constant at any setting of the variable condenser.

Steps 2 to 4 employ a Hazeltine Standard Test Loop No. 1150, or a reasonable substitute. Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

IMPORTANT NOTICE: Make certain that each step is done with a minimum input signal.

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
1	Mixer Grid & Grd. .01 Mfd. Cap.	455 KC	540 KC	Trimmers A, B, C, & D
2	Standard* Test Loop	1740 KC	1740 KC	Trimmer E to 1740 KC
3	Standard* Test Loop	1500 KC	1500 KC	Trimmer F
4	Standard* Test Loop	600 KC	600 KC	Loop

*NOTE: Hazeltine Standard Test Loop No. 1150 or a reasonable substitute.

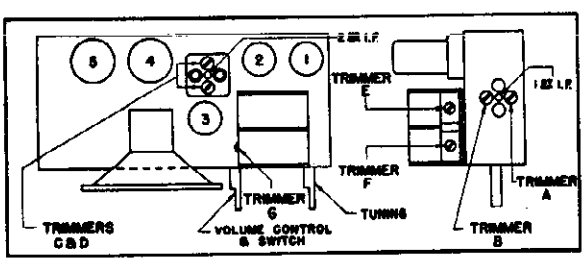
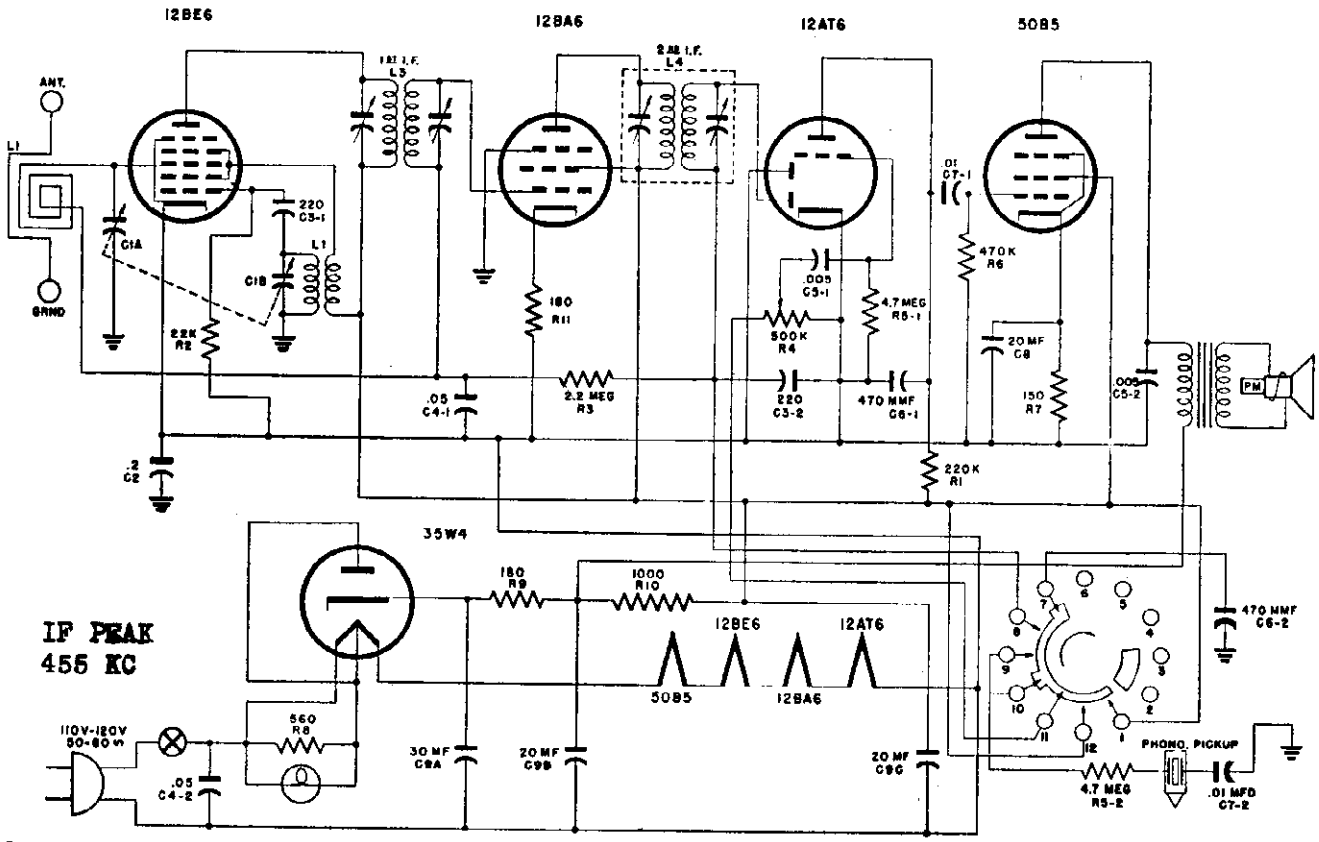
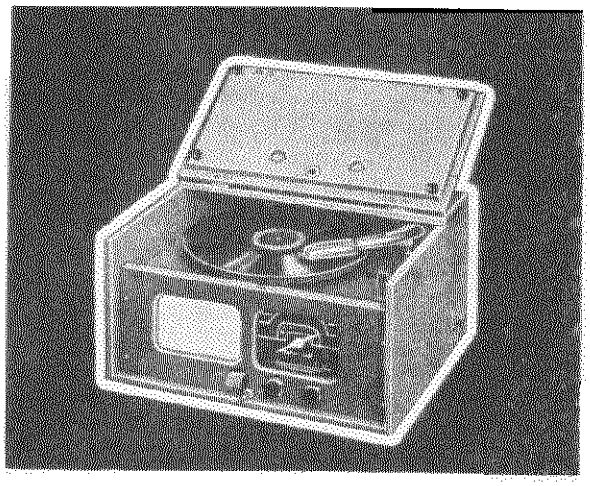


FIGURE 2—TRIMMER LOCATION

PACKARD BELL CO.



PART NO.	REF. SYMBOL	DESCRIPTION
18004A		Bracket, pilot light
18012		Pick-up rest
20001B		Button plug
21027B		Cabinet, power cord holder
21046C		Cabinet, wood: fabricoid covered
23503	C1A & B	Capacitor, variable: two gang with pulley
23018	C2	Capacitor, paper: .2 Mfd., 200 volt
23228	C3-1 C3-2	Capacitor, mica: 220 Mmf., 20%
23009	C4-1 C4-2	Capacitor, paper: .05 Mfd., 400 volt
23004	C5-1 C5-2	Capacitor, paper: .005 Mfd., 600 volt
23916	C6-1 C6-2	Capacitor, mica: 470 Mmf., 20%
23006	C7-1 C7-2	Capacitor, paper: .01 Mfd., 600 volt
24032	C8 C9A,B&C	Capacitor, electrolytic: 30 Mfd., 2 x 20 Mfd., 150 WV & 25 Mfd., 25 WV
28013		Clip, electrolytic
29320	L1	Loop antenna
29203	L2	Coil, oscillator
29002	L3	Coil, 1st I.F.: 455 KC
29004D	L4	Coil, 2nd I.F.: 455 KC
32012-AB		Cord, AC: 6' brown rubber
38044B		Dial scale, stationized
38053		Dial scale, export
41002		Escutcheon, AC switch
52014		Knob, bar
54002		Lamp, dial: bayonet base
55008		Crystal, dial
58012		Motor, phono
59003		Needle, phono: permanent, osmium tip
62030A		Panel, cabinet
62031A		Panel, motor
63023		Pick-up arm
63024		Pick-up cartridge
65042A		Plate, paper: dial
66013		Plug, phono
66008		Plug, phono motor
67005		Pointer, dial
73049	R1	Resistor, carbon: 220,000 ohms, 20%, ½ watt
73041	R2	Resistor, carbon: 22,000 ohms, 10%, ½ watt
73055	R3	Resistor, carbon: 2.2 megohms, 20%, ½ watt
25001A	R4	Control, volume: 500,000 ohms, with AC switch
73057	R5-1 R5-2	Resistor, carbon: 4.7 megohms, 20%, ½ watt
73051	R6	Resistor, carbon: 470,000 ohms, 20%, ½ watt
73081	R7	Resistor, carbon: 150 ohms, 10%, 1 watt
73022	R8	Resistor, carbon: 560 ohms, 10%, ½ watt
73077	R9	Resistor, carbon: 180 ohms, 10%, 1 watt
73071	R10	Resistor, carbon: 1000 ohms, 10%, 1 watt
73016	R11	Resistor, carbon: 180 ohms, 10%, ½ watt
77017		Shaft, dial drive
78019		Shield, AC switch
78026		Shield, phono plug
79004		Socket, phono
79007		Socket, phono motor
79012		Socket, tube: 7 prong miniature
79033		Socket, dial lamp: bayonet base
83004		Speaker, permanent magnet: 4"
84001		Spring, dial drive
86005B		Switch, rotary: radio-phono
86701A		Switch, slide: AC phono motor
89411		Transformer, output



SPECIFICATIONS

Overall Dimensions:

Width . . . . . 15" Depth . . . 13⅛"
Height . . . 7¾" Weight . . 15 lbs.

Electrical Rating:

Line Voltage . . . 110-120 volts AC
Power Consumption . . . 43 watts

Tuning Frequency Range: 540 to 1740 KC

Intermediate Frequency: 455 KC

Electrical Power Output:

Maximum . . . 1.7 watts

Loudspeaker:

Type . . . Permanent Magnet
Outside Cone Diameter . . . 4"
Voice Coil Impedance . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1.0 Oz. Alnico 5

Tubes:

12BE6 Frequency Converter
12BA6 I. F. Amplifier
12AT6 Detector Amplifier
50B5 Power Amplifier
35W4 Rectifier

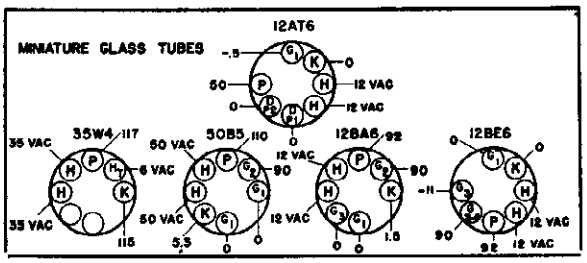


FIGURE 1—SOCKET VOLTAGES

All D.C. voltages measured from socket contacts to ground buss with a vacuum tube voltmeter. — A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to ground buss.* — volume control maximum. — No Signal. — 117 A.C. line voltage. — All voltages shown are positive D.C. unless otherwise noted.

*NOTE: Filament voltages should be measured across the filament of the tube.

GENERAL INFORMATION

Model 568 is a combination superheterodyne receiver and phonograph. This model employs a permanent magnet speaker and a specially designed "Hi-Q" loop antenna. The model is capable of playing ten or twelve-inch records and is enclosed in a fabricoid covered carrying case.

IMPORTANT: While it is true this model uses a conventional "AC-DC" circuit, it must be confined to AC operation due to the AC phonograph motor.

NOTE: The 3 position Radio-Phono switch shown in the Schematic Diagram was used in the major portion of this model. A very small quantity utilized a 4 position switch. The overall wiring differs very little; the extra position on the 4 position switch provides a "Radio-Tone" position.

SPECIAL SERVICE INFORMATION

Stage Gain Measurements:

Measurements taken with volume control maximum. — AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy Antenna . . . 200 Mmf.
Converter Grid to 1st I.F. Grid . . . 71X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 78 X at 455 KC
1st I.F. to 2nd Detector . . . 77X at 455 KC
Overall Audio Gain . . . 375X at .5 watts 400 cycles

Oscillator Grid Voltages:

600 KC . . . 15 volts AC 1500 KC . . 20 volts AC

DC Resistance Measurements:

1st I.F. Coil
Primary . . . 17.5 ohms Secondary . . 17.5 ohms
2nd I.F. Coil
Primary . . . 14.5 ohms Secondary . . 14.5 ohms
Oscillator Coil
Primary . . . 1.2 ohms Secondary . . 4.5 ohms

ALIGNMENT PROCEDURE

Alignment Procedure consists of the four steps outlined in the Alignment Chart.

For Step No. 1, I.F. Alignment, connect the leads of a test oscillator to the mixer grid and the ground buss through an .01 Mfd. capacitor (dummy load). Upon completion of this step "Rock" the variable condenser to assure that the I.F.s have been aligned to the correct frequency. Output should remain constant at any setting of the variable condenser.

Steps 2 to 4 employ a Hazeltine Standard Test Loop No. 1150 or a reasonable substitute. Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

IMPORTANT NOTICE: Make certain that each step is done with a minimum input signal.

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
1	Mixer Grid & Grd. .01 Mfd. Cap.	455 KC	540 KC	Trimmers A, B, C & D
2	Standard* Test Loop	1740 KC	1740 KC	Trimmer E to 1740 KC
3	Standard* Test Loop	1500 KC	1500 KC	Trimmer F
4	Standard* Test Loop	600 KC	600 KC	Loop

*NOTE: Hazeltine Standard Test Loop or a reasonable substitute.

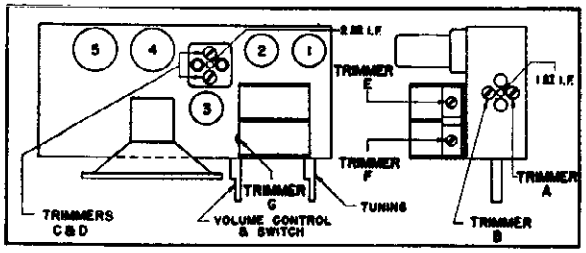
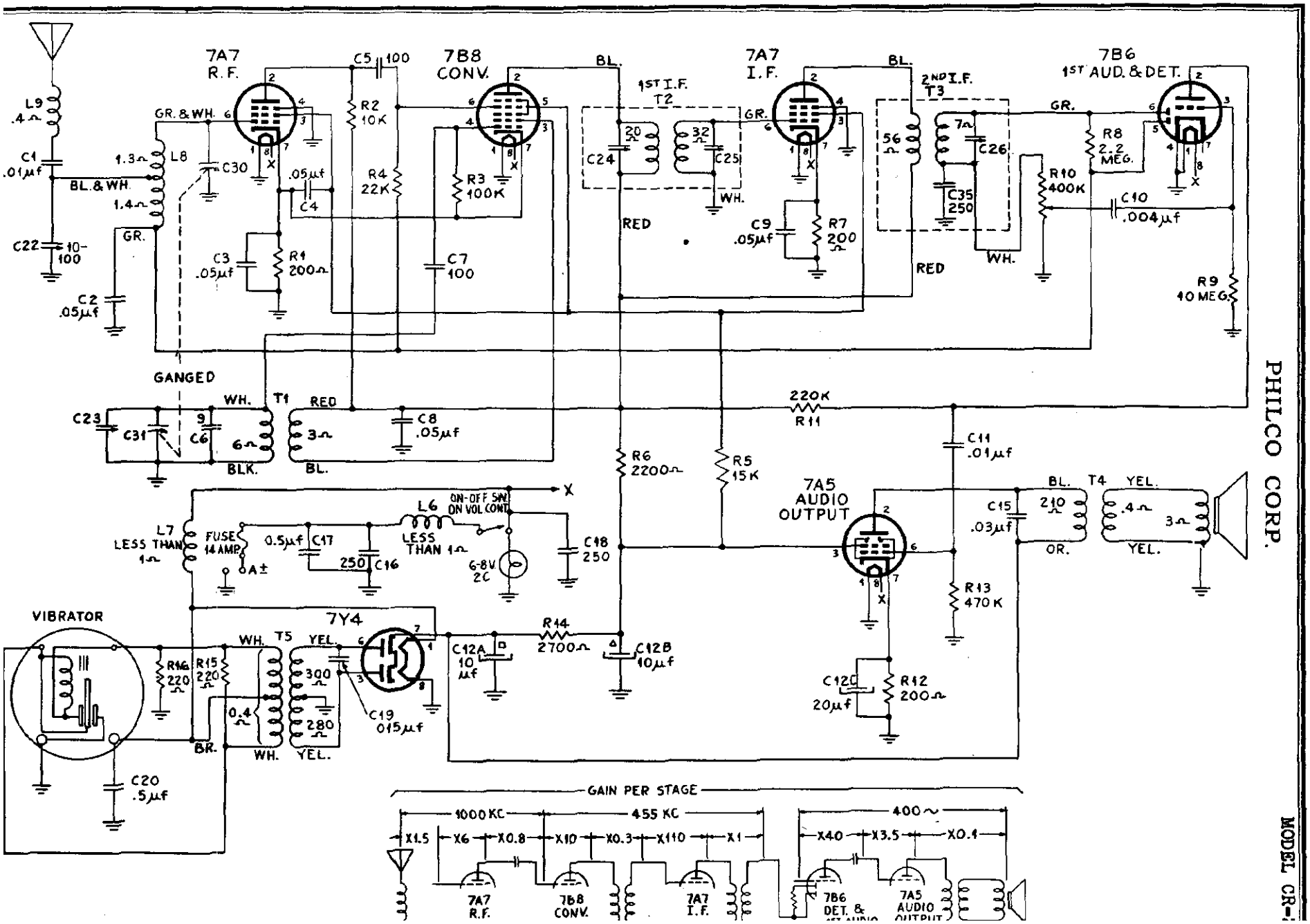


FIGURE 2—TRIMMER LOCATION



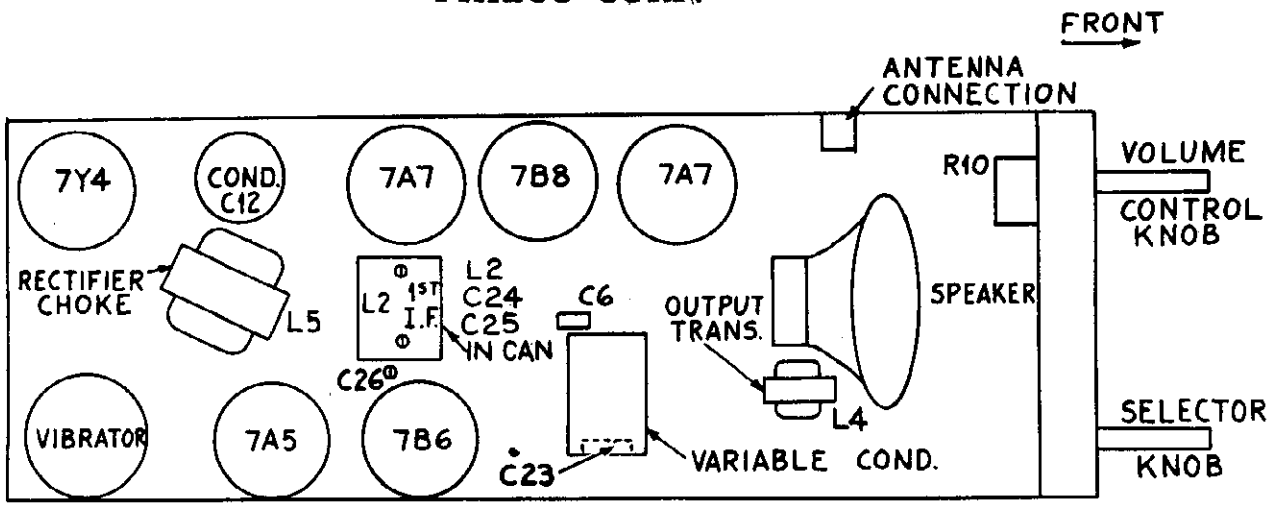
PHILCO CORP.

PHILCO PAGE 16

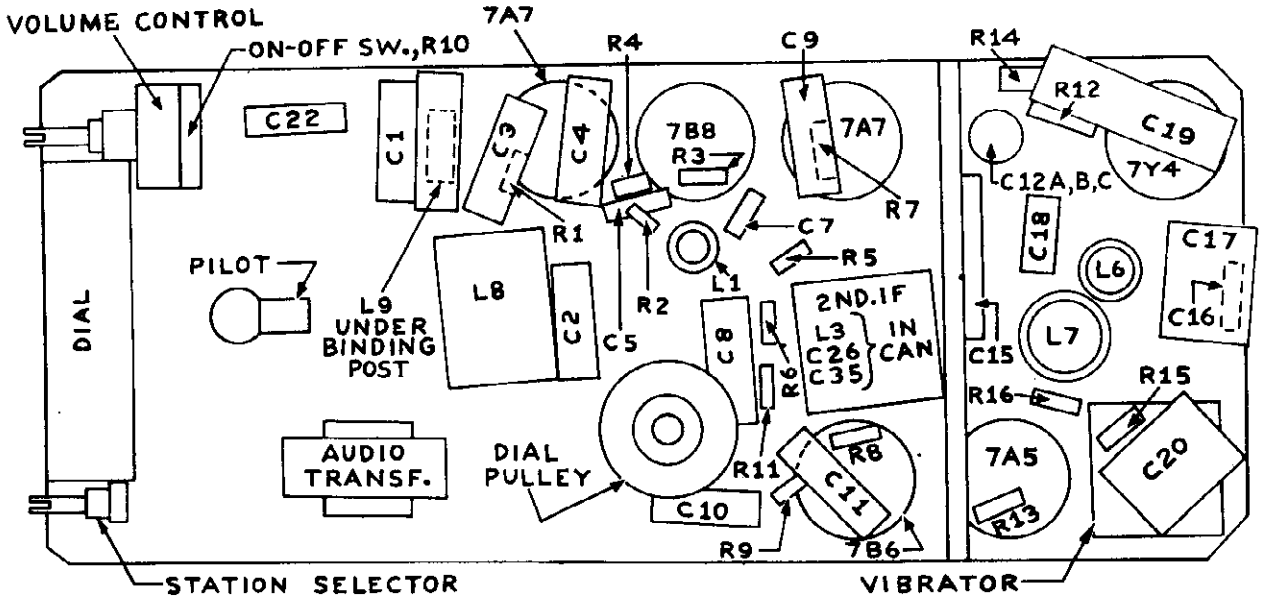
MODEL CR-

MODEL CR-2

PHILCO CORP.



TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS

ALIGNMENT PROCEDURE

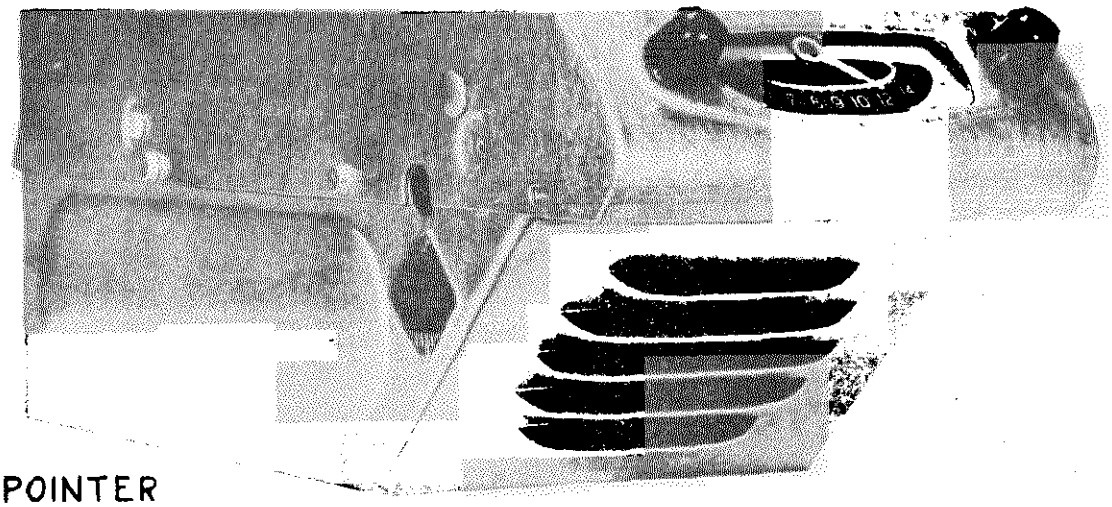
CONNECT AN OUTPUT METER ACROSS THE VOICE COIL AND THE SPEAKER. CONNECT A SIGNAL GENERATOR THRU A .01 mf CONDENSER TO THE ANTENNA LEAD. MESH THE VARIABLE TUNING CONDENSER FULLY. (PIN 4 OF THE 7B8 SHOULD BE GROUNDED WHILE ALIGNING THE IF STAGE) SET THE SIGNAL GENERATOR TO 455 KC. TURN THE VOLUME CONTROL OF THE RECEIVER TO MAXIMUM. TURN UP THE OUTPUT OF THE SIGNAL GENERATOR SO THAT THERE IS A SMALL DEFLECTION ON THE OUTPUT METER. NOW ADJUST IF TRIMMERS C26, C25 AND C24 FOR A MAXIMUM DEFLECTION ON THE METER.

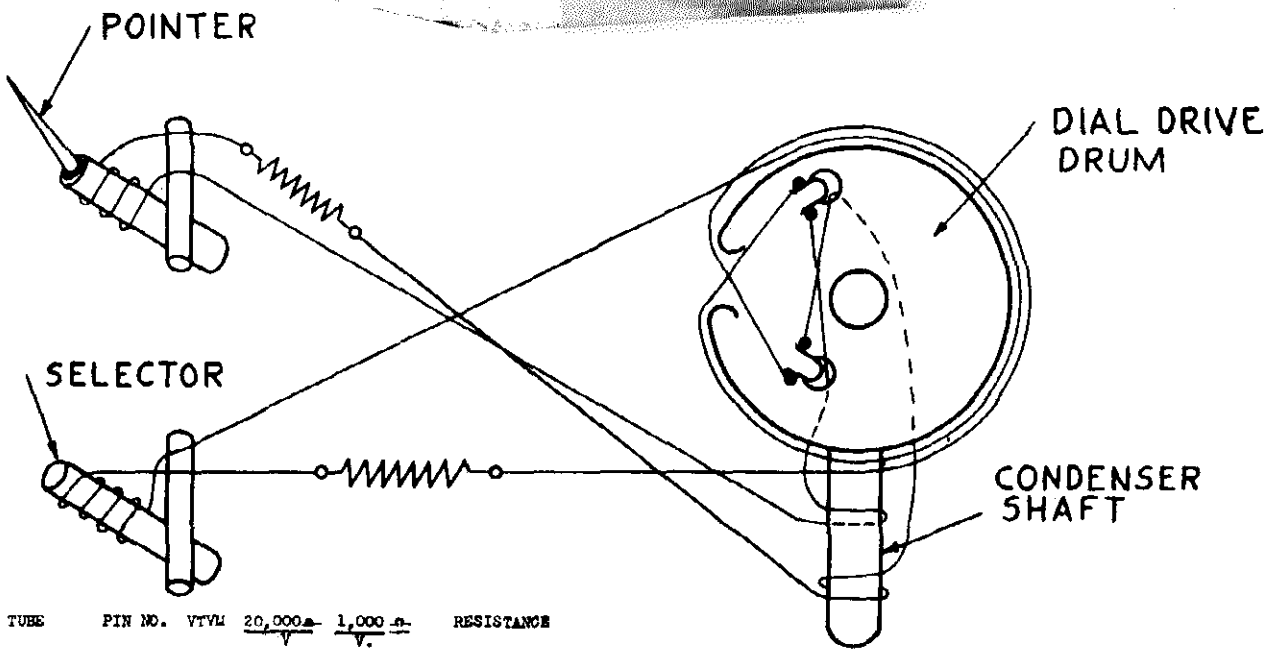
TO ALIGN THE OSCILLATOR STAGE, CONNECT THE SIGNAL GENERATOR THRU A 50 MMF CONDENSER TO THE ANTENNA LEAD. TUNE BOTH THE RECEIVER AND THE SIGNAL GENERATOR TO 1600 KC. TURN UP THE OUTPUT OF THE SIGNAL GENERATOR SO THAT THERE IS A SMALL DEFLECTION ON THE OUTPUT METER. ADJUST OSCILLATOR TRIMMER C23, FOR A MAXIMUM DEFLECTION ON THE METER.

TO ALIGN RF STAGE FOLLOW ABOVE PROCEDURE EXCEPT THAT THE RECEIVER AND SIGNAL GENERATOR ARE TUNED TO 1400 KC AND TRIMMER C22 IS ADJUSTED FOR MAXIMUM DEFLECTION ON THE OUTPUT METER.

MODEL CR-2

PHILCO CORP.





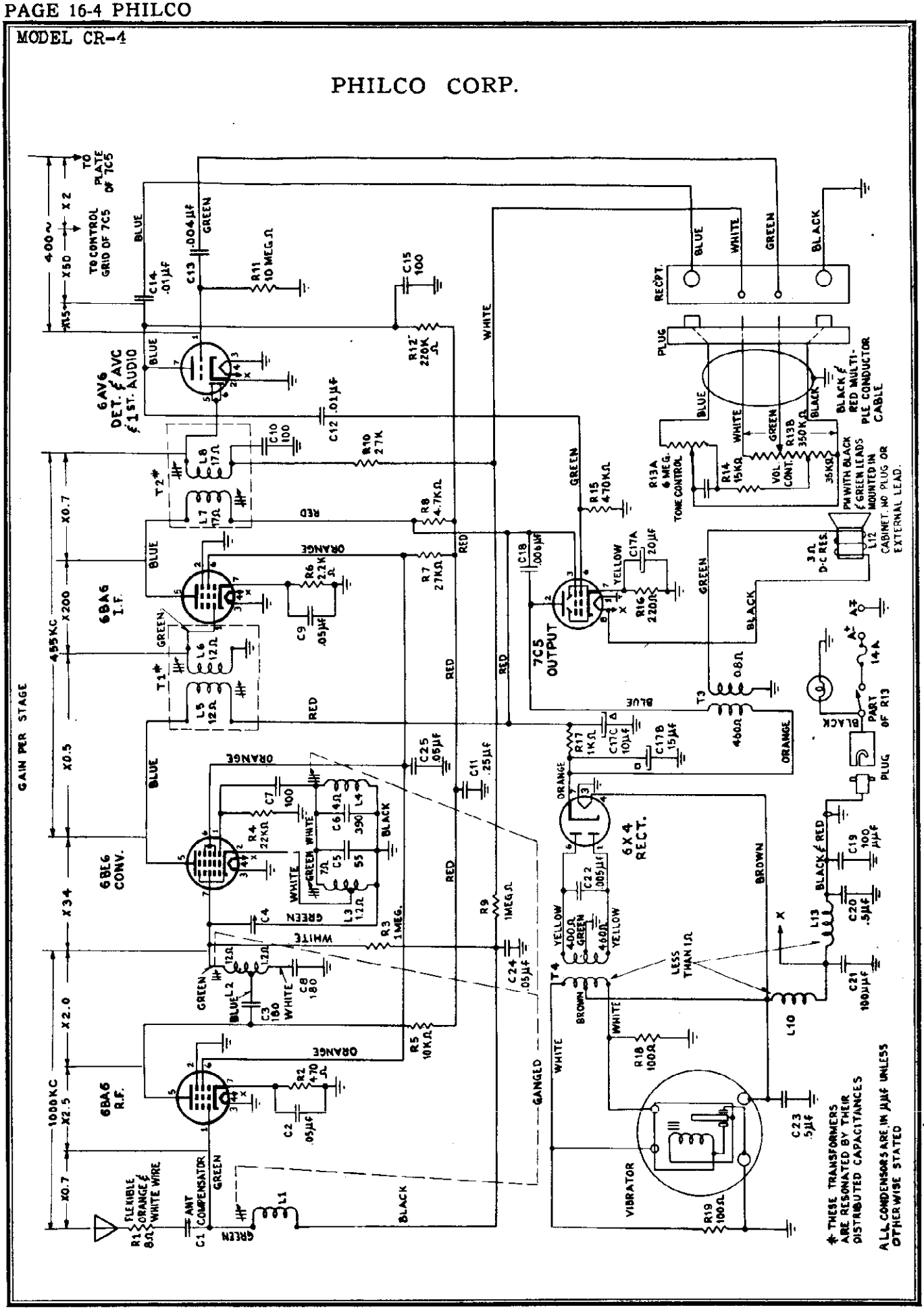
TUBE	PIN NO.	VTVM	20,000Ω/V	1,000Ω/V	RESISTANCE
7 A 7 RF	1	0	0	0	0
	2	55V.	51V.	46V.	OVER 5 MEG.
	3	47V.	46V.	43V.	OVER 5 MEG.
	4	0	0	0	0
	5	0	0	0	0
	6	-1.2V.	35V.	-.04V.	2.7 MEG.
	7	1.1V.	1V.	1V.	200Ω
	8	6.2V.	6V.	6.1V.	.3Ω
7 B 8 CONVERTER	1	0	0	0	0
	2	78V.	77V.	72V.	OVER 5 MEG.
	3	78V.	77V.	72V.	OVER 5 MEG.
	4	-12V.	-8.3V.	-3.3V.	125 K
	5	47V.	46 V	46V.	OVER 6 MEG.
	6	-1.05 V.	.16V.	-.01V.	2.8 MEG.
	7	1.15V.	1V.	1V.	200Ω
	8	6.2V.	6V.	6V.	.3Ω
7 A 7 IF	1	0	0	0	0
	2	78V.	76V.	71V.	OVER 5 MEG.
	3	48V.	46V.	43V.	OVER 5 MEG.
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	30Ω
	7	1.15V.	1V.	1V.	210Ω
	8	6.2V	6V.	6V.	.3Ω
7 B 6 DET. & 1st AUDIO	1	0	0	0	0
	2	57V.	54V.	23V.	OVER 5 MEG.
	3	-.95V.	-.36V.	-.1V.	OVER 5 MEG.
	4	0	0	0	.2Ω
	5	-1V.	-.28V.	-.03V.	2.7 MEG.
	6	-1.2V.	-.42V.	-.05V.	380 K.
	7	0	0	0	0
	8	6.2V.	6V.	6V.	.3Ω

TUBE	PIN NO.	VTVM	20,000Ω/V	1,000Ω/V	RESISTANCE
7A5 AUDIO OUTPUT	1	0	0	0	0
	2	124V.	124V.	120V.	OVER 30 MEG.
	3	95V.	97V.	90V.	OVER 30 MEG.
	4	—	—	—	—
	5	—	—	—	—
	6	.06V.	0	0	650 K
	7	6.3V.	6V.	6V.	210Ω
	8	6.2V.	6V.	6V.	.3Ω
7Y4 RECTIFIER	1	6.2V.	6V.	6.1V.	.3Ω
	2	—	—	—	—
	3	A C	A C	A C	240Ω
	4	—	—	—	—
	5	—	—	—	—
	6	A C	A C	A C	260Ω
	7	130V.	120V.	120V.	OVER 5 MEG.
	8	0	0	0	0
VIBRATOR 2 3 / 1 4 Bottom View	1	0	0	0	0
	2	6V.	5.7V.	6V.	.8Ω
	3	6V.	5.7V.	6V.	.8Ω
	4	6.2V.	5.9V.	6.2V.	.4Ω

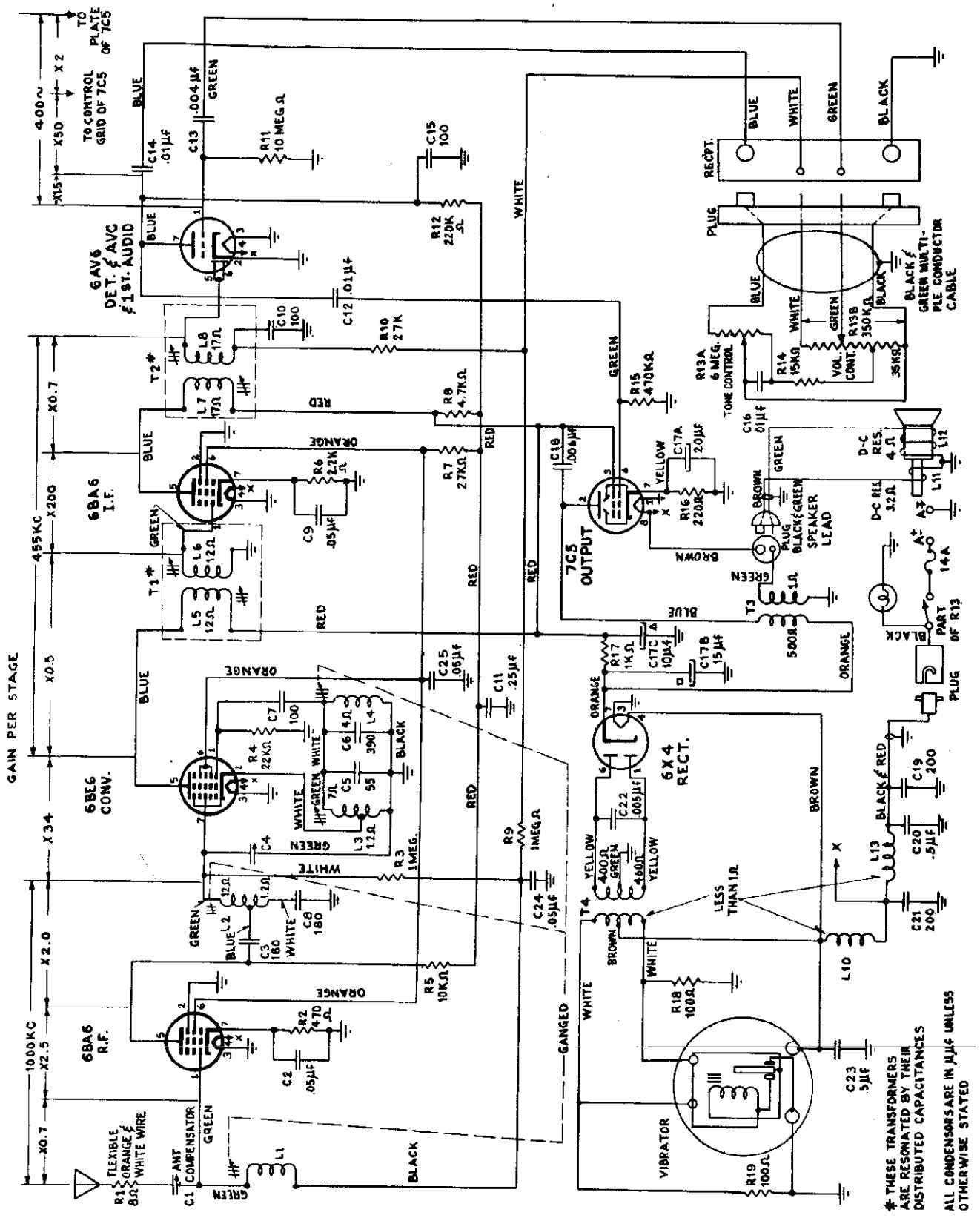
VOLTAGE MEASURED WHEN "A" VOLTAGE = 6.4V.,
THE CONDENSER FULLY MESHED AND VOLUME CONTROL AT MINIMUM.

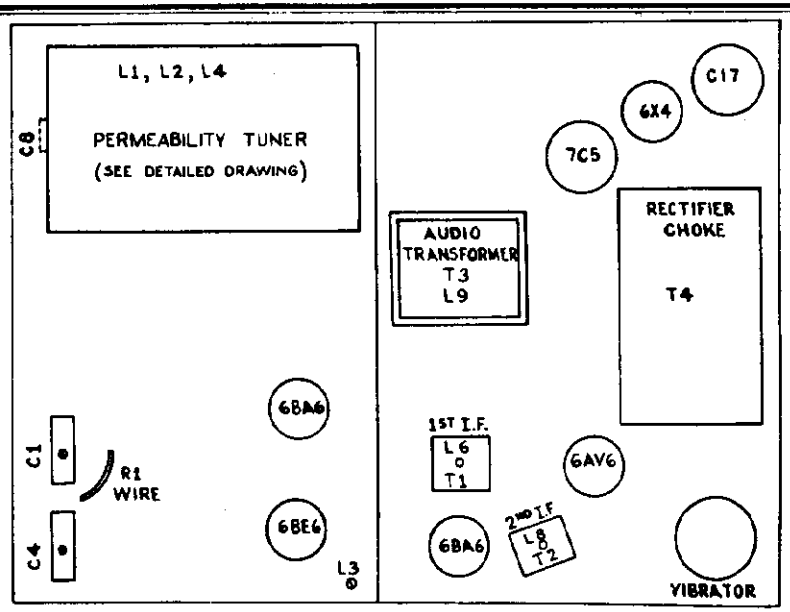
MODEL CR-4

PHILCO CORP.



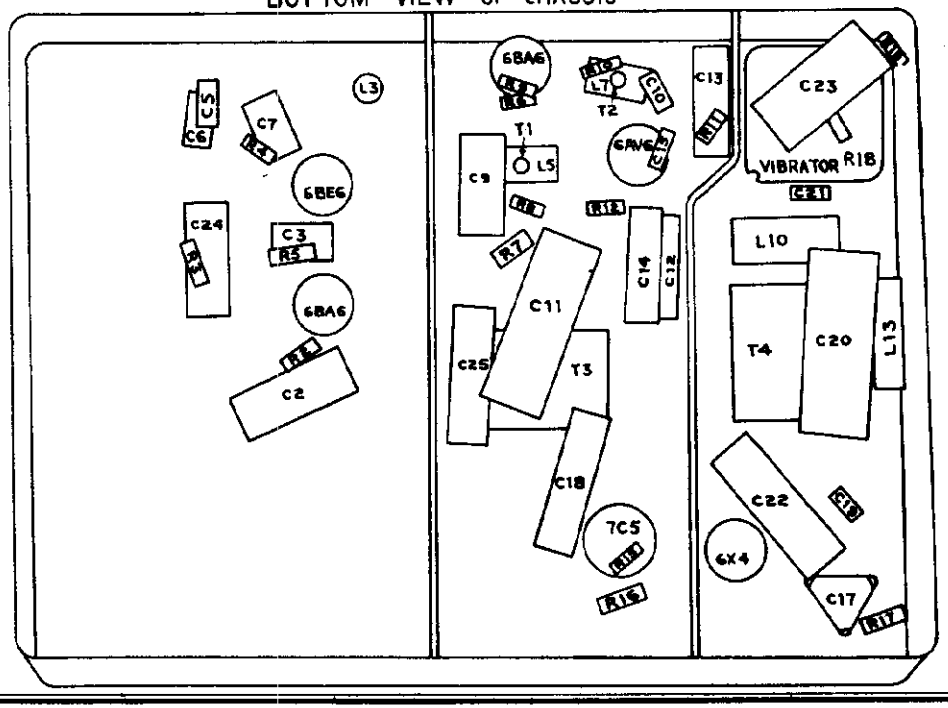
PHILCO CORP.


6AV6 DET. & AVC & 1ST. AUDIO
6BA6 I.F.
6BE6 CONV.
6BA6 R.F.
7C5 OUTPUT
6X4 RECT.
VIBRATOR
GAIN PER STAGE
400~
X50
X2
TO CONTROL GRID OF 7C5
TO PLATE OF 7C5
455KC
1000KC
X0.7
X0.5
X34
X2.0
X2.5
X200
FLEXIBLE ORANGE & WHITE WIRE
ANT COMPENSATOR
GANGED
RECPT.
PLUG
BLACK & GREEN MULTI-PLE CONDUCTOR CABLE
TONE CONTROL
VOL. CONT.
D-C RES. 4Ω
D-C RES. 3.2Ω
PLUG BLACK & GREEN SPEAKER LEAD
PART OF R13
14A
PLUG
LESS THAN 1Ω
* THESE TRANSFORMERS ARE RESONATED BY THEIR DISTRIBUTED CAPACITANCES
ALL CONDENSORS ARE IN μμf UNLESS OTHERWISE STATED



TOP VIEW OF CHASSIS

BOTTOM VIEW OF CHASSIS



ALIGNMENT PROCEDURE

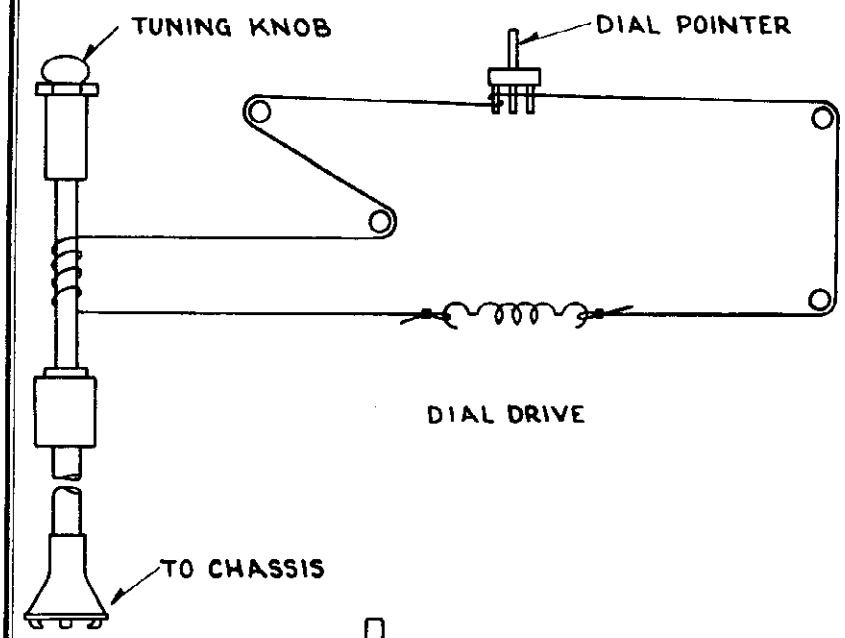
TO ALIGN SET, CONNECT ALL LEADS AND CABLES FROM THE CONTROL UNIT TO THE CHASSIS HOUSING. CONNECT THE SPEAKER TO THE CHASSIS HOUSING. CONNECT THE OUTPUT METER TO THE VOICE COIL OF THE SPEAKER. SET RECEIVER VOLUME CONTROL TO MAXIMUM. CONNECT THE SIGNAL GENERATOR THROUGH A .01 MF CONDENSER TO THE ANTENNA LEAD OF THE RECEIVER. TUNE RECEIVER TO ITS LOWEST FREQUENCY. (TUNING SLUG INSERTED IN COIL AS FAR AS POSSIBLE.
SET SIGNAL GENERATOR TO 455KC AND SET THE OUTPUT SO THAT A DEFLECTION ON THE OUTPUT METER IS JUST NOTICEABLE. ADJUST SLUGS L8, L7, L6, AND L5 (IN ORDER GIVEN) FOR A MAXIMUM DEFLECTION ON THE METER.

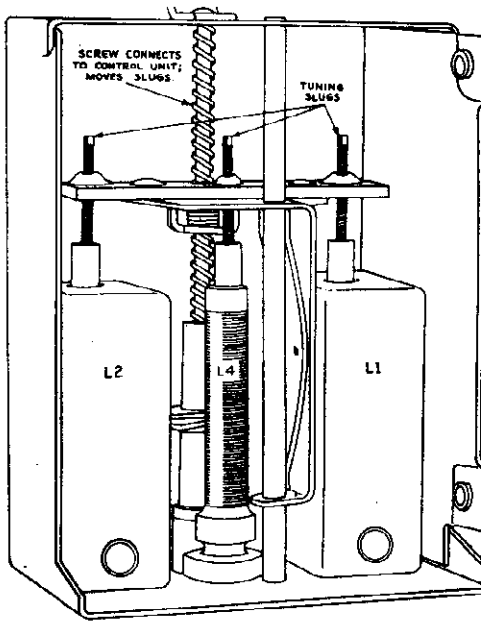
NEXT CONNECT THE SIGNAL GENERATOR THROUGH A 50MMF CONDENSER TO THE ANTENNA LEAD. SET THE SIGNAL GENERATOR AND THE RECEIVER TO 600KC. THE VOLUME OF THE RECEIVER SHOULD BE AT MAXIMUM AND THE OUTPUT OF THE SIGNAL GENERATOR IS GREAT ENOUGH SO THAT A DEFLECTION IS JUST POSSIBLE ON THE OUTPUT METER. ADJUST L3 FOR MAXIMUM DEFLECTION.

REPEAT THE ABOVE SETUP AT 800KC, AND ADJUST C4 FOR MAXIMUM DEFLECTION.

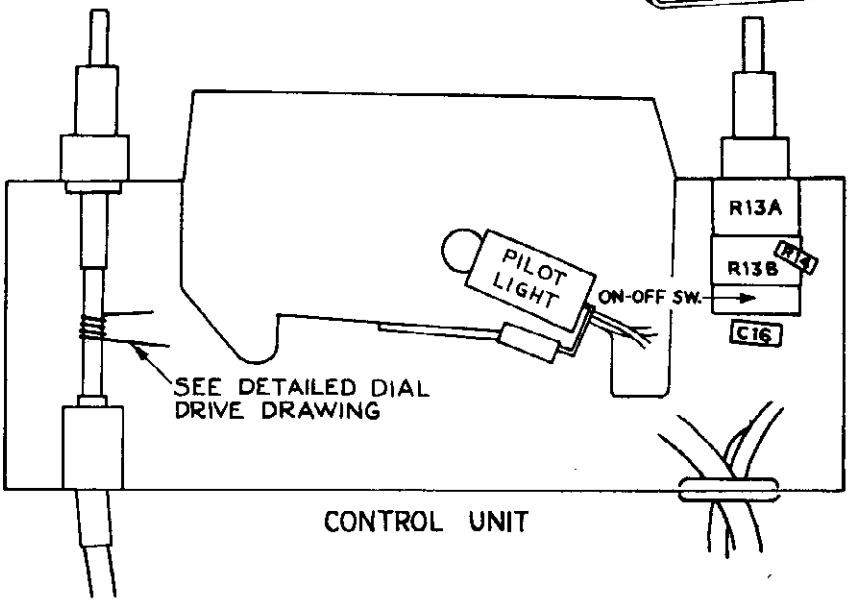
REPEAT ABOVE SETUP AT 1400KC AND ADJUST C1 FOR MAXIMUM DEFLECTION.

PHILCO CORP.





PERMEABILITY TUNER



CONTROL UNIT

TUBE	PIN NO.	VTVM	20,000 Ω/V	1,000 Ω/V	RESISTANCE
6 B A 6 RF	1	-0.65V	-2 V	0 V.	1.2 MEG.
	2	0V	0 V	0 V.	0
	3	0V	0 V	0 V.	0
	4	5.5V	5.3V.	5.4V.	0.5 Ω
	5	166V	160V.	160V.	OVER 5 MEG.
	6	60V	58V	52V.	OVER 5 MEG.
	7	1.44 V	1.3 V.	1.3 V.	500 Ω
6 B E 6 CONV	1	-3.5V	-2.5V	-1.2V.	24 K
	2	0V.	0V.	0V.	1.4 Ω
	3	0V	0V.	0V.	0
	4	5.5V	5.3V	5.4V	0.5 Ω
	5	220V	220V.	200V.	OVER 5 MEG.
	6	60V	59V.	51V.	OVER 5 MEG.
	7	-0.6V	-0.1V.	0V.	2.2 MEG.
6 B A 6 IF	1	0V	0V	0V	17.5 Ω
	2	0V	0V	0V	0
	3	0V	0V	0V	0
	4	5.5V	5.4V	5.4V	0.4 Ω
	5	220V	210V	210V	OVER 5 MEG.
	6	60V	58V	52V	OVER 5 MEG.
	7	3.3V	3.0V	2.8V	2K
6 A V 6 DET & 1ST AUDIO	1	-0.7V	-0.4V.	-0.1V	10 MEG
	2	0V	0V.	0V.	0
	3	0V	0V	0V.	0
	4	5.5V	5.3V.	5.4V.	0.4 Ω
	5	-0.75V	-0.5V.	-0.2V.	280 K
	6	-0.75V	-0.5V.	-0.2V.	300 K
	7	105V	100V	64V	OVER 5 MEG.

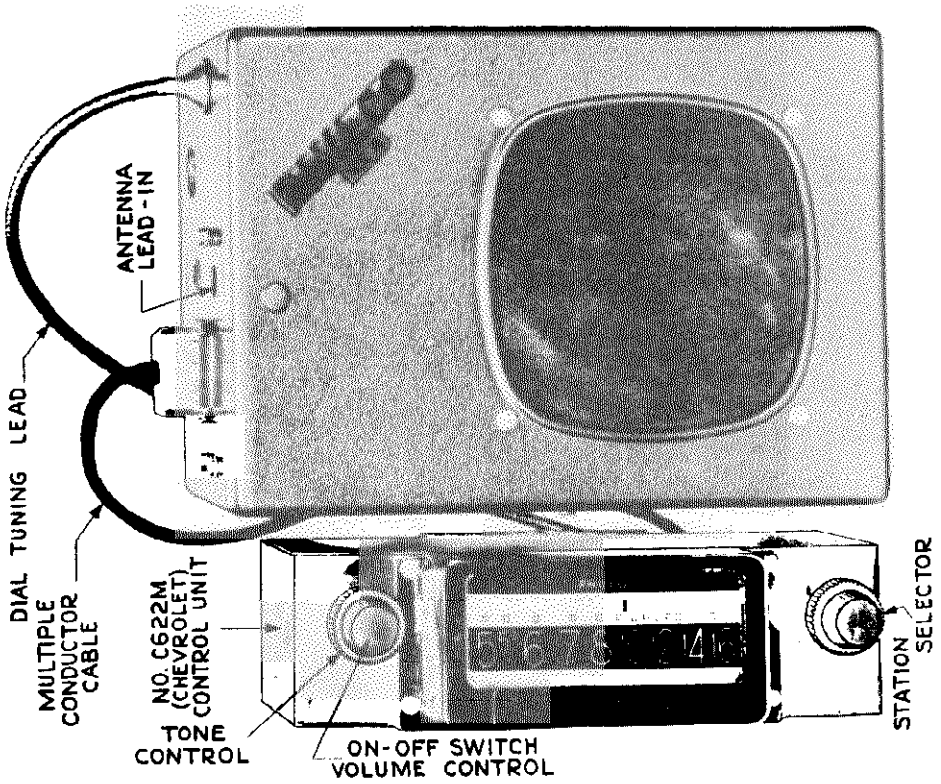
7 C 5 AUDIO OUTPUT	1	0	0	0	0
	2	220V	210V.	200V.	OVER 5 MEG.
	3	220V	210V.	200V.	OVER 5 MEG.
	4	235V	230V	220V	OVER 5 MEG.
	5	—	—	—	—
	6	0.05V	0V.	0V	400 K
	7	7.7V	8V.	8V	210 Ω
	8	5.5V	5.3	5.5V	0.4 Ω
6 X 4 RECTIFIER	1	A.C.	A.C.	A.C.	460 Ω
	2	0V	0V.	0V.	0
	3	0V	0V.	0V.	0
	4	5.4V	5.2V.	5.3V.	0.5 Ω
	5	—	—	—	—
	6	A.C.	A.C.	A.C.	420 Ω
	7	237V	220V.	220V.	OVER 5 MEG.
VIBRATOR 2 3 / 1 4	1	0V	0V.	0V.	0
	2	5.3V	5.0V	5.2V	.8 Ω
	3	5.3V	5.0V	5.2V	.8 Ω
	4	5.4V	5.2V	5.3V	.6 Ω

VOLTAGE MEASURED WITH "A" VOLTAGE = 6.0 V, TUNING SLUG AT LOWEST FREQUENCY, VOLUME CONTROL AT MINIMUM, TONE CONTROL FULLY CLOCKWISE.

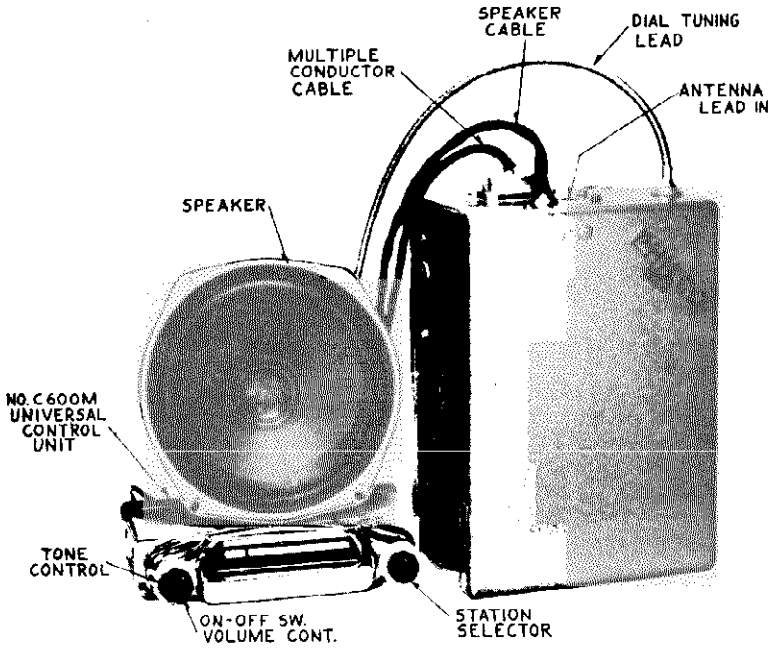
MODELS CR-4, CR-6

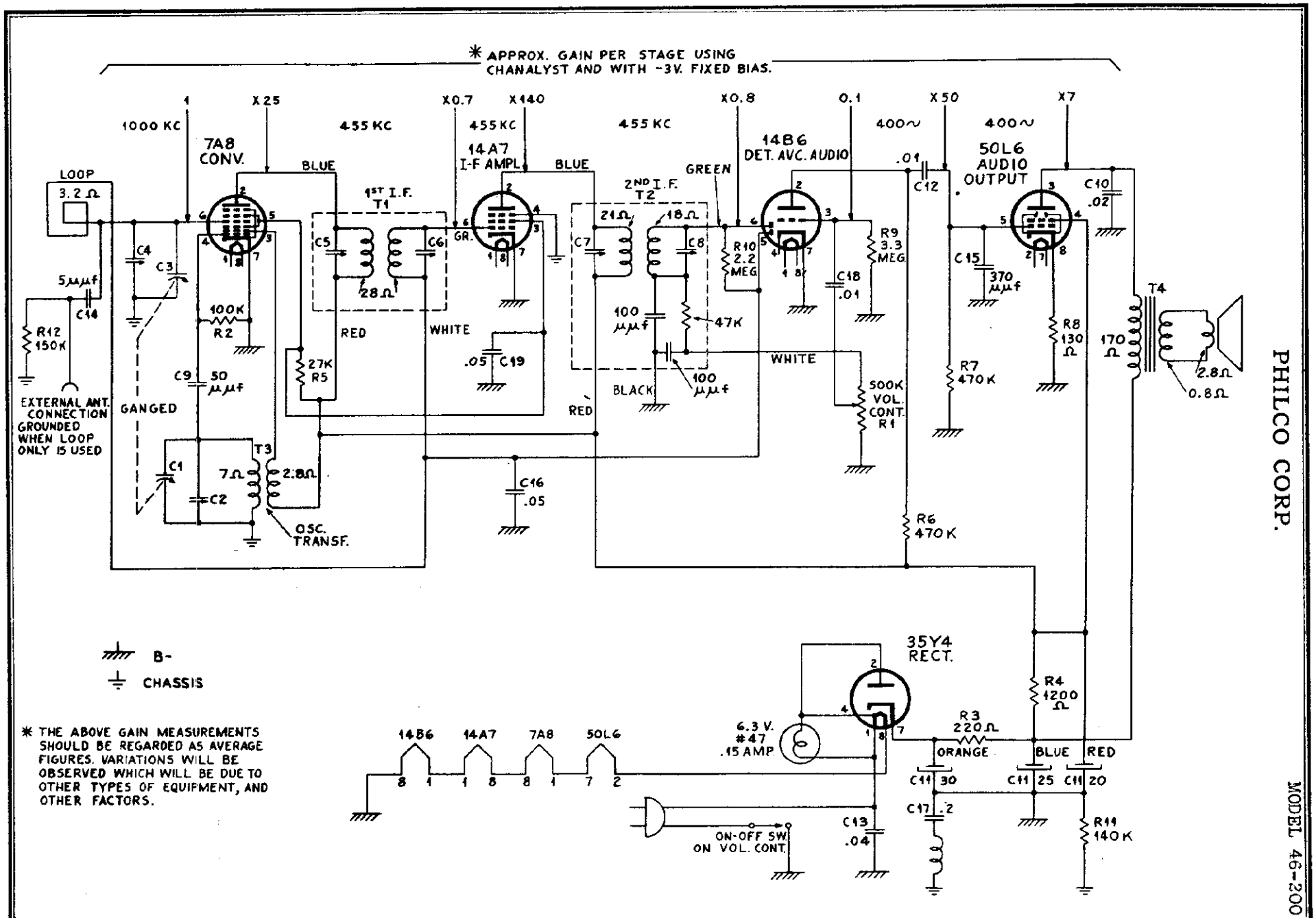
PHILCO CORP.

CR-4



CR-6





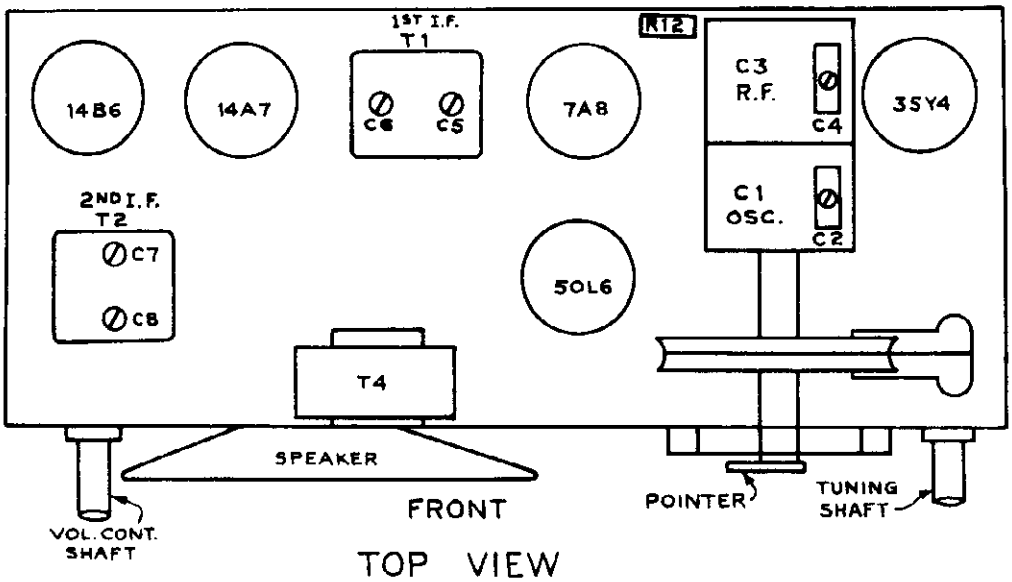
PHILCO CORP.

PHILCO PAGE 16-

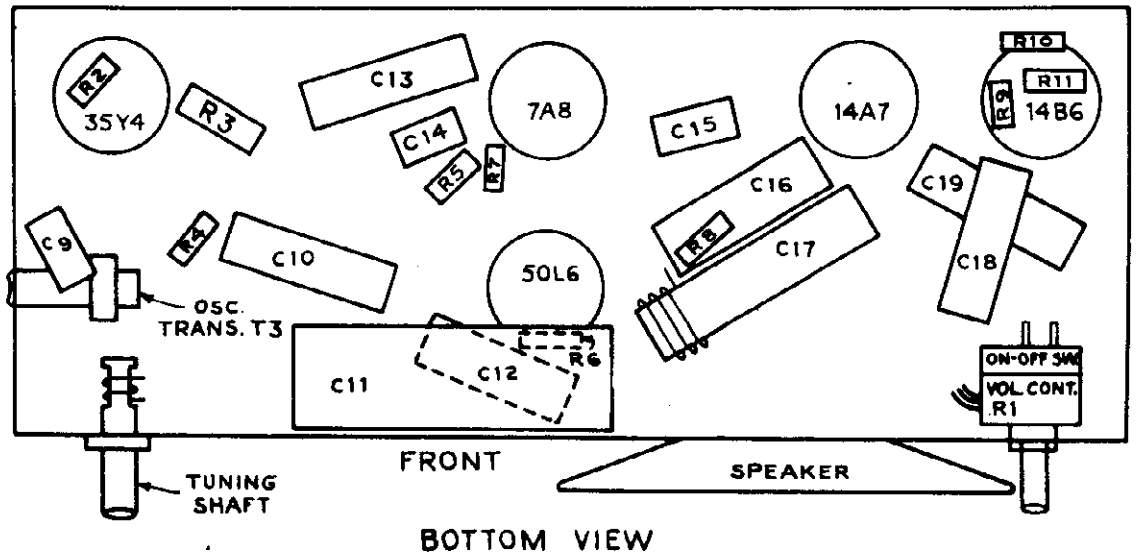
MODEL 46-200

MODEL 46-200

PHILCO CORP.



TOP VIEW



BOTTOM VIEW

ALIGNMENT

Remove the chassis from the cabinet and connect the output meter to the left terminal (High) and the center terminal (Low) of the three lug terminal strip on the rear of the chassis.

Connect the Signal generator to the standard Hazeltine loop, Model 1150 and couple it loosely to the receiver loop.

Set the Volume at maximum, and fully mark the tuning condenser.

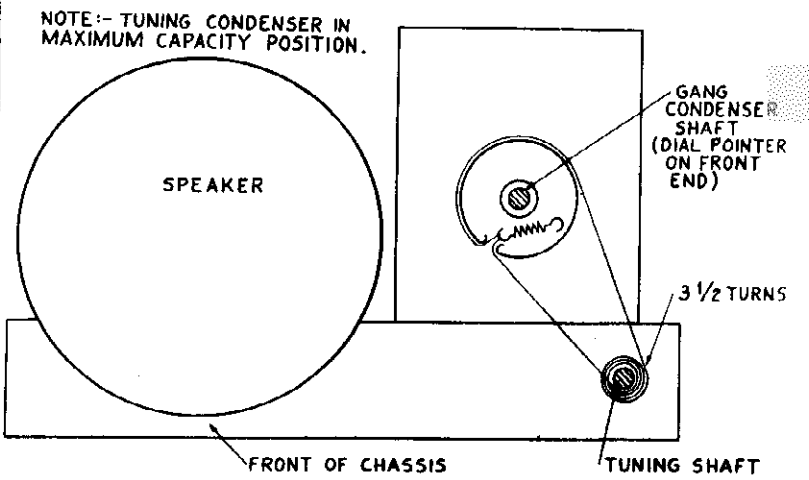
The output of the signal generator should be just sufficient to give a readable deflection on the output meter.

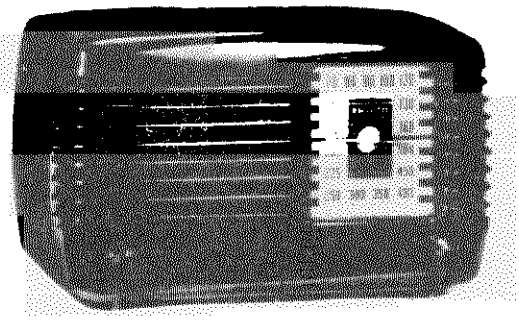
Set the signal generator to 455 KC and adjust the IF trimmers for maximum output in the following order: C8, C7, C6, C5.

Set the signal generator and receiver to 1600 KC and adjust the oscillator trimmer C2 for maximum output.

Set the signal generator and receiver to 1400 KC and adjust the RF trimmer C4 for maximum output.

PHILCO CORP.





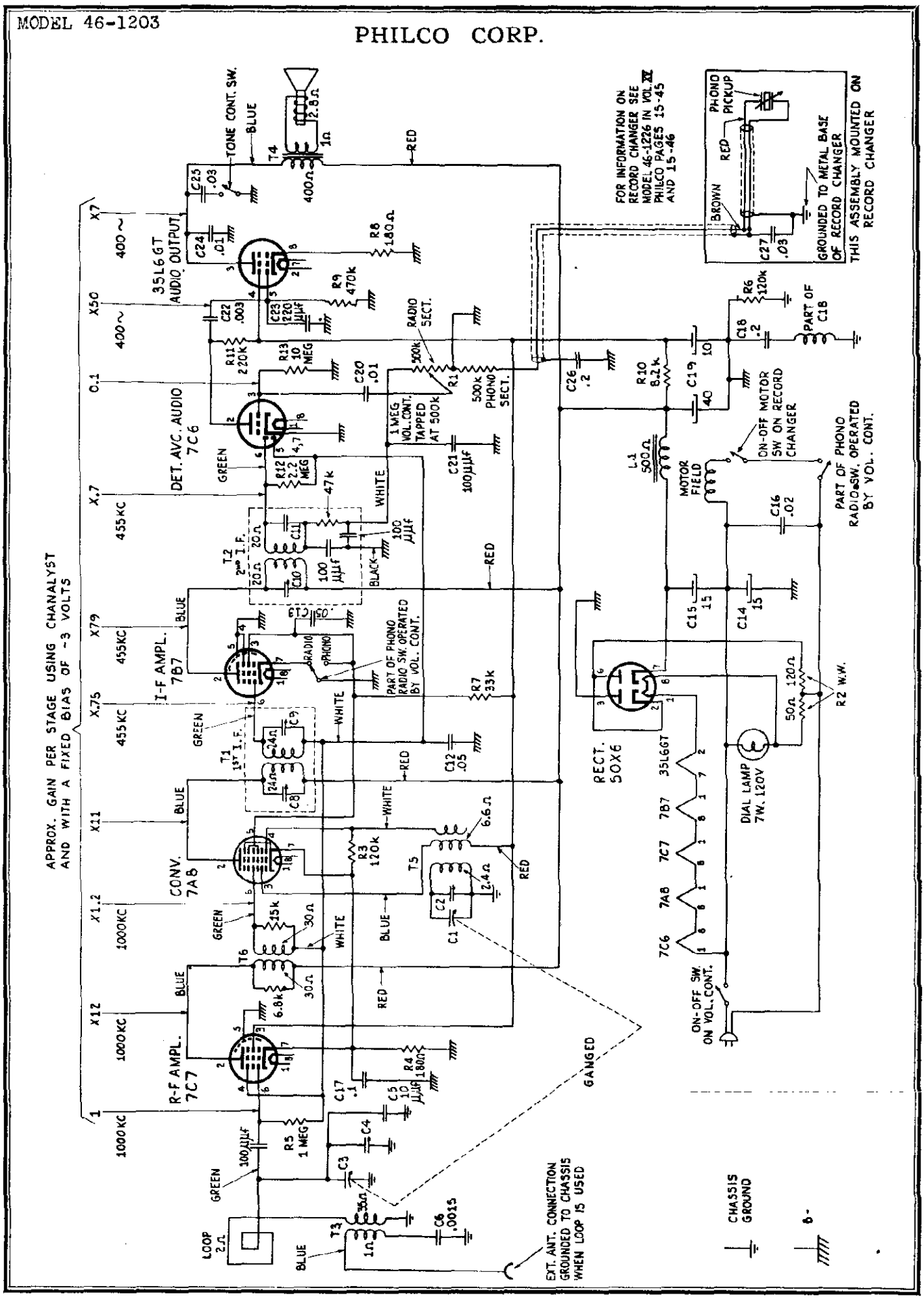
SOCKET	PIN	VTVM	20,000 Ω / P.V.	1,000 Ω / P.V.	RESISTANCE
7A8	1	AC	AC	AC	30 Ω
CONV.	2	100	100	100	OVER 2 MEGS.
	3	100	100	100	OVER 2 MEGS.
	4	-12	-8.6	-4.2	900 K
	5	44	44	38	OVER 2 MEGS.
	6	-1	-0.8	-0.4	2.8 MEGS.
	7	0	0	0	0
	8	AC	AC	AC	24 Ω
14A7	1	AC	AC	AC	12 Ω
I-F AMPL.	2	100	100	100	OVER 2 MEGS.
	3	43	43	38	OVER 2 MEGS.
	4	0	0	0	0
	5	0	0	0	0
	6	-1	-0.8	-0.4	2.8 MEGS.
	7	0	0	0	0
	8	AC	AC	AC	24 Ω
14B6	1	AC	AC	AC	12 Ω
DET.	2	56	54	16	OVER 2 MEGS.
A.V.C.	3	-1	-0.6	-0.4	3 MEGS.
AUDIO	4	0	0	0	0
	5	-1	-0.8	-0.4	2.8 MEGS.
	6	-1	-0.6	-0.3	5.2 MEGS.
	7	0	0	0	0
	8	0	0	0	0
50L6GT	1	56	54	16	OVER 2 MEGS.
AUDIO	2	AC	AC	AC	75
OUTPUT	3	105	105	105	OVER 2 MEGS.
	4	100	100	100	OVER 2 MEGS.
	5	0	0	0	400 K
	6	-1	-0.8	-0.4	2.8 MEGS.
	7	AC	AC	AC	32 Ω
	8	6	6	6	130 Ω
35Y4	1	AC	AC	AC	105 Ω
	2	AC	AC	AC	105 Ω
	3	-12	-8.6	-4.2	90 K
	4	AC	AC	AC	105
	5	100	100	100	OVER 2 MEGS.
	6	0	0	0	0
	7	125	125	125	OVER 2 MEGS.
	8	AC	AC	AC	75 Ω

All voltage and resistance measurements made with respect to B-.
And with a line voltage of 116 V.A.C.

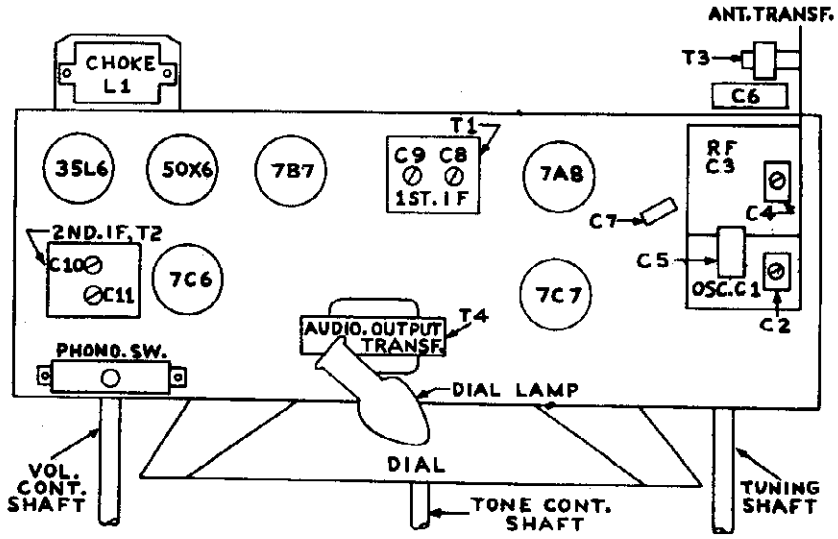
There is a resistance of 140 K. between B- and chassis ground.

MODEL 46-1203

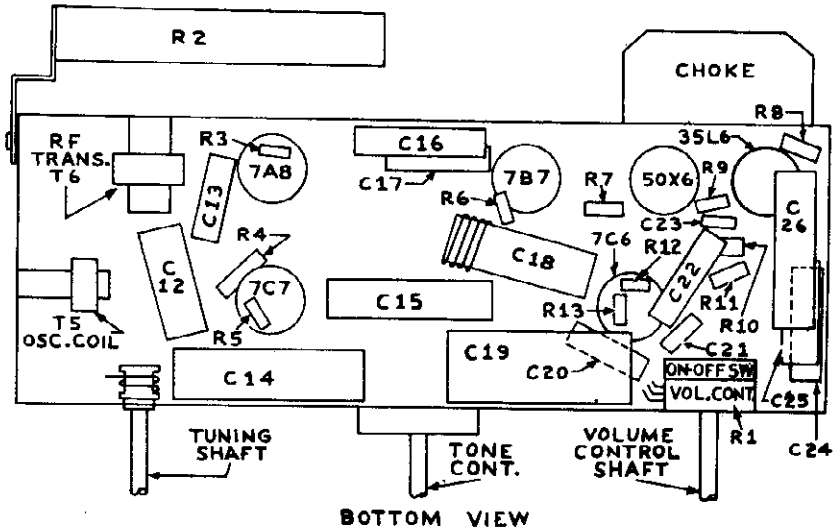
PHILCO CORP.



PHILCO CORP. MODEL 46-1203



TOP VIEW



BOTTOM VIEW

ALIGNMENT

This receiver may be aligned with the chassis in the cabinet.

Connect the output meter to the center terminal (Low) and the right terminal (High) of the three lug terminal strip mounted on the rear of the chassis.

Connect the signal generator to the standard Hazeltine loop Model 1150 and couple it loosely to the receiver loop. Set the volume control at maximum, and fully mesh the tuning condenser.

The output of the signal generator should be just sufficient to give a readable deflection on the output meter.

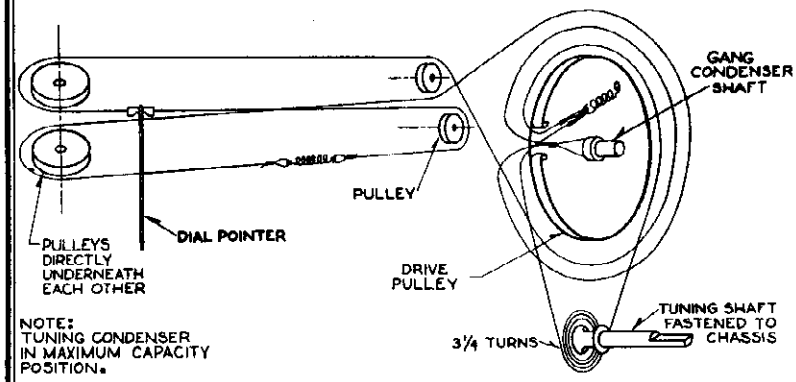
Set the signal generator to 455 KC and adjust the IF trimmers for maximum output in the following order: C11,C10,C9,C8.

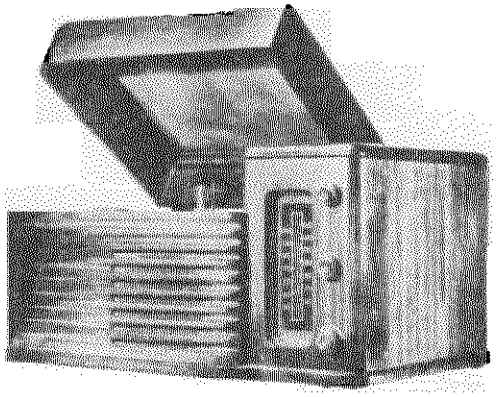
Set the signal generator and receiver to 1600 KC and adjust the oscillator trimmer C2 for maximum output.

Set the signal generator and receiver to 1400 KC and adjust the RF trimmer C4 for maximum output.

MODEL 46-1203

PHILCO CORP.

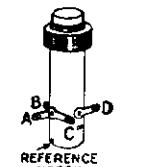




SOCKET	PIN NO.	VTVM	20,000 Ω / P.V.	1,000 Ω / P.V.	RESISTANCE
7C7	1	100 V	100 V	100 V	OVER 5 MEG
RF	2	170 V	165 V	165 V	OVER 5 MEG
	3	115 V	108 V	108 V	OVER 5 MEG
	4	-4.5 V	-2.2 V	-2 V	2.8 MEG
	5	0 V	0 V	0 V	0
	6	-1.3 V	-0.3 V	0 V	3.8 MEG
	7	1.3 V	0.8 V	.8 V	190 Ω
	8	100 V	100 V	100 V	OVER 5 MEG
7A8	1	100 V	100 V	100 V	OVER 5 MEG
CONVERTER	2	167 V	160 V	160 V	OVER 5 MEG
	3	113 V	110 V	110 V	OVER 5 MEG
	4	-12.5 V	-4.4 V	-2 V	130 K
	5	65 V	65 V	56 V	OVER 5 MEG
	6	-4.5 V	-2 V	-0.2 V	2.8 MEG
	7	1.3 V	0.8 V	0.9 V	190 Ω
	8	100 V	100 V	100 V	OVER 5 MEG
7B7	1	100 V	100 V	100 V	OVER 5 MEG
IF	2	170 V	160 V	160 V	4.4 MEG
	3	65 V	65 V	57 V	4.6 MEG
	4	0 V	0 V	0 V	0
	5	0 V	0 V	0 V	0
	6	-1.5 V	-0.4 V	-0.2 V	2.8 MEG
	7	0	0	0	0
	8	100 V	100 V	100 V	OVER 5 MEG
7C6	1	100 V	100 V	100 V	OVER 5 MEG
AVC	2	78	74	35	OVER 5 MEG
DETECTOR	3	-0.8 V	-0.5 V	-0.2 V	10 MEGS.
	4	0 V	0 V	0 V	0
	5	-4.4 V	-1.2 V	-0.2 V	2.8 MEG
	6	-4.3 V	-1.5 V	-0.8 V	600 K
	7	0 V	0 V	0 V	0
	8	100 V	100 V	100 V	OVER 5 MEG
35L6GT/G	1	0 V	0 V	0 V	0
	2	100 V	100 V	100 V	OVER 5 MEG
	3	155 V	150 V	150 V	OVER 5 MEG
	4	118 V	115 V	115 V	OVER 5 MEG
	5	0 V	0 V	0 V	500 K
	6	173 V	165 V	165 V	OVER 5 MEG
	7	100 V	100 V	100 V	OVER 5 MEG
	8	7.9 V	7.6 V	7.8 V	190 Ω
50X6	1	100 V	100 V	100 V	OVER 5 MEG
RECTIFIER	2	100 V	100 V	100 V	OVER 5 MEG
	3	0 V	0 V	0 V	0
	4	173 V	170 V	170 V	OVER 5 MEG
	5	120 V	115 V	110 V	OVER 5 MEG
	6	100 V	100 V	100 V	OVER 5 MEG
	7	200 V	200 V	200 V	OVER 5 MEG
	8	100 V	100 V	100 V	OVER 5 MEG

With respect to B-: Line Voltage 116 V

On-Off switch in off position Volume control at minimum
Radio-Phono switch on radio Tone control in left (counterclockwise position)

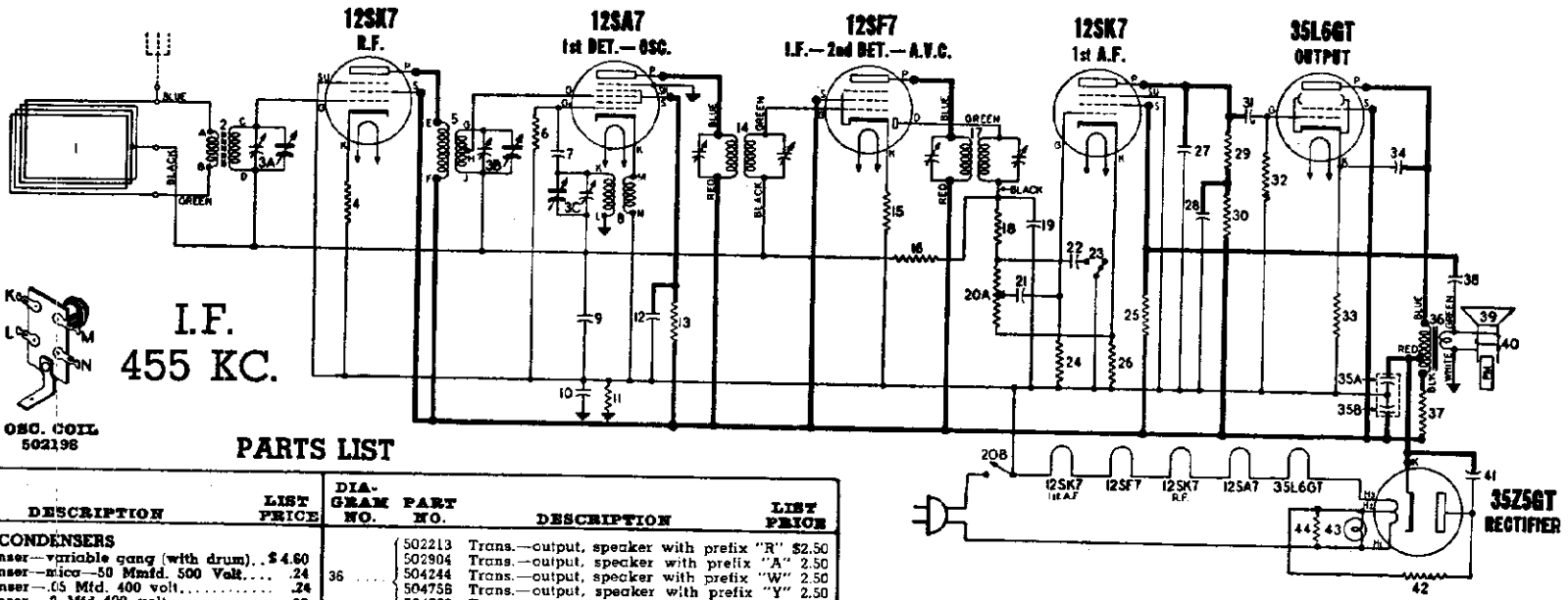


ANT. COUPLING COIL 502121

R. F. COIL 502142

OSC. COIL 502198

I.F. 455 KC.



PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3A-3B-3C	502123	Condenser—variable gang (with drum)	$ 4.60
7	502158	Condenser—mica—50 Mmfd. 500 Volt	.24
9	502157	Condenser—.05 Mfd. 400 volt	.24
10	502158	Condenser—.2 Mfd. 400 volt	.36
12	502262	Condenser—.25 Mfd. 200 Volt	.36
19	502160	Condenser—mica—110 Mmfd. 500 Volt	.24
21	502453	Condenser—.002 Mfd. 400 Volt	.20
22	502470	Condenser—.0008 Mfd. 400 Volt	.20
27	502160	Condenser—Mica—110 Mmfd. 500 Volt	.24
28	502153	Condenser—.05 Mfd. 200 Volt	.24
31	502156	Condenser—.004 Mfd. 400 Volt	.20
34	502151	Condenser—.01 Mfd. 400 Volt	.20
35A-35B	500256	Condenser — electrolytic A-40 Mfd. 150 Volt / B-20 Mfd. 150 Volt	1.50
38	502152	Condenser—.02 Mfd. 400 Volt	.24
41	502157	Condenser—.05 Mfd. 400 Volt	.24
		RESISTORS	
4	502125	Resistor—carbon 220 Ohms 1/4 watt	.12
6	502130	Resistor—carbon 22,000 Ohms 1/4 Watt	.12
11	502133	Resistor—carbon 220,000 Ohms 1/4 Watt	.12
13	502291	Resistor—carbon 4700 Ohms, 1/4 Watt	.12
15	502264	Resistor—carbon 47 Ohms 1/4 Watt	.12
16	502269	Resistor—carbon 3.3 Meg. 1/4 Watt	.12
18	502131	Resistor—carbon 47,000 Ohms 1/4 Watt	.12
20A-20B	502145	Volume control 500,000 Ohms (with switch)	1.25
24	502136	Resistor—carbon 10 Meg. 1/4 Watt	.12
25	502135	Resistor—carbon 2.2 Meg. 1/4 Watt	.12
26	502128	Resistor—carbon 2200 Ohms 1/4 Watt	.12
29-30	502133	Resistor—carbon 220,000 Ohms 1/4 Watt	.12
32	502134	Resistor—carbon 470,000 Ohms 1/4 Watt	.12
33	502138	Resistor—carbon 130 Ohms 1/4 Watt	.12
37	502469	Resistor—carbon 1500 Ohms 1 Watt	.16
42	502574	Resistor—carbon 33 Ohms 1/2 Watt	.12
44	502140	Resistor—carbon 390 Ohms 1/2 Watt	.12
		COILS & TRANSFORMERS	
1	502504	Loop Antenna	2.90
2	502121	Coil—antenna coupling	1.64
5	502142	Coil—R.F.	2.26
8	502198	Coil—oscillator	1.32
14	502102	Transformer 1st I.F.	2.30
17	502103	Transformer 2nd I.F.	2.30
36	502213	Trans.—output, speaker with prefix "R"	$2.50
	502904	Trans.—output, speaker with prefix "A"	2.50
	504244	Trans.—output, speaker with prefix "W"	2.50
	504756	Trans.—output, speaker with prefix "Y"	2.50
	504758	Trans.—output, speaker with prefix "Z"	2.50
	504781	Trans.—output, speaker with prefix "C"	2.50
		OTHER ELECTRICAL PARTS	
23	500546	Switch-tone control	0.84
39	502214	Cone & voice coil, spkr. with prefix "R"	2.50
	502903	Cone & voice coil, spkr. with prefix "A"	2.50
	504245	Cone & voice coil, spkr. with prefix "W"	2.50
	504757	Cone & voice coil, spkr. with prefix "Y"	2.50
	504759	Cone & voice coil, spkr. with prefix "Z"	2.50
	504782	Cone & voice coil, spkr. with prefix "C"	2.50
40	502998	Speaker—P.M. dynamic (5 inch)	6.60
43	118921	Lamp—dial (Mazda 47) 6-8V, 150 Ma.	.15
		MISCELLANEOUS PARTS	
	502502	Back for cabinet	.30
	116467	Base for mtg. electrolytic condenser	.04
	502476	Cabinet—ivory (Model 3-1AX)	5.00
	502477	Cabinet—mahogany (Model 3-2AX)	4.60
	502506	Clamp—dial scale mtg.	.04
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	500497	Clip—retainer for cabinet back	.02
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (55 in. required) per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	502598	Dial scale—glass	1.40
	501186	Grounding plate (under I.F. trans. can)	.10
	502564	Knob—ivory (Model 3-1AX)	.08
	502563	Knob—mahogany (Model 3-2AX)	.08
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	17063	Screw—No. 6 x 1/4	.01
	114628	Screw—No. 8 x 1/2 chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	161364	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

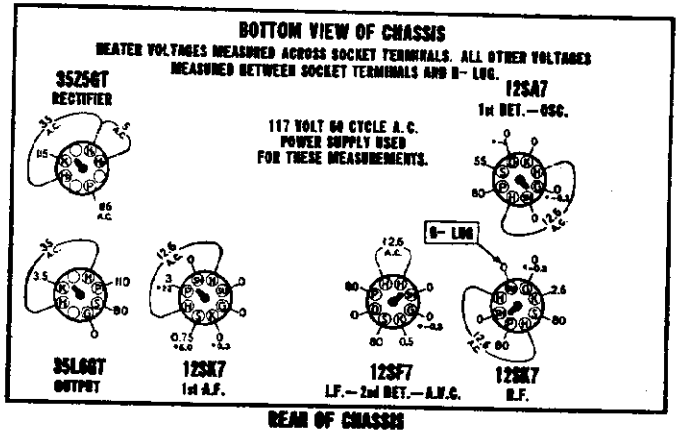
SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B− LUG.



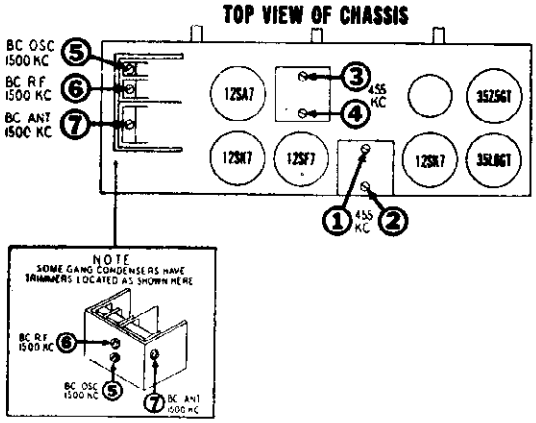
REAR OF CHASSIS

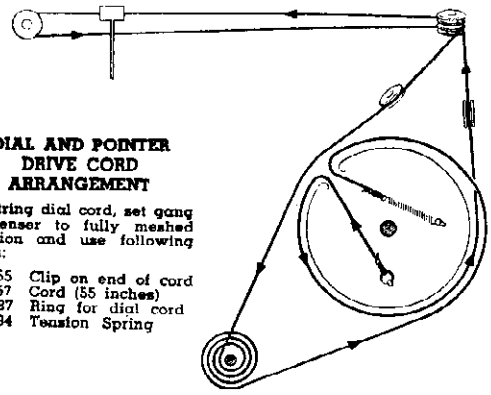
*—Measured with vacuum tube voltmeter

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

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 12SA7	455 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	External Antenna Clip on Loop Frame	1500 KC	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

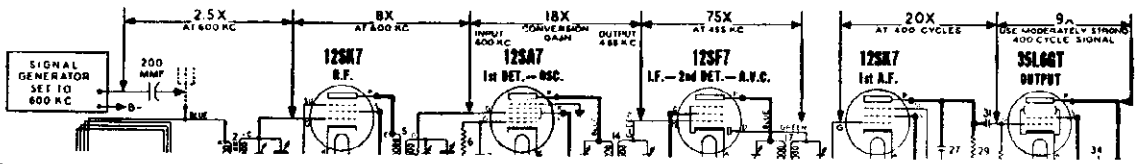
114955 Clip on end of cord
117057 Cord (55 inches)
119087 Ring for dial cord
161384 Tension Spring

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

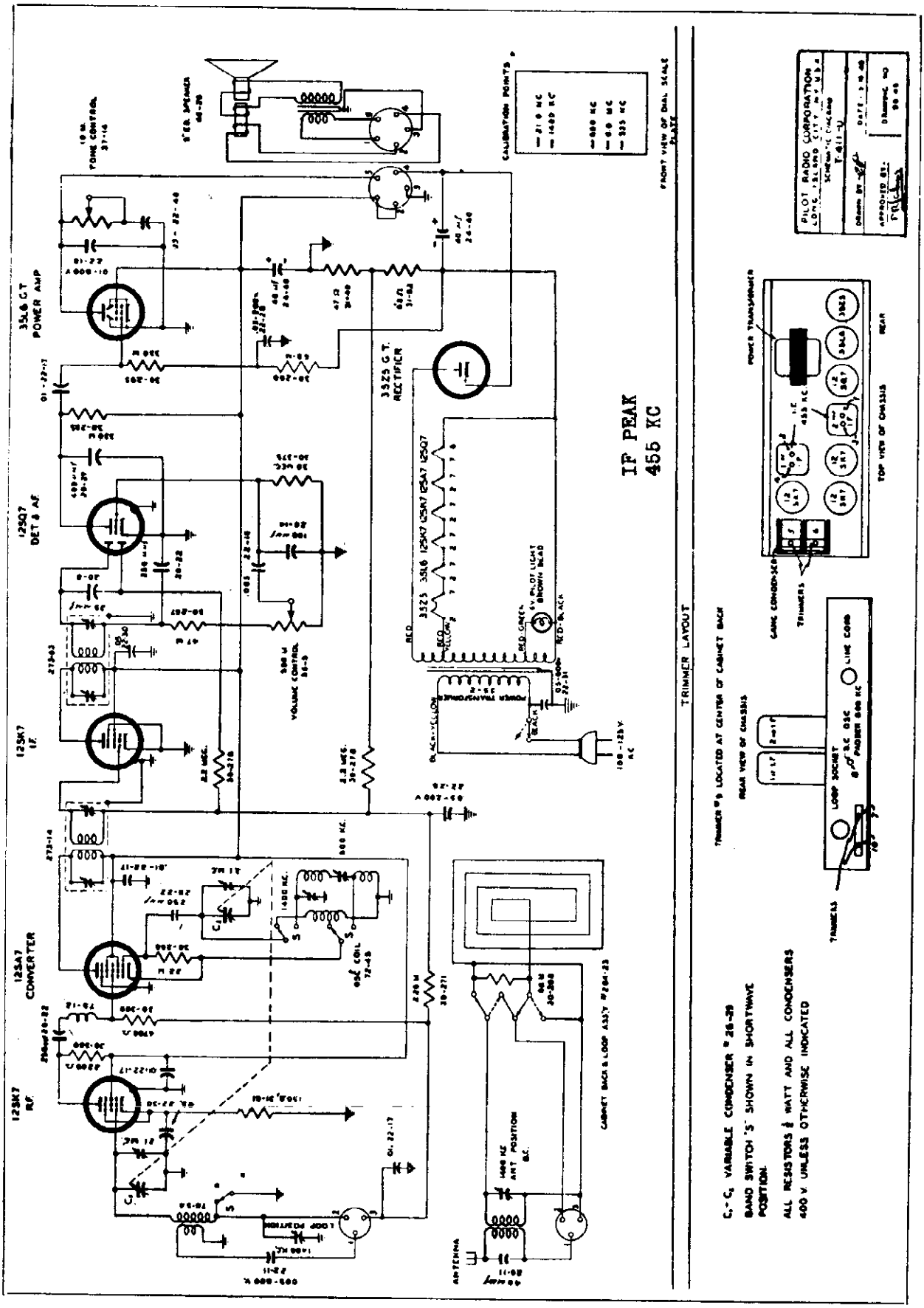
The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

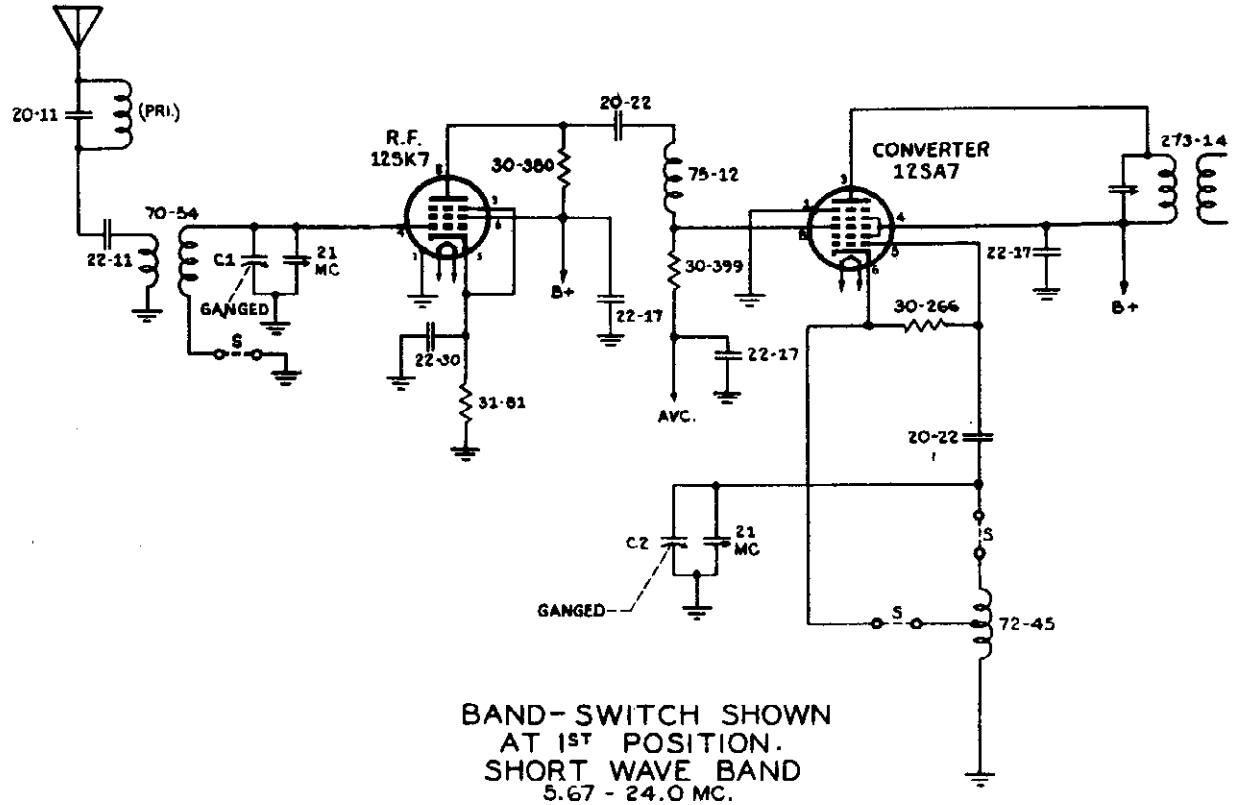
MODEL T-411-U

PILOT RADIO CORP.

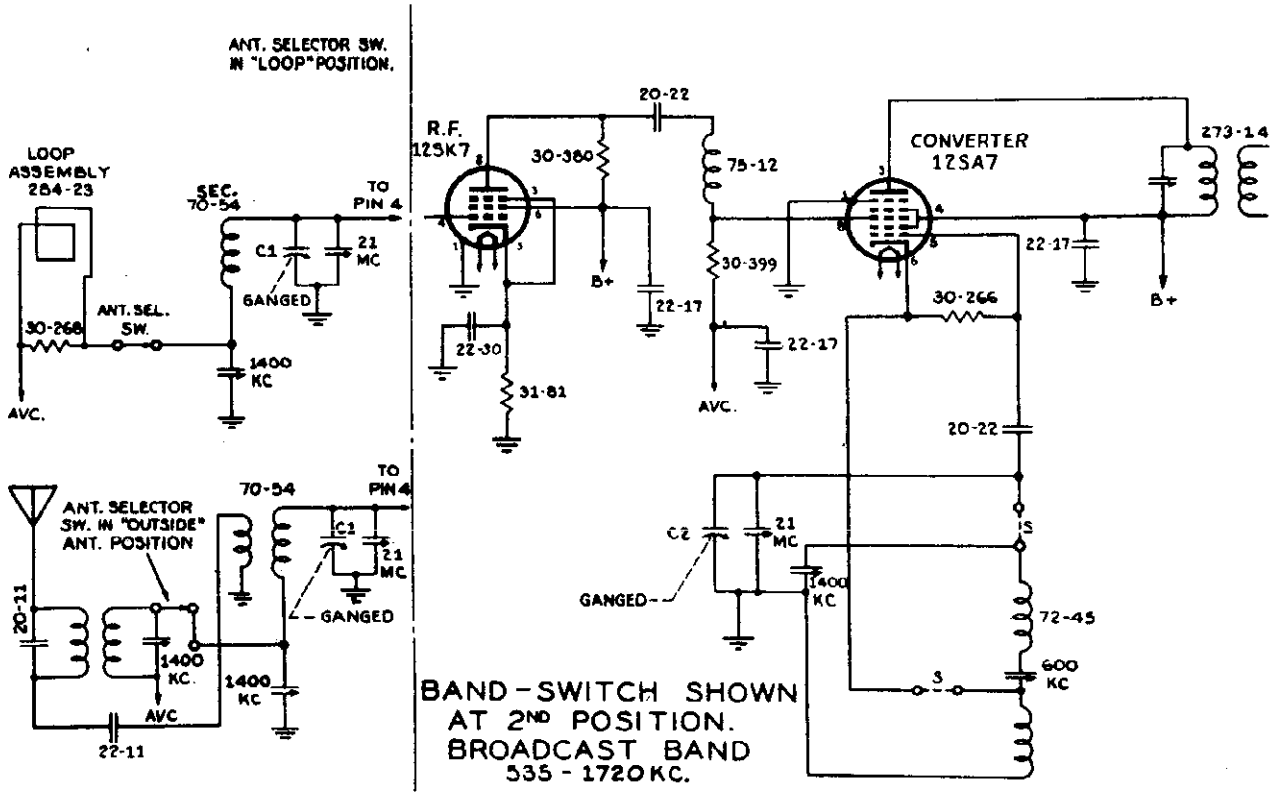


MODEL T-411-U

PILOT RADIO CORP.



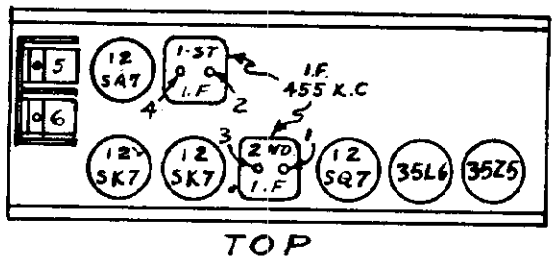
BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.67 - 24.0 MC.



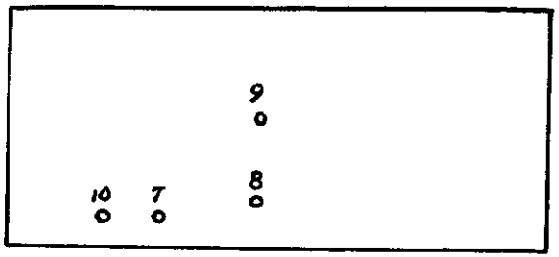
BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND
535 - 1720 KC.

ALIGNMENT CHART

STEP	CIRCUIT ALIGNED	RECEIVER		SIGNAL GENERATOR		DUMMY ANTENNA	ADJUSTMENTS (All maximum output)
		BAND SWITCH	DIAL POINTER	FREQUENCY	CONNECTION		
1	IF	BC	Low end of dial	455 KC	Grid of 12SK7 RF	0.1 mfd.	#1, 2, 3, 4
2	SW	SW	E	21 MC	Antenna Post	400 ohm carbon resistor	First #5 Then #6
3	BC	BC	D	1400 KC	Antenna Post	200 mmfd. mica capacitor	#7
4	BC	BC	C	600 KC	Antenna Post	200 mmfd. mica capacitor	#8
5	Repeat steps 3 and 4						
6	BC	BC	Set for broadcast station near 1400 KC			——	#9 and #10



TOP



BACK

E — 21.0 MC
D — 1400 KC
C — 600 KC
B — 6.0 MC
A — 535 KC

Alignment should be attempted only if a low range A.C. meter, a signal generator, and insulated alignment tools are at your disposal. The A.C. meter is used as an outputmeter. The signal generator must cover a frequency range from 450 kc to 24 mc.

The output of the signal generator must always be kept at its lowest possible value. This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

During alignment, the line voltage feeding the receiver power supply should be kept at approximately 117 volts.

For all alignments, connect the outputmeter across the voice coil. With the volume control turned fully clockwise, tune for a maximum reading.

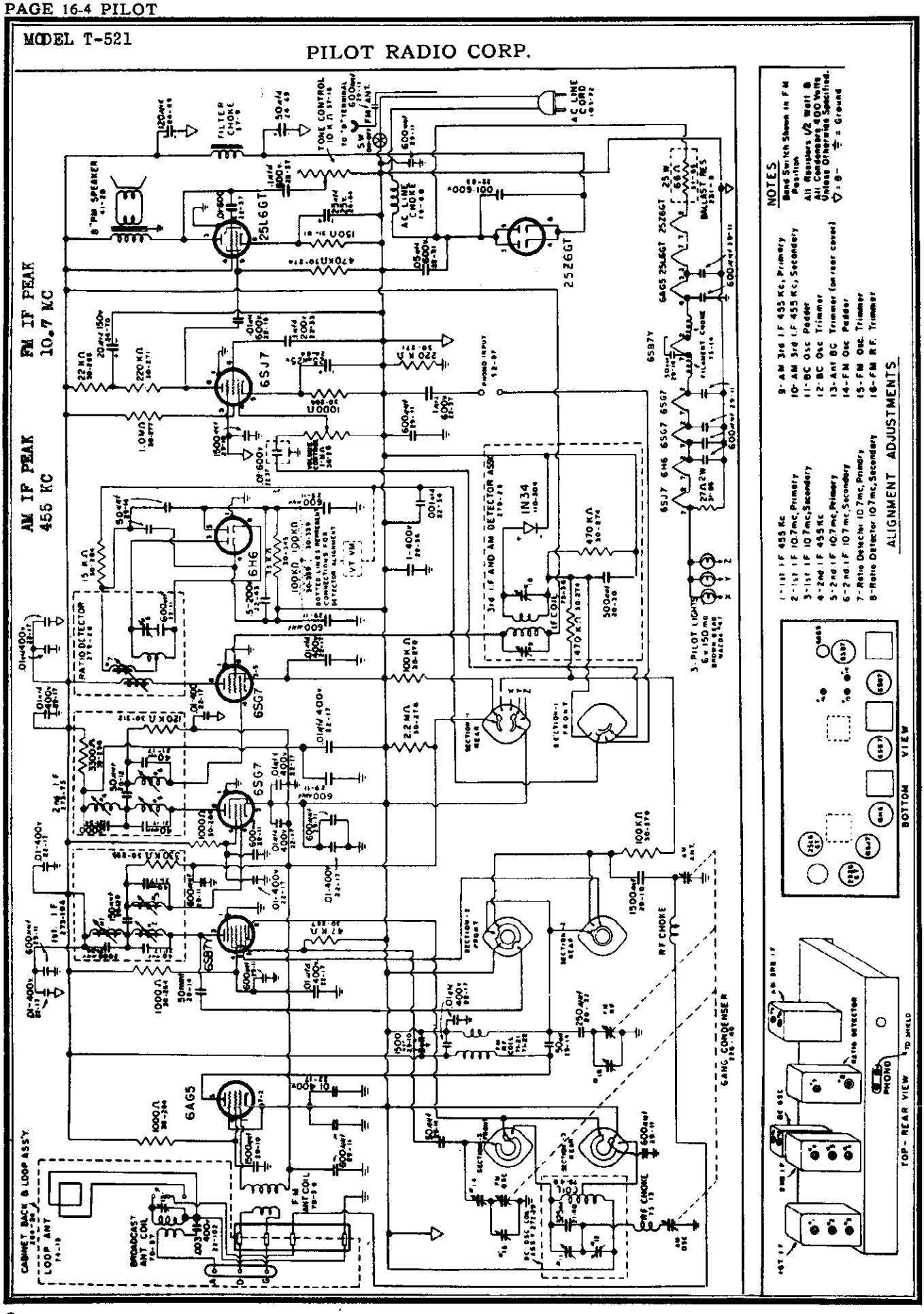
TUNING RANGE

Broadcast Band—535 to 1720 kc or 174 to 561 meters.

Short Wave Band—5.67 to 24.0 mc or 12.5 to 53.6 meters.

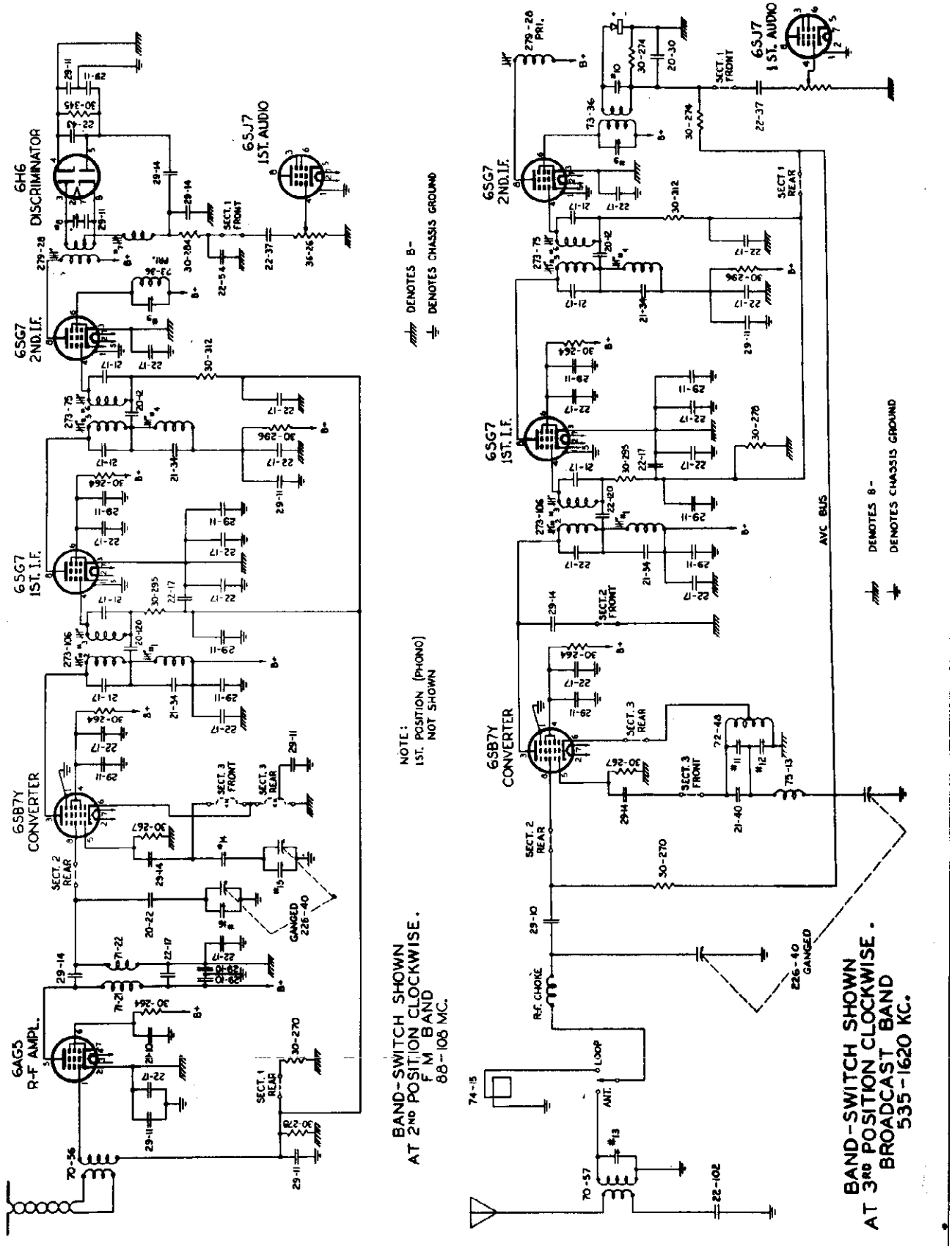
MODEL T-521

PILOT RADIO CORP.



MODEL T-521

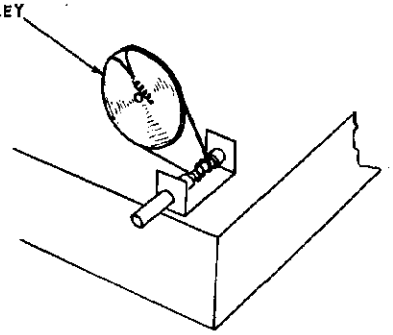
PILOT RADIO CORP.

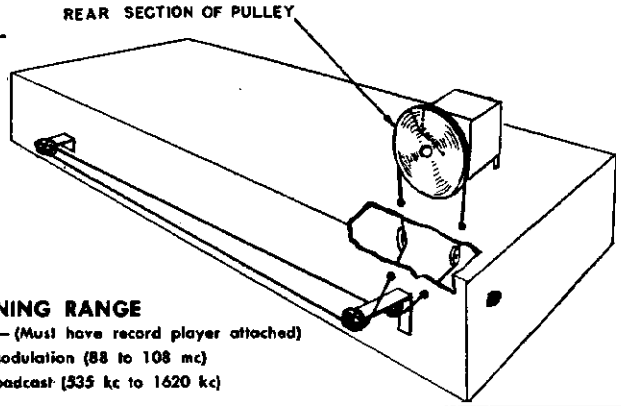


ALIGNMENT CHART

(FOLLOW SEQUENCE AS INDICATED)

CIRCUIT ALIGNED	STEP	RECEIVER		SIGNAL GENERATOR		METER CONNECTIONS		TRIMMER OR SLUG ADJUST	PROCEDURE
		BAND SWITCH	DIAL POINTER	FREQ.	CONNECTIONS	TYPE See List			
AM I.F.	1	BC	55	455 KC	Through .1 MFD cap. to Grid of 6SB7Y	A	Across Voice-Coil of Speaker	1, 4, 9, 10	Adjust for Maximum Output
FM I.F.	2	FM	88	10.7 MC	Through .1 MFD cap. to Grid of 6SB7Y	A	Across Voice-Coil of Speaker	2, 3, 5, 6, 7, 8	Adjust for Maximum Output
Ratio-detector	3	FM	88	10.7 MC	Through .1 MFD cap. to Grid of 6SB7Y	B	*From:* Junction of two 100K resistors connected across 47K load resistor of the ratio detector. *To:* Audio output of ratio detector. (See Circuit Diagram)	8	Adjust meter to zero. (Check proper zero set. Meter should register reverse polarity when trimmer is turned slightly to the right, and then to the left of zero output)
Broadcast R.F.	4	BC	150	1500 KC	Through 200 mmf. cap. to Antenna "A" Post on back.	A	Across Voice-Coil of Speaker	12, 13	Adjust for maximum output
	5	BC	60	600 KC	Through 200 mmf. cap. to Antenna "A" Post on back.	A	Across Voice-Coil of Speaker	11	Adjust for maximum output while rocking variable condenser
	6	REPEAT STEPS 4 AND 5 AND REPLACE BOTTOM COVER OF CHASSIS							
Frequency Modulation R.F.	7	FM	106	106 MC	To "D" and "G" Antenna Terminals	A	Across Voice-Coil of Speaker	15, 16	Adjust for maximum output
	8	FM	90	90 MC	To "D" and "G" Antenna Terminals	A	Across Voice-Coil of Speaker	14	Adjust for maximum output
	9	REPEAT STEPS 7 AND 8							





FM Antenna

Special attention should be given to the selection of the antenna used on F.M. The receiver as shipped from the factory contains a built-in "line-cord" aerial that is connected by a spade lug to terminal "D" on the rear of the receiver. This aerial will be found satisfactory for many conditions.

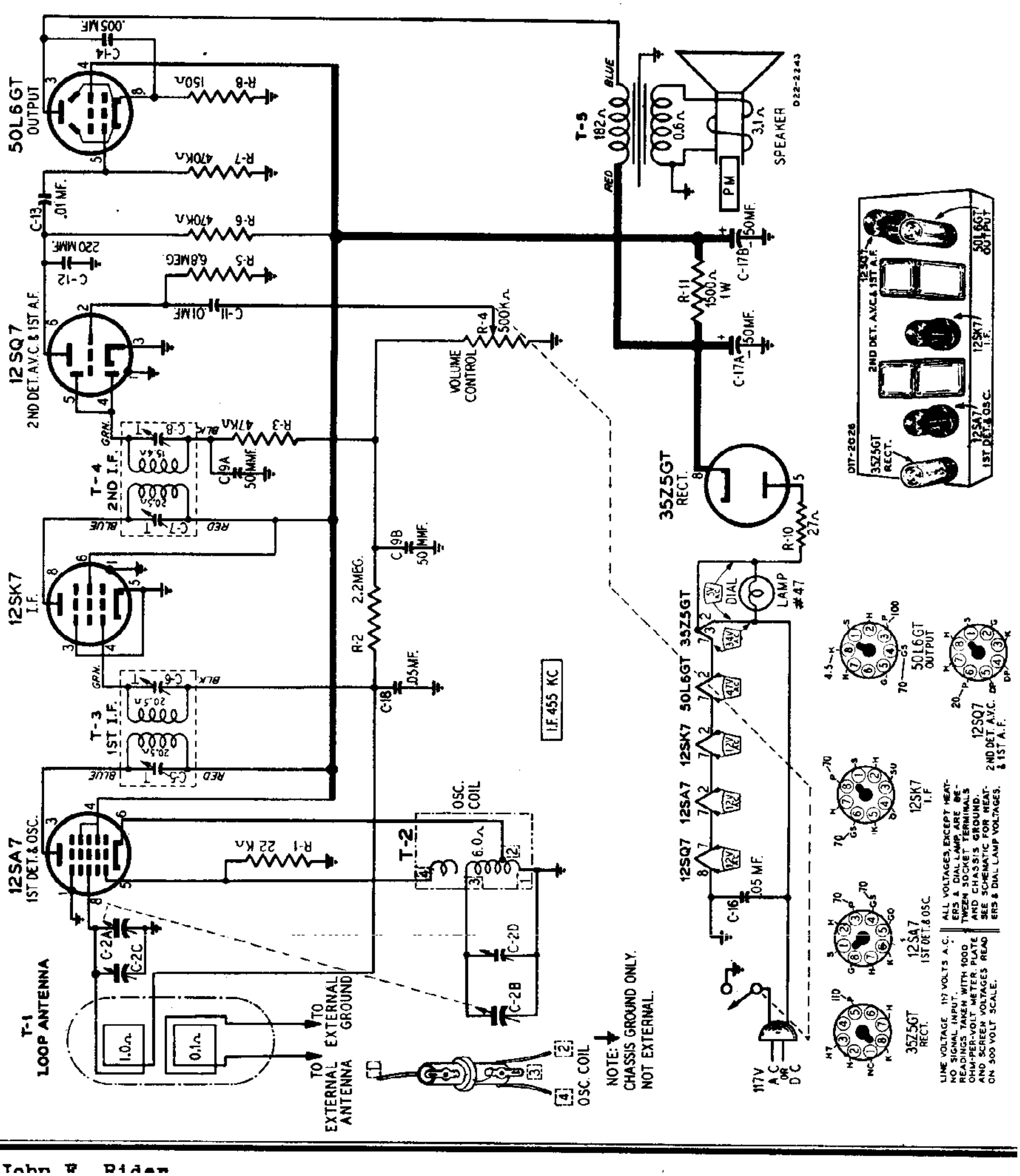
Improved results on weak or distant stations, or in locations unfavorable to F.M. reception, can be had by using the "Pilot" F.M. antenna, packed with each set.

To install the special "Pilot" F.M. antenna, connect the spade lugs at the base of the "T" shaped aerial to terminals "D" and "G" on the rear of the receiver. The two remaining ends may be stretched out under a rug or fastened to a moulding. Try to locate a favorable position in the room, preferably near the window, in order to take advantage of the directional effect of this antenna.

In rare cases, where the receiver is located a great distance from the station or is centrally located in a steel building, an outside dipole antenna may be found necessary. Where an outside dipole is used, the ends of the lead-in, should be connected to "D" and "G" terminals on the rear of the receiver.

TUNING RANGE

Band (1) — Phonograph — (Must have record player attached)
Band (2) — Frequency Modulation (88 to 108 mc)
Band (3) — Standard Broadcast (535 kc to 1620 kc)

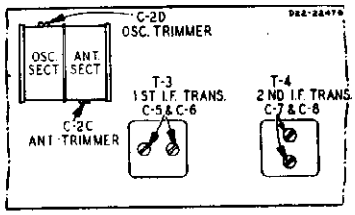

50L6GT
OUTPUT
12SQ7
2ND DET. A.V.C. & 1ST A.F.
12SK7
I.F.
12SA7
1ST DET. & OSC.
35Z5GT
RECT.
T-1
LOOP ANTENNA
T-2
OSC. COIL
T-3
1ST I.F.
T-4
2ND I.F.
T-5
SPEAKER
PM
VOLUME CONTROL
I.F. 455 KC
TO EXTERNAL ANTENNA
TO EXTERNAL GROUND
NOTE: CHASSIS GROUND ONLY. NOT EXTERNAL.
117V A.C. OR D.C.
DIAL LAMP #47
R-1 22 KΩ
R-2 2.2 MEG.
R-3 47KΩ
R-4 500KΩ
R-5 6.8 MEG.
R-6 470KΩ
R-7 470KΩ
R-8 150Ω
R-10 27Ω
R-11 1500Ω 1W
C-11 .01MF
C-12 220 MMF.
C-13 .01 MF.
C-14 .005MF
C-16 .05 MF.
C-17A 50MF.
C-17B 50MF.
C-18 .05MF.
C-9A 50MMF.
C-9B 50MMF.
D22-2243
D17-2026
LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER PLATE AND SCREEN VOLTAGES READ ON 300 VOLT SCALE.
ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND CHASSIS GROUND. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.

MODELS 5D15WG-5015, 5D25WG-5025, Puritan

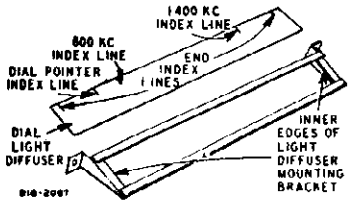
THE PURE OIL CO., U.S.A.

SPECIFICATIONS

5 Tube Superheterodyne, including Rectifier Tube.
Tuning Frequency Range.....540 to 1600 KC
Power Consumption.....30 watts (At 117 volts AC)
Power Output....1.5 watt maximum, .9 watt (10% distortion)
Intermediate Frequency.....455 KC
Speaker.....5" PM Dynamic



DIAL CALIBRATION



In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped to prevent movement of the diffuser strip. To position the dial pointer, turn the large drive pulley to the maximum counterclockwise position. The dial pointer should be directly over the dial pointer index line. (See illustration).

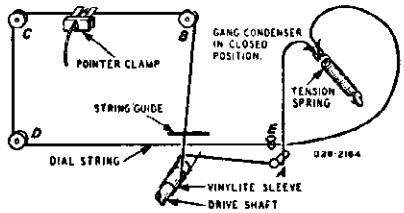
ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.
Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.
The equipment in column at right 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., 50 mmf.
Blocking Condenser—.1 mf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Control Grid 12SK7—I.F. Prong No. 4	Chassis Base Through .1 mf. Condenser	.1 mf.	Turn Rotor to full open	2nd I.F. (C-7) & (C-8)
455 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C-5) & (C-6)
1620 KC	Control Grid 12SA7—1st Det. Prong No. 8	External Ground Clip On Loop	.1 mf.	Turn Rotor to full open	Oscillator (C-2D)
1400 KC	External Antenna Clip On Loop	Same As Above	50 mmf.	Turn dial to 1400 KC. See Note A	Antenna (C-2C)

DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 10X48 drive cord assembly, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2¾ turns counterclockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring.



REPLACEMENT PARTS LIST

NOTICE: There is a model number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A432		5" Speaker
3A303		Tube Socket, Octal (8 prong) Molded
10A297		Knob (Brown)
10A300		Knob (Ivory)
55X255		Cabinet (Ivory)
55X313		Cabinet (Brown)
28X292		Snap Buttons (mounting loop to cabinet)
14X334		Speaker Baffle
13X328		Line Cord Assembly

TRANSFORMERS AND COILS

9A1916	T-1	"B" Range Loop Antenna Assembly
9A1914	T-2	Oscillator Coil Assembly
9A1908	T-3	1st I.F Coil Assembly
9A1909	T-4	2nd I.F Coil Assembly
51X152	T-5	Output Transformer

CAPACITORS

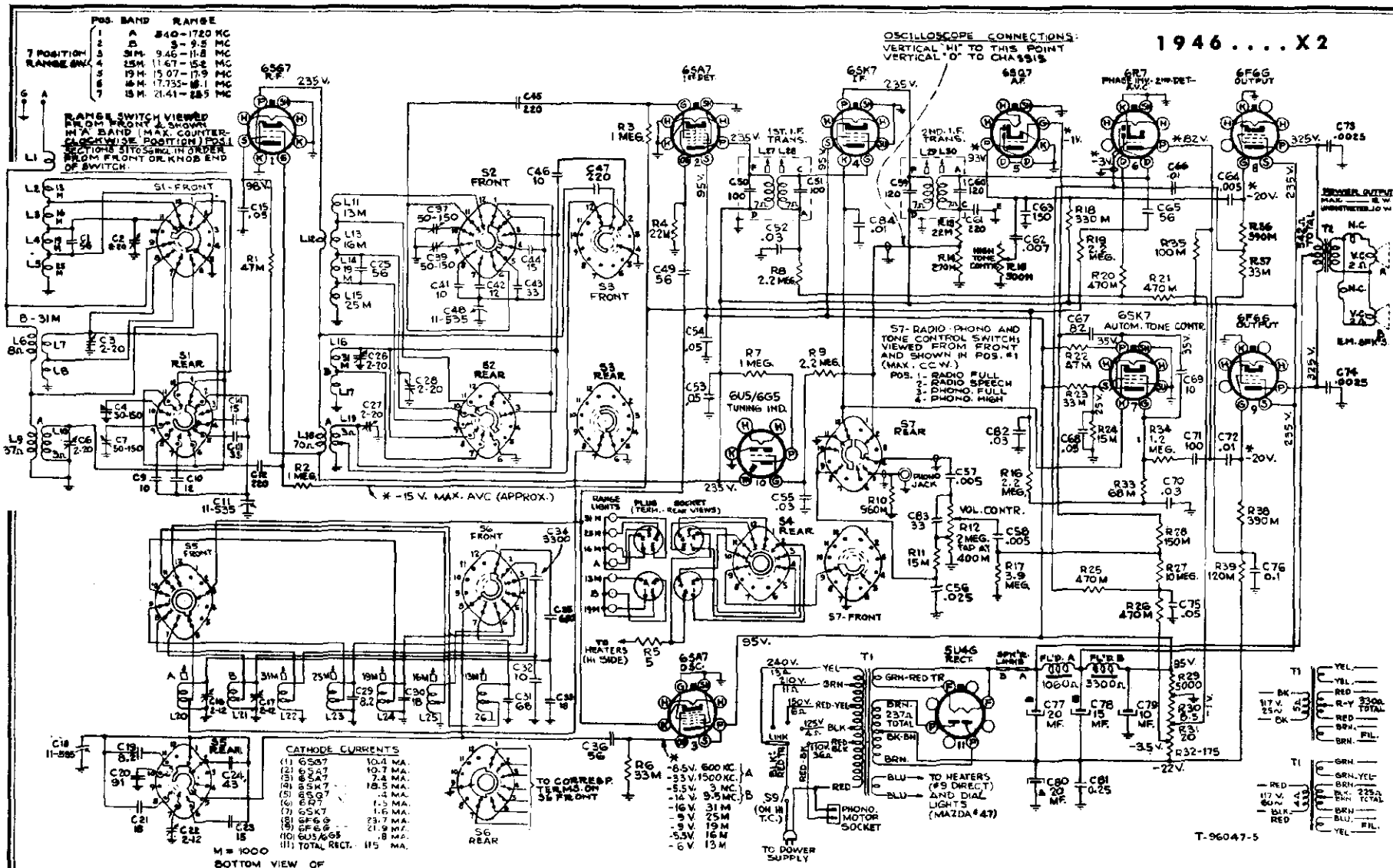
14A194	C-2A,C-2B, C-2C,C-2D		Gang Condenser Assembly	
	C-5,C-6		Part of T-3 (1st I.F Coil)	
	C-7,C-8		Part of T-4 (2nd I.F Coil)	
47X112	C-9A,C-9B	50-50	mmf.	Dual Mica
B66103	C-11,C-13	.01	mf 200V.	Tubular
47X488	C-12	220	mmf	Molded
D66502	C-14	.005	mf 400V.	Tubular
B66503	C-16	.05	mf 400V.	Tubular
45X341	C-17A	50	mf 150V.	Dry Electrolytic
	C-17B	50	mf 150V.	
B66503	C-18	.05	mf 200V.	Tubular

RESISTORS

B84223	R-1	22,000 ohms	0.5 watt Carbon
B85225	R-2	2.2 meg.	0.5 watt Carbon
B85473	R-3	47,000 ohms	0.5 watt Carbon
36X352	R-4	500,000 ohms	Volume control and line switch
B85685	R-5	6.8 meg.	0.5 watt Carbon
B84474	R-6	470,000 ohms	0.5 watt Carbon
B85474	R-7	470,000 ohms	0.5 watt Carbon
B84151	R-8	150 ohms	0.5 watt Carbon
B84270	R-10	27 ohms	0.5 watt Carbon
C85152	R-11	1500 ohms	1.0 watt Carbon

DIAL AND DRIVE ASSEMBLY

26A466		Pointer Bracket Assembly complete with light diffuser holder, string guide and idler pulleys
41X74		Dial light diffuser
18X223		Pointer
6X21		Rubber Grommet (Mtg. gang condenser)
20X329		Cond. Cushion Stud (Mtg. gang condenser)
26X482		Drive shaft
10X182		"C" Washer (for drive shaft)
10X48		Drive cord assembly
28X88		Drive cord tension spring
7A194		Pilot light socket assembly
		No. 47 Pilot light
58X688		Dial
30X686		Dial clamp (upper)
30X680		Dial clamp (lower)

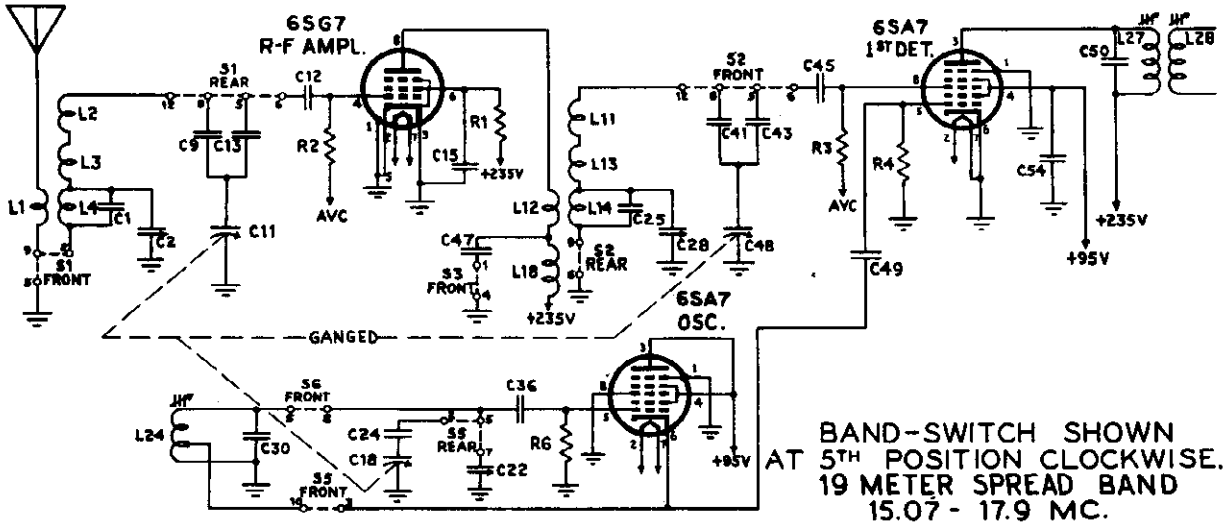


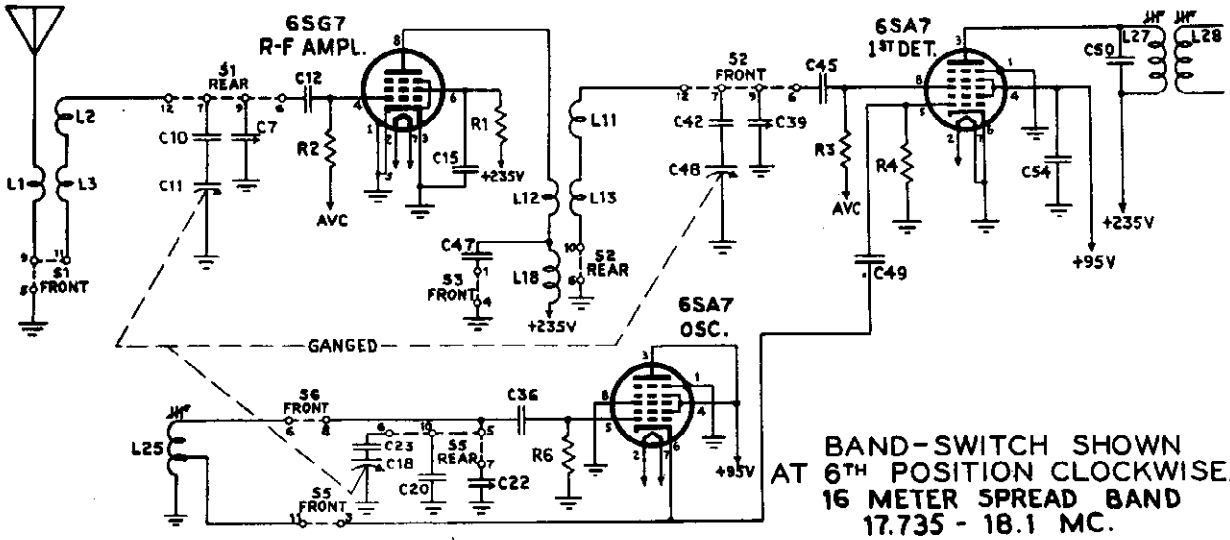
NOTE: On some sets C52, C35, C70 or C82 may be .025 mfd.

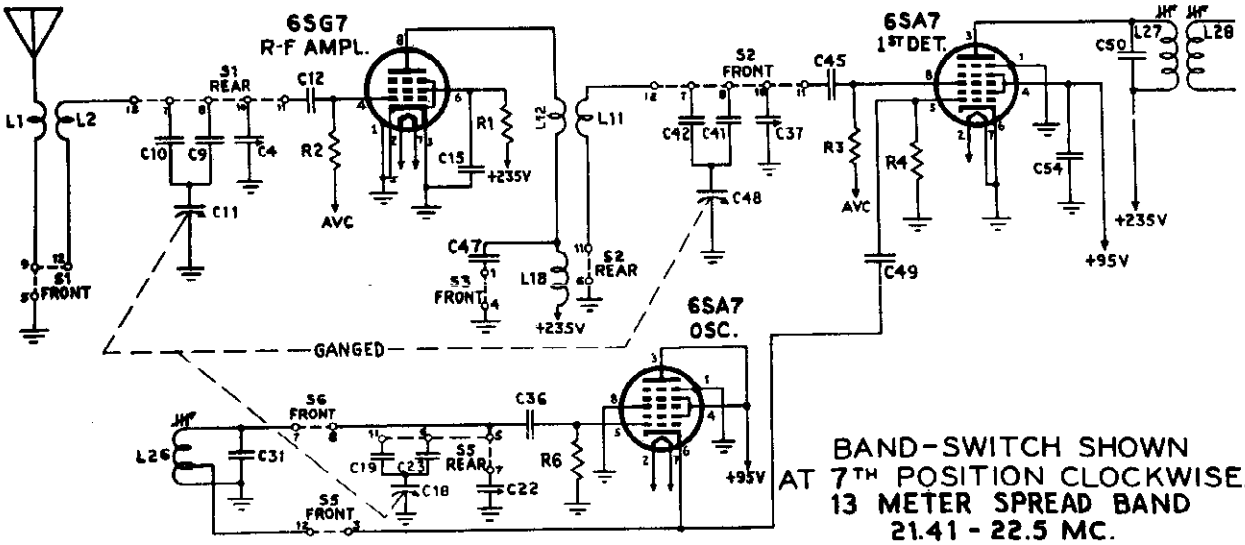
NOTE: In some sets and on some replacement units, the power transformer lead color code may vary from that shown above. On universal transformers (Rating D), the primary start may be black, the 110 v. tap black/yellow, and the link, black/red. The primary leads on the 25 and 60 cycle transformers (Ratings A and B) may be black. Secondaries of the three transformers would be—rectifier filament, yellow—high voltage, red—high voltage center tap, red/yellow—amplifier filament, green. In case of doubt, identify windings by resistance or voltage measurements.

MODEL Q36

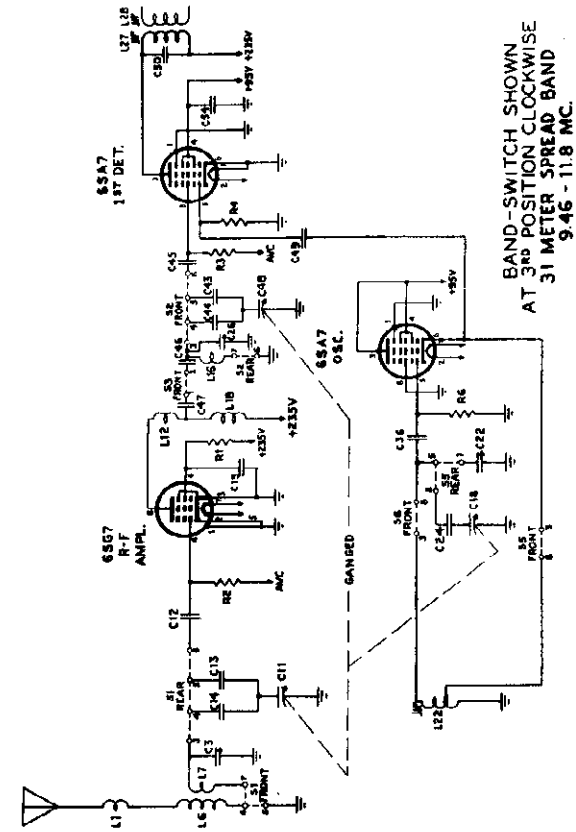
RCA MFG. CO.

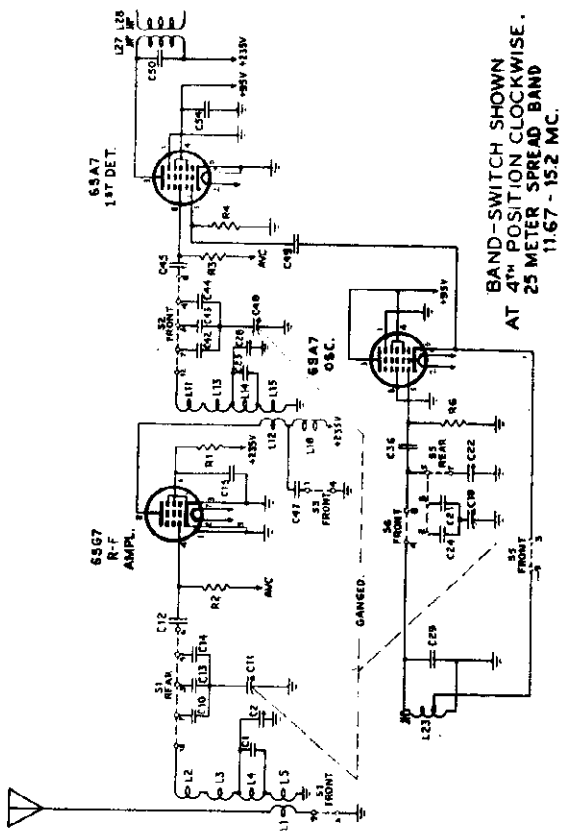


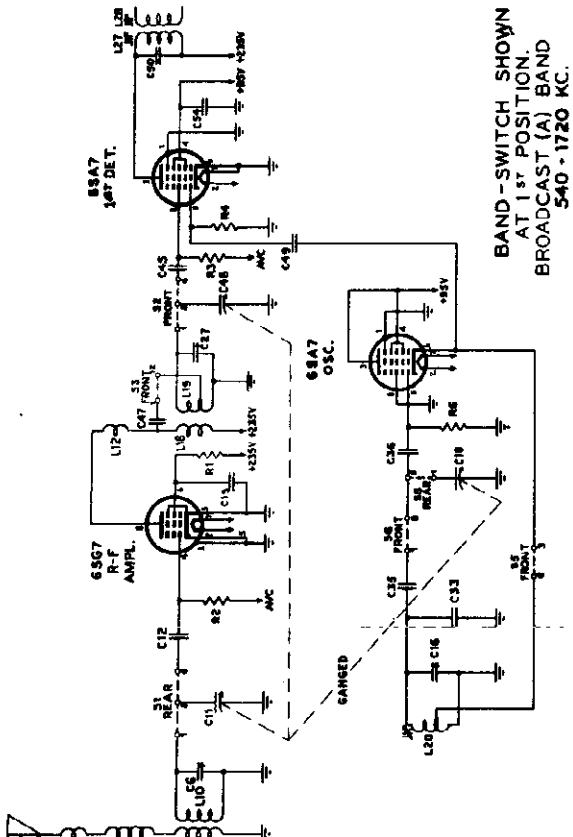


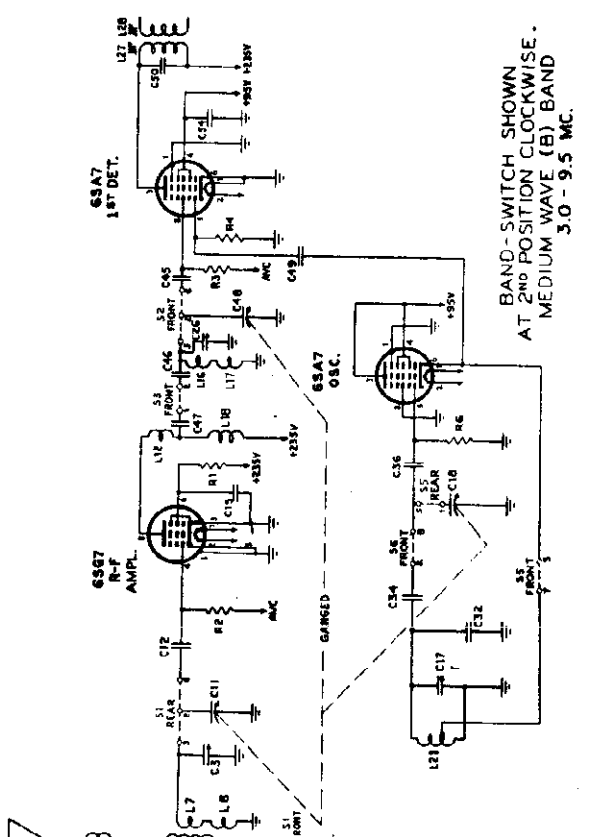


RCA MFG. CO.


6SA7
1ST DET.
6SG7
R-F
AMPL.
6SA7
OSC.
GANGED
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
31 METER SPREAD BAND
9.46 - 11.8 MC.


6SA7
1ST DET.
6SG7
R-F
AMPL.
6SA7
OSC.
GANGED
BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
25 METER SPREAD BAND
11.67 - 15.2 MC.


6SA7
1ST DET.
6SG7
R-F
AMPL.
6SA7
OSC.
GANGED
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
540 - 1720 KC.


6SA7
1ST DET.
6SG7
R-F
AMPL.
6SA7
OSC.
GANGED
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
MEDIUM WAVE (B) BAND
3.0 - 9.5 MC.

MODEL Q36

RCA MFG. CO.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across either 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 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 indicator-drive-cord drum which is mounted on the shaft of the gang condenser.

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Inaicator and Drive Mechanism drawing when the gang condenser 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.

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.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial drawing.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the oscillator coil magnetite-core for each spread-band so that these stations come in at the correct points on the dial.

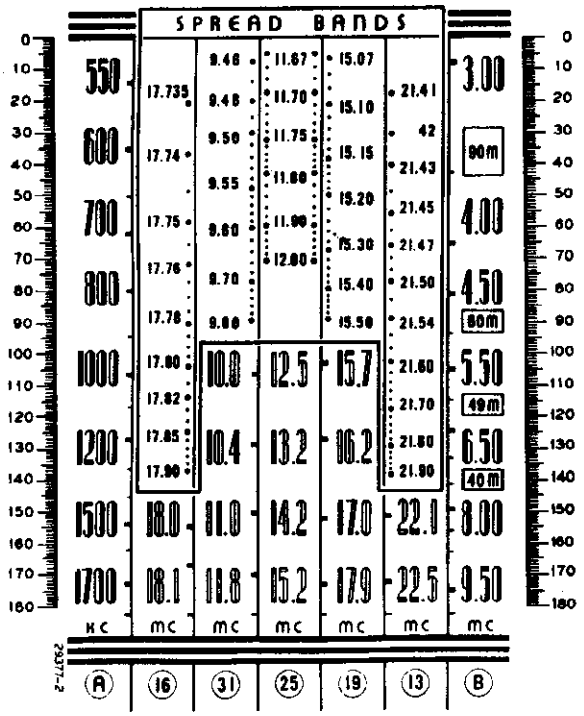
In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

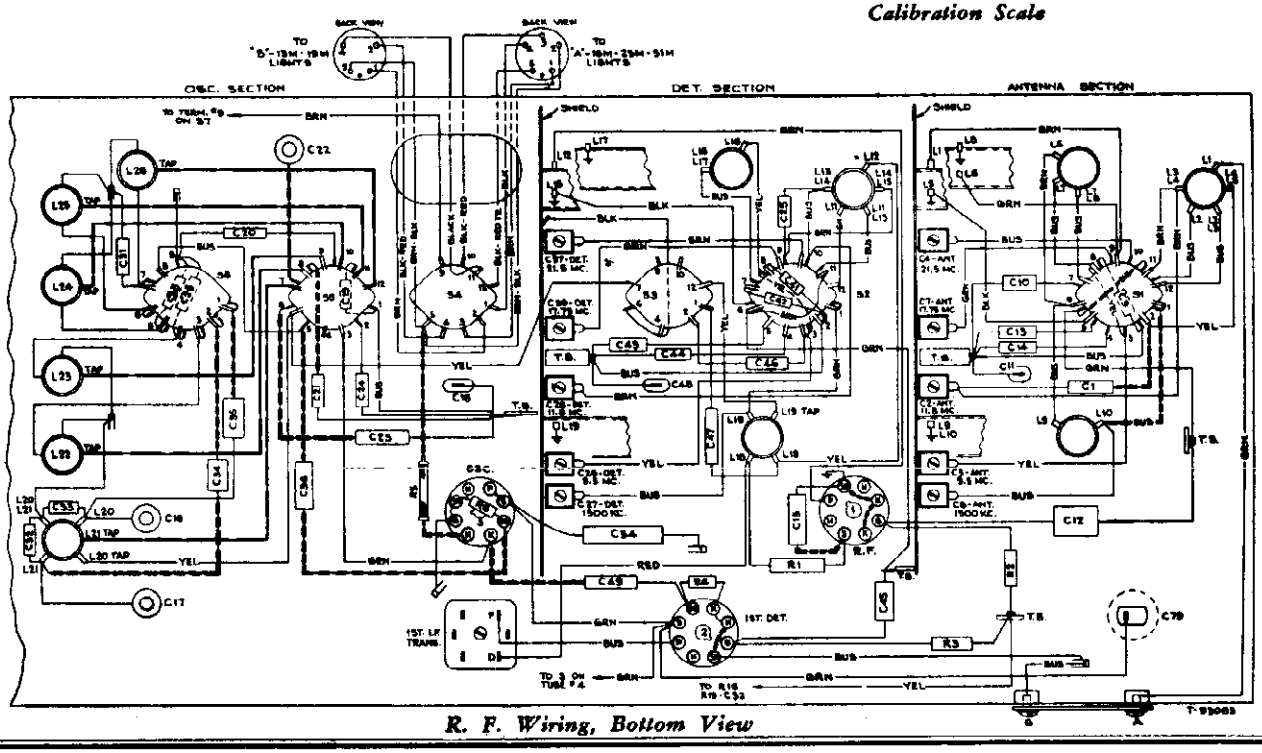
When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetic-core for each band should be retouched so that the stations come in at the correct points on the dial.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with the indicator to the line under "Spread Bands" on the glass dial plate with the gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional information, refer to booklet "RCA Victor Receiver Alignment."



Receiver Dial with Calibration Scale



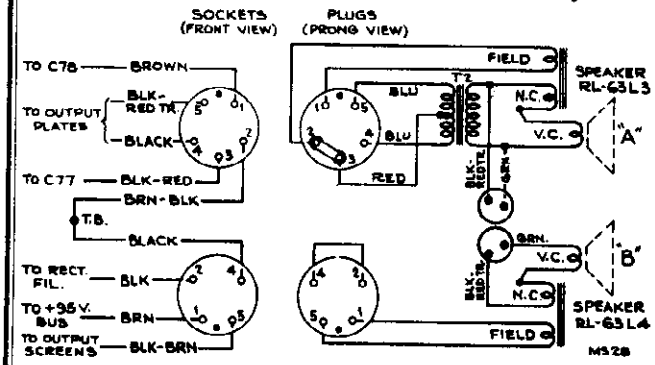
R. F. Wiring, Bottom View

RCA MFG. CO.

Alignment Procedure

Precautionary Lead Dress.—

1. All leads in the R.F. assembly should be dressed away from coils, switch assemblies, capacitors, shield plates, and mounting plates.
2. All capacitors in the R.F. assembly should be dressed apart from each other and away from the Range Switch drive shaft.
3. All indicating light cable leads to S4 should be dressed toward the shield plate and away from all other leads and components.
4. Leads and components connected to the oscillator and 1st Detector tube sockets must not impede the flexible mounting.
5. The green lead from pin 4 of the oscillator tube socket to pin 4 of the 1st Detector should be dressed close to C54.
6. All excess power transformer leads should be dressed back between transformer and rear chassis apron and close to chassis base.
7. The capacitors that connect the volume control and tone control should be dressed away from other parts.



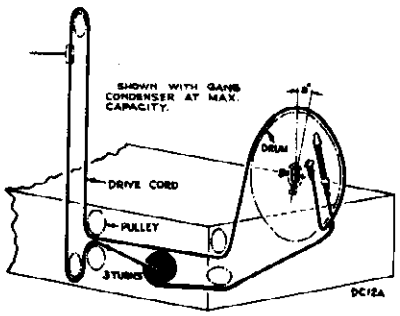
Loudspeaker Connections

Loudspeaker.—It is essential that the two speaker cones move in and out together, i.e. in phase. For an outline of test methods refer to RCA Victor Supplementary Information—No. 5 "Speaker Phasing."

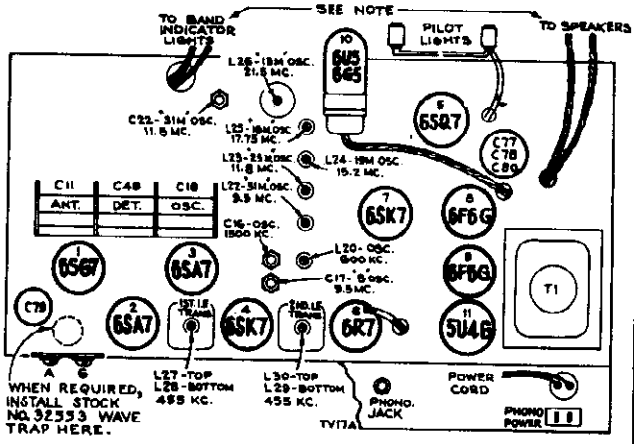
ALIGNMENT TABLE

Steps	Connect the high side of test osc. to—	Tune test osc. to—	Turn Range Switch to—	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (35°)	L30-L29 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L28-L27 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (154°)	C16 (osc.) C27 (det.) C6 (ant.)
4		600 kc	"A" Band	600 kc (35°)	L20* Rock in
5	Repeat steps 3 and 4 until aligned				
6	Antenna terminal in series with 300 ohms	9.5 mc	"31M" Band	9.5 mc (30°)	L22 (osc.)* C26 (det.) C3 (ant.)
7		11.8 mc	"31M" Band	11.8 mc (170°)	C22 (osc.) **
8	Repeat steps 6 and 7				
9	Antenna terminal in series with 300 ohms	9.5 mc	"B" Band	9.5 mc (175.5°)	C17 (osc.) **
10		11.8 mc	"25M" Band	11.8 mc (43°)	L23 (osc.)* C28 (det.) C2 (ant.)
11		15.2 mc	"16M" Band	15.2 mc (50°)	L24 (osc.)*
12		17.75 mc	"16M" Band	17.75 mc (58°)	L25 (osc.)*** C39 (det.) C7 (ant.)
13		21.5 mc	"13M" Band	21.5 mc (77°)	L26 (osc.)*** C37 (det.) C4 (ant.)

* If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).
** Use minimum capacity peak if two can be obtained.
*** If two peaks can be obtained use the one obtained when the core screw is farthest in (clockwise).
NOTE: Oscillator tracks above signal on all except the 16M and 13M bands.



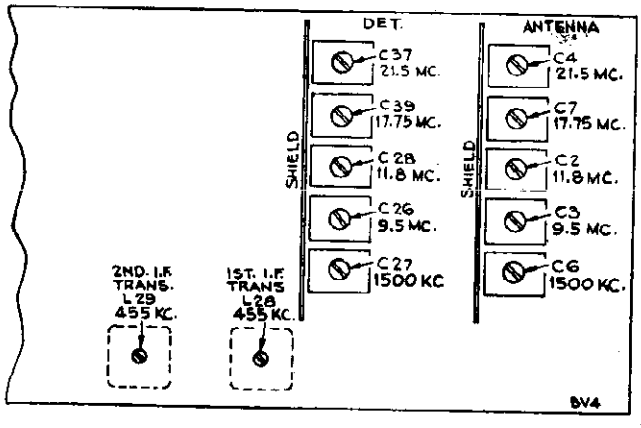
Dial-Indicator and Drive Mechanism



Tube and Trimmer Locations (Top View)

Caution.—The sockets used on the band indicator light cables are identical to those used on the speaker cables. In connecting, care should be taken to assure that the cables are plugged to the proper units.

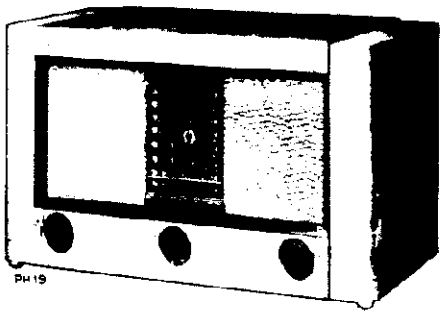
Use of Wave Trap.—Should interference from a powerful nearby station require the use of a wave trap, install a Stock No. 32553 trap behind antenna and ground terminal board as indicated above. Connect coil lug to antenna connection, ground connection is made to chassis through coil mounting foot. Adjust capacitor to resonance with interfering station.



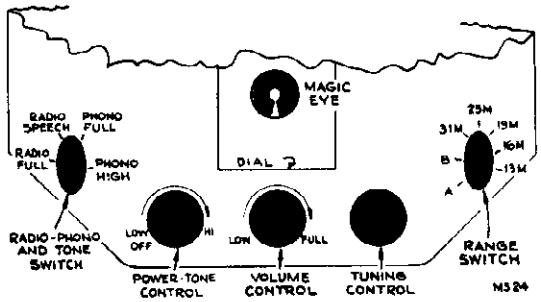
Trimmer Locations (Bottom View)

MODEL Q36

RCA MFG. CO.



Model Q36



Location of Controls

Specifications

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.46-11.8 mc (31.7-25.4 m)
"25" Meter Spread Band	11.67-15.2 mc (25.7-19.8 m)
"19" Meter Spread Band	15.07-17.9 mc (19.9-16.8 m)
"16" Meter Spread Band	17.735-18.1 mc (16.9-16.6 m)
"13" Meter Spread Band	21.41-22.5 mc (14.0-13.4 m)
Intermediate Frequency	455 kc

Tube Complement

(1)	RCA-6SG7	R-F Amplifier
(2)	RCA-6SA7	1st Detector
(3)	RCA-6SA7	Oscillator
(4)	RCA-6SK7	I-F Amplifier
(5)	RCA-6SQ7	A-F Amplifier
(6)	RCA-6R7	Phase Inverter, 2nd Detector
(7)	RCA-6SK7	Automatic Tone Control
(8)	RCA-6F6G	Power output
(9)	RCA-6F6G	Power output
(10)	RCA-6U5/6G5	Tuning indicator
(11)	RCA-5U4G	Rectifier

Pilot Lamps ..... 9-type 47; 6.3 volts, 0.15 amps.

Power Output Rating

Undistorted	10 watts
Maximum	12 watts

Loudspeakers

One Model RL-63L3 and one model RL-63L4

Type (Electrodynamic)	8 inches
V-C Impedance at 400 c.p.s.	2.2 ohms

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.

A 110-volt outlet for Victrola attachment is available on back of the chassis.

Cabinet Dimensions

Height	14¾ inches
Width	24¾ inches
Depth	12⅞ inches
Net Weight	approx. 49 pounds
Shipping Weight	approx. 56 pounds
Chassis Base Dimensions (inches) Height, 3½; Length, 22; Depth 13	
Over-all Chassis Height	12¾ inches
Tuning Drive Ratio	25 to 1

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105 to 125, nominal 117	25 to 60	135
Rating B	105 to 125, nominal 117	50 to 60	135
Rating D	(See below)	40 to 60	135

110 position	100 min.	115 max.
125 position	115 min.	135 max.
150 position	135 min.	165 max.
210 position	190 min.	230 max.
240 position	220 min.	260 max.

Note: Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.

CAUTION: Remove power cord from line receptacle before changing link position.

Automatic Tone Control.—

The Model Q36 incorporates a circuit for automatically attenuating noise and selective fading distortion components.

Basically the circuit is a combination of a high pass filter and variable inverse feedback controlled by the AVC voltage.

Capacitor C71 (100 mmf.) and resistor R34 (1.2 meg.) couple the plate of the 6R7 (tube 6) to the grid of the 6SK7 (tube 7). The plate of this tube is connected to the grid of the 6SQ7 (tube 5) through capacitor C67 (82 mmf.). The grid bias for the 6SK7 (tube 7) is obtained from the AVC bus through R16 (2.2 meg.) and R33 (68M).

The values of C71, R34, C67 and R33 are such that this inverse feedback loop passes only the high audio frequencies therefore they are the frequencies that are attenuated in the output of the audio system. The amount of attenuation of the "highs" is controlled by the negative voltage on the AVC bus.

When the incoming signal is weak the AVC voltage is close to zero, the gain of the ATC 6SK7 is large and the attenuation of the highs is a maximum; when the incoming signal is strong the AVC voltage becomes more negative thus decreasing the gain and thereby increasing the high frequency response of the audio system. The cathode of the 6SK7 (tube 7) is grounded only when S7 is switched to either "Radio" position; the ATC circuit is inoperative when S7 is in either of the "Phono" positions.

With an R.F. input of 100 microvolts the audio frequency response at 2000 cycles is down approximately 20 db. as compared to the response obtained with an RF input of 10,000 microvolts.

If desired, the amount of high frequency attenuation at a particular value of input signal below approximately 10,000 microvolts may be varied by changing the value of R33. Increasing R33 will increase the attenuation of the "highs"; decreasing R33 will decrease the attenuation.

A quick check of the operation of the circuit may be made by tuning in a weak station and then pulling the 6SK7 (tube 7) out of its socket, a very noticeable increase in the high frequency audio response will indicate that the circuit is functioning properly.

As can be well appreciated by the foregoing explanation of ATC operation, it is desirable to use an antenna with good signal pickup when full fidelity is required. Short length antennas should be avoided whenever possible.

MODEL QB13 Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	QB13 (RC-612)
35622	Bracket—Mounting bracket for tuning knob shaft and flywheel
37976	Bracket—Tone control mounting bracket
35642	Calibrator—Drive drum calibrator scale
34634	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3)
12734	Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14)
35646	Capacitor—Ceramic, 6 mmf. (C36)
45465	Capacitor—Ceramic, 15 mmf. (C33)
36012	Capacitor—Ceramic, 15 mmf. (C37)
35644	Capacitor—Ceramic, 47 mmf. (C8, C12)
30627	Capacitor—Mica, 56 mmf. (C17)
70586	Capacitor—Mica, 68 mmf. (C9)
35645	Capacitor—Ceramic, 68 mmf. (C13)
30628	Capacitor—Mica, 100 mmf. (C29)
30634	Capacitor—Mica, 180 mmf. (C34)
30636	Capacitor—Mica, 220 mmf. (C6)
70607	Capacitor—Mica, 560 mmf. (C5)
70087	Capacitor—Mica, 3000 mmf. (C6)
70502	Capacitor—Tubular, .0025 mfd., 400 volts (C23, C24)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C25, C26)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C39)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C19, C35, C48)
71010	Capacitor—Tubular, .07 mfd., 400 volts (C27)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C28)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C46)
70619	Capacitor—Tubular, 0.5 mfd., 400 volts (C38)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C47)
37250	Capacitor—Electrolytic, 20 mfd., 250 volts (C32)
37807	Capacitor—Electrolytic, 30 mfd., 250 volts (C30)
35631	Coil—Antenna coil, 25 meter and 19-13 meter bands (L1, L2, L3)
35632	Coil—Antenna coil, "A" band, "B" band and 31 meter band (L4, L5, L6, L7, L18)
35623	Coil—Oscillator coil, "A" and "B" band (L8, L9)
35626	Coil—Oscillator coil, 31 meter band (L10)
35625	Coil—Oscillator coil, 25 meter band (L11)
35624	Coil—Oscillator coil, 19-11 meter band (L12)
35619	Condenser—Variable tuning condenser (C10, C11)
37833	Control—Volume control and power switch (R6, S6)
32634	Cord—Drive cord (approx. 30" overall length) NOTE: Before assembling, stretch to full length.
34662	Cord—Indicator cord (approx. 54" overall length) NOTE: Before assembling, stretch to full length.
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter band, 25 meter band or 31 meter band oscillator coils
12006	Core—Adjustable core and stud for I-F transformers
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning knob shaft flywheel
70930	Grommet—Rubber mounting grommet for tuning condenser (4 required)
5119	Plug—3 contact female plug for speaker cable
14404	Plug—7 prong plug for power input cable
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley, between tuning knob shaft and range switch shaft
8063	Resistor—330 ohms, ½ watt (R19)
30498	Resistor—390 ohms, ½ watt (R17)
30736	Resistor—5600 ohms, ½ watt (R7)
30151	Resistor—18,000 ohms, 1 watt (R4)
30492	Resistor—22,000 ohms, ½ watt (R5)
30685	Resistor—33,000 ohms, ½ watt (R2)
30180	Resistor—120,000 ohms, ½ watt (R9, R18)
30648	Resistor—470,000 ohms, ½ watt (R11)
30632	Resistor—1 megohm, ½ watt (R1)
30162	Resistor—1.2 megohm, ½ watt (R10)
30649	Resistor—2.2 megohms, ½ watt (R3)
30992	Resistor—10 megohms, ½ watt (R8)
14350	Screw—No. 8-32 square head set screw for drive drum
35633	Shaft—Range switch indicator shaft
35637	Shaft—Tuning knob shaft
35787	Socket—Phono input socket
34500	Socket—Tube socket, miniature
31251	Socket—Tube socket
*72679	Socket—Tube socket, cushion mounted
12007	Spring—Retaining spring for I-F transformers core and stud assemblies

STOCK No.	DESCRIPTION
31261	Spring—Retaining spring for oscillator coils, core and studs assemblies
31418	Spring—Tension spring for drive cord as indicator cord
35640	Support—Drive pulley support complete with one pulley
35639	Support—Drive pulley support complete with three (3) pulleys
35621	Switch—Range switch (S1, S2, S3, S4)
33197	Switch—Tone control switch (S5)
37896	Transformer—Driver transformer (T1)
*72835	Transformer—Output transformer (T2)
35616	Transformer—First I. F. transformer (T4, L13, L14, C15, C16)
35628	Transformer—Second I. F. transformer (T5, L15, L16, C20, C21)
33720	Washer—"C" washer for idler pulley
2917	Washer—"C" washer for tuning knob shaft
	VIBRATOR POWER SUPPLY RS-115
4289	Body—Fuse connector body
4288	Cap—Fuse connector cap
39644	Capacitor—Mica, 470 mmf. (C42, C44)
71008	Capacitor—Tubular, .008 mfd., 1200 volts (C43)
*70641	Capacitor—Tubular, .01 mfd., 1000 volts (C40)
37877	Capacitor—Electrolytic, 15 mfd., 350 volts (C41)
37836	Case—Power supply case less cover
14289	Clip—Battery clips (1 set)
37025	Coil—Choke coil (L21)
37836	Cover—Power supply case cover
4286	Ferrule—Fuse connector ferrule and bushing
5140	Fuse—5 ampere
4290	Insulator—Fuse connector insulator
14409	Plug—7 contact female plug for power supply cable
34705	Resistor—100 ohms, ½ watt (R15)
38906	Resistor—1200 ohms, 1 watt (R14)
71004	Resistor—2200 ohms, 1 watt (R16)
12241	Socket—Vibrator socket
4284	Spring—Fuse connector spring
35544	Transformer—Vibrator transformer (T3, C45, L22)
35543	Vibrator—Plug-in vibrator
4285	Washer—Fuse connector insulating washer
	SPEAKER ASSEMBLIES 92510-1
70578	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker cable
70577	Speaker—6½" P.M. speaker complete with cone and voice coil less plug

NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

	MISCELLANEOUS ASSEMBLIES
70833	Board—Baffle board and grille for QB12 & QB13
71382	Cabinet—Plastic cabinet for QB12 & QB13
71089	Decal—Trademark decal for QB12 & QB13
70579	Decal—Trademark decal for QB11
35634	Dial—Glass dial scale
36618	Extension—Tune control shaft extension for QB11
37838	Frame—Dial frame assembly less indicator
E1611	Grille—Cabinet grille cloth for Model QB11
37306	Grommet—Rubber grommet for mounting speaker (4 required for QB12 & QB13
70839	Grommet—Rubber grommet for mounting chassis (4 required for QB12 & QB13
	Indicator—Station selector indicator
35632	Knob—Range indicator knob
35631	Knob—Range switch knob
35630	Knob—Tone control knob
34489	Knob—Tuning or volume control knob for QB11
70603	Knob—Tuning or volume control knob for QB12 & QB13
14270	Spring—Retaining spring for tone control, volume control, range switch or tuning knob
4982	Spring—Retaining spring for range indicator knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

*This is the first time this stock number has appeared in service data.

MODEL Q36

Stock No.	Description
	CHASSIS ASSEMBLIES RC-585
39781	Bearing—Tuning knob shaft bearing
37633	Board—"Antenna-Ground" board
39799	Bracket—Long bracket complete with three (3) drive cord pulleys
39800	Bracket—Upper bracket complete with one (1) drive cord pulley
36397	Calibrator—Drive drum calibrator
12884	Capacitor—Air trimmer, 2-12 mmf. (C16, C17, C22)
70597	Capacitor—Ceramic, 8.2 mmf. (C18, C26)
33098	Capacitor—Ceramic, 10 mmf. (C32)
45488	Capacitor—Ceramic, 10 mmf. (C8, C42, C46)
39804	Capacitor—Mica, 10 mmf (C69)
70595	Capacitor—Ceramic, 12 mmf. (C10, C42)
45485	Capacitor—Ceramic, 15 mmf. (C14, C23, C44)
39041	Capacitor—Ceramic, 18 mmf. (C21, C33)
71020	Capacitor—Ceramic, 18 mmf. (C30)
39818	Capacitor—Mica, 33 mmf. (C63)
70596	Capacitor—Ceramic, 33 mmf. (C13, C43)
71022	Capacitor—Ceramic, 43 mmf. (C24)
39794	Capacitor, Mica trimmer, consisting of 2 sections of 50-150 mmf. and 2 sections of 2-20 mmf. (C2, C3, C4, C5, C7 and C26, C27, C28, C37, C38)
39821	Capacitor—Mica, 56 mmf. (C65)
70594	Capacitor—Ceramic, 56 mmf. (C1, C25)
70598	Capacitor—Ceramic, 56 mmf. (C36, C45)
70593	Capacitor—Ceramic, 68 mmf. (C31)
39826	Capacitor—Mica, 82 mmf. (C67)
71021	Capacitor—Ceramic, 91 mmf. (C20)
39819	Capacitor—Mica, 100 mmf. (C50, C51, C71)
39830	Capacitor—Mica, 120 mmf. (C59, C62)
39832	Capacitor—Mica, 150 mmf. (C53)
39836	Capacitor—Mica, 220 mmf. (C12, C41, C47, C61)
39648	Capacitor—Mica, 680 mmf. (C35)
39844	Capacitor—Mica, 3300 mmf. (C34)
71006	Capacitor—Tubular, .0025 mfd., 1600 volts (C72, C74)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C57, C58)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C54)
70629	Capacitor—Tubular, .007 mfd., 600 volts (C52)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C68)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C73, C84)
70612	Capacitor—Tubular, .025 mfd., 200 volts (C56)
70613	Capacitor—Tubular, .03 mfd., 200 volts (C52, C55, C78, C82)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C54, C80, C75)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C15, C59)
70617	Capacitor—Tubular, 0.1 mfd., 200 volts (C75)
70618	Capacitor—Tubular, 0.25 mfd., 200 volts (C81)
35879	Capacitor—Electrolytic, 10 mfd., 300 volts (C79)
34393	Capacitor—Electrolytic, consisting of 1 section of 20 mfd., 450 volts; 1 section of 15 mfd., 450 volts; and 1 section of 20 mfd., 25 volts (C77, C76, C80)
39797	Coil—Antenna coil, "A" band (L8, L10)
39795	Coil—Antenna coil, "B" and 31 meter bands (L6, L7, L9)
39792	Coil—Antenna or R.F. coil, 25, 19, 16, and 13 meters (L1, L2, L3, L4, L5, L11, L12, L13, L14, L15)
39804	Coil—Oscillator coil, "A" and "B" bands (L28, L21)
39809	Coil—Oscillator coil, 13 and 16 meter bands (L25, L26)
39805	Coil—Oscillator coil, 19 meter bands (L24)
39806	Coil—Oscillator coil, 25 meter band (L23)
39807	Coil—Oscillator coil, 31 meter band (L22)
39795	Coil—R.F. coil, "A" band (L18, L19)
39798	Coil—R.F. coil, "B" band and 31 meter band (L16, L17)
39785	Condenser—Variable tuning condenser (C11, C18, C48)
39788	Control—Tone control and power switch (R15, S9)
39789	Control—Volume control (R12)
34662	Cord—Indicator cord (approx. 63 in. overall length)
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
12006	Core—Adjustable core and stud for I.F. transformers
31259	Core—Adjustable core and stud for 13 meter, 16 meter, 19 meter, 25 meter, and 31 meter bands oscillator coils
36398	Drum—Drive drum less calibrator
18469	Plate—Bakelite mounting plate for capacitor # 34393
5040	Plug—4 contact female plug for speaker or band indicator cable
12493	Plug—5 contact female plug for speaker or band indicator cable
35973	Pulley—Drive cord pulley
36637	Receptacle—A.C. power receptacle
36642	Resistor—Flexible, wire wound 5 ohms, 1 watt (R5)

Stock No.	Description
39803	Resistor—Voltage divider consisting of 1 section of 155 ohms, 3 watt; 1 section of 50 ohms, 0.2 watt; 1 section of 8.5 ohms, 0.1 watt; and 1 section of 5900 ohms, 2.5 watt (R29, R30, R31, R32)
36714	Resistor—15,000 ohms, ½ watt (R11, R24)
30482	Resistor—22,000 ohms, ½ watt (R4, R13)
30685	Resistor—33,000 ohms, ½ watt (R6, R23, R27)
30787	Resistor, 47,000 ohms, ½ watt (R22)
30495	Resistor, 47,000 ohms, 1 watt (R1)
14138	Resistor—68,000 ohms, ½ watt (R33)
9232	Resistor, 100,000 ohms, ½ watt (R35)
30136	Resistor—120,000 ohms, ½ watt (R39)
14010	Resistor—150,000 ohms, ½ watt (R28)
30651	Resistor—270,000 ohms, ½ watt (R14)
14983	Resistor—330,000 ohms, ½ watt (R10)
11988	Resistor—390,000 ohms, ½ watt (R36, R38)
30648	Resistor—470,000 ohms, ½ watt (R20, R21, R25, R26)
30653	Resistor—560,000 ohms, ½ watt (R10)
30632	Resistor—1 megohm, ½ watt (R2, R3, R7)
30162	Resistor—1.2 megohm, ½ watt (R34)
30649	Resistor—2.2 megohms, ½ watt (R8, R9, R16, R30)
70592	Resistor—3.9 megohms, ½ watt (R17)
30992	Resistor—10 megohms, ½ watt (R37)
14350	Screw—#8-32 square head set screw for drive drum
39790	Shaft—Tuning knob shaft and flywheel
31365	Socket—Lamp socket
35787	Socket—Phono input socket
31252	Socket—Tube socket
34866	Socket—Tuning tube socket
31418	Spring—Indicator cord spring
12007	Spring—Retaining spring for I.F. transformers, core and stud assemblies
31261	Spring—Retaining spring for oscillator coils' core and stud assemblies and for 13 meter band oscillator coil, core and stud
39787	Switch—Radio-phono switch (S7)
39793	Switch—Range switch (S1, S2, S3, S4, S5, S8)
35636	Transformer—First I.F. transformer (L17, L18, C50, C51)
36815	Transformer—Second I.F. transformer (L19, L20, C59, C60, C61)
39796	Transformer—Power transformer—105-125 volts, 25 to 60 cycle (T1) (Rating A)
36044	Transformer—Power transformer—105-125 volts, 50 to 60 cycle (T1) (Rating B)
34193	Transformer—Power transformer—110-125-150-210-240 volts, 40 to 60 cycle (T1, S8) (Rating D)
33726	Washer—"C" washer for drive cord pulley
2917	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES RL-6315
13857	Cap—Dust cap
12879	Coil—Field coil—1060 ohms
11468	Coil—Neutralizing coil
71825	Cone—Cone complete with voice coil
30668	Plug—3 contact female plug
31529	Plug—3 prong male plug
37807	Transformer—Output transformer
	SPEAKER ASSEMBLIES RL-6314
13857	Cap—Dust cap
71826	Coil—Field coil—3300 ohms
11468	Coil—Neutralizing coil
71825	Cone—Cone complete with voice coil
30670	Plug—2 prong male plug
5039	Plug—4 prong male plug
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
38819	Back—Cabinet back
30718	Clip—Tuning tube clip
70579	Decal—Trade mark decal
70665	Dial—Glass dial scale
70858	Indicator—Station selector indicator
70654	Knob—Radio-phono, or range switch knob
70653	Knob—Tone control, volume control, or tuning knob
31480	Lamp—Dial lamp
39816	Plate—Dial back plate less indicator, tube clip and dial
5039	Plug—4 prong male plug for band indicator cable
12387	Plug—5 prong male plug for band indicator cable
31482	Screw—#8-32 square head set screw for radio-phono switch shaft
36658	Shaft—Radio-phono switch shaft
31365	Socket—Lamp socket
14270	Spring—Retaining spring for radio-phono or range switch knobs and for tone control, volume control, or tuning knobs

MODELS Q103,-2,A,A-2,Ch.RC1044
MODELS Q103X,-2,AX,AX-2,Ch.RC1044B

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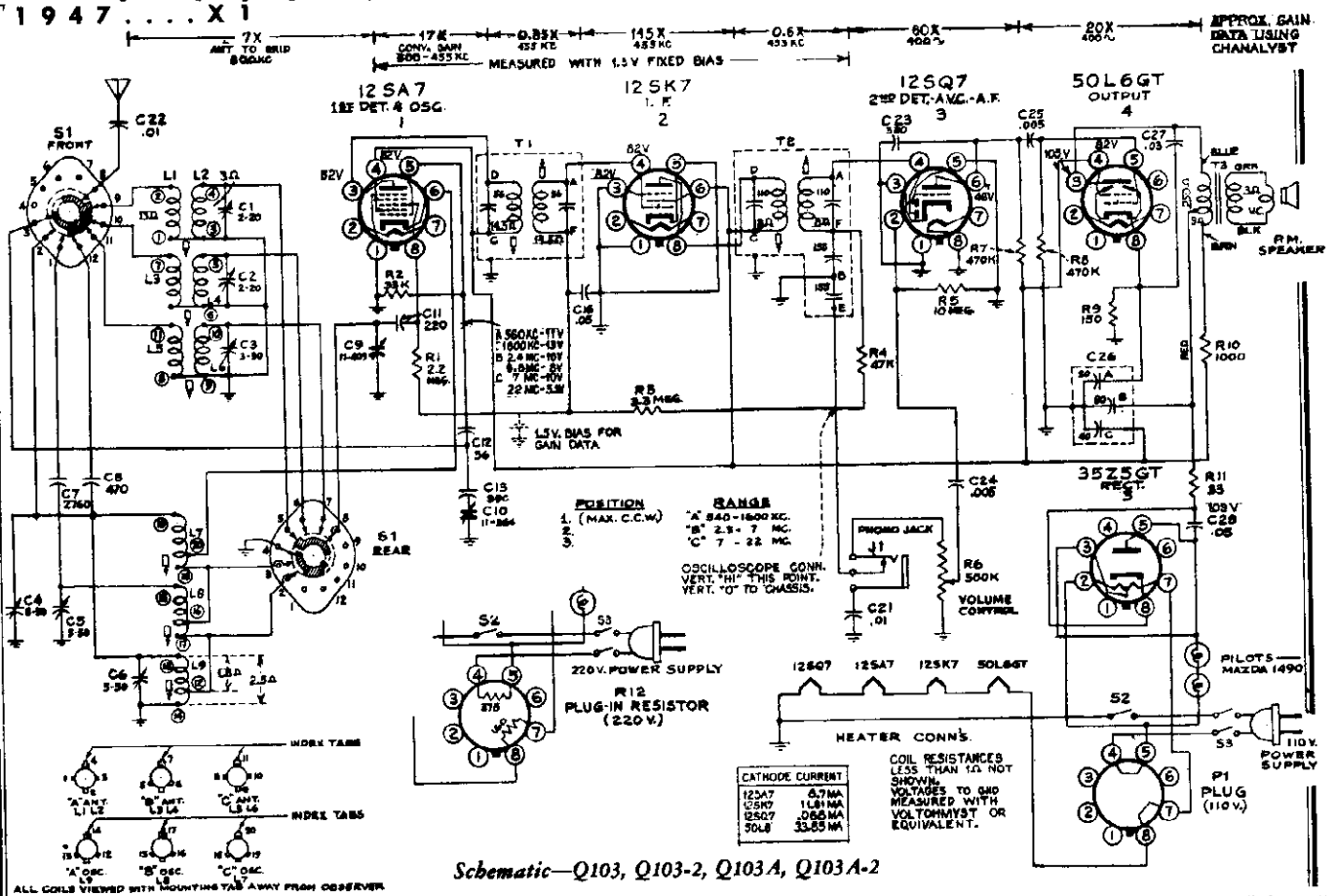
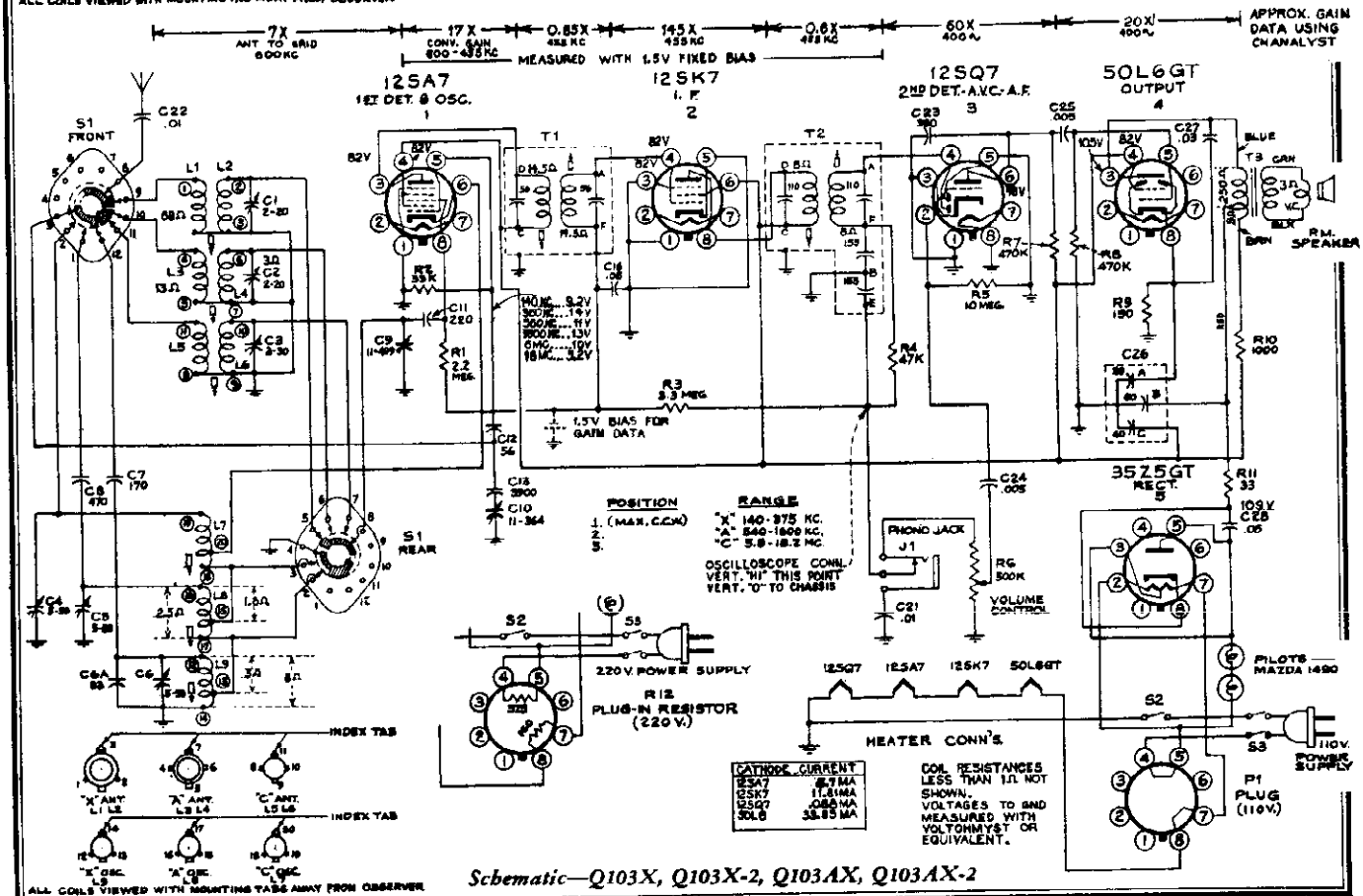
1947 . . . X1



Schematic—Q103, Q103-2, Q103A, Q103A-2



Schematic—Q103X, Q103X-2, Q103AX, Q103AX-2

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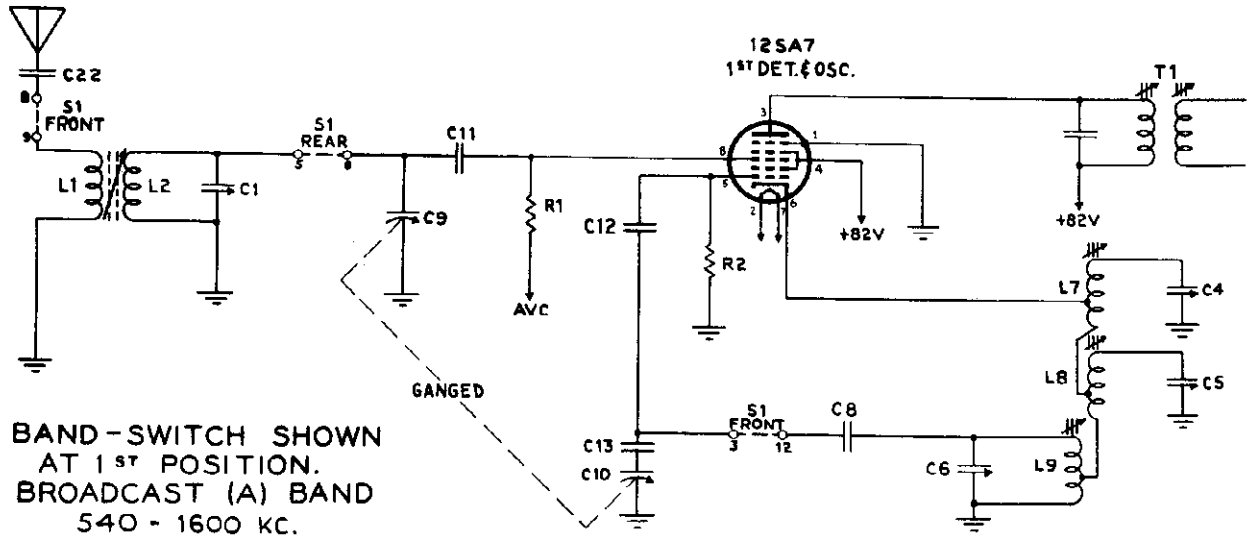
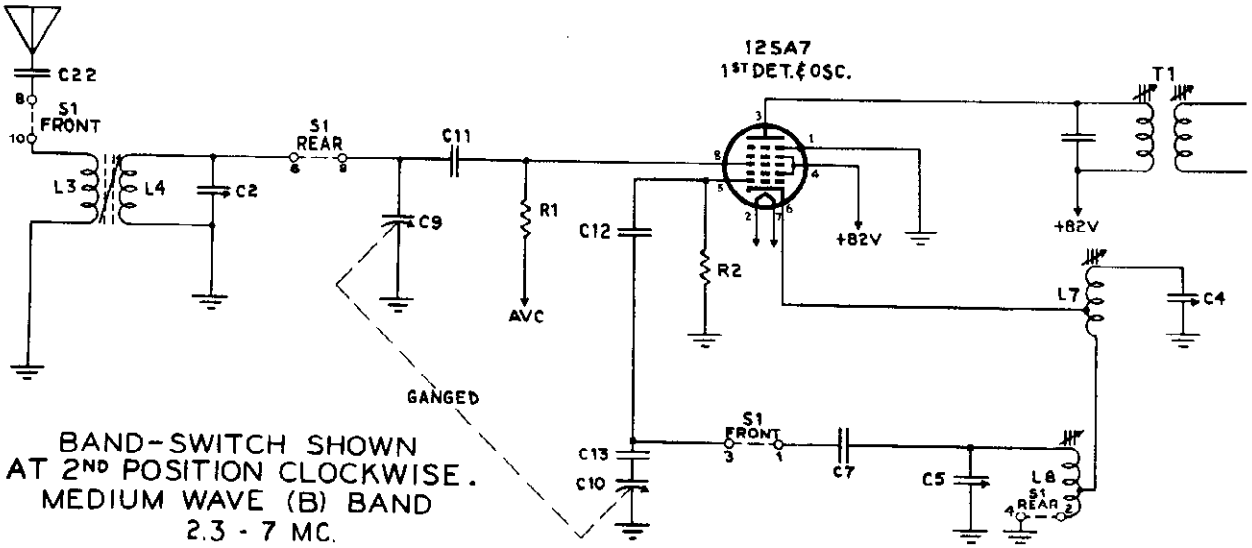
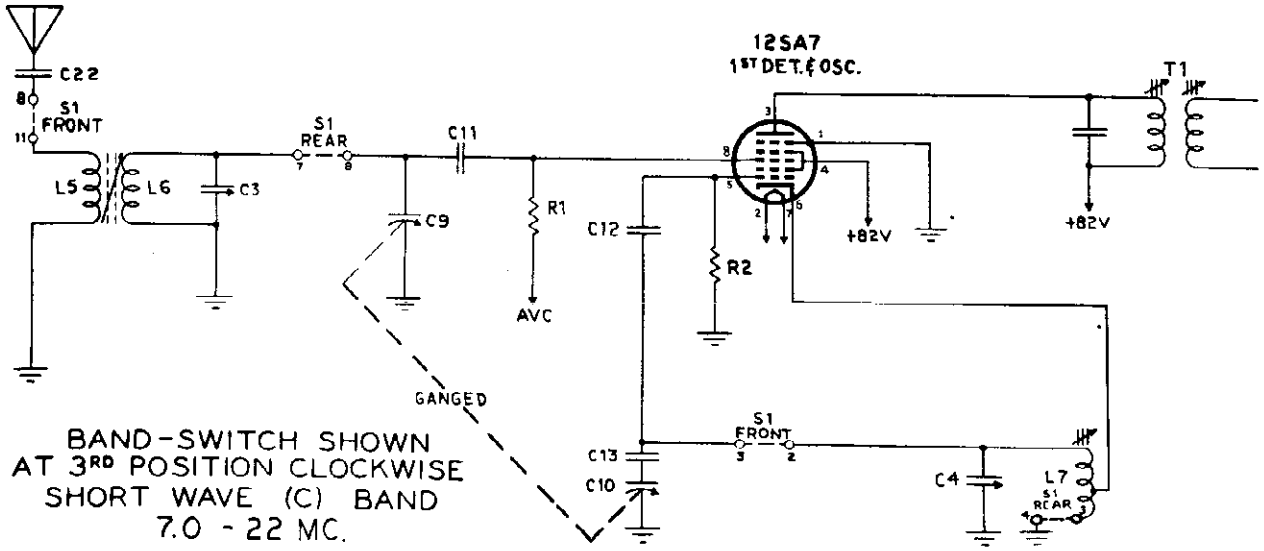


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
540 - 1600 KC.



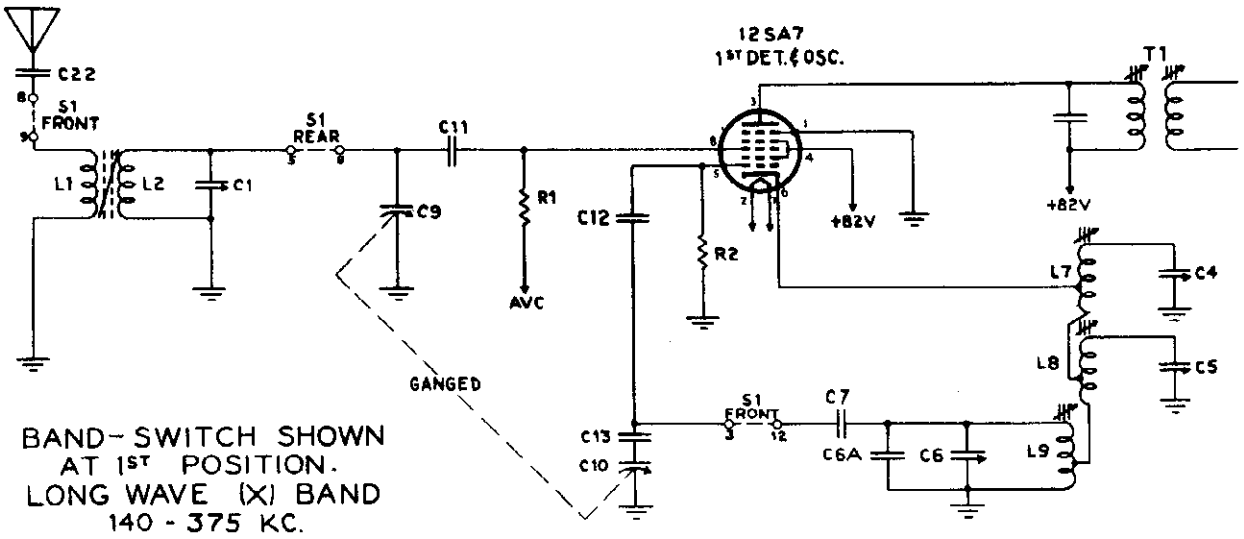
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
MEDIUM WAVE (B) BAND
2.3 - 7 MC.



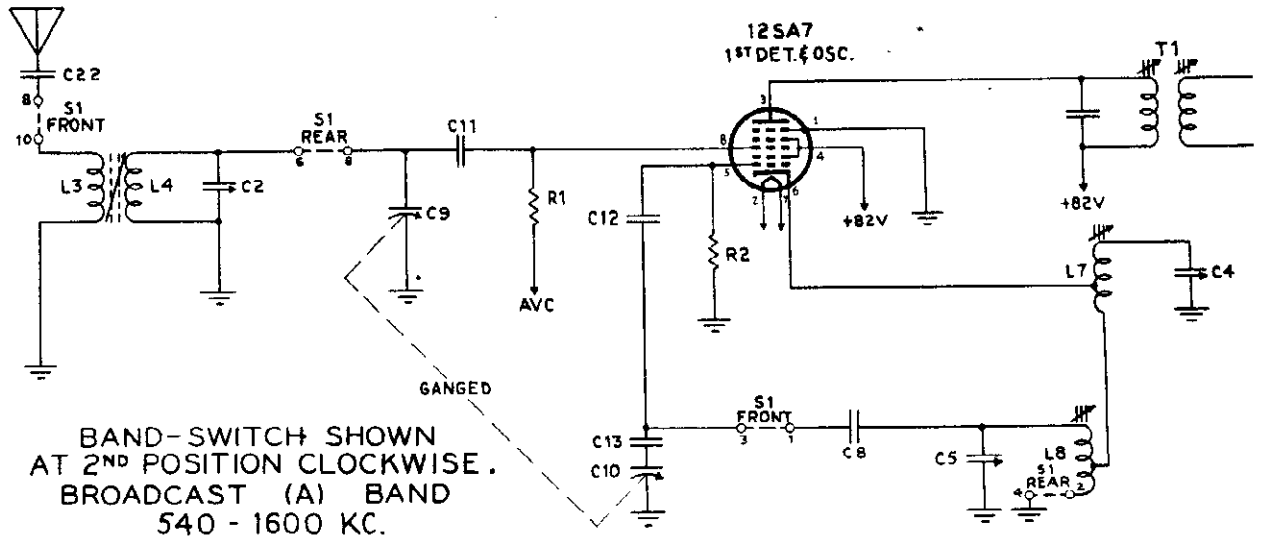
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
SHORT WAVE (C) BAND
7.0 - 22 MC.

MODELS Q103X,-2,AX,AX-2

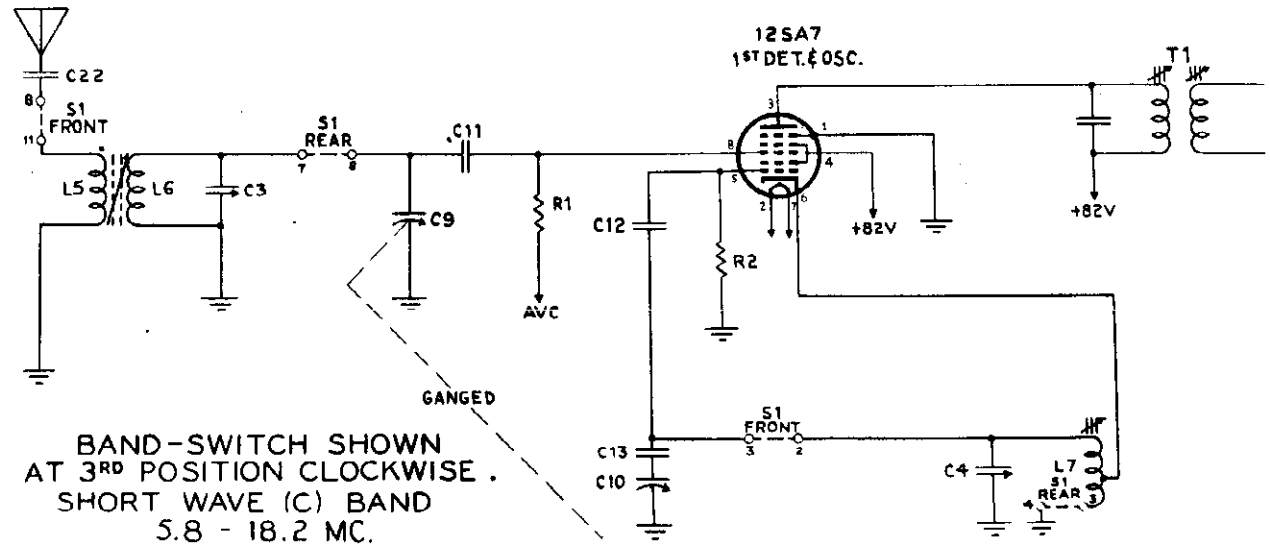
RCA MFG. CO.



BAND-SWITCH SHOWN AT 1ST POSITION. LONG WAVE (X) BAND 140 - 375 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST (A) BAND 540 - 1600 KC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. SHORT WAVE (C) BAND 5.8 - 18.2 MC.

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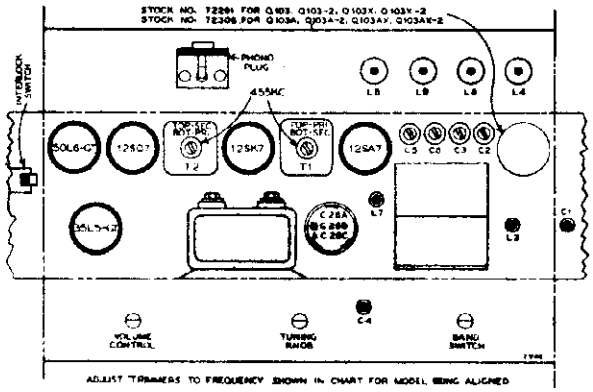
MODELS Q103,-2,A,A-2
MODELS Q103X,-2,AX,AX-2



Tube and Trimmer Locations

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across either 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.

Alignment.—With the gang condenser in full mesh, the pointer should be set three inches from the left edge of the dial back plate. This point corresponds to the first mark on the dial scale to the left of "550" kc. on "A" band. To find any calibration point it is necessary to draw a line on the dial scale drawing through the desired freq., so that the line passes through the same reading on the top and bottom rule scales. For instance, 1300 kc. on "A" band will correspond to a dial indicator setting of 7⅝" from the LEFT EDGE of the dial back plate. Move the indicator the desired distance by turning the tuning knob. ONCE THE INDICATOR HAS BEEN SET AT FULL MESH, MOVE THE INDICATOR ONLY BY TURNING THE TUNING KNOB.

Alignment Table Q103X, Q103X-2, Q103AX, Q103AX-2

Steps	Connect high side of test-osc. to—	Tune test osc. to—	Range Switch	Move indicator to—	Adjust following for max. output—
1	12SK7 1-F grid in series with .01 mfd. condenser	455 kc	A Band	Quiet point around 600 kc	T2 top and bottom core
2	12SA7 1st Det. grid in series with .01 mfd. condenser				T1 top and bottom core
3§	Antenna lead (blue) in series with a 300 ohm resistor	15.2 mc	C Band	15.2 mc	C4 osc.† C3 ant.‡
4		6.1 mc		6.1 mc	L7 osc.* L6 ant.
5	Repeat steps 3 and 4 until aligned				
6	Antenna lead in series a 200 mmf. condenser	1300 kc	A Band	1300 kc	C5 osc. C2 ant.
7		600 kc		600 kc	L8 osc. L4 ant.
8		Repeat steps 6 and 7 until aligned			
9		350 kc	X Band	350 kc	C6 osc. C1 ant.
10		150 kc		150 kc	L9 osc. L2 ant.
11		Repeat steps 9 and 10 until aligned			

Dial Indicator Adjustment.—After the set has been aligned, replace it in the cabinet. Turn the tuning knob until the condenser is in full mesh. The indicator should now be under the first mark on the dial scale face to the left of "550" kc on "A" band. If it is not, press out on the metal strip at the bottom of the dial glass. The metal strip will swing out exposing the dial indicator, which may be moved by sliding it along the dial string until it is at the desired point when the gang condenser is fully closed. If the indicator is more than a half inch off, the calibration should be rechecked.

Alignment.—The most satisfactory method of aligning or checking the ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce inaccuracy on the band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

***Caution:** This is an AC-DC type chassis with one side of the power line connected to the metal base, which is also—B. Connection from the signal generator must have a large (.1 MFD) capacitor in the ground side to prevent damage to the generator attenuator, unless the power source to the receiver is isolated from ground.

Alignment Table, Q103, Q103-2, Q103A, Q103A-2

Steps	Connect high side of test-osc. to—	Tune test osc. to—	Range Switch	Move indicator to—	Adjust following for max. output—
1	12SK7 1-F grid in series with .01 mfd. condenser	455 kc	A Band	Quiet point around 600 kc	T2 top and bottom core
2	12SA7 1st Det. grid in series with .01 mfd. condenser				T1 top and bottom core
3§	Antenna lead (blue) in series with a 300 ohm resistor	18.2 mc	C Band	18.2 mc	C4 osc.† C3 ant.‡
4		7.2 mc		7.2 mc	L7 osc.* L6 ant.
5		Repeat steps 3 and 4 until aligned			
6		6.1 mc	B Band	6.1 mc	C5 osc.† C2 ant.
7		2500 kc		2500 kc	L8 osc. L4 ant.
8	Repeat steps 6 and 7 until aligned				
9	Antenna lead (blue) in series with a 200 mmf condenser	1300 kc	A Band	1300 kc	C6 osc. C1 ant.
10		600 kc		600 kc	L9 osc. L2 ant.
11		Repeat steps 9 and 10 until aligned			

*Use min inductance if two peaks can be found.
†Use min. capacity if two peaks can be found.
‡Use max. capacity if two peaks can be found.
§Bottom shield cover in place after I-F's are aligned.

MODELS Q103,-2,A,A-2
MODELS Q103X,-2,AX,AX-2

RCA MFG. CO.

Specifications

Frequency Ranges Chassis No. RC-1044

Standard Broadcast ("A" Band) ..... 540-1600 kc (555-187 m)
Medium Wave ("B" Band) ..... 2.3-7.0 mc (130-42.2 m)
Short Wave ("C" Band) ..... 7.0-22 mc (42.2-13.6 m)

Frequency Ranges Chassis No. RC-1044B

Long Wave ("X" Band) ..... 140-375 kc (2,222-780 m)
Standard Broadcast ("A" Band) ..... 540-1600 kc (555-187 m)
Short Wave ("C" Band) ..... 5.8-18.2 mc (51.7-16.5 m)

Intermediate Frequency ..... 455 kc

RCA Tube Complement

(1) RCA-12SA7 ..... 1st Detector-Oscillator
(2) RCA-12SK7 ..... 1-F Amplifier
(3) RCA-12SQ7 ..... 2nd Detector, A.V.C., and A-F Amplifier
(4) RCA-50L6GT ..... Power Output
(5) RCA-35Z5GT ..... Rectifier

Power Supply Ratings (D-C or 50 to 60 cycles A-C)

Q103, Q103-2, Q103X, Q103X-2—105-125 volts ..... 30 watts
Q103A, Q103A-2, Q103AX, Q103AX-2—210-250 volts ..... 60 watts

Power Output Rating

Undistorted ..... 9 watts
Maximum ..... 1.5 watts

Loudspeaker

Type ..... 4 x 6 in. elliptical PM
Voice Coil Impedance ..... 3.4 ohms at 400 cycles

Tuning Drive Ratio ..... 20 to 1

Dimensions (Inches)	Width	Height	Depth
Cabinet (Outside)	15	9¾	7
Chassis Base (Outside)	13	2¾	4½
Chassis Overall	13	9¾	4½

Weight Net ..... 9 lbs.
Weight Shipping ..... 11 lbs.

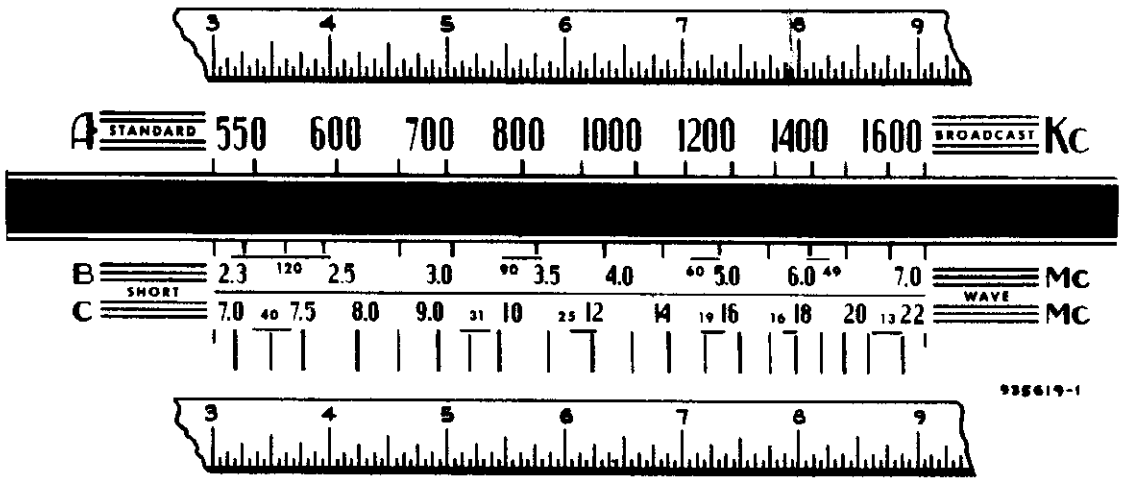
Phonograph Attachment.—A jack is provided on the bottom of the chassis for connection to a phonograph. The cable from the attachment should be terminated in a Stock No. 31048 plug. Plug must be removed when radio is in use.

When the phonograph is in use the volume control on the radio should be at minimum.

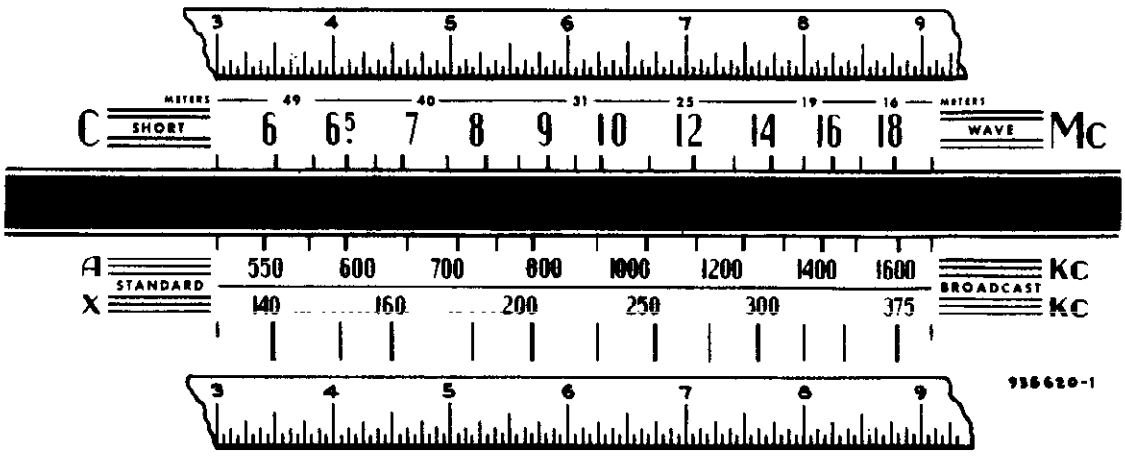
Plug-In Resistor.—Either a plug-in resistor or a shorting plug is used with these sets. The plugs are physically interchangeable and may be used to convert the set from 110 to 220 volts or from 220 to 110 volts. DANGER—Do not attempt to use these sets on 220 volts unless the plug-in RESISTOR is used. If the shorting plug is in place, serious damage will result. Consult the instrument label for original rating.

Disassembly.—Remove the screws holding the chassis bottom plate to the cabinet. Remove the chassis from the cabinet by removing the knobs and tilting the cabinet so that the chassis will slide back and out. Looking at the chassis from the front, a switch is visible on the left apron in the rear. This is an interlock switch. The set will not function out of the cabinet unless this switch is closed. A small screw through the interlock actuating arm and the hole in the chassis bottom plate will serve to keep the switch closed. When the chassis is replaced in the cabinet, remove the screw so that the switch will function.

Model	Bands	Power Supply	Cabinet
Q103	"A"-"B"-"C"	110V	Brown
Q103A	"A"-"B"-"C"	220V	Brown
Q103-2	"A"-"B"-"C"	110V	Ivory
Q103A-2	"A"-"B"-"C"	220V	Ivory
Q103X	"X"-"A"-"C"	110V	Brown
Q103AX	"X"-"A"-"C"	220V	Brown
Q103X-2	"X"-"A"-"C"	110V	Ivory
Q103AX-2	"X"-"A"-"C"	220V	Ivory



Reduced Reproduction of Receiver Dial, RC-1044, and Corresponding Rule Scales



Reduced Reproduction of Receiver Dial, RC-1044B, and Corresponding Rule Scales

The corresponding position of the dial indicator in inches, from the left hand edge of the dial plate, for any frequency can be determined by drawing a line from the frequency to a point on the bottom rule scale passing through the same point on the top rule scale. For example 600 kc on the dial scale corresponds to a dial indicator setting of 4¼" from the left hand edge of the dial plate, etc. Read instructions under "Alignment Procedure."

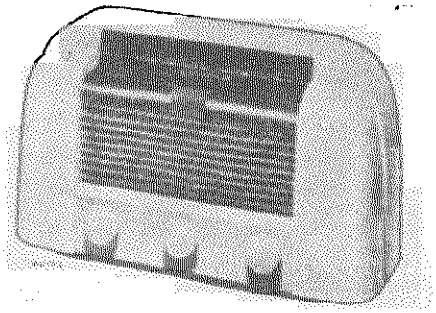
RCA MFG. CO.

MODELS Q103,-2,A,A-2
MODELS Q103X,-2,AX,AX-2

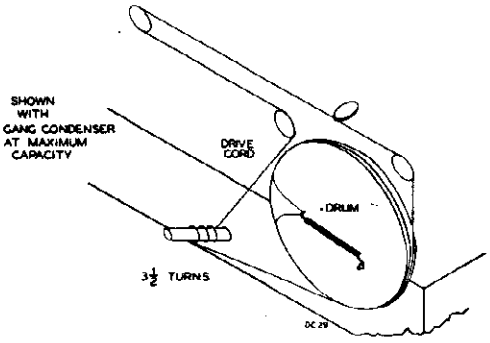
PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.

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.

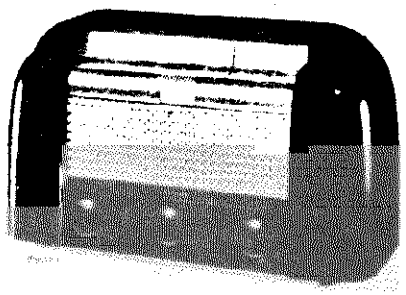


Q103-2, Q103A-2
Q103X-2, Q103AX-2



Dial-Indicator and Drive Mechanism

Q103, Q103A
Q103X, Q103AX



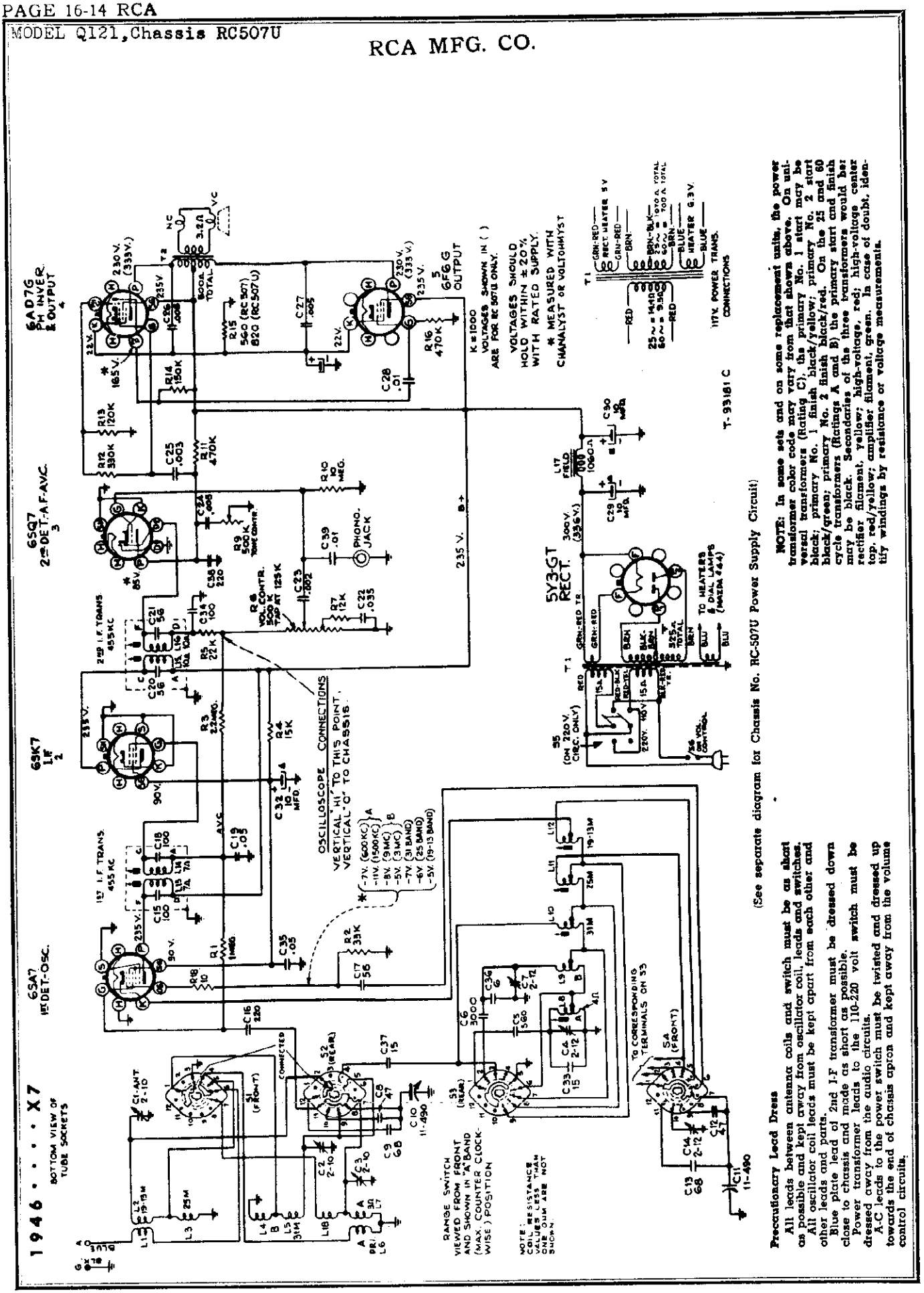
Replacement Parts

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1044—Q103, Q103-2, Q103A, Q103A-2 RC-1044B—Q103AX, Q103AX-2, Q103X, Q103X-2
*72306	Capacitor—Mica trimmer, 3-30 mmf. (C3)
*72307	Capacitor—Mica trimmer, 5-50 mmf. (C4)
39616	Capacitor—Mica, 33 mmf. (C6A for Q103AX, Q103AX-2, Q103X, Q103X-2)
39622	Capacitor—Mica, 56 mmf. (C12)
*72794	Capacitor—Ceramic, 170 mmf. (C7 for Q103AX, Q103AX-2, Q103X, Q103X-2)
39636	Capacitor—Mica, 220 mmf. (C11)
72571	Capacitor—Mica, 330 mmf. (C23)
*72814	Capacitor—Ceramic, 470 mmf. (C8)
*72305	Capacitor—Mica trimmer, comprising 2 sections of 2-20 mmf. and 2 sections of 5-50 mmf. (C1, C2, C5, C6)
*72795	Capacitor—Mica, 2760 mmf. (C7 for Q103, Q103-2, Q103A, Q103A-2)
*72637	Capacitor—Mica, 3900 mmf. (C13)
*71699	Capacitor—Molded paper, .005 mfd., 400 volts (C24, C25)
71770	Capacitor—Molded paper, .01 mfd., 400 volts (C21, C22)
*72815	Capacitor—Molded paper, .03 mfd., 400 volts (C27)
*71702	Capacitor—Molded paper, .05 mfd., 400 volts (C16, C28)
*72281	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts, 1 section of 40 mfd., 150 volts and 1 section of 20 mfd., 25 volts (C26)
*72576	Coil—Antenna coil, "A" band (L1, L2 for Q103 and Q103A, Q103-2, Q103A-2; L3, L4 for Q103AX, Q103X, Q103X-2, Q103AX-2)
*72298	Coil—Antenna coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L3, L4)
*72299	Coil—Antenna coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L5, L6)
*72276	Coil—Antenna coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L5, L6)
*72297	Coil—Antenna coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2, (L1, L2)
*72575	Coil—Oscillator coil, "A" band (L9 for Q103, Q103A, Q103-2, Q103A-2, L8 for Q103AX, Q103X, Q103X-2, Q103AX-2)
*72302	Coil—Oscillator coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L8)
*72303	Coil—Oscillator coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L7)
*72274	Coil—Oscillator coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L7)
*72300	Coil—Oscillator coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L9)
*72294	Condenser—Variable tuning condenser (C9, C10)
38410	Control—Volume control and power switch (R6, S2)
34662	Cord—Drive cord (approx. 56" overall length)
70384	Drum—Drive drum
72283	Grommet—Rubber grommet for mounting tuning condenser and speaker
70429	Grommet—Rubber grommet for mounting tube socket
*72547	Indicator—Station selector indicator
71116	Lamp—Dial lamp, Mazda No. 1490
*72548	Plate—Dial back plate complete with drive cord pulleys
36230	Pulley—Drive cord pulley
71290	Resistor—33 ohms, 1 watt (R11)
30880	Resistor—150 ohms, ½ watt (R9)
71916	Resistor—1000 ohms, 1 watt (R10)
30685	Resistor—33,000 ohms, ½ watt (R2)
30787	Resistor—47,000 ohms, ½ watt (R4)
30648	Resistor—470,000 ohms, ½ watt (R7, R8)
30649	Resistor—2.2 megohms, ½ watt (R1)
31417	Resistor—3.3 megohms, ½ watt (R3)
30992	Resistor—10 megohms, ½ watt (R5)
*72577	Shaft—Tuning knob shaft
71115	Socket—Lamp socket
*72295	Socket—Phono-input socket (J1)
37605	Socket—Tube socket
31319	Socket—Tube socket
70390	Spring—Drive cord spring
*72745	Switch—Interlock switch, slide type, D.P.D.T. (S3)
*72304	Switch—Range switch (S1)
*72545	Transformer—First I. F. transformer (T1)
70918	Transformer—Second I. F. transformer (T2)
*72296	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES 922258-2
71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil. NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71122	Baffle—Speaker baffle
*71123	Bottom—Case bottom
Y1354	Cabinet—Brown plastic cabinet for Q103, Q103A, Q103X, Q103AX
Y1355	Cabinet—Ivory plastic cabinet for Q103-2, Q103A-2, Q103X-2, Q103AX-2
*72578	Clamp—Dial clamp (2 required)
*72686	Decal—Power switch decal
*72687	Decal—Range switch decal for Q103AX, Q103AX-2, Q103X, Q103X-2
*72747	Decal—Range switch decal for Q103, Q103-2, Q103A and Q103A-2
*72609	Dial—Glass dial scale for Q103, Q103A, Q103-2, Q103A-2
*72610	Dial—Glass dial scale for Q103AX, Q103X, Q103X-2, Q103AX-2
71127	Foot—Cabinet foot (walnut) for Q103, Q103A, Q103AX, Q103X (4 required)
71128	Foot—Cabinet foot (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2 (4 required)
70473	Knob—Tuning knob (walnut) for Q103, Q103A, Q103AX, Q103X
70474	Knob—Tuning knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2
*72549	Knob—Volume control or range switch knob (walnut) for Q103, Q103A, Q103AX, Q103X
*72550	Knob—Volume control or range switch knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2
71126	Nut—Speed nut to fasten hand grip screen (4 required)
*72291	Plug—Shorting plug for Q103, Q103-2, Q103X, Q103X-2
*72308	Resistor—Plug-in resistor for Q103A, Q103A-2, Q103AX and Q103AX-2 (R12)
71125	Screen—Protective screen for hand grip
*72746	Slide—Interlock switch actuating slide
30900	Spring—Retaining spring for knobs
71130	Spring—Retaining spring for front strip
71129	Strip—Finished strip for cabinet front
34373	Washer—"C" washer to hold interlock actuating

*This is the first time this Stock No. has appeared in Service data.

MODEL Q121, Chassis RC507U

RCA MFG. CO.



(See separate diagram for Chassis No. RC-507U Power Supply Circuit)

NOTE: In some sets and on some replacement units, the power transformer color code may vary from that shown above. On universal transformers (Rating C), the primary No. 1 start may be black; primary No. 1 finish black/yellow; primary No. 2 start black/green; primary No. 2 finish black/red. On the 25 and 60 cycle transformers (Ratings A and B) the primary start and finish may be black. Secondaries of the three transformers would be: rectifier filament, yellow; high-voltage, red; high-voltage center top, red/yellow; amplifier filament, green. In case of doubt, identity windings by resistance or voltage measurements.

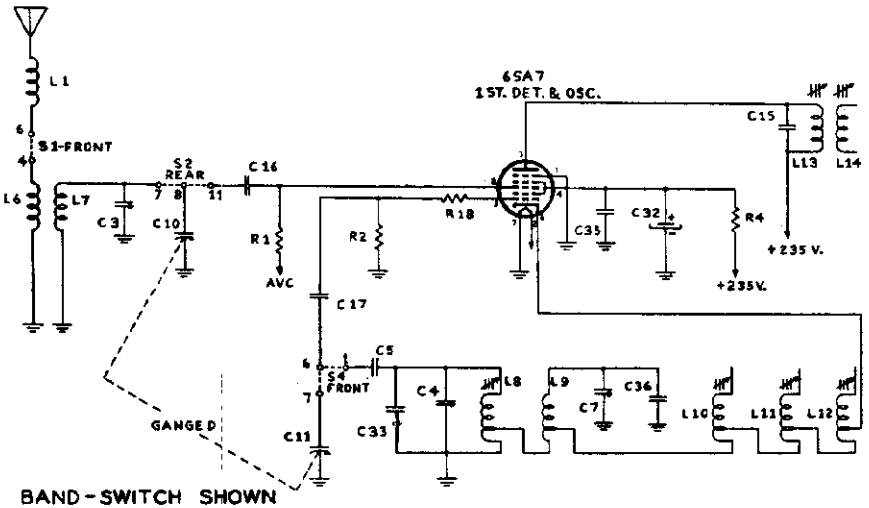
Precautionary Lead Dress

All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches. All oscillator coil leads must be kept apart from each other and other leads and parts.

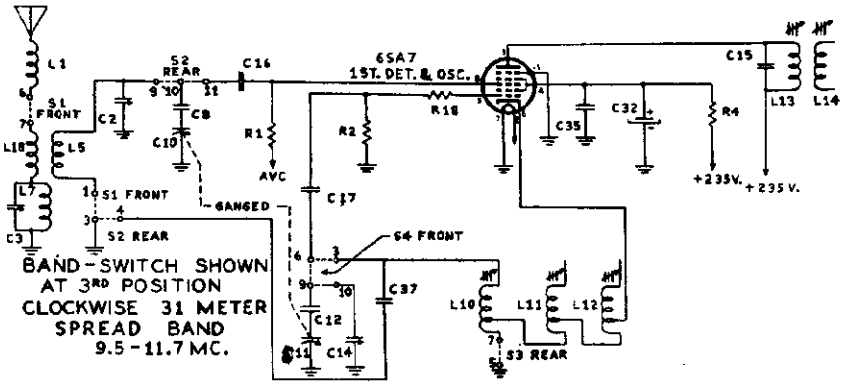
Blue plate lead of 2nd I.F transformer must be dressed down close to chassis and made as short as possible.

Power transformer leads to the 110-220 volt switch must be dressed away from the audio circuits.

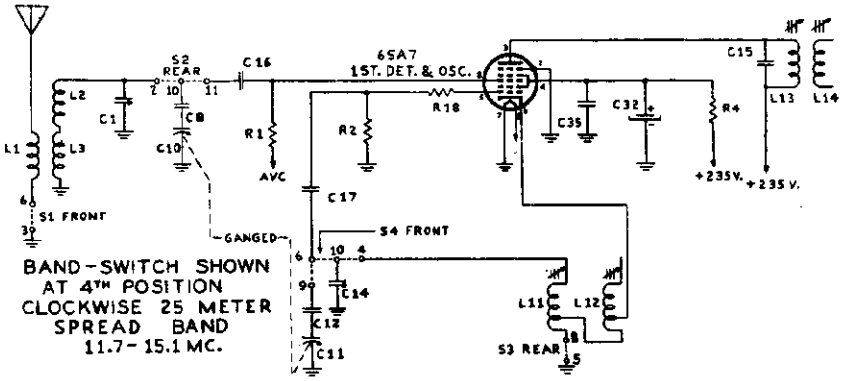
A.C leads to the power switch must be twisted and dressed up towards the end of chassis apron and kept away from the volume control circuits.



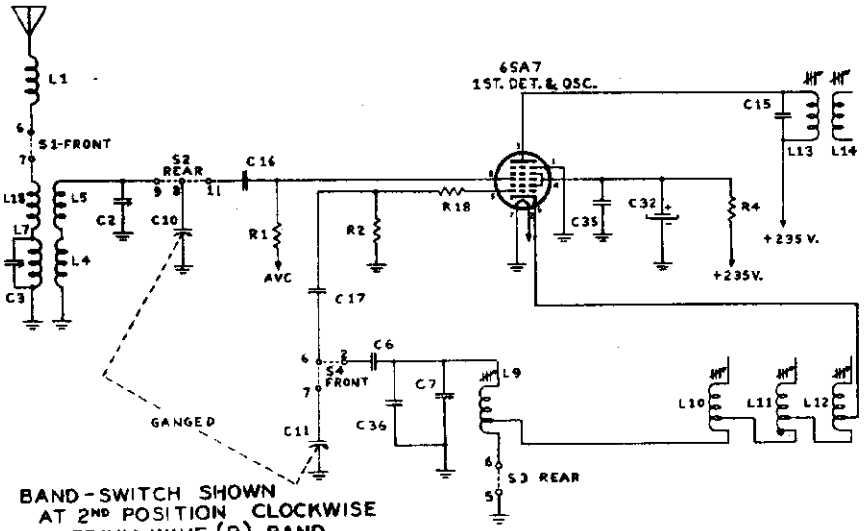
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST (A) BAND 540-1720 KC.



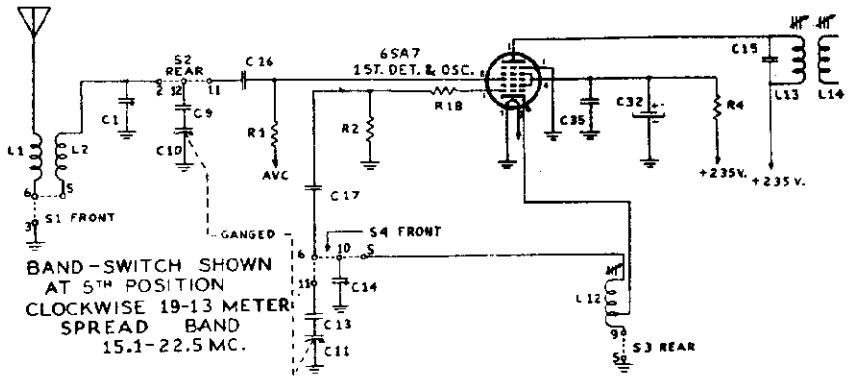
BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE 31 METER SPREAD BAND 9.5-11.7 MC.



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE 25 METER SPREAD BAND 11.7-15.1 MC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE MEDIUM WAVE (B) BAND 3.0-9.5 MC.



BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE 19-13 METER SPREAD BAND 15.1-22.5 MC.

MODEL Q121

RCA MFG. CO.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

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 oscillator output as low as possible to avoid a-v-c action.

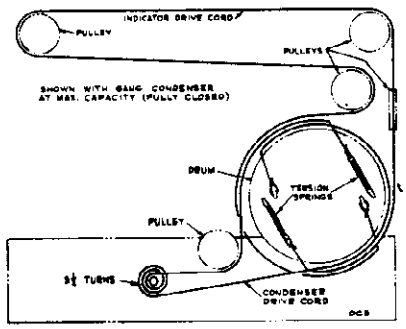
Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser 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 "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 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.

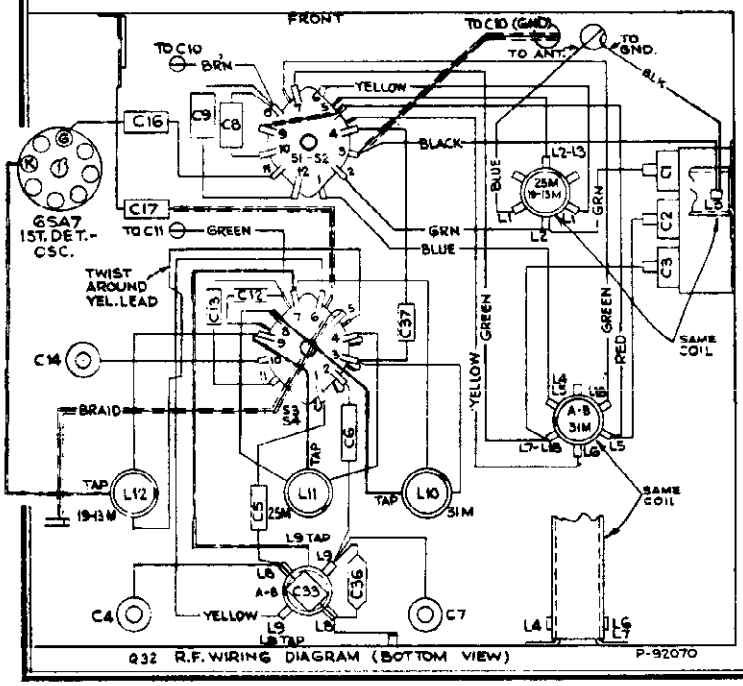
To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

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 "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 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.



Dial-Indicator and Drive Mechanism



Q32 R.F. WIRING DIAGRAM (BOTTOM VIEW) P-92070

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

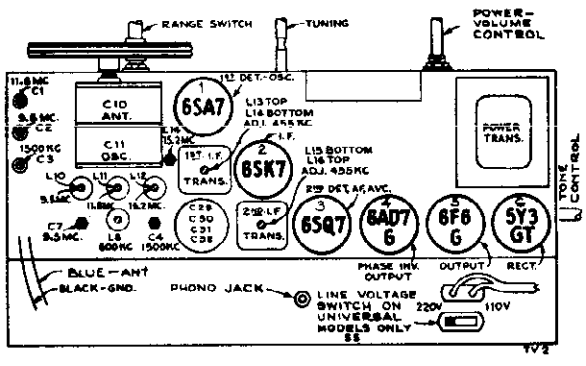
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L15 and L16 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L13 and L14 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25 M	138.5°	L11 (osc.)** C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13 M	156°	L12 (osc.)**
7		9.5 mc	31 M	156°	L10 (osc.)** C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

** If two peaks can be obtained use the one obtained when the core screw is farthest out (counter-clockwise).

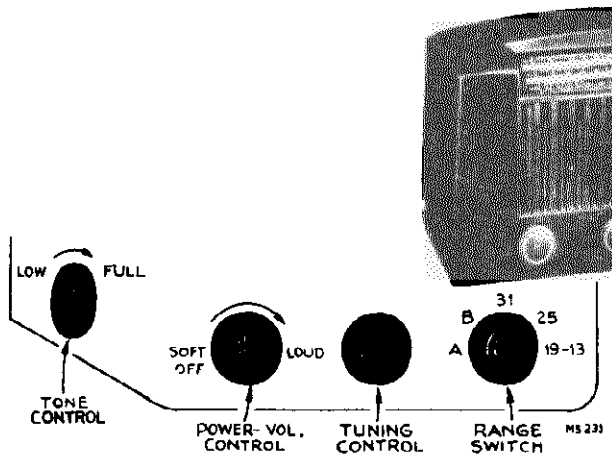
*** Peak at minimum capacity if two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.

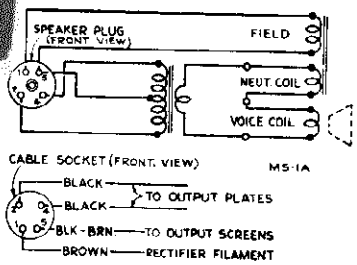


Tube and Trimmer Locations

RCA MFG. CO.



Location of Controls



Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507

Electrical and Mechanical Specifications

Chassis No. RC-507U differs from Chassis No. RC-507 in that it is equipped with a permanent magnet dynamic loudspeaker. Other than the loudspeaker and required changes to the power supply filter, and output tubes bias circuits, the chassis are identical.

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency ..... 455 kc

Tube Complement

(1) RCA-6SA7	1st Detector-Oscillator
(2) RCA-6SK7	I-F Amplifier
(3) RCA-6SQ7	2nd Detector, A-F Amplifier, A.V.C.
(4) RCA-6AD7-G	Phase Inverter, Power Output
(5) RCA-6F6-G	Power Output
(6) RCA-5Y3-GT	Rectifier

Power Output Rating

Undistorted	3 watts
Maximum	3.5 watts

Loudspeaker

Chassis No. RC-507	Identification No. 92517-1
Type (Electrodynamic)	6½ inches
V-C Impedance at 400 c.p.s.	3.4 ohms
Chassis No. RC-507U	Identification No. 92570-1
Type (P.M. dynamic)	6½ inches
V-C Impedance at 400 c.p.s.	3.4 ohms

Cabinet Dimensions (Inches)

	Height	Width	Depth
Q121 (Plastic)	10⅞	16¼	7⅝

Net Weight (pounds)	21
Shipping Weight (pounds)	25
Chassis Base Dimensions (inches)	Height, 2¾; Width, 15⅛; Depth, 5¼
Over-all Chassis Height	9¼ inches
Tuning Drive Ratio	25 to 1

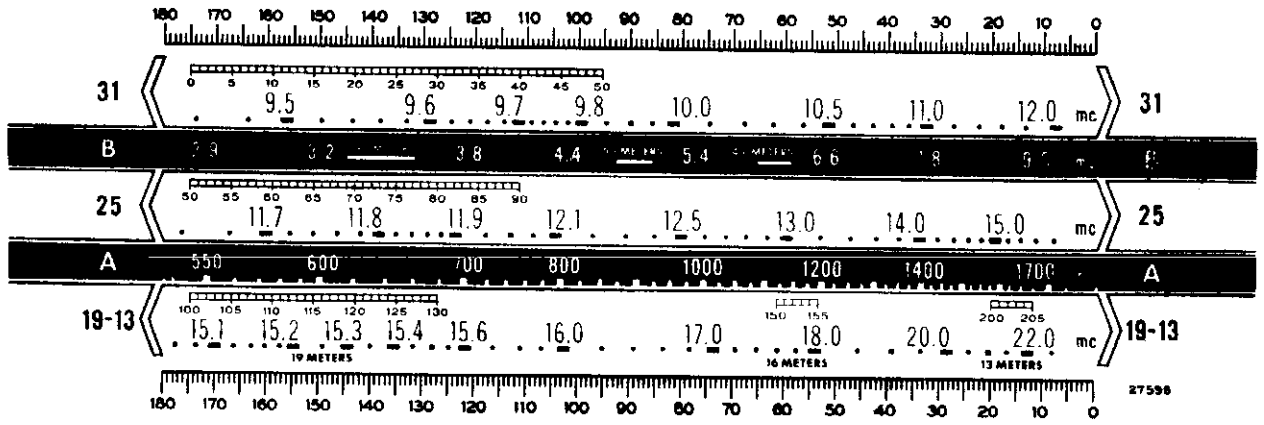
Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105 to 125 volts, 117 nominal	25 to 60	65
Rating B	105 to 125 volts, 117 nominal	50 to 60	65
Rating C	105 to 125 volts, 117 nominal 210 to 250 volts, 234 nominal	50 to 60	65

(Shipped in 210-250 volt position)

Phonograph Attachment.—A jack is provided on the rear of chassis for connection to a Phonograph Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Phonograph is not in use its plug should be removed. When Phonograph is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.

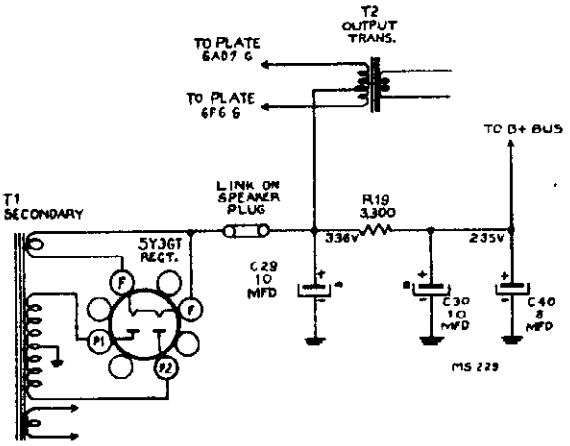


Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

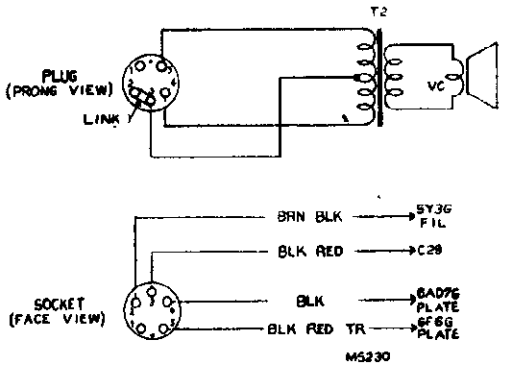
The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

MODEL Q121

RCA MFG. CO.



Chassis No. RC-507U Power Supply Circuit Diagram



Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507U

Replacement Parts

NOTE: The replacement parts listed below are applicable to both chassis except where specifically indicated.

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-507 and RC-507U
35622	Bracket—Flywheel and tuning shaft mounting support
37976	Bracket—Support bracket for tone control
35642	Calibrator—Drive drum calibrator
12714	Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14)
34654	Capacitor—Mica trimmer, comprising three sections of 2.5-10 mmf. (C1, C2, C3)
35646	Capacitor—Ceramic, 6 mmf. (C36)
36012	Capacitor—Ceramic, 15 mmf. (C37)
39041	Capacitor—Ceramic, 18 mmf. (C33)
70582	Capacitor—Ceramic, 47 mmf. (C9, C12)
39622	Capacitor—Mica, 56 mmf. (C17)
35645	Capacitor—Ceramic, 68 mmf. (C13)
70586	Capacitor—Mica, 68 mmf. (C9)
39628	Capacitor—Mica, 100 mmf. (C15, C18, C34)
39636	Capacitor—Mica, 220 mmf. (C16, C38)
70667	Capacitor—Mica, 560 mmf. (C5)
70687	Capacitor—Mica, 3000 mmf. (C6)
70585	Capacitor—Tubular, .0015 mfd., 1500 volts (C23)
70644	Capacitor—Tubular, .0025 mfd., 700 volts (C25)
70627	Capacitor—Tubular, .005 mfd., 500 volts (C24)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C27, C26)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C28, C39)
70614	Capacitor—Tubular, .035 mfd., 400 volts (C22)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C19, C35)
39014	Capacitor—Electrolytic, comprising 3 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C29, C30, C31 C32)
72139	Capacitor—Electrolytic, 8 mfd., 450 volts (RC-507U only) (C40)
35632	Coil—Antenna coil, "A", "B" and 31 meter bands (L4, L5, L6, L7 L18)
35631	Coil—Antenna coil, spread band (L1, L2, L3)
35623	Coil—Oscillator coil, "A" and "B" band (L8, L9)
35624	Coil—Oscillator coil, 19-13 meter band (L12)
35625	Coil—Oscillator coil, 25 meter band (L11)
35626	Coil—Oscillator coil, 31 meter band (L10)
35618	Condenser—Variable tuning condenser (C10, C11)
35629	Control—Tone control (R9)
35620	Control—Volume control and power switch (R6, S6)
32634	Cord—Drive cord (approx. 28" overall length)
34662	Cord—Indicator cord (approx. 53" overall length)
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter band, 25 meter band and 31 meter band oscillator coils
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning shaft flywheel
70930	Grommet—Rubber grommet for mounting tuning condenser (4 required)
5040	Plug—4 contact female plug for speaker cable (RC-507 only)
12493	Plug—5 contact female plug for speaker cable (RC-507U only)
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley
34761	Resistor—10 ohms, ¼ watt (R18)
30735	Resistor—560 ohms, 1 watt (RC-507 only) (R15)
39050	Resistor—820 ohms, 1 watt (RC-507U only) (R15)
48674	Resistor—3,300 ohms, 4 watt (RC-507U only) (R19)
30438	Resistor—12,000 ohms, ¼ watt (R7)
35595	Resistor—15,000 ohms, 3 watt (R4)
30492	Resistor—22,000 ohms, ¼ watt (R5)
30685	Resistor—33,000 ohms, ¼ watt (R2)
30180	Resistor—120,000 ohms, ¼ watt (R13)
30493	Resistor—150,000 ohms, ½ watt (R14)
14983	Resistor—330,000 ohms, ¼ watt (R12)
30648	Resistor—470,000 ohms, ½ watt (R11, R16)
30652	Resistor—1 megohm ¼ watt (R1)
30649	Resistor—2.2 megohms, ¼ watt (R3)
30982	Resistor—10 megohms, ¼ watt (R10)
14350	Screw—#8-32 square head set screw for drive drum
35633	Shaft—Extension shaft for range switch
35637	Shaft—Tuning knob shaft
31384	Socket—Lamp socket
14278	Socket—Phono input socket
31251	Socket—Tube socket
31261	Spring—Retaining spring for oscillator coils core and studs
31418	Spring—Tension spring for drive or indicator cord
35640	Support—Drive cord pulley support complete with one pulley
35639	Support—Drive cord pulley support complete with three pulleys
35621	Switch—Range switch (S1, S2, S3, S4)
32827	Switch—Voltage change switch (S5)
35636	Transformer—First I-F transformer (L13, L14, C15, C18)
35628	Transformer—Second I-F transformer (L15, L16, C20, C21)
32852	Transformer—Power transformer, 117 or 235 volt, 50 to 60 cycle (Rating "C") (T1)
35588	Transformer—Power transformer 117 volt, 25 to 60 cycle (Rating "A") (T1)
2917	Washer—"C" washer to fasten tuning shaft
33728	Washer—"C" washer to fasten idler pulley
	SPEAKER ASSEMBLY Stamped 92517-1] (For RC-507 only)
70578	Cone—Cone and voice coil assembly
5118	Plug—4 prong male speaker plug
70583	Speaker—6½" E.M. speaker complete with cone and voice coil, less output transformer and plug
70584	Transformer—Output transformer (T2)
	SPEAKER ASSEMBLY Stamped 92570-1] (For RC-507U only)
72425	Speaker—6½" P.M. speaker complete with cone and voice coil, less output transformer and plug
31539	Plug—5 prong speaker plug
70584	Transformer—Output transformer (T2)
	MISCELLANEOUS
*72142	Back—Cabinet back
70833	Board—Baffle board and grille cloth
Y1382	Cabinet—Plastic cabinet
70579	Decal—Trade mark decal
35654	Dial—Glass dial scale
35647	Frame—Dial frame only less indicator and dial
70580	Indicator—Station selector indicator
35651	Knob—Range switch knob
35652	Knob—Range indicator knob
35650	Knob—Tone control knob
34489	Knob—Tuning or volume control knob
11691	Lamp—Dial lamp, Mazda 44
14270	Spring—Retaining spring for knobs #34489, 35650 or 35651
4902	Spring—Retaining spring for knob #35652

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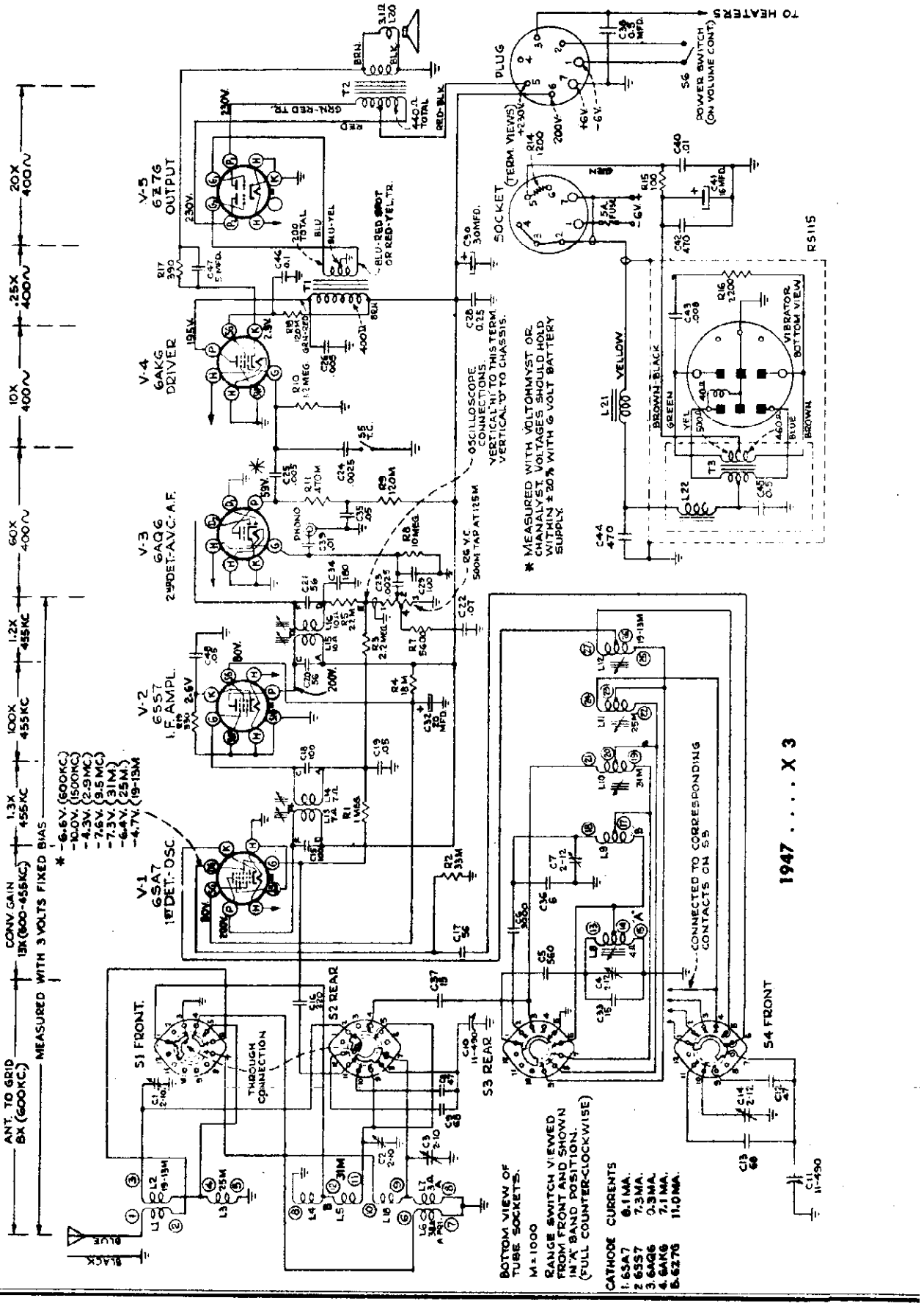
MODEL QB13, Chassis
RC529A, RC612



MODEL QB13

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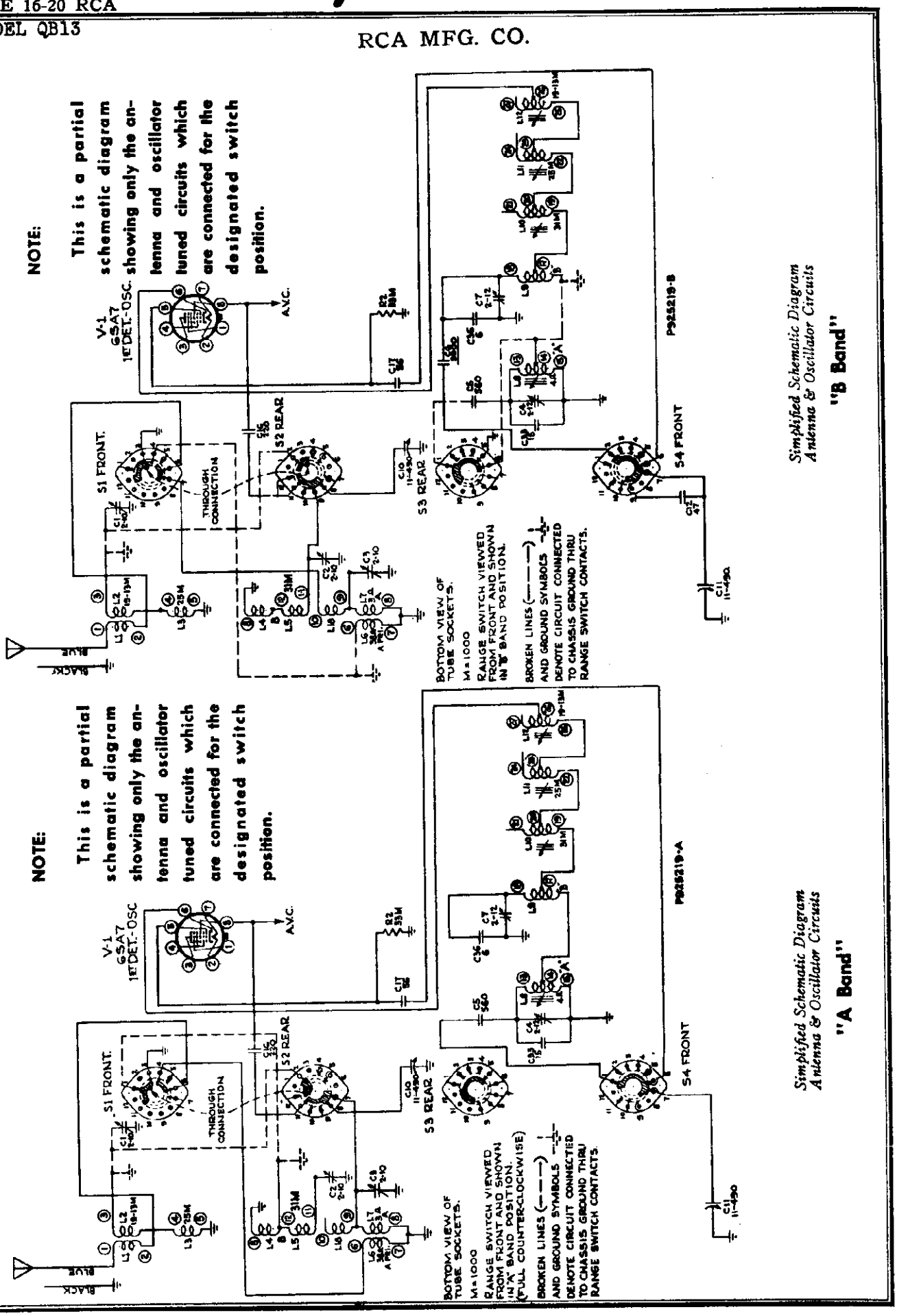
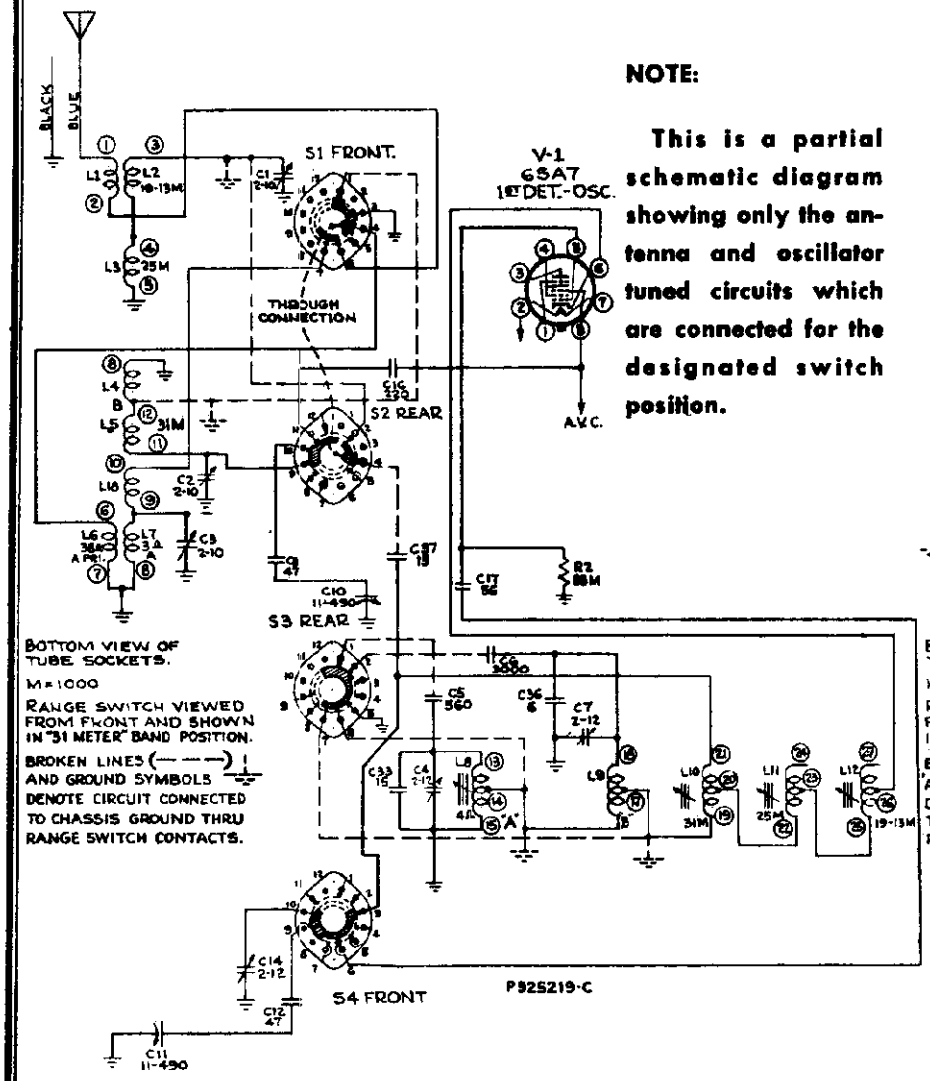
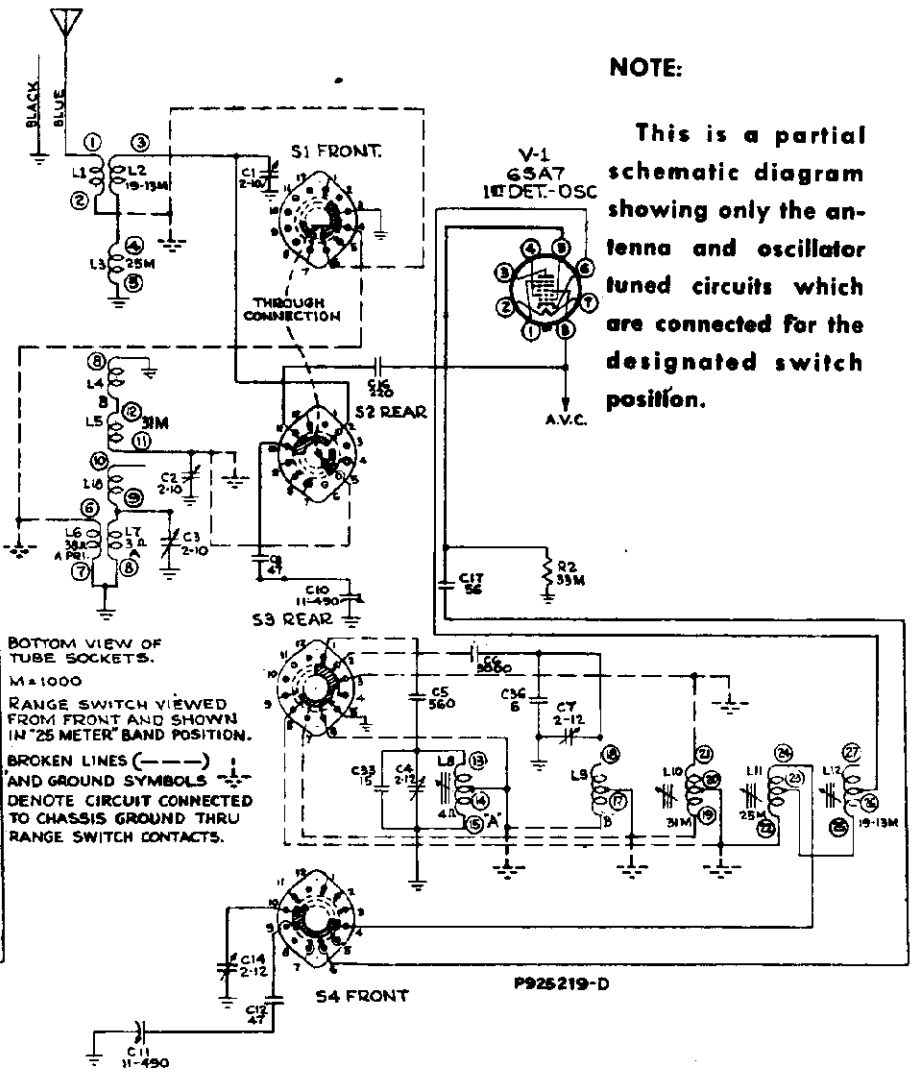




Simplified Schematic Diagram
Antenna & Oscillator Circuits

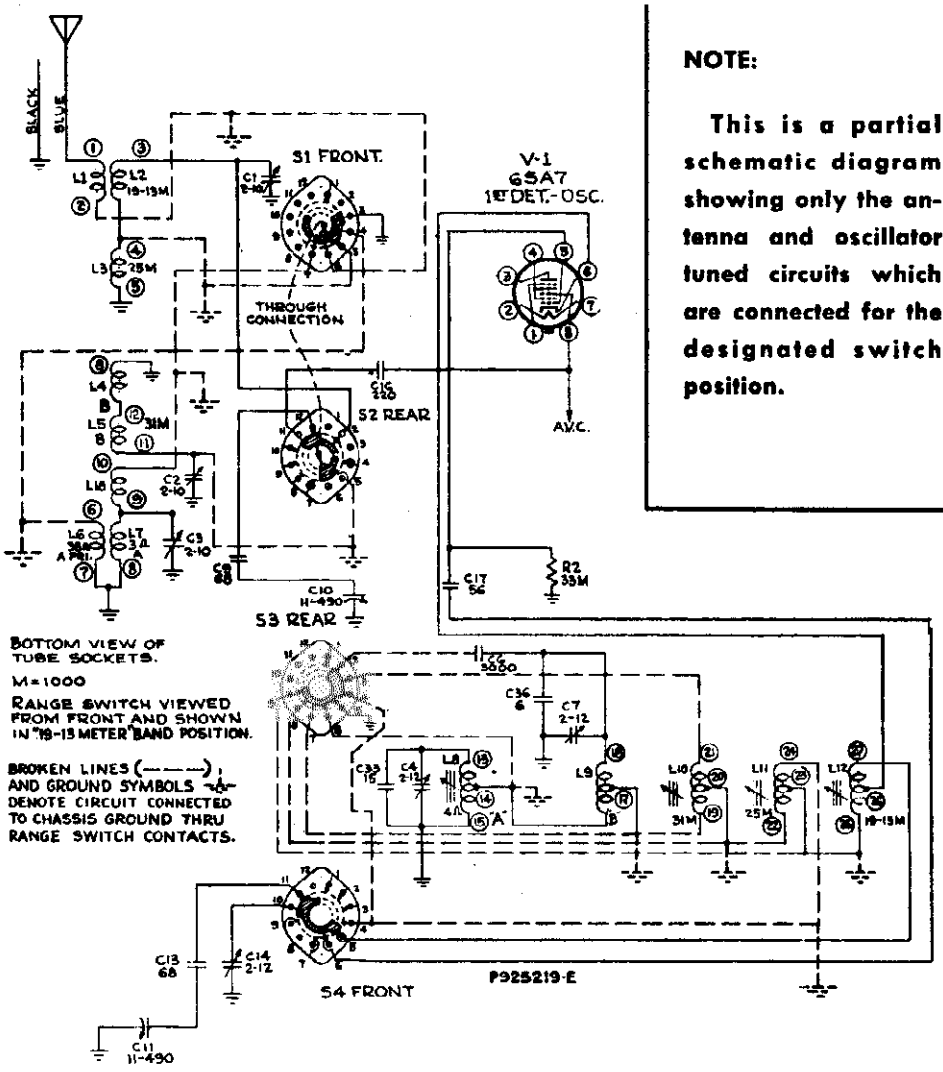
"31 Meter Band"



Simplified Schematic Diagram
Antenna & Oscillator Circuits

"25 Meter Band"

RCA MFG. CO.



NOTE:

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.

Simplified Schematic Diagram
Antenna & Oscillator Circuits

"19-13 Meter Band"

RCA MFG. CO.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the diagram.

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 oscillator 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 indicator-drive-cord 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.

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 dire tly 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 "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the oscillator coil magnetite-core for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of the test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetite-core for each band should be re-touched so that the stations come in at the correct points on the dial.

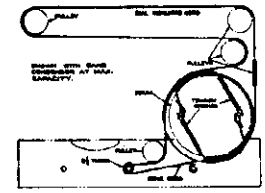
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid in series with .01 mfd.	455 kc	A	Quiet point near 180°	L16—L15 2nd I-F transformer
2	1st Det. grid, in series with .01 mfd.				L14—L13 1st I-F transformer
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.)* C1 (ant.)
4		15.2 mc		17°	C14 (osc.)***
5		Repeat steps 3 and 4.			
6		15.2 mc	19-13M	156°	L12 (osc.)*
7		9.5 mc	31M	156°	L10 (osc.)* C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)**
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.)** C3 (ant.)
10		600 kc		150°	L8 (osc.)* (Rock gang.)
11		Repeat steps 9 and 10.			

*If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

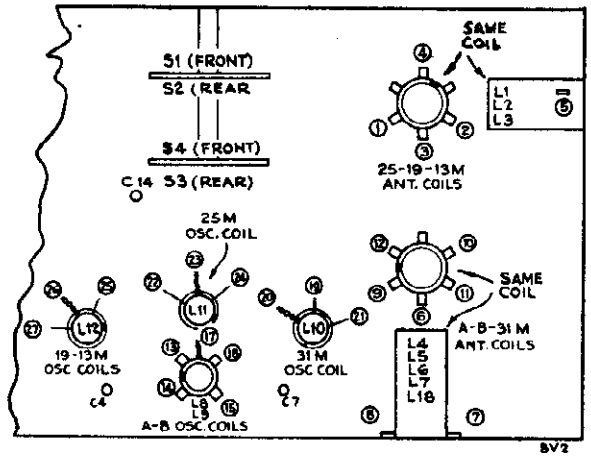
**Use minimum capacity peak if two can be obtained.

***Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

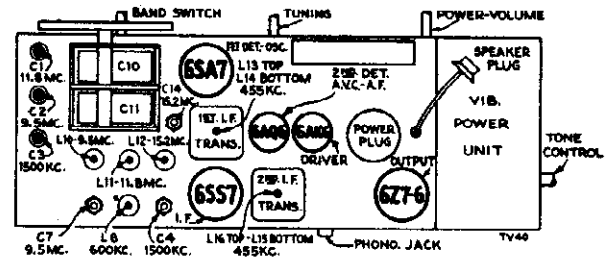
NOTE: Oscillator tracks above signal on all bands.



Dial-Indicator and Drive Mechanism



Coil and Band Switch Locations (Bottom Chassis View)



Tube and Trimmer Locations (Top Chassis View)

Precautionary Lead Dress.

1. Twist yellow lead from terminal 14 of L8 to terminal 6 of S3 with the lead from terminal 27 of L12 to terminal 5 of S4.
2. All other oscillator coil leads must be kept apart from each other as well as from other leads and parts. No two leads may be less than ⅛ inch apart.
3. The lead from the tap on 19-13 oscillator coil to pin number 6 (K) of 6SA7 socket should be dressed up and away from all parts as far as possible.
4. Condensers C8, C9 and C16 must be as far away from all metal parts as possible.
5. All leads from the antenna coil to the range switch should be dressed together.
6. The green lead from pin 4 (SG) of 6SA7 socket to pin 6 (SG) of 6SS7 socket should be dressed down against the chassis and away from the I.F. terminals.
7. All leads and parts must clear the tuning flywheel by at least ⅛ inch.
8. The leads to the power switch should be twisted together and dressed away from other leads and parts as much as possible.
9. Capacitor C34 must be mounted edgewise and close to the chassis with the leads as short as possible.
10. The green lead from term. C of 1st I-F trans to pin 4 (G) of 6SS7 must be short and close to chassis under all other leads.

MODEL QB13

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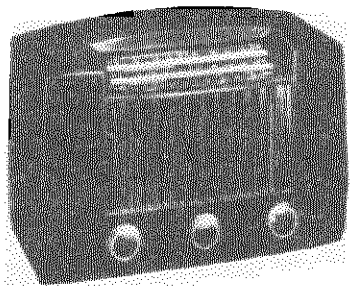


Electrical and Mechanical Specifications

Frequency Ranges

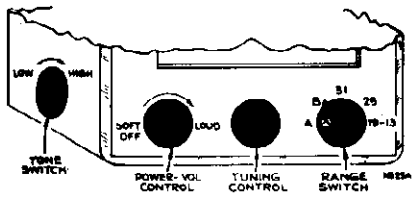
Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	2.9-9.5 mc (103-31.6 m)
"31" Meter Spread Band	9.5-12 mc (31.6-25 m)
"25" Meter Spread Band	11.7-15 mc (25.6-20 m)
"19-13" Meter Spread Band	15.1-22 mc (19.9-13.6 m)

Intermediate Frequency ..... 455 kc

RCA Tube Complement

RC-529A	RC-612	
(1) RCA-6SA7	RCA-6SA7	1st-Det.—Osc.
(2) RCA-6S7*	RCA-6SS7	I-F Amplifier
(3) RCA-6T7-G*	RCA-6AQ6	2nd-Det., A.V.C., and 1st Audio
(4) RCA-6J7	RCA-6AK6	Driver
(5) RCA-6Z7-G	RCA-6Z7G	Power Output

*In some units, a 6K7 may be substituted for the 6S7 and a 6Q7 in place of the 6T7G.



Location of Controls

Power Supply Rating

With vibrator power supply unit (RS-115):

6.3 volts, total current drain	*RC-529A	3.35 amperes
	RC-612	3.2 amperes

*If both tube substitutions are made, the total current consumption will be increased to 3.65 Amperes.

Power Output	RC-529A	RC-612
Undistorted	3.1 watts	2.1 watts
Maximum	4.5 watts	3.1 watts

Loudspeaker (92519-1)

Type ..... 6½ inch, permanent-magnet dynamic
Voice-coil Impedance at 400 cycles ..... 3.4 ohms

		Height	Length	Depth
Cabinet Dimensions	QB11	11¾"	17½"	7½"
	QB12 & QB13	10⅞"	16¼"	7¾"

Net Weight	QB11	21.5 lbs.
	QB12 & QB13	20.0 lbs.

Tuning Drive Ratio 25:1

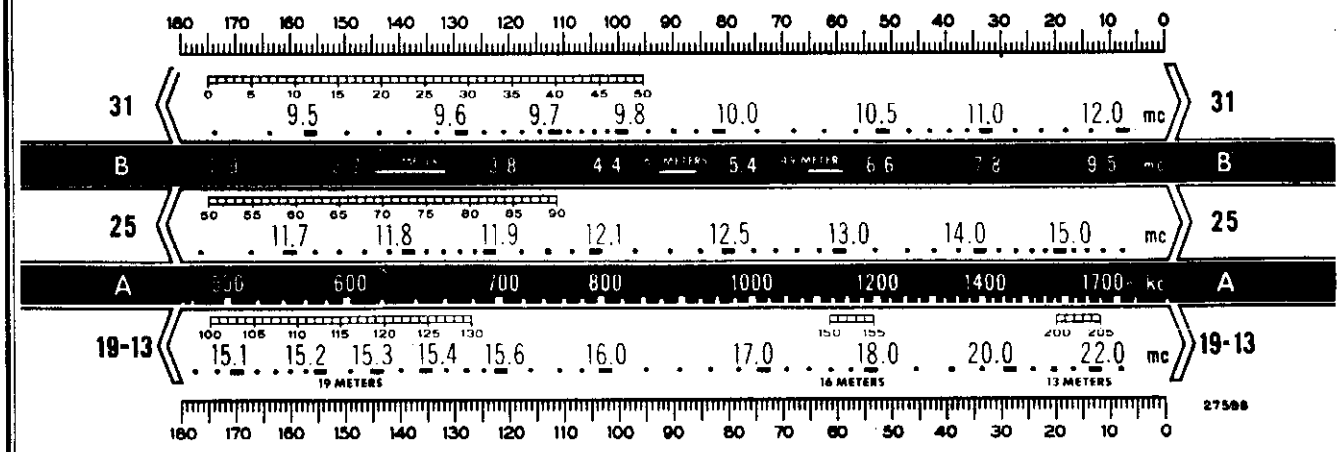
Phonograph Attachment

A jack is provided on the rear of chassis for connecting a Phonograph attachment to the audio amplifying circuit.

When Phonograph attachment is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.

When Phonograph attachment is not in use its plug should be disconnected.

RECEIVER DIAL WITH 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: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

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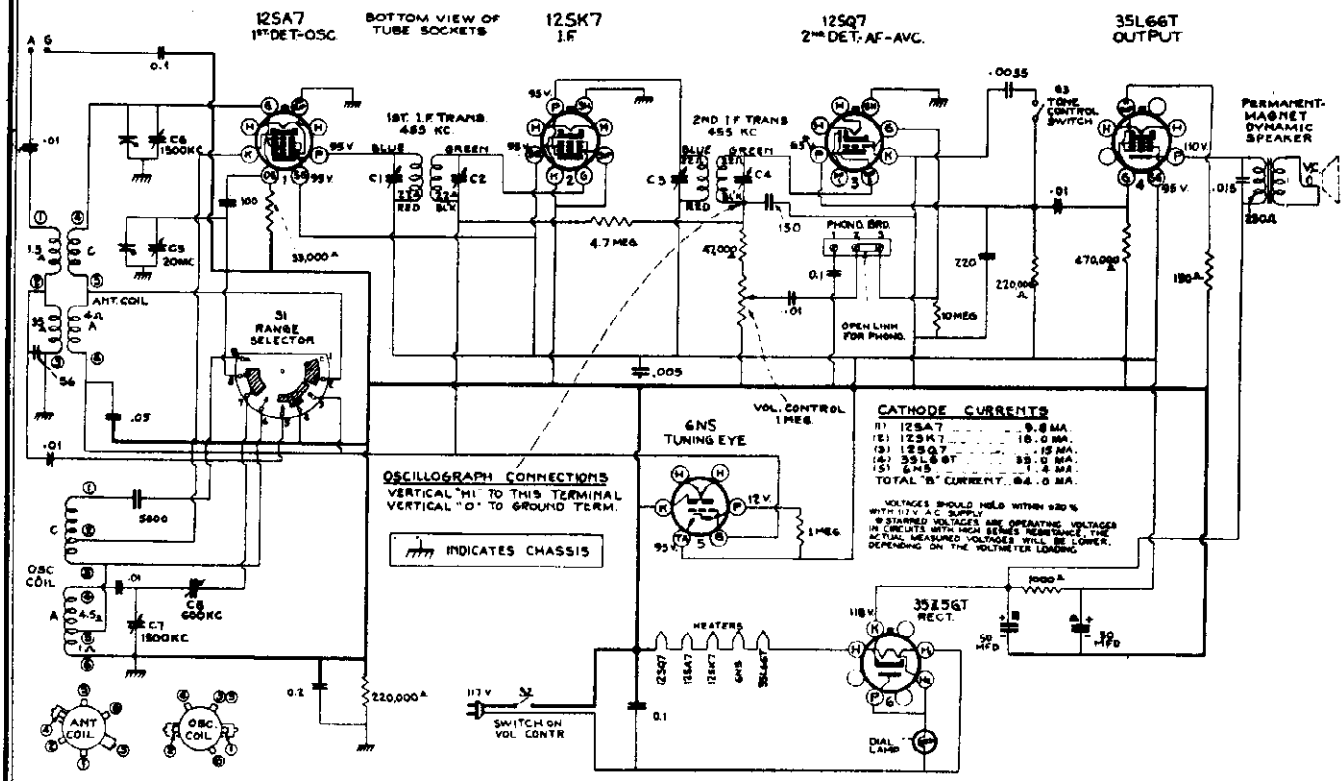
MODEL X60, Chassis RC474D

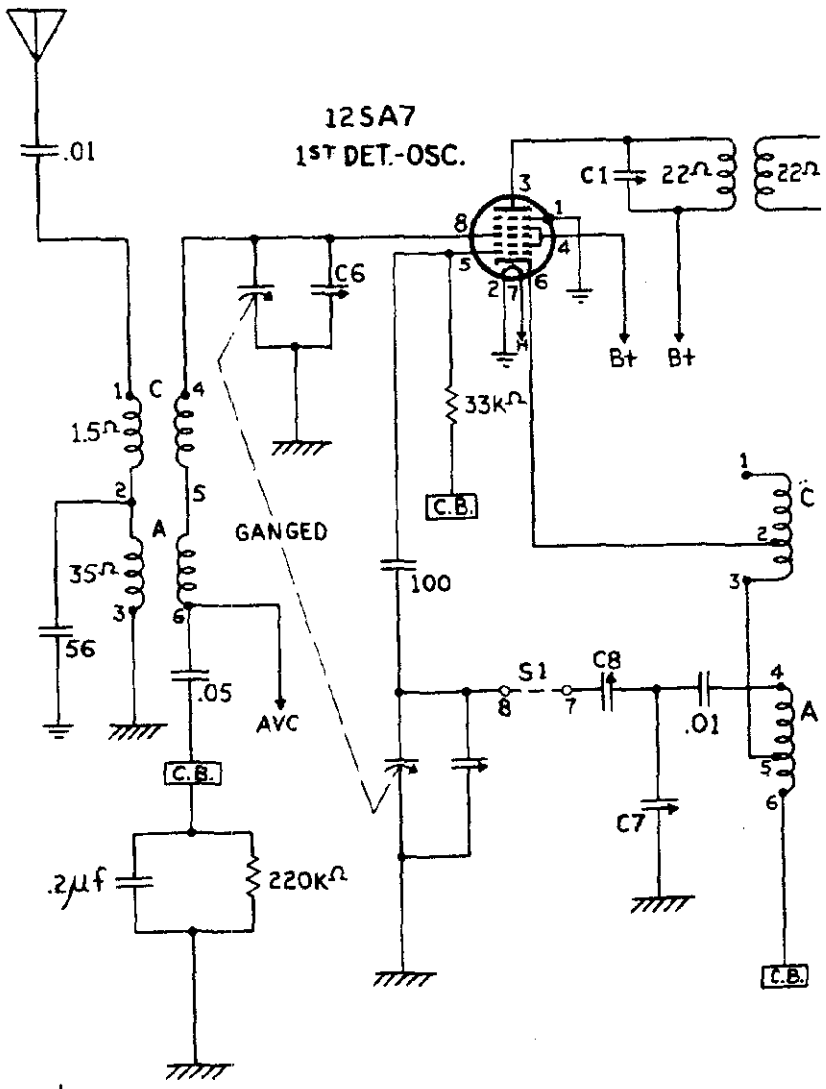


STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC-474D)	14284	Resistor—22,000 ohms, 1/10 watt
33719	Belt—Push button adjusting belts	13998	Resistor—22,000 ohms, ½ watt
34024	Board—"Antenna-Ground" board	12454	Resistor—33,000 ohms, ½ watt
34025	Board—"Radio-Phono" board	12412	Resistor—47,000 ohms, ½ watt
33731	Button—Push button	12264	Resistor—220,000 ohms, ½ watt
30766	Cap—Rubber shield for Magic Eye	12285	Resistor—470,000 ohms, ½ watt
33629	Capacitor—Trimmer capacitor comprising of 2 sections (C7, C8)	30271	Resistor—4.7 megohm, ½ watt
12723	Capacitor—56 mmfd., moulded mica	13601	Resistor—10 megohm, ½ watt
12720	Capacitor—100 mmfd., moulded mica	33438	Screw—Magic Eye clip screw
12725	Capacitor—150 mmfd., moulded mica	33725	Shaft—Tuning knob drive shaft and retainer
12694	Capacitor—220 mmfd., moulded mica	31365	Socket—Dial lamp socket
13895	Capacitor—5,600 mmfd., moulded mica	13871	Socket—Magic Eye socket
30303	Capacitor—.0035 mfd., 700 volts	31319	Socket—Tube socket
33584	Capacitor—.005 mfd., 1,200 volts	31418	Spring—Tuning condenser drive cord spring
4937	Capacitor—.01 mfd., 500 volts	33720	Spring—Push arm return spring
11315	Capacitor—.015 mfd., 400 volts	33946	Switch—Range switch (S1)
4870	Capacitor—.025 mfd., 400 volts	34336	Switch—Tone control switch (S3)
32787	Capacitor—.05 mfd., 400 volts	33722	Transformer—First i-f transformer (C1, C2)
4839	Capacitor—0.1 mfd., 400 volts	34026	Transformer—Second i-f transformer (C3, C4)
34505	Capacitor—0.2 mfd., 300 volts	33726	Washer—"C" washer for drive shaft
34212	Capacitor—Comprising 2 sections of 50 mfd., each, 150 volts		**SPEAKER ASSEMBLIES (RL 85-2)**
30716	Clip—Magic Eye clip	32907	Cap—Cone center dust cap
33732	Coil—Antenna coil	34554	Cone—Speaker cone and voice coil
33733	Coil—Oscillator coil	34803	Transformer—Output transformer
33635	Condenser—Tuning condenser and drum assembly		**MISCELLANEOUS ASSEMBLIES**
33631	Control—Volume control and power switch	31456	Cover—8-protective covers for push button markers
32634	Cord—Tuning condenser drive cord	34270	Dial—Glass dial scale
33633	Indicator—Station selector pointer	33837	Escutcheon—Dial and button escutcheon
11765	Lamp—Dial lamp—Mazda No. 51	30863	Knob—Tuning, tone, range or volume control
33734	Plate—Dial plate complete less condenser and button	33973	Marker—1 set push button markers
30880	Resistor—150 ohms, ½ watt	30900	Spring—Retaining spring for knob or button
30152	Resistor—1,000 ohms, 1 watt		

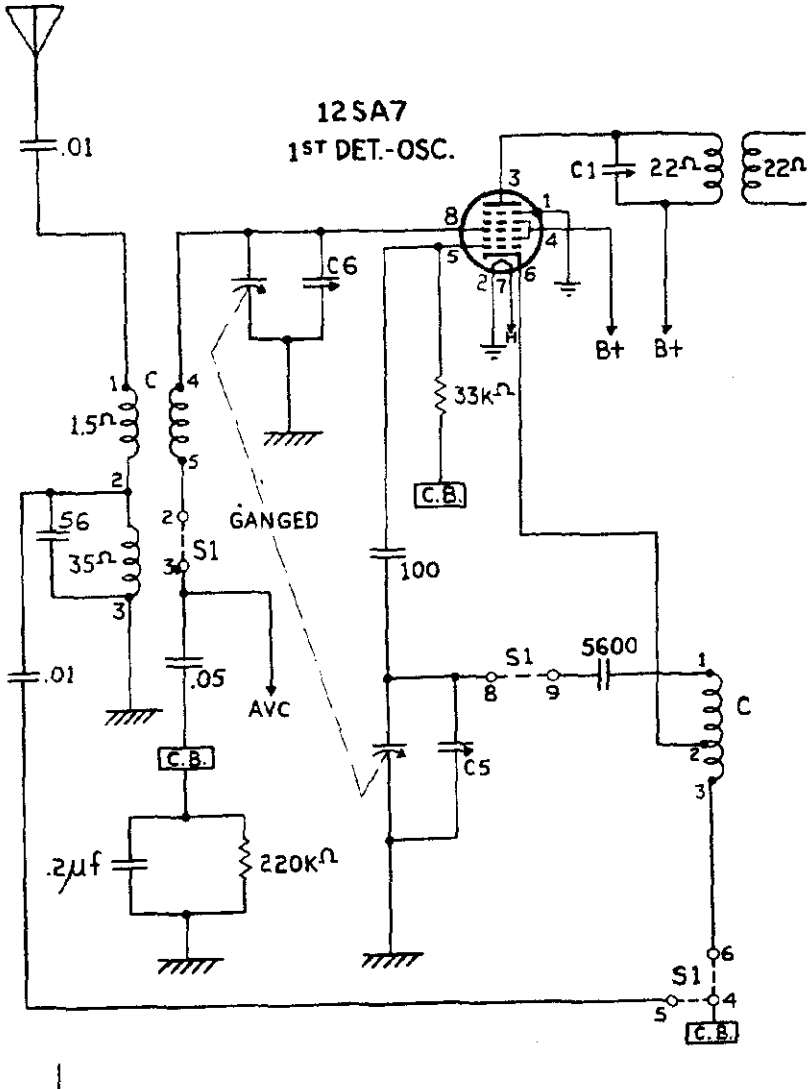
Short-Wave Sensitivity:

Where insufficient sensitivity is noted on the short-wave band of Model X-60, addition of capacity coupling of 3 or 4 mmfd. between signal and oscillator grids of converter tube will usually restore normal sensitivity to entire band. This coupling can be effected in several ways:

(a) Unsolder one grid lead, take several turns around other lead to give desired capacity, resolder.
(b) Twist several turns of insulated wire around both grid leads to give desired value of capacity coupling.
(c) Install a 3 to 4 mmfd. capacitor between tube grids.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST (A) BAND 540 - 1720 KC.



BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE (C) BAND 5.6 - 20 MC.

RCA MFG. CO.

Electrical and Mechanical Specifications

FREQUENCY RANGES

Standard Broadcast	540-1,720 kc
Short Wave	5.6-20 mc
Intermediate Frequency	455 kc
Number of Push Buttons	Six

TUBE COMPLEMENT

(1) RCA-12SA7	First Detector-Oscillator
(2) RCA-12SK7	I-F Amplifier
(3) RCA-12SQ7	Second Detector, A-F, and A.V.C.
(4) RCA-35L6GT	Power Output
(5) RCA-6N5	Magic Eye
(6) RCA-35Z5GT	Rectifier
Dial Lamp	Mazda No. 51, 7.5 volts, 0.20 amp.

POWER OUTPUT (125 volts, 60 cycle supply)

Undistorted	0.8 watts
Maximum	1.4 watts

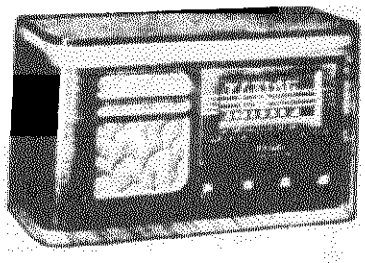
POWER SUPPLY RATINGS

A-C Rating	105-125 volts, 50-60 cycles, 35 watts
D-C Rating	105-125 volts, direct current, 35 watts

LOUDSPEAKER (RL 85-2)

Type	5-inch permanent magnet dynamic
V.C. impedance at 400 cycles	4.5 ohms

	Height	Width	Depth
Cabinet Dimensions (inches)	9¾	16	7
Chassis Base Dimensions (inches)	2-3/16	12¾	5¾
Overall Chassis Height	6¾ inches		
Shipping Weight	15 pounds		
Tuning Drive Ratio	10:1		



Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Pull off the push-buttons and loosen the push-button rods with a small screwdriver.

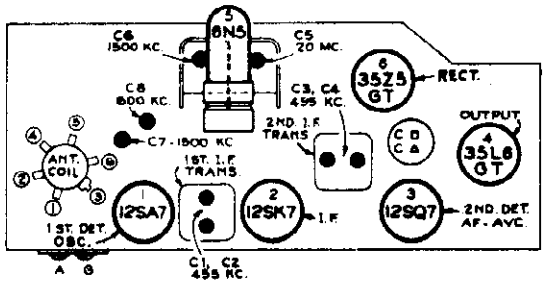
2. Check to be sure the link connection on back of chassis is in "Radio" position (connected between terminals 2 and 3).

3. Press in push-button No. 1 (left) as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the rod. Do not tighten more than ¼ turn after the screw begins to grip or damage to the mechanism may result.

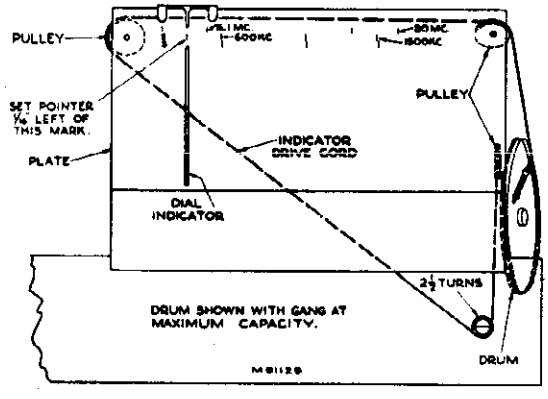
4. Replace the push-button on its shaft.

5. Proceed in a similar manner for the remainder of the push-buttons.

6. Insert the station marker tabs in the recesses above the push-buttons.



Tube and Trimmer Locations



Dial-Indicator and Drive Mechanism

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic 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 binding post, 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, 6.1 mc, and 20 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 1/16 inch to the left of the mark at the extreme left (low frequency) end of the dial scale.

Steps	Connect the high side of the test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Antenna terminal	455 kc	"A" Band Quiet Point between 550-750 kc	C8 and C4 (2nd I-F trans.)
2				C1 and C2 (1st I-F trans.)
3	Antenna terminal in series with 300 ohms	20 mc	"C" Band 20 mc calibration mark	C5 (osc.) *
4	Antenna terminal in series with 200 mmf.	1,500 kc	"A" Band 1,500 kc calibration mark	C7 (osc.) C6 (ant.)
5		600 kc	"A" Band 600 kc calibration mark	C8 (osc.) Rock gang
6	Repeat step 4			

* Use minimum peak if two can be obtained. Check to determine that C5 has been adjusted properly by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

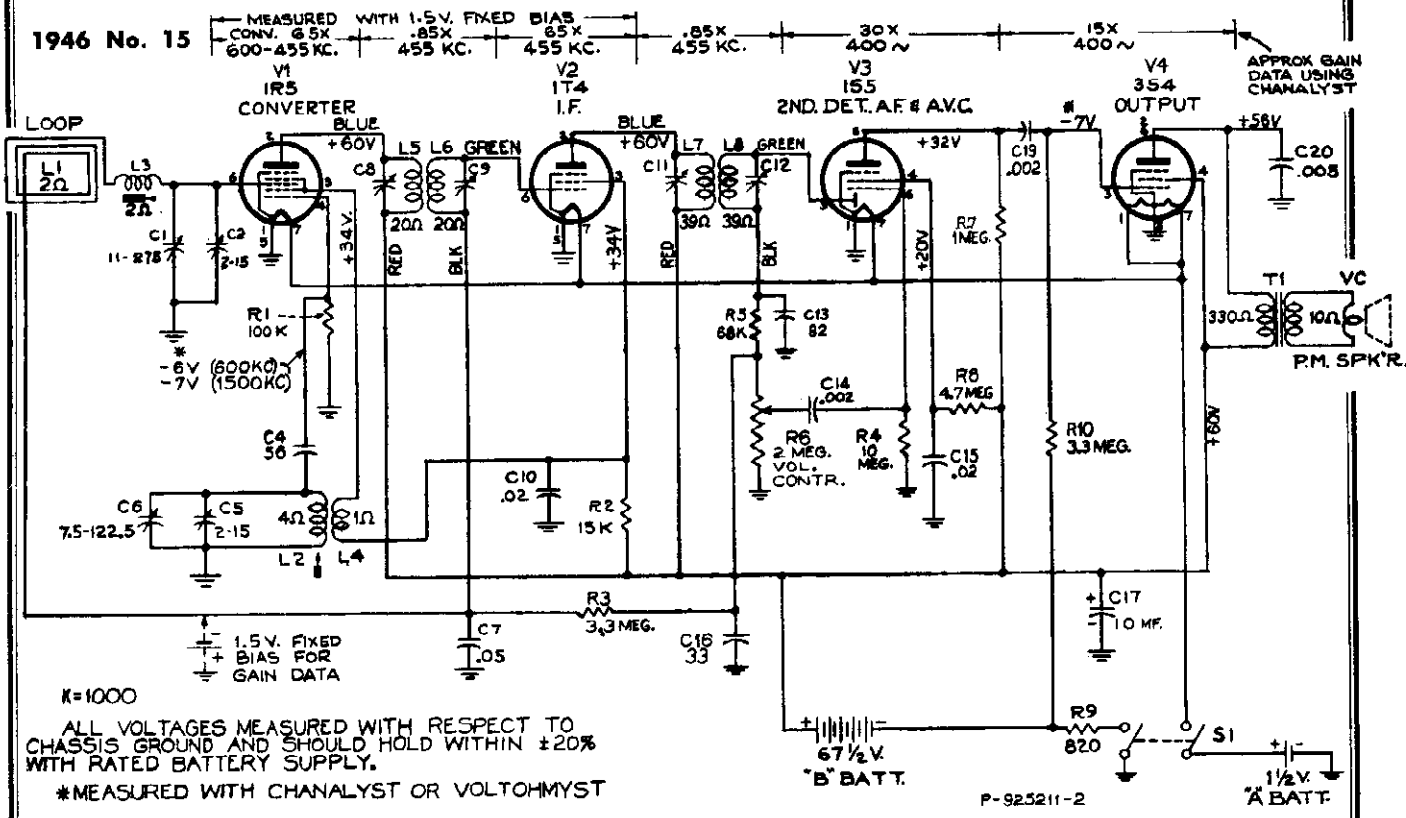
Note: Oscillator tracks above signal on both bands.

MODEL 54B5, Chassis RC1047

RCA MFG. CO.

IF PEAK 455 KC

1946 No. 15



K=1000

ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS GROUND AND SHOULD HOLD WITHIN ±20% WITH RATED BATTERY SUPPLY.

*MEASURED WITH CHANALYST OR VOLTOHMYST

Alignment Procedure

Test Oscillator.—Connect test oscillator as indicated in chart keeping the output as low as possible to avoid A V C action.

Output Meter.—Connect a high resistance AC voltmeter in series with a .1 mfd capacitor from top lug of TB1 (plate of 354) to ground. Turn volume control to maximum position.

Fig. 1 shows the modifications necessary to convert a case into a convenient shield to be used as a substitute for the regular case in the Ant. Osc. alignment.

When using the dummy case for the osc. alignment, the loop assembly must be raised slightly so that osc. trimmer becomes accessible.

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	lug of C2, (located on rear of gang) through a .01 mfd. capacitor	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	**Antenna coupling loop thru 200 mmf. capacitor	1,600 kc	1,600 kc	C5 (osc.)
4		1,500 kc	1,500 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.) (Rock gang)
6	Repeat steps 4 and 5 for final adjustments.			

*The IF transformers can be aligned with chassis out of case.

**Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the back. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

CRITICAL LEAD DRESS

1. Dress blue, green and black leads of second IF transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.

2. Cross the green and the black leads inside the first IF transformer can, keeping the green lead to the outside. Load coil bracket is to separate the blue and the green leads.

3. Dress audio coupling capacitor C14 and the lead to the volume control up and underneath shelf supporting the output transformer.

4. Wire in the three capacitors pyramided behind the speaker with enough space behind the battery holder to allow holder to move when battery is replaced. Dress the ground leads of these capacitors to keep from shorting the off-on switch.

5. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor C17.

6. Keep blue and red leads of output transformer above the mounting shelf.

7. Dress all leads as far as possible from loading coil.

8. Dress leads to gang as far as possible from all metal parts.

9. Dress loop leads to keep from interfering with battery replacement.

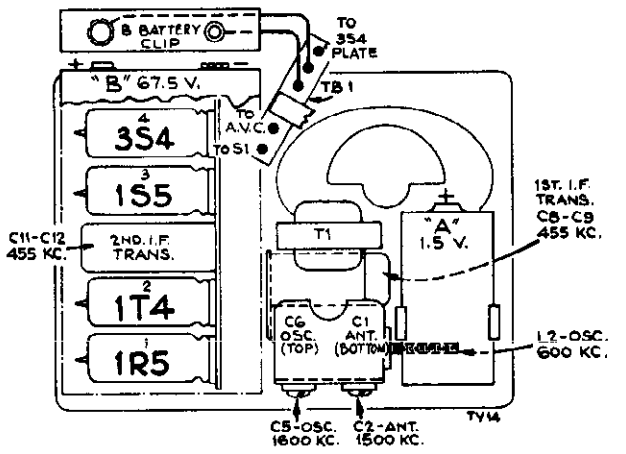


Fig. 4

NOTE:
A rubber band should be placed around each tube for cushioning.
Dirty tube contacts may be mistaken for a defective tube.

RCA MFG. CO.

Replacement of Component Parts

I. To remove tubes:
- a. Slide back cover towards handle.
- b. Remove both batteries.
- c. Pry tubes out of sockets by gently wedging small screwdriver between base of tubes and sockets.

II. To replace batteries:
- a. Slide back cover towards handle.
- b. Remove, either or both, the "A" and "B" battery as the case may warrant. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

III. To remove loop:
- a. Remove "A" and "B" batteries (see item II).
- b. Unsolder loop leads from terminals on battery holder.
- c. Remove four mounting screws "B" in the four corners as indicated in fig. 2 and lift off.

IV. To remove chassis:
- a. Remove loop.
- b. Remove the two screws "H" holding the switch bracket.
- c. Remove the two chassis mounting screws "A", fig. 2.

V. To remove speaker
- a. Remove volume control knob by loosening set screw and pull.
- b. Unsolder voice coil leads, and remove the two mounting screws "C", fig. 2.
- c. Slide speaker out.

VI. To remove output transformer:
- a. Remove speaker and keep it clear of metal particles.
- b. Drill out mounting rivet, and bend tabs (when replacing use small screw).
- c. Unsolder leads and lift out.

VII. To remove chassis mounting plate:
- a. Unsolder copper strip under 3S4 tube.
- b. Remove two screws (F) holding tube shelf to front plate. These screws are located between tubes 1R5 and 1T4, also 3S4 and 1S5. Rubber shock mounts may stick on studs, pry loose.
- c. Remove nut (G) beneath tube shelf below second I-F transformer.
- d. Remove screw (G) beneath the negative terminal of "A" battery holder, and also screw (G) adjacent to volume control below "A" battery holder.
- e. Carefully invert the chassis.
- f. Remove volume control wheel (loosen set screw and pull off).
- g. Lift the mounting plate off.

VIII. To remove volume control:
- a. Remove "A" battery holder.
- b. Unsolder volume control leads.
- c. Remove chassis mounting plate (see item VII).
- d. Remove volume assembly by bending tabs and lifting out.

IX. To remove oscillator coil:
- a. Remove battery holder.
- b. Remove chassis mounting plate.
- c. Unsolder oscillator coil leads.
- d. Remove coil by unsnapping spring mounting clips from angle bracket.

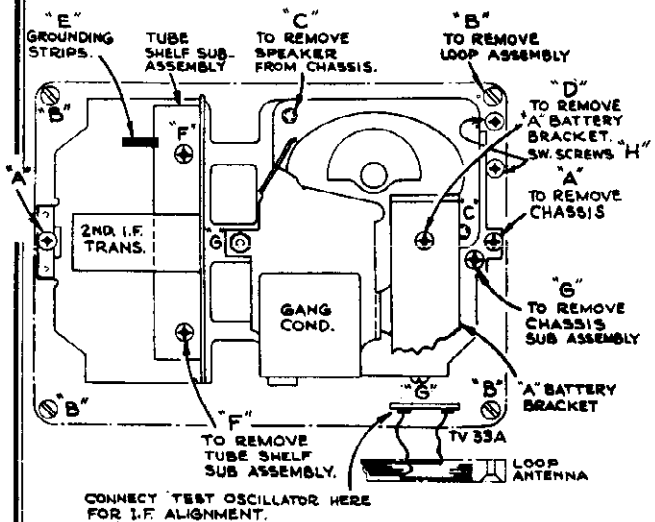
X. To remove 1st I-F transformer:
- a. Remove speaker.
- b. Unsolder four leads from 1st I-F transformer.
  1. Blue to plate of 1R5 tube.
  2. Green to grid of 1T4 tube.
  3. Red to B + terminal of 5 lug terminal board adjacent to output transformer.
  4. Black to AVC terminal of same strip as above.
- c. Remove connections as required from two lug terminal board adjacent to 1st I-F transformer to permit this terminal board to be moved to a position free of the 1st I-F transformer.
- d. Unsolder and bend mounting tabs straight on the I-F transformer can. These tabs are immediately below the 2nd I-F transformer on tube shelf.
- e. Slip 1st I-F transformer forward toward volume control and out.

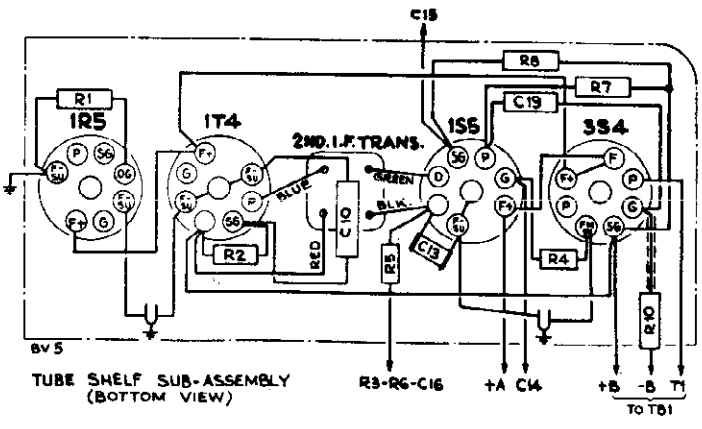
  Note: It is possible to fold the 1st I-F transformer out the front of the chassis if the front plate is removed. This will eliminate the unsoldering of leads from the two lug terminal board.

XI. To remove 2nd I-F transformer:
- a. Carefully remove the two 0.02 uf C10, C15 capacitors.
- b. Carefully depress the two leads (B+ and A+) near the I-F transformer case mounting lugs and unsolder these tabs from the tube mounting shelf and bend out.
- c. Unsolder the blue (plate of 1T4), green (grid of 1S5), red (B+ on terminal board), and black leads.
- d. Remove 2nd I-F transformer.

XII. To remove tuning condenser:
- a. Remove chassis mounting plate (see item VII).
- b. Unsolder leads to tuning gang.
- c. Loosen loading coil if necessary.
- d. Remove two mounting screws and lift out.

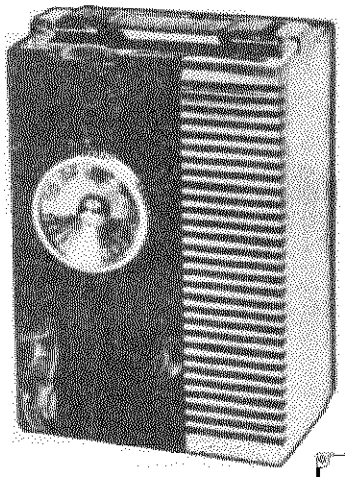
Tools required:
1. One Phillips No. 1 screwdriver.
2. One small insulated alignment tool.
3. Allen wrench for a #6 set screw. (Use to remove volume control wheel.)





MODEL 54B5

RCA MFG. CO.



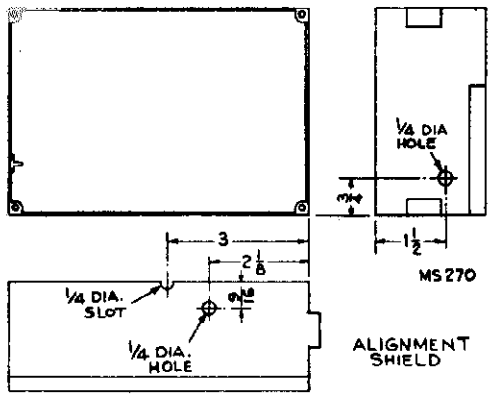


Fig. 1

Specifications

Frequency Range.....550-1,600 kc

Intermediate Frequency.....455 kc

Power Supply

Type Battery	Current Consumption	Approximate Life (Intermittent Duty)
"A"—1.5 volt RCA-VS 036 or VS 001	0.25 amperes	5-6 hours
"B"—67.5 volts RCA-VS 016	8.5 milliamperes	25-40 hours

Power Output.....Undistorted 0.05 watts.....Maximum 0.12 watts

Loudspeaker

Type Permanent-Magnet Dynamic Elliptical.....2 x 3 in.

Voice Coil Impedance.....11¾ ohms at 1000 cycles

Replacement Parts

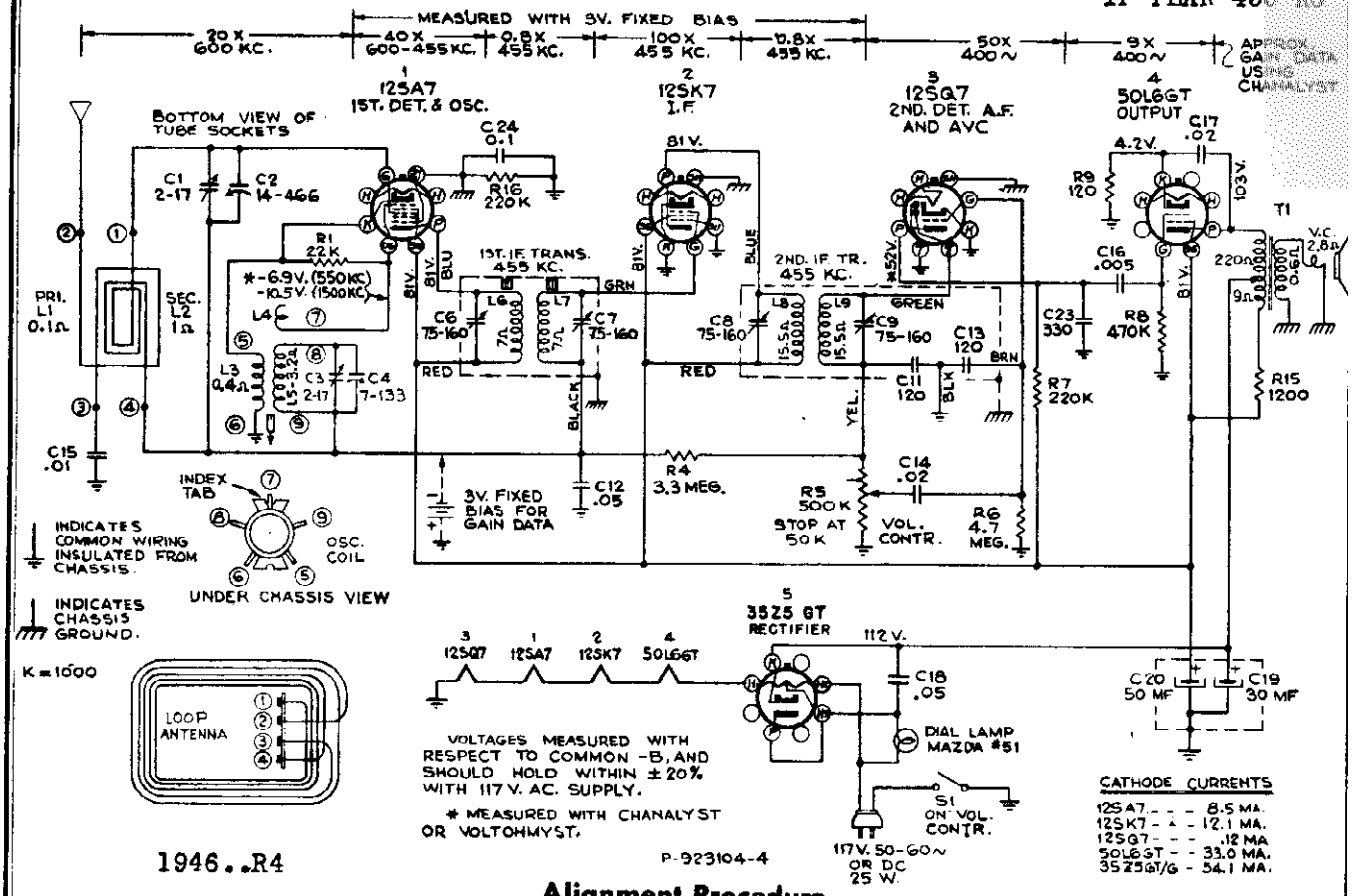
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1047
70423	Band—Rubber band for tubes
70444	Board—Speaker terminal board (5 contact)
70445	Board—Terminal board (1 contact)
33111	Capacitor—Ceramic, 33 mmf. (C16)
71924	Capacitor—Ceramic, 56 mmf. (C4)
71514	Capacitor—Ceramic, 82 mmf. (C13)
72315	Capacitor—Tubular, .002 mfd., 150 volts (C14, C19)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C20)
70453	Capacitor—Tubular, .02 mfd., 100 volts (C10, C15)
71013	Capacitor—Tubular, .05 mfd., 400 volts (C7)
36718	Capacitor—Electrolytic, 10 mfd., 60 volts (C17)
*72215	Coil—Loading coil (L3)
70443	Coil—Oscillator coil (L2, L4)
*72227	Condenser—Variable tuning condenser (C1, C2, C5, C6)
*72228	Control—Volume control (R6)
70429	Grommet—Rubber grommet to mount tube support assembly (2 required)
*72229	Holder—Battery holder
*72225	Insulator—Insulator for chassis panel
*72226	Knob—Volume control knob
*72224	Panel—Front panel
14076	Resistor—820 ohms, ¼ watt (R9)
36714	Resistor—15,000 ohms, ¼ watt (R2)
14138	Resistor—68,000 ohms, ¼ watt (R5)
3252	Resistor—100,000 ohms, ¼ watt (R1)
30652	Resistor—1 megohm, ¼ watt (R7)
31417	Resistor—3.3 megohms, ¼ watt (R3, R10)
30931	Resistor—4.7 megohms, ¼ watt (R8)
30992	Resistor—10 megohms, ¼ watt (R4)
70527	Screw—#6-32 x 5/16" set screw for volume control knob
70436	Socket—Tube socket
*72230	Support—Tube support less tube socket and transformer
*72231	Switch—Power switch (S1)
70440	Transformer—Output transformer (T1)
70442	Transformer—First I. F. transformer (L5, L6, C8, C9)
70437	Transformer—Second I. F. transformer (L7, L8, C11, C12)
	SPEAKER ASSEMBLY 92523-3W RL95-4
70428	Speaker—2 x 3" P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
*72233	Back—Case back
*72238	Case—"Jewel Box" case less front cover and divider strip
*72241	Cover—Front cover only less screen
*72243	Frame—Loop frame only less loop winding
*72235	Handle—Carrying handle
*72232	Knob—Tuning knob
*72234	Link—Link for carrying handle (2 required)
*72244	Loop—Loop winding only (L1)
*72237	Mounting—One set of hardware to mount chassis
*72242	Screen—Front cover screen only
*72240	Screw—Drive screws for Divider strip and front panel (total of 4 required)
*72236	Screw—Flat head screw for mounting loop (4 required)
70425	Spring—Tuning knob spring clip
*72239	Strip—Divider strip

*This is the first time this Stock No. has appeared in Service Data.

RCA MFG. CO.

MODELS 61-8, 61-9,
Chassis RC1034

IF PEAK 455 KC



1946 - R4

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn receiver the 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 Scale.—The glass tuning dial may be removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

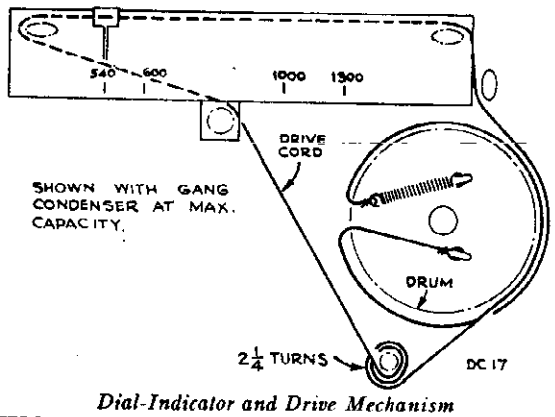
Dial Backing Plate.—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

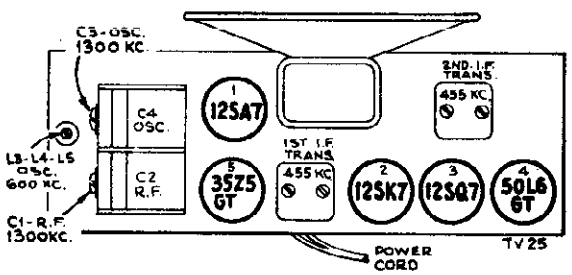
For additional information refer to booklet, "RCA Victor Receiver Alignment."

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	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	C8 and C9 2nd I-F transformer
2	Stator of C2 through 0.1 mfd.			*C6 and C7 1st I-F transformer
3	Ant. lead in series with 200 mmfd.	1,300 kc	1,300 kc	C3 (osc.) C1 (ant.)
4		600 kc	600 kc "A" Band	L5 (osc.) Rock gang
5	Repeat steps 3 and 4			

*Do not readjust C8 or C9 when test oscillator is connected to C2.



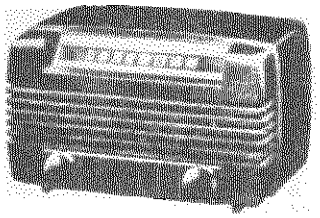
Dial-Indicator and Drive Mechanism



Tube and Trimmer Locations

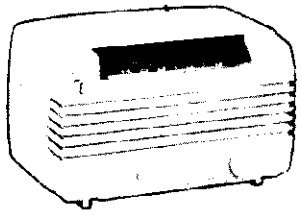
MODELS 61-8,61-9

RCA MFG. CO.



61-8
(Brown Plastic)

61-9
(Ivory Plastic)



Specifications

Frequency Range ..... 540-1600 kc

Intermediate Frequency ..... 455 kc

Power Output

Undistorted ..... 1.0 watt
Maximum ..... 1.5 watts

Tube Complement

(1) RCA Radiotron 12SA7 ..... Converter
(2) RCA Radiotron 12SK7 ..... I-F Amplifier
(3) RCA Radiotron 12SQ7 ..... 2nd Det., A.V.C., and A-F Amplifier
(4) RCA Radiotron 50L6GT ..... Power Output
(5) RCA Radiotron 35Z5GT ..... Rectifier

Pilot Lamp ..... Mazda No. 51, 6-8 volts, 0.2 amp.

Loudspeaker (922258-1)

Type ..... 4" x 6" PM
V. C. Impedance ..... 3.4 ohms at 400 cycles

Cabinet Dimensions	**Height**	**Width**	**Depth**
Cabinet (Outside)	7"	11¾"	7½"
Shipping Weight			9 lbs.
Tuning Drive Ratio			20:1

Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC ..... 30 watts

POWER SUPPLY POLARITY.—For operation on DC, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On AC, reversal of the plug may reduce hum.

Critical Lead Dress

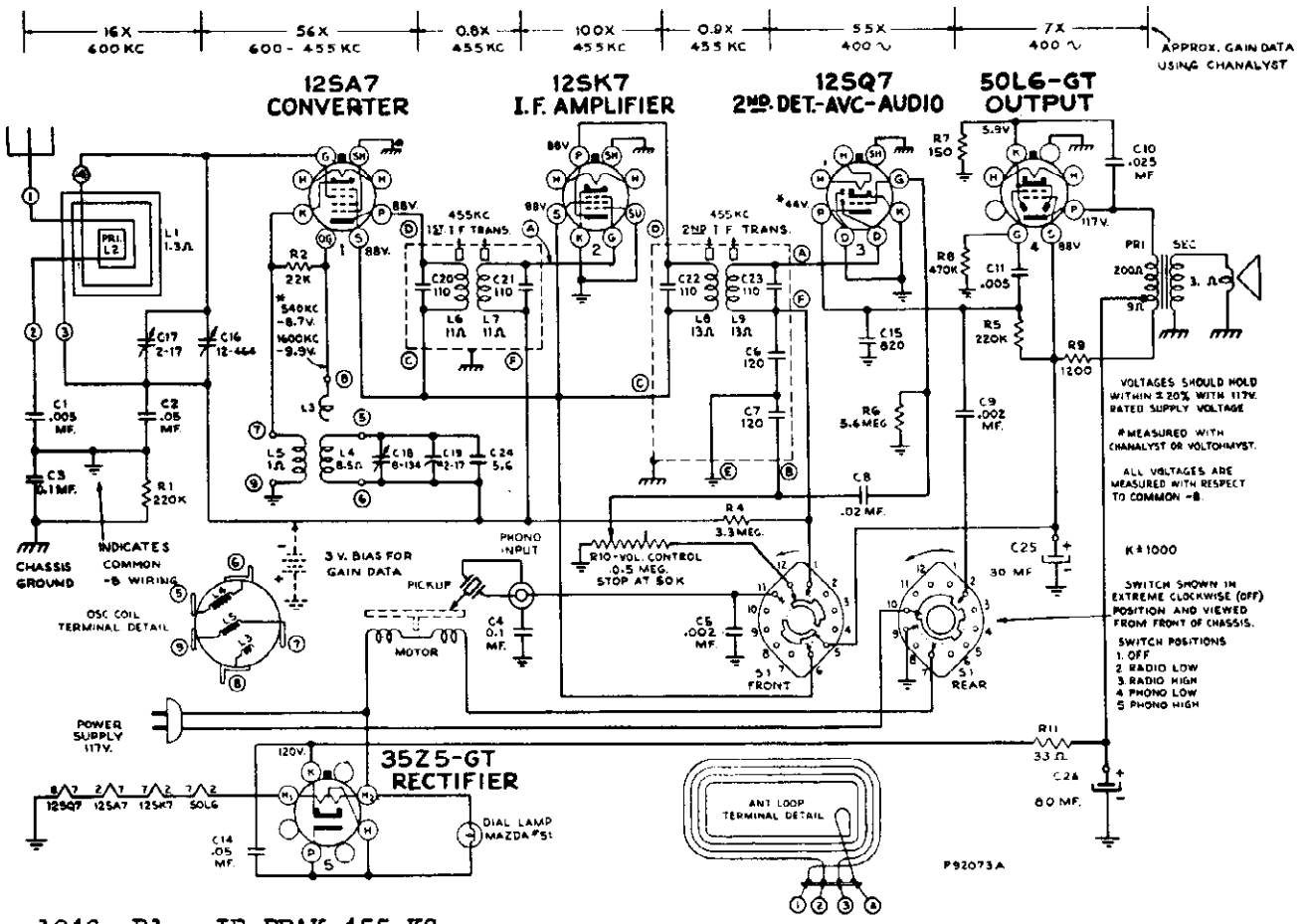
1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible.
2. Dress all heater leads next to chassis.
3. Dress power cord toward output transformer away from volume control and audio circuits.
4. Dress capacitor (C14) toward switch and parallel to chassis length.
5. Dress capacitor (C16) back against rear chassis apron.
6. Dress capacitor (C17) over and towards 50L6 socket perpendicular to capacitor (C14) and (C16).
7. Dress pilot lamp leads over second I-F transformer and away from tubes.
8. Dress blue lead from output transformer against front apron and away from I-F leads.
9. Dress contact on oscillator section of gang condenser back away from oscillator coil (L3, 4, 5) adjustment.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1034
70389	Bearing—Tuning knob shaft bearing
39640	Capacitor—Mica, 330 mmf. (C23)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C16)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C15)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14, C17)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C12, C18)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)
70408	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C19, C20)
70477	Coil—Oscillator coil (L3, L4, L5)
70463	Condenser—Variable tuning condenser complete with drum (C1, C2, C3, C4)
70322	Control—Volume control and power switch (R5, S1)
32634	Cord—Drive cord (approximately 38")
70464	Drum—Drive drum
70469	Indicator—Station selector indicator
11765	Lamp—Dial lamp—Mazda 51
70468	Loop—Antenna loop (L1, L2)
70462	Plate—Dial back plate complete with drive cord pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R9)
6134	Resistor—1200 ohms, 1 watt (R15)
30492	Resistor—22,000 ohms, ¼ watt (R1)
14583	Resistor—220,000 ohms, ¼ watt (R7, R16)
30648	Resistor—470,000 ohms, ¼ watt (R8)
31417	Resistor—3.3 megohms, ¼ watt (R4)
30931	Resistor—4.7 megohms, ¼ watt (R6)
70467	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket moulded
70390	Spring—Drive cord tension spring
70465	Transformer—First I.F. transformer (L6, L7, C6, C7)
70466	Transformer—Second I.F. transformer (L8, L9, C8, C9, C11, C13)
70385	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 922258-1
70470	Speaker—4" x 6" P.M. elliptical speaker complete NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
*71794	Back—Cabinet back for Radiola 61-8
*71795	Back—Cabinet back for Radiola 61-9
Y1365	Cabinet—Brown plastic cabinet for Radiola 61-8
Y1366	Cabinet—Ivory plastic cabinet for Radiola 61-9
70475	Clamp—Dial clamp (1 set)
*71796	Dial—Glass dial scale
37831	Fastener—Push fastener (1 set) for cabinet back
70474	Knob—Control knob—ivory—for Radiola 61-9
70473	Knob—Control knob—mottled walnut—for Radiola 61-8
30900	Spring—Retaining spring for knob

*THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

RCA MFG. CO. MODEL 62-1, Chassis RC1017A, RC-1017B



1946..R1 IF PEAK 455 KC

Replacement Parts—Radio Only

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 1017A** **RC 1017B**
70389	Bearing—Tuning knob shaft bearing
70407	Button—Plug button (2 required)
70997	Capacitor—Mica, 5.6 mmf. (C24)
39650	Capacitor—Mica, 820 mmf. (C15)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C8)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10)
70615	Capacitor—Tubular .05 mfd., 400 volts (C2, C14)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)
*72312	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C25, C26)
70403	Coil - Oscillator coil
70383	Condenser—Variable tuning condenser complete with drum
72756	Control—Volume control
32634	Cord—Drive cord (approx. 48" overall length)
70392	Cord—Power cord
70384	Drum—Drive drum
70397	Gear—Power or radio-phono switch gear
70395	Gear—Volume control gear and spring assembly
70404	Indicator—Station selector indicator
70391	Insulator—Bakelite insulator for phono input socket
11765	Lamp—Dial lamp
*72311	Loop—Antenna loop
70382	Plate Dial back plate complete with pulleys less dial
30868	Plug—2 contact female plug for "AC" cable
36230	Pulley—Drive cord pulley
*72313	Resistor—33 ohms, 1 watt (R11)
30880	Resistor—150 ohms, ¼ watt (R7)
6134	Resistor—1200 ohms, 1 watt (R9)
30492	Resistor—22,000 ohms, ¼ watt (R2)
14583	Resistor—220,000 ohms, ¼ watt (R1, R5)
30648	Resistor—470,000 ohms, ¼ watt (R8)
12928	Resistor—3.3 megohms, ¼ watt (R4)
31455	Resistor—5.6 megohms, ¼ watt (R6)
14974	Screw—#8-32 x 3/16" long set screw for lower gear
70388	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
35787	Socket—Phono input socket
27605	Socket—Tube socket—moulded
70390	Spring—Drive cord tension spring
70396	Spring—Volume control gear tension spring
70394	Switch—Power or radio phono switch
70386	Transformer—First I.F. transformer
70387	Transformer—Second I.F. transformer
70385	Transformer—Output transformer
33726	Washer—"C" washer for tuning knob shaft
70406	Washer—Spring washer for volume control
	SPEAKER ASSEMBLY 922279-1
70405	Speaker—4" x 6" P.M. speaker complete
70470	Speaker—4" x 6" elliptical P.M. speaker complete with cone and voice coil
	SPEAKER ASSEMBLY 922258-2
71058	Speaker—4" x 6" P.M. elliptical speaker complete with cone and voice coil NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
70398	Clamp—Dial clamps (1 set)
70709	Dial—Glass dial
71595	Feet -Rubber feet (4 required)
70707	Hinge—Lid hinge (2 required)
70401	Knob—Power switch and radio-phono switch knob
70400	Knob—Tuning knob
70399	Knob—Volume control knob
71815	Mounting—One set of hardware consisting of four springs, two spring washers and two rubber washers to mount record changer
14270	Spring—Retaining spring for knobs
71824	Stud Stud and screw to mount lid hinge (1 set)
39545	Support—Lid support

* THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

RCA MFG. CO.

Electrical and Mechanical Specifications

Five-Tube, Single-Band, Superheterodyne Receiver

Frequency Range ..... 540-1,600 kc

Intermediate Frequency ..... 455 kc

Power Output

Undistorted ..... 1.5 watts

Maximum ..... 2.4 watts

Loudspeaker (922279-1) "PM" or 922258-2

Size ..... 4 x 6 inch, elliptical

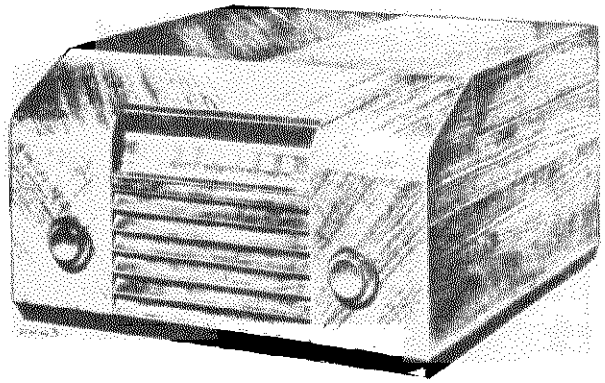
V.C. Impedance ..... 3.4 ohms at 400 cycles

Power Supply Rating

105-125 volts, AC, 60 cycles ..... 60 watts

IMPORTANT Do not plug instrument into a d-c supply.

	Height	Width	Depth
Cabinet dimensions (inches)	10½	17¼	17¼
Chassis overall (inches)	6⅝	14	6¼
Chassis base (inches)	1⅜	14	3¾
Tuning Drive Ratio			14:1



Phonograph

Type ..... Automatic (960260-2)

Record Capacity ..... Twelve 10-in., Ten 12-in.

Turntable Speed ..... 78 r.p.m.

Type Pickup ..... Crystal

Motor Power Consumption ..... 25 watts

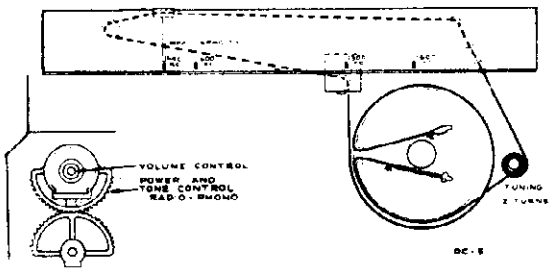
Alignment Procedure

CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.

Take off both wooden strips on bottom of cabinet by removing wood screws before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. All filament wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.



Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.

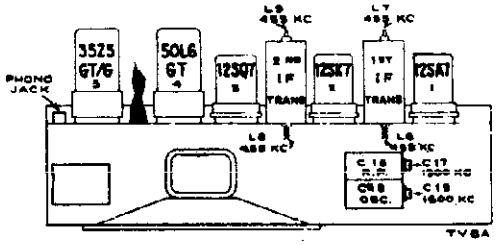
Control Positions

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B." Keep the output signal as low as possible to avoid a.v.c. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

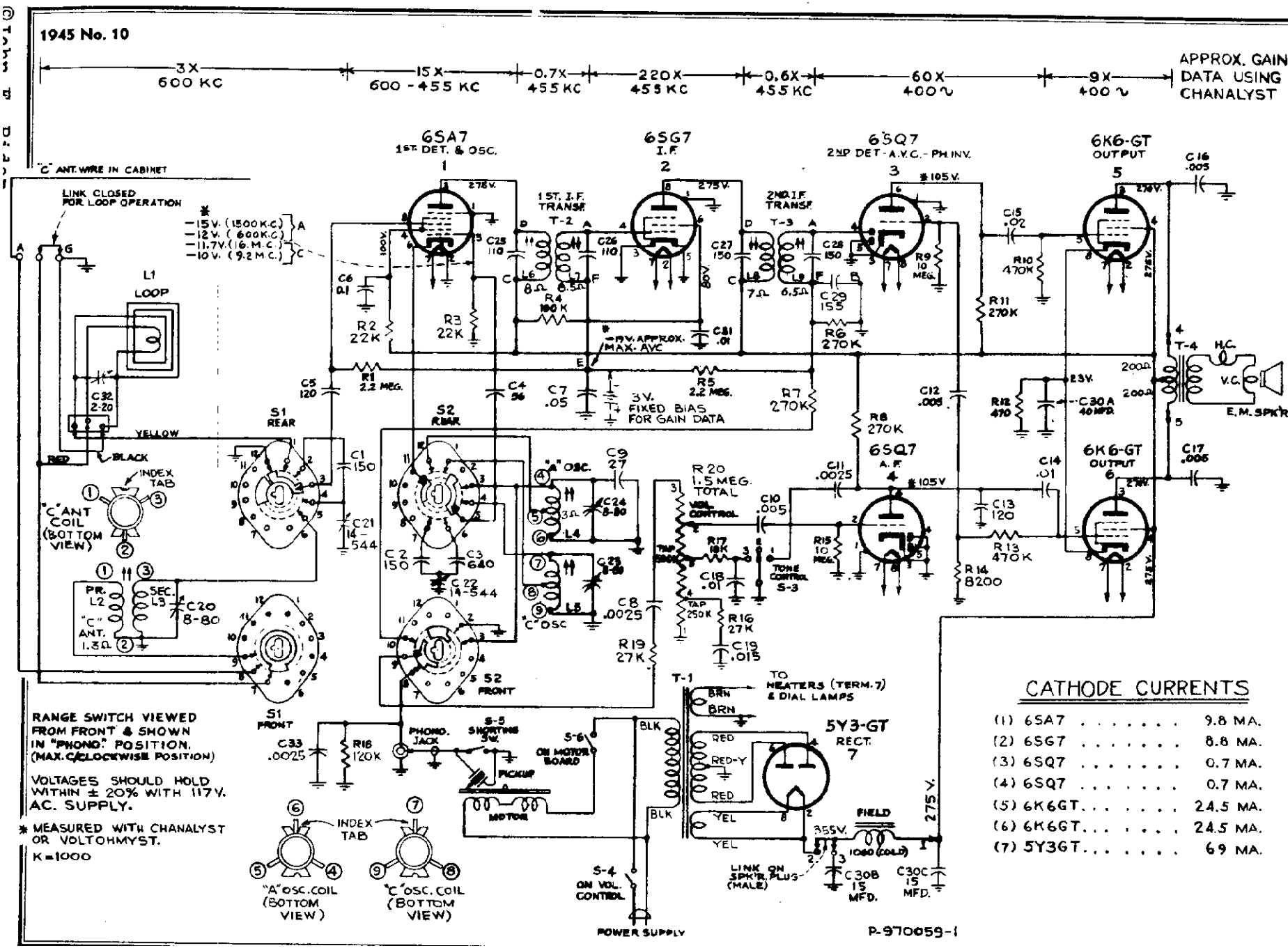
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			L6 and L7 1st I.F. transformer
NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET				
3	Antenna terminal in series with 220 mmfd.	1600 kc	Gang at minimum	C19 (osc.)
4	Radiated signal 1300 kc		Signal frequency	C17 (ant.)
5	Repeat steps 3 and 4.			

* Do not readjust L8 or L9 when test oscillator is connected to 1st Det.



Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on d.c., as this would damage the motor.

Reversal of plug in outlet receptacle may reduce hum.



RANGE SWITCH VIEWED FROM FRONT & SHOWN IN "PHONO." POSITION. (MAX. C/CLOCKWISE POSITION)

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

K = 1000

CATHODE CURRENTS

(1) 6SA7	9.8 MA.
(2) 6SG7	8.8 MA.
(3) 6SQ7	0.7 MA.
(4) 6SQ7	0.7 MA.
(5) 6K6GT	24.5 MA.
(6) 6K6GT	24.5 MA.
(7) 5Y3GT	69 MA.

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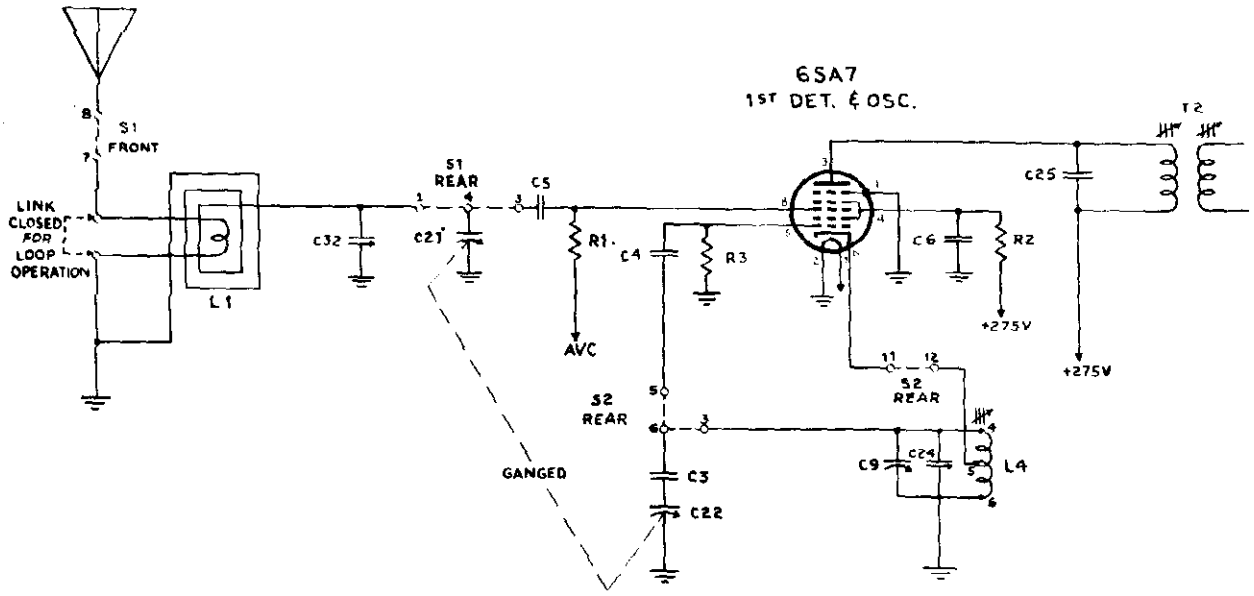
RCA PAGE 15-
MODELS 67V1, 67AV1
Chassis RC606

"clarified schematics"

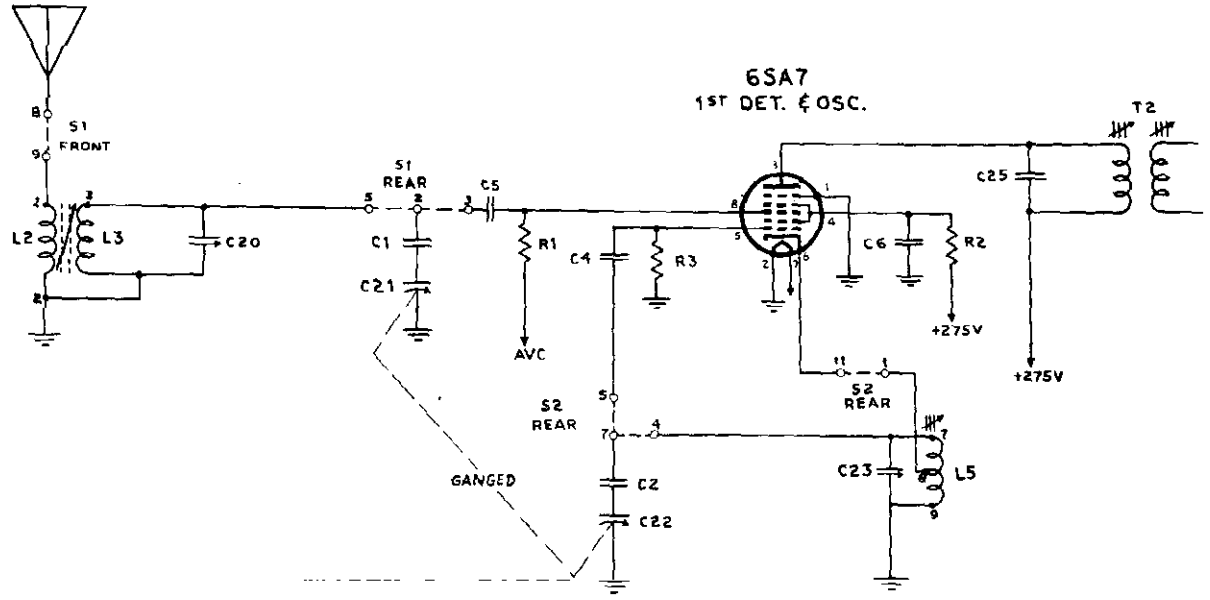
MODELS 67V1,67AV1

RCA MFG. CO.

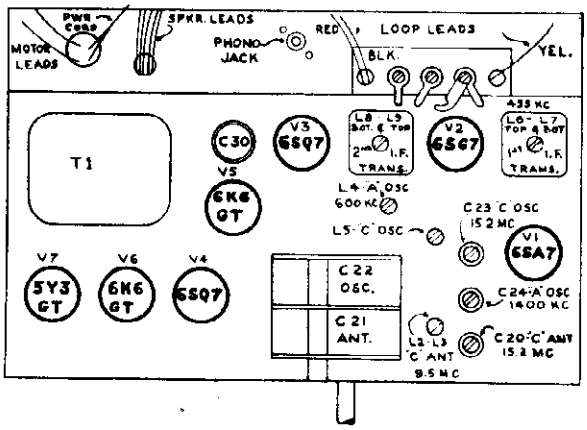


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540 - 1600 KC.

NOTE:
1ST POSITION (PHONO)
NOT SHOWN.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
9.2 - 16 MC.

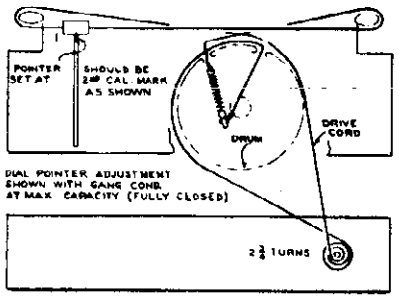


TOP VIEW

Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SG7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	L8, L9 (2nd I-F Trans.)
2	6SA7 grid in series with .01 mfd.			L6, L7 (1st I-F Trans.)
3	Yellow lead on loop in series with 200 mmfd. (link closed)	1,400 kc.	Broadcast 1400 kc.	C24 (osc.)
4		600 kc.	Broadcast 600 kc.	L4 (osc.) Rock gang
5		Repeat steps 3 and 4.		
6	Antenna terminal in series with 47 mmfd.	15.2 mc.	Short Wave 15.2 mc.	C23 (osc.)* C20 (ant.)
7		9.5 mc.	Short Wave 9.5 mc.	L5 (osc.) L3 (ant.)
8		Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with link closed. Tune in a radiated signal of 1400 kc. on broadcast band and peak C32 on loop.			

* Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning the receiver to approximately 14.3 mc., where a weaker signal should be received.

Oscillator tracks 455 kc. above signal on both bands.



DIAL INDICATOR AND DRIVE MECHANISM

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 oscillator output as low as possible to avoid a-v-c action

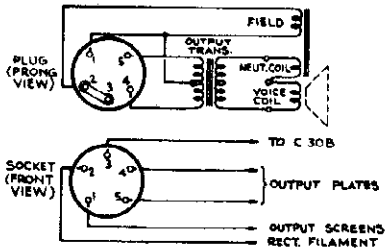
Calibration Scale.—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

Using Printed Dial Scale.—

1. Cut out the printed dial scale, or, better still, make a tracing of the scale.
2. With gang at full mesh the pointer should be set to the second reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

Note.—It is not recommended that the glass dial scale in the cabinet be removed as an alignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C20 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer C20 for best receptibn on 31-meter band.



SPEAKER CONNECTIONS

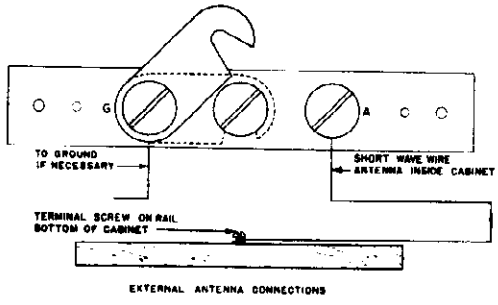
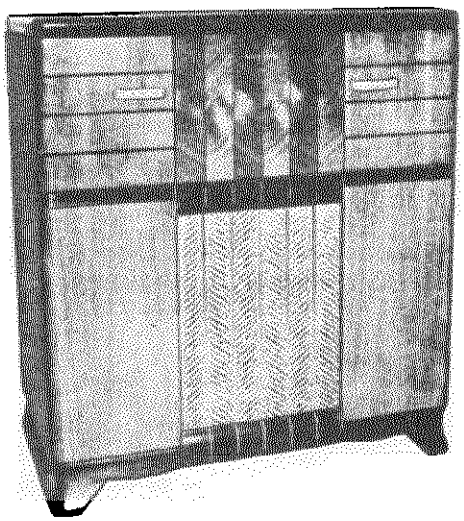


FIG. 3

WHEN USING EXTERNAL ANTENNA, OPEN LINK AND CONNECT LEAD-IN TO TERMINAL SCREW.

MODELS 67V1,67AV1

RCA MFG. CO.



Critical Lead Dress:

1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate lead of output tube away from grid of audio amplifier.
4. Dress all a-c leads away from volume control down next to chassis.
5. Dress R16 away from a-c leads at on-off switch.
6. Dress R2 away from side of chassis.

Note.—In order to remove the chassis from the cabinet, remove the knobs and the connecting cables, then unscrew the four slotted hex head screws from the two "L" brackets bolted to the rear of the chassis. The chassis may then be slid out toward the bottom rear of the cabinet. Do not remove the hinge screws or the two large nuts in the rear of the chassis. When replacing the chassis, make sure that the tapered pins on the front of the chassis fit into the holes on the metal runners screwed to the cabinet door.

Specifications

Circuit Description

The receiver is a seven tube superheterodyne employing push-pull power output. AVC is applied to the converter and i-f tubes. The broadcast band utilizes a standard loop antenna, and the short wave antenna is a wire tacked in the cabinet.

Dimensions

	Cabinet	Chassis (overall)
Height (inches)	34	5⅝
Width (inches)	31	11⅛
Depth (inches)	16¼	8
Tuning Drive Ratio		14:1

Frequency Ranges

Standard Broadcast "A"	540-1,600 kc
Short Wave "C"	9.2-16 mc
Intermediate Frequency	455 kc

Tube Complement

(1) RCA-6SA7	1st Det., Oscillator
(2) RCA-6SG7	I-F Amplifier
(3) RCA-6SQ7	2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7	A-F Amplifier
(5) RCA-6K6-GT	Power Output
(6) RCA-6K6-GT	Power Output
(7) RCA-5Y3-GT	Rectifier

Power Supply Rating (including Phono Motor)

105-125 volts, 60 cycles ..... 95 watts

Pilot Lamps ..... (2) Mazda No. 51, 6-8 volts, 0.2 amp.

Compartment Lamp ..... (1) Mazda No. 55, 6-8 volts, 0.4 amp.

Loudspeaker

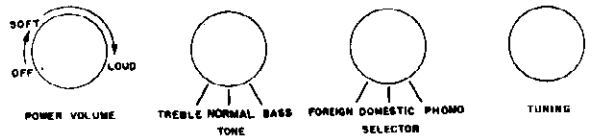
Electrodynamic	92566-1W
Size	12-inch
V. C. impedance at 400 cycles	2.2 ohms

Power Output Rating

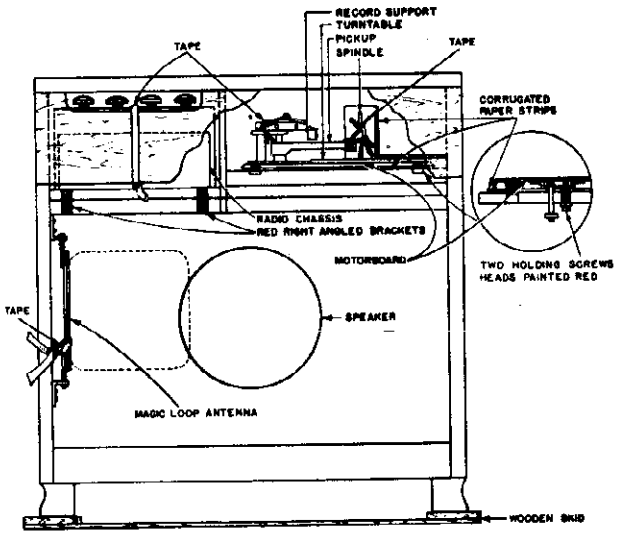
Undistorted	5 watts
Maximum	6.5 watts

Phonograph

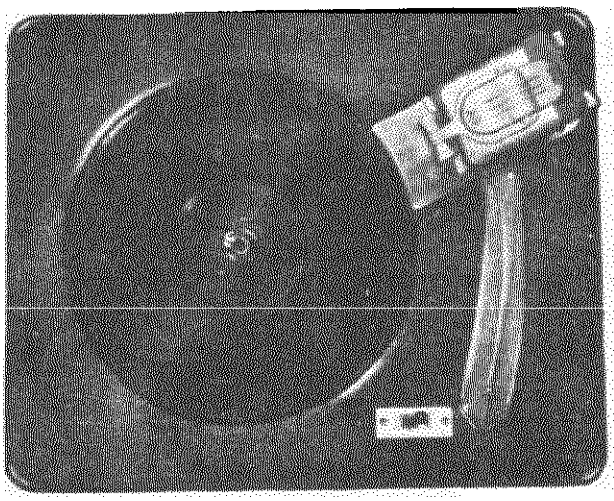
Type	Automatic 960260-1
Record Capacity	Twelve 10-in., Ten 12-in.
Turntable	78 r.p.m. type
Type Pickup	Crystal
Motor Power consumption (115 v., 60 cycles)	30 watts



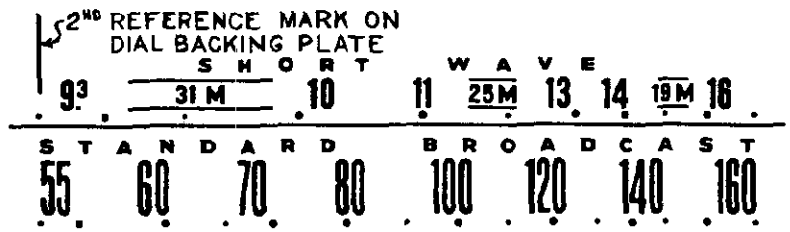
FRONT PANEL CONTROLS



BACK VIEW



MODELS 67V1,67AV1



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

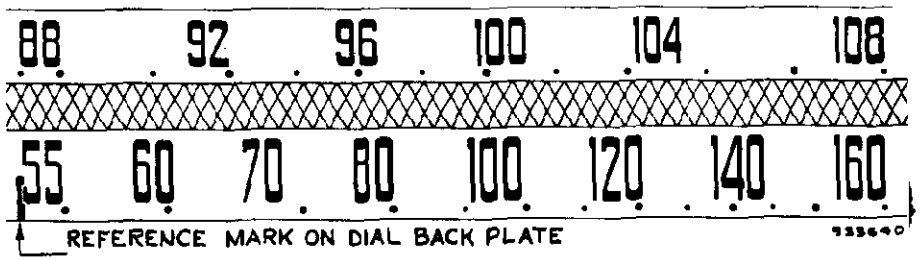
Replacement Parts

For Automatic Mechanism Parts refer to Service Data for Model 96BR-1

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC 606)
*71661	Board—"Ant. ground" board
*71664	Bracket—Dial bracket with drive cord pulley (L. H.)
*71665	Bracket—Dial bracket with drive cord pulley (R. H.)
*71615	Capacitor—Ceramic, 27 mmf. (C9)
71924	Capacitor—Ceramic, 56 mmf. (C4)
*71610	Capacitor—Mica trimmer, 3 sections 8-80 mmf. (C20, C23, C24)
*71614	Capacitor—Ceramic, 150 mmf. (C1, C5)
*71613	Capacitor—Mica, 840 mmf. (C2)
70833	Capacitor—Tubular, .0021 mfd., 600 volts (C8, C11, C22)
70846	Capacitor—Tubular, .005 mfd., 1000 volts (C16, C17)
70837	Capacitor—Tubular, .005 mfd., 600 volts (C10, C12)
70831	Capacitor—Tubular, .01 mfd., 600 volts (C14, C18, C21)
*71195	Capacitor—Tubular, .015 mfd., 150 volts (C19)
*70832	Capacitor—Tubular, .02 mfd., 600 volts (C13)
70835	Capacitor—Tubular, .05 mfd., 400 volts (C7)
70817	Capacitor—Tubular, 0.1 mfd., 400 volts (C6)
37888	Capacitor—Comprising 2 sections, 15 mfd., 450 volts, and 1 section 40 mfd., 25 volts (C30A, C30B, C30C)
*71633	Coil—"A" band oscillator coil (L4)
*71632	Coil—"C" band antenna coil (L2, L3)
*71634	Coil—"C" band oscillator coil (L5)
*71600	Condenser—Variable tuning condenser (C31, C32)
70342	Control—Volume control and power switch (R20, S4)
25784	Cord—Drive cord (approx. 45" overall length)
*71629	Drum—Drive drum
*72000	Grommet—Rubber grommet for rear mounting feet
*71690	Indicator—Station selector indicator
*71697	Plate—Dial back plate
36032	Plug—Pin plug for loop lead
12489	Plug—Speaker cable plug, 5 contact (female)
36230	Pulley—Drive cord pulley mounted on dial bracket
*71611	Resistor—470 ohms, 1 watt (R12)
14250	Resistor—8,200 ohms, ½ watt (R14)
3219	Resistor—18,000 ohms, ½ watt (R17)
36492	Resistor—22,000 ohms, ½ watt (R13)
46925	Resistor—22,000 ohms, 1 watt (R2)
36408	Resistor—27,000 ohms, ½ watt (R15, R16)
2321	Resistor—100,000 ohms, ½ watt (R4)
36186	Resistor—120,000 ohms, ½ watt (R18)
30681	Resistor—270,000 ohms, ½ watt (R6, R7, R8, R11)
30644	Resistor—470,000 ohms, ½ watt (R10, R19)
30649	Resistor—2.2 megohms, ½ watt (R1, R3)
30901	Resistor—10 megohms, ½ watt (R9, R13)
*71684	Shaft—Tuning shaft
35787	Socket—Input socket
30868	Socket—Motor cable socket, 2 contact (female) (67V1)
31364	Socket—Pilot lamp socket
31251	Socket—Tube socket
31418	Spring—Indicator cord tension spring
*71602	Switch—Range switch (S1, S2)
*71603	Switch—Tone control switch (S3)
*71625	Transformer—First I-F transformer T2 (L5, L7, C25, C28)
*71631	Transformer—Second I-F transformer T3 (L6, L8, C27, C28, C29)
31369	Transformer—Power transformer 117 volts 50/60 cycle (T1)
35968	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES (92573-1W) (RL702B2)
13887	Cap—Dust cap
*71167	Clamp—Clamp to hold metal cone suspension (2 required)
12079	Coil—Field coil—1,000 ohms
11468	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
31530	Plug—5 prong male plug for speaker
71146	Speaker—12" P. M. speaker complete with cone and voice coil less output transformer and plug
*71145	Suspension—Metal cone suspension
36071	Transformer—Output transformer (T4)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
*71658	Bar—Grille bar
70545	Bracket—Antenna loop mounting bracket complete with spring (2 required)
*71618	Bracket—Door check mounting bracket
38481	Button—Plug button
38664	Capacitor—Mica trimmer 2-30 mmf. (C32)
*71630	Check—Radio compartment door check assembly less spring
K1615	Cloth—Grille cloth
70547	Cover—Compartment lead cover
*71709	Decal—Caswel hazelton decal
*71708	Decal—Trade mark decal
*71617	Dial—Glass dial scale
*71616	Escutcheon—Dial scale escutcheon less dial
11680	Grommet—Rubber grommet to cushion chassis front screw (2 required)
*71700	Hinge—Cabinet lid hinge
*71704	Hinge—Cabinet door hinge (2 required)
13103	Jewel—Pilot lamp cap
*71622	Knob—Range switch or tone switch knob
71621	Knob—Volume control or tuning knob
5117	Lamp—Compartment lamp
13785	Lamp—Dial lamp
*71618	Loop—Antenna loop complete (L1, C22)
*71619	Mounting—One set of hardware to mount record changer—consisting of four springs, two spring washers and two rubber washers
*71658	Pull—Door pull
37800	Shade—Compartment lamp shade
36433	Socket—3 contact socket (female) for loop leads
*71618	Spring—Door check spring
30600	Spring—Retaining spring for knobs
*71705	Support—Cabinet lid support
*71614	Washer—Rubber washer for door check

* THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

MODELS 68R1,68R2,68R3,68R4



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLY RC606
72658*	Board—"F.M." Antenna—Ground" board
72646*	Capacitor—Mica trimmer, 2.5-13 mmf. (C33)
38357	Capacitor—Mica trimmer, 2-20 mmf. (C34)
71808	Capacitor—Mica trimmer, 3-35 mmf. (C31)
72334*	Capacitor—Mica trimmer, 4-70 mmf. (C35)
72570*	Capacitor—Ceramic, 27 mmf. (C1)
30042	Capacitor—Ceramic, 47 mmf. (C28)
71924	Capacitor—Ceramic, 56 mmf. (C7)
71614	Capacitor—Ceramic 120 mmf. (C6, C19, C30)
72571*	Capacitor—Mica, 330 mmf. (C2)
72639*	Capacitor—Mica, 390 mmf. (C8)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C25, C23)
71687*	Capacitor—Molded paper, .003 mfd., 1000 volts (C29)
72490*	Capacitor—Tubular, .005 mfd., 200 volts (C11, C15, C16, C17)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C9, C10, C13, C14)
70600	Capacitor—Tubular, .005 mfd., 400 volts (C20)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C21)
71623	Capacitor—Tubular, .01 mfd., 200 volts (C22, C24)
71025	Capacitor—Tubular, .01 mfd., 400 volts (C3, C4, C5, C12)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C26)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C18)
72271*	Capacitor—Electrolytic, comprising (C30A, C30B, C30C, C30D) 1 section of 30 mfd., 450 volts, 1 section of 15 mfd., 450 volts, 1 section of 15 mfd., 350 volts and 1 section of 40 mfd., 25 volts
72335*	Coil—F.M. Antenna Coil (L1, L2)
72336*	Coil—F.M. Oscillator Coil (L3)
72574*	Coil—Filament choke Coil (L8)
36031	Coil—Loop primary Coil (L5, L6)
72331*	Coil—Oscillator Coil "A" band (L7)
72059*	Condenser—Variable tuning condenser, less mounting bracket and trimmers (C32, C35, C36, C61)
38404	Control—Volume control and power switch (R40, S2)
34602	Cord—Drive cord (approx. 80" overall length)
70392	Cord—Power cord
71709	Grommet—Rubber grommet for mounting R.F. shelf (3 req'd)
72069	Grommet—Rubber grommet for rear mounting feet (2 req'd)
72061*	Indicator—Station selector indicator
72159*	Loop—Antenna loop complete (L4, L5, L6, C34, R34)
72142	Plate—Dial back plate complete with pulleys
12481	Plug—5 contact female plug for speaker cable
36230	Pulley—Drive cord pulley
30732	Resistor—47 ohms, ½ watt (R30)
30139	Resistor—120 ohms, ½ watt (R13)
5J005	Resistor—220 ohms, 2 watts (R26)
19233	Resistor—680 ohms, 1 watt (R23)
34766	Resistor—1000 ohms, ½ watt (R5, R15)
72762*	Resistor—1500 ohms, 1 watt (R10)
19525	Resistor—3300 ohms, 2 watts (R24, R25)
38868	Resistor—8200 ohms, 1 watt (R4)
71914	Resistor—10,000 ohms, 1 watt (R3)
36714	Resistor—15,000 ohms, ½ watt (R16)
39158	Resistor—18,000 ohms, 2 watts (R7)
71909	Resistor—22,000 ohms, 1 watt (R9)
30492	Resistor—22,000 ohms, ½ watt (R2, R6, R17)
36409	Resistor—27,000 ohms, ½ watt (R14)
30147	Resistor—39,000 ohms, ½ watt (R28)
30651	Resistor—270,000 ohms, ½ watt (R11, R21, R29)
30648	Resistor—470,000 ohms, ½ watt (R22, R27)
30652	Resistor—1 megohm, ½ watt (R1)
30649	Resistor—2.2 megohms, ½ watt (R8, R12, R18)
30902	Resistor—10 megohms, ½ watt (R20)
71917	Resistor—22 megohms, ½ watt (R19)
72055*	Shaft—Tuning knob shaft
35787	Socket—Input socket, Phono.
31364	Socket—Lamp socket
72515*	Socket—Tube socket—miniature
31251	Socket—Tube socket—Octal
31618	Spring—Tension spring for drive cord
72000*	Switch—Range switch (S1)
71603	Switch—Tone switch (S3)
71625	Transformer—First I.F. Transformer—A.M. (T2, C41, C42)
72593*	Transformer—First I.F. Transformer—F.M. (T1, C30, C40)
71631	Transformer—Second I.F. Transformer—A.M. (T4, C45, C46, C47)
72723*	Transformer—Second I.F. Transformer—F.M. (T5, C44)
71935	Transformer—Driver transformer (T7, C49)
71975	Transformer—Power transformer 117 volt, 60 cycle (T8)
71934	Transformer—Ratio detector transformer (T6, C50, C51)
35999	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES 92573-1K
72728*	Cone—Cone and voice coil assembly
31539	Plug—5 prong male plug for speaker
72312*	Transformer—Output transformer (T7)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
71964	Antenna—FM-AM antenna
72537*	Back—Cabinet back for Model 68R1
72538*	Back—Cabinet back for Model 68R2
72500*	Back—Cabinet back for Model 68R3, 68R4
72539*	Baffle—Speaker baffle assembly for 68R1, 68R2
T1196	Cabinet—Blond plastic cabinet for Model 68R1
T1197	Cabinet—Ivory plastic cabinet for Model 68R2
72536*	Clip—Spring clip for dial "A" set for 68R1 and 68R2
72537*	Clip—Spring clip for dial for 68R3, 68R4
K1651	Cloth—Grille cloth for 68R1
K1644	Cloth—Grille cloth for 68R2
72533*	Dial—Glass dial scale for 68R1, 68R2, 68RJ
72532*	Dial—Glass dial scale for 68R4
71813*	Fastener—Push fastener for cabinet back for 68R1, 68R2
71905	Feet—Rubber feet (4 req'd) for 68R3, 68R4
71821	Knob—Control knob—maroon for Model 68R1, 68R3, 68R4
70474	Knob—Control knob—ivory—for Model 68R2
11765	Lamp—Dial lamp—Miniz No. 51
30900	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

*This is the first time this Stock No. has appeared in print

RCA MFG. CO.

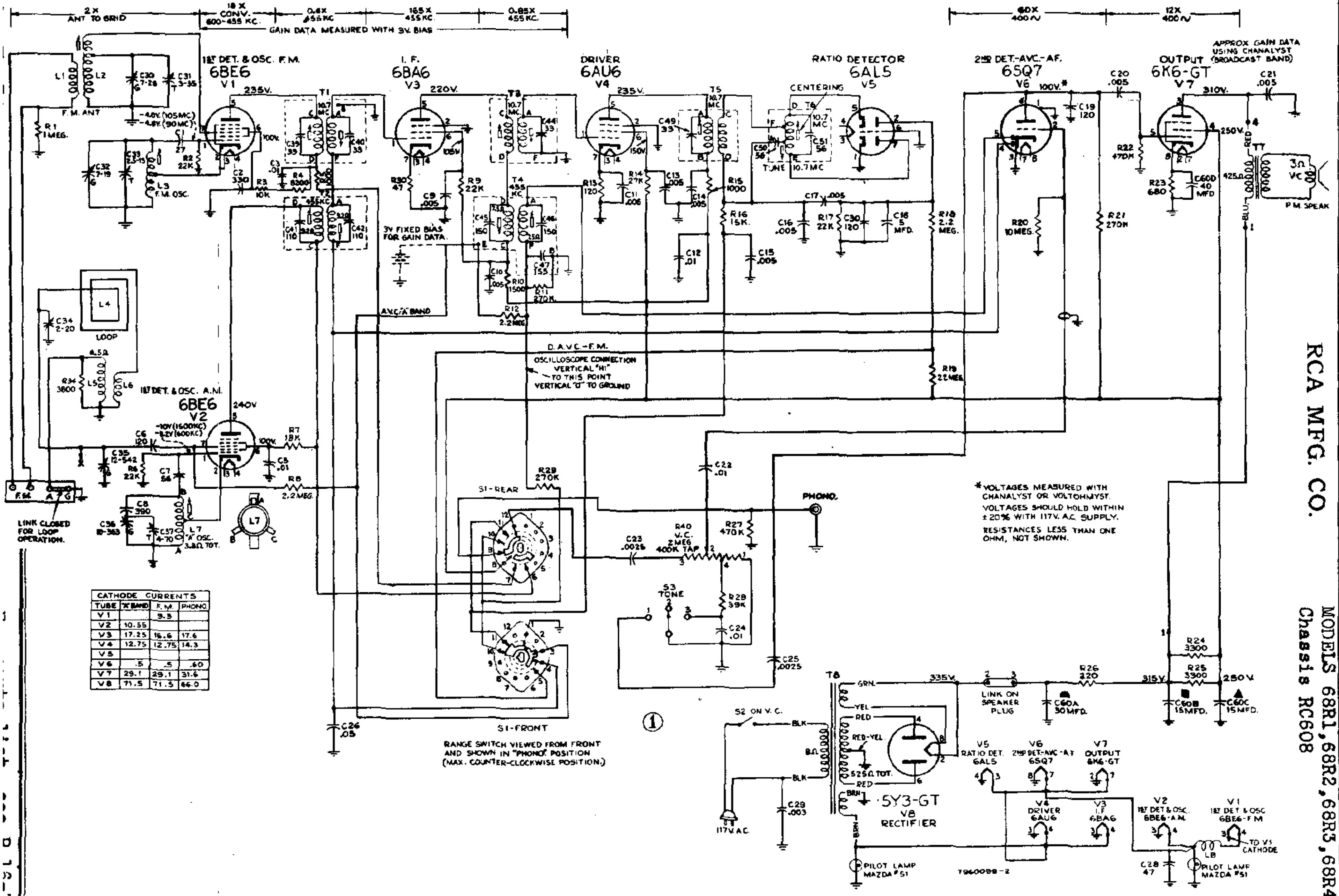
MODELS 67V1, 67AV1
MODELS 68R1, 68R2
68R3, 68R4

RCA PAGE 16

RCA MFG. CO.

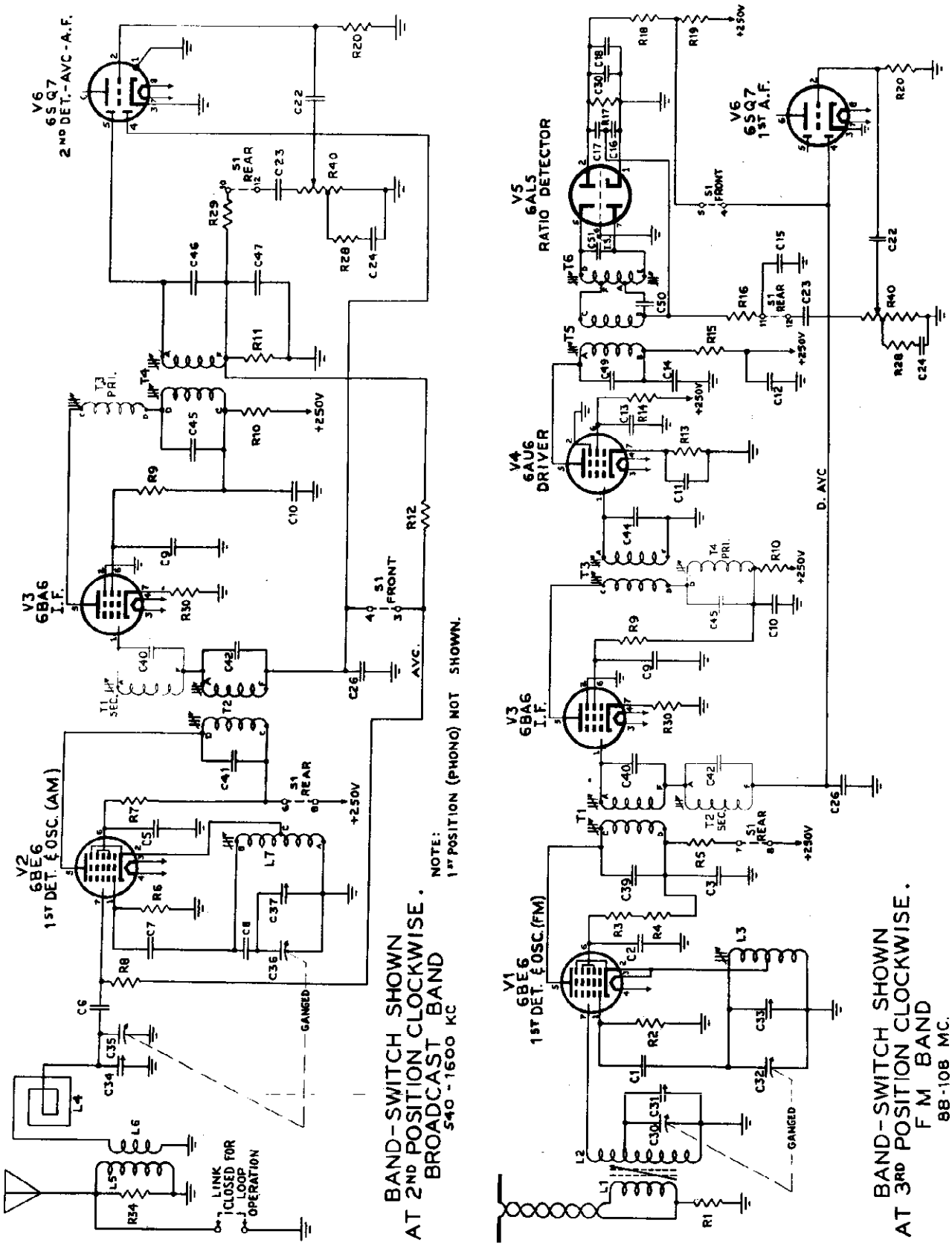
MODELS 68R1, 68R2, 68R3, 68R4
Chassis RC608

1946 No. 7


2X ANT TO GRID
18X CONV. 600-455 KC.
0.4X 455KC
165X 455KC.
0.85X 455KC.
GAIN DATA MEASURED WITH 3V. BIAS
60X 400~
12X 400~
APPROX GAIN DATA USING CHANALYST (BROADCAST BAND)
1ST DET. & OSC. F.M. 6BE6 V1
I.F. 6BA6 V3
DRIVER 6AU6 V4
RATIO DETECTOR 6AL5 V5
2ND DET.-AVC.-AF. 6SQ7 V6
OUTPUT 6K6-GT V7
1ST DET. & OSC. A.M. 6BE6 V2
5Y3-GT V8 RECTIFIER
CENTERING
TUNE
3V FIXED BIAS FOR GAIN DATA.
AVC "A" BAND
D.A.V.C.-F.M.
OSCILLOSCOPE CONNECTION VERTICAL "HI" TO THIS POINT VERTICAL "G" TO GROUND
LOOP
LINK CLOSED FOR LOOP OPERATION.
F.M. ANT
PHONO.
P.M. SPEAK
S1-REAR
S1-FRONT
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "PHONO" POSITION (MAX. COUNTER-CLOCKWISE POSITION.)
S2 ON V.C.
S3 TONE
117V. A.C.
LINK ON SPEAKER PLUG
* VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST. VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. A.C. SUPPLY. RESISTANCES LESS THAN ONE OHM, NOT SHOWN.
PILOT LAMP MAZDA #51
T960088-2

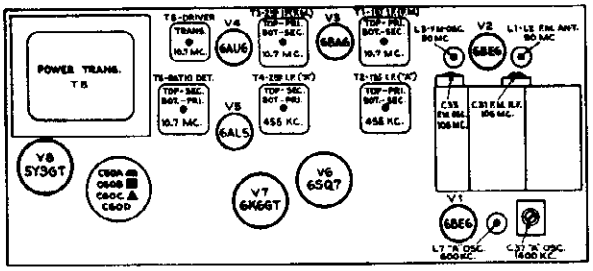
CATHODE CURRENTS			
TUBE	"A" BAND	F.M.	PHONO
V1		9.3	
V2	10.55		
V3	17.25	16.6	17.6
V4	12.75	12.75	14.3
V5			
V6	.5	.5	.60
V7	29.1	29.1	31.6
V8	71.5	71.5	66.0

RCA MFG. CO.


V6 6SQ7 2ND DET.-AVC-A.F.
V3 6BA6 I.F.
V2 6BE6 1ST DET. & OSC. (AM)
S1 FRONT
S1 REAR
AVC.
GANGED
+250V
LINK CLOSED FOR LOOP OPERATION
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540-1600 KC
NOTE: 1ST POSITION (PHONO) NOT SHOWN.
V5 6AL5 RATIO DETECTOR
V6 6SQ7 1ST A.F.
V4 6AU6 DRIVER
V3 6BA6 I.F.
V1 6BE6 1ST DET. & OSC. (FM)
D. AVC
BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
F M BAND
88-108 MC.

MODELS 68R1,68R2,
68R3,68R4

RCA MFG. CO.



Tube and Trimmer Locations (Top View)

FM I.F. R.F. Alignment*

Range Switch in FM Position

Steps	Connect the high side of the test-osc. to—	Connect the ground side of the test-osc. to—	Tune test-osc. to—	Radio dial turned to—	Adjust
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. electrolytic condenser, C18, and the common lead of the meter to chassis ground.				
2	To one terminal of the FM antenna in series with .01 mfd.	To the other terminal of the FM antenna.	10.7 mc. 30% mod. at 400 cycles. (AM)	Maximum capacity. (Fully meshed)	†T3, bottom core for maximum d-c across C 18. Load the plate winding of T3 with a 680 ohm resistor.‡
3	Same as 2.				T3, top core for maximum d-c across C 18. Load the grid winding of T3 with the 680 ohm resistor‡ used in Step 2.
4	Same as 2.				T1, bottom core for maximum d-c across C 18. Load the plate winding of T1 with the 680 ohm resistor.
5	Same as 2.				T1, top core for maximum d-c across C 18. Load the grid winding of T1 with the 680 ohm resistor.
6	To one terminal of the FM antenna in series with a 120 ohm resistor.	To the other terminal of the antenna in series with a 120 ohm resistor.	106 mc.	106 mc.§	Condensers C33 and C31 for maximum d-c output across C18.
7	Same	Same	90 mc.	90 mc.	Coils L2 and L3 for maximum d-c output across C18.
8	Repeat steps 6 & 7 until further adjustment no longer improves calibration.				

*Correct alignment of the 455 kc. I.F. requires that the 10.7 mc. FM I.F. be aligned previously.

†This method is known as alternate loading which involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the *same* transformer is peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked.

‡When the windings are loaded it may be necessary to increase the 10.7 mc input since the gain will decrease resulting in a small or no reading across C18. This reading should be maintained at 2-4 volts, by adjusting the input, as each transformer is aligned.

§Completely mesh the gang and see that the pointer goes to mechanical maximum calibration point at low end of band. (Reference mark on dial back plate).

Alignment Procedure

Test Oscillator—

For all alignment operations, unless specified, keep the output as low as possible to avoid A.V.C. action. Ground lead of test-osc. to chassis ground, unless specified.

Output Meter—

To correctly observe the point of minimum a-f output, it is necessary to connect an output meter across the voice coil, and turn the receiver volume control to maximum.

"A" Band Alignment*

Range Switch in BC Position

Steps	Connect the high side of the test osc. to—	Tune test osc. to—	Turn the radio dial to—	Adjust for max. peak output.
1	AM converter grid, pin 1, 6BE6 in series with .01 mfd.	455 kc.	"A" Band Quiet point at high freq. end.	†T4—Top core T4—Bottom core
2				T2—Bottom core T2—Top core
3	Antenna lead in series with 200 mmf.	1400 kc.	"A" Band 1400 kc calibration pt.	C37—Osc. C34—Ant. (Loop)
4		600 kc.	"A" Band 600 kc calibration pt.	L7—Osc. Rock in.
5	Repeat steps 3 and 4 until aligned			
6	When chassis is installed, readjust C34 on the loop for max. output at 1400 kc.			

*Correct alignment of the 455 kc. I.F. requires that the 10.7 mc. FM I.F. be aligned previously.

†Align T4 and T2 by means of alternate loading. Use a 47,000 ohm resistor instead of a 680 ohm resistor. Alternate loading is explained in "FM I.F.-R.F. Alignment."

FM Ratio Detector Alignment

Range Switch in FM Position

Steps	Connect the high side of the test osc. to—	Tune test-osc. to—	Turn volume control to—	Adjust
1	Connect a 680 ohm resistor between pins 5 & 7 of the ratio detector tube 6AL5. Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. electrolytic condenser, C18. The common lead of the meter to ground.			
2	Driver grid, pin 1, of the 6AU6 in series with .01 mfd.	10.7 mc. 30% mod. 400 cycles (AM) Approx. .25 Volt output	Maximum Volume	*Driver transformer, T5 for maximum d-c across C18.
3	Remove the meter leads and disconnect the 680 ohm resistor from the 6AL5. Connect two 68,000 ohms (±1%) resistors in series, across the 22,000 ohm ratio detector load resistor, R17. Connect the common lead of the VoltOhmyst to the center point of the 68,000 ohm resistors, and the d-c probe to terminal "A" of the ratio detector transformer, T6. Set the meter to the 0-30 VDC scale.			
4	Same as in Step 2.	Same as in Step 2. Approx. .25 Volt output.	Maximum volume.	†T6 bottom core for zero d-c balance. T6 top core for min. audio output.‡
5	Reconnect VoltOhmyst as in Step 1, omitting 680 ohm resistor.			
6	Repeat Step 2.			
7	Remove ALL connections.			

*Approximately 14.5 volts.

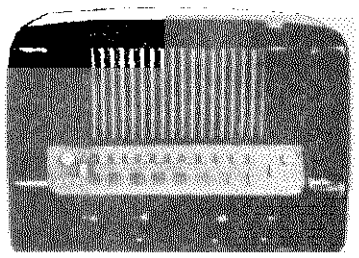
†Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

‡The zero d-c balance and the minimum a-f output should occur at the same point. If such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and the output meter, hooked across the voice coil, for the point at which both zero d-c and minimum a-f output occur.

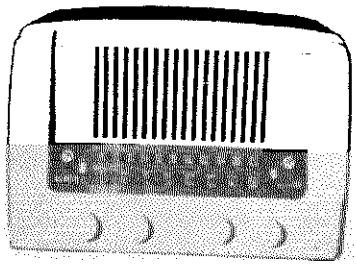
Note:—Two or more points may be found which will satisfy the condition required in Step 4. T6 top core should be correctly adjusted when approximately ⅛ inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum a-f and zero d-c is reached.

RCA MFG. CO.

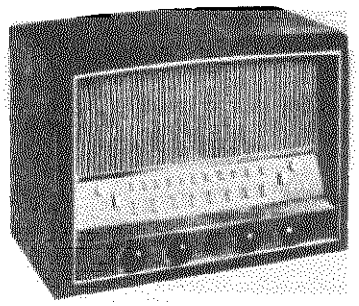
MODELS 68R1, 68R2
68R3, 68R4



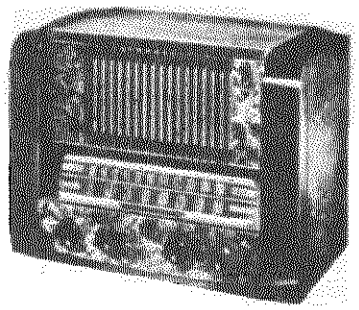
68R1



68R2



68R3



68R4

Circuit Description

These receivers are eight tube, table model, superhetrodyne radios, incorporating two separate converters, one for the FM band and the other for the broadcast band. The range switch has a position in which these models can be operated as a phonograph sound channel.

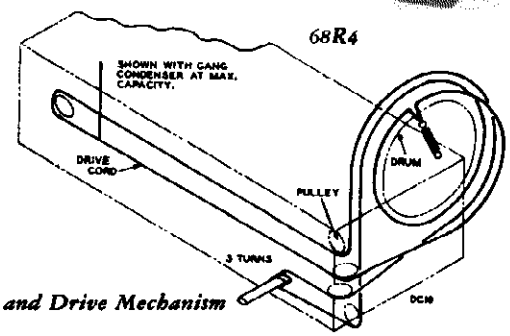
Ratio Detector—

These sets utilize a FM detector known as the "Ratio Detector." This type of circuit eliminates the necessity for a limiting stage preceding the detector, and has an inherent insensitivity to amplitude modulated signals. It is desirable, that before attempting to service these receivers, that this type of circuit be completely understood. Special care should be taken in alignment, and all precautions should be carefully observed.

Note:—Two antennas, a loop for broadcast reception and a folded dipole for FM, are contained in the cabinet. Because of the directional characteristic of these antennas, it may be necessary, when interference is encountered, to rotate the cabinet until a point of minimum interference is found. In some locations, a phenomenon known as "Multi-Path Reception" exists which produces distortion on FM. This is not a fault of the receiver. If this condition is suspected, remove the set to another location, and check it there. An external FM antenna, such as the RCA Dipole and Reflector, Stock #225, will eliminate, or appreciably reduce this effect.

Standard Broadcasts—

To install an external antenna for Standard Broadcasts, the link on the terminal board on the chassis in the back of the cabinet must be opened. Then connect the antenna, which should be a wire 40 to 60 feet long, to the terminal marked "A". A connection from "G" to ground should not be necessary but may be advantageous.



Dial-Indicator and Drive Mechanism

Electrical and Mechanical Specifications

Frequency Range

Broadcast ("A" Band) ..... 540-1600 kc.
Frequency Modulation (FM Band) ..... 88-108 mc.

Intermediate Frequency

Broadcast ..... 455 kc.
Frequency Modulation ..... 10.7 mc.

Tube Complement

(1) RCA 6BE6 ..... 1st Det. & Osc. FM
(2) RCA 6BE6 ..... 1st Det. & Osc. AM
(3) RCA 6BA6 ..... I-F Amplifier
(4) RCA 6AU6 ..... Driver
(5) RCA 6AL5 ..... Ratio Detector
(6) RCA 6SQ7 ..... 2nd Det., A.V.C., and A-F Amplifier
(7) RCA 6K6 GT ..... Power Output
(8) RCA 5Y3 GT ..... Rectifier

Power Supply Rating

105-125 volts, 60 cycles ..... 64 watts

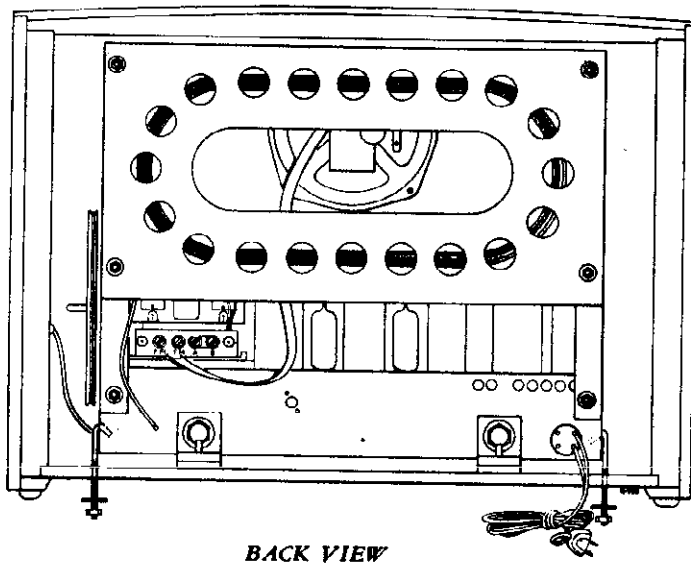
Pilot Lamps ..... (2) Mazda No. 51, 6-8 volts, 0.2 amp.

Loudspeaker 940923-7

Size ..... 5" x 7" elliptical PM
V.C. Impedance ..... 3.4 ohms at 400 cycles

Power Output

Undistorted ..... 2.0 watts
Maximum ..... 4.0 watts



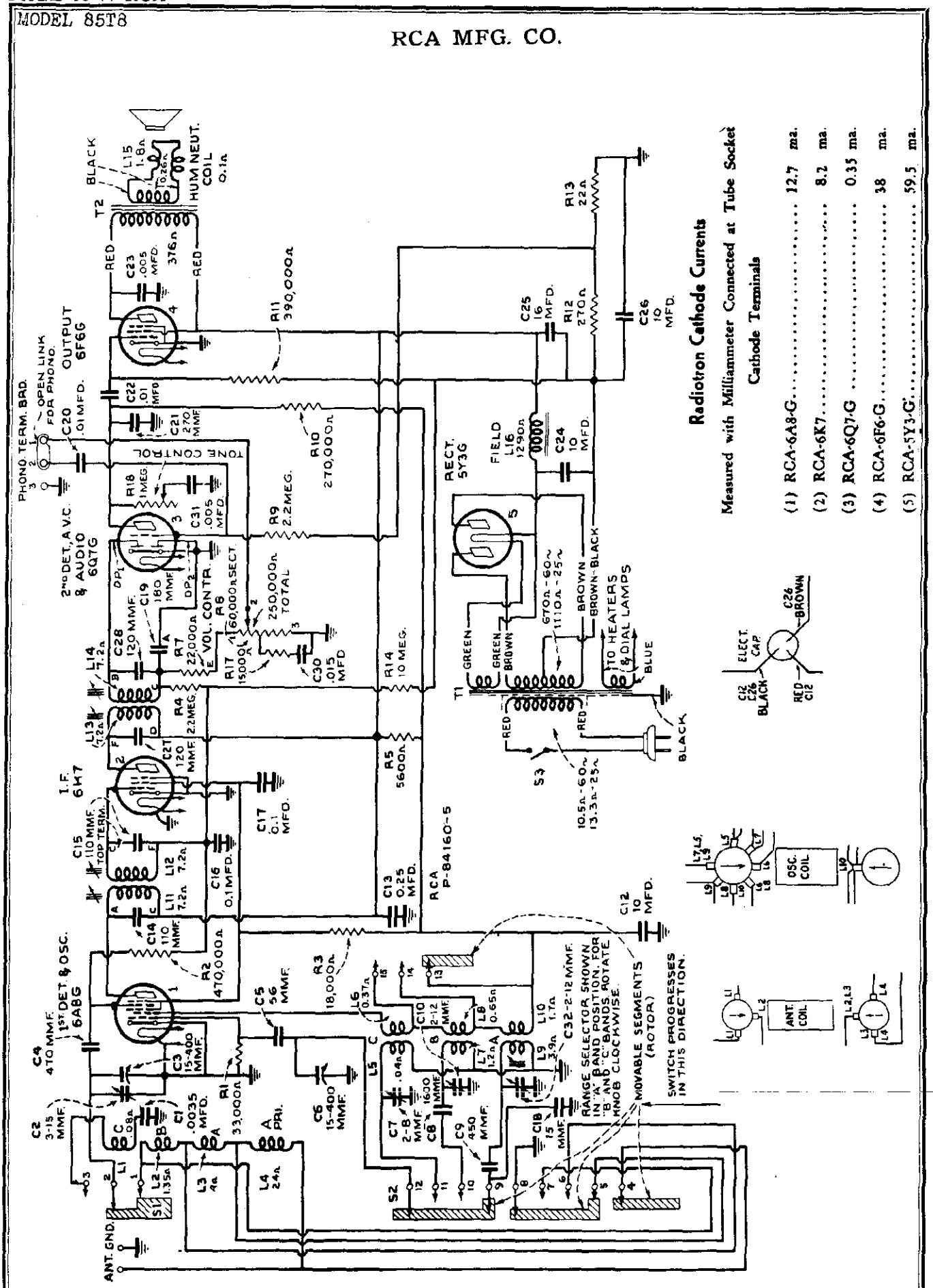
BACK VIEW

Critical Lead Dress

1. Dress capacitor C-1 near chassis base.
2. Dress lead from pin No. 5, No. 1 6BE6 to terminal C, of transformer T1, as near the bottom of the FM shelf as possible.
3. Dress capacitor C-23 next to chassis.
4. The lead from capacitor C-23 to the high side of the volume control must be dressed next to chassis along front apron.
5. Dress resistor R-20 near chassis base.
6. Dress all a-c leads away from volume control.
7. Solder FM antenna coil primary leads to terminal board with as short a lead length as practical.
8. Make all FM leads as short as possible. Dress of all other leads should be similar to original wiring.
9. The lead from pin No. 2, 6BA6, to ground must be dressed as close to the base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length, nor the point at which it is grounded to the chassis should be changed.

MODEL 85T8

RCA MFG. CO.



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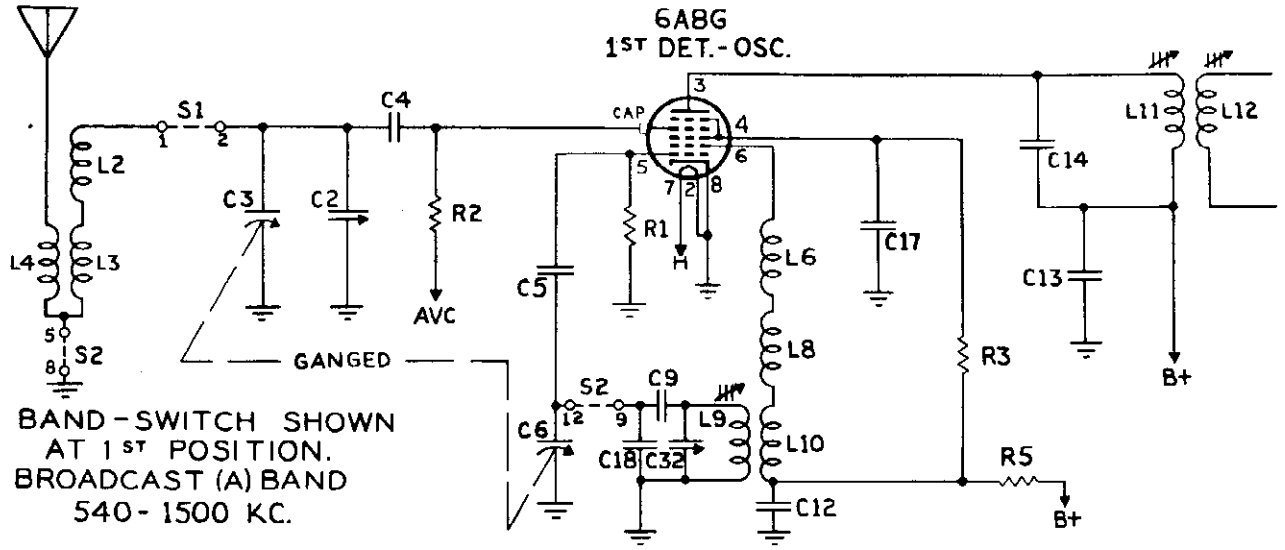
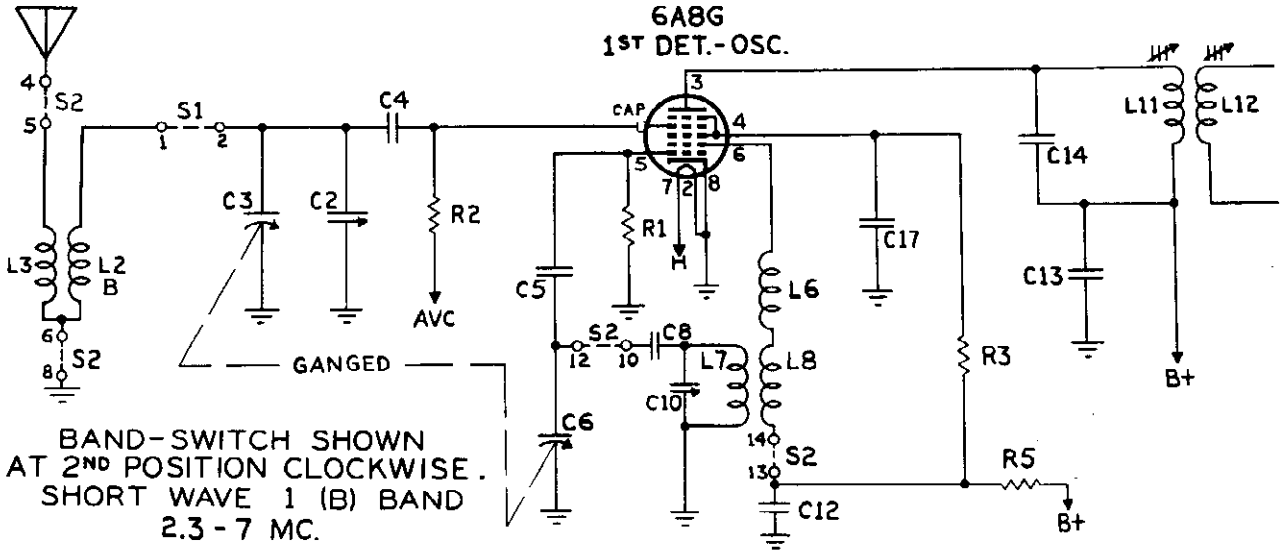
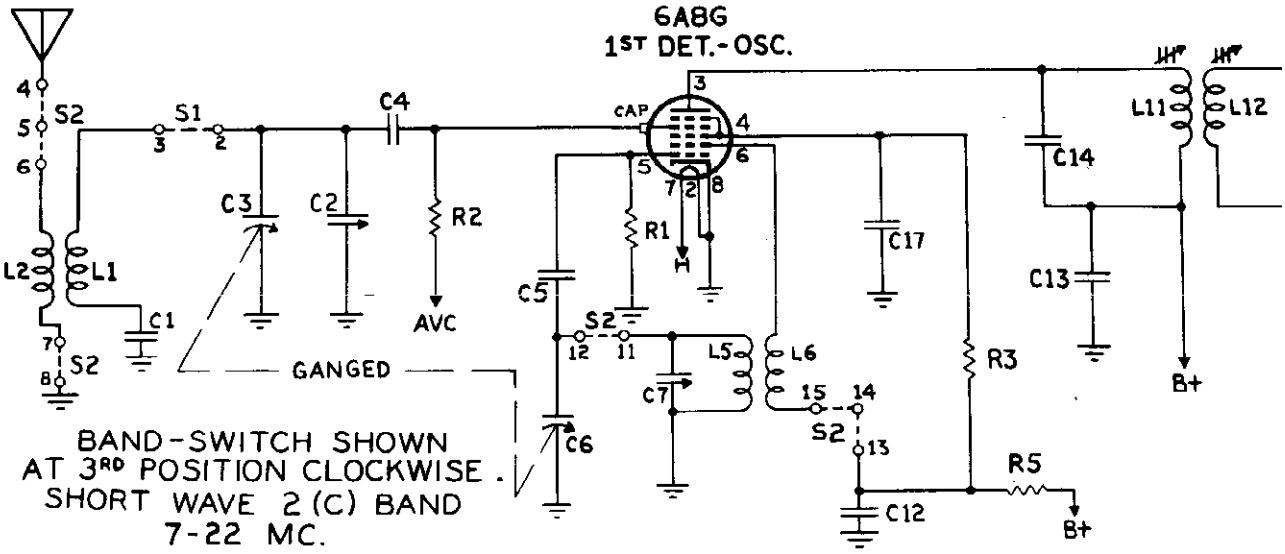


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
540-1500 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE 1 (B) BAND
2.3-7 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE 2 (C) BAND
7-22 MC.

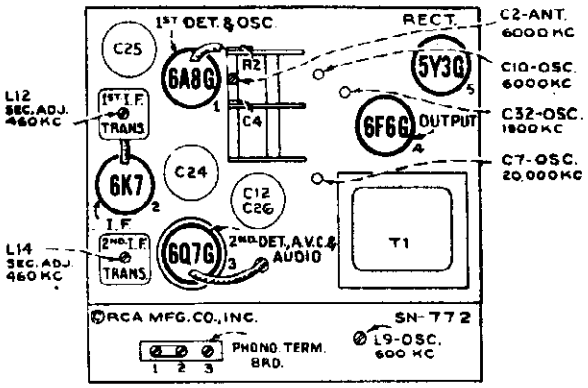
RCA MFG. CO.

Alignment Procedure

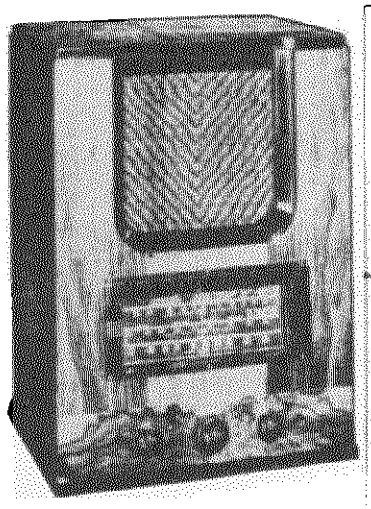
Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position. The pointer is soldered in place on the drive cable.

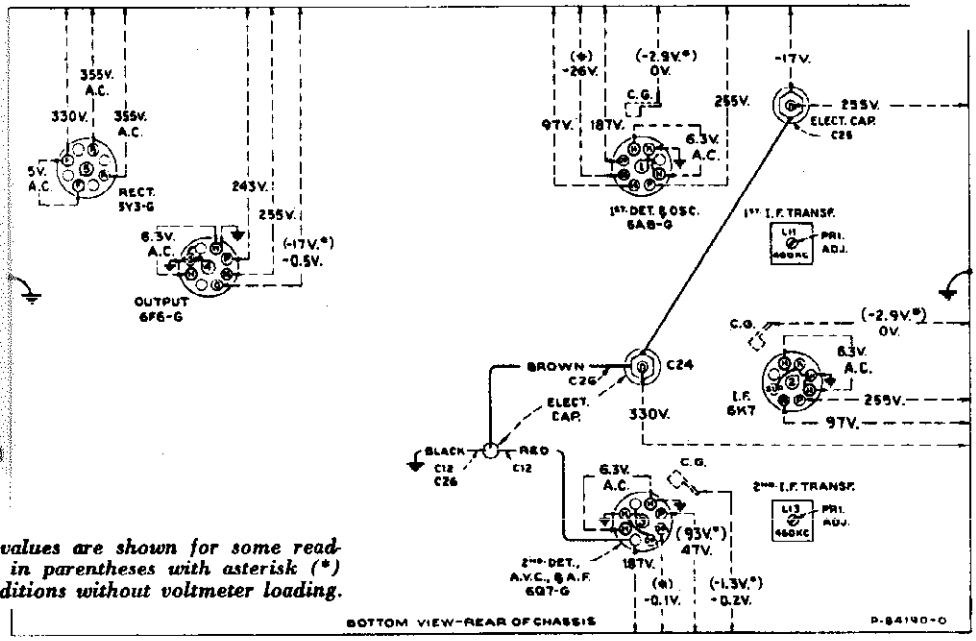
STEP	CONNECT HIGH SIDE OF TEST OSC. TO –	TUNE TEST OSC TO –	TURN RADIO DIAL TO	ADJUST THE FOLLOWING FOR MAX. OUTPUT
1	I-F Grid in series with 0.01 mfd	460 Kc	Quiet point near 600 Kc "A" Band	L14 L13 2nd I-F Trans.
2	1st Det. Grid in series with 0.01mfd			L12 L11 1st I-F Trans.
3	Antenna in series with 300 ohms	6000 Kc	6000 Kc "B" Band	C10 C2 Osc. Ant.
4		20000 Kc	20000 Kc "C" Band	C7▲ Osc.
5	Antenna in series with 200 mmfd	1500 Kc	1500 Kc "A" Band	C32 Osc.
6		600 Kc	600 Kc "A" Band	L9 L-F Osc. Rock Gang
7		*Repeat Step 5*		

▲ *Use maximum capacity peak.*
Osc. tracks 460 Kc below signal on "C" Band.



Radiotron, Coil and Trimmer Locations





Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading.

Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")
No signal being received—Volume control minimum—Tone control optional

RCA MFG. CO.

Electrical Specifications

FREQUENCY RANGES

"Standard Broadcast" (A)	540-1,500 kc
"Short Wave—1" (B)	2,300-7,000 kc
"Short Wave—2" (C)	7,000-22,000 kc

R-F ALIGNMENT FREQUENCIES

"Short Wave—1" (B)	6,000 kc (osc., ant.)
"Short Wave—2" (C)	20,000 kc (osc.)
"Standard Broadcast" (A)	600 kc (osc.), 1,500 kc (osc.)

INTERMEDIATE FREQUENCY ..... 460 kc

RADIOTRON COMPLEMENT

(1) RCA-6A8-G ..... First Detector—Oscillator
(2) RCA-6K7 ..... Intermediate Amplifier
(3) RCA-6Q7-G .. Second Detector, A.V.C., and A-F Amp.
(4) RCA-6F6-G ..... Power Output
(5) RCA-5Y3-G ..... Full-Wave Rectifier

POWER SUPPLY RATINGS

Rating A	105-125 volts, 50-60 cycles, 75 watts
Rating B	105-125 volts, 25-60 cycles, 75 watts
Rating C	105-125/200-250 volts, 50-60 cycles, 75 watts

PILOT LAMPS (2) ..... 6.3 volts, 0.25 amp.

POWER OUTPUT RATING

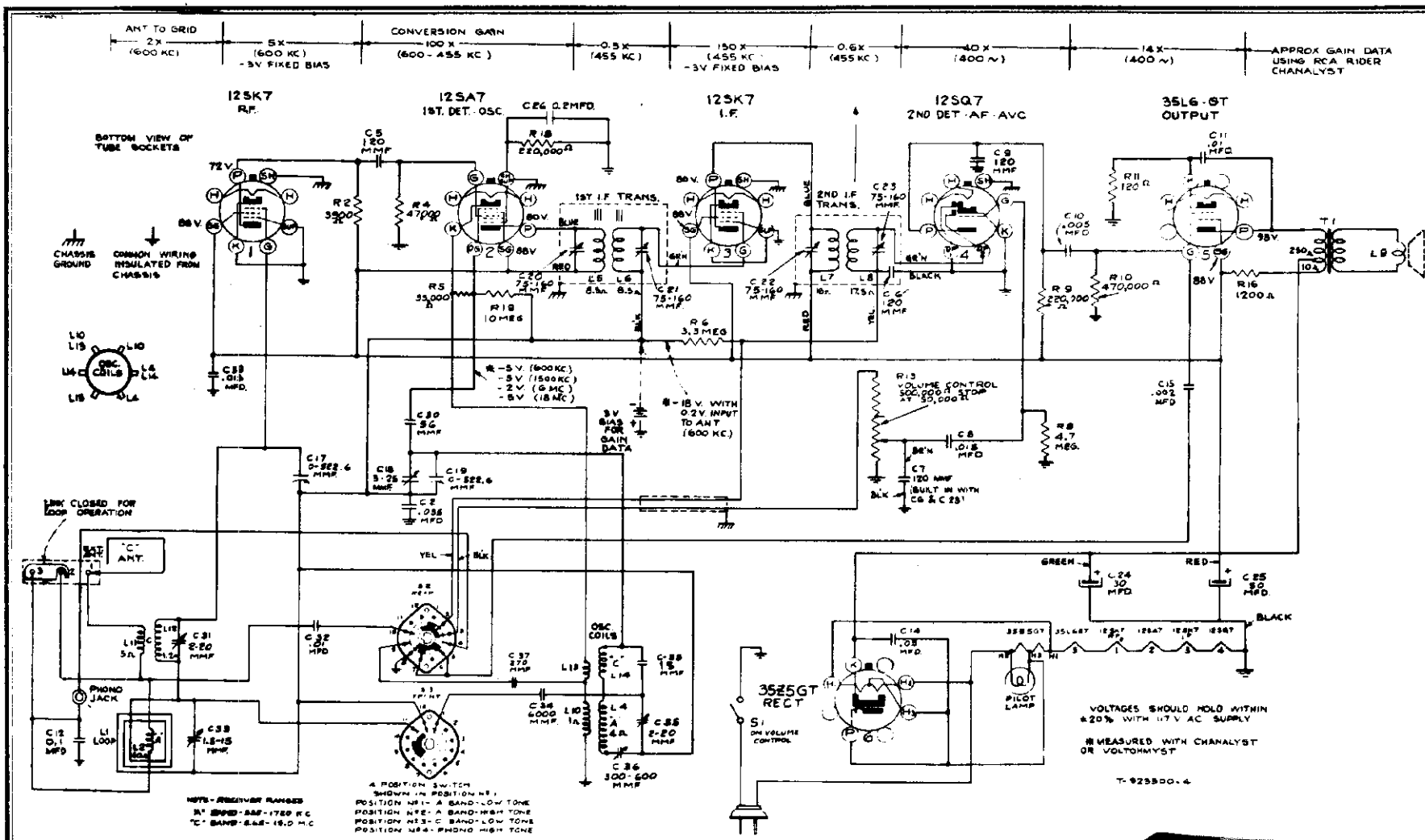
Undistorted	2.5 watts
Maximum	4.5 watts

LOUDSPEAKER

Type	8-inch Electrodynamic
V.C. Impedance	2.2 ohms at 400 cycles

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14380	Arm—Hub and arm for operating band indicator shutter—fastens on range switch shaft
14352	Belt—Station selector drive belt
13216	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
12607	Cap—Top shield cap for first i-f transformer
12581	Cap—Top shield cap for second i-f transformer
11350	Cap—Grid contact cap
12807	Capacitor—Adjustable trimmer (short) (C7)
12714	Capacitor—Adjustable trimmer (medium) (C32)
12896	Capacitor—15 mmfd. (C18)
12723	Capacitor—56 mmfd. (C5)
14262	Capacitor—110 mmfd. (C14, C15)
12404	Capacitor—120 mmfd. (C27, C28)
12406	Capacitor—180 mmfd. (C19)
12488	Capacitor—270 mmfd. (C21)
12812	Capacitor—450 mmfd. (C9)
30433	Capacitor—470 mmfd. (C4)
30592	Capacitor—1,600 mmfd. (C8)
30303	Capacitor—.0035 mfd. (C1)
4838	Capacitor—.005 mfd. (C23, C31)
14393	Capacitor—.01 mfd. (C20, C22)
11315	Capacitor—.015 mfd. (C30)
4839	Capacitor—0.1 mfd. (C16, C17)
12484	Capacitor—0.25 mfd. (C13)
11203	Capacitor—10 mfd. (C24)
30577	Capacitor Pack—Comprising two sections, each 10 mfd. (C12), C26)
5212	Capacitor—16 mfd. (C25)
4358	Clamp—Mounting clamp for capacitor pack, Stock No. 30577
30621	Coil—Antenna coil (L1, L2, L3, L4)
30579	Coil—Oscillator coil (L5, L6, L7, L8, L9, L10)
30573	Condenser—2-gang variable tuning condenser (C2, C3, C6)
30586	Cord—Station selector indicator pointer cord
12800	Core—Adjustable core and stud for oscillator coil
12006	Core—Adjustable core and stud for i-f transformers
30622	Dial—Station selector dial scale
30581	Disc—Band indicator disc with celluloid window
30572	Drive—Vernier drive shaft and pinion gear for variable condenser
30584	Drum—Station-selector drive-cord drum with set screws
30583	Indicator—Station-selector indicator pointer and holder assembly
5226	Lamp—Dial lamp
14028	Nut—Jamb nut for adjustable capacitor, Stock Nos. 12807 and 12714
30587	Pulley—Drive-belt pulley for condenser shaft
14636	Pulley—Drive-belt idler pulley
14525	Resistor—22 ohms, carbon type, ½ watt (R13)
13819	Resistor—270 ohms, insulated, wire-wound, 1.1 watt (R12)
11298	Resistor—5,600 ohms, carbon type, 1 watt (R5)
12695	Resistor—15,000 ohms, insulated, ½ watt (R17)
30151	Resistor—18,000 ohms, insulated, 1 watt (R3)
14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R7)
12454	Resistor—33,000 ohms, insulated, ½ watt (R1)
12199	Resistor—270,000 ohms, insulated, ½ watt (R10)
13005	Resistor—390,000 ohms, carbon type, 1/10 watt (R11)
11452	Resistor—470,000 ohms, carbon type, 1/10 watt (R2)
11626	Resistor—2.2 meg., carbon type, ½ watt (R4, R9)
13601	Resistor—10 meg., insulated, ½ watt (R14)
30582	Retainer—Band indicator disc retainer
14343	Ring—Retaining ring for range switch shaft
14350	Screw—No. 8-32 x 3/16-inch square-head set screw for drum, Stock No. 30584; arm, Stock No. 14380, and pulley, Stock No. 30587
14340	Shaft—Drive pulley and knob shaft—fastens on range-switch shaft
3682	Shield—Radiotron shield
12008	Shield—I-f transformer shield can
5119	Socket—3-contact speaker cable socket
11196	Socket—6-contact Radiotron socket
14114	Socket—Dial lamp socket
12007	Spring—Retaining spring for core, Stock No. 12006
30585	Spring—Tension spring for pointer cord
30588	Spring—Tension spring for idler pulley
30620	Switch—Range switch (S1, S2)
30574	Tone control and power switch (R18, S3)
14376	Transformer—First i-f transformer (L11, L12, C14, C15)
14308	Transformer—Second i-f transformer (L13, L14, C19, C27, C28, R7)
30571	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
30617	Transformer—Power transformer, 105-125 and 200-250 volts, 50-60 cycles (T1)
30575	Volume Control (R6)
	REPRODUCER ASSEMBLIES (RL-63F-1)
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L16)
11469	Coil—Hum neutralizing coil (L17)
12642	Cone—Reproducer cone and dust cap (L15)
5118	Plug—3-contact male plug for reproducer
14360	Reproducer—Complete
14358	Screw—Screw, washer, and lockwasher to hold core in yoke
14365	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
30593	Escutcheon—Dial escutcheon and crystal
14359	Knob—Station selector knob
14269	Knob—Tone control, volume control, or range-switch knob
14267	Screw—Chassis mounting screw and washer assembly
14270	Spring—Retaining spring for knob, Stock No. 14269
4982	Spring—Retaining spring for knob, Stock No. 14359



Specifications

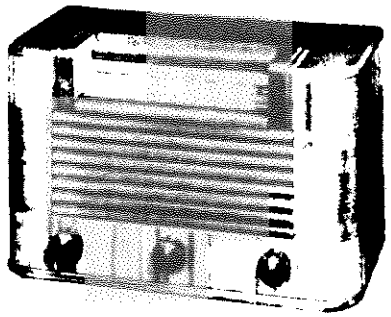
FREQUENCY RANGE	535-1,720 kc 5.74-19 mc
Intermediate Frequency	455 kc

POWER SUPPLY RATINGS
AC Rating.. 105-125 volts, direct current, or 50-60 cycles, 30 watts

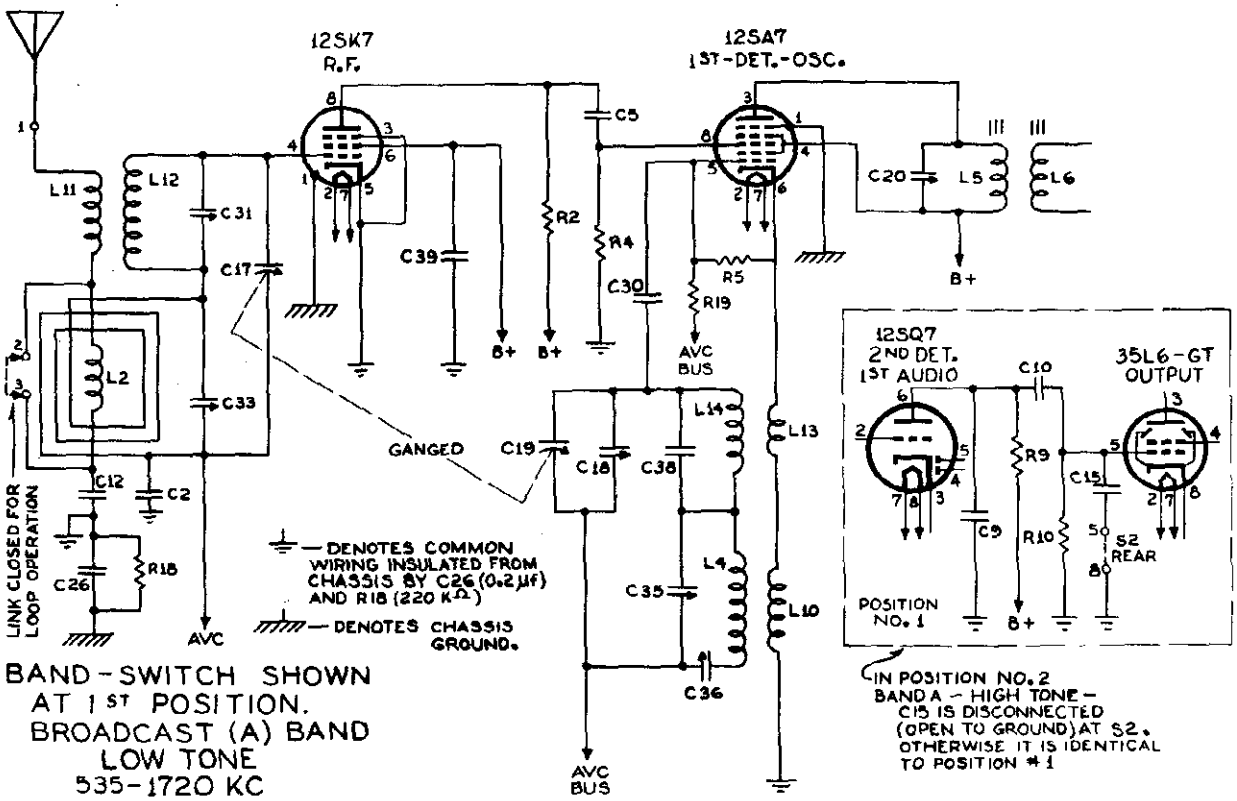
POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted..... 0.9 watts Maximum..... 1.4 watts

LOUDSPEAKER (RL-81-B2).....5-inch permanent-magnet dynamic
Voice Coil Impedance at 400 cycles..... 4 ohms

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.

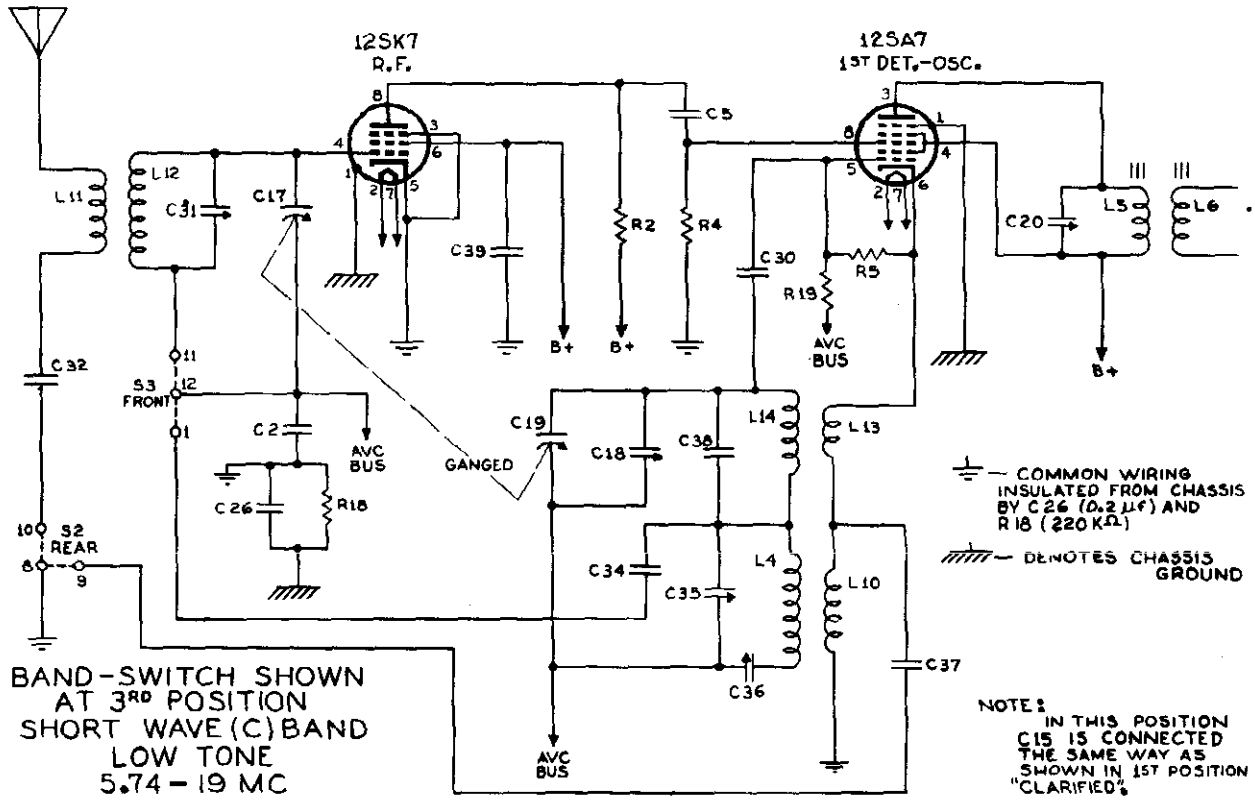


RCA MFG. CO.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST (A) BAND LOW TONE 535-1720 KC

IN POSITION NO. 2 BAND A - HIGH TONE - C15 IS DISCONNECTED (OPEN TO GROUND) AT S2. OTHERWISE IT IS IDENTICAL TO POSITION #1



BAND-SWITCH SHOWN AT 3RD POSITION SHORT WAVE (C) BAND LOW TONE 5.74 - 19 MC

NOTE: IN THIS POSITION C15 IS CONNECTED THE SAME WAY AS SHOWN IN 1ST POSITION "CLARIFIED".

MODEL 515

RCA MFG. CO.

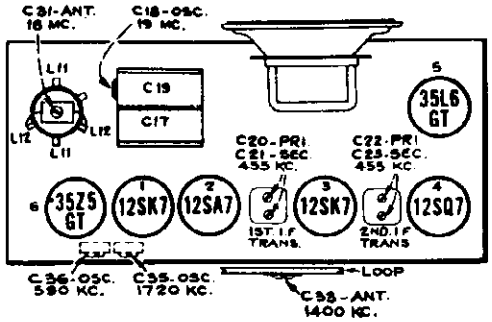
Alignment Procedure

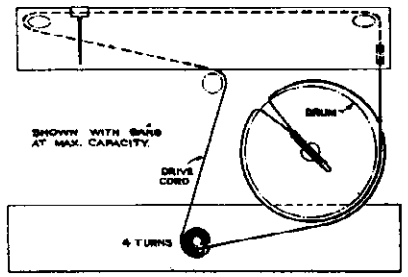
Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

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	I-F grid in series with 0.1 mfd.	455 kc	"A" Band Quiet Point 1,600 kc end of dial	C23, C22 2nd I-F Trans.
2	1st Det. grid in series with 0.1 mfd.			C21, C20 1st I-F Trans.
3	Ant. terminal in series with 47 mmfd.	19 mc	"C" Band 19 mc	C18 (osc.)

Steps	Connect the high side of test-osc. to—	Tune test osc. to	Turn radio dial to—	Adjust the following for max. peak output—
4	Radiated Signal, 18 mc		"C" Band Resonance on Signal	C31 (ant.)
5	Radiated Signal, 6.1 mc			L12*
6	Ant. terminal in series with 200 mmfd.	1,720 kc	"A" Band 1,720 kc	C35 (osc.)
7	Radiated signal (Link closed)	1,400 kc	Resonance on Signal	C33 (ant.)
8	Ant. terminal in series with 200 mmfd.	590 kc	"A" Band 590 kc	C36 (osc.)
9	Repeat steps 6, 7 and 8			

* Adjust by dressing proximity of AVC lead to coil.





Precautionary Lead Dress.—

1. Dress all capacitors, leads, etc., coming close to osc. coil rigidly and as far as possible from it.
2. Dress blue lead from loop trimmer against loop and around outside of 35Z5GT tube.
3. Dress leads of 120 mmfd. capacitor from terminal board to grid of 12SA7 as short and direct as possible.
4. Dress blue lead from SW ant. coil through same hole in base through which green lead from stator of rear section of the variable condenser passes.

Replacement Parts

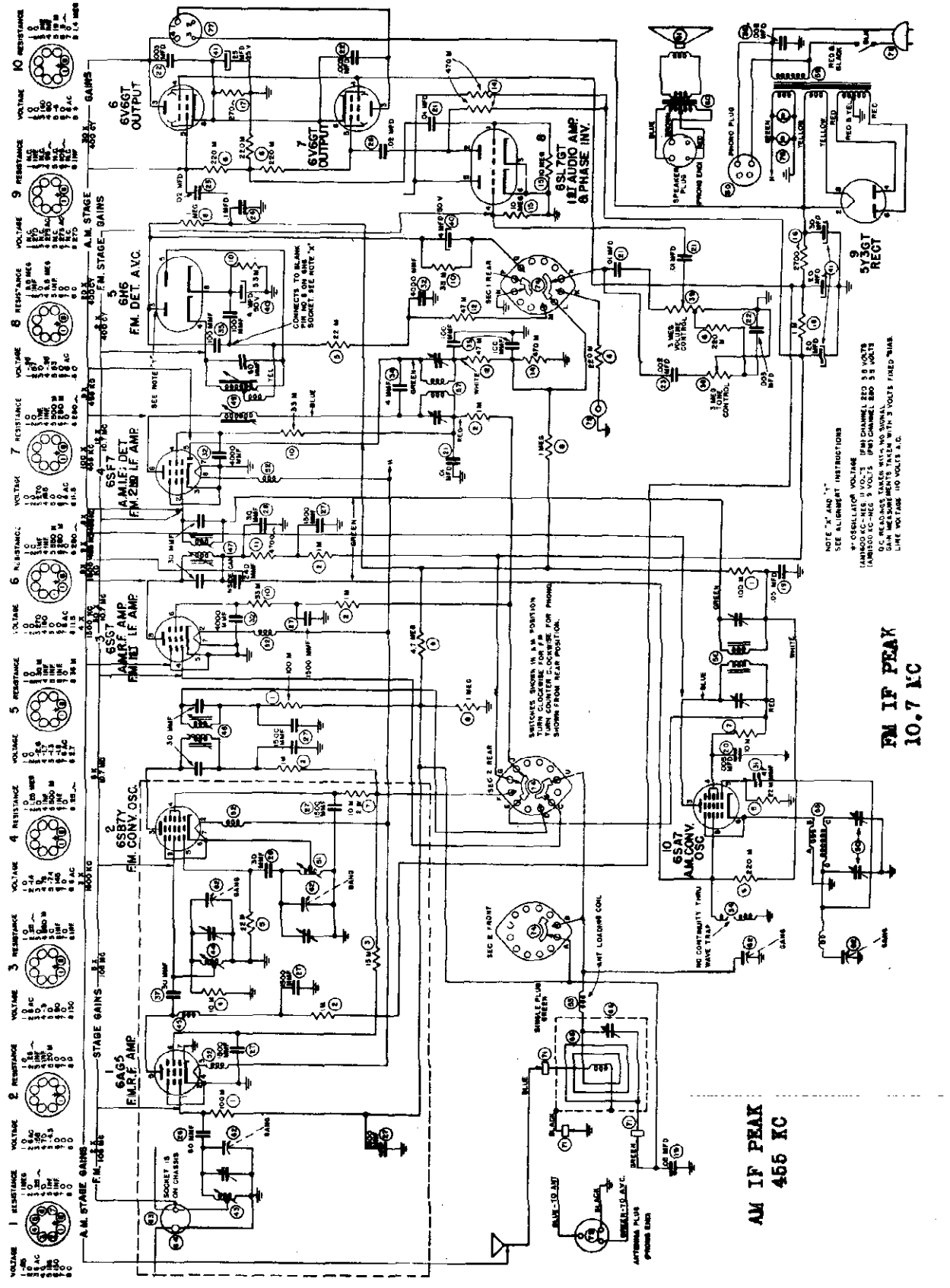
Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-1000C)	
36947	Board—"Antenna-Ground" and phono input board	.25
35998	Capacitor—Mica trimmer for loop	.25
36880	Capacitor—Mica trimmer—1 section 2-20 mmfd. and 1 section 300-800 mmfd.	.60
11859	Capacitor—Adjustable trimmer—3-30 mmfd.	.25
12896	Capacitor—15 mmfd.	.35
12723	Capacitor—56 mmfd.	.35
12724	Capacitor—120 mmfd.	.35
12488	Capacitor—270 mmfd.	.35
31405	Capacitor—6,000 mmfd.	.75
34506	Capacitor—.0018 mfd.	.25
33584	Capacitor—.005 mfd.	.25
4937	Capacitor—.01 mfd.	.25
11315	Capacitor—.015 mfd.	.20
5196	Capacitor—.035 mfd.	.20
32787	Capacitor—.05 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
34505	Capacitor—0.2 mfd.	.30
36301	Capacitor—Electrolytic comprising 1 section of 30 mfd. 150 volts, and 1 section of 50 mfd. 150 volts	1.25
35713	Coil—Antenna coil	.75
35096	Coil—Loop primary coil	.50
36937	Coil—Oscillator coil	.85
36876	Condenser—Two gang variable tuning condenser	3.00
36242	Control—Volume control and power switch	1.50
32634	Cord—Drive cord (approx. 50 inches long overall)	.10
36237	Drum—Tuning condenser drive cord drum	.25
37068	Indicator—Station selector indicator	.20
36882	Loop—Antenna loop complete	2.00
36877	Loop—Loop winding only—less support, primary coil, and trimmer	.55
37928	Plate—Dial back plate complete	1.00
36230	Pulley—Drive cord pulley	.04
30189	Resistor—120 ohms, ½ watt	.20
6134	Resistor—1,200 ohms, 1 watt	.22
12955	Resistor—3,900 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
30648	Resistor—470,000 ohms, ½ watt	.20
12928	Resistor—3.3 meg., ½ watt	.20
30271	Resistor—4.7 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
36897	Shaft—Tuning knob shaft	.10
34449	Socket—Dial lamp socket	.30
31251	Socket—Tube socket	.25
31418	Spring—Drive cord spring	.05
36881	Switch—Range switch	1.25
36232	Transformer—First I.F. transformer	1.50
36233	Transformer—Second I.F. transformer	1.50
36800	Transformer—Output transformer	1.30
33726	Washer—"C" washer to hold tuning shaft	.02
	SPEAKER ASSEMBLIES (RL-81B2)	
35570	Cone—Cone complete with voice coil	1.20
37612	Speaker—5-inch permanent magnet speaker complete with cone and voice coil—less output transformer	3.50
	MISCELLANEOUS ASSEMBLIES	
36302	Back—Cabinet back—less red lead wire and terminal	.15
36873	Clamp—Dial clamp	.10
37929	Dial—Glass dial scale	
37831	Fastener—Push-on fastener	.10
37386	Knob—Range switch knob	.25
36541	Knob—Tuning or volume control knob	.20
11765	Lamp—Dial lamp, Mazda No. 51	.15
11349	Spring—Retaining rings for knobs	.05

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

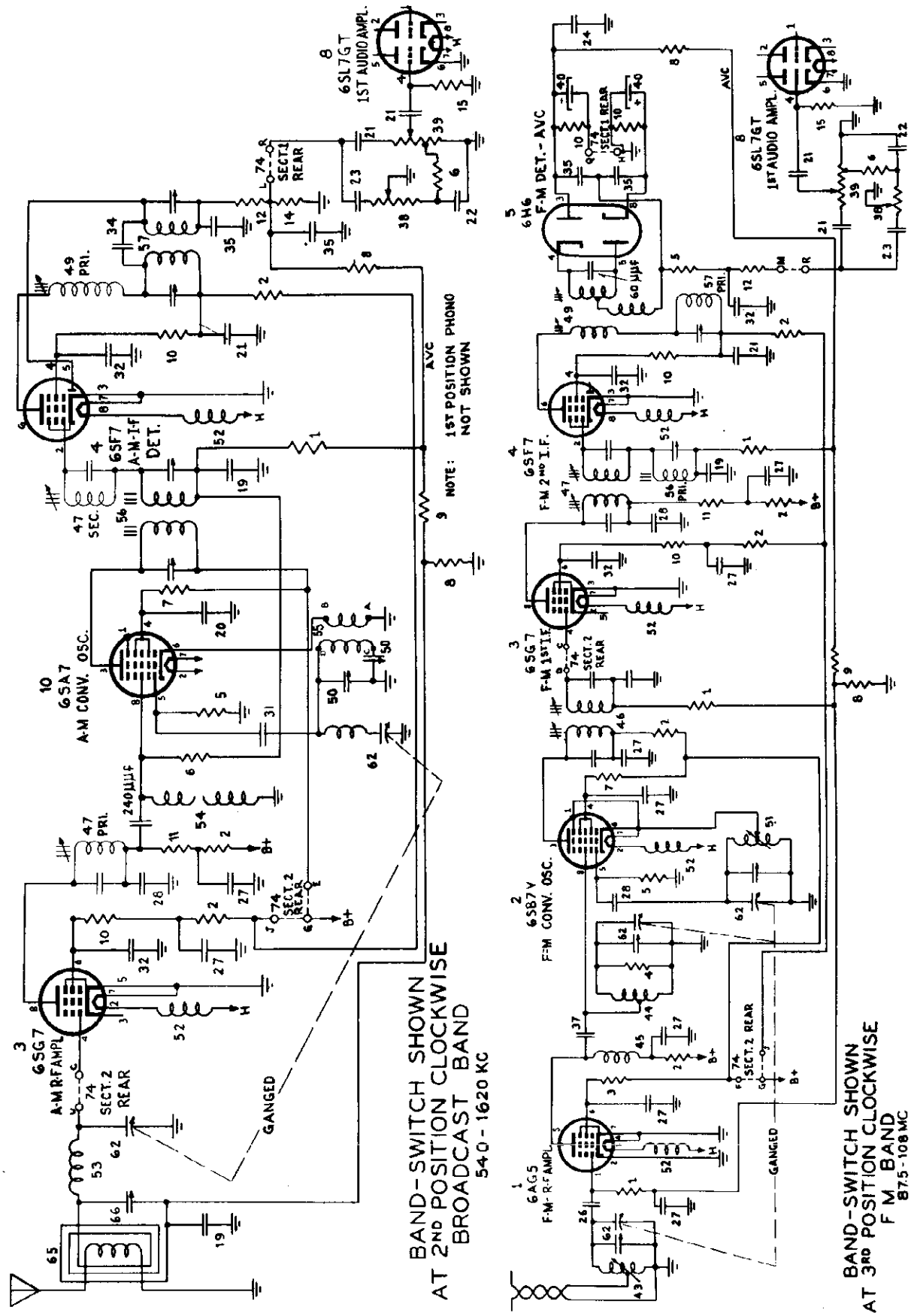
RADIO & TELEV. INC.

MODELS SF-6810, T-4000
T-4000-1/2, D-6876

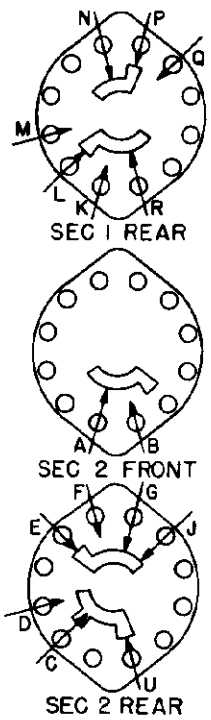


MODELS SF-6810,T-4000,
T-4000-1/2,D-6876

RADIO & TELEV. INC.



BAND SWITCH DECKS

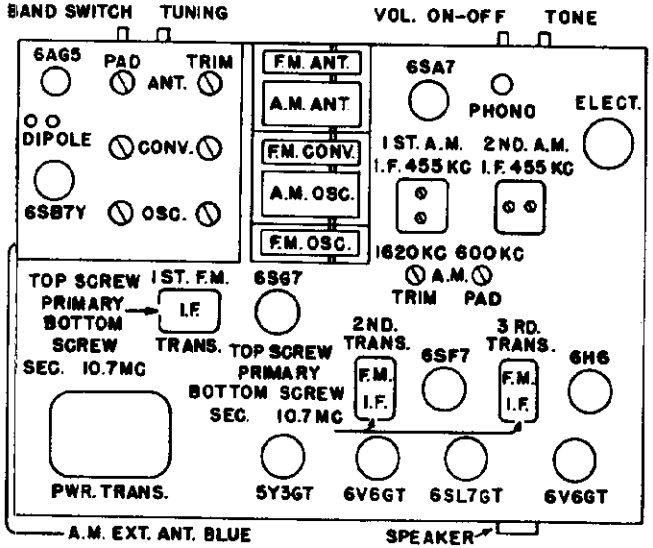


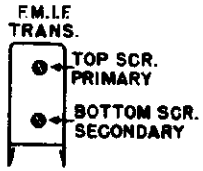
Letters on terminals of switches and coils shown on this page correspond to similarly lettered terminals on the switches and coils shown in the circuit diagam.

FM ANTENNA—The folded dipole antenna built into this instrument gives satisfactory reception under normal conditions. For best results an outdoor dipole is recommended.

GROUND—A ground connection is not normally required unless an outside aerial is used. The ground connection is made by attaching one end of a length of wire to a water pipe, radiator or pipe driven into the ground and connecting the other end to the black wire found at the rear of the receiver. A gas pipe or electrical conduit must not be used for a ground.

CHASSIS LAYOUT





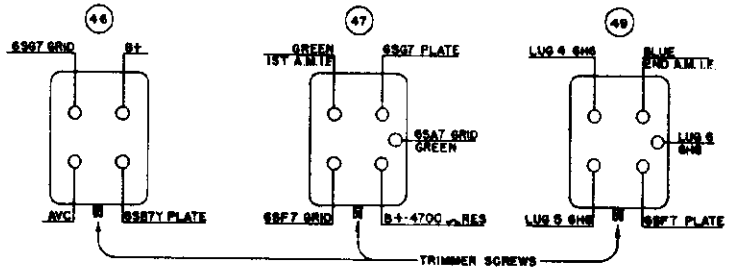
ELECTRICAL SPECIFICATIONS:

Ten tube, 60 cycle A. C., 105-125 volt operated superheterodyne receiver with built-in loop antenna and FM folded dipole. AM Broadcast band tuning range 540 Kc. to 1620 Kc. FM band range 87.5 Mc. to 108 Mc. calibrated in channel numbers from 200 to 300.

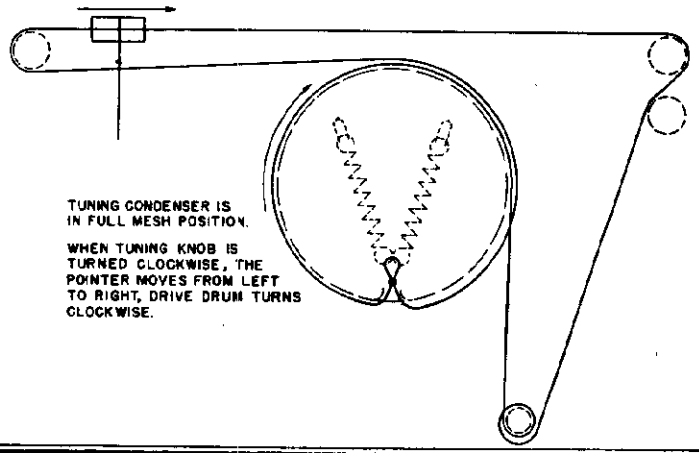
Speaker 12" PM
Voice coil impedence 3.5 ohms

Power output
Radio-7 watts
Phono-9 watts

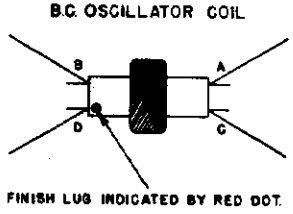
BOTTOM VIEW FM I.F. TRANS.

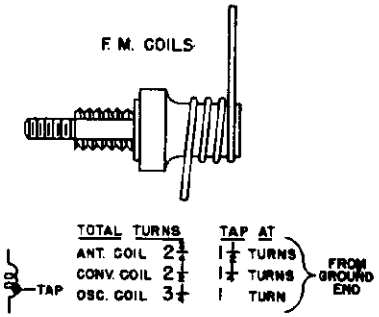


DIAL STRINGING



BROADCAST AND FM COILS





MODELS SP-6810, T-4000, T-4000-1/2, D-6876

OSCILLISCOPE ALIGNMENT OF FM BAND

A. Equipment required will be an oscilliscope, a frequency modulated signal generator covering the range 87.5 to 108.5 mc on fundamentals, a sweep generator producing a signal of 10.7 mc and sweeping at least 150 kc each side of 10.7 mc, and an output meter.

B. The vertical or "Y" axis terminals of the oscilliscope should be connected between pin 3 of the 6H6 discriminator and ground. The sweep voltage of the sweep generator should be fed to the horizontal or "X" axis terminals of the 6SF7 tube through a condenser of approximately 3300 mmfd.

C. Remove the negative lead of the 4 mfd. electrolytic from pin #3 of 6H6 socket. Remove 6SL7 tube from socket. Turn the set on and turn both the tone control and the volume control all the way to the right. Detune the secondary of the third FM I.F. transformer by turning the bottom slug screw out as far as possible. Adjust the primary, top slug screw, until pattern (a) appears on the oscilliscope. Adjust the secondary, bottom slug screw, until pattern "b" is obtained on the oscilliscope and until both sides of this pattern are symmetrical.

D. Remove the 10.7 mc output of the sweep generator from the grid of the 6SF7 tube and connect to the grid of the 6SG7. Align the second FM I.F. transformer as in paragraph "C".

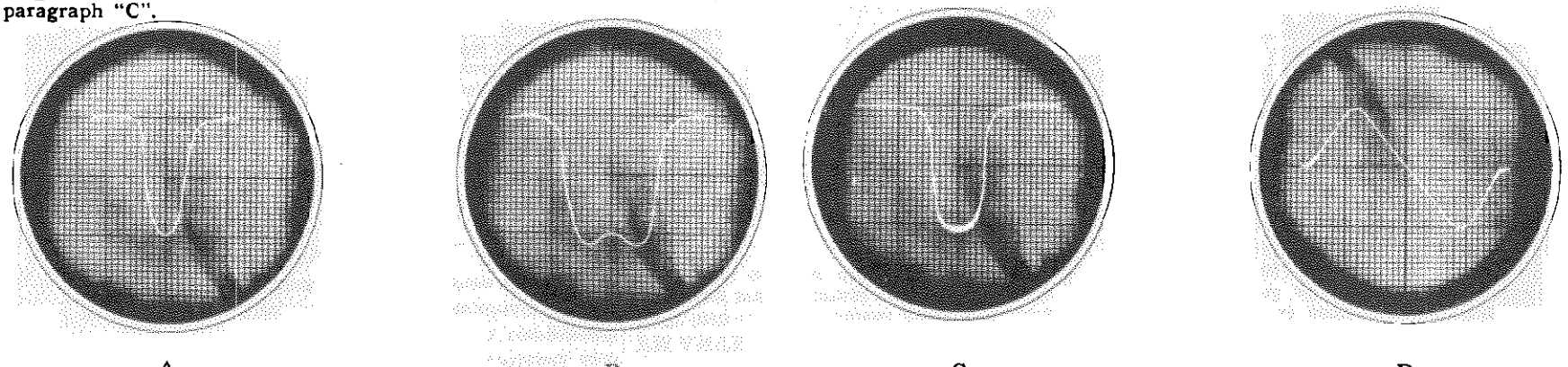
E. Connect the 10.7 ms output of the sweep generator to the signal grid of the 6SB7Y, (pin 8). Detune secondary of the first FM I.F. transformer and tune primary as before for pattern (a). Tune secondary for pattern "c" and make both sides of pattern as symmetrical as possible. This completes alignment of the FM I.F. transformers.

F. Reconnect the negative lead of the 4 mfd. electrolytic to pin #3 of the 6H6 socket and move the oscilliscope leads to pin #6 of the 6H6 socket and ground. With the sweep generator connected to the 6SB7Y signal grid as before, the discriminator pattern (d) should appear on the oscilliscope if the I.F. alignment instructions have been followed carefully. Remove the oscilloscope and sweep generator leads and reinstall 6SL7 tube in socket. Never adjust AM I.F. transformers without rechecking FM I.F. alignment.

G. Connect the 87.5 to 108.5 mc signal generator to the antenna socket of the receiver through a 300 ohm resistor. The generator should be frequency modulated at some frequency in the audible range. Connect output meter across secondary of output transformer. Tune receiver to channel 300 on FM dial. With signal generator set at 107.9 mc adjust oscillator trimmer condenser, third from front, for maximum reading on output meter. Set signal generator to 87.9 mc and tune receiver to channel 200 on FM dial. Adjust oscillator coil screw, third from front, (see chassis layout) for maximum reading on output meter. Recheck oscillator setting for channel 300.

Tune signal generator and receiver to 5 mc (channel 285 approx.). Adjust converter signal grid trimmer condenser, second from front, for maximum reading on output meter. Tune signal generator and receiver to 92 mc, (channel 220 approx.) and adjust converter coil screw, (second from front), to maximum reading on output meter. Recheck converter trimmer setting at 105 mc (channel 285 approx.).

I. Repeat operations of paragraph (G) for antenna trimmer condenser and coil. This completes FM R.F. alignment.



A B C D

ALIGNMENT INSTRUCTIONS AM BAND

An output meter and a signal generator calibrated at 455 Kc., 600 Kc., 1500 Kc. and 1600 Kc., are required to properly align these receivers on AM band. Keep the output of the signal generator as low as possible to prevent AVC action and false settings. Connect the high side of the generator to the blue wire found at rear of set and low side to the black wire.

STEPS	DUMMY ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	
1	SET VOLUME AND TONE CONTROLS AT MAXIMUM					MAXIMUM OUTPUT
2	200 MMF.	455 Kc.	Minimum	2nd. I.F. Trimmers *	Top of I.F. Transformers	
3				1st. I.F. Trimmers *		
4		1600 Kc.	1600 Kc.	B. C. Osc. Trimmer	See Chassis Layout	
5		1500 Kc.	1500 Kc.	B. C. R. F. Trimmer	On Loop	
6		600 Kc.	600 Kc. Rock Gang	600 Kc. Padder	See Chassis Layout	
7		Recheck 1500 Kc.				

* Recheck after FM alignment.

ALTERNATE FM ALIGNMENT PROCEDURE

Necessary Equipment:
Signal Generator
Voltohmyst

Connect Voltohmyst from ground to pin 6 of 6H6 (audio, marked X on Schematic). Connect generator tuned to 10.7 mc, to pin #4 on 6SG7. Turn secondary slug of 3rd FM I.F. (closest to chassis) out as far as it will go. Tune Primary of 3rd I.F. for maximum negative voltage. Next tune Secondary slug for zero voltage. (As Sec. slug is tuned voltage will go up slowly then start decreasing rapidly, tune slug till it reaches zero). Next connect voltmeter between ground and pin #3 (marked Y on Schematic) on 6H6 socket (AVC). Turn Secondary slug of 2nd FM I.F. out as far as it will turn. Tune primary for maximum negative voltage. Then tune secondary for maximum negative voltage. Move generator to pin #8 of 6SB7Y socket. Follow same procedure as on 2nd I.F. for the 1st. I.F. transformer. I.F. is now aligned.

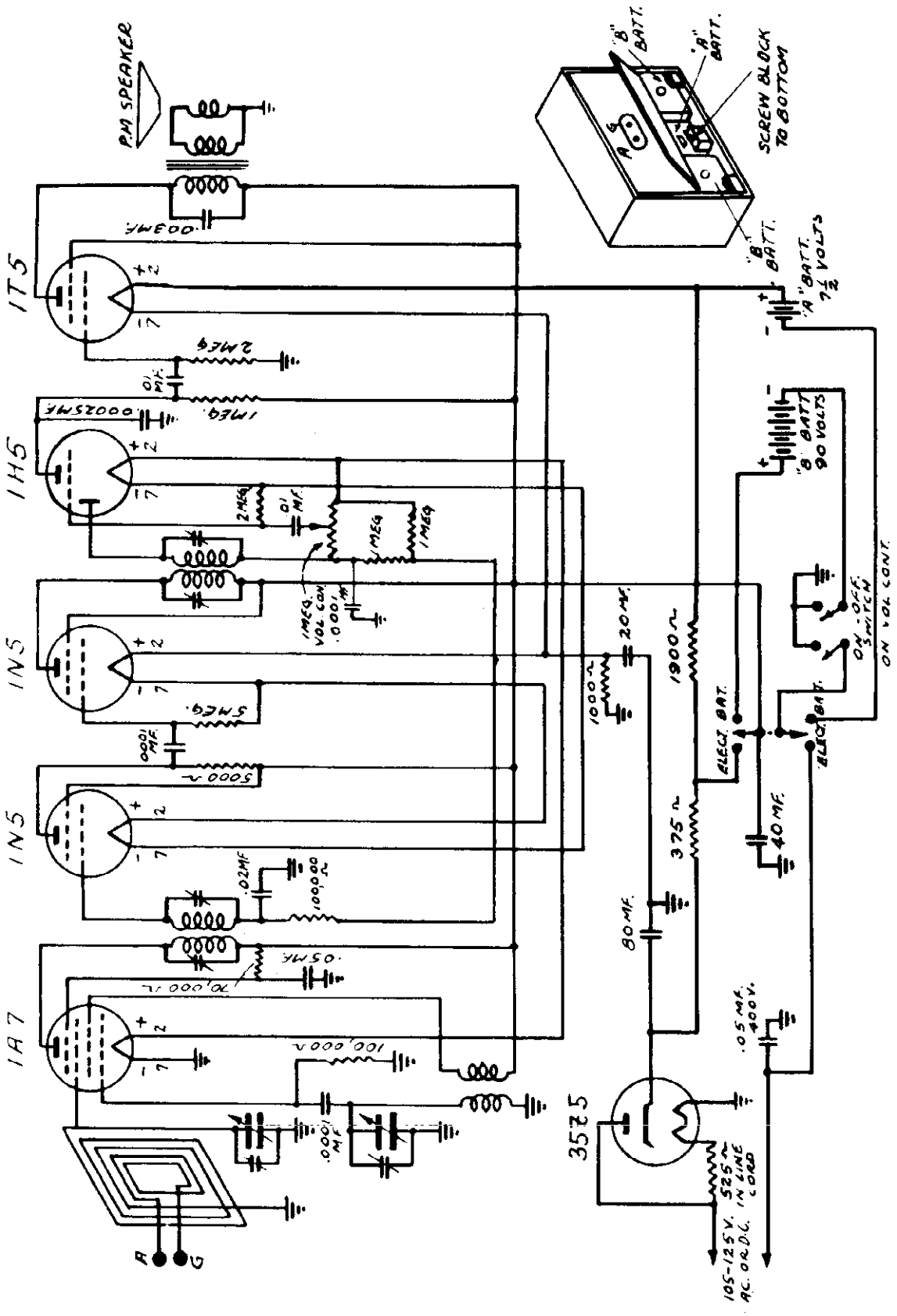
RF ALIGNMENT:

With Voltohmyst still connected between ground and pin #3 on 6H6 socket, connect generator between ground and small pin of dipole antenna socket. Use very short leads on generator and a 300 ohm resistor as a dummy antenna. Set generator at 87.5 mc and gang closed. Adjust oscillator slug for maximum voltage. Adjust generator to 108.5 mc and gang to minimum and adjust oscillator trimmer for maximum voltage. Go back and check low frequency end. Next set generator at 92 mc, tune in signal on receiver, approximately 220 on dial. Adjust converter and antenna slug for maximum voltage output. Set generator at 105 mc. Tune in signal on receiver, approximately 280 on dial. Tune converter and antenna trimmer for maximum voltage output. Check adjustment of antenna and converter slugs at 92 mc.

MODEL SF-6810—PARTS LIST

Ref. No.	Part No.	DESCRIPTION	List Price
1	77214	100M Ohms	$ .15
2	77262	1000 Ohms	.15
3	77265	15 M Ohms	.15
4	77212	10 M Ohms	.15
5	77266	22 M Ohms	.15
6	77216	220 M Ohms	.15
7	77013	10 M Ohms 2 Watt	.25
8	77218	1 Megohm	.15
9	77272	4.7 Megohms	.15
10	77267	33 M Ohms	.15
11	77211	4700 Ohms	.15
12	77213	47 M Ohms	.15
14	77217	470 M Ohms	.15
15	77274	10 Megohms	.15
16	77243	2700 Ohm Molded Resistor 4.7 Watt	.50
17	77189	270 Ohms, 2 Watt	.25
18	77304	1000 Ohms, 2 Watt	.20
19	25196	.05 Mfd. 600 Volt	.20
20	25183	.005 Mfd. 600 Volt	.15
21	25194	.01 Mfd. 600 Volt	.20
22	25184	.003 Mfd. 600 Volt	.20
23	25185	.002 Mfd. 600 Volt	.15
24	25215	.1 Mfd. 600 Volt	.20
25	25031	.005 Mfd. Buffer Capacitor, 600 Volt	.30
26	25333	60 MMF. Ceramic Capacitor	.25
27	25273	1500 MMF. Ceramic Capacitor	.30
28	25329	30 MMF. Ceramic Capacitor, N-150	.20
31	25193	47 MMF. Mica Capacitor	.30
32	25271	4000 MMF. Ceramic Capacitor	.65
34	25327	4 MMF. Ceramic Capacitor	.60
35	25188	100 MMF. Mica Capacitor	.25
37	25332	30 MMF. Ceramic Capacitor, N-750	.20
38	78072	Tone Control, 3 Megohms	.80
39	78120	Volume Control, 3 Megohms	1.10
40	25316	4 Mfd., 50 V. Electrolytic Capacitor	.80
41	25214	Electrolytic Capacitor 20 Mfd., 20 Mfd., 30 Mfd., 450 volt, 25 Mfd., 25 Volt	3.10
43	38690	FM Antenna Coil	1.05
44	38691	FM Convertor Coil	1.05
45	58471	FM RF Choke	.10
46	38683	1st. FM I.F. Transformer	3.75
47	38684	2nd. FM I.F. Transformer	4.05
49	38685	3rd. FM I.F. Transformer	4.35
50	26240	B. C. Osc. Trimmer Strip	.75
51	38692	FM Oscillator Coil	1.05
52	38661	Heater Choke	.25
53	38845	Antenna Loading Coil	.50
54	38484	Wave Trap Coil	.55
55	38694	BC Oscillator Coil	.65
56	38681	1st. AM I.F. Transformer	2.40
57	38682	2nd. AM I.F. Transformer	2.40
59	94204	Power Transformer	7.90
60	94195	Output Transformer	4.55
61	81126	Speaker	20.05
62	26237	Gang Capacitor	8.85
63	11325	FM Dipole Rod Plug	1.15
64	80361	FM Dipole Socket	.10
65	38835	Loop Antenna	6.65
66	26031	Loop Antenna Trimmer	.35
71	80256	Loop Antenna Socket	.10
72	80252	Antenna 3-Prong Plug	.10
74	90214	Band Switch	2.65
75	80030	Phono Input Socket	.10
76	42185	Dial Lamp, 250 Ma.	.15
77	80385	Speaker Socket	.10
79	27118	Line Cord	1.10
80	11274	Phono AC Socket	.75
	31385	Glass Dial	2.95
	04089	Dial Background	1.55
	11257	Dial Pointer	.55
	17019	Drive Drum	.25
	05089	Drive Cord (42 inches) and springs	.25
	67444	Knob	.20
	80325	Mica Filled Octal Socket for 6SB7Y	.25
	80139	Molded Octal Socket	.15
	80239	Molded Octal Socket for Rectifier	.10
	80362	2-Prong FM Antenna Plug	.10
	80319	Miniature Tube Socket	1.85
	22147	Pickup Cable	1.20
	71223	Phono Needle	1.20

RADIO WIRE TELEVISION



MODEL BP-12 RADIO WIRE TELEVISION

This receiver will operate either from batteries contained within the case or from the regular Electric mains (AC or DC) on voltages from 105 to 125. A self-contained antenna is built in and will give good performance from stations not too remote. Where signal strength is poor or where reception from great distances is required, Antenna (A) and Ground (G) terminals are provided. These are located on the rear of the case. An antenna from 50 to 100 feet long may be used.

BATTERIES - The following batteries are required where no electric power is abailable:

7½ Volt "A" - USALITE #687, BURGESS #G5, GENERAL #5-H-5 - or equivalent (4-3/8" X 3⅛" X 2-3/4") - 1 Required

45 Volt "B" - USALITE #624, BURGESS #B30, GENERAL #V-30-B, EVEREADY #762 ADVANCE #267 - or equivalent (5-11/32" X 2-17/32" X 4-3/16") - 2 Required

TO INSTALL BATTERIES - Access to the battery compartment may be had by opening the bottom flap on the back of the cabinet. Insert the "B" batteries on each side, slide the "A" into place, then screw the wood block to the bottom to hold batteries. (See diagram).
With the ELEC-BATT switch on the front panel in the BATT position, the receiver is now ready for operation as a portable unit. When prolonged operation in the "ELECTRIC" position is contemplated (as during the winter season), it is advisable to remove the batteries and store them in a cool, dry place. DO NOT leave exhausted batteries in the carrying case as chemical action may expand the batteries and make it difficult to remove them.

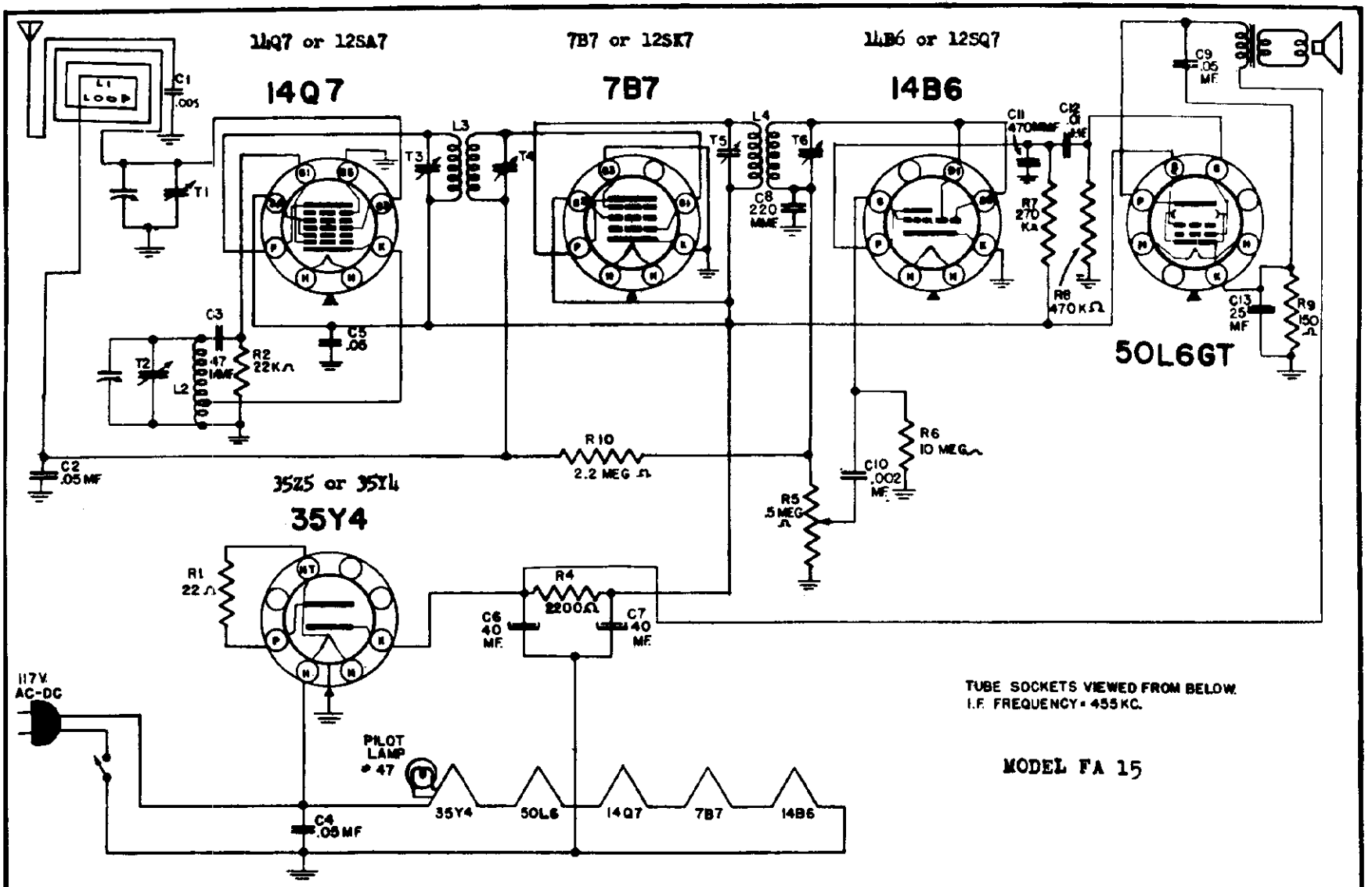
WAVE BAND: The range covered is as follows:
175 - 555 METERS (1720 - 540 KC)

OPERATION

BATTERY	ELECTRIC
After the batteries have been installed in accordance with the instructions given above, set the slide switch on the front of the cabinet to the right.	Open the small door on the rear of the cabinet providing access to the power cord which can be plugged into any outlet (105 to 125 Volts AC or DC.) Slide the switch on the front of the cabinet to the left.

The receiver may now be operated by turning the LEFT hand knob to the right, (Clockwise). The Volume is turned up and the station tuned in. (Right hand knob). By rotating the cabinet slowly (when the self-contained loop is used) maximum signal with minimum noise may be obtained. The direction effect is lost when a large antenna is used, but in this case, ample signal is obtained to be heard above the noise level. The volume is adjusted for the desired level.

NOTE:- When this set is to be operated from the 115-125 Volt DC line and no signal can be tuned in with the power switch in the "ELECTRIC" position, reverse the plug in the light socket one-half turn. When operating on AC, a slight hum may be heard on some stations. Reversing the line plug one-half turn in the socket will alleviate this condition.



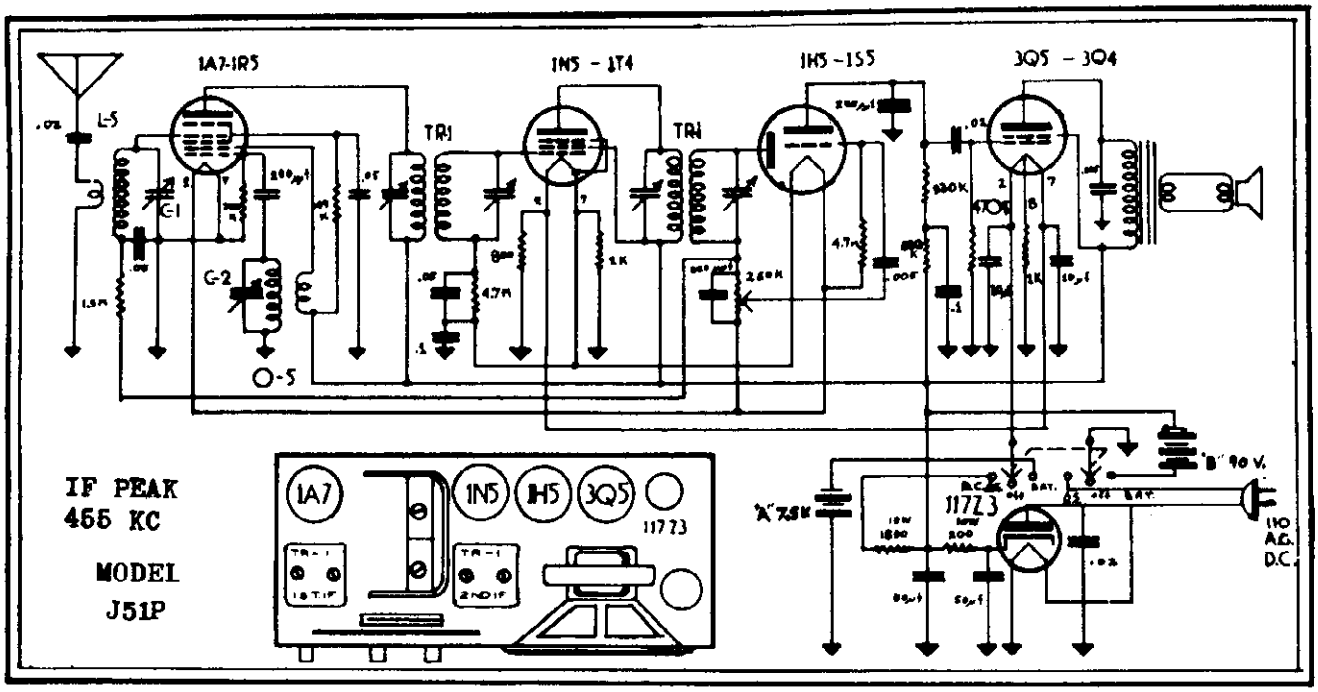
TUBE SOCKETS VIEWED FROM BELOW.
I.F. FREQUENCY = 455 KC.

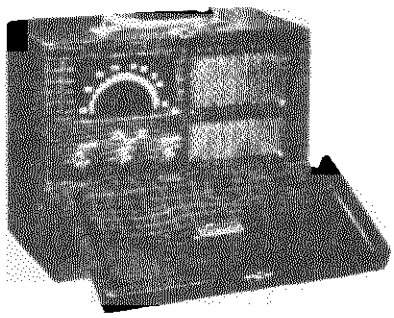
MODEL FA 15

C-1	Paper, .005 mfd., 400 volts	C-8	Mica, 220 mmfd., 500 volts	R-2	22,000 ohms, 2 W.	R-9	150 ohms, 1 W.
C-2	Paper, .05 mfd., 400 volts	C-9	Paper, .05 mfd., 400 volts	R-4	2200 ohms, ½ W.	R-10	2.2 Megohms, ¼ W.
C-3	Mica, 47 mmfd., 500 volts	C-10	Paper, .002 mfd., 400 volts	R-5	Volume Control & Switch	L-1	Loop Aerial
C-4	Paper, .05 mfd., 400 volts	C-11	Mica, 470 mmfd., 500 volts	R-6	10 Megohms, ¼ W.	L-2	Oscillator Coil
C-5	Paper, .05 mfd., 400 volts	C-12	Paper, .01 mfd., 400 volts	R-7	270,000 ohms, ½ W.	L-3	First I-F Transformer
C-6, C-7, C-13	Electrolytic, 40x40, 150 V, 25 mfd., 25V.	R-1	22 ohms, ½ W.	R-8	470,000 ohms, ¼ W.	L-4	Second I-F Transformer

MODEL J51P

RADIO WIRE TELEVISION





This is a portable, 5-tube superheterodyne radio, designed for operation from a self-contained battery pack or a power line of 115 volts AC or DC current. It has a tuning range from 550 to 1700 kilocycles.

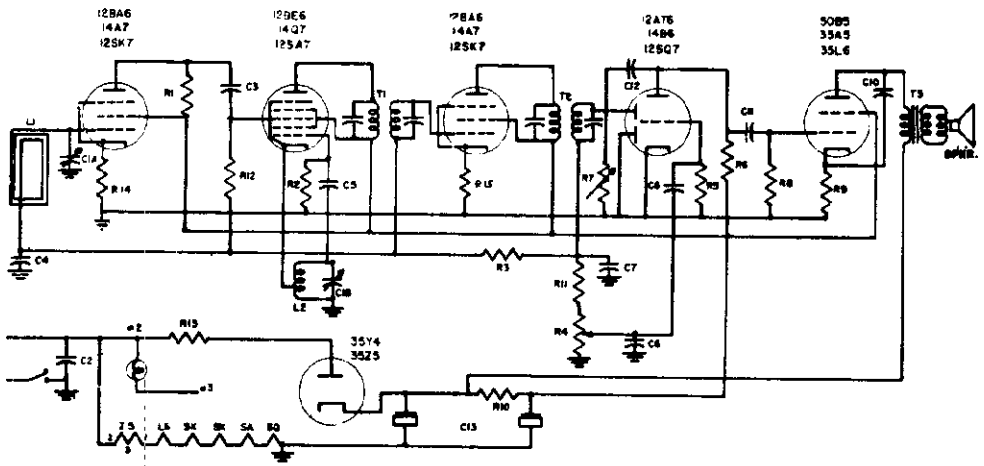
p o w e r s u p p l y

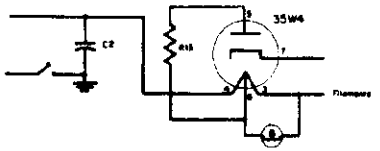
The battery pack is a standard pack made by the Eveready Company (No. 754). The Burgess equivalent is the Burgess No. G6M60 or the Ray O Vac equivalent. The life of the packs depend on how often the radio is used on batteries.

CAUTION: When NOT in use, be SURE that the center knob is in the OFF position, else batteries will be damaged or drained, affecting the operation. If reception becomes weak or distorted, have the batteries checked by your dealer or service man.

THE INTERMEDIATE FREQUENCY IS 455 KC. TO ALIGN, SET THE OSCILLATOR TO 550 AND 1650 KC, ALIGNING THE RF AT 1500 KC.

TUBES: The following tubes, together with their substitutes in certain models, are used: 1A7 or 1R5 Mixer-Oscillator, 1N5 or 1T4 IF Amplifier, 1H5 or 1S5 Detector-RF Amplifier-AVC, 3Q5 or 3Q4 Power Amplifier or Audio Amplifier, and 117Z3 rectifier.



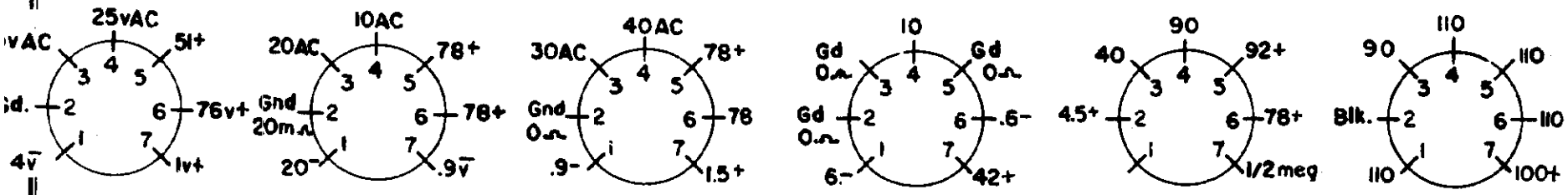


IF PEAK
455 KC

CIRCUIT SYMBOL	PART NO.	DESCRIPTION
C1	CV-10009	Condenser, Variable with Pulley.
C2	CP-14503	Condenser, Paper .05 Mfd. 400 volts.
C3	CH-15250	Condenser, Mica 25 mmf. 500 volts.
C4	CP-12503	Condenser, Pdper .05 Mfd. 200 volts.
C5	CH-15500	Condenser, Mica 50 mmf. 500 volts.
C6-C7	CH-15251	Condenser, Mica 250 mmf. 500 volts.
C8, C11	CP-14103	Condenser, Paper .01 mfd. 400 volts.
C10	CP-14203	Condenser, Paper .02 mfd. 400 volts.
C12	CP-14302	Condenser, Paper .003 mfd. 400 volts.
C13	CL-10007	Condenser, Electrol. 50/30 mfd. 150 volts.
L1	AL-10010	Loop Antenna.
L2	TRC-10000D	Coil, Oscillator
R1	RC-34701	Resistor, Carbon 4700 ohm ½ watt.
R2	RC-32202	Resistor, Carbon 22000 ohm ½ watt.
R3	RC-32204	Resistor, Carbon 2.2 megohm ½ watt.

CIRCUIT SYMBOL	PART NO.	DESCRIPTION
R4	VC-11105	Control, Volume 1 megohm with switch.
R5	RC-31005	Resistor, Carbon 10 megohm ½ watt.
R6	RC-32203	Resistor, Carbon 220,000 ohm ½ watt.
R7	VC-13105	Control, Tone 1 megohm.
R8, R12	RC-34703	Resistor, Carbon 470,000 ohm ½ watt.
R9, R14	RC-31500	Resistor, Carbon 150 ohm ½ watt.
R10	RC-41001	Resistor, Carbon 1000 ohm 1 watt.
R11	RC-31003	Resistor, Carbon 100,000 ohm ½ watt.
R13	RC-30220	Resistor, Carbon 22 ohm ½ watt.
R15	RC-33300	Resistor, Carbon 330 ohm ½ watt.
SPKR	SO-10002	Speaker, Oval 4 x 6.
T1	TS-10000	Transformer, I. F. Input.
T2	TS-10001	Transformer, I. F. Output.
T3	TO-10000	Transformer, Output.

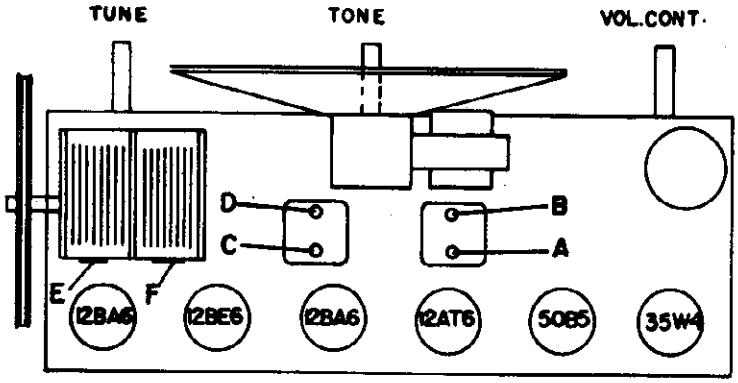
All grid voltages measured with 200,000 ohms per volt meter and other voltages with 1000 ohms per volt meter.

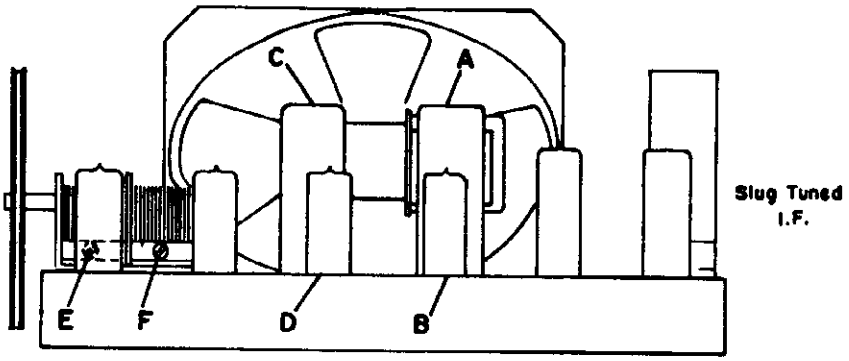


12BA6 12BE6 12BA6 12AT6 50B5 35W4

MODEL MC-11

RADIO WIRE TELEVISION





Tubes used (6) 12BA6 RF amplifier; 12BE6 converter; 12BA6 IF amplifier; 12AT6 Det., AVC, AF; 50B5 power output; and 35W4 rectifier.

Power supply 110-125 volts AC/DC.

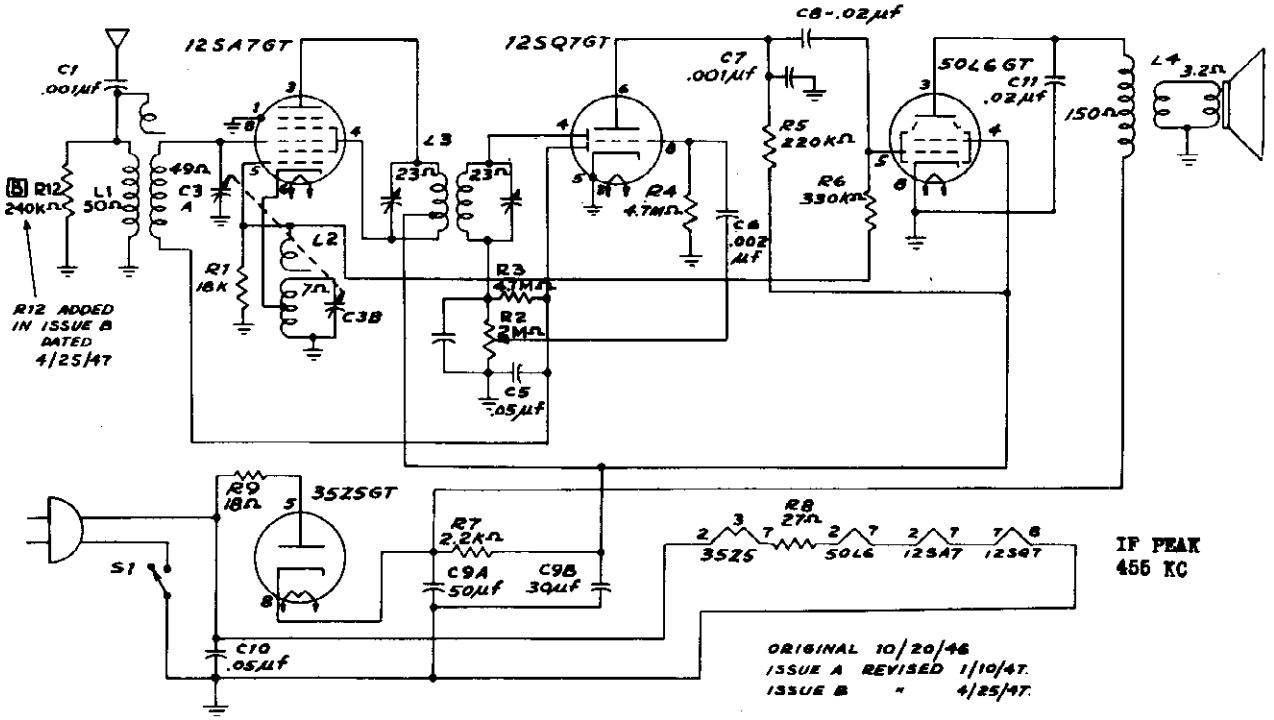
Tuning Range—Broadcast 550 Kc to 1720 Kc Rating .24 amp @ 117 volts AC/DC.

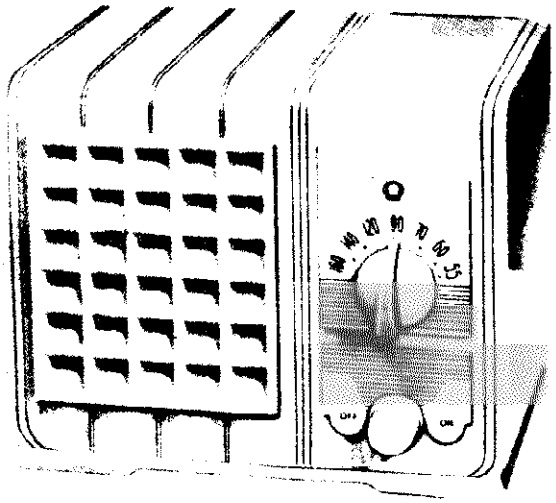
ALIGNMENT INSTRUCTIONS — READ CAREFULLY

Use isolation transformer if available. If not, connect a capacitor in series with low side to chassis. Volume control should be at a maximum and output of signal generator no higher than necessary to obtain output reading. Use insulated alignment screwdriver for adjusting.

Dummy Antenna	Signal Generator Coupling	Signal Generator Frequency	Gang Condenser Position	Output Meter	Adjust	Remarks
.05 Mfd.	High side of Mixer tube Grid (12BE6)	455 Kc	Stator Turned out to minimum Capacity position	Across Voice Coil	A, B, C, D	Adjust for maximum output. If isolation transformer is not used, reduce dummy ant. to .001 MFD. to reduce hum modulation.
	Loop	1720 Kc	Stator Turned out to minimum Capacity position	Across Voice coil	E	Fashion loop from few turns of wire and radiate signal into set. Adjust for maximum output.
	Loop	1500 Kc	Tune gang to resonance	Across Voice coil	F	Fashion loop from few turns of wire and radiate signal into set. Adjust for maximum output.

RADIONIC EQUIPMENT CO.



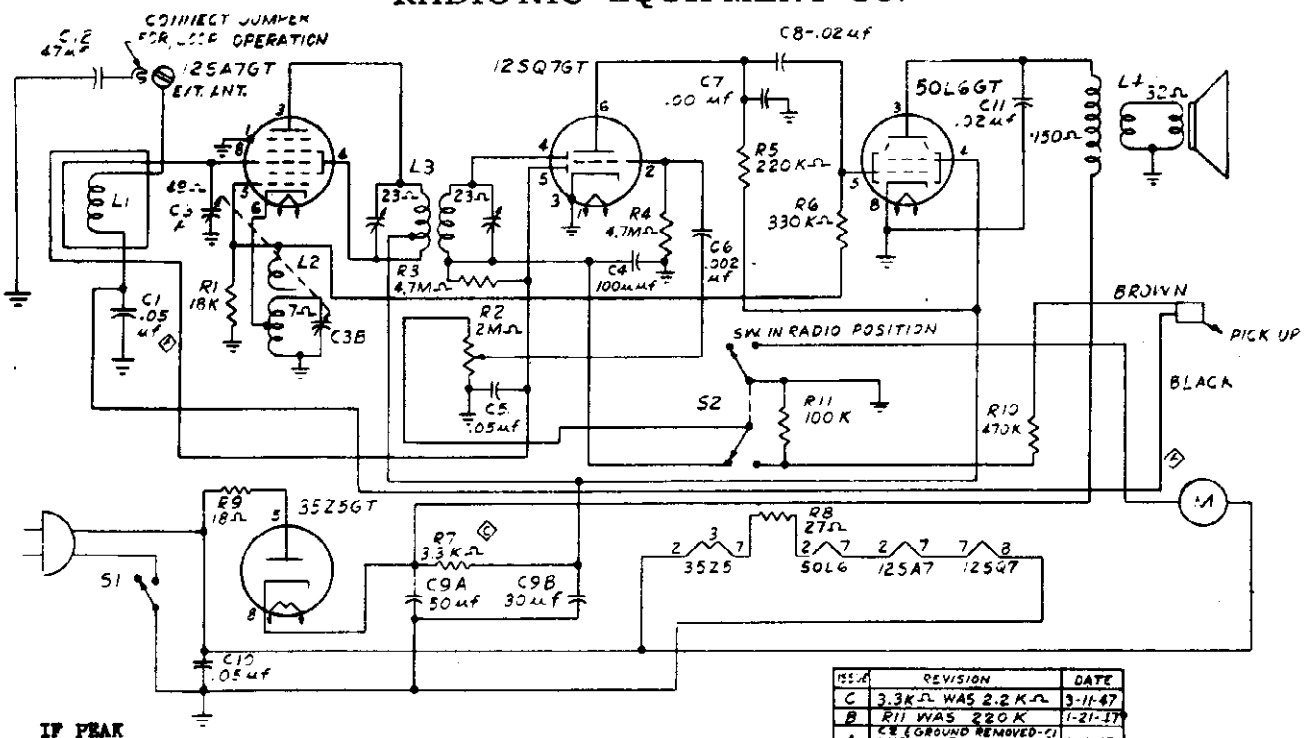


DESCRIPTION		PRICE
Paper condenser	.05/400 v.	.21
" "	.01/ "	.18
" "	.002/ "	.17
" "	.02/ "	.18
" "	.05/200 v.	.19
" "	.005/ "	.17
" "	.001/500 v.	.18
Mica "	100 mmf	.19
" "	47 "	.17
Resistor	10K ohm ½w.	.05
"	4.7 meg ohm ½w.	.05
"	220 ohm ½ w.	.05
"	2200 ohm 2 w.	.18
"	18 ohm ½ w.	.05
"	47 " 1 w.	.10
"	330K ohm ½ w.	.05

	DESCRIPTION	PRICE
	Plastic cabinet walnut	2.40
5877	Speaker and output transformers	3.19
39156	Plastic knob tuning	.30
39157	" " volume	.13
62192	Cabinet back	.25
	Instruction book— —	.05
1673	Variable condenser	3.65
2073	Electrolytic condenser unit 50-30 mf 150 v.	1.60
2479	Volume control with switch 2 meg ohm	1.20
28182	Antenna coil	1.05
28184	Oscillator coil	.75
3376	I.F. transformer	2.05
5580	Antenna hank	.37
	Line cord	.75

MODEL 240T

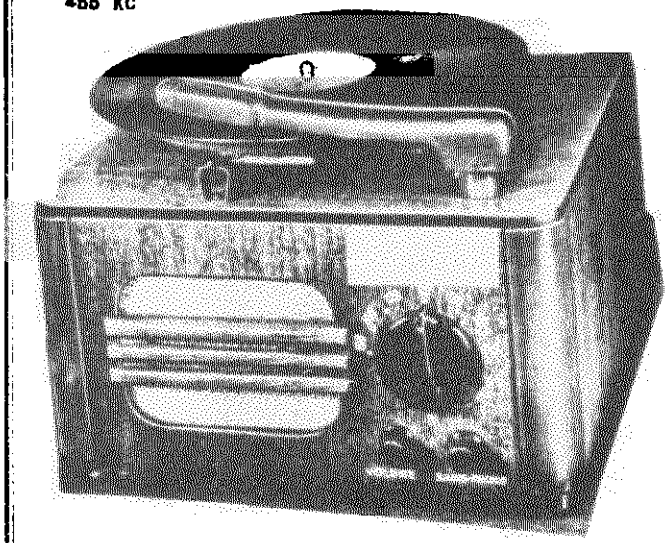
RADIONIC EQUIPMENT CO.



IF PEAK
455 KC

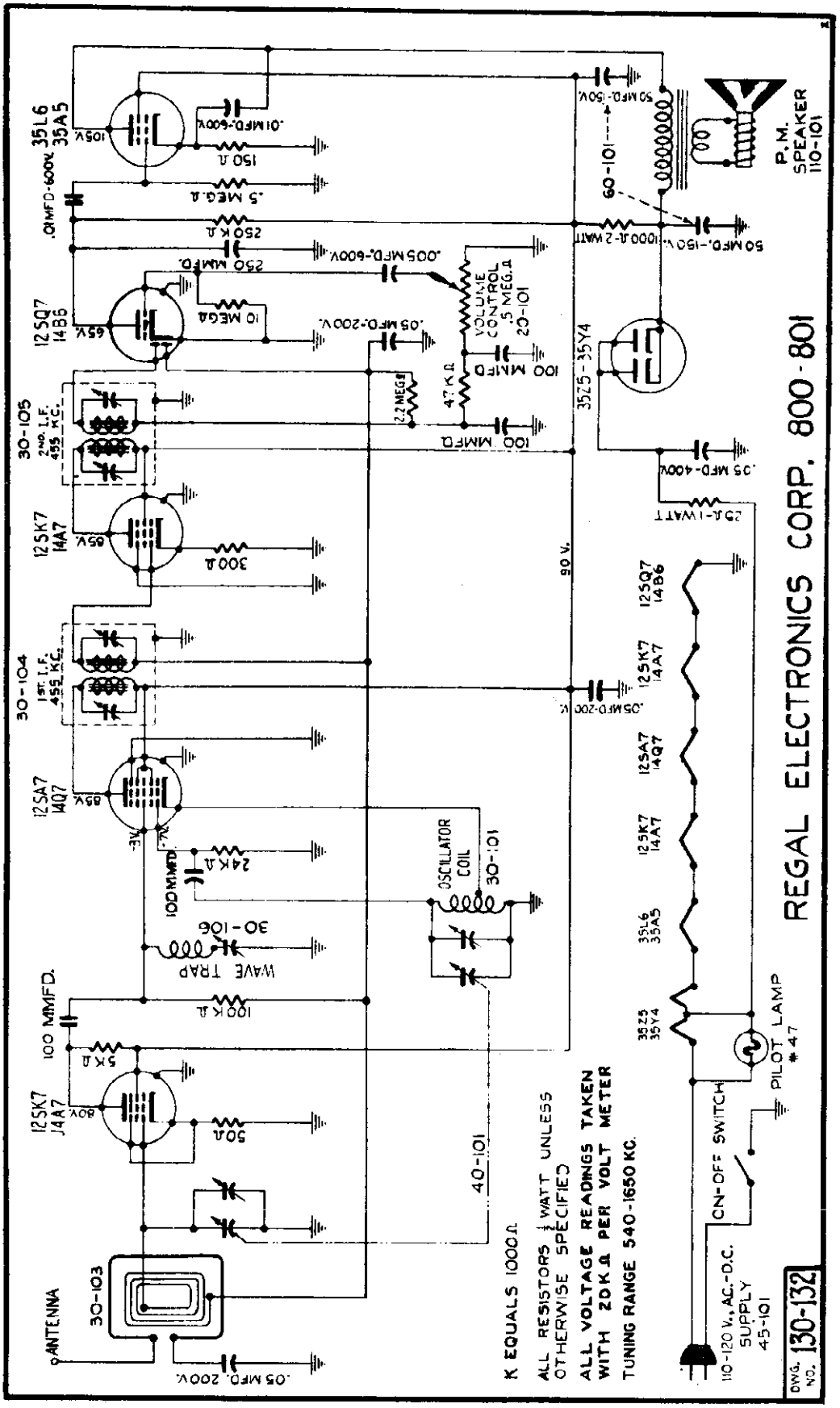
ISS.	REVISION	DATE
C	3.3K Ω WAS 2.2 KΩ	3-11-47
B	R11 WAS 220 K	1-21-47
A	C8 (GROUND REMOVED-C1 WAS .001- BLK LEAD BETWEEN XTAL & C1 ADDED	1-14-47

ORIGINAL DRAWING 1-10-47



DESCRIPTION	PRICE
Paper condenser .05 mf 400 v.	.21
" " .002 200 v.	.17
" " .02 "	.18
" " .05 "	.19
" " .001 "	.17
Ceramic 100 mmf 500 volts	.18
16K ohms ¼ w.	.15
4.7 meg ohms ¼ w.	.15
220K " ¼ w.	.15
2200 " 2 w.	.18
18 " ½ w.	.15
47 " 1 w.	.15
330K " ¼ w.	.15
470K " ¼ w.	.15

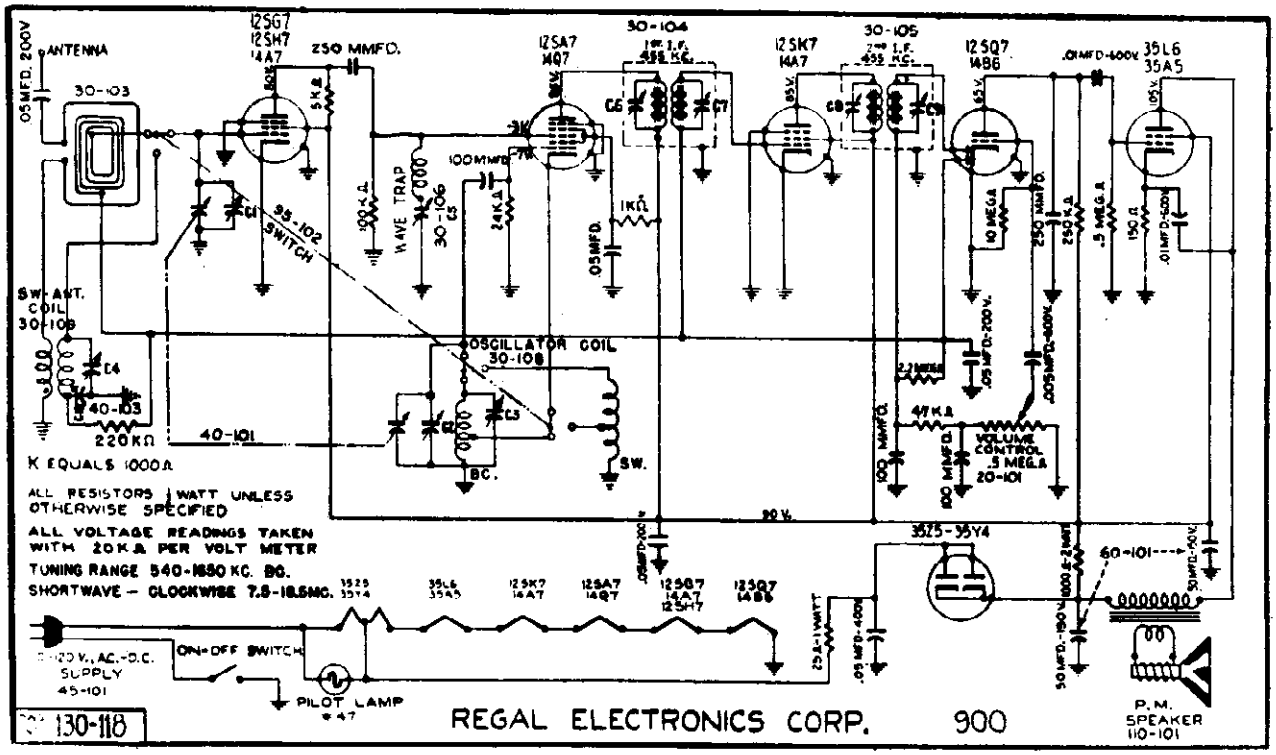
	DESCRIPTION	PRICE
A403	Cabinet, wood less lid	13.35
5877	Speaker and output transformer	3.31
39160	Knob, tuning wood	.30
39161	Knob, (volume, phono-radio)	.15
59307	Instruction book	.05
1675	Variable condenser	4.00
2073	Electrolytic condenser unit 50-30 mf/150 v.	1.70
2480	Volume control 2 meg with switch	1.20
28184	Oscillator coil	.75
28185	Antenna coil (chassis 470-1)	.80
3376	I.F. transformer	2.20
28186		
28189	Loop and loading coil (chassis 470-2)	1.75
5559	Line cord	.75
3828	Switch radio/phono	.85
6343	Pick-up arm and rest	7.65
6418	Motor and turntable 8"	8.70
	Lifetime needle	1.30


REGAL ELECTRONICS CORP. 800-801
P.M. SPEAKER 110-101
VOLUME CONTROL .5 MEG.Δ 20-101
OSCILLATOR COIL 30-101
WAVE TRAP 30-106
30-105 2ND I.F. 455 KC.
30-104 1ST I.F. 455 KC.
30-103
ANTENNA
40-101
60-101
35L6 35A5
12SQ7 14B6
12SK7 14A7
12SA7 14Q7
35Z5 35Y4
PILOT LAMP #47
ON-OFF SWITCH
110-120 V., AC.-D.C. SUPPLY 45-101
90 V.
K EQUALS 1000Δ
ALL RESISTORS ½ WATT UNLESS OTHERWISE SPECIFIED
ALL VOLTAGE READINGS TAKEN WITH 20K Δ PER VOLT METER
TUNING RANGE 540-1650 KC.
DWG. NO. 130-132

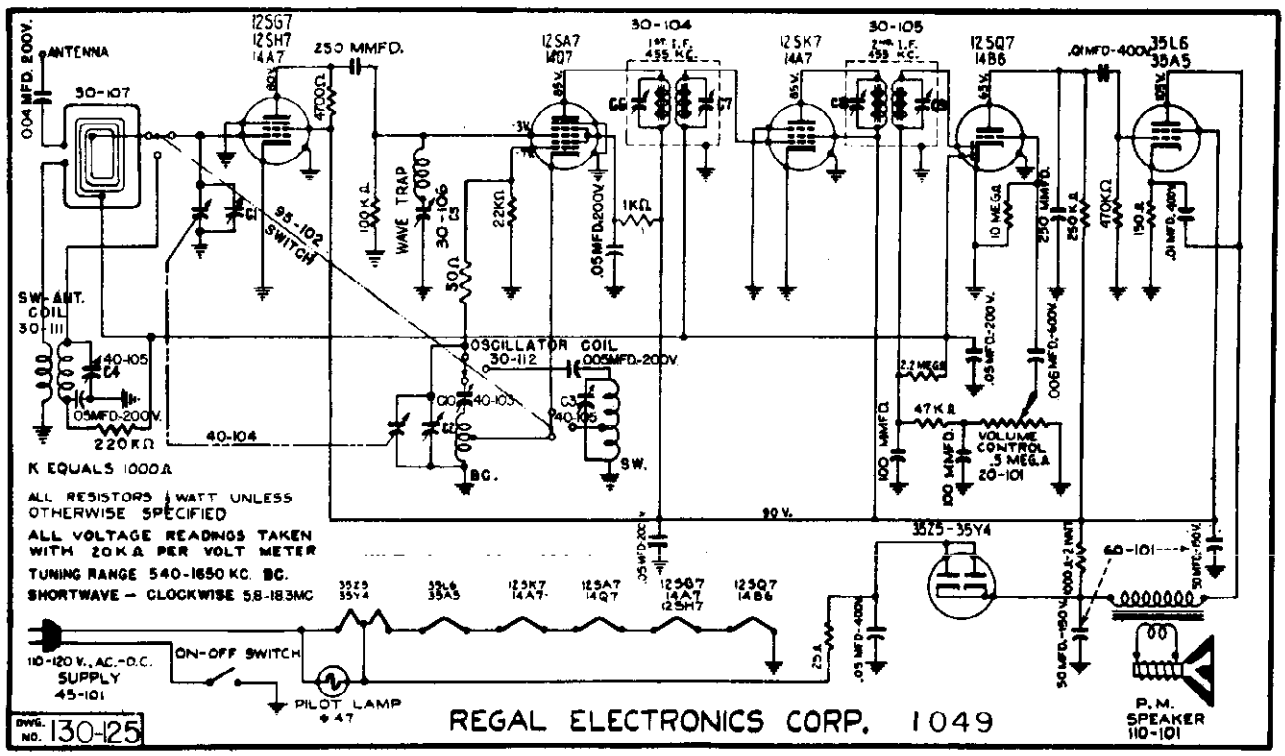
MODEL 900
MODEL 1049

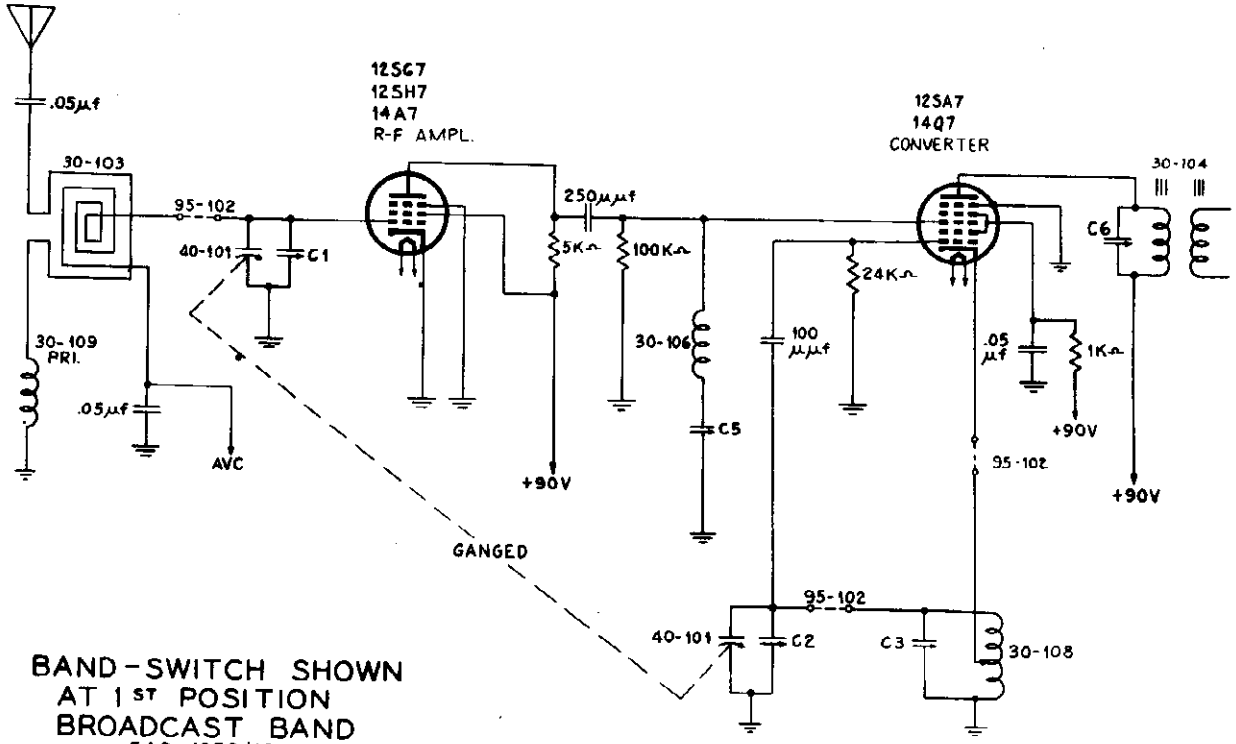
REGAL ELECTRONICS CORP.

MODEL 900

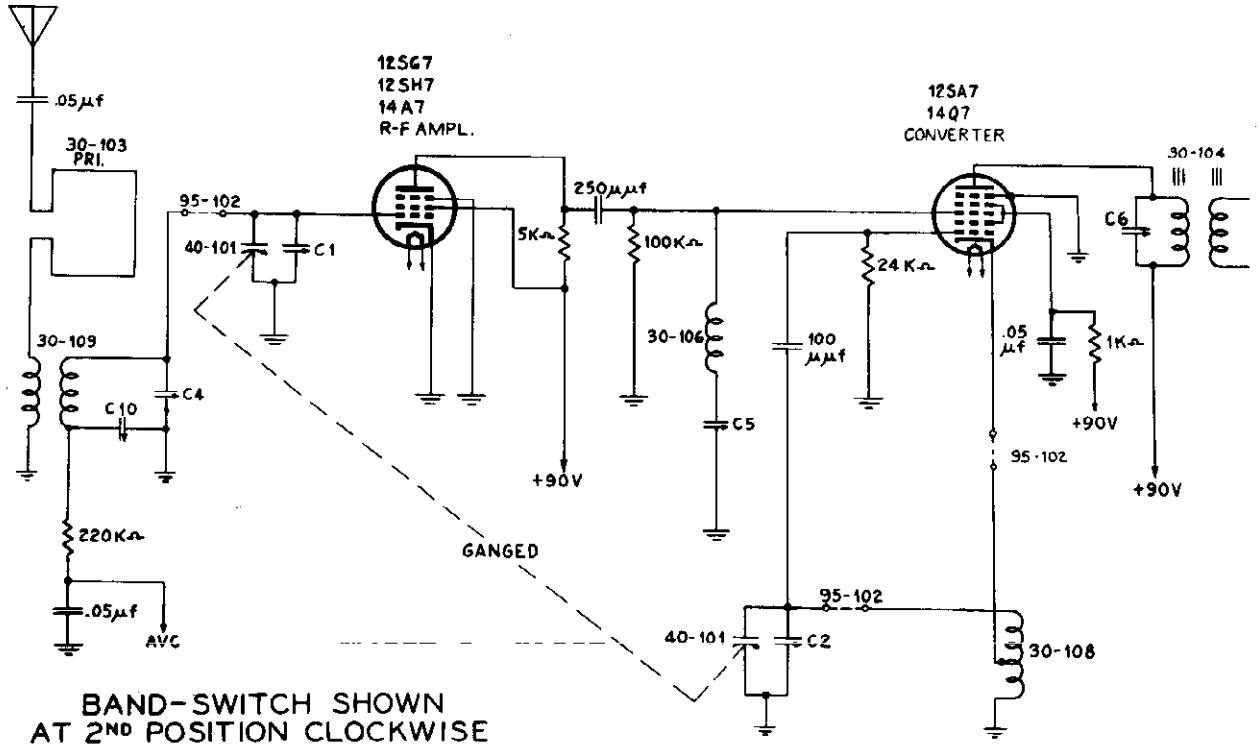


MODEL 1049



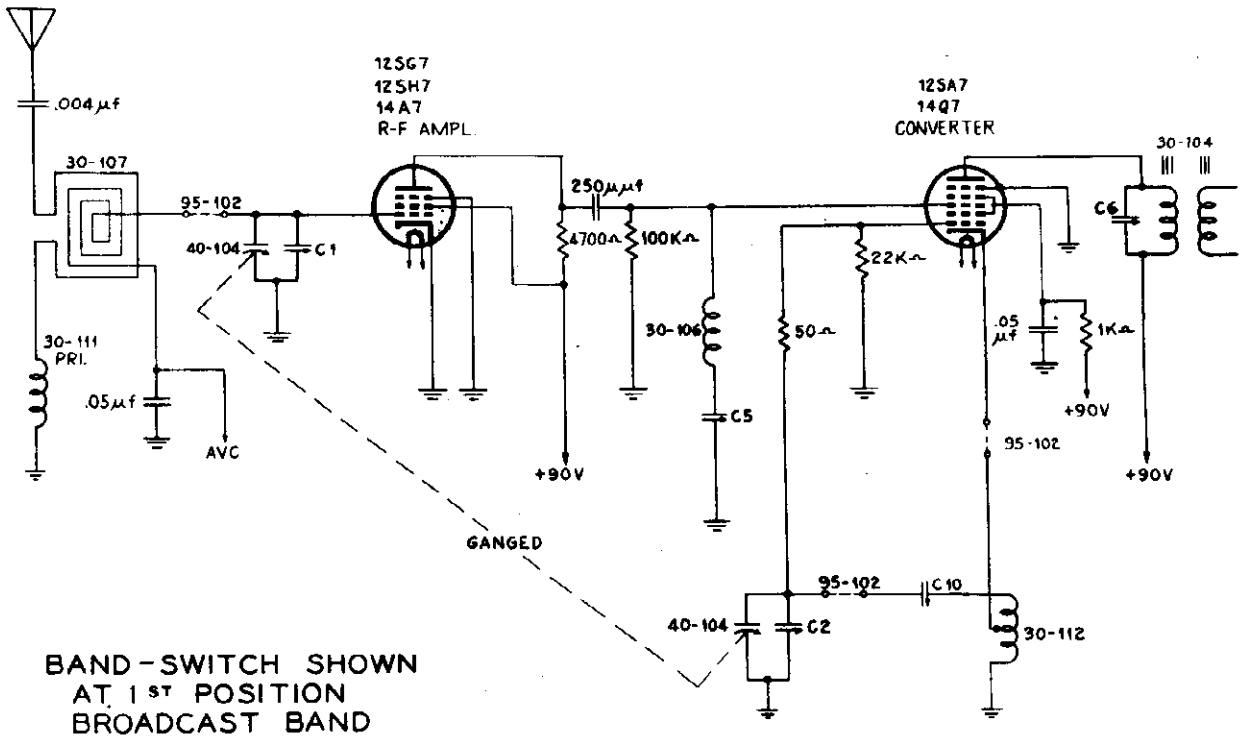


BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1650 KC.

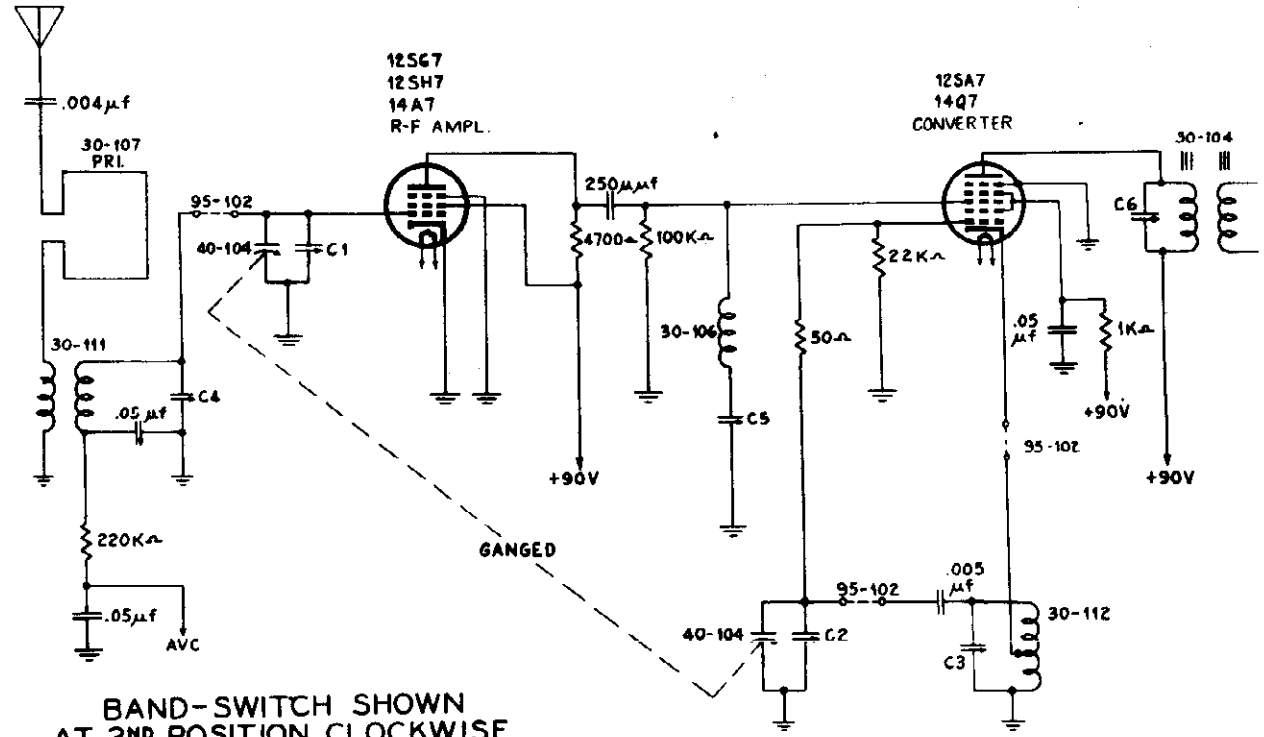


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
7.5-18.5 MC.

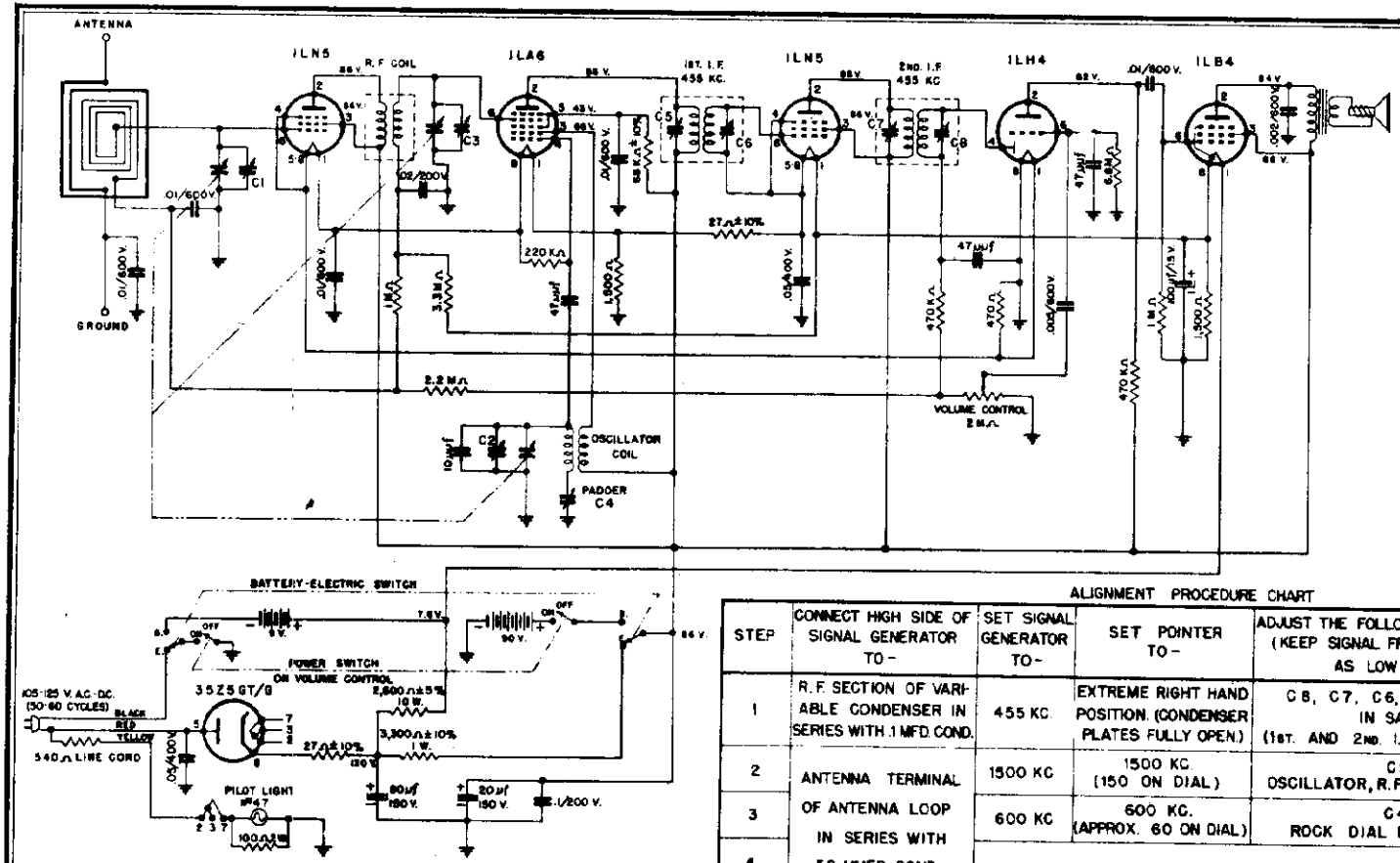
REGAL ELECTRONICS CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1650 KC.

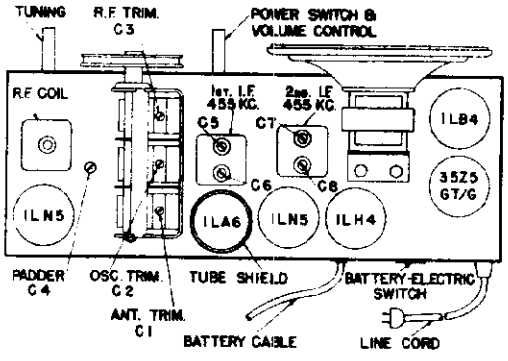


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.8-18.3 MC.

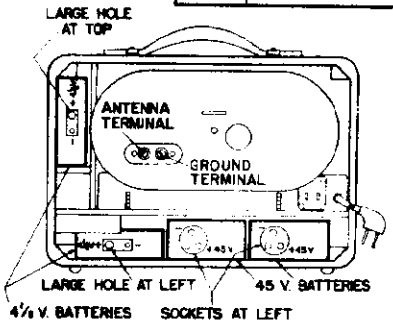


ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN.)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS.)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 OSCILLATOR, R.F. AND ANTENNA TRIMMERS
3		600 KC.	600 KC. (APPROX. 60 ON DIAL)	C4 PADDER ROCK DIAL FOR MAXIMUM SIGNAL
4		REPEAT STEPS 2 AND 3		



TOP VIEW OF CHASSIS



REAR VIEW OF CABINET SHOWING PLACEMENT OF BATTERIES

NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V, 60 CYCLES, A.C.
4. 1LA6 TUBE IS ENCLOSED IN METAL SHIELD.

NOTE: 1LA6 TUBE IS ENCLOSED IN METAL SHIELD.

Frequency Range 530 - 1700 kc.

REXEL MERCHANDISE CO.

REXEL PAGE 15
MODEL 1-366

MODEL L-266

REXEL MERCHANDISE CO.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

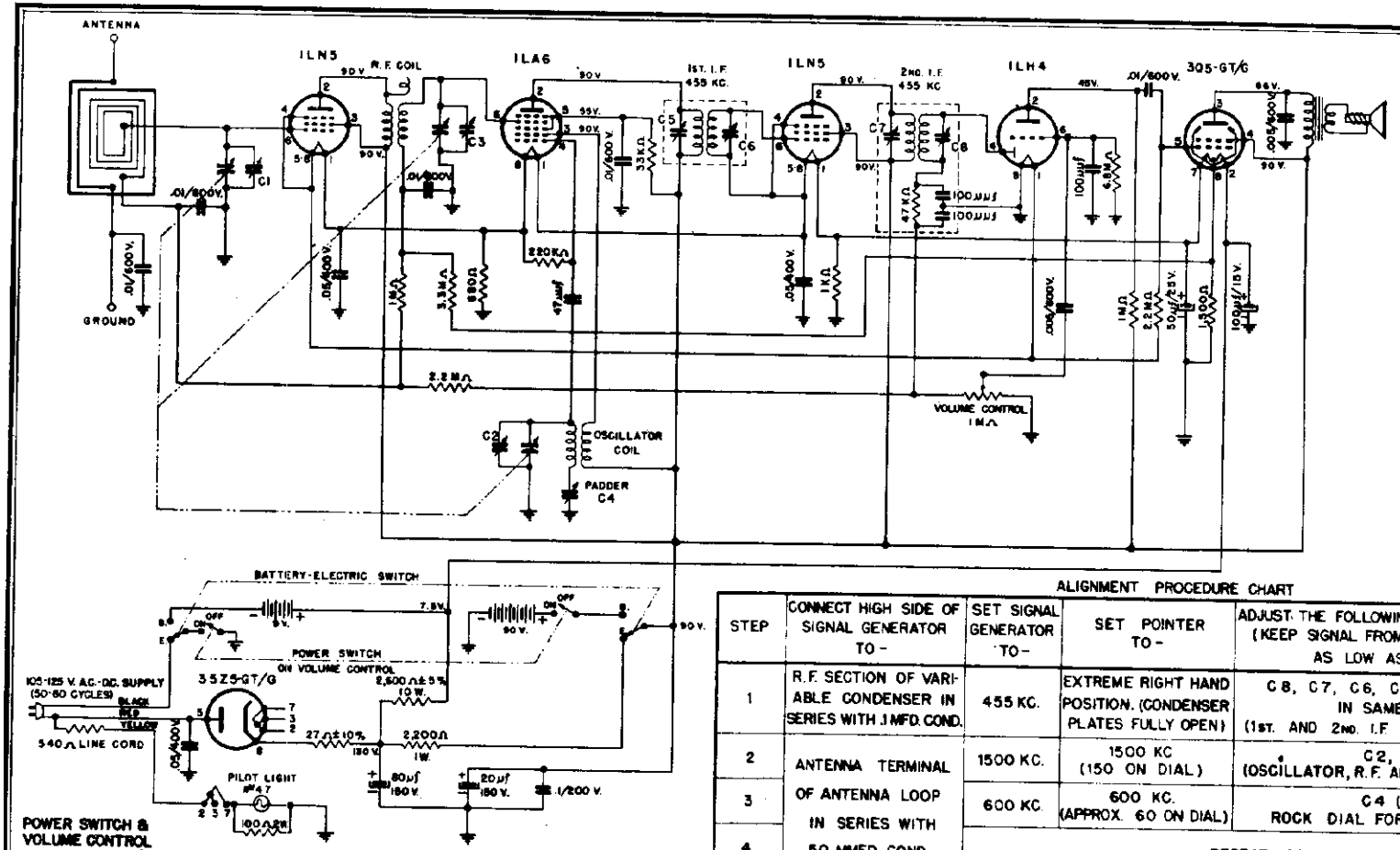
Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

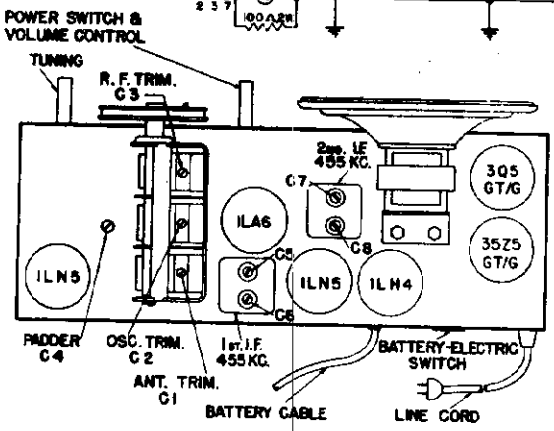
REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
BT-232	Battery-4½ volt battery (A)
BT-233	Battery-45 volt battery (B)
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)
CA-472	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-176	Coil-R.F. coil, shielded
CL-177	Coil-oscillator coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-3	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LC-315	Line Cord-540 ohms resistance line cord
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-383	Control-volume control 2 megohms with D.P.S.T. switch
RCM20A100M	Condenser-10 mmfd ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1-200WV paper tubular condenser
RCP10W2203A	Condenser-.02/200WV paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6202M	Condenser-.002/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB270K	Resistor-27 ohms ±10% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB471M	Resistor-470 ohms ±20% ½ watt resistor
REB474M	Resistor-470,000 ohms ±20% ½ watt resistor
REB683K	Resistor-68,000 ohms ±10% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
REC332K	Resistor-3300 ohms ±10% 1 watt resistor
RED101M	Resistor-100 ohms ±20% 2 watt resistor
SD-607	Shield-Tube Shield
SK-156	Speaker-5" P.M. Speaker with output transformer
SO-572	Socket-pilot light socket assembly
SP-191	Spring-Drive shaft retaining spring
SW-185	Switch-battery-electric D.P.D.T. slide switch
TR-186	Transformer-I.F. 455 K.C. Transformer

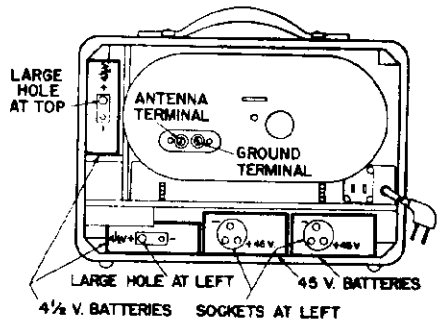


ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1500 KC.	1500 KC (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3		600 KC.	600 KC. (APPROX. 60 ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4		REPEAT STEPS 2 AND 3		



TOP VIEW OF CHASSIS



REAR VIEW OF CABINET
SHOWING PLACEMENT OF BATTERIES

NOTES:

1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V, 60 CYCLES, A.C.

Frequency Range 530 - 1700 kc.

REXEL MERCHANDISE CO.

REXEL MODEL L-266-

MODEL L-266-A

REXEL MERCHANDISE CO.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

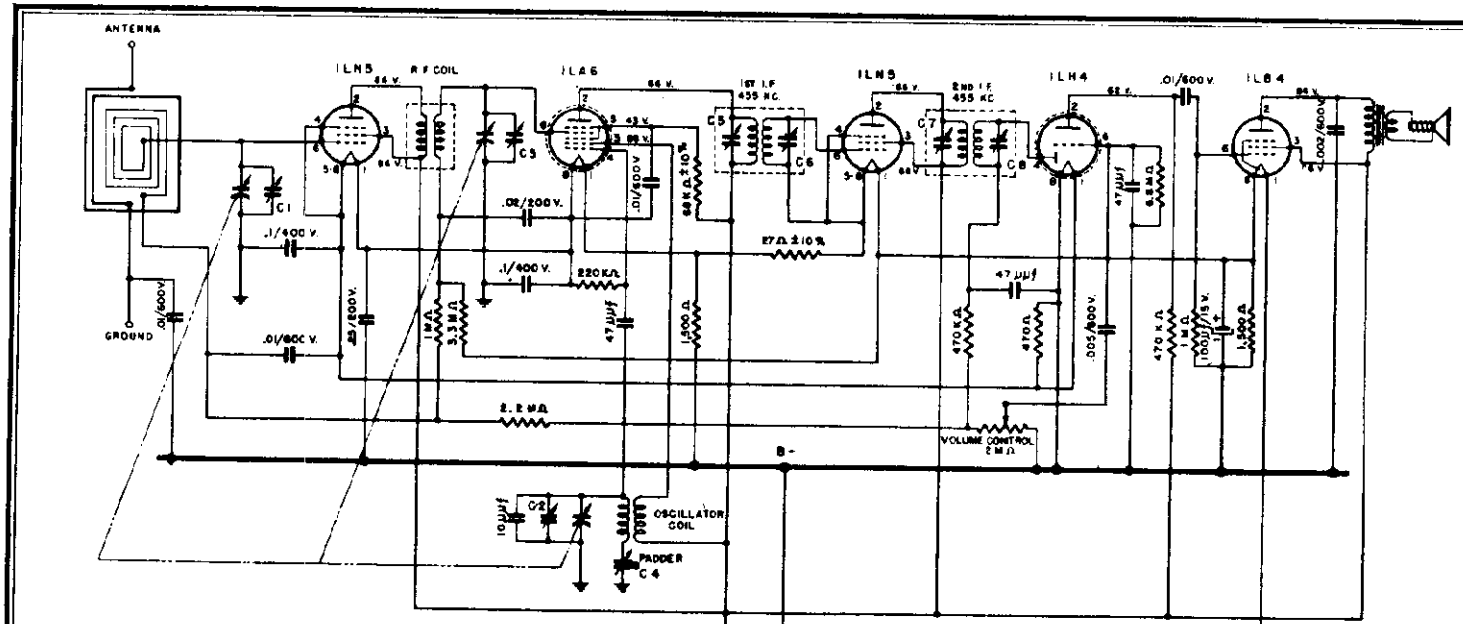
Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

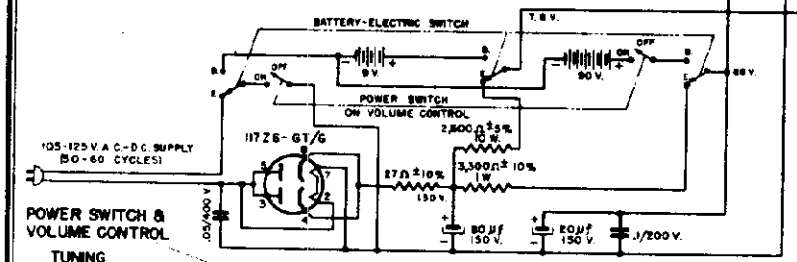
BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

REPLACEMENT PARTS

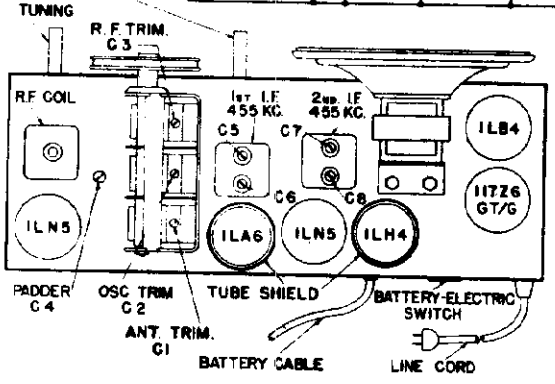
Part No.	Description
BK-405	Bracket-Resistor mounting bracket
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)
CA-472	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-177	Coil-oscillator coil
CL-630	Coil-R.F. coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-3	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LC-315	Line Cord-540 ohms resistance line cord
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control 1 megohm with D.P.S.T. switch
RCM20A101M	Condenser-100 mmf ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1/200WV paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ± 5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% ½ watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ± 20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB270K	Resistor-27 ohms ±10% ½ watt resistor
REB333M	Resistor-33,000 ohms ±20% ½ watt resistor
REB335M	Resistor-3.3 megohms ± 20% ½ watt resistor
REB681M	Resistor-680 Ohms ±20% ½ watt resistor
REB685M	Resistor-6.8 megohms ± 20% ½ watt resistor
REC 222M	Resistor-2200 ohms ±20% 1 watt resistor
RED101M	Resistor-100 ohms ±20% 2 watt resistor
SK-476	Speaker-5" P.M. Speaker with output transformer
SO-572	Socket-pilot light socket assembly
SP-191	Spring-Drive shaft retaining spring
SW-185	Switch-battery-electric D.P.D.T. slide switch
TR-707	Transformer-I.F. 455 K.C. input-Transformer
TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter





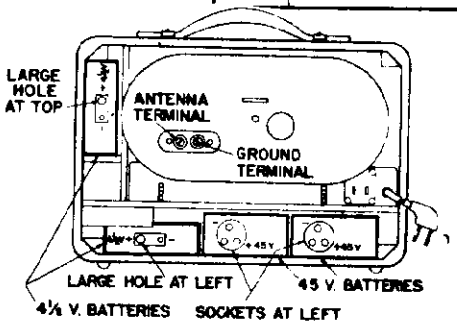
ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD COND.	455 KC	EXTREME RIGHT HAND POSITION (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST AND 2ND I.F. TRANSFORMERS)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD COND.	1500 KC	1500 KC (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3		600 KC	600 KC (APPROX. 60 ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4		REPEAT STEPS 2 AND 3		



TOP VIEW OF CHASSIS

NOTE:
1LA6 AND 1LH4 TUBES ARE ENCLOSED IN METAL SHIELDS.



REAR VIEW OF CABINET SHOWING PLACEMENT OF BATTERIES.

LEGEND:
CHASSIS
GROUND

NOTES:
1. ALL RESISTORS ±20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ±20% TOLERANCE
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND B- WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ±10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ±5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.
4. 1LA6 AND 1LH4 TUBES ARE ENCLOSED IN METAL SHIELDS.

Frequency Range 530 - 1700 kc.

REXEL MERCHANDISE CO. MODEL L-266-C

MODEL L-266-U

REXEL MERCHANDISE CO.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

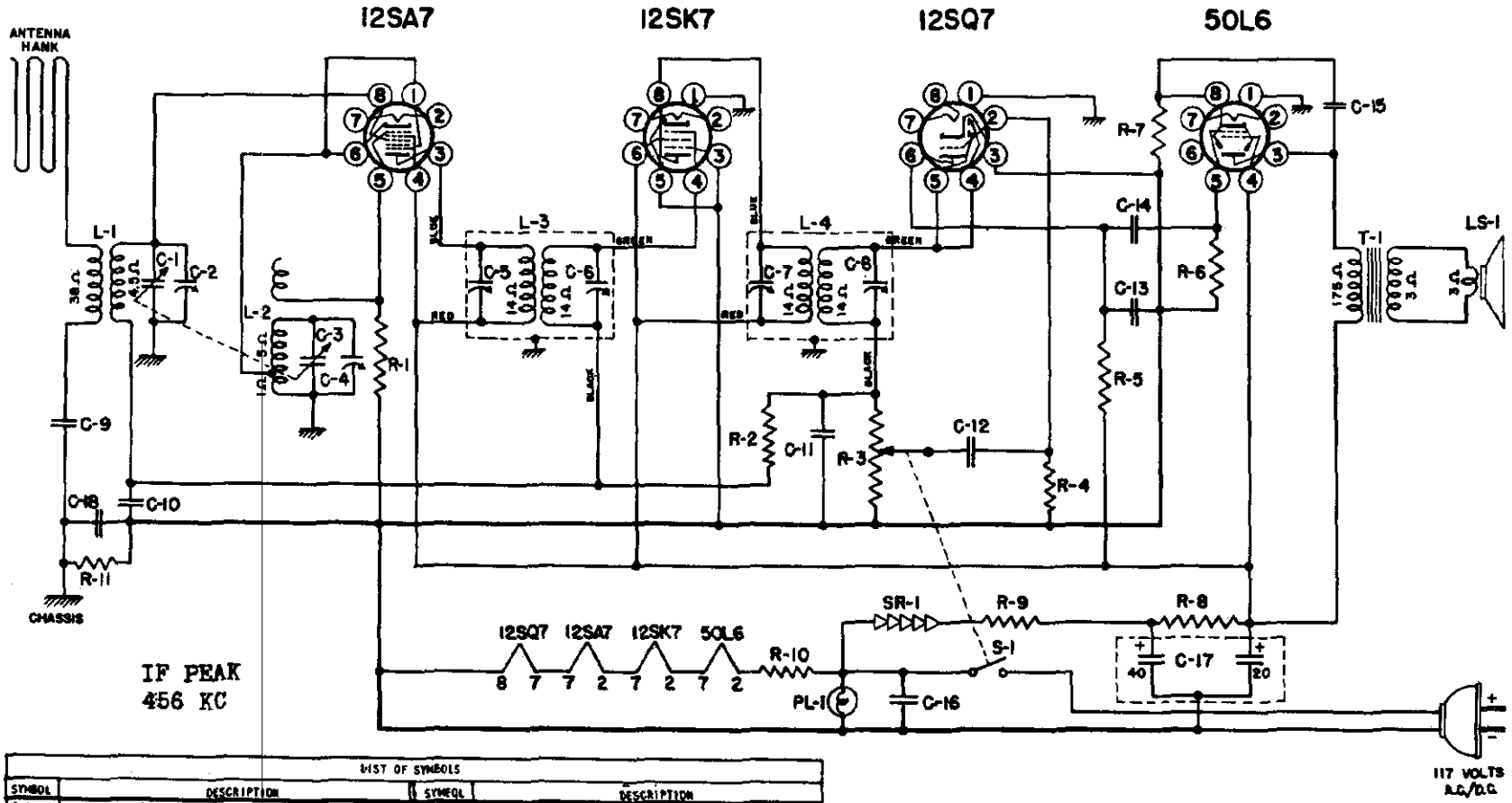
Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
CA-472	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-176	Coil-R.F. coil, shielded
CL-177	Coil-oscillator coil
CO-182	Condenser-80/20/150W.V. & 100/15W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LC-223	Line Cord
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-383	Control-volume control 2 megohms with D.P.S.T. switch
RCM20A100M	Condenser-10 mmfd ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1/200W.V. paper tubular condenser
RCP10W2203A	Condenser-.02/200W.V. paper tubular condenser
RCP10W2254A	Condenser-.25/200W.V. paper tubular condenser
RCP10W4104L	Condenser-.1/400W.V. paper tubular condenser
RCP10W4503A	Condenser-.05/400W.V. paper tubular condenser
RCP10W6103A	Condenser-.01/600W.V. paper tubular condenser
RCP10W6202M	Condenser-.002/600W.V. paper tubular condenser
RCP10W6502A	Condenser-.005/600W.V. paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB270K	Resistor-27 ohms ±10% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB471M	Resistor-470 ohms ±20% ½ watt resistor
REB474M	Resistor-470,000 ohms ±20% ½ watt resistor
REB683K	Resistor-68,000 ohms ±10% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
REC332K	Resistor-3300 ohms ±10% 1 watt resistor
SD-607	Shield-Tube Shield
SK-156	Speaker-5" P.M. Speaker with output transformer
SP-191	Spring-Drive shaft retaining spring
SW-193	Switch-battery-electric T.P.D.T. slide switch
TR-186	Transformer-I.F. 455 K.C. Transformer



LIST OF SYMBOLS

SYMBOL	DESCRIPTION
C-1	ANT. TUNING CAPACITOR including trimmer C-2
C-3	OSC. TUNING CAPACITOR including trimmer C-4
C-5,6	1st I. F. TRIMMER CAPACITORS
C-7,8	2nd I. F. TRIMMER CAPACITORS
C-9	CAPACITOR - 0.001 mfd. - 600 volts - Mica
C-10	CAPACITOR - 0.05 mfd. - 200 volts - Paper
C-11	CAPACITOR - 0.00025 mfd. - 600 volts - Mica
C-12	CAPACITOR - 0.002 mfd. - 600 volts - Paper
C-13	CAPACITOR - 0.00025 mfd. - 500 volts - Mica
C-14	CAPACITOR - 0.02 mfd. - 400 volts - Paper
C-15	CAPACITOR - 0.02 mfd. - 400 volts - Paper
C-16	CAPACITOR - 0.05 mfd. - 400 volts - Paper
C-17	CAPACITOR - 40/20 mfd. - 150 volts - Electrolytic
C-18	CAPACITOR - 0.05 mfd. - 400 volts - Paper
L-1	ANTENNA COIL
L-2	OSCILLATOR COIL
L-3	1st I. F. TRANSFORMER
L-4	2nd I. F. TRANSFORMER

SYMBOL	DESCRIPTION
LS-1	LOUDSPEAKER - 5" PM
PL-1	PILOT LAMP - 117 volts - 6 watts
R-1	RESISTOR - 20,000 ohms - 1/2 watt
R-2	RESISTOR - 0.1 Megohm - 1/2 watt
R-3	POTENTIOMETER AND SPST SWITCH (S-1) - 500,000 ohms
R-4	RESISTOR - 10.0 Megohms - 1/2 watt.
R-5	RESISTOR - 470,000 ohms - 1/2 watt
R-6	RESISTOR - 470,000 ohms - 1/2 watt
R-7	RESISTOR - 250 ohms - 1/2 watt
R-8	RESISTOR - 1,000 ohms - 5 watts
R-9	RESISTOR - 15 ohms - 1RC Type CW
R-10	RESISTOR - 200 ohms - 10 watts
R-11	RESISTOR - 250,000 ohms - 1/2 watt
S-1	POWER SWITCH - SPST (part of R-3)
SR-1	SELENIUM RECTIFIER - 100 milliamperes - 5 plates
T-1	OUTPUT TRANSFORMER

TUBE COMPLEMENT

Converter and Oscillator.....12SA7
I.F. Amplifier.....12SK7
Detector-AVC-Audio.....12SQ7
Power Output.....50L6GT
Rectifier.....Selenium

ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts, 50-60 cycles, AC

Power Consumption.....30 watts
Frequency Range.....500-1700 Kcs.
Intermediate Frequency.....456 Kcs.
Audio Output.....1.5 watts

LOUDSPEAKER

Permanent Magnet.....5" Diameter

INSTALLATION FACILITIES PROVIDED

Power.....5' cord and plug
Antenna.....10' indoor type
Ground.....None required

RYAN SALES CO.

RYAN RADIO
MODEL C5TS

RYAN SALES CO.

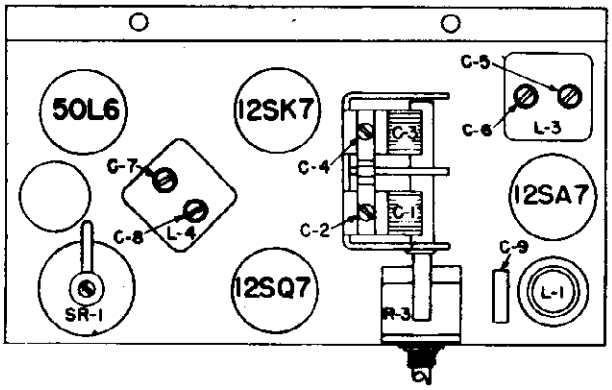


FIG. 1 - Tube and Trimmer Locations (Top View)

ALIGNMENT PROCEDURE

Alignment Frequencies:

I.F. .....456 Kcs.
R.F. .....1500 Kcs.

I. F. Alignment:

Connect output meter across the voice coil. Turn the receiver volume control to maximum. Connect high side of the alignment oscillator, through a .05 mfd. capacitor, to the converter grid.

Set alignment oscillator at 456 Kcs. and adjust output to give the lowest conveniently readable indication on the output meter. Adjust trimmers C-7 and C-8 in 2nd I.F. transformer to give maximum indication on output meter. Repeat this procedure for trimmers C-5 and C-6 in the 1st I.F. transformer. Repeat procedure to check accuracy.

R. F. Alignment:

Retain output meter connected as above and receiver volume control set at maximum. Connect alignment oscillator to antenna.

Set alignment oscillator at 1500 Kcs. and place in operation. Rotate receiver tuning capacitor (C-1 and C-3) to give maximum signal indication on output meter. Adjust output of alignment oscillator to give the lowest conveniently readable indication on the output meter. Adjust oscillator trimmer C-4 to peak the signal indication on output meter. Then, adjust antenna trimmer C-2 to further peak the signal. Repeat procedure to check accuracy.

Trimmer locations are shown in Figure 1.

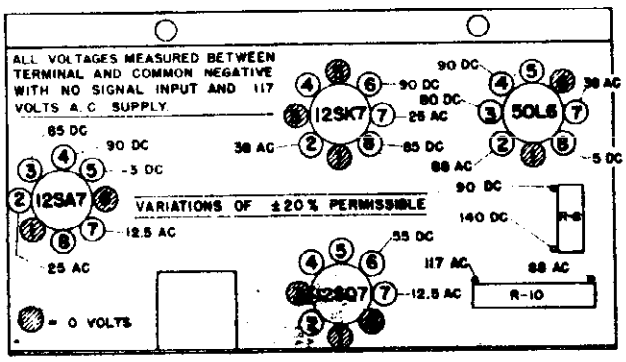


FIG. 2 - Socket Terminal Voltages (Bottom View)

NOTES:

An electronic voltmeter may be connected to the AVC bus and used for alignment indication in lieu of the output meter across the voice coil.

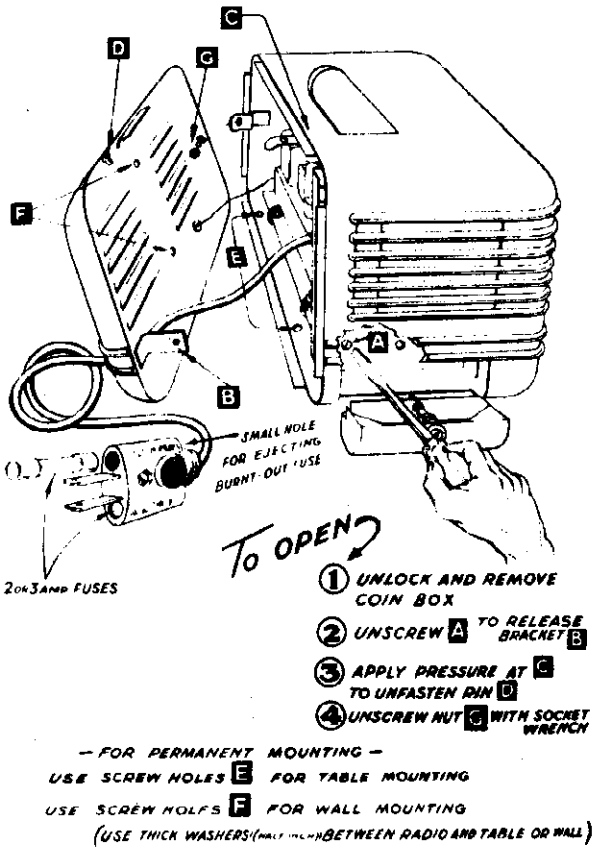
An electronic voltmeter or a voltmeter with a minimum resistance of 20,000 ohms per volt should be used for voltage measurements.

The polarity of the power connection must be correct when operating the receiver on direct current. If the receiver does not operate when the power plug is first inserted, remove and re-insert in opposite position. Reversal of plug position on alternating current supply may reduce hum in some cases.

If the ELECTONE is to be used in a location remote from broadcasting stations or the reception of distant stations is desired, an outdoor antenna and a ground connection may be utilized. The outdoor antenna should be connected to the indoor antenna and the ground lead to the chassis.

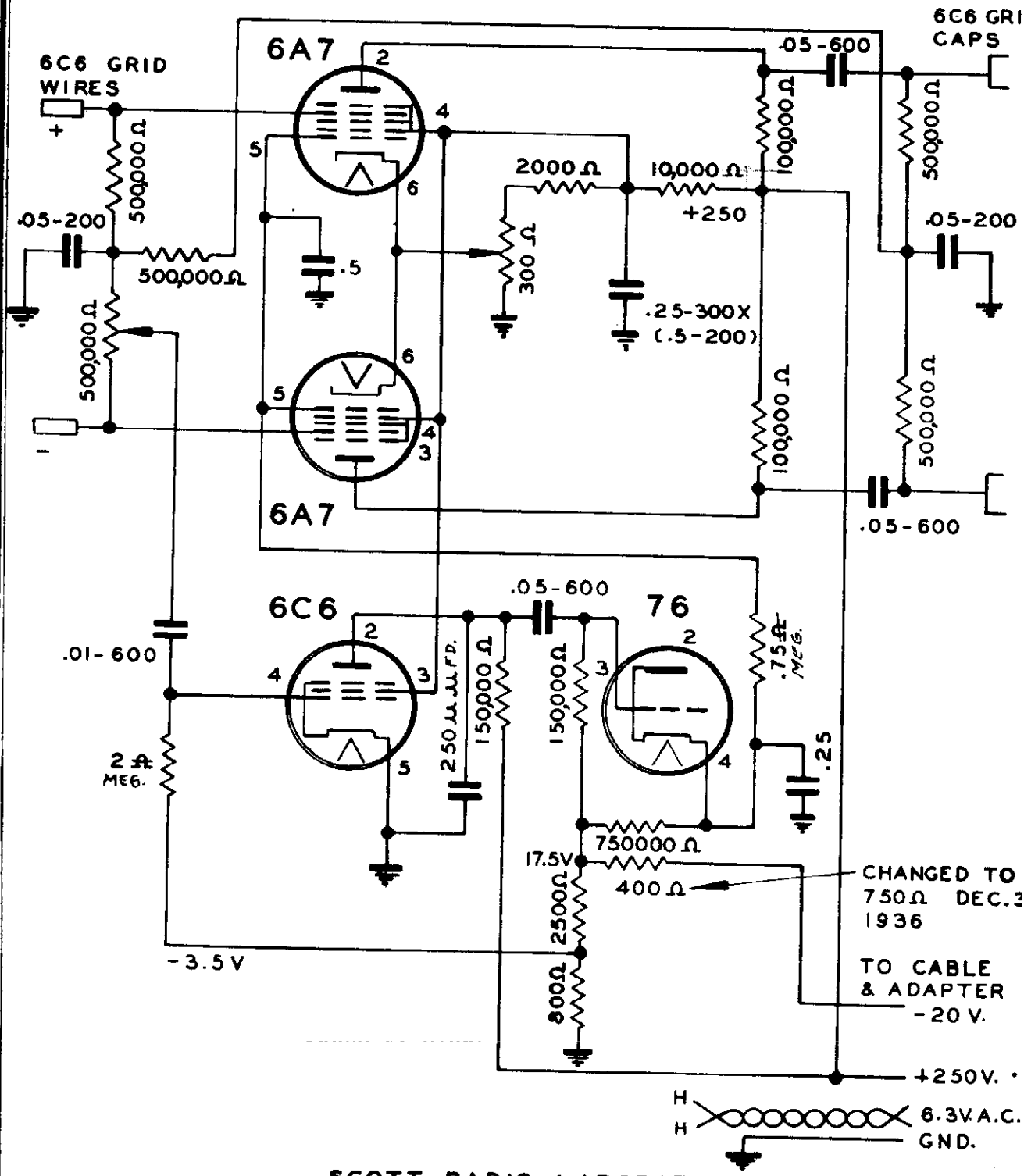
GENERAL DESCRIPTION

The Model C5TS3 ELECTONE is a four tube and rectifier super-heterodyne broadcast entertainment receiver designed for operation from either a direct or alternating current power source. The circuit utilizes multi-unit tubes and incorporates automatic volume control. The chassis is enclosed in an all-metal cabinet of modern styling and having the following dimensions: Width 12"; Depth 7"; Height 7".

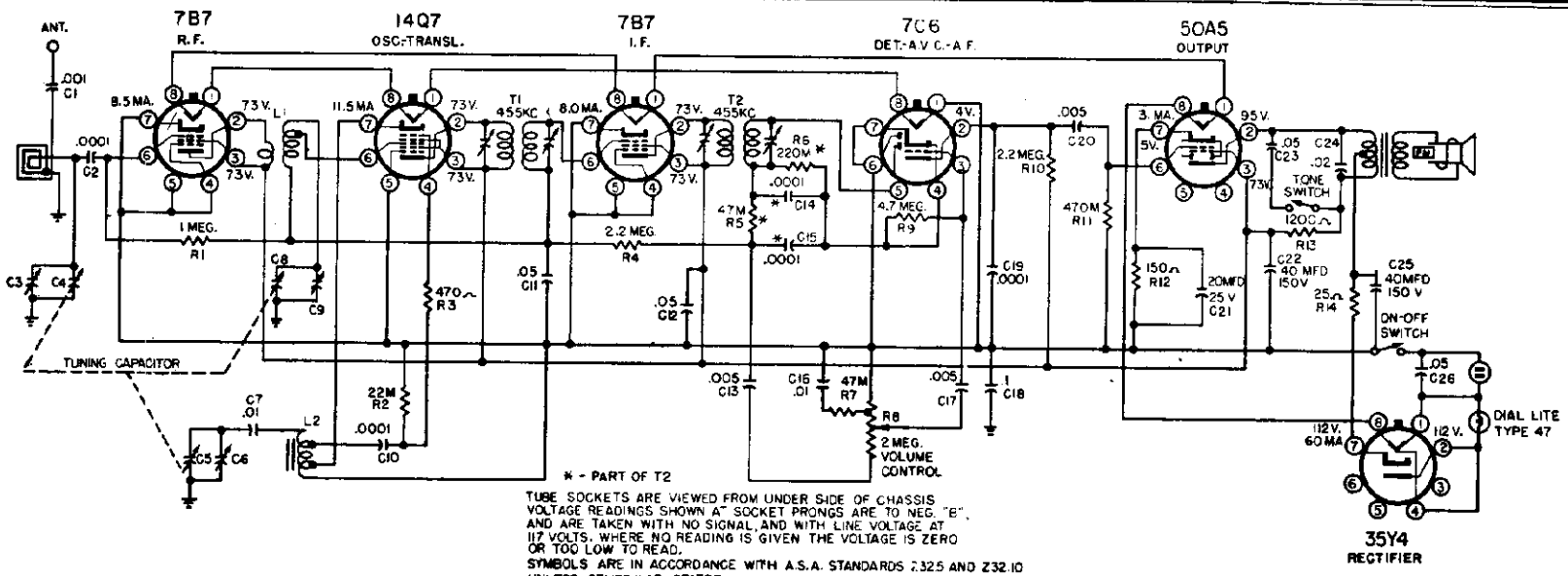


NOV. 30, 1936

REVISED VOL. RANGE EXPANDER



SCOTT RADIO LABORATORIES INC.
CHICAGO 40 ILLINOIS



* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "B", AND ARE TAKEN WITH NO SIGNAL, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

SYMBOLS ARE IN ACCORDANCE WITH A.S.A. STANDARDS Z32.5 AND Z32.10 UNLESS OTHERWISE STATED.

MODELS 7020,7021,7054; 7080,7100

ALIGNMENT PROCEDURE

Output Meter Connection.....Across Loud Speaker Voice Coil
Output Meter Reading to Indicate .05 Watts (Standard Output).....0.4 Volts
Generator Ground Lead Connection.....I. F. Alignment - Negative B Lead
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 Tone Control.....Treble
Position of Pointer with Tuner Fully Closed.....Last Line Below 540 Calibration Mark

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS IN ORDER SHOWN	TRIMMER FUNCTION
Closed	455 KC	0.1 Mfd.	Translator Grid	T2-T1	I. F.
1500 KC	1500 KC	.0002 Mfd.	Antenna	C6	Oscillator
1500 KC	1500 KC	.0002 Mfd.	Antenna	C9	R. F.
1500 KC	1500 KC	.0002 Mfd.	Antenna	C3	Antenna

IMPORTANT ALIGNMENT NOTES

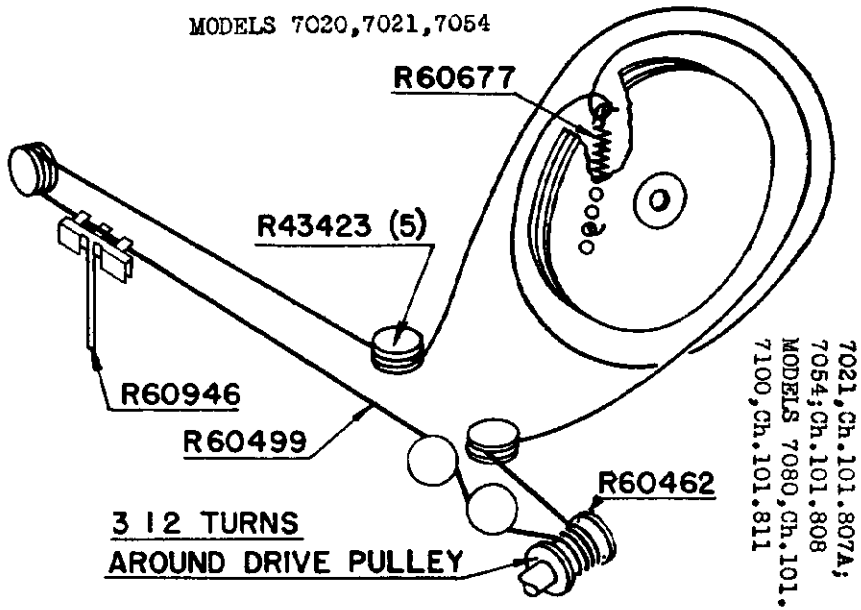
The alignment must be done in the order given.

The Alignment Procedure should be repeated step by step in the original order for greatest 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.

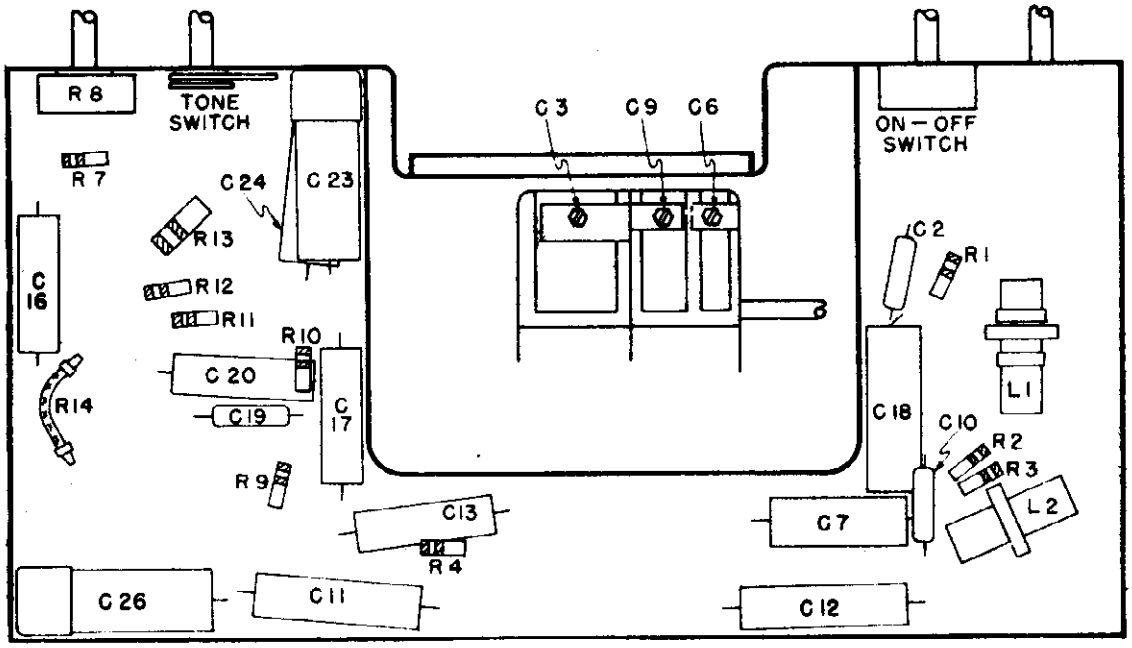
Power Output — Undistorted 1.1 Watts — Maximum 1.9 Watts

MODELS 7020,7021,7054

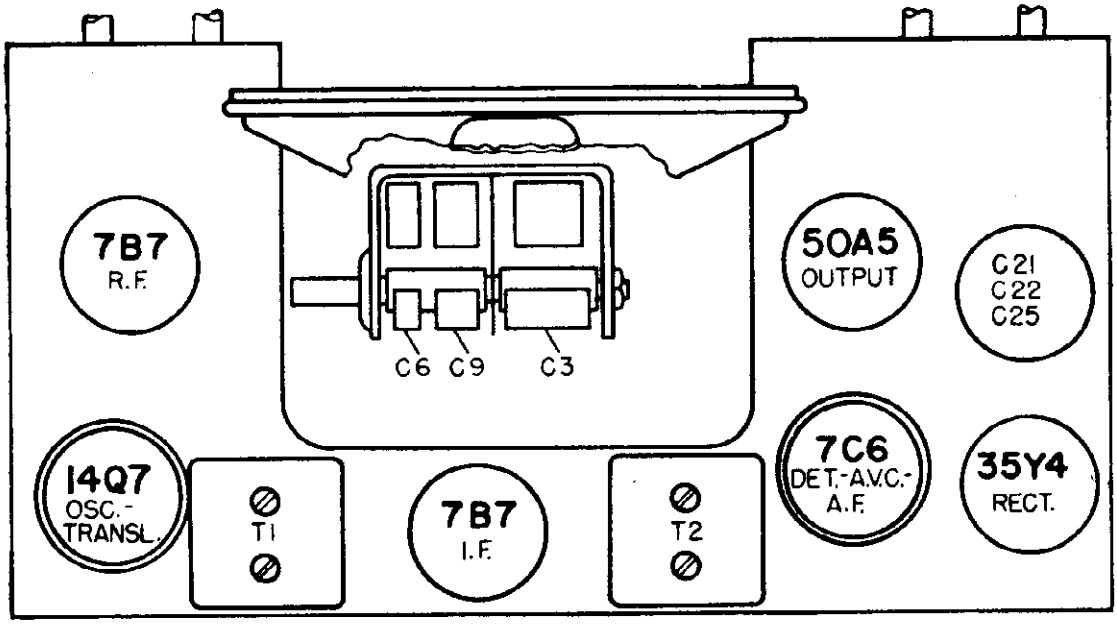


MODELS 7020,7021,7064

SEARS ROEBUCK & CO.



LOCATION OF PARTS UNDER CHASSIS



LOCATION OF PARTS ON TOP OF CHASSIS

Power Supply:

All models available.....117 Volts DC 25-60 Cycles AC 30 Watts

Frequency Range:

Broadcast.....540-1600 KC

Difference between 101.807 and 101.807-A

101.807-A same as 101.807 except ivory cabinet instead of brown.

Recommended Antenna Equipment:

Catalog #6703 Conventional Antenna
Catalog #6704 Noise Reducing Antenna
Catalog #6705 Greatest Reception and Noise Reduction Antenna

SEARS ROEBUCK & CO.

MODEL 101.807, 101.807A

HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) THE CHASSIS NUMBER, which is 101.807 or 101.807-A. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.

REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SEARS LIST PRICE EACH	MU CODE
	R60426	Button - Push, Brown (101.807)	$ .11	
	R60486	Button - Push, Ivory (101.807-A)	.14	
	R61846	Button - Snap	.02	
	R60415	Cabinet - Brown (101.807)	4.17	A0
	R60950	Cabinet - Ivory (101.807-A)	5.40	A0
C4,C5,C8	R60413	Capacitor - Variable Tuning	5.35	
C1		Capacitor - .001 Mfd. 600 V.	.15	
C7		Capacitor - .01 Mfd. 600 V.	.18	
C11,C12		Capacitor - .05 Mfd. 200 V.	.21	
C13,C17,C20		Capacitor - .005 Mfd. 600 V.	.17	
C16		Capacitor - .01 Mfd. 400 V.	.18	
C18		Capacitor - .1 Mfd. 200 V.	.27	
C23,C26		Capacitor - .05 Mfd. 600 V.	.26	
C24		Capacitor - .02 Mfd. 600 V.	.27	
C2,C10,C19		Capacitor - .0001 Mfd. Mica	.20	
C21,C22,C25	R60416	Capacitor - Electrolytic, 40 Mfd. 150 V, 40 Mfd. 150 V., 20 Mfd. 25 V.	1.91	
	R61836	Cloth - Grille, Gold (101.807)	.34	
	R60952	Cloth - Grille, Tan (101.807-A)	.43	
L1	R60465	Coil - R. F.	1.25	
L2	R60448	Coil - Oscillator	1.53	
	R60430	Control - Volume - 2 Megohm	.80	
	R16706	Cord - Power	.77	
	R60540	Covers - Tab	.01	
	R60458	Covers - Dial	.14	
	R60446	Dial	.23	
	R60461	Drum and Pinion Assembly	.68	
	R60459	Gear and Hub Assembly	.46	
	R60444	Grille - Cabinet	.81	
	R60455	Knob - Tone, Brown (101.807)	.14	
	R60485	Knob - Tone, Ivory (101.807-A)	.14	
	R60456	Knob - Tuning, Brown (101.807)	.14	
	R60480	Knob - Tuning, Ivory (101.807-A)	.14	
	R60457	Knob - Volume, Brown (101.807)	.14	
	R60484	Knob - Volume, Ivory (101.807-A)	$ .14	
	R60456	Knob - On-Off, Brown (101.807)	.14	
	R60483	Knob - On-Off, Ivory (101.807-A)	.14	
	R20963	Lamp - Dial #47	.18	
	R54529	Leaflet - Instruction	.20	
	R60541	Loop Assembly with Back Cover	2.08	A0
	R60464	Plunger and Yoke Assembly	.43	
	R60946	Pointer - Dial	.09	
	R43423	Pulley - Wood	.01	
R14	R40232	Resistor - Glasohm, 25 Ohm, 1 Watt	.14	
R1		Resistor - 1 Megohm, 1/3 Watt	.15	
R2		Resistor - 22,000 Ohm, 1/3 Watt	.15	
R3		Resistor - 470 Ohm, 1/3 Watt	.15	
R4,R10		Resistor - 2.2 Megohm, 1/3 Watt	.15	
R7		Resistor - 47,000 Ohm, 1/3 Watt	.15	
R9		Resistor - 4.7 Megohm, 1/3 Watt	.15	
R11		Resistor - 470,000 Ohm, 1/3 Watt	.15	
R12		Resistor - 150 Ohm, 1/3 Watt	.15	
R13		Resistor - 1200 Ohm, 1 Watt	.21	
	R60462	Shaft - Tuning Assembly	.17	
	R57049	Socket - Tube	.13	
	R60401	Socket - Pilot Lamp	.29	
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER		
	R60431	Speaker - P. M. 5½"	6.76	A0
	R60674	Cone and Voice Coil	2.51	
	R60675	Output Transformer	2.74	
	R60429	Spring - Extension	.06	
	R60417	Spring - Compression	.01	
	R60499	String - Dial Drive Assembly	.31	
	R60447	Switch - Tone	.68	
	R60432	Switch - On-Off	.63	
	R60474	Tube - Station	.26	
T1	R60417	Transformer - 1st I. F.	2.24	
T2	R60418	Transformer - 2nd I. F.	2.71	

MODEL 101.808

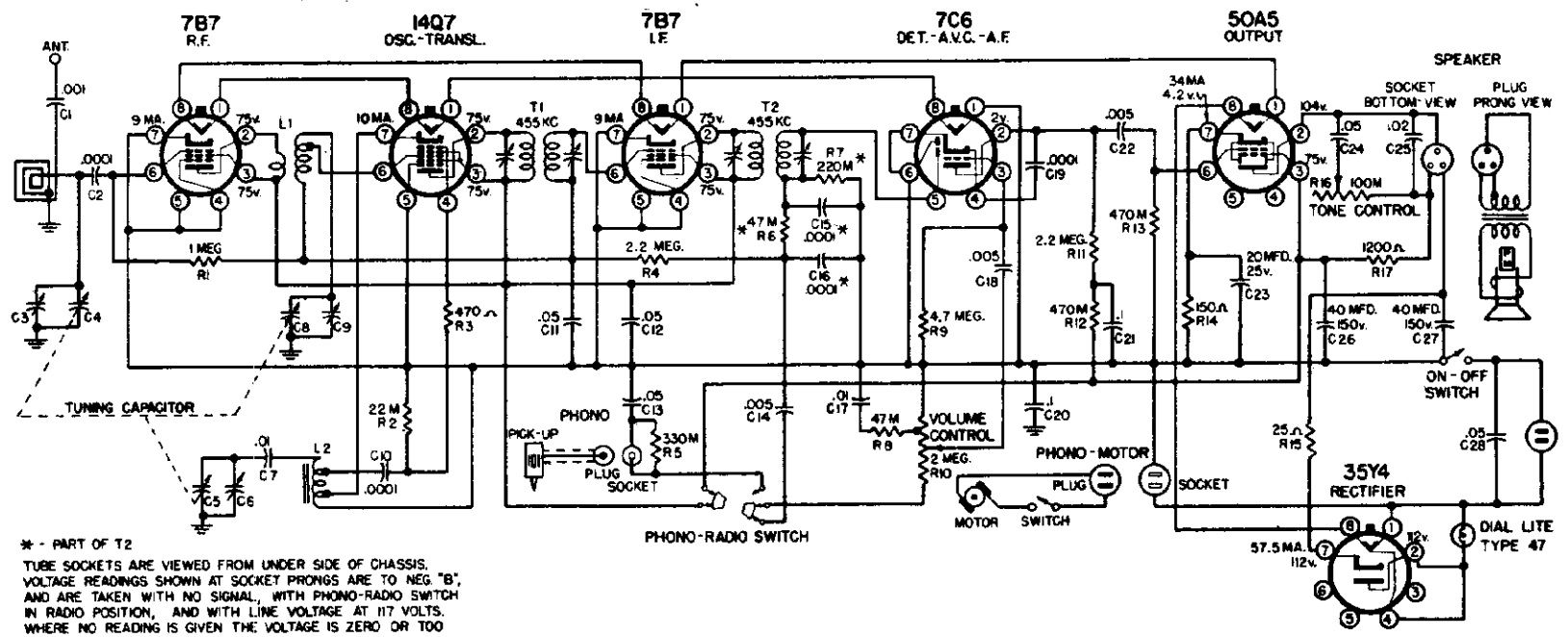
HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) THE CHASSIS NUMBER, which is 101.808. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.
5. In all correspondence relating to cabinets, always mention the source code letter stamped into the upper rear rail of consoles or the bottom of table models, and the CATALOG NUMBER shown on the sticker on the back, bottom or inside of cabinet.

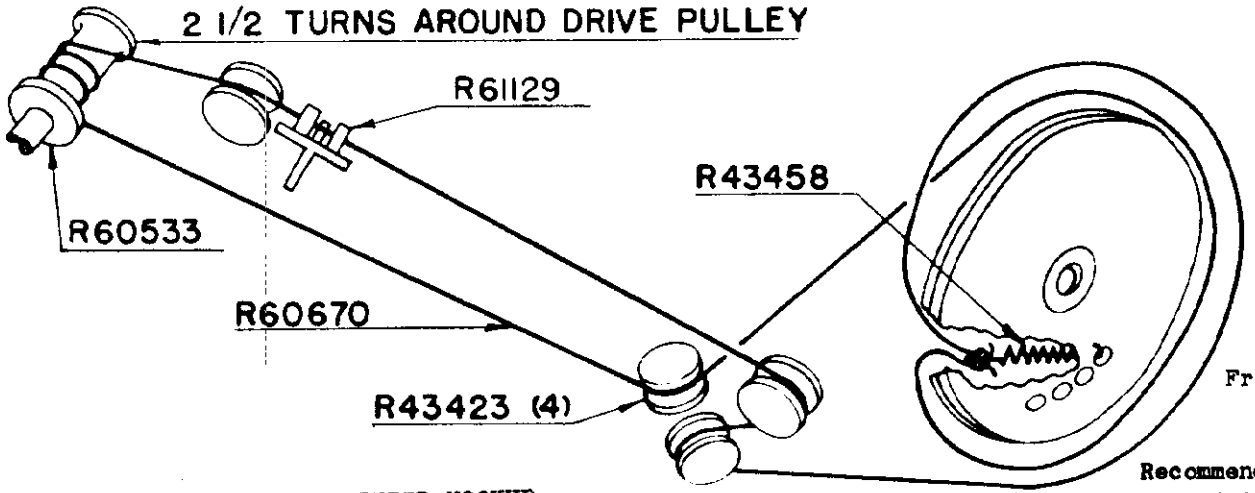
REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SEARS LIST PRICE EACH	MU CODE
	R60486	Button - Push	$ .14	
	R61846	Button - Snap	.01	
C4,C5,C8	R60413	Capacitor - Variable Tuning	5.35	
C1		Capacitor - .001 Mfd. 600 V.	.15	
C7		Capacitor - .01 Mfd. 600 V.	.18	
C11,C12		Capacitor - .05 Mfd. 200 V.	.21	
C13,C17,C20		Capacitor - .005 Mfd. 600 V.	.17	
C16		Capacitor - .01 Mfd. 400 V.	.18	
C18		Capacitor - .1 Mfd. 200 V.	.27	
C23,C26		Capacitor - .05 Mfd. 600 V.	.26	
C24		Capacitor - .02 Mfd. 600 V.	.27	
C2,C10,C25		Capacitor - .0001 Mfd. Mica	.20	
C21,C22,C25	R60416	Capacitor - Electrolytic, 40 Mfd. 150 V, 40 Mfd. 150 V., 20 Mfd. 25 V.	1.91	
L1	R60465	Coil - R. F.	1.25	
L2	R60448	Coil - Oscillator	1.53	
	R60430	Control - Volume - 2 Megohm	.80	
	R16706	Cord - Power	.77	
	R60540	Covers - Tab	.01	
	R60458	Covers - Dial	.14	
	R60529	Dial	.23	
	R60461	Drum and Pinion Assembly	.68	
	R60487	Escutcheon	1.25	
	R60459	Gear and Hub Assembly	.46	
	R60455	Knob - Tone	.14	
	R60480	Knob - Tuning	.14	
	R60484	Knob - Volume	.14	
	R60483	Knob - On-Off	.14	
		Lamp - Dial Marie Type #47	.18	
	R54534	Leaflet - Instruction	.20	
	R60541	Loop Assembly with Back Cover	$ 2.10	A0
	R60464	Plunger and Yoke Assembly	.43	
	R60946	Pointer - Dial	.09	
	R43423	Pulley - Wood	.01	
R4	R40232	Resistor - Glasohm, 25 Ohm, 1 Watt	.14	
R1		Resistor - 1 Megohm, 1/3 Watt	.15	
R2		Resistor - 22,000 Ohm, 1/3 Watt	.15	
R3		Resistor - 470 Ohm, 1/3 Watt	.15	
R4,R10		Resistor - 2.2 Megohm, 1/3 Watt	.15	
R7		Resistor - 47,000 Ohm, 1/3 Watt	.15	
R9		Resistor - 4.7 Megohm, 1/3 Watt	.15	
R11		Resistor - 470,000 Ohm, 1/3 Watt	.15	
R12		Resistor - 150 Ohm, 1/3 Watt	.15	
R13		Resistor - 1200 Ohm, 1 Watt	.21	
	R60462	Shaft - Tuning Assembly	.17	
	R57049	Socket - Tube	.13	
	R60401	Socket - Pilot Lamp	.29	
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER		
	R61627	Speaker - P. M. 5½"	6.76	A0
	R61634	Cone and Voice Coil	2.51	
	R61635	Output Transformer	2.74	
	R60429	Spring - Extension	.06	
	R60417	Spring - Compression	.01	
	R60499	String - Dial Drive Assembly	.31	
	R60447	Switch - Tone	.68	
	R60432	Switch - On-Off	.63	
	R60474	Tube - Station	.26	
T1	R60417	Transformer - 1st I. F.	2.24	
T2	R60418	Transformer - 2nd I. F.	2.71	



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "B", AND ARE TAKEN WITH NO SIGNAL, WITH PHONO-RADIO SWITCH IN RADIO POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
SYMBOLS ARE IN ACCORDANCE WITH A.S.A. STANDARDS Z32.5 AND Z32.10 UNLESS OTHERWISE STATED.



STRING AND POINTER HOOKUP

Uses Record Changer 101.203-1

SPECIFICATIONS

Power Supply:

All models available..

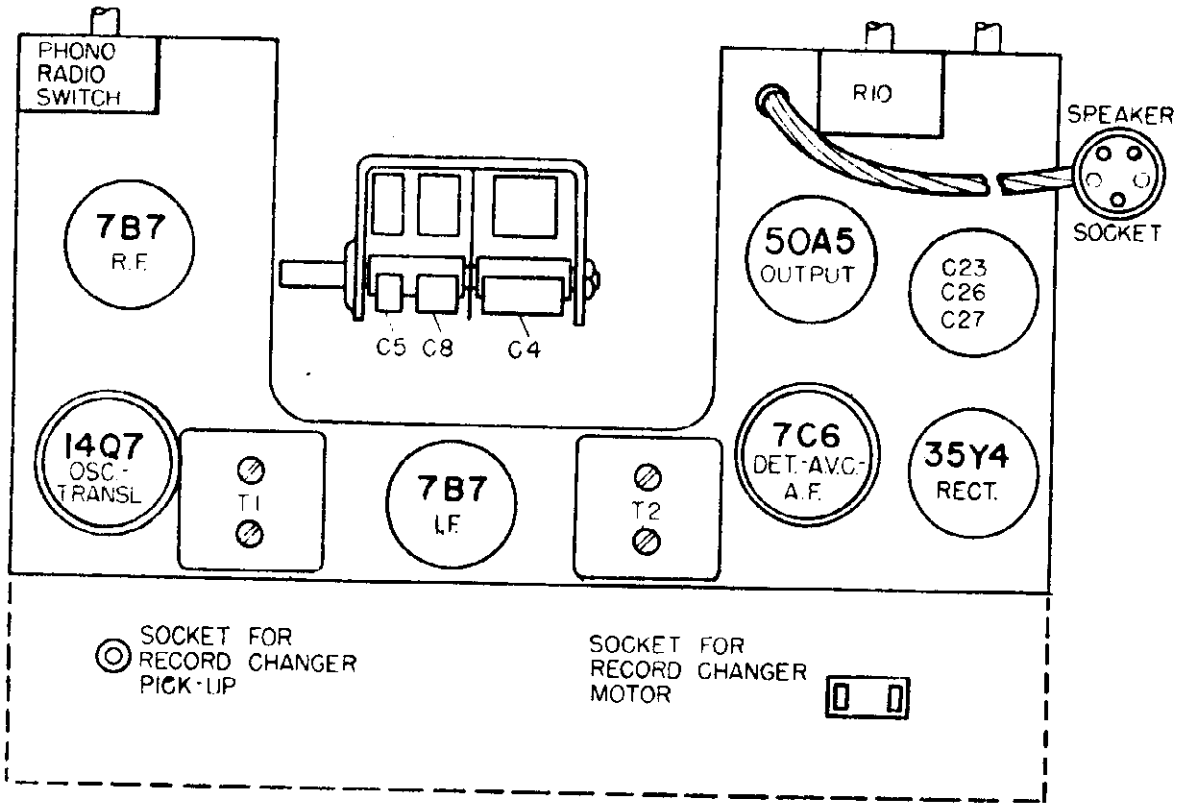
117 Volts 60 Cycles AC 60 Watts

Frequency Range:

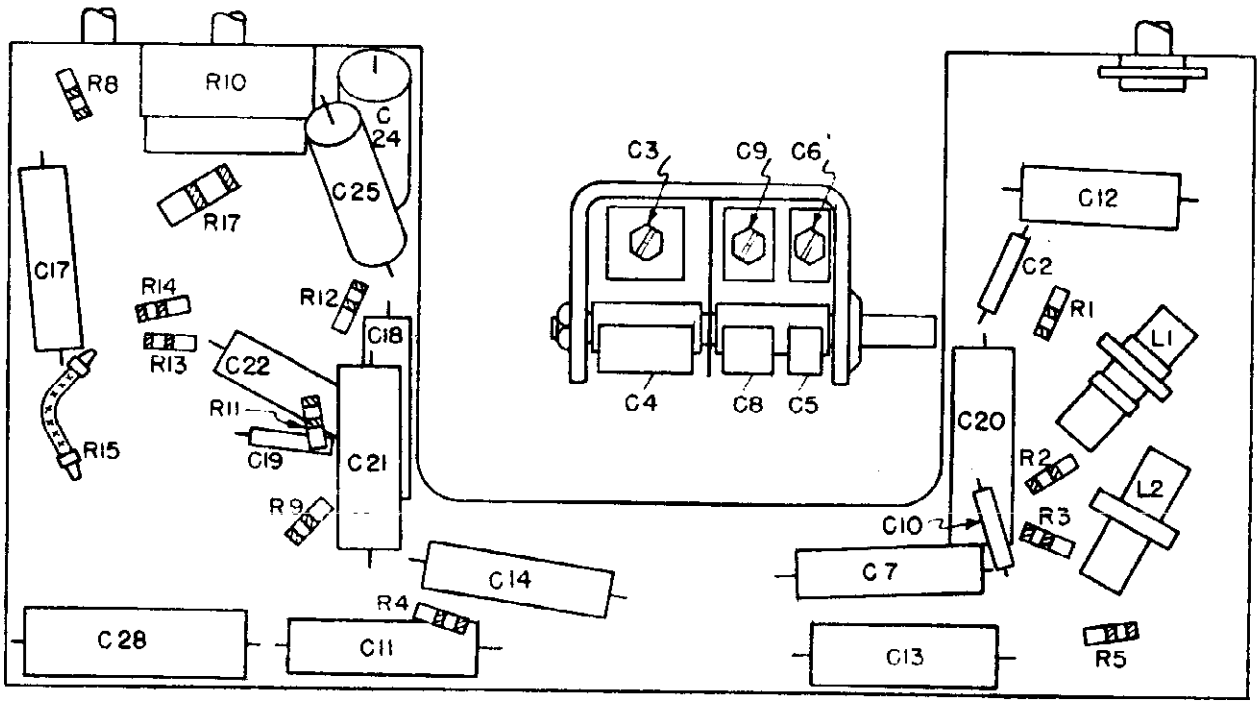
Broadcast...540-1600 KC

Recommended Antenna Equipment:

Catalog #6703 A Conventional Antenna
Catalog #6704 Noise Reducing Antenna
Catalog #6705 Greatest Reception and Noise Reduction Antenna



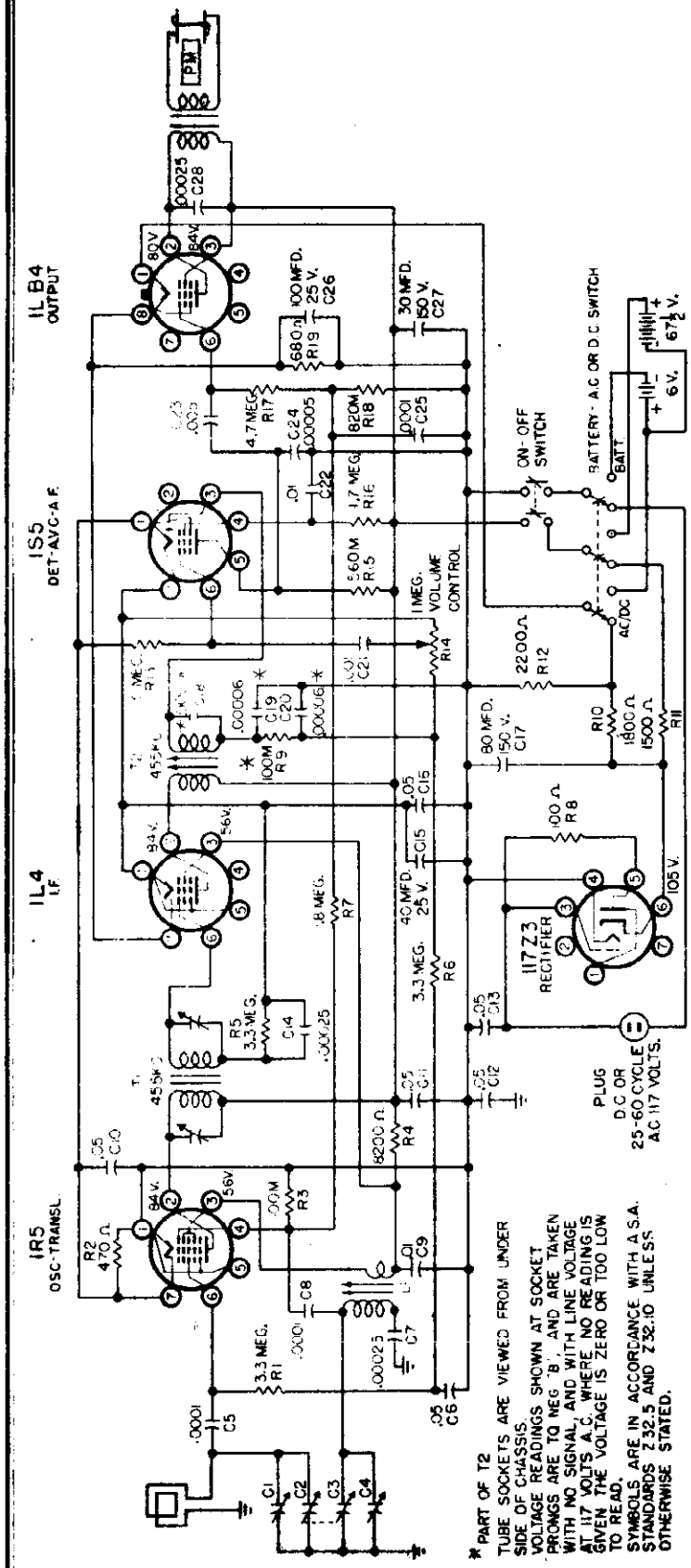
LOCATION OF PARTS ON TOP OF CHASSIS



LOCATION OF PARTS UNDER CHASSIS

MODELS 7165,Ch.101.823, 101.823-1; 7166,Ch.101.823A, 101.823-1A

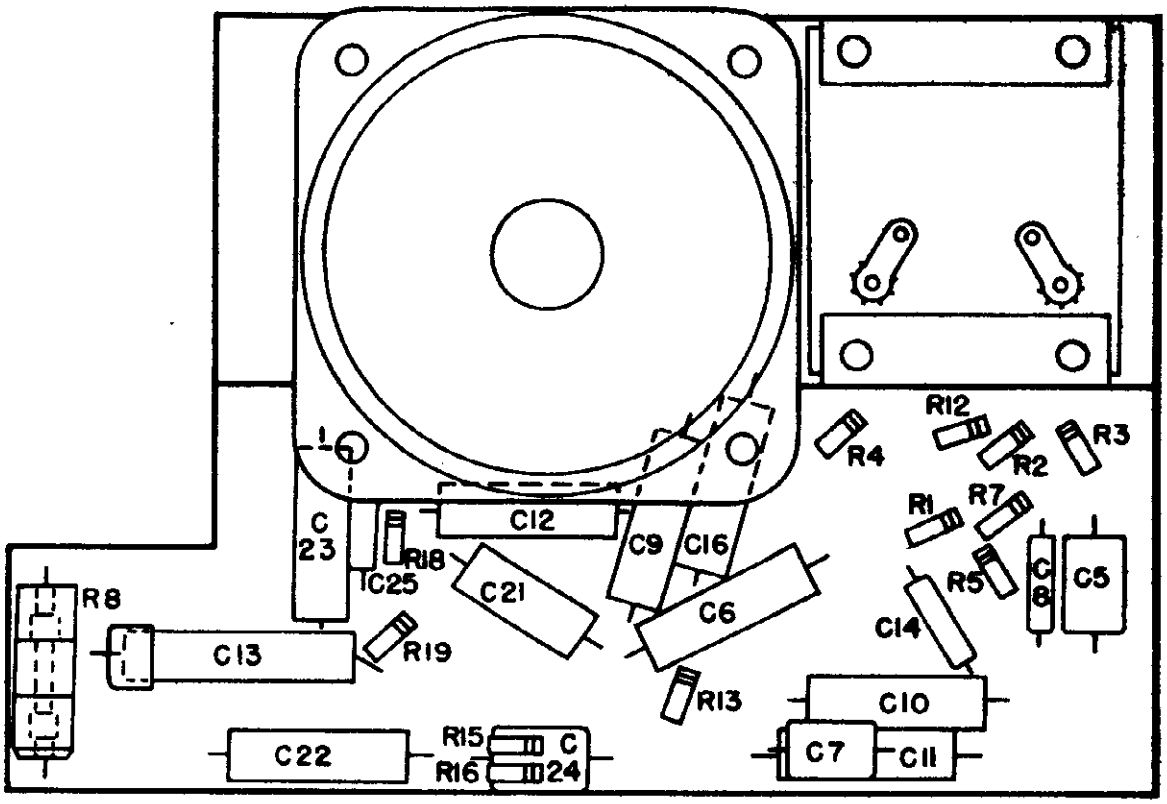
SEARS ROEBUCK & CO.



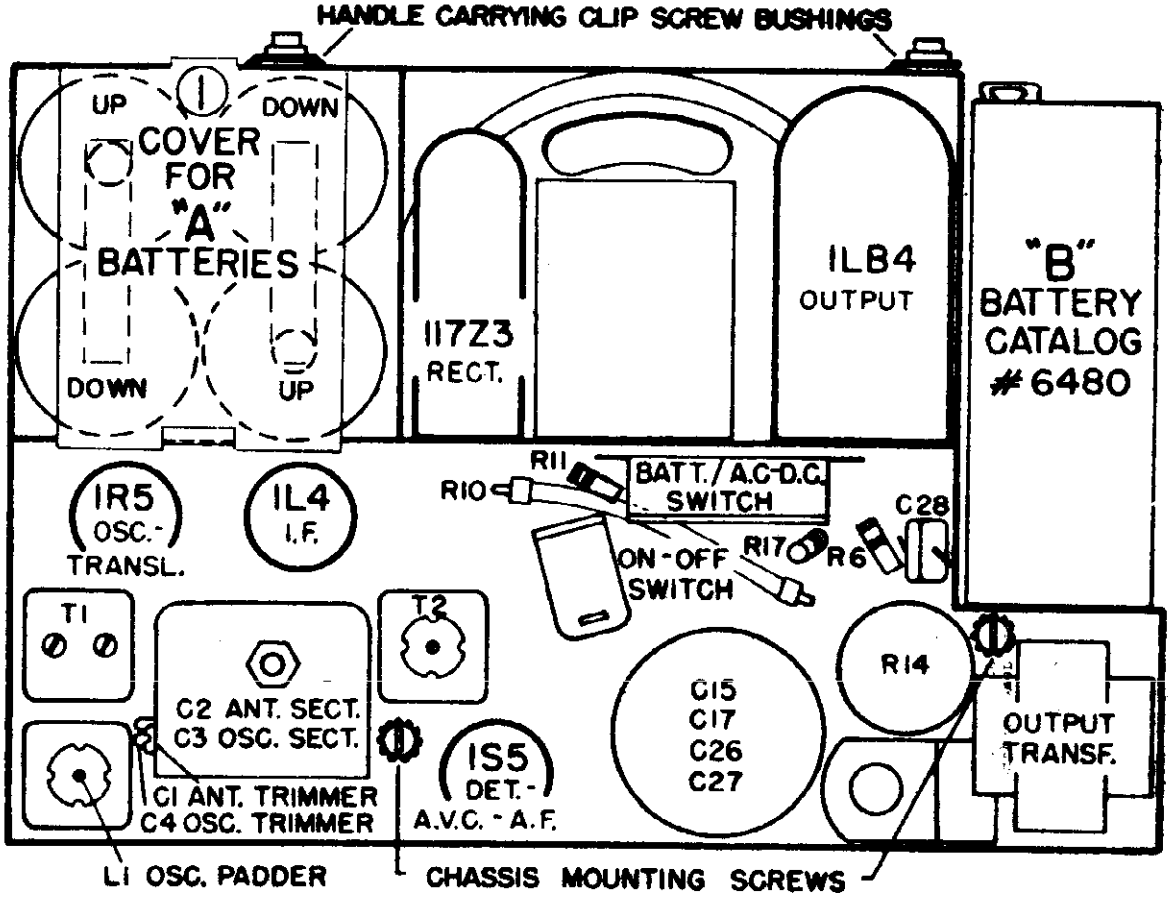
REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER MARCH 1 1947. AFTER THIS DATE REFER TO "DIV. 57 REPAIR PARTS STRAIGHT LIST" - ALL PRICES PREPAID.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SEARS LIST PRICE EACH $	MD CODE
	R60808	Knob - Tuning (Ivory 101.823)		11
	R60905	Knob - Tuning (Black 101.823-A)		12
	R60889	Knob - Volume (Ivory 101.823)		12
	R60906	Knob - Volume (Black 101.823-A)		12
	R54540	Escutcheon - Dial		26
	R60875	Lanyard - Instruction		02
	R60876	Pin - Drive for On-Off Button		29
	R60942	Pointer - Dial Assy. (Except 101.823)		29
		Pointer - Dial Assy. (Except 101.823-A)		29
		Resistor - 470 Ohm - 1/3 W.		15
		Resistor - 680 Ohm - 1/3 W.		15
		Resistor - 2200 Ohm - 1/3 W.		15
		Resistor - 8200 Ohm - 1/3 W.		15
		Resistor - 100,000 Ohm - 1/3 W.		15
		Resistor - 820,000 Ohm - 1/3 W.		15
		Resistor - 1.0 Megohm - 1/3 W.		15
		Resistor - 3.3 Megohm - 1/3 W.		15
		Resistor - 4.7 Megohm - 1/3 W.		15
		Resistor - 10 Megohm - 1/3 W.		15
	R61219	Resistor - 1500 Ohm - 1 W.		22
	R60811	Resistor - Gistohm - 100 Ohm 2 W.		15
	R57049	Resistor - Filament 180 Ohm 5 W.		14
	R60955	Socket - Tube - Miniature (Lock-In		13
	R60811	Socket - Tube - Miniature (1L4)		16
		WHEN ORDERING SPEAKER PARTS, LEARN GIVE THE PART NUMBER APPEARING ON THE SPEAKER		
	R60812	Speaker - 12" P. M.	4.28	AB
	R60890	Cone and Voice Coil	2.00	AB
	R60842	Spring - "A" Battery Retaining		05
	R60897	Spring - Compression On-Off Switch		05
	R60870	Spring - Loop Lead Tension		05
	R60821	Strap - Carrying (Tan 101.823)		77
	R60874	Strap - Carrying (Black 101.823-A)		77
	R60811	Strap - Shoulder (Tan 101.823)	1.65	77
	R60811	Strap - Shoulder (Black 101.823-A)	1.65	77
	R60883	Switch - AC - Battery - T.P.D.T.		02
	R60624	Switch - On-Off		02
	R60817	Transformer - Output		44
	R60815	Transformer - I. F. #1		44
	R60816	Transformer - I. F. #2		44



PARTS LAYOUT - FRONT



PARTS LAYOUT - BACK

101.823,101.823-1 IMPORTANT ALIGNMENT NOTES 101.823A,101.823-1A

An isolation transformer between the power source and the receiver is recommended during any service or alignment operation which requires that service equipment be connected to the receiver. Failure to observe this precaution might damage service equipment.

*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.

ALIGNMENT PROCEDURE

Output Meter Connection.....Across Speaker Voice Coil
Output Meter Reading to Indicate 40 Milliwatts.....0.4 Volts
Generator Ground Lead Connection.....To B- through .1 Mfd. Capacitor
Connection of Generator Output Lead.....See Chart Below
Position of Volume Control.....Fully On (Clockwise)
Position of Pointer with Variable Fully Closed....To right of 540 KC Calibration Mark

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS IN ORDER SHOWN	TRIMMER FUNCTION
Closed	455	0.05 Mfd.	1R5 Translator Grid	T2-T1	I. F.
Open	1610	0.05 Mfd.	Hazeltine Loop	C4	Oscillator
1400	1400	0.05 Mfd.	Hazeltine Loop	C1	Antenna
*600	600	0.05 Mfd.	Hazeltine Loop	L1	Padder

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	MEANS LIST PRICE EACH	MU CODE
	R13961	Button - Snap	$ .01	
C4,C8,C5	R60413	Capacitor - Variable Tuning	5.35	
C1		Capacitor - .001 Mfd. 600 V.	.15	
C7		Capacitor - .01 Mfd. 600 V.	.18	
C11,C12,C13		Capacitor - .05 Mfd. 200 V.	.21	
C14,C18,C22		Capacitor - .005 Mfd. 600 V.	.17	
C17		Capacitor - .01 Mfd. 400 V.	.18	
C20		Capacitor - .1 Mfd. 200 V.	.27	
C21		Capacitor - .1 Mfd. 200 V. H. T.	.22	
C24,C28		Capacitor - .05 Mfd. 600 V.	.26	
C25		Capacitor - .02 Mfd. 600 V.	.27	
C2,C10,C19		Capacitor - .0001 Mfd. Mica	.20	
C23,C26,C27	R60416	Capacitor - Electrolytic, 20 Mfd. 25 V 40 Mfd. 150 V., 40 Mfd. 150 V.	1.91	
L1	R60465	Coil - R. F.	1.25	
L2	R60448	Coil - Oscillator	1.53	
R16	R60516	Control - Tone and On-Off	1.08	
R10	R60505	Control - Volume - 2 Megohm	.89	
	R16706	Cord - Power	.77	
	R60506	Dial	.26	
	R60523	Drum - Drum & Bushing Assembly	.42	
	R60520	Escutcheon - Plastic	1.19	
	R60482	Knob - Phono-Radio	.14	
	R60522	Knob - Tone - On-Off	.14	
	R60480	Knob - Tuning	.14	
	R60484	Knob - Volume	.14	
		Lamp Dial Mazda Type #47	.18	
	R54551	Leaflet - Instruction	.20	
	R60985	Loop - Assembly with Board	2.26	A0
	R61129	Pointer - Dial	$ .11	
	R44145	Plug - Female	.30	
	R43423	Pulley - Wood	.01	
R1		Resistor - 1 Megohm 1/3 Watt	.15	
R2		Resistor - 22,000 Ohm 1/3 Watt	.15	
R3		Resistor - 470 Ohm 1/3 Watt	.15	
R4,R11		Resistor - 2.2 Megohm 1/3 Watt	.15	
R5		Resistor - 330,000 Ohm 1/3 Watt	.15	
R8		Resistor - 47,000 Ohm 1/3 Watt	.15	
R9		Resistor - 4.7 Megohm 1/3 Watt	.15	
R12,R13		Resistor - 470,000 Ohm 1/3 Watt	.15	
R14		Resistor - 150 Ohm 1/3 Watt	.15	
R17		Resistor - 1200 Ohm 1 Watt	.21	
R15	R40232	Resistor - Glaschm 1 Watt 25 Ohm	.14	
	R60533	Shaft - Tuning Assembly	.18	
	R44897	Socket - Phono - 1 Prong	.07	
	R60515	Socket - Pilot Lamp	.24	
	R57049	Socket - 8 Prong - Lock-in	.13	
	R61032	Speaker - P. M. 8"	9.84	A0
	R61037	Cone and Voice Coil	3.56	A5
	R61038	Output Transformer	2.48	A5
	R60670	String Assembly	.27	
	R60517	Switch - Phono - Radio	.68	
T1	R60417	Transformer - 1st I. F.	2.24	
T2	R60418	Transformer - 2nd I. F.	2.71	

MODEL 101.809, 101.811

SPECIFICATIONS

Power Supply:
4 Large Flashlight "A" Batteries — "A" Drain . . . . . 0.050 Amperes
1 #6680 - 67.5 Volt "B" Battery — "B" Drain . . . . . 0.010 Amperes
105-125 Volts AC or DC — Power Consumption 10 Watts
Frequency Range — 540 to 1610 KC

CHASSIS DIFFERENCES: Chassis 101.823 and 101.823A are mounted by two machine screws through the chassis. (See Page 2 "Parts Layout Back" for location of mounting screws.) Chassis 101.823-1 and 101.823-1A are mounted by one machine screw through the outside bottom of the case into the chassis. Both types of chasses are held at the top by machine screws through the carrying handle escutcheons.

HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) The CHASSIS NUMBER, which is 101.823 or 101.823-A. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. Refer to "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of Mark-up Code.

REMOVING CHASSIS FROM CASE:

1. Open front cover, turn tuning knob to low frequency stop (54 on dial).
2. Remove volume and tuning knobs and dial pointer.
3. Close front cover.
4. Remove two screws holding carrying handle clips.
5. Open back cover.
6. Remove batteries.
7. Unsolder loop lead from variable capacitor and pull this lead out of the vinylite protective tubing.
8. Unsolder second loop lead at ground lug.
9. Remove two chassis mounting screws (See Tube and Battery Layout Illustration).
10. Pull chassis carefully from the case as far as it will go keeping the chassis square with the case.
11. Insert a screw driver or similar tool between chassis and case at the hinges and carefully bend the case to allow carrying strap screw anchors (riveted to the chassis) to clear hinges (See Parts Layout Front Illustration).
12. Pull chassis again squarely until speaker housing holds at the hinge side of the case.
13. Insert the screw driver between chassis and case at or near the speaker housing and gently pry the case to allow speaker to clear. The chassis can then be lifted clear of the case.

REPLACING CHASSIS INTO CASE:

To replace the chassis into the case the above procedure should be reversed and the following precautions taken:

1. Dress the loop leads in such manner as not to cut insulation against the edge of the chassis or case.
2. Guide the "on off" switch button through the hole in the front panel.

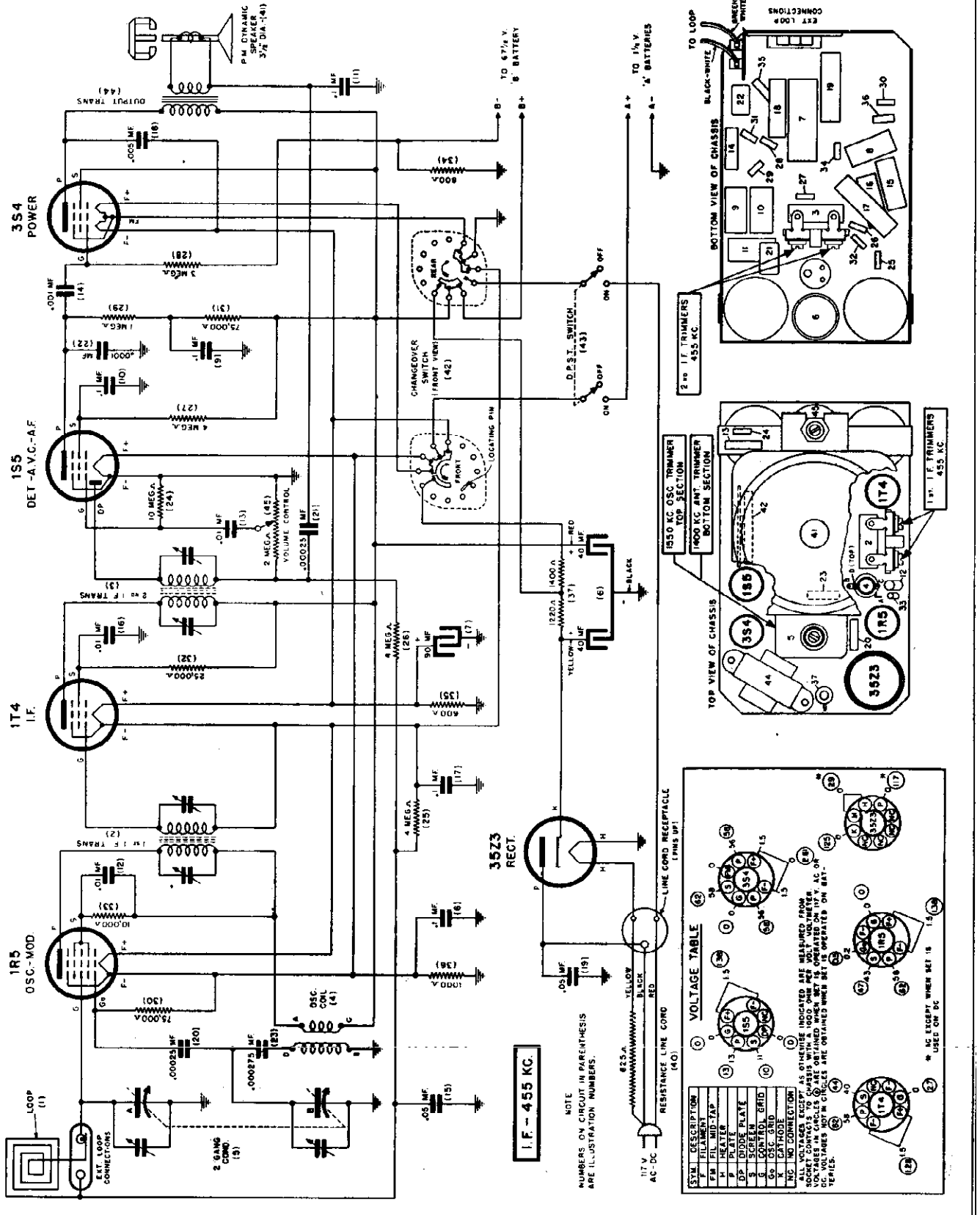
HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) THE CHASSIS NUMBER, which is 101.811. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.
5. In all correspondence relating to cabinets, always mention the source code letter stamped into the upper rear rail of consoles or the bottom of table models, and the CATALOG NUMBER shown on the sticker on the back, bottom or inside of cabinet.

REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

SENTINEL RADIO CORP.



ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required, make the adjustment marked (1) first, (2) next. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA AND BATTERIES IN THE SAME POSITION THEY WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1550 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. 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.

Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to lug on stator of gang condenser to which loop lead is connected.	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.
1 Exactly 1550 K.C.	Exactly 1550 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1550 K. C. oscillator trimmer for maximum output.
2 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.

BATTERY INSTALLATION

The plastic case is made in two sections. To install batteries in receiver, push the slide lock button underneath the carrying handle and gently separate the case.

Place the batteries in the exact position shown on the diagram.

Press the snap buttons on the end of the short flexible wire leads into the terminals on top of "B" battery.

After batteries have been installed, gently press the two sections of the case together and lock in place with slide button underneath case handle.

WHEN INSTALLING BATTERIES BE CAREFUL NOT TO INJURE ANY OF THE EXPOSED RADIO PARTS.

BATTERY LIFE

The life of the batteries depends on the number of hours the set is operated.

Based on average usage, the flashlight "A" batteries will supply approximately ten hours' service—the "B" battery approximately forty hours' service.

Because the "A" batteries become exhausted much faster than the "B" battery, six to eight "A" batteries may be used during the life of a single "B" battery.

Be sure to try new "A" batteries before replacing the "B" battery.

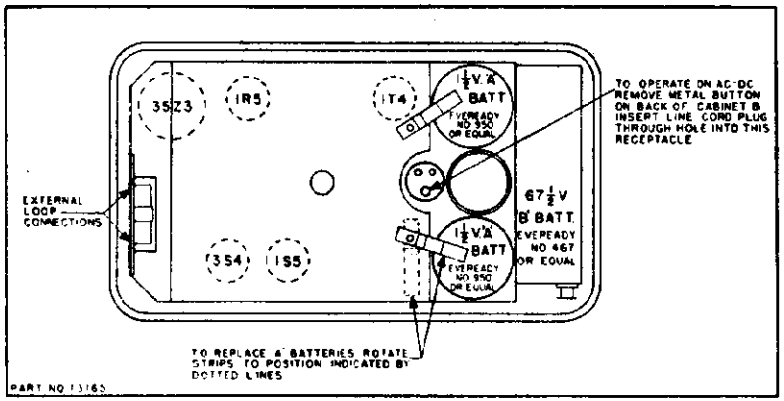
115 VOLT D.C. OR 115 VOLT 50-60 CYCLE ELECTRIC INSTALLATION AND OPERATION

To operate the receiver on 110-120 volt direct current or 50-60 cycle alternating current, just:

(a) Remove metal button on back of cabinet and insert plug on end of AC-DC line cord into receptacle in back of the small hole that will be exposed when metal button is removed.

(b) Place battery or AC-DC selector knob in AC/DC position.

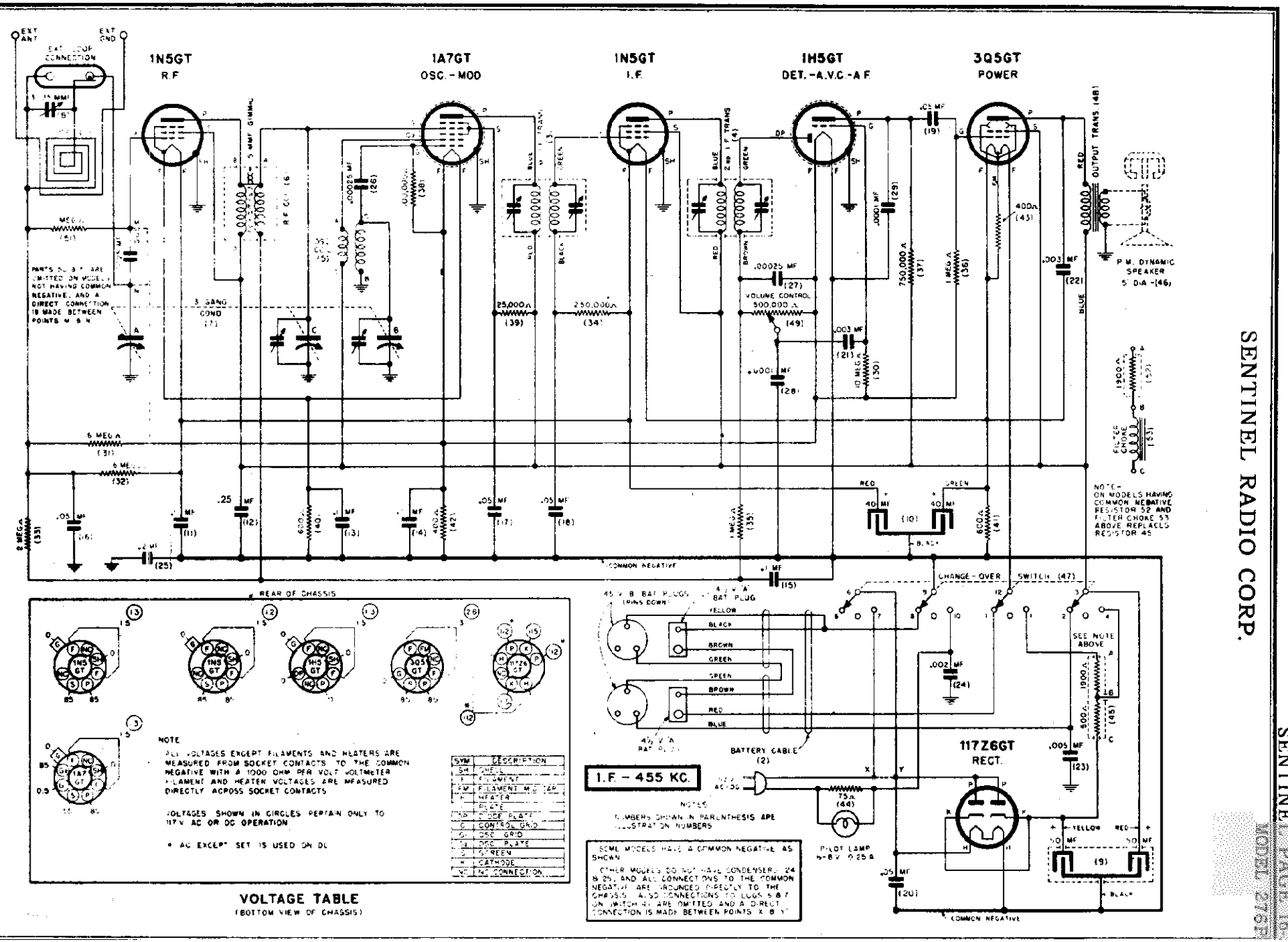
If the radio does not operate on "DC" current after approximately one minute, remove the plug on the end of radio set power cord from the house current receptacle, turn it half way around (180°) and reinsert it into the power receptacle.



THIS RECEIVER CAN BE OPERATED EITHER WITH DRY BATTERIES OR FROM 110-120 VOLT DIRECT CURRENT OR 50-60 CYCLE ALTERNATING CURRENT.

THUS THE SET MAY BE OPERATED ON FARMS, IN SUMMER CAMPS, HUNTING LODGES, BOATS, OR IN ANY ISOLATED DISTRICTS WHERE ELECTRIC SERVICE IS NOT AVAILABLE BY USING BATTERIES. WHERE 110-120 VOLT DIRECT CURRENT OR 50-60 CYCLE ALTERNATING CURRENT IS AVAILABLE, THE RADIO MAY BE OPERATED DIRECT FROM THE ELECTRIC LINES WITHOUT USING THE BATTERIES OR MAKING ANY CHANGE IN THE RECEIVER.

WHEN THE "BATTERY OR AC-DC" SWITCH KNOB IS IN THE AC-DC POSITION THE BATTERIES ARE ENTIRELY DISCONNECTED AND THE SET RECEIVES ALL ITS POWER FROM THE AC OR DC ELECTRIC LINE.



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

SENTINEL RADIO CORP.

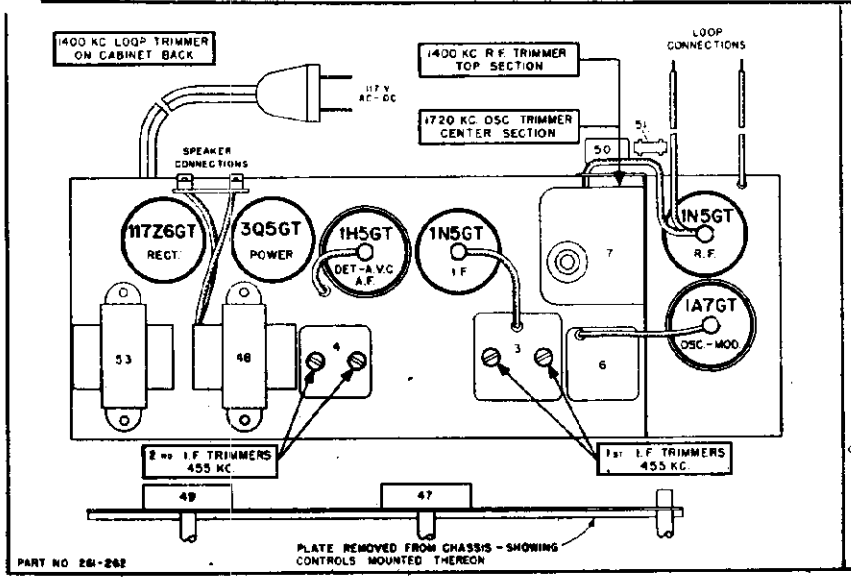
ALIGNMENT PROCEDURE

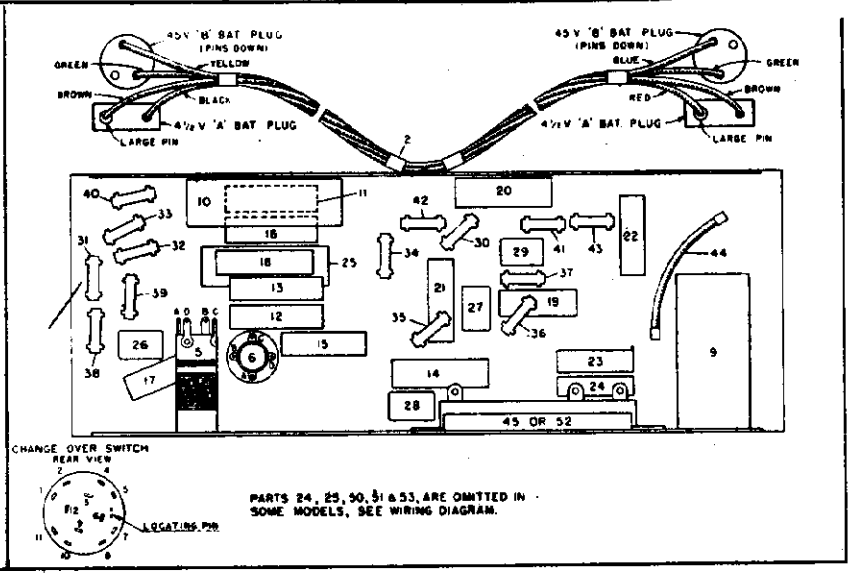
PART NO. 13335—262A

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. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna and R.F. trimmers, do not connect test oscillator to loop. 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 near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

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:
Any point where no interfering signal is received.		Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 1A7GT 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.
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.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1400 K.C. loop and R.F. trimmers for maximum output.





VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE WITH BATTERIES OR ON EITHER 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC) OR 110-120 VOLTS DIRECT CURRENT (DC).

IMPORTANT—If hum is high when set is operated on A.C. current, reverse position of set power cord plug in house current socket.

GROUND

WHEN AN EXTERNAL AERIAL IS ATTACHED TO THE RADIO A GOOD GROUND MUST BE USED.

A wire placed underneath the lower left hand screw on back of cabinet and firmly attached to a metal stake driven two to four feet in moist ground, or attached to a cold water pipe will provide a suitable ground.

CONTROLS

THE LEFT HAND KNOB controls the volume control.

THE CENTER KNOB is the voltage selector and on-off switch.

THE RIGHT HAND KNOB is the station selector.

BATTERY INSTALLATION AND OPERATION

BATTERY EQUIPMENT:

Diagram shows proper location and connections of the following and similar types of batteries:

2—4½ VOLT "A" BATTERIES such as Eveready type 746.

2—45 VOLT "B" BATTERIES such as Eveready type 482.

115 VOLT D.C. OR 115 VOLT 50-60 CYCLE ELECTRIC INSTALLATION AND OPERATION

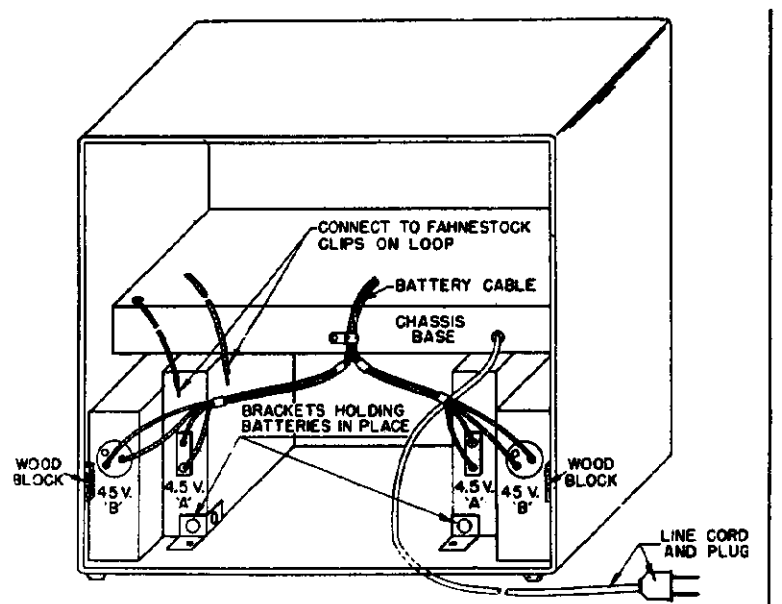
To operate the receiver on 110-120 volt direct current or 50-60 cycle alternating current, just:

(a) Bring line cord through opening in bottom of cabinet.

(b) Insert line cord plug into 110-115 volt AC or DC electric power socket.

(c) Rotate voltage selector knob to left hand AC/DC position.

If the radio does not operate on DC current after approximately one minute remove the plug on the end of radio line cord from the house current receptacle, turn it half way around (180°) and reinsert it into the power receptacle.



TO INSTALL BATTERIES REMOVE BACK FROM CABINET, AND PLACE BATTERIES AS SHOWN.
FOR AC/DC OPERATION BRING LINE CORD THROUGH OPENING IN BOTTOM OF CABINET.
ALWAYS KEEP BACK ON CABINET.

12517

PARTS LIST

Illus. No.	Part No.	Part Name	Description	List Price
1	13331	Antenna	Loop Assembly	$1.50
2	12204	Cable	Battery with 2 Three Prong "B" and 2 Two Prong "A" Plugs	.55
3	12182	Coil	First I.F. Transformer	1.05
4	11988	Coil	Second I.F. Transformer	.75
5	12184	Coil	Oscillator—used in Models not having common ground	.60
5	13566	Coil	Oscillator—used in Models having common ground	.60
6	13323	Coil	R.F. Coil	.50
7	12188	Condenser	Tuning (Three Gang)	2.50
8	11636	Condenser	Trimmer (2-40 MMF.)	.20
9	13326	Condenser	Tubular Dry Elec. (50-50 Mfd. 150 Volt)	.75
10	13242	Condenser	Tubular Dry Elec. (40-40 Mfd. 25 Volt)	.50
11	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
12	9832	Condenser	Tubular .25 Mfd. 200 Volt	.23
13	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
14	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
15	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
16	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
17	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
18	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
19	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
20	9457	Condenser	Tubular .05 Mfd. 400 Volt	.20
21	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
22	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
23	1275	Condenser	Tubular .005 Mfd. 400 Volt	.18
24	10762	Condenser	Tubular .002 Mfd. 400 Volt used in Models having common ground	.19
25	12089	Condenser	Tubular .2 Mfd. 400 Volt used in Models having common ground (with Red Dot)	.26
26	9458	Condenser	Mica .00025 Mfd.	.21
27	9458	Condenser	Mica .00025 Mfd.	.21
28	7934	Condenser	Mica .0001 Mfd.	.21
29	7934	Condenser	Mica .0001 Mfd.	.21
30	4804	Resistor	Carbon 10 Megohm 1/3 Watt	.19
31	2333	Resistor	Carbon 5 Megohm 1/3 Watt	.19
32	2333	Resistor	Carbon 5 Megohm 1/3 Watt	.19
33	2705	Resistor	Carbon 2 Megohm 1/3 Watt	.19
34	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
35	7998	Resistor	Carbon 1 Megohm 1/3 Watt	.19
36	7998	Resistor	Carbon 1 Megohm 1/3 Watt	.19
37	2573	Resistor	Carbon 750,000 Ohm 1/3 Watt	.19
38	8000	Resistor	Carbon 100,000 Ohm 1/3 Watt	.19
39	8907	Resistor	Carbon 25,000 Ohm 1/3 Watt	.19
40	1562	Resistor	Carbon 600 Ohm 1/3 Watt	.19
41	1562	Resistor	Carbon 600 Ohm 1/3 Watt	.19
42	1152	Resistor	Carbon 400 Ohm 1/3 Watt	.19
43	1152	Resistor	Carbon 400 Ohm 1/3 Watt	.19
44	12084	Resistor	Flexible 75 Ohm 2 Watt	.20
45	13327	Resistor	Wire Wound (500 Ohm 3 Watt and 1900 Ohm 6 Watt)	.50
46	12211	Speaker	P.M. Dynamic (5")	3.25
47	12193	Switch	Voltage Selector Switch	1.00
48	13055	Transformer	Output used in Models not having common ground	1.00
48	12183	Transformer	Output used in Models having common ground	1.10
49	13324	Volume Control	used in Models not having common ground	.60
49	13397	Volume Control	used in Models having common ground	.70
50	9458	Condenser	Mica .00025 Mfd.	.21
51	7998	Resistor	Carbon 1 megohm 1/3 watt	.19
52	10831	Resistor	Wire Wound 1900 ohm 6W used in Model having common ground	.55
53	12069	Filter Choke	Used in Model having common ground	1.00

MISCELLANEOUS PARTS

10292	Bulb	6.3 Volt .250 Amp. Dial Light No. 44 Bayonet Base	$0.10
8184	Dial Cord	24" of No. 18 Lb. Drive Cord	.15
12191	Dial Shaft	Drive Shaft	.15
12221	Dial Pointer	For Dial	.20
12222	Dial Pointer	AC-DC Battery Indicator	.10
13325	Dial Scale	Calibrated Scale	.35
12208	Dial Crystal	For Dial	.30
12096	Knob		.10
11642	Plug	Three Prong "B"	.10
12205	Plug	Two Prong "A"	.08
13330	Plate	Metal Control Face Plate for Cabinet	1.00

FOR RADIO RECEPTION:
Slide switch knob to "RADIO" position.

FOR RECORD PLAYING:
Slide switch knob to "PHONO" position.

Slide switch knob to "PHONO" position.

TUNING CONTROL:
Use this knob to tune in desired station.

VOLUME CONTROL and ON OFF SWITCH
Turn clockwise to increase volume.

INSTRUCTIONS FOR PLAYING A 7", 10" OR 12" RECORD:

A. LIFT CABINET LID AND PLACE RECORD ON TURNTABLE.

B. SLIDE RECORD SIZE SELECTOR BUTTON TO PROPER POSITION.
FOR 12" RECORD, SLIDE BUTTON TO 12 POSITION.
FOR 10" RECORD, SLIDE BUTTON TO POSITION MARKED 10.
FOR 7" RECORD, DEPRESS BUTTON AND SLIDE TO 7 POSITION.

C. PLACE "RADIO-PHONO" SWITCH IN PHONO POSITION.

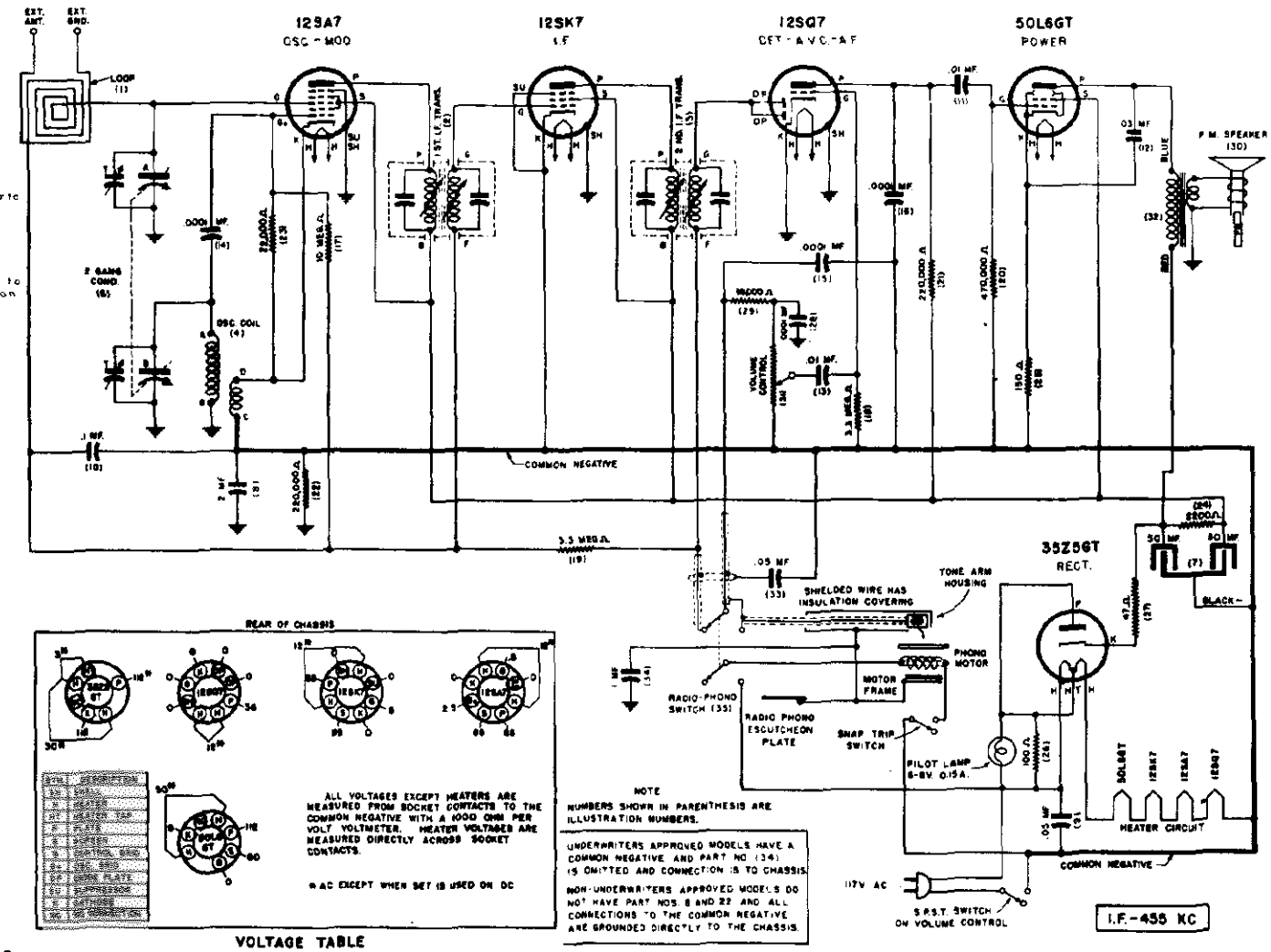
D. CLOSE LID – THIS WILL AUTOMATICALLY START RECORD PLAYING.

WHEN RECORD HAS BEEN COMPLETELY PLAYED, TURNTABLE WILL AUTOMATICALLY TURN OFF.

TO PLAY SAME RECORD AGAIN, JUST LIFT LID ALL THE WAY UP AND RE CLOSE.

TO PLAY ANOTHER RECORD, REPLACE RECORD ON TURNTABLE AND PROCEED AS ABOVE.

DO NOT HAVE MORE THAN ONE RECORD ON TURNTABLE.



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

NOTE
NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE AND PART NO. (34) IS OMITTED AND CONNECTION IS TO CHASSIS.

NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PART NOS. 8 AND 22 AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.

LOOP AERIAL

THE LOOP AERIAL SUPPLIED with the radio should provide ample reception in average locations.

Loop aerials are directional—the volume of a weak station may be improved, or undesired electrical noise may be reduced, by lifting and turning the radio to a different position. A trial will reveal position of best reception with least interference.

OUTSIDE AERIAL

If the radio is used in shielded areas or located a great distance from broadcast stations, the volume of some or all stations may not be ample, in which case it would be necessary to ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT OF THE REAR OF THE CHASSIS.

GROUND

When a regular aerial is used, best result will be obtained with a ground attached to the black lead coming out of the rear of the chassis. WARNING — DO NOT ATTACH A GROUND DIRECT TO THE RADIO CHASSIS—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

DIAL LIGHT

It is normal for the dial light to be dim for approximately 60 seconds after set is turned "on" and then attain normal brilliance—also, on very loud signals the light may fluctuate.

When replacing light, always use a 6.3 volt .150 ampere dial light.

ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

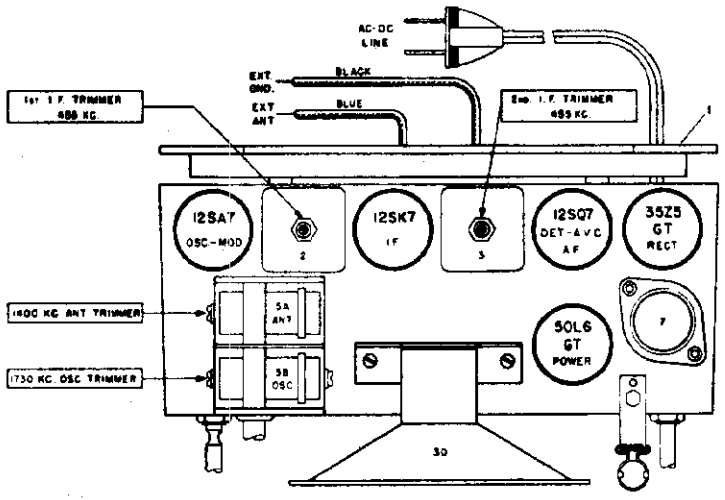
Before starting alignment:

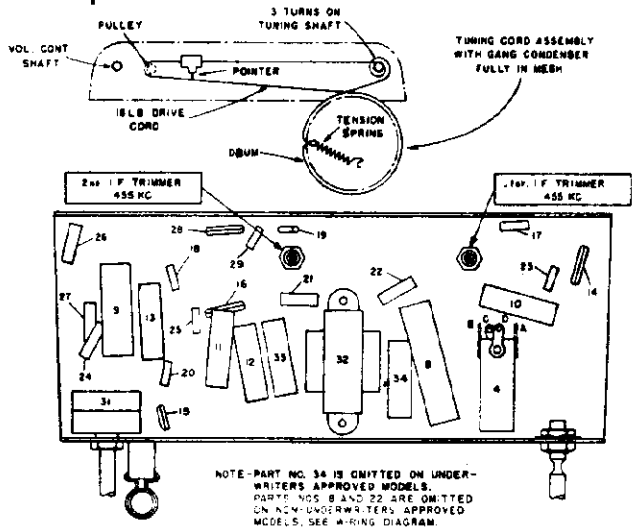
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.

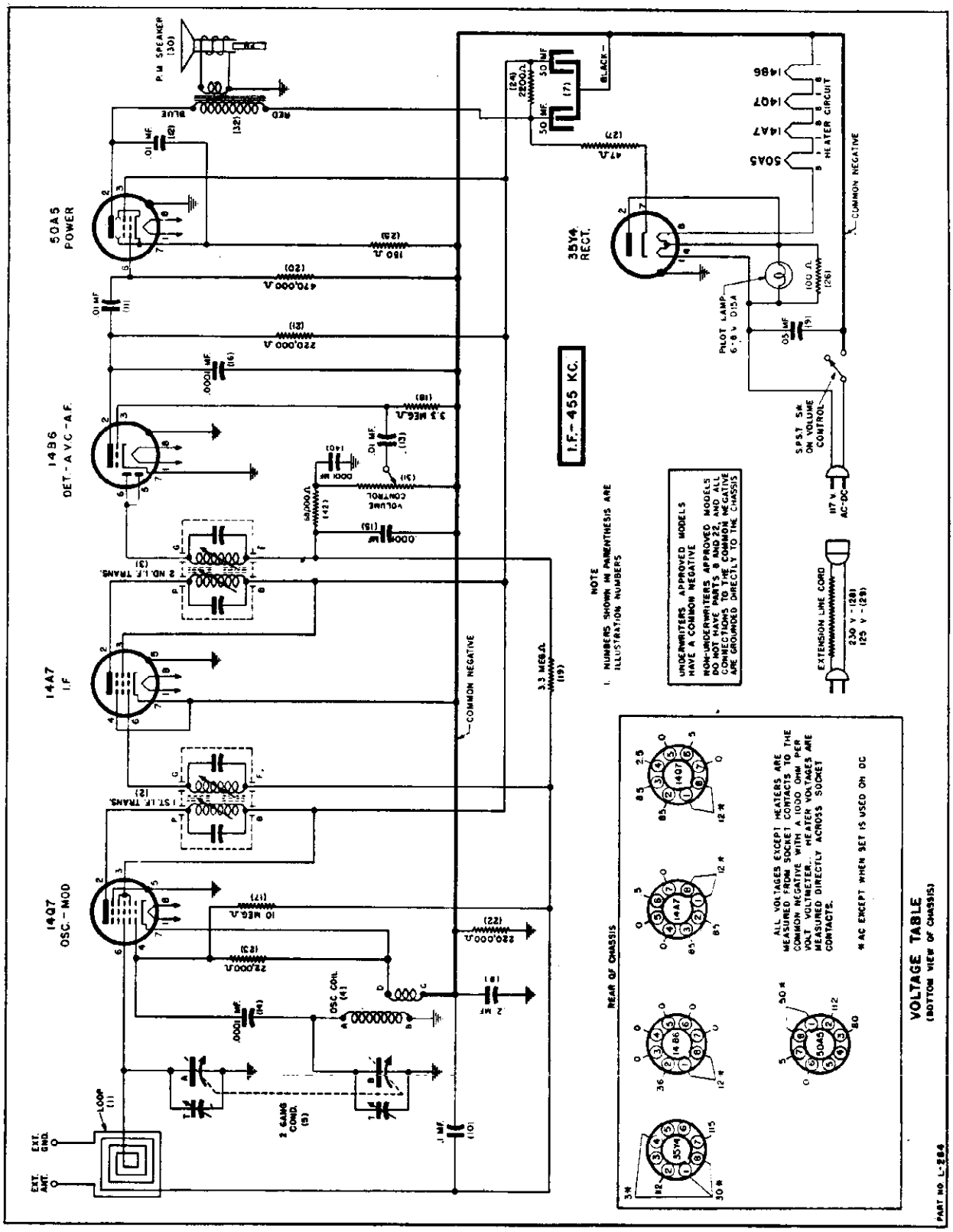




NOTE-PART NO. 34 IS OMITTED ON UNDERWRITERS APPROVED MODELS. PARTS NOS. 8 AND 22 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS. SEE WIRING DIAGRAM.

MODELS L-284I, L-284NA, L-284NI, L-284NR, L-284W

SENTINEL RADIO CORP.



ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

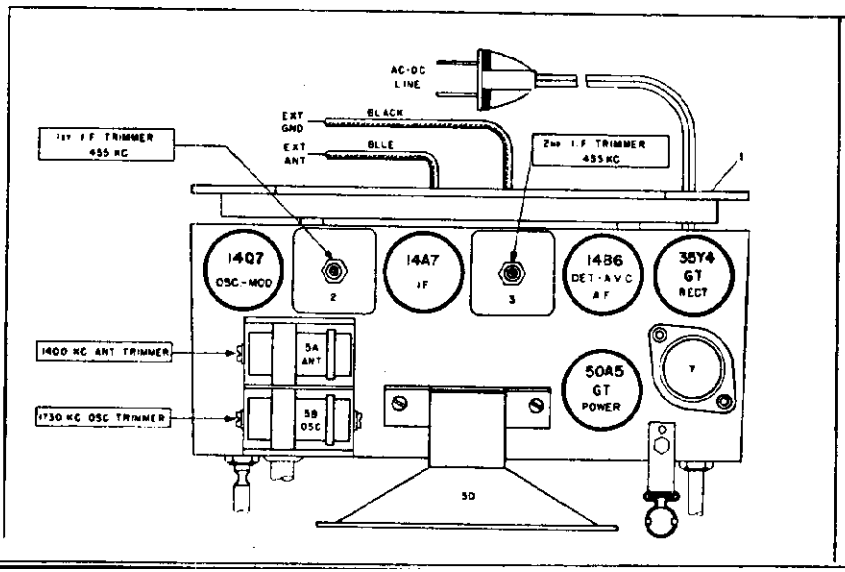
Before starting alignment:

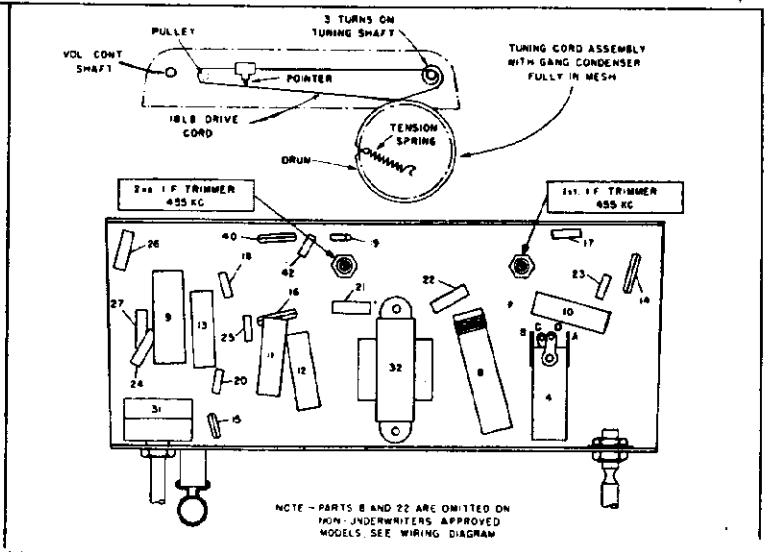
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.





PARTS LIST

MODEL L-284W, L-284I, L-284NI, L-284NA, L-284NR

Ill. No.	Part No.	Part Name	Description	List Price
1	20E24	Antenna	Loop	$1.75
2	20E21 or	Coil	1st I.F. Transformer	2.75
2	20E261	Coil	1st I.F. Transformer	2.75
3	20E22 or	Coil	2nd I.F. Transformer	2.75
3	20E261-2	Coil	2nd I.F. Transformer	2.75
4	20E162	Coil	Oscillator	.95
5	24E2 or	Condenser	Tuning, 2 Gang (3 Hole Mtg.)	3.40
5	24E18	Condenser	Tuning, 2 Gang (2 Hole Mtg.)	4.00
7	25E1	Condenser	Dry Electrolytic, 50-50 Mfd. 150 V.	1.40
8	23E421	Condenser	Tubular, .2 Mfd. 400 Volts	.30
9	23E416	Condenser	Tubular, .05 Mfd. 400 Volts	.20
10	23E418	Condenser	Tubular, .1 Mfd. 400 Volts	.24
11	23E211	Condenser	Tubular, .01 Mfd. 200 Volts	.18
12	23E211	Condenser	Tubular, .01 Mfd. 200 Volts	.18
13	23E211	Condenser	Tubular, .01 Mfd. 200 Volts	.18
14	23E39	Condenser	Mica, .0001 Mfd.	.25
15	23E39	Condenser	Mica, .0001 Mfd.	.25
16	23E39	Condenser	Mica, .0001 Mfd.	.25
17	27E106	Resistor	Carbon, 10 Megohm 1/3 Watt	.07
18	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt	.07
19	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt	.07
20	27E474	Resistor	Carbon, 470,000 Ohm 1/3 Watt	.07
21	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt	.08
22	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt (Und. Appd. Only)	.08
23	27E223	Resistor	Carbon, 22,000 Ohm 1/3 Watt	.08
24	27E222-3	Resistor	Carbon, 2,200 Ohm 1 Watt	.14
25	27E151	Resistor	Carbon, 150 Ohm 1/3 Watt	.08
26	27E101	Resistor	Carbon, 100 Ohm 1/3 Watt	.08
27	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt	.08
28		Resistor	230 Volt Extension Line Cord Used in models not Underwriters Apprd.	
29		Resistor	125 Volt Extension Line Cord Used in models not Underwriters Apprd.	
30	1E9	Speaker	5" PM	4.40
31	28E1	Volume Control	With S.P.S.T. Switch	.75
32	22E2	Transformer	Output for Speaker	1.75
40	23E39	Condenser	Mica, .0001 Mfd.	.25
42	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 Watt	.06

MISCELLANEOUS PARTS

Part No.	Part Name	Description	List Price
7E31-1	Cabinet	Walnut Plastic	$3.35
7E31-2	Cabinet	Ivory Plastic	4.85
7E1-1	Cabinet	Amber Catalin	17.00
7E1-5	Cabinet	Ivory Catalin	17.00
7E1-6	Cabinet	Red Catalin	17.00
7E70	Cabinet Back	For Catalin Cabinet	.20
7E32	Cabinet Back	For Walnut & Ivory Plastic Cabinets	.15
41E1	Cord	6 Ft. Rubber Line Cord	.40
20E12	Dial Plate Assem.	Dial Back Plate Assem. Less Scale	.70
4E1	Dial Cord	30" of 18 Lb. Dial Drive Cord	.15
9E2	Dial Crystal	Acetate Dial Crystal	.45
36E10	Dial Scale	Calibrated Scale	.65
20E225-3	Dial Shaft Assembly	Dial Drive Shaft with "C" Washer, Bearing & Lock Nut	.40
35E8	Dial Pointer	Dial Indicator	.10
65E2	Dial Spring	Tension Spring For Drive Cord, set	.02
37E17-1	Knob	For Walnut Cabinet	.10
37E17-3	Knob	For Ivory Cabinet	.10
37E29-4	Knob	For Catalin Cabinet	.40
20E43	Pilot Lamp Socket	Pilot Lamp Socket Assembly	.25
40E1	Pilot Lamp	6-8 Volt .150 Amp. Type 47 Lamp	.10

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON EITHER: 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC) OR 110-120 VOLTS DIRECT CURRENT (DC). IF THE RADIO DOES NOT OPERATE AFTER APPROXIMATELY ONE MINUTE, REMOVE THE PLUG ON THE END OF THE RADIO LINE CORD FROM THE POWER RECEPTACLE, TURN IT HALF WAY AROUND AND RE-INSERT IT INTO THE RECEPTACLE.

DIAL LIGHT

IT IS NORMAL FOR THE DIAL LIGHT TO BE DIM FOR APPROXIMATELY 60 SECONDS AFTER SET IS TURNED "ON" AND THEN ATTAIN NORMAL BRILLIANCE --ALSO, ON VERY LOUD SIGNALS THE LIGHT MAY FLUCTUATE.

ALWAYS USE A 6.3 VOLT .150 AMPERE DIAL LIGHT.

MODEL 247

PARTS LIST

Illus. No.	Part No.	Part Name	Description	List Price
1	13275	Antenna	Loop Assembly Mounted in Lid Cover Mention Color of Cabinet.	$1.50
2	13282	Coil	First I.F. Transformer	1.25
3	13288	Coil	Second I.F. Transformer	1.25
4	†13281	Coil	Oscillator	.85
5	13143	Condenser	Tuning (2 Gang)	1.90
6	12955	Condenser	Tubular Dry Elec. 40-40 Mfd. 150 V.	.75
7	13148	Condenser	Tubular Dry Elec. 80 Mfd. 16 Volt	.85
8	12958	Condenser	Tubular .1 Mfd. 120 Volt	.19
9	12959	Condenser	Tubular .1 Mfd. 120 Volt	.19
10	12960	Condenser	Tubular .1 Mfd. 120 Volt	.19
11	12290	Condenser	Tubular .1 Mfd. 120 Volt	.19
12	12961	Condenser	Tubular .01 Mfd. 120 Volt	.19
13	12291	Condenser	Tubular .01 Mfd. 420 Volt	.19
14	6961	Condenser	Tubular .001 Mfd. 120 Volt	.18
15	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
16	12291	Condenser	Tubular .01 Mfd. 200 Volt	.19
17	12290	Condenser	Tubular .1 Mfd. 120 Volt	.19
18	1276	Condenser	Tubular .001 Mfd. 400 Volt	.18
19	6427	Condenser	Tubular .05 Mfd. 400 Volt	.18
20	6428	Condenser	Mica .00025 Mfd. + or — 20%	.21
21	6428	Condenser	Mica .00025 Mfd. + or — 20%	.21
22	7984	Condenser	Mica .0001 Mfd. + or — 20%	.21
23	†13302	Condenser	Mica .000275 Mfd. + or — 1%	.35
24	12952	Resistor	Carbon 10 Meg Ohm 1/3 Watt	.19
25	12841	Resistor	Carbon 4 Meg Ohm 1/3 Watt	.19
26	12841	Resistor	Carbon 4 Meg Ohm 1/3 Watt	.19
27	12841	Resistor	Carbon 4 Meg Ohm 1/3 Watt	.19
28	12234	Resistor	Carbon 3 Meg Ohm 1/3 Watt	.19
29	12959	Resistor	Carbon 1 Meg Ohm 1/3 Watt	.19
30	12948	Resistor	Carbon 75,000 Ohm 1/3 Watt	.19
31	12949	Resistor	Carbon 75,000 Ohm 1/3 Watt	.19
32	12950	Resistor	Carbon 25,000 Ohm 1/3 Watt	.19
33	12954	Resistor	Carbon 10,000 Ohm 1/3 Watt	.19
34	13188	Resistor	Carbon 900 Ohm 1/3 Watt	.19
35	12960	Resistor	Carbon 900 Ohm 1/3 Watt	.19
36	13185	Resistor	Carbon 1,000 Ohm 1/3 Watt	.19
37	*13148	Resistor	Wire Wound 800 Ohms	.90
37	‡13864	Resistor	Wire Wound 1220 & 1400 Ohm	.55
38	†15288	Resistor	Carbon 420 Ohm ½ Watt	.19
38	13150	Resistor	Wire Wound 1,400 Ohm	.55
40	15247	Resistor	Line Cord Assembly (825 Ohm)	1.00
41	12866A	Speaker	P. M. (8½")	2.00
42	13145	Switch	Changeover	1.10
43	12880	Switch	Snap	.25
44	13141	Transformer	Output	
45	13144	Volume Control		.75

MISCELLANEOUS PARTS

Part No.	Part Name	Description	List Price
13148	Arm	For Voltage Selector Switch	$0.10
12864	Bat. Connectors	B— & B+ Dot Snapper "B" Connectors (Set of Two)	.10

Part No.	Part Name	Description	List Price
13152	Battery Spring	"A" Battery Contacts	.05
13102	Button Plug	Metal Plug for Cabinet Hook	.05
	Cabinet	Complete Cabinet Less Lid Assembly	2.75
	Cabinet Top	Top Section of Cabinet Only	1.00
	Cabinet Bottom	Bottom Section of Cabinet Only	1.40
12735	Chassis Plate	Metal Bottom Plate	.10
10035	Chassis Fastener	Trimount Studs for Metal Bottom Plate (Pkg. of 12)	.10
	Handle	For Cabinet	.35
12741	Handle Ring	For Attaching Handle to Cabinet (Pkg. of 2)	.10
12795	Knob Pointer	Dial Indicator	.15
12796	Knob	For Tuning	.15
12851	Knob	For Volume	.15
12886	Latch Lift	Latch Lift Plate	.05
12815	Latch Bar	Latch Lift Bar	.06
13758	Lock Assembly	Lock Used to Hold Two Halves of Cabinet Together	.15
10064	Loop Jack	External Loop Jack	.12
13147	Plug	Three Prong	.20
13104	Socket	Female Receptacle Used on Resistor Line Cord	.15

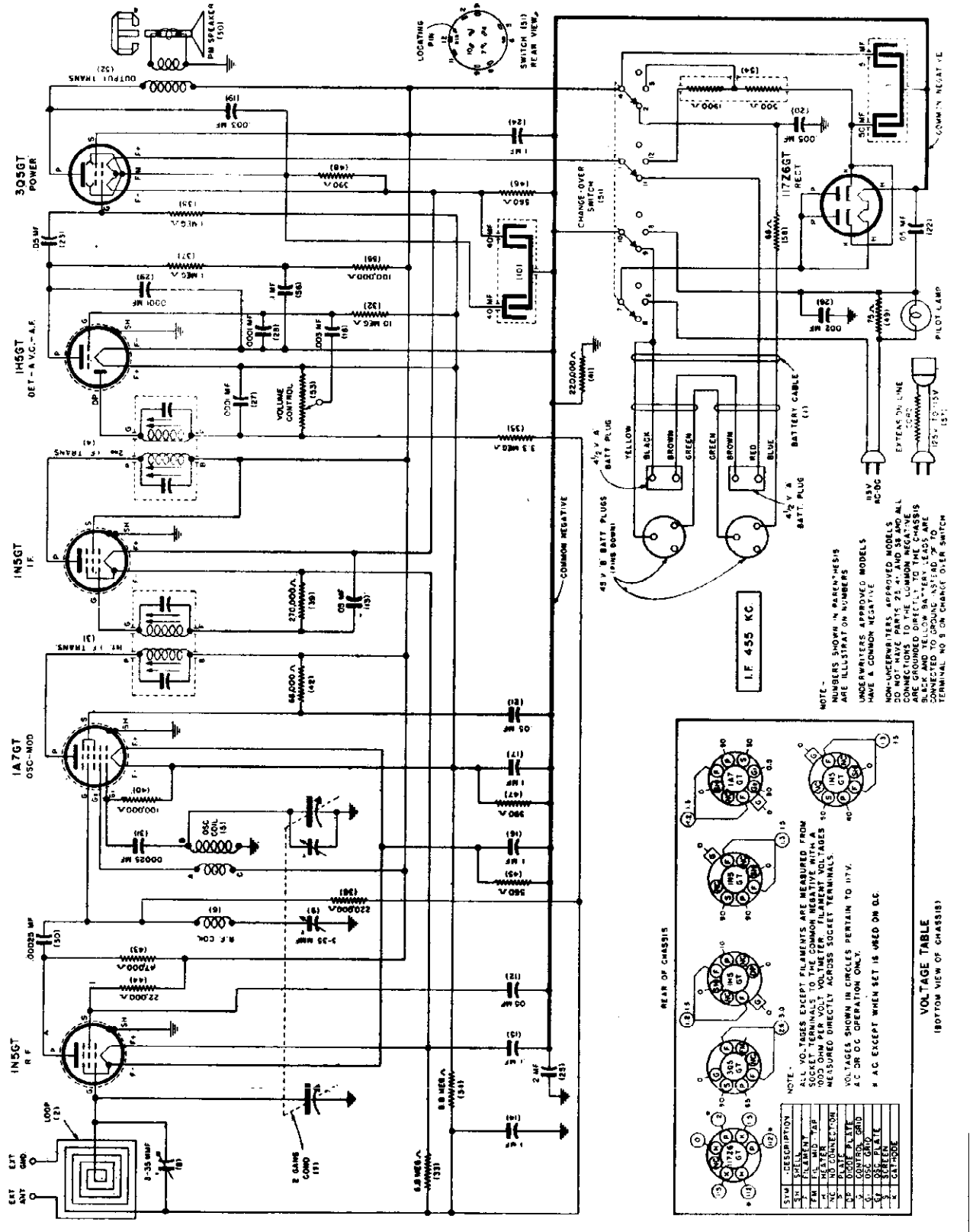
*NOTE: These resistors were used in first production only, they were replaced with 1 No. 12248 960 Ohm Wire Wound and 1 No. 13267a 270 Ohm 1 Watt Resistor.

$Part No. 13864 Wire Wound Resistor having 1220 and 1400 Ohm sections replaced No. 13148, 13266 and 13150 Resistors in latest production.

†NOTE—Replaces part No. 13142 Oscillator Coil and 13178 Mica .00024 Mfd. Padder Condenser which were used in first production. It is important to remember that the 13142 and 13281 Oscillator Coils and 13179 .00024 Mfd. and 15302 .000275 Mfd. Condenser cannot be interchanged. When 13281 Coil is used the .000275 Mfd. Padder Condenser 13302 must be used. With 13142 Oscillator Coil the .00024 Mfd. Condenser 15179 must be used. Both having part No. 13281 Oscillator Coil and 13302 Mica .000275 Condenser can be identified by the letter "A" which will be found stamped on the back of the chassis.

SENTINEL RADIO CORP.

MODELS 285P, 1028[illegible]



ALIGNMENT PROCEDURE

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. Make the adjustment marked (1) first, (2) next, (3) third, etc.

Before starting alignment:

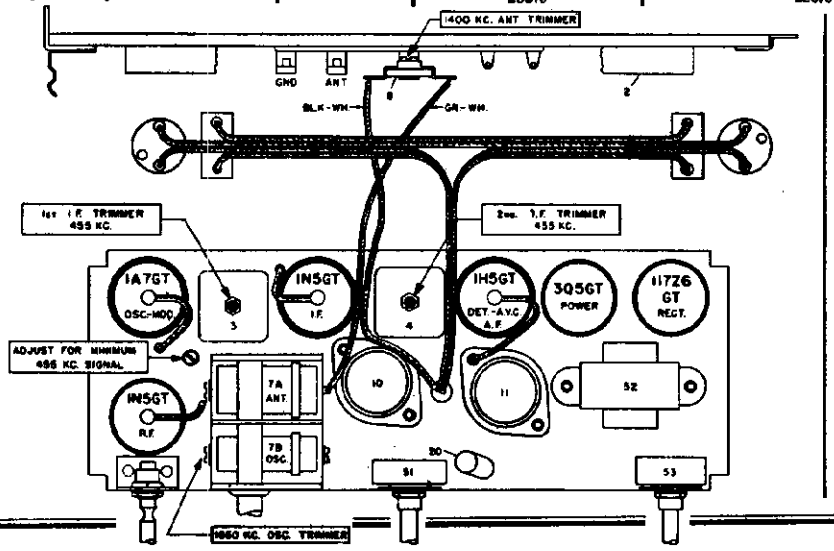
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

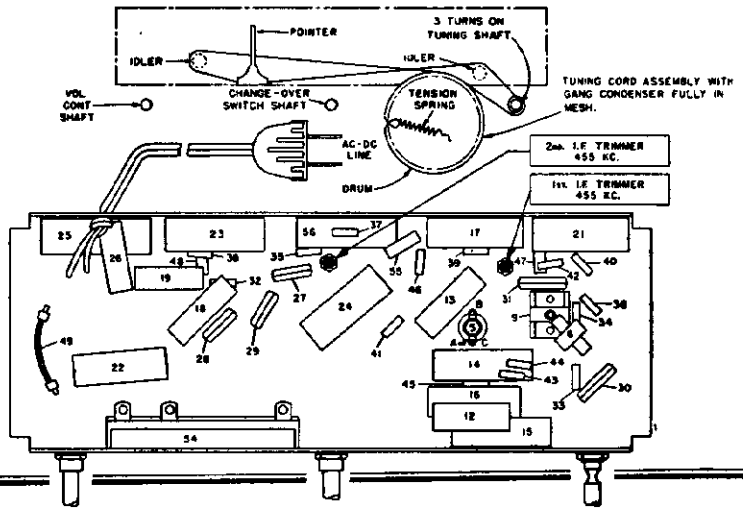
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) WHEN ADJUSTING 1650 KC OSCILLATOR TRIMMER AND 455 KC TRIMMER remove chassis from cabinet and disconnect the white-green and white-black loop connection wires from the 1400 KC loop antenna trimmer.
Attach a 1 megohm resistor across these wires and feed output of test oscillator across the 1 megohm resistor.

(d) THE 1400 KC LOOP ANTENNA TRIMMER is accessible through hole in cabinet back. It should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet and the back IN CLOSED position.
When aligning the 1400 KC trimmer connect test oscillator output to the "ANT" and "GND" clips that are attached to the inside of the cabinet back.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1A7GT tube, Low side to chassis (if non-Underwriter Approved) or Common Negative (if Underwriter Approved).	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust R. F. coil trimmer for minimum 455 K. C. signal.
3	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.			Adjust 1650 K. C. oscillator trimmer for maximum output.
4	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.





PARTS LIST

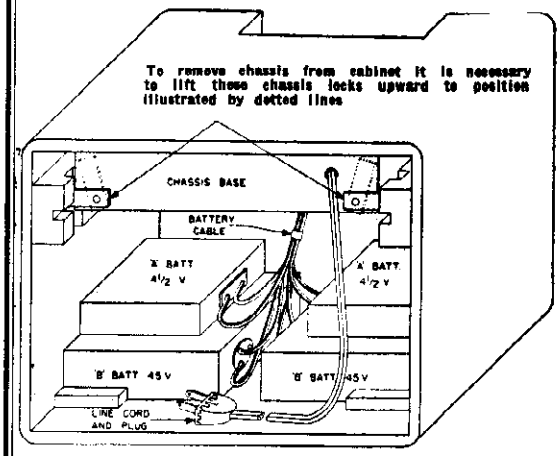
Illus. No.	Part No.	Part Name	Description
1	20E79	Cable	Battery with 2 "B" and 2 "A" Plugs
2	20E82	Coil	Honey Comb Type Loop with Back
		or	
2	20E160-1	Coil	Flat Type Loop with Back
3	20E53	Coil	1st I.F. Transformer
4	20E54	Coil	2nd I.F. Transformer
5	20E52	Coil	Oscillator
6	2E19	Coil	R. F.
7	24E2	Condenser	Tuning, 2 Gang, 2 Hole Mtg—with Pulley
		or	
7	24E18	Condenser	Tuning, 2 Gang, 3 Hole Mtg—with Pulley
8	24E3	Condenser	Trimmer, 3-35 MMF
9	24E3	Condenser	Trimmer, 3-35 MMF
10	25E4	Condenser	Dry Elec. 40-40 Mfd. 25 Volt
		or	
10	25E18	Condenser	Dry Elec. 50-50 Mfd. 150 Volt, Und. Approved Models only
11	25E1	Condenser	Dry Elec. 50-50 Mfd. 150 Volt
		or	
11	25E17	Condenser	Dry Elec. 40-40 Mfd. 25 Volt, Und. Approved Models only
12	23E216	Condenser	Tubular, .05 Mfd. 200 Volt
13	23E216	Condenser	Tubular, .05 Mfd. 200 Volt
14	23E218	Condenser	Tubular, .1 Mfd. 200 Volt
15	23E218	Condenser	Tubular, .1 Mfd. 200 Volt
16	23E218	Condenser	Tubular, .1 Mfd. 200 Volt
17	23E218	Condenser	Tubular, .1 Mfd. 200 Volt
18	23E406	Condenser	Tubular, .003 Mfd. 400 Volt
19	23E406	Condenser	Tubular, .003 Mfd. 400 Volt
20	23E408	Condenser	Tubular, .005 Mfd. 400 Volt
21	23E416	Condenser	Tubular, .05 Mfd. 400 Volt
22	23E416	Condenser	Tubular, .05 Mfd. 400 Volt
23	23E416	Condenser	Tubular, .05 Mfd. 400 Volt
24	23E418	Condenser	Tubular, .1 Mfd. 400 Volt
25	23E421	Condenser	Tubular, .2 Mfd. 400 Volt Und. App'd Only
26	23E405	Condenser	Tubular, .002 Mfd. 400 Volt

Illus. No.	Part No.	Part Name	Description
27	23E39	Condenser	Mica, .0001 Mfd.
28	23E39	Condenser	Mica, .0001 Mfd.
29	23E39	Condenser	Mica, .0001 Mfd.
30	23E42	Condenser	Mica, .00025 Mfd.
31	23E42	Condenser	Mica, .00025 Mfd.
32	27E106	Resistor	Carbon, 10 Megohm, 1/3 W.
33	27E685	Resistor	Carbon, 6.8 Megohm, 1/3 W.
34	27E685	Resistor	Carbon, 6.8 Megohm, 1/3 W.
35	27E335	Resistor	Carbon 3.3 Megohm, 1/3 W.
36	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W.
37	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
38	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
39	27E1002	Resistor	Carbon, 270,000 Ohm, 1/3 W.
40	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.
41	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W. Und. App'd Only
42	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W.
43	27E473	Resistor	Carbon, 47,000 Ohm, 1/3 W.
44	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 W.
45	27E561	Resistor	Carbon, 560 Ohm, 1/3 W.
46	27E561	Resistor	Carbon, 560 Ohm, 1/3 W.
47	27E391	Resistor	Carbon, 390 Ohm, 1/3 W.
48	27E391	Resistor	Carbon, 390 Ohm, 1/3 W.
49	27E1001	Resistor	Flexible Wire Wound 75 Ohm, 2 W.
50	1E12	Speaker	5" PM
51	29E5	Switch	Changeover
52	22E9	Transformer	Output
		or	
52	22E7	Transformer	Output—Und. Approved Models only.
53	28E6	Volume Control	1 Megohm
		or	
53	28E12	Volume Control	1 Megohm—Und. Approved only
54	27E1000	Resistor	Fixed Wire Wound 2 Sect. Candohm
55	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.
56	23E218	Condenser	Tubular, .1 Mfd. 200 Volt
58	27E680	Resistor	Carbon 68 Ohm 1/3 W.

MISCELLANEOUS PARTS

Part No.	Part Name	Description
20E79	Battery Cable	Complete with "A" & "B" Batt. Plugs
17E3-2	"A" Battery Plug	2 Prong "A" Battery Plug
17E3-5	"B" Battery Plug	3 Prong "B" Battery Plug
7E43-1	Cabinet	Complete Cabinet, less Back
7E44-1	Cabinet Back	Back only, for Honey-Comb Type Loop
7E87-1	Cabinet Back	Back only, for Flat Type Loop
20E78	Dial Plate Assem.	Dial Back Plate
9E4	Dial Crystal	Acetate Crystal
4E1	Dial Cord	18 lb. Dial Drive Cord

Part No.	Part Name	Description
48E1	Dial Escutcheon	Plastic Escutcheon
36E15	Dial Scale	Calibrated Dial Scale
65E2	Dial Spring	Tension Spring for Drive Cord
68E5	Dial Shaft	Dial Drive Shaft
35E10	Dial Pointer	For Dial
37E21-1	Knob	
37E21-3	Knob	Marked "AC-DC-OFF-BATT"
20E25	Pilot Lamp Socket	Pilot Lamp Socket Assembly
40E2	Pilot Lamp	6-8 Volt .250 Amp. Type No. 44 Lamp



TO INSTALL BATTERIES, OPEN CABINET BACK AND PLACE BATTERIES AS SHOWN.

FOR AC/DC OPERATION, BRING LINE CORD THROUGH OPENING IN RIGHT SIDE OF CABINET BACK.

ALWAYS KEEP BACK CLOSED.

ELECTRIC OPERATION

To operate the receiver on 110 to 120 Volt direct current or 110 to 120 Volt, 50 to 60 Cycle, alternating current:

(A) Open hinged cabinet back outward by pulling on the tab attached to the right side of the back, then take out the power line cord, and reclose back.

(B) Insert line cord plug into 110 to 120 Volt AC or DC electric power outlet.

(C) Turn voltage selector knob to center "AC-DC" position.

If the current supply is DIRECT CURRENT and the radio does not play after it has been turned on for approximately one minute, reverse radio plug connection at electric power receptacle.

INSTALLATION OF REQUIRED BATTERIES

Diagram shows proper location and connections of the following required types of batteries.

2 Sentinel number 38A 4½ Volt "A" Batteries or equivalent such as Ray-O-Vac type 83A, etc.

2 Sentinel number 3870 45 Volt "B" Batteries or equivalent such as Ray-O-Vac type 7830.

POWER SUPPLY

THIS RADIO CAN BE OPERATED ON EITHER:

110 TO 120 VOLTS DIRECT CURRENT

OR

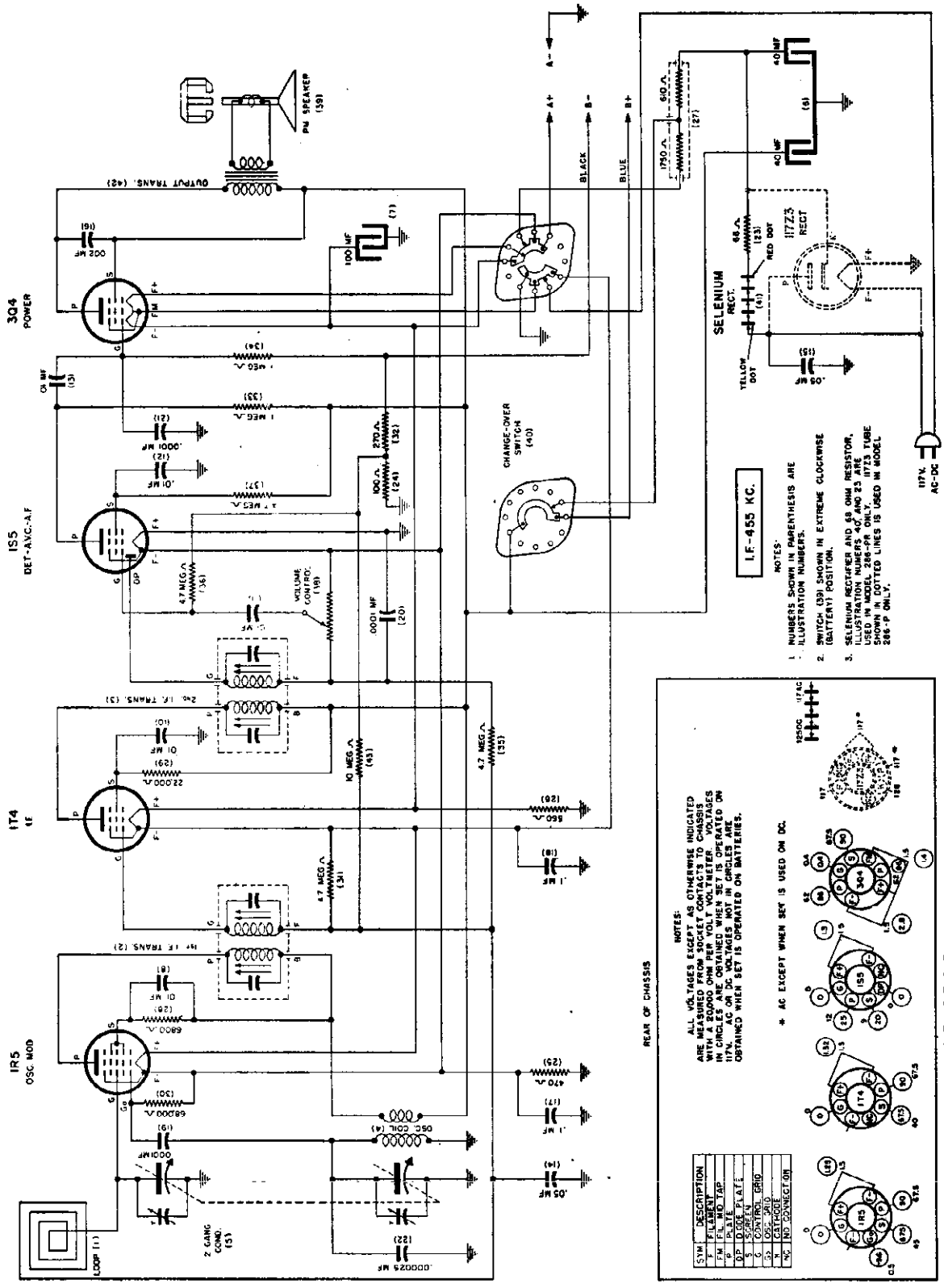
110 TO 120 VOLT, 50 TO 60 CYCLE ALTERNATING CURRENT

OR

BATTERIES—2 - 4½ VOLT "A" AND 2 - 45 VOLT "B"

MODELS 286P,286PR

SENTINEL RADIO CORP.



ALIGNMENT PROCEDURE

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. Make the adjustment marked (1) first, (2) next, (3) third.

ALWAYS HAVE METAL BOTTOM PLATE MOUNTED ON CHASSIS WHEN ALIGNING SET.

Before starting alignment:

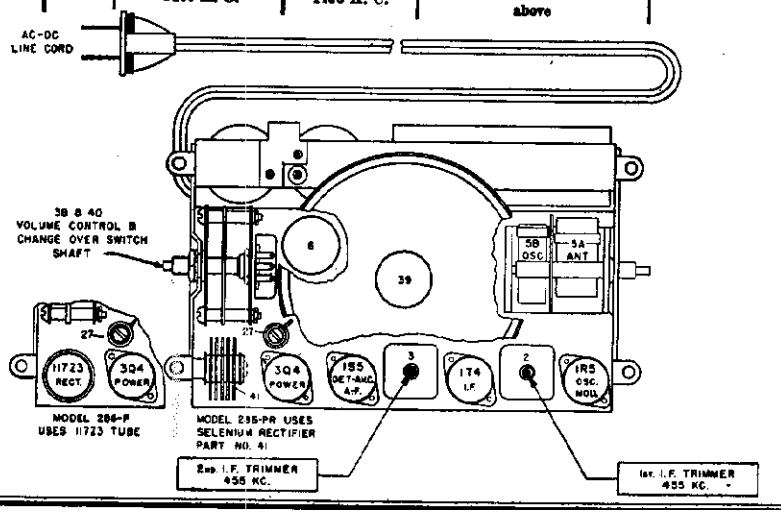
(A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the bottom edge of the large 5 in the 55 calibration number at the low frequency end of the dial scale. If dial indicator does not point exactly to the bottom edge of the large 5, move knob to correct position.

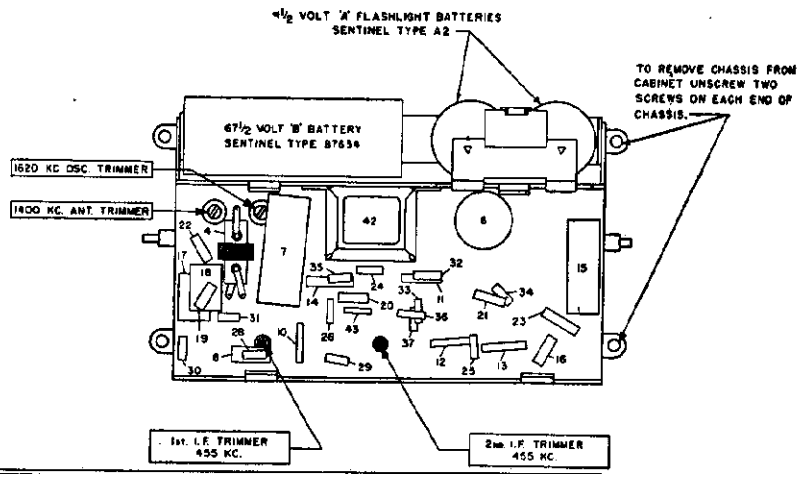
(B) Use an accurately calibrated test oscillator with some type of output measuring device.

(C) WHEN ADJUSTING THE 1620 KC OSCILLATOR TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the loop. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.

(D) THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet, and the loop in an upright position. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1R5 tube. Low side to chassis.	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to minimum capacity	Exactly 1620 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust 1620 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.





MODELS 286P, 286PR

SENTINEL RADIO CORP.

PARTS LIST

Illus. No.	Part No.	Part Name	Description	List Price
1	20E134	Antenna	Loop with Cabinet Lid Assem.	$3.55
2	20E125	Coil	1st I.F. Transformer	3.00
3	20E125	Coil	2nd I.F. Transformer	3.00
4	20E127	Coil	Oscillator	1.00
5	24E20	Condenser	Tuning, 2 Gang	3.40
6	25E13	Condenser	Tubular, Dry Elect. 40-40 Mfd. 150 Volt	1.15
7	25E12	Condenser	Tubular, Dry Elect. 100 Mfd. 10 Volt	.80
8	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.	.40
10	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.	.40
11	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.	.40
12	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.	.40
13	23E2004-5	Condenser	Tubular, .01 Mfd. 150 V.	.40
14	23E2004-7	Condenser	Tubular, .05 Mfd. 150 V.	.40
15	23E416	Condenser	Tubular, .05 Mfd. 400 V.	.25
16	23E2004-2	Condenser	Tubular, .002 Mfd. 150 V.	.40
17	23E2004-8	Condenser	Tubular, .1 Mfd. 150 V.	.45
18	23E2004-8	Condenser	Tubular, .1 Mfd. 150 V.	.45
19	23E9	Condenser	Mica, .0001 Mfd.	.20
20	23E9	Condenser	Mica, .0001 Mfd.	.20
21	23E9	Condenser	Mica, .0001 Mfd.	.20
22	23E8	Condenser	Mica, .000025 Mfd.	.23
23	27E680-2	Resistor	Carbon, 68 Ohm 1/2 W. (used in Model 286PR only)	.0743
24	27E101-7	Resistor	Carbon, 100 Ohm, 1/4 W.	.07
25	27E471-7	Resistor	Carbon, 470 Ohm, 1/4 W.	.06
26	27E561-7	Resistor	Carbon, 560 Ohm, 1/4 W.	.06
27	27E1003	Resistor	Wire Wound 1750 and 610 Ohms, 7 W.	.85
28	27E682-7	Resistor	Carbon, 6,800 Ohm, 1/4 W.	.06
29	27E223-7	Resistor	Carbon, 22,000 Ohm, 1/4 W.	.06
30	27E683-7	Resistor	Carbon, 68,000 Ohm, 1/4 W.	.06
31	27E475-7	Resistor	Carbon, 4.7 Megohm, 1/4 W.	.06
32	27E271-7	Resistor	Carbon, 270 Ohm, 1/4 W.	.06
33	27E105-7	Resistor	Carbon, 1 Meg Ohm, 1/4 W.	.06
34	27E105-7	Resistor	Carbon, 1 Meg Ohm, 1/4 W.	.06
35	27E475-7	Resistor	Carbon, 4.7 Meg Ohm, 1/4 W.	.06
36	27E475-7	Resistor	Carbon, 4.7 Meg Ohm, 1/4 W.	.06
37	27E475-7	Resistor	Carbon, 4.7 Meg Ohm, 1/4 W.	.06
38	28E14	Vol. Control	2 Megohm	.80
39	1E19	Speaker	4 Inch P.M.	4.00
40	29E11	Switch	Power Selector	2.25
41	57E1 OR	Rectifier	Selenium (Used in Model 286PR only)	2.00
41	57E1-4	Rectifier	Selenium (Round Type) used in Model 286PR only	2.00
42	22E16	Transformer	Output	2.25
43	27E106-7	Resistor	Carbon, 10 Megohm, 1/4 W.	.06

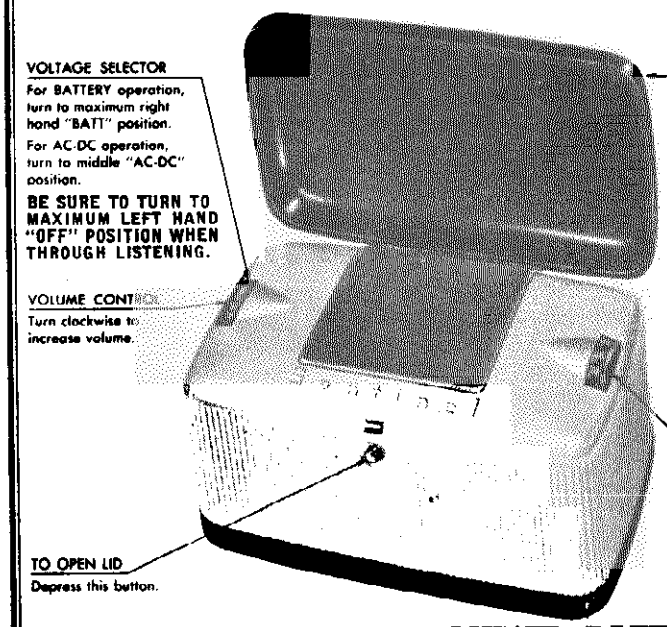
MISCELLANEOUS PARTS

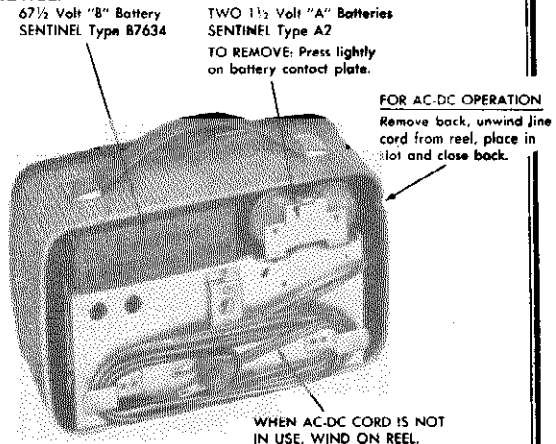
Part No.	Part Name	Description	List Price
20E128	"A" Batt. Con. Bracket Assembly	With 4 No. 10E43 Trimount Studs	.60
20E130-1	Cab. Assembly	Complete Cabinet Assembly with Lid & Loop, Handle, Lid Catch & Push Button Assembly & Bottom Assembly	9.00
20E134	Cab. Lid. Assembly	Lid Assembly with Loop and Hinges	3.55
20E135-1	Cab. Bottom	Bottom Assem. with Locking Slotted Head Stud	2.10
30E25-1	Cab. Center Section	Less Lid and Bottom Assemblies, with Handle, Sptr. Screen, Lid Catch & Push Button	4.30
20E131	Chassis Plate	Bottom Shield Plate for Chassis	.85
20E136-1	Hinge	Hinge & Spring Assembly with 2 No. 82E36-F10 No. 4 24x1/4 Mtg. Screws	.40
37E44-1	Knob	Calibrated Dial Knob	.88
37E34-1	Knob	"Off-AC-DC-Batt."	.85
37E32-1	Knob	Tuning and Volume Knobs	.53
20E129	"B" Batt. Connector	B— and B+ Batt. Connector Assembly	.50

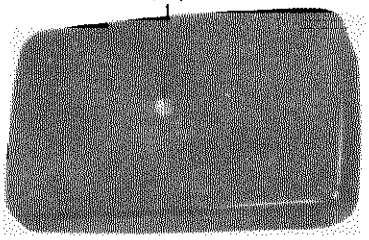
HARDWARE

			List Price
15E41	Lid Catch Bracket	Bracket for Mounting Lid Catch, With 2 No. 82E3-F10 Screws	.12
20E138	Lid Catch	Lid Catch with Screw	.25
37E36-1	Lid Catch Button	Button for Lid Catch with No. 13E3-F10 No. 4 40x1/4 Hex Screw and No. 11E3-F10 Lockwasher	.14
55E22-1	Handle	Leather	.50
55E21-1	Handle Bracket	Bracket for Mounting Handle	.25
71E42-F10	Screw	No. 4 40x3/16 Slot B.H.I.M.	.30/C
78E142-F50	Screw	No. 2 56x3/16 Rec. Oval Hd. B.M.	1.25/C
82E3-F10	Screw	No. 4 24x1/4 Rec. Hd. Type 25	.93/C
82E36-F10	Screw	No. 6 20x5/16 Rec. Hd. Type 25	2.25/C
10E41	Stud	Trimount for Mounting Chassis Bottom Shield	1.15/C
10E43	Stud	Trimount for Mounting "A" Batt. Contact Brkt. Assem.	1.15/C
65E8	Spring	Lid Index Spring	.09
66E12-1	Screen	Speaker Screen Grille	.60

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.







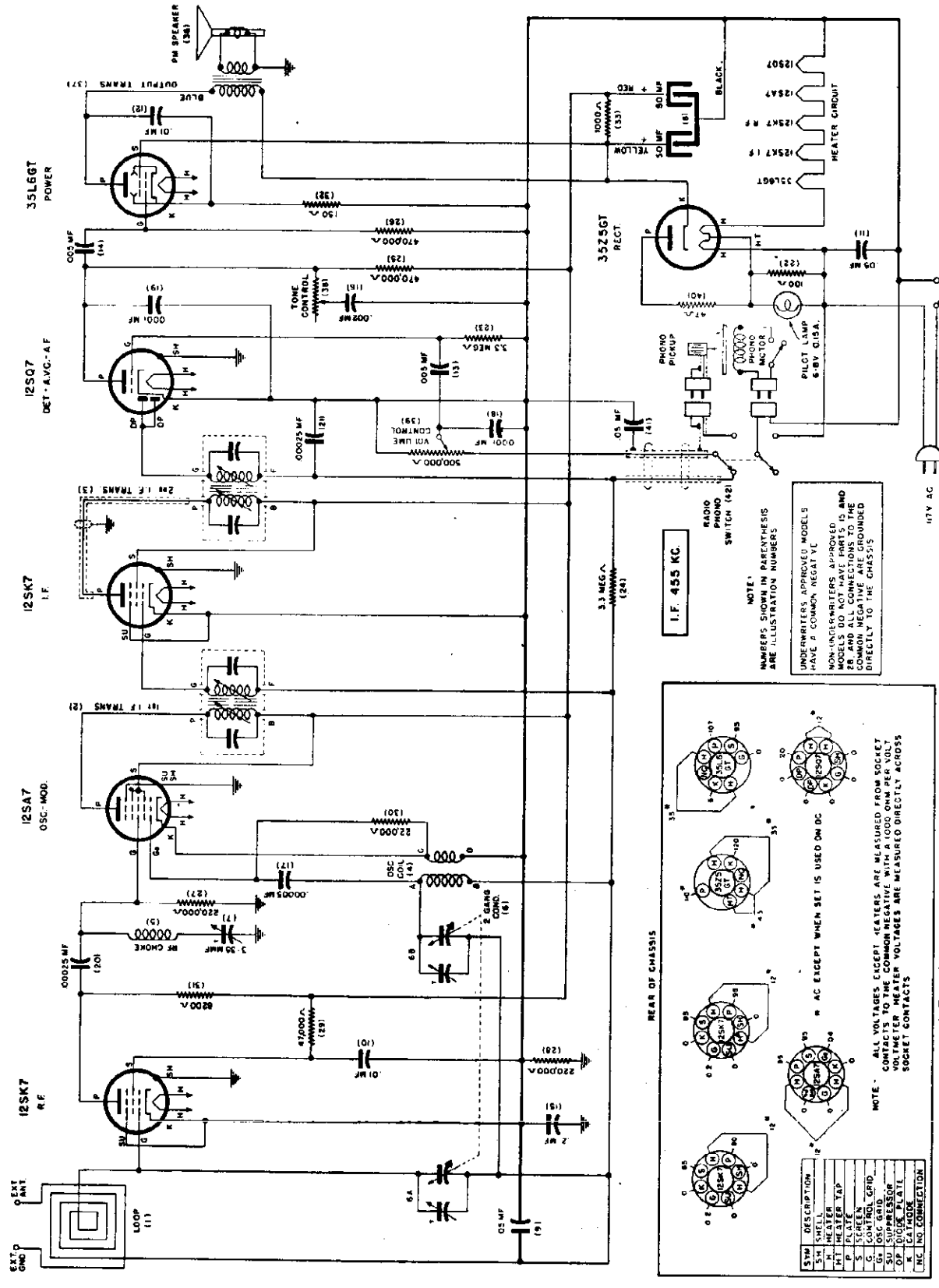
INSTALLATION OF REQUIRED BATTERIES

Diagram shows proper location and connections of the following required types of batteries:

Two SENTINEL, Type A2, 1½ Volt "A" batteries, or equivalent, such as Ray-O-Vac Type No. 2, Eveready 750, etc.

One SENTINEL Type B7634, 67½ Volt "B" battery, or equivalent, such as Ray-O-Vac Type 4367, Eveready 467, etc.

SENTINEL RADIO CORP. MODELS 293CT, 1U293CT

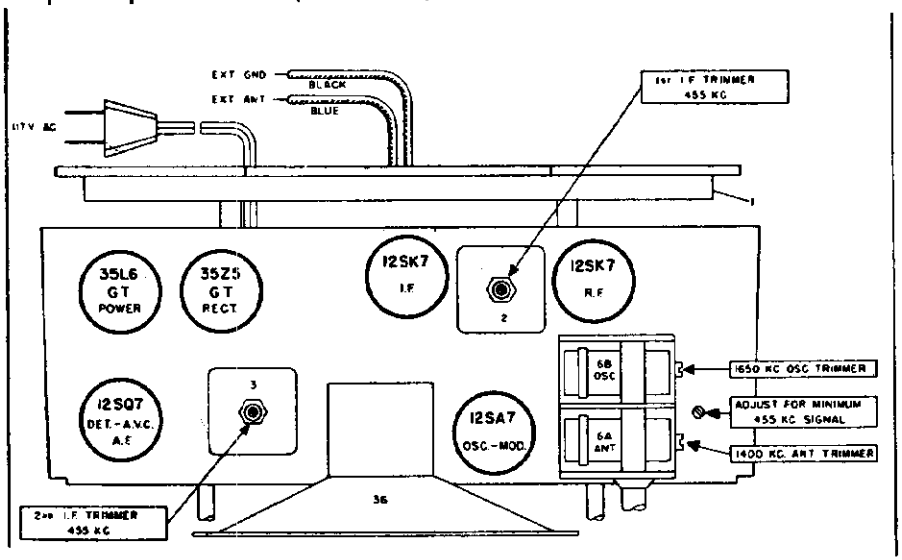


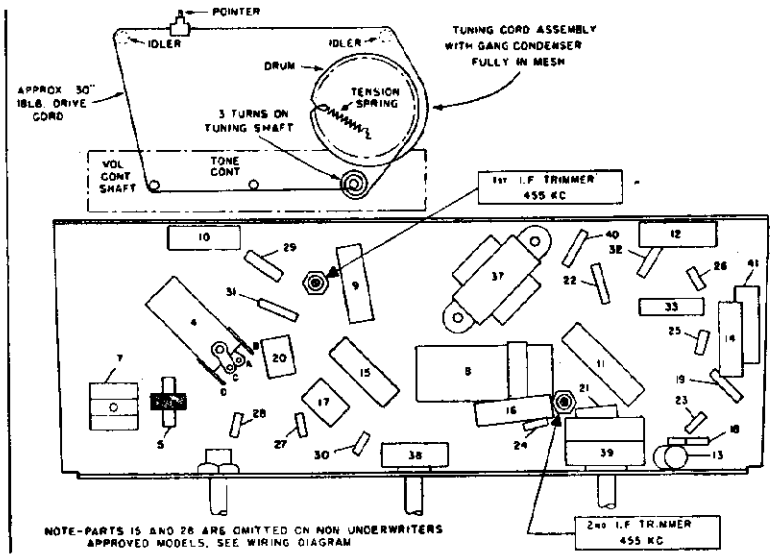
ALIGNMENT PROCEDURE

For Alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.
IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET. BE SURE THAT IT DOES NOT MOVE WHILE ALIGNING.

When adjusting 1650 kilocycle oscillator trimmer, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, connect test oscillator to loop external antenna and ground connections with a .0002 Mfd. condenser in series with antenna lead.

Steps	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:
	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 12SA7 tube. Low side to chassis (if Model 293CT) or Common Negative (if Model 1U-293CT).	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
1	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust R. F. coil trimmer for minimum 455 K. C. signal.
2	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1400 K. C. antenna trimmer for maximum output.





RADIO PARTS LIST — MODEL 293-CT, 1U-293-CT

Illus. No.	Part No.	Part Name	Description	List Price
1	20E67	Antenna	Antenna Loop & Mounting Assembly	$1.70
2	20E21	Coil	1st I. F. Transformer	2.75
	or			
2	20E261	Coil	1st I. F. Transformer	2.75
3	20E22	Coil	2nd I. F. Transformer	2.75
	or			
3	20E261-2	Coil	2nd I. F. Transformer	2.75
4	20E64	Coil	Oscillator	1.10
5	2E19	Coil	R. F. Choke	.65
6	24E8	Condenser	Tuning, 2 Gang	3.50
	or			
6	24E6	Condenser	Tuning, 2 Gang	3.50
7	24E3	Condenser	Trimmer, (3-35 MMF Working)	.32
8	25E6	Condenser	Tubular, Dry Elect. 50-50 Mfd. 150 V.	1.15
9	23E216	Condenser	Tubular, .05 Mfd. 200 V.	.18
10	23E211	Condenser	Tubular, .01 Mfd. 200 V.	.18
11	23E416	Condenser	Tubular, .05 Mfd. 400 V.	.20
12	23E411	Condenser	Tubular, .01 Mfd. 400 V.	.18
13	23E408	Condenser	Tubular, .005 Mfd. 400 V.	.18
14	23E408	Condenser	Tubular, .005 Mfd. 400 V.	.18
15	23E421	Condenser	Tubular, .2 Mfd. 400 V. [1U293CT Only]	.30
16	23E405	Condenser	Tubular, .002 Mfd. 400 V.	.18
17	23E37	Condenser	Mica, .00005 Mfd.	.22
18	23E39	Condenser	Mica, .0001 Mfd.	.25
19	23E39	Condenser	Mica, .0001 Mfd.	.25
20	23E42	Condenser	Mica, .00025 Mfd.	.25
21	23E42	Condenser	Mica, .00025 Mfd.	.25
22	27E101-2	Resistor	Carbon, 100 Ohm 1/2 W.	.08
23	27E335	Resistor	Carbon, 3.3 Megohm 1/3 W.	.07
24	27E335	Resistor	Carbon, 3.3 Megohm 1/3 W.	.07
25	23E474	Resistor	Carbon, 470,000 Ohm 1/3 W.	.07
26	27E474	Resistor	Carbon, 470,000 Ohm 1/3 W.	.07
27	27E224	Resistor	Carbon, 220,000 Ohm 1/3 W.	.08
28	27E224	Resistor	Carbon, 220,000 Ohm 1/3 W. [1U-293CT Only]	.08
29	27E473	Resistor	Carbon, 47,000 Ohm 1/3 W.	.07
30	27E223	Resistor	Carbon, 22,000 Ohm 1/3 W.	.08
31	27E822	Resistor	Carbon, 8,200 Ohm 1/3 W.	.07
32	27E151	Resistor	Carbon, 150 Ohm 1/3 W.	.08
33	27E103-3	Resistor	Carbon, 1,000 Ohm 1 W.	.11
36	1E1	Speaker	4" x 6" Elliptical P. M. (less Transformer	4.00
37	22E8	Transformer	Output for Speaker.	1.70
38	28E8	Tone Control		.60
39	28E7	Volume Control	500,000 Ohm, with S.P.S.T. Switch	.80
40	27E470-2	Resistor	Carbon, 47 Ohm 1/2 W.	.08
41	23E416	Condenser	Tubular, .05 Mfd. 400 V.	.20
42	20E203	Switch	Radio Phono, D.P.D.T.	.70

MISCELLANEOUS PARTS

Part No.	Part Name	Description	List Price
40E1	Bulb	6-8 Volt, .150 Amp. Dial Light, #47	$ .10
65E2	Dial Cord Spring	Tension Spring	Net .02
4E1	Dial Cord	30" of 18 lb. Drive Cord	.15
20E225-7	Dial Shaft Assem.	Dial Drive Shaft, with "C" Washer, Bearing & Lock Nut	.40
20E65	Dial Back Plate	Backplate Assembly less Calibrated Scale	.90
36E16	Dial Scale	Calibrated Glass Scale	$ .60
35E13	Dial Pointer	Dial Indicator	.15
37E21-17	Knob		.10
20E184-1	Socket Assem.	2-Contact, for Phono Motor	.55
20E185-1	Socket Assem.	4-Contact, for Phono-Pick Up	.64

GROUND

When a regular aerial is used, best results will be obtained with a ground attached to the black lead coming out of the rear of the chassis.

WARNING—DO NOT ATTACH A GROUND DIRECT TO THE RADIO CHASSIS OR RECORD CHANGER. Any external ground connection to any metal part of the chassis or record changer may cause a short and possible damage.

FUNCTION OF CONTROLS

THE LEFT HAND KNOB controls the volume control and off-and-on switch.

THE RIGHT HAND KNOB is the station selector.

THE CENTER KNOB is the tone control.

THE "PHONO-RADIO" SWITCH is located in the lower left hand corner of the record-changer compartment.

MODEL 284GA, 1U284GA

PARTS LIST

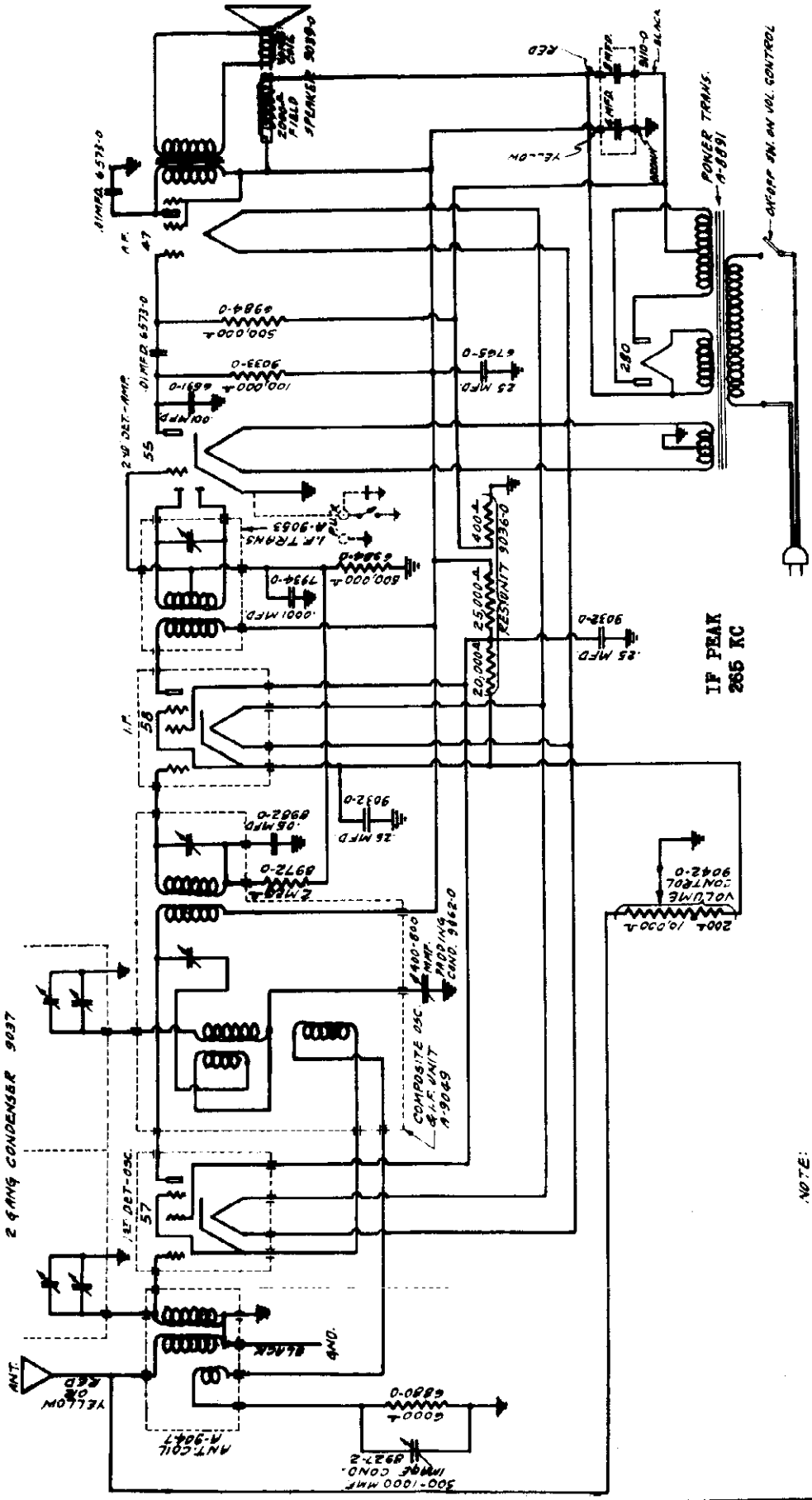
Illus. No.	Part No.	Part Name	Description
1	20E24	Antenna	Loop
2	20E21 OR	Coil	1st I.F. Trans.
2	20E261	Coil	1st. I.F. Trans.
3	20E22 OR	Coil	2nd I.F. Trans.
3	20E261-2	Coil	2nd I.F. Trans.
4	20E162	Coil	Oscillator
5	24E2 OR	Condenser	Tuning, 2 Gang (3 Hole Mtg.)
5	24E18	Condenser	Tuning, 2 Gang (2 Hole Mtg.)
7	25E1 OR	Condenser	Dry Elect. (50-50 Mfd.) 150 V.
7	25E18	Condenser	Dry Elect. (50-50 Mfd.) 150 V. Und. App'd only
8	23E421	Condenser	Tubular, .2 Mfd. 400 V.
9	23E416	Condenser	Tubular, .05 Mfd. 400 V.
10	23E418	Condenser	Tubular, .1 Mfd. 400 V. (Und. App'd only)
11	23E211	Condenser	Tubular, .01 Mfd. 200 V.
12	23E414	Condenser	Tubular, .03 Mfd. 400 V.
13	23E211	Condenser	Tubular, .01 Mfd. 200 V.
14	23E39	Condenser	Mica, .0001 Mfd.
15	23E39	Condenser	Mica, .0001 Mfd.
16	23E39	Condenser	Mica, .0001 Mfd.
17	23E106	Resistor	Carbon, 10 Megohm 1/3 Watt
18	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt
19	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt
20	27E474	Resistor	Carbon, 470,000 Ohm 1/3 Watt
21	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt
22	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt Und. App'd only
23	27E223	Resistor	Carbon, 22,000 Ohm 1/3 Watt
24	27E222-3	Resistor	Carbon, 2,200 Ohm 1 Watt
25	27E151	Resistor	Carbon, 150 Ohm 1/3 Watt
26	27E101	Resistor	Carbon, 100 Ohm 1/3 Watt
27	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt
28	23E39	Condenser	Mica, .0001 Mfd.
29	27E683	Resistor	Carbon, 68,000 Ohm 1/3 Watt
30	1E9	Speaker	5" P. M.
31	28E1	Vol. Control	With S.P.S.T. Switch
32	22E2	Transformer	Output for Speaker
33	23E416	Condenser	Tubular, .05 Mfd. 400 V.
34	23E418	Condenser	Tubular, .1 Mfd. 400 V.
35	20E203-2 OR	Switch	Radio Phono D.P.D.T.
35	20E203-4	Switch	Radio Phono D.P.D.T. Und. App'd only

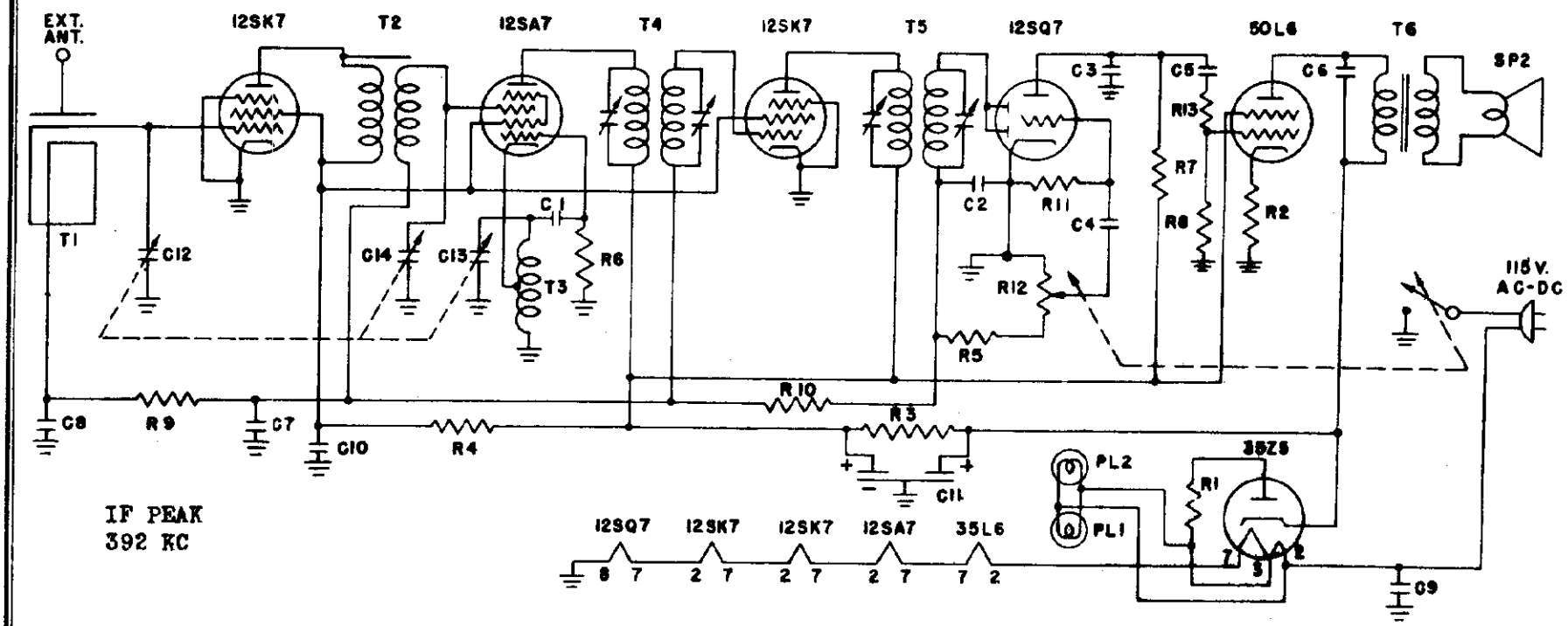
MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E106	Cabinet	Complete Cabinet
7E59	Cabinet Back	
41E1	Line Cord	6 Ft. Rubber Line Cord
5E14-1	Dial Plate Assembly	Dial Back Plate Assembly Less Dial Scale and Drive Shaft
4E1	Dial Cord	30" of 18 Lb. Dial Drive Cord
36E10-2	Dial Scale	Calibrated Scale
20E225-3	Dial Shaft Assembly	Drive Shaft with "C" Washer & Locknut
35E8	Dial Pointer	Dial Indicator
65E2	Dial Spring	Tension Spring for Drive Cord
37E27-1	Knob	
20E43	Pilot Lamp Socket	Pilot Lamp Socket Assembly
40E1	Pilot Lamp	6-8 Volt .150 Amp. Type 47 Lamp

MODEL 510

SENTINEL RADIO CORP.





IF PEAK
392 KC

R1 - 25	OHMS	1/2	WATT	RESISTOR	TOL.	10	%
R2 - 180	"	"	"	"	"	"	
R3 - 1200	"	"	"	"	"	"	
R4 - 15M	"	"	"	"	"	"	
R5 - 50M	"	1/3	"	"	"	"	
R6 - 50M	"	"	"	"	"	"	
R7 - 500M	"	"	"	"	"	"	
R8 - 1 MEG	"	"	"	"	"	"	
R9 - 1 MEG	"	"	"	"	"	"	
R10 - 2MEG	"	"	"	"	"	"	
R11 - 5MEG	"	"	"	"	"	"	
R12 - 500M	"	POT. WITH SWITCH					
R13 - 100M	"	1/3 WATT RESISTOR TOL. 0%					

C1 - .0001	MFD.	400	V.	CONDENSER	TOL.	10	%
C2 - .0001	"	"	"	"	"	"	
C3 - .0001	"	"	"	"	"	"	
C4 - .006	"	"	"	"	"	"	
C5 - .01	"	"	"	"	"	"	
C6 - .02	"	"	"	"	"	"	
C7 - .05	"	200	V.	"	"	"	
C8 - .05	"	"	"	"	"	"	
C9 - .05	"	400	V.	"	"	"	
C10 - .1	"	200	V.	"	"	"	
C11 - 50+50	"	150	V.	"	"	"	
C12 - ANT. SECTION OF GANG CONDENSER							
C13 - OSC	"	"	"	"			
C14 - R.F.	"	"	"	"			

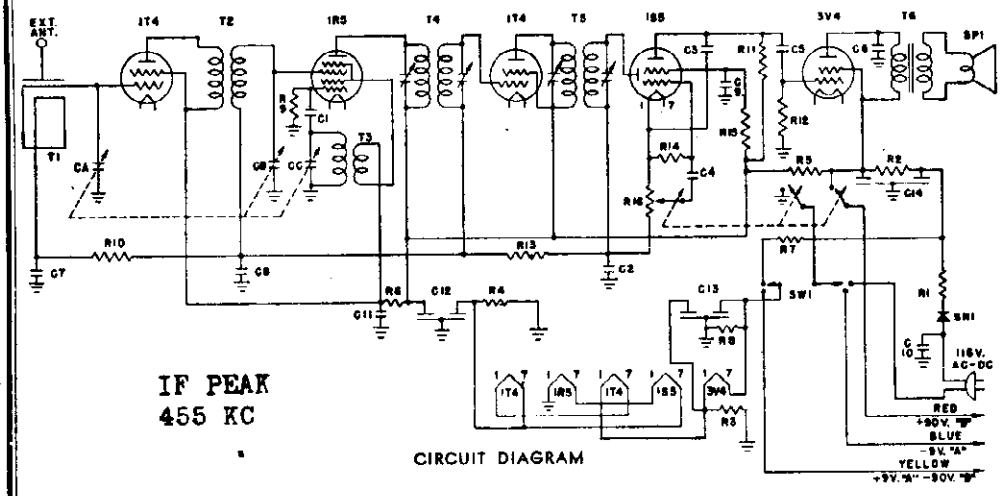
T1 - LOOP ANTENNA
T2 - R F COIL
T3 - OSC. COIL
T4 - INPUT IF COIL 392 KC
T5 - OUTPUT IF COIL 392 KC
T6 - O.P. TRANSFORMER

PL1 - NO. 47 PILOT LAMP
PL2 - " " " "
SP2 - 6" P.M. DYNAMIC SPEAKER

SETCHELL CARLSON INC.
SET. CARL PAGE 1
MODEL 42

MODEL 447

SETCHELL CARLSON INC.

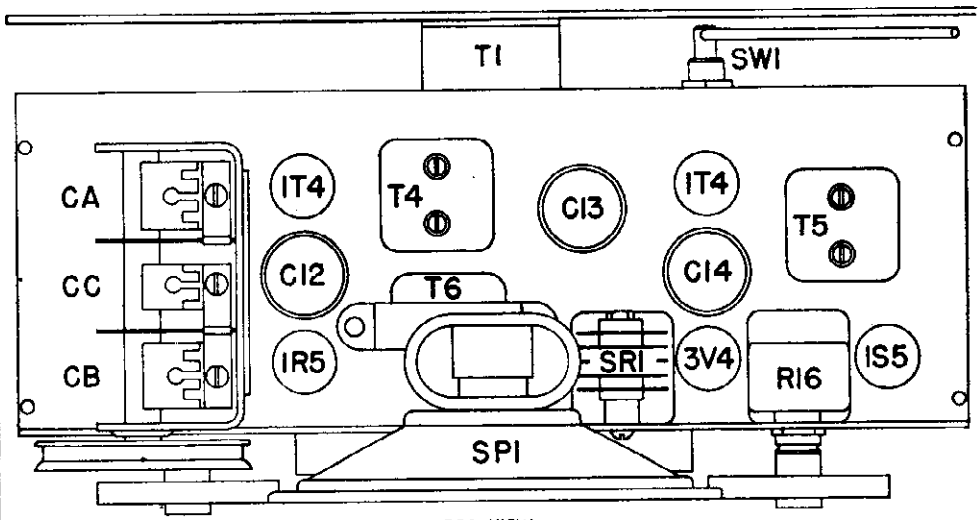


CIRCUIT DIAGRAM

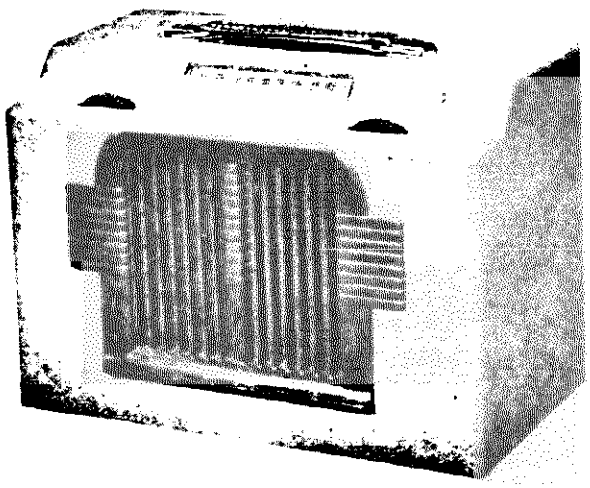
R1	—100	OHM — 5	W. RESISTOR
R2	—150	OHM — 1	W. RESISTOR
R3	—700	OHM — 1	W. RESISTOR
R4	—1200	OHM — 1/2	W. RESISTOR
R5	—3000	OHM — 1/2	W. RESISTOR
R6	—5000	OHM — 1/3	W. RESISTOR
R7	—2000	OHM — 10	W. RESISTOR
R8	—25 M	OHM — 1/3	W. RESISTOR
R9	—100M	OHM — 1/3	W. RESISTOR
R10	—1Meg.	OHM — 1/3	W. RESISTOR
R11	—1Meg.	OHM — 1/3	W. RESISTOR
R12	—1Meg.	OHM — 1/3	W. RESISTOR
R13	—2Meg.	OHM — 1/3	W. RESISTOR
R14	—5Meg.	OHM — 1/3	W. RESISTOR
R15	—5Meg.	OHM — 1/3	W. RESISTOR
R16	—500M	OHM — POT. & 2 P SW.	
C1	—.0001	MFD. 400 V.	CONDENSER
C2	—.0001	MFD. 400 V.	CONDENSER
C3	—.0001	MFD. 400 V.	CONDENSER
C4	—.004	MFD. 400 V.	CONDENSER
C5	—.004	MFD. 400 V.	CONDENSER
C6	—.004	MFD. 400 V.	CONDENSER
C7	—.05	MFD. 200 V.	CONDENSER
C8	—.05	MFD. 200 V.	CONDENSER
C9	—.05	MFD. 200 V.	CONDENSER
C10	—.05	MFD. 400 V.	CONDENSER
C11	—.1	MFD. 200 V.	CONDENSER
C12	—50 + 50	MFD. 150 V.	CONDENSER
C13	—50 + 50	MFD. 150 V.	CONDENSER
C14	—50 + 50	MFD. 150 V.	CONDENSER
C A-B-C	— 3 GANG.	CONDENSER	

T1 —LOOP ANTENNA
T2 —R. F. COIL
T3 —OSC. COIL
T4 —455 KC. IF. COIL
T5 —455 KC. IF. COIL
T6 —OUTPUT TRANSFORMER
SP1 —5" PM SPEAKER
SW1—2 POLE 2 POS. SWITCH
SR1 —SELENIUM RECTIFIER

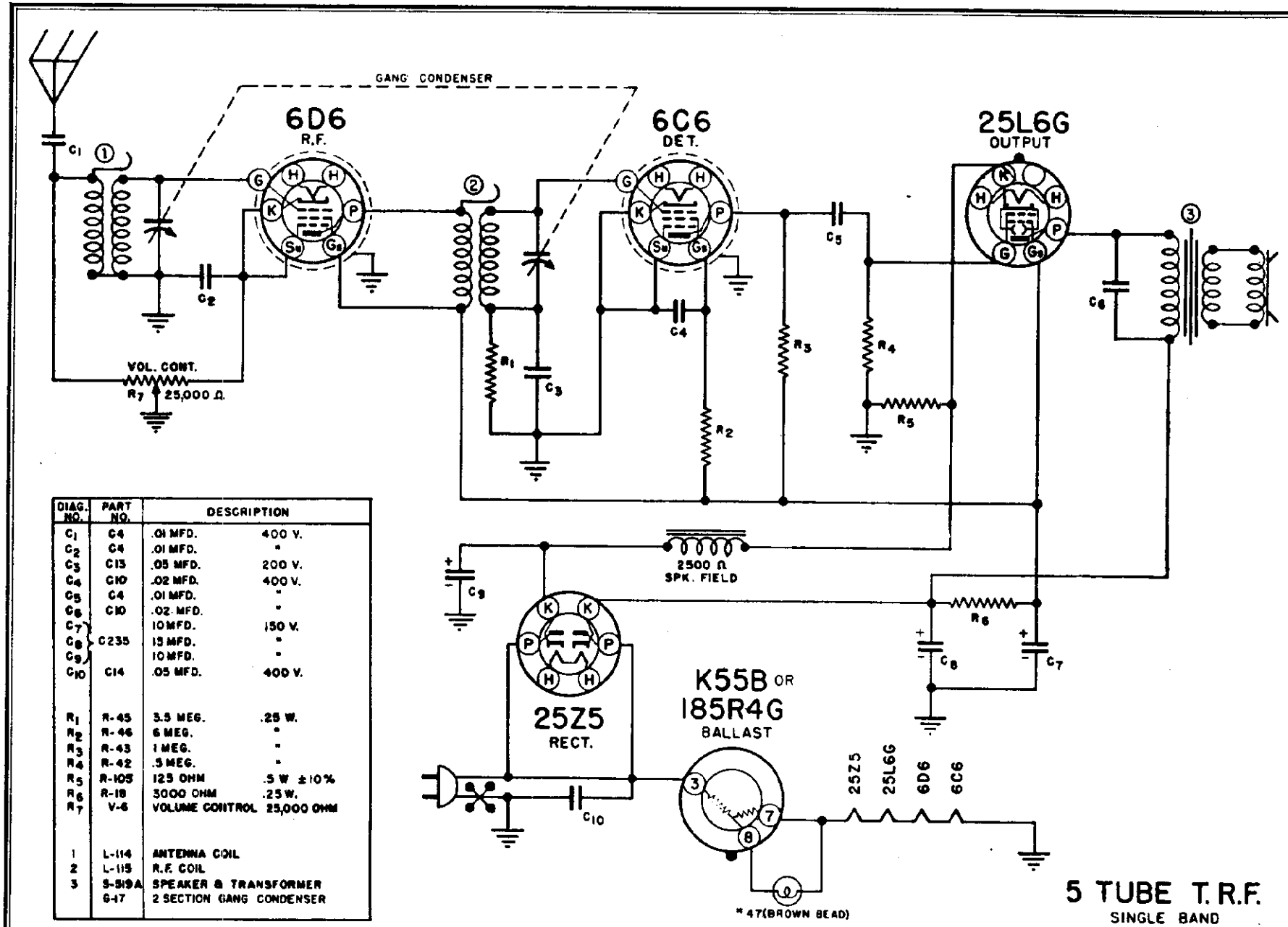
ALIGNMENT PROCEDURE
I. F. Alignment 455 KC (Connect to 1R5 Grid) Loop and R. F. Alignment—1400, 1000 and 600 KC. Dial Pointer Setting—535 KC with fully closed condenser.



TOP VIEW



- Three-gang tuning condenser (selectivity).
- Tuned R. F. stage (sensitivity).
- Super-het circuit.
- Band coverage—540 KC to 1650 KC.
- Five miniature tubes—
  1—1T4-RF. 1—1R5-Mixer, 1—1T4-IF, 1—1S5-Det. and 1st Audio, 1—3V4-Pr. output. Plus selenium rectifier (6-tube performance).
- Instant heating—no waiting for tube warm-up.
- Battery life—approximately 170 hours.
  Burgess No. F6A60, Eveready No. 753, Ray-O-Vac No. AB994.
- Trigger switch automatically prevents battery drain when operating on A.C. or D.C.
- Five-inch P. M. dynamic speaker—1.47 oz. Alnico 5.
- Sealed filter for long-life hum-free operation.
- Finger-tip controls.
- Inverted aluminum chassis.
- Heavy leather snap-down handle.
- Weight with batteries 12½ lbs.
- Size: 11¾" wide, 6¾" deep, 8¼" high.
- Color optional: Brown with walnut grille or maroon with ivory grille.



DIAG. NO.	PART NO.	DESCRIPTION	
C_1	C4	.01 MFD.	400 V.
C_2	C4	.01 MFD.	"
C_3	C13	.05 MFD.	200 V.
C_4	C10	.02 MFD.	400 V.
C_5	C4	.01 MFD.	"
C_6	C10	.02 MFD.	"
C_7	C235	10 MFD.	150 V.
C_8		15 MFD.	"
C_9		10 MFD.	"
C_{10}	C14	.05 MFD.	400 V.
R_1	R-45	3.5 MEG.	.25 W.
R_2	R-46	6 MEG.	"
R_3	R-43	1 MEG.	"
R_4	R-42	.5 MEG.	"
R_5	R-105	125 OHM	.5 W ±10%
R_6	R-18	3000 OHM	.25 W.
R_7	V-6	VOLUME CONTROL	25,000 OHM
1	L-114	ANTENNA COIL	
2	L-115	R.F. COIL	
3	S-519A	SPEAKER & TRANSFORMER	
	G-47	2 SECTION GANG CONDENSER	

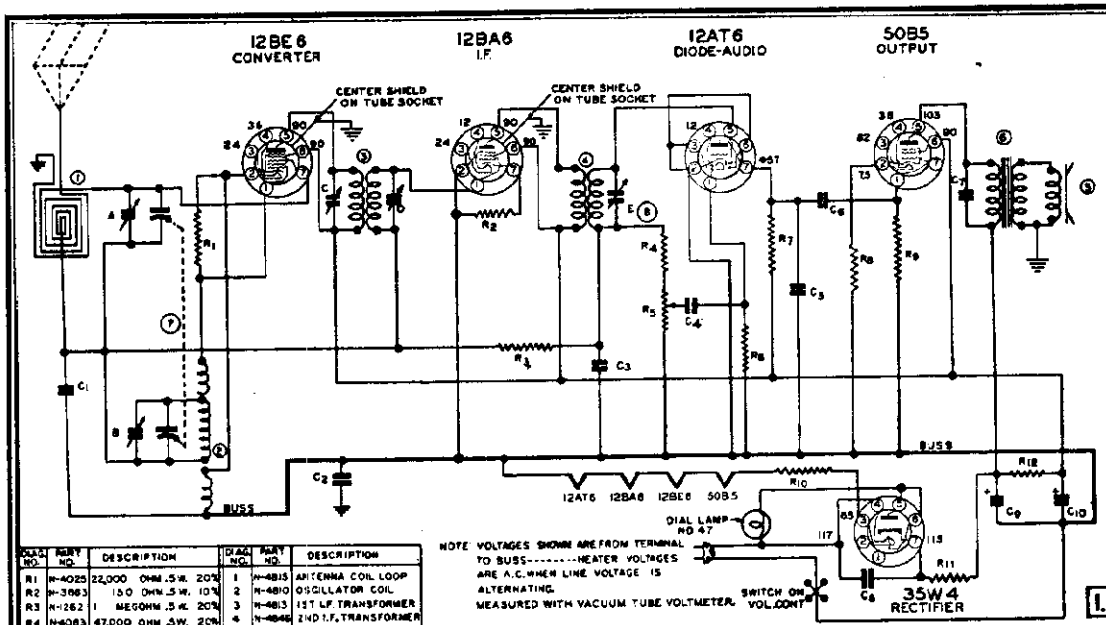
5 TUBE T.R.F.
SINGLE BAND
CHASSIS – A

4-21-38

SONORA RADIO & TELEV. CORP MODEL A-11. Chassis A

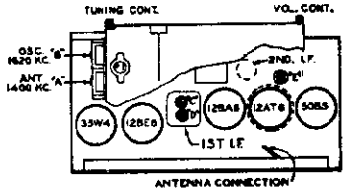
ALIGNMENT PROCEDURE FOR MODEL RBMU-176, RK/RKRU-215

SCHEMATIC FOR MODEL RBMU-176



I.F. 455KC.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R1	N-4025	22,000 OHM .5 W. 20%	1	N-4815	ANTENNA COIL LOOP
R2	N-3863	150 OHM .5 W. 10%	2	N-4810	OSCILLATOR COIL
R3	N-1262	1 MEGOHM .5 W. 20%	3	N-4813	1ST I.F. TRANSFORMER
R4	N-4063	47,000 OHM .5 W. 20%	4	N-4846	2ND I.F. TRANSFORMER
R5	N-4843	.5 MEGOHM VOL. CON.	5	N-4318	4" SPEAKER
R6	N-4026	6.8 MEGOHM .5 W. 20%	6	N-3899	OUTPUT TRANSFORMER
R7	N-4028	220,000 OHM .5 W. 20%	7	N-4812	2 GANG CONDENSER
R8	N-5632	220 OHM .5 W. 10%	8	N-4048	TRIMMER
R9	N-4027	470,000 OHM .5 W. 20%			
R10	N-5631	2.2 OHM 1 W. 10%			
R11	N-4022	33 OHM .5 W. 20%			
R12	N-5356	1000 OHM 1 W. 10%			
C1	N-1345	.05 MFD. 200 V.			
C2	N-1345	.05 MFD. 200 V.			
C3	N-1374	100 MMFD. MICA			
C4	N-4894	.005 MFD 600 V.			
C5	N-4890	.0005 MFD. 600 V.			
C6	N-1344	.01 MFD. 400 V.			
C7	N-1376	.02 MFD. 400 V.			
C8	N-1345	.05 MFD. 400 V.			
C9	N-3302	25 MFD. 150 V. ELECT.			
C10		30 MFD. 150 V.			



TUBE AND TRIMMER LOCATIONS

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, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved 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 TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

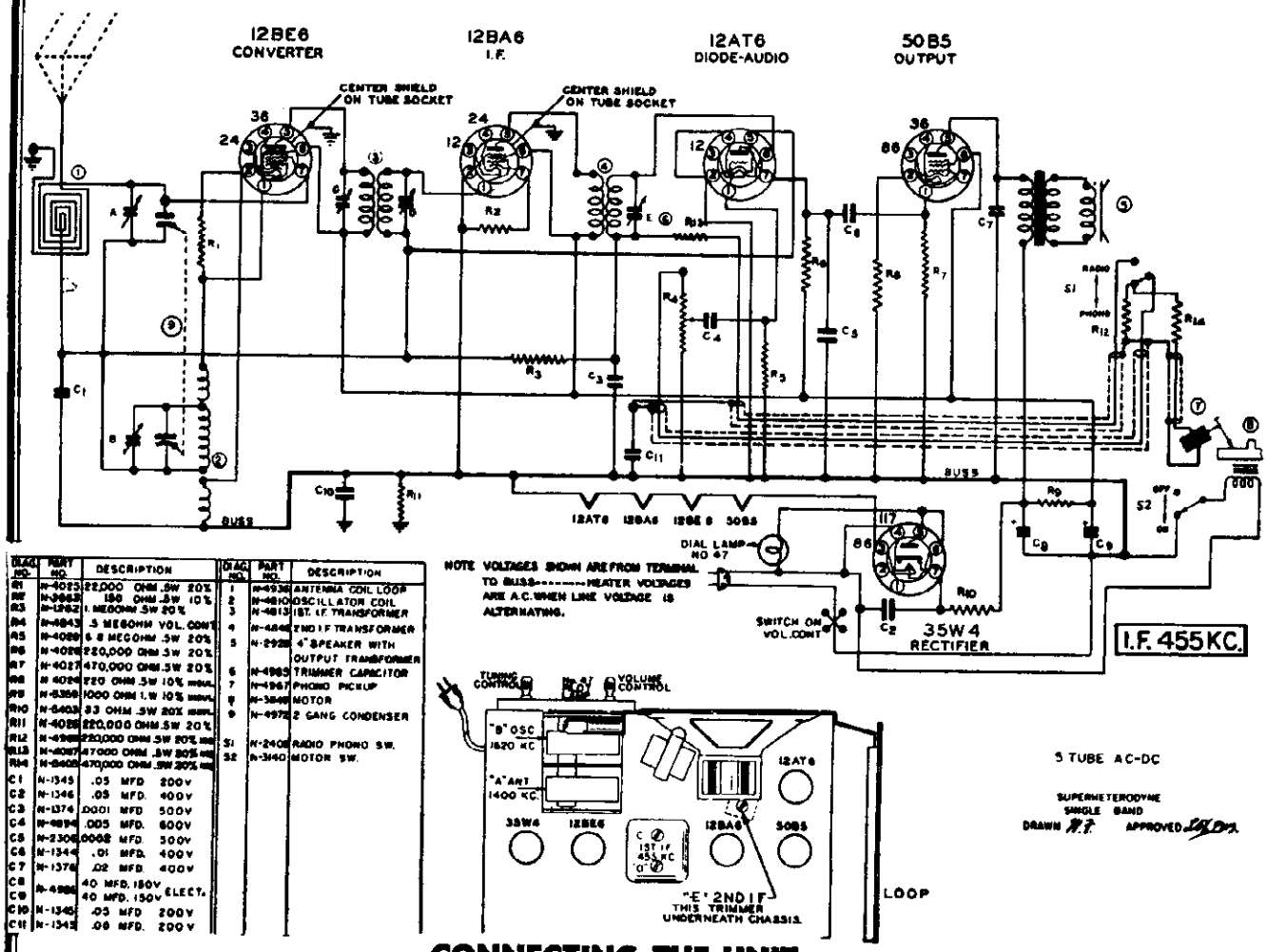
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control 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 be adjusted.

I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective position on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12BE6) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

SONORA RADIO & TELEV. CORP. MODELS RGMF-212-230



BLOCK NO.	PART NO.	DESCRIPTION
R1	N-4025	22,000 OHM .5W 20%
R2	N-3963	150 OHM .5W 10%
R3	N-1382	1 MEGOHM .5W 20%
R4	N-4843	.5 MEGOHM VOL. CONT
R5	N-4029	6.8 MEGOHM .5W 20%
R6	N-4028	220,000 OHM .5W 20%
R7	N-4027	470,000 OHM .5W 20%
R8	N-4024	220 OHM .5W 10% WIRE
R9	N-4356	1000 OHM 1.W 10% WIRE
R10	N-4403	33 OHM .5W 20% WIRE
R11	N-4026	220,000 OHM .5W 20%
R12	N-4966	220,000 OHM .5W 20% WIRE
R13	N-4067	47000 OHM .5W 20% WIRE
R14	N-4405	470,000 OHM .5W 20% WIRE
C1	N-1345	.05 MFD 200V
C2	N-1346	.05 MFD. 400V
C3	N-1376	.0001 MFD 500V
C4	N-4894	.005 MFD. 600V
C5	N-2306	.0068 MFD. 500V
C6	N-1344	.01 MFD. 400V
C7	N-1378	.02 MFD. 400V
C8	N-4986	40 MFD. 150V ELECT.
C9		40 MFD. 150V ELECT.
C10	N-1345	.05 MFD 200V
C11	N-1345	.05 MFD 200V

BLOCK NO.	PART NO.	DESCRIPTION
1	N-4936	ANTENNA COIL LOOP
2	N-4810	OSCILLATOR COIL
3	N-4813	1ST. I.F. TRANSFORMER
4	N-4846	2ND I.F. TRANSFORMER
5	N-2928	4" SPEAKER WITH OUTPUT TRANSFORMER
6	N-4965	TRIMMER CAPACITOR
7	N-4967	PHONO PICKUP
8	N-3848	MOTOR
9	N-4972	2 GANG CONDENSER
S1	N-2408	RADIO PHONO SW.
S2	N-3440	MOTOR SW.

CONNECTING THE UNIT

Before connecting the unit, be sure that your house is wired for the voltage and current for which the set is designed. If in doubt, call your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

POWER SUPPLY. This Radio-Phonograph is designed to operate on an alternating current supply (AC) ranging from 110 to 120 volts. The current must be 60 cycles. Never plug into a D.C. outlet.

GROUND. No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

CAUTION. *Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the internal components of the unit.*

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, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved 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 TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter 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 be adjusted.

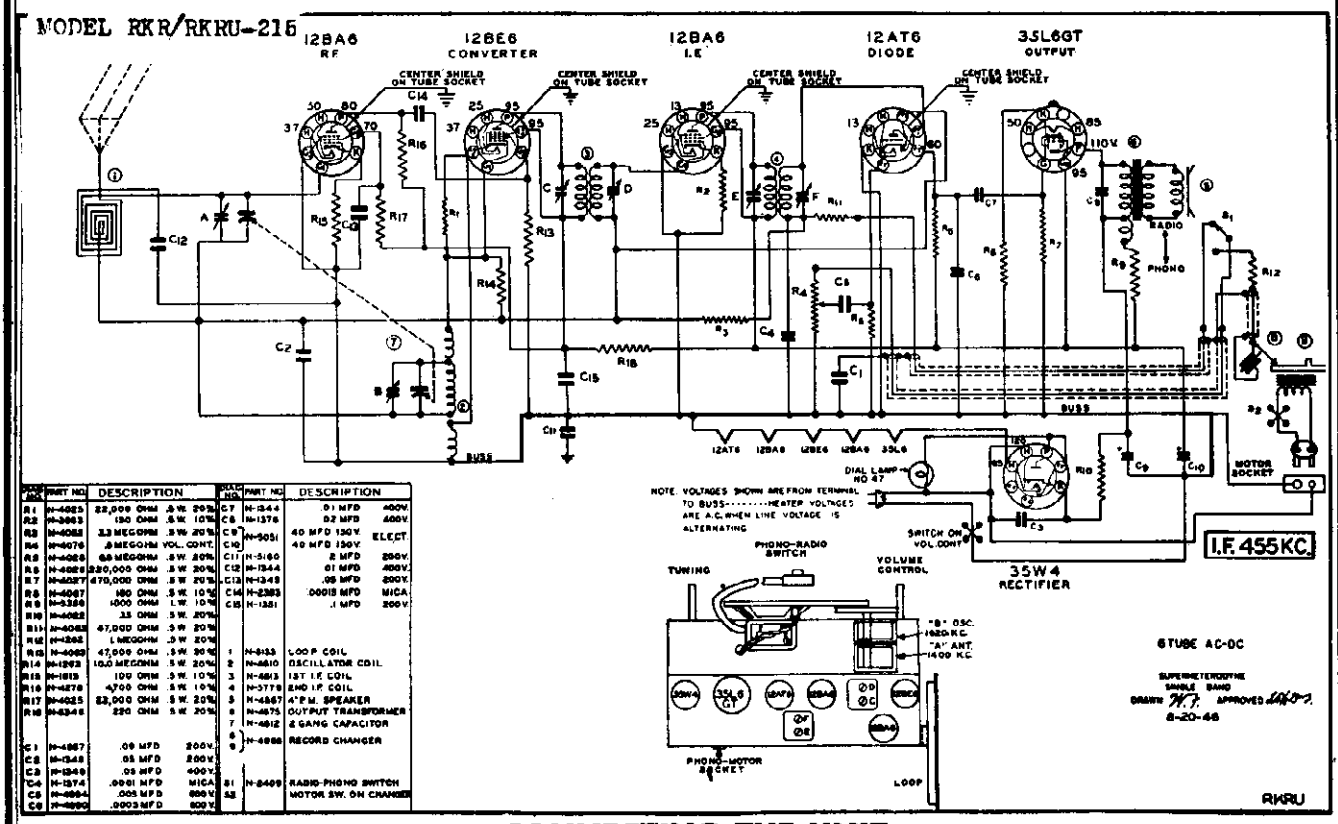
I. F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum capacity, set the test oscillator to 455 KC and connect the output to the grid of the converter tube through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next — set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODELS RK-215,RKRU-215
MODELS WA.WAU

SONORA RADIO & TELEV. CORP.

MODEL RKR/RKRU-215



CIRCUIT NO.	PART NO.	DESCRIPTION
R1	N-4025	22,000 OHM .5 W. 20%
R2	N-3993	150 OHM .5 W. 10%
R3	N-4088	3.3 MEGOHM .5 W. 20%
R4	N-4078	.5 MEGOHM VOL. CONT.
R5	N-4028	68 MEGOHM .5 W. 20%
R6	N-4029	220,000 OHM .5 W. 20%
R7	N-4027	470,000 OHM .5 W. 20%
R8	N-4067	180 OHM .5 W. 10%
R9	N-3328	1,000 OHM 1 W. 10%
R10	N-4082	33 OHM .5 W. 20%
R11	N-4083	47,000 OHM .5 W. 20%
R12	N-4202	1 MEGOHM .5 W. 20%
R13	N-4069	47,000 OHM .5 W. 20%
R14	N-4093	10.0 MEGOHM .5 W. 20%
R15	N-1819	100 OHM .5 W. 10%
R16	N-4278	4,700 OHM .5 W. 10%
R17	N-4025	22,000 OHM .5 W. 20%
R18	N-4348	220 OHM .5 W. 20%
C1	N-4067	.05 MFD 200V.
C2	N-1348	.05 MFD 200V.
C3	N-1349	.05 MFD 400V.
C4	N-1374	.0001 MFD MICA
C5	N-4084	.005 MFD 600V.
C6	N-4080	.0003 MFD 600V.

CIRCUIT NO.	PART NO.	DESCRIPTION
C7	N-1344	.01 MFD 400V.
C8	N-1376	.02 MFD 400V.
C9	N-5051	40 MFD 150V. ELECT.
C10		40 MFD 150V.
C11	N-5160	.2 MFD 200V.
C12	N-1344	.01 MFD 400V.
C13	N-1345	.05 MFD 200V.
C14	N-2383	.0001 MFD MICA
C15	N-1351	.1 MFD 200V.
1	N-4133	LOOP COIL
2	N-4810	OSCILLATOR COIL
3	N-4813	1ST I.F. COIL
4	N-5178	2ND I.F. COIL
5	N-4867	4" P.M. SPEAKER
6	N-4875	OUTPUT TRANSFORMER
7	N-4812	2 GANG CAPACITOR
8 9	N-4986	RECORD CHANGER
S1	N-5409	RADIO-PHONO SWITCH
S2		MOTOR SW. ON CHANGER

NOTE VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS-------HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING

"B" OSC. 1600 K.C.
"A" ANT. 1400 K.C.

CONNECTING THE UNIT

Before connecting the unit, be sure that your house is wired for the voltage and current for which the set is designed. If in doubt, call your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

POWER SUPPLY. This Radio-Phonograph is designed to operate on an alternating current supply (AC) ranging from 110 to 120 volts. The current must be 60 cycles. Never plug into a D.C. outlet.

GROUND. No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

CAUTION. *Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the internal components of the unit.*

MODEL WA/WAU

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, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved 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 TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

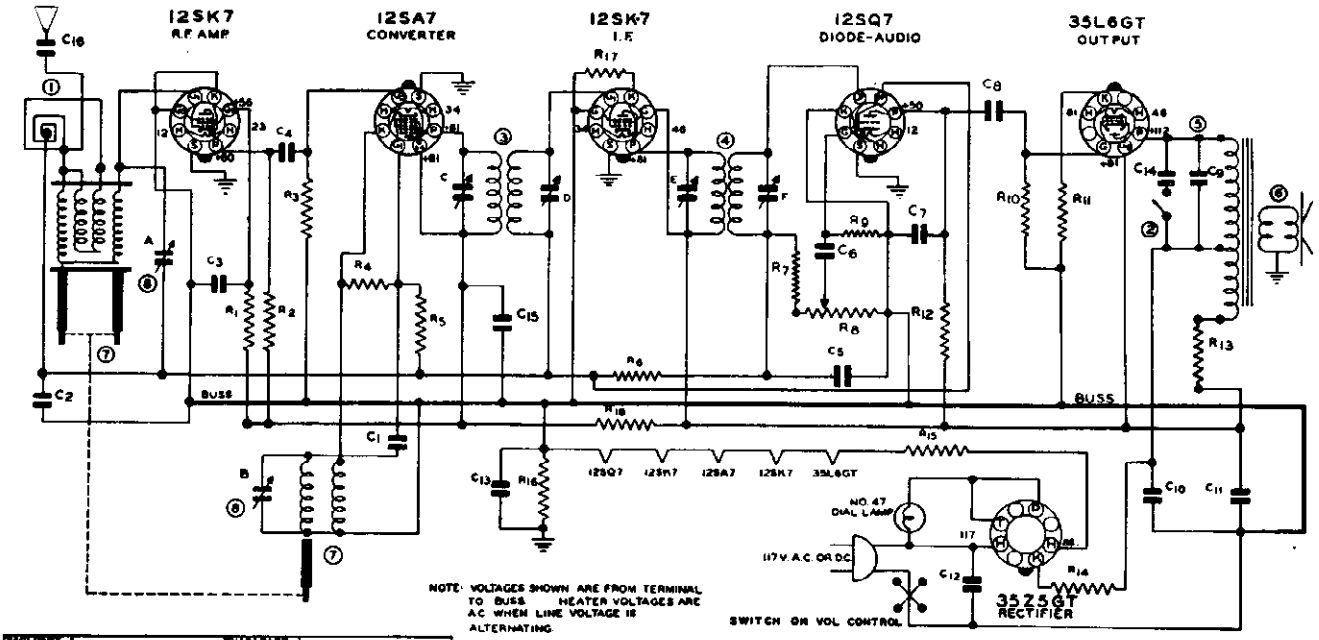
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control 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 be adjusted.

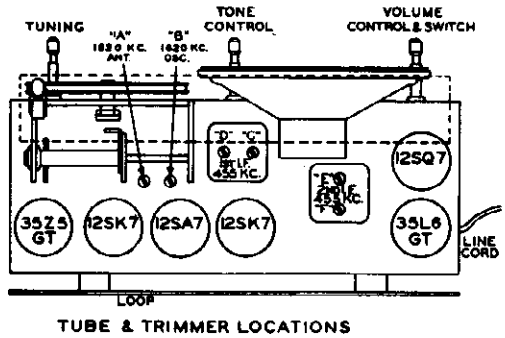
I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

For alignment of Models RK-215,RKRU-215, see P.16-2



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	N-1342	50 MMFD MICA 20%	R6	N-4082	3.3 MEGOHM .5W 20%
C2	N-1345	.05 MFD 200 V. 20%	R7	N-4083	47,000 OHM .5W 20%
C3	N-1345	.05 MFD 200 V. 20%	R8	N-5025	0.5 MEGOHM VOL. CONT.
C4	N-2363	150 MMFD MICA 20%	R9	N-4081	.47 MEGOHM .5W. 20%
C5	N-1374	100 MMFD MICA 20%	R10	N-4027	470,000 OHM .5W 20%
C6	N-4094	.005 MFD 600V -15+40%	R11	N-4067	180 OHM .5W. 10%
C7	N-4090	.0005 MFD 600V -25+60%	R12	N-4998	220,000 OHM .5W INS. 20%
C8	N-1344	.01 MFD 400V 20%	R13	N-5623	1500 OHM 1W. 10%
C9	N-1344	.01 MFD 400V 20%	R14	N-4022	33 OHM .5W 20%
C10	N-3858	40 MFD 150 W.V. ELECTRO	R15	N-4628	33 OHM 1W. 10%
C11		40 MFD 150 W.V. LYTIC	R16	N-4026	220,000 OHM .5W. 20%
C12	N-1348	.05 MFD 400 V. 20%	R17	N-4022	33 OHM .5W. 20%
C13	N-5180	.2 MFD 200V +10+0%	R18	N-4066	470 OHM .5W. 10%
C14	N-1346	.05 MFD 400V 20%	1	N-5374	LOOP COIL
C15	N-1351	.1 MFD 200V -10+20%	2	N-4942	TONE SWITCH
C16	N-1342	50 MMFD MICA 20%	3	N-4872	1ST I.F. TRANSFORMER
			4	N-5571	2ND I.F. TRANSFORMER
R1	N-5351	22,000 OHM .5W INS. 20%	5	N-4875	OUTPUT TRANSFORMER
R2	N-4278	4,700 OHM 5W 10%	6	N-4864	"S SPEAKER
R3	N-4087	47,000 OHM .5W INS. 20%	7	N-5580	PERMEABILITY TUNER
R4	N-5351	22,000 OHM .5W INS. 20%	8	N-5582	2 SECTION TRIMMER
R5	N-5624	15 MEGOHM .5W INS. 20%			



TUBE & TRIMMER LOCATIONS

I.F. 455 KC.

6 TUBE A.C.-D.C.
SUPERHETERODYNE
SINGLE BAND

DRAWN BY W.F. APPROVED
JUNE 1, 1946

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, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved 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 TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 1000 and 1620 KC and an output meter 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 be adjusted.

I. F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the pointer at right end of dial adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

PERMEABILITY TUNER ALIGNMENT. To align the tuner requires four separate steps which must be followed in the order given.

1. Marking Test Points on Dial Plate. Use an accurate scale or ruler. Make a pencil mark at 1-13/16 inches and another at 4-3/16 inches from the right hand edge of the dial plate.

2. Location of Pointer. Turn right hand knob all the way to the right. This moves the slugs to the left out of the coils.

The pointer should be at the 1-13/16 inch mark. If the pointer is not in this position, slide pointer on string and crimp in place.

3. Oscillator Alignment. Connect the test oscillator to the grid of the 12SA7 tube through a .05 or .1 mfd. condenser.

Set test oscillator at 1620 KC, turn right hand knob all the way to the right and adjust oscillator trimmer "B" for maximum signal.

Set test oscillator at 1000 KC, tune in signal using right hand knob. Pointer should now be at the 4-3/16 inch mark in dial plate. If not, adjust oscillator tuning slug (located beneath chassis) so that 1000 KC comes in at this mark.

4. Antenna Alignment. Connect the test oscillator to the antenna lead through a 100 mfd (.0001) condenser.

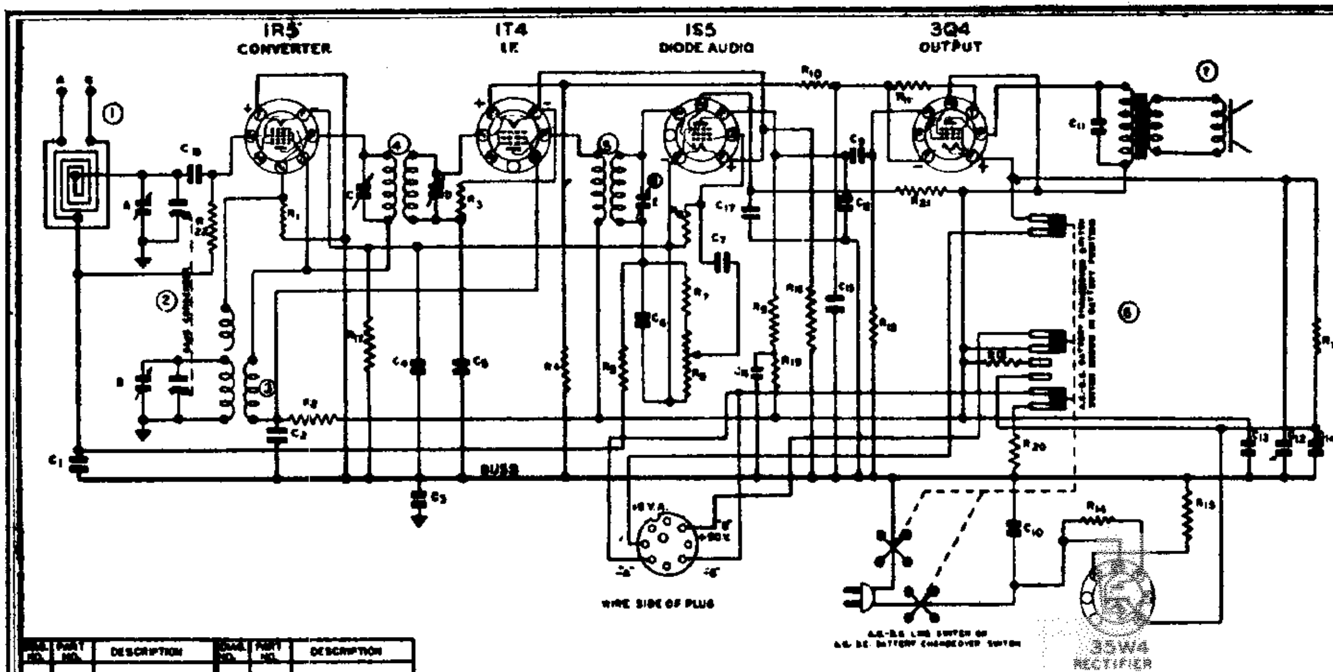
Set the test oscillator at 1620 KC, turn right hand knob all the way to the right and adjust antenna trimmer "A" for maximum signal.

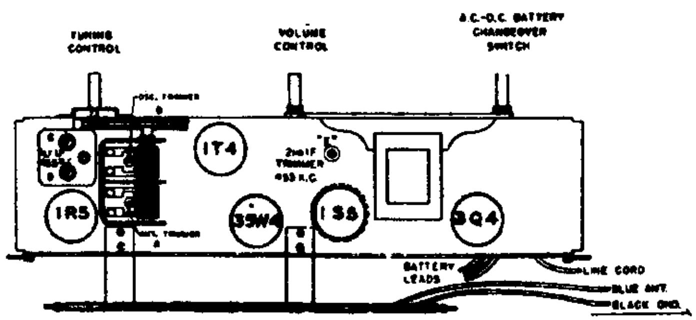
Set test oscillator at 1000 KC. Tune in signal using right hand knob. Adjust antenna tuning slugs (located above chassis) for maximum signal.

In adjusting these slugs, it is best to turn one core about a half turn, then remove the hand or tool and tune in the signal. Repeat this until the adjustment for maximum signal is reached. Keep the two antenna slugs as even as possible.

MODEL RYMU-224

SONORA RADIO & TELEV. CORP.





Diag. No.	Part No.	Description	Diag. No.	Part No.	Description
C1	[illegible]	.05 MFD. 200 W.V. 20%	R1	[illegible]-1778	100,000 OHM .5W. 20%
C2	[illegible]	.05 MFD. 200 W.V. 20%	R2	[illegible]	10,000 OHM .5W. 10%
C3	[illegible]	.2 MFD. 200 W.V. 10%	R3	[illegible]-1263	10 MEGOHM .5W. 20%
C4	[illegible]	.1 MFD. 200 W.V. 20%	R4	[illegible]-1260	330 OHM .5W. 10%
C5	[illegible]	.02 MFD. 400 W.V. 20%	R5	[illegible]-4277	2.2 MEGOHM .5W. 20%
C6	[illegible]	.0001 MFD. MICA 20%	R6	[illegible]	10 MEGOHM .5W. 20%
C7	[illegible]	.005 MFD. 600 W.V. [illegible]	R7	[illegible]-4063	47,000 OHM .5W. 20%
C8	[illegible]-1374	.0001 MFD. MICA 20%	R8	[illegible]-3940	1 MEG. VOLUME CONT.
C9	[illegible]	.01 MFD. 400 W.V. 20%	R9	[illegible]	1 MEGOHM .5W. 10%
C10	[illegible]	.05 MFD. 400 W.V. 20%	R10	[illegible]	15 OHM .5W. 10%
C11	[illegible]	.005 MFD. 600 W.V. -10 +40%	R11	[illegible]-4420	330 OHM .5W. 10%
			R12	[illegible]-4277	2.2 MEGOHM .5W. 20%
C12	[illegible]	100 MFD. 7.5 V. ELECTROLYTIC COND.	R13	[illegible]-1776	1,100 OHM .5W. 20%
C13	[illegible]	40 MFD. 150 V.	R14	[illegible]	82 OHM 1W. 10%
C14	[illegible]	40 MFD. 150 V.	R15	[illegible]-3342	850 OHM 12.5W. 10%
C15	[illegible]	100 MFD. 7.5 V. ELECT.	R16	[illegible]	2,150 OHM 2.5W. 5%
C16	[illegible]-1381	.1 MFD. 200 W.V. 20%	R17	[illegible]-1776	1,500 OHM .5 20%
C17	[illegible]	.01 MFD. 400 W.V. 20%	R18	[illegible]	2,100 OHM .5 20%
C18	[illegible]	.0002 MFD. MICA 20%	R19	[illegible]	100,000 OHM .5 10%
1	[illegible]	LOOP ANT. COIL	R20	[illegible]	12 OHM .5 10%
2	[illegible]	TWO GANG COND.	R21	[illegible]	3.3 MEGOHM .5 10%
3	[illegible]	OSCILLATOR COIL	R22	[illegible]-4277	2.2 MEGOHM .5 20%
4	[illegible]	1ST I.F. TRANSF.			
5	[illegible]	2ND I.F. TRANSF.			
6	[illegible]	CHANGEOVER SW'CH			
7	[illegible]	[illegible] & TRANS.			
8	[illegible]	ADJUSTABLE TRIMMER			

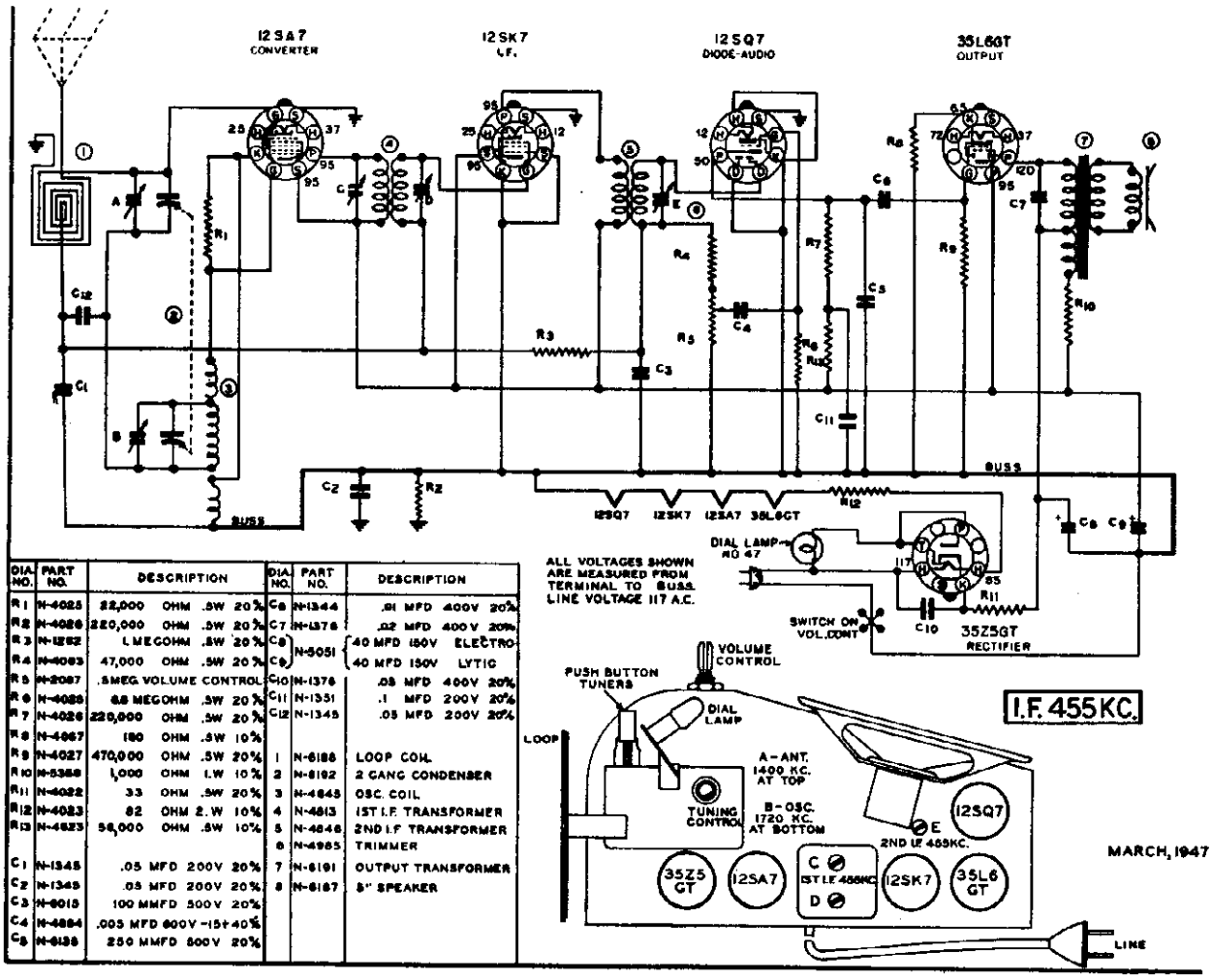
BATTERY. To install a new battery or replace an old one, remove the screws holding the back in place and lift off the back. Remove the battery and pull out the plug. Insert plug in new battery and place battery in bottom of cabinet. Replace back.

The batteries listed below are satisfactory for service in your receiver. They are combination "A" and "B" packs having 90 volts "B" and 9 and 7½ volts "A".

Manufacturer	Type Number
Burgess	F6A60
Burgess	G6M60
Eveready	754
General Dry Battery	60B6F6-5
Ray-O-Vac	AB878
Ray-O-Vac	AB994

ALIGNMENT

Operation	Connect Oscillator To:	Dummy Ant.	Set Osc. To:	Set Dial To:	Adjust Trimmers	Purpose
1	Converter Grid	.05 MFD.	455 KC	Min. Cap.	C, D, E	Align IF
2	Antenna	100 MMF.	1620 KC	Min. Cap.	B	Set Oscillator
3	Antenna	100 MMF.	1400 KC	1400 KC	A	Adjust Ant.
4	Antenna	100 MMF.	600 KC	600 KC	....	Check Calibration



DIA. NO.	PART NO.	DESCRIPTION
R1	N-4025	22,000 OHM .5W 20%
R2	N-4026	220,000 OHM .5W 20%
R3	N-1252	1 MEGOHM .5W 20%
R4	N-4063	47,000 OHM .5W 20%
R5	N-2087	.5MEG VOLUME CONTROL
R6	N-4028	.68 MEGOHM .5W 20%
R7	N-4026	220,000 OHM .5W 20%
R8	N-4067	180 OHM .5W 10%
R9	N-4027	470,000 OHM .5W 20%
R10	N-5368	1,000 OHM 1W 10%
R11	N-4022	33 OHM .5W 20%
R12	N-4023	82 OHM 2W 10%
R13	N-4623	56,000 OHM .5W 10%
C1	N-1345	.05 MFD 200V 20%
C2	N-1345	.05 MFD 200V 20%
C3	N-6018	100 MMFD 500V 20%
C4	N-4884	.005 MFD 600V -15+40%
C5	N-6138	250 MMFD 500V 20%

DIA. NO.	PART NO.	DESCRIPTION
C6	N-1344	.01 MFD 400V 20%
C7	N-1378	.02 MFD 400V 20%
C8	N-5051	40 MFD 150V ELECTRO-
C9		40 MFD 150V LYTIC
C10	N-1376	.05 MFD 400V 20%
C11	N-1351	.1 MFD 200V 20%
C12	N-1345	.05 MFD 200V 20%
1	N-6188	LOOP COIL
2	N-6192	2 GANG CONDENSER
3	N-4643	OSC. COIL
4	N-4613	1ST I.F. TRANSFORMER
5	N-4646	2ND I.F. TRANSFORMER
6	N-4985	TRIMMER
7	N-6191	OUTPUT TRANSFORMER
8	N-6187	8" SPEAKER

MARCH, 1947

AUTOMATIC TUNING

Automatic tuning is a standard feature on this Model. It provides instantaneous selection of any four favorite stations by simply depressing a button. The automatic unit is wholly mechanical in operation and of rugged construction to assure greater accuracy over a longer period of time.

ADJUSTMENT. All adjustments are simply made from the front of the cabinet using an ordinary screw driver.

To make adjustments remove all four buttons, which pull off readily. The center buttons should be removed first, since by depressing the adjacent buttons with thumb and finger a firm grip may be secured on either center button. The top and bottom buttons can then be easily removed.

Loosen the screw of the desired button and with the manual tuning knob tune to any desired station. Hold the manual tuning knob in position and depress the button shaft as far as possible. With the button fully depressed, tighten the screw firmly.

Be sure the push button knob is held down in position while being tightened.

After the stations are adjusted, it is advisable to check each button to assure sufficient tightening.

To assure accurate adjustment, the volume control should be set at a moderate level and the station tuned in slowly to a point of maximum volume and clarity.

It is not necessary to follow any particular sequence of stations since each button is adjustable to any station.

With each button definitely set and securely tightened to the selected station, the tuner is ready for operation.

OPERATION. With the set turned on to a moderate level of volume, the automatic tuner is operated by merely pressing a button set to the desired station.

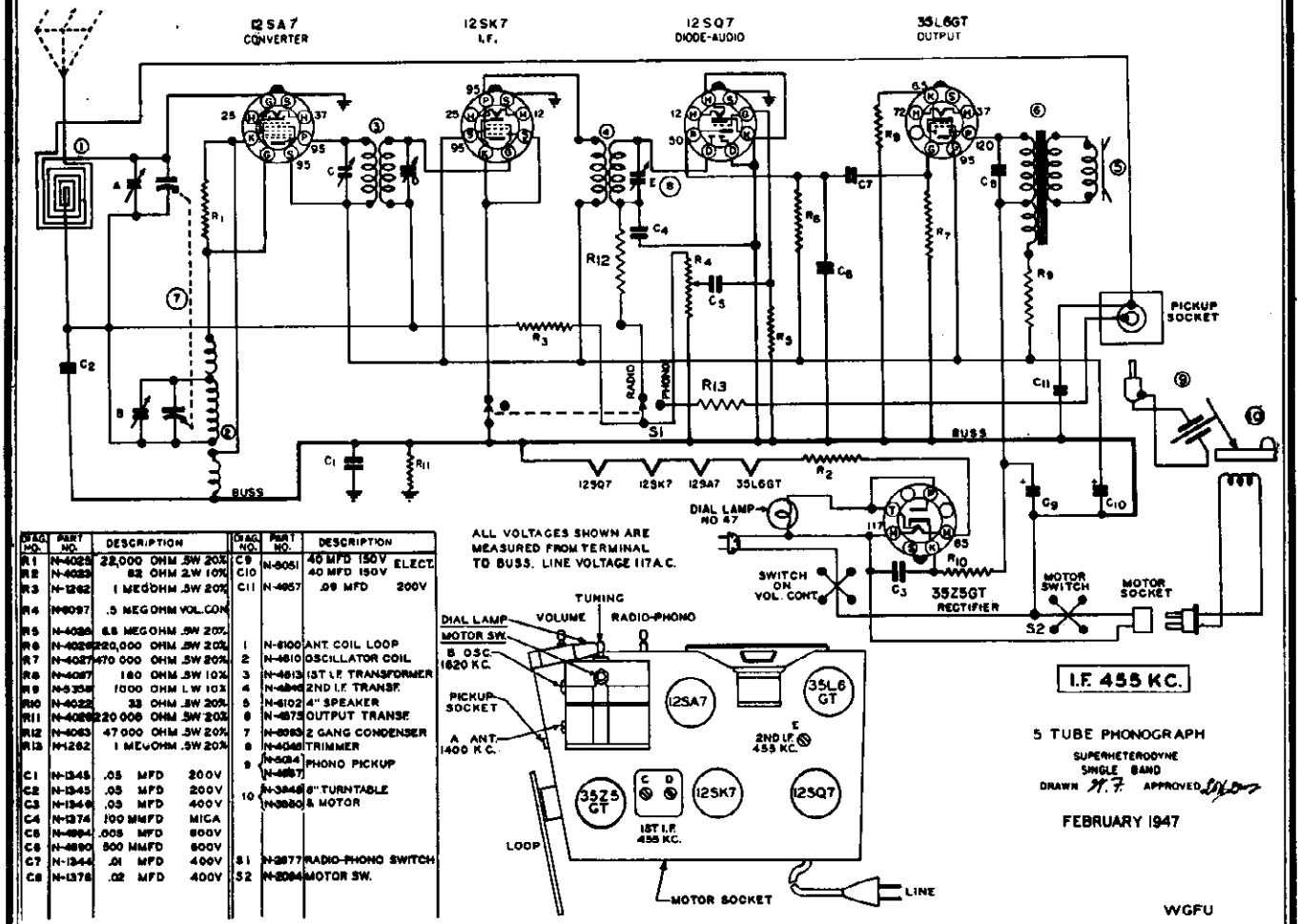
Station selection may be made automatically or manually at will, since the manual tuning control functions integrally with the automatic unit.

The station call letter tabs enclosed in the Operating Instruction Sheet envelope should be inserted into the slot of the push-buttons, using designations corresponding to the station selected for each button. After inserting call letter tabs, the buttons may be replaced.

For alignment see P.16

MODELS WGF, WGFU

SONORA RADIO & TELEV. CORP.



MFG. NO.	PART NO.	DESCRIPTION	MFG. NO.	PART NO.	DESCRIPTION
R1	N-4025	22,000 OHM .5W 20%	C9	N-5051	40 MFD 150V ELECT.
R2	N-4023	82 OHM 2W 10%	C10		40 MFD 150V
R3	N-1262	1 MEGOHM .5W 20%	C11	N-4057	.09 MFD 200V
R4	N-4037	.5 MEGOHM VOL.CON.			
R5	N-4026	68 MEGOHM .5W 20%			
R6	N-4028	220,000 OHM .5W 20%	1	N-6100	ANT. COIL LOOP
R7	N-4027	470 000 OHM .5W 20%	2	N-4810	OSCILLATOR COIL
R8	N-4027	180 OHM .5W 10%	3	N-4813	1ST I.F. TRANSFORMER
R9	N-5358	1000 OHM 1W 10%	4	N-4846	2ND I.F. TRANSF.
R10	N-4022	33 OHM .5W 20%	5	N-6102	4" SPEAKER
R11	N-4028	220 000 OHM .5W 20%	6	N-4875	OUTPUT TRANSF.
R12	N-4063	47 000 OHM .5W 20%	7	N-6063	2 GANG CONDENSER
R13	N-1262	1 MEGOHM .5W 20%	8	N-4048	TRIMMER
			9	N-5034 N-4857	PHONO PICKUP
C1	N-1345	.05 MFD 200V			
C2	N-1345	.05 MFD 200V	10	N-3846 N-3880	6" TURNTABLE & MOTOR
C3	N-1346	.03 MFD 400V			
C4	N-1374	100 MMFD MICA			
C5	N-4894	.005 MFD 600V			
C6	N-4890	500 MMFD 500V			
C7	N-1344	.01 MFD 400V	S1	N-2877	RADIO-PHONO SWITCH
C8	N-1376	.02 MFD 400V	S2	N-2094	MOTOR SW.

AERIAL SYSTEM

The receiver has a built-in "loop" aerial. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. The "loop" aerial used on this receiver is somewhat directional so reception from weak stations can be improved by turning the set in the proper direction. In or near metal buildings, iron ore deposits or steel structures or in localities remote from broadcasting stations, reception can be improved by using an outside aerial 50 feet to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead. When using the outside aerial it may be necessary to reverse the power cord plug in wall socket to eliminate hum or distortion.

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, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved 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 TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter 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.

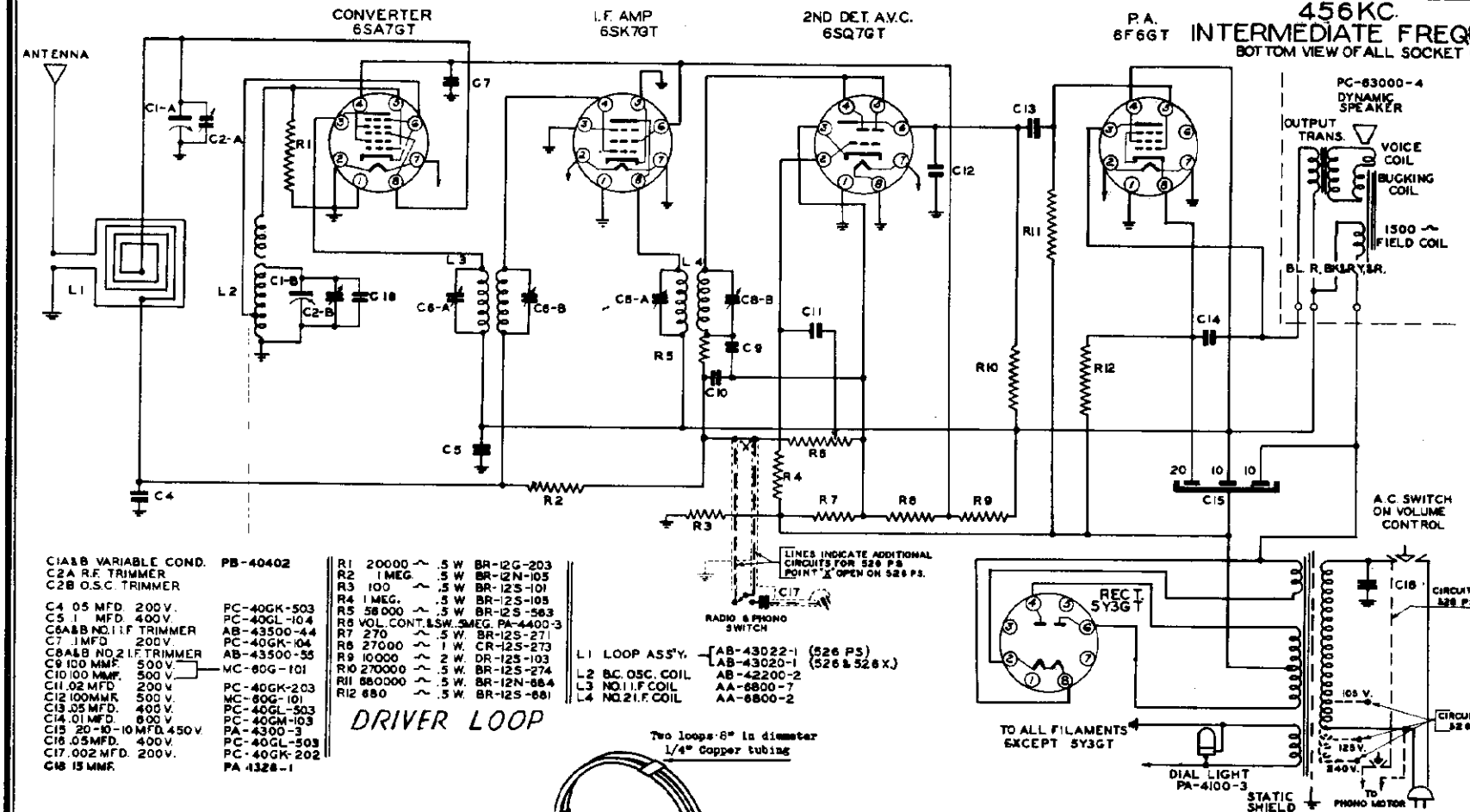
CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

456KC. INTERMEDIATE FREQUENCY

BOTTOM VIEW OF ALL SOCKET CONNECTIONS

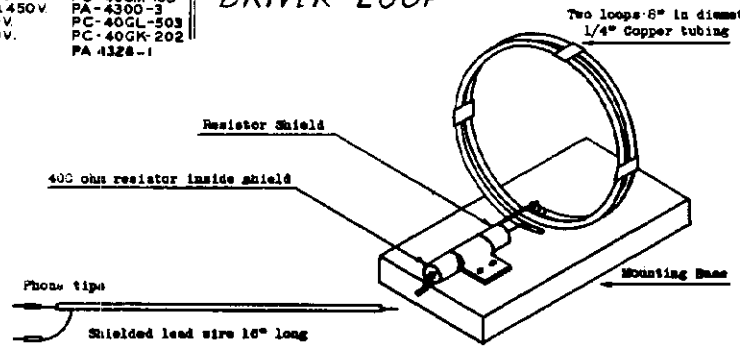


C1A&B VARIABLE COND.	PB-40402
C2A R.F. TRIMMER	
C2B O.S.C. TRIMMER	
C4 .05 MFD. 200 V.	PC-40GK-503
C5 .1 MFD. 400 V.	PC-40GL-104
C6A&B NO.1 I.F. TRIMMER	AB-43500-44
C7 .1 MFD. 200 V.	PC-40GK-104
C8A&B NO.2 I.F. TRIMMER	AB-43500-55
C9 100 MMF. 500 V.	MC-60G-101
C10 100 MMF. 500 V.	
C11 .02 MFD. 200 V.	PC-40GK-203
C12 100 MMF. 500 V.	MC-60G-101
C13 .05 MFD. 400 V.	PC-40GL-503
C14 .01 MFD. 600 V.	PC-40GM-103
C15 20-10-10 MFD. 450 V.	PA-4300-3
C16 .05 MFD. 400 V.	PC-40GL-503
C17 .002 MFD. 200 V.	PC-40GK-202
C18 15 MMF.	PA-4328-1

R1	20000 ~	.5 W	BR-12G-203
R2	1 MEG.	.5 W	BR-12N-105
R3	100 ~	.5 W	BR-12S-101
R4	1 MEG.	.5 W	BR-12S-105
R5	58000 ~	.5 W	BR-12S-583
R6	VOL. CONT. & SW.	.5 MEG.	PA-4400-3
R7	270 ~	.5 W.	BR-12S-271
R8	27000 ~	1 W.	CR-12S-273
R9	10000 ~	2 W.	DR-12S-103
R10	270000 ~	.5 W.	BR-12S-274
R11	680000 ~	.5 W.	BR-12N-684
R12	680 ~	.5 W.	BR-12S-681

L1	LOOP ASS'Y.	AB-43022-1 (526 PS) / AB-43020-1 (526 & 526 X)
L2	B.C. OSC. COIL	AB-42200-2
L3	NO.1 I.F. COIL	AA-6800-7
L4	NO.2 I.F. COIL	AA-6800-2

DRIVER LOOP



SPECIFICATIONS

Two loops of 1/4" copper tubing 8" in diameter spaced 1/4" apart with 400 ohms resistor in series. Connecting cable and resistor must be shielded.
The loop should be spaced twice the diameter of the loop from the receiver being aligned to prevent an over modulated signal and poor alignment of the receiver.

VOLTAGE CHART

Line Voltage: 117 Volts AC

Position of volume control: Full with set tunned to quiet channel
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Ground see prong nos. on schematic							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6SA7GT	Converter	0	0	230	85	* *	* *	6.3*	-.45
6SK7GT	I.F. Amp.	0	6.3*	0	-.45	0	85	0	230
6SQ7GT	2nd. Det. A.V.C.	0	-.95	-.9	-1.2	-1.2	125	6.3*	0
6F6GT	P.A.	0	6.3*	215	230	* *	-1.9	0	15
5Y3GT	Rect.	0	290	0	290	0	290	0	290

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 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

THE SPARKS WITHINGTON CO.

MODELS 5-26, 5-26X, 5-26PS

SPARTON PAGE 16

MODELS 5-26, 5-26X, 5-26PS

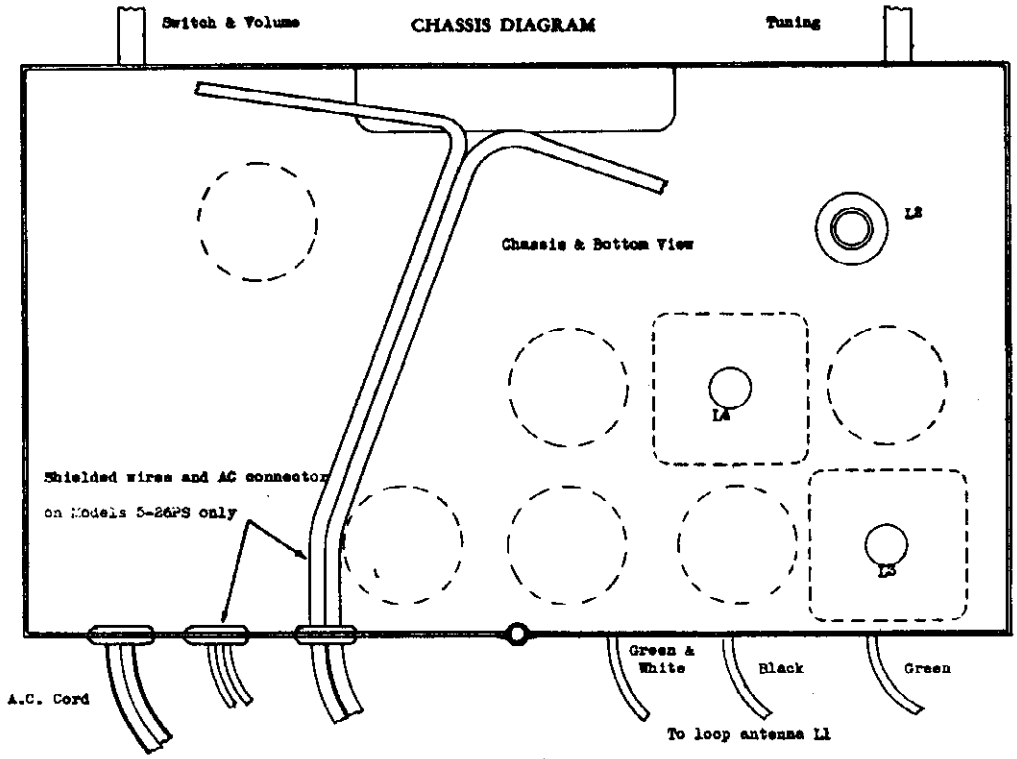
THE SPARKS WITHINGTON CO.

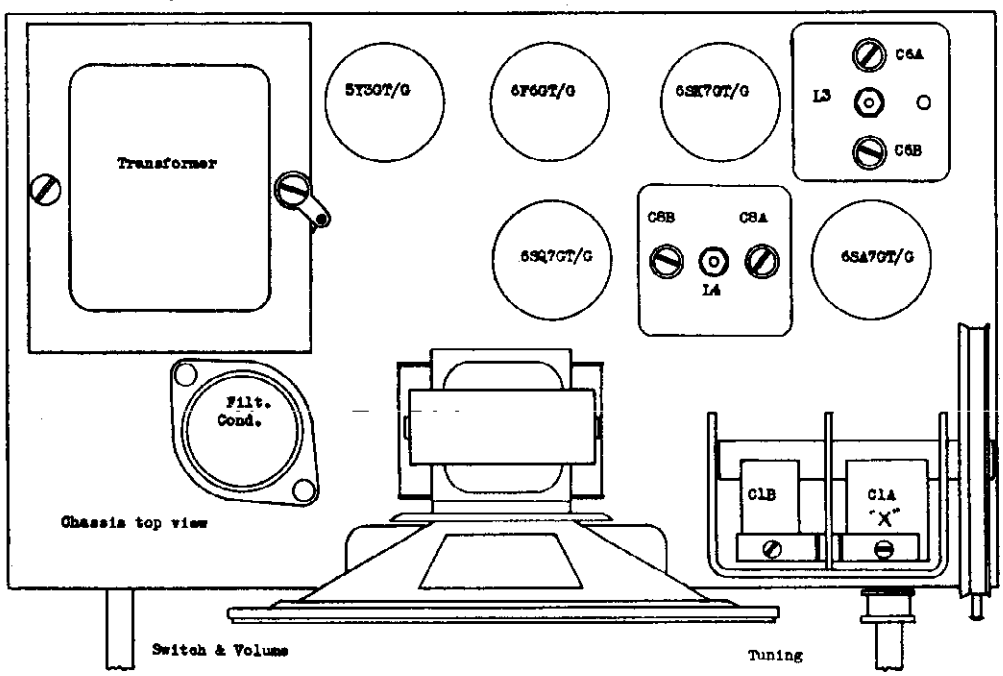
ALIGNMENT DATA

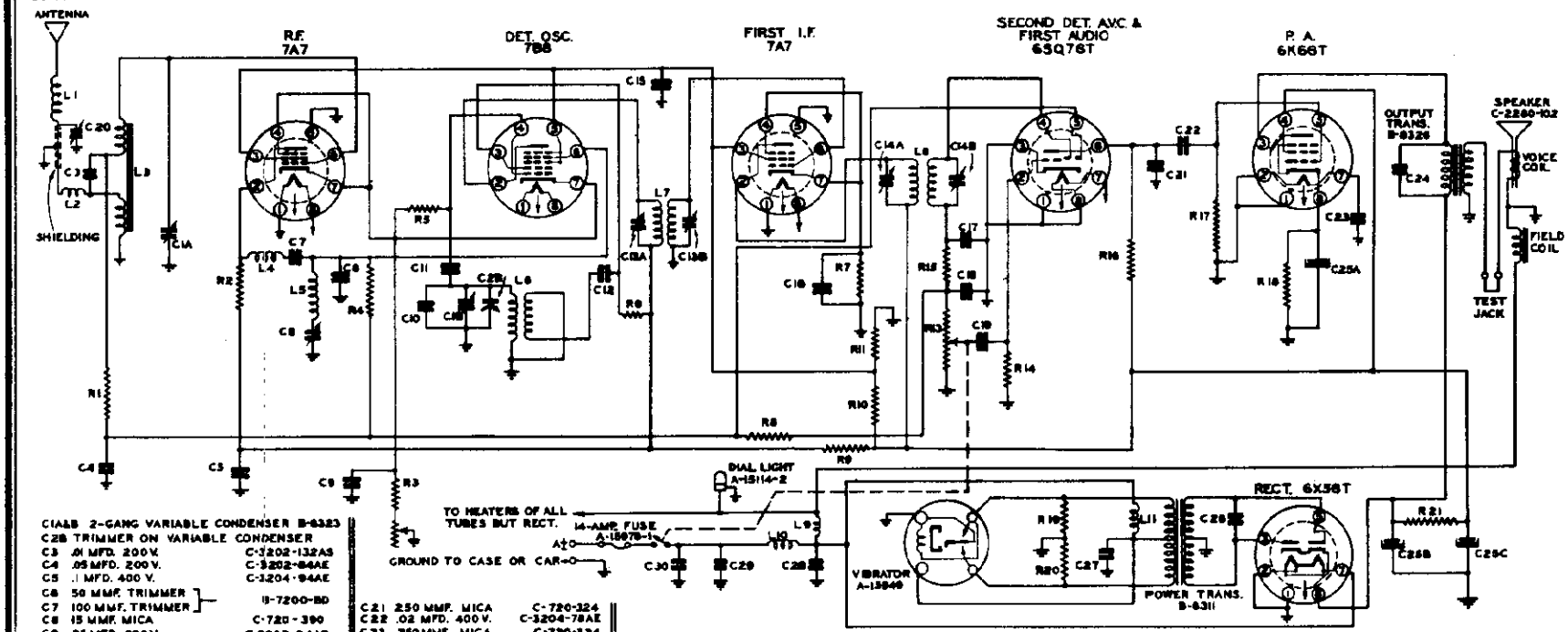
OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING CONDENSER SETTING	TRIMMER	REMARKS
1	Set pointer to last calibration mark at low end of dial with condenser gang fully closed.						
2	I.F.	*	.02MFD	456 KC	Open	C8A&B	Peak accurately
						C6A&B	Peak accurately
3	Broadcast	* *	Driver Loop	1500 KC	1500 KC	C2B Osc.	Peak accurately
						C2A Ant.	Peak accurately
4	(Repeat operation No. 3)						
5	(Check calibration at 600 KC, 900 KC and 1500 KC)						
6	(Check operations 1 to 5 inclusive)						

Notes: * X on chassis diagram.
** Driver loop see diagram below.

CHASSIS DIAGRAM







C1A&B 2-GANG VARIABLE CONDENSER B-8323		
C2B TRIMMER ON VARIABLE CONDENSER		
C3 .01 MFD. 200 V.	C-3202-132AS	
C4 .05 MFD. 200 V.	C-3202-84AE	
C5 .1 MFD. 400 V.	C-3204-94AE	
C6 50 MMF. TRIMMER	B-7200-BD	
C7 100 MMF. TRIMMER		
C8 15 MMF. MICA	C-720-390	
C9 .05 MFD. 200 V.	C-3202-84AE	
C10 14 MMF. CERAMICON	A-14622-2	
C11 250 MMF. MICA	C-720-324	
C12 250 MMF. MICA	C-720-324	
C13A&B NO.1 I.F. TRIMMER	B-7200-GG	
C14A&B NO.2 I.F. TRIMMER	B-7200-GG	
C15 .05 MFD. 200 V.	C-3202-84AE	
C16 .05 MFD. 200 V.	C-3202-84AE	
C17 250 MFD. MICA	C-720-324	
C18 250 MFD. MICA	C-720-324	
C19 .01 MFD. 200 V.	C-3202-76AS	
C20 ANTENNA TRIMMER	A-20046	

C21 250 MMF. MICA	C-720-324	
C22 .02 MFD. 400 V.	C-3204-78AE	
C23 250 MMF. MICA	C-720-324	
C24 .005 MFD. 600 V.	C-3206-86AE	
C25A 20 MFD. 25 V.	ELECT. A-15946	
C25B 10 MFD. 350 V.		
C25C 15 MFD. 350 V.		
C26 .003 MFD. 1600 V.	C-3216-82AS	
C27 .5 MFD. 120 V.	C-3203-102AE	
C28 .5 MFD. 120 V.	C-3203-102AE	
C29 100 MMF. MICA	C-720-325	
C30 .5 MFD. 120 V.	C-3203-102AE	

R1 330,000 Ω .25 W.	C-2795-92B	
R2 15,000 Ω .5 W.	C-2796-78C	
R3 SENSITIVITY CONTROL	A-15962	
R4 1 MEG. .25 W.	C-2795-98B	
R5 100,000 Ω .5 W.	C-2796-86C	
R6 27,000 Ω .5 W.	C-2796-79C	
R7 470 Ω .25 W.	C-2795-58B	
R8 1 MEG. .25 W.	C-2795-98B	
R9 3300 Ω 1 W.	C-2797-66B	
R10 27,000 Ω 1 W.	C-2797-79B	
R11 22,000 Ω .5 W.	C-2796-78C	

R13 350,000 Ω VOL. CONTROL	A-15144	
R14 6.8 MEG. .25 W.	C-2795-108B	
R15 27,000 Ω .25 W.	C-2795-79B	
R16 270,000 Ω .25 W.	C-2795-91B	
R17 470,000 Ω .25 W.	C-2795-94B	
R18 560 Ω 1 W.	C-2797-59B	
R19 56 Ω .5 W.	C-2796-47C	
R20 56 Ω .5 W.	C-2796-47C	
R21 1800 Ω 2 W.	A-20029	

L1 ANT. SPARK CHOKE	A-20000	
L2 ANT. SPARK CHOKE	A-20000	
L3 ANTENNA COIL	A-15997-1	
L4 R.F. COIL	A-15952-1	
L5 R.F. COIL		
L6 OSCILLATING COIL	A-20001-1	

L7 NO.1 I.F. COIL	A-15995	
L8 NO.2 I.F. COIL	A-15995-1	
L9 HEATER HASH CHOKE	A-20002	
L10 MOTOR NOISE CHOKE	A-20007	
L11 HASH CHOKE	A-20002-H	

455 K.C.
INTERMEDIATE FREQUENCY
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 7 should be noted. The output transformer in this circuit is identical to the regular output transformer part No. B-8326 used in the Model 6F1 receiver.

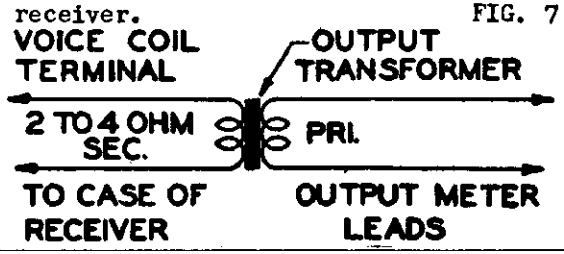


FIG. 7

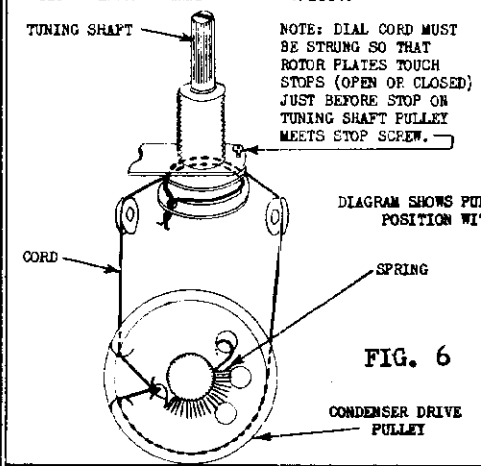


FIG. 6

DIAL CORD

Fig. 6 shows the correct way to string the dial cord. Unless the dial cord is strung properly it may have a tendency to jump off the pulley or otherwise operate improperly.

ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

Dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of two 20 mmf. condensers (SPARTON Part C-720-389). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F1 is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 7 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

I-F ALIGNMENT

1. Set signal generator at 455 KC and connect through the dummy antenna to the receiver.

2. Adjust trimmers C-14 A&B and C-13 A&B to maximum response. (See Fig. 2)

3. Adjust code rejector trimmer C-6 for minimum response. (See Fig. 2).

R-F ALIGNMENT

1. Turn the manual tuning knob until the variable condenser plates are completely out of mesh (1600 KC).

2. Set signal generator 1600 KC.

3. Adjust oscillator trimmers C-2B for maximum response. (See Fig. 4).

4. Set signal generator to 1400 KC and rotate the manual tuning control until a signal is heard.

5. Adjust the antenna trimmer C-20 (See Fig. 5) for maximum response.

6. After receiver has been installed in car the antenna trimmer (C-20) must be adjusted for maximum response on a weak station at or near 1400 KC.

MISCELLANEOUS DATA

TEST JACK

It will be noted that a test jack is provided in the output circuit. The jumper must be connected to the jack in order to have the loud speaker operate properly. This jumper may be conveniently removed to permit the connection of an output meter to the voice coil side of the output transformer.

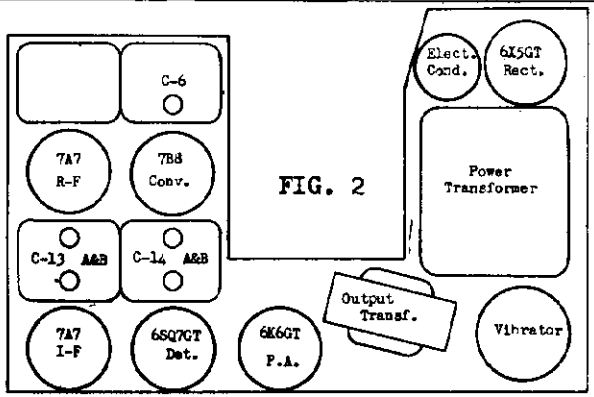


FIG. 2

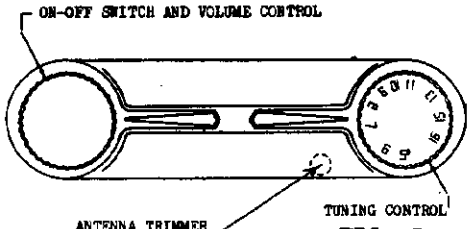


FIG. 5

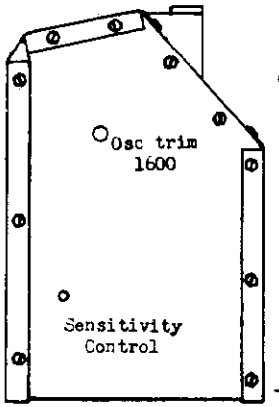


FIG. 4

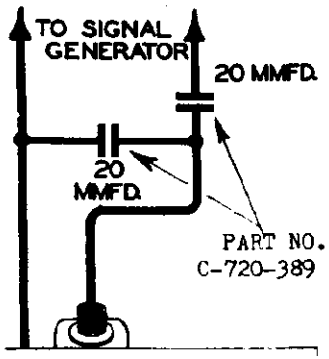


FIG. 3

Sensitivity: 7 microvolts at 1 watt output.

Tuning Range: 540 to 1600 KC.

Current Consumption: 8.5 amps.

Power Output: 3.5 watts measured at voice coil.

Speaker: Full electro dynamic (5 inch.)

THE SPARKS WITHINGTON CO.

MODEL 6F1
MODEL 6F1D

MODEL 6F1 VOLTAGE CHART

Input Voltage: 6.6 volts at panel. Volume Control Full On with Antenna Disconnected

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A7	R-F Amplifier	H 0	P 187	Gs 68	Gsu 3.8	S 0	G 0	K 3.8	H 6.4
7B8	Osc - Converter	H 0	P 225	Ga 137	Go -10	Gs 68	G 0	K 3.8	H 6.4
7A7	I-F Amplifier	H 0	P 244	Gs 68	Gsu 2.6	S 0	G 0	K 2.6	H 6.4
6SQ7 GT	Det - AVC - 1st A-F	S 0	G 0	K 0	Dp 0	Dp 0	P 98	H 6.4	H 0
6K6G T	Power Amplifier	S 0	H 0	P 255	Gs 242	G 0	-	H 6.4	K 18.
6X5G T	Rectifier	S 0	H 0	P 320*	-	P 320*	-	H 6.5	K 275

Notes: Voltage readings are for schematic diagram on page 3. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All D-c measurements made with 20000 ohms per volt voltmeter. All A-c voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are - D-c volts. *Indicates AC volts.
Explanation of Symbols: H - Heater, P - Plate, Ga - Oscillator Anode, Go - Oscillator Grid, Gs - Screen Grid, Gsu - Suppressor Grid, S - Shield, Dp - Diode Plate, K - Cathode.

MODEL 6F1D VOLTAGE CHART

Input Voltage: 6.6 volts at panel. Volume Control Full On with Antenna Disconnected

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A7	R-F Amplifier	H 0	P 153	Gs 72	Gsu 3.5	S 0	G -.1	K 3.5	H 6.3*
7B8	Osc - Converter	H 0	P 205	Ga 130	Go -7	Gs 72	G -.1	K 3.5	H 6.3*
7A7	I-F Amplifier	H 0	P 227	Gs 72	Gsu 2.6	S 0	G 0	K 2.6	H 6.3*
7B6	Det-AVC-1st A-F	H 0	P 94	G -.5	K 0	Dp 0	Dp -.1	K 0	H 6.3*
7C5	Power Amplifier	H 0	P 250	Gs 230	-	-	G 0	K 12	H 6.3*
7Y4	Rectifier	H 0	-	P 275*	-	-	P 275*	K 255*	H 6.4*

Notes: Voltage readings are for schematic diagram on page . Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All D-c measurements made with 20000 ohms per volt voltmeter. All A-c voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are + D-c volts. *Indicates AC volts.
Explanation of Symbols: H - Heater, P - Plate, Ga - Oscillator Anode, Go - Oscillator Grid, Gs - Screen Grid, Gsu - Suppressor Grid, S - Shield, Dp - Diode Plate, K - Cathode.

MODEL 6F1D

THE SPARKS WITHINGTON CO.

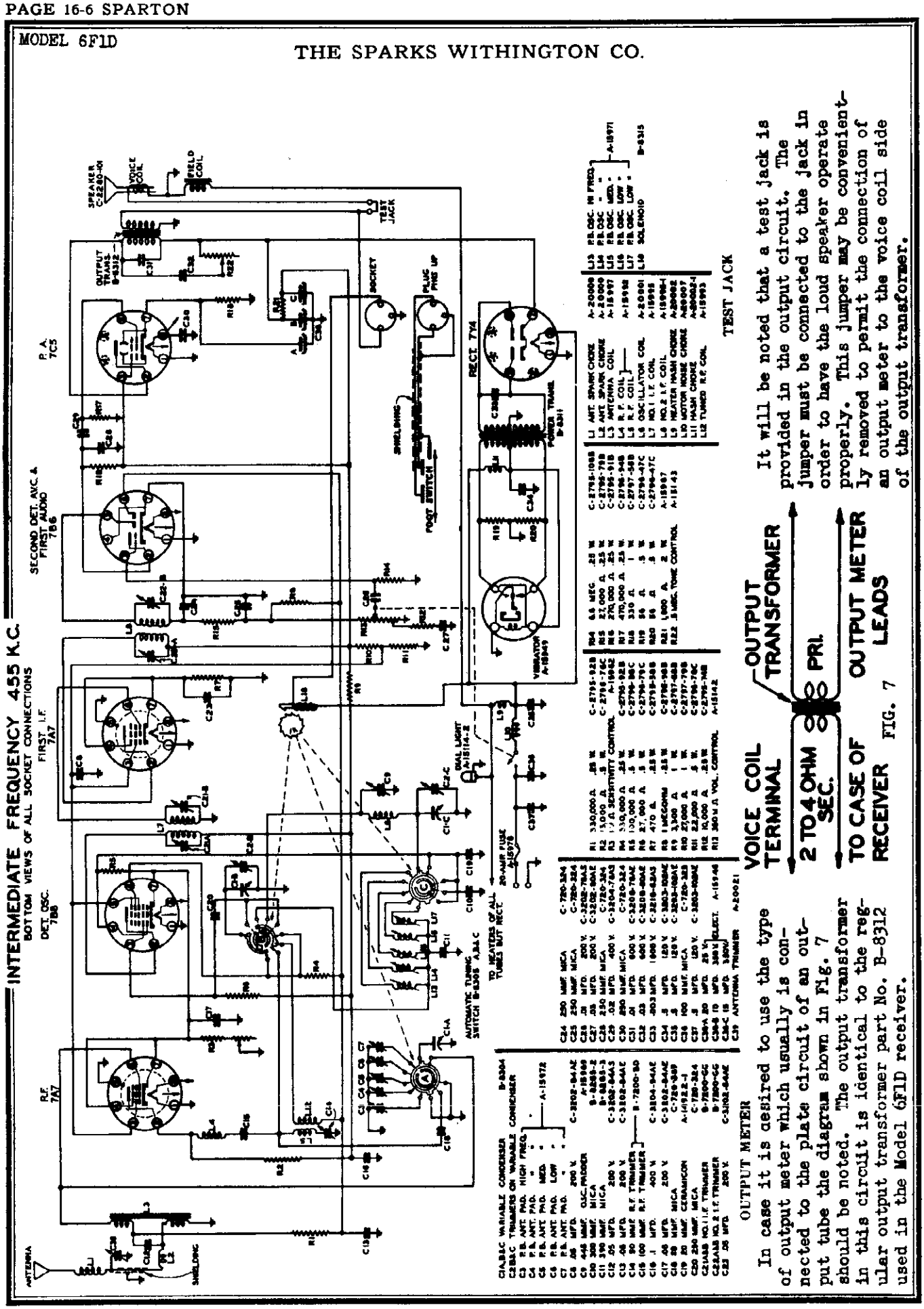


FIG. 7

OUTPUT METER

In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 7 should be noted. The output transformer in this circuit is identical to the regular output transformer part No. B-8312 used in the Model 6F1D receiver.

It will be noted that a test jack is provided in the output circuit. The jumper must be connected to the jack in order to have the loud speaker operate properly. This jumper may be conveniently removed to permit the connection of an output meter to the voice coil side of the output transformer.

For voltages, see Page 16-5

ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

Dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of two 20 mmf. condensers (SPARTON Part C-720-389). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F1D is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 7 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

I-F ALIGNMENT

1. Turn selector switch to the No. 1 (Automatic) position (580 KC).
2. Set signal generator at 455 KC and connect through the dummy antenna to the receiver.
3. Adjust trimmers C-22 A&B and C-21 A&B to maximum response. (See Fig. 2).
4. Adjust code rejector trimmer C-14 for minimum response. (See Fig. 2).

R-F ALIGNMENT

1. Turn selector switch to "Manual Tuning" (D).
2. Turn the manual tuning knob until the variable condenser plates are completely cut of mesh (1600 KC).
3. Set signal generator 1600 KC.
4. Adjust oscillator trimmer C-2C for maximum response. (See Fig. 4).
5. Set signal generator to 1400 KC and rotate the manual tuning control until a signal is heard.
6. Adjust R-F trimmer C-2B (See Fig. 4) and the antenna trimmer C-39 (See Fig. or maximum response.
7. Set the signal generator to 600 KC and rotate the manual tuning control until a signal is heard.
8. The variable condenser should then be rocked slightly while adjusting the oscillator padder condenser C-9. (See Fig. 5).
9. Repeat adjustments described in step 6 to make sure that condensers C-2B and C-39 are peaked for maximum response.
10. After receiver has been installed in car the antenna trimmer (C-39) must be adjusted for maximum response on a weak station at or near 1400 KC.

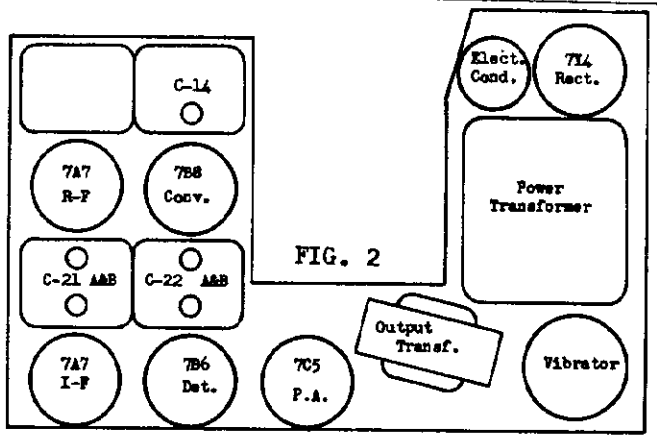


FIG. 2

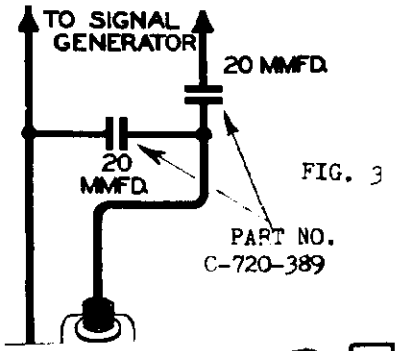


FIG. 3

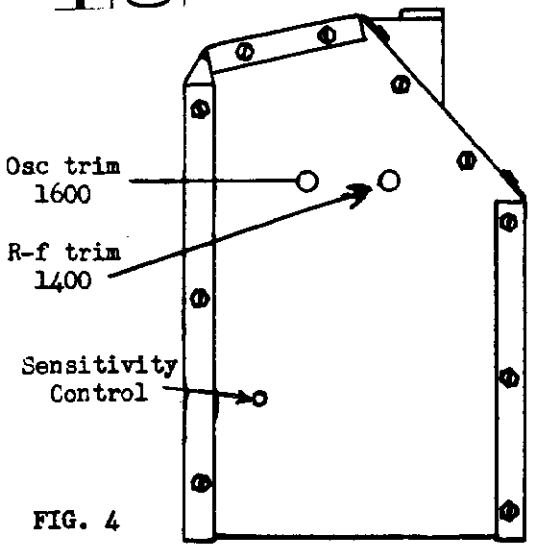


FIG. 4

SETTING THE ROTO-SELECTOR

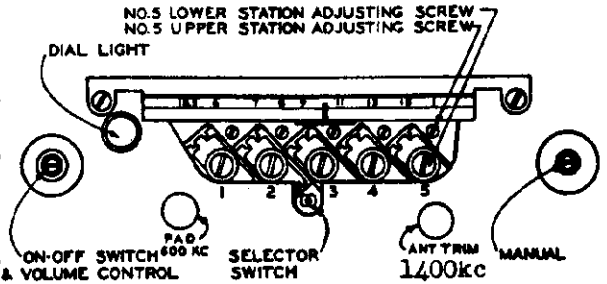
1. Turn receiver on and allow it to operate for approximately ½ hour. (This is necessary in order that the operating temperature may reach normal and to be assured of accurate adjustment).

2. Remove the plastic escutcheon over the tuning control by first pulling off the three (3) knobs and removing the lock nuts on the tuning and volume control shafts. With the escutcheon removed, the automatic adjusting screws become accessible as shown in Fig. 5. The adjustments are easily made by means of a small screw driver.

3. Select five stations within the frequency range shown under each set of adjustment screws in Fig. 5.

4. With the selector switch in the "D" position, tune in manually the broadcast station to be set up on position No. 1 and identify the program. Note: Due to the net-work programs broadcast by many stations, it is advisable to wait until the station announces its call letters before completing the adjustments.

5. With the desired station accurately tuned in turn selector switch to the No. 1 position. Now using the screw driver turn the top screw at position No. 1 until the station selected is brought in with the loudest volume, then adjust the larger screw at the bottom until maximum volume is obtained. Note: Stations of the higher frequencies are tuned in by turning the screws to the left (counter-clockwise). Lower frequency stations are tuned by turning the screws to the right (clockwise).



TUNING RANGES		WHEN SHIPPED, THE AUTOMATICS ARE ADJUSTED TO THESE FREQUENCIES:	
1	540-950 K. C.	1	580 K.C.
2	540-950 K. C.	2	780 K.C.
3	650-1300 K. C.	3	1000 K.C.
4	850-1600 K. C.	4	1200 K.C.
5	950-1600 K. C.	5	1380 K.C.

FIG. 5

6. Proceed with setting up the remaining four stations in the same manner as described under paragraphs 4 and 5.

7. Recheck the screws for each station to make sure that each one of the selected stations is tuned in as accurately as possible. It is advisable for the final rechecking of adjustments to be made in an area of low signal strength or in some known "dead spot", where radio signals are difficult to receive.

SOLENOID PLUNGER

The solenoid plunger is fully lubricated at the factory and normally no special lubrication service will be required. However, it is good practice to place one or two drops of lubricant on the plunger at such times as the receiver may be in the service shop. Use only Super Pyroil "B" as a plunger lubricant. It is readily obtainable from any auto supply house or from the factory.

DIAL CORD

Fig. 6 shows the correct way to string the dial cord. Unless the dial cord is strung properly it may have a tendency to jump off the pulley or otherwise operate improperly.

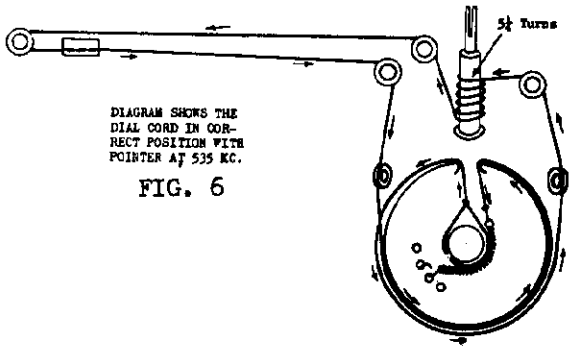
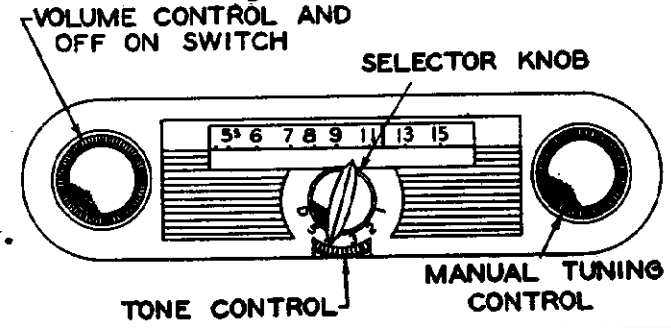


FIG. 6

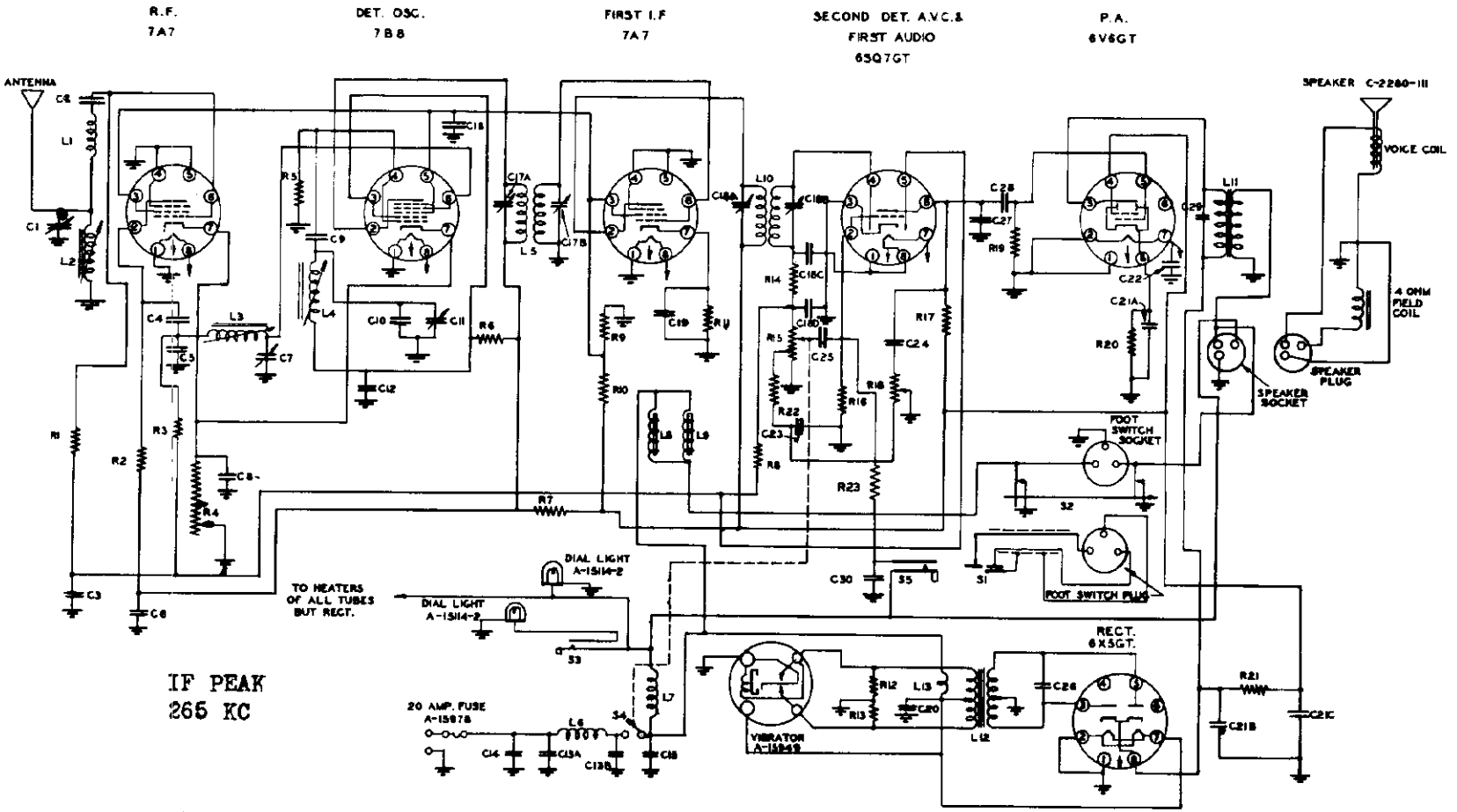
ELECTRICAL SPECIFICATIONS

Sensitivity: 7 microvolts at 1 watt output.
Power Output: 4.5 watts measured at voice coil.
Speaker: Full electro dynamic (7 inch diameter).
Roto-Selector Tuning: Automatic tuning for five stations.
Current Consumption: 8.5 amps.
Foot Control Switch (Optional): Automatic tuning for five stations and automatic reduction of volume by floor-mounting foot control switch.



THE SPARKS WITHINGTON CO.

MODEL 6F2D



FOOT SWITCH	A-20566	L11	OUTPUT TRANSFORMER	B-8312-1	C12	300 MMFD. SILVER MICA	B-8285-2	C23	.03 200 V.	C-3202-88AE	R7	3300 Ω 1 W.	C-2797-68C
ACTUATOR & MUTING SWITCH	A-20445	L12	POWER TRANSFORMER	B-8480	C13A	DUAL 200 MMFD MICA	A-20458	C24	.005 600V.	C-3206-66AE	R8	1,000,000 Ω 1/2 W.	C-2796-98C
DIAL LIGHT SWITCH	A-20536	L13	TRANSFORMER HASH CHOKE	A-20002-1	C13B			C25	.01 200 V.	C-3202-76AE	R9	22,000 Ω 1/2 W.	C-2796-78C
OFF-ON SWITCH					C14	.5 100 V.	C-3209-102AE	C26	.004 1600V.	C-3216-84AS	R10	27,000 Ω 1 W.	C-2797-78C
DELAY MUTING SWITCH	A-20536				C15	.5 100 V.	C-3201-102AE	C27	250 MMFD. MICA	C-720-324	R11	470 Ω 1/2 W.	C-2796-58C
					C16	.05 200V.	C 3202-84AE	C28	.02 400 V.	C-3204-78AE	R12	56 Ω 1/2 W.	C-2796-47C
ANTENNA SPARK CHOKE	A-20496	C1	ANTENNA TRIMMER	A-20445	C17A	I. F. TRIMMER ASSEMBLY	A-20023-2	C29	.005 600 V.	C-3206-66AE	R13	56 Ω 1/2 W.	C-2796-47C
ANTENNA COIL	A-20527	C2	.01 200V.	C-3202-76AE	C17B			C30	.02 400 V.	C-3204-78AE	R14	27,000 Ω 1/2 W.	C-2796-78C
R.F. COIL	A-20527-1	C3	.05 200V.	C-3202-84AE	C18A						R15	350,000 Ω VOLUME CONTROL	A-15146
OSCILLATOR COIL	A-20528	C4	25 MMFD. MICA	C-720-369	C18B	NO.2 I.F. TRIMMER ASSEMBLY	A-20096				R16	10,000,000 Ω 1/2 W.	C-2796-110C
1ST DET. COIL ASSEMBLY	A-15995-2	C5	650 MMFD	C-720-385	C18C						R17	270,000 Ω 1/2 W.	C-2796-91C
A.V.C. LEAD SPARK CHOKE	A-20482	C6	.1 400V.	C-3204-94AE	C18D						R18	1 MEG. TONE CONTROL	A-15446
HEATER HASH CHOKE	A-20481	C7	R.F. TRIMMER	A-20522-1	C19	.05 200 V.	C-3202-84AE	R1	330,000 Ω 1/2 W	C-2796-82C	R19	470,000 Ω 1/2 W.	C-2796-94C
TUNER SOLENOID ASSEMBLY	B-8456	C8	.1 200 V.	C-3202-94AE	C20	.5 100 V.	C-3201-102AE	R2	33,000 Ω 1/2 W	C-2796-80C	R20	330 Ω 1 W.	C-2797-56C
TUNING SOLENOID ASSEMBLY	B-8457	C9	50 MMFD MICA	C-720-315	C21A	20 MFD. 25V.	ELECTROLYTIC CONDENSER A-20092	R3	330,000 Ω 1/2 W	C-2796-82C	R21	1800 Ω 2 W.	A-20029
1ST I.F. COIL ASSEMBLY	A-15995-3	C10	350 MMFD. COMPENSATOR	A-20463-1	C21B	10 MFD. 350V.		R4	SENSITIVITY CONTROL 1000 Ω	A-15962	R22	10,000 Ω 1/2 W.	C-2796-74C
		C11	OSCILLATOR TRIMMER	A-20522	C21C	15 MFD. 300V.		R5	100,000 Ω 1/2 W	C-2796-86C	R23	1,000,000 1/2 W.	*C-2796-98C
					C22	250 MMFD. MICA	C-720-324	R6	27,000 Ω 1/2 W	C-2796-78C			

ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

A dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of one 20 mmf. condenser (SPARTON Part C-720-389) and one 30 mmf. condenser (SPARTON Part C-720-308). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F2D is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 6 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

I-F ALIGNMENT

1. Index the tuner to dial position and tune the set to 550 KC.

2. Set the signal generator at 265 KC and connect through the dummy antenna to the receiver.

3. Adjust trimmers C-18 A&B and C-17 A&B for maximum response. (See Fig. 5.)

R-F ALIGNMENT

1. Tune the set to 1610 KC by rotating the tuning knob as far as it will go clockwise.

2. Set the signal generator to 1610 KC.

3. Adjust the oscillator trimmer C-11, the RF trimmer C-7 and the antenna trimmer C-1 for maximum response, in the sequence given. (See Fig. 4 & 5 for trimmer locations.)

4. After the receiver has been installed in the car the antenna trimmer C-1 must be adjusted for maximum response with the set tuned to a weak station near 1600 KC.

SOLENOID PLUNGER

The solenoid plunger is fully lubricated at the factory and normally no special lubrication service will be required. However, it is good practice to place one or two drops of lubricant on the plunger at such times as the receiver may be in the service shop. Use only Super Pyroil "B" as a plunger lubricant. It is readily obtainable from any auto supply house or from the factory.

DIAL CORD

The dial pointer should be so adjusted that when the iron slugs are in the maximum out position with respect to the coils the dial pointer should be the pointer width to the right hand side of 1600 KC on the dial scale.

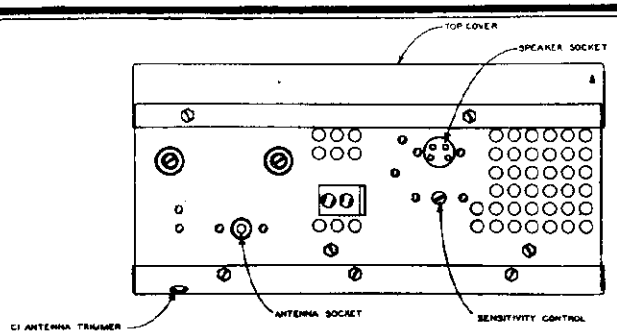
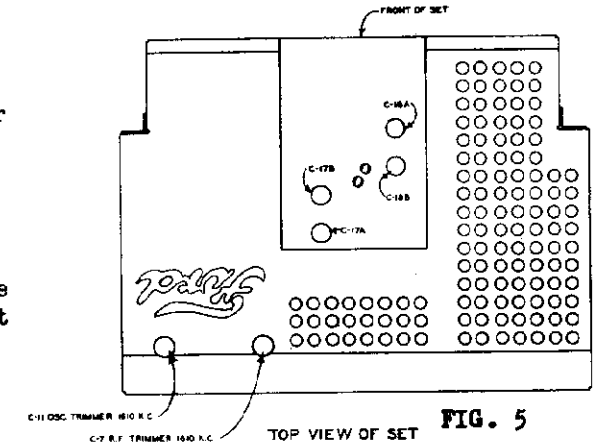


FIG. 4 BACK VIEW OF SET



TOP VIEW OF SET

FIG. 5

TO SIGINAL GENERATOR

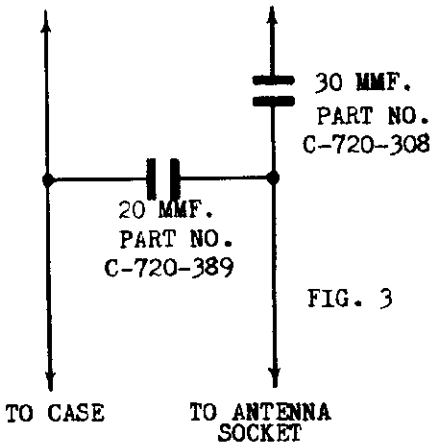


FIG. 3

SETTING THE ADJUST-O-MATIC TUNER

1. Turn receiver on and allow it to operate for approximately ½ hour. (This is necessary in order that the operating temperature may reach normal and to be assured of accurate adjustment).

2. With the tuning knob in its normal position and the tuner indexed so that the word DIAL in the pointer background is illuminated, the set is ready for manual operation.

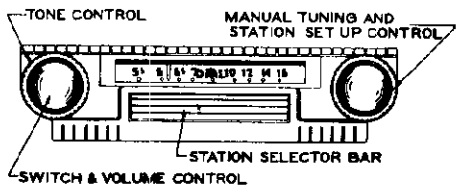
3. By indexing the tuner with the push bar the first automatic position is ready for setting up. The station is tuned in by retracting the manual knob and tuning to the desired station as indicated by the dial pointer.

4. The manual knob should then be pushed back to its normal position.

5. The next automatic position may then be indexed and the desired station set up in the same manner as mentioned in paragraph 3 and 4.

6. After all five automatic positions are set up the manual knob should be returned to its normal position. If desired, the manual position may also be set up and used as an automatic position. Any station may be set up in any desired automatic position.

Note: Due to the net-work programs broadcast by many stations, it is rather difficult to determine the station until the station call letters have been announced.



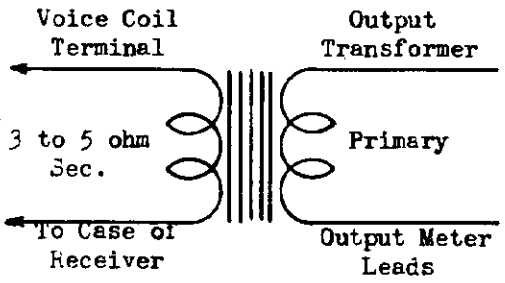
Input Voltage: 6.6 Volts. Volume Control Full on with Antenna Disconnected									
TUBE	FUNCTION	Voltage of socket prongs to gnd.(See schematic dia.)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A7	R-F Amplifier	H 0	P 132	Gs 112	Gsu 0	S 0	G -.03	K 2.9	H 6.25
7B8	Osc-Converter	H 0	P 208	Gs 142	Go -.75	Gs 60	G -.03	K 2.9	H 6.25
7A7	I-F Amplifier	H 0	P 223	Gs 62	Gsu 0	S 0	G 0	K 2.1	H 6.25
6SQ7GT	Det-AVC-1st AF	S 0	G -.22	K 0	Dp -.3	Dp -.3	P 95	H 6.25	H 0
6V6GT	Power Amplifier	-	H 0	P 235	Gs 225	G 0	-	H 6.25	K 12
6X5GT	Rectifier	-	H 0	P 230*	-	P 230*	-	H 6.2	K 250

Notes: Voltage readings are for schematic diagram on page 3. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are + DC volts. *Indicates AC volts.
Explanation of Symbols: H-Heater, P-Plate, Ga-Oscillator Anode, Go-Oscillator Grid, Gs-Screen Grid, Gsu-Suppressor Grid, S-Shield, Dp-Diode Plate, K-Cathode.

OUTPUT METER

In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 6 should be noted.

The output transformer in this circuit is identical to the regular output transformer part No. B-8312-1 used in the Model 6F2D receiver.



Sensitivity: 6 microvolts at 1 watt output.

Power Output: 4.5 watts measured at voice coil.

Current Consumption: 8.5 Amps.

Speaker: Full electro dynamic (6 x 9 inch oval).

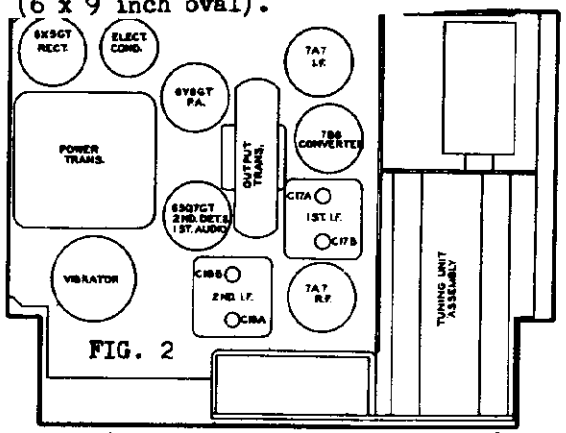
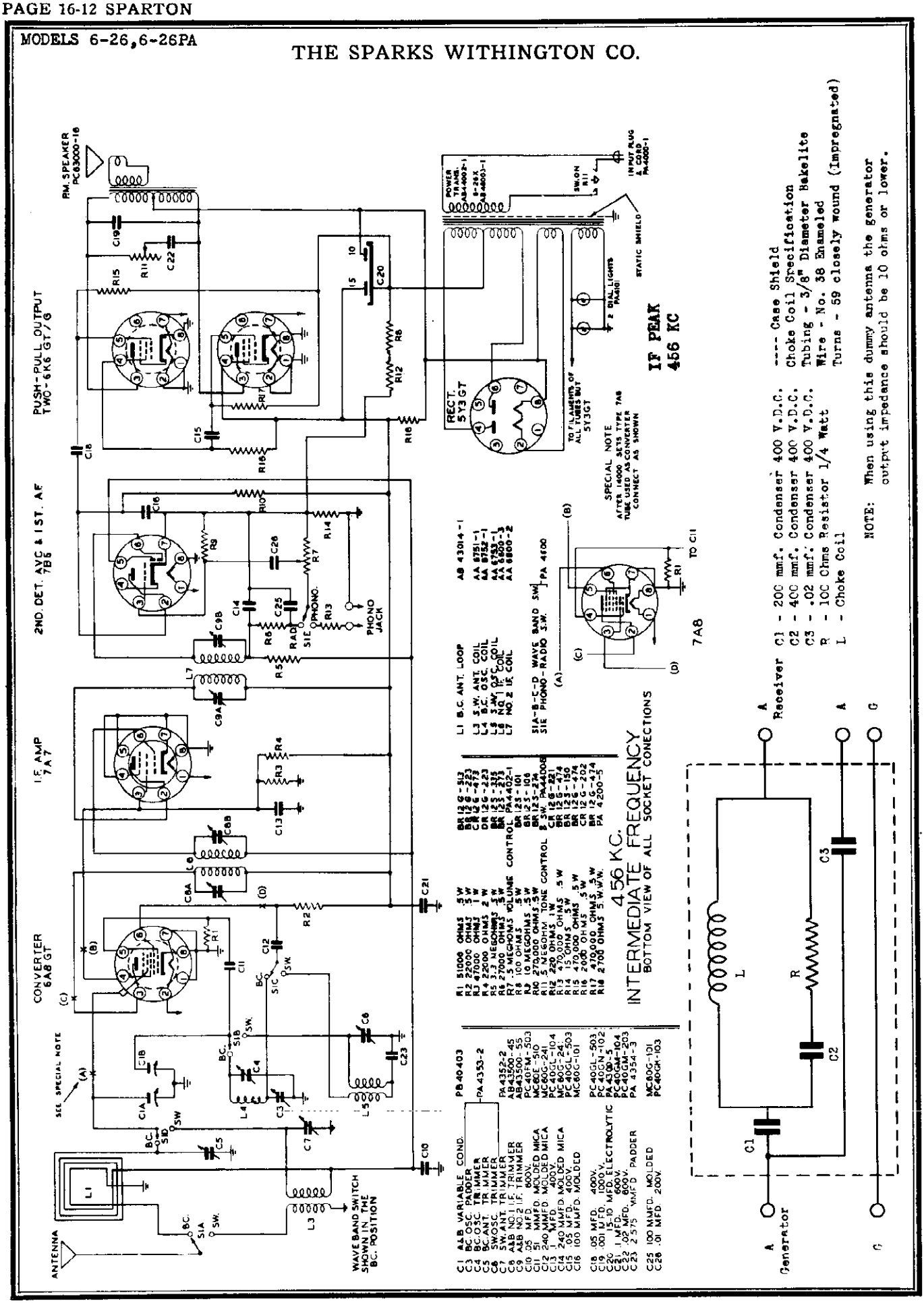


FIG. 2

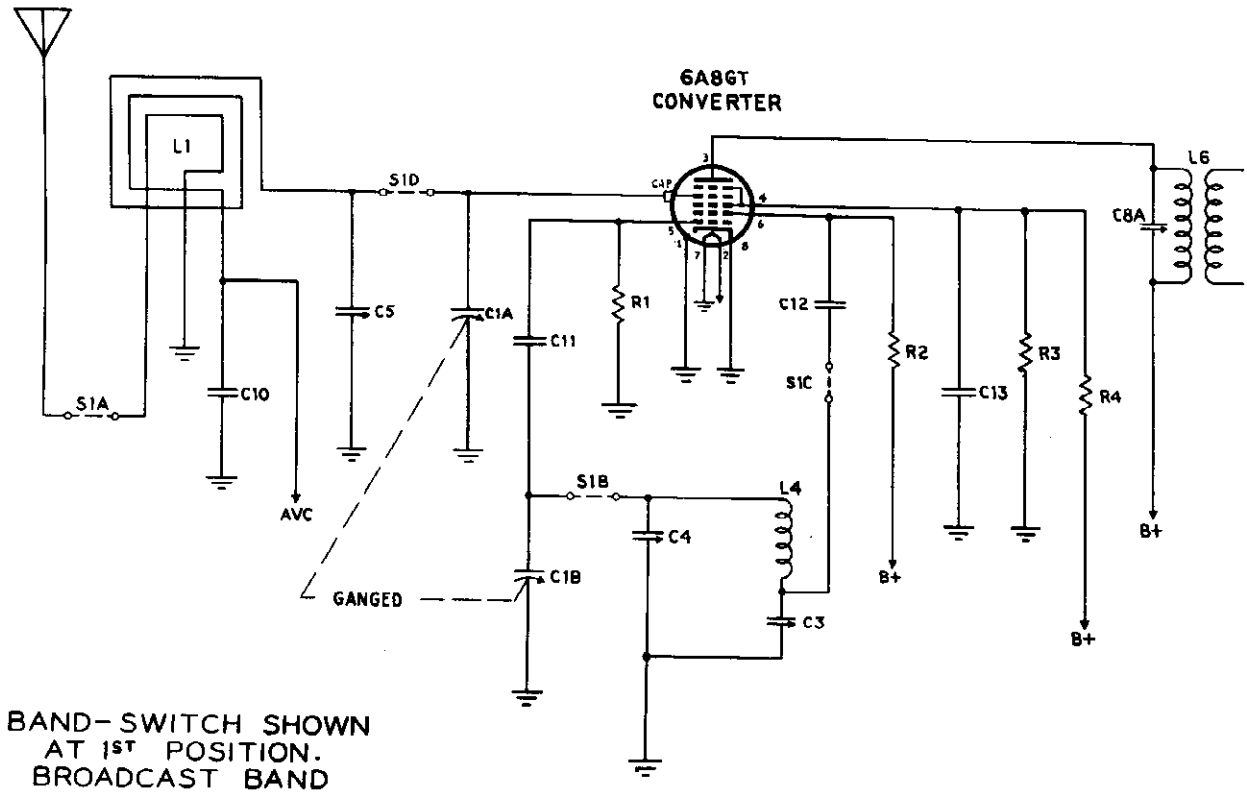
MODELS 6-26,6-26PA

THE SPARKS WITHINGTON CO.

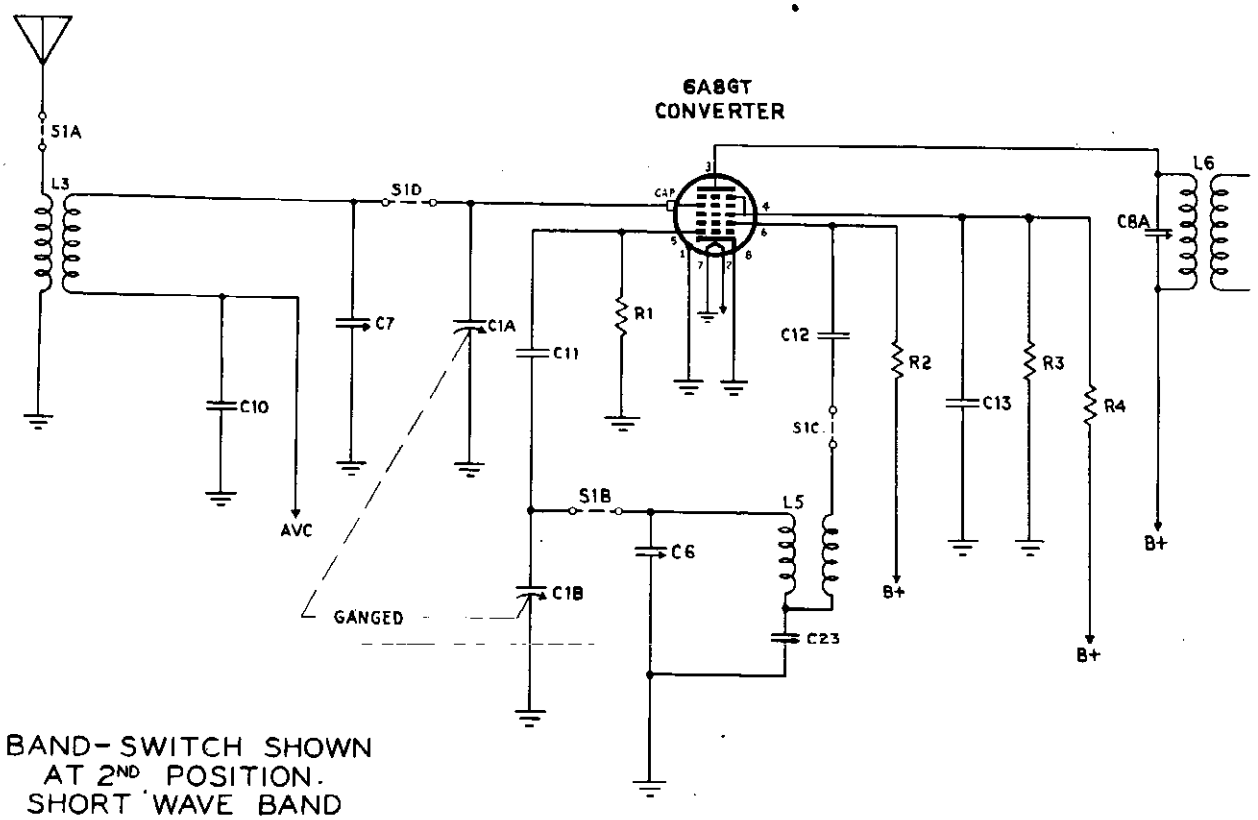


MODELS 6-26,6-26PA

THE SPARKS WITHINGTON CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND

C3,C4,C5,C6, REFER TO TRIMMERS ON THE RIGHT SIDE OF CHASSIS IN THE BOTTOM VIEW.

C3 ⊖
C4 ⊖
C5 ⊖
C6 ⊖

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING CONDENSER SETTING	TRIMMERS	REMARKS
1	Set dial pointer even with L.H. stop line with condenser gang fully closed.							
2	I.F.	G.C. 6A8GT	.02 MFD.	456 KC.	BC	OPEN	C9 A & B	Peak Accurately
							C8 A & B	Peak Accurately
3	BC	Driver Loop	*	1500 KC.	BC	1500 KC.	C4 Osc.Trim.	Peak Accurately
							C5 Ant.Trim.	Peak Accurately
				600 KC.	BC	600 KC.	C3 Osc.Pad.	Peak Accurately
4	(Repeat Operation #3)							
5	Check Calibration at 600 KC., 1000 KC., and 1500 KC.							
6	S.W.	"A" on Antenna Strip	* *	18 MC.	S.W.	18 MC.	C6 Osc.Trim.	Peak Accurately
							C7 Ant.Trim.	* * *
							C23 Osc.Pad.	See Operation #7
7	Osc. padder C23 is percision set at the factory and should not be readjusted in the field.							
8	(Repeat Operation #6)							
9	Check calibration at 6 MC., 11 MC., and 18 MC.							
10	Check Operations 1 to 6 inclusive.							

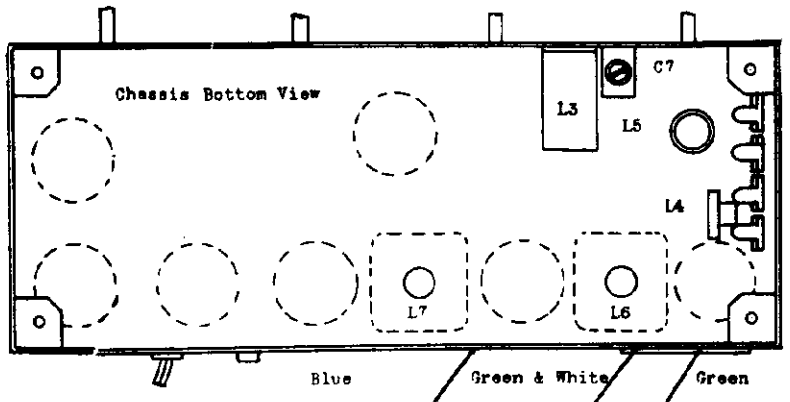
NOTES: * Driver Loop. See manual 5, Bulletin 1-1 for diagram.
** Standard Dummy. See diagram below.
*** Rock dial while making this adjustment.

VOLTAGE CHART

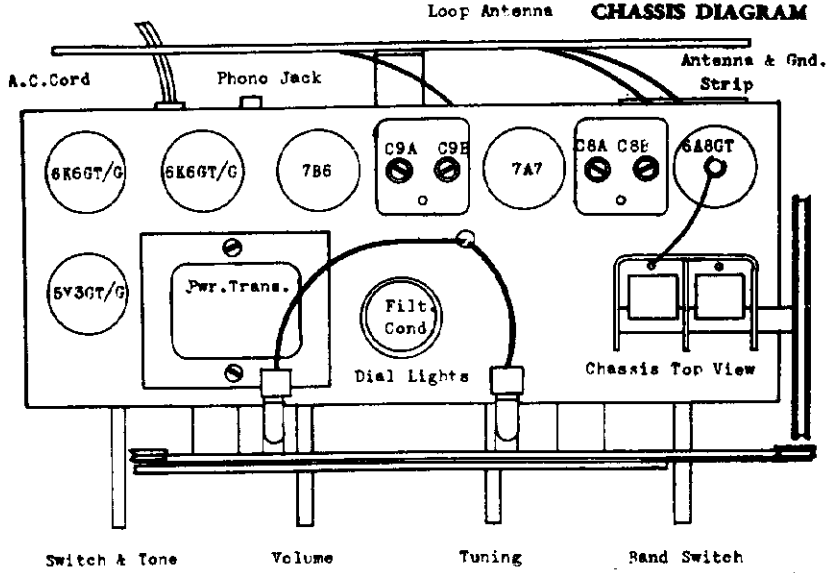
Line Voltage: 117 Volts AC — Position of Volume Control: Full with set tunned to quiet channel. Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Ground See Prong Diagram Schematic.								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	G.Cap.
6A8GT/G	Converter	0	6.4*	233	87.5	5.6	150	C	0	-.98
7A7	I.F. Amplifier	6.4*	230	85	0	0	-1.03	C	0	-
7B6	2-d. Det. AVC. 1st A.F.	6.4*	97.5	-1.15	-1.0	-1.15	-1.23	-1.0	C	-
6K6GT/G	Phase Invt. output	C	0	217.5	217.5	**	0	6.4*	13.5	-
6K6GT/G	Push-Pull Output	0	0	217.5	230	**	0	6.4*	13.5	-
5V3GT/G	Rectifier	0	237.5	C	320	0	320	0	237.5	-

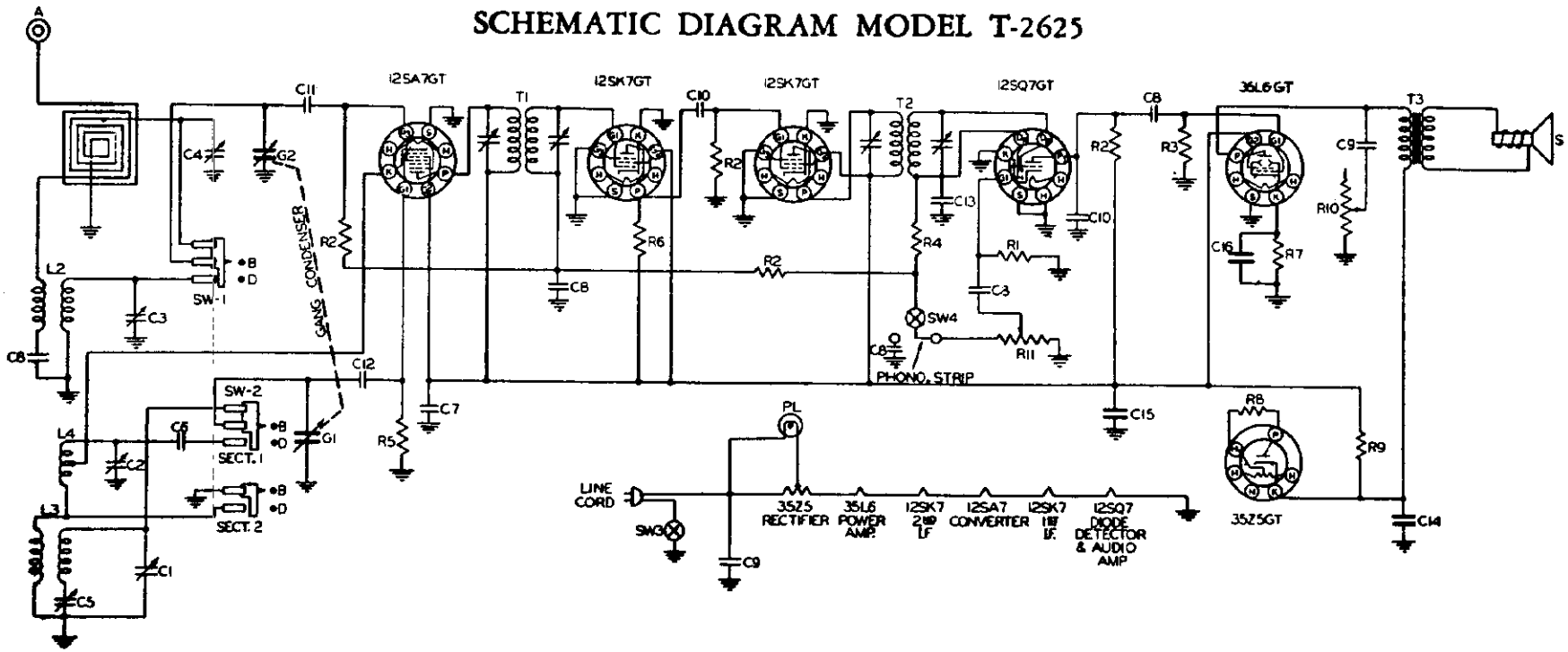
NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
* AC volts.
** Cannot be measured with 20,000 ohms/volt voltmeter.



CHASSIS DIAGRAM



SCHEMATIC DIAGRAM MODEL T-2625



PART NO	SCHEMATIC LOCATION	DESCRIPTION
3-2	R1	2 MEG ± ½W 20% RESISTOR
3-6	R2	1 MEG ± " " "
3-1	R3	500M ± " " "
3-4	R4	50M ± " " "
3-116	R5	30M ± " " "
3-321	R6	1700 ± " 10% "
3-34	R7	100 ± " 20% "
3-174	R8	50 ± " " "
3-37	R9	2500 ± " " "
5-311	R10	25M ± TONE CONTROL
5-310	R11	1 MEG ± VOLUME CONTROL
9-305	C1	BC. OSC. TRIMMER COND.
	C2	SW. OSC. TRIMMER COND.
	C3	SW. ANT. TRIMMER COND.
9-47	C4	BC. ANT. TRIMMER COND.
9-27	C5	BC. OSC. PADDER COND.

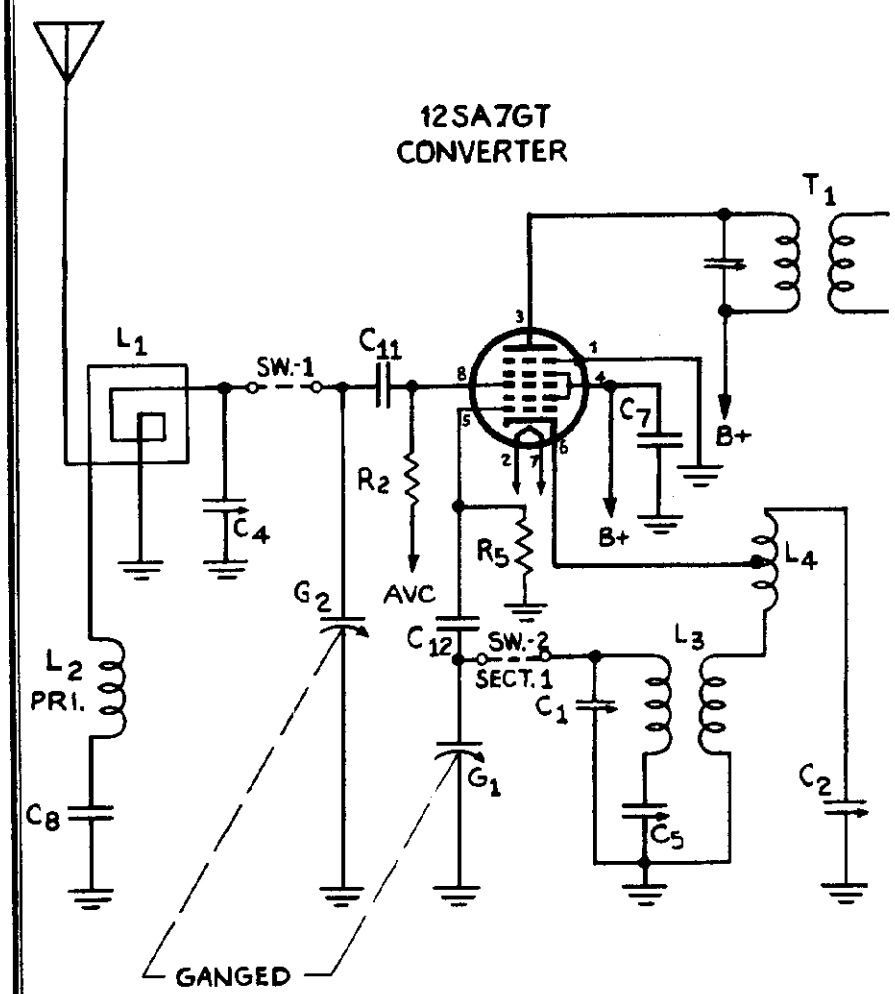
PART NO	SCHEMATIC LOCATION	DESCRIPTION
	C6	SW. OSC. PADDER COND. 250WV (ON COIL)
6-26	C7	0.1 MFD. 400 VDC PAPER COND.
6-3	C8	.01 MFD. " " "
6-14	C9	.05 MFD. " " "
8-10	C10	.00025 MFD. 20% MICA COND.
8-43	C11	.0005 MFD. " " "
8-13	C12	.00005 MFD. " " "
8-8	C13	.0001 MFD. " " "
A7-302	C14	80 MFD. 150WV ELECTROLYTIC COND.
	C15	10 MFD. " " "
	C16	10 MFD. 25WV " "
15-315	L1	BC. LOOP
15-316	L2	SW. ANTENNA COIL
15-317	L3	BC OSCILLATOR COIL
	L4	SW. " "
43-301	S	PM SPEAKER

PART NO	SCHEMATIC LOCATION	DESCRIPTION
16-39	T1	INPUT IF TRANSFORMER
16-40	T2	OUTPUT IF "
	T3	OUTPUT TRANSFORMER (ON SPKR)
14-307	SW1	BAND SWITCH
	SW2	" "
	SW3	ON-OFF SWITCH ON VOL. CONTROL
28-303	SW4	PHONO. JACK & SWITCH
47	PL	PILOT LIGHT
40-306	12SA7GT	CONVERTER
	12SK7GT	1ST & 2ND IF
	12SQ7GT	DIODE DETECTOR & AUDIO AMP.
	35L6GT	POWER AMPLIFIER
	35Z5GT	RECTIFIER
10-304	G1	OSCILLATOR TUNING COND.
	G2	ANTENNA TUNING COND.

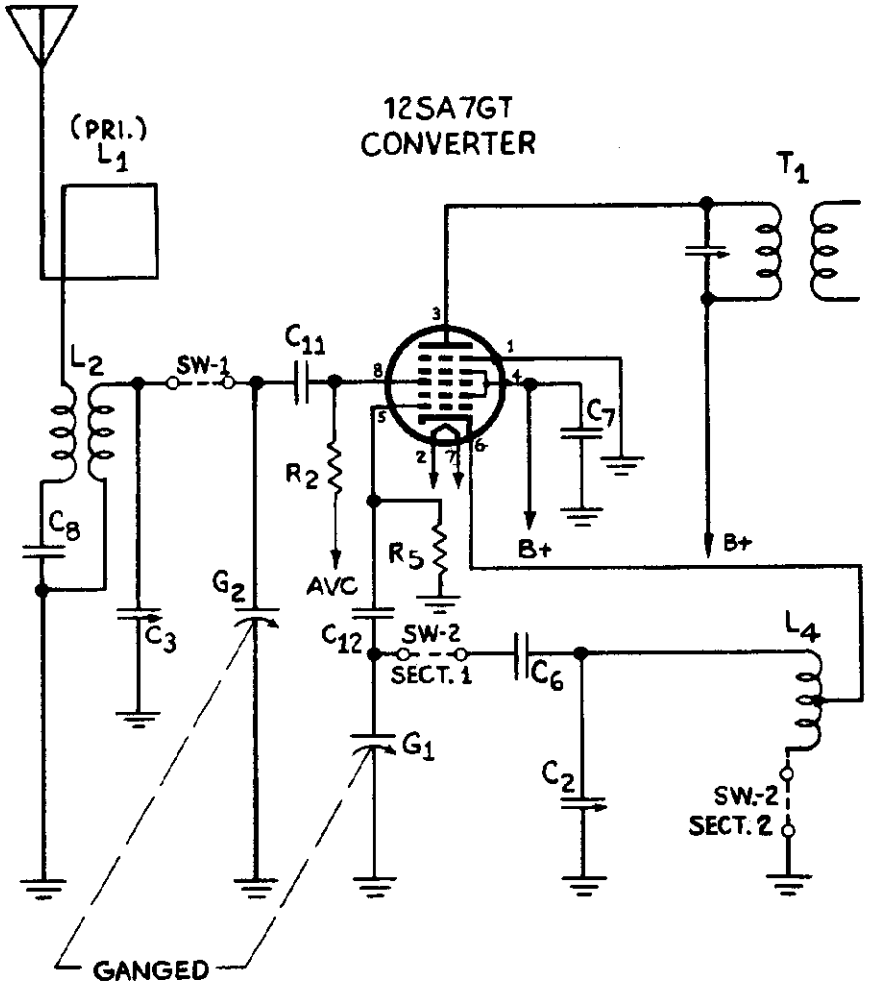
DRAWN BY [illegible] APPROVED BY [illegible]
MARCH 2, 1948

SPIEGEL

SPIEGEL PAGE 16
MODEL T-2625



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND

SPIEGEL

"clarified schematics"

ALIGNMENT AND SERVICE DATA

Remove the chassis from the cabinet for alignment.

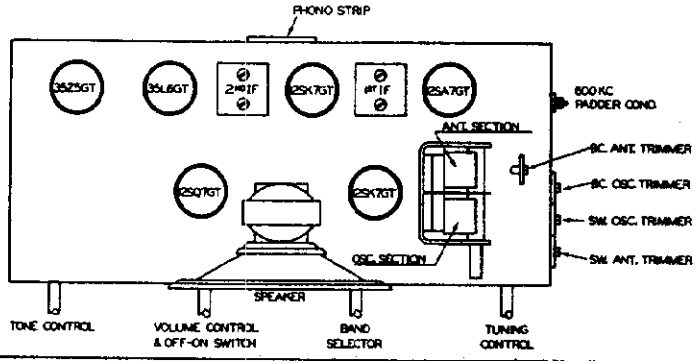
A signal generator is required having the following frequencies: 456KC, 1400KC, 1720KC, 5MC, 16MC, 18.3MC. An output meter should be connected across the speaker.

I. F. Alignment: Connect the generator lead through a .1MFD condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the chassis base. Set the generator at 456KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (see Fig. No. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the I F and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

BC or Broadcast Alignment: With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1720KC. Adjust the BC oscillator trimmer until the signal is tuned in. Next, remove the generator leads and connect them to the antenna lead of the loop antenna, through a 100 MMFD condenser. Set the generator to 1400KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600KC and turn the tuning condenser until the signal is tuned in. Rock the tuning control back and forth slowly until a maximum reading is noted on the output meter. It is advisable to return to the 1720KC adjustment and recheck that setting to make sure it has not changed while padding at 600KC.

SW or Short Wave Alignment: Set the generator at 18.3MC. Turn the receiver band switch to short wave position. Turn the tuning condenser to complete minimum capacity. The generator leads should be connected to the antenna lead of the loop through a 400 Ohm resistor. Adjust the S. W. oscillator trimmer slowly until the 18.3MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is tuned in. Turn up the generator output and tune the receiver to approximately 17.3MC. At this point, the 18.3MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to complete minimum and readjust the SW oscillator trimmer. Remember the image must always be heard (at 2 times the IF frequency in KC) lower in frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16MC and rotate the tuning control until the signal is tuned in. Adjust the SW antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary, as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6MC.



INSTRUCTIONS FOR CONNECTING F.M., TELEVISION OR PHONOGRAPH CONVERTOR

A shielded lead wire is usually provided with the aforementioned instruments. To connect them to this receiver, plug the insulated wire into the hole on the connector strip which is marked with red paint. The shield or bare wire is plugged into the unmarked hole. When the wires are plugged in, the radio portion of the receiver is automatically cut off. It is only necessary to turn the volume control to increase or decrease volume.

When you desire to use the receiver for radio reception, it is necessary to pull out the external plugs.

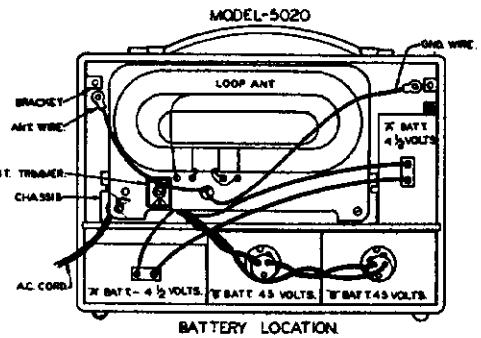
MODEL 5020 BATTERY SUPPLIERS

The batteries for this receiver may be purchased from any reliable radio dealer.

For proper operation of this receiver, you must use, two (2) 4½ Volt "A" batteries, and two (2) 45 Volt "B" batteries.

The following is a table of manufacturers and their battery type number:

Mfgr.	Volts	Type No.
"B" BATTERIES (2 Required)		
Burgess	45 "B"	M30
General	45 "B"	W30B
Bright Star	45 "B"	3033
Usalite	45 "B"	640
Rayovac	45 "B"	P7830
Eveready	45 "B"	482
"A" BATTERIES (2 Required)		
Burgess	4½ "A"	G3
General	4½ "A"	3H3
Bright Star	4½ "A"	361
Usalite	4½ "A"	683
Rayovac	4½ "A"	P83A
Eveready	4½ "A"	746



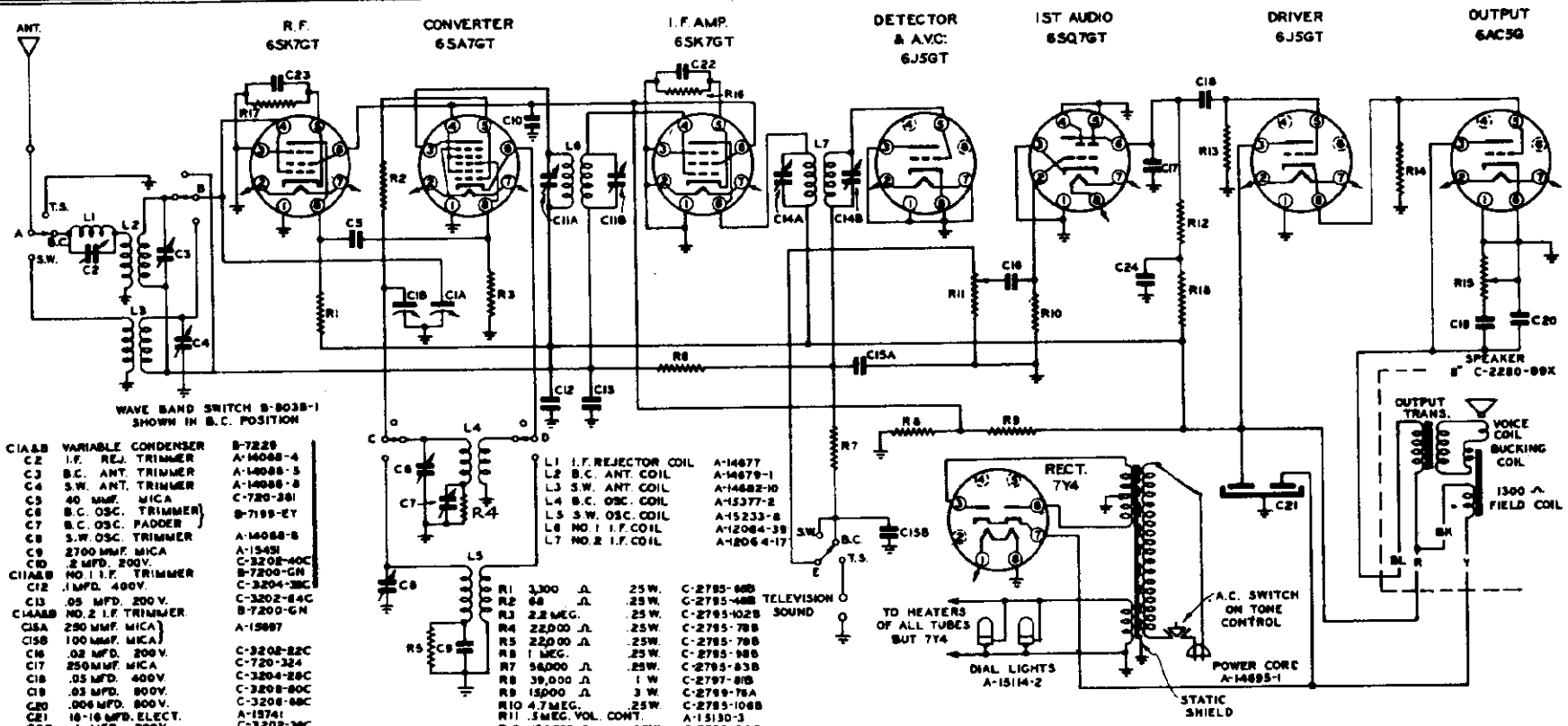
BATTERY LOCATION
FIGURE-1

BATTERY SERVICING

(See Figure No. 1)

Te replace batteries, loosen and remove the two screws at the upper left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

After the batteries have been installed, replace the back, making sure that the two washers riveted to the bottom of the back, fit into the slots near the bottom edge of the cabinet. Also make sure that the two wires from the loop antenna are held in place between the top brackets of the cabinet and the back by the two fastening screws.



C1A&B	VARIABLE CONDENSER	B-7229
C2	I.F. REJ. TRIMMER	A-14068-4
C3	B.C. ANT. TRIMMER	A-14088-5
C4	S.W. ANT. TRIMMER	A-14088-8
C5	40 MMF. MICA	C-720-381
C6	B.C. OSC. TRIMMER	B-7199-EY
C7	B.C. OSC. PADDER	
C8	S.W. OSC. TRIMMER	A-14068-8
C9	2700 MMF. MICA	A-1545N
C10	.2 MFD. 200V.	C-3208-40C
C11A&B	NO. 1 I.F. TRIMMER	B-7200-GN
C12	.1 MFD. 400V.	C-3204-28C
C13	.05 MFD. 200 V.	C-3202-24C
C14A&B	NO. 2 I.F. TRIMMER	B-7200-GN
C15A	250 MMF. MICA	A-15897
C15B	100 MMF. MICA	
C16	.02 MFD. 200V.	C-3208-22C
C17	250 MMF. MICA	C-720-324
C18	.05 MFD. 400V.	C-3204-28C
C19	.03 MFD. 800V.	C-3208-30C
C20	.006 MFD. 800V.	C-3208-18C
C21	10-10 MFD. ELECT.	A-1574I
C22	.1 MFD. 200V.	C-3202-38C
C23	.1 MFD. 200V.	C-3202-38C
C24	.1 MFD. 400V.	C-3204-38C

L1	I.F. REJECTOR COIL	A-14677
L2	B.C. ANT. COIL	A-14679-1
L3	S.W. ANT. COIL	A-14682-10
L4	B.C. OSC. COIL	A-15377-2
L5	S.W. OSC. COIL	A-15233-8
L6	NO. 1 I.F. COIL	A-12084-38
L7	NO. 2 I.F. COIL	A-12064-17

R1	3,300 Ω	.25 W.	C-2795-68B
R2	68 Ω	.25 W.	C-2795-48B
R3	2.2 MEG.	.25 W.	C-2795-102B
R4	22,000 Ω	.25 W.	C-2795-78B
R5	22,000 Ω	.25 W.	C-2795-78B
R6	1 MEG.	.25 W.	C-2795-98B
R7	56,000 Ω	.25 W.	C-2795-83B
R8	39,000 Ω	1 W	C-2797-8IB
R9	15,000 Ω	3 W.	C-2799-78A
R10	4.7 MEG.	.25 W.	C-2795-106B
R11	.5 MEG. VOL. CONT.		A-15130-3
R12	150,000 Ω	.25 W.	C-2795-88B
R13	470,000 Ω	.25 W.	C-2795-94B
R14	2.2,000 Ω	.25 W.	C-2795-78B
R15	.25 MEG. T.C. & SWITCH		A-15128-2
R16	270 Ω	.25 W.	C-2795-55B
R17	270 Ω	.25 W.	C-2795-55B
R18	100,000 Ω	.25 W.	C-2795-86B

MODEL 831

INTERMEDIATE FREQUENCY 456 K.C

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

VOLTAGE CHART

Line voltage: 117 volts

Position of Volume control: Full with Antenna disconnected

Position of Band Switch: Broadcast

Tube	Function	Voltage of socket prongs to Gnd. (Prong no's. on Schematic)							
		No 1	No 2	No 3	No 4	No 5	No 6	No 7	No 8
6SK7GT	R-f Amplifier	0	0	0	**	1.6	76	6.2*	237
6SA7GT	Oscillator-Converter	0	0	245	76	0	**	6.2*	0
6SK7GT	I-f Amplifier	0	0	0	**	1.6	76	6.2*	245
6J5GT	Detector-AVC	0	0	0	0	**	155	6.2*	0
6SQ7GT	1st Audio Amplifier	0	**	0	0	0	60	6.2*	0
6J5GT	Audio Driver	0	0	255	77	0	0	6.2*	11
6AC5G	Power Amplifier	0	0	240	0	11	0	6.2*	0
7Y4	Rectifier ***	0	0	300*	0	0	300*	0	0

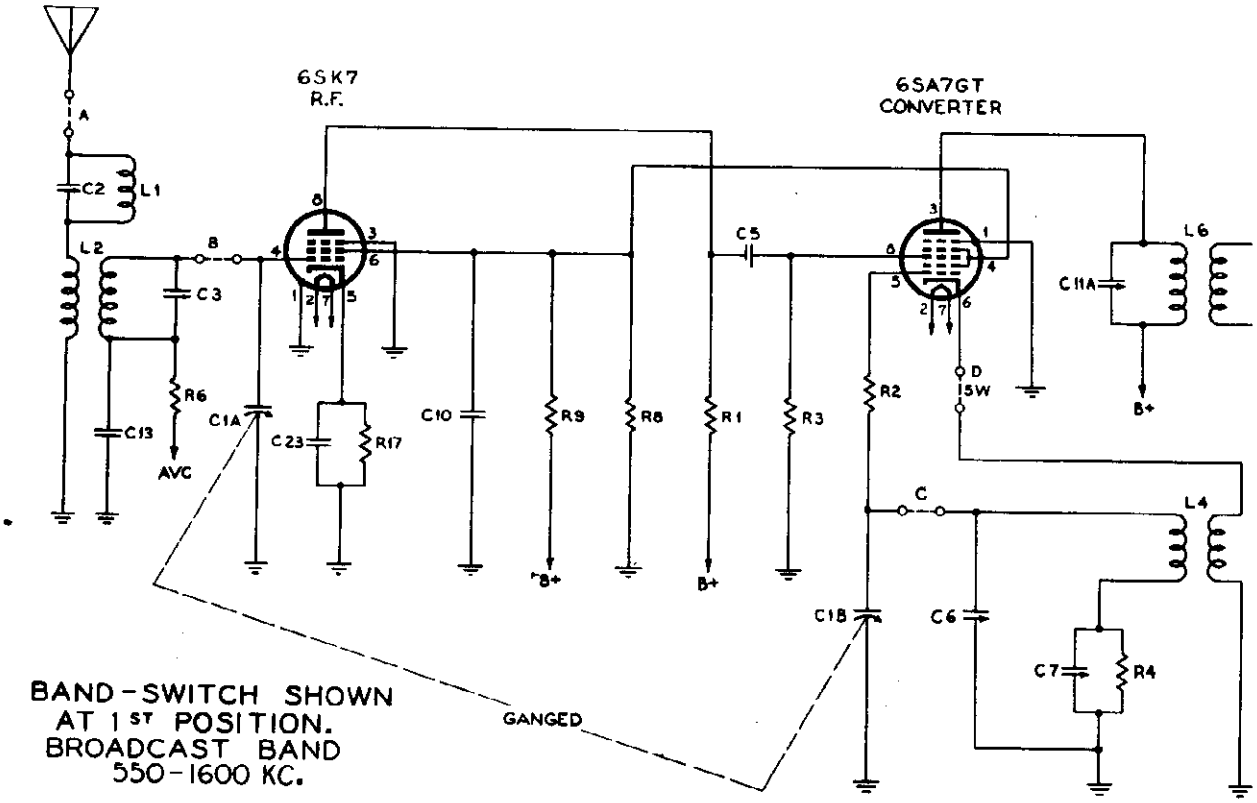
* AC volts

** Cannot be measured with 1000 ohms/volt voltmeter.

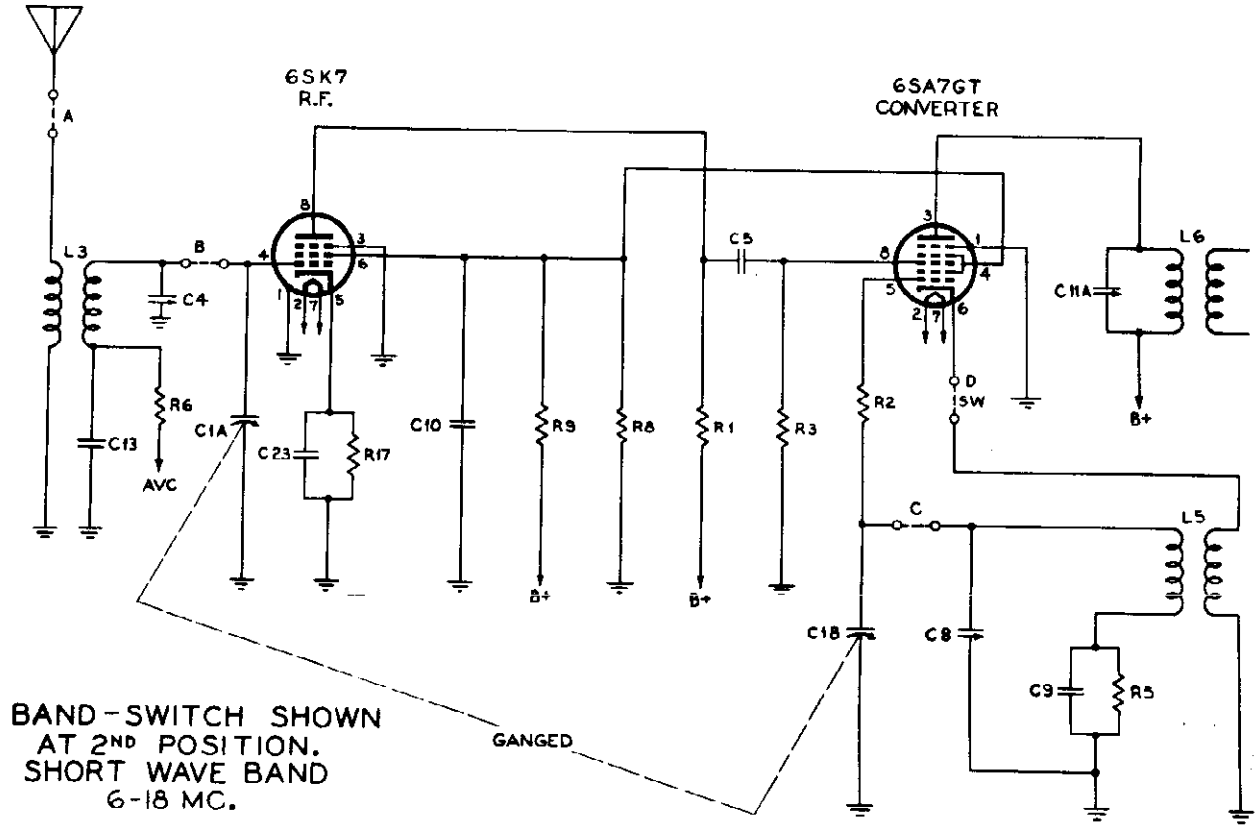
*** Tube removed from socket to enable test prods to reach socket pronge.

August 1, 1940

SPIEGEL



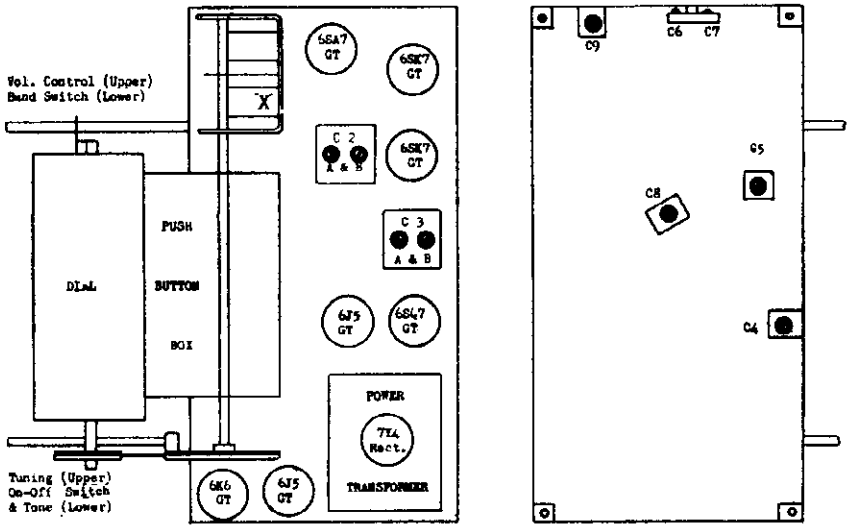
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
550-1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
6-18 MC.

MODEL 831

SPIEGEL



TOP VIEW OF CHASSIS

BOTTOM VIEW OF CHASSIS

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that last mark on BC scale is directly toward front of set when condenser plates are fully meshed.)							
2	I.F.	*	.1 mf.	456 KC	BC	Open	C3 A&B C2 A&B	2nd I-F 1st I-F
3	Rejector	Ant.	200 mmf.	456 KC	BC	Closed	C4	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C6 Osc. C5 Ant.	
5				600 KC	BC	600 KC	C7 Osc.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	Shortwave Band	Ant.	*	18 MC	SW	18 MC	C9 Osc. C8 Ant.	Rock dial while adjusting for maximum output
9	(Check calibration and sensitivity at 6 MC and 18 MC)							
10	(Check operations 1 to 9 inclusive)							

Notes: *Connect to point "X" on Variable Condenser. See drawing below.
**100 ohm and 200 mmf. in series

ADJUSTING THE PUSH-BUTTON TUNER

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. 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 low frequency end of the dial.

3. Using a small screwdriver or other tool that will fit the screw 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.

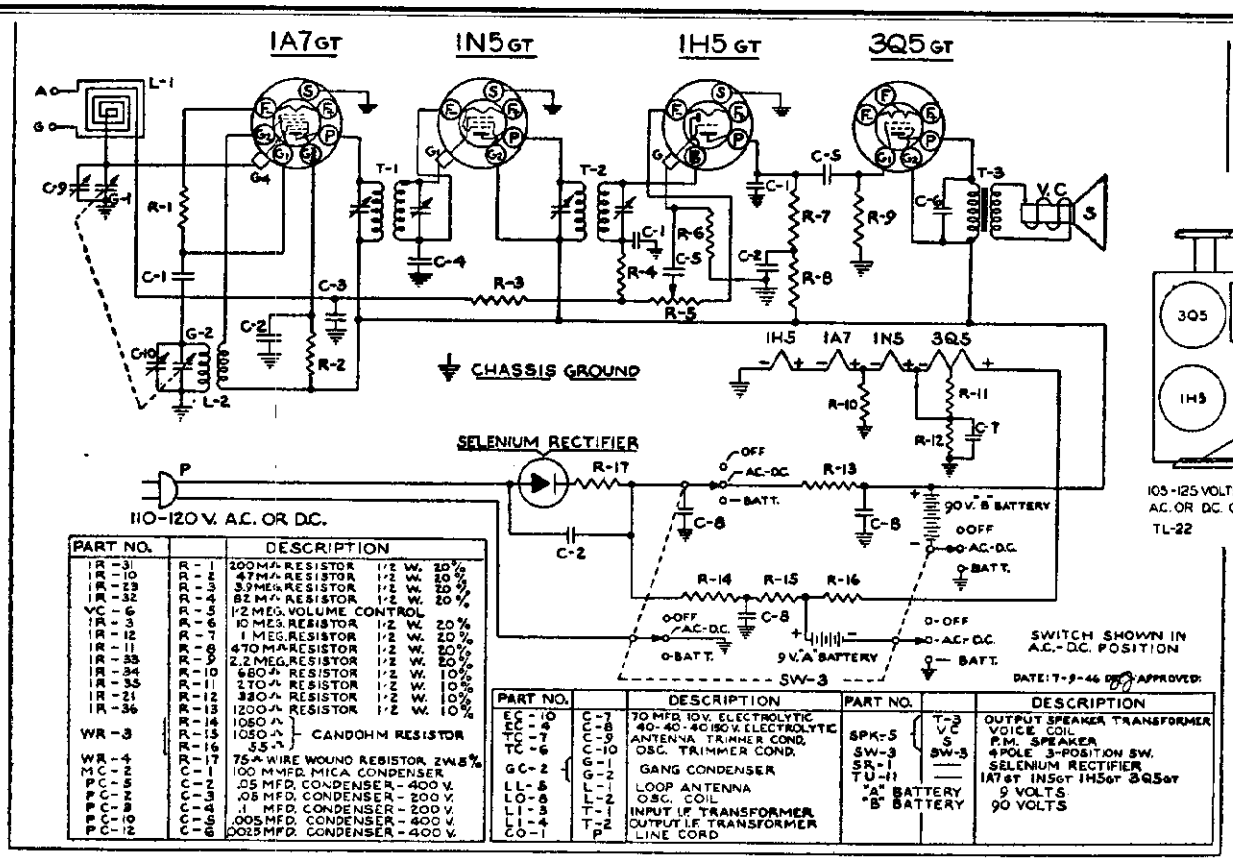
6. Insert the proper tab in each button by pressing it in position.

7. Any of the six stations to which the push-button tuner has been adjusted may now be received simply by pushing the button for the desired station.

The tuning range of each band is as follows.

Position of Band Selector Switch	Dial Scale	Meters	or	Kilocycles	or	Megacycles
"B" Broadcast	Right hand	545 to 187		550 to 1600		.55 to 1.6
"S" Short-Wave	Left hand	50 to 16.6		6000 to 18000		6. to 18

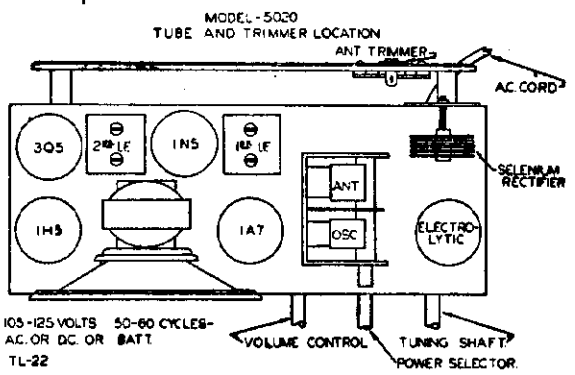
"T" (Use pin jacks at back of chassis for phono or television sound.)



PART NO.		DESCRIPTION
IR-31	R-1	200 M/A RESISTOR 1/2 W. 20%
IR-10	R-2	47 M/A RESISTOR 1/2 W. 20%
IR-29	R-3	3.9 MEG. RESISTOR 1/2 W. 20%
IR-32	R-4	82 M/A RESISTOR 1/2 W. 20%
VC-6	R-5	1/2 MEG. VOLUME CONTROL
IR-3	R-6	10 MEG. RESISTOR 1/2 W. 20%
IR-12	R-7	1 MEG. RESISTOR 1/2 W. 20%
IR-11	R-8	470 M/A RESISTOR 1/2 W. 20%
IR-38	R-9	2.2 MEG. RESISTOR 1/2 W. 20%
IR-34	R-10	680 Ω RESISTOR 1/2 W. 10%
IR-35	R-11	270 Ω RESISTOR 1/2 W. 10%
IR-21	R-12	330 Ω RESISTOR 1/2 W. 10%
IR-36	R-13	1200 Ω RESISTOR 1/2 W. 10%
WR-3	R-14	1050 Ω CANDOHM RESISTOR
	R-15	1050 Ω CANDOHM RESISTOR
	R-16	55 Ω CANDOHM RESISTOR
WR-4	R-17	75 Ω WIRE WOUND RESISTOR 2W 5%
MC-2	C-1	100 MMFD. MICA CONDENSER
PC-5	C-2	.05 MFD. CONDENSER - 400 V.
PC-2	C-3	.08 MFD. CONDENSER - 200 V.
PC-8	C-4	.1 MFD. CONDENSER - 200 V.
PC-10	C-5	.005 MFD. CONDENSER - 400 V.
PC-12	C-6	.0025 MFD. CONDENSER - 400 V.

PART NO.		DESCRIPTION
EC-10	C-7	70 MFD. 10 V. ELECTROLYTIC
EC-4	C-8	40-40-40 150 V. ELECTROLYTIC
TC-7	C-9	ANTENNA TRIMMER COND.
TC-6	C-10	OSC. TRIMMER COND.
GC-2	G-1, G-2	GANG CONDENSER
LL-5	L-1	LOOP ANTENNA
LO-6	L-2	OSC. COIL
LI-3	T-1	INPUT I.F. TRANSFORMER
LI-4	T-2	OUTPUT I.F. TRANSFORMER
CO-1	P	LINE CORD

PART NO.		DESCRIPTION
	T-3	OUTPUT SPEAKER TRANSFORMER
SPK-5	V.C.	VOICE COIL
	S	P.M. SPEAKER
SW-3	SW-5	4 POLE 3-POSITION SW.
SR-1		SELENIUM RECTIFIER
TU-11		1A7GT 1N5GT 1H5GT 3Q5GT
"A" BATTERY		9 VOLTS
"B" BATTERY		90 VOLTS



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

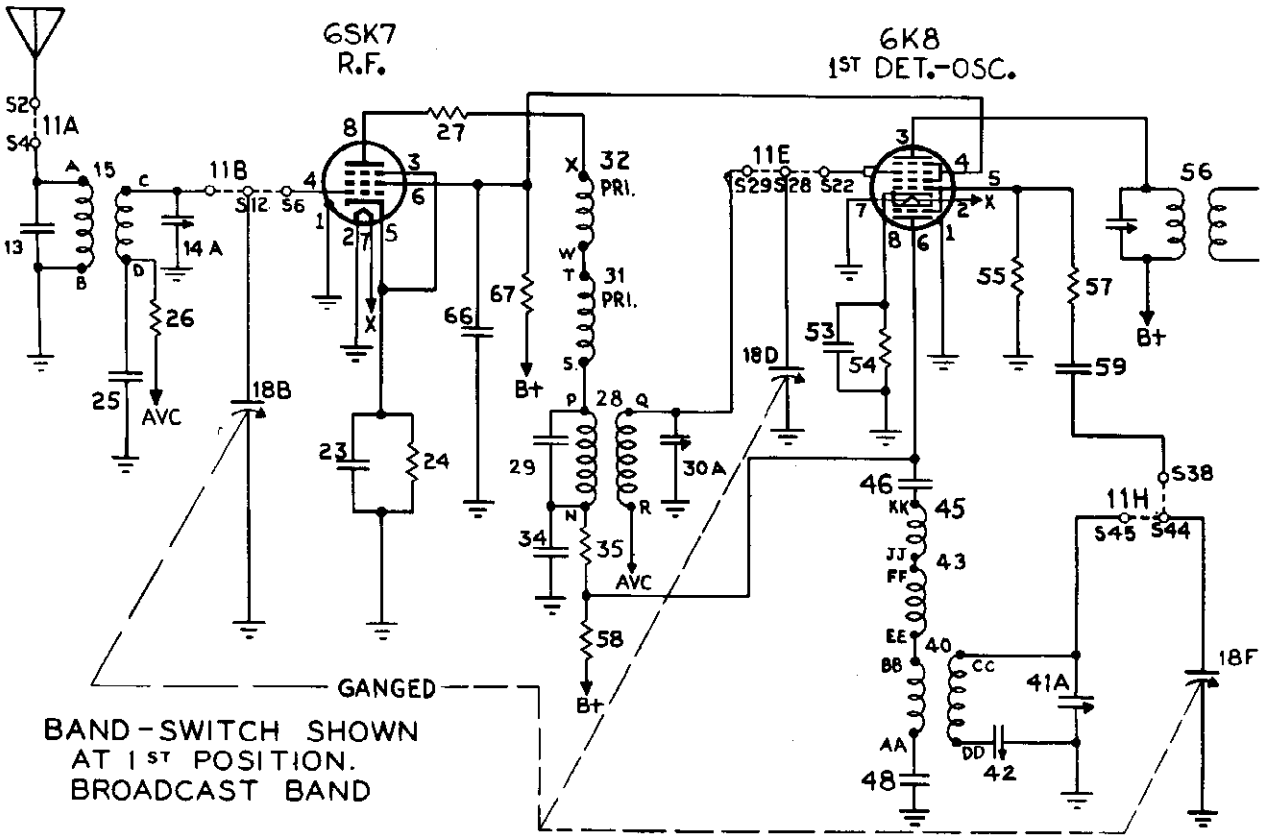
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

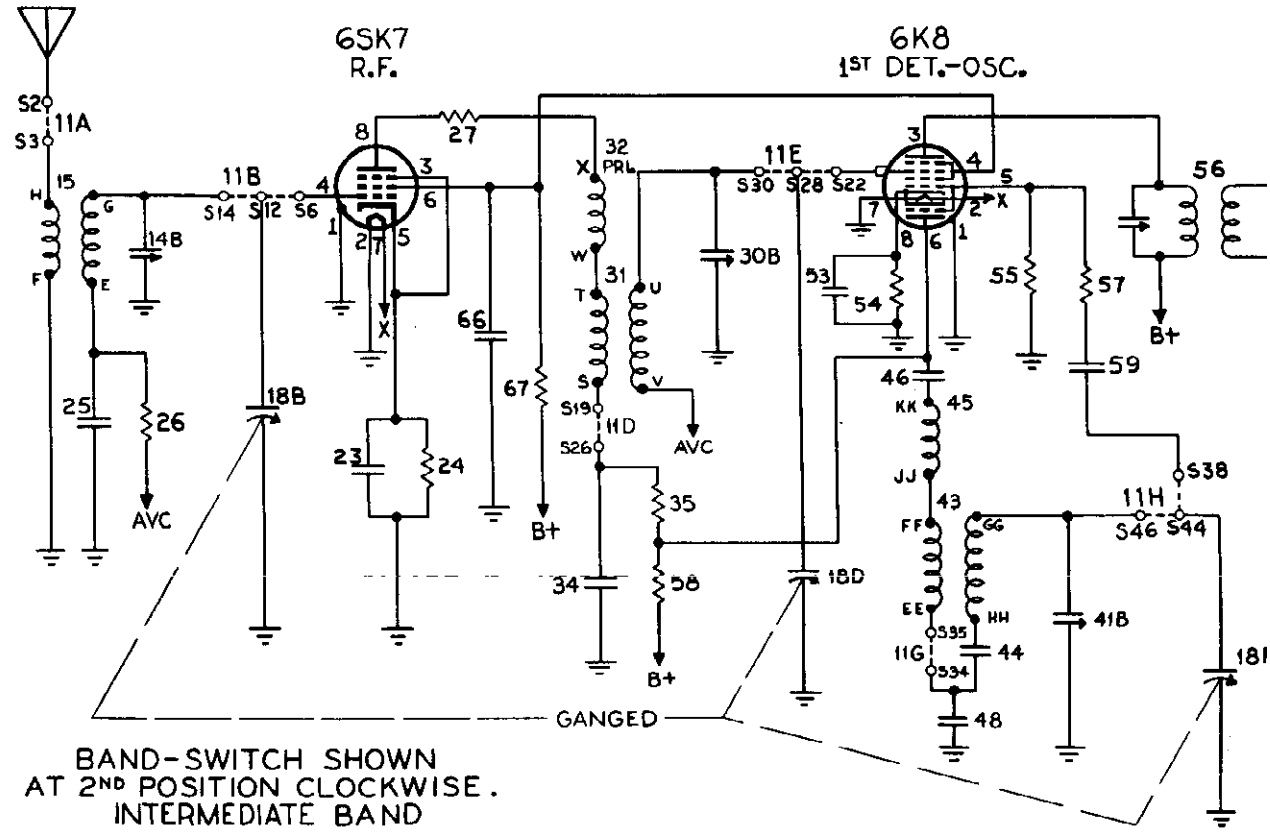
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

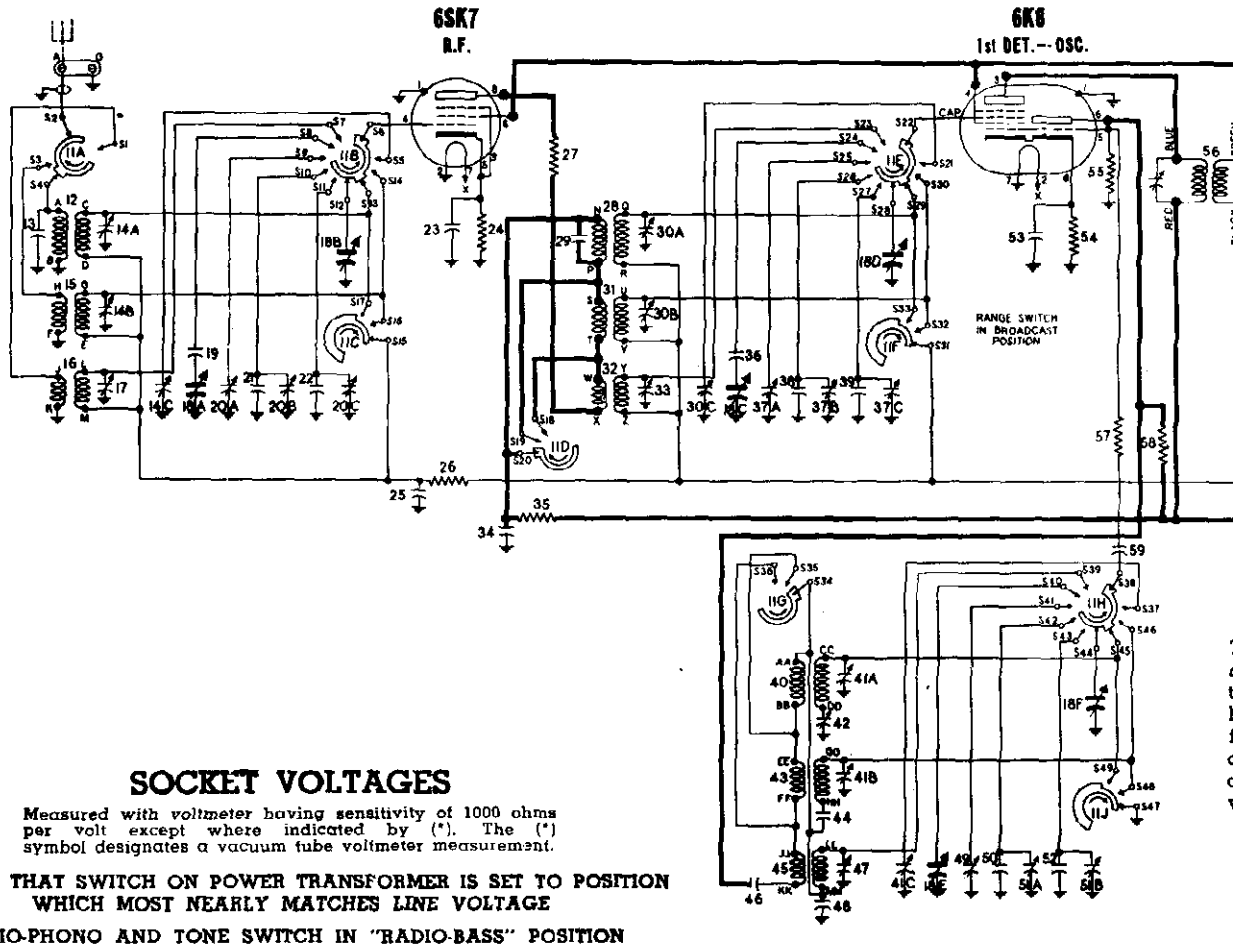
SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the top of the oscillator section of the gang condenser. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

CAUTION: When the receiver is not in use, the power selector knob must be turned to "OFF." If the knob is allowed to remain in "BATT" position, the batteries will be in use constantly. The volume control does not control the batteries and they are still in operation even though the volume control is turned all the way off.


6SK7
R.F.
6K8
1ST DET.-OSC.
S2
S4
11A
A
15
C
11B
S12
S6
13
B
D
14 A
26
25
AVC
18B
8
3
6
1
2
7
5
X
27
66
67
B+
23
24
X
32
PRI.
W
T
31
PRI.
S
P
28
Q
29
N
34
35
AVC
30 A
R
58
B+
11E
S29
S28
S22
3
4
5
7
2
X
8
6
1
18D
53
54
55
57
56
59
B+
46
KK
45
JJ
43
FF
EE
40
BB
CC
41A
AA
DD
42
48
S38
11H
S45
S44
18F
GANGED
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND


6SK7
R.F.
6K8
1ST DET.-OSC.
S2
S3
11A
H
15
G
11B
S14
S12
S6
F
E
14B
25
26
AVC
18B
8
3
6
1
2
7
5
X
27
66
67
B+
23
24
32
PRL
W
T
31
U
S
S19
11D
S26
AVC
30B
35
34
58
B+
11E
S30
S28
S22
3
4
5
7
2
X
8
6
1
53
54
55
57
56
59
B+
18D
46
KK
45
JJ
43
FF
GG
EE
HH
S35
11G
S34
44
48
S38
11H
S46
S44
41B
18I
GANGED
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
INTERMEDIATE BAND

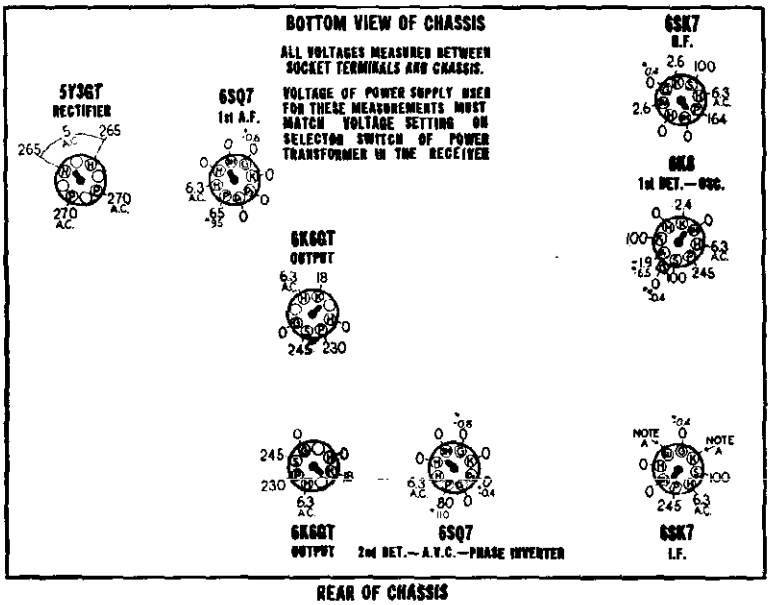


SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

BE SURE THAT SWITCH ON POWER TRANSFORMER IS SET TO POSITION WHICH MOST NEARLY MATCHES *LINE* VOLTAGE

RADIO-PHONO AND TONE SWITCH IN "RADIO-BASS" POSITION
VOLUME ON FULL WITH NO SIGNAL. DIAL TUNED TO 540 KC
BAND SWITCH IN BROADCAST POSITION



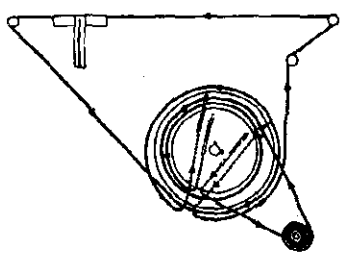
NOTE A: The voltage at the cathode or suppressor terminals of this tube is 13 volts when Local-Distant switch is in "Local" position and 2.4 volts when switch is set to "Distant" position.

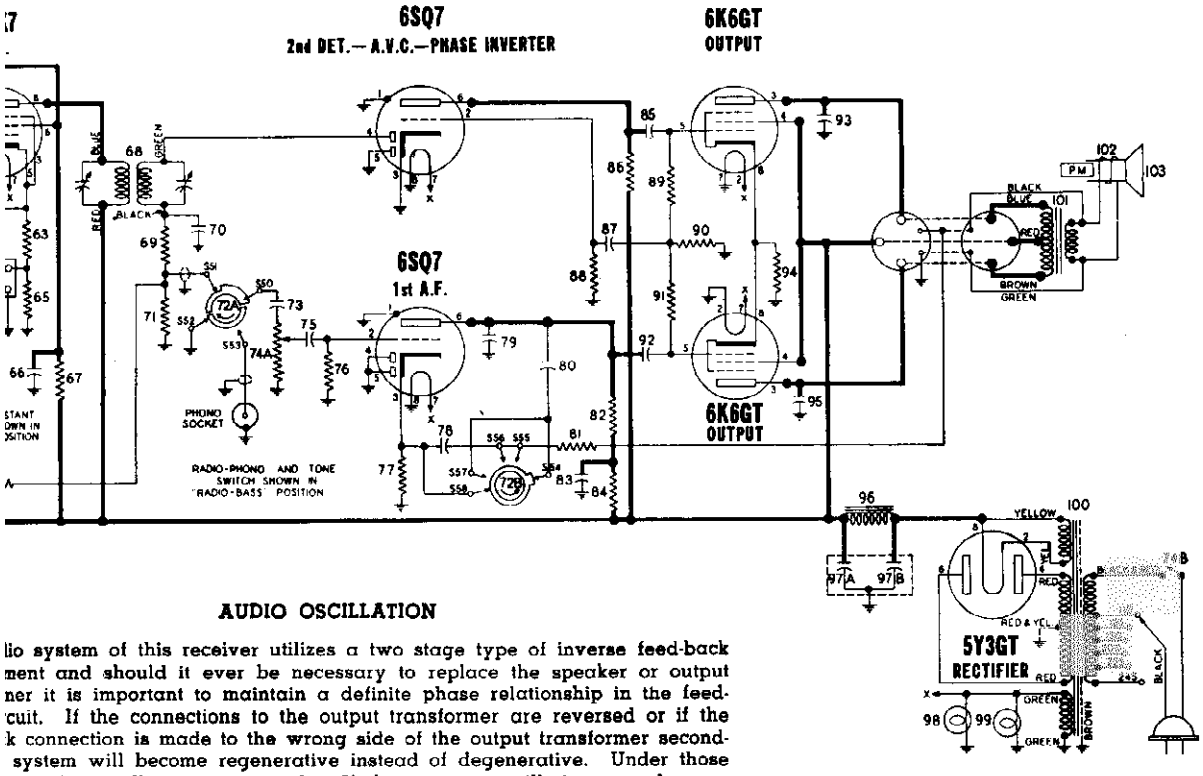
Lettered terminals in illustrations correspond similarly lettered terminals on the circuit diagra

DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

113177 Tension Spring
114955 Clip on end of cord
119087 Ring
502773 Cord (8 feet)
4½ ft. for pointer drive
3½ ft. for tuning drive





AUDIO OSCILLATION

lio system of this receiver utilizes a two stage type of inverse feed-back ment and should it ever be necessary to replace the speaker or output ner it is important to maintain a definite phase relationship in the feed- cuit. If the connections to the output transformer are reversed or if the k connection is made to the wrong side of the output transformer second- system will become regenerative instead of degenerative. Under those it audio oscillation may result. If that occurs, oscillation may be pre-)y reversing the connections to the primary of the output transformer.

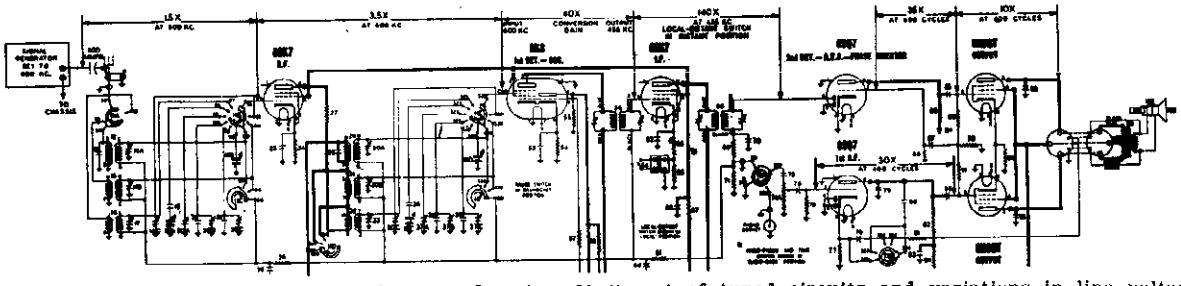
I.F. 455 KC.

STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver may be measured with an A.C. Vacuum Tube Voltmeter or a "channel" type instrument containing a tuned and calibrated amplifier.

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F. and I.F. stages are carefully and accurately aligned by utilizing the alignment procedure given above.
2. Connect Signal Generator as shown below.
3. The values of stage gain which are given here were measured with a fixed bias of 3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to A.V.C. at the black lead of the 1st I.F. transformer and connect the positive battery lead to the receiver chassis.
4. Set Signal Generator for operation at 600 Kc with 400 cycle modulation and carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.
6. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.

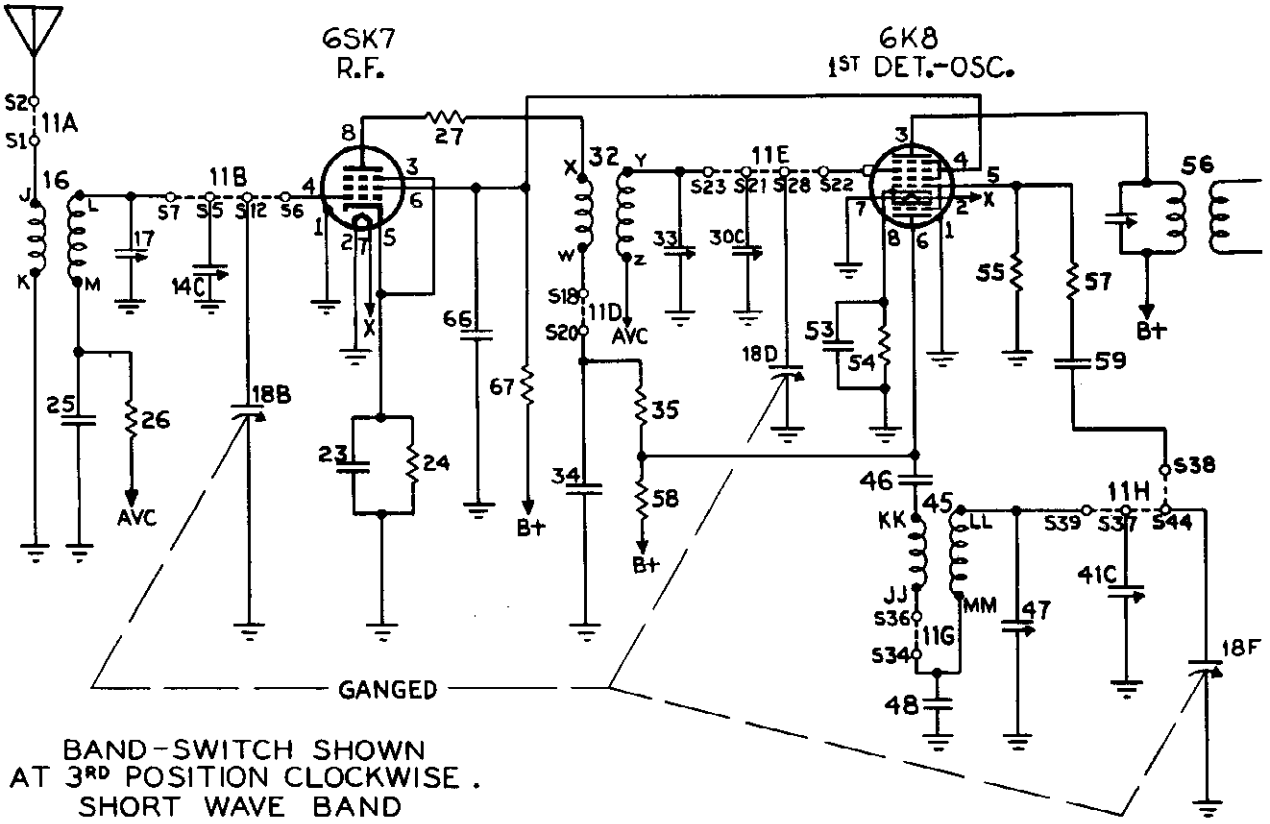


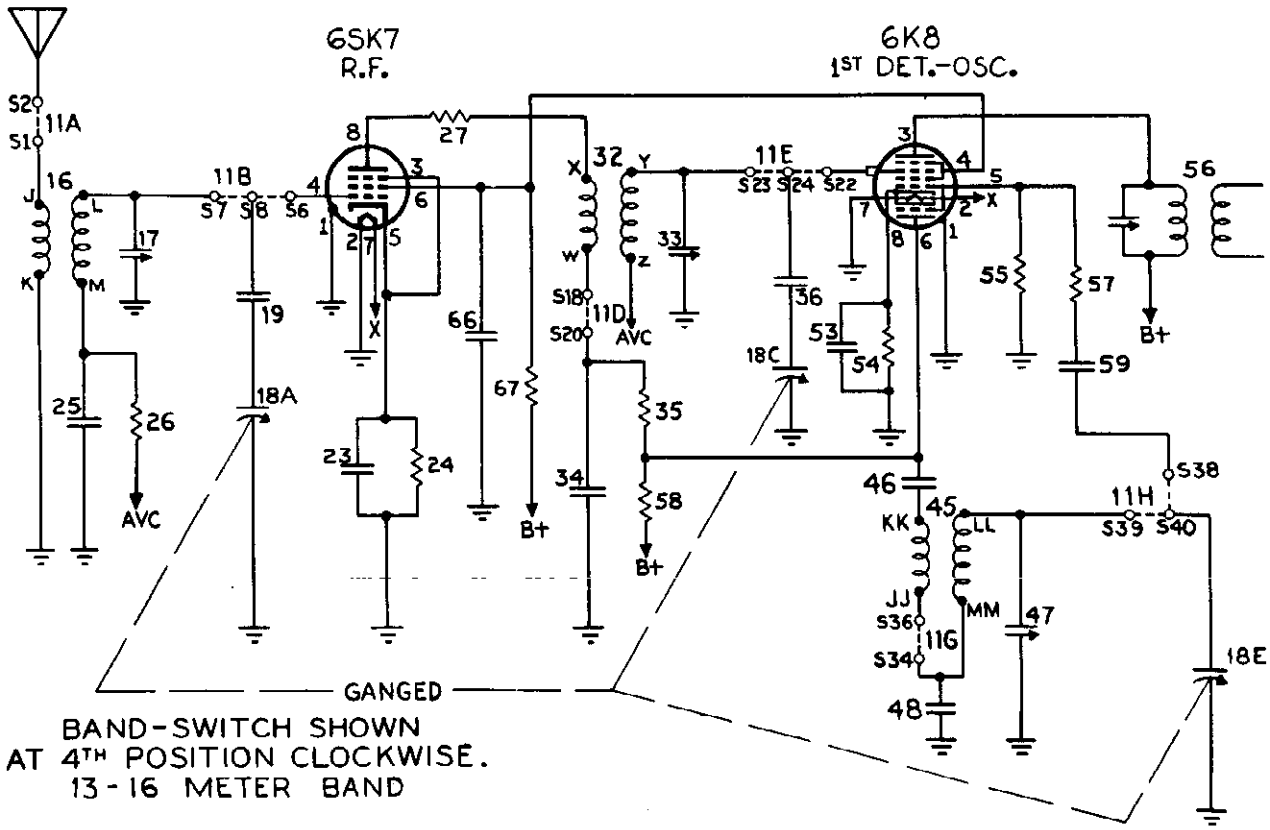
DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

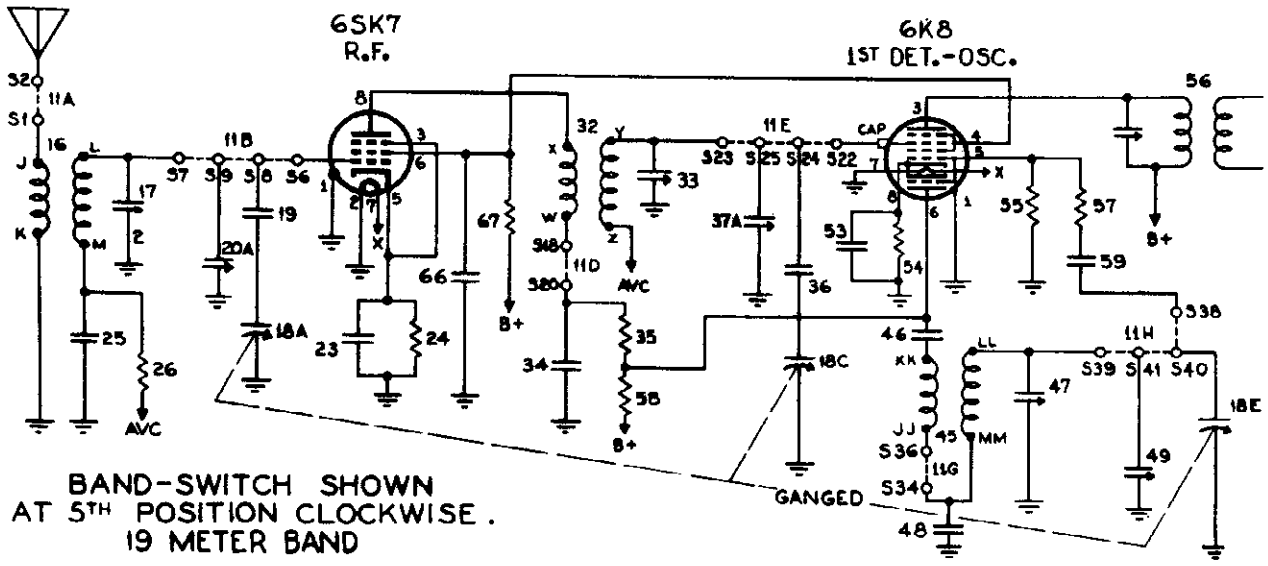
"clarified schematics"

MODEL 9010-A

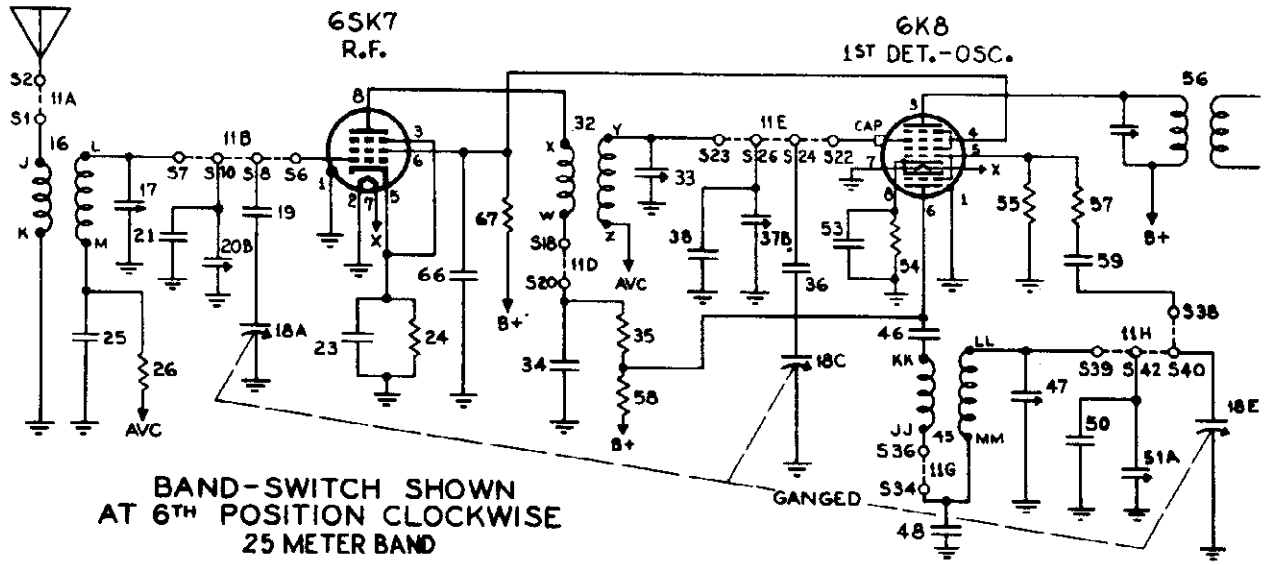
STEWART WARNER CORP.



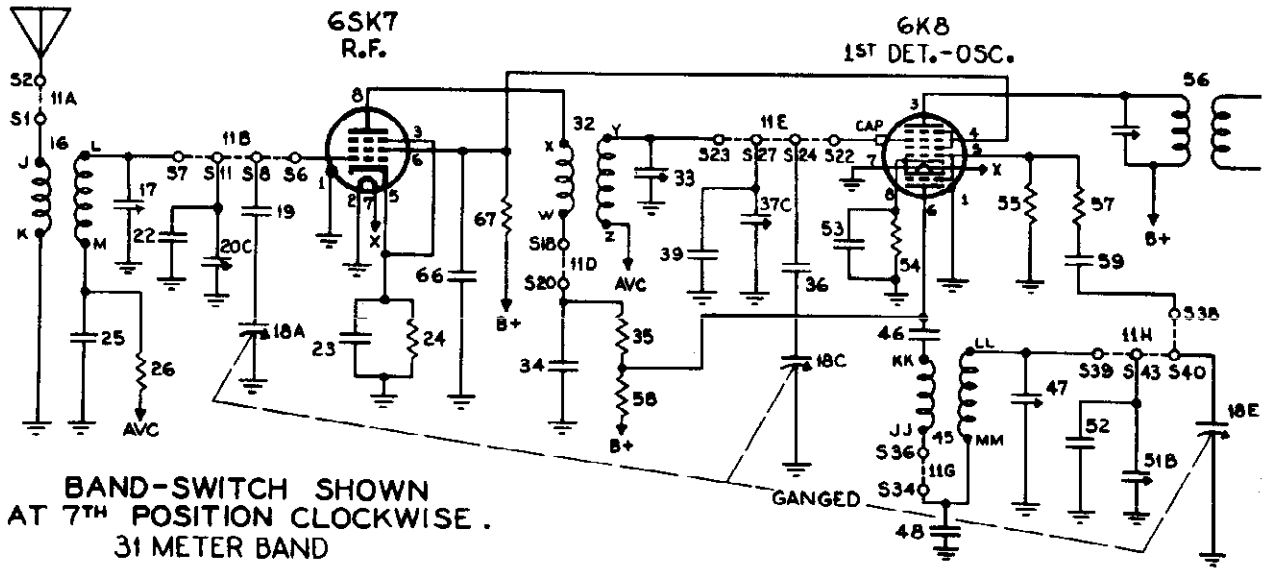




BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
19 METER BAND



BAND-SWITCH SHOWN
AT 6TH POSITION CLOCKWISE
25 METER BAND



BAND-SWITCH SHOWN
AT 7TH POSITION CLOCKWISE.
31 METER BAND

ALIGNMENT PROCEDURE

1. When gang condenser is fully meshed, dial pointer should be in the position indicated by the last division below 550 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
2. Connect an output meter across the speaker voice coil or from the plate of the 6K6GT tube to chassis through a 0.1 Mfd. condenser.
3. Connect the ground lead of the signal generator to the receiver chassis.
4. Set volume control to maximum volume position and use a weak signal from the signal generator.
5. Set Radio-Phono and Tone switch to "Radio-Bass" position.
6. Set Local-Distant switch to "Distant" position.

IMPORTANT: Align this receiver in exactly the order shown below. The 13-16 Meter band must be aligned before any of the other short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Cap of 6K8	455 KC	Broadcast (*Position 1)	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	"A" terminal at rear of chassis.	1500 KC	Broadcast (*Position 1)	1500 Kc.	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	"A" terminal at rear of chassis.	1500 KC	Broadcast (*Position 1)	Tune to 1500 Kc. generator signal.	6	Broadcast Antenna	Adjust for maximum output.
					7	Broadcast R.F.	
200 MMFD. Mica Condenser	"A" terminal at rear of chassis.	600 KC	Broadcast (*Position 1)	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.
200 MMFD. Mica Condenser	"A" terminal at rear of chassis.	Repeat adjustment of trimmers 5, 6, and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	5.5 MC	Intermediate (*Position 2)	5.5 Mc.	9	Intermediate Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 4.6 MC. If image does not appear, realign at 5.5 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	5.5 MC	Intermediate (*Position 2)	Tune to 5.5 Mc. generator signal.	10	Intermediate Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					11	Intermediate R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	20 MC	13-16 Meter (*Position 4)	20 Mc.	12	13-16 Meter 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 20 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	20 MC	13-16 Meter (*Position 4)	Tune to 20 Mc. generator signal.	13	13-16 Meter Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					14	13-16 Meter R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	16 MC	19 Meter (*Position 5)	16 Mc.	15	19 Meter Oscillator	Adjust for maximum output. 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	"A" terminal at rear of chassis.	16 MC	19 Meter (*Position 5)	Tune to 16 Mc. generator signal.	16	19 Meter Antenna	Adjust for maximum output.
					17	19 Meter R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	12 MC	25 Meter (*Position 6)	12 Mc.	18	25 Meter Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 Mc. with trimmer screw farther out. Recheck image.

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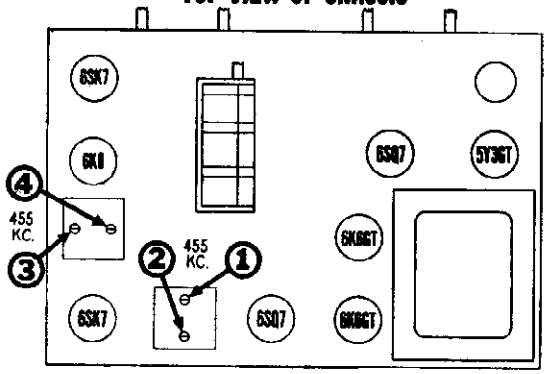
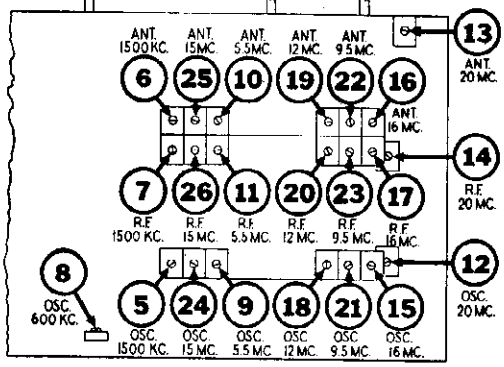
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	12 MC	25 Meter (*Position 6)	Tune to 12 Mc. generator signal.	19	25 Meter Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					20	25 Meter R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	9.5 MC	31 Meter (*Position 7)	9.5 Mc.	21	31 Meter Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 8.6 MC. If image does not appear, realign at 9.5 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	9.5 MC	31 Meter (*Position 7)	Tune to 9.5 Mc. generator signal.	22	31 Meter Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					23	31 Meter R.F.	
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	15 MC	S.W. (*Position 3)	15 Mc.	24	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear, realign at 15 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"A" terminal at rear of chassis.	15 MC	S.W. (*Position 3)	Tune to 15 Mc. generator signal.	25	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
					26	S.W. R.F.	

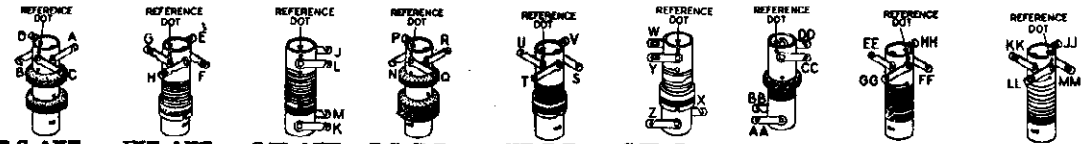
* Position 1 corresponds to extreme counter-clockwise setting of band switch. Succeeding positions are numbered in ascending order as switch is rotated clockwise.

TOP VIEW OF CHASSIS

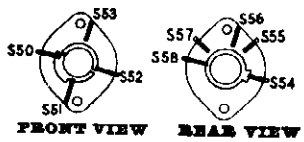


BOTTOM VIEW OF CHASSIS



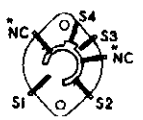


B.C. ANT. COIL 502710 | INT. ANT. COIL 502713 | S.W. ANT. COIL 502716 | B.C. R.F. COIL 502711 | INT. R.F. COIL 502714 | S.W. R.F. COIL 502717 | B.C. OSC. COIL 502712 | INT. OSC. COIL 502715 | S.W. OSC. COIL 502718



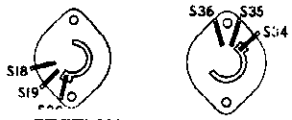
FRONT VIEW — REAR VIEW

RADIO-PHONO & TONE SWITCH 502719



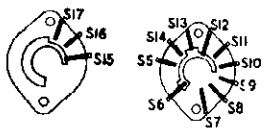
SECTION 2 FRONT VIEW

*No connection

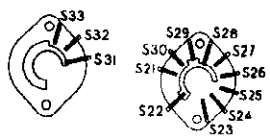


SECTION 4 FRONT VIEW — SECTION 4 REAR VIEW

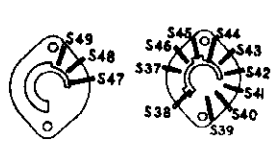
BAND SWITCH 502748



SECTION 1 FRONT VIEW — SECTION 1 REAR VIEW



SECTION 3 FRONT VIEW — SECTION 3 REAR VIEW



SECTION 5 FRONT VIEW — SECTION 5 REAR VIEW

MODEL 9010-A
MODEL 9013-A

STEWART WARNER CORP

PARTS LIST

ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

DIA-GRAM NO.	PART NO.	MODEL 9010-A DESCRIPTION	LIST PRICE
		CONDENSERS	
13	502787	Condenser—mica 100 Mmfd. 500 volt	$0.24
14A, B, C	502753	Condenser—trimmer assembly A—1.6 to 18 Mmfd. B—1.6 to 18 Mmfd. C—3 to 35 Mmfd.	1.25
17	502758	Condenser—trimmer; 1.6 to 18 Mmfd.	.35
18A to E	502749	Condenser—variable gang	9.00
19	502778	Condenser—ceramic 200 Mmfd. 500 volt	.40
20A, B, C	502754	Condenser—trimmer assembly A—3 to 35 Mmfd. B—3 to 35 Mmfd. C—1.6 to 18 Mmfd.	1.25
21	502779	Condenser—ceramic 56 Mmfd. 500 volt	.45
22	502788	Condenser—mica 130 Mmfd. 500 Volt	.45
23	502806	Condenser—.05 Mfd. 200 volt	.36
25	502806	Condenser—.05 Mfd. 200 volt	.36
29	502787	Condenser—mica 100 Mmfd. 500 volt	.24
30A, B, C	502753	Condenser—trimmer assembly A—1.6 to 18 Mmfd. B—1.6 to 18 Mmfd. C—3 to 35 Mmfd.	1.25
33	502759	Condenser—trimmer; 1.6 to 18 Mmfd.	.35
34	502807	Condenser—.05 Mfd. 400 volt	.37
36	502778	Condenser—ceramic 200 Mmfd. 500 volt	.40
37A, B, C	502754	Condenser—trimmer assembly A—3 to 35 Mmfd. B—3 to 35 Mmfd. C—1.6 to 18 Mmfd.	1.25
38	502779	Condenser—ceramic 56 Mmfd. 500 volt	.45
39	502788	Condenser—mica 130 Mmfd. 500 volt	.45
41A, B, C	502753	Condenser—trimmer assembly A—1.6 to 18 Mmfd. B—1.6 to 18 Mmfd. C—3 to 35 Mmfd.	1.25
42	502922	Condenser—trimmer; 300 to 600 Mmfd.	.85
44	502791	Condenser—mica 1600 Mmfd. 500 volt	.80
46	502792	Condenser—mica 4000 Mmfd. 500 volt	.80
47	502756	Condenser—trimmer; 2 to 6 Mmfd.	.60
48	502793	Condenser—mica 8600 Mmfd. 500 volt	1.15
49	502757	Condenser—trimmer; 6.5 to 35 Mmfd.	.60
50	502167	Condenser—ceramic 68 Mmfd. 500 volt	.40
51A, B	502755	Condenser—trimmer assembly A—3 to 35 Mmfd. B—1.6 to 18 Mmfd.	90
52	502789	Condenser—mica 160 Mmfd. 500 volt	.45
53	502806	Condenser—.05 Mfd. 200 volt	.36
59	502790	Condenser—mica 200 Mmfd. 500 volt	.24
60	502806	Condenser—.05 Mfd. 200 volt	.36
62	502806	Condenser—.05 Mfd. 200 volt	.36
66	502807	Condenser—.05 Mfd. 400 volt	.37
70	502787	Condenser—mica 100 Mmfd. 500 volt	.24
73	502802	Condenser—.004 Mfd. 600 volt	.30
75	502802	Condenser—.004 Mfd. 600 volt	.30
78	502808	Condenser—.25 Mfd. 200 volt	.45
79	502787	Condenser—mica 100 Mmfd. 500 volt	.24
80	502803	Condenser—.006 Mfd. 600 volt	.30
83	502809	Condenser—.25 Mfd. 400 volt	.36
85	502805	Condenser—.02 Mfd. 400 volt	.36
87	502804	Condenser—.01 Mfd. 400 volt	.30
92	502805	Condenser—.02 Mfd. 400 volt	.36
93	502802	Condenser—.004 Mfd. 600 volt	.30
95	502802	Condenser—.004 Mfd. 600 volt	.30
97A, B	502720	Condenser—electrolytic A—15 Mfd. 400 volt B—20 Mfd. 400 volt	2.10
		RESISTORS	
24	502125	Resistor—carbon 220 ohms ¼ watt	.12
26	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
27	502478	Resistor—carbon 1800 ohms ½ watt	.12
35	502795	Resistor—carbon 4700 ohms ½ watt	.12
54	502125	Resistor—carbon 220 ohms ¼ watt	.12
55	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
57	502794	Resistor—carbon 68 ohms ¼ watt	.12
58	502801	Resistor—carbon 39,000 ohms ½ watt	.12
61	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
63	502125	Resistor—carbon 220 ohms ¼ watt	.12
65	502796	Resistor—carbon 8200 ohms ¼ watt	.12
67	502981	Resistor—carbon 15,000 ohms 2 watt	.25
69	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
71	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
74A, B	502750	Volume control—with switch; 2 meg.	1.50
76	502136	Resistor—carbon 10 meg. ¼ watt	.12
77	502794	Resistor—carbon 68 ohms ¼ watt	.12
81	502126	Resistor—carbon 470 ohms ¼ watt	.12
82	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
84	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
86	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
88	502136	Resistor—carbon 10 meg. ¼ watt	.12
89	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
90, 91	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
94	502813	Resistor—wire wound 300 ohms 2 watt	.25
		COILS AND TRANSFORMERS	
12	502710	Coil—BC. antenna	2.10
15	502713	Coil—Int. antenna	1.40
16	502716	Coil—S.W. antenna	1.40

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
28	502711	Coil—BC. R.F.	2.30
31	502714	Coil—Int. R.F.	1.50
32	502717	Coil—S.W.R.F.	1.40
40	502712	Coil—BC. oscillator	1.80
43	502715	Coil—Int. oscillator	1.80
45	502718	Coil S.W. oscillator	1.70
56	502725	Transformer—1st I.F.	2.15
68	502726	Transformer—2nd I.F.	2.15
96	502751	Coil—filter choke	4.60
100	502747	Transformer—power	12.50
101	502776	Transformer—output for M-502775 spkr.	2.75
		OTHER ELECTRICAL PARTS	
11A to J	502748	Switch—band	7.00
64	502916	Switch—local-distant	.80
72A, B	502719	Switch—tone control	1.40
98, 99	110629	Lamp—dial (Mazda No. 44) 6.3V 0.25 Amps.	.15
102	502775	Speaker—P.M. dynamic (8 inch)	12.50
103	502777	Cone & voice coil for M-502775 speaker	3.00
		MISCELLANEOUS	
	502724	Background for dial	.35
	160026	Base for mtg. electrolytic condenser	.04
	500420	Clamp—for dial glass	.15
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	502773	Cord—dial drive (8 ft. required) Per ft.	.05
	502921	Dial scale—glass	2.25
	117029	Drum—for dial drive	.70
	501458	Knob—tone or band switch	.16
	501449	Knob volume or tuning	.15
	502762	Plug—for Local-Distant switch	.15
	502772	Pointer	.50
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	113463	Rubber pad for mtd. chassis	.03
	116584	Rubber spacer for mtg. dial scale	.02
	85827	Screw—No. 8-32 for dial drum	.02
	112874	Screw—No. 10 x 1⅛ for mtg. chassis	.03
	504990	Shaft—tuning control	.12
	502770	Socket—for dial lamp	.18
	502761	Socket—for Local-Distant switch	.20
	502769	Socket—for speaker	.30
	114876	Socket—octal base	.15
	160039	Socket—phono. plug	.08
	113177	Spring—dial cord tension	.09
	502767	Terminal strip—"A G"	.18
	500487	Washer—felt for knobs	.01
	111456	Washer—spring washer for tuning shaft	.005

SOCKET VOLTAGES

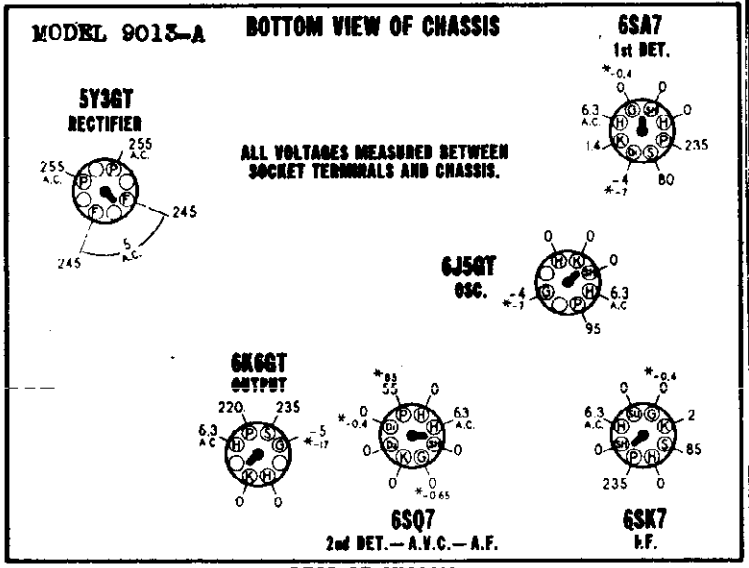
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

BE SURE THAT SWITCH ON POWER TRANSFORMER IS SET TO POSITION WHICH MOST NEARLY MATCHES LINE VOLTAGE

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BAND SWITCH IN BROADCAST POSITION

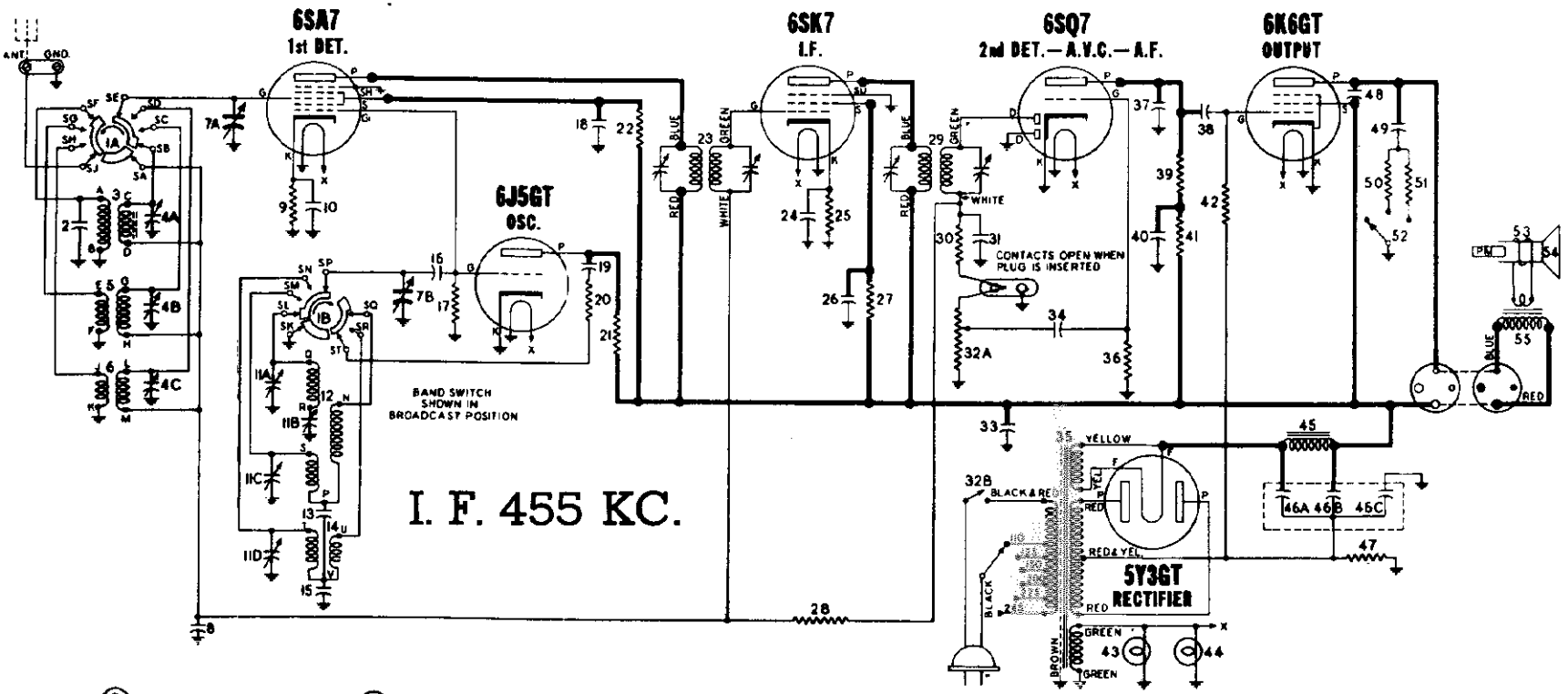
MODEL 9013-A — BOTTOM VIEW OF CHASSIS



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.

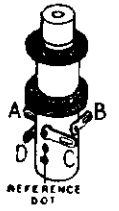
NOTE:—The 6K6GT grid bias of —17 volts can be measured across resistor No. 47



FRONT SECTION
REAR VIEW

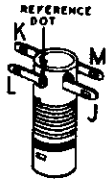
REAR SECTION
REAR VIEW

BAND SWITCH
504028



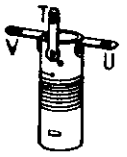
BC.
ANTENNA
COIL
504038

INT.
ANTENNA
COIL
504038



S.W.
ANTENNA
COIL
504036

BC. & INT.
OSCILLATOR
COIL
504040

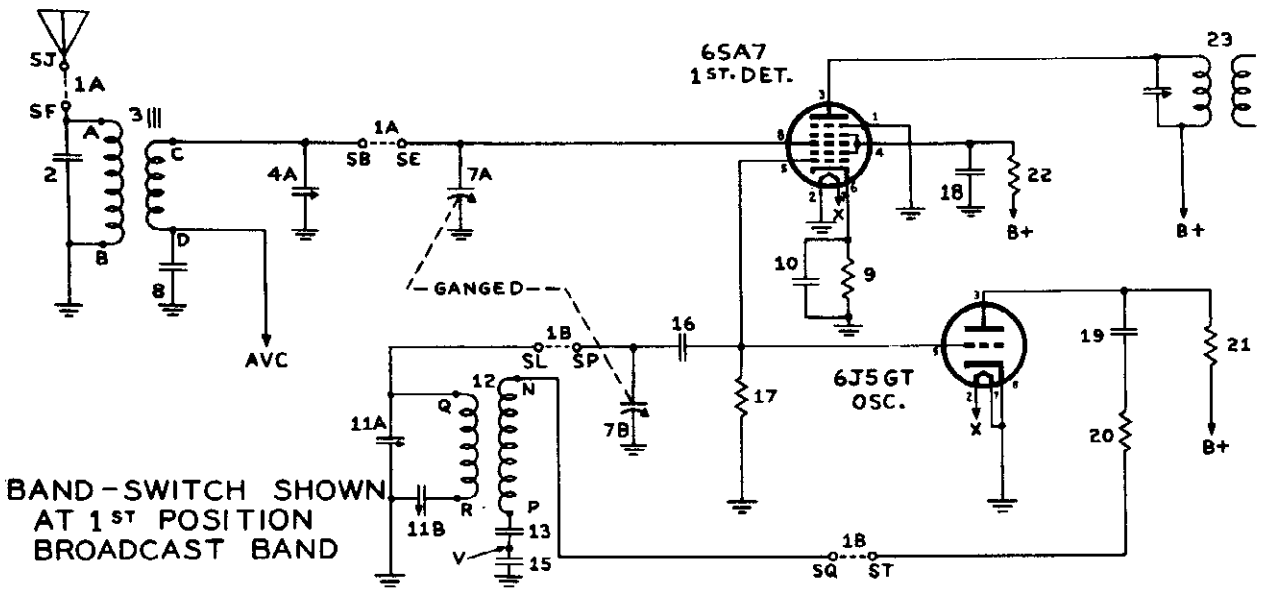


S.W.
OSCILLATOR
COIL
504037

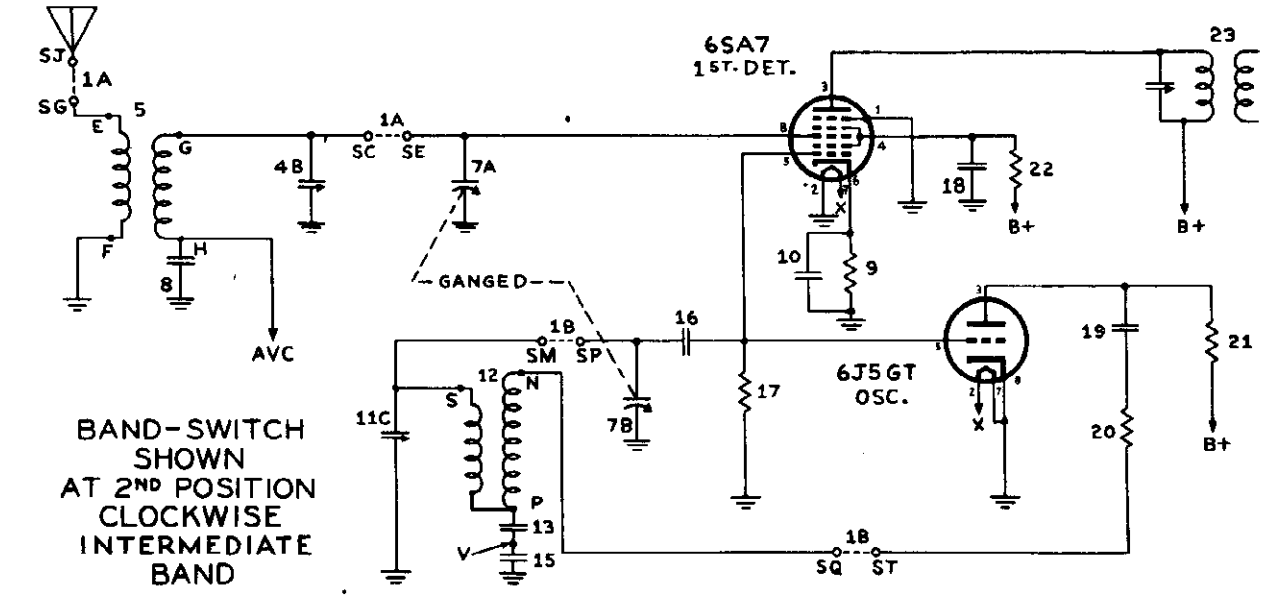
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

MODEL 9013-A

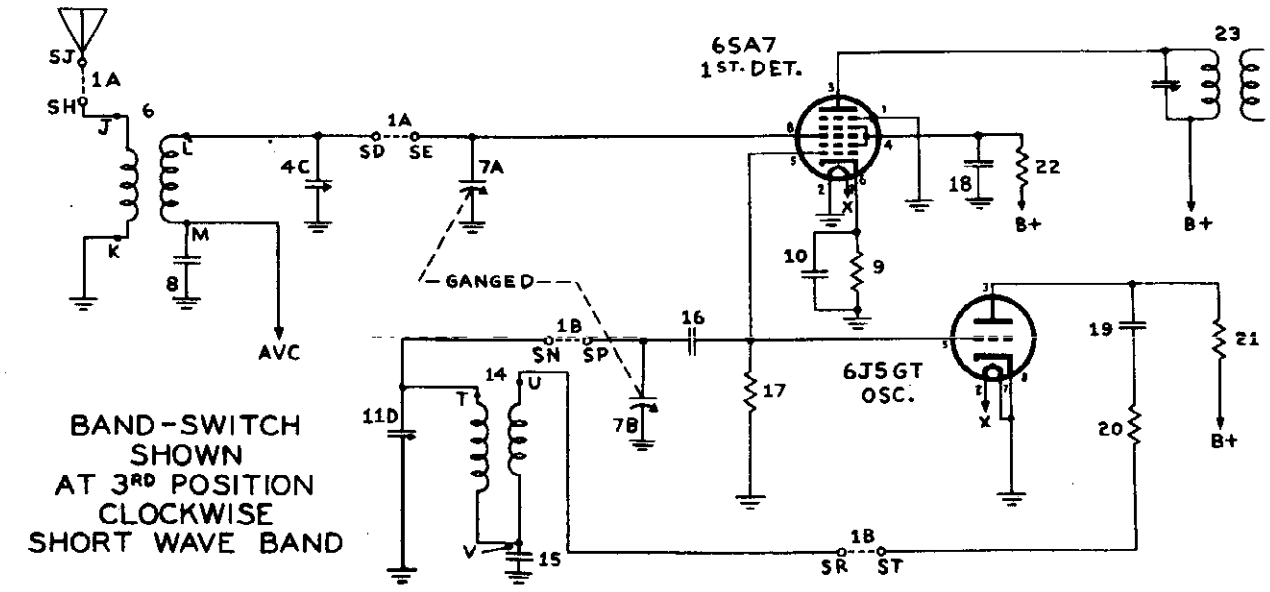
STEWART WARNER CORP.



BAND-SWITCH SHOWN AT 1ST POSITION BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE INTERMEDIATE BAND



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE SHORT WAVE BAND

PARTS LIST ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
2	502931	Condenser—mica 100 Mmfd 500 volt	$0.24
4A, B, C	504030	Condenser—trimmer assembly A—1.6 to 18 Mmfd. B—1.6 to 18 Mmfd. C—3 to 35 Mmfd.	.90
7A, B	504026	Condenser-variable gang	4.60
8	502806	Condenser—.05 Mfd. 200 volt	.36
10	502806	Condenser—.05 Mfd. 200 volt	.36
11 (A, B, C, D)	504031	Condenser—trimmer assembly A—3 to 35 Mmfd. B—300 to 600 Mmfd. C—1.6 to 18 Mmfd. D—1.6 to 18 Mmfd.	1.40
13	504048	Condenser—mica 4,300 Mmfd. 500 volt	1.30
15	504049	Condenser—mica 4,300 Mmfd. 500 volt	1.30
16	502929	Condenser—mica 47 Mmfd. 500 volt	.16
18	502807	Condenser—.05 Mfd. 400 volt	.36
19	502804	Condenser—.01 Mfd. 400 volt	.30
24	502806	Condenser—.05 Mfd. 200 volt	.36
26	502807	Condenser—.05 Mfd. 400 volt	.26
31	502931	Condenser—mica 100 Mmfd. 500 volt	.24
33	504220	Condenser—.1 Mfd. 600 volt	.36
34	504051	Condenser—.004 Mfd. 400 volt	.24
37	502790	Condenser—mica 200 Mmfd. 500 volt	.24
38	502805	Condenser—.02 Mfd. 400 volt	.36
40	502807	Condenser—.05 Mfd. 400 volt	.36
46A, B, C	504033	Condenser—electrolytic A—20 Mfd. 400 volt B—10 Mfd. 400 volt C—20 Mfd. 25 volt	2.20
48	504051	Condenser—.004 Mfd. 400 volt	.24
49	504050	Condenser—.05 Mfd. 600 volt	.36

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		RESISTORS	
9	502125	Resistor—carbon 220 Ohms ¼ watt	$0.12
17	502130	Resistor—carbon 22,000 Ohms ¼ watt	.12
20	502794	Resistor—carbon 68 Ohms ¼ watt	.12
21	504047	Resistor—carbon 22,000 Ohms ½ wat	.12
22	502466	Resistor—carbon 33,000 Ohms 1 watt	.16
25	502125	Resistor—carbon 220 Ohms ¼ watt	.12
27	504048	Resistor—carbon 56,000 Ohms ½ watt	.12
28	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
30	502131	Resistor—carbon 47,000 Ohms ¼ watt	.12
32A B	504029	Volume control 1 Meg. (with switch)	1.35
36	502136	Resistor—carbon 10 Meg. ¼ watt	.12
39	502133	Resistor—carbon 220,000 Ohms ¼ watt	.12
41	502132	Resistor—carbon 100,000 Ohms ¼ watt	.12
42	502134	Resistor—carbon 470,000 Ohms ¼ watt	.12
47	502137	Resistor—wire wound 330 Ohms 2 watt	.25
50	502291	Resistor—carbon 4,700 Ohms ¼ watt	.12
51	502141	Resistor—carbon 560 Ohms ¼ watt	.12
		COILS AND TRANSFORMERS	
3	504038	Coil—BC. antenna	$1.85
5	504039	Coil—Int. Band antenna coil	1.50
6	504036	Coil—S.W. antenna	1.25
12	504040	Coil—BC. and Int. Band Oscillator	1.80
14	504037	Coil—S.W. Oscillator	1.25
23	504024	Transformer—1st I.F.	2.60
29	504025	Transformer—2nd I.F.	2.60
35	504032	Transformer—power	11.60
45	502751	Choke coil	4.60
55	504763	Transformer—output for W-504056 spkr.	2.75

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		OTHER ELECTRICAL PARTS	
1A, B	504028	Switch—band	$2.40
43, 44	110629	Lamp—dial (Mazda No. 44) 6.3V 0.25Amps.	.15
52	504027	Switch—tone	.85
53	504056	Speaker—P.M. dynamic (6 inch)	8.90
54	504764	Cone & voice coil for W-504056 spkr.	2.50
		MISCELLANEOUS PARTS	
	504054	Background for dial	$0.10
	504034	Base for mtg. electrolytic condenser	.04
	119559	Clamp—dial glass	.08
	112745	Clip—coil mounting	.01
	114955	Clip—retainer on end of dial cord	.01
	502773	Cord—dial drive (66 in. required) per ft.	.05
	504055	Dial scale—glass	1.30
	117029	Drum—for dial drive	.70
	504108	Plug—speaker	.25
	501449	Knob—volume or tuning	.15
	501458	Knob—tone or band switch	.16
	502601	Pointer	.18
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	113483	Rubber pad—chassis mtg.	.03
	116584	Rubber spacer for mtg. dial scale	.02
	85827	Screw—8-32 for dial drum	.02
	112874	Screw—No. 10 x 1⅛; chassis mtg.	.03
	118606	Shaft—tuning control	.18
	112818	Socket—dial lamp with lead	.10
	160392	Socket—octal	.16
	504035	Socket—speaker	.18
	113177	Spring—dial cord tension	.09
	502767	Terminal strip—"GND-ANT"	.18
	504044	Terminal strip—phono	.22
	111456	Washer—spring washer for tuning shaft	.005
	500487	Washer—felt; for knobs	.01

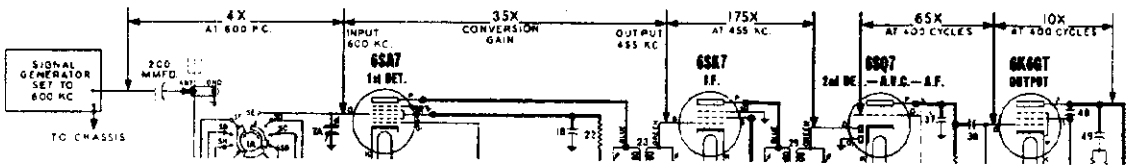
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

APPROXIMATE STAGE GAIN DATA

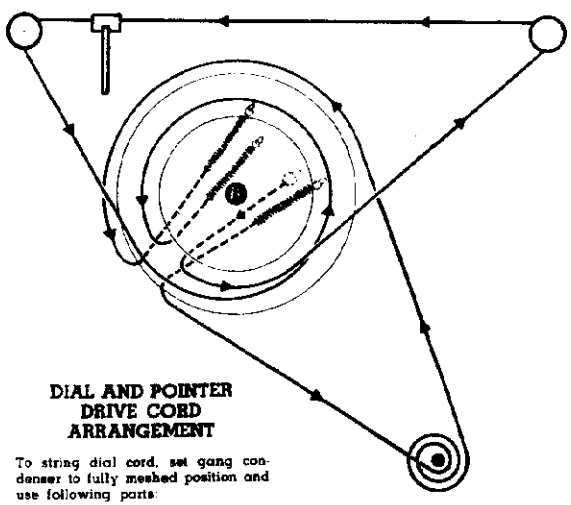
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal D of BC. antenna coil (#3). Then connect positive battery terminal to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning).
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

113177	Tension Spring
114955	Clip on end of cord
119087	Ring
502773	Cord (66 inches) 38 inches for pointer drive 30 inches for tuning drive

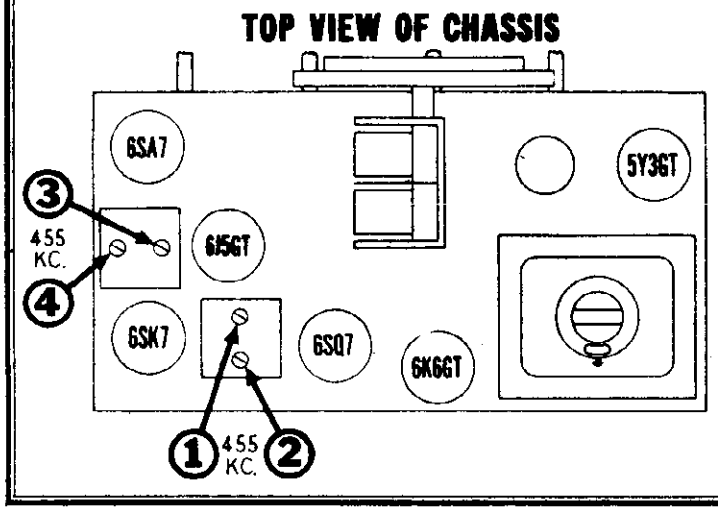
MODEL 9013-A

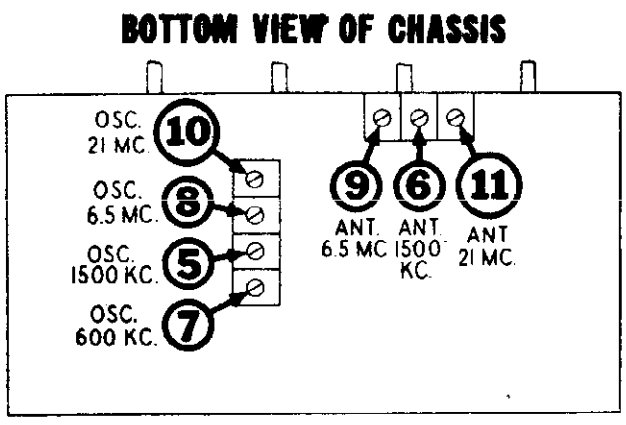
STEWART WARNER CORP.

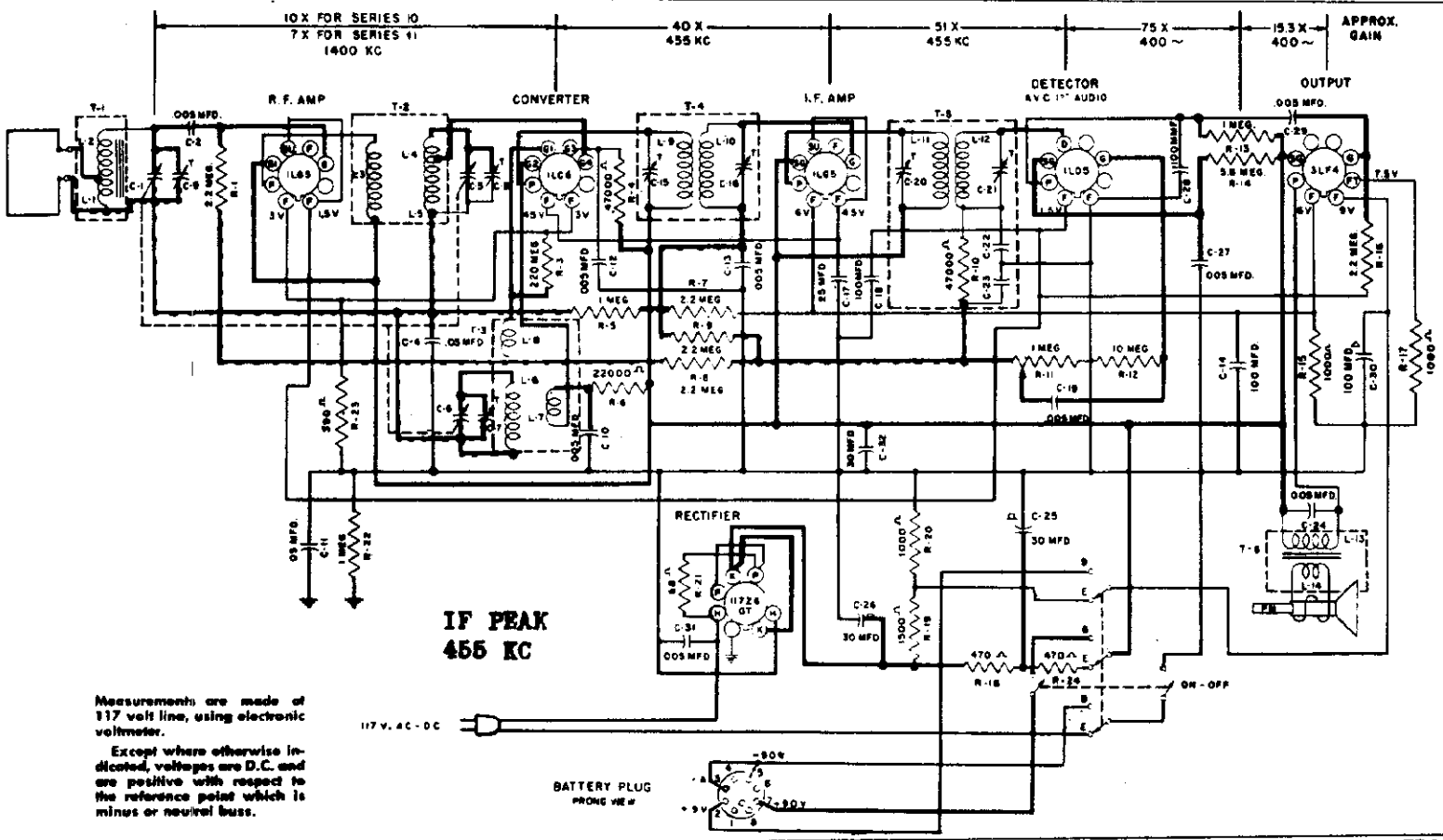
ALIGNMENT PROCEDURE

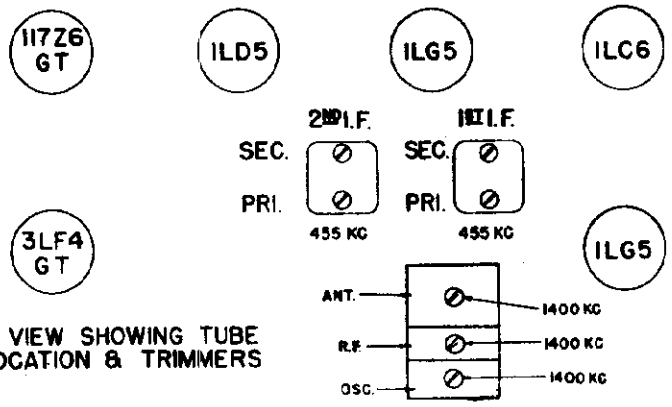
1. When gang condenser is fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
2. Connect on output meter across the speaker voice coil or from the plate of the 6K6GT tube to chassis through a 0.1 Mfd. condenser.
3. Connect the ground lead of the signal generator to the receiver chassis.
4. Set volume control to maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
1 MFD. Condenser	Lug on front section of gang.	455 KC.	Broadcast (counter-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	"ANT" terminal at rear of chassis.	1500 KC	Broadcast (counter-clockwise)	1500 Kc.	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	"ANT" terminal at rear of chassis.	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 Kc. generator signal.	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	"ANT" terminal at rear of chassis.	600 KC	Broadcast (counter-clockwise)	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.
400 OHM Carbon Resistor	"ANT" terminal at rear of chassis.	6.5 MC	Intermediate (middle)	6.5 Mc.	8	Intermediate Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 5.6 Mc. If image does not appear, realign at 6.5 Mc. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"ANT" terminal at rear of chassis.	6.5 MC	Intermediate (middle)	Tune to 6.5 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	"ANT" terminal at rear of chassis.	21 MC	Short wave (clockwise)	21 Mc.	10	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 20.1 Mc. If image does not appear, realign at 21 Mc. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	"ANT" terminal at rear of chassis.	21 MC	Short wave (clockwise)	Tune to 21 Mc. generator signal.	11	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

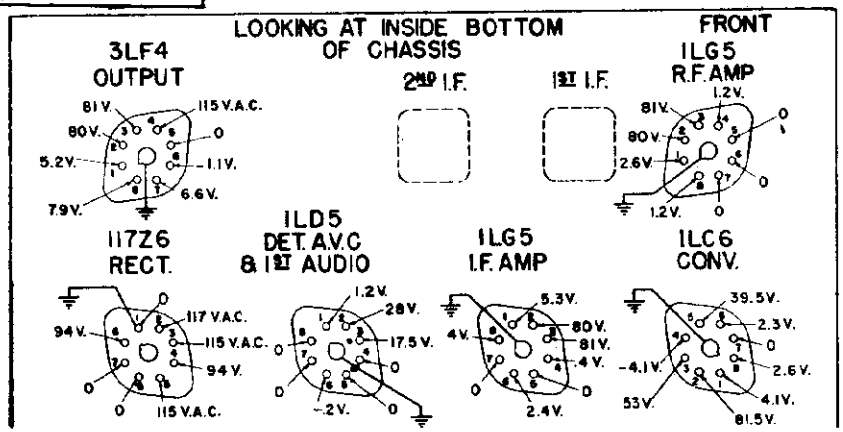








TOP VIEW SHOWING TUBE LOCATION & TRIMMERS



MODEL 1105

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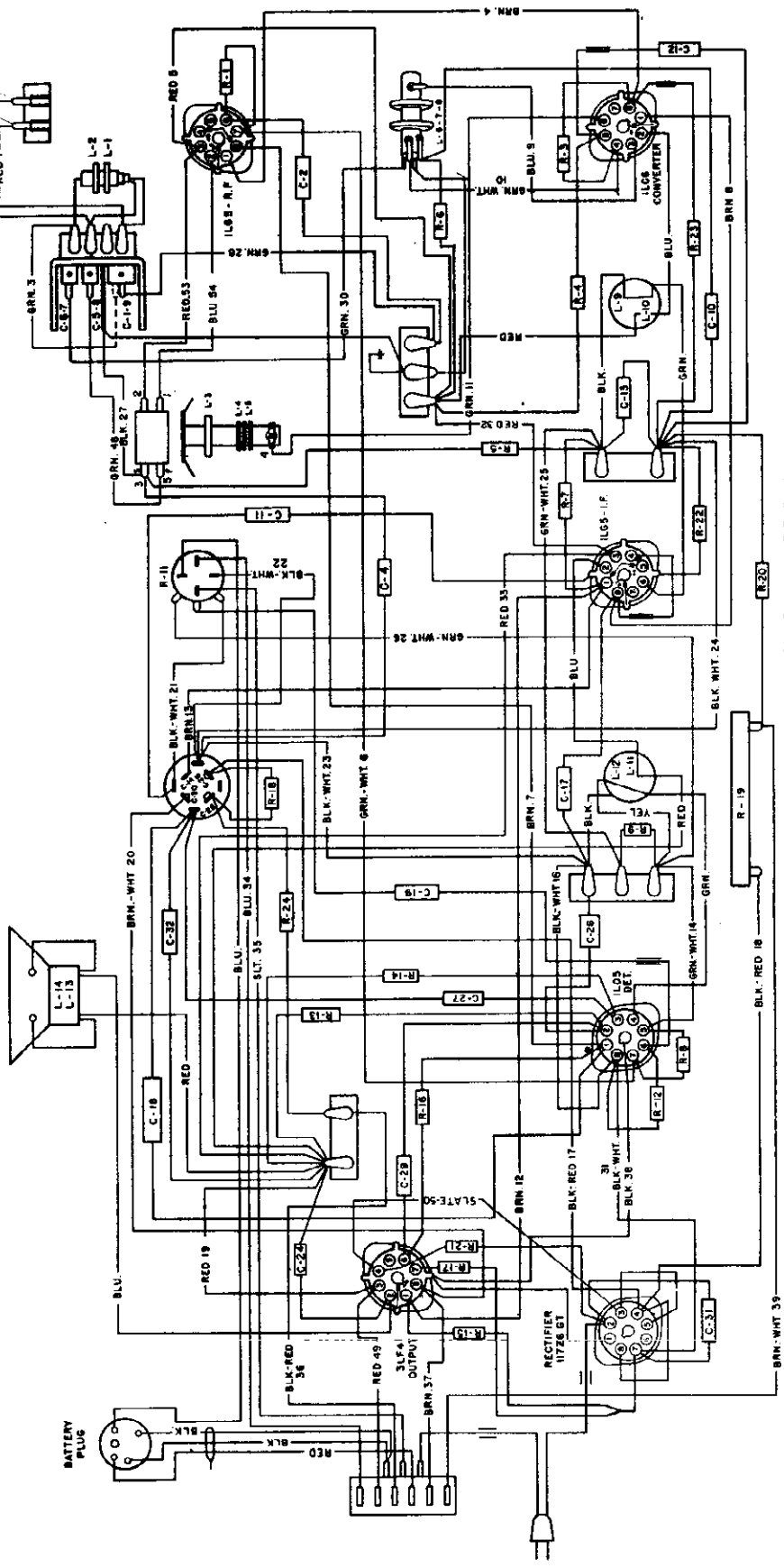

WIRING DIAGRAM

In cases where microphoniam is due to the 1LD5 tube, a 1LH4 should be employed. This change requires no rewiring or removal of chassis from cabinet. This is a direct substitute.

When this tube is replaced, the tube label on the back of the chassis should be changed by crossing out the 1LD5 which is indicated on the label and marking in the 1LH4 designation above it. On future production the screen dropping resistor and bypass capacitor R-14-(5.6 Meg.) and C-27 (.005 Mfd.) will be omitted from the chassis. These part numbers are 28200 and 27760.

This change replaces the pentode audio section of the 1LD5 with a triode audio section of the 1LH4.

On all receivers bearing series No. 12, there will be no screen voltage reading on terminal number three.

Note on all 1105 Receivers:

In some cases oscillation will be present over a major portion of the band. To cure this reverse antenna loop leads. The pin terminals have been coded red and black. Disregard coding.

STROMBERG CARLSON CO.

ALIGNING

Never realign unless absolutely necessary.

Use a good signal generator modulated at 400 or 1000 cycles with variable output voltage. Use a sensitive output meter across the voice coil of the speaker. Always align using the smallest possible input from the signal generator. A strong signal makes adjustments approximate. Always have volume control "full on".

Refer to Location Chart on page two for trimmer locations.

Aligning Procedure *(follow this order exactly)*

Intermediate Frequency Adjustments

The built-in loop should remain connected to the antenna and ground terminals. (or use a dummy loop).

1. Turn the tuning control to the extreme low frequency position *(Variable capacitor plates all the way in).*
2. Connect both signal generator leads to an 8 inch radiating loop *(1 turn).*

   Place the radiating loop close to the antenna of the receiver. The antenna in the 1105 is built around the carrying case.
3. Introduce a modulated signal of 455 KC to the radiating loop.
4. Adjust the I.F. aligners for maximum output in the following order:

   A. Secondary of second I.F. Transformer
   B. Primary of second I.F. Transformer
   C. Secondary of first I.F. Transformer
   D. Primary of first I.F. Transformer

Dial Pointer Adjustment

Align the two arrow pointers, located at the extreme ends of the dial, horizontal with respect to the chassis base.

Radio Frequency Adjustments

The built-in antenna should remain connected to the antenna and ground terminals of the receiver.

1. Leave signal generator and radiating loop connected in same position as for I.F. Transformer.
2. Set signal generator and receiver tuning dial to 1400 kilocycles. Arrow on dial scale indicates 1400 kilocycles.
3. Adjust the oscillator, radio frequency and antenna trimmers for maximum output.
4. Set both the signal generator's frequency and the receiver's tuning dial to 600 kilocycles and check calibration.

Note: If the calibration is off at 600 kilocycles, operations 2 and 3 may be repeated until the best results are obtained.

IDENTIFICATION TABLE

Model	Chassis	Cabinet	Speaker
1105	112009	108025	155013

SPECIFICATIONS

Voltage Rating.....105-125 Volts
Type of Circuit.....Superheterodyne
Tuning Range.....540 Kc. to 1600 Kc.
Number and type of Tubes—6
1—1LG5.....R.F. Amplifier
1—1LC6.....Converter
1—1LG5.....I.F. Amplifier
1—1LD5....Demodulator, A.V.C., 1st Audio
1—3LF4.....Power Output
1—117Z6GT.....Rectifier
Input Power Rating.....25 Watts
Input Power Frequency.....25-60 Cycles AC-DC
Intermediate Frequency.....455 Kc.
Speaker Voice Coil Impedance at 400 Cycles 3.5 Ohms
Speaker.....PM
Power Output ... 170 Milliwatts AC, 180 Milliwatts Batt.

Resistors

27407	R-6	22,000 Ohm
28153	R-23	390 Ohm
28154	R-18-24	470 Ohm
28158	R-15-17	1,000 Ohm
28177	R-4	47,000 Ohm
28183	R-3	.22 Meg.
28191	R-5-13-22	1. Meg.
28195	R-1-7-8-9-16	2.2 Meg.
28200	R-14	5.6 Meg.
28203	R-12	10. Meg.
45529	R-20	1,000 Ohm 1 W
114310	R-10	47,000 Ohm
145007	R-11	1. Meg. Volume Control Off-On Switch
149015	R-19	1,500 Ohm Voltage Divider
149206	R-21	68 Ohm 2 W

Capacitors

27760	C-2-10-12-13-19-24-27-29-31	.005 mf.
34800	C-28	100 mmf.
40632	C-4-11	.05 mf.
110001	C-1-9-5-8-6-7	Variable Capacitor
110010	C-18	100 mfd. Electrolytic
111008	C-14-25-26-30	100 mfd., 30 mfd., 30 mfd., 100 mfd. Electrolytic
111013	C-32	30 mfd. Electrolytic
110421	C-17	.25 mfd.

Transformers, and Coils

114001	T-2 (L-3-4-5)	RF Coil
114023	T-1 (L-1-2)	Antenna Coil
114024	T-3 (L-6-7-8)	Oscillator Coil
114025	R.F. Coil used on Series 10	See Note Page 4
114309	T-4 (L-9-10-C-15-16)	1st I.F. Transformer
114310	T-5 (L-11-12-C-20-21-22-23-R-10)	2nd I.F. Transformer
155006		Speaker Cone Assembly
155011	T-6 (L-13-14)	Output Transformer
155013		Speaker Assembly

Miscellaneous

30151	Socket, Tube 117Z6
33218	Cord, AC
34590	Socket, Tube (4)
109008	Cable Plug Assembly, Battery
116001	Contact Strip, Antenna
122010	Dial Scale
124002	Cord, Dial Drive
131001	Grommet, Variable Mounting
131003	Grommet, Tube Socket 1LD5
144005	Indicator, Off-On
150011	Shaft, Dial Drive
151015	Shield, Tube
152008	Socket, Tube 1LD5
156009	Spring, Indicator
158008	Switch, AC-Batt.
159011	Cord Tip, Antenna Red
159012	Cord Tip, Antenna Black
168004	Battery Pack

Knobs and Cabinet Parts

24135	Tips, Felt
130013	Grille
132041	Handle, Carrying
132042	Handle, Panel
134015	Knob (2)
138007	Lens, Dial

Series 10 employed R.F. Coil 114025. This has superseded by coil No. 114001. Rewire to use 114 as shown on Schematic and Wiring Diagram.

NOTE—When ordering replacement parts alv specify series number as well as model part number. Series number is stampe back of chassis.

MODEL 1110

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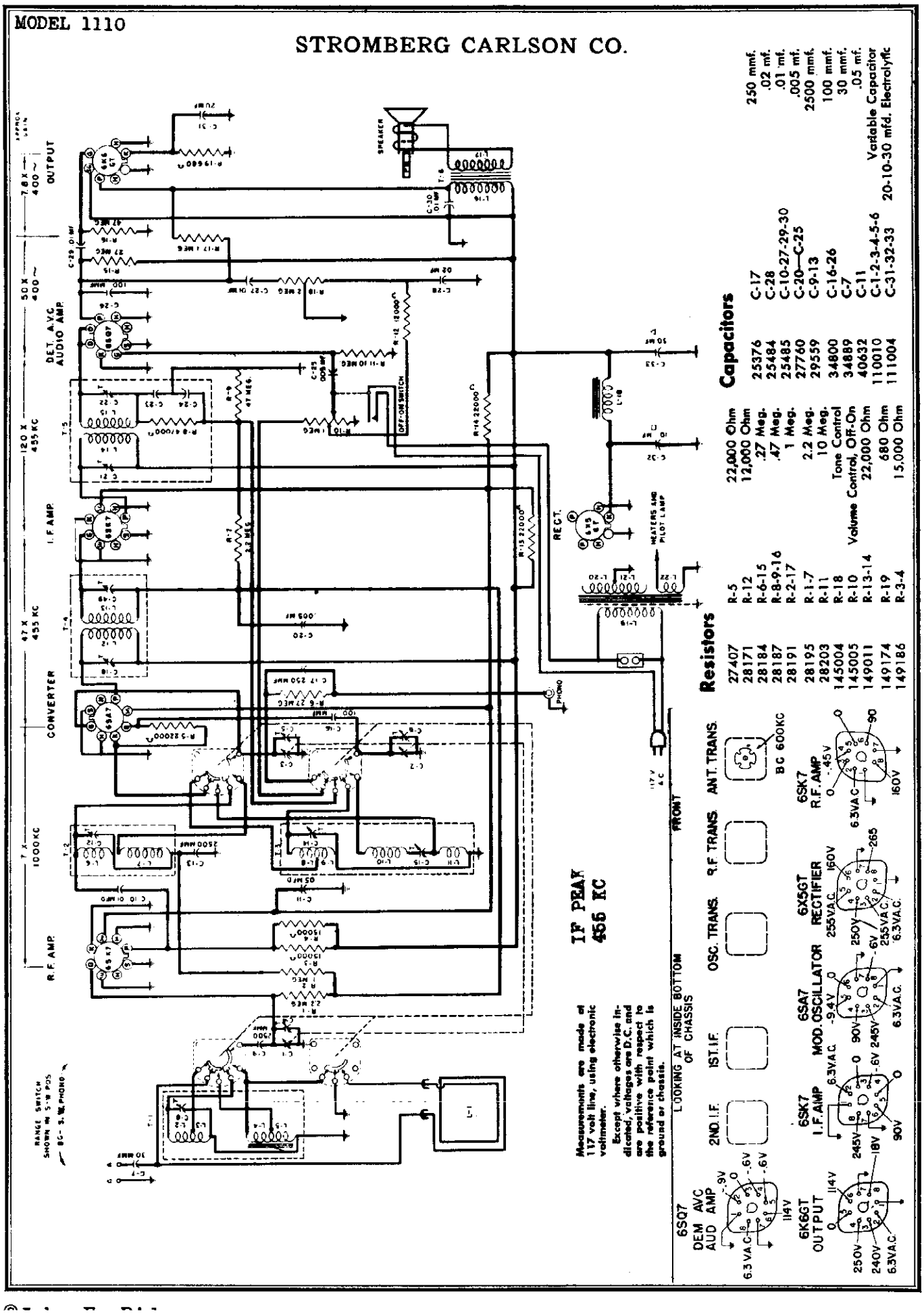

Capacitors

22,000 Ohm	25376	C-17	250 mmf.
12,000 Ohm	25484	C-28	.02 mf.
.27 Meg.	25485	C-10-27-29-30	.01 mf.
.47 Meg.	27760	C-20—C-25	.005 mf.
1 Meg.	29559	C-9-13	2500 mmf.
2.2 Meg.	34800	C-16-26	100 mmf.
10 Meg.	34889	C-7	30 mmf.
Tone Control	40632	C-11	.05 mf.
Volume Control, Off-On	110010	C-1-2-3-4-5-6	Variable Capacitor
22,000 Ohm	111004	C-31-32-33	20-10-30 mfd. Electrolytic
680 Ohm			
15,000 Ohm			

Resistors

27407	R-5	R-1-7	28195
28171	R-12	R-11	28203
28184	R-6-15	R-18	145004
28187	R-8-9-16	R-10	145005
28191	R-2-17	R-13-14	149011
		R-19	149174
		R-3-4	149186

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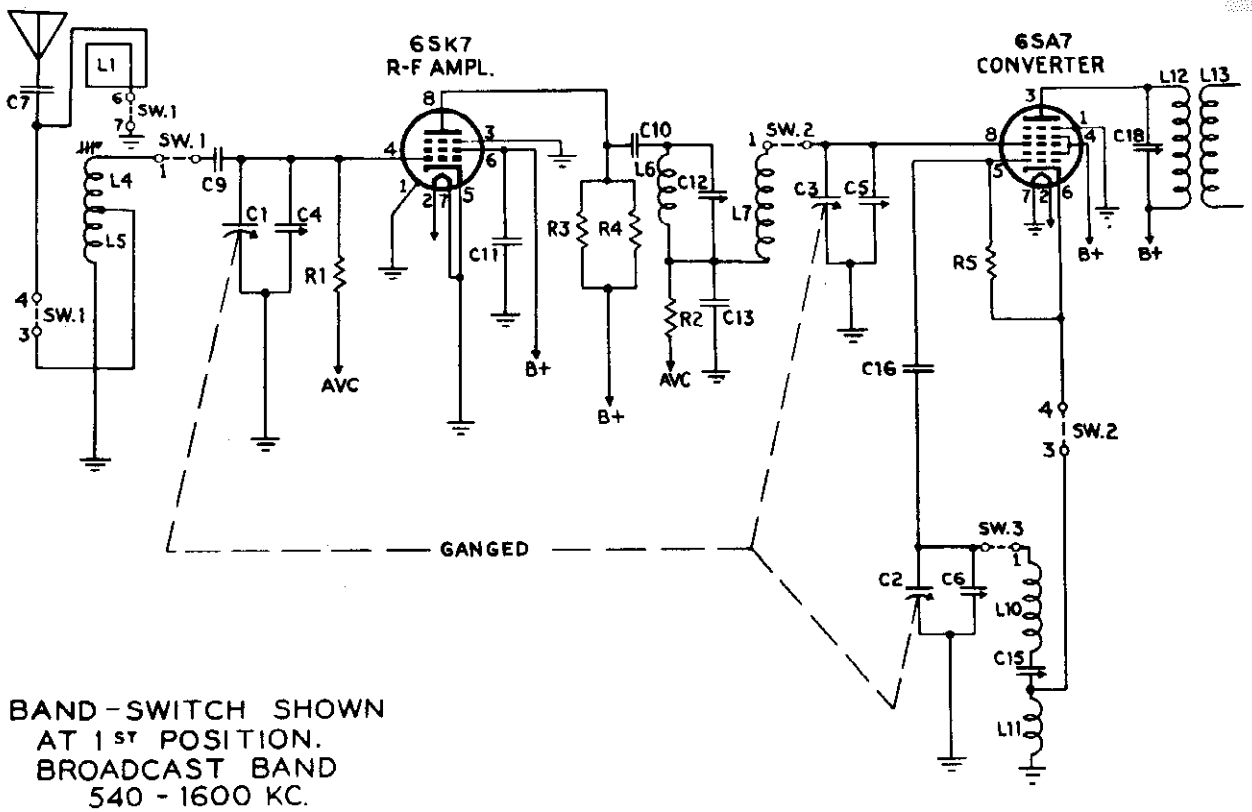
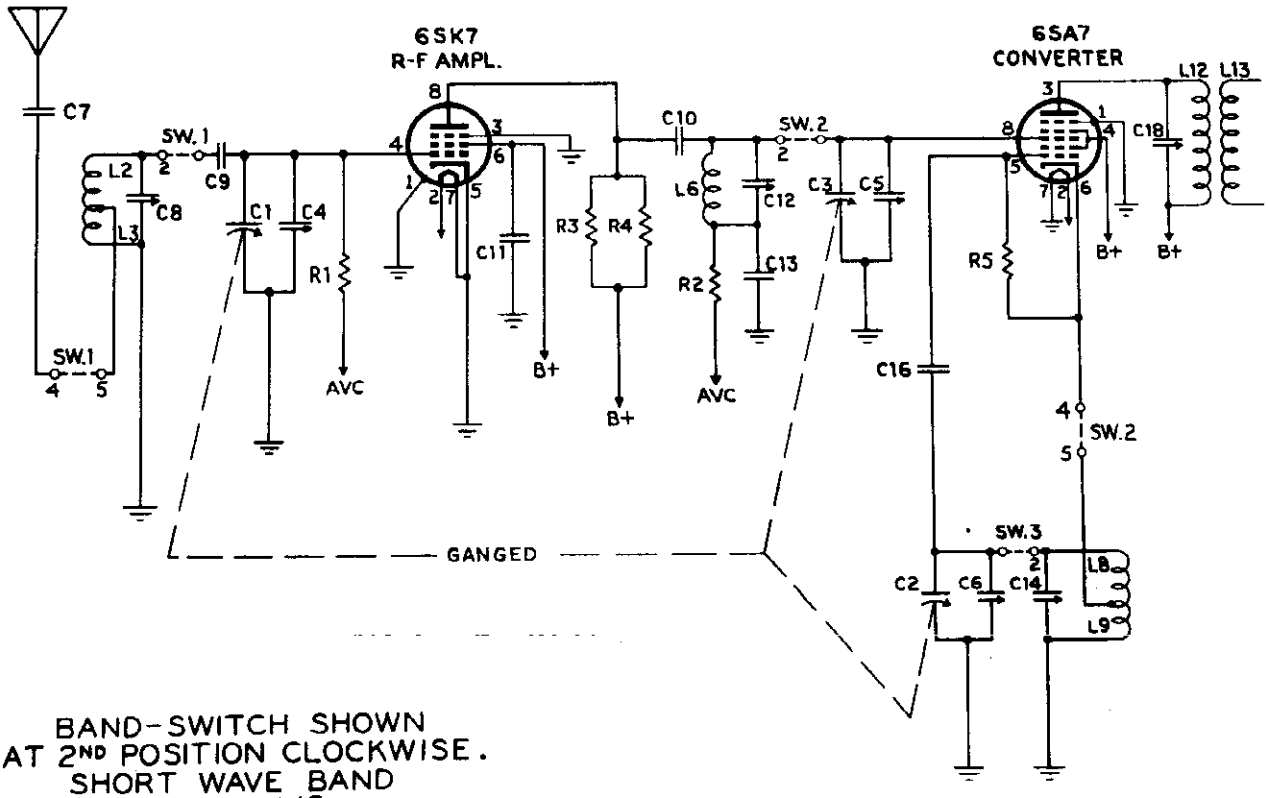


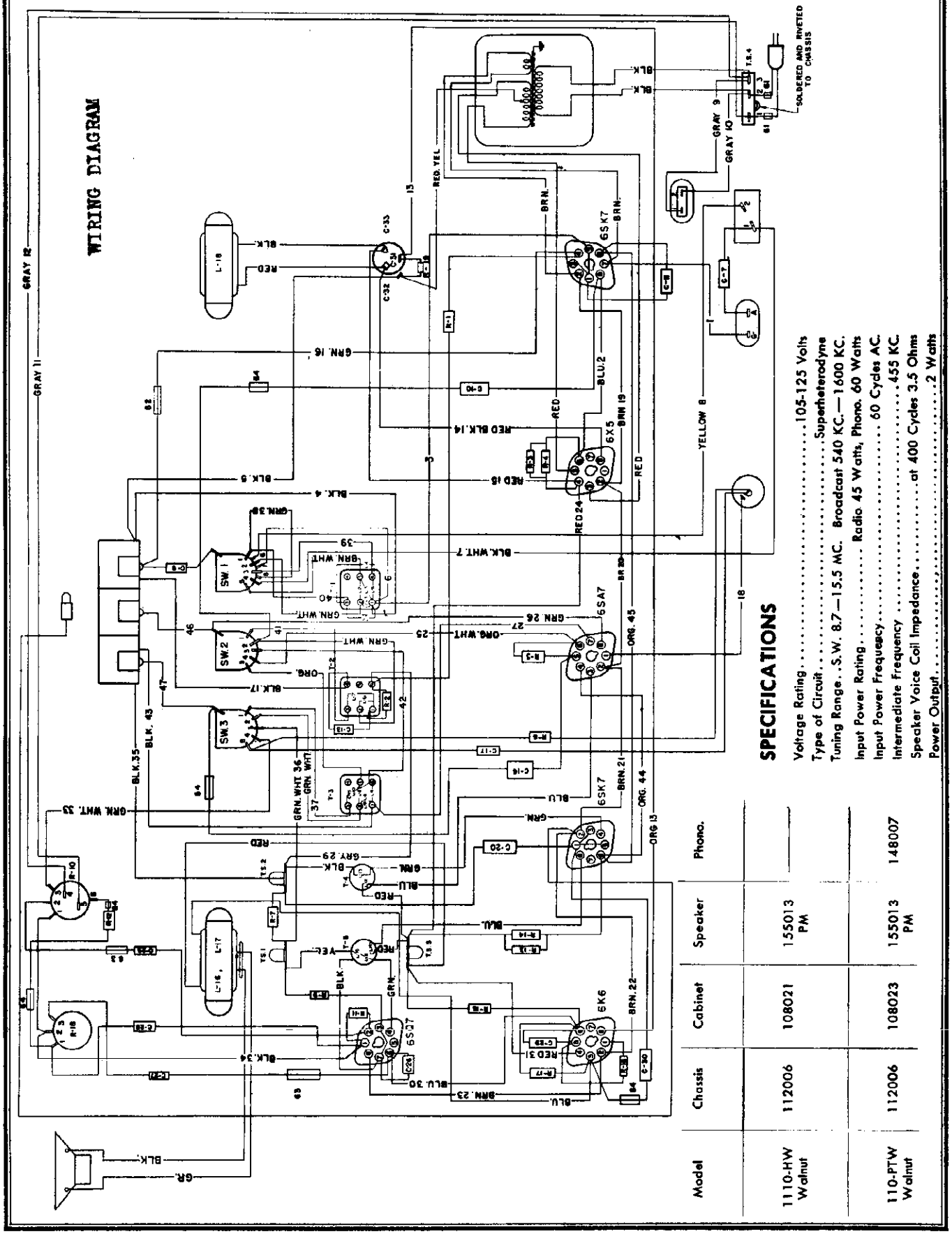
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 - 1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
8.7-15.5 MC.

MODEL 1110

STROMBERG CARLSON CO.



SPECIFICATIONS

Voltage Rating.....105-125 Volts
Type of Circuit.....Superheterodyne
Tuning Range..S.W. 8.7—15.5 MC. Broadcast 540 KC.—1600 KC.
Input Power Rating..... Radio 45 Watts, Phono. 60 Watts
Input Power Frequency..... 60 Cycles AC.
Intermediate Frequency .....455 KC.
Speaker Voice Coil Impedance.....at 400 Cycles 3.5 Ohms
Power Output.....2 Watts

Model	Chassis	Cabinet	Speaker	Phono.
1110-HW Walnut	112006	108021	155013 PM	———
110-PTW Walnut	112006	108023	155013 PM	148007

ALIGNING

Never realign unless absolutely necessary.

Use a good signal generator modulated at 400 or 1,000 cycles, with variable output voltage and a sensitive output meter across the voice coil of the speaker.

Always align using the lowest possible input from the signal generator. A strong signal makes adjustments approximate.

Always have the volume control "full on."

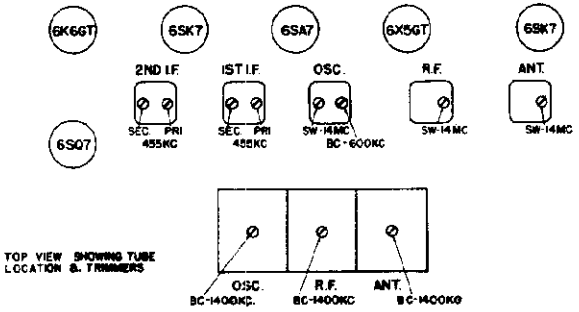
Aligning Procedure *(follow this order exactly)*

Intermediate Frequency Adjustments.

1. Set range switch to Standard Broadcast Position.
2. Tune set to extreme high frequency end of dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 KC. to the grid of the 6SA7 Converter tube (middle section of gang condenser) using a 0.1 mfd. capacitor in series with the output lead of the signal generator.
5. Adjust the I.F. aligners for maximum output in the following order:
   a. Secondary of second I.F. transformer.
   b. Primary of second I.F. transformer.
   c. Secondary of first I.F. transformer.
   d. Primary of first I.F. transformer.

Dial Pointer Adjustment

With plates of the gang tuning capacitor fully engaged make certain that the dial pointer is in a horizontal position directly on the calibration marks located at the low frequency end of dial scale. Adjust the dial pointer if necessary.



Switches

145005	Volume Control, Off-on Switch
158004	Range Switch

Radio Frequency Adjustments

Standard Broadcast Range.

Antenna must remain connected for R.F. adjustments.

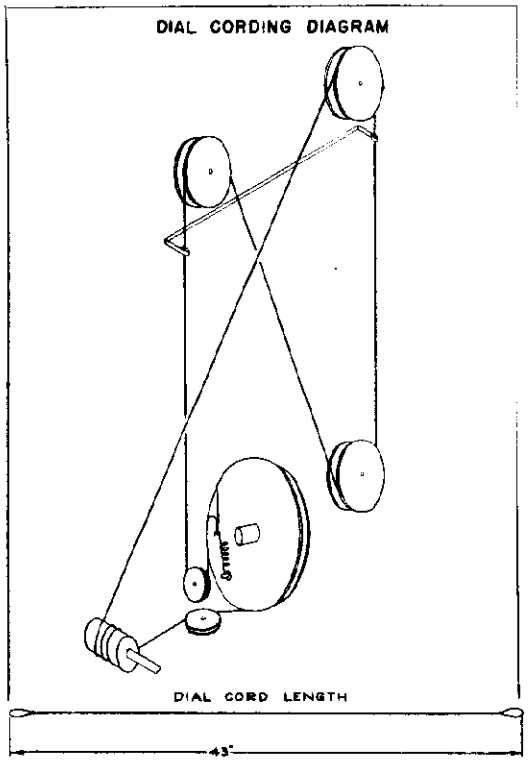
1. With the signal generator output lead connected to the Antenna and Ground terminal of the receiver, tune the signal generator frequency and receiver tuning dial to 1400 KC.
2. Adjust the oscillator, R.F. and antenna trimmers of the gang condenser for maximum signal.
3. Set the signal generator frequency and receiver tuning dial to 600 KC.
4. Adjust the 600 KC. padding condenser in oscillator coil shield for maximum signal.
5. Adjust the iron core in antenna transformer for maximum output. (Underside of chassis)
6. Repeat the above procedure until no further change is required.

Radio Frequency Adjustments

Short Wave Range

1. Set the range switch to Short Wave position.
2. Set the signal generator frequency and receiver tuning dial to 14 MC.
3. Connect the output of the signal generator to the antenna terminal on the chassis.
4. Adjust the oscillator, R.F. and antenna trimmers for maximum output.
5. Repeat the above procedure until no further change is required.

24135	Felt Tips
26122	Antenna—Ground Strip
28694	Socket, Pilot
29956	Lamp, Pilot
32048	Socket, AC. Outlet
32075	Pulley, Small
32076	Pulley, Medium
32077	Pulley, Large
33218	Cord, AC.
34421	Connector, Phono
40546	Clip, Pulley
80881	Crystal Cartridge (L-70)
101047	Back
122007	Dial Scale
124005	Dial Cord
129003	Gear Assembly, Switch Drive
143001	Plug, Antenna
144004	Pointer, Dial
146025	Station Call Letters
150007	Shaft Assembly, Dial Drive
150008	Shaft, Switch Drive
152002	Socket, Tube



PART No. 124005

Transformers, and Coils

114011	T-1 (L-2-3-4-5) (C-8)	Antenna Coil
114012	T-2 (L-6-7) (C-12)	R.F. Coil
114013	T-3 (L-8-9-10-11) (C-14-15)	Oscillator Coil
114307	T-4 (L-12-13) (C-18-49)	1st I.F. Transformer
114308	T-5 (L-14-15) (C-21-22-23-24-R-8)	2nd I.F. Transformer
155006		Speaker Cone
155013		PM Speaker Assembly
161001	L-18	Choke
161207	T-6 (L-16-17)	Output Transformer
161402	L-19-20-21-22	Power Transformer

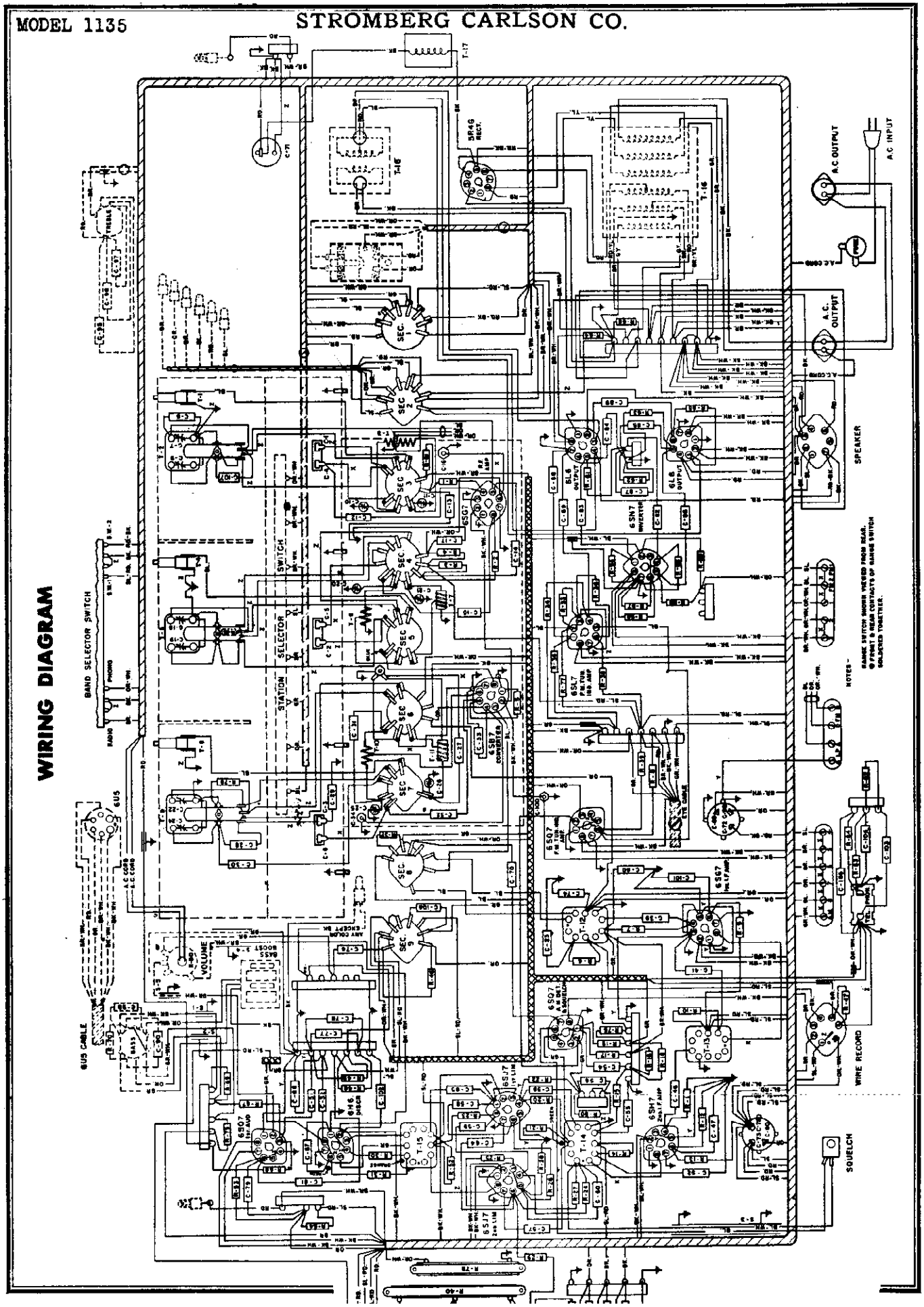
Knobs and Cabinet Parts

32224	Knob,—Volume, Tone, Tuning
35725	Knob,—Range
80874	Decal—Tone, Volume-Off-on, Stations, Range
80875	Grille and Baffle, Assembly—Left Hand
80876	Grille and Baffle, Assembly—Right Hand
80877	Lid Support
80878	Hinge
107003	Push Button
125005	Escutcheon and Lens, Dial

MODEL 1135

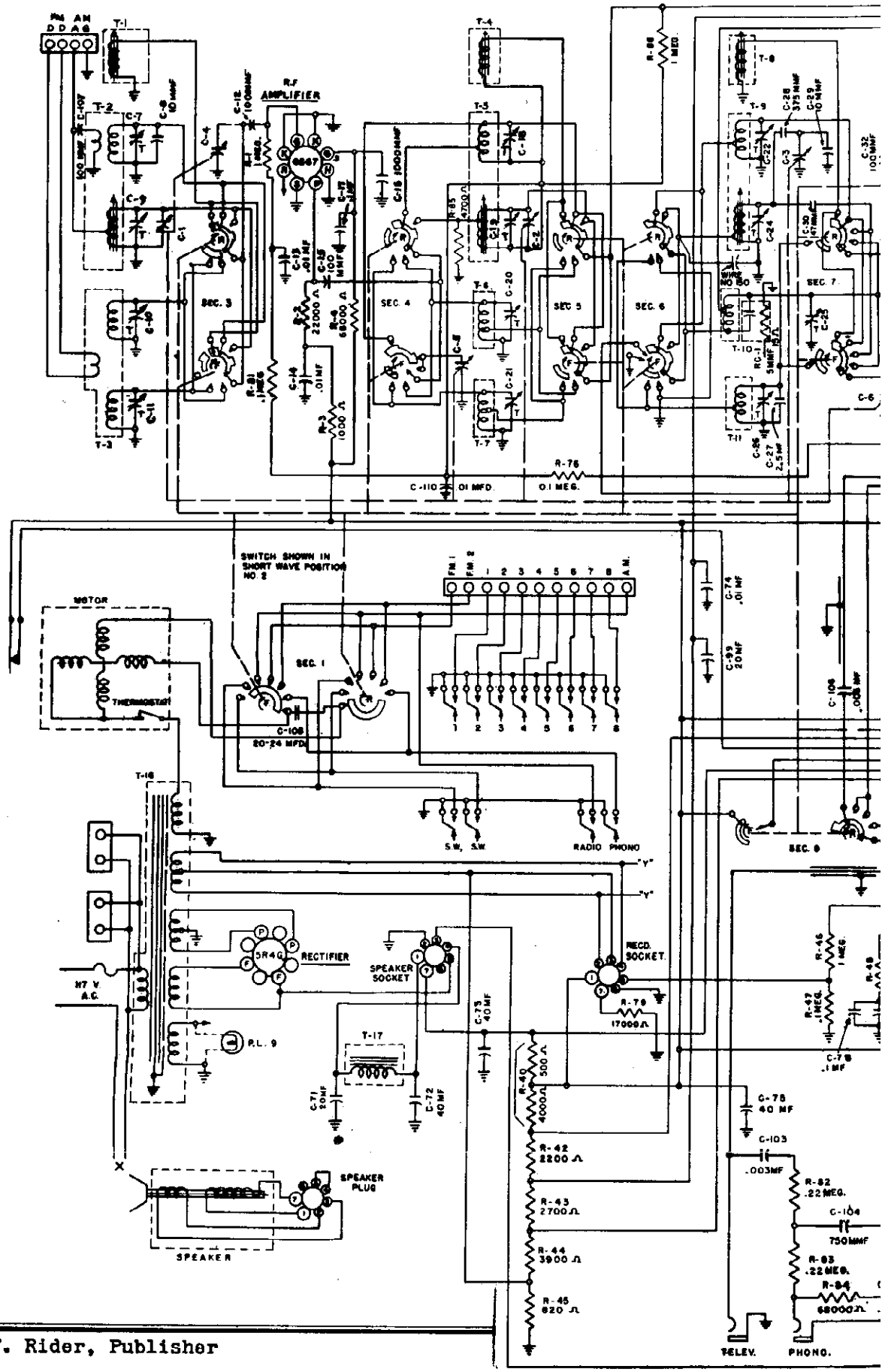
STROMBERG CARLSON CO.

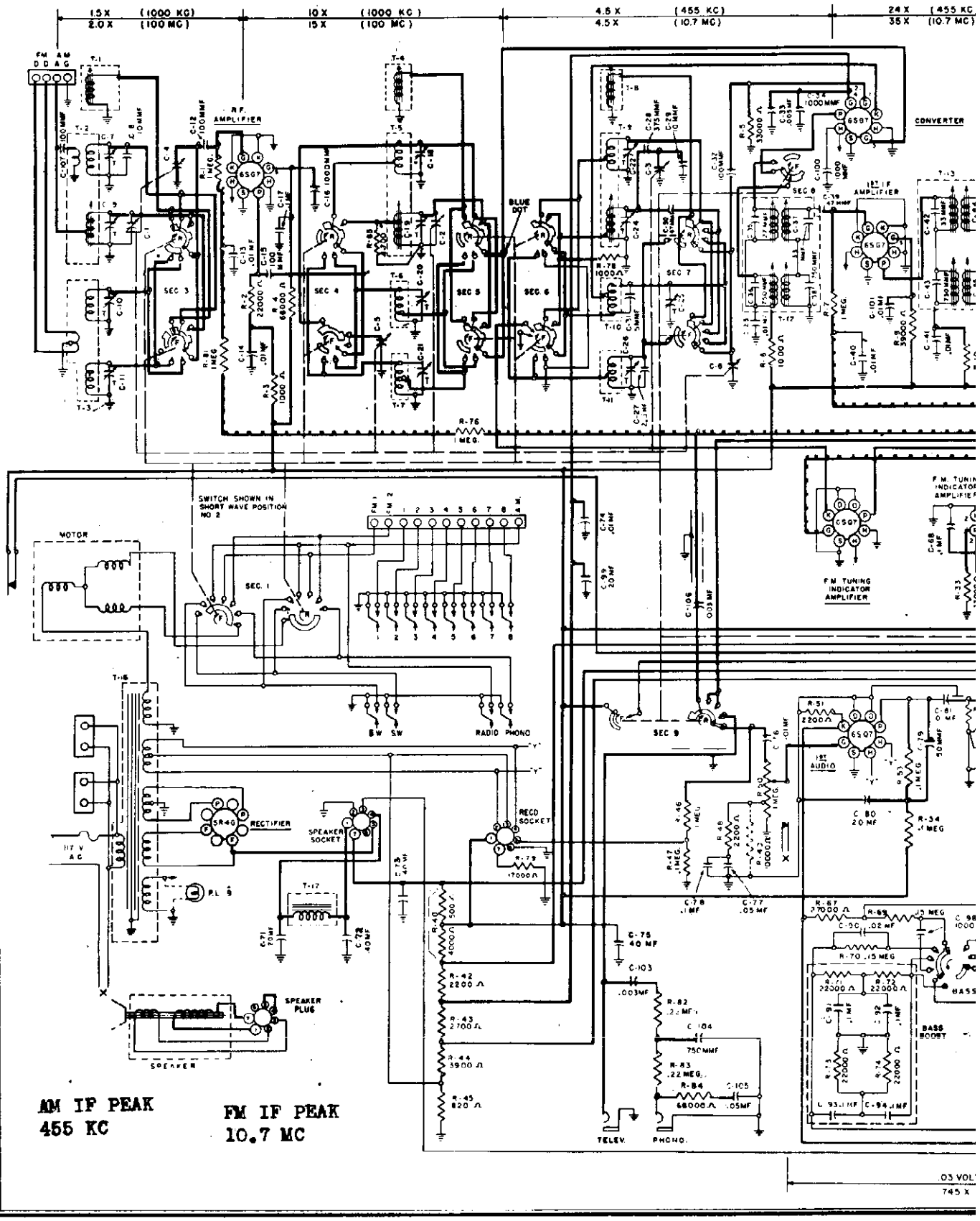
WIRING DIAGRAM



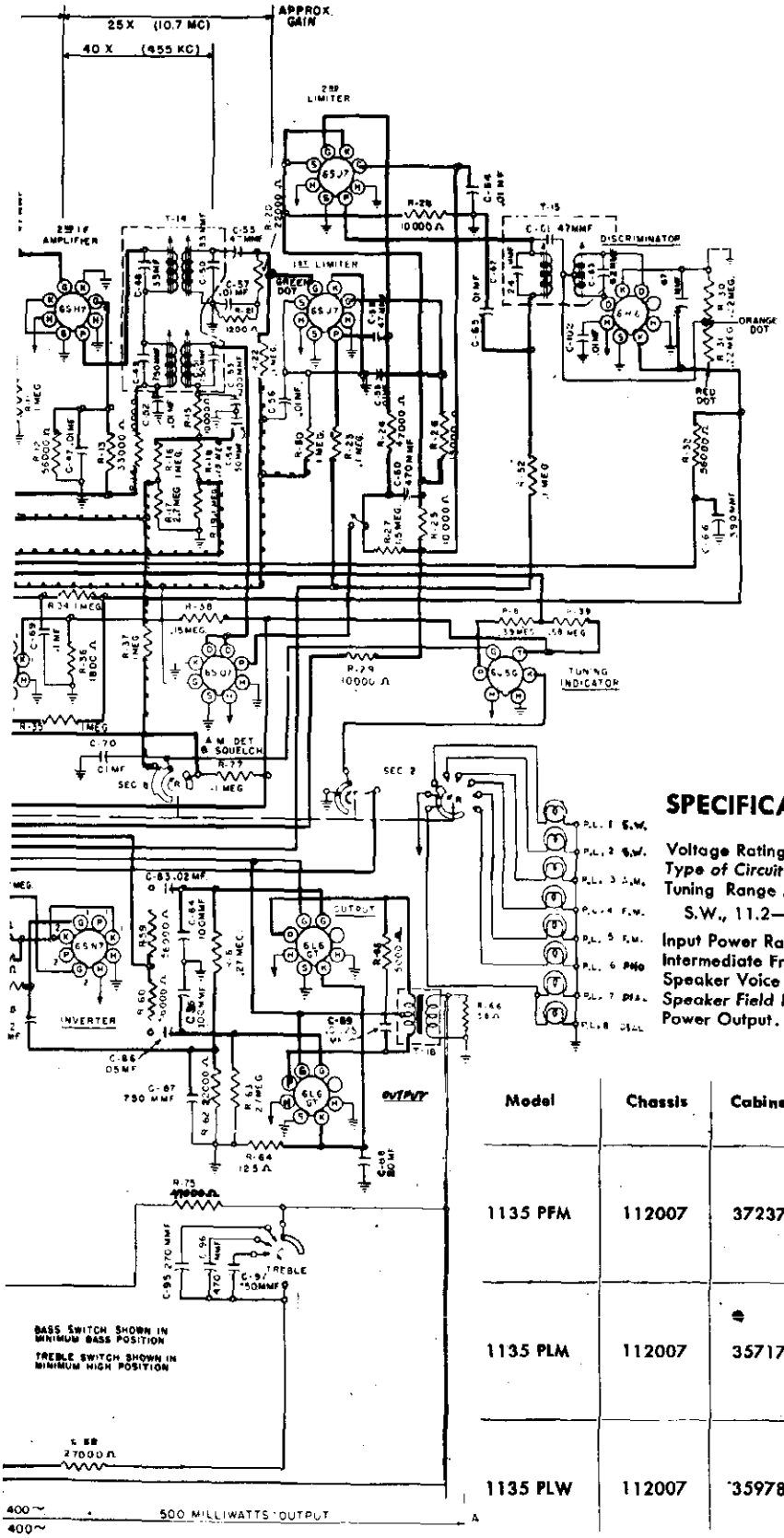
MODEL 1135A

STROMB




1.5 X (1000 KC) 2.0 X (100 MC)
10 X (1000 KC) 15 X (100 MC)
4.5 X (455 KC) 4.5 X (10.7 MC)
24 X (455 KC) 35 X (10.7 MC)
R.F. AMPLIFIER
CONVERTER
1ST I.F. AMPLIFIER
BLUE DOT
SEC 3
SEC 4
SEC 5
SEC 6
SEC 7
SEC 8
SEC 9
R-76 1 MEG.
SWITCH SHOWN IN SHORT WAVE POSITION NO 2
MOTOR
SEC 1
FM TUNING INDICATOR AMPLIFIER
BW SW
RADIO PHONO
1ST AUDIO
RECTIFIER
SPEAKER SOCKET
RECD SOCKET
117 V AC
PL 5
SPEAKER PLUG
SPEAKER
BASS BOOST
TELEV.
PHONO.
AM IF PEAK 455 KC
FM IF PEAK 10.7 MC

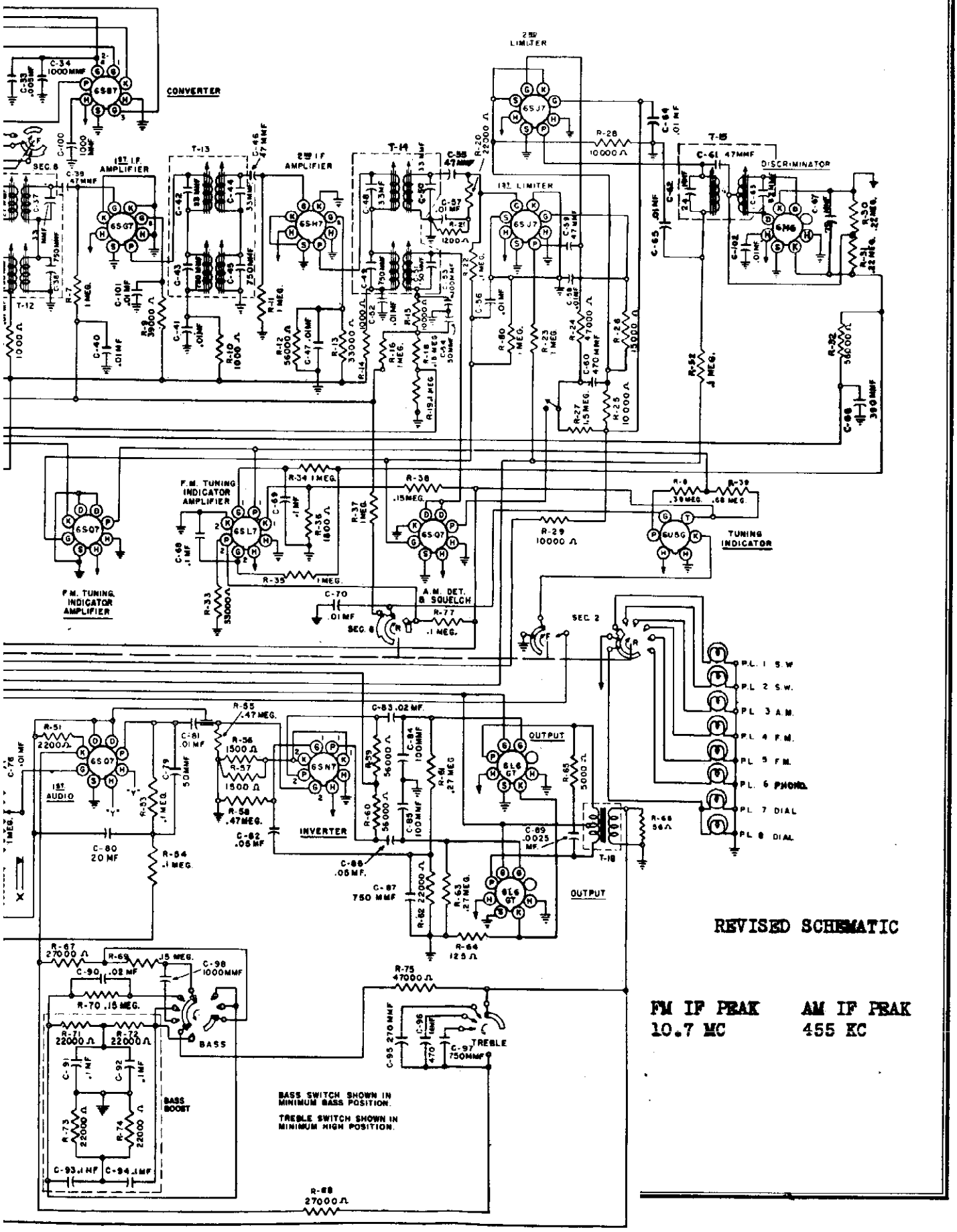
:ARLSON CO.



SPECIFICATIONS

Voltage Rating.....105-125 Volts
Type of Circuit.....Superheterodyne
Tuning Range ... Broadcast, 540-1620 KC.—S.W., 8.8—10.2 MC.
S.W., 11.2—12.6 MC.—FM (2) 42-50 MC.—FM (1) 88-108 MC.
Input Power Rating.....235 Watts
Intermediate Frequency.....AM. 455 KC. FM-10.7 MC.
Speaker Voice Coil Impedance at 400 Cycles.....10 Ohms
Speaker Field Resistance.....*210 Ohms*
Power Output.....19 Watts less than 10% Distortion

Model	Chassis	Cabinet	Speaker	Phono
1135 PFM	112007	37237	155019	148002 & 41613
1135 PLM	112007	35717	155019	41613
1135 PLW	112007	35978	155019	41613



REVISED SCHEMATIC

FM IF PEAK	AM IF PEAK
10.7 MC	455 KC

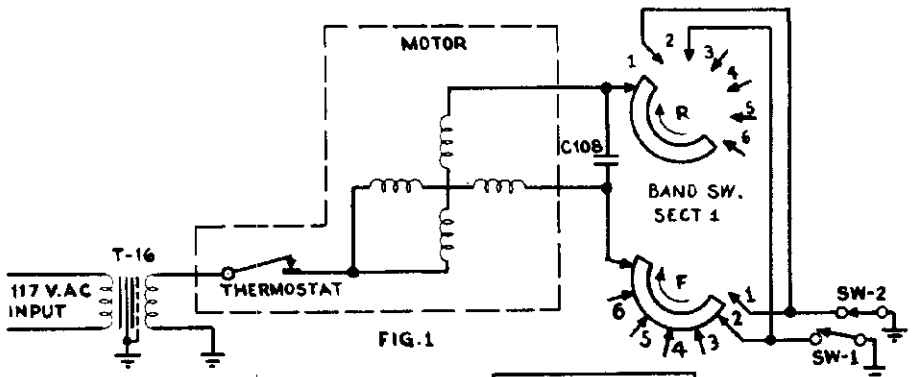


FIG. 1

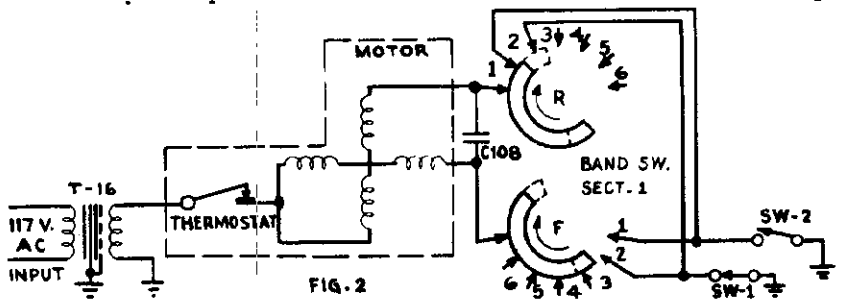
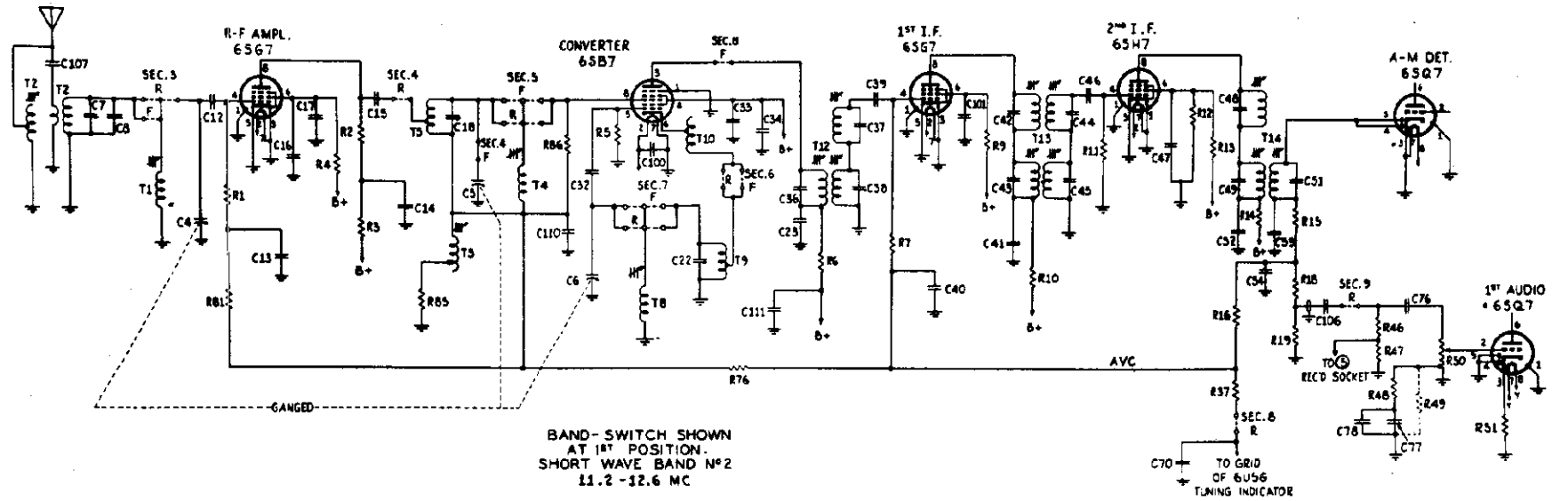


FIG. 2

NOTES: - FIGS. 1 AND 2 SHOW SCHEMATICALLY HOW THE BAND SWITCH IS ROTATED BY THE MOTOR WHEN THE DESIRED PUSHBUTTON IS DEPRESSED. PUSHBUTTONS 1 (SHORT WAVE 2-BAND) AND 2 (SHORT WAVE 1-BAND) ARE THE ONLY ONES SHOWN FOR CLARITY OF DIAGRAM. THE OTHER PUSHBUTTONS OPERATE IN A SIMILAR MANNER. FIG. 1 SHOWS THE MOTOR AT REST WITH THE BAND SWITCH AT SW-2 POSITION, NO. 1 BUTTON DEPRESSED. IF SW-1 BAND IS DESIRED THEN NO. 2 BUTTON IS CLOSED AND NO. 1 - OPENS, THIS PUTS A GROUND THROUGH SECTION 1-F OF THE BAND SWITCH ON ONE WINDING OF THE MOTOR, COMPLETING THE CIRCUIT, WHICH CAUSES THE MOTOR TO TURN THE BAND SWITCH IN THE DIRECTION OF THE ARROWS SHOWN TO POSITION OF FIG. 2 (SOLID LINES). THE GROUND WILL THEN BE DISCONNECTED FROM THE MOTOR WINDING, OPENING THE CIRCUIT AND CAUSING THE MOTOR TO STOP. IF THE MOTOR DOESN'T STOP FAST ENOUGH AND THE BAND SWITCH IS ROTATED TOO FAR, THEN IT WILL HAVE TO ASSUME THE POSITION SHOWN IN DOTTED LINES. THIS WILL PUT A GROUND ON THE OTHER WINDING OF THE MOTOR, THROUGH CONTACT 2 OF SECTION 1-R OF THE BAND SWITCH, MAKING THE MOTOR REVERSE ITS DIRECTION OF ROTATION TO ITS NORMAL POSITION (SOLID LINES) FOR SW-1.

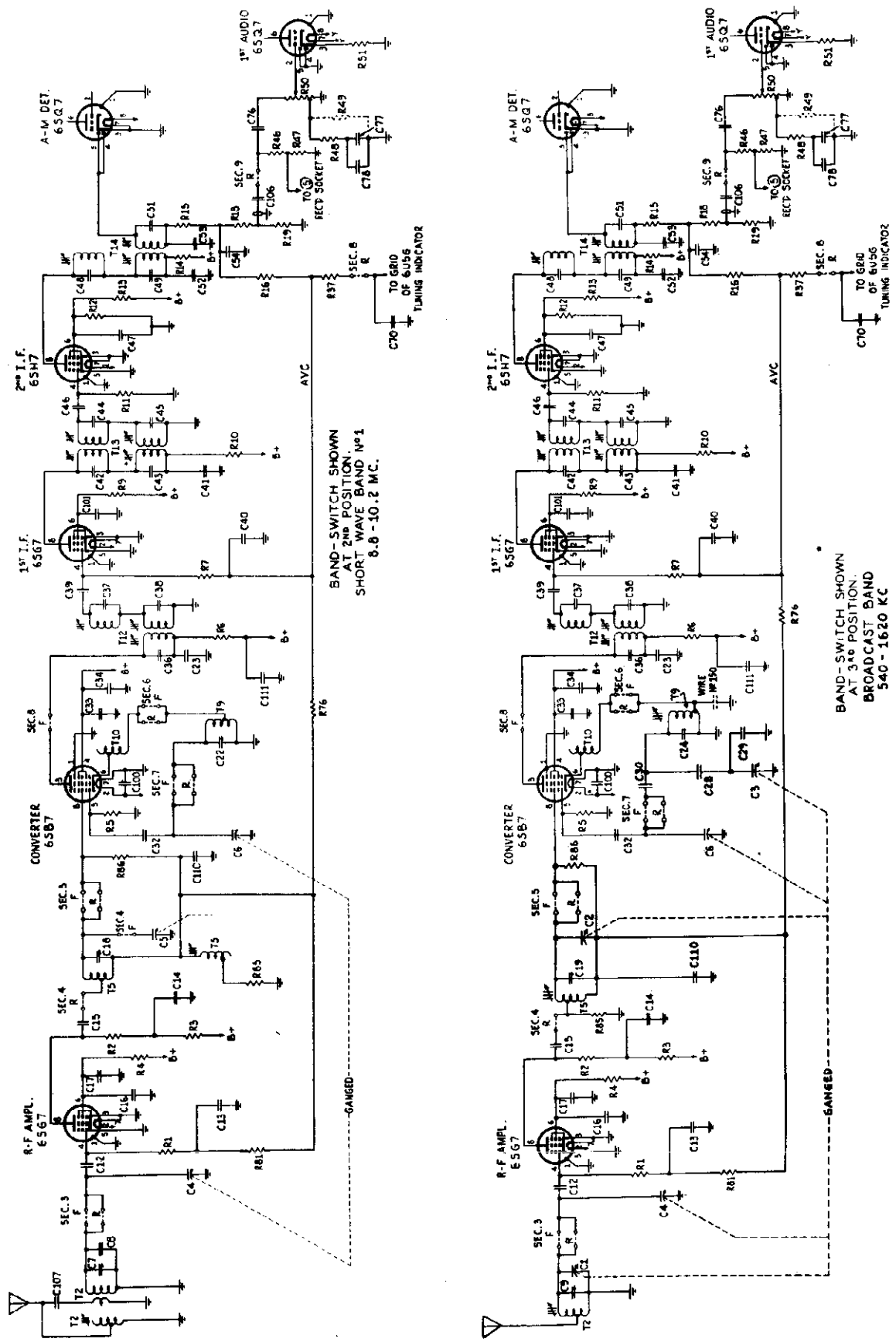
MOTOR BREAKDOWN FOR MODEL 1135A ONLY



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND Nº2 11.2 -12.6 MC

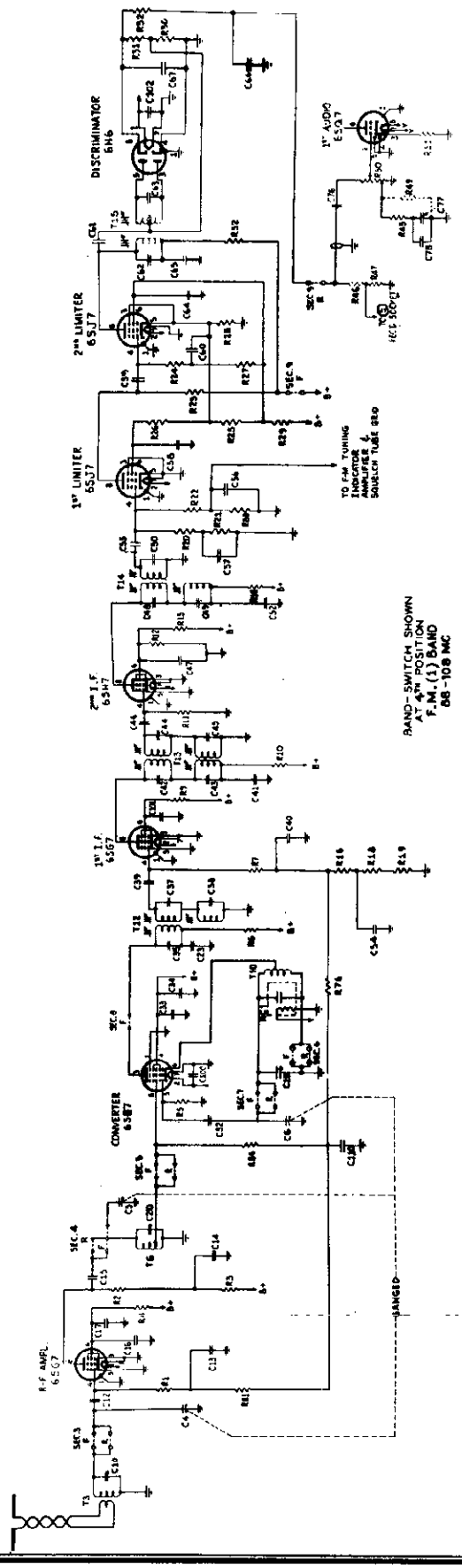
MODEL 1135A

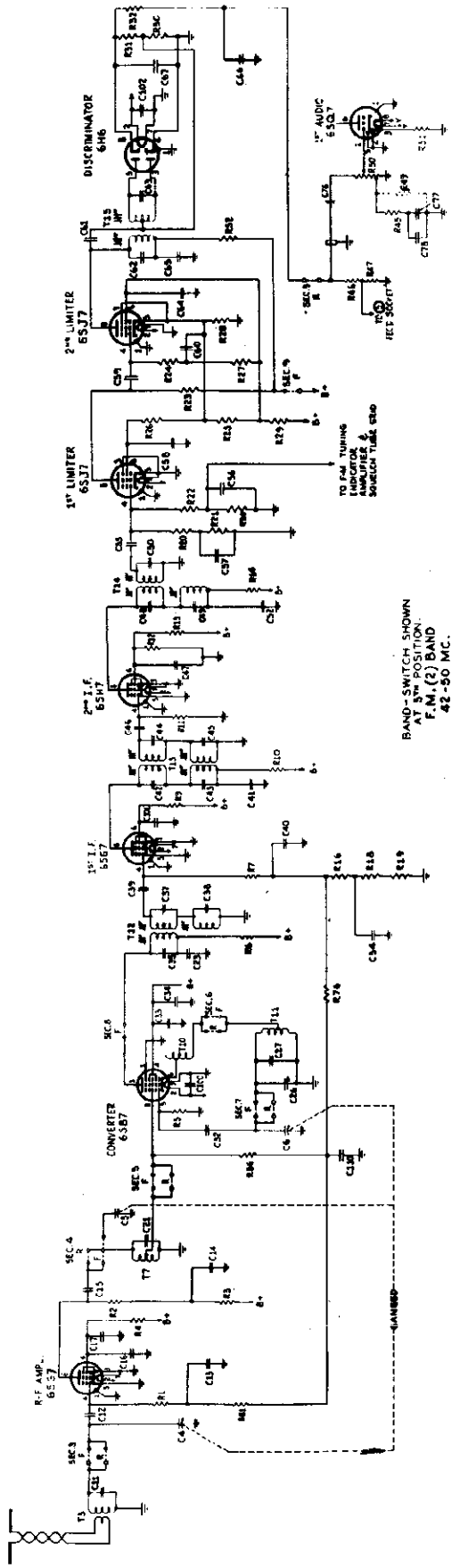
STROMBERG CARLSON CO.



MODEL 1135A

STROMBERG CARLSON CO.



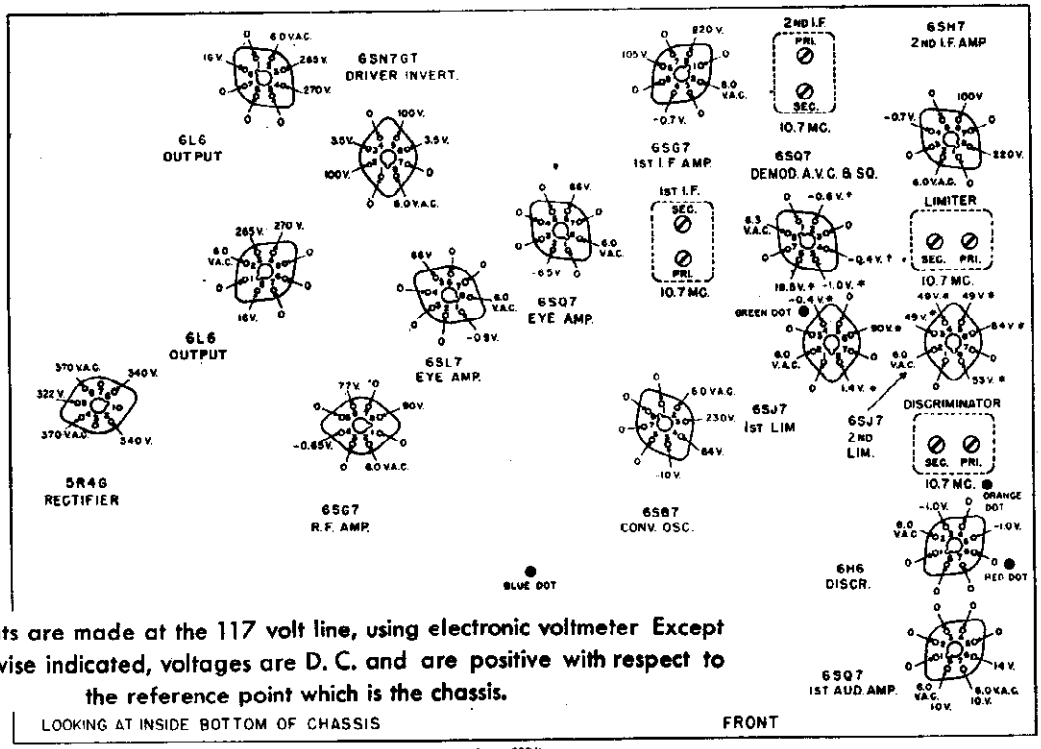


MODEL 1135

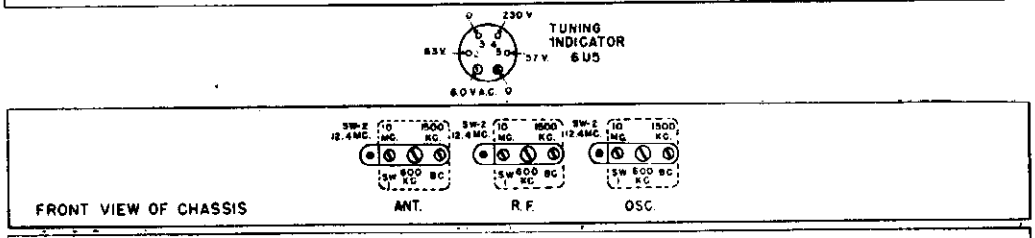
STROMBERG CARLSON CO.

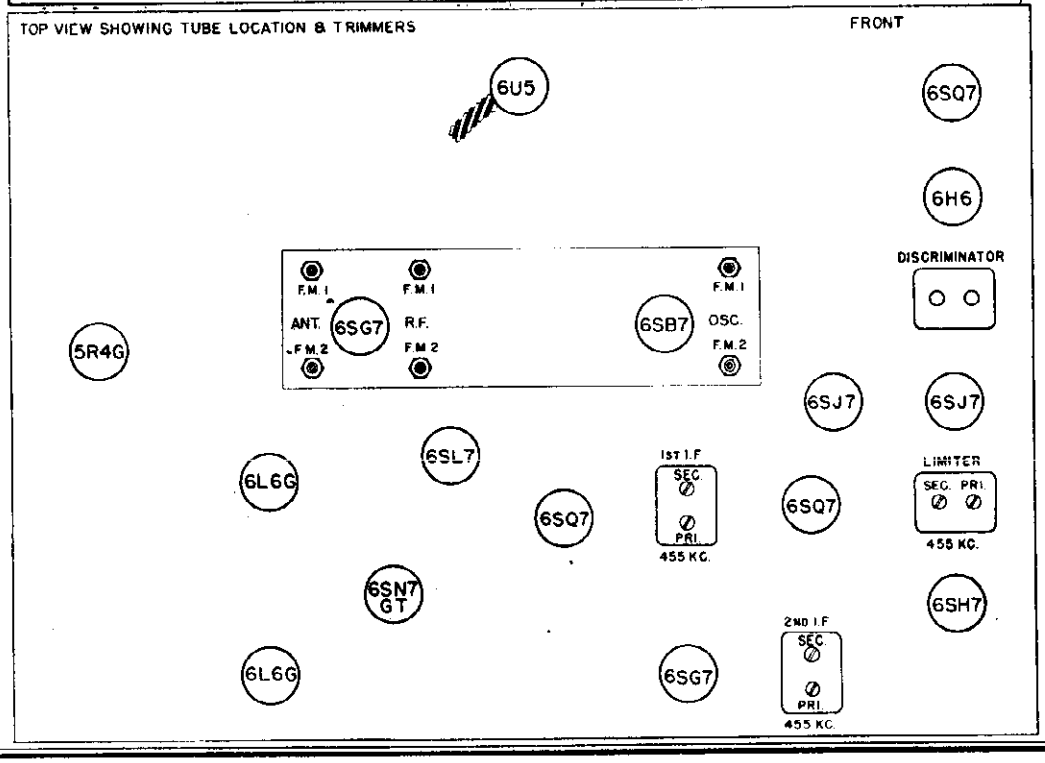
LOCATION CHARTS

TUBES, TRIMMERS AND VOLTAGE



Measurements are made at the 117 volt line, using electronic voltmeter Except where otherwise indicated, voltages are D. C. and are positive with respect to the reference point which is the chassis.





ALIGNING

Never realign unless absolutely necessary.

Refer to "Location Chart" for alignment adjusters. Allow set to warm up 10 to 15 minutes before attempting to align.

Always align using the smallest possible input from the signal generator. A strong signal makes adjustments approximate.

Always have volume full on.

The alignment of this receiver does not require special equipment or information; however, it is well to adhere to the standard procedure as outlined.

The required equipment is: 1 Electronic Voltmeter, 1 Output Meter, 1 Standard Signal Generator, 1 High Frequency Signal Generator, 1 No. 80777 Aligning Tool.

ALIGNING PROCEDURE *(follow this order exactly)*

Intermediate Frequency Adjustments

Amplitude Modulation

The I.F. aligners that are used to adjust the amplitude modulation (AM) channel are found on the top side of the chassis. They consist of 6 adjustable iron cores used to tune the inductance of the 1st, 2nd and 3rd I.F. transformers (161202, 161200, 161201). These cores are found inside the plastic tubes protruding from the top of the I.F. transformers and are equipped with small screwdriver slots.

Caution: These cores are made of high quality R.F. iron and are fragile; therefore care must be used in adjusting them.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube which is connected to the wave band switch, and is identified by a blue dot.
2. Connect the output meter across the voice coil of the speaker (green and black wires from cable).
3. Adjust the signal generator to 455 KC. Use 30% modulation at 400 cycles.
4. Adjust volume control full on.
5. Adjust tone control to maximum high, minimum bass.
6. Adjust range switch to standard broadcast band, actuate any AM. push button.
7. Adjust the tuning selector to approximately 600 KC.
8. Adjust I.F. cores for maximum output with a reduced signal Input.

Frequency Modulation

The I.F. Aligners may be found from the underside of the chassis. The adjusters are 6 Iron cores used to tune the inductance of the high frequency coils.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube, which is connected to the wave band switch, and is identified by a blue dot.
2. Connect the electronic voltmeter to the junction of the 22,000 ohm and the 100,000 ohm resistors in the first limiter grid circuit identified by a green dot. This junction point will be found underneath the limiter shield.
3. Adjust the voltmeter to the lowest negative voltage scale.
4. Actuate push button on extreme right of row of eight.
5. Adjust the tuning selector to approximately 21 on this band.
6. Adjust the signal generator to 10.7 megacycles. No modulation is required.
7. Adjust the cores for maximum output of the voltmeter. Reduce the input signal and readjust until the maximum output is secured for minimum input. (Approximately 1 volt output).

Discriminator Alignment (FM)

Caution: ***Discriminator secondary must be zeroed at same generator setting used for FM I.F. alignment.***

1. Connect the signal generator to the grid of the second I.F. tube, terminal No. 4 of the 6SH7.
2. Connect the electronic voltmeter to the center of the diode load resistors at the point indicated by the orange dot.
3. Adjust the primary for maximum output with .1 volt from signal generator set at 10.7 megacycles.
4. Switch the electronic voltmeter to the high side of the diode load resistors, identified by a red dot.
5. Adjust the secondary for zero output.
6. Swing generator to 75 KC. higher and 75 KC. lower in frequency and note the plus and minus voltage. If these voltage values are not approximately equal, repeat operations 3, 4 and 5.

R.F. Adjustment—Amplitude Modulation

The Broadcast band should be adjusted first. The built-in loop should remain connected to the antenna and ground terminals.

1. Connect the signal generator to the AM antenna terminals leaving the loop antenna connected. A 400 ohm resistor must be used in series with the signal generator. Use of a 30% modulated signal of 400 cycles is recommended.
2. Adjust the signal generator to 1500 KC.
3. Adjust station selector to 1500 KC.
4. Adjust range switch to AM Broadcast. Actuate any AM push button.
5. Adjust the oscillator, R.F. and antenna trimmer for maximum output.
6. Reduce the input signal and readjust the trimmers until the maximum output is secured for minimum input.
7. Adjust station selector to 600 KC.
8. Set signal generator to 600 KC.
9. Adjust iron cores in oscillator, R.F. and antenna coils for maximum output.
10. Repeat 1500 KC. and 600 KC. alignments until no further change is required.

R.F. Adjustment—Short Wave (9-10 MC. Band)

The built-in loop should remain connected to the antenna and ground terminals.

1. Connect the signal generator to the antenna and ground terminals of the receiver using a 400 ohm resistor.
2. Set the dial pointer to 10 MC.
3. Adjust signal generator to 10 MC.
4. Actuate left S.W. push button.
5. Adjust oscillator, R.F., and antenna trimmer for maximum output. (No further alignment is required on this band.)

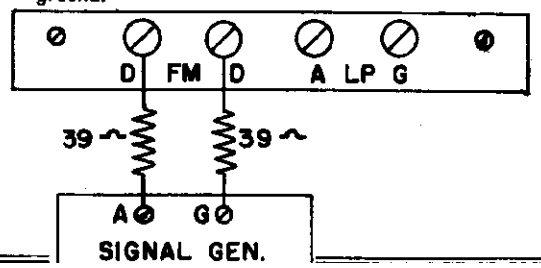
R.F. Adjustment—Short Wave (11.2-12.6 MC. Band)

1. Connect the signal generator to the antenna and ground terminals of the receiver using a 400 ohm resistor in series with the signal generator.
2. Set dial pointer to 12.4 MC.
3. Adjust signal generator to 12.4 MC.
4. Actuate right S.W. push button.
5. Adjust oscillator, R.F. and antenna iron cores for maximum output.

R.F. Adjustments—Frequency Modulation

Align the FM (2) Band first.

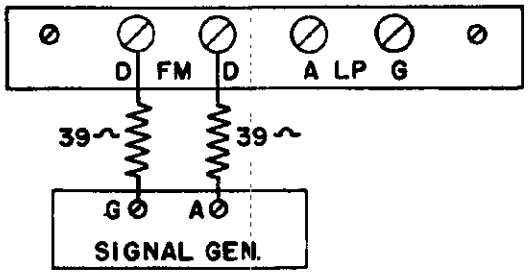
1. Set dial pointer to channel 90 (49 MC.)
2. Connect the signal generator to FM dipole terminals using 39 ohm resistors as indicated (disconnect dipole antenna). *Connect signal generator ground to chassis ground.*



3. Set signal generator to 49 MC.
4. Actuate FM (2) push button (extreme right hand button in row of 8 buttons).
5. Connect electronic voltmeter to the junction of the 22,000 and the 100,000 ohm resistors in the first limiter grid circuit (identified by green dot).
6. Adjust oscillator R.F. and antenna trimmers for maximum output on electronic voltmeter.

FM (1) Band

Adjust the same as the FM (2) band using 106 MC., setting the dial pointer to channel 290. Connect the generator to the dipole input using 39 ohm resistors as indicated. Actuate 3rd push button from right in row of 8 buttons. Connect *signal generator ground to chassis ground. Note reverse signal generator connection.*



Dial Pointer Adjustment

Check dial pointer to see that it is aligned with the two diamond shaped markers at the extreme left of the dial scale, when the variable capacitor plates are completely engaged.

IN ALMOST EVERY LOCATION FM PERFORMANCE IS IMPROVED WITH THE ADDITION OF A DYNTENNA. IN REMOTE OR FRINGE AREAS THIS FOLDED DIPOLE IS A MUST IF GOOD RESULTS ARE TO BE EXPECTED FROM THE STATIONS NOW ON THE AIR.

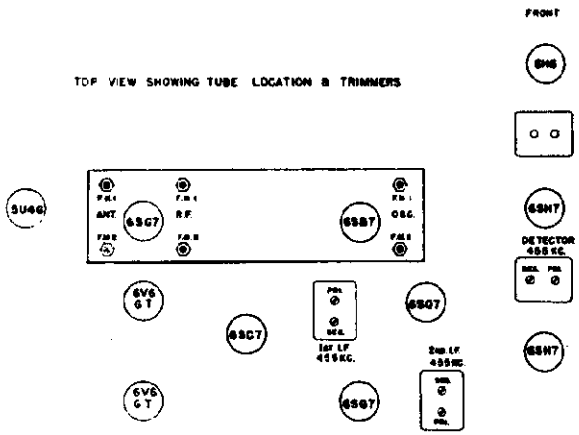
WHEN INSTALLING A DYNATENNA, IT IS MOST IMPORTANT THAT THE INSTRUCTIONS BE FOLLOWED VERY CLOSELY. GET IT HIGH, STAY AWAY FROM METAL CONDUCTORS OF ALL TYPES, AND ORIENT IT CAREFULLY. AFTER FOLLOWING THESE FUNDAMENTALS CLOSELY, THERE ARE SIMPLE ADJUSTMENTS THAT MAY BE MADE THAT WILL ADD TO THE OVERALL GAIN CONSIDERABLY, AS FOLLOWS:

1 - AFTER DYNATENNA HAS BEEN INSTALLED AND PROPERLY CONNECTED TO THE RECEIVER TUNE IN THE WEAKEST STATION THAT CAN BE HEARD OR ONE IN OR NEAR THE CENTER OF THE FREQUENCY BAND ASSIGNED TO YOUR AREA.

2 - IN THE CASE OF RECEIVERS THAT HAVE TUNING EYE TUBES (1135), REMOVE THE TUBE FROM HOLDER IN ORDER THAT IT MAY BE SEEN FROM BACK OF SET.

3 - ADJUST ANTENNA AND RF-FM TRIMMERS (SEE CHART BELOW) FOR GREATEST DEFLECTION OF EYE. IN THE CASE OF SETS THAT DO NOT HAVE AN EYE TUBE, SOME ADJUSTMENT IS MADE. OPTIMUM SIGNAL STRENGTH IS DETERMINED BY INCREASE IN RATIO OF AUDIBLE SIGNAL TO NOISE LEVEL.

TOP VIEW SHOWING TUBE LOCATION & TRIMMERS



THE TRIMMERS REFERRED TO ARE EASILY ACCESSIBLE AND MAY BE REACHED FROM THE BACK OF THE CABINET WITHOUT REMOVING THE CHASSIS.

THIS RECOMMENDED ADJUSTMENT WILL MAKE A VERY NOTCEABLE IMPROVEMENT IN SIGNAL STRENGTH IN ANY INSTALLATION THAT IS MADE A FEW MILES FROM THE TRANSMITTER. WE CANNOT EMPHASIZE TOO STRONGLY THAT THAT ALL THE BENEFITS TO BE DERIVED FROM THE DYNATENNA CAN ONLY BE REALIZED IF ALL THE TUNED CIRCUITS ARE IN RESONANCE.

Cabinet Parts

PF		PL
29597	Labyrinth	29597
35852	Screws, Escutcheon Mtg.	35852
37083	Key Pull	37083
37139	Decal, Station	37139
37140	Decal Off-On, Volume	37140
37145	Lid Support	—
37149	Drawer Pull	39024
—	Grille Cloth—W—	37168
37169	Grille Cloth—M—	130017
37239	Socket, Phono. Compartment	—
37240	Lamp, Phono. Compartment	—
37242	Block, Lamp and Switch Mtg.	—
37579	Escutcheon	35726
38442	Bullet Catch with Strike	38442
39200	Piano Hinge	—
80681	Stop Hinge	80681
—	Phono. Drawer and Tracks	108035
108036	Phono. Panel	—
—	Phono. Drawer Track Right	132021
—	Phono. Drawer Track Left	132022
150024	Metal Grille	130023
801401	Lamp Cap, Bullseye	801401

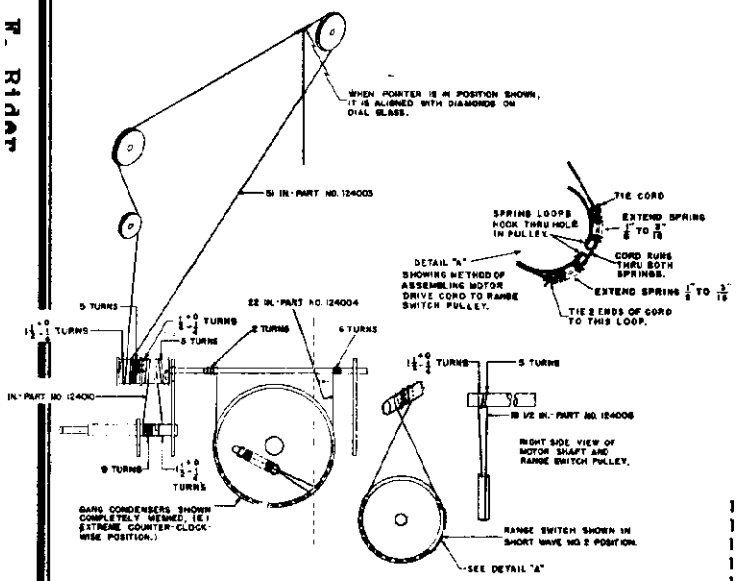
Knobs—Push Buttons

Part No.	
32156	Push Button
32172	Lens, Push Button
32224	Off-On, Volume
35866	Call Letter Kit
37007	Indicator Lever, Tone
37093	Tuning
121007	"S.W." Push Button Tab
121008	"Radio" Push Button Tab
121009	"Record" Push Button Tab

Controls—Switches

Part No.		
37238		Phono. Compartment Switch
145002	R-50	1 Meg. Volume Control and Switch
158005		Tone Switch, Bass
158006		Tone Switch, Treble
158014		Squelch Switch
158019		Switch, S.W., Radio, Phono

CORD STRINGING DIAGRAM
1135-A RADIO REC.



Coils—Transformers—Speaker

Part No.		
32460		Speaker Cone
*112008		R.F. Chassis Assembly
114003	T-5	R.F. Coil SW-1 Broadcast
114004	T-9	Oscillator Coil SW-1 Broadcast
114005	T-2	Antenna Coil SW-1 Broadcast
114020	T-1, T-4, T-8	Antenna, R.F., Oscillator, Coil S.W. Band (2)
114317	T-15	Discriminator Transformer
140001		Motor, Switch Drive
155019		Speaker Assembly
161002	T-17	Filter Choke
161200	T-13	2nd I.F. Transformer
161201	T-14	3rd I.F. Transformer
161202	T-12	1st I.F. Transformer
161206	T-18	Output Transformer
161403	T-16	Power Transformer

*Band Switch, Sockets, Variable Capacitor, R.F. Coils all bands. This is a complete R.F. Assembly. Sold as a unit only.

NOTE—When ordering replacement parts always specify series number as well as model and part number. Series number is stamped on back of chassis.

Resistors

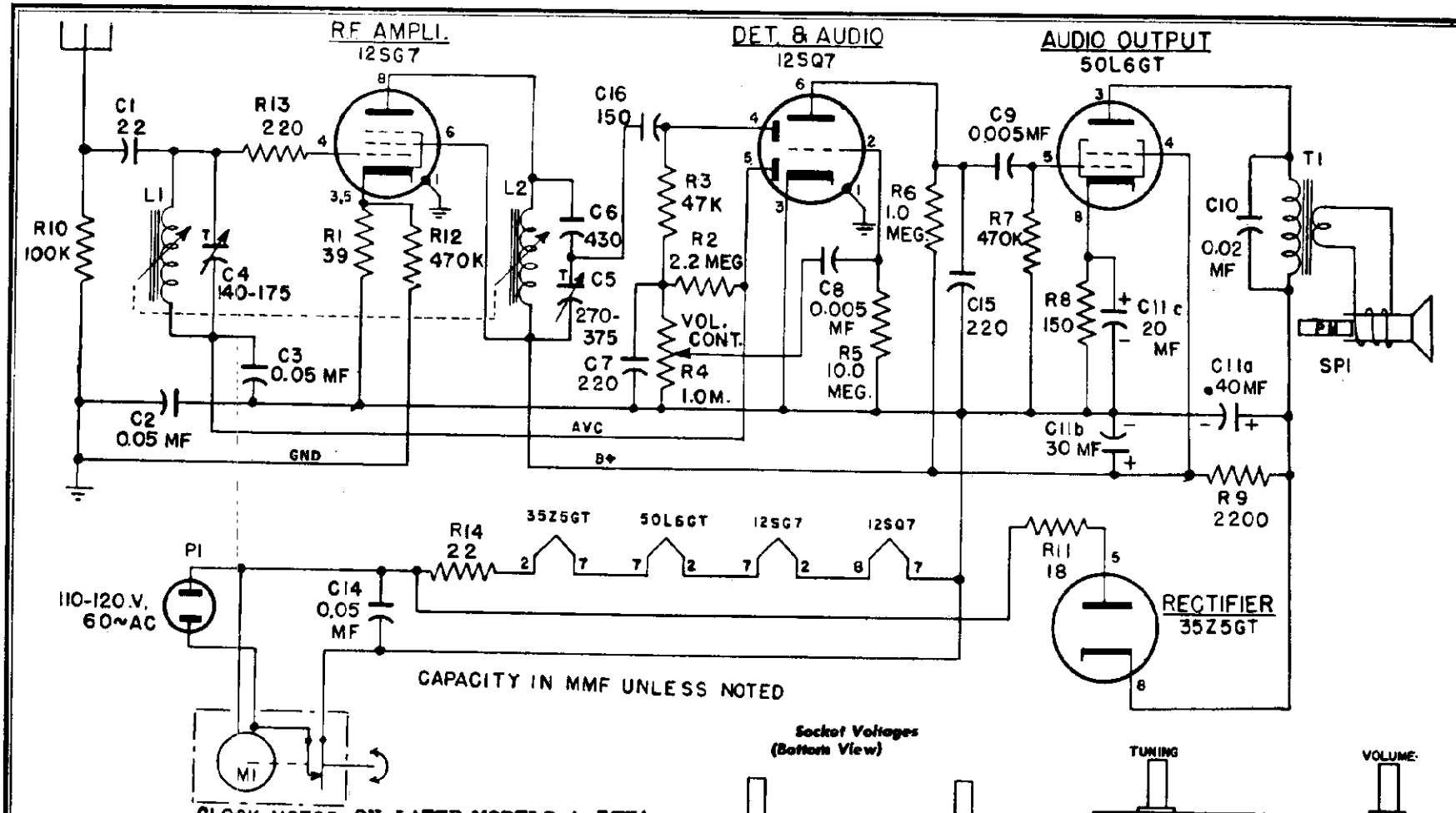
Part No.		
27407	R-20, R-62, R-71, R-72, R-73, R-74	22,000 Ohms
27640	R-18, R-69, R-70	.15 Meg.
28006	R-19, R-22, R-23, R-47, R-52, R-53, R-54, R-77, R-81	.1 Meg.
28157	R-45	820 Ohms
28158	R-3, R-6, R-10, R-14, R-78	1,000 Ohms
28159	R-21	1,200 Ohms
28160	R-56, R-57	1,500 Ohms
28161	R-36	1,800 Ohms
28162	R-48, R-51	2,200 Ohms
28170	R-15, R-25, R-28, R-29, R-49	10,000 Ohms
28172	R-26	15,000 Ohms
28174	R-67, R-68	27,000 Ohms
28175	R-13, R-33	33,000 Ohms
28176	R-9	39,000 Ohms
28177	R-24, R-75	47,000 Ohms
28178	R-12, R-32, R-59, R-60	56,000 Ohms
28179	R-4, R-84	68,000 Ohms
28183	R-30, R-31, R-82, R-83	.22 Meg.
28184	R-61, R-63	.27 Meg.
28186	R-8	.39 Meg.
28187	R-55, R-58	.47 Meg.
28189	R-39	.68 Meg.
28191	R-7, R-11, R-16, R-34, R-35, R-37 R-46, R-76, R-80	1 Meg.
28193	R-27	1.5 Meg.
28196	R-17	2.7 Meg.
145002	R-50	.1 Meg. Volume Control
149004	R-85	4,700 Ohms
149005	R-2	22,000 Ohms
149006	R-5	33,000 Ohms
149007	R-1	1 Meg.
149009	R-79	17,000 Ohms Voltage Divider
149010	R-40	500 Ohms, 4,000 Ohms Voltage Divider
149078	R-42	2,200 Ohms, 2 W
149164	R-66	56 Ohms, 1 W
149180	R-43	2,700 Ohms, 1 W
149182	R-44	3,900 Ohms, 1 W
149194	R-38	.15 Meg., 1 W
149207	R-65	5,000 Ohms, 5 W
149208	R-64	125 Ohms, 5 W

Capacitors

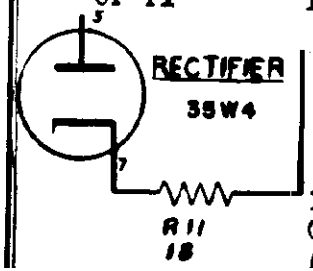
Part No.		
25150	C-90	.02 mf (400 V)
25484	C-83	.02 mf (600 V)
25485	C-13, C-14, C-23, C-40, C-47, C-52, C-56, C-57, C-58, C-64, C-65, C-70, C-74, C-76, C-81, C-102	.01 mf (600 V)
28325	C-17	.1 mf
29359	C-67	75 mmf
29559	C-89	.0025 mf
29891	C-86	.05 mf (600 V)
34796	C-54, C-79	50 mmf
34800	C-53, C-84, C-85	100 mmf
40632	C-77, C-82, C-105	.05 mf (400 V)
46315	C-103, C-106	.003 mf (400 V)
110006	C-11, C-20, C-21, C-25, C-26	R.F. Trimmer H.F.
110007	C-10	Antenna F.M. H.F. Trimmer
110201	C-36, C-38, C-43, C-45, C-49, C-51	750 mmf
110202	C-8	10 mmf
110203	C-28	375 mmf
110208	C-95	270 mmf
110209	C-60, C-96	470 mmf
110215	C-87, C-97, C-104	750 mmf
110216	C-66	390 mmf
110401	C-12, C-15, C-32, C-107	100 mmf
110402	C-30, C-39, C-41, C-46, C-55, C-59, C-61, C-101	47 mmf
110403	C-62	24 mmf
110406	C-63	62 mmf
110407	C-37, C-42, C-44, C-48, C-50	33 mmf
110408	C-16, C-34, C-100	1,000 mmf
110410	C-35	27 mmf
110411	C-29	10 mmf
110412	C-27	2.5 mmf
110413	C-31	5 mmf
110415	C-68, C-69, C-78, C-91, C-92, C-93, C-94	.1 mf
110417	C-98	1,000 mmf Ceramic
110419	C-33	.005 mf
111005	C-73, C-75, C-80	40 mf, 4 mf, 20 mf, Electrolytic
111006	C-71	20 mf, Electrolytic
111007	C-72, C-88, C-99	40 mf, 20 mf, 20 mf, Electrolytic

Miscellaneous

Part No.	
25156	Fuse
27958	Fuse Holder
28694	Socket, Pilot
29956	Pilot Lamp
30152	Socket, Speaker
30269	Corner Mtg., Dial Scale
31539	Jack, Phono
32075	Pulley
32076	Pulley
33218	Cord, A.C.
34068	Cable and Socket, Eye
40546	Clip, Pulley
113002	Clip, Tube Ground
118001	Iron Core, I.F.
118002	Iron Core, R.F.
122009	Dial Scale
124003	Cord, Pointer
124004	Drive Cord, Condenser Gang
124006	Drive Cord Assembly, Motor
124010	Drive Cord, Selector
138002	Lens, Phono
138005	Lens, Range
144003	Pointer, Dial
145002	Volume Control
147002	Pulley Assembly, Band Switch
150004	Shaft Assembly, Dial and Pulley Drive
150005	Shaft, Knob Drive
151035	Shield, Pilot Lamp
152002	Socket, Tube (10)
152004	Socket, Recorder
152007	Socket, Pilot Bullseye
152014	Socket, Tube (3)
152026	Socket, A.C.
158019	Switch Assembly, SW, Radio, Phono.
159002	Binding Post, Ant.
159008	Binding Post, 6 pt.
159009	Binding Post, 5 pt.
167009	Bass Boost
80891	Phono. Cartridge Qtm.
80892	Metal Needle for 80891
80894	Jewel Needle for 80891

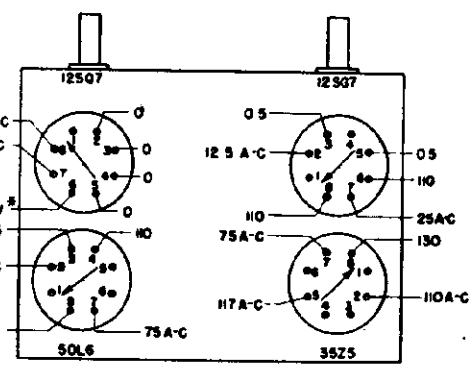


R11 GOES TO TAP ON PRI. OF T1

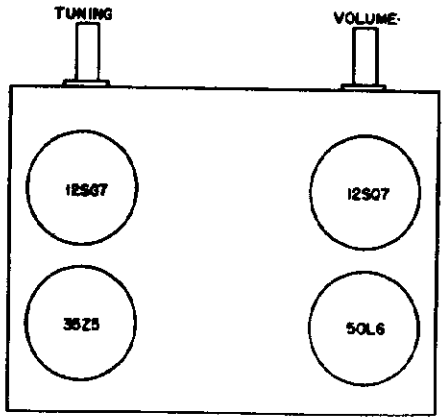


ON LATER MODELS A 35W4 RECT. TUBE REPLACES THE 35Z5GT. THE FOLLOWING CHANGES IN WIRING ARE MADE: R11 IN THE CATHODE LEAD OF THE 35W4 (AS SHOWN ON LEFT) INSTEAD OF THE PLATE LEAD OF THE 35Z5GT. R14 IS BETWEEN PIN #4 OF THE 35W4 AND PIN #7 OF THE 50L6GT IN THE FILAMENT CIRCUIT INSTEAD OF BETWEEN PIN#2 OF THE 35Z5GT AND R11.

Socket Voltages (Bottom View)



*Measured with 20,000 ohm/volt meter



Tube Location (Top View)

TELECHRON, INC.

SPECIFICATIONS

CABINET:

Height	5¾ inches
Width	10⅝ inches
Depth	4¾ inches

ELECTRICAL RATING (INPUT):

Voltage	105–125 volts, a-c
Frequency	60 cycles
Wattage	30 watts

TUNING FREQUENCY (RADIO):

Broadcast Band	540–1600 kc

POWER OUTPUT (117 VOLTS LINE):

Undistorted	1.5 watts
Maximum	2.2 watts

LOUDSPEAKER:

Type	Alnico P.M.
Outside Cone Diameter	4 inch
Voice Coil Impedance (400 Cycles)	3.5 ohms

TUBE COMPLEMENT:

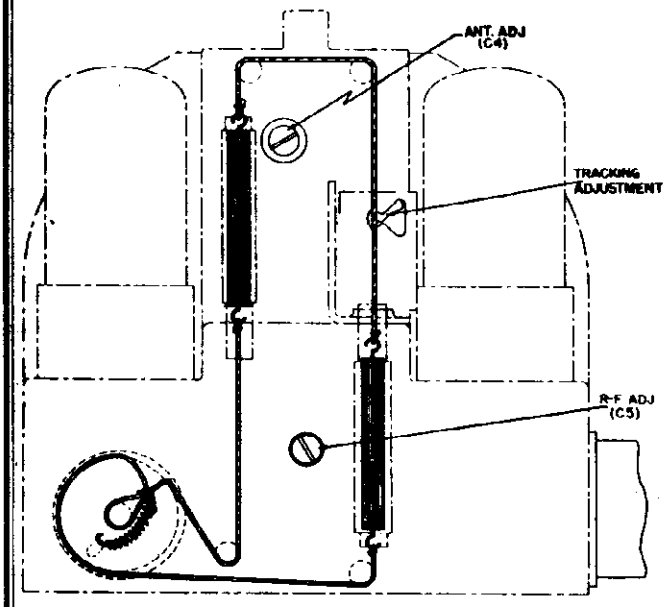
R-F Amplifier	Type 12SG7
Detector-Audio	Type 12SQ7
Output Power	Type 50L6GT
Rectifier	Type 35Z5GT

Note: Order tubes from Tube Division, Replacement Parts Section, General Electric Co., Schenectady, N. Y.

RADIO CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F . . . . . 1620 kc and 580 kc



Drive Stringing and Trimmer Location

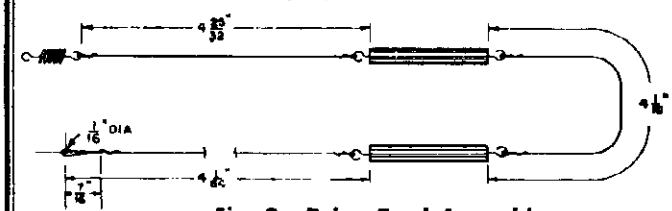
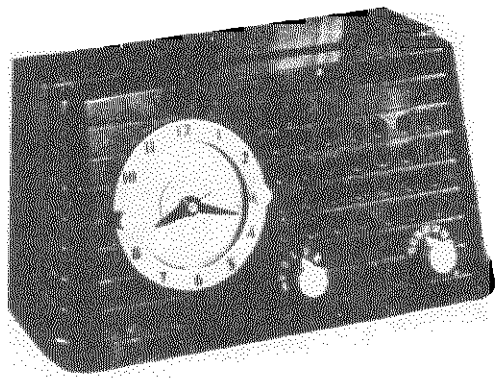


Fig. 2. Drive Cord Assembly



EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. 100 mmf. mica capacitor.
4. Insulated screwdriver.

PROCEDURE

1. Connect test oscillator through 100 mmf. to antenna lead; connect output meter across the loudspeaker voice coil leads.
2. Turn dial pointer as far clockwise as it will go.
3. Set test oscillator to 1620 kc with tone modulation. Keeping the radio volume control set for maximum and attenuating test oscillator so that the output meter reading never exceeds 1¼ volts, trim antenna (C4) and RF (C5) trimmers for maximum output.
4. Set test oscillator to 580 kc with tone modulation. While rocking tuning control in vicinity of this dial calibration, adjust tracking adjustment platform up or down to give maximum output meter reading.
5. Recheck 1620 calibration adjustment. If RF (C5) trimmer has to be changed appreciably for maximum output, recheck step 4.

GENERAL

DRIVE CORD REPLACEMENT

When replacing the drive cord, it is essential that the measurements shown in Figure 2 be maintained very accurately, otherwise alignment and dial calibration difficulties will be experienced. Use a 32-inch diameter nylon jacketed cord, Part No. RDC-015, for replacement.

RADIO STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings are taken with low signal input.

(1) R-F Stage Gains.

Antenna lead to 12SG7 grid	8 at 1000 kc
12SG7 grid to 12SQ7 diode plate	50 at 1000 kc

(2) Audio Gain.

0.06 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately ½-watt output across speaker voice coil.

(3) Socket Pin Voltages.

Figure 4 shows voltages from all points to B –. Voltage readings much lower than those specified may help localize defective components or tubes.

RADIO REPLACEMENT PARTS LIST—MODEL No. 8H59

(Order from G-E Co., Specialty Division, Wolfe St. Plant, Syracuse, N. Y.)

UNIVERSAL G-E RADIO REPLACEMENT PARTS

CAT. NO.	SYMBOL	DESCRIPTION
UCC-039	C8	CAPACITOR—0.005 mfd., 600 v., paper
UCC-045	C2, 3	CAPACITOR—0.05 mfd., 600 v., paper
UCG-543	C6	CAPACITOR—430 mmf., silver mica
UCU-512	C1	CAPACITOR—22 mmf., mica
UCU-532	C16	CAPACITOR—150 mmf., mica
UCU-536	C7, 15	CAPACITOR—220 mmf., mica
UIC-001		CEMENT—Speaker cement
UOP-405	SP1	LOUDSPEAKER—4-inch PM speaker
UOX-009		CONE—Speaker replacement cone
URD-015	R1	RESISTOR—39 ohms, ½ w., carbon
URD-029	R8	RESISTOR—150 ohms, ½ w., carbon
URD-033	R13	RESISTOR—220 ohms, ½ w., carbon
URD-089	R3	RESISTOR—47,000 ohms, ½ w., carbon
URD-097	R10	RESISTOR—100,000 ohms, ½ w., carbon
URD-113	R7, 12	RESISTOR—470,000 ohms, ½ w., carbon
URD-121	R6	RESISTOR—1.0 megohm, ½ w., carbon
URD-129	R2	RESISTOR—2.2 megohms, ½ w., carbon
URD-145	R5	RESISTOR—10.0 megohms, ½ w., carbon
URE-057	R9	RESISTOR—2,200 ohms, 1 w., carbon

NOTE: See page 1 for tube complement

SPECIALIZED G-E REPLACEMENT PARTS

CAT. NO.	SYMBOL	DESCRIPTION
RAB-016		COVER—Cabinet back cover
RAU-009		CABINET—Plastic cabinet
RCC-839	C9	CAPACITOR—0.005 mfd., 600 v., paper
RCC-041	C10	CAPACITOR—0.02 mfd., 600 v., paper
RCC-045	C14	CAPACITOR—0.05 mfd., 600 v. paper
RCE-031	C11A, B, C	CAPACITOR—40 mfd., 15J v.; 30 mfd., 150 v.; 20 mfd., 25 v.; electrolytic
RCY-007	C4	TRIMMER—140-175 mmf., antenna trimmer
RCY-008	C5	TRIMMER—270-375 mmf.; r-f trimmer
RDC-015		CORD—Tuning drive cord (bulk)
RDK-028		KNOB—Volume or tuning knob
REI-004		CORE—Powdered iron tuning core
RHJ-001		ASSEMBLY—Tuning shaft assembly and spacer
RIT-005		COVER—Electrolytic cardboard cover (inner and outer)
RJS-003		SOCKET—Tube socket
RLA-005	L1, 2	COIL—Antenna or R-F coil
RMB-003		BUSHING—Drive shaft bushing
RMS-034		SPRING—Drive cord tension spring
RMX-006		PULLEY—Drive pulley
RRW-003	R14	RESISTOR—22 ohms, 1 w., wirewound
RRW-008	R11	RESISTOR—18 ohms, 1 w., glassohm W.W.
RWL-009		CORD—Power cord

CLOCK REPLACEMENT PARTS LIST—MODEL No. 8H59

(Order from Telechron Inc., Ashland, Mass.)

CAT. NO.	SYMBOL	DESCRIPTION
C35X84		Bezel 2⅞" Rd. Gold Color
C58X16		Crystal 2⅞" Rd.
C61X701		Dial
C34X111	4	Front Plate Assem.
C32X130		Hands (Hr. and Min.) Maroon Lacquer
C31X27		Hand (Sweep Sec.) Gold Color
C55X4		Alarm Disc
C59X221		Numeral Color Ring (Maroon)
C4X6	3	Knob—Alarm Set—Ivory Color Plastic
C40X75	1	Knob—Switch—Ivory Color Plastic
C3X49	14	Knob—Time Set—Stat. Bronze Color
C11X8	15	Alarm Set Shaft Assem.
C10X115	7	Time Set Shaft Assem.
C40X73	19	Switch Shaft Assem.
C40X260	20	Switch Shaft Spacer
C40X261	6	Time Set Shaft Spacer
C40X262	5	Time Set Shaft Spacer (at Front Plate)
C40X263	17	Alarm Set Shaft Spacer
C14X15	10	Minute Hand Sleeve Assem.
C13X11	9	Hour Hand Sleeve Assem.
C15X3	8	Alarm Hand Sleeve Assem.
C40X77	16	Intermediate Gear and Shaft Assem.

CAT. NO.	SYMBOL	DESCRIPTION
C17X8	12	Cam Shaft Assem.
C16X14	13	Sweep Second Hand Shaft Assem.
C40X78	18	Switch Lever Assem.
C44X38	24	Rotor Unit (M1630)
C45X69	27	Field and Coil Assem.
C40X202	25	Spreader Post
C64X1	2 and 22	Front Plate Screws
C35X39	21	Base Plate Assem.
C40X252	11	Cam Friction Washer
C1X1	26	Motor Mtg. Screws (4-40X1 ⅛" Rd. Hd.)
C1X2	26	No. 1204 Lockwasher
C40X76	23	Switch Assem.

PARTS OF SWITCH ASSEMBLY

C40X79		Upper Contact Spring Assem.
C40X80		Lower Contact Spring Assem.
C1X6		Screw (4-40X⅜" Rd. Hd.)
C1X43		Hex Nut (4-40)

CLOCK INSTRUCTIONS

1. CONTACT ADJUSTMENT

A. Set switch to "Alarm" position so that cam follower rests on timing cam. Contacts shall be adjusted to .017" min. gap.
B. With switch in "Off" position, contacts shall remain open as in "A" and there shall be clearance between cam follower and cam.
C. With switch in "On" position, contacts shall be closed.
D. Set switch to "Alarm" position, turn alarm set knob until cam follower drops into slot of timing cam. The contacts shall be closed.
E. Check for proper contact pressure by depressing lower contact strip, using a small pointed tool. If upper contact strip follows the lower a noticeable amount before the contacts separate, the pressure is sufficient.
F. To insure that contacts close, connect a small lamp in series with the switch assembly when testing.

2. TIMING

A. Set minute and hour hands to 12 o'clock.
B. Set timer dial so that the 12 o'clock mark lines up with small line on the dial. In this position the indicator on the hour hand should also line up with the line on the dial.
C. Adjust timer for contact closure at 6:55 o'clock when dial is set for alarm to operate at 7:00 o'clock. On repeat tests the contacts shall close at 6:55, plus or minus 3 minutes. At all other settings, the contacts shall close within 12 minutes ahead or 2 minutes after the time for which the dial is set.

3. VIBRATOR ADJUSTMENT

A. Vibrator shall start buzzing 10 minutes plus or minus 5 minutes after contact closure occurs.
B. When vibrator is in "Shut-off" position the shut-off spring shall lift the vibrator sufficiently above the cam, so that the cam will not contact vibrator in any position.
C. Adjust vibrator for maximum sound.
D. Vibrator shall be shut off before completion of buzzing period.

4. NOISE PREVENTION

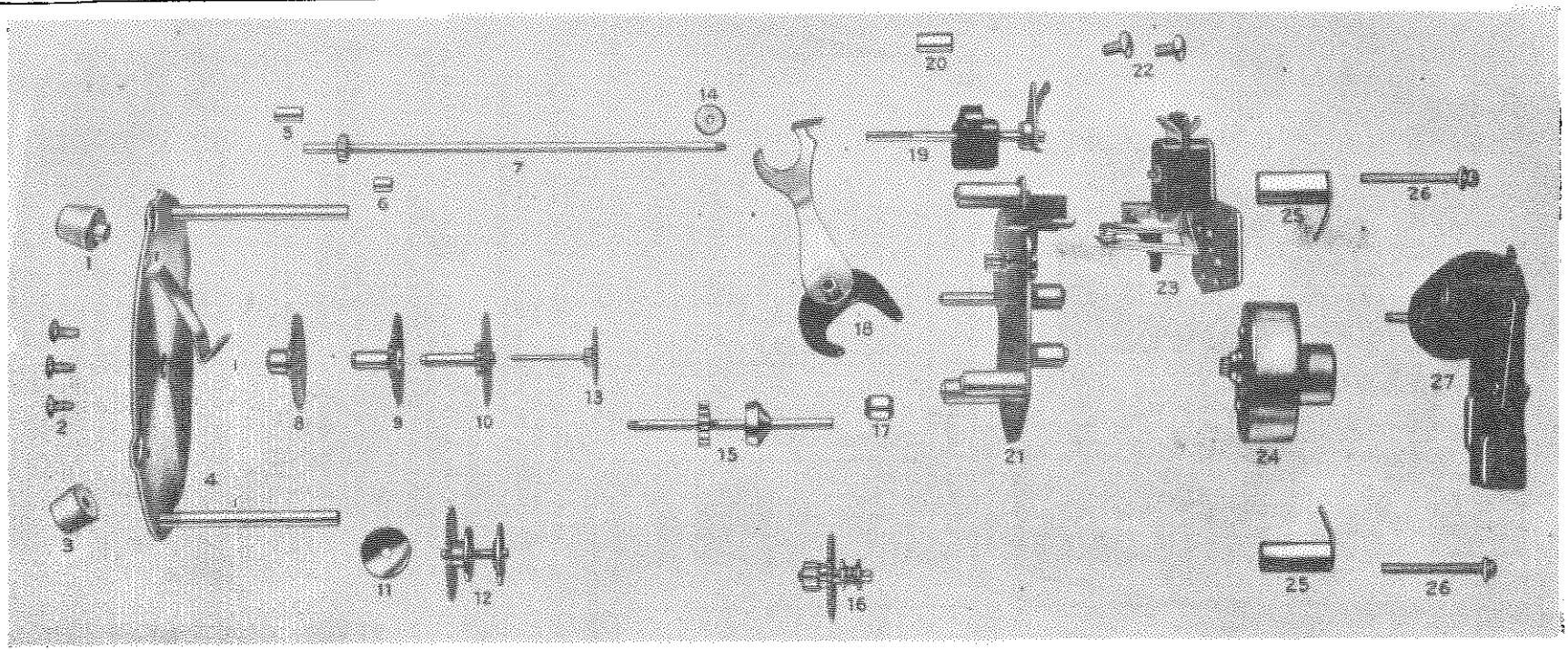
Vistac has been applied to such parts as are specified in notes under exploded view of movement. When the parts specified are replaced, a very small amount of Vistac should be applied.

5. GENERAL

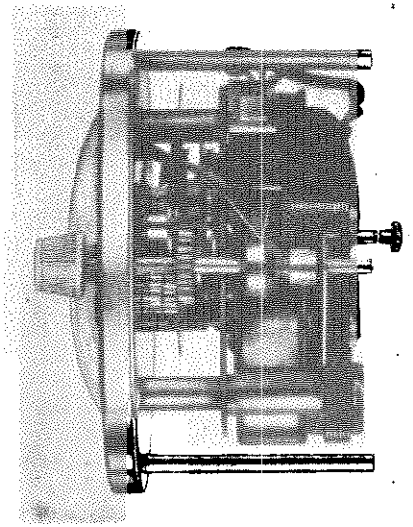
A. Alarm set knob to be sufficiently tight on shaft to permit setting of "Alarm" disc in clockwise or counter-clockwise direction, but shall loosen when cam is turned against vibrator.
B. Switch knob shall turn freely.
C. Alarm disc shall not rub against the dial in any position. Prongs must be fully seated in alarm set groove.

6. CAUTION

A. This radio alarm clock will operate satisfactorily only on a circuit supplied with regulated alternating current of the voltage and frequency stamped on name plate.
B. If clock loses time, or hour and minute hands fail to rotate, check clearance of time setting shaft from case back or any obstruction behind the Musalarm. This shaft must be allowed to rotate while clock is in operation.
C. It is common practice for people to disconnect their radios during a thunder storm, or to use the outlet for a vacuum cleaner, or when moving furniture in housecleaning. The clock will, of course, stop when disconnected and start immediately when plugged in again. However, it will be necessary to reset the clock to the proper time if disconnected for any reason.



EXPLODED VIEW OF H21 MOVEMENT



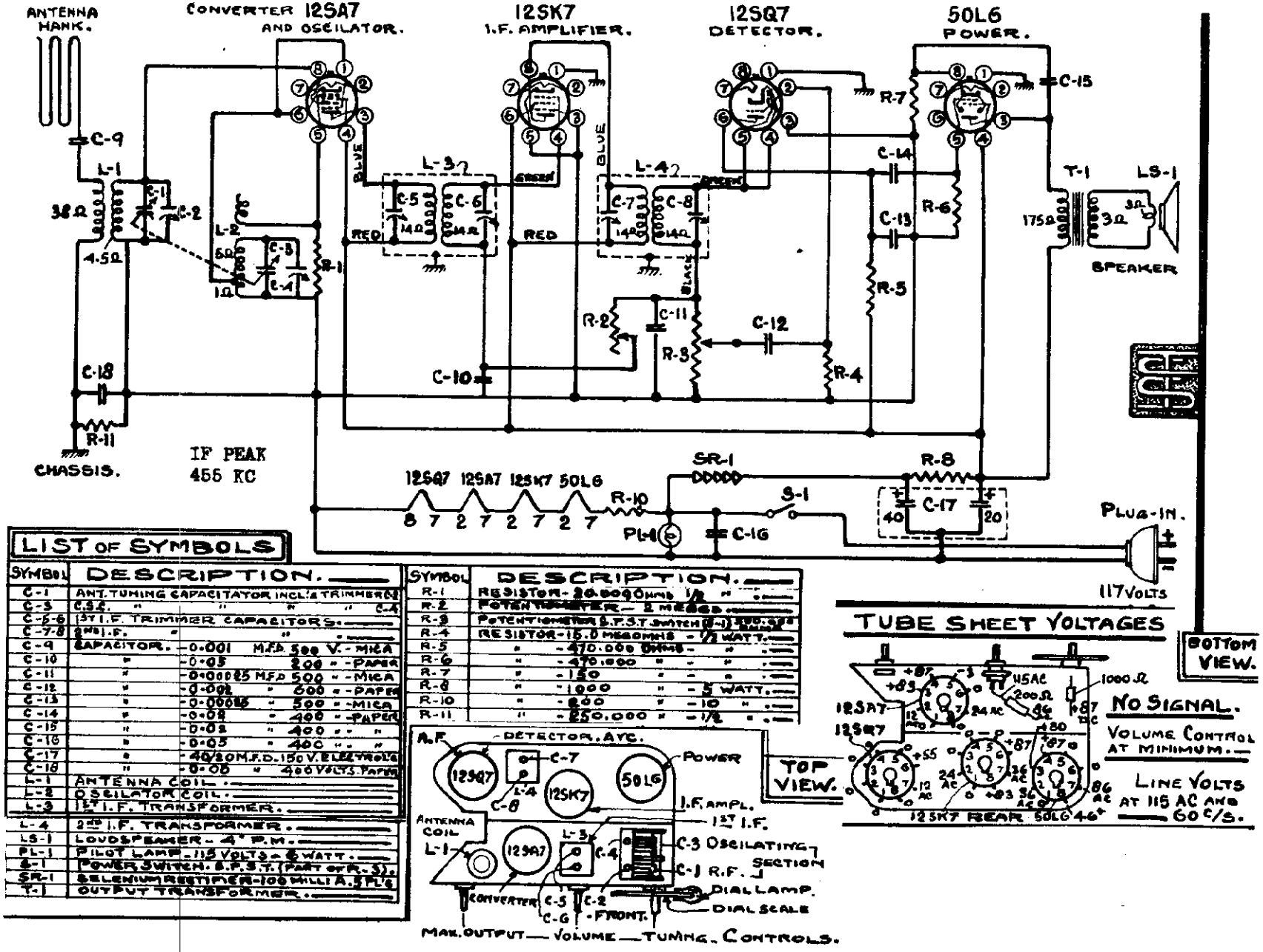
H21 Movement Assembly

1. Switch Knob (C40X75)
2. Front Plate Screws (C64X1)
3. Alarm Set Knob (C4X6)
4. Front Plate Assem. (C34X111)
5. Time Set Shaft Spacer (C40X262)
6. Time Set Shaft Spacer (C40X261)
7. Time Set Shaft Assem. (C10X115)
8. Alarm Hand Sleeve Assem. (C15X3)
9. Hour Hand Sleeve Assem. (C13X11)
10. Minute Hand Sleeve Assem. (C14X15)
11. Cam Friction Washer (C40X252)
12. Cam Shaft Assem. (C17X8)
13. Sweep Second Shaft Assem. (C16X14)
14. Time Set Knob (C3X49)
15. Alarm Set Shaft Assem. (C11X9)
16. Intermediate Gear Shaft Assem. (C40X77)
17. Alarm Set Shaft Spacer (C40X263)
18. Switch Lever Assem. (C40X78)
19. Switch Shaft Assem. (C40X73)
20. Switch Shaft Spacer (C40X260)
21. Base Plate Assem. (C35X39)
22. Front Plate Screws (C64X1)
23. Switch Assem. (C40X76)
24. Rotor Unit M1630 (C44X38)
25. Spreader Posts (C40X202)
26. Motor Mtg. Screws (C1X1)
27. Field and Coil Assem. (C45X69)

"Vistac" has been applied to the following parts of the clock movement:

1. Time set shaft before assembling, and time set shaft spacers where they touch front plate and base plate.
2. Base plate stud where the switch lever touches it.
3. Both ends of the shaft for the intermediate gear and shaft assembly.
4. Switch lever assembly where it touches the front plate.

If it is necessary to replace any of the above parts, a very small amount of "Vistac" should be applied.



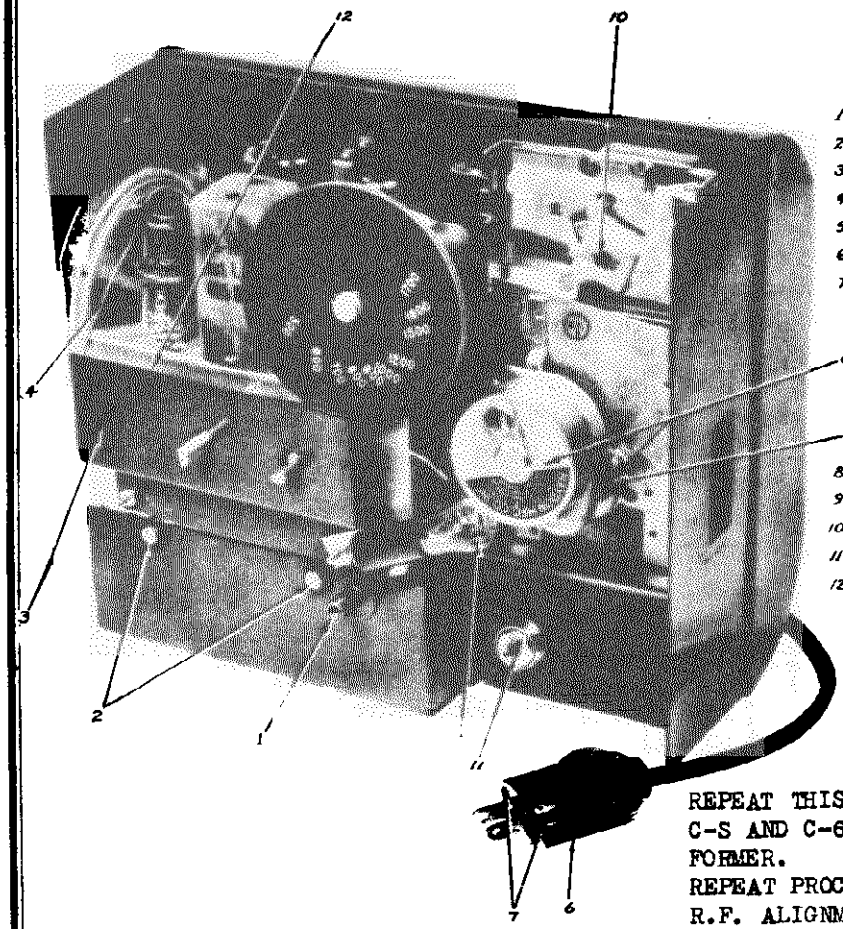
LIST OF SYMBOLS

SYMBOL	DESCRIPTION.
C-1	ANT. TUNING CAPACITATOR INCL. TRIMMER
C-3	" " " " C-4
C-5-6	1ST I.F. TRIMMER CAPACITORS.
C-7-8	2ND I.F. " " "
C-9	CAPACITOR. — 0.001 M.F.D. 500 V. — MICA
C-10	" — 0.05 " 200 " — PAPER
C-11	" — 0.00025 M.F.D. 500 " — MICA
C-12	" — 0.02 " 600 " — PAPER
C-13	" — 0.00015 " 500 " — MICA
C-14	" — 0.02 " 400 " — PAPER
C-15	" — 0.02 " 400 " "
C-16	" — 0.05 " 400 " "
C-17	" — 40/20 M.F.D. 150 V. ELECTROLYTIC
C-18	" — 0.05 " 400 VOLTS PAPER
L-1	ANTENNA COIL.
L-2	OSCILATOR COIL.
L-3	1ST I.F. TRANSFORMER.
L-4	2ND I.F. TRANSFORMER.
LS-1	LOUDSPEAKER — 4" P.M.
PL-1	PILOT LAMP — 115 VOLTS — 6 WATT.
S-1	POWER SWITCH. S.P.S.T. (PART OF R-5).
SR-1	SELENIUM RECTIFIER — 100 MILLI A. 5 PLS.
T-1	OUTPUT TRANSFORMER.

SYMBOL	DESCRIPTION.
R-1	RESISTOR — 20,000 OHMS 1/2 " "
R-2	POTENTIOMETER — 2 MEGS.
R-3	POTENTIOMETER S.P.S.T. SWITCH (S-1) 100,000 OHMS
R-4	RESISTOR — 15.0 MEGOHMS — 1/2 WATT.
R-5	" — 470,000 OHMS — " "
R-6	" — 470,000 " " — " "
R-7	" — 150 " " — " "
R-8	" — 1000 " — 5 WATT.
R-10	" — 800 " — 10 " "
R-11	" — 250,000 " — 1/2 " "

MODEL M5TS4

TELECOIN CORP.



1- Nut For Cabinet Stud-Type Lock.
2- Hex Nuts Securing Chassis To Cabinet Back.
3- Control Knob Panel.
4- Antenna Wire.
5- 110 Volt 6 Watt Dial Lamp.
6- Fuse Plug And Cord.
7- 2- 110Volt Fuses 2 or 3 Amps. Eject By Pushing Out With Pencil or Screwdriver From Rear.
8- 110 Volt 60 Cycle Timer Motor.
9- Timer On-Off Switch.
10- Slug Rejector Assembly.
11- Coin Box Lock.
12- Adjustable Maximum Volume Control Under Panel. (R-2 on Schematic)

ELECTRICAL SPECIFICATIONS

POWER SUPPLY.105-125 V.-50/60 CYCL. AC
POWER CONSUMPTION - 30 WATTS
FREQUENCY RANGE 500-1700 KCS.
INTERMEDIATE FREQUENCY 455 KCS.
AUDIO OUTPUT 1.5 WATTS
TIMER.--60 CYCLES. 110 VOLTS - AC.

LOUD SPEAKER

PERMANENT MAGNET...4" DIAMETER.

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES:

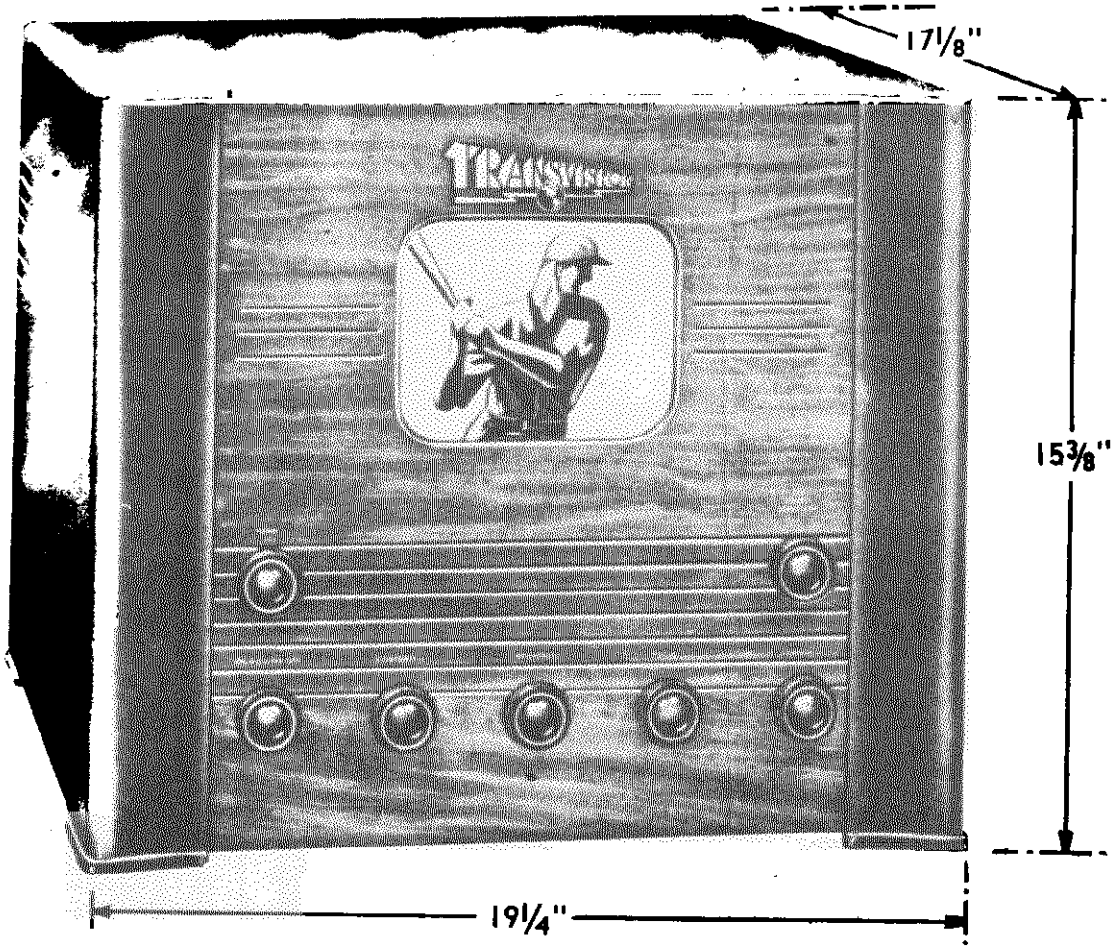
I.F. 455 KCS. R.F. 1700 KCS.

I.F. ALIGNMENT:
CONNECT OUTPUT METER ACROSS THE VOICE COIL.--TURN THE RECEIVER VOLUME CONTROL TO MAXIMUM.
CONNECT HIGH SIDE OF ALIGNMENT OSCILLATOR, THROUGH A.05 MFD CAPACITOR, TO THE CONVERTER GRID.
SET ALIGNMENT OSCILLATOR AT 455 KCS AND ADJUST OUTPUT TO GIVE THE LOWEST CONVENIENTLY READABLE INDICATION ON THE OUTPUT METER .
ADJUST TRIMMERS C-7 AND C-8 IN 2ND I.F. TRANSFORMER TO GIVE MAXIMUM INDICATION ON OUTPUT METER.--
REPEAT THIS PROCEDURE FOR TRIMMERS C-5 AND C-6 IN THE 1ST I.F. TRANSFORMER.
REPEAT PROCEDURE TO CHECK ACCURACY.--
R.F. ALIGNMENT :
RETAIN OUTPUT METER CONNECTED AS ABOVE AND RECEIVER VOLUME CONTROL SET AT MAXIMUM.--
CONNECT ALIGNMENT OSCILLATOR TO ANTENNA.--
SET ALIGNMENT OSCILLATOR AT 1700 KCS. AND PLACE IN OPERATION.
ROTATE RECEIVER TUNING CAPACITOR (C-1 AND C-3 TO GIVE MAXIMUM SIGNAL INDICATION ON OUTPUT METER.
ADJUST OUTPUT OF ALIGNMENT OSCILLATOR TO GIVE THE LOWEST CONVENIENTLY READABLE INDICATION ON THE OUTPUT METER.
ADJUST OSCILLATOR TRIMMER C-4 TO PEAK THE SIGNAL INDICATION ON OUTPUT METER.-
THEN ADJUST ANTENNA TRIMMER C-2 TO FURTHER PEAK THE SIGNAL.--
REPEAT PROCEDURE TO CHECK ACCURACY--
TRIMMER LOCATIONS ARE SHOWN IN

N O T E S

AN ELECTRONIC VOLTMETER MAY BE CONNECTED TO THE AVC BUS AND USED FOR ALIGNMENT INDICATION IN LIEU OF THE OUTPUT METER ACROSS THE VOICE COIL.
AN ELECTRONIC VOLTMETER OR A VOLTMETER WITH A MINIMUM RESISTANCE OF 20,000 OHMS PER VOLT SHOULD BE USED FOR VOLTAGE MEASUREMENTS.

TRANSVISION, INC.

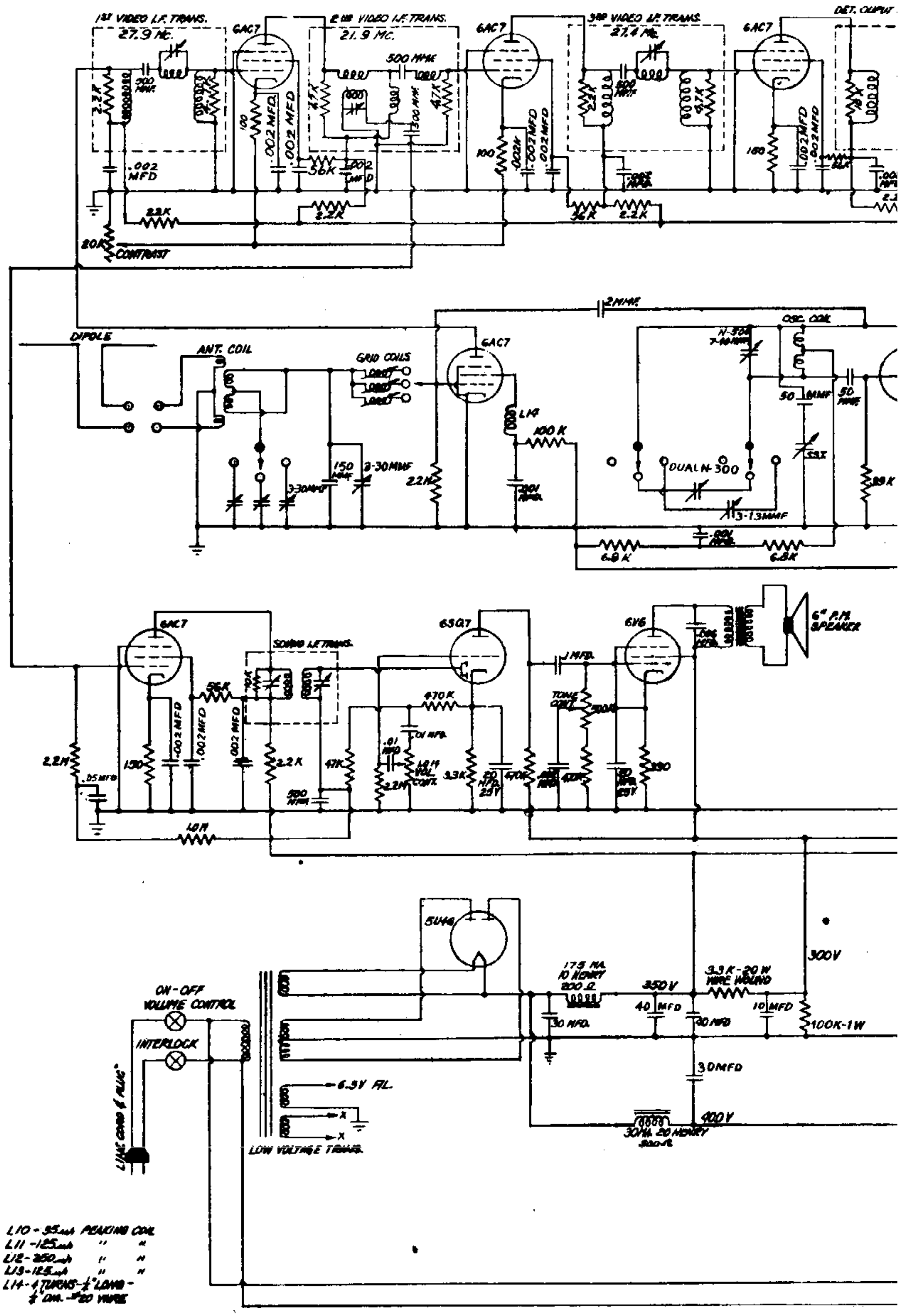


The tube lineup in the RF section is a 6AC7 mixer and a 6C4 local oscillator. This stage has been carefully designed for flat response to the entire 6.5 megacycles of all channels and, despite compactness is also capable of surprising gain.

In the video IF section there are three stages, each using a 6AC7. The Audio Intelligence is picked off of the second IF transformer by a trap tuned to 21.9 megacycles and fed into a sound IF stage that uses another 6AC7. A 6SQ7 demodulator-amplifier and a 6V6 power amplifier comprise the audio section, while the video detection and amplification are achieved by a 6H6 and 6AG7 respectively.

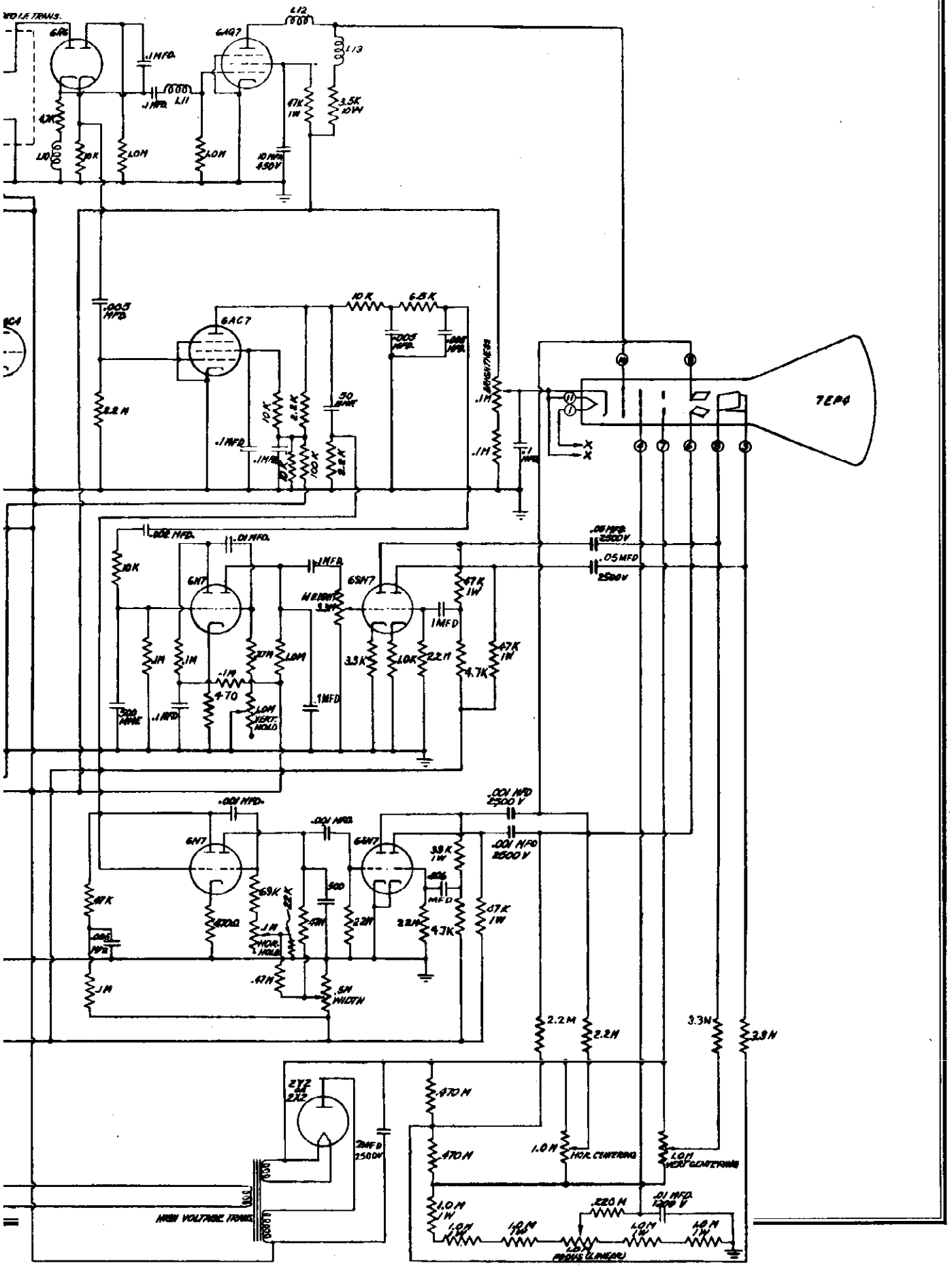
The sync separator is still another 6AC7 and it fires 6N7 multivibrators in both the vertical and horizontal sweep circuits. The 6SN7's that follow are push-pull amplifiers. Low voltage rectification employs a 5A4G while a 2X2 (or 2Y2) rectifies the high voltages. The picture tube is the type 7EP4.

Perhaps the most striking feature of the IF section is the system of fixed, double-tuned trap coupling. This method not only obviates the need for a signal generator, but, in spite of the high IF frequency, it simultaneously affords satisfactory gain over a 3.5 megacycle bandpass that is obtained by heavy damping. The only tuning imposed upon the constructor at all involve trimmers in the trap circuits. In the second IF can, for example, the 21.9 megacycle trap is simply adjusted for maximum output (audio), while the two remaining trimmers are set for greatest brightness.


1ST VIDEO I.F. TRANS.
27.9 MC.
6AC7
2ND VIDEO I.F. TRANS.
21.9 MC.
500 MMF
6AC7
3RD VIDEO I.F. TRANS.
27.4 MC.
6AC7
DET. OUTPUT
2.2K
.002 MFD
100
.002 MFD
56K
47K
2.2K
36K
20K
CONTRAST
2 MMF
DIPOLE
ANT. COIL
GRID COILS
6AC7
L17
100 K
2.2M
150 MMF
3-30 MMF
OSC. COIL
N-300
50 MMF
DUAL N-300
3-13 MMF
6.8 K
6AC7
SOUND I.F. TRANS.
56K
2.2 K
6SQ7
470 K
3.3K
.01 MFD
VOL. CONT.
6V6
TONE CONT.
6" P.M. SPEAKER
2.2M
.05 MFD
150
10M
47K
5U4G
ON-OFF VOLUME CONTROL
INTERLOCK
175 MA. 10 HENRY 200 Ω
350V
40 MFD
30 MFD
3.3 K-20 W WIRE WOUND
10 MFD
300V
100K-1W
30 MFD
400V
30 MA. 20 HENRY
6.3V FIL.
LOW VOLTAGE TRANS.
L10 - 35 µh PEAKING COIL
L11 - 125 µh " "
L12 - 250 µh " "
L13 - 125 µh " "
L14 - 4 TURNS - ½" LONG - ¼" DIA. - #20 WIRE

SION, INC.

7 INCH KIT



TRANSVISION, INC.

The selection of a relatively high intermediate frequency was dictated by image considerations. This choice fixes the various image frequencies in channels that for the present are inactive, thereby evading this problem despite the inherently poor image rejection power of television receivers in general. Measurements have indicated that at these high image frequencies convential tubes like the 6AC7 became inoperative and in this curious manner introduce acceptable rejection properties.

A noteworthy wiring precaution that preserves IF gain at its highest possible level concerns the use of a single ground for each IF stage. This common ground is a lug securely fastened to the appropriate socket under the #1 pin. In this manner, spurious voltages that frequently reduce gain are effectively eliminated. Excellent response in the video circuit is derived through the use of low resistance in the detector circuits and through a carefully designed series-shunt peaking arrangement in both the input and output of the section.

In the audio section, demodulation is accomplished by means of slope detection, while ample volume is provided by the two stages of amplification that follow. A tone control is also included. The salient feature of the sync separater is the exceedingly low voltages employed, a provision that affords maximum limiting.

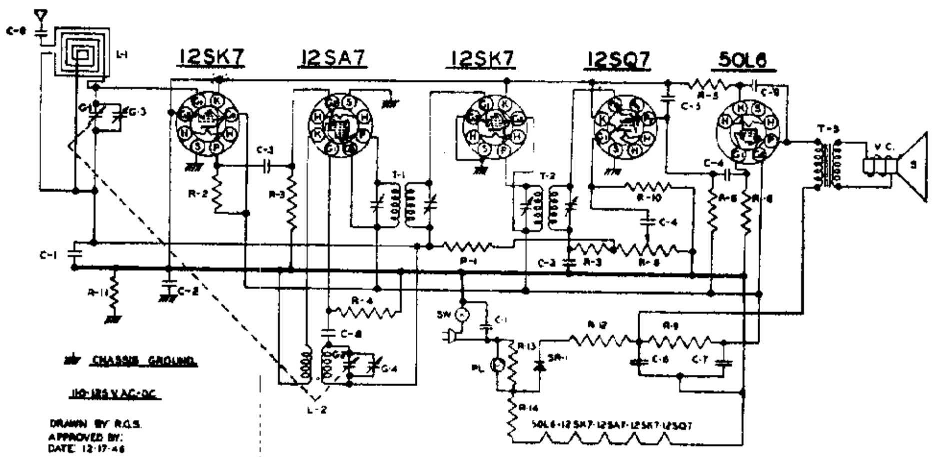
Because of the latitude present in sweep design, it is always of interest to discuss what considerations have guided final circuit decisions. The primary one, of course, pertains to the selection of impulse generator. Greater flexibility is naturally permitted in the vertical section because of its lower frequency and, consequently, the advantages of a multivibrator can be utilized here without further ado.

The problem of stability, however, must be considered more cautiously in horizontal design. Initial plans, therefore, tentatively called for another multivibrator in the horonzital section. Surprisingly enough, the instability that actually materialized appeared to be closely connected with the interference problem, such as ignition disturbances, for example. Investigation soon focused attention upon the long time constant of the capacity grid leak arrangement originally coupling the differentiating network to the 6N7 multivibrator. At any rate, a direct connection from differentiator to frid, together with a further lowering of the differentiator time constant, succeeded in reducing the problem to such neglible proportions that the multivibrator proved completely acceptable.

A common expedient used in the rectifier circuits to provide the kinescope with an extra 350 volts deserves a word of comment. Generally, the low side of the high voltage rectifier is returned directly to ground. But since this procedure has the disadvantage of losing the potential available in the low voltage section, it appeared sensible to connect the two rectifier circuits in series. As a precaution against noise pickup, the low side of the high voltage supply was tied to a 350 volt terminal point safely distant from the HF unit. No ill effects developed and, because of the additional voltage, the kinescope performance was materially improved.

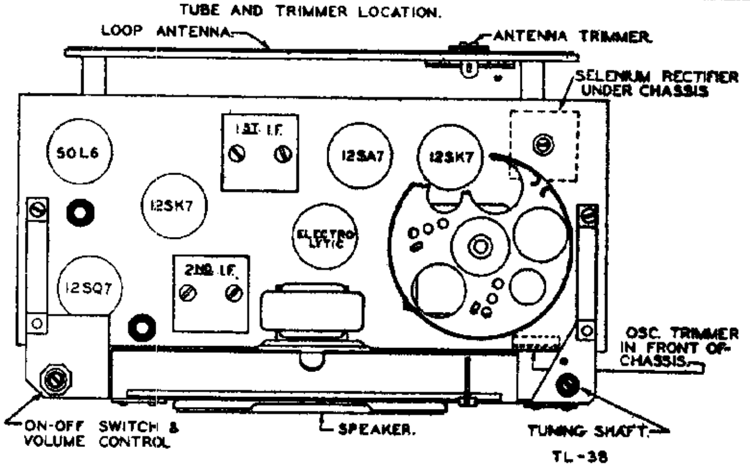
A final consideration that demands special attention in the kit field concerns adequate protection against the high voltages present. For the under surface of the chassis, an interlock switch and a bottom plate are provided, while for the top surface a ceramic cap insulates the connection to the anode of the 2X2. The last protective measure is the use of bakelite shafts, attached, of course, to all controls possessing high voltage connections.

Despite the simplicity of design employed to make the TRANSVISION TELEVISION KIT the ideal set for the inexperienced assembler to construct, no modern television technique was omitted. As a result, we have a television kit easy to construct into a set which, when complete, provides the user with a quality television receiver.



PART NO.		DESCRIPTION.	PART NO.		DESCRIPTION.	PART NO.		DESCRIPTION.
IR-23	R-1	3.9 MEG RESISTOR 1/2W 20	MC-5	C-5	.0005 MFD MICA CONDENSER.	GC-2	C-1, C-2	GANG CONDENSER
IR-22	R-2	3900 Ω RESISTOR 1/2W 10	EC-10	C-6	40 MFD } 150V. ELECTROLYTIC	TC-7	G-3	ANT TRIMMER CONDENSER.
IR-10	R-3	47M Ω RESISTOR 1/2W 20		C-7	40 MFD	TC-6	G-4	OSC. TRIMMER CONDENSER.
IR-9	R-4	22M Ω RESISTOR 1/2W 20	MC-4	C-8	.00005 MFD MICA CONDENSER		SW.	SWITCH ON VOLUME CONTROL
IR-14	R-5	150 Ω RESISTOR 1/2W 20	PC-7	C-9	.01 MFD CONDENSER 400V	TU-25		2/12SK7-12SA7-12SQ7 50L6
IR-11	R-6	470M Ω RESISTOR 1/2W 20	LO-9	L-2	OSC COIL	WR-4	R-13	30 Ω } 3W 5%
[illegible]	[illegible]	[illegible] VOLUME CONTROL.	CO-1	P	LINE CORD.		R-14	90 Ω
[illegible]	[illegible]	[illegible] Ω RESISTOR 1W 10	PB-1	PL	PILOT LITE #41	SR-1	SR-1	SELENIUM RECTIFIER
[illegible]	[illegible]	[illegible] Ω RESISTOR 1/2W 20	LI-1	T1	INPUT IF TRANSFORMER			
[illegible]	[illegible]	[illegible] Ω RESISTOR 1/2W 20	LI-2	T2	OUTPUT IF TRANSFORMER			
[illegible]	[illegible]	[illegible] Ω RESISTOR 2W 10	LL-1	L1	LOOP ANTENNA			
[illegible]	[illegible]	[illegible] D. CONDENSER 400V	SPK-5	T3	SPK TRANSFORMER			
[illegible]	[illegible]	[illegible] CONDENSER 400V		VC	VOICE COIL			
[illegible]	[illegible]	[illegible] MFD MICA CONDENSER		S	PM SPEAKER			
[illegible]	[illegible]	[illegible] FD CONDENSER 400V						

TUBE AND TRIMMER LOCATION.



POWER SOURCES: This receiver may be operated on alternating current (AC) of 110 to 125 volts at 60 cycles or on direct current (DC) of 110 to 125 volts. When used on DC, if the tubes light up but set does not play, reverse the cord plug in the power outlet.

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

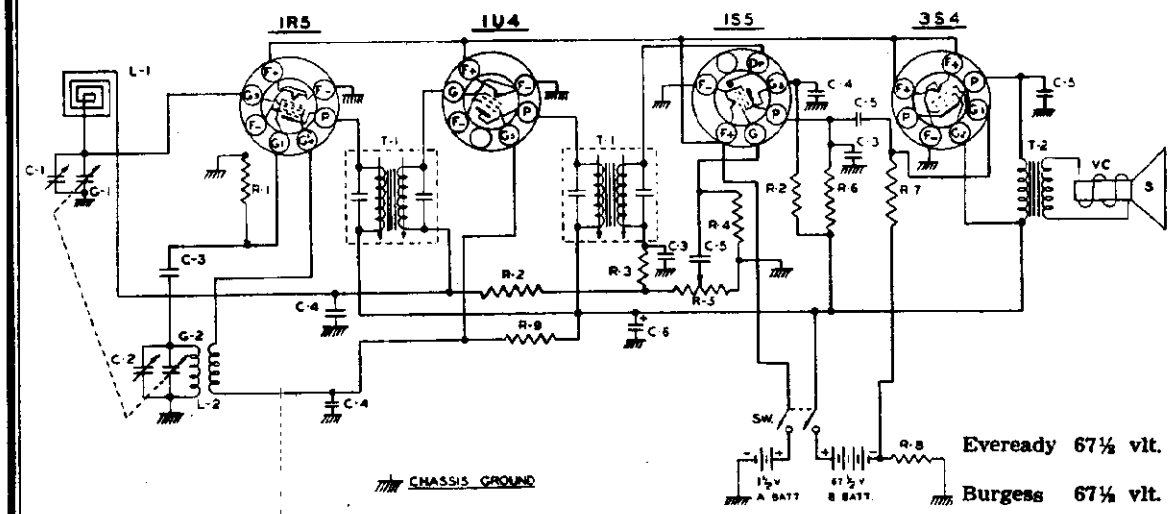
SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

CAUTION: Always predetermine voltage of power source. Never try to plug this receiver into a 220 volt line, as this will cause serious damage.

INSTALLATION: Unwind the power cord and plug into a convenient outlet. This receiver is equipped with a sensitive loop antenna and under ordinary conditions no external antenna would be required.

Due to the directional qualities of the loop antenna the reception of some stations may be improved by placing the receiver in different positions.



PART NO		DESCRIPTION	PART NO		DESCRIPTION
1R-20	R-1	220M Ω RESISTOR 1/2W 20 %	GC-4	C-1	GANG CONDENSER
1R-23	R-2	3.3MEG RESISTOR 1/2W 20 %		C-2	
1R-31	R-3	82M Ω RESISTOR 1/2W 10 %	LL-8	L-1	LOOP ANTENNA
1R-3	R-4	10MEG RESISTOR 1/2W 20 %	LO-12	L-2	OSC. COIL
VC-8	R-5	1MEG VOLUME CONTROL	LI-5	T-1	I.F. TRANSFORMER
1R-12	R-6	1MEG RESISTOR 1/2W 20 %		SW	DPST. SWITCH ON VOLUME CONTROL
1R-13	R-7	2.2MEG RESISTOR 1/2W 20 %		T-2	SPEAKER TRANSFORMER
1R-5	R-8	220 Ω RESISTOR 1/2W 10 %	SPK-8	VC	VOICE COIL
1R-37	R-9	10M Ω RESISTOR 1/2W 20 %		S	PM SPEAKER
TC-7	C-1	ANT. TRIMMER	TU-29		1R5-1U4-1S5-3S4
	C-2	OSC. TRIMMER ON GANG			
MC-2	C-3	100MMFD MICA CONDENSER			
PC-7	C-4	.01 MFD 400 V.			
PC-6	C-5	.005MFD 600 V.			
EC-7	C-6	.20MFD 80WV.			

BATTERY SERVICING

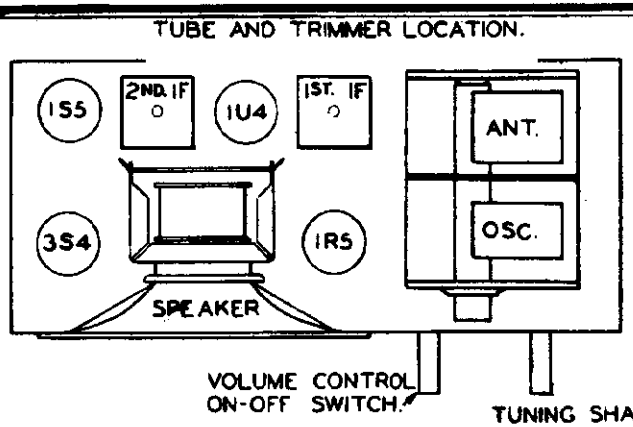
To replace the batteries in this receiver loosen and remove the screw in the back of the cabinet. Remove the back.

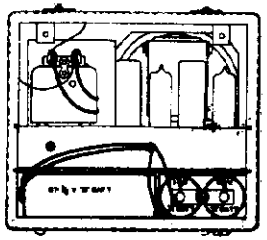
To the right looking at the rear of the cabinet is the "A" or flashlight battery assembly. Remove the battery assembly from the cabinet. Loosen the screw in the cross arm assembly until the batteries may be removed. Replace with fresh batteries and retighten the screw making sure that the battery center caps fit into the small recesses in the ends of the cross arm.

To replace the "B" battery, remove it from the cabinet. Disconnect the fasteners from the battery. Replace with a fresh battery and reconnect the fasteners. When replacing the "B" battery in the cabinet, make sure that the terminal end of the battery faces the end of the cabinet.

After the batteries have been installed, replace the back, making sure that the two washers in the bottom of the back fit into the slot near the bottom edge of the cabinet. Replace and tighten the screw.

CAUTION: If the batteries in the receiver wear out from use and the receiver refuses to operate make sure that the volume control is turned all the way to the left in "OFF" position, until the batteries can be replaced. If the switch is left in the "ON" position this will cause the battery cells to burst and they will leak into the receiver which may ruin the component parts.





Eveready 67½ vlt. #467

Burgess 67½ vlt. #XX45

General 67½ vlt. #W45A

Ray-O-Vac 67½ vlt. #4367

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

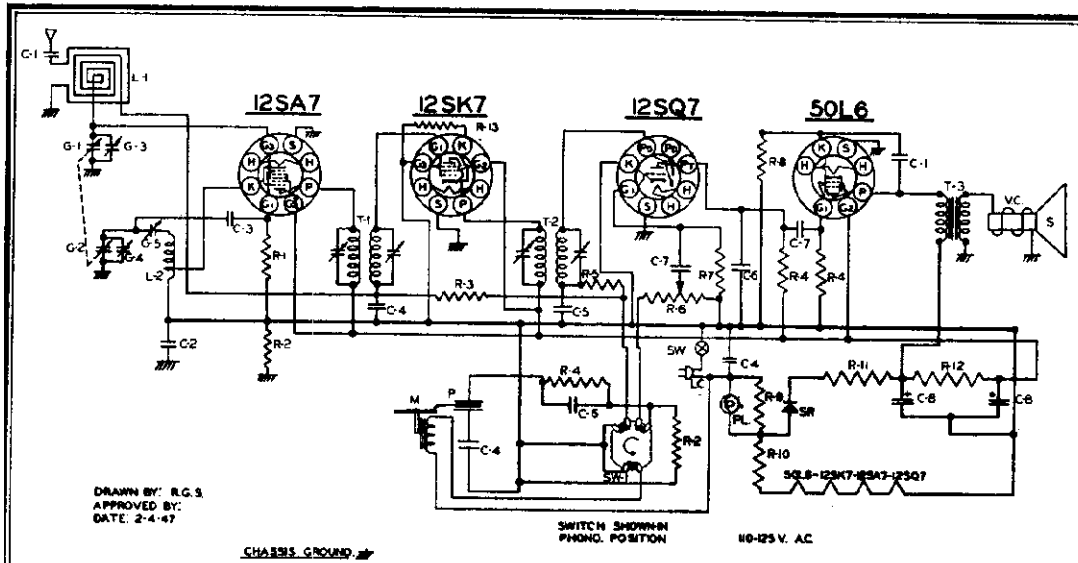
SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

THIRD STEP: Remove the generator leads from the gang condenser.

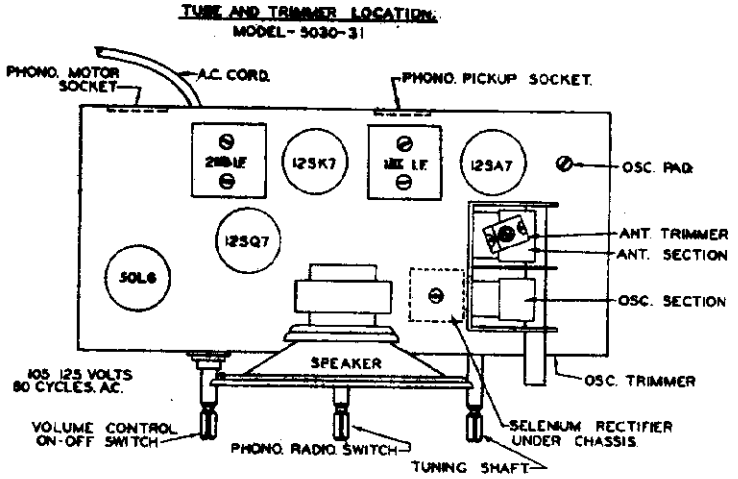
Replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn over the outside of the cabinet. With the receiver and the generator still set at 1400 KC increase the generator output. Adjust the Antenna trimmer through the back of the chassis until a maximum signal is noted on the output meter.

No further adjustment should be necessary as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

NOTE: When the antenna trimmer is adjusted at 1400 KC., the chassis as well as the "A" and "B" batteries must be in normal position in the cabinet to reflect the proper loop impedance.



PART NO.		DESCRIPTION	PART NO.		DESCRIPTION	PART NO		DESCRIPTION
PC-7	C-1	.01MFD. CONDENSER 400V	IR-13	R-7	2MEG. RESISTOR 1/2W 20%	LI-1	T-1	INPUT IF TRANSFORMER
PC-6	C-2	.1MFD. CONDENSER 400V	IR-14	R-8	150 Ω RESISTOR 1/2W 20%	LI-2	T-2	OUTPUT IF TRANSFORMER
MC-4	C-3	50MMFD. MICA. COND. 500V	WR-5	R-9	30Ω WIREWOUND RESISTOR 5W 5%			
PC-5	C-4	.05MFD. CONDENSER 400V		R-10	165Ω		T-3	OUTPUT TRANSFORMER
MC-2	C-5	100MMFD. MICA COND. 500V	IR-35	R-11	82 Ω RESISTOR 2W 10%	SPK-5	VC	VOICE COIL
MC-5	C-6	500MMFD. MICA COND. 500V	IR-25	R-12	2200Ω RESISTOR 1W 10%		S	SPEAKER
PC-10	C-7	.005MFD CONDENSER 400V	IR-1	R-13	470 Ω RESISTOR 1/2W 20%	SR-1	SR	SELENIUM RECTIFIER
EC-10	C-8	40MFD 40MFD 150V ELECTROLYTIC.				M-1	M	110V.60 CYCLES MOTOR
						L-75	P	CRYSTAL PICKUP
			GC-1	G-1	GANG CONDENSER	SW-1	SW-1	RADIO-PHONO SWITCH
				G-2			SW	AC. SWITCH ON VOLUME CONTROL
IR-9	R-1	22000Ω RESISTOR 1/2W 20%	TC-7	G-3	ANT. TRIMMER	PB-1	PL	#47 PILOT BULB
IR-20	R-2	220M Ω RESISTOR 1/2W 20%	TC-8	G-4	OSC. TRIMMER	CO-1	LC	LINE CORD.
IR-23	R-3	3.9MEG. RESISTOR 1/2W 20%	TC-9	G-5	600 K.C. TRIMMER			
IR-11	R-4	470M Ω RESISTOR 1/2W 20%				TU-26	—	50L6-12SQ7-12SA7-12SK7
IR-10	R-5	47M Ω RESISTOR 1/2W 20%	LL-7	L-1	LOOP			
VC-4	R-6	1MEG. VOLUME CONTROL	LO-7	L-2	OSC. COIL.			



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the top of the ANT. section of the gang condenser. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

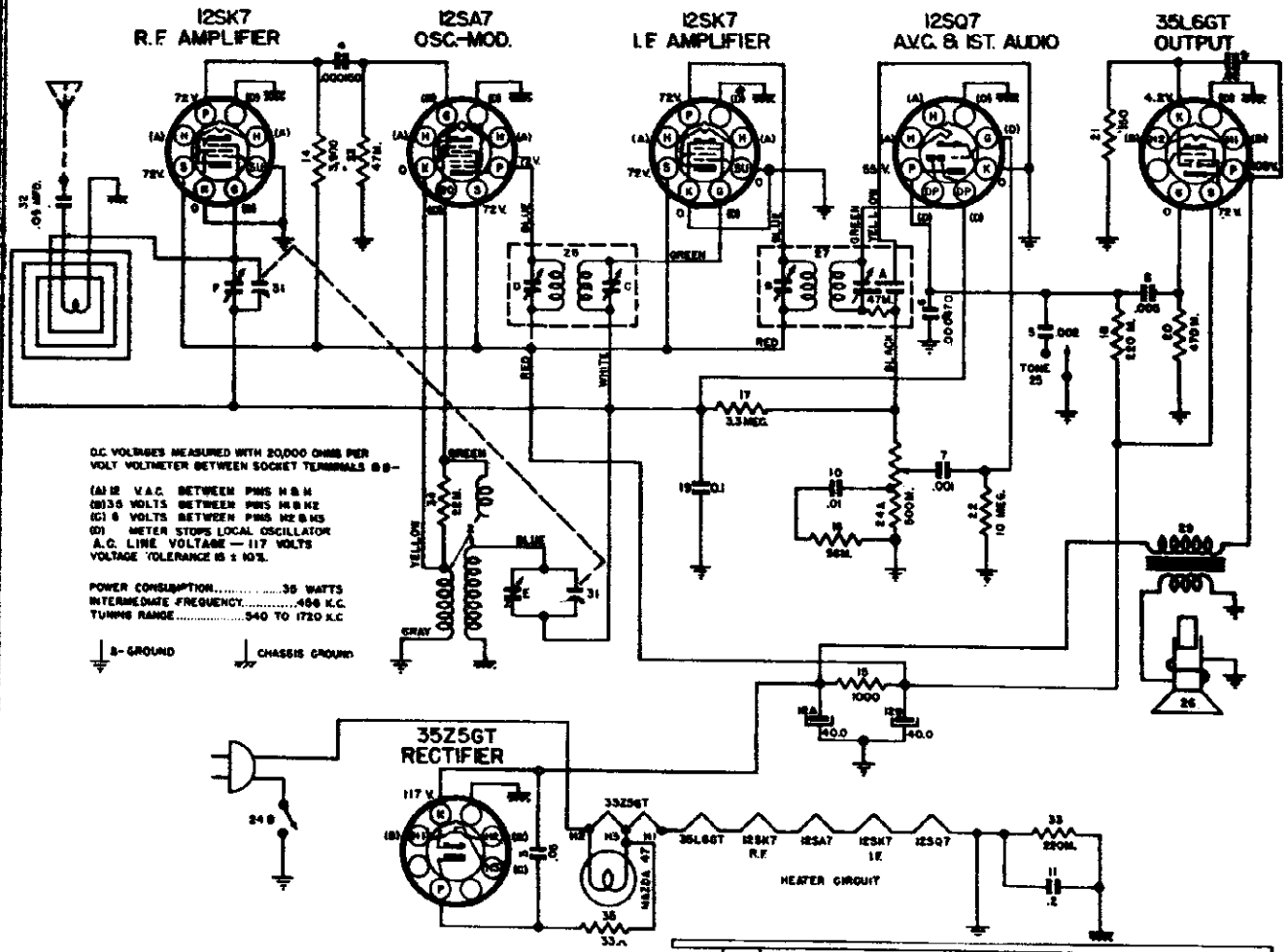
POWER SOURCES: This combination will operate on an alternating (AC) current only, of 110 to 125 volts at 60 cycles.

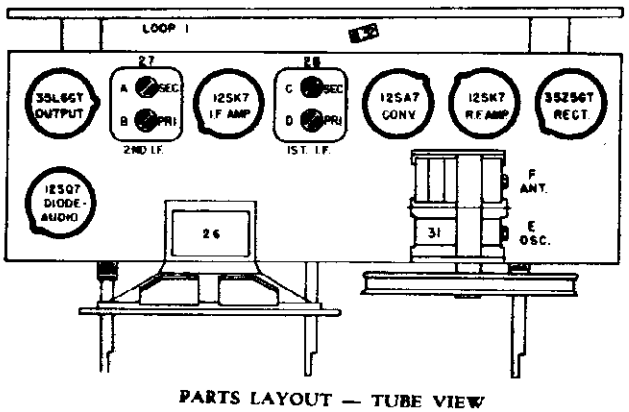
CAUTION: Always predetermine voltage of power source. Never try to plug this combination into a 220 volt line, as this will cause serious damage.

Never try to operate this combination on 50 cycle current, as this will cause the motor to rotate at an incorrect speed. The normal speed is 78 R.P.M., (revolutions per minute) and to insure proper reproduction of recordings 60 cycle current must be used.

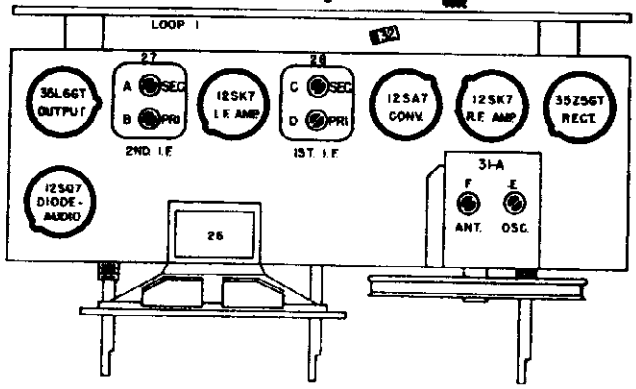
Never plug this combination into a direct current (DC) source as this will seriously damage the motor which has been designed for AC operation only.

UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS) MODELS R-1227, R-1228, R-1229

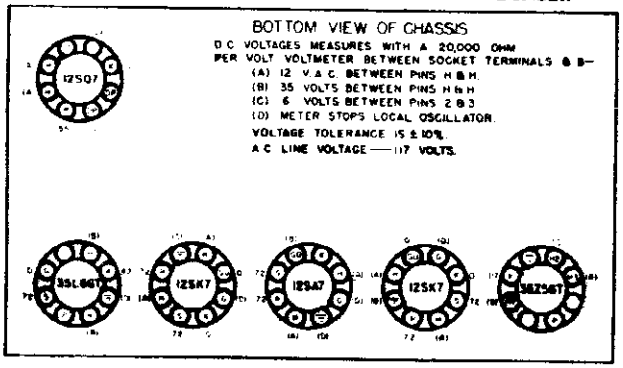




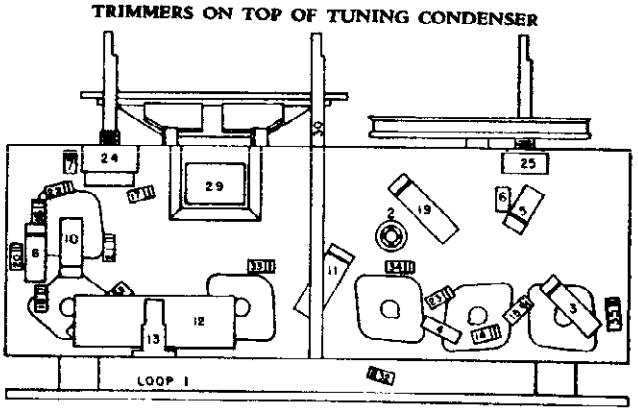
PARTS LAYOUT — TUBE VIEW
TRIMMERS ON SIDE OF TUNING CONDENSER



PARTS LAYOUT — TUBE VIEW
TRIMMERS ON TOP OF TUNING CONDENSER

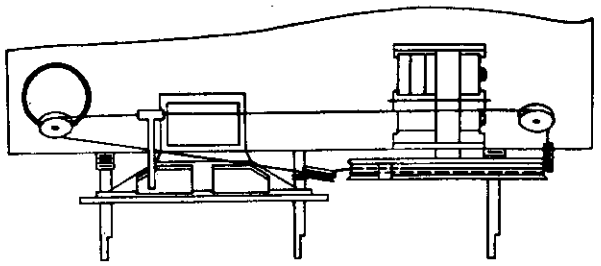


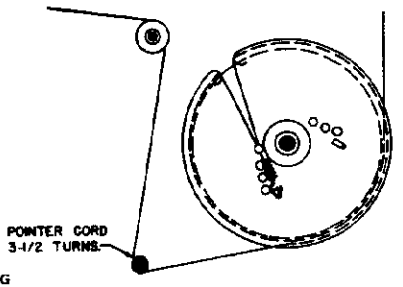
TUBE SOCKET VOLTAGE CHART



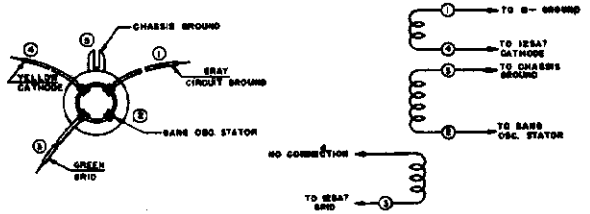
PARTS LAYOUT — CHASSIS VIEW

Illus. No.	Service Part No.	Description
		ELECTRICAL PARTS
		COILS
1	1217138	Antenna Assy. — Loop and Back Cover — Models R-1227 and R-1228, (Includes Condenser #32)
1A	1216937	Antenna Assy. — Loop and Back Cover — Model R-1229 (Includes Condenser #32)
2	1216915	Oscillator Coil Complete
27	1216570	2nd I. F. Assy.
28	1216605	1st I. F. Assy.
		CONDENSERS
3	E503	.05 Mfd. 600 V. Tubular
4	G151	.000150 Mfd. Molded
5	E202	.002 Mfd. 600 V. Tubular
6	G471	.000470 Mfd. Molded
7	E102	.001 Mfd. 600 V. Tubular
8	E502	.005 Mfd. 600 V. Tubular
9	E203	.02 Mfd. 600 V. Tubular
10	E103	.01 Mfd. 600 V. Tubular
11	E204	.20 Mfd. 400 V. Tubular
12	J908	2 Section Electrolytic
12A		40 Mfd. 150 V.
12B		40 Mfd. 150 V.
10	E104	.10 Mfd. 600 V. Tubular
31	1217414	Condenser and Pulley Parts Pkg.
		Variable Condenser and Pulley Assy.
		Grommet (3) Lockwasher (2)
		Spacer - Sleeve (3) Solder Lug
		Screw (3)
31A	1217413	Condenser and Pulley Parts Pkg. (Alternate for 1217414)
32	E503	.05 Mfd. 600 V. Tubular
		RESISTORS
14	A392	3,900 Ohms ½ W. Insulated
15	B102	1,000 Ohms 1 W. Insulated
16	A563	56,000 Ohms ½ W. Insulated
17	A335	3.3 Megohm ½ W. Insulated
18	A224	220,000 Ohms ½ W. Insulated
20	A474	470,000 Ohms ½ W. Insulated
21	A151	150 Ohms ½ W. Insulated
22	A106	10 Megohm ½ W. Insulated
23	A473	47,000 Ohms ½ W. Insulated
33	A224	220,000 Ohms ½ W. Insulated
34	A223	22,000 Ohms ½ W. Insulated
35	A330	33 Ohms ½ W. Insulated
		TUBE COMPLEMENT
	1213813	12SQ7
	1213809	12SA7
	1213812	12SK7
	1213818	35L6GT
	1213848	35Z5GT — Rectifier
		MISCELLANEOUS ELECTRICAL PARTS
13	1216559	Clip — Condenser
24	1216505	Control — Volume Control and Switch
24A		Volume Control
24B		Switch
25	1216544	Control — Tone
	47	Lamp — Dial Light (Mazda #47)
26	1216563	Speaker — 5" PM
29	1216597	Transformer — Output
		MISCELLANEOUS CHASSIS PARTS
	7241702	Cord — Dial Drive (72" Length)
	1216512	Cord — Power
	1216562	Pointer — Dial
	1216650	Shaft — Drive
	1217123	Spring — Cord Tension
	1217819	Socket — Dial Light Assy. (Less Lamp)
	7236279	Socket — Octal Base Tube
	7245333	Washer — "C" (Use With Drive Shaft)
		CABINET PARTS
	1217724	Cabinet Assy. — Model R-1227 — Brown Plastic (Complete With Dial Glass, Clamps and Screws)
	1217725	Cabinet Assy. — Model R-1228 — White Plastic (Complete With Dial Glass, Clamps and Screws)
	1217723	Cabinet Assy. — Model R-1229 — Wood (Complete With Dial Glass, Clamps and Screws)
	1217191	Clamp — Dial Glass — Model R-1229
	1216583	Clamp — R. H. — Dial Glass — Models R-1227 and R-1228
	1216582	Clamp — L. H. — Dial Glass — Models R-1227 and R-1228
	1217156	Dial Glass — Models R-1227, R-1228 and R-1229
	1217975	Knob — Brown — Control — Mode. R-1227
	1217571	Knob — Ivory — Control — Model R-1228
	1216878	Knob — Ivory — Control — Model R-1229
	1217192	Rubber Band — Model R-1229
	1217169	Screw — Self Tapping — Models R-1227 and R-1228





DIAL STRING DRAWING



OSCILLATOR COIL

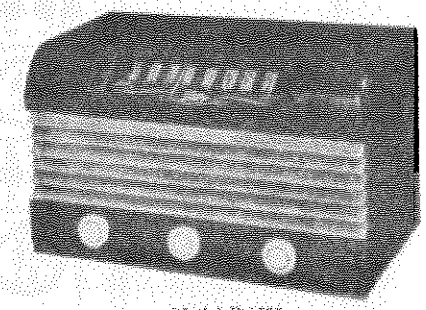
Some receivers are made using a gang condenser having the trimmers on the side of the condenser and some with the trimmers on the top of the condenser. Two Parts Layout drawings are used to illustrate this difference.

ALIGNMENT PROCEDURE

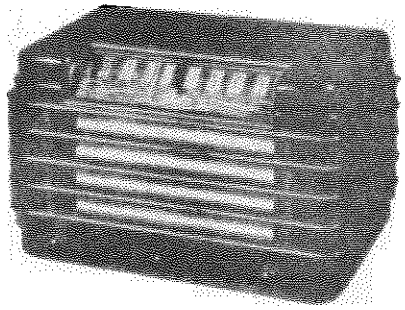
Output Meter Connections	Across Voice Coil Winding
Generator Ground	To Chassis through .01 MFD
Dummy Antenna	In Series with generator
Volume Control Position	Fully on

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	.02 Mfd.	12SA7 Grid (Pin #8)	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	.000200 Mfd.	Ant. lead	1720 KC	1720 KC	E (Osc.)
3	.000200 Mfd.	Ant. lead	1400 KC	1400 KC	F (Ant.)

Power Supply ..... 105/125 volts AC-DC
Power Consumption ..... 35 Watts
Model R-1227 ..... Brown Plastic Cabinet
Model R-1228 ..... White Plastic Cabinet
Model R-1229 ..... Wood Cabinet

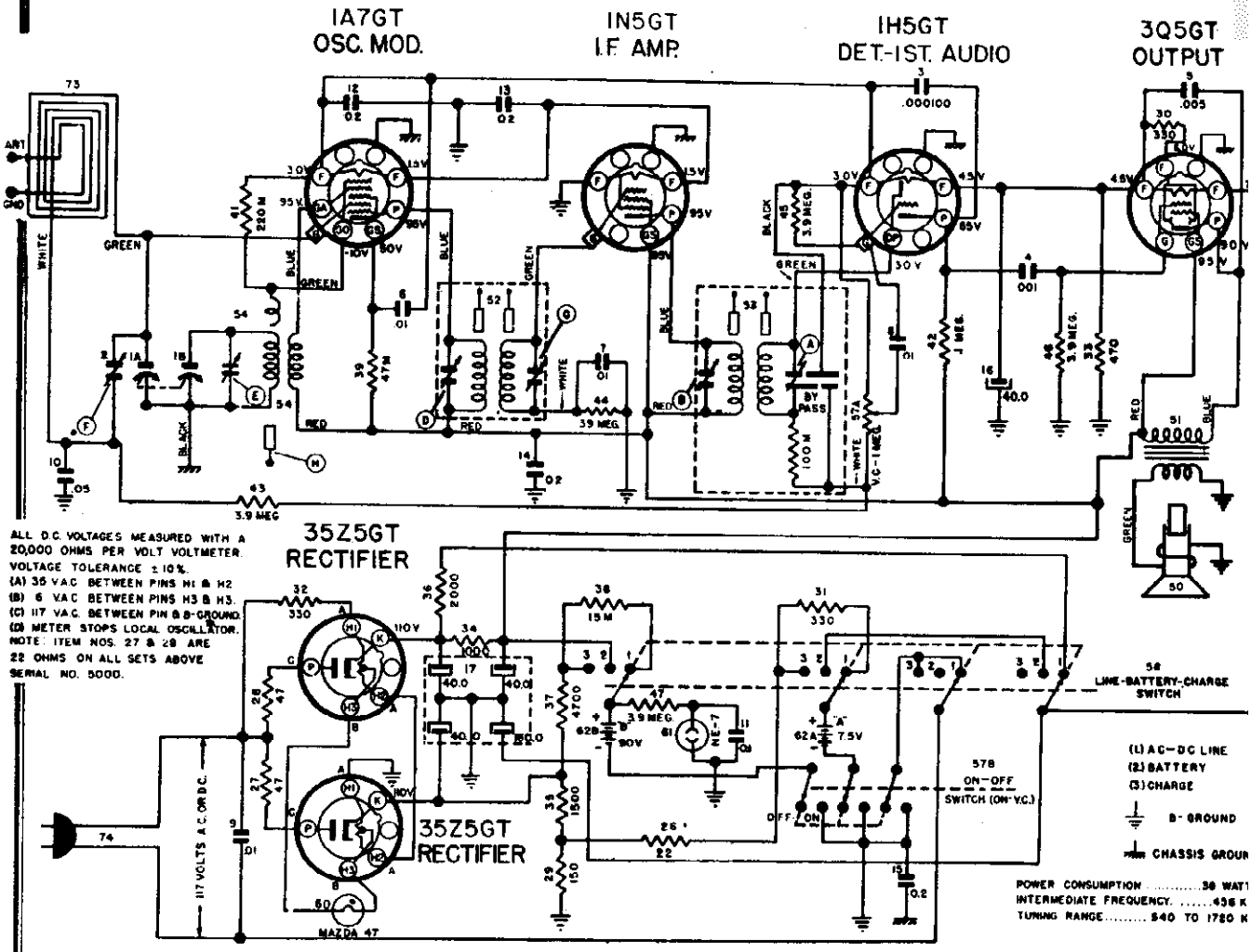


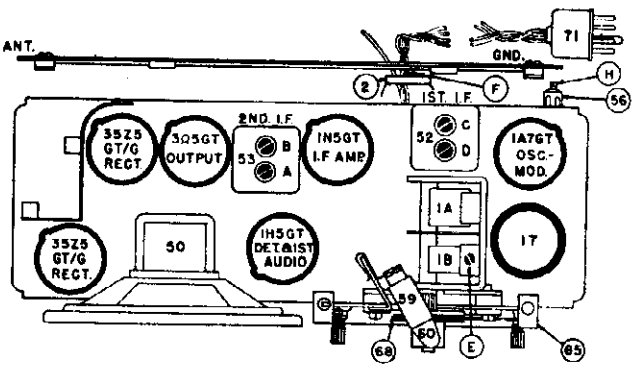
Model R-1229



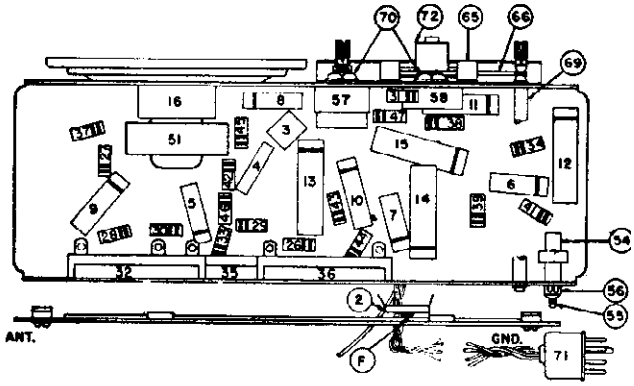
Models R-1227 and R-1228

UNITED MOTORS SERVICE CORP. MODELS R-1408,R-140
(DIV. OF GEN. MOTORS)

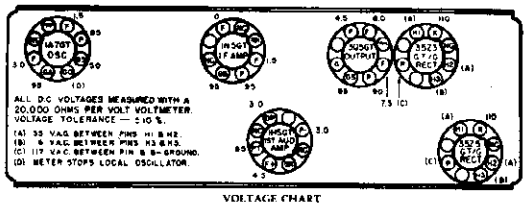




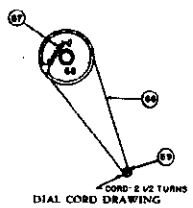
PARTS LAYOUT - TUBE VIEW



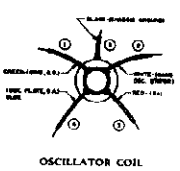
PARTS LAYOUT - CHASSIS VIEW



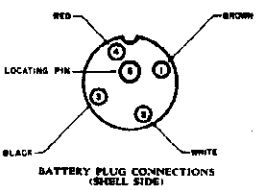
VOLTAGE CHART



DIAL CORD DRAWING



OSCILLATOR COIL



BATTERY PLUG CONNECTIONS (SHELL SIDE)

MODELS R-1408,R-1409 UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

ALIGNMENT PROCEDURE

Output Meter Connections ..... Across Voice Coil Winding
Generator Ground ..... To Ground Terminal
Dummy Antenna ..... In Series with generator
Volume Control Position ..... Fully on

Adjust Signal Generator Output to a Minimum for Satisfactory Output Indication.

Steps	Series Condenser Or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	0.1 Mfd.	1A7 Grid Cap.***	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	.000200 Mfd.	Ant. Terminal	1720 KC	1720 KC	E (Osc.)
3	.000200 Mfd.	Ant. Terminal	1400 KC	1400 KC	F (Ant.)
4*	.000200 Mfd.	Ant. Terminal	600 KC	600 KC	H

*Rock in Oscillator Core "H" with Signal Generator until maximum output is secured.

Repeat steps 2, 3 and 4 for most accurate alignment.

NOTE: If hum is encountered in output when an AC operated signal generator is used for Step 1, short out the 0.2 mfd condenser (#15) which is connected between B– and the chassis until work is completed. Shorting wire must be removed for normal operation in order to reduce shock hazard.

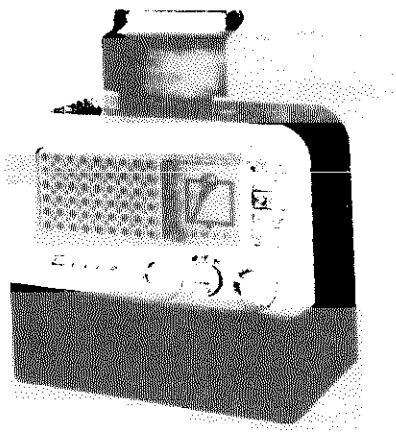
***Connect generator ground to chassis ground.

NOTE: On all sets above Serial No. 3000 the 47 ohm resistors, Illustration No. 27 and 28, have been replaced by 22 ohm resistors to prevent possible overheating if the line voltage is above 120 volts. If replacement becomes necessary, install either a 22 ohm resistor or two 47 ohm resistors in parallel in both locations (Illus. No. 27 and 28).

Illus. No.	Service Part No.	Description
		ELECTRICAL PARTS
		COILS
73	1217535	Antenna Assy. — Loop and Back Cover — Model R-1409 (Includes Condenser #2)
73	1217569	Antenna Assy. — Loop and Back Cover — Model R-1408 (Includes Condenser #2)
54	1217068	Oscillator
52	1216952	1st I. F.
53	1216953	2nd I. F.
		CONDENSERS
1	1216884	2 Gang Variable
1A		Antenna Section
1B		Oscillator Section
2	1217250	Antenna Trimmer (Included in #1217535 and 1217569)
3	G988	.000100 Mfd. Molded
4	B982	.001 Mfd. 600 V. Tubular
5	B982	.005 Mfd. 600 V. Tubular
6	B980	.01 Mfd. 600 V. Tubular
7	B989	.01 Mfd. 600 V. Tubular
8	B989	.01 Mfd. 600 V. Tubular
9	B985	.01 Mfd. 600 V. Tubular
10	B986	.05 Mfd. 600 V. Tubular
11	B984	0.1 Mfd. 600 V. Tubular
12	B984	0.2 Mfd. 400 V. Tubular
13	B984	0.2 Mfd. 400 V. Tubular
14	B984	0.2 Mfd. 400 V. Tubular
15	B984	0.2 Mfd. 400 V. Tubular
16	J988	40 Mfd. 25 V. Electrolytic
17	1217139	4 Section Electrolytic
17A		40 Mfd. 150 V.
17B		40 Mfd. 150 V.
17C		40 Mfd. 150 V.
17D		160 Mfd. 25 V.
		RESISTORS
26	A220	22 Ohms ½ W. Insulated
27	B470	47 Ohms 1 W. Insulated — Illus. Nos. 27 and 28 are B220
28	B470	47 Ohms 1 W. Insulated — 22 Ohm 1 W on Sets above Serial #3000
29	B151	150 Ohms 1 W. Insulated
30	A331	330 Ohms ½ W. Insulated
31	A331	330 Ohms ½ W. Insulated
32	1216950	330 Ohms 10 W. Candohm
33	A471	470 Ohms ½ W. Insulated
34	B102	1,000 Ohms 1 W. Insulated
35	1216956	1,500 Ohms 10 W. Candohm
36	1216960	2,800 Ohms 10 W. Candohm
37	B472	4,700 Ohms 1 W. Insulated
38	A153	15,000 Ohms ½ W. Insulated
39	A473	47,000 Ohms ½ W. Insulated
41	A224	220,000 Ohms ½ W. Insulated
42	A105	1 Megohm ½ W. Insulated
43	A395	3.9 Megohm ½ W. Insulated
44	A395	3.9 Megohm ½ W. Insulated
45	A395	3.9 Megohm ½ W. Insulated
46	A395	3.9 Megohm ½ W. Insulated
47	A395	3.9 Megohm ½ W. Insulated
		MECHANICAL PARTS
		CHASSIS PARTS
72	1836870	Bushing — Selector Switch
	1217103	Cable Assy. — Battery
66	1212253	Cord — Universal Dial Drive — 48" Length
65	1217301	Dial and Dial Plate Assy.
	7257173	Grommet — Neon Lamp Mtg.
70	7231480	Nut — Hex
	1217553	Plug — Male Chassis
	1217297	Pointer — Dial
74	1217538	Power Cord and Socket
68	1217238	Pulley Assy.
69	1216951	Shaft — Manual Drive
50	1217030	Socket — Dial Light Assy., Less Lamp
	7236279	Socket — Octal Base Tube
67	1217523	Spring — Cord Tension
	7269393	Washer — "C" (Use With #1216951)
62	8760	Battery — "A" 7.4 V., "B" 90 V.
56	1217105	Fastener — Coil Form
55	1217124	Iron Core Assembly
60	47	Lamp — Dial
61	1217239	Lamp — Neon Glow
30	1216563	Speaker — 5" PM
58	1216956	Transfer Switch
51	1217582	Transformer Output
57	1216943	Volume Control and Switch
		CABINET PARTS
	1217586	Cabinet — Model R-1409 — Brown Leather
	1217587	Cabinet — Model R-1408 — Cream Leather
	1217581	Front Cover Assy. — Complete — Model R-1409
	1217584	Front Cover Assy. — Complete — Model R-1408
		Front Cover
		Grille and Baffle Cloth — Included in Both
		Mounting Brackets and Screws — Front Cover Assys.
		Dial Crystal
	1217585	Handle Assy. Complete
	1217043	Knob — Power Volume and Tuning Control — Model R-1409
	1217557	Knob — Power Volume and Tuning Control — Model R-1408
	1217068	Knob and Spring — Transfer Switch — Model R-1409
	1217558	Knob and Spring — Transfer Switch — Model R-1408

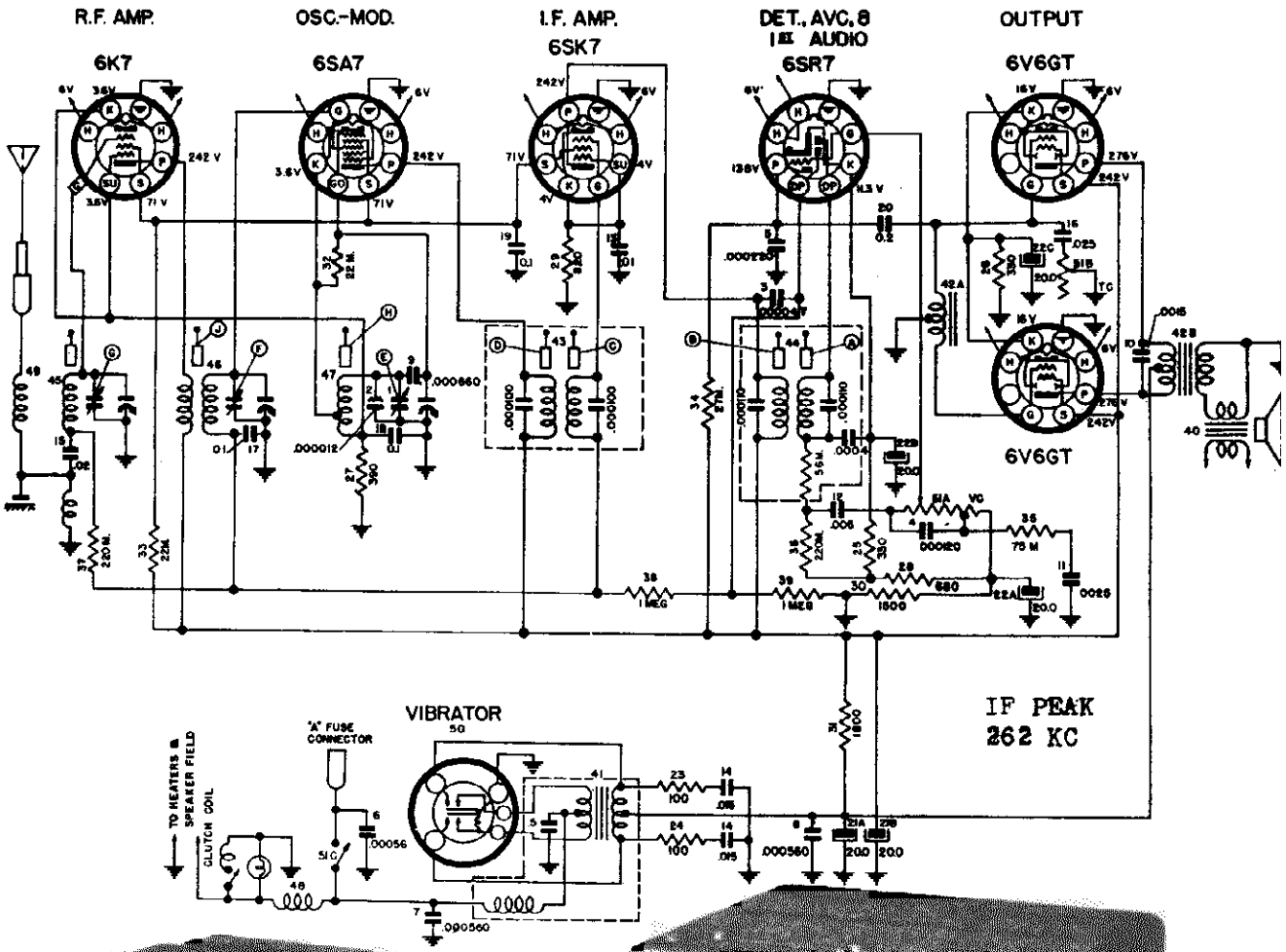
Charging Rate (Battery Charging) "A" ..... 15 Mils.
Charging Rate (Battery Charging) "B" ..... 4 Mils.
Battery Supply, "A" ..... 7.5 Volts
Battery Supply, "B" ..... 90 Volts
Power Supply ..... 105/125 volts AC-DC
Power Consumption ..... 38 Watts

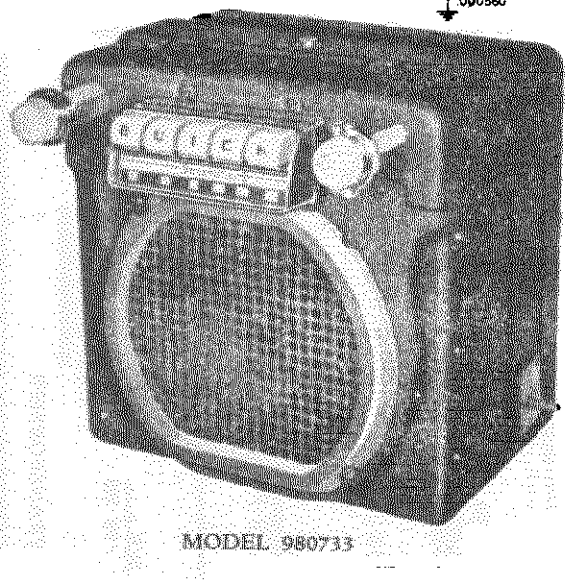
The only difference between the R-1408 and R-1409 is in cabinet colors. The R-1408 is cream leather and the R-1409 is brown leather.



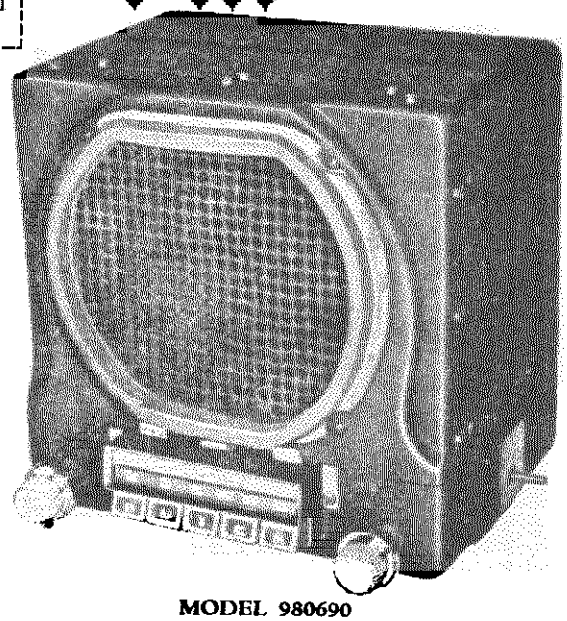
UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

MODELS 980690, Revised, 980733, Buick





MODEL 980733



MODEL 980690

SPEAKER—8" Electro-dynamic.

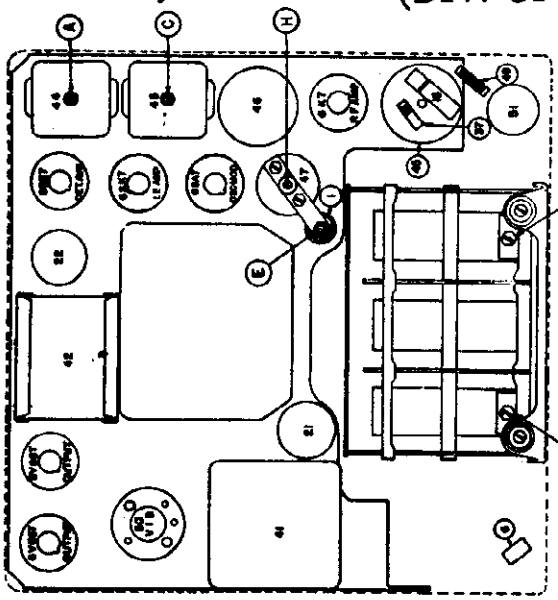
TUNING—Manual and 5 P. B. Mechanical with electric clutch.

CAR ANTENNA CAPACITY—.000052 to .000068 Mfd.

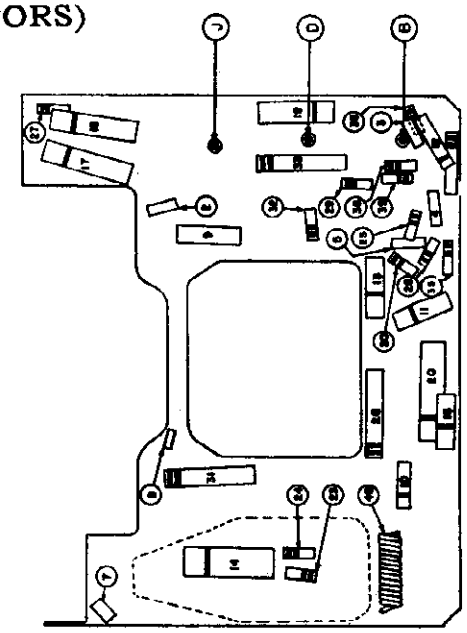
TUNING RANGE—550-1600 K. C.

MODELS 980690, Revised, 980733, Buick

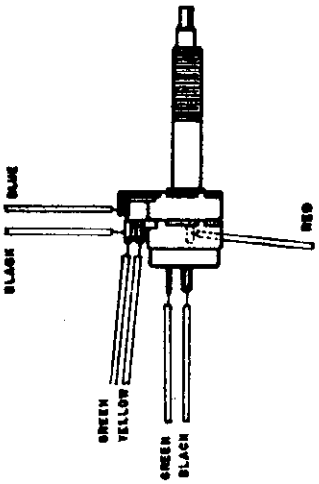
UNITED MOTORS SERVICE CORP.
(DIV. OF GEN. MOTORS)



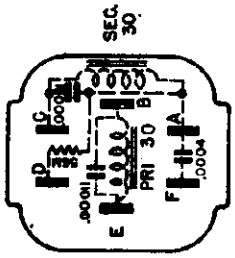
PARTS LAYOUT - TUBE VIEW



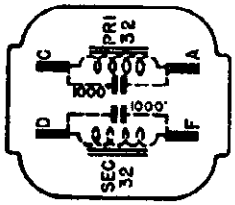
PARTS LAYOUT - CHASSIS VIEW



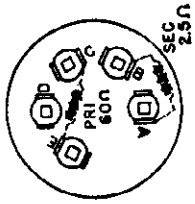
DUAL CONTROL



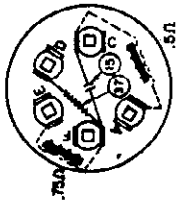
2nd I.F. TRANS.



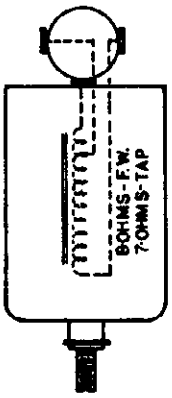
1st I.F. TRANS.



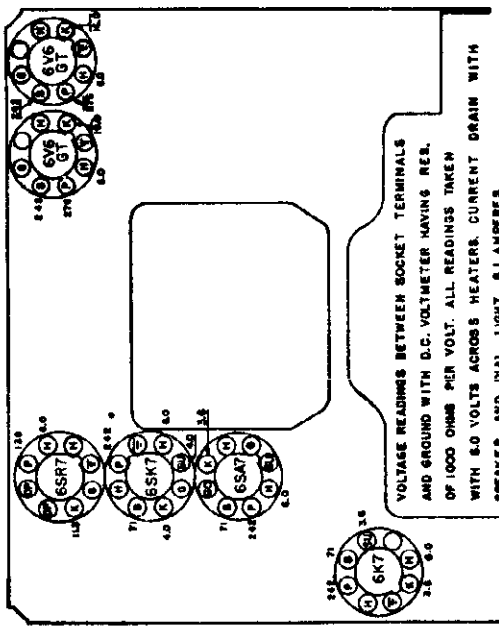
R. F. COIL



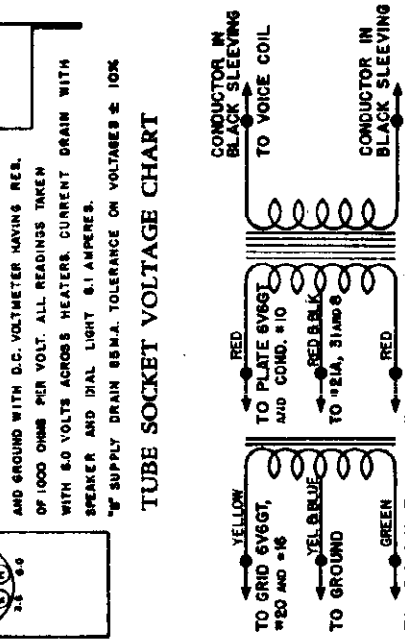
ANT. COIL



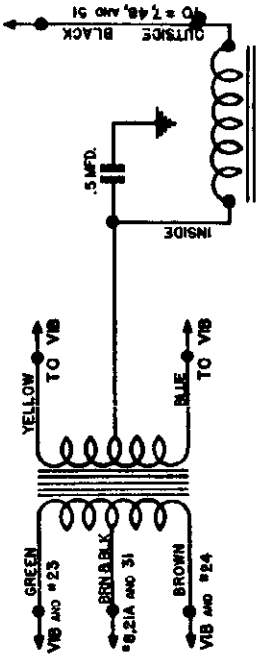
OSC. COIL



TUBE SOCKET VOLTAGE CHART



AUDIO PACK - DRIVER AND OUTPUT TRANSFORMER



POWER TRANSFORMER

UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

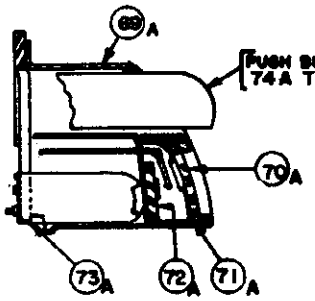
MODELS 980690, Revised, 980733, Buick

PUSH BUTTON SET-UP

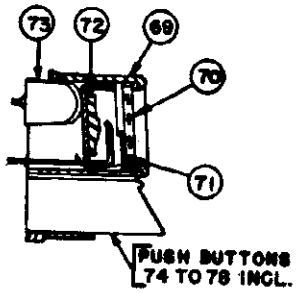
Release holding spring in bottom of button, pull button off. Loosen re-set screw and push in until it bottoms. Tune in desired station while holding in re-set screw. Release and tighten screw. Replace button.

ALIGNMENT PROCEDURE

Volume control maximum. Signal Generator output minimum for satisfactory output indication (preferably below one watt output).



MODEL 980733



MODEL 980690

ESCUTCHEON CROSS SECTION

Series Condenser or Dummy Antenna	Connect to	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd.	Grid side of R. F. Sec. of Gang. Cond.	262 K. C.	A B C D
0.1 Mfd.	Grid side of R. F. Sec. of Gang. Cond.	1615 K. C.	E
.000060 Mfd.	Antenna Connector	1430 K. C.	F G
.000060 Mfd.	Antenna Connector	600 K. C.	H J

Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

SPECIAL INSTRUCTIONS

Rock gang condenser back and forth through signal during 600 K. C. adjustment of screws H and J. Repeat Alignment adjustment of trimmers F and G at 1430 K. C. and of cores H and J at 600 K. C.

SERVICE PARTS LIST

1946 BUICK MODELS 980690 (CONTROLS AT BOTTOM) AND 980733 (CONTROLS AT TOP)

Illus. No.	Service Part No.	Description
		CONDENSERS
1	7244039	Oscillator Air Trimmer (Included in Osc. Coil Assembly. Part #7244111)
2	7242450	.000012 Mfd. Compensating
3	7253313	.000047 Mfd. Molded
4	7240577	.000120 Mfd. Molded
5	7236105	.000220 Mfd. Molded
6	7240566	.000560 Mfd. Mica
7	7240566	.000780 Mfd. Mica
8	7240566	.000560 Mfd. Mica
	7255067	.000780 Mfd. Mica - Molded (Alt. for 7240566)
9	7236151	.0006660 Mfd. Silver Mica
10	7236184	.0015 Mfd. 600 V. Tubular
11	7240578	.0025 Mfd. 400 V. Tubular
12	7230012	.005 Mfd. 600 V. Tubular
13	1208600	.01 Mfd. 600 V. Tubular
14	7236075	.015 a .015 Mfd. 1500 V. Dual-Tubular
15	1212099	.02 Mfd. 600 V. Tubular
16	1211232	.025 Mfd. 400 V. Tubular
17	1207908	0.1 Mfd. 400 V. Tubular
18	1207908	0.1 Mfd. 400 V. Tubular
19	1207908	0.1 Mfd. 400 V. Tubular
20	7240570	0.2 Mfd. 400 V. Tubular
21	7240612	Electrolytic - 2 Section 20-20 Mfd. 400 V.
22	7238553	Electrolytic - 3 Section 20-20-20 Mfd. 25 V.
		RESISTORS
23	1213217	100 Ohms ½ W. Insulated
24	1213217	100 Ohms ½ W. Insulated
25	1213224	330 Ohms ½ W. Insulated
26	1214572	330 Ohms 2 W. Insulated
27	1213482	390 Ohms ½ W. Insulated
28	1214543	680 Ohms ½ W. Insulated
29	1214544	820 Ohms ½ W. Insulated
30	1213237	1,500 Ohms ½ W. Insulated
31	1214573	1,800 Ohms 2 W. Insulated
32	1214530	22,000 Ohms ½ W. Insulated
33	7240590	22,000 Ohms 2 W. Insulated
34	1213342	27,000 Ohms 1 W. Insulated
35	1213364	68,000 Ohms ½ W. Insulated
36	1214553	220,000 Ohms ½ W. Insulated
37	1214555	220,000 Ohms ½ W. Insulated
38	1213282	1 Megohm ½ W. Insulated
39	1213282	1 Megohm ½ W. Insulated
		MISCELLANEOUS ELECTRICAL PARTS
40	7240469	Speaker - 8" Electrodynamic
41	7240519	Power Transformer Assembly
42	7240464	Audio Pack - Driver and Output Transformer
43	7238546	First I. F. Transformer Assembly
44	7240467	Second I. F. Transformer Assembly
45	7242232	Antenna Coil and Shield Assembly
46	7242238	R. F. Coil Assembly
47	7244111	Oscillator Coil Assembly
48	7241708	"A" Filter Choke
49	7240251	Antenna Choke Coil
50	8630	Vibrator - Synchronous
51	7241967	Volume, Tone Control and Switch (Model 980690)
	7241928	Volume, Tone Control and Switch (Model 980733)
		MISCELLANEOUS CHASSIS PARTS
	7242034	"A" Lead Connector Assembly
	7242035	Antenna Lead Connector Assembly
	7238539	Vibrator Socket
	7236279	Octal Base Tube Socket
	7240668	Dial Light Assembly (Includes Dial Lamp)
	125988	Bulb - Dial Lamp
	1321177	"A" Lead Cable Assembly - Model 980690
	1321178	"A" Lead Cable Assembly - Model 980733
	120131	Plate
	1266759	Static Collector Assembly
	1880639	Generator Condenser
	1207820	Distributor Suppressor
	1853686	Suppressor Adaptor
	1324056	Bracket - R. H. - Model 980690
	1324057	Bracket - L. H. - Model 980690
	1323926	Bracket - R. H. - Model 980733
	1323927	Bracket - L. H. - Model 980733
	1320824	Washer
	120780	Lockwasher
	120375	Hex. Nut
	123291	Screw
		TUNER UNIT AND PARTS
	7242170	Tuner Assembly Complete (Model 980690)
	7242350	Tuner Assembly Complete (Model 980733)
56	7240287	Shaft - Declutching Switch Lever
57	7240410	Declutching Switch Lever Assembly
	7255606	Retainer Spring
	7240392	Spring - Declutching Switch Lever
58	7240397	Switch Assembly - Declutching
59	7240396	Drive Drum Assembly
60	7240471	Clutch Assembly Complete
	7237174	Universal Joint Spring

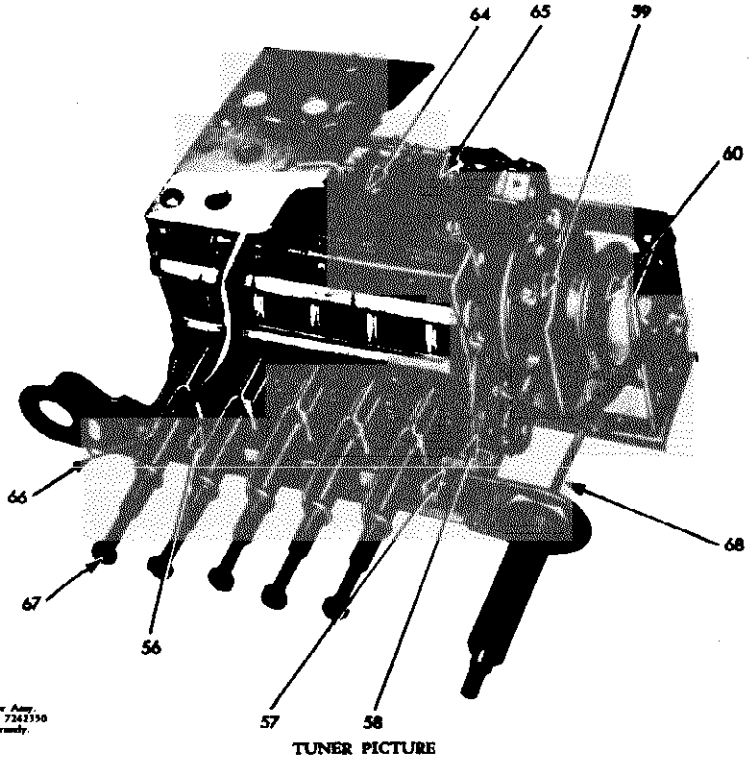
Parts Included in Tuner Assy. Part 7242170 and Part 7242350 which are serviced separately.

64	7242167	Cord and Spring Assembly
65	7242168	Cord and Link Assembly
66	7240460	Pointer and Tip Assembly
67	7240568	Reset Screw Assembly
68	7241981	Tuning Shaft Assembly
69	7241966	Escutcheon
70	7242173	Dial - Glass
71	7240508	Dial Shield
72	7240509	Backplate Assembly
73	7238513	Dial Clamp
74	7242221	Button Assembly - "B"
75	7242222	Button Assembly - "D"
76	7242223	Button Assembly - "F"
77	7242224	Button Assembly - "C"
78	7242225	Button Assembly - "K"

Parts included in Part #7242170 which are serviced separately.

64A	7242005	Cord and Spring Assembly
65A	7242006	Cord and Link Assembly
66A	7241997	Pointer and Tip Assembly
67A	7241982	Reset Screw Assembly
68A	7241980	Tuning Shaft Assembly
69A	7242039	Escutcheon Assembly
70A	7241981	Dial Glass
71A	7241992	Dial Shield
72A	7241987	Backplate Assembly
73A	7242003	Dial Clamp
74A	7242226	Button Assembly - "B"
75A	7242227	Button Assembly - "D"
76A	7242228	Button Assembly - "F"
77A	7242229	Button Assembly - "C"
78A	7242230	Button Assembly - "K"

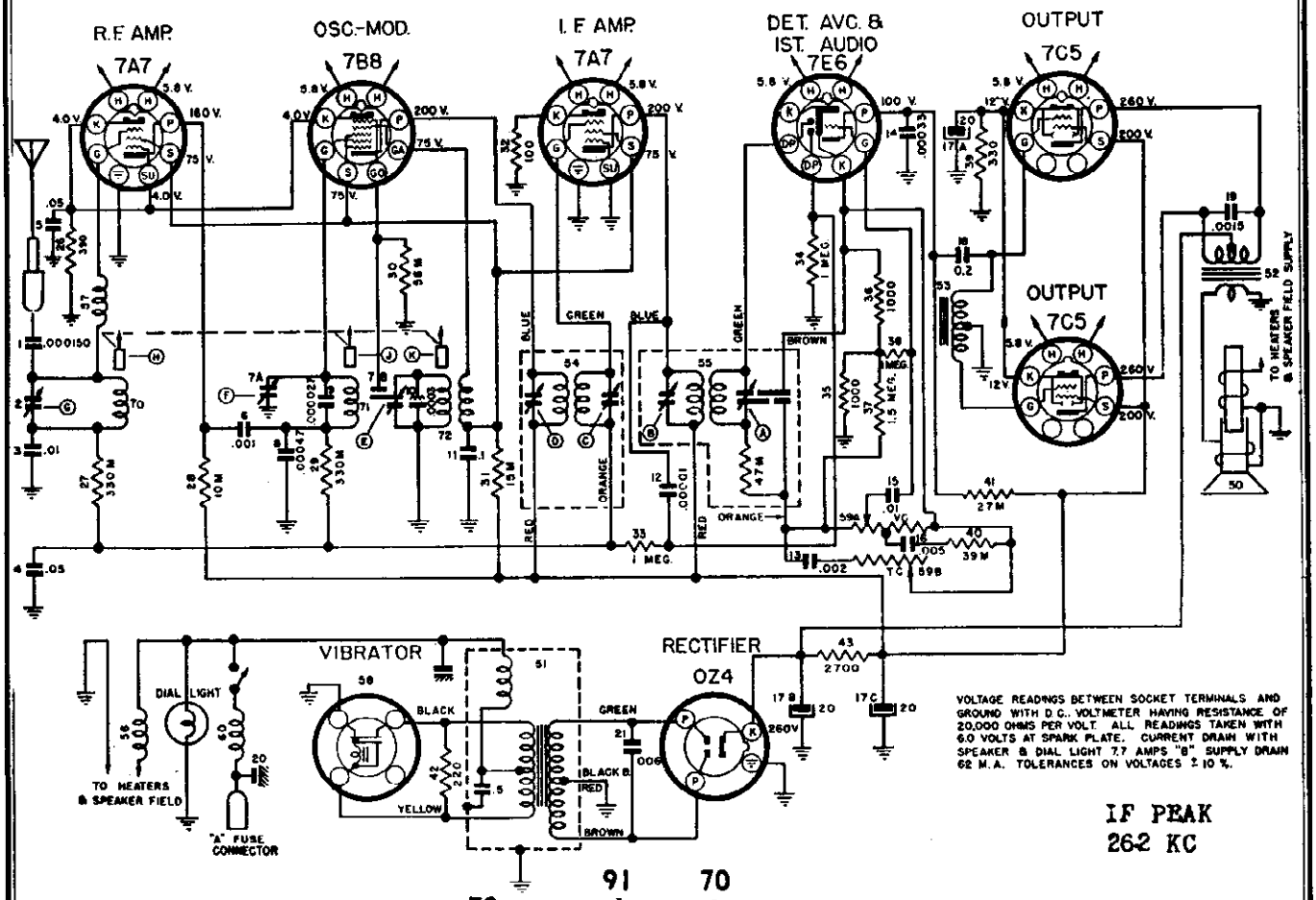
Parts included in Part #7242350 which are serviced separately.



TUNER PICTURE

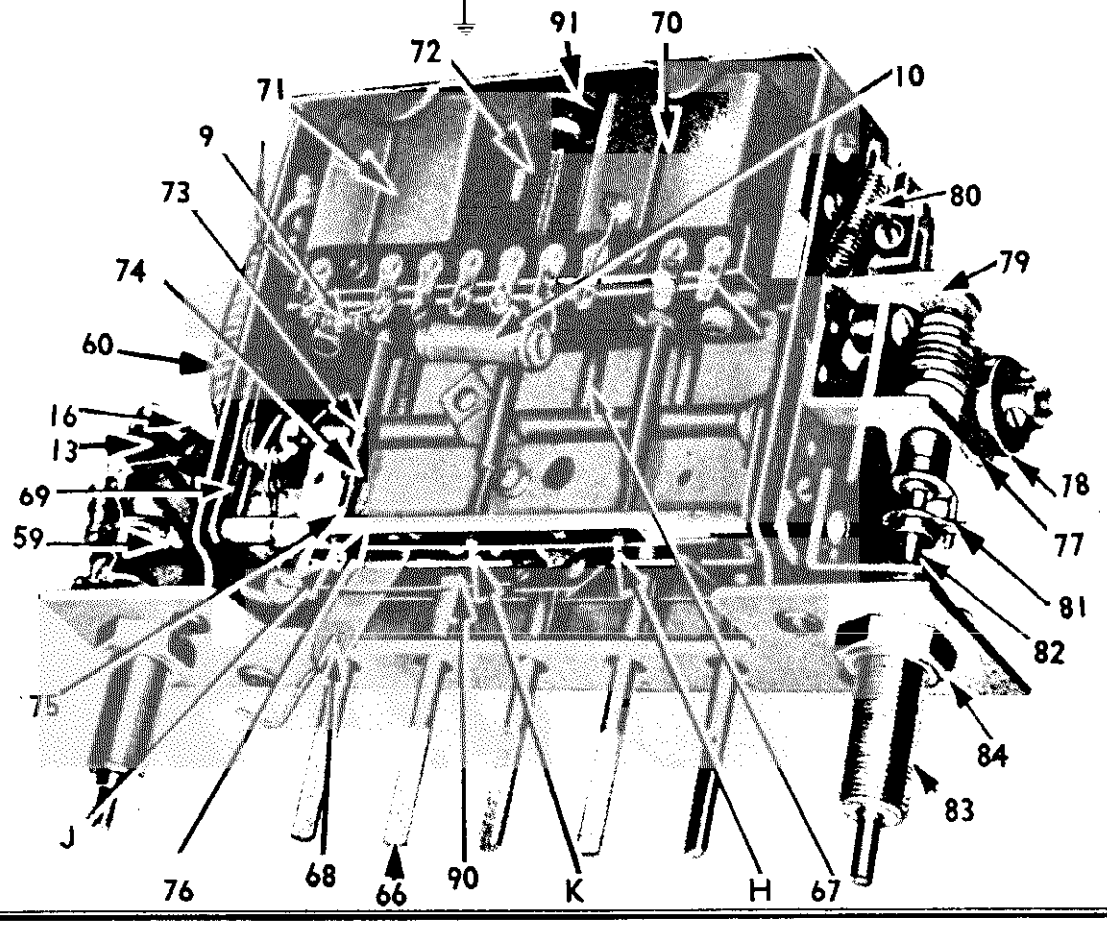
MODEL 982399,
Oldsmobile

UNITED MOTORS SERVICE CORP.
(DIV. OF GEN. MOTORS)



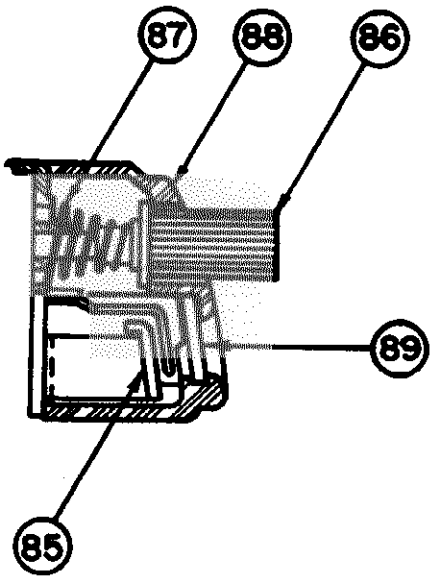
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 20,000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 7.7 AMPS "B" SUPPLY DRAIN 62 M.A. TOLERANCES ON VOLTAGES ± 10 %.

IF PEAK
262 KC

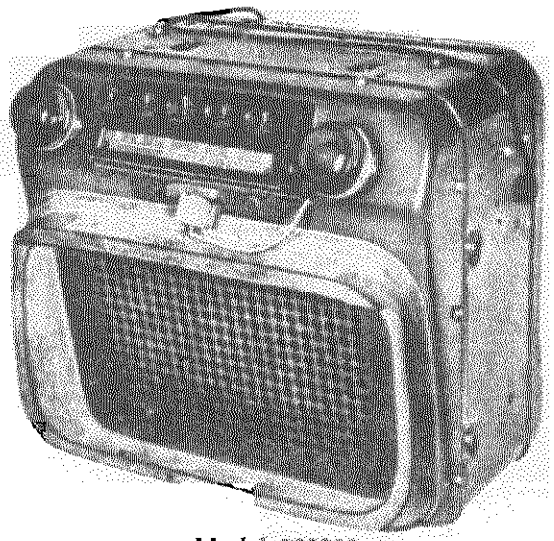


UNITED MOTORS SERVICE CORP.
(DIV. OF GEN. MOTORS)

MODEL 982399
Oldsmobile



ESCUTCHEON CROSS SECTION



Model 982399

CAR ANTENNA CAPACITY—.000070 Mfd.

PUSH BUTTON SET-UP

Push button in and latch. Allow to return to normal position. Turn button until desired station is brought in. Do not hold button in while adjusting.

Illus. No.	Service Part No.	Description
		CONDENSERS
1	G151	.000150 Mfd. Molded
2	7255662	Antenna Trimmer and Bracket Assy.
3	E103	.01 Mfd. 600 V. Tubular
4	E503	.05 Mfd. 600 V. Tubular
5	E503	.05 Mfd. 600 V. Tubular
6	E102	.001 Mfd. 600 V. Tubular
7	7242322	Dual Trimmer
8	G471	.000470 Mfd. Molded
9	G270	.000027 Mfd. Molded
10	7255494	.000300 Mfd. Compensating
11	E104	0.1 Mfd. 600 V. Tubular
12	G100	.000010 Mfd. Molded
13	E202	.002 Mfd. 600 V. Tubular
14	G331	.000330 Mfd. Molded
15	E103	.01 Mfd. 600 V. Tubular
16	E502	.005 Mfd. 600 V. Tubular
17	M908	Electrolytic 3 Section
17A		20.0 Mfd. 25 V.
17B		20.0 Mfd. 450 V.
17C		20.0 Mfd. 450 V.
18	E204	0.2 Mfd. 400 V. Tubular
19	7236134	0.0015 Mfd. 800 V. Tubular
20	7241259	Spark Plate
21	H602	.006 Mfd. 1600 V. Tubular (Buffer)
		RESISTORS
26	A391	390 Ohms ½ W. Insulated
27	A334	330,000 Ohms ½ W. Insulated
28	B103	10,000 Ohms 1 W. Insulated
29	A334	330,000 Ohms ½ W. Insulated
30	A363	56,000 Ohms ½ W. Insulated
31	C193	15,000 Ohms 2 W. Insulated
32	A101	100 Ohms ½ W. Insulated
33	A105	1 Megohm ½ W. Insulated
34	A105	1 Megohm ½ W. Insulated
35	A102	1,000 Ohms ½ W. Insulated
36	A102	1,000 Ohms ½ W. Insulated
37	A155	1.5 Megohm ½ W. Insulated
38	A105	1 Megohm ½ W. Insulated
39	B331	330 Ohms 1 W. Insulated
40	A393	39,000 Ohms ½ W. Insulated
41	B273	27,000 Ohms 1 W. Insulated
42	B221	220 Ohms 1 W. Insulated
43	C772	2,700 Ohms 2 W. Insulated
		MISCELLANEOUS ELECTRICAL PARTS
50	7256643	Speaker — 6" x 9" Elliptical — Electro Dynamic
51	7255881	Power Transformer Assy.
52	7240453	Output Transformer Assy.
53	7256432	Input Transformer Assy.
54	7242079	First I. F. Transformer Assy.
55	7242533	Second I. F. Transformer Assy.
56	7241708	"A" Filter Choke
57	7240251	Antenna Choke Coil
58	8638	Vibrator - Non-Synchronous
59	7255298	Volume, Tone Control and Switch
60	7241701	"A" Spark Choke
	5274904	Volume Control Cable
		MISCELLANEOUS CHASSIS PARTS
	7255307	Front Cover
	7256452	Rear Cover Assy.
	7255757	"A" Lead Assy.
	7233944	Vibrator Socket
	7236279	Octal Base Tube Socket
	7241356	Loctal Base Tube Socket
	1217820	Dial Light Assembly (Less Bulb #187189)
	187189	Dial Light Bulb

Illus. No.	Service Part No.	Description
		TUNER UNIT AND PARTS
65	7255472	Tuner Staked Assembly
66	7255373	Screw — Push Button
	7240740	Nut — Tuning
	7241835	Spring — Tuning Nut
	7239991	"C" Washer
67	7241169	Spring — Return
	7242426	Button — Latching
	7255370	Spring — Lever Return (L. H.)
	7255372	Spring — Lever Return (R. H.)
	7241039	Spring — Latch Bar
68	7255451	Pointer Assembly Complete
	7255713	Spring — Pointer Return
69	7241042	Spring — Connecting Link
70	7255408	Antenna Coil Assembly
71	7255408	R. F. Coil Assembly
72	7255297	Oscillator Coil Assembly
	7256097	Iron Core Parts Package
73		Iron Core and Stud Assy.
74		Spring
75		Washer
76		Speed Nut
77	7255347	Clutch Assembly
78	7255330	Clutch Jaw-Driver
79	7255365	Bracket and Worm Assy.
80	7255670	Spring-Slide Bracket Return
81	7255348	Coupler and Shaft Assy.
82	7255350	Manual Control Shaft Assy.
83	7255326	Bushing — Manual Shaft
84	7242048	Hex Nut
85	7256437	Dial Back Plate
86	7255402	Push Button Assy.
87	7255397	Spring — Push Button Return
88	7255277	Escutcheon Assy.
89	7255275	Dial Glass
90	1212233	Cord-Pointer (48" length)
	7244020	Grommet (Ant. and R. F. Coil)
91	7244021	Grommet (Oscillator)
		TUBE COMPLEMENT
	1213562	7A7 — R. F. Amplifier
	1213567	7B8 — Oscillator Modulator
	1213562	7A7 — I. F. Amplifier
	1213980	7E6 — Det., AVC and First Audio Amp.
	1213568	7C5 — Push-Pull Output
	1211924	0Z4 — Rectifier
		MOUNTING AND INSTALLATION PARTS
	7255290	Control Knob Kit
	7255289	Tuning Knob Assembly (2)
	7255282	Tone Control Knob
	7255283	Dummy Knob
		Hex Nut (½ x 28 special) (2)
		Washer — Felt (2)
		Washer — Radio Control Shaft (2)
		Control Washer — Metal Spring
	415640	"A" Lead and Condenser Assembly (Includes ammeter condenser)
	120151	Fuse — 15 Amp.
	1845913	Tube — Fuse Connector
	1880659	Generator Condenser .5 Mfd.
	7239327	Distributor Suppressor, 15,000 Ohms
	6008	Suppressor Adapter
	6013	Static Collector Assy.
	7255280	Mounting Bracket — Receiver
	121797	Bolt — Hex Hd.

MODEL 982399,
Oldsmobile

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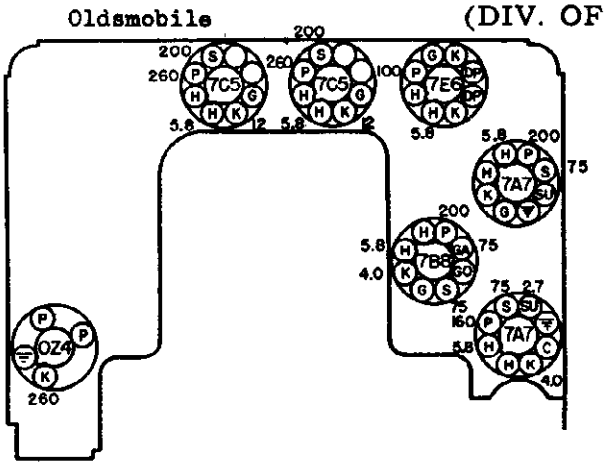
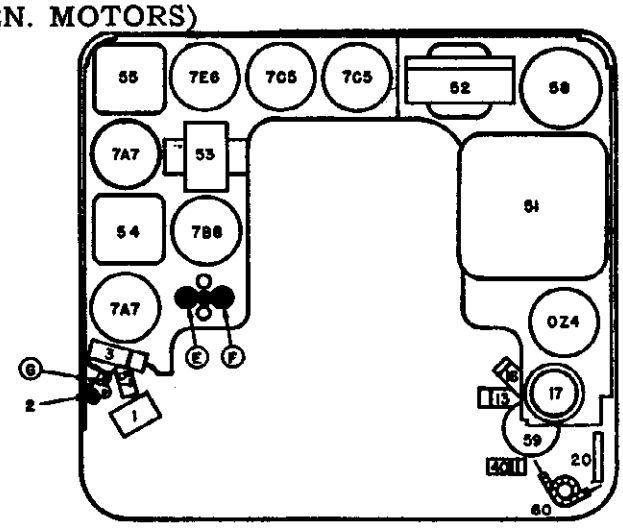
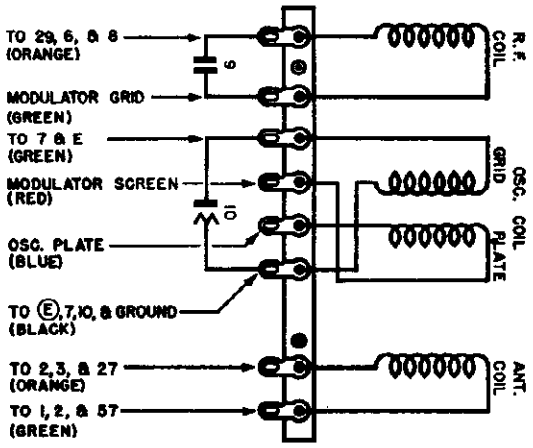


VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 20,000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.7 AMPS. "B" SUPPLY DRAIN 82 MA. TOLERANCES ON VOLTAGES ±10%

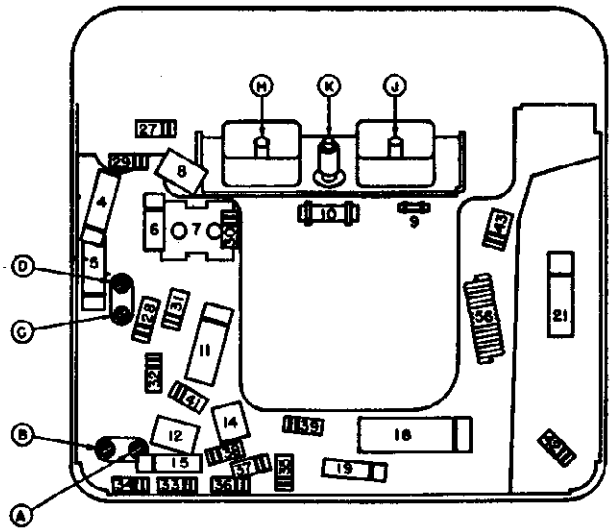
TUBE SOCKET VOLTAGE CHART



PARTS LAYOUT—TUBE VIEW



TUNER COILS



PARTS LAYOUT—CHASSIS VIEW

ALIGNMENT PROCEDURE

Volume Control Maximum — Tone Control on treble.

Signal Generator minimum for satisfactory output indication.

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 MFD	Grid side of Trimmer F	262 KC	A B C D
.000070 MFD	Antenna Terminal	1615 KC	E
.000070 MFD	Antenna Terminal	1430 KC	F G

Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

SPECIAL INSTRUCTIONS

Mechanical alignment of iron cores. Tune to stop at H. F. end of dial. Adjust cores H, J, and K to extend $1\frac{5}{32}$" from end of coil form. Adjust trimmers E, F, and G, (1615 KC). Adjust cores H and J for maximum output at 1430 KC. Repeat alignment of trimmers E, F, and G at 1615 KC. Repeat alignment of cores H and J at 1430 KC. Align trimmers F and G at 1430 KC.

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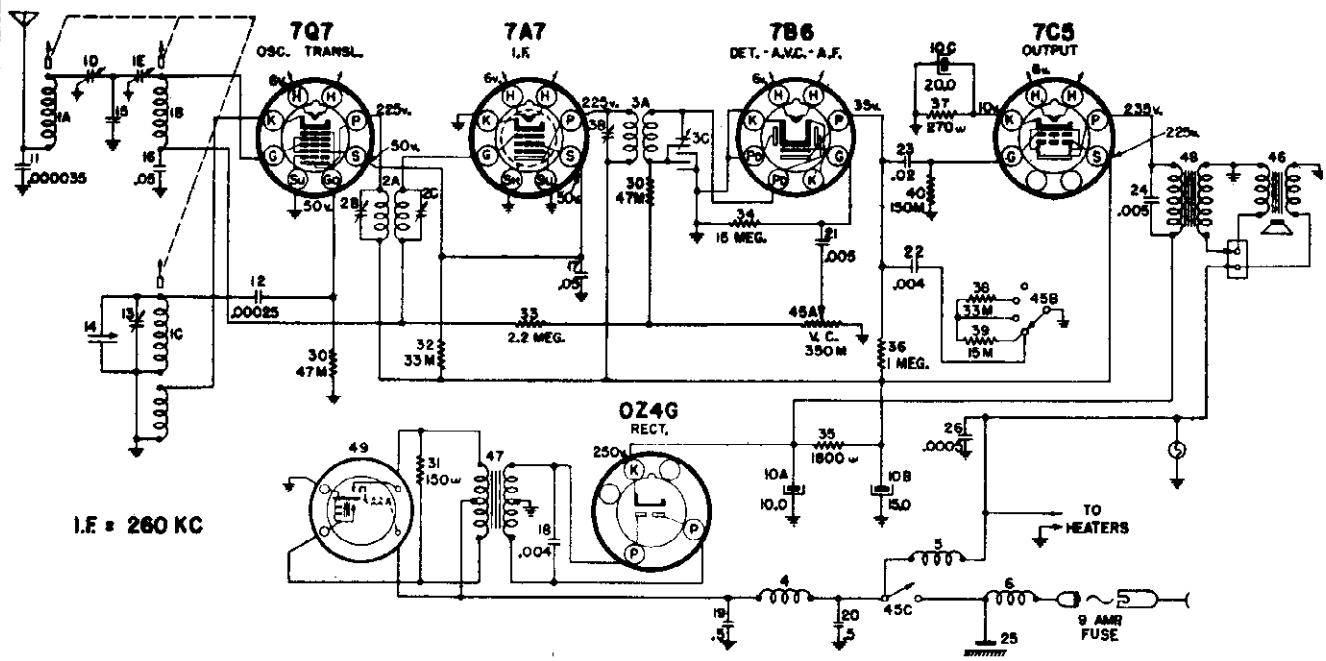
MODEL 984170, Pontiac



READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A 1000 OHMS PER VOLT D.C. VOLTMETER. "A" BATTERY - 6.0 VOLTS. CURRENT DRAIN - 6.0 AMPERES. "B" SUPPLY DRAIN - APPROX. 50 MA. ALL READINGS ±10%

Illus. No.	Service Part No.	Description
		COILS
1	1216539	Tuning Coil & Core Assembly
1A		Antenna Coil
1B		Grid Coil
1C		Oscillator Coil
1D		Antenna Trimmer
1E		Grid Coil Trimmer
2	1215916	1st I. F. Assembly
2A		I. F. Coil Assembly
2B		Primary Trimmer
2C		Secondary Trimmer
3	1215917	2nd I. F. Assembly
3A		I. F. Coil Assembly
3B		Primary Trimmer
3C		Secondary Trimmer
3D		Resistor 47,000 Ohm
4	1213663	Hash Choke
5	1214385	Filament Choke
6	1217193	Spark Choke
		CAPACITORS
10	1213868	Electrolytic
10A		10 Mfd. 350 Volt
10B		15 Mfd. 300 Volt
10C		20 Mfd. 25 Volt
11	1214949	.000035 Mfd. Moulded
12	1209055	.00025 Mfd. Moulded
13	1215925	Oscillator Trimmer
14	1216540	Compensating 265 Mmfd.
15	1212098	.004 Mfd. 800 Volt
16	7230592	.05 Mfd. 600 Volt
17	7230592	.05 Mfd. 600 Volt
18	1213854	.004 Mfd. 1500 Volt
19	7240248	.5 Mfd. 100 Volt
20	7240248	.5 Mfd. 100 Volt
21	7230912	.005 Mfd. 800 Volt
22	1212098	.004 Mfd. 800 Volt
23	1212099	.02 Mfd. 600 Volt
24	7230912	.005 Mfd. 800 Volt
25	1212278	Spark 225 Mmfd.
26	1207636	.0005 Mfd. Mica

Service Part No.	Description
	CHASSIS PARTS - MISCELLANEOUS
187189	Bulb - Pilot Light - Mazda #44
1215926	Bushing - Station Selector Shaft
1216535	Connector Assembly - Antenna
1214394	Connector Assembly - "A" Lead
1215937	Cover - Case Back
1215927	Cover - Power Supply
1216536	Dial Pointer & Slide Assembly
1216537	Dial - Window
7242463	Nut - 1/2-28 Mtg. Spacer
1863407	Pin Connector - Speaker
1214471	Pulley - Wood 17/32 OD
1214472	Pulley - Wood 7/16 OD
1216587	Push Button Assembly
1213685	Screw - Cover Retaining
1215932	Shaft Assembly - Front Drive
1215933	Shaft Assembly - Rear Drive
1215936	Socket Assembly - Pilot Light
7238455	Socket - Lock-in
1214420	Socket - Rectifier
1213684	Socket - Vibrator
1214399	Speaker Gasket - Rubber
1216038	Spring - Core Driving
1215934	Spring - Rear Drive Shaft
1214386	String & Spring Assy.-Pointer Drive
1216538	Tuner Unit - Mechanical Portion Only
	RESISTORS
1214553	47,000 Ohm 1/2 Watt
1211005	150 Ohm 1 Watt
7242447	33,000 Ohm 1 Watt
1214563	2.2 Megohm 1/2 Watt
1213143	15 Megohm 1/2 Watt
1214573	1800 Ohm 2 Watt
1209885	1 Megohm 1/2 Watt
1213846	270 Ohm 1 Watt
1213845	33,000 Ohm 1/2 Watt
1211089	15,000 Ohm 1/2 Watt
1211163	150,000 Ohm 1/2 Watt

Service Part No.	Description
	RADIO PACKAGE CONTENTS
504617	"A" Lead & Female Fuse Holder Assy.
1853686	Adaptor - Radio Distributor Suppressor
505629	Bolt - 1/4-20 x 5/8 Hex Hd. Special - Zinc (Receiver to Brace)
1849161	Capacitor Assembly - Ammeter (.5 Mfd.)
1866865	Capacitor Assembly - Generator (.5 Mfd.)
147684	Fuse - (9 Amp.) "A" Lead
509129	Insulator - Radio Distributor Suppressor
507505	Knob Assy.- Radio Tuning and Volume Control
507510	Knob - Radio Dummy
507511	Knob - Radio Tone Control
7235968	Nut - 1/2-28 Thin Hex - Zinc (Receiver to Instrument Panel)
509031	Owners Instruction & Warranty Card
508583	Plate - Radio Control Finish
144722	Screw - #7 x 3/8 Rnd. Hd. Type "A" Self Tapping - Zinc
1207821	Suppressor - Radio Distributor
504618	Tube - Fuse Insulating
121753	Washer - 1/4 External Tooth Lock
1299232	Washer - 1/4 Flat Special - Zinc
7238755	Washer - Radio Dummy Knob - Spring
505630	Washer - Radio Tone Control Knob-Felt
	MISCELLANEOUS ELECTRICAL PARTS
1216541	Control-Volume-Tone-Switch
	Volume Control 350,000 Ohm
	Tone Control Switch
	On-Off Switch
1214389	Speaker - Electro Dynamic
1214391	Transformer - Power
1215918	Transformer - Output
B638	Vibrator - Plug-in

PUSH BUTTON SET-UP

Turn counter clockwise - tune in manually - depress loosened button - turn button clockwise to tighten.

MOUNTING - All 1946 Pontiac Cars

TUNING - Manual and 5 P. B.

TUBES - 7Q7, 7A7, 7B6, 7C5, OZ4G

TUNING RANGE - 540 KC - 1610 KC

SPEAKER - 6" Electro Dynamic

CAR ANTENNA CAPACITY - 60 mmfd.

MODEL 984170, Pontiac **UNITED MOTORS SERVICE CORP.**
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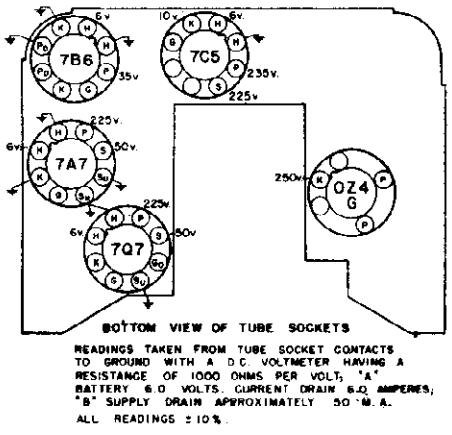
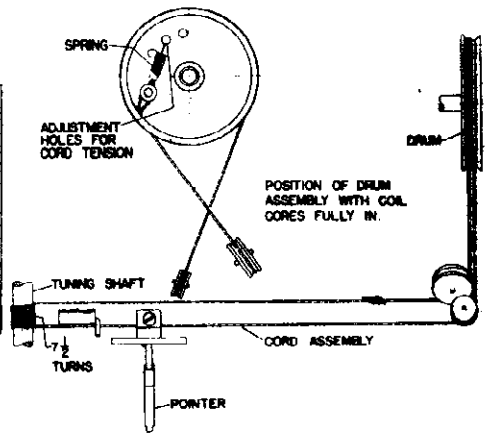
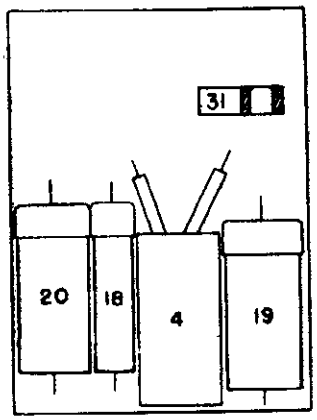


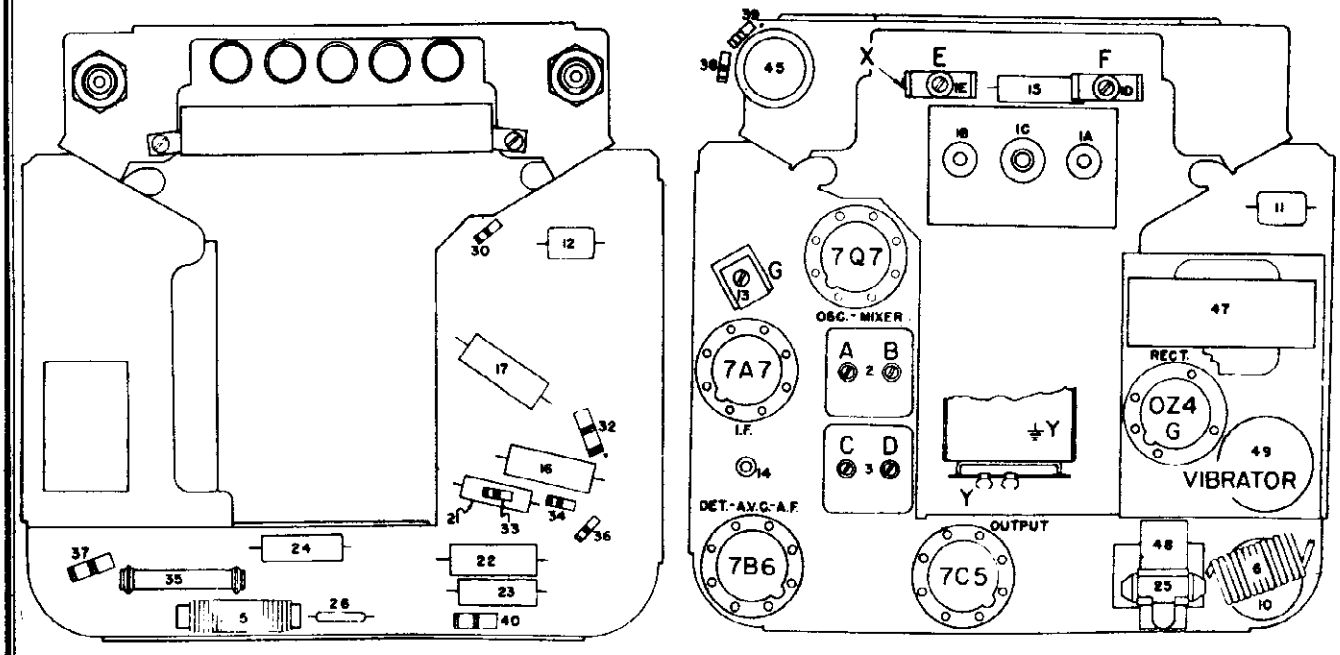
SOCKET VOLTAGES



DIAL CORD HOOKUP



POWER PACK LAYOUT



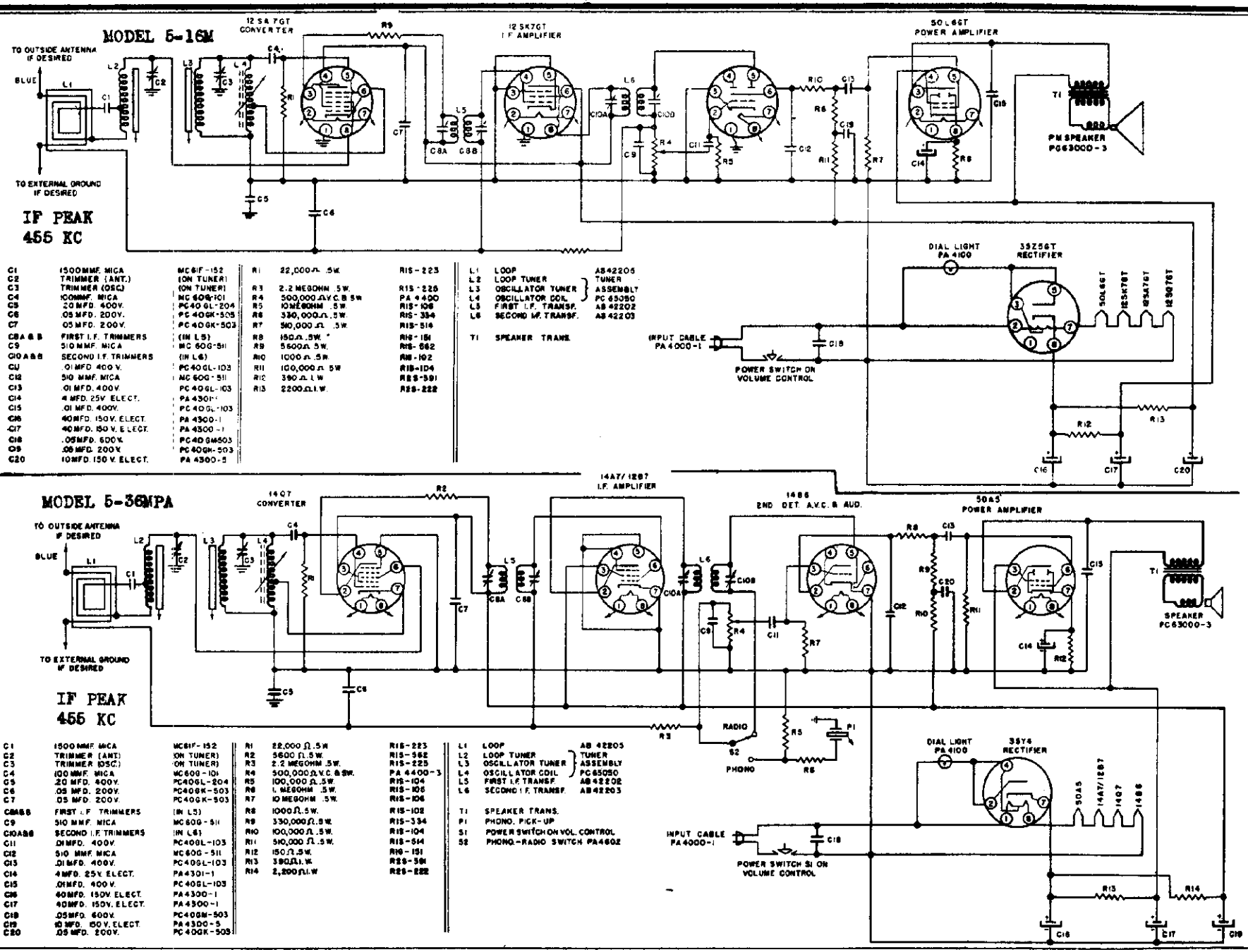
PARTS LAYOUT

ALIGNMENT PROCEDURE

Volume Control maximum.
Tone Control on high position.
Signal Generator Output minimum for satisfactory output indication.

Series Capacitor Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 mfd.	Terminal X (See Parts Layout)	260 KC	A, B, C, D
.000060 mfd.	Antenna Terminal	1610 KC	G
.000060 mfd.	Antenna Terminal	1400 KC	E, F

Low frequency alignment not required.
Adjust Trimmer F to match car antenna (1400 KC) when radio is installed.



C1	1500MMF. MICA	MC61F-152
C2	TRIMMER (ANT.)	(ON TUNER)
C3	TRIMMER (OSC.)	(ON TUNER)
C4	100MMF. MICA	MC60G-101
C5	.20 MFD. 400V.	PC40GL-204
C6	.05 MFD. 200V.	PC40GK-503
C7	.05 MFD. 200V.	PC40GK-503
C8A & B	FIRST I.F. TRIMMERS	(IN L5)
C9	510 MMF. MICA	MC 60G-511
C10A & B	SECOND I.F. TRIMMERS	(IN L6)
C11	.01 MFD. 400 V.	PC40GL-103
C12	510 MMF. MICA	MC 60G-511
C13	.01 MFD. 400V.	PC40GL-103
C14	4 MFD. 25V ELECT.	PA4301-
C15	.01 MFD. 400V.	PC40GL-103
C16	40MFD. 150V. ELECT.	PA 4300-1
C17	40 MFD. 150 V. ELECT.	PA 4300-1
C18	.05MFD. 600V.	PC40GM503
C19	.05 MFD. 200V.	PC40GK-503
C20	10MFD. 150 V. ELECT.	PA 4300-5

R1	22,000Ω .5W.	RIS-223
R3	2.2 MEGOHM .5W.	RIS-225
R4	500,000Ω V.C.B 5W	PA 4400
R5	1 MEGOHM .5W.	RIS-108
R6	330,000Ω .5W.	RIS-334
R7	560,000Ω .5W.	RIS-514
R8	150Ω .5W.	RIS-151
R9	5600Ω .5W.	RIS-562
R10	1000Ω .5W.	RIS-102
R11	100,000Ω .5W	RIS-104
R12	390Ω 1 W	RES-391
R13	2200Ω 1 W.	RES-222

L1	LOOP	AB42205
L2	LOOP TUNER	TUNER
L3	OSCILLATOR TUNER	ASSEMBLY
L4	OSCILLATOR COIL	PC 65050
L5	FIRST I.F. TRANSF.	AB 42202
L6	SECOND I.F. TRANSF.	AB 42203
T1	SPEAKER TRANS.	

C1	1500 MMF. MICA	MC61F-152
C2	TRIMMER (ANT)	(ON TUNER)
C3	TRIMMER (OSC.)	(ON TUNER)
C4	100 MMF. MICA	MC60G-101
C5	.20 MFD. 400V.	PC40GL-204
C6	.05 MFD. 200V.	PC40GK-503
C7	.05 MFD. 200V.	PC40GK-503
C8A&B	FIRST I.F. TRIMMERS	(IN L5)
C9	510 MMF. MICA	MC60G-511
C10A&B	SECOND I.F. TRIMMERS	(IN L6)
C11	.01MFD. 400V.	PC40GL-103
C12	510 MMF. MICA	MC60G-511
C13	.01MFD. 400V.	PC40GL-103
C14	4MFD. 25V. ELECT.	PA4301-1
C15	.01MFD. 400 V.	PC40GL-103
C16	40MFD. 150V. ELECT.	PA4300-1
C17	40MFD. 150V. ELECT.	PA4300-1
C18	.05MFD. 600V.	PC40GM-503
C19	10 MFD. 150 V. ELECT.	PA4300-5
C20	.05 MFD. 200V.	PC40GK-503

R1	22,000 Ω .5 W	RIS-223
R2	5600 Ω .5 W.	RIS-562
R3	2.2 MEGOHM .5W.	RIS-225
R4	500,000Ω V.C. & SW.	PA 4400-3
R5	100,000 Ω .5W.	RIS-104
R6	1 MEGOHM .5W.	RIS-108
R7	10 MEGOHM .5W.	RIS-106
R8	1000 Ω .5 W.	RIS-102
R9	330,000 Ω .5 W.	RIS-334
R10	100,000 Ω .5 W.	RIS-104
R11	510,000 Ω .5 W.	RIS-514
R12	150 Ω .5 W.	RIS-151
R13	390 Ω 1 W.	RES-391
R14	2,200 Ω 1 W	RES-222

L1	LOOP	AB 42205
L2	LOOP TUNER	TUNER
L3	OSCILLATOR TUNER	ASSEMBLY
L4	OSCILLATOR COIL	PC 65050
L5	FIRST I.F. TRANSF.	AB 42202
L6	SECOND I.F. TRANSF.	AB 42203
T1	SPEAKER TRANS.	
P1	PHONO. PICK-UP	
S1	POWER SWITCH ON VOL. CONTROL	
S2	PHONO.-RADIO SWITCH PA 4602	

VOLTAGE CHART MODEL 5-36MPA

LINE VOLTAGE: 117 VOLTS AC — VOLUME CONTROL ON FULL WITH NO SIGNAL

TUBE	FUNCTION	Voltage of Each Socket Prong to Switch on Volume Control							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
14Q7	Converter	24*	67	85	—5.5	0	—.4	0	13*
14A7/12B7	I. F. Amp.	37*	84	84	0	0	—.5	0	24*
14B6	2nd Det. - AVC - AF	0	55	—.5	0	—.5	—.6	0	13*
50A5	Power Amp.	37*	76	83	—	—	0	5.6	84*
35Y4	Rectifier	117*	112*	—	112*	—	—	114.	84*

Voltage readings are for schematic diagram shown on back of sheet. Allow 15%+ or — on all measurements. Measurements were made with Simpson Model 260 Meter.
*AC volts.

VOLTAGE CHART MODEL 5-16M

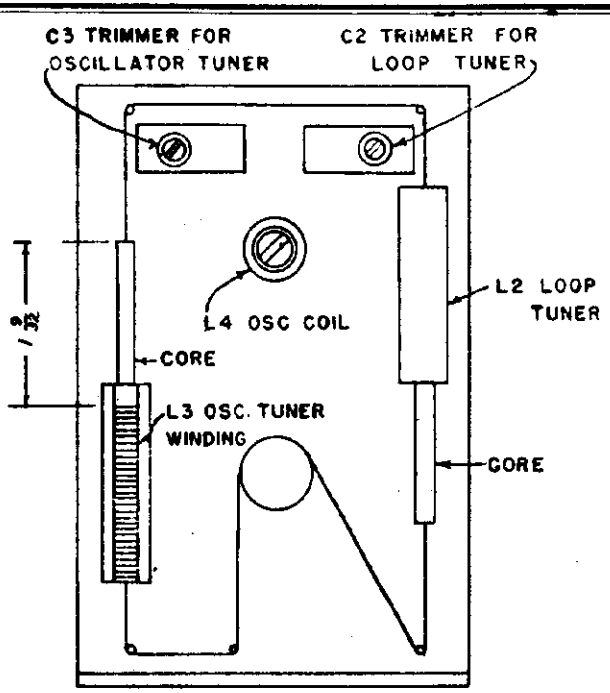
LINE VOLTAGE: 117 VOLTS AC — VOLUME CONTROL ON FULL WITH NO SIGNAL

TUBE	FUNCTION	Voltage of Each Socket Prong to Switch on Volume Control							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
12SA7GT	Converter	0	24*	65	72	—6	0	12*	—.4
12SK7GT	I. F. Amp.	0	36*	0	—.4	0	72	24*	72
12SQ7GT	2nd Det. - AVC - AF	0	—.4	0	0	—.25	49	12*	0
50L6GT	Power Amp.	0	36*	92	99	0	—	86*	6.5
35Z5GT	Rectifier	0	117*	112*	—	112*	—	86	115

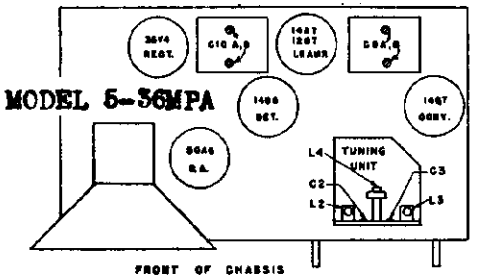
Voltage readings are for schematic diagram shown on back of sheet. Allow 15%+ or — on all measurements. Measurements were made with Simpson Model 230 Meter.
*AC volts.

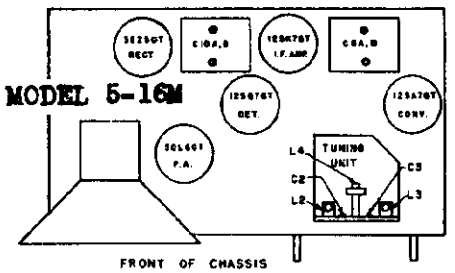
ALIGNMENT CHART FOR MODEL 5-16M 5-36MPA

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNER SETTING	TRIMMER	REMARKS
1	I.F.	Converter Pin No. 8	.01 mfd.	455 KC	High Freq. End	C10 A&B	2nd I.F.
						C 8 A&B	1st I.F.
2	Osc. Tuner Core	When tuner is against stop at high frequency end, the end of core should be 1-9/32" away from end of winding L3, oscillator tuner					
3	Pointer	Set pointer to coincide with the first horizontal line below 160 on dial					
4	Trimmers	Blue Ant. Lead	200 mmf.	1400 KC	1400 KC	C3 Osc. Tuner Trim.	Peak at max.
						C2 Loop Tuner Trim.	Peak at max.
5	Oscillator	Blue Ant. Lead	200 mmf.	600 KC	Rock Tuner Control	Adjust Iron Core in L4 Osc. Coil	Use short non-metallic screw driver to fit slot of core from back of tuner
6	Repeat operations 4 and 5						
7	Check operations 1 to 6 inclusive						



BACK VIEW OF TUNING UNIT
MODEL 5-16M, 5-36MPA





VIEWTONE TELEPHONE RECEIVER

ADVENTURER - CONSOLE WITH RADIO AND TELEVISION
FUTURA - TABLE MODEL

GENERAL DESCRIPTION

THESE MODELS CONSIST OF A 19-TUBE, DIRECT VIEWING TELEVISING RECEIVER. FEATURES OF THE TELEVISION RECEIVER INCLUDE:

SEVEN INCH CATHODE RAY TUBE, SINGLE-STATION, SELECTOR SWITCH WITH FINE TUNING CONTROL; DOUBLE SAFETY PROTECTION WHICH INCLUDES FUSE AND INTERLOCK SWITCH; SAFETY PLEXITE VIEWING WINDOW AND AUTOMATIC GAIN CONTROL.

OPERATION OF THE VIEWTONE TELEVISION RECEIVER

ON THE FRONT OF THE CHASSIS THERE ARE FOUR CONTROLS:

1. VOLUME, OFF-ON.
2. STATION SELECTOR AND FINE TUNING.
3. CONTRAST
4. INTENSITY

THE POWER-VOLUME CONTROL TURNS ON THE POWER FOR THE COMPLETE SET AND ALSO CONTROLS THE VOLUME OF THE SOUND ACCOMPANYING THE PICTURE

THE STATION SELECTOR AND FINE TUNING IS A COAXIAL DUAL CONTROL WHOSE OUTER KNOB SELECTS THE CHANNEL OF THE STATION WHICH IT IS DESIRED TO RECEIVE, THAT IS IN NEW YORK:

CHANNEL	FREQUENCY	STATION
2	54-60	WCBS - TV (C.B.S.)
4	66-72	WNBT (N.B.C.)
5	76-82	WABD (Dumont)

SET THE LARGE KNOB TO THE CORRESPONDING NUMERALS ON THE FRONT OF THE CABINET. THE INNER SECTION OF THIS KNOB IS THEN USED FOR FINE TUNING, AND MAY ELIMINATE RIPPLES AND DISTORTION FROM THE PICTURE. BY TURNING THIS KNOB, BOTH PICTURE AND SOUND ARE TUNED IN SIMULTANEOUSLY.

THE CONTRAST CONTROL VARIES THE BLACK AND WHITE TONES OF THE PICTURE BEING RECEIVED. TURNING THIS CONTROL CLOCKWISE INCREASES THE CONTRAST FROM GRAYS, TO BLACK AND WHITE.

THE INTENSITY CONTROL SHOULD BE TURNED COMPLETELY COUNTER-CLOCKWISE BEFORE TURNING THE SET ON. THIS WILL REDUCE THE ILLUMINATION OF THE INTENSE SPOT THAT APPEARS ON THE CATHODE RAY TUBE BEFORE THE SWEEP CIRCUITS START FUNCTIONING. BY TURNING THE CONTROL CLOCKWISE THE AVERAGE ILLUMINATION, OR BRIGHTNESS OF THE PICTURE IS INCREASED.

ON THE REAR OF THE CHASSIS ARE SEVEN CONTROLS, WHICH ONCE SET, NEED ONLY OCCASIONAL ADJUSTMENT.

THE HORIZONTAL SYNC. CONTROLS THE PICTURE STABILITY. IT SHOULD BE ADJUSTED TO THE ONE POINT WHERE THE PICTURE "LOCKS IN" HORIZONTALLY.

THE HORIZONTAL AMPLITUDE CONTROLS THE SIZE OF THE PICTURE ONCE IT HAS BEEN LOCKED IN.

THE VERTICAL SYNC. SHOULD BE ADJUSTED TO THE POINT WHERE ONLY ONE PICTURE LOCKS IN VERTICALLY.

THE VERTICAL AMPLITUDE CONTROLS THE VERTICAL SIZE OF THE PICTURE.

THESE CONTROLS WHEN ONCE SET REQUIRE ONLY OCCASIONAL ADJUSTMENT, THIS DUE TO THE AGING OR CHANGING OF TUBES.

THE FOCUS CONTROL SHOULD BE ADJUSTED TO THE POINT OF THE GREATEST SHARPNESS OF THE PICTURE

THE HORIZONTAL CENTERING CONTROL ENABLES THE COMPLETE PICTURE TO BE MOVED HORIZONTALLY IN ORDER TO CENTER IT ON THE TUBE.

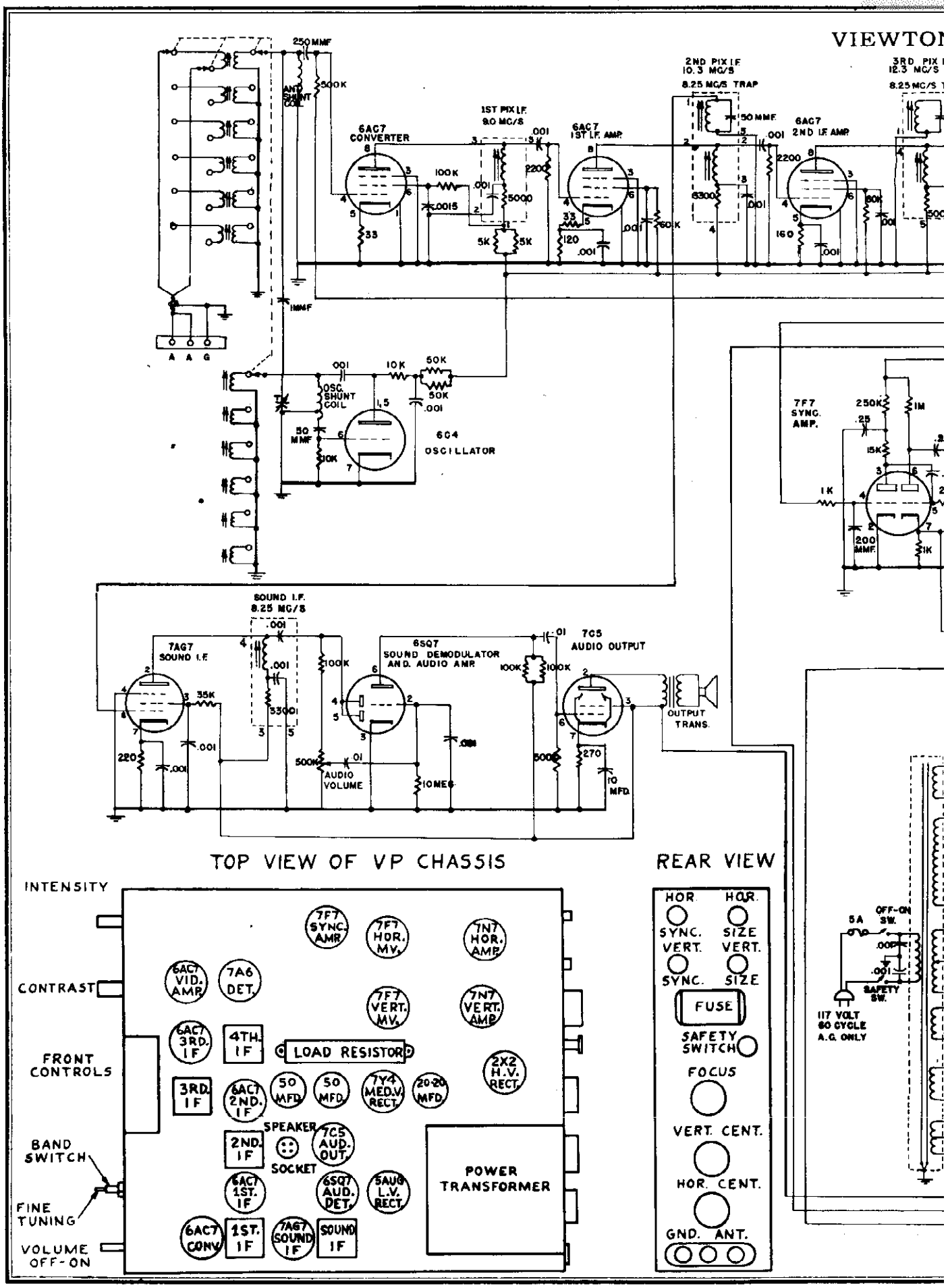
THE VERTICAL CENTERING CONTROL ENABLES THE COMPLETE PICTURE TO BE MOVED VERTICALLY IN ORDER TO CENTER IT ON THE TUBE.

IMPORTANT SAFETY PRECAUTIONS

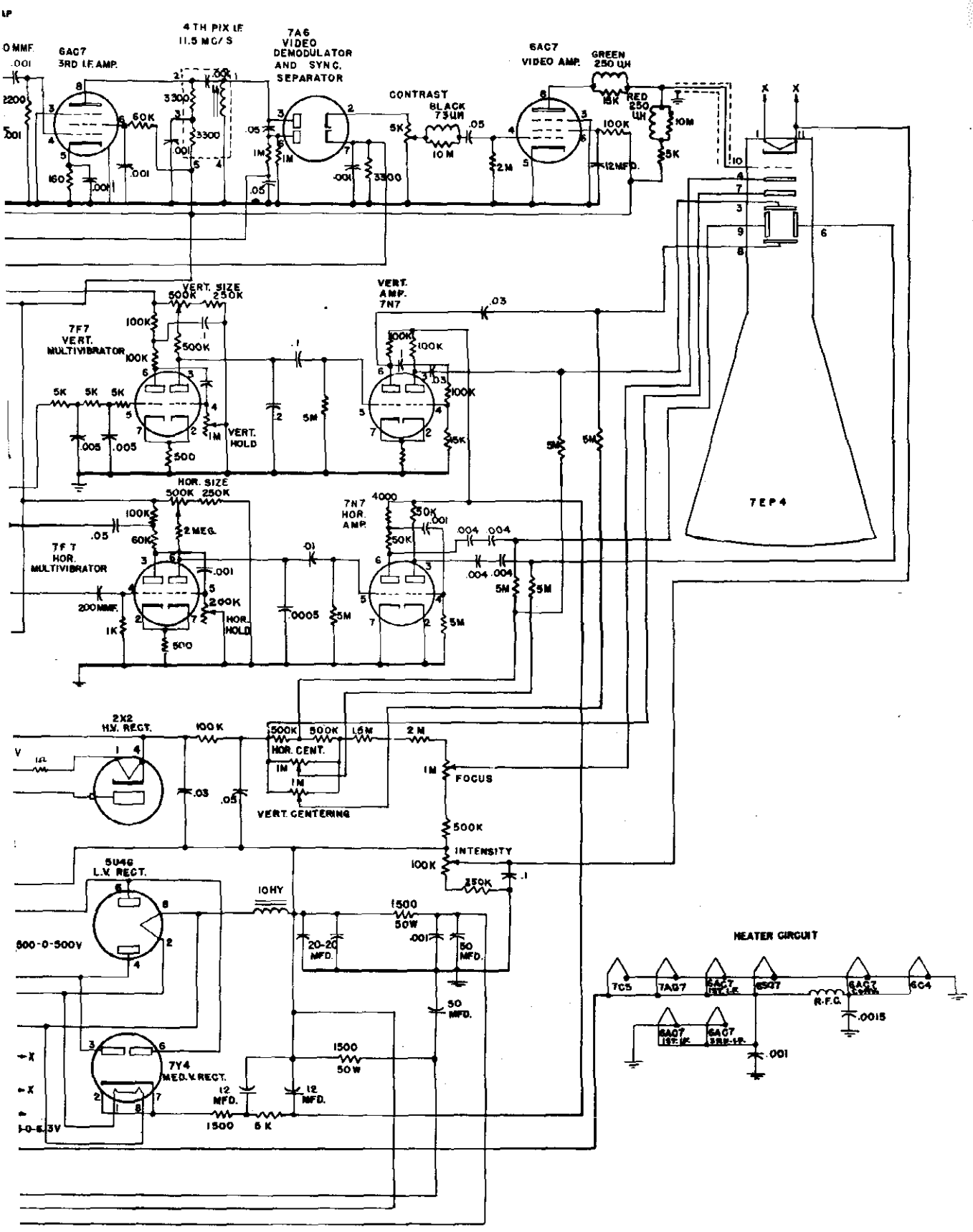
USE EXTREME CAUTION AT ALL TIMES WHEN SERVICING RECEIVER.

THIS RECEIVER CONTAINS HIGH VOLTAGE (3,000 volts). AN INTERLOCK SWITCH IS PROVIDED AT THE REAR OF THE CHASSIS FOR THE PROTECTION OF THE INDIVIDUAL. IT IS RECOMMENDED THAT ONLY QUALIFIED PERSONNEL BE ALLOWED TO SERVICE THIS RECEIVER.

THE MOST DANGEROUS PORTION OF THE H.V. SUPPLY IS THE PLATE LEAD OF THE 2X2/879 RECTIFIER TUBE.


VIEWTO
250 MMF
ANT. SHUNT COIL
500K
6AC7 CONVERTER
1ST PIX I.F. 9.0 MC/S
6AC7 1ST I.F. AMP.
2ND PIX I.F. 10.3 MC/S
8.25 MC/S TRAP
6AC7 2ND I.F. AMP
3RD PIX I.F. 12.3 MC/S
8.25 MC/S
A A G
OSC. SHUNT COIL
50 MMF
6C4 OSCILLATOR
7F7 SYNC. AMP.
SOUND I.F. 8.25 MC/S
7AG7 SOUND I.F.
6SQ7 SOUND DEMODULATOR AND AUDIO AMP
7C5 AUDIO OUTPUT
OUTPUT TRANS.
AUDIO VOLUME
TOP VIEW OF VP CHASSIS
REAR VIEW
INTENSITY
CONTRAST
FRONT CONTROLS
BAND SWITCH
FINE TUNING
VOLUME OFF-ON
7F7 SYNC. AMP
7F7 HOR. MV.
7N7 HOR. AMP.
6AC7 VID. AMP.
7A6 DET.
7F7 VERT. MV.
7N7 VERT. AMP.
6AC7 3RD. I.F.
4TH. I.F.
LOAD RESISTOR
3RD. I.F.
6AC7 2ND. I.F.
50 MFD.
50 MFD.
7Y4 MED.V. RECT.
20-20 MFD.
2X2 H.V. RECT.
SPEAKER
SOCKET
2ND. I.F.
7C5 AUD. OUT.
6AC7 1ST. I.F.
6SQ7 AUD. DET.
5AUG L.V. RECT.
POWER TRANSFORMER
6AC7 CONV.
1ST. I.F.
7AG7 SOUND I.F.
SOUND I.F.
HOR. SYNC.
HOR. SIZE
VERT. SYNC.
VERT. SIZE
FUSE
SAFETY SWITCH
FOCUS
VERT. CENT.
HOR. CENT.
GND. ANT.
5A
OFF-ON SW.
SAFETY SW.
117 VOLT 60 CYCLE A.C. ONLY

E COMPANY


6AC7 3RD I.F. AMP.
4TH PIX I.F. 11.5 MC/S
7A6 VIDEO DEMODULATOR AND SYNC. SEPARATOR
CONTRAST
6AC7 VIDEO AMP.
GREEN 250 UH
RED 250 UH
VERT. SIZE
7F7 VERT. MULTIVIBRATOR
VERT. HOLD
VERT. AMP. 7N7
HOR. SIZE
7F7 HOR. MULTIVIBRATOR
HOR. HOLD
7N7 HOR. AMP.
7EP4
2X2 H.V. RECT.
HOR. CENT.
VERT. CENTERING
FOCUS
INTENSITY
5U4G L.V. RECT.
7Y4 MED. V. RECT.
HEATER CIRCUIT
7C5
7AQ7
6SQ7
6AC7
6C4
R.F.C.

ANTENNA INSTALLATION

THE IMPORTANCE OF A GOOD ANTENNA INSTALLATION CANNOT BE OVEREMPHASIZED. A PROPERLY INSTALLED ANTENNA IS THE DIFFERENCE BETWEEN GOOD OR POOR RECEPTION. AN ANTENNA SHOULD NOT BE INSTALLED PERMANENTLY ON AN APARTMENT OR RESIDENCE ROOF UNTIL THE QUALITY OF PICTURE RECEPTION IS AT ITS BEST. ENOUGH SLACK SHOULD BE ALLOWED IN THE LEAD IN TO FACILITATE MOVEMENT OF THE ANTENNA. A SHIFT OF ONLY A FEW FEET IN ANTENNA POSITION MAY RESULT IN AN ENORMOUS DIFFERENCE IN PICTURE RECEPTION. THE ANTENNA SHOULD BE POSITIONED BROADSIDE TOWARD THE TRANSMITTER. IF A RECEPTOR AND REFLECTOR ARRANGEMENT IS USED, THE RECEPTOR IS PLACED IN FRONT OF THE REFLECTOR BROADSIDE TOWARD THE STATION.

FOR BEST POSSIBLE RESULTS THE ANTENNA SHOULD BE REMOVED AS FAR AS POSSIBLE FROM HIGHWAYS, HOSPITALS, AND OTHER SOURCES OF INTERFERENCE. AUTOMOBILE IGNITION NOISES AND DIATHERMY MACHINES MAY CAUSE "HERRINGBONES" WHICH DISTORT THE PICTURE BEING RECEIVED.

R. F. ALIGNMENT PROCEDURE

1. REPLACE 6C4 OSCILLATOR TUBE. APPLY OUTPUT OF SIG. GEN. TO ANTENNA TERMINAL OF CHASSIS. CONNECT OUTPUT INDICATING DEVICE TO VIDEO LEAD OF C.R.T. SET OSCILLATOR CONDENSER HALF WAY OPEN.

2. ADJUST OSC. COIL SLUGS SO THAT SOUND OUTPUT IS HEARD AS THE SIG. GEN. IS SET ON THE SOUND CARRIER FREQUENCY OF THE TELEVISION CHANNEL.

CHANNEL	SOUND CARRIER
1	43.75 Mc
2	59.75 Mc
3	65.75 Mc
4	71.75 Mc
5	81.75 Mc
6	87.75 Mc

3. ADJUST ANTENNA COIL SLUGS SO THAT THE OUTPUT INDICATING DEVICE INDICATES MAXIMUM AS THE SIG. GEN. IS SET ON THE FREQUENCIES LISTED BELOW. THESE FREQUENCIES ARE BETWEEN THE SOUND AND THE PICTURE CARRIERS TO GIVE RESPONSE TO BOTH.

CHANNEL	SET ANT. COIL TO
1	47 Mc
2	58 Mc
3	63 Mc
4	70 Mc
5	78 Mc
6	85 Mc

I. F. ALIGNMENT PROCEDURE

1. REQUIRED: SIGNAL GENERATOR, 8-15 MC
   OUTPUT INDICATOR (OSCILLOSCOPE, V.T.V.M.)
   REMOVE OSCILLATOR TUBE
   TYPE VP100 CHASSIS DISTINGUISHED BY BLACK SERIAL NO.
   TYPE VP100A " " " RED " "

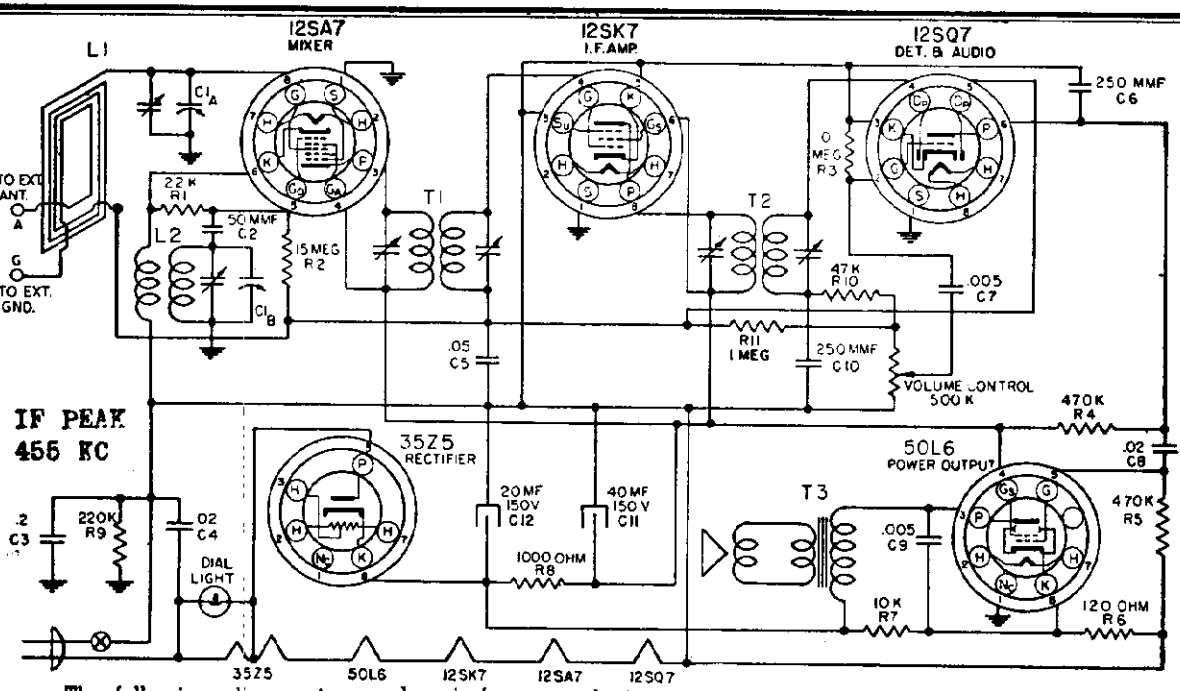
2. ALIGNMENT OF 4TH I.F. TRANSFORMER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OF THIRD I.F. TUBE.
   TUNE IN SLUG OF TRANS. FOR MAXIMUM DEFLECTION IN INDICATOR CONNECTED TO C.R.T. VIDEO LEAD.
   FREQUENCY: VP100 12.8 Mc
   VP100A 11.5 Mc

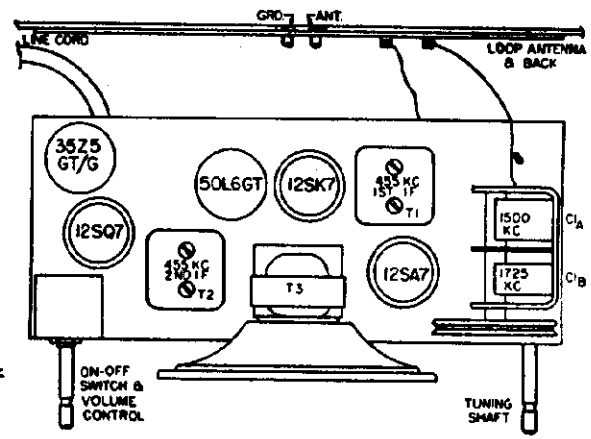
3. ALIGNMENT OF 3RD I.F. TRANSFORMER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OF SECOND I.F. TUBE.
   TUNE BOTTOM SLUG OF I.F. TRANS. FOR MAXIMUM DEFLECTION IN OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAD.
   FREQUENCY: VP100 12.0 Mc
   VP100A 12.0 Mc
   TUNE TOP IRON SLUG OF IF TRANS. FOR MINIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAST
   TRAP FREQUENCY: VP100 8.25 Mc
   VP100A 10.3 Mc

4. ALIGNMENT OF 2ND I.F. TRANSFORMER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OF 1ST IF AMPLIFIER TUBE. TUNE BOTTOM SLUG OF IF FOR MAXIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO VIDEO LEAD OF C.R.T.
   FREQUENCY: VP100 11.5 Mc
   VP100A 10.3 Mc
   TUNE TOP SLUG OF IF TRANS. FOR MINIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAD. THIS WILL CORRESPOND TO MAXIMUM AUDIO OUTPUT.
   TRAP FREQUENCY: VP100 8.25 Mc
   VP100A 8.25 Mc

5. ALIGNMENT OF 1ST IF TRANSOFMRER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OR CATHODE OF CONVERTER TUBE. TUNE BOTTOM IRON SLUG FOR MAXIMUM DEFLECTION IN OUTPUT.
   FREQUENCY: VP100 10.3 Mc
   VP100A 9.0 Mc
   IN THE MODEL VP100 THERE IS A 14.25 Mc TRAP WHICH IS TUNED FOR MINIMUM DEFLECTION.

6. ALIGNMENT OF SOUND IF TRANSFRMER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OR CATHODE OF CONVERTER TUBE. TUNE TOP SLUG FOR MAXIMUM SOUND OUTPUT. MAXIMUM SOUND CAN BE DETERMINED BY EAR OR BY APPLYING V.T.V.M. OR OSCILLOSC. TO GRID OF 7C5 AUDIO OUTPUT.
   FREQUENCY: VP100 8.25 Mc
   VP100A 8.25 Mc





The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

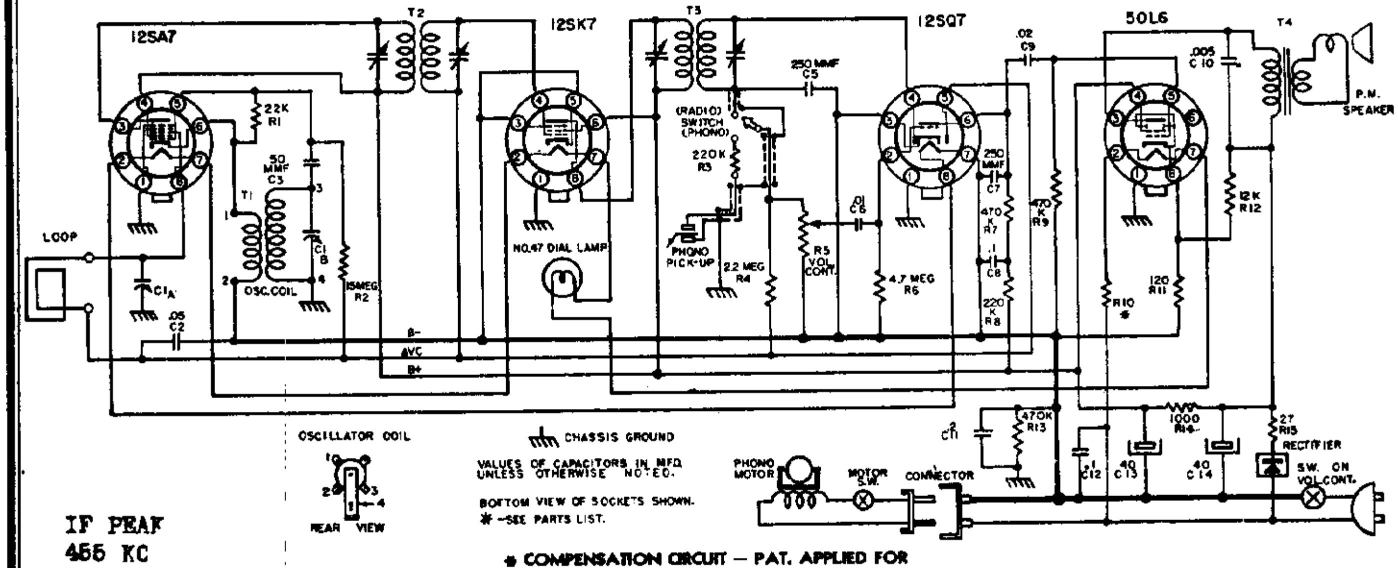
CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	1725 KC	.00025	** Ant. terminal on loop	C1B	Oscillator
Tune in signal from generator	1500 KC	.00025	** Ant. terminal on loop	C1A	Antenna

* Connect ground lead of signal generator to chassis.
** Connect ground lead of signal generator to terminal marked "G" on the back of the loop.

Code	Part No.	DESCRIPTION
C1A, C1B	B19-180	Variable condenser
C2	A15-175	50 mmfd. mica condenser
C3	A16-154	.2 mfd. 400 volt tubular condenser
C4	A16-151	.02 mfd. 600 volt tubular condenser
C5	A16-152	.05 mfd. 200 volt tubular condenser
C6, C10	A15-176	250 mmfd. mica condenser
C7, C9	A16-153	.005 mfd. 600 volt tubular condenser
C8	A16-150	.02 mfd. 400 volt tubular condenser
C11	A18-280	40 mfd. 150 volt electrolytic condenser
C12	A18-272	20 mfd. 150 volt electrolytic condenser
R1	A60-659	22K ohm 1/3 watt resistor
R2	A60-864	15 megohm 1/3 watt resistor
R3	A60-663	10 megohm 1/3 watt resistor
R4, R5	A60-682	470K ohm 1/3 watt resistor
R6	A60-658	120 ohm 1/3 watt resistor
R7	A60-698	10K ohm 1 watt resistor
R8	A60-198	1000 ohm 1/2 watt resistor
R9	A60-660	220K ohm 1/3 watt resistor
R10	A60-685	47K ohm 1/3 watt resistor
R11	A60-868	1 megohm 1/3 watt resistor
L1	B82-40	Antenna, loop
L2	A10-411	Oscillator coil
T1	B10-453	1st I.F. transformer
T2	B10-454	2nd I.F. transformer
T3		Output transformer (part of speaker)
	A71-22	Cover, for volume control
	A75-52	Dial drive shaft
	A24-164	Volume control and switch
	B79-340	5" P.M. speaker with output transformer
	B79-343	Alternate speaker
	B79-344	Alternate speaker
	C83-332	Cabinet back (mahogany)
	A83-335	Cabinet back (ivory)
	D42-375	Cabinet, molded bakelite (mahogany)
	A42-397	Cabinet, molded bakelite (ivory)
	B67-486	Dial scale
	A52-181	Knob (mahogany)
	A52-189	Knob (ivory)
	A58-41	Dial pointer
	B83-257	Dial diffusing plate

MODEL 11305 WARWICK MFG. CO.



IF PEAK
455 KC

Code	Part No.	DESCRIPTION
C1A. C1B	B15-189	Variable Condenser
C2	A16-152	.05 MFD. 200 volt Condenser
C3	A15-175	50 MMFD. Mica Condenser
C9	A16-150	.02 MFD. 400 volt Condenser
C5. C7	A15-176	250 MMFD. Mica Condenser
C6	A16-156	.01 MFD. 400 volt Condenser
C8	A16-157	.1 MFD. 200 volt Condenser
C10	A16-153	.005 MFD. 600 volt Condenser
C11	A16-154	.2 MFD. 400 volt Condenser
C12	A16-160	.1 MFD. 400 volt Condenser
C13. C14	A18-280	40 MFD. 150 volt Electrolytic Condenser
R1	A60-659	22K Ohm ½ watt 20% Resistor
R2	A60-664	15 Megohm ½ watt 20% Resistor
R3. R8	A60-657	220K Ohm ½ watt 20% Resistor
R4	A60-684	2.2 Megohm ½ watt 10% Resistor
R5	A24-164	500K Ohm Volume Control with Switch
R6	A60-669	4.7 Megohm ½ watt 20% Resistor
R7. R9. R13	A60-662	470K Ohm ½ watt 20% Resistor
R10	A60-719	Special Compensating Resistor, order only from the manufacturer
R11	A60-702	120 Ohm ½ watt 10% Resistor
R12	A60-720	12K Ohm 2 watt 10% Resistor
R14	A60-699	1000 Ohm 2 watt 10% Resistor
R15	A60-721	27 Ohm 1 watt 10% Resistor
T1	B10-411	Oscillator Coil
T2	A10-468	1st I. F. Transformer
T3	B10-454	2nd I. F. Transformer
T4	B80-330	Output Transformer
	A52-199	Knob, Volume
	A52-200	Knob, Tuning
	A52-201	Knob, Phono-Radio
	A69-172	Switch, Phono-Radio
	A38-270	Drum for Variable Condenser
	B76-352	5" P. M. Speaker
	A71-32	Cover for Volume Control
	A83-201	Selenium Rectifier
	A75-52	Tuning Shaft
	A63-303	Connector
	D42-407	Cabinet, Wood
	C71-37	Cover for Dial Plate
	B67-408	Dial Scale
	A58-59	Dial Pointer
	B63-406	Dial Scale Retainer
	C83-410	Cabinet Back
	C82-43	Loop Antenna
	A83-273	Dial Diffusing Plate

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

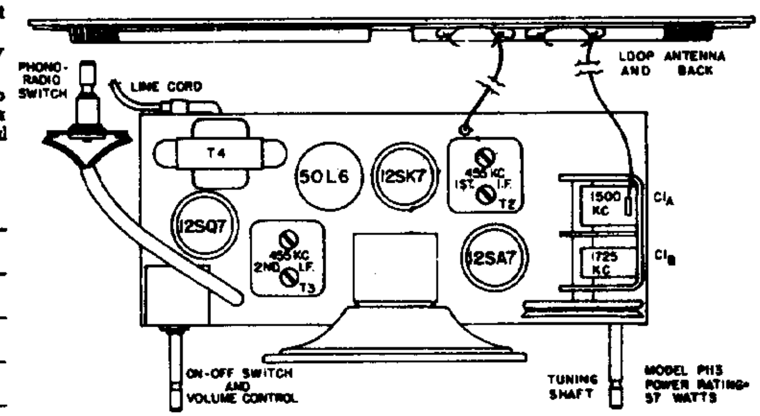
Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T2	Input I.F.
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T3	Output I.F.
Fully open	1729 KC	.00025	* 12SA7 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1500 KC	.00025	**Loosely Coupled to Loop	C1A	Antenna

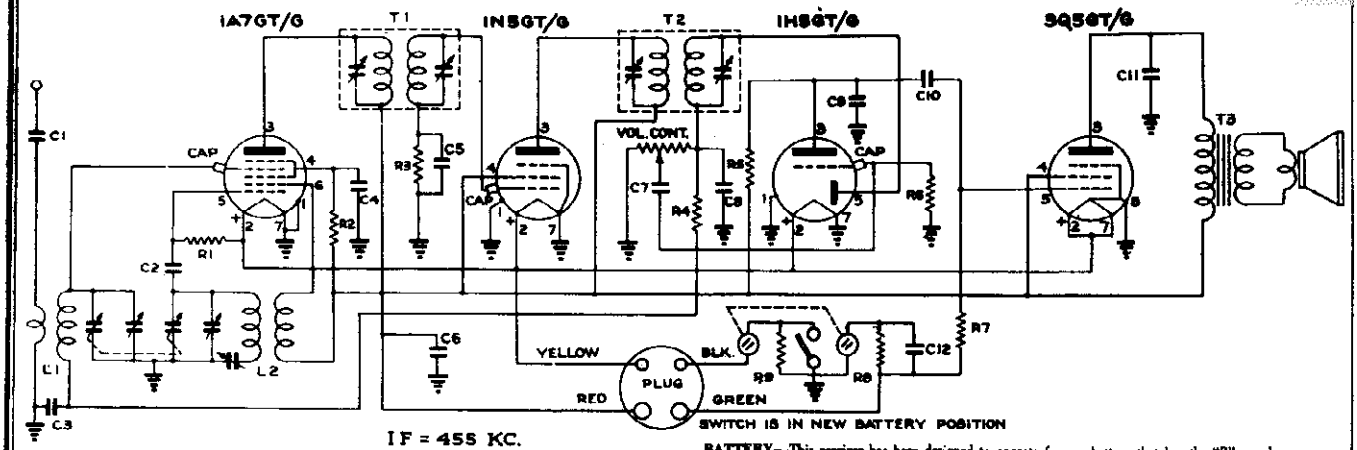
*Connect ground lead of signal generator to Common "B."

**Do not connect ground lead of signal generator.



MODEL 4782

WATTERSON RADIO MFG. CORP.



SWITCH IS IN NEW BATTERY POSITION

IF = 455 KC.

CODE	PART NO.	DESCRIPTION
C1	6W4	.00005 MICA CONDENSER
C2	6W3	.0005 MICA CONDENSER
C3	5W13	.1 MFD. 400 V. TUBULAR
C4	5W13	.1 MFD. 400 V. TUBULAR
C5	5W7	.02 MFD. 400 V. TUBULAR
C6	5W14	.25 MFD. 400 V. TUBULAR
C7	5W2	.005 MFD. 400 V. TUBULAR
C8	6W2	.00025 MFD. MICA CONDENSER
C9	6W1	.0001 MFD. MICA CONDENSER
C10	5W6	.01 MFD. 400 V. TUBULAR
C11	5W18	.002 MFD. 600 V. TUBULAR
C12	19W11	10 MFD. 50 V. TUBULAR
R1	9W47	220,000 Ω - 1/2 WATT
R2	9W6	22,000 Ω - 1/2 WATT
R3	9W55	1 MEGOHM - 1/4 WATT
R4	9W55	1 MEGOHM - 1/4 WATT
R5	9W55	1 MEGOHM - 1/4 WATT
R6	9W69	10 MEGOHM - 1/2 WATT
R7	9W56	2.2 MEGOHM 1/2 WATT
R8	9W32	360 Ω - 1/4 WATT
R9	9W12	75 Ω 1/4 WATT
T1	3W24	1ST. I.F. TRANSFORMER
T2	3W25	2ND. I.F. TRANSFORMER
T3	12W2	OUTPUT TRANSFORMER
L1	3W46	ANTENNA COIL
L2	3W45	OSCILLATOR COIL
SP.	22W10B	P.M. SPEAKER
VOL.	15W2	VOLUME CONTROL - 500M Ω

BATTERY—This receiver has been designed to operate from a battery that has the "B" supply (90 volts) and the "A" supply (1½ volts) incorporated into a single pack. The batteries recommended to be used with this set are the following:

1. Ray-O-Vac—their No. "AB" 82 Power Pack.
2. Eveready—their No. 748 Power Pack.
3. Burgess—their No. 17G-D60 Power Pack.
4. General—their No. 60DL11L Power Pack.

Either of the above battery packs may be used in conjunction with this receiver, and is to be placed inside and to the rear of the cabinet and the 4 prong plug provided plugged into the socket of the battery pack.

ANTENNA—To obtain the excellent performance of which your Watterson Receiver is capable, a good outside antenna must be provided. For best results the antenna should be approximately 75 to 100 feet long, including the lead in, and should be connected to the colored wire coming out of the back of the cabinet. It should be erected as high as possible and as far from surrounding objects as practical.

GROUND—A ground connection must be used. A satisfactory ground can be made by connecting the black wire to a nearby cold water pipe by means of an approved clamp, or to a pipe or ground rod driven into the ground.

BATTERY AND TUBE SAVING SWITCH—Located on the back of the chassis is a slide type witch identified by the instruction tag "New Battery" and "Old Battery". When using an unused or new battery, the switch must be in the "New Battery" position. After approximately 100 hours of actual use of battery, this switch may be moved to the "Old Battery" position and increased sensitivity and performance obtained.

OPERATION—There are two adjustable controls on the front panel of the receiver. The one on the left is the volume control. Turning the volume control knob in a clockwise direction turns the receiver on, and is also a means of adjusting the volume output of the receiver.

CAUTION—When not using the receiver, make certain that it is shut off by turning the volume control knob completely to the left until the on-off switch has been thrown. Failure to do this will cause the battery pack to run down.

The knob on the right is the tuning knob and is used to tune any desired station within the broadcast band.

I. F. Alignment

The I. F. frequency of this receiver is 455 K. C. For realignment, use the following procedure:

Open tuning condenser fully, and set volume control to maximum volume.

Couple an accurately calibrated signal generator to the grid of the 1A7 tube with a .1 mfd. condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 455 K. C. Attenuate the signal generator so that the signal is just audible in the speaker. If possible, an output meter should be used.

Adjust the 2nd I. F. transformer first. Each screw should be adjusted for maximum output. After the 2nd I. F. has been adjusted, the 1st I. F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck both transformers, making sure maximum output has been attained from both I. F.'s.

R. F. Alignment

To align the R. F. section of the receiver, proceed as follows:

1. Connect the "high" side of the signal generator to the antenna lead and the ground lead to radio chassis.

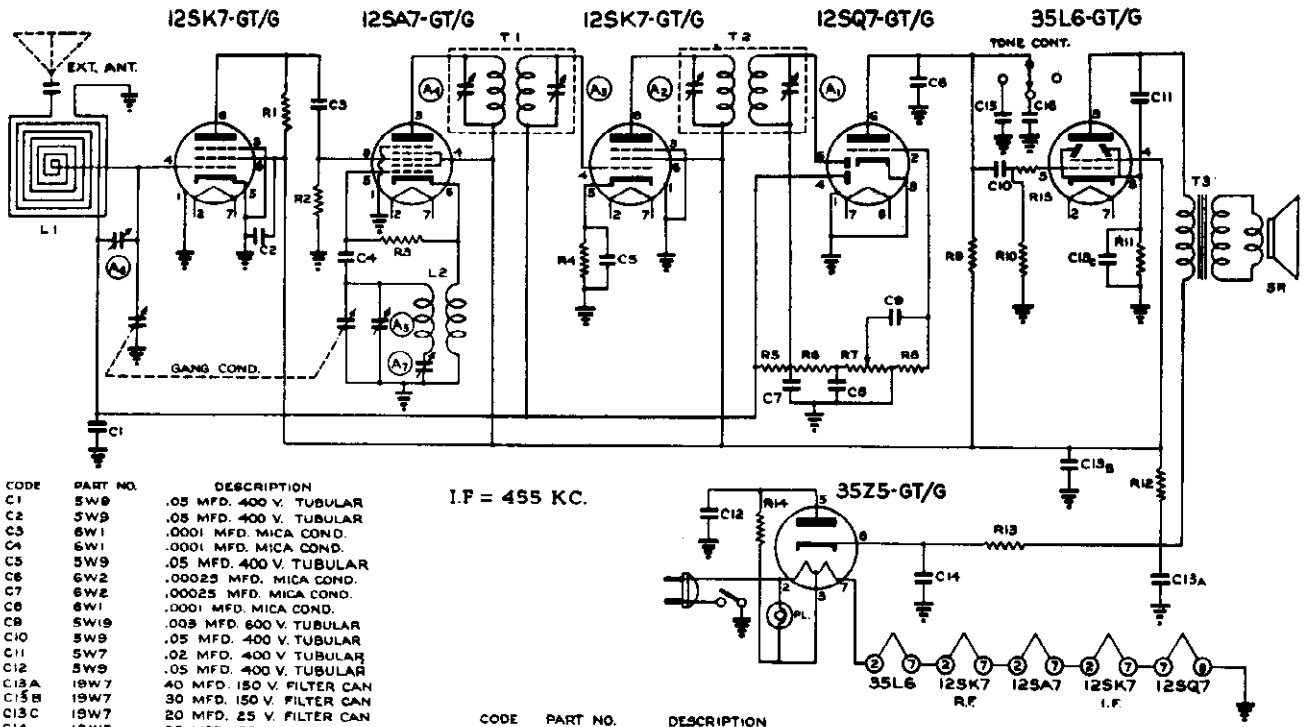
2. Set tuning dial to 1400 K. C. and while feeding a 1400 K. C. signal into receiver adjust the oscillator trimmer (inside adjustment) and antenna trimmer (on top of chassis) for maximum output.

3. Set tuning dial to approximately 600 K. C. and while "rocking" the dial adjust the oscillator padder (nearest edge of chassis) for maximum output.

4. Repeat steps 2 and 3 above.

MODEL 4790

WATTERSON RADIO MFG. CORP.



CODE	PART NO.	DESCRIPTION
C1	5W9	.05 MFD. 400 V. TUBULAR
C2	5W9	.05 MFD. 400 V. TUBULAR
C3	6W1	.0001 MFD. MICA COND.
C4	6W1	.0001 MFD. MICA COND.
C5	5W9	.05 MFD. 400 V. TUBULAR
C6	6W2	.00025 MFD. MICA COND.
C7	6W2	.00025 MFD. MICA COND.
C8	6W1	.0001 MFD. MICA COND.
C9	5W19	.003 MFD. 600 V. TUBULAR
C10	5W9	.05 MFD. 400 V. TUBULAR
C11	5W7	.02 MFD. 400 V TUBULAR
C12	5W9	.05 MFD. 400 V. TUBULAR
C13A	19W7	40 MFD. 150 V. FILTER CAN
C13B	19W7	30 MFD. 150 V. FILTER CAN
C13C	19W7	20 MFD. 25 V. FILTER CAN
C14	18W5	30 MFD 150 V. PAPER FILTER
C15	5W20	.006 MFD. 600 V. TUBULAR
C16	5W17	.001 MFD. 600 V. TUBULAR

R1	9W37	2,200 Ω - 1/2 WATT RESISTOR
R2	9W28	100,000 Ω - 1/2 WATT
R3	9W64	22,000 Ω - 1/2 WATT
R4	9W72	1,000 Ω - 1/2 WATT
R5	9W56	2.2 MEGOHM - 1/2 WATT
R6	9W52	47,000 Ω - 1/2 WATT
R7	13W1	.5 MEGOHM VOL. CONT.
R8	9W63	10 MEGOHM - 1/2 WATT
R9	9W62	220,000 Ω - 1/2 WATT
R10	9W59	470,000 Ω - 1/2 WATT
R11	9W20	150 Ω - 1/2 WATT
R12	9W72	1000 Ω - 1/2 WATT
R13	9W47	220 Ω - 1 WATT
R14	9W61	22 Ω - 1/2 WATT

CODE	PART NO.	DESCRIPTION
L1	3W31	LOOP - 184 m.h.
L2	3W28	OSCILLATOR COIL
T1	8W20	1ST. I.F. TRANSFORMER
T2	8W21	2ND. I.F. TRANSFORMER
T3	12W1	OUTPUT TRANSFORMER
PL.	26W2	PILOT LIGHT
SP.	22W22	SPEAKER
NOTE: R15	9W11	250 Ω - 1/2 WATT (OMITTED ON SOME MODELS)

ANTENNA—No external antenna is required for the Model 4790 except in remote localities where reception is poor. For proper performance in such a case, an outside antenna approximately 75 feet in length, including lead in, should be connected to the colored antenna lead extending from the back of the set.

OPERATION—The three controls on the front panel of the receiver are used as follows: the extreme left control is the on-off switch and volume control; the center control is the tuning control; and the extreme right control is the tone control.

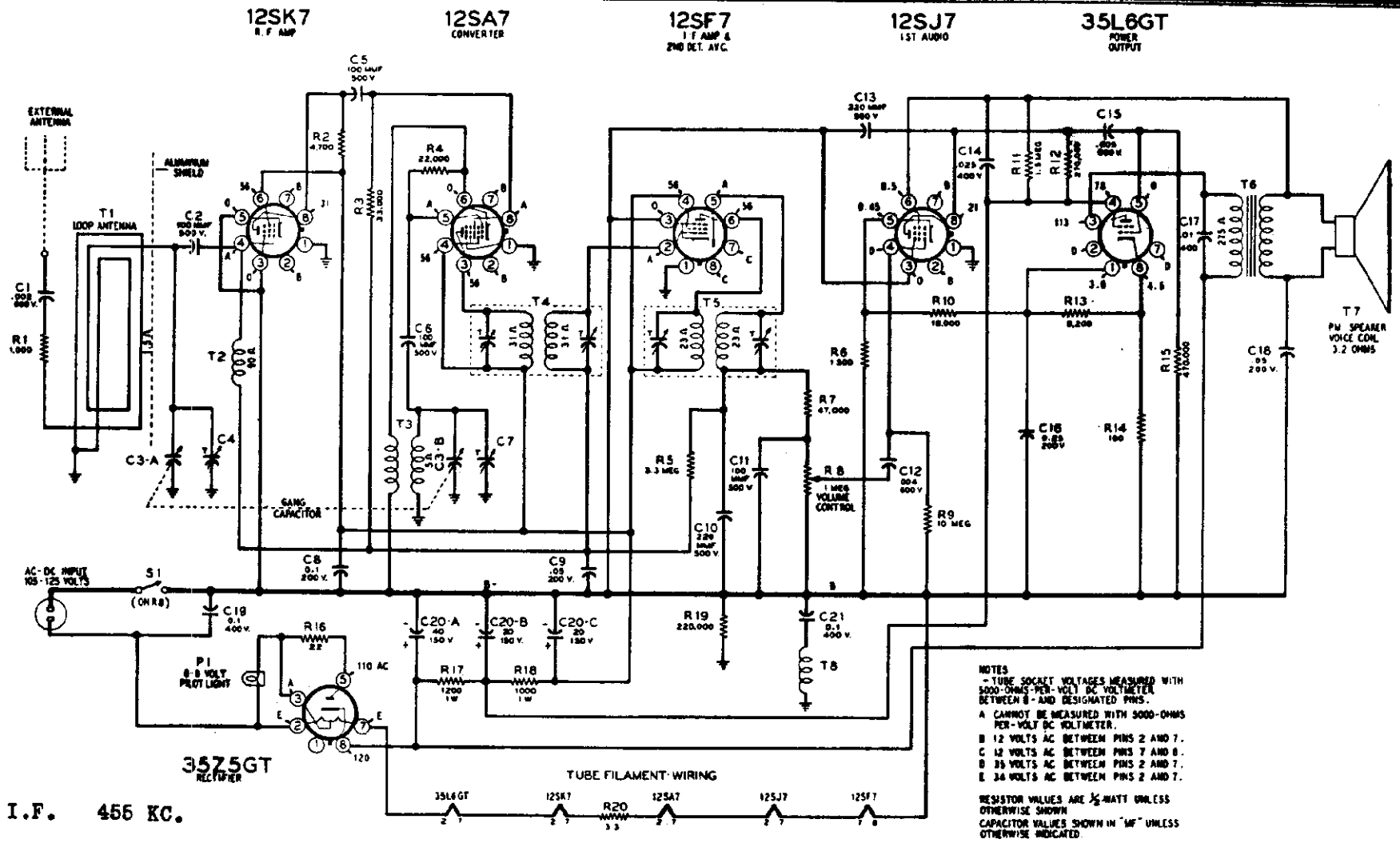
I. F. Alignment

Connect the low side of an accurately calibrated signal generator through a .1 mfd condenser to the chassis of the receiver and the "high" side of the generator through a .1 mfd. condenser to the R. F. grid (pin 8) of the 12SA7 converter tube. Set the signal generator to 455 Kc. with just enough signal to be audible in the speaker with the receiver volume control full on. If possible, an output meter should be used.

Adjust the second I. F. transformer (A_1 and A_2) and then the first I. F. transformer (A_3 and A_4) for maximum output. Recheck all adjustments.

R. F. Alignment

Connect "high" side of signal generator to the antenna lead of the receiver. Set dial pointer to 1400 Kc. on the receiver dial and turn volume control full on. Set signal generator to 1400 Kc. Adjust oscillator trimmer (A_5) and then the antenna trimmer (A_6) for maximum output. Set signal generator to 600 Kc. and receiver dial to approximately 600 Kc. While "rocking" receiver dial, adjust oscillator padder (A_7) for maximum output. Recheck adjustments at 1400 Kc.



I.F. 455 KC.

WESTERN AUTO SUPPLY CO.

TRUETONE PAGE 16
MODEL D2516

Technical Data

Tuning range	530 to 1600 kc
Intermediate frequency	455 kc
Power consumption	30 watts
Selectivity	65 kc broad at 1000 x signal at 1000 kc
Sensitivity (for 0.05 watt output)	14 microvolts average
Power output (in voice coil)	
Undistorted	0.84 watts
Maximum	1.5 watts

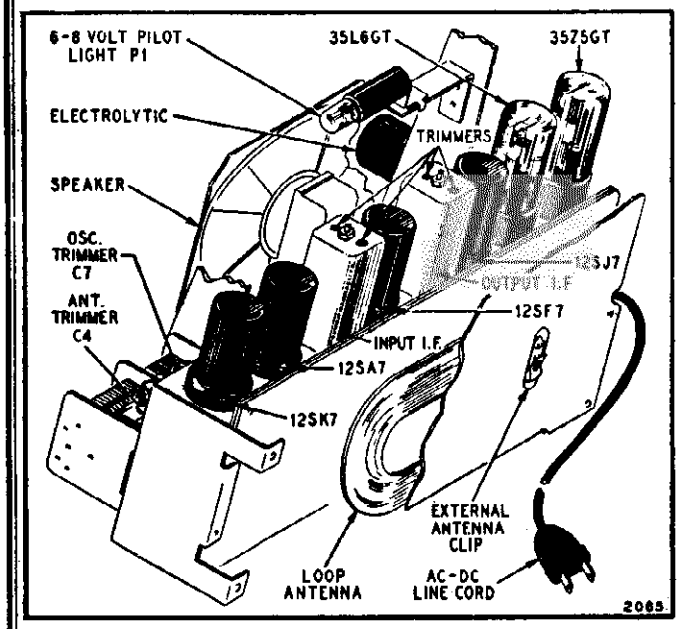
WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURE

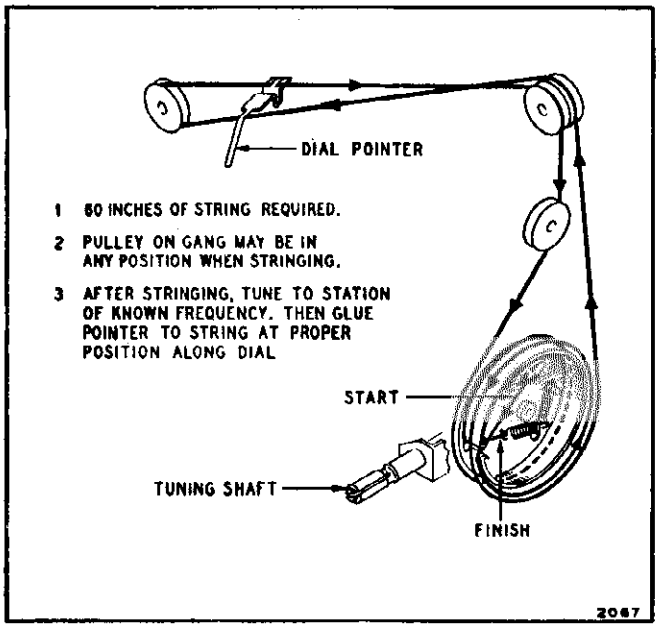
(Refer to Chassis View)

- **Output meter across 3.2-ohm output load.**
- **Volume control at maximum.**
- **Connect ground post of signal generator to B— of radio.**
- **Align for maximum output. Reduce input as needed to keep output near 0.4 volts.**

SIGNAL GENERATOR			*TUNER SETTING*	*ADJUST FOR MAXIMUM OUTPUT (in order shown)*
Frequency	*Dummy Antenna*	*Connection to Radio*		
455 kc	0.1 mf	Stator of antenna section of gang	Rotor full open (plates out of mesh)	Trimmers on output and input I.F. cans
1600 kc	0.1 mf	Stator of antenna section of gang	Rotor full open (plates out of mesh)	Oscillator trimmer C7
1400 kc	200 mmf	External antenna clip	1400 kc	Antenna trimmer C4



Chassis View



Replacing Dial Pointer Drive Cord

SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select.

1. Turn on the radio.

2. Push out the call letters of the desired stations from the call-letter sheets supplied with this manual.

3. Insert one call letter tab in each of the pushbuttons, preferably but not necessarily in order of frequency (as obtained from your newspaper). Press an acetate tab (supplied in small envelope) into each of the buttons.

4. Rotate the tuning knob to the left (counterclockwise) as far as it will go.

5. On the bottom of the set is a hole through which the pushbutton locking screw can be adjusted. With a screwdriver, check to see if the screw is loose. If it is not, turn it several turns to the left. Then return the set to an upright position.

6. Press the first pushbutton down **all the way**. With one hand hold the button down **firmly** and with the other carefully tune in the desired station. Release the pushbutton.

7. Follow this procedure for each of the five other buttons, adjusting each one for a different station.

8. Rotate the tuning knob as far to the left as it will go. Now tighten the locking screw on the bottom of the radio. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

9. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

MODEL D 2616 WESTERN AUTO SUPPLY CO.

Ref. No.	Part No.	Description
		CAPACITORS*
C1	C-8D-10778	.002 mf. 600 volts, +40%—15%
C2,C5 C6,C11	C-8F3-8	100 mmf, 500 volts, 20%, mica
C-3A,B C4,C7	B-8A-10827	Two-gang condenser assembly, including antenna and oscillator trimmers. Range of gang: 15-452 mmf (ant.), 10-162 mmf (osc.).
C8	C-8D-10771	.1 mf, 200 volts, +20%—10%
C9,C18	C-8D-10770	.05 mf, 200 volts, 20%
C10,C13	C-8F3-10	220 mmf, 500 volts, 20%, mica
C12	C-8D-10788	.004 mf, 600 volts, 20%
C14	C-8D-10997	.025 mf, 400 volts, 10%
C15	C-8D-10935	.005 mf, 600 volts, +40%—15%
C16	C-8D-10775	.25 mf, 200 volts, +20%—10%
C17	C-8D-10761	.01 mf, 400 volts, 20%
C19,C21	C-8D-10760	.1 mf, 400 volts, +20%—10%
C20-A,B,C	A-8C-10077	Electrolytic, for 60-cycles: 40 mf x 150 volts, 20 mf x 150 volts, 20 mf x 150 volts
C20-A,B,C	A-8C-10946	Electrolytic, for 25 cycles: 60 mf x 150 volts, 40 mf x 150 volts, 40 mf x 150 volts
		RESISTORS*
R1	C-9B1-62	1000 ohms, ½ watt, 10%
R2	C-9B1-70	4700 ohms, ½ watt, 10%
R3	C-9B1-80	33,000 ohms, ½ watt, 10%
R4	C-9B1-78	22,000 ohms, ½ watt, 10%
R5	C-9B1-34	3.3 megohms, ½ watt, 20%
R6	C-9B1-64	1500 ohms, ½ watt, 10%
R7	C-9B1-82	47,000 ohms, ½ watt, 10%
R8,S1	A-10A-10642	Volume control (1 megohm) and on-off switch
R9	C-9B1-37	10 megohms, ½ watt, 20%
R10	C-9B1-77	18,000 ohms, ½ watt, 10%
R11	C-9B1-32	1.5 megohms, ½ wat, 20%
R12	C-9B1-91	270,000 ohms, ½ watt, 10%
R13	C-9B1-72	8200 ohms, ½ watt, 10%
R14	C-9B1-53	180 ohms, ½ watt, 10%
R15	C-9B1-94	470,000 ohms, ½ watt, 10%
R16	C-9B1-3	22 ohms, ½ watt, 20%
R17	C-9B2-63	1200 ohms, 1 watt, 10%
R18	C-9B2-62	1000 ohms, 1 watt, 10%
R19	C-9B1-90	220,000 ohms, ½ watt, 10%
R20	C-9B2-44	33 ohms, 1 watt, 10%
		COILS AND TRANSFORMERS
T1	C-201-10903	Loop antenna assembly (includes cabinet back, capacitor C1 and resistor R1)
T2	A-16A-12161	R.F. choke coil
T3	A-13D-10661	Oscillator coil
T4	B-13B-10091-1	Input I.F. transformer complete in can. Range of trimmers: 45-85 mmf each.
T5	B-13B-10794	Output I.F. transformer complete in can. Range of trimmers: 43-79 mmf each.
T6	B-12C-10623	Output transformer for speaker
T8	A-16A-10792	I.F. choke coil

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences in both resistors and capacitors follows:

Pre-standardized value—50,000 ohms, 1/3 watt, 10%
RMA value—47,000 ohms, 1/2 watt, 10%
Pre-standardized value—200 mmf, 500 volts, 20%
RMA value—220 mmf, 500 volts, 20%

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

Ref. No.	Part No.	Description
		DIAL AND TUNING PARTS
	B-6D-10650	Dial scale
	A-6A-10609	Diffuser
	B-2M-7758	Snap-in rivet, for diffuser (2 used)
	A-2G-10639	Dial pointer
	B-53A-10989	String for dial pointer (60")
	A-49A-10887	Spring for dial pointer string
	A-65A-10093	Socket assembly, for dial light
P1	A-46A-10793	Dial light bulb, 6-8 volts, T-47
	A-3C-10641	Spacer, brass (on extreme left)
	A-3C-10640	Spacer, brass (5 used)
	A-2C-10658	Cam
	A-2C-10611	Washer, D-D, on sides of cams
	29E-1812	Spring washer, on cam shaft
	A-3F-10656	Locking screw for cams
	A-2C-10654	Retainer yoke
	A-2C-10655	Cam yoke
	A-2L-10610	Stop arm
	200-10653	Lever assembly (arm and roller)
	A-2C-10607	Gear segment
	A-3B-10643	Gear bushing
	A-3C-10636	Coupling pin on gear segment
	A-49A-10646	Drum spring, on gear coupling pin
	A-3A-10651	Tuning shaft
	A-3L-7192	Pinion gear on tuning shaft
	A-49A-10628	Lever spring
		MISCELLANEOUS
T7	B-18A-10647	P.M., 6" x 4" oval
	A-15B-10440	Socket, octal (for all tubes but 12SK7)
	A-15C-11201	Socket, octal, laminated (for 12SK7)
	B-15B-10076	Mounting plate, for electrolytic
	B-14M-10088	Line cord and plug
	B-2M-11205	Snap-in rivets, for mounting back (5 used)
	A-2M-10096	Split tee-pins, for mounting back (2 used)
	5C-10010-9	Cabinet
	B-5B-10018-8	Knob, volume and tuning
	B-5A-10648-8	Pushbutton
	A-25B-10736	Rubber feet for cabinet
	A-23L-10934	Station call letters, one set
	A-6C-10819	Acetate tabs, for pushbuttons
	A-2H-10715	Tube shield (used with metal-base 12SA7GT tube)
	A-2H-11271	Tube shield (used with bakelite-base 12SA7GT tube)

NOTICE: There is a power rating label on the cabinet. This label specifies the power supply on which the radio may be used, and identifies it as to stock number and model. When ordering parts or writing, give ALL information appearing on label.

H-244A	Speaker 5" PM	
S-608A	Tube Socket Octal (8 prong)	
E-164A	Knob-tuning and volume	
A-2131	Line Cord and plug	

COILS

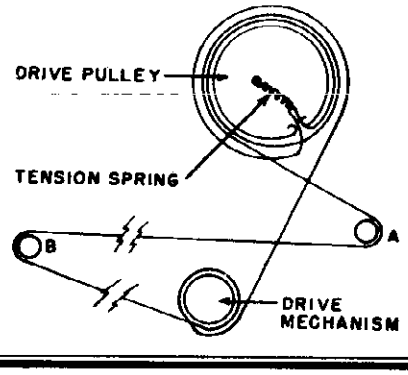
A-2154B	Antenna & Back Cover Assembly	
T-1361A	1st I.F. Transformer	456 KC
T-1362A	2nd I.F. Transformer	456 KC
T-1365A	R. F. Choke Coil	1.4 MH
T-1368A	Audio Transformer	
T-1372A	R.F. Choke Coil	3.0 MH

CAPICATORS

C-471A	0.1 mfd, 400 V	Tubular
C-493A	1000 mmf, 350 V	Ceramic
C-494A	250 mmf, 350 V	Ceramic
C-495A	50 mmf, 500 V	Ceramic
C-480A	0.005 mfd, 400 V	Tubular
C-466A	40-40 mfd, 150 V	Electrolytic
C-483A	10-160 mmf	Trimmer
C-496A	0.02 mfd, 200 V	Tubular
C-460A	0.1 mfd, 200 V	Tubular
C-497A	0.2 mfd, 400 V	Tubular
C-500A	0.01 mfd, 400 V	Molded

MODEL D2619

W-43A	50 ohm, 10 Watt	Wire wound
W-415A	150 ohm, 0.5 Watt	Carbon
W-452A	4700 ohm, 0.5 Watt	Carbon
W-433A	1000 ohm, 1.0 Watt	Carbon
W-437A	22,000 ohm, 0.25 Watt	Carbon
W-438A	47,000 ohm, 0.25 Watt	Carbon
W-439A	100,000 ohm, 0.25 Watt	Carbon
W-440A	220,000 ohm, 0.25 Watt	Carbon
W-441A	470 ohm, 0.25 Watt	Carbon
W-442A	2.2 megohm, 0.25 Watt	Carbon
W-443A	10 megohm, 0.25 Watt	Carbon
W-444A	Switch & Pot, 500,000 ohm,	Carbon



TUNER & DRIVE PARTS

A-2143E	Tuner Assembly
L-2450A	Pulley-Drive
L-2451A	Pulley-Idler
U-1442A	Shoulder Rivet
H-2478	Glass Dial
H-246A	Translucent Screen
U-1445A	Snaps for Screen
U-1461A	Pointer
U-1444A	Spring
S-599A	Pilot Light Socket Assembly
A-2155A	Dial Drive Assembly

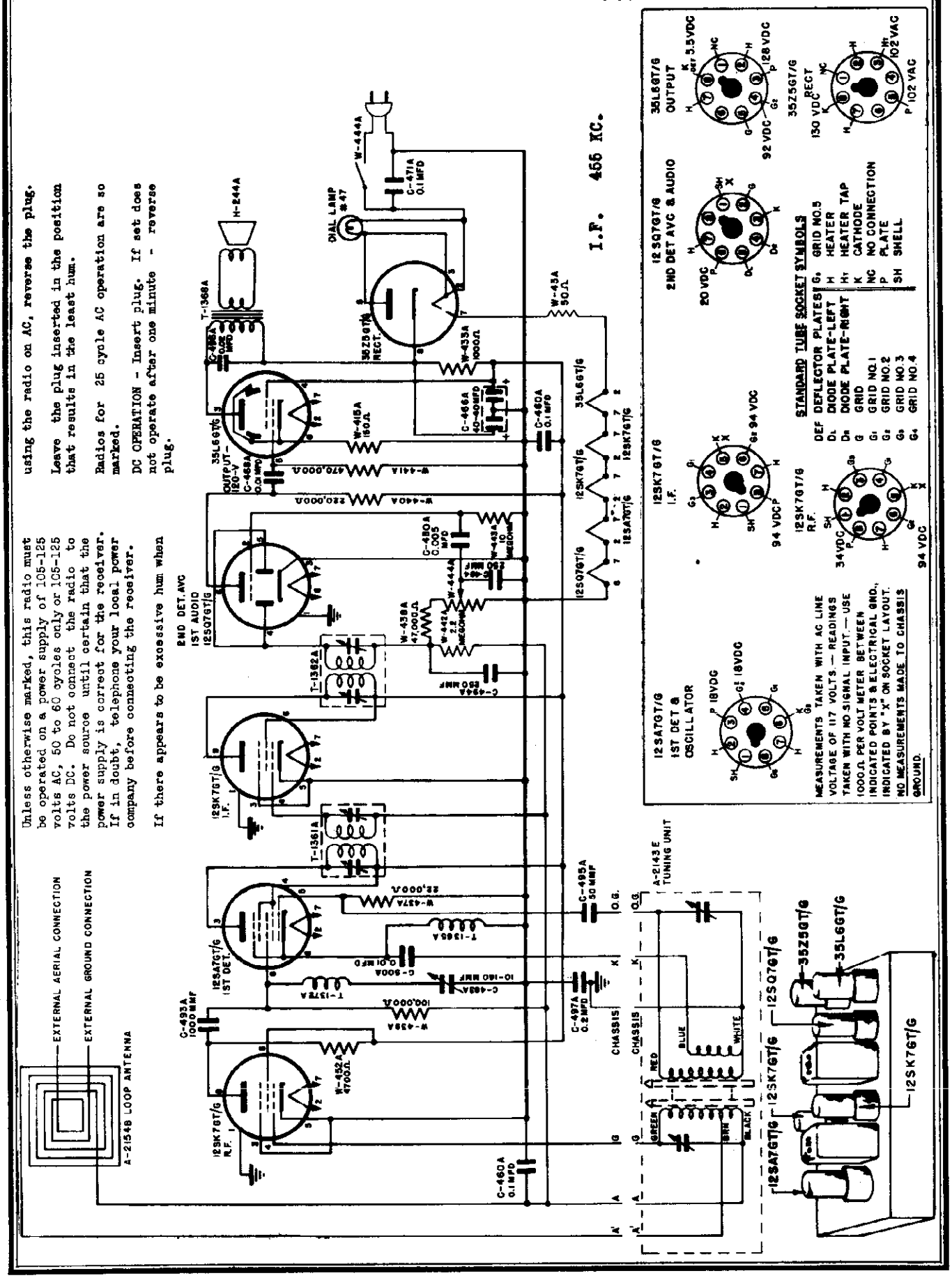
DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.

Attach dial pointer to cord.

MODEL D2619

WESTERN AUTO SUPPLY CO.



Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only or 105-125 volts DC. Do not connect the radio to the power source until certain that the power supply is correct for the receiver. If in doubt, telephone your local power company before connecting the receiver.

If there appears to be excessive hum when using the radio on AC, reverse the plug.

Leave the plug inserted in the position that results in the least hum.

Radios for 25 cycle AC operation are so marked.

DC OPERATION - Insert plug. If set does not operate after one minute - reverse plug.

ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

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

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING	DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Out	Adjust Osc. #5 per Max. signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 1400KC	Adjust RF trimmer #6 per Max. Signal.	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. (care should be taken not to disturb carriage position of tuner)	If more than one turn is required, the trimming 1400 KC should be repeated and the 700 KC padding of the tuning core also repeated until correct alignment has been reached

ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F.coil winding. (Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F.adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F.input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F.coil slug by rotation in the Timmerman nut to maximum output.

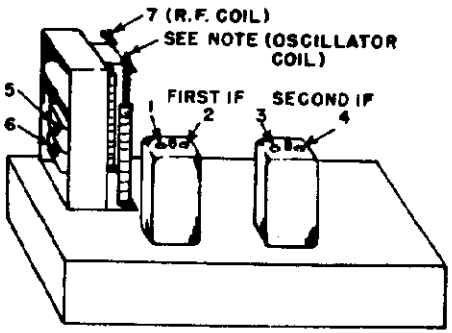
NOTE: If more than one complete turn of the slug is required to obtain maximum signal, return tuner to 1400 kc. position and repeat steps 4 and 5.

If less than one turn is required to obtain the maximum 700 kc. audio output, the R.F. alignment may be considered complete.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

SPECIFICATIONS

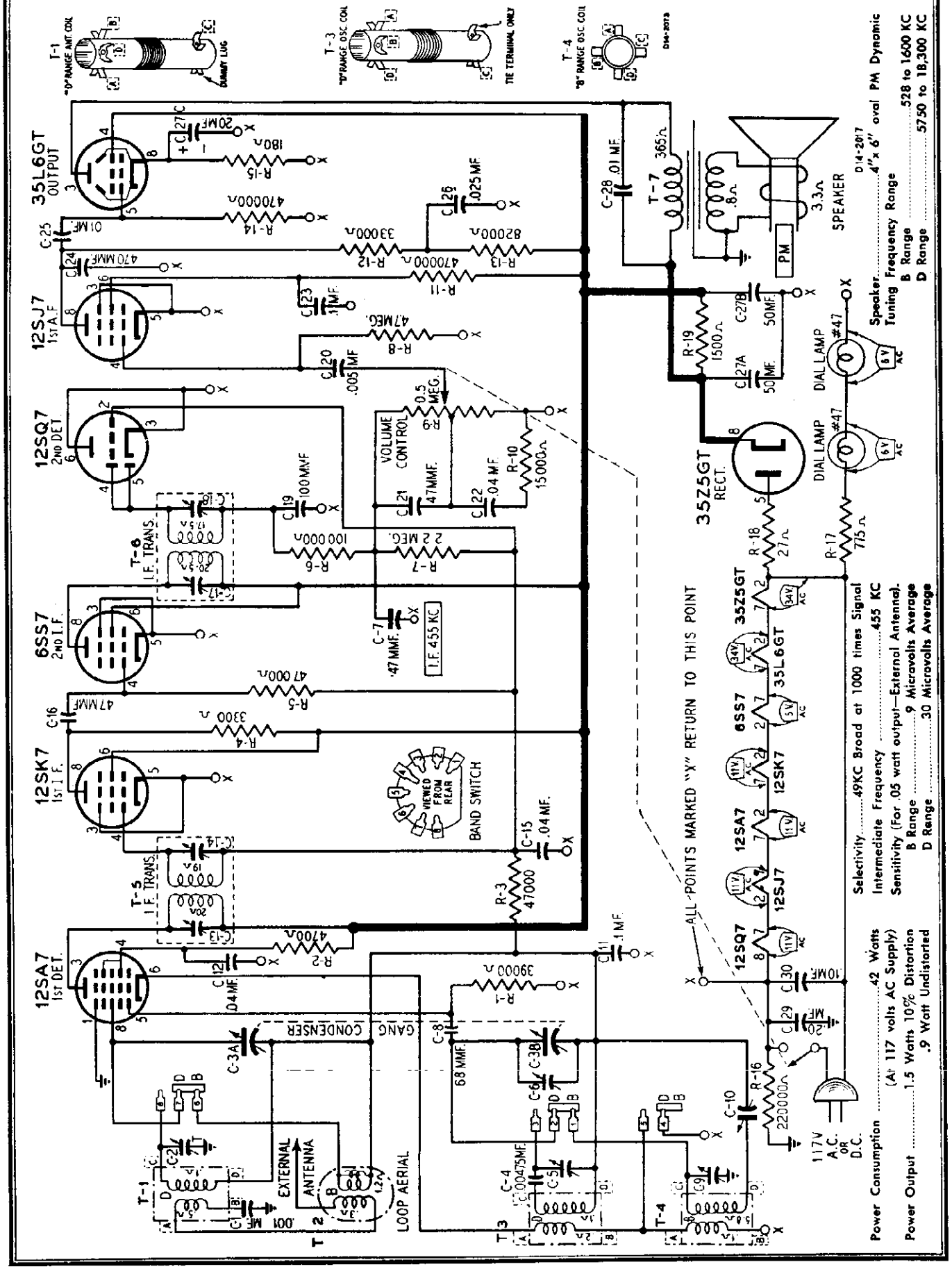
Power consumption..... 35 Watts
(At 117 volts AC Supply)
Power Output- 1.6 Watts 10% Distortion
1.1 Watt Undistorted
Selectivity----49 KC Broad at
1000 times Signal
Intermediate Frequency..... 455 KC
Speaker..... 5" PM Dynamic
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 20 microvolts average

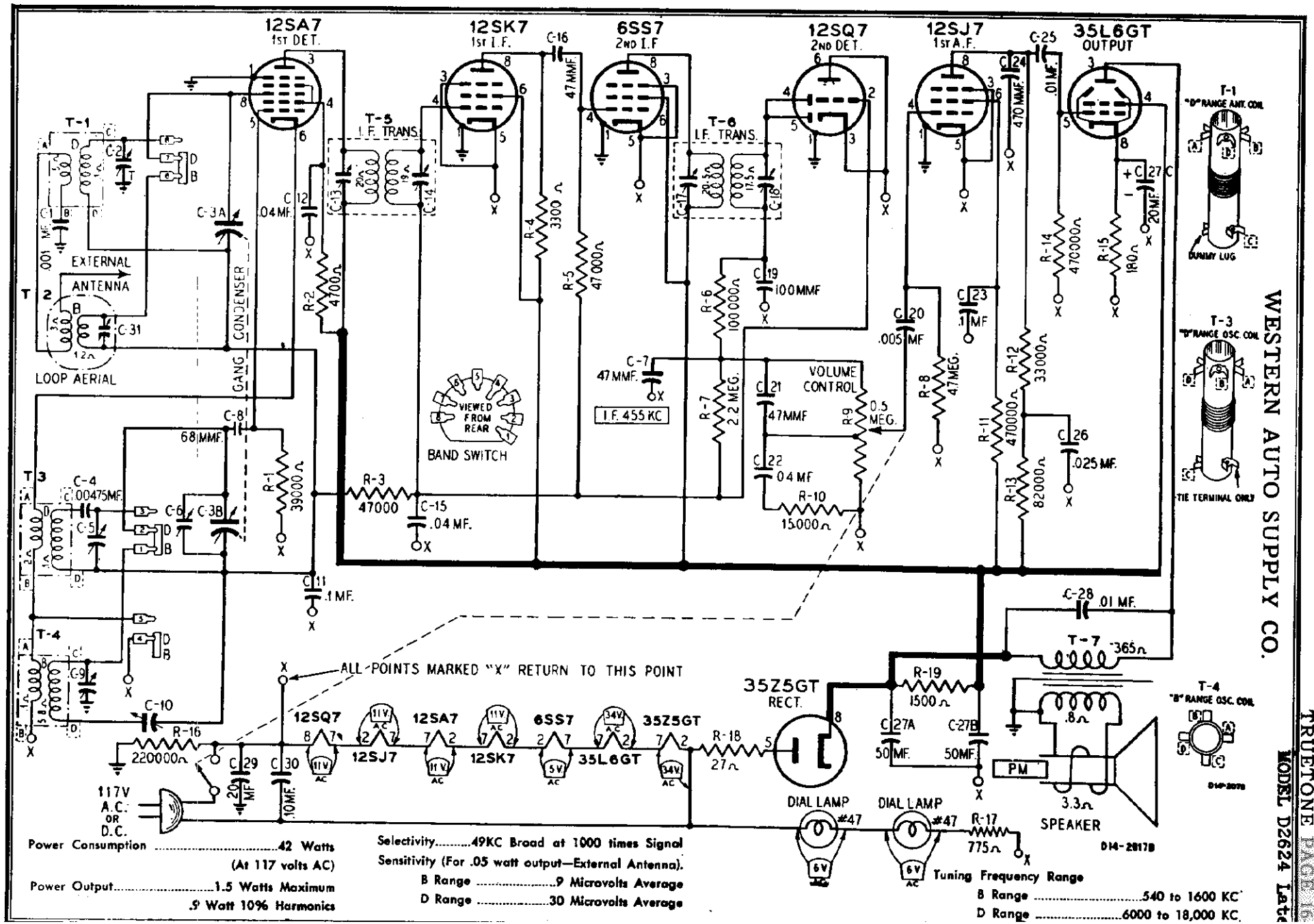


WESTERN AUTO SUPPLY CO.

MODELS D2624 Early,
D2630

WESTERN AUTO SUPPLY CO.





Power Consumption .....42 Watts
(At 117 volts AC)
Power Output.....1.5 Watts Maximum
.9 Watt 10% Harmonics

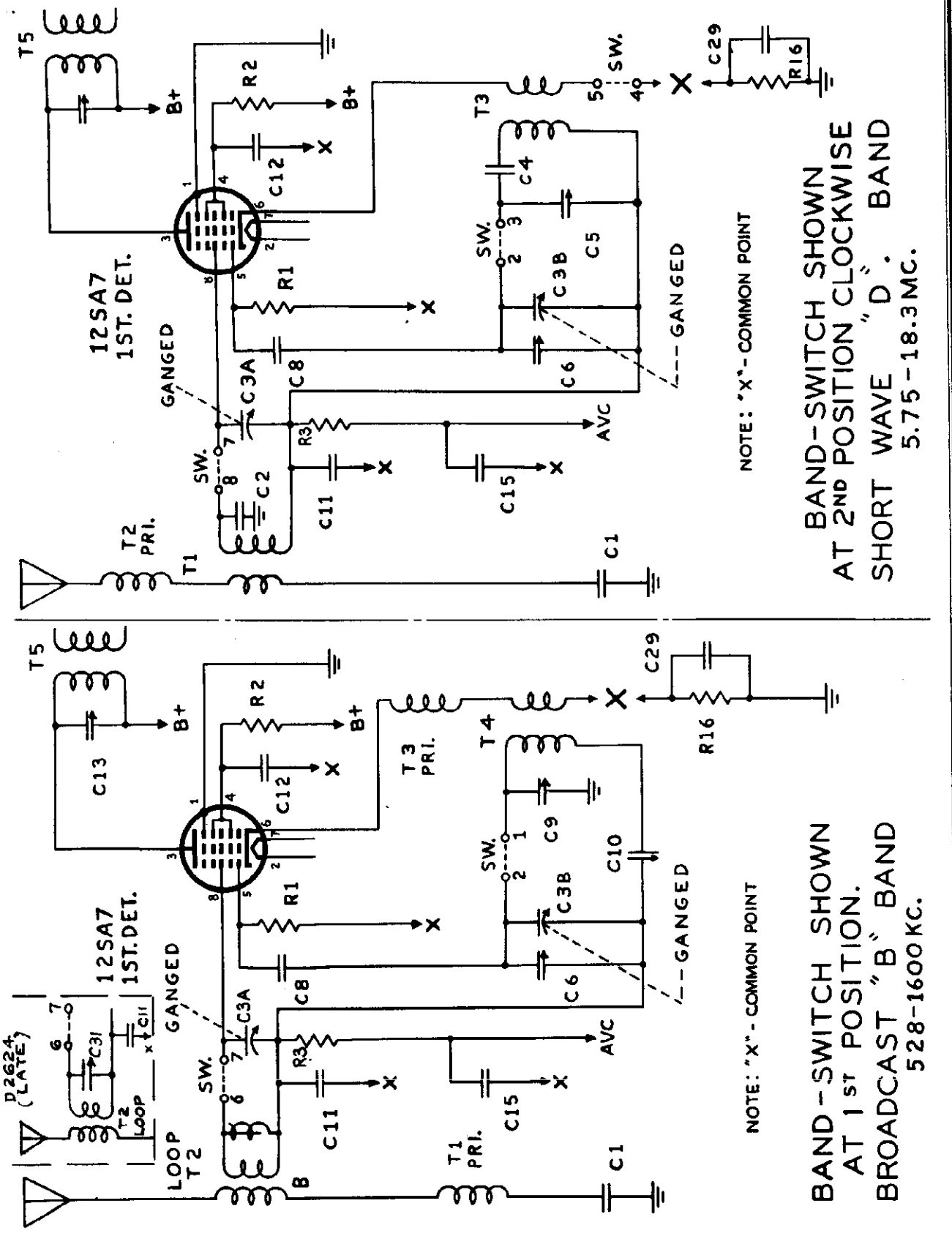
Selectivity.....49KC Broad at 1000 times Signal
Sensitivity (For .05 watt output—External Antenna).
B Range .....9 Microvolts Average
D Range .....30 Microvolts Average

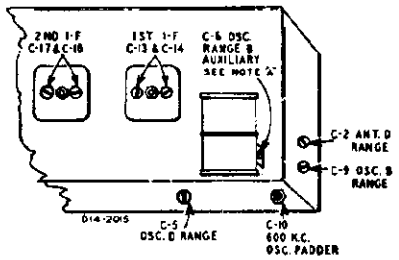
Tuning Frequency Range
B Range .....540 to 1600 KC
D Range .....6000 to 18,000 KC.

WESTERN AUTO SUPPLY CO.
TRUETONE
MODEL D2624 Late

MODELS D2624 Early, Late, D2630

WESTERN AUTO SUPPLY CO.





ALIGNMENT NOTES

NOTE A—Adjust Oscillator Range B (C9) trimmer on side of chassis. Oscillator Range B (C6) auxiliary trimmer on gang condenser is adjusted at factory and ordinarily need not be readjusted in the field.

NOTE B—Index line is on dial background strip. See DIAL CALIBRATION paragraph.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—A "gimmick" capacity is used on the loop antenna in place of a trimmer. This normally requires no adjustment. However, if a new loop is installed it may be necessary to adjust the "gimmick" by increasing or decreasing the number of turns in the "gimmick." Complete the oscillator adjustment (C9) at 1400 KC, then adjust the "gimmick" at the same frequency.

ALIGNMENT PROCEDURE

Check Dial Pointer position, see DIAL CALIBRATION paragraph.

Volume Control—Maximum All Adjustments.

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

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

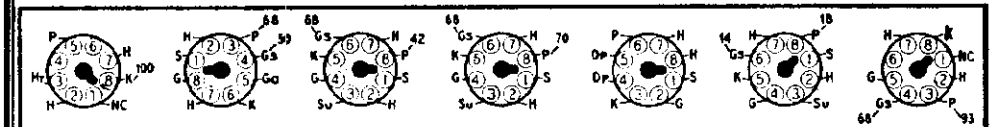
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohm.

SIGNAL GENERATOR						ADJUST TRIMMERS
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	TO MAXIMUM (See Trimmer Illustration)
I.F. 455 KC	Signal Grid of 1st. Det. Connect at Stator of Large Gang Section.	Point "X" 12SK7—1st I-F Prong No. 3	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C13) & (C14) 2nd I.F. (C17) & (C18)
RANGE B 1400 KC	External Antenna Clip	Point "X"	200 mmf.	B Range	Turn Rotor to 1400 KC Index Line. See Note B	Oscillator Range B (C8) See Note A
			SEE NOTE D			
600 KC	External Antenna Clip	Point "X"	200 mmf.	B Range	Turn Rotor to Max. Output and Rock	600 KC Padder (C10) Rock Rotor See Note C
1400 KC	External Antenna Clip	Point "X"	200 mmf.	B Range	Turn Rotor to 1400 KC Index Line. See Note B	Oscillator Range B (C9)
Repeat above steps at 1400 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.						
RANGE D 16 MC	External Antenna Clip	Point "X"	400 Ohm	D Range	Turn Rotor to 1400 KC Index Line. See Note B	Oscillator Range D (C5)
16 MC	External Antenna Clip	Point "X"	400 Ohm	D Range	Turn Rotor to 1400 KC Index Line. See Note B	Ant. Range D (C2)

Note: In late models note D is not used in the alignment procedure. All other data is the same for both models.

BC. Band Early
528 to 1600 KC
BC. Band Late
540 to 1600 KC
SW. Band Early
5.75 to 18.3 MC
SW. Band Late
6 to 18 MC



DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new cord 60" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in the pulley rim and continue one half turn counterclockwise, over top of pulley. Wind 3 turns clockwise around wooden drive shaft spool. Turns must progress toward chassis. Pass cord around idler pulley A, over color disc pulley B, under color disc pulley C, and around idler pulleys D, E, and F.

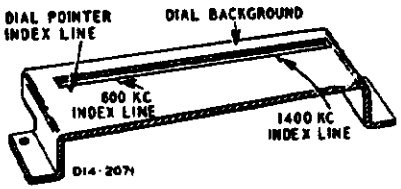
Wind ¾ turn counterclockwise around drive pulley. Pass cord through slot in rim, stretch tension spring and tie cord to it. Cut off the excess string.

Attach dial pointer to cord and position the pointer directly over the Dial Pointer Index Line

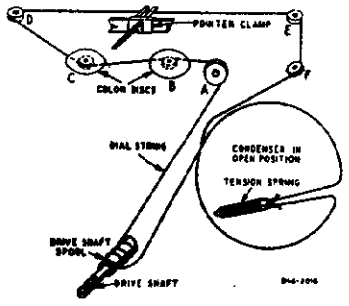
In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial background for this purpose.

To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration.)

The 600 KC and 1400 KC index lines are for use when aligning the receiver.



16 Meter Band	17.1—17.9 MC
19 Meter Band	15.1—15.3 MC
25 Meter Band	11.7—11.9 MC
31 Meter Band	9.5— 9.7 MC
49 Meter Band	6— 6.2 MC



MODELS D2624 Early,
Late, D2630
MODEL D2644

WESTERN AUTO SUPPLY CO.
REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

12A430	4" x 6" P.M. speaker—with mounting bracket Cone and voice coil assembly for speaker (specify part number and letters stamped on speaker)	
3A303	Tube Socket—octal (8 prong) molded	
10A520	Knob, tuning	for IVORY cabinet
10A521	Knob, volume	for IVORY cabinet
10A522	Knob, band	for IVORY cabinet
10A467	Knob, tuning	for WALNUT cabinet
10A468	Knob, volume	for WALNUT cabinet
10A469	Knob, band	for WALNUT cabinet
13X546	Line cord and plug	
2A206	Band change switch	
28X292	Snap button (mounting antenna to cabinet)	
	No. 6x¾" P.K. Type "Z" screws (mounting antenna to chassis)	

TRANSFORMERS AND COILS

9A1443	T-1	"D" Range Antenna Coil Assembly
26A386	T-2	"B" Band Loop Antenna Assembly with Trimmer (for Walnut Cabinet)
26A387	T-2	"B" Band Loop Antenna Assembly with Trimmer (for Ivory Cabinet)
9A1444	T-3	"D" Range Oscillator Coil Assembly
9A1442	T-4	"B" Band Oscillator Coil Assembly
9A1793	T-5	1st I-F coil assembly
9A1794	T-6	2nd I-F coil assembly
51X118	T-7	Output transformer

CAPACITORS

B67102	C-1	.001 mf	200 V	Tubular
17A152	C-2	2-25 mmf Ant. Range "D"		Trimmer
	C-9	2-25 mmf. Osc. Range "B"		
14A148	C-3A	Gang capacitor and pulley		
	C-3B			
46X289	C-4	.00475 mf	180 V	Tubular
17A174	C-5	2-25 mmf Osc. Range "D"		Trimmer
	C-6	Part of C-3		
47X463	C-7	47 mmf		Molded
47X466	C-8	68 mmf		Molded
17A234	C-10	250-525 mmf		600 K.C. Padder
B66104	C-11	.1 mf	200 V	Tubular
	C-23			
	C-12			
B66403	C-15	.04 mf	200 V	Tubular
	C-22			
	C-13, C-14 Part of T-5 (1st I-F coil assembly)			
47X446	C-16, C-21 47 mmf			Molded
	C-17, C-18 Part of T-6 (2nd I-F coil assembly)			
47X476	C-19	100 mmf		Molded
B66502	C-20	.005 mf	200 V	Tubular
47X467	C-24	470 mmf		Molded
B66101	C-25	.01 mf	200 V	Tubular
	C-28			
B67253	C-26	.025 mf	200 V	Tubular
45X342	C-27A	50 mf	150 V	Dry electrolytic
	C-27B	50 mf	150 V	
	C-27C	20 mf	25 V	
D67204	C-29	.20 mf	400 V	Tubular
D66104	C-30	.10 mf	400 V	Tubular
17A123	C-31	1-12 mmf	Antenna Range B	Trimmer

RESISTORS

		Ohms	Watts	
B84393	R-1	30,000	0.5	Carbon
B84472	R-2	4700	0.5	Carbon
B65473	R-3	R-5 47,000	0.5	Carbon
B84332	R-4	3300	0.5	Carbon
B85104	R-6	100,000	0.5	Carbon
B85225	R-7	2.2 meg	0.5	Carbon
B85475	R-8	4.7 meg	0.5	Carbon
36X309	R-9	Volume control and switch 0.5 megohms		
B84153	R-10	15,000	0.5	Carbon
B85474	R-11, R-14	470,000	0.5	Carbon
B84333	R-12	33,000	0.5	Carbon
B84823	R-13	82,000	0.5	Carbon
B84181	R-15	180	0.5	Carbon
B85224	R-16	220,000	0.5	Carbon
43X214	R-17	775	28	Wire wound
B84270	R-18	27	0.5	Carbon
C85152	R-19	1500	1.0	Carbon

DIAL AND DRIVE ASSEMBLY

6X21	Rubber grommet	Mounting pans
20X329	Cond. cushion stud	Mounting pans
		capacitor
15A128	Color disc assembly	
58X588	Dial scale	
58X587	Dial background	
26A384	Pointer bracket assembly complete with pulleys and studs	
15X220	Pointer	
	5 ft. Drive cord	
28X113	Drive cord tension spring	
25X580	Drive shaft bracket	
26X465	Drive shaft	
19X192	"C" Washer (for drive shaft)	
24X564	Drive shaft spool	
7A193	Pilot light socket assembly	
	No. 47 Pilot light	

Model D2644

ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.

Connect ground lead of signal generator to radio chassis.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

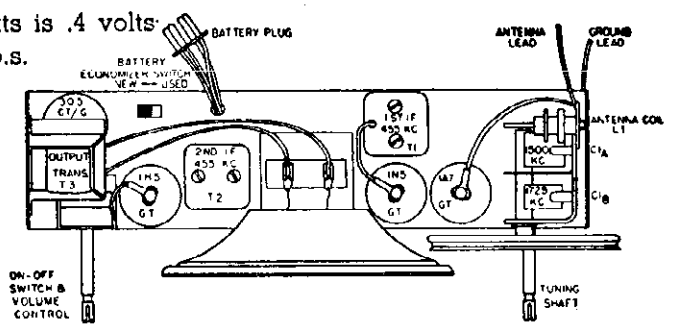
The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.
Output meter.
Non metallic screwdriver.
Dummy antennas... .1 mfd., 00025 mfd.

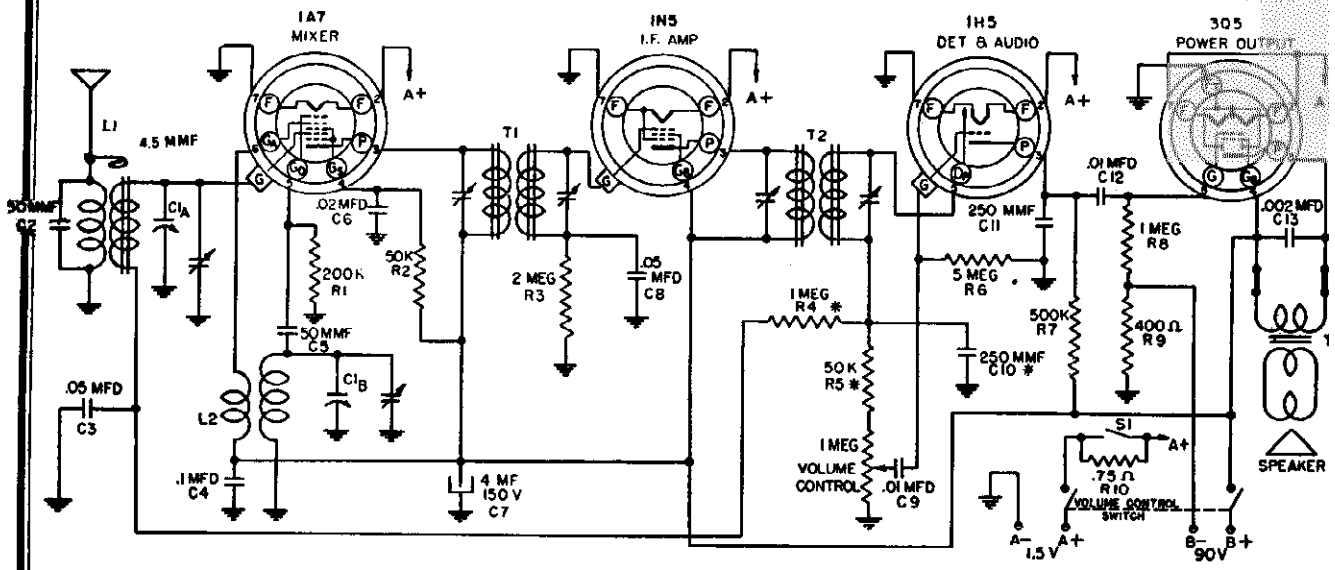
Variable Condenser Setting	Generator Frequency	Dummy Antenna Mfd.	Connection to Radio	Trimmer Adjustment	Trimmer Function
Minimum Capacity (Fully Opened)	455 K.C.	.1	Grid of 1A7GT Tube	Two Trimmers on Top of T2	Output I.F.
Minimum Capacity (Fully Opened)	455 K.C.	.1	Grid of 1A7GT Tube	Two Trimmers on Top of T1	Input I.F.
Minimum Capacity (Fully Opened)	1725 K.C.	.00025	Antenna Lead	C1B	Oscillator Trimmer
Tune in signal From Generator	1500 K.C.	.00025	Antenna Lead	C1A	Antenna Trimmer

With an output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 30% at 400 c.p.s.

Frequency Range
540 to 1725 K.C.
I.F. Frequency 455 K.C.



WESTERN AUTO SUPPLY CO.



* Note: R4, R5, and C10 are part of 2nd I.F. Transformer (T2) and can not be replaced separately.

IF PEAK 455 KC

PARTS LIST

CONDENSERS

Circuit Diagram Reference	Part No.	Description
C1A, C1B	B19-185	Variable condenser with Drum
C3, C8	A16-152	.05 mfd. 200 volt tubular condenser
C4	A16-157	.1 mfd. 200 volt tubular condenser
C5	A15-175	50 mmfd mica condenser
C6	A16-150	.02 mfd. 400 volt tubular condenser
C7	A18-273	4 mfd. 150 volt electrolytic condenser
C9, C12	A16-156	.01 mfd. 400 volt tubular condenser
C11	A15-176	250 mmfd mica condenser
C13	A16-155	.002 mfd. 600 volt tubular condenser

RESISTORS

R1	A60-667	200 K Ohm 1/3 watt resistor—20%
R2	A60-685	50 K Ohm 1/3 watt resistor—20%
R3	A60-684	2 Megohm 1/3 watt resistor—20%
R6	A60-669	5 Megohm 1/3 watt resistor—20%
R7	A60-662	500 K Ohm 1/3 watt resistor—20%
R8	A60-668	1 Megohm 1/3 watt resistor—20%
R9	A60-665	400 Ohm 1/3 watt resistor—10%
R10	A60-691	.75 Ohm 1 watt resistor

COILS

L1	A10-414	Antenna Coil
L2	A10-415	Oscillator coil
T1	B10-416	1st I.F. Transformer
T2	B10-417	2nd I.F. Transformer

MISCELLANEOUS

T3	A80-218	Speaker output transformer
S1	A69-164	Battery Economizer switch
	A24-165	Volume control and switch
	B79-335	6¼ inch P.M. Speaker
	D42-382	Wood cabinet
	B67-484	Dial scale
	A52-182	Knobs, Walnut Bakelite
	B58-59	Dial pointer
	A84-35	Dial drive shaft and pulley assembly
	A45-118	Battery plug, 4 prong

VOLTAGE CHART

All voltages measured with a 1000 ohm per volt meter on the 150 volt scale. For the following voltages the "B" battery section of the power pack should read 90 volts under load. Where no voltages are shown the voltage is O or is to low to be read with this type of voltmeter.

1A7GT TUBE	PIN NO.	VOLTS
Plate-P—to ground	3	85
Screen-G3 & G5—to ground	4	37
Grid-G2—to ground	6	85
1N5GT TUBE		
Plate-P—to ground	3	85
Screen-G2—to ground	4	85
1H5GT TUBE		
Plate-P—to ground	3	17
3Q5GT TUBE		
Plate-P—to ground	3	83
Screen-G2—to ground	4	85

SERVICE NOTES

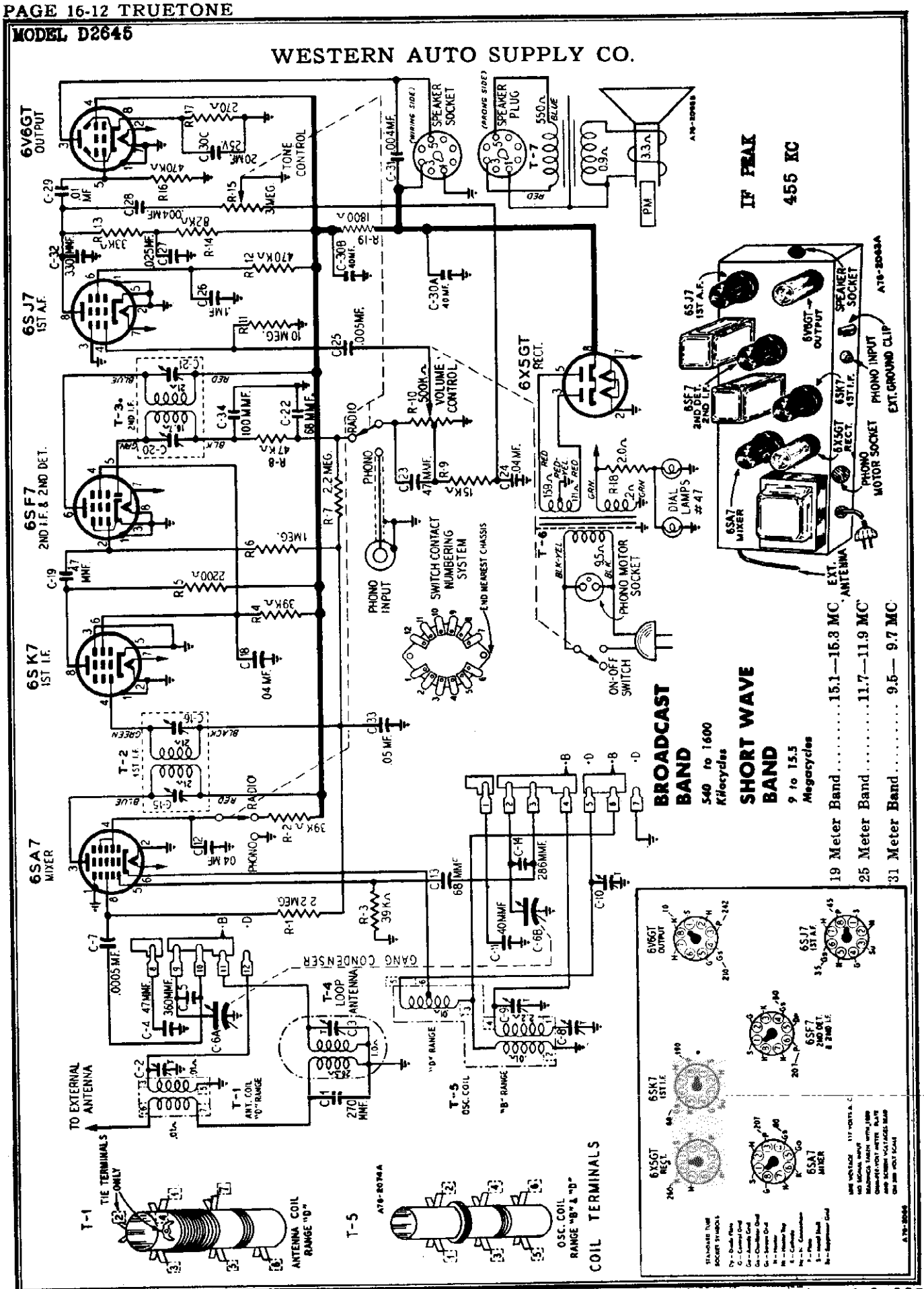
Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt, using the 150 volt scale. These voltages are clearly indicated on the voltage chart.

All voltages should be measured with a new battery or one that gives 90 volts under load.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

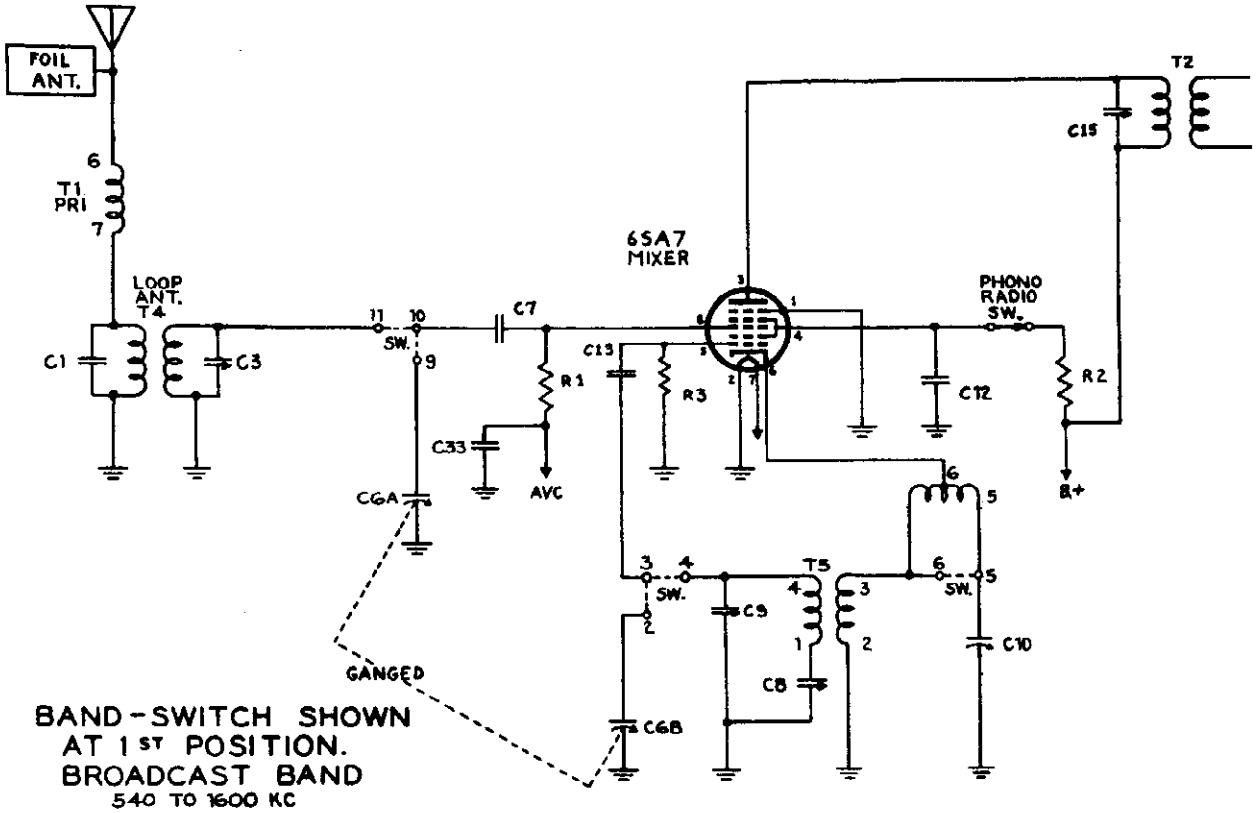
MODEL D2645

WESTERN AUTO SUPPLY CO.

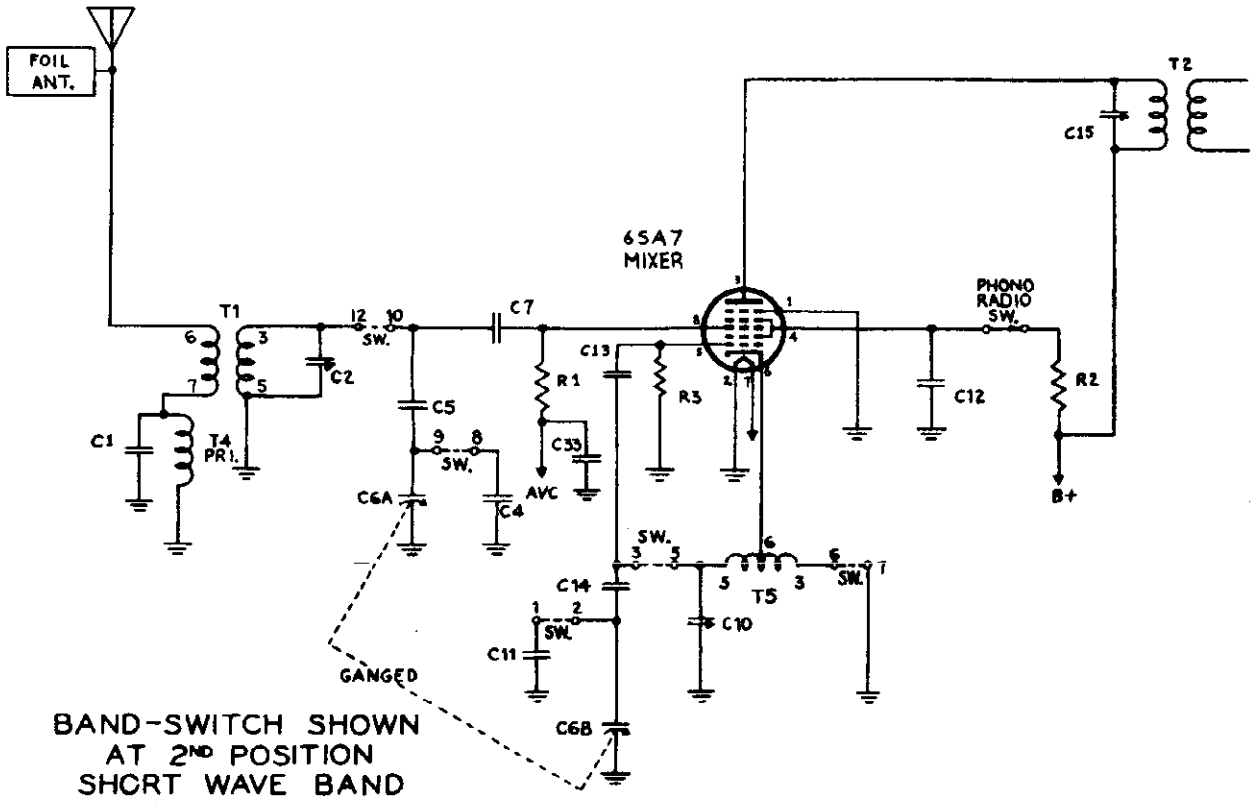


Record Changer: General Instrument Model 205

WESTERN AUTO SUPPLY CO.



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND
540 TO 1600 KC



BAND-SWITCH SHOWN AT 2ND POSITION
SHORT WAVE BAND
9 TO 15.6 MC.

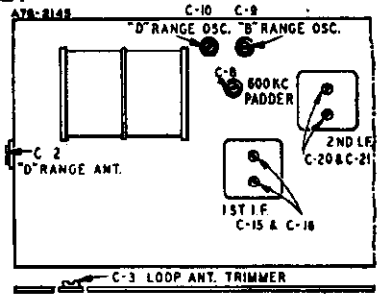
WESTERN AUTO SUPPLY CO.

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.

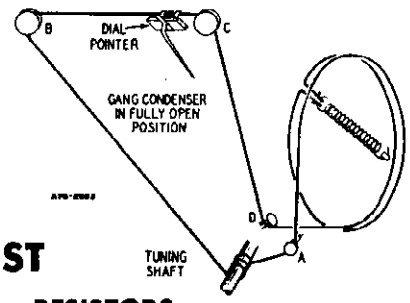
The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 KC	Grid of 6BA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C20) & (C21) 1st I.F. (C15) & (C16)
RANGE B	1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Set Pointer to 1400 KC (See Note A)	Ant. Range B (C3)
	600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C8) Rock Rotor—See Note B
	Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.					
RANGE D	15,600 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14,000 KC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B (C3)



NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



DRIVE CORD REPLACEMENT

The drive cord should be replaced as shown on the accompanying illustration using a 46" drive cord for the purpose. Three turns are to be wound clockwise around the tuning shaft with the turns progressing away from the chassis. After the cord has been installed, stretch the tension spring and hook the free end to the tab on the drive pulley. Cut off any excess string that may remain.

REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A442	6" P.M. Speaker Complete with Output Transformer
	Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)
	Output Transformer (Specify part number and letters stamped on speaker)
3A303	Tube socket-octal (8 prong) moulded
3A304	Phono motor socket
3A305	Phono socket—single pin tip
10A578	Knob (Tuning)
10A579	Knob (Off-On, Volume)
10A581	Knob (Tone, Radio-Phono)
10A580	Knob (SW-BC)
2A359	Band Change Switch
13X328	Line cord and plug assembly

TRANSFORMERS AND COILS

T-1	9A1812	"D" Range Antenna Coil Assembly
T-2	9A1814	1st I.F. Coil Assembly
T-3	9A1815	2nd I.F. Coil Assembly
T-4	9A1831	"B" Range Loop Antenna
T-5	9A1813	"B" Range and "D" Range Oscillator Coil Assembly
T-6	53X282	117 Volt 60 Cycle Standard Power Transformer
T-7		Output Transformer (See Miscellaneous)

CAPACITORS

C-1	47X445	270 mmf		Moulded
C-2	17A164	5-50 mmf		Trimmer
C-3	17A123	1-12 mmf		Trimmer
C-4	47X473	47 mmf		Silvered mica
C-5	47X474	360 mmf		Silvered mica
C-6A, C-6B	14A178	Gang Capacitor with drive pulley		
C-7	B66531	.0005 mf	200 V	Tubular
C-8	17A155	350-430 mmf		Trimmer
C-9, C-10	17A109	2.5-35 mmf		Dual Trimmer
C-11	47X472	40 mmf		Silvered mica
C-12, C-18	D66403	.04 mf	400 V	Tubular
C-13	47X466	68 mmf		Moulded
C-14	47X481	286 mmf		Silvered mica
C-15, C-16	Part of T-2 (1st I.F. Coil Assem.)			
C-19, C-23	47X463	47 mmf		Moulded
C-20, C-21	Part of T-3 (2nd I.F. Coil Assem.)			
C-22	47X471	68 mmf		Moulded
C-24	D66403	.04 mf	400 V	Tubular
C-25	D66502	.005 mf	400 V	Tubular
C-26	D66104	.10 mf	400 V	Tubular
C-27	D64253	.025 mf	400 V	Tubular
C-28, C-31	D66402	.004 mf	400 V	Tubular
C-29	D66103	.01 mf	400 V	Tubular
C-30A	45X346	40 mf	450 V	3 Section Electrolytic
C-30B		40 mf	450 V	
C-30C		20 mf	25 V	
C-32	47X470	330 mmf		Moulded
C-33	B66503	.05 mf	200 V	Tubular
C-34	47X476	100 mmf		Moulded

RESISTORS

B85225	R-1, R-7	2.2 megohms	0.5 W Carbon
C84393	R-2, R-4	39 K ohms	1.0 W Carbon
B84393	R-3	39 K ohms	0.5 W Carbon
B84222	R-5	2200 ohms	0.5 W Carbon
B85105	R-6	1 megohm	0.5 W Carbon
B85473	R-8	47 K ohms	0.5 W Carbon
B84153	R-9	15 K ohms	0.5 W Carbon
36X358	R-10	.5 megahm	Volume control and line switch
B85106	R-11	10 megohms	0.5 W Carbon
B85474	R-12, R-16	470 K ohms	0.5 W Carbon
B84333	R-13	33 K ohms	0.5 W Carbon
B84823	R-14	82 K ohms	0.5 W Carbon
*40X276	R-15	3.0 megohms	Tone control & Radio-Phono switch
C84271	R-17	270 ohms	1.0 W Carbon
43X213	R-18	2.0 ohms	0.5 W Wire wound
D84182	R-19	1800 ohms	2.0 W Carbon

DIAL AND DRIVE ASSEMBLY

26A400	Dial bracket assembly complete with dial glass, background, diffusers, etc.
7A202	Pilot light socket assembly
	No. 47 Pilot light
28X113	Drive cord tension spring
	46" Drive cord (18 lb. test)
15X150	Pointer
26X485	Drive Shaft
19X192	"C" Washer (for drive shaft)
6X21	Rubber Grommet
20X329	Cond. Cushion Stud — Mtg. Gang Capacitor

Speaker .....6" PM Dynamic

Selectivity .....40 KC Broad at 1000 Times Signal

Sensitivity (For 0.5 Watt Output, with External Antenna)
B Range..... 9 Microvolts Average
D Range.....20 Microvolts Average

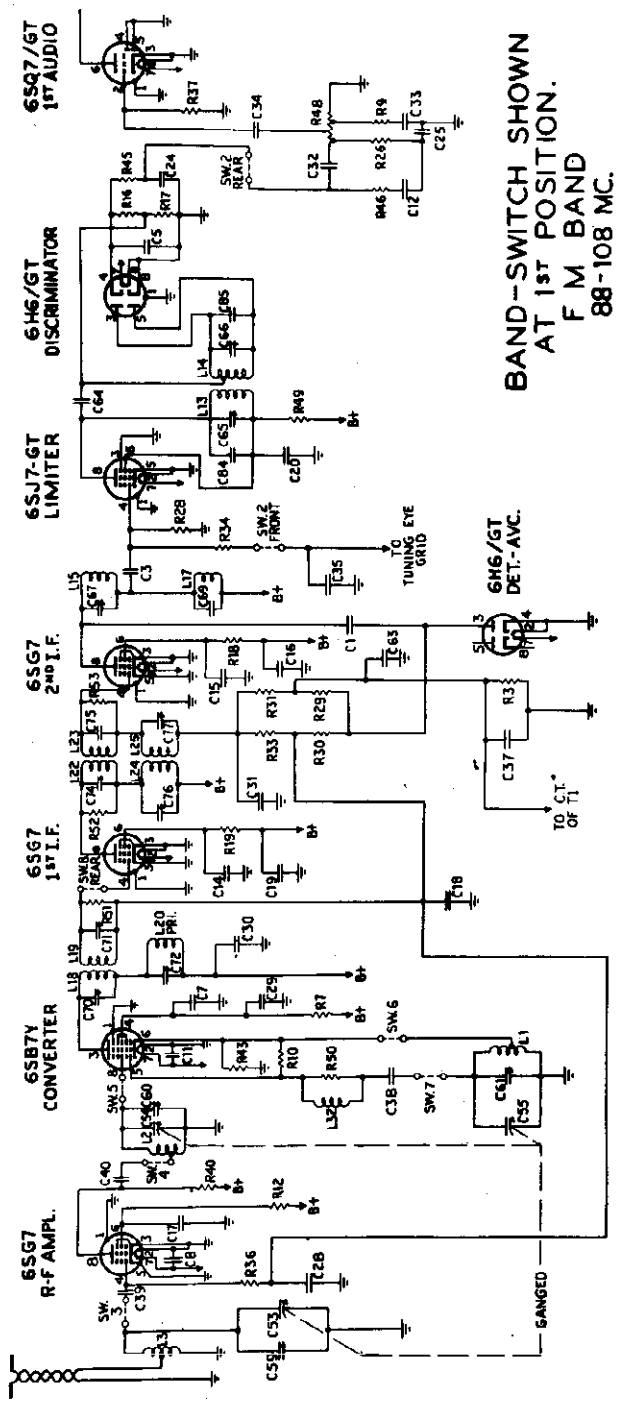
Power Consumption
(at 117 Volts AC).....40 Watts (normal)
60 Watts (phono operating)

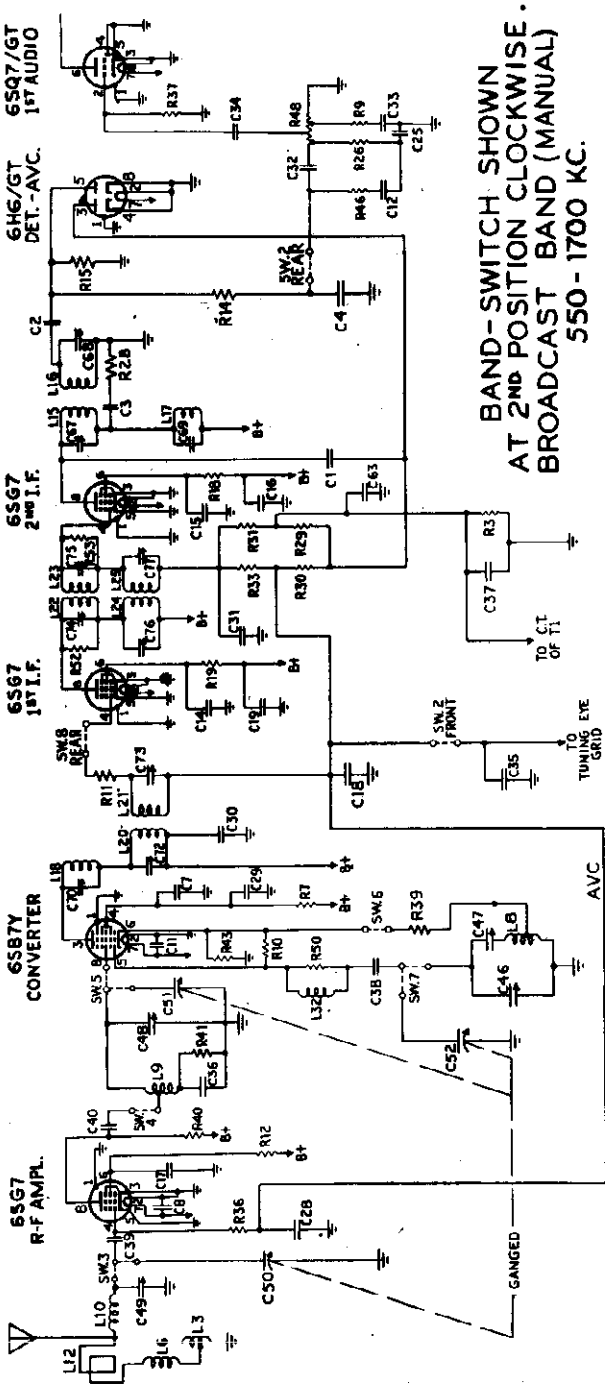
Power Output.....4 Watts Maximum
2.3 Watts, 10% Harmonics

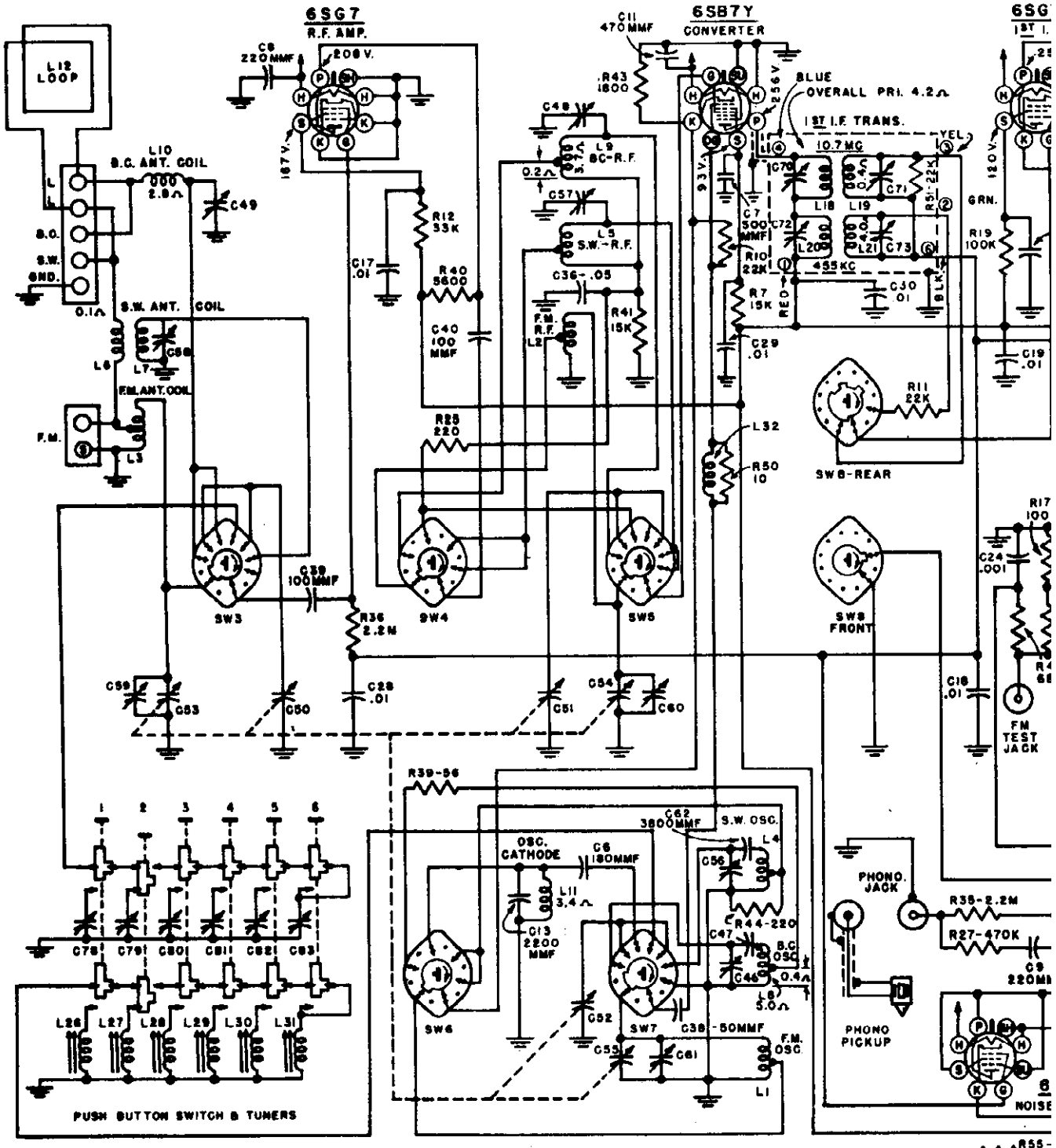
Tuning Frequency Range
B Range.....540-1600 Kilocycles
D Range.....9-15.5 Megacycles

WESTINGHOUSE ELECTRIC CORP.

MODELS H-113 -114,
-116,-117, ,-119





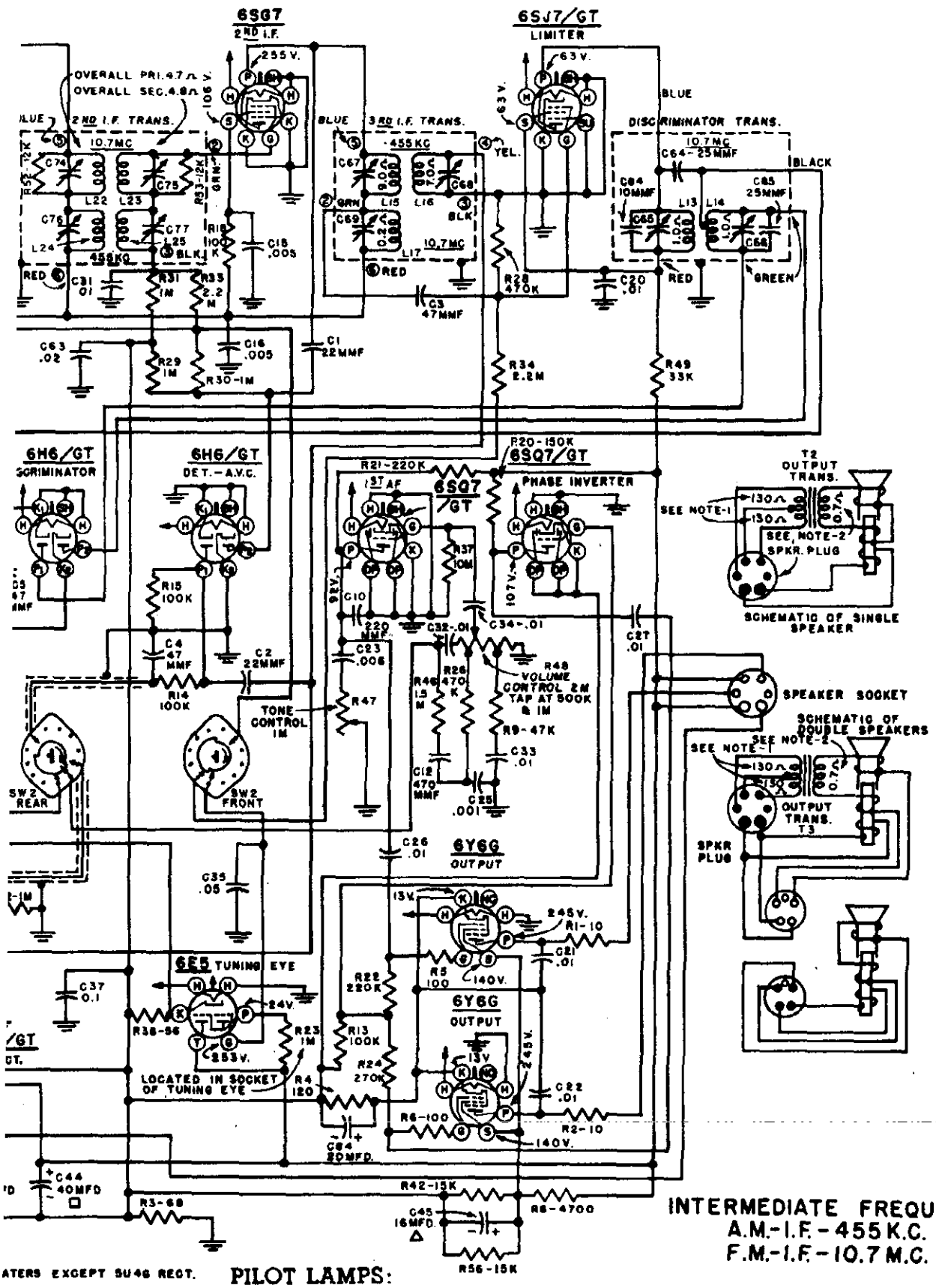


NOTES—

1. SPEAKER PLUG REMOVED.
2. VOICE COIL DISCONNECTED.
3. SWITCH SW. 2-3-4-5-6-7&8 SHOWN IN EXTREME COUNTER-CLOCKWISE OR FIRST POSITION - F.M. BAND.
   SECOND POSITION CLOCKWISE - MANUAL B.C. BAND.
   THIRD POSITION CLOCKWISE - PB.-B.C. BAND.
   FOURTH POSITION CLOCKWISE - S.W. BAND.
   FIFTH POSITION CLOCKWISE - PHONO.
   SWITCHES ROTATE 60° BETWEEN POSITIONS &
   ARE SHOWN AS VIEWED FROM FRONT OF SET.
   ALL VOLTAGES MEASURED FROM CHASSIS (GND.),
   USING 20,000 OHMS/VOLT METER.
   LINE VOLTAGE 117 V.A.C. MAX. VOLUME CONTROL
   SETTING AT NO SIGNAL CONDITIONS FOR B.C. BAND.

CTRIC CORP.

MODELS H-113,-114,-
-116,-117, -119



INTERMEDIATE FREQUENCIES
A.M.-I.F.-455 K.C.
F.M.-I.F.-10.7 M.C.

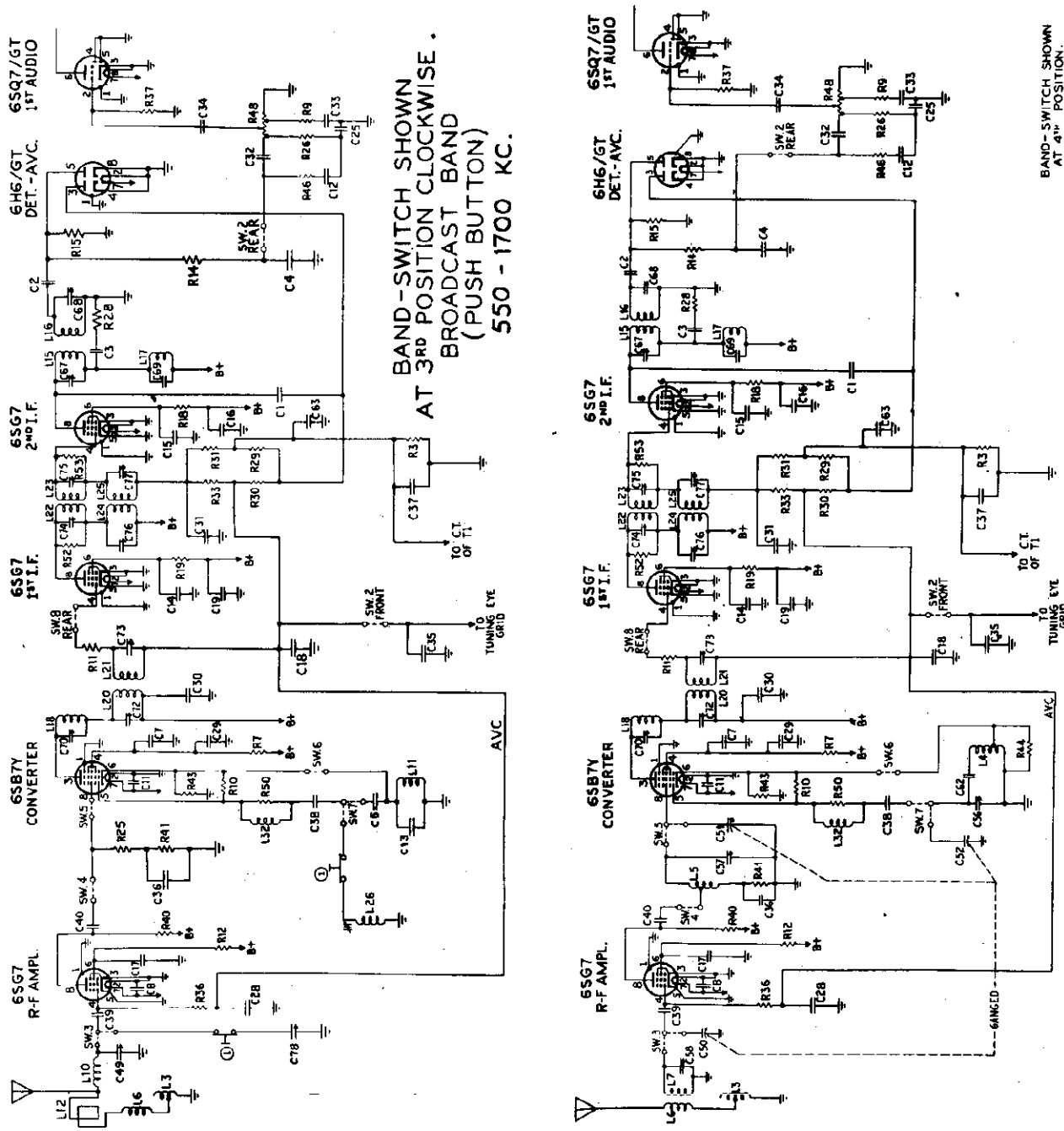
ATERS EXCEPT 5U4G RECT.

PILOT LAMPS:

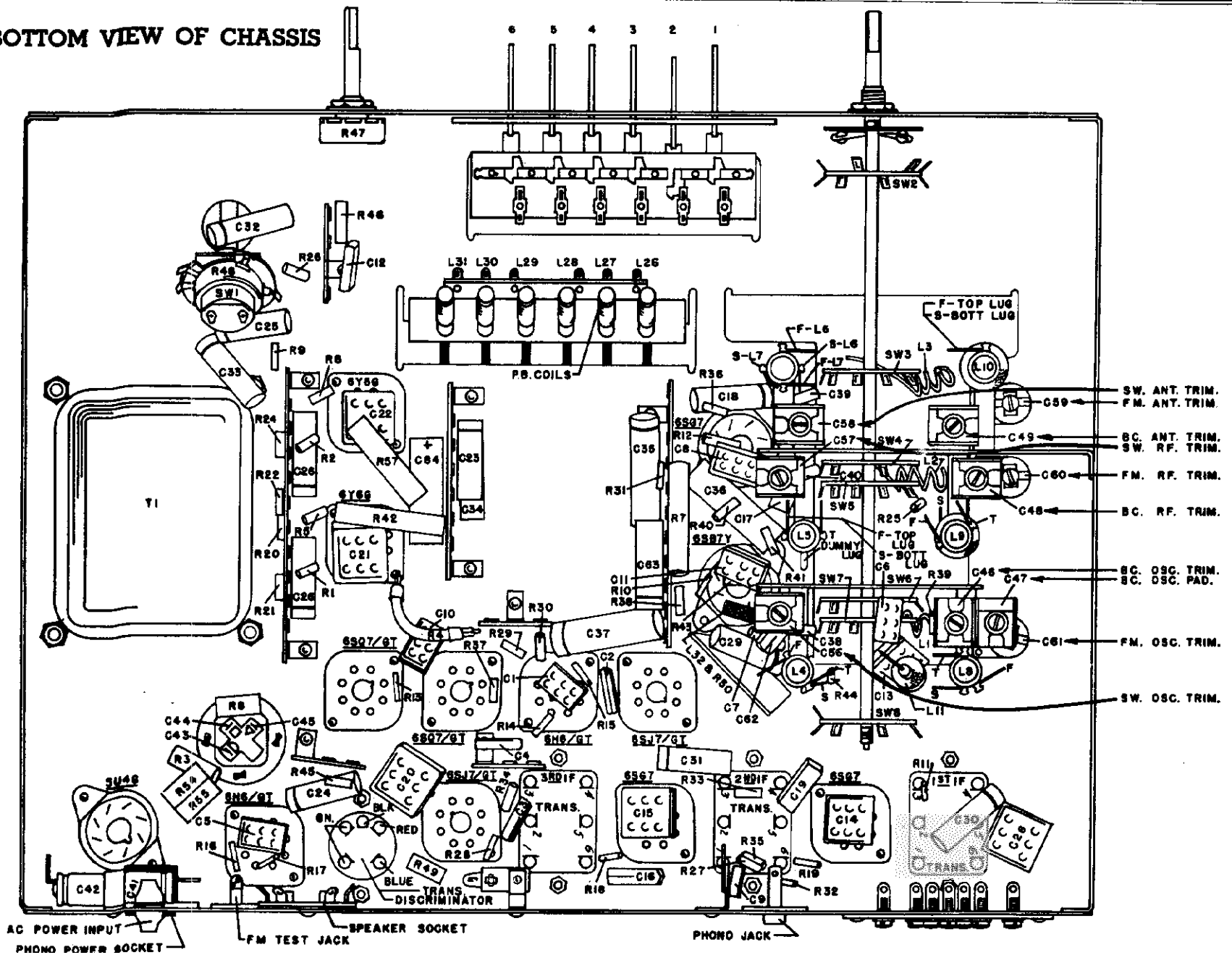
2 Westinghouse No. 44, 6.3 volts, 0.25 amps.

WESTINGHOUSE ELECTRIC CORP.

MODELS H-113,-114,-
-115,-117, -119



BOTTOM VIEW OF CHASSIS



ALIGNMENT

BROADCAST AND SHORT WAVE BANDS
AMPLITUDE MODULATION

Connect an output meter across the speaker voice coil.

With the volume control set for maximum output and the signal from the generator attenuated to avoid A.V.C. action, proceed as follows:

Step	Connect Signal Generator to—	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set Phono-Band switch to "BC"			
2	6SG7, 2nd I-F, control grid through a 0.1 mfd capacitor	455 kc	550 kc	455 kc secondary and primary trimmers of 3rd I-F transformer for maximum output.
3	6SG7, 1st I-F, control grid through a 0.1 mfd. capacitor	455 kc	550 kc	455 kc secondary and primary trimmers of 2nd I-F transformer for maximum output.
4	6SB7Y, converter, control grid through a 0.1 mfd capacitor	455 kc	550 kc	455 kc secondary and primary trimmers of 1st I-F transformer for maximum output.
5	6SB7Y, converter, control grid through a 0.1 mfd capacitor	455 kc	550 kc	carefully "peak" all 455 kc I-F transformer trimmers for maximum output.
6	BC antenna terminal through a 200 mmf capacitor	600 kc	600 kc	BC oscillator padder for maximum output.
7	BC antenna terminal through a 200 mmf capacitor	1600 kc	1600 kc	BC oscillator trimmer for maximum output.
8	Re-check steps 6 and 7			
9	Radiated signal (no connection)	1400 kc	1400 kc	BC R-F and ANT trimmers for maximum output.
10	Set Phono-Band switch to "S.W."			
11	SW antenna terminal through a 400 ohm resistor	18.0 mc	18.0 mc	SW oscillator trimmer for maximum output. NOTE: If the signal is heard at two different trimmer settings, the one nearest minimum capacity is correct--the other is the image.
12	Radiated signal (no connection)	18.0 mc	18.0 mc	SW R-F and ANT trimmers for maximum output.

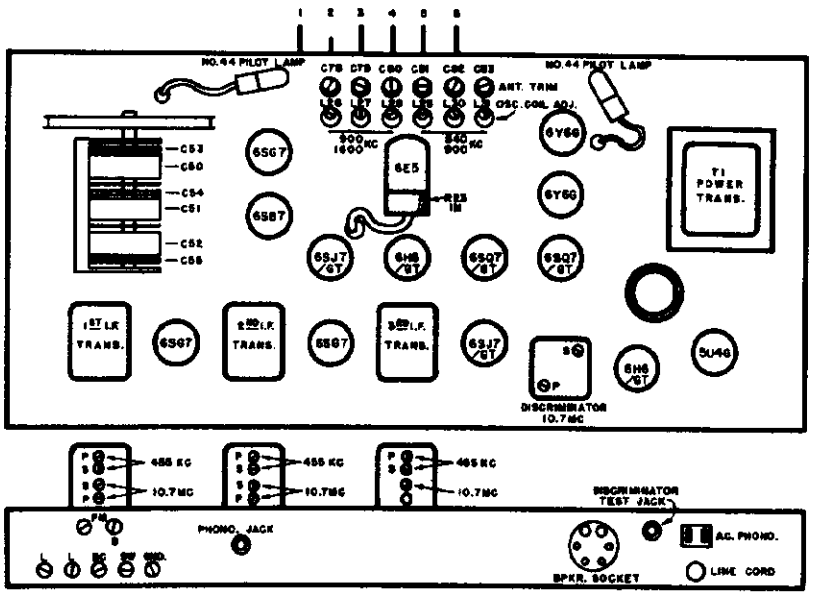
F. M. BAND
FREQUENCY MODULATION

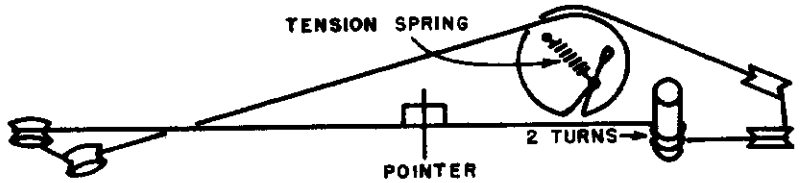
Connect a 20,000 ohms-per-volt or Vacuum Tube Voltmeter between the Discriminator Test Jack and the chassis.

With the volume control set for maximum output and the signal from the generator attenuated to avoid A.V.C. action, proceed as follows:

Step	Connect Signal Generator to—	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set Phono-Band switch to "F.M."			
2	Detune secondary trimmer of discriminator transformer.			
3	6SG7, 2nd I-F, control grid through a .01 mfd mica capacitor	UNMODULATED 10.7 mc	90 mc	10.7 mc primary trimmer of 3rd I-F trans. for maximum voltage.
4	6SG7, 1st I-F, control grid through a .01 mfd mica capacitor	UNMODULATED 10.7 mc	90 mc	10.7 mc secondary and primary trimmers of 2nd I-F trans. for maximum voltage.
5	Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor	UNMODULATED 10.7 mc	90 mc	10.7 mc secondary and primary trimmers of 1st I-F transformer for maximum voltage.
6	Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor	UNMODULATED 10.7 mc	90 mc	carefully "peak" all 10.7 mc I-F trimmers for maximum voltage.
7	FM antenna terminal through a non-inductive 300 ohm resistor	UNMODULATED 105 mc	105 mc	FM oscillator trimmer for maximum voltage.
8	FM antenna terminal through a non-inductive 300 ohm resistor	UNMODULATED 105 mc	105 mc	FM R-F and ANT trimmers for maximum voltage.
9	Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor	UNMODULATED 10.7 mc	90 mc	Primary trimmer of discriminator transformer for maximum voltage.
10	Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor	UNMODULATED 10.7 mc	90 mc	Secondary trimmer of discriminator transformer for zero voltage. The voltage will change polarity as the trimmer is tuned through resonance. Tune carefully for zero voltage.
11	Re-check steps 9 and 10.			

CHASSIS LAYOUT





DIAL DRIVE MECHANISM

LOUDSPEAKER:

H-113, H-114, H-119:
- Size and Type ..... (1) 12" Electro-Dynamic
- Field Resistance ..... 250 ohms
- Voice Coil Impedance ..... 8 ohms

H-116, H-117:
- Size and Type ..... (2) 8" Electro-Dynamic
- Field Resistance ..... 500 ohms
- Voice Coil Impedance ..... 3.2 ohms

SPECIAL PROVISIONS:

H-113, H-114:
Phonograph, playback of wire recording and television sound input connection. A-C outlet for phonograph motor at rear of chassis.

H-116, H-117, H-119:
Playback of wire recording and television sound input connection at rear of chassis.

POWER OUTPUT
- Undistorted ..... 14 watts
- Maximum ..... 25 watts

FREQUENCY RANGES:
- Standard Broadcast ..... 550 to 1700 kc.
- International Short Wave .. 5.0 to 18.0 mc.
- Frequency Modulation ..... 88 to 108 mc.

POWER SUPPLY RATING: 105-120 volts, 50-60 cycles A-C

POWER CONSUMPTION (radio sect. only): ...175 watts

Part No.	Description
V-3420	Background, felt
V-3532S	Bar, flat bar phone, mtg. (H-116, H-117)
V-3420S-4	Bolt, chassis mtg.
V-3185	Bracket, dial light (short)
V-3357	Bracket, dial light (long)
V-4006-1	Bracket, meterboard stop, R.H. (H-116, H-117)
V-4006-2	Bracket, meterboard stop, L.H. (H-116, H-117)
V-3671	Bracket, variable capacitor mtg. (rear)
V-3672	Bracket, variable capacitor mtg. (front)
V-3274	Bracket, volume control mtg.
V-3567	Bracket & Clip Assy. (tuning eye)
RC40BC220M	Capacitor, 22 mmf. mica (C1, C2)
RC40BB470K	Capacitor, 47 mmf. mica (C3, C4, C5)
RC40BC101J	Capacitor, 100 mmf. mica (C6)
V-3714-4	Capacitor, fixed ceramic, 500 mmf. (C7)
RC40BB221M	Capacitor, 220 mmf. mica (C8, C9, C10)
RC40BB471M	Capacitor, 470 mmf. mica (C11, C12)
RC40BB222M	Capacitor, 2200 mmf. mica (C13)
RC40DB6120M	Capacitor, .006 mfd. mica (C14, C15, C16)
RC40DB1020M	Capacitor, .01 mfd. mica (C17, C18, C19, C20, C21, C22)
RCP10M6002M	Capacitor, .006 mfd. 600 v. (C23)
RCP10M6102M	Capacitor, .001 mfd. 600 v. (C24, C25)
RCP10M4103A	Capacitor, .01 mfd. 400 v. (C26, C27)
RCP10W4103A	Capacitor, .01 mfd. 400 v. (C28, C29, C30, C31, C32, C33, C34)
RCP10W4503A	Capacitor, .05 mfd. 400 v. (C35)
RCP10M4503A	Capacitor, .05 mfd. 400 v. (C36)
RCP10W4104A	Capacitor, 0.1 mfd. 400 v. (C37)
V-3714-1	Capacitor, fixed ceramic, 56 mmf. (C38)
V-3714-2	Capacitor, fixed ceramic, 100 mmf. (C39, C40)
V-3841	Capacitor, dual line filter, .05 - .05 mfd. 600 v. (C41, C42)
V-3382	Capacitor, electrolytic 50 mfd. 450 v. (C43) 40 mfd. 450 v. (C44) 15 mfd. 350 v. (C45)
V-3434	Capacitor, 2 gang trimmer (C46 & C47)
V-3396-1	Capacitor, trimmer (C48)
V-3425-1	Capacitor, trimmer (C49)
V-3396	Capacitor, variable, 3 gang (C50, C51, C52, C53, C54, C55)
V-3425-2	Capacitor, trimmer (C56, C57)
V-3396-2	Capacitor, trimmer (C58)
V-3713-1	Capacitor, variable ceramic (C59, C61)
V-3713-2	Capacitor, variable ceramic (C60)
RC40C202G	Capacitor, 2000 mmf. mica (C62)
RCP10W4203A	Capacitor, .02 mfd. 400 v. (C63)
V-3101	Rail, pointer
RC20AE100K	Resistor, 10 ohms ½ w. (R1, R2)
RC40AE680J	Resistor, 68 ohms 2 w. (R3)
V-3282	Resistor, 120 ohms 3 w. (R4)
RC20AE101K	Resistor, 100 ohms ½ w. (R5, R6)
RC40AE153K	Resistor, 15K 2 w. (R7)
RC40AE4725M	Resistor, 4700 ohms 2 w. (R8)
RC10AE473M	Resistor, 47K ¼ w. (R9)
RC10AE223K	Resistor, 22K ¼ w. (R10, R11)
RC20AE333M	Resistor, 33K ½ w. (R12)
RC10AE104K	Resistor, 100K ¼ w. (R13, R14, R15, R16, R17, R18, R19)
RC10AE154K	Resistor, 150K ¼ w. (R20)
RC10AE224K	Resistor, 220K ¼ w. (R21, R22)
RC10AE105K	Resistor, 1 meg. ¼ w. (R23, R29, R30, R31)
RC10AE274K	Resistor, 270K ¼ w. (R24)
RC18AE221M	Resistor, 220 ohms ⅛ w. (R25)
RC18AE474M	Resistor, 470K ⅛ w. (R26, R27)
RC18AE474K	Resistor, 470K ⅛ w. (R28)
RC18AE105M	Resistor, 1 meg. ⅛ w. (R32)
RC18AE225K	Resistor, 2.2 meg. ⅛ w. (R33)
RC18AE225M	Resistor, 2.2 meg. ⅛ w. (R34, R35, R36)
RC10AE106M	Resistor, 10 meg. ⅛ w. (R37)
RC20AE560K	Resistor, 56 ohms ½ w. (R38, R39)
RC20AE562K	Resistor, 5600 ohms ½ w. (R40)
RC10AE153M	Resistor, 15K ¼ w. (R41)
RC41AE152K	Resistor, 1.5K 2 w. (R42, R58)
RC20AE102K	Resistor, 1000 ohms ½ w. (R43)
RC10AE221K	Resistor, 220 ohms ¼ w. (R44)
RC10AE683K	Resistor, 68K ¼ w. (R45)
RC10AE155M	Resistor, 1.5 meg. ⅛ w. (R46)
RC30AE333K	Resistor, 33K 1 w. (R49)
RC40AE560K	Resistor, 56 ohms 2 w. (replaces R54 & R55)
V-3805	Shield, spiral, 4" long

Part No.	Description
V-3238	Capacitor, electrolytic 20 mfd, 25 v. (C84)
V-4156	Choke Assy., parasitic suppressor (L52, R50)
V-3327	Clamp, tuning eye cable
V-3183	Clip, speed (dial mtg.)
V-3361	Coil Assy., F.M. osc. (L1)
V-3418	Coil Assy., F.M. R.F. (L2)
V-3465	Coil Assy., F.M. ant. (L3)
V-3534	Coil, S.W. osc. (L4)
V-3536	Coil, S.W. R.F. (L5)
V-3525	Coil, S.W. ant. (L6 & L7)
V-3512	Coil, B.C. osc. (L8)
V-3527	Coil, B.C. R.F. (L9)
V-3520	Coil, B.C. ant. (L10)
V-3513	Coil, osc. cathode (L11)
V-3254	Connector, phono
V-3305	Control, tone 1 meg. (R47)
V-3293	Control, volume and power, 2 meg. tapped at 500K and 1M (R48), and switch (SW1)
V-3230	Cord, A-C power
V-4137S-00	Cord, dial drive
V-3622	Cover, back (H-116, H-117)
V-3342	Decal, band
V-3669	Decal, tone
V-3422	Dial glass
V-3354	Dripboard (H-116, H-117)
V-3384	Escutcheon, push button
V-3651	Escutcheon, tuning eye (H-116, H-117, H-118)
V-3276-1	Grille Cloth, speaker (H-113)
V-3276-2	Grille Cloth, speaker (H-114)
V-3618-1	Grille Cloth, speaker (H-116)
V-3618-2	Grille Cloth, speaker (H-117)
V-3617-1	Grille Cloth, speaker (H-118)
V-3345S-4	Grommet, var. cond. mtg.
V-3107S-1	Grommet, rubber, chassis mtg.
V-4318	Hinge, door (submit sample with order)
V-3538	Insulator, filter capacitor
Form R3422	Instruction Book (H-113, H-114)
Form R3420	Instruction Book (H-116, H-117)
Form R3440	Instruction Book (H-118)
V-3403	Jack, discriminator test
V-3384-1	Knob, tuning & volume (H-113, H-116, H-118)
V-3383-1	Knob, tone (H-113, H-116, H-118)
V-3383-2	Knob, band (H-113, H-116, H-118)
V-3384-2	Knob, tuning & volume (H-114, H-117)
V-3383-3	Knob, tone (H-114, H-117)
V-3383-4	Knob, band (H-114, H-117)
V-4328-1	Knob, door (H-116)
[W] No. 44	Lamp, dial, 6.3 v.
V-3385-2	Loop Assembly (L12)
V-3702	Mask, tuning eye (H-116, H-117, H-118)
V-3613	Speaker, 6" Electro Dynamic with receptacle (H-116, H-117)
V-3240S	Spring, dial drive
V-3238S	Spring, knob
V-3287	Spring, push button
V-3107S-1	Stud, pulley (threaded)
V-3420	Support, volume control shaft
V-3361-3	Switch Assy., push button
V-3310	Switch, selector (SW2 to SW8 incl.)
V-3305	Tube, station (for push buttons)
V-3402	Tweet (H-116, H-117)
V-3643	Tweet (H-118)
V-3553	Terminal Board, 3 lugs
V-3404	Terminal Board, 1 lug
V-3407	Terminal Board, 11 lugs
V-3240	Terminal Board, 9 lugs
V-3675	Terminal Board, 2 lugs (no lugs grounded)
V-3408	Terminal Board, 12 lugs
V-3406	Terminal Board, 3 lugs (one lug grounded)
V 3255	Terminal Board, ANT-GND
V-3417	Terminal Board F.M. ANT.
V-3411	Transformer, discriminator
V-3410	Transformer, 3rd, I-F
V-3426	Transformer, 1st, I-F
V-3427	Transformer, 2nd, I-F
V-3295	Transformer, power
V-3276S	Tube holder (5U4G)
V-3317	Tuner push button (C79 to C83 and L26 to L31 incl.)
V-3415	Tuning Shaft & Bracket Assy.
V-3668S	Washer, felt
V-3505S-1	Washer, neoprene, chassis mtg.
V-3267S-3	Washer, steel, chassis mtg.
V-3431	Windows, station tab

Part No.	Description
V-3229-3	Moulding, dial (H-113, H-114, H-116, H-117)
V-3229-4	Moulding, dial (H-118)
V-3450	Nameplate (H-118)
V-3366S-2	Pin, escutcheon
V-3041-1	Plate Assy., front glass (H-113)
V-3041-2	Plate Assy., front glass (H-114)
V-3041-3	Plate Assy., front glass (H-116)
V-3041-4	Plate Assy., front glass (H-117)
V-3041-5	Plate Assy., front glass (H-119)
V-3398	Pointer Assy.
V-4318-3	Pull, drawer (H-116, H-117)
V-4318-2	Pull, drawer (H-118)
V-3106S	Pulley, 7/16" dia.
V-3396-1	Push Button with Spring (H-113, H-116, H-118)
V-3396-2	Push Button with Spring (H-114, H-117)

Part No.	Description
V-3344-2	Sleeve, cond. mtg.
V-3639-1	Slide Mechanism, left hand unit (H-116, H-117, H-118)
V-3639-2	Slide Mechanism, right hand unit (H-116, H-117, H-119)
V-3283-2	Socket, A-C outlet
V-3288S	Socket, 8 contact tube
V-3260	Socket, moulded octal tube (6SB7Y, 6SC7)
V-3275S	Socket, moulded octal tube (5U4G)
V-3346S	Socket, octal tube
V-3256-2	Socket, pilot light
V-3308	Socket, tuning eye (with R23)
V-3292	Speaker, 12" Electro Dynamic, incl. output trans. T2 (H-113, H-114, H-119)
V-3612	Speaker, 8" Electro Dynamic with cord, plug and output trans. T3 (H-116, H-117)

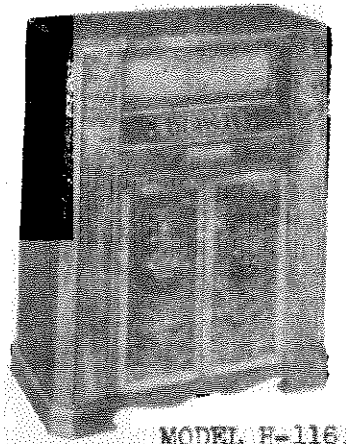
PUSH BUTTONS

Push buttons 1 to 3 are designed to receive stations from 900 to 1600 kc; push buttons 4 to 6 are designed to receive stations from 540 to 900 kc.

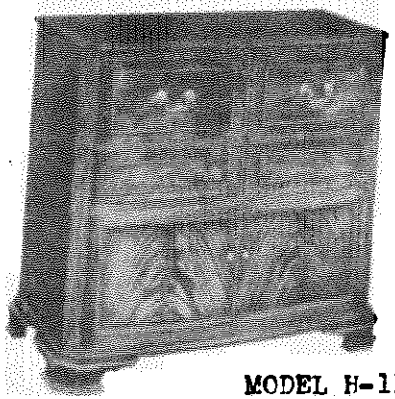
Refer to CHASSIS LAYOUT drawing for location of push button adjusters, and then proceed as follows:

1. Turn on radio and allow it to warm up for five minutes.
2. Set the Phono-Band switch on "BC," and tune in the desired station in the frequency range 900 to 1600 kc.
3. Re-set the Phono-Band switch on "P.B.", and depress the first push button (right button viewed from the front).
4. Adjust C78 for maximum receiver output (either a station or static will be heard depending on the setting of L26). Now adjust L26 until the desired station is heard. It will be necessary to re-adjust C78 at intervals to maintain maximum output.
5. Make a final adjustment of L26 for proper tuning and C78 for maximum output.
6. Return the band switch to "B.C." to make certain that the push button has been set to the desired station.
7. Adjust the remaining push buttons in the same manner.

MODEL H-113, H-114



MODEL H-116, H-117

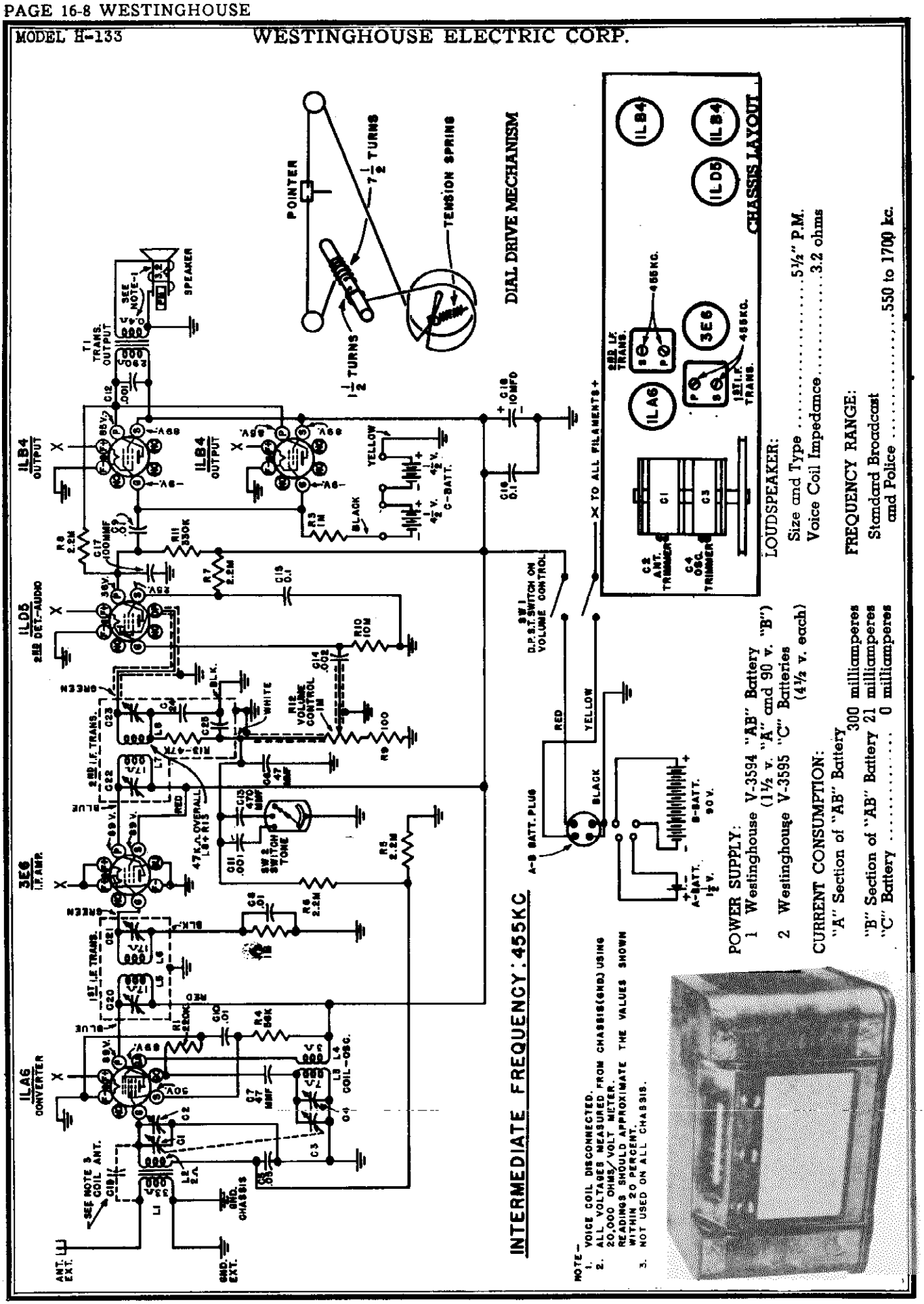


MODEL H-119

WESTINGHOUSE ELECTRIC CORP.
MODELS H-113,-114,-115,
-116,-117,-118,-119

MODEL H-133

WESTINGHOUSE ELECTRIC CORP.



NOTE—
1. VOICE COIL DISCONNECTED.
2. ALL VOLTAGES MEASURED FROM CHASSIS(GND) USING 20,000 OHMS/VOLT METER. READINGS SHOULD APPROXIMATE THE VALUES SHOWN WITHIN 20 PERCENT.
3. NOT USED ON ALL CHASSIS.

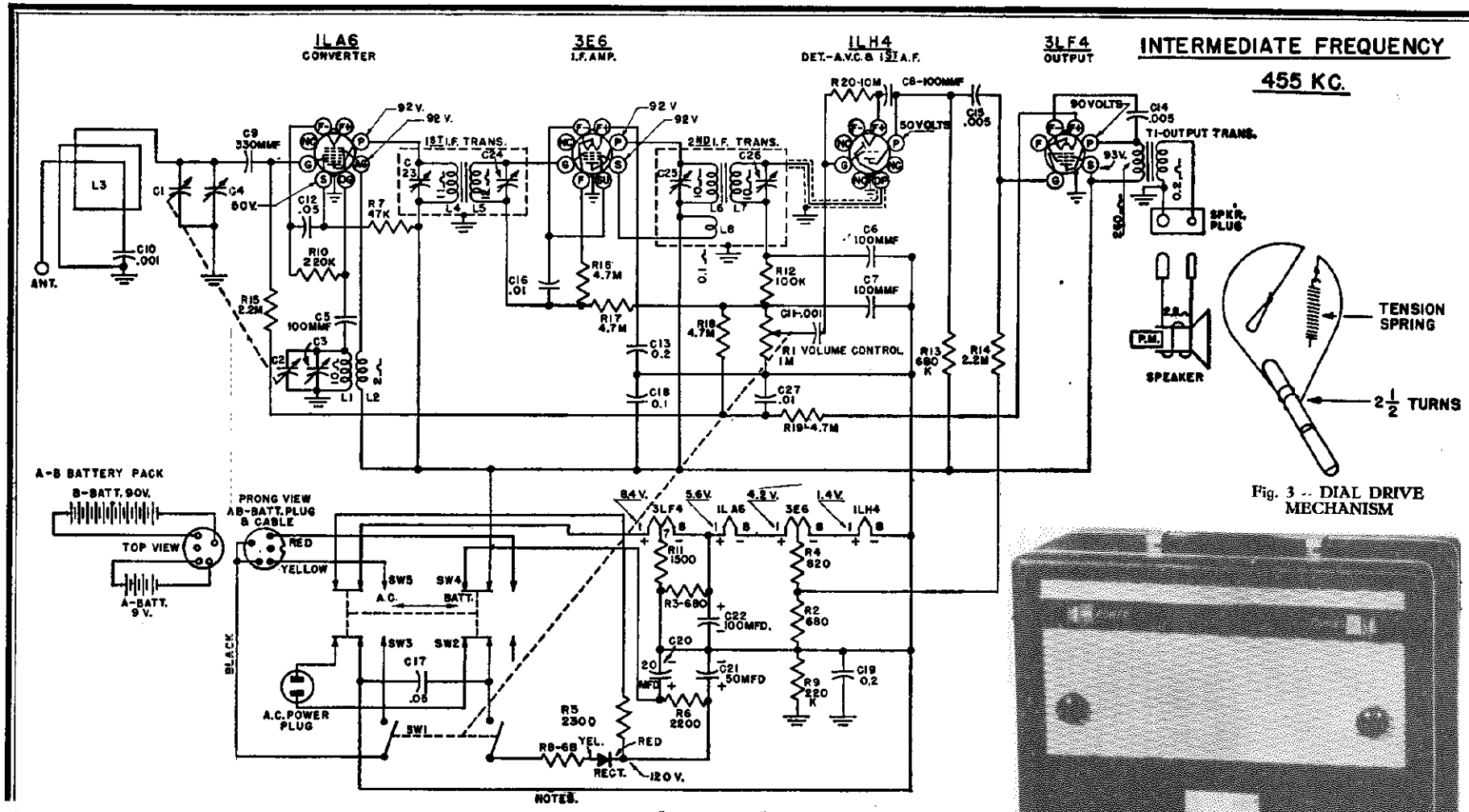
POWER SUPPLY:
1 Westinghouse V-3594 "AB" Battery (1½ v. "A" and 90 v. "B")
2 Westinghouse V-3595 "C" Batteries (4½ v. each)

CURRENT CONSUMPTION:
"A" Section of "AB" Battery 300 milliamperes
"B" Section of "AB" Battery 21 milliamperes
"C" Battery ..... 0 milliamperes

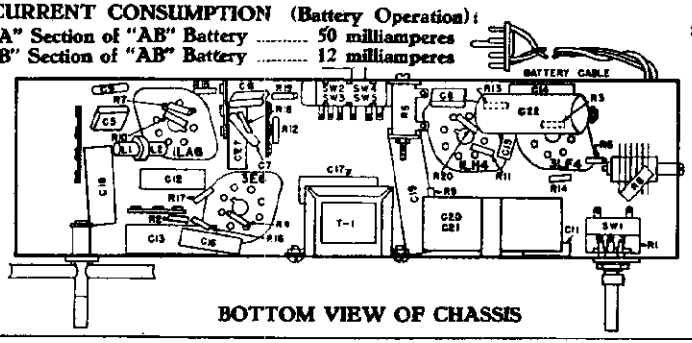
LOUDSPEAKER:
Size and Type ..... 5½" P.M.
Voice Coil Impedance ..... 3.2 ohms

FREQUENCY RANGE:
Standard Broadcast and Police ..... 550 to 1700 kc.

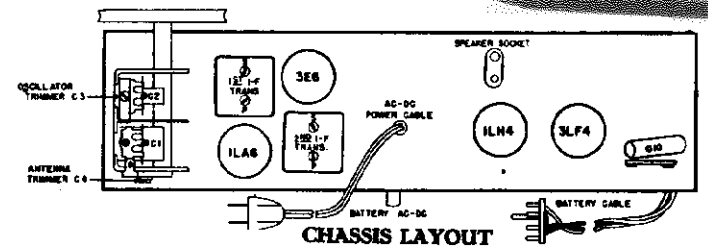
For Parts list and Alignment, see P.16-10



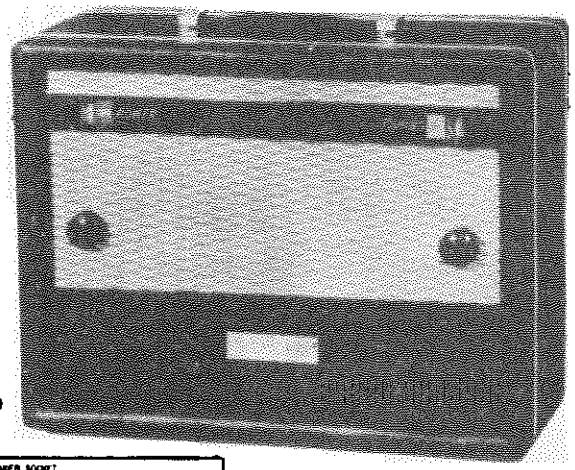
CURRENT CONSUMPTION (Battery Operation):
"A" Section of "AB" Battery ..... 50 milliamperes
"B" Section of "AB" Battery ..... 12 milliamperes



BOTTOM VIEW OF CHASSIS



CHASSIS LAYOUT

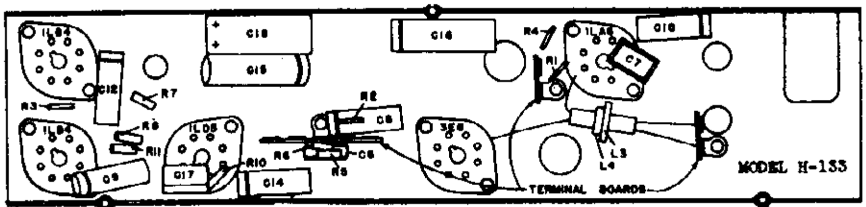


POWER OUTPUT:
Undistorted ..... 200 milliwatts
Maximum ..... 400 milliwatts

LOUDSPEAKER:
Size and Type ..... 4" P. M
Voice Coil Impedance ..... 3.2 ohms

MODEL H-133
MODEL H-148

WESTINGHOUSE ELECTRIC CORP.



BOTTOM VIEW OF CHASSIS

MODEL H-133 **ALIGNMENT** MODEL H-148

Before beginning alignment, make certain that the dial pointer aligns with the dot on the extreme high-frequency end of the dial when the tuning capacitor is set for minimum capacity.

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid A.V.C. action.

Step	Connect Signal Generator to—	Signal Generator Frequency	Radio Dial Setting	Adjust
1	3E6 control grid through 0.1 mfd capacitor	455 kc	550 kc	Secondary and Primary trimmers of 2nd I-F trans. for max. output.
2	1LA6 control grid through 0.1 mfd capacitor	455 kc	550 kc	Secondary and Primary trimmers of 1st I-F trans. for max. output.
3	Antenna terminal through 200 mmf capacitor	455 kc	550 kc	"Peak" all I-F trimmers.
4	Antenna terminal through 200 mmf capacitor	* 1700 kc	*1700 kc	Oscillator trimmer for max. output.
5	Antenna terminal through 200 mmf capacitor	1400 kc	1400 kc	Antenna trimmer for max. output.

*1600 KC for Model H-148; rest of alignment the same

When ordering parts specify model number of set in addition to part number and description of part.

MODEL H-133

Part Number	Description
V-3883	Background, dial
V-4521	Baffle and Grille Cloth Assy.
V-3504	Battery, "A-B" (1½ v. & 90 v.)
V-3505	Battery, "C" (4½ v.)
V-3500	Bracket, var. cap. mtg.
V-1112-2	Cabinet
V-3886	Capacitor, variable, 2 gang (C1, C2, C3, C4)
RCP10W2503A	Capacitor, 0.05 mfd. 200 v. (C5)
RCM20A470K	Capacitor, 47 mmf. (C6, C7)
RCP10W4103A	Capacitor, 0.01 mfd. 400 v. (C8, C9, C10)
RCP10W6102K	Capacitor, 0.001 mfd. 600 v. (C11, C12)
RCM20A471K	Capacitor, 470 mmf. (C13)
RCP10W6202A	Capacitor, 0.002 mfd. 600 v. (C14)
RCP10W2104A	Capacitor, 0.1 mfd. 200 v. (C15, C16)
RCM20A101M	Capacitor, 100 mmf. (C17)
V-3501	Capacitor, electrolytic, 10 mfd. 150 v. (C18)
V-4733	Capacitor, 4.7 mmf. (C19—not used on all chassis)
V-3502	Clamp, dial mtg.
V-3507	Coil, antenna (L1, L2)
V-3503	Coil, oscillator (L3, L4)
V-3884	Control, volume, 1 meg. (R12) with switch (SW1)
V-41578-60	Cord, dial drive
V-3886	Decal, OFF
V-3888	Decal, TONE
V-3882	Decal, STATIONS
V-3885	Decal, WESTINGHOUSE
V-3580	Dial, glass
V-3400	Feet, felt
V-3280	Grommet, variable cap. mtg.
V-3082	Jumper, "C" battery
V-3331-1	Knob, volume (including spring)
V-3331-2	Knob, tuning (including spring)
V-3331-3	Knob, tone (including spring)
Form [illegible]	Operating Instructions
V-3505	Plug, battery cable
V-3587	Plug and Cable Assy., battery
V-3558	Pointer Assy.
V-31068	Pulley, 7/16" dia.
RC10AE224M	Resistor, 220K ¼ w. (R1)
RC10AE105M	Resistor, 1.0 meg. ¼ w. (R2, R3)
RC10AE563M	Resistor, 56K ¼ w. (R4)
RC10AE225M	Resistor, 2.2 meg. ¼ w. (R5, R6, R7, R8)
RC10AE101M	Resistor, 100 ohms ¼ w. (R9)
RC10AE106M	Resistor, 10 meg. ¼ w. (R10)
RC10AE334M	Resistor, 330K ¼ w. (R11)
V-37558-10	Screw, chassis mtg.
V-3573	Socket, loctal tube
V-3601	Speaker, 5¼" P.M.
V-32485	Spring, dial drive
V-3551	Stud and Bracket Assy., pulley
V-3563	Switch, tone control (SW2)
V-3574	Terminal Board, 2 lugs
V-3575	Terminal Board, 5 lugs
V-3576	Transformer, output (T1)
V-3577	Transformer, 1st I.F.
V-3578	Transformer, 2nd I.F.
V-3237	Washer, cup, var. cap. mtg.
V-37528	Washer, felt
V-32878-4	Washer, chassis mtg.

MODEL H-148

PART NO.	DESCRIPTION
V-3881	Baffle and Grille Cloth Assy.
V-3920	Battery Pack, "AB" (9 v. and 90 v.)
V-3523	Bearing, tuning shaft
V-3044	Bracket Assy. (OFF-ON)
V-3057	Bracket, variable capacitor mtg.
V-1114	Cabinet
V-3058	Capacitor, variable 2 gang (C1, C2, C3)
V-4542	Capacitor, Antenna trimmer (C4)
RCM20A101M	Capacitor, 100 mfd mica (C5, C6, C7, C8)
RCM20A331M	Capacitor, 330 mfd mica (C9)
RCP10W6102A	Capacitor, .001 mfd 600 v. (C10, C11)
RCP10W2503A	Capacitor, .05 mfd 200 v. (C12)
RCP10W2204A	Capacitor, 0.2 mfd 200 v. (C13)
RCP10W6502A	Capacitor, .005 mfd 600 v. (C14, C15)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C16, C27)
RCP10W4503A	Capacitor, .05 mfd 400 v. (C17)
RCP10W4104A	Capacitor, 0.1 mfd 400 v. (C18)
RCP10W4204K	Capacitor, 0.2 mfd 400 v. (C19)
V-3061	Capacitor, electrolytic 20 mfd 150 v. (C20) 50 mfd 150 v. (C21)
V-3066	Capacitor, electrolytic cartridge 100 mfd 25 v. (C22)
V-3097	Channel, decorative strip mtg.
V-3337	Clamp, cable
V-3006	Clamp, handle
V-3062	Clamp, spring (electrolytic cap. mtg.)
V-3045	Coil, oscillator (L1, L2)
V-3052	Control, volume (R1) with switch (SW1)
V-4349-1	Cord, A-C power
V-41575-15	Cord, dial drive
V-3078	Decal, OFF-ON
V-3059	Dial
V-3005	Feet, felt
V-3098	Grille
V-3766	Grommet, fiber
V-3000	Grommet, rubber, square
V-3901	Handle
V-3912	Knob, tuning and volume
V-3914	Label, tube layout
V-5265	Latch Assy., back cover
V-3915	Loop, antenna (L3)
V-3094	Name Plate
V-3904	Panel, metal
V-3874	Plug and Cable, Assy., battery
V-4115	Rectifier, selenium
RC10AE681K	Resistor, 680 ohms ¼ w. (R2, R3)
RC10AE821K	Resistor, 820 ohms ¼ w. (R4)
V-3069	Resistor, ballast, 2300 ohms 5 w. (R5)
RC20AE222K	Resistor, 2200 ohms ½ w. (R6)
RC10AE473K	Resistor, 47K ¼ w. (R7)
RC40AE680M	Resistor, 68 ohms 2 w. (R8)
RC10AE224M	Resistor, 220K ¼ w. (R9, R10)
RC10AE152K	Resistor, 1500 ohms ¼ w. (R11)
RC10AE104K	Resistor, 100K ¼ w. (R12)
RC10AE684K	Resistor, 680K ¼ w. (R13)
RC10AE225M	Resistor, 2.2M ¼ w. (R14, R15)
RC10AE475K	Resistor, 4.7M ¼ w. (R16, R17, R18, R19)
RC10AE106M	Resistor, 10M ¼ w. (R20)
V-3560	Shaft, tuning
V-3099	Shield, plastic front
V-3071	Shield, spiral
V-3070-1	Socket, lock in
V-3299	Socket, speaker
V-4114	Spacer, sleeve
V-3917	Speaker, 4" P.M.
V-3050	Spring, OFF-ON
V-3055	Spring, coil, for OFF-ON switch
V-32485	Spring, dial drive
V-3900	Strip, decorative power and tuning
V-3909	Strip, plastic, loop mtg.
V-3072	Switch, battery AC-DC (SW2, SW3, SW4, SW5)
V-41165	Terminal Board, 1 lug
V-3064	Terminal Board, 2 lugs
V-3042	Terminal Board, 3 lugs
V-3065	Terminal Board, 4 lugs
V-3077	Transformer, 1st I-F (L4, L5, C23, C24)
V-3076	Transformer, 2nd I-F (L6, L7, C25, C26)
V-3068	Transformer, output
V-3067	Washer, phenolic (resistor mtg.)
V-37525	Washer, felt
V-3919	Washer, flat (chassis mtg.)

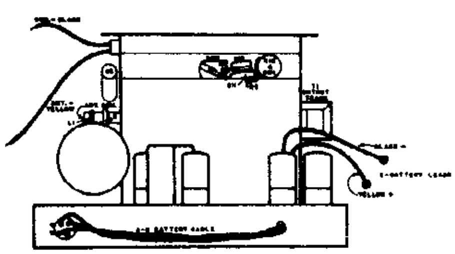
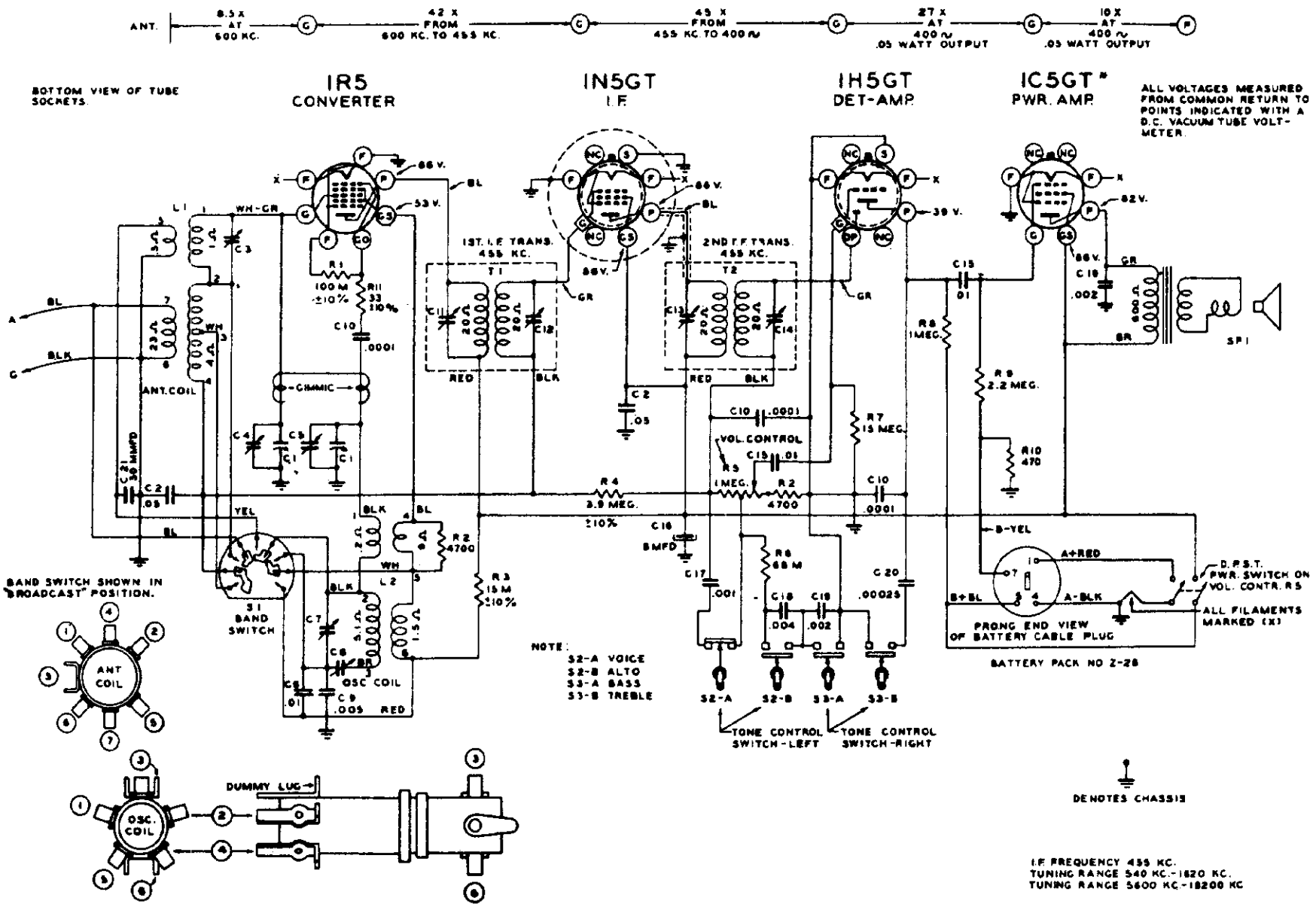


FIG. 3—REAR VIEW OF CHASSIS

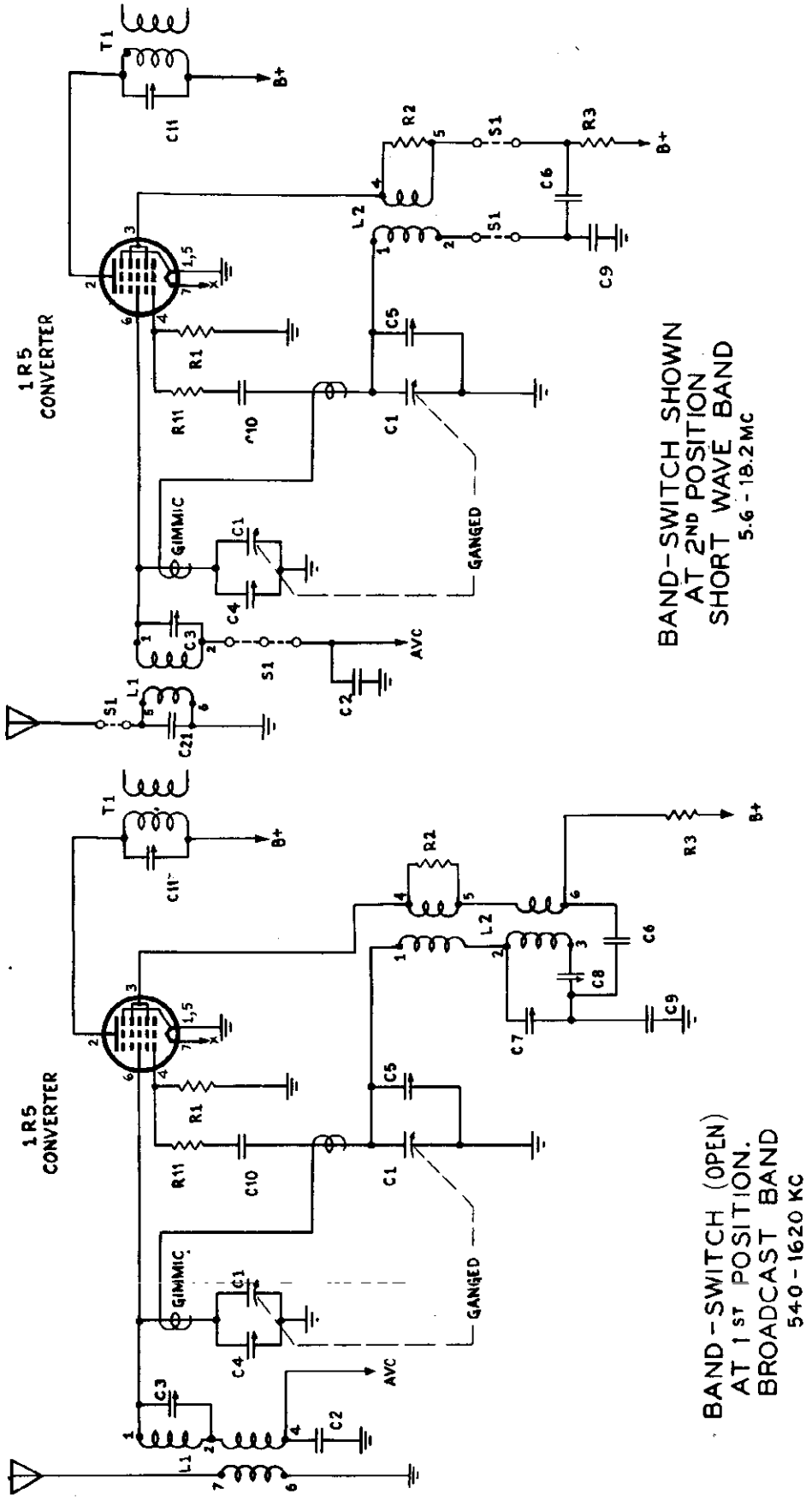


ZENITH RADIO CORP.

MODELS 4K040, 4K040G

Chassis 4C54

MODELS 4K040, 4K040G. ZENITH RADIO CORP.



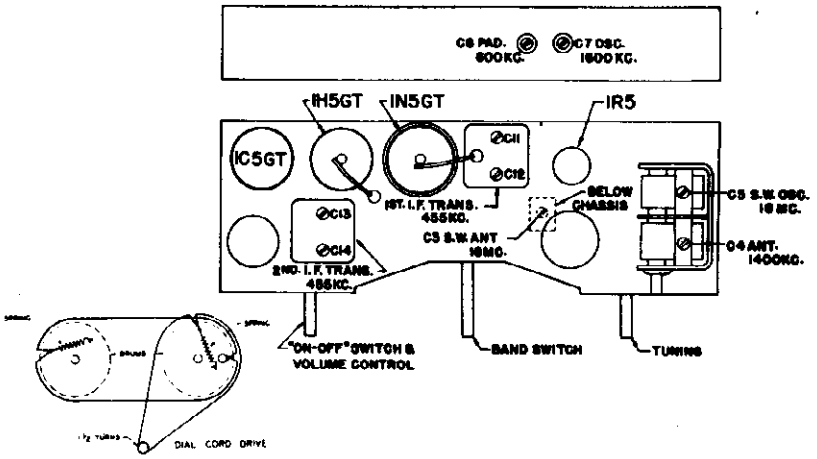
ZENITH RADIO CORP.

MODELS 4K040 4K0400

TO THE SERVICE MAN:

The alignment of this receiver is conventional. An output meter, connected across the voice coil of the speaker, is very helpful in making correct adjustments.

The Guardian Reminder Circuit consist of a 4700 ohm resistor (R2) in series with the low side of the volume control. With this circuit, it is impossible to turn the volume completely off and leave the power on. In some cases where the minimum volume is too high even at the lowest setting of the volume control, R2 may be changed to a lower value or shorted out completely.



TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING

ALIGNMENT PROCEDURE

OPERATION	CONNECT OSC. TO	DUMMY ANT.	INPUT SIG. FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	BC	600 Kc.	C-11, C-12, C-13, C-14	Align I.F.
2	Ant.-Gnd.	400 ohms	18 Mc.	SW	18 Mc.	C-5	Set Osc. to Scale
3	Ant.-Gnd.	400 ohms	400 ohms	SW	Rock Gang 18 Mc.	C-3	Align Antenna
4	Ant.-Gnd.	200 Mmf.	1600 Kc.	BC	1600 Kc.	C-7	Set Osc. to Scale
5	Ant.-Gnd.	200 Mmf.	1400 Kc.	BC	1400 Kc.	C-4	Align Antenna
6	Ant.-Gnd.	200 Mmf.	600 Kc.	BC	Rock Gang 600 Kc.	C-8	Adjust Padder

DIAL ASSEMBLY

26-342	Dial Scale	.32
46-443	Radiogram Knob (Voice)	.07
46-444	" " (Treble)	.07
46-445	" " (Alto)	.07
46-446	" " (Bass)	.07
59-122	Off & ON Indicator	.12
59-160	Dial Pointer	1.14
76-335	Tuning Control Shaft	.07
80-183	Indicator Spring	.024
80-209	Dial Cord Tension Spring	.024
80-471	Tuning Shaft Spring	1.31C
93-690	Felt Washer (S-11362)	.60C
192-90	Dial Crystal	.50
196-64	Dial Crystal Gasket	.08
S9588	Indicator Cam Assem.	.07
S9610	Dial Cord & Eyelet (Pointer)	.12
S9733	Dial Cord & Eyelet (Gang Cond.)	.07
S9751	Pulley & Rivet Assem. (Gang Cond.)	.12
S11362	Pulley & Bushing Assem. (Pointer)	.11
S11556	Vol. & Tuning Knob Assem. (2 used) (46-520)	.28
S12305	Band Switch Knob Assem. (46-598)	.32

COILS & CHOKES

95-838	1st I.F. Transformer (T1)	1.77
95-839	2nd I.F. Transformer (T2)	1.77
S9829	Osc. Coil Assem. (L2)	1.39
S9832	Ant. Coil Assem. (L1)	1.39

CONDENSERS

22-162	.0001 Mfd. (C10)	600 V.	.20
22-182	.00025 Mfd. (C20)	600 V.	.26
22-196	.01 Mfd. (C15)	600 V.	.20
22-448	.004 Mfd. (C18)	600 V.	.20
22-492	.002 Mfd. (C19)	600 V.	.20
22-684	Dry Electrolytic 8 Mfd. (C16)	150 V.	.45
22-826	.01 Mfd. (C6)	200 V.	.20
22-829	.05 Mfd. (C2)	200 V.	.20
22-887	.001 Mfd. (C17)	600 V.	.20
22-1022	.005 Mfd. (C9)	600 V.	.38
22-1208	Two Section Gang (C1)		2.56
22-1239	Two Section Trimmer (C7 & C8)		.58
22-1240	Single Section Ceramic Trimmer (C5)		.20
22-1532	50 Mmfd. (C21)	500 V.	.20

RESISTORS

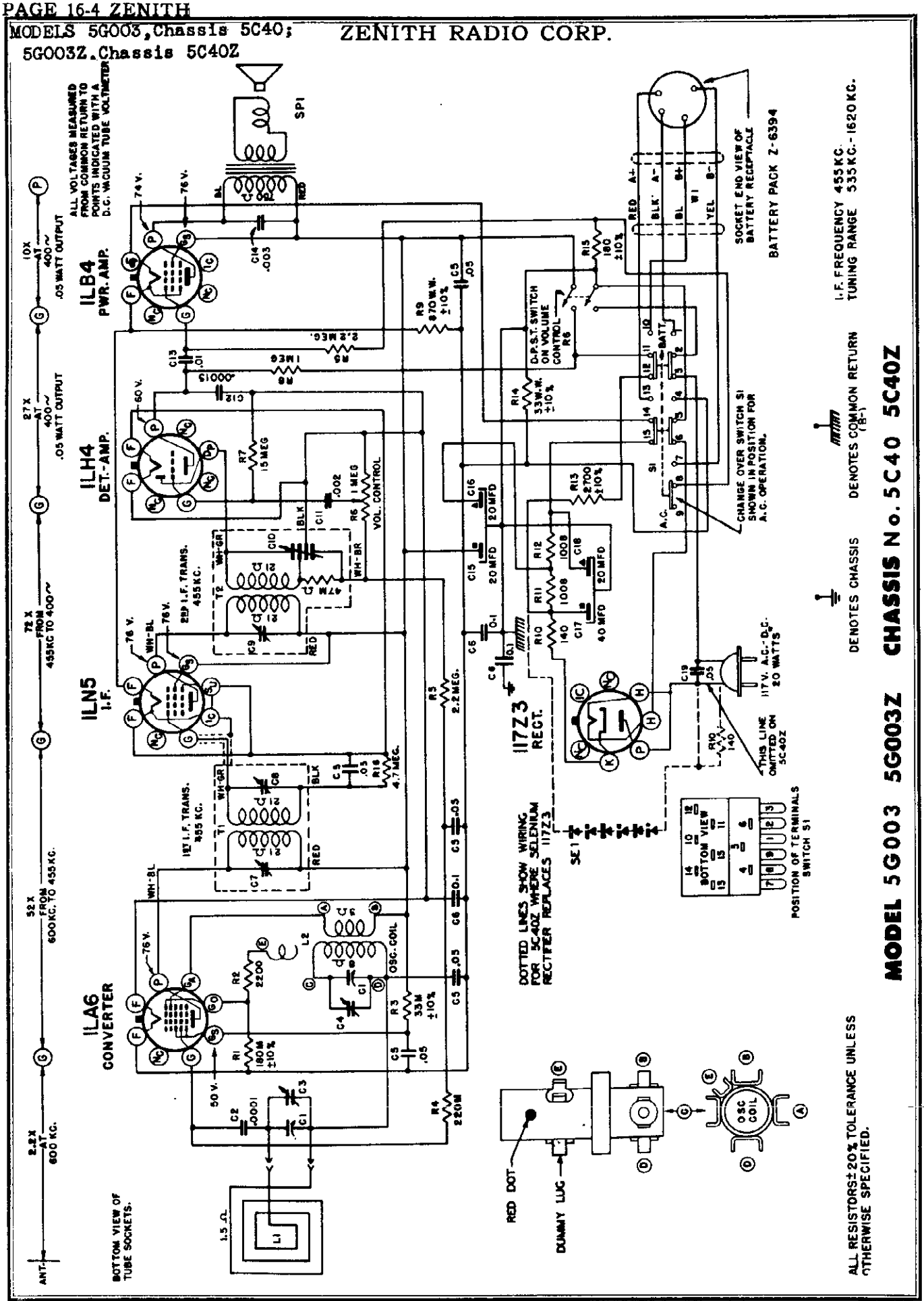
63-260	100M Ohm (R1)	1/4 Watt	.09
63-271	1 Megohm (R8)	1/4 "	.09
63-311	15M Ohm (R3)	1/4 "	.09
63-581	470 Ohm (R10)	1/4 "	.09
63-587	4700 Ohm (R2)	1/4 "	.09
63-594	68M Ohm (R6)	1/4 "	.09
63-600	2.2 Megohm (R9)	1/4 "	.09
63-620	33 Ohm (R11)	1/4 "	.09
63-669	3.9 Megohm (R4)	1/4 "	.09
63-976	15 Megohm (R7)	1/4 "	.09
63-1236	Volume Control & Switch (R5)		1.81

MISCELLANEOUS

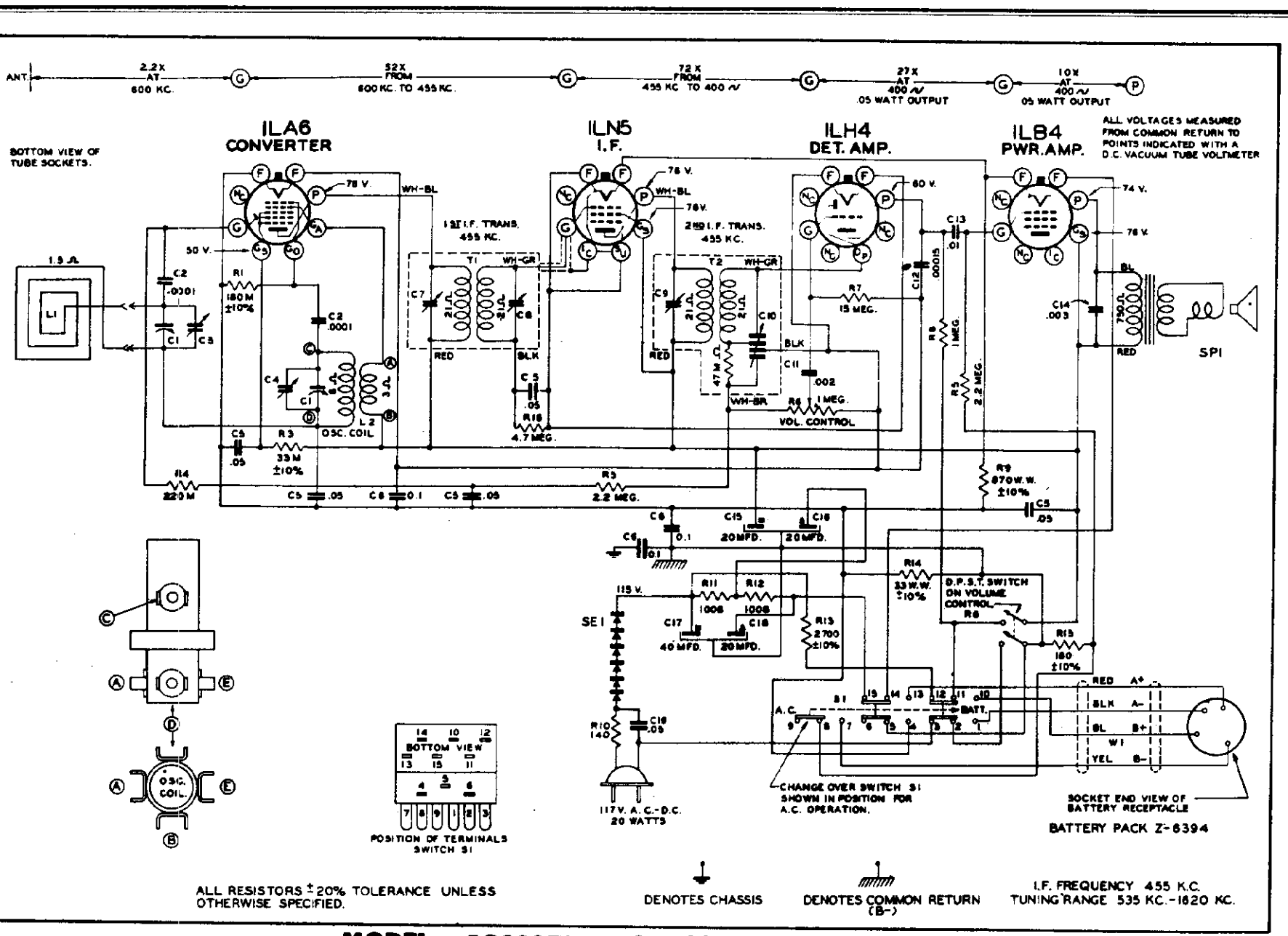
49-522	6½" P.M. Speaker	10.00
	206-522 Output Transformer	2.21
	208-522 Cone & Voice Coil	2.09
52-190	Speaker Cable	.19
54-34	#6-32 x 1/4 x 3/32 Hex Nut	.31C
57-11A	Antenna Marker	.024
57-11C	Ground Marker	.024
57-900	Dial Mtg. Plate	.35
57-1159	Radiorgan Escutcheon Plate (2 used)	.18
58-74	Battery Cable Plug	.12
70-124	#2 x 3/8 Phillips Hd. Wood Screw - Brass Plated (57-1159)	1.90C
78-436	Miniature Tube Socket	.19
78-611	Octal Base Tube Socket (3 used)	.12
95-279	Band Selector Switch	.72
85-284	Radiorgan Switch L.H. (Voice & Alto)	.55
85-288	Radiorgan Switch R.H. (Treble & Bass)	.55
93-125	#6 Internal Shakeproof Lockwasher	.31C
93-258	Brown Felt Washer (Knobs)	.78C
94-29C	Steel Bushing (Radiorgan) (4 used)	.036
112-56	#6-1/4 Hex Hd. Self Tapping Screw	.55C
114-67	#6-32 x 7/16 Hex Acorn Hd. M.S. Steel N.P. (Radiorgan) (4 used)	.43C
114-162	#8 x 7/8 Hex Acorn Hd. Self Tapping Screw (Chassis Mtg.)	1.20C
125-17	Rubber Grommets (85-284 & 288)	.03
125-39	Rubber Grommets	.02
126-379	Tube Shield	.07
159-14	Plug Buttons (Dial Scale)	.78C
188-32	Retainer Ring (76-335)	1.03C
188-34	Retainer Ring (S-11362)	1.20C
188-48	Control Knob Decorative Ring	.035
202-384	Instruction Book	.15

MODELS 5G003, Chassis 5C40; 5G003Z, Chassis 5C40Z

ZENITH RADIO CORP.



For other data. see P.16-6



MODEL 5G003ZZ CHASSIS No. 5C40ZZ

ZENITH RADIO CORP. MODEL 5G003ZZ, Chassis 5C40ZZ ZENITH PAGE 16-

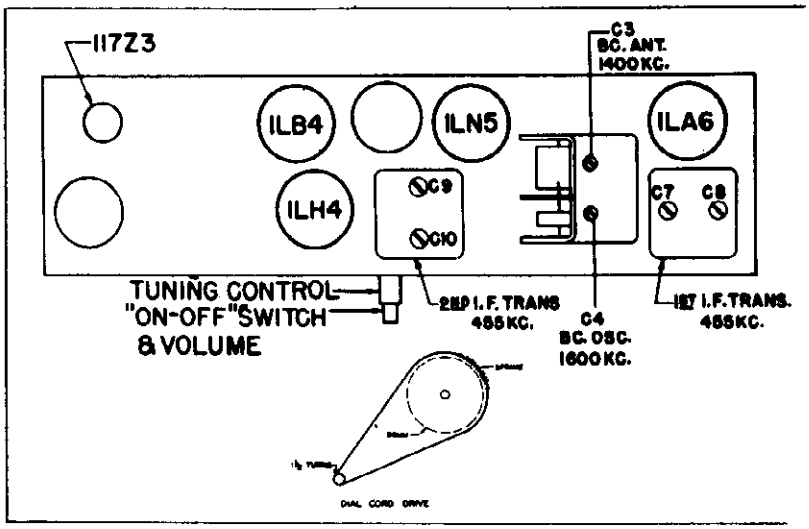
MODELS 5G003, 5G003Z
MODEL 5G003ZZ

ZENITH RADIO CORP.

TO THE SERVICEMAN:

The alignment of chassis 5C40 is conventional and the most accurate alignment will be accomplished if the procedure is followed exactly. The IF frequency is 455 KC and all measurements, voltage, and resistance have been taken with an electronic voltohm meter.

Stage by stage gain measurements are for reference purposes only. Gain measurements can seldom be duplicated, and are used only for comparison purposes.



TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING

ALIGNMENT PROCEDURE

OPERATION	CONNECT OSC. TO	DUMMY ANT.	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455	600	C7, C8, C9 C10	1.F. Alignment
2	Single Turn Loop	--	1600	1600	C4	Set Osc. to scale
3	Coupled Loosely to Wavemagnet	--	1400	1400	C3	Alignment of Antenna

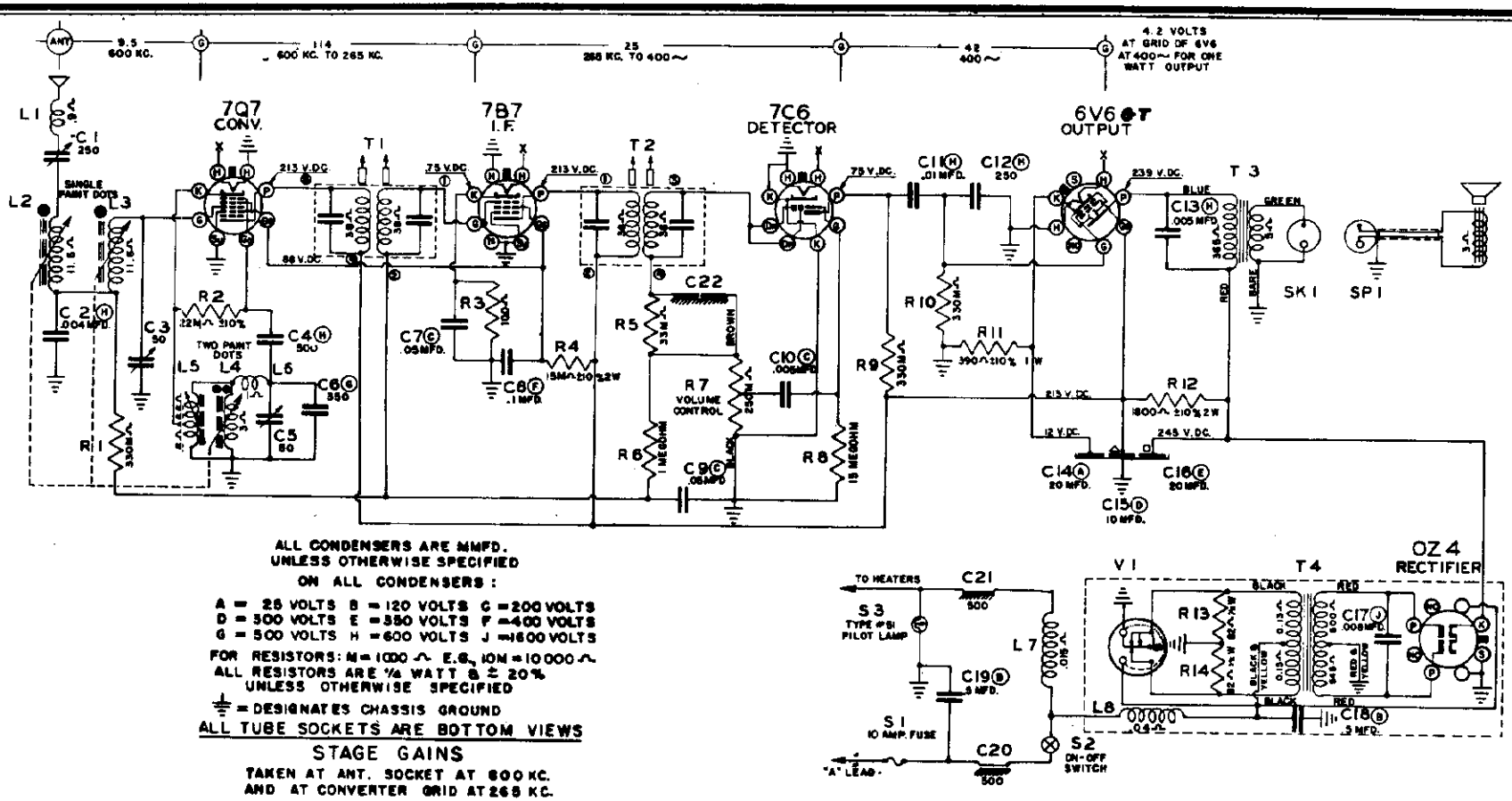
PARTS LIST

PART NO.	REF. NO.	DESCRIPTION	PRICE
		DIAL ASSEMBLY	
26-366		Dial Scale	.12
46-530		Volume Control Knob (Small)	.17
46-587		Tuning Control Knob (Large)	.11
57-1120		Escutcheon Plate	1.00
57-1187		Dial Plate	.60
59-164		Dial Pointer	.19
76-488		Tuning Control Shaft	.28
80-365		Tuning Shaft Tension Spring (63-1459)	.03
80-508		Dial Cord Tension Spring	.04
125-17		Rubber Grommets (22-1450)	.02
147-148		Dial Plate Spacer	.02
159-50		Plug Button (26-366-192-99)	.01
188-53		Tuning Shaft Retainer Ring	.01
192-99		Dial Glass	.20
196-88		Dial Glass Gasket	.06
S-11098		Pulley & Bushing Assembly	.33
S-11137		Dial Cord & Eyelet Assembly	.09
		CHOKES AND COILS	
93-937	T1	First I.F. Transformer	1.85
93-938	T2	Second I.F. Transformer	1.85
S-11830	L2	Osc. Coil Assem. 5C40-402	.95
S-13765	L2	Osc. Coil Assem. 5C40ZZ	.95
		CONDENSERS	
22-162	C2	.0001 Mfd. 500 Volt	.20
22-196	C13	.01 Mfd. 600 Volt	.20
22-326	C14	.003 Mfd. 400 Volt	.20
22-470	C12	.00015 Mfd. 600 Volt	.20
22-492	C11	.002 Mfd. 600 Volt	.20
22-827	C6	.1 Mfd. 200 Volt	.23
22-829	C5	.05 Mfd. 200 Volt	.20
22-1014	C15 & C16	Dry Electrolytic 20 x 20 Mfd. 150 Volt	.95
22-1017	C19	.05 Mfd. 200 Volt	.20
22-1081	C17 & C18	Dry Electrolytic 40 x 20 Mfd. 150 Volt-25 Volt	.83
22-1450	C1	Two Section Gang 5C40-402	4.15
22-1653	C1	Two Section Gang 5C40ZZ	4.15
		RESISTORS	
63-271	R8	1 Megohm 1/4 Watt	.09
63-296	R4	220 M Ohm 1/4 Watt	.09
63-439	R13	2700 Ohm 1/4 Watt	.09
63-579	R2	220 Ohm 1/4 Watt	.09
63-600	R5	2.2 Megohm 1/4 Watt	.09
63-602	R16	4.7 Megohm 1/4 Watt	.09
63-627	R15	180 Ohm 1/4 Watt	.09
63-646	R3	33 M Ohm 1/4 Watt	.09
63-654	R1	180 M Ohm 1/4 Watt	.09
63-976	R7	15 Megohm 1/4 Watt	.09
63-1097	R9	870 Ohm W. W. Insl. 1 Watt	.24
63-1099	R14	33 Ohm W. W. Insl. 1/2 Watt	.21
63-1363	R11-R12	Two Section Candohm (63-1132)	.80
63-1366	R10	Zipohm	.24
63-1549	R6	Vol. Control & Switch D P S T	1.81
		MISCELLANEOUS	
11-70		A. C. Line Cord & Plug (Alt 11-90)	.80
12-1322		Reinforcing Brkt. (2 used Handle)	.15
14-903		Polystyrene Cabinet Front Less Accessories (use S-13209)	...
45-51		Battery Socket Cap	.08
24-371		Cabinet Rear Cover Less Accessories (Use S-11999)	...
40-28		Cabinet Hinge	.20
43-111		Handle End Pieces (Die Cast)	.65
49-540		4" P M Speaker (Complete)	7.35
		206-540 Output Transformer	1.87
		208-540 Cone & Voice Coil Assem.	1.73
54-224		Speed Nut (2 used S-11999)	.02
57-1119		Chassis Bottom Plate	.24
64-98		Brass Eyelet (S-11998)	.02
64-99		Brass Eyelet (S-11999)	.01
78-229		Electrolytic Socket	.05
78-275		Electrolytic Socket	.03
78-400		Loktal Base Tube Socket	.19
78-437		Miniature Base Tube Socket	.12
78-446		Loktal Base Tube Socket (3 used)	.18
78-637		Battery Cable Socket	.23
80-436		Tube Retaining Spring (117Z3)	.15
82-20		Battery Retaining Strip	.25
83-1393		Rubber Strip (Handle)	.30
85-367-S1		Power Change Over Switch	.82
86-66		Pin Jack Terminal (Gang)	.02
86-142		Pin Jack Terminal (Gang)	.02
93-743		Bakelite Spacer Washer (S-11999)	.03
110-119		Grille Cloth	.15
112-488		#6 x 5/16 Phillips B H Self Tapping Screw (82-20)	1.85C
112-533		#6 x 1/4 Phillips R.H. Self Tapping Screw (40-28)	.02
112-604		#8 x 5/16 Phillips Stove Hd. Self Tapping Screw (Chassis Mtg.)	.03
126-482		Spiral Shield	.05
139-61		Baffle Board (or 139-66)	.08
156-27		Cover Catch (2 used)	.09
193-53		Flexible Handle Sleeve	.40
202-429		Instruction Book	.03
212-2		Selenium Rectifier	
S-11999	L1	Cabinet Back & Wavemagnet Assem. Complete (24-371) 5C40-5C40Z	4.75
S-13767		Cabinet Back & Wavemagnet Assem. ZZ Model	
S-13209		Front Cabinet & Hinge Assem. (14-903)	6.25
S-13210		Strap & Rivet Assem. (Handles)	.20

Prices subject to change without notice.

2SM 4-20-47

ZENITH
MODEL 5
5080, Crosley



ALL CONDENSERS ARE MMFD.
UNLESS OTHERWISE SPECIFIED

ON ALL CONDENSERS :

A = 25 VOLTS B = 120 VOLTS C = 200 VOLTS
D = 500 VOLTS E = 350 VOLTS F = 400 VOLTS
G = 500 VOLTS H = 600 VOLTS J = 1600 VOLTS

FOR RESISTORS: M = 1000 Ω E.G. 10M = 10 000 Ω
ALL RESISTORS ARE ½ WATT & ± 20%
UNLESS OTHERWISE SPECIFIED

⏚ = DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS

STAGE GAINS

TAKEN AT ANT. SOCKET AT 600 KC.
AND AT CONVERTER GRID AT 265 KC.

DUMMY ANTENNA

30 MMFD SERIES & 30 MMFD. SHUNT AT ANT.
SOCKET & 0.1 MFD. SERIES TO CONVERTER GRID

BATTERY CONDITIONS

6.3 VOLTS AT STORAGE BATTERY TERMINALS
WITH POSITIVE GROUNDED

TEST CONDITIONS

VOLUME CONTROL SET AT MAXIMUM
WITH NO INCOMING SIGNAL

VOLTAGES READ FROM POINT SHOWN TO
CHASSIS WITH 1000 OHM PER VOLT METER

SCHEMATIC DIAGRAM FOR 5 TUBE
CROSLEY 5MX080

I. F. 265 KC.
TUNING RANGE 540 KC. TO 1600 KC.

SENSITIVITY: ..... 10 microvolts at one watt output.

UNDISTORTED POWER OUTPUT: .....
2 watts measured at the voice coil.

MAXIMUM POWER OUTPUT: .....
4.25 watts measured at the voice coil.

SPEAKER: ..... 6" x 9" oval, instrument panel mounting.

CURRENT CONSUMPTION: ..... 5. amperes

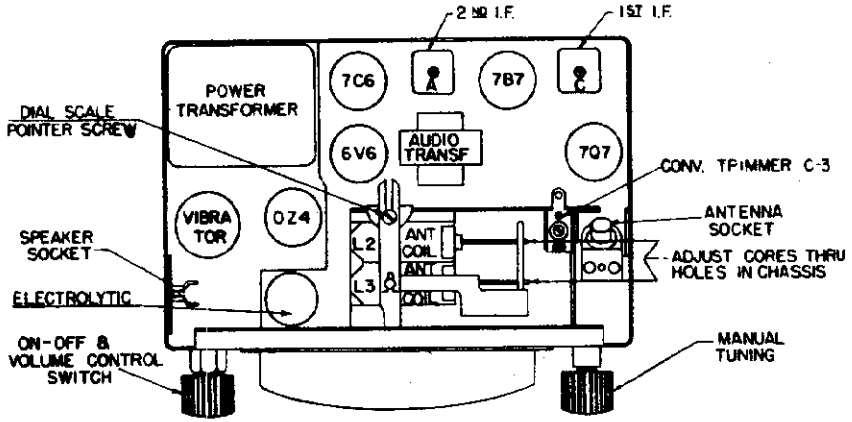


Fig. 7. Top View of Chassis

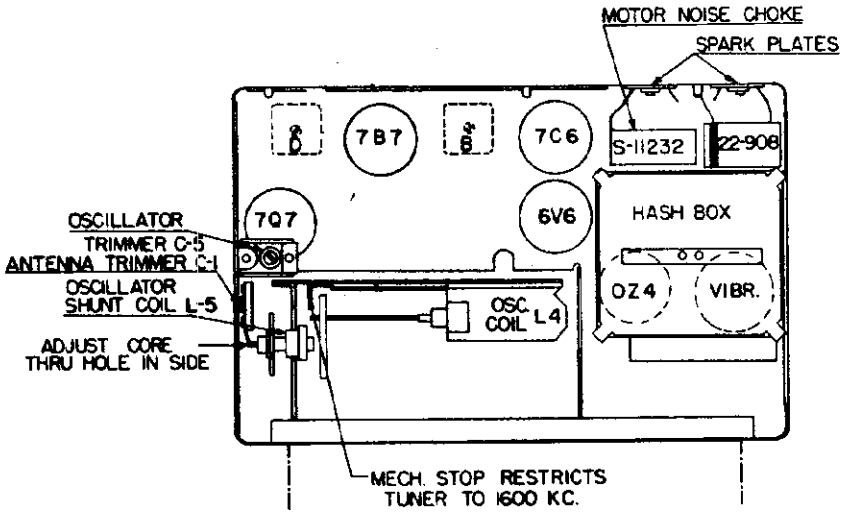


Fig. 8. Bottom View of Chassis

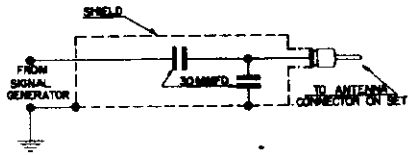


Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustments to the receiver with the volume control set at maximum. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I. F. ALIGNMENT PROCEDURE

1—Remove top and bottom covers from receiver.

2—Set signal generator to 265 Kc.

3—Apply signal from generator through a .1 Mfd. dummy to 7Q7 converter grid. (Pin No. 6 on socket.)

4—Adjust I.F. slugs A, B, C and D (Figs. 7 and 8), in the order named for maximum output. Repeat the operation to assure accurate alignment.

R. F. AND OSCILLATOR ALIGNMENT

1—Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver. This is important.

2—Set signal generator to 535 Kc.

3—Set dial to 535 Kc. (End of travel, against the stop.)

4—Adjust oscillator trimmer C-5 (Fig. 8) for maximum response.

5—Set signal generator to 1200 Kc.

6—Tune set to 1200 Kc.

7—Adjust converter trimmer C-3 (Fig. 7) and Ant. trimmer C-1 (Fig. 8) for maximum response.

8—If dial calibration is off after making above adjustments, a correction can be made by turning eccentric screw at fulcrum of dial pointer. (Fig. 7.)

CORE OR COIL REPLACEMENT ONLY

WARNING: The following adjustments are to be made ONLY if a core or coil is replaced.

1—Replace coil or core.

2—Set signal generator to 1675 Kc.

3—Connect signal generator leads through dummy, illustrated in Figure 9, to antenna receptacle on the receiver. This is important.

4—Set receiver dial to 1600 Kc. (maximum high frequency end of dial.)

5—Break cement loose on all cores and, using the special tuning wrench part No. S-13064, screw the core completely out of the antenna coil, the converter coil, and the oscillator coil.

6—Adjust oscillator trimmer C-5 (Fig. 8) at 1675 Kc.

7—Adjust converter trimmer C-3 and antenna trimmer C-1 (Fig. 7 and 8) for maximum output reading.

8—Replace cores to their approximate original position.

9—Set generator and receiver dial to 1200 Kc.

10—Adjust oscillator core L-4 (Fig. 8) to scale at 1200 Kc.

11—Adjust the two antenna cores L2 and L3 (Fig. 7) for maximum output reading. Do not adjust trimmers.

12—Set signal generator to 600 Kc.

13—If necessary, "rock in" shunt oscillator core L-5 (Fig. 8) for maximum output reading. This should be done only as a last resort, as the core has been set and sealed and should not require adjustment.

14—Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.

15—After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station near 1200 Kc.

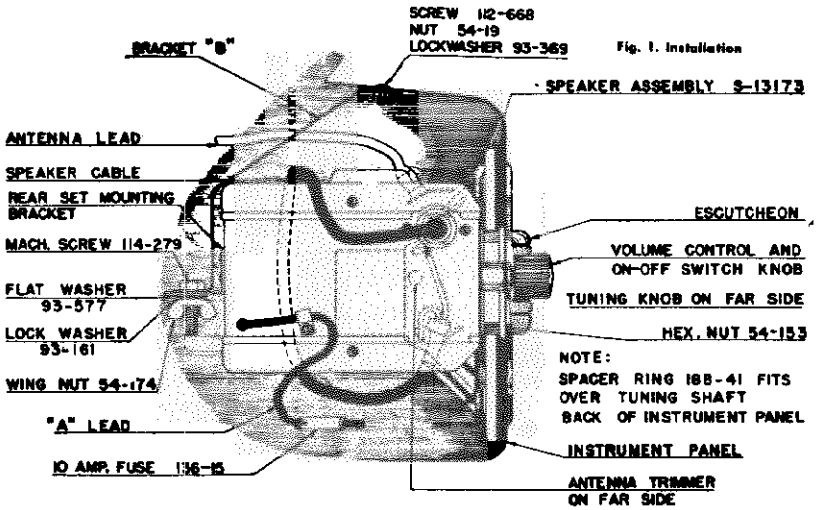


Fig. 1. Installation

RECEIVER INSTALLATION

Figures 1 and 2, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to assist in the removal and reinstallation of this receiver when service is necessary.

To take the receiver from the car, remove the control knobs and mounting nuts from the front panel, and remove the wing-nut, 54-174, lock washer 93-161, flat washer 93-577, and machine screw 114-279 from the set mounting bracket "B."

The speaker is held to the rear of the panel by four hex. nuts.

OFF-ON SWITCH AND VOLUME CONTROL

To turn the receiver on, turn the volume control knob to the right until it clicks and the dial is illuminated. Allow the receiver to reach operating temperature. (Approximately 20 seconds.) To increase the volume, continue to rotate this knob to the right. To turn the receiver off turn the volume control knob to the left until it clicks. (Fig. 2.)

CONDENSERS

C- 8	22-170	.1 mfd.	400 volt
C-12	22-182	250 mmfd.	600 volt
C- 9	22-250	.05 mfd.	200 volt
C- 4	22-716	500 mmfd.	600 volt
C-13	22-838	.005 mfd.	600 volt
C-10	22-906	.005 mfd.	200 volt
C-18	22-908	.5 mfd.	120 volt
C-19			
C-11	22-1170	.01 mfd.	600 volt
C-22	22-1076	Dual 250 mmfd.	100 volt
C- 7	22-250	.05 mfd.	200 volt
C- 2	22-1244	.004 mfd.	600 volt
C- 3	22-1376	Detector trimmer	
C- 5	22-1378	Oscillator trimmer	
C-14	22-1387	Dry electrolytic—20 mfd.—25 v. x	
C-15		10 mfd.—300 v. x 20 mfd.—	
C-16		350 volt	
C- 1	22-1420	Antenna trimmer	
C-17	22-1448	.008 mfd.	1600 volt
C- 6	22-1641	350 mmfd.	500 volt

SCREW 112-668
NUT 54-19
LOCKWASHER 93-369

Fig. 1. Installation

SPEAKER ASSEMBLY S-13173

ANTENNA LEAD

SPEAKER CABLE

REAR SET MOUNTING BRACKET

MACH. SCREW 114-279

ESCUTCHEON

VOLUME CONTROL AND ON-OFF SWITCH KNOB

TUNING KNOB ON FAR SIDE

FLAT WASHER 93-577

LOCK WASHER 93-161

HEX. NUT 54-153

NOTE:
SPACER RING 188-41 FITS OVER TUNING SHAFT BACK OF INSTRUMENT PANEL

WING NUT 54-174

"A" LEAD

INSTRUMENT PANEL

10 AMP. FUSE 136-15

ANTENNA TRIMMER ON FAR SIDE

TUNING

Turn the tuning knob (Fig. 1) to tune in the desired station. Tune to the exact frequency to prevent distortion. The pointer in front of the illuminated dial scale indicates the frequency to which the receiver is tuned. (Fig. 2.)

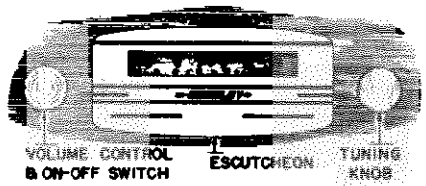


Fig. 2. Front View

RESISTORS

R- 4	63-942	15M ohm	2 watt insl.
R-12	63-1368	1800 ohm W.W.	2 watt insl.
R-11	63-1372	390 ohm, W.W.	1 watt insl.
R- 6	63-1390	1 megohm	¼ watt insl.
R- 5	63-1391	33M ohm	¼ watt insl.
R- 1			
R- 9	63-1392	330M ohm	¼ watt insl.
R-10			
R- 2	63-1395	22M ohm	¼ watt. insl.
R-13			
R-14	63-1399	82 ohm	½ watt insl.
R- 8	63-1400	15 megohm	¼ watt insl.
R- 3	63-1414	100 ohm	¼ watt insl.
R- 7	63-1513	Vol. con. and sw.	

SPEAKER AND GASKET ASSEMBLY

	S13173	Speaker and gasket assem. (comp.)
SP-1	49-576	6" x 9" P.M. speaker
	196-91	Speaker gasket and screen
	208-576	Cone and voice coil assem.

INTERFERENCE ELIMINATION

There should be no interference from the ignition system if the receiver has been installed according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

IMPORTANT: Be sure that good contacts are made between the car frame, or body, and the interference condensers. If necessary, clean away paint or dirt with emery paper. Be sure all nuts and bolts are tightened securely.

The distributor supressor No. 63-1046 and the flexible ground strap No. 83-1335 should be connected as shown in figure 3.

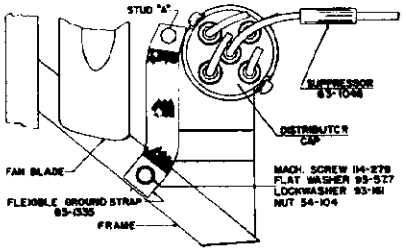


Fig. 3

The fuel gauge condenser No. 22-919 should be installed as shown in figure 4.

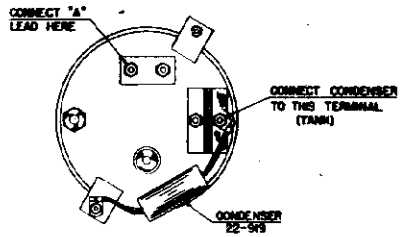


Fig. 4

MISCELLANEOUS

	52-294	Vol. con. cable
	52-397	Speaker cable and plug
	52-417	Battery cable (set to fuse)
	52-418	Battery cable (fuse to ammeter)
	54-184	Set spacer nut (used on 63-1513)
	78-281	Vibrator socket
	78-596	Loktal base tube socket (8 contact)
	78-684	Octal base tube socket (moulded)
	78-749	Speaker plug socket
	78-756	Loktal base tube socket
	78-758	Octal base tube socket
	93-456	Vibrator cushion washer
T-3	95-915	Output transformer
T-4	95-1002	Power transformer
S-1	136-15	10 amp. fuse (3AG)
V-1	190-20	Vibrator
	202-486	Instruction book
	S11391	Ant. con. socket and brkt. assem.

The generator condenser No. 22-920 should be installed as shown below in figure 5.

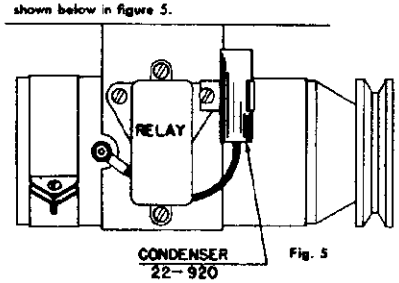


Fig. 5

The motor hood bond spring No. 80-145 should be installed as shown in Figure 6. Note that the sharp extrusions are facing down toward the front of the car before the hood grounding strip is bent back.

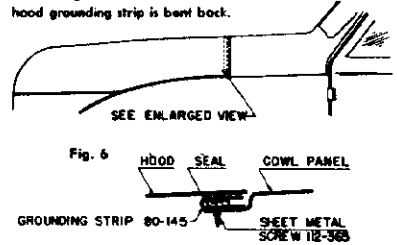


Fig. 6

DIAL AND TUNING MECHANISM ASSEMBLY

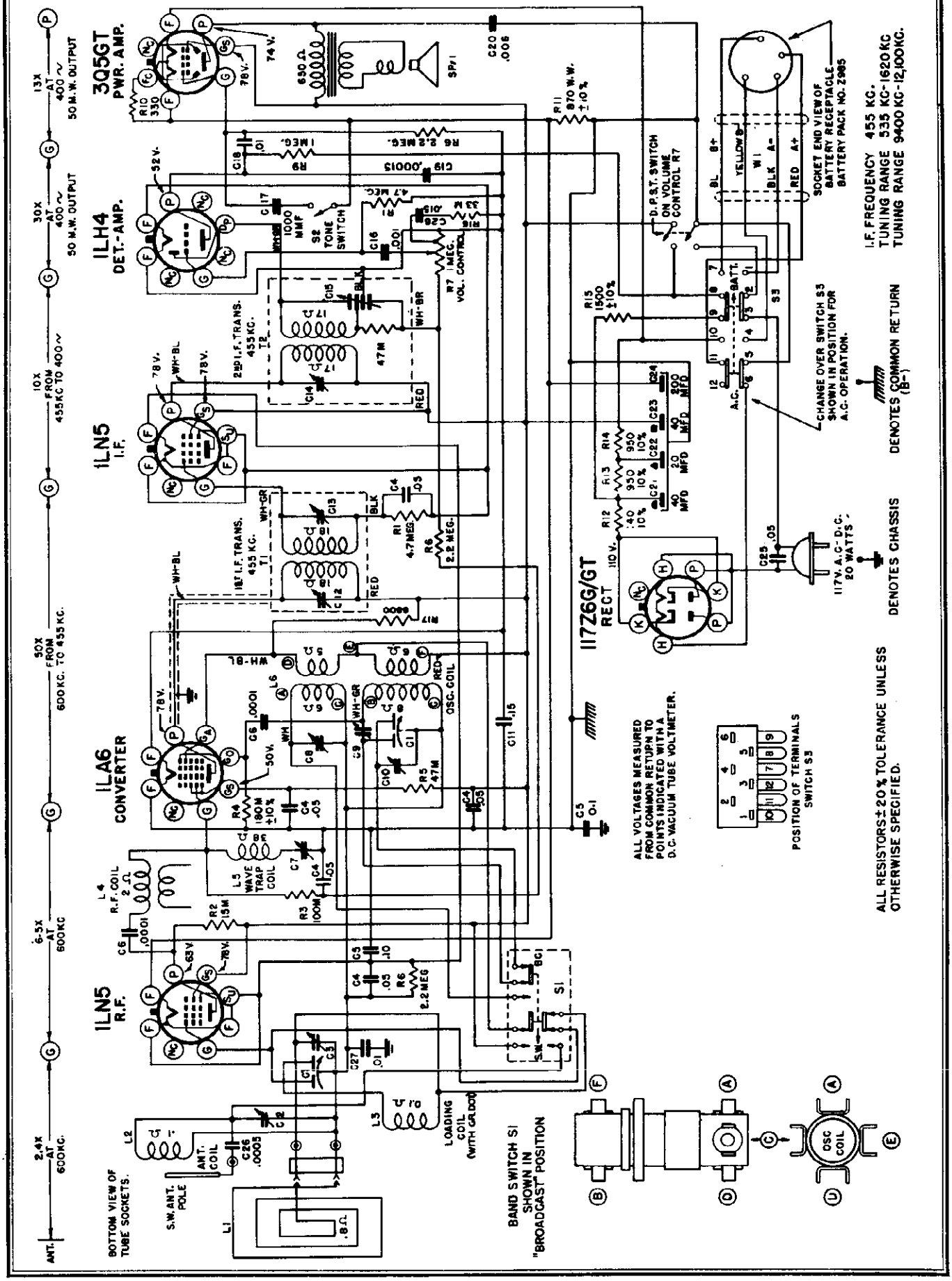
Diagram No.	Part No.	Description
	26-380	Dial scale
	57-1228	Escutcheon
	59-180	Dial pointer
	80-329	Gear indexing spring
	80-331	Cross arm return spring
	80-379	Pointer retainer spring
S-3	100-32	Dial light bulb
	149-44	Adjusting spring and core (3 used)
	188-45	Turret screw lock ring
	S10826	Solenoid end plug and brkt. assem.
	S12439	Pointer mtg. brkt. and stud assem.
	S12440	Pointer drive brkt. and stud assem.
	S12447	Dial light socket and wire assem.
	S12594	Manual tuner assem. (final)
	S13156	Tuning and vol. con. knob assem. (46-639 red)
	S13161	Tuning shaft and gear assem.
	S13162	Mtg. plate and retaining strip assem.
	S13178	Cross arm assem.
	S13238	Turret assem.

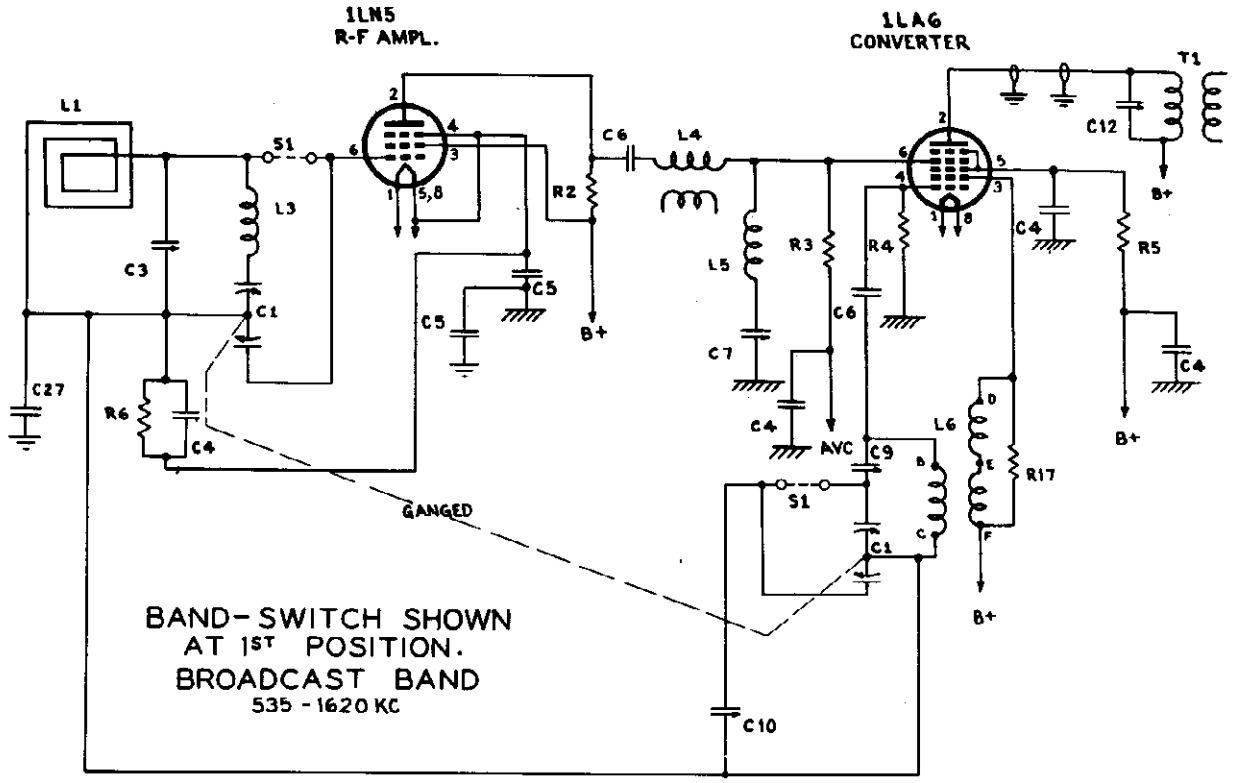
CHOKES AND COILS

L8	20-213	*Main hash choke
T1	95-1003	1st I.F. transformer
T2	95-1004	2nd I.F. transformer
L1	S8819	Ant. motor noise choke assem.
	S11040	R. F. coil and shield assem.
L6	S11229	Osc. series coil assem.
L7	S11232	Motor noise choke coil assem.
L4	S12053	Osc. tuning coil assem.
L2, L3	S12060	R. F. coil tuning assem. (2 used)
L5	S13155	Osc. shunt coil assem.
	S13160	Ant. coil and shield assem.

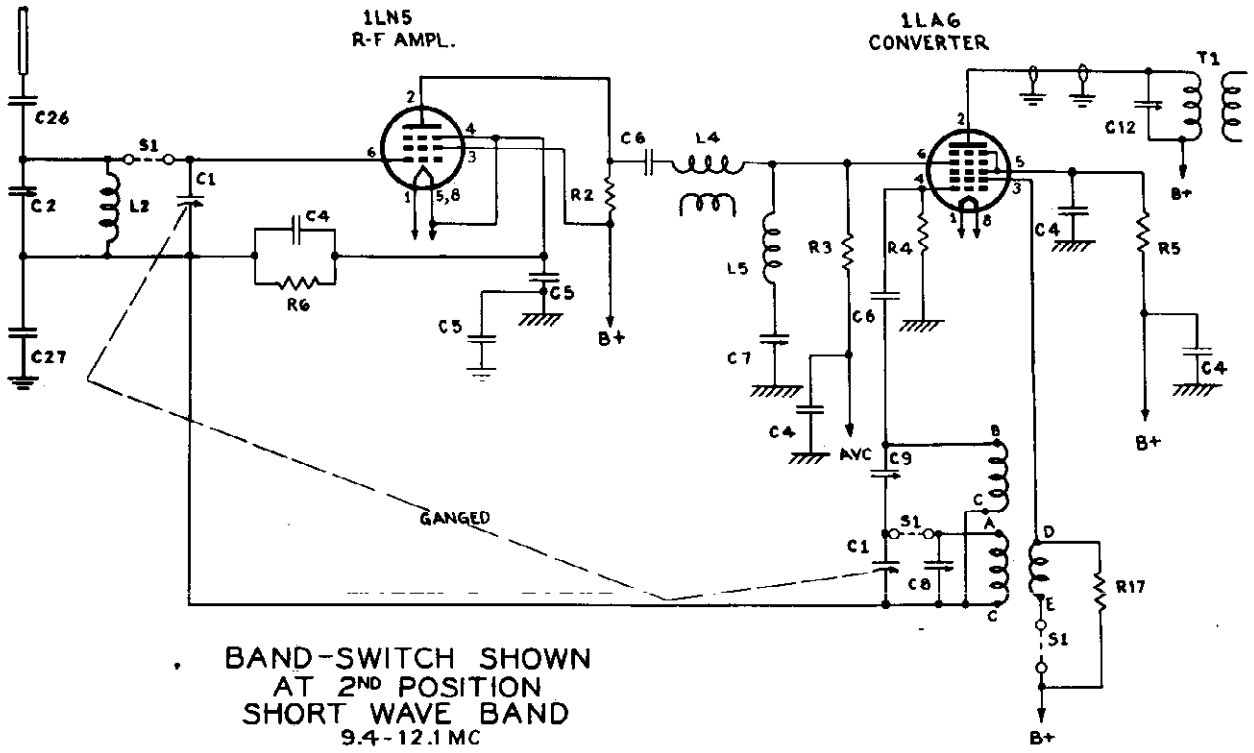
MODEL 6G004Y, Chassis 6C41

ZENITH RADIO CORP.





BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535 - 1620 KC



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
9.4 - 12.1 MC

PARTS LIST

DIAL ASSEMBLY

12-887	TUNING CONTROL SHAFT BRACKET
26-349	DIAL SCALE
46-518	TUNING & VOLUME CONTROL KNOB (2 USED)
46-573	SWITCH CONTROL KNOB (RED) (2 USED)
59-146	DIAL POINTER
59-167	ON-OFF INDICATOR
76-304	TUNING CONTROL SHAFT
80-209	DIAL CORD TENSION SPRING
80-421	INDICATOR SPRING
188-32	RETAINING RING (76-304)
192-112	DIAL CRYSTAL
S-9534	INDICATOR LEVER & BUSHING ASSEMBLY
S-9653	DIAL CORD & EYELET ASSEMBLY
MS-684	PULLEY & BRACKET ASSEMBLY

COILS AND CHOKES

95-804	1ST I.F. TRANSFORMER (T1)
95-805	2ND I.F. TRANSFORMER (T2)
S-8326	WAVE TRAP COIL ASSEMBLY (L5)
S-11591	ANTENNA LOADING COIL ASSEMBLY (L3)
S-11798	OSCILLATOR COIL ASSEMBLY (L6)
S-11800	PEAKING COIL ASSEMBLY (L4)
S-11801	ANTENNA COIL ASSEMBLY (L2)

CONDENSERS

22-147	500 MMFD. (C26) 600 V.
22-162	.0001 MFD. (C6) 500 V.
22-196	.01 MFD. (C18) 600 V.
22-458	.006 MFD. (C20) 600 V.
22-470	.00015 MFD. (C19) 600 V
22-826	.01 MFD. (C27) 200 V.
22-827	.1 MFD. (C5) 200 V.
22-829	.05 MFD. (C4) 200 V.
22-1017	.05 MFD. (C25) 200 V.
22-1025	.15 MFD. (C11) 200 V.
22-1120	.015 MFD. (C28) 400 V.
22-1388	SINGLE SECTION TRIMMER (WAVE-TRAP) (85 MMFD.) (C7)
22-1427	TWO GANG VARIABLE (C1)
22-1428	TWO SECTION TRIMMER (ANT.) 2-20 MMF. (C2 & C3)
22-1429	THREE SECTION TRIMMER (OSC.) (C8,C9 & C10)
22-1431	.001 MFD. (C16) 600 V.
22-1443	DRY ELECTROLYTIC 40-40-20 MFD.-150 V.-200 MFD. 10 V. (C21,C22,C23 & C24)
22-1444	.001 MFD. 200V (C17)

RESISTORS

63-271	1 MEGOHM (R9) 1/4 WATT
63-418	1500 OHM (R15) 1/2 WATT
63-580	330 OHM (R10) 1/4 WATT
63-590	15000 OHM (R2) 1/4 WATT
63-592	33000 OHM (R16) 1/4 WATT
63-600	2.2 MEGOHM (R6) 1/4 WATT
63-602	4.7 MEGOHM (R1) 1/4 WATT
63-708	6800 OHM (INSULATED) (R17) 1/4 WATT
63-713	47000 OHM (INSULATED) (R5) 1/4 WATT
63-715	100000 OHM (INSULATED) (R3) 1/4 WATT
63-773	180000 OHM (INSULATED) (R9) 1/4 WATT
63-1097	870 OHM W.W. (INSULATED) (R11) 1 WATT
63-1362	2 SECTION CANDOHM (OR 63-1365) 3 WATT (R13 & R14)
63-1366	140 OHM ZIPOHM (R12) 2½ WATT
63-1537	VOLUME CONTROL & SWITCH (R7)

MISCELLANEOUS

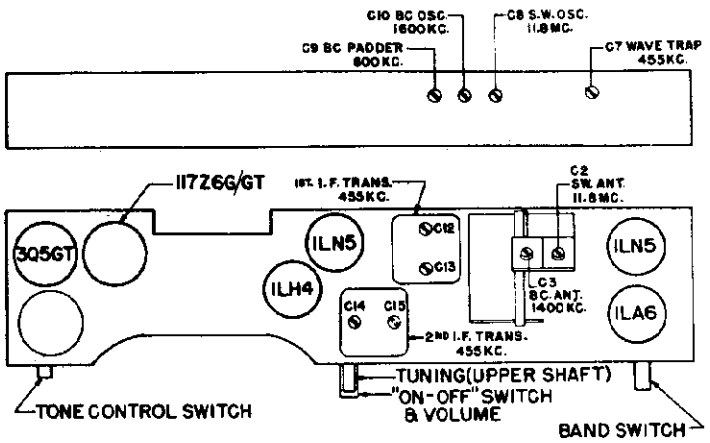
11-70	LINE CORD & PLUG (OR 11-90)
12-1134	TELESCOPIC ANTENNA SUPPORT BRACKET
15-51	PLUG CAP
19-125	ANTENNA MOUNTING CLIP
19-148	ANTENNA MOUNTING CLIP
36-37	CABINET HANDLE & INSERT (36-38)
49-512	5½" P.M. SPEAKER 206-512 OUTPUT TRANSFORMER 208-512 CONE & VOICE COIL
54-211	SPEED NUT (3 USED)
57-1111	FRONT PANEL
57-1121	ESCUTCHEON:
64-98	BRASS EYELET
64-99	BRASS EYELET (ANT. LEAD) (2 USED)
700-111	#5 X 3/8" PHILLIPS R.H. WOOD SCREW (FRONT PANEL MTG.)
78-274	ELECTROLYTIC SOCKET
78-371	LOKTAL BASE TUBE SOCKET
78-401	LOKTAL BASE TUBE SOCKET (OR 78-596 OR 78-729)
78-543	FOUR PRONG FEMALE SOCKET (BATTERY CABLE)
78-611	OCTAL BASE TUBE SOCKET
78-671	OCTAL BASE TUBE SOCKET
83-1401	FELT STRIP (USED ON 46-573)
85-311	POWER CHANGE-OVER SWITCH (244705) (S3)
85-364	BAND SWITCH (S1)
85-368	TONE CONTROL SWITCH (S2)
93-485	COUNTERSUNK WASHER (2 USED) (STATUARY BRONZE) (CHASSIS MTG.)
93-553	BLACK FELT WASHER (2 USED)
110-105	GRILLE CLOTH
112-236	ORNAMENTAL HD. M.SC. (ANT. MTG.) (2 USED)
112-290	CHASSIS MTG. SCREW (2 USED)
112-403	10-24 X 1" WASHER HD. M.S. (HANDLE MTG.) (2 USED)
125-17	RUBBER GROMMET (GANG MTG. & ANT. MTG.)
139-54	BAFFLE BOARD
156-19	FRICTION CATCH (2 USED)
156-20	DOOR LATCH - UPPER HALF
156-21	DOOR LATCH - LOWER HALF
157-7	STRIKE FASTENER (2 USED)
184-7	BALL TIP FOR TELESCOPIC ANTENNA
188-47	HANDLE RING (2 USED)
202-400	INSTRUCTION BOOK
S-11802	ANTENNA TRIMMER BRKT. & PIN JACK ASSEM.
S-11820	TELESCOPIC ANT. ASSEM. (COMPLETE)
S-13719	TONE SWITCH KNOB YOKE & PLATE ASSEM.

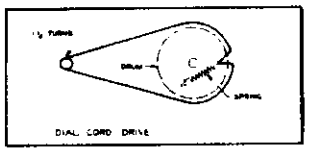
WAVEMAGNET PARTS

19-134	WAVEMAGNET CABLE CLIP
S-10862	WAVEMAGNET CABLE ASSEMBLY
S-10865	WAVEMAGNET SUCTION CUP ASSEM. (OR S-12528) (2 USED)
S-10867	WAVEMAGNET MTG. STRIP ASSEMBLY (SINGLE SNAP)
S-11928	WAVEMAGNET WINDING & PLATE ASSEMBLY (L1)
S-12382	WAVEMAGNET MTG. STRIP ASSEMBLY (THREE SNAP)

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

3-10-47





DIAL CABLE DRAWING

TUBE TRIMMER LOCATION

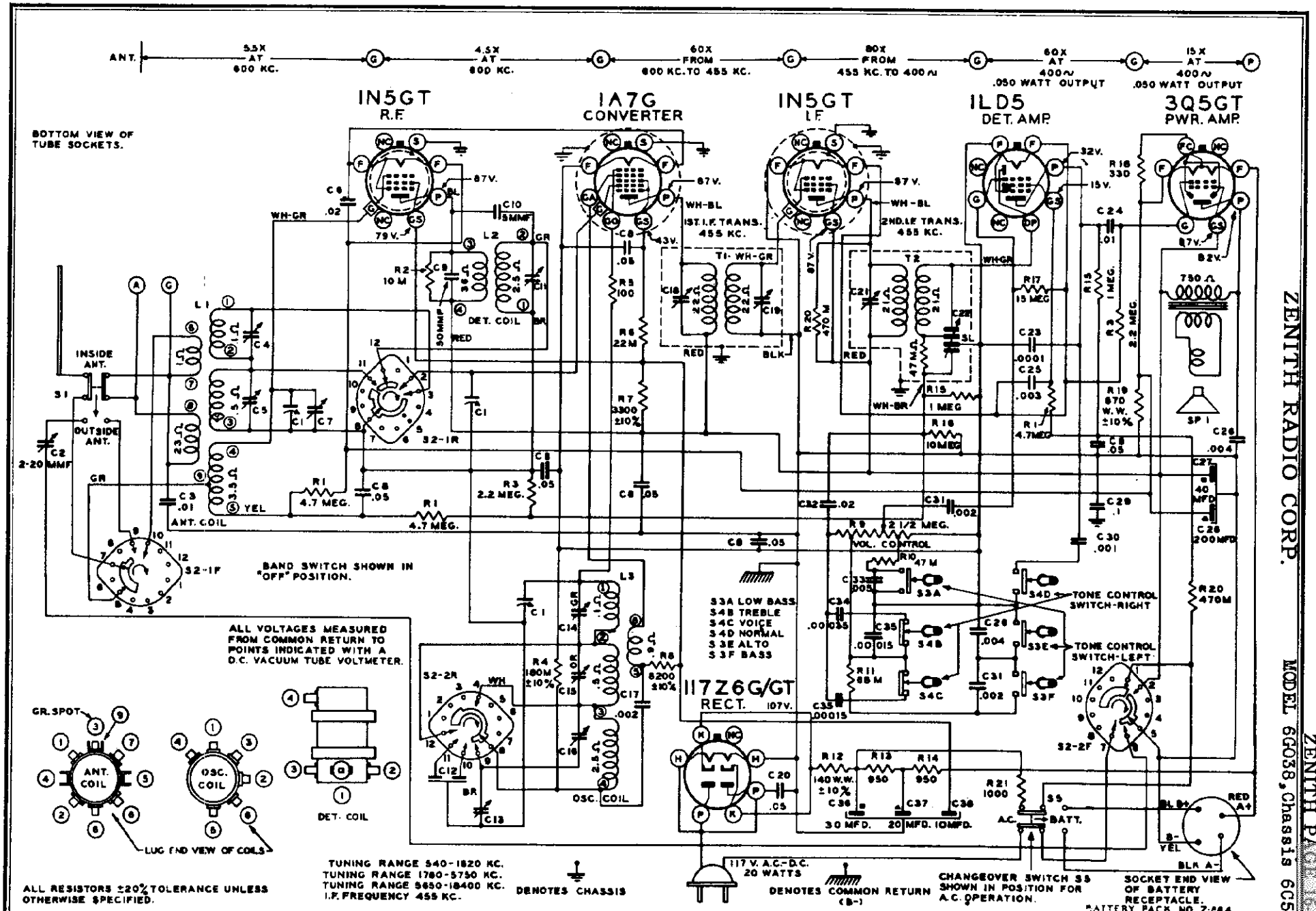
TO THE SERVICEMAN: THE 6C41 CHASSIS IS A AC.DC OR BATTERY OPERATED SUPERHETERODYNE WITH A STAGE OF RF AMPLIFICATION AND TWO TUNING RANGES. 935 TO 1620KC AND 9.4 TO 12.1 MC. THE CHASSIS IS ISOLATED FROM THE DC CIRCUITS, AND ALL MEASUREMENTS MUST BE MADE FROM A COMMON NEGATIVE POINT. THE MOST CONVENIENT PLACE TO REACH THIS NEGATIVE POINT IS THE TERMINAL STRIP TO WHICH C5 IS CONNECTED. THE DC RESISTANCE FROM CHASSIS TO ANY CIRCUIT MUST BE ALMOST INFINITE. IF ANY CIRCUIT BECOMES GROUNDED A HUM WILL DEVELOP. MICROPHONIC TUBES WILL CAUSE AUDIO HOWL. CHECK 1LA6.

THE WAVEMAGNET IS CONNECTED TO THE CHASSIS THROUGH THE HINGES IN THE CABINET, SNAPS AND FLEXIBLE LEADS. IF THE RF BECOMES WEAK OR DEAD, CHECK THE RESISTANCE OF THE WAVEMAGNET AT TUNING GANG. THE DC RESISTANCE ACROSS THE TWO LEADS SHOULD BE APPROXIMATELY 1 OHM. IF THE CIRCUIT IS OPEN, REMOVE THE TWO SCREWS WHICH HOLD THE HANDLE AND TOP PANEL AND REMOVE THE TOP PANEL. WHEN THE TOP IS REMOVED, THE WAVEMAGNET CONNECTING LEADS WILL BE VISIBLE FOR INSPECTION. ALSO LOOSEN THE SNAP-ON SOCKET AND CHECK FOR SHORTED OR BROKEN LEADS.

IF ALIGNMENT: REMOVE THE CHASSIS FROM THE CABINET AND ARRANGE THE UNITS SO THAT THE WAVEMAGNET CAN BE PLUGGED IN. THROUGH A 1MFD DUMMY ANTENNA, FEED A 455 KC SIGNAL TO THE CONVERTER GRID. CONNECT AN OUTPUT METER ACROSS THE VOICE COIL OF THE SPEAKER (TWO LUGS PROVIDED) AND ADJUST C12,C13,C14 AND C15 FOR MAXIMUM INDICATION ON THE OUTPUT METER. ALWAYS KEEP THE SIGNAL OUTPUT FROM THE GENERATOR JUST HIGH ENOUGH TO GET INDICATION ON THE METER. TOO MUCH SIGNAL WILL CAUSE LOADING AND INACCURATE ALIGNMENT. THE WAVE-TRAP IS ADJUSTED BY COUPLING THE 455KC SIGNAL TO THE WAVEMAGNET THROUGH A ONE TURN LOOP AND ADJUSTING C7 FOR MINIMUM INDICATION ON THE OUTPUT METER.

RF ALIGNMENT: SET THE BAND SWITCH TO SHORT WAVE AND THROUGH A SINGLE TURN LOOP LOOSELY COUPLE A 11.8 MC SIGNAL TO THE WAVEROD. C8 AND C2 ARE ADJUSTED TO SCALE AND MAXIMUM OUTPUT. SET THE BAND SWITCH TO STANDARD BROADCAST. SIGNAL GENERATOR TO 1600KC AND LOOSELY COUPLE A ONE TURN LOOP TO THE WAVEMAGNET. C10 IS ADJUSTED TO SCALE. SET SIGNAL GENERATOR AND DIAL SCALE TO 1400 KC AND ADJUST C3 FOR MAXIMUM SIGNAL. SET SIGNAL GENERATOR AND DIAL TO 600 AND WHILE ROCKING THE GANG ADJUST C9 TO MAXIMUM A SLIGHT RE-ADJUSTMENT OF C2 AT 11.8 MC AND C3 AT 1400KC MAY BE NECESSARY AFTER THE CHASSIS IS INSTALLED IN THE CABINET.

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	CONVERTER GRID	5 MFD	455 KC	BC	600 KC	C12 C13 C14 C15	ALIGN I.F.
2	ONE TURN LOOSELY COUPLED TO WAVEMAGNET		455 KC	BC	600 KC	C7	ADJUST WAVETRAP TO MINIMUM
3	ONE TURN LOOSELY COUPLED TO WAVEROD	EXTEND WAVEROD FULL LENGTH	11.8 MC	SW	11.8 MC	C8	SET OSCILLATOR TO SCALE
4			11.8 MC	SW	11.8 MC	C2	ALIGN WAVEROD
5	ONE TURN LOOSELY COUPLED TO WAVEMAGNET		1600 KC	BC	1600 KC	C10	SET OSCILLATOR TO SCALE
6			1400 KC	BC	1400 KC	C3	ALIGN WAVEMAGNET
7			600 KC	BC	ROCK GANG AT 600 KC	C9	ADJUST PADDER

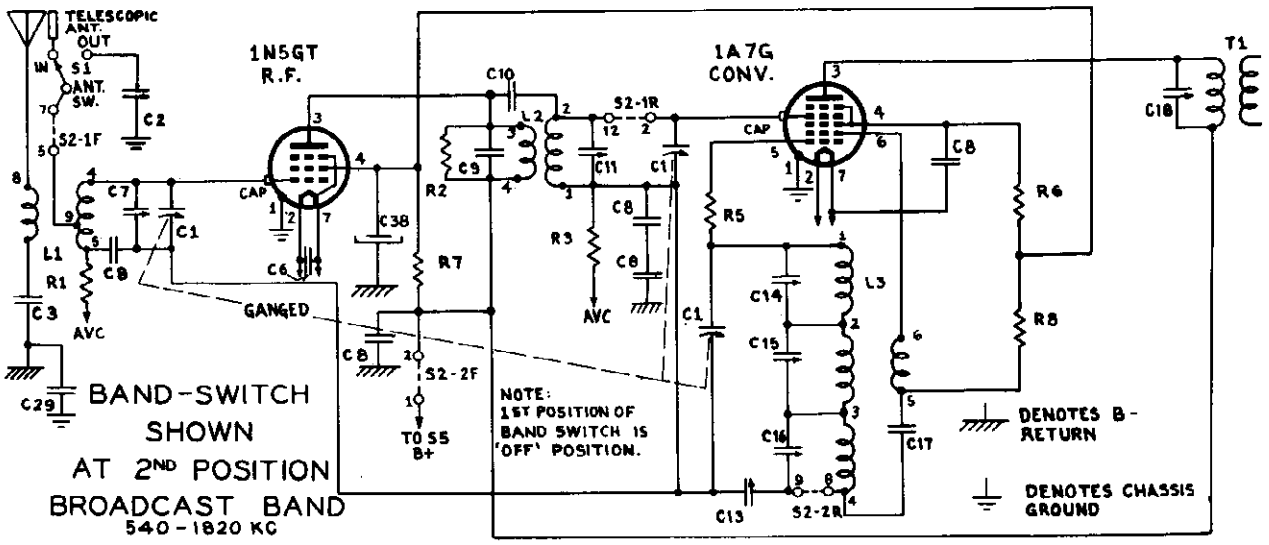


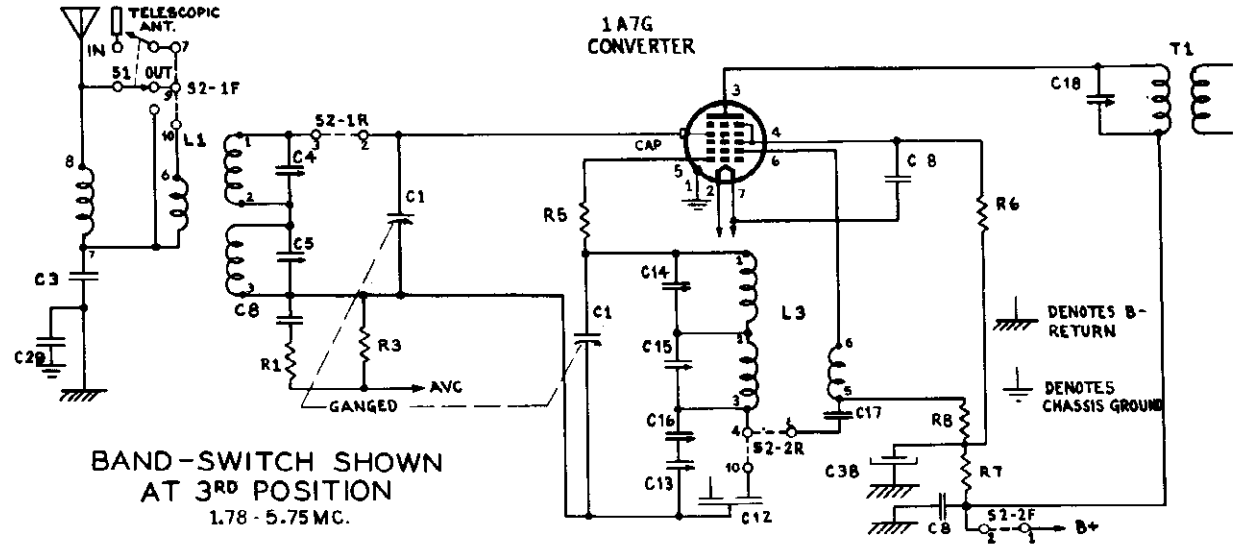
ZENITH RADIO CORP. MODEL 6G038, Chassis 6C50

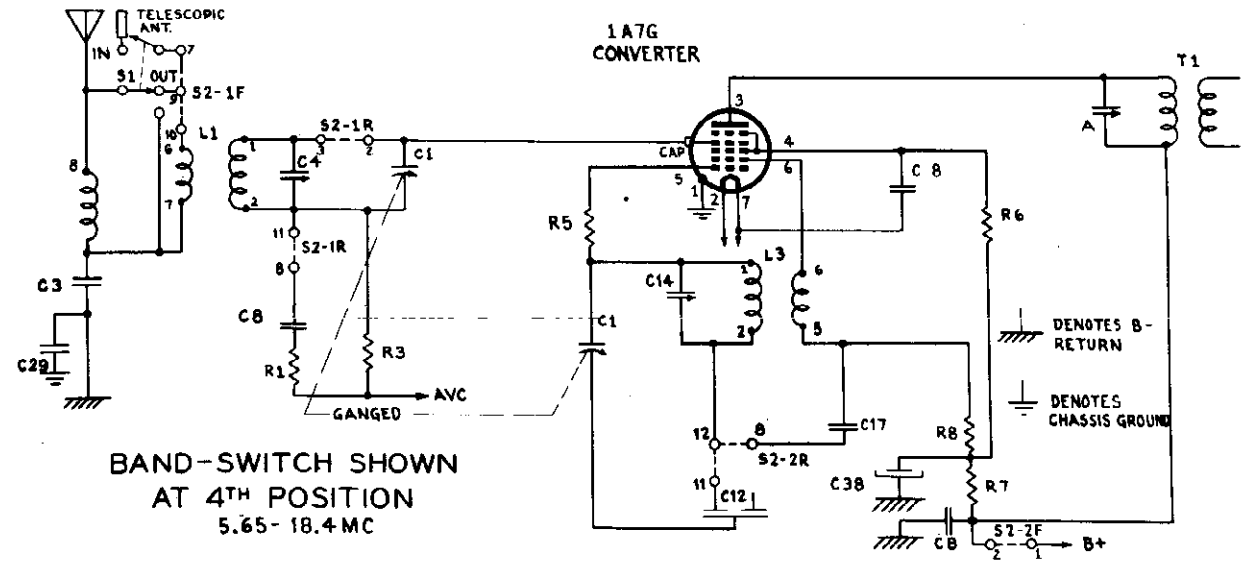
ZENITH PAGE 1

MODEL 6G038

ZENITH RADIO CORP.



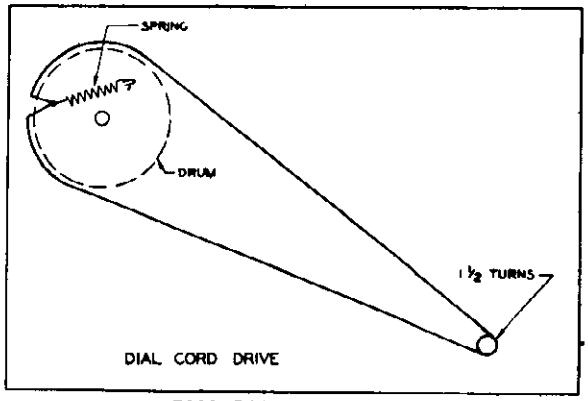




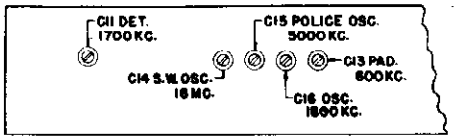
ZENITH RADIO CORP.

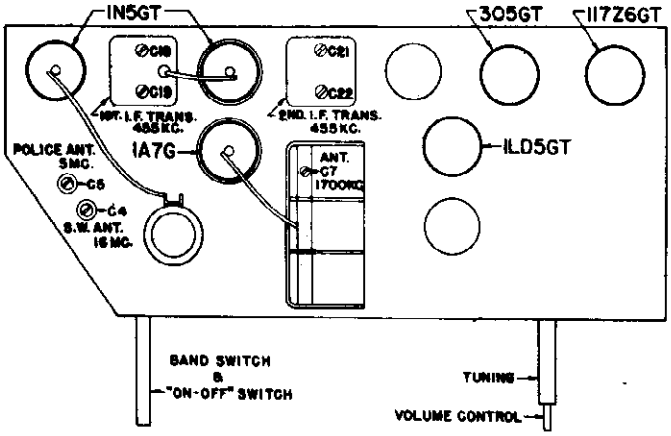
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter grid	.5 mfd	455 Kc	600 Kc	C18,C19,C21,C22	Align I.F.
2	One turn		18 Mc	18 Mc	C14	Adjust oscillator to scale
3			16 Mc	16 Mc	C4	Adjust for max.
4	Loosely		5 Mc	5 Mc	C15	Adjust oscillator to scale
5	Coupled		5 Mc	5 Mc	C5	Adjust for max.
6	To		1800 Kc	1800 Kc	C16	Adjust oscillator to scale
7	Waverod		1700 Kc	1700 Kc	C11 & C7	Adjust for max.
8			600 Kc	600 Kc	C13	Rock gang and adjust for max.



DIAL CABLE DRAWING





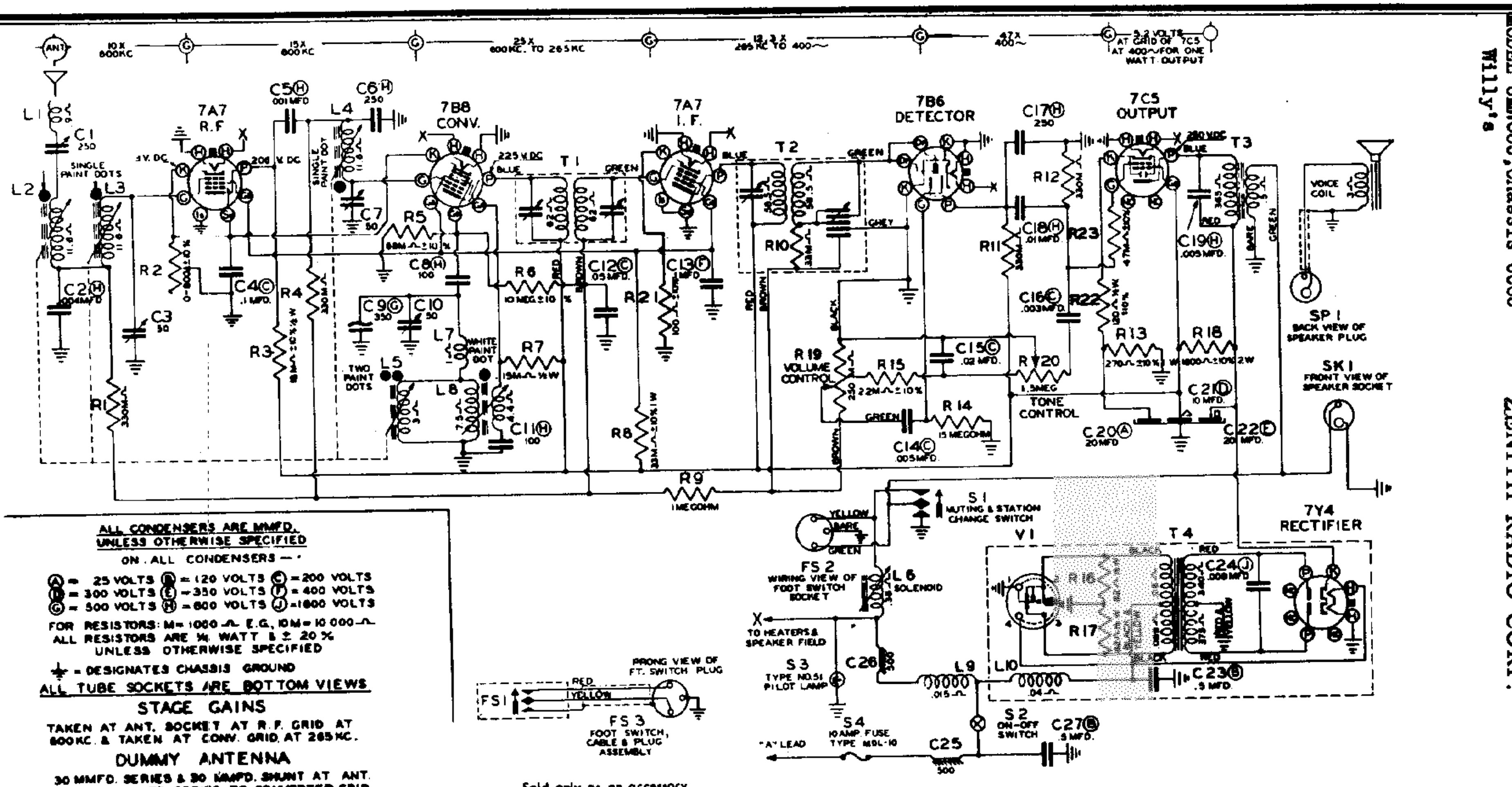
PARTS LIST

PART NO.	REF. NO.	DESCRIPTION	PRICE
		DIAL ASSEMBLY	
59-121		Dial pointer	.19
76-305		Tuning Control shaft	.12
40-89		Dial Cord Tension Spring	.02
88-227		Tuning Shaft Tension Spring	.02
93-482		Black Bakelite Washer (used with 59-121)	.72C
188-27		Retaining Ring (76-305)	1.20C
S-9643		Dial Scale & Indicator Assembly (26-293)	1.20
S-9758		Dial Cord Assembly	.07
MS-586		Pulley & Bracket Assembly	.18
		COILS & CHOKES	
95-821	T1	1st I.F. Transformer	1.77
95-822	T2	2nd I.F. Transformer	1.77
S-9689	L3	Oscillator Coil & Wire Assembly	1.26
S-9690	L2	Detector Coil Assembly	1.04
S-11015	L1	Antenna Coil Assembly	1.65
		CONDENSERS	
22-162	C23	.0001 Mfd	500 Volt .20
22-186	C24	.01 Mfd	600 Volt .20
22-229	C33	.005 Mfd	600 Volt .20
22-289	C9	50 Mmfd	500 Volt .20
22-303	C10	5 Mmfd	500 Volt .20
22-326	C25	.003 Mfd	400 Volt .20
22-327	C6	.02 Mfd	200 Volt .20
22-358	C17	.002 Mfd	600 Volt .38
22-448	C26	.004 Mfd	600 Volt .20
22-470	C35	.00015 Mfd	600 Volt .20
22-492	C30	.002 Mfd	600 Volt .20
22-827	C29	.1 Mfd	200 Volt .23
22-829	C8	.05 Mfd	200 Volt .20
22-830	C32	.02 Mfd	600 Volt .20
22-887	C31	.001 Mfd	600 Volt .20
22-930	C12	Dual unit padder	.82
22-954	C34	.00035 Mfd	600 Volt .16
22-1017	C20	.05 Mfd	400 Volt .20
22 1047	C36,37,38	10-20-30 Mfd. Dry Electrolytic	150 Volt 1.63
22-1144	C13,14,15,16	Four Section Ceramic Trimmer	.83
22-1193	C9	.01 Mfd	400 Volt .20
22-1217	C1	Three Gang Variable	4.48
22-1230	C4,C5	Two Section Ceramic Trimmer	.38
22-1234	C27,28	200 Mfd.- 10 V. x 40 Mfd. 150 V. Dry Electrolytic	1.92
22-1421	C2,C11	Trimmer Capacitor	.40
		RESISTORS	
63-271	R15	1 Megohm	1/4 Watt .09
63-577	R5	100 Ohms	1/4 Watt .08
63-580	R10	330 Ohms	1/4 Watt .09
63-588	R2	10,000 Ohms	1/4 Watt .09
63-591	R6	22,000 Ohms	1/4 Watt .09
63-593	R10	47,000 Ohms	1/4 Watt .09
63-594	R11	68,000 Ohms	1/4 Watt .09
63-597	R20	470,000 Ohms	1/4 Watt .09
63-600	R3	2.2 Megohms	1/4 Watt .09
63-602	R1	4.7 Megohms	1/4 Watt .09
63-604	R16	10 Megohms	1/4 Watt .09
63-605	R21	1000 Ohms	1/2 Watt .10
63-635	R7	3300 Ohms	1/4 Watt .09
63-640	R8	9200 Ohms	1/4 Watt .09
63-654	R4	180,000 Ohms	1/4 Watt .09
63 976	R17	15 Megohms	1/4 Watt .09
63-1097	R19	870 Ohms W.W. Insul.	1 Watt .24
63-1244	R9	Volume Control	1.20
63-1259	R13,14	Condohm (2 section)	.43
63-1366	R12	140 Ohm Zipohm W.W.	2-1/2 Watt .24

TUBE TRIMMER LOCATION

PART NO.	REF. NO.	DESCRIPTION	PRICE
		RADIO ESCUTCHEON PARTS	
S-9935		Radiorgan Escutcheon & Knob Assem. L.H. (Complete)	1.20
S-9936		Radiorgan Escutcheon & Knob Assem. R.H. (Complete)	1.20
MS-660		Bracket Assembly	.25
S-3590		Knob & Eyelet Assem (2 used on L.H., 1 on R.H.	.12
S-3591		Knob & Eyelet Assembly (2 used on R.H. only)	.12
57-911		Tenite Escutcheon (Black) (1 used on L.H. only)	.36
57-912		Tenite Escutcheon (Black) (1 used on R.H. only)	.36
78-337		Latch Shaft	.03
76-338		Knob Shaft	.04
80-264		Latch Spring	.72C
114-159		#6 x 1/4" Hex Hd. Self Tapping Screw (2 used)	.72C
156-10		Latch	.38C
		MISCELLANEOUS	
11-68		Line Cord & Plug (8 ft. long)	.65
12-702		Volume Control Mounting Bracket	.05
12-787		Tuning Sleeve Support Bracket	.04
12-1082		Antenna Rod Mounting Bracket	.06
15-34		Socket Cap (or 15-67) (Battery Cable)	.07
17-67		Antenna Rod Retaining Clamp	.06
18-97		Cable Retaining Clamp	.01
46-579		Band Selector Switch Knob	.20
49-464	SP1	6" P.M. Speaker	10.52
		208-464 Output Transformer	1.87
		208-464 Cone & Voice Coil	2.63
57-11A		Antenna Lead Marker	.03
57-11C		Ground Lead Marker	.03
57-905		Dial Escutcheon (or 57-1112) (Part of S-9580 or S-11777)	2.41
57-1109		Antenna Knob_Escutcheon	.70
76-124		#2 x 3/8" Oval Hd. Wood Screw (Ant. Esc. Mtg.)	1.70C
72-58		#2 x 3/8" Flat Hd. Wood Screw (Dial Esc. Mtg.)	.02
78-190		Speaker Plug Socket	.12
78-228		Electrolytic Capacitor Socket	.03
78-396		Four Contact Socket (Battery Cable)	.12
78-446		Loktol Base Tube Socket (7 contact)	.19
78-611		Octal Base Tube Socket (8 contact)	.12
78-671		Octal Base Tube Socket	.12
85-171	S5	Power Switch	.91
85-303	S1	Antenna Switch	.35
85-366	S2	Band Selector Switch	2.00
93-215		Rubber Washer (Chassis Mtg.)	.07
112-56		#6 x 1/4" Hex.Hd.Self Tapping Screw (Radiogram Switch Mtg.)	.55C
114-40		#10-32 x 7/8" Hex Washer Hd.N.S.Steel (Chassis Mtg.) (3 used)	.78C
114-128		#10 x 1-1/16" Hex Washer Hd Self Tapping Screw (Chassis Mtg.) (1 used)	1.81C
125-17		Rubber Grommet	.03
126-378		Tube Shield (for GT type)	.07
126-382		Tube Shield	.08
192-68		Dial Escutcheon Glass (Part of S-11777 or S-9580)	.43
196-47		Dial Escutcheon Gasket(" " " " ")	.19
202-388		Instruction Book	.25
S-8540		Dummy Knob & Set Screw Assembly (46-350)	.24
S-9580		Dial Escutcheon Assembly (or S-11777)	3.01
S-9593	S3,4	Radiorgan Strip & Contact Assembly (2 used)	.31
S-9816		Tuning Control Knob & Set Screw Assembly	.30
S-11251		Telescopic Antenna Assembly	7.85
S-11699		Volume Control Knob Assembly (46-578)	.20

ZENITH RADIO CORP.



ALL CONDENSERS ARE MMFD. UNLESS OTHERWISE SPECIFIED

ON ALL CONDENSERS —

Ⓐ = 25 VOLTS Ⓑ = 120 VOLTS Ⓒ = 200 VOLTS
Ⓓ = 300 VOLTS Ⓔ = 350 VOLTS Ⓕ = 400 VOLTS
Ⓖ = 500 VOLTS Ⓗ = 600 VOLTS Ⓙ = 1600 VOLTS

FOR RESISTORS: M = 1000 Ω E.G. 10M = 10 000 Ω
ALL RESISTORS ARE ½ WATT & ± 20 % UNLESS OTHERWISE SPECIFIED

⏚ = DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS

STAGE GAINS

TAKEN AT ANT. SOCKET AT R.F. GRID AT 600KC. & TAKEN AT CONV. GRID AT 265KC.

DUMMY ANTENNA

30 MMFD. SERIES & 30 MMFD. SHUNT AT ANT. SOCKET & 0.1 MFD. SERIES TO CONVERTER GRID

BATTERY CONDITIONS

6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUNDED

TEST CONDITIONS

VOL. CONTROL SET AT "MAX." TONE CONTROL SET ON "HIGH", WITH NO INCOMING SIGNAL

VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER

SCHEMATIC DIAGRAM FOR 6 TUBE
WILLY'S 6MW083
WITH FOOT CONTROL
I. F. 265 KC.
TUNING RANGE 540KC. TO 1600KC.

CURRENT CONSUMPTION: . . . . . 7.5 amperes

INSTANTANEOUS CURRENT CONSUMPTION DURING AUTOMATIC CHANGE CYCLE: . . . . 20 amperes

SENSITIVITY: . . . . 4 microvolts at one watt output.

POWER OUTPUT: . . . . 5.5 watts measured at the voice coil.

SPEAKER: . . . . 8" round, mounted on firewall.

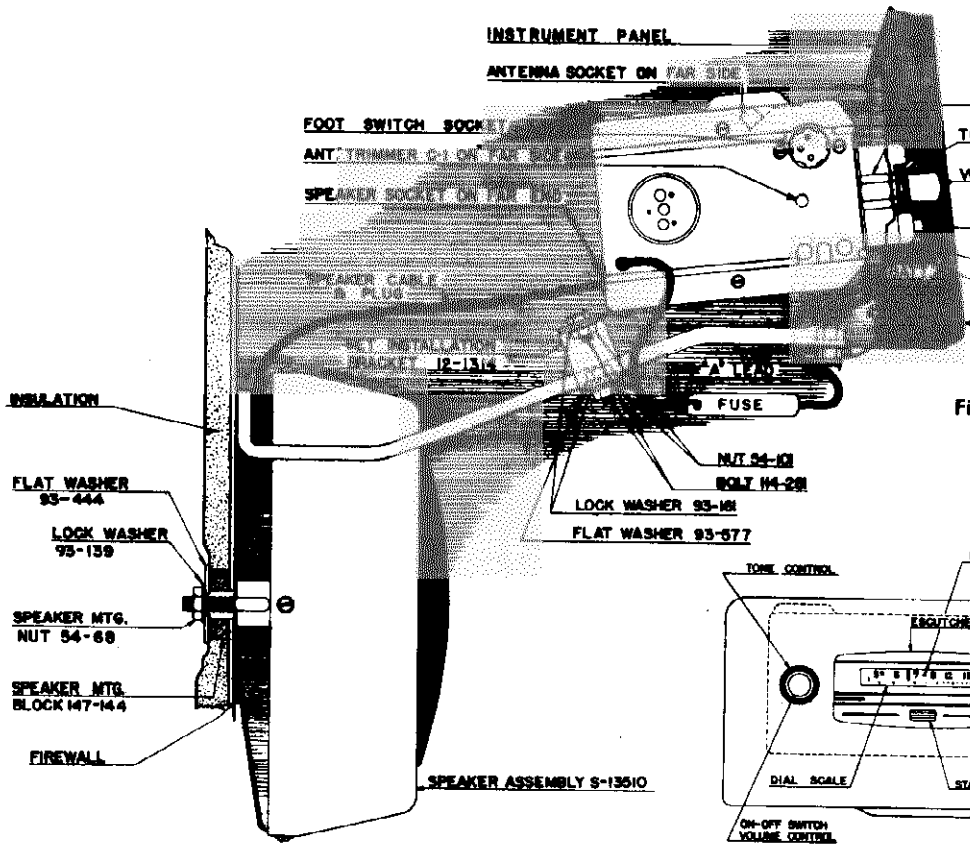


Fig. 1. Installation

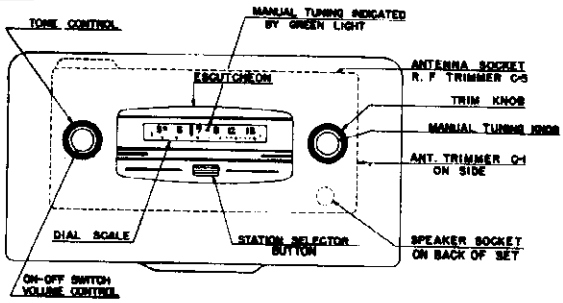


Fig. 2. Front View

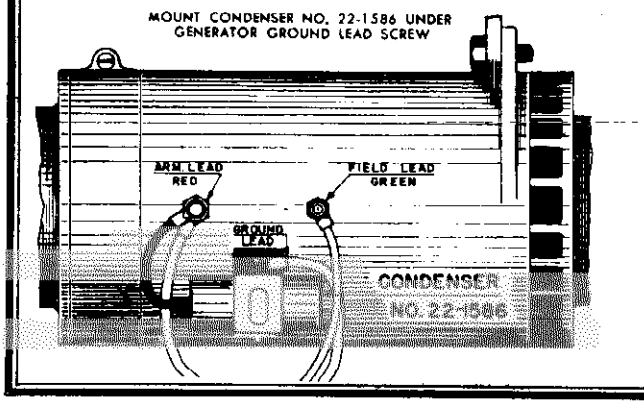
RECEIVER INSTALLATION

Figures 1 and 2, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to facilitate removal and reinstallation of this receiver when service or repair is necessary.

To take the receiver from the car, remove the control knobs and mounting nuts from the front panel, and remove the set installation Bracket No. 12-1314 from the rear set mounting bracket.

MANUAL TUNING

1. Press the Station Selector push button (Fig. 2) several times or until the green dot in the dial scale is illuminated.
2. Pull the Manual Tuning control knob (right hand) outward and turn to tune in desired station. Be sure to tune to exact frequency to assure the best tone quality.

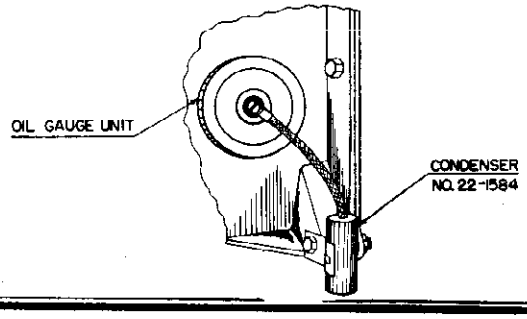


AUTOMATIC TUNING

There are five automatic tuning positions which may be adjusted to five desired stations. If these positions have not been previously adjusted proceed as follows:

1. Press the station selector push button repeatedly until the green dot in the dial scale is illuminated.
2. Press the button once more to move the mechanism to the No. 1 Position.
3. Pull manual tuning knob outward to engage the automatic mechanism.
4. Select the station desired and tune to its frequency by turning the tuning knob. Tune very carefully for clearest reception.
5. Press the station selector push button, pull the manual tuning knob outward, and tune in the station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

When the five automatic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the station selector push button to return to dial tuning, or any one of the stations adjusted on the Automatic.



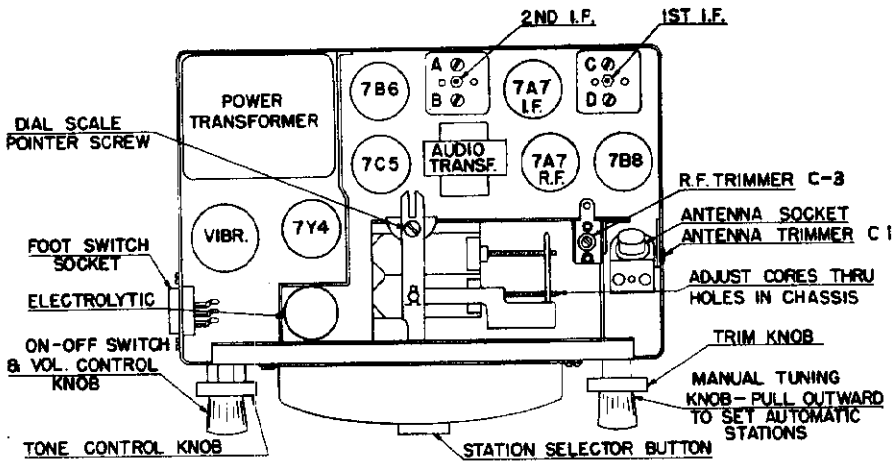


Fig. 7. Top View of Chassis

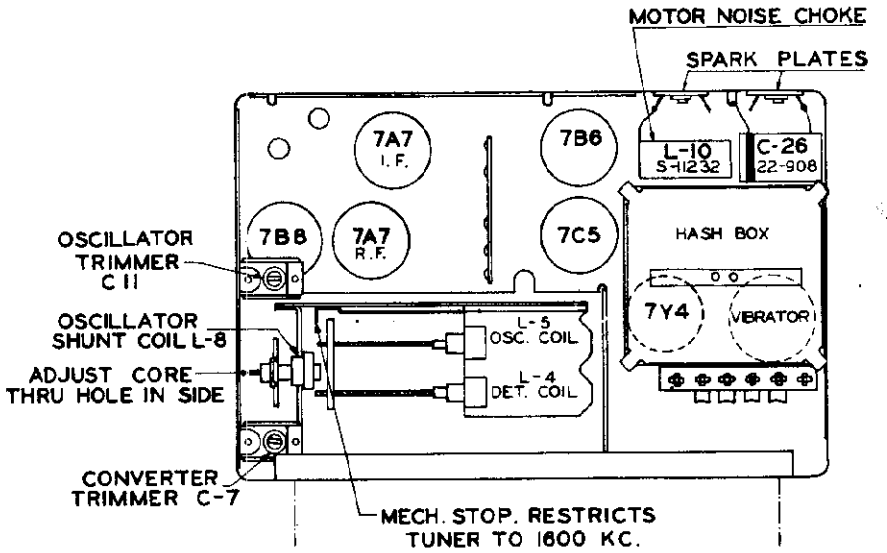


Fig. 8. Bottom View of Chassis

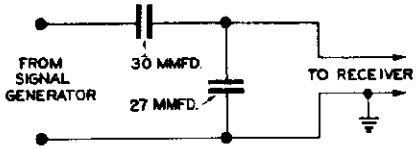


Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustments to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1—Remove top and bottom covers from receiver.

2—Set signal generator to 265 Kc.

3—Apply signal from generator through a .1 Mfd. dummy to 7B8 coverter grid. (Pin No. 6 on socket.)

4—Adjust I.F. trimmers, A, B, C and D (Fig. 7) in the order named for maximum output. Repeat the operation to assure accurate alignment.

R.F. AND OSCILLATOR ALIGNMENT

1—Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver.

2—Set signal generator to 535 Kc.

3—Place set in manual tuning position and set dial to 535 Kc.

4—Adjust oscillator trimmer C-11 (Fig. 8) for maximum response.

5—Set signal generator to 1200 Kc.

6—Tune set to 1200 Kc.

7—Adjust converter trimmer C-7 (Fig. 8) and R.F. trimmer C-3 (Fig. 7) for maximum response.

8—If dial calibration is off after making above adjustments, a correction can be made by turning the slotted brass screw at the rear of the pointer bracket.

CORE OR COIL REPLACEMENT ONLY

WARNING: The following adjustments are to be made ONLY if a core or coil is replaced.

1—Replace coil or core.

2—Set signal generator to 1700 Kc.

3—Connect signal generator leads through dummy, illustrated in Figure 9, to antenna receptacle on the receiver.

4—Set receiver dial to 1600 Kc. (maximum high frequency end of dial.)

5—Screw the core completely out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.

6—Adjust oscillator trimmer C-11 (Fig. 8) at 1700 Kc.

7—Adjust converter trimmer C-7, R.F. trimmer C-3, and antenna trimmer C-1 (Fig. 7 and 8) for maximum output reading.

8—Replace cores to their approximate original position.

9—Set generator dial and receiver dial to 1200 Kc.

10—Adjust oscillator core L-5 (Fig. 8) to scale at 1200 Kc.

11—Adjust the antenna core, R.F. core, and converter core (Fig. 7 and 8) for maximum output reading.

12—Set signal generator to 600 Kc.

13—"Rock in" shunt oscillator coil L-8 (Fig. 8) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a ganged condenser receiver.

14—Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.

15—After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station near 1200 Kc.

PARTS LIST MODEL 6MW083 (CHASSIS 6C83)

1946 WILLYS OVERLAND LONG DISTANCE RADIO

COILS AND CHOKES

Diagram No.	Part No.	Description
L 9	20-213	Main Hash Choke
T 1	95-916	1st I.F. Transformer
T 2	95-942	2nd I.F. Transformer
L 1	S8819	Ant. Motor Noise Choke Assem.
L 2, L 3	S11040	Ant. & R.F. Coil Assem. (Right Hand)
L 4, L 5	S11041	Osc. & Converter Coil Assem. (Left Hand)
L 7	S11229	Osc. Series Coil Assem.
L 8	S11231	Osc. Shunt Coil Assem.
L10	S11232	Motor Noise Choke Coil Assem.

CONDENSERS

C 8, C11	22-162	100 Mmfd.	600 V.
C13	22-170	.1 Mfd.	400 V.
C17	22-182	250 Mmfd.	600 V.
C 4	22-190	.1 Mfd.	200 V.
C12	22-250	.05 Mfd.	200 V.
C19	22-838	.005 Mfd.	600 V.
C14	22-906	.005 Mfd.	200 V.
C23, C27	22-908	.5 Mfd.	120 V.
C 6	22-1136	250 Mmfd.	600 V.
C 5	22-1169	.001 Mfd.	600 V.
C18	22-1170	.01 Mfd.	600 V.
C16	22-1180	.003 Mfd.	600 V.
C 2	22-1244	.004 Mfd.	600 V.
C15	22-1270	.02 Mfd.	200 V.
C 3	22-1376	R.F. Trimmer	
C 7	22-1377	Det. Trimmer	
C10	22-1378	Osc. Trimmer	
C20, C21, C22	22-1387	Dry Electrolytic—20 Mfd. 25 V. x 10 Mfd.—300 V. x 20 Mfd. 350 V.	
C 1	22-1420	Ant. Trimmer	
C24	22-1448	.008 Mfd.	1600 V.
C 9	22-1478	350 Mmfd. Compensator	
	22-1553*	Dry Electrolytic—20 Mfd.—25 V.	
	22-1554*	Dry Electrolytic—10 Mfd.—300 V. x 20 Mfd.—350 V.	
C25	27-87	Spark Plate	
C26	27-87	Spark Plate	

*Note: It is necessary to use one each 22-1553 and 22-1554 to replace one 22-1387.

RESISTORS

Diagram No.	Part No.	Description	
R 2	63-1267	Sensitivity Control (Sub. for 63-1379)	
R18	63-1368	1800 Ohm, 2 Watt Insl. W.W.	
R13	63-1369	270 Ohm, 1 Watt Insl. W.W.	
R 2	63-1379	Sensitivity Control	
R 9	63-1390	1 Megohm	¼ Watt.
R 1, R 4, R11, R12	63-1392	330M Ohm	¼ Watt.
R15	63-1395	22M Ohm	¼ Watt.
R 5	63-1396	68M Ohm	¼ Watt.
R 8	63-1398	33M Ohm	1 Watt.
R16, R17	63-1399	82 Ohm	½ Watt.
R14	63-1400	15 Megohm	¼ Watt.
R 7	63-1401	15M Ohm	½ Watt.
R22	63-1410	120 Ohm	½ Watt.
R 3	63-1411	18M Ohm	½ Watt.
R 6	63-1413	10 Megohm	¼ Watt.
R21	63-1414	100 Ohm	¼ Watt.
R23	63-1417	47M Ohm	¼ Watt.
R19, R20	63-1508	Tone Con., Vol. Con. & Switch	

MISCELLANEOUS

	19-114	Foot Sw. Cable Retaining Clip
	46-624	Selector Sw. Knob
	52-294	Vol. Con. Cable
	52-398	Battery Cable (Set to Fuse)
	52-399	Battery Cable (Fuse to Ammeter)
	57-1173	Escutcheon
	78-281	Vibrator Socket (or 78-732-733)
	78-596	Loktal Tube Socket (or 78-717-726-729-730)
FS 2	78-646	Foot Sw. Cable Socket (or 78-406)
SK 1	78-728	Speaker Cable Socket
	80-232	Vol. Con. Knob Retaining Spring
	80-454	Selector Knob Spring
T 4	95-914	Power Transformer (Alt. for 95-1013)
T 3	95-915	Output Transformer
T 4	95-1013	Power Transformer
	112-310	Foot Sw. Mtg. Screw
S 4	136-14	Fuse—10 Amp.—Type MDL—10
V 1	190-20	Vibrator
	202-430	Instruction Book
FS 3	S12042	Foot Sw., Cable & Plug Assem.
FS 1	S-9458	Foot Switch & Plate Assembly

*Note: Not used in production. Sold only as an accessory.

DIAL AND TUNING MECHANISM ASSEMBLY

	26-385	Dial Scale
	34-132	Indexing Disc
	34-138	Tuning Gear
	34-158	Ratchet Gear
	56-174	Indicator Pin
	57-1077	Protector Plate
	59-160	Dial Pointer
	76-378	Guide Rod
	80-329	Gear Indexing Spring

DIAL AND TUNING MECHANISM ASSEMBLY (Continued)

Diagram No.	Part No.	Description
	80-331	Cross Arm Return Spring
	80-332	Cam Lever Spring
	80-336	Ratchet Gear Return Spring
	80-340	Lever Spring
	80-341	Kick-off Spring
	80-342	Tuning Shaft Spring
	80-379	Pointer Retainer Spring
	80-445	Flag Spring
	83-1030	Return Spring Retainer Strip
	83-1039	Solenoid Insulating Strip
	86-30	#6 Shakeproof Terminal
	93-125	#6 Internal Shakeproof Lockwasher
	93-501	#4 Internal Shakeproof Lockwasher
	93-631	Retainer Washer
	93-650	Brass Washer (.010 x 3/16 x 7/16)
	93-706	Neoprene Washer (.020 x 7/16 x 3/4)
	93-822	Brass Washer (.008 x .125 x 7/32)
	93-849	Shim Washer
	94-438	Spacing Bushing
	97-193	Lever Stud
	97-236	Flag Stud
S3	100-32	Dial Light Bulb
	114-63	#6-32 x 3/16 Hex Acorn Hd. M.S.
	114-69	#4-40 x 1/4 Hex Acorn Hd. M.S.
	114-150	#6-32 x 5/32 Hex Acorn Hd. M.S.
	117-83	Tuning Shaft Locking Lever
	128-26	Dial Indicator Cam
	147-126	Gear & Disc Spacer
	149-44	Adjusting Spring & Core
	S10826	Solenoid End Plug & Bracket Assem.
	S10829	Solenoid & Terminal Assem.
	S10381	Ratcher & Bracket Assem.
	S10836	Cross Arm Assem.
	S11056	Tuning Shaft & Gear Assem.
	S11076	Push-Pull Tuner Assem. (complete)
	S11082	Turret Assem.
S1	S11271	Solenoid Sw. Assem. (Hand Selector & Muting)
	S11391	Antenna Connector Socket & Bracket Assembly
	S12438	Mounting Plate & Lever Assem.
	S12439	Pointer Mounting Bracket & Stud Assem.
	S12440	Pointer Drive Bracket & Stud Assem.
	S12447	Dial Light Socket & Wire Assem.
	S12909	Indicator Flag & Bracket Assem. (59-186)
	S12911	Front Plate & Bushing Assem.

SET INSTALLATION AND SUPPRESSION KIT

Diagram Part No.		Description
	S13597	Set Installation & Suppression Kit (complete)
	12-1314	Set Installation Bracket
	22-1584	Oil Gauge Cond. (.5 Mfd.—200 V.)
	22-1585	Temp. Gauge Cond. (.5Mfd.—200V.)
	22-1586	Generator Cond. (1 Mfd.—200 V.)
	54-68	5/16 x 3/4 x 7/32 Hex Nut
	54-104	1/4-20 x 1/2 x 3/16 Hex Nut
	54-153	7/16-28 x 19/32 x .120 Hex Nut
	63-1512	Distributor Suppressor
	80-145	Motor Hood Bond Spring
	93-139	5/16 External Shakeproof Lockwasher
	93-161	1/4 External Shakeproof Lockwasher
	93-444	1/16 x 3/8 x 1 3/4 Steel Washer
	93-577	.062 x 1 3/4 x 3/4 Steel Washer
	112-365	#8 x 1/2 B.H. Sheet Metal Screw
	114-281	1/4-20 x 5/8 Hex Hd. M.S.
	147-144	Specker Mounting Spacer
	188-41	Spacer Ring

KNOB KIT

S13174	Knob Kit (complete)
S12910	Tuning & Trim Knob Assem.
S13-239	Vol. Con. Knob & Spring Assem.
46-635	Tone Con. Knob

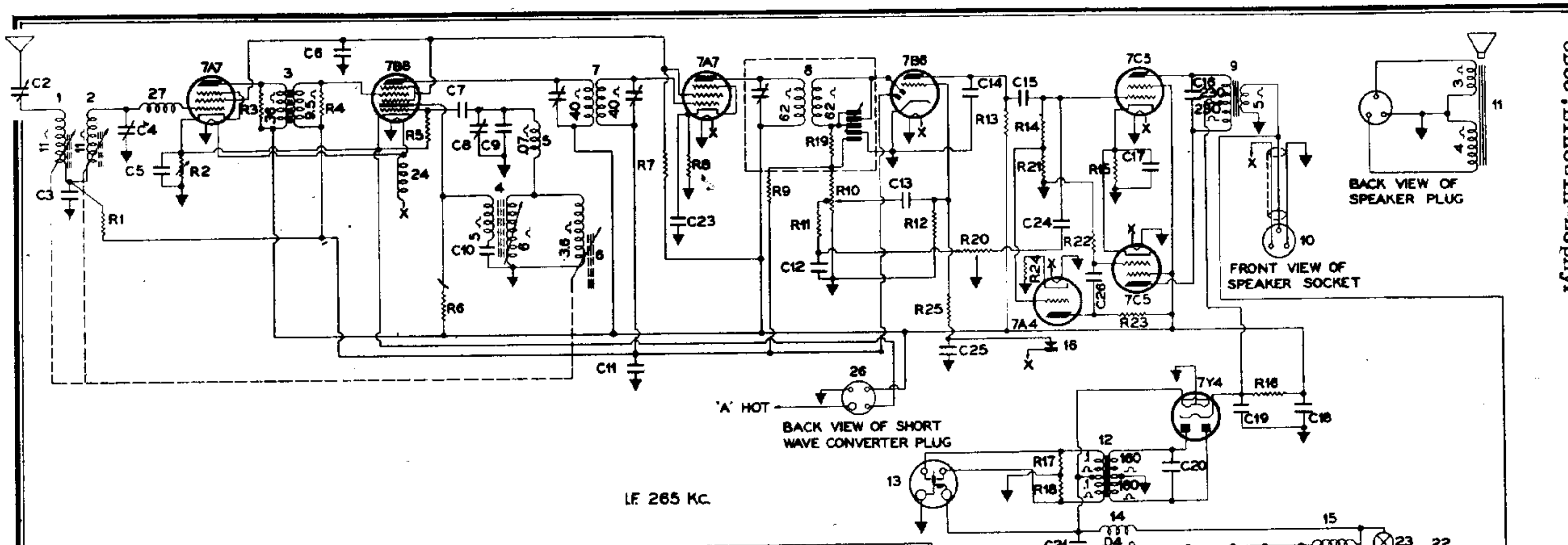
SPEAKER AND SPEAKER MOUNTING PARTS

	43-131	Speaker Housing
SP 1	49-566	7.6" PM Speaker & Cable 208-566 Cone & Voice Coil
	54-30	5/32 x 5/16 x 7/64 Hex Nut
	74-41	Speaker Screen
	93-126	#8 Internal Shakeproof Lockwasher
	93-783	Stat. Bronze Steel Washer (1/32 x 3/16 x 3/8)
	112-248	#8-32 x 5/8 Oval B.H.M.S.
	147-85	Spacer
	S13066	Speaker Mounting Bracket & Stud Assem.
	S13510	Complete Speaker & Housing Assem.

Note: When ordering cone and voice coil marked * be sure to add manufacturers' code letter that follows base part number.

MODEL 8ML692, Chassis 8B03, Lincoln-Zephyr

ZENITH RADIO CORP.



DIAG NO.	PART NO.	CONDENSERS
C1	22-1076	LOW REACTOR DUAL 250MMFD.
2	22-1076	ANT. TRIM. 6PLATE 250MMF
3	22-424	.004 MFD. ±10% MICA
4	22-1075	R.F. TRIM. 3PLATE 50MMF
5	22-190	.1MFD. 50% 10% 200V
6	22-170	.1MFD. 50% 10% 400V
7	22-187	100MMF 50/20% MICA
8	22-1235	OSC. TRIM. 2PLATE 50MMF
9	22-1236	50MMF TEMP. COMPENSATOR
10	22-182	100MMF ±50 20% MICA
11	22-255	.1MFD. 50% 10% 200V
12	22-185	.01MFD. 10% 10% 200V
13	22-906	.05MFD. 20% 10% 200V
14	22-183	250MMFD. 50% 10% MICA
15	22-433	.02MFD. 10% 10% 600V
16	22-912	.005MFD. 50% 10% 600V
17		10MFD. 25WV
18	22-1273	20MFD. 350WV
19		20MFD. 400WV
20	22-1247	.005MFD. ±20% 10% 1600V
21	22-908	.5MFD. 50% 10% 120V
22	22-908	.5MFD. 50% 10% 120V
23	22-250	.05MFD. 50% 10% 200V
24	22-906	.05MFD. 20% 10% 200V
25	22-1270	.05MFD. 20% 10% 200V
26	22-914	.05MFD. ±50% 10% 600V

DIAG NO.	PART NO.	RESISTORS
R1	63-598	330000 OHMS 1/4W ±20%
2	63-1131	SENSITIVITY CONTROL
3	63-645	27000 OHMS 1/4W ±10%
4	63-646	33000 OHMS 1/4W ±10%
5	63-596	68000 OHMS 1/4W ±20%
6	63-1180	15000 OHMS 1/2W ±20%
7	63-597	3000 OHMS 1W ±10%
8	63-256	1000 OHMS 1/4W ±20%
9	63-271	1 MEG. 1/4W ±20%
10	63-1262	250000 VC TAP AT 75000
11	63-765	33000 OHMS 1/4W ±10%
12	63-976	15 MEG. 1/4W ±20%
13	63-837	330000 OHMS 1/4W ±20%
14	63-837	330000 OHMS 1/4W ±10%
15	63-1202	350 OHMS 2W ±10%
16	63-1201	400 OHMS 3W ±10%
17	63-1197	32 OHMS 1/2W ±20%
18	63-1197	32 OHMS 1/2W ±20%
19	63-765	33000 OHMS 1/4W ±10%
20	63-1261	1 MEG. TONE CONTROL
21	63-848	47000 OHMS 1/4W ±10%
22	63-598	330000 OHMS 1/4W ±10%
23	63-847	3300 OHMS 1/4W ±10%
24	[illegible]	2200 OHMS 1/4W ±10%
25	63-271	1 MEG. 1/4W ±20%

DIAG NO.	PART NO.	MISCELLANEOUS
1	S-10064	ANTENNA COIL
2	S-10064	R.F. GRID COIL
3	S-9763	UNTUNED R.F. TRANSFORMER
4	S-10099	OSC. SHUNT COIL
5	20-244	OSC. SERIES COIL
6	S-10063	OSC. TUNING COIL
7	95-871	1ST I.F. TRANSFORMER
8	95-872	DIODE TRANSFORMER
9	95-874	OUTPUT TRANSFORMER
10	52-244	SPEAKER CABLE & SOCKET
11	49-493	SPEAKER & PLUG
12	95-873	VIBRATOR POWER TRANSFORMER
13	190-15	VIBRATOR
14	20-213	HASH CHOKE
15	S-5844	MOTOR NOISE CHOKE
16		DELAYED MUTING SWITCH
17	100-32	DIAL LIGHT 51
18	78-406	FOOT SWITCH SOCKET
19	S-10411	SILENCING & SELECTOR SWITCH
20	S-10411	SAFETY SWITCH-AUTOMATIC SET UP
21	S-10127	SOLENOID
22	136-12	FUSE-20 AMPS
23	63-1262	ON-OFF SWITCH ON VOL. CONTROL
24	S-10506	HEATER LINE CHOKE
25	100-32	MANUAL DIAL INDICATOR
26	78-209	CONVERTER PLUG
27	S-8619	ANTENNA MOTOR NOISE CHOKE
28	100-31	PILOT LIGHT 51

SCHEMATIC DIAGRAM AND PARTS LIST FOR 1942 LINCOLN-ZEPHYR RECEIVER

SENSITIVITY: ....5 microvolts at one watt output.

POWER OUTPUT: ......7 watts measured at the voice coil.

SPEAKER: ....6" x 9" oval, instrument panel mounting.

CURRENT CONSUMPTION: ..9.2 amperes

INSTANTANEOUS CURRENT CONSUMPTION DURING AUTOMATIC CHANGE CYCLE: ....18.2 amperes

TUBE COMPLEMENT: ....7A7 R.F., 7B8 converter, 7A7 I.F., 7B6 Detector and 1st Audio, 7A4 Phase Inverter, 2-7C5 Push pull power output. 7Y4 Rectifier.

RECEIVER INSTALLATIONS:

Figures 1-1A-2 and 2A, illustrating the escutcheon plate, control knobs and the installed receivers, are given here to facilitate removal and reinstallation of the receivers when service or repairs are necessary.

Remove the tuning and volume control knobs to expose the 8/32 flat head screws that support the receiver at the top. Remove the lower support brackets "D" next and finally loosen the hook bolts "A" to remove the receiver from the car.

NOTE: To set up a station on any automatic position pull the tuning knob out and tune the receiver as in manual tuning. Press the tuning knob in to its original position after the station has been accurately tuned in.

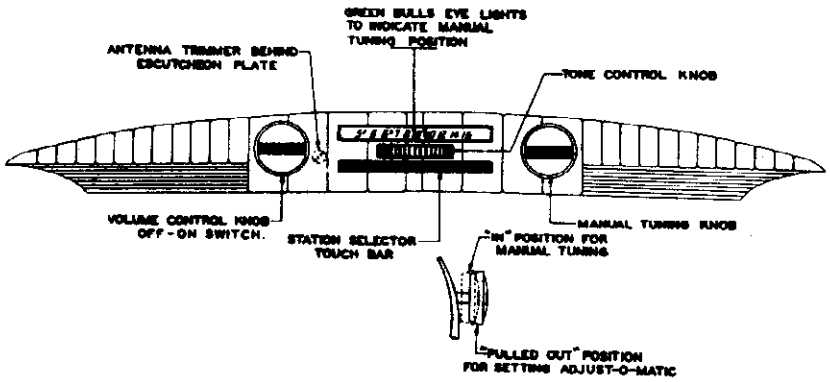


FIG. 1—Zephyr

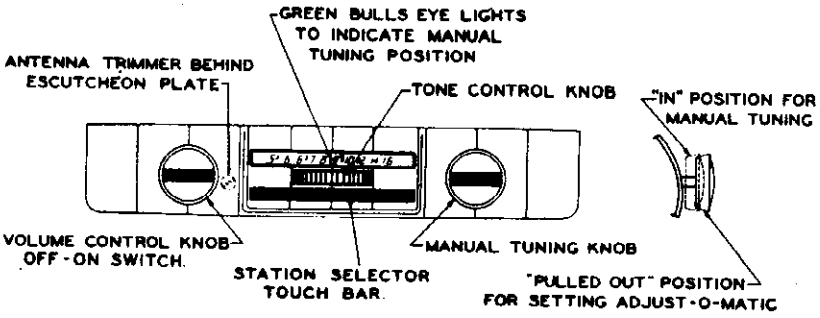


FIG. 1A—Continental

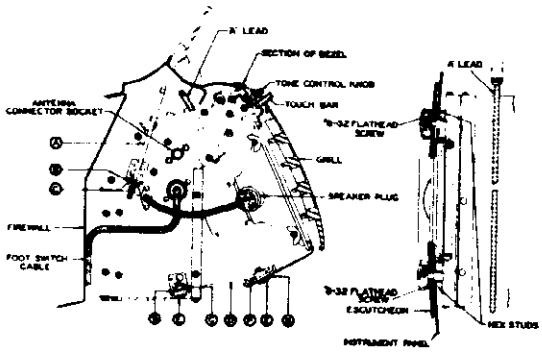


FIG. 2—Zephyr

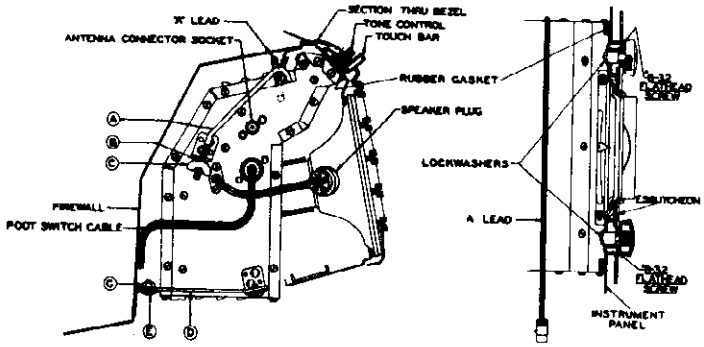


FIG. 2A—Continental

DELAYED AUTOMATIC MUTING CIRCUIT

Pressing either the Touch-bar or the foot control switch automatically mutes the receiver for the duration of the change cycle. This action is accomplished by applying 6 volts negative to the 7B6 first audio grid through the 1 megohm resistor R-25. (See schematic diagram). This negative voltage blocks the grid of the 7B6 until the voltage bleeds off through the 15 megohm resistor R-12, when the receiver will again operate normally. NOTE: The storage battery in the car must be properly polarized to apply the negative muting voltage to the receiver. If the battery polarity is reversed the receiver will not mute and it may become distorted during the change cycle. Always connect the positive (+) terminal of the storage battery or power supply to the receiver case when checking the receiver.

INTERFERENCE SUPPRESSION

There should be no motornoise or interference from the ignition circuit, if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The two distributor condensers No. 22-1147 should be installed as shown in Figure 3 below.

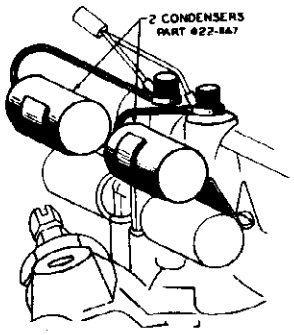


FIG. 3

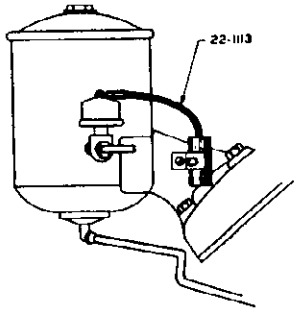


FIG. 4

The oil gauge condenser No. 22-113 should be installed as shown in Figure 4 above.

The temperature gauge condenser No. 22-1113 should be installed with its bracket fastened under one of the cylinder head bolts as shown in Figure 5 below.

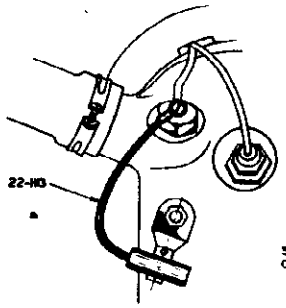


FIG. 5

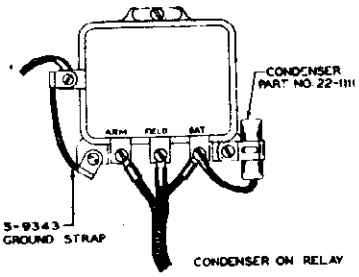


FIG. 6

The No. S-9343 ground strap and the voltage regulator condenser No. 22-1111 should be installed as shown in Figure 6 above. The condenser lead should be connected to the "Batt" terminal.

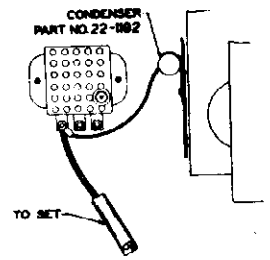


FIG. 7

The No. 22-1192 condenser and the "A" lead should be connected together at the terminal strip inside the car above the steering column as shown in Figure 7.

Check the antenna connector and the instrument panel bolts so they make a good ground contact with the car body.

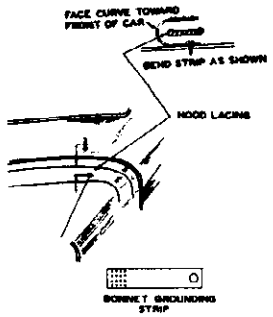
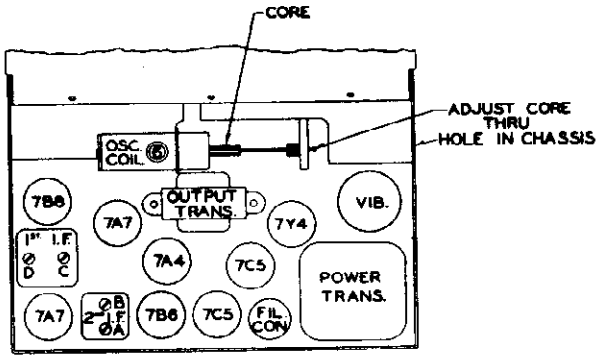


FIG. 8

Install the No. 80-145 bonnet grounding strip as illustrated in figure 8.



TUBE & TRIMMER LAYOUT MOD. 8ML692

FIG. 9

ALIGNMENT

Maximum performance is dependent upon the accurate alignment of the receiver, so follow the alignment instructions carefully.

CAUTION: Make all alignment adjustments to the receiver with the volume control turned full on. Reduce the signal intensity, if necessary, at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1—Remove the top and bottom covers from the receiver.

2—Place the receiver in the Manual tuning position and set the pointer at the low frequency end of the dial. (540 Kc.)

3—Set the signal generator at 265 Kc.

4—Apply the signal from the generator through a .1 mfd. dummy to the 7B8 converter grid.

5—Adjust trimmers A-B-C and D (Fig. 9) for maximum output. Repeat the operation to assure accurate alignment.

R. F. AND OSCILLATOR ALIGNMENT

1—Set the signal generator at 1640 Kc.

2—Connect the signal generator leads, through the dummy as illustrated in Figure 12. to the antenna receptacle on the receiver.

3—Set the receiver dial at 1640 Kc. (Maximum high frequency end of dial.)

4—Screw the cores completely out of the antenna. R.F. and oscillator coils.

5—Set the oscillator trimmer (F—Fig. 10) at 1640 Kc.

6—Peak R.F. and antenna trimmers (G—Fig. 10 and H—Fig. 11) for maximum output reading.

7—Replace the cores to their approximate original positions in the antenna. R.F. and oscillator coils.

8—Set the generator and the receiver dial at 1200 Kc.

9—Adjust the oscillator core (No. 6—Fig. 9) to scale at 1200 Kc.

10—Adjust the antenna and R.F. cores (No. 1 and No. 2—Fig. 10) for maximum output reading.

11—Set the signal generator at 600 Kc.

12—"Rock in" the Shunt oscillator core (No. 4—Fig. 10) for maximum output reading. (Same as rocking in the padder condenser on a ganged condenser receiver.)

13—Check receiver at 1200 Kc. for calibration and gain. If receiver is off scale or weak. repeat operation 9 and 10.

IMPORTANT: When reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature before checking the antenna trimmer alignment on a weak station at approximately 1200 Kc.

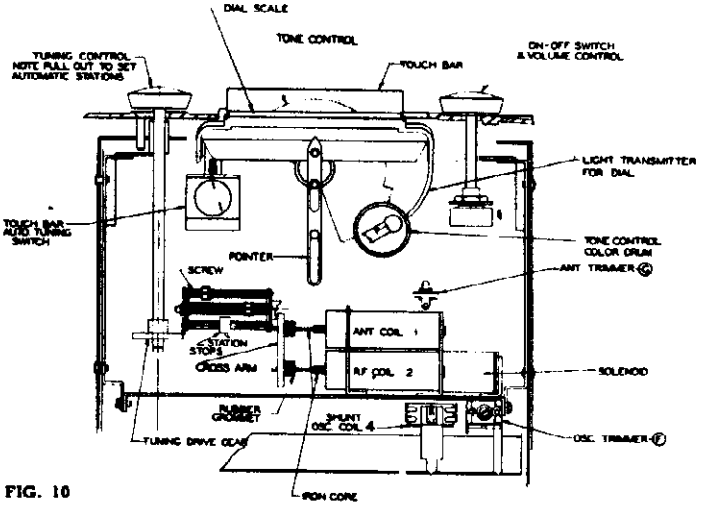


FIG. 10

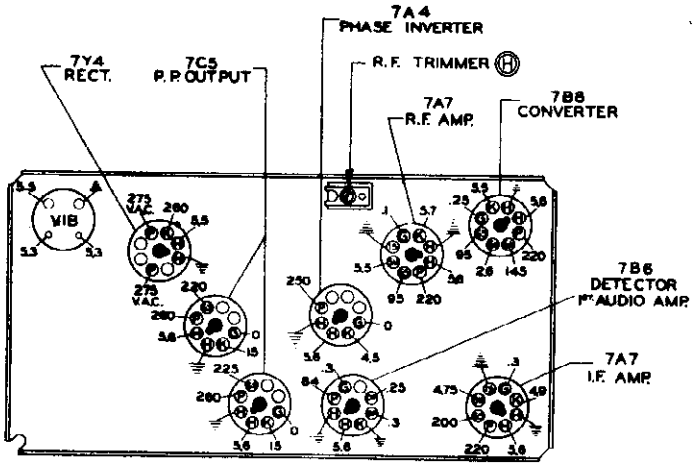


FIG. 11

Figure 11 shows the approximate voltages as measured with a 1000 ohm per volt meter measured between the socket terminals and the chassis. Volume control set at maximum with no signal. Battery Voltage—6.3.

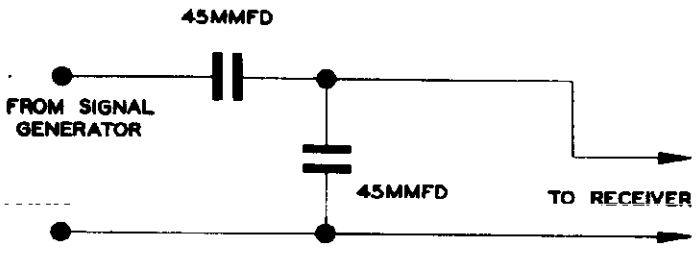


FIG. 12

Schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver Fig. 12.

PARTS PRICE LIST

MODEL 8ML692 (CHASSIS 8B03)

LINCOLN

1942 ADJUST-O-MATIC RADIO

26H-18805

DIAL AND TUNING MECHANISM

12-894	Rear magnet mounting bracket	$ .15
26-314	Dial scale	1.00
34-106	Ratchet	.25
34-122	Tone control gear	.03
35-6	Tone control color drum	.15
46-478	Volume control knob	.20
57-963	Dial scale background plate	.60
80-272	Ratchet lever spring	.02
80-274	Tuning coil return spring	.05
80-300	Gear indexing spring	.03
85-308	Station selector switch	.60
93-558	Brass washer	.01
97-156	Tone control knob retaining stud	.30
100-32	Dial light bulb	.07
128-437	Dial light shield	.01
128-438	Dial scale light shield	.005
128-439	Color organ light shield	.02
147-118	Manual automatic bakelite breaker collar	.04
187-5	Indicator light rod (lucite)	.20
188-34	Retaining ring (tuning shaft)	.01
188-39	Turret screw lock ring	.02
188-43	Retaining ring	.01
S10109	Ratchet drive lever & spring assembly	.35
S10110	Front magnet mounting bracket & detent lever spring assembly	.20
S10117	Bracket & index spring assembly	.20
S10120	Tuning adjustment screw & grommet assembly	.40
S10127	Magnet coil & terminal assembly	1.00
S10232	Tuning shaft & gear assembly	.35
S10411	Manual automatic selector switch assembly	.25
S10415	Turret shaft, screw & stop assembly	2.00
S10514	Magnet core, cross arm, pointer drive bracket & stud assembly	.90
S10517	Tone control knob assembly (46-478)	.45
S10518	Dial pointer, stud & bushing assy. (59-138)	.30
S10521	Manual dial light socket, switch, bracket and stud assembly	.75
S10522	Color organ light socket & wire assembly	.40
S10523	Dial light socket & wire assembly	.40
S10524	Station selector bar, bracket & stud assembly	.45
S10568	Tuning control knob assembly (46-477)	.35

COILS AND CHOKES

20-213	Main hash choke	.25
20-242	Oscillator series coil	.20
95-871	1st I. F. transformer	1.25
95-872	2nd I. F. transformer	1.50
55844	Motor noise choke assembly	.15
S8819	Antenna motor noise choke assembly	.20
S9762	Untuned R. F. coil & core assembly	.50
S10063	Oscillator coil & shield asembly	1.10
S10064	R. F. coil & shield assembly	1.40
S10095	Oscillator shunt coil assembly	.60
S10506	Heater line choke assembly	.30

CONDENSERS

22-162	.0001 mfd.	600 volt		.15
22-170	.1 mfd.	400 volt		.20
22-182	.00025 mfd.	600 volt		.20
22-185	.01 mfd.	200 volt		.15
22-190	1 mfd.	200 volt		.18
22-250	.05 mfd.	200 volt		.15
22-435	.02 mfd.	800 volt		.15
22-906	.005 mfd.	200 volt		.15
22-908	.5 mfd.	120 volt		.25
22-912	.002 mfd.	600 volt		.15
22-914	.05 mfd.	600 volt		.20
22-1076	Dual spark plate condenser			.20
22-1111	Generator condenser			.45
22-1113	Oil & water gauge condenser			.35
11-1147	Distributor condenser			.35
22-1192	"A" lead condenser			.50
22-1235	Single section ceramic trimmer			.15
22-1244	.004 mfd.	600 volt		.20
22-1247	.008 mfd.	1600 volt		.20
22-1248	350 mmfd. compensator			.40
22-1270	.02 mfd.	200 volt		.15
22-1272	20 mfd. 25 volt x 20 mfd. 400 volt x 20 mfd. 350 volt dry electrolytic			1.25
22-1275	Single section ceramic trimmer			.25
22-1276	Antenna trimmer			.35

RESISTORS

63-238	1M ohm	¼ watt	.07
63-271	1 megohm	¼ watt	.07
63-282	2200 ohm	¼ watt	.07
63-594	68M ohm	¼ watt	.07
63-596	330M ohm	¼ watt	.07
63-845	27M ohm	¼ watt	.07
63-846	33M ohm	¼ watt	.07
63-847	39 M ohm	¼ watt	.07
63-848	47M ohm	¼ watt	.07
63-857	330M ohm	¼ watt	.07
63-785	33M ohm	½ watt insulated	.15
63-957	33M ohm	1 watt insulated	.20
63-976	15 megohm	¼ watt	.07
63-1131	Sensitivity control		.50
63-1180	15M ohm	½ watt insulated	.17
63-1197	82 ohm	½ watt	.08
63-1201	1800 ohm W.W.	3 watt insulated	.30
63-1202	330 ohm W.W.	2 watt insulated	.30
63-1261	Tone control		1.00
63-1282	Volume control & switch		1.50

MISCELLANEOUS

49-493	Dynamic speaker (6" x 9" oval)	5.00
	207-493 Field coil (not replaceable)	
	208-493 Cone & voice coil assembly	2.00
52-200	Battery cable—fuse to ammeter	.20
52-244	Speaker cable and plug	.45
52-253	Battery cable—set to fuse	.20
52-266	Antenna cable	1.70
78-209	Socket—short wave adapter	.10
78-251	Socket—antenna connector	.10
78-406	Socket—foot switch	.10
78-454	Socket—loktal tube (8 contact)	.15
78-455	Socket—loktal tube (6 contact)	.15
78-467	Socket—loktal tube (5 contact)	.15
78-477	Socket—vibrator	.10
80-246	Power transformer ground spring	.07
80-291	Muting switch spring	.03
83-961	Muting switch insulating strip	.35C
83-962	Muting switch insulating strip	.30C
93-125	No. 6 internal shakeproof lockwasher	.25C
93-573	Muting switch fibre washer	.03
95-873	Power transformer	3.00
95-874	Output transformer	1.50
114-83	No. 8/32 x 3/16" Hex acorn Hd. M.S.-N.P.	.25C
114-149	No. 6 x 3/16" Hex Hd. S.T. screw-N.P.	.45C
127-39	Muting switch contact	.03
127-40	Muting switch contact	.03
136-12	Fuse—20 ampere	.10
190-15	Vibrator	2.95
202-324	Instruction book	.15
S9462	Foot control switch & cable assembly	2.00

INSTALLATION KIT ASSEMBLY

S10573	Installation kit complete	1.00
12-972	Set installation bracket	.07
19-114	Foot switch cable clip	.02
54-99	No. 12/24 x 7/16" Hex nut	.35C
54-146	No. 10/32 wing nut	1.50C
54-151	No. 12/24 wing nut	1.50C
64-141	Foot switch installation eyelet	.04
71-59	No. 8-32 x 1/2" flat Hd. M.S.-N.P.	.80C
93-340	No. 3/32 x .255 x 1/2" steel washer	.75C
93-372	No. 12 Internal shakeproof lockwasher	.40C
93-524	Foot switch installation washer	.04
97-153	Set installation spacer stud	.15
112-257	No. 4 x 1/4" R.H. sheet metal screw	.50C
112-310	Foot switch mounting screw	.85C
112-342	No. 12/24 x 5/8" R.H.M.S.	.01
112-348	Set installation screw	.09

MOTOR NOISE SUPPRESSION KIT ASSEMBLY

S10574	Motor noise suppression kit complete	2.80
S9343	Regulator ground lead assembly	.05
12-831	Suppressor condenser bracket	1.50C
22-1111	Generator condenser	.45
22-1113	Water & oil gauge condenser	.35
22-1147	Distributor condenser	.35
22-1192	"A" lead condenser	.50
83-916	Bonding strip	.04
114-39	No. 8 x 1/4" Hex Hd. slotted S.T. screw	.50C

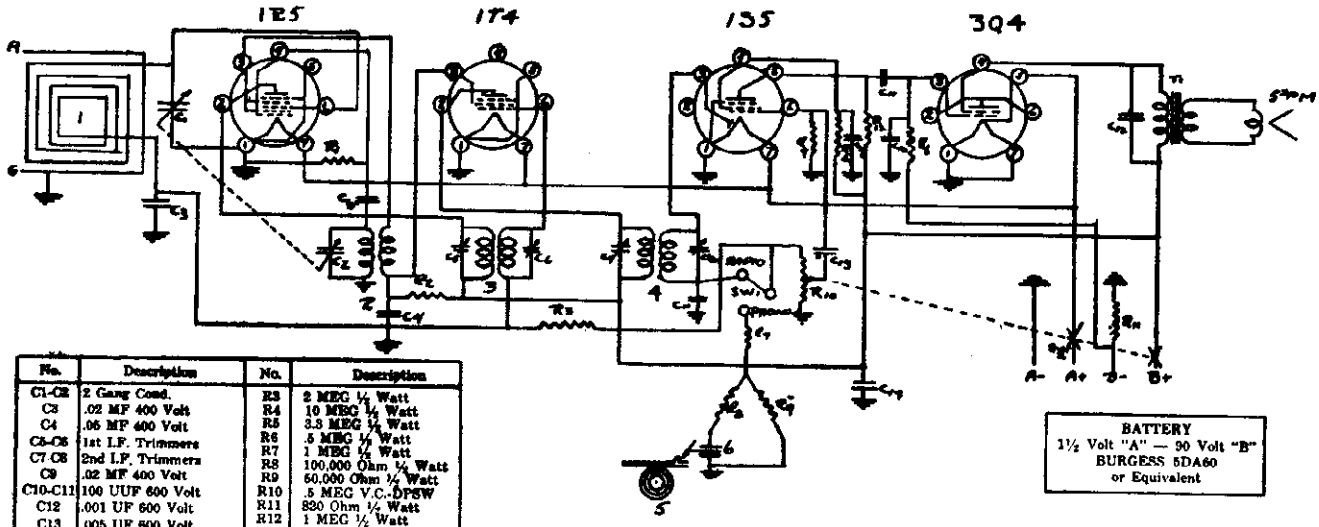
TUNING KNOB KIT ASSEMBLY

S10577	Tuning knob kit complete	.55
S10568	Tuning control knob assembly (46-477)	.35
46-478	Volume control knob	.20

All Prices List—Subject to Regular Discount and Change Without Notice—9/15/41.

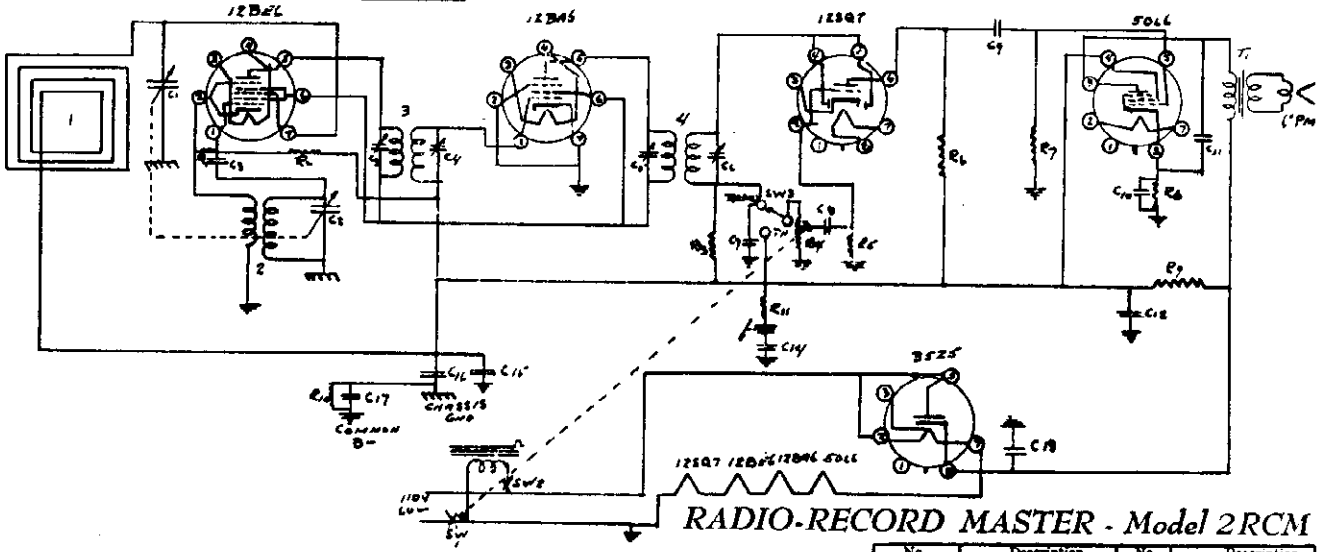
AL AMO ELECTRONICS CORP.

MODEL AEC-3RCMB
MODEL 2RCM



No.	Description	No.	Description
C1-C2	2 Gang Cond.	R3	2 MEG ½ Watt
C3	.02 MF 400 Volt	R4	10 MEG ½ Watt
C4	.05 MF 400 Volt	R5	3.3 MEG ½ Watt
C5-C6	1st I.F. Trimmers	R6	.5 MEG ½ Watt
C7-C8	2nd I.F. Trimmers	R7	1 MEG ½ Watt
C9	.02 MF 400 Volt	R8	100,000 Ohm ½ Watt
C10-C11	100 UUF 600 Volt	R9	50,000 Ohm ½ Watt
C12	.001 UF 600 Volt	R10	.5 MEG V.C.-DPSW
C13	.005 UF 600 Volt	R11	820 Ohm ½ Watt
C14	10 MFD 90 Volt	R12	1 MEG ½ Watt
C15	50 UUF 600 Volt	1	Loop
R1	100,000 Ohm ½ Watt	2	Osc. Coil
R2	18,000 Ohm ½ Watt	3	1st I.F.
		4	2nd I.F.
		5	Spring Motor
		6	Crystal Pickup
5-16-47	A.E.C.		App. C.E.

MODEL AEC-3RCMB



RADIO-RECORD MASTER - Model 2RCM

No.	Description	No.	Description
C1 & C2	2 Gang Cond.	1	Loop
C3	50 UUF 600V	2	Osc. Coil
C3 & C4	1st I.F.	4	1st I.F. 456 Kc
C5 & C6	2nd I.F.	3	2nd I.F. 456 Kc
C7	100 UUF 600V	T1	Output Trans.
C8 & C9	.005 MF 600V	SW2	T. T. Power
C10	10 MFD 25V	SW3	Radio-Phono.
C11	.03 MF 400V		
C12 & C13	40 MFD 150V		
C14 & C15			
C16 & C17	.05 MFD 400V		
R1	20,000 ½ Watt		
R2	10 MEG ½ Watt		
R3	2 MEG ½ Watt		
R4	.5 MEG V.C. & SW1		
R5	4.7 MEG ½ Watt		
R6 & R7	470,000 ½ Watt		
R10			
R8	15052 ½ Watt		
R9	150052 ½ Watt		
R11	1 MEG ½ Watt		
5-12-47	AEC		App. C.E.

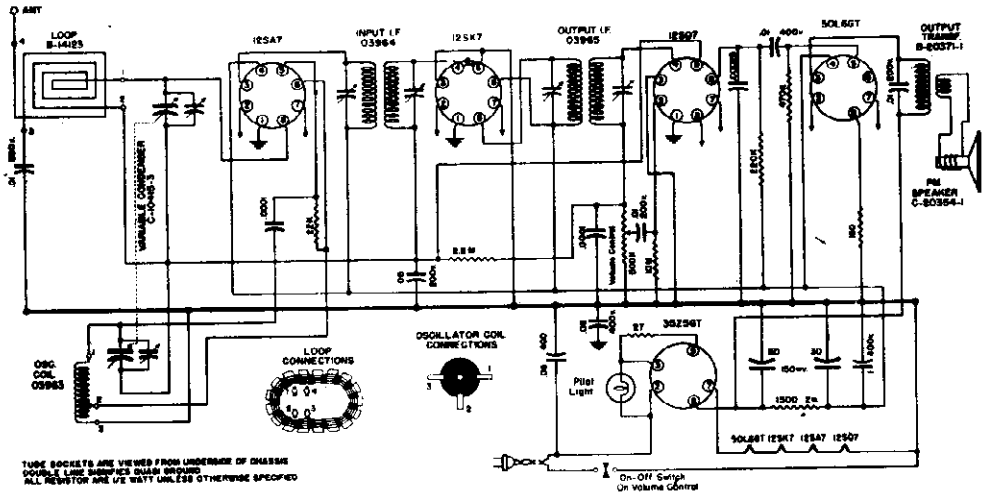
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control 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 oscillator and loop should be adjusted.

I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12BE6) through a .05 to .1 mfd condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter. Each I.F. has two adjustments at the top of the can.

LOOP ALIGNMENT. Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

ALDEN, INC.



When using D.C. power supply, and after allowing sufficient time for tubes to warm up, if the receiver does not operate, remove the line cord plug from the socket and reverse. Replace the plug in the reverse position and allow tubes to warm up, at which time the receiver will operate

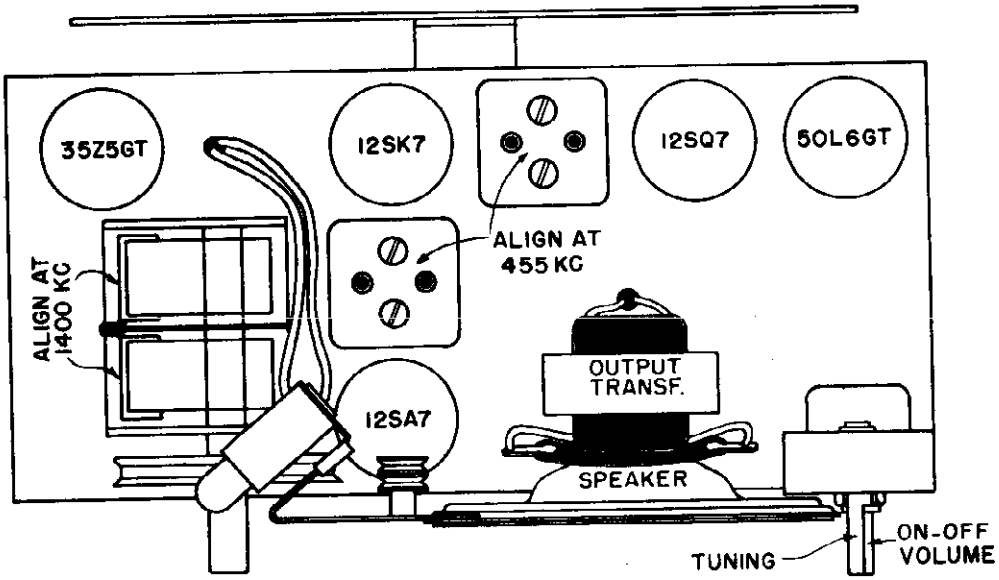
When using A.C. power supply, it will be found that there will be less hum when the line cord plug is in the best position. Try both positions, leaving the plug in the position that produces the least hum.

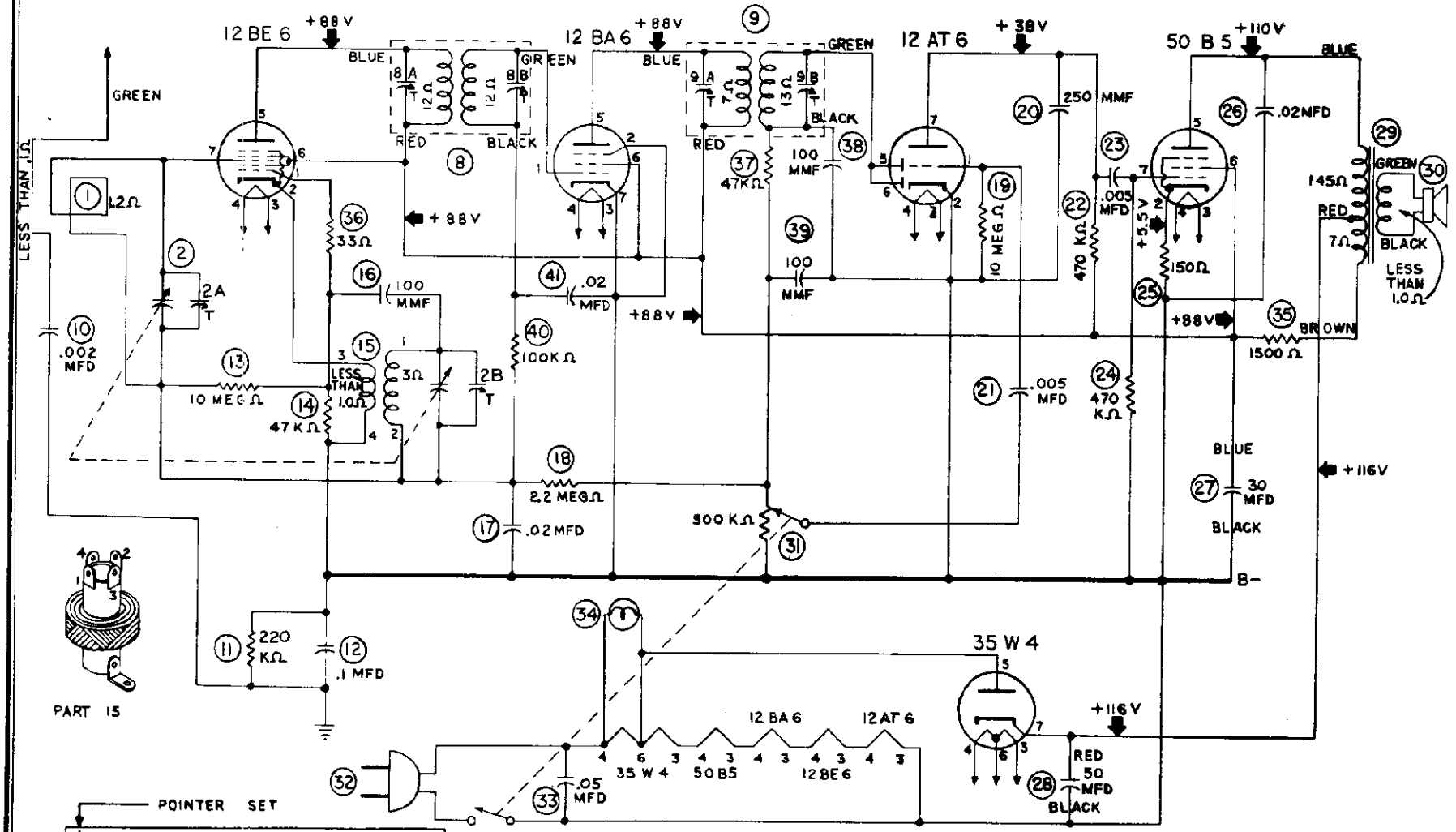
For the reception of local stations no antenna is necessary, the built-in loop providing sufficient volume. If it is desired to listen to more distant stations, an antenna 50 to 100 feet long should be connected to the flexible lead protruding from rear of the cabinet. *Donot use a ground with this receiver.*

If the receiver fails to operate, remove the back plate to see that all tubes are pushed down in their respective sockets as illustrated in the tube layout diagram below. *Always disconnect line cord plug before making any adjustments inside of cabinet.*

Sometimes, when operating this receiver in buildings having steel in their construction, it will be necessary to use an external antenna to provide sufficient volume for satisfactory operation.

TUBE LAYOUT

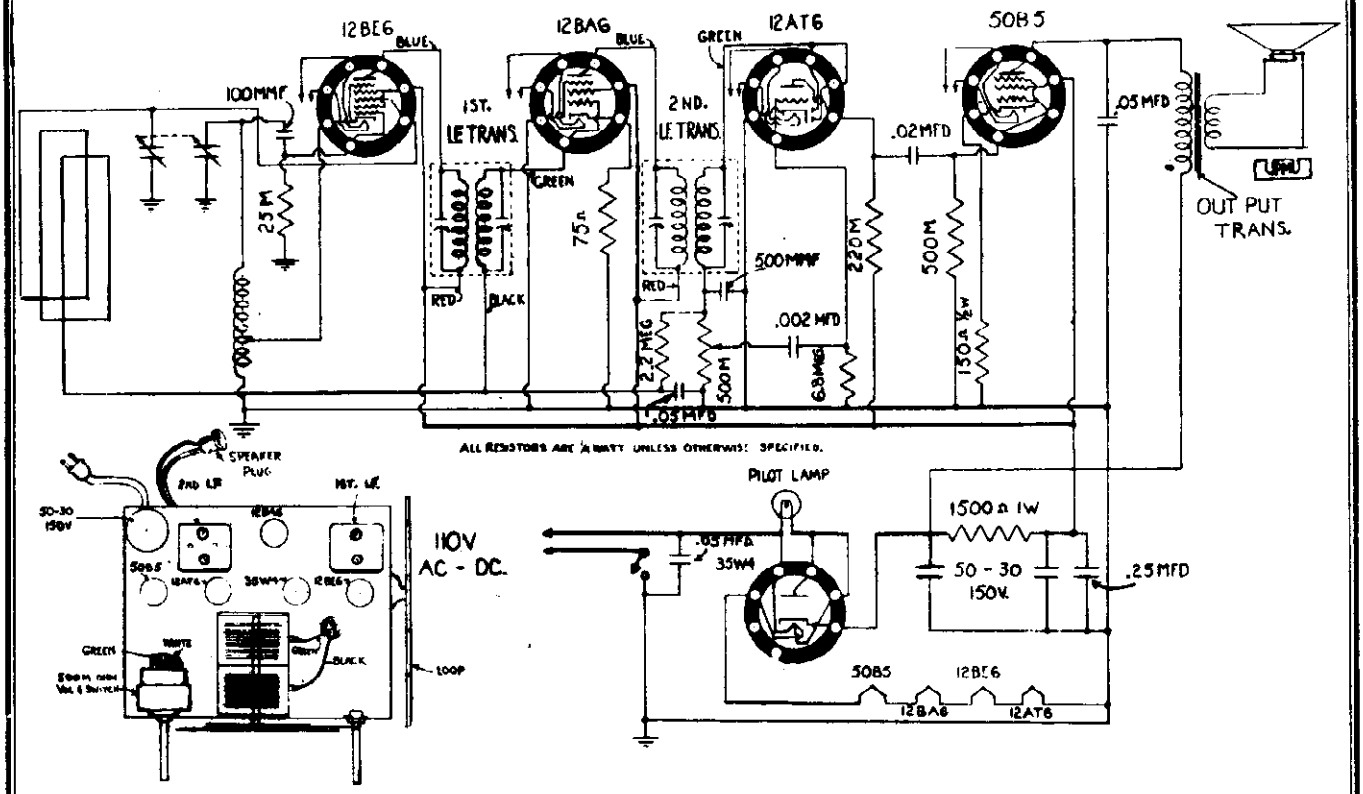




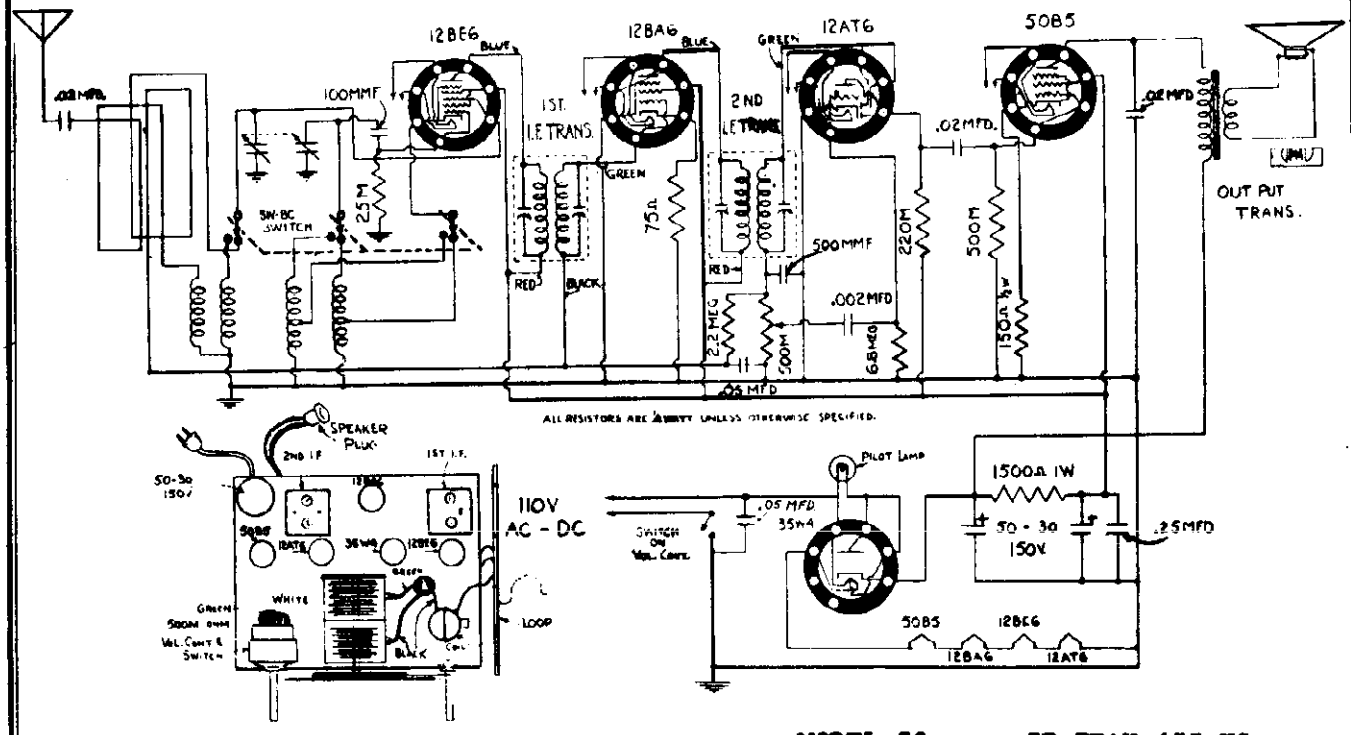
NOTE: ALL VOLTAGES MEASURED FROM B- WITH A 20,000 Ω/VOLT VOLTMETER.
LINE VOLTAGE 117 V. A.C.- VOLUME CONTROL AT MAXIMUM- NO SIGNAL RECEIVED.
I. F. FREQUENCY 455 K.C. ⏚ DENOTES CHASSIS GROUND

EMPIRE DESIGNING CORP.

MODEL 55
MODEL 56



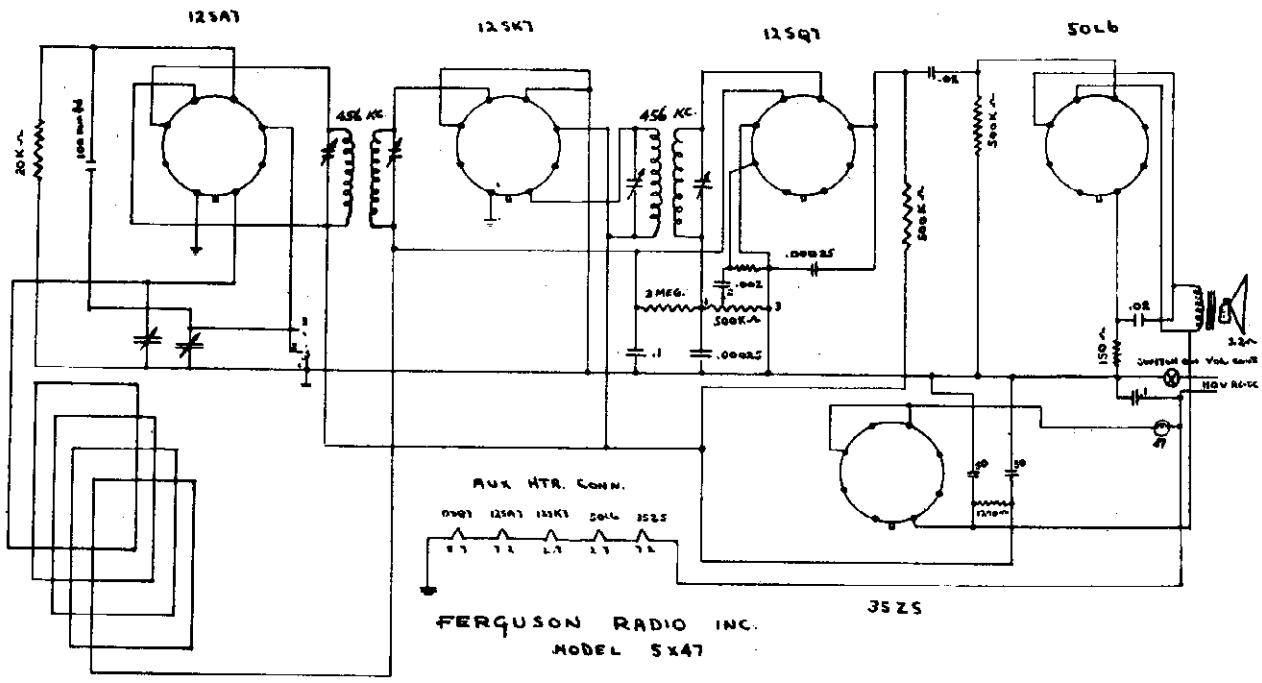
MODEL 55 IF PEAK 455 KC

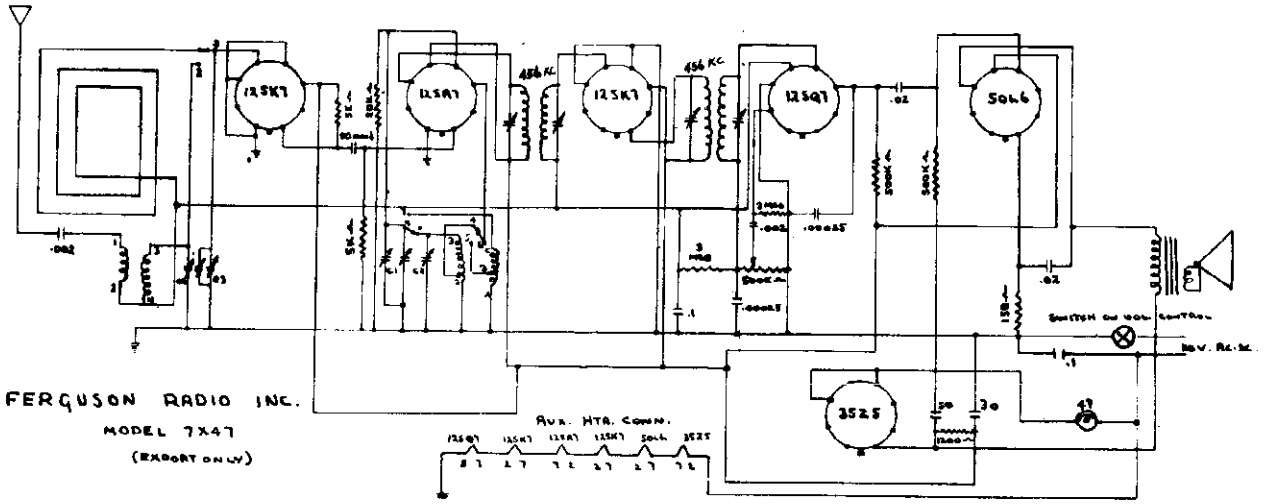


MODEL 56 IF PEAK 455 KC

FERGUSON RADIO CORP.

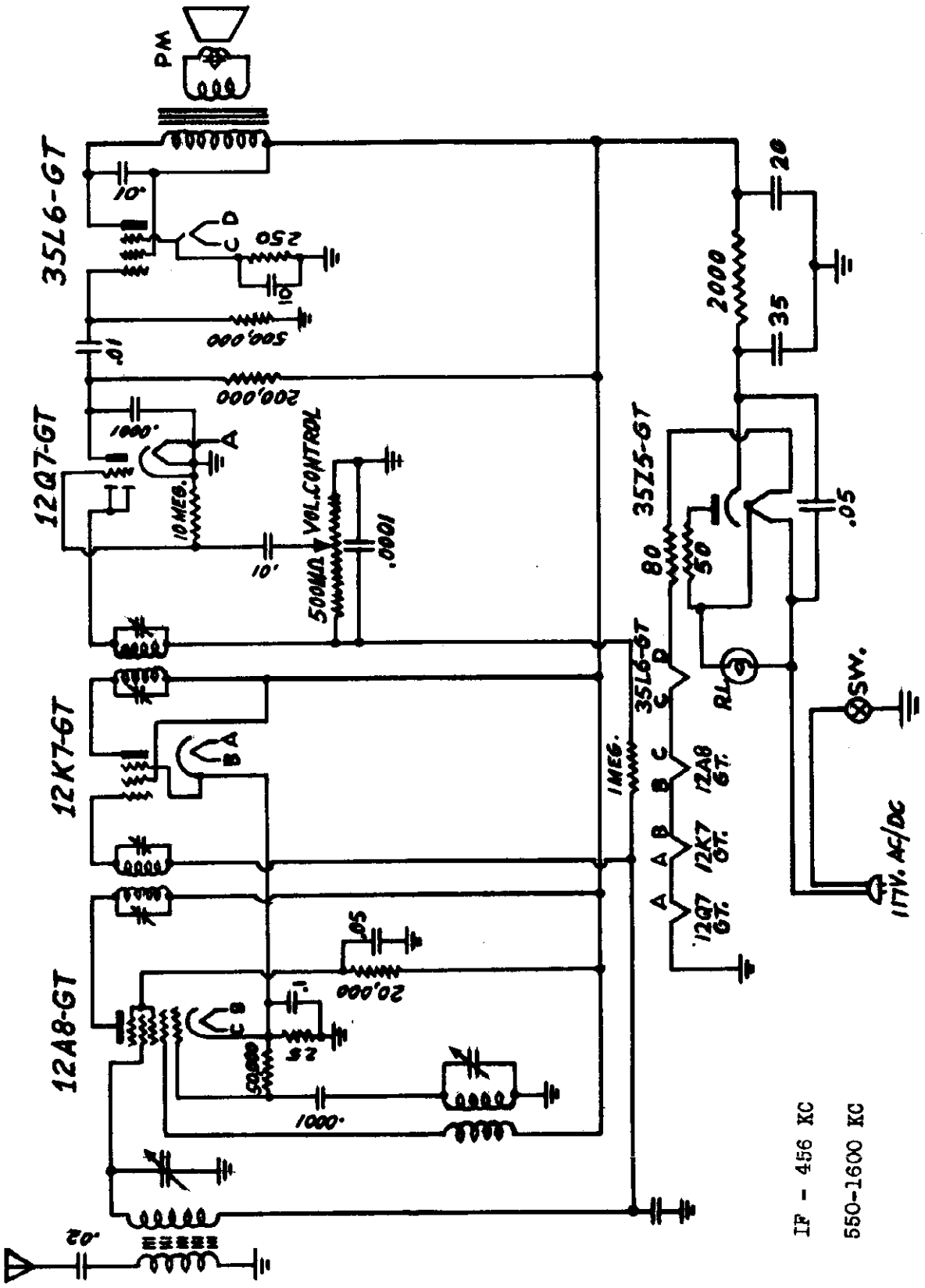
MODEL 5X47
MODEL 7X47





MODEL L-52

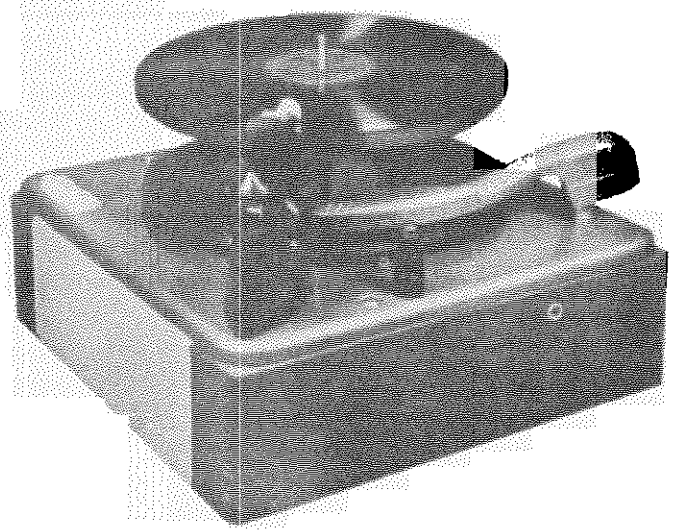
LAUREHK RADIO MFG. CO.



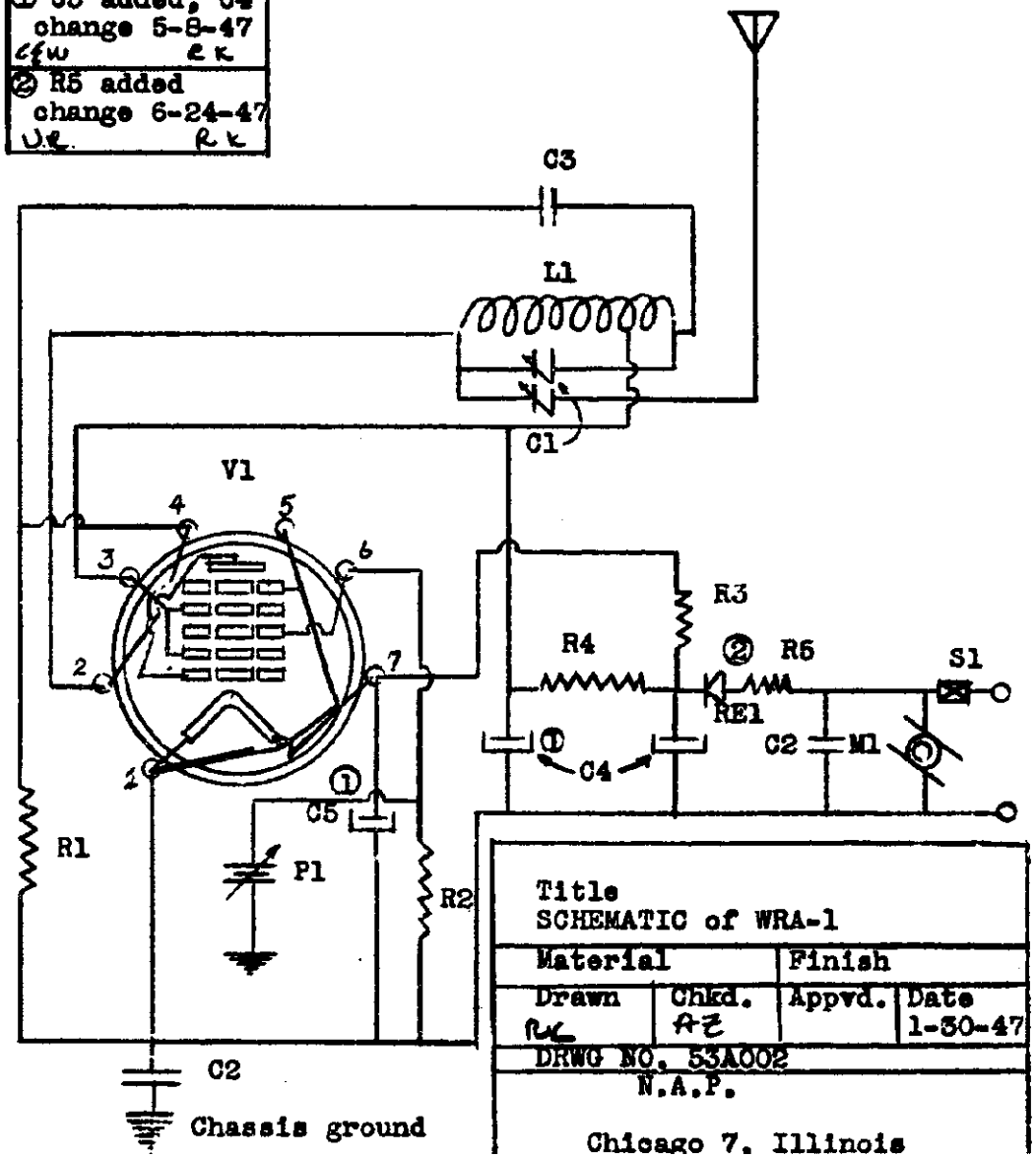
Sym.No.	Part No.	Part Value
C 1	44S001	Trimmer Cond.
C 2	19S007	.05 MFD 400 W.V. (2)
C 3	19S015	100 MMFD Mica
C 4	18S020	20-20 MFD 150 W.V.
C 5	19S011	100 MFD 10 W.V.
L 1	49S001	Osc. Coil
M 1	24S042	Changer Motor
P 1	24S042	Crystal Pickup
R 1	16S011	27000 ohm ½ W.
R 2	16S020	500000 ohm ½ W.
R 3	16S028	2500 ohm 10 W.
R 4	16S029	5000 ohm ½ W.
R 5		110 ohm 2 W ± 10%
RE 1	48S001	Selenium Rect.
S 1	24S042	SPST Switch
V 1	24S025	1R5 Tube

CAUTION: Remove AC plug before removing or installing V1

NOTE: C4 must be two separate 20 MFD. capacitors



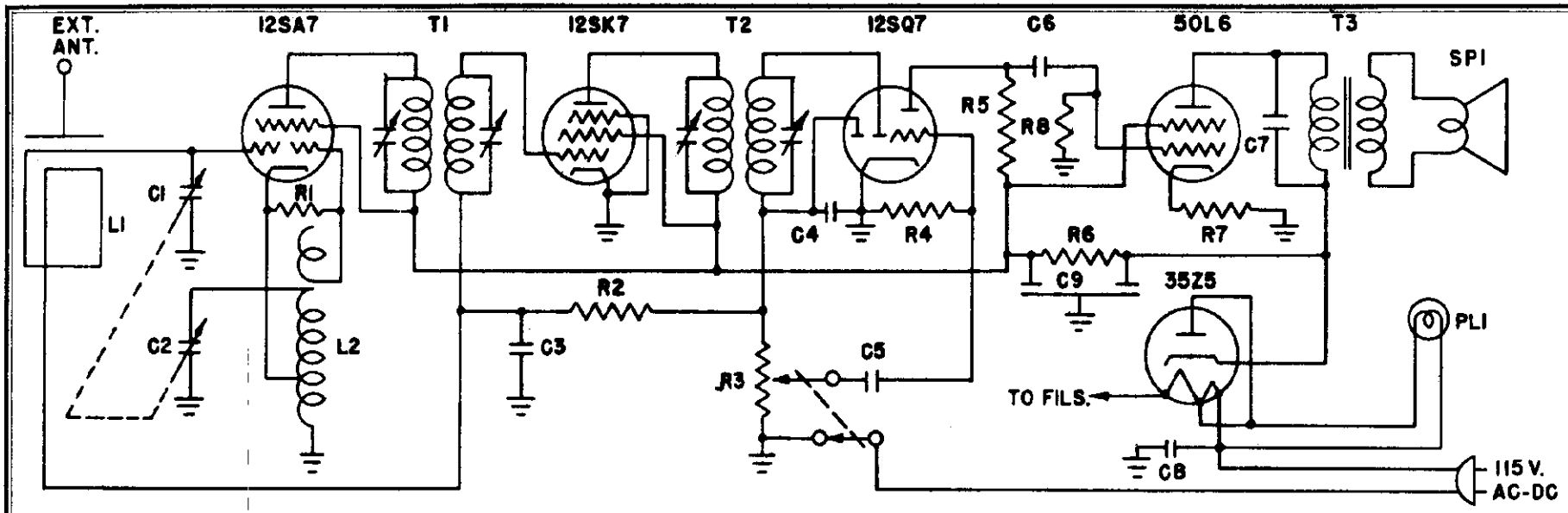
CHANGE
Issue No. 1
① C5 added, C4 change 5-8-47 cfw ek
② R5 added change 6-24-47 cfw rk



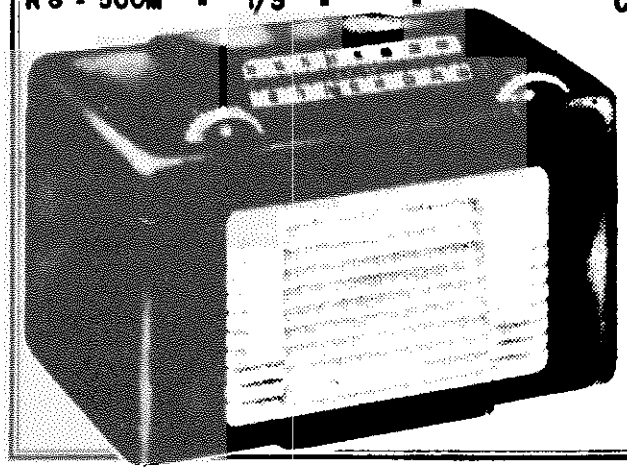
Title SCHEMATIC of WRA-1			
Material		Finish	
Drawn rc	Chkd. AZ	Appvd.	Date 1-30-47
DRWG NO. 53A002 N.A.P.			
Chicago 7, Illinois			

NATIONAL ACOUSTIC PRODUCTS

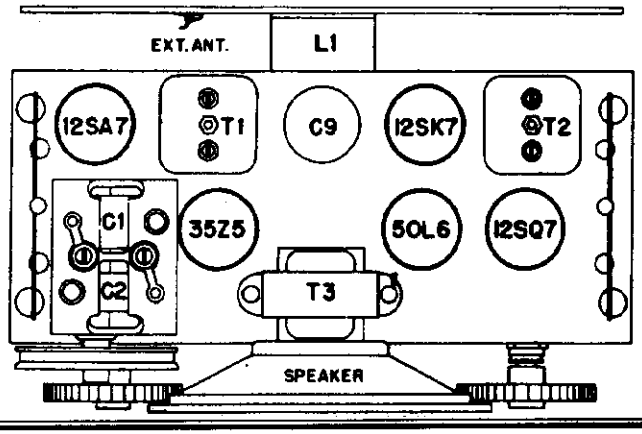
MODEL WRA-1



R 1 - 25M OHMS 1/3 WATT RESISTOR	C 1 - ANT. SECTION GANG CONDENSER	C 9 - 50-50 MFD. 150 V. CONDENSER
R 2 - 5MEG " " " "	C 2 - OSC. " " "	L 1 - LOOP ANTENNA
R 3 - 500M " POT. WITH SWITCH	C 3 - .05 MFD. 200 V. CONDENSER	L 2 - OSC. COIL
R 4 - 5MEG " 1/3 WATT RESISTOR	C 4 - .00025 MFD. 500 V. CONDENSER	T 1 - 465KC. I. F. TRANSFORMER
R 5 - 200M " " " "	C 5 - .006 MFD. 500 V. CONDENSER	T 2 - " " " "
R 6 - 1200 " 1/2 " "	C 6 - .01 " 400 V. "	T 3 - OUTPUT TRANSFORMER
R 7 - 150 " " " "	C 7 - .02 " " "	PL1 - NO. 44 PILOT LIGHT
R 8 - 500M " 1/3 " "	C 8 - .05 " " "	SP1 - 5" P.M. SPEAKER

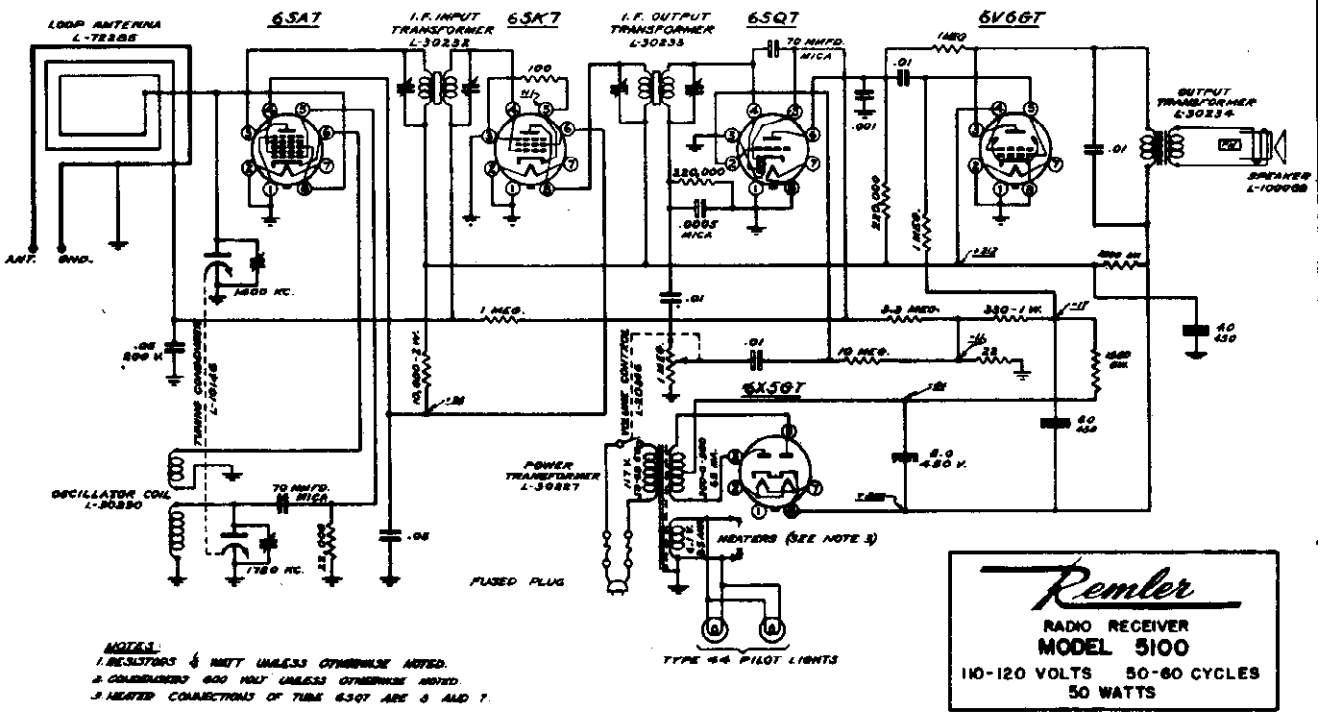


IF PEAK 465 KC



REMLER CO. LTD.

MODEL 5100



NOTES:
1. RESISTORS ½ WATT UNLESS OTHERWISE NOTED.
2. CONDENSERS 600 VOLT UNLESS OTHERWISE NOTED.
3. HEATER CONNECTIONS OF TUBE 6X5GT ARE 6 AND 7.

Remler
RADIO RECEIVER
MODEL 5100
110-120 VOLTS 50-60 CYCLES
50 WATTS

INSTALLATION

RECEPTION OF LOCAL STATIONS IN THE MAJORITY OF LOCATIONS WILL BE ENTIRELY SATISFACTORY WITH THE BUILT-IN ANTENNA. WHERE GREATER DISTANCE IS REQUIRED OR WHERE RECEIVING CONDITIONS ARE NOT SATISFACTORY WITH THE BUILT-IN ANTENNA, AN OUTSIDE ANTENNA MAY BE USED. THIS OUTSIDE ANTENNA SHOULD BE FROM 50 TO 100 FEET IN LENGTH AND SHOULD BE CONNECTED TO THE TERMINAL MARKED "A", WHICH IS INSIDE OF THE BACK COVER. THIS ANTENNA SHOULD BE RUN IN AS STRAIGHT A LINE AS POSSIBLE AND BE KEPT CLEAR OF WIRE AND OTHER METAL OBJECTS. A GOOD GROUND CONNECTION TO A WATER PIPE IS ESSENTIAL FOR THE CLEAREST RECEPTION. THE GROUND WIRE SHOULD BE CONNECTED TO THE TERMINAL MARKED "G", WHICH IS ALSO INSIDE OF THE BACK COVER. THE BACK COVER MAY BE TAKEN OFF AFTER THE FOUR SCREWS IN THE CORNERS HAVE BEEN REMOVED.

CONTROLS

THE CONTROL ON THE LEFT SIDE OF THE CABINET IS THE VOLUME CONTROL AND ON-OFF SWITCH WHEN IN THE EXTREME LEFT POSITION. THE RIGHT HAND CONTROL IS THE STATION SELECTOR.

OPERATION

WITH THE LINE CORD CONNECTED, TURN THE VOLUME CONTROL ABOUT ONE-QUARTER TURN TO THE RIGHT AND ALLOW ONE-HALF MINUTE FOR THE TUBES TO PROPERLY HEAT. SELECT THE DESIRED STATION WITH THE TUNING CONTROL. FOR THE BEST REPRODUCTION, THE STATION SELECTOR MUST BE ADJUSTED TO THE CENTER OF THE MARKS ON THE DIAL WITHIN WHICH THE STATION IS HEARD AND THE VOLUME ADJUSTED WITH THE VOLUME CONTROL ONLY.

SERVICE DATA

UNDERSCORED FIGURES ON THE DIAGRAM ARE AVERAGE VOLTAGES FROM THAT PARTICULAR POINT OF THE CIRCUIT TO THE CHASSIS. THESE VOLTAGES ARE FOR A 117 VOLT LINE, AND WITH THE SET TUNED TO NO STATION.

THE INTERMEDIATE FREQUENCY IS 456 K.C. OTHER ALIGNMENT FREQUENCIES ARE INDICATED ON THE DIAGRAM. THE FREQUENCY RANGE OF THE RADIO IS 540-1730 KILOCYCLES.

A FUSED PLUG IS ATTACHED TO THE POWER CORD.

FUSES MAY BE REMOVED BY INSERTING A SMALL DIAMETER INSTRUMENT (PENCIL, STIFF WIRE, ETC.) IN THE PRONG END OF THE PLUG. IN NO CASE SHOULD A FUSE OF GREATER CAPACITY THAN 3 AMPERE BE USED. LOWER CAPACITY FUSES SUCH AS 1 AMPERE MAY BE USED, BUT LOWER CAPACITY TYPES MAY BURN OUT MORE FREQUENTLY ON CURRENT SURGES NORMALLY ENCOUNTERED WHEN THE SET IS TURNED ON.

THE CHASSIS IS SECURED BY THE FOUR SCREWS WHICH ARE A PART OF THE FELT FEET. THE CHASSIS MAY BE REMOVED AFTER FIRST TAKING OFF THE BACK AND KNOBS. THE CABINET HANDLE MUST BE RAISED AS FAR AS POSSIBLE IN ORDER THAT IT WILL CLEAR THE CHASSIS WHILE THE LATTER IS BEING REMOVED.

1. If a hum becomes evident after the radio has been operating about 30 minutes, and is more noticeable at low set volumes, it is probably due to loose laminations in the transformer.

To correct, allow the set to warm up for at least one hour, and then tighten the two screws which hold the laminations between the power transformer end-caps.

2. The 8.0 mfd 450 v electrolytic condenser shown in the circuit diagram has been omitted in some sets. It should be added in all cases.

3. In receivers installed in locations where unusual conditions in the ac power supply cause hum, the first filter condenser can be changed from 8.0 mfd to 16 mfd.

4. The power transformer has a grounded shield winding between the primary and secondary. The shield winding ground lead is brought out between the laminations and the end-cap, either at the side or the bottom of the transformer. Frequently the ground lead does not make good contact because the laminations and the end-caps were painted before assembly of the transformers. This will cause static when the connection makes and breaks, and it also allows the power transformer to conduct more of the power-line static into the receiver circuit when the shield is not grounded.

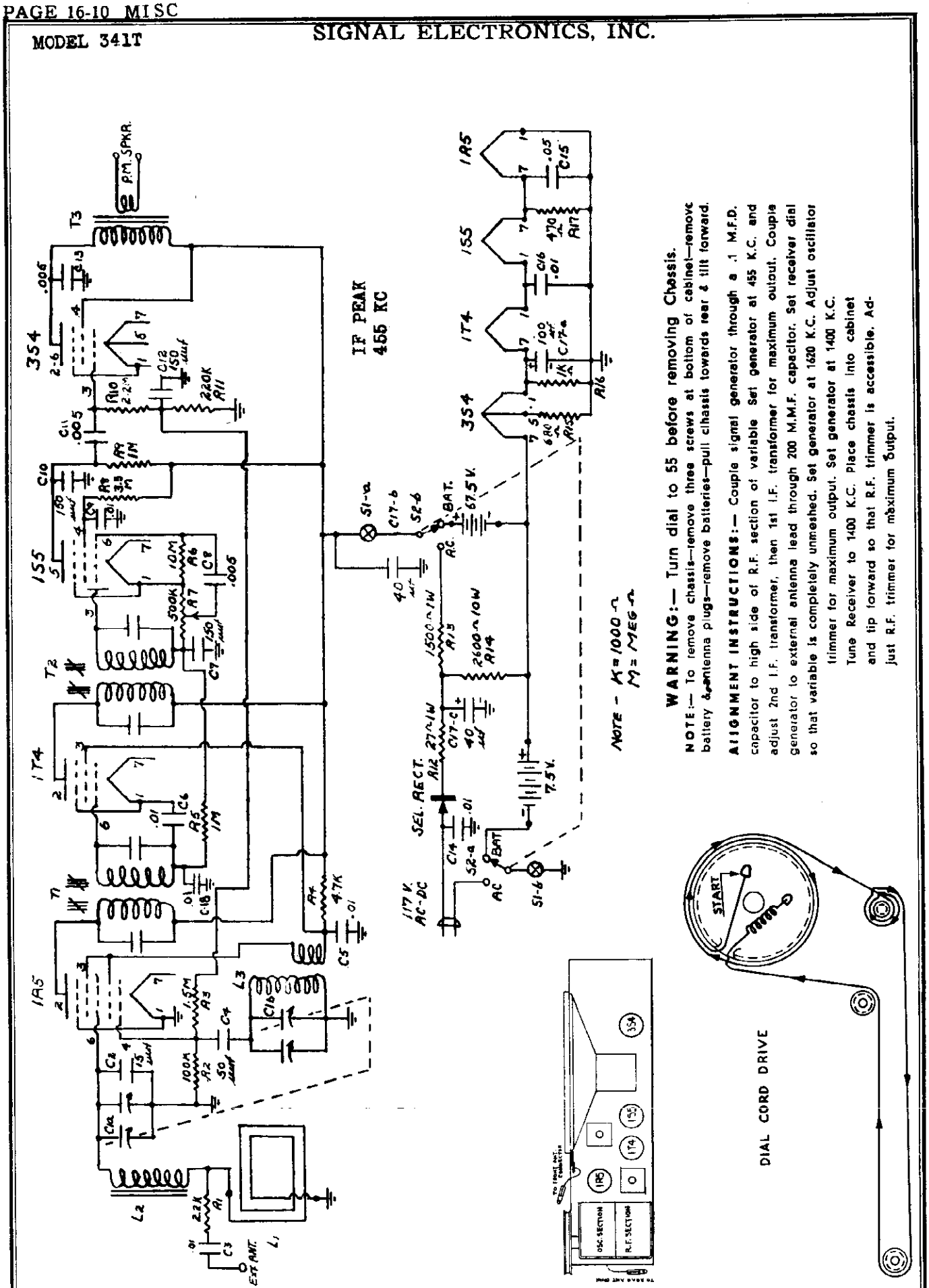
To identify this defect, tune the receiver to a point between stations and tap the power transformer firmly on top and sides. An ungrounded shield will produce noise when jarred.

The easiest and best way to correct this trouble is to make a positive ground of the transformer shield winding by soldering another wire to it which may then be soldered to the radio chassis.

5. Where the radio is used in locations where the line static is unusually bad, one or two .05 mfd 600 v condensers can be added, installed from both sides of the line to the chassis, or from one side of the line to chassis, or directly across the line. The method which gives best results will depend upon local line conditions, and will have to be determined by experimentation. If the method which gives best results is not effective when the line cord plug is reversed, be sure the radio owner is made aware of this condition and the line cord plug is marked so it can always be inserted with the correct polarity.

MODEL 341T

SIGNAL ELECTRONICS, INC.



NOTE - K = 1000 Ω
M = MEGΩ

WARNING:— Turn dial to 55 before removing Chassis.

NOTE:— To remove chassis—remove three screws at bottom of cabinet—remove battery & antenna plugs—remove batteries—pull chassis towards rear & tilt forward.

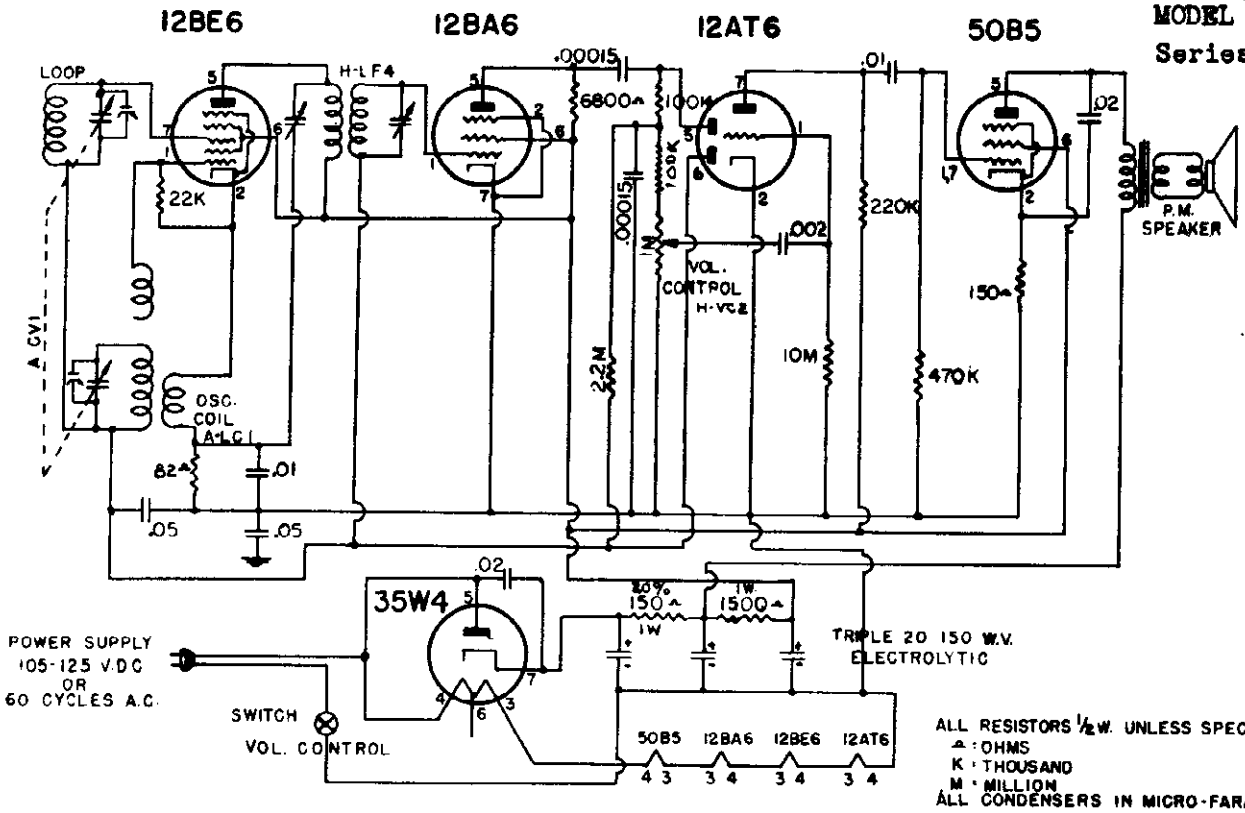
ALIGNMENT INSTRUCTIONS:— Couple signal generator through a .1 M.F.D. capacitor to high side of R.F. section of variable. Set generator at 455 K.C. and adjust 2nd I.F. transformer, then 1st I.F. transformer for maximum output. Couple generator to external antenna lead through 200 M.M.F. capacitor. Set receiver dial so that variable is completely unmeshed. Set generator at 1620 K.C. Adjust oscillator trimmer for maximum output. Set generator at 1400 K.C.

Tune Receiver to 1400 K.C. Place chassis into cabinet and tip forward so that R.F. trimmer is accessible. Adjust R.F. trimmer for maximum output.

TELETONE RADIO CORP.

MODEL 135, Dynamite
Series H

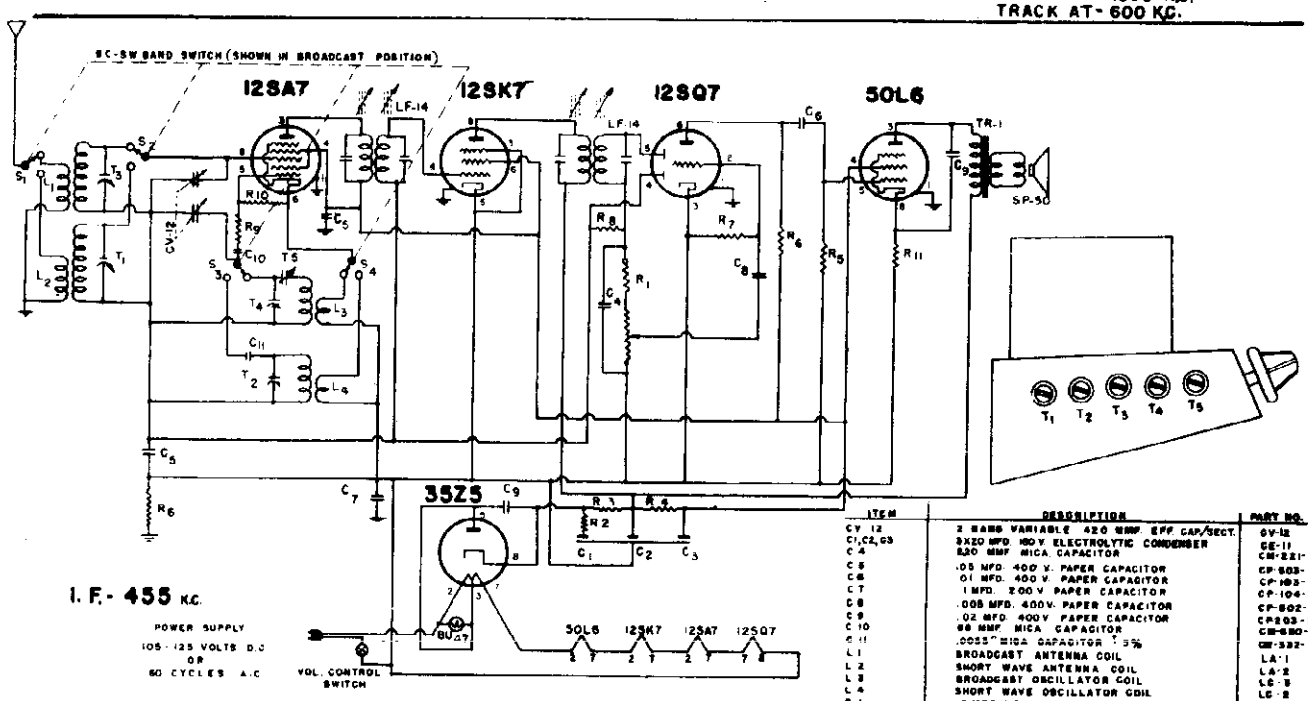
MODEL 138
Series N



ALL RESISTORS ½W. UNLESS SPECIFIED
Ω : OHMS
K : THOUSAND
M : MILLION
ALL CONDENSERS IN MICRO-FARAD

MODEL 135
"DYNAMITE" CHASSIS SERIES "H"

I.F. - 455 K.C.
FREQ. RANGE - 530-1700 K.C.
ALIGN AT - 1500 K.C.
TRACK AT - 600 K.C.



ITEM	DESCRIPTION	PART NO.
CV-12	2 GANG VARIABLE 420 MMF EFF. CAP/SECT.	CV-12
C1,C2,C3	8X20 MFD. 150 V. ELECTROLYTIC CONDENSER	CE-11
C4	820 MMF MICA CAPACITOR	CM-822-1
C5	.05 MFD. 400 V. PAPER CAPACITOR	CP-503-1
C6	.01 MFD. 400 V. PAPER CAPACITOR	CP-103-1
C7	1 MFD. 200 V. PAPER CAPACITOR	CP-104-3
C8	.005 MFD. 400 V. PAPER CAPACITOR	CP-502-1
C9	.02 MFD. 400 V. PAPER CAPACITOR	CP-203-2
C10	68 MMF. MICA CAPACITOR	CM-680-1
C11	.0055 MICA CAPACITOR ± 5%	CM-332-1
L1	BROADCAST ANTENNA COIL	LA-1
L2	SHORT WAVE ANTENNA COIL	LA-2
L3	BROADCAST OSCILLATOR COIL	LC-3
L4	SHORT WAVE OSCILLATOR COIL	LC-2
R1	.5 MEG VOLUME CONTROL 47K STOP	VC-5
R2	18 OHM ½ W RESISTOR	RC-180-1
R3	150 OHM 1W RESISTOR	RC-151-5
R4	1500 OHM ½ W RESISTOR	RC-152-1
R5	470,000 OHM ½ W RESISTOR	RC-474-1
R6	220,000 OHM ½ W RESISTOR	RC-224-1
R7	10 MEG. ½ W. RESISTOR	RC-106-1
R8	2.2 MEG ½ W RESISTOR	RC-228-1
R9	47 OHM ½ W RESISTOR	RC-470-5
R10	22,000 OHM ½ W RESISTOR	RC-223-1
R11	150 OHM ½ W RESISTOR	RC-151-1
T1,2,3,4,5	TRIMMER ASSEMBLY	TA-1
S1,2,3,4	WAFER SWITCH	SW-2
TR-1	OUTPUT TRANSFORMER	TR-1
SP-50	SPEAKER (5" ALNICO V MAGNET)	SP-50
LF-14	I.F. TRANSFORMER	LF-14
#47	#47 PILOT LAMP	#47

BROADCAST BAND
RANGE 530-1700 KC (566-176 METERS)
ALIGNMENT. PEAK T_4 AT 1700 KC
T_3 AT 1400 KC
T_5 AT 600 KC

SHORT WAVE BAND
RANGE 5-18 MC (60-16.5 METERS)
ALIGNMENT PEAK T_2 AT 18 MC
T_1 AT 15 MC

CHASSIS SERIES "N"

MODEL 138

OPERATING INSTRUCTIONS

1. SETTING FOR SIZE OF RECORD

The size of record for which the record changer is set to play is indicated by the position of the size-change knob (96). The record size is stamped on the housing (94) of the head assembly.

To change the setting, slide the size-change knob backward or forward to the numeral corresponding to the size of records to be played. Slide the knob to "M" for manual play.

If the size-change knob does not slide back freely, the setting may be changed by pushing against the front of the record clip (83) when it is in the downward position as shown in Figure 1.

2. STARTING THE RECORD CHANGER

To load the Record Changer, lift the record clip (83) to its upright position and place the records on the center post (27). The bottom record is supported by the shoulder of the center post and the push plate (79A).

Lower the record clip gently, using care not to let it snap onto the records or damage may result.

Turn the Phono-Motor switch (33) to the ON position. Move the switch button to the left (REJECT) momentarily and release. The bottom record will drop to the turntable and the Record Changer will play the entire stack of records automatically.

3. REJECTING A RECORD

To reject a record at any time, move the Phono-Motor switch button (33) to the left (REJECT).

4. STOPPING AND UNLOADING

It is advisable to stop the Record Changer when the Changer mechanism is out of cycle (playing a record). To remove the records, lift the record clip to its upright position and move the pickup arm to the right so that it clears the records. Lift the records straight up by supporting the bottom one. Do not tilt or squeeze the records when lifting.

5. REPLACING CARTRIDGE AND NEEDLE

Before replacing, see cartridge service data on page 5.

Remove the old cartridge (3) by getting your finger nails or a small screwdriver under it as shown in Figure 2 and pull down on **the back edge.** Press new cartridge into place again, making sure to push near its back edge where its pins go into the socket.

THE CHANGE CYCLE

6. DESCRIPTION OF CHANGE CYCLE (See Figures 7 and 8)

If at all possible, we recommend that you carefully observe the operation of a changer that is in normal operating condition. It is a good idea to rotate the turntable by hand and repeat the changing cycle until you understand the function of each part.

The changer operates as follows: The changer mechanism is driven during its change cycle by the knurled hub of the turntable rotating the rubber-tired drive wheel (28). During normal playing, the drive wheel is held in a neutral position as illustrated in Fig. 8 so that the indentation prevents the tire from contacting the knurled hub. The drive wheel (28) is held in this position by the trip lever (63) and the stop stud (65) on the main cam (66).

When a record has finished playing and the needle has reached the trip point, the arm control lever roller (48C, Fig. 7) makes contact with reject link (43A), moving the trip arm (43) which releases trip lever (63). The trip lever spring (62) moves trip lever (63) freeing cam stop stud (65) and allows spring (69) to pull the main cam clockwise (bottom view). Since the main cam (66) and the drive wheel (28, Fig. 8) are on the same shaft, the drive wheel is thus turned so its rubber tire is against the knurled hub of the turntable. The turntable now rotates the drive wheel (28) which in turn rotates the main cam (66). Roller (68), Fig. 7) riding on the main cam, moves arm control slide (52), and the raised portion (52A) of this slide raises arm lift shaft (This shaft is 19 on the RC170 and 103 on the RC170A.) which lifts pickup arm from the record. Stud (52C) moving with slide (52) pushes arm control lever (48A) causing the pickup arm to move to the right, clearing the record. The movement of roller (68) also causes trip lever (63) to re-engage in the recess of trip arm (43). Trip spring (61) holds the trip arm (43) and trip lever (63) together.

Roller (70), also riding against main cam (66), moves push-off arm (71). This movement is transmitted through the linkage of 79F, 79D (Fig. 7) to the push-off plate 79A, Fig. 8. (Note that the record stack rests on plate 79A.) The shape of the main cam (66) is such that the push-off plate (79A) first moves back, allowing the bottom record to drop onto the record support plate (79B). Then the push-off plate (79A) slides forward and drops the next record to be played but only after the pickup arm has cleared the record stack. The little slide in the top end of the center post holds back all records other than the bottom one.

As the main cam continues its rotation, the arm control slide (52) moves back following the cam since it is kept in contact with it by slide spring (76). Stud (52C) moving with the arm control slide (52) allows arm control lever (48A) to move back. The tension of the set-down spring (55) moves the arm control lever through set-down lever (54B) and roller (48D). This moves the pickup arm to the set-down point for the record to be played. This set-down point is governed by the set-down adjustment screw (25) for 12-inch records and screw (26) for 10-inch records.

When the record changer is set to play 10-inch records, the arm control lever roller (48D) moving along the edge of the set-down lever (54B) and on reaching the shoulder of the set-down lever, moves this lever and the set-down arm (54) until they are stopped by the set-down adjustment screw (26) making contact with the rear flange of the record changer pan (24). At this point the pick-up arm is above the starting groove and is lowered by the action of the arm control slide as explained above.

When the record changer is set to play 12-inch records, the size change link (75) removes the tension from the change link spring (74) allowing the set-down arm (54) to move so that the set-down adjustment screw (25) makes contact with the rear flange, instead of screw (26). This movement of the set-down arm is caused by spring (55) when the arm is in its change cycle. This changes the set-down of the pick-up arm for 12-inch records.

While the needle is held in position above the starting groove, the safety arm (52B) pushes stud (54A)

MODEL RC 170, RC 170 A. ADMIRAL CORPORATION

IMPORTANT

These two models are very similar. The differences are illustrated in Figures 3 and 4 To be certain which model changer you are servicing, look for the changer model number which appears on the underside of the changer mechanism.

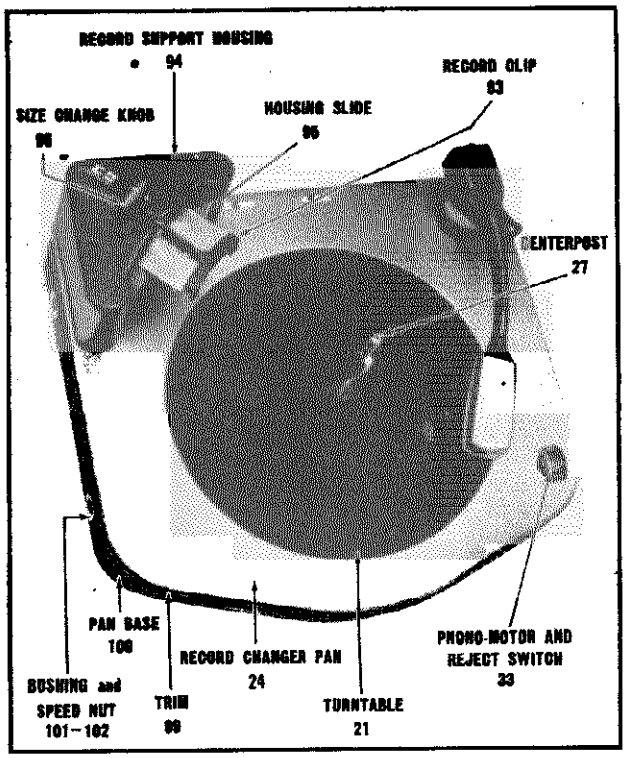


Figure 1. Record Changer, Top View

Figures 3 and 4 show major differences between models RC170 and RC170A. In addition, differences occur in parts carrying reference numbers 49, 50 and 52 (see parts list).

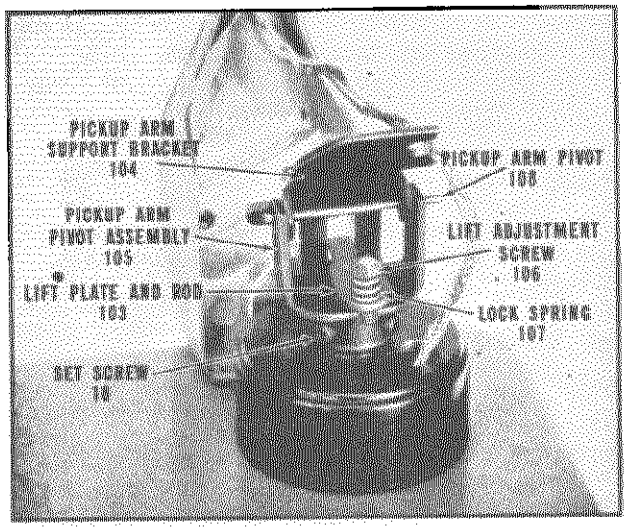


Figure 4. Pickup Arm Hinge Assembly for RC170A

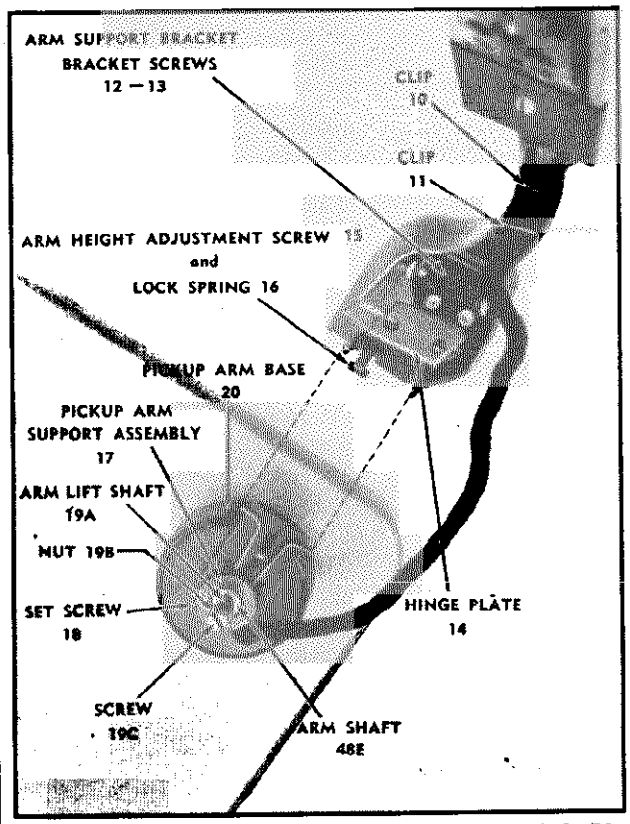


Figure 3. Pickup Arm Hinge Assembly for RC170

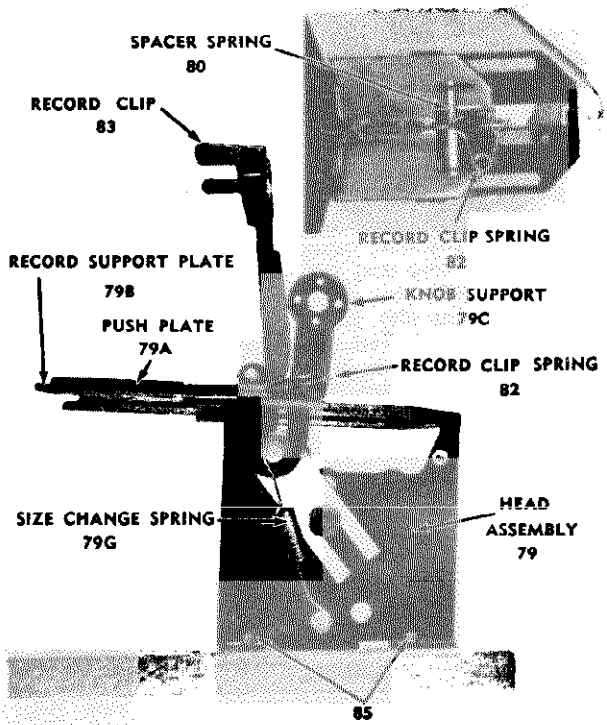


Figure 5. Head Assembly

releasing the pickup arm so that it has a free sideward movement to follow the record groove. About one revolution of the turntable after the releasing of the pickup arm, the arm is lowered by the downward movement of arm lift shaft (19).

When the reject is used, the movement of the reject knob (33) forces stud (39A) against the reject link (43A) moving trip arm (43) which releases trip lever (63) and the cycle of record change proceeds in the same manner as for automatic changing.

ADJUSTMENTS

TOOLS REQUIRED ***No. 8 Allen Set Screw Wrench (Part No. P-5825. List price $0.10)***
3/16 inch Open End Wrench (Part No. P-5807. Net price $0.39)

7. ADJUSTMENT OF SET-DOWN POINT (See Figures 1 and 8)

Adjustments for 10-inch records are made by the screw (26) which can be seen through the right hand slot at the top rear of the record changer. Turning this screw in moves the set-down point of the pickup arm closer to the center post and turning the screw out moves it further away. The proper set-down point is between 4 5/8" and 4 11/16" from the needle to the near side of the center post.

Adjust the 12-inch set-down with screw (25), Fig. 8. Turning screw (25) in (as seen through the left hand slot) moves the set-down point for 12-inch records further from the center post and turning the screw out moves it closer to the center post. The proper set-down point is between 5 5/8" and 5 11/16" from the needle to the near side of the center post.

If either adjusting screw has reached the end of its travel so that it is not possible to get a proper setdown, it will be necessary to re-set the assembly (17) or (105) as follows:

7A. SETTING PICKUP ARM SUPPORT ASSEMBLY (17) IN RC170 OR (105) IN RC170A

(a) Set adjusting screws (25) and (26) half-way in.

(b) With the set screws (18) loose, move the pickup arm so that the pickup arm cap (2) rests against the top portion (above the shelf) of center post.

(c) Holding the pickup arm in this position, move the arm control lever (48B) so that it is 3/64" from the rear flange of the pan (24); always keep this spacing less than 1/16" but more than 1/32" (between .04 and .06" is correct).

(d) Press the arm control lever assembly (48) up into the pickup arm base (20). Press the pickup arm support assembly (17) or (105) down against the pickup arm base (20), leaving a .006 to .008 inch clearance between them. This clearance is necessary to prevent binding. The spring washer (part number 405A27) should be slightly compressed between the top of the pickup arm base and the bottom of the collar.

(e) Tighten the two set screws (18).

(f) Make final set-down adjustments with adjustment screws (25) and (26). (See page 2)

8. ADJUSTMENT OF PICKUP POINT (See Fig. 7)

The pick-up or tripping point adjustment is made by screw (45). Turning the screw in brings the pick-up point closer to the center post and turning the screw out moves it further away. The proper pick-up point is between 1 11/16" and 1 3/4" from the needle to the near edge of the center post.

On the late production of the record changer used with the console radios, a hole has been made in the bottom cover so that this adjustment can be made without removing the bottom cover from the changer. As the table models do not use the bottom cover, this adjustment is easily made.

In adjusting the pick-up point it will be found that an occasional record does not have the groove run in far enough so that the pick-up arm will be carried close enough to the center post to actuate the reject link. If adjustments are made to accommodate these few records, it will be found that the changer starts its change cycle with some normal records before they are finished playing. In adjusting for this type complaint, it is wise to let the customer decide for which side the adjustment should be made.

9. ADJUSTMENT OF PICKUP ARM HEIGHT (See Figures 3 and 4)

Before adjusting arm height, be sure needle is properly adjusted (see paragraph 18).

With the record changer out of cycle and the pick-up arm clear of the turntable, adjust screw (This adjustment screw is 15 on the RC170 and 106 on the RC170A.) so that the tone arm needle is approximately 1/8" above the top of the pan. Turning the screw in raises the arm and turning it out lowers the arm.

The model RC170 also has an adjustment screw (19C) to adjust the maximum height that the pickup arm should reach. The maximum height of the pick-up arm during the change cycle should be from 1 3/8" and 1 1/2" between the needle and turntable. After making this adjustment tighten locking nut (19B) and again check the adjustment.

10. ADJUSTING DISTANCE BETWEEN HEAD ASSEMBLY (79) AND CENTERPOST (See Figs. 7, 8)

Do not bend the centerpost to make this adjustment; adjust as described below.

The adjustment of the head assembly (79) is made by loosening the three screws. 85 (underneath the changer) and moving the assembly closer or further away from the center post as the case may be. The head assembly is in proper relationship to the center post when it is set with a dimension of 4 7/8" from the front edge of the record support plate (79B, Fig. 8) to the rear of the center post (side nearest the record support plate) and at a point on the center post of the same height as the record support plate. This dimension is taken with the changer set to play 10-inch records.

After adjusting, check as follows:

(a) Place a 10-inch record (with a true center hole) on the centerpost to a point in line with the record support plate (79B). Holding the record horizontal and exerting force on it toward the head assembly, the record should just clear the record support plate (79B). Exerting force away from the head assembly should give a small gap between the record support plate (79B) and the record. **Repeat with a 12-inch record.**

(b) Load the changer with a stack of records; push record stack toward head assembly. Start the changer mechanism, and check push-off for several 10-inch records. **Repeat for 12-inch records.**

MODEL RC 170. RC 170 A. ADMIRAL CORPORATION

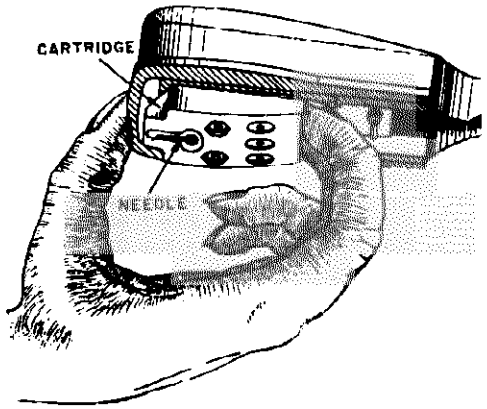


Figure 2: Removing Cartridge by Pulling Down on Back Edge

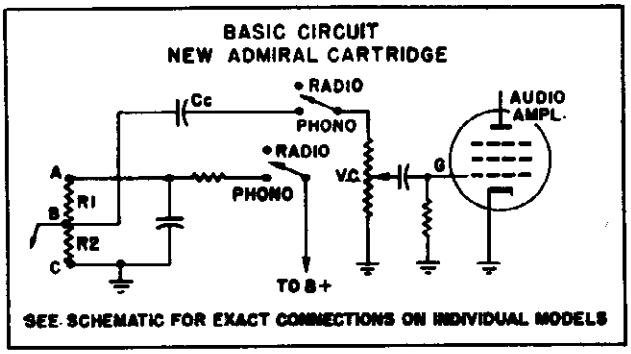


Figure 6. Basic Circuit for New Admiral Cartridge

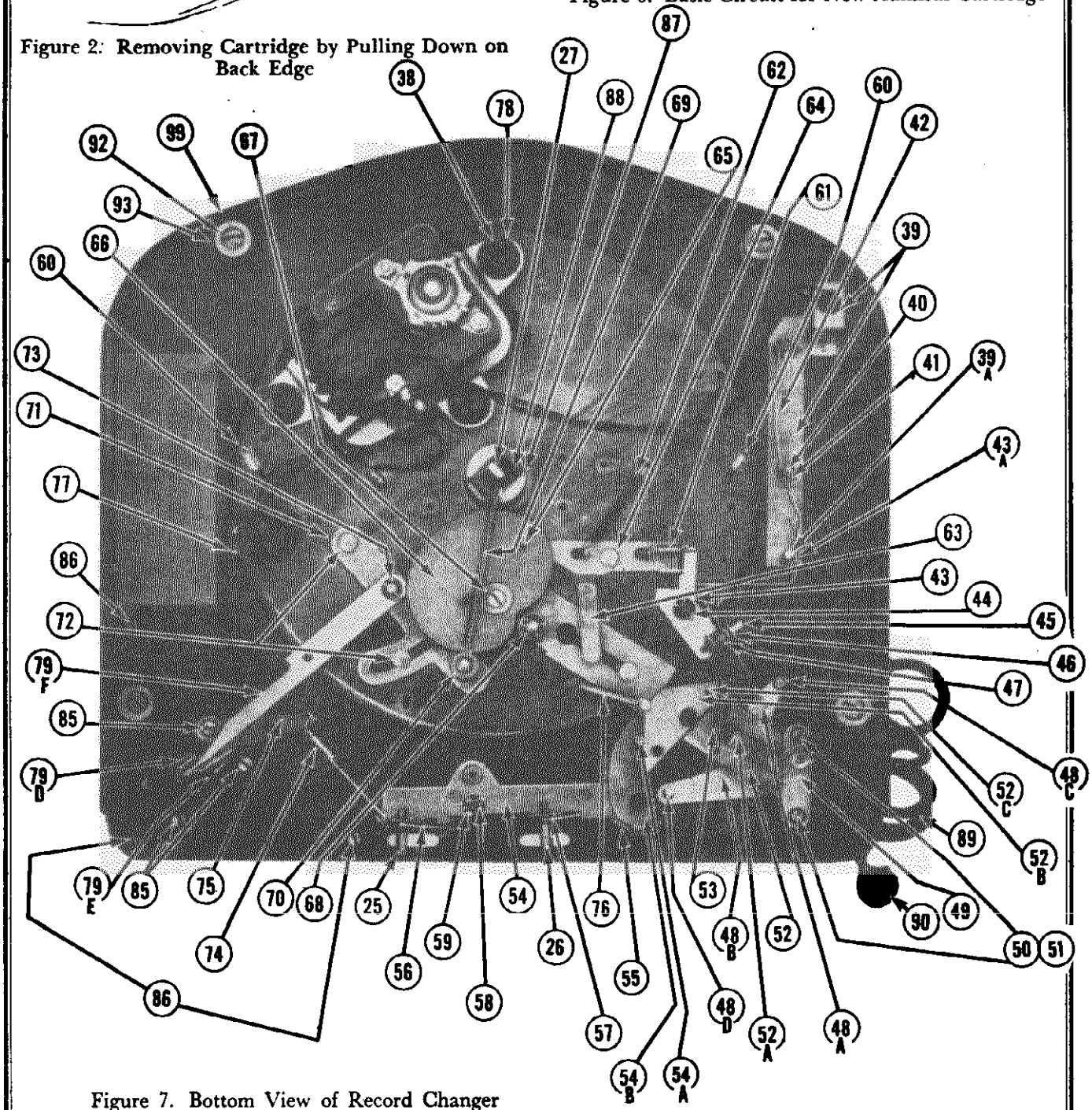


Figure 7. Bottom View of Record Changer

ADMIRAL CORPORATION

Reference numbers 12, 14, 17, and 19 apply to RC 170 only; see Figs. 3 and 4 and note marked † in parts list.

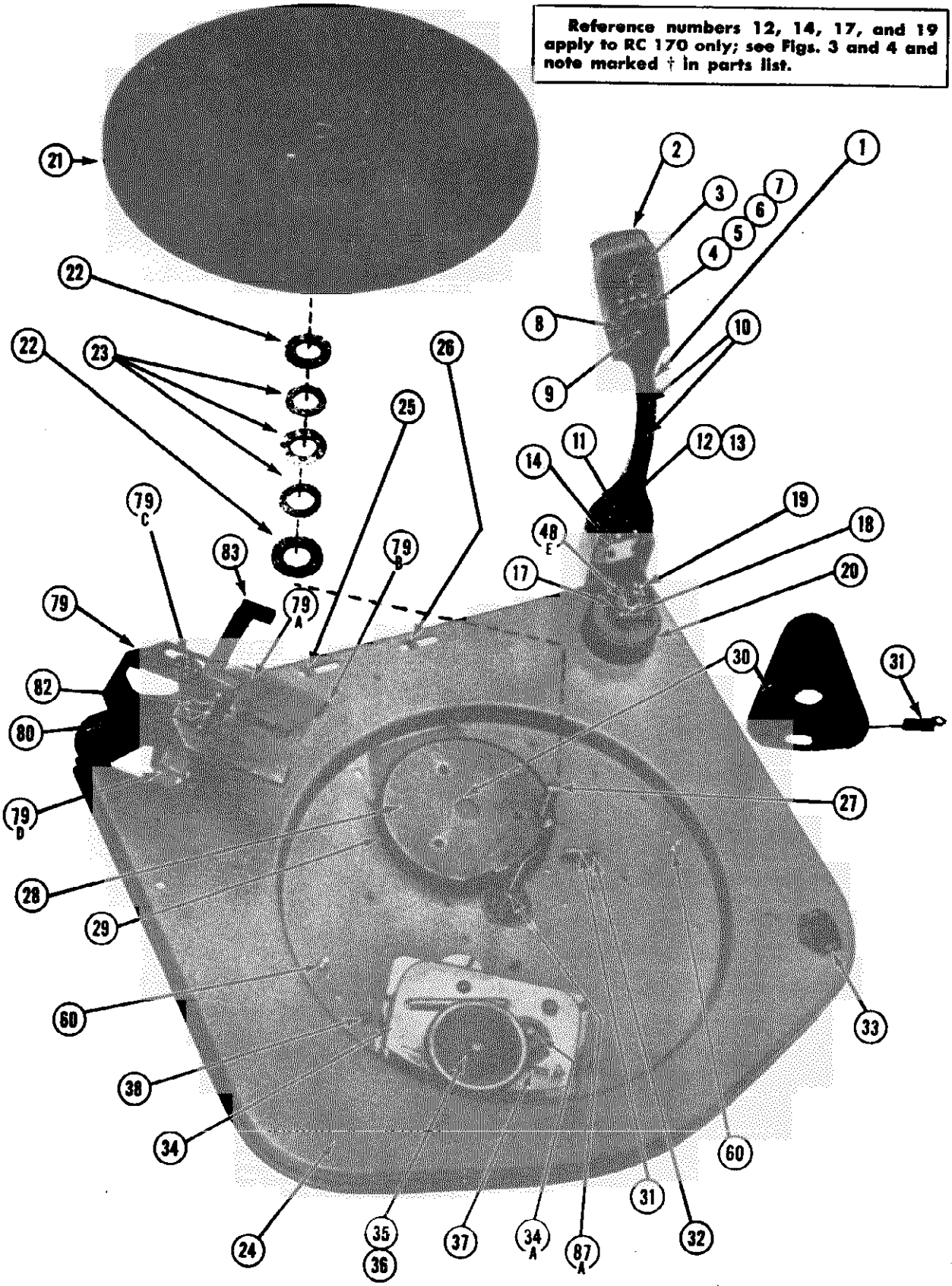


Figure 8. Top View of Record Changer

SERVICE PARTS LIST FOR RC170 & 170A RECORD CHANGER

Ref. No.	Part Number	Description
1	G400A177	Pickup Arm Casting Only (painted)
2	403B16-1	Pickup Arm Cap (clear plastic)
3	A1372	Cartridge and Needle
4	G400A198	Cartridge Holder (socket with contacts)
5	401A152	Plate (For mounting cartridge holder to pickup arm)
6	20-312-C2-6	Screw #2-56x5/16" R.H.M.S. (4 required)
7	2A1-1-6	Nut #2-56 (4 required)
8	401A115	Cap Clamp
9	20-312-C2-6	Screw for Cap Clamp #2-56x3/8" R.H.M.S.
10	414A17	Pickup Arm Wire Clip (.359"x.047"; 3 required)
11	414A17-1	Pickup Arm Wire Clip (.506"x.047"; 1 required)
12	†401A134	Arm Support Bracket (see note †)
13	65-250-C2-39	Arm Support Bracket Screw #6-32x1/4" B.H.M.S.
14	†G400A165	Pickup Arm Hinge Plate (see note †)
15	†65-625-C2-47	Pickup Arm Adjustment Screw #6-32x5/8" (see note †)
16	†405A70	Lock Spring for Pickup Arm Adjustment Screw (see note †)
17	†G400A168	Pickup Arm Support Assembly (see note †)
18	1A43-14	Allen Set Screw #8-32x3/16" Cone Point (2 required)
19	†G400A172	Arm Lift Shaft (includes screw and lock nut) (see note †)
19A		Arm Lift Shaft
19B		Nut #6-32
19C		Screw #6-32x3/8" Fil. H.M.S.
20	G400A173	Pickup Arm Base
21	G400A167	Turntable
22	412A1	Cork Washer (2 required)
23	415A2	Thrust Bearing Assembly (replace as a unit)
24	G400A195	Record Changer Pan with Studs and Welded Parts
25	402A87	Set Down Adjustment Screw
26	402A87	Set Down Adjustment Screw
27	G400B137-1	Center Post (includes 405A62 speed nut)
28	G400A179	Drive Wheel (includes tire)
29	406A13	Drive Wheel Tire Only
30	G400A149-1	Drive Wheel Support Assembly
31	405A54	Drive Wheel Spring
32	402A76	Spring Stud
33	403A23	Reject Knob
33A	405A80	Reject Knob Retaining Spring
34	*407B3-2 or **407B1-2	Motor with Idler Wheel and fasteners; 105-125 V, 60 Cycle
	*407B4-2	Motor with Idler Wheel and fasteners; 105-125 V, 50 Cycle
34A	401A48	Drive Pulley (Part of 34. For motors 407B3, 407B4. In addition, motor 407B4 includes a coil spring, part number 405A32.)
	405A32	50 Cycle Conversion Spring (this spring used to convert 407B3 motor)
35	G400A23	Idler Wheel Assembly (used with either 407B3 or 407B4 motor)
	G400A57	Idler Wheel Assembly (for 407B1 motor)
36	405A15	Hairpin Spring for Idler Wheel
37	405A14	Spring, Idler Wheel (for 407B3 or 407B4 motor)
	405A67	Spring, Idler Wheel (for 407B1 motor)
38	401A106	Shakeproof Motor Fastener
39	G400A162	Switch and Lever (ON-OFF-REJECT)
39A		Spring Stud (Part of 39)
40	405A78	Hairpin Spring
41	405A22	Spring Washer
42	405A77	Switch Lever Spring
43	G400A181	Trip Arm Assembly
43A		Reject Link (part of 43)
44	405A78	Hairpin Spring
45	402A96	Trip Adjustment Screw
46	4B1-34-37	Washer (2 required)
47	405A76	Adjustment Lock Spring
48	G400A175	Arm Control Lever Assembly
48A		Arm Control Lever (Part of 48)
48B		Arm Control Lever (Part of 48)
48C		Arm Control Lever Roller (Part of 48)
48D		Arm Control Lever Roller (Part of 48)
48E		Pickup Arm Shaft (Part of 48)
49	401A143	Slide Support (RC170 only)
	401A143-1	Slide Support (RC170A only)
50	402A85-1	Slide Spacer (RC170 only; See Note C)
	402A85-2	Slide Spacer (RC170A only)
51	C2-1000-C2-39	Spacer Screw #6-32x1" Fil. H.M.S. (2 required)
52	G400A159	Arm Control Slide Assembly (RC170 only)
	G400A159-1	Arm Control Slide Assembly (RC170A only)
52A		Inclined (raised) Portion of Arm Control Slide (part of 52)
52B		Safety Arm (part of 52)
52C		Stud (part of 52)
53	405A58	Relief Spring
54	G400A152	Set Down Arm Assembly
54A		Stud (part of 54)
54B		Set Down Lever (part of 54)
55	405A56	Set Down Spring
56	405A44	Lock Spring
57	405A44	Lock Spring
58	405A22	Spring Washer
59	405A78	Hairpin Spring
60	1A80-5	Mounting Screws
61	405A68	Trip Spring
62	405A75	Trip Lever Spring
63	401A153-1	Trip Lever (includes shoulder rivet #64)
64	402A97	Shoulder Rivet (See Note A)
65		Cam Stop Stud (part of 66)
66	G400A163	Main Cam
67	85-375-C2-39	Main Cam Screw #8-32x3/8" B.H.M.S.
68	415A9	Roller
69	405A79	Push Off Arm Spring
70	415A9	Roller
71	G400A154-1	Push Off Arm (includes 2 shoulder rivets, #72)
72	402A97	Shoulder Rivet
73	405A78	Hairpin Spring
74	405A54	Change Link Spring
75	401A159	Size Change Link
76	405A60	Slide Spring
77	88A8-1	Motor Plug (male)
78	G400A196	Rubber Mounting Grommet and 401A106 fastener (for 407B3-2 and 407B4-2 motor) (3 required)
	G400A203	Rubber Mounting Grommet, spacer, and fastener (for 407B1-2 motor)
79	G400A186-1	Head Assembly (includes 79A to 79G; does not include #80, 82 or 83)
79A		Push Plate (Part of 79)
79B		Record Support Plate (Part of 79)
79C		Knob Support (Part of 79)
79D		Push Off Lever (Part of 79)
79E	405A69	Size Change Lever Spring (Part of 79)
79F		Push Off Link (See Note B (Part of 79)
79G	405A57	Size Change Spring (Part of 79)
80	405A74	Spacer Spring
82	405A73	Record Clip Spring
83	G400A190	Record Clip (does not include #405A73, 405A74 springs or 406A16 rubber bumpers)
84	406A16	Rubber Bumpers for Record Clip
85	62-375-C2-39	Screw #6-32x3/8" Fil. H.M.S. (3 required)
86	62-375-C2-39	Screw #6-32x3/8" Fil. H.M.S. (3 required)
87	G400A146-1	Center Post Bracket Assembly (includes 1-#405A-62 speed nut)
88	405A62	Speed Nut for Fastening Center Post
89		See Radio Service Manual for Proper Cable and Part Number
90	98A19	Plug, 3 contact
	88A8-5	Plug, 4 contact
92	G400A197	Mounting Screw (for mounting bottom cover to pan)
93	19A10-3	Mounting Spring (for mounting bottom cover to pan)
94	403C14	Record Support Housing Plastic (does not include #95)
95	403B15	Housing Slide, Plastic
96	403A20	Size Change Knob (2 required)
97	402A81	Knob Spacer
98	443-312-C2-34	Screw (size change knob) #4-40x5/16" Philips
99	403A24	Trim
100	G400A143	Bottom Cover (consoles only)
100A	413A7	Grommet (1") for bottom cover
101	27A24	Bushing in Bottom Cover (consoles only; 4 required)
102	2A10-10-59	Speed Nut for Bushing (consoles only) (4 required)
103	††G400A201	Lift Plate and Rod (See Note ††)
104	††401A162	Arm Support Bracket (See Note ††)
105	††G400A200	Arm Pivot Assembly (See Note ††)
106	††402A104	Lift Adjusting Screw, #6-32x3/8" cap screw (See Note ††)
107	††405A81	Lock Spring (See Note ††)
108	††414A18	Pickup Arm Pivot (See Note ††)
109	405A27	Washer, spring

*407B3-2 and 407B4-2 are the same as #40783 and 407B4 respectively except that 3 #401A106 fasteners are included.

**407B1-2 is the same as #407B1 except that three spacer washers and three #401A106 fasteners are included.

† Parts marked † are used in the RC170 only. See Figure 3. See Ref. numbers 103, 104, 105, 106, 107, 108 for RC170A parts.

†† Parts marked †† are used in the RC170A only. See Figure 4. See Ref. numbers 12, 14, 15, 16, 17, 19 for RC170 parts.

NOTE A: The rivet (64) has been replaced on the late RC170 and all of the RC170A by a stud the same as spring stud #32. A spring washer (41) and a hairpin spring (40) is used to hold the trip lever (63) in place. The trip lever (63) remains the same in either case.

NOTE B: Three different type push off links (79F) have been used. The one shown in figure 7 is the latest but is now installed with its offset to the rear of the changer. In other words it is turned over on its axis 180°. This latest type can be used on all earlier changers.

NOTE C: The model RC170 uses two different type spacers (50). However, 402A85-1 can be used to replace either type. In re-assembling be sure that the spacer with the cut down section is used near the spring mounting bushing (front).

If the setting of the head assembly does not give proper push-off for both 10-inch and 12-inch records, vary the spacing slightly and re-check.

It should be noted that the records do not rest on the record support plate (79B) during normal playing of the changer; but rest on top of the push off plate (79A). During record change the push off moves back and allows the records to drop to the record support plate (79B). The push off plate now moves forward pushing the bottom record off. The remaining records are being supported by the push off plate itself. This is done to reduce any tendency for two records to drop to the turntable at the same time.

SERVICE AND REPAIR

CAUTION

See that the rubber tires on both the drive wheel (28) and the idler wheel (35) are kept clean and free from oil, grease, dirt, or any foreign material. Carbona or carbon tetrachloride may be used for cleaning these parts.

11. REMOVING PLASTIC HOUSING FROM HEAD ASSEMBLY (See Figures 1 and 7)

The housing (94) of the head assembly can be taken off by removing the two size change knobs (96) and the three screws (86). With the record clip (83) in the down position, the housing can be lifted from the assembly. The housing slide (95) will drop out as the housing is removed.

12. REPLACING A PICKUP ARM BASE (See Figures 3, 4 and 7)

When installing a pick-up arm base (20) and before tightening the two screws (51), exert pressure on the base towards the front of the changer and at the same time rotate it in a clockwise (bottom view) direction. Tighten the screws while holding the base in this position. If this is not done properly, the arm control slide (52) may bind between the two slide spacers (50).

After replacing the pickup arm base, re-set the pickup arm support assembly as in paragraph 7A.

13. REPLACING SIZE CHANGE SPRING (See Figure 5)

Whenever it is necessary to remove or replace the size change spring (79G) care must be taken to re-install it in its proper position. See Figure 5 for its mounting position.

14. REPLACING HEAD ASSEMBLY

Remove the assembly housing as explained in No. 11. Release the push-off link (79F) from the push-off arm (71) by removing the hairpin clip (73) and washer. Remove three screws and washers (85) and the assembly is free from the pan.

When re-installing the head assembly, replace the three screws and washers but do not tighten them. Reconnect the push-off link and arm. Adjust the head assembly as explained in paragraph 10.

15. REMOVING TURNTABLE AND BEARING ASSEMBLY

To remove the turntable it is only necessary to grasp the table by its edges and lift up. **Before replacing the turntable, make sure that the recessed part of the drive wheel (28) is towards the centerpost. If necessary, turn drive wheel counter clockwise about a turn so it locks in this position.** The pickup arm should be positioned away from the turntable to avoid the possibility of accidentally tripping the changer mechanism. In replacing the turntable **force is not needed** to seat it. Make sure, however, that the drive wheel of the motor has been pushed in towards the centerpost and that the wheel is making contact with the inner side of the turntable flange. In some cases it may be found that the two cork washers, after considerable use, are compressed so the turntable will rub. To build the stack up, an extra cork washer should be used. This third cork washer may be placed at the top or bottom of the stack.

The washers (22) and thrust bearing assembly (23) are removed by sliding them off of the centerpost. In replacing, have them in the order shown in Figure 8.

16. REMOVING BOTTOM COVER (100)

To remove the bottom cover (100) from the record changer, remove the two rear screws (92) through the bottom. Then press on the front edge of the bottom cover; this frees the changer from the slotted mounting brackets at the front of the bottom cover. To replace bottom cover, reverse above operations.

The changer must float on the springs (93) to prevent microphonic feedback, thus the springs (93) must be re-installed properly. The wider end fits around and hugs the extrusion in the mounting brackets in the bottom cover. The narrow end of the spring fits over the threaded bushing on the changer pan (24). In some changers it has been necessary to add spacer washers beneath the narrow portion of the spring (93) to assure "free floating" of the changer.

17. MOUNTING 407B1 MOTOR TO CHANGER

The model 407B1 motor may be used with this record changer but it is necessary that a fibre or felt washer be used as a spacer between the motor mounting grommet and the changer pan. The No. 401A106 shakeproof motor fastener can be used to then mount the motor.

18. CARTRIDGE (See Figure 6)

The new Admiral pick-up cartridge uses an entirely new principle since it is not a crystal, magnetic, or capacitive device. The pick-up element is made of special rubber which is a high resistance electrical conductor (R-1 & R-2). The resistance varies as the length of the rubber is changed. A Monel metal needle, osmium tipped, is clamped to the center of the resistive rubber as shown at B. As the needle moves back and forth in the record groove, it alternately lengthens the rubber on one side and shortens the rubber on the other side.

A DC voltage is applied at A. The voltage drop from B to C varies as the resistance changes due to the "back and forth" movement of the needle. The varying voltage drop is in reality an alternating voltage of audio frequency. This voltage is applied through the coupling condenser (Cc) to the grid (G) of the audio amplifier tube.

Trouble Shooting: If you suspect the cartridge or needle and have a replacement cartridge available, the quickest test is to try the other cartridge. This is very simple since the Admiral cartridge plugs in. Remove

the old cartridge as described on page 1 and plug in the replacement cartridge. If replacing cartridge does not correct the trouble or if no replacement is available, proceed as follows:

1. Make sure radio operates satisfactorily on radio stations.
2. Turn switch to Phono and turn volume control up high. Touch the needle with finger. If a loud hum is heard, circuit from B to G is not open or shorted. If hum is not heard, check circuit from B to G.
3. If hum is heard, check voltage across outer terminals on bottom of cartridge. Generally it should measure from 80 to 100 volts DC. See circuit diagram for individual chassis. If voltage is correct, cartridge should be replaced.
4. If voltage is not correct, check circuit for fault. In case of distortion, check coupling condensers.
5. If the needle is bent, it can be straightened by bending it down so that it projects $\frac{1}{16}$" from cartridge. It should then be pressed back several times with a flat object.

Do not attempt to repair cartridges or remove the cap on the cartridge assembly as this will void the warranty.

19. LUBRICATION

Under normal operating conditions, the motor should never require oiling. The rest of the changer, however, should be lubricated with grease whenever it comes into the shop for repairs or adjustment. A good grade automobile chassis grease may be used for this purpose.

The oilite bearings, used in the turntable hub and pick-up arm base, may be lubricated with SAE No. 20 motor oil.

Care should be taken to prevent any of the lubricant from coming into contact with the drive or idler wheel tires. Also be careful, when using oil, that an excess does not seep into the felt of the turntable.

Use grease sparingly on stud (64) of trip lever (63); excessive lubricant may cause suction binding and subsequent failure of the trip mechanism.

20. REPLACEMENT PARTS

In some cases replacement parts from the factory may be a different type than those being replaced. These parts will be of a later production but may be used as replacement parts. In cases where rivets or adapting parts are needed, they will be included with the replacement part.

Note that when replacements involve loosening or removing set screws (18) in assemblies (17) or (105), it will be necessary to re-set the assembly as described in paragraph 7A.

OPERATING AND SERVICE INSTRUCTIONS FOR
RECORD CHANGER
MODEL 46-A

General Specifications

MOTOR VOLTAGE—115 Volts—60-cycles A.C. **(DO NOT USE D.C.)**

MAXIMUM NUMBER OF RECORDS PLAYED AUTOMATICALLY:
Fourteen (14) 10" records
Twelve (12) 12" records

TURNTABLE SPEED - - - 78 to 80 R.P.M.

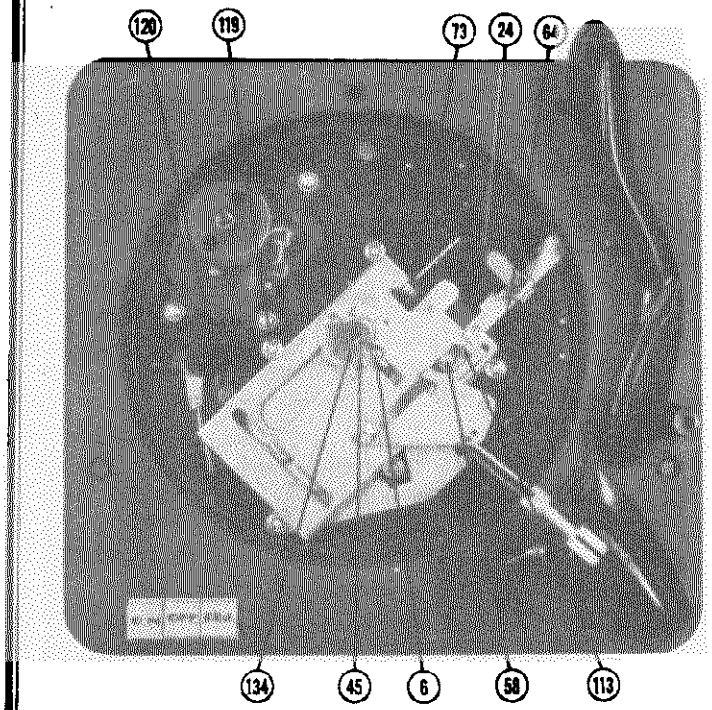


FIGURE I

CAUTION

Twelve only 12" or fourteen 10" records may be played, DO NOT INTERMIX 12" and 10" records.

DO NOT CHANGE CAP playing position unless Changer is out of cycle.

DO NOT USE FORCE at any time to either start or stop the Changer mechanism.

DO NOT LEAVE RECORDS ON SUPPORTS when Changer is not in use as this will cause the records to warp and hinder the efficiency of the Changer.

For more enjoyable listening and operating performance, always keep records in albums.

The last record in the stack will keep repeating until the Changer is stopped.

DO NOT OPERATE the Changer on **D.C. Current.**

Make certain that the center post slide cap is down before loading.

If a record does not have the eccentric inside groove, it will be necessary to use the REJECT PUSH BUTTON to play the next record.

With normal use, the needle should not require replacement. **DO NOT DROP** the needle or damage its precision point. DO NOT REMOVE and then replace the same needle. Make certain that the needle is securely held in cartridge case.

LOADING

The plastic cap can be moved either forward or backward, from the 10-inch to 12-inch position, or from the 12-inch to the 10-inch position.

The records are placed over the center post, resting on the ledge in the center and on the cap ledge on the outside edge.

Snap pressure clamp down on top record stack.

To place Changer in either 10" or 12" playing position, use the following procedures:
For 10" playing position, lift up the cap at an angle and push the cap forward until the maximum forward motion is reached, then release cap to allow it to fall into place. The Changer is now ready to play 10" records.
For 12" playing position, lift up the cap at an angle and pull backwards until the maximum backward position is reached, then release cap to allow it to fall into place. The Changer is now ready to play 12" records.

NOTE: The 10" cap position is always in the maximum FORWARD position, and the 12" cap position is always in the maximum BACKWARD position.

AERO-METAL PRODUCTS

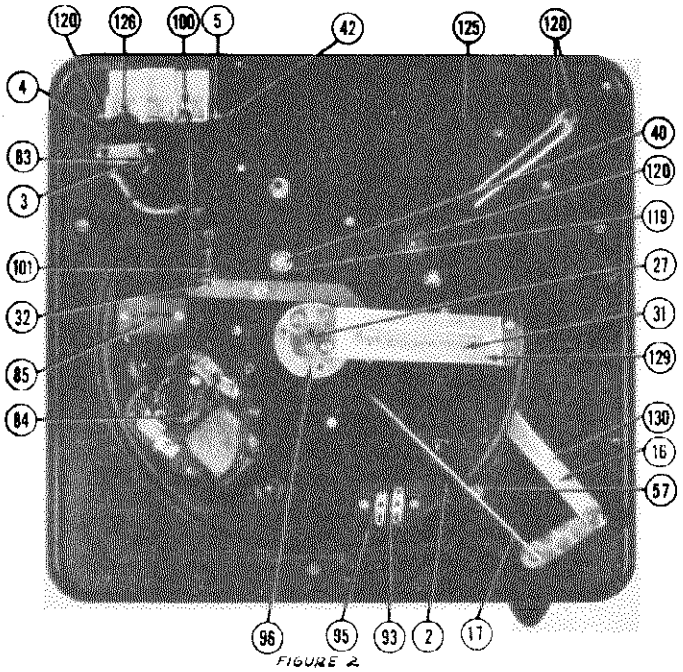


FIGURE 2

STARTING

Press down on the push button marked "ON." After the turntable has attained speed, press down on the push button marked "REJ." Hold finger pressure for a few seconds and then release.

The bottom record will fall on the turntable and the Changer will automatically play through the entire stack of records.

REJECTING

Press down on the push button marked "REJ." Hold finger pressure for a few seconds and release. A record may be rejected at any time during playing by this simple operation.

UNLOADING

Press down on the push button marked "OFF." Set the tone arm on the tone arm rest post. Set the record pressure clamp in an upright position. The played records may now be easily removed by lifting the entire stack of records upward and in a horizontal plane.

OPERATING CYCLE

1—Records are placed on offset portion of center post. Tone arm plays through the first record and follows on to the eccentric groove. When needle feeds into a position of $1\frac{5}{16}$ inches away from center post, the trip which is attached to tone arm link (16) engages and moves pawl lever (23). Clutch arm which is attached to pinion gear is now released thus engaging turntable clutch. Changing mechanism is now powered.

2—Lift lever roller (73) travels over lift lever (17) raising tone arm off record.

3—End of elongated slot in main slide (21) engages stud (58) on tone arm link (16). The backward motion causes the tone arm to swing clear, allowing record to drop.

4—Push-off stud (68) on slide plate (10) engages push-off arm (10) which in turn retards record cap (89). Record drops from upper shelf to lower shelf. At this point the slide reverses its motion.

5—Stud (68) on slide plate (10) reverses its motion thereby causing record cap to advance. This action pushes the record forward, allowing it to drop off spindle shelf.

6—Spring on return slide (113) engages stud (58) on tone arm link (16). It then moves forward until the stud engages position stop (8) in either 10" or 12" position.

7—Tone arm is now in set down position and is allowed to rest on record when lift lever roller (73) is disengaged from lift lever (17).

8—Tone arm is now resting on record and remains locked for the next half turn.

9—Roller (70) on bottom of large gear (18) pushes position stop (8) until it is clear of stud (58) on tone arm link (16).

10—Pawl lever (23) engages clutch arm thus cutting off power for changing mechanism. Changer will now proceed through playing cycle.

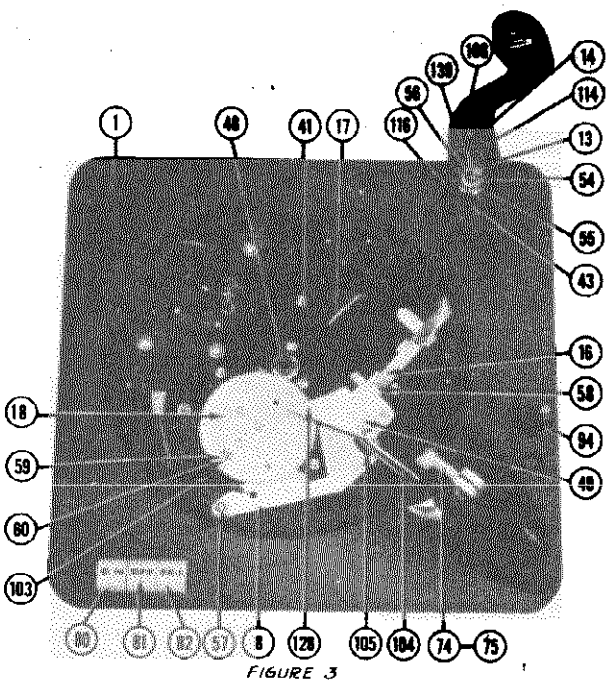


FIGURE 3

OPERATION OF PUSH-OFF HEAD

When record cap (89) is in 12" position the push-off lever (9) is in the forward hole. The 12"-10" lever (11) is free. When record cap (89) is in 10" position the push-off lever (9) is in the rear hole and the 12"-10" lever (11) is pushed forward. This in turn pulls

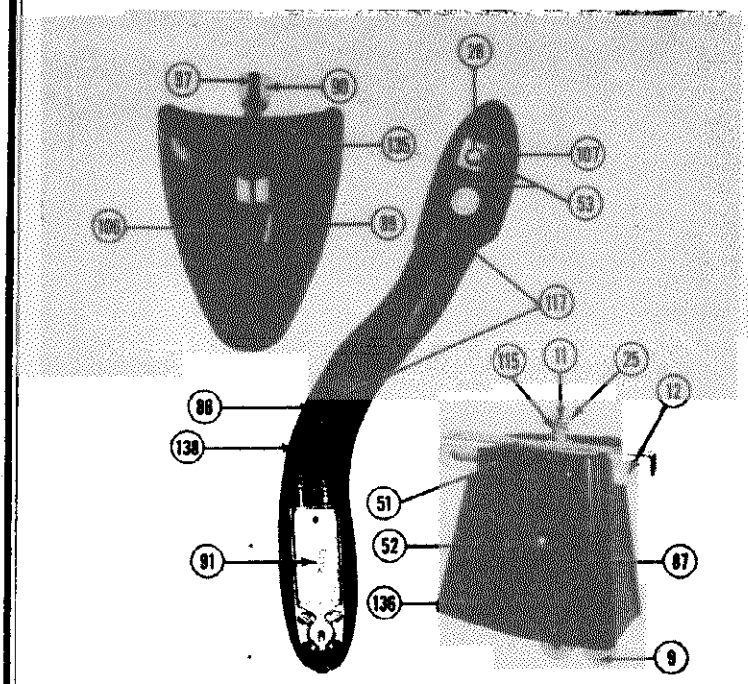


Figure 4

the position stop (8) into the 10" position through the action of the connecting link (16).

OPERATION OF REJECT LEVER

When reject button (82) is pushed down it moves reject arm (32) through the action of connecting link (100). The reject arm (32) engages tab on bottom of pawl lever ((23) thereby engaging the clutch.

TONE ARM ADJUSTMENT

(Vertical)

Tighten screw (77) clockwise to raise tone arm. Counter-clockwise to lower.

(Horizontal)

Operate mechanism by hand, through change cycle, until tone arm rests on turntable. For slight adjustment—turn screw in hole in rear of tone arm clockwise for outward adjustment, counter-clockwise for inward adjustment. For greater adjustment turn hexagon head screw. Place in proper position for set down and tighten screw.

ADJUSTMENT OF PUSH-OFF HEAD

Be sure center post (45) has not been bent. It should be at right angles to turntable before proceeding with adjustment. To adjust, loosen three screws holding base (87) to base plate (11). Place 10" record on center post (45) so that it rests on shoulder of record cap (89). Be sure the hole in record is directly on top of center post (45). With edge of record resting on top shelf, move base (87) back or forward until edge of record has 1/32" clearance from back edge of top step. When proper adjustment is made tighten screws in base (87), being certain position is not changed.

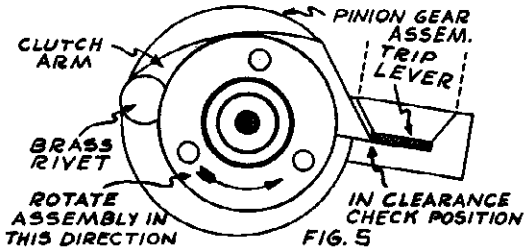


FIG. 5

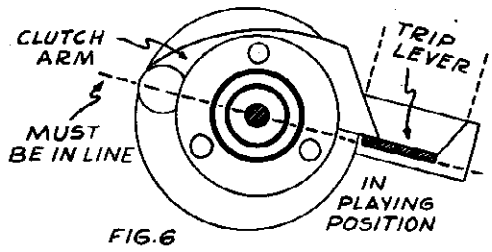


FIG. 6

TIMING OF GEARS AND CLUTCH ADJUSTMENT TO ADJUST REMOVE TURNTABLE

1—Normal position of large gear, while in playing cycle should be with roller (60) centered in slot at end of slide plate (21). In this position the gear will snap into the index position. (As shown in Figure 1), and clutch will be disengaged.

2—The small pinion gear is indexed correctly when the turntable shaft and clutch assembly is rotated in a counter clockwise direction, with clutch engaged. The end of the clutch arm will be in line with the edge of the trip lever as shown in Figure 5.

3—If pinion gear has been removed from changer proceed as follows. Place large gear in index position. Insert pinion gear with brass rivet opposite trip lever as shown in Figure 6. Clutch arm will be resting on trip lever. If properly timed you will be able to spin turntable and clutch assembly freely. If motion is not free remove assembly and rotate pinion gear one tooth (clockwise direction).

4—For a finer adjustment bend end of trip lever forward or backward. Clutch arm should have smallest clearance possible between turntable and clutch assembly.

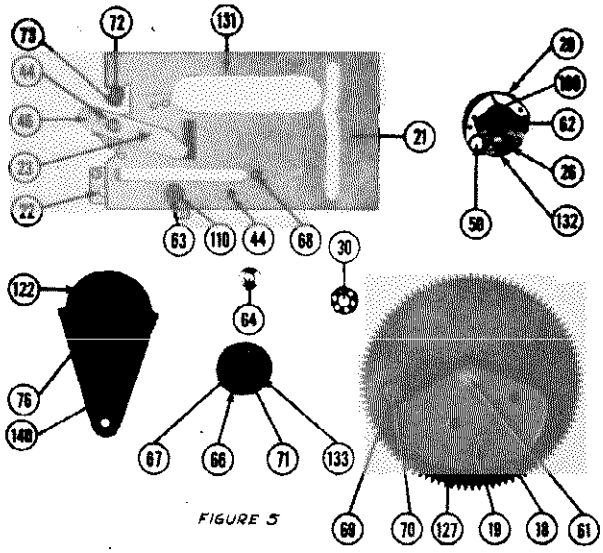


FIGURE 5

AERO-METAL PRODUCTS

IF CHANGER FAILS TO REJECT OR PUSH RECORD PROPERLY

1—Be sure tone arm shaft has .005 to .010 end play.

2—Be certain trip lever is properly adjusted on tone arm link (16). Move trip lever forward or backward and tighten locking screws.

3—See that there is no excess play in tone arm linkage.

Also be sure needle is fastened securely in cartridge and cartridge is fastened securely to tone arm.

If tone arm sets down in 12" position regardless of cap setting, shorten 10"-12" link (105) by bending.

If tone arm has erratic motion when setting down check to determine if tone arm bracket is free from index washer (33) and that it returns to normal position without end play. If this condition exists free bracket from tone arm lever (34). USE FINE OIL and adjust spring to take out side play.

TO PREVENT BINDING OF CHANGER

Remove turntable by removing three screws on top. Revolve turntable hub and clutch by hand. If binding occurs look for bent parts or heavy burrs. If burrs are found remove them with a smooth file. Be certain stud (58) has 1/32" to 1/16" clearance from push-off arm (10).

If it does not have this clearance bend backward to obtain correct dimension. Be sure the four rollers (64) are free.

LUBRICATION

Use fine oil sparingly on rollers and other moving parts.

Use light cup grease on bottom of turn table thrust bearing. Remove excess grease from large gear (on cam side).

DO NOT UNDER ANY CIRCUMSTANCES OIL MOTOR. Keep turntable and idler wheels free from oil. If oil should get on any of these parts be sure to remove it.

The turntable bearing and center shaft hub are self-lubricating and therefore require no oil.

Grounded side of pick up cartridge is terminal nearest the tone arm.

A.C. connections (85) will fit Allen-502 or EBY-624 plug or equivalent.

PARTS LIST

INDEX NO.	DESCRIPTION	PART NO.
1	Base	1200
2	Lift Pivot Bracket	1201
3	Switch Mounting Bracket	1202
4	Switch Lever	1203
5	Push Button Bracket	1204
6	Center Post Cap	1205
8	Position Stop	1207
9	Push Off Lever	1208
10	Push Off Arm	1209
11	12"-10" Lever	1210
12	Push Off Channel	1211
13	Tone Arm Adjusting Plate	1212
14	Tone Arm Mounting Bracket	1213
15	Tone Arm Lever	1214
16	Tone Arm Link	1215
17	Lift Lever	1216
18	100-tooth Gear	1217
19	Cam Plate	1218
20	Clutch Arm	1219
21	Main Slide	1220
22	Return Slide	1221
23	Pawl Lever	1222
24	Trip	1238
25	Washer Push-off Arms	1224
26	Gear Cam	1225
27	Center Post Support Plate	1226
28	Square Washer Pickup	1227
29	A.C. Cover and Insulator	1228
30	Ball Bearing Retainer	1229
31	Bearing Bracket	1230
	Base Skirt Side	1231
	Base Skirt Corner	1232
	Base Skirt Bracket	1233
32	Reject Arm	1234
33	Index Washer	1235
34	Tone Arm Lever	1236
40	Hub Push-Off	2200
41	Roller Stud	2201
42	Push Button Shaft	2202
43	Tone Arm Bearing	2203
44	Shoulder Rivets	2204
45	Center Post	2205
46	Shoulder Rivet	2207
47	Center Post Shaft	2208
48	Oilite Bearing—T. T.	2209
49	Push Off Plate Shaft	2210
50	Large Shoulder Rivet	2211
51	Push Off Slide Rod	2212

INDEX NO.	DESCRIPTION	PART NO.
52	Push Off Lever Rod	2213
53	Pick Up Pivot Stud	2215
54	Lift Rod	2216
55	Tone Arm Shaft	2217
56	Tone Arm Shaft Hub	2218
57	Tone Arm Shoulder Bushing	2219
58	Tone Arm Link Stud	2220
59	Gear Stud Bearing—Upper	2221
60	Gear Roller—Upper	2222
61	Gear Shaft	2223
62	Pinion Gear	2224
63	Shoulder Rivet—Large	2226
64	Roller	2227
65	Spacer	2228
66	Turntable Hub	2229
67	Oilite Bearing—C. S.	2230
68	Push Off Stud	2231
69	Gear Stud Bearing—Lower	2232
70	Gear Roller—Lower	2233
71	Turntable Shaft	2235
72	Stud Lift Roller	2236
73	Lift Lever Roller	2237
74	Wheel Shaft	2239
75	Wheel Bushing	2240
	Contact Pins	2241-A
76	Bushing—Tone Arm	
77	Screw-Height Adj. (Gulmite Head)	
80	Push Button—On	3200
81	Push Button—Off	3201
82	Push Button—Reject	3202
83	Slide Switch	3203
84	Motor	3204
85	A. C. Plug	3205
	Lead Wire Set—A. C.	3206
86	⅛" Ball Bearing	3207
87	Record Post	3208
88	Tone Arm	3209
89	Cap Record	3210
90	Clamp	3211
91	Cartridge and Clips	3212
	Needle	3213
93	Tone Arm Terminal	3214
	Shielded Cable	3215
94	Tone Arm Rest	3216
95	Instrument Panel Spacer	3217
96	Turntable Main Bearing	3218
97	Rubber Wheel	3219
	Rubber Grommets	3220

INDEX NO.	DESCRIPTION	PART NO.
	Turntable (only)	3224
100	Link—Reject	4201
101	Reject Spring	4202
102	Pawl Spring	4203
103	10"-12" Position Spring	4204
104	Push Off Link	4205
105	10"-12" Link	4206
106	Record Clamp Spring	4207
107	Tone Arm Mounting Spring	4208
108	Tone Arm Height Spring	4209
109	Clutch Spring	4210
110	Slide Spring	4211
	Mounting Spring	4213
113	Lead-in Spring	4214
114	Tone Arm Adjusting Screw Spring	4215
115	Channel Spring	4216
116	Spring Washer	4217
117	Lead Clip Spring	4218
118	¼" Spring Clip	4219
119	3/16" Spring Clip	4220
120	⅛" Spring Clip	4221
	Center Post Retainer Spring	4222
121	Spring—Push Down	4223
122	Index—Tone Arm Spring	

Parts Listed Below are Sub-Assemblies

125	Base Spotweld Assembly	9201
126	Switch Mounting Assembly	9202
127	Drive Gear Assembly	9203
128	Push Off Lever Assembly	9204
129	Turntable Bearing Assembly	9205
130	Tone Arm Link Assembly	9206
131	Main Slide Assembly	9207
132	Pinion Gear and Cam Assembly	9210
133	Turntable Shaft and Clutch Assembly	9212
134	Center Post Assembly	9213
135	Record Post and Cap Assembly	9214
136	Record Post Assembly	9215
137	Tone Arm Shaft Assembly	9217
138	Tone Arm Assembly Complete	9218
139	Tone Arm Mounting Assembly	9219
140	Tone Arm Shaft Assembly—New	9226